

# Inspiron 15 7510

## 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.

<b>Chapter 1: Working inside your computer</b>	<b>6</b>
Before working inside your computer	6
Safety instructions	6
Electrostatic discharge—ESD protection	7
ESD field service kit	7
Transporting sensitive components	8
Entering Service Mode	8
Exiting Service Mode	9
After working inside your computer	9
<b>Chapter 2: Removing and installing components</b>	<b>10</b>
Recommended tools	10
Screw list	10
Major components of Inspiron 15 7510	11
Base cover	13
Removing the base cover	13
Installing the base cover	14
Battery	16
Lithium-ion battery precautions	16
Removing the battery	16
Installing the battery	17
Battery cable	18
Removing the battery cable	18
Installing the battery cable	19
Memory	20
Removing the memory module	20
Installing the memory module	21
Solid-state drive—M.2 slot one	23
Removing the 2230 solid-state drive from M.2 slot one	23
Installing the 2230 solid-state drive in M.2 slot one	24
Removing the 2280 solid-state drive from M.2 slot one	26
Installing the 2280 solid-state drive in M.2 slot one	27
Solid-state drive—M.2 slot two	28
Removing the 2230 solid-state drive from M.2 slot two	28
Installing the 2230 solid-state drive in M.2 slot two	29
Wireless card	30
Removing the wireless card	30
Installing the wireless card	31
GPU fan	32
Removing the GPU fan	32
Installing the GPU fan	33
System fan	34
Removing the system fan	34
Installing the system fan	34

Heat sink.....	35
Removing the heat sink.....	35
Installing the heat sink.....	36
I/O board.....	37
Removing the I/O board.....	37
Installing the I/O board.....	38
Speakers.....	39
Removing the speakers.....	39
Installing the speakers.....	40
Touchpad.....	41
Removing the touchpad.....	41
Installing the touchpad.....	42
Display assembly.....	44
Removing the display assembly.....	44
Installing the display assembly .....	46
Power-button board.....	48
Removing the power-button board .....	48
Installing the power-button board.....	49
Power button with optional fingerprint reader.....	49
Removing the power-button with optional fingerprint reader.....	49
Installing the power-button with optional fingerprint reader.....	50
Power button with fingerprint reader.....	51
Removing the power button with fingerprint reader.....	51
Installing the power button with fingerprint reader.....	52
Power-adapter port.....	53
Removing the power-adapter port.....	53
Installing the power-adapter port.....	54
System board.....	55
Removing the system board.....	55
Installing the system board.....	58
Palm-rest and keyboard assembly.....	60
Removing the palm-rest and keyboard assembly.....	60
Installing the palm-rest and keyboard assembly.....	61
<b>Chapter 3: Drivers and downloads.....</b>	<b>63</b>
<b>Chapter 4: System setup.....</b>	<b>64</b>
Entering BIOS setup program.....	64
Navigation keys.....	64
Boot Sequence.....	64
One time boot menu.....	65
System setup options.....	65
System and setup password.....	74
Assigning a system setup password.....	74
Deleting or changing an existing system setup password.....	75
Clearing CMOS settings.....	75
Clearing BIOS (System Setup) and System passwords.....	75
Updating the BIOS.....	76
Updating the BIOS in Windows.....	76




Updating the BIOS using the USB drive in Windows.....	76
Updating the BIOS from the F12 One-Time boot menu.....	76
<b>Chapter 5: Troubleshooting.....</b>	<b>78</b>
Handling swollen Lithium-ion batteries.....	78
<b>Locate the Service Tag or Express Service Code of your Dell computer .....</b>	<b>78</b>
System-diagnostic lights.....	79
SupportAssist diagnostics.....	80
Backup media and recovery options.....	80
Built-in self-test (BIST).....	80
M-BIST.....	80
LCD Built-in Self Test (BIST).....	81
Recovering the operating system.....	81
WiFi power cycle.....	81
Drain residual flea power (perform hard reset).....	82
Real Time Clock—RTC reset.....	82
<b>Chapter 6: Getting help and contacting Dell.....</b>	<b>84</b>




# Working inside your computer

## Before working inside your computer

### About this task


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


### Steps

1. Save and close all open files and exit all open applications.
2. Shut down your computer. Click **Start** >  **Power** > **Shut down**.  
 **NOTE:** If you are using a different operating system, see the documentation of your operating system for shut-down instructions.
3. Disconnect your computer and all attached devices from their electrical outlets.
4. Disconnect all attached network devices and peripherals, such as keyboard, mouse, and monitor from your computer.  
 **CAUTION:** To disconnect a network cable, first unplug the cable from your computer and then unplug the cable from the network device.
5. Remove any media card and optical disc from your computer, if applicable.


## Safety instructions


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


 **WARNING:** Before working inside your computer, read the safety information that is shipped with your computer. For more safety best practices, see the Regulatory Compliance home page at [www.dell.com/regulatory\\_compliance](http://www.dell.com/regulatory_compliance).


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

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

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

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

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

 **CAUTION:** When you disconnect a cable, pull it by its connector or its pull tab, not the cable itself. Some cables have connectors with locking tabs or thumbscrews that you must disengage before disconnecting the cable.

**When disconnecting cables, keep them evenly aligned to avoid bending the connector pins. When connecting cables, ensure that the ports and the connectors are correctly oriented and aligned.**

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

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

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

## Electrostatic discharge—ESD protection

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

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

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

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

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

Perform the following steps to prevent ESD damage:

- Use a wired ESD wrist strap that is properly grounded. The use of wireless anti-static straps is no longer allowed; they do not provide adequate protection. Touching the chassis before handling parts does not ensure adequate ESD protection on parts with increased sensitivity to ESD damage.
- Handle all static-sensitive components in a static-safe area. If possible, use anti-static floor pads and workbench pads.
- When unpacking a static-sensitive component from its shipping carton, do not remove the component from the anti-static packing material until you are ready to install the component. Before unwrapping the anti-static packaging, ensure that you discharge static electricity from your body.
- Before transporting a static-sensitive component, place it in an anti-static container or packaging.

## ESD field service kit

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

### Components of an ESD field service kit

The components of an ESD field service kit are:

- **Anti-Static Mat** – The anti-static mat is dissipative and parts can be placed on it during service procedures. When using an anti-static mat, your wrist strap should be snug and the bonding wire should be connected to the mat and to any bare metal on the system being worked on. Once deployed properly, service parts can be removed from the ESD bag and placed directly on the mat. ESD-sensitive items are safe in your hand, on the ESD mat, in the system, or inside a bag.
- **Wrist Strap and Bonding Wire** – The wrist strap and bonding wire can be either directly connected between your wrist and bare metal on the hardware if the ESD mat is not required, or connected to the anti-static mat to protect hardware that is temporarily placed on the mat. The physical connection of the wrist strap and bonding wire between your skin, the ESD mat, and the hardware is known as bonding. Use only Field Service kits with a wrist strap, mat, and bonding wire. Never

use wireless wrist straps. Always be aware that the internal wires of a wrist strap are prone to damage from normal wear and tear, and must be checked regularly with a wrist strap tester in order to avoid accidental ESD hardware damage. It is recommended to test the wrist strap and bonding wire at least once per week.

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

## ESD protection summary

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

## Transporting sensitive components


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


## Entering Service Mode

**Service Mode** allows users to immediately cut off electricity from the computer and conduct repairs without disconnecting the battery cable from the system board.

To enter **Service Mode**:

1. Shut down your computer and disconnect the AC adapter.
2. Hold **<B>** key on the keyboard and press the power button for 3 seconds or until the Dell logo appears on the screen.
3. Press any key to continue.

 **NOTE:** If the power adapter has not been disconnected, a message prompting you to remove the AC adapter appears on the screen. Remove the AC adapter and then press any key to continue the **Service Mode** procedure.

 **NOTE:** The **Service Mode** procedure automatically skips the following step if the **Owner Tag** of the computer is not set up in advance by the manufacturer.

4. When the ready-to-proceed message appears on the screen, press any key to proceed. The computer emits three short beeps and shuts down immediately.

Once the computer shuts down, you may perform the replacement procedures without disconnecting the battery cable from the system board.

## Exiting Service Mode


**Service Mode** allows users to immediately cut off electricity from the computer and conduct repairs without disconnecting the battery cable from the system board.

To exit **Service Mode**:

1. Connect the AC adapter to the power-adapter port on your computer.
2. Press the power button to turn on the computer. Your computer will automatically return to normal functioning mode.

## 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.

## Recommended tools

The procedures in this document may require the following tools:

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









## Screw list

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












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

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

**Table 1. Screw list**

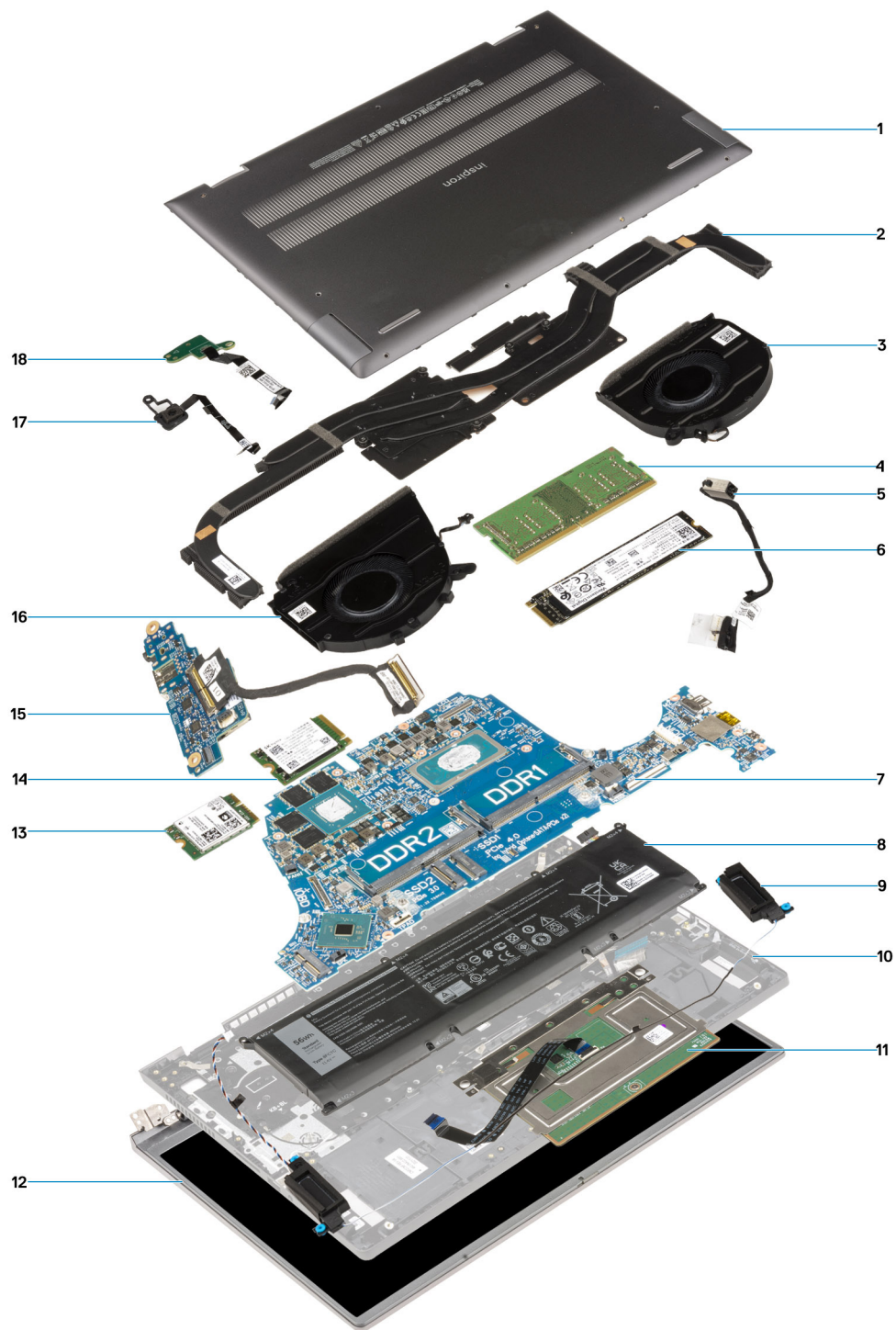
Component	Screw type	Quantity	Screw image
Base cover	M2x7.5 - captive screws	2	
Base cover	M2x4	7	
Battery	M2x3	5	
Wireless card	M2x4	1	
Solid-state drive - Slot 1	M2x4	1	
Solid-state drive - Slot 2	M2x4	1	
GPU fan	M2x4	2	
System fan	M2x4	2	
Heat sink	Captive screws	7	

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

Component	Screw type	Quantity	Screw image
System board	M2x2	2	
System board	M2x4	1	
USB Type-C bracket	M2x5	2	
Power button board	M2x4	1	
Power button with optional fingerprint reader	M2x4	1	
Power button with fingerprint reader	M2x4	1	
I/O board	M2x4	2	
Touchpad	M2x1.8	5	
Touchpad	M2x3	2	
Power-adaptor port	M2.5x5	2	
Display hinges	M2.5x5	4	

## Major components of Inspiron 15 7510

The following image shows the major components of Inspiron 15 7510.



1. Base cover
2. Heat sink
3. System fan
4. Memory module
5. Power-adaptor port
6. Solid-state drive
7. System board
8. Battery
9. Speaker
10. Palm-rest and keyboard assembly



11. Touchpad
12. Display assembly
13. Wireless card
14. Solid-state drive
15. I/O board
16. GPU fan
17. Power button with fingerprint reader
18. Power button

**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

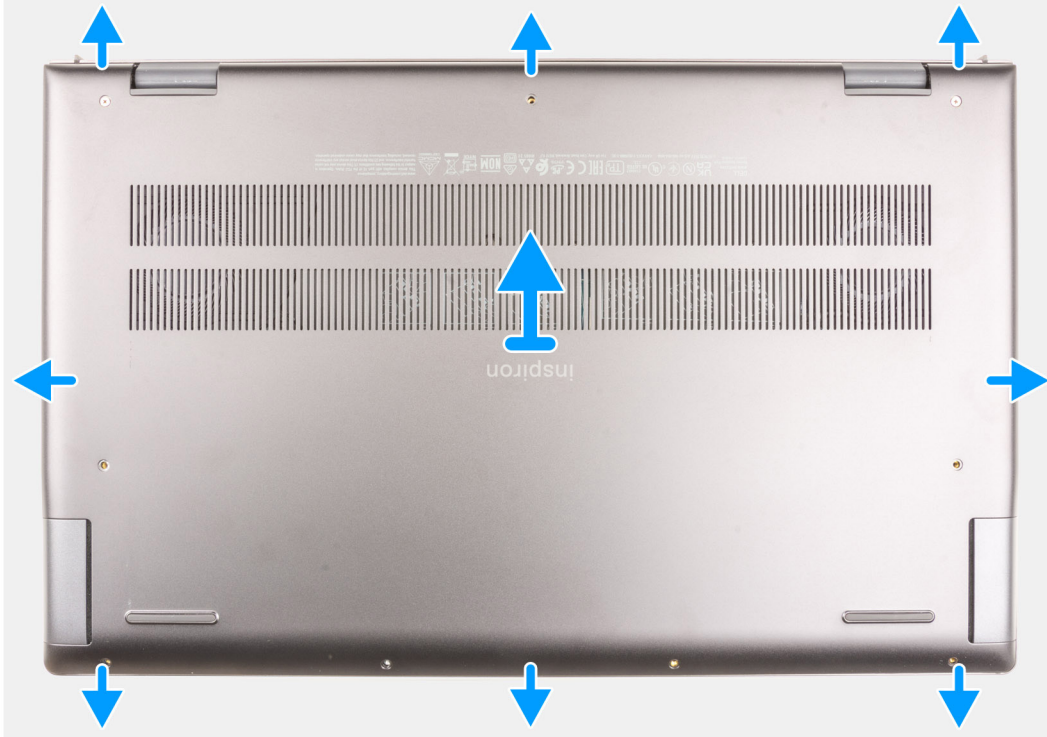
1. Follow the procedure in [Before working inside your computer](#).
2. Enter [Service Mode](#).

#### About this task

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



2



### Steps

1. Remove the seven (M2x4) screws that secure the base cover to the palm-rest and keyboard assembly.
2. Loosen the two (M2x7.5) captive screws that secure the base cover to the palm-rest and keyboard assembly.
3. Using a plastic scribe, pry the base cover from the U-shaped indents at the top edge of the base cover and continue to work on the sides to release the base cover from the palm-rest and keyboard assembly.
4. Lift the base cover off the palm-rest and keyboard assembly.

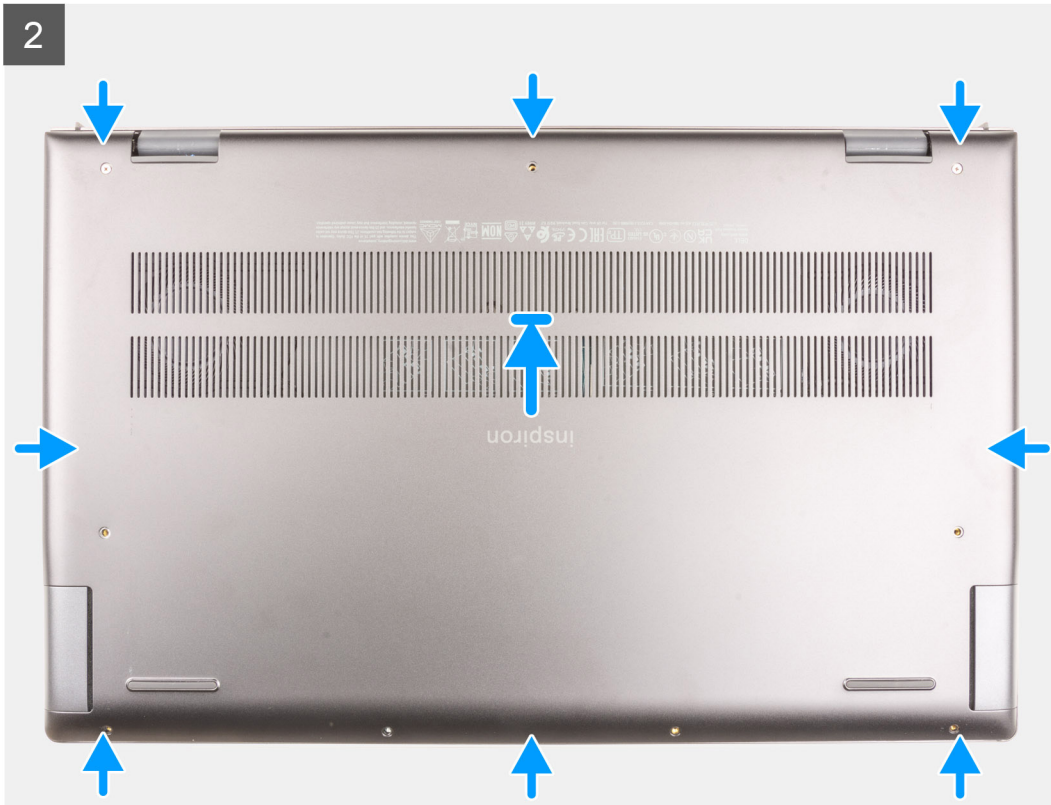
## Installing the base cover

### 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.



### Steps

1. Place the base cover on top of the palm-rest and keyboard assembly.
2. Align the screw holes on the base cover with the screw holes on the palm-rest and keyboard assembly, and then snap the base cover into place.
3. Tighten the two (M2x7.5) captive screws that secure the base cover to the palm-rest and keyboard assembly.
4. Replace the seven (M2x4) screws that secure the base cover to the palm-rest and keyboard assembly.

### Next steps

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

## Battery

### Lithium-ion battery precautions

#### CAUTION:


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

## Removing the battery

### Prerequisites

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

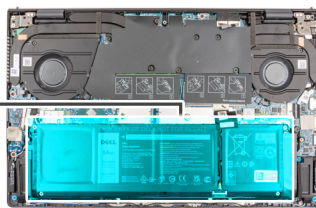
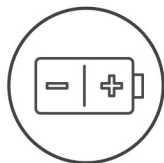
### About this task

 **NOTE:** Inspiron 15 7510 also supports 6-cell (86 Wh) battery.

The following image indicates the location of the 3-cell (56 Wh) battery and provides a visual representation of the removal procedure.



5x  
M2x3



## Steps

1. Disconnect the battery cable from the system board.
2. Remove the five (M2x3) screws that secure the 3-cell battery to the palm-rest and keyboard assembly.
3. Lift the 3-cell battery, along with its cable, 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

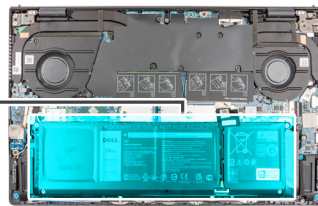
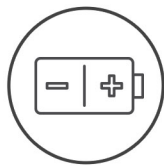
**NOTE:** Inspiron 15 7510 also supports 6-cell (86 Wh) battery.

The following image indicates the location of the 3-cell (56 Wh) battery and provides a visual representation of the installation procedure.





5x  
M2x3



## Steps

1. Using the alignment posts, place the 3-cell battery on the palm-rest and keyboard assembly.
2. Align the screw holes on the 3-cell battery with the screw holes on the palm-rest and keyboard assembly.
3. Replace the five (M2x3) screws that secure the 3-cell 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 on your computer](#).

# Battery cable

## Removing the battery cable

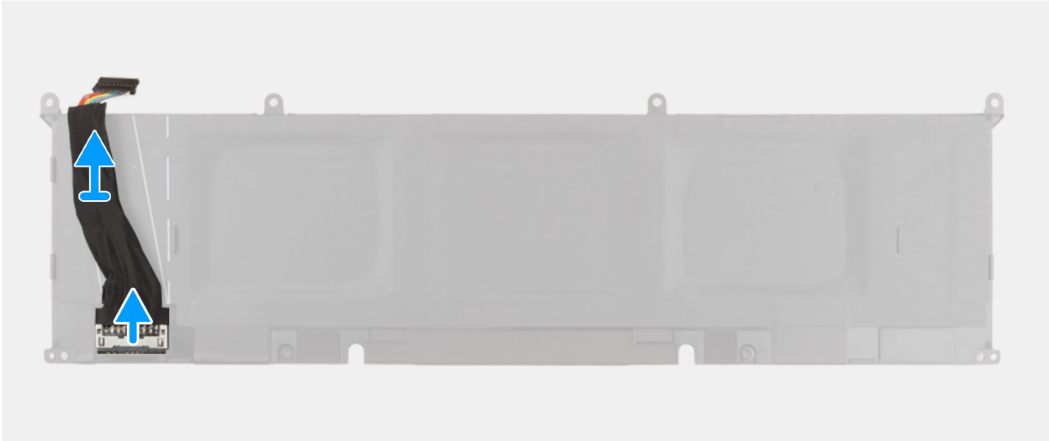
### Prerequisites

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

**NOTE:** If battery is disconnected from system board for service, then there is a delay during system boot as the system undergoes RTC battery reset.

### About this task

The following images indicate the location of the battery cable and provide a visual representation of the removal procedure.



### Steps

1. Flip the battery and remove the battery cable from the routing guides on the battery.
2. Disconnect the battery cable from the connector on the battery.
3. Lift the battery cable off the battery.

