Dell Precision 3930 Rack

Service Manual

Regulatory Model: D02R
Regulatory Type: D02R001
May 2022
Rev. A04

DELL Technologies

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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1

Working on your computer

Safety instructions

Prerequisites

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 the following conditions exist:

- You have read the safety information that shipped with your computer.
- A component can be replaced or, if purchased separately, installed by performing the removal procedure in reverse order.

About this task

WARNING: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

CAUTION: To avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by periodically touching an unpainted metal surface at the same time as touching a connector on the back of the computer.

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: 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; if you are disconnecting this type of cable, press in on the locking tabs before you disconnect the cable. As you pull connectors apart, keep them evenly aligned to avoid bending any connector pins. Also, before you connect a cable, ensure that both connectors are correctly oriented and aligned.

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 power source.

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

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

CAUTION: System will shut down if side covers are removed while the system is running. The system will not power on if the side cover is removed.

Before working inside your computer

About this task

To avoid damaging your computer, perform the following steps before you begin working inside the computer.

Steps

1. Ensure that you follow the Safety Instruction.

2. Ensure that your work surface is flat and clean to prevent the computer cover from being scratched.
3. Turn off your computer.
4. Disconnect all network cables from the computer.

   CAUTION: To disconnect a network cable, first unplug the cable from your computer and then unplug the cable from the network device.

5. Disconnect your computer and all attached devices from their electrical outlets.
6. Press and hold the power button while the computer is unplugged to ground the system board.

   NOTE: To avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by periodically touching an unpainted metal surface simultaneously as touching a connector on the back of the computer.

Safety precautions

The safety precautions chapter details the primary steps to be taken before performing any disassembly instructions.

Observe the following safety precautions before you perform any installation or break/fix procedures involving disassembly or reassembly:

- Turn off the system and all attached peripherals.
- Disconnect the system and all attached peripherals from AC power.
- Disconnect all network cables, telephone, and telecommunications lines from the system.
- Use an ESD field service kit when working inside any tabletnotebookdesktop to avoid electrostatic discharge (ESD) damage.
- After removing any system component, carefully place the removed component on an antistatic mat.
- Wear shoes with nonconductive rubber soles to reduce the chance of getting electrocuted.

Standby power

Dell products with standby power must be unplugged before you open the case. Systems that incorporate standby power are essentially powered while turned off. The internal power enables the system to be remotely turned on (wake on LAN) and suspended into a sleep mode and has other advanced power management features.

Unplug AC power from the system, press and hold the power button for 15 seconds to discharge residual power in the system board.

Bonding

Bonding is a method for connecting two or more grounding conductors to the same electrical potential. This is done by using a field service electrostatic discharge (ESD) kit. When connecting a bonding wire, ensure that it is connected to bare metal and never to a painted or nonmetal surface. The wrist strap should be secure and in full contact with your skin, and ensure that you remove all jewelry such as watches, bracelets, or rings prior to bonding yourself and the equipment.

Electrostatic discharge—ESD protection

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

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

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

- **Catastrophic** – Catastrophic failures represent approximately 20 percent of ESD-related failures. The damage causes an immediate and complete loss of device functionality. An example of catastrophic failure is a memory DIMM that has received a static shock and immediately generates a "No POST/No Video" symptom with a beep code emitted for missing or nonfunctional memory.
- **Intermittent** – Intermittent failures represent approximately 80 percent of ESD-related failures. The high rate of intermittent failures means that most of the time when damage occurs, it is not immediately recognizable. The DIMM

receives a static shock, but the tracing is merely weakened and does not immediately produce outward symptoms related to the damage. The weakened trace may take weeks or months to melt, and in the meantime may cause degradation of memory integrity, intermittent memory errors, etc.

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

Perform the following steps to prevent ESD damage:

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

ESD field service kit

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

Components of an ESD field service kit

The components of an ESD field service kit are:

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

ESD protection summary

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

Transporting sensitive components

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

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

After you complete any replacement procedure, ensure that you connect any external devices, cards, and cables before turning on your computer.

Steps

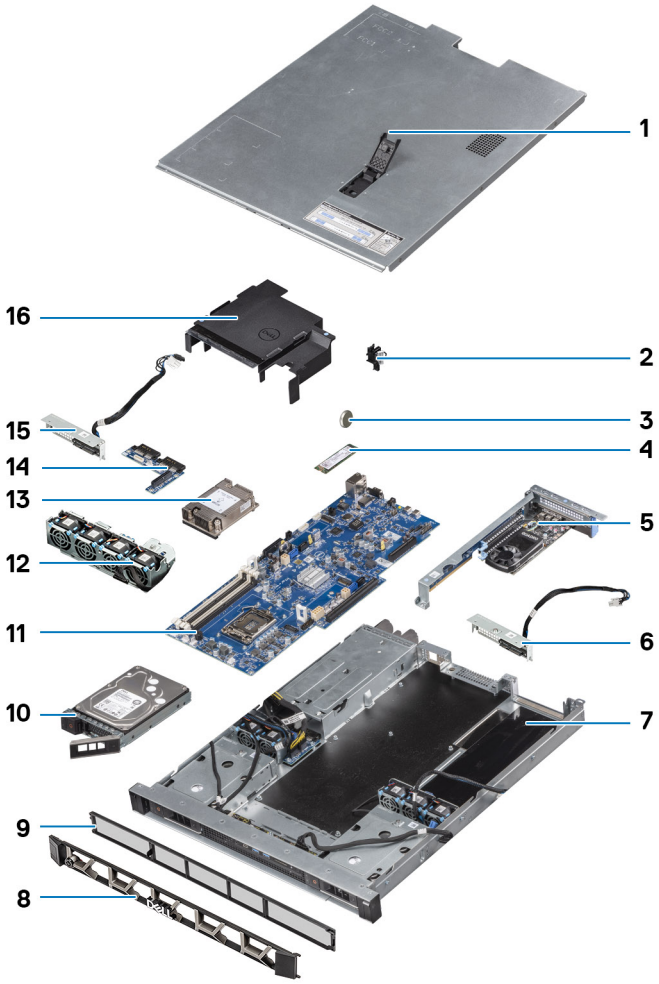
1. Connect any network cables to your computer.

   CAUTION: To connect a network cable, first plug the cable into the network device and then plug it into the computer.

2. Connect your computer and all attached devices to their electrical outlets.
3. Turn on your computer.
4. If required, verify that the computer works correctly by running **ePSA diagnostics**.

2

Major components of your system



1. System cover
2. Intrusion switch
3. Coin cell battery
4. M.2 PCIe Solid State Drive -SSD
5. Expansion card
6. Hard drive backplane
7. Chassis
8. Front bezel
9. Dust filter
10. Hard drive assembly
11. System board
12. System fan
13. Heat sink
14. Power distribution board
15. Hard drive backplane
16. Air duct

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

3

Technology and components

USB features

Universal Serial Bus, or USB, was introduced in 1996. It dramatically simplified the connection between host computers and peripheral devices like mice, keyboards, external drivers, and printers.

Let's take a quick look on the USB evolution referencing to the table below.

Table 1. USB evolution

Type	Data Transfer Rate	Category	Introduction Year
USB 2.0	480 Mbps	High Speed	2000
USB 3.0/USB 3.1 Gen 1	5 Gbps	Super Speed	2010
USB 3.1 Gen 2	10 Gbps	Super Speed	2013

USB 3.0/USB 3.1 Gen 1 (SuperSpeed USB)

For years, the USB 2.0 has been firmly entrenched as the de facto interface standard in the PC world with about 6 billion devices sold, and yet the need for more speed grows by ever faster computing hardware and ever greater bandwidth demands. The USB 3.0/USB 3.1 Gen 1 finally has the answer to the consumers' demands with a theoretically 10 times faster than its predecessor. In a nutshell, USB 3.1 Gen 1 features are as follows:

- Higher transfer rates (up to 5 Gbps)
- Increased maximum bus power and increased device current draw to better accommodate power-hungry devices
- New power management features
- Full-duplex data transfers and support for new transfer types
- Backward USB 2.0 compatibility
- New connectors and cable

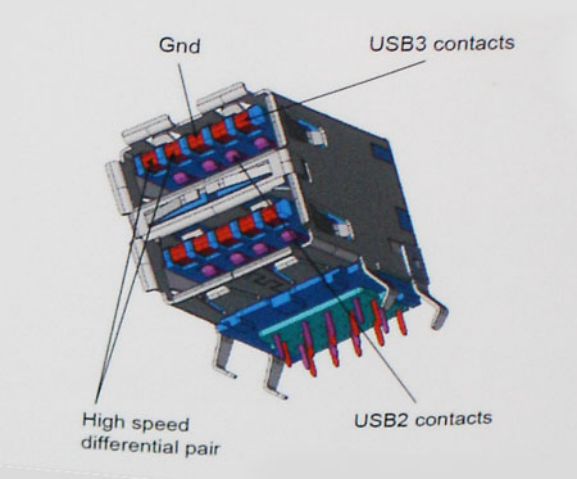
The topics below cover some of the most commonly asked questions regarding USB 3.0/USB 3.1 Gen 1.

Speed

Currently, there are 3 speed modes defined by the latest USB 3.0/USB 3.1 Gen 1 specification. They are Super-Speed, Hi-Speed and Full-Speed. The new SuperSpeed mode has a transfer rate of 4.8Gbps. While the specification retains Hi-Speed, and Full-Speed USB mode, commonly known as USB 2.0 and 1.1 respectively, the slower modes still operate at 480Mbps and 12Mbps respectively and are kept to maintain backward compatibility.

USB 3.0/USB 3.1 Gen 1 achieves the much higher performance by the technical changes below:

- An additional physical bus that is added in parallel with the existing USB 2.0 bus (refer to the picture below).
- USB 2.0 previously had four wires (power, ground, and a pair for differential data); USB 3.0/USB 3.1 Gen 1 adds four more for two pairs of differential signals (receive and transmit) for a combined total of eight connections in the connectors and cabling.
- USB 3.0/USB 3.1 Gen 1 utilizes the bidirectional data interface, rather than USB 2.0's half-duplex arrangement. This gives a 10-fold increase in theoretical bandwidth.



With today's ever increasing demands placed on data transfers with high-definition video content, terabyte storage devices, high megapixel count digital cameras etc., USB 2.0 may not be fast enough. Furthermore, no USB 2.0 connection could ever come close to the 480Mbps theoretical maximum throughput, making data transfer at around 320Mbps (40MB/s) — the actual real-world maximum. Similarly, USB 3.0/USB 3.1 Gen 1 connections will never achieve 4.8Gbps. We will likely see a real-world maximum rate of 400MB/s with overheads. At this speed, USB 3.0/USB 3.1 Gen 1 is a 10x improvement over USB 2.0.

Applications

USB 3.0/USB 3.1 Gen 1 opens up the laneways and provides more headroom for devices to deliver a better overall experience. Where USB video was barely tolerable previously (both from a maximum resolution, latency, and video compression perspective), it's easy to imagine that with 5-10 times the bandwidth available, USB video solutions should work that much better. Single-link DVI requires almost 2Gbps throughput. Where 480Mbps was limiting, 5Gbps is more than promising. With its promised 4.8Gbps speed, the standard will find its way into some products that previously weren't USB territory, like external RAID storage systems.

Listed below are some of the available SuperSpeed USB 3.0/USB 3.1 Gen 1 products:

- External Desktop USB 3.0/USB 3.1 Gen 1 Hard Drives
- Portable USB 3.0/USB 3.1 Gen 1 Hard Drives
- USB 3.0/USB 3.1 Gen 1 Drive Docks & Adapters
- USB 3.0/USB 3.1 Gen 1 Flash Drives & Readers
- USB 3.0/USB 3.1 Gen 1 Solid-state Drives
- USB 3.0/USB 3.1 Gen 1 RAIDs
- Optical Media Drives
- Multimedia Devices
- Networking
- USB 3.0/USB 3.1 Gen 1 Adapter Cards & Hubs

Compatibility

The good news is that USB 3.0/USB 3.1 Gen 1 has been carefully planned from the start to peacefully co-exist with USB 2.0. First of all, while USB 3.0/USB 3.1 Gen 1 specifies new physical connections and thus new cables to take advantage of the higher speed capability of the new protocol, the connector itself remains the same rectangular shape with the four USB 2.0 contacts in the exact same location as before. Five new connections to carry receive and transmitted data independently are present on USB 3.0/USB 3.1 Gen 1 cables and only come into contact when connected to a proper SuperSpeed USB connection.

Windows 8/10 will be bringing native support for USB 3.1 Gen 1 controllers. This is in contrast to previous versions of Windows, which continue to require separate drivers for USB 3.0/USB 3.1 Gen 1 controllers.

DDR4

DDR4 (double data rate fourth generation) memory is a higher-speed successor to the DDR2 and DDR3 technologies and allows up to 512 GB in capacity, compared to the DDR3's maximum of 128 GB per DIMM. DDR4 synchronous dynamic random-access

memory is keyed differently from both SDRAM and DDR to prevent the user from installing the wrong type of memory into the system.

DDR4 needs 20 percent less or just 1.2 volts, compared to DDR3 which requires 1.5 volts of electrical power to operate. DDR4 also supports a new, deep power-down mode that allows the host device to go into standby without needing to refresh its memory. Deep power-down mode is expected to reduce standby power consumption by 40 to 50 percent.

DDR4 Details

There are subtle differences between DDR3 and DDR4 memory modules, as listed below.

Key notch difference

The key notch on a DDR4 module is in a different location from the key notch on a DDR3 module. Both notches are on the insertion edge but the notch location on the DDR4 is slightly different, to prevent the module from being installed into an incompatible board or platform.

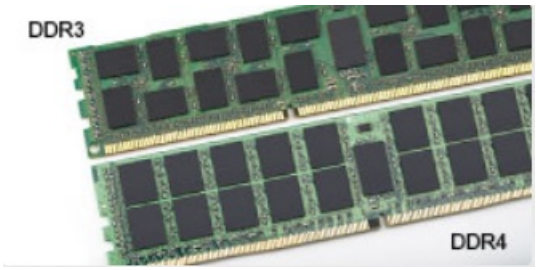


Figure 1. Notch difference

Increased thickness

DDR4 modules are slightly thicker than DDR3, to accommodate more signal layers.

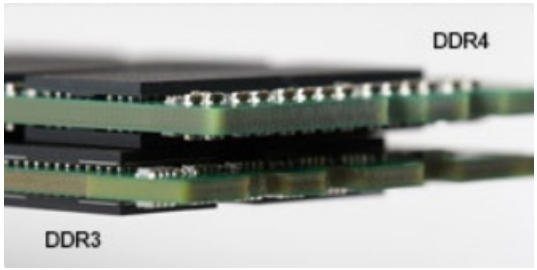


Figure 2. Thickness difference

Curved edge

DDR4 modules feature a curved edge to help with insertion and alleviate stress on the PCB during memory installation.

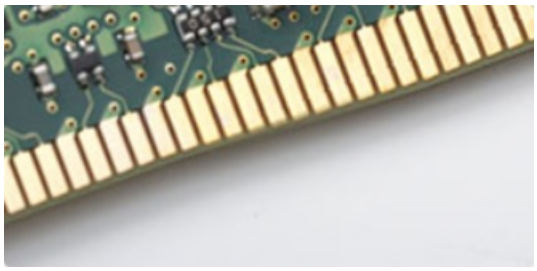


Figure 3. Curved edge

Memory Errors

Memory errors on the system display the new ON-FLASH-FLASH or ON-FLASH-ON failure code. If all memory fails, the LCD does not turn on. Troubleshoot for possible memory failure by trying known good memory modules in the memory connectors on the bottom of the system or under the keyboard, as in some portable systems.

NOTE: The DDR4 memory is imbedded in board and not a replaceable DIMM as shown and referred.

Processor

NOTE: Processor numbers are not a measure of performance. Processor availability is subject to change and may vary by region/country.

Table 2. Processor specifications

Type	UMA Graphics
Intel Xeon E Processor E-2288G (8 Core, 3.7 GHz, 16 MB Cache)	Integrated Intel UHD P630
Intel Xeon E Processor E-2286G (6 Core, 4.0 GHz, 12 MB Cache)	Integrated Intel UHD P630
Intel Xeon E Processor E-2278G (8 Core, 3.4 GHz, 16 MB Cache)	Integrated Intel UHD P630
Intel Xeon E Processor E-2276G (6 Core, 3.8 GHz, 12 MB Cache)	Integrated Intel UHD P630
Intel Xeon E Processor E-2246G (6 Core, 3.6 GHz, 12 MB Cache)	Integrated Intel UHD P630
Intel Xeon E Processor E-2236 (6 Core, 3.4 GHz, 12 MB Cache)	Not Supported
Intel Xeon E Processor E-2226G (6 Core, 3.4 GHz, 12 MB Cache)	Integrated Intel UHD P630
Intel Xeon E Processor E-2224G (4 Core, 3.5 GHz, 8 MB Cache)	Integrated Intel UHD P630
Intel Xeon E Processor E-2224 (4 Core, 3.4 GHz, 8 MB Cache)	Not Supported
Intel Xeon E Processor E-2186G (6 Core HT 3.8 Ghz, 4.7 GHz Turbo, 8 MB Cache)	Integrated Intel UHD P630
Intel Xeon E Processor E-2176G (6 Core HT 3.7 Ghz, 4.7 GHz Turbo, 8 MB Cache)	Integrated Intel UHD P630
Intel Xeon E Processor E-2174G (4 Core HT 3.8 Ghz, 4.7 GHz Turbo, 8 MB Cache)	Integrated Intel UHD P630
Intel Xeon E Processor E-2146G (6 Core HT 3.5 GHz, 4.5 Ghz Turbo, 8 MB Cache)	Integrated Intel UHD P630
Intel Xeon E Processor E-2136 (6 Core HT 3.3 Ghz, 4.5 Ghz Turbo, 8 MB Cache)	Not Supported

Table 2. Processor specifications (continued)

Type	UMA Graphics
Intel Xeon E Processor E-2134 (4 Core HT 3.5 Ghz, 4.5 Ghz Turbo, 8 MB Cache)	Not Supported
Intel Xeon E Processor E-2124G (4 Core, 3.4 GHz, 4.5 Ghz Turbo, 8 MB Cache)	Integrated Intel UHD P630
Intel Xeon E Processor E-2124 (4 Core 3.4 GHz, 4.5 Ghz Turbo, 8 MB Cache)	Not Supported
Intel Core i3-8100 Processor (4 Core, 3.6 GHz, 6 MB Cache)	Integrated Intel UHD 630
Intel Core i5-8500 Processor (6 Core, 3.0 GHz up to 4.1 GHz Turbo, 9 MB Cache)	Integrated Intel UHD 630
Intel Core i5-8600 Processor (6 Core, 3.1 GHz up to 4.3 GHz Turbo, 9 MB Cache)	Integrated Intel UHD 630
Intel Core i5-8600K Processor (6 Core, 3.6 GHz up to 4.3 GHz Turbo, 9 MB Cache)	Integrated Intel UHD 630
Intel Core i7-8700 Processor (6 Core, 3.2 GHz up to 4.6 GHz Turbo, 12 MB Cache)	Integrated Intel UHD 630
Intel Core i7-8700K Processor (6 Core, 3.7 GHz up to 4.7 GHz Turbo, 12 MB Cache)	Integrated Intel UHD 630
Intel Core i3-9100 Processor (4 Core, 3.6 GHz, 6 MB Cache)	Integrated Intel UHD 630
Intel Core i5-9400 Processor (8 Core, 2.9 GHz, 9 MB Cache)	Integrated Intel UHD 630
Intel Core i5-9500 Processor (6 Core, 3.0 GHz, 9 MB Cache)	Integrated Intel UHD 630
Intel Core i5-9600 Processor (6 Core, 3.1 GHz, 9 MB Cache)	Integrated Intel UHD 630
Intel Core i7-9700 Processor (8 Core, 3.0 GHz, 12 MB Cache)	Integrated Intel UHD 630
Intel Core i7-9700K Processor (8 Core, 3.6 GHz, 12 MB Cache)	Integrated Intel UHD 630
Intel Core i9-9900 Processor (8 Core, 3.1 GHz, 16 MB Cache)	Integrated Intel UHD 630
Intel Core i9-9900K Processor (8 Core, 3.6 GHz, 16 MB Cache)	Integrated Intel UHD 630

4

Removing and installing components

Recommended tools

The procedures in this document require the following tools:

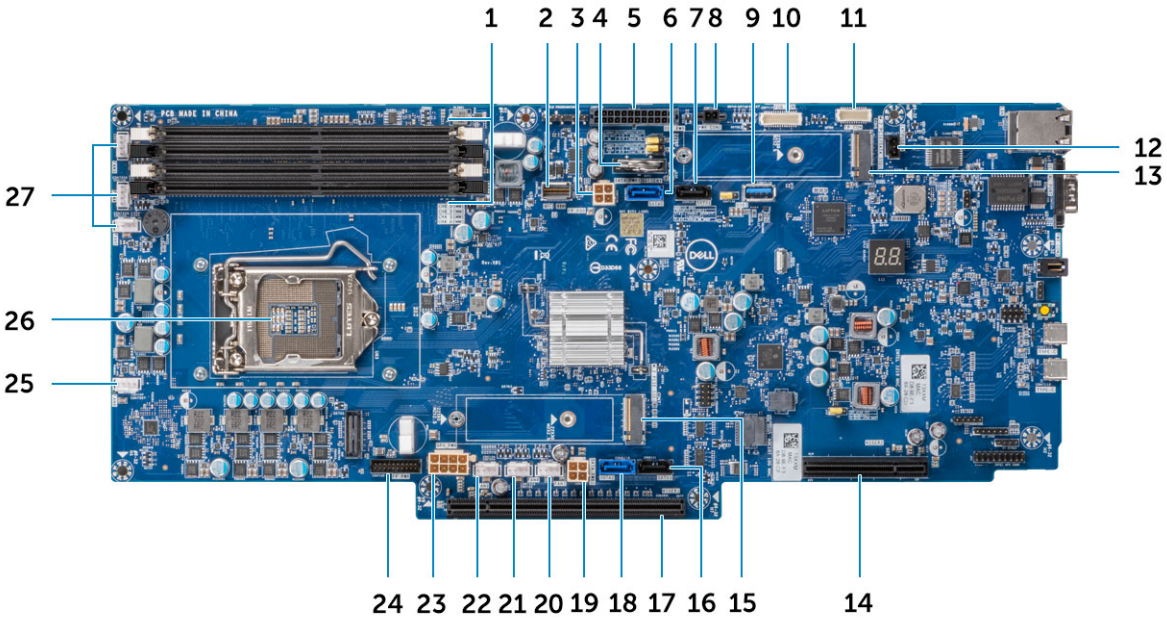
- Phillips #1 screwdriver
- Philips #2 screwdriver
- 5.5 mm Socket wrench
- Plastic scribe

Screw size list

Table 3. Screw size list

Component	#6.32x6 	M3x4 	M2x3.5 	#6.32x5 
System board	9			
Riser 1	4			
Riser 2	2			
Front IO board	3			
M.2 PCIe SSD card slot			2	
L Ear BKT		3		
R Ear BKT		3		
PDB	3			
CPU Fan Cage				2

System board layout



1. Memory Slots
2. Front panel HSD
3. Left SATA power connector
4. Coin cell battery
5. Power distribution board power connector
6. SATA 0 connector
7. SATA 1 connector
8. Power connector 1
9. USB Type-A 3.1 Gen1
10. Power distribution board connector
11. Front panel connector
12. Intrusion switch connector
13. M.2 PCIe connector (SSD0)
14. PCIe slot
15. M.2 PCIe connector (SSD1)
16. SATA 3 connector
17. PCIe slot
18. SATA 2 connector
19. Right SATA power connector 2
20. Fan 7 power connector
21. Fan 8 power connector
22. Fan 9 power connector
23. GPU power connector
24. Front panel power connector
25. Fan 6 power connector
26. Processor
27. Fan 5/4/3 power connector

Disassembly and reassembly

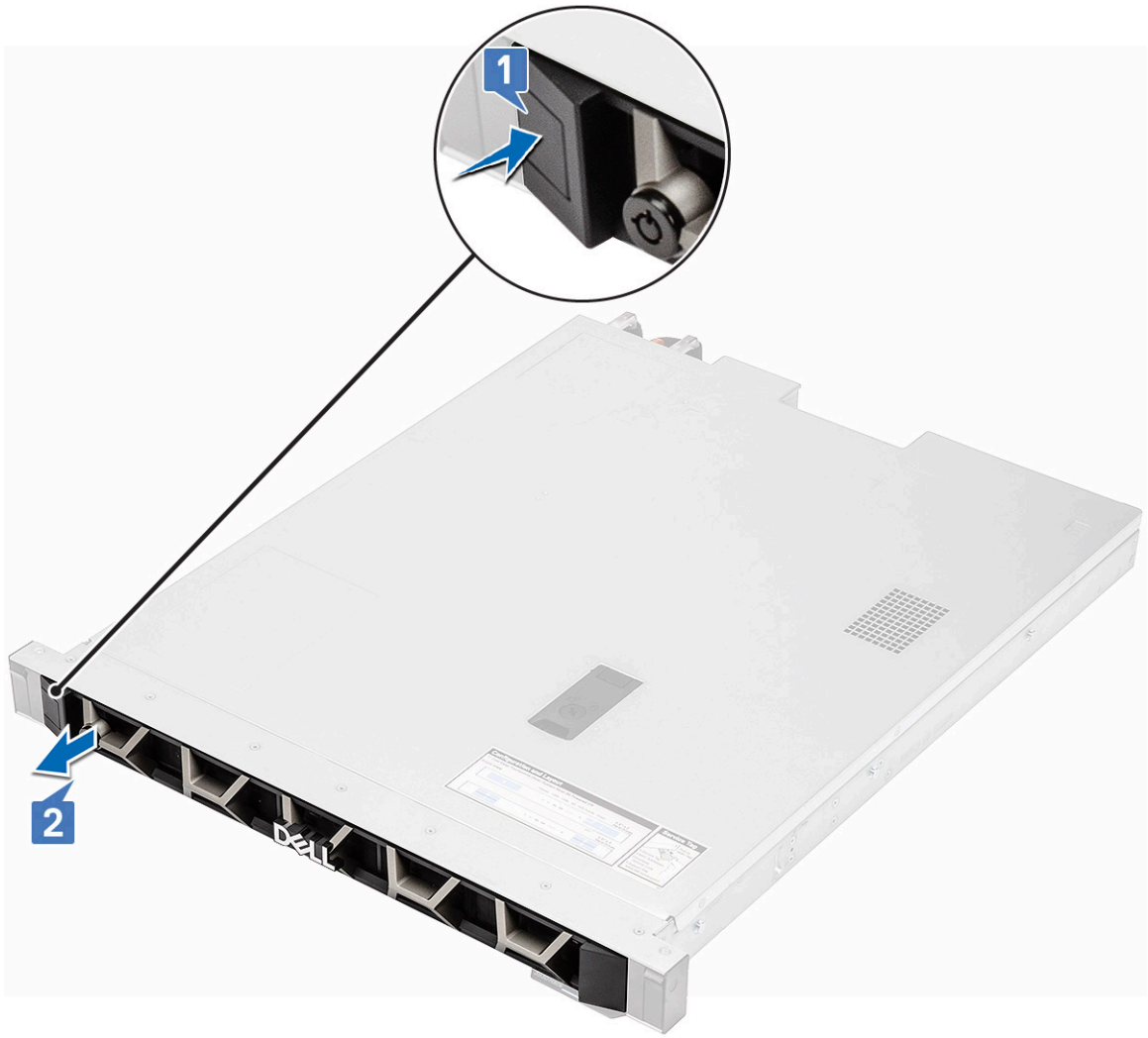
Front bezel

Removing the front bezel

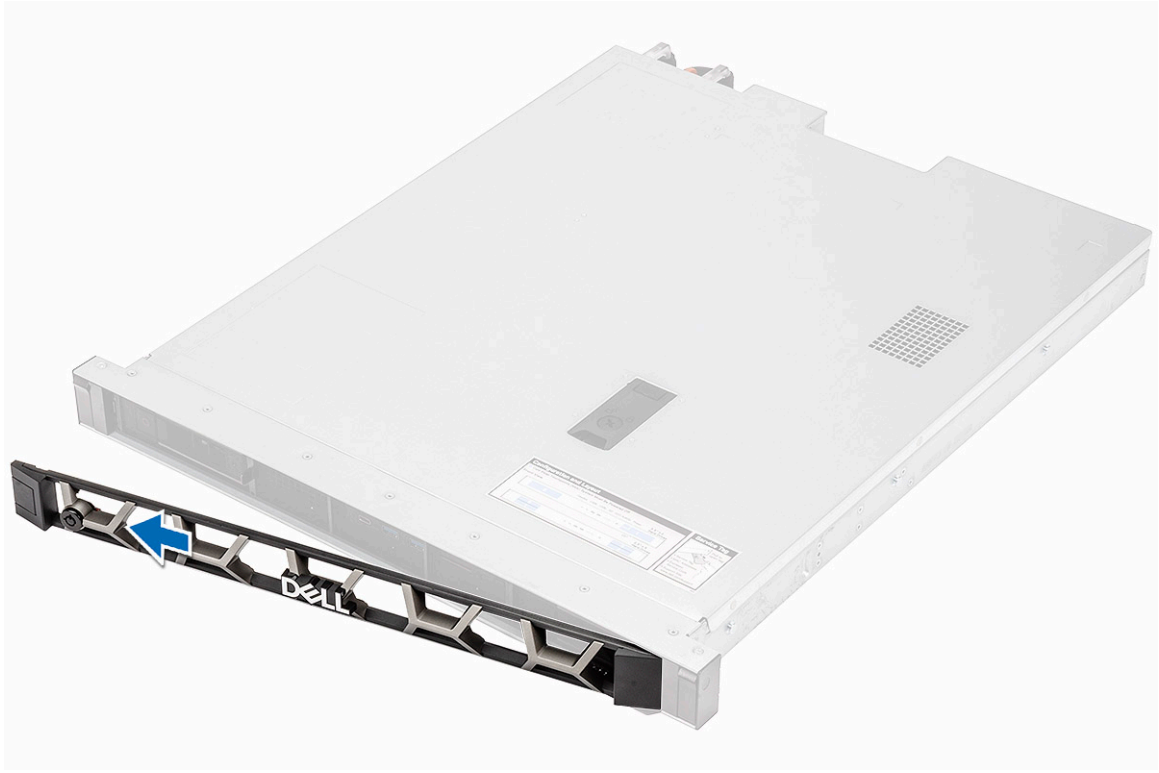
Steps

1. Follow the procedure in Before working inside your computer.
2. To unlock the front bezel
   a. Insert the bezel key [1] and turn the key in clockwise direction to unlock the bezel [2].

3. To remove the front bezel
   a. Press the release button [1], and pull the left end of the bezel [2].



b. Slide the bezel to the left and remove it from the system.

