

G5 5090

Service Manual



Identifier	GUID-5B8DE7B7-879F-45A4-88E0-732155904029
Status	Released

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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Status	Released

Working inside your computer

Identifier	GUID-71128823-CE64-4E17-9439-DEE95AF668C4
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Safety instructions

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

-  **NOTE:** Before working inside your computer, read the safety information that shipped with your computer. For more safety best practices, see the Regulatory Compliance home page at www.dell.com/regulatory_compliance.
-  **NOTE:** Disconnect 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 to the electrical outlet.
-  **CAUTION:** To avoid damaging the computer, ensure that the work surface is flat and clean.
-  **CAUTION:** Handle components and cards with care. Do not touch the components or contacts on a card. Hold a card by its edges or by its metal mounting bracket. Hold a component such as a processor by its edges, not by its pins.
-  **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 shipped with the product or at www.dell.com/regulatory_compliance.
-  **CAUTION:** Before touching anything inside your computer, ground yourself by using a wrist grounding strap or by periodically 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 on its connector or on its pull tab, not on the cable itself. Some cables have connectors with locking tabs or thumb-screws that you must disengage before disconnecting the cable. When disconnecting cables, keep them evenly aligned to avoid bending any connector pins. When connecting cables, ensure that the ports and connectors are correctly oriented and aligned.
-  **CAUTION:** Press and eject any installed card from the media-card reader.
-  **NOTE:** The color of your computer and certain components may appear differently than shown in this document.

Identifier	GUID-5D3B1051-9384-409A-8D5B-9B53BD496DE8
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Before working inside your computer

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

Identifier	GUID-B2521C24-A407-4ABB-8022-6D88B53F0B94
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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.

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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.

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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.


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Transporting sensitive components

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

Lifting equipment


Adhere to the following guidelines when lifting heavy weight equipment:

 **CAUTION: Do not lift greater than 50 pounds. Always obtain additional resources or use a mechanical lifting device.**

1. Get a firm balanced footing. Keep your feet apart for a stable base, and point your toes out.
2. Tighten stomach muscles. Abdominal muscles support your spine when you lift, offsetting the force of the load.
3. Lift with your legs, not your back.
4. Keep the load close. The closer it is to your spine, the less force it exerts on your back.
5. Keep your back upright, whether lifting or setting down the load. Do not add the weight of your body to the load. Avoid twisting your body and back.
6. Follow the same techniques in reverse to set the load down.

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.

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Removing and installing components

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Status	Released

Inside view of your computer

NOTE: The appearance of heat sink differs depending on the graphics configuration you ordered.

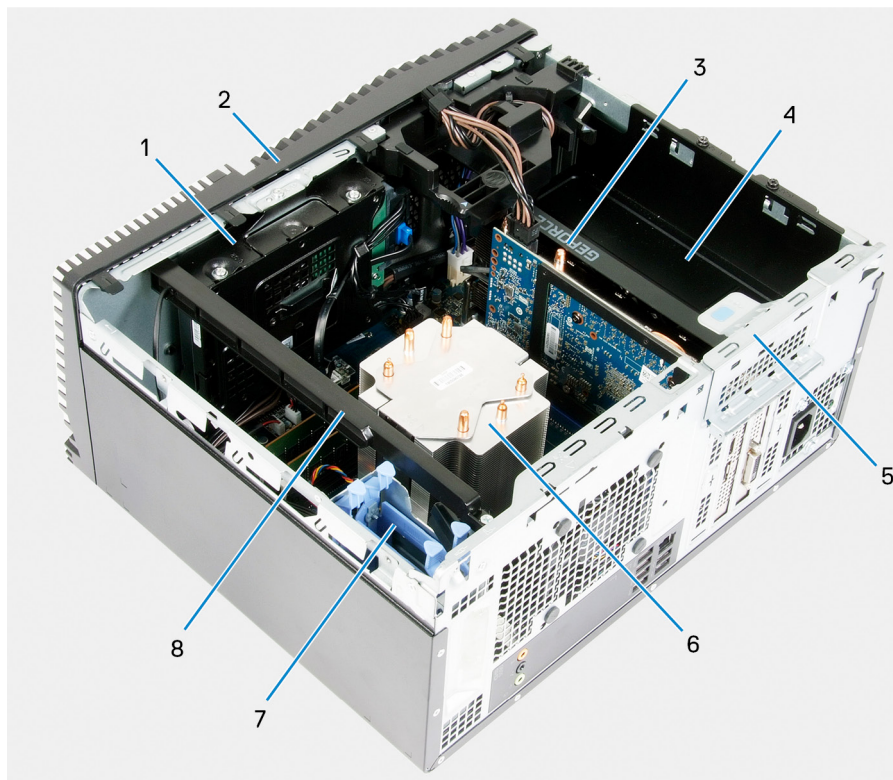


Figure 1. Inside view of your computer

1. 3.5-inch hard drive assembly
2. front cover
3. graphics card
4. power-supply unit
5. PCIe door
6. processor fan and heat-sink assembly
7. 2.5-inch hard-drive assembly
8. light bar

System-board components

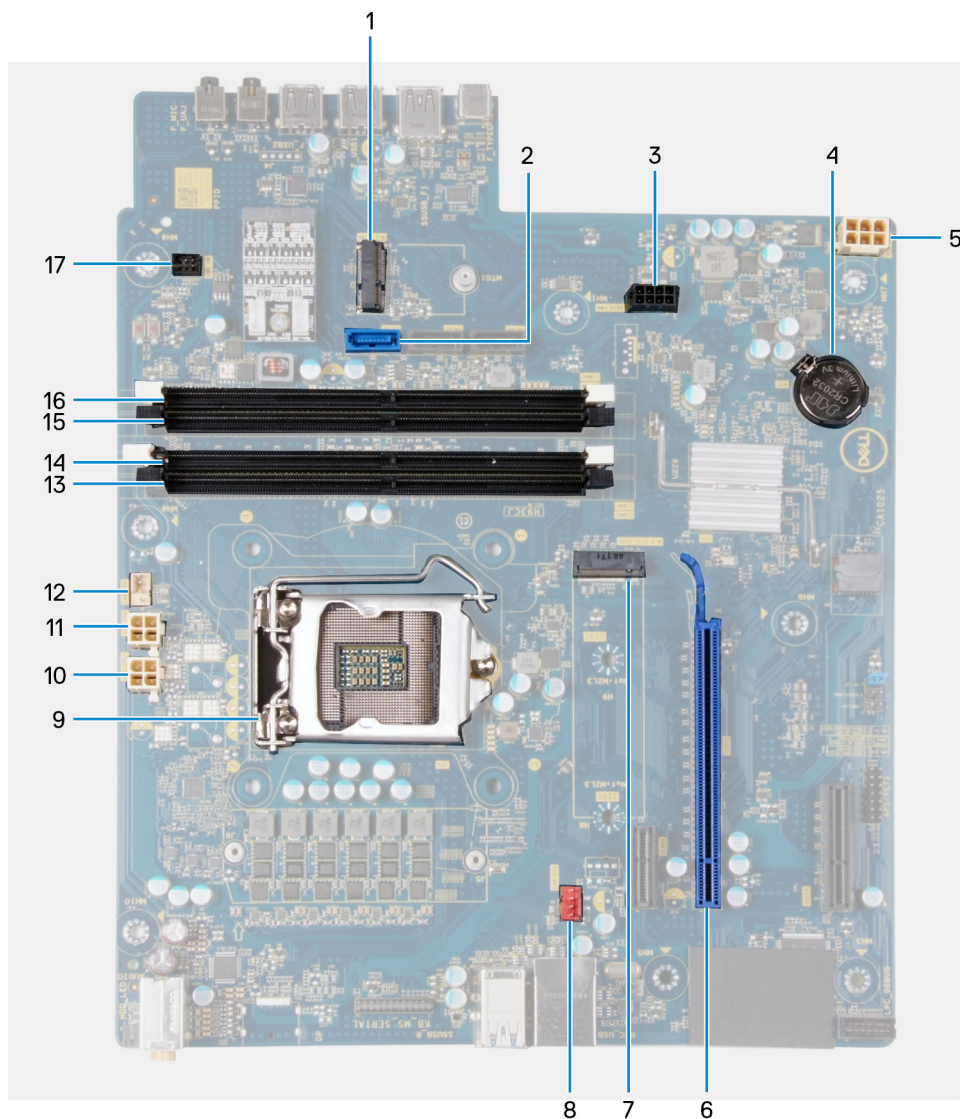


Figure 2. System-board components

1. wireless-card slot
2. hard-drive data cable connector (SATA0)
3. hard-drive power cable connector (SATA PWR)
4. coin-cell battery
5. power-supply unit cable connector
6. graphics-card slot
7. solid-state drive connector (m.2 PCIe SSD)
8. chassis-fan cable connector (FAN SYS)
9. processor
10. processor power cable connector (ATX CPU1)
11. processor power cable connector (ATX CPU)
12. processor-fan cable connector (FAN CPU)
13. memory-module slot (DIMM3)
14. memory-module slot (DIMM1)
15. memory-module slot (DIMM4)
16. memory-module slot (DIMM2)
17. memory-module slot (DIMM5)

- 16. memory-module slot (DIMM2)
- 17. front LED cable connector (PWR SW)

Identifier	GUID-EA979CC8-84EC-4827-86C4-C80A8C31F4BF
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Recommended tools

The procedures in this document may require the following tools:

- Philips screwdriver #1
- Flat-head screwdriver
- Plastic scribe

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Screw list











- i



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

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

NOTE: Screw color may vary with the configuration ordered.

Table 1. Screw list

Component	Secured to	Screw type	Quantity	Screw image
Right-side cover	Chassis	#6-32	2	
Light bar	Chassis	#6-32	1	
3.5-inch hard drive	Chassis	#6-32	1	
3.5-inch hard drive	Hard-drive cage	#6-32	4	
Wireless-card bracket	System board	M2x3	1	
Solid-state drive	System board	M2x3	1	
Intel Optane	System board	M2x3	1	
Power-supply unit	Chassis	#6-32	2	
Power-supply unit	Chassis	#6-32	3	
Ports bezel	Chassis	#6-32	1	

Component	Secured to	Screw type	Quantity	Screw image
System board	Chassis	#6-32	8	
System board	Chassis	#6-32	1	

Identifier	GUID-E9D0D744-F098-486A-9576-4EEEC69CDCD7
Status	Released

Left-side cover

Identifier	GUID-DAF26955-9CE3-4385-BE9A-B386DD58CE6A
Status	Released

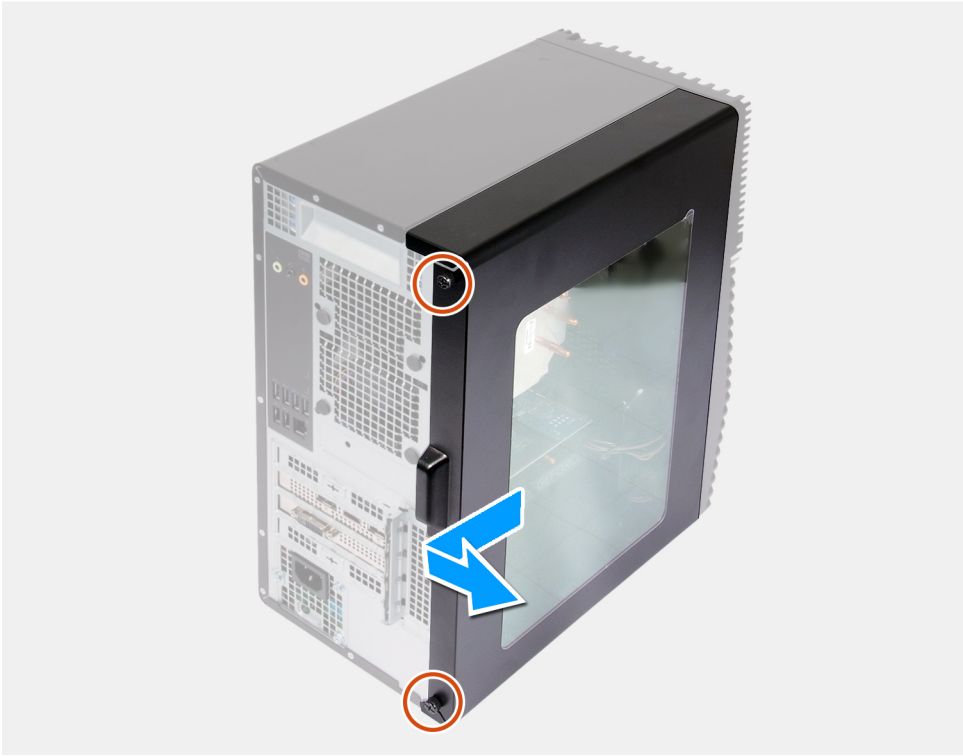
Removing the left-side cover

Prerequisites

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

About this task

The following images indicate the location of the left-side cover and provides a visual representation of the removal procedure.



Steps

1. Loosen the two captive screws that secure the left-side cover to the chassis.

- Using the tab on the left-side cover, slide and lift the left-side cover off the chassis.

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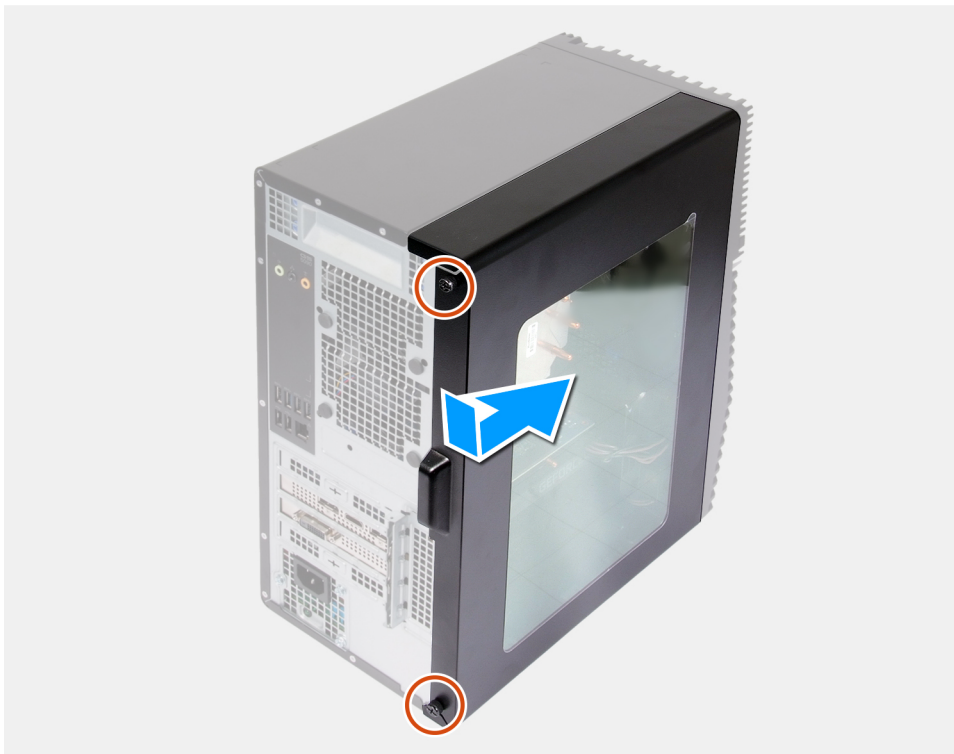
Installing the left-side cover

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 left-side cover and provides a visual representation of the installation procedure.



Steps

- Align the tabs on the left-side cover with the slots on the chassis, and slide it towards the front of the computer.
- Tighten the two captive screws that secure the left-side cover to the chassis.

Next steps

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

Identifier	GUID-545CA604-17B6-4170-A9A8-90BFD6E1B0B0
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Light bar

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Status	Released

Removing the light bar

Prerequisites

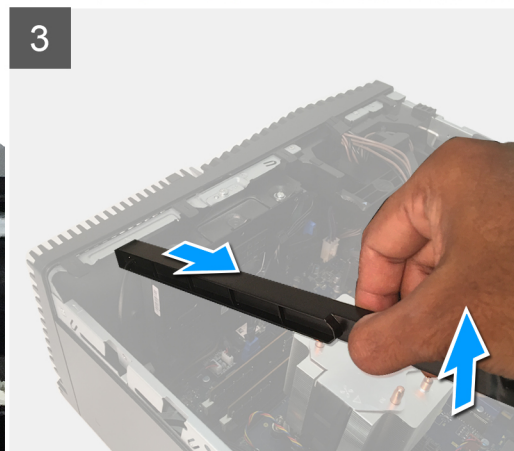
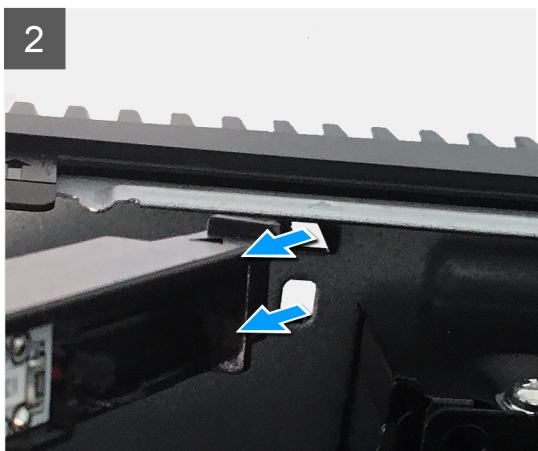
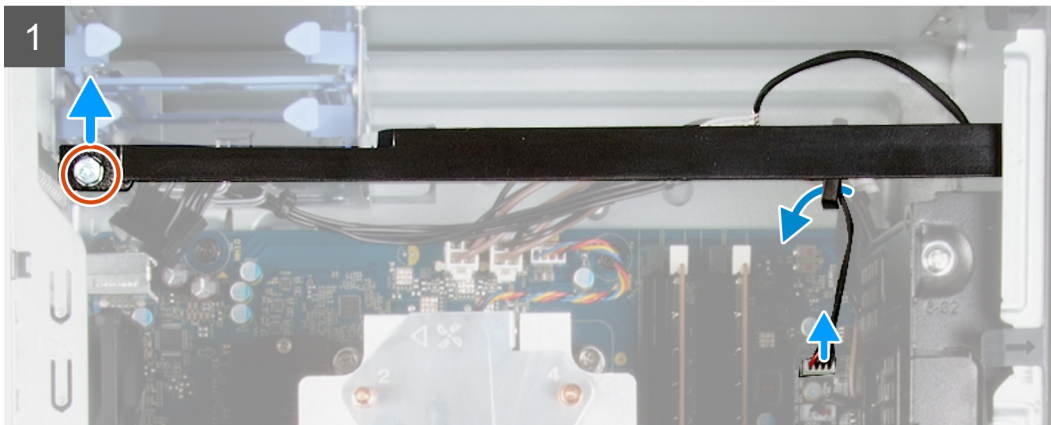
1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [left-side cover](#).

About this task

The following images indicate the location of the light bar and provides a visual representation of the removal procedure.



1x
6-32



Steps

1. Disconnect the light bar cable from its connector on the system board.

2. Remove the light-bar cable from the routing guides.
3. Remove the screw (#6-32) that secures the light bar to the chassis and lift the light bar off the tab.
4. Release the tab on the other end of light bar from the slot on the chassis.
5. Slide and remove the light bar off the chassis.

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Installing the light bar

Prerequisites

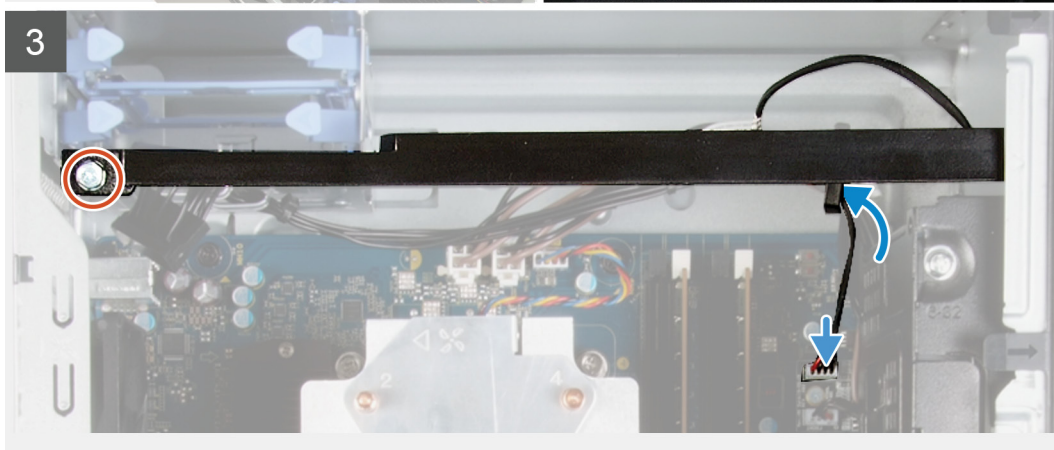
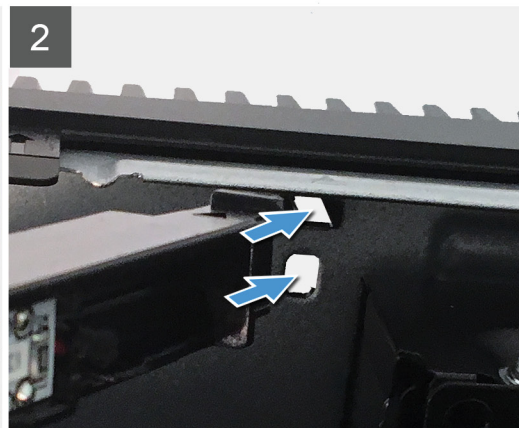
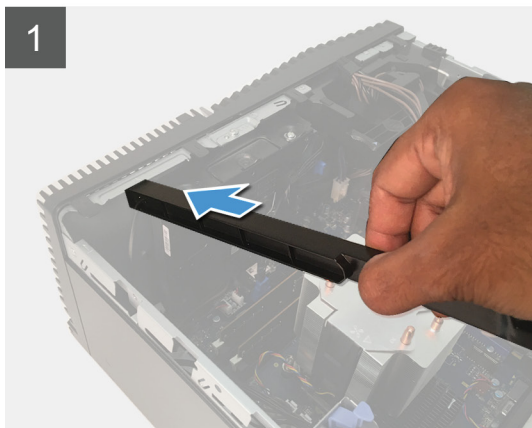
If you are replacing a component, remove the existing component before performing the installation procedure.