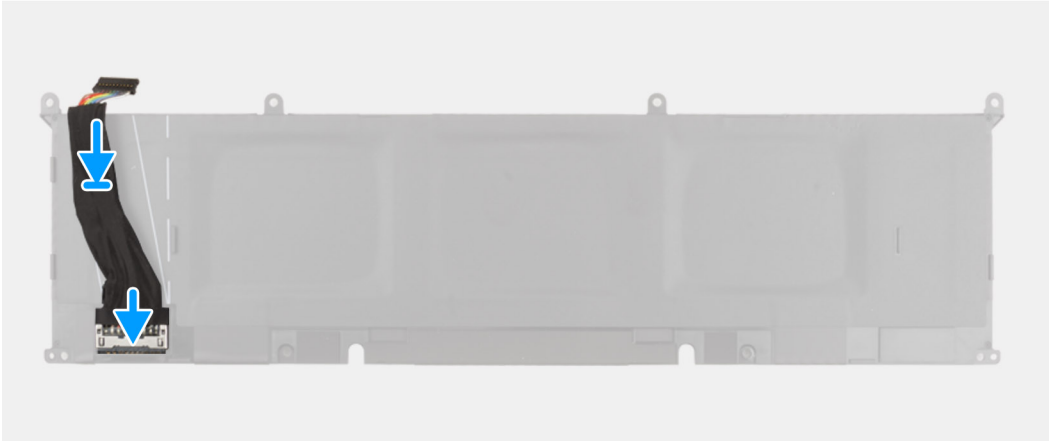
## Installing the battery cable

### Prerequisites

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

### About this task

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



### Steps

1. Align and place the battery cable on the battery.
2. Route the battery cable through the routing guides on the battery.
3. Connect the battery cable to the connector on the battery.

### Next steps

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


## Memory

### Removing the memory module

#### Prerequisites

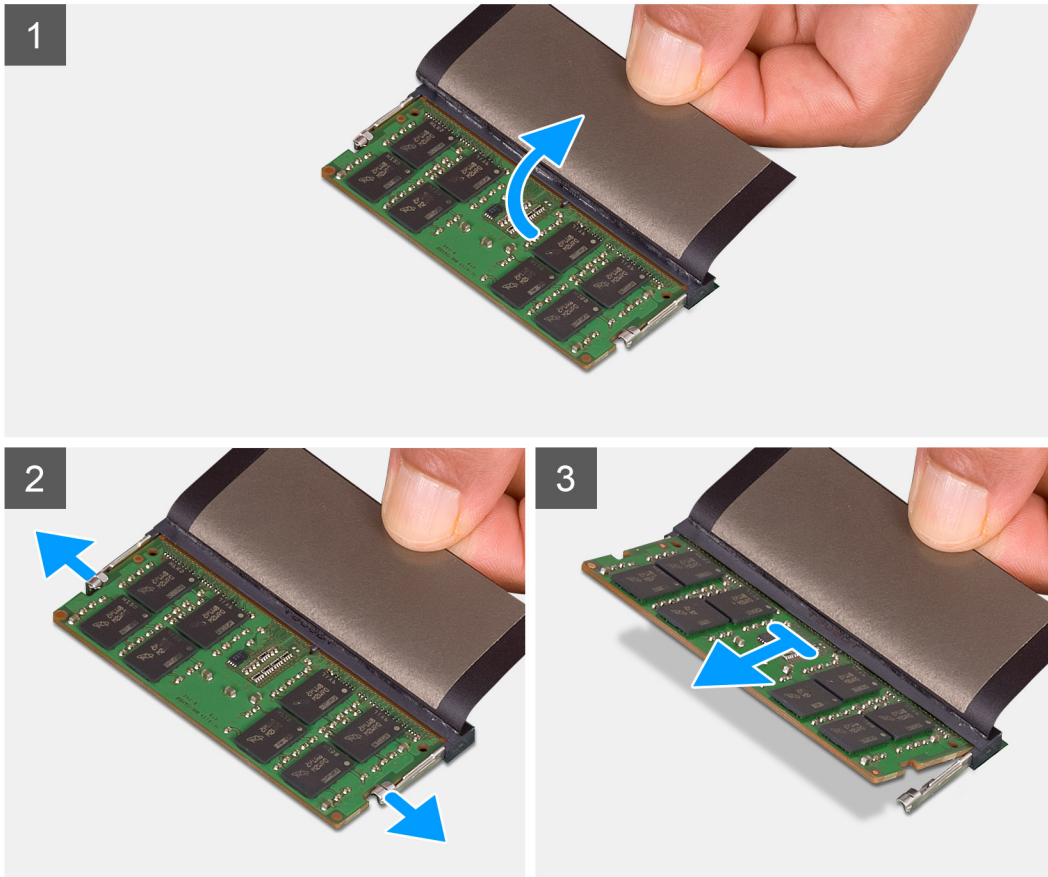
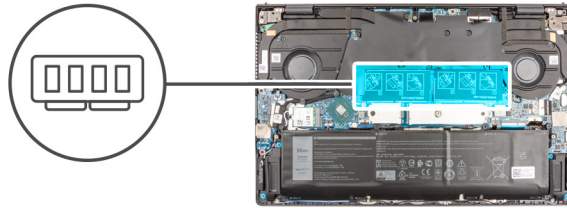
1. Follow the procedure in [Before working inside your computer](#).
2. Enter [Service Mode](#).
3. Remove the [base cover](#).

#### About this task

 **NOTE:** Inspiron 15 7510 supports two memory slots.

The following images indicate the location of the memory module and provide a visual representation of the removal procedure.





### Steps

1. Lift the Mylar to access the memory module.
2. Pry the retention clips securing the memory module until the memory module pops-up.
3. Remove the memory module from the memory-module slot.

**NOTE:** Repeat step 1 to step 3 to remove any other memory module installed in your computer.

## Installing the memory module

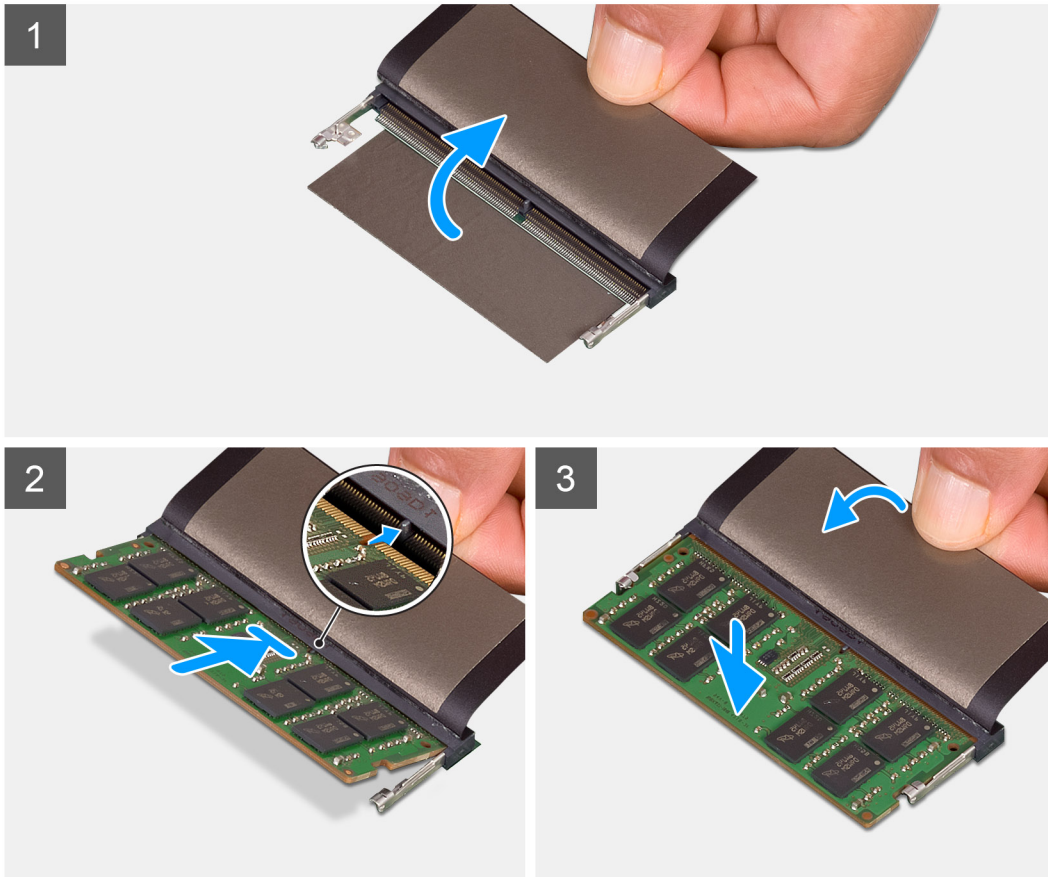
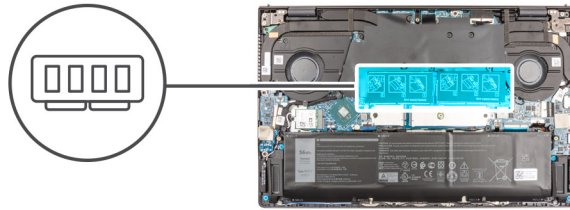
### Prerequisites

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

### About this task

**NOTE:** Inspiron 15 7510 supports two memory slots.

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



## Steps

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

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

**i NOTE:** Repeat step 1 to step 4 to install any other memory modules in your computer.

## Next steps

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

# Solid-state drive—M.2 slot one

## Removing the 2230 solid-state drive from M.2 slot one

### Prerequisites

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

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

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

2. Enter [Service Mode](#).
3. Remove the [base cover](#).

### About this task

**NOTE:** The M.2 card installed on M.2 slot one depends on the configuration ordered. Supported card configurations on M.2 slot one:

- M.2 2230 solid-state drive + M.2 2230 bracket
- M.2 2280 solid-state drive

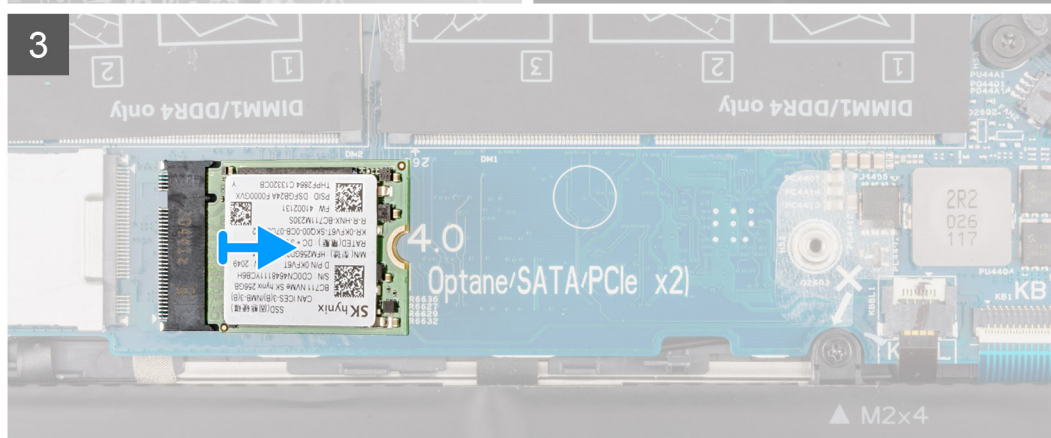
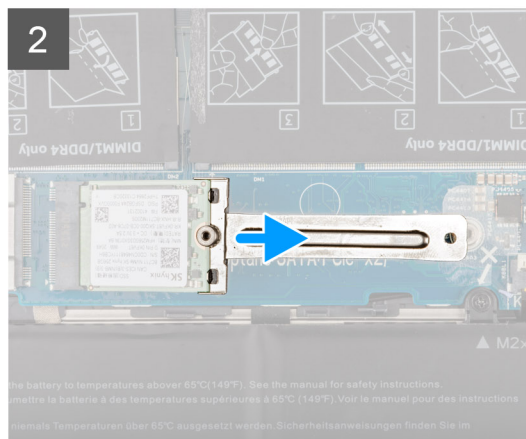
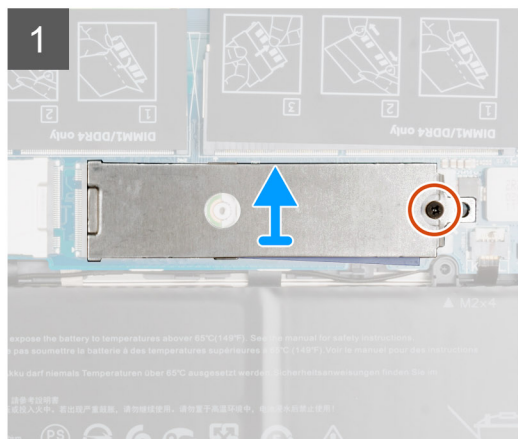
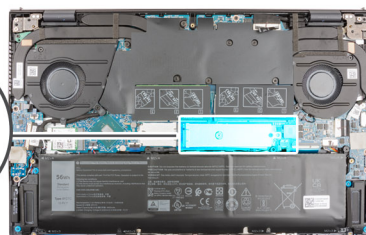
**NOTE:** If you have ordered a system with M.2 2280 solid-state drive in M.2 slot one and want to replace it with a M.2 2230 solid-state drive, you will need a bracket (sold separately, please contact Dell support).

**NOTE:** This procedure applies only to computers shipped with a 2230 solid-state drive installed in M.2 slot one.

The following image indicates the location of the 2230 solid-state drive that is installed in M.2 slot one and provides a visual representation of the removal procedure.



1x  
M2x4



## Steps

1. Remove the screw (M2x4) that secures the solid-state drive thermal shield and the solid-state drive to the palm-rest and keyboard assembly.
2. Slide and lift the solid-state drive thermal shield off the solid-state drive.
3. Slide and remove the solid-state drive bracket from the M.2 slot one.
4. Slide and remove the solid-state drive from the M.2 slot one.

## Installing the 2230 solid-state drive in M.2 slot one

### Prerequisites

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

### About this task

- NOTE:** Solid-state drives are fragile. Exercise care when handling the solid-state drive.
- NOTE:** The M.2 card installed on M.2 slot one depends on the configuration ordered. Supported card configurations on M.2 slot one:
  - M.2 2230 solid-state drive + M.2 2230 bracket

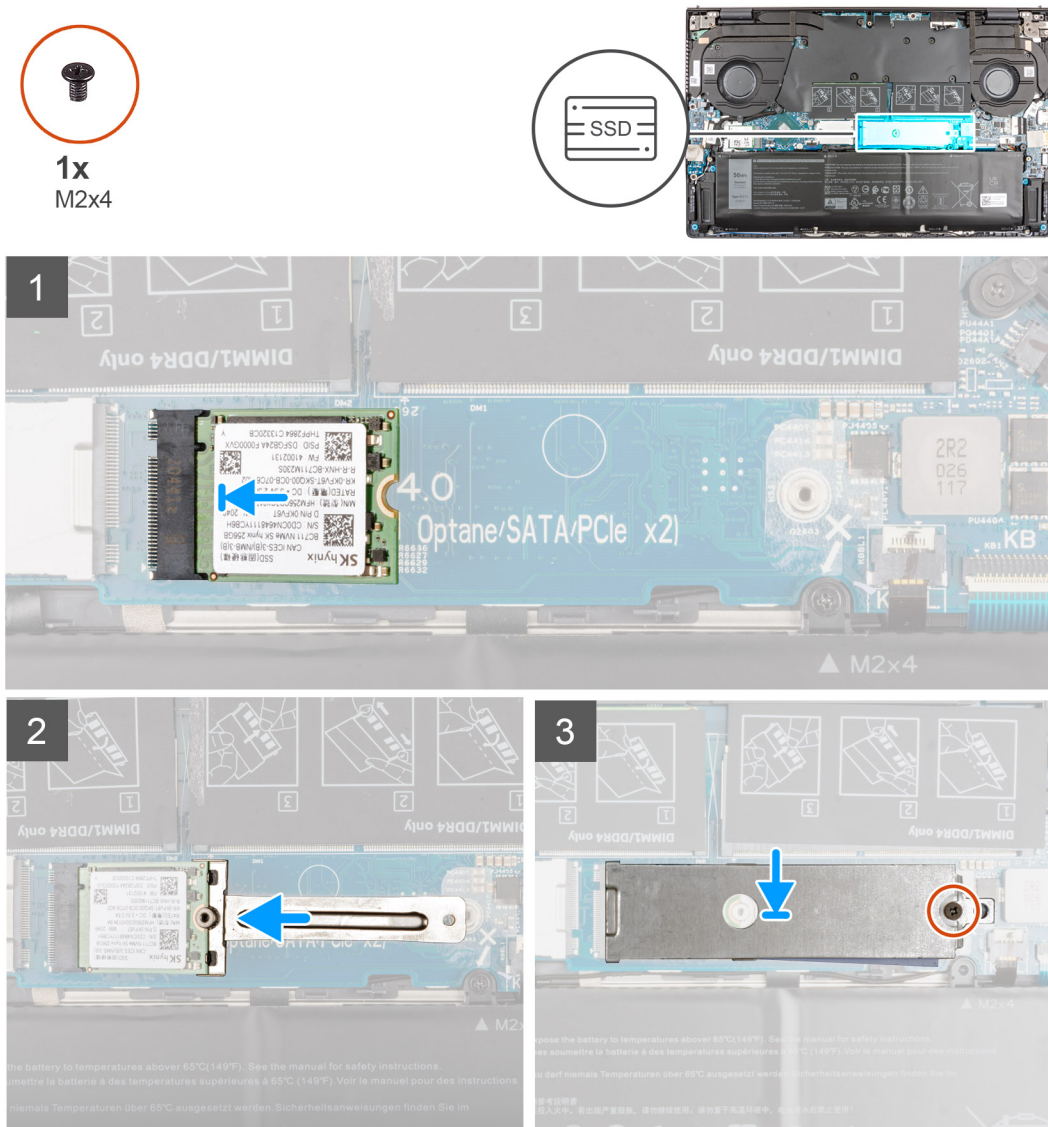


- M.2 2280 solid-state drive

**NOTE:** If you have ordered a system with M.2 2280 solid-state drive in M.2 slot one and want to replace it with a M.2 2230 solid-state drive, you may need a bracket (sold separately, please contact Dell support).

**NOTE:** This procedure applies only if you are installing a 2230 solid-state drive in M.2 slot one.

The following image indicates the location of the 2230 solid-state drive that is installed in M.2 slot one 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. Slide the solid-state drive firmly into the solid-state drive slot at an angle.
3. Align the notch on the solid-state drive with the securing peg on the bracket and clamp the solid-state drive in place.
4. Place the solid-state drive thermal shield on the solid-state drive.
5. Replace the screw (M2x4) that secures the solid-state drive thermal shield and solid-state drive to the palm-rest and keyboard assembly.

## Next steps

1. Install the [base cover](#).
2. Exit [Service Mode](#).

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

## Removing the 2280 solid-state drive from M.2 slot one

### Prerequisites

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

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

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

2. Enter [Service Mode](#).
3. Remove the [base cover](#).

### About this task

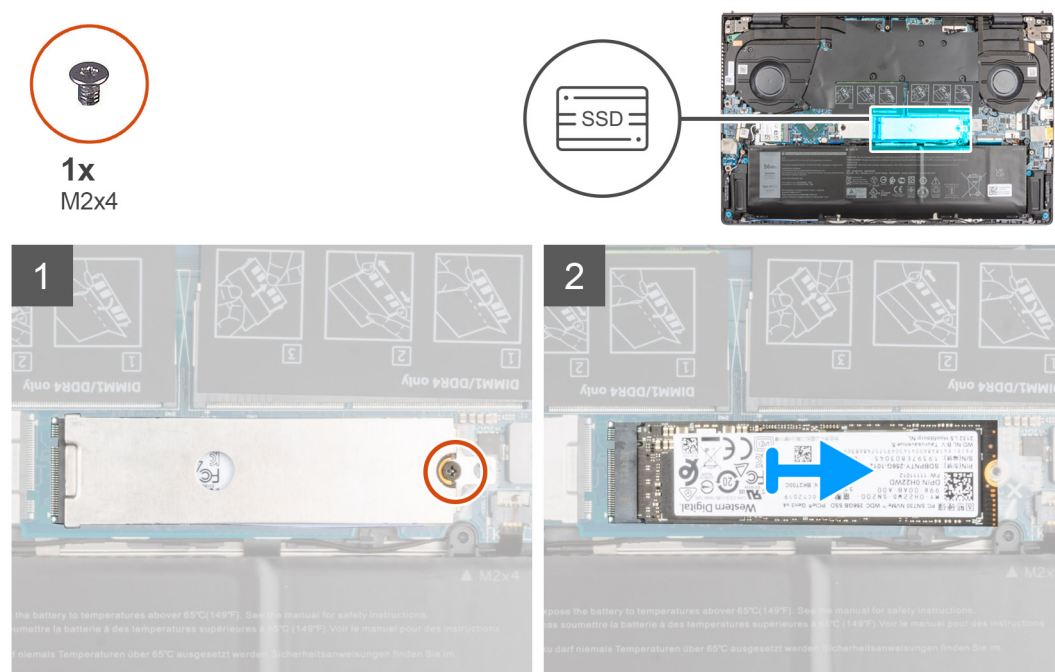
**NOTE:** The M.2 card installed on M.2 slot one depends on the configuration ordered. Supported card configurations on M.2 slot one:

- M.2 2230 solid-state drive + M.2 2230 mounting bracket
- M.2 2280 solid-state drive

**NOTE:** If you have ordered a system with M.2 2280 solid-state drive in M.2 slot one and want to replace it with a M.2 2230 solid-state drive, you will need a mounting bracket (sold separately, please contact Dell support).

**NOTE:** This procedure applies only to computers shipped with a 2280 solid-state drive installed in M.2 slot one.

The following image indicates the location of the 2280 solid-state drive that is installed in M.2 slot one and provides a visual representation of the removal procedure.



### Steps

1. Remove the screw (M2x4) that secures the solid-state drive thermal shield and the solid-state drive to the palm-rest and keyboard assembly.
2. Slide and lift the solid-state drive thermal shield off the solid-state drive.
3. Slide and lift the 2280 solid-state drive off the M.2 solid-state drive slot one on the system board.

