

Dell G15 5510

Service Manual



Notes, cautions, and warnings

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

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

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

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Working inside your computer

Before working inside your computer

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

Before you begin

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.
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.

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

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

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

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

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

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

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

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

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

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

Electrostatic discharge—ESD protection

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

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

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

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

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

Perform the following steps to prevent ESD damage:

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

ESD field service kit

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

Components of an ESD field service kit

The components of an ESD field service kit are:

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

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

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

ESD protection summary

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

Transporting sensitive components

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

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
- Flat-head screwdriver
- 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	Secured to	Screw type	Quantity	Screw image
Base cover	Palm-rest and keyboard assembly	M2x6	4	 NOTE: Screw color may vary depending on the configuration ordered.
4-cell Battery	Palm-rest and keyboard assembly	M2x4	4	
Touchpad bracket	Palm-rest and keyboard assembly	M2x2	7	
Rear cover	Palm-rest and keyboard assembly	M2x2	2	
Rear cover	Palm-rest and keyboard assembly	M2.5x5	2	
Display-hinge brackets	Palm-rest and keyboard assembly	M2.5x4	4	
SSD1	Solid-state drive bracket	M2x4	2	

Table 1. Screw list (continued)

Component	Secured to	Screw type	Quantity	Screw image
SSD2	Solid-state drive bracket	M2x4	2	
Wireless-card bracket	System board	M2x4	1	
Power-adaptor port	Palm-rest and keyboard assembly	M2x4	2	
Left fan	Palm-rest and keyboard assembly	M2x6	2	
Right fan	Palm-rest and keyboard assembly	M2x6	2	
Power button	Palm-rest and keyboard assembly	M2x2	2	
System board	Palm-rest and keyboard assembly	M2x4	4	
USB board	System board	M2x4	2	
I/O board	System board	M2x4	2	
Power-button shield	Palm-rest and keyboard assembly	M2x2	2	

Base cover

Removing the base cover

Prerequisites

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

About this task

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



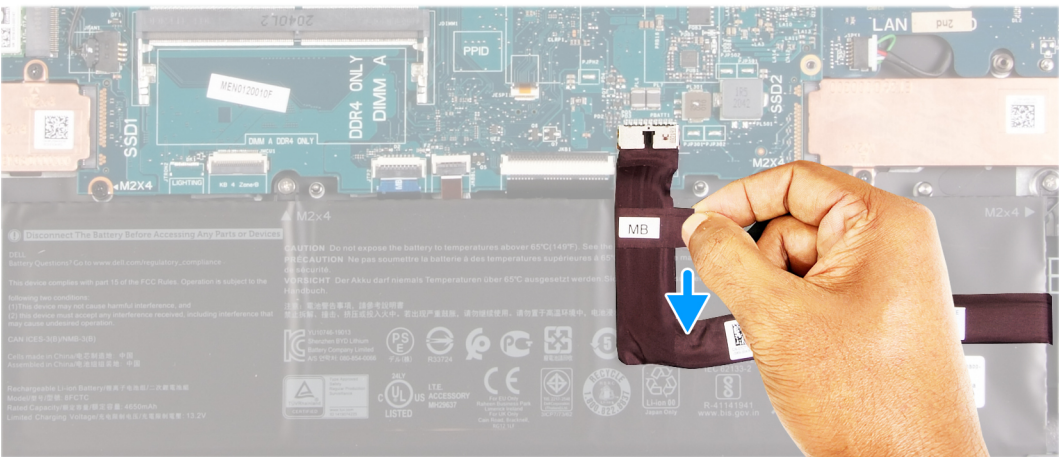
4x
M2x6

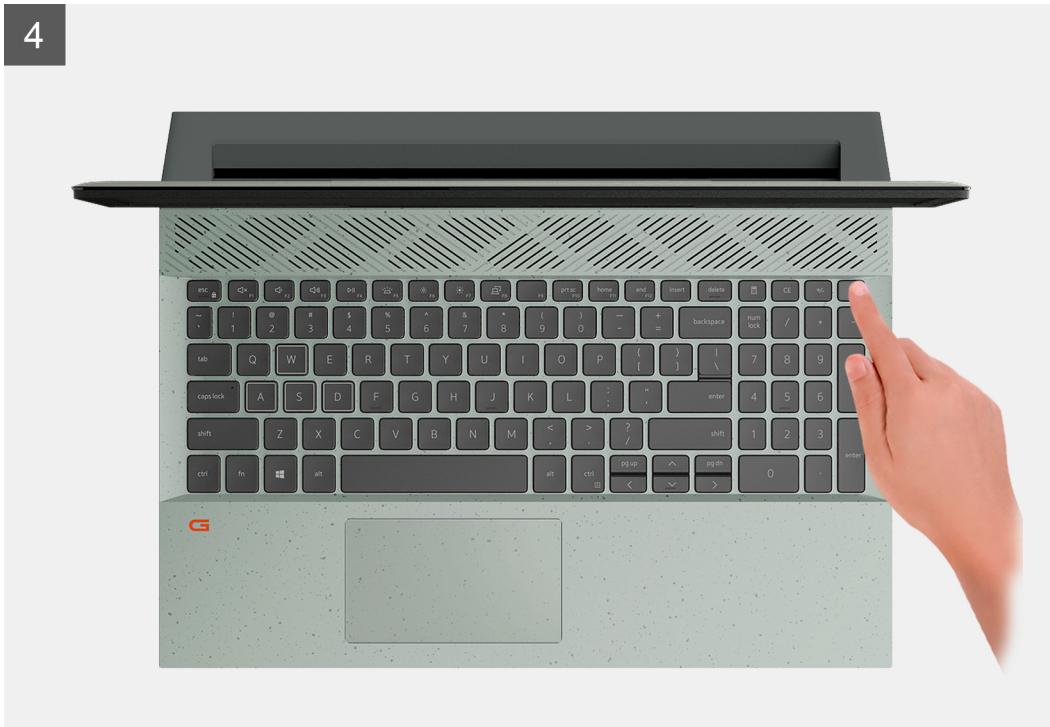


4x

1







Steps

1. Loosen the four captive screws that secure the base cover to the palm-rest and keyboard assembly.
2. Remove the four screws (M2x6) that secure the base cover to the palm-rest and keyboard assembly.
 - NOTE:** Loosening the two captive screws located in the front of the computer creates a gap which can be used to pry and lift the base cover off the palm-rest and keyboard assembly.
3. Starting from the left corner, use a plastic scribe to pry the base cover and to release the base cover from the tabs. Lift the base cover off the palm-rest and keyboard assembly.
 - NOTE:** The following steps are applicable only if you want to further remove any other component from your computer.
4. Using the pull tab, disconnect the battery cable from the system board.
5. Turn your computer over and press the power button for 15 seconds to drain the flea power.

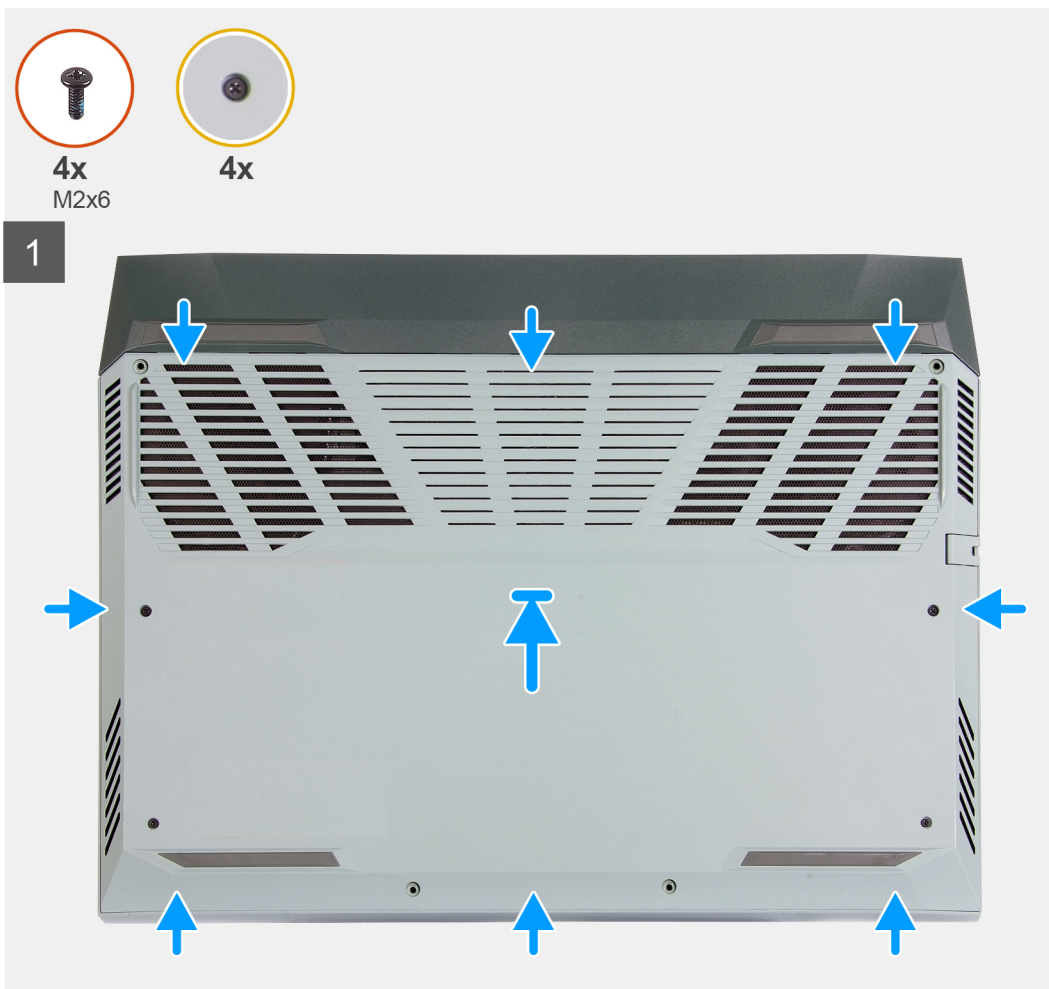
Installing the base cover

Prerequisites

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

About this task

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



Steps

1. Connect the battery cable to the system board, if the battery cable had been previously disconnected.
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. Replace the four screws (M2x6) that secure the base cover to the palm-rest and keyboard assembly.
4. Tighten the four captive screws that secure the base cover to the palm-rest and keyboard assembly.

Next steps

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

Solid-state drives

Removing the solid-state drive in SSD slot one

Prerequisites

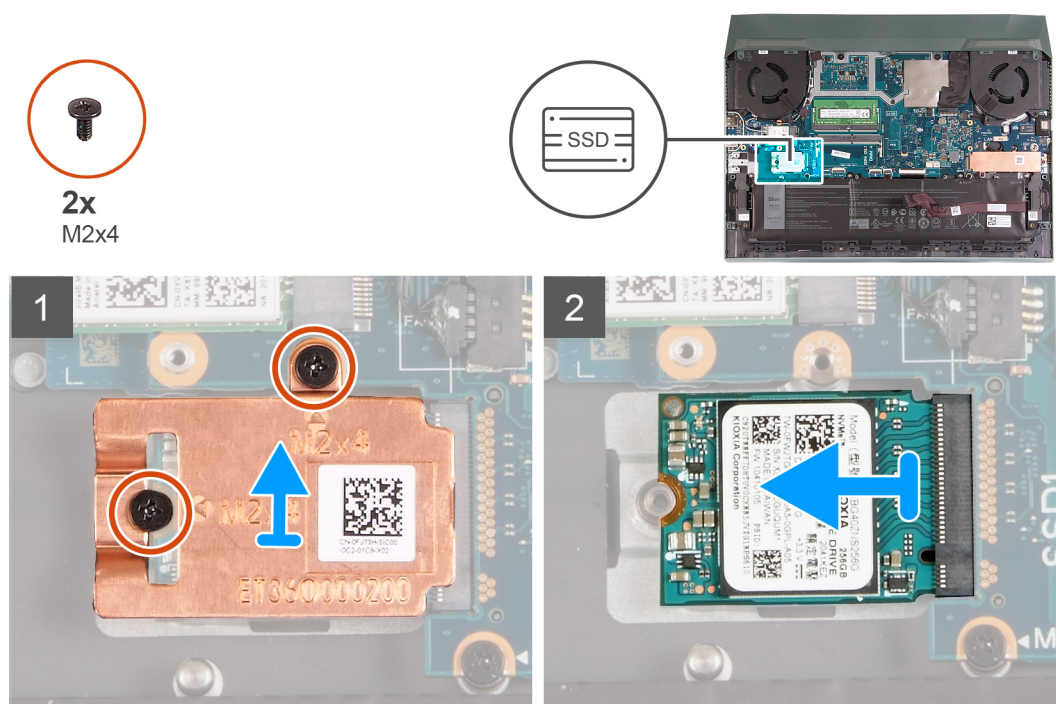
1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).

About this task

NOTE: Your computer has two solid-state drive slots. The solid-state drive 1 slot is located at the bottom left corner of the system board and the solid-state drive 2 slot is located at the bottom right corner of the system board. Both slots support M.2 2230 and M.2 2280 SSDs.

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

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



Steps

1. Remove the two screws (M2x4) that secure the thermal shield to the solid-state drive and the system board.

2. Lift the thermal shield off the palm-rest and keyboard assembly.
3. Slide and lift the solid-state drive off the slot on the system board.

Installing the solid-state drive in SSD slot one

Prerequisites

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

About this task

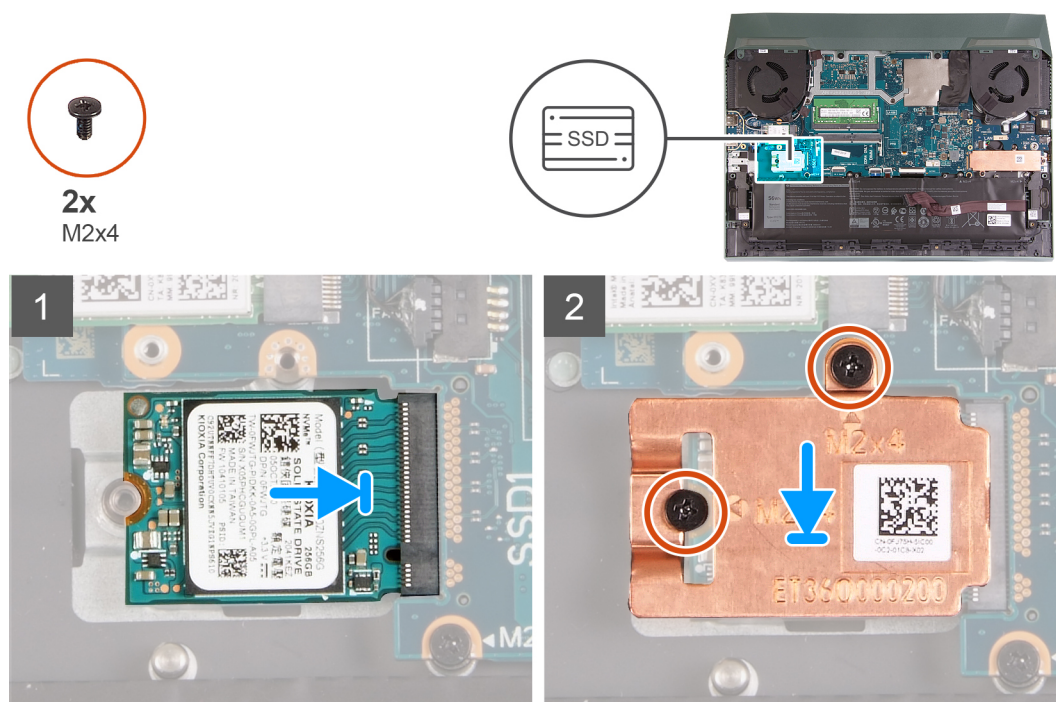
NOTE: Your computer has two solid-state drive slots. The solid-state drive 1 slot is located at the bottom left corner of the system board and the solid-state drive 2 slot is located at the bottom right corner of the system board. Both slots support M.2 2230 and M.2 2280 SSDs.

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

If you want to replace your 2230 card with a 2280 card, see [procedure to move the screw mount](#) and [installing 2280 solid-state drive](#).

If you want to replace your 2280 card with a 2230 card, see [procedure to change the screw mount](#) and [installing 2230 solid-state drive](#).

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



Steps

1. Align the notches on the solid-state drive with the tab on the solid-state drive slot.
2. Slide the solid-state drive into the solid-state drive slot.
3. Place the thermal shield on the solid-state drive.
4. Align the screw holes on the thermal shield with the screw holes on the solid-state drive and system board.
5. Replace the two screws (M2x4) that secure the thermal shield to the solid-state drive and the system board.