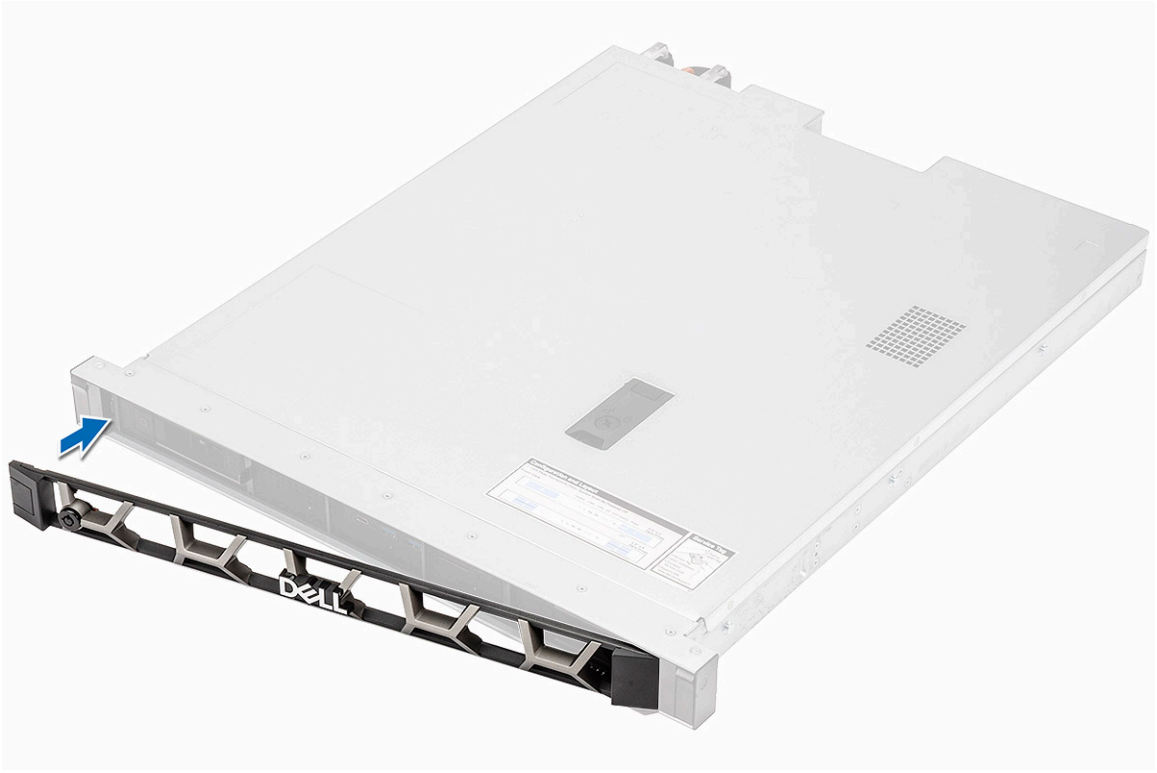


Installing the front bezel

Steps

1. Align and insert the right end of the bezel into the system.

2. Press the release button and fit the left end of the bezel onto the system.



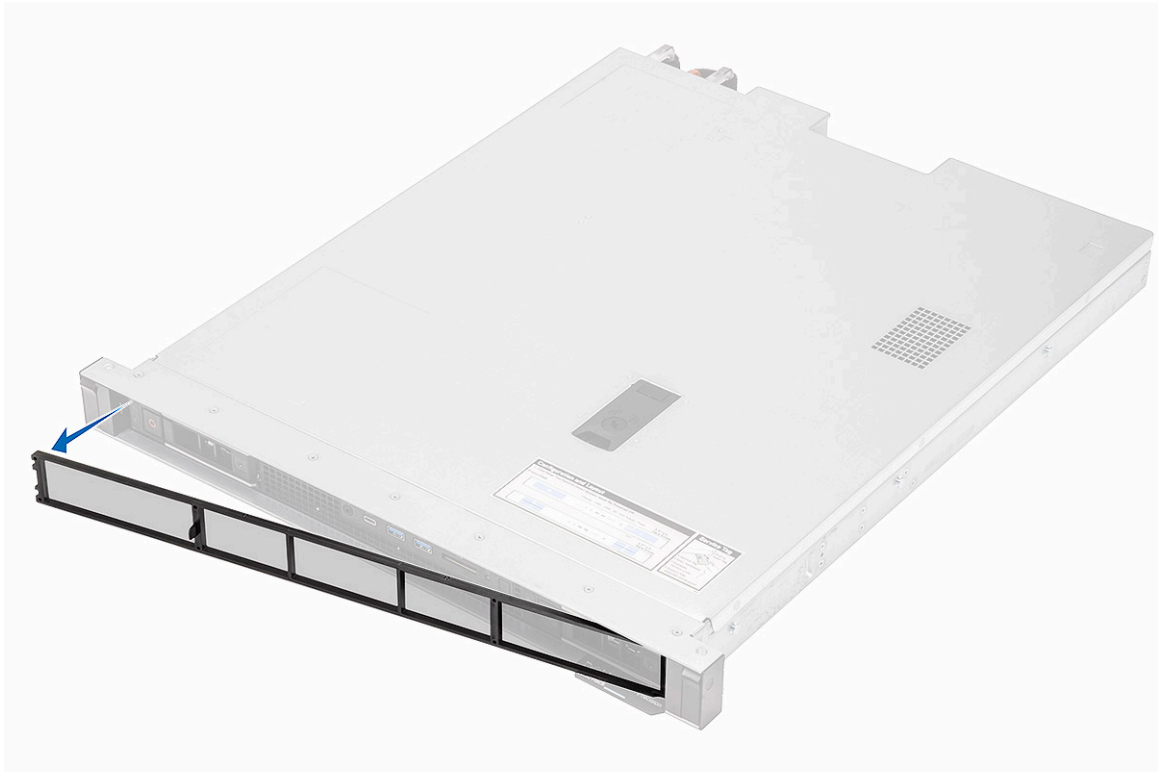
3. Lock the bezel using the key.

Dust filter

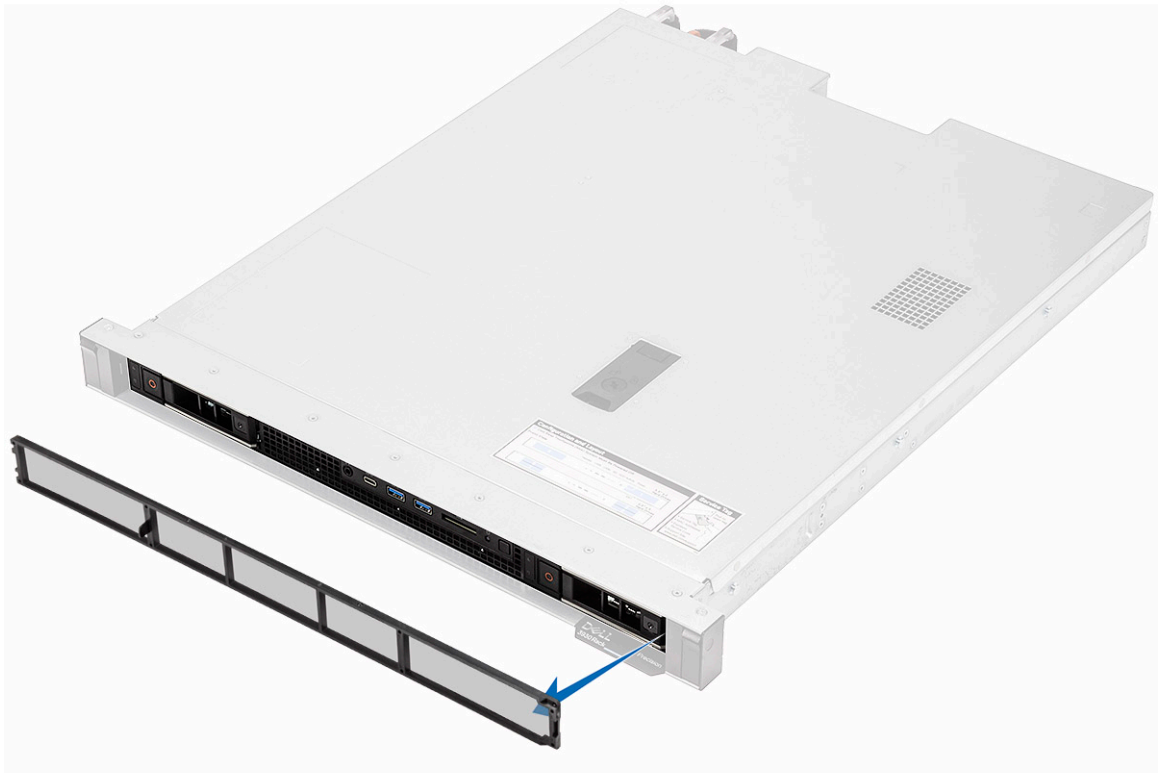
Removing the dust filter

Steps

1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a. Front bezel
3. To remove the dust filter:
   a. Pull the left end of the dust filter.



b. Unhook and slide the dust filter to the left and remove it from the system.

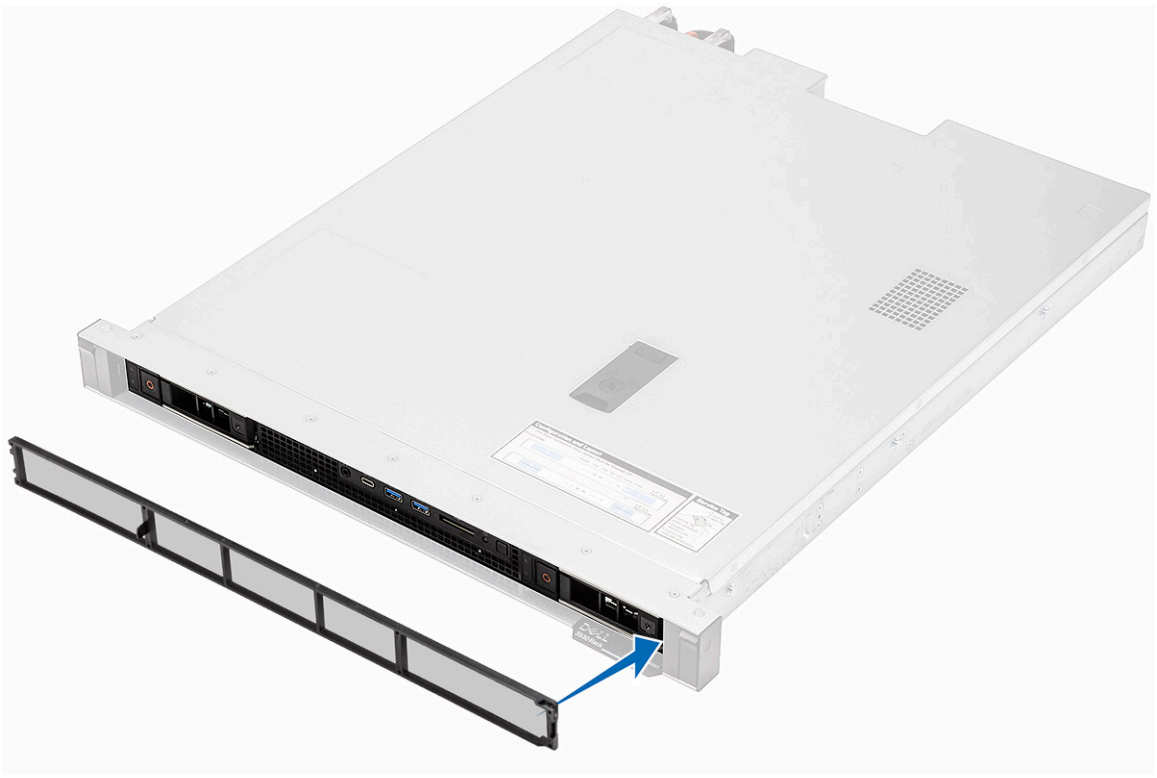


Installing the dust Filter

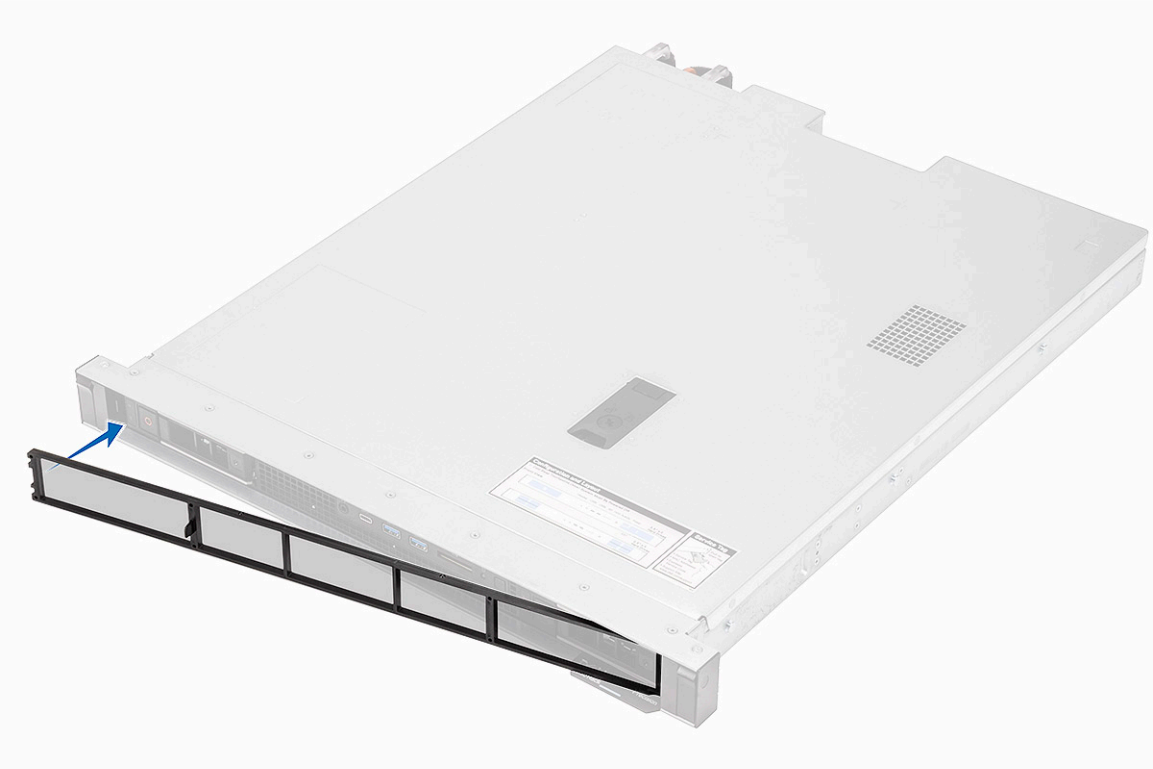
Steps

1. Align and insert the right end of the dust filter into the system.

   NOTE: These steps are for the systems purchased without Dust Filter and Front Bezel.



2. Fit the left end of the bezel onto the system.



3. Install the:
   a. Front bezel.

System cover

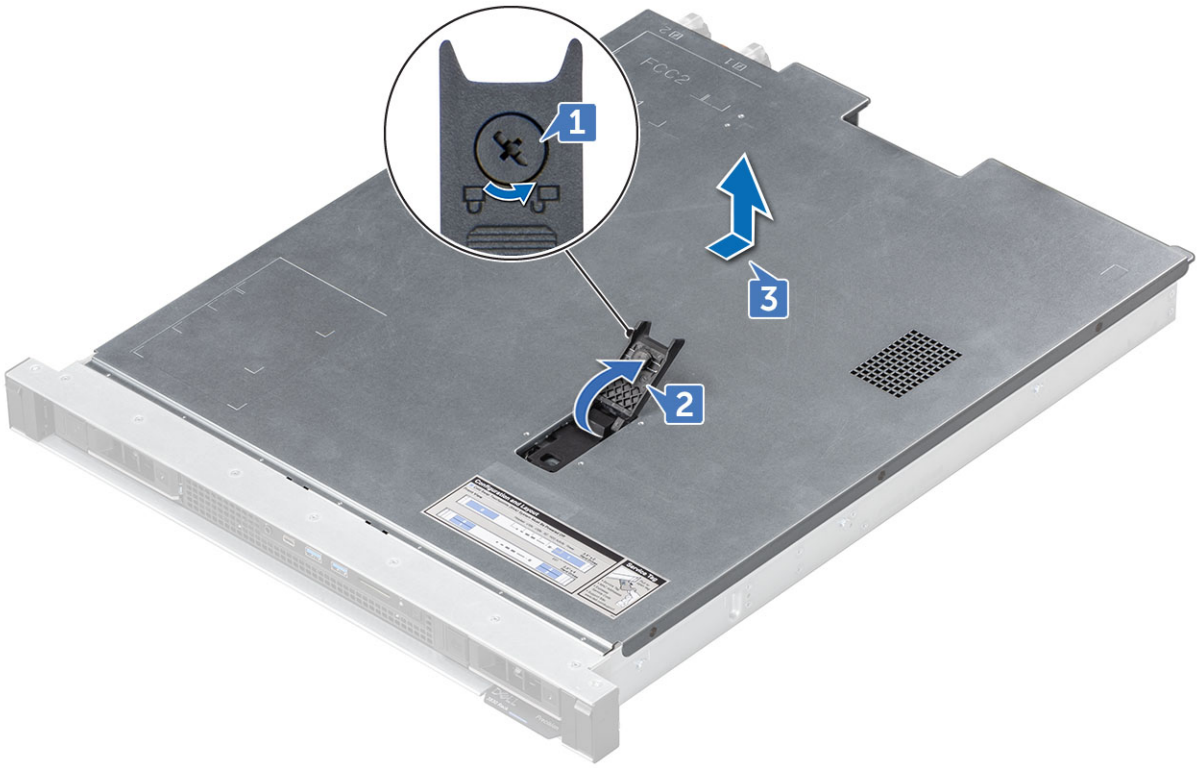
Removing the system cover

Steps

1. Follow the procedure in Before working inside your computer.

   NOTE: System will sound an alarm for 4 seconds and shut down if top cover is removed while the system is running. The system will not power on if the top cover is removed.

2. To remove the cover:
   a. Rotate lock on latch with a Phillips screwdriver to release the lock [1].
   b. Pull the latch to release the top cover [2].
   c. Lift the top cover away [3].



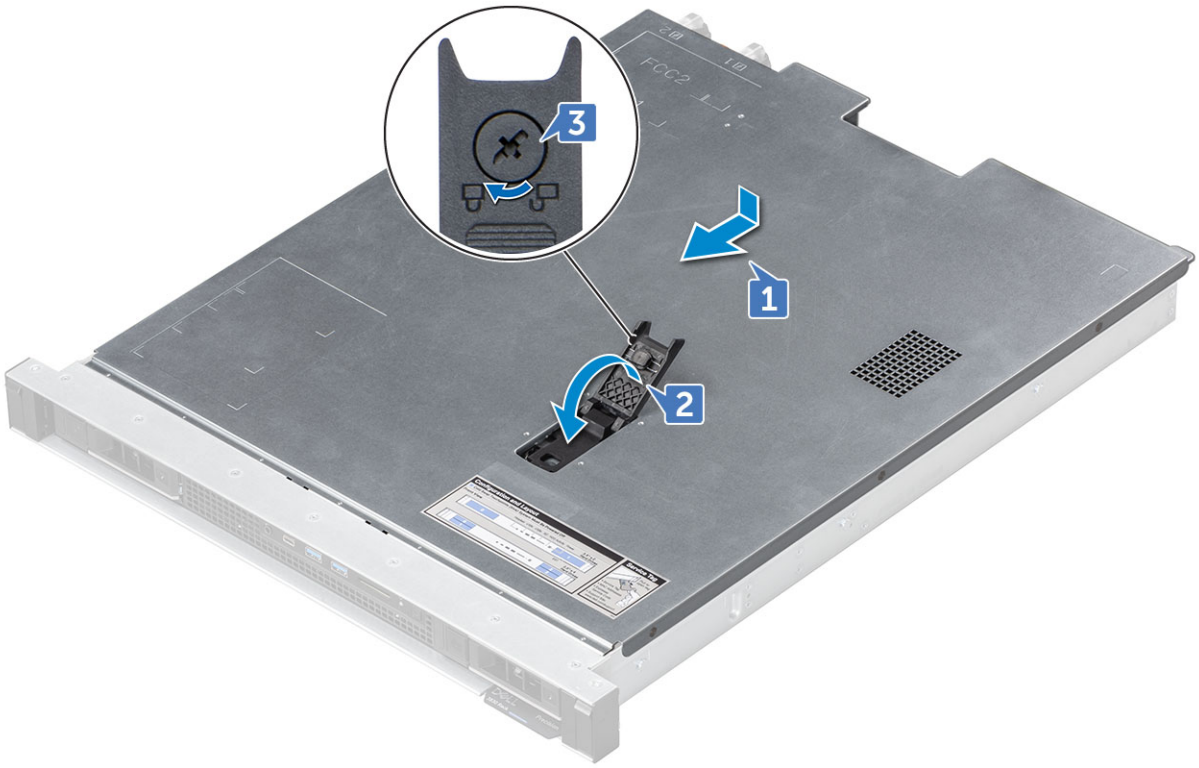
Installing the system cover

Steps

1. Lift the release latch and align the top cover tabs with the slots on the system chassis [1] and slide it into the slot.

   NOTE: Ensure that all internal cables are routed correctly and connected before securing the top cover.

2. The release latch automatically locks the top cover to the system.



3. Using a Philips screwdriver, rotate the latch release lock clockwise to the locked position [3].
4. Follow the procedure in After working inside your computer.

Ear assembly

Removing the left ear assembly

Steps

1. Follow the procedure in Before working inside your computer.
2. To remove the left ear assembly
   a. Remove three (M3x4) that secure the left ear assembly [1].
   b. Slide out the left ear assembly [2].

Installing left ear assembly

Steps

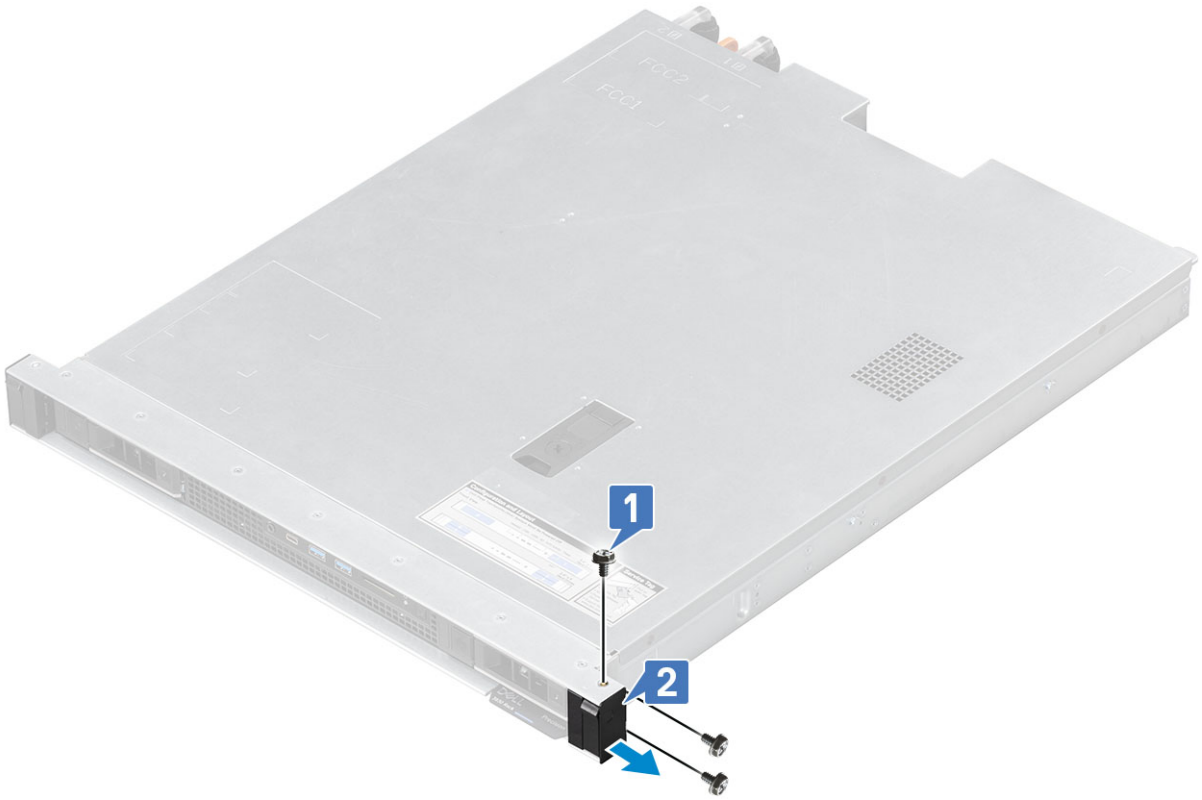
1. To install the left ear assembly
   a. Slide the ear module into the slot [1].
   b. Fasten the three (M3x4) screws to secure the ear module to the system chassis [2].

2. Follow the procedure in After working inside your computer.

Removing the right ear assembly

Steps

1. Follow the procedure in Before working inside your computer.
2. To remove the right ear assembly
   a. Remove three (M3x4) that secure the right ear assembly [1].
   b. Slide out the right ear assembly [2].



Installing right ear assembly

Steps

1. To install the right ear assembly
   a. Slide the ear module into the slot [1].
   b. Fasten the three (M3x4) screws to secure the ear module to the system chassis [2].

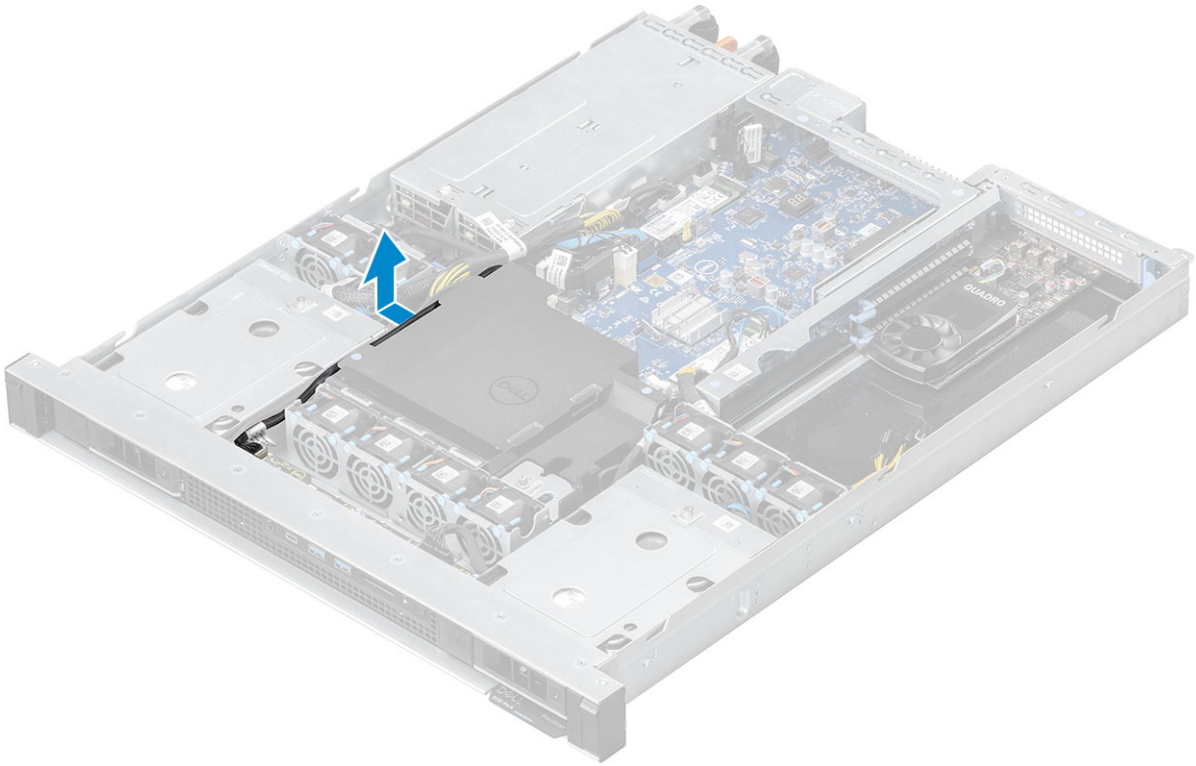
2. Follow the procedure in After working inside your computer.

Air duct

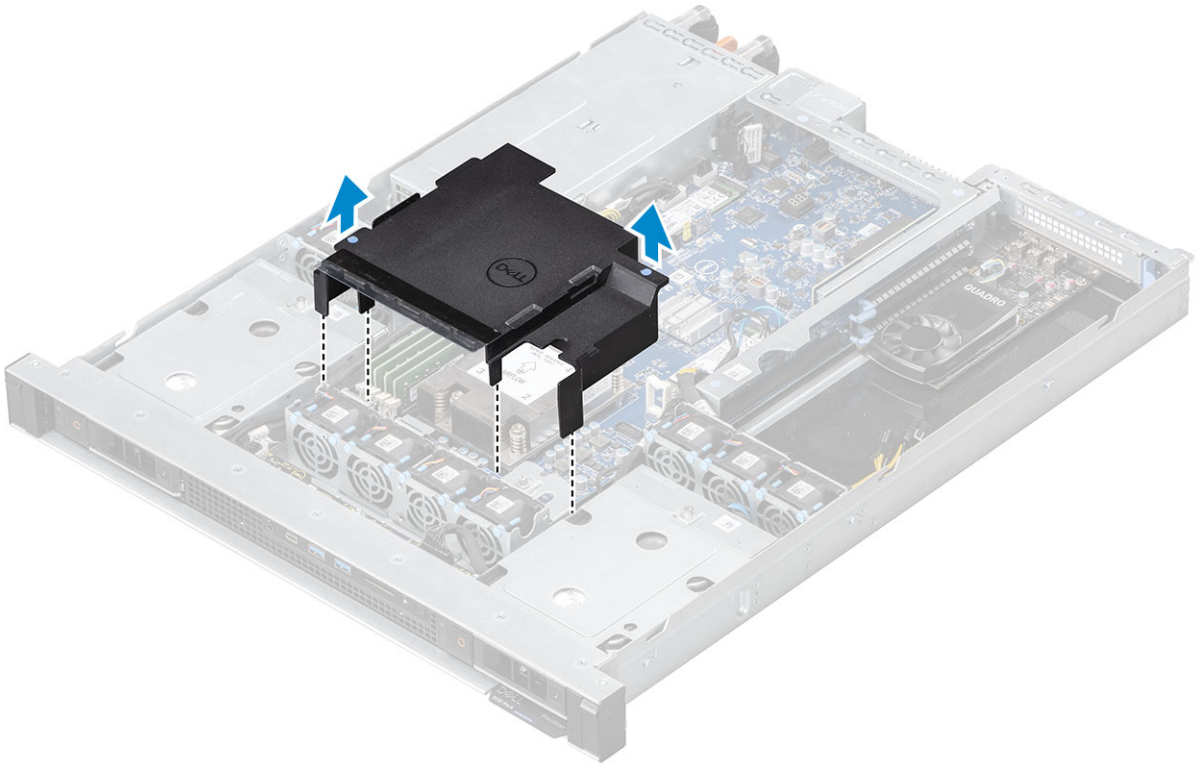
Removing the air duct

Steps

1. Follow the procedure in Before working inside your computer.
2. Remove the top cover.
3. To remove the air duct:
   a. Unroute the front panel cable.