# Installing the 2280 solid-state drive in M.2 slot one

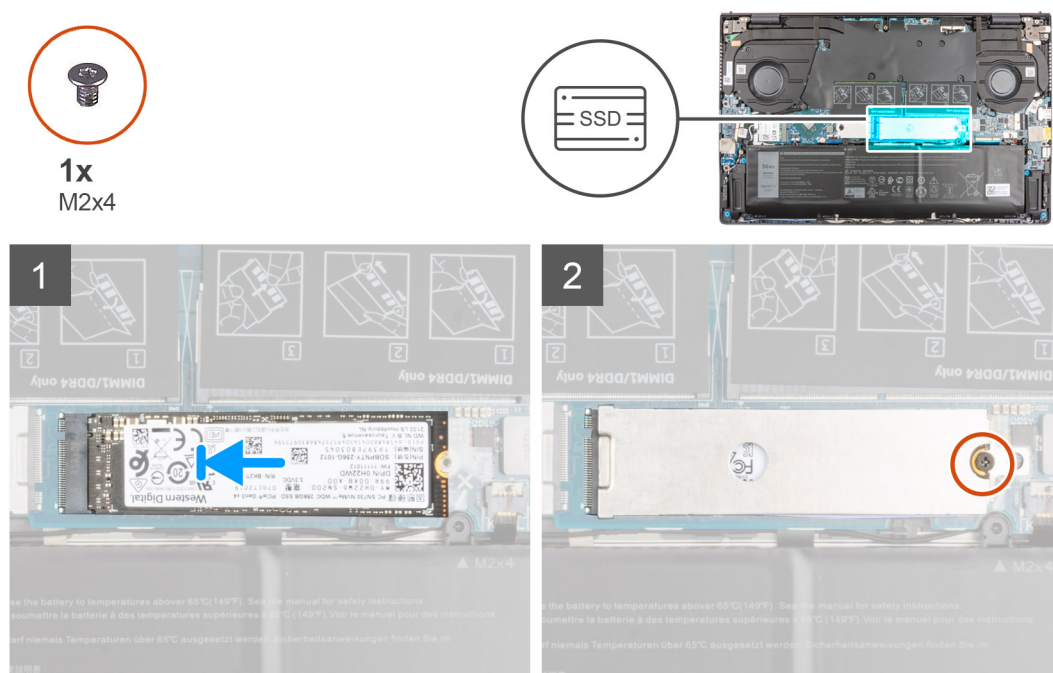
## Prerequisites

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

## About this task

- NOTE:** Solid-state drives are fragile. Exercise care when handling the solid-state drive.
- NOTE:** The M.2 card installed on M.2 slot one depends on the configuration ordered. Supported card configurations on M.2 slot one:
  - M.2 2230 solid-state drive + M.2 2230 mounting bracket
  - M.2 2280 solid-state drive
- NOTE:** If you have ordered a system with M.2 2280 solid-state drive in M.2 slot one and want to replace it with a M.2 2230 solid-state drive, you will need a mounting bracket (sold separately, please contact Dell support).
- NOTE:** This procedure is applicable if you are installing a 2280 solid-state drive in M.2 slot one.
- NOTE:** When installing a M.2 2280 NVMe Gen4.0 x4 solid-state drive, you may order a copper thermal shield from Dell support for better thermal performance.

The following image indicates the location of the 2280 solid-state drive that is installed in M.2 slot one and provides a visual representation of the installation procedure.



## Steps

- Align the notch on the 2280 solid-state drive with the tab on the solid-state drive slot.
- Slide the solid-state drive firmly into the solid-state drive slot at an angle.
- Place the solid-state drive thermal shield on the solid-state drive.
- Align the screw hole on the solid-state drive thermal shield with the screw hole on the palm-rest and keyboard assembly.
- Replace the screw (M2x4) that secures the solid-state drive thermal shield and solid-state drive to the palm-rest and keyboard assembly.





### Next steps

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

## Solid-state drive—M.2 slot two

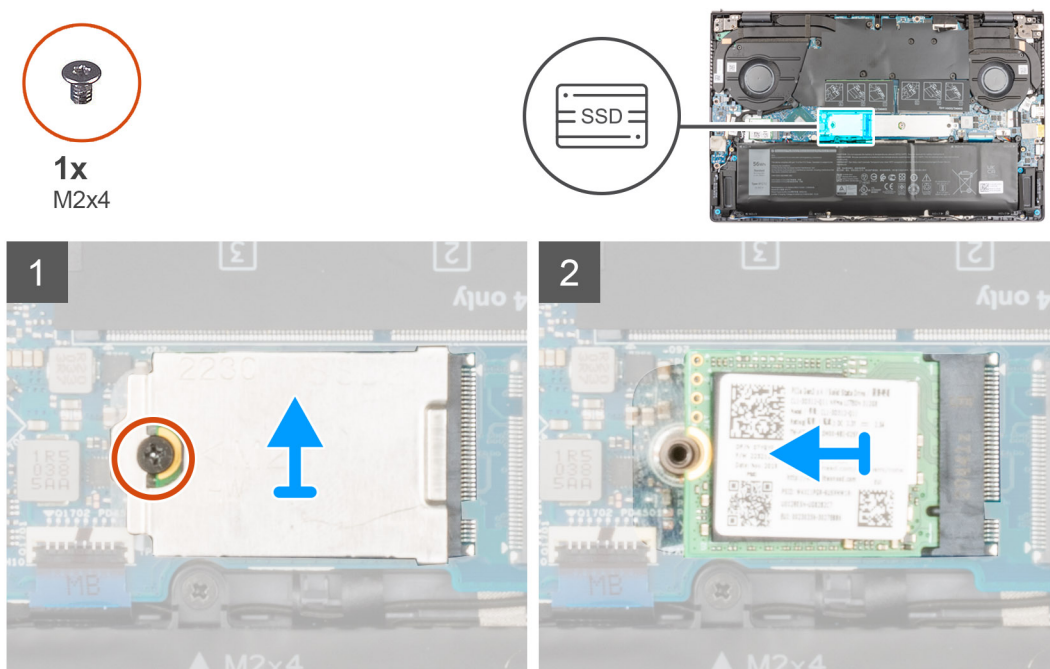
### Removing the 2230 solid-state drive from M.2 slot two

#### Prerequisites

-  **NOTE:** M.2 slot two supports only 2230 solid-state drive.
  -  **NOTE:** This procedure applies only to computers shipped with a 2230 solid-state drive installed in M.2 slot two.
1. Follow the procedure in [Before working inside your computer](#).
    -  **NOTE:** Solid-state drives are fragile. Exercise care when handling the solid-state drive.
    -  **NOTE:** To avoid data loss, do not remove the solid-state drive while the computer is in sleep or on state.
  2. Enter [Service Mode](#).
  3. Remove the [base cover](#).

#### About this task

The following image indicates the location of the 2230 solid-state drive that is installed in M.2 slot two and provides a visual representation of the removal procedure.



#### Steps

1. Remove the screw (M2x4) that secures the solid-state drive thermal shield and the solid-state drive to the palm-rest and keyboard assembly.
2. Slide and lift the solid-state drive thermal shield off the solid-state drive.
3. Slide and remove the solid-state drive from the M.2 slot two.



# Installing the 2230 solid-state drive in M.2 slot two

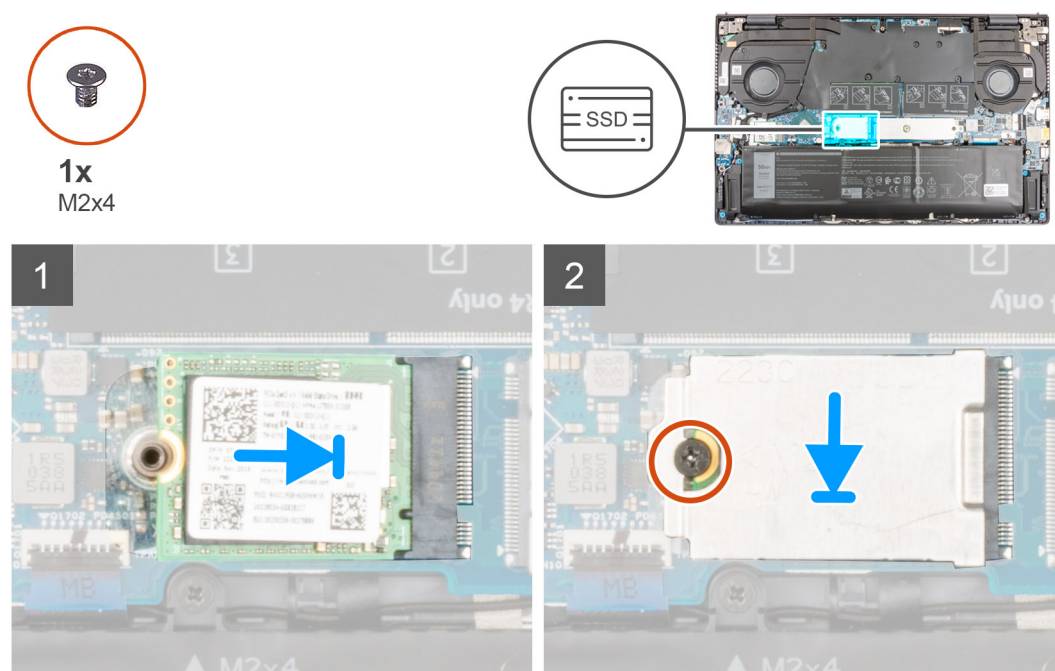
## Prerequisites

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

## About this task

- NOTE:** Solid-state drives are fragile. Exercise care when handling the solid-state drive.
- NOTE:** M.2 slot two supports only 2230 solid-state drive.
- NOTE:** This procedure applies only to computers shipped with a 2230 solid-state drive installed in M.2 slot two.

The following image indicates the location of the 2230 solid-state drive that is installed in M.2 slot two and provides a visual representation of the installation procedure.



## Steps

1. Align the notch on the 2230 solid-state drive with the tab on M.2 slot two on the system board.
2. Slide the solid-state drive into M.2 slot two on the system board.
3. Place the solid-state drive thermal shield on the solid-state drive.
4. Align the screw hole on the solid-state drive thermal shield with the screw hole on the palm-rest and keyboard assembly.
5. Replace the screw (M2x4) that secures the solid-state drive thermal shield and solid-state drive to the palm-rest and keyboard assembly.

## Next steps

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

# Wireless card

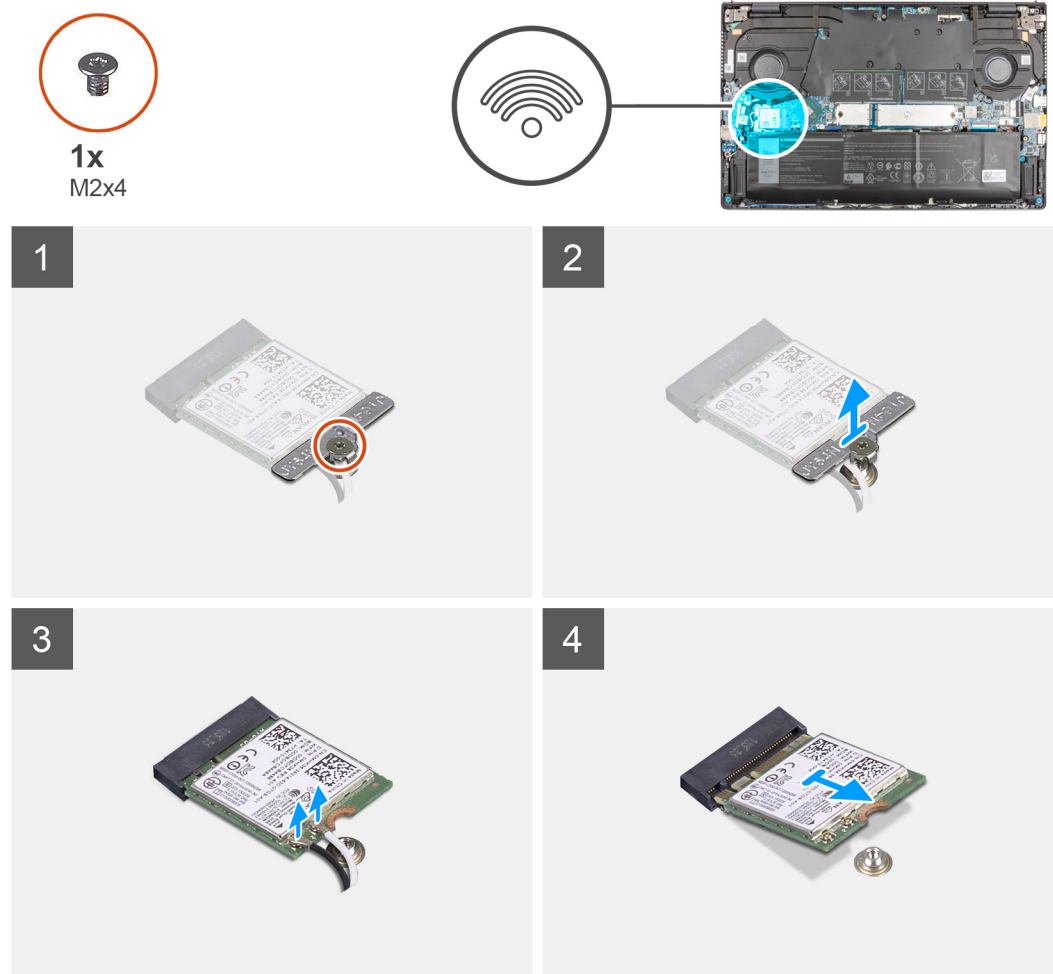
## Removing the wireless card

### Prerequisites

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

### About this task

The following images indicate the location of the wireless card and provide a visual representation of the removal procedure.



### Steps

1. Remove the screw (M2x4) that secures the wireless-card bracket to the wireless card and system board.
2. Remove the wireless-card bracket from the wireless card.
3. Disconnect the antenna cables from the wireless card.
4. Slide and remove the wireless card from the wireless-card slot.

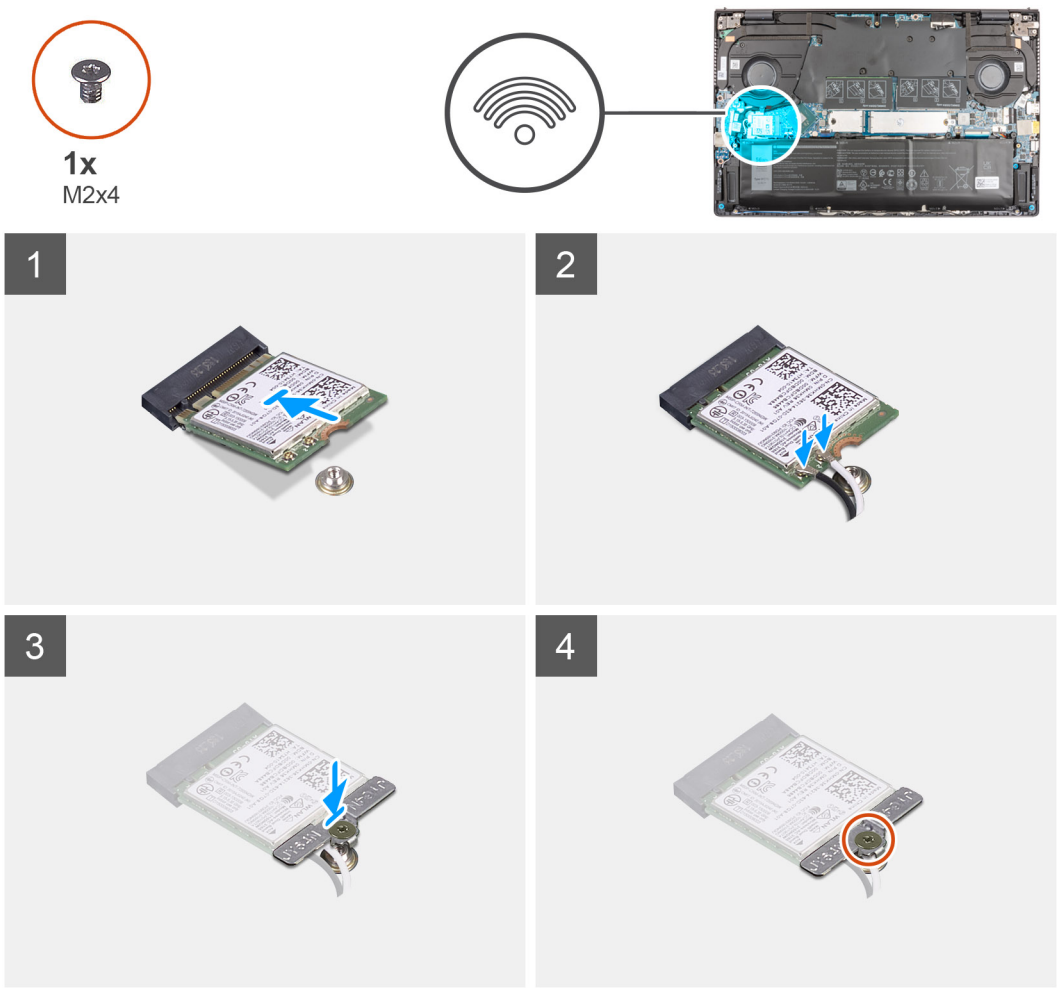
# Installing the wireless card

## 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 wireless card and provides a visual representation of the installation procedure.



## Steps

- 1. Connect the antenna cables to the wireless card.

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

**Table 2. Antenna-cable color scheme**

Connectors on the wireless card	Antenna-cable color	Silkscreen marking	
Main	White	MAIN	△ (white triangle)
Auxiliary	Black	AUX	▲ (black triangle)

- 2. Align the notch on the wireless card with the tab on the wireless-card slot on the system board.
- 3. Slide and insert the wireless card at an angle into the wireless-card slot on the system board.
- 4. Align the screw hole on the wireless-card bracket to the screw hole on the wireless card and system board.

5. Replace the screw (M2x4) that secures the wireless-card bracket to the wireless card and the system board.

#### Next steps

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

## GPU fan

### Removing the GPU fan

#### Prerequisites

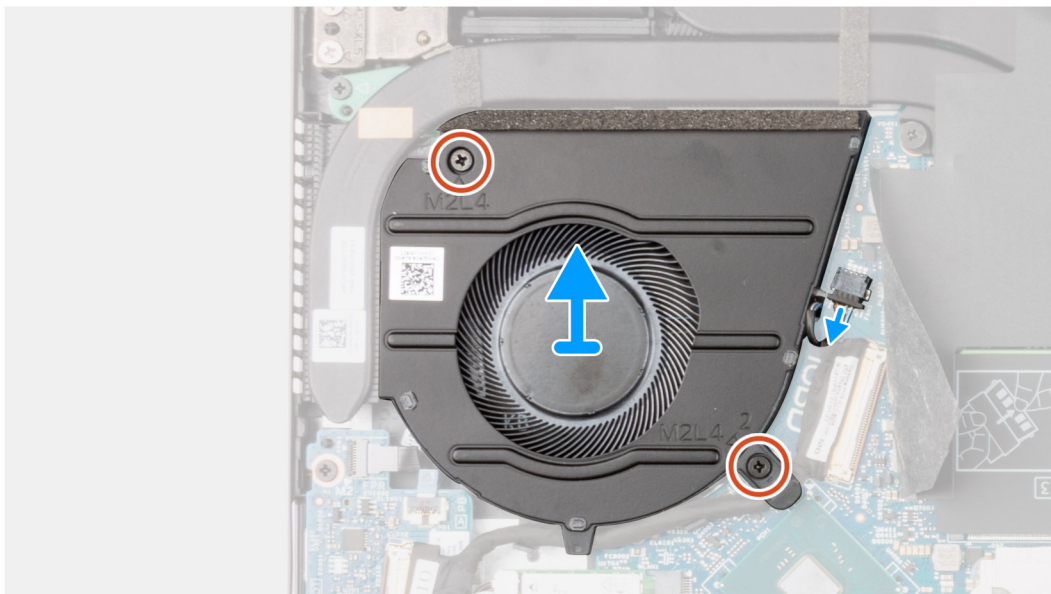
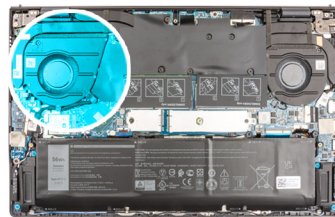
1. Follow the procedure in [Before working inside your computer](#).
2. Enter [Service Mode](#).
3. Remove the [base cover](#).

#### About this task

The figure indicates the location of the GPU fan and provides a visual representation of the removal procedure.



**2x**  
M2x4



#### Steps

1. Flip the Mylar cover open.
2. Disconnect the GPU fan cable from the system board.
3. Remove the two (M2x4) screws that secure the GPU fan to the palm-rest and keyboard assembly.
4. Unroute the I/O cable from routing guides underneath the GPU fan.
5. Slide and lift the GPU fan off the palm-rest and keyboard assembly.

# Installing the GPU fan

## Prerequisites

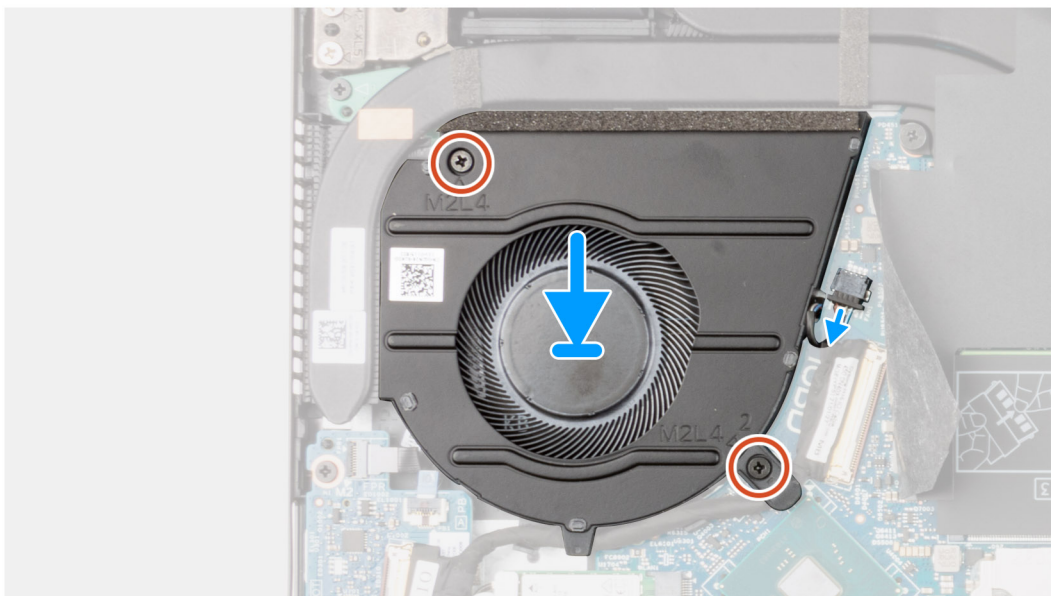
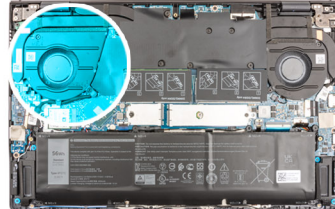
If you are replacing a component, remove the existing component before performing the installation procedure.

## About this task

The figure indicates the location of the GPU fan and provides a visual representation of the installation procedure.



**2x**  
M2x4



## Steps

1. Lift the Mylar cover to access the cable connector.
2. Route the I/O cable through the routing guides underneath the GPU fan.
3. Slide and place the GPU fan on the palm-rest and keyboard assembly.
4. Align the screw holes on the GPU fan with the screw holes on the palm-rest and keyboard assembly.
5. Replace the two (M2x4) screws to secure the GPU fan to the palm-rest and keyboard assembly.
6. Connect the GPU fan cable to the system board.