Next steps

1. Install the [base cover](#).

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

Removing the solid-state drive in SSD slot two

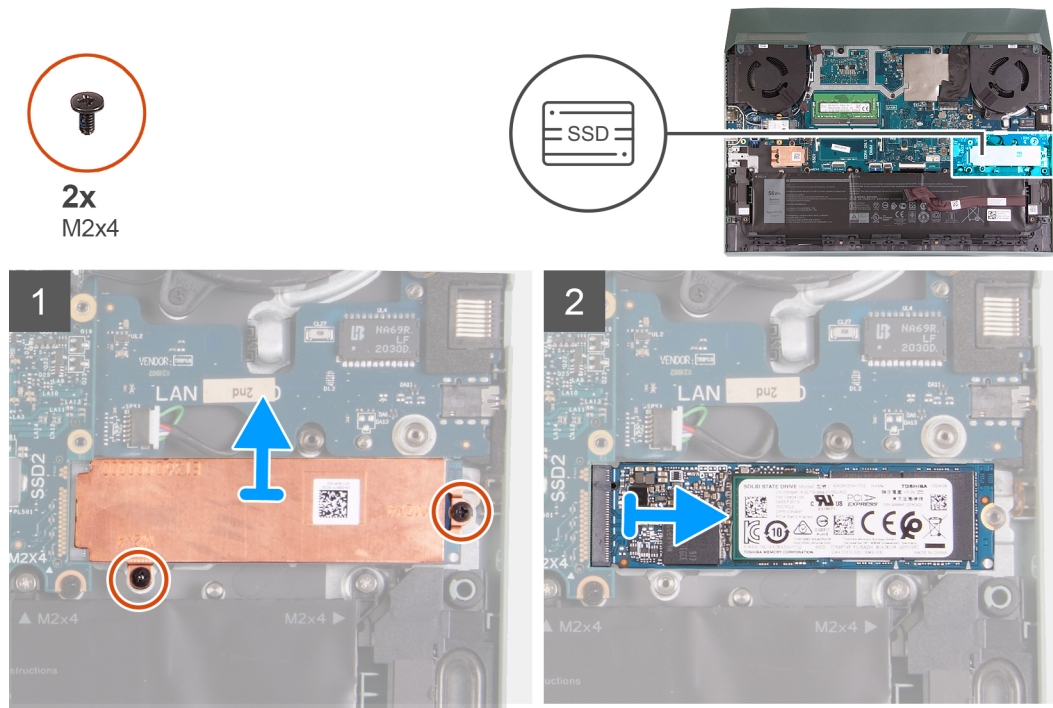
Prerequisites

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

About this task

- NOTE:** Your computer has two solid-state drive slots. The solid-state drive 1 slot is located at the bottom left corner of the system board and the solid-state drive 2 slot is located at the bottom right corner of the system board. Both slots support M.2 2230 and M.2 2280 SSDs.
- NOTE:** This procedure applies only to computers shipped with a 2230 solid-state drive installed in SSD slot one.
- NOTE:** Depending on the configuration ordered, your computer may support either 2230 solid-state drive or 2280 solid-state drive in M.2 slot two.

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



Steps

1. Remove the two screws (M2x4) that secure the thermal shield to the system board and the palm-rest and keyboard assembly.
2. Lift the thermal shield off the palm-rest and keyboard assembly.
3. Slide and lift the solid-state drive off the solid-state drive slot on the system board.

Installing the solid-state drive in SSD slot two

Prerequisites

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

About this task

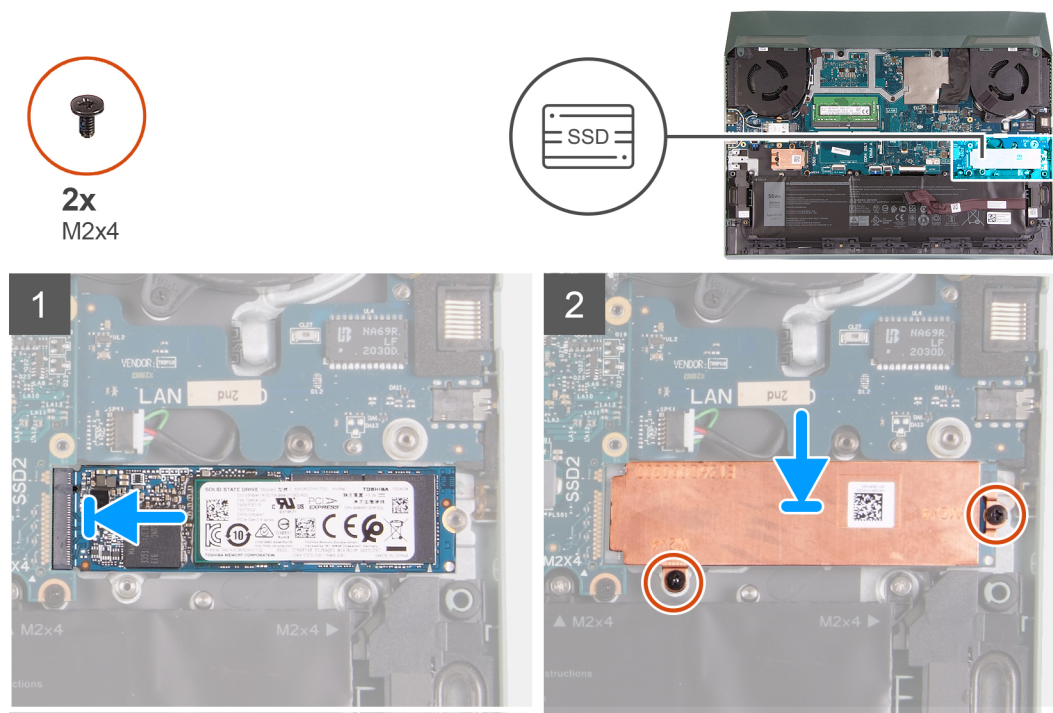
NOTE: Your computer has two solid-state drive slots. The solid-state drive 1 slot is located at the bottom left corner of the system board and the solid-state drive 2 slot is located at the bottom right corner of the system board. Both slots support M.2 2230 and M.2 2280 SSDs.

NOTE: This procedure applies only to computers shipped with a 2280 solid-state drive installed in SSD slot two.

If you want to replace your 2230 card with a 2280 card, see [procedure to move the screw mount](#) and [installing 2280 solid-state drive](#).

If you want to replace your 2280 card with a 2230 card, see [procedure to change the screw mount](#) and [installing 2230 solid-state drive](#).

The following image indicates the location of the 2280 solid-state drive installed in SSD slot two and provides a visual representation of the installation procedure.



Steps

1. Align the notches on the solid-state drive with the tab on the solid-state drive slot.
2. Slide the solid-state drive into the solid-state drive slot.
3. Place the solid-state drive bracket on the solid-state drive
4. Align the screw holes on the thermal shield with the screw holes on the solid-state drive and system board.
5. Replace the two screws (M2x4) that secure the solid-state drive to the system board.

Next steps

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

Procedure to move the screw mount

About this task

This computer supports two solid-state drive form factors:

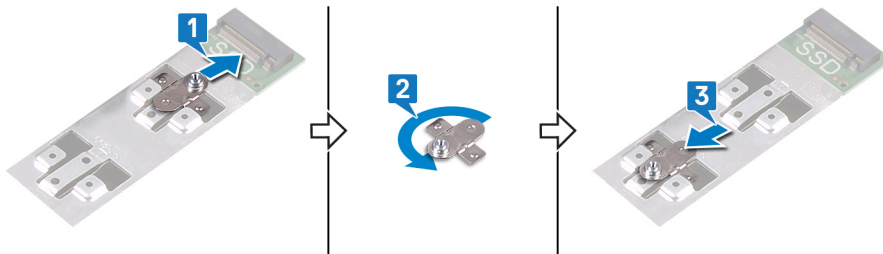
- M.2 2230
- M.2 2280

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

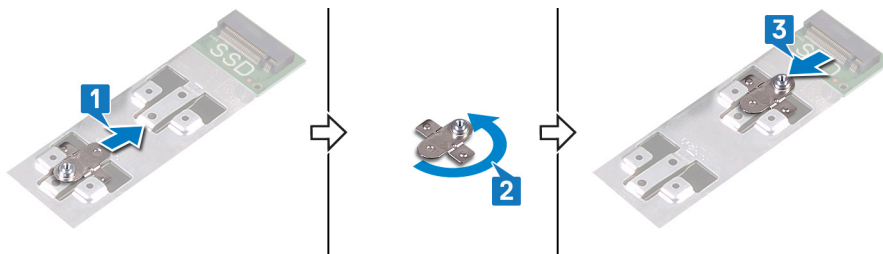
Steps

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

M.2 2230 → M.2 2280



M.2 2280 → M.2 2230



4. To install 2230 solid-state drive, see [installing 2230 solid-state drive](#).
5. To install 2280 solid-state drive, see [installing 2280 solid-state drive](#).

Wireless card

Removing the wireless card

Prerequisites

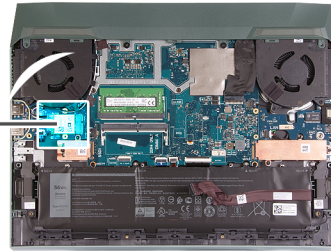
1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).

About this task

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



1x
M2x4



Steps

1. Remove the screw (M2x4) that secures the wireless card to the USB board.
2. Lift the bracket that secures the wireless card to the system board.
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

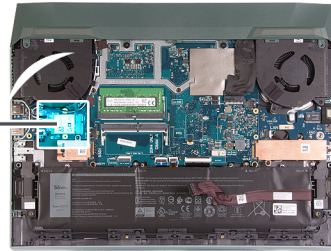
If you are replacing a component, remove the existing component before performing the installation procedure.

About this task

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



1x
M2x4



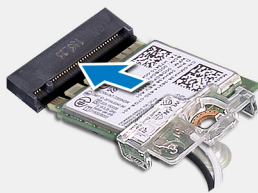
1



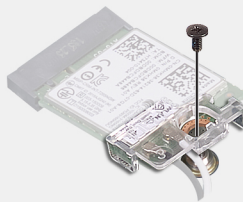
2



3



3



Steps

1. Connect the antenna cables to the wireless card.

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

Table 2. Antenna-cable color scheme

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

2. Align the notch on the wireless card with the tab on the wireless-card slot and insert the wireless card at an angle into the wireless-card slot.
3. Align and place the wireless-card bracket on the wireless card.
4. Replace the screw (M2x4) to secure the wireless card to the USB board.

Next steps

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

Memory module

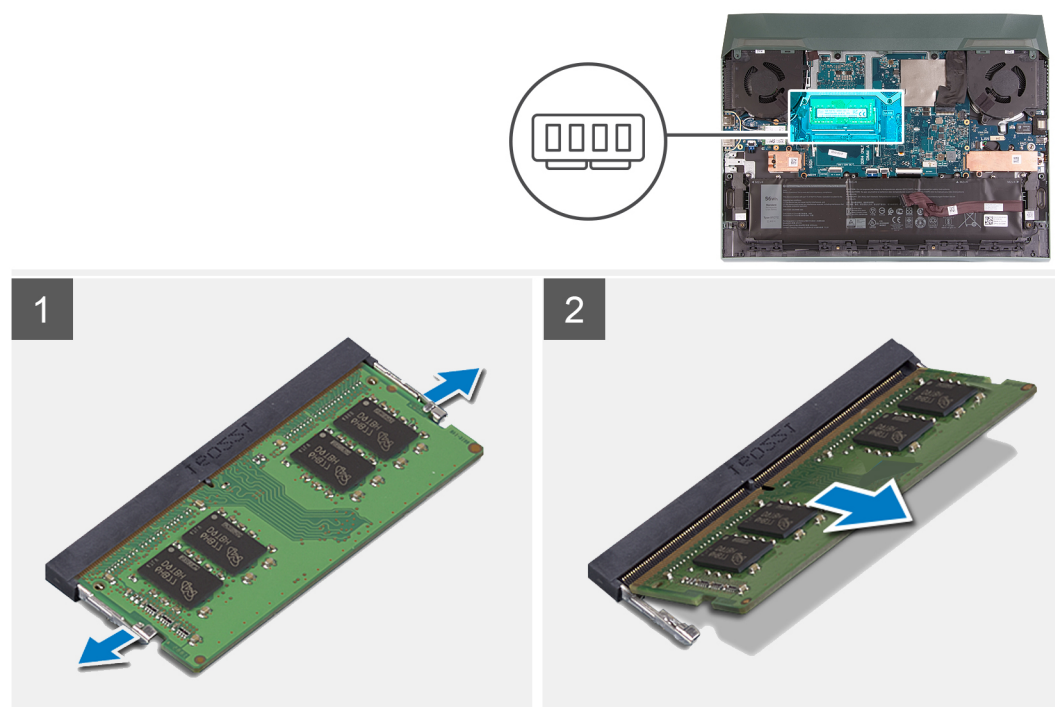
Removing the memory module

Prerequisites

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

About this task

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



Steps

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

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

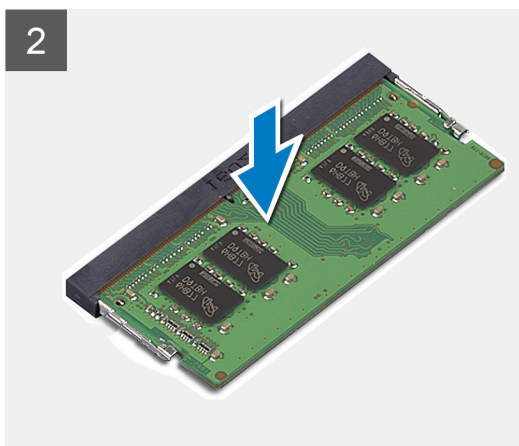
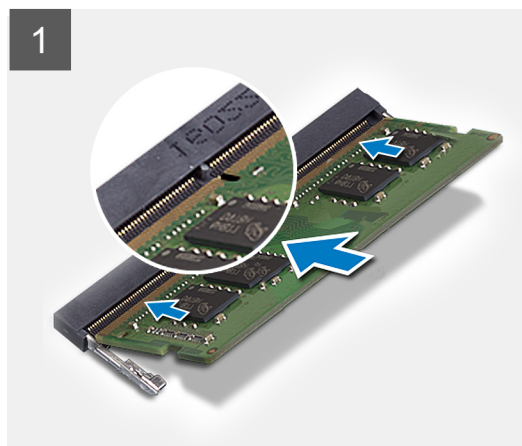
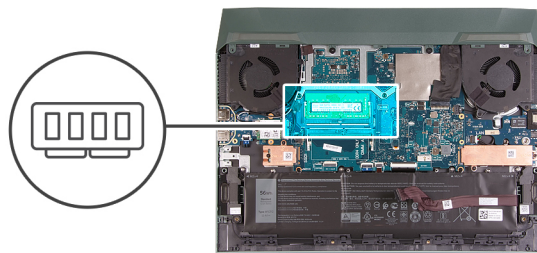
Installing the memory module

Prerequisites

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

About this task

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



Steps

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

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

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

Next steps

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

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.
- Always purchase genuine batteries from www.dell.com or authorized Dell partners and resellers.
- Swollen batteries should not be used and should be replaced and disposed properly. For guidelines on how to handle and replace swollen Lithium-ion batteries, see [Handling swollen Lithium-ion batteries](#).

