COASTIPC
coastipc.com | 866-412-6278 | info@coastipc.com

Neousys Technology Inc.

Nuvo-11000 Series

User Manual

Revision 1.0

Rev091525

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Appendix B PoE On/ Off Control

Legal Information

All Neousys Technology Inc. products shall be subject to the latest Standard Warranty Policy

Neousys Technology Inc. may modify, update or upgrade the software, firmware or any accompanying user documentation without any prior notice. Neousys Technology Inc. will provide access to these new software, firmware or documentation releases from download sections of our website or through our service partners.

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.

To the extent permitted by applicable laws, Neousys Technology Inc. shall NOT be responsible for any interoperability or compatibility issues that may arise when (1) products, software, or options not certified and supported; (2) configurations not certified and supported are used; (3) parts intended for one system is installed in another system of different make or model.

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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Disclaimer

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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
- This product is intended to be supplied by a Listed Power Adapter or DC power source, rated 12-35Vdc, 16A, Tma 60 degree C and 5000m altitude during operation. If further assistance is required, please contact Neousys Technology
- 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)
- Ce produit doit être alimenté par un adaptateur de courant homologué ou une source d'alimentation CC, de 12-35 Vcc et 16 A, conçue pour fonctionner à 60 ºC Tma et à 5 000 m d'altitude. Communiquer avec Neousys Technology si de l'assistance supplémentaire est requise
- 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

Avertissement concernant les piles

- Les piles risquent d’exploser si 10ece sont mal installées.
- Ne jamais essayer de recharger, d’ouvrir de force ou de chauffer les piles.
- Remplacer les piles uniquement avec le 10ece type ou l’équivalent recommandé par le fabricant.

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 11ecess 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

Entretien et 12ecessarie

- 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

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 13ecessari in your work area.
- Do not remove any module or component from its anti-static bag before installation

Précautions 13ecessaries 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 Neousys Nuvo-11000 series featuring Intel® Core Ultra 200S hybrid performance/ efficient core processors.

The guide also demonstrates the system's installation procedures.

Applicable systems:

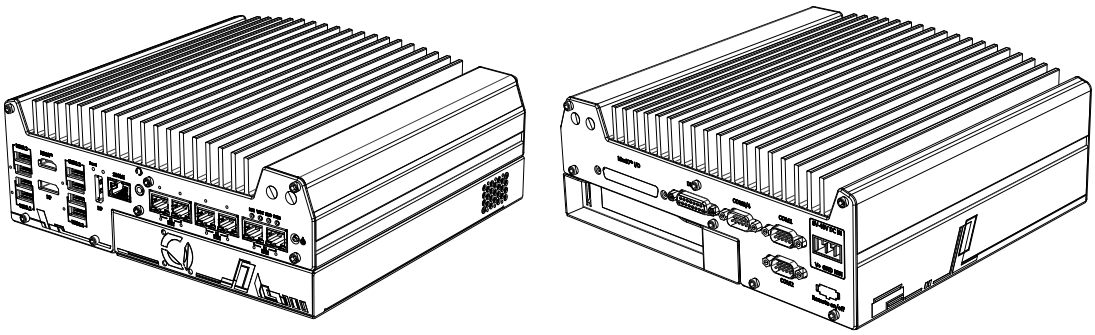
System	Description
Nuvo-11002E	Intel® Core™ Ultra 200S Series Rugged Embedded Computer with 2x GbE, USB 3.2, single-slot PCIe Cassette & MezIO™ Interface
Nuvo-11006E	Intel® Core™ Ultra 200S Series Rugged Embedded Computer with 6x GbE, USB 3.2, single-slot PCIe Cassette & MezIO™ Interface
Nuvo-11002LP	Intel® Core™ Ultra 200S Series Rugged Embedded Computer with 2x GbE, USB 3.2, and 2.5" hot-swappab;e tray
Nuvo-11006LP	Intel® Core™ Ultra 200S Series Rugged Embedded Computer with 6x GbE, USB 3.2, and 2.5" hot-swappab;e tray

Revision History

Version	Date	Description
1.0	Sep. 2025	Initial release

1 Introduction

Nuvo-11000 series is Neousys' flagship rugged embedded computer built on the Intel® Core™ Ultra 200S series platform. Powered by TSMC's advanced 3nm photolithography, the latest Core™ Ultra 200S processors offer up to 24 cores/ 24 threads with higher CPU clock rates, and an integrated neural processing unit (NPU) for AI acceleration, this results in a 1.2x boost in CPU performance and AI computing capabilities of up to 36 TOPs. Combined with DDR5-6400 memory and PCIe Gen5 support, it delivers a significant improvement in computing power, enhancing performance across diverse industrial applications.



Nuvo-11000 series provides comprehensive I/O capabilities for industrial applications. It includes five 2.5Gb and a 1Gb Ethernet ports with optional PoE+ capability, one optional 10GbE port for high-speed data transfer or 10Gb industrial camera, and eight USB 3.2 Gen2 ports for USB3 cameras. Additionally, an upgraded M.2 Gen5x4 slot supports the latest NVMe SSDs, achieving read/ write speeds over 11,000 MB/s and the system also features 4x isolated DI and 4x isolated DO for automation and machine vision applications.

For extended functionality, the series supports add-on cards via its expansion Cassette, proprietary MezIO® interface, and internal mini-PCIe slots, ensuring adaptability to diverse application requirements.

The advanced Intel® Core™ Ultra 200S processors also bring better energy efficiency to the Nuvo-11000 platform. Compared to the previous generation, they can deliver nearly 120% the performance while consuming only 80% of the power*. Combing a proven thermal design with versatile I/O functions, Nuvo-11000 offers a rugged, high-performance embedded computing solution tailored for a wide range of industrial applications.

1.1 Product Specifications

1.1.1 Nuvo-11002E Specifications

System Core	
Processor	Supports Core™ Ultra 200S series CPU (LGA 1851 socket) - Intel® Core™ Ultra 9 285/285T - Intel® Core™ Ultra 7 265/265T - Intel® Core™ Ultra 5 245/245T
Chipset	Intel® H810 Platform Controller Hub
Graphics	Integrated Intel Xe LPG Graphics
AI Engine	Integrated neural processing unit
Memory	Up to 128GB non-ECC DDR5 6400 SDRAM (Dual SODIMM slots)
AMT	Supports Intel vPro/ AMT 16.0
TPM	Supports dTPM 2.0
I/O Interface	
Ethernet port	1x 2.5G Ethernet by I226-IT* with screw-lock 1x Gigabit Ethernet by I219-LM with screw-lock
USB	2x USB 3.2 Gen2 2x USB 3.2 Gen1 4x USB 2.0 ports
Video Port	1x HDMI connector, supporting 3840 x 2160 resolution 2x DisplayPort connector, supporting 3840 x 2304 resolution
Serial Port	2x software-programmable RS-232/ 422/ 485 ports (COM1/ COM2) 2x RS-232 ports (COM3/ COM4) or 1x RS-422/ 485 port (COM3)
Audio	1x 3.5 mm jack for mic-in and speaker-out
Isolated digital input/ output	4-CH isolated DI and 4-CH isolated DO
Storage Interface	
SATA HDD	2x internal SATA ports for 2.5” HDD/ SSD (up to 15mm thickness), supporting RAID 0/1
Internal Expansion Bus	
PCI Express Slot	1x PCIe x16 slot@Gen4, 16-lanes PCIe signals in Cassette module
Mini PCI-E	2x full-size mini PCI Express socket
Power Supply	

DC Input	1x 3-pin pluggable terminal block for 8V to 48VDC DC input (V+/ GND/ IGN)	
Remote Ctrl. &LED Output	1x 10-pin (2x5) wafer connector for remote on/off control and status LED output	
Maximum Power Consumption	**Ultra 7 265 (35W)**	**Ultra 9 285 (35W)**
	67.4W (PL2) @ 12V 70.1W (PL2) @ 24V 74.8W (PL2) @ 48V	67.9W (PL2) @ 12V 69.6W (PL2) @ 24V 73.7W (PL2) @ 48V
	Ultra 7 265 (65W)	**Ultra 9 285 (65W)**
	120.6W (PL2) @ 12V 123.0W (PL2) @ 24V 126.4W (PL2) @ 48V	123.5W (PL2) @ 12V 121.9W (PL2) @ 24V 127.0W (PL2) @ 48V
	Ultra 7 265 (Max SKU)	**Ultra 9 285 (Max SKU)**
	189.8W (PL2) @ 12V 178.7W (PL2) @ 24V 183.4W (PL2) @ 48V	189.1W (PL2) @ 12V 184.4W (PL2) @ 24V 188.2W (PL2) @ 48V
Mechanical		
Dimension	240 mm (W) x 225 mm (D) x 90 mm (H)	
Weight	3.58Kg	
Mounting	Wall-mounting (standard) or DIN-rail mounting (optional)	
Environmental		
Operating Temperature	**With 35W CPU** -25°C to 70°C * **With 65W CPU** -25°C to 70°C * (configured as 35W TDP) -25°C to 50°C * (configured as 65W TDP)	
Storage Temperature	-40°C to 85°C	
Humidity	10% to 90%, non-condensing	
Vibration	MIL-STD-810H, Method 514.8, Category 4	
Shock	MIL-STD-810H, Method 516.8, Procedure I	
EMC	CE/FCC Class A, according to EN 55032 & EN 55035	

** For sub-zero operating temperature, a wide temperature HDD or Solid State Disk (SSD) is required.*

1.1.2 Nuvo-11006E Specifications

System Core	
Processor	Supports Core™ Ultra 200S series CPU (LGA 1851 socket) - Intel® Core™ Ultra 9 285/285T - Intel® Core™ Ultra 7 265/265T - Intel® Core™ Ultra 5 245/245T
Chipset	Intel® Q870 Platform Controller Hub
Graphics	Integrated Intel Xe LPG Graphics
AI Engine	Integrated neural processing unit
Memory	Up to 128GB non-ECC DDR5 6400 SDRAM (Dual SODIMM slots)
AMT	Supports Intel vPro/ AMT 16.0
TPM	Supports dTPM 2.0
I/O Interface	
Ethernet port	5x 2.5G Ethernet by I226-IT* with screw-lock 1x Gigabit Ethernet by I219-LM with screw-lock 1x optional 10GBASE-T Ethernet
PoE+	Optional IEEE 802.3at PoE+ PSE for Port 3 ~ Port 6 (100 W total power budget)
USB	8x USB 3.2 Gen2
Video Port	1x HDMI connector, supporting 3840 x 2160 resolution 2x DisplayPort connector, supporting 3840 x 2304 resolution
Serial Port	2x software-programmable RS-232/ 422/ 485 ports (COM1/ COM2) 2x RS-232 ports (COM3/ COM4) or 1x RS-422/ 485 port (COM3)
Audio	1x 3.5 mm jack for mic-in and speaker-out
Isolated digital input/ output	4-CH isolated DI and 4-CH isolated DO
Storage Interface	
SATA HDD	2x internal SATA ports for 2.5” HDD/ SSD (up to 15mm thickness), supporting RAID 0/1
M.2 NVMe	1x M.2 2280 M key NVMe socket (PCIe Gen5x4) for NVMe SSD
Internal Expansion Bus	
PCI Express Slot	1x PCIe x16 slot@Gen4, 16-lanes PCIe signal in Cassette module
Mini PCI-E	2x full-size mini PCI Express socket
Expandable I/O	1x MezIO® expansion port for Neousys MezIO® modules

USB2.0	1x USB 2.0 port with Type-A connector	
Power Supply		
DC Input	1x 3-pin pluggable terminal block for 8V to 48VDC DC input (V+/ GND/ IGN)	
Remote Ctrl. &LED Output	1x 10-pin (2x5) wafer connector for remote on/off control and status LED output	
Maximum Power Consumption	**Ultra 7 265 (35W)**	**Ultra 9 285 (35W)**
	67.4W (PL2) @ 12V 70.1W (PL2) @ 24V 74.8W (PL2) @ 48V	67.9W (PL2) @ 12V 69.6W (PL2) @ 24V 73.7W (PL2) @ 48V
	Ultra 7 265 (65W)	**Ultra 9 285 (65W)**
	120.6W (PL2) @ 12V 123.0W (PL2) @ 24V 126.4W (PL2) @ 48V	123.5W (PL2) @ 12V 121.9W (PL2) @ 24V 127.0W (PL2) @ 48V
	Ultra 7 265 (Max SKU)	**Ultra 9 285 (Max SKU)**
	189.8W (PL2) @ 12V 178.7W (PL2) @ 24V 183.4W (PL2) @ 48V	189.1W (PL2) @ 12V 184.4W (PL2) @ 24V 188.2W (PL2) @ 48V
Mechanical		
Dimension	240 mm (W) x 225 mm (D) x 90 mm (H)	
Weight	3.58Kg	
Mounting	Wall-mounting (standard) or DIN-rail mounting (optional)	
Environmental		
Operating Temperature	**With 35W CPU** -25°C to 70°C * **With 65W CPU** -25°C to 70°C * (configured as 35W TDP) -25°C to 50°C * (configured as 65W TDP)	
Storage Temperature	-40°C to 85°C	
Humidity	10% to 90%, non-condensing	
Vibration	MIL-STD-810H, Method 514.8, Category 4	
Shock	MIL-STD-810H, Method 516.8, Procedure I	
EMC	CE/FCC Class A, according to EN 55032 & EN 55035	

** For sub-zero operating temperature, a wide temperature HDD or Solid State Disk (SSD) is required.*

1.1.3 Nuvo-11002LP Specifications

System Core		
Processor	Supports Core™ Ultra 200S series CPU (LGA 1851 socket) - Intel® Core™ Ultra 9 285/285T - Intel® Core™ Ultra 7 265/265T - Intel® Core™ Ultra 5 245/245T	
Chipset	Intel® H810 Platform Controller Hub	
Graphics	Integrated Intel Xe LPG Graphics	
AI Engine	Integrated neural processing unit	
Memory	Up to 128GB non-ECC DDR5 6400 SDRAM (Dual SODIMM slots)	
AMT	Supports Intel vPro/ AMT 16.0	
TPM	Supports dTPM 2.0	
I/O Interface		
Ethernet port	1x 2.5G Ethernet by I226-IT* with screw-lock 1x Gigabit Ethernet by I219-LM with screw-lock	
USB	2x USB 3.2 Gen2 2x USB 3.2 Gen1 4x USB 2.0	
Video Port	1x HDMI connector, supporting 3840 x 2160 resolution 2x DisplayPort connector, supporting 3840 x 2304 resolution	
Serial Port	2x software-programmable RS-232/ 422/ 485 ports (COM1/ COM2) 2x RS-232 ports (COM3/ COM4) or 1x RS-422/ 485 port (COM3)	
Audio	1x 3.5 mm jack for mic-in and speaker-out	
Storage Interface		
SATA HDD	1x hot-swappable 2.5” HDD tray (7mm HDD/ SSD) and 1x internal 2.5” SATA port, supporting RAID 0/1	
Internal Expansion Bus		
Mini PCI-E	2x full-size mini PCI Express socket	
Power Supply		
DC Input	1x 3-pin pluggable terminal block for 8V to 48VDC DC input (V+/ GND/ IGN)	
Remote Ctrl. &LED Output	1x 10-pin (2x5) wafer connector for remote on/off control and status LED output	
Maximum Power Consumption	**Ultra 7 265 (35W)**	**Ultra 9 285 (35W)**
	67.4W (PL2) @ 12V 70.1W (PL2) @ 24V 74.8W (PL2) @ 48V	67.9W (PL2) @ 12V 69.6W (PL2) @ 24V 73.7W (PL2) @ 48V

	Ultra 7 265 (65W)	**Ultra 9 285 (65W)**
	120.6W (PL2) @ 12V 123.0W (PL2) @ 24V 126.4W (PL2) @ 48V	123.5W (PL2) @ 12V 121.9W (PL2) @ 24V 127.0W (PL2) @ 48V
	Ultra 7 265 (Max SKU)	**Ultra 9 285 (Max SKU)**
	189.8W (PL2) @ 12V 178.7W (PL2) @ 24V 183.4W (PL2) @ 48V	189.1W (PL2) @ 12V 184.4W (PL2) @ 24V 188.2W (PL2) @ 48V
Mechanical		
Dimension	240 mm (W) x 225 mm (D) x 90 mm (H)	
Weight	3.36Kg	
Mounting	Wall-mounting (standard) or DIN-rail mounting (optional)	
Environmental		
Operating Temperature	**With 35W CPU** -25°C to 70°C * **With 65W CPU** -25°C to 70°C * (configured as 35W TDP) -25°C to 50°C * (configured as 65W TDP)	
Storage Temperature	-40°C to 85°C	
Humidity	10% to 90%, non-condensing	
Vibration	MIL-STD-810H, Method 514.8, Category 4	
Shock	MIL-STD-810H, Method 516.8, Procedure I	
EMC	CE/FCC Class A, according to EN 55032 & EN 55035	

** For sub-zero operating temperature, a wide temperature HDD or Solid State Disk (SSD) is required.*

1.1.4 Nuvo-11006LP Specifications

System Core	
Processor	Supports Core™ Ultra 200S series CPU (LGA 1851 socket) - Intel® Core™ Ultra 9 285/285T - Intel® Core™ Ultra 7 265/265T - Intel® Core™ Ultra 5 245/245T
Chipset	Intel® Q870 Platform Controller Hub
Graphics	Integrated Intel Xe LPG Graphics
AI Engine	Integrated neural processing unit
Memory	Up to 128GB non-ECC DDR5 6400 SDRAM (Dual SODIMM slots)
AMT	Supports Intel vPro/ AMT 16.0
TPM	Supports dTPM 2.0
I/O Interface	
Ethernet port	5x 2.5G Ethernet by I226-IT* with screw-lock 1x Gigabit Ethernet by I219-LM with screw-lock 1x optional 10GBASE-T Ethernet
PoE+	Optional IEEE 802.3at PoE+ PSE for Port 3 ~ Port 6 (100 W total power budget)
USB	8x USB 3.2 Gen2
Video Port	1x HDMI connector, supporting 3840 x 2160 resolution 2x DisplayPort connector, supporting 3840 x 2304 resolution
Serial Port	2x software-programmable RS-232/ 422/ 485 ports (COM1/ COM2) 2x RS-232 ports (COM3/ COM4) or 1x RS-422/ 485 port (COM3)
Audio	1x 3.5 mm jack for mic-in and speaker-out
Storage Interface	
SATA HDD	1x internal SATA port for 2.5” HDD/ SSD (up to 15mm thickness), 1x via 2.5” hot-swappable tray, supporting RAID 0/1
M.2 NVMe	1x M.2 2280 M key NVMe socket (PCIe Gen5x4) for NVMe SSD
Internal Expansion Bus	
Mini PCI-E	2x full-size mini PCI Express socket
Expandable I/O	1x MezIO® expansion port for Neousys MezIO® modules
USB2.0	1x USB 2.0 port with Type-A connector
Power Supply	
DC Input	1x 3-pin pluggable terminal block for 8V to 48VDC DC input (V+/ GND/ IGN)
Remote Ctrl. &LED Output	1x 10-pin (2x5) wafer connector for remote on/off control and status LED output

Maximum Power Consumption	**Ultra 7 265 (35W)**	**Ultra 9 285 (35W)**
	67.4W (PL2) @ 12V 70.1W (PL2) @ 24V 74.8W (PL2) @ 48V	67.9W (PL2) @ 12V 69.6W (PL2) @ 24V 73.7W (PL2) @ 48V
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Mechanical		
Dimension	240 mm (W) x 225 mm (D) x 90 mm (H)	
Weight	3.36Kg	
Mounting	Wall-mounting (standard) or DIN-rail mounting (optional)	
Environmental		
Operating Temperature	**With 35W CPU** -25°C to 70°C * **With 65W CPU** -25°C to 70°C * (configured as 35W TDP) -25°C to 50°C * (configured as 65W TDP)	
Storage Temperature	-40°C to 85°C	
Humidity	10% to 90%, non-condensing	
Vibration	MIL-STD-810H, Method 514.8, Category 4	
Shock	MIL-STD-810H, Method 516.8, Procedure I	
EMC	CE/FCC Class A, according to EN 55032 & EN 55035	

** For sub-zero operating temperature, a wide temperature HDD or Solid State Disk (SSD) is required.*

1.2 Nuvo-11000E Series Dimensions

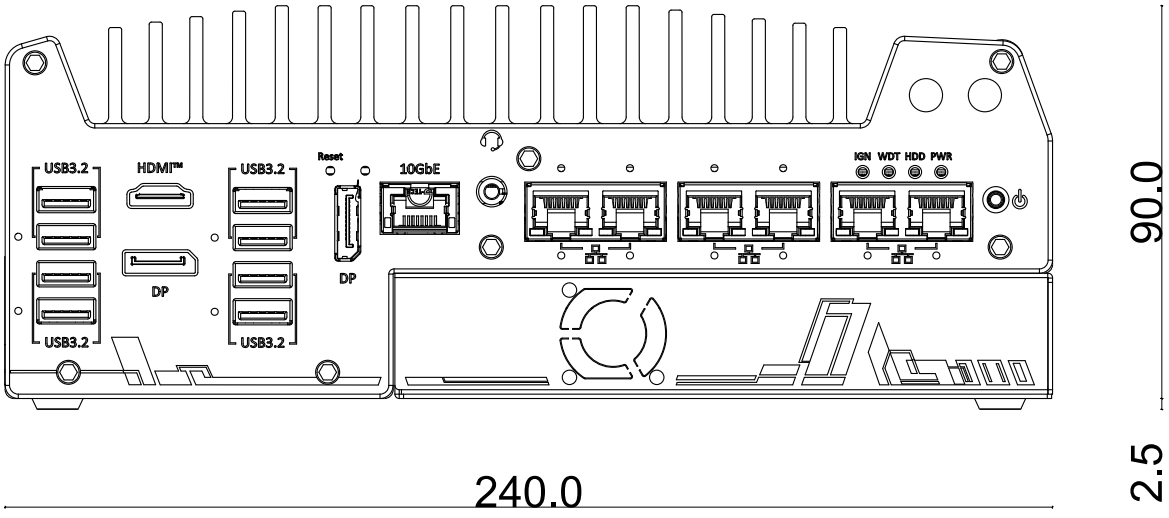
NOTE

All measurements are in millimeters (mm).

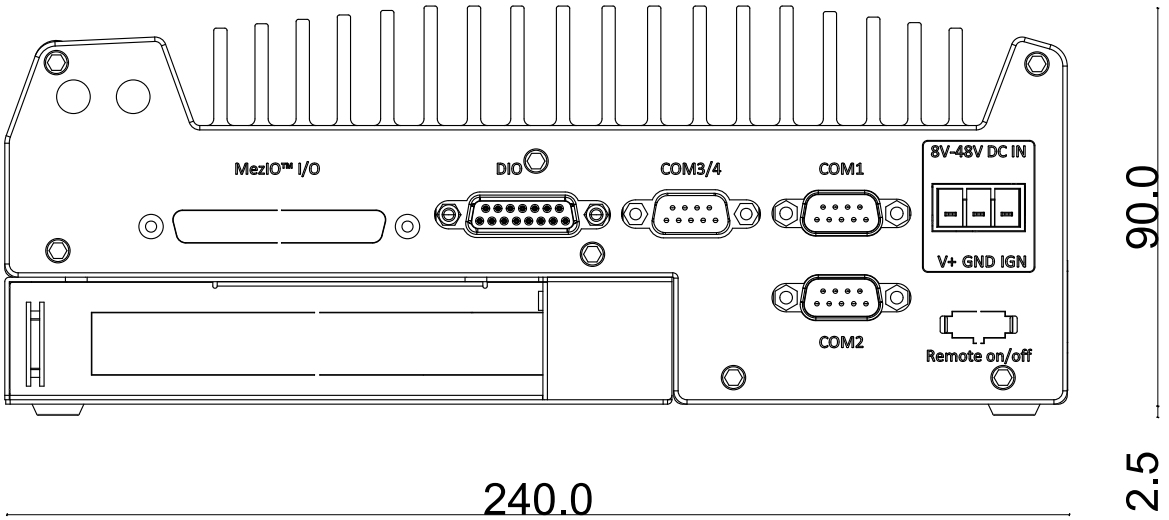
Applicable to Nuvo-11002E/ 11006E

The numbers “2.5” represents the height of the rubber stands at 2.5mm.

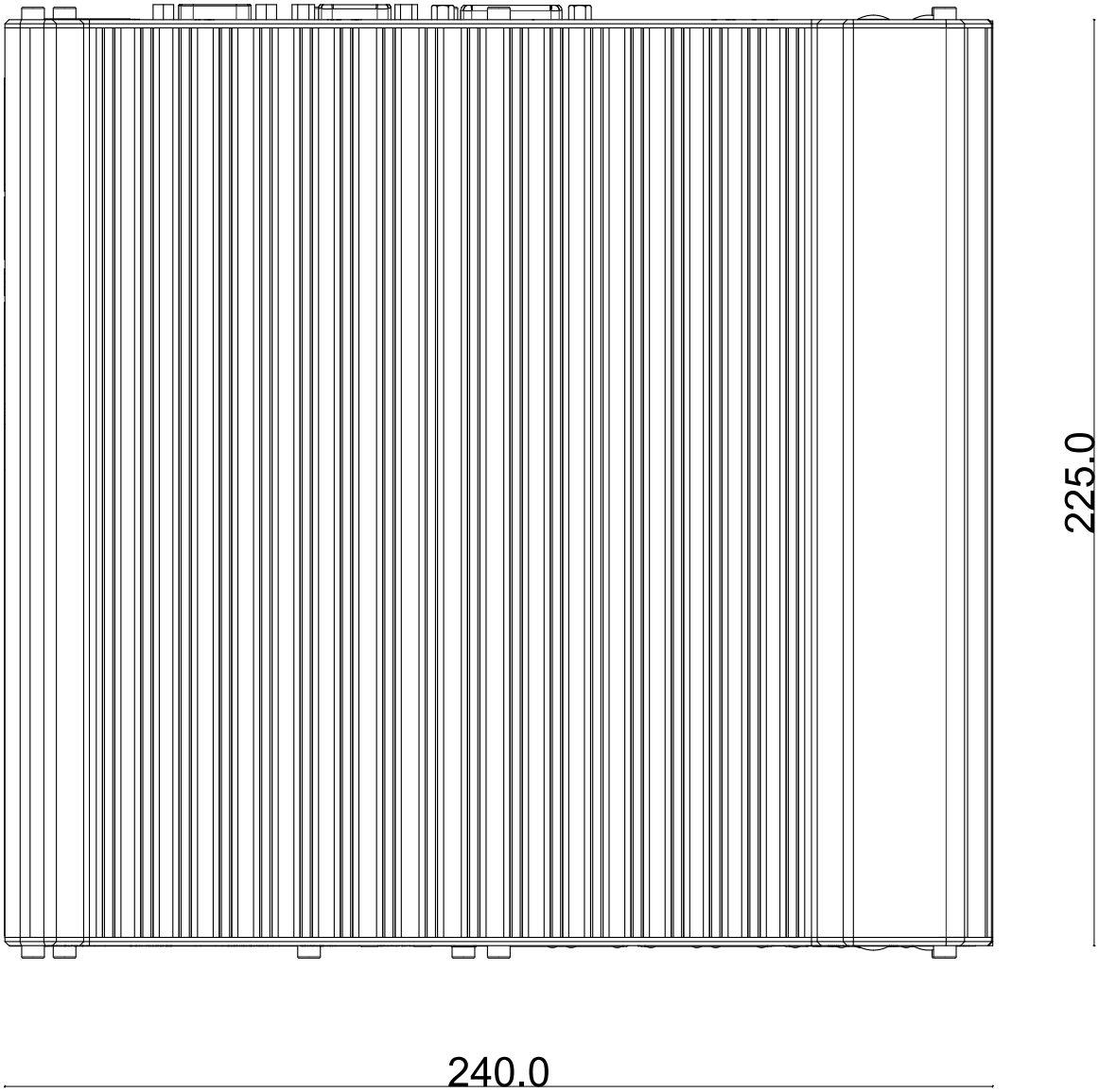
1.2.1 Nuvo-11000E Front Panel View



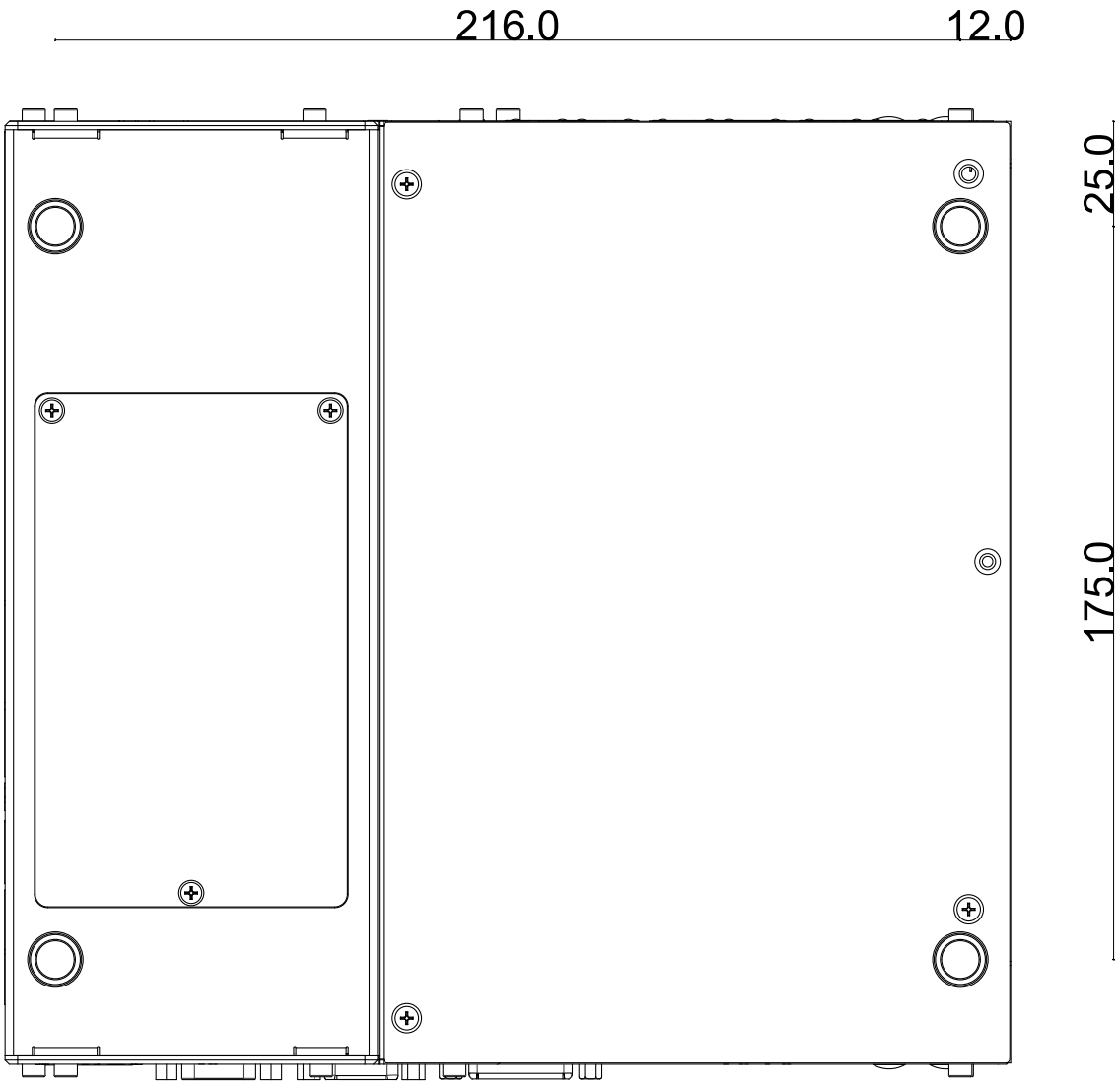
1.2.2 Nuvo-11000E Rear Panel View



1.2.3 Nuvo-11000E Top View



1.2.4 Nuvo-11000E Bottom View



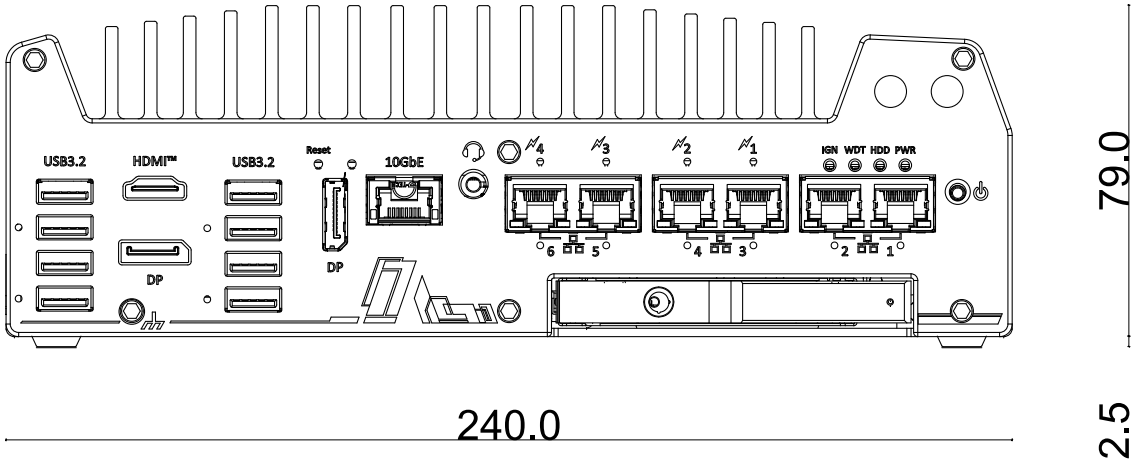
1.3 Nuvo-11000LP Series Dimensions

NOTE

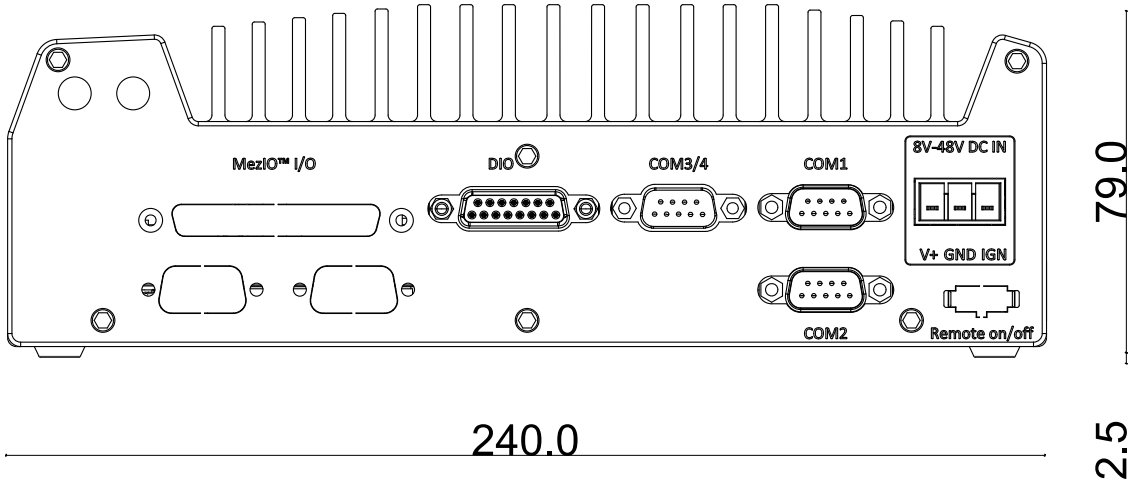
All measurements are in millimeters (mm).

The numbers “2.5” represents the height of the rubber stands at 2.5mm.

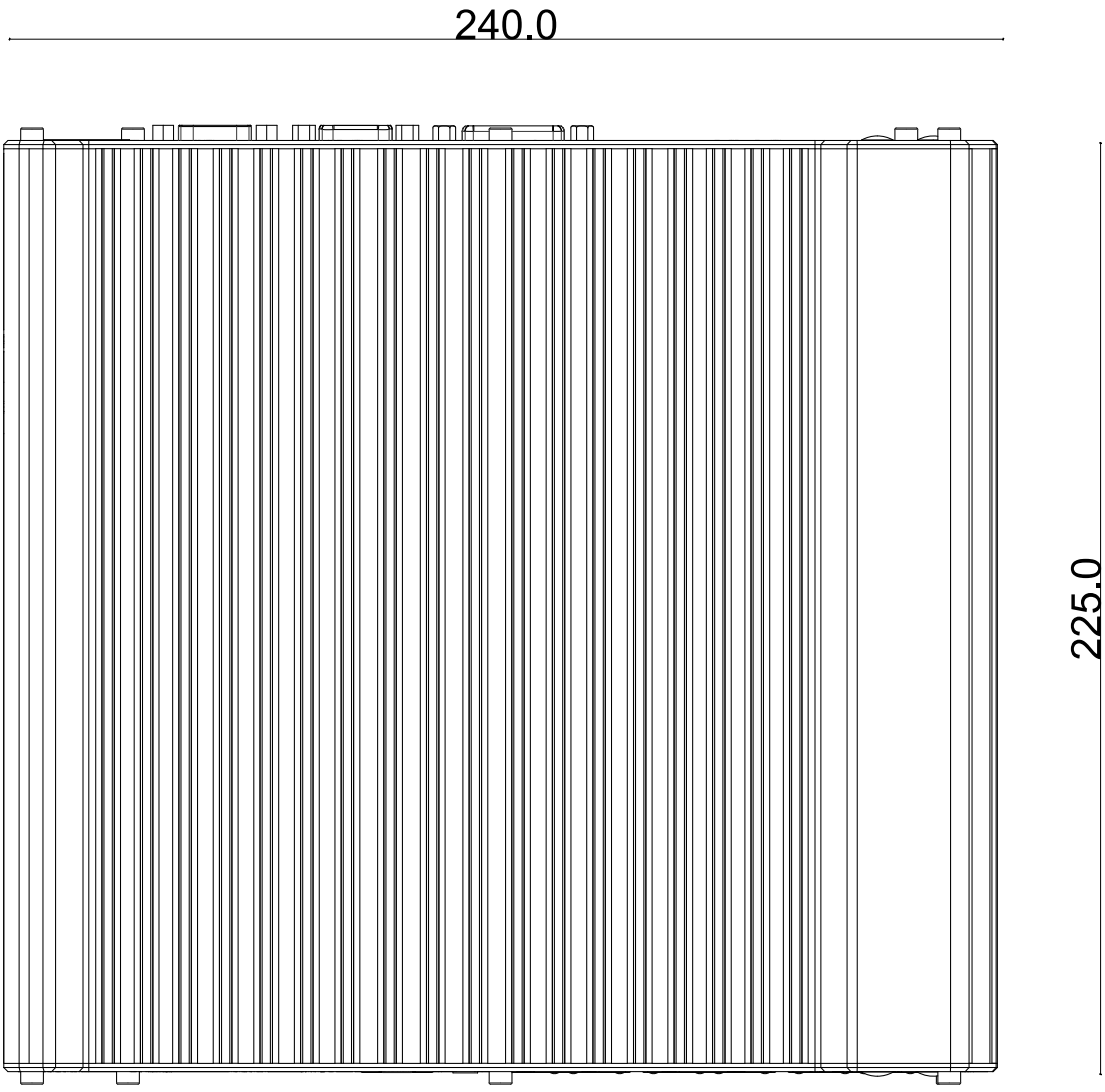
1.3.1 Nuvo-11000LP Front Panel View



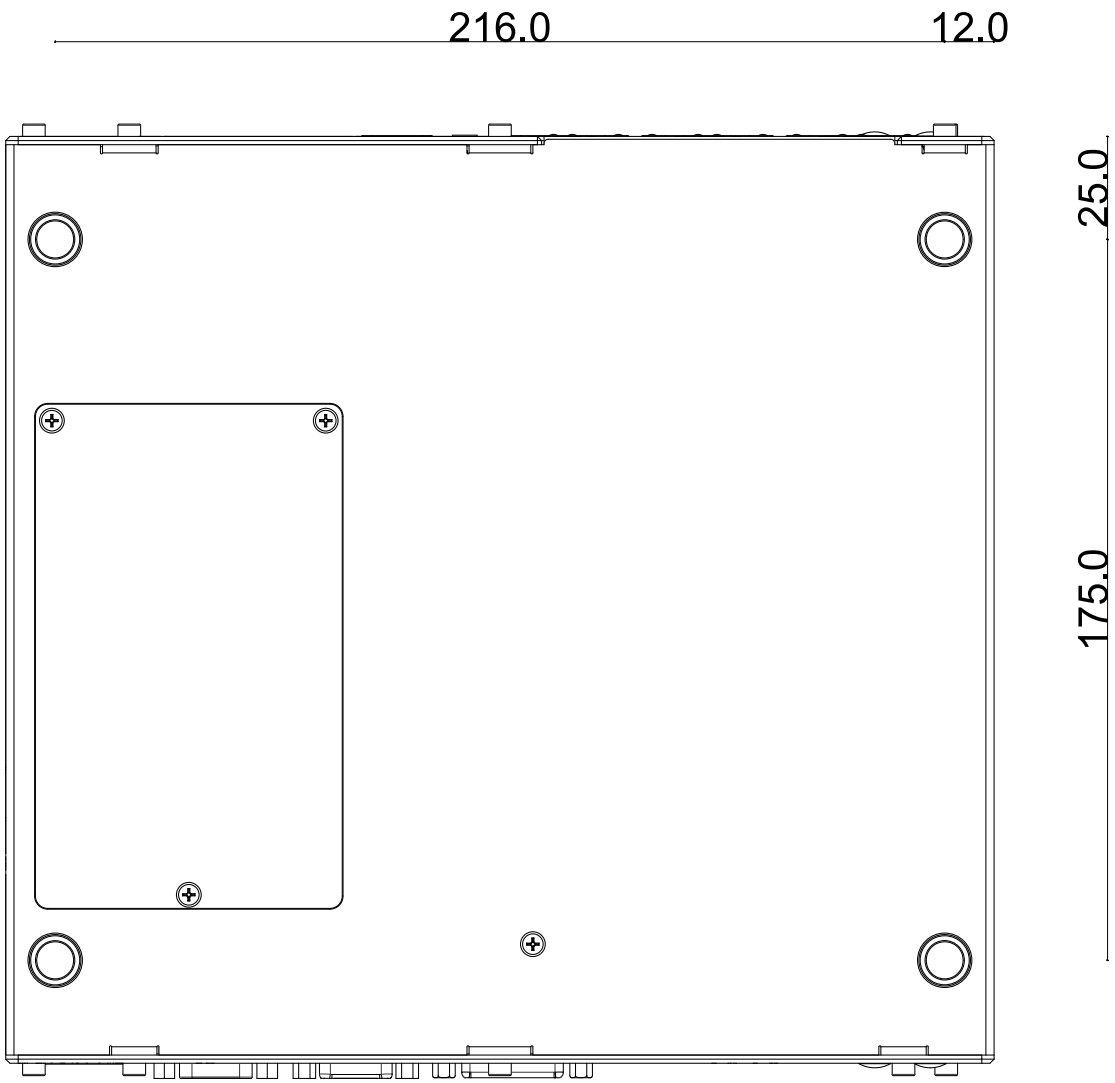
1.3.2 Nuvo-11000LP Rear Panel View



1.3.3 Nuvo-11000LP Top View



1.3.4 Nuvo-11000LP Bottom View



2 System Overview

Upon receiving and unpacking your Nuvo-11000 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 Nuvo-11000E Series Packing List

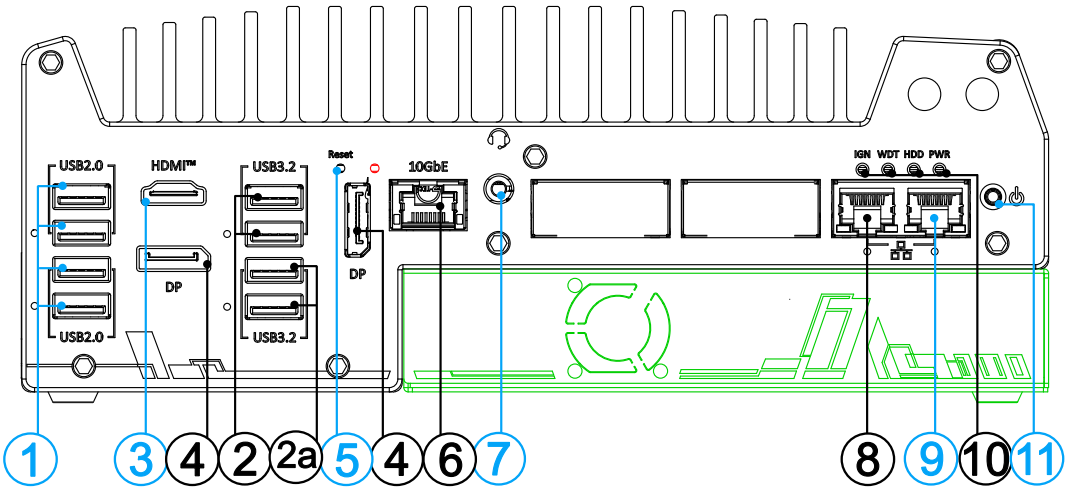
System / Pack	Nuvo-11000E Series	Qty
1	Nuvo-11000E series system (If you ordered CPU/ RAM/ HDD, please verify these items)	1
2	Accessory box, which contains	
	● CPU bracket	1
	● Wall-mount bracket	2
	● Foot pad	4
	● 3-pin push-in power terminal block	1
	● Screw pack	1
	● Rubber spacer	4

2.1.2 Nuvo-11000LP Packing List

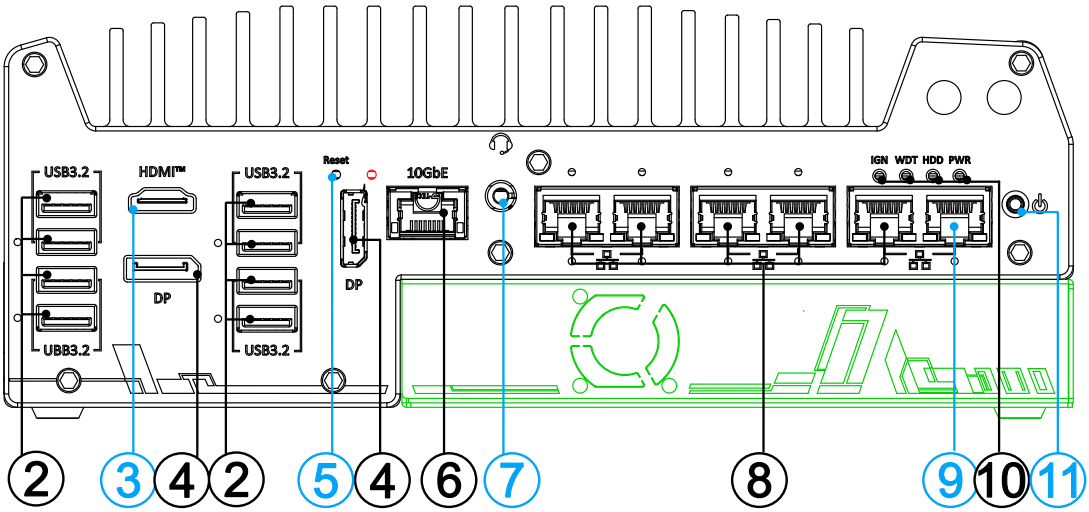
System / Pack	Nuvo-11000LP Series	Qty
1	Nuvo-11000LP system (If you ordered CPU/ RAM/ HDD, please verify these items)	1
2	Accessory box, which contains	
	● CPU bracket	1
	● Wall-mount bracket	2
	● Foot pad	4
	● 3-pin push-in power terminal block	1
	● Screw pack	1

2.2 Front Panel I/O

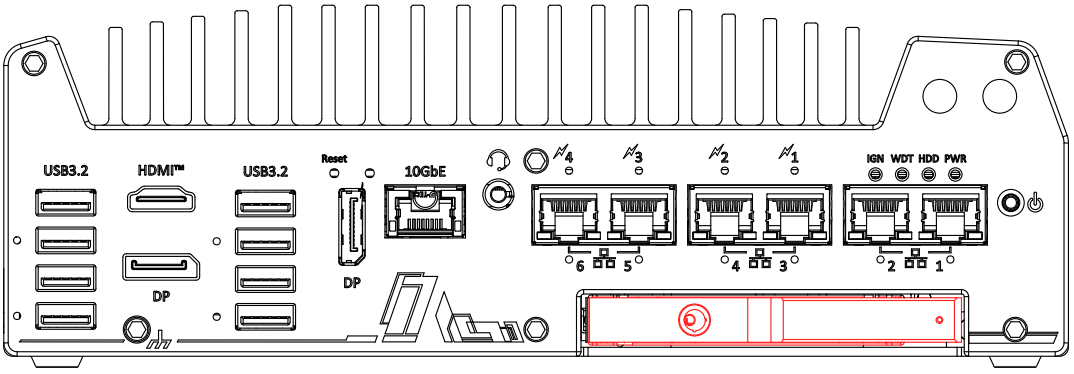
The Nuvo-11000E series and Nuvo-11000LP series share the same front panel I/Os, therefore, Nuvo-11000E series will be used for demonstration purposes.



