Neousys Technology Inc.

RGS-9805GC Series

User Manual

Revision 1.0

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Legal Information

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Before installing any software, applications or components provided by a third party, customer should ensure that they are compatible and interoperable with Neousys Technology Inc. product by checking in advance with Neousys Technology Inc.. Customer is solely responsible for ensuring the compatibility and interoperability of the third party's products. Customer is further solely responsible for ensuring its systems, software, and data are adequately backed up as a precaution against possible failures, alternation, or loss.

For questions in regards to hardware/ software compatibility, customers should contact Neousys Technology Inc. sales representative or technical support.

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Contact Information

For contact information, please visit our official website

Declaration of Conformity

FCC	This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at own expense.
CE	The product(s) described in this manual complies with all applicable European Union (CE) directives if it has a CE marking. For computer systems to remain CE compliant, only CE-compliant parts may be used. Maintaining CE compliance also requires proper cable and cabling techniques.

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Safety Precautions

- Read these instructions carefully before you install, operate, or transport the system.
- Install the system or DIN rail associated with, at a sturdy location
- Install the power socket outlet near the system where it is easily accessible
- Secure each system module(s) using its retaining screws
- Place power cords and other connection cables away from foot traffic. Do not place items over power cords and make sure they do not rest against data cables
- Shutdown, disconnect all cables from the system and ground yourself before touching internal modules
- Ensure that the correct power range is being used before powering the device
- Should a module fail, arrange for a replacement as soon as possible to minimize down-time
- By means of a power cord connected to a socket-outlet with earthing connection
- If the system is not going to be used for a long time, disconnect it from mains (power socket) to avoid transient over-voltage

Mesures de sécurité

- Lire attentivement ces directives avant d’installer, d’utiliser ou de transporter le système.
- Installer le système ou la barrette DIN qui lui est associée, à un endroit solide
- Installer la prise de courant près du système et pour qu’elle soit facilement accessible
- Fixer chaque module du système à l'aide de ses vis de fixation
- Éloigner de la circulation piétonne les cordons d'alimentation et autres câbles de connexion. Ne jamais placer d’objets sur les cordons d’alimentation et s’assurer qu’ils ne reposent pas contre les câbles de données
- Avant de toucher les modules internes, arrêter, débrancher tous les câbles du système et raccordez-vous à la terre
- S’assurer que la bonne plage de puissance est utilisée avant d'alimenter l'appareil
- Prévoir un remplacement dès que possible en cas de défaillance d'un module, afin de minimiser les temps d'arrêt
- Au moyen d'un cordon d'alimentation branché à une prise de courant avec mise à la terre (MALT)
- Si le système ne sera pas être utilisé pendant une période prolongée, le débrancher du réseau (prise de courant) pour éviter une surtension transitoire

Service and Maintenance

- ONLY qualified personnel should service the system
- Shutdown the system, disconnect the power cord and all other connections before servicing the system
- When replacing/ installing additional components (expansion card, memory module, etc.), insert them as gently as possible while assuring proper connector engagement

Entretien et réparation

- La réparation du système ne peut être effectuée que par du personnel qualifié
- Avant de réparer le système, arrêter le système, débrancher le cordon d'alimentation et toutes les autres connexions
- Lors du remplacement ou de l'installation de composants supplémentaires (carte d'extension, module de mémoire, etc.), les insérer le plus doucement possible tout en s’assurant que les connecteurs sont bien engagés jusqu’au bout

Hot Surface Warning

HOT SURFACE. DO NOT TOUCH. "ATTENTION: Surface chaude. Ne pas toucher."

WARNING!

Components/ parts inside the equipment may be hot to touch! Please wait one-half hour after switching off before handling parts.

Surface chaude

AVERTISSEMENT : *SURFACE CHAUDE. NE PAS TOUCHER.*

Les composants et pièces à l'intérieur de l'équipement peuvent être chauds au toucher. Après l'arrêt, attendre au moins 30 minutes pour que le système refroidisse avant d'effectuer l'entretien.

- Respecter les règles de sécurité et d'entretien mentionnées au début du guide d'utilisation!

Battery Warning

- Batteries are at risk of exploding if incorrectly installed
- Do not attempt to recharge, force open, or heat the battery
- Replace the battery only with the same or equivalent type recommended by the manufacturer

Avertissement concernant les piles

- Les piles risquent d'exploser si elles sont mal installées.
- Ne jamais essayer de recharger, d'ouvrir de force ou de chauffer les piles.
- Remplacer les piles uniquement avec le même type ou l’équivalent recommandé par le fabricant.

ESD Precautions

- Handle add-on module, motherboard by their retention screws or the module's frame/ heat sink. Avoid touching the PCB circuit board or add-on module connector pins
- Use a grounded wrist strap and an anti-static work pad to discharge static electricity when installing or maintaining the system
- Avoid dust, debris, carpets, plastic, vinyl and styrofoam in your work area.
- Do not remove any module or component from its anti-static bag before installation

Précautions nécessaires de décharge électrostatique (ESD)

- Tenir le module complémentaire et la carte mère par leurs vis de rétention ou le châssis/dissipateur de chaleur du module. Éviter de toucher la carte de circuit imprimé ou les broches du connecteur du module complémentaire
- Afin de décharger l'électricité statique, utiliser une dragonne mise à la terre et un tapis de travail antistatique lors de l'installation ou de l'entretien du système
- Éviter la poussière, les débris, les tapis, le plastique, le vinyle et la mousse de polystyrène dans votre zone de travail.
- Ne retirer aucun module ou composant de son sac antistatique avant l'installation

Restricted Access Location

The controller is intended for installation only in certain environments where both of the following conditions apply:

- Access can only be gained by QUALIFIED SERVICE PERSONNEL who have been instructed on the reasons for restrictions applied to the location and any precautions that shall be taken
- Access is through the use of a TOOL, lock and key, or other means of security, and is controlled by the authority responsible for the location

Lieu d’accès restreint

Le contrôleur doit être installé uniquement dans les environnements où les deux conditions suivantes sont présentes :

- Le lieu ne peut être accédé que par du PERSONNEL TECHNIQUE QUALIFIÉ informé des raisons des restrictions appliquées à l'emplacement et des précautions à prendre
- L'accès est contrôlé par l'autorité responsable de l'emplacement et se fait au moyen d'un OUTIL, d'une serrure et d'une clé ou d'autres moyens de sécurité

About This Manual

This manual introduces RGS-9805GC series and demonstrates the system's installation procedures.

Revision History

Version	Date	Description
1.0	Jul. 2026	Initial release

1 Introduction

Driven by AMD EPYC™ 9005 Series Turin processors and two NVIDIA® RTX Pro™ 6000 GPUs, the RGS-9805GC is a rugged HPC server engineered for the absolute extremes. It thrives where standard servers fail, delivering massive CPU/GPU performance while withstanding harsh temperatures, violent shock, and heavy vibration.

To fuel performance-hungry, real-time physical AI applications, the RGS-9805GC can host a 400W AMD EPYC™ 9005 processor (up to 160 cores/ 320 threads), striking a perfect CPU-and-GPU balance with two NVIDIA® RTX Pro™ 6000 MAX-Q GPUs. A partitioned enclosure creates a sealed tunnel for efficient CPU/ GPU heat dissipation, ensuring reliable operation from -25°C to 60°C. Additionally, specialized GPU brackets and damping brackets provide MIL-STD-810H compliance for shock and vibration for in-vehicle or on-robot deployments.

The RGS-9805GC provides high-density expansion flexibility within a compact 19" 3U chassis featuring a 388 mm depth. The system includes two PCIe Gen5 x16 slots supporting dual-slot, FHFL (full-height, full-length) NVIDIA® GPUs, alongside five additional PCIe Gen5 x16/x8 slots designed for high-bandwidth CoaXPress, GMSL2, 10GbE, and USB3 frame grabber cards. Two mPCIe slots allow further expansion for mobile connectivity or supplementary CAN/COM ports. For high-speed data logging, storage options include two M.2 NVMe slots and one front-accessible U.2 tray. Additionally, an onboard ASIL-B MCU provides continuous system health monitoring, paving the way for a functionally safe autonomous vehicle system architecture.

The RGS-9805GC redefines the physical AI computer, designed to meet extreme CPU/ GPU performance, expansion flexibility, and field deployment requirements while integrating sense-think-act capabilities into a single rugged HPC server. Whether it’s

powering high-speed autonomous trucking, capturing massive data streams for in-vehicle HD mapping, or driving real-time robotics for autonomous logistics, the RGS-9805GC is built to dominate harsh environments.

1.1 Product Specifications

1.1.1 RGS-9805GC Specifications

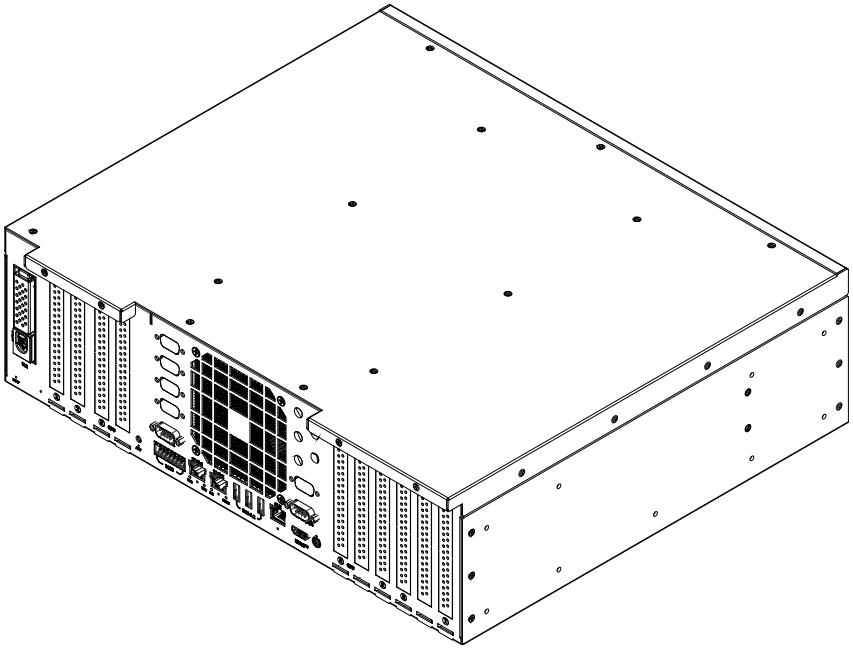
System Core	
Processor	AMD® EPYC™ 9005 Turin series server 400W CPU, up to 160 cores/ 320 threads
Graphics	Silicon Motion SM768
Memory	Up to 384GB ECC DDR5 6000 RDIMM (six RDIMM slots)
TPM	Supports TPM 2.0
I/O Interface	
10G Ethernet	2x 10GBASE-T ports with screw-lock by Broadcom 57416, supporting 10G/1G link speed and RDMA (RoCEv2)
Ethernet port	1x GbE port with screw-lock by Intel i210 supporting Wake-on-LAN (WOL)
Video port	1x HDMI port via SM768, supporting 1920 x 1080 resolution
USB	3x USB 3.2 Gen1 (5 Gbps) ports
Serial port	1x software-programmable RS-232/ 422/ 485 ports (COM1) 3x 3-wire RS-232 ports (COM2/ 3/ 4) or 1x RS-422/ 485 port (COM2)
2x8 pin terminal block	1x Ignition power control 1x Power LED 1x System monitoring MCU RS-232 port 1x System monitoring MCU isolated DO 1x System monitoring MCU isolated CAN 2.0 port
Storage Interface	
M.2 M	2x M.2 2280 M key socket (PCIe Gen4x4) for NVMe SSD
U.2 NVMe	1x front-accessible 2.5” U.2 tray (up to 15mm height, PCIe Gen3x4)
SlimSAS	1x internal SlimSAS (PCIe Gen3x4) port
Expansion Bus	
PCI Express	2x PCIe x16 slot@Gen5, 16-lane interface for 400W, dual-slot width, NVIDIA® FHFL GPU card 4x PCIe x16 slot@Gen5, 16-lane interface 1x PCIe x16 slot@Gen5, 8-lane interface
mini-PCIe	2x full-size Mini PCIe sockets (PCIe + USB 2.0; one with micro-SIM slot)
Power Supply	
DC Input	1x 4-pin + 1x 5-pin pluggable terminal block for 9V to 32V DC input with ignition control [1]
Maximum	Power consumption with AMD EPYC 9015:

power consumption	Status	C-states	Power option	9v	12v	24v	32v
	Standby (S5)	-	-	5.93	8.62	12	15.95
	Win 11 Idle	Enabled	High performance	48.43	51.78	61.28	71.76
	Win 11 Idle	Disabled		85.31	87	97.82	106.73
	Burn-in test: CPU 100%	Disabled		195.5	196.8	207.58	217.1
	Burn-in test: CPU/ MEM/ COM/ Disk 100%	Disabled		209.1	209.97	221.2	234.71

Mechanical	
Dimension	444 mm (W) x 388 mm (D) x 130 mm (H)
Weight	12.9Kg (excluding mounting kits)
Mounting	Wall-mount (standard) Rack-mount (standard) Damping bracket (standard)
Environmental	
Operating Temperature	-25°C to 60°C Under continuous 100% CPU and GPU utilization, non-throttling operation is maintained as follows: · 55°C to 60°C: Up to 300W CPU and 200W GPU · 45°C to 50°C: Up to 400W CPU and 300W GPU
Storage Temperature	-40°C to 85°C
Humidity	10% to 90%, non-condensing
Vibration	MIL-STD-810H, Method 514.8, Category 4 (operating)
Shock	MIL-STD-810H, Method 516.8, Procedure I (operating): 20G, ±X/ ±Y/ ±Z-axes, 3 shocks per direction (18 total shocks) IEC 60068-2-27:2008 (Operating): 50G, ±Z-axis only, 3 shocks per direction (6 total shocks)
EMC	CE/ FCC Class A, according to EN 55032 & EN 55035

[1] The allowable DC input current for each pin is 40A. With a 9V DC input, the maximum system load is 1440W.

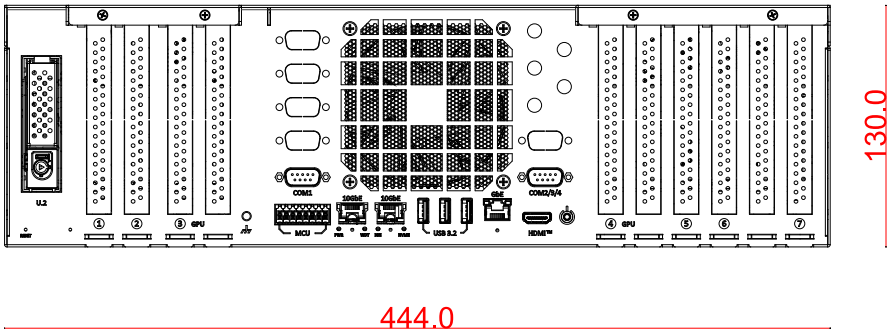
1.2 RGS-9805GC Dimension



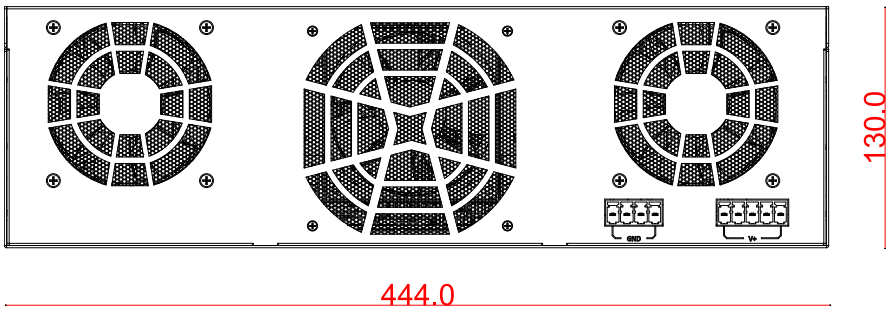
NOTE

All measurements are in millimeters (mm).

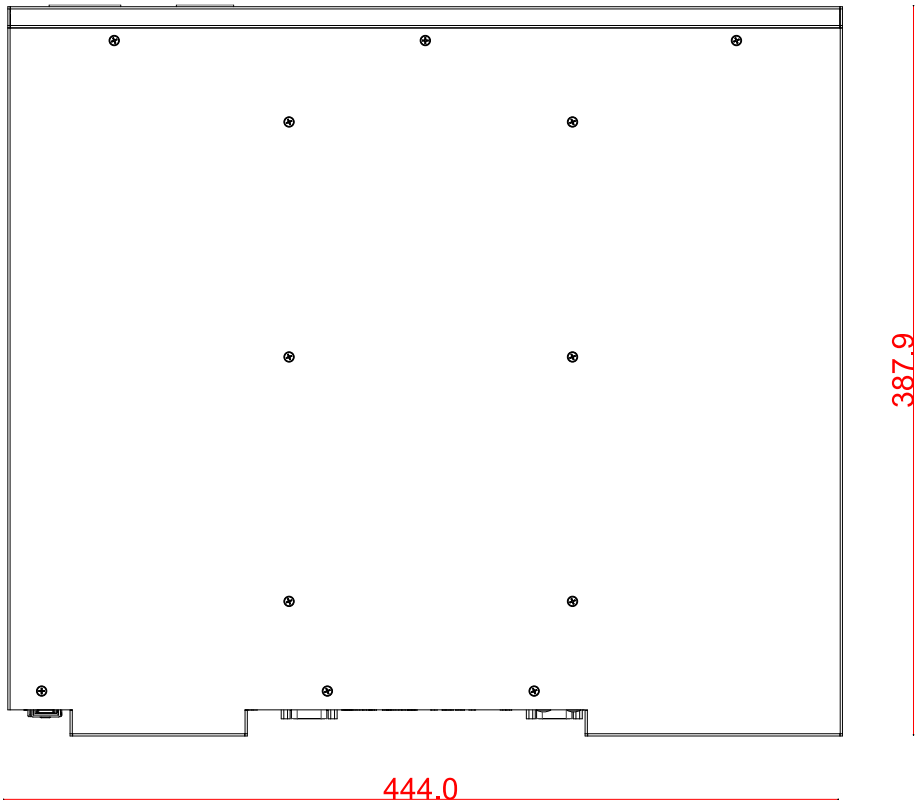
1.2.1 RGS-9805GC Front Panel View



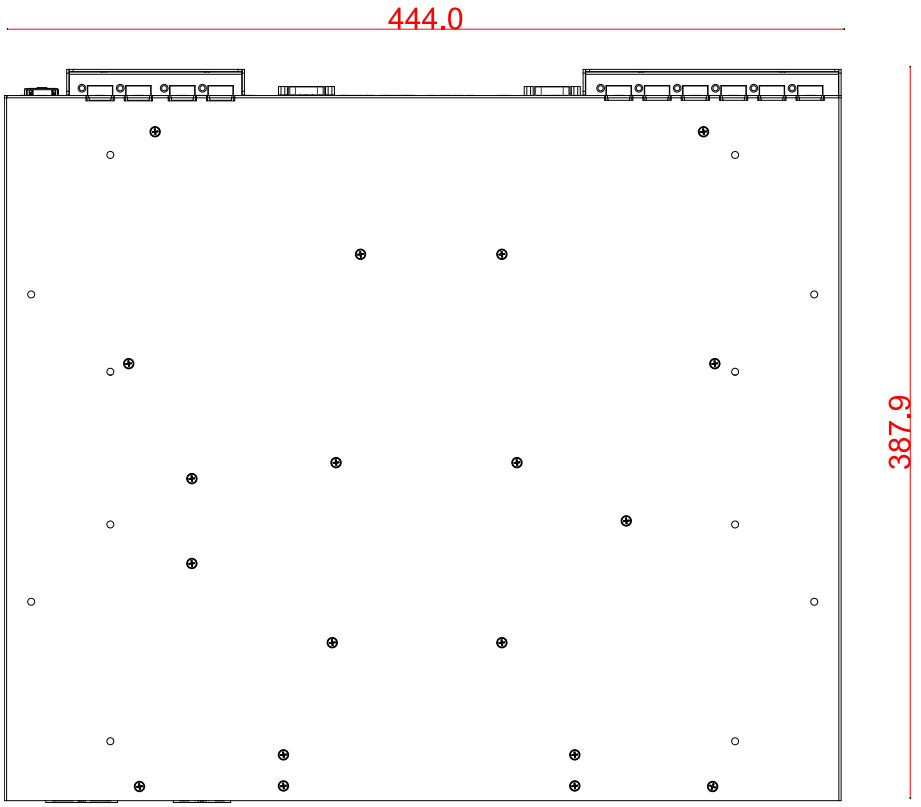
1.2.2 RGS-9805GC Rear Panel View



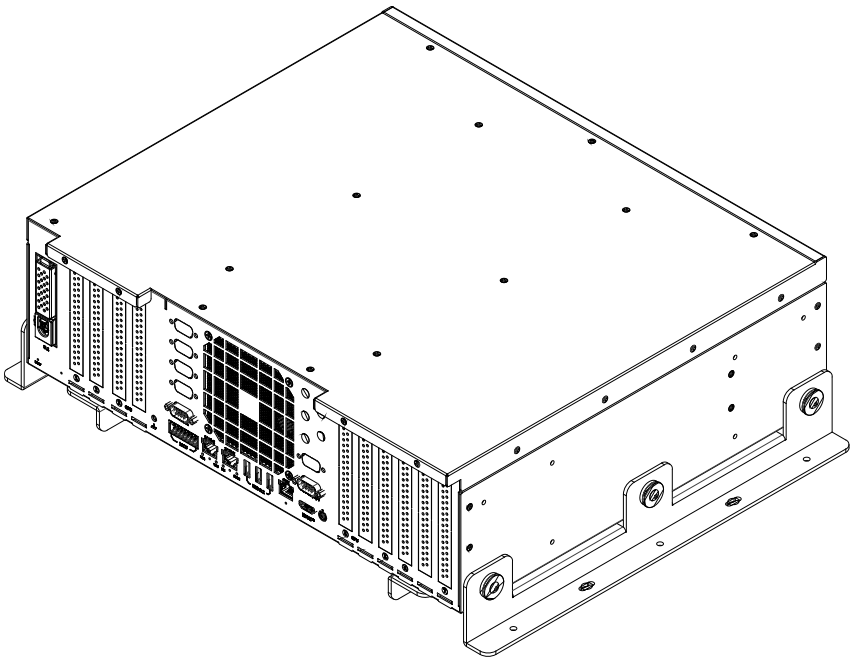
1.2.3 RGS-9805GC Top View



1.2.4 RGS-9805GC Bottom View



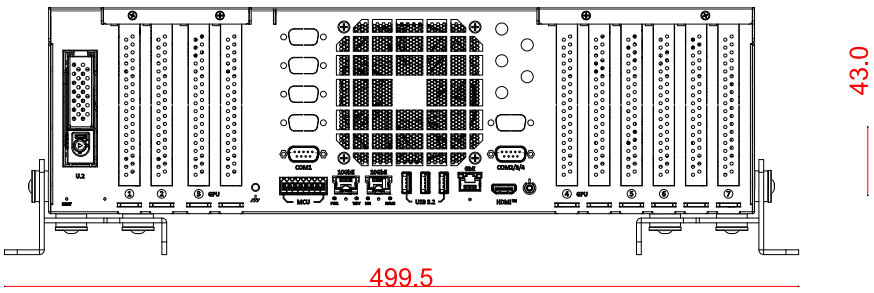
1.3 RGS-9805GC Dimensions with Damping Bracket



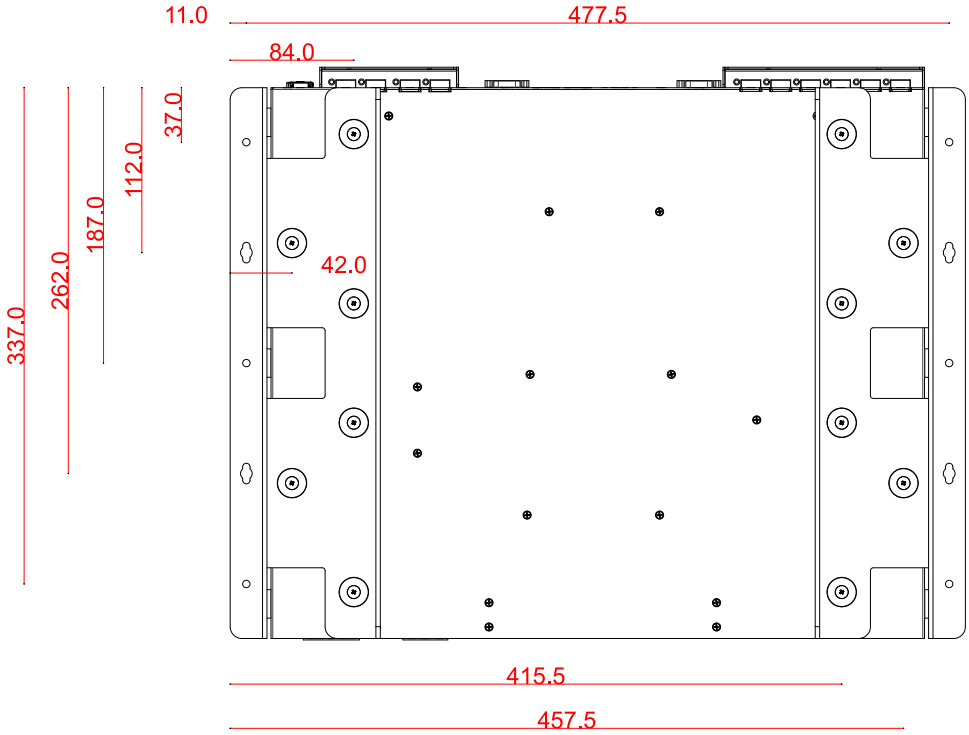
NOTE

All measurements are in millimeters (mm).

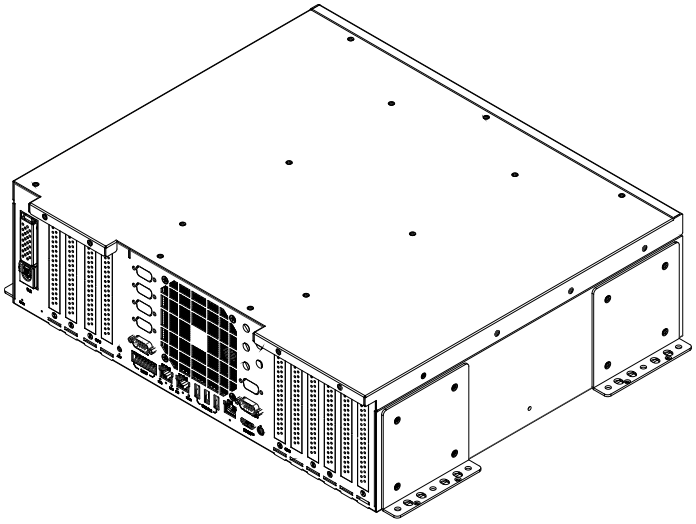
1.3.1 Front View



1.3.2 Bottom View



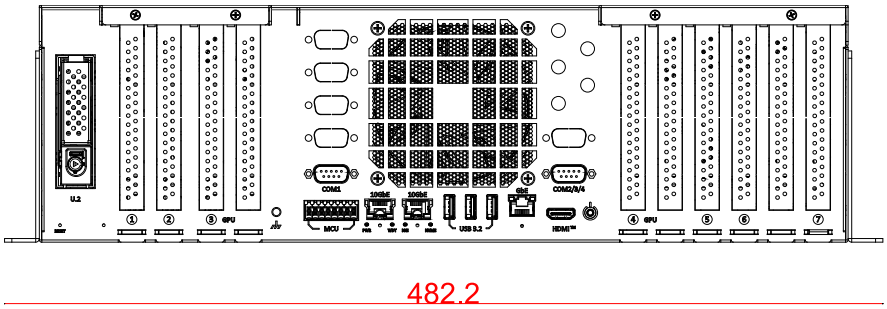
1.4 RGS-9805GC Dimensions with Wall Mount Bracket



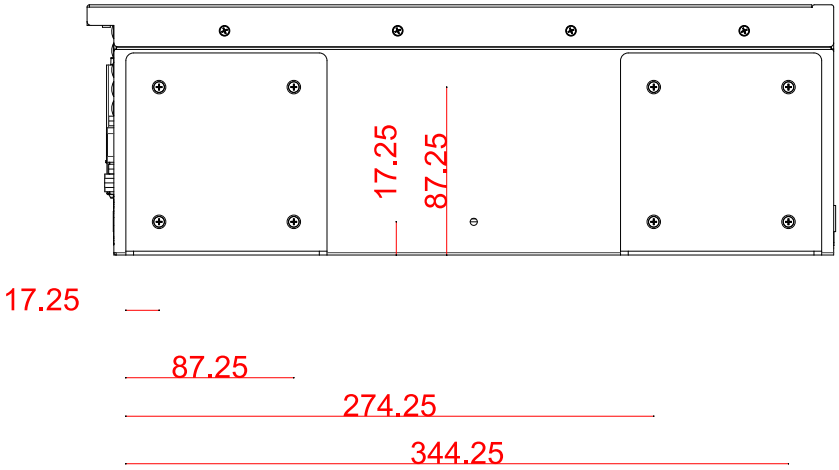
NOTE

All measurements are in millimeters (mm).

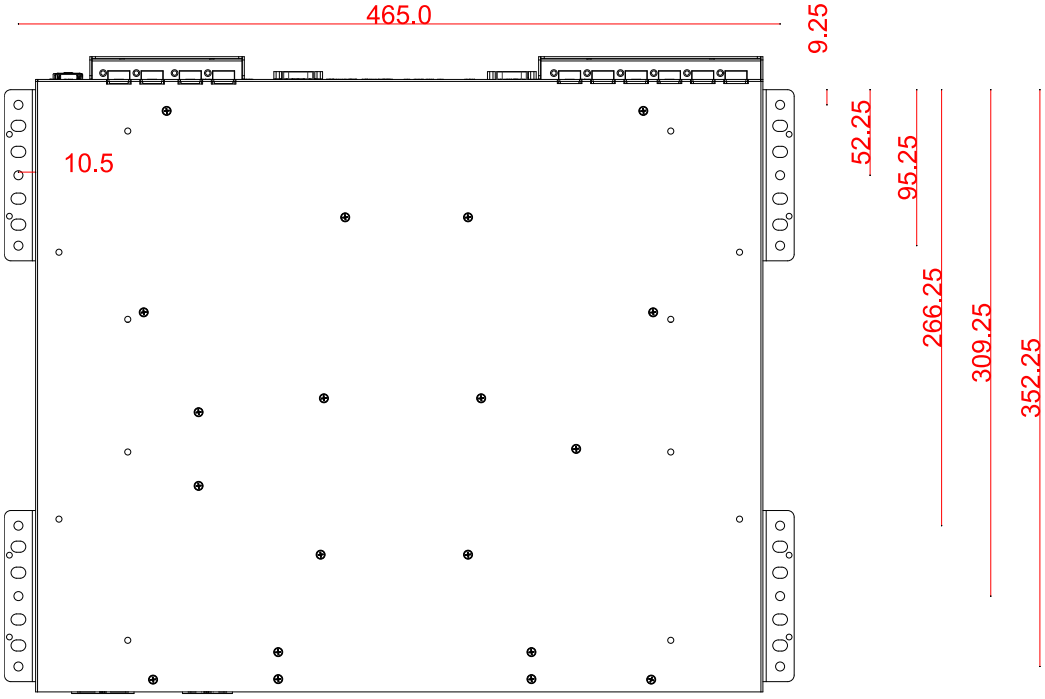
1.4.1 Front View



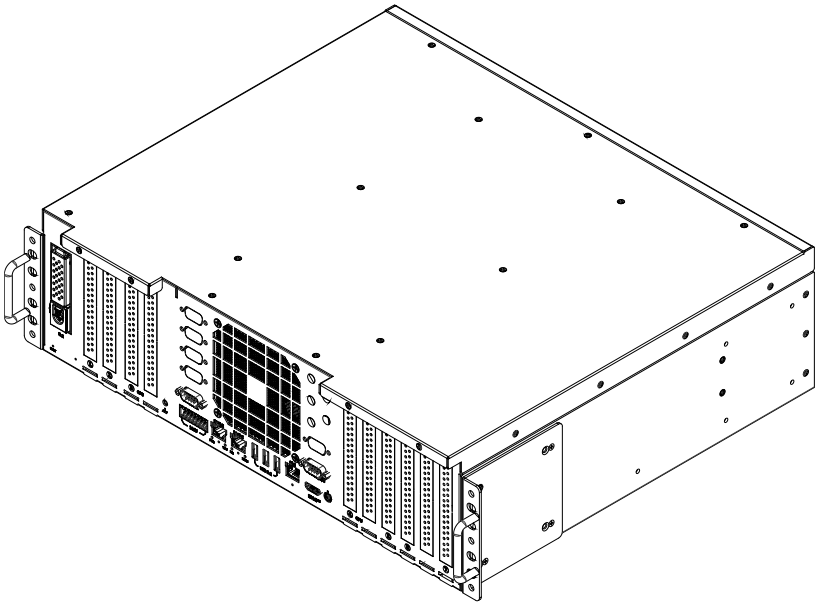
1.4.2 Side View



1.4.3 Bottom View

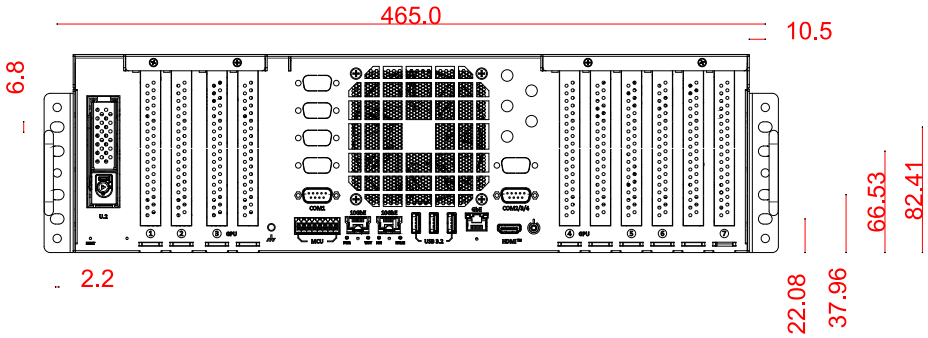


1.5 RGS-9805GC Dimensions with Rack Mount

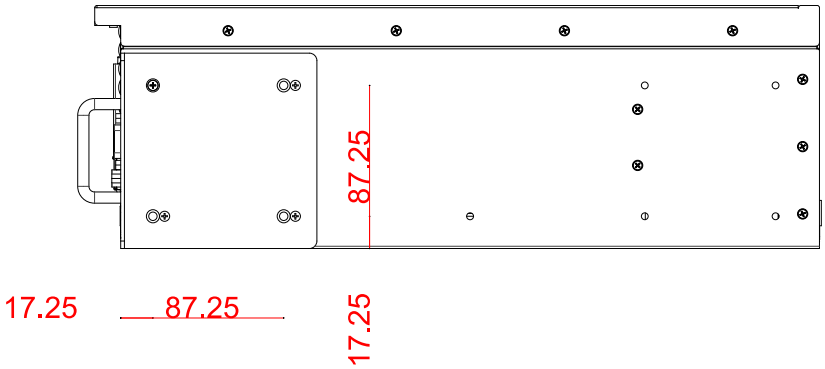


> NOTE
>
> *All measurements are in millimeters (mm).*

1.5.1 Front View



1.5.2 Side View



2 System Overview

Upon receiving and unpacking your RGS-9805GC series system, please check immediately if the package contains all the items listed in the following table. If any item(s) are missing or damaged, please contact your local dealer or Neousys Technology.

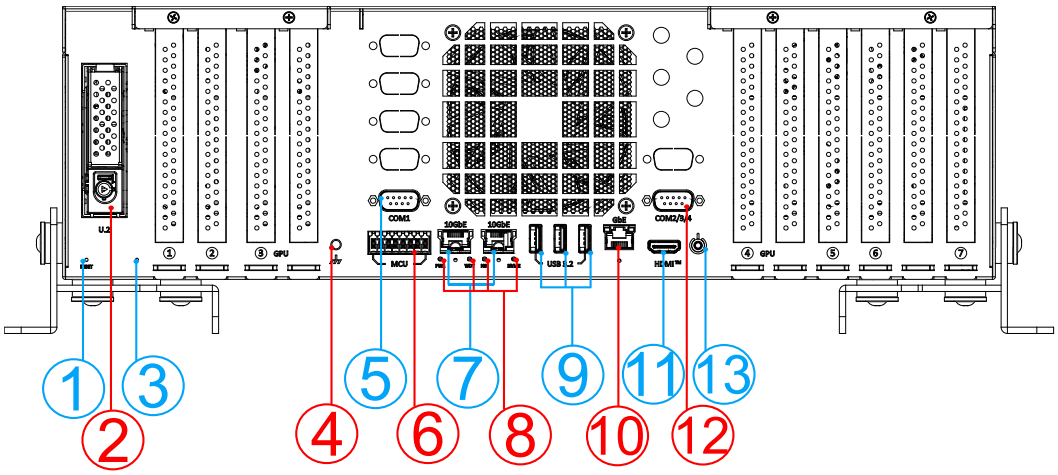
2.1 Packing List

2.1.1 RGS-9805GC Series Packing List

System / Pack	RGS-9805GC	Qty
1	RGS-9805GC System (if you ordered CPU, RAM, NVMe, etc., please verify these items)	1
2	RGS-9805GC Damping Bracket	2
3	RGS-9805GC CPU Cooler	1
4 Accessory Box Content	**Accessory box Content**	
	12+4 Pin 17cm GPU Power Cable	2
	16-Pole(2x8) 3.5mm Terminal Plug | for MCU features	1
	5-Pole 7.62mm Terminal Plug | for DC input	1
	4-Pole 7.62mm Terminal Plug | for DC input	1
	Rubber Foot	4
	RGS-9805GC Wall Mount Bracket	4
	RGS-9805GC Handle | for Rack Mount	2
	RGS-9805GC Graphics Card Bracket-B-P4K | for RTX Pro 4000	2
	RGS-9805GC Graphics Card Bracket-B-P56K | for RTX Pro 4500/5000/6000 MAX-Q	2
	RGS-9805GC Graphics Card Bracket-A-1 | for Left Partition	1
	RGS-9805GC Graphics Card Bracket-A-2 | for Right Partition	1
	Sleeve D20,L10.5 | for Damping Bracket	18
	RGS-9805GC Anti-Vibrate Grommet | for Damping Bracket	18
	RGS-9805GC Memory Rubber (Pre-installed in RGS-9805GC when ordered with memory modules)	2
	Screw pack	1

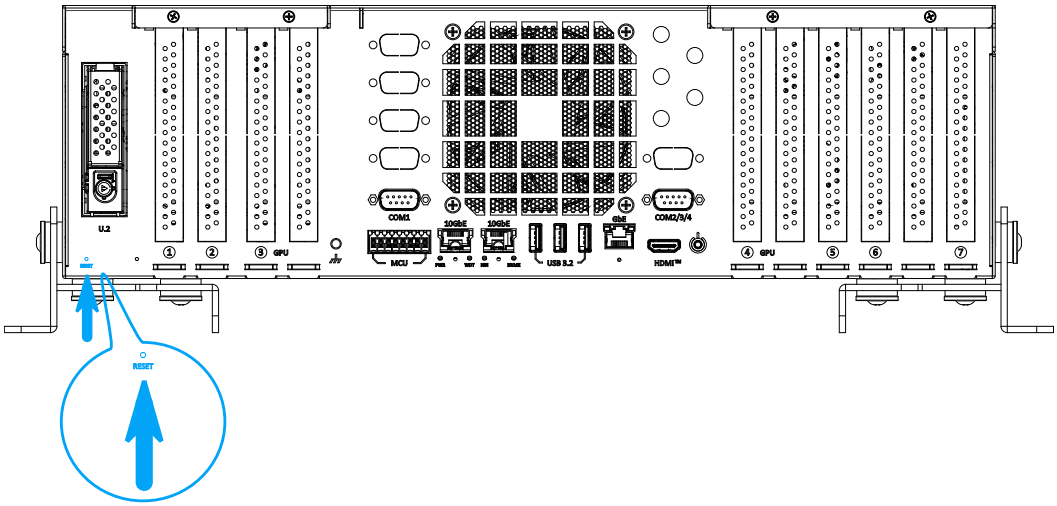
2.2 Front Panel I/O

The RGS-9805GC systems' front panel features the following external I/O connections.