Removing the battery

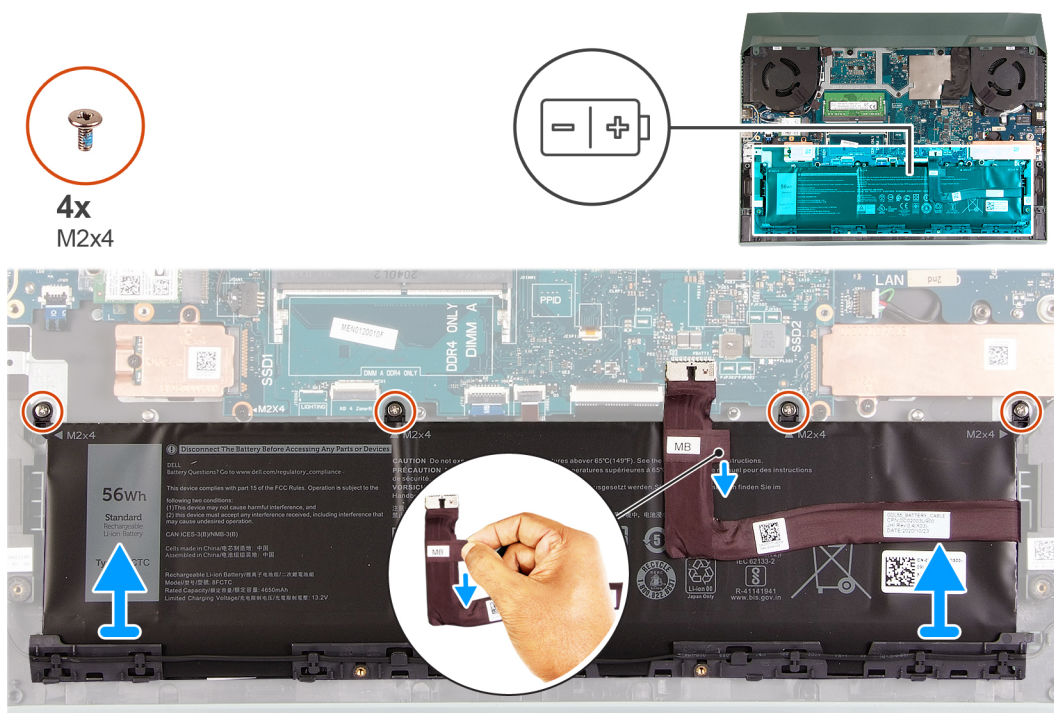
Prerequisites

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

About this task

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

CAUTION: After removing the battery, store the battery cable safely. The replacement battery will not be shipped with the battery cable. If you want to replace the battery cable, it has to be purchase separately.



Steps

1. Disconnect the battery cable from the system board, if it is not previously disconnected.
2. Remove the four screws (M2x4) that secure the battery to the palm-rest and keyboard assembly.
3. Lift the battery off the palm-rest and keyboard assembly.

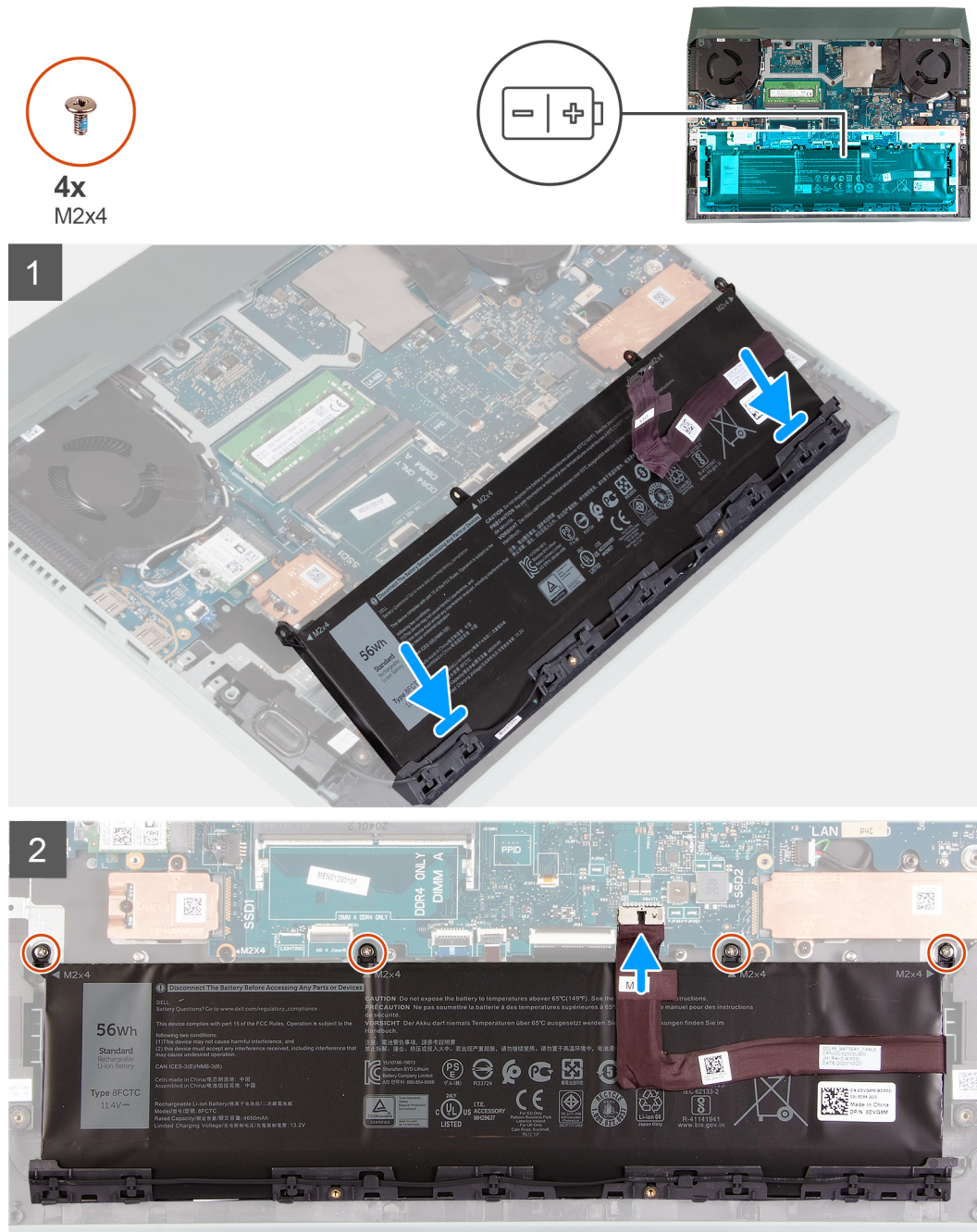
Installing the battery

Prerequisites

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

About this task

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



Steps

1. At an angle, slide the battery into the slot on the palm-rest and keyboard assembly.
2. Align the screw holes on the battery with the screw holes on the palm-rest and keyboard assembly.
3. Replace the four screws (M2x4) that secure the battery to the palm-rest and keyboard assembly.
NOTE: If you are replacing your old battery with the new battery, use the battery cable that came with the old battery. If you want to replace the battery cable, it has to be purchase separately.
4. Connect the battery cable to the system board.

Next steps

1. Install the [base cover](#).

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

Touchpad

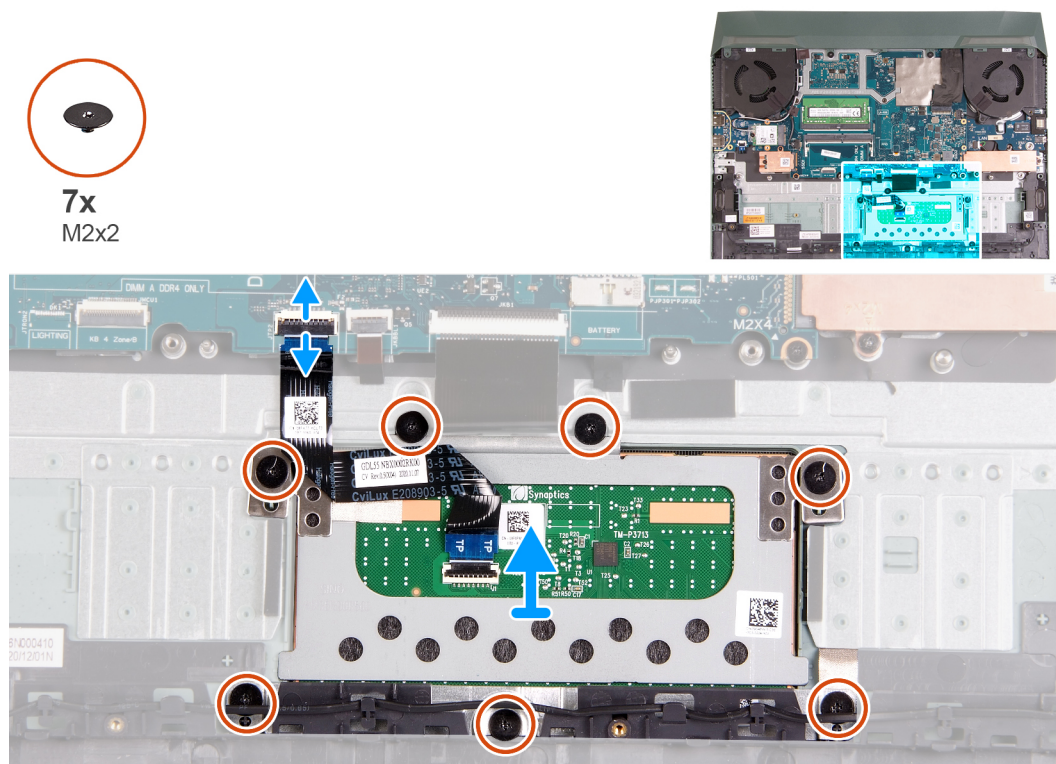
Removing the touchpad

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 image indicates the location of the touchpad and provides a visual representation of the removal procedure.



Steps

1. Remove the seven (M2x2) screws that secure the touchpad bracket and touchpad to the palm-rest and keyboard assembly.
2. Open the latch and disconnect the touchpad cable from the system board.
3. Lift the touchpad off the palm-rest and keyboard assembly.

Installing the touchpad

Prerequisites

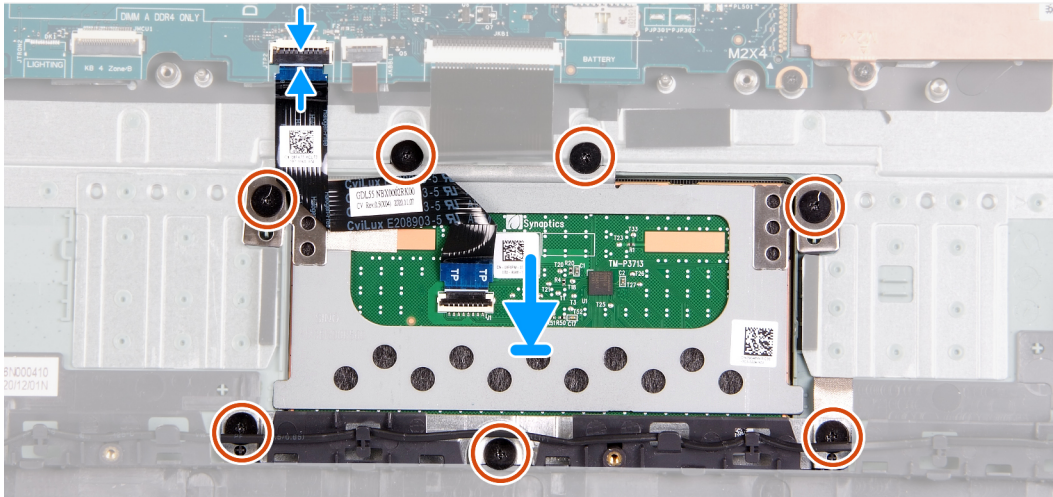
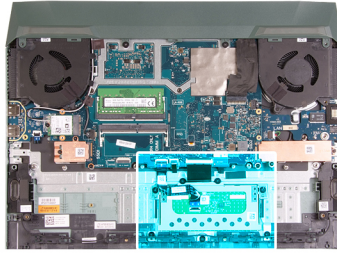
If you are replacing a component, remove the existing component before performing the installation procedure.

About this task

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



7x
M2x2



Steps

1. Align and place the touchpad into the slot on the palm-rest and keyboard assembly.
2. Replace the seven (M2x2) screws that secure the touchpad and touchpad bracket to the palm-rest and keyboard assembly.
3. Connect the touchpad cable to the system board and close the securing latch.

Next steps

1. Install the [battery](#).
2. Install the [base cover](#).
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. Remove the [base cover](#).
3. Remove the [battery](#).
4. Remove the [rear cover](#).
5. Remove the [solid-state drive 1](#).
6. Remove the [solid-state drive 2](#).
7. Remove the [wireless card](#).
8. Remove the [memory module](#).
9. Remove the [right fan](#).
10. Remove the [left fan](#).
11. Remove the [system board](#).

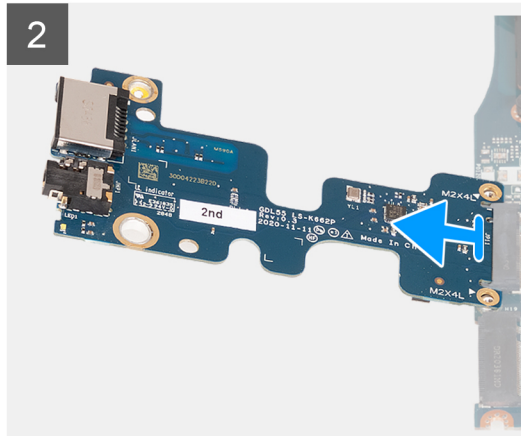
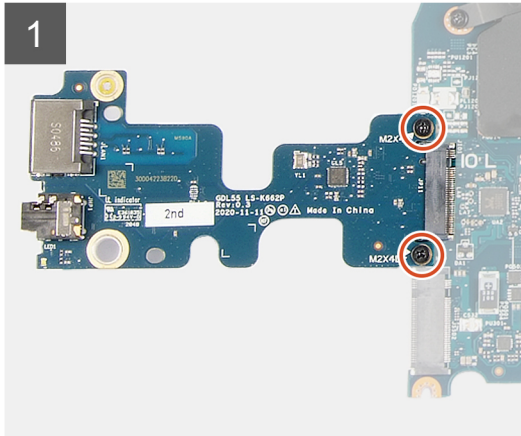
NOTE: System board can be removed with the heat sink, I/O board, and USB board attached.

About this task

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



2x
M2x4



Steps

1. Turn the system board over.
2. Remove the two screws (M2x4) that secure the I/O board to the system board.
3. Remove the I/O board from the system board.

Installing the I/O board

Prerequisites

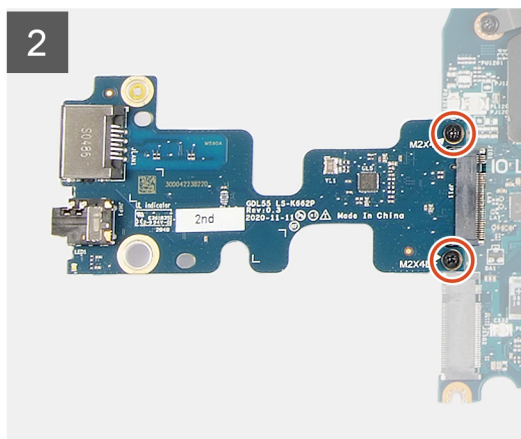
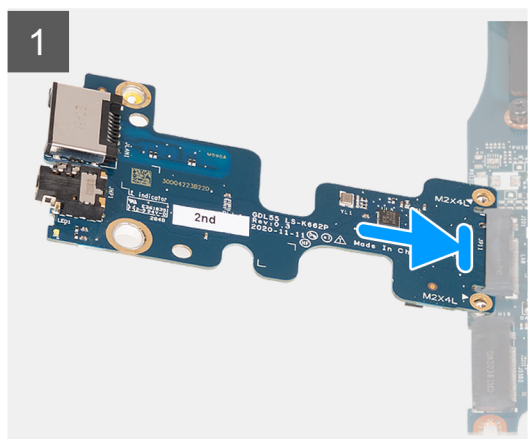
If you are replacing a component, remove the existing component before performing the installation procedure.

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. Insert the I/O board at a 45 degree angle into the slot on the system board.
2. Align the screw holes on the I/O board with the screw holes on the system board.
3. Install the two screws (M2x4) that secure the I/O board to the system board.
4. Turn the system board to the front and align the screw holes on the system board with the screw holes on the palm-rest and keyboard assembly.

Next steps

1. Install the [system board](#).
2. Install the [left fan](#).
3. Install the [right fan](#).
4. Install the [memory module](#).
5. Install the [wireless card](#).
6. Install the [solid-state drive 2](#).
7. Install the [solid-state drive 1](#).
8. Install the [rear cover](#).
9. Install the [battery](#).
10. Install the [base cover](#).
11. Follow the procedure in [After working inside your computer](#).