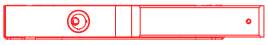
Nuvo-11002E



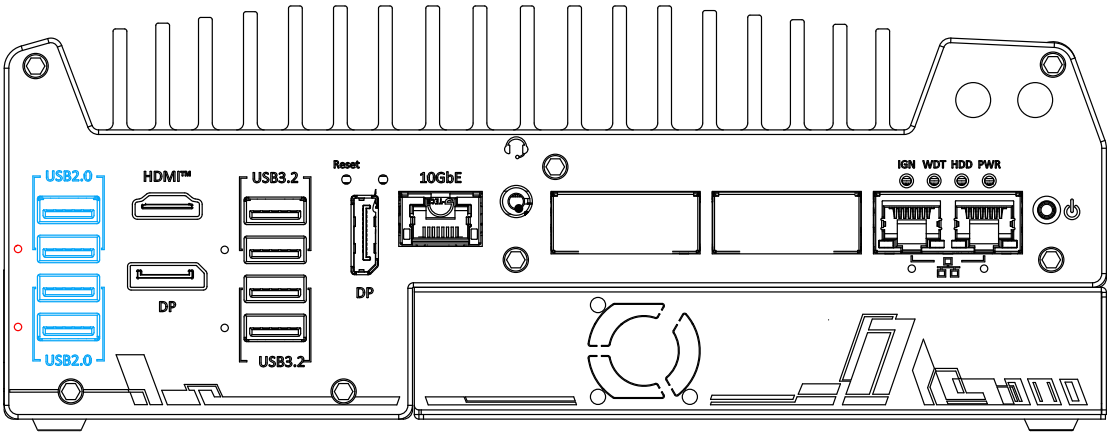
Nuvo-11006E



Nuvo-11000LP series 2.5” Tray

No.	Item	Description
1	USB2.0 port	**For Nuvo-11002E only**, the USB 2.0 ports offer up to 480Mbit/s bandwidth and are backward compatible with USB 1.1/ 1.0.
2	USB3.2 Gen2 x1 port	Applicable to Nuvo-11006E and Nuvo-11006LP series systems. The USB3.2 Gen2 x1 port offers up to 10Gbps. It is also backwards compatible with USB3.0 and USB2.0
2a	USB3.2 Gen1 x1 port	Applicable to Nuvo-11002E and Nuvo-11002LP series systems. The USB3.2 Gen1 x1 port offers up to 5Gbps. It is also backwards compatible with USB3.0 and USB2.0
3	HDMI™ port	The HDMI™ port is a high-resolution graphics/ data port supporting up to 3840 x 2160 @ 60Hz.
4	DisplayPort	Support display resolutions up to 3840 x 2160 @ 60Hz. Compatible with HDMI/ DVI via respective adapter/ cable (resolution may vary).
5	Reset button	Use this button to manually reset the system.
	CMOS reset button	The clear CMOS button is used for manually resetting the CMOS to load the default BIOS.
6	Option 10Gb Ethernet	The optional 10Gb Ethernet port is backward compatible with 5GBASE-T, 2.5GBASE-T, and 1Gb Ethernet protocols.
7	4-pole 3.5mm headphone/ microphone jack	3.5mm jack for speaker-output and microphone-input.
8	2.5Gb Ethernet	2.5Gb Ethernet ports by Intel I226-IT.
9	1Gb Ethernet	Gigabit Ethernet by I219
10	LED indicators	From left to right, the LEDs are IGN (ignition control), WDT (watchdog timer), HDD (hard disk drive) and PWR (system power).
11	Power button	Use this button to turn on or shutdown the system.
Area in Green	Cassette module	The cassette module offers a separate compartment to manage thermal conditions and reduce installation complications of an add-on card. 1x PCIe x16 slot@Gen4, 16-lanes PCIe signal
		Nuvo-11000LP features a 2.5” hot-swappable tray supports an HDD/ SSD up to 7mm thickness.

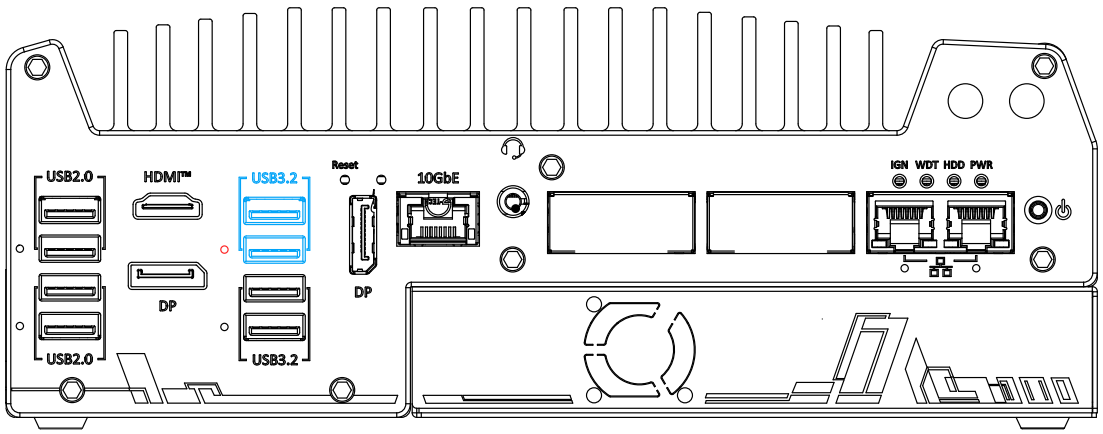
2.2.1 USB2.0 Port (Nuvo-11002 series Only)



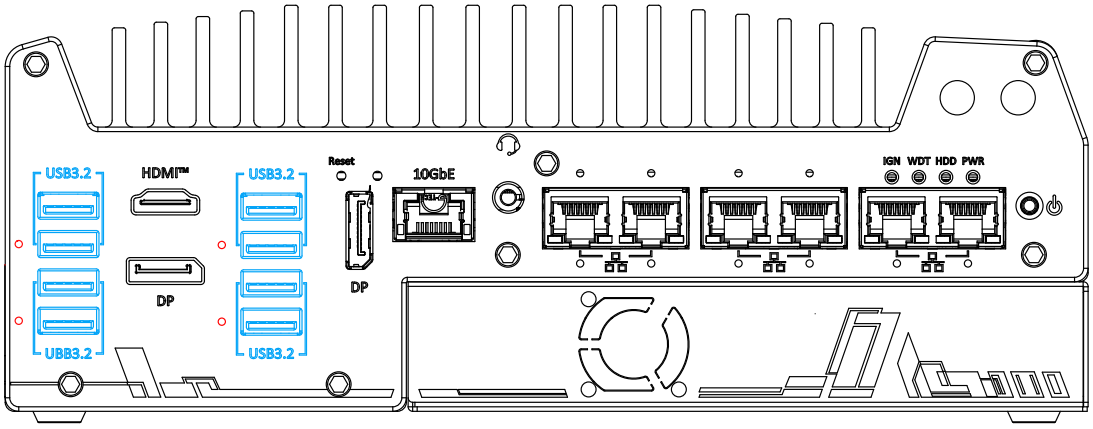
The USB2.0 ports are implemented via native xHCI (eXtensible Host Controller Interface) and are backward compatible with USB 1.1 and USB 1.0 devices. UEFI USB support is also provided so you can use USB keyboard/ mouse in UEFI shell environment. Indicated in **red** is a screw-lock hole for the corresponding USB port.

xHCI driver is supported natively in Windows 10, therefore you do not need to install xHCI driver to utilize USB functions.

2.2.2 USB3.2 Gen2x1 Port



Nuvo-11002 series systems

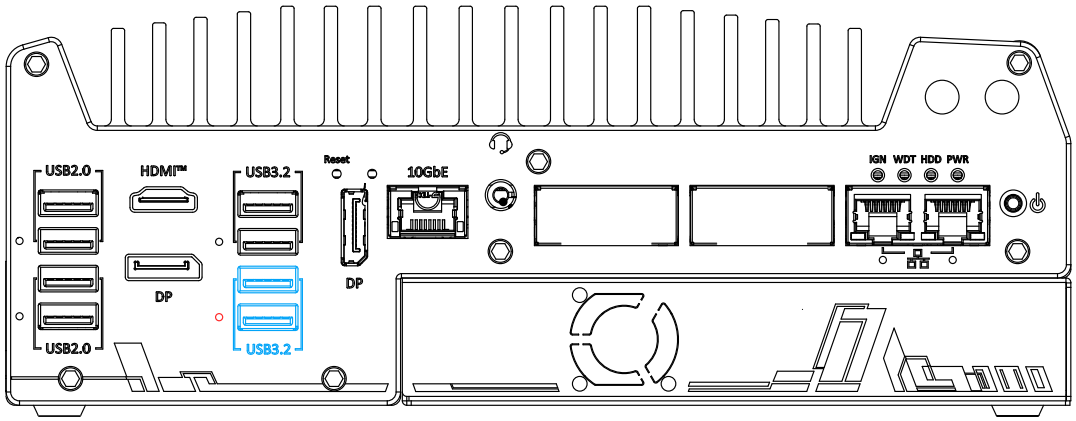


Nuvo-11006 series systems

The system's USB 3.2 Gen2x1 ports (10Gbps) are implemented via native xHCI (eXtensible Host Controller Interface) controller and are backward compatible with USB3.2 Gen2x1, USB 2.0, USB 1.1 and USB 1.0 devices. UFEI USB is also supported so you can use USB keyboard/ mouse in UEFI shell environment. Indicated in **red** are screw-lock holes for the corresponding USB port.

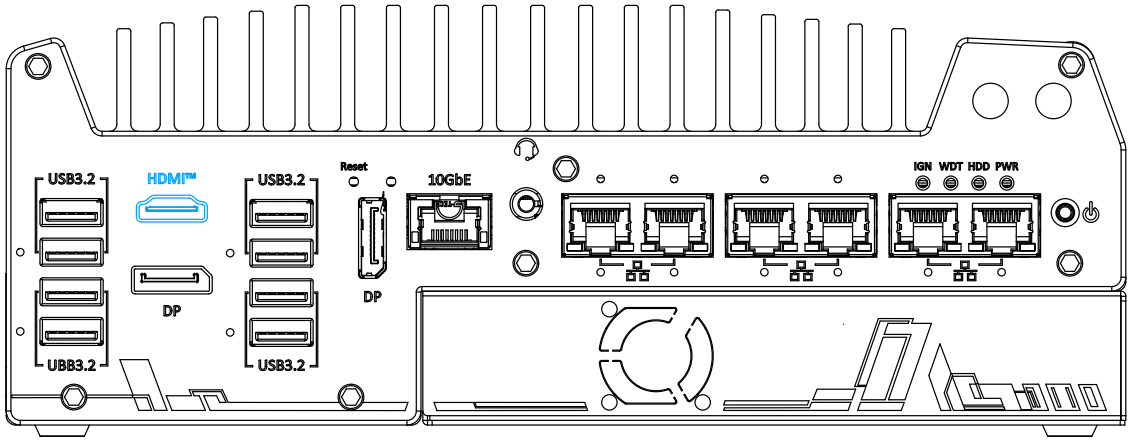
xHCI driver is supported natively in Windows 10, therefore you do not need to install the xHCI driver prior to utilizing USB functions.

2.2.3 USB3.2 Gen1x1 Port



The system's USB 3.2 Gen1x1 ports (5Gbps) are implemented via native xHCI (eXtensible Host Controller Interface) controller and are backward compatible with USB3.0, USB 2.0, USB 1.1 and USB 1.0 devices. UFEI USB is also supported so you can use USB keyboard/ mouse in UEFI shell environment. Indicated in **red** are screw-lock holes for the corresponding USB port. xHCI driver is supported natively in Windows 10, therefore you do not need to install the xHCI driver prior to utilizing USB functions.

2.2.4 HDMI™ Port

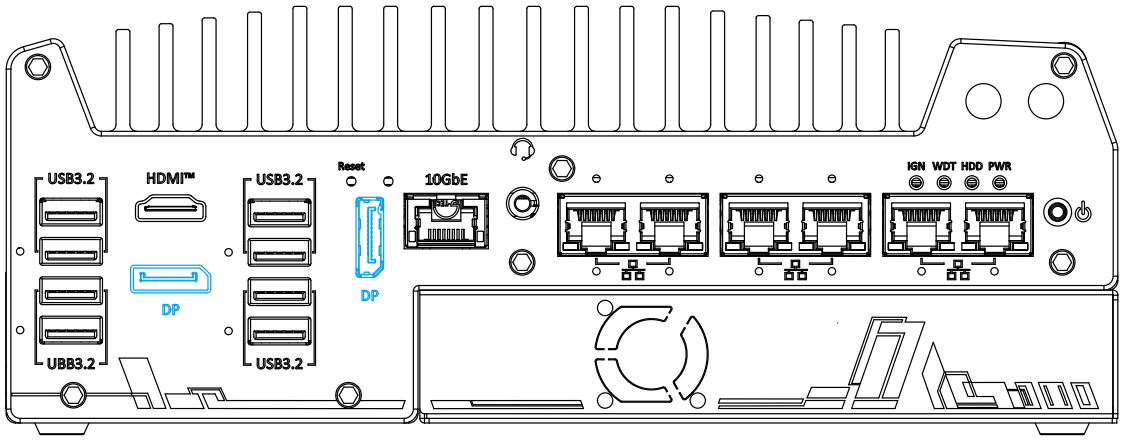


The High-Definition Multimedia Interface (HDMI) port provides uncompressed high-quality digital video and audio transmission between the system and a multimedia display device on a single cable. You can connect to other digital inputs by using a HDMI-to-DVI or HDMI-to-DP cable.

HDMI-to-DP

The system supports dual independent display outputs by connecting display devices to HDMI and DisplayPort connection. To support dual display outputs and achieve best DisplayPort output resolution in Windows, you need to install corresponding graphics drivers. Please refer to section OS Support and Driver Installation for details.

2.2.5 DisplayPort



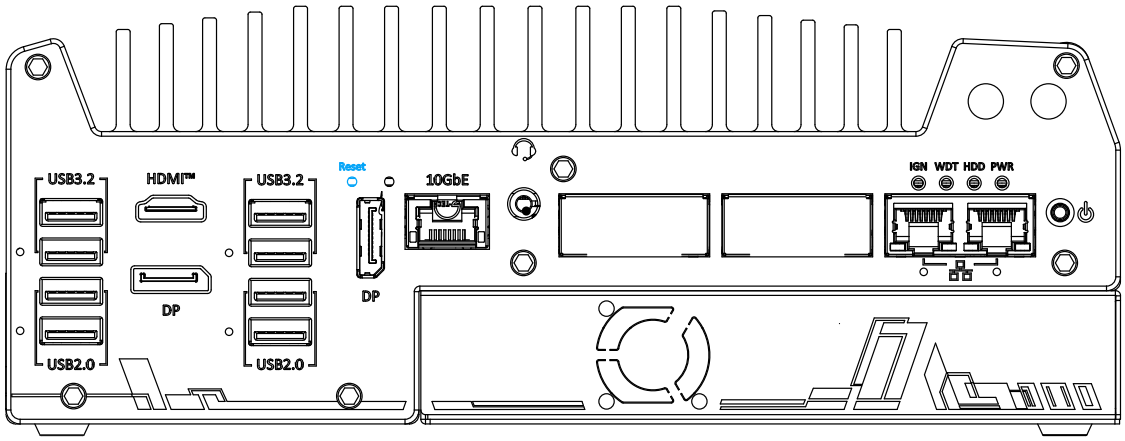
The system has a DisplayPort (DP) output which is a digital display interface that mainly connect video source and carry audio to a display device. When connecting a DP, it can deliver up to 4K UHD (4096 x 2304 @ 60Hz) in resolution. The system is designed to support passive DP adapter/ cable. You can connect to other display devices using DP-to-HDMI cable or DP-to-DVI cable.

DP-to-HDMI

DP-to-DVI

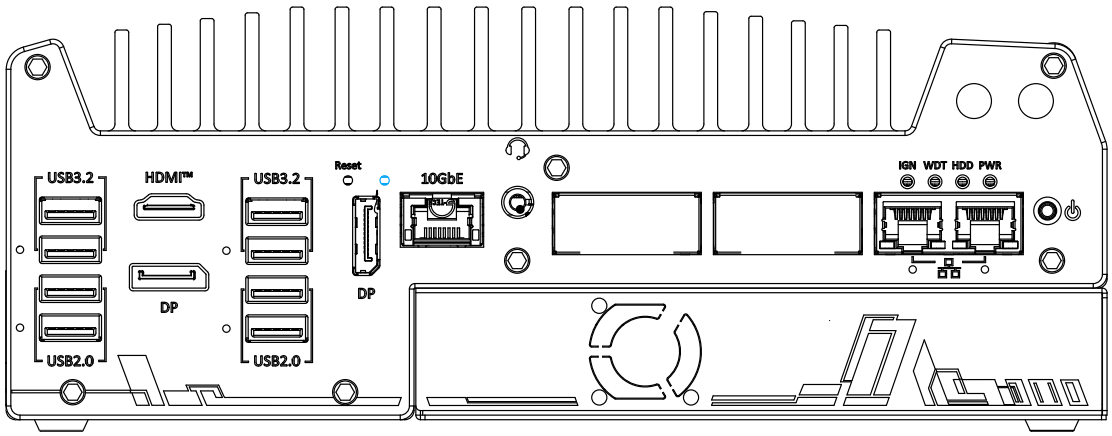
The system supports triple independent display outputs by connecting display devices to VGA, DVI and DisplayPort connection. To support multiple display outputs and achieve best DisplayPort output resolution in Windows, you need to install corresponding graphics drivers. Please refer to section OS Support and Driver Installation for details.

2.2.6 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.

2.2.7 CMOS Reset 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.

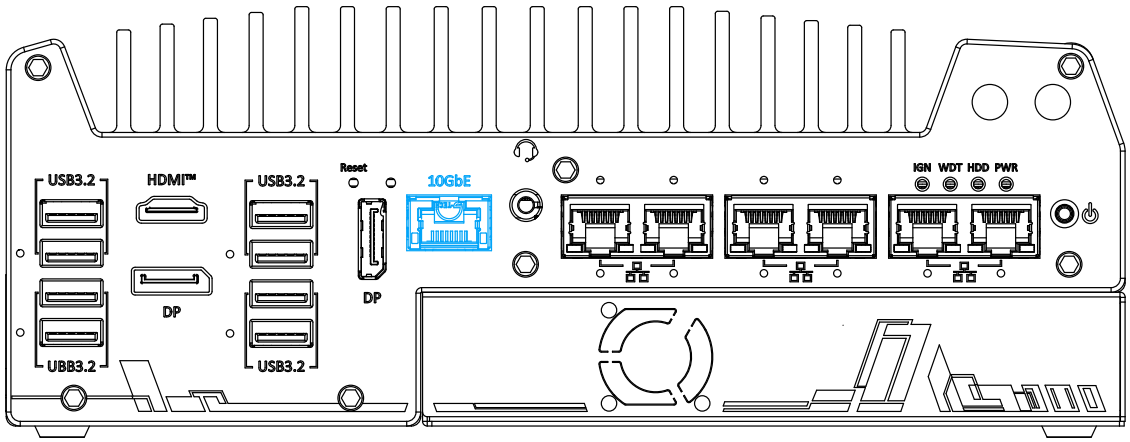
NOTE

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

WARNING

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

2.2.8 10Gb Ethernet (Optional, Nuvo-11006 series systems only)



The optional high-speed data transmission 10G Ethernet port is backward compatible with 5GBASE-T and 2.5GBASE-T to work with NBASE-T industrial cameras.

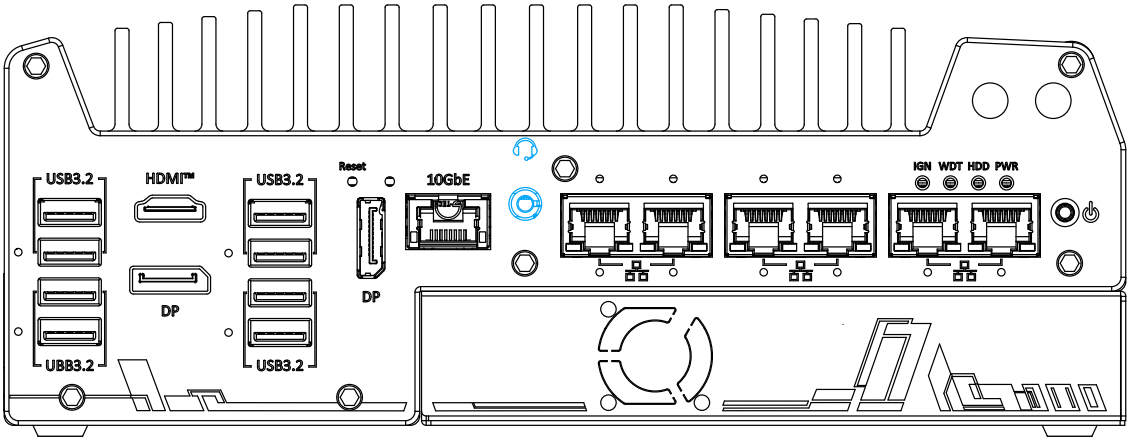
Speed LED (Right)

LED Color	Status	Description
Green or Orange	Off	Ethernet port is disconnected
	Orange	10/ 100/ 1000/ 2500/ 5000 Mbps
	Green	10000 Mbps

Active/Link LED (Left)

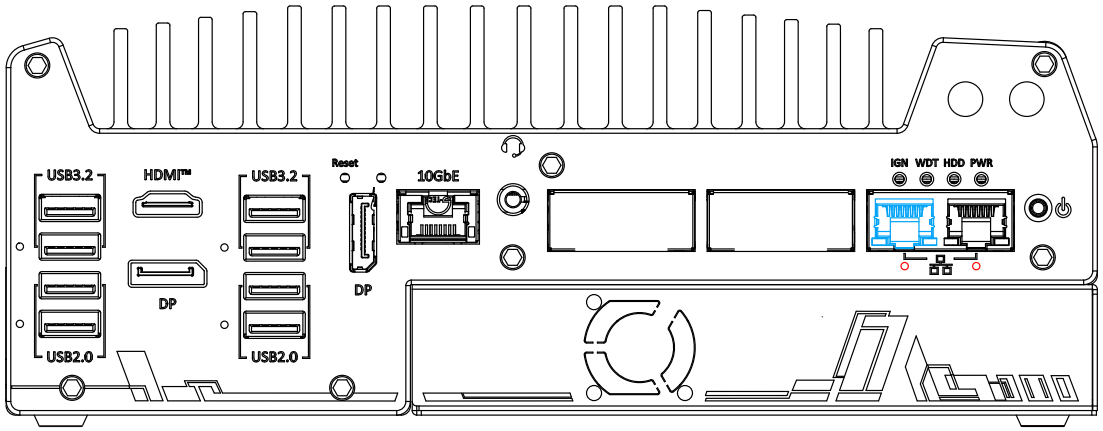
LED Color	Status	Description
Green	Off	Ethernet port is disconnected
	On	Ethernet port is connected and no data transmission
	Flashing	Ethernet port is connected and data is transmitting/receiving

2.2.9 4-Pole 3.5mm Headphone/ Microphone Jack

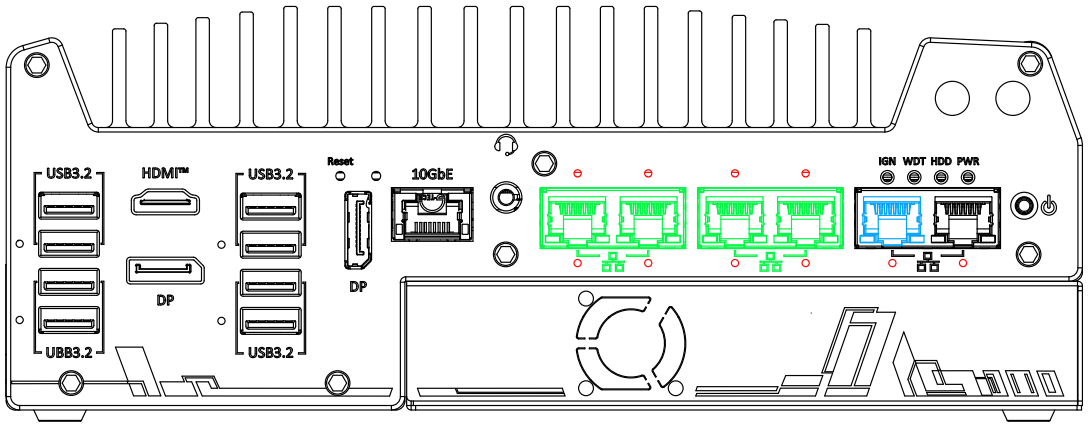


The system audio function uses high definition audio. There is a female 4-pole audio jack for headphone (speaker) output and microphone input. To utilize the audio function in Windows, you need to install corresponding drivers for both Intel® chipset and audio device drivers

2.2.10 1Gb & 2.5Gb Ethernet Port (Optional PoE+ on Ports 3 – 6)



Nuvo-11002 series



Nuvo-11006 series

The Nuvo-11000 series systems have one GbE port (in **black)** and one 2.5GbE port indicated in **blue** (for Nuvo-11002E) or five 2.5GbE ports indicated in **blue** and **green** (for Nuvo-11006E). The ports indicated in green have the optional of IEEE 802.3at PoE+ PSE functionality. All Ethernet ports feature panel screw fix holes for a firm connection (indicated in **red**). The port marked in **black** is implemented using Intel® I219-LM controller that supports Wake-on-LAN and is also compatible with Intel® AMT (Active Management Technology) to support advanced features such as remote SOL desktop and remote on/ off control.

The optional Power over Ethernet (PoE) functionality supplies electrical power and data on a standard CAT-5/CAT-6 Ethernet cable. Acting as a PoE PSE (Power Sourcing Equipment), compliant with IEEE 802.3at, each PoE port (indicated in **green**) delivers up to 25W to a Powered Device (PD). The system has a total 100W power budget. PoE ports can automatically detect and determine if the connected device requires power or not, so it is compatible with standard Ethernet devices as well.

Each port has one dedicated PCI Express link for maximum network performance. Please refer to the table below for LED connection statuses.

Active/Link LED (Right)

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 (Left)

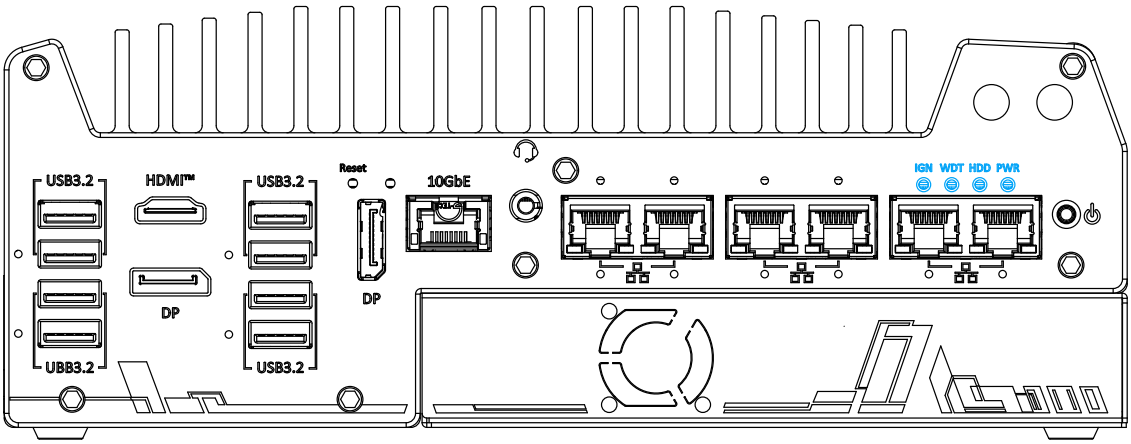
LED Color	Status	Description
Green or Orange	Off	10 Mbps
	Green	100 Mbps
	Orange	1000/ 2500 Mbps

To utilize the Ethernet ports in Windows, you need to install corresponding driver for Intel® I226-IT and I219-LM controllers.

NOTE

If you are utilizing the maximum 100W PoE power budget, please power the system with at least 24V DC.

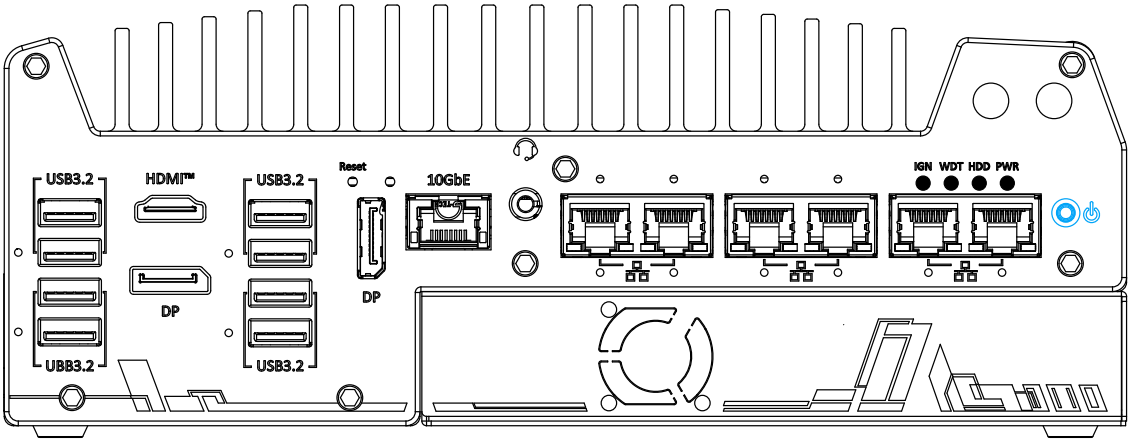
2.2.11 System Status LED Indicators



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

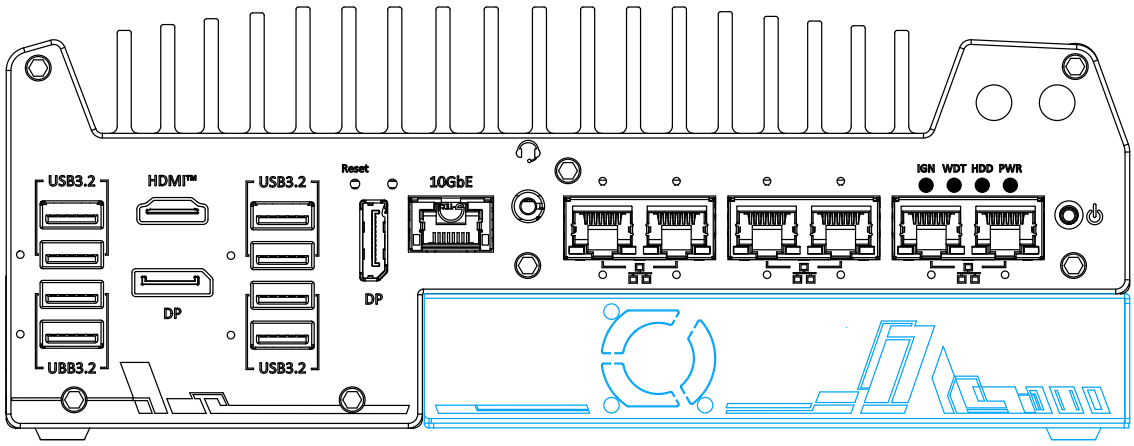
Indicator	Color	Description
IGN	Yellow	Ignition signal indicator, lid when IGN is high (12V/ 24V).
WDT	Yellow	Watchdog timer LED, flashing when WDT is active.
HDD	Red	Hard drive indicator, flashing when hard disk drive is active.
PWR	Green	Power indictor, lid when system is on.

2.2.12 Power Button



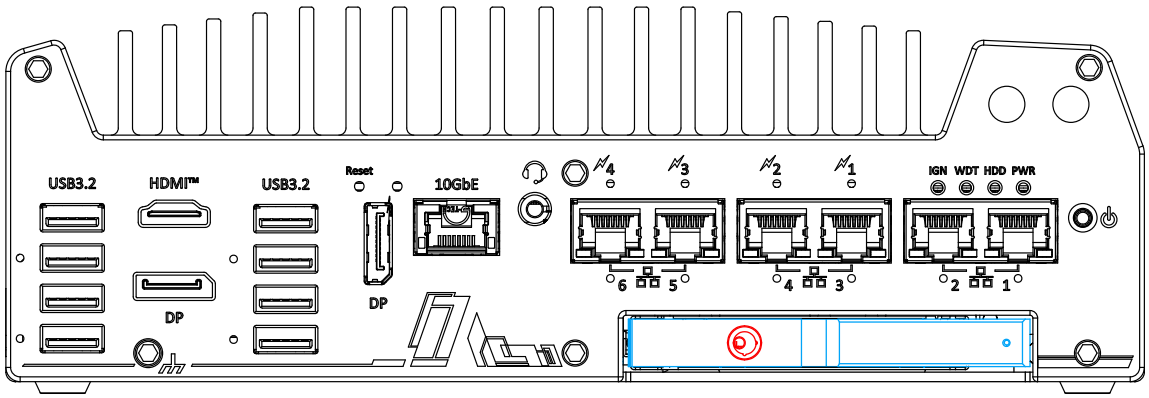
The power button is a non-latched switch for ATX mode on/off operation. To turn on the system, press the power button and the PWR LED should light-up green. To turn off the system, issuing a shutdown command in OS is preferred, or you can simply press the power button. To force shutdown when the system 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).

2.2.13 Cassette Module (Nuvo-11000E Series Only)



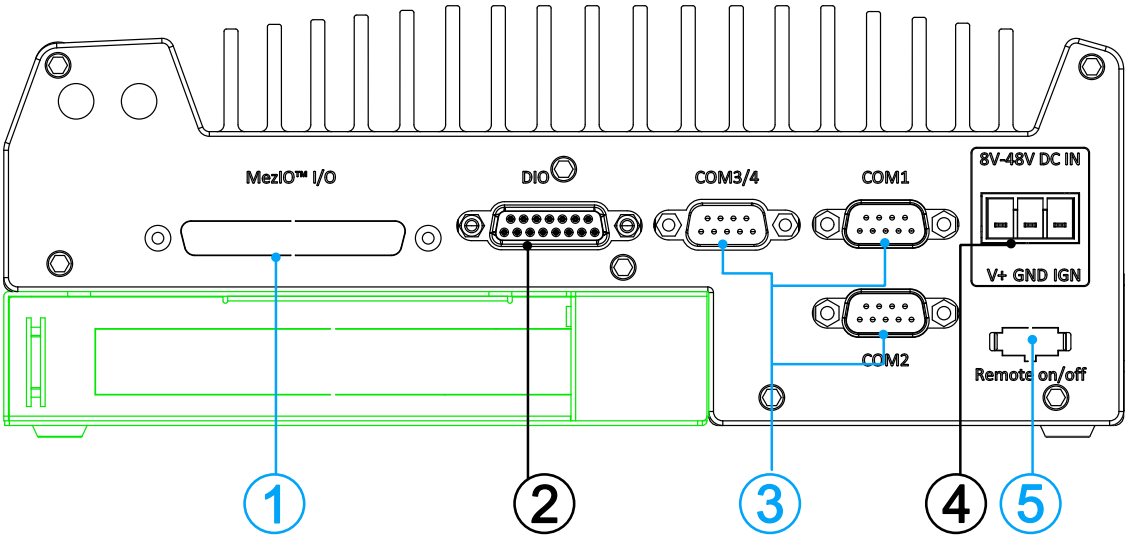
Neousys' patented expansion Cassette (R.O.C. Patent No. M456527) provides a separated compartment to accommodate an add-on card. It effectively manages thermal conditions of both the system and the add-on card. The modular concept brought by Cassette module also reduces the complexity of installing and replacing an add-on card in the fanless controller.

2.2.14 2.5" HDD/ SSD Hot Swappable Tray (Nuvo-11000LP Series Only)



The system features an external hot-swappable 2.5" hot-swappable tray that supports a 2.5" HDD/ SSD up to 7mm thickness. Designed for easy access, the HDD tray is secured by a lock (indicated in **red**).

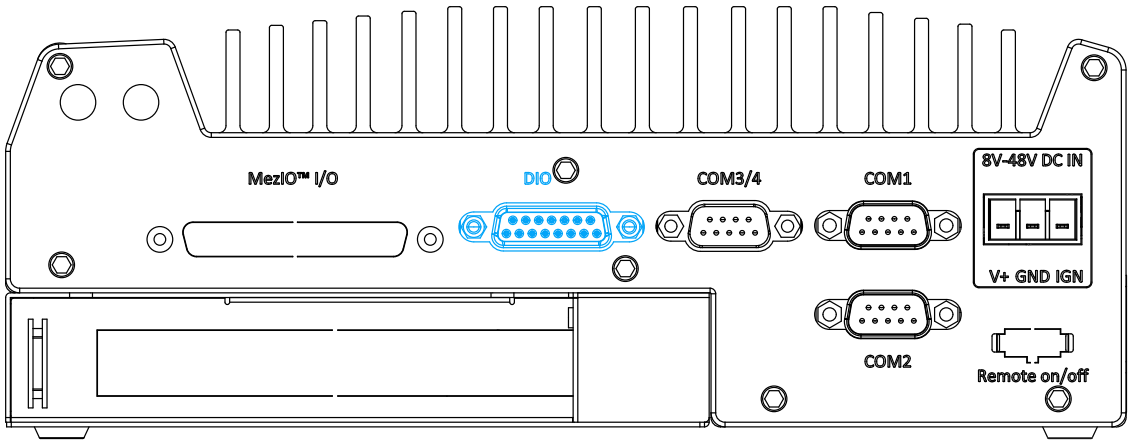
2.3 Rear Panel I/O



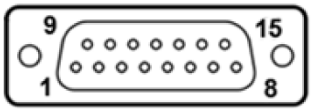
The Nuvo-11000 rear panel features MezIO® port, four (4) COM ports, 3-pin terminal and remote on/ off control. The Cassette module can be located at the bottom of the enclosure. The connectors of the installed PCI or PCIe card within the Cassette module can be accessed from this side of the panel.

No.	Item	Description
1	MezIO® I/O	Reserved for MezIO® I/O connector. Connector may vary depending on your choice of MezIO® module.
2	Digital input/ output	Isolated 4 channel digital input and output.
3	COM ports 1-4	The four COM ports offer communication with external devices.
4	3-pin terminal block (DC/ ignition input)	Compatible with DC power input from 8-48V, the terminal block is also used for ignition signal input.
5	10-pin wafer connector	The connector is used for remote on/off control and status LED output. Please also refer to its onboard pin definition.
Area in green	Cassette module	The cassette module offers a separate compartment to manage thermal conditions and reduce installation complications of an add-on card.

2.3.1 Digital Input/ Output



The digital input (DI) and digital output (DO) function provides four digital input and four digital output on the rear panel of the system via DB15 female connector.

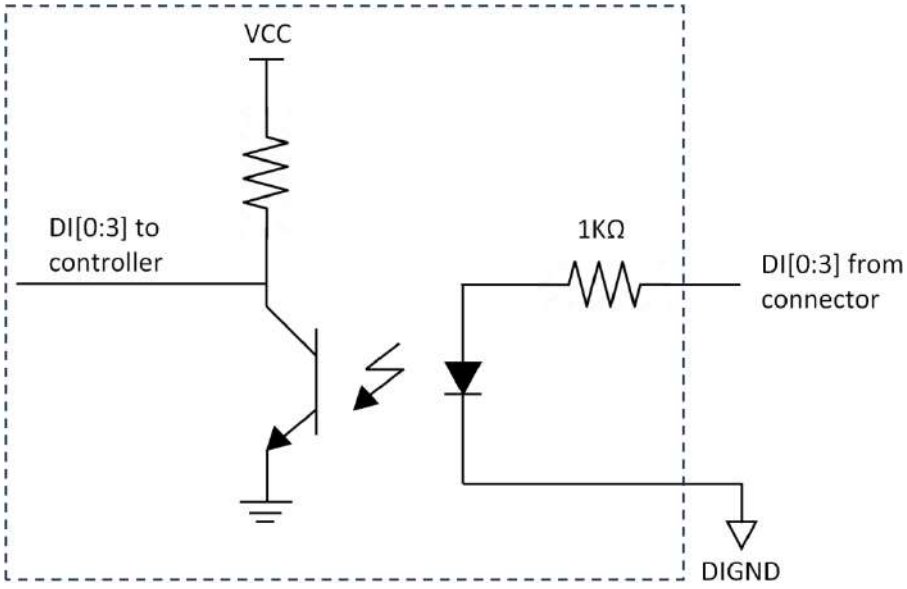


Pin Definition

Pin#	Pin Definition	Pin#	Pin Definition
1	VDD	9	ISO_DO0_CN
2	ISO_DO1_CN	10	DO0_COM
3	DO1_COM	11	ISO_DO2_CN
4	ISO_DO3_CN	12	DO2_COM
5	DO3_COM	13	ISO_DI0_CN
6	ISO_DI1_CN	14	DI_GND
7	DI_GND	15	ISO_DI2_CN
8	ISO_DI3_CN		

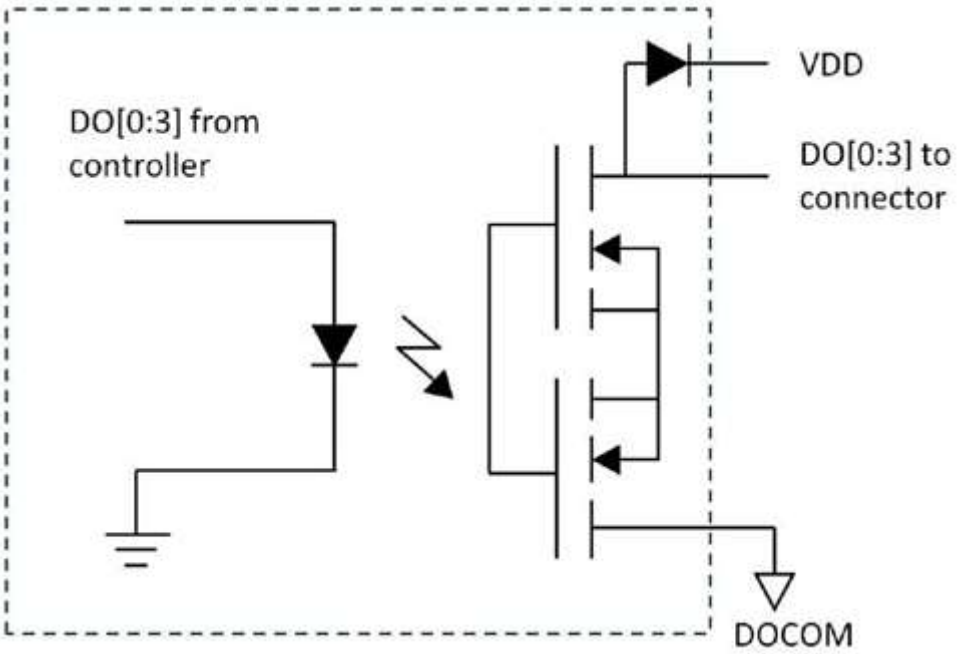
Digital Input Wiring

Channel	4
Type	Sink mode
Interface	Unipolar Photocoupler
Isolation Voltage	2500Vrms
Rated Input Voltage	0V-24V
Logic High Voltage	5V-24V
Logic Low Voltage	0V-1.5V
Operation Mode	Polling
Response Time (Rise)	3us
Response Time (Fall)	3us

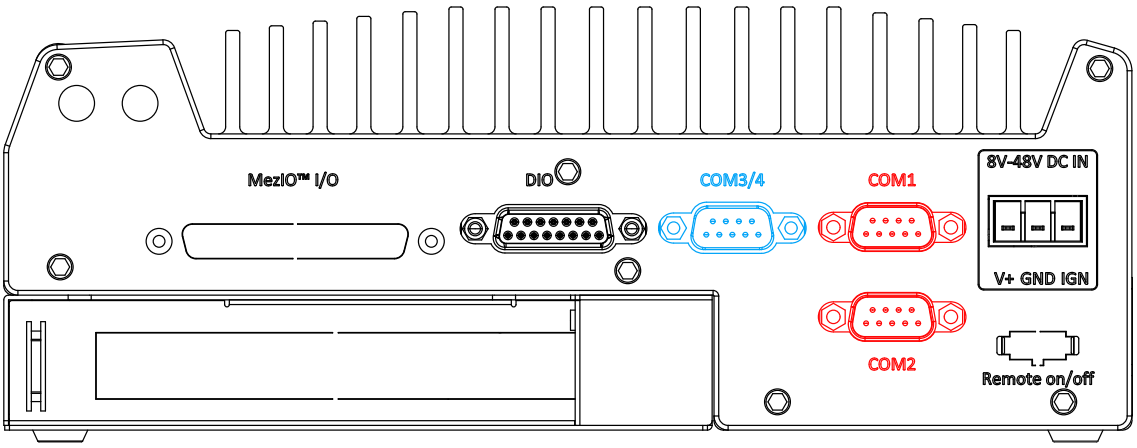


Digital Output Wiring

Channel	4
Type	Sink mode
Interface	Bidirectional PhotoMOS
Isolation Voltage	1500V AC
Operation Voltage	0V-24V
Driving Current	250mA
Operation Mode	Polling
Response Time (Turn on)	660us ~ 2ms
Response Time (Turn off)	90us ~ 210us



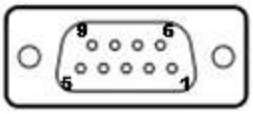
2.3.2 COM Ports



The system provides three physical COM ports for communicating with external devices. These COM ports are implemented using industrial-grade ITE8786 Super IO chip (-40 to 85°C) and provide up to 115200 bps baud rate.

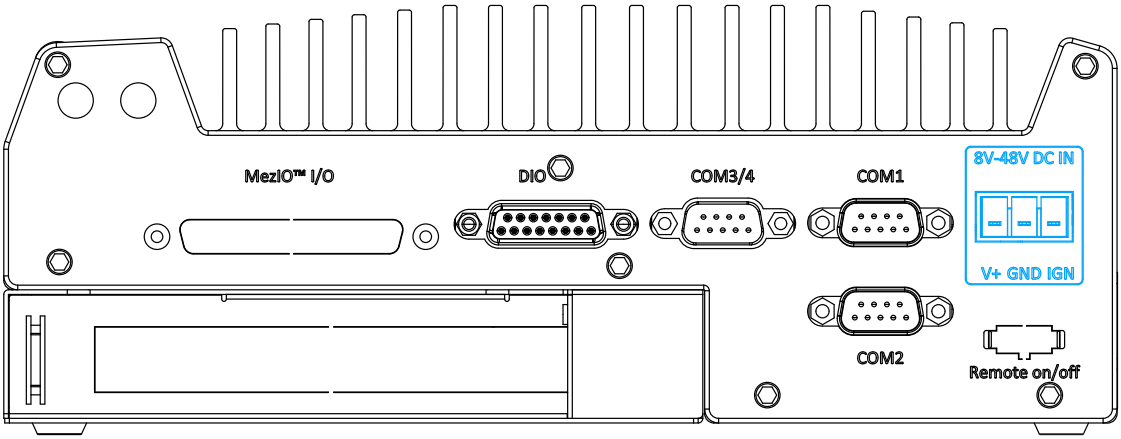
COM1 and COM2 (in **red**) are software-configurable RS-232/ 422/ 485 ports. COM3 and COM4 (in **blue**) are standard RS-232 ports. The operation modes of the ports can be set in BIOS setup utility. The following table describes the pin definition of COM ports.