4. Lift the air duct away from the heat sink.

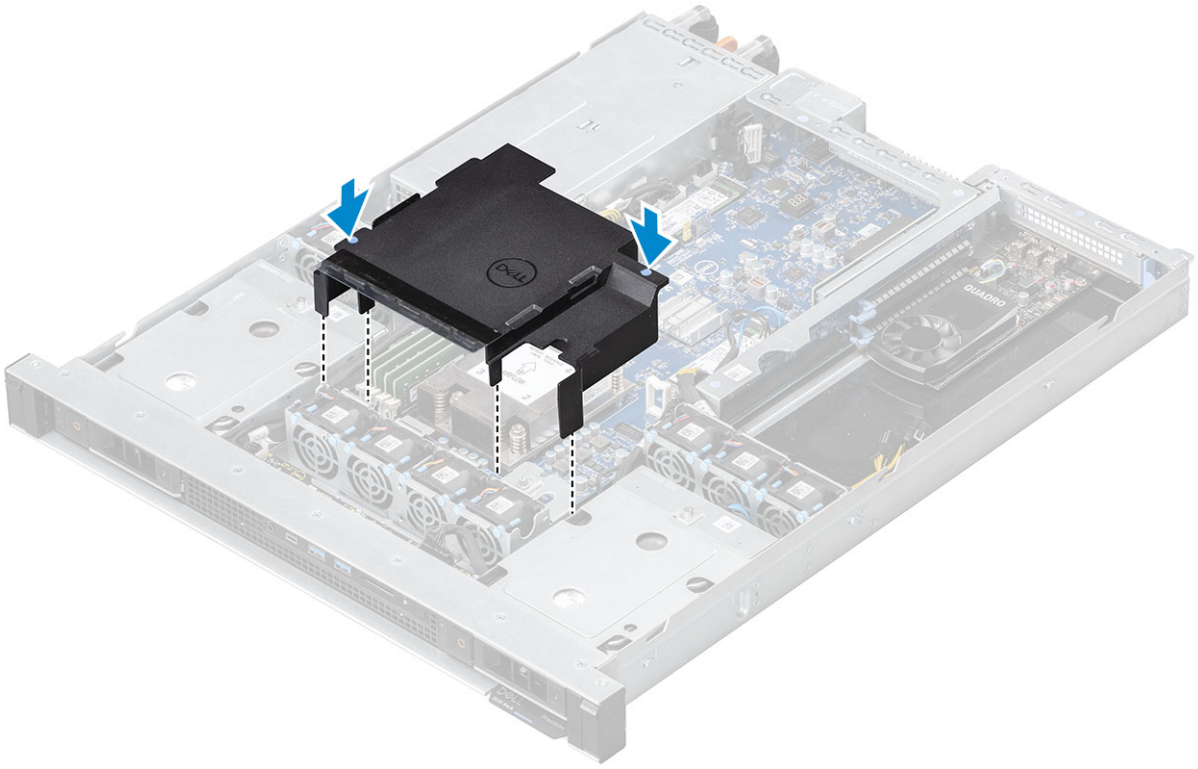


Installing the air duct

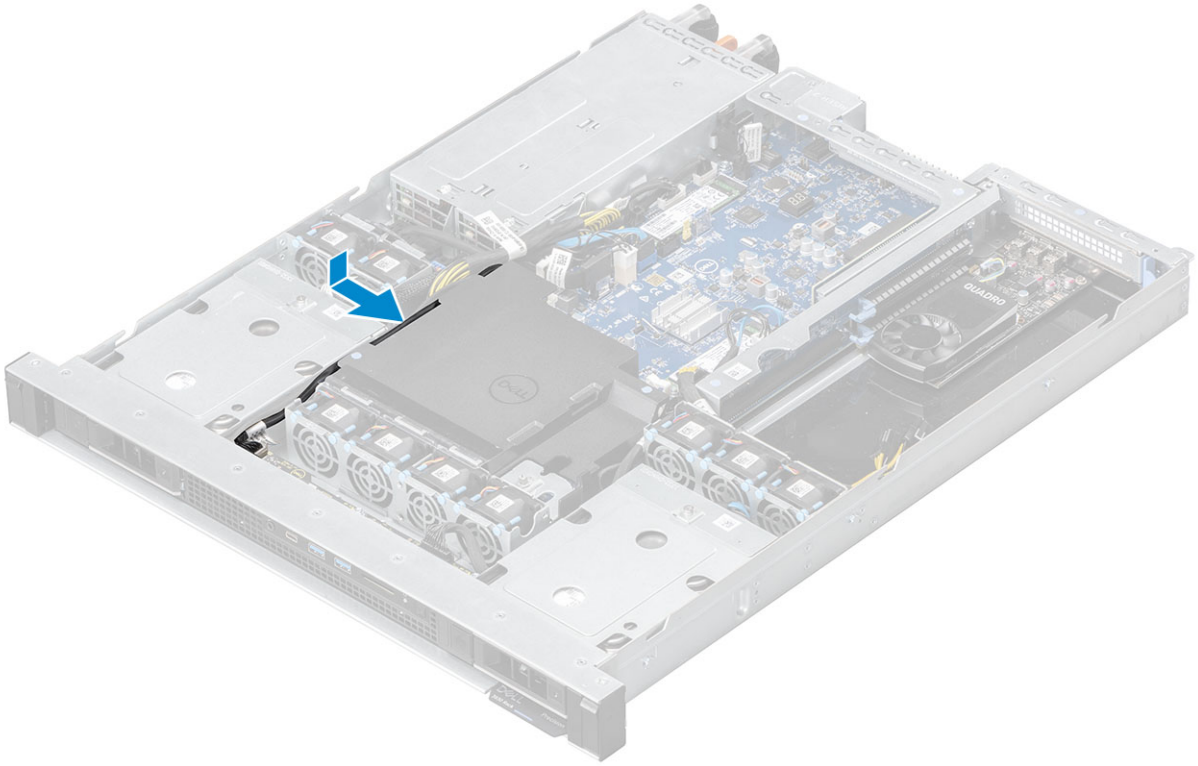
Steps

1. Align the air duct over the heat sink holding the blue point and seat it in the slot.

NOTE: Ensure that no cable has been trapped under the air duct on both sides during installation. Damage to the cables could occur.



2. Route the front panel cable through the cable routing on the air duct.



3. Install the Top cover.
4. Follow the procedure in After working inside your computer.

Coin cell battery

Removing coin cell battery

Steps

1. Follow the procedure in Before working inside your computer.
2. Remove the Top cover.
3. To remove the coin cell battery:
   a. Using a plastic scribe press the release latch [1].
   b. Remove the coin cell battery from the system [2].

Installing the coin cell battery

Steps

1. Place the coin cell battery in its slot on the system board [1].
2. Press the battery into the connector until it locks into place [2].

3. Install the Top cover.
4. Follow the procedure in After working inside your computer.

Hard drive assembly

Removing the hard drive assembly

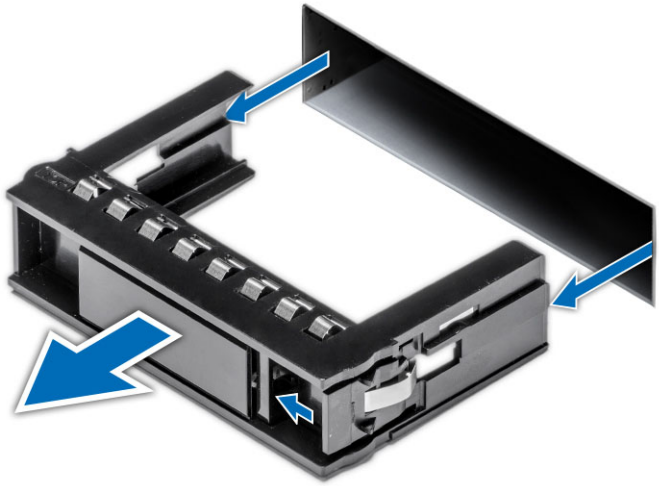
About this task

NOTE: The front accessible hard drive assemblies are not hot pluggable. If the hard drive assembly is removed when the system is powered up data loss and system failure can occur.

NOTE: The hard drive assembly is applicable for both 2.5 and 3.5 inch hard drives. Only one type of hard drive can be installed in a system. The 2.5 and 3.5 inch hard drives are not interchangeable.

Steps

1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a. Front bezel
   b. Dust filter
3. To remove the hard drive blank if replacing with a new hard drive.
   a. Press the release tabs on the sides of the blank and slide the hard drive blank out of the hard drive slot.



4. To remove the hard drive assembly:
   a. Push the release button on the hard drive assembly bracket [1] to open the release latch [2].
   b. Pull the hard drive assembly away from the system [3].

5. To remove the hard drive from the assembly bracket:
   a. Using Philips screwdriver, remove the screws from the slide rails on the hard drive bracket [1].
   b. Lift the hard drive out of the hard drive bracket [2].

Installing the hard drive assembly

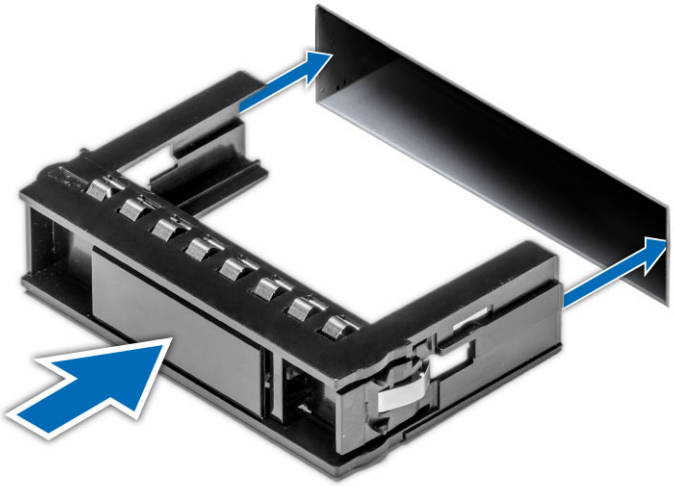
Steps

1. To install the hard drive in the assembly bracket:
   a. Align the hard drive within the drive bracket [1].
   b. Secure the hard drive to the drive bracket with the screws [2].

2. To install the hard drive:
   a. Insert the hard drive assembly into the hard drive slot [1].
   b. Push the release latch back into closed position to secure the hard drive in the slot [2].

NOTE: Ensure that the release latch [2], is open while inserting the hard drive back into the slot.

3. To Install the hard drive blank if slot is not occupied by a hard drive:
   a. Insert the hard drive blank into the hard drive slot and slide it in.



4. Install the:
   a. Dust filter
   b. Front bezel
5. Follow the procedure in After working inside your computer.

NOTE: All hard drive slots should be populated with either a hard drive assembly or hard drive blank to ensure proper system cooling and air flow.

Hard drive backplane

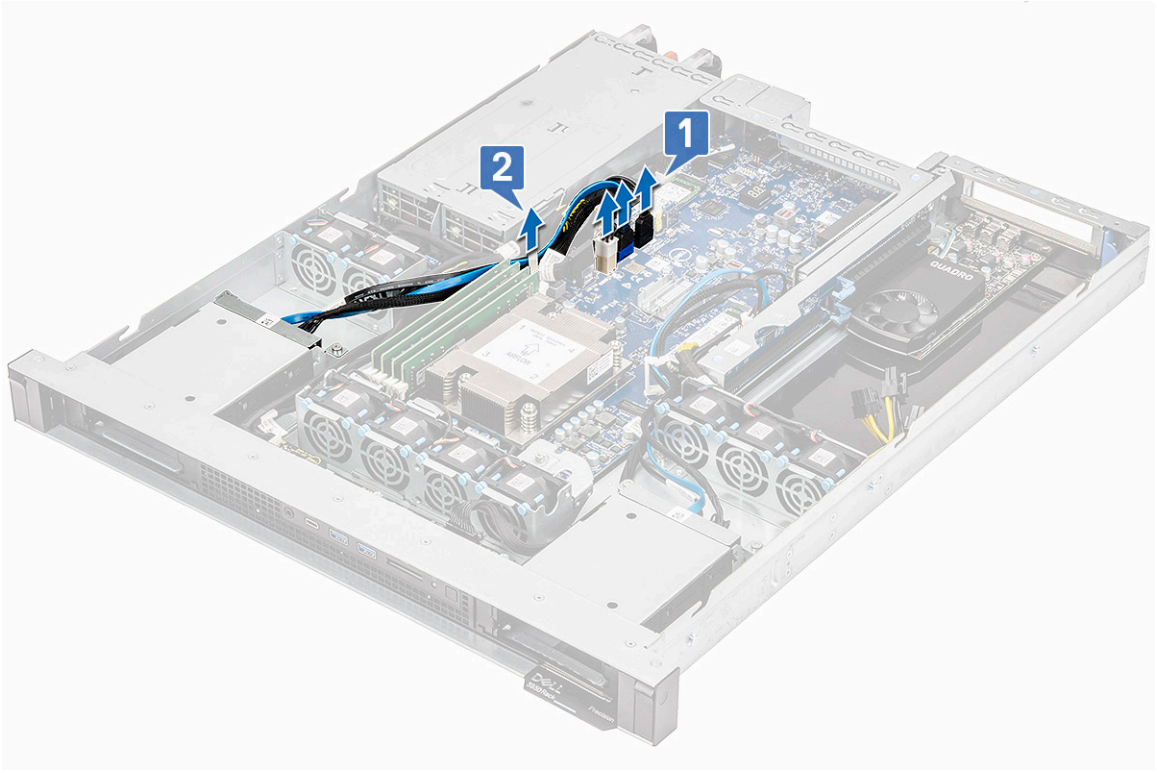
3.5 inch hard drive backplane

2.5 inch hard drive backplane

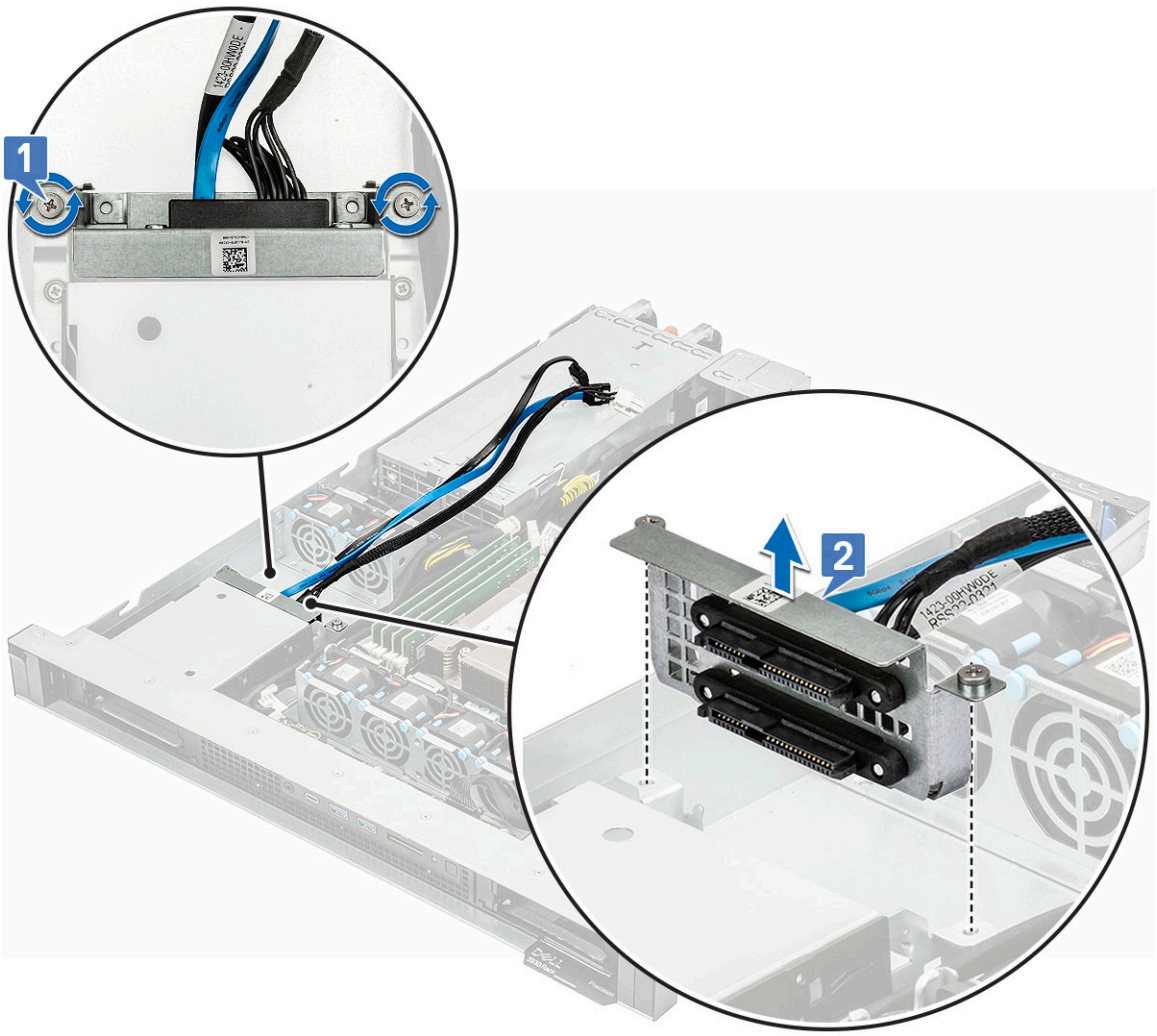
Removing left hard drive backplane

Steps

1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a. Front bezel
   b. Dust filter
   c. Top cover
   d. Air duct
   e. Hard drives
3. To remove the left hard drive backplane:
   a. Disconnect the SATA 0 connector cable, the SATA 1 connector cable, and the SATA power cable [1].
   b. Unroute the cables from the cable retention clips provided [2].



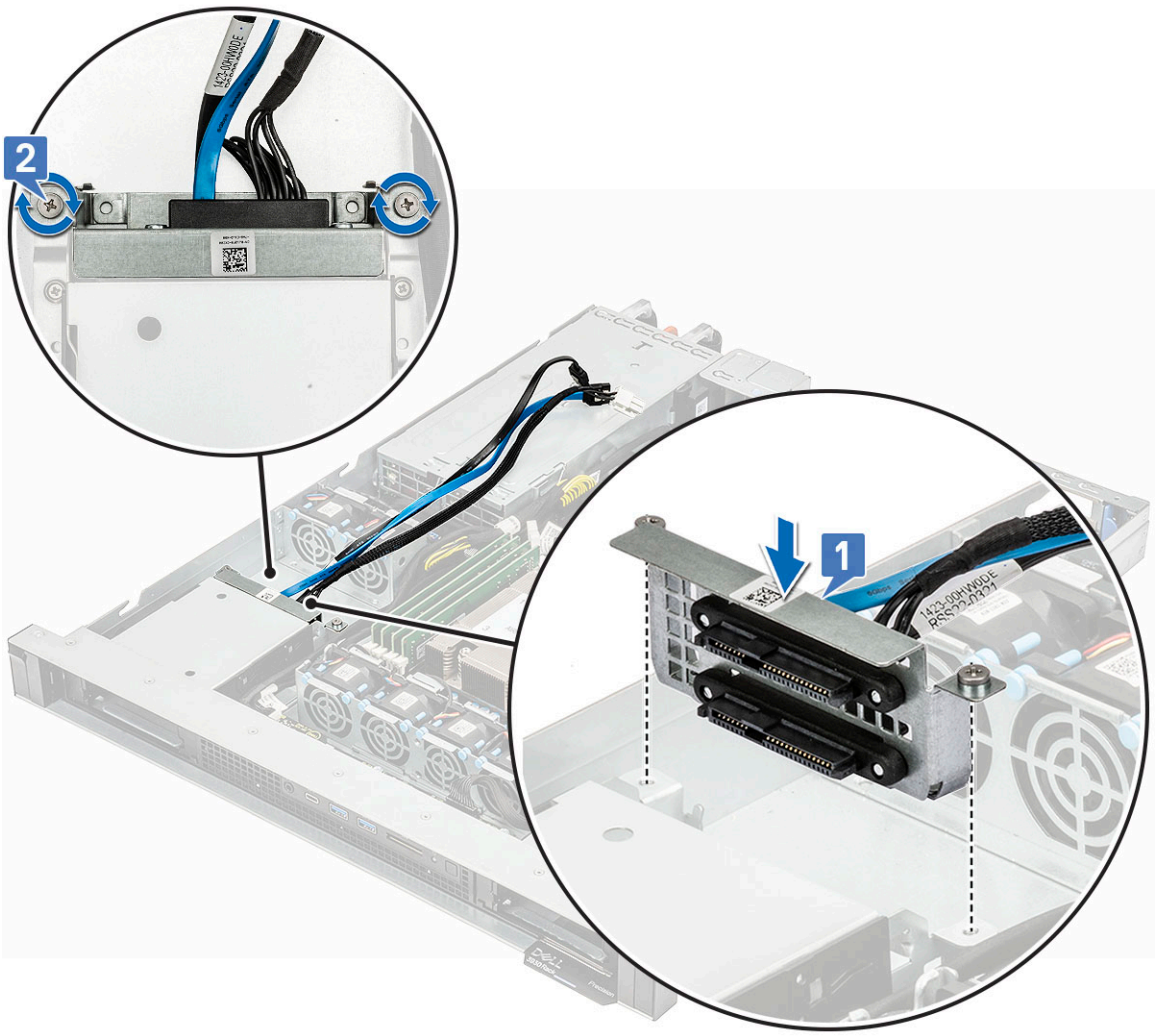
a. Loosen the two captive screws [1], lift the HDD backplane away from the system chassis [2].



Installing the 2.5-inch hard drive backplane

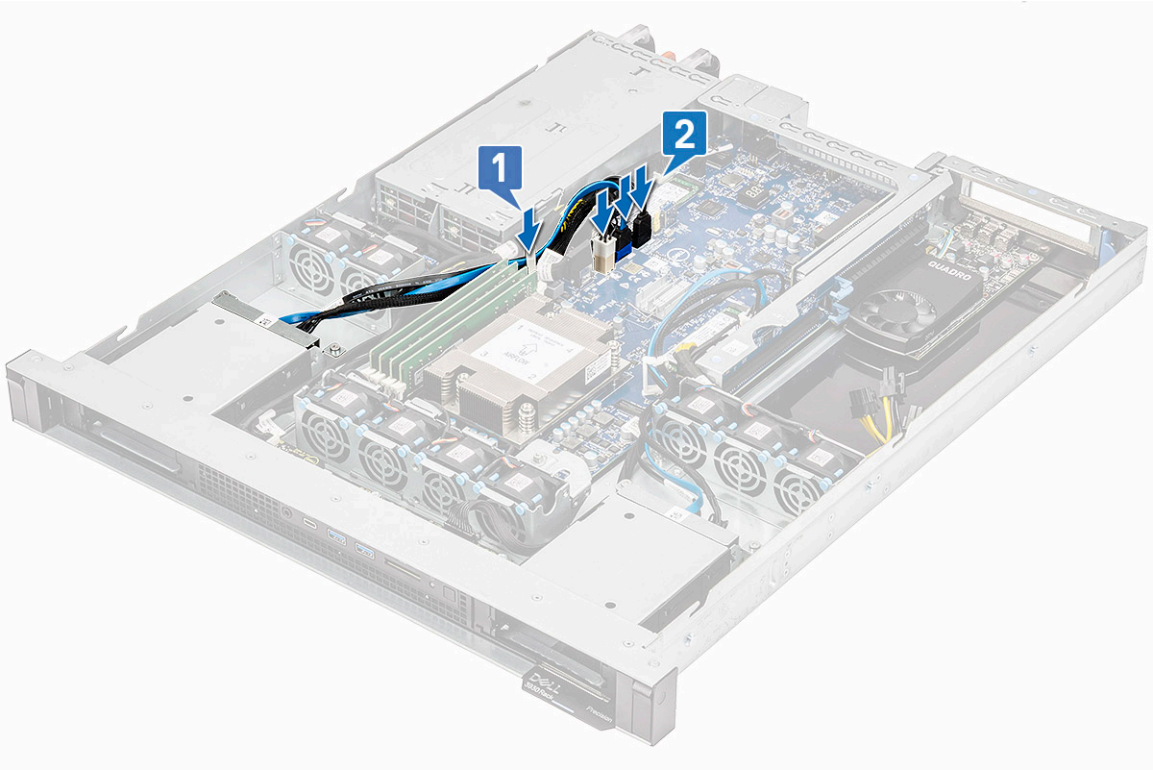
Steps

1. Align and place the hard drive backplane in the slot provided on the hard drive cage [1].
2. Fasten the captive screws to secure the backplane to the hard drive cage [2].



3. Reroute the SATA power cable and the SATA connector cables through the cable retention clip [1].
4. Connect the SATA power cable, the SATA 0 connector cable, and SATA 1 connector cable [2].

NOTE: The blue SATA signal cable plugs into the blue connector on the system board. The black SATA signal cable plugs into the black connector on the system board.



5. Install the:
   a. Hard drives
   b. Air duct
   c. Top cover
   d. Dust filter
   e. Front bezel
6. Follow the procedure in After working inside your computer.

Memory module

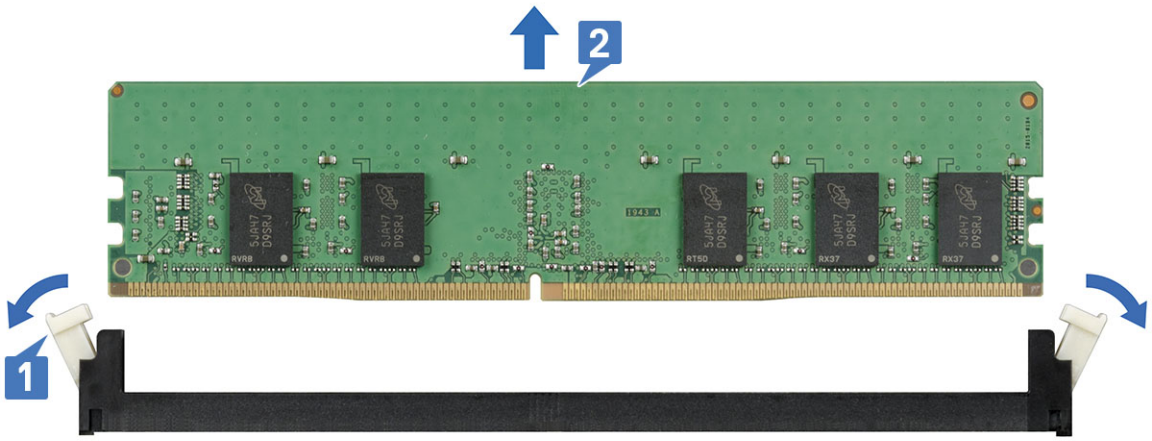
Removing memory module

Steps

1. Follow the procedure in Before working inside your computer.

   NOTE: Allow the memory modules to cool after you power down the system. Handle the memory module by the card edges and avoid touching the components or metallic contacts on the memory module.

2. Remove the:
   a. Top cover
   b. Air duct
3. To remove the memory module:
   a. Press open the retention tabs from both sides to lift the memory module from the connector [1].
   b. Remove the memory module from the system board [2].



Installing the memory module

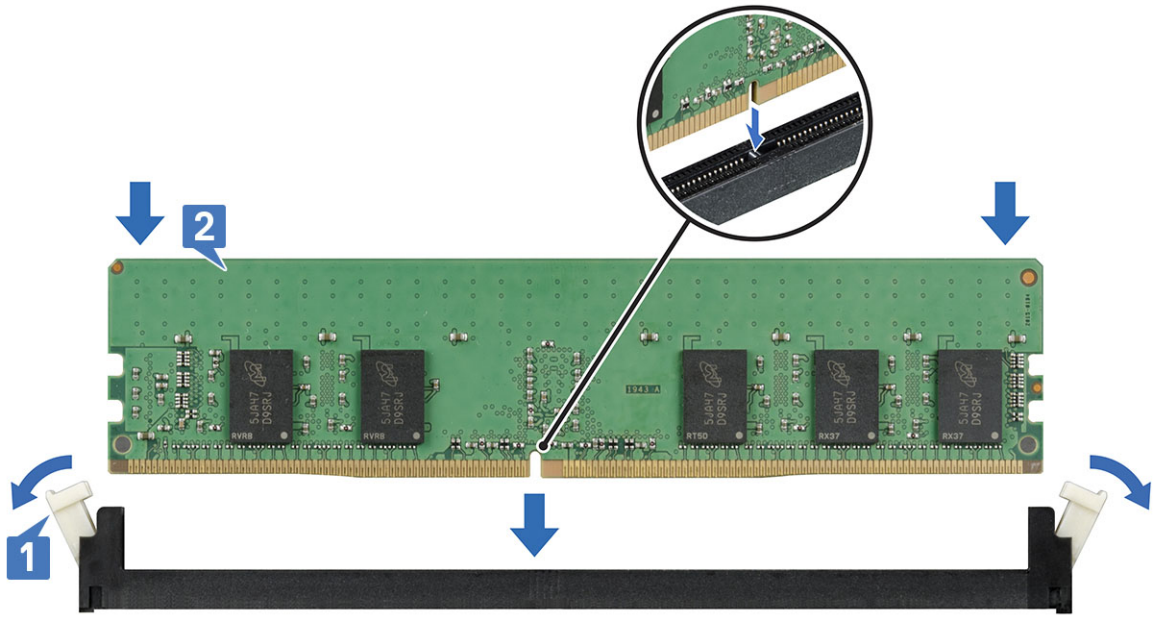
Steps

1. Locate the appropriate memory module connector.
2. Align the edge connector of the memory module with the alignment key of the memory module connector, and insert the memory module in the connector [1].

   NOTE: Do not apply pressure at the center of the memory module, apply pressure at both ends of the memory module evenly.

   NOTE: The memory module connector has an alignment key that enables you to install the memory module in the connector in only one orientation.

3. Press the memory module with your thumbs until the retention tabs firmly click into place [2].
4. Repeat step 1 through step 4 of this procedure to install the remaining memory modules.



5. Install the:
   a. Top cover

b. Air duct

6. Follow the procedure in After working inside your computer.

Heat sink

Removing heat sink

Steps

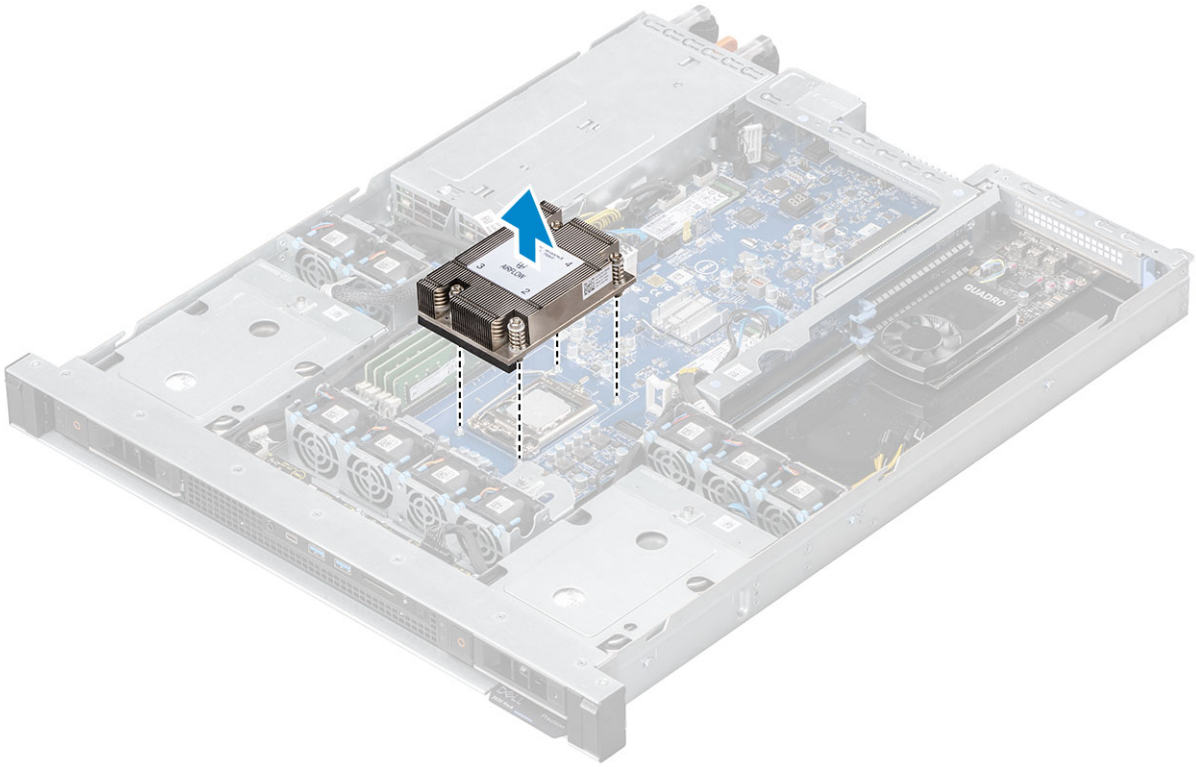
1. Follow the procedure in Before working inside your computer.

   WARNING: Allow the heat sink to cool after you power down the system.

2. Remove the:
   a. Top cover
   b. Air duct
3. To remove the heat sink:
   a. Loosen the 4 captive screws that secure the heat sink and lift it away from the system.

   NOTE: Ensure that the screw is completely loosened before moving on to the next screw.

   NOTE: Loosen the screws in a sequential order (1,2,3,4) as shown on the heat sink label.



Installing heat sink

Steps

1. To install the heat sink:

   NOTE: If using an existing heat sink, remove the thermal grease from the heat sink by using a clean lint-free cloth.

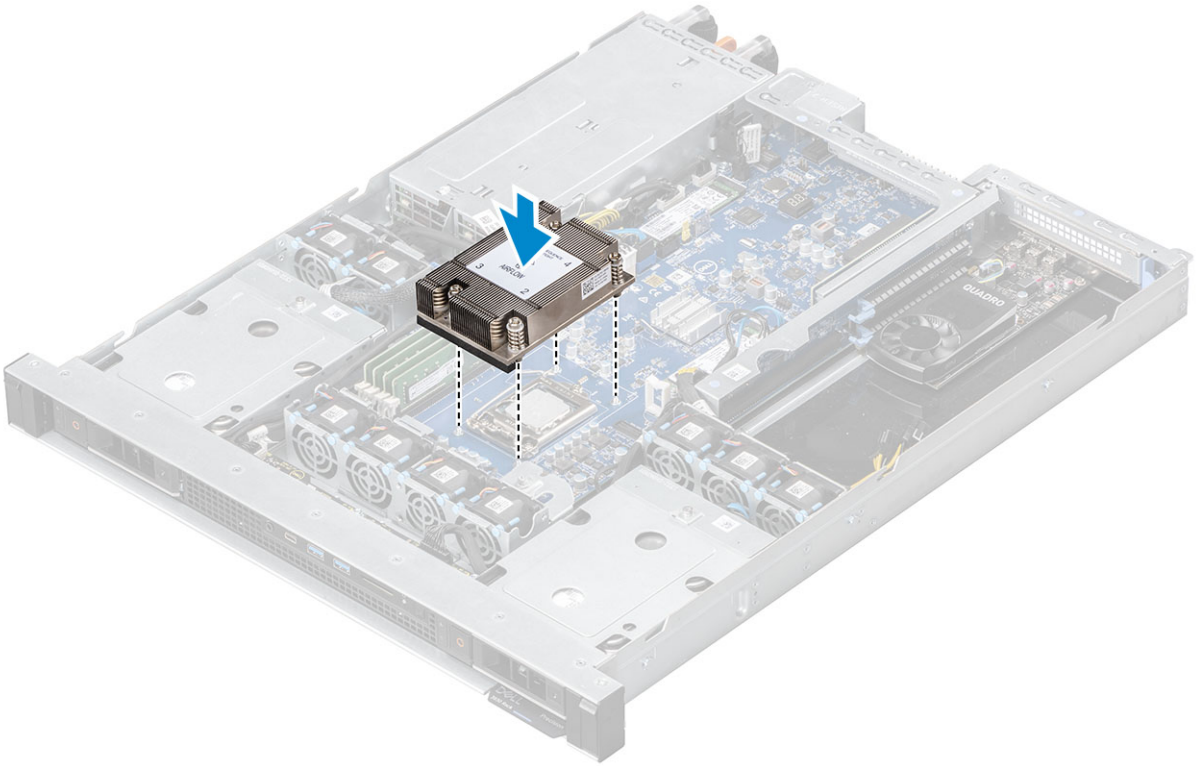
   CAUTION: Ensure the airflow indicator on the heat sink label is in the correct direction.

a. Align the heat sink onto the processor.
b. Tighten the 4 captive screws to secure the heat sink assembly to the system board.