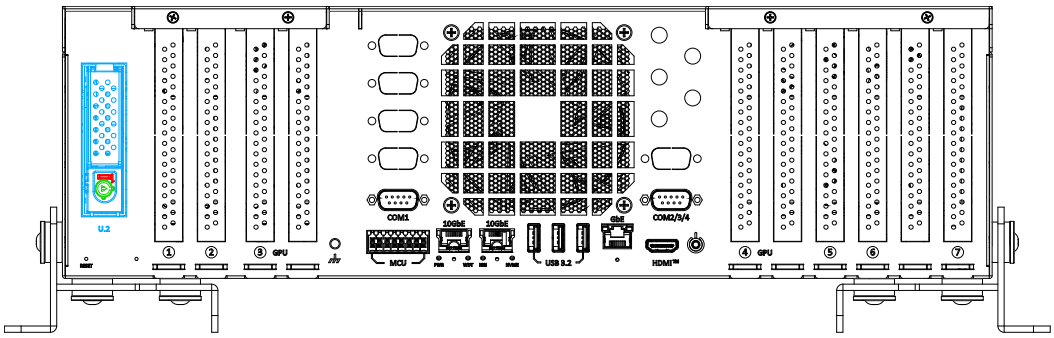
No.	Item	Description
1	Reset button	Use this button to manually reset the system.
2	2.5" U.2 drive tray	1x front-accessible tray for 2.5" U.2 SSD installation (supports up to 15mm, via PCIe Gen3 x4 signal)
3	CMOS clear button	Use this button to manually to reset the CMOS to load default BIOS
4	Grounding point	Chassis grounding point: alternative M4 screws may be used to secure electrical ground ring
5	COM1 port	A configurable RS-232/422/485 port, the operation mode can be set in the BIOS.
6	MCU connector	The 16-pin terminal block exposes the onboard system monitoring MCU interfaces, including: 1x Ignition power control, 1x power LED, 1x system monitoring MCU RS-232 port, 1x system monitoring MCU isolated DO, 1x system monitoring MCU isolated CAN 2.0 port. The corresponding terminal plug is included in the accessory box.
7	10GbE port	2x 10GBASE-T ports with screw-lock by Broadcom 57416, supporting 10G/1G link speed and RDMA (RoCEv2)
8	Status LEDs	From left to right, the status LEDs are: power (PWR), Watchdog timer (WDT), ignition control (IGN), and M.2 NVMe SSD (NVMe).
9	USB3.2 Gen1 port	USB3.2 Gen 1 offers up to 5Gbps of data-throughput performance
10	GbE port	1x GbE port with screw-lock by Intel i210 supporting Wake-on-LAN (WOL)
11	HDMI™ port	HDMI port via SM768, supporting 1920 x 1080 resolution
12	COM2/3/4 port	A configurable RS-232/422/485 port, the operation mode can be set in the BIOS.
13	Power button	Use this button to turn on or shutdown the system.

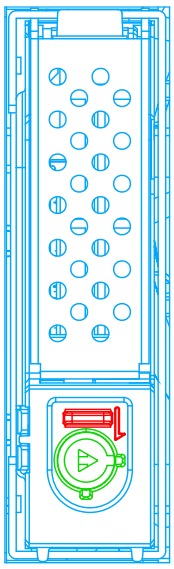
2.2.1 Reset Button



The reset button is used to manually reset the system in case of system halt or malfunction. To avoid unexpected reset, the button is purposely placed behind the panel. To reset, please use a pin-like object (eg. tip of a pen) to access the reset button.

2.2.2 2.5” U.2 Drive Tray



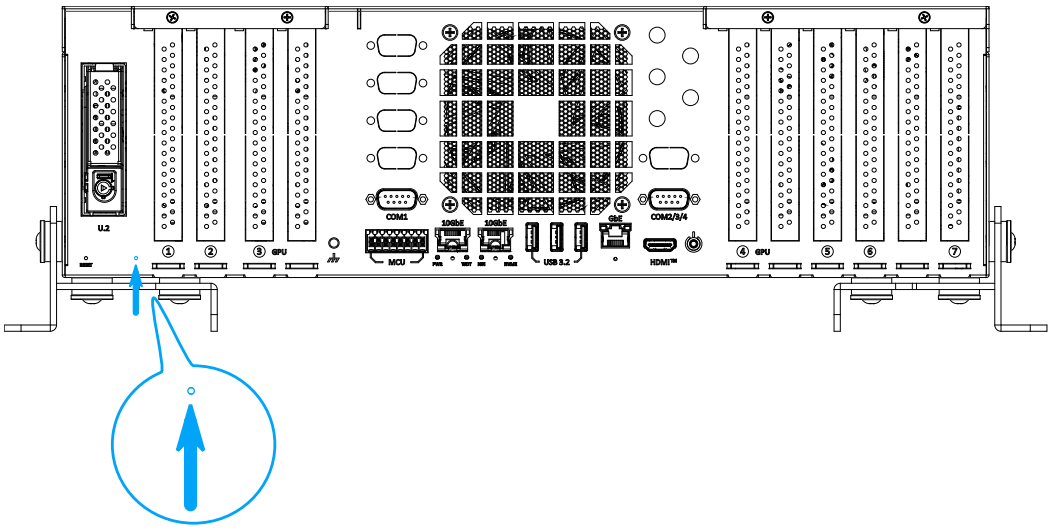


The front I/O panel features a 2.5-inch front-accessible U.2 drive tray. This tray includes a lock mechanism (highlighted in green). To open a tray, slide the release switch (highlighted in red) downward. When installing a U.2 SSD, make sure the U.2 connector side enters the tray enclosure first.

NOTE

The trays support hard drives with up to 15mm thickness.

2.2.3 CMOS Clear Button



The CMOS Reset button is used to manually reset the motherboard BIOS in case of system halt or malfunction. To avoid unexpected operation, it is purposely placed behind the panel. To reset, disconnect the DC power input, and use the tip of a pen to press and hold for at least 5 seconds to reset the BIOS.

NOTE

*You **MUST** disconnect the DC input from the system before resetting the CMOS.*

Clearing the CMOS won't reset the power mode of the onboard MCU. To reset the MCU to ATX mode, please follow these steps:

- Disconnect the DC power input from the RGS-9805GC.

- While holding down the power button, reconnect the DC power input.

- Continue holding the power button for 2 seconds.

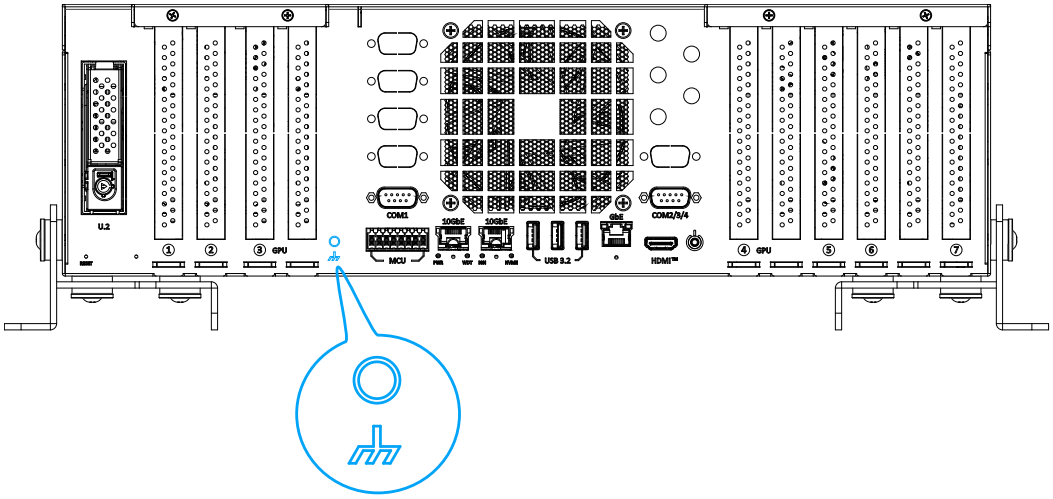
- Disconnect the DC power input once more.

After completing these steps, the ignition power mode will be reset to ATX.

WARNING

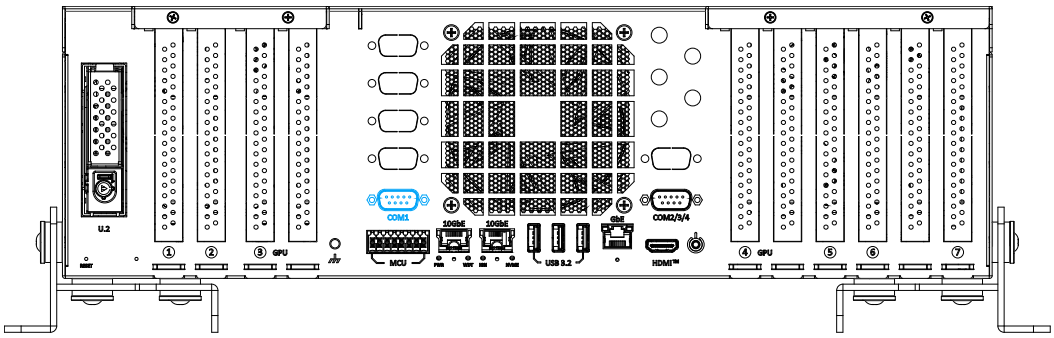
Clearing the CMOS will reset all BIOS settings to default and may result in down time!

2.2.4 Grounding Point

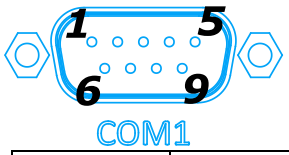


Connecting the chassis grounding point to the vehicle's common ground (via an M4 screw) eliminates ground loops and drains EMI, ensuring sensor signal integrity. It also safely diverts voltage surges, load dumps, and static charges away from sensitive electronics, preventing unexpected reboots and protecting system hardware during operation.

2.2.5 COM Port (COM1)

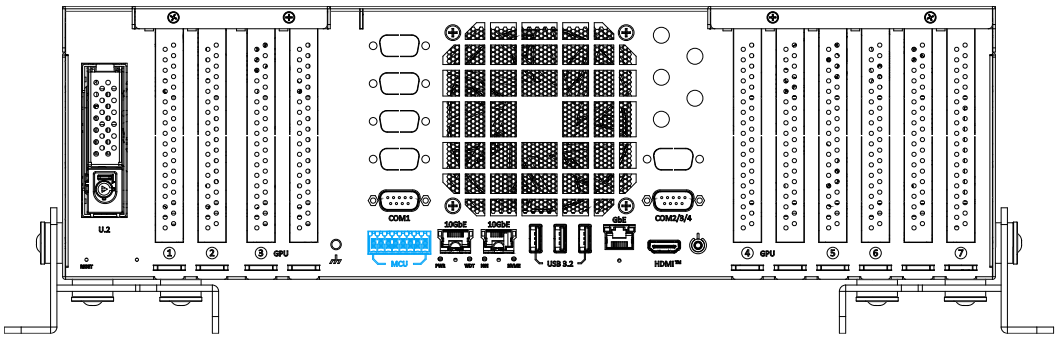


The system's COM1 port is implemented using industrial-grade ITE8786 Super IO chip (-40 to 85°C) and provide up to 921600 bps baud rate, COM1 is a software-configurable RS-232/422/485 port via 9-pin D-Sub male connector. The operation mode, slew rate and termination of COM1 can be set in BIOS setup utility. The following table describes the pin definition of COM ports.



	COM1		
Pin#	**RS-232 Mode**	**RS-422 Mode**	**RS-485 Mode (Two-wire 485)**
1	DCD		
2	RX	422 TXD+	485 TXD+/RXD+
3	TX	422 RXD+	
4	DTR	422 RXD-	
5	GND	GND	GND
6	DSR		
7	RTS		
8	CTS	422 TXD-	485 TXD-/RXD-
9	RI		

2.2.6 MCU Connector



- **MCU Connector Interface**

To facilitate system monitoring, diagnostics, and power management, the platform reserves a dedicated connector for communication with the onboard System Monitoring MCU. This interface provides access to several MCU-controlled I/O signals, enabling external devices or applications to monitor system health, retrieve operating information, and control platform power behavior. For details, please refer to this link.

The MCU connector includes the following interfaces:

- 1x Ignition power control
- 1x Power LED
- 1x System monitoring MCU RS-232 port
- 1x System monitoring MCU isolated DO
- 1x System monitoring MCU isolated CAN 2.0 port

Refer to the connector pin assignment below for details.

The functions of each interface are described below:

System monitoring MCU RS-232 port (MCU_RS232)

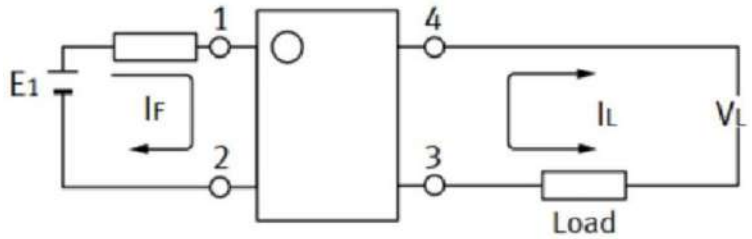
Provides the current operating status of the main CPU. It is an interactive interface for sending commands and querying results once the MCU is powered up.

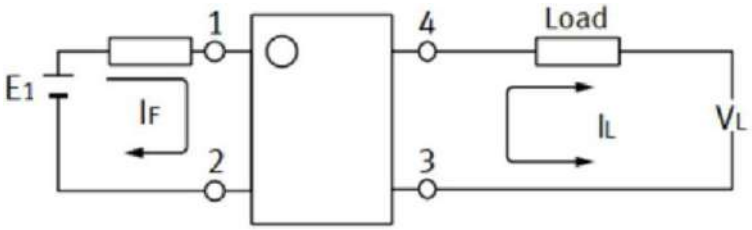
.

System monitoring MCU isolated DO (MCU_STATUS)

The System Monitoring MCU continuously tracks CPU status via heartbeat detection and handshake mechanisms. It signals system health to external equipment by shorting MCU_STATUS_H and MCU_STATUS_L during normal operation, or opening them when unresponsive.

MCU_STATUS is an isolated digital output that utilizes an open-drain design to support external device voltages up to 24V. It features a bidirectional photoMOS to support both sink and source modes. Below are the reference wiring diagrams and characteristics.





Type	Sink/ Source mode
Interface	Bidirectional PhotoMOS
Isolation Voltage	1500V AC
Operation Voltage	0V to 24V
Operation Mode	Polling
Response Time (Rising)	660us ~ 2ms
Response Time (Falling)	90us ~ 210us

System monitoring MCU isolated CAN 2.0 port (MCU_CAN)

Provides a dedicated, one-way isolated CAN interface that periodically broadcasts system monitoring data collected by the MCU. Transmitted information includes onboard voltage, current consumption, and thermal sensor measurements, allowing external controllers to monitor the platform's operating conditions in real time. This CAN interface

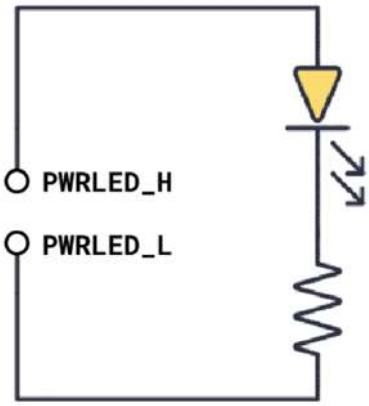
becomes active only after the sustain power rail has been established.

Ignition power control (IGNITION_IN)

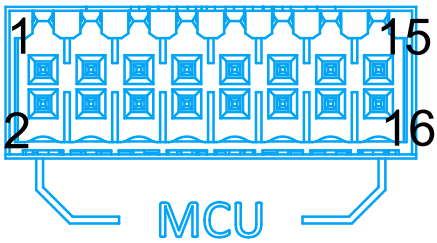
Serves as the ignition input for the platform's ignition power control circuitry. This input allows external ignition signals to control the system's power-on and power-off sequence, enabling seamless integration with vehicle and industrial power management systems.

Power LED connectivity

The PWRLED_H (pin 13)/ PWRLED_L (pin 14) on the 16-pin terminal block allow users to monitor system power status. This non-isolated design outputs 5V at PWRLED_H when the onboard power LED illuminates. PWRLED_L should be tied to system ground. Please refer to the wiring diagram.



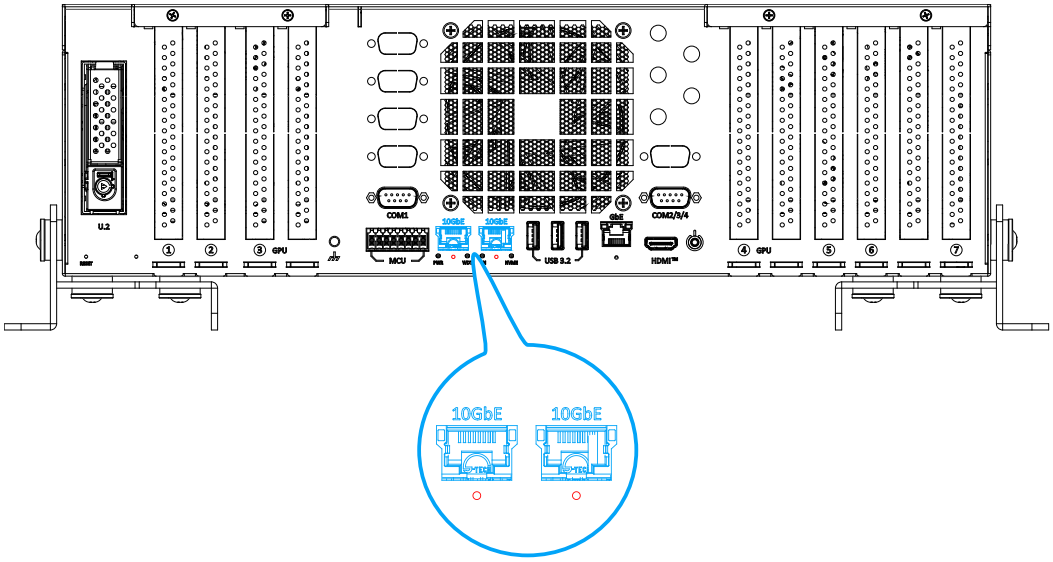
Pin Definition



Pin #	Signal	Pin #	Signal
1	NC	9	MCU_RS232_RX
2	NC	10	MCU_RS232_GND
3	MCU_CAN_H	11	MCU_RS232_TX
4	MCU_CAN_GND	12	MCU_RS232_GND
5	MCU_CAN_L	13	PWRLED_H
6	MCU_CAN_GND	14	PWRLED_L
7	MCU_STATUS_H	15	IGNITION_IN_H
8	MCU_STATUS_L	16	IGNITION_IN_L

For ignition signal input (IGN) for in-vehicle applications, please refer to the section "Ignition Power Control" for more information.

2.2.7 10Gb Ethernet Port



There are two 10G Ethernet ports, featuring a **screw-lock hole** each for secured connection. They are backward compatible with 1GbE specifications, and support RDMA (RoCEv2).

> NOTE
>
> ***NOT** compatible with 5GbE or 2.5GbE connections.*

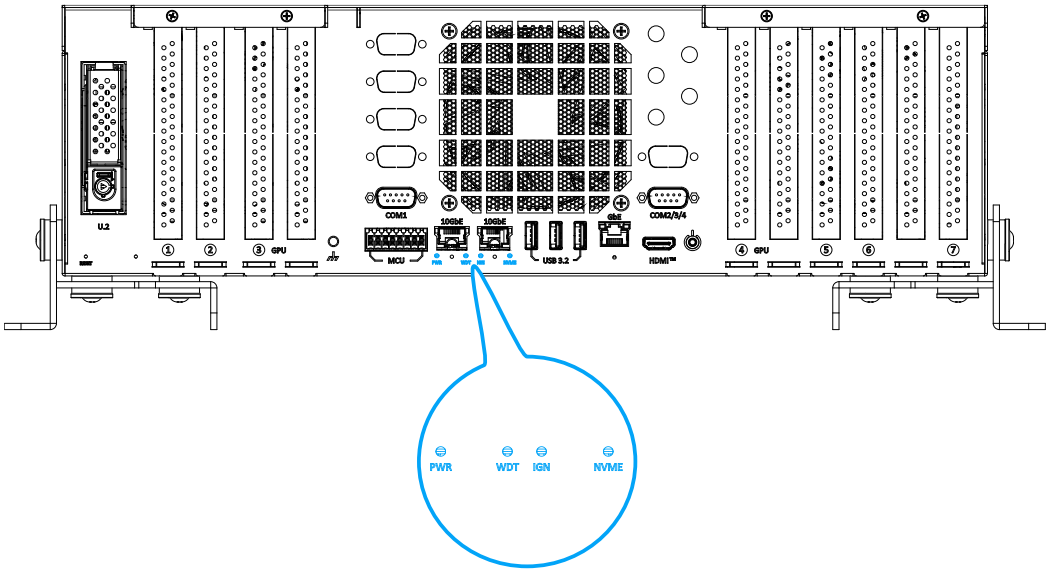
Speed LED (left)

LED Color	Status	Description
Green or Orange	Off	Ethernet port is disconnected
	Orange	1000 Mbps
	Green	10000 Mbps

Active/Link LED (right)

LED Color	Status	Description
Green	Off	Ethernet port is disconnected
	On	Ethernet port is connected and no data transmission
	Flashing	Ethernet port is connected and data is transmitting/receiving

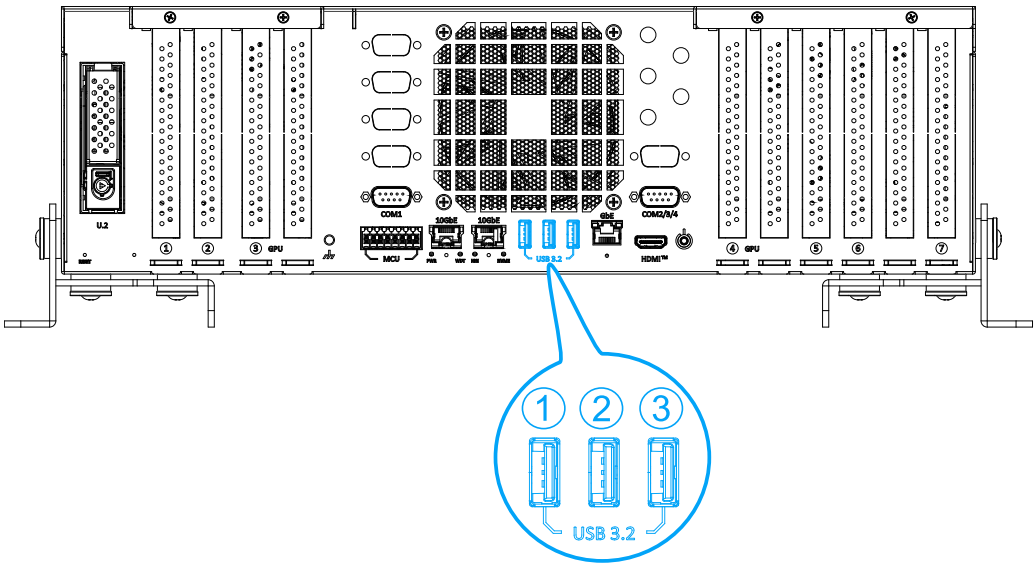
2.2.8 Status Indicator LED



There are four LED indicators on the I/O panel: IGN, WDT, NVMe and PWR. The descriptions of these four LED are listed in the following table.

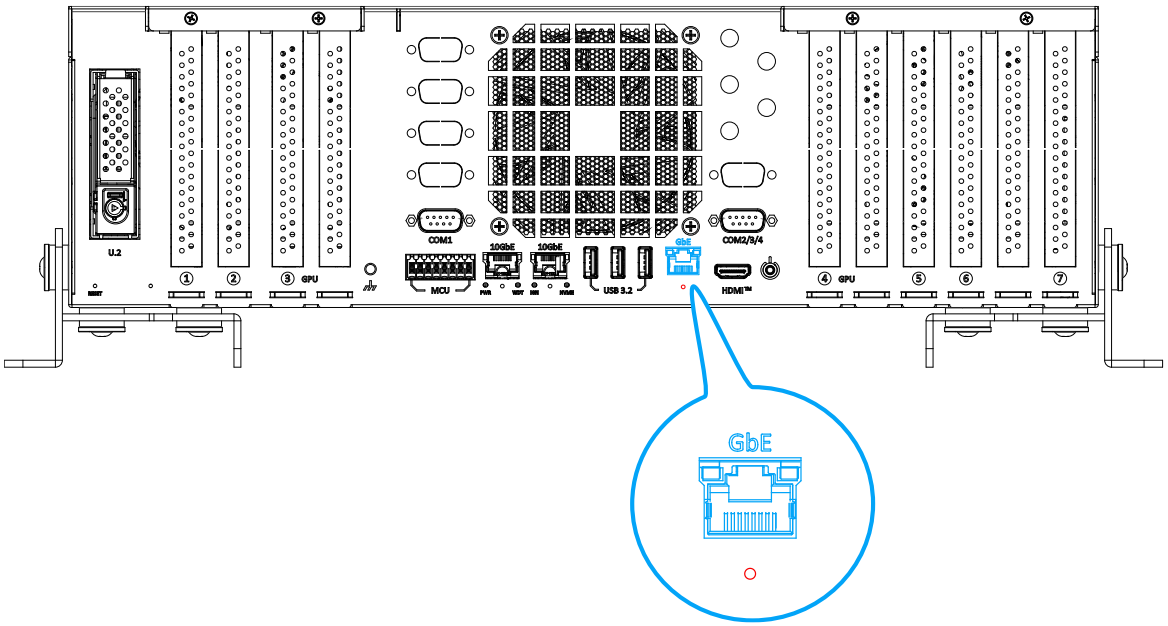
Indicator	Color	Description
PWR	Green	Power indictor, lid when system is on.
WDT	Yellow	Watchdog timer LED, flashing when WDT is active.
IGN	Yellow	Ignition signal indicator, lid when IGN is high (12V/ 24V).
NVMe	Red	NVMe indicator, flashing when NVMe is active.

2.2.9 USB3.2 Gen 1 Port



There are three onboard USB 3.2 Gen1 ports. These USB ports are backward compatible with USB3.0, USB 2.0, USB 1.1 and USB 1.0 devices. USB #1 uses a dedicated native USB 3 signal from the AMD CPU, while USB #2, USB #3, and two internal mPCIe slots share another native USB 3 signal via a USB 3 hub.

2.2.10 1Gb Ethernet Port



The system includes one **GbE port**, featuring a **screw-lock hole** for a secure connection. The port uses an Intel® I210-IT controller with Wake-on-LAN support. Refer to the table below for LED connection status.

Please refer to the table below for LED connection statuses.

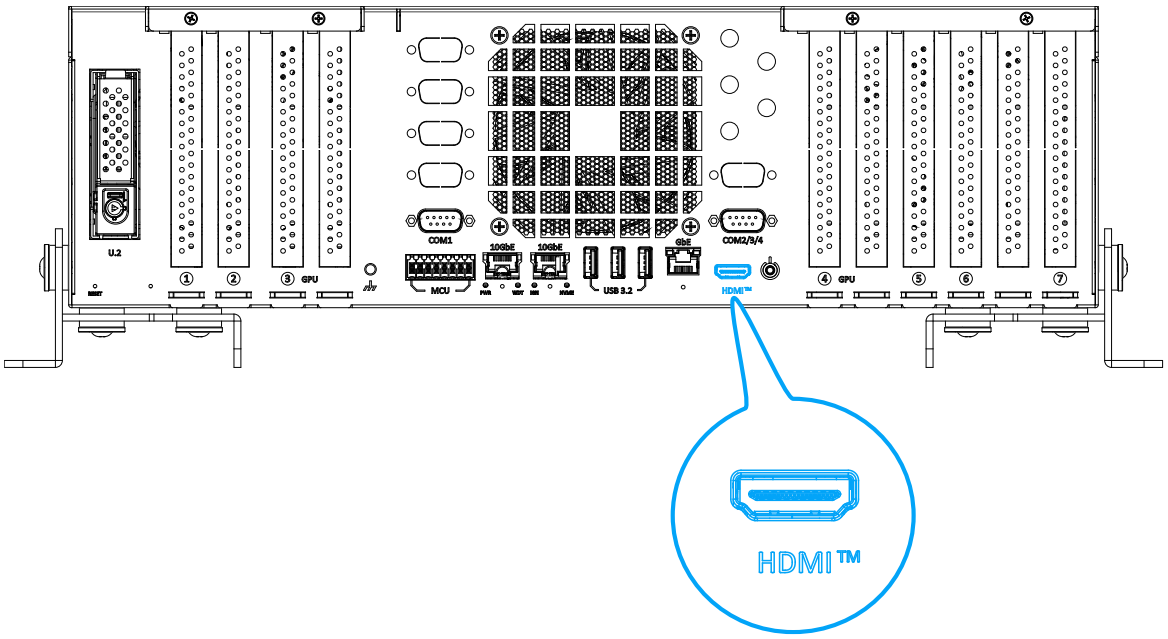
Active/Link LED (Left)

LED Color	Status	Description
Orange	Off	Ethernet port is disconnected
	On	Ethernet port is connected and no data transmission
	Flashing	Ethernet port is connected and data is transmitting/receiving

Speed LED (Right)

LED Color	Status	Description
Amber or Green	Off	10 Mbps
	Amber	100 Mbps
	Green	1000 Mbps

2.2.11 HDMI™ Port

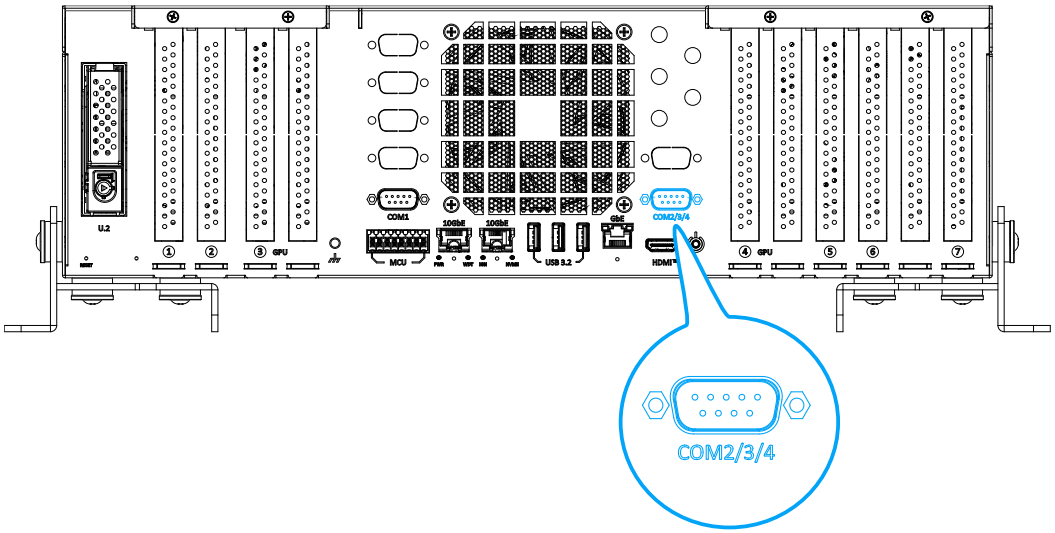


The High-Definition Multimedia Interface (HDMI) port provides uncompressed high-quality digital video and audio transmission between the system and a multimedia display device on a single cable. You can connect to other digital inputs by using a HDMI-to-DVI or HDMI-to-DP cable.

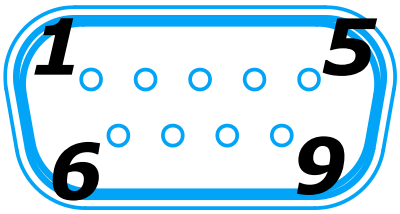
HDMI-to-DP

To achieve the best DisplayPort output resolution in Windows, you need to install corresponding graphics drivers. Please refer to section OS Support and Driver Installation for details.

2.2.12 COM2/ 3/ 4 Port



Implemented using industrial-grade ITE8786 Super IO chip (-40 to 85°C) and provide up to 921600 bps baud rate, the second D-Sub male connector (COM2/ 3/ 4) can be configured in BIOS as single RS-422/ 485 port (COM2) or three 3-wire RS-232 ports (COM2/COM3/COM4). Please refer to COM2/ 3/ 4 Port Configuration for configuring operation mode. An optional 1-to-3 Y-cable is available to connect three RS-232 devices.

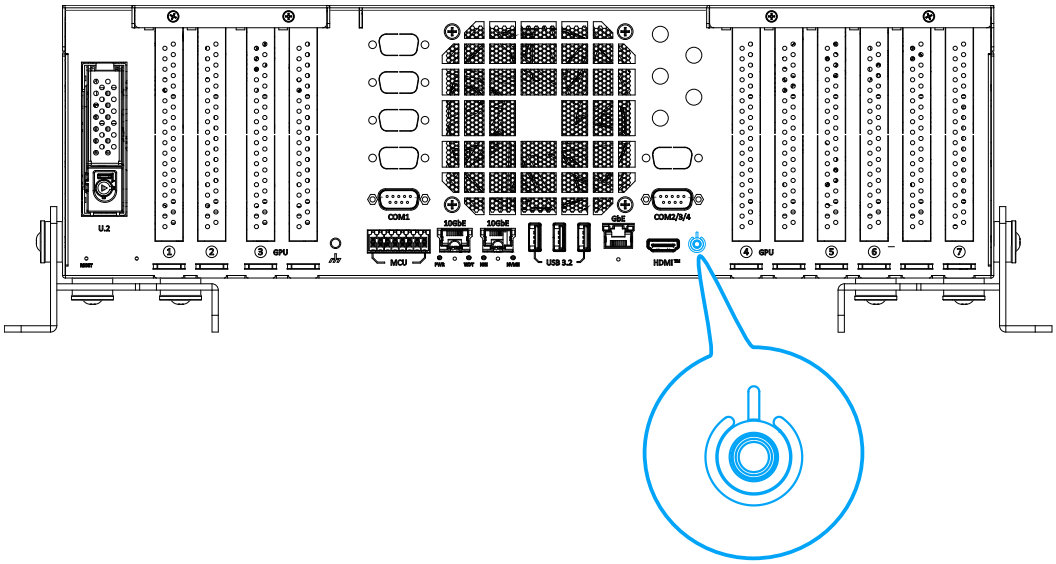
	
COM2/ 3/ 4 Pin	**1-to-3 Y-cable**

The following table describes the pin definition of the COM port

	3-port RS-232 COM2/ 3/ 4		
Pin#	**COM2**	**COM3**	**COM4**
1			
2	RX		
3	TX		
4		TX	
5	GND	GND	GND
6		RX	
7			TX
8			RX
9			

	Single port RS-422/ 485	
Pin#	RS-422	RS-485
1		
2	TxD+	TxD+/ RxD+
3	RxD+	
4	RxD-	
5	GND	GND
6		
7		
8	TxD-	TxD-/ RxD-
9		

2.2.13 Power Button

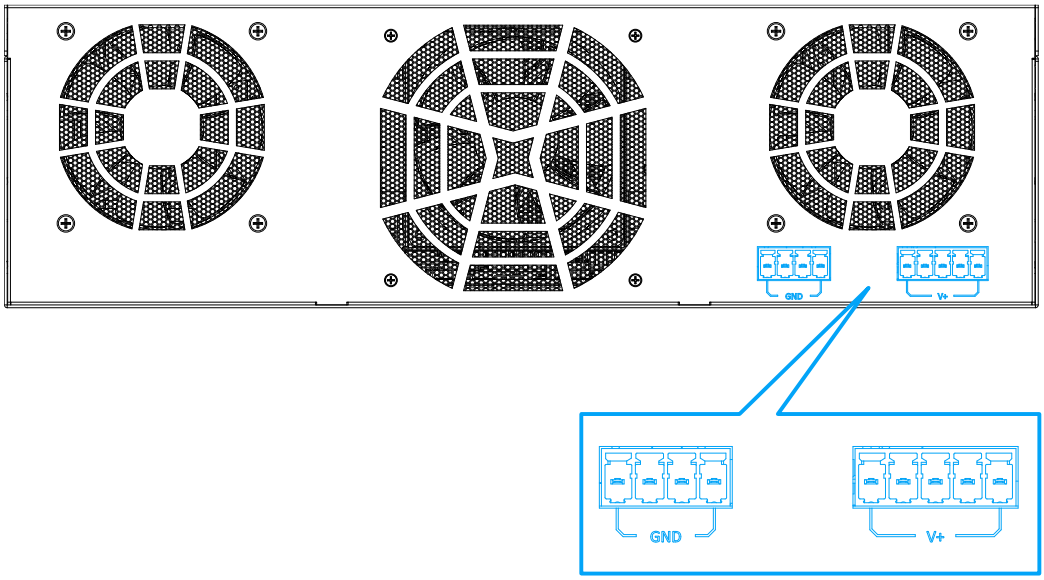


The power button is a non-latched switch for ATX mode on/off operation. To turn on the system, press the power button and the PWR LED should light-up green. To turn off the system, issuing a shutdown command in OS is preferred, or you can simply press the power button. To force shutdown when the system freezes, press and hold the power button for 5 seconds. Please note that there is a 5-second interval between on/off operations (i.e. once the system is turned off, there is a 5-second wait before you can power-on the system).

NOTE

Due to the nature of server-grade CPUs and their large number of PCIe lanes, the system has a longer boot time compared to a standard desktop CPU. After reinstalling the CPU or memory, or clearing the CMOS, and depending on the number of PCIe devices installed, the 1st and 2nd boots may take up to 9 minutes. Starting from the 3rd boot, the startup time may take up to 3 minutes.

2.3 DC Input



The system accepts a wide range of DC power input from 9 to 32V via dual 4-pin/ 5-pin pluggable terminal blocks, fit for field usage where DC power is usually provided. The screw clamping mechanism on the terminal block offers connection reliability when wiring DC power.

A corresponding 4-pin/5-pin plug for the DC-input connector is included in the accessory box. Please refer to the following recommended wiring specifications:

Wire Range: 10 to 20 AWG

Rated Current: 40A per pin

Depending on your specific CPU, GPU, and PCIe configurations, the RGS-9805GC can support a total system power budget of up to 2000W. Please ensure that you select an appropriate wire gauge and sufficient number of wires to safely accommodate your system's actual power requirements.