About this task

The following images indicate the location of the light bar and provides a visual representation of the installation procedure.



1x
6-32



Steps

1. Align and slide the tabs on the light bar into the slot on the chassis.
2. Replace the screw (#6-32) that secures the light bar to the chassis.

3. Connect the light bar cable to its connector on the system board.

Next steps

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

Identifier	GUID-39973F09-265E-45B1-8DC7-BB1C951C625D
Status	Released

Front cover

Identifier	GUID-8A522B68-98BC-430D-BBC0-C06668823D85
Status	Released

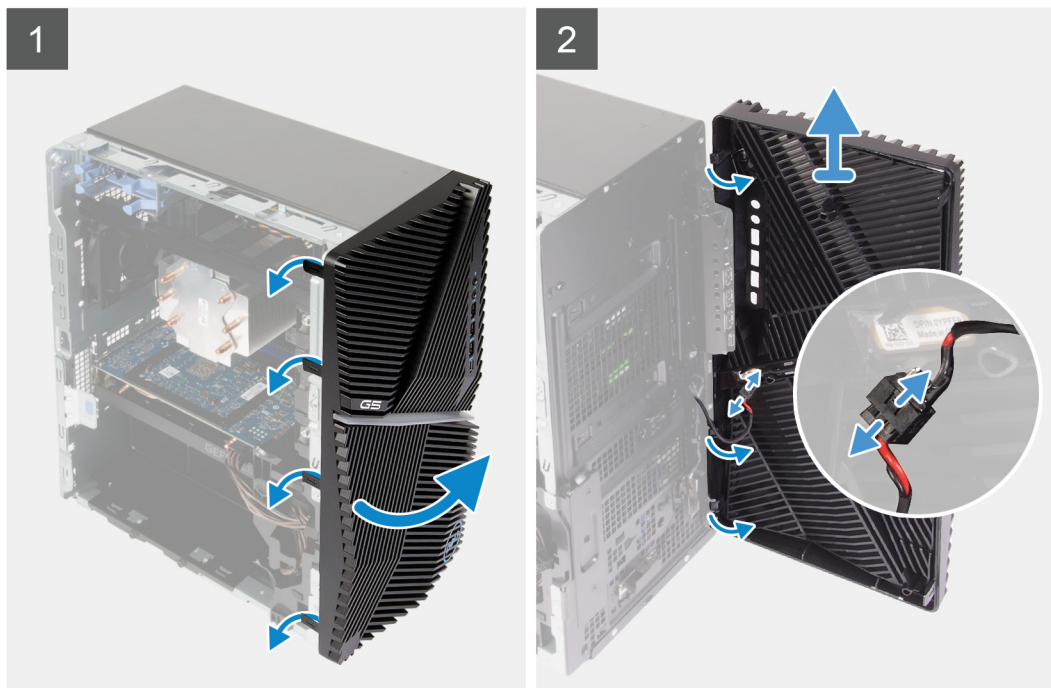
Removing the front cover

Prerequisites

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

About this task

The following images indicate the location of the front cover and provides a visual representation of the removal procedure.



Steps

1. Place the computer in an upright position.

2. Gently pry and release the front-cover tabs sequentially from the top.
3. Move the front cover outward from the chassis.
4. Disconnect the front-LED cable from the connector on the front cover.

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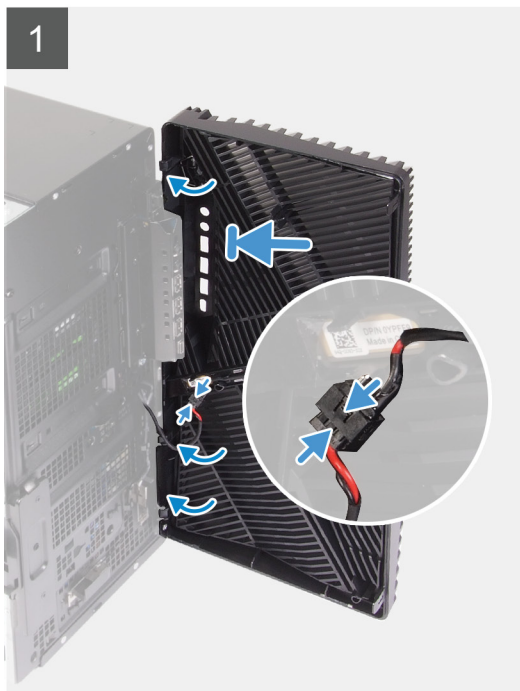
Installing the front cover

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 front cover and provides a visual representation of the installation procedure.



Steps

1. Place the computer in an upright position.
2. Connect the front-LED cable to the connector on the front cover.
3. Align the front-cover tabs with the slots on the chassis.
4. Rotate the front cover towards the chassis and snap it into place.

Next steps

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

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2.5-inch hard drive

Identifier
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Removing the 2.5-inch hard drive

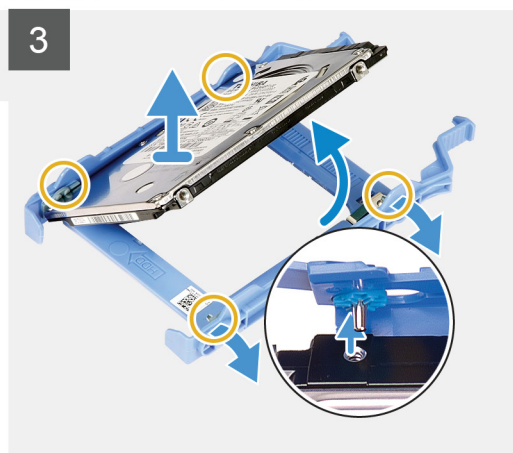
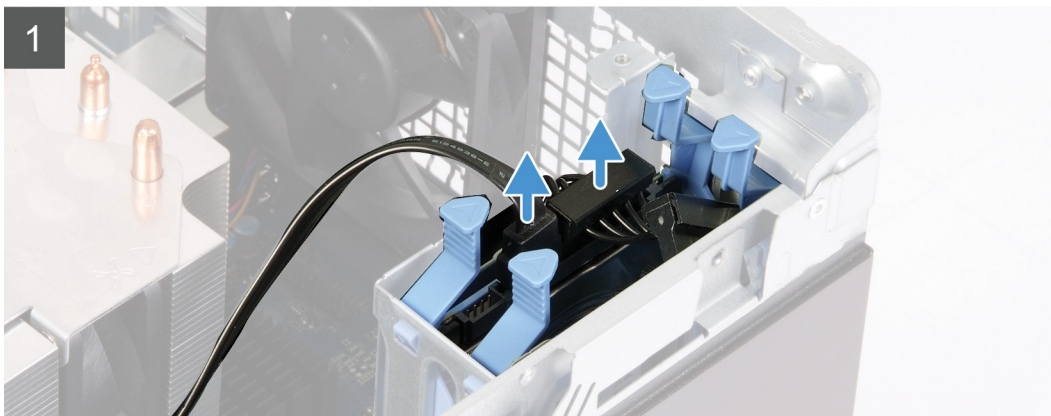
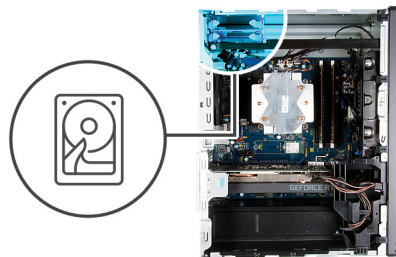
Prerequisites

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

About this task

The following images indicate the location of the 2.5-inch hard-drive assembly and provides a visual representation of the removal procedure.

NOTE: This computer is not shipped with a 2.5-inch hard drive installed. It is shipped with two empty 2.5-inch hard drive cages and a SATA extension cable.

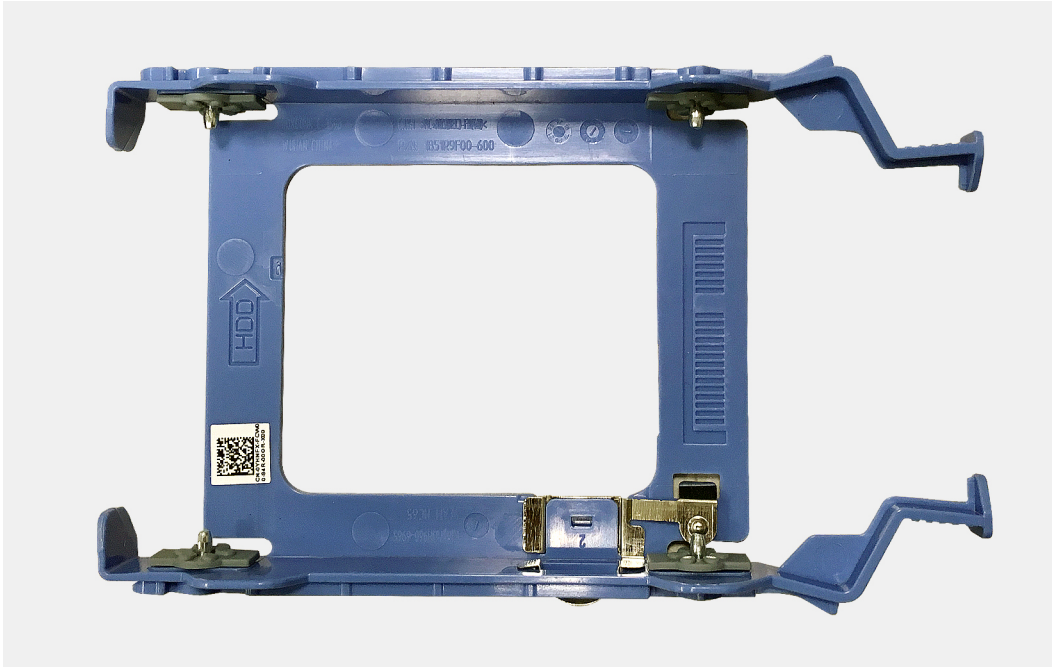


Steps

1. Disconnect the data and power cables from the hard drive.
2. Press the release tabs on the hard-drive carrier and slide the hard-drive assembly out of the hard-drive cage.
3. Pry the hard-drive carrier to release the tabs on the assembly from the slots on the hard drive.
4. Lift and remove the hard drive off the hard-drive carrier.



NOTE: Note the orientation or the SATA connector marking on the hard-drive carrier so that you can replace it correctly.



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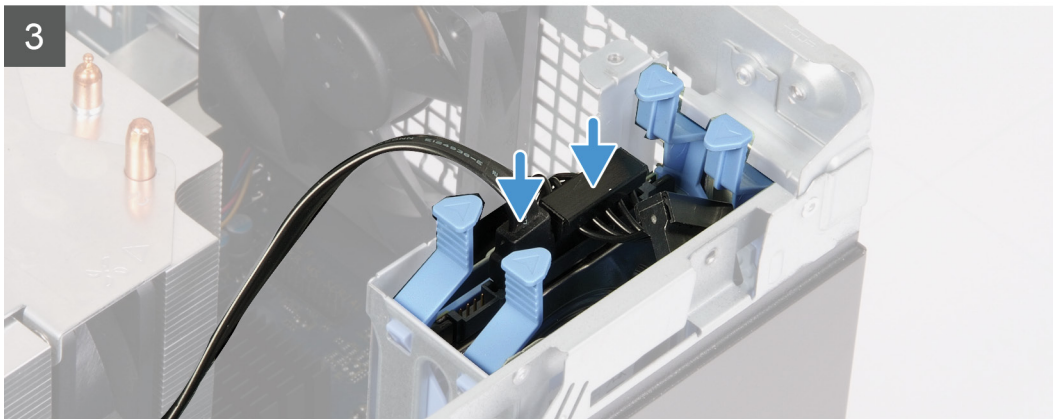
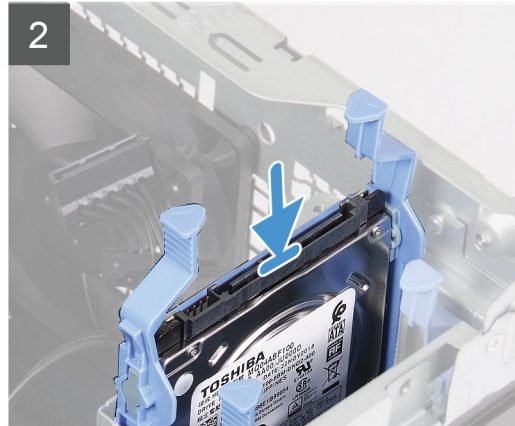
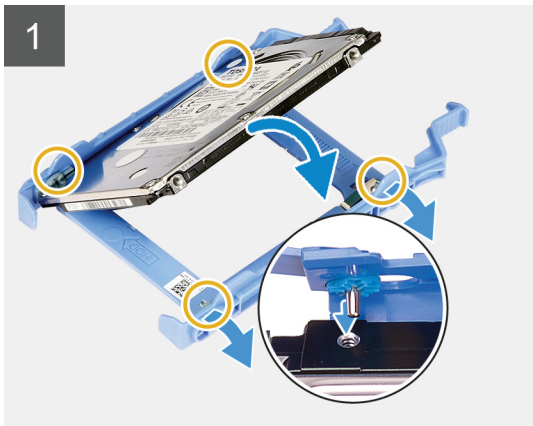
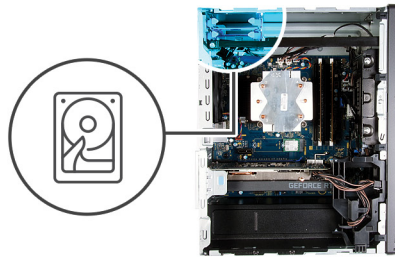
Installing the 2.5-inch hard drive

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 2.5-inch hard-drive assembly and provides a visual representation of the installation procedure.



Steps

1.  **NOTE:** Note the orientation or the SATA connector marking on the hard drive to replace it correctly.
Place the hard drive into the hard-drive carrier and align the tabs on the carrier with the slots on the hard drive.
2. Slide the hard-drive assembly into the hard-drive cage until it snaps into place.
3. Connect the data cable and power cable to the hard drive.

Next steps

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

Identifier	GUID-DFA3DF29-7400-460D-B0A6-B30544A46E4A
Status	Released

3.5-inch hard drive

Removing the 3.5-inch hard drive

Prerequisites

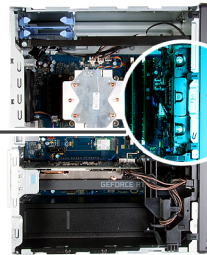
1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [left-side cover](#).

About this task

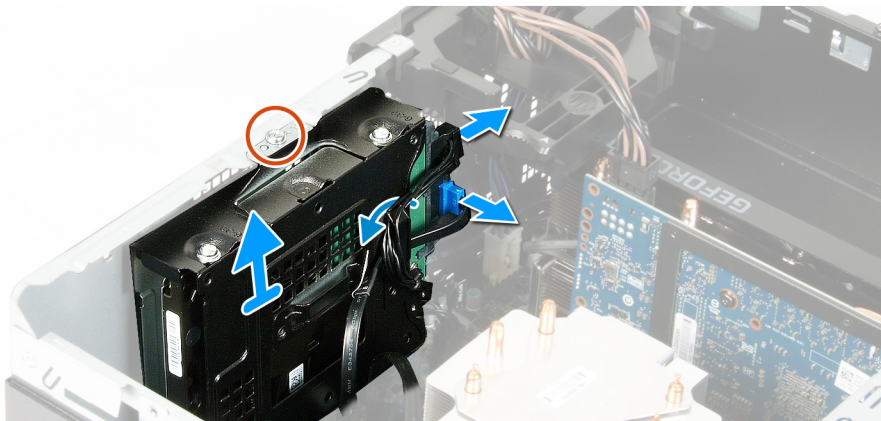
The following images indicate the location of the 3.5-inch hard-drive assembly and provides a visual representation of the removal procedure.



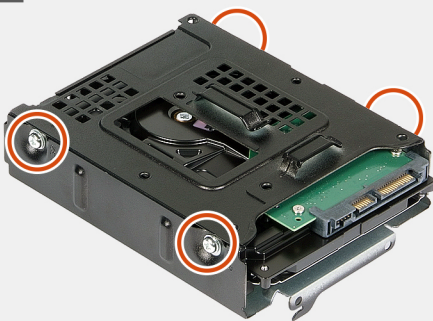
5x
6-32



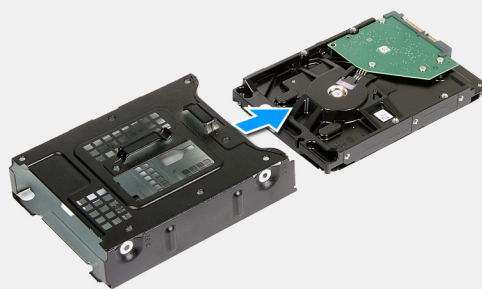
1



2



3



Steps

1. Lay the computer on the right side.
2. Remove the screw (#6-32) that secures the 3.5-inch hard-drive assembly to the chassis.
3. Lift the hard-drive assembly away from the chassis.
4. Remove the cables from the routing guides on the hard-drive assembly.
5. Disconnect the data and power cables from the hard drive.

6. Lift the hard-drive assembly away from the chassis.
7. Remove the four screws (#6-32) that secure the the hard drive to the hard-drive cage.
8. Slide the hard drive from the hard-drive cage.

Identifier	GUID-85DB53B6-6327-41E1-9C2B-E3E587774479
Status	Released

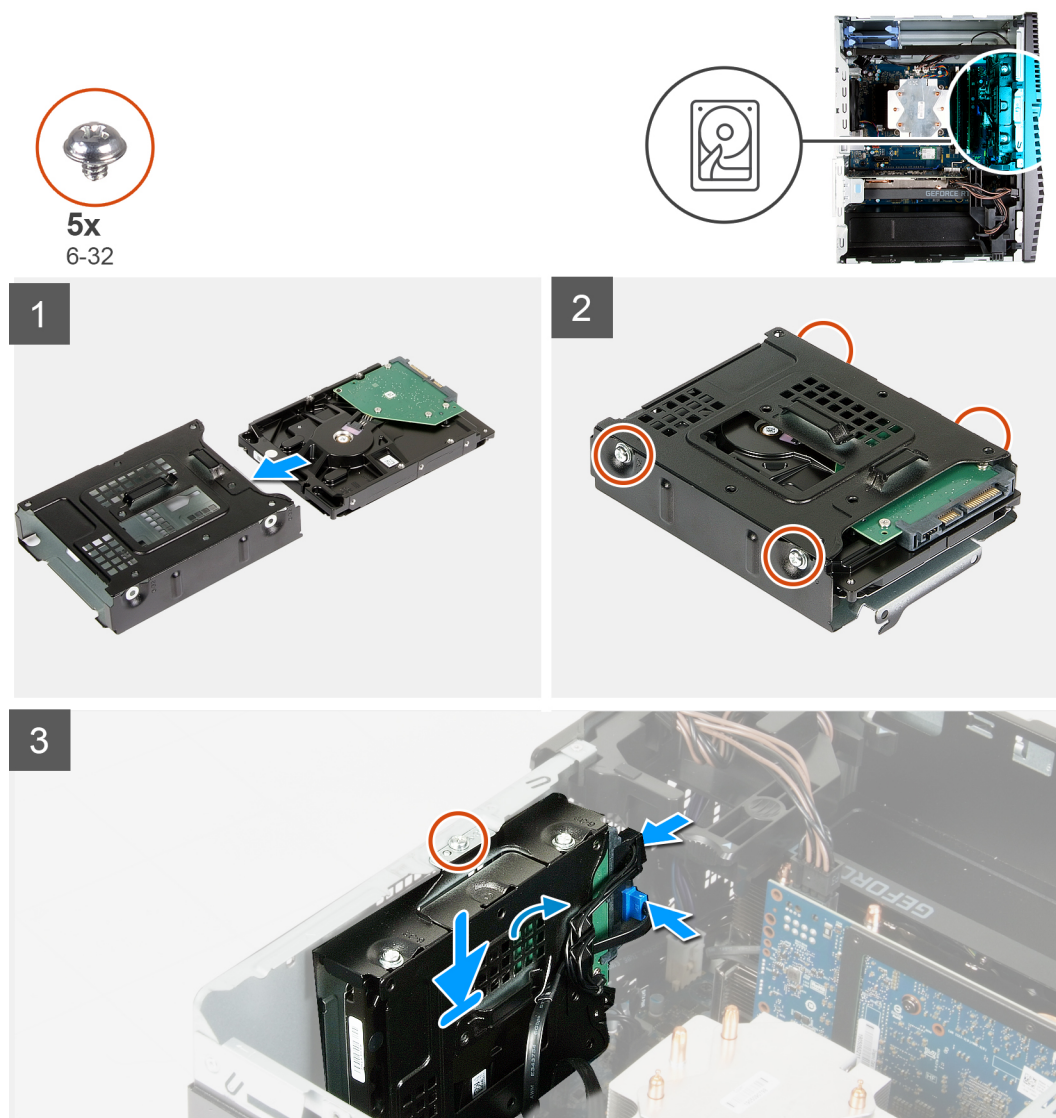
Installing the 3.5-inch hard drive

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 3.5-inch hard-drive assembly and provides a visual representation of the installation procedure.