NOTE: Tighten the screws in a sequential order (1,2,3,4) as shown on the heat sink label.

CAUTION: Ensure that the heat sink is held parallel to the system board to prevent damaging the components.

NOTE: Ensure that the screw is tightened completely before moving on to the next screw.



2. Install the:
   a. Air duct
   b. Top cover
3. Follow the procedure in After working inside your computer.

Processor

Removing processor

Steps

1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a. Top cover
   b. Air duct
   c. Heat sink
3. To remove the processor:
   a. Release the socket lever by pushing the lever down and out from under the tab on the processor shield [1].
   b. Lift the lever upward, and lift the processor shield [2].
   c. Lift the processor out of the socket [3].

d. Remove the thermal grease from the processor using a clean lint free cloth.

Installing the processor

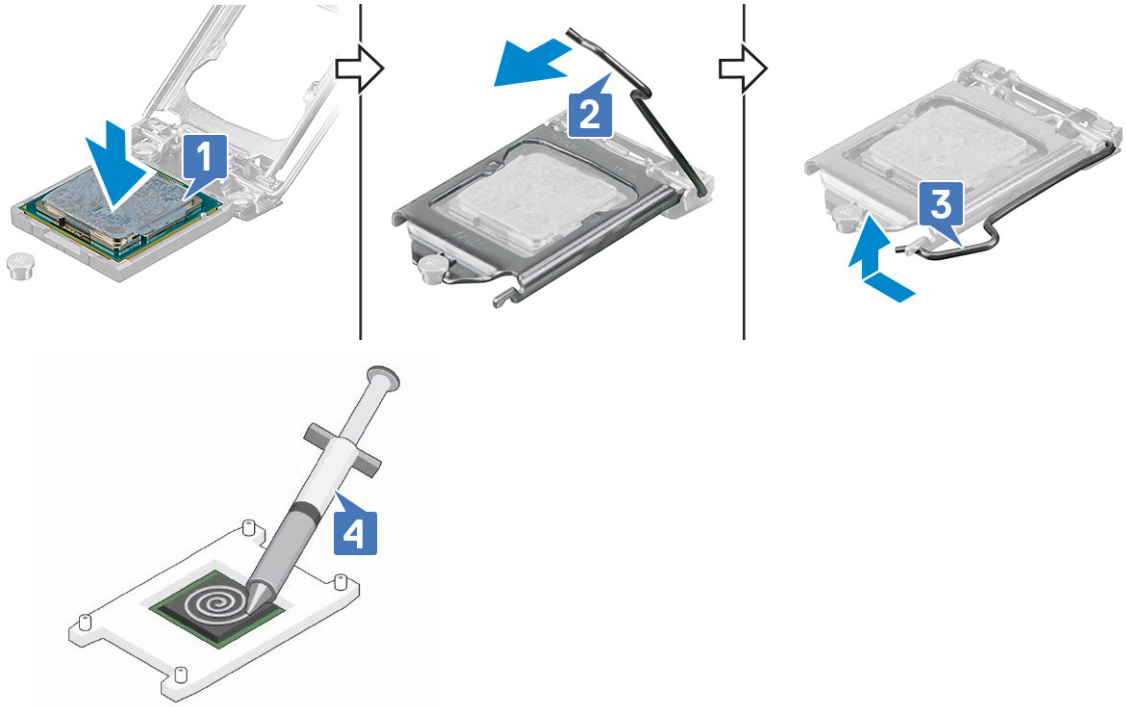
About this task

NOTE: Ensure pin-1 indicator of the processor is aligned with the pin-1 indicator on the system board.

Steps

1. Place the processor on the socket such that the slots on the processor align with the socket keys [1].
2. Close the processor shield by sliding it under the retention screw [2].
3. Lower the socket lever and push it under the tab to lock it [3].
4. Use the thermal grease syringe included with the processor kit. Apply the grease in a spiral design on top of the processor [4].

   CAUTION: Applying too much thermal grease can result in excessive grease coming in contact with and contaminating the processor socket.



NOTE: The thermal-grease is intended for one-time use only. Dispose of the syringe after you use it.

5. Install the:
   a. Heat sink

b. Air duct
c. Top cover

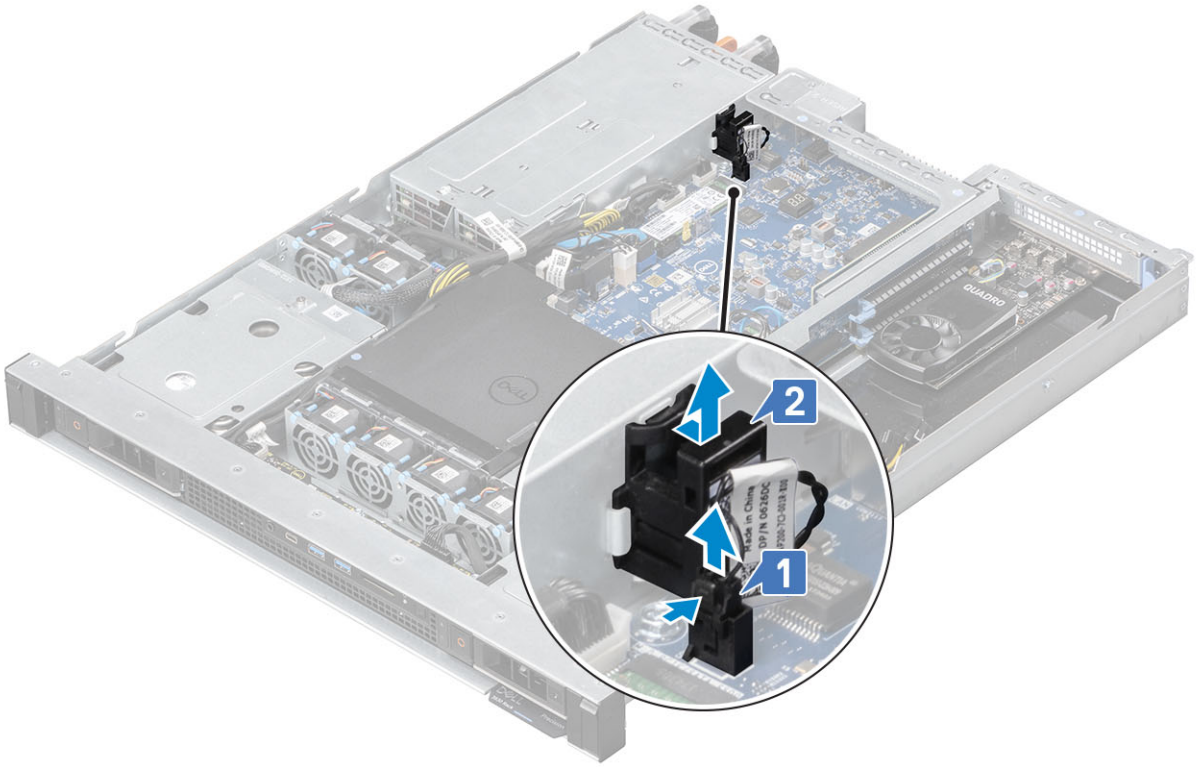
6. Follow the procedure in After working inside your computer.

Intrusion switch

Removing intrusion switch

Steps

1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a. Top cover
3. To remove the intrusion switch:
   a. Disconnect the intrusion switch cable from the connector on the system board [1].
   b. Pull the intrusion switch release tab, and lift it away from the system [2].



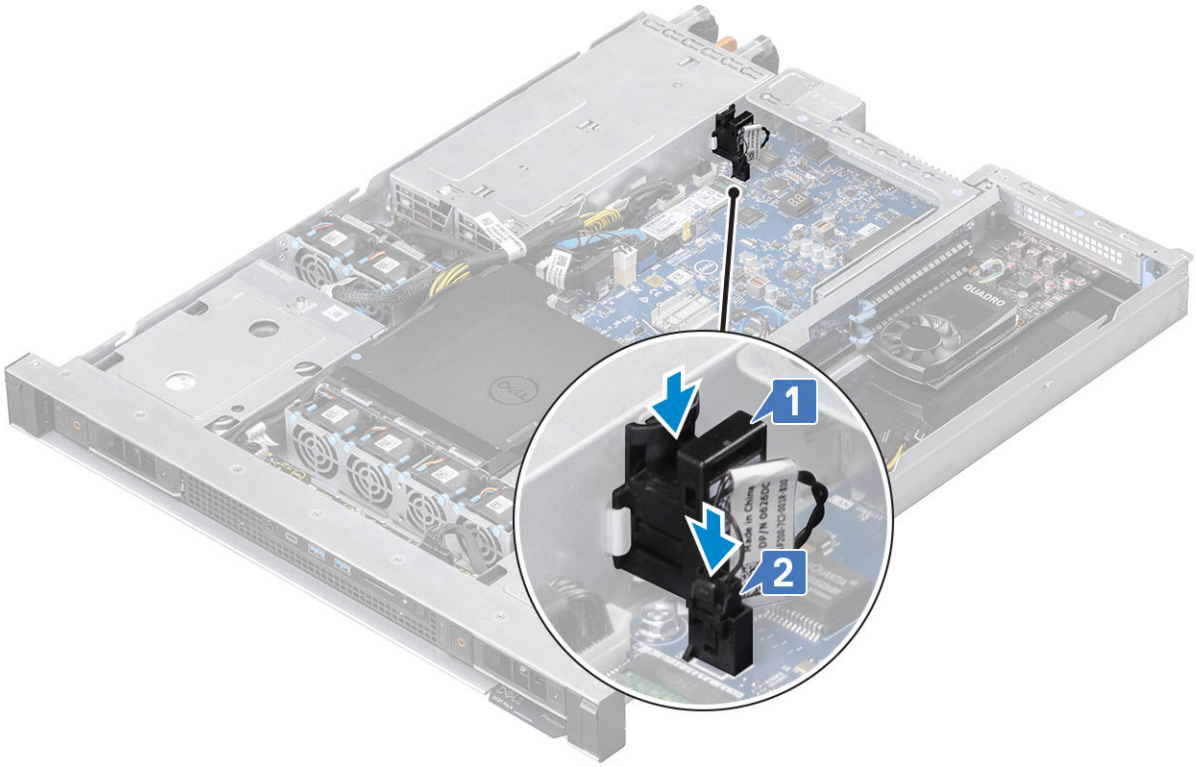
Installing the intrusion switch

About this task

NOTE: Ensure the intrusion switch is completely seated and latched in place.

Steps

1. Insert the intrusion switch into the slot on the chassis [1].
2. Connect the intrusion switch cable to the system board [2].



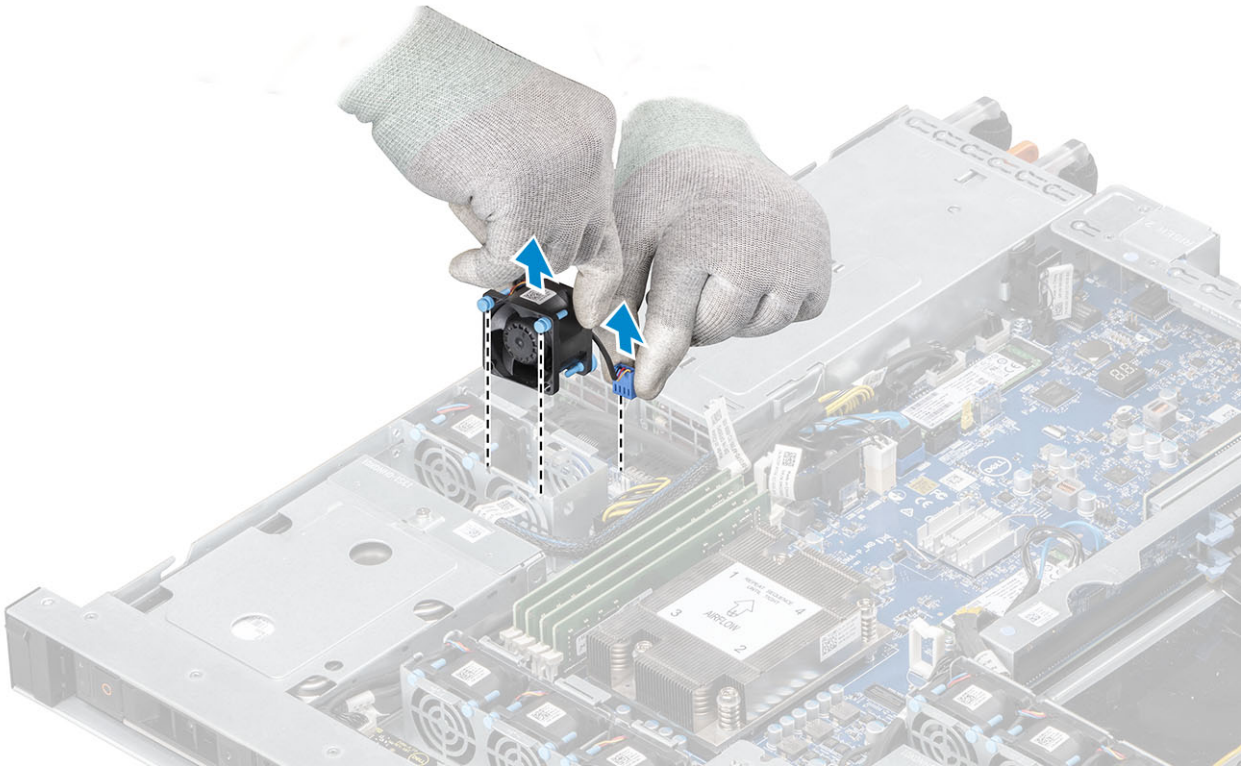
3. Install the:
   a. Top cover
4. Follow the procedure in After working inside your computer.

System fan

Removing the system fan

Steps

1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a. Top cover
   b. Air duct (if required)
3. To remove the system fan:
   a. Disconnect the system fan cable from the system board.
   b. Lift the blue release pins on the system fan.
   c. Lift the fan away from the fan cage.

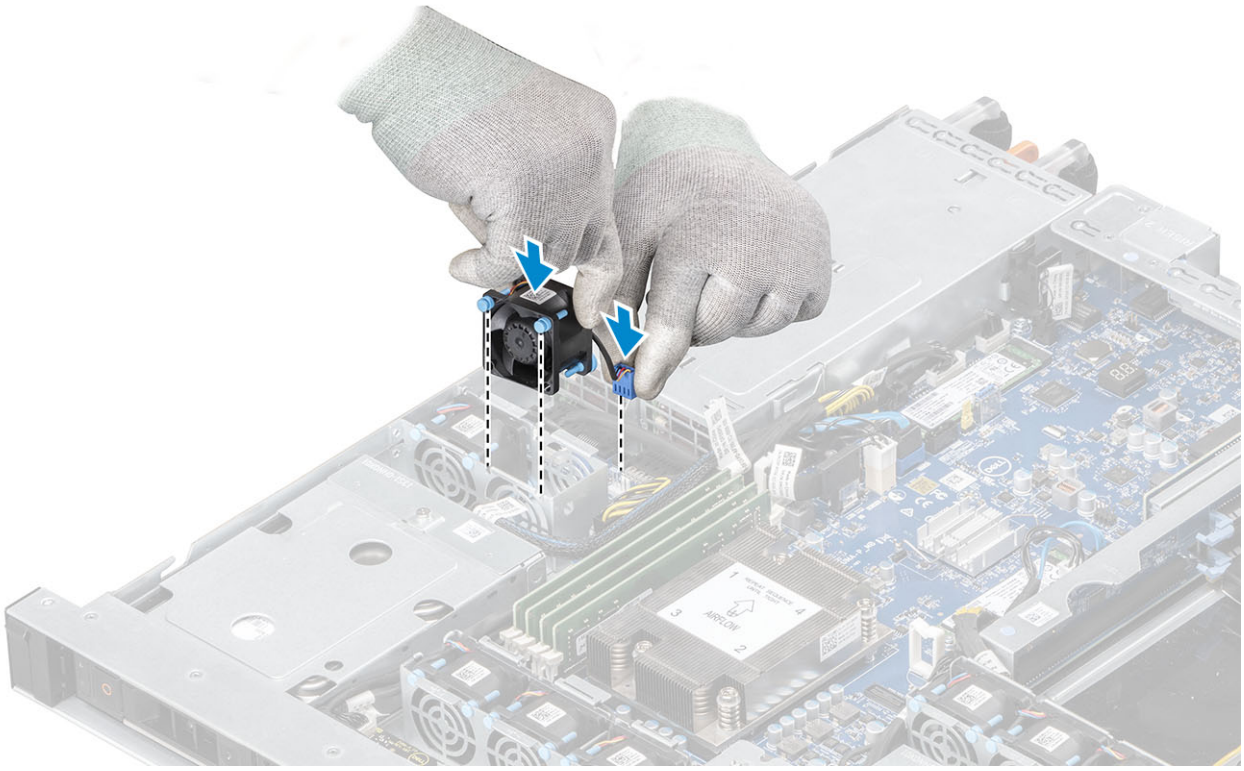


Installing the system fan

Steps

1. To replace the system fan:
   a. Align blue release pins of the fan and the slot of the fan cage.
   b. Push down the blue release pins until it sits in the slot.
   c. Connect the system fan cable to the system board.

   NOTE: Fold and tuck excess fan cable in the gap on the left side of the fan.



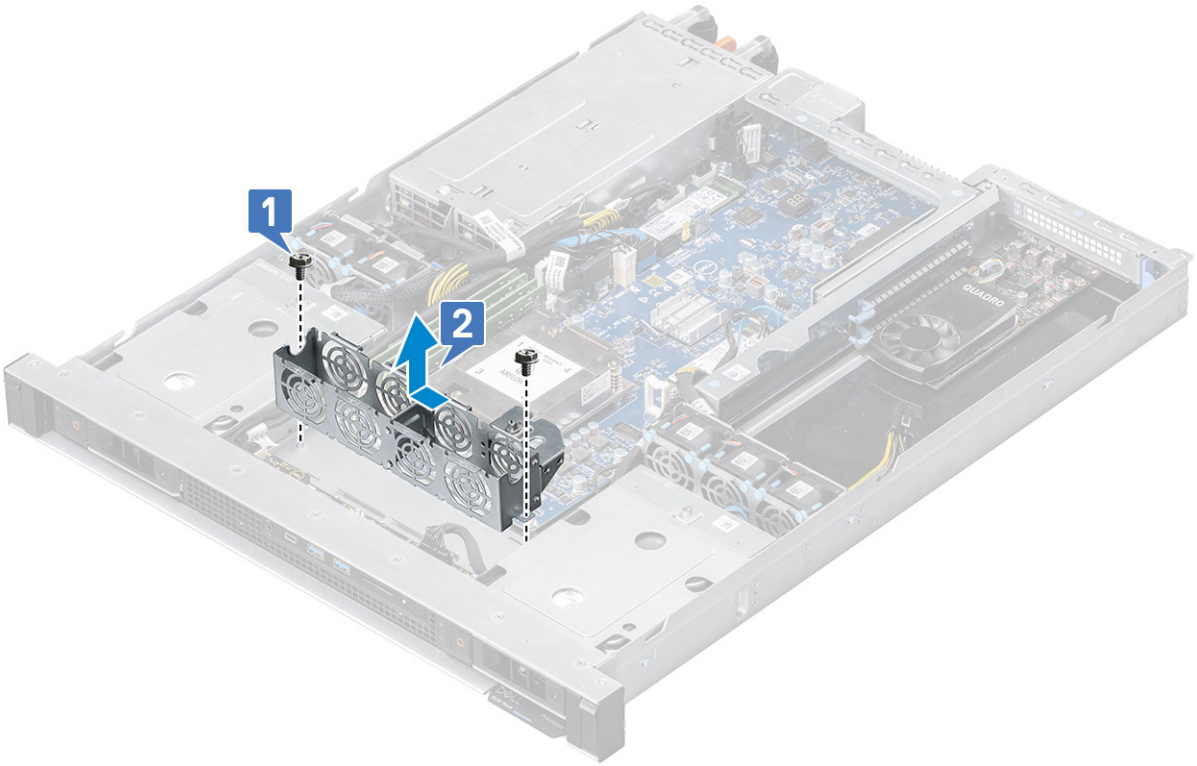
2. Install the:
   a. Air duct (if removed)
   b. Top cover
3. Follow the procedure in After working inside your computer.

System fan cage

Removing the system fan cage

Steps

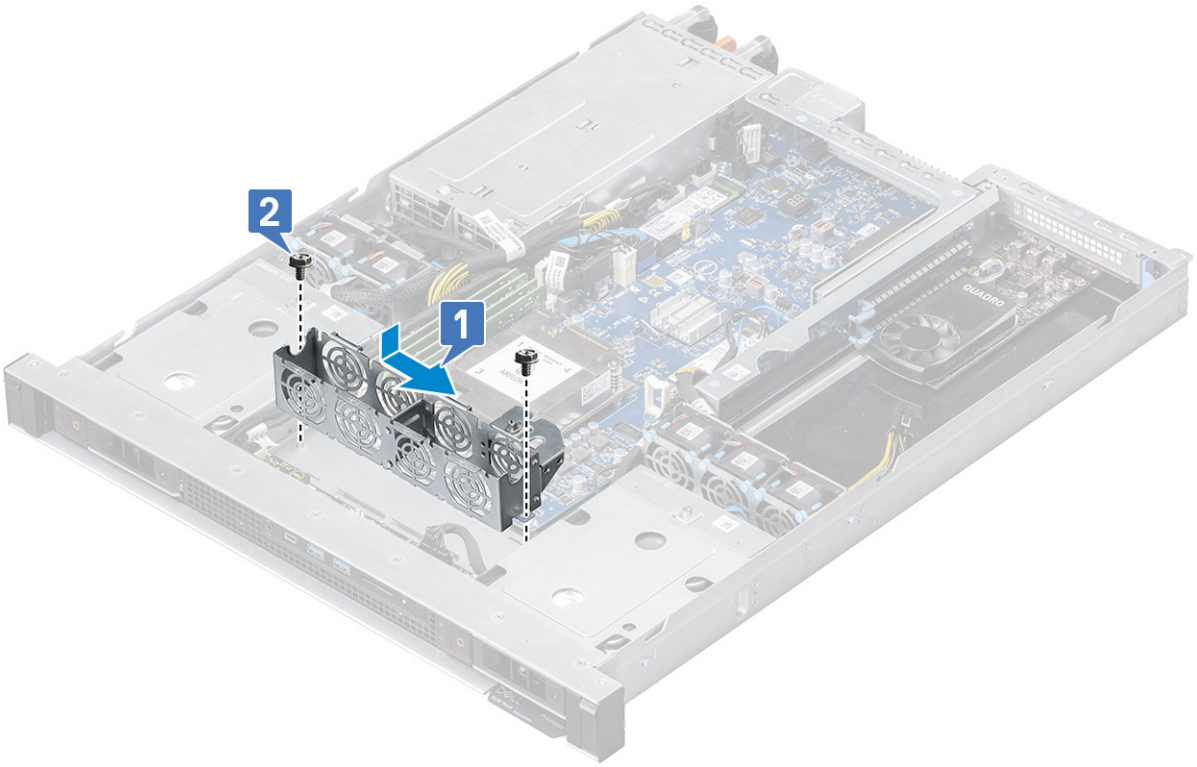
1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a. Top cover
   b. Air duct
   c. System fan
3. To remove the system fan cage:
   a. Remove the two (#6-32x5) that secures the fan cage to the chassis [1].
   b. Slide the fan cage to the left until the retention clips disengage [2].
   c. Lift the fan cage away from the chassis.



Installing the system fan cage

Steps

1. To install the system fan cage:
   a. Lower the fan cage into the chassis aligning the retention clips into the guide slots.
   b. Slide the fan cage to the right until the retention clips engage [1].
   c. Fasten the two (#6-32x5) to secure the fan cage to the chassis [2].



2. Install the:
   a. System fan
   b. Air duct
   c. Top cover
3. Follow the procedure in After working inside your computer.

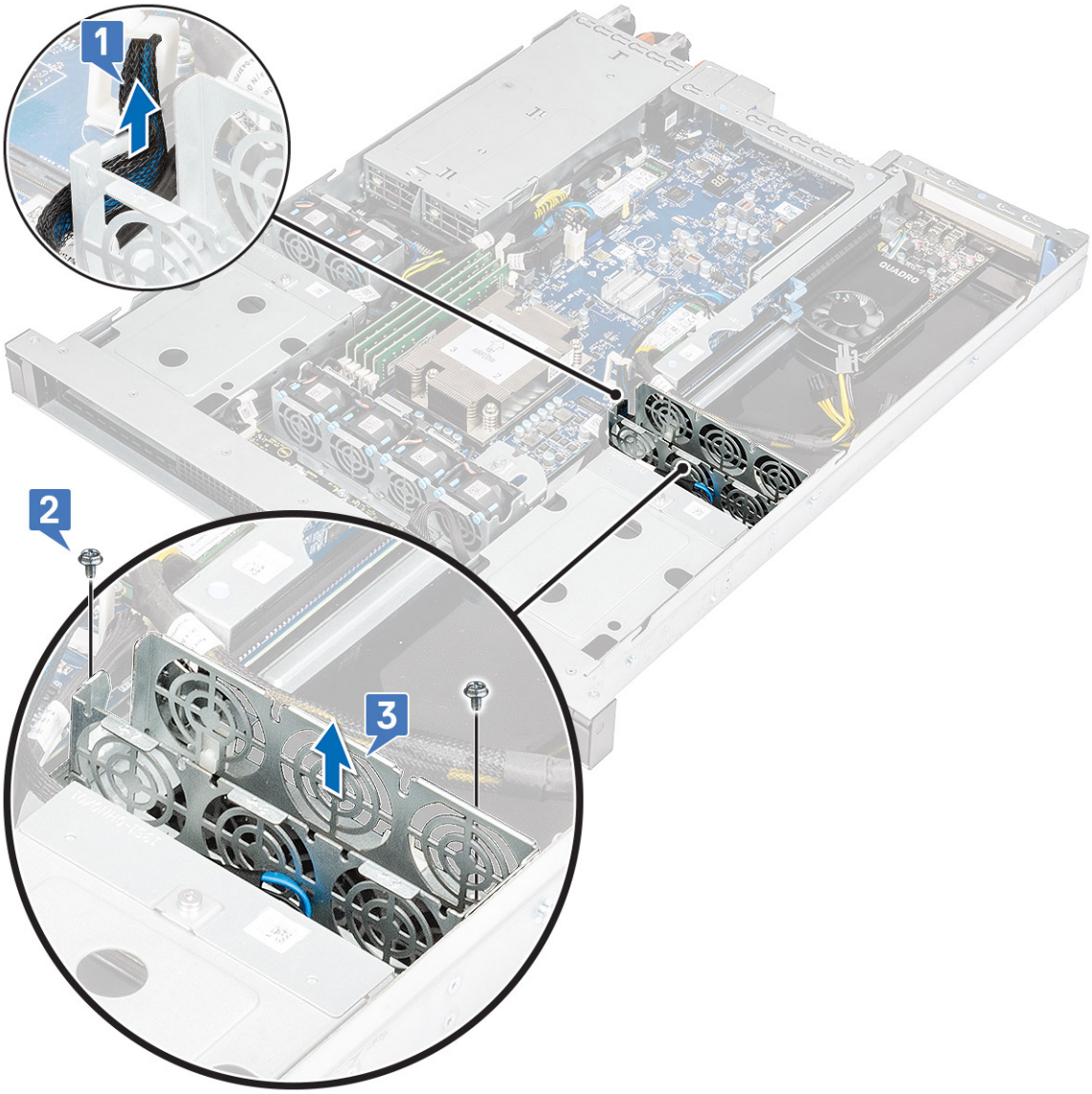
Graphics card fan cage

Removing the graphics card fan cage

Steps

1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a. Top cover
   b. Air duct
   c. System fan
3. To remove the graphics card fan cage:
   a. Unroute the SATA power cable and the SATA connector cables from the retention clip on the side of the graphics card fan cage [1].
   b. Loosen the two (#6-32x5) that secures the fan cage to the chassis [2], and the lift the cage away from the system chassis [3].

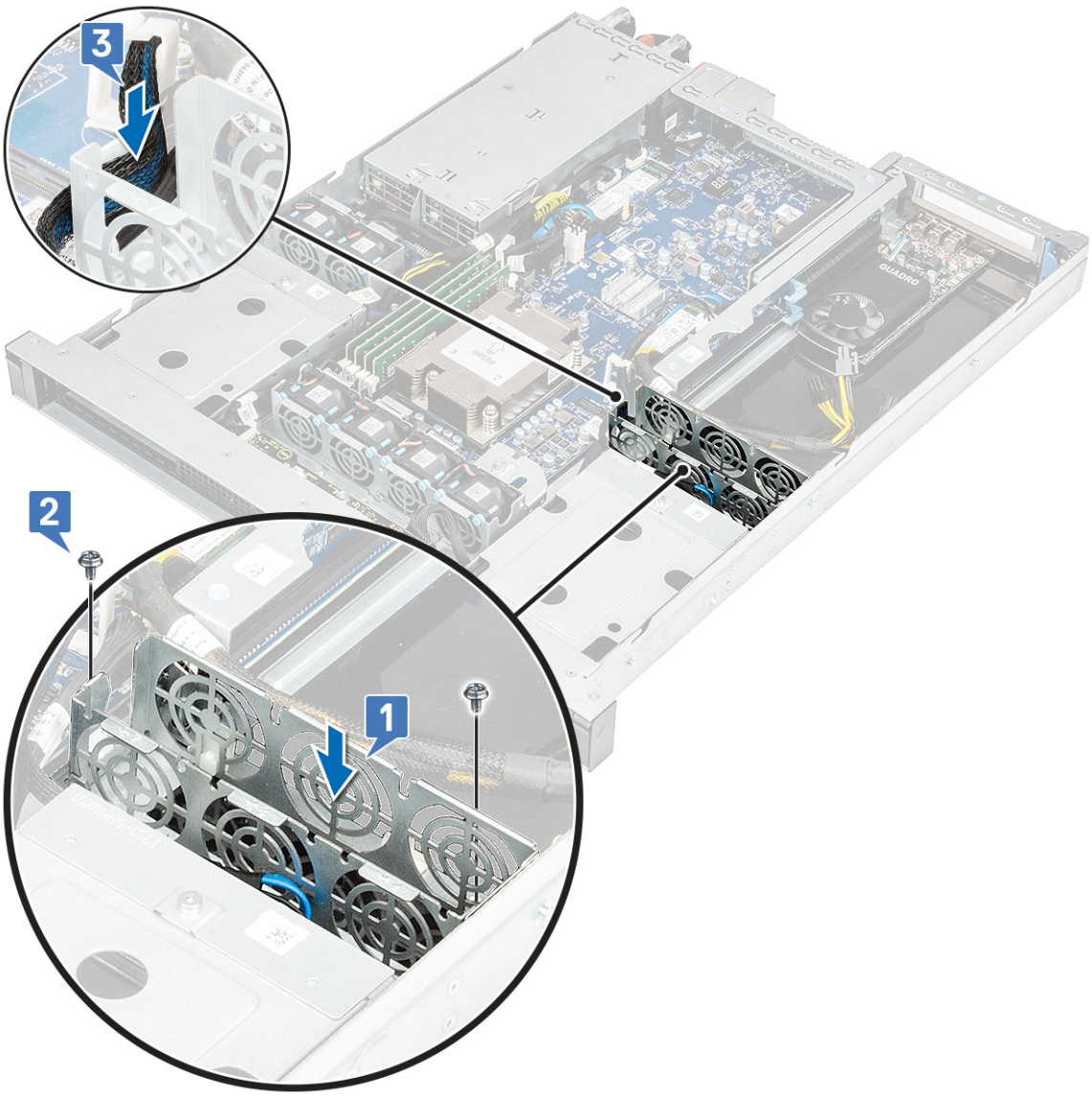
c.