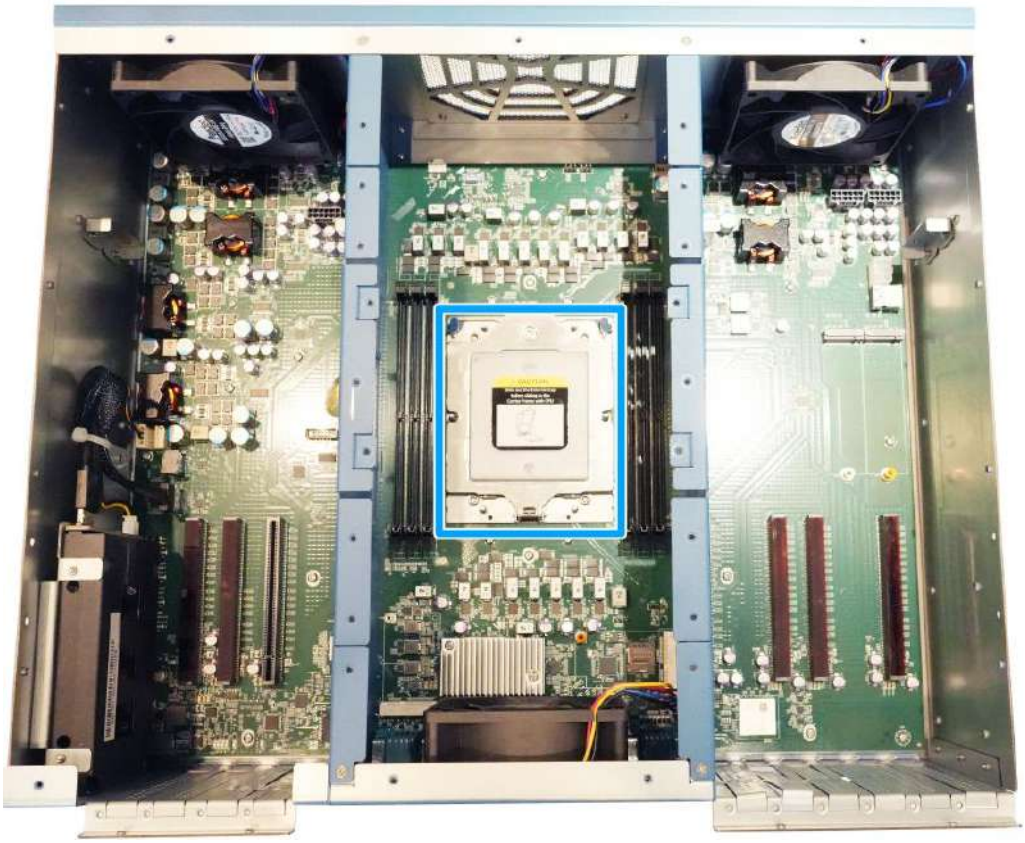
WARNING

Please make sure the voltage of DC power is correct before you connect it to the system. Supplying a voltage over 32V will damage the system.

2.4 Internal I/O Functions

In addition to I/O connectors on the front panel, the system also provides internal on-board connectors, such as M.2 NVMe, mini-PCIe slots, internal USB 3.0 ports, etc. In this section, we'll illustrate these internal I/O functions.

2.4.1 CPU Socket

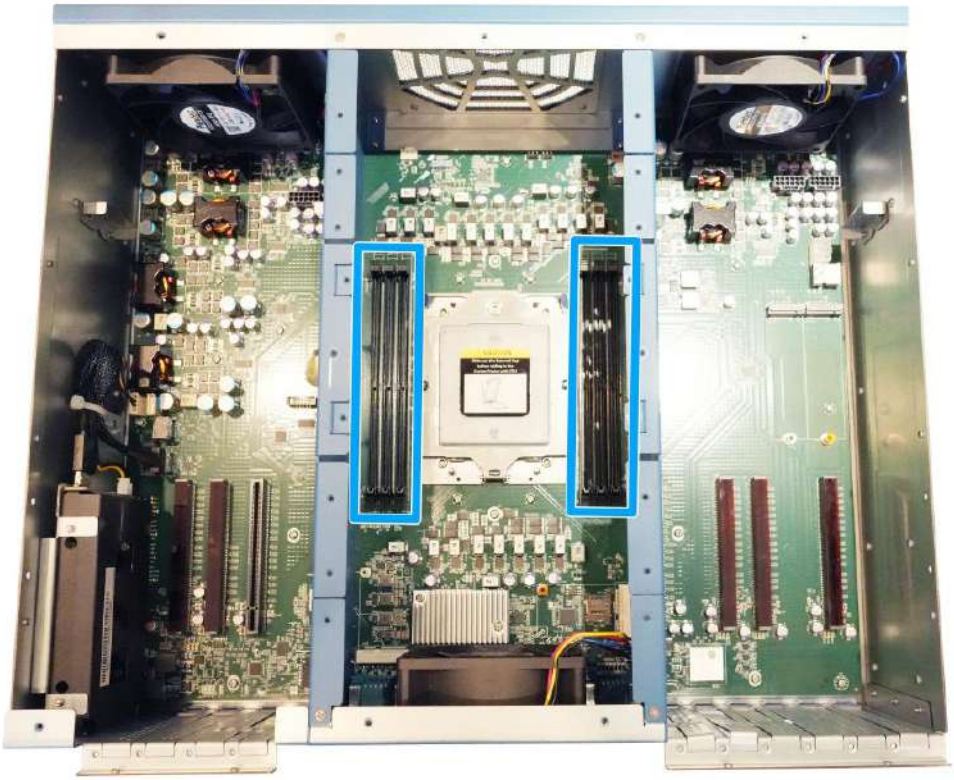


The system supports server-grade AMD EPYC™ 9005 Turin series processors based on Zen-5 and Infinity microarchitecture. With industry leading IO, 3nm manufacturing, integrated on-die security processor, supporting up to 160 cores/ 320 threads, and interleaving multi-channel memory optimization, etc., it delivers one of the best CPU performances for an edge AI computer in the industry.

WARNING

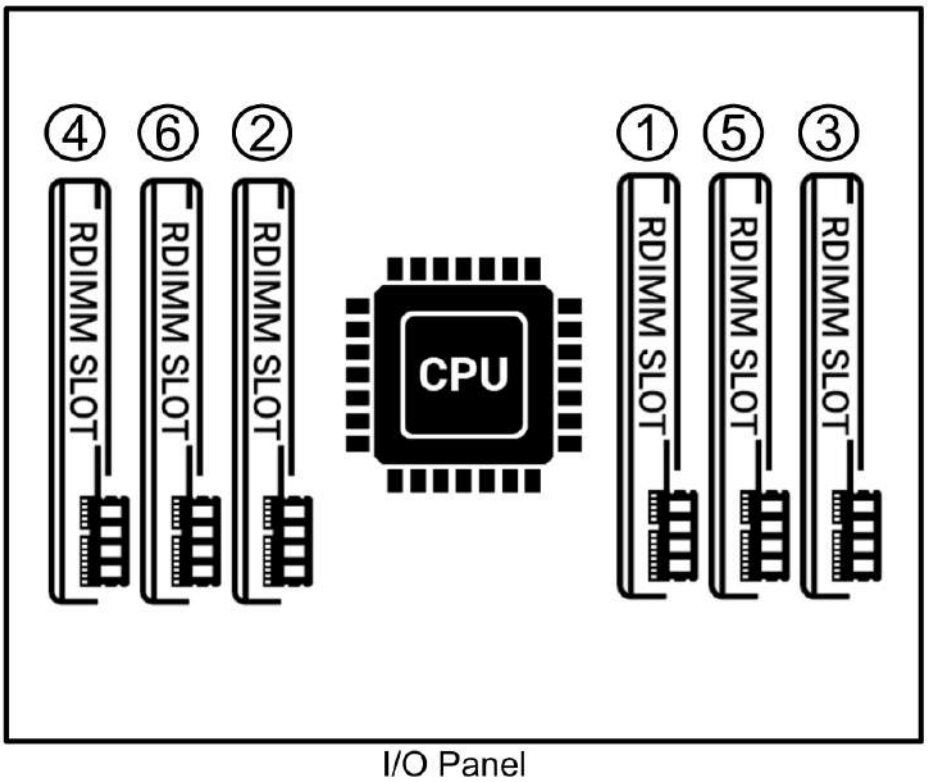
*To avoid possible CPU socket pin damages, **DO NOT** remove the CPU socket cover until you have the CPU, and is ready to install it into the socket!*

2.4.2 ECC DRAM Slots



The system supports six registered DDR5 DIMMs up to 6000MHz. When installing the modules, please install into the specific slots accordingly. Please refer to the following illustration/ description for details.

DRAM Configuration



CH mode	Slot 1	Slot 3	Slot 5	Slot 2	Slot 4	Slot 6	NPS* support
6-CH	v	v	v	v	v	v	NPS2, NPS1
4-CH	v	v		v	v		NPS4, NPS2, NPS1
2-CH	v			v			NPS2, NPS1
1-CH	v						NPS1

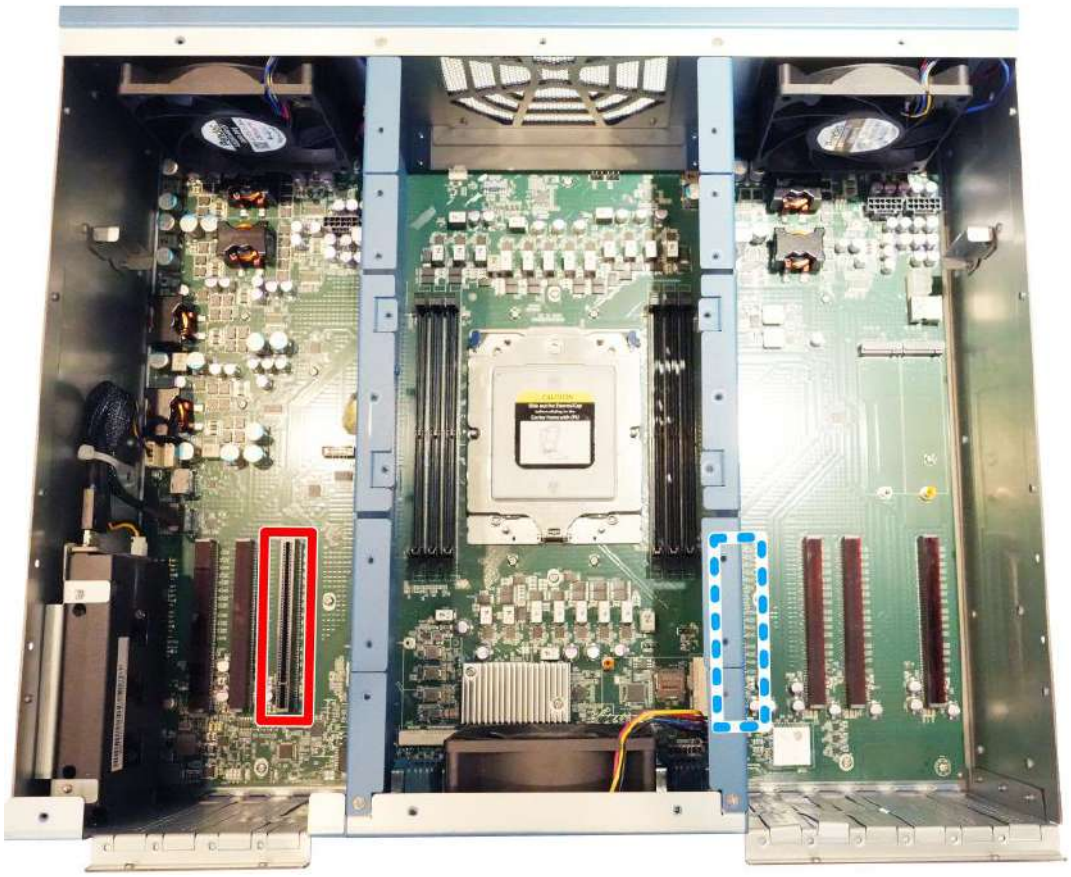
*NPS=NUMA Nodes Per Socket

- **NPS1**: The CPU acts as **one NUMA node**. All cores and all memory channels on the socket communicate as a single unit. All cores access memory across all memory channels.
- **NPS2: The CPU is split into two NUMA nodes. Half the cores and half the memory** channels belong to each node. Cores are divided into two domains and memory interleaved within each half.
- **NPS4**: The CPU is split into **four NUMA nodes** (one per physical quadrant). Cores, memory, and PCIe devices are bound to their local quadrant. Cores are divided into quadrants, each managing cores, local memory, I/O, etc.

NOTE

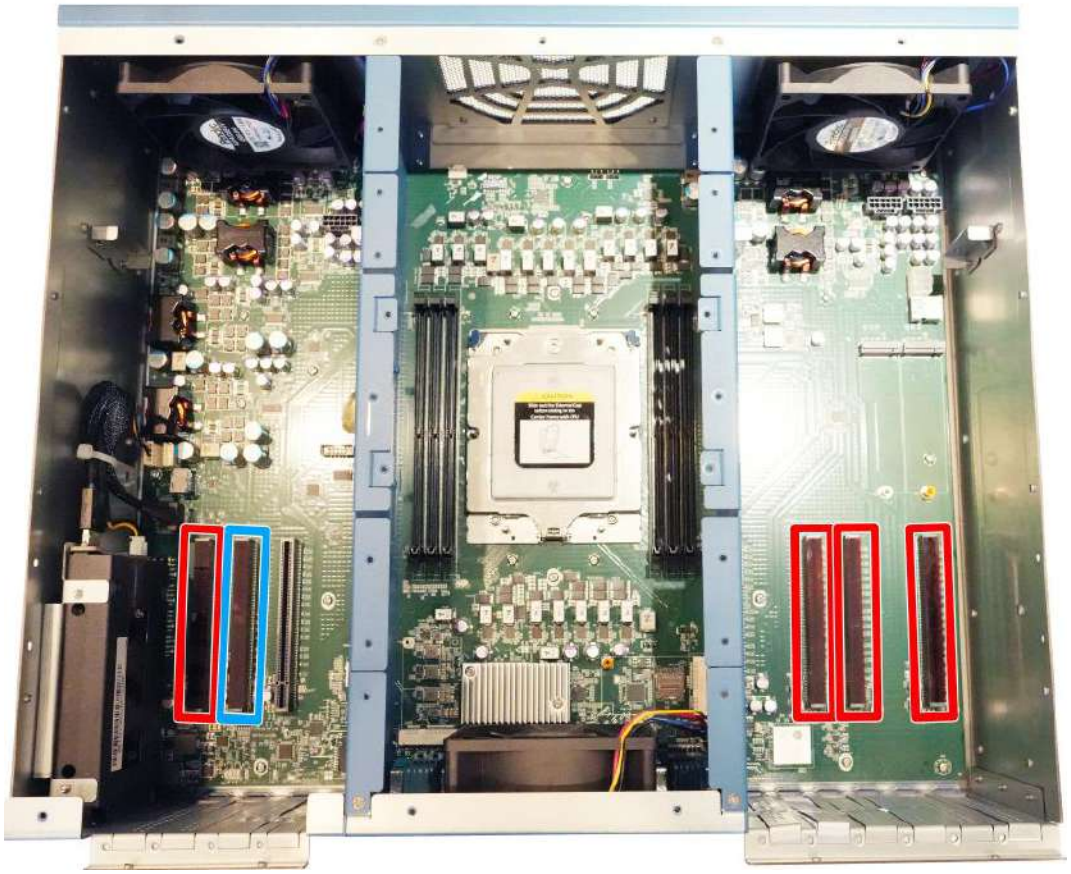
Due to the nature of server-grade CPUs and their large number of PCIe lanes, the system has a longer boot time compared to a standard desktop CPU. After reinstalling the CPU or memory, clearing the CMOS or batter replacement, and depending on the number of PCIe devices installed, the 1st and 2nd boots may take up to 9 minutes. Starting from the 3rd boot, the startup time may take up to 3 minutes.

2.4.3 PCIe x16 Slots for GPU



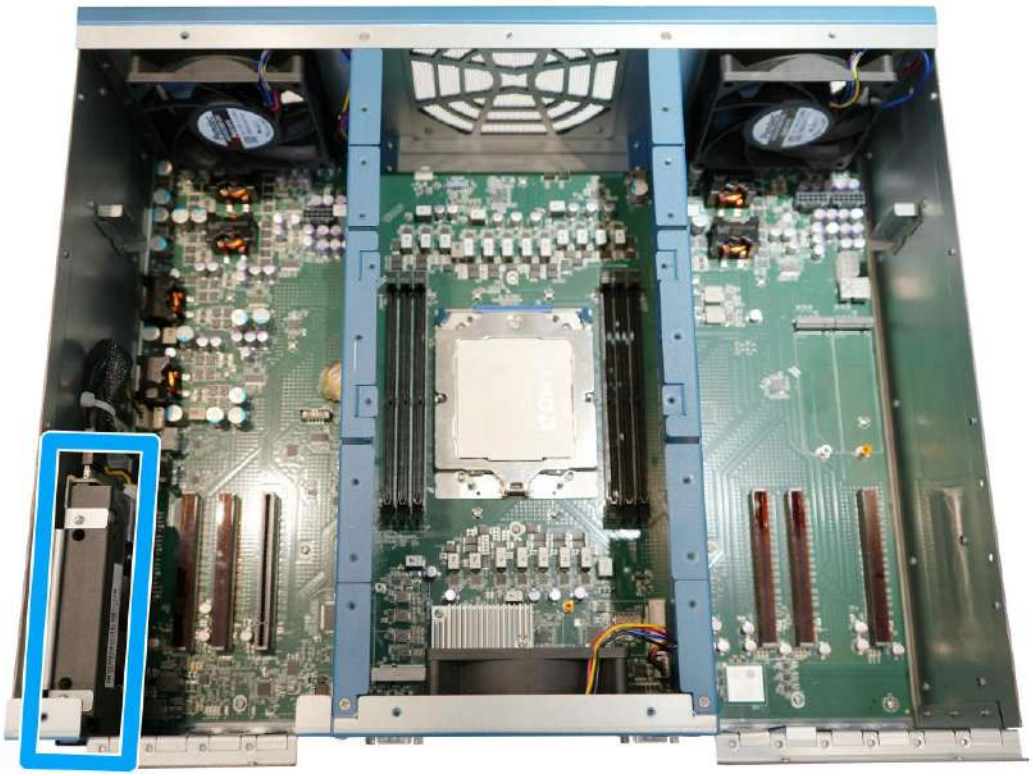
The system features two PCIe x16 @ Gen5 slots (indicated in **red and dotted blue**) and supports an inference accelerator (NVIDIA FHFL GPU up to 400W). The PCIe slot in **dotted blue** is too close to the compartment wall and can not be seen in this photo.

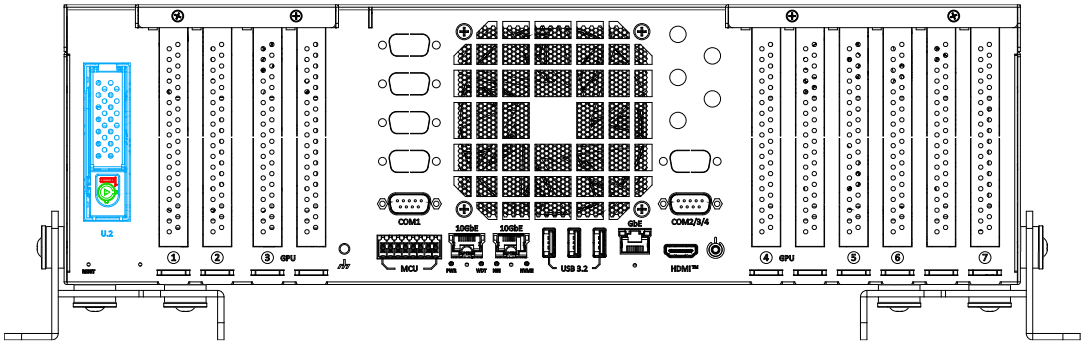
2.4.4 PCIe Slots for Add-on Card Installation



The system has four additional slots that are PCIe x16 Gen5 16-lanes (indicated in **red**), and a PCIe x16 Gen5 8-lanes (indicated in **blue**) for installing add-on cards, for additional I/O expansion or function cards such as a frame grabber card.

2.4.5 2.5” Front-Accessible U.2 Tray (PCIe Gen3x4)





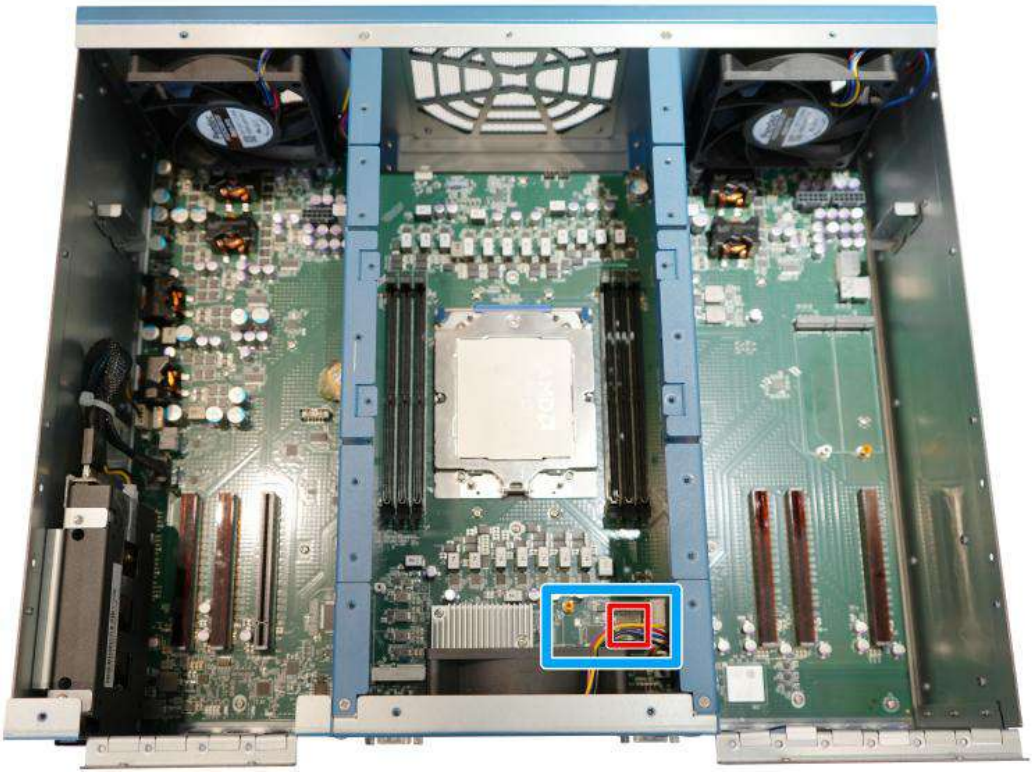
The system provides a 2.5” U.2 cage that can hold up to a 15mm 2.5” U.2 SSD connected via a Gen3x4 PCIe interface.

NOTE

Supports up to 15mm thickness U.2 SSD.

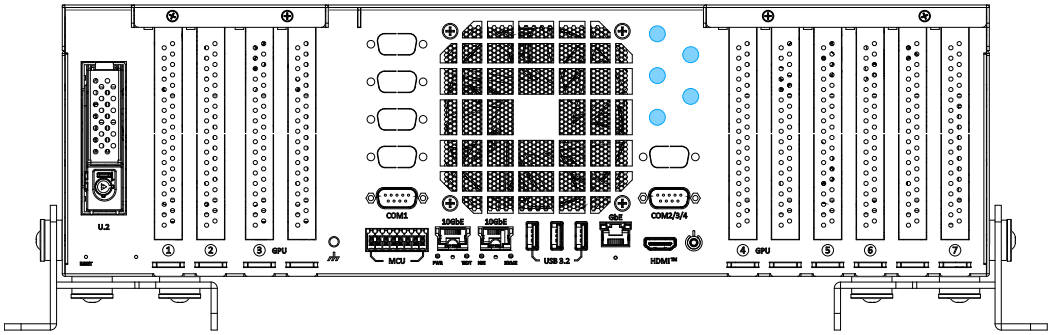
While stable PCIe Gen4 x4 transmission is achievable, it is highly dependent on the quality of the U.2 storage drive used.

2.4.6 mini-PCIe Socket with SIM Slot

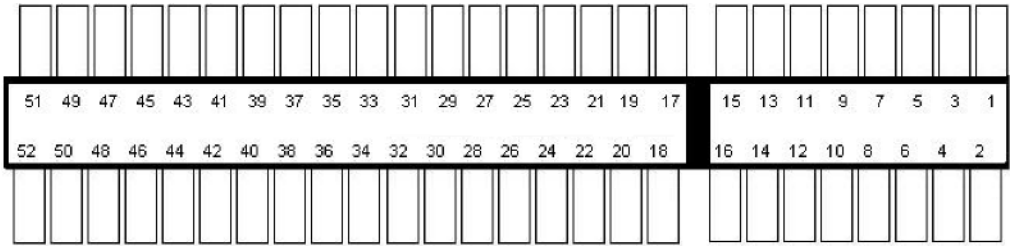


The system provides a mini-PCIe socket (indicated in **blue**) with a SIM slot (indicated in **red**). With a SIM card installed, your system can access the internet via your network provider's 5G/ 4G network.

For wireless (WiFi/ 5G/ 4G) communication, multiple SMA antenna apertures can be located on the I/O panel.



mini-PCIe with SIM PIN Definition



Pin #	Signal	Pin #	Signal
1	-	2	+3.3V
3	-	4	GND
5	-	6	+1.5V
7	-	8	UIM_PWR
9	GND	10	UIM_DATA
11	REFCLK-	12	UIM_CLK
13	REFCLK+	14	UIM_RESET
15	GND	16	UIM_VPP
Mechanical Key			
17	-	18	GND
19	-	20	-
21	GND	22	PERST#
23	PERn0	24	3.3V
25	PERp0	26	GND
27	GND	28	+1.5V
29	GND	30	-
31	PETn0	32	-
33	PETp0	34	GND
35	GND	36	USB_D-
37	GND	38	USB_D+
39	3.3V	40	GND
41	3.3V	42	-
43	GND	44	-
45	-	46	-
47	-	48	+1.5V
49	-	50	GND
51	-	52	3.3V

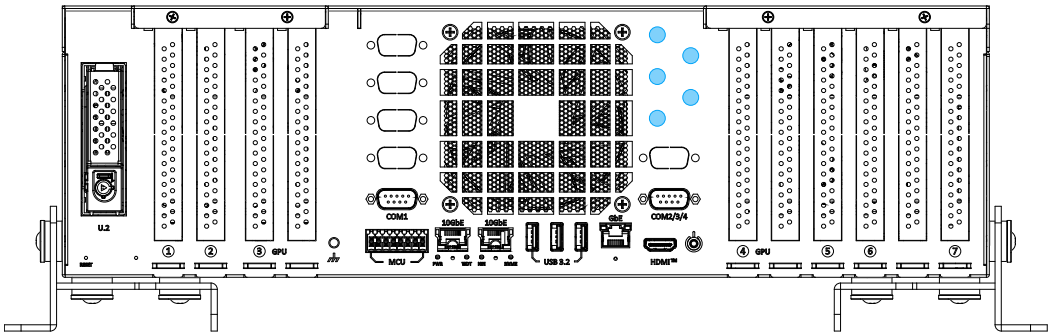
WARNING

Some off-the-shelf mini-PCIe 5G/4G modules are not compliant to standard mini-PCIe interface. They use 1.8V I/O signals instead of standard 3.3V I/O and may cause signal conflict. Please consult with Neousys for compatibility when in doubt! Installing an incompatible module may damage the system or the module itself may be damaged.

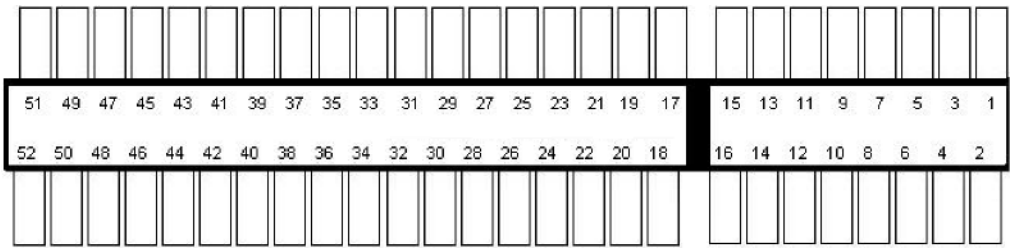
2.4.7 mini-PCIe Socket

The system provides a mini-PCIe socket (indicated in **blue**) without a SIM slot. With a WiFi wireless module installed, your system can access nearby wireless networks.

For wireless WiFi communication, multiple SMA antenna apertures can be located on the I/O panel.

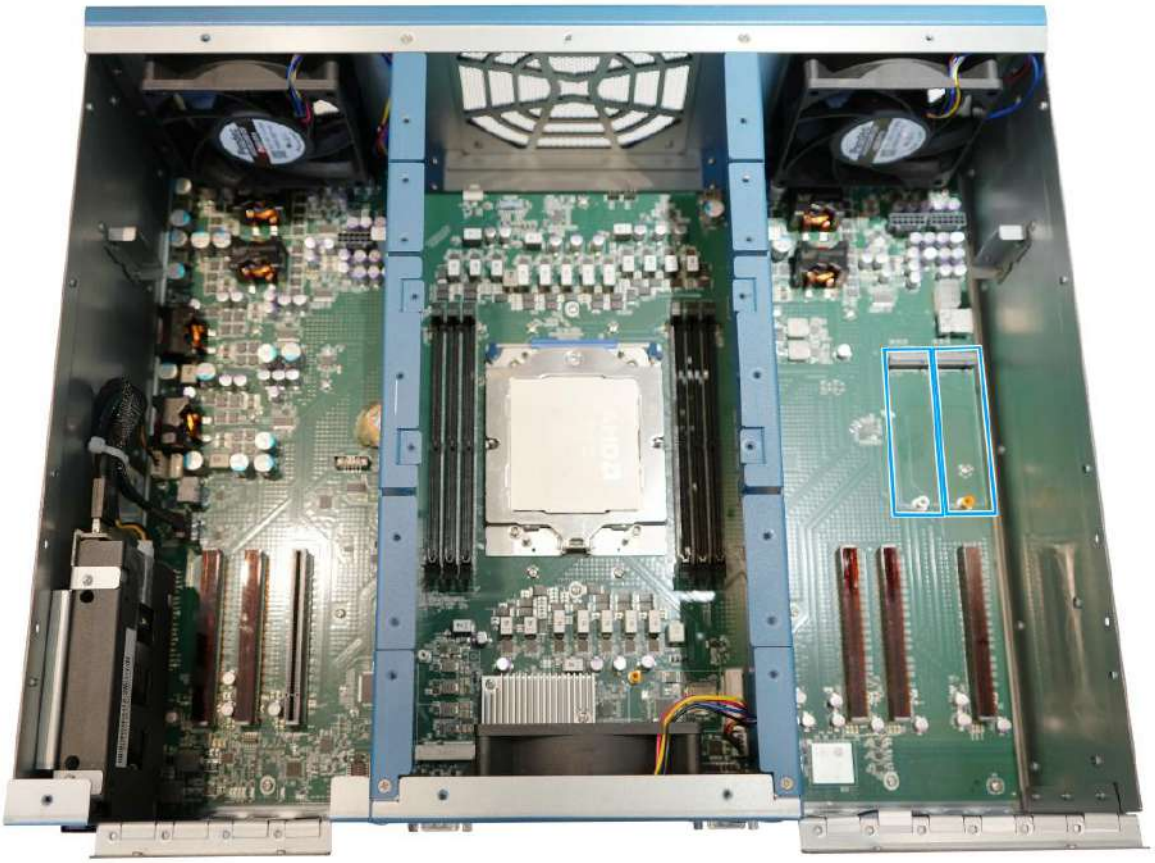


mini-PCIe Pin Definition



Pin #	Signal	Pin #	Signal
1	-	2	+3.3V
3	-	4	GND
5	-	6	+1.5V
7	-	8	-
9	GND	10	-
11	REFCLK-	12	-
13	REFCLK+	14	-
15	GND	16	-
Mechanical Key			
17	-	18	GND
19	-	20	-
21	GND	22	PERST#
23	PERn0	24	3.3V
25	PERp0	26	GND
27	GND	28	+1.5V
29	GND	30	-
31	PETn0	32	-
33	PETp0	34	GND
35	GND	36	USB_D-
37	GND	38	USB_D+
39	3.3V	40	GND
41	3.3V	42	-
43	GND	44	-
45	-	46	-
47	-	48	+1.5V
49	-	50	GND
51	-	52	3.3V

2.4.8 M.2 2280 (M Key) Slot for NVMe SSD

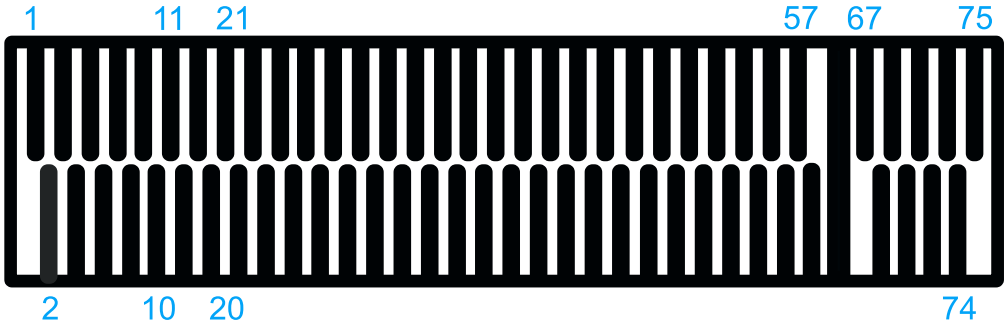


The system has two Gen4 x4 PCIe M.2 2280 slots for NVMe SSD installation. An NVMe SSD offers significant read/ write performance advantages over 2.5” SSDs.

NOTE

The M.2 2280 M key slots support only PCIe signal.

M.2 (M Key) Slot Pin Definition



Pin #	Signal	Pin #	Signal
1	GND	**2**	+3V3
3	GND	**4**	+3V3
5	PERN3	**6**	-
7	PERP3	**8**	-
9	GND	**10**	DAS/DSS_N
11	PETN3	**12**	+3V3
13	PETP3	**14**	+3V3
15	GND	**16**	+3V3
17	PERN2	**18**	+3V3
19	PERP2	**20**	-
21	GND	**22**	-
23	PETN2	**24**	-
25	PETP2	**26**	-
27	GND	**28**	-
29	PERN1	**30**	-
31	PERP1	**32**	-
33	GND	**34**	-
35	PETN1	**36**	-
37	PETP1	**38**	-
39	GND	**40**	-
41	PERn0	**42**	-
43	PERp0	**44**	-
45	GND	**46**	-
47	PETn0	**48**	-
49	PETp0	**50**	PERST_N
51	GND	**52**	-
53	REFCLKN	**54**	-
55	REFCLKP	**56**	-
57	GND	**58**	-
Mechanical Key			
67	-	**68**	-
69	-	**70**	+3V3
71	GND	**72**	+3V3
73	GND	**74**	+3V3
75	GND		

3 System Installation

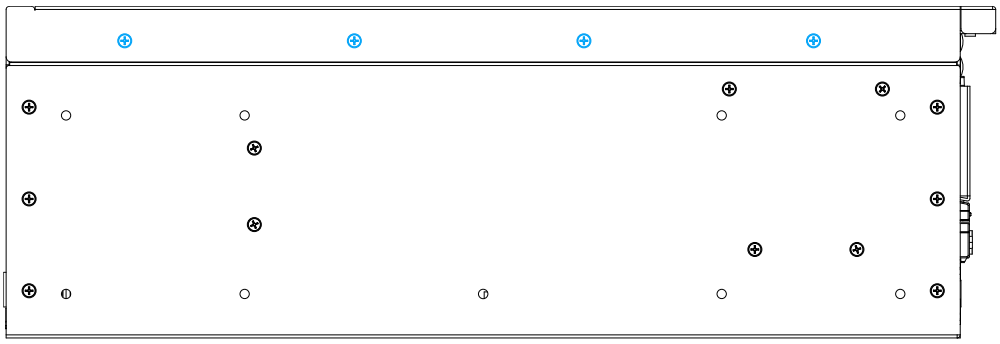
Before disassembling the system enclosure and installing components and modules, please make sure you have done the following:

- It is recommended that only qualified service personnel should install and service this product to avoid injury or damage to the system.
- Please observe all ESD procedures at all times to avoid damaging the equipment.
- Before disassembling your system, please make sure the system has powered off, all cables and antennae (power, video, data, etc.) are disconnected.
- Place the system on a flat and sturdy surface (remove from mounts or out of server cabinets) before proceeding with the installation/ replacement procedure.

3.1 Disassembling the System

To access system internal components, please refer to the instructions below to disassemble the enclosure.

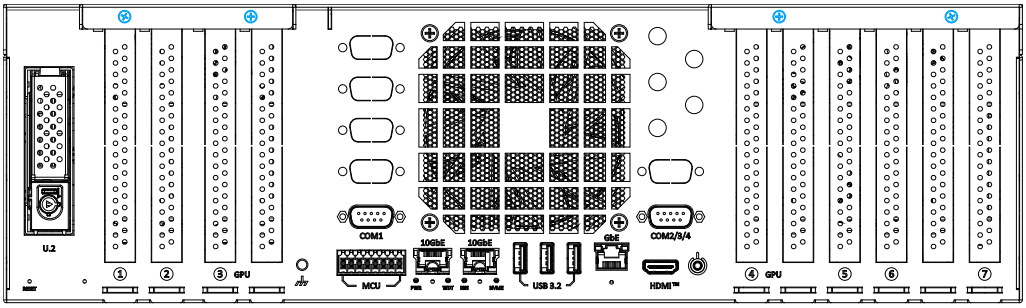
1. Remove the **screws** indicated on both sides of the enclosure.