COM Port Pin Definition



	COM1 & COM2			COM3 & COM4
Pin#	**RS-232 Mode**	**RS-422 Mode**	**RS-485 Mode (Two-wire 485)**	**RS-232 Mode**
1	DCD			
2	RX	422 TXD+	485 TXD+/RXD+	COM3_RX
3	TX	422 RXD+		COM3_TX
4	DTR	422 RXD-		COM4_TX
5	GND	GND	GND	GND
6	DSR			COM4_RX
7	RTS			
8	CTS	422 TXD-	485 TXD-/RXD-	
9	RI			

2.3.3 3-Pin Terminal Block for DC and Ignition Input

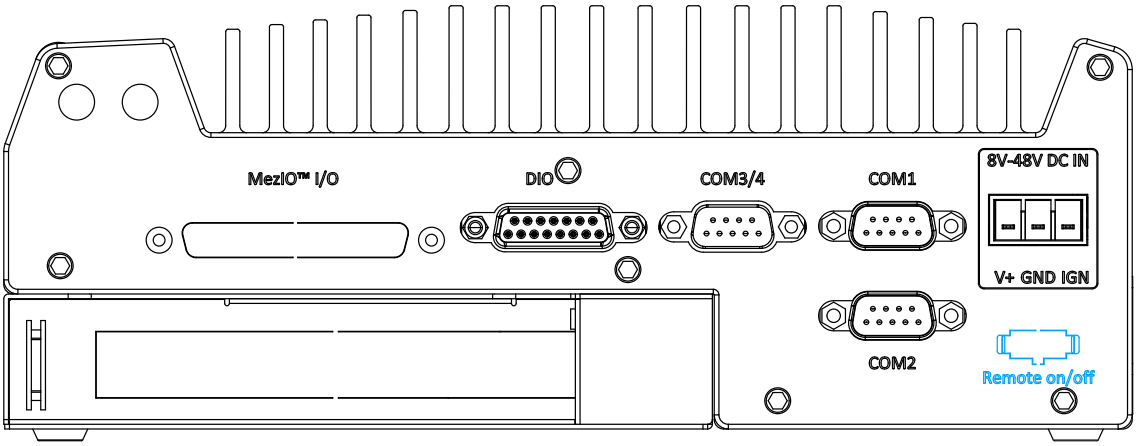


The system accepts a wide range of DC power input from 8 to 48V via a 3-pin pluggable terminal block, which is fit for field usage where DC power is usually provided. The screw clamping mechanism on the terminal block offers connection reliability when wiring DC power. In addition to DC power input, this terminal block can also accept ignition signal input (IGN) when ignition control module (eg. MezIO-V20) is installed for in-vehicle applications.

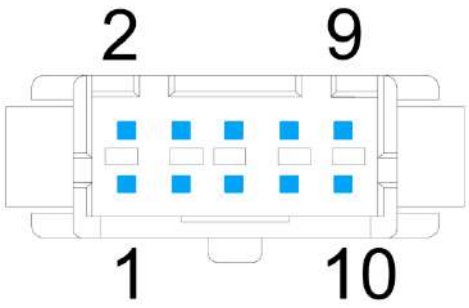
WARNING

Please make sure the voltage of DC power is correct before you connect it to the system. Supplying a voltage over 48V will damage the system.

2.3.4 ON/ Off Control & Status Output (Optional)



On/Off Status Control Pin Definition



I/O panel pins

Pin#	Definition	Description
1	WDT_LED-	[Output] Watchdog timer indicator, flashing when Watchdog timer is active
2	WDT_LED+	
3	UID_LED-	[Output] User defined LED, reserved for future usage
4	UID_LED+	
5	HDD-	[Output] Hard drive indicator, flashing when SATA hard drive is active.
6	HDD+	
7	Power_LED-	[Output] System power indicator, on if system is turned on, off if system is turned off.
8	Power_LED+	
9	Ctrl-	[Input] Remote on/off control, connects to an external switch to turn on/off the system (polarity is negligible).
10	Ctrl+	

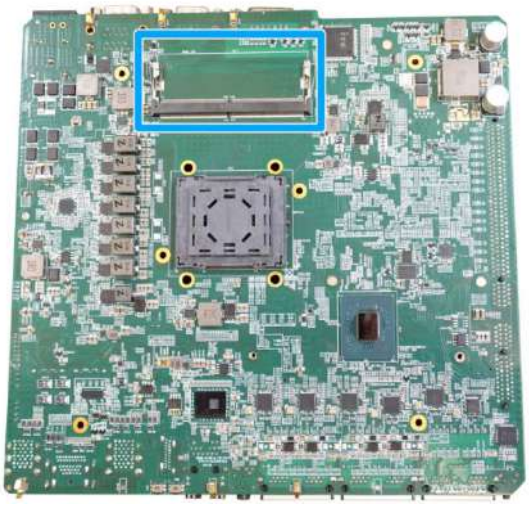
NOTE

Please make sure the polarity is correct when you connect the external LED indicator to the Status LED Output.

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 remote on/off control, LED status output, internal USB 2.0 ports, etc. In this section, we'll illustrate these internal I/O functions.

2.4.1 Dual SODIMM DRAM Slot



Memory slot on CPU socket side

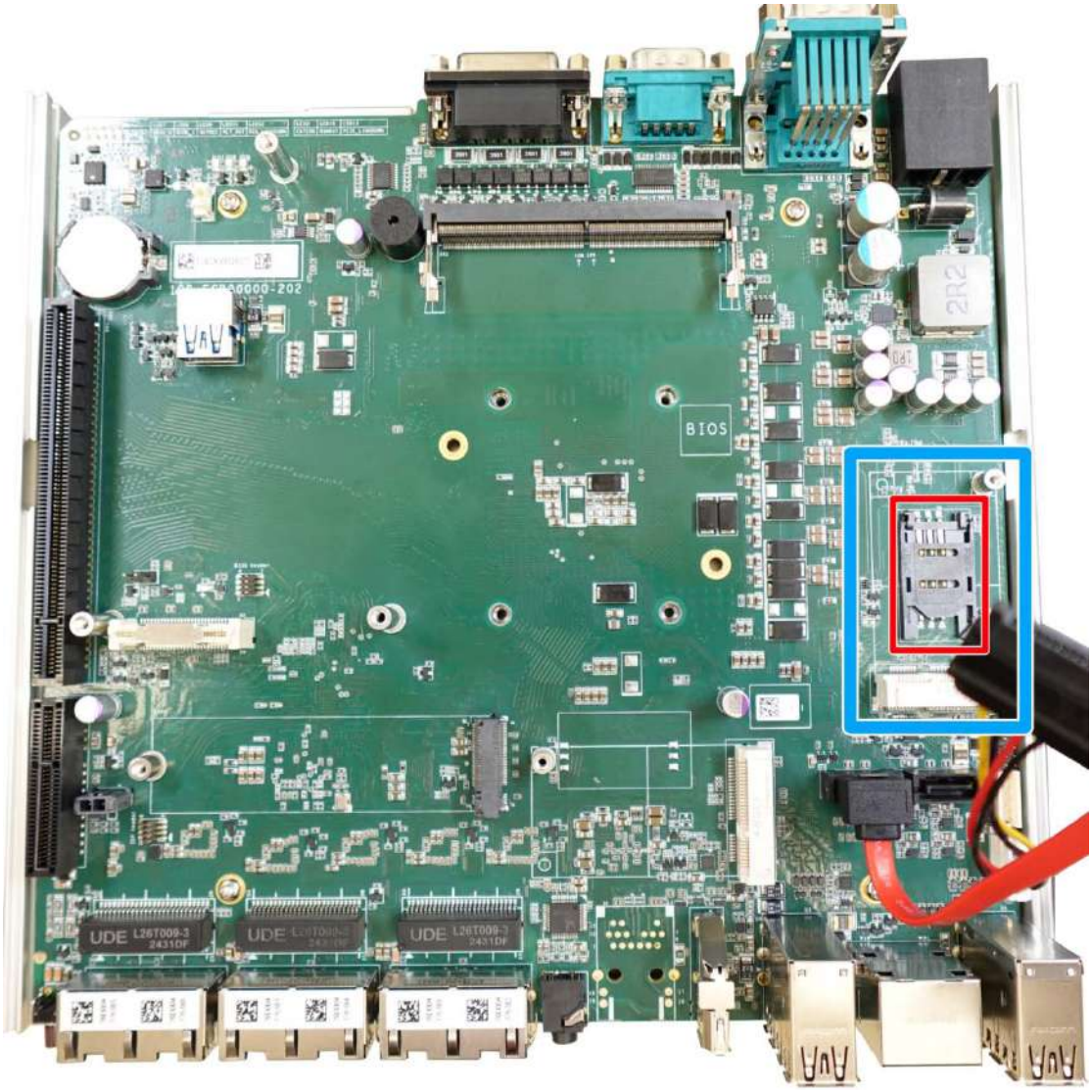
Memory slot on expansion socket side

The system motherboard supports two DDR5 6400 SODIMMs memory module up to 128GB. Each slot supports single module SODIMM up to 64GB capacity.

NOTE

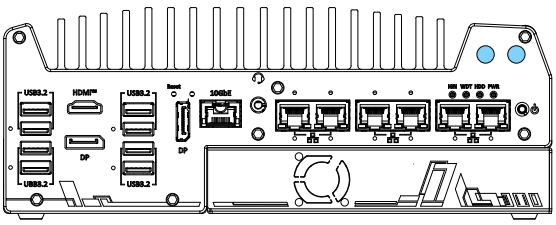
When changes are made to DRAM module(s), such as additionally install or remove and reinstall (into the same/ different slot), it will result in approximately a 30 to 60 seconds delay when booting up for the first time after such change(s).

2.4.2 mini-PCIe Socket w/ SIM slot & Pin Definition

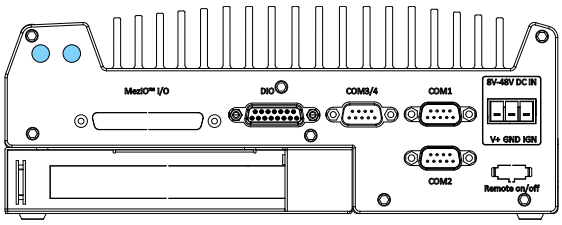


The system provides a mini-PCIe socket (indicated in **blue**) that is designed with SIM card (slot indicated in **red**) support. With a SIM card installed, your system can access the internet via your network provider's wireless network.

For wireless communication, multiple SMA antenna apertures can be located on the front and rear panel.

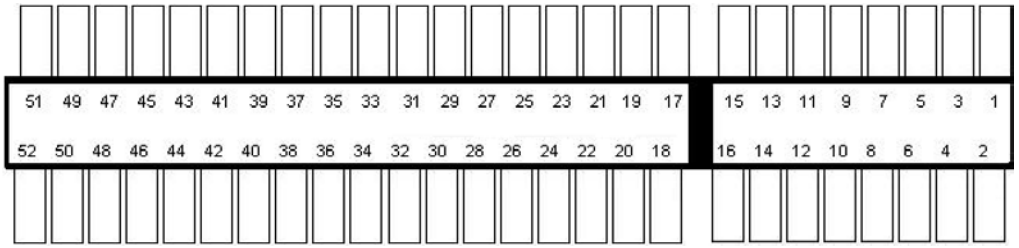


Front panel antennae opening



Rear panel antennae opening

mini-PCIe socket definition



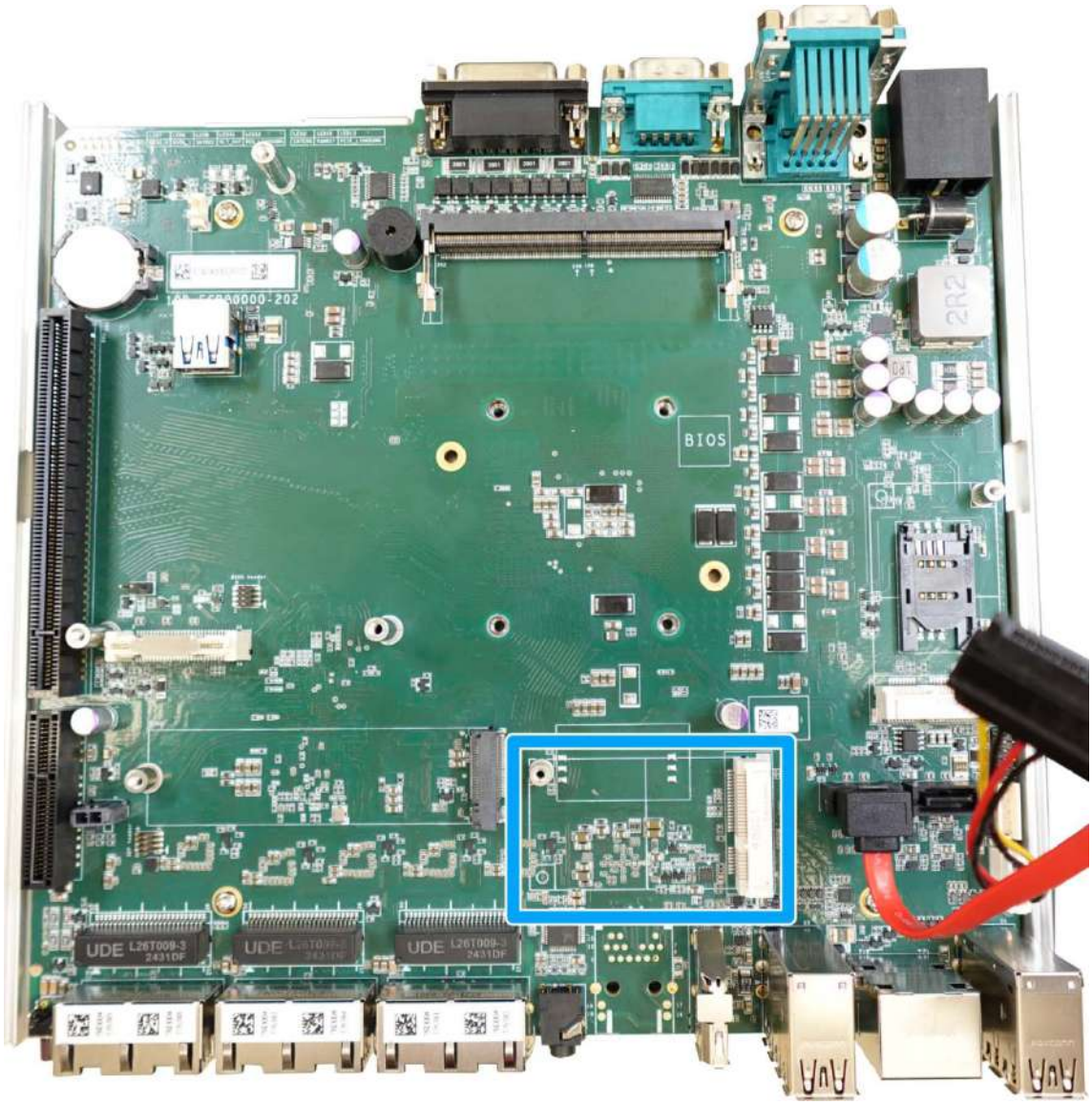
Pin	Signal (mPCIe)	Pin #	Signal (mPCIe)
1	WAKE#	2	+3.3Vaux
3	-	4	GND
5	-	6	+1.5V
7	CLKREQ#	8	UIM_PWR
9	GND	10	UIM_DATA
11	REFCLK-	12	UIM_CLK
13	REFCLK+	14	UIM_RESET
15	GND	16	UIM_VPP
Mechanical Key			
17	Reserved* (UIM_C8)	18	GND
19	Reserved* (UIM_C4)	20	W_DISABLE#
21	GND	22	PERST#
23	PERn0	24	3.3V
25	PERp0	26	GND
27	GND	28	+1.5V
29	GND	30	SMB_CLK
31	PETn0	32	SMB_DATA
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	Reserved	46	-
47	Reserved	48	+1.5V
49	Reserved	50	GND
51	Reserved	52	3.3V

WARNING

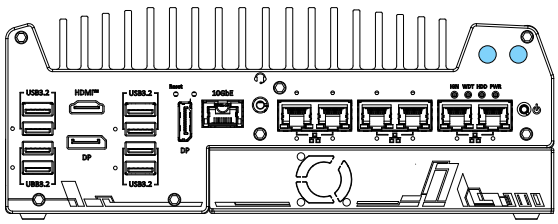
Some off-the-shelf mini-PCIe 5G/4G modules are not compliant to standard mini-PCIe interface. They use 1.8V I/O signals instead of standard 3.3V I/O and may cause signal conflict. Please consult with Neousys for compatibility when in doubt! Installing an incompatible 4G module may damage the system or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

2.4.3 mini-PCIe w/o SIM slot

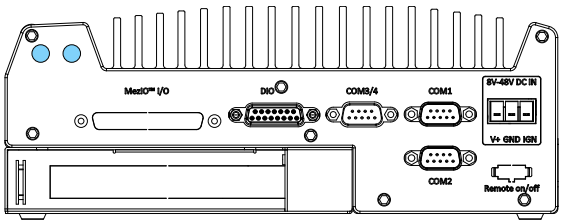
The system provides a mini-PCIe socket (indicated in **blue**) without the support for a SIM card. With this module installed, it can access wireless WiFi networks.



For wireless communication, multiple SMA antenna apertures can be located on the front and rear panel.



Front panel antennae opening

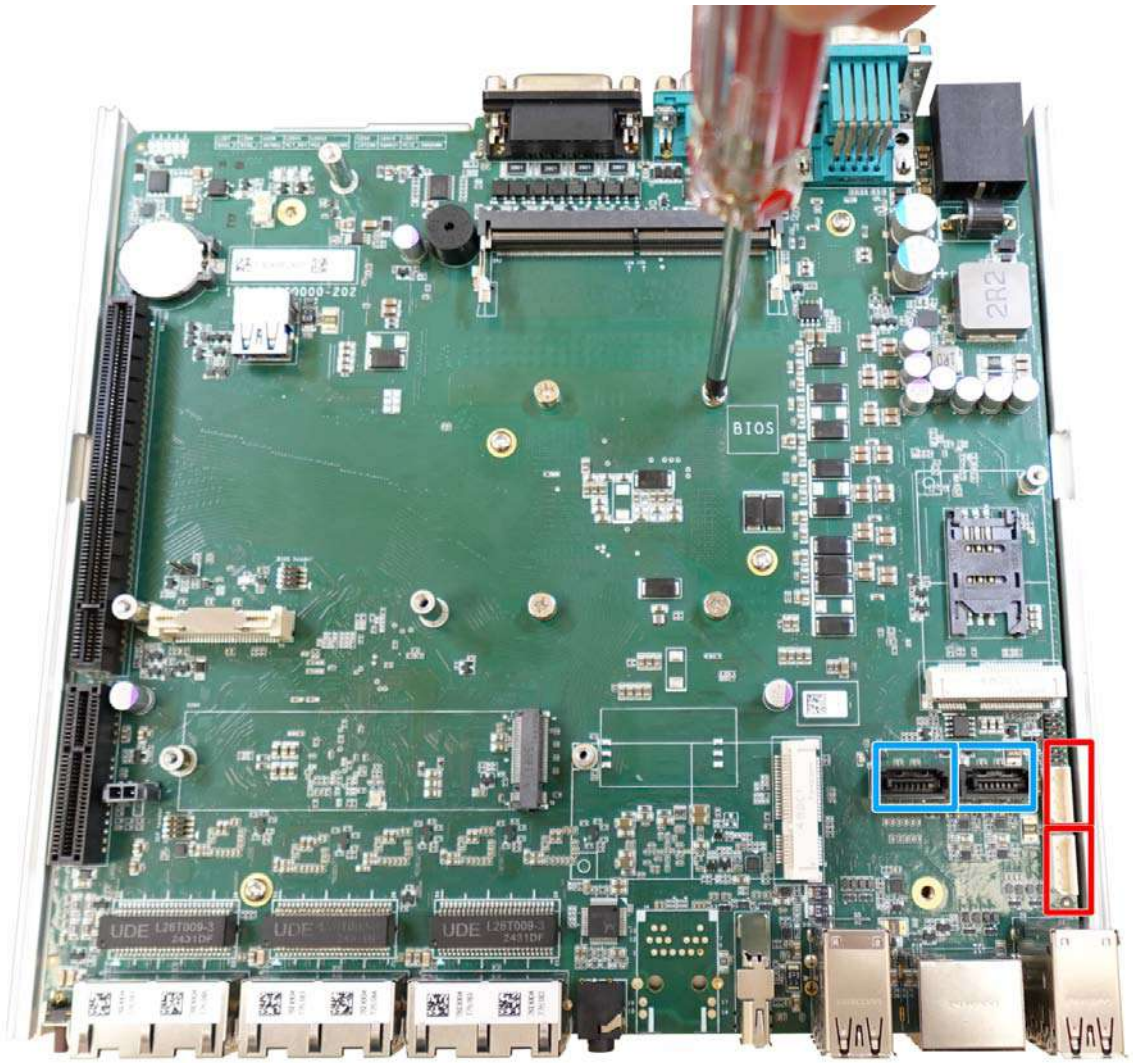


Rear panel antennae opening

mini-PCIe socket definition

Pin	Signal (mPCIe)	Pin #	Signal (mPCIe)
1	WAKE#	2	+3.3Vaux
3	-	4	GND
5	-	6	+1.5V
7	CLKREQ#	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	SMB_CLK
31	PETn0	32	SMB_DATA
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	Reserved	46	-
47	Reserved	48	+1.5V
49	Reserved	50	GND
51	Reserved	52	3.3V

2.4.4 SATA Ports



The system has two SATA ports which support Gen3, 6 Gb/s SATA signals. Each SATA port (indicated in **blue**) features a 7-pin SATA connector.

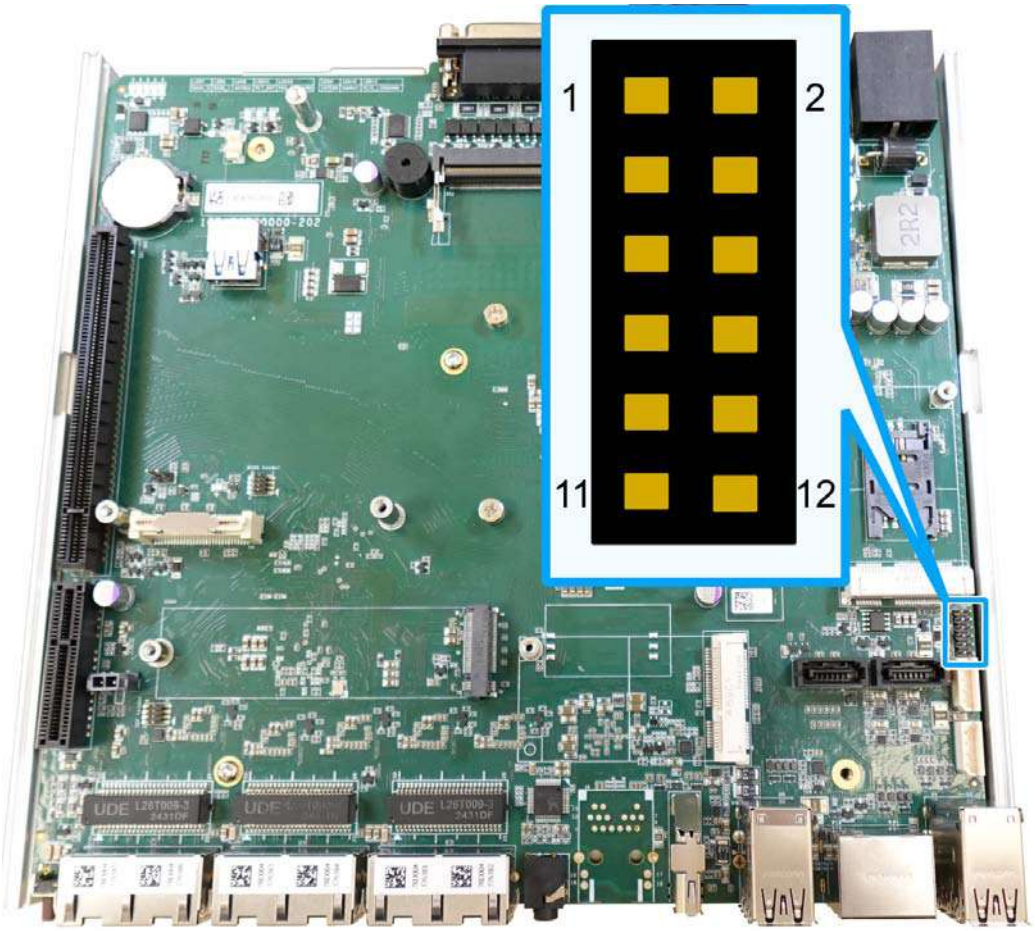
The two power connectors (indicated in **red**) can accommodate a 2.5” HDD/ SSD each in the internal HDD bracket. Standard 22-pin SATA connectors are provided with the system. You may refer to the SATA Configuration section for SATA settings.

NOTE

The 2.5” hot swappable tray in Nuvo-11000LP supports an HDD/ SSD up to 7mm thickness.

2.4.5 On/ Off Ctrl & Status Output (Optional)

An optional cable is available to connect the output pins to the I/O panel of the system. For an application where the system is placed inside a cabinet, it is useful to connect the system status LED to an external indicator. The system provides a 2x6, 2.0mm pitch pin header on the motherboard to indicate output system status such as power, HDD, watchdog timer, control system on/off remotely, etc. The status LED output has a built-in series-resistor and provides 10mA current to directly drive the external LED indicators. System on/off control is also provided so you can use an external non-latched switch to turn on/off the system exactly the same as the power button on the front panel.



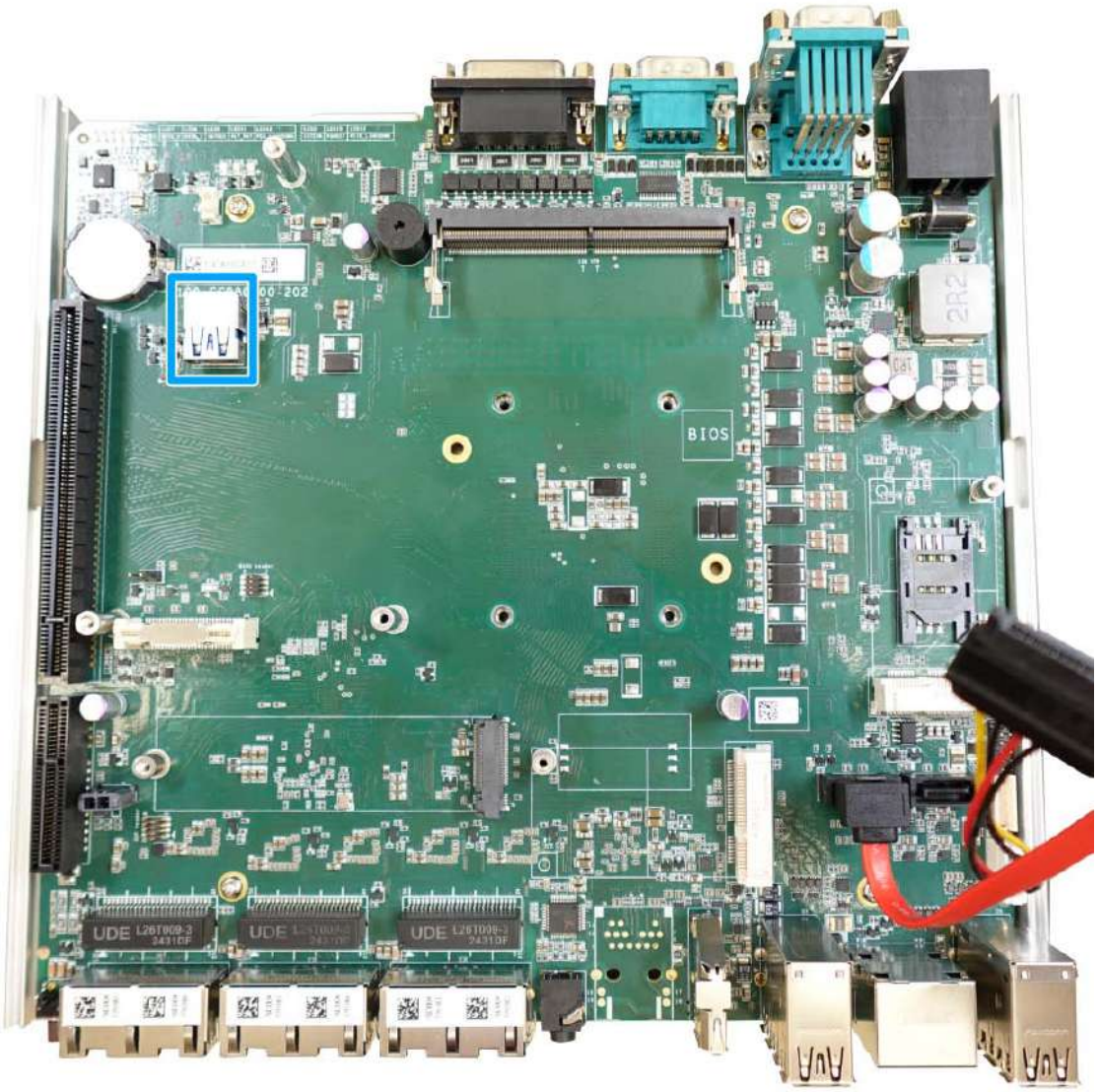
Pin#	Definition	Description
1	WDT_LED-	[Output] Watchdog timer indicator, flashing when Watchdog timer is active
2	WDT_LED+	
3	Standby Power-	[Output] Standby power indicator, on if DC power is applied and system is in S5 (standby) mode.
4	Standby Power+	
5	HDD-	[Output] Hard drive indicator, flashing when SATA hard drive is active.
6	HDD+	
7	Power-	[Output] System power indicator, on if system is turned on,

8	Power+	off if system is turned off.
9	Ctrl-	[Input] Remote on/off control, connects to an external switch to turn on/off the system (polarity is negligible).
10	Ctrl+	
11	IGN_LED-	[Output] Ignition control indicator, on if ignition control is on, off if ignition control is off.
12	IGN_LED+	

2.4.6 Internal USB 2.0 Port

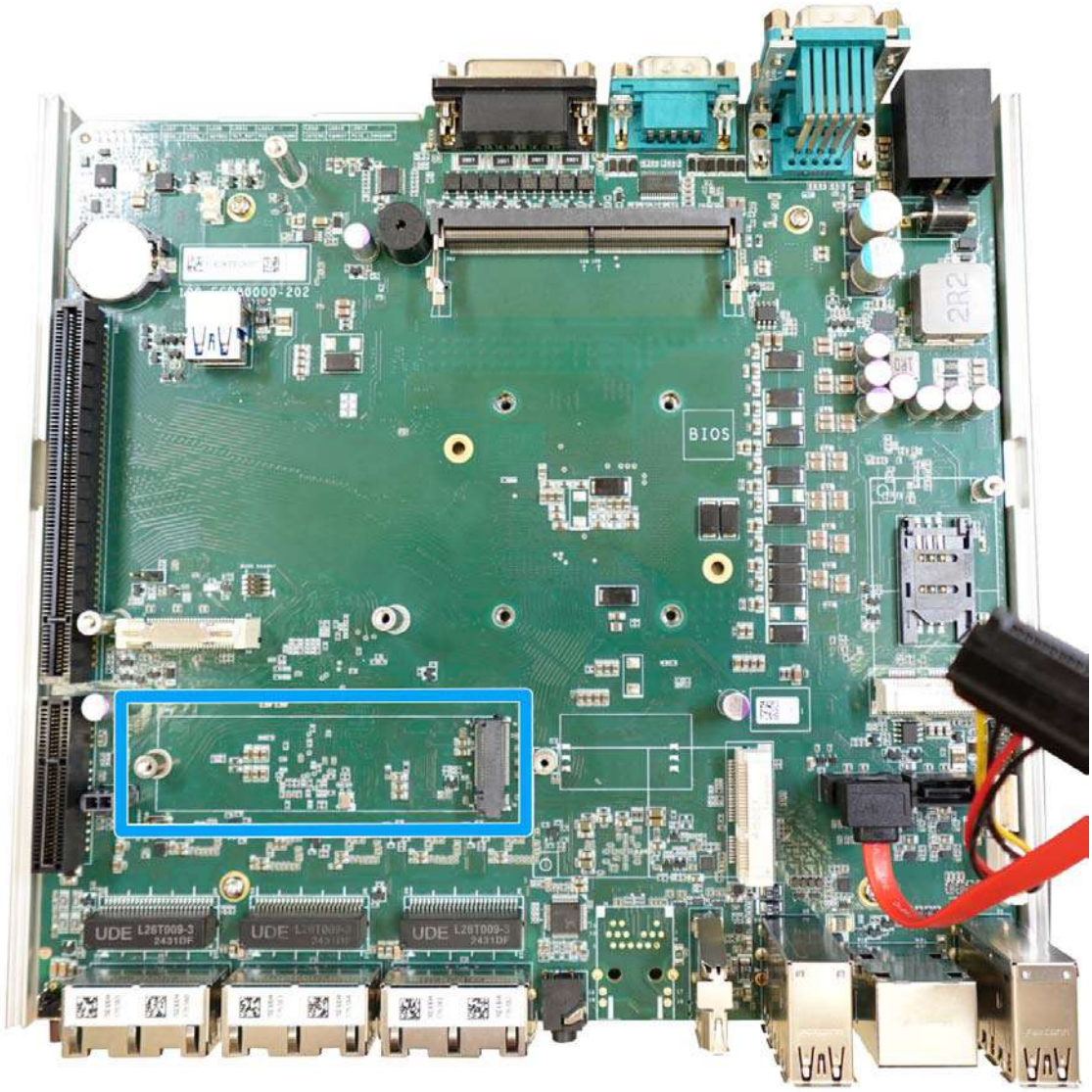
NOTE

Not applicable to Nuvo-11002E series systems.



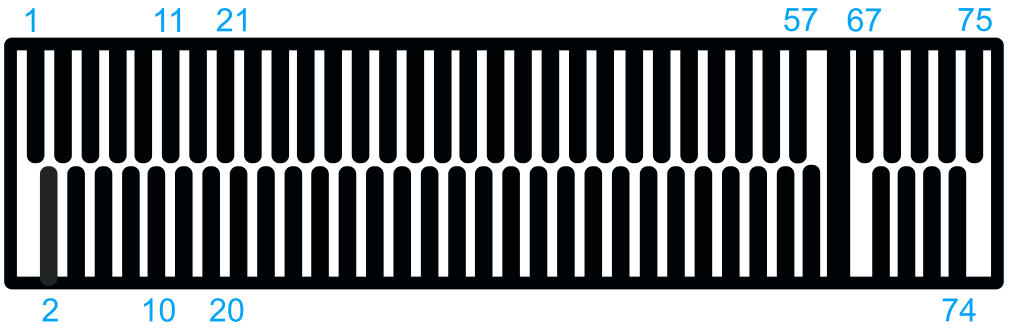
The system's motherboard has an internal USB2.0 port on the PCBA. You can utilize this USB port to connect a USB protection dongle inside the chassis of the system.

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



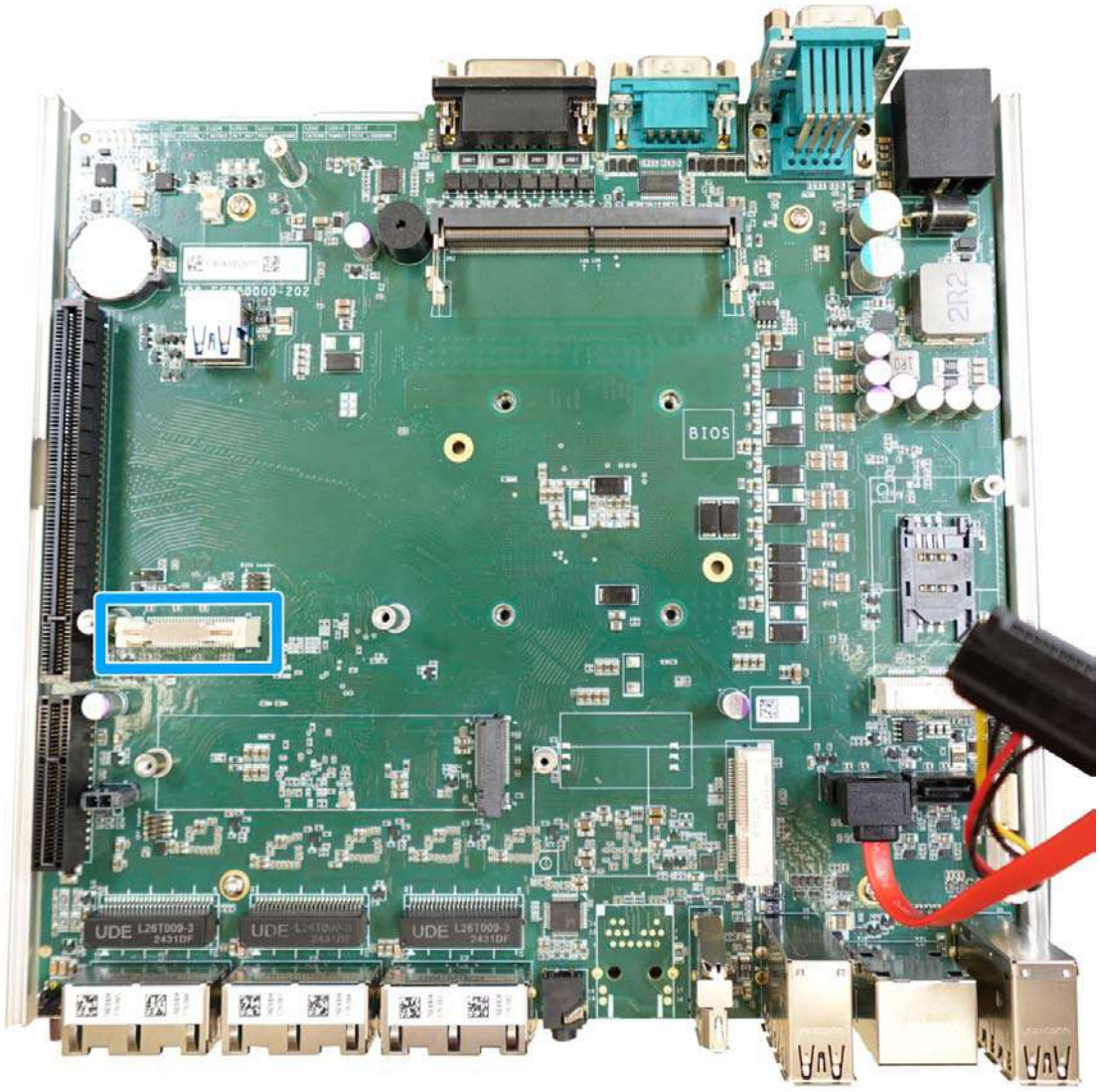
The system has a Gen5 x4 PCIe M.2 2280 slot for you to install an NVMe SSD. The M.2 NVMe SSD offers significantly better system performances when compared to a 2.5” SSD.

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**	SUSCLK
69	PEDET	**70**	+3V3
71	GND	**72**	+3V3
73	GND	**74**	+3V3
75	GND		

2.4.8 MezIO™ Interface & Pin Definition

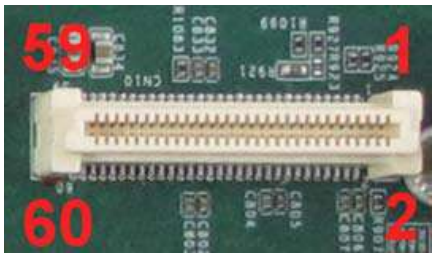


MezIO™ is an innovative interface designed for integrating application-oriented I/O functions into an embedded system. It offers computer signals, power rails and control signals via a high-speed connector. MezIO™ is also mechanically reliable benefited from its 3-point mounted mezzanine structure. A MezIO™ module can leverage these signals to implement comprehensive I/O functions.

The system incorporates MezIO™ interface and universal mechanical design to accommodate Neousys' standard MezIO™ modules. For customers who want to develop their own MezIO™ module, Neousys provides MezIO™ design documents on a NDA basis. Please contact Neousys for further information.

MezIO™ Interface Pin Definition

MezIO™ interface leverages FCI BergStak® board-to-board connector to provide interconnectivity of high-speed signals. The receptacle part on the PCBA is FCI 61082-063402LF while the plug part on the MezIO™ module is FCI 61083-064402LF. Please refer to the following table for signal definition of its 60-pin connector.



Function Description	Signal	Pin#	Pin#	Signal	Function Description
Reserved	Reserved	1	2	PCIE_TXP_0	PCIe data pair
Reserved	Reserved	3	4	PCIE_TXN_0	PCIe data pair
Reserved	Reserved	5	6	GND	Ground
Reserved	Reserved	7	8	PCIE_RXP_0	PCIe data pair
System S4 signal	SLP_S4#	9	10	PCIE_RXN_0	PCIe data pair
Ground	GND	11	12	CLK100_P_0	PCIe clock pair
Reserved	Reserved	13	14	CLK100_N_0	PCIe clock pair
Ground	GND	15	16	GND	Ground
Reserved	UID_LED	17	18	PCIE_TXP_1	PCIe data pair
Platform reset	PLT_RST#	19	20	PCIE_TXN_1	PCIe data pair
USB data pair	USBP5_N	21	22	PCIE_RXP_1	PCIe data pair
USB data pair	USBP5_P	23	24	PCIE_RXN_1	PCIe data pair
Ground	GND	25	26	GND	Ground
SMB bus	SMB_DATA	27	28	CLK100_P_1	PCIe clock pair
SMB bus	SMB_CLK	29	30	CLK100_N_1	PCIe clock pair
PCIe data pair	PCIE_TXP_3	31	32	GND	Ground
PCIe data pair	PCIE_TXN_3	33	34	PCIE_TXP_2	PCIe data pair
Ground	GND	35	36	PCIE_TXN_2	PCIe data pair
PCIe data pair	PCIE_RXP_3	37	38	GND	Ground
PCIe data pair	PCIE_RXN_3	39	40	PCIE_RXP_2	PCIe data pair
Power button	PWRBTN#	41	42	PCIE_RXN_2	PCIe data pair
Reserved	Reserved	43	44	RXD4	SIO COM4
PCH GPIO	GPIO_RISER3	45	46	TXD4	SIO COM4
PCH GPIO	GPIO_RISER2	47	48	RXD5	SIO COM5
PCH GPIO	GPIO_RISER1	49	50	TXD5	SIO COM5
Ground	GND	51	52	GND	Ground
3.3V power	P3V3	53	54	P1V8	1.8V power
3.3V power	P3V3	55	56	GND	Ground
5V power	P5V	57	58	P12V	12V power
5V power	P5V	59	60	P12V	12V power

3 System Installation

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

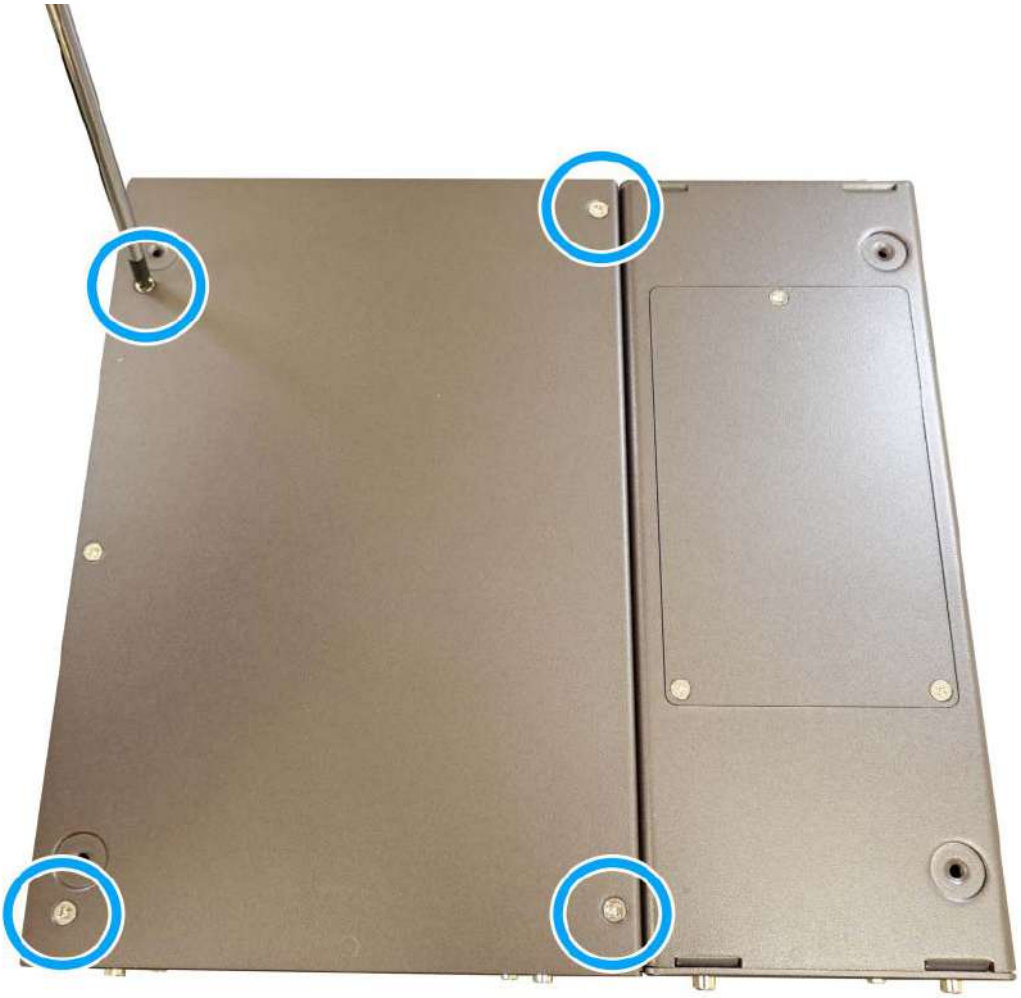
- It is recommended that only qualified service personnel should install and service this product to avoid injury or damage to the system.
- Please observe all ESD procedures at all times to avoid damaging the equipment.
- Before disassembling your system, please make sure the system has powered off, all cables and antenna (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, the system needs to be disassembled. To disassemble the system enclosure, you need to remove the Cassette module and screws on both I/O panels.