Installing the graphics fan cage

Steps

1. To install the graphics card fan cage:
   a. Lower the fan cage into the chassis aligning the retention clips into the guide slots [1].
   b. Fasten the two (#6-32x5) to secure the fan cage to the chassis [2].
   c. Reroute the SATA power cable and the SATA connector cables through the cable retention clip on the graphics card fan cage [3].



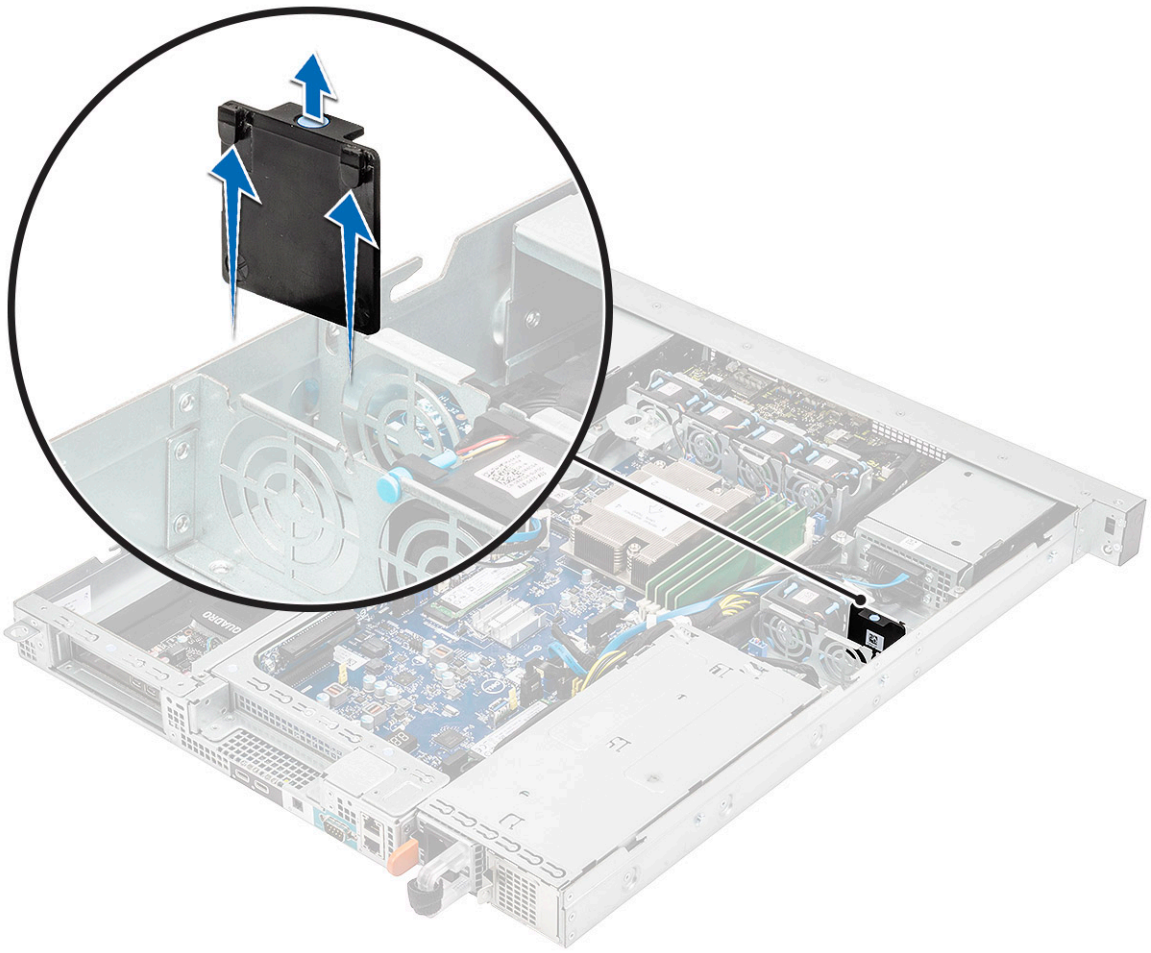
2. Install the:
   a. System fan
   b. Air duct
   c. Top cover
3. Follow the procedure in After working inside your computer.

Second PSU fan blank

Removing the second psu fan blank

Steps

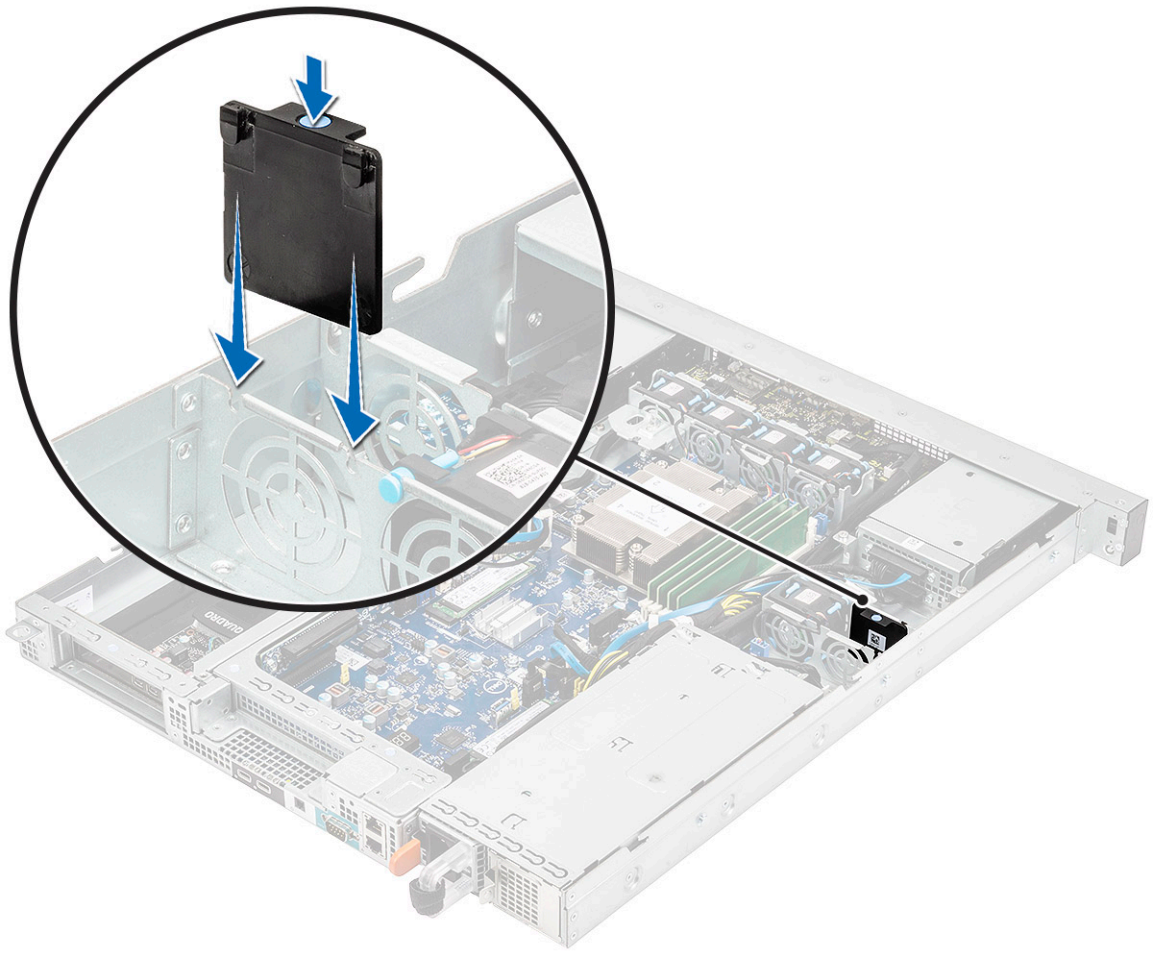
1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a. Top cover
3. Holding the blue contact point, lift the psu fan blank away from the fan cage.



Installing the second psu fan blank

Steps

1. Align the clips of the fan blank with the slots on the fan cage.
2. Push down into place.



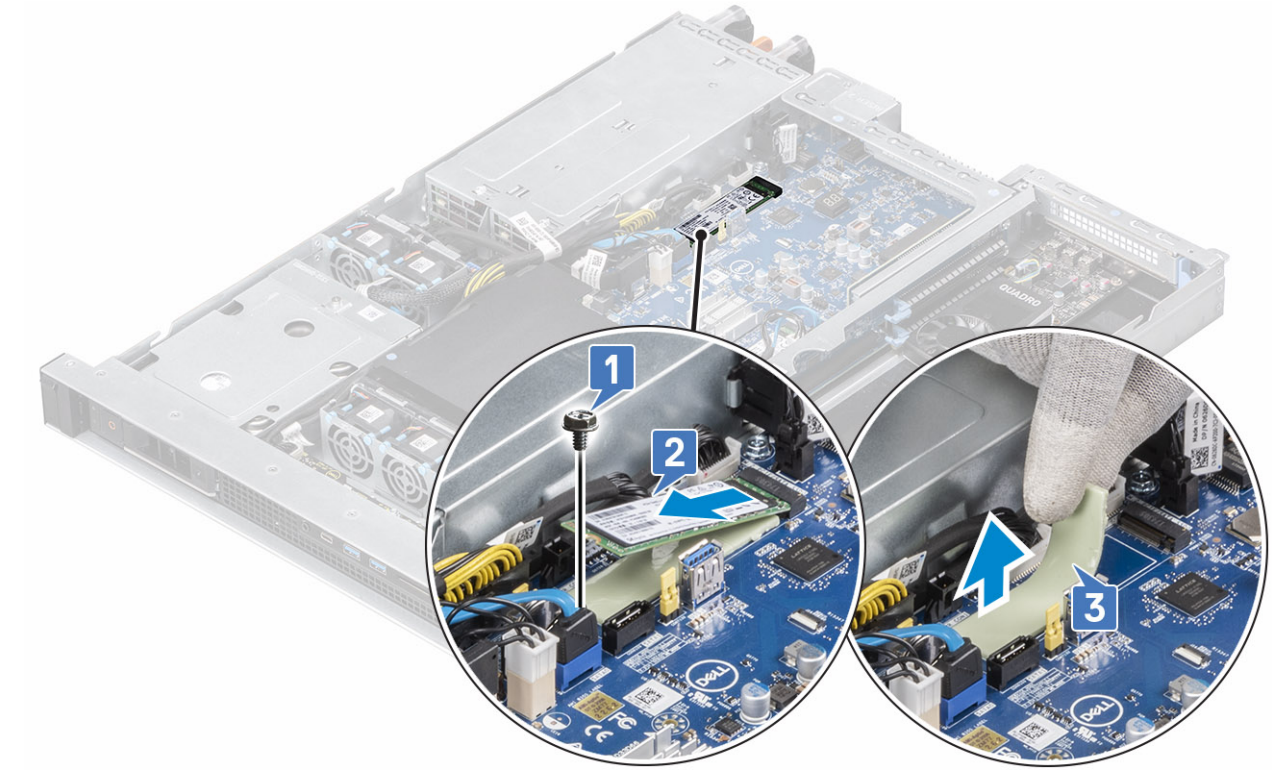
3. Follow the procedure in After working inside your computer.

M.2 PCIe Solid State Drive -SSD

Removing the M.2 PCIe Solid State Drive -SSD

Steps

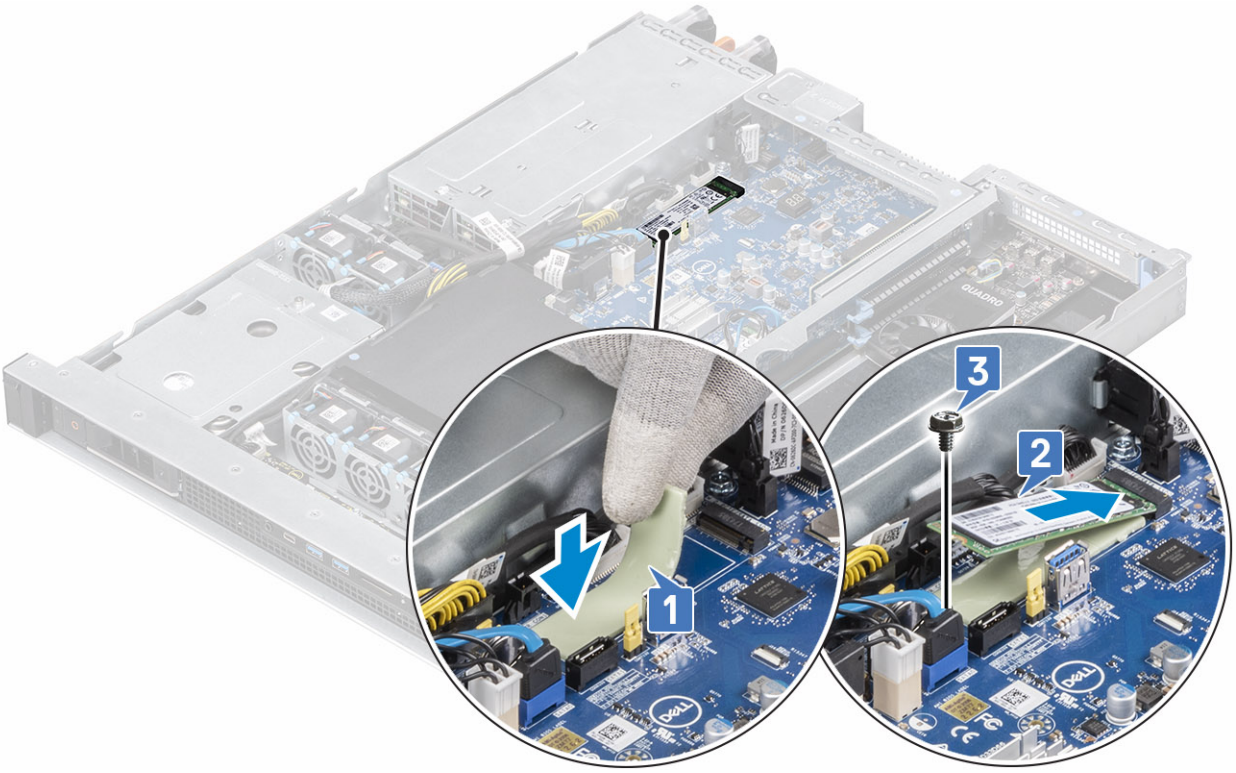
1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a. Top cover
3. To remove the M.2 PCIe SSD card:
   a. Remove the single (M2x3.5) screw that secures the M.2 PCIe SSD card to the system board [1].
   b. Lift and pull out the SSD card from its connector on the system board [2].
   c. Remove the thermal pad.



Installing the M.2 PCIe Solid State Drive -SSD

Steps

1. Place the thermal pad into the slot on the system board [1].
2. Insert the M.2 PCIe SSD card into the card slot on the system board [2].
3. Replace the single (M2x3.5) screw that secures the M.2 PCIe SSD card to the system board [3].



4. Install the:
   a. Top cover
5. Follow the procedure in After working inside your computer.

Front Input Output panel

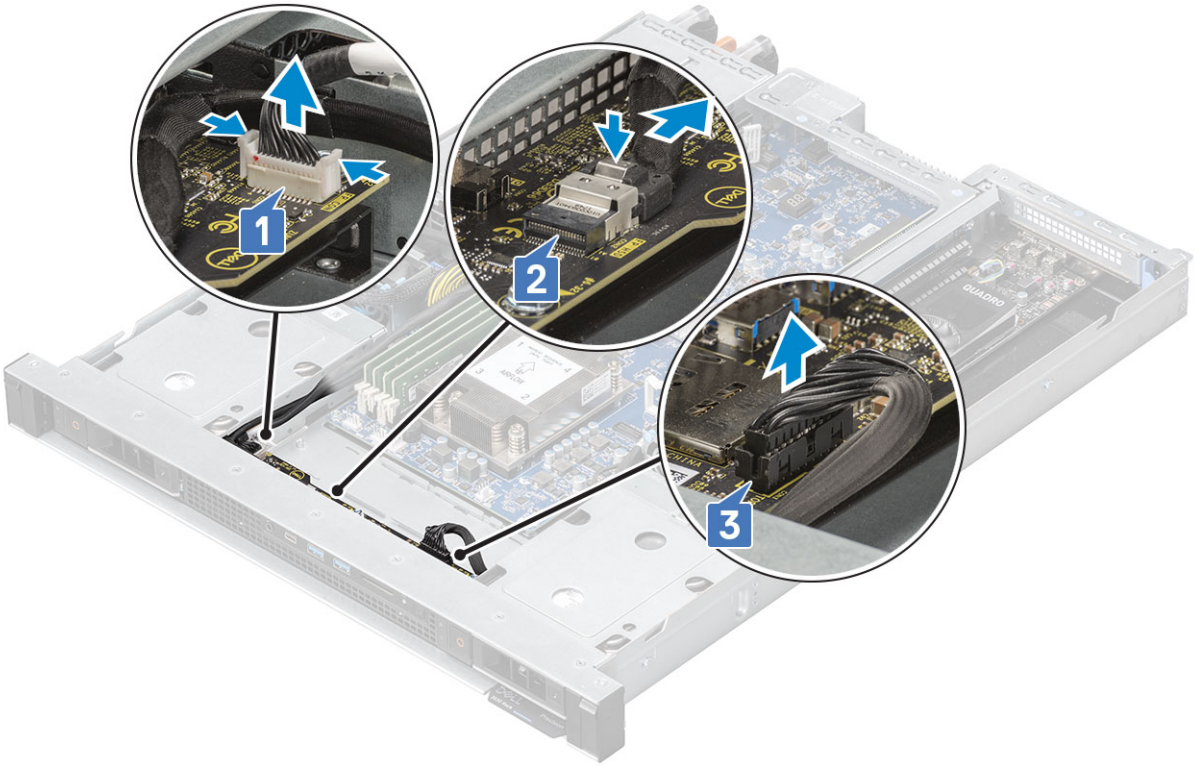
Removing the front Input Output panel

Steps

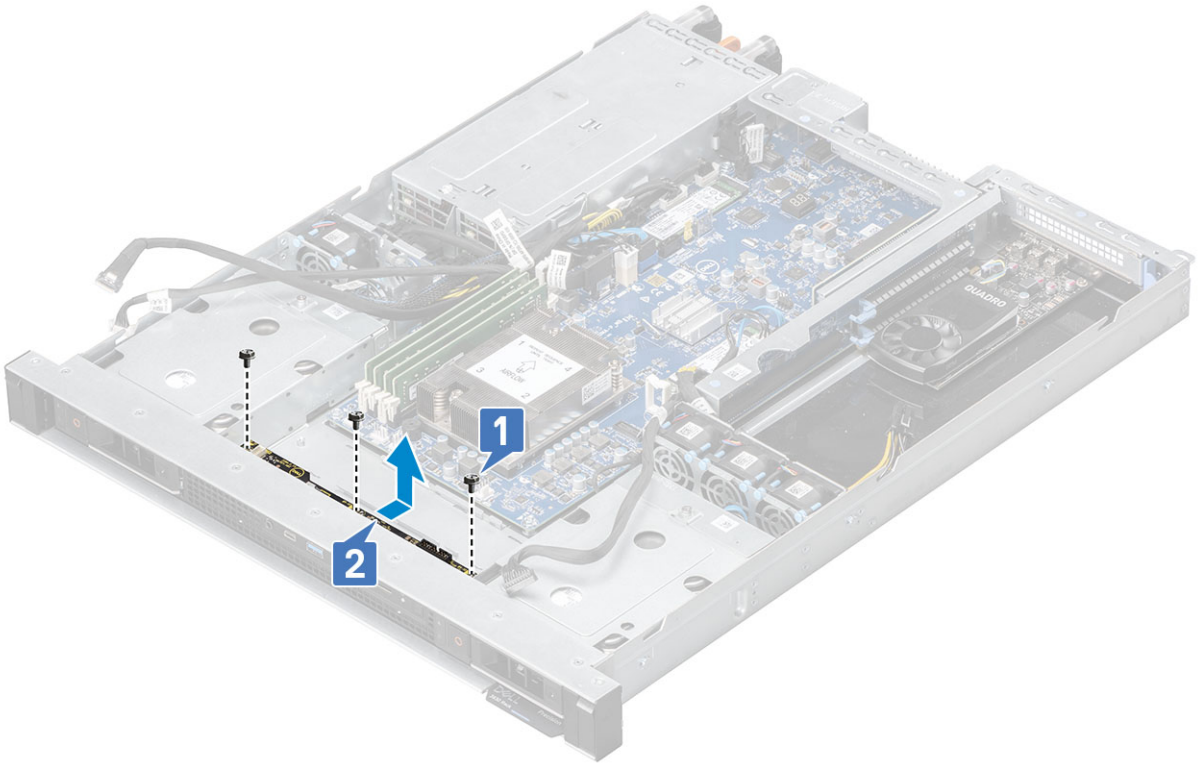
1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a. Top cover

   NOTE: Take a picture or document the routing of the three cables that are attached to the front I/O panel.

3. To remove the Intel front I/O panel:
   a. Press the release tabs on the sides of the front panel cable connector and lift the cable away [1].
   b. Press down the metal release tab on the front panel HSD cable and slide it out of the socket [2].
   c. Disconnect the front panel power connector cable [3].



4. Remove the three (#6-32x5) screws that secure the I/O panel to the system chassis [1], lift the I/O panel away from the system chassis [2].



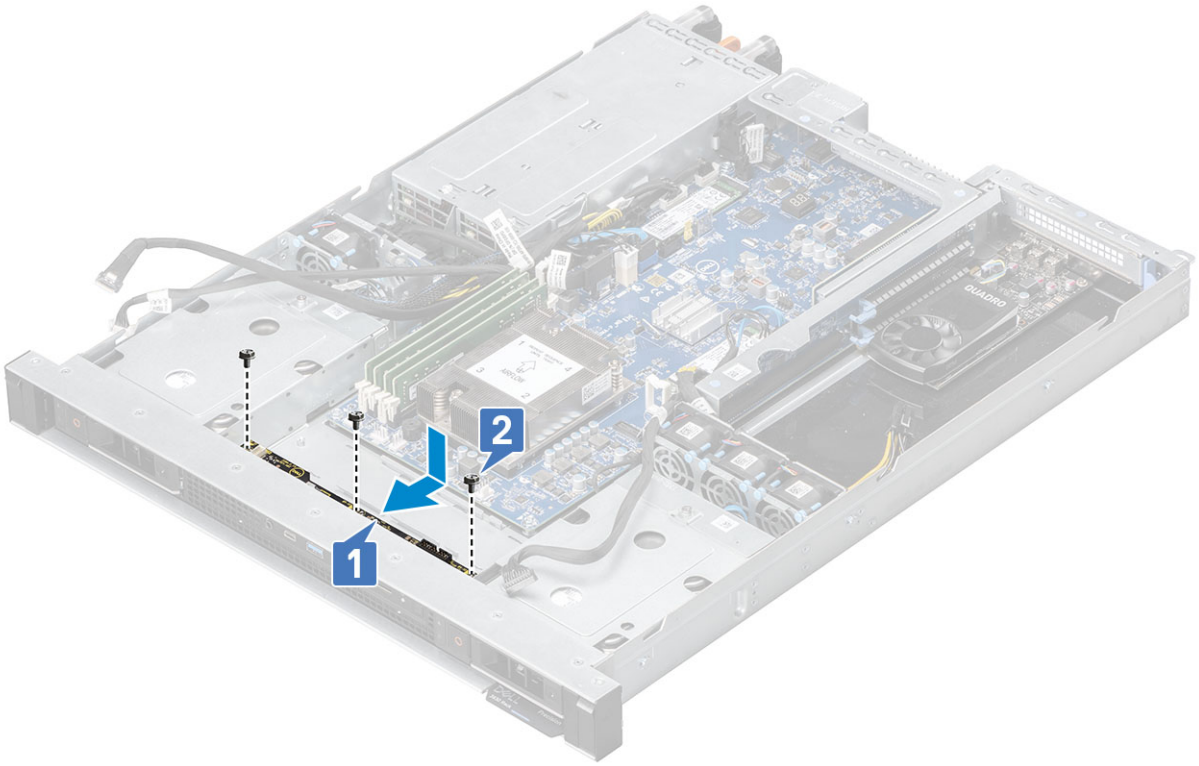
Installing the front Input Output panel

About this task

NOTE: Ensure the front I/O panel is under the two guide clips (one on left side and another on the right side) or the panel will not properly rest on the screw standoffs. The front I/O panel can be damaged if not properly installed.

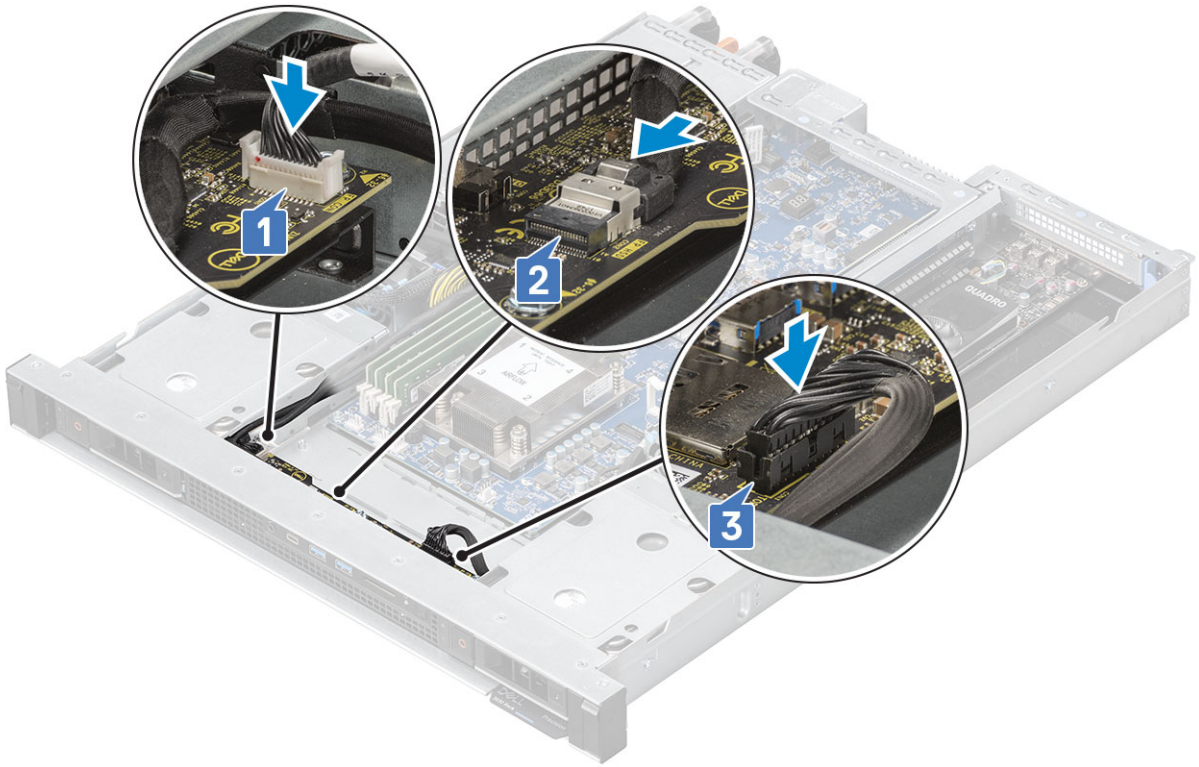
Steps

1. Align the front I/O panel with the slots on the system chassis [1].
2. Replace the three (#6-32x5) screws that secures the front I/O panel to the system chassis [2].



3. Reconnect the front panel cable [1], front panel HSD cable [2], and the front panel power cable [3].

   NOTE: Refer to cable routing picture or document and ensure the three cables are properly routed from the I/O panel to the system board.



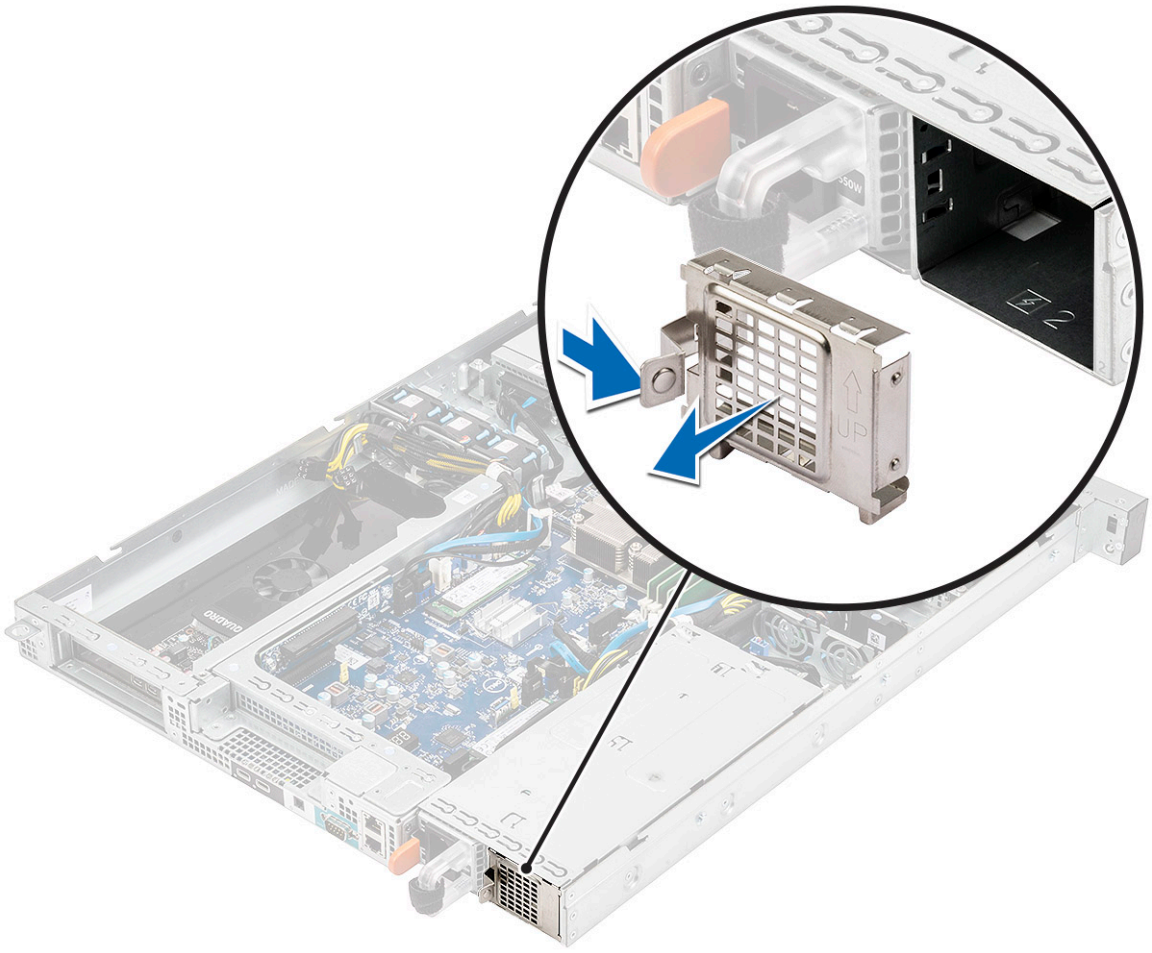
4. Install the:
   a. Top cover
5. Follow the procedure in After working inside your computer.

Second PSU blank

Removing the second psu blank

Steps

1. Follow the procedure in Before working inside your computer.
2. To remove the psu blank
   a. Press the release latch on the psu blank, and pull the psu blank out of the system chassis.