## Next steps

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



# System fan

## Removing the system fan

### Prerequisites

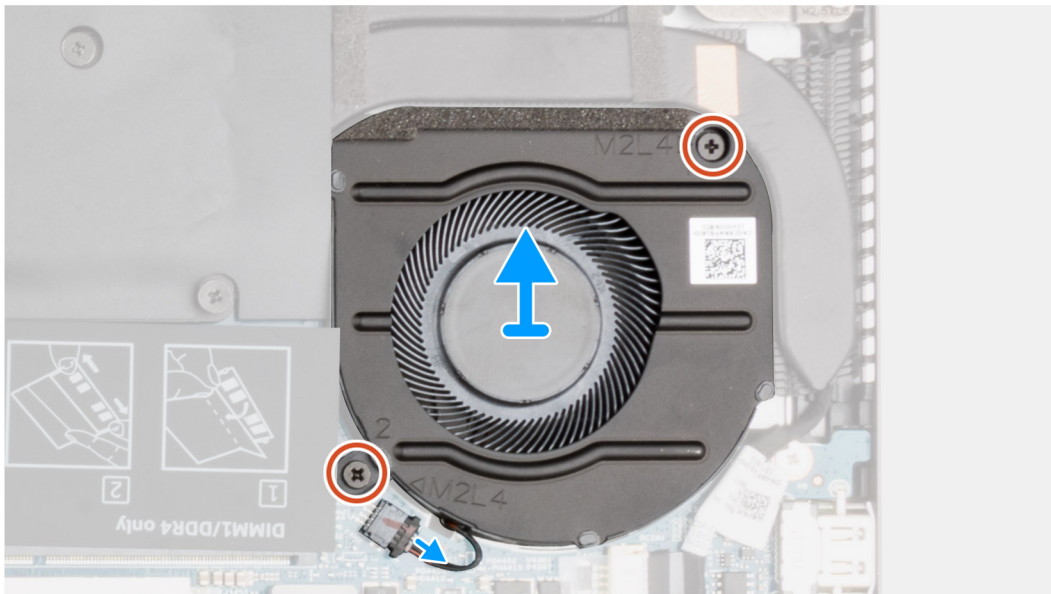
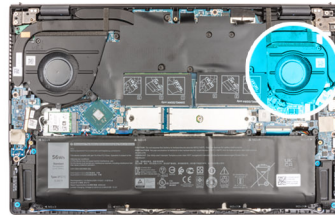
1. Follow the procedure in [Before working inside your computer](#).
2. Enter [Service Mode](#).
3. Remove the [base cover](#).

### About this task

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



2x  
M2x4



### Steps

1. Disconnect the fan cable from the system board.
2. Remove the two (M2x4) screws that secure the fan to the palm-rest and keyboard assembly.
3. Lift the fan off the palm-rest and keyboard assembly.

## Installing the system fan

### Prerequisites

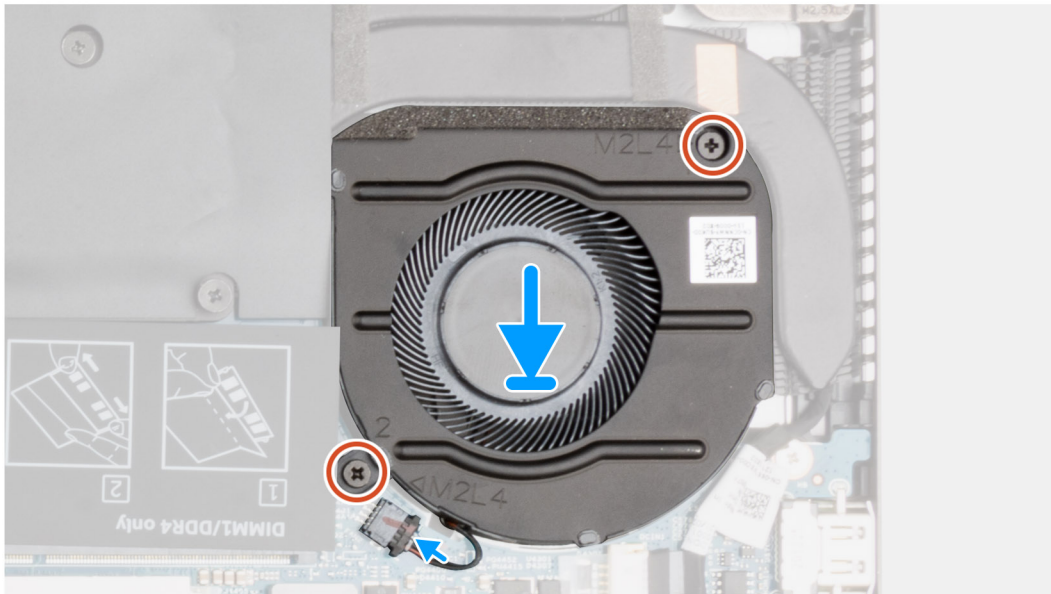
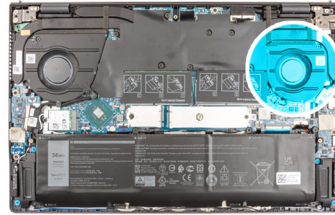
If you are replacing a component, remove the existing component before performing the installation procedure.

### About this task

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



2x  
M2x4



### Steps

1. Using the alignment posts, place the fan on the palm-rest and keyboard assembly.
2. Replace the two (M2x4) screws to secure the fan to the palm-rest and keyboard assembly.
3. Connect the fan cable to the system board.

### Next steps


1. Install the [base cover](#).
2. Exit [Service Mode](#).
3. 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.

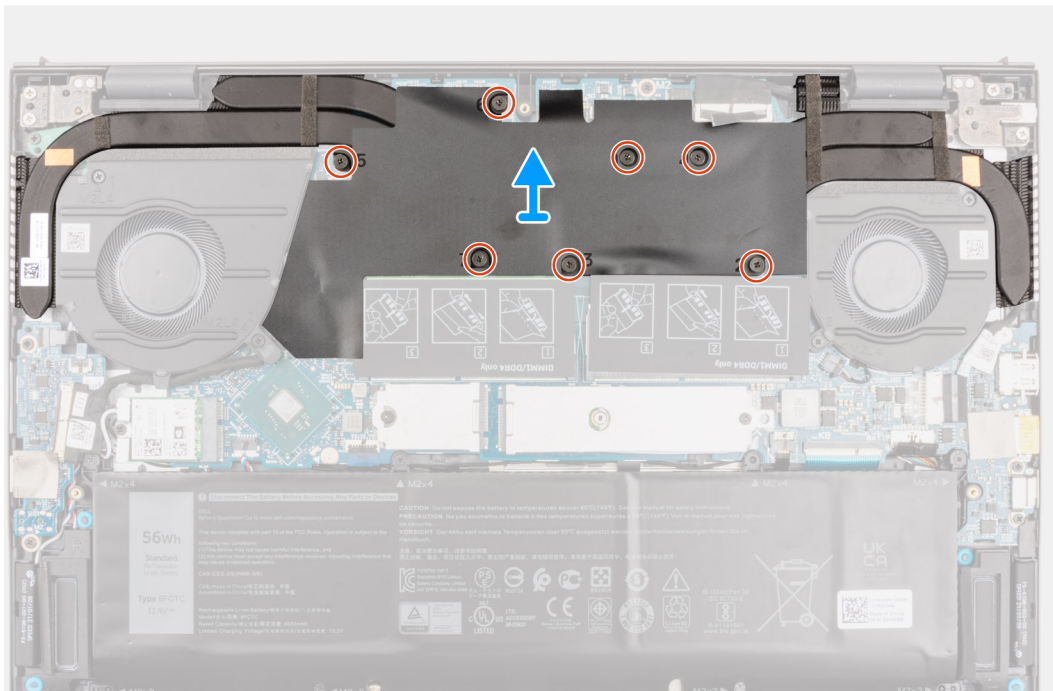
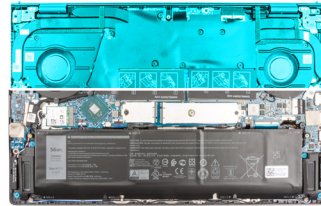
 **NOTE:** The heat sink may become hot during normal operation. Allow sufficient time for the heat sink to cool before you touch it.

2. Enter [Service Mode](#).
3. Remove the [base cover](#).



### About this task

The following images indicate the location of the heat sink and provide a visual representation of the removal procedure.



### Steps

1. In reverse sequential order (as indicated on the Mylar cover), loosen the seven captive screws that secure the heat sink to the system board.
2. Lift the heat sink off the system board along with the Mylar cover.

## Installing the heat sink

### Prerequisites

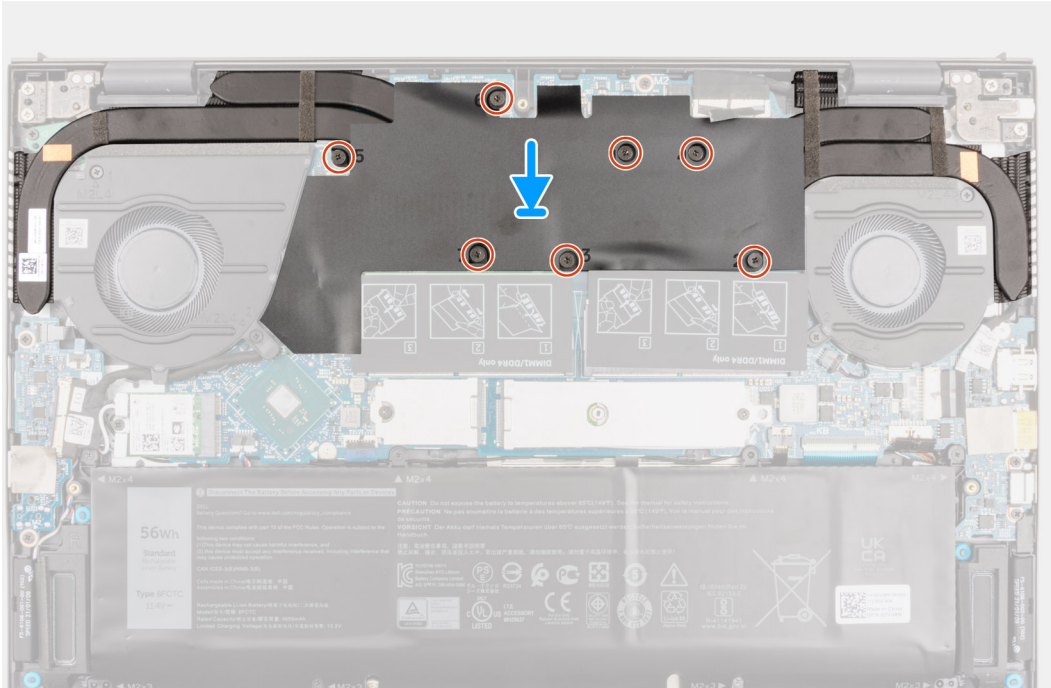
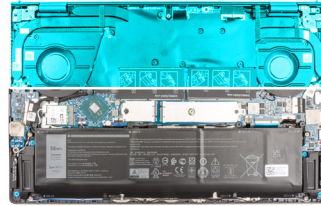
If you are replacing a component, remove the existing component before performing the installation procedure.

**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/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 and Mylar cover with the screw holes on the system board.
2. In sequential order (as indicated on the Mylar cover), tighten the seven captive screws that secure the heat sink to the system board.

### Next steps

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

## I/O board

### Removing the I/O board

#### Prerequisites

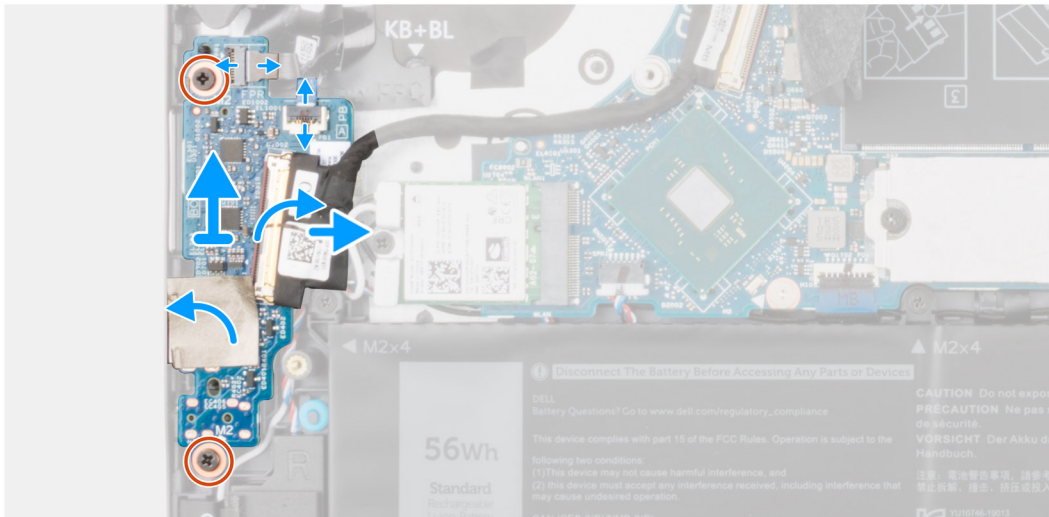
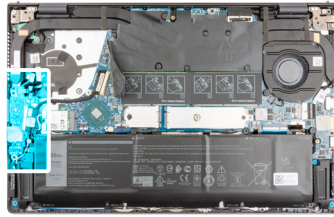
1. Follow the procedure in [Before working inside your computer](#).
2. Enter [Service Mode](#).
3. Remove the [base cover](#).
4. Remove the [GPU fan](#).

#### About this task

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



**2x**  
M2x4



### Steps

1. Open the latch, and disconnect the power button with fingerprint reader cable from the I/O board.
2. Open the latch, and disconnect the power button cable from the I/O board.
3. Peel the tape that secures the I/O-board cable to the I/O board.
4. Open the latch and disconnect the I/O-board cable from the I/O board.
5. Peel the adhesive tape securing the I/O board to the palm-rest and keyboard assembly.
6. Remove the two (M2x4) screws that secure the I/O board to the palm-rest and keyboard assembly.
7. Lift the I/O board off the palm-rest and keyboard assembly.

## Installing the I/O board

### Prerequisites

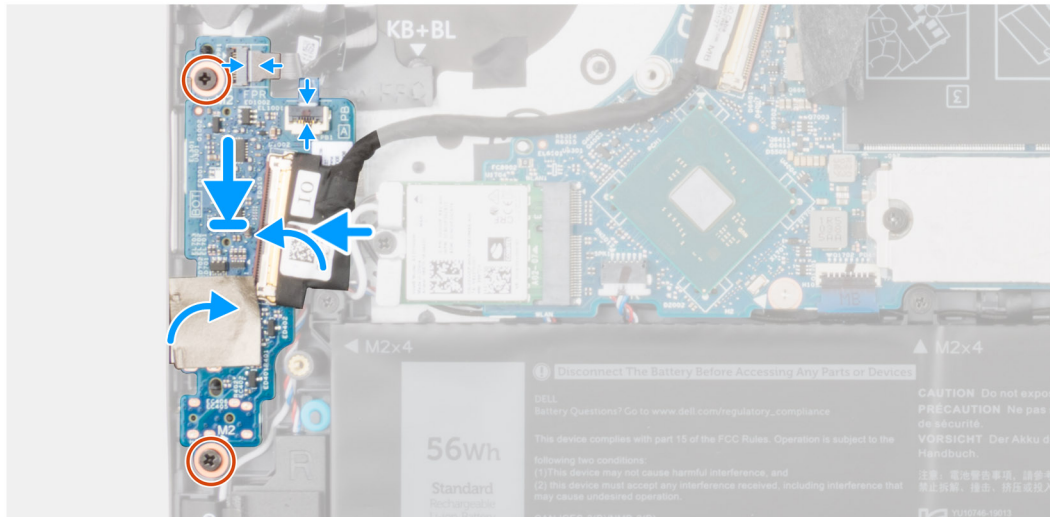
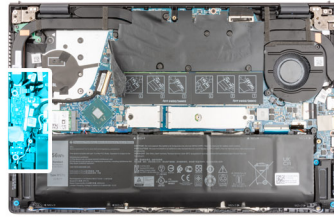
If you are replacing a component, remove the existing component before performing the installation procedure.

### 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. Slide the I/O board into the slot on the palm-rest and keyboard assembly.
2. Align the screw holes on the I/O board with the screw holes on the palm-rest and keyboard assembly.
3. Replace the two (M2x4) screws that secure the I/O board to the palm-rest and keyboard assembly.
4. Connect the power button with fingerprint reader cable into the connector on the I/O board and close the latch to secure the cable.
5. Connect the power button cable to the I/O board.
6. Connect the I/O-board cable to the I/O board and close the latch to secure the cable.
7. Adhere the tape that secures the I/O-board cable to the I/O board.
8. Adhere the adhesive tape that secures the I/O board to the palm-rest and keyboard assembly.

## Next steps

1. Install the [GPU fan](#).
2. Install the [base cover](#).
3. Exit [Service Mode](#).
4. Follow the procedure in [After working inside your computer](#).

# Speakers

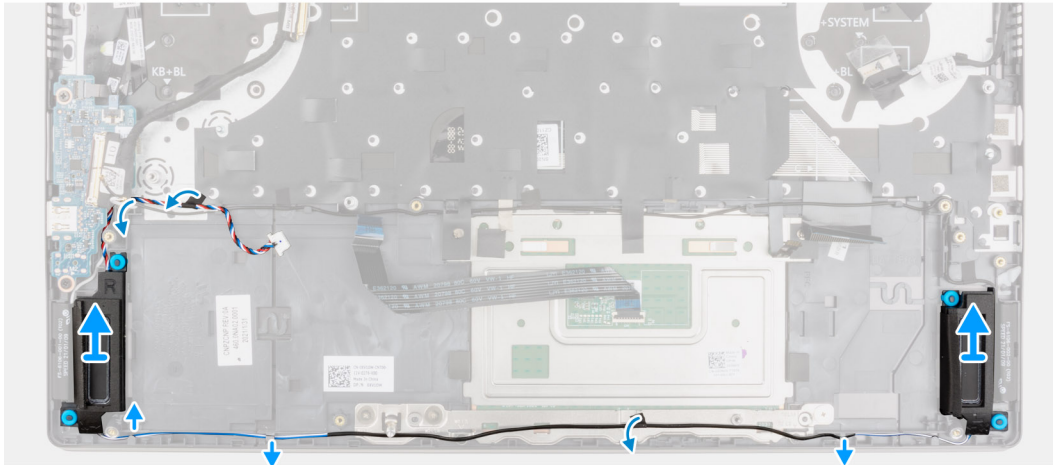
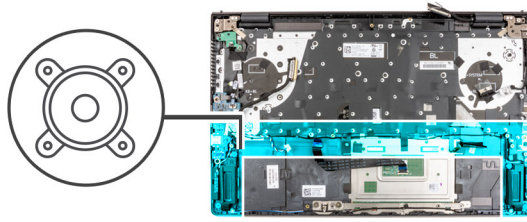
## Removing the speakers

### Prerequisites

1. Follow the procedure in [Before working inside your computer](#).
2. Enter [Service Mode](#).
3. Remove the [base cover](#).
4. Remove the [battery](#).
5. Remove the [system board](#).

### About this task

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



### Steps

1. Peel the tape that secures the speaker cable to the palm-rest and keyboard assembly.
2. Note the speaker cable routing, and remove the speaker cable from the routing guides on the palm-rest and keyboard assembly.
3. Disconnect the speaker cable from the system board.
4. Lift the speakers, along with the cable, off the palm-rest and keyboard assembly.

## Installing the speakers

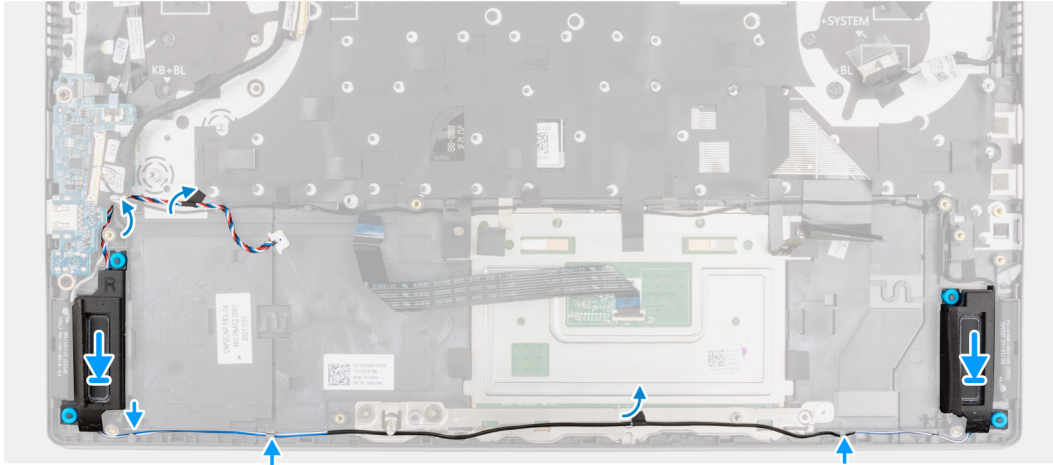
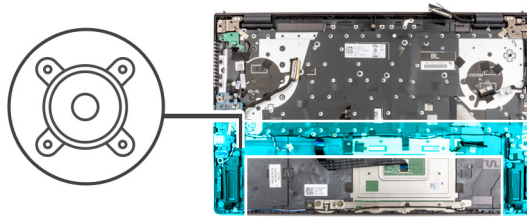
### Prerequisites

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 speaker 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. Connect the speaker cable to the system board.
3. Route the speaker cable through the routing guides on the palm-rest and keyboard assembly.
4. Adhere the tape that secures the speaker cable to the palm-rest and keyboard assembly.

### Next steps

1. Install the [system board](#).
2. Install the [battery](#).
3. Install the [base cover](#).
4. Exit [Service Mode](#).
5. Follow the procedure in [After working inside your computer](#).

## Touchpad

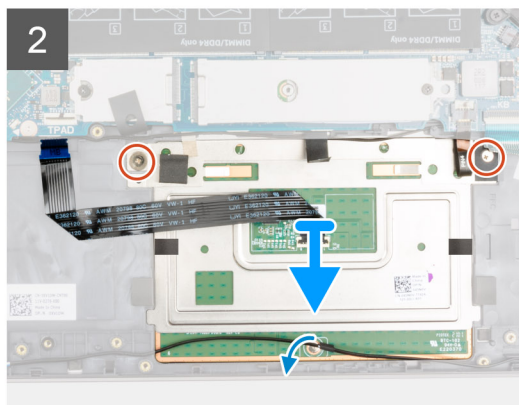
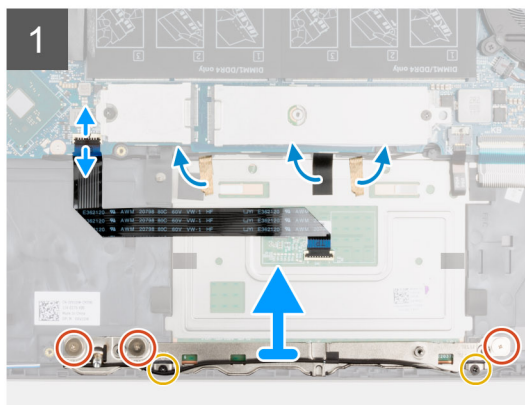
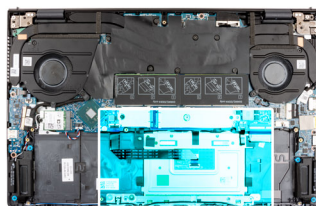
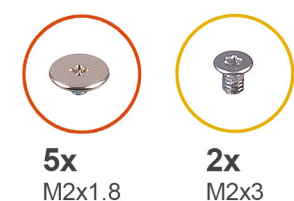
### Removing the touchpad

#### Prerequisites

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

#### About this task

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



## Steps

1. Open the latch and disconnect the touchpad cable from the system board.
2. Peel the tape that secures the touchpad bracket to the palm-rest and keyboard assembly.
3. Remove the three (M2x1.8) and the two (M2x3) screws that secure the touchpad bracket to the palm-rest and keyboard assembly.
4. Lift the touchpad bracket off the palm-rest and keyboard assembly.
5. Remove the two (M2x1.8) screws that secure the touchpad to the palm-rest and keyboard assembly.
6. Peel the tape that secures the speaker cable to the touchpad bracket.
7. Lift the touchpad, along with the touchpad cable, off the palm-rest and keyboard assembly.