Steps

1. Slide the hard drive into the hard-drive cage.
2. Replace the four screws (#6-32) that secure the hard drive to the hard-drive cage.
3. Align the hard-drive assembly with the tabs on the chassis.

4. Using the alignment post, align the screw hole on the hard-drive assembly with the screw hole on the chassis.
5. Route the power cable and data cable through the routing guides on the hard-drive assembly and connect the cables to the hard drive.
6. Replace the screw (#6-32) that secures the hard-drive assembly to the chassis.

Next steps

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

Identifier	GUID-55DF0237-E5D4-4AE6-855C-4E8A9733E1EC
Status	Released

Chassis fan

Identifier	GUID-1831E91D-8022-4BAA-9CA1-30B55F1BF67D
Status	Released

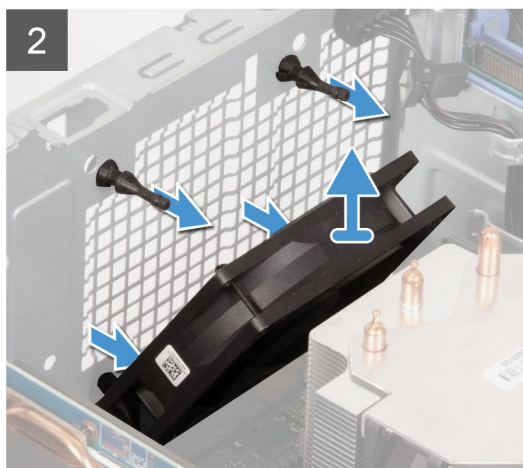
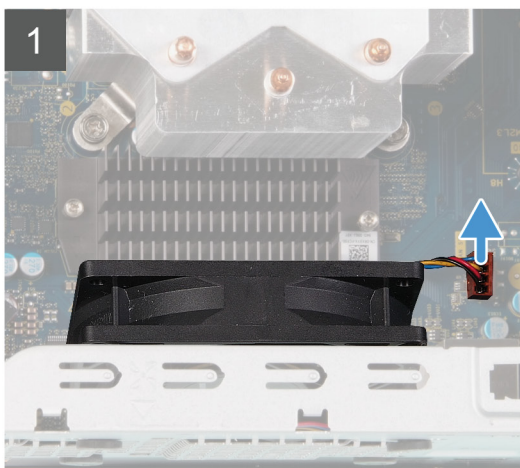
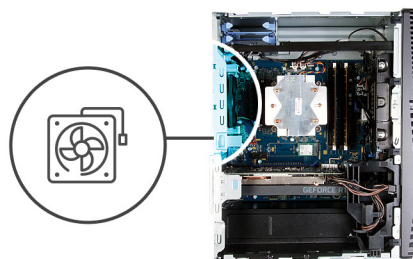
Removing the chassis fan

Prerequisites

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [left-side cover](#).
3. Remove the [light bar](#).

About this task

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



Steps

1. Lay the computer on the right side.
2. Disconnect the fan cable from the system board.
3. Gently pull the fan to release it from the rubber grommets.

4. Remove the fan off the chassis.

Identifier	GUID-4C1D64DC-157D-4048-8528-59A88A030C7C
Status	Released

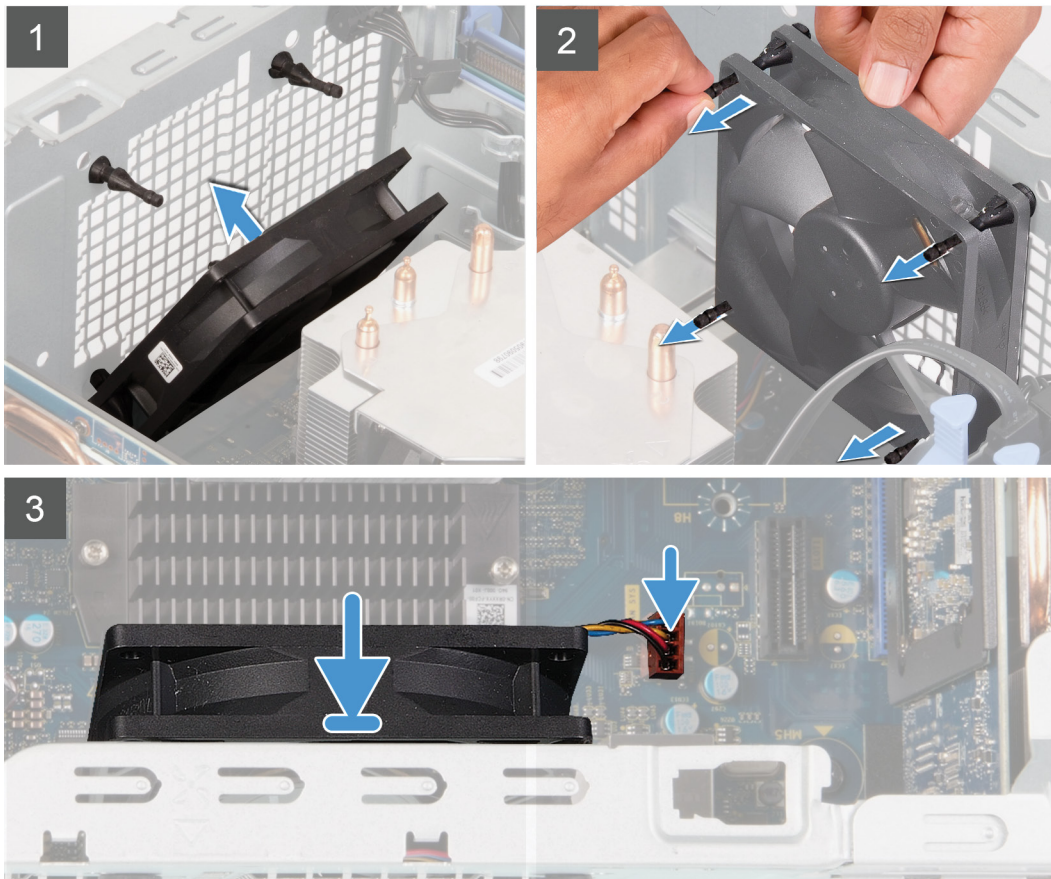
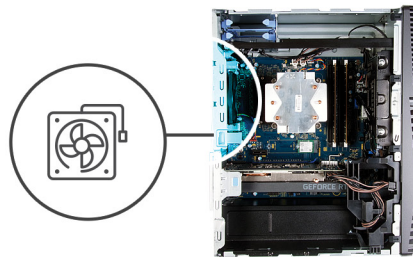
Installing the chassis fan

Prerequisites

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

About this task

The following images indicate the location of the chassis fan and provides a visual representation of the installation procedure.



Steps

1. Align the slots on the fan with the rubber grommets on the chassis.

NOTE: The replaceable fan may have tabs inserted in the grommets slots to block the grommets slots and to avoid incorrect installation on the fan. Service fan will have tabs plugged on one side to avoid incorrect installation of the fan.



2. Route the rubber grommets through the slots on fan and pull the rubber grommets until the fan snaps into position.
3. Connect the fan cable to the system board.

Next steps

1. Install the [light bar](#).
2. Install the [left-side cover](#).
3. Follow the procedure in [After working inside your computer](#).

Identifier	GUID-2A6DAE1B-1FBE-40F9-8D46-40E8C3FBD267
Status	Released

Memory modules

Identifier	GUID-50B70DE0-84DE-4AD1-BA49-C3C8A1F410F1
Status	Released

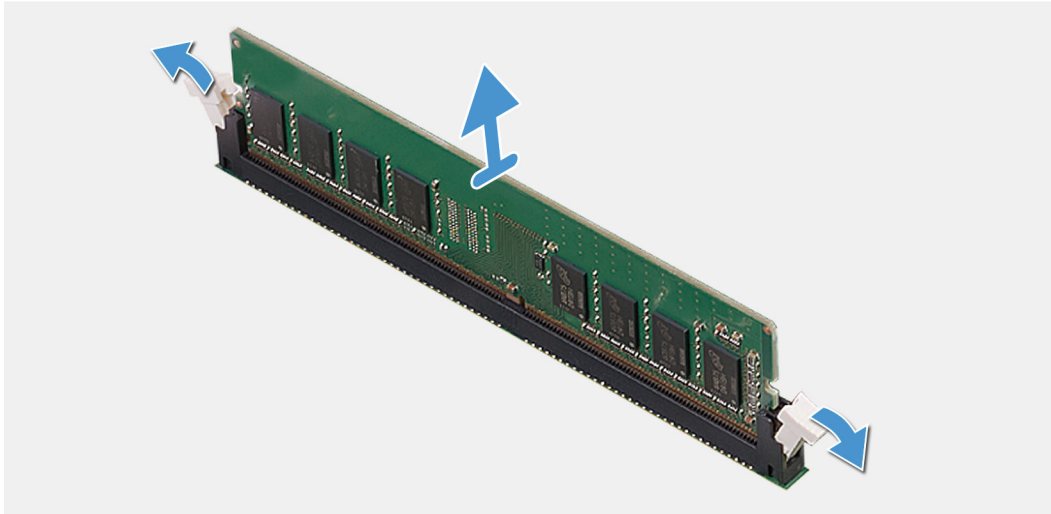
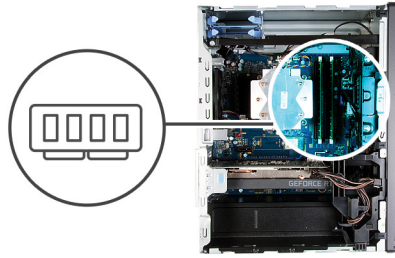
Removing the memory modules

Prerequisites

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

About this task

The following images indicate the location of the memory modules and provides a visual representation of the removal procedure.



Steps

1. Lay the chassis on the right side.
2. Use your fingertips to carefully spread apart the securing-clips on each end of the memory-module slot.
3. Grasp the memory module near the securing clip, and then gently ease the memory module out of the memory-module slot.

- NOTE:** Repeat step 2 to step 4 to remove any other memory modules installed in your computer.
- NOTE:** Note the slot and the orientation of the memory module in order to replace it in the correct slot.
- NOTE:** If the memory module is difficult to remove, gently ease the memory module back and forth to remove it from the slot.
- CAUTION:** To prevent damage to the memory module, hold the memory module by the edges. Do not touch the components on the memory module.

Identifier	GUID-0DAE4C68-0D78-4C07-BA7F-41FDE15F2BE4
Status	Released

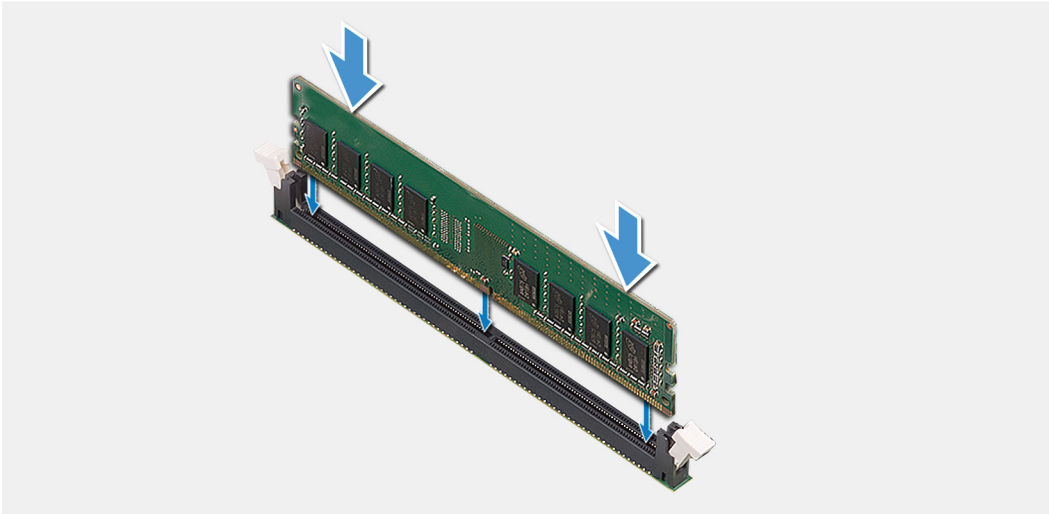
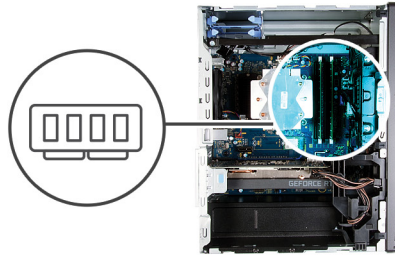
Installing the memory modules

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 memory modules and provides a visual representation of the installation procedure.



Steps

1. Align the notch on the memory module with the tab on the memory-module slot.
2. Insert the memory module into the memory-module connector until the memory module snaps into position and the securing clip locks in place.

NOTE: The securing clips return to the locked position. If you do not hear the click, remove the memory module and reinstall it.

NOTE: If the memory module is difficult to remove, gently ease the memory module back and forth to remove it from the slot.

CAUTION: To prevent damage to the memory module, hold the memory module by the edges. Do not touch the components on the memory module.

Next steps

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

Identifier	GUID-602E7FD5-CE2D-4838-B813-40F62F9EC1F1
Status	Released

Wireless card

Identifier	GUID-815CFF95-4270-443B-B172-4F8683FD5926
Status	Released

Removing the wireless card

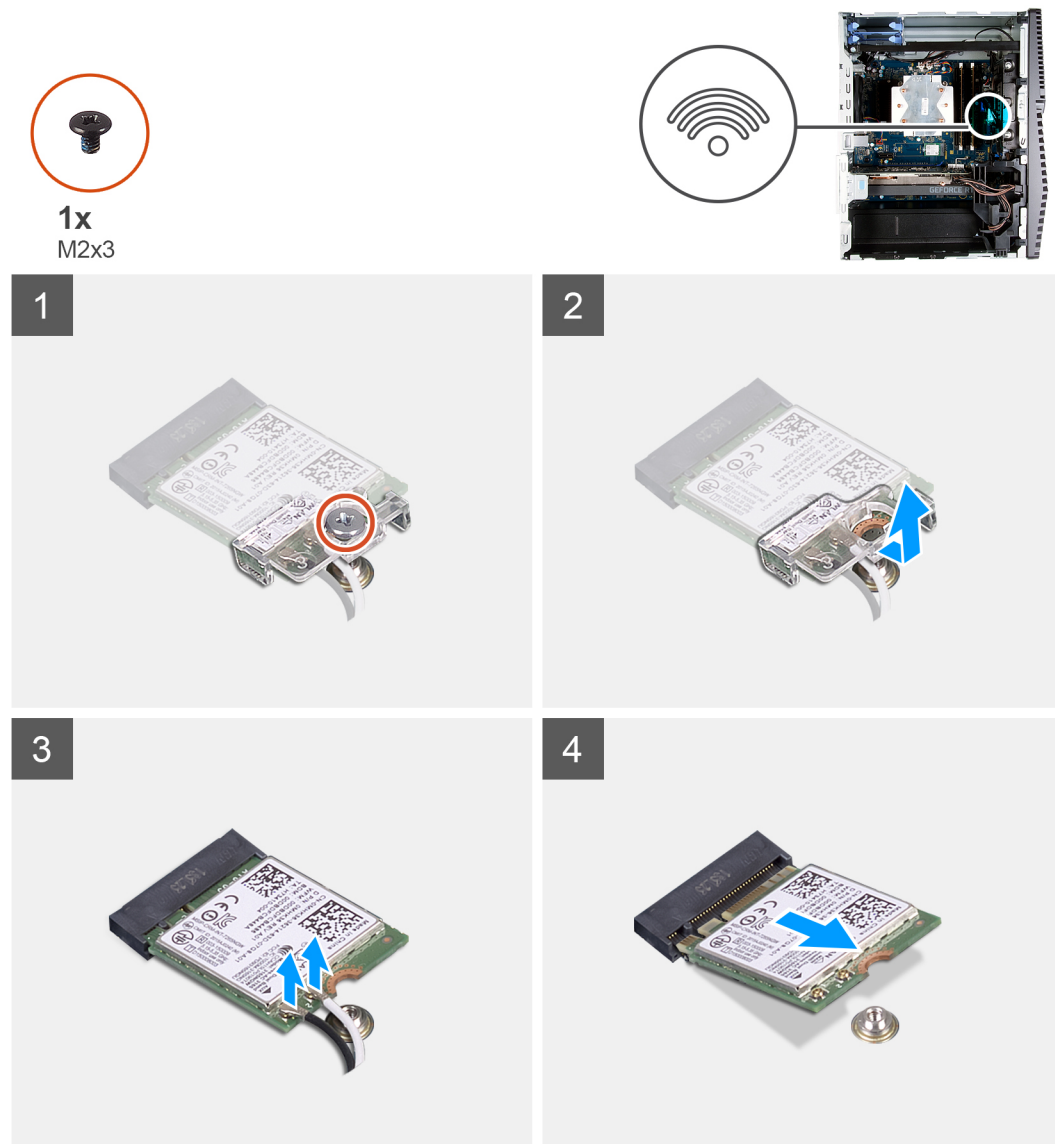
Prerequisites

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

3. Remove the [3.5-inch hard drive](#).

About this task

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



Steps

1. Lay the computer on the right side.
2. Remove the screw (M2x3) that secures the wireless card to the system board.
3. Slide and lift the wireless-card bracket off the wireless card.
4. Disconnect the antenna cables from the wireless card.
5. Slide and remove the wireless card at an angle from the wireless-card slot.

Identifier	GUID-01BF7E08-76E2-4C7E-89AC-D8336D473992
Status	Released

Installing the wireless card

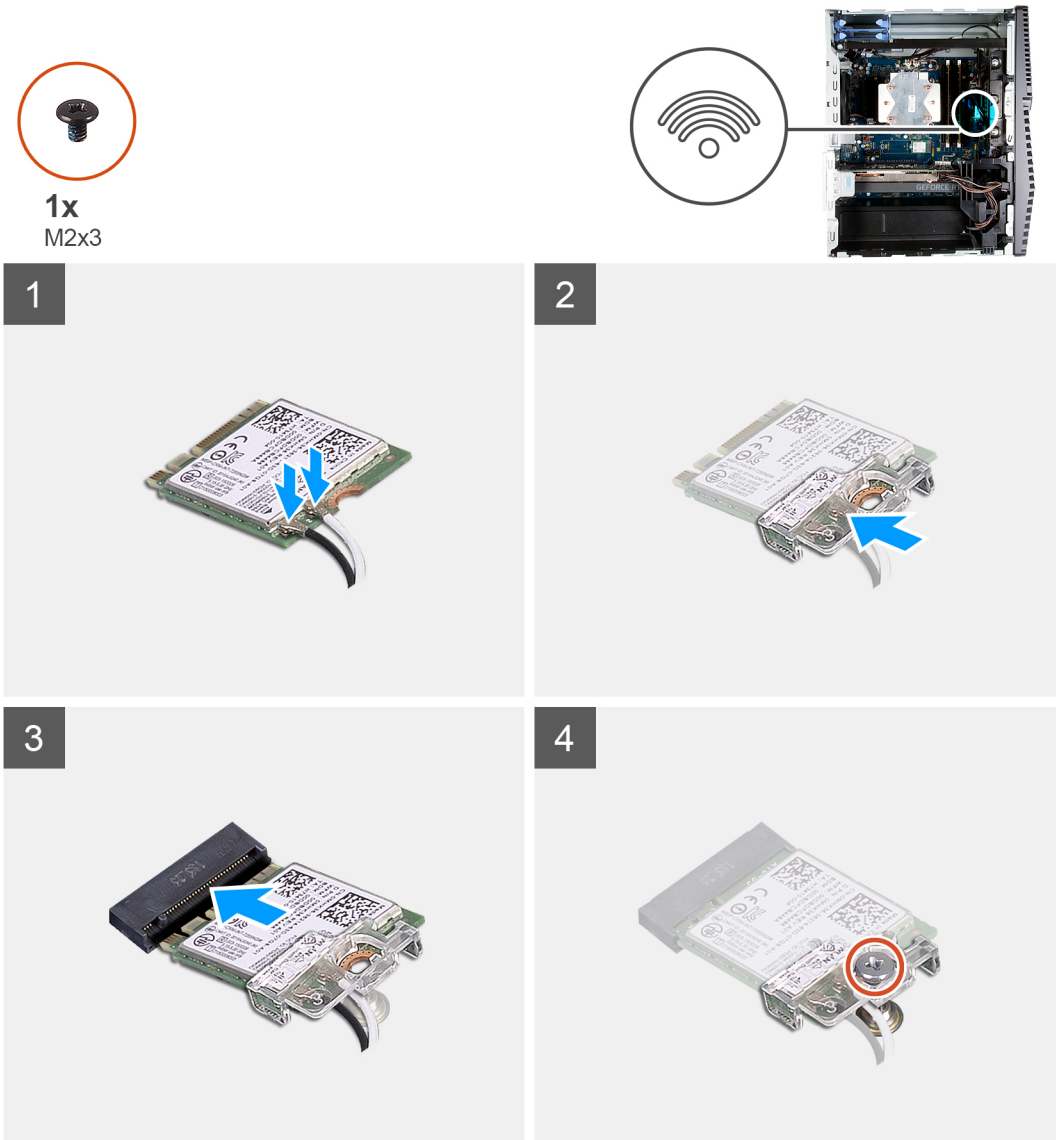
Prerequisites

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

NOTE: To avoid damage to the wireless card, do not place any cables under it.