Speakers

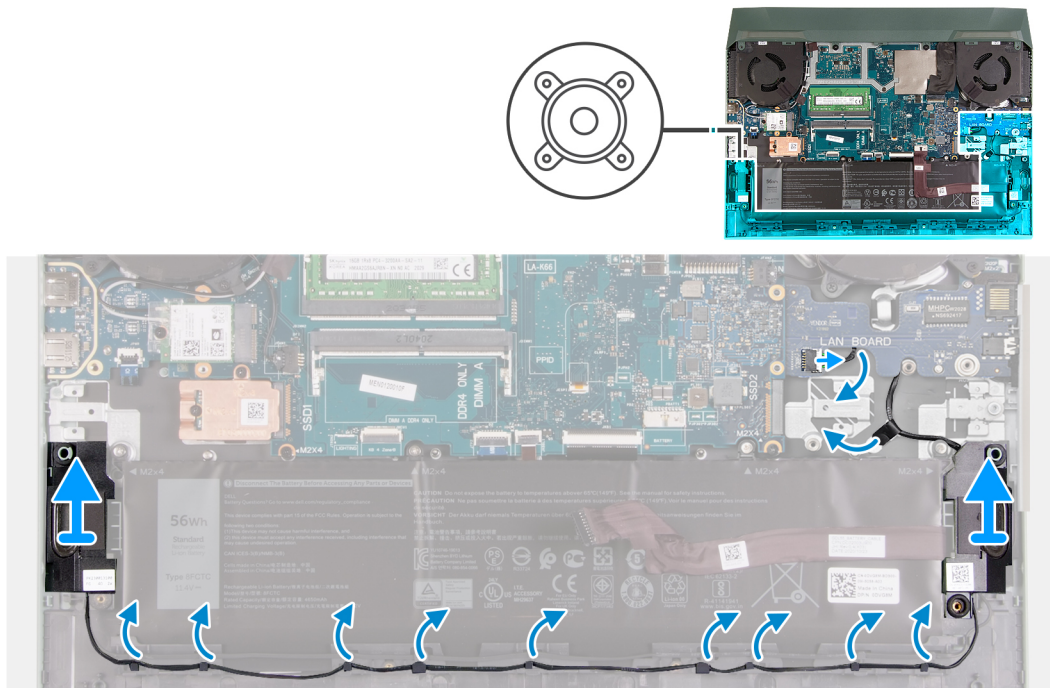
Removing the speakers

Prerequisites

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

About this task

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



Steps

1. Note the routing of the cable that connects the left speaker to the right speaker and remove it from the routing guides on the palm-rest and keyboard assembly.
NOTE: Note the position of the rubber grommets before lifting the speakers.
2. Peel the tape that adheres the speaker cable to the palm-rest and keyboard assembly.
NOTE: Note the routing of the speaker of cable and remove it from under the USB board before disconnecting the cable from the system board.
3. Disconnect the speaker cable from the system board and release the cable from below the USB board .
4. Lift the speakers, along with the cable, off the palm-rest and keyboard assembly.

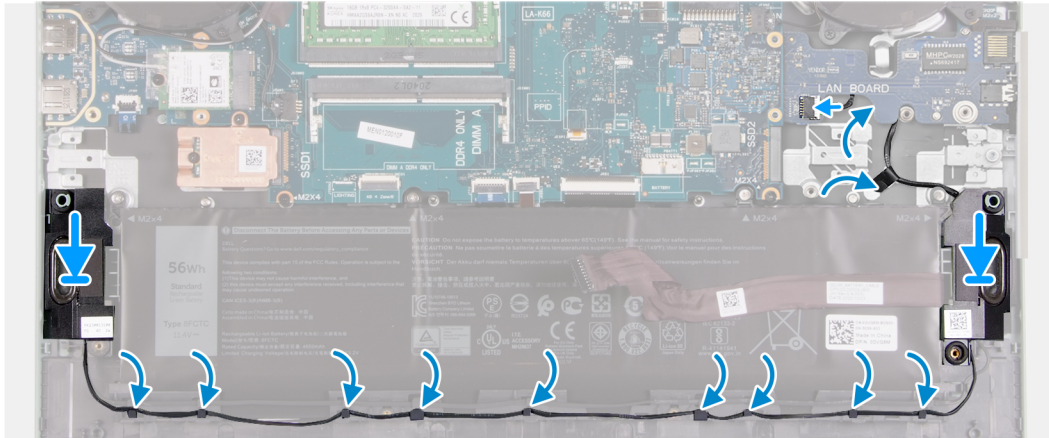
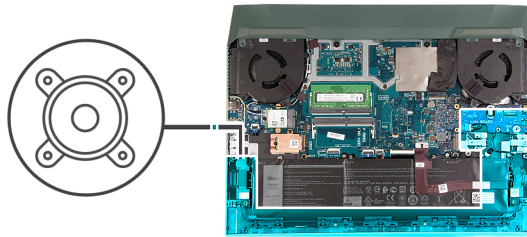
Installing the speakers

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 speakers and provides a visual representation of the installation procedure.



Steps

1. Using the alignment posts and rubber grommets, place the speakers in the slots on the palm-rest and keyboard assembly
NOTE: If the rubber grommets are pushed out of the speakers when removing the speakers, push them back in place before replacing the speakers.
2. Connect the speaker cable to the system board and route the cable below the USB board .
3. Adhere the speaker cable to the palm-rest and keyboard assembly.
4. Route the speaker cable through the routing guides on the palm-rest and keyboard assembly.

Next steps

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

Rear cover

Removing the rear cover

Prerequisites

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

About this task

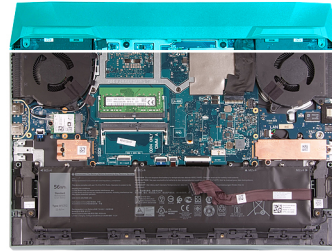
The following image indicates the location of the rear cover and provides a visual representation of the removal procedure.



2x
M2x2



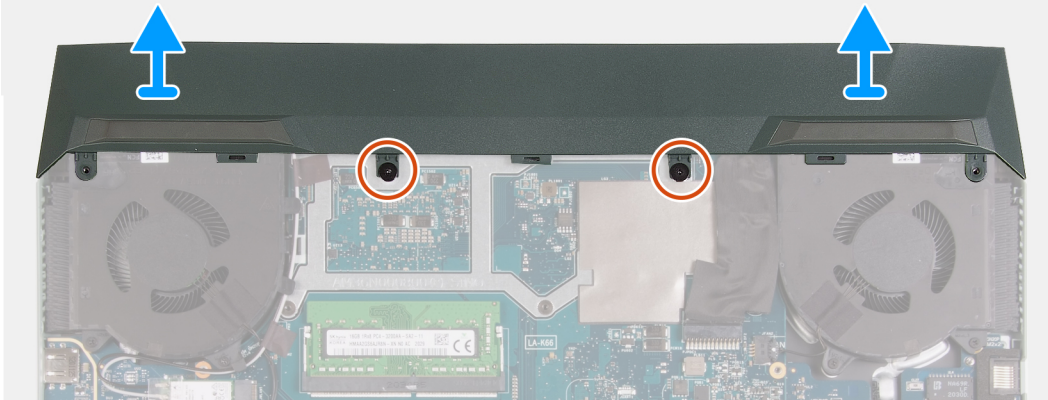
2x
M2.5x5



1



2



Steps

1. Remove the two screws (M2.5x5) that secure the rear cover to the palm-rest and keyboard assembly.
2. Remove the two screws (M2x2) that secure the rear cover to the system board.
3. Push the rear cover away from the system board and lift it off the palm-rest and keyboard assembly.

Installing the rear cover

Prerequisites

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

About this task

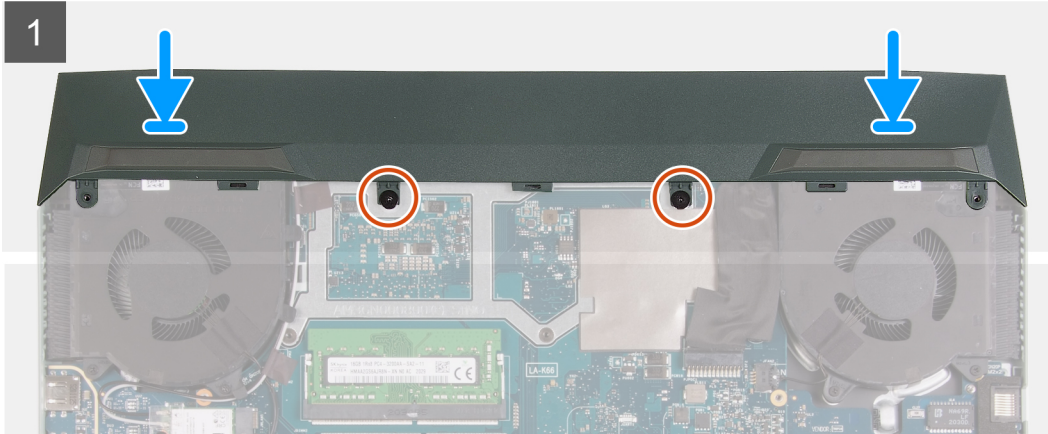
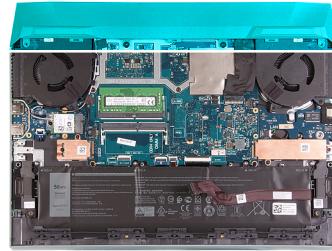
The following image indicates the location of the rear cover and provides a visual representation of the installation procedure.



2x
M2x2



2x
M2.5x5



Steps

1. Slide the rear cover towards the system board till it snaps into place.
2. Align the screw holes on the rear cover with the screw holes on the palm-rest and keyboard assembly.
3. Replace the two screws (M2.5x5) that secure the rear cover to the palm-rest and keyboard assembly.
4. Replace the two screws (M2x2) that secure the rear cover to the system board.

Next steps

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

Display assembly

Installing the display assembly

Prerequisites

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

Steps

1. Align the screw holes on the display hinges with screw holes on the palm-rest and keyboard assembly and place the display assembly on the palm-rest and keyboard assembly.

2. Route the antenna cable and display cable through the routing guides on the palm-rest and keyboard assembly and to the top side of the computer and along the left of the power adapter port.
3. Replace eight screws (M2.5x4) that secure the display-assembly hinges to the palm-rest and keyboard assembly.
4. Turn the display assembly over.
5. Connect the display cable to the connector on the system board and close the latch to secure the cable.
6. Adhere the tape that secures the display cable to the system board.
7. Route the antenna cables through the routing guides on the fan and adhere the tape that secures the antenna cables to the system board .

Next steps

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

Removing the display assembly

Prerequisites

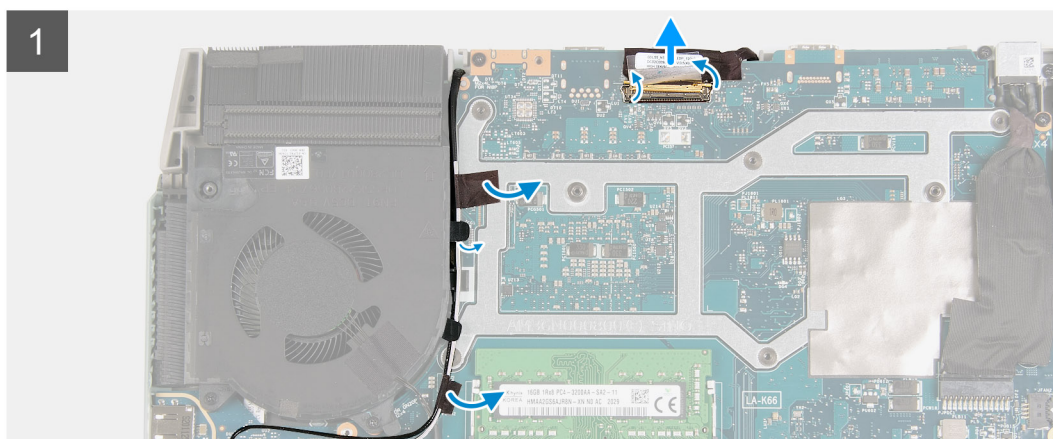
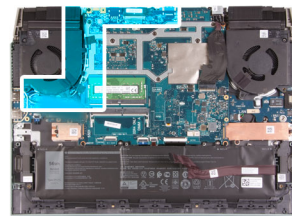
1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [rear cover](#).
4. Remove the [wireless card](#).

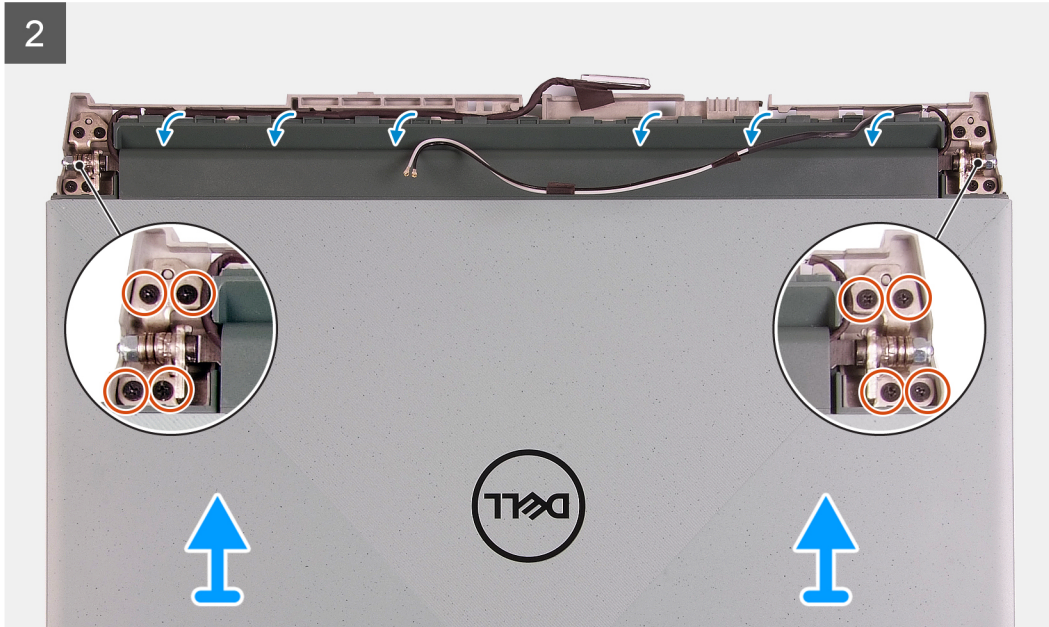
About this task

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



8x
M2.5x4





Steps

1. Peel the tapes that secure the antenna cables to the system board.
2. Note the routing of the antenna cable and display cable, and remove the antenna cables from the left fan.
3. Peel the tape and open the latch, and disconnect the display cable from the system board.
4. Flip the computer over and place the computer on a clean and flat surface.
5. Remove the antenna cable and display cable from the routing guides on the palm-rest and keyboard assembly.
6. Remove the eight screws (M2.5x4) that secure the display-assembly hinges to the palm-rest and keyboard assembly.
7. Lift the hinges from the palm-rest and keyboard assembly.
8. Slide and lift the display assembly off the palmrest and keyboard assembly.
9. After performing all the above steps, you are left with the display assembly.



Power-adapter port

Removing the power-adapter port

Prerequisites

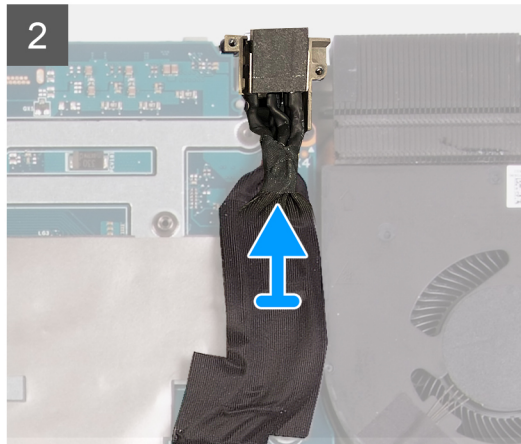
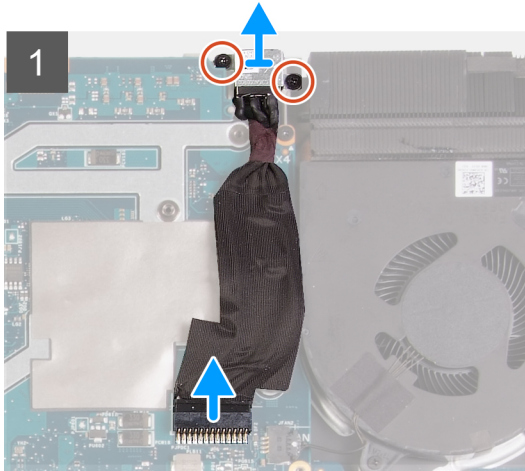
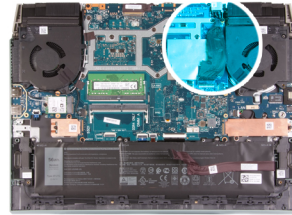
1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [rear cover](#).