## Installing the touchpad

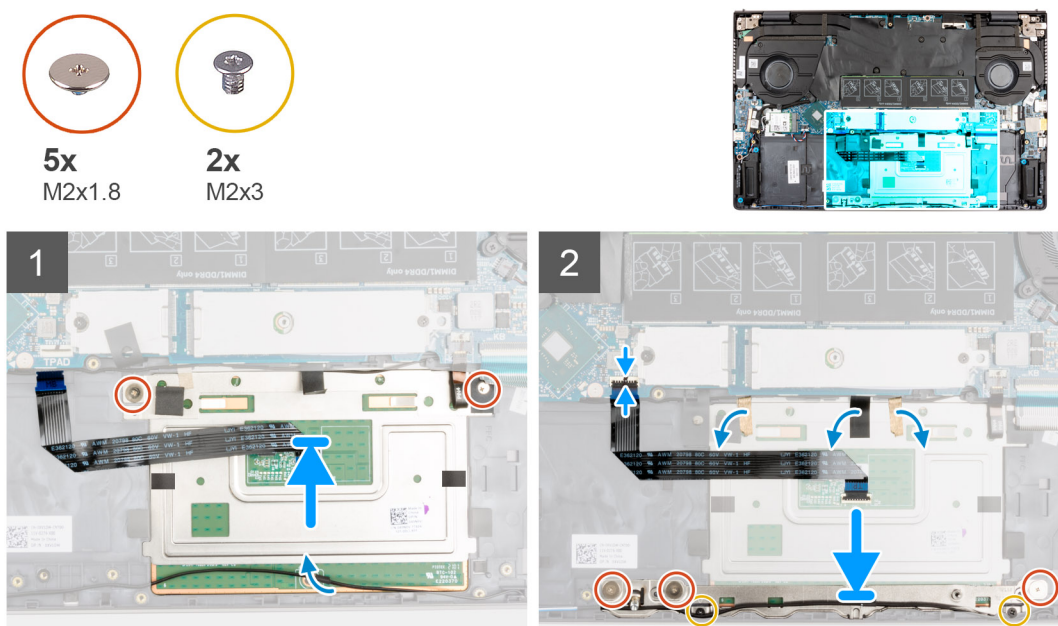
### Prerequisites

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 touchpad and provides a visual representation of the installation procedure.

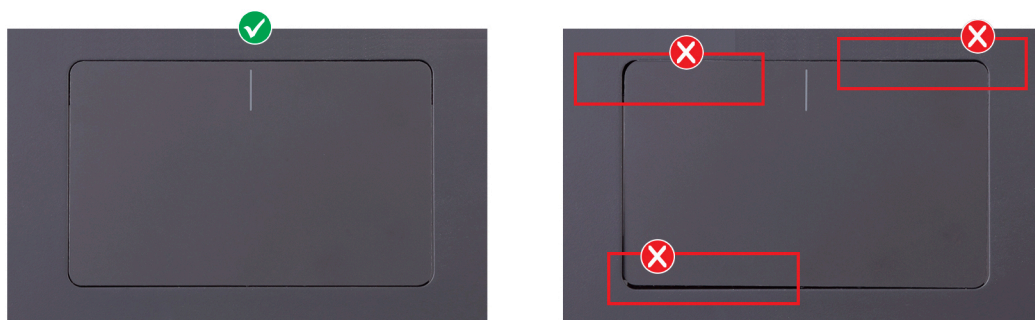




## Steps

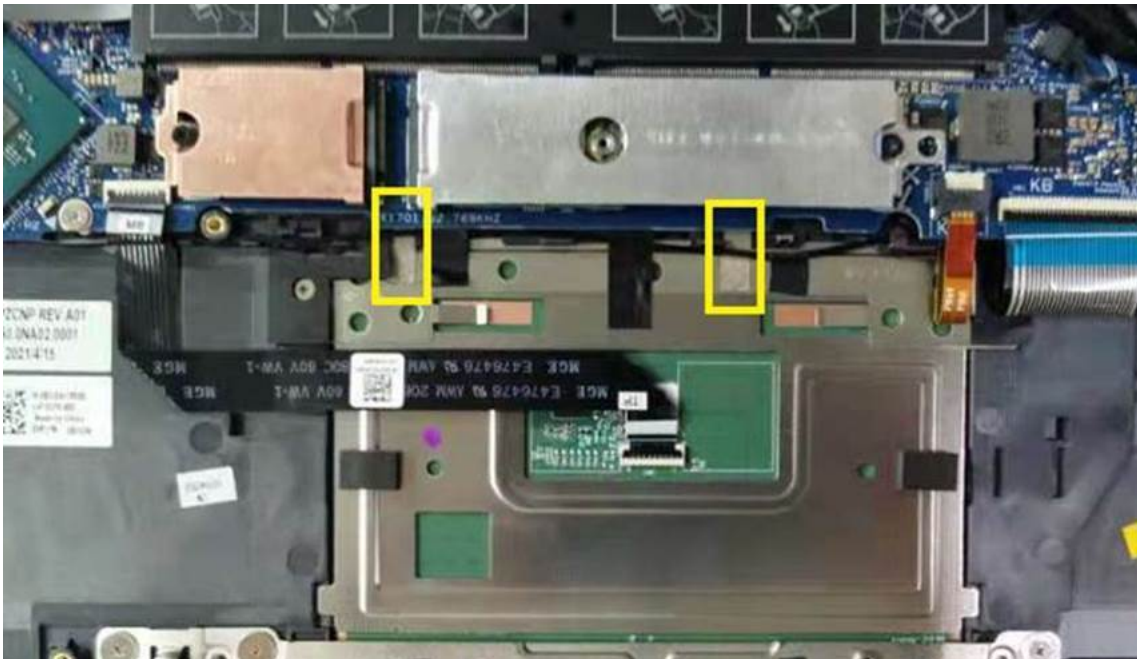
1. Slide the touchpad into the slot on the palm-rest and keyboard assembly.

**NOTE:** Turn the computer over and open the display. Ensure that the touchpad is equally aligned along all four sides.



2. Replace the two (M2x1.8) screws that secure the touchpad to the palm-rest and keyboard assembly.
3. Adhere the tapes that secure the touchpad to the palm-rest and keyboard assembly.

**NOTE:** Adhere the tapes back to its original position so that it runs across touchpad and palmrest.



4. Align the screw holes on the touchpad bracket with the screw holes on the palm-rest and keyboard assembly.
5. Replace the three (M2x1.8) and two (M2x3) screws that secure the touchpad bracket to the palm-rest and keyboard assembly.
6. Slide the touchpad cable into the connector on the touchpad and close the latch to secure the cable.
7. Adhere the tape that secures the touchpad bracket to the palm-rest and keyboard assembly.
8. Adhere the tape that secures the speaker cable to the touchpad.

#### Next steps

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

## Display assembly

### Removing the display assembly

#### Prerequisites

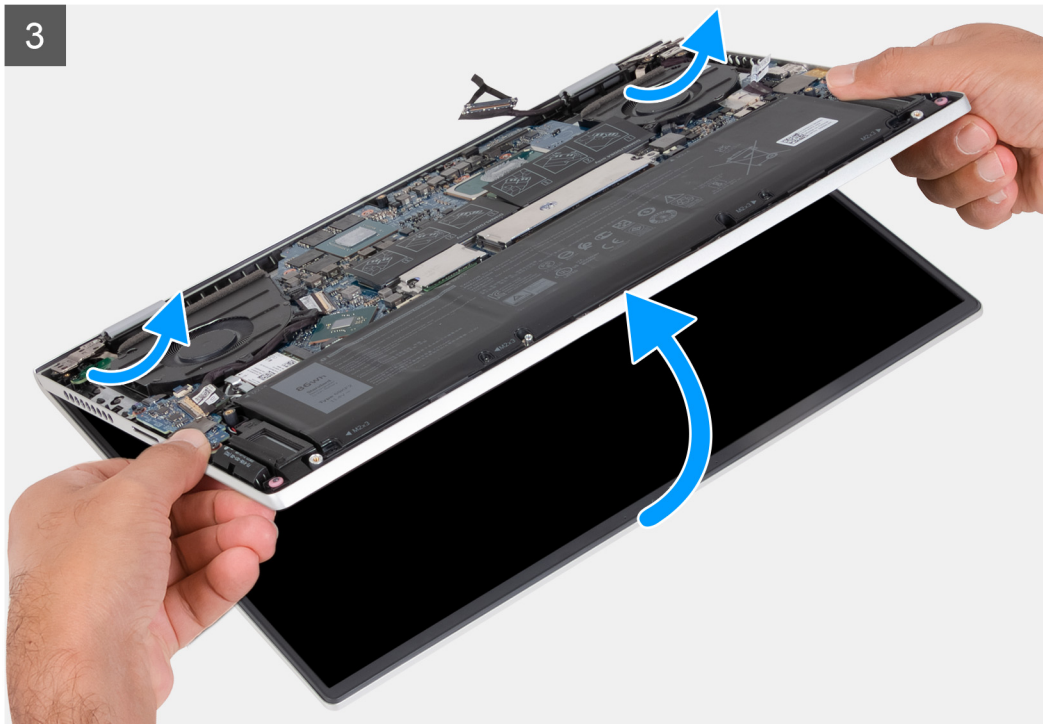
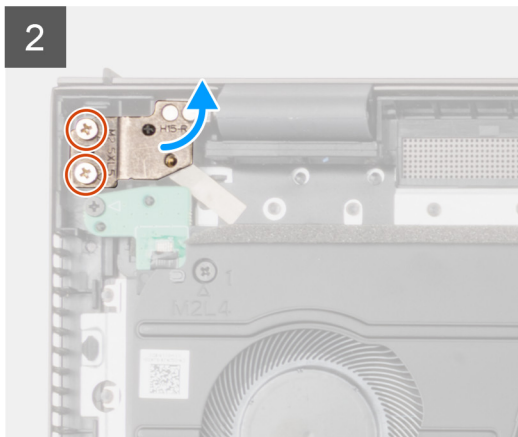
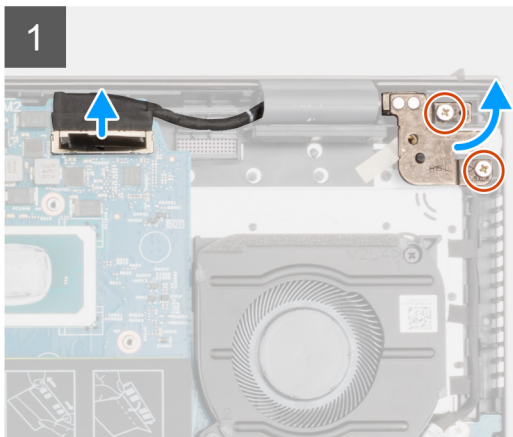
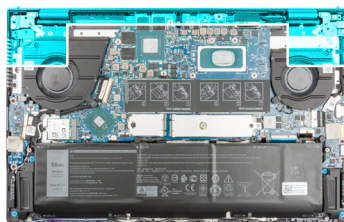
1. Follow the procedure in [Before working inside your computer](#).
2. Enter [Service Mode](#).
3. Remove the [base cover](#).
4. Remove the [heat sink](#).

#### About this task

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



**4x**  
M2.5x5





### Steps

1. Disconnect the display cable from its connector on the system board.
2. Remove the two (M2.5x5) screws that secure the left-display hinge to the system board.
3. Remove the two (M2.5x5) screws that secure the right-display hinge to the system board.
4. Open the display hinges at an angle of 90 degrees.
5. Gently slide the palm-rest and keyboard assembly off the display assembly.

## Installing the display assembly

### Prerequisites

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

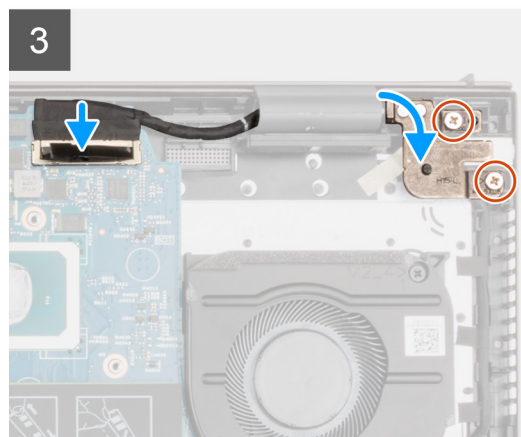
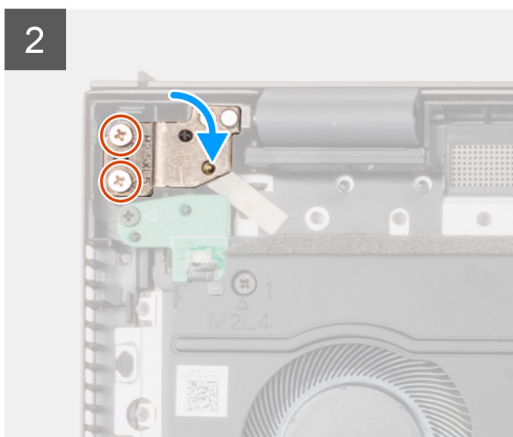
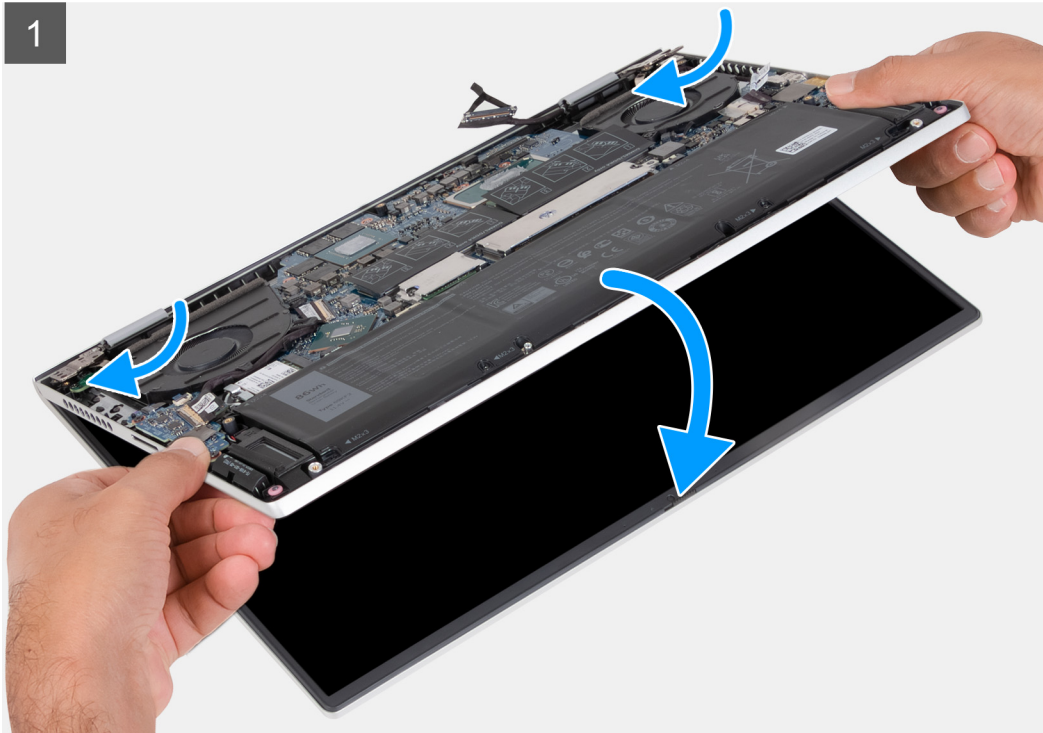
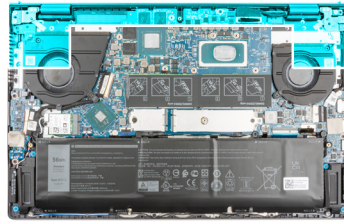
### About this task

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





4x  
M2.5x5



### Steps

1. Slide the display assembly at an angle, and place the display assembly on the palm-rest and keyboard assembly.
2. Using the alignment posts, close the display hinges.
3. Replace the two (M2.5x5) screws that secure the right-display hinge to the system board.
4. Replace the two (M2.5x5) screws that secure the left-display hinge to the system board.
5. Slide the display cable into the connector on the system board.

### Next steps

1. Install the [heat sink](#).
2. Install the [base cover](#).

3. Exit [Service Mode](#).
4. Follow the procedure in [After working inside your computer](#).

## Power-button board

### Removing the power-button board

#### Prerequisites

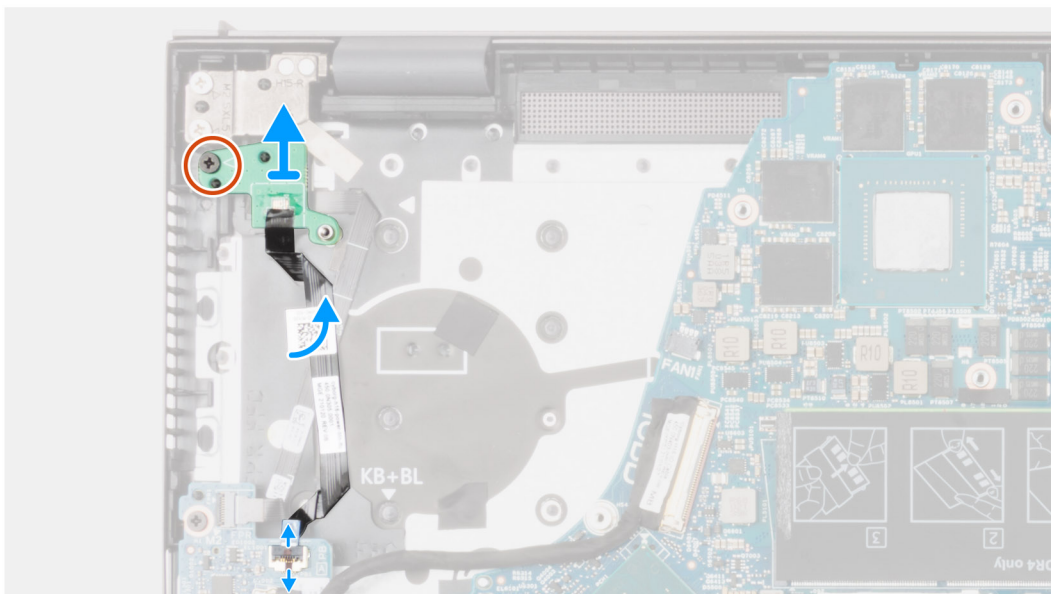
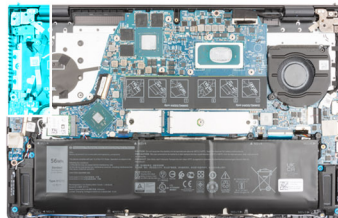
1. Follow the procedure in [Before working inside your computer](#).
2. Enter [Service Mode](#).
3. Remove the [base cover](#).
4. Remove the [GPU fan](#).
5. Remove the [heat sink](#).

#### About this task

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



**1x**  
M2x4



#### Steps

1. Disconnect the power-button cable from the I/O board.
2. Peel the adhesive tape securing the power-button cable to palm-rest and keyboard assembly.
3. Remove the screw (M2x4) that secures the power-button board with the cable to the palm-rest and keyboard assembly.
4. Lift the power-button board with the cable off the palm-rest and keyboard assembly.

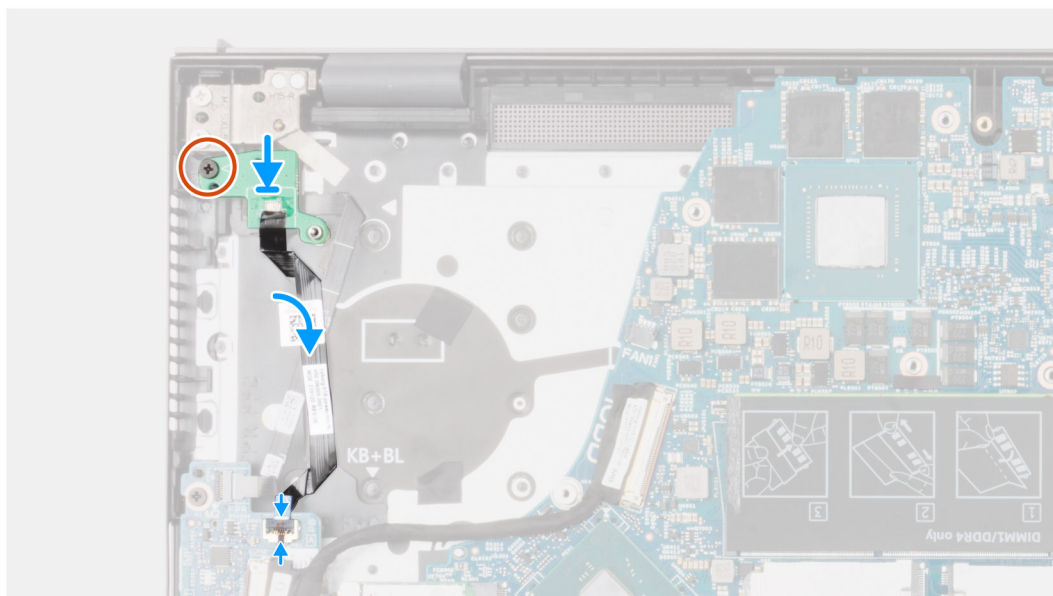
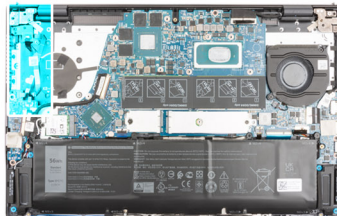
## Installing the power-button board

### About this task

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



1x  
M2x4



### Steps

1. Align and place the power-button board along with the cable on the palm-rest and keyboard assembly.
2. Replace the screw (M2x4) that secures the power-button board with the cable to the palm-rest and keyboard assembly.
3. Connect the power-button cable to the I/O board.

### Next steps

1. Install the [heat sink](#).
2. Install the [GPU fan](#).
3. Install the [base cover](#).
4. Exit [Service Mode](#).
5. Follow the procedure in [After working inside your computer](#).