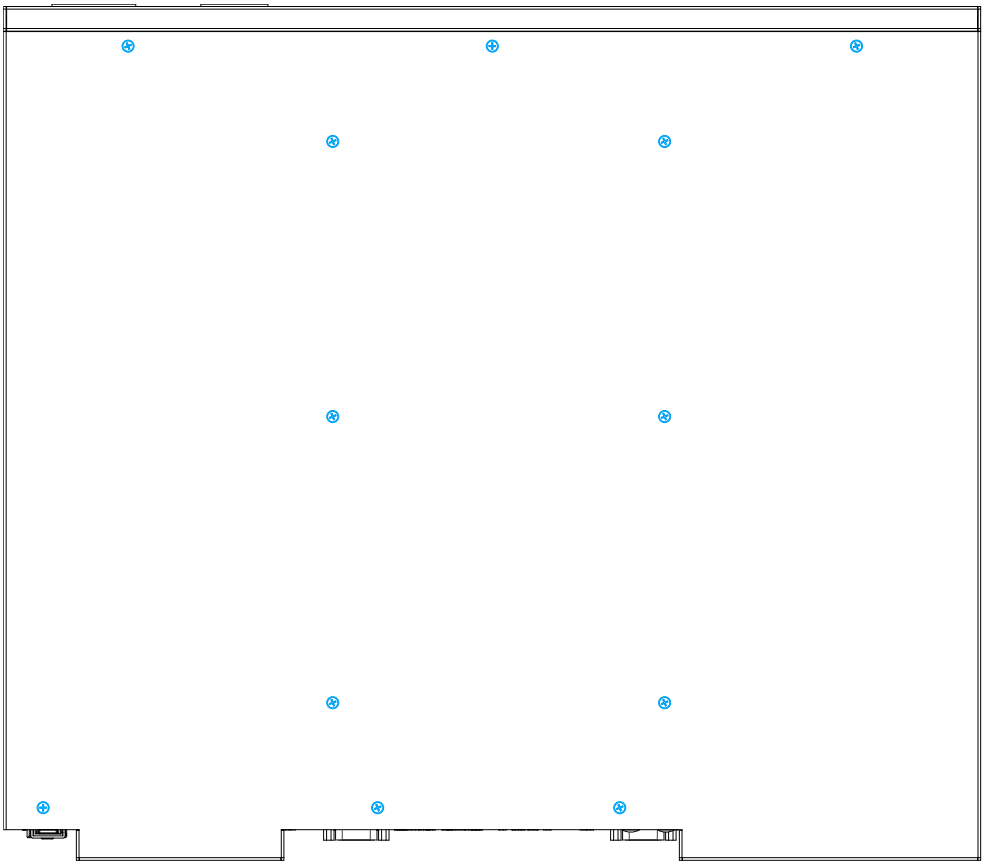
Left side (facing the I/O panel)

Right side (facing the I/O panel)

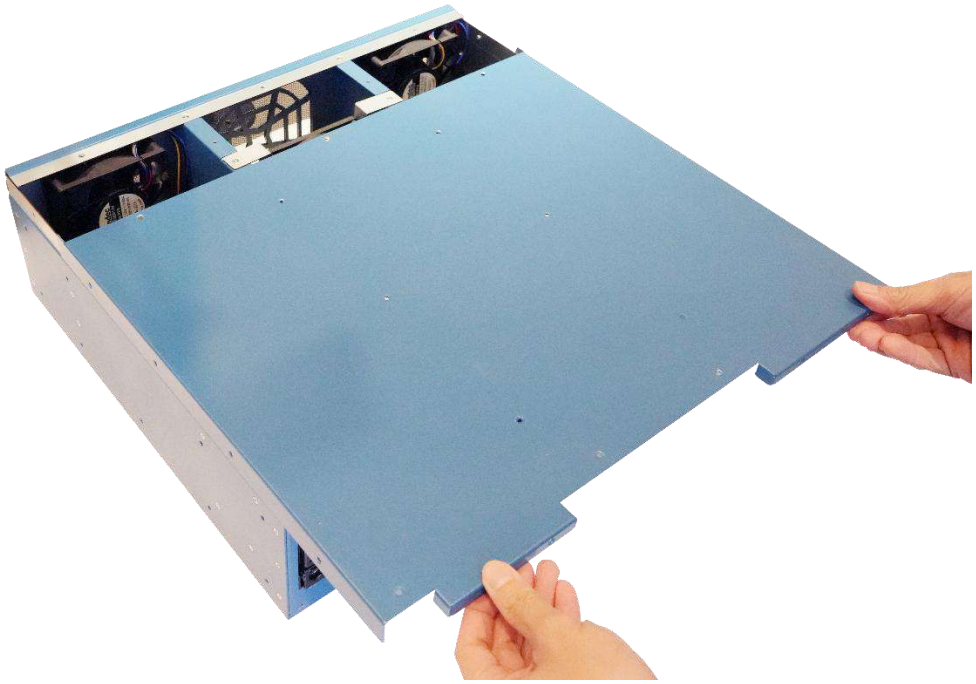
2. Remove the **screws** indicated on the I/O panel.



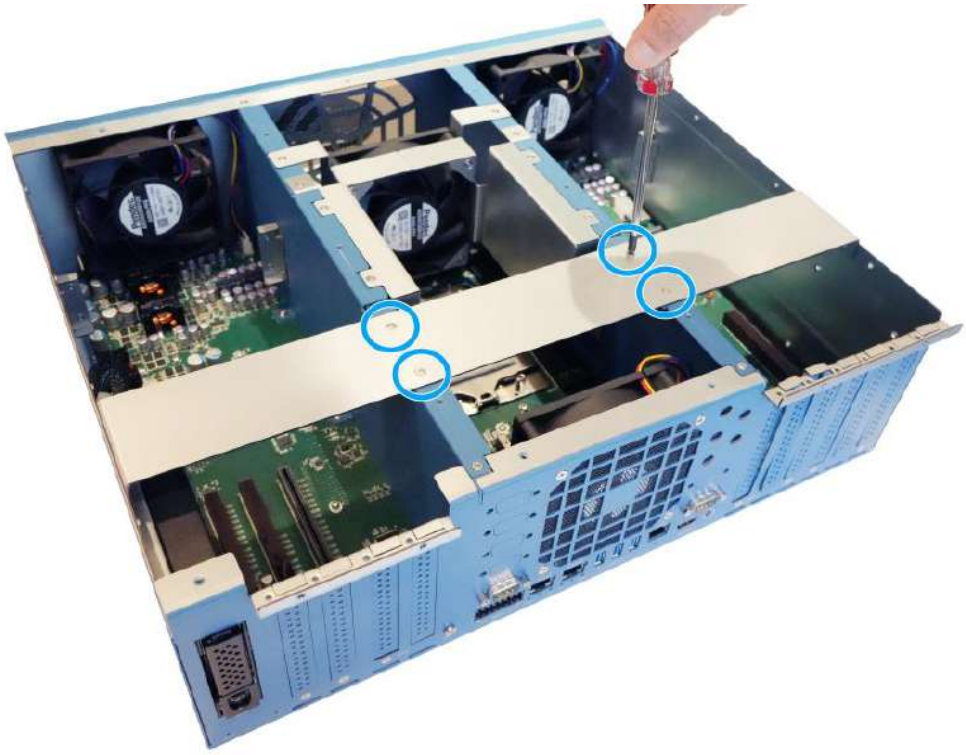
3. Remove the **screws** indicated on the top panel.



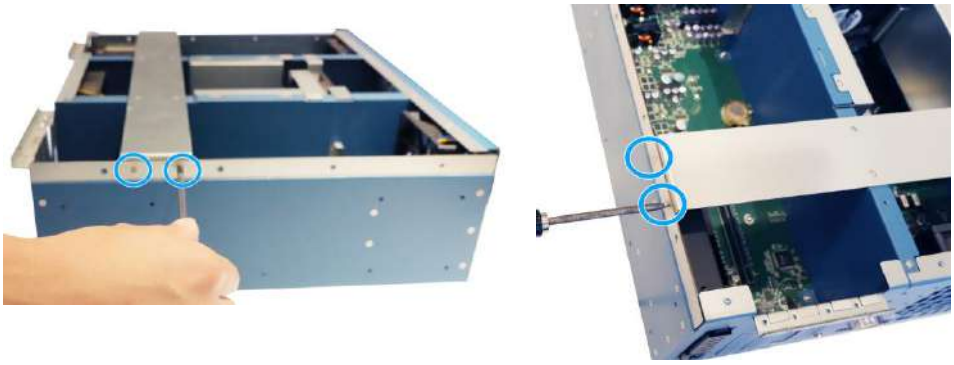
4. Slide the top panel towards the direction of the I/O panel and lift the top panel to separate it from the enclosure.



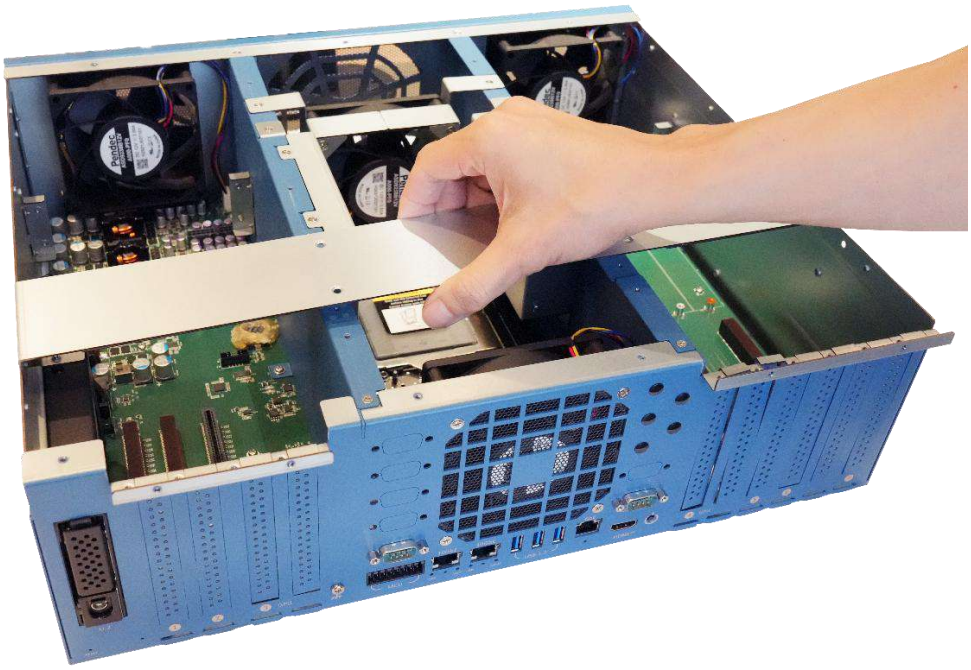
5. Remove the **screws** indicated on top of the enclosure backet.



6. Remove the **screws** indicated on both sides of the enclosure bracket.



7. Lift and remove the enclosure bracket.



8. Once the enclosure bracket has been removed, you can access the system's internal components.

3.2 Installing Internal Components

3.2.1 CPU/ ECC DRAM Installation Procedure

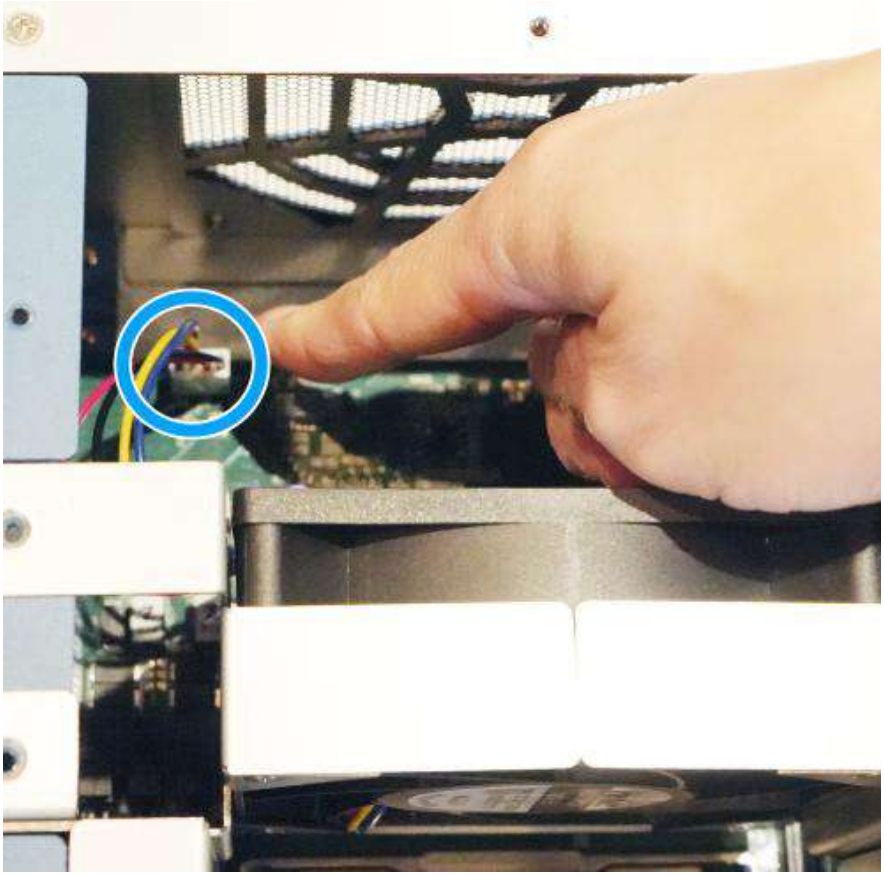
NOTE

Due to the nature of server-grade CPUs and their large number of PCIe lanes, the system has a longer boot time compared to a standard desktop CPU. After reinstalling the CPU or memory, clearing the CMOS or battery replacement, and depending on the number of PCIe devices installed, the 1st and 2nd boots may take up to 9 minutes. Starting from the 3rd boot, the startup time may take up to 3 minutes.

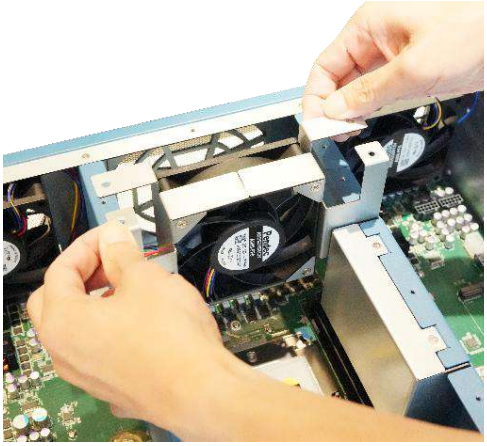
Due to the relative positions of the CPU socket and ECC DRAM slots, it is recommended to complete the installation of these two components in one procedure.

1. To gain access to internal components, please refer to the section "Disassembling the System".
2. To gain access to the CPU/ DRAM socket, remove the **screws** indicated.

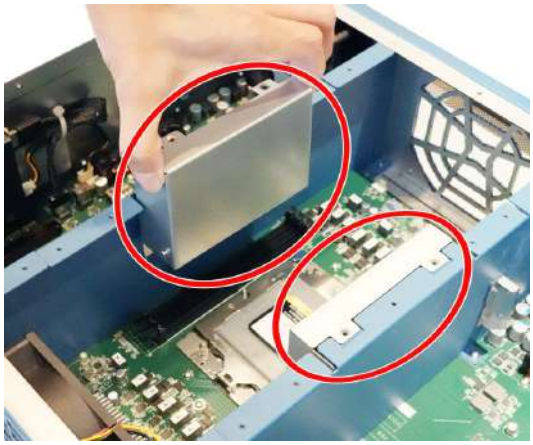
3. Disconnect the fan power cable.



4. Remove the fan module/ DRAM covers.



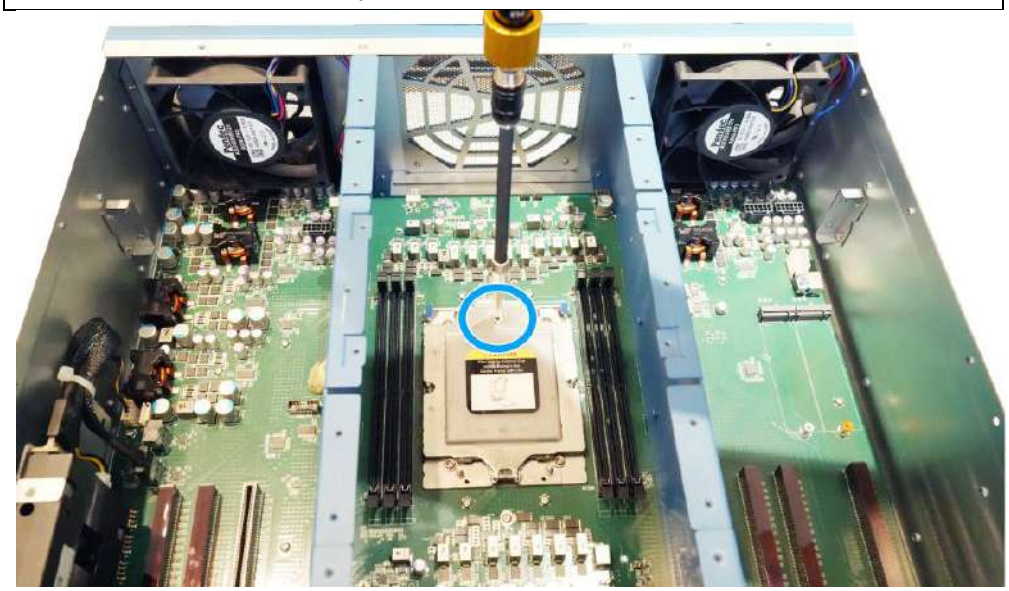
Remove fan module



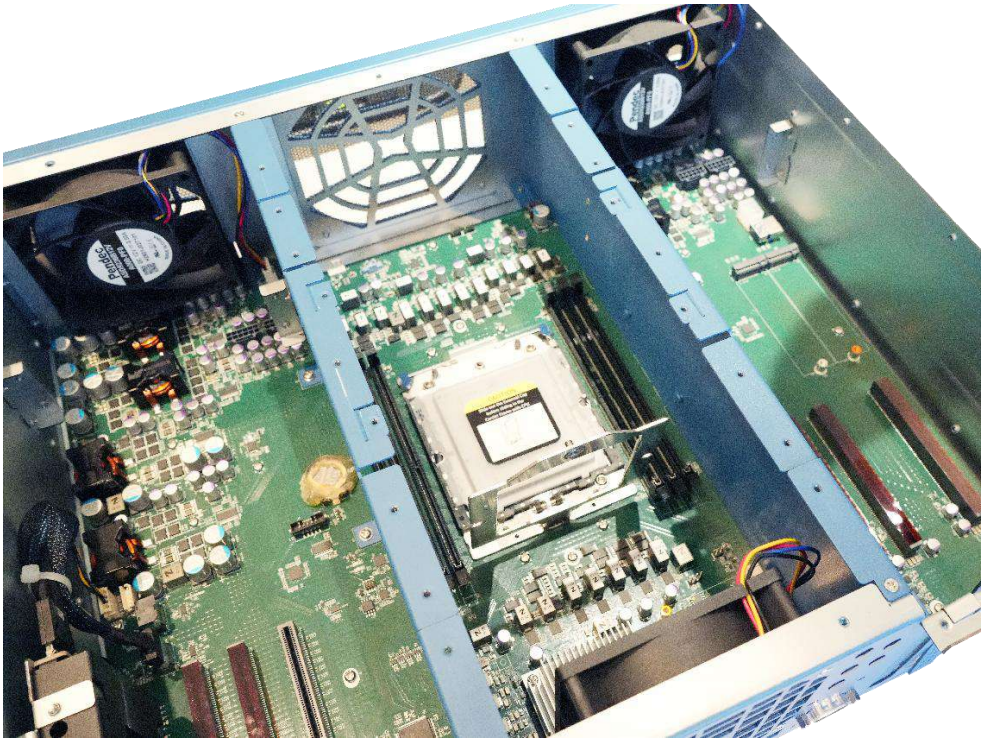
Remove DRAM covers on both sides

5. To remove the CPU cover, loosen the **Torx screw** indicated.

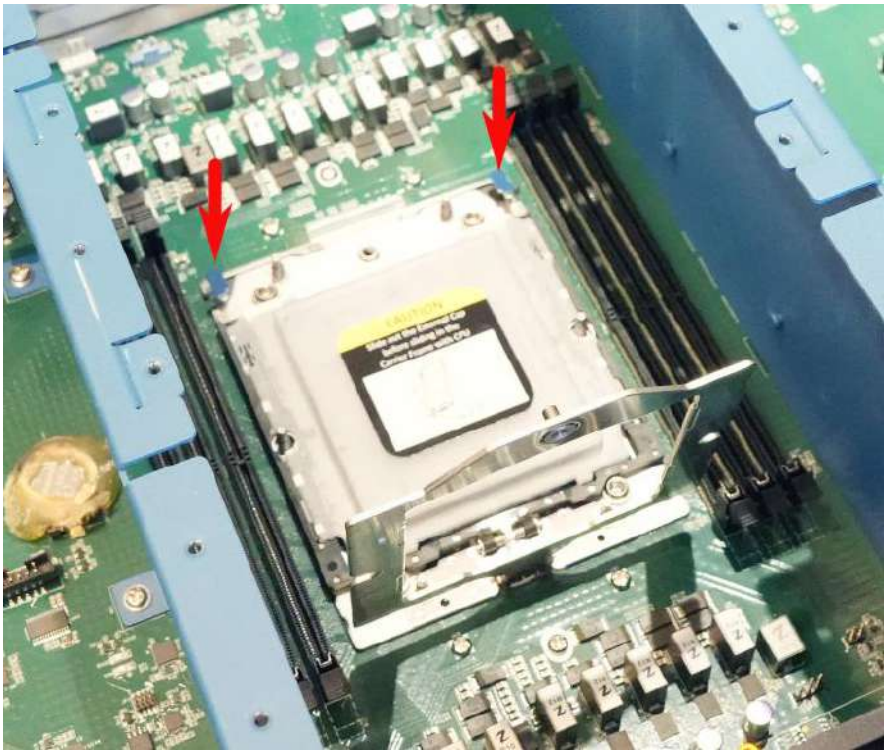
> **NOTE**
>
> *Please use T20 Torx screw specification.*



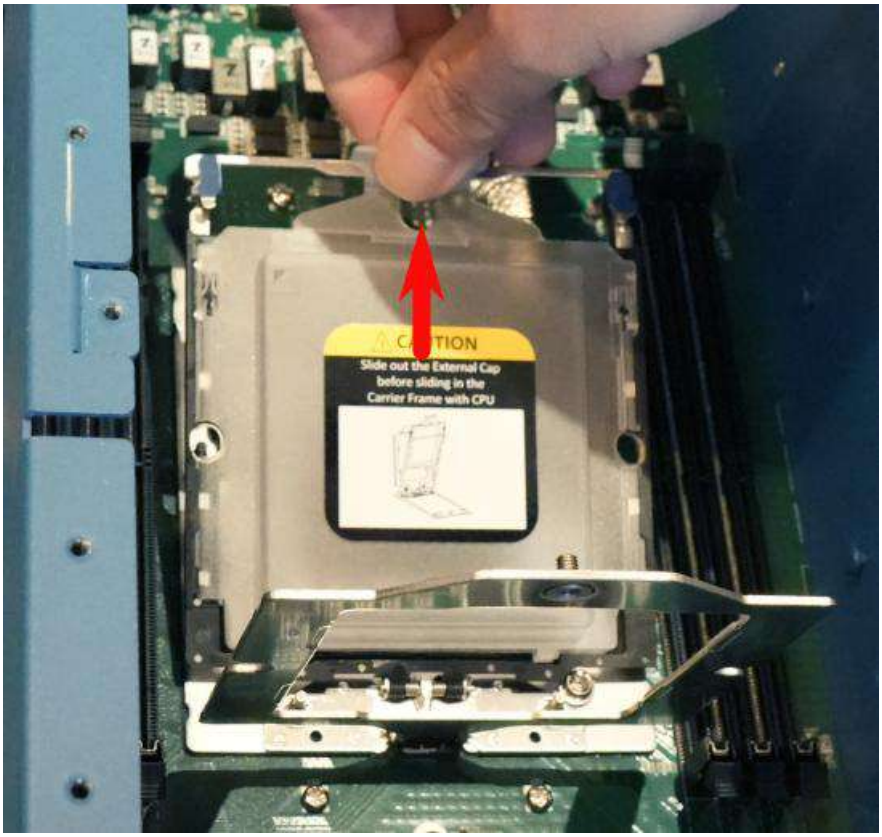
6. The CPU load plate should gently spring open.



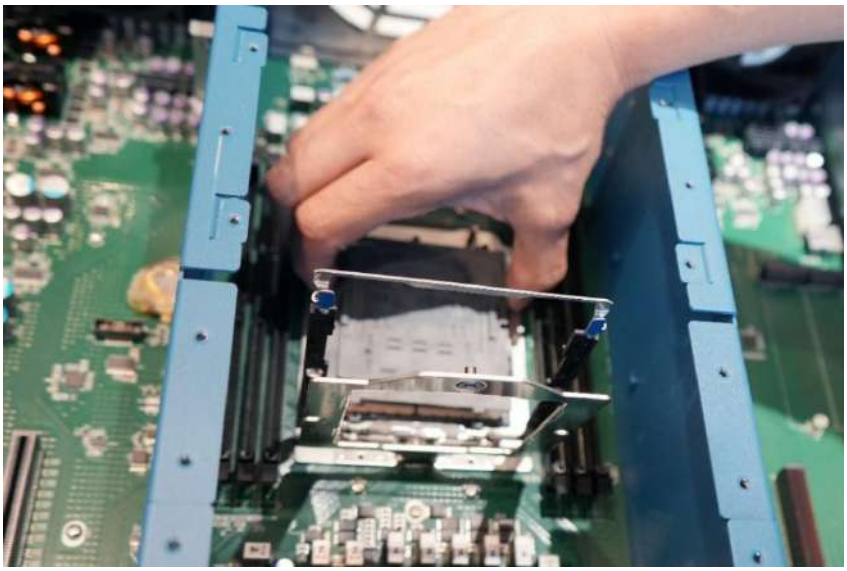
7. Gently pull the **blue tab** (indicated by the **red arrows**) to lift the CPU frame rail.



8. Slide out the external cap.



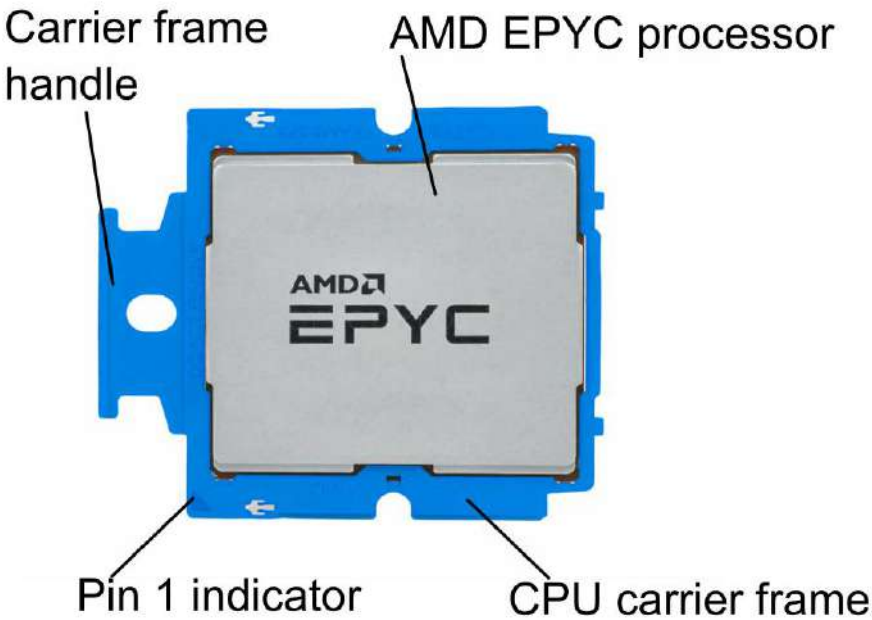
9. Remove the CPU socket cover.



WARNING

With the protective cover removed, please be careful when handling the motherboard. DO NOT touch the pins in the socket!

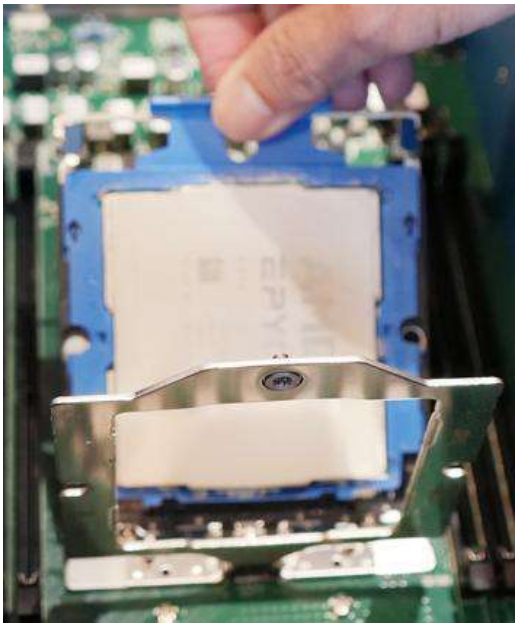
10. Retrieve the CPU and carrier frame out of the CPU container.



NOTE

DO NOT *separate the CPU carrier frame from the CPU. They must be inserted into the CPU frame rail together upon installation.*

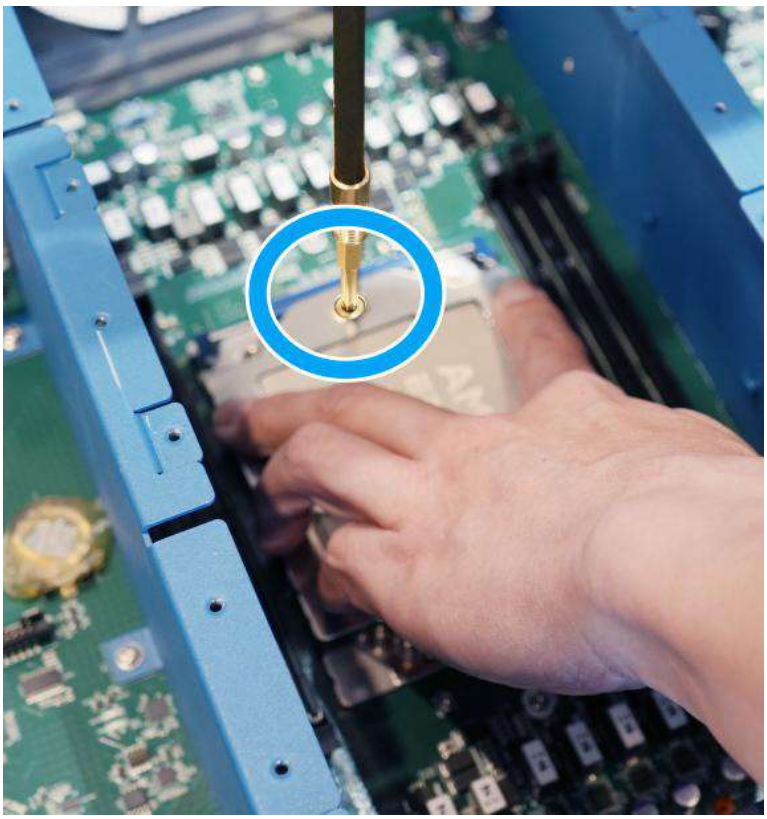
11. Holding the carrier frame handle, insert the CPU into the CPU frame rail, and gently push the frame rail into the socket.



Insert into CPU frame rail

Gently push into the socket

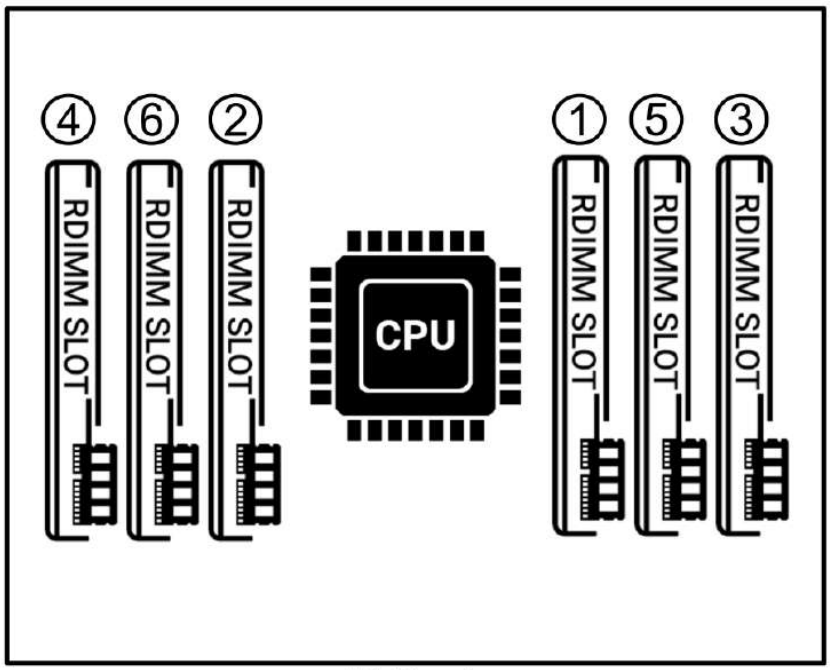
12. Gently lower CPU load plate, and secure it by tightening the **Torx screw** indicated.



NOTE

Please secure using T20 Torx screw @ 13kgf-cm specification.

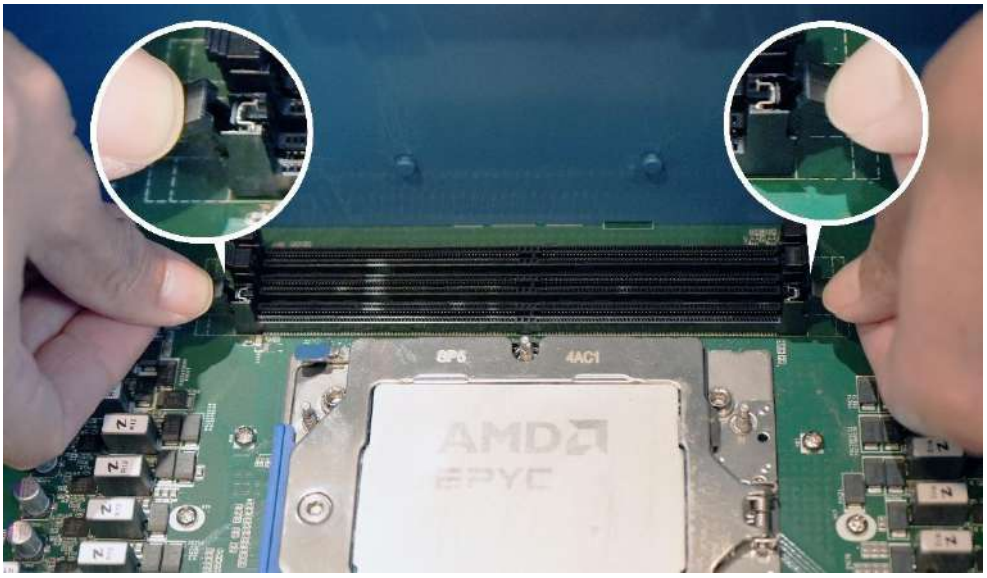
13. For ease of installation, it is recommended to install the memory modules before installing the CPU heatsink. Please refer to the table below for memory installation configurations.



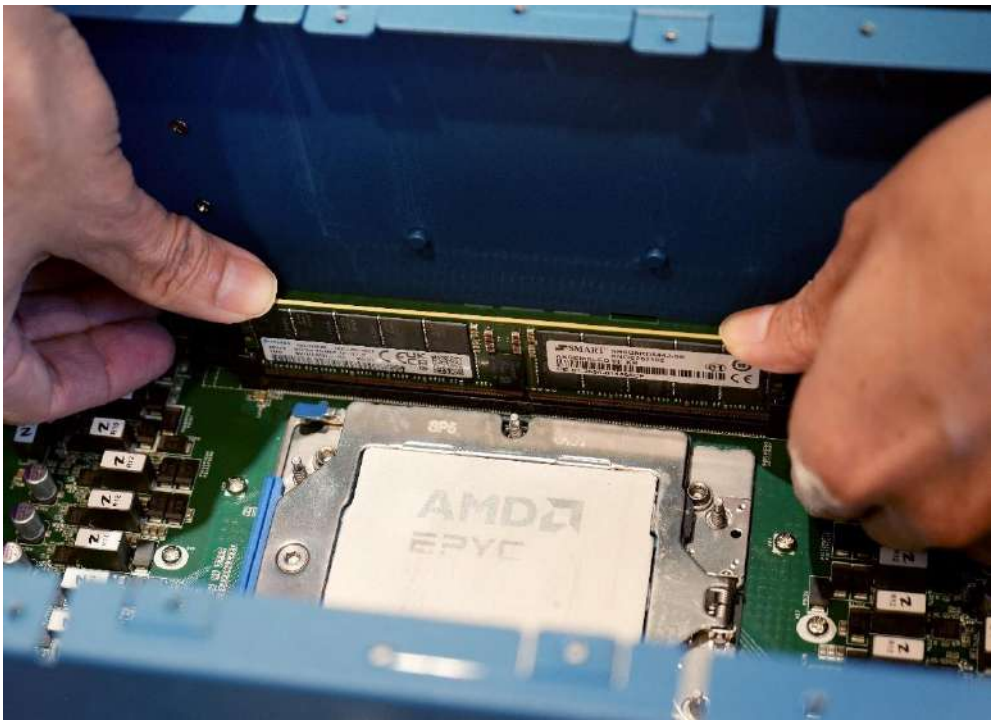
CH mode	Slot 1	Slot 3	Slot 5	Slot 2	Slot 4	Slot 6	Node support*
6-CH	v	v	v	v	v	v	NPS2, NPS1
4-CH	v	v		v	v		NPS4, NPS2, NPS1
2-CH	v			v			NPS2, NPS1
1-CH	v						NPS1

*For details, please refer to "ECC DRAM Slots" section.

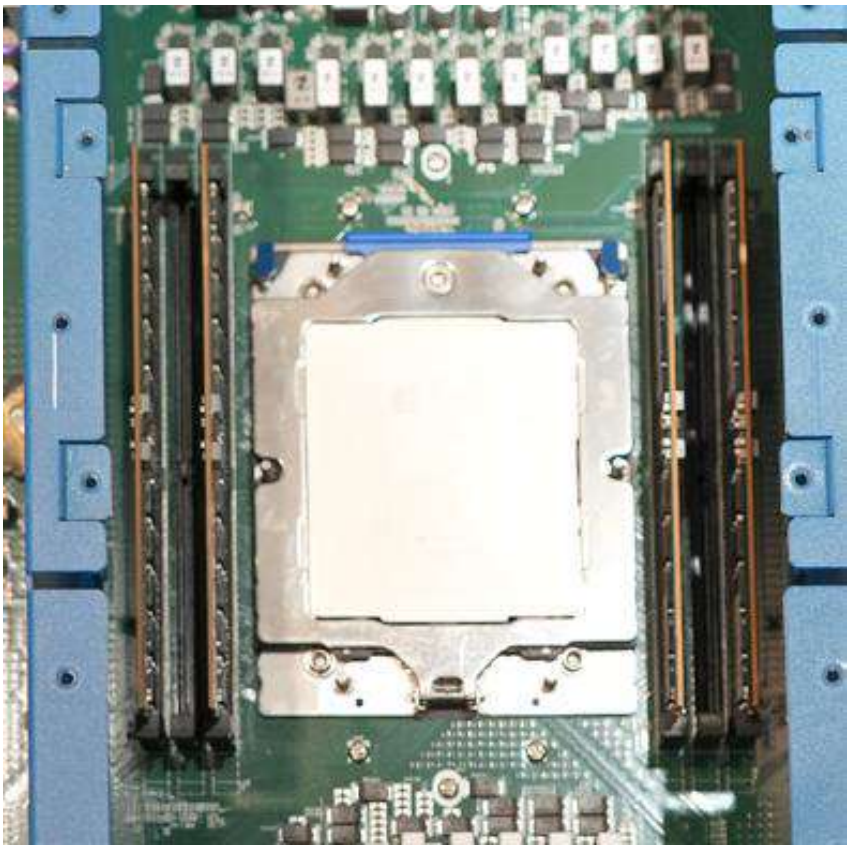
14. To install a ECC DRAM module, gently push the DRAM slot clips outwards.