About this task

The following images indicate the location of the wireless card and provides a visual representation of the installation procedure.



Steps

- 1. Connect the antenna cables to the wireless card.
The following table provides the antenna-cable color scheme for the wireless card 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. Slide and place the wireless-card bracket on the wireless card.
- 3. Align the notch on the wireless card with the tab on the wireless-card slot.
- 4. Slide the wireless card at an angle into the wireless-card slot.
- 5. Replace the screw (M2x3) that secures the wireless card to the system board.

Next steps

1. Install the [3.5-inch hard drive](#).
2. Install the [left-side cover](#).
3. Follow the procedure in [After working inside your computer](#).


Identifier	GUID-1C622BA0-DC4F-4B77-8AD0-153BD9C5F567
Status	Released

Solid-state drive/Intel Optane

Identifier	GUID-0F45212A-7635-49C0-B9CD-C7E4D90E3EC8
Status	Released

Removing the solid-state drive/Intel Optane

Prerequisites

 **NOTE:** You need to disable the Intel Optane memory before removing Intel Optane from your computer. For more information about disabling the Intel Optane memory, see [Disabling Intel Optane](#).

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [left-side cover](#).
3. Remove the [graphics card](#).

About this task

The following images indicate the location of the solid-state drive/Intel Optane and provides a visual representation of the removal procedure.



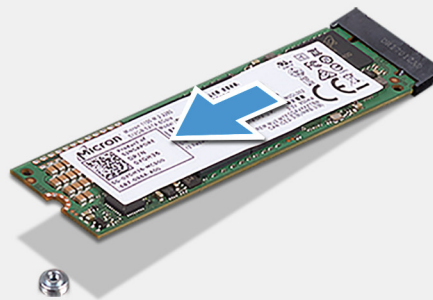
1x
M2x3



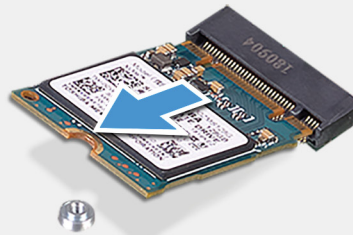
1 M.2 2280



2



M.2 2230



Steps

1. Remove the screw (M2x3) that secures the solid-state drive/Intel Optane to the system board.
2. Slide and lift the solid-state drive/Intel Optane from the M.2 card slot on the system board.

Identifier	GUID-F592144F-AFDC-4277-8344-374DDB56523F
Status	Released

Installing the solid-state drive/Intel Optane

Prerequisites

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

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

About this task

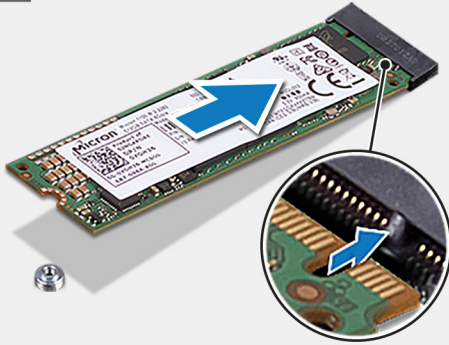
The following images indicate the location of the solid-state drive/Intel Optane and provides a visual representation of the installation procedure.



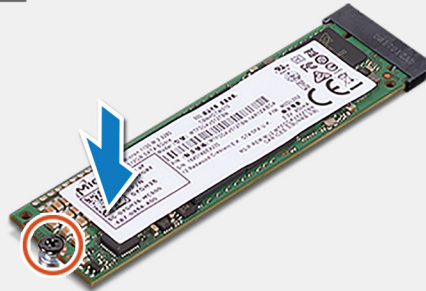
1x
M2x2.5



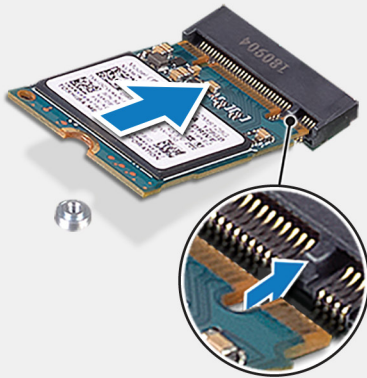
1 M.2 2280



2



M.2 2230



Steps

1. Locate the notch on the solid-state drive/Intel Optane.
2. Align the notch on the solid-state drive/Intel Optane with the tab on the M.2 card slot.
3. Slide the solid-state drive/Intel Optane into the M.2 card slot on the system board.
4. Replace the screw (M2x3) that secures the solid-state drive/Intel Optane to the system board.

Next steps

1. Install the [graphics card](#).
2. Install the [left-side cover](#).
3. Follow the procedure in [After working inside your computer](#).



NOTE: Enable the Intel Optane memory after you replace the Intel Optane memory module. For more information about enabling the Intel Optane memory, see [Enabling Intel Optane](#).

Identifier	GUID-5A806E3E-047F-4BAD-9DEE-DE3EAE17033
Status	Released

Graphics card

Identifier	GUID-5EA1BD4A-EB77-4ACA-826A-7B6873E821A4
Status	Released

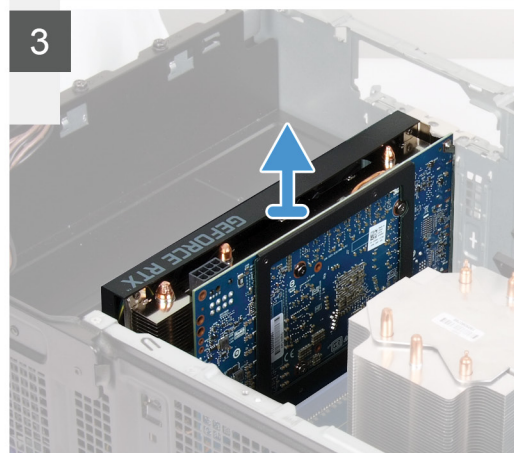
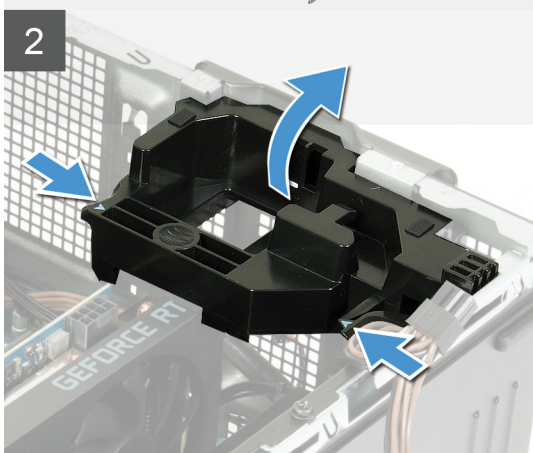
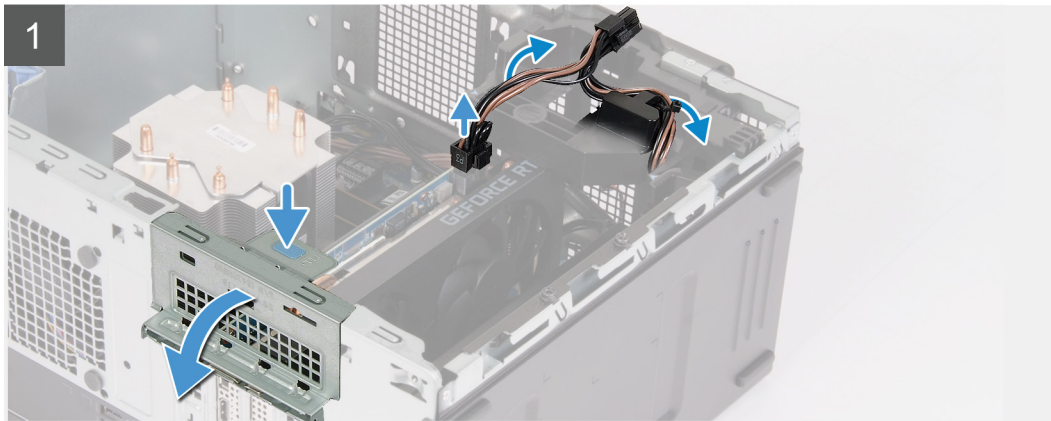
Removing the graphics card

Prerequisites

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

About this task

The following images indicate the location of the graphics card and provides a visual representation of the removal procedure.



Steps

1. Lay the computer on the right side.

2. Locate the graphics card (PCI-Express).
3. Disconnect the power cables from the graphics card and remove them from the routing guides on the graphics -card support bracket.

NOTE: This step is applicable only for computers that are shipped with a graphics-card support bracket.

4. Push the securing tabs on the graphics-card support bracket and rotate to remove it off the chassis.
5. Lift the pull tab to open the PCIE door.
6. Push and hold the securing tab on the graphics-card slot and lift the graphics card from the graphics-card slot.

NOTE: To remove the NVIDIA GeForce RTX 2080 graphics card, lift and rotate the graphics card.

Identifier
Status

GUID-EA269A94-9752-4E9A-BED6-B00D1E7B430C
Released

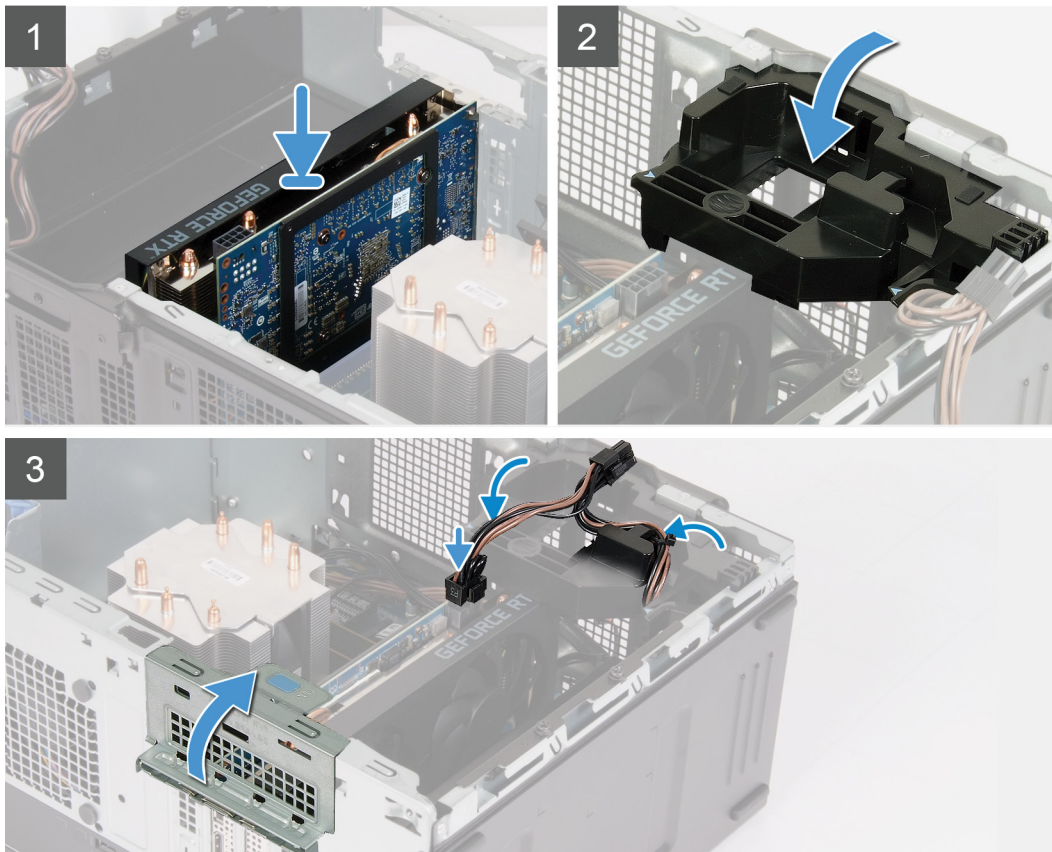
Installing the graphics card

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 graphics card and provides a visual representation of the installation procedure.



Steps

1. Align the graphics card with the PCI-Express card connector on the system board.
 **NOTE:** To install the NVIDIA GeForce RTX 2080 graphics card, rotate and install the graphics card.
2. Using the alignment post, connect the card in the connector and press down firmly. Ensure that the card is firmly seated.
3. Close the PCIe door.
4. Place the graphics-card support bracket that connects the graphics card.
 **NOTE:** This step is applicable only for computers that are shipped with a graphics-card support bracket.
5. Route the cables through the routing guide on the graphics-card support bracket and connect the power cables to the graphics card.

Next steps

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



Identifier	GUID-D99D5F9B-0FF3-406B-A51F-FFA061BB89EA
Status	Released

Coin-cell battery

Identifier	GUID-AD775204-4DA1-428A-A736-11E8E7C7DD53
Status	Released

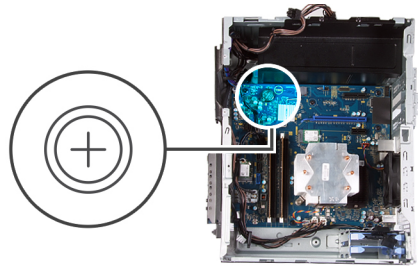
Removing the coin-cell battery

Prerequisites

1. Follow the procedure in [Before working inside your computer](#).
 **NOTE:** Before working inside your computer, read the safety information that shipped with your computer and follow the steps in [Before working inside your computer](#). After working inside your computer, follow the instructions in [After working inside your computer](#). For more safety best practices, see the Regulatory Compliance home page at www.dell.com/regulatory_compliance.
 **CAUTION:** Removing the coin-cell battery resets the BIOS setup program's settings to default. It is recommended that you note the BIOS setup program's settings before removing the coin-cell battery.
2. Remove the [left-side cover](#).
3. Remove the [graphics card](#).

About this task

The following images indicate the location of the coin-cell battery and provides a visual representation of the removal procedure.



Steps

1. Lay the computer on the right side.
2. Using your finger, push the coin-cell battery-release lever on the coin-cell battery socket to release the coin-cell battery out of the socket.
3. Remove the coin-cell battery.

Identifier	GUID-15487FD4-FEAB-4D7A-B067-E7B5DEE0C427
Status	Released

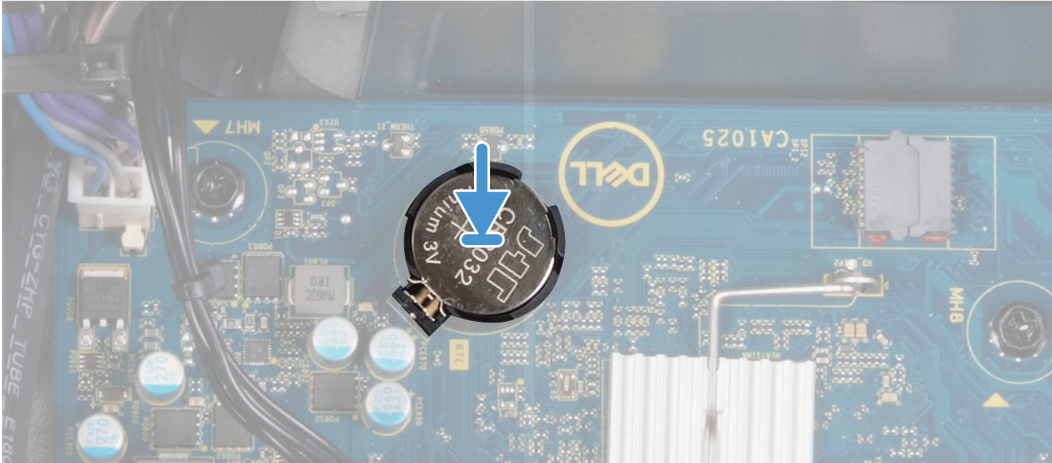
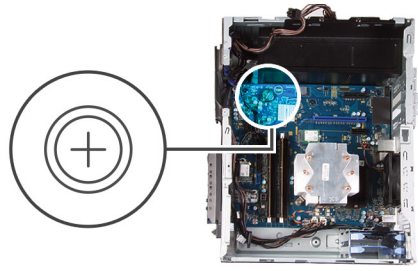
Installing the coin-cell battery

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 coin-cell battery and provides a visual representation of the installation procedure.



Insert the coin-cell battery into the socket with the positive side (+) label facing up and snap the battery in the socket.

Next steps

1. Install the [graphics card](#).
2. Install the [left-side cover](#).
3. Follow the procedure in [After working inside your computer](#).

Identifier	GUID-17EA17F2-CD9D-44A3-AD68-6907FB42EFF7
Status	Released

Power-supply unit

Identifier	GUID-1848C517-25D8-40F7-BDC2-D98C9BD9C4B6
Status	Released

Removing the power-supply unit

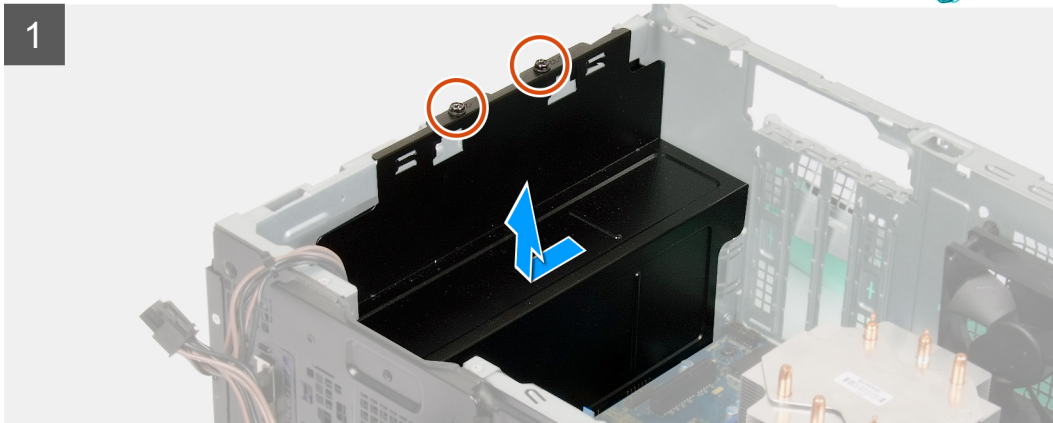
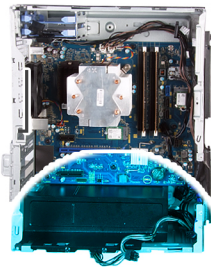
Prerequisites

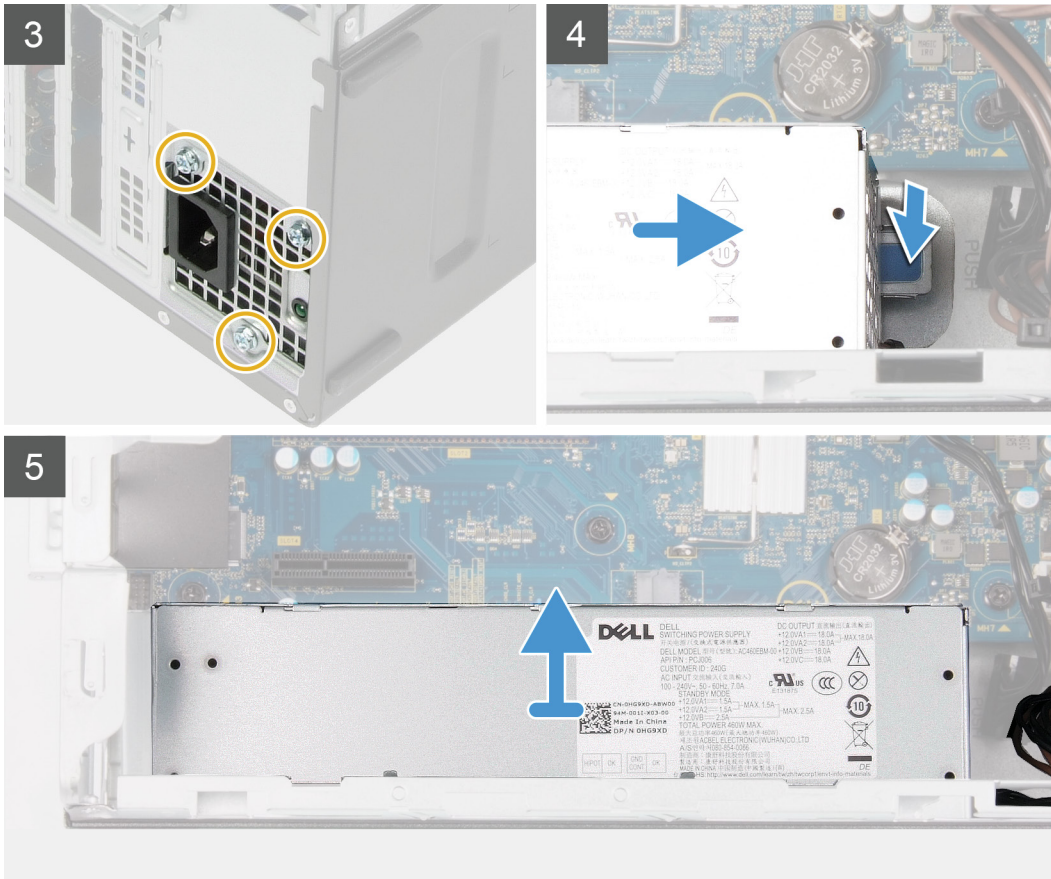
1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [left-side cover](#).
3. Remove the [graphics card](#).
4. Remove the [3.5-inch hard drive](#).

NOTE: Note the routing of all cables as you remove them so that you can route them correctly while you are replacing the power-supply unit.

About this task

The following images indicate the location of the power-supply unit and provides a visual representation of the removal procedure.