1. Turn the system upside-down and remove the four screws (indicated in **blue**) at the bottom of the Cassette module.

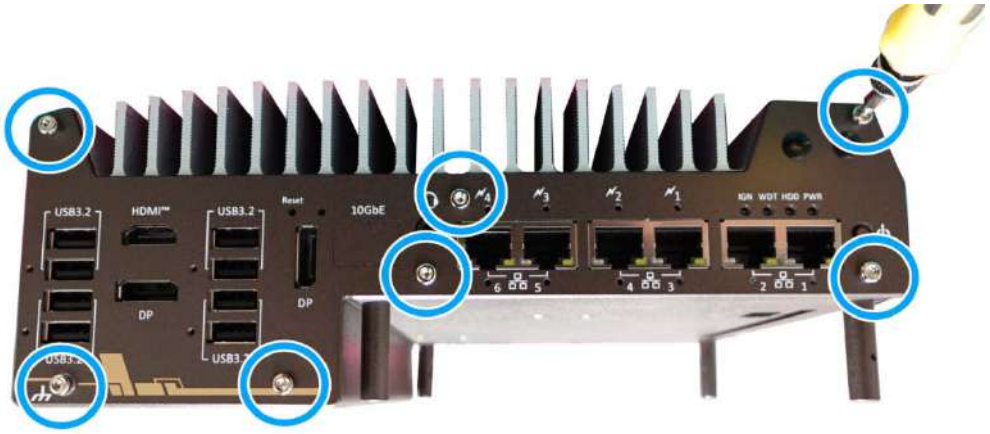
> **NOTE**
>
> *For Nuvo-11000E series systems only.*



2. Gently wiggle and separate the Cassette module from the system.

> **NOTE**
>
> *For Nuvo-11000Eseries systems only.*

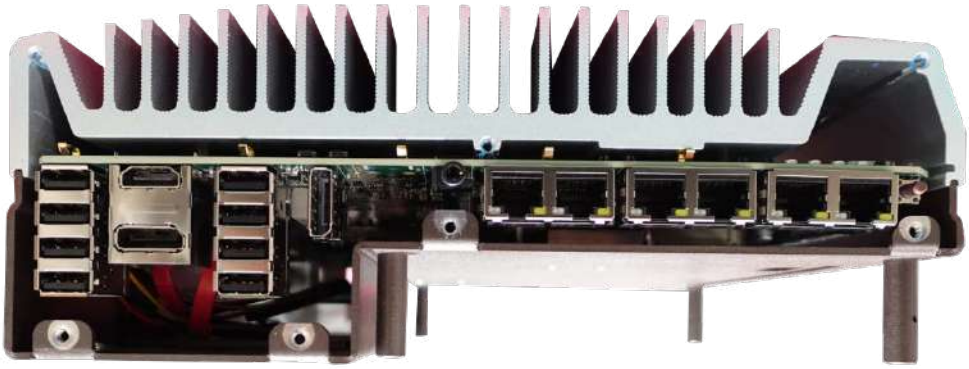
3. On the front I/O panel, remove the hexa-screws indicated below.



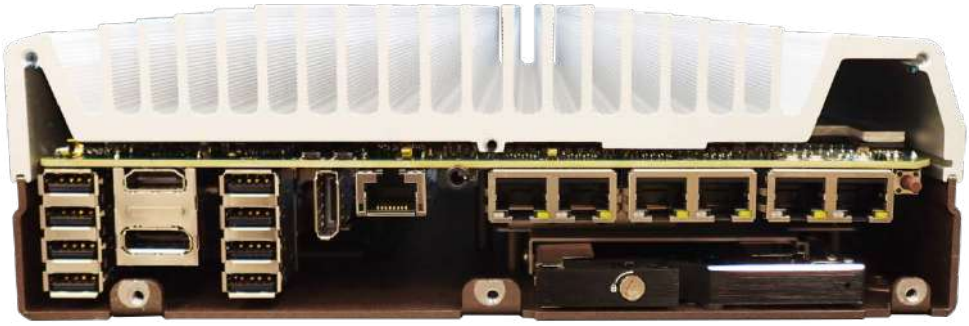
Nuvo-11000Esystems

Nuvo-1100LP systems

4. Remove the front I/O panel.

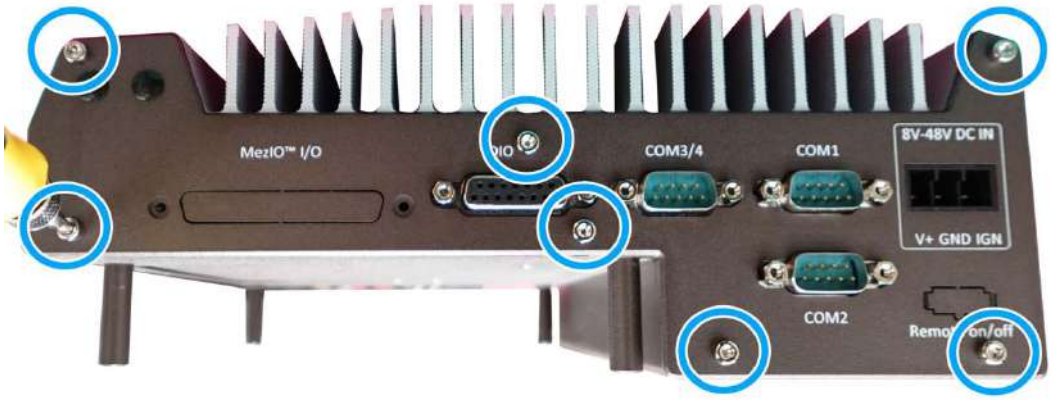


Nuvo-11000E series



Nuvo-11000LP

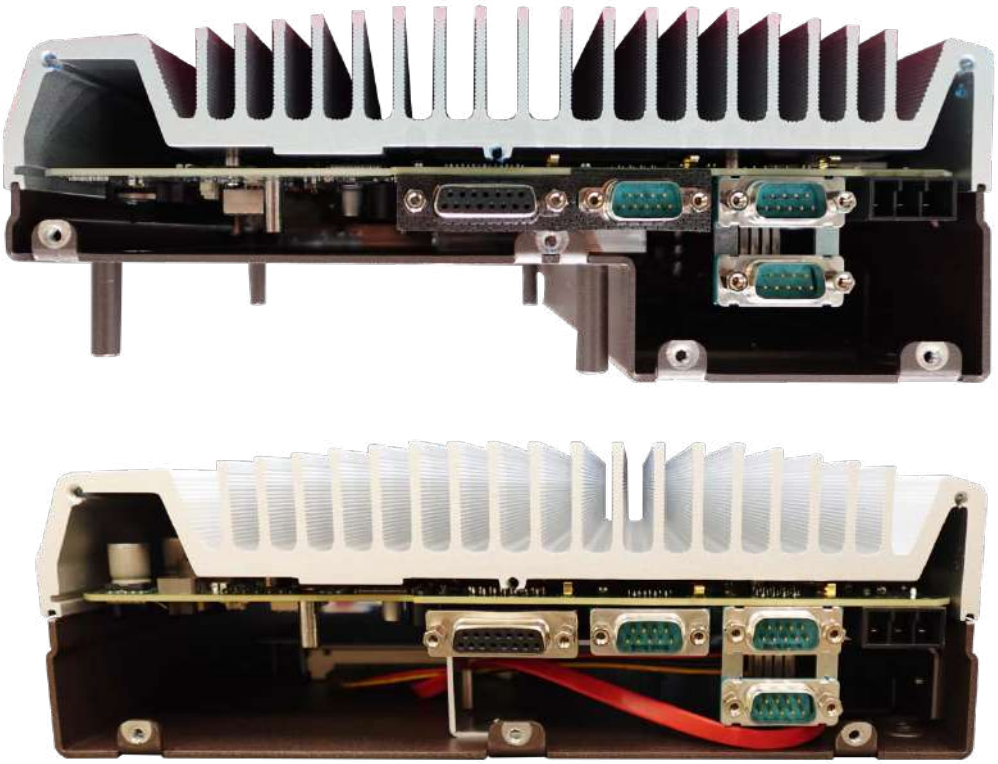
5. On the rear I/O panel, remove the hexa-screws indicated below.



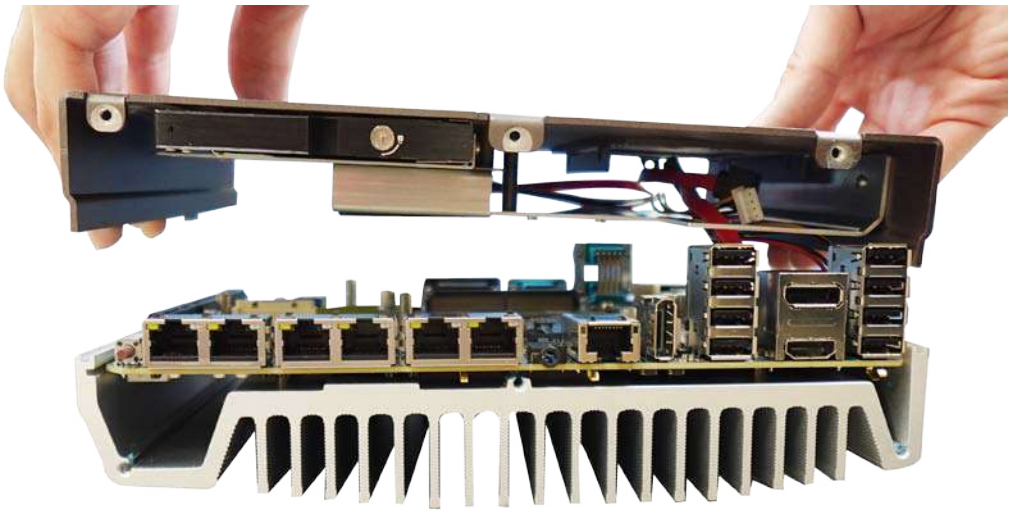
Nuvo-11000E systems

Nuvo-11000LP systems

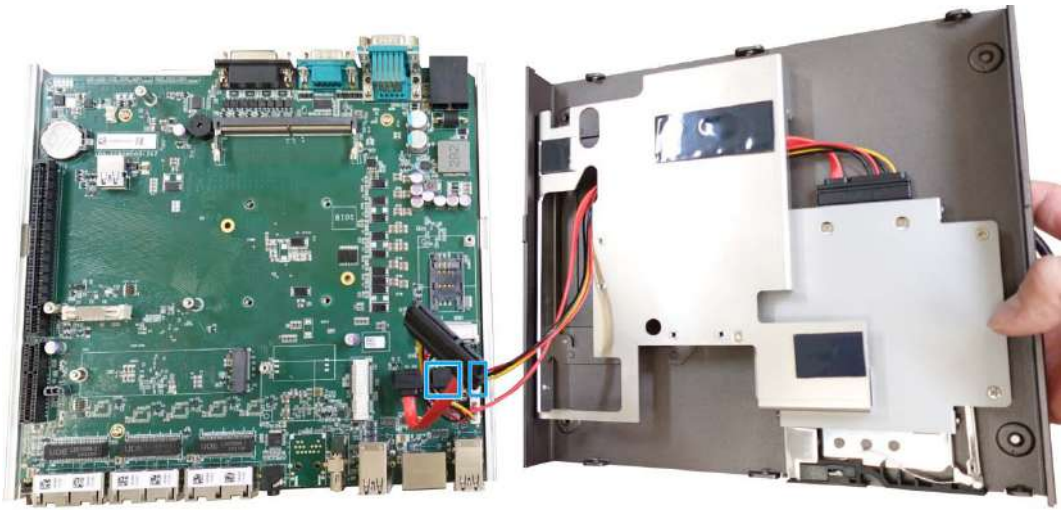
6. Remove the rear I/O panel.



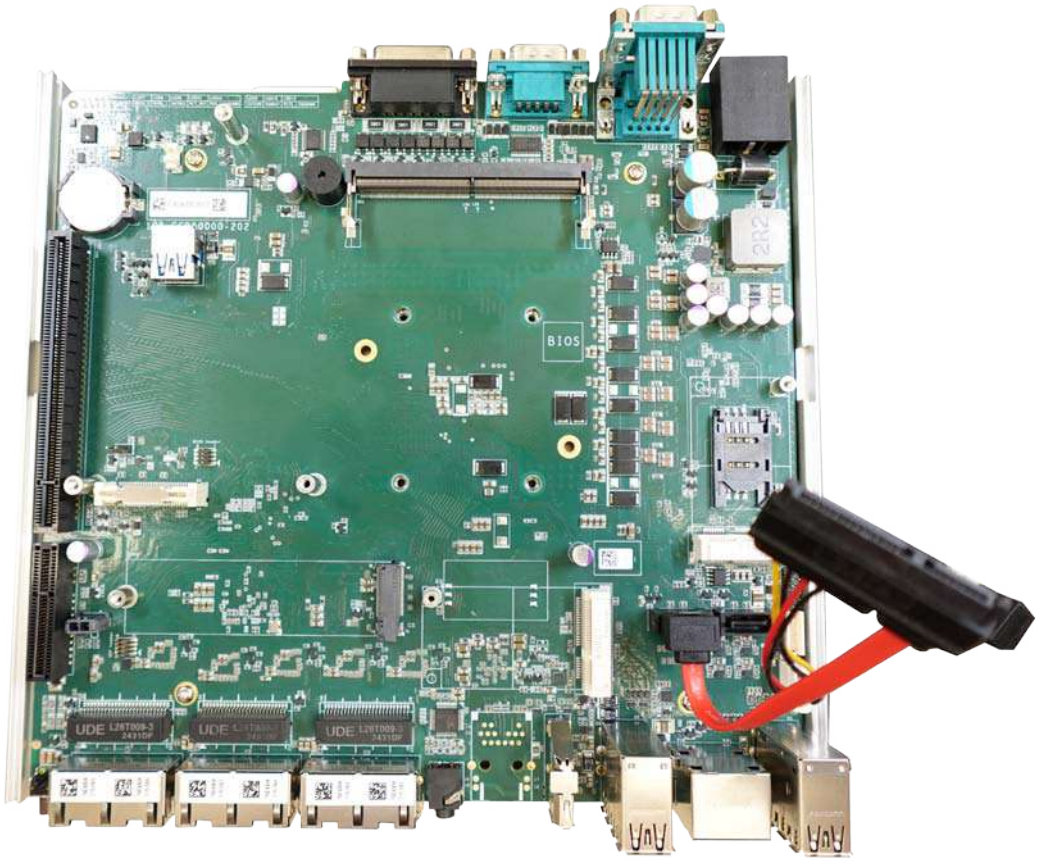
7. Gently lift the system's bottom panel. Nuvo-11000LP is used here for demonstration purposes.



8. Disconnect the SATA and power cable (indicated in **blue**) attached to motherboard.



9. Once the bottom panel has been removed, you should have access to the system's internal I/O interfaces.

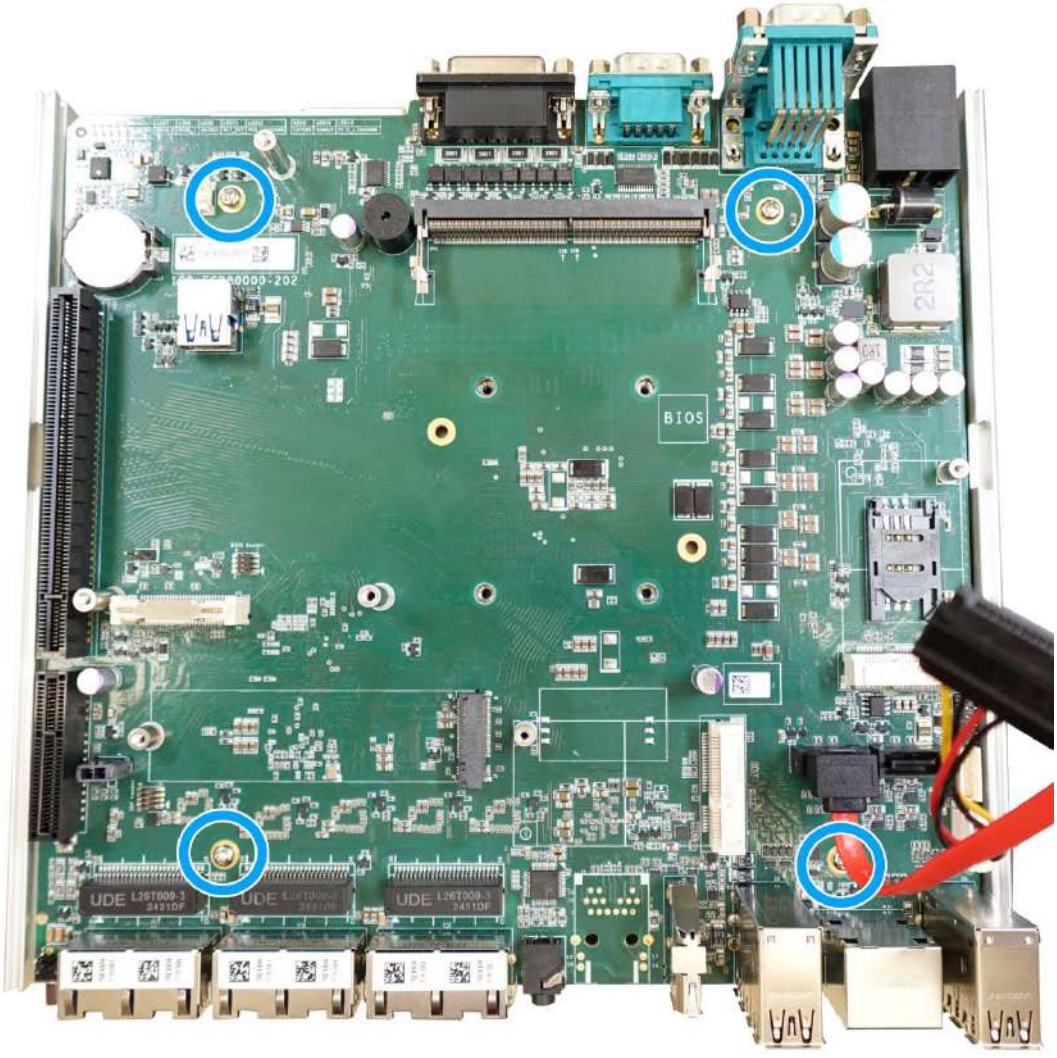


3.2 Installing Internal Components

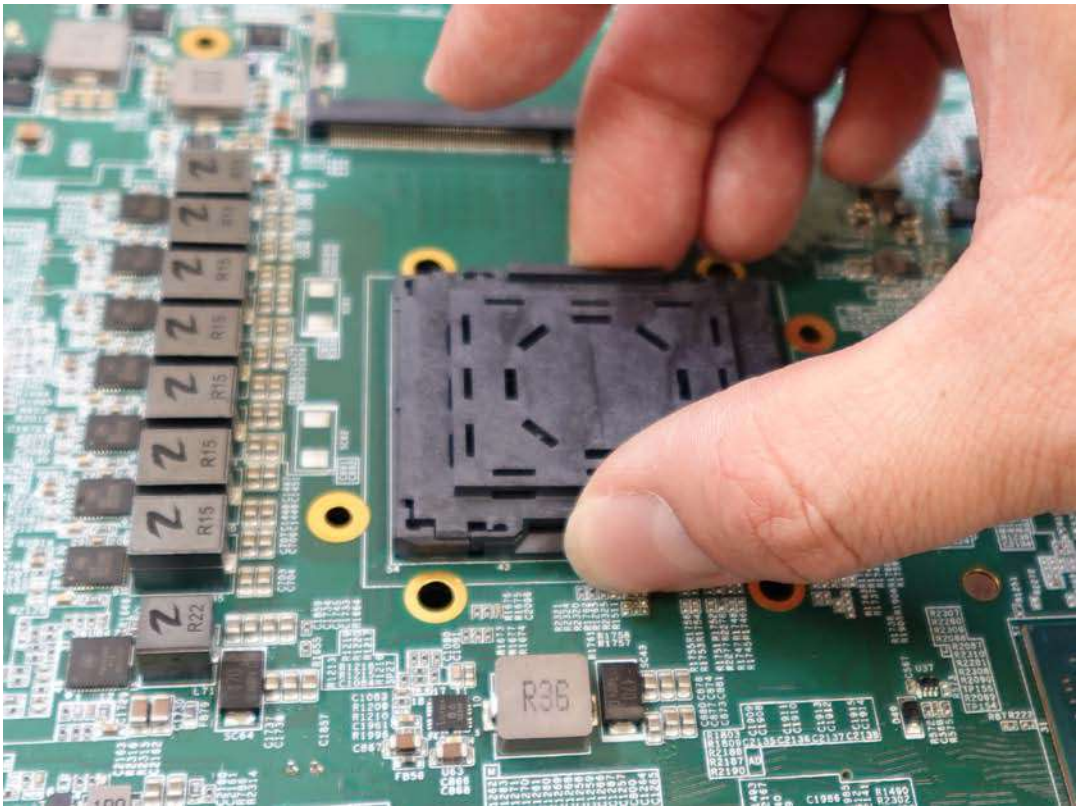
> NOTE
>
> *For demonstration purposes, Nuvo-11000E/ P will be used in most illustrations. A dedicated illustration will be shown if the component is significantly different.*

3.2.1 CPU Installation for Barebone System

1. Please refer to the section "Disassembling the System".
2. To install the CPU, you will need to separate the heatsink and the motherboard.
3. To do so, remove the four screws indicated below.



4. Gently separate the motherboard from the heatsink, you'll see the CPU socket protective cover, place finger tips underneath the sign "REMOVE" for leverage and gently lift the cover.



CPU protective cover

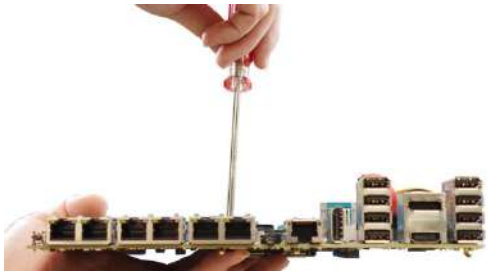
WARNING

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

5. Remove the CPU from its container/ tray. Lower the CPU into the socket matching the notches on the side (indicated by **blue arrows**).

6. Locate the CPU retention bracket (holder) from the accessory box. Place the retention bracket on the CPU and hold it in place. Make sure the indicator triangle engraved on the CPU's integrated heat spreader (HIS) and the triangle indicator on the retention bracket are positioned in the same corner (indicated by **blue circles**).

7. Turn the motherboard around while holding the CPU retention bracket in-place, and secure the bracket by tightening two M3 P-head screws on the other side of the motherboard.



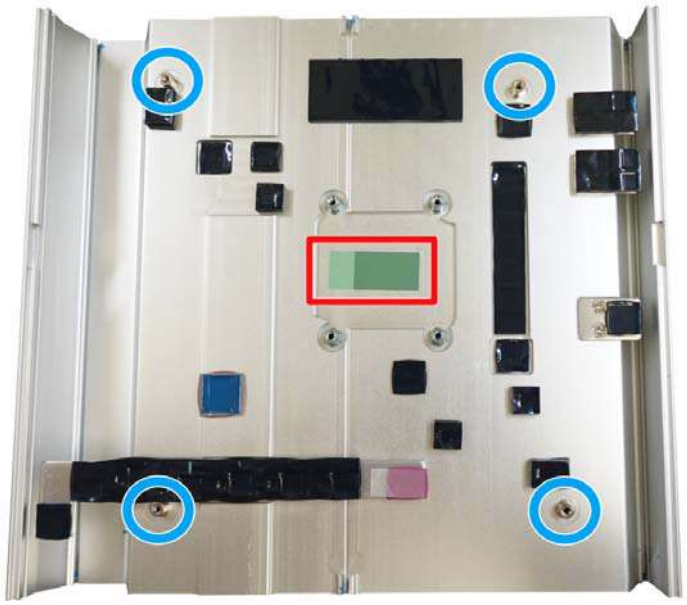
Hold CPU bracket firmly and turn the motherboard around

Secure two M3 P-head screws

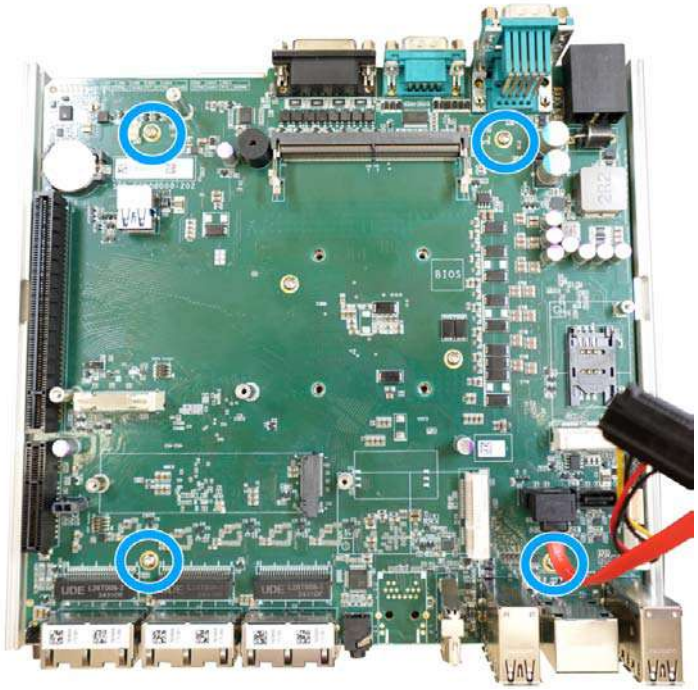
8. Remove all thermal pads' protective films on the heatsink.

9. With the four motherboard standoffs aligned, gently lower the motherboard onto the heatsink and secure the four screws. Please remember to remove the protective film (indicated in **red**) on the CPU's thermal pad as well.

> **NOTE**
>
> *If thermal pad(s) seem to be missing, please check if the thermal pad is on the motherboard component.*

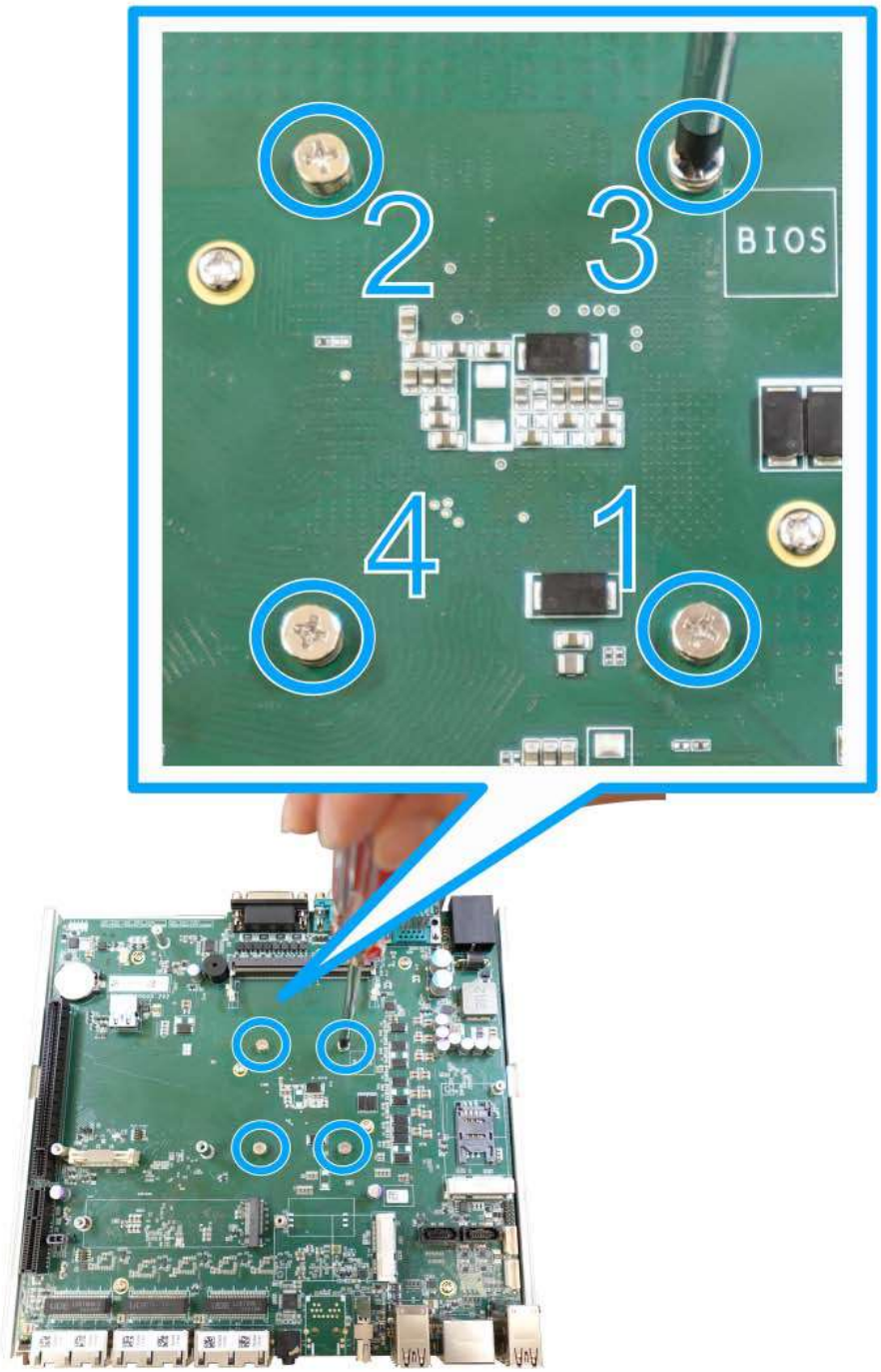


Four standoffs on the heatsink



Secure motherboard with four screws

10. Once the motherboard has been installed, you're ready to secure the four screws that help the heatsink apply pressure to the CPU/ chipset die. You'll want to apply even pressure to the corners by gradually tightening each screw. Please refer to the recommended order when tightening the screws.



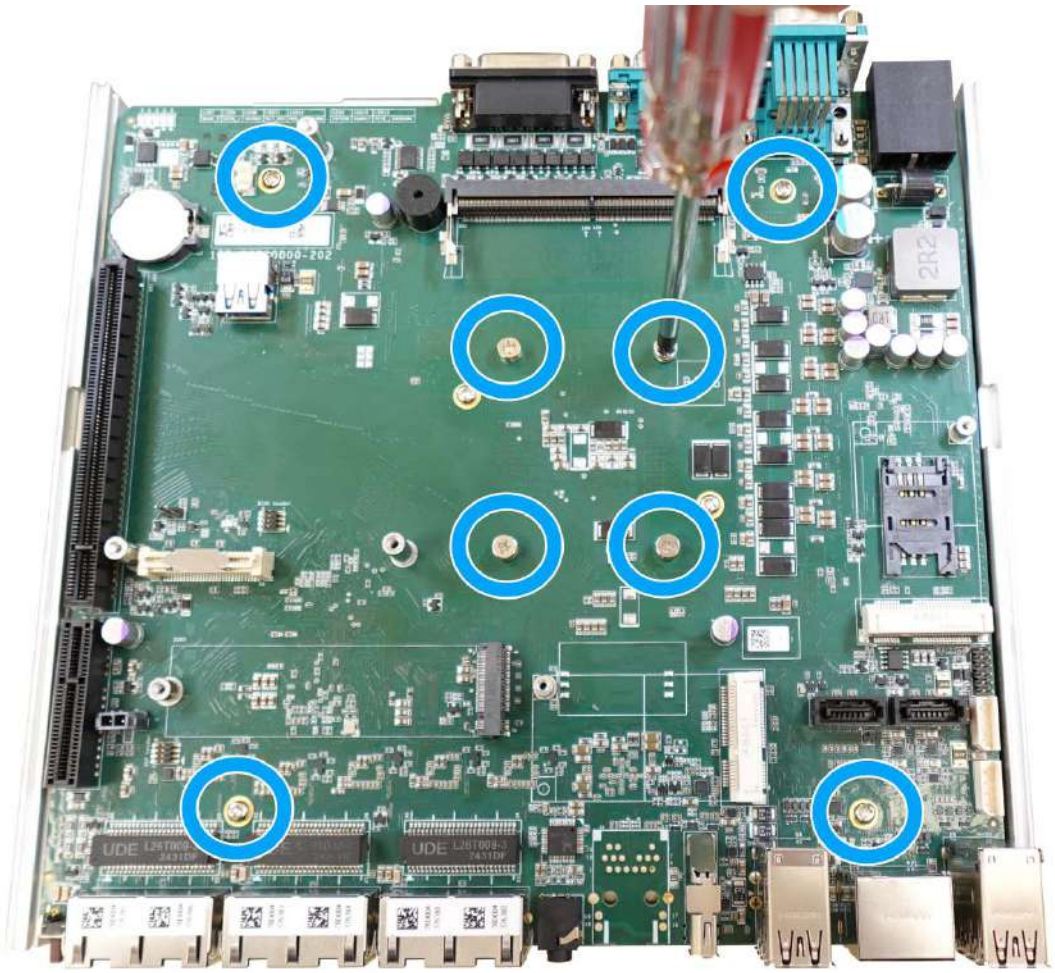
11. Reinstall the system panels, enclosure and Cassette module when done.

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

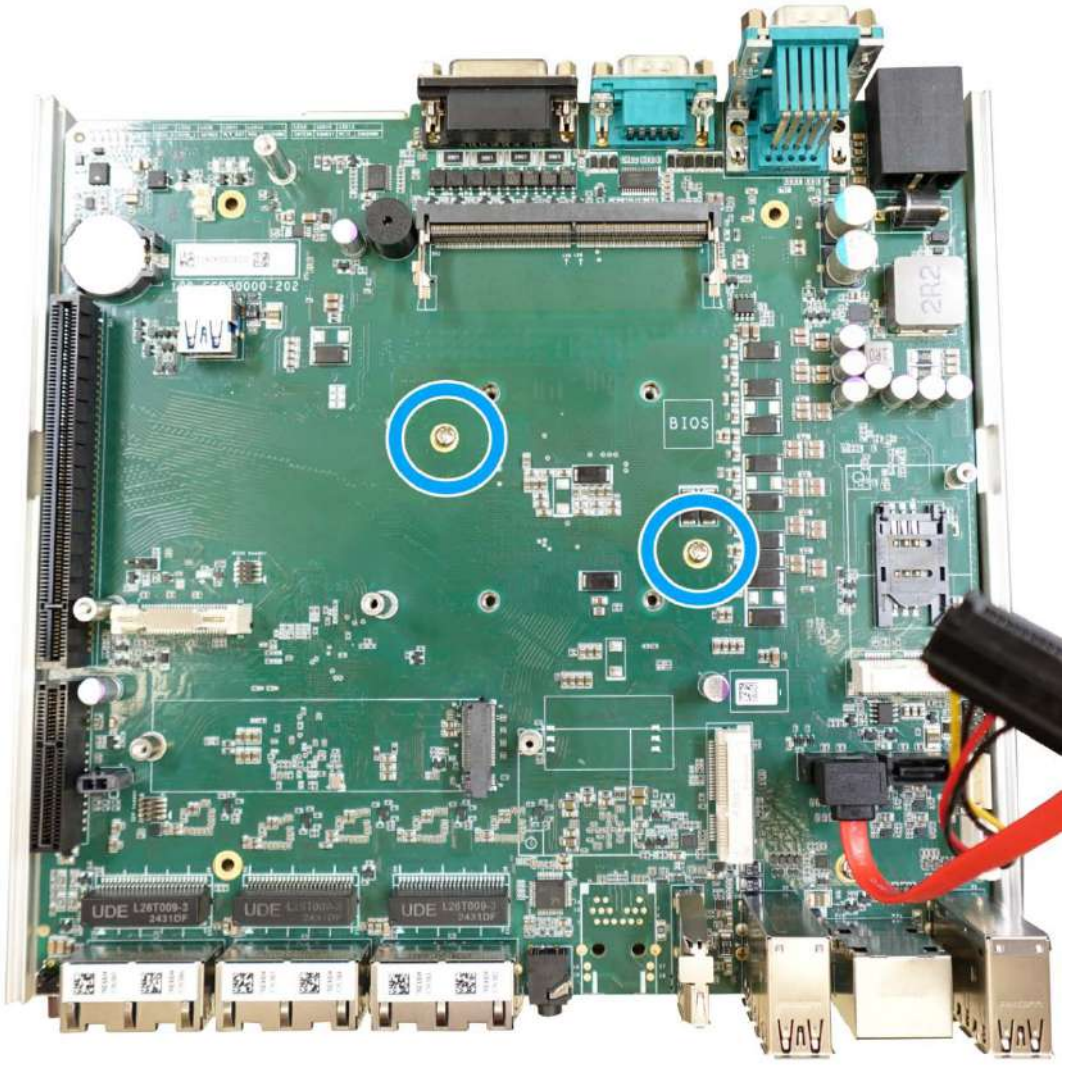
3.2.2 Remove and Replace the Existing CPU

1. To replace the existing CPU, you will need to separate the heatsink and the motherboard.

2. To do so, remove the eight screws indicated below.



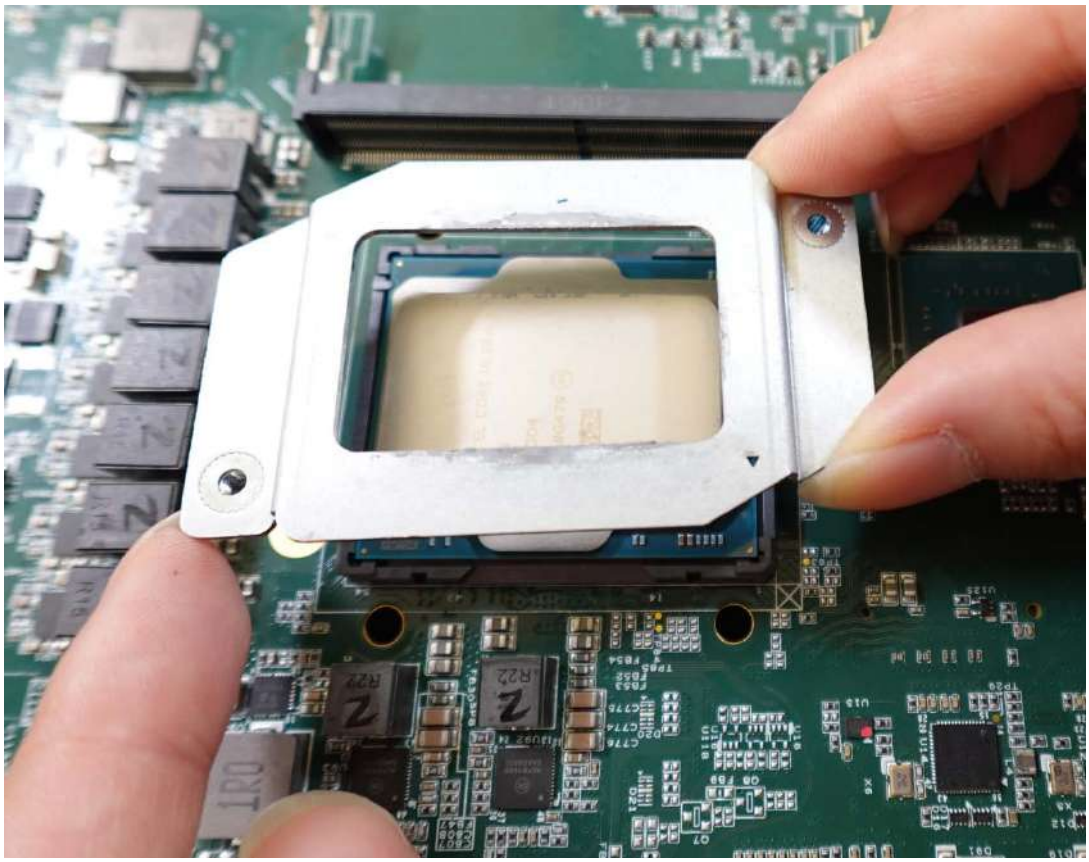
3. Remove the screws indicated once you separate the heatsink from the motherboard to remove the CPU holder.



4. At this point, the CPU and retention bracket may be stuck onto the heatsink (due to the thermal pad). Please use a plastic pry tool and gentle separate the CPU/ holder from the heatsink.

> **WARNING**
>
> *With the heatsink, CPU, and retention bracket removed, please be careful when handling the motherboard. DO NOT touch the pins in the LGA socket!*

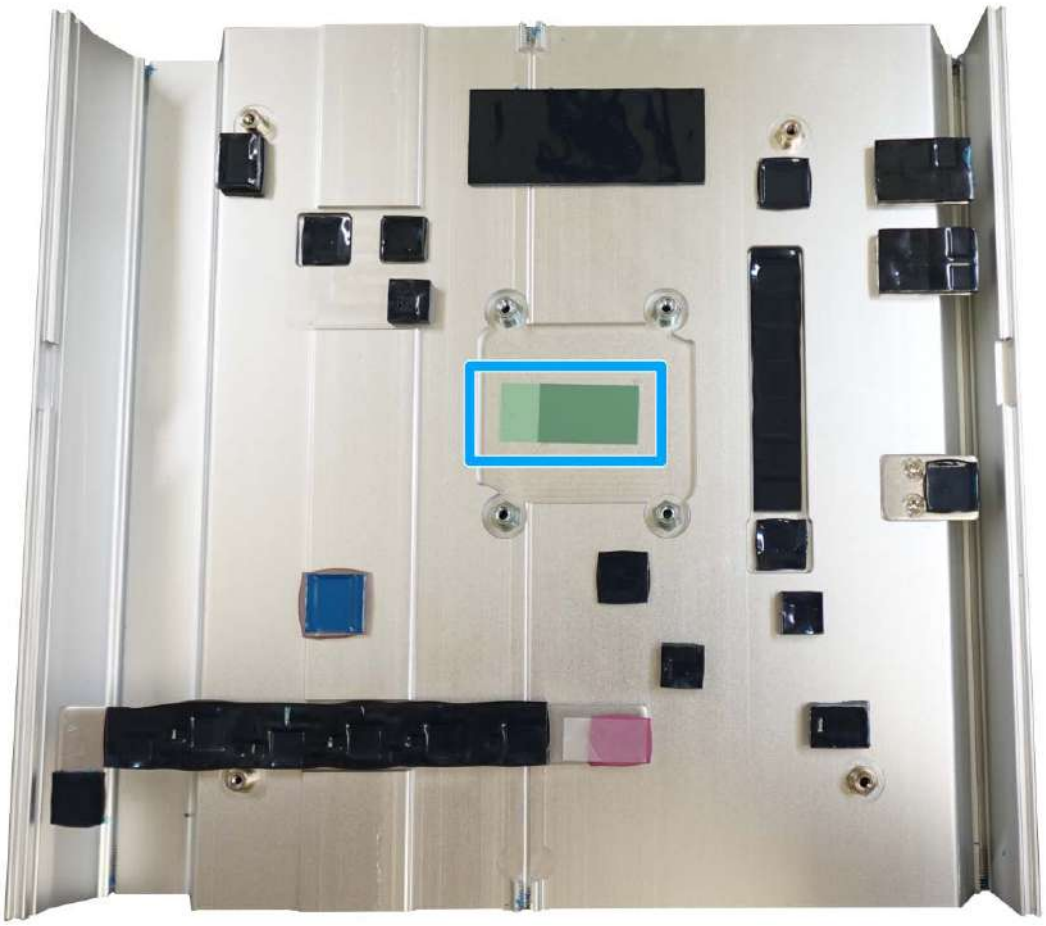
5. Gently separate the CPU from the retention bracket, and clean off any thermal pad residues on the heatsink and on the retention bracket.



CPU retention bracket (holder)

> **WARNING**
>
> *With the CPU removed, please be careful when handling the motherboard. DO NOT touch the pins in the LGA socket!*

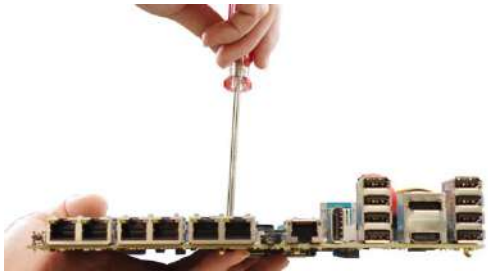
6. Place a new CPU thermal pad (indicated in **blue**) onto the heatsink for the new CPU.



7. Remove and clean off any thermal pad residues around the socket/ motherboard and remove the CPU from its container/ tray. Gently place the new CPU into the socket by matching the notches (indicated by **blues arrows**).

8. Locate the CPU retention bracket (holder) from the accessory box. Place the retention bracket on the CPU and hold it in place. Make sure the indicator triangle engraved on the CPU's integrated heat spreader (HIS) and the triangle indicator on the retention bracket are positioned in the same corner (indicated by **blue circles**).

9. Turn the motherboard around while holding the CPU retention bracket in-place, and secure the bracket by tightening two M3 P-head screws on the other side of the motherboard.



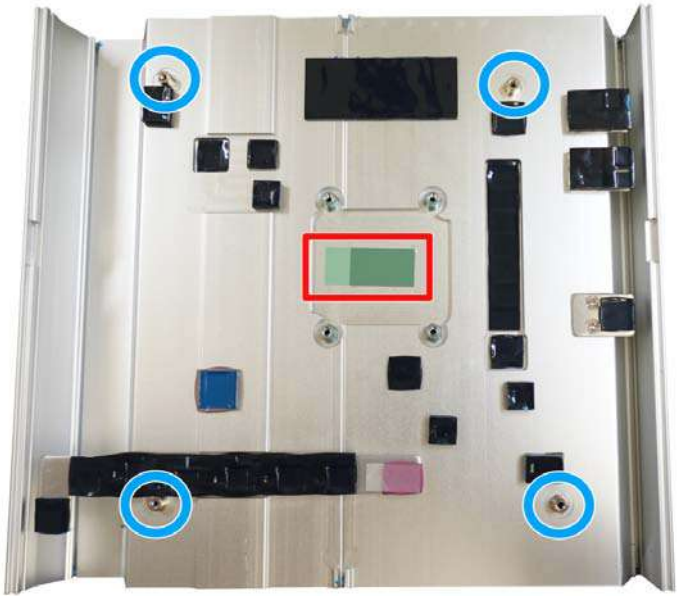
Hold CPU bracket firmly and turn the motherboard around

Secure two M3 P-head screws

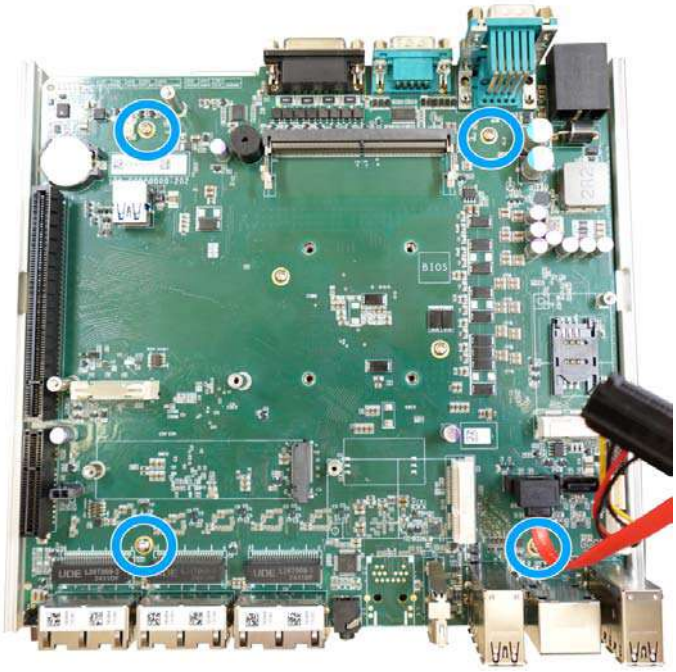
10. Make sure all thermal pads' protective films on the heatsink have been removed.

11. With the four motherboard standoffs aligned, gently lower the motherboard onto the heatsink and secure the four screws. Please remember to remove the protective film (indicated in **red**) on the CPU's thermal pad as well.