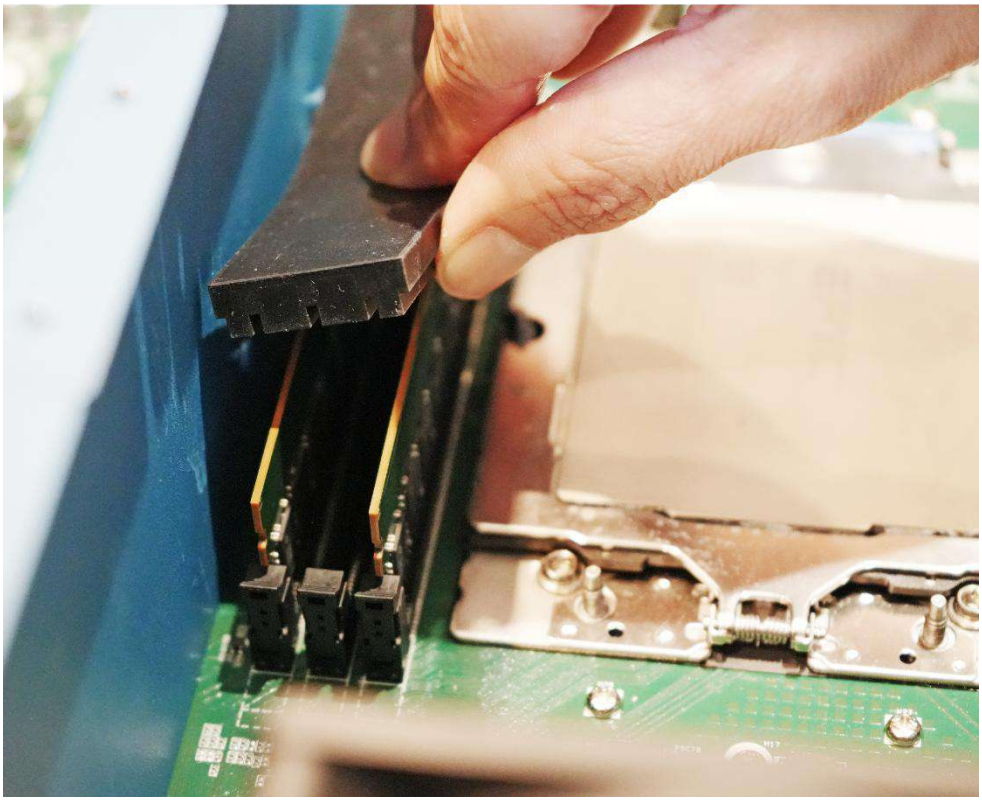
15. Lower and insert the DRAM module into the slot and push downwards until the module is clipped in (you should hear a “click” sound).



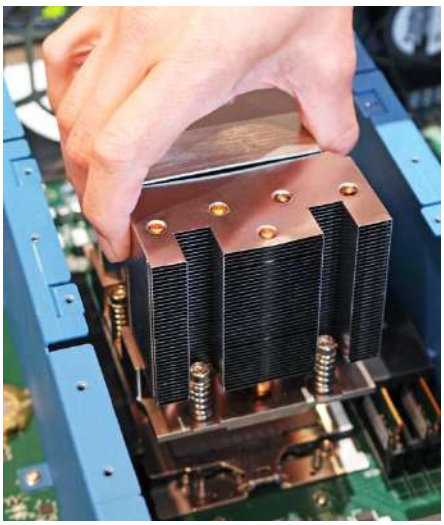
16. Please repeat above steps to install other ECC DRAM modules. The illustration below demonstrates a 4-CH ECC DRAM module installation.



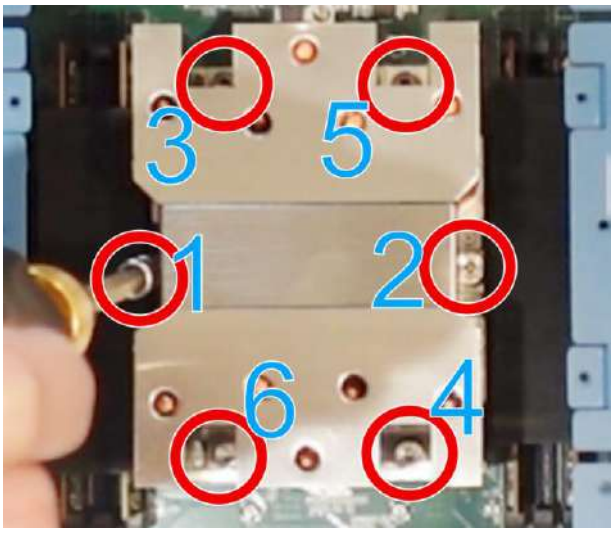
17. Take the rubber DRAM stabilizer out of the accessory box and place it on top of the DRAM modules on both sides.



18. Remove the thermal paste protection cover on the bottom of the CPU heatsink, lower the CPU heatsink onto the CPU/ socket, and secure the screws indicated. Make sure the screws are tightened gradually in numeric order to ensure even pressure.

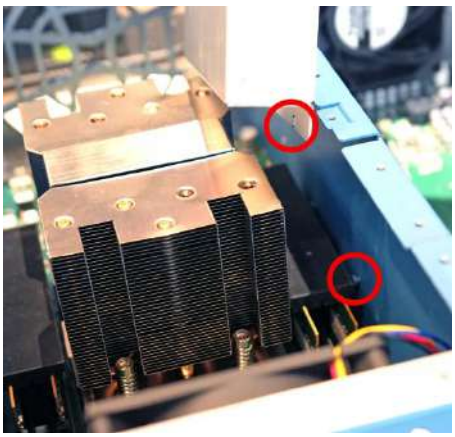


Lower the heatsink

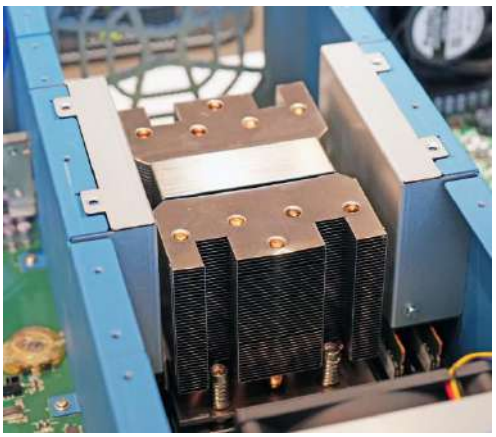


Tighten the screws in numeric order

19. Reinstall the DRAM covers (make sure the **notches** meet). There are two notches on each side.

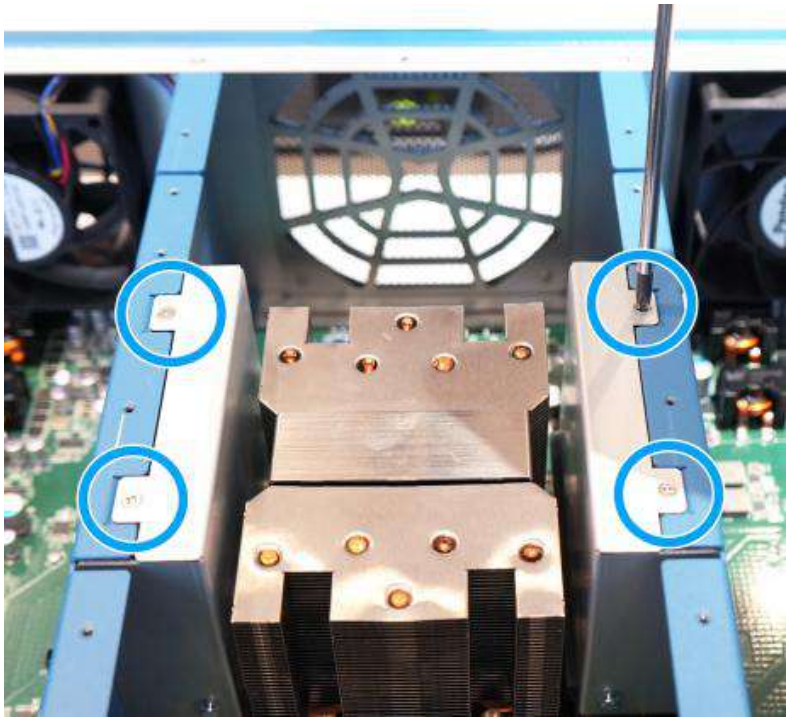


Make sure the notches match

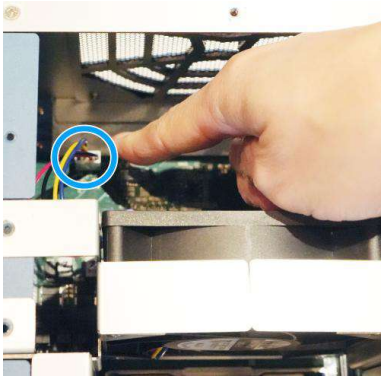


Install both DRAM covers

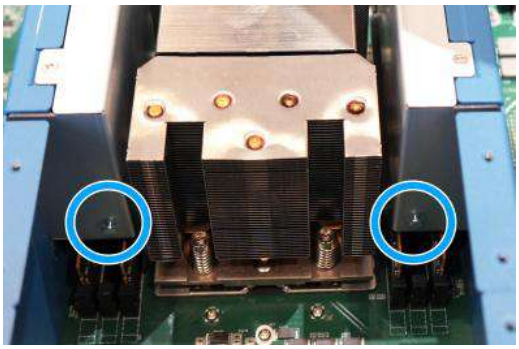
20. Secure the **screws** indicated.



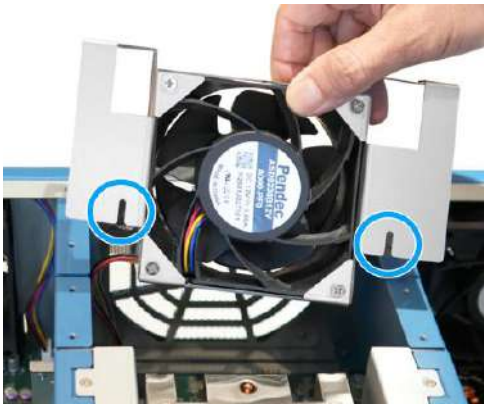
21. Reinstall the fan module (make sure the notches meet). There is one notch on each side on the DRAM cover.



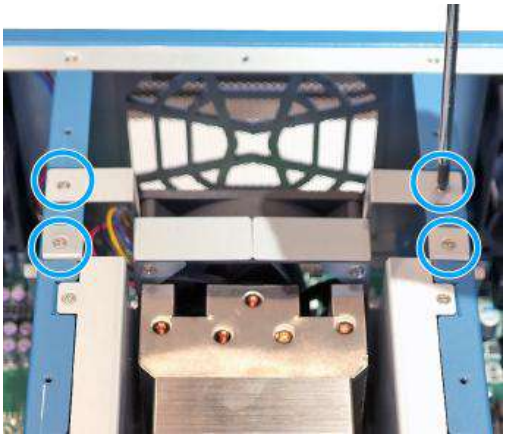
Connect fan module power cable



Notches on DRAM cover



Notches on fan module



Install and secure the fan module

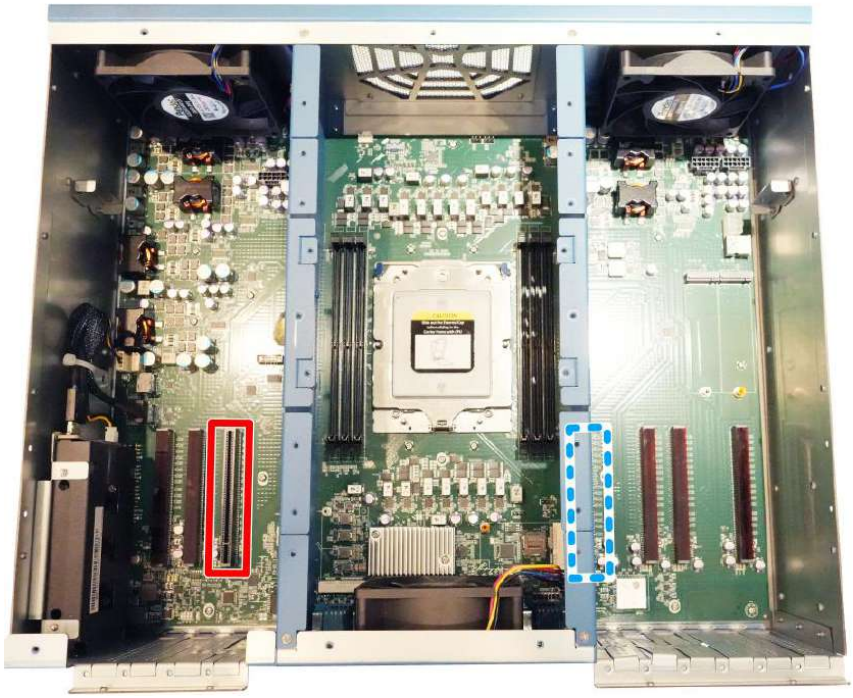
22. Reinstall the system enclosure.

23. If you need to install other components, please refer to respective sections.

3.2.2 GPU Installation

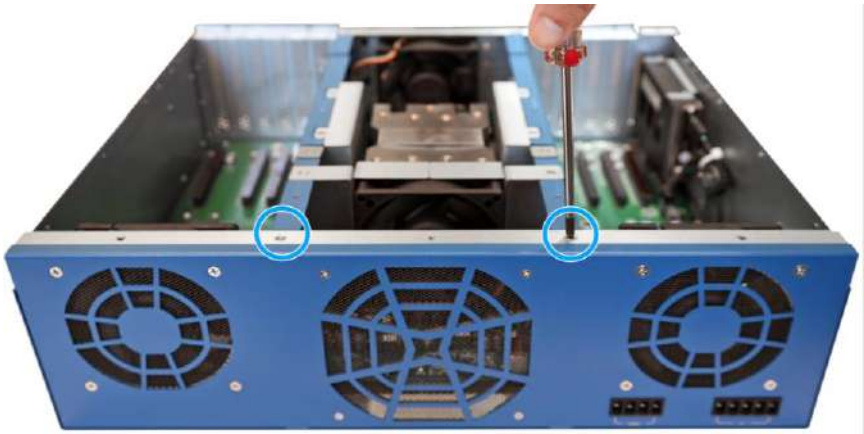
NOTE

Due to the nature of server-grade CPUs and their large number of PCIe lanes, the system has a longer boot time compared to a standard desktop CPU. After reinstalling the CPU or memory, clearing the CMOS or battery replacement, and depending on the number of PCIe devices installed, the 1st and 2nd boots may take up to 9 minutes. Starting from the 3rd boot, the startup time may take up to 3 minutes.

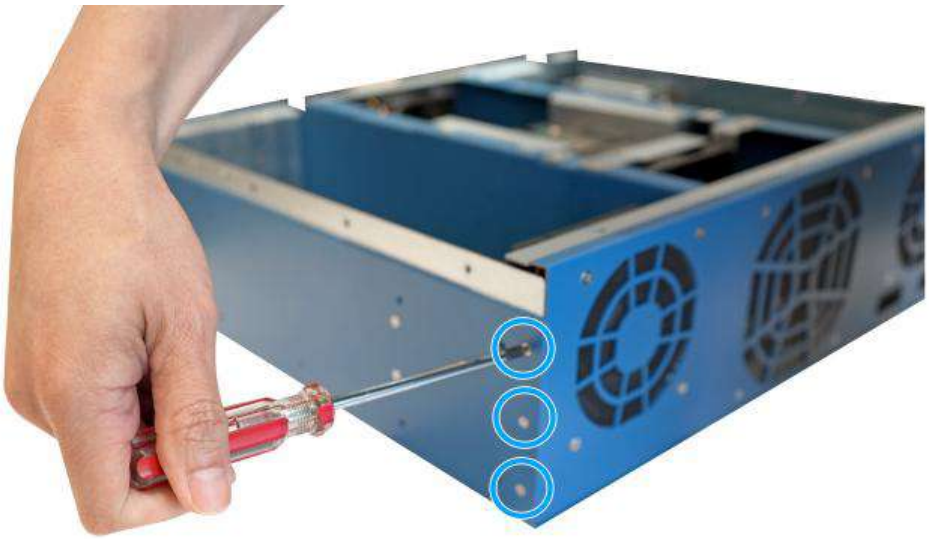


The system has two dedicated PCIe x16 @ Gen5 slots (indicated in **red** and **dotted blue**) that each supports up to a 400W inference accelerator.

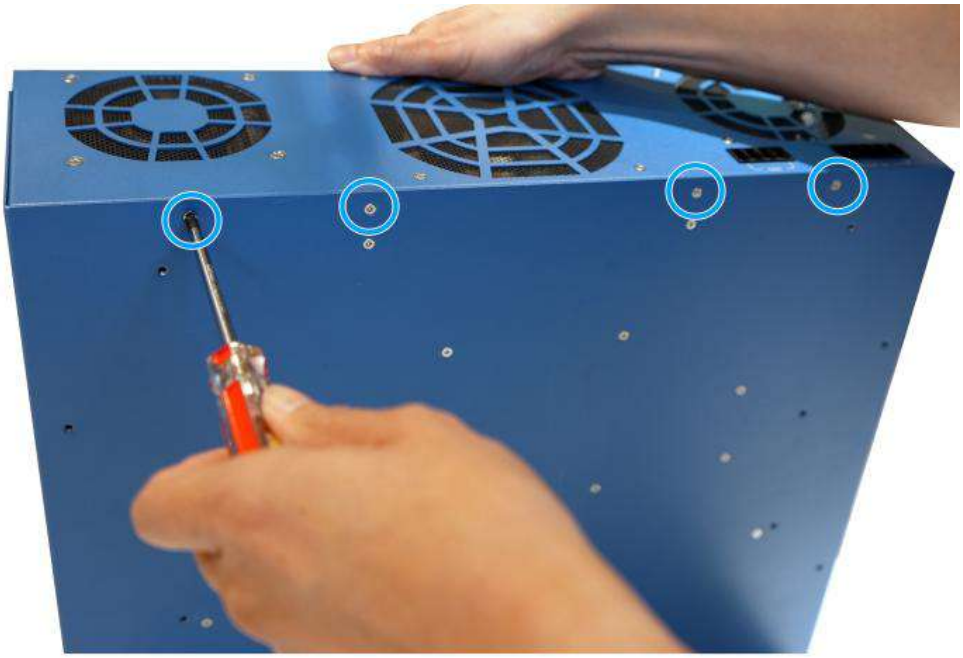
1. To gain access to internal components, please refer to the section "Disassembling the System".
2. Remove the **screws** indicated on the power connector panel.



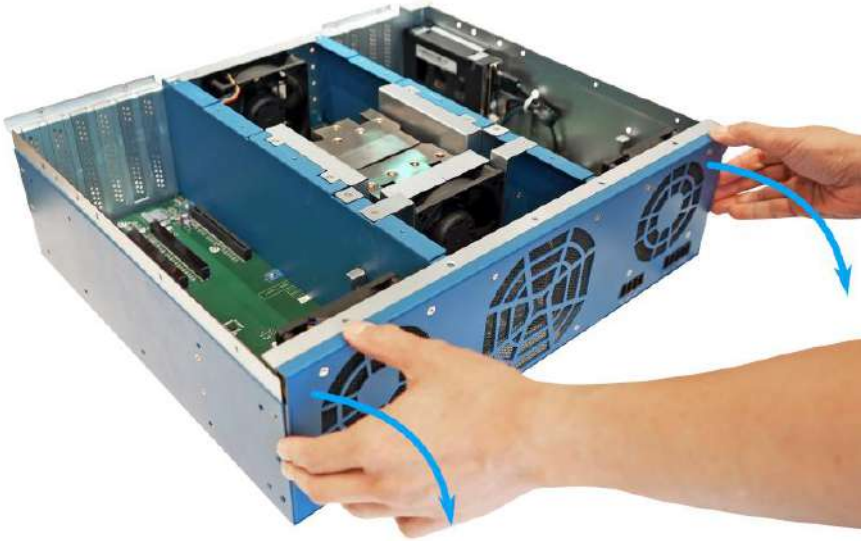
3. Remove the **screws** indicated on both sides of the power connector panel.



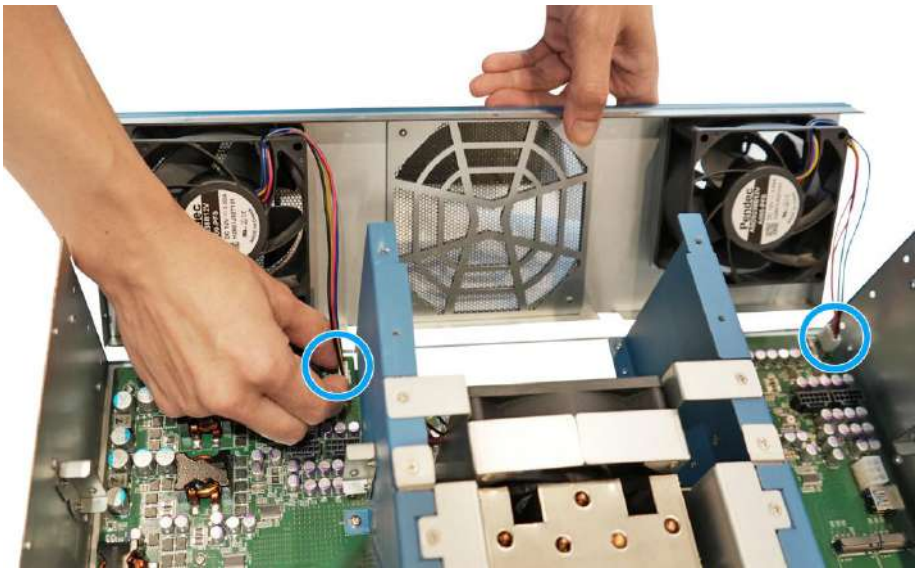
4. Remove the **screws** underneath the power connector panel.

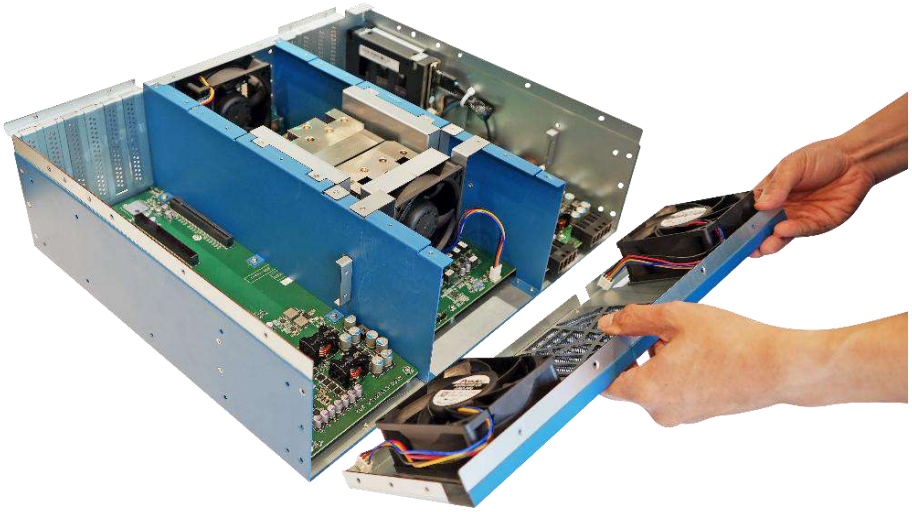


5. Tilt the top part of the power connector panel away from the enclosure.

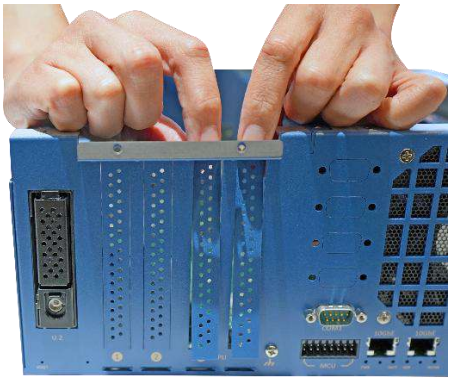


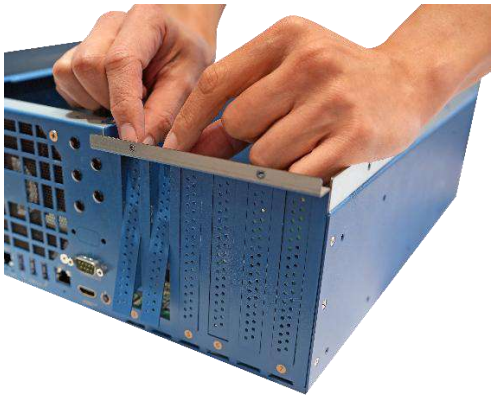
6. Disconnect the both fans' power cable (do not pull on the cable), and remove the panel.





7. Remove the inference accelerator's punch-out panel.



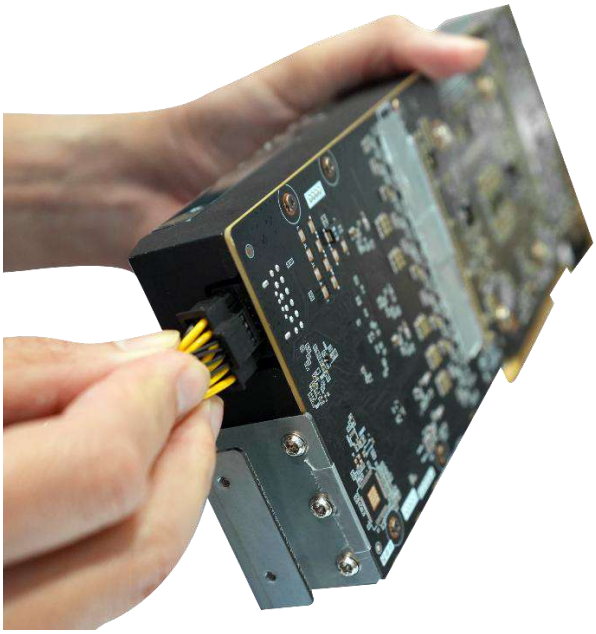


8. Take the brackets out of the accessory box and secure it onto the back of the inference accelerator.

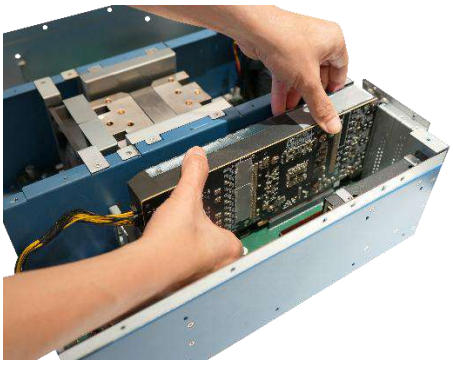
Place bracket onto GPU

Secure using **screws**

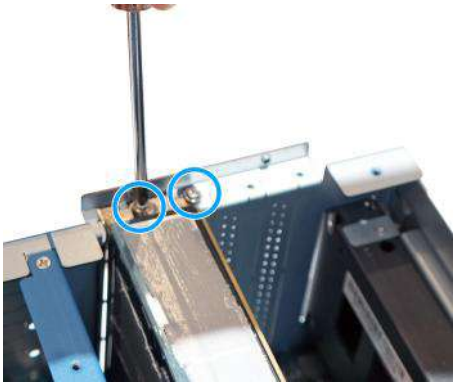
9. Connect the power cable to the back of the inference accelerator(s).



10. Lower the inference accelerator into the system, insert the goldfinger into the dedicated x16 slot, and secure it with screws.



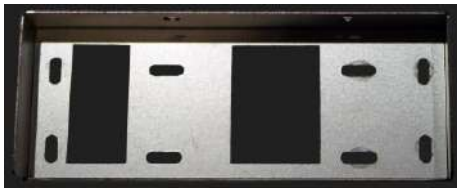
Lower and insert the GPU into x16 PCIe slot



Secure with a screw

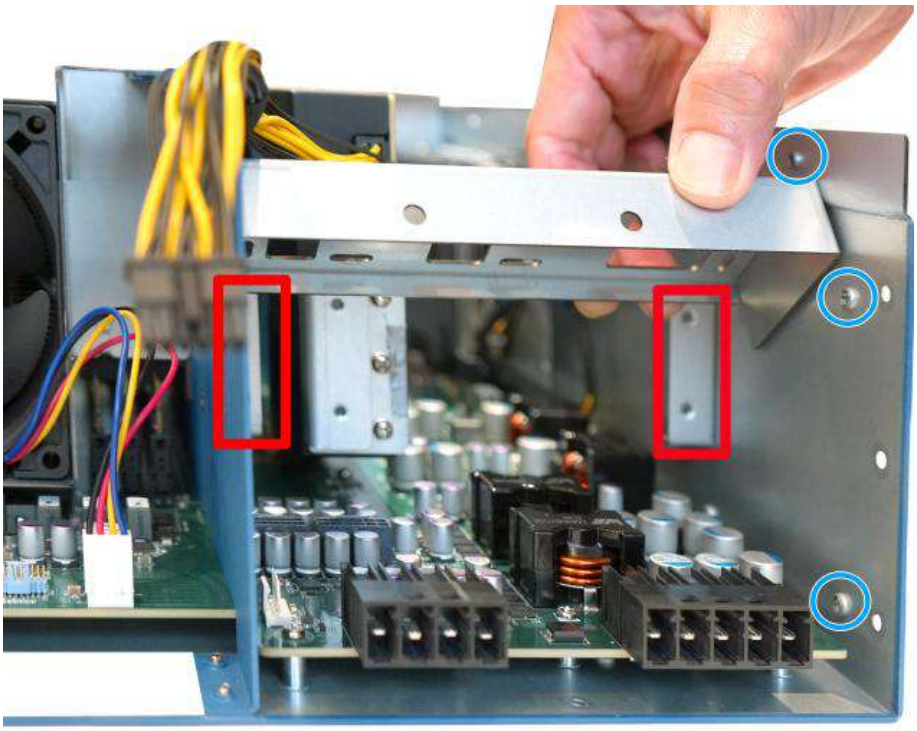
11. The back of the inference accelerator is secured with a back plate. Note that the left and right back plates (viewed from the power connector panel) are different.

Right side back plate

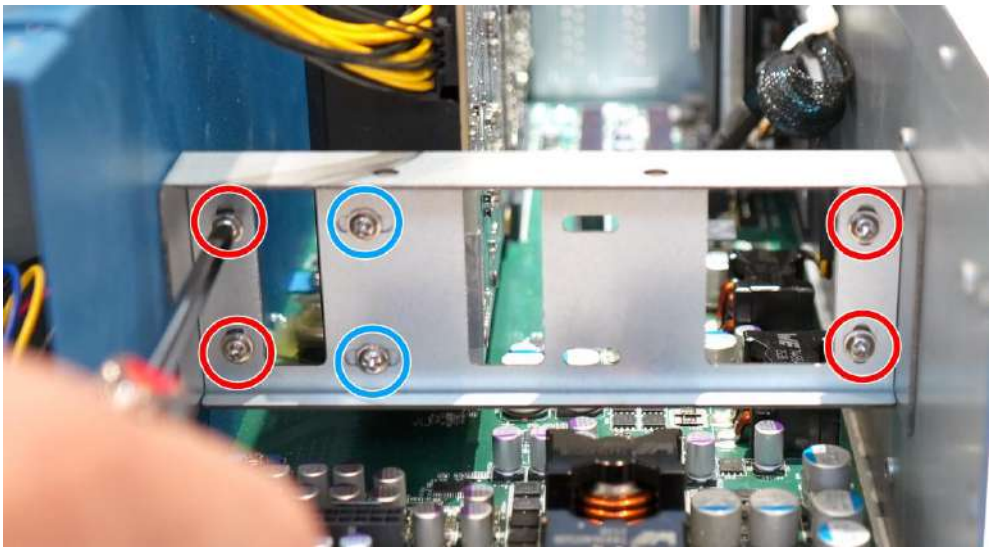


Left side back plate

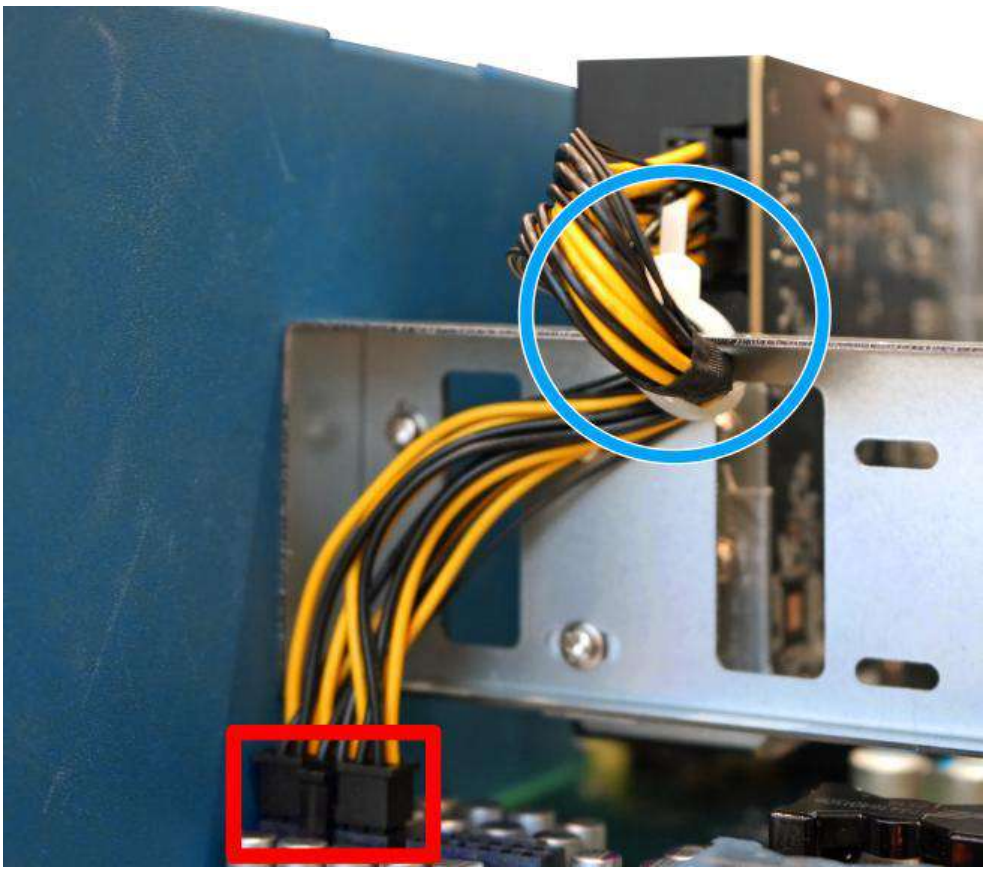
12. To install back plate for the inference accelerator, holding the back plate wall-to-wall, slide it between the **screw-holes** on the panel until it meets the side plates (indicated in **red**) on the enclosure/ partition wall.



13. Secure the back plate onto the inference accelerator's bracket (indicated in **blue**), and secure the back plate onto the two side plates (indicated in **red**).

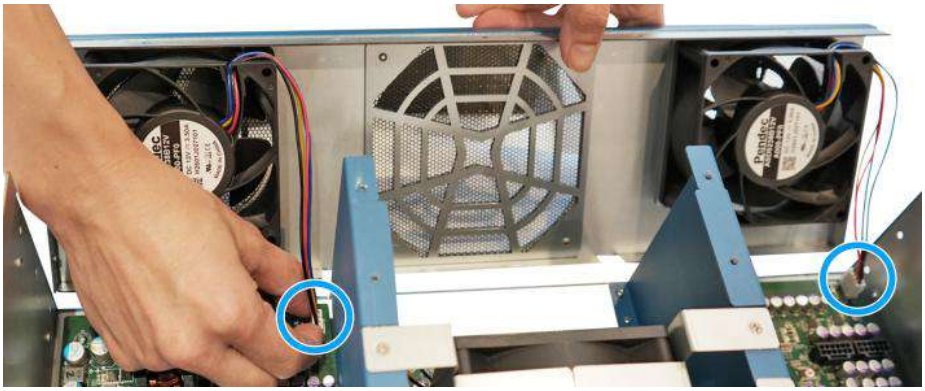


14. Plug in the inference accelerator's **power connector** onto the motherboard, and tie up the loose power cable with a **zip-tie** (to avoid fan interference).

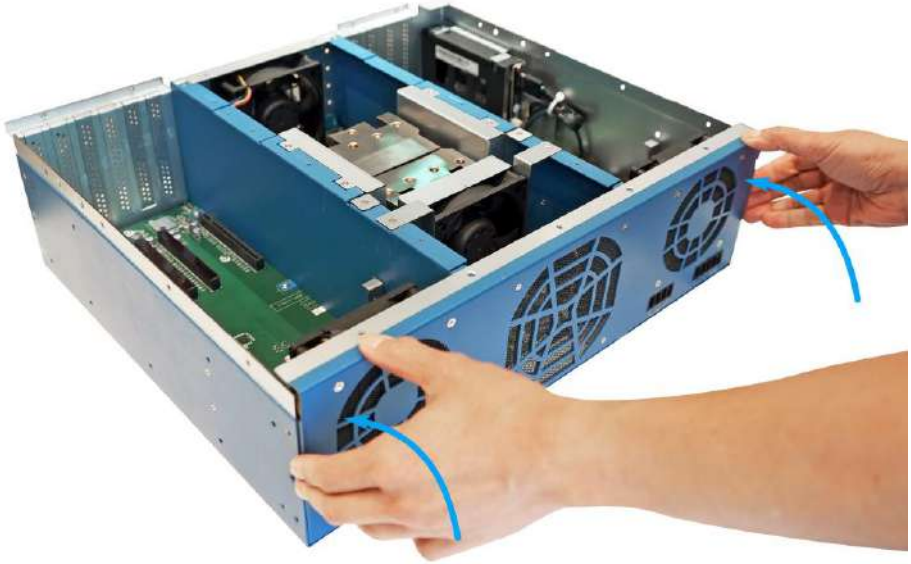


15. If you are installing a second inference accelerator, repeat the installation process in the partition on the left with the dedicated "left" side back bracket.

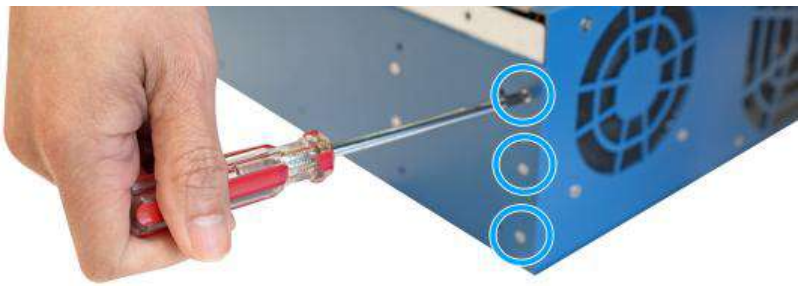
16. Once the inference accelerator(s) have been installed, connect the fan's power plug back onto the motherboard.