Steps

1. Lay the computer on the right side.
2. Remove the two screws (#6-32) that secure the power-supply unit cover to the chassis.

NOTE: Only the computer with clear doors are shipped with power-supply unit cover. This step is applicable only for computers shipped with power-supply unit cover.
3. Slide and lift the power-supply unit cover off the power-supply unit.
4. Remove the three screws (#6-32) that secure the power-supply unit to the chassis.
5. Disconnect the power cables from the system board and remove them from the routing guides on the chassis.
6. Press the securing clip and slide the power-supply unit away from the back of the chassis.
7. Lift the power-supply unit off the chassis.

Identifier	GUID-38C69312-0C2F-46E0-9FCE-B731779CE72D
Status	Released

Installing the power-supply unit

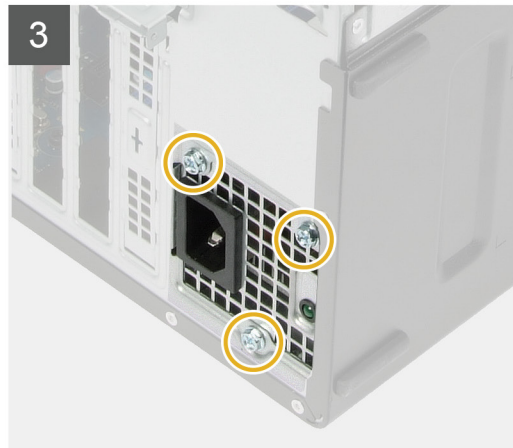
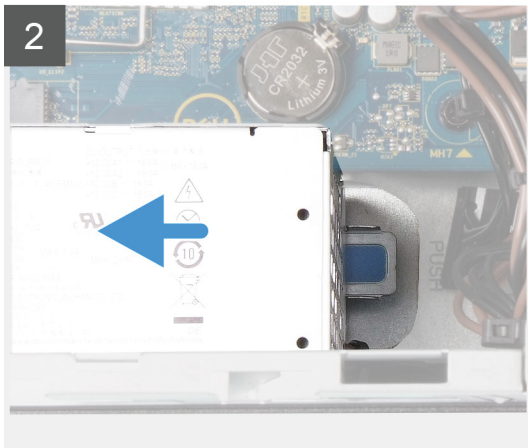
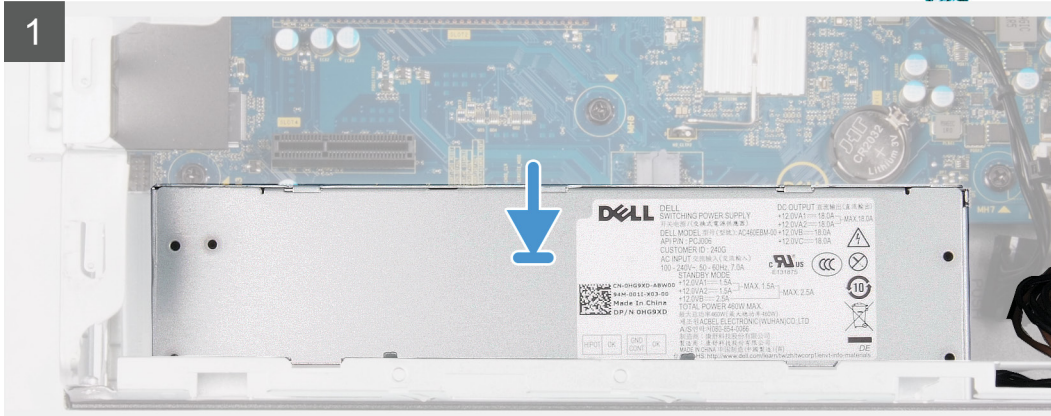
Prerequisites

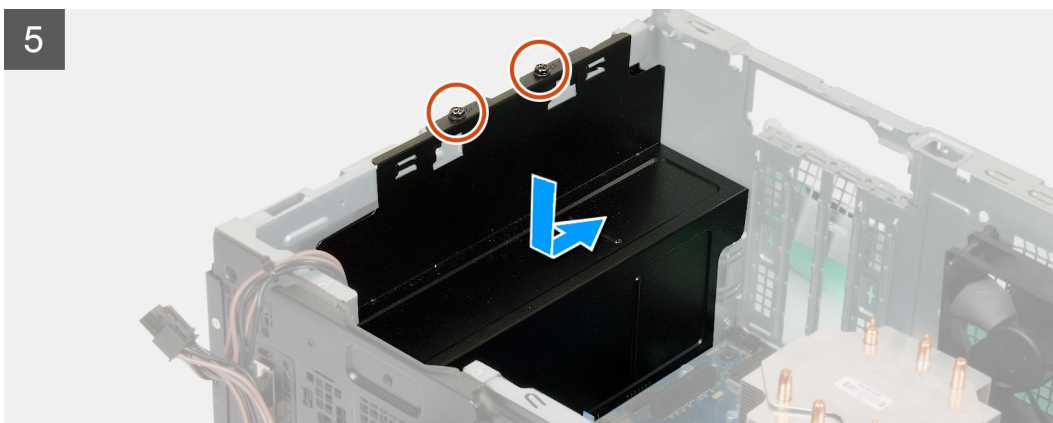
If you are replacing a component, remove the existing component before performing the installation procedure.

WARNING: The cables and ports on the back of the power-supply unit are color-coded to indicate the different power wattage. Ensure that you plug in the cable to the correct port. Failure to do so may result in damaging the power-supply unit and/or system components.

About this task

The following images indicate the location of the power-supply unit and provides a visual representation of the installation procedure.





Steps

1. Slide the power-supply unit into the chassis until the securing tab snaps into position.
2. Route the power cable through the routing guides on the chassis and connect the power cables to their respective connectors on the system board.
3. Replace the three screws (#6-32) that secure the power-supply unit to the chassis.
4. Slide and align the screw holes on the power-supply unit cover with the screw holes on the chassis.
i NOTE: Only the computer with clear doors are shipped with power-supply unit cover. This step is applicable only for computers shipped with power-supply unit cover.
5. Replace the two screws (#6-32) that secure the power-supply unit to the chassis.

Next steps

1. Install the [3.5-inch hard drive](#).
2. Install the [graphics card](#).

3. Install the [left-side cover](#).
4. Follow the procedure in [After working inside your computer](#).



Identifier	GUID-144718DC-52F6-4737-BAE2-BEE6BE85E996
Status	Released

Processor fan and heat-sink assembly

Identifier	GUID-F6A51655-FD8C-4150-8CBF-78BAF14A762A
Status	Released

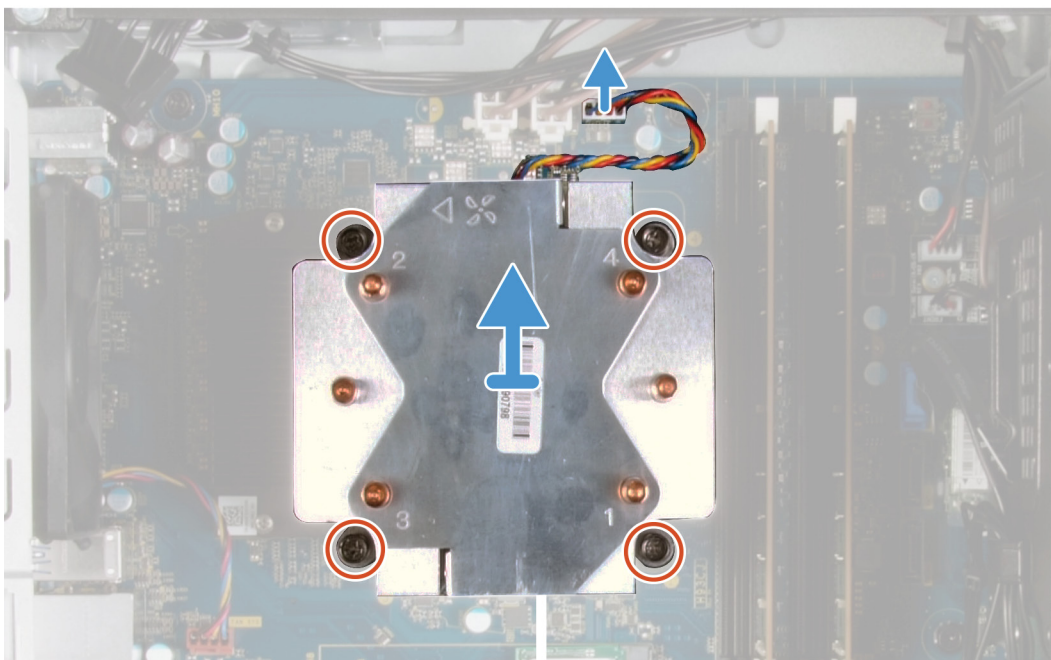
Removing the processor fan and heat-sink assembly

Prerequisites

1. Follow the procedure in [Before working inside your computer](#).
 -  **NOTE:** The heat sink may become hot during normal operation. Allow sufficient time for the heat sink to cool before you touch it.
 -  **CAUTION:** For maximum cooling of the processor, do not touch the heat transfer areas on the heat sink. The oils in your skin can reduce the heat transfer capability of the thermal grease.
2. Remove the [left-side cover](#).

About this task

The following images indicate the location of the processor fan and heat-sink assembly and provides a visual representation of the removal procedure.



Steps

1. Disconnect the processor-fan cable from the system board.
2. In the reverse sequential order (4->3->2->1), loosen the captive screws that secure the processor fan and heat-sink assembly to the system board.
3. Lift the processor fan and heat-sink assembly off the system board.

Identifier	GUID-C8D76B0A-9B29-4471-8C47-D06989380E7A
Status	Released

Installing the processor fan and heat-sink assembly

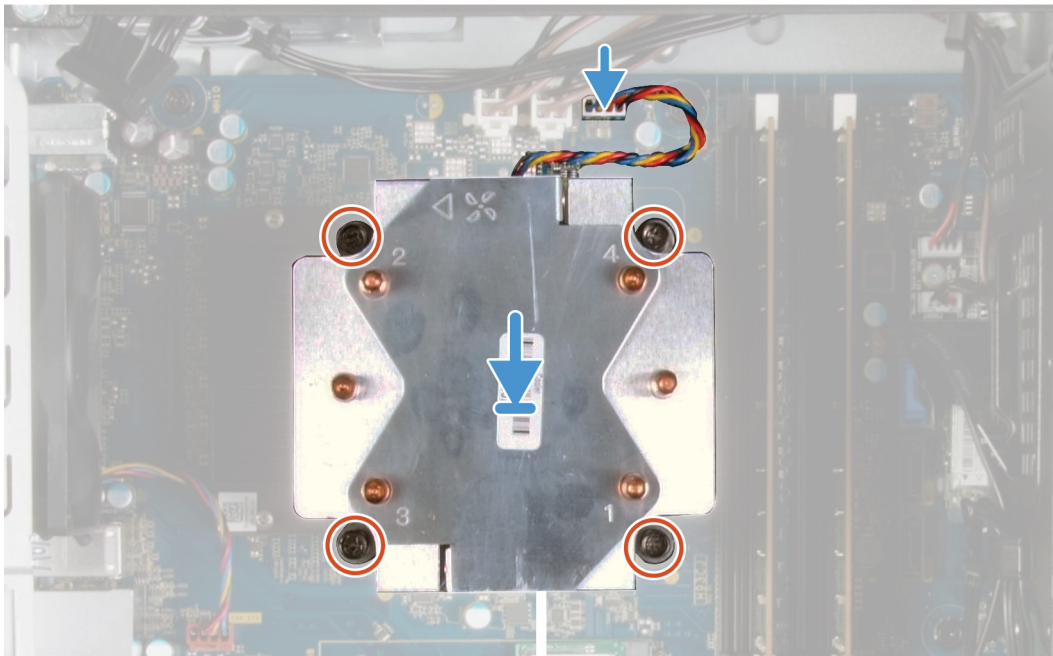
Prerequisites

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

CAUTION: If either the processor or the heat sink is replaced, use the thermal grease provided in the kit to ensure that thermal conductivity is achieved.

About this task

The following images indicate the location of the processor fan and heat-sink assembly and provides a visual representation of the installation procedure.



Steps

1. Align the numbering on the processor fan and heat-sink assembly with the numbering on the system board.
2. In the sequential order (1->2->3->4), tighten the captive screws that secure the processor fan and heat-sink assembly to the system board.
3. Connect the processor-fan cable from the system board.

Next steps

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

Identifier	GUID-CA447DD8-2E2F-41C3-AB86-5E82BB744D6A
Status	Released

Processor

Identifier	GUID-13F3DC8B-07C4-45A5-A2E8-F3C3F3F64311
Status	Released

Removing the processor

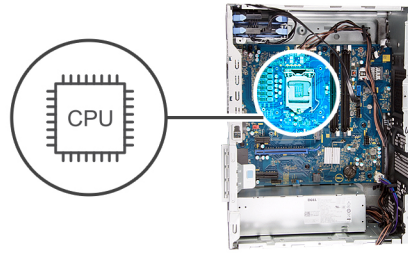
Prerequisites

- 1. Follow the procedure in [Before working inside your computer](#).
- 2. Remove the [left-side cover](#).
- 3. Remove the [processor fan and heat-sink assembly](#).

 **WARNING:** The processor might still be hot after the computer is shut down. Allow the processor to cool down before removing it.

About this task

The following images indicate the location of the processor and provides a visual representation of the removal procedure.



Steps

1. Press the release lever down and then push it away from the processor to release it from the securing tab.
2. Extend the release lever completely and open the processor cover.

CAUTION: When removing the processor, do not touch any of the pins inside the socket or allow any objects to fall on the pins in the socket.

3. Gently lift the processor from the processor socket.

Identifier	GUID-4F27517D-D874-45A4-842F-44330252F6AC
Status	Released

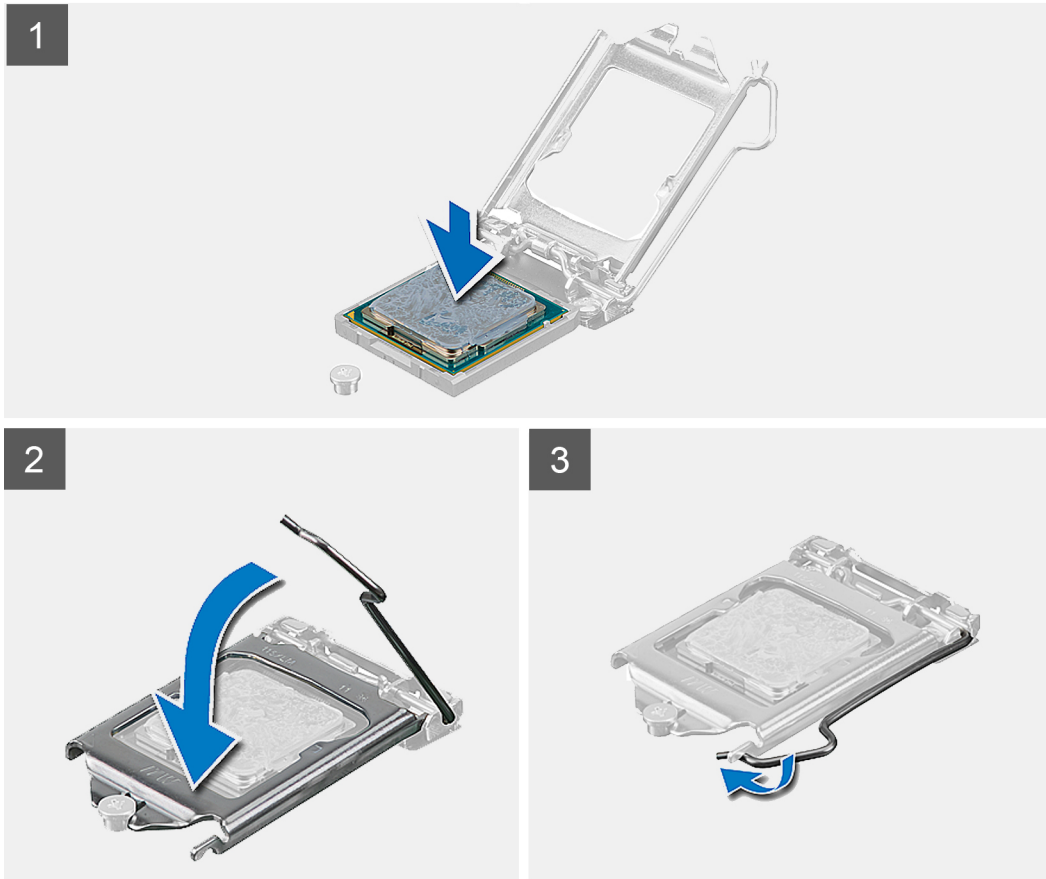
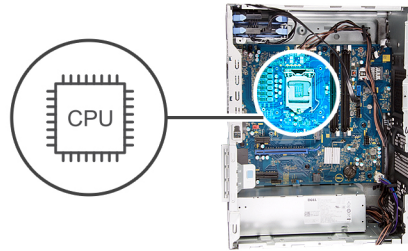
Installing the processor

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 processor and provides a visual representation of the installation procedure.



Steps

1. Ensure that the release lever on the processor socket is fully extended in the open position.

NOTE: The pin-1 corner of the processor has a triangle that aligns with the triangle on the pin-1 corner on the processor socket. When the processor is properly seated, all four corners are aligned at the same height. If one or more corners of the processor are higher than the others, the processor is not seated properly.

2. Align the notches on the processor with the tabs on the processor socket and place the processor in the processor socket.

CAUTION: Ensure that the processor-cover notch is positioned underneath the alignment post.

3. When the processor is fully seated in the socket, pivot the release-lever down and place it under the tab on the processor cover.

Next steps

1. Install the [processor fan and heat-sink assembly](#).
2. Install the [left-side cover](#).
3. Follow the procedure in [After working inside your computer](#).

Identifier	GUID-38F51F10-D0BE-4003-968E-FCD44D96B684
Status	Released

VR heat sink

Identifier	GUID-D15B0A27-8433-46B8-B8F1-DA86C922E4AB
Status	Released

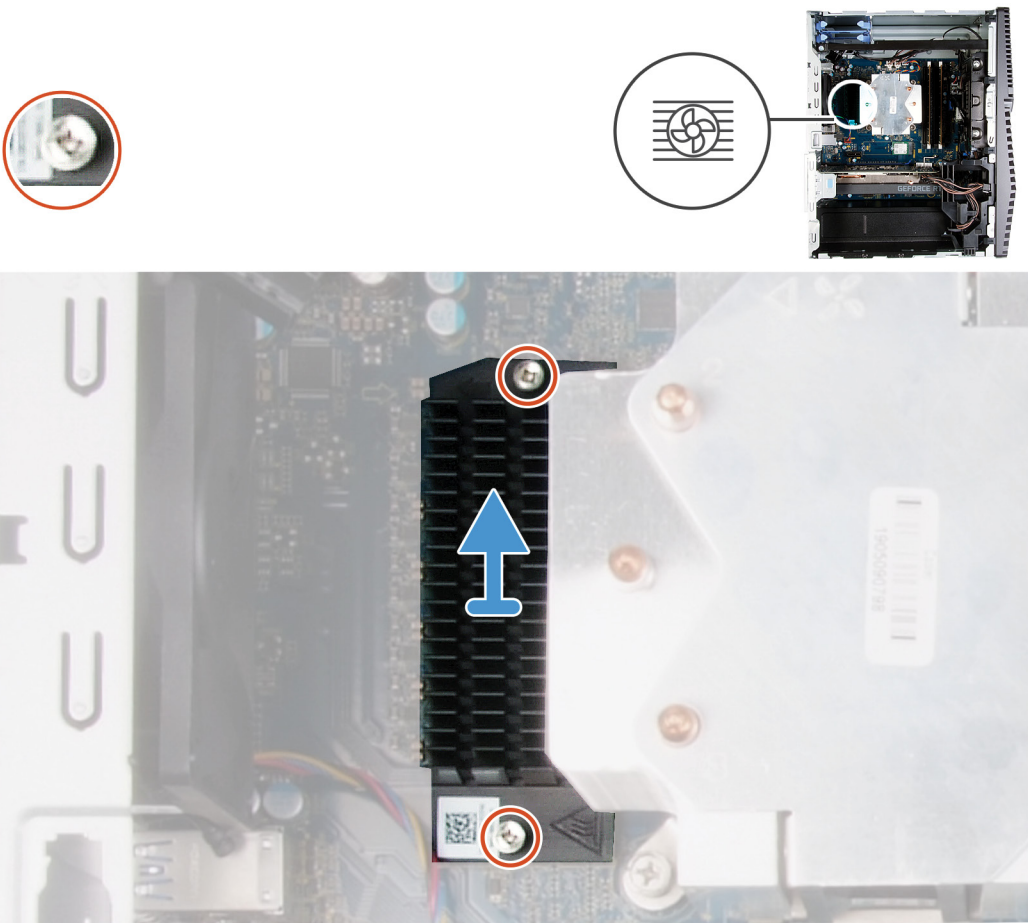
Removing the VR heat sink

Prerequisites

- Follow the procedure in [Before working inside your computer](#).
 - NOTE:** The heat sink may become hot during normal operation. Allow sufficient time for the heat sink to cool before you touch it.
 - CAUTION:** For maximum cooling of the processor, do not touch the heat transfer areas on the heat sink. The oils in your skin can reduce the heat transfer capability of the thermal grease.
 - NOTE:** The VR heat sink is shipped as a separate unit and it does not ship along with the system board. Ensure to replace the VR heat sink from old system board to the new system board.
- Remove the [left-side cover](#).

About this task

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



Steps

- Loosen the captive screws that secure the VR heat sink to the system board.