> **NOTE**
>
> *If thermal pad(s) seem to be missing, please check if the thermal pad is on the motherboard component.*

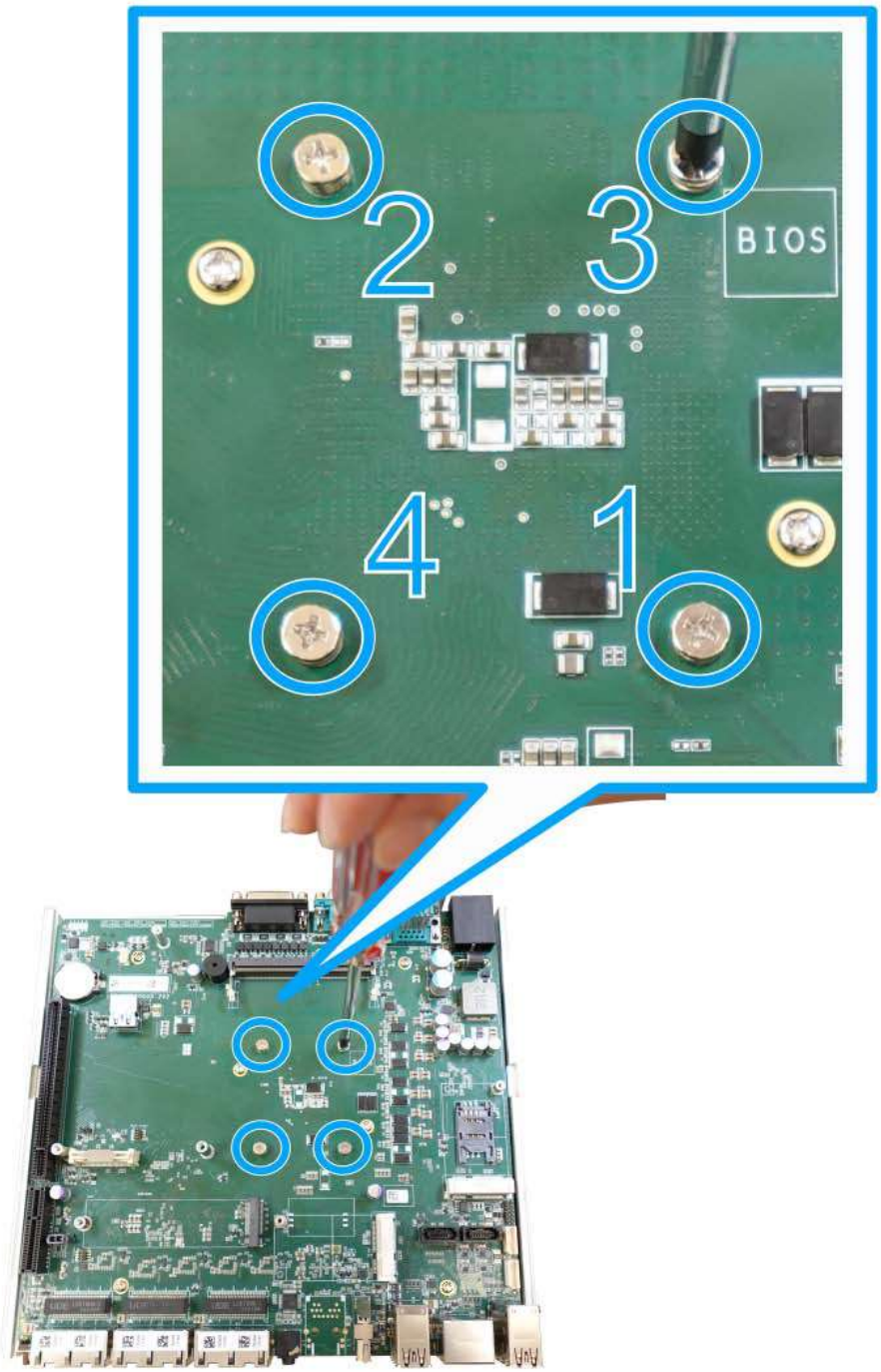


Four standoffs on the heatsink



Secure motherboard with four screws

12. Once the motherboard has been installed, you're ready to secure the four screws that help the heatsink apply pressure to the CPU/ chipset die. You'll want to apply even pressure to the corners by gradually tightening each screw. Please refer to the recommended order when tightening the screws.



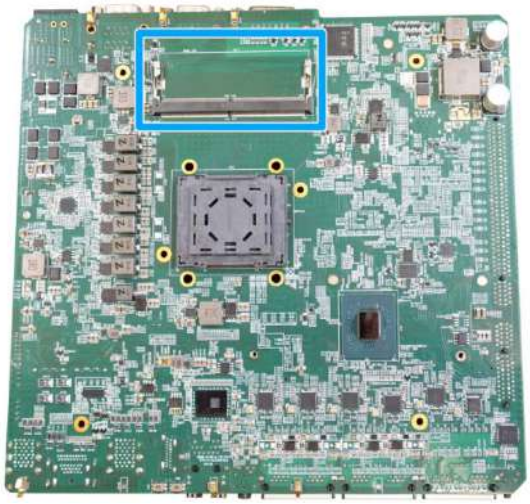
13. Reinstall the system panels, enclosure and Cassette module when done.

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

3.2.3 DDR5 SO-DIMM Installation

There are two SO-DIMM memory slots (indicated in **blue**) on the motherboard that supports a total maximum of 128GB DDR5-6400. Please follow the procedures below to replace or install the memory modules.

1. Please refer to the section "Disassembling the System".
2. Locate the SODIMM memory module slots on the motherboard.

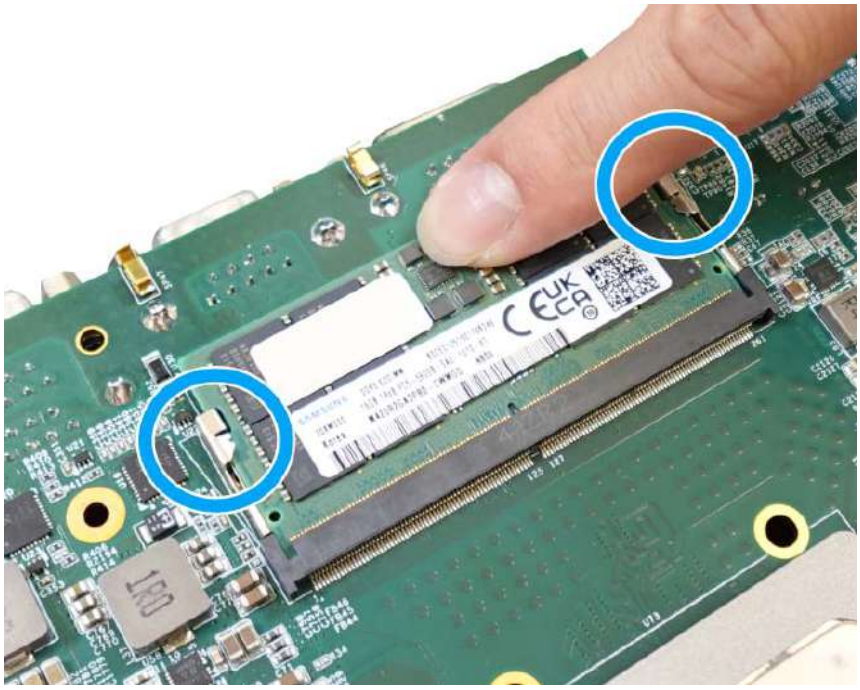


Memory slot on CPU socket side

Memory slot on expansion socket side

3. To install the memory module, insert gold fingers into the slot at 45-degree angle, push down on the memory module to clip the module into position.

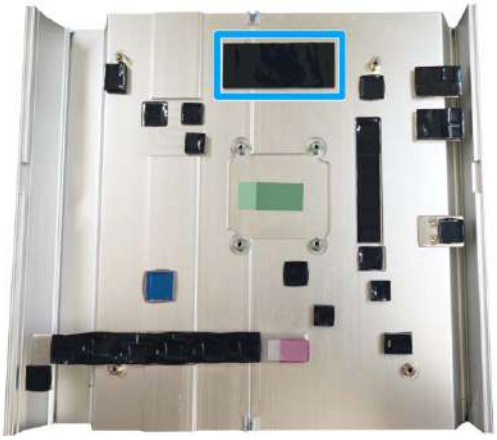
4. Push the memory module down until it is clipped-in.



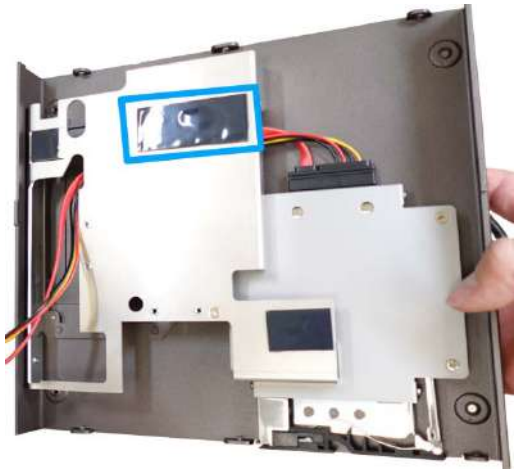
5. Repeat steps 3 and 4 to install the other module.

6. Before you reinstall the system enclosure, please remove the respective thermal pad protective film located on the heatsink and/or the enclosure's bottom panel.

> **NOTE**
>
> *If thermal pad(s) seem to be missing, please check if the thermal pad is on the motherboard component.*



Heatsink's memory thermal pad



Nuvo-11000LP bottom panel's memory thermal pad

Nuvo-11000E series bottom panel's thermal pad

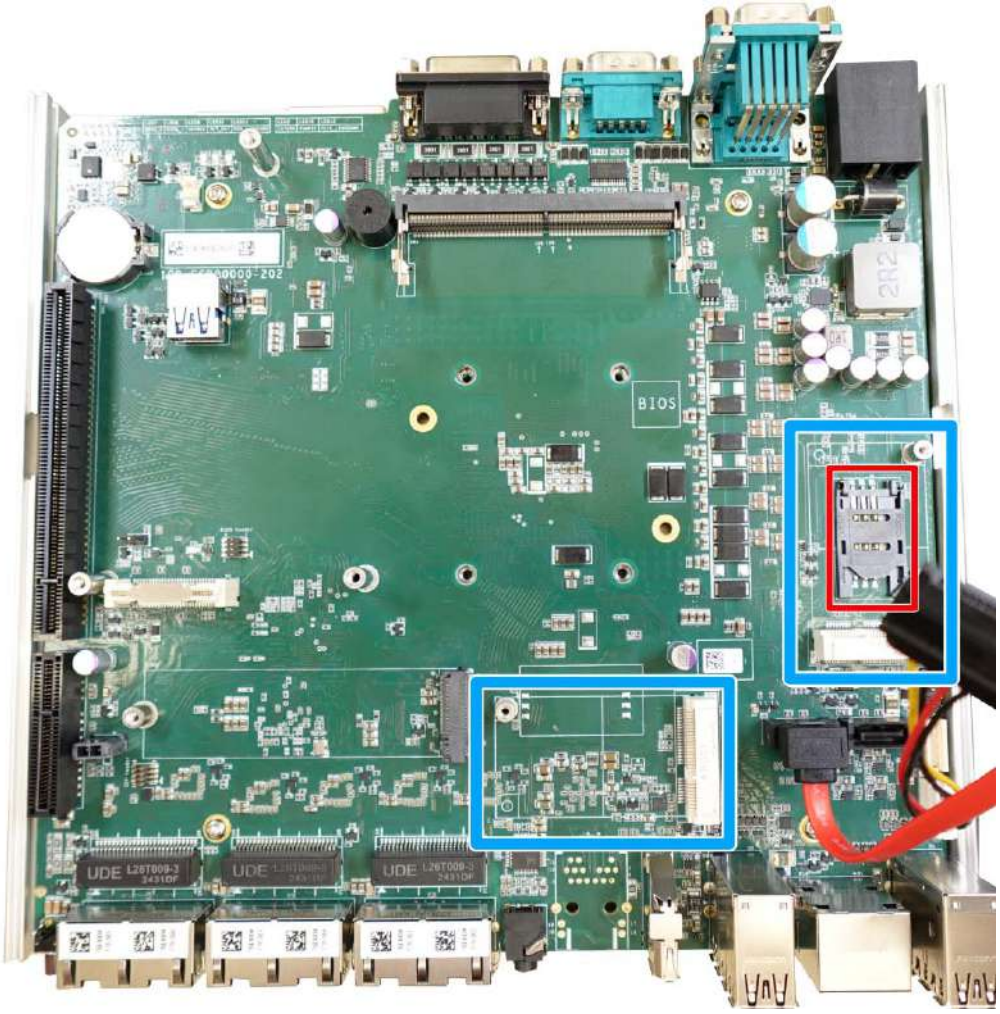
7. Reinstall the system enclosure and panel when done.

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

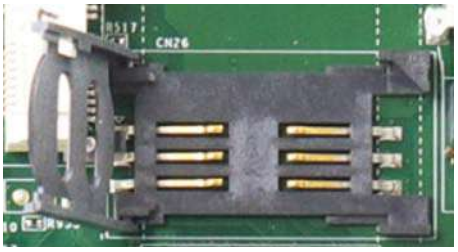
3.2.4 mPCIe Module, Mini-SIM (2FF) Card and Antenna Installation

The system has an mPCIe slot (indicated in **blue)** coupled with Mini-SIM socket (indicated in **red**) for installing 4G/ 3G module, and an mPCIe slot (also indicated in **blue**) without SIM slot. For installation, please refer to the following instructions.

1. Please refer to the section "Disassembling the System".
2. Locate the mPCIe and SIM card slots on the motherboard.



3. If you are installing an mPCIe module with SIM, you need to insert the Mini-SIM card first. Slide the SIM slot holder and lift the SIM card holder. Insert the Mini-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

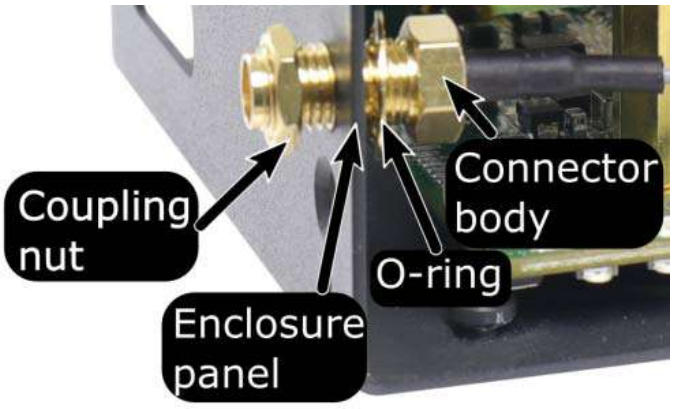
Insert Mini-SIM card with pins facing up

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

5. Insert the mPCIe module on a 45 degree angle into the mPCIe slot 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 or rear panel. Please refer to the module's manual for clip-on connection.

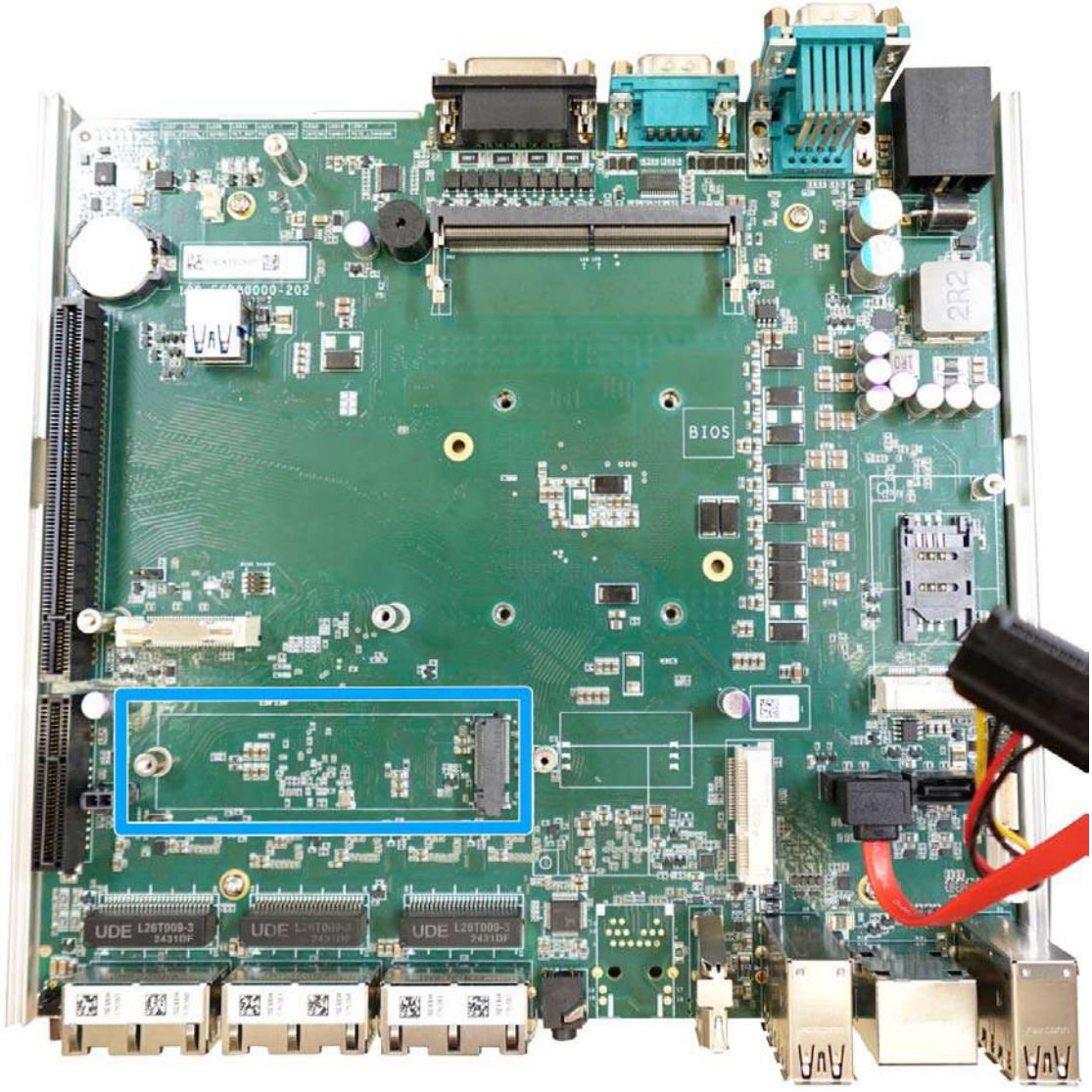


Clip on IPEX-to-SMA cable **Secure antenna to rear panel**

7. Reinstall the system enclosure and panel when done.

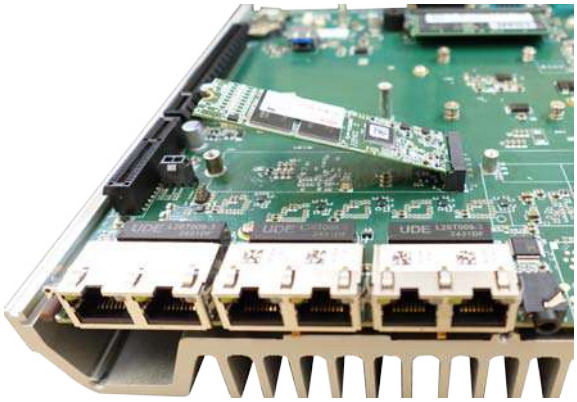
8. If you need to install other components, please refer to respective sections.

3.2.5 M.2 2280 NVMe SSD Installation



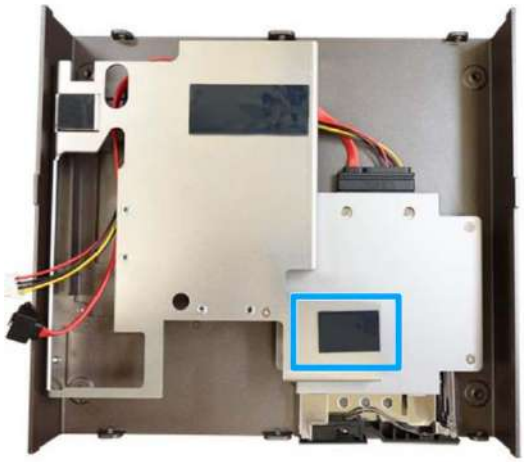
The system has a Gen5 x4 PCIe M.2 2280 slot for you to install an NVMe SSD. For installation, please refer to the following instructions.

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.

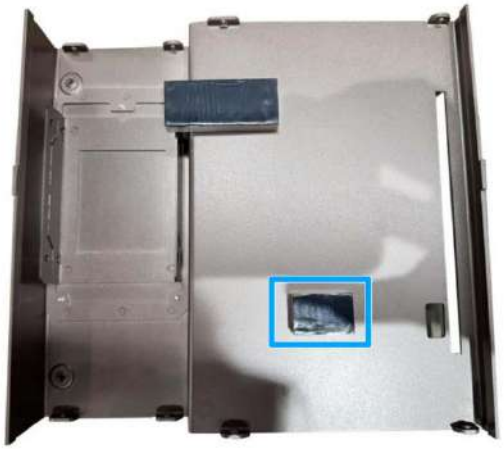


3. Gently press down and secure the module with an M2.5 P-head screw.

4. Remove the thermal pad's protective film at the bottom of the enclosure panel for the NVMe module.



Nuvo-11000LP system's NVMe thermal pad

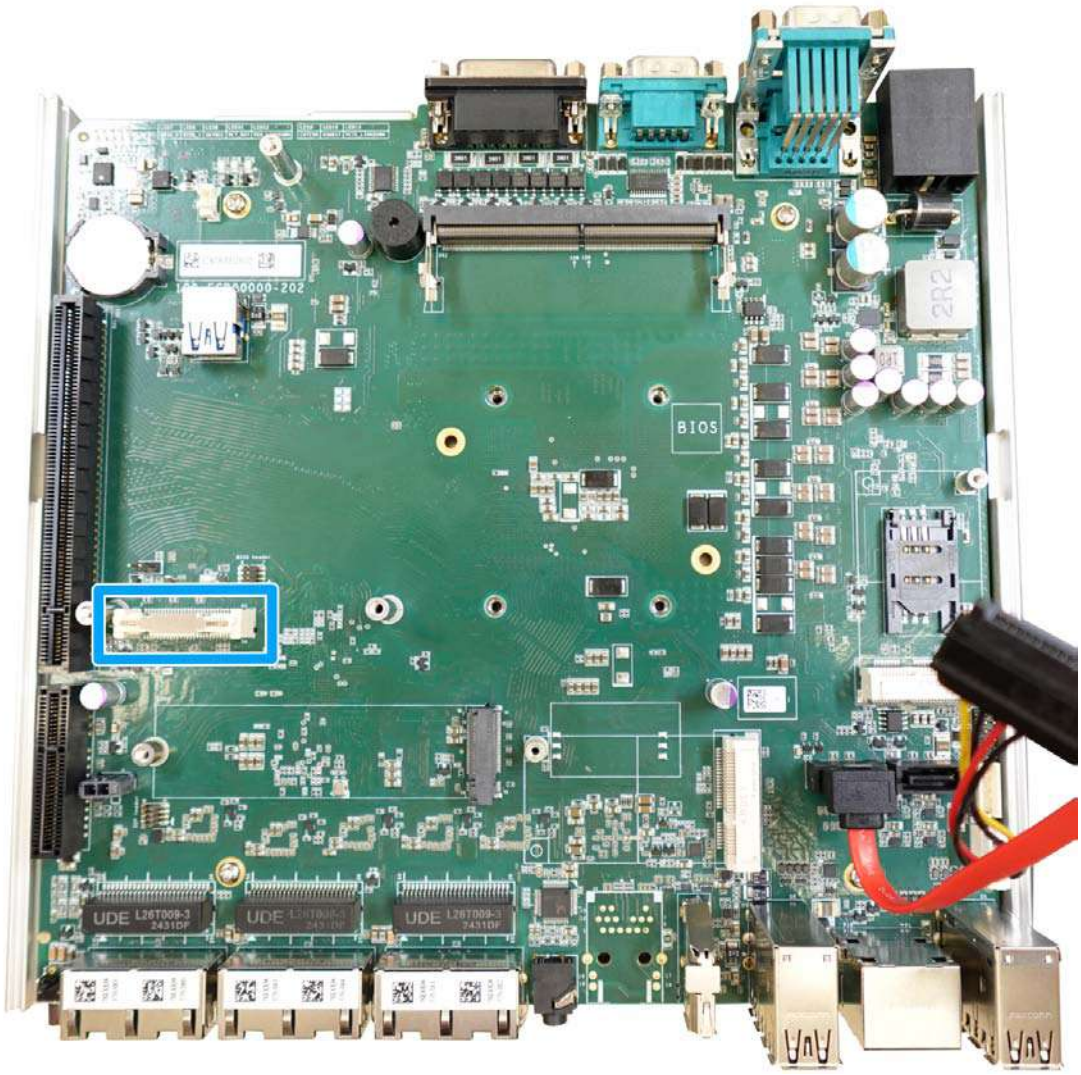


Nuvo-11000E series system's NVMe thermal pad

5. Reinstall the system enclosure and panel when done.

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

3.2.6 MezIO™ Module Installation

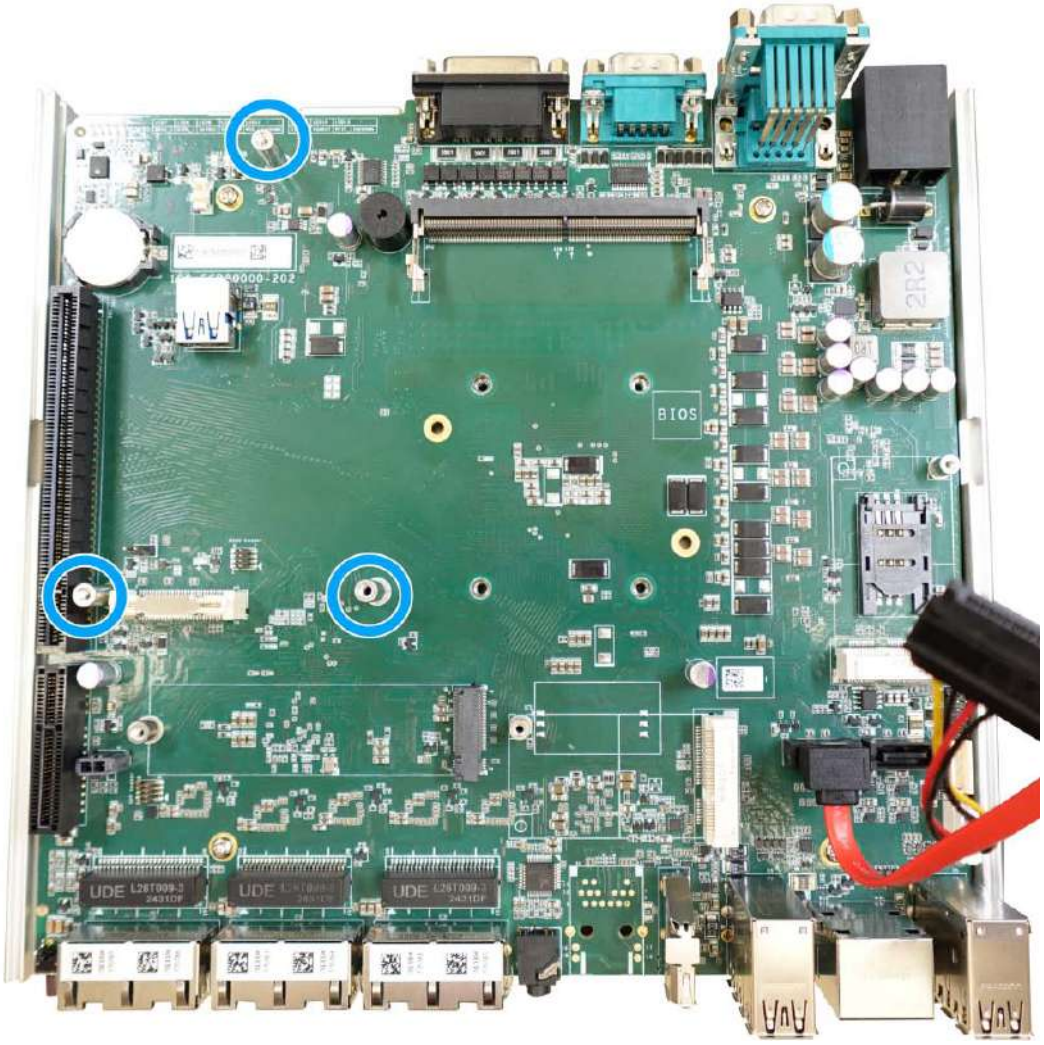


MezIO™ is an innovative interface designed for integrating application-oriented I/O functions into an embedded system. It offers computer signals, power rails and control signals via a high-speed connector. MezIO™ is also mechanically reliable benefited from its 3-point mounted mezzanine structure. A MezIO™ module can leverage these signals to implement comprehensive I/O functions.

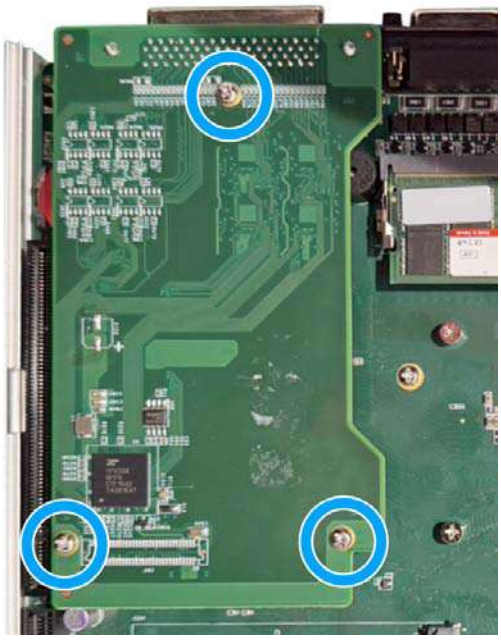
The system incorporates MezIO™ interface and universal mechanical design to accommodate Neousys' standard MezIO™ modules. For customers who want to develop their own MezIO™ module, Neousys provides MezIO™ design documents on a NDA basis. Please contact Neousys for further information.

1. Please refer to the section "Disassembling the System", you may not need to completely dismantle the system to gain access to the MezIO™ interface.

2. The MezIO™ module is secured by the three stand-mounts indicated.



3. Gently lower the MezIO™ module onto the three stand-mounts while matching the MezIO™ interface. Secure the module using three screws supplied.

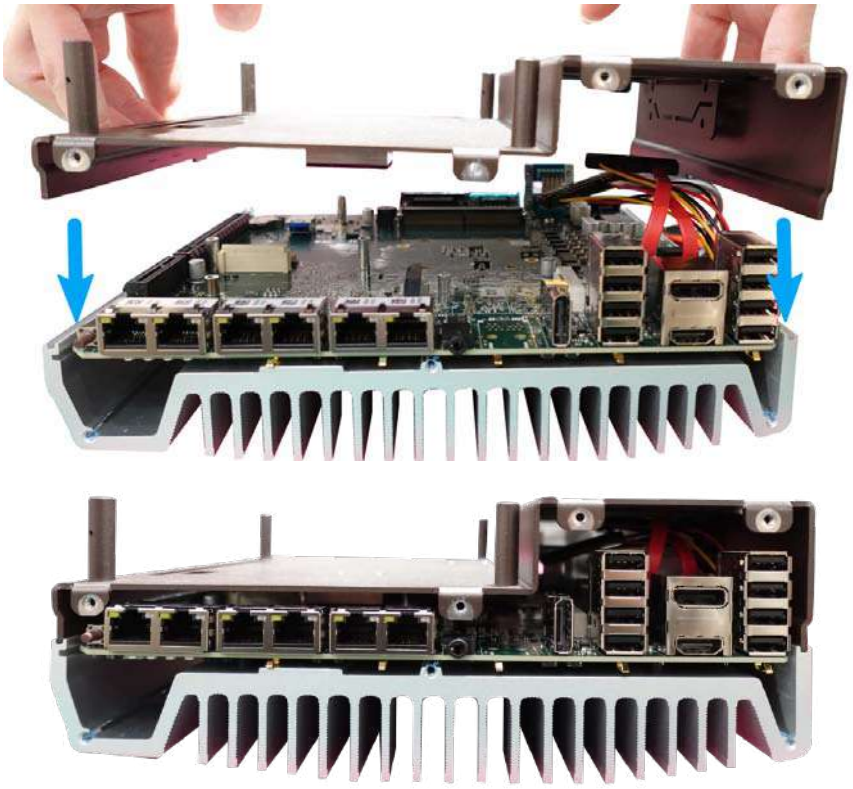


4. Reinstall the system enclosure and panel when done.

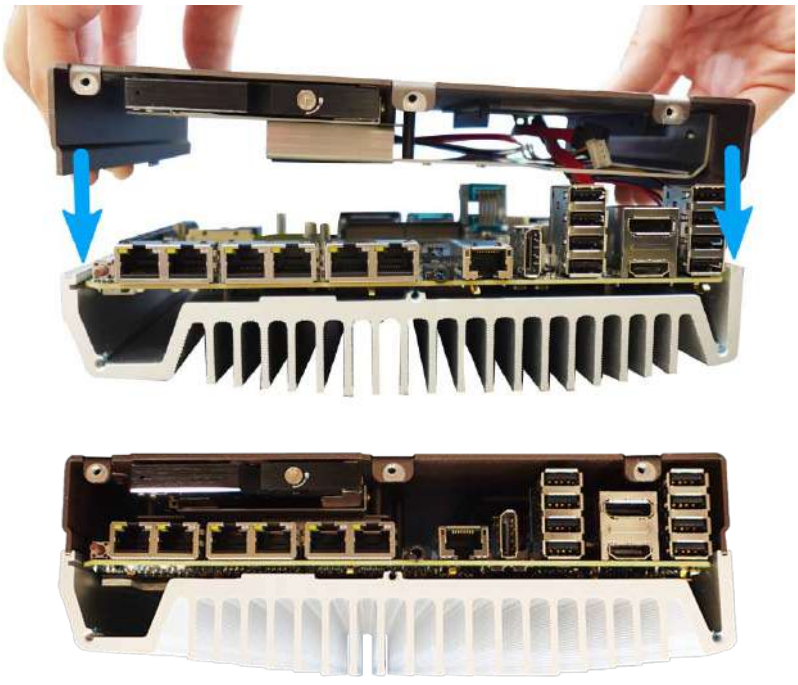
5. If you need to install other components, please refer to respective sections.

3.3 Installing the System Enclosure

1. To reinstall the system enclosure, place the bottom panel on top of the motherboard while making sure both sides are inserted into the heatsink (indicated in **blue**).

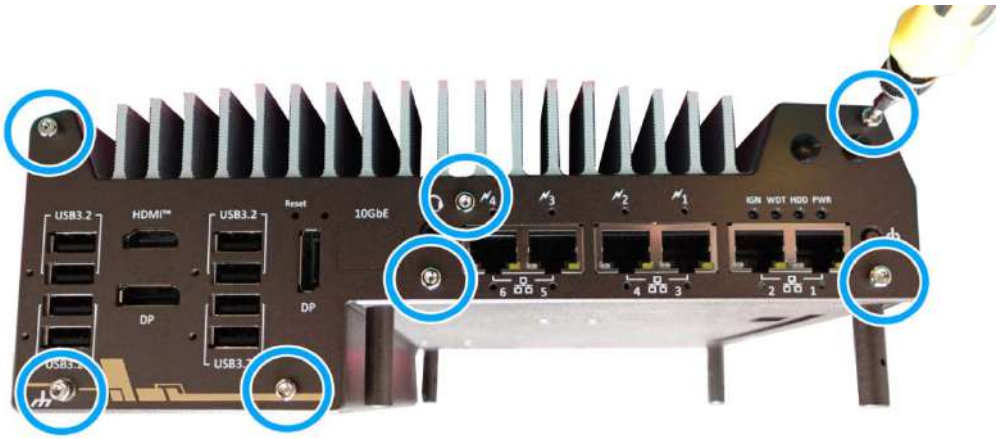


Nuvo-11000E series system



Nuvo-11000LP system

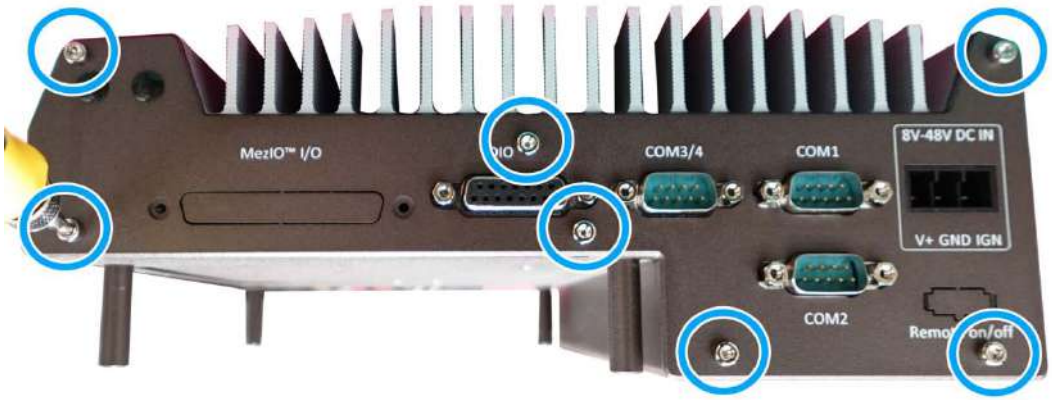
2. Install the front panel and secure screws indicated in **blue**.



Nuvo-11000Esystems

Nuvo-1100LP systems

3. Install the rear panel and secure screws indicated in **blue**. The Nuvo-11000LP enclosure installation is complete



Nuvo-11000E systems

Nuvo-11000LP systems

4. For Nuvo-11000E series systems, please continue to install the Cassette module and secure with screws (indicated in **blue**) to complete Nuvo-11000E series enclosure installation.

> **NOTE**
>
> *Not applicable to Nuvo-11000LP systems.*

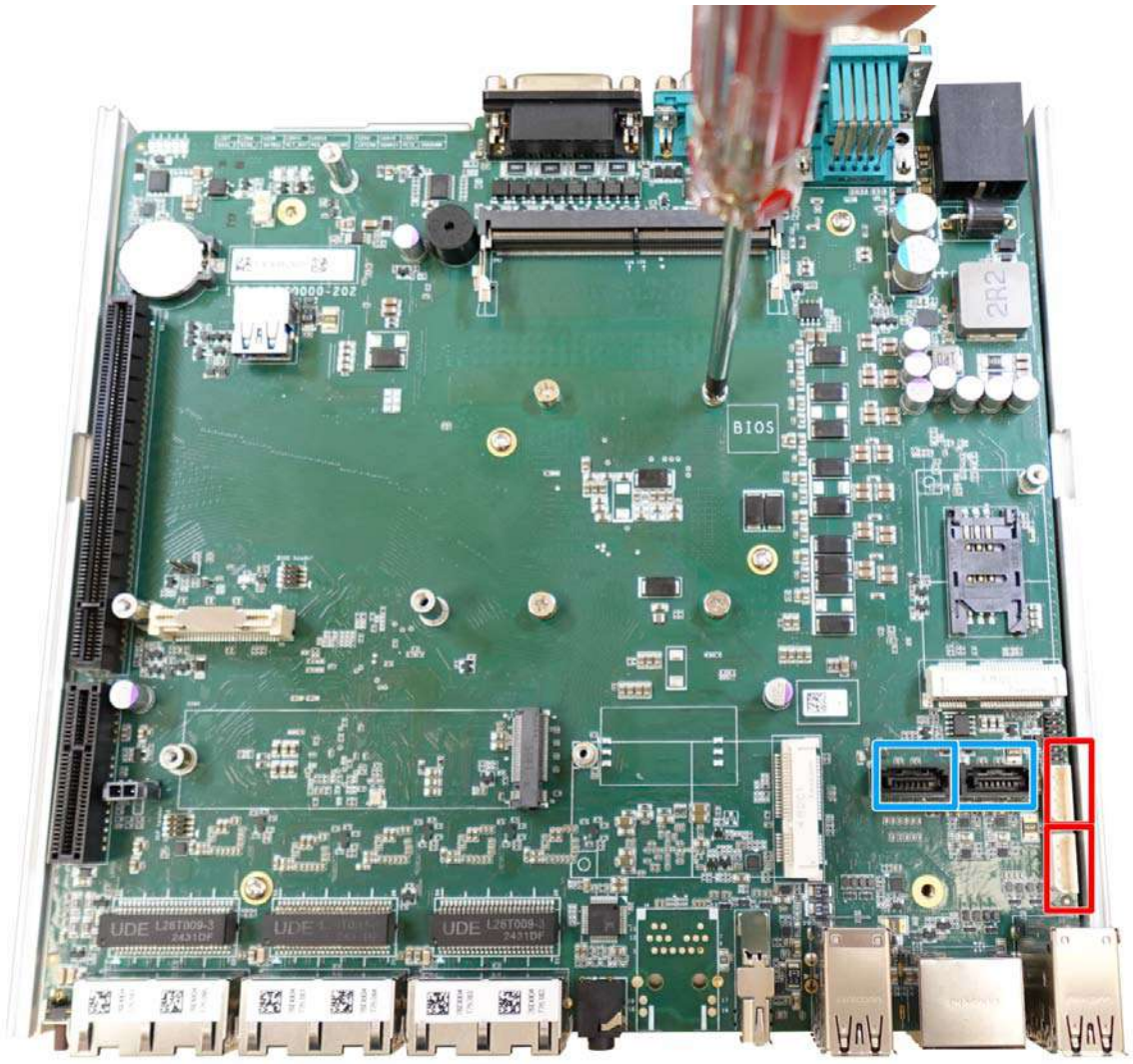
Install the Cassette module

Secure the screws indicated

3.4 HDD/ SSD Installation

NOTE

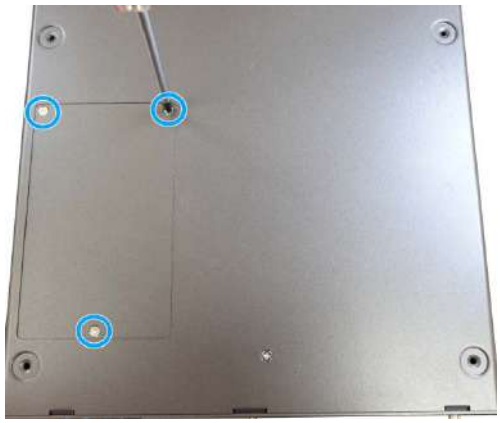
Supports up to 15mm thickness HDD/ SSD.



The system has two SATA ports (indicated in **blue)** and two four pin power connectors (indicated in **red**). The SATA and power cables should already be connected on the motherboard so users only need to install the HDD/ SSD. Please refer to the following instructions on how to install 2.5” SATA HDD/SSD.

1. Turn the system upside-down and remove the three screws indicated in the illustration below and lift the tray out of the system.

Nuvo-11000E series



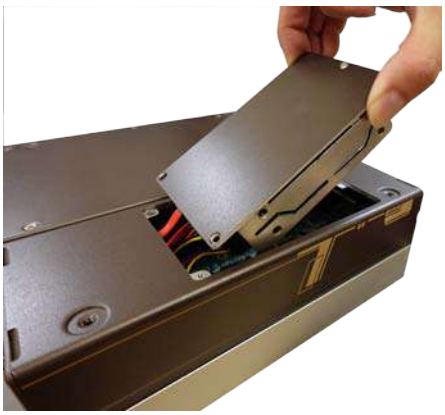
Nuvo-11000LP

2. Take the HDD/ SSD thermal pad (if not already attached) out of the accessory box and place it in the middle of the tray. Remove the protective film covering the HDD/ SSD thermal pad.

NOTE

The tray for Nuvo-11000E can support the installation of two disk drives.

The tray for Nuvo-11000LP can support the installation of one disk drive.



Nuvo-11000E series

Nuvo-11000LP

3. Place the HDD/ SSD (with labels facing up), note the orientation of the disk drive (in relation to the red arrow) r end to the side with two screw holes (indicated in **blue**), secure the HDD/ SSD with the supplied flathead screws (4 per drive). Connect the 22-pin SATA cable to the installed HDD/ SSD.

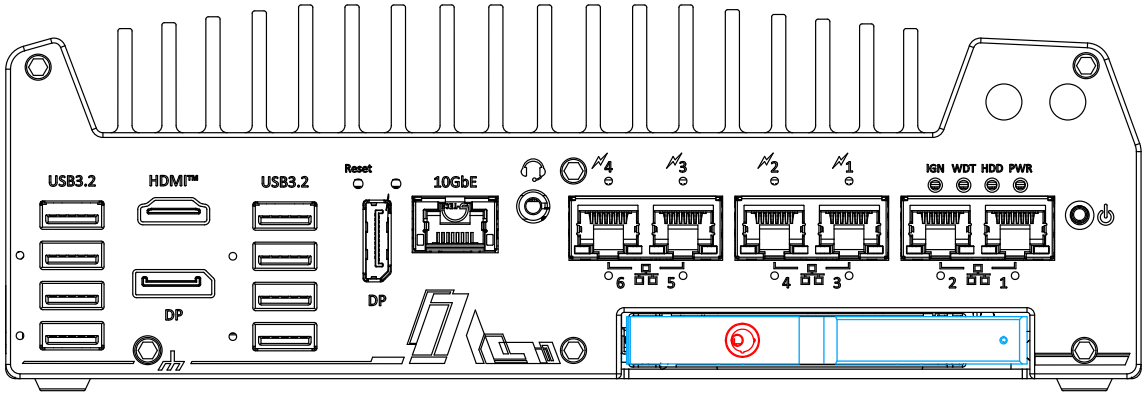
2 screws on each side per HDD/ SSD HDD/SSD tray installation orientation

4. Gently put the tray back into the system with the connector side being inserted into the system first and secure the tray with three screws.

Reinsert the tray **Securing the tray**

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

3.5 2.5” Hot-swappable Tray HDD/SSD Installation (Nuvo-11000LP series Only)



The system features a 2.5” external hot-swappable tray (indicated in **blue**), and secured by a lock (indicated in **red**), supporting a HDD/ SSD up to 7mm in thickness. It coincides with the internal drive and can be configured into RAID 0 or 1 storage. To install HDD/ SSD into the 2.5” external hot-swappable slot, please refer to the following procedure:

1. Pull the handle on the 2.5” external hot-swappable slot to open it.

Pull handle

Open slot door

2. With the label side facing upward, insert the SATA connector side of the 2.5” HDD/ SSD into the slot first. You may feel resistance when the SATA connectors meet, push it firmly until the 2.5” HDD/ SSD is fully inserted into the slot.

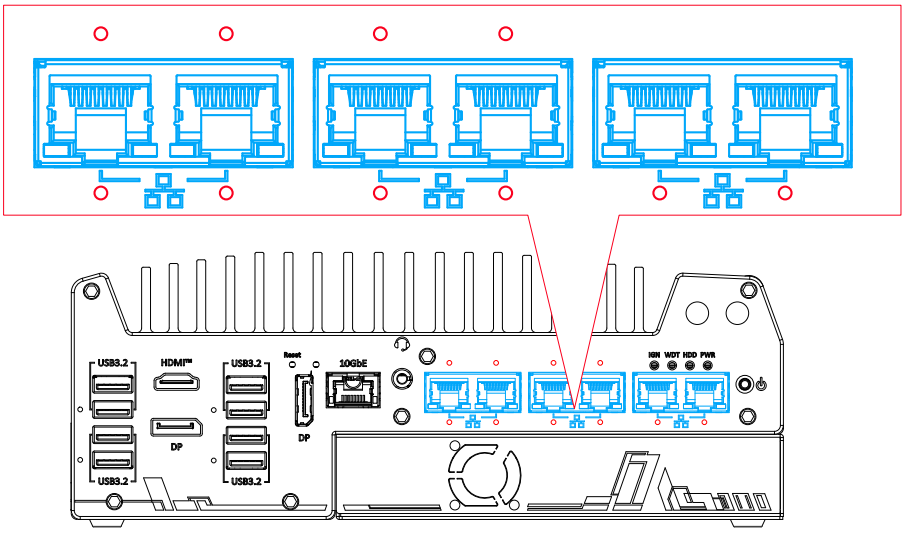
3. Push the handle into the 2.5” slot until it snaps into position. A key is provided (in accessory box) to lock the external slot.

Key in accessory box

2.5” HDD/ SSD slot lock

3.6 Ethernet/ PoE+ Port Panel Screw Fix

The systems feature RJ45 Ethernet ports with screw fix holes (indicated in **red**) to secure the cable connection.