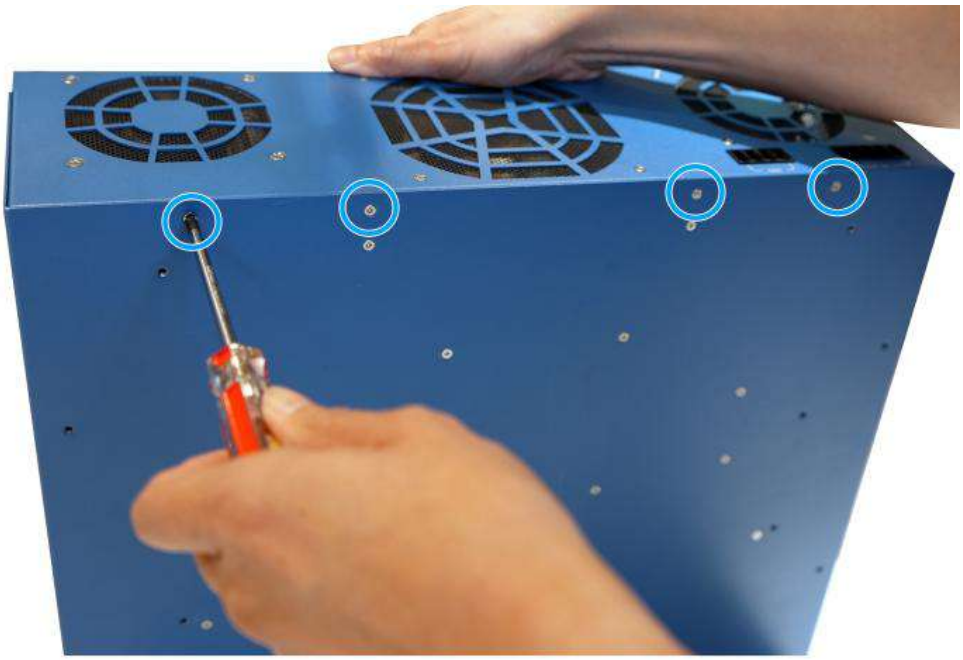
17. Reinstall the power connector panel.



18. Secure the power connector panel with **screws** on both sides.



19. Secure the power connector panel's screws at the bottom.



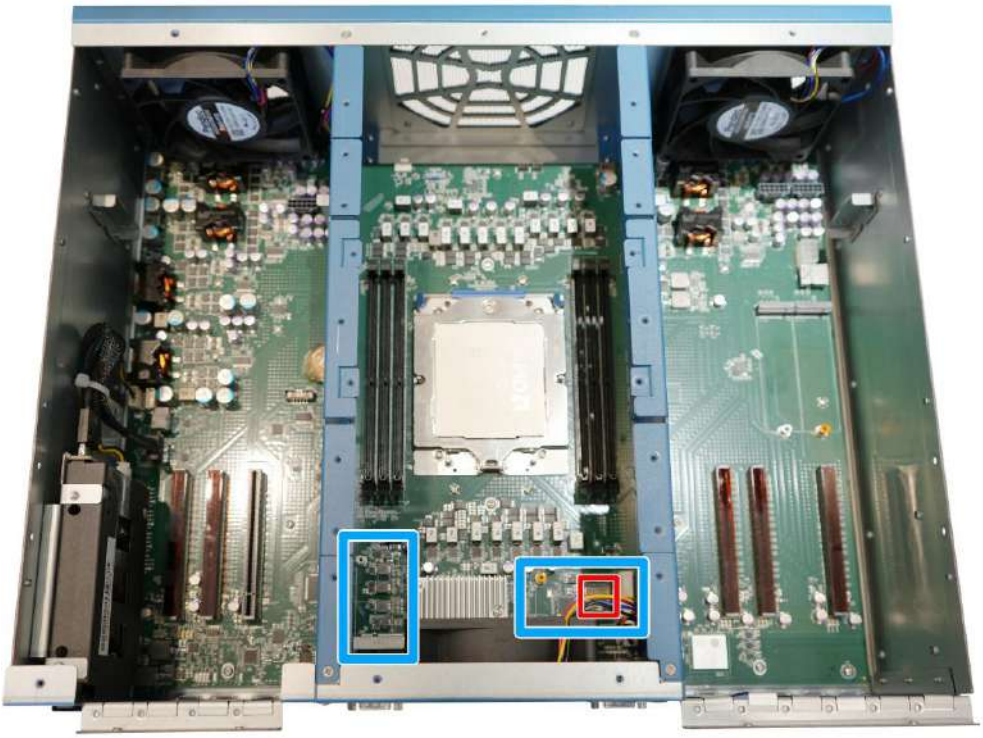
20. Reinstall the system enclosure and panel when done.

21. If you need to install other components, please refer to respective sections.

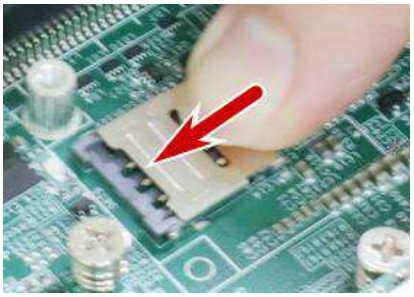
3.2.3 mini-PCIe Module, SIM Card and Antenna Installation

The system has two **mini-PCIe slots** coupled with **SIM socket** for installing wireless communication module. For installation, please refer to the following instructions.

1. Please refer to the section "Disassembling the System".
2. Locate the **mini-PCIe** and **SIM socket** on the motherboard.



3. Before installing the mini-PCIe module, you need to insert the micro-SIM card. Slide the SIM slot holder and lift the SIM card holder. Insert the micro-SIM card (pins facing up), shut the SIM holder and slide it to lock the SIM card in-place.

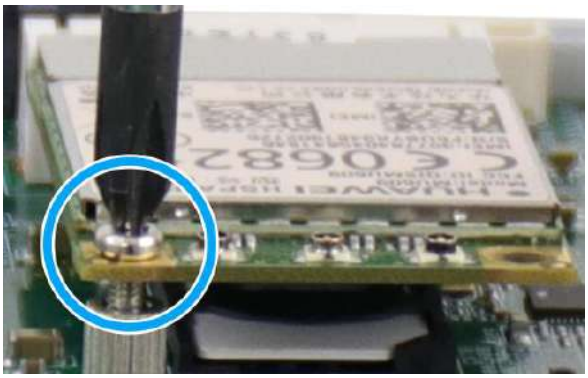


Slide and lift SIM card holder

Place SIM in the socket

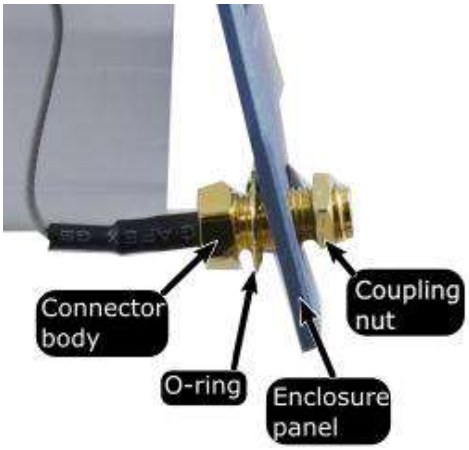
4. Secure the micro-SIM card by sliding the holder.

5. Insert the mPCIe module on a 45-degree angle, and secure the module.

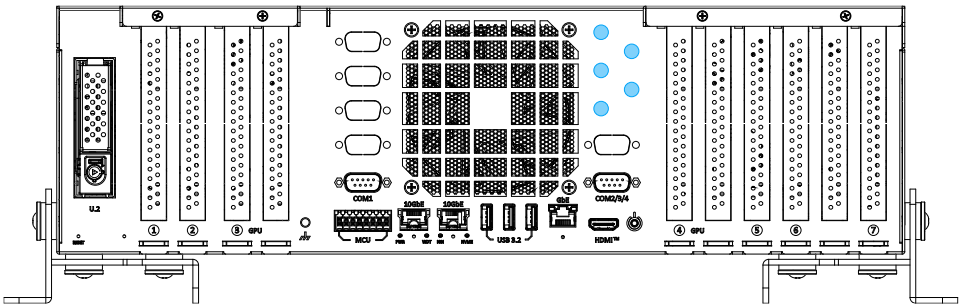


Insert on 45-degree angle **Secure the module**

6. Clip on the IPEX-to-SMA cable to the module and secure the antenna to the front panel. Please refer to the module's manual for clip-on connection.



Clip on IPEX-to-SMA cable **Secure antenna to rear panel**

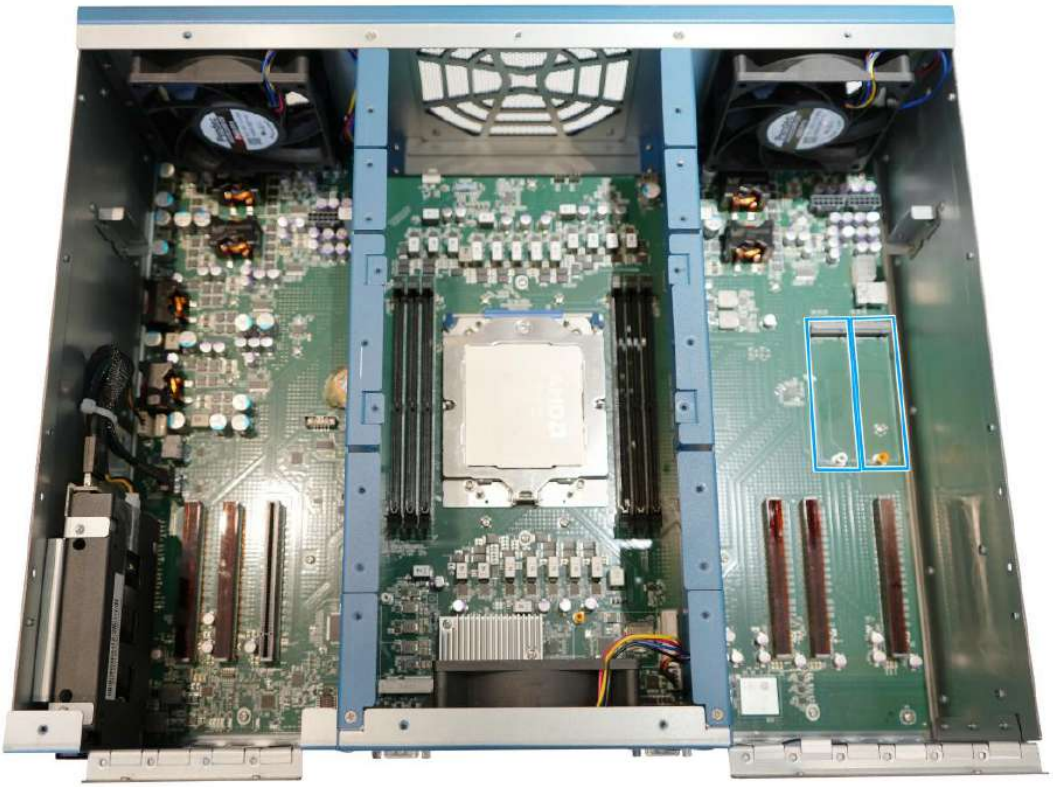


Antenna aperture on the I/O panel

7. Reinstall the system enclosure and panel when done.

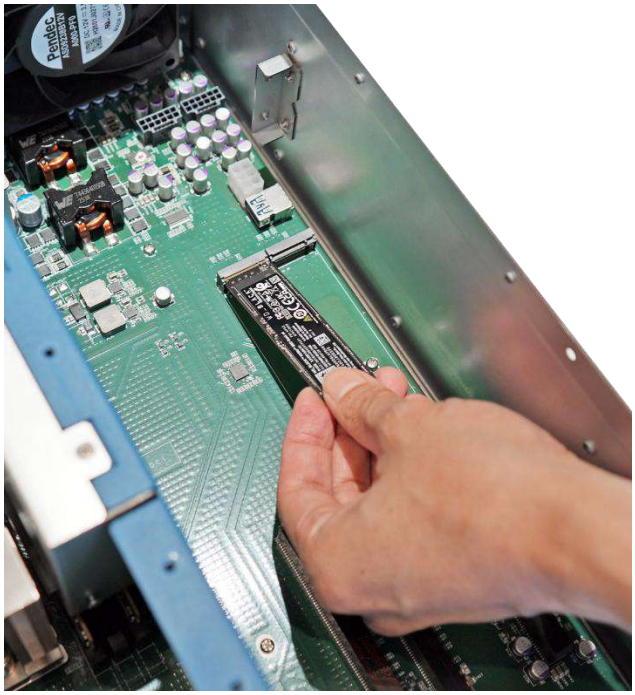
8. If you need to install other components, please refer to respective sections.

3.2.4 M.2 2280 M Key NVMe SSD Installation

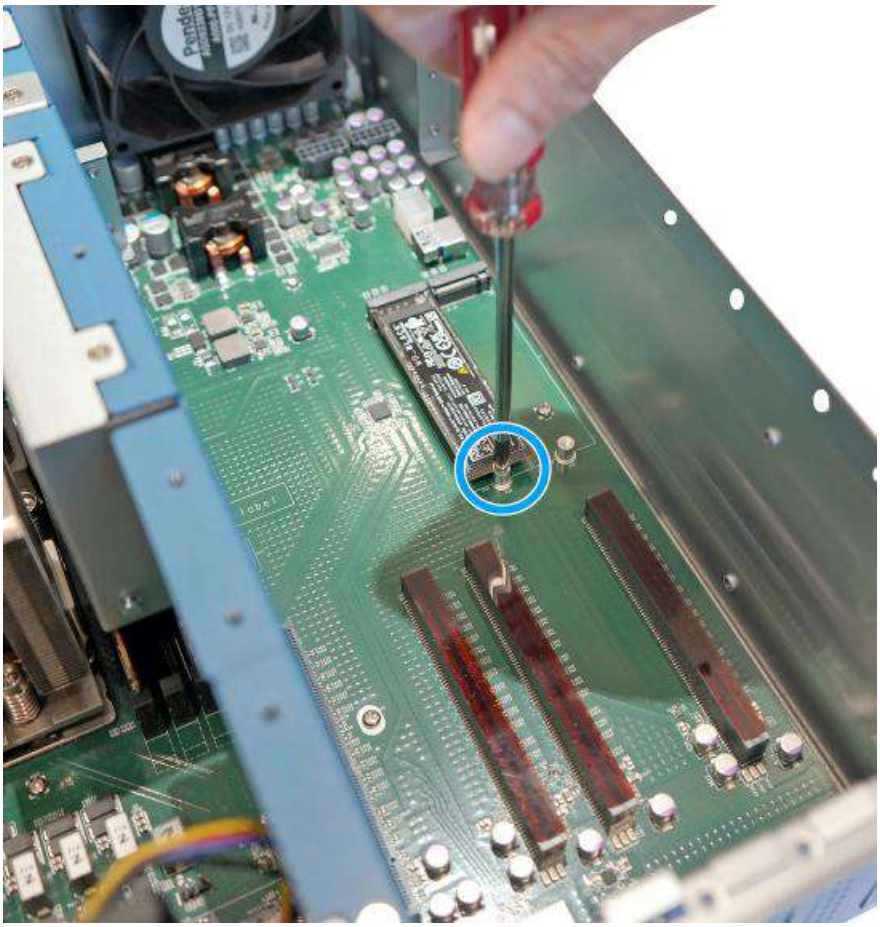


The system has two PCIe Gen4 x4 M.2 2280 slots for you to install NVMe SSDs for the fast read/ write performance. An NVMe SSD offers exceptional performance over 2.5" SSDs. For installation, please refer to the following instructions.

1. Please refer to the section "Disassembling the System", you may not need to completely dismantle the system to gain access to the M.2 slot.
2. Insert the module on a 45-degree angle.



3. Gently press down and secure the module with an M3 P-head screw.



4. Repeat the installation procedure if you need to install an NVMe SSD in the other slot.

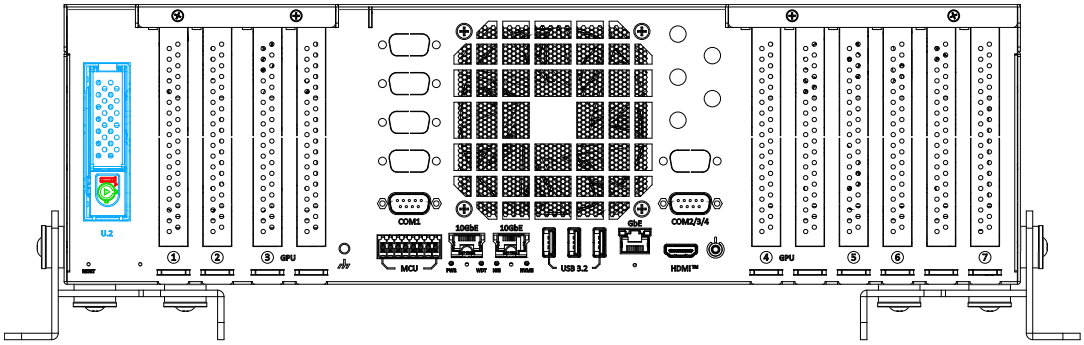
5. Reinstall the system enclosure and panel when done.

6. If you need to install other components, please refer to respective sections.

3.2.5 U.2 SSD Installation

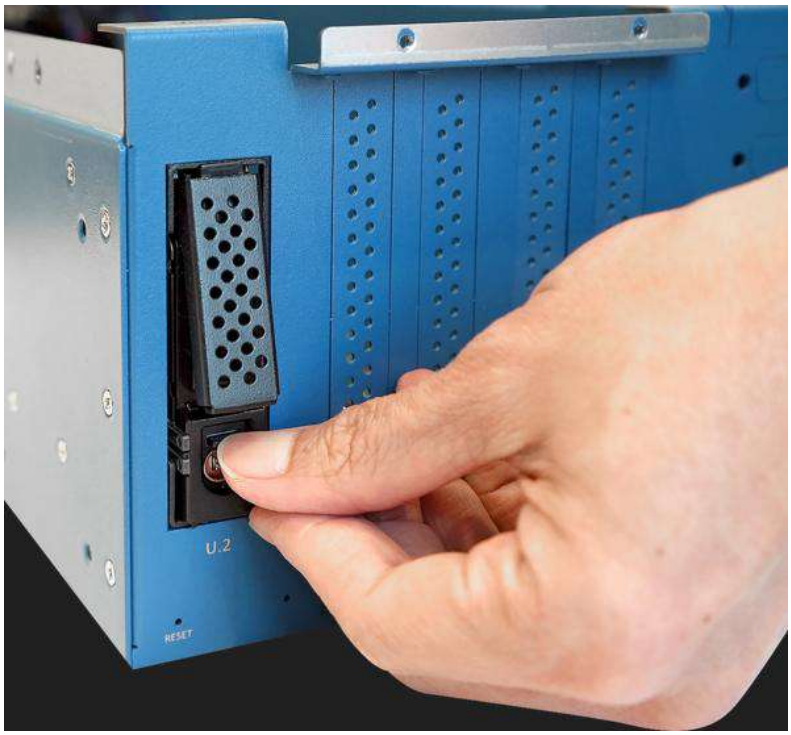
NOTE

The system's 2.5" tray support up to 15mm thick disk drives.



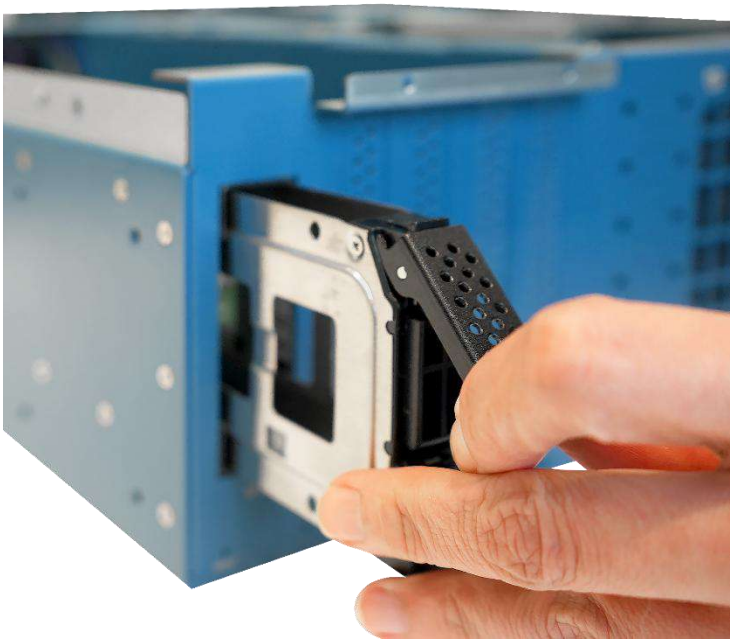
There is a 2.5 inch easy-swap hard drive tray on the front IO panel. The 2.5" tray supports a 2.5" U.2 SSD up to 15mm thick. There is a lock (indicated in green) for the tray, use your fingernail to press the switch (indicated in red) downward to open it. When installing an SSD, please make sure the U.2 connector end is facing and inserted into the enclosure. Please refer to the following instructions on how to install a 2.5" U.2 SSD.

1. Using your finger tip/ nail, press the switch downward and the tray handle should pop open.

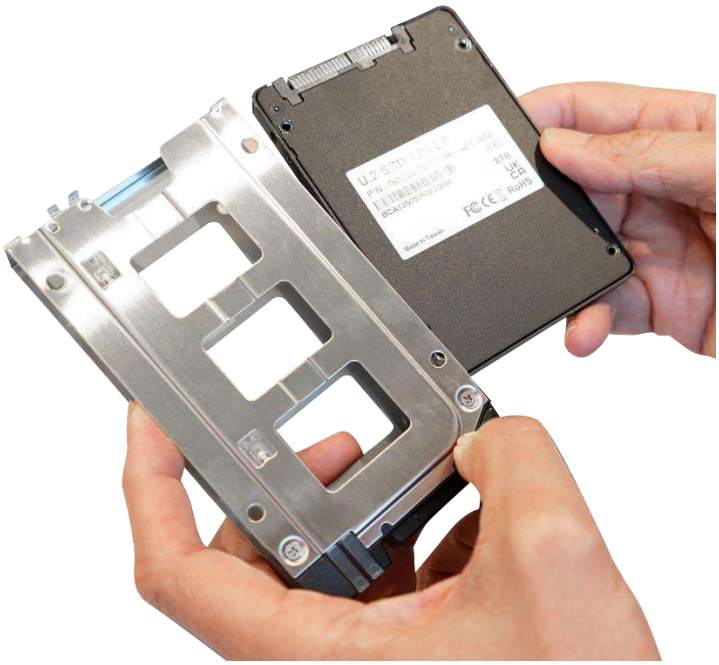


Press the switch downward and the tray will open

2. Gently pull the tray out of the enclosure.

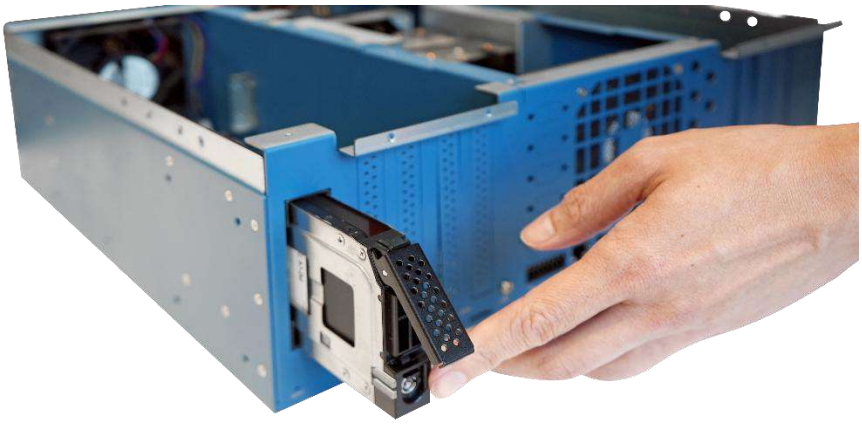


3. Slide the disk drive into the tray from the side (make sure the U.2 connectors are facing the inside).

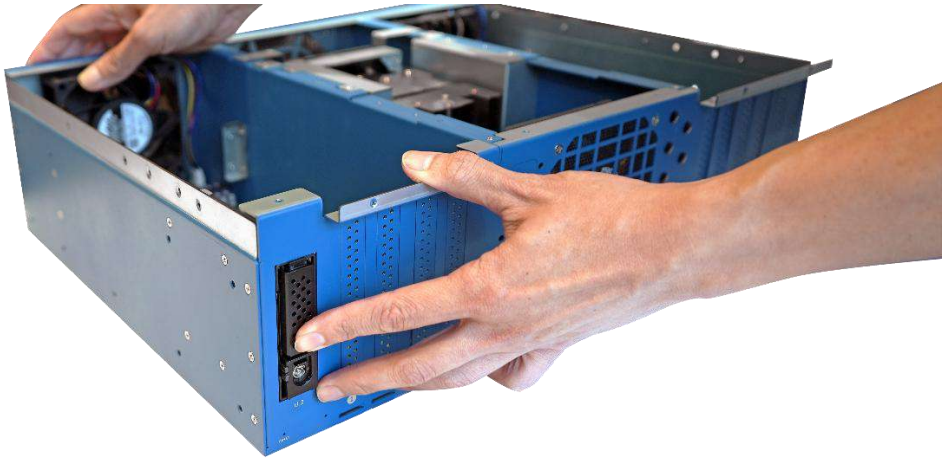


4. Secure the disk with **M3 F-head screws** on the locations indicated.

5. Insert the installed disk drive and tray back into the enclosure.

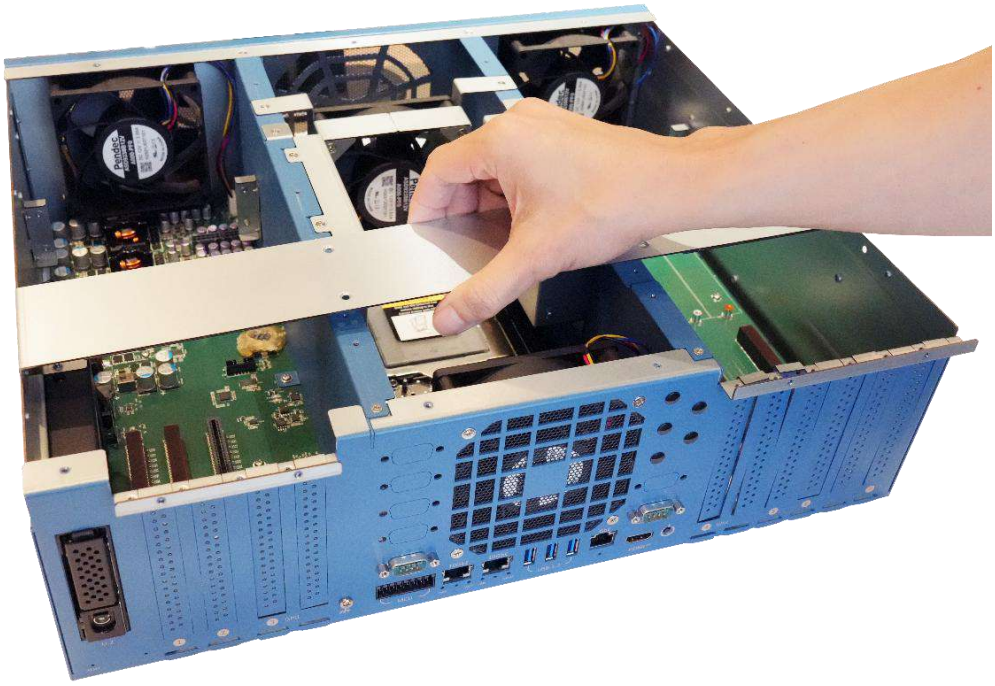


6. Gently place and push the tray back into the enclosure to complete the disk drive installation. Lock the drive with the key provided, if you need to.

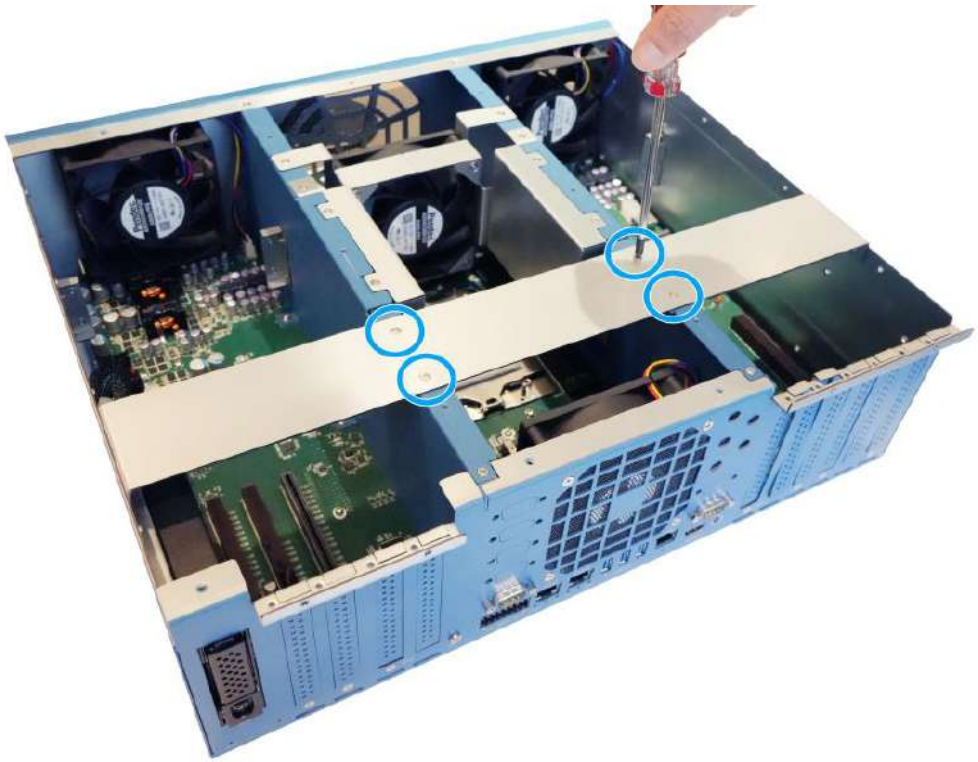


3.3 Installing the System Enclosure

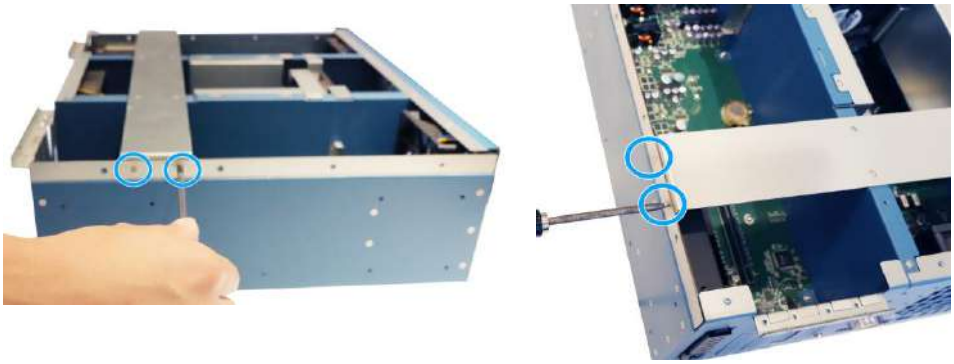
1. Place the enclosure bracket on top.



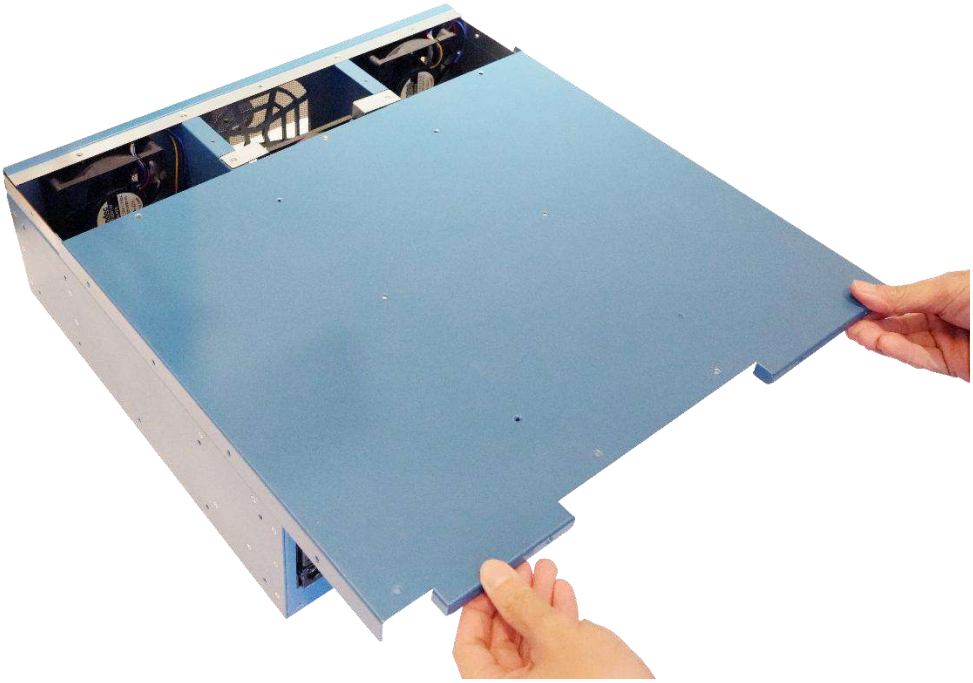
2. Secure the enclosure bracket with the **screws** indicated.



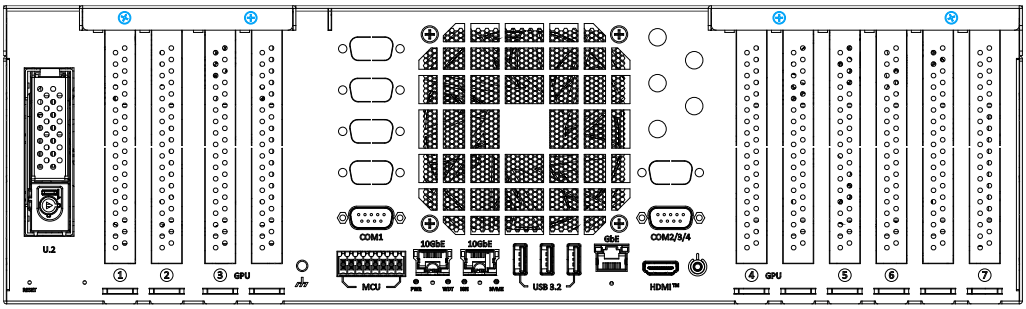
3. Secure the enclosure bracket's side **screws**.



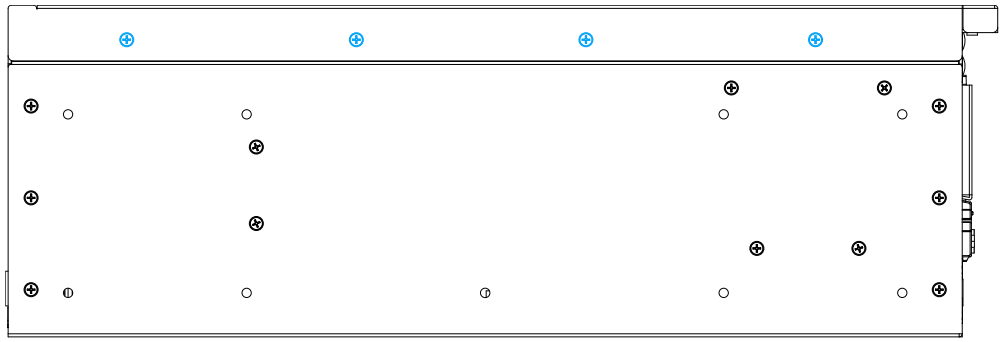
4. Slide the top panel back onto the enclosure.



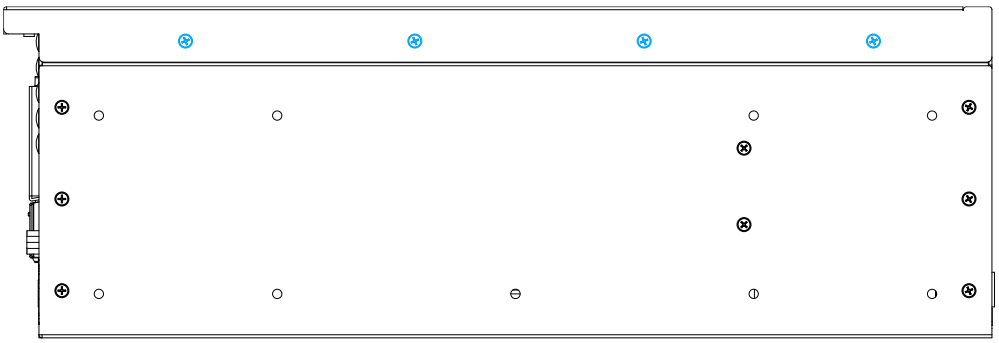
5. Secure the **screws** indicated on the I/O panel.



6. Secure the **screws** indicated on both sides of the enclosure.

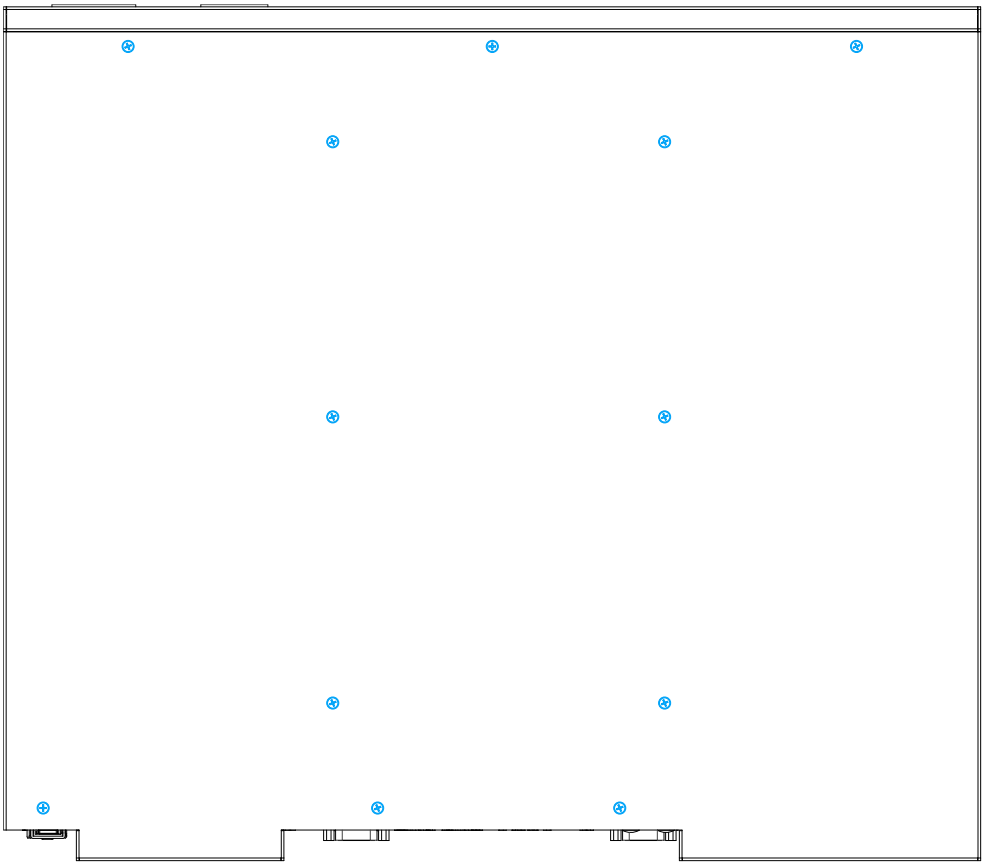


Left side (facing the I/O panel)



Right side (facing the I/O panel)

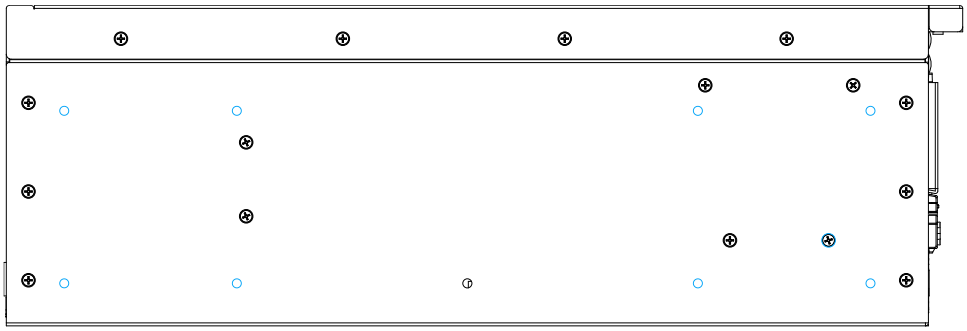
7. Secure the **screws** indicated on the top panel to complete the process.