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

Identifier	GUID-39948DB5-7968-443E-9BBA-BC632FB9F03F
Status	Released

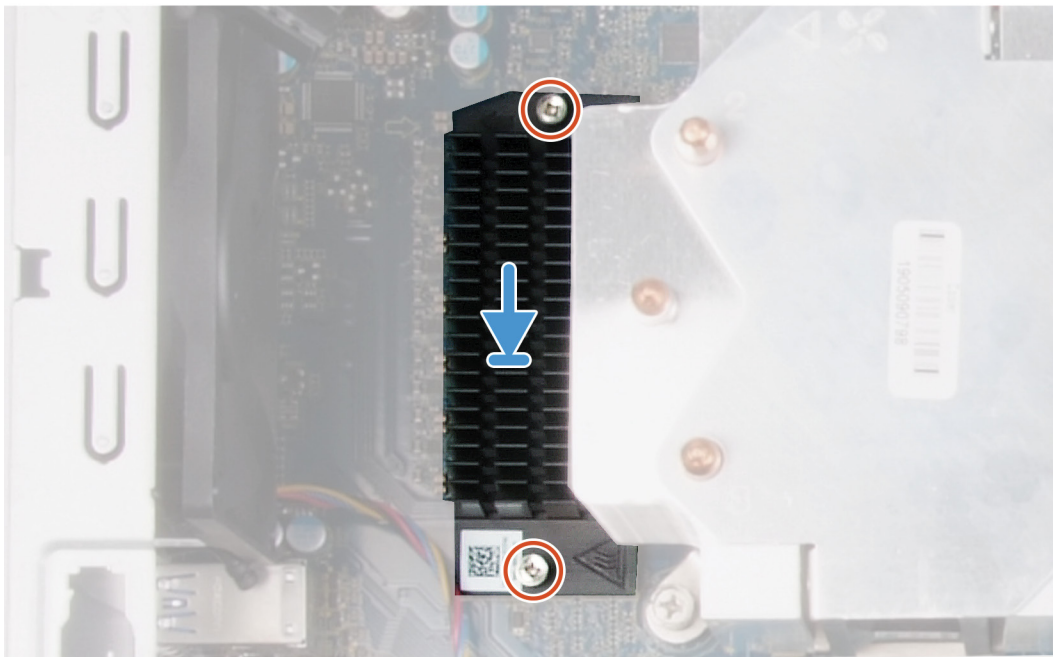
Installing the VR heat sink

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 VR heat sink and provides a visual representation of the installation procedure.



Steps

1. Align and place the VR heat sink on the system board.
2. Tighten the captive screws that secure the VR heat sink to the system board.

Next steps

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

Identifier	GUID-3AC1585B-34E2-40B4-9C26-E98CDE685DB3
Status	Released

LED daughter board

Identifier	GUID-CA0C60A7-925F-4C6A-81D8-005A32B0403C
Status	Released

Removing the LED daughter board

Prerequisites

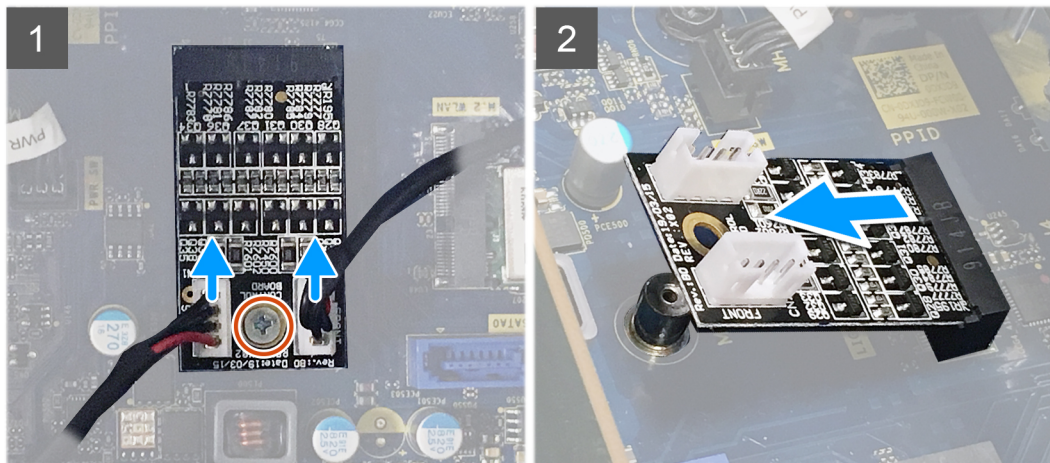
1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [left-side cover](#).

About this task

The following images indicate the location of the LED daughter board and provides a visual representation of the removal procedure.



1x
M2x3



Steps

1. Disconnect the light-bar cable and the front-LED cable from their respective connectors on the LED daughter board.
2. Remove the screw (M2x3) that secures the LED daughter board to the system board.
3. Slide and remove the LED daughter board off the system board.

Identifier	GUID-C47D51F9-CA07-4CB8-AAC7-BC4786BCA842
Status	Released

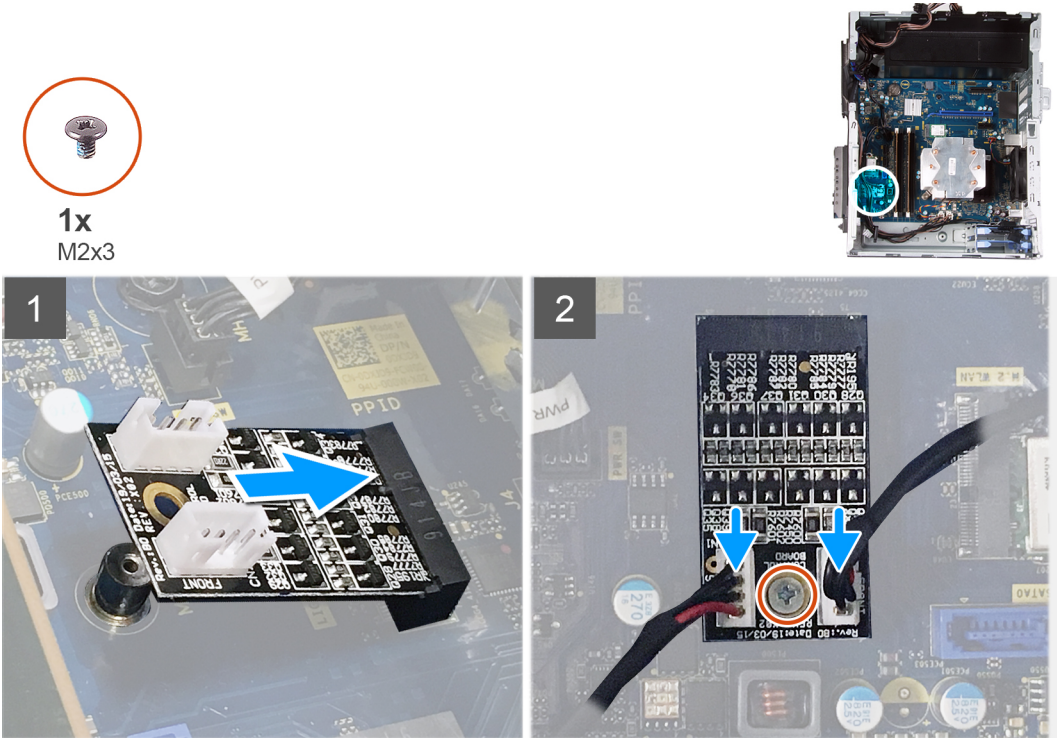
Installing the LED daughter board

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 LED daughter board and provides a visual representation of the removal procedure.



Steps

1. Slide the LED daughter board in place on the system board.
2. Replace the screw (M2x3) that secures the LED daughter board to the system board.
3. Connect the light-bar cable and the front-LED cable to their respective connectors on the LED daughter board.

Next steps

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

Identifier	GUID-46B53388-5C4F-4861-92E0-6AE357EE9CBF
Status	Released

System board

Identifier	GUID-0D33162E-A036-49D7-97CC-C79D09691FD5
Status	Released

Removing the system board

Prerequisites

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

2. Remove the [left-side cover](#).
3. Remove the [light bar](#).
4. Remove the [front cover](#)
5. Remove the [memory modules](#).
6. Remove the [wireless card](#).
7. Remove the [solid-state drive/Intel Optane](#).
8. Remove the [graphics card](#).
9. Remove the [coin-cell battery](#).
10. Remove the [processor fan and heat-sink assembly](#).
11. Remove the [processor](#).
12. Remove the [LED daughter board](#).

About this task

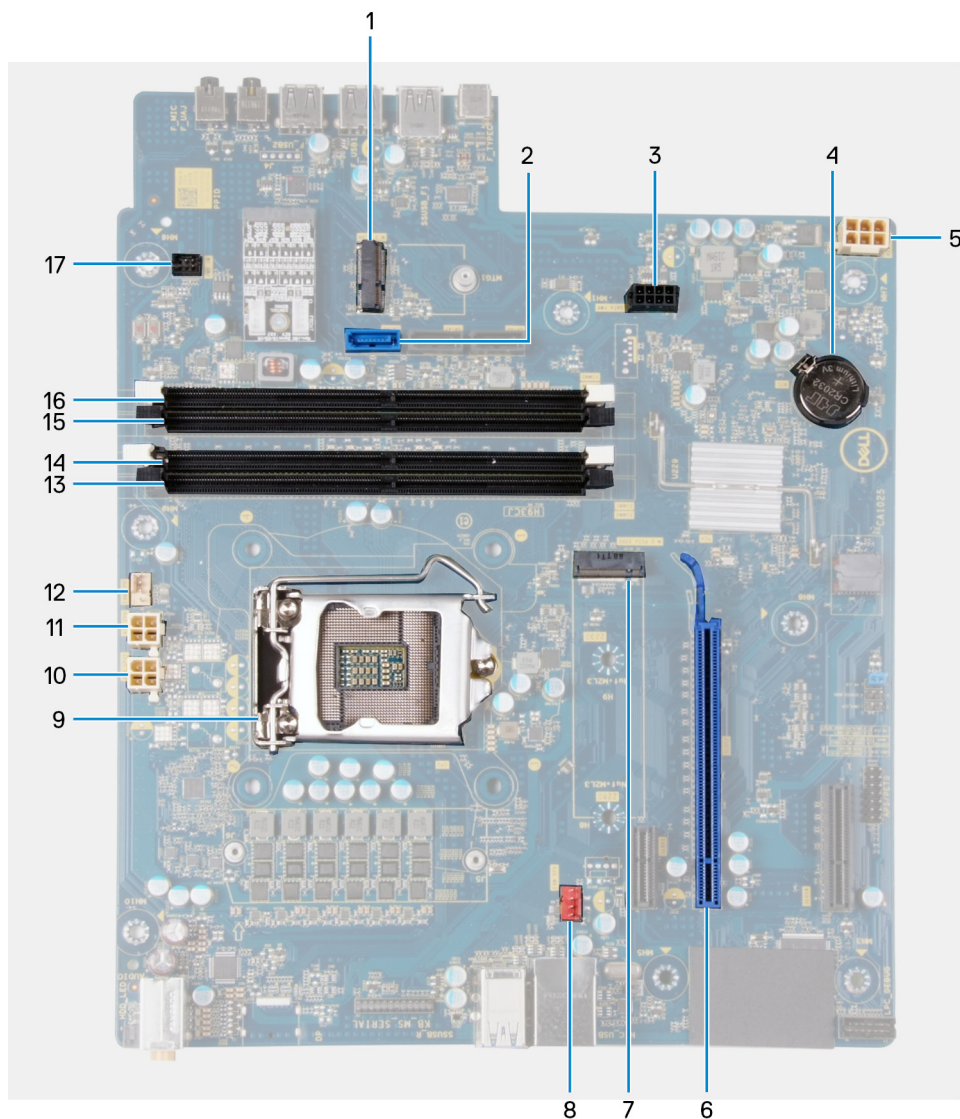
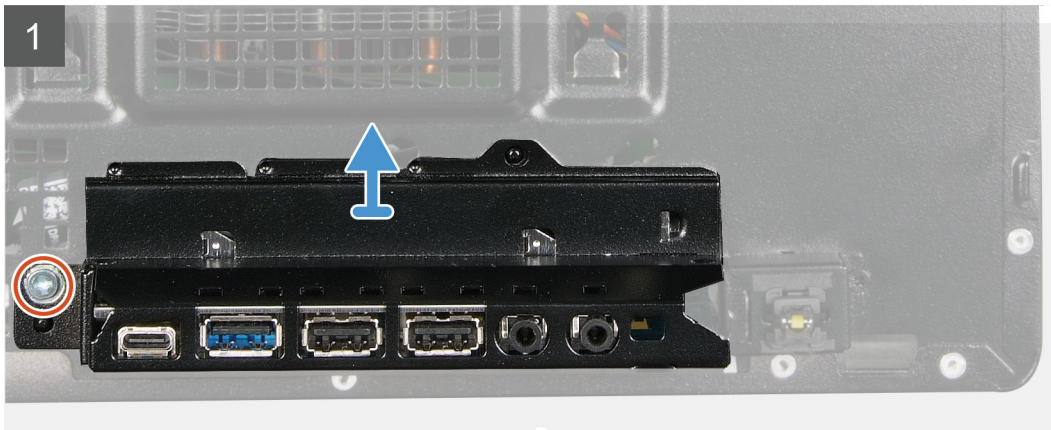


Figure 3. System-board components

1. wireless-card slot
2. hard-drive data cable connector (SATA0)
3. hard-drive power cable connector (SATA PWR)
4. coin-cell battery
5. power-supply unit cable connector
6. graphics-card slot

7. solid-state drive connector (m.2 PCIe SSD)
8. chassis-fan cable connector (FAN SYS)
9. processor
10. processor-power cable connector (ATX CPU1)
11. processor-power cable connector (ATX CPU)
12. processor-fan cable connector (FAN CPU)
13. memory-module slot (DIMM3)
14. memory-module slot (DIMM1)
15. memory-module slot (DIMM4)
16. memory-module slot (DIMM2)
17. front LED cable connector (PWR SW)

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





NOTE: Note the routing of all cables as you remove them so that you can route them correctly after you replace the system board. For information on system-board connectors, see “[System-board components](#)”.

NOTE: Note the routing of all cables as you remove them so that you can route them correctly after you replace the system board. For information on system-board connectors, see “[System-board components](#)”.

Steps

- 1. Lay the computer on the right side.
- 2. Remove the screw (#6-32) that secures the front I/O-bracket to the chassis.
- 3. Rotate and remove the front I/O-bracket from the chassis.
- 4. Disconnect all the cables connected to the system board.
- 5. Remove the eight screws (#6-32) and that secure the system board to the chassis.
- 6. Remove the [VR heat sink](#).

NOTE: The VR heat sink is shipped as a separate unit and it does not ship along with the system board. Ensure that you replace the VR heat sink from old system board to the new system board.

- 7. Remove the screw (M2x4) and that secures the system board to the chassis.
- 8. Lift the system board at an angle and remove it off the chassis.

Identifier	GUID-92799A60-2F19-444C-AD6D-833DE31A9437
Status	Released

Installing the system board

Prerequisites

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

About this task

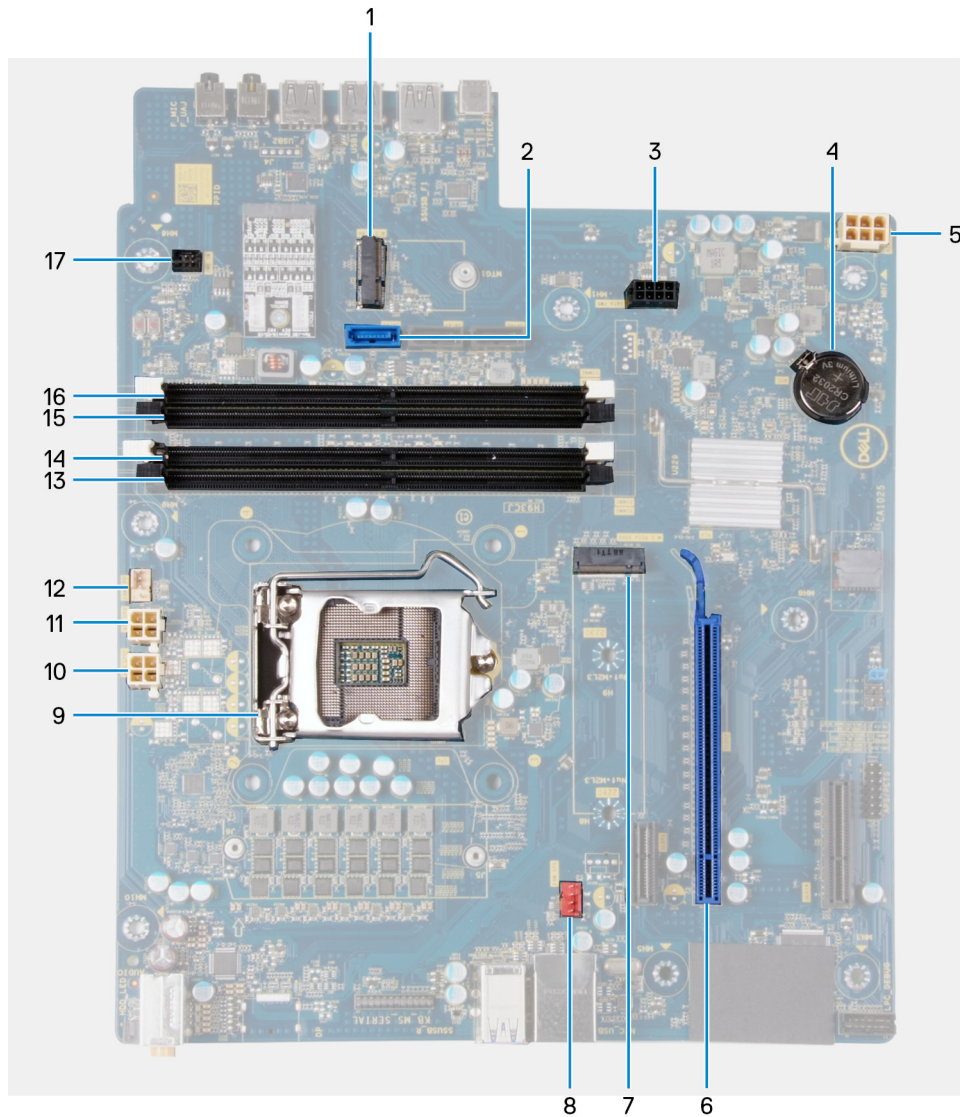


Figure 4. System-board components

1. wireless-card slot
2. hard-drive data cable connector (SATA0)
3. hard-drive power cable connector (SATA PWR)
4. coin-cell battery
5. power-supply unit cable connector
6. graphics-card slot
7. solid-state drive connector (m.2 PCIe SSD)
8. chassis-fan cable connector (FAN SYS)
9. processor
10. processor-power cable connector (ATX CPU1)
11. processor-power cable connector (ATX CPU)
12. processor-fan cable connector (FAN CPU)
13. memory-module slot (DIMM3)
14. memory-module slot (DIMM1)
15. memory-module slot (DIMM4)
16. memory-module slot (DIMM2)
17. front LED cable connector (PWR SW)

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



1x
6-32



8x
6-32

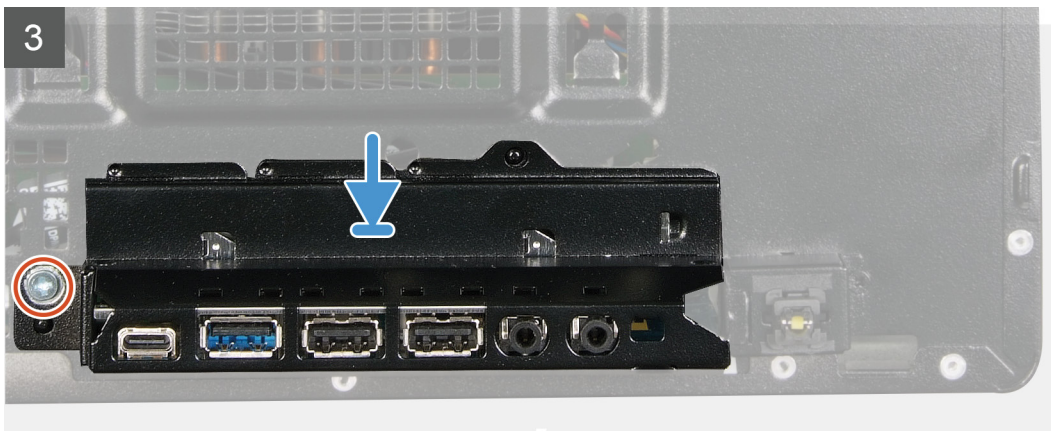


1x
M2x4



1





Steps

1. Slide the back I/O-ports on the system board into the front I/O-slots on the chassis and align the screw holes on the system board with the screw holes on the chassis.
2. Replace the screw (M2x4) that secures the system board to the chassis.
3. Install the [VR heat sink](#).


NOTE: The VR heat sink is shipped as a separate unit and it does not ship along with the system board. Ensure that you replace the VR heat sink from old system board to the new system board.
4. Replace the eight screws (#6-32) that secure the system board to the chassis.
5. Route and connect all the cables that you disconnected from the system board.

NOTE: For information on system-board connectors, see [“System-board components”](#).
6. Align the front I/O-bracket with the slots on the chassis.
7. Replace the screw (#6-32) that secures the front I/O-bracket to the chassis.