## Power button with optional fingerprint reader

### Removing the power-button with optional fingerprint reader

#### Prerequisites

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



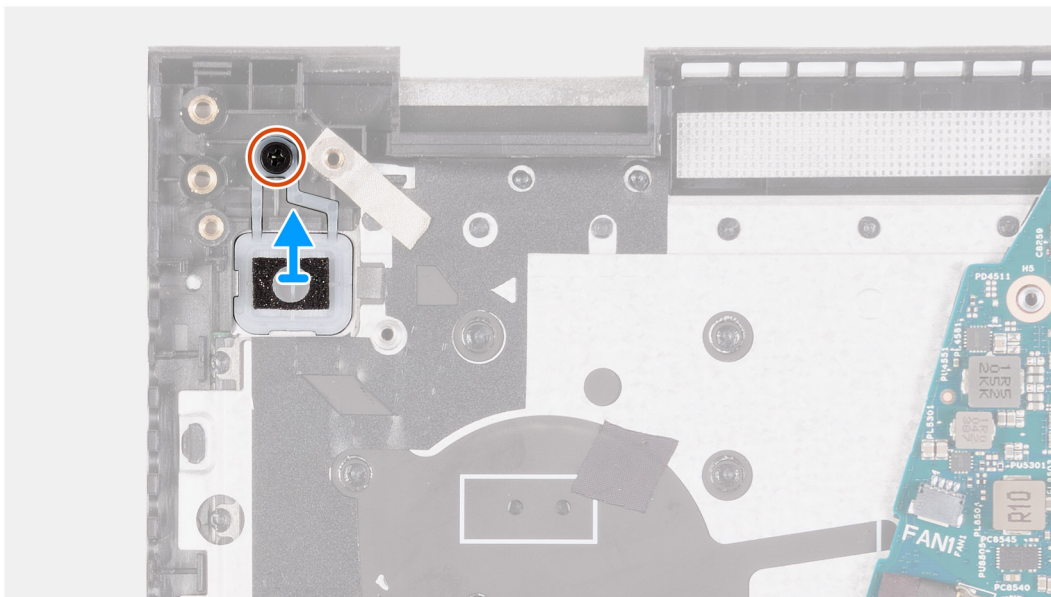
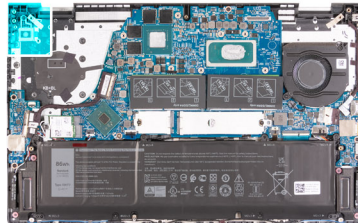
3. Remove the [battery](#).
4. Remove the [heat sink](#).
5. Remove the [GPU fan](#).
6. Remove the [power-button board](#).

#### About this task

The following image indicates the location of the power-button with optional fingerprint reader and provides a visual representation of the removal procedure.



1x  
M2x4



#### Steps

1. Remove the screw (M2x4) that secures the power-button with optional fingerprint reader to the palm-rest and keyboard assembly.
2. Lift the power-button with optional fingerprint reader off the palm-rest and keyboard assembly.

## Installing the power-button with optional fingerprint reader

#### Prerequisites

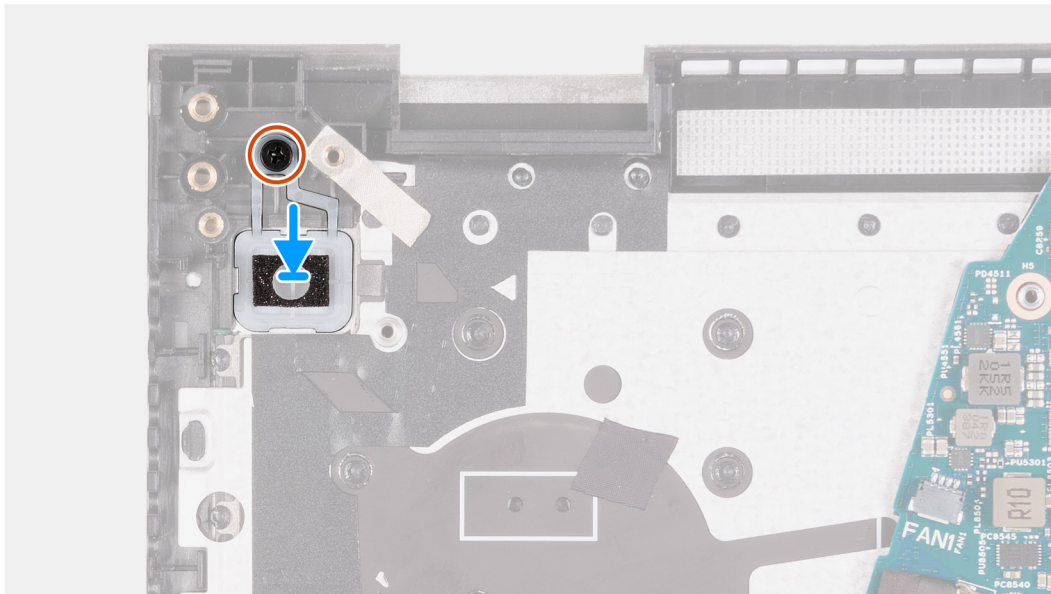
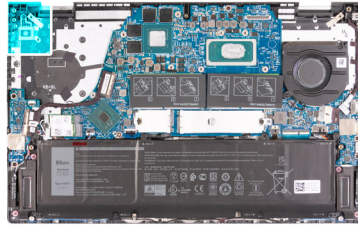
If you are replacing a component, remove the existing component before performing the installation process.

#### About this task

The following image indicates the location of the power-button with optional fingerprint reader and provides a visual representation of the installation procedure.



**1x**  
M2x4



### Steps

1. Using the alignment posts, place the power-button with optional fingerprint reader into its slot on the palm-rest and keyboard assembly.
2. Replace the screw (M2x4) that secures the power-button with optional fingerprint reader to the palm-rest and keyboard assembly.

### Next steps

1. Install the [power-button board](#).
2. Install the [heat sink](#).
3. Install the [GPU fan](#).
4. Install the [base cover](#).
5. Exit [Service Mode](#).
6. Follow the procedure in [After working inside your computer](#).

## Power button with fingerprint reader

### Removing the power button with fingerprint reader

#### Prerequisites

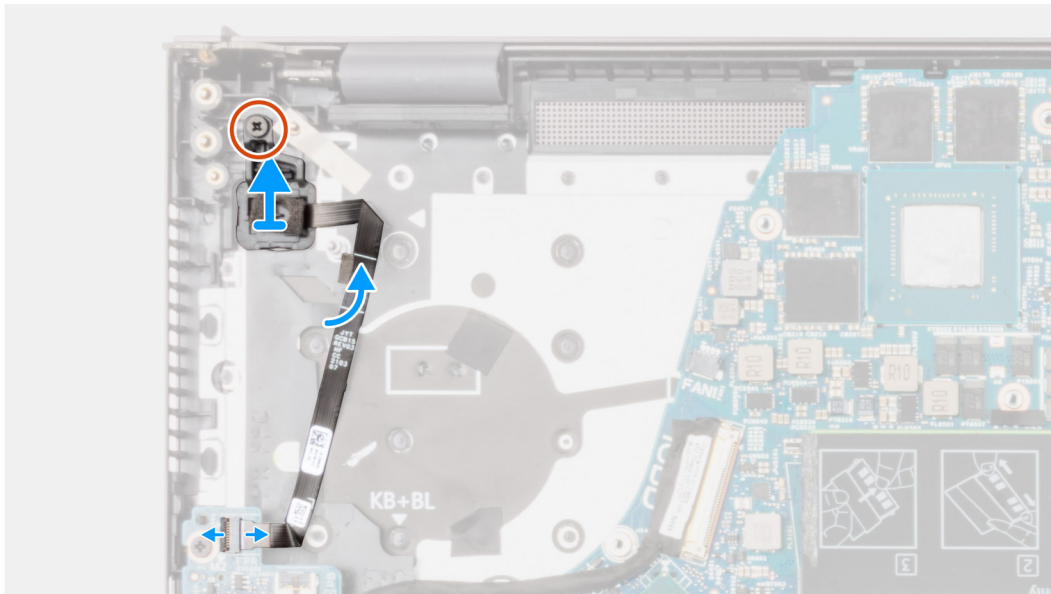
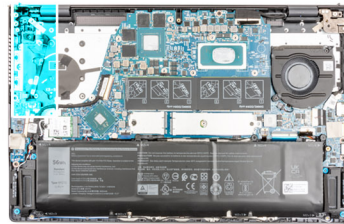
1. Follow the procedure in [Before working inside your computer](#).
2. Enter [Service Mode](#).
3. Remove the [base cover](#).
4. Remove the [heat sink](#).
5. Remove the [GPU fan](#).
6. Remove the [power-button board](#).

### About this task

The following images indicate the location of the power button with fingerprint reader and provide a visual representation of the removal procedure.



**1x**  
M2x4



### Steps

1. Disconnect the power button with fingerprint reader cable from the I/O board.
2. Remove the screw (M2x4) that secures the power button with fingerprint reader to the palm-rest and keyboard assembly.
3. Lift the power button with fingerprint reader along with the cable off the palm-rest and keyboard assembly.

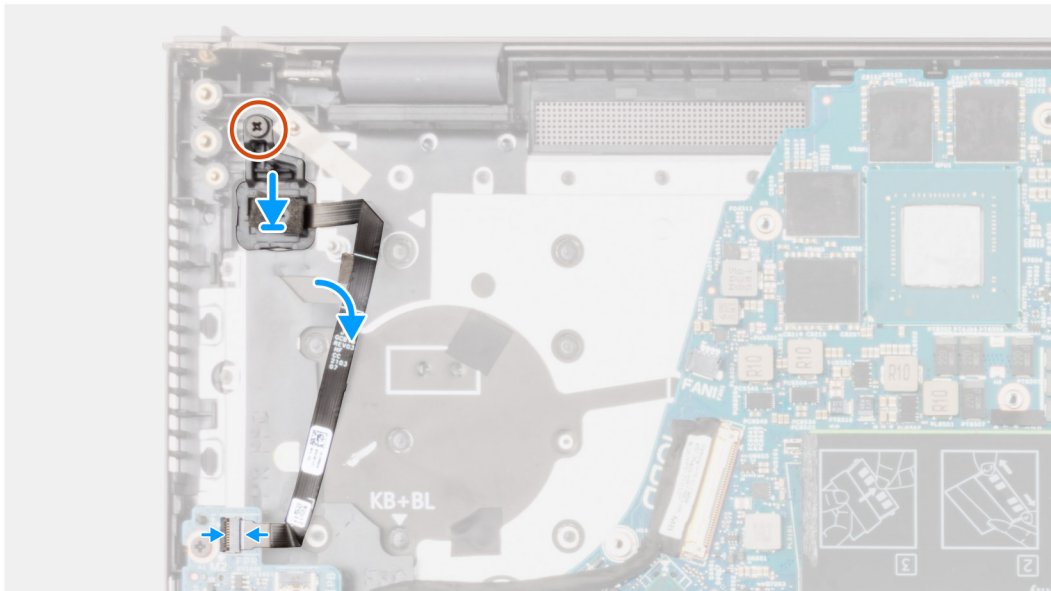
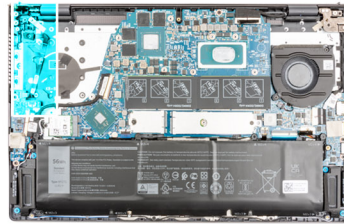
## Installing the power button with fingerprint reader

### About this task

The following images indicate the location of the power button with fingerprint reader and provide a visual representation of the installation procedure.



**1x**  
M2x4



### Steps

1. Align and place the power button with fingerprint reader along with the cable on the palm-rest and keyboard assembly.
2. Replace the screw (M2x4) that secures the power button with fingerprint reader to the palm-rest and keyboard assembly.
3. Connect the power button with fingerprint reader cable to the I/O board.

### Next steps

1. Install the [power-button board](#).
2. Install the [heat sink](#).
3. Install the [GPU fan](#).
4. Install the [base cover](#).
5. Exit [Service Mode](#).
6. Follow the procedure in [After working inside your computer](#).

## Power-adapter port

### Removing the power-adapter port

#### Prerequisites

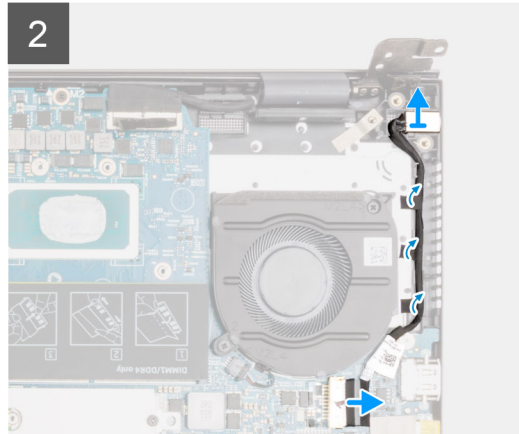
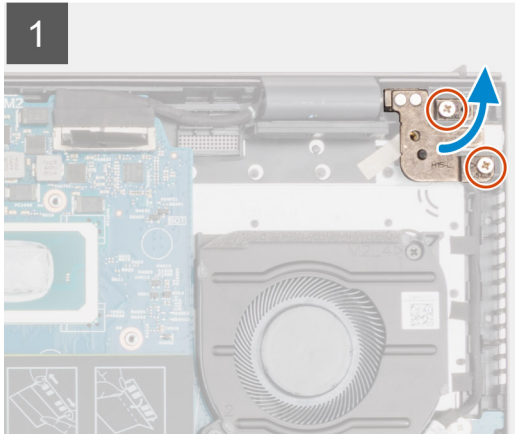
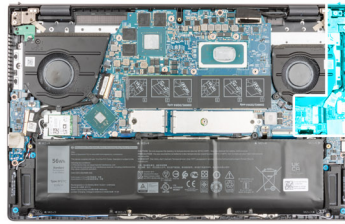
1. Follow the procedure in [Before working inside your computer](#).
2. Enter [Service Mode](#).
3. Remove the [base cover](#).
4. Remove the [heat sink](#).

### About this task

The following images indicate the location of the power-adapter port and provide a visual representation of the removal procedure.



**2x**  
M2.5x5



### Steps

1. Remove the two (M2.5x5) screws that secure the right display-hinge to the system board.
2. Open the display hinge at an angle of 90 degrees.
3. Disconnect the power-adapter port cable from the system board.
4. Peel the tapes that secure the power-adapter port cable to the system board.
5. Remove the power-adapter port cable from the routing guide on the palm-rest and keyboard assembly.
6. Lift the power-adapter port, along with its cable, off the palm-rest and keyboard assembly.

## Installing the power-adapter port

### Prerequisites

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

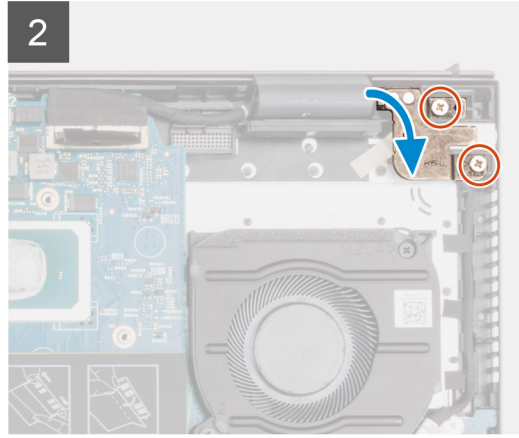
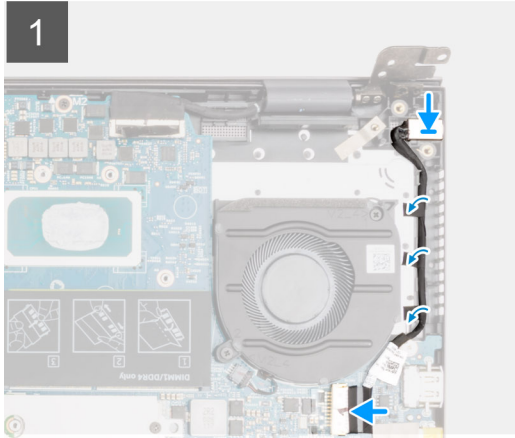
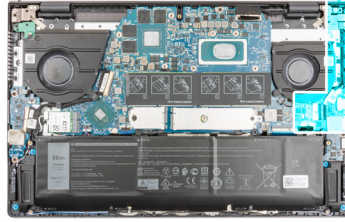
### About this task

The following image indicates the location of the power-adapter port and provides a visual representation of the installation procedure.





**2x**  
M2.5x5



### Steps

1. Place the power-adapter port, along with its cable, into the slot on the palm-rest and keyboard assembly.
2. Route the power-adapter port cable through the routing guide on the palm-rest and keyboard assembly.
3. Adhere the tapes that secure the power-adapter port cable to the system board.
4. Connect the power-adapter port cable to the system board.
5. Close the right display-hinge and align the screw holes on the right display-hinge with the screw holes on the system board and palm-rest and keyboard assembly.
6. Replace the two (M2.5x5) screws that secure the right display-hinge to the system board and palm-rest and keyboard assembly.

### Next steps

1. Install the [heat sink](#).
2. Install the [base cover](#).
3. Exit [Service Mode](#).
4. Follow the procedure in [After working inside your computer](#).

## System board

### Removing the system board

#### Prerequisites

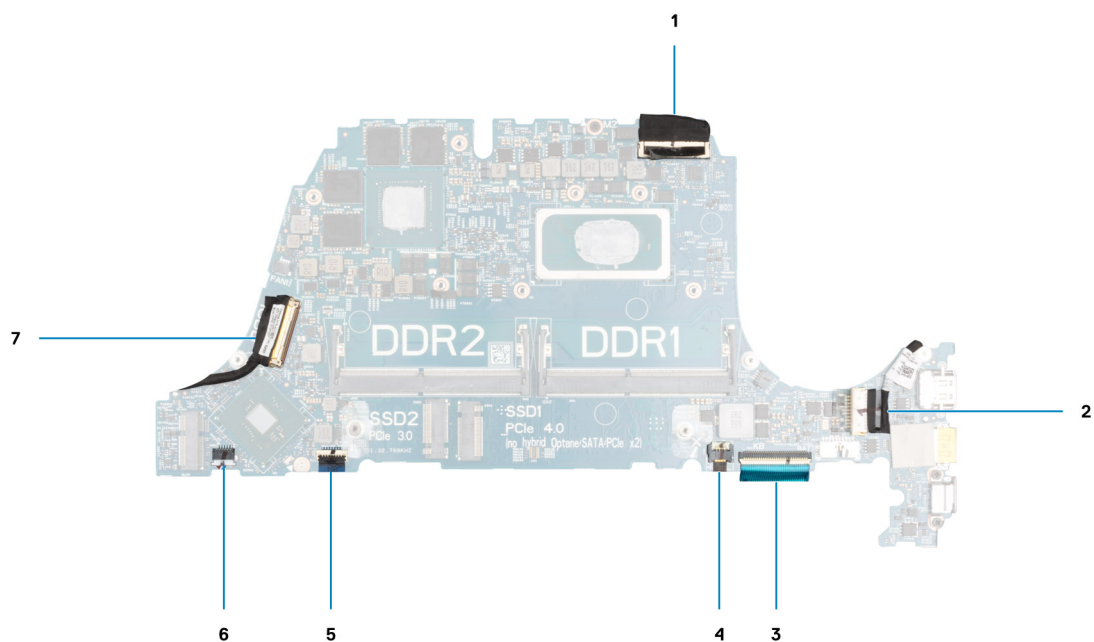
1. Follow the procedure in [Before working inside your computer](#).
  - NOTE:** Your computer's Service Tag is stored in the system board. You must enter the Service Tag in the BIOS setup program after you replace the system board.
  - NOTE:** Replacing the system board removes any changes that you have made to the BIOS using the BIOS setup program. You must make the appropriate changes again after you replace the system board.
  - NOTE:** Before disconnecting the cables from the system board, note the location of the connectors so that you can reconnect the cables correctly after you replace the system board.

2. Remove the [base cover](#).
3. Remove the [battery](#).
4. Remove the [memory module](#).
5. Remove the [M.2 2280 solid-state drive](#) or [M.2 2230 solid-state drive](#) from M.2 slot one, whichever applicable.
6. Remove the [M.2 2230 solid-state drive](#) from M.2 slot two, if applicable.
7. Remove the [wireless card](#).
8. Remove the [GPU fan](#).
9. Remove the [system fan](#).
10. Remove the [heat sink](#).

#### About this task

**NOTE:** When removing the system board to replace/access other parts, the system board can be removed and installed with the heat sink attached in order to simplify the procedure and preserve the thermal bond between the system board and heat-sink.

The following image indicates the connectors on your system board.

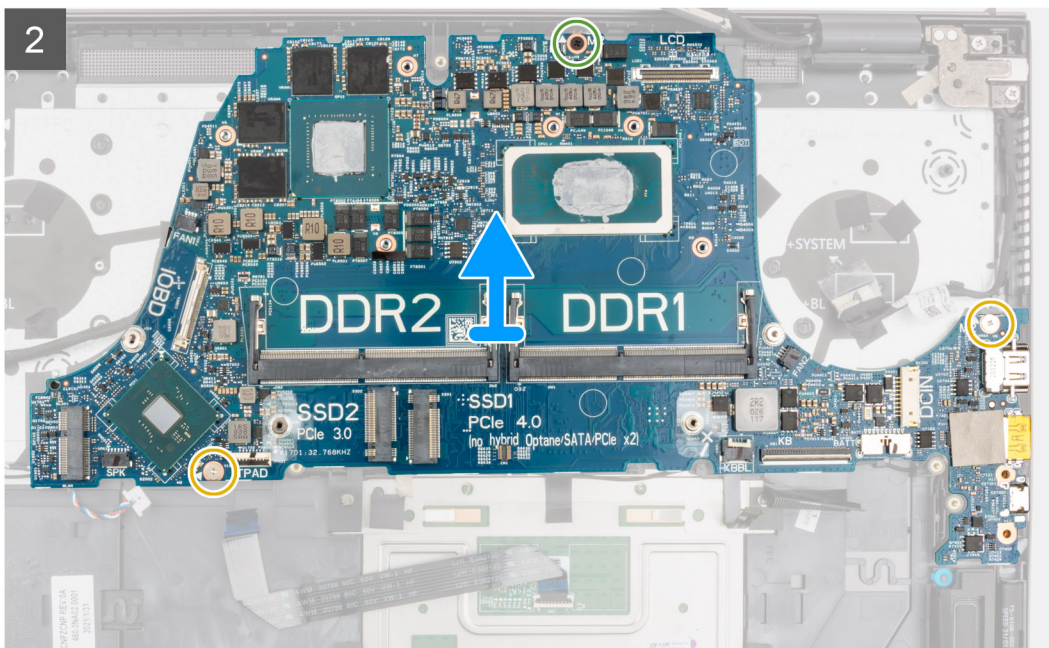
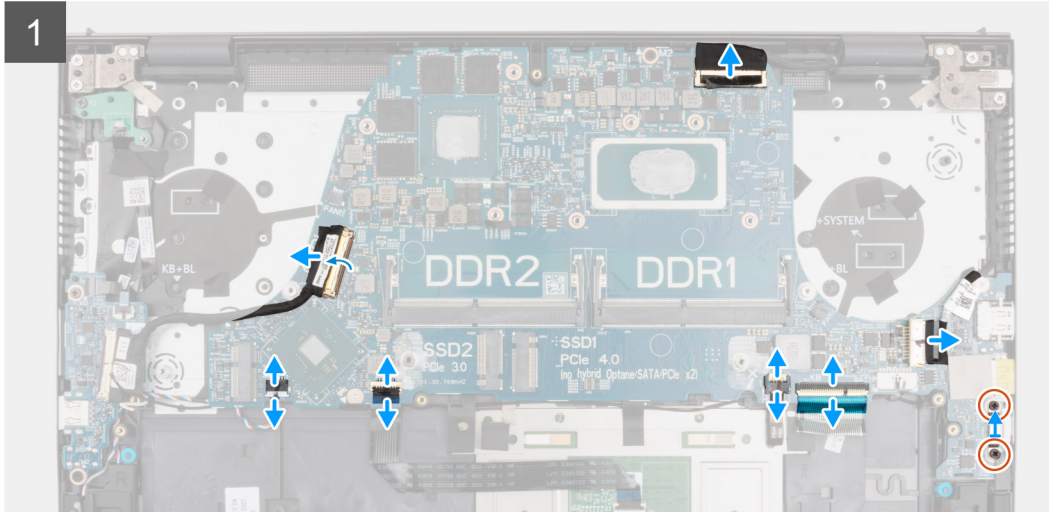
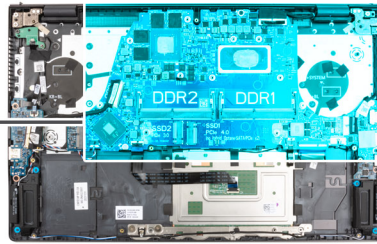
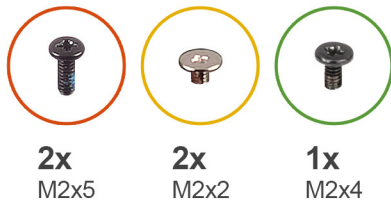


**Figure 1. System board connectors**

1. Display cable connector
2. Power-adaptor port cable connector
3. Keyboard cable connector
4. Keyboard backlit cable connector
5. Touchpad cable connector
6. I/O-board cable connector
7. Speaker cable connector

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





## Steps

1. Peel the tape that secures the display cable to the system board.
2. Open the latch and disconnect the display cable from the system board.
3. Peel the tape and disconnect the I/O-board cable from the system board.
4. Disconnect the speaker cable from the system board.
5. Open the latch, and disconnect the touchpad cable from the system board.
6. Open the latch, and disconnect the keyboard backlit cable from the system board.
7. Open the latch, and disconnect the keyboard cable from the system board.
8. Peel the tape and disconnect the power-adapter port cable from the system board.