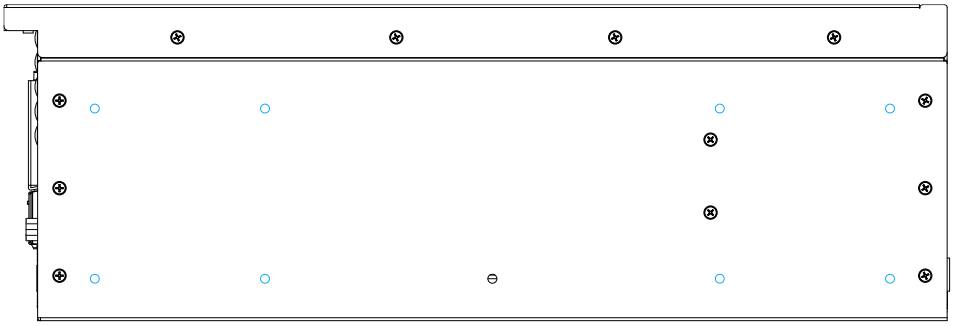
3.4 Wall Mount Bracket Installation

The system comes standard with a wall mount kit that has four brackets. For installation, please refer to the following instructions.

1. To install the brackets, place the system on a flat surface, locate the **screw holes** on the both sides of the enclosure

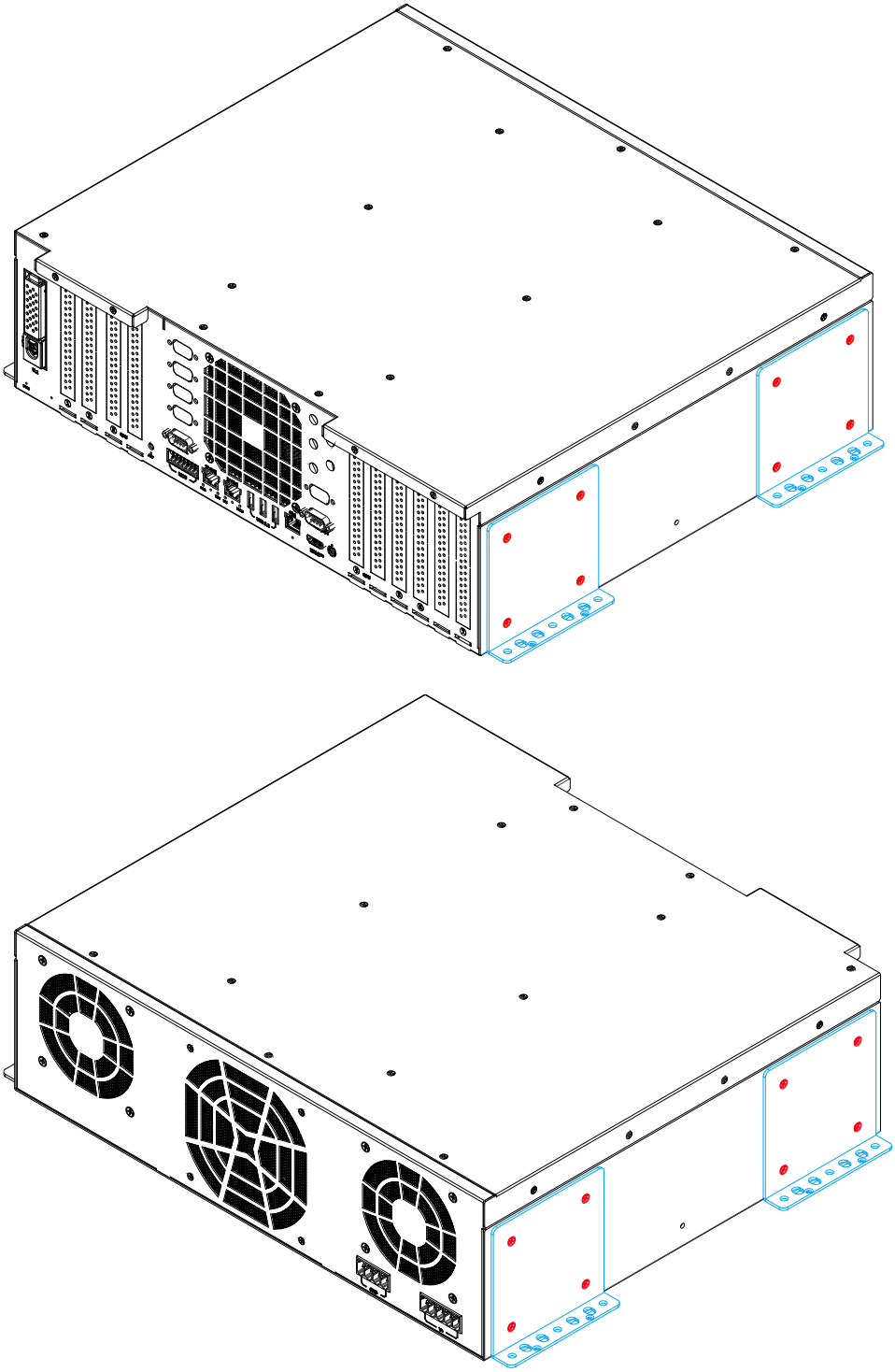


Left side (when facing the I/O panel) **screw hole** locations



Right side (when facing the I/O panel) **screw hole** locations

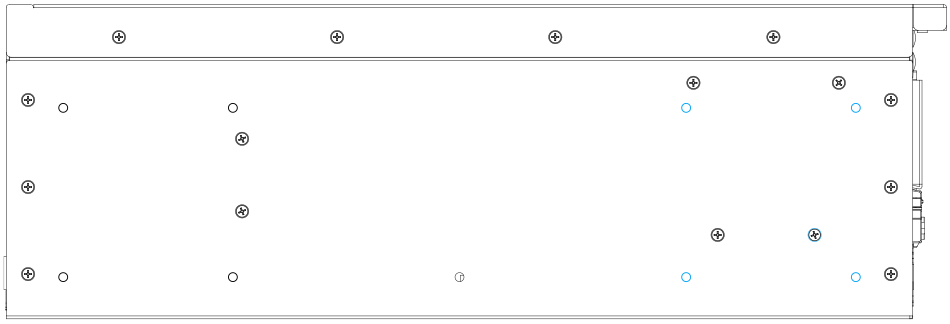
2. Take the brackets (in **blue**) out of the accessory box, and secure the brackets with the screws (in **red**) on both sides of the enclosure to complete the wall mount bracket installation.



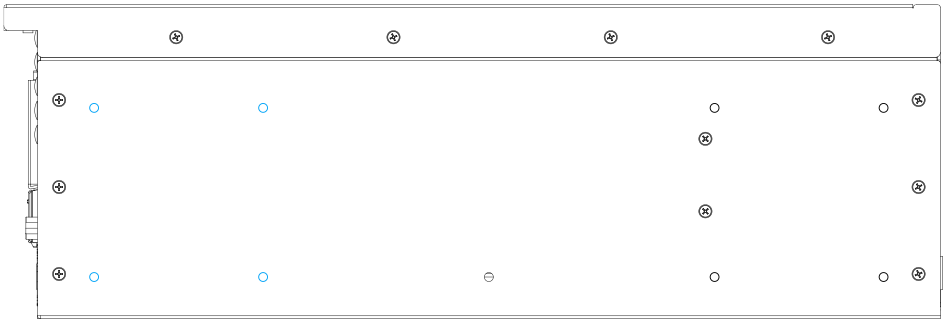
3.5 Rack Mount Installation

The system comes standard with server rack mount kit. The kit utilizes two wall mount brackets turned 90 degrees to install handles for rack mounting. For installation, please refer to the following instructions.

1. To install the brackets, place the system on a flat surface, locate the **screw holes** on the both sides of the enclosure

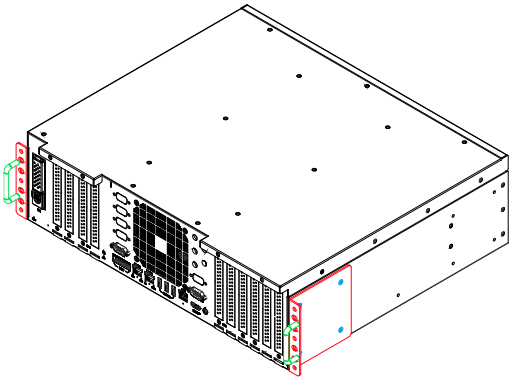


Left side (when facing the I/O panel) **screw hole** locations

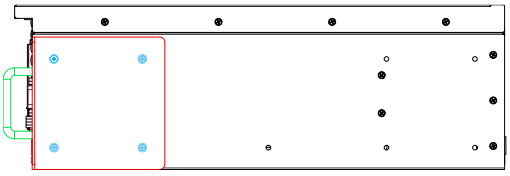


Right side (when facing the I/O panel) **screw hole** locations

2. You need **two brackets**, **two grips**, and **eight screws** for this installation. Secure the **brackets** on both sides of the enclosure with the **screws** supplied.

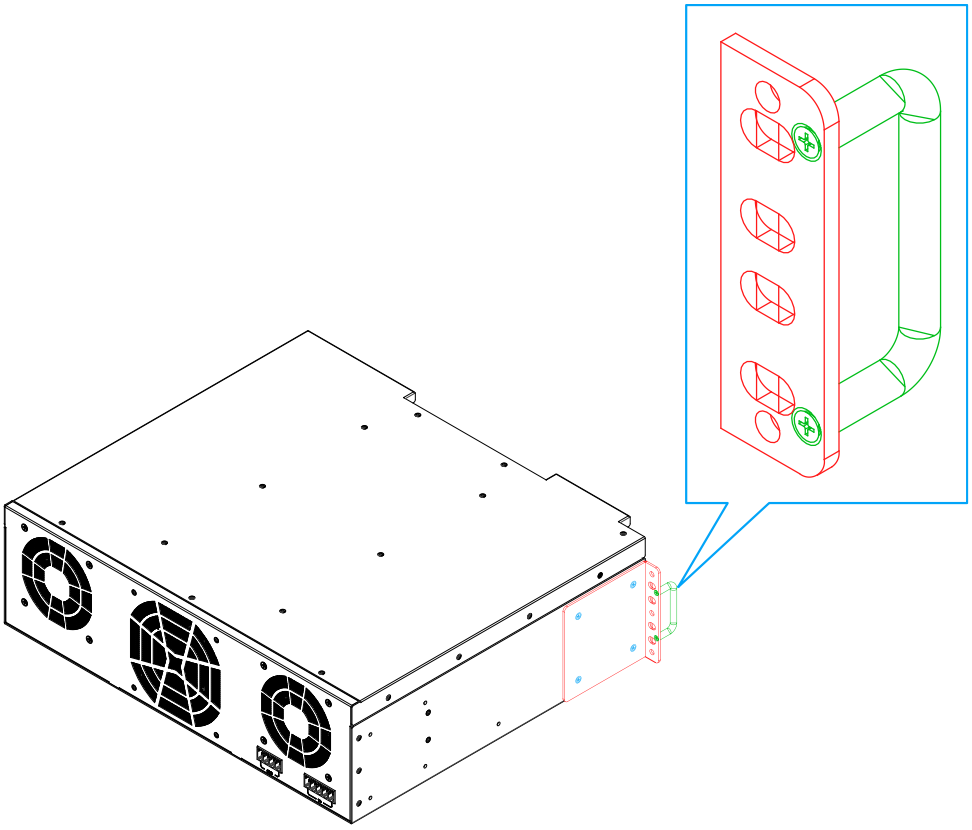


Left side bracket



Screws securing the bracket

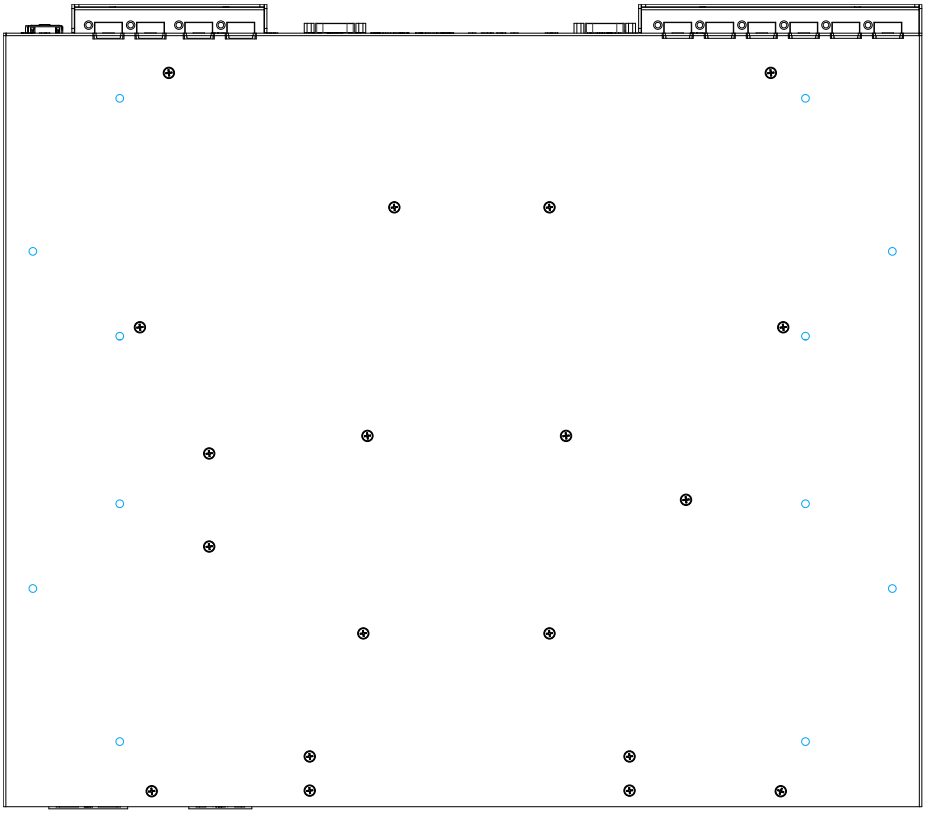
3. Repeat the same rack mount bracket installation on the other side of the enclosure. The grip (in **green**) can be found in the accessory box and is an optional installation item. Simply match the grip to the openings on the rack mount bracket and secure with M3 screws (in **green**) provided in the accessory box.



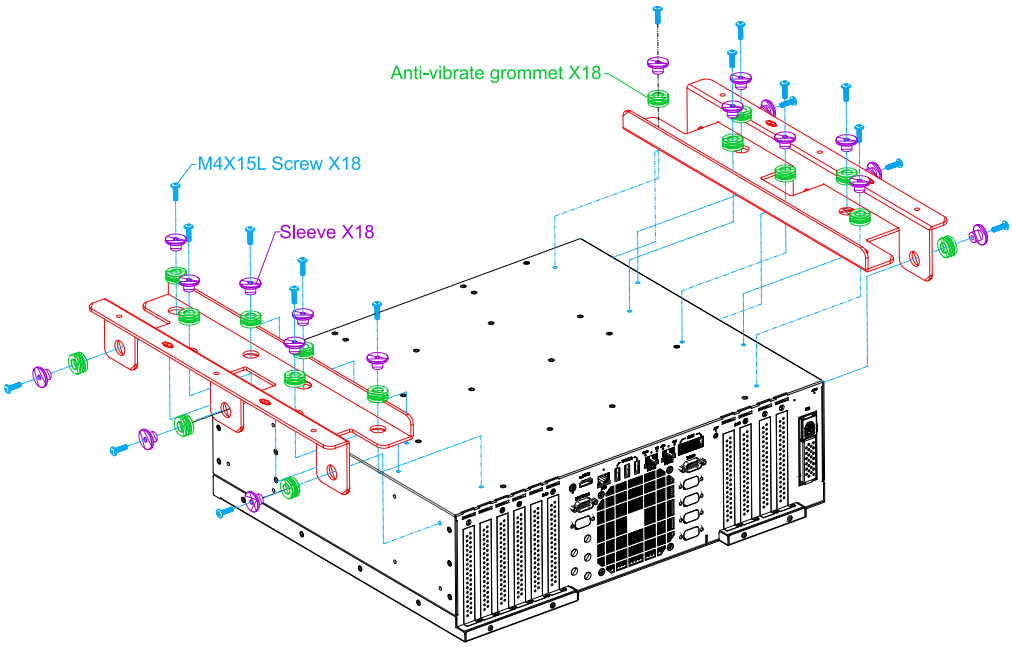
3.6 Damping Bracket Installation

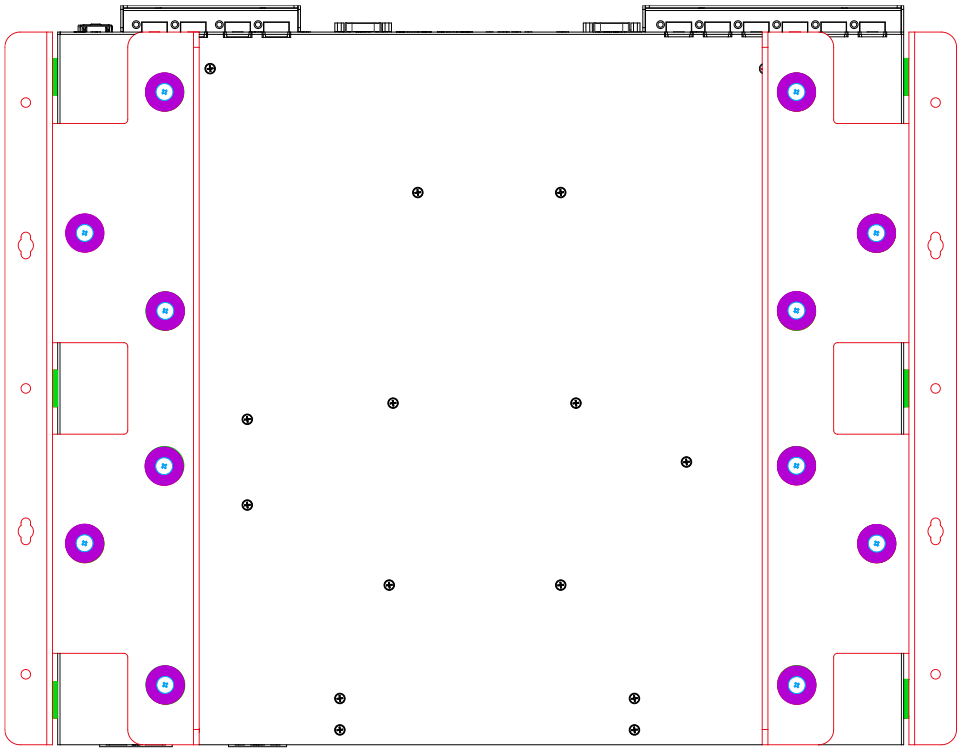
The system comes standard with damping bracket mount kit. For installation, please refer to the following instructions.

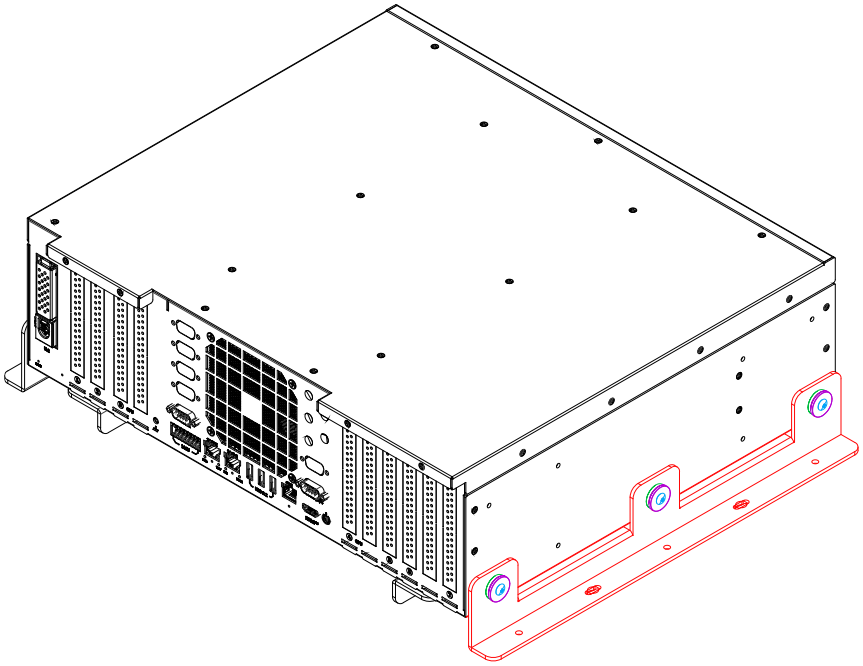
1. Before you install the damping brackets, please insert the supplied damping absorbers onto the brackets. There are 12 at the bottom (6 on each bracket), and 6 on the side (3 on the side of each bracket).
2. To install the damping brackets, turn and place the system upside-down on a flat surface, locate the **screw holes** on the bottom of the enclosure.

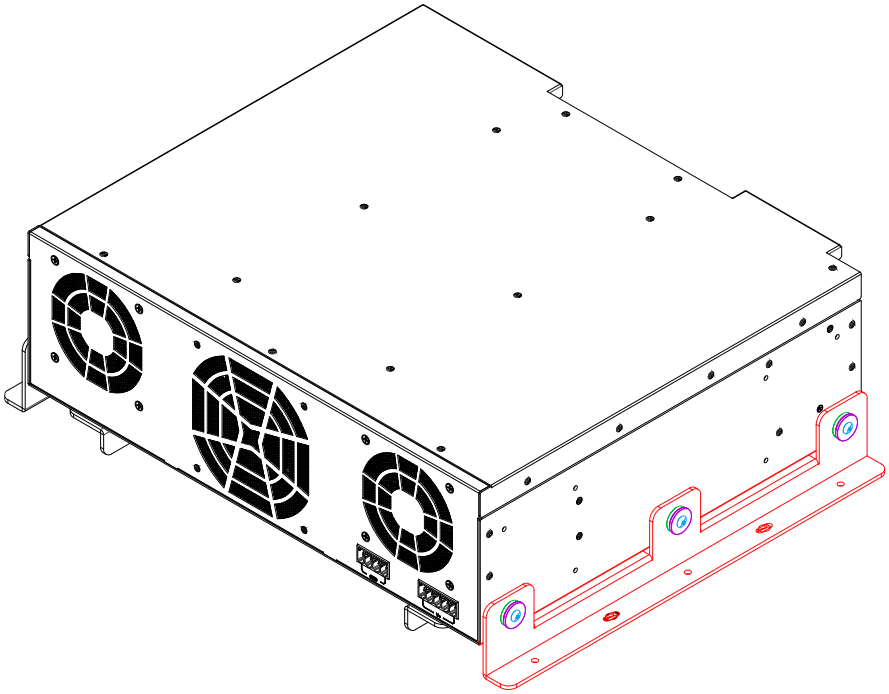


3. Insert **18 sleeves** into **18 damping absorbers** (12 at the bottom, 3 on each side) onto **brackets**, and secure the brackets onto the bottom of the enclosure with the supplied **screws**.









4 Powering On the System

There are three methods to power on the system

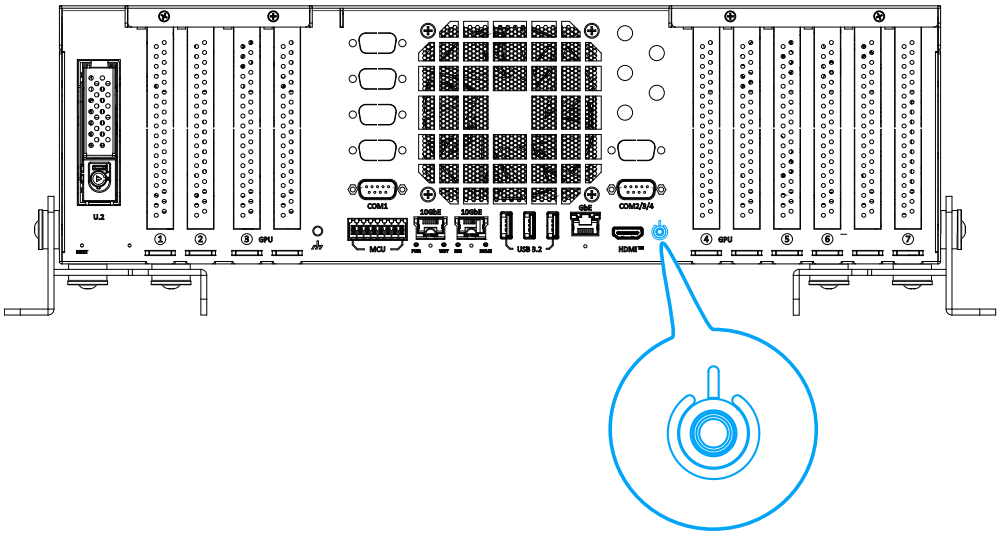
- Pressing the power button
- Sending a LAN packet via Ethernet (Wake-on-LAN)
- Powering on via ignition control (please refer to Ignition Power Control BIOS section)

NOTE

Due to the nature of server-grade CPUs and their large number of PCIe lanes, the system has a longer boot time compared to a standard desktop CPU. After reinstalling the CPU or memory, clearing the CMOS or battery replacement, and depending on the number of PCIe devices installed, the 1st and 2nd boots may take up to 9 minutes. Starting from the 3rd boot, the startup time may take up to 3 minutes.

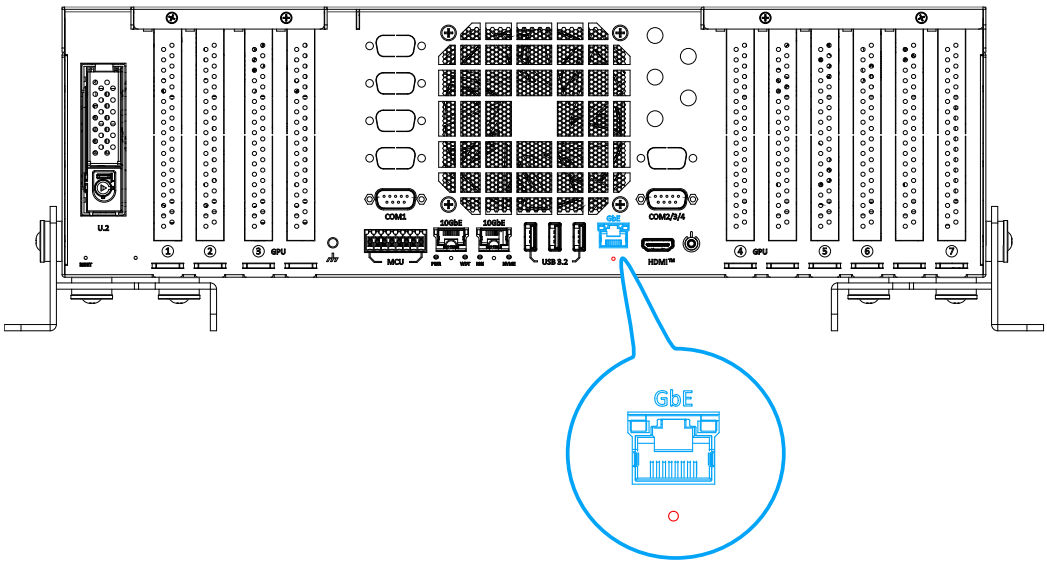
4.1.1 Powering On Using the Power Button

This is the simplest way to turn on your system. The power button on the front panel is a non-latched switch and behaves as the ATX-mode on/off control. With DC power connected, pushing the power button will turn on the system and the PWR LED indicator will light up. Pushing the button when system is on will turn off the system. If your operating system supports ATX power mode (i.e. Microsoft Windows or Linux), pushing the power button while the system is in operation will result in a pre-defined system behavior, such as shutdown or hibernation.



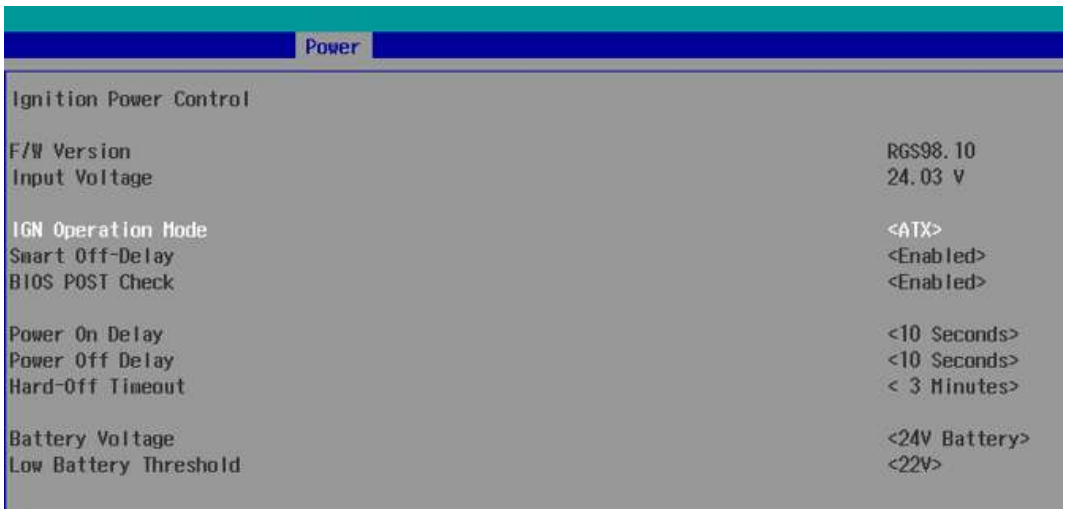
4.1.2 Powering On Using Wake-on-LAN

Wake-on-LAN (WOL) is a mechanism to wake up a computer system from a S5 (system off with standby power) state via issuing a magic packet. The system's Wake-on-LAN compatible GbE port is shown below.



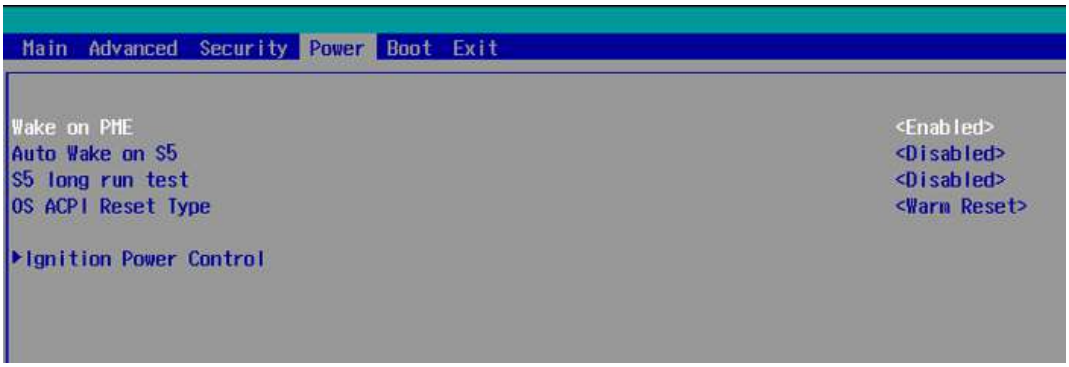
NOTE

*Please make sure the system is set to ATX mode (IGN Operation Mode), and the Ethernet driver has been properly installed prior to setting up WOL function. The WOL function is **NOT** supported when the system is set to "Auto Power On" and "Ignition Power Control" modes.*

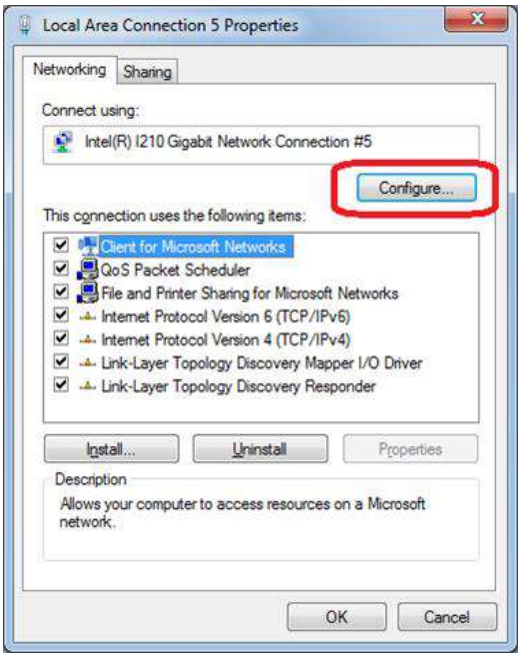


To enable WOL function, please set up PME settings in the BIOS and in the operating system by follow the steps described below.

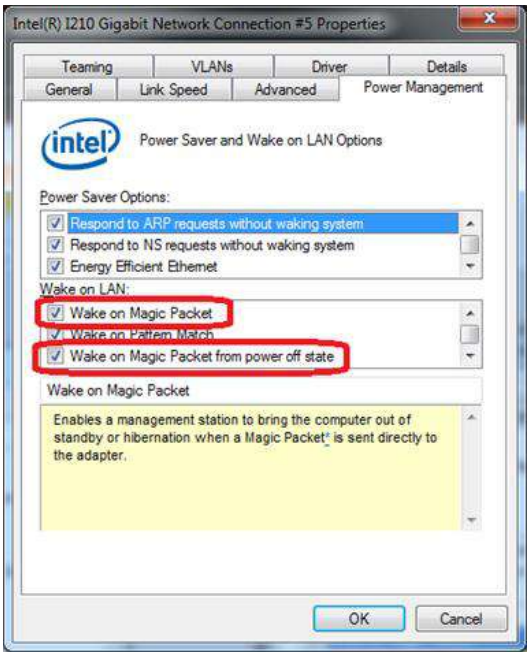
1. When the system boots up, press F2 to enter BIOS setup utility.
2. Go to the **[Power]** > **[Wake On PME]** and set it to **[Enabled]**.



3. Press F10 to "**Save changes and exit BIOS**" and allow the system boot into the operating system.
4. Once booted into the Windows system, press "**Windows key + E**", right-click on "**Network**>**Properties**>**Change adapter settings**". Locate and double-click on the adapter Intel® I210 Gigabit Network Connection, click on **Configure...**



5. Click on the **Power Management** tab and check the following options. Click on OK when done.



Magic Packet

The magic packet is a broadcast frame containing anywhere within its payload 6 bytes of all 255 (FF FFFFFFFFFF in hexadecimal), followed by sixteen repetitions of the target computer's 48-bit MAC address.

For example, NIC's 48-bit MAC Address is 78h D0h 04h 0Ah 0Bh 0Ch

DESTINATION SOURCE MISC

FF FFFFFFFFFF

78 D0 04 0A 0B 0C 78 D0 04 0A 0B 0C

78 D0 04 0A 0B 0C 78 D0 04 0A 0B 0C

78 D0 04 0A 0B 0C 78 D0 04 0A 0B 0C

78 D0 04 0A 0B 0C 78 D0 04 0A 0B 0C

78 D0 04 0A 0B 0C 78 D0 04 0A 0B 0C

78 D0 04 0A 0B 0C 78 D0 04 0A 0B 0C

78 D0 04 0A 0B 0C 78 D0 04 0A 0B 0C

78 D0 04 0A 0B 0C 78 D0 04 0A 0B 0C

MISC CRC

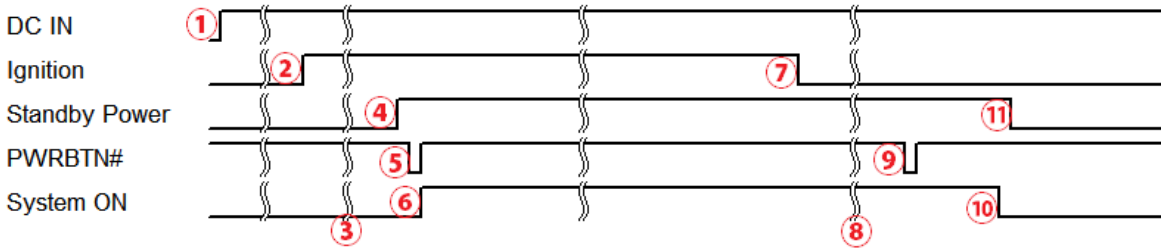
There are some free tools available on Internet that can be used to send a magic packet. Please refer to the following link to understand more about Magic Packet.

4.2 Ignition Power Control

The ignition power control module for in-vehicle applications is an MCU-based implementation that monitors the ignition signal and reacts to turn on/off the system according to predefined on/off delay. Its built-in algorithm supports other features such as ultra-low power standby, battery-low protection, system hard-off, etc. In this section, we'll illustrate the principle of ignition power control and operation modes.

4.2.1 Principles of Ignition Power Control

The basic concept of ignition power control module is to control the timing correlation between ignition signal and system power status. A typical timing correlation is described in following diagram.



1. When DC power is supplied to the system, MCU starts to periodically detect ignition signal. Note that only MCU is working at this moment and the overall power consumption is less than 2 mW.
2. Ignition signal is active (both 12VDC and 24VDC ignition signals are accepted).
3. MCU starts to count a pre-defined power-on delay.
4. Once power-on delay expired, MCU turns on necessary standby power for the system (3.3VSB & 5VSB).
5. A PWRBTN# pulse is then issued to turn on the system (equivalent to one pressing the power button on the front panel).
6. The system is booting and becomes operational.
7. After a period of time, the ignition signal becomes inactive.
8. MCU starts to count a pre-defined power-off delay.
9. Once power-off delay expired, another PWRBTN# pulse is issued to perform a soft-off for the system (ex. a normal shutdown process for Windows system).
10. The system is completely shut down.
11. As MCU detects system is off, it turns off the standby power for the system, and operates in low power mode again (< 2mW power consumption).

4.2.2 Additional Features of Ignition Power Control

In addition to the typical timing correlation, the ignition power control module offers additional features to provide additional reliability for in-vehicle applications.

1. **Low battery detection**

   The ignition power control module continuously monitors the voltage of DC input when the system is operational. If input voltage is less than 11V (for 12VDC input) or less than 22V (for 24VDC input) over a 60-second duration, it will shut down the system automatically.

2. **Guarded power-on/ power-off delay duration**

   If ignition signal goes inactive during the power-on delay duration, the ignition power control module will cancel the power-on delay process and go back to idle status. Likewise, if ignition signal goes active during the power-off delay duration, the ignition power control module will cancel the power-off delay process and keep the system running.