Next steps

1. Install the [LED daughter board](#).
2. Install the [processor](#).
3. Install the [processor fan and heat-sink assembly](#).
4. Install the [coin-cell battery](#).
5. Install the [graphics card](#).
6. Install the [solid-state drive/Intel Optane](#).
7. Install the [wireless card](#).
8. Install the [memory module](#).
9. Install the [front cover](#).
10. Install the [light bar](#).
11. Install the [left-side cover](#).
12. Follow the procedure in [After working inside your computer](#).

 **NOTE:** Your computer's Service Tag is stored in the system board. You must enter the Service Tag in the BIOS setup program after you replace the system board.

 **NOTE:** Replacing the system board removes any changes you have made to the BIOS using the BIOS setup program. You must make the appropriate changes again after you replace the system board.

Identifier	GUID-B7285CF1-FC18-4DE7-8A89-31812159C4BE
Status	Released

Device drivers

Identifier	GUID-2959A596-4E1F-4C1B-9E6C-857583B2F398
Status	Released

Operating system

- Windows 10 Home (64-bit)
- Windows 10 Professional (64-bit)

Identifier	GUID-DD32CB6A-6C6E-4127-90F1-E2DF2412C595
Status	Released

Downloading the audio driver

Steps

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

NOTE: If you do not have the Service Tag, use the auto-detect feature or manually browse for your computer model.
4. Click **Drivers & downloads**.
5. Click the **Detect Drivers** button.
6. Review and agree to the Terms and Conditions to use **SupportAssist**, then click **Continue**.
7. If necessary, your computer starts to download and install **SupportAssist**.

NOTE: Review on-screen instructions for browser-specific instructions.
8. Click **View Drivers for My System**.
9. Click **Download and Install** to download and install all driver updates detected for your computer.
10. Select a location to save the files.
11. If prompted, approve requests from **User Account Control** to make changes on the system.
12. The application installs all drivers and updates identified.

NOTE: Not all files can be installed automatically. Review the installation summary to identify if manual installation is necessary.
13. For manual download and installation, click **Category**.
14. Click **Audio** in the drop-down list.
15. Click **Download** to download the audio driver for your computer.
16. After the download is complete, navigate to the folder where you saved the audio driver file.
17. Double-click the audio driver file icon and follow the instructions on the screen to install the driver.

Identifier	GUID-66B4DB07-F4BF-4188-8363-EB6191B37196
Status	Released

Downloading the graphics driver

Steps

1. Turn on your computer.

2. Go to www.dell.com/support.
3. Enter the Service Tag of your computer, and then click **Submit**.
i **NOTE:** If you do not have the Service Tag, use the auto-detect feature or manually browse for your computer model.
4. Click **Drivers & downloads**.
5. Click the **Detect Drivers** button.
6. Review and agree to the Terms and Conditions to use **SupportAssist**, then click **Continue**.
7. If necessary, your computer starts to download and install **SupportAssist**.
i **NOTE:** Review on-screen instructions for browser-specific instructions.
8. Click **View Drivers for My System**.
9. Click **Download and Install** to download and install all driver updates detected for your computer.
10. Select a location to save the files.
11. If prompted, approve requests from **User Account Control** to make changes on the system.
12. The application installs all drivers and updates identified.
i **NOTE:** Not all files can be installed automatically. Review the installation summary to identify if manual installation is necessary.
13. For manual download and installation, click **Category**.
14. Click **Video** in the drop-down list.
15. Click **Download** to download the graphics driver for your computer.
16. After the download is complete, navigate to the folder where you saved the graphics driver file.
17. Double-click the graphics driver file icon and follow the instructions on the screen to install the driver.

Identifier	GUID-8FFA775C-7C2B-4BAD-90F5-2EAEAB4F47B3
Status	Released

Downloading the USB driver

Steps

1. Turn on your computer.
2. Go to www.dell.com/support.
3. Enter the Service Tag of your computer, and then click **Submit**.
i **NOTE:** If you do not have the Service Tag, use the auto-detect feature or manually browse for your computer model.
4. Click **Drivers & downloads**.
5. Click the **Detect Drivers** button.
6. Review and agree to the Terms and Conditions to use **SupportAssist**, then click **Continue**.
7. If necessary, your computer starts to download and install **SupportAssist**.
i **NOTE:** Review on-screen instructions for browser-specific instructions.
8. Click **View Drivers for My System**.
9. Click **Download and Install** to download and install all driver updates detected for your computer.
10. Select a location to save the files.
11. If prompted, approve requests from **User Account Control** to make changes on the system.
12. The application installs all drivers and updates identified.
i **NOTE:** Not all files can be installed automatically. Review the installation summary to identify if manual installation is necessary.
13. For manual download and installation, click **Category**.
14. Click **Chipset** in the drop-down list.
15. Click **Download** to download the USB driver for your computer.
16. After the download is complete, navigate to the folder where you saved the USB driver file.
17. Double-click the USB driver file icon and follow the instructions on the screen to install the driver.

Downloading the WiFi driver

Steps

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

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

4. Click **Drivers & downloads**.
5. Click the **Detect Drivers** button.
6. Review and agree to the Terms and Conditions to use **SupportAssist**, then click **Continue**.
7. If necessary, your computer starts to download and install **SupportAssist**.

 **NOTE:** Review on-screen instructions for browser-specific instructions.

8. Click **View Drivers for My System**.
9. Click **Download and Install** to download and install all driver updates detected for your computer.
10. Select a location to save the files.
11. If prompted, approve requests from **User Account Control** to make changes on the system.
12. The application installs all drivers and updates identified.

 **NOTE:** Not all files can be installed automatically. Review the installation summary to identify if manual installation is necessary.

13. For manual download and installation, click **Category**.
14. Click **Network** in the drop-down list.
15. Click **Download** to download the WiFi driver for your computer.
16. After the download is complete, navigate to the folder where you saved the WiFi driver file.
17. Double-click the WiFi driver icon and follow the instructions on the screen to install the driver.

Downloading the chipset driver

Steps

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

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

4. Click **Drivers & downloads**.
5. Click the **Detect Drivers** button.
6. Review and agree to the Terms and Conditions to use **SupportAssist**, then click **Continue**.
7. If necessary, your computer starts to download and install **SupportAssist**.

 **NOTE:** Review on-screen instructions for browser-specific instructions.

8. Click **View Drivers for My System**.
9. Click **Download and Install** to download and install all driver updates detected for your computer.
10. Select a location to save the files.
11. If prompted, approve requests from **User Account Control** to make changes on the system.
12. The application installs all drivers and updates identified.




 **NOTE:** Not all files can be installed automatically. Review the installation summary to identify if manual installation is necessary.

13. For manual download and installation, click **Category**.
14. Click **Chipset** in the drop-down list.
15. Click **Download** to download the chipset driver for your computer.
16. After the download is complete, navigate to the folder where you saved the saved the chipset driver file.
17. Double-click the chipset driver file icon and follow the instructions on the screen to install the driver.

Identifier	GUID-02779B77-B7F7-44A4-BCC4-808F60A86E8E
Status	Released

Downloading the network driver

Steps

1. Turn on your computer.
2. Go to www.dell.com/support.
3. Enter the Service Tag of your computer, and then click **Submit**.
 **NOTE:** If you do not have the Service Tag, use the auto-detect feature or manually browse for your computer model.
4. Click **Drivers & downloads**.
5. Click the **Detect Drivers** button.
6. Review and agree to the Terms and Conditions to use **SupportAssist**, then click **Continue**.
7. If necessary, your computer starts to download and install **SupportAssist**.
 **NOTE:** Review on-screen instructions for browser-specific instructions.
8. Click **View Drivers for My System**.
9. Click **Download and Install** to download and install all driver updates detected for your computer.
10. Select a location to save the files.
11. If prompted, approve requests from **User Account Control** to make changes on the system.
12. The application installs all drivers and updates identified.
 **NOTE:** Not all files can be installed automatically. Review the installation summary to identify if manual installation is necessary.
13. For manual download and installation, click **Category**.
14. Click **Network** in the drop-down list.
15. Click **Download** to download the network driver for your computer.
16. After the download is complete, navigate to the folder where you saved the network driver file.
17. Double-click the network driver file icon and follow the instructions on the screen to install the driver.

Identifier	GUID-4D6759B1-4017-4F54-87E6-9153B9D6E101
Status	Released

System setup

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

Topics:

- [System setup](#)
- [BIOS overview](#)
- [Entering BIOS setup program](#)
- [Navigation keys](#)
- [Boot Sequence](#)
- [System setup options](#)
- [System and setup password](#)

Identifier	GUID-E8E05C46-BC9D-4CF1-AC84-34B87FDCCFB7
Status	Released

System setup

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

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

Use the BIOS Setup program for the following purposes:

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

Identifier	GUID-C4107AD0-123A-4CAF-98F0-003DD7E0CF76
Status	Released

BIOS overview

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

Identifier	GUID-7B8D1F6E-F174-442B-9C08-C86C39394C20
Status	Released

Entering BIOS setup program

About this task

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

Identifier	GUID-7A7EB30A-4A48-422B-AE30-B8DC236A1790
Status	Released

Navigation keys

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

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

Identifier	GUID-C50BED7F-226B-4768-AB61-9725153DF132
Status	Released

Boot Sequence

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

- Access System Setup by pressing F2 key
- Bring up the one-time boot menu by pressing F12 key

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

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

NOTE: XXX denotes the SATA drive number.

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

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

Identifier	GUID-873CEA22-041B-4A2F-AF2D-4E33151F5498
Status	Released

System setup options

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

Table 3. System setup options—System information menu

General-System Information	
System Information	
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.

General-System Information

Ownership Date	Displays the ownership date of the computer.
Express Service Code	Displays the express service code of the computer.
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 used for the memory.
DIMM 1 Size	Displays the DIMM 1 memory size.
DIMM 2 Size	Displays the DIMM 2 memory size.
DIMM 3 Size	Displays the DIMM 3 memory size.
DIMM 4 Size	Displays the DIMM 4 memory size.
PCI Information	
SLOT1	Displays the PCI information of the computer.
SLOT2	Displays the PCI information of the computer.
SLOT4	Displays the PCI information of the computer.
SLOT5_M.2	Displays the PCI information of the computer.
SLOT6_M.2	Displays the PCI information of the computer.
Processor Information	
Processor Type	Displays the processor type.
Core Count	Displays the number of cores on the processor.
Processor ID	Displays the processor identification code.
Current Clock Speed	Displays the current processor clock speed.
Minimum Clock Speed	Displays the minimum processor clock speed.
Maximum Clock Speed	Displays the maximum processor clock speed.
Processor L2 Cache	Displays the Processor L2 Cache size.
Processor L3 Cache	Displays the Processor L2 Cache size.
HT Capable	Displays whether the processor is HyperThreading (HT) capable.
64-Bit Technology	Displays whether 64-bit technology is used.
Device Information	
SATA-0	Displays the SATA device information of the computer.
SATA-1	Displays the SATA device information of the computer.
SATA-2	Displays the SATA device information of the computer.
SATA-3	Displays the SATA device information of the computer.
SATA-4	Displays the SATA device information of the computer.
M.2 PCIe SSD-0	Displays the M.2 PCIe SSD information of the computer.
M.2 PCIe SSD-1	Displays the M.2 PCIe SSD information of the computer.
LOM MAC Address	Displays the LOM MAC address of the computer.

General-System Information

Video Controller	Displays the video controller type 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.
Boot Sequence	
Boot Sequence	Displays the boot sequence.
Boot List Option	Displays the available boot options.
Advanced Boot Options	
Enable Legacy Option ROMs	Enable or disable the Legacy Option ROMs.
Enable Attempt Legacy boot	Enable or disable Legacy Boot.
UEFI Boot Path Security	
Always,Except Internal HDD	Enable or disable the system to prompt the user to enter the Admin password when booting a UEFI boot path from the F12 boot menu. Default: Enabled
Always	Enable or disable the system to prompt the user to enter the Admin password when booting a UEFI boot path from the F12 boot menu. Default: Disabled
Never	Enable or disable the system to prompt the user to enter the Admin password when booting a UEFI boot path from the F12 boot menu. Default: Disabled
Date/Time	Displays the current date in MM/DD/YY format and current time in HH:MM:SS AM/PM format.

Table 4. System setup options—System Configuration menu

System Configuration

Integrated NIC	Controls the on-board LAN controller.
Enable UEFI Network Stack	Enable or disable UEFI Network Stack.
Front bezel LED Light Intensity Control	Enable, disable or adjust the Front bezel LED Light Intensity to Low or medium.
Serial port	Enable or disable the serial ports.
SATA Operation	Configure operating mode of the integrated SATA hard drive controller.
Drives	Enable or disable various drives on board.
SATA-0	Displays the SATA device information of the computer.
SATA-1	Displays the SATA device information of the computer.
SATA-2	Displays the SATA device information of the computer.
SATA-3	Displays the SATA device information of the computer.
SATA-4	Displays the SATA device information of the computer.
M.2 PCIe SSD-0	Displays the M.2 PCIe SSD information of the computer.
M.2 PCIe SSD-1	Displays the M.2 PCIe SSD information of the computer.
SMART Reporting	Enable or disable SMART Reporting during system startup.
USB Configuration	
Enable Boot Support	Enable or disable booting from USB mass storage devices such as external hard drive, optical drive, and USB drive.
Enable front USB Port	Enable or disable the front USB ports.
Enable internal USB Port	Enable or disable booting from USB mass storage devices connected to internal USB port.

System Configuration

Enable rear USB Port	Enable or disable the rear USB ports.
Front USB Configuration	Enable or disable the front USB ports.
Rear USB Configuration	Enable or disable the rear USB ports.
Thunderbolt Adapter Configuration	Enable or disable Thunderbolt technology support.
Auto switch	Enable or disable the auto switch.
Native enumeration	Enable or disable the native enumeration.
BIOS Assist enumeration	Enable or disable the BIOS Assist enumeration.
USB Powershare	Enable or disable the USB powershare.
Audio	Enable or disable the integrated audio controller.
Dust Filter Maintenance	Enable or disable various onboard devices.
Miscellaneous Devices	Enable or disable various onboard devices.
Watchdog Timer support	Enable or disable the watchdog timer support.

Table 5. System setup options—Video menu

Video

Multi-Display	Enable or disable multiple displays.
Primary Display	Set or change the primary display.

Table 6. System setup options—Security menu

Security

Admin Password	Set, change, or delete the administrator password.
System Password	Set, change, or delete the system password.
Internal HDD-0 Password	Set, change, or delete the internal hard-disk drive password.
Internal HDD-1 Password	Set, change, or delete the internal hard-disk drive password.
Internal HDD-2 Password	Set, change, or delete the internal hard-disk drive password.
Internal HDD-3 Password	Set, change, or delete the internal hard-disk drive password.
M.2 SATA SSD Password	Set, change, or delete the M.2 solid-state drive password.
Strong Password	Enable or disable strong passwords.
Password Configuration	Control the minimum and maximum number of characters allowed for Admin and System passwords.
Password Bypass	Bypass the System (Boot) Password and the internal HDD password prompts during a system restart.
Password Change	Enable or disable changes to the System and Hard Disk passwords when an administrator password is set.
UEFI Capsule Firmware Updates	Enable or disable BIOS updates through UEFI capsule update packages.
TPM 1.2 Security	Enable or disable the firmware TPM 1.2 function.
TPM 2.0 Security	Enable or disable the firmware TPM 2.0 function.
TPM Security	Enable or disable the firmware TPM function.
PTT Security	
PTT On	Enable or disable Platform Trust Technology (PTT) visibility to the operating system.
Clear	Default: Disabled

Security

PPI ByPass for Clear Command	Enable or disable the TPM Physical Presence Interface (PPI). When enabled, this setting will allow the OS to skip BIOS PPI user prompts when issuing the Clear command. Changes to this setting take effect immediately. Default: Disabled
Computrace(R)	Enable or disable the BIOS module interface of the optional Computrace(R) Service from Absolute Software.
Admin Setup Lockout	Enable to prevent users from entering Setup when an Admin Password is set.
Master Password Lockout	Disables the master password support. Hard Disk passwords need to be cleared before changing the setting.
HDD protection	Set, change, or delete the hard-disk drive password.
SMM Security Mitigation	Enable or disable SMM Security Mitigation

Table 7. System setup options—Secure Boot menu

Secure Boot

Secure Boot Enable	Enable or disable the secure boot feature.
Secure Boot Mode	Modifies the behavior of Secure Boot to allow evaluation or enforcement of UEFI driver signatures. <ul style="list-style-type: none">· Deployed Mode-Default: Enabled· Audit Mode-Default: Disabled
Deployed Mode	Enable or disable the deployed mode.
Audit Mode	Enable or disable the audit mode.

Expert Key Management

Expert Key Management	Enable or disable Expert Key Management.
Custom Mode Key Management	Select the custom values for expert key management.

Table 8. System setup options—Intel Software Guard Extensions menu

Intel Software Guard Extensions

Intel SGX Enable	Enable or disable Intel Software Guard Extensions.
Enclave Memory Size	Set the Intel Software Guard Extensions Enclave Reserve Memory Size.

Performance

Multi Core Support	Enable multiple cores. Default: Enabled.
Intel SpeedStep	Enable or disable Intel Speedstep Technology. Default: Enabled. NOTE: If enabled, the processor clock speed and core voltage are adjusted dynamically based on the processor load.
C-States Control	Enable or disable additional processor sleep states. Default: Enabled.
Limit CUID Value	Enable or disable CUID value.
Intel TurboBoost	Enable or disable Intel TurboBoost mode of the processor. Default: Enabled.
HyperThread control	Enable or disable HyperThreading in the processor. Default: Enabled.

Power Management

Intel Software Guard Extensions

AC Recovery	Sets what action the computer takes when power is restored.
Enable Intel Speed Shift Technology	Enable or disable Intel Speed Shift Technology.
Auto On Time	Enable to set the computer to turn on automatically every day or on a preselected date and time. This option can be configured only if the Auto On Time is set to Everyday, Weekdays or Selected Days. Default: Disabled.
USB Wake Support	Enable the USB devices to wake the computer from Standby.
Deep Sleep Control	Enables you to control the Deep Sleep mode support.
Fan Control Override	Enable or disable Fan control Override.
Wake on LAN/WLAN	Enables the computer to be powered on by special LAN signals.
Block sleep	Enables you to block entering to sleep mode in OS environment.
Intel Ready Mode	Enable or disable the Intel Ready Mode.

POST Behavior

Adapter Warnings	Enable adapter warnings. Default: Enabled.
Numlock LED	Enables the NumLock function when computer boots.
Keyboard Errors	Enables the keyboard error detection.
Fastboot	Enable to set the speed of the boot process. Default: Thorough.
Extend BIOS POST Time	Configure additional pre-boot delay.
Full Screen Logo	Enable or disable to display full screen logo.
Warnings and Errors	Sets the boot process to pause when Warnings or Errors are detected.

Table 9. System setup options—Virtualization Support menu

Virtualization Support

Virtualization	Specify whether a Virtual Machine Monitor (VMM) can utilize the additional hardware capabilities provided by Intel Virtualization Technology.
VT for Direct I/O	Specify whether a Virtual Machine Monitor (VMM) can utilize the additional hardware capabilities provided by Intel Virtualization Technology for Direct I/O.
Trusted Execution	Enable or disable trusted execution.

Table 10. System setup options—Wireless menu

Wireless

Wireless Device Enable	Enable or disable internal wireless devices.
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Table 11. System setup options—Maintenance menu

Maintenance

Service Tag	Display the system's Service Tag.
Asset Tag	Create a system Asset Tag.
SERR Messages	Enable or disable SERR messages.
Dell development configuration	Enable or disable Dell development configuration.
BIOS Downgrade	Control flashing of the system firmware to previous revisions.
Data Wipe	Enable to securely erase data from all internal storage devices.

Maintenance

BIOS Recovery	Enable the user to recover from certain corrupted BIOS conditions from a recovery file on the user primary hard drive or an external USB key.
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Table 12. System setup options—System Logs menu

System Logs

BIOS Events	Display BIOS events.
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Table 13. System setup options—SupportAssist System Resolution menu

SupportAssist System Resolution

Auto OS Recovery Threshold	Control the automatic boot flow for SupportAssist System Resolution Console and for Dell OS Recovery tool.
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Identifier	GUID-859887F0-B1B4-4530-855E-100D4FDE930A
Status	Released

System and setup password

Table 14. System and setup password

Password type	Description
System password	Password that you must enter to log on 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 stored on your computer if it is not locked and left unattended.

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

Identifier	GUID-D91DBF33-F0AB-477E-A22D-D6CD2D066BBE
Status	Released

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 F2 immediately after a power-on or re-boot.

Steps

1. In the **System BIOS** or **System Setup** screen, select **Security** and press Enter.
The **Security** screen is displayed.
2. Select **System/Admin Password** and create a password in the **Enter the new password** field.
Use the following guidelines to assign the system password:
 - A password can have up to 32 characters.
 - The password can contain the numbers 0 through 9.
 - Only lower case letters are valid, upper case letters are not allowed.
 - Only the following special characters are allowed: space, ("), (+), (.), (-), (.), (/), (:), ([), (\), (]), (').
3. Type the system password that you entered earlier in the **Confirm new password** field and click **OK**.

4. Press Esc and a message prompts you to save the changes.
5. Press Y to save the changes.
The computer reboots.

Identifier	GUID-3D32F643-EE78-4538-9D89-34BDFB68E9F1
Status	Released

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 F2 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**, alter or delete the existing system password and press Enter or Tab.
4. Select **Setup Password**, alter or delete the existing setup password and press Enter or Tab.

 **NOTE:** If you change the System and/or Setup password, re-enter 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 reboot.