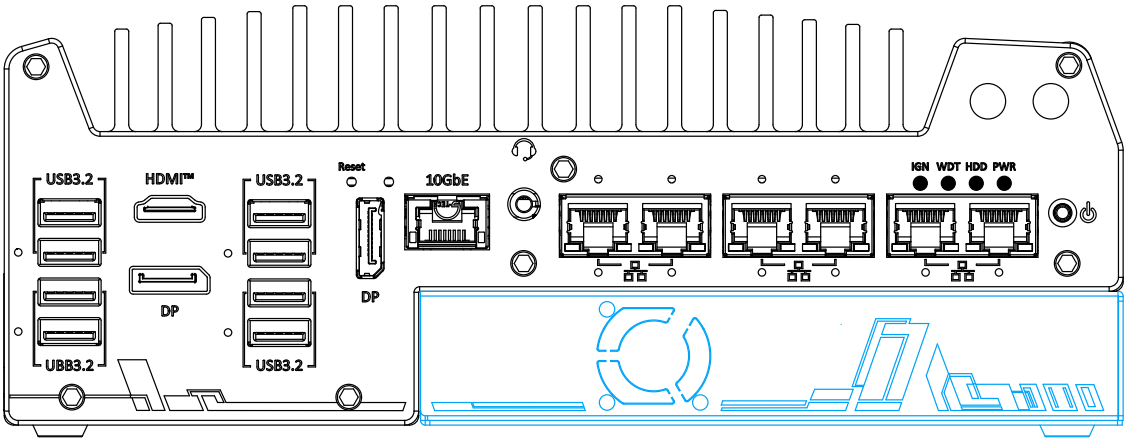
1. To install and make use to the panel screw fix connection, you must acquire panel screw fix cables such as the cable shown below.

2. Simply insert the RJ45 connector into the RJ45 port and secure the top and bottom screws using your fingers or a screw driver.

NOTE

Ports 1 and 2 have only the bottom panel screw fix hole.

3.7 PCIe Card Installation into Cassette Module (Nuvo-11000E Series Only)



The Cassette module provides a separated compartment to accommodate add-on card(s). It compartmentalizes the heat generated and effectively manages thermal conditions of both the system and add-on card(s). The modular design reduces the complexity of installing and replacing add-on card(s) in the fanless controller. In addition, the mechanical design creates a sealed wind tunnel to bring in cold air and expels hot air via a system fan to offer the system extreme stability and reliability.

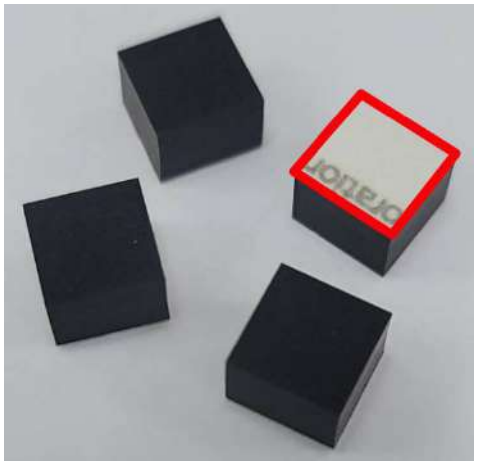
To install a PCIe card into the Cassette module, please refer to the following procedure:

1. Turn the system upside-down and remove the four screws.

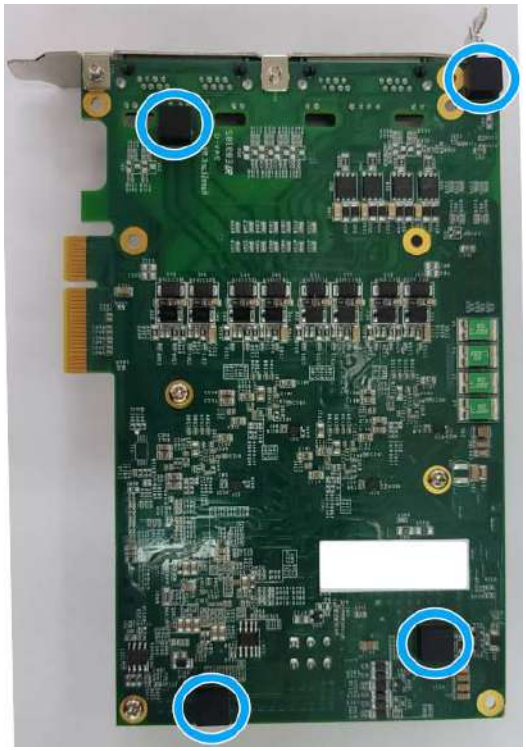
2. Gently wiggle the Cassette module and separate it from the system enclosure.

3. Remove the screw to open the Cassette cover.

4. Before installing the PCIe card into the Cassette module, it is recommended to attach the rubber spacers provided onto the back of the card to avoid possible contact with the enclosure. Simply attach the rubber spacers on the back of the card, in the four corners. **DO NOT** attach them on any components, please remove the protective film on each rubber spacer (indicated in **blue**), and attach them to the PCBA.



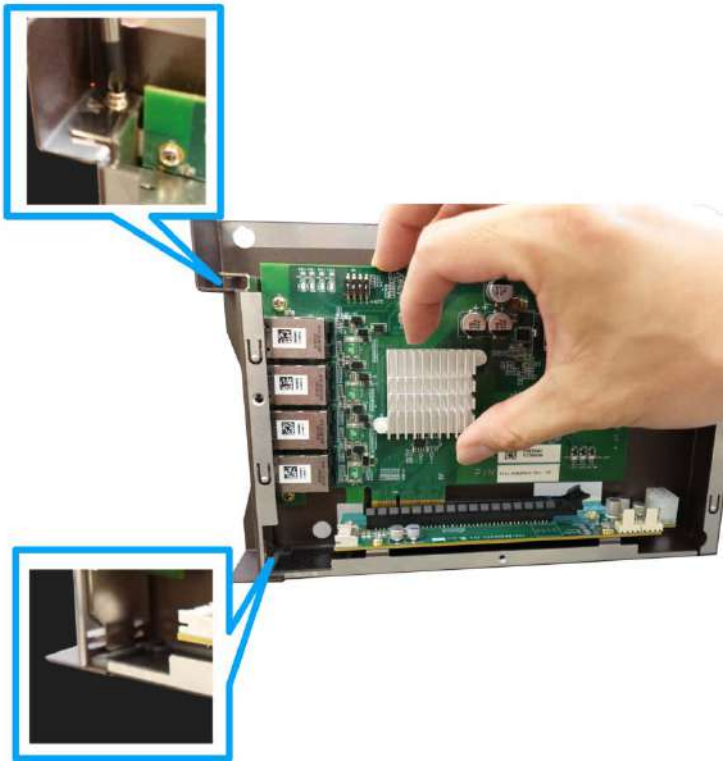
Rubber stands, remove each protective film (indicated in **red**) before attaching to the card



Attach the rubber stands on the back of the PCBA.

5. Remove the punch-out bezel cover (indicated in **blue circle**) and insert the card into the PCIe slot while making sure the bezel is properly inserted into the notch and the card is secured in place with screw.

Remove bezel cover and insert the card



Make sure the card is inserted into the notch and secured with a screw

6. Secure the screw indicated.

7. Gently lower the Cassette module back onto the system enclosure and secure the module onto the system enclosure by securing the following screws.

3.8 Wall Mount Bracket/ DIN-rail Installation

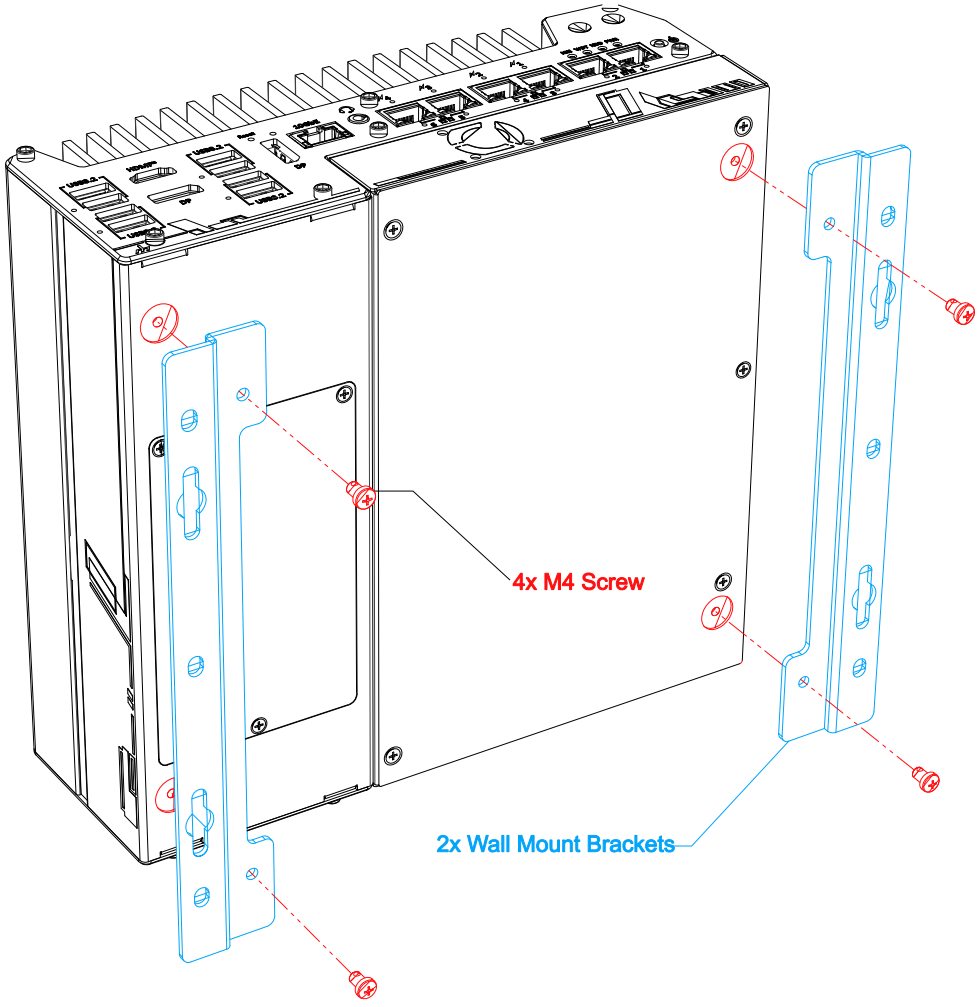
Nuvo-11000 series ships with dedicated wall mount and DIN-rail (optional).

> **NOTE**
>
> *You will need to remove the four (4) rubber stands at the bottom of the enclosure if they have been attached.*

3.8.1 Wall Mount Bracket Installation

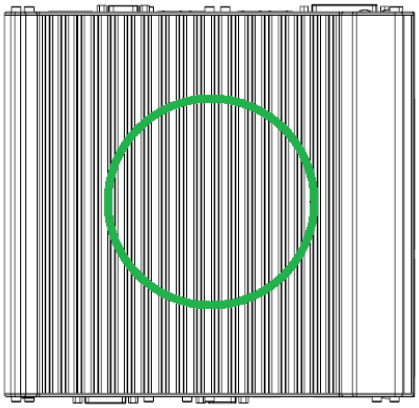
To install the system as a wall mount device, please refer to the following instructions.

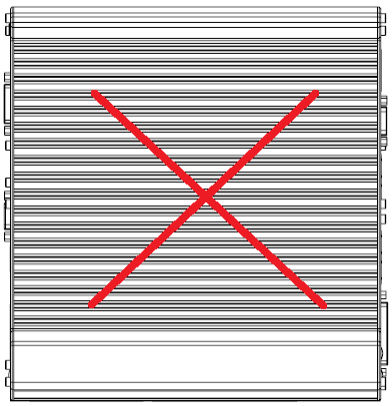
1. Take out the two wall mount brackets (indicated in **blue**) and four M4 screws out of the accessory box. Fix the wall mount brackets to the system enclosure using M4 screws (indicated in **red**).



2. Place the system on a flat surface portion of the wall and secure it with four (4) M4 screws.

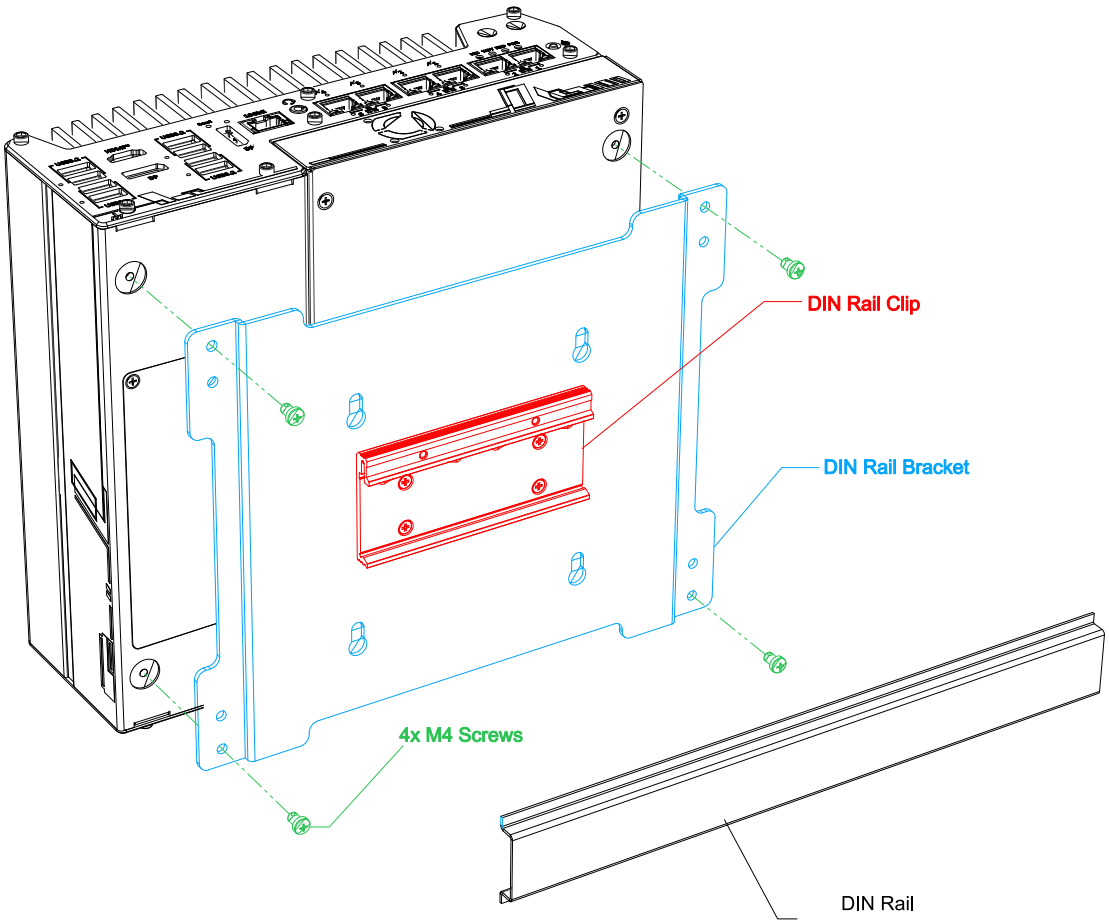
3. When wall mounting, place the heatsink fins perpendicular to the ground for better heat dissipation efficiency.





3.8.2 DIN-rail Installation (Optional)

The system also has an optional DIN-rail mounting kit. The kit includes a bracket (in **blue**) and a DIN-rail mounting clip (in **red**). By fixing the clip to the bracket using four M4 flat-head screws and fixing the bracket assembly to the system four M4 screws (in **green**), complete the installation by clipping the system onto the DIN rail. This option may be useful if you want to deploy it inside an equipment cabinet where DIN rail is available.



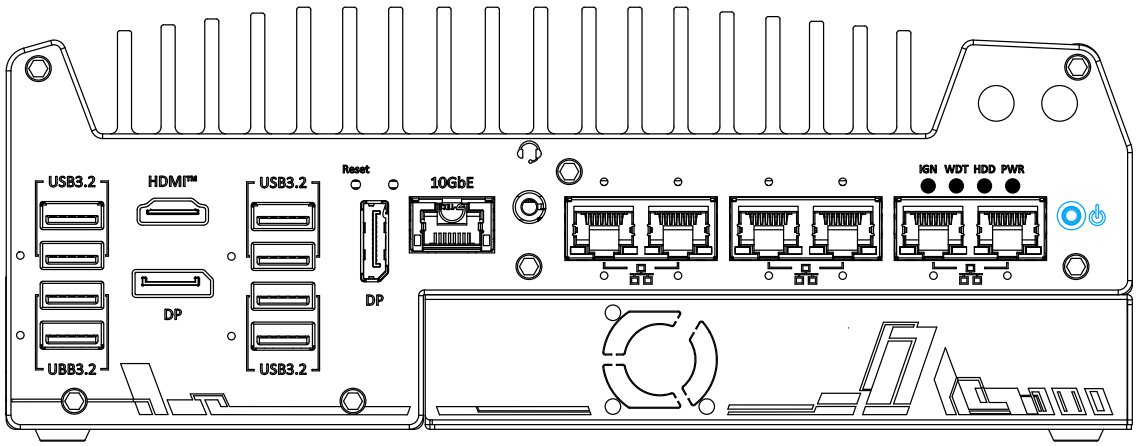
3.9 Powering On the System

There are three methods to power on the system

- Pressing the power button
- Using an external non-latched switch by connecting to the remote on/ off plug
- Sending a LAN packet via Ethernet (Wake-on-LAN)

3.9.1 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.

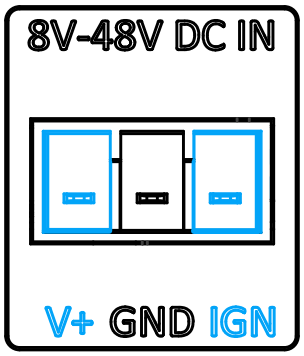


3.9.2 Powering On Using External Non-latched Switch

If your application demands the system to be placed inside a cabinet, you may use an external non-latched switch to power on/ off the system. The system provides a 3-pin “Remote On/ Off” plug for connecting a non-latched switch and acts as the ATX-mode power on/off control switch. The external non-latched switch acts exactly the same as the power button on the front panel. To setup and power on/ off the system using an external non-latched switch (ATX-mode), please follow the steps described below.

1. Acquire a non-latched switch with 3-pin plug.

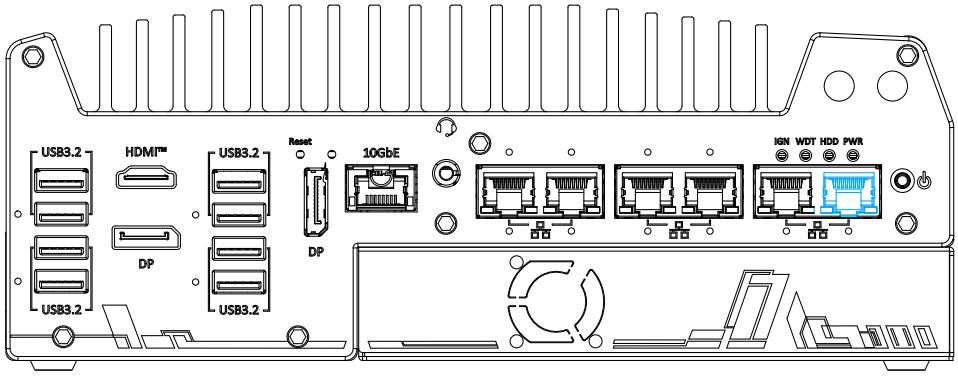
2. Connect the non-latched switch to IGN and V+ pins.



3. 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.

3.9.3 Powering On Using Wake on LAN

Wake on LAN 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 port is shown below.

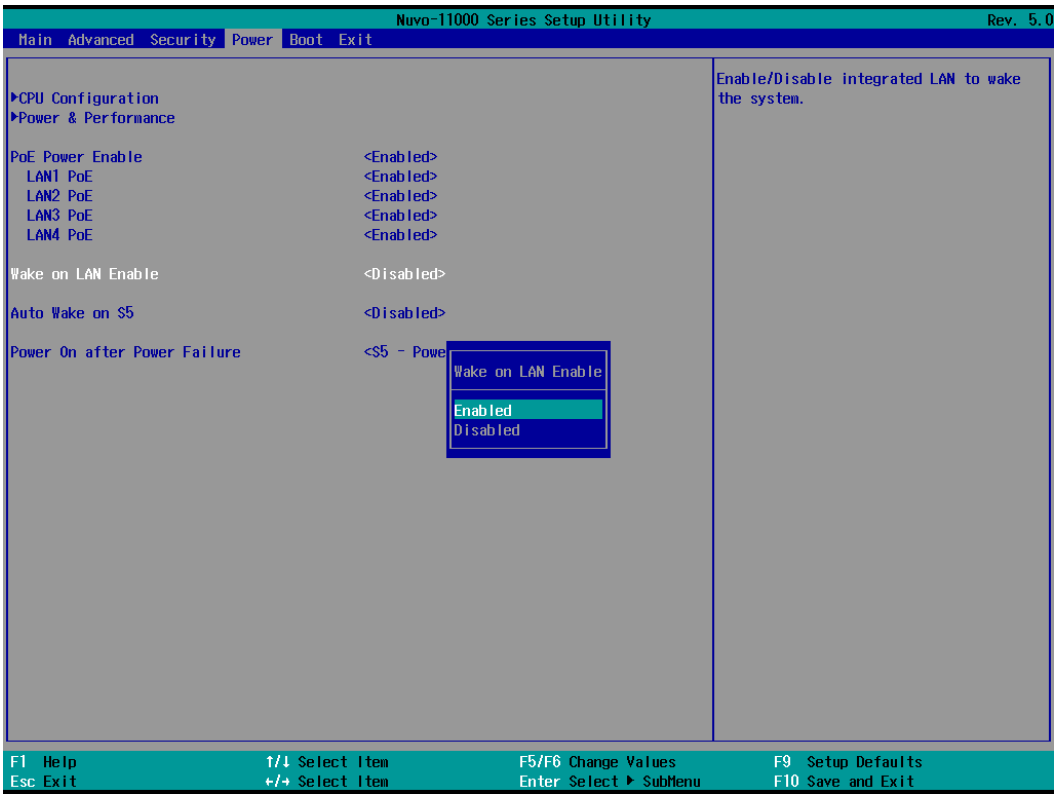


NOTE

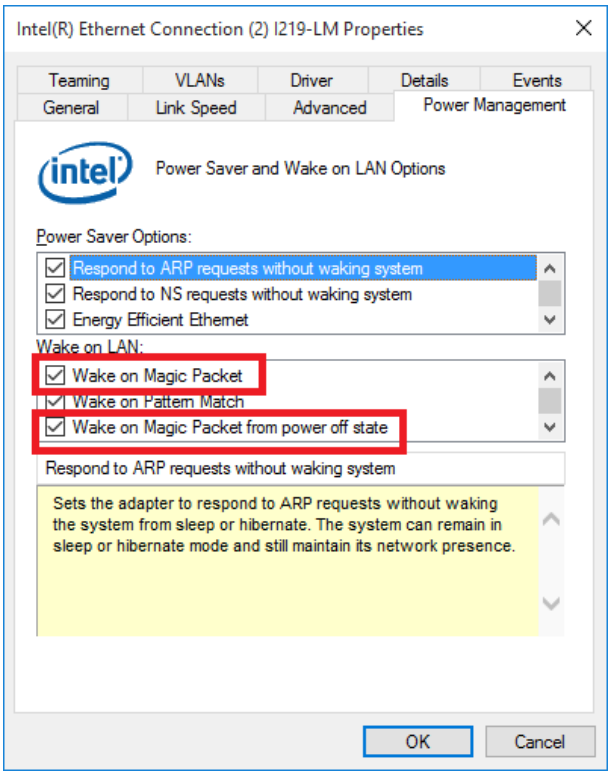
Please make sure the Intel® chipset and Ethernet driver has been properly installed prior to setting up Wake on LAN function.

To enable this function, please set up Wake on LAN 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 LAN Enable]** 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® 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

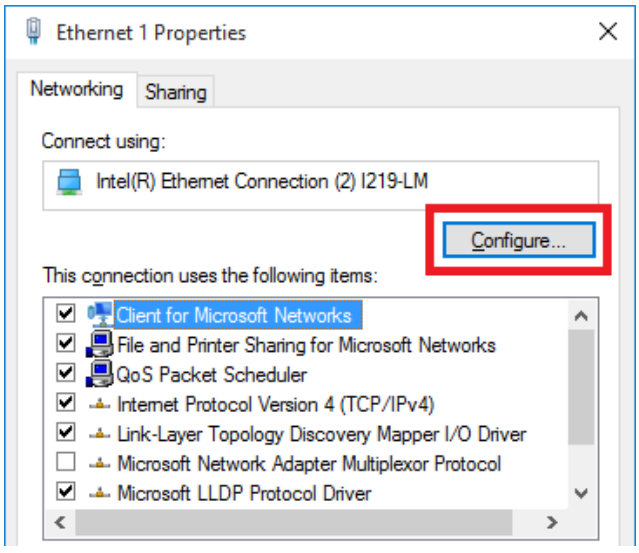
The magic packet is a broadcast frame containing anywhere within its payload 6 bytes of all 255 (FF FFFFFFFFF in hexadecimal), followed by sixteen repetitions of the target computer's 48-bit MAC address. For example, NIC's 48-bit MAC Address is 78h D0h 04h 0Ah 0Bh 0Ch

DESTINATION SOURCE MISC

FF FFFFFFFFF

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

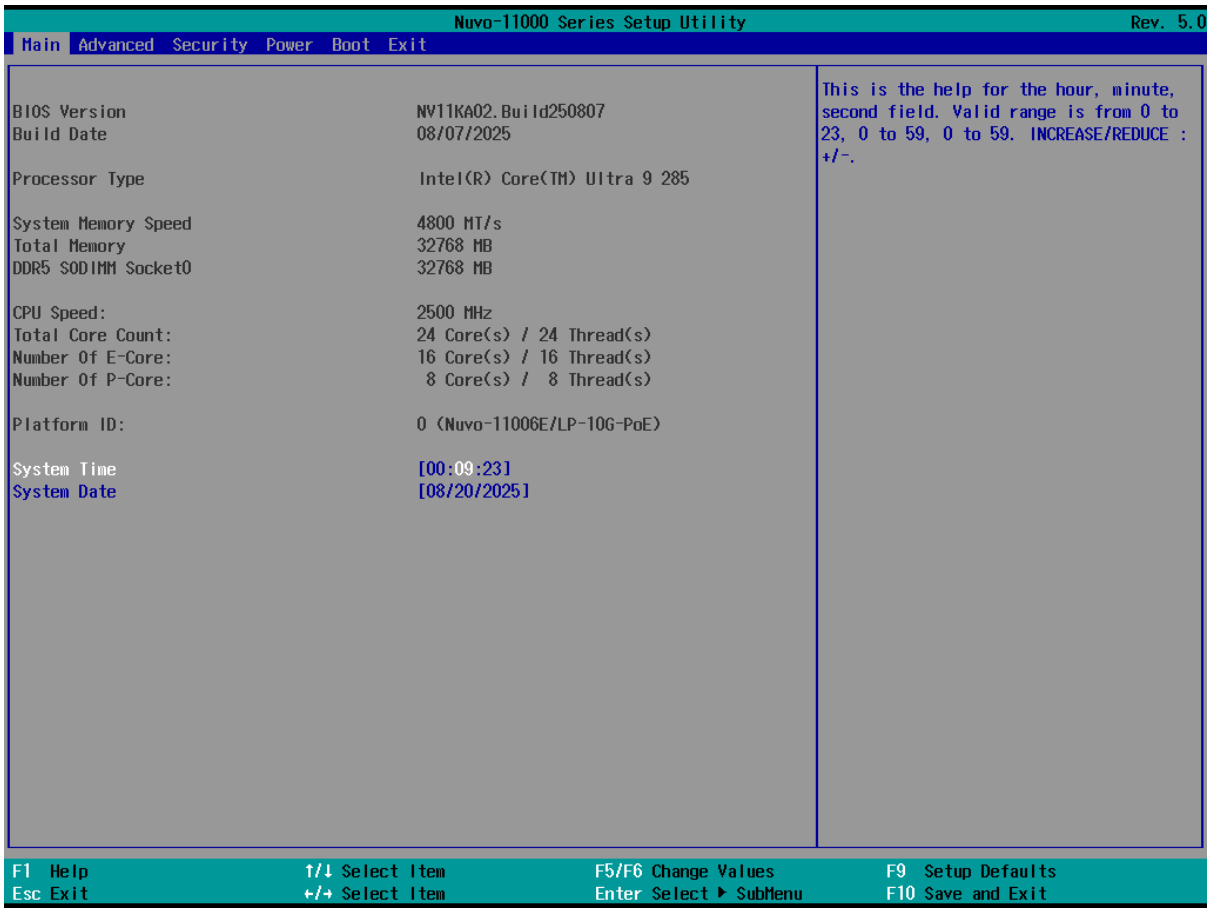
MISC CRC

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 System Configuration

4.1 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).

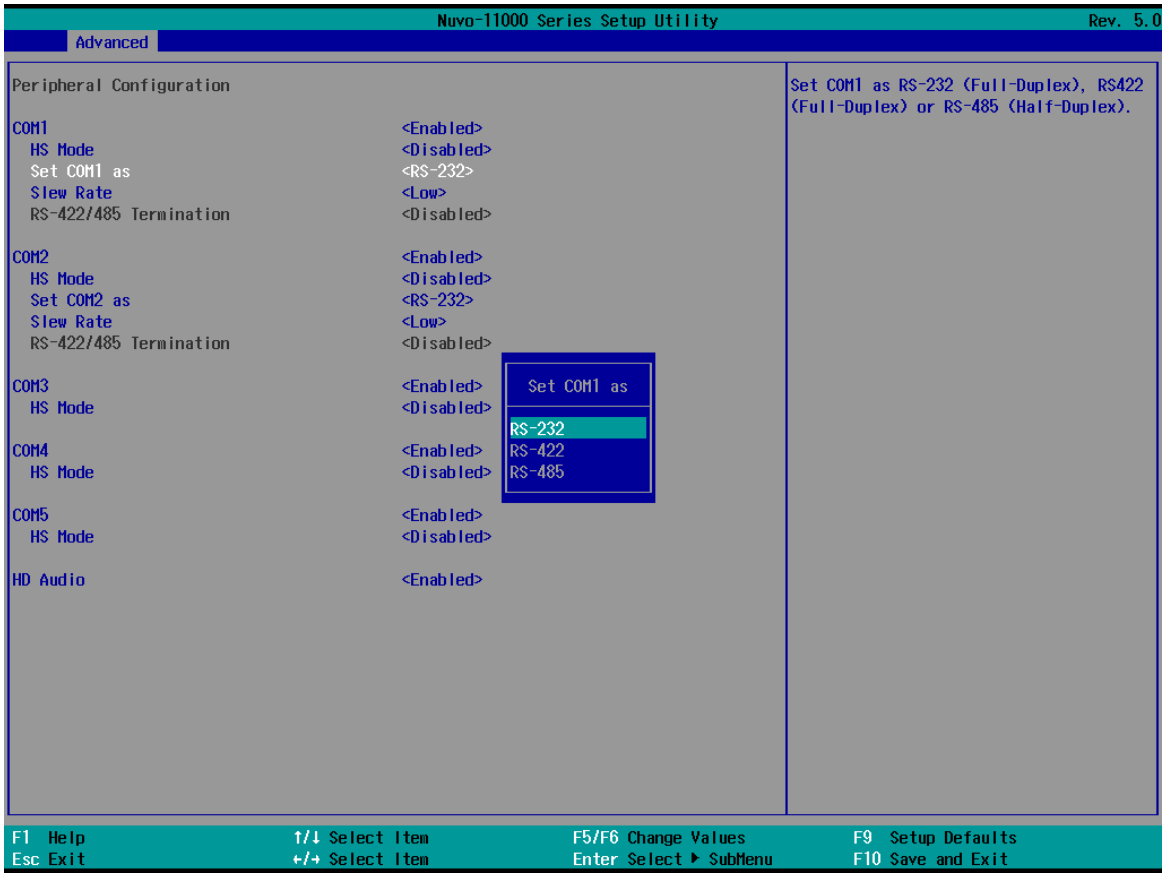


NOTE

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.

4.1.1 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).

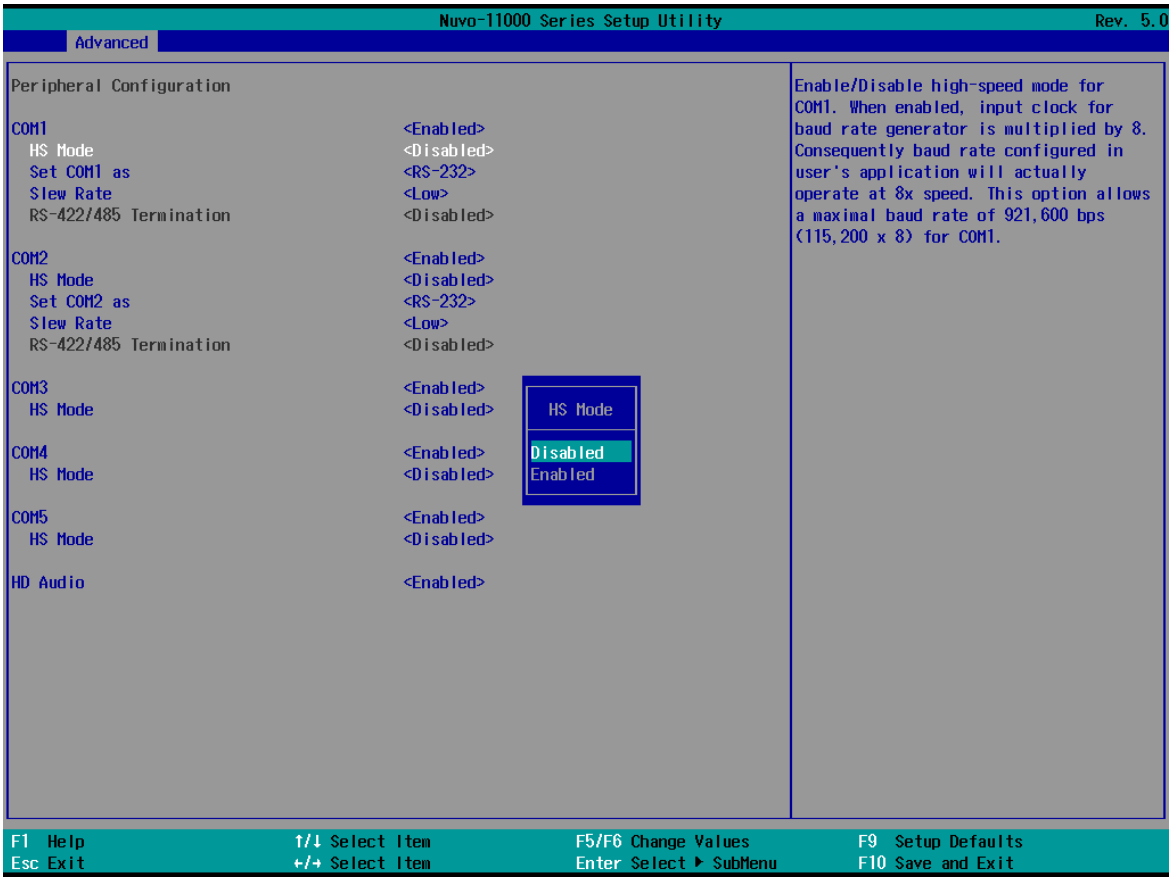


To set COM port operating mode:

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 desired mode.
4. Once set, press **F10** to "Exit Saving Changes".

4.1.2 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:

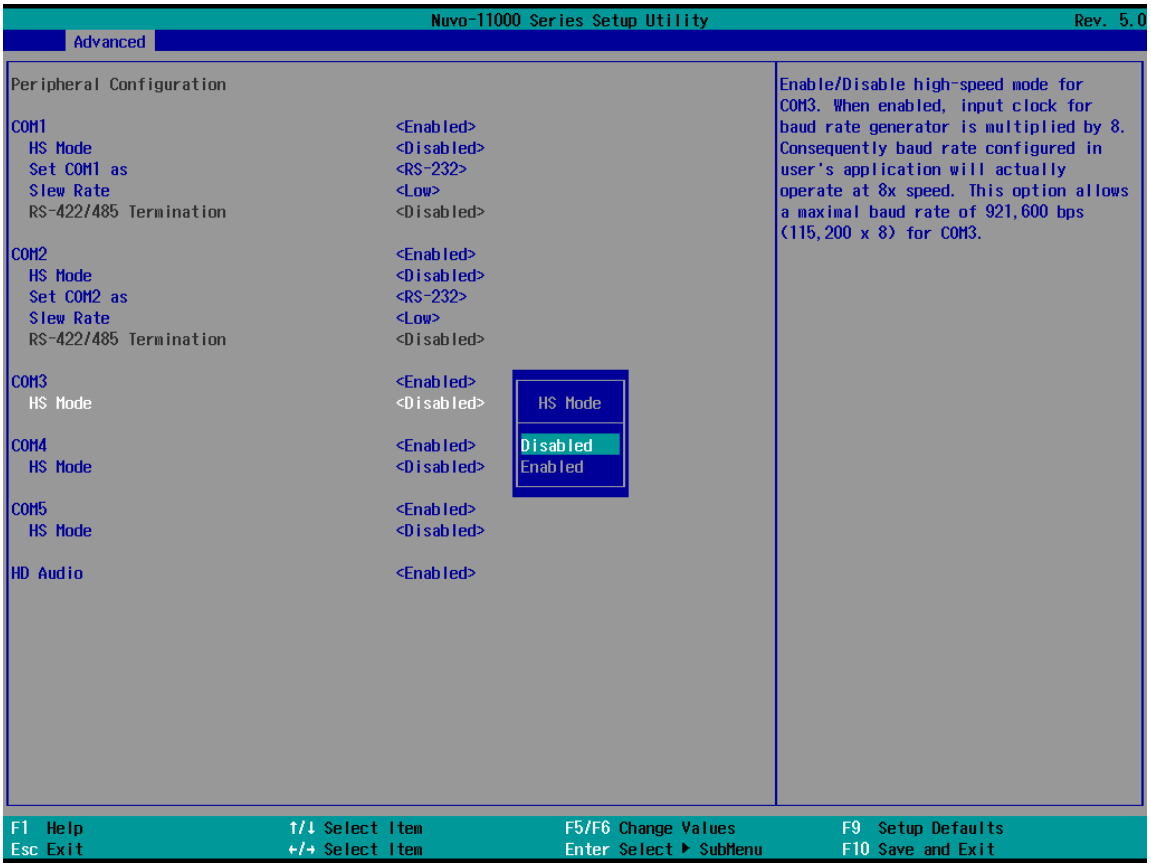
1. Press **F2** when the system boots up to enter the BIOS setup utility.
2. Go to **[Advanced] > [Peripheral Configuration]**.
3. Enable or set the **[Set COM1 Mode as]** option to the desired mode.
4. Highlight **[HS Mode]** and press ENTER to bring up options, highlight **[Enable]** and press ENTER.
5. Once set, press **F10** to “Exit Saving Changes”.

4.1.3 COM3/4 Port Configuration

The system's COM3/ 4 ports support RS-232 (full-duplex) mode. The operating mode can be configured via the BIOS. COM3/ 4 ports also have "High Speed" mode (HS Mode).

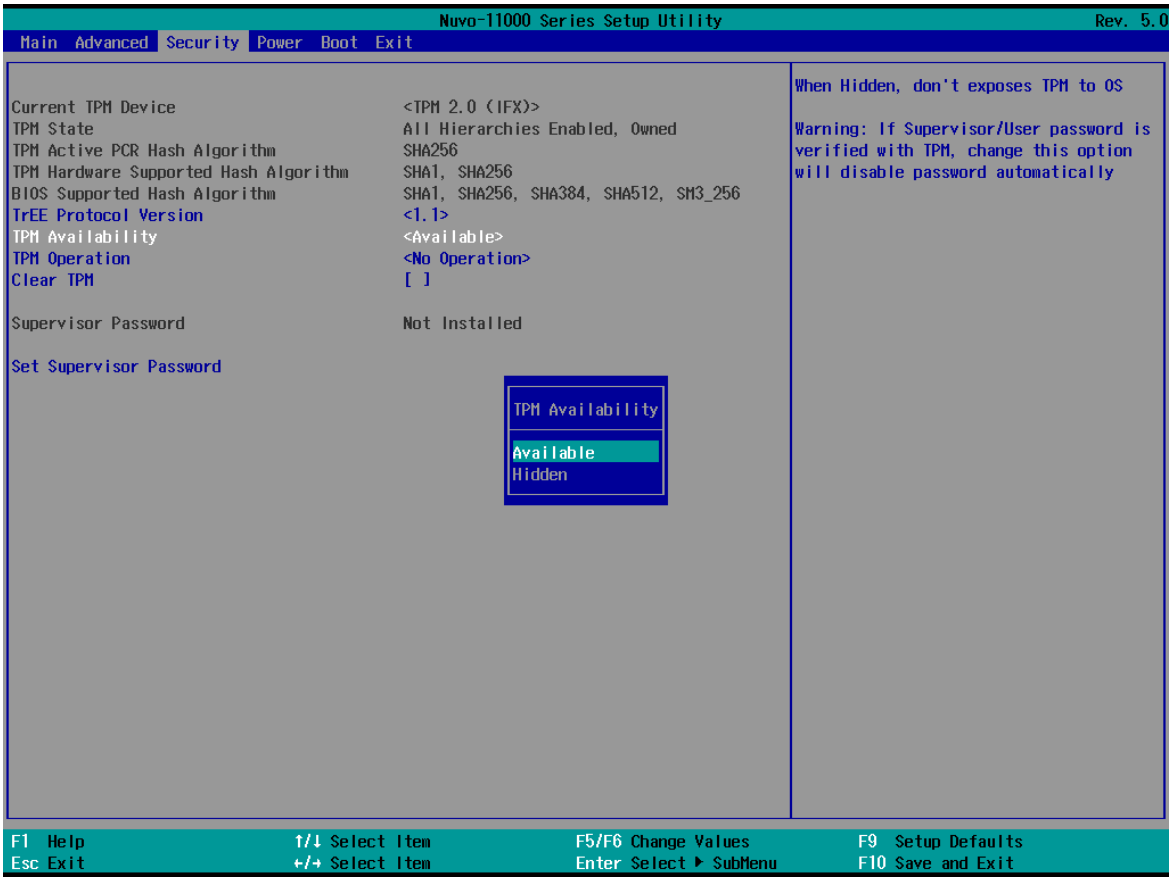
To set COM3/ 4 operating mode:

1. Press **F2** when the system boots up to enter the BIOS setup utility.
2. Go to **[Advanced]** → **[Peripheral Configuration]**.
3. Set the **[Set COM3/ 4]** option to Enable or Disable.
4. Once set, press **F10** to save setting and exit.



4.1.4 TPM Availability

Trusted Platform Module (TPM) is a hardware-based cryptoprocessor to secure hardware by integrating cryptographic keys into devices. The system is designed with on-board TPM 2.0 module. As TPM 2.0 requires 64-bit Windows 10 with UEFI boot mode, it is enabled in BIOS by default.

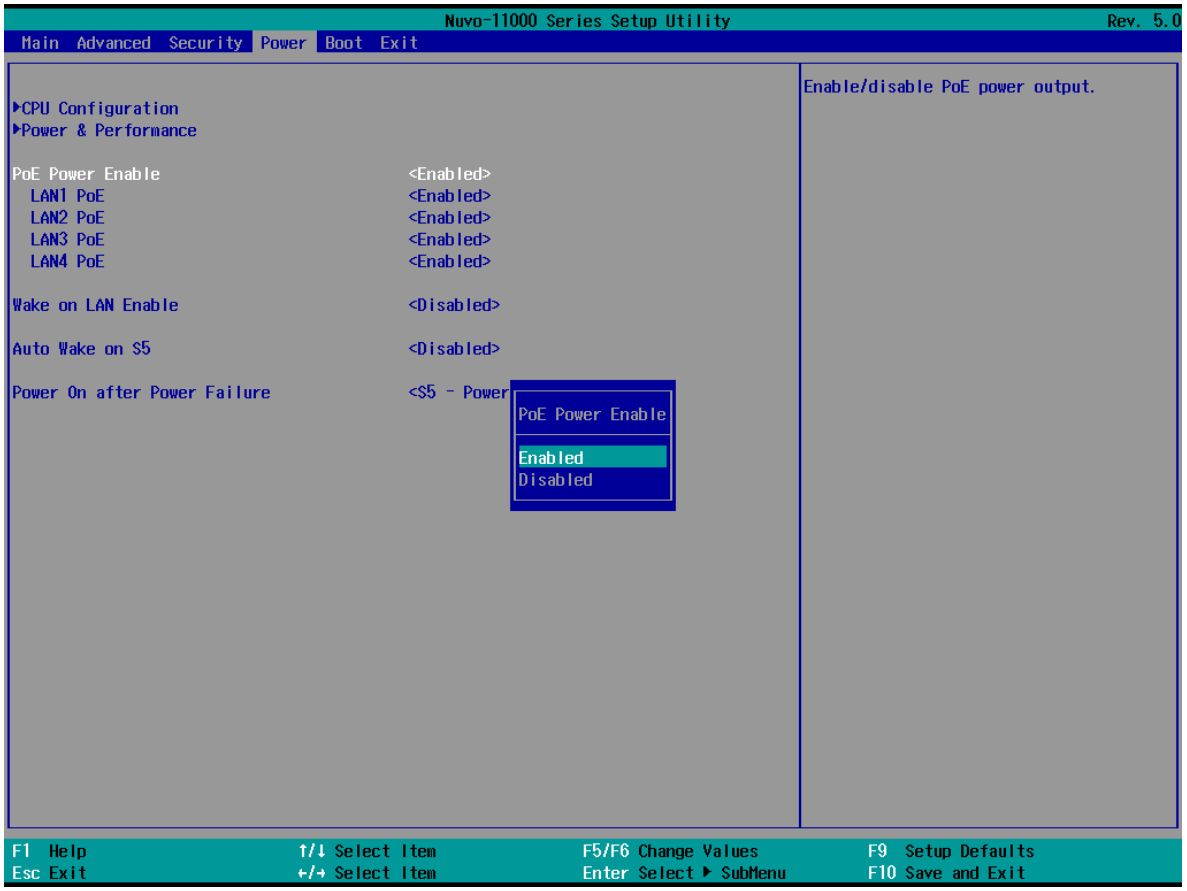


To enable TMP availability:

1. When system boots up, press F2 to enter BIOS setup utility.
2. Go to **[Security] > [TPM Availability]**, press ENTER to bring up Options, Available/ Hidden.
3. Highlight your selection, press Enter and press F10 to “Exit Saving Changes”.

4.1.5 Power over Ethernet (PoE) Power Enable

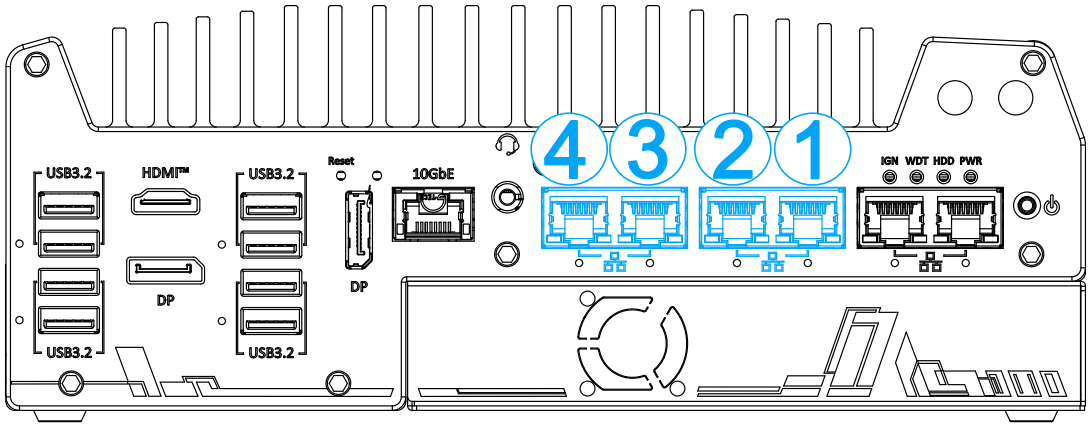
Power over Ethernet (PoE) supplies electrical power and data on a standard CAT-5/CAT-6 Ethernet cable. Acting as a PoE PSE (Power Sourcing Equipment), compliant with IEEE 802.3at, each PoE port delivers up to 25W to a Powered Device (PD). The system has a total 100W power budget. The PoE power can be Enabled/ Disabled in the BIOS.