About this task

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



2x
M2x4



Steps

1. Remove the two screw (M2x4) on the power-adaptor port-bracket that secures the power-adaptor port to the palm-rest and keyboard assembly.
2. Remove the power-adaptor port-bracket from the power-adaptor port.
3. Disconnect the power-adaptor port-cable from the system board.
4. Lift the power-adaptor port, along with its cable, off the palm-rest and keyboard assembly.

Installing the power-adaptor port

Prerequisites

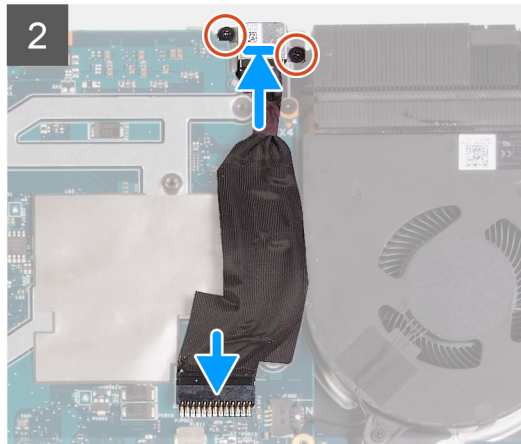
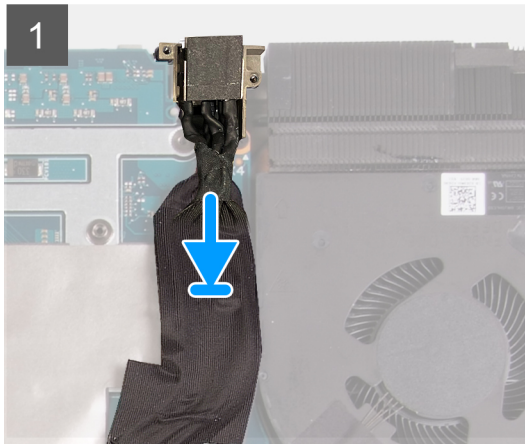
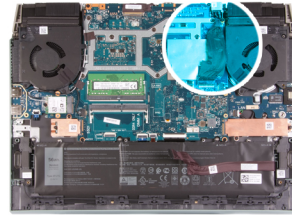
If you are replacing a component, remove the existing component before performing the installation procedure.

About this task

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



2x
M2x4



Steps

1. Place the power-adapter port into the slot and adhere the power-adapter port cable on the system board.
2. Connect the power-adapter port cable to the system board.
3. Align and place the power-adapter port bracket over the power-adapter port.
4. Replace the two screws (M2x4) to secure the power-adapter port bracket to the palm-rest and keyboard assembly.

Next steps

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

Fans

The following procedure of removing and installing fans are applicable only on computers that are shipped with NVIDIA GeForce GTX 1650.

Removing the right fan

Prerequisites

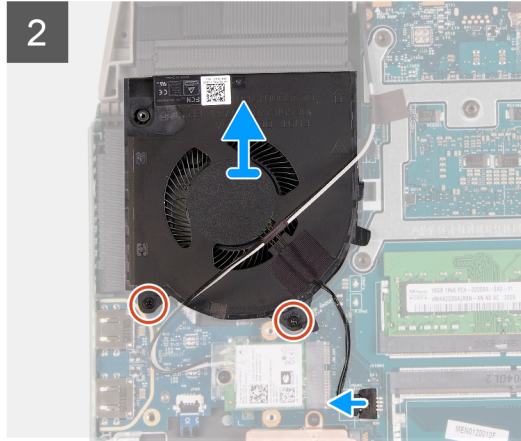
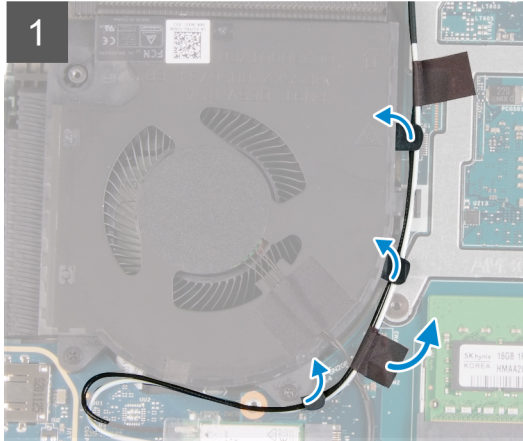
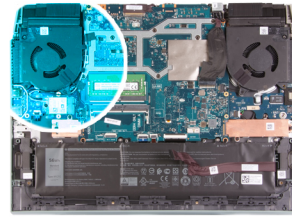
1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [rear cover](#).

About this task

The following image indicates the location of the right fan and provides a visual representation of the installation procedure. The orientation is based on the position of the fan when you are working on your computer.



2x
M2x6



Steps

1. Peel the tapes that secures the wireless-card cable to the system board.
2. Note the routing of the wireless-card cable and remove the wireless-card cable from the right fan.
3. Disconnect the fan cable from the system board.
4. Remove the two (M2x6) screws that secure the right fan to the system board.
5. Lift the right fan off the palm-rest and keyboard assembly.

Installing the right fan

Prerequisites

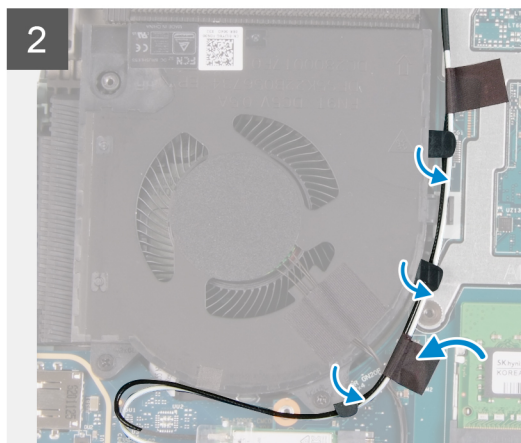
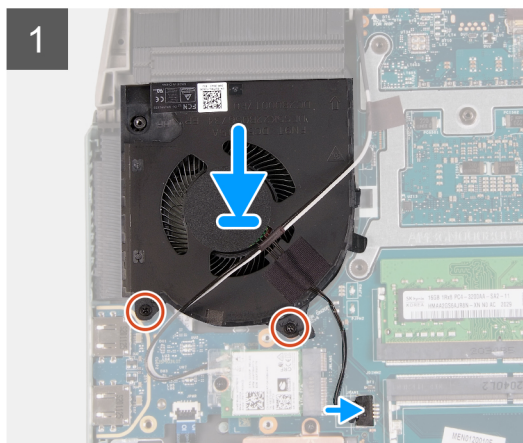
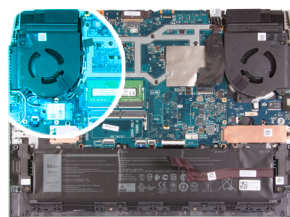
If you are replacing a component, remove the existing component before performing the installation procedure.

About this task

The following image indicates the location of the right fan and provides a visual representation of the installation procedure. The orientation is based on the position of the fan when you are working on your computer.



2x
M2x6



Steps

1. Align and place the right fan on the palm-rest and keyboard assembly.
2. Replace the two (M2x6) screws to secure the right fan to the palm-rest and keyboard assembly.
3. Connect the left-fan cable to the system board.
4. Route the wireless-card cable through the routing guides on the fan.
5. Adhere the tapes that secures the wireless-card cable to the system board.

Next steps

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

Removing the left fan

Prerequisites

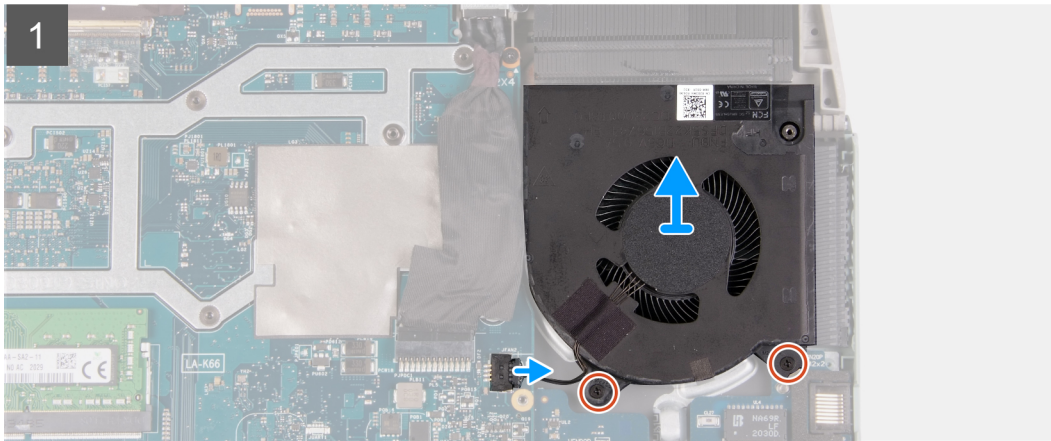
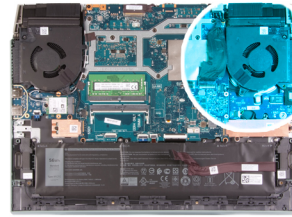
1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [rear cover](#).

About this task

The following image indicates the location of the left fan and provides a visual representation of the removal procedure. The orientation is based on the position of the fan when you are working on your computer.



2x
M2x6



Steps

1. Disconnect the left-fan cable from the system board.
2. Remove the two (M2x6) screws that secure the left fan to the system board.
3. Lift the left fan off the palm-rest and keyboard assembly.

Installing the left fan

Prerequisites

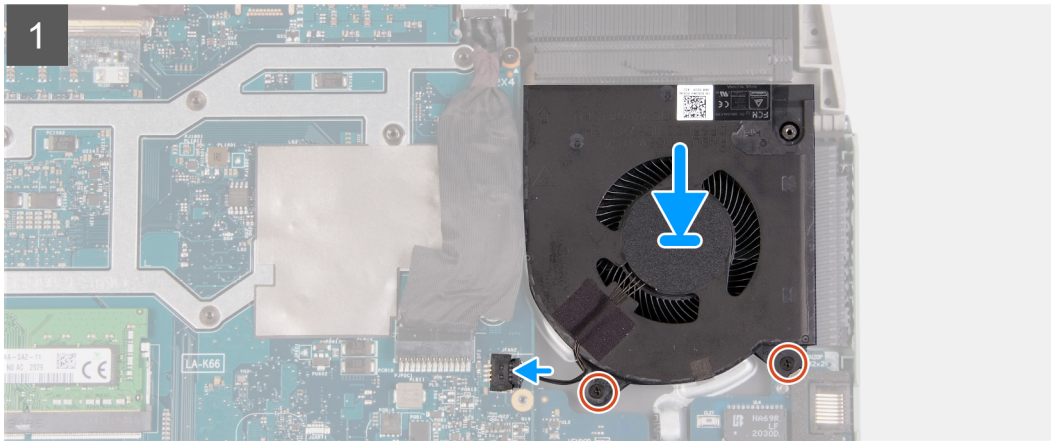
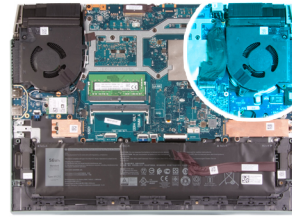
If you are replacing a component, remove the existing component before performing the installation procedure.

About this task

The following image indicates the location of the left fan and provides a visual representation of the installation procedure. The orientation is based on the position of the fan when you are working on your computer.



2x
M2x6



Steps

1. Align and place the left fan on the palm-rest and keyboard assembly.
2. Replace the two (M2x6) screws to secure the left fan to the palm-rest and keyboard assembly.
3. Connect the left-fan cable to the system board.

Next steps

1. Install the [rear cover](#).
2. Install the [base cover](#).
3. 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: Replacing the system board removes any changes that you have made to the BIOS using the BIOS setup program. Make the appropriate changes again after you replace the system board.

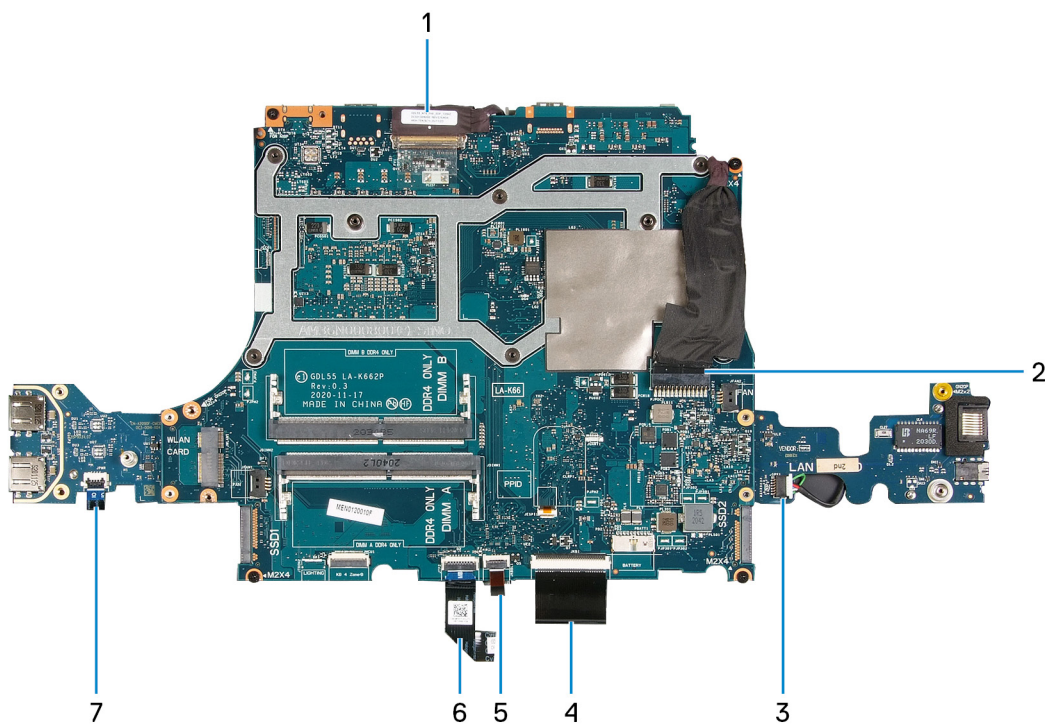


NOTE: Before disconnecting the cables from the system board, note the location of the connectors so that you can reconnect the cables correctly after you replace the system board.

2. Remove the [base cover](#).
3. Remove the [battery](#).
4. Remove the [rear cover](#).
5. Remove the [solid-state drive 1](#).
6. Remove the [solid-state drive 2](#).
7. Remove the [wireless card](#).
8. Remove the [memory module](#).
9. Remove the [right fan](#).
10. Remove the [left fan](#).

About this task

The following image indicates the connectors on your system board.