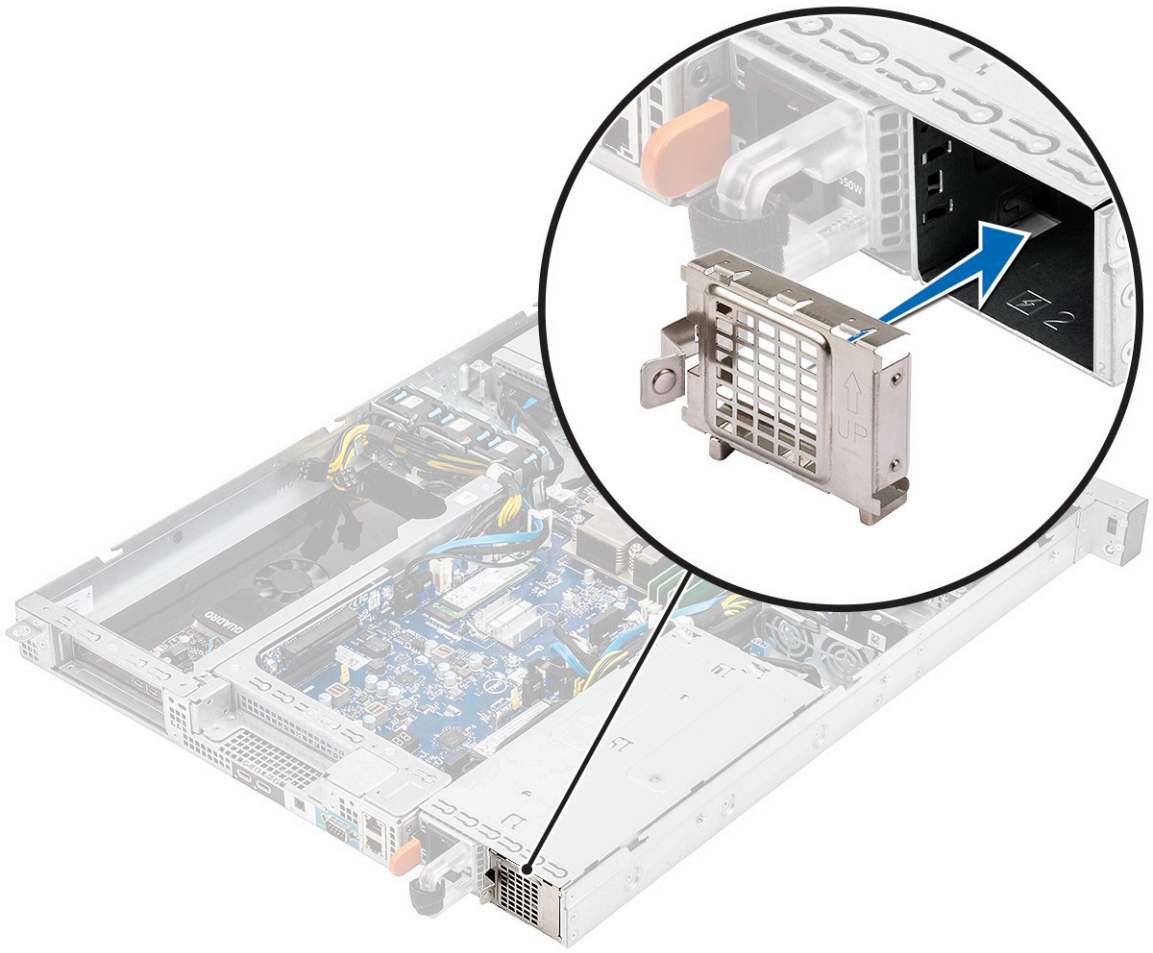


Installing the second psu blank

Steps

1. Align the psu blank with the slot on the system chassis, and install the bank.

   NOTE: Ensure to follow the direction marked on the psu blank while installation.



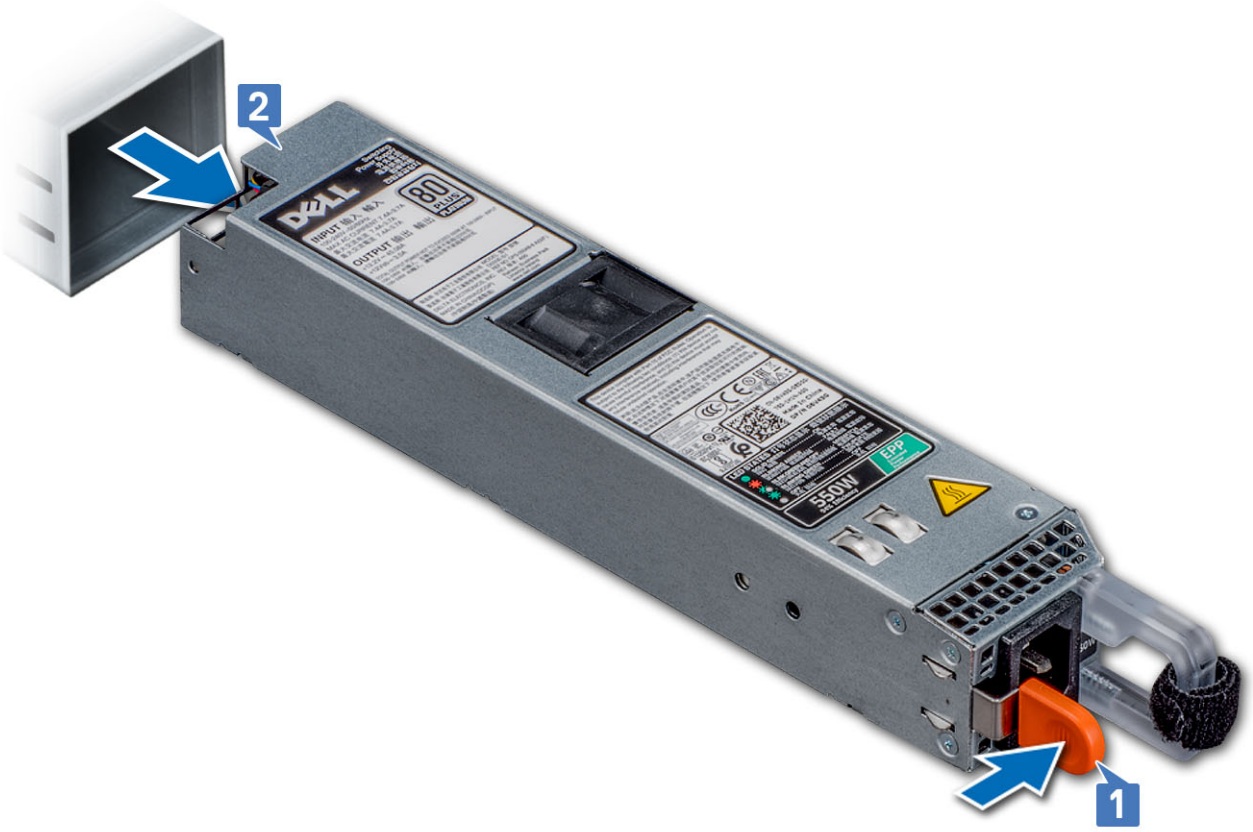
2. Follow the procedure in After working inside your computer.

Power supply unit - PSU

Removing power supply unit

Steps

1. Follow the procedure in Before working inside your computer.
2. To remove the PSU:
   a. Press the release latch on the PSU [1].
   b. Pull the PSU out of the slot and away from the system [2].



Installing the power supply unit

Steps

1. Insert the PSU in the chassis and slide it into the slot until it locks.

2. Follow the procedure in After working inside your computer.

Installing the second redundant PSU

Steps

1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a. Second PSU blank
   b. Top cover
   c. Second PSU fan blank
3. Install the:
   a. Second PSU fan
   b. Connect fan cable to power distribution board "FAN2" connector.

      NOTE: Refer to the System fan section.

      NOTE: Fold and tuck excess fan cable in the gap on the left side of the fan.

   c. Insert the PSU in the chassis and slide it into the slot until it locks.

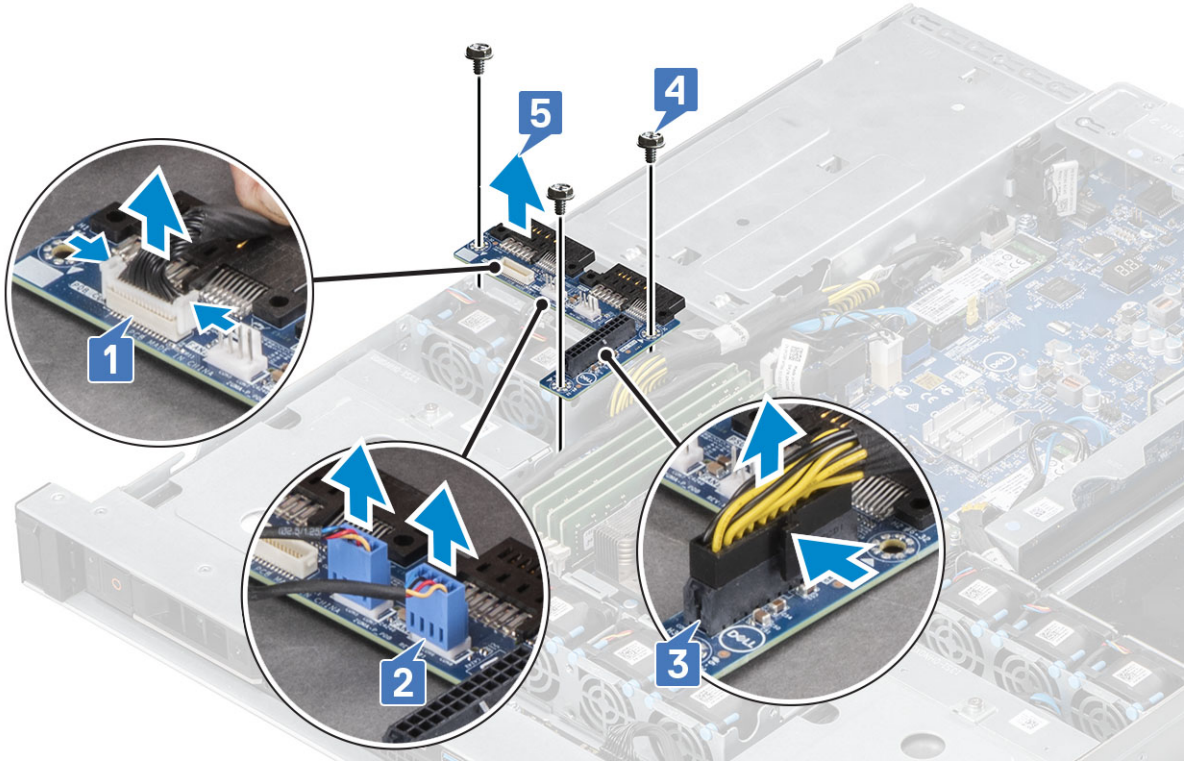
4. Install the:
   a. Top cover
5. Follow the procedure in After working inside your computer.

Power distribution board

Removing the power distribution board

Steps

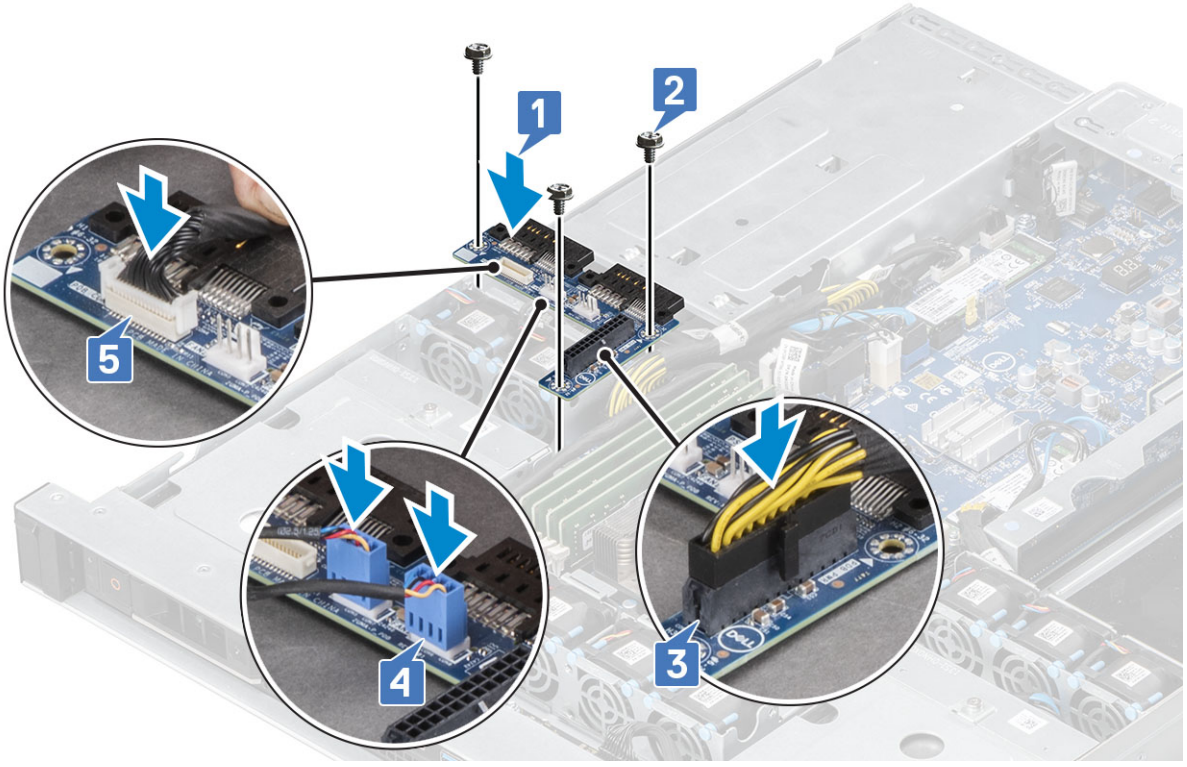
1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a. Top cover
   b. Power supply unit
3. To remove the power distribution board:
   a. Press the release tabs on the sides of the power distribution board connector and lift the cable away [1].
   b. Disconnect the two power supply unit fan connectors [2].
   c. Press the release tabs of the power distribution board, power supply connector and disconnect the cable [3].
   d. Remove the three (#6.32x6) screws that secure the power distribution board [4].
   e. Lift away the power distribution board from the system chassis [5].



Installing power distribution board

Steps

1. Align the power distribution board with the slots on the system chassis [1].
2. Replace the three (#6.32x6) screws that secures the power distribution board to the system board [2].
3. Reconnect the power distribution board, power cable [3], power supply unit fan cables [4], and the power distribution board connector [5].



4. Install the:
   a. Power supply unit
   b. Top cover
5. Follow the procedure in After working inside your computer.

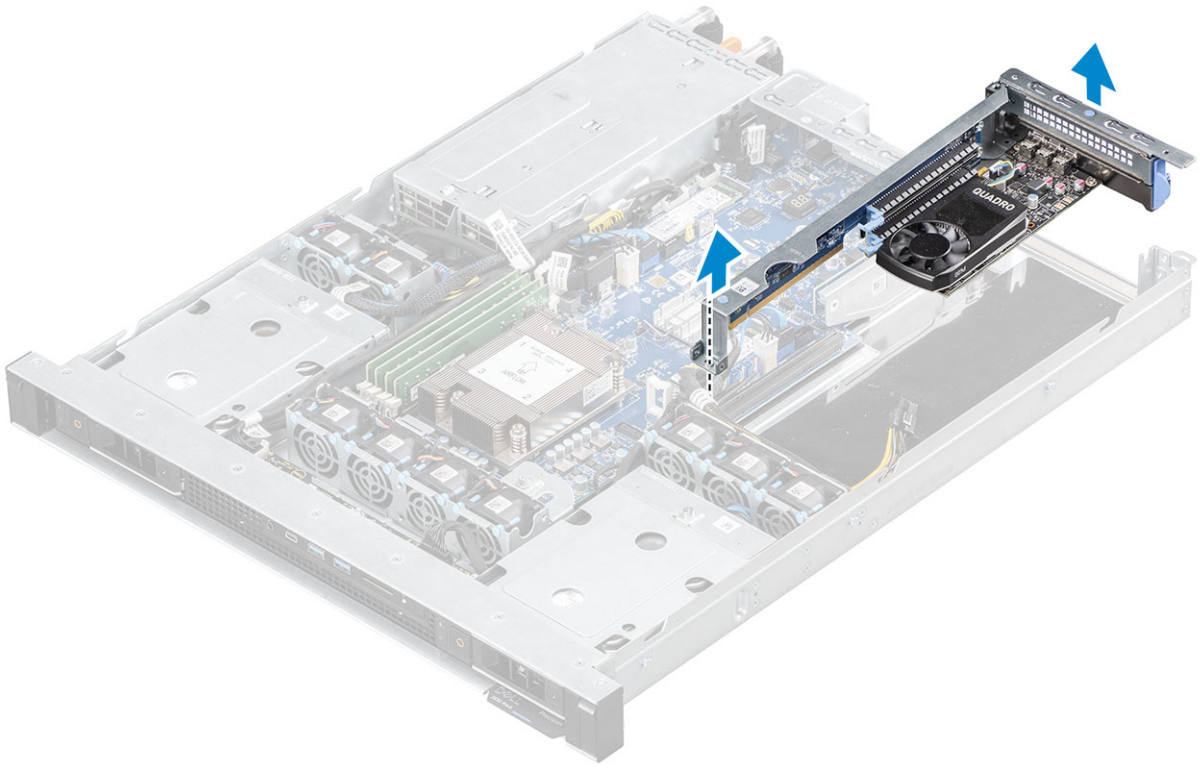
Expansion card

Riser 1 module

Removing riser1 module

Steps

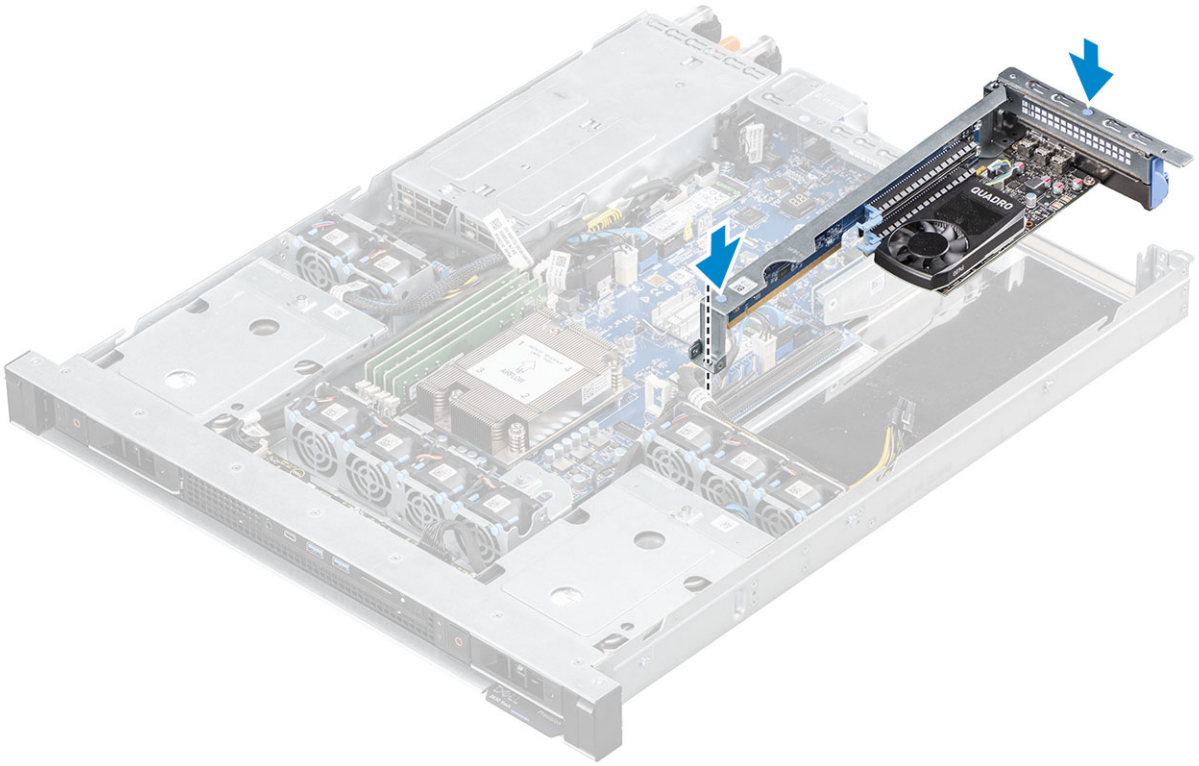
1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a. Top cover
3. To remove the riser1 module:
   a. Holding the two blue lift points and pull the riser1 module from the slot.



Installing the riser1 module

Steps

1. Holding the blue contact points align the module with the alignment pins on the chassis and insert the riser1 module into the slot.

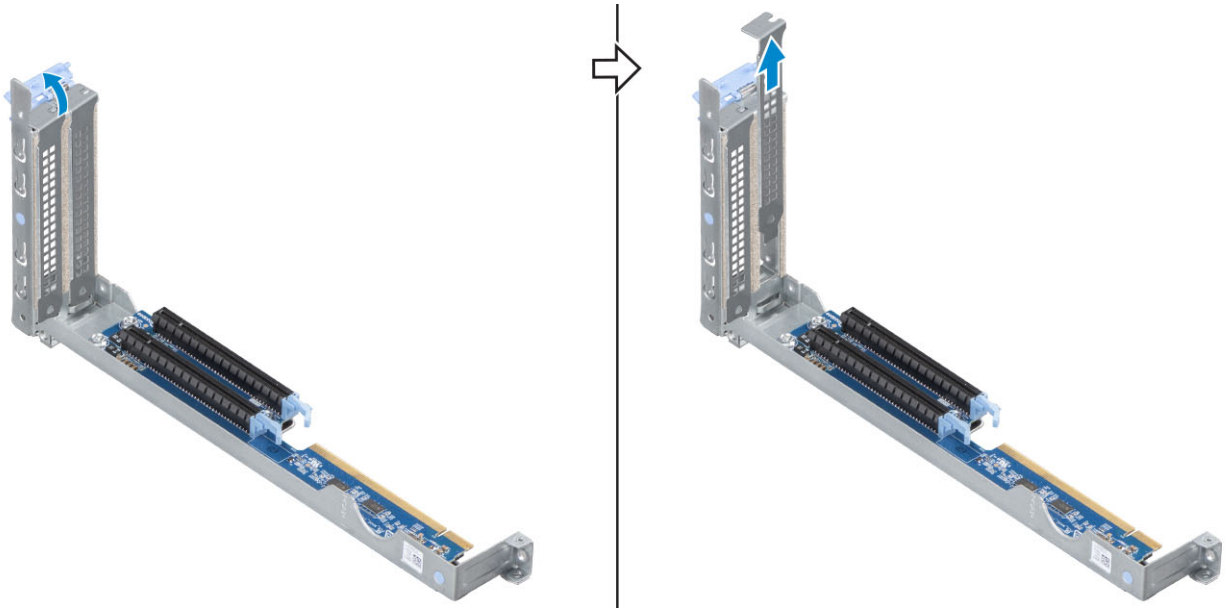


2. Install the:
   a. Top cover
3. Follow the procedure in After working inside your computer.

Removing riser1 blank

Steps

1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a. Top cover
   b. Riser 1 module
3. To remove the riser1 blank:
   a. Pull the release tab [1] to open the riser1 slot and lift out the riser1 blank from the slot.



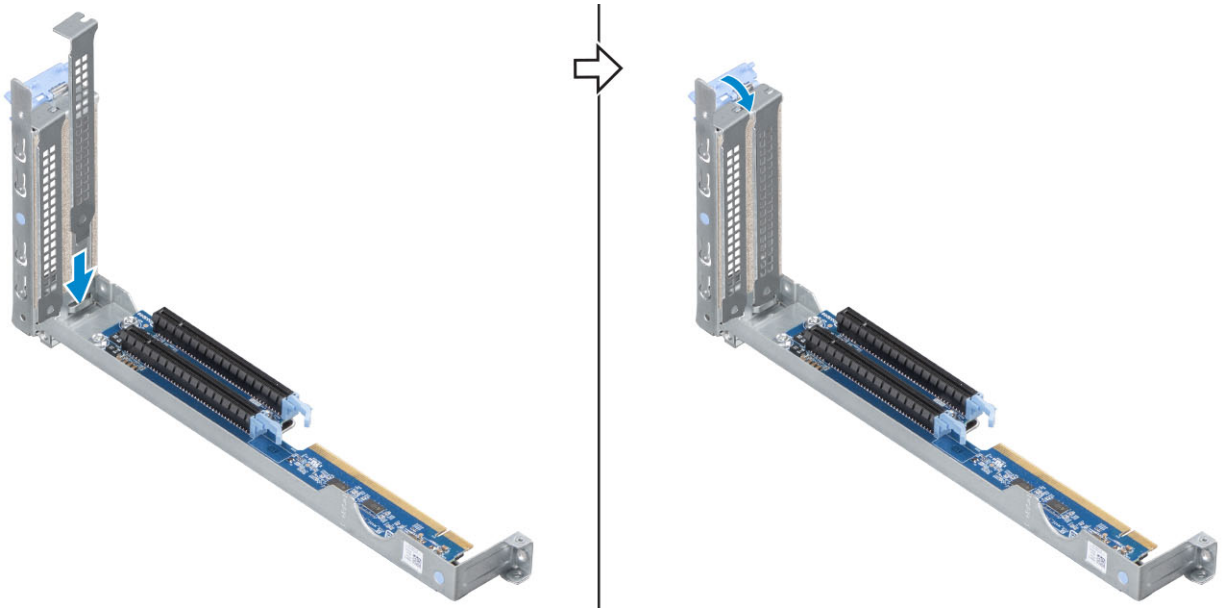
Installing the riser1 blank

About this task

NOTE: A riser1 blank must be installed over an empty expansion card slot to maintain Federal Communications Commission (FCC) certification of the system. The blank also keep dust and dirt out of the system and aid in proper cooling and airflow inside the system.

Steps

1. Insert the riser1 blank into the slot and close the release tab to secure the riser1 blank in place.



2. Install the:
   a. Riser 1 module
   b. Top cover
3. Follow the procedure in After working inside your computer.

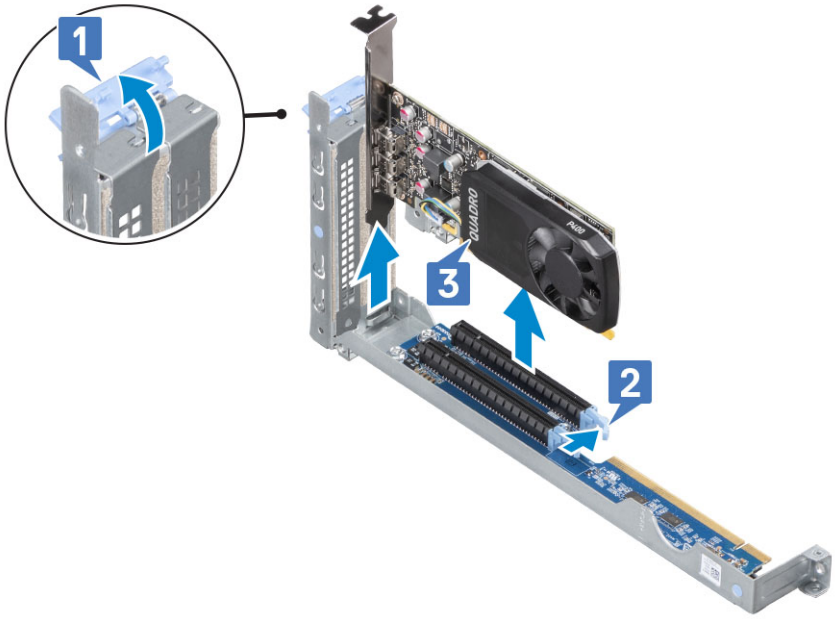
Removing riser1 Graphics Card

Steps

1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a. Top cover
   b. Riser 1 module
3. To remove the riser1 graphics card:

   NOTE: If installed, disconnect graphics card power cable from graphics card.

   a. Pull the release tab [1] to open the riser1 slot.
   b. Push the release tab on the PCIe slot [2], lift out the graphics card from the slot [3].



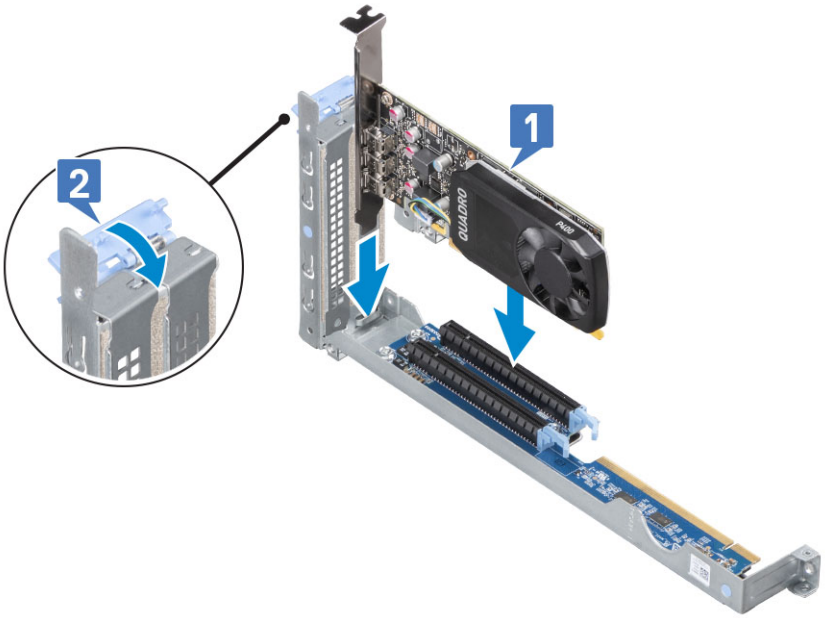
NOTE: If removing the graphics card permanently, install Riser1 blank in empty expansion slot opening.

Installing the riser1 Graphics Card

Steps

1. Insert the riser1 graphics card into the slot [1] and close the release tab to secure the riser1 graphics card in place [2].

   NOTE: Ensure that the graphics card bracket is installed correctly in the slot.



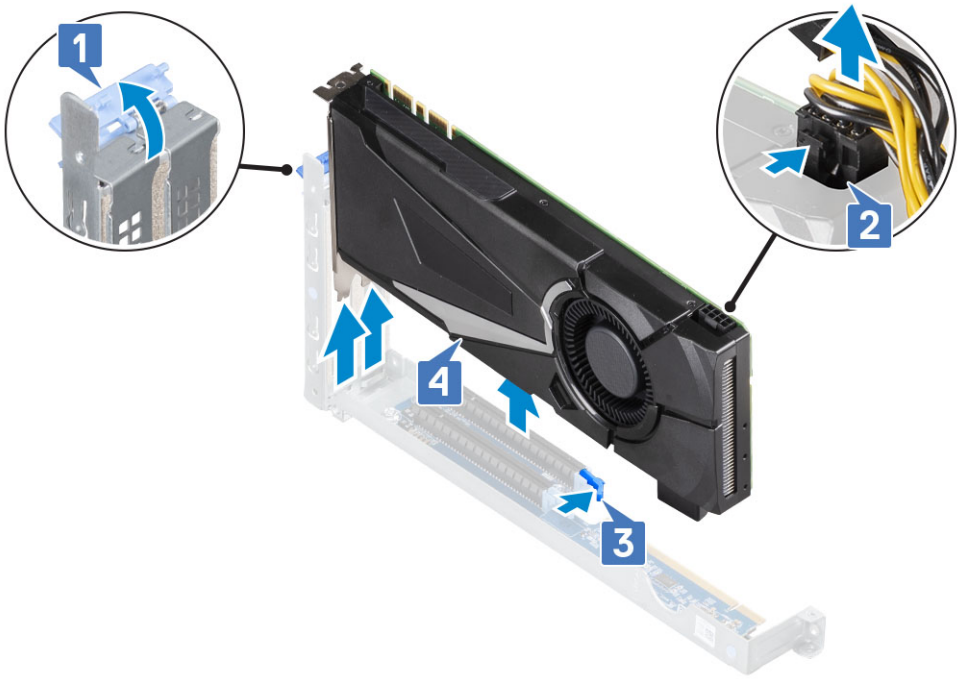
2. Install the:
   a. Riser 1 module
   b. Top cover
3. Follow the procedure in After working inside your computer.

Removing riser1 Dual Graphics Card

Steps

1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a. Top cover
   b. Riser 1 module
3. To remove the riser1 Dual graphics card:
   a. Pull the release tab [1] to open the riser1 slot.
   b. Disconnect the dual graphics card power cable [2].
   c. Push the release tab on the PCIe slot [3], lift out the graphics card from the slot [4].

   NOTE: If removing the dual graphics card permanently, install two Riser1 blanks in empty expansion slot opening.