To enable/ disable “PoE Power Enable” option:

1. When system boots up, press F2 to enter BIOS setup utility.
2. Go to **[Power] > [PoE Power Enable]**.
3. Press ENTER to bring up setting options, scroll to the setting (Enabled/ Disabled) you desire and press ENTER to set.

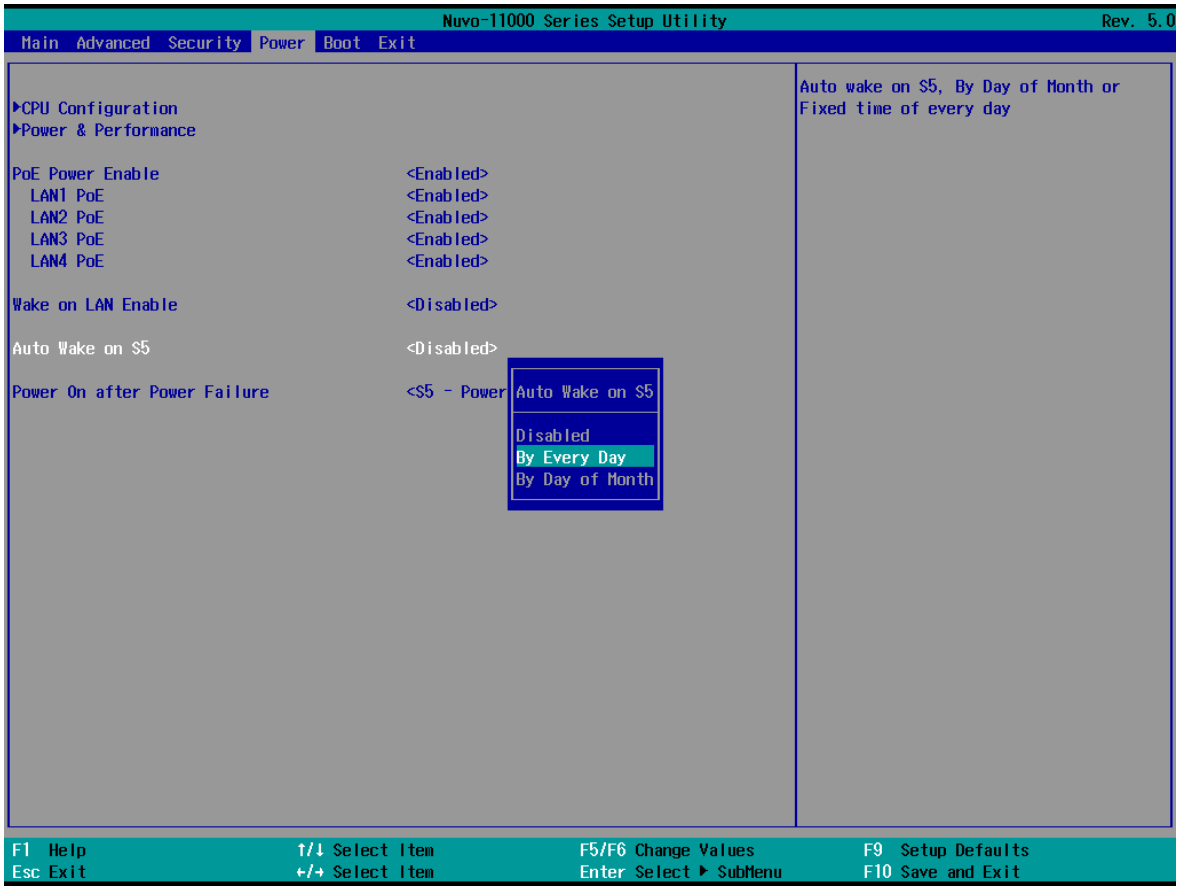
4. You can also enable/ disable each port, individually. Simply use the arrow key to highlight the port, press ENTER to bring up options (Enabled/ Disabled), press ENTER again to select the option.



5. Press F10 to “Exit Saving Changes”.

4.1.6 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.

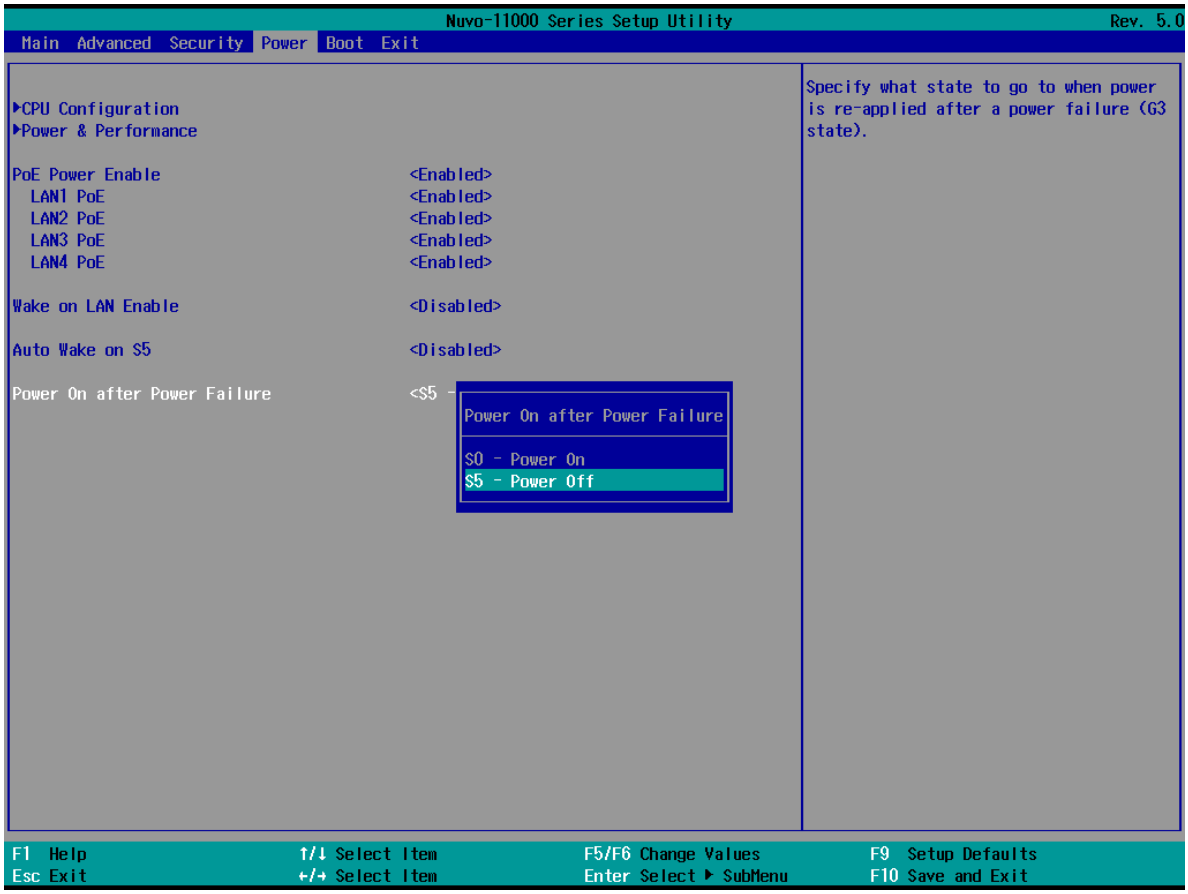


Value	Option	Description
Auto Wake on S5	Disabled	The system does not turn on when operating in state S5.
	By Every Day	The system turns on each day when operating in state S5. Specify the time of day.
	By Day of Month	The system turns on each month when operating in state S5. Specify the day and time.

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

4.1.7 Power On After Power Failure Option

This option defines the behavior of System series when DC power is supplied.



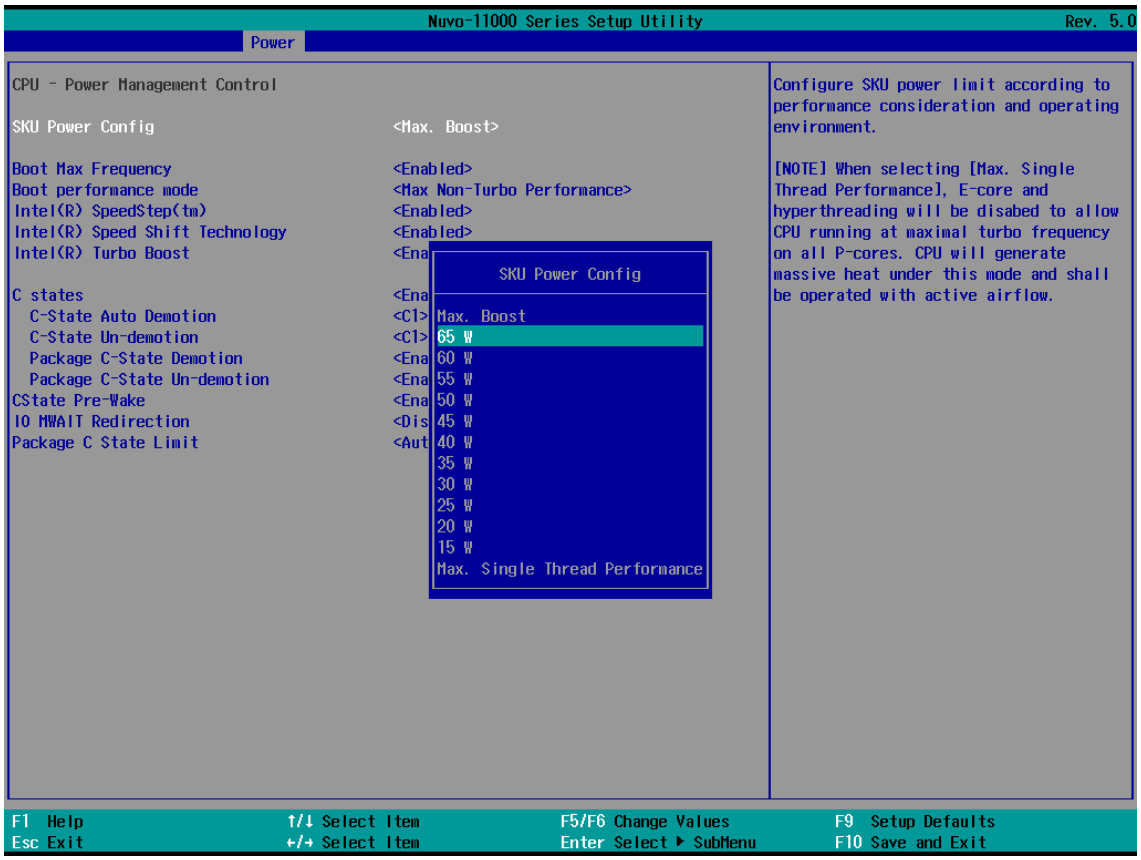
Value	Description
S0 – Power On	System is powered on when DC power is supplied.
S5 – Power Off	System is kept in off state when DC power is supplied.

To set “Power On after Power Failure” option:

1. When system boots up, press F2 to enter BIOS setup utility.
2. Go to **[Power] > [Power On after Power Failure]**.
3. Scroll down to highlight **[Power On after Power Failure]**, press ENTER to bring up setting options, S0 – Power On or S5 – Power Off, and press ENTER to select the setting.
4. Press F10 to “Exit Saving Changes”.

4.1.8 Power & Performance (CPU SKU Power Configuration)

The system supports Intel Core Ultra 200S series CPUs from 35W to 65W TDP. A unique feature, "**SKU Power Config**" is implemented in BIOS to allow users to specific user-defined SKU power limit. Although the system is designed to have best thermal performance with CPUs of 35W TDP, you can install a 65W CPU and limit its SKU power (to 35W) to obtain more computing power. This feature gives you the flexibility of CPU selection and great balance between computing power and operating temperature range.



To configure the CPU SKU power limit:

1. When the system boots up, press F2 to enter BIOS setup utility.
2. Go to **[Power]** → **[Power & Performance]**.
3. Select a proper value of SKU power limit for **[SKU Power Config]** option.
4. Press F10 to "Exit Saving Changes.

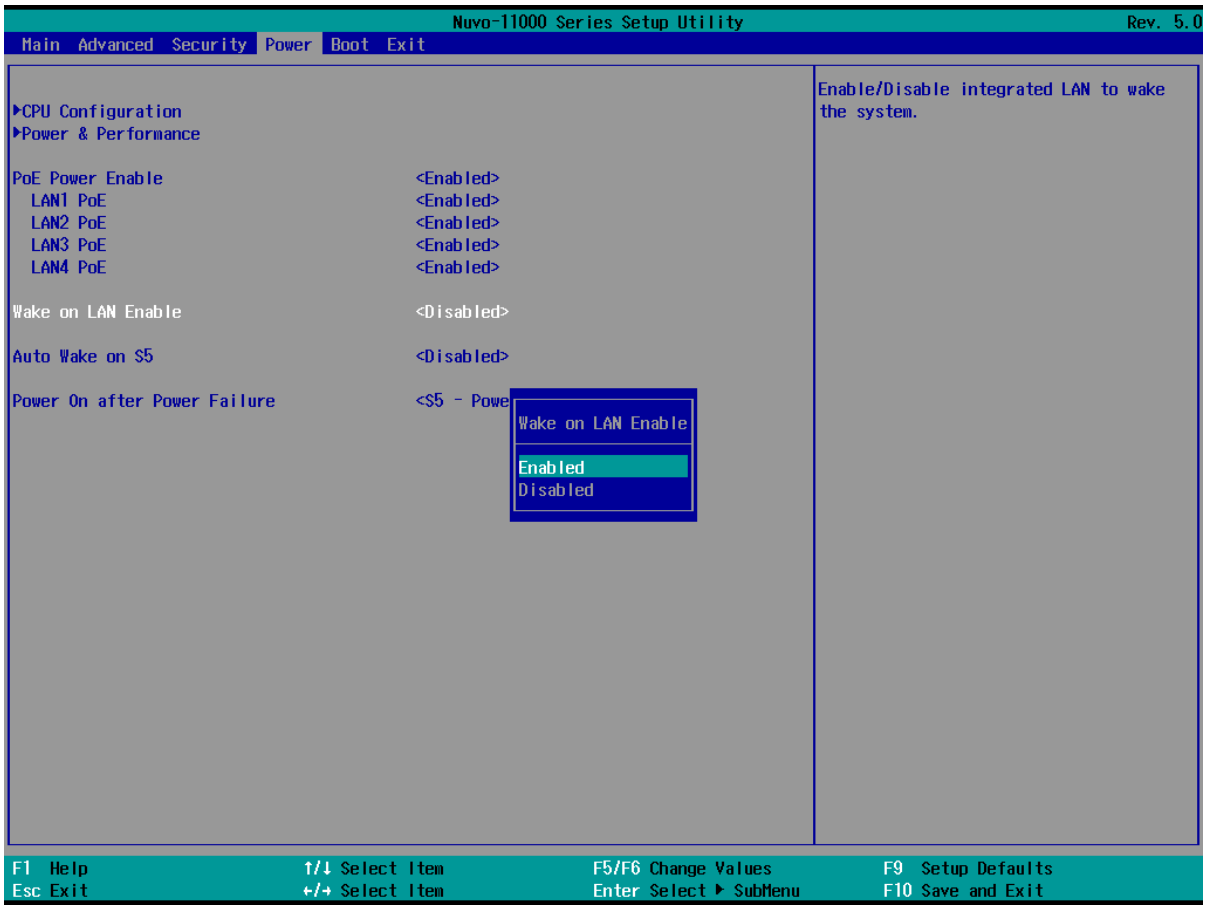
NOTE

The option "Max. Boost" unleashes the CPU's maximum performance with the highest power consumption. Make sure you're using a power supply with a rated power output four times that of the CPU TDP to ensure reliable system operations.

For users not utilizing multi-thread performance, you may select "Max. Single Thread Performance" option to enable maximum single core performance.

4.1.9 Wake on LAN

Wake on LAN is a mechanism which allows you to turn on your System series via the Ethernet connection. To utilize Wake on PME function, you have to enable this option first in the BIOS. Please refer “Powering On Using Wake on LAN)” to set up the system.

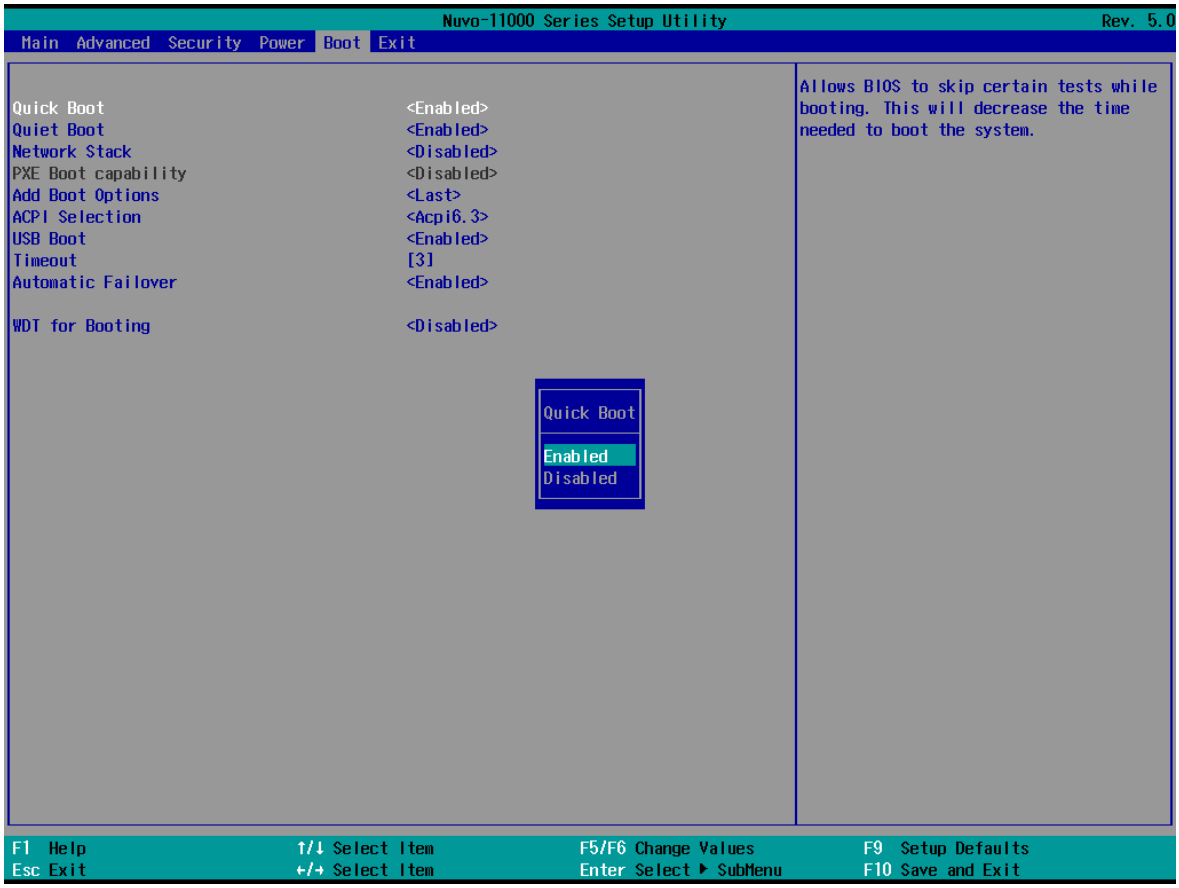


To enable/ disable “Wake on LAN” option:

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

4.1.10 Boot Menu

The Boot menu in BIOS allows you to specify the system's boot characteristics by setting bootable device components (boot media) and method. Or, you may press F12 upon system start up and select a device you wish boot from.



Value	Option	Description
Boot Type	UEFI Boot Type	Only UEFI boot media listed are approved as boot media.
Quick Boot	Enabled	The system starts up faster because BIOS skips various hardware function tests
	Disabled	The system starts up slower because BIOS goes through various hardware functions tests
Network Stack	Enabled	The system is available for network access using UEFI.
	Disabled	The system is not available for network access using UEFI.
PXE Boot capability	Disabled	Only UEFI Network Stack is supported: Preboot eXecution Environment (PXE) is not supported
	Enabled	By enabling the PXE boot, one can choose to

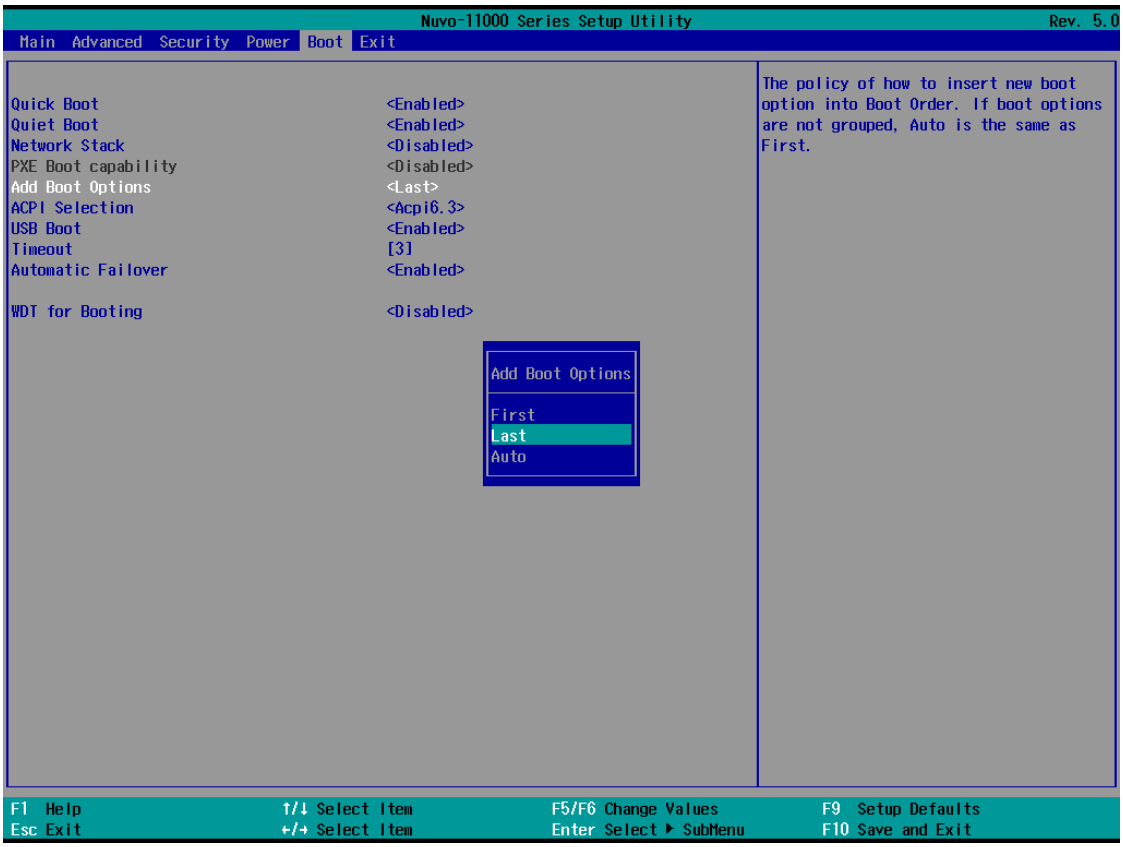
		boot via **I219 Only**/ **I225 Only** or **All NICs**.
Add Boot Options	First	Newly detected boot media are placed at the top of the boot order.
	Last	Newly detected boot media are placed at the bottom of the boot order.
ACPI Selection	1.0B/ 3.0/ 4.0/ 5.0/ 6.0	Advanced Configuration and Power Interface allows the operating system to control system power management
USB Boot	Enabled	Allow boot from bootable USB devices.
	Disabled	Does not allow boot from bootable USB devices
Timeout	1, 2, 3, etc (in seconds)	Boot delay time in seconds to give the user time to activate the hotkey to access the BIOS
Automatic Failover	Enabled	Automatically checks for the next bootable device when the set default device fails.
	Disabled	Will only boot from the designated device.
WDT for booting	Disabled, 1, 3, 5, 10 (minutes)	WDT ensures a successful system boot by specifying a timeout value

4.1.11 Add Boot Options (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:

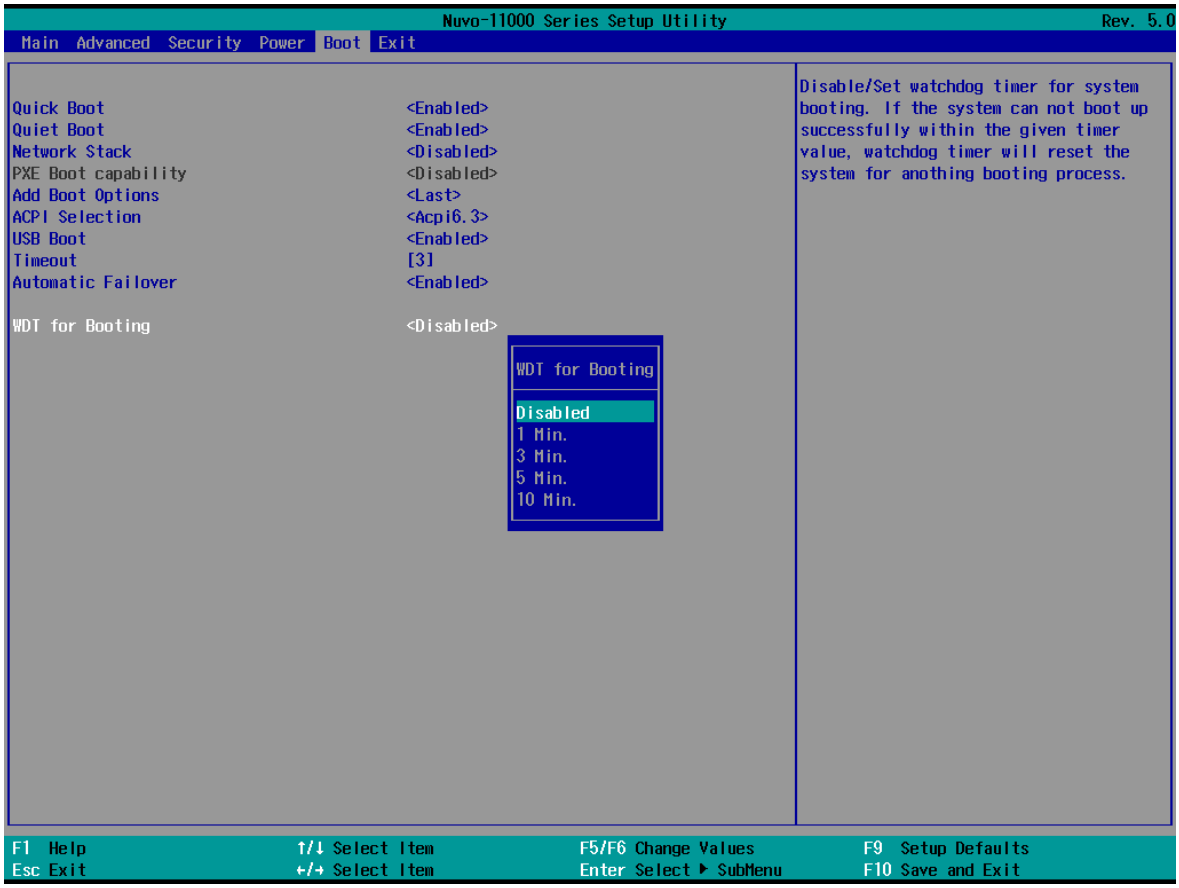
1. Press **F2** when the system boots up to enter the BIOS setup utility.
2. Go to **[Boot] > [Add Boot Options]** menu.
3. Select **[First]** or **[Last]** for your newly-added boot device and press ENTER.



4. Once set, press **F10** to “Exit Saving Changes”.

4.1.12 Watchdog Timer for Booting

The watchdog timer secures the boot process by means of a timer. Once the timer expires, a reset command is issued to initiate another booting process. There are two options in BIOS menu, "*Automatically after POST*" and "*Manually after Entering OS*". When "*Automatically after POST*" is selected, the BIOS automatically stops the watchdog timer after POST (Power-On Self Test) OK. When "*Manually after Entering OS*" is selected, the user must stop the watchdog timer once booted into the OS. This guarantees the system can always boot into the OS, otherwise another booting process will be initiated. For information about programming watchdog timer, please refer to Watchdog Timer & Isolated DIO.



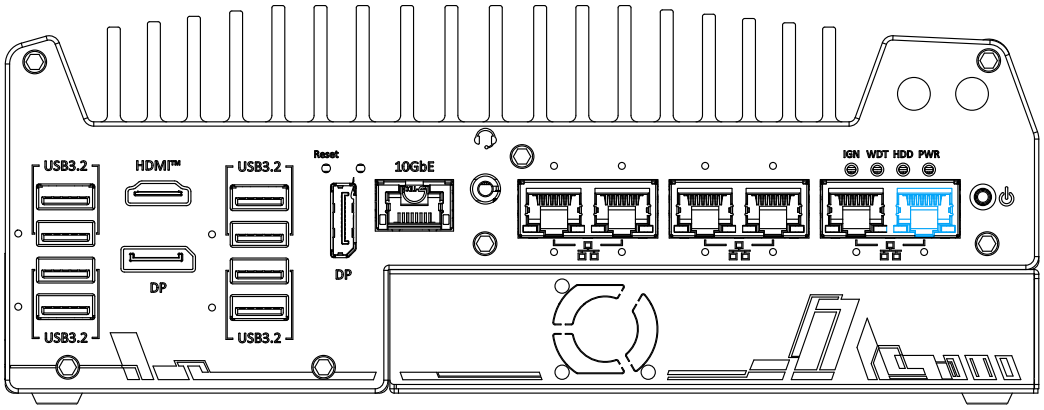
To set the watchdog timer for boot in BIOS:

1. When system boots up, press F2 to enter BIOS setup utility.
2. Go to **[Boot]** menu.
3. Disable or select timeout value for **[WDT for Booting]** option.
4. Once you give a timeout value, the **[WDT Stop Option]** option appears. You can select *"Automatically after POST"* or *"Manually after Entering OS"*.
5. Press F10 to "Exit Saving Changes".

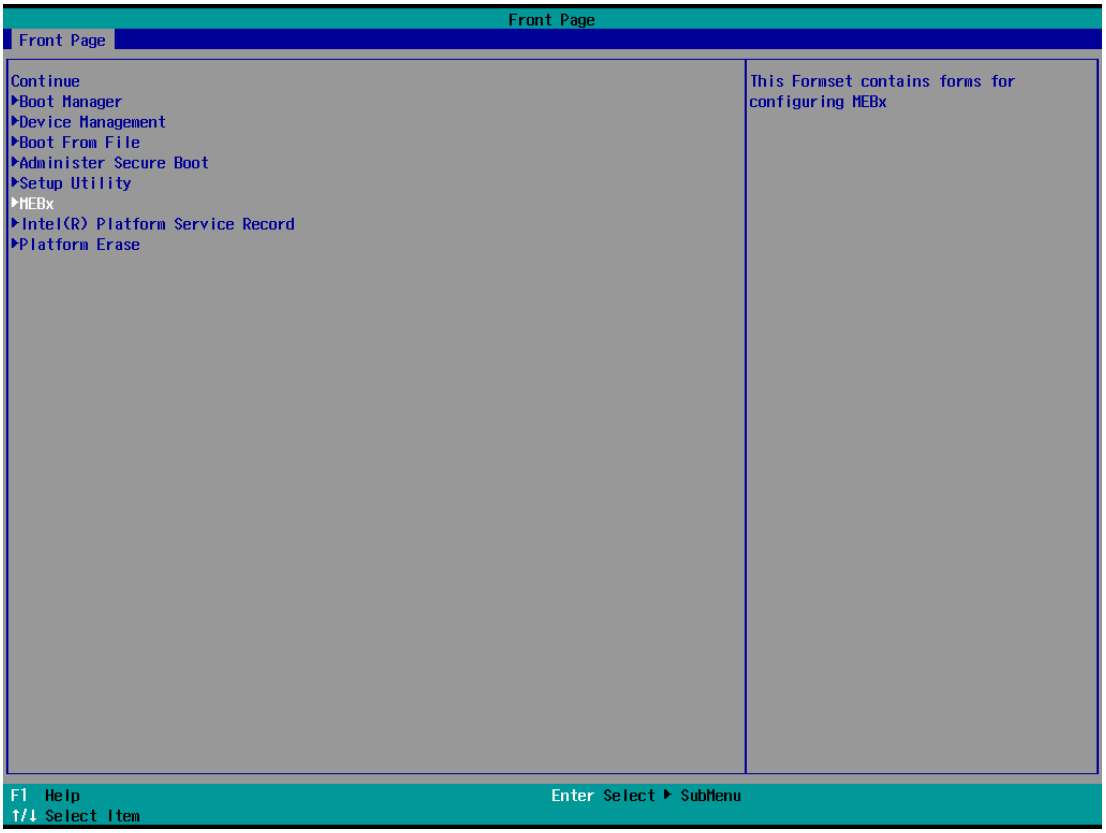
4.2 AMT Configuration

Intel® AMT (Active Management Technology) is a hardware-based technology for remotely managing target PCs via Ethernet connection. The system supports AMT function via its Ethernet port implemented with Intel I219-LM. Prior to using the AMT function to remotely control the system, you need to configure AMT password and network settings.

1. Connect Ethernet cable toI219-LM Ethernet port (indicated in **blue**).



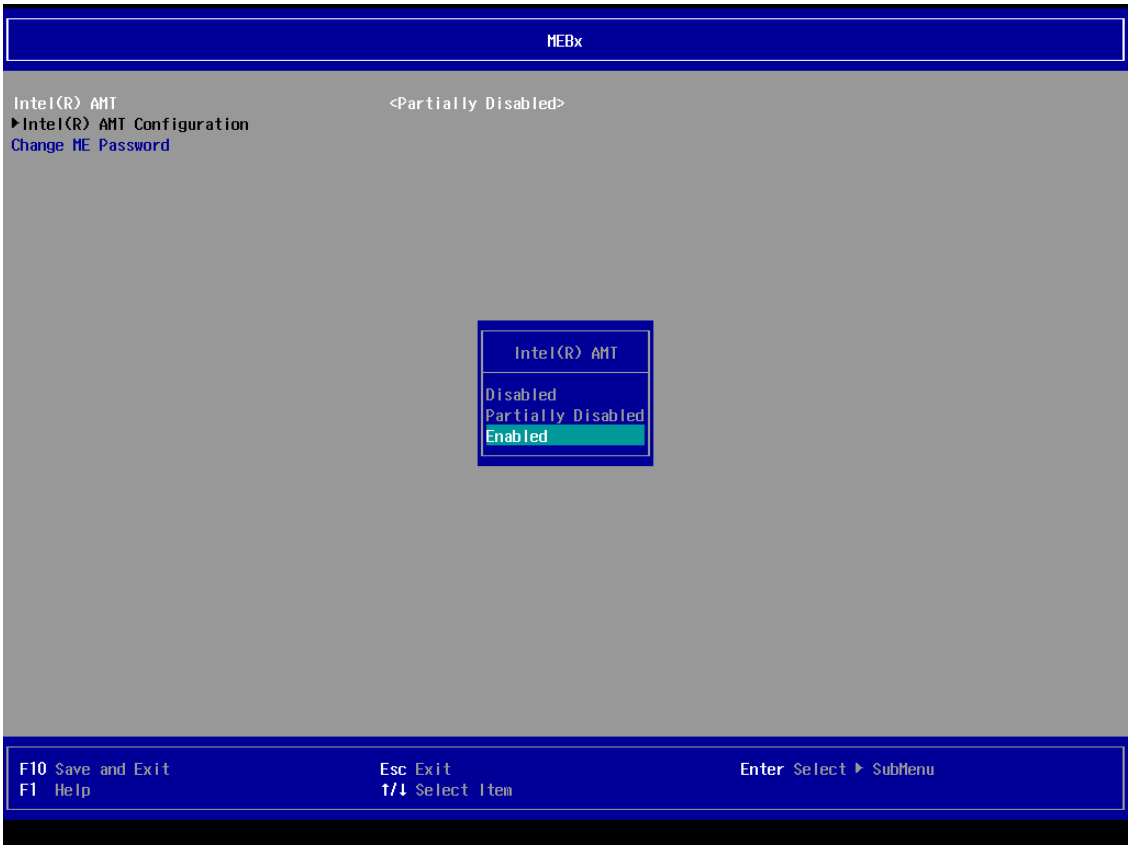
2. When the system boots up, press F10 to enter the “Front Page” menu, use the arrow key to highlight MEBx and press ENTER.



3. When entering MEBx for the first time, it will ask for the default (old) password. Please type “admin” and press ENTER.

4. The system will then request that you enter a new password. The new password must consists of at least one 7-bit ASCII non alpha-numeric character, above 32 (eg,!, @, $) and 8 to 32 characters long. Note that under score “_” is considered an alpha-numeric character.

5. After typing your new password, it will bring you to the MEBx settings page. For more MEBx configuration details, please refer to Intel® MEBX User Guide.



4.3 RAID Configuration

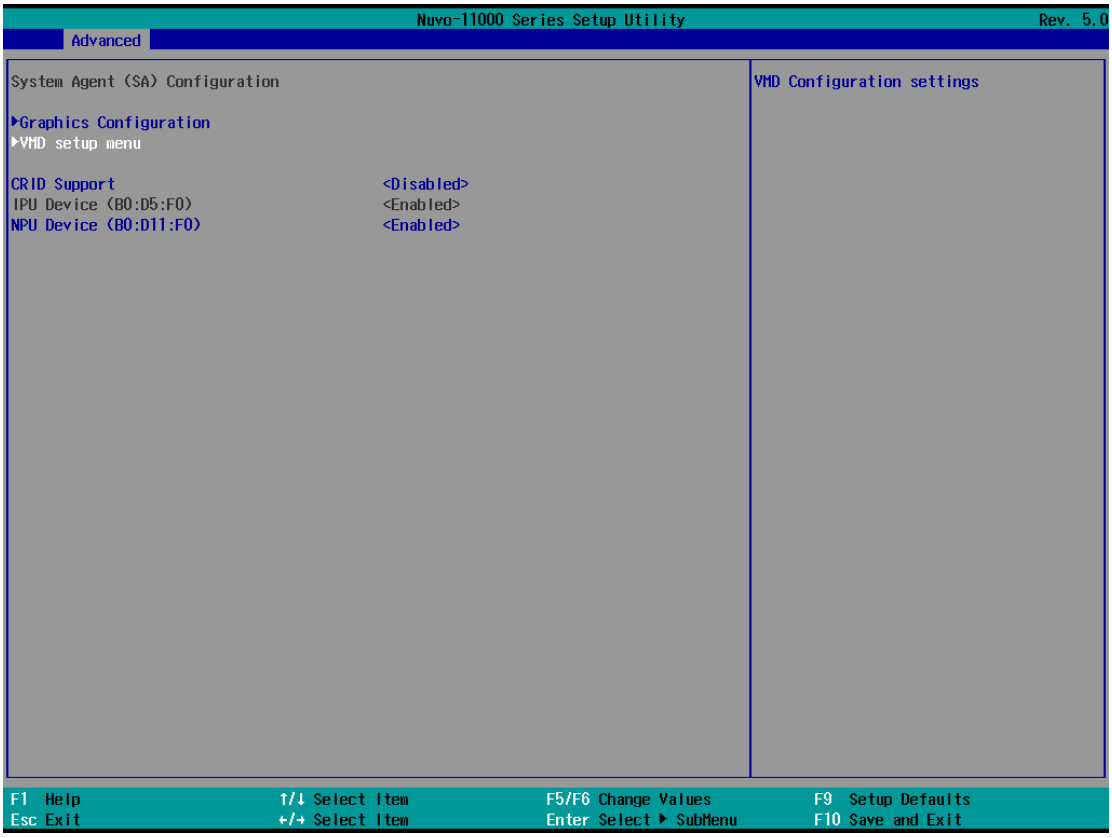
To set up a RAID 0 or 1 volume, you need to have at least two hard drives or SSDs installed. The system supports RAID configurations in RAID 0 (striping) or RAID 1 (mirror) mode. Users can select the configuration that best suit their needs with RAID 0 (striping) mode offering better hard drive read/ write performances while RAID 1 (mirror) offers better data security.

WARNING

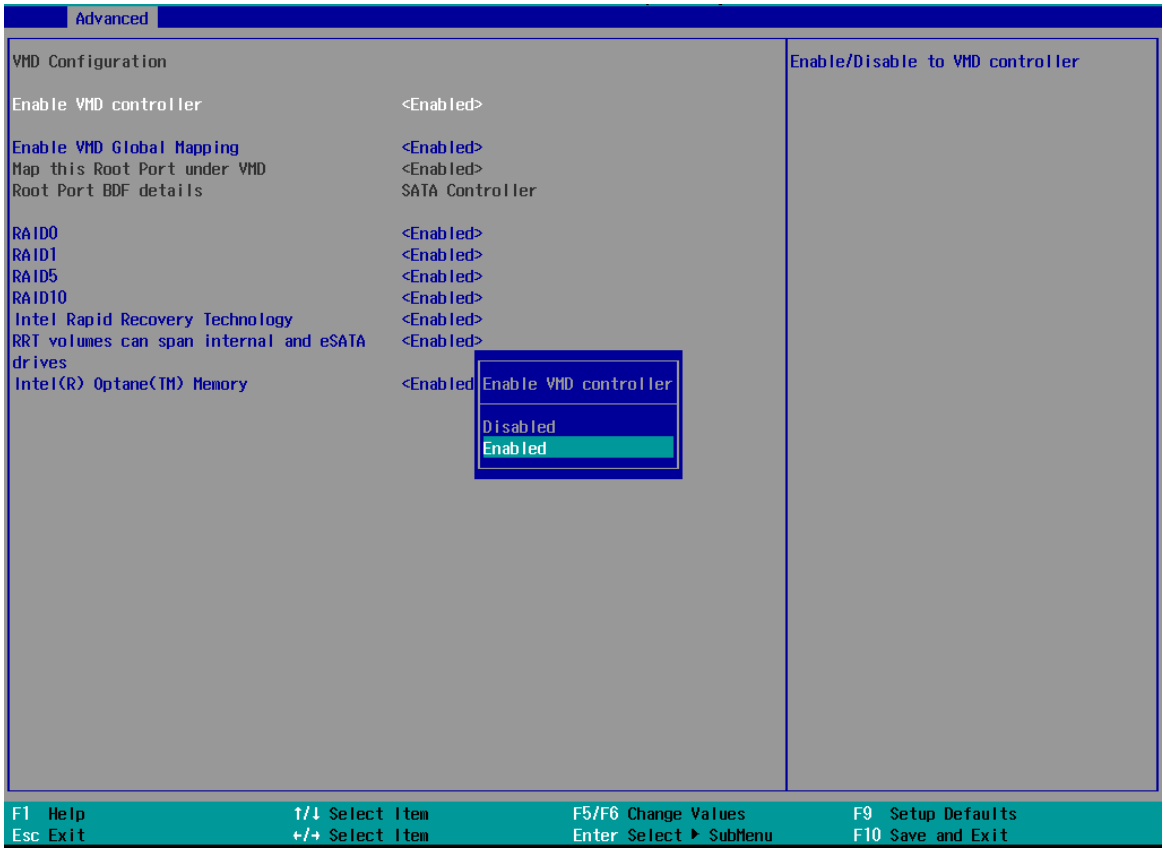
Please back up the hard drive data before you create or modify RAID volume(s) as the process may cause irreversible data deletion. When creating a RAID volume, it is also recommended to use hard drives from the same batch (same brand, model, capacity, rpm rate, etc.) to avoid performance or capacity allocation issues.

4.3.1 Enabling Volume Management Device (VMD) for RAID Volume Setup

1. When system boots up, press F2 to enter BIOS setup utility.
2. Go to **[Advanced] > [System Agent (SA) Configuration] > [VMD setup menu]**, and press ENTER.



3. Select **[Enable VMD controller]** and press ENTER, highlight **[Enabled]** and press ENTER.

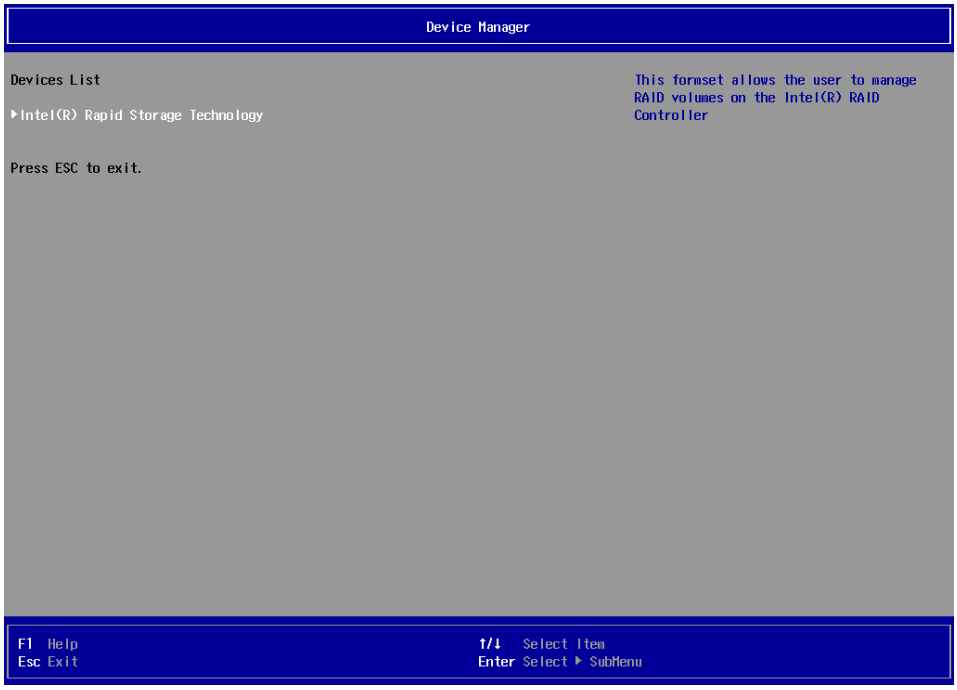


4. Press F10 to “Exit Saving Changes” and reboot the system.

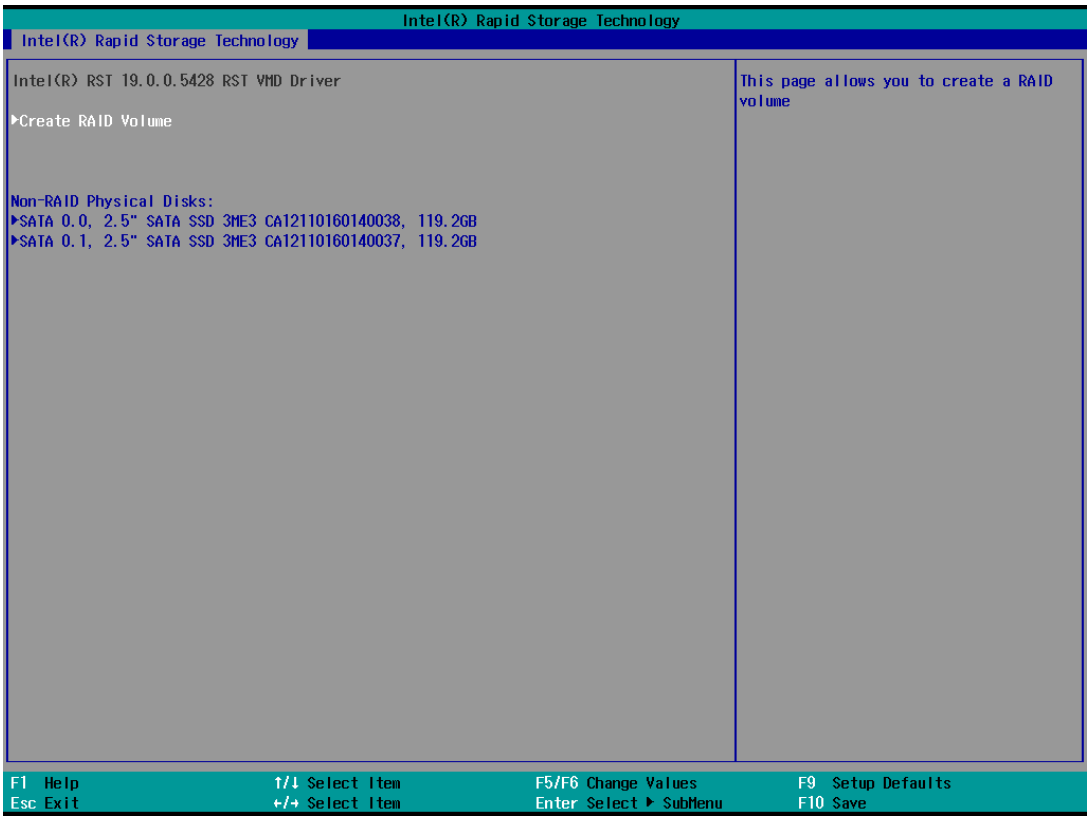
5. When the system reboots, press **[F3]** to enter the Device Manager configuration utility**.**

4.3.2 RAID Volume Setup

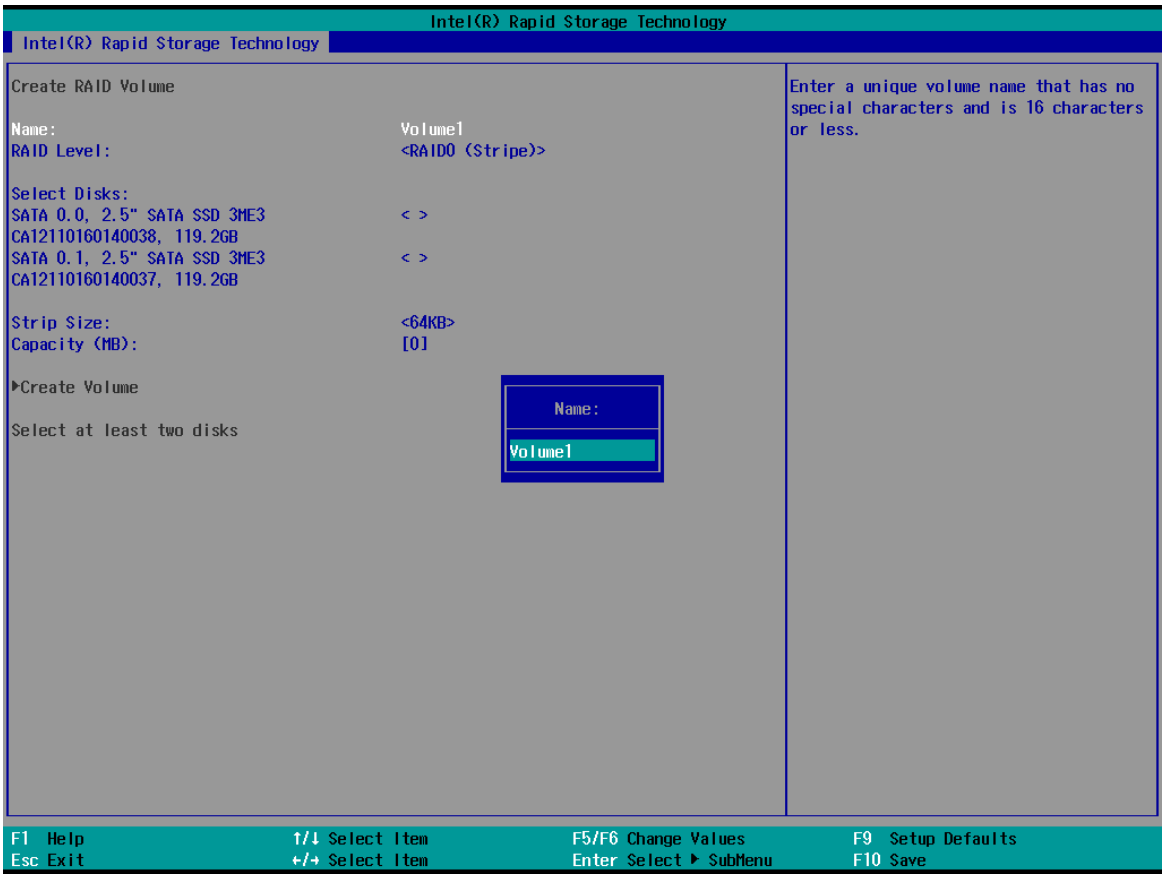
1. Once you've press F3 upon system boot up and you are in the Device Manager configuration utility, select **[Intel® Rapid Storage Technology]** and press ENTER.