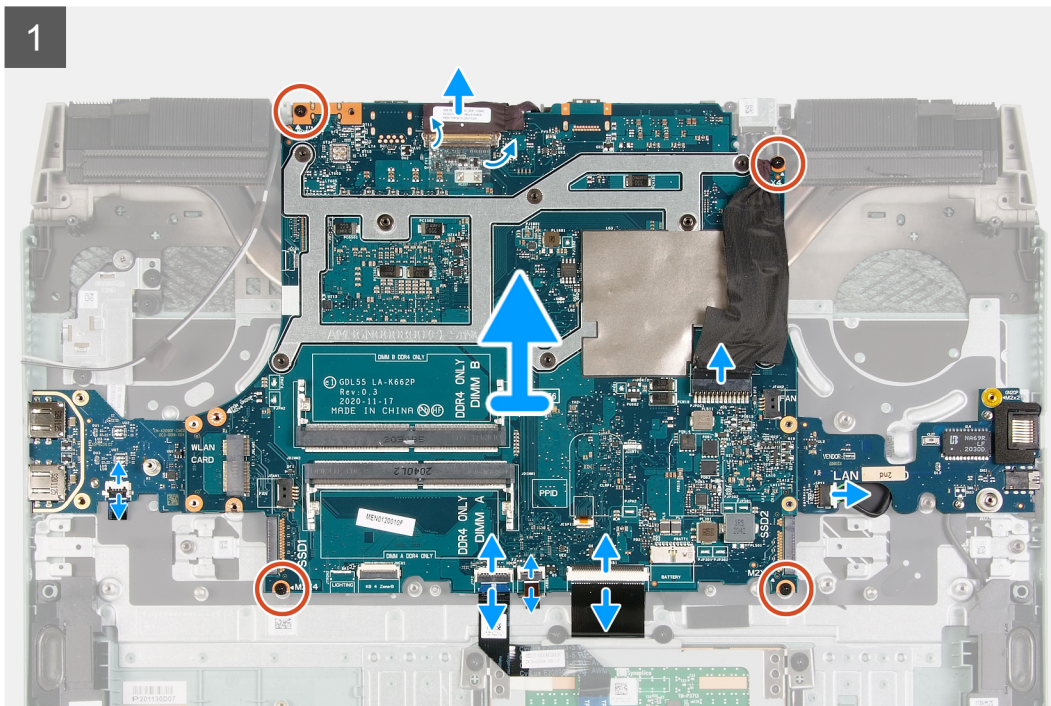
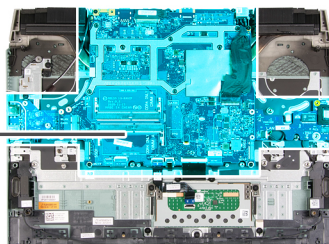


- | | |
|---------------------------|-----------------------------|
| 1. Display cable | 2. Power-adaptor port cable |
| 3. Speaker cable | 4. Keyboard cable |
| 5. Keyboard backlit cable | 6. Touchpad cable |
| 7. Power-button cable | |

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



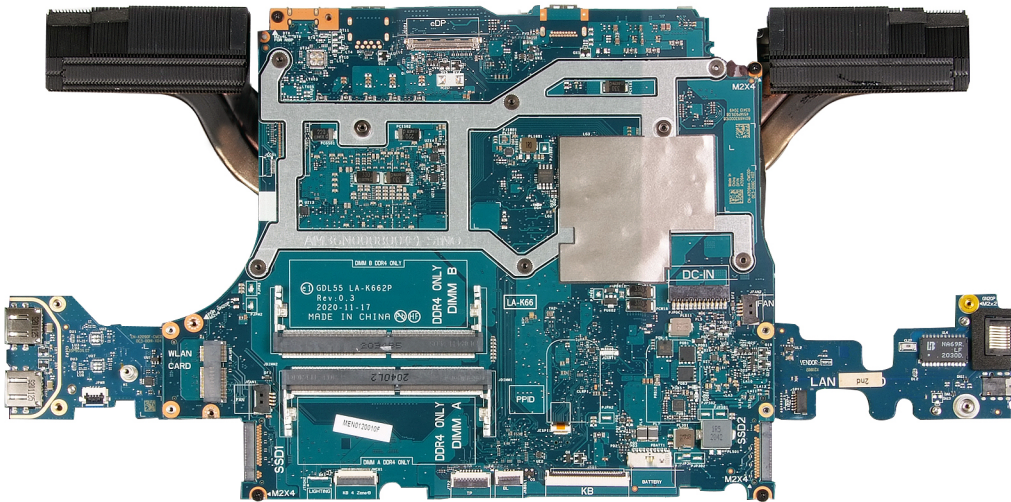
4x
M2x4



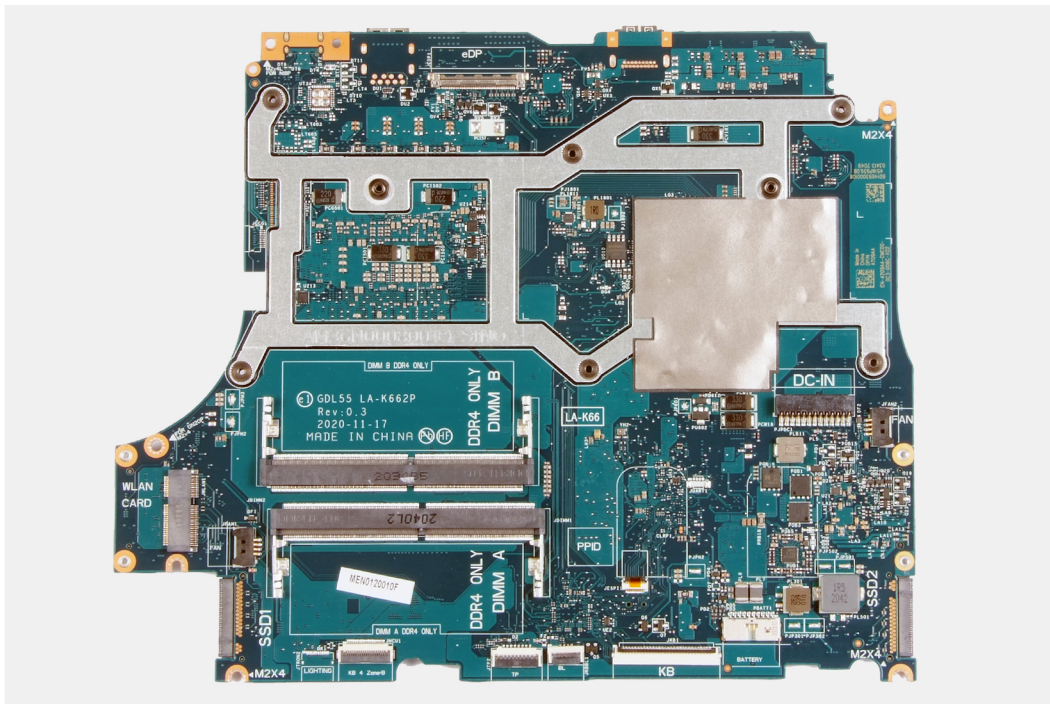
Steps

1. **NOTE:** Move in clock-wise direction to disconnect the cables from the system board.
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 and place it on a flat and clean surface.
3. Open the latch and disconnect the power-adaptor port cable from the system board.
4. Disconnect the speaker cable from the system board.
5. Open the latch and disconnect the keyboard cable from the system board.
6. Open the latch and disconnect the keyboard-backlight cable from the system board.
7. Open the latch and disconnect the touchpad cable from the system board.
8. Open the latch and disconnect the power-button cable from the USB board.
9. Remove the four (M2x4) screws that secure the system board to the palm-rest and keyboard assembly.
 NOTE: I/O board, USB board, and heat sink are attached to the system board.
 NOTE: After removing the screws, lift the system board from the top left and right sides of the heat sink. Ensure the connectors are released from the ports and pins on the left and right sides of your computer.
 NOTE: Place the system board on a clean and flat surface.

10. After performing all the above steps, lift the system board off the palm-rest and keyboard assembly along with the I/O board, USB board, and heat sink.



11. Turn the system board over and remove I/O board, USB board, and heat sink.
12. After performing all the above steps, you are left with system board.



Installing the system board

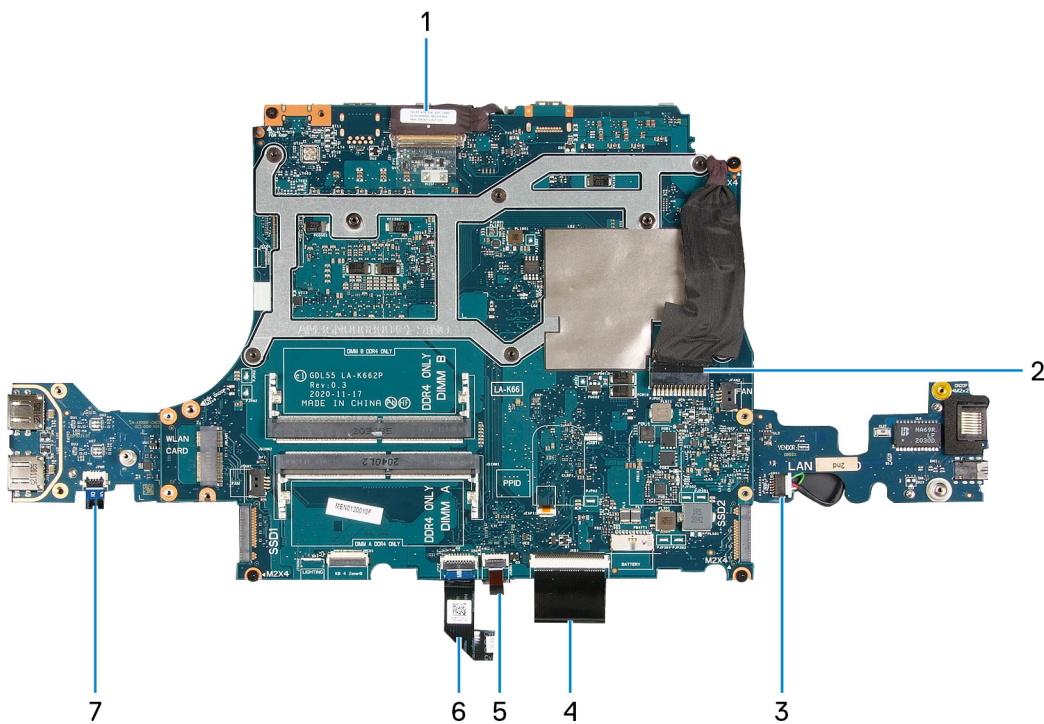
Prerequisites

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

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

About this task

The following image indicates the connectors on your system board.

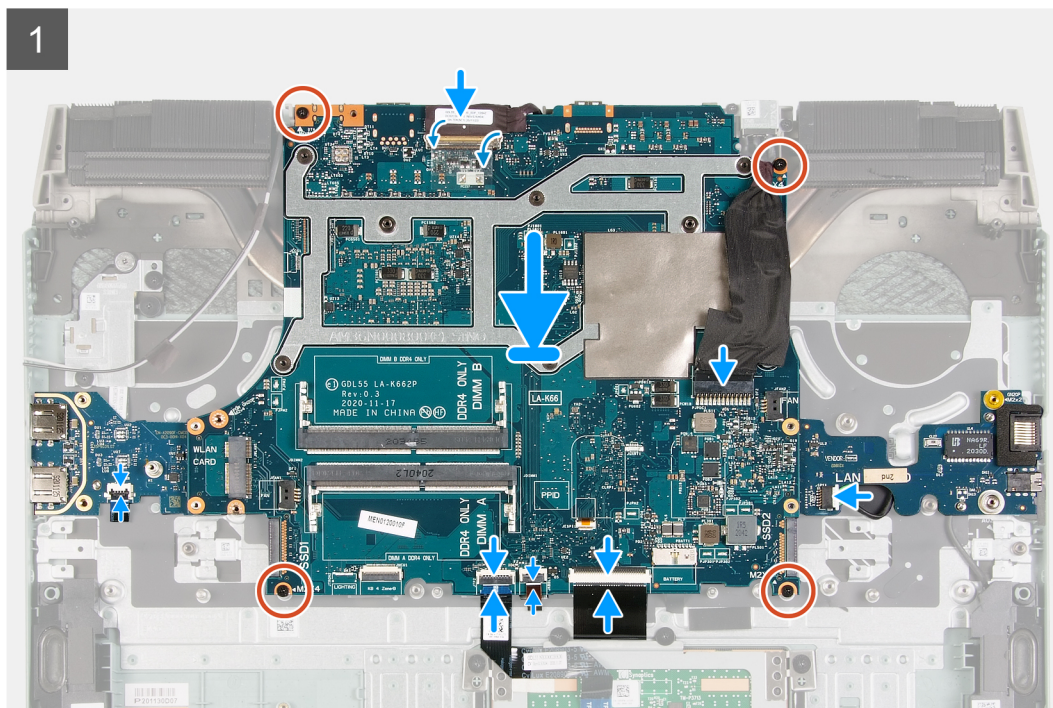
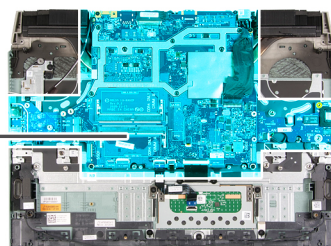


- | | |
|---------------------------|-----------------------------|
| 1. Display cable | 2. Power-adaptor port cable |
| 3. Speaker cable | 4. Keyboard cable |
| 5. Keyboard backlit cable | 6. Touchpad cable |
| 7. Power-button cable | |

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



4x
M2x4



Steps

1. **NOTE:** Place the system board on a clean and flat surface.

Replace the I/O board, USB board, and heat sink.

2. Turn the system board over.

CAUTION: Before replacing the system board, ensure that the power button cable is routed below the USB board. If the power button cable is not routed and connected properly, the computer will not power on.

3. Align the screw holes on the system board with the screw holes on the palm-rest and keyboard assembly.

NOTE: Align the system board with the positioning pins on the palm-rest and keyboard assembly.

NOTE: Align the heat sink to the top edge of the palm-rest and keyboard assembly.

4. Replace the four (M2x4) screws that secure the system board to the palm-rest and keyboard assembly.

NOTE: Move in clock-wise direction to connect the cables to the system board.

5. Replace the three (M2x4) screws that secure the system board to the palm-rest and keyboard assembly.

NOTE: Move in clock-wise direction to connect the cables to the system board.

6. Open the latch and connect the display cable to the system board.

7. Adhere the tape that secures the display cable to the system board.

8. Open the latch and connect the power-adaptor port cable to the system board.

9. Connect the speaker cable to the system board.

10. Open the latch and connect the keyboard cable to the system board.
11. Open the latch and connect the keyboard-backlight cable to the system board.
12. Open the latch and connect the touchpad cable to the system board.
13. Open the latch and connect the power-button cable to the USB board.

Next steps

1. Install the [left fan](#).
2. Install the [right fan](#).
3. Install the [memory module](#).
4. Install the [wireless card](#).
5. Install the [solid-state drive 2](#).
6. Install the [solid-state drive 1](#).
7. Install the [rear cover](#).
8. Install the [battery](#).
9. Install the [base cover](#).
10. Follow the procedure in [After working inside your computer](#).

Heat sink

Removing the heat sink

Prerequisites

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

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

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

2. Remove the [base cover](#).
3. Remove the [battery](#).
4. Remove the [rear cover](#).
5. Remove the [solid-state drive 1](#).
6. Remove the [solid-state drive 2](#).
7. Remove the [wireless card](#).
8. Remove the [memory module](#).
9. Remove the [right fan](#).
10. Remove the [left fan](#).
11. Remove the [system board](#).

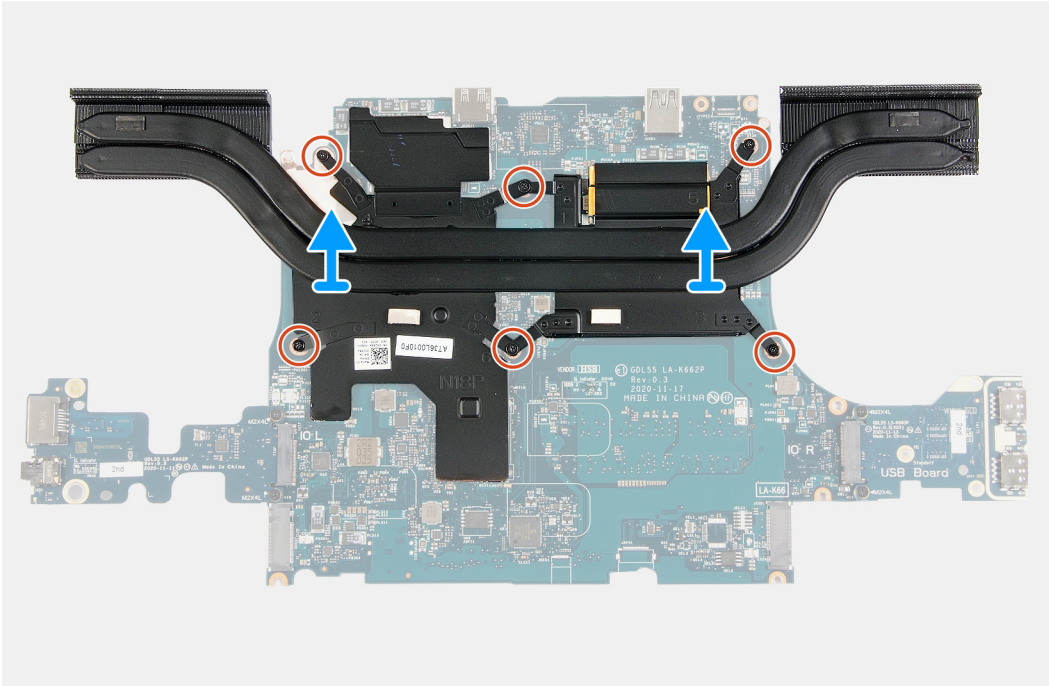
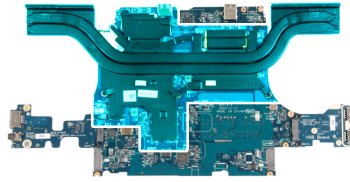
 **NOTE:** System board can be removed with the heat sink, I/O board, and USB board attached.

About this task

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



6x
M2x4



Steps

1. Turn the system board over.
2. Remove the six screws (M2x4) that secure the heat sink to the system board.
3. Lift the heat sink off the system board.