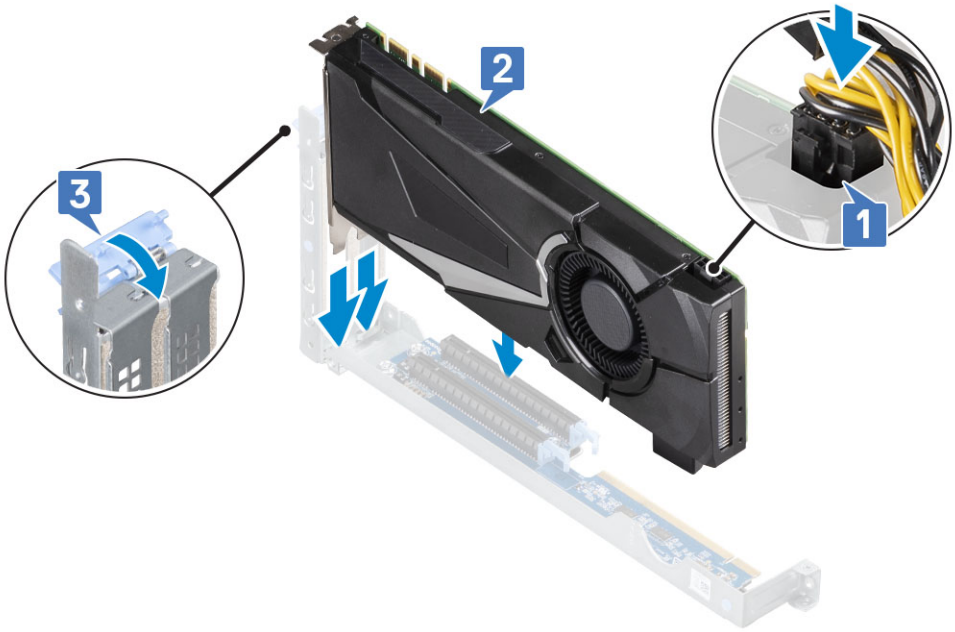


Installing the Riser1 Dual Graphics Card

Steps

1. Reconnect the graphics card power cable [1], insert the dual graphics card into the PCIe slot [2].
2. Close the release tab to secure the riser1 dual graphics card in place [3].

   NOTE: Ensure that the graphics card bracket is installed correctly in the slot.

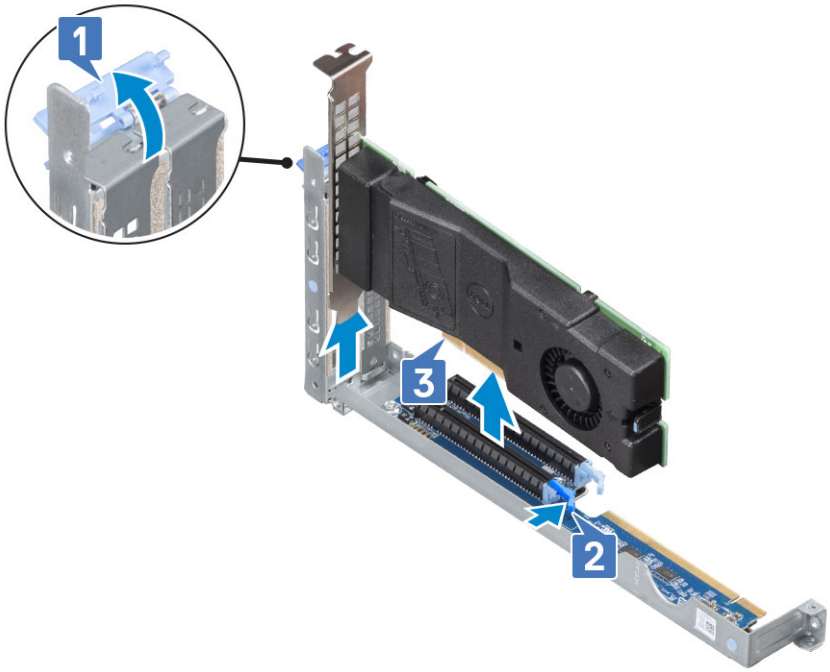


3. Install the:
   a. Riser 1 module
   b. Top cover
4. Follow the procedure in After working inside your computer.

Removing the riser 1 dell ultraspeed drive duo card

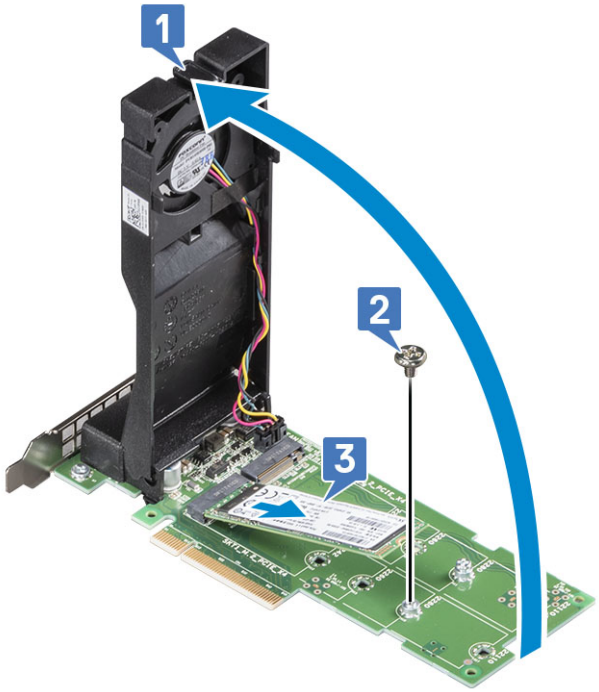
Steps

1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a. Top cover
   b. Riser 1 module
3. Removing the riser 1 dell ultraspeed drive duo card:
   a. Pull the release tab [1], and open the riser 1 slot.
   b. Push the release tab on the PCIe slot [2], lift out the Dell Ultraspeed Drive Duo Card from slot [3].



4. To remove the SSD card
   a. Press the release latch on the Dell Ultraspeed Drive Duo Card cover [1], remove the one (M2x2.5) screw [2] and take out the SSD card [3].

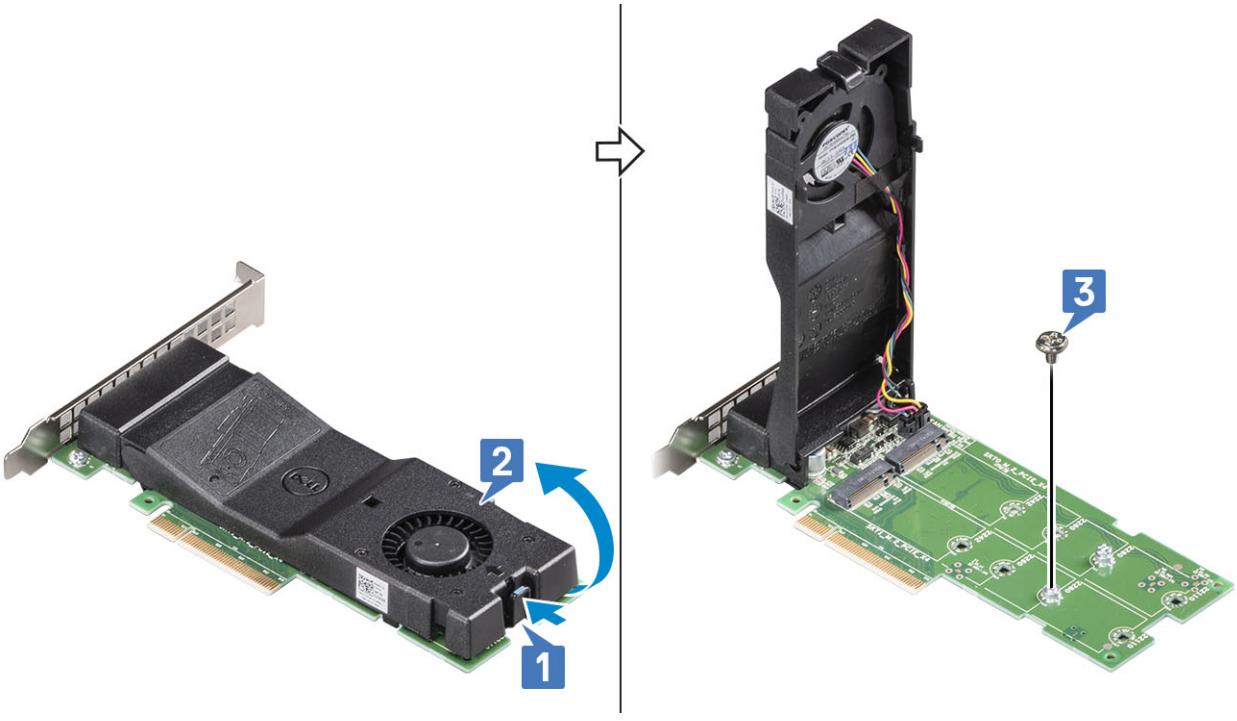
   NOTE: If removing the Dell Ultraspeed Drive Duo Card permanently, install Riser1 blank in empty expansion slot 2 opening.



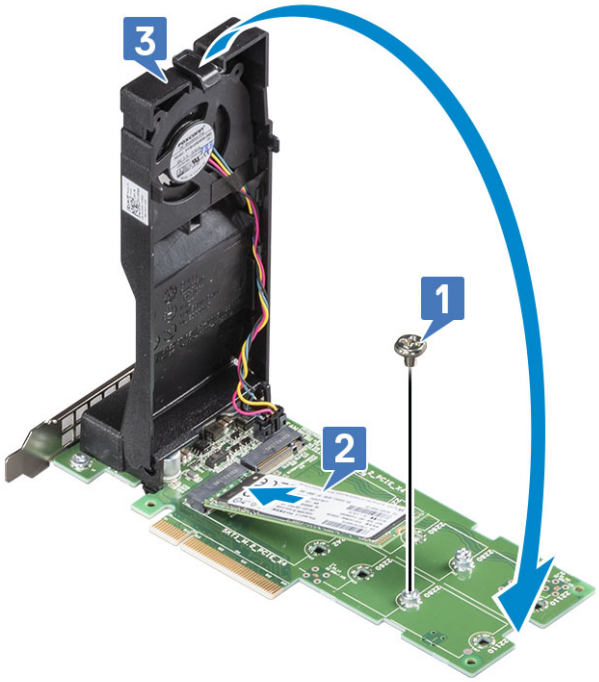
Installing the riser 1 dell ultraspeed drive duo card

Steps

1. Press the release latch on the dell ultraspeed drive duo card cover [1] and lift the cover open [2]. Remove the one (M2x2.5) screw [3].

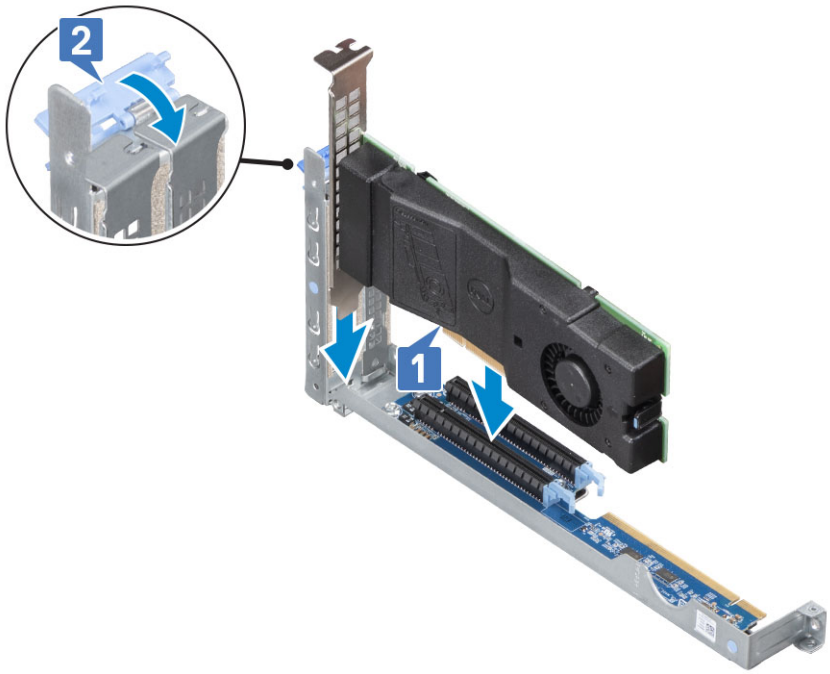


2. To install the M.2 SSD
   a. Insert the SSD card into the slot on the module [1], Replace the one (M2x2.5) screw [2] that secures the SSD card and close the module cover [3].



3. Slide the Dell Ultraspeed Drive Duo Card into the riser 1 slot 2 [1]. Close the riser 1 module release latch [2].

   NOTE: Ensure that the Dell Ultraspeed Drive Duo Card bracket is installed correctly in the slot.

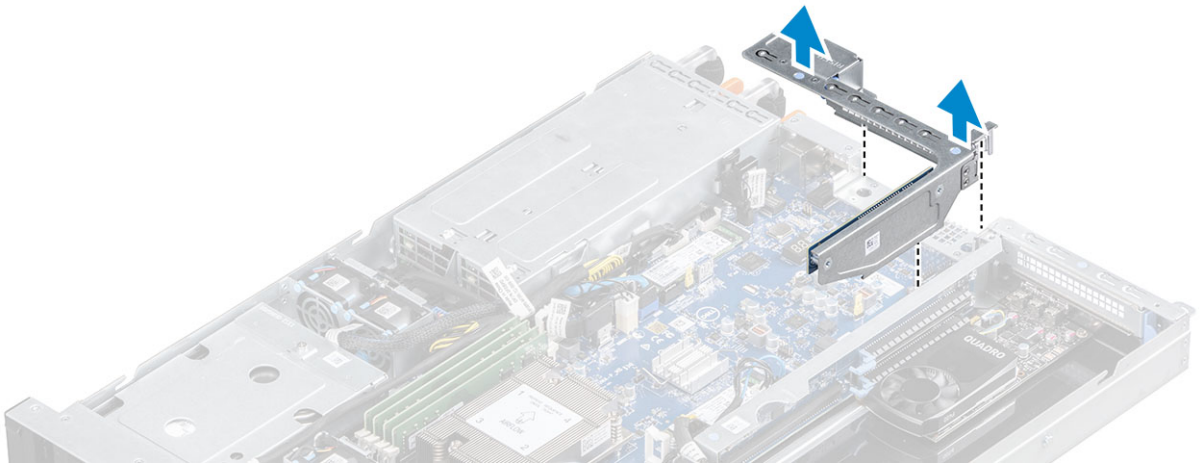


4. Install the:
   a. Riser 1 module
   b. Top cover
5. Follow the procedure in After working inside your computer.

Removing riser 2 module

Steps

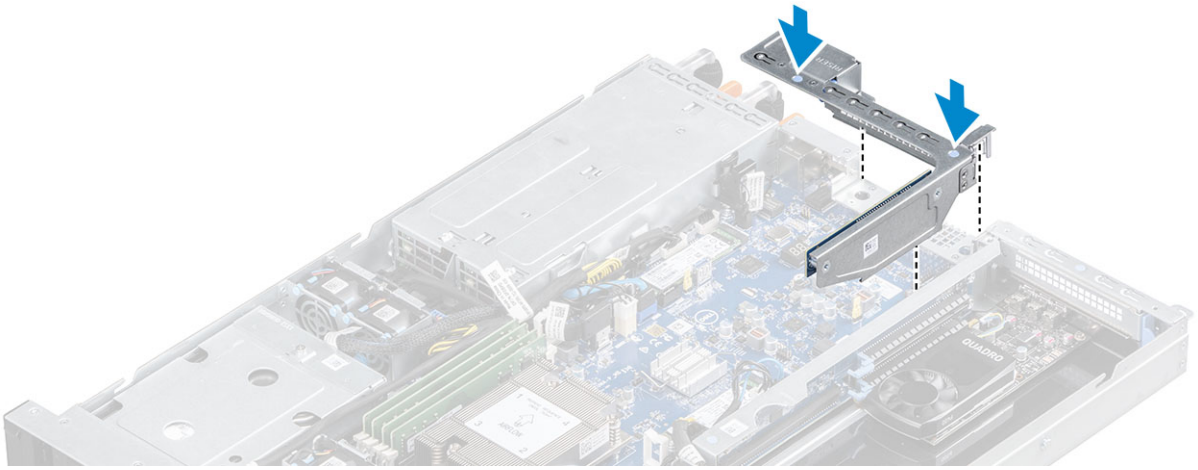
1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a. Top cover
3. To remove the riser 2 module:
   a. Locate the blue points on the riser 2 module. Grab the blue points, and lift the riser 2 module away from the system chassis.



Installing the Riser 2 Module

Steps

1. Hold the blue points on the riser 2 module, and align it with the guide pins to install.
2. Press down the riser 2 module and ensure that it is seated in the PCIe slot.



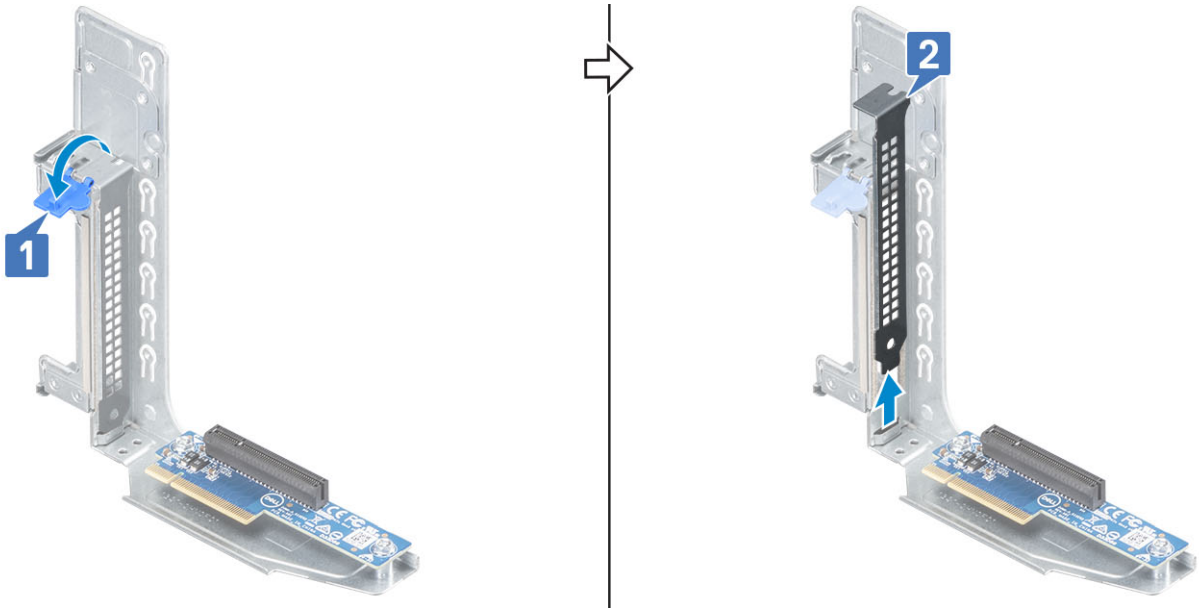
3. Install the:
   a. Top cover
4. Follow the procedure in After working inside your computer.

Removing riser 2 blank

Steps

1. Follow the procedure in Before working inside your computer.

2. Remove the:
   a. Top cover
   b. Riser 2 module
3. To remove the riser 2 blank:
   a. Pull the release tab [1] to open the riser2 slot and lift out the riser2 blank from the slot [2].

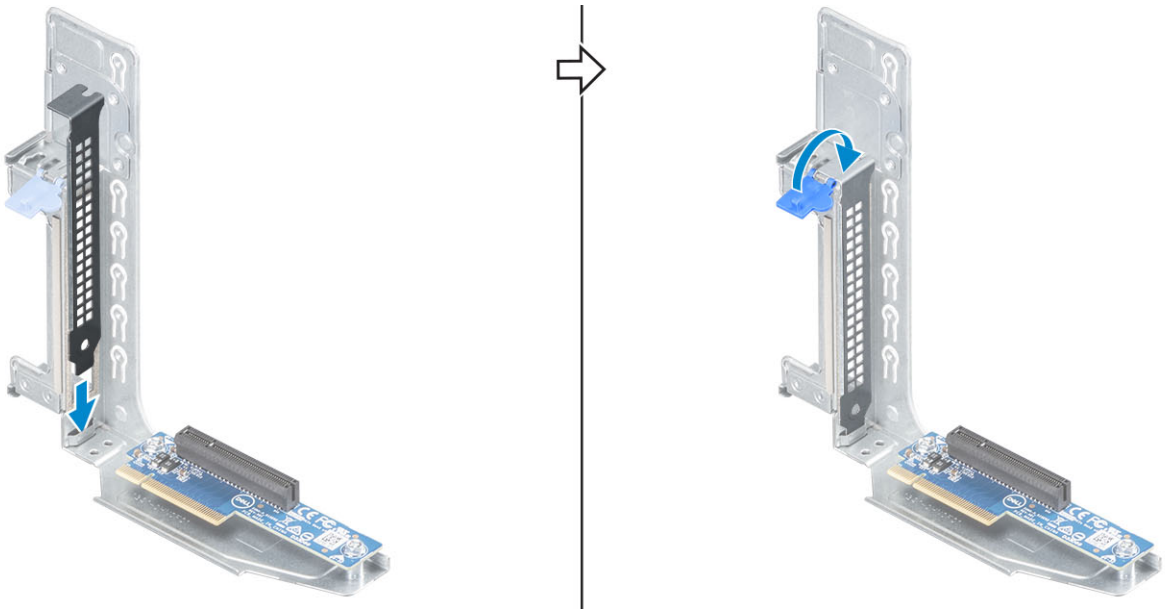


Installing the riser2 blank

Steps

1. Insert the riser2 blank into the slot and close the release tab to secure the riser2 blank in place.

   NOTE: A riser2 blank must be installed over an empty expansion card slot to maintain Federal Communications Commission (FCC) certification of the system. The blank also keep dust and dirt out of the system and aid in proper cooling and airflow inside the system.



2. Install the:
   a. Riser 2 module
   b. Top cover

3. Follow the procedure in After working inside your computer.

System board

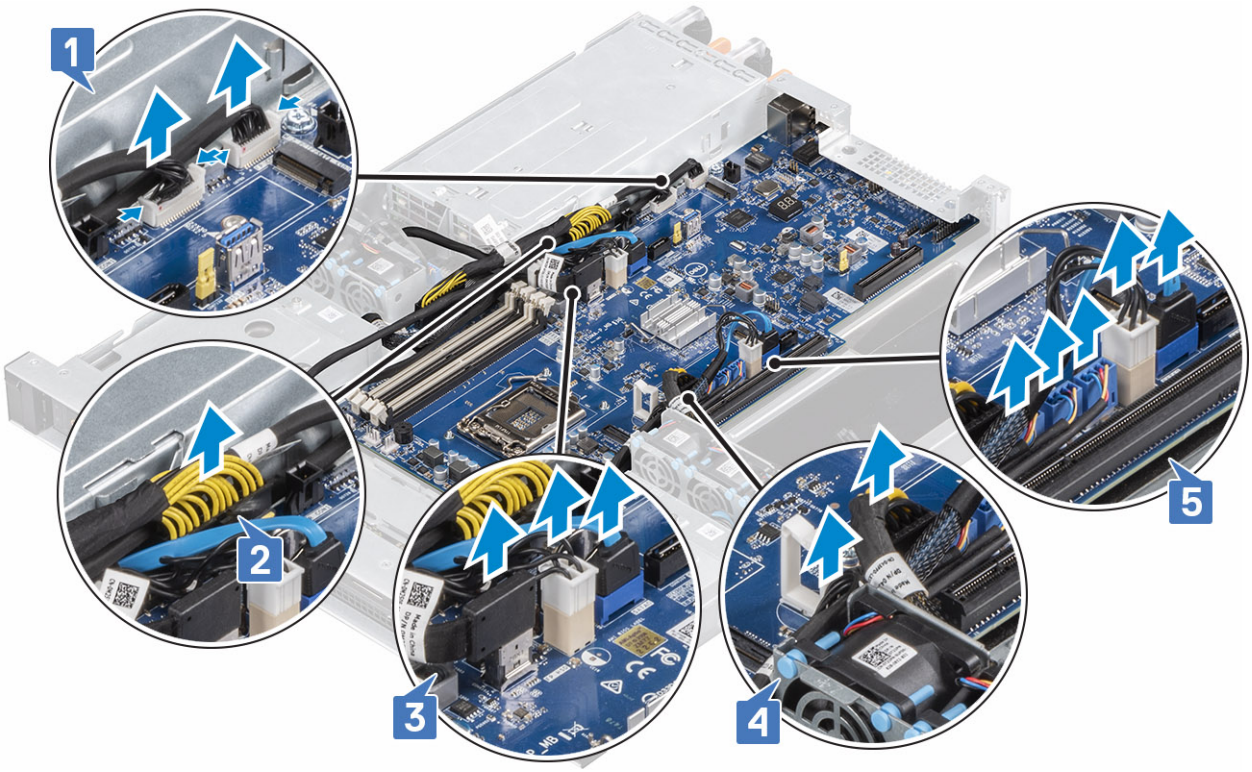
Removing system board

Steps

1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a. Top cover
   b. Air duct
   c. System Fan
   d. System fan cage
   e. Memory module
   f. Heat sink
   g. Processor
   h. M.2 PCIe Solid State Drive(if installed)
   i. Intrusion switch
   j. Riser 2 Module
   k. Riser 1 Module
3. To remove the system board connections:

   NOTE: Take a picture or document the cable routing.

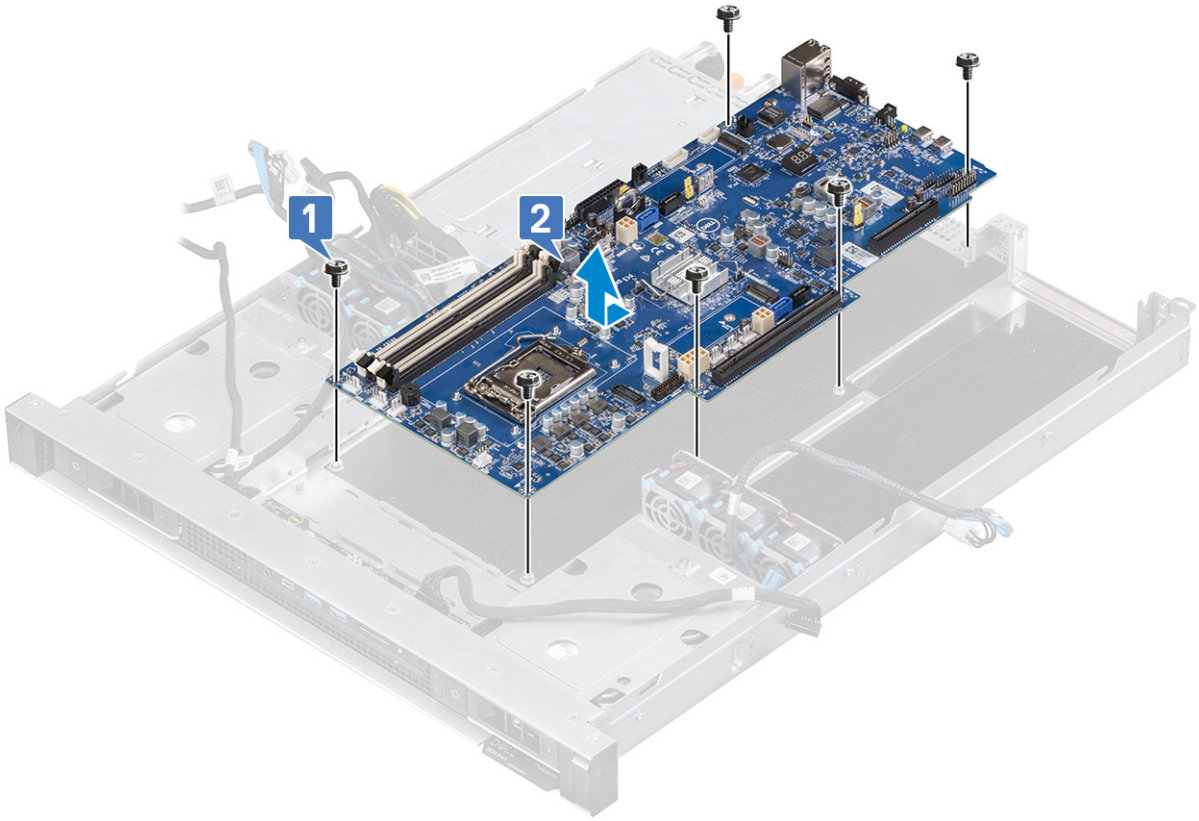
   a. Disconnect the power distribution board cable and front panel cable [1], power distribution board power cable [2], front panel HSD cable, SATA power cable, SATA 0, SATA 1 (if installed) cable [3] and unroute it from the retention clip on the system board.
   b. Disconnect front panel power cable, GPU power cable [4] and unroute it from the retention clip on the system board.
   c. Disconnect the SATA 2 power cable and the SATA 2, SATA 3 (if installed) cable [5] and lift to gain access to disconnect the GPU fan cables.



4. To remove the system board screws and system board:

5. Remove the nine #6 32 screws that secure the system board [1], lift the front of the system board, gently pull it toward the front of the chassis to disengage the connectors from the rear wall, and lift it out of the chassis.

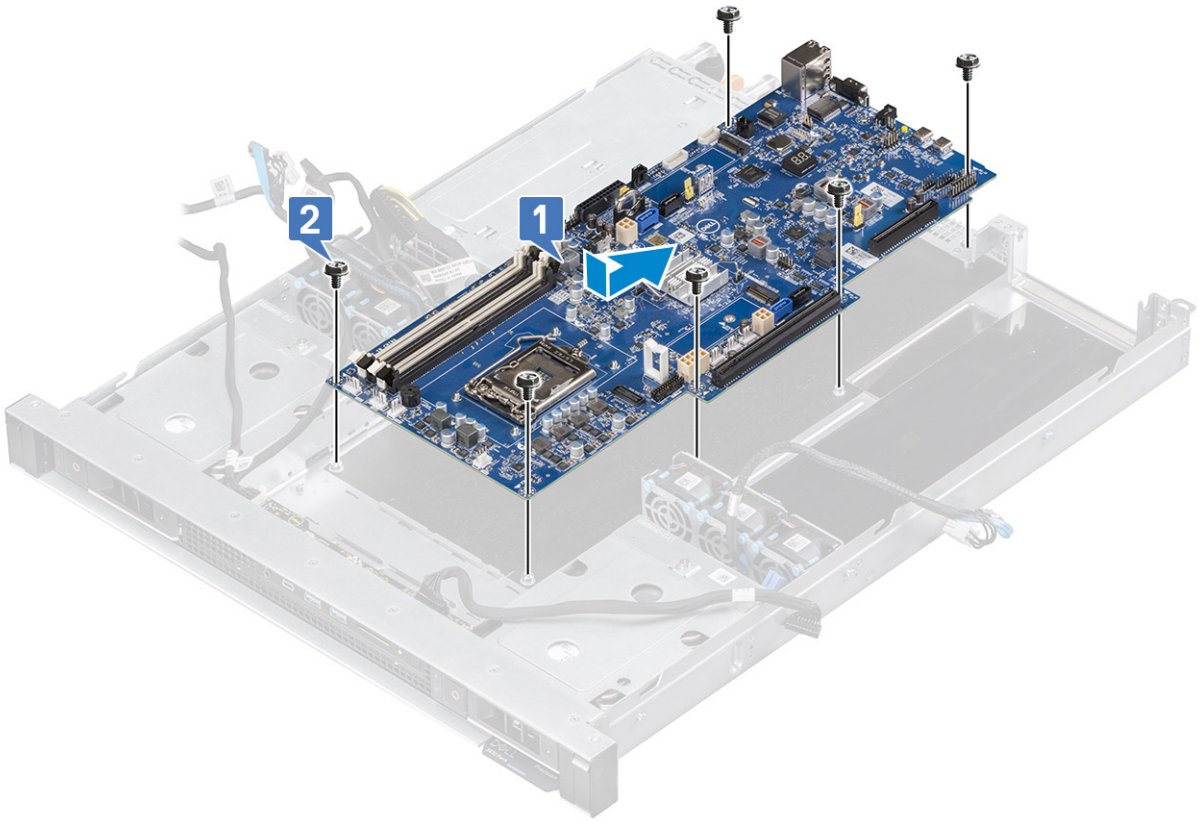
   NOTE: The system board connectors have to be pulled out of the rear wall before the system board can be removed.