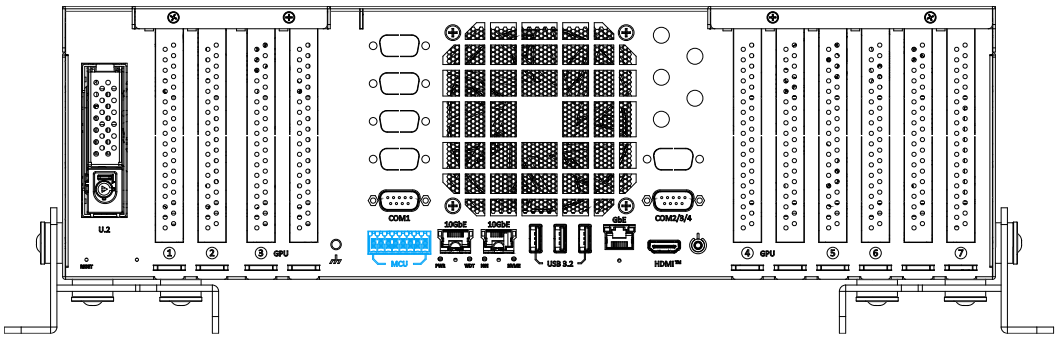
3. **System hard-off**

   In some cases, system may fail to shutdown via a soft-off operation due to system/ application halts. The ignition power control module offers a mechanism called “hard-off” to handle this unexpected condition. By detecting the system status, it can determine whether the system is shutting down normally. If not, the ignition power control module will force cut-off the system power 10 minutes after the power-off delay duration.

4. **Smart off-delay**

   While enabled "Smart off-delay" in the BIOS, the ignition power control module will automatically detect the system status during the power-off delay duration. If the system has shutdown (by the application software) prior to power-off delay expiring, it will cut off the system power immediately to prevent further battery consumption.

4.2.3 Wiring Ignition Signal



- **MCU Connector Interface**

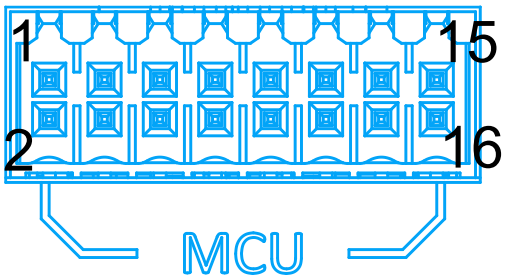
The MCU interface provides several interface signals, including the ignition power control.

Please refer to the connector pin assignment below for detailed pin definitions on establishing ignition power control.

MCU_IGNITION

Serves as the ignition input for the platform's ignition power control circuitry. This input allows external ignition signals to control the system's power-on and power-off sequence, enabling seamless integration with vehicle and industrial power management systems.

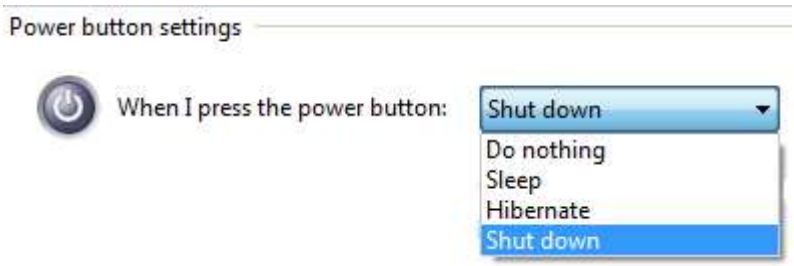
Pin Definition



Pin #	Signal	Pin #	Signal
1	NC	9	MCU_RS232_RX
2	NC	10	MCU_RS232_GND
3	MCU_CAN_H	11	MCU_RS232_TX
4	MCU_CAN_GND	12	MCU_RS232_GND
5	MCU_CAN_L	13	PWRLED_H
6	MCU_CAN_GND	14	PWRLED_L
7	MCU_STATUS_H	15	IGNITION_IN_H
8	MCU_STATUS_L	16	IGNITION_IN_L

4.2.4 Configure your Windows system

When applying ignition power control to your system, please make sure you've configured your Windows system to initiate a shutdown process when pressing the power button. By default, Windows 10 goes to sleep (S3) mode when power button is pressed. As sleep (S3) is not a complete shutdown behavior, the ignition control function does not recognize the finish of a normal shut down process and thus users will encounter a system hard-off (power cut-off after 10 minutes). Please configure "When I press the power button" to "Shut down" in your Windows system settings.



5 System BIOS Configuration

5.1 BIOS Settings

The system is shipped with factory-default BIOS settings meticulously programmed for optimum performance and compatibility. In this section, we'll illustrate some of BIOS settings you may need to modify. Please always make sure you understand the effect of change before you proceed with any modification. If you are unsure of the function you are changing, it is recommended to change one setting at a time to see its effect(s).

NOTE

Not all BIOS settings will be discussed in this section. If a particular setting/ function you are after requires specific BIOS settings but is not discussed in this section, please contact Neousys Technical Support staff.

5.1.1 COM Port Configuration

The system's COM1/ COM2 ports support RS-232 (full-duplex), RS-422 (full-duplex) and RS-485 (half-duplex) mode. You can set the COM1 operating mode via BIOS settings. Another option in BIOS called "*Slew Rate*" defines how sharp the rising/falling edge is for the output signal of COM1. For long-distance RS-422/485 transmission, you may set the "*Slew Rate*" option as "High" to improve signal quality. For RS-422/485 communication, the "*RS-422/485 Termination*" option determines whether to enable/disable internal termination of RS-422/485 transceiver according to your wiring configuration (e.g. with or without external termination).

To set COM port operating mode:

1. Press **F2** when the system boots up to enter the BIOS setup utility.
2. Go to **[Advanced] > [Peripheral Configuration]**.
3. Set the **[Set COM1 Mode as]** option to the mode you wish to implement.
4. Once set, press **F10** to save setting and exit.

5.1.2 COM Port High Speed Mode

The high speed mode of each COM port effectively allows for the port's baud rate generator to operate at 8x the speed with an effective baud rate of 921,600 bps (115,200 x 8). Please refer to the following instructions on how to enable the high speed mode for your COM port (COM1 used as an example).

To set COM port high speed mode:

1. Press **F2** when the system boots up to enter the BIOS setup utility.
2. Go to **[Advanced] > [Peripheral Configuration]**.
3. Enable or set the **[Set COM1 Mode as]** option to the mode you wish to implement.
4. Highlight **[HS Mode]** and press ENTER to bring up options, highlight **[Enable]** and press ENTER.
5. Once set, press **F10** to save setting and exit.

5.1.3 COM 2/ 3/ 4 Port Configuration

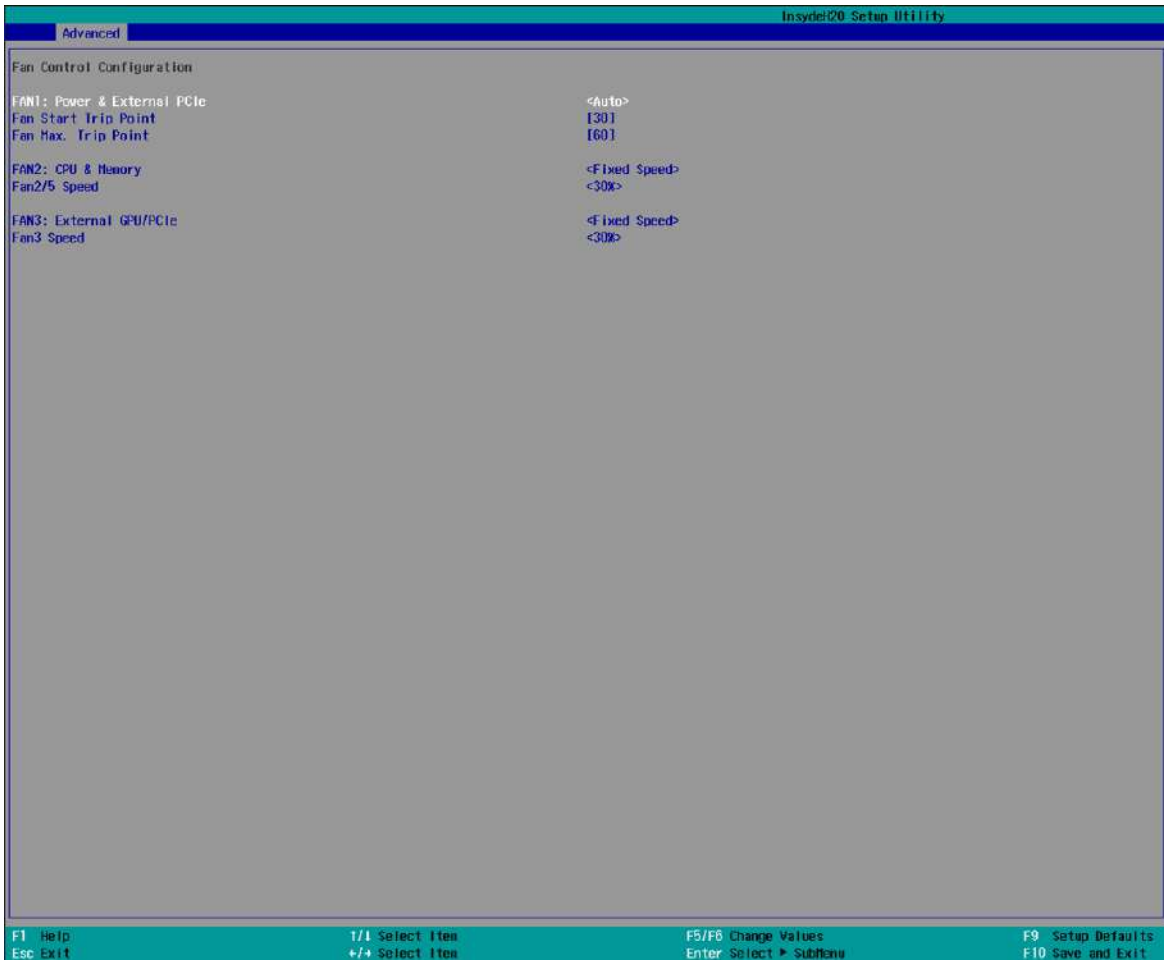
The system's COM 2/ 3/ 4 ports support RS-232 (full-duplex). When set to RS-422/485 mode, it will only act as COM2 port only.

To enable COM/ 3/ 4 operating mode:

1. Press **F2** when the system boots up to enter the BIOS setup utility.
2. Go to **[Advanced]** → **[Peripheral Configuration]**.
3. Highlight the COM port (3 or 4) and set it to <Enabled>.
4. Once set, press **F10** to save setting and exit.

5.1.4 Fan Control Configuration

By default, fan speeds are set to 30% at startup to keep noise low. To get maximum CPU and GPU performance, switch the fan control to Auto or manually set the speed to 100%. The fans cool the three compartments in the system, power & add-on PCIe cards, CPU& memory, and the inference accelerator compartment. Users can manually adjust the default settings according to their deployment environment needs, from 0 to 100%, or set it to auto and the system will automatically adjust the fan speed percentage for you, according to temperature conditions. Users can choose the fan(s) they wish to adjust in this configuration.



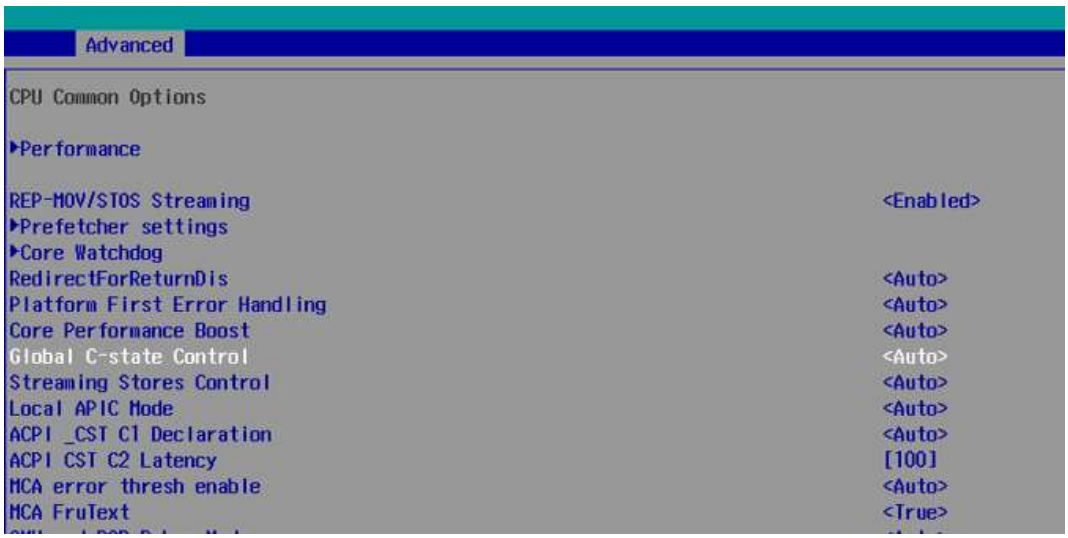
To set COM port high speed mode:

1. Press **F2** when the system boots up to enter the BIOS setup utility.
2. Go to **[Advanced] > [Fan Control Configuration]**.
3. Highlight the fan you wish to configure, such as **[Power & External PCIe]**, set it to **Auto** and the system will adjust the fan speed according to the system's temperature conditions.
4. Or set it to **Fixed Speed**, and highlight the fan speed percentage column to set the fan speed (0 – 100%) you wish the system to operate on.

5.1.5 Global C-State Control

Global C-State controls whether the processor is allowed to enter low-power idle states (C-States) when CPU cores are not actively processing tasks. Enabling this feature reduces power consumption and heat generation, improving energy efficiency during light workloads. Disabling Global C-State keeps the CPU in a more active state, which may reduce latency in certain real-time or low-latency applications at the expense of higher power consumption.

To maximize CPU performance, ensure deterministic low latency/ jitter, and maintain high-speed I/O stability, disable Global C-States Control. Conversely, enable it if power efficiency is the top priority



To enable Global C-State Control:

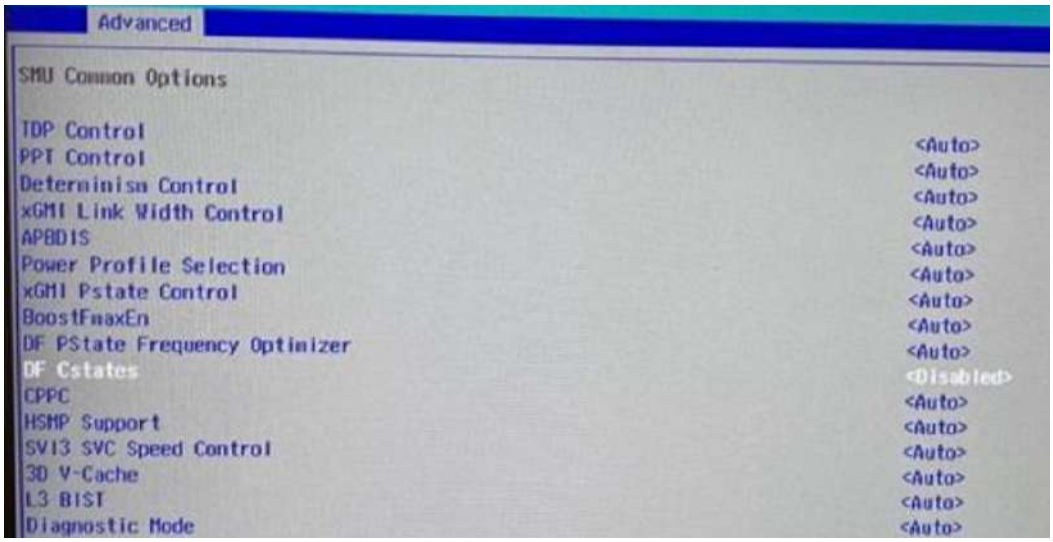
1. When the system boots up, press F2 to enter BIOS setup utility.
2. Go to **[Advance]** > **[AMD CBS]** > **[CPU Common Options**] > **[Global C-State Control]**, press ENTER to bring up options (Auto/ Enable/ Disable).
3. Highlight your selection, and press ENTER.
4. Press F10 to “Exit Saving Changes”.

5.1.6 DF C-State

DF C-State (Data Fabric C-State) controls whether the processor's internal interconnect that links the CPU cores, memory controller, PCIe interfaces, and other I/O components can enter a low-power idle state when system activity is low.

Enabling this feature reduces overall platform power consumption and heat generation during idle or light workloads. Disabling DF C-State keeps the Data Fabric fully active, which may reduce latency for certain real-time or latency-sensitive applications at the cost of increased power consumption.

To maximize CPU performance, ensure deterministic low latency/ jitter, and maintain high-speed I/O stability, disable DF C-States Control. Conversely, enable it if power efficiency is the top priority



To enable DF C-State Control:

1. When the system boots up, press F2 to enter BIOS setup utility.
2. Go to **[Advance]** > **[AMD CBS]** > **[NBIO Common Options**] > **[SMU Common Options]** > **[DF CState]**, press ENTER to bring up options (Auto/ Enable/ Disable).
3. Highlight your selection, and press ENTER.
4. Press F10 to “Exit Saving Changes”.

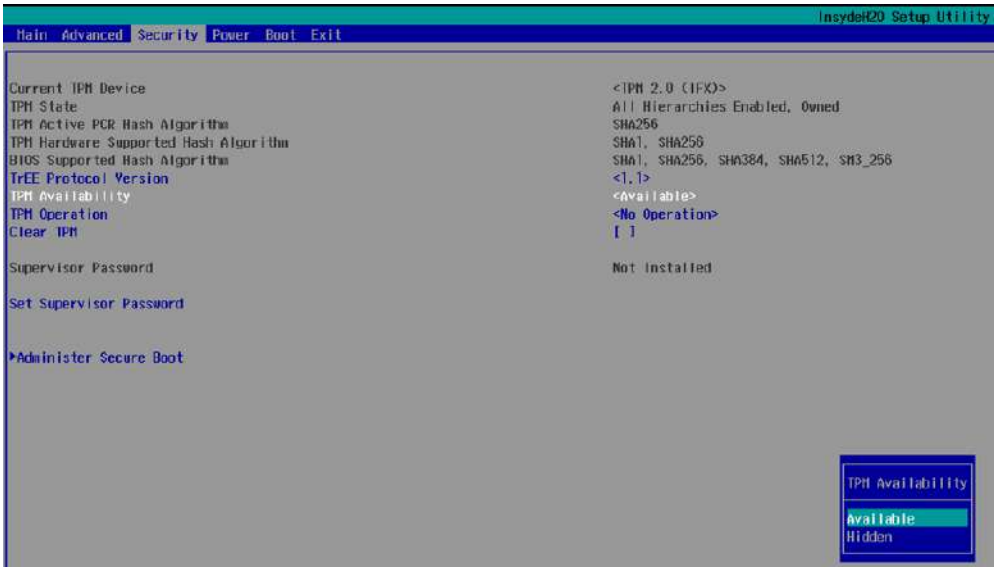
5.1.7 TPM Availability

Trusted Platform Module (TPM) is a hardware-based cryptoprocessor to secure hardware by integrating cryptographic keys into devices. The system needs to reboot when enabling from a disabled state.

To enable TMP:

1. When system boots up, press F2 to enter BIOS setup utility.
2. Go to **[Advanced] > [Trusted Platform Module]**, press ENTER to bring up options, Disabled/ Enable discrete TPM.

3. To set TMP availability, go to **[Security]** > **[TPM Availability]**, press ENTER to bring up options, Available/ Hidden.

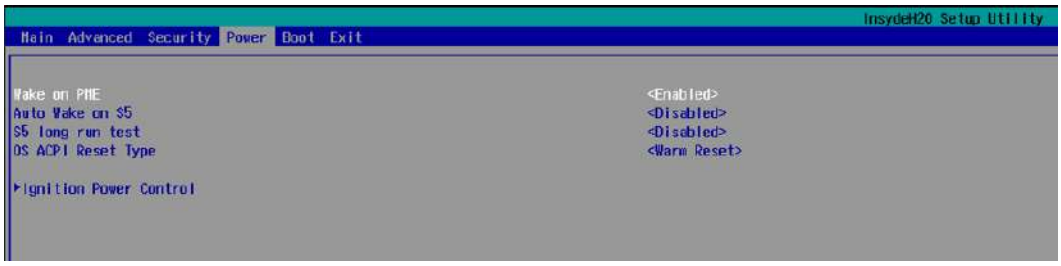


4. Highlight your selection, press Enter and press F10 to “Exit Saving Changes”.

5.1.8 Wake on PME (Power Management Event)

Wake on PME is a hardware power-management feature that allows a computer to power on or wake from a low-power state when a supported PCIe or PCI device generates a Power Management Event (PME). Typical triggers include network activity (Wake on LAN), communication from expansion cards, or other external hardware events. Wake on PME enables unattended remote access, system monitoring, and automated operation, making it useful for industrial, embedded, and remote computing applications where manual power-up is impractical.

Please refer "Powering On Using Wake-on-LAN" to set up the system.

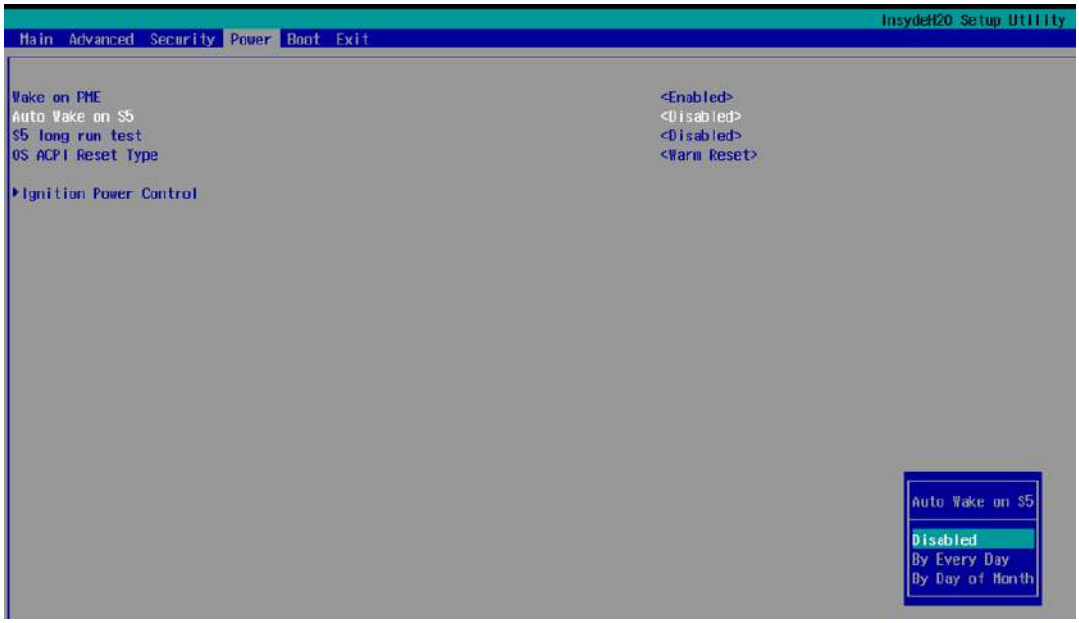


To enable/ disable "Wake on LAN" option:

1. When system boots up, press F2 to enter BIOS setup utility.
2. Go to **[Power] > [Wake on PME]**.
3. Press ENTER to bring up setting options, scroll to the setting you wish to implement and press Enter to set.
4. Press F10 to "Exit Saving Changes.

5.1.9 Auto Wake on S5

When the system is set to operate in S5 state, the user can specify a time to turn on the system, daily or monthly.



Value	Option	Description
Auto Wake on S5	Disabled	The system does not turn on when operating in state S5.
	By Every Day	The system turns on each day when operating in state S5. Specify the time of day.
	By Day of Month	The system turns on each month when operating in state S5. Specify the day and time.

Highlight your selection, press ENTER and press F10 to “Exit Saving Changes”.

5.1.10 Ignition Power Control

The ignition power control features three settings:

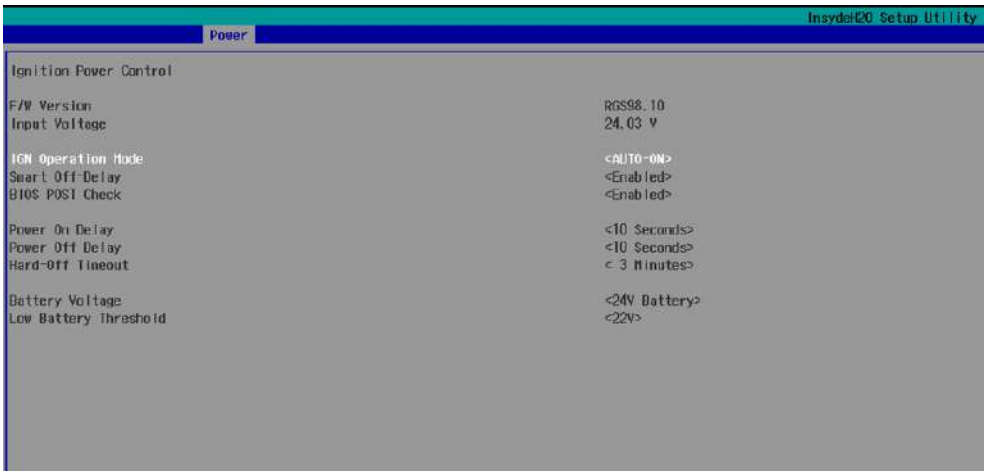
AUTO-ON	The system turns on with the vehicle's ignition
IGN	The system turns on with the vehicle's ignition, according to manual delay settings
ATX	Ignition control is disabled, Wake-On-LAN compatible

NOTE

The power mode is tied to the onboard MCU behavior. After adjusting the power settings, please save the settings to the BIOS. After exiting the BIOS menu, unplug the DC input and wait for the onboard capacitors to fully discharge. Then, re-plug the DC input to ensure the MCU behavior is fully applied.

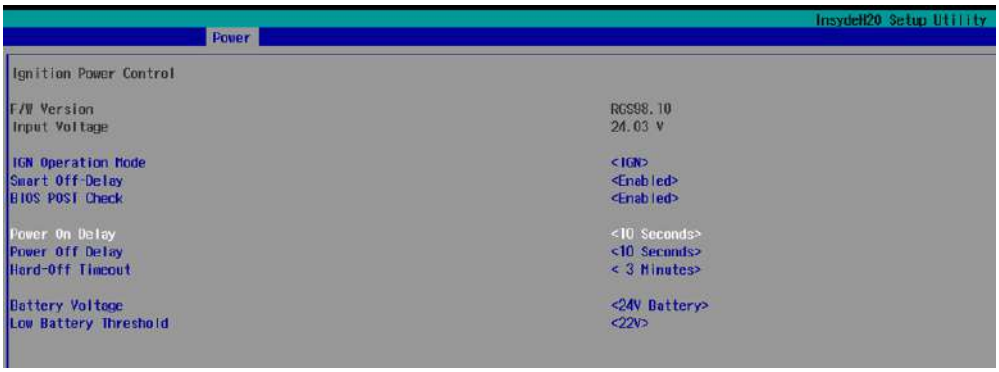
To set the ignition power control in the BIOS:

1. Press **F2** when the system boots up to enter the BIOS setup utility.
2. Go to **[Power] →[Ignition Power Control]** and press **ENTER.**

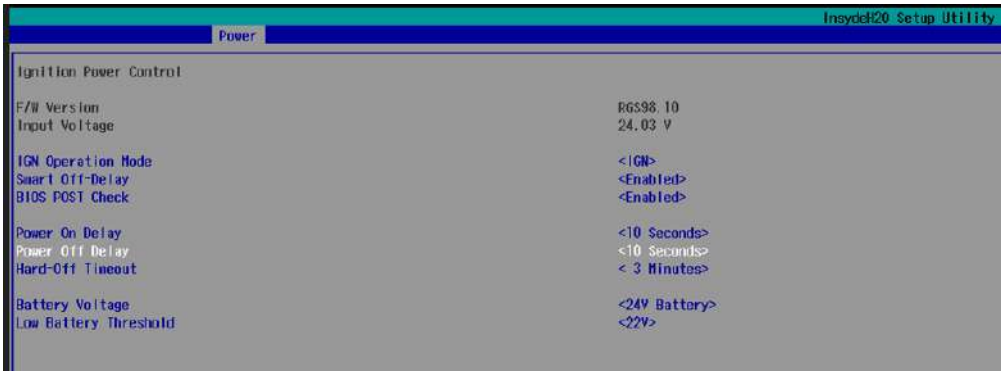


3. Set **IGN Operation Mode** to "IGN" and press ENTER.

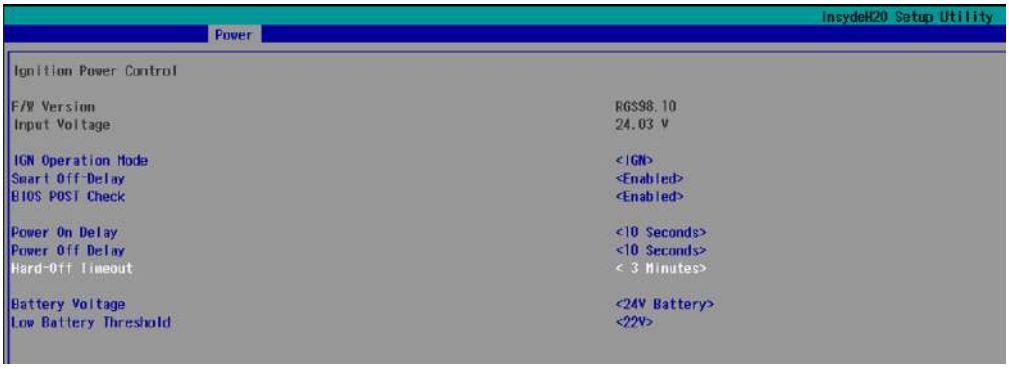
4. If you wish to set the power on delay time from when you start-up the vehicle, highlight and select “Power On Delay”, select the timing according to your needs and press Enter.



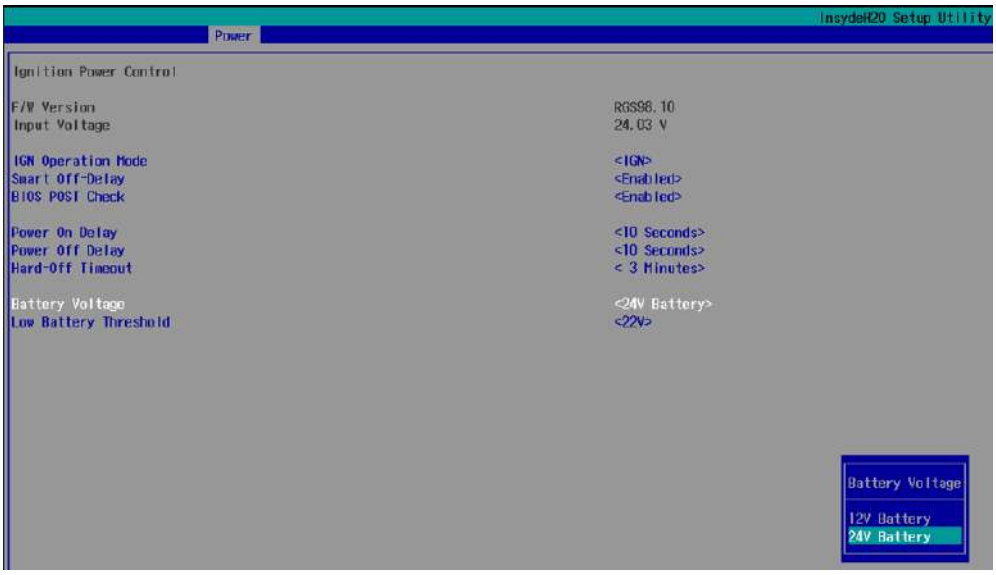
5. If you wish to set the power off delay time from when you turn off the vehicle, highlight and select “Power Off Delay”, select the timing according to your needs and press Enter.



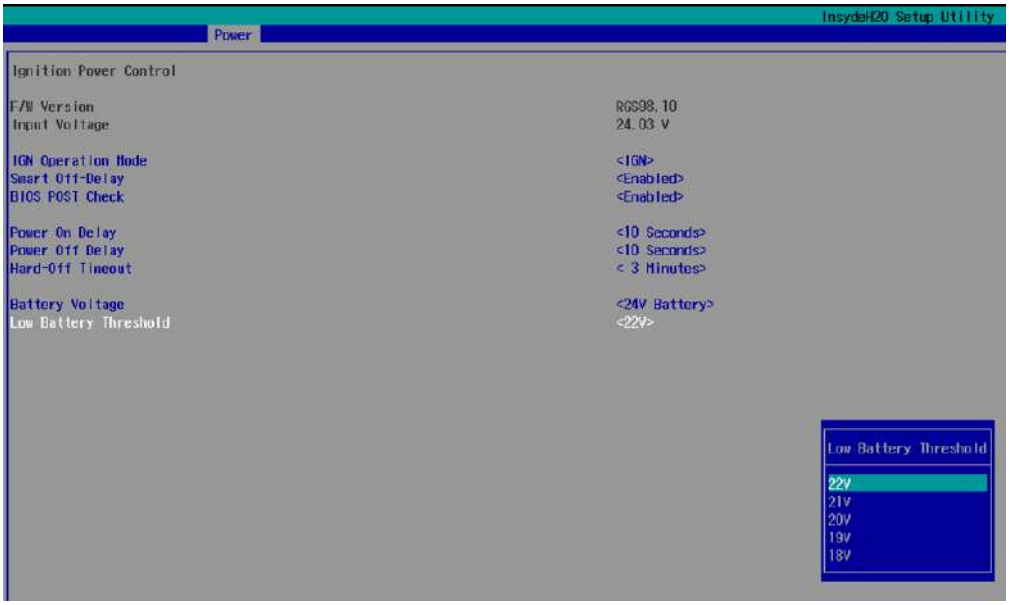
6. If you wish to set a hard power off timing, select “Hard-Off Timeout”, select the timing according to your needs and press Enter.



7. For Battery voltage setting, you may choose between 12V (with a default low battery threshold of 11V, for normal passenger vehicles), or 24V (with a default low battery threshold of 22V, for trucks). Highlight an option and press Enter.



8. To set the low battery threshold, highlight “Low Battery Threshold”, select a setting, and press Enter.



When you are done configuring the BIOS ignition control settings, press F10 to save changes and exit the BIOS.

NOTE

The ignition power control is managed by an onboard MCU. To prevent an incorrect boot process, we have reserved a way to reset the MCU ignition mode without booting into the BIOS.

To reset the MCU to ATX mode, please follow these steps:

- *Disconnect the DC power input from the RGS-9805GC.*
- *While holding down the power button, reconnect the DC power input.*
- *Continue holding the power button for 2 seconds.*
- *Disconnect the DC power input once more.*

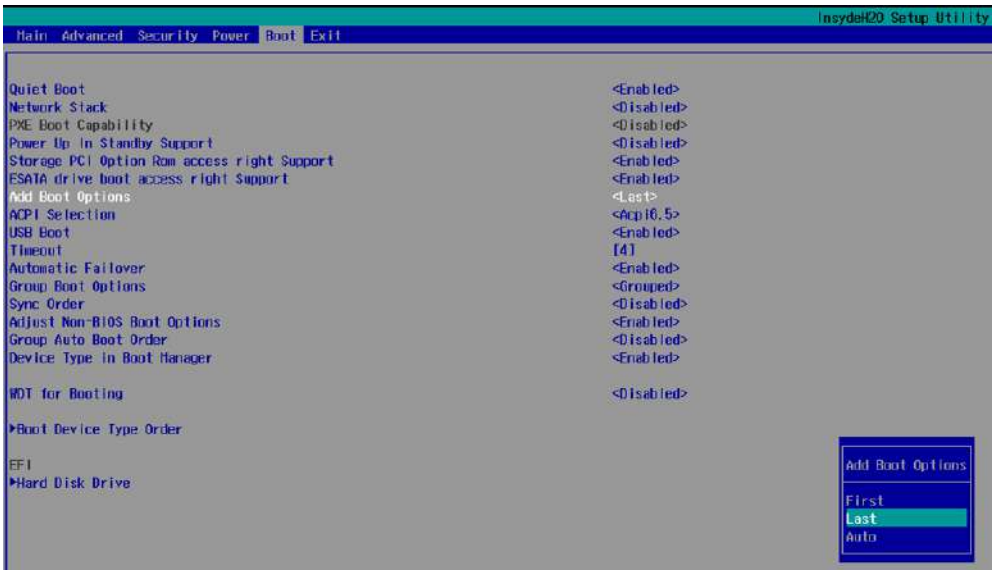
After completing these steps, the ignition power mode will be reset to ATX.

5.1.11 Position New Boot Device

The “Add Boot Options” allow you to determine whether a newly added device (eg. USB flash disk) is to boot as the first device to boot or the last in the boot sequence.

To set the newly-installed boot device as the first or last boot device:

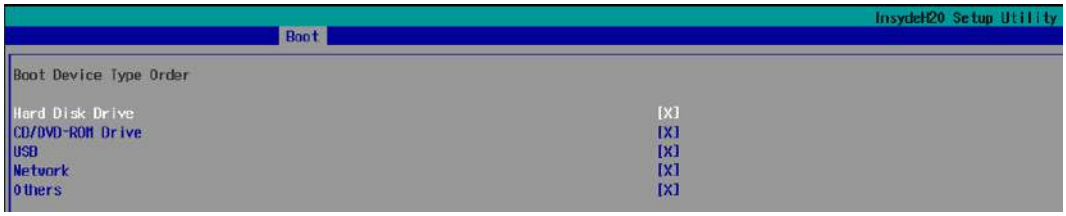
1. Press **F2** when the system boots up to enter the BIOS setup utility.
2. Go to **[Boot] > [Add Boot Options]** menu.
3. Select **[First]** or **[Last]** for your newly-added boot device and press ENTER.



4. Once set, press F10 to save setting and exit.

5.1.12 Boot Device Type Order

When you wish to set a designated boot device, you may set it as the first device to boot. Or if you wish to manually select a boot device, you may do so by pressing F12 when the system boots up.



To set boot order for devices:

1. When system boots up, press F2 to enter BIOS setup utility
2. Go to **[Boot] > [Boot Device Type Order]**
3. Highlight the device you wish to make boot order changes to and press F5/ F6 or +/ - to change device boot order.
4. You may also highlight an item, press ENTER to enable/ disable the selection.

6 OS Support and Driver Installation

6.1 Operating System Compatibility

The following list contains the operating systems which have been tested by Neousys Technology.

- Microsoft Windows 11 LTSC 24H2
- Ubuntu 24.04.3 LTS kernel:6.14.0-29-generic

NOTE

** For Linux system, user may need to manually compile and install the driver for AMD chipset, NVIDIA inference accelerator or Ethernet controller if the driver is not embedded in kernel. You can visit Intel website for further information.*

*** For distributions, graphics driver and RAID function may not be completely implemented in its kernel. You may encounter restrictions when using these features, such as triple independent display and RAID. For optimum operation, it is the users' responsibility to manually check for new drivers and upgrades!*

Neousys may remove or update operating system compatibility without prior notice. Please contact us if your operating system of choice is not on the list.

6.2 Driver Installation

The system drivers are available online, please click on this link to download the drivers.