# Neousys Technology Inc.

## Nuvo-10000

## User Manual

Revision 1.2

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# 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.

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# Contact Information

| Headquarters (Taipei, Taiwan) | **Neousys Technology Inc.** |
| --- | --- |
| | 15F, No.868-3, Zhongzheng Rd., Zhonghe Dist., New Taipei City, 23586, Taiwan |
| | Tel: +886-2-2223-6182 Fax: +886-2-2223-6183 Email, Website |

| Americas (Illinois, USA) | **Neousys Technology America Inc.** |
| --- | --- |
| | 3384 Commercial Avenue, Northbrook, IL 60062, USA |
| | Tel: +1-847-656-3298Email, Website |

| China | **Neousys Technology (China) Ltd.** |
| --- | --- |
| | Room 612, Building 32, Guiping Road 6100, Shanghai |
| | Tel: +86-2161155366Email, Website |

# Declaration of Conformity

| FCC | This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at own expense. |
| --- | --- |

| CE | The product(s) described in this manual complies with all applicable European Union (CE) directives if it has a CE marking. For computer systems to remain CE compliant, only CE-compliant parts may be used. Maintaining CE compliance also requires proper cable and cabling techniques. |
| --- | --- |

# Copyright Notice

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**Patents and Trademarks**

# 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

- If the system is not going to be used for a long time, disconnect it from mains (power socket) to avoid transient over-voltage

# 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

# ESD Precautions

- Handle add-on module, motherboard by their retention screws or the module's frame/ heat sink. Avoid touching the PCB circuit board or add-on module connector pins

- Use a grounded wrist strap and an anti-static work pad to discharge static electricity when installing or maintaining the system

- Avoid dust, debris, carpets, plastic, vinyl and styrofoam in your work area.

- Do not remove any module or component from its anti-static bag before installation

# About This Manual

This manual introduces Neousys Nuvo-10000 Series featuring Intel® 14th/ 13th /12th Gen Core™ 65W/ 35W processors with up to 7 slot expandability. The system is capable of supporting one 115W NVIDIA® graphics card for modern AI applications.

The guide also demonstrates the system's installation procedures.

## Revision History

| Version | Date | Description |
|---|---|---|
| 1.0 | Apr. 2024 | Initial release |
| 1.1 | May. 2024 | Updated the required DC input voltage when the system is operating under certain power load |
| 1.2 | Jul. 2024 | Added On/Off Control Status pin number illustration on I/O panel |

# 1    Introduction

Nuvo-10000 series is the ideal choice to replace your bulky rack-mount or wall-mount IPC systems. The system offers up to seven PCIe/ PCI slots in its compact chassis to deliver the same level of expandability as off-the-shelf 4U 19" IPCs. Users can install a wide variety of AIO, DIO, communication, image capture and motion control cards for versatile applications.



Leveraging Intel® 14th/ 13th/ 12th-Gen Alder Lake Core™ i desktop processors with Q670 chipset, Nuvo-10000 series delivers exceptional computing power over traditional IPCs in a comparatively compact size with a competitive price. It features eight USB 3.2 ports with screw-lock mechanism for USB3 cameras. There is one GbE, one 2.5 GbE, 5 COM ports, and accommodates two 2.5" HDDs/ SSDs with the addition of an internal SATA port for a third HDD/SSD. The system can also support a 115W NVIDIA® GPU to offer significant AI computing power for modern deep-learning applications.

Driven by the increasing demand for industrial IoT, vision inspection and machine automation, Nuvo-10000 series is a flexible all-around rugged solution that can satisfy various industrial applications. With an assortment of I/O ports and flexible 7-slot PCIe/ PCI expandability, Nuvo-10000 series is geared for the fifth industrial revolution.