Identifier	GUID-362C305C-3F9F-4346-B5CF-6B2C25268D44
Status	Released

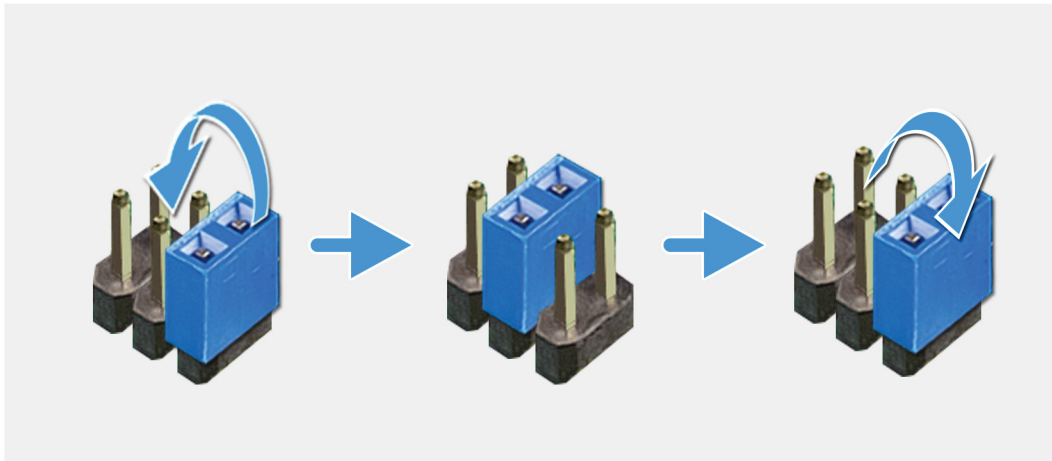
Clearing CMOS settings

About this task

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

Steps

1. Remove the [left-side cover](#).
2. Remove the [graphics card](#).
3. Remove the jumper plug from the password jumper-pins (PSWD) and connect it to the CMOS jumper-pins.
4. Wait for 5 seconds and then replace the jumper plug to its original location.



5. Install the [graphics card](#).
6. Install the [left-side cover](#).

Identifier	GUID-5731AF4C-632C-476A-BAD1-57D0842DE27E
Status	Released

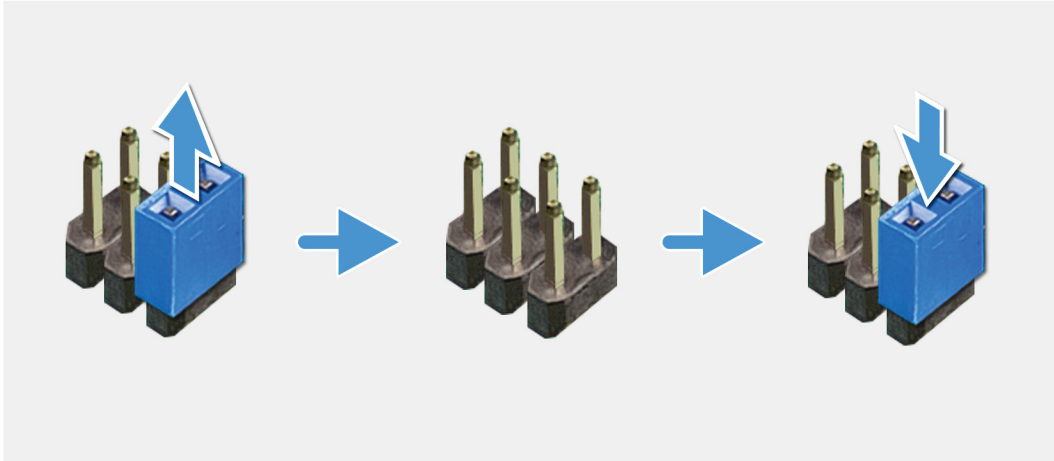
Clearing BIOS (System Setup) and System passwords

About this task

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

Steps

1. Remove the [left-side cover](#).
2. Remove the [graphics card](#).
3. Remove the jumper plug from the password jumper-pins (PSWD).
4. Wait for 5 seconds and then replace the jumper plug to its original location.



5. Install the [graphics card](#).
6. Install the [left-side cover](#).

Identifier	GUID-F93F7E34-BE30-464B-886E-C284BF961CB2
Status	Released

Troubleshooting

Identifier	GUID-EE9A5D95-88BE-4EE7-983E-D97C680BDECD
Status	Released

Enhanced Pre-Boot System Assessment (ePSA) diagnostics

About this task

The ePSA diagnostics (also known as system diagnostics) performs a complete check of your hardware. The ePSA is embedded with the BIOS and is launched by the BIOS internally. The embedded system diagnostics provides a set of options for particular devices or device groups allowing you to:

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

NOTE: Some tests for specific devices require user interaction. Always ensure that you are present at the computer terminal when the diagnostic tests are performed.

For more information, see [Dell EPSA Diagnostic 3.0](#).

Identifier	GUID-0B893EED-EFBC-4831-A9C4-7298A7A9F619
Status	Released

Running the ePSA diagnostics

Steps

1. Turn on your computer.
2. As the computer boots, press the F12 key as the Dell logo appears.
3. On the boot menu screen, select the **Diagnostics** option.
4. Click the arrow at the bottom left corner.
Diagnostics front page is displayed.
5. Click the arrow in the lower-right corner to go to the page listing.
The items detected are listed.
6. To run a diagnostic test on a specific device, press Esc and click **Yes** to stop the diagnostic test.
7. Select the device from the left pane and click **Run Tests**.
8. If there are any issues, error codes are displayed.
Note the error code and validation number and contact Dell.

Diagnostics

The computer POST (Power On Self Test) ensures that it meets the basic computer requirements and the hardware is working appropriately before the boot process begins. If the computer passes the POST, the computer continues to start in a normal mode. However, if the computer fails the POST, the computer emits a series of LED codes during the start-up. The system LED is integrated on the Power button.

The following table shows different light patterns and what they indicate.

Table 15. Power LED summary

Amber LED state	White LED state	System state	Description
Off	Off	S4, S5	<ul style="list-style-type: none"> Hibernate or Suspend to Disk (S4) Power is off (S5)
Off	Blinking	S1, S3	System is in a low power state, either S1 or S3. This does not indicate a fault condition.
Previous State	Previous State	S3, no PWRGD_PS	This entry provides for the possibility of a delay from SLP_S3# active to PWRGD_PS inactive.
Blinking	Off	S0, no PWRGD_PS	Boot Failure - The computer is receiving electrical power, and power supplied by the power supply is normal. A device might be malfunctioning or incorrectly installed. Refer to the table below for Amber Blinking Pattern diagnostics suggestion and possible failures.
Steady	Off	S0, no PWRGD_PS, Code fetch = 0	Boot Failure - This is a system fault error condition, including the power supply. Only the +5VSB rail on the power supply is working correctly.
Off	Steady	S0, no PWRGD_PS, Code fetch = 1	This indicates that the host BIOS has started to execute and the LED register is now writable.

Table 16. Amber LED blinking failures

Amber LED state	White LED state	System state
2	1	Bad MBD
2	2	Bad MB, PSU or cabling
2	3	Bad MBD, DIMMS, or CPU
2	4	Bad coin cell

Table 17. States Under Host BIOS Control

Amber LED state	White LED state	System state	Description
2	5	BIOS state 1	BIOS Post code (Old LED pattern 0001) Corrupt BIOS.

Amber LED state	White LED state	System state	Description
2	6	BIOS state 2	BIOS Post code (Old LED pattern 0010) CPU config or CPU failure.
2	7	BIOS state 3	BIOS Post code (Old LED pattern 0011) MEM config in process. Appropriate mem modules detected but failure has occurred.
3	1	BIOS state 4	BIOS Post code (Old LED pattern 0100) Combine PCI device config or failure with video sub sytem config or failure. BIOS to eliminate 0101 video code.
3	2	BIOS state 5	BIOS Post code (Old LED pattern 0110) Combine storage and USB config or failure. BIOS to eliminate 0111 USB code.
3	3	BIOS state 6	BIOS Post code (Old LED pattern 1000) MEM config, no memory detected.
3	4	BIOS state 7	BIOS Post code (Old LED pattern 1001) Fatal Motherboard error.
3	5	BIOS state 8	BIOS Post code (Old LED pattern 1010) Mem config, modules incompatible or invalid config.
3	6	BIOS state 9	BIOS Post code (Old LED pattern 1011) combine "Other pre-video activity and resource configuration codes. BIOS to eliminate 1100 code.
3	7	BIOS state 10	BIOS Post code (Old LED pattern 1110) Other pre-post activity, routine subsequent to video init.

Identifier
Status

GUID-5F241F58-AE5B-4819-877C-A04F4940C36F
Released

System diagnostic lights

Power-supply diagnostics light

Indicates the power-supply state.

Hard-drive activity light

Turns on when the computer reads from or writes to the hard drive.

Table 18. LED codes

Diagnostic light codes	Problem description
2,1	System board failure
2,2	System board, PSU, or cabling failure
2,3	System board, memory, or processor failure

Diagnostic light codes	Problem description
2,4	Coin-cell battery failure
2,5	Corrupt BIOS. Recovery image is not found or is invalid during auto BIOS recovery process.
2,6	Processor configuration error or processor failure
2,7	Memory failure
3,1	PCI or video card/chip failure
3,2	Storage and USB configuration error or failure
3,3	No memory detected
3,4	System board error
3,5	Memory configuration error, incompatible memory, or invalid memory configuration
3,6	Recovery image not found
3,7	Recovery image found but invalid

Identifier	GUID-5AC44435-2478-42B6-AA13-993B9B828C4D
Status	Released

Diagnostic error messages

Table 19. Diagnostic error messages

Error messages	Description
AUXILIARY DEVICE FAILURE	The touchpad or external mouse may be faulty. For an external mouse, check the cable connection. Enable the Pointing Device option in the System Setup program.
BAD COMMAND OR FILE NAME	Ensure that you have spelled the command correctly, put spaces in the proper place, and used the correct path name.
CACHE DISABLED DUE TO FAILURE	The primary cache internal to the microprocessor has failed. Contact Dell
CD DRIVE CONTROLLER FAILURE	The optical drive does not respond to commands from the computer.
DATA ERROR	The hard drive cannot read the data.
DECREASING AVAILABLE MEMORY	One or more memory modules may be faulty or improperly seated. Reinstall the memory modules or, if necessary, replace them.
DISK C: FAILED INITIALIZATION	The hard drive failed initialization. Run the hard drive tests in Dell Diagnostics .
DRIVE NOT READY	The operation requires a hard drive in the bay before it can continue. Install a hard drive in the hard drive bay.
ERROR READING PCMCIA CARD	The computer cannot identify the ExpressCard. Reinsert the card or try another card.
EXTENDED MEMORY SIZE HAS CHANGED	The amount of memory recorded in non-volatile memory (NVRAM) does not match the memory module installed in the computer. Restart the computer. If the error appears again, Contact Dell
THE FILE BEING COPIED IS TOO LARGE FOR THE DESTINATION DRIVE	The file that you are trying to copy is too large to fit on the disk, or the disk is full. Try copying the file to a different disk or use a larger capacity disk.
A FILENAME CANNOT CONTAIN ANY OF THE FOLLOWING CHARACTERS: \ / : * ? " < > -	Do not use these characters in filenames.

Error messages	Description
GATE A20 FAILURE	A memory module may be loose. Reinstall the memory module or, if necessary, replace it.
GENERAL FAILURE	The operating system is unable to carry out the command. The message is usually followed by specific information. For example, Printer out of paper. Take the appropriate action.
HARD-DISK DRIVE CONFIGURATION ERROR	The computer cannot identify the drive type. Shut down the computer, remove the hard drive, and boot the computer from an optical drive. Then, shut down the computer, reinstall the hard drive, and restart the computer. Run the Hard Disk Drive tests in Dell Diagnostics .
HARD-DISK DRIVE CONTROLLER FAILURE 0	The hard drive does not respond to commands from the computer. Shut down the computer, remove the hard drive, and boot the computer from an optical drive. Then, shut down the computer, reinstall the hard drive, and restart the computer. If the problem persists, try another drive. Run the Hard Disk Drive tests in Dell Diagnostics .
HARD-DISK DRIVE FAILURE	The hard drive does not respond to commands from the computer. Shut down the computer, remove the hard drive, and boot the computer from an optical drive. Then, shut down the computer, reinstall the hard drive, and restart the computer. If the problem persists, try another drive. Run the Hard Disk Drive tests in Dell Diagnostics .
HARD-DISK DRIVE READ FAILURE	The hard drive may be defective. Shut down the computer, remove the hard drive, and boot the computer from an optical. Then, shut down the computer, reinstall the hard drive, and restart the computer. If the problem persists, try another drive. Run the Hard Disk Drive tests in Dell Diagnostics .
INSERT BOOTABLE MEDIA	The operating system is trying to boot to non-bootable media, such as an optical drive. Insert bootable media.
INVALID CONFIGURATION INFORMATION-PLEASE RUN SYSTEM SETUP PROGRAM	The system configuration information does not match the hardware configuration. The message is most likely to occur after a memory module is installed. Correct the appropriate options in the system setup program.
KEYBOARD CLOCK LINE FAILURE	For external keyboards, check the cable connection. Run the Keyboard Controller test in Dell Diagnostics .
KEYBOARD CONTROLLER FAILURE	For external keyboards, check the cable connection. Restart the computer, and avoid touching the keyboard or the mouse during the boot routine. Run the Keyboard Controller test in Dell Diagnostics .
KEYBOARD DATA LINE FAILURE	For external keyboards, check the cable connection. Run the Keyboard Controller test in Dell Diagnostics .
KEYBOARD STUCK KEY FAILURE	For external keyboards or keypads, check the cable connection. Restart the computer, and avoid touching the keyboard or keys during the boot routine. Run the Stuck Key test in Dell Diagnostics .
LICENSED CONTENT IS NOT ACCESSIBLE IN MEDIADIRECT	Dell MediaDirect cannot verify the Digital Rights Management (DRM) restrictions on the file, so the file cannot be played.
MEMORY ADDRESS LINE FAILURE AT ADDRESS, READ VALUE EXPECTING VALUE	A memory module may be faulty or improperly seated. Reinstall the memory module or, if necessary, replace it.

Error messages	Description
MEMORY ALLOCATION ERROR	The software you are attempting to run is conflicting with the operating system, another program, or a utility. Shut down the computer, wait for 30 seconds, and then restart it. Run the program again. If the error message still appears, see the software documentation.
MEMORY DOUBLE WORD LOGIC FAILURE AT ADDRESS, READ VALUE EXPECTING VALUE	A memory module may be faulty or improperly seated. Reinstall the memory module or, if necessary, replace it.
MEMORY ODD/EVEN LOGIC FAILURE AT ADDRESS, READ VALUE EXPECTING VALUE	A memory module may be faulty or improperly seated. Reinstall the memory module or, if necessary, replace it.
MEMORY WRITE/READ FAILURE AT ADDRESS, READ VALUE EXPECTING VALUE	A memory module may be faulty or improperly seated. Reinstall the memory module or, if necessary, replace it.
NO BOOT DEVICE AVAILABLE	The computer cannot find the hard drive. If the hard drive is your boot device, ensure that the drive is installed, properly seated, and partitioned as a boot device.
NO BOOT SECTOR ON HARD DRIVE	The operating system may be corrupted, Contact Dell .
NO TIMER TICK INTERRUPT	A chip on the system board may be malfunctioning. Run the System Set tests in Dell Diagnostics .
NOT ENOUGH MEMORY OR RESOURCES. EXIT SOME PROGRAMS AND TRY AGAIN	You have too many programs open. Close all windows and open the program that you want to use.
OPERATING SYSTEM NOT FOUND	Reinstall the operating system. If the problem persists, Contact Dell .
OPTIONAL ROM BAD CHECKSUM	The optional ROM has failed. Contact Dell .
SECTOR NOT FOUND	The operating system cannot locate a sector on the hard drive. You may have a defective sector or corrupted File Allocation Table (FAT) on the hard drive. Run the Windows error-checking utility to check the file structure on the hard drive. See Windows Help and Support for instructions (click Start > Help and Support). If a large number of sectors are defective, back up the data (if possible), and then format the hard drive.
SEEK ERROR	The operating system cannot find a specific track on the hard drive.
SHUTDOWN FAILURE	A chip on the system board may be malfunctioning. Run the System Set tests in Dell Diagnostics . If the message reappears, Contact Dell .
TIME-OF-DAY CLOCK LOST POWER	System configuration settings are corrupted. Connect your computer to an electrical outlet to charge the battery. If the problem persists, try to restore the data by entering the System Setup program, then immediately exit the program. If the message reappears, Contact Dell .
TIME-OF-DAY CLOCK STOPPED	The reserve battery that supports the system configuration settings may require recharging. Connect your computer to an electrical outlet to charge the battery. If the problem persists, Contact Dell .
TIME-OF-DAY NOT SET-PLEASE RUN THE SYSTEM SETUP PROGRAM	The time or date stored in the system setup program does not match the system clock. Correct the settings for the Date and Time options.
TIMER CHIP COUNTER 2 FAILED	A chip on the system board may be malfunctioning. Run the System Set tests in Dell Diagnostics .
UNEXPECTED INTERRUPT IN PROTECTED MODE	The keyboard controller may be malfunctioning, or a memory module may be loose. Run the System Memory tests and the Keyboard Controller test in Dell Diagnostics or Contact Dell .

Error messages	Description
X:\ IS NOT ACCESSIBLE. THE DEVICE IS NOT READY	Insert a disk into the drive and try again.

Identifier	GUID-8D6E38AD-7596-43A5-9CD9-80F2D87B01F2
Status	Released

System error messages

Table 20. System error messages

System message	Description
Alert! Previous attempts at booting this system have failed at checkpoint [nnnn]. For help in resolving this problem, please note this checkpoint and contact Dell Technical Support	The computer failed to complete the boot routine three consecutive times for the same error.
CMOS checksum error	RTC is reset, BIOS Setup default has been loaded.
CPU fan failure	CPU fan has failed.
System fan failure	System fan has failed.
Hard-disk drive failure	Possible hard disk drive failure during POST.
Keyboard failure	Keyboard failure or loose cable. If reseating the cable does not solve the problem, replace the keyboard.
No boot device available	<p>No bootable partition on hard disk drive, the hard disk drive cable is loose, or no bootable device exists.</p> <ul style="list-style-type: none"> If the hard drive is your boot device, ensure that the cables are connected and that the drive is installed properly and partitioned as a boot device. Enter system setup and ensure that the boot sequence information is correct.
No timer tick interrupt	A chip on the system board might be malfunctioning or motherboard failure.
NOTICE - Hard Drive SELF MONITORING SYSTEM has reported that a parameter has exceeded its normal operating range. Dell recommends that you back up your data regularly. A parameter out of range may or may not indicate a potential hard drive problem	S.M.A.R.T error, possible hard disk drive failure.

Identifier	GUID-2492FF0C-5409-4E99-9C6A-F40516F1A256
Status	Released

Recovering the operating system

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

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

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

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

Identifier	GUID-060D210F-C287-462B-AC38-81183D440A9D
Status	Released

Flashing BIOS (USB key)

Steps

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

Identifier	GUID-F5899359-C2E1-41C0-9663-4C79969506EB
Status	Released

Flashing the BIOS

About this task

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

Follow these steps to flash the BIOS:

Steps

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

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

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

Identifier	GUID-B4DD52FB-C0FE-4818-9D7C-A0D2BF4491D7
Status	Released

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.

Identifier	GUID-8CEF1F7A-1327-43EB-9E2E-8EC169AEFE4A
Status	Released

Flea power release

About this task

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

Steps

1. Turn off your computer.
2. Disconnect the power adapter from your computer.
3. Press and hold the power button for 15 seconds to drain the flea power.
4. Connect the power adapter to your computer.
5. Turn on your computer.

Identifier	GUID-FE39A314-6129-4A79-A5FA-B69617360582
Status	Released

Enabling Intel Optane memory

Steps

1. On the taskbar, click the search box, and then type `Intel Rapid Storage Technology`.
2. Click **Intel Rapid Storage Technology**.
The **Intel Rapid Storage Technology** window is displayed.
3. On the **Status** tab, click **Enable** to enable the Intel Optane memory.
4. On the warning screen, select a compatible fast drive, and then click **Yes** to continue enabling Intel Optane memory.
5. Click **Intel Optane memory** > **Reboot** to complete enabling your Intel Optane memory.

 **NOTE:** Applications may take up to three subsequent launches after enablement to see the full performance benefits.

Identifier	GUID-CD2E8B90-160E-43C9-BA9D-F0F6C6BAA458
Status	Released

Disabling Intel Optane memory

About this task

 **CAUTION:** After disabling Intel Optane memory, do not uninstall the driver for Intel Rapid Storage Technology as it will result in a blue screen error. The Intel Rapid Storage Technology user interface can be removed without uninstalling the driver.

 **NOTE:** Disabling Intel Optane memory is required before removing the SATA storage device accelerated by the Intel Optane memory module from the computer.

Steps

1. On the taskbar, click the search box, and then type `Intel Rapid Storage Technology`.
2. Click **Intel Rapid Storage Technology**.
The **Intel Rapid Storage Technology** window is displayed.
3. On the **Intel Optane memory** tab, click **Disable** to disable the Intel Optane memory.



NOTE: For computers in which Intel Optane memory acts as a primary storage, do not disable the Intel Optane memory. The Disable option will be grayed out.

4. Click **Yes** if you accept the warning.
The disabling progress is displayed.
5. Click **Reboot** to complete disabling your Intel Optane memory and restart your computer.

Identifier
Status



GUID-79104453-0F4A-4408-A5D4-44ABDD02CAE
Released

Getting help and contacting Dell

Self-help resources

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

Table 21. Self-help resources

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

Contacting Dell

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

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

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