2. The following screen shows Non-RAID physical disks and the option "**Create RAID Volume**". Highlight "**Create RAID Volume**" and press ENTER to begin creating your RAID volume.

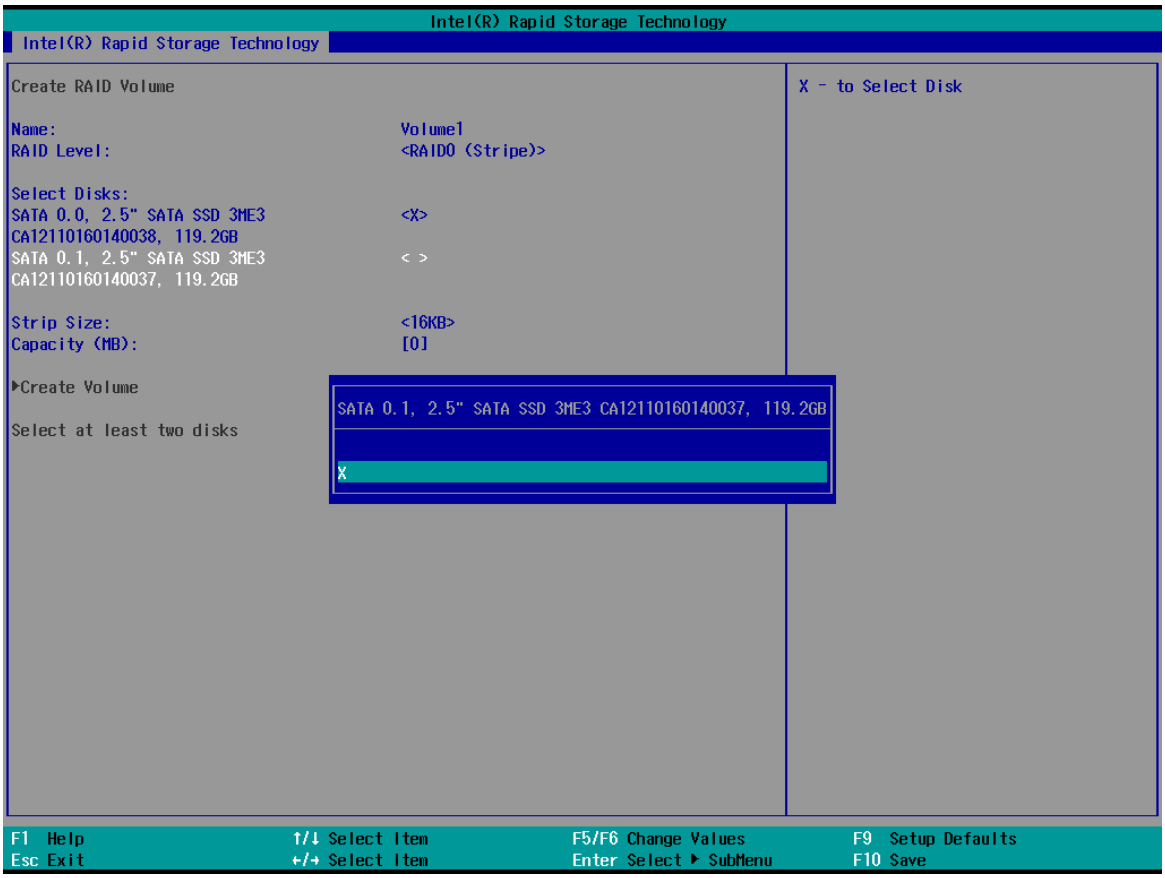


3. The Name option allows you to name your RAID volume. Press ENTER when ready to go to the next option.



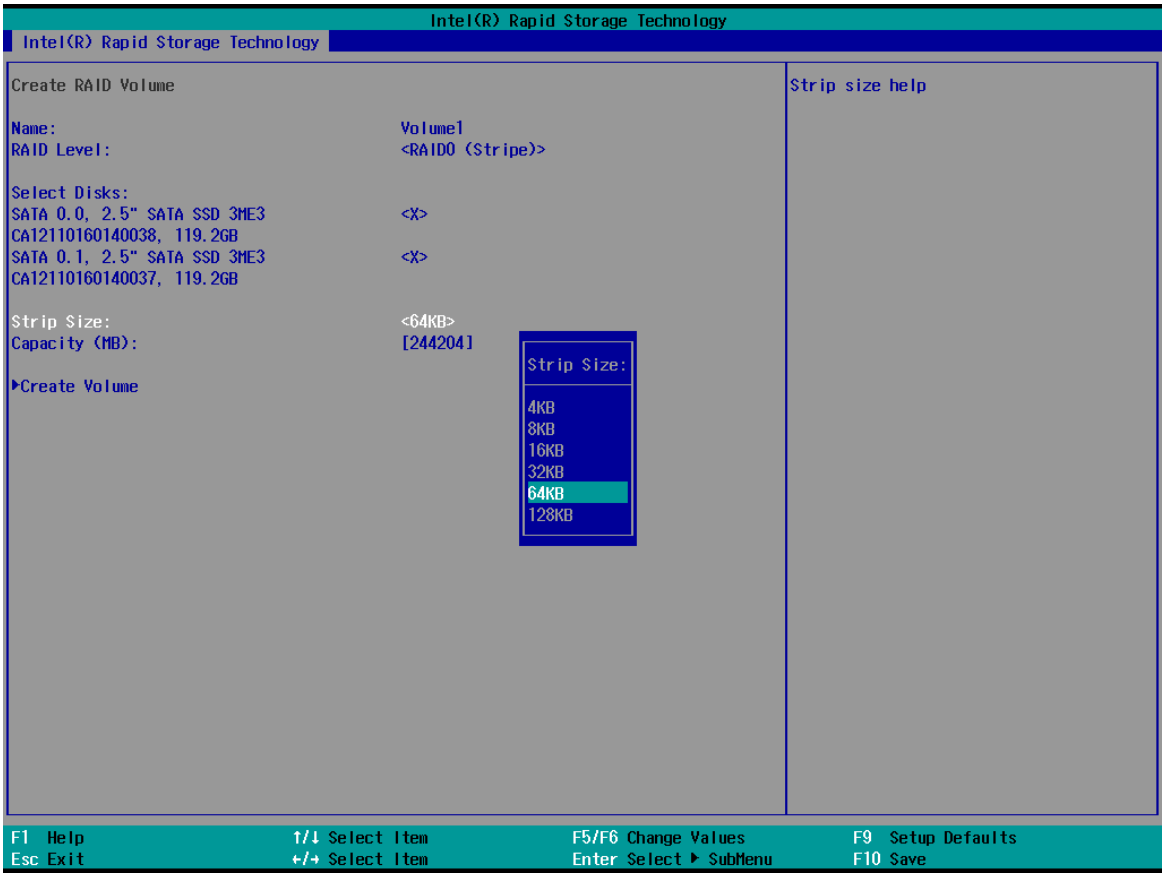
4. The RAID Level option allows you to select RAID-0 (stripping) or RAID-1 (mirror) for your RAID volume. Press ENTER when ready.

5. The Select Disks option allows you to select disk drives for your RAID volume. Highlight a drive and press ENTER, use up/ down arrow keys to highlight “x” and press ENTER to confirm the selection. A minimum of two disk drives must be selected for RAID-0 or RAID-1 configuration. Press ENTER when ready.

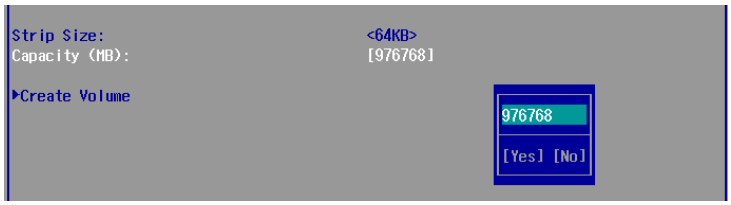


6. The Stripe Size option allows you to configure the stripe size of your RAID volume. Available stripe sizes are 4KB, 8KB, 16KB, 32KB, 64KB, 128KB, use the up and down arrow keys to highlight and press ENTER to confirm the stripe size selection.

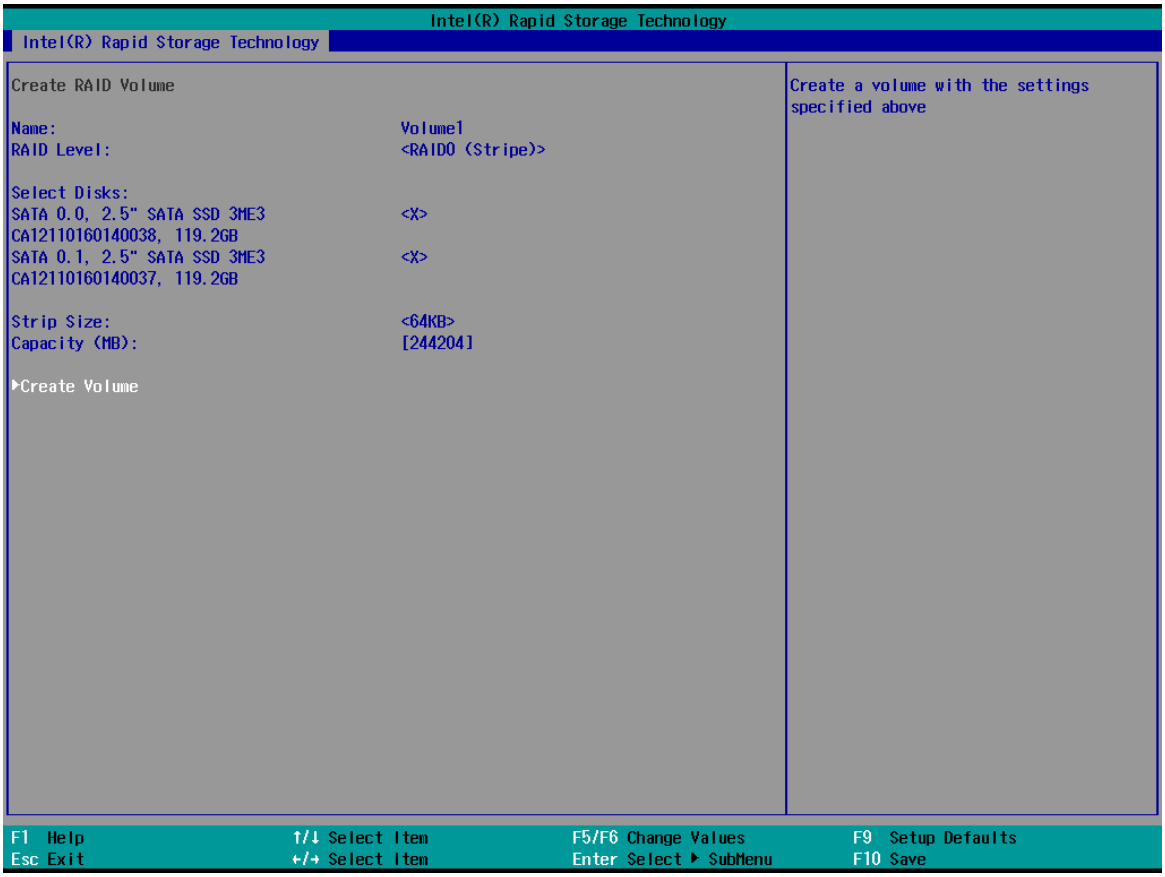
   *RAID1(Mirror) does not offer Stripe Size options.



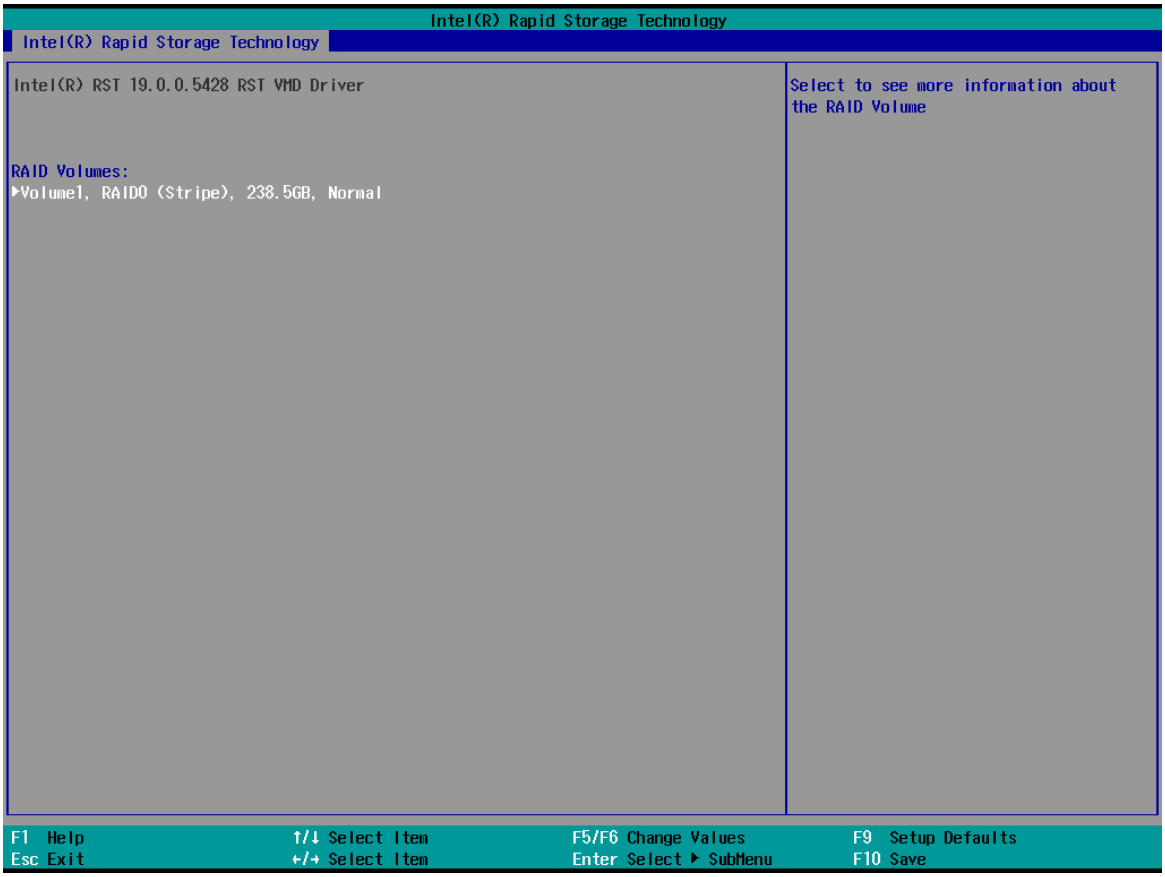
7. The Capacity (MB) option allows you to configure the storage capacity of your RAID volume. By default, the full storage capacity will be applied. Once you have entered a capacity, press ENTER to confirm.



8. The Create Volume option is the final step in the volume creation process. Highlight "**Create Volume**" and press ENTER to begin creating your RAID volume base on the settings you just configured.



9. A summary and status of the RAID volume will be shown when the RAID volume is successfully created.



10. Press F10 to save and Esc to exit the Intel® Rapid Storage Technology configuration page.

NOTE

The above process was to create a RAID-0 volume. If you wish to create a RAID-1 volume, please perform RAID Volume Setup process and select RAID-1 (Mirror) during step 4.

4.3.3 Loading RAID Driver for Windows Installation

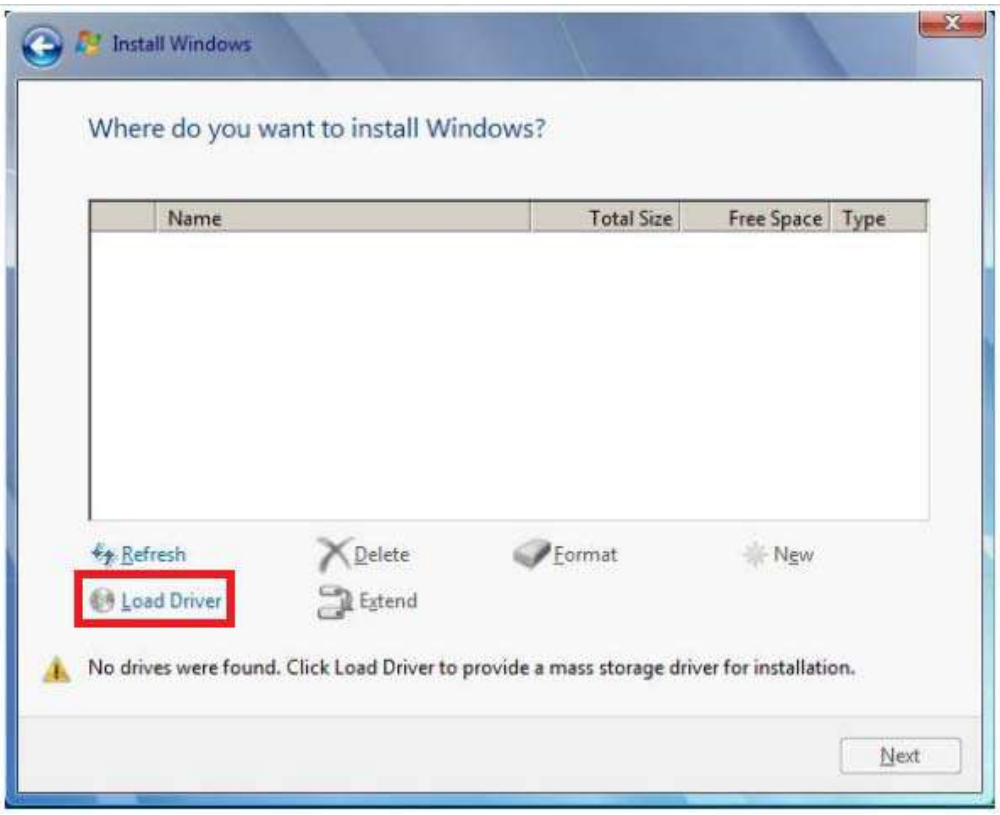
To install Windows on the RAID volume you created, please refer to the following procedure:

1. Please prepare a bootable Windows installation USB drive with the zip file "f6vmdflpy-x64". Download and unzip the driver files, copy the driver files onto the Windows installation USB drive.

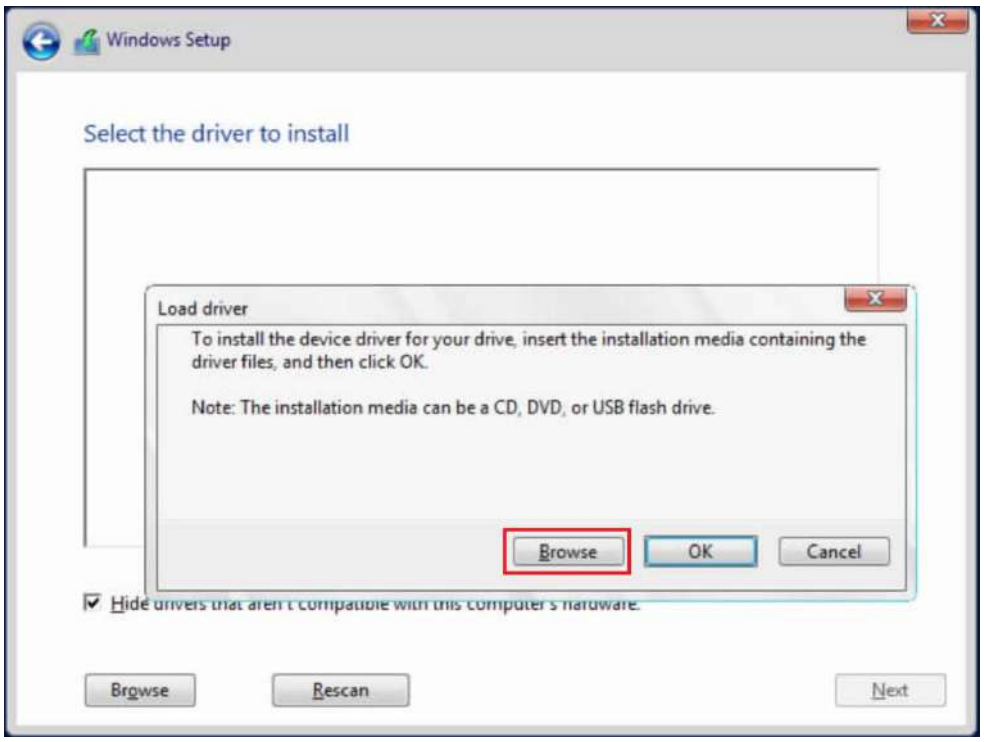
2. Connect the Windows installation USB drive into one of the USB connections on Nuvo-11000.

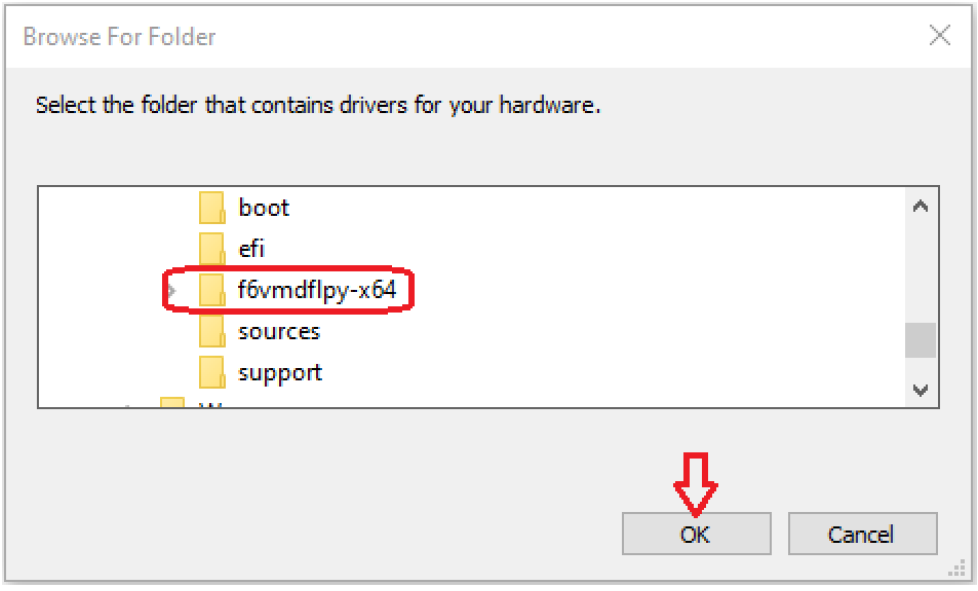
3. Windows installation process should automatically begin (if not, please make sure the boot device in BIOS is set properly).

4. Select the "Load Driver" icon.

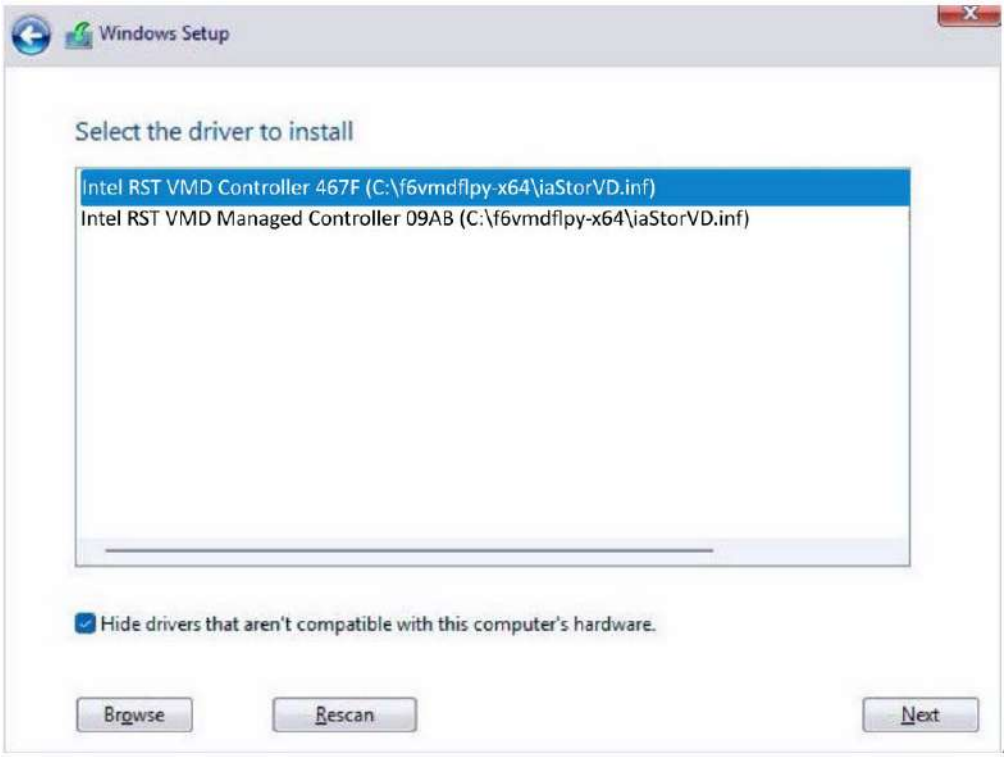


5. In the pop-up Window, select “Browse”, go to the directory where you saved the unzipped drivers “f6vmdflpy-x64”, and click OK.

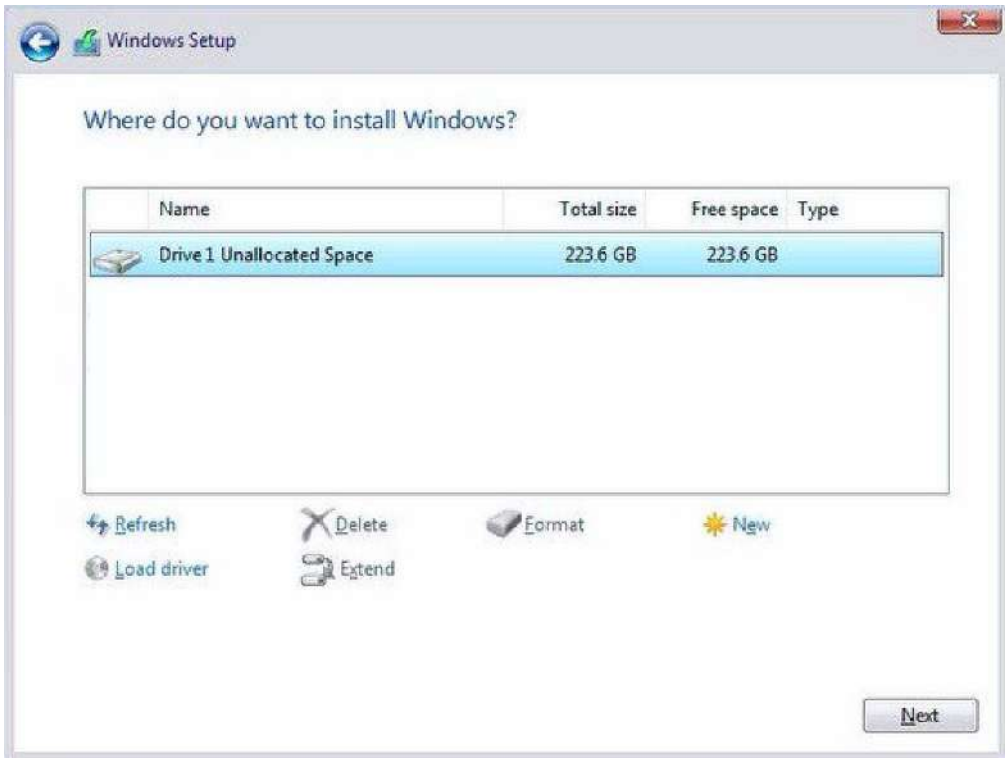




6. Select the driver “Intel RST VMD Controller 467F” and click on Next.



7. The previous created RAID volume shall appear as unallocated space.



8. From here, just follow the standard Windows installation procedures.

5 OS Support and Driver Installation

5.1 Operating System Compatibility

The system supports most operating system developed for Intel® x86 architecture. The following list contains the operating systems which have been tested by Neousys Technology.

- Microsoft Windows 11 LTSC 24H2
- Microsoft Windows 10 LTSC 21H2
- Ubuntu 24.04.1 LTS or other distribution with kernel version ≥ 6.8 */**

 NOTE

** For Linux system, user may need to manually compile and install the driver for Intel graphics or I226 GbE 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.

5.2 System Driver Installation

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

5.3 Driver Installation for Watchdog Timer Control

Neousys provides a driver package which contain function APIs for Watchdog Timer control function. You should install the driver package (WDT_DIO_Setup.exe) in prior to use these functions. Please note that you must install WDT_DIO_Setup_v2.4.1.0 or later versions.

Please refer to this link to download WDT_DIO.

Appendix A Using WDT & DIO

The watchdog timer (WDT) function to ensure reliable system operation. The WDT is a hardware mechanism to reset the system if the watchdog timer is expired. Users can start the WDT and keeping resetting the timer to make sure the system or program is running. Otherwise, the system shall be reset.

In this section, we'll illustrate how to use the function library provided by Neousys to program the WDT functions. Currently, WDT driver library supports Windows 10 x64 and WOW64 platform. For other OS support, please contact Neousys Technology for further information.

Installing WDT_DIO Library

The WDT_DIO function library is delivered in the form of a setup package named **WDT_DIO_Setup.exe**. In prior to program WDT, you should execute the setup program and install the WDT library. Please use the following WDT_DIO_Setup packages according to your operating systems and application.

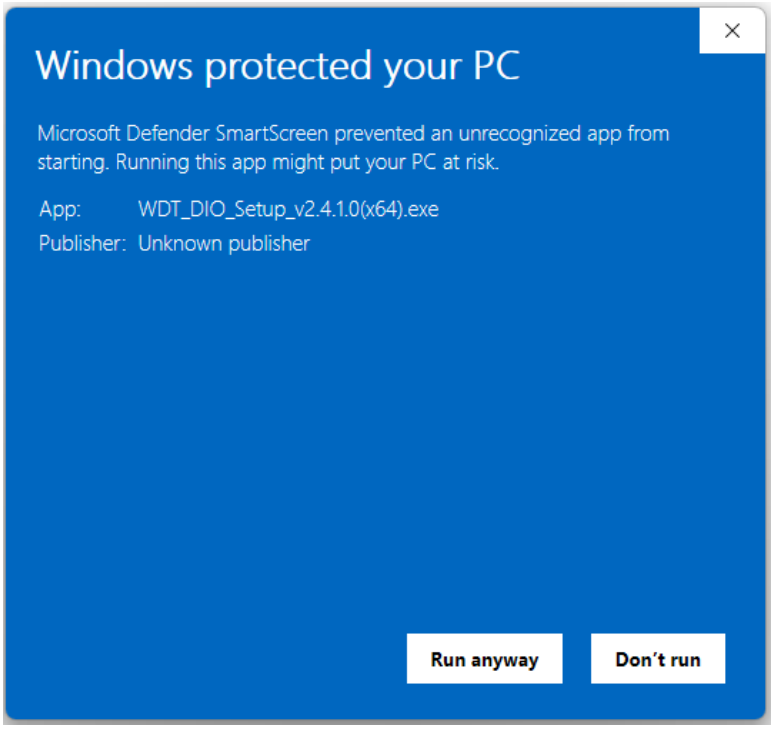
- For Windows 10 64-bit OS with 64-bit application (x64 mode), please install WDT_DIO_Setup_v2.4.1.0(x64).exe or later versions.

WDT and DIO Library Installation

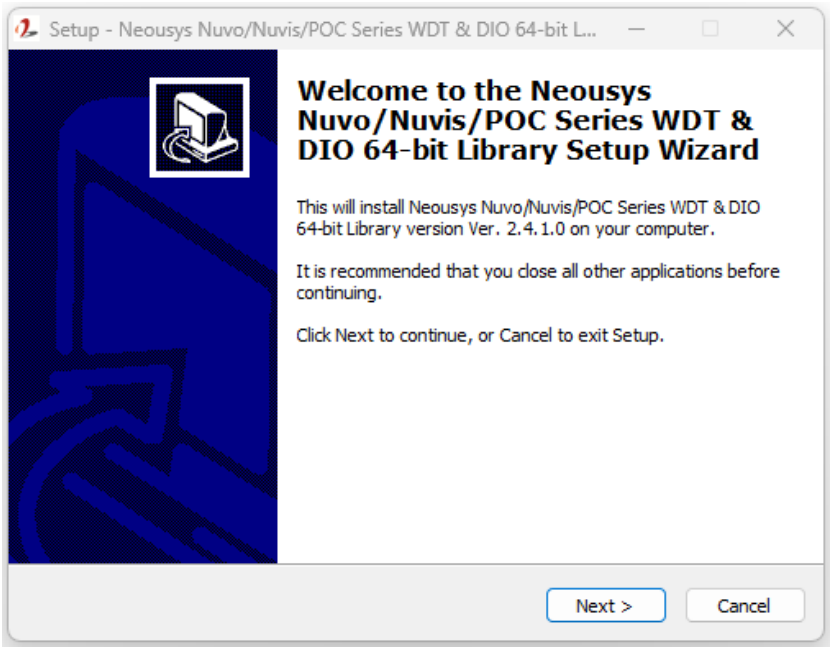
To setup WDT & DIO Library, please follow instructions below.

1. Execute **WDT_DIO_Setup.2.4.1.0.exe** (or later) and the following dialog may appear. If so, click on “More Info”.

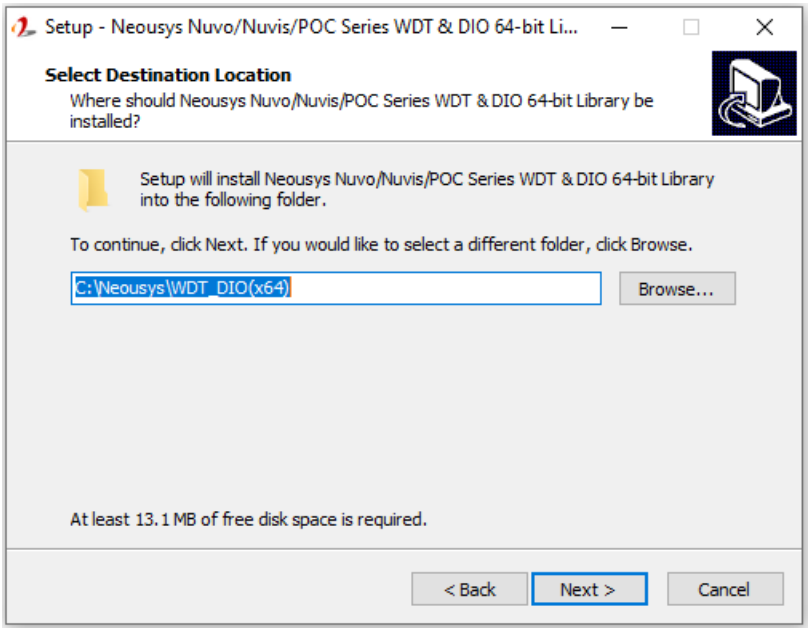
2. Click on “Run anyway” for installation, and click on “Yes” to proceed.



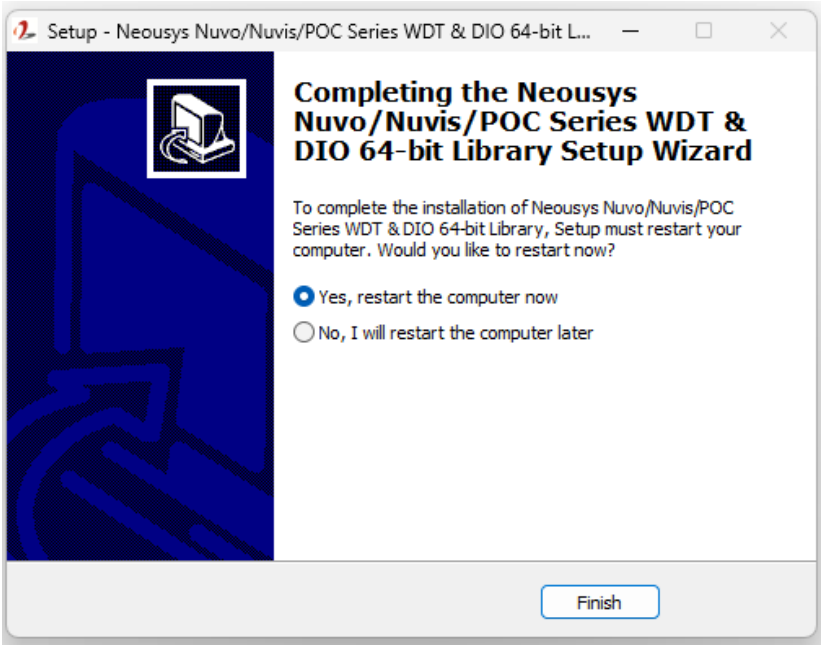
3. Click on Next to begin installation.



4. Specify the directory you would like to install to, and Click “Next >”. The default directory is *C:\Neousys\WDT_DIO(x64)*.



5. Once the installation has finished, a dialog will appear to prompt you to reboot the system. The WDT & DIO library will take effect after the system has rebooted.



6. When programming your WDT or DIO program, the related files are located in

Header File:	\Include
Library File:	\Lib
Function Reference:	\Manual
Sample Code:	\Sample\WDT_Demo (Demo for Watchdog Timer)

WDT Functions

InitWDT

Syntax	BOOL InitWDT(void);
Description:	Initialize the WDT function. You should always invoke InitWDT() before set or start watchdog timer.
Parameter	None
Return Value	**TRUE:** Successfully initialized **FALSE:** Failed to initialize
Usage	BOOL bRet = InitWDT()

SetWDT

Syntax	BOOL SetWDT(WORD tick, BYTE unit);
Description	Set timeout value and unit for watchdog timer. When InitWDT() is invoked, a default timeout value of 255 seconds is assigned.
Parameter	*tick* WORD value (1 ~ 65535) to indicate timeout ticks. *unit* BYTE value (0 or 1) to indicate unit of timeout ticks. 0 : unit is minute 1: unit is second
Return Value	If value of unit is correct (0 or 1), this function returns TRUE, otherwise FALSE.

Usage	WORD tick=255;
	BYTE unit=1; //unit is second.
	BOOL bRet = SetWDT(tick, unit); //timeout value is 255 seconds

StartWDT

Syntax	BOOL StartWDT(void);
Description	Starts WDT countdown. Once started, the WDT LED indicator will begin blinking. If ResetWDT() or StopWDT is not invoked before WDT countdowns to 0, the WDT expires and the system resets.
Parameter	None
Return Value	If the timeout value is given in correct format (WDT started), this function returns TRUE, otherwise FALSE
Usage	BOOL bRet = StartWDT()

ResetWDT

Syntax	BOOL ResetWDT(void);
Description	Reset the timeout value to the value given by SetWDT().If ResetWDT() or StopWDT is not invoked before WDT countdowns to 0, the WDT expires and the system resets.
Parameter	None
Return Value	Always returns TRUE
Usage	BOOL bRet = ResetWDT()

StopWDT

Syntax	BOOL StopWDT(void);
Description	Stops the countdown of WDT. When WDT has stopped, the WDT LED indicator stops blinking.
Parameter	None
Return Value	Always returns TRUE
Usage	BOOL bRet = StopWDT()

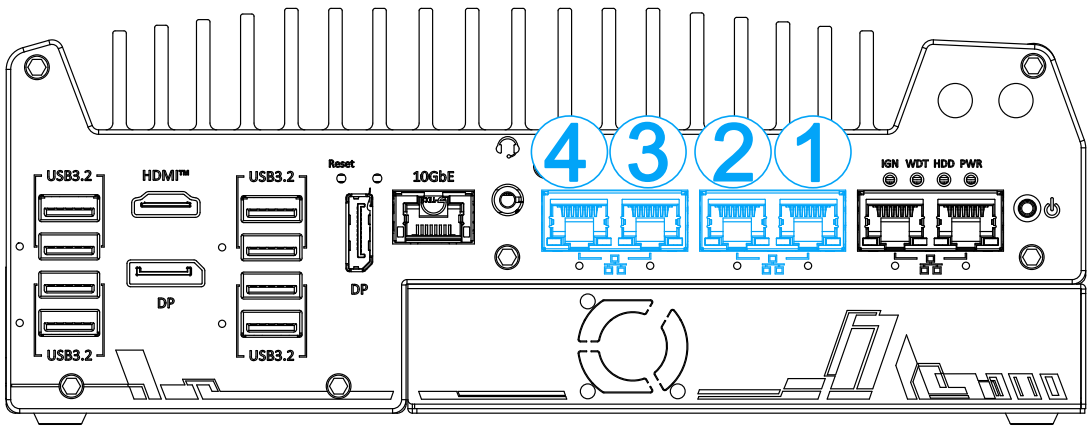
Appendix B PoE On/ Off Control

Nuvo-11000 series offer 802.3at PoE+ ports and users are allowed to manually turn on or off the power supply of each PoE port. This can be useful in power device (PD) fault-recovery or power reset. The APIs are part of Neousys WDT_DIO driver package. Please follow the instructions in Appendix AWatchdog Timer & Isolated DIO for installation before programming PoE on/off control function.

> **NOTE**
>
> Nuvo-11000E/P series will be shown in illustrations for demonstration purposes.

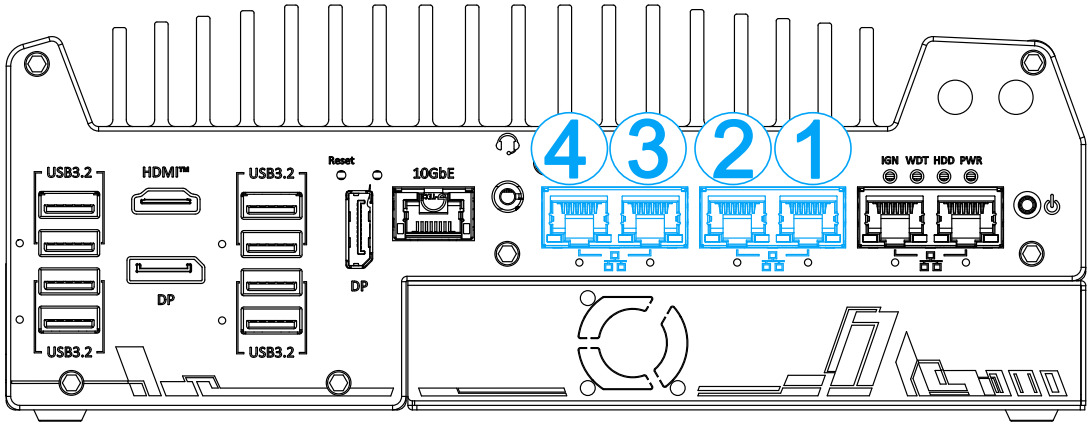
GetStatusPoEPort

Syntax	BYTE GetStatusPoEPort (Byte port);
Description	Get current on/off status of designated PoE port.
Parameter	*port* BYTE value specifies the index of PoE port. Please refer to the following illustration, *port* should be a value of 1 ~ 4
Return Value	BYTE value indicating PoE on/off status 0 if port is disabled (off) 1 if port is enabled (on)
Usage	BYTE bEnabled = GetStatusPoEPort (1); //Get on/off status of PoE Port#1



EnablePoEPort

Syntax	BOOL EnablePoEPort (BYTE port);
Description	Turn on PoE power of designated PoE port.
Parameter	*port* BYTE value specifies the index of PoE port. Please refer to the following illustration, *port* should be a value of 1 ~ 4
Return Value	**TRUE** if enabled success **FALSE** if fail to enable.
Usage	BOOL bRet = EnablePoEPort (1); //Turn on PoE Port#1



DisablePoEPort

Syntax	BOOL DisablePoEPort (BYTE port);
Description	Turn off PoE power of designated PoE port
Parameter	*port* BYTE value specifies the index of PoE port. Please refer to the following illustration, *port* should be a value of 1 ~ 4
Return Value	**TRUE** if disabled success **FALSE** if fail to disable
Usage	BOOL bRet = DisablePoEPort (1); //Turn off PoE Port#1