Installing the heat sink

Prerequisites

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

About this task

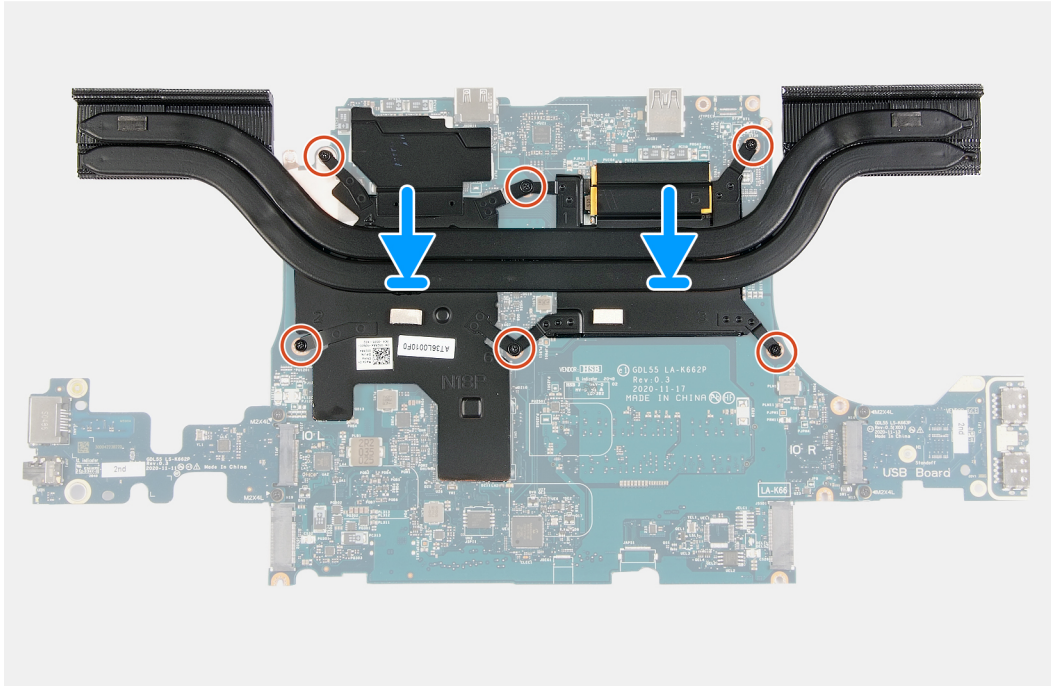
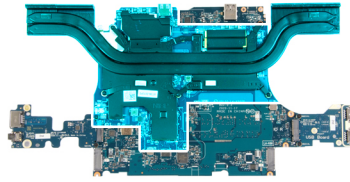
The following image indicates the location of the heat sink and provides a visual representation of the installation procedure.

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.



6x
M2x4



Steps

1. Place the heat sink on the system board and align the screw holes on the heat sink with the screw holes on the system board.
2. Replace the six screws (M2x4) that secure the heat sink to the system board.
3. Turn the system board over and align the screw holes on the system board with the screw holes on the palm-rest and keyboard assembly.

Next steps

1. Install the [system board](#).
2. Install the [left fan](#).
3. Install the [right fan](#).
4. Install the [memory module](#).
5. Install the [wireless card](#).
6. Install the [solid-state drive 2](#).
7. Install the [solid-state drive 1](#).
8. Install the [rear cover](#).
9. Install the [battery](#).
10. Install the [base cover](#).
11. Follow the procedure in [After working inside your computer](#).

USB board

Removing the USB board

Prerequisites

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [battery](#).
4. Remove the [rear cover](#).
5. Remove the [solid-state drive 1](#).
6. Remove the [solid-state drive 2](#).
7. Remove the [wireless card](#).
8. Remove the [memory module](#).
9. Remove the [right fan](#).
10. Remove the [left fan](#).
11. Remove the [system board](#).

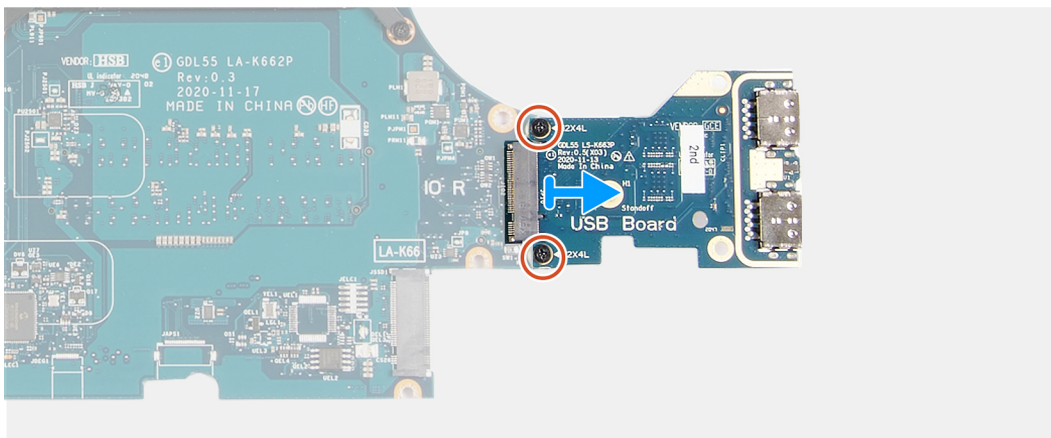
 **NOTE:** System board can be removed with the heat sink, I/O board, and USB board attached.

About this task

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



2x
M2x4



Steps

1. Turn the system board over.
2. Remove the two screws (M2x4) that secure the USB board to the system board.
3. Remove the USB board from the system board.

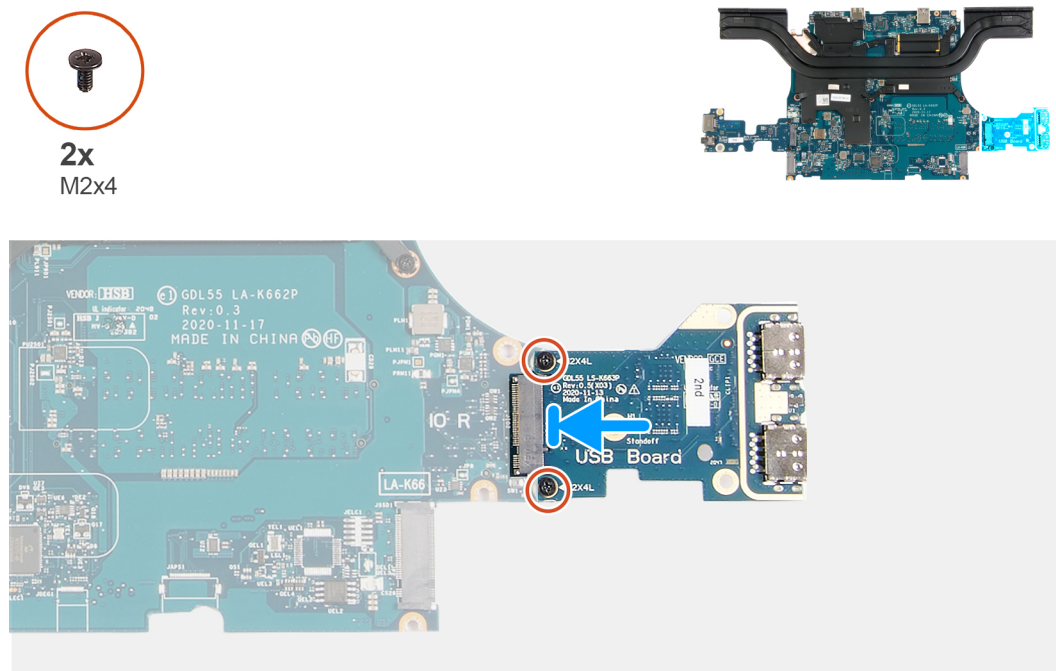
Installing the USB board

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 USB board and provides a visual representation of the installation procedure.



Steps

1. Align the screw holes on the USB board with the screw holes on the system board and insert the USB board in to the system board.
2. Replace the two screws (M2x4) that secure the USB board to the system board.

Next steps

1. Install the [system board](#).
2. Install the [left fan](#).
3. Install the [right fan](#).
4. Install the [memory module](#).
5. Install the [wireless card](#).
6. Install the [solid-state drive 2](#).
7. Install the [solid-state drive 1](#).
8. Install the [rear cover](#).
9. Install the [battery](#).
10. Install the [base cover](#).
11. Follow the procedure in [After working inside your computer](#).

I/O board

Removing the I/O board

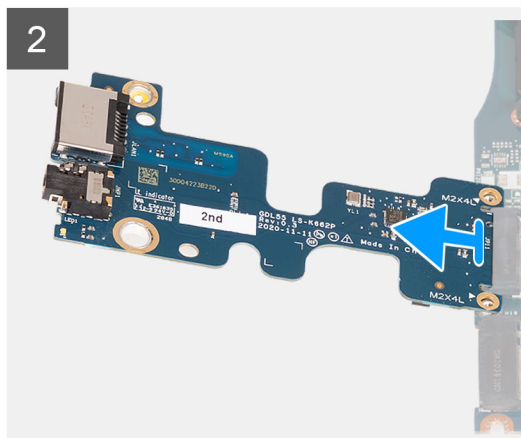
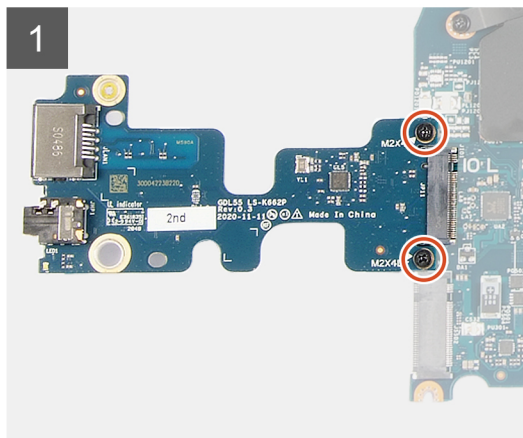
Prerequisites

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [battery](#).
4. Remove the [rear cover](#).
5. Remove the [solid-state drive 1](#).
6. Remove the [solid-state drive 2](#).
7. Remove the [wireless card](#).
8. Remove the [memory module](#).
9. Remove the [right fan](#).
10. Remove the [left fan](#).
11. Remove the [system board](#).

 **NOTE:** System board can be removed with the heat sink, I/O board, and USB board attached.

About this task

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



Steps

1. Turn the system board over.
2. Remove the two screws (M2x4) that secure the I/O board to the system board.
3. Remove the I/O board from the system board.

Installing the I/O board

Prerequisites

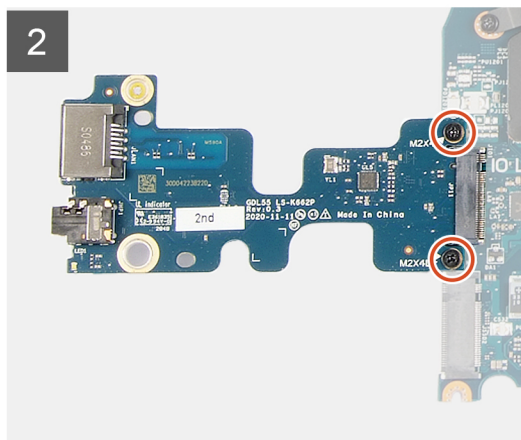
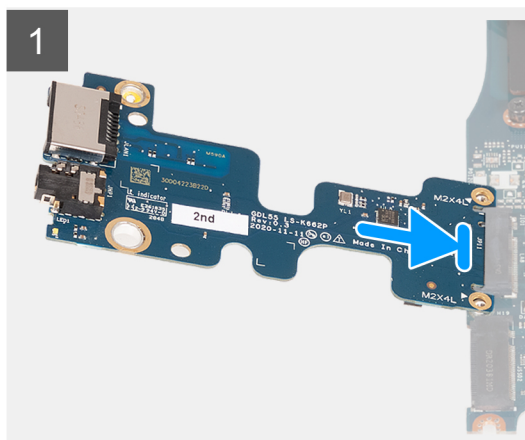
If you are replacing a component, remove the existing component before performing the installation procedure.

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. Insert the I/O board at a 45 degree angle into the slot on the system board.
2. Align the screw holes on the I/O board with the screw holes on the system board.
3. Install the two screws (M2x4) that secure the I/O board to the system board.
4. Turn the system board to the front and align the screw holes on the system board with the screw holes on the palm-rest and keyboard assembly.

Next steps

1. Install the [system board](#).
2. Install the [left fan](#).
3. Install the [right fan](#).
4. Install the [memory module](#).
5. Install the [wireless card](#).
6. Install the [solid-state drive 2](#).
7. Install the [solid-state drive 1](#).
8. Install the [rear cover](#).
9. Install the [battery](#).
10. Install the [base cover](#).
11. Follow the procedure in [After working inside your computer](#).

Power button

Removing the power button

Prerequisites

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [battery](#).
4. Remove the [rear cover](#).
5. Remove the [solid-state drive](#).
6. Remove the [solid-state drive 2](#).
7. Remove the [wireless card](#).
8. Remove the [memory module](#).
9. Remove the [right fan](#).
10. Remove the [left fan](#).
11. Remove the [system board](#).

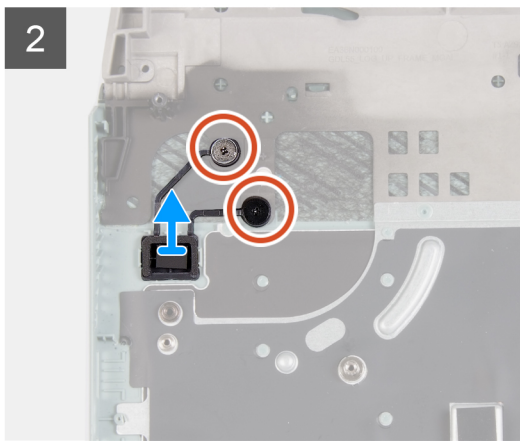
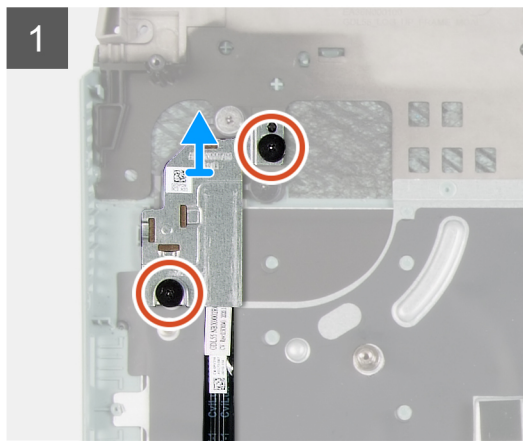
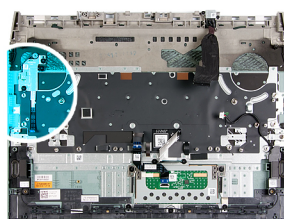
 **NOTE:** System board can be removed with the heat sink, I/O board, and USB board attached.

About this task

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



4x
M2x2



Steps

1. Remove the two screws (M2x2) that secure the power-button shield to the palm-rest and keyboard assembly.
2. Lift the power-button shield off the palm-rest and keyboard assembly.
3. Remove the two screws (M2x2) that secure the power button to the palm-rest and keyboard assembly.
4. Lift the power button off the palm-rest and keyboard assembly.

Installing the power button

Prerequisites

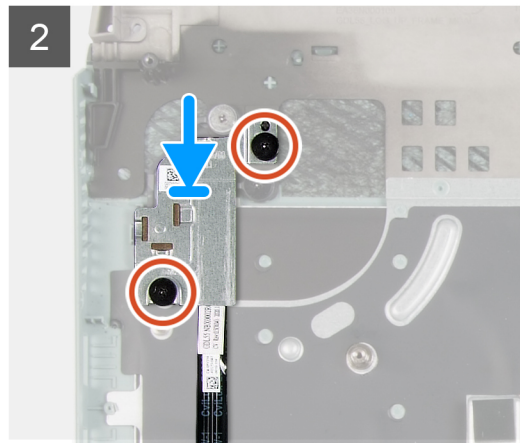
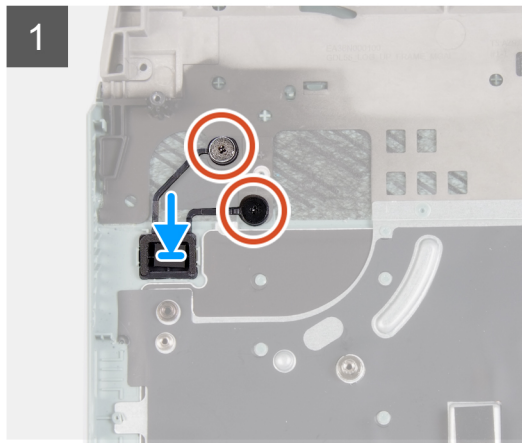
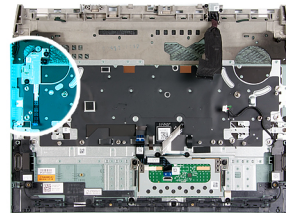
If you are replacing a component, remove the existing component before performing the installation procedure.