9. Remove the two (M2x5) screws that secure the USB Type-C bracket to the system board.
10. Remove the two (M2x2) screws and one (M2x4) screw that secures the system board to the palm-rest and keyboard assembly.
11. Lift the system board off the palm-rest and keyboard assembly.

## Installing the system board

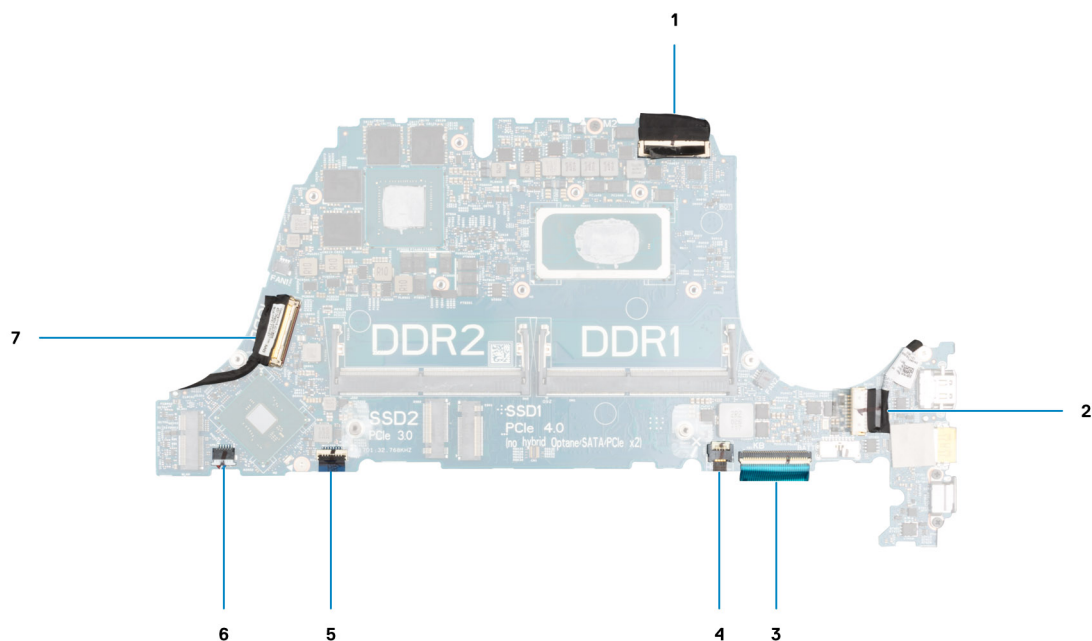
### Prerequisites

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

### About this task

- NOTE:** When replacing/accessing other parts, the system board can be installed with the heat sink attached in order to simplify the procedure and preserve the thermal bond between the system board and heat-sink.
- NOTE:** Your computer's Service Tag is stored in the system board. You must enter the Service Tag in the BIOS setup program after you replace the system board.
- NOTE:** Replacing the system board removes any changes you have made to the BIOS using the BIOS setup program. You must make the appropriate changes again after you replace the system board.

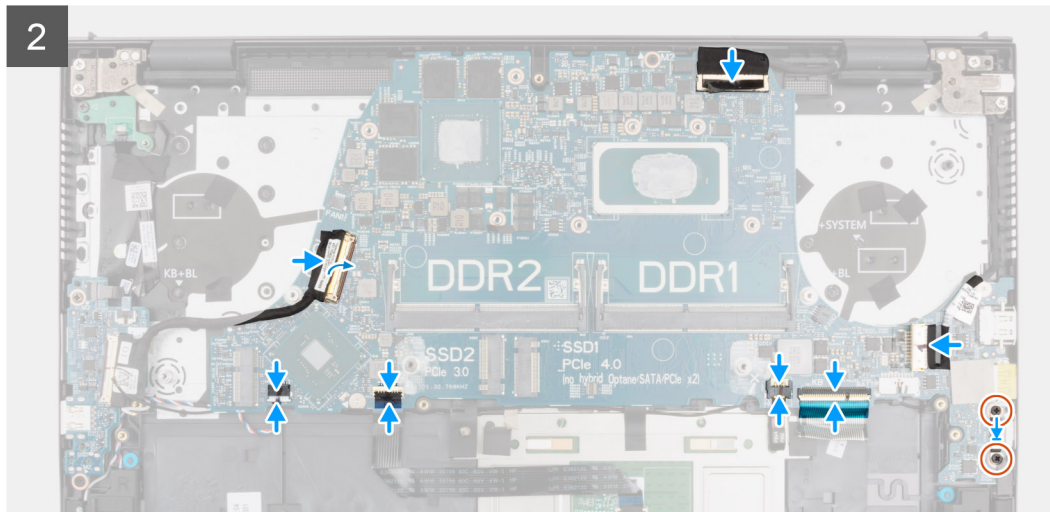
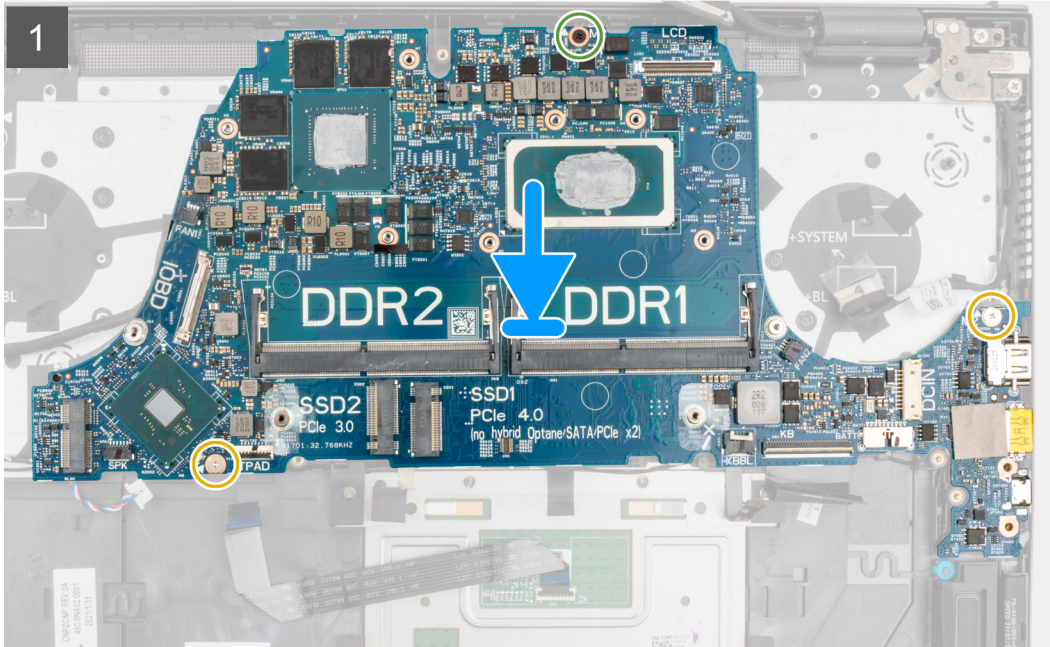
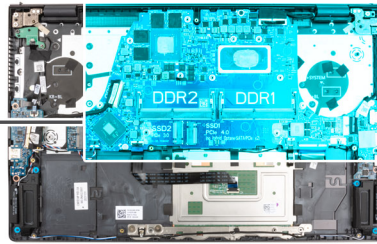
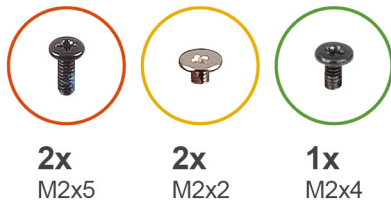
The following image indicates the connectors on your system board.



**Figure 2. System board connectors**

1. Display cable connector
2. Power-adaptor port cable connector
3. Keyboard cable connector
4. Keyboard backlit cable connector
5. Touchpad cable connector
6. I/O-board cable connector
7. Speaker cable connector

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



## Steps

1. Align and place the system board on the palm-rest and keyboard assembly.
2. Replace the two (M2x2) screws and one (M2x4) screw that secure the system board to the palm-rest and keyboard assembly.
3. Connect the display cable to the system board and close the latch to secure the cable.
4. Adhere the tape that secures the display cable to the system board.
5. Connect the power-adaptor port cable to the system board.
6. Adhere the tape that secures the power-adaptor port cable to the system board.
7. Align the screw holes on the USB Type-C port bracket with the screw holes on the system board.
8. Replace the two (M2x5) screws that secure the USB Type-C port bracket to the system board.



9. Connect the keyboard cable to the system board and close the latch to secure the cable.
10. Connect the keyboard backlit cable to the system board and close the latch to secure the cable.
11. Connect the touchpad cable to the system board and close the latch to secure the cable.
12. Connect the speaker cable to the system board.
13. Connect the I/O-board cable to the system board.
14. Adhere the tape that secures the I/O-board cable to the system board.

#### Next steps


1. Install the [heat sink](#).
2. Install the [GPU fan](#).
3. Install the [system fan](#).
4. Install the [wireless card](#).
5. Install the [M.2 2280 solid-state drive](#) or [M.2 2230 solid-state drive](#) in M.2 slot one, whichever applicable.
6. Install the [M.2 2230 solid-state drive](#) in M.2 slot two, if applicable.
7. Install the [memory module](#).
8. Install the [battery](#).
9. Install the [base cover](#).
10. Follow the procedure in [After working inside your computer](#).

## Palm-rest and keyboard assembly

### Removing the palm-rest and keyboard assembly

#### Prerequisites

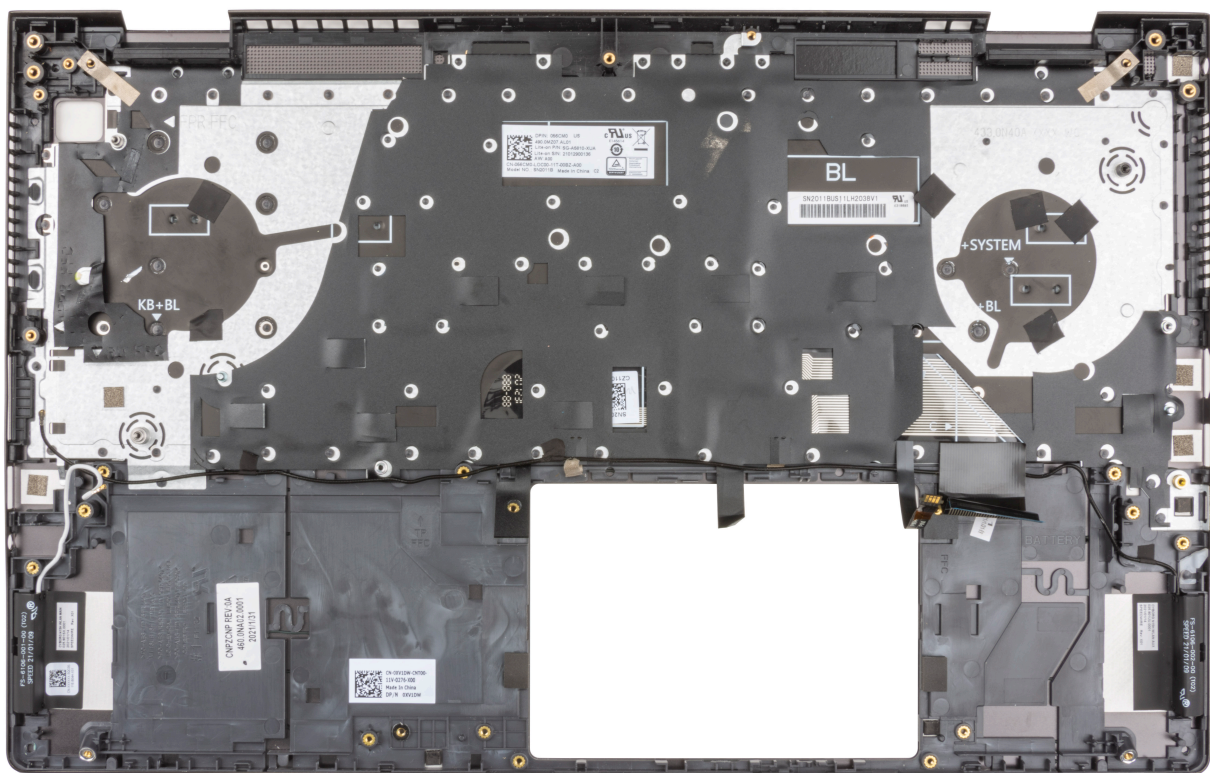
1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [battery](#).
4. Remove the [memory module](#).
5. Remove the [M.2 2280 solid-state drive](#) or [M.2 2230 solid-state drive](#) from M.2 slot one, whichever applicable.
6. Remove the [M.2 2230 solid-state drive](#) from M.2 slot two, if applicable.
7. Remove the [wireless card](#).
8. Remove the [GPU fan](#).
9. Remove the [system fan](#).
10. Remove the [heat sink](#).
11. Remove the [I/O board](#).
12. Remove the [system board](#).

 **NOTE:** The system board can be removed along with the heat sink.

13. Remove the [power-button board](#).
14. Remove the [power button with optional fingerprint reader](#) based on the system configuration.
15. Remove the [power button with fingerprint reader](#) based on the system configuration.
16. Remove the [power-adaptor port](#).
17. Remove the [speakers](#).
18. Remove the [touchpad](#).
19. Remove the [display assembly](#).

#### About this task

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



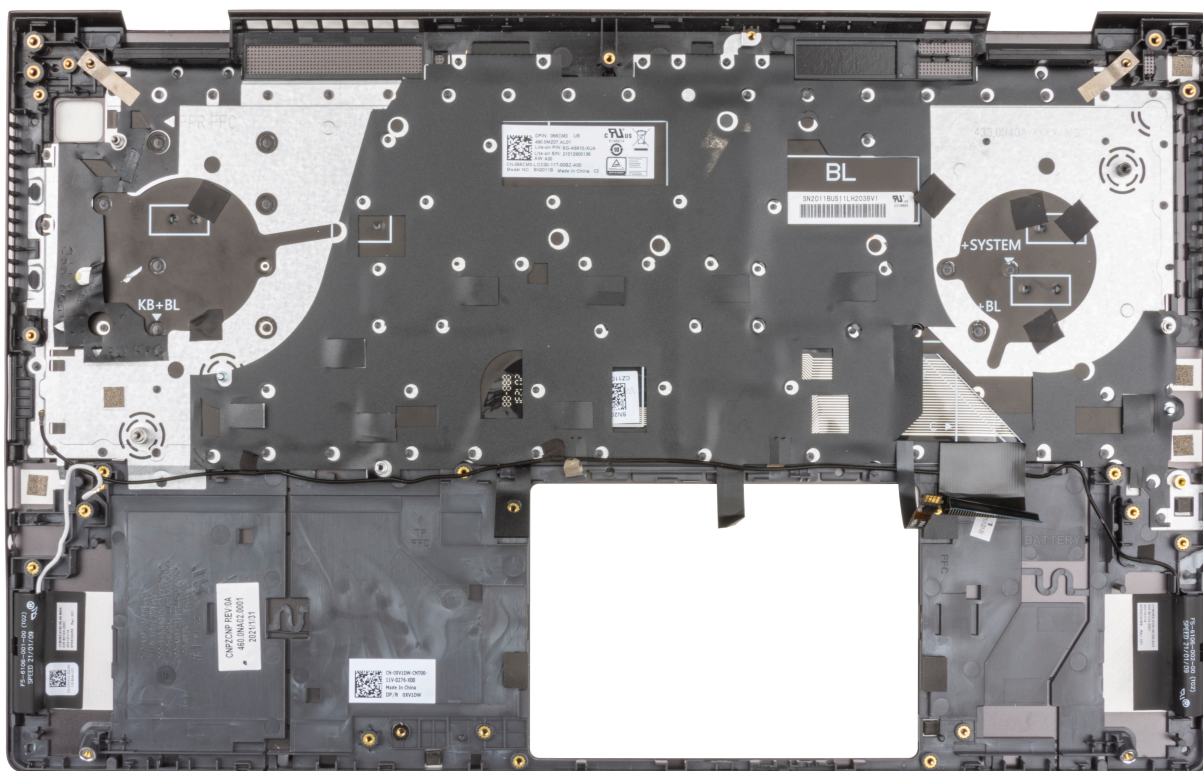
## Installing the palm-rest and keyboard assembly

### Prerequisites

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

### About this task

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



### Next steps

1. Install the [display assembly](#).
2. Install the [touchpad](#).
3. Install the [speakers](#).
4. Install the [power-adapter port](#).
5. Install the [power button with fingerprint reader](#) based on system configuration.
6. Install the [power button with optional fingerprint reader](#) based on system configuration.
7. Install the [power-button board](#).
8. Install the [system board](#).
 


**NOTE:** The system board can be installed along with the heat sink.
9. Install the [I/O board](#).
10. Install the [heat sink](#).
11. Install the [GPU fan](#).
12. Install the [system fan](#).
13. Install the [wireless card](#).
14. Install the [M.2 2280 solid-state drive](#) or [M.2 2230 solid-state drive](#) in M.2 slot one, whichever applicable.
15. Install the [M.2 2230 solid-state drive](#) in M.2 slot two, if applicable.
16. Install the [memory module](#).
17. Install the [battery](#).
18. Install the [base cover](#).
19. Follow the procedure in [After working inside your computer](#).





## Drivers and downloads

When troubleshooting, downloading or installing drivers it is recommended that you read the Dell Knowledge Based article, Drivers and Downloads FAQ [000123347](#).

## System setup

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

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

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

Use the BIOS Setup program for the following purposes:


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

## Entering BIOS setup program


### About this task

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

## Navigation keys

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

**Table 3. Navigation keys**

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


## Boot Sequence

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

- Access System Setup by pressing F2 key

- Bring up the one-time boot menu by pressing F12 key


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

- Removable Drive (if available)
- STXXXX Drive (if available)  
 **NOTE:** XXX denotes the SATA drive number.
- Optical Drive (if available)
- SATA Hard Drive (if available)
- Diagnostics


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

## One time boot menu

To enter **one time boot menu**, turn on your computer, and then press F12 immediately.


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

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

- Removable Drive (if available)
- STXXXX Drive (if available)  
 **NOTE:** XXX denotes the SATA drive number.
- Optical Drive (if available)
- SATA Hard Drive (if available)
- Diagnostics

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

## System setup options

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

**Table 4. System setup options—System information menu**

Overview	
BIOS Version	Displays the BIOS version number.
Service Tag	Displays the Service Tag of the computer.
Asset Tag	Displays the Asset Tag of the computer.
Ownership Tag	Displays the ownership tag of the computer.
Manufacture Date	Displays the manufacture date of the computer.
Ownership Date	Displays the ownership date of the computer.
Express Service Code	Displays the express service code of the computer.
Ownership Tag	Displays the ownership tag of the computer.
Signed Firmware Update	Displays whether the signed firmware update is enabled.
<b>Battery</b>	Displays the battery health information.
Primary	Displays the primary battery.
Battery Level	Displays the battery level.
Battery State	Displays the battery state.

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

Overview		
Health		Displays the battery health.
AC Adapter		Displays whether an AC adapter is installed.
<b>Processor Information</b>		
Processor Type		Displays the processor type.
Maximum Clock Speed		Displays the maximum processor clock speed.
Core Count		Displays the number of cores on the processor.
Processor L2 Cache		Displays the processor L2 Cache size.
Processor ID		Displays the processor identification code.
Processor L3 Cache		Displays the processor L3 Cache size.
Current Clock Speed		Displays the current processor clock speed.
Minimum Clock Speed		Displays the minimum processor clock speed.
Microcode Version		Displays the microcode version.
Intel Hyper-Threading Capable		Displays whether the processor is Hyper-Threading (HT) capable.
64-Bit Technology		Displays whether 64-bit technology is used.
<b>Memory Information</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 capacity of the memory installed in the first DIMM slot.
DIMM_SLOT 2		Displays capacity of the memory installed in the second DIMM slot.
<b>Device Information</b>		
Panel Type		Displays the Panel Type of the computer.
Video Controller		Displays the graphics information of the computer.
Video Memory		Displays the video memory information of the computer.
Video BIOS Version		Displays the video BIOS version of the computer.
Native Resolution		Native Resolution
Audio Controller		Audio Controller
Wi-Fi Device		Wi-Fi Device
Bluetooth Device		Bluetooth Device
dGPU Video Controller		Displays the discrete graphic card used in the computer

**Table 5. System setup options—Boot Configuration menu**

Boot options		
<b>Boot Sequence</b>		
Boot Mode: UEFI only		Displays the boot mode of this computer.
Boot Sequence		Displays the boot sequence.
<b>Secure Boot</b>		
Enable Secure Boot		Ensures the system boots using only to validated boot software.