Installing the system board

Steps

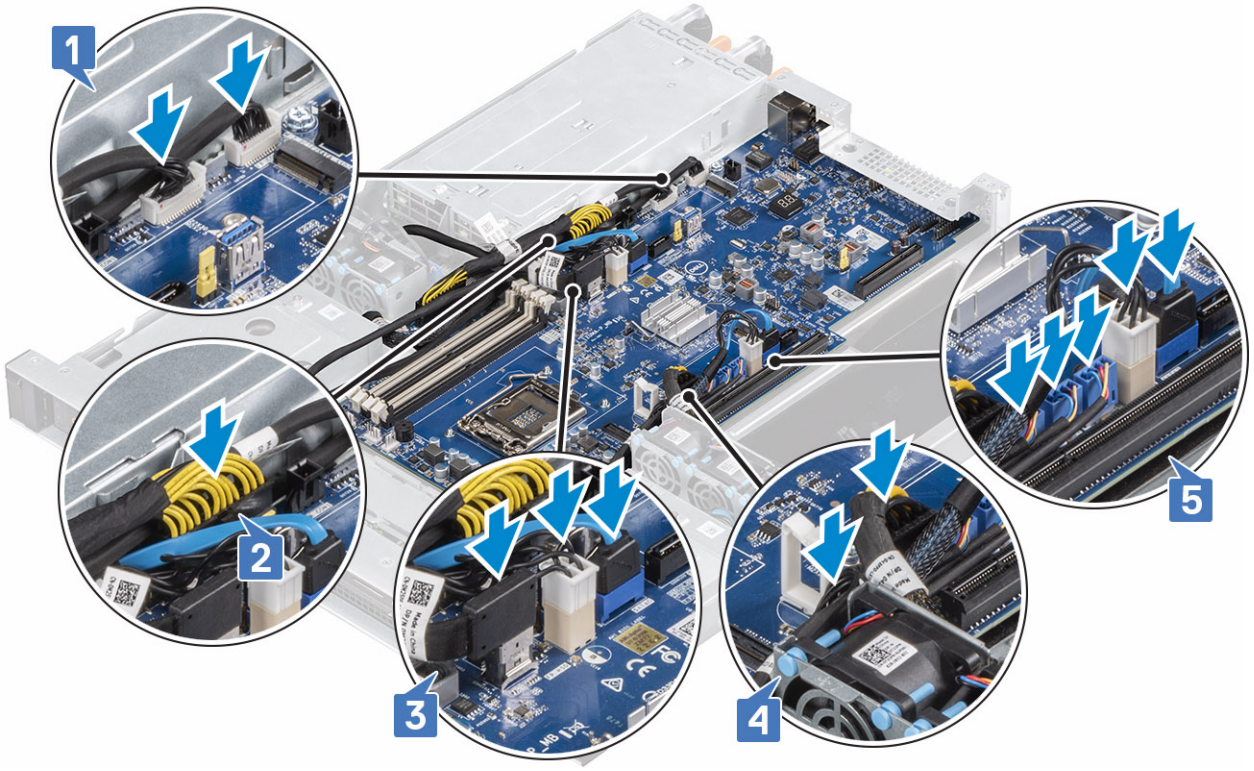
1. Hold the system board by its edges, and align it towards the back of the system.
2. Lower the system board into the system chassis until the connectors at the back of the system board align with the slots on the chassis rear wall. Move the board toward the rear wall until the screw holes on the system board align with the standoffs on the system chassis [1].
3. Secure the system board to the chassis with the nine #6 32 screws.



4. Align the cables with the pins on connectors on the system board and connect power distribution board cable and front panel cable [1], power distribution board power cable [2], front panel HSD cable, SATA power cable, SATA 0, SATA 1 (if disconnected) cable [3].
5. Reconnect the front panel power cable, GPU power cable [4].
6. Reconnect the SATA 2 power cable and the SATA 2, SATA 3 (if disconnected) cable, and the GPU fan cables [5].

NOTE: Route all cables through the retention clips that are provided on the system chassis and ensure that no cables are stuck under the system board during installation.

NOTE: Refer to cable routing picture or document and ensure the cables are properly routed.



7. Install the:
   a. Riser 1 module
   b. Riser 2 module
   c. Intrusion switch
   d. M.2 PCIe Solid State Drive - SSD (if removed)
   e. Processor
   f. Heat sink
   g. Memory module
   h. System fan cage
   i. System fan
   j. Air duct
   k. Top cover
8. Follow the procedure in After working inside your computer.

5

Troubleshooting

NIC indicator codes

Each NIC on the back of the system has LED indicators that provide information about the activity and link status. The activity LED indicator , and the link LED indicator

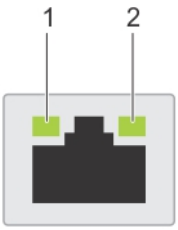


Figure 4. NIC indicator codes

1. Link LED indicator: Indicates the speed of the connected network.
2. Activity LED indicator: Indicates if data is flowing through the NIC.

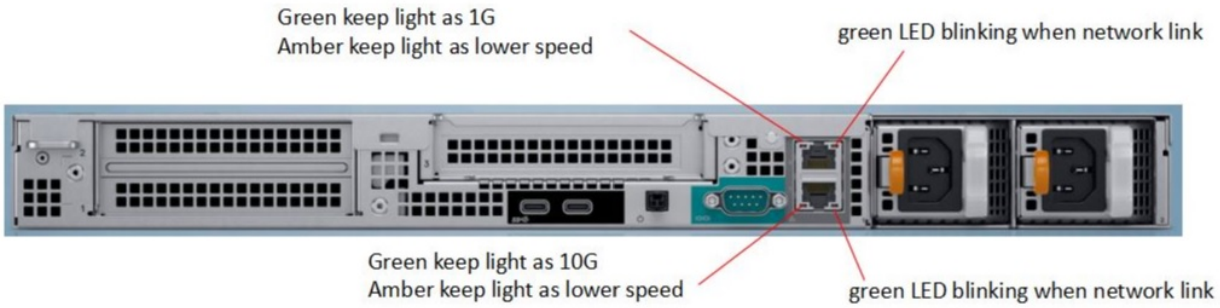


Table 4. NIC indicator codes

Status	Condition
Link and activity indicators are off.	The NIC is not connected to the network.
Link indicator is green, and activity indicator is blinking green.	The NIC is connected to a valid network at its maximum port speed, and data is being sent or received.
Link indicator is amber, and activity indicator is blinking green.	The NIC is connected to a valid network at less than its maximum port speed, and data is being sent or received.

Table 4. NIC indicator codes (continued)

Status	Condition
Link indicator is green, and activity indicator is off.	The NIC is connected to a valid network at its maximum port speed, and data is not being sent or received.
Link indicator is amber, and activity indicator is off.	The NIC is connected to a valid network at less than its maximum port speed, and data is not being sent or received.
Link indicator is blinking green, and activity is off.	NIC identify is enabled through the NIC configuration utility.

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

CAUTION: Use the system diagnostics to test only your computer. Using this program with other computers may cause invalid results or error messages.

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.

Running the ePSA Diagnostics

Steps

1. Invoke diagnostics boot by either of the methods suggested above
2. Once on one time boot menu use up/down arrow key to navigate to ePSA or diagnostics and press <return> key to launch Fn+PWR will flash diagnostics boot selected on screen and launch ePSA/diagnostics directly.
3. On the boot menu screen, select the **Diagnostics** option.
4. Press the arrow in the lower-right corner to go to the page listing.
   The items detected are listed and will be tested
5. If there are any issues, error codes are displayed.
   Note the error code and validation number and contact Dell.

To run a diagnostic test on a specific device

Steps

1. Press Esc and click **Yes** to stop the diagnostic test.
2. Select the device from the left pane and click **Run Tests**.
3. 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 5. States Under Host BIOS Control

Amber LED state	Fault Description	Faults	Recommendation for Tech Support
1, 1	Bad MBD	BAD MBD – Rows A, G, H, I and J from table 12.4 of SIO Spec- Pre-POST indicators	Make sure PSU stays off when this happen or it might just be a tripping system. If truly is the 1-1 blink code, replace MB.
1, 2	Bad MB, PSU or cabling	Bad MBD, PSU or PSU cabling -Rows B, C and D of table 12.4 SIO spec	Make sure all PSU cable, control and power are all connected. Remove PSU and test BIST button outside of the system first, if failed, replace PSU. If not, install back the PSU and test the BIST button again. If failed, replace motherboard.
1, 3	Bad MBD, DIMMS or CPU	Bad MBD, DIMMS or CPU- Rows F and K from table 12.4 of SIO spec	Make sure PSU stays ON when this happen or it might just be a false alarm. If truly is the 1-3 blink code, replace MB.
2, 1	CPU	CPU failure	Make sure a CPU is installed in primary socket. Check for CPU gold pad dirt/ finger prints. Try a known good CPU on failing system. If still cannot resolve issue, replace motherboard.
2, 2	Motherboard: BIOS ROM failure	Motherboard, covers BIOS corruption or ROM error	Power off system and install RTC_RST jumper. Remove jumper and power back on to see if issue persist. Make sure system stays ON and 2-2 code repeats when this happen or it might just be a false alarm. If truly is the 2-2 blink code, replace MB.
2, 3	Memory	No Memory/RAM detected	Make sure a supported DIMM is installed. Try different DIMM slots. Try knonw good DIMM stick. If still cannot resolve issue, replace motherboard.
2, 4	Memory	Memory/RAM failure	Make sure a supported DIMM is installed. Try different DIMM slots. Try knonw good DIMM stick. If still cannot resolve issue, replace motherboard.
2, 5	Memory	Invalid memory installed	Make sure a supported DIMM is installed. Try different DIMM slots. Try knonw good DIMM stick. If still cannot resolve issue, replace motherboard.
2, 6	Motherboard: Chipset	Motherboard / Chipset Error	Power off system and install RTC_RST jumper. Remove jumper and power back on to see if issue persist. If yes, power off system and remove coin cell battery. Install back battery and power back on to see if issue persist. If yes, replace motherboard.

Table 5. States Under Host BIOS Control (continued)

Amber LED state	Fault Description	Faults	Recommendation for Tech Support
3, 2	PCI / Video	PCI or Video card/chip failure	Swap monitor/Video cable/GFX card. Try GFX card only in slot 2 and slot 4. If not resolved, replace motherboard.
3, 3	BIOS Recovery 1	Recovery Image not found	Power off system and install RTC_RST jumper. Remove jumper and power back on to see if issue persist. If yes, power off system and remove coin cell battery. Install back battery and power back on to see if issue persist. If yes, replace motherboard.
3, 4	BIOS Recovery 2	Recovery Image found but invalid	Power off system and install RTC_RST jumper. Remove jumper and power back on to see if issue persist. If yes, power off system and remove coin cell battery. Install back battery and power back on to see if issue persist. If yes, replace motherboard.
4, 7	System Side cover is missing		Install back the side cover. If not resolve, check intrusion switch mechanical and connector plugged in.

PSU LED indicator

Table 6. PSU LED indicator summary

LED behavior	Diagnosis
Off	AC Power is not connected
Solid green	In standby mode. A valid AC source is connected and power is operational. When on PSU is providing DC power to the system.
Flashing amber	Indicates a problem with the power supply
Flashing Green	When hot-adding a power supply, this indicates that the power supply is mismatched with the other power supply (in terms of efficiency, features set, health status, and supported voltage).

Diagnostic error messages

Table 7. 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**

Table 7. Diagnostic error messages (continued)

Error messages	Description
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.
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**.

Table 7. Diagnostic error messages (continued)

Error messages	Description
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.
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

Table 7. Diagnostic error messages (continued)

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

System error messages

Table 8. 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	No bootable partition on hard disk drive, the hard disk drive cable is loose, or no bootable device exists.

Table 8. System error messages (continued)

System message	Description
	• 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.

Configuring RAID with Intel RSTe

Configuring RAID using Legacy OROM configuration utility

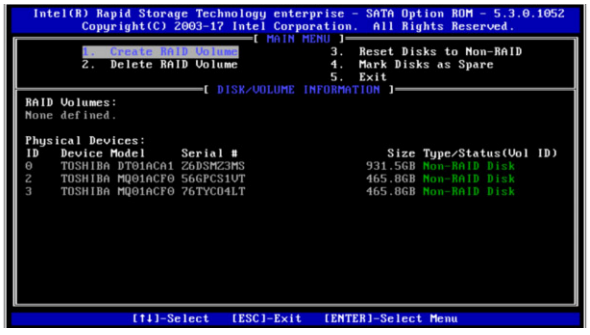
During POST when the Intel RSTE Option ROM is loading, press CTRL+I on the keyboard to enter the Intel® RSTE Configuration Utility. Once inside the OROM the user can navigate around using the up (↑) and down (↓) arrows on the keyboard. ESC can be used to exit the OROM and reboot the system. ENTER is used to select the currently selected menu option. These options are also described at the bottom of the screen.

Creating a RAID Volume

Enter the Intel RSTe Legacy OROM: During POST when the Intel RSTE Option ROM is loading, press CTRL+I on the keyboard to enter the Intel RSTE Configuration Utility.

NOTE: If only a single drive is attached, the Intel RSTe Legacy OROM is not shown during boot.

- **Creating a RAID Array:**Navigate to Option 1 "Create RAID Volume" and press the "ENTER" key. The following screen is displayed

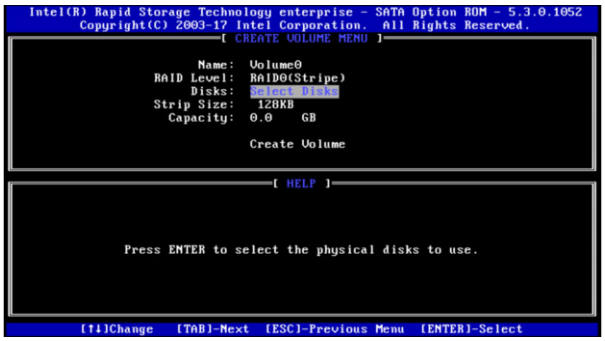


- **Name the RAID volume:**The first step is to provide a name for the RAID Array. This can be an alpha-numeric name with no more than 16 characters. Once finished, press TAB to go to the next step.

- **Choose a RAID level :**The next step is to choose the RAID level that you plan on configuring. Use the ↑ and ↓ arrow keys on the keyboard to select different options. Once the desired RAID level is chosen, press TAB to go to the next step.

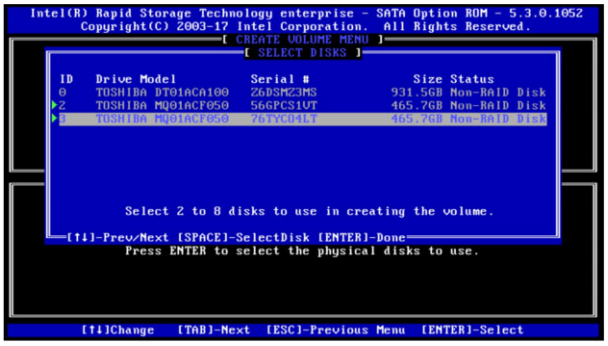
NOTE: Depending on the number of drives attached to the system, the RAID options may be limited. RAID0 requires a minimum of 2 drives. RAID1 is limited to 2 drives. RAID5 requires a minimum of 3 drives. RAID10 requires a minimum of 4 drives.

- **Select Disks :**The next step is to select the disks that will be used within this volume. If the below option is not already highlighted, press TAB until the below option is highlighted, then press ENTER.

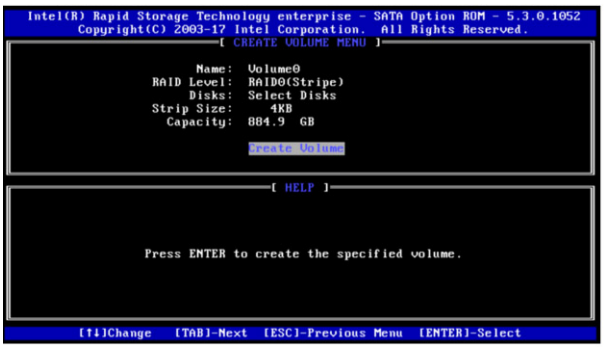


NOTE: If you only have the minimum number of disks installed for the RAID level chosen, the Select Disks option will not be visible as the disks are selected automatically. In this scenario, all included disks would be included in the RAID Array.

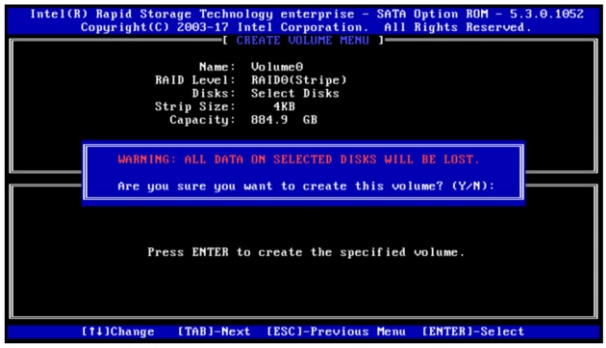
- You will now be presented with a screen similar to the below. You can use ↑ and ↓ arrow keys on the keyboard to navigate between the different drives. The SPACE key is used to select the drives you plan on using for the RAID Volume. The ENTER key is used to finish this step. Press TAB to move to the next step. A small green indicator will appear next to the drives that you have selected as shown below.



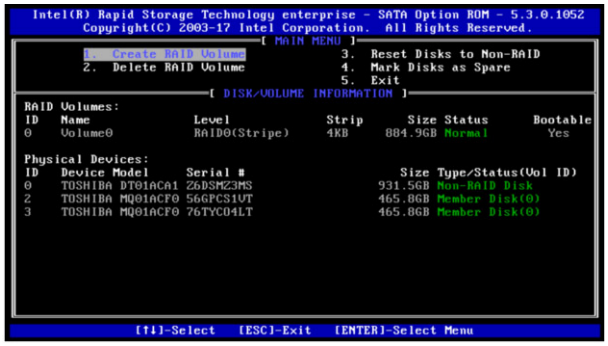
- **Select Stripe size and Capacity (Optional) :**Strip size can be adjusted depending on the usage scenario. This is entirely up to the user on the strip size that might provide the most benefit to your usage model. The capacity section of this menu is automatically populated with the maximum capacity available based on the combination of RAID Level chosen, and the actual drive capacity. This can be adjusted if the user desires.
- **Create Volume :**Create Volume Once the above steps have been completed, press TAB again to navigate to the "Create Volume" option as below.



- **Confirmation :**Press ENTER to select this option. You will now be presented with a warning that all data will be lost on the drives when you create the RAID array. If you are ready, press Y to create the RAID volume.

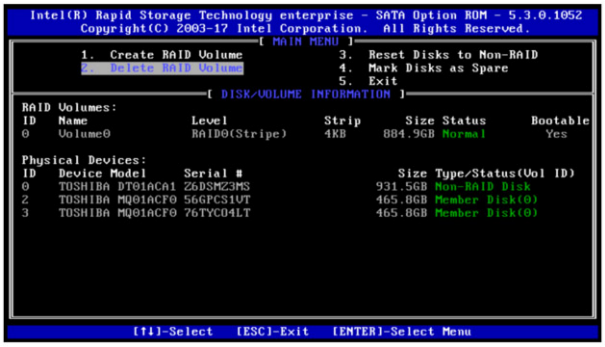


- **Completion :**You will now be taken back to the home page. If your RAID volume was created successfully, you will see the RAID volume appear in the list, and the drive status for the member drives will have changed as well. Please see below, for a simple RAID0 built from two 500GB HDD's.

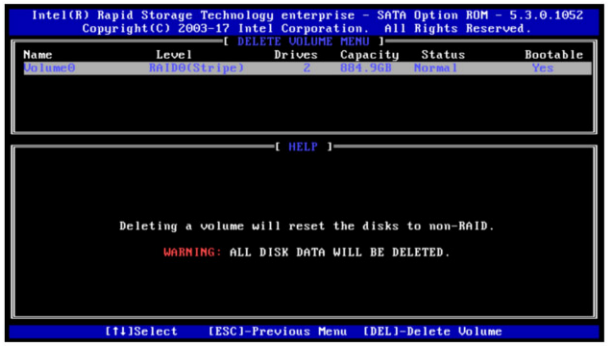


Deleting a RAID Volume

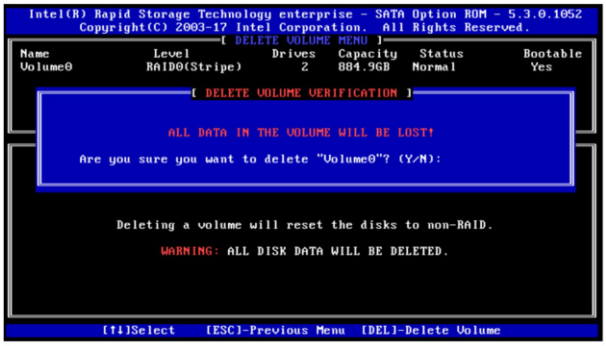
- **Enter the Intel RSTE Legacy OROM :**During POST when the Intel RSTE Option ROM is loading, press CTRL+I on the keyboard to enter the Intel® RSTE Configuration Utility.
- **Deleting a RAID Volume :**Navigate to Option 2 "Delete RAID Volume" using the ↑ and ↓ arrow keys and press the "ENTER" key.



- **Choosing the Volume to delete :**You will now be presented with the below screen. Use the ↑ and ↓ arrow keys again to select the RAID volume you would like to delete. Once selected, press the DEL (Delete) button on your keyboard to delete the volume.



- **Confirmation :**There is a confirmation step prior to deletion to confirm. All data on the disks will be deleted upon completion of this step. If you are certain you'd like to proceed, press the Y key on your keyboard.



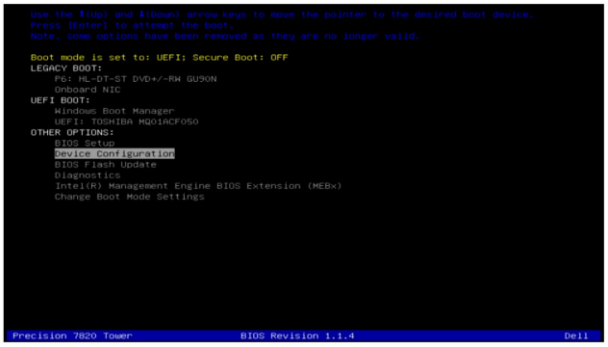
- Upon successful deletion, you will be taken back to the original home screen.

Configuring RAID using UEFI-HII

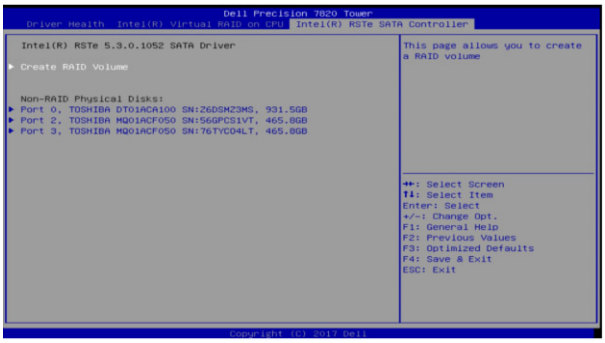
When UEFI boot mode is enabled, and Legacy Option ROMs are disabled, the user will not see the Intel RSTE Option ROM load during system boot. Instead, to create RAID volumes, you must F12 -> "Device Configuration" menu.

Creating a RAID Volume

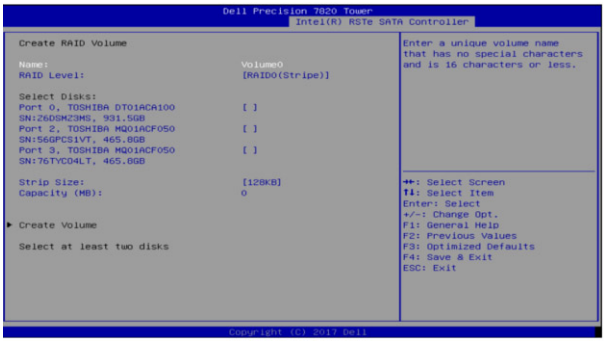
Entering the Boot Options menu : During system POST, press the F12 menu when the Dell logo is loading. You will see a progress bar appear if your keystroke was successful. You will now be presented with a menu similar to the below.



- **Entering the Device Configuration Utility :**Using the ↑ and ↓ arrow keys, navigate to Device Configuration, and press the ENTER key on your keyboard. Depending upon the devices you have installed in the system, you may be presented with different options than the below. You can use the left and right arrow keys to navigate to the different devices you have installed in the system.



- **Navigation within the Device Configuration Utility :** Once inside the Intel RSTe SATA Controller the user can navigate around using the up (↑) and down (↓) arrows on the keyboard. ESC can be used to exit the device and return to the Boot Options Menu. ENTER is used to select the currently highlighted menu option. These options are also described at the bottom right hand corner of the screen.
- **Creating a RAID Volume :** Navigate to "Create RAID Volume" and press the "ENTER" key. You will be presented with the below screen.



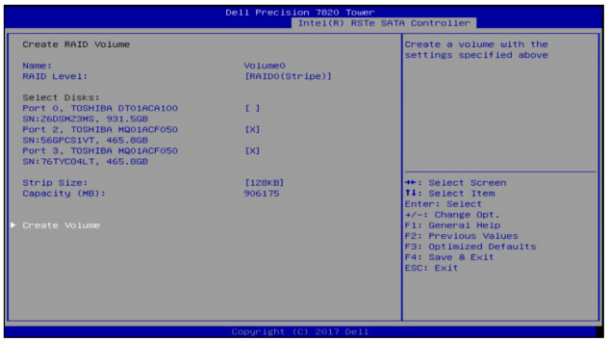
- **Name the RAID Volume :**Name the RAID Volume: The first step is to provide a name for the RAID Array. This can be an alpha-numeric name with no more than 16 characters. Once finished, press the down arrow to go to the next step.
- **Choose a RAID Level :**The next step is to choose the RAID level that you plan on configuring. Use the + and - keys on the keyboard to select different options. Once the desired RAID level is chosen, press TAB to go to the next step.

NOTE: Depending on the number of drives attached to the system, the RAID options may be limited. RAID0 requires a minimum of 2 drives. RAID1 is limited to 2 drives. RAID5 requires a minimum of 3 drives. RAID10 requires a minimum of 4 drives.

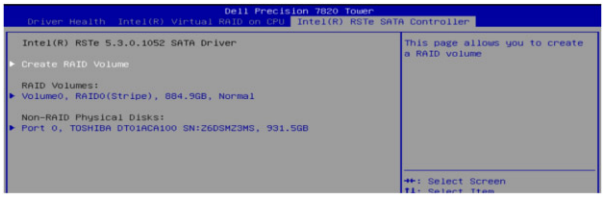
- **Select Disks :**The next step is to select the disks that will be used within this volume. Using the Up and Down arrow keys, you can navigate to the different disks. Use the + and - keys to select (+) or deselect (--) a drive as a member disk for the RAID volume.

NOTE: A small X will appear next to the drives that you have selected as shown above. Drives already a part of an existing volume will not appear in this list. You will need to delete the existing volume if you plan to use those drives within a new RAID volume.

- **Choose Strip Size and Capacity (Optional) :**Strip size can be adjusted depending on the usage scenario. This is entirely up to the user on the strip size that might provide the most benefit to your usage model. The capacity section of this menu is automatically populated with the maximum capacity available based on the combination of RAID Level chosen, and the actual drive capacity. This can be adjusted if the user desires.
- **Create Volume :**Once the above steps have been completed, press down key again to navigate to the "Create Volume" option as below.

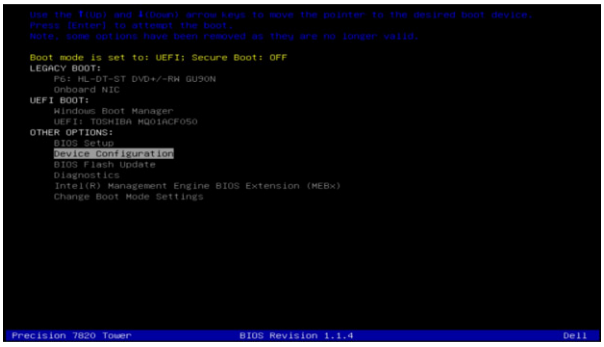


- **Confirmation :** Press enter to select this option. You will now be presented with a warning that all data will be lost on the drives when you create the RAID array. If you are ready, press Y to create the RAID volume.
- **Completion :** You will now be taken back to the home page. If your RAID volume was created successfully, you should see the RAID volume appear in the list, and the drives included in the RAID volume are no longer present within the Non-RAID Physical Disks list. Please see below, for a simple RAID0 built from two 500GB HDD's.

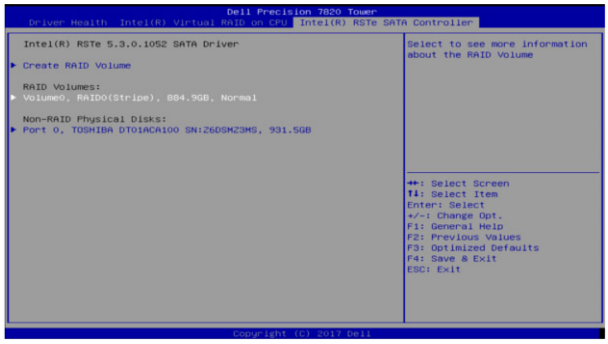


Deleting a RAID Volume

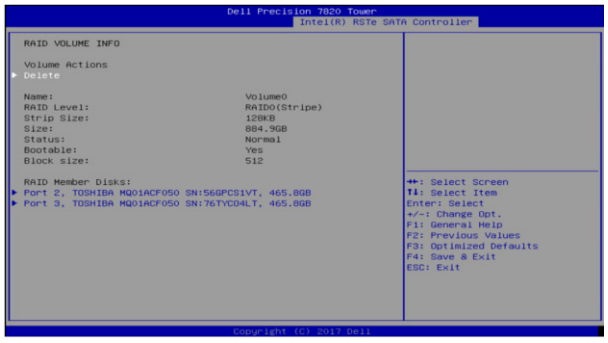
- **Entering the Boot Options menu :** During system POST, press the F12 menu when the Dell logo is loading. You will see a progress bar appear if your keystroke was successful. You will now be presented with a menu similar to the below.



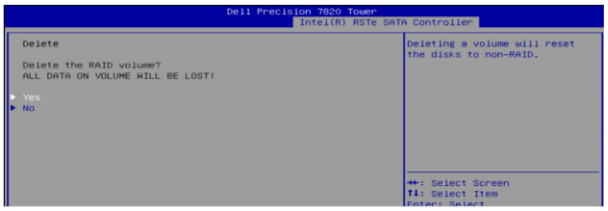
- **Choosing the right RAID Volume :** Enter the Device Configuration menu as shown in the Creating a RAID Volume step. While in the Device Configuration menu, you can navigate using the Up and Down arrow keys to get to additional information on the various RAID volumes. Once you have the RAID volume selected you would like to delete, press the Enter key on your keyboard.



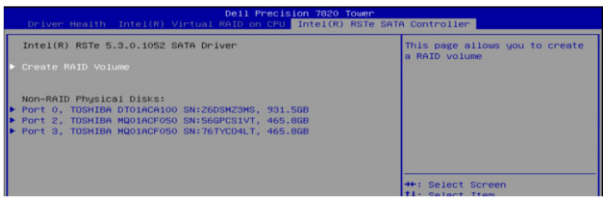
- **Delete Volume :** You will now be presented with the below screen. Use the ↑ and ↓ arrow keys again to navigate to different options within the menu. You can also select the individual disks and press Enter to see additional information on the disks. Once you are ready to delete the volume, navigate to the Delete option as below, and press Enter on your keyboard.



- **Confirmation :** There is a confirmation step prior to deletion to confirm. All data on the disks will be deleted upon completion of this step. If you are certain you'd like to proceed, navigate to Yes using the up and down arrow keys, and press Enter.



- **Completion :** Upon successful deletion, you will be taken back to the original home screen.



Backup media and recovery options

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

WiFi power cycle

About this task

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

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

Steps

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

6

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 9. 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.	1. Go to https://www.dell.com/support/home/?app=knowledgebase. 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: • Product specifications • Operating system • Setting up and using your product • Data backup • Troubleshooting and diagnostics • Factory and system restore • BIOS information	See *Me and My Dell* at www.dell.com/support/manuals. To locate the *Me and My Dell* relevant to your product, identify your product through one of the following: • 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 and product, and some services may not be available in your country.

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.