About this task

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



4x
M2x2



Steps

1. Place the power button on the slot on the palm-rest and keyboard assembly.
2. Replace the two screws (M2x2) that secure the power button to the palm-rest and keyboard assembly.
3. Align the screw holes on the power-button shield with the screw holes on the palm-rest and keyboard assembly.
4. Replace the two screws (M2x2) that secure the power-button shield to the palm-rest and keyboard assembly.

Next steps

1. Install the [system board](#).
2. Install the [left fan](#).
3. Install the [right fan](#).
4. Install the [memory module](#).
5. Install the [wireless card](#).
6. Install the [solid-state drive 2](#).
7. Install the [solid-state drive 1](#).
8. Install the [rear cover](#).
9. Install the [battery](#).
10. Install the [base cover](#).
11. Follow the procedure in [After working inside your computer](#).

Palm-rest and keyboard assembly

Removing the palm-rest and keyboard assembly

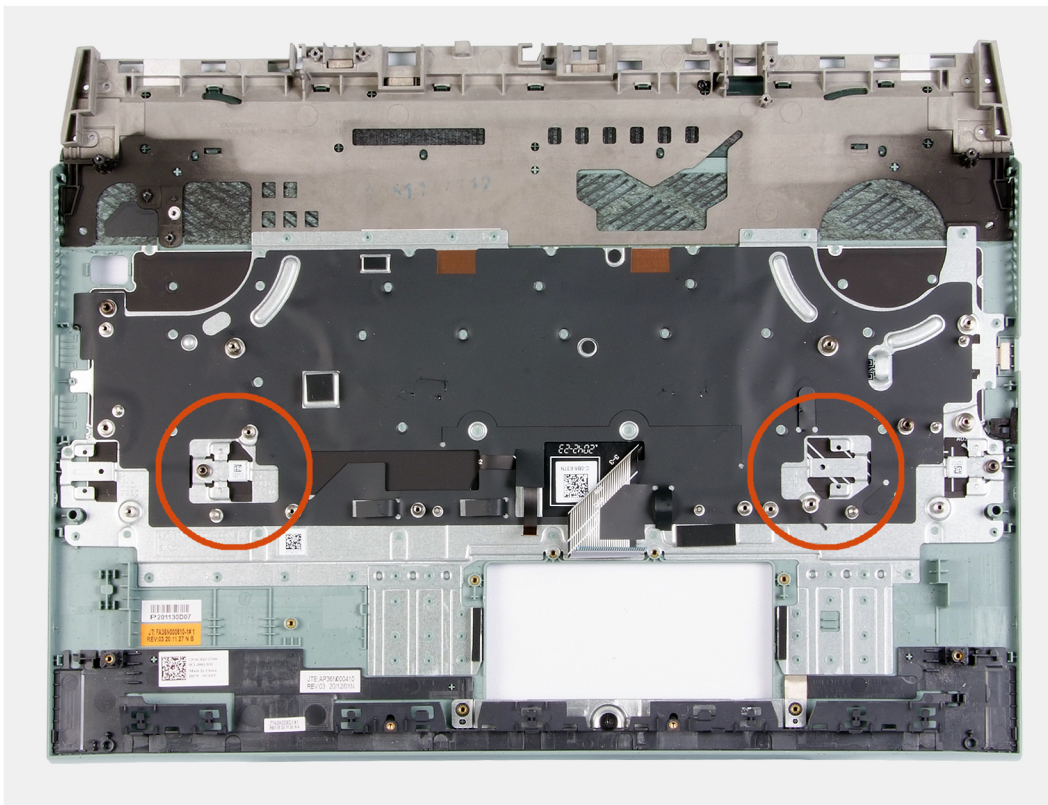
Prerequisites

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [battery](#).
4. Remove the [touchpad](#).
5. Remove the [rear cover](#).
6. Remove the [display assembly](#).
7. Remove the [solid-state drive](#).
8. Remove the [solid-state drive 2](#).
9. Remove the [wireless card](#).
10. Remove the [memory module](#).
11. Remove the [power-adaptor port](#).
12. Remove the [right fan](#).
13. Remove the [left fan](#).
14. Remove the [speakers](#).
15. Remove the [system board](#).
-  **NOTE:** System board can be removed with the heat sink, I/O board, and USB board attached.
16. Remove the [power button](#).

About this task

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

-  **NOTE:** When replacing the palm rest, the solid-state drive mounting brackets has to be removed from the existing palm rest and transferred to the replacement palm rest.



Installing the palm-rest and keyboard assembly

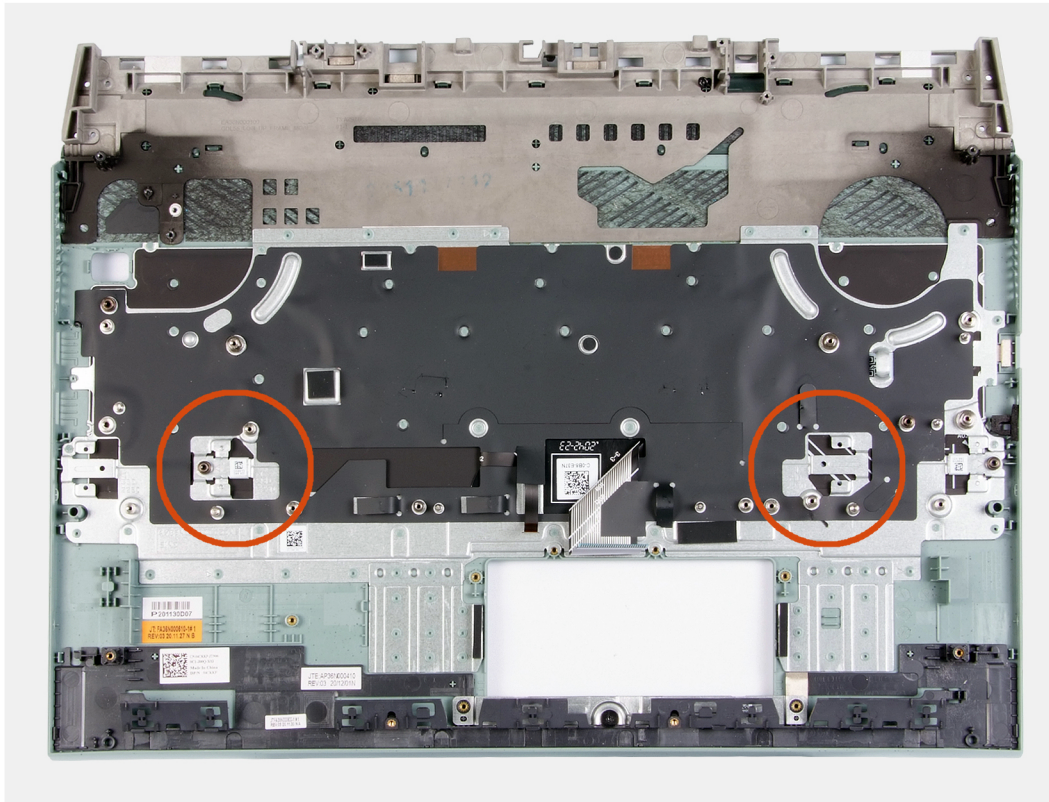
Prerequisites

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.

NOTE: When replacing the palm rest, the solid-state drive mounting brackets has to be transferred from the old palm rest to the replacement palm rest.



Next steps

1. Install the [power button](#).
2. Install the [system board](#).
3. Install the [speakers](#).
4. Install the [left fan](#).
5. Install the [right fan](#).
6. Install the [power-adapter port](#).
7. Install the [memory module](#).
8. Install the [wireless card](#).
9. Install the [solid-state drive 2](#).
10. Install the [solid-state drive 1](#).
11. Install the [display assembly](#).
12. Install the [rear cover](#).
13. Install the [touchpad](#).
14. Install the [battery](#).
15. Install the [base cover](#).
16. 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

Steps

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

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

Navigation keys

 **NOTE:** For most of the 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.  NOTE: For the standard graphics browser only.
Esc	Moves to the previous page until you view the main screen. Pressing Esc in the main screen displays a message that prompts you to save any unsaved changes and restarts the system.

One time boot menu

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

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

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

System setup options

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.
Battery	Displays the battery health information.
Primary	Displays the primary battery.
Battery Level	Displays the battery level.
Battery State	Displays the battery state.
Health	Displays the battery health.
AC Adapter	Displays whether an AC adapter is installed.
Processor Information	
Processor Type	Displays the processor type.
Maximum Clock Speed	Displays the maximum processor clock speed.
Core Count	Displays the number of cores on the processor.
Processor L2 Cache	Displays the processor L2 Cache size.
Processor ID	Displays the processor identification code.

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

Overview		
Processor L3 Cache		Displays the processor L3 Cache size.
Current Clock Speed		Displays the current processor clock speed.
Minimum Clock Speed		Displays the minimum processor clock speed.
Microcode Version		Displays the microcode version.
Intel Hyper-Threading Capable		Displays whether the processor is Hyper-Threading (HT) capable.
64-Bit Technology		Displays whether 64-bit technology is used.
Memory Information		
Memory Installed		Displays the total computer memory installed.
Memory Available		Displays the total computer memory available.
Memory Speed		Displays the memory speed.
Memory Channel Mode		Displays single or dual channel mode.
Memory Technology		Displays the technology that is used for the memory.
Device Information		
Video Controller		Displays the integrate graphics information of the computer.
dGPU Video Controller		Displays the discrete graphics information of the computer.
Video BIOS Version		Displays the video BIOS version of the computer.
Video Memory		Displays the video memory information of the computer.
Panel Type		Displays the Panel Type of the computer.
Native Resolution		Displays the native resolution of the computer.
Audio Controller		Displays the audio controller information of the computer.
Wi-Fi Device		Displays the wireless device information of the computer.
Bluetooth Device		Displays the Bluetooth device information of the computer.

Table 5. System setup options—Boot options menu

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

Table 6. System setup options—System Configuration menu

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

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

System Configuration	
	Default: ON.

Table 7. System setup options—Video menu

Video	
LCD Brightness	
Brightness on battery power	Sets the screen brightness when the computer is running on battery power.
Brightness on AC power	Sets the screen brightness when the computer is running on AC power.
EcoPower	Enables or disables EcoPower which increases the battery life by reducing the screen brightness when appropriate. Default: ON.

Table 8. System setup options—Security menu

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

Table 8. System setup options—Security menu (continued)

Security	
	NOTE: This feature may cause compatibility issues or loss of functionality with some legacy tools and applications.
Enable Strong Passwords	Enables or disables strong passwords. Default: OFF.
Password Configuration	Control the minimum and maximum number of characters that are allowed for Admin and System passwords.
Admin Password	Sets, Changes, or deletes the administrator (admin) password (sometimes called the "setup" password).
System Password	Sets, Changes, or deletes the system password.
Enable Master Password Lockout	Enables or disables the master password support. Default: OFF.

Table 9. System setup options—Secure Boot menu

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

Table 10. System setup options—Expert Key Management menu

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

Table 11. System setup options—Performance menu

Performance	
Intel Hyper-Threading Technology	Enables or disables the Intel Hyper-Threading Technology to use processor resources more efficiently. Default: ON.
Intel SpeedStep	Enables or disables the Intel SpeedStep Technology to dynamically adjust processor voltage and core frequency, decreasing average power consumption and heat production. Default: ON.
Intel TurboBoost Technology	Enabled or disabled the Intel TurboBoost mode of the processor. If enabled, the Intel TurboBoost driver increases the performance of the CPU or graphics processor.

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

Performance	
Multi-Core Support	Default: ON. Changes the number of CPU cores available to the operating system. The default value is set to the maximum number of cores. Default: All Cores.
Enable C-State Control	Enables or disables the CPU's ability to enter and exit low-power states. Default: ON.

Table 12. System setup options—Power Management menu

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

Table 13. System setup options—Wireless menu

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

Table 13. System setup options—Wireless menu (continued)

Wireless	
WLAN	Default: ON.
Bluetooth	Default: ON.
Wireless Device Enable	Enable or disable internal WLAN/Bluetooth devices.
WLAN	Default: ON.
Bluetooth	Default: ON.

Table 14. System setup options—POST Behavior menu

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

Table 15. System setup options—Virtualization menu

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

Table 16. System setup options—Maintenance menu

Maintenance	
Asset Tag	Creates a system Asset Tag that can be used by an IT administrator to uniquely identify a particular system. Once set in BIOS, the Asset Tag cannot be changed.
Service Tag	Displays the Service Tag of the computer.
BIOS Recovery from Hard Drive	Enables the computer to recover from a bad BIOS image, as long as the Boot Block portion is intact and functioning. Default: ON.  NOTE: BIOS recovery is designed to fix the main BIOS block and cannot work if the Boot Block is damaged. In addition, this feature cannot work in the event of EC corruption, ME corruption, or a hardware issue. The recovery image must exist on an unencrypted partition on the drive.
BIOS Auto-Recovery	Enables the computer to automatically recover the BIOS without user actions. This feature requires BIOS Recovery from Hard Drive to be set to Enabled. Default: OFF.
Start Data Wipe	 CAUTION: This Secure Wipe Operation will delete information in a way that it cannot be reconstructed. If enabled, the BIOS will queue up a data wipe cycle for storage devices that are connected to the motherboard on the next reboot. Default: OFF.
Allow BIOS Downgrade	Controls flashing of the system firmware to previous revisions. Default: ON.

Table 17. System setup options—System Logs menu

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

Table 18. System setup options—SupportAssist menu

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

System and setup password

Table 19. 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:
 - 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. Turn off your computer.
2. Remove the [base cover](#).
 **NOTE:** The battery cable must be disconnected from the system board (see Step 4 in [Removing the base cover](#)).
3. Turn your computer over and press the power button for 15 seconds to drain the flea power.
4. Before you turn on your computer, follow the steps in [installing the base cover](#).

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.

 **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.
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](#) at 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](#) at www.dell.com/support.
3. Copy the BIOS setup program file to the bootable USB drive.
4. Connect the bootable USB drive to the computer that needs the BIOS update.
5. Restart the computer and press **F12**.
6. Select the USB drive from the **One Time Boot Menu**.
7. Type the BIOS setup program filename and press **Enter**.
The **BIOS Update Utility** appears.
8. Follow the on-screen instructions to complete the BIOS update.

Updating the BIOS in Linux and Ubuntu

To update the system BIOS on a computer that is installed with Linux or Ubuntu, see the knowledge base article [000131486](#) at www.dell.com/support.

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](#).

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](#).

System diagnostic lights

Battery-status light

Indicates the power and battery-charge status.

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

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

Off

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

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

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

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

Table 20. LED codes

Diagnostic light codes	Problem description
1,1	TPM detection failure
1,2	Unrecoverable SPI flash failure
1,5	i-Fuse failure
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	Display failure - EC detection of power rail failure
3,1	Coin-cell battery failure
3,2	PCI, video card/chip failure
3,4	Recovery image found but invalid
3,5	Power-rail failure
3,6	System BIOS Flash incomplete

Table 20. LED codes (continued)

Diagnostic light codes	Problem description	
3,7	Management Engine (ME) error	

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

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

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

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

Recovering the operating system

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

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

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

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

Backup media and recovery options

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

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.

Getting help and contacting Dell

Self-help resources

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

Table 21. Self-help resources

Self-help resources	Resource location
Information about Dell products and services	www.dell.com
My Dell app	
Tips	
Contact Support	In Windows search, type <code>Contact Support</code> , and press Enter.
Online help for operating system	www.dell.com/support/windows www.dell.com/support/linux
Access top solutions, diagnostics, drivers and downloads, and learn more about your computer through videos, manuals and documents.	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 www.dell.com/support . For more information on how to find the Service Tag for your computer, see Locate the Service Tag on your computer .
Dell knowledge base articles for a variety of computer concerns	1. Go to www.dell.com/support. 2. On the menu bar at the top of the Support page, select Support > Knowledge Base. 3. In the Search field on the Knowledge Base page, type the keyword, topic, or model number, and then click or tap the search icon to view the related articles.

Contacting Dell

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

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

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