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

Boot options	
Secure Boot Mode	Changes to Secure Boot operation mode modifies the behavior of the Secure Boot to allow evaluation of UEFI driver signatures. <ul style="list-style-type: none"> <li>• Deployed Mode - Default: ON</li> <li>• Audit Mode - Default: OFF</li> </ul>
<b>Expert Key Management</b>	
Enable Custom Mode	Enables or disables the PK, KEK, db and dbx security key databases to be manipulated. Default: OFF.
Custom Mode Key Management	Default: PK.
<b>Advanced Boot Options</b>	
Enable UEFI Network Stack	Enables or disables UEFI Network Stack. Default: PK

**Table 6. System setup options—Integrated Devices menu**

System Configuration	
<b>HDD Fans</b>	Configures which HDD fans are populated in the sytem.
<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>Camera</b>	Enables or disables the camera
Enable Camera	Default: ON.
<b>Enable Audio</b>	Enables or disables all integrated audio controller. Default: ON.
<b>Enable Microphone</b>	Enables or disables microphone. Default: ON.
<b>Enable Internal Speaker</b>	Enables or disables internal speaker. Default: ON.
<b>USB/Thunderbolt Configuration</b>	
Enable External USB Ports	Enables or disables USB ports to be functional in an operating system environment. Default: ON.
Enable USB Boot Support	Enables or disables booting from USB mass storage devices such as external hard drive, optical drive, and USB drive. Default: ON.
<b>Enable Thunderbolt Boot Support</b>	Enables or disables the Thunderbolt features during preboot. Default: OFF.
<b>Enable Thunderbolt (and PCIE behind TBT) pre-boot modules</b>	Enables or disables the PCIE devices connected through a Thunderbolt adapter to execute the PCIE device's UEFI option ROM(s) present during preboot. Default: OFF.

**Table 6. System setup options—Integrated Devices menu (continued)**

System Configuration	
Video/Power only on Type-C Ports	Limits Type-C port functionality to video or power only. Default: OFF.
<b>SATA Operation</b>	Configures operating mode of the integrated SATA hard drive controller. Default: RAID. SATA is configured to support RAID (Intel Rapid Restore Technology).
<b>Drives</b>	Enables or disables various onboard drives.
M.2 PCIe SSD-0/SATA-2	Default: ON.
SATA-0	Default: ON.
Drive Information	Displays the information of various onboard drives.

**Table 7. System setup options—Storage menu**

Storage	
<b>Storage Interface</b>	
Port Enablement	Enables or disables onboard drives Default: ON.
<b>SMART Reporting</b>	
Enable SMART Reporting	Enables or disables the S.M.A.R.T.(Self-Monitoring, Analysis, and Reporting Technology) option on the system. Default: OFF.
<b>Drive Information</b>	
M.2 PCIe SSD-1	Provides information about the type and device on the computer.

**Table 8. System setup options—Display menu**


Storage	
<b>Display Brightness</b>	
Brightness on battery power	Sets the screen brightness when the computer is running on battery power.
Brightness on AC power	Sets the screen brightness when the computer is running on AC power.
<b>Full-Screen Logo</b>	Displays full screen logo if the image matches screen resolution. Default: OFF.

**Table 9. System setup options—Connection menu**


Connection	
<b>Wireless Device Enable</b>	Enable or disable internal WLAN/Bluetooth devices.
WLAN	Default: ON.
Bluetooth	Default: ON.
<b>Enable UEFI Network Stack</b>	Allows pre-OS and early OS networking features to use any enabled NICs. This may be used without the PXE turned on. Default: Selective Enabled.
<b>HTTP(s) Boot Feature</b>	
HTTP(s) Boot	This platform has HTTP(s) Boot capabilities.



**Table 9. System setup options—Connection menu (continued)**

Connection	
	<p>Default: ON.</p> <p> <b>NOTE:</b> Provisioning of the Certificate is necessary to connect to HTTPs Boot server.</p>

**Table 10. System setup options—Power Management menu**

Power Management	
<b>Battery Configuration</b>	<p>Enables the computer to run on battery during peak power usage hours. Use the below options to prevent AC power usage between certain times of each day.</p> <p>Default: Adaptive. Battery settings are adaptively optimized based on your typical battery usage pattern.</p>
<b>Enable Advanced Battery Charge Configuration</b>	<p>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.</p> <p>Default: OFF.</p>
<b>Enable Peak Shift</b>	<p>Enables the system to run on battery during peak power usage hours.</p> <p>Default: OFF.</p>
<b>Thermal Management</b>	<p>Allows for cooling fan and processor heat management to adjust system performance, noise, and temperature.</p> <p>Default: Optimized.</p>
<b>Enable USB Wake Support</b>	<p>Enables the USB devices to wake the computer from Standby mode, Hibernate and Power Off.</p> <p>Default: OFF.</p>
<b>Enable on Dell USB-C Dock</b>	<p>Enables the Dell USB-C Dock when connected to wake the computer from Standby mode, Hibernate and Power Off.</p> <p>Default: ON.</p>
<b>Block Sleep</b>	<p>Blocks the computer from entering Sleep (S3) mode in the operating system.</p> <p>Default: OFF.</p> <p> <b>NOTE:</b> 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.</p>
<b>Lid Switch</b>	
Enable Lid Switch	<p>Enables or disables lid switch.</p> <p>Default: ON.</p>
Power On Lid Open	<p>Enables the computer to power up from the off state whenever the lid is opened.</p> <p>Default: ON.</p>
<b>Intel Speed Shift Technology</b>	<p>Enables or disables Intel Speed Shift Technology support which enables the operating system to select the appropriate processor performance automatically.</p> <p>Default: ON.</p>

**Table 11. System setup options—Security menu**

Security	
<b>TPM 2.0 Security</b>	
TPM 2.0 Security On	<p>Enable or disable TPM 2.0 security options.</p> <p>By default, the <b>TPM 2.0 Security On</b> option is enabled.</p>
Attestation Enable	<p>Enables to control whether the Trusted Platform Module (TPM) Endorsement Hierarchy is available to the operating system.</p> <p>By default, the <b>Attestation Enable</b> option is enabled.</p>
Key Storage Enable	<p>Enables to control whether the Trusted Platform Module (TPM) Storage Hierarchy is available to the operating system.</p> <p>By default, the <b>Key Storage Enable</b> option is enabled.</p>
SHA-256	<p>BIOS and the TPM will use the SHA-256 hash algorithm to extend measurements into the TPM PCRs during BIOS boot.</p> <p>By default, the <b>SHA-256</b> option is enabled.</p>
Clear	<p>Enables to clear the TPM owner information and returns the TPM to the default state.</p> <p>By default, the <b>Clear</b> option is disabled.</p>
PPI ByPass for Clear Commands	<p>Controls the TPM Physical Presence Interface (PPI).</p> <p>By default, the <b>PPI ByPass for clear Commands</b> option is disabled.</p>
<b>SMM Security Mitigation</b>	
	<p>Enable or disable SMM Security Mitigation.</p> <p>By default, the option is disabled.</p>
<b>Data Wipe on Next Boot</b>	
Start Data Wipe	<p>Enable or disable the data wipe on next boot.</p> <p>By default, the option is disabled.</p>
Absolute	<p>Enable or disable or permanently disable the BIOS module interface of the optional Absolute Persistence Module service from Absolute software.</p> <p>By default, the <b>Enable Absolute</b> option is enabled.</p>
UEFI Boot Path Security	<p>Controls whether or not the computer will prompt the user to enter the admin password (if set) when booting to a UEFI boot device from the F12 boot menu.</p> <p>By default, the <b>Always Except Internal HDD</b> option is enabled.</p>

**Table 12. System setup options—Passwords menu**

Passwords	
<b>Admin Password</b>	Set, change, or delete the administrator password.
<b>System Password</b>	Set, change, or delete the computer password.
<b>M.2 PCIe SSD-1</b>	Set, change, or delete the M.2 PCIe SSD-1 password.
<b>Password Configuration</b>	
Upper Case Letter	<p>Reinforces password must have at least one upper case letter.</p> <p>By default, the option is disabled.</p>
Lower Case Letter	<p>Reinforces password must have at least one lower case letter.</p> <p>By default, the option is disabled.</p>
Digit	<p>Reinforces password must have at least one digit.</p> <p>By default, the option is disabled.</p>

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

<b>Passwords</b>	
Special Character	Reinforces password must have at least one special character. By default, the option is disabled.
Minimum Characters	Set the minimum characters allowed for password - <b>4</b> is minimum.
Password Bypass	When enabled, this always prompts for computer and internal hard drive passwords when powered on from the off state. By default, the <b>Disabled</b> option is enabled.
<b>Password Changes</b>	
Enable Non-Admin Password Changes	Enable or disable to change computer and hard drive password without the need for admin password. By default, the option is enabled.
<b>Admin Setup Lockout</b>	
Enable Admin Setup Lockout	Enables administrators control over how their users can or cannot access BIOS setup. By default, the option is disabled.
<b>Master Password Lockout</b>	
Enable Master Password Lockout	When enabled, this will disable the master password support. By default, the option is disabled.
<b>Allow Non-Admin PSID Revert</b>	
Enable Allow Non-Admin PSID Revert	Controls access to the Physical Security ID (PSID) revert of NVMe hard-drives from the Dell Security Manager prompt. By default, the option is disabled.

**Table 13. System setup options—Update, Recovery menu**

<b>Update, Recovery</b>	
<b>UEFI Capsule Firmware Updates</b>	Enable or disable BIOS updates through UEFI capsule update packages. By default, the option is enabled.
<b>BIOS Recovery from Hard Drive</b>	Enables the user to recover from certain corrupted BIOS conditions from a recovery file on the user primary hard drive or an external USB key. By default, the option is enabled.
<b>BIOS Downgrade</b>	
Allow BIOS Downgrade	Enable or disable the flashing of the computer firmware to previous revision is blocked. By default, the option is enabled.
<b>SupportAssist OS Recovery</b>	Enable or disable the boot flow for SupportAssist OS Recovery tool in the event of certain computer errors. By default, the option is enabled.
BIOSConnect	Enable or disable cloud Service OS recovery 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 and local Service OS does not boot or is not installed. By default, the option is enabled.

**Table 13. System setup options—Update, Recovery menu (continued)**

Update, Recovery	
Dell Auto OS Recovery Threshold	Controls the automatic boot flow for SupportAssist System Resolution Console and for Dell OS Recovery Tool.  By default, the threshold value is set to 2.

**Table 14. System setup options—System Management menu**

System Management	
<b>Service Tag</b>	Displays the Service Tag of the computer.
<b>Asset Tag</b>	Create a computer Asset Tag.
<b>AC Behavior</b>	
Wake on AC	Enable or disable the wake on AC option.  By default, the option is enabled.
<b>Auto on Time</b>	Enable to set the computer to turn on automatically every day or on a preselected date and time. This option can be configured only if the Auto On Time is set to Everyday, Weekdays, or Selected Days.  By default, the option is disabled.
<b>First Power On Date</b>	Allows you to set ownership date.  By default, the option is disabled.

**Table 15. System setup options—Keyboard menu**

Keyboard	
<b>Numlock Enable</b>	Enable or disable the Numlock function when the computer boots.  By default, the option is enabled.
<b>Fn Lock Options</b>	By default, the Fn lock option is enabled.
Lock Mode	<ul style="list-style-type: none"> <li>Lock Mode Standard - Traditional F1-F12 functions</li> <li>Lock Mode Secondary - Enables secondary functions on the Fn keys.</li> </ul>
Keyboard illumination	Allows you to set Keyboard illumination settings.  By default, the <b>Bright</b> option is enabled.
Keyboard Backlight Timeout on AC	Defines the timeout value for keyboard backlight when AC adapter is plugged into the system.  By default, the option <b>1 minute</b> is enabled.
Keyboard Backlight Timeout on Battery	Defines the timeout value for keyboard backlight when the system is running only on system power.  By default, the option <b>1 minute</b> is enabled.

**Table 16. System setup options—Pre-boot Behavior menu**

Pre-boot Behavior	
<b>Adapter Warnings</b>	
Enable Adapter Warnings	Enable or disable the warning messages during boot when the adapters with less power capacity are detected.  By default, the option is enabled.
<b>Warnings and Errors</b>	Enable or disable the action to be done when a warning or error is encountered.  By default, the <b>Prompt on Warnings and Errors</b> option is enabled.

**Table 16. System setup options—Pre-boot Behavior menu (continued)**

Pre-boot Behavior	
<b>USB-C Warnings</b>	<p>Enable or disable dock warning messages.</p> <p>By default, the <b>Enable Dock Warning Messages</b> option is enabled.</p>
<b>Fastboot</b>	<p>Enable to set the speed of the boot process.</p> <p>By default, the <b>Thorough</b> option is enabled.</p>
<b>Extend BIOS POST Time</b>	<p>Set the BIOS POST time.</p> <p>By default, the <b>0 seconds</b> option is enabled.</p>

**Table 17. System setup options—Virtualization menu**

Virtualization	
<b>Intel Virtualization Technology</b>	
Enable Intel Virtualization Technology (VT)	<p>Specify whether a Virtual Machine Monitor (VMM) can utilize the additional hardware capabilities provided by Intel Virtualization Technology.</p> <p>By default, the option is enabled.</p>
<b>VT for Direct I/O</b>	<p>Specify whether a Virtual Machine Monitor (VMM) can utilize the additional hardware capabilities provided by Intel Virtualization Technology for Direct I/O.</p> <p>By default, the option is enabled.</p>

**Table 18. System setup options—Performance menu**

Performance	
<b>Multi Core Support</b>	
Active Cores	<p>Enables to change the number of CPU cores available to the operating system.</p> <p>By default, the <b>All Cores</b> options is enabled.</p>
<b>Intel SpeedStep</b>	
Enable Intel SpeedStep Technology	<p>Enables the computer to dynamically adjust processor voltage and core frequency, decreasing average power consumption and heat production.</p> <p>By default, the option is enabled.</p>
<b>C-States Control</b>	
Enable C-State Control	<p>Enable or disable additional processor sleep states.</p> <p>By default, the option is enabled.</p>
<b>Enable Adaptive C-States for Discrete Graphics</b>	<p>Adaptive C-states will allow for the system to dynamically detect high usage of discrete graphics and adjust system parameters during that time period.</p> <p>By default, the option is enabled.</p>
<b>Intel Turbo Boost Technology</b>	
Enable Intel Turbo Boost Technology	<p>Enable or disable Intel TurboBoost mode of the processor.</p> <p>By default, the option is enabled.</p>
<b>Intel Hyper-Threading Technology</b>	
Enable Intel Hyper-Threading Technology	<p>Enable or disable Hyper-Threading in the processor.</p> <p>By default, the option is enabled.</p>
<b>Enable Dynamic Tuning:Machine Learning</b>	<p>Enable or disable OS capability to enhance dynamic power tuning capabilities based on detected workloads.</p> <p>By default, the option is disabled.</p>

**Table 19. System setup options—System Logs menu**

System Logs		
<b>BIOS Event Log</b>		
Clear Bios Event Log	Display BIOS events.	
	By default, the <b>Keep Log</b> option is enabled.	
<b>Thermal Event Log</b>		
Clear Thermal Event Log	Display Thermal events.	
	By default, the <b>Keep Log</b> option is enabled.	
<b>Power Event Log</b>		
Clear Power Event Log	Display power events.	
	By default, the <b>Keep Log</b> option is enabled.	
<b>License Information</b>	Displays the license information of the computer.	

## System and setup password


**Table 20. System and setup password**

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

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

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

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

 **NOTE:** System and setup password feature is disabled.

## Assigning a system setup password

### Prerequisites

You can assign a new **System or Admin Password** only when the status is in **Not Set**.

### About this task

To enter the system setup, press F12 immediately after a power-on or reboot.

### Steps

1. In the **System BIOS** or **System Setup** screen, select **Security** and press Enter.  
The **Security** screen is displayed.
2. Select **System/Admin Password** and create a password in the **Enter the new password** field.  
Use the following guidelines to assign the system password:
  - A password can have up to 32 characters.
  - At least one special character: ! " # \$ % & ' ( ) \* + , - . / : ; < = > ? @ [ \ ] ^ \_ ` { | }
  - Numbers 0 through 9.
  - Upper case letters from A to Z.
  - Lower case letters from a to z.



3. Type the system password that you entered earlier in the **Confirm new password** field and click **OK**.
4. Press Esc and save the changes as prompted by the pop-up message.
5. Press Y to save the changes.  
The computer restarts.

## Deleting or changing an existing system setup password


### Prerequisites

Ensure that the **Password Status** is Unlocked (in the System Setup) before attempting to delete or change the existing System and/or Setup password. You cannot delete or change an existing System or Setup password, if the **Password Status** is Locked.

### About this task

To enter the System Setup, press F12 immediately after a power-on or reboot.

### Steps

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

## Clearing CMOS settings

### About this task

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


### Steps

1. Remove the [base cover](#).
2. Disconnect the battery cable from the system board.
3. Wait for one minute.
4. Connect the battery cable to the system board.
5. Replace the [base cover](#).

## Clearing BIOS (System Setup) and System passwords

### About this task


To clear the system or BIOS passwords, contact Dell technical support as described at [www.dell.com/contactdell](http://www.dell.com/contactdell).

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

# Updating the BIOS

## Updating the BIOS in Windows

### Steps

1. Go to [www.dell.com/support](http://www.dell.com/support).
2. Click **Product support**. In the **Search support** box, enter the Service Tag of your computer, and then click **Search**.  
 **NOTE:** If you do not have the Service Tag, use the SupportAssist feature to automatically identify your computer. You can also use the product ID or manually browse for your computer model.
3. Click **Drivers & Downloads**. Expand **Find drivers**.
4. Select the operating system installed on your computer.
5. In the **Category** drop-down list, select **BIOS**.
6. Select the latest version of BIOS, and click **Download** to download the BIOS file for your computer.
7. After the download is complete, browse the folder where you saved the BIOS update file.
8. Double-click the BIOS update file icon and follow the on-screen instructions.  
For more information, see knowledge base article [000124211](https://www.dell.com/support/article/000124211) at [www.dell.com/support](http://www.dell.com/support).

## Updating the BIOS using the USB drive in Windows

### Steps

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

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


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

### About this task

#### BIOS Update

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

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

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


### Updating from the One-Time boot menu

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

- USB drive formatted to the FAT32 file system (key does not have to be bootable)
- BIOS executable file that you downloaded from the Dell Support website and copied to the root of the USB drive

- AC power adapter that is connected to the computer
- Functional computer battery to flash the BIOS

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

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

### Steps

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

## Troubleshooting

### Handling swollen Lithium-ion batteries

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

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

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

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

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

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

### Locate the Service Tag or Express Service Code of your Dell computer

Your Dell computer is uniquely identified by a Service Tag or Express Service Code. To view relevant support resources for your Dell computer, we recommend entering the Service Tag or Express Service Code at [www.dell.com/support](http://www.dell.com/support).

For more information on how to find the Service Tag for your computer, see [Locate the Service Tag for your Dell Laptop](#).

# System-diagnostic lights

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

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

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

**Off:**

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

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

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

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

**NOTE:** The following diagnostic light codes and recommended solutions are intended for Dell service technicians to troubleshoot problems. You should only perform troubleshooting and repairs as authorized or directed by the Dell technical support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty.

**Table 21. Diagnostic-light codes**


Diagnostic light codes (Amber, white)	Problem description
1,1	TPM detection failure
1,2	Unrecoverable SPI flash failure
1,3	Short in hinge cable tripped OCP1
1,4	Short in hinge cable tripped OCP2
1,5	EC unable to program i-Fuse
1,6	EC internal Failure
2,1	Processor failure
2,2	System board: BIOS or ROM (Read-Only Memory) failure
2,3	No memory or RAM (Random-Access Memory) detected
2,4	Memory or RAM (Random-Access Memory) failure
2,5	Invalid memory installed
2,6	System-board or chipset error
2,7	Display failure - SBIOS message
2,8	LCD failure (EC detection of power rail failure)
3,2	PCI, video card/chip failure
3,3	BIOS recovery image not found
3,4	Recovery image found but invalid
3,5	Power-rail failure
3,6	System BIOS Flash incomplete
3,7	Management Engine (ME) error

# SupportAssist diagnostics

## About this task

The SupportAssist diagnostics (previously known as ePSA diagnostics) performs a complete check of your hardware. The SupportAssist diagnostics is embedded in the BIOS and is launched by it internally. The SupportAssist diagnostics provides a set of options for particular devices or device groups. It allows you to:

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

 **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](#).


## Backup media and recovery options

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


## Built-in self-test (BIST)

### M-BIST

M-BIST (Built In Self-Test) is the system board's built-in self-test diagnostics tool that improves the diagnostics accuracy of system board embedded controller (EC) failures.

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

### How to run M-BIST

 **NOTE:** M-BIST must be initiated on the system from a power-off state either connected to AC power or with battery only.

1. Press and hold both the **M** key on the keyboard and the **power button** to initiate M-BIST.
2. With both the **M** key and the **power button** held down, the battery indicator LED may exhibit two states:
  - a. OFF: No fault detected with the system board
  - b. AMBER: Indicates a problem with the system board
3. If there is a failure with the system board, the battery status LED will flash one of the following error codes for 30 seconds:

**Table 22. 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	Unrecoverable SPI Failure



4. If there is no failure with the system board, the LCD will cycle through the solid color screens described in the LCD-BIST section for 30 seconds and then power off.


## LCD Built-in Self Test (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 PC settings.

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

### How to invoke LCD BIST Test

1. Power off the Dell laptop.
2. Disconnect any peripherals that are connected to the laptop. Connect only the AC adapter (charger) to the laptop.
3. Ensure that the LCD (screen) is clean (no dust particles on the surface of the screen).
4. Press and hold **D** key and **Power on** the laptop to enter LCD built-in self test (BIST) mode. Continue to hold the D key, until the system boots up.
5. The screen will display solid colors and change colors on the entire screen to white, black, red, green, and blue twice.
6. Then it will display 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 system will shut down.

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

## Recovering the operating system

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

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


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

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

## WiFi power cycle

### About this task

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

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

### Steps

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

7. Turn on your computer.

## Drain residual 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 are requested to drain residual flea power before removing or replacing any components in your computer.

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

### To drain residual flea power (perform a hard reset)


#### Steps

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

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


## Real Time Clock—RTC reset

The Real Time Clock (RTC) reset function allows you or the service technician to recover the recently launched model Dell Latitude and Precision systems from **No POST/No Boot/No Power** situations. You can initiate the RTC reset on the system from a power-off state only if it is connected to AC power. Press and hold the power button for 25 seconds. The system RTC reset occurs after you release the power button.

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

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

- Service Tag
- Asset Tag
- Ownership Tag
- Admin Password
- System Password
- HDD Password
- Key Databases
- System Logs

 **NOTE:** The IT administrator's vPro account and password on the system will be un-provisioned. The system needs to go through the setup and configuration process again to reconnect it to the vPro server.

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

- Boot List
- Enable Legacy Option ROMs



- Secure Boot Enable
- Allow BIOS Downgrade

# 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="http://www.dell.com">www.dell.com</a>
My Dell app	
Tips	
Contact Support	In Windows search, type <code>Contact Support</code> , and press Enter.
Online help for operating system	<a href="http://www.dell.com/support/windows">www.dell.com/support/windows</a>
Access top solutions, diagnostics, drivers and downloads, and learn more about your computer through videos, manuals and documents.	<p>Your Dell computer is uniquely identified by 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="http://www.dell.com/support">www.dell.com/support</a>.</p> <p>For more information on how to find the Service Tag for your computer, see <a href="#">Locate the Service Tag on your computer</a>.</p>
Dell knowledge base articles for a variety of computer concerns	<ol style="list-style-type: none"> <li>1. Go to <a href="http://www.dell.com/support">www.dell.com/support</a>.</li> <li>2. On the menu bar at the top of the Support page, select <b>Support &gt; Knowledge Base</b>.</li> <li>3. In the Search field on the Knowledge Base page, type the keyword, topic, or model number, and then click or tap the search icon to view the related articles.</li> </ol>

## Contacting Dell

To contact Dell for sales, technical support, or customer service issues, see [www.dell.com/contactdell](http://www.dell.com/contactdell).

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

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