## 1.1   Product Specifications

### 1.1.1   Nuvo-10003 Specifications

| System Core | |
|---|---|
| Processor | Supporting Intel® 14th-Gen Core™ CPU (LGA1700 socket, 65W/ 35W TDP)<br>- Intel® Core™ i9-14900/ i9-14900T<br>- Intel® Core™ i7-14700/ i7-14700T<br>- Intel® Core™ i5-14500/ i5-14400/ i5-14500T<br>- Intel® Core™ i3-14100/ i3-14100T<br><br>Supporting Intel® 13th-Gen Core™ CPU (LGA1700 socket, 65W/ 35W TDP)<br>- Intel® Core™ i9-13900E/ i9-13900TE<br>- Intel® Core™ i7-13700E/ i7-13700TE<br>- Intel® Core™ i5-13500E/ i5-13400E/ i5-13500TE<br>- Intel® Core™ i3-13100E/ i3-13100TE<br><br>Supporting Intel® 12th-Gen Core™ CPU (LGA1700 socket, 35W/ 65W TDP)<br>- Intel® Core™ i9-12900E/ i9-12900TE<br>- Intel® Core™ i7-12700E/ i7-12700TE<br>- Intel® Core™ i5-12500E/ i5-12500TE<br>- Intel® Core™ i3-12100E/ i3-12100TE<br>- Intel® Pentium® G7400E/ G7400TE<br>- Intel® Celeron® G6900E/ G6900TE |
| Chipset | Intel® Q670E platform controller hub |
| Graphics | Integrated Intel® UHD Graphics 770 (32EU)/ 730 (24EU) |
| Memory | Up to 64 GB DDR5 4800 SDRAM (two SODIMM slots) |
| AMT | Supports Intel vPro/ AMT 16.0 |
| TPM | Supports dTPM2.0 |
| I/O Interface | |
| Ethernet | 1x 2.5G Ethernet port by I226-IT<br>1x Gigabit Ethernet port by I219-LM |
| Video port | 1x HDMI 1.4b, supporting 3840 x 2160 resolution<br>1x DisplayPort, supporting 4096 x 2304 resolution |
| Serial Port | 2x software-programmable RS-232/422/485 ports (COM1/ COM2)<br>3x 3-wire RS-232 ports (COM3/ COM4/ COM5) |
| USB3.2 | 4x USB 3.2 Gen2 (10 Gbps) ports |

| | 4x USB 3.2 Gen2 (5 Gbps) ports |
|---|---|
| USB2.0 | 1x USB 2.0 port with Type-A connector (internal) |
| Audio | 1x 3.5mm jack for mic-in and speaker-out |
| **Storage Interface** | |
| SATA | 2x SATA ports for internal 2.5" HDD/ SSD installation |
| M.2 | 1x M.2 2280 SATA interface |
| **Expansion Bus** | |
| PCI Express | 1x PCIe x16 slot @ Gen3, 16-lanes |
| | 2x PCIe x8 slot @ Gen3, 4-lanes |
| mini PCIe | 2x full-size mini PCI Express socket |
| **Power Supply** | |
| DC Input | 1x 3-pin pluggable terminal block for 12V to 35V DC input * |
| Remote Ctrl. & LED Output | 1x 10-pin (2x5) wafer connector for remote on/off control and status LED output |
| Max. power consumption | For reference only, actual consumption may vary depending on configuration. |
| | With i7-12700 (65W mode): 141.4W (Max.) @ 24V |
| | With i7-12700 (65W mode): 146.4W (Max.) @ 48V |
| | With i7-12700TE (35W mode): 106.6W (Max.) @ 24V |
| | With i7-12700TE (35W mode): 111.8W (Max.) @ 48V |
| | With i5-12400 (35W mode): 105.1W (Max.) @ 24V |
| | With i5-12400 (35W mode): 110.9W (Max.) @ 48V |
| | With i5-12400 (65W mode): 120.5W (Max.) @ 24V |
| | With i5-12400 (65W mode): 126.2W (Max.) @ 48V |
| **Mechanical** | |
| Dimension | 157.1(W) x 280(D) x 188.3(H) mm (Nuvo-10003) |
| Weight | 4.2kg |
| Mounting | Wall-mount (standard) |
| **Environmental** | |
| Operating temperature | -25°C to 60°C ** |
| Storage temperature | -40°C to 85°C |
| Humidity | 10% to 90%, non-condensing |
| Vibration | Operating, MIL-STD-810H, Method 514.6, Category 4 |
| Shock | Operating, MIL-STD-810H, Method 516.6, Procedure I, Table 516.6-II |
| EMC | CE/ FCC Class A, according to EN 55032 & EN 55035 |

\* When system load is 150W or less, the required DC input range is 12V to 35V; when the system load is between 151W and 320W (with a GPU card), the required DC input is 24V to 35V.

\*\* For sub-zero operating temperature, a wide temperature HDD or solid state disk (SSD) is required.

### 1.1.2    Nuvo-10007 Specifications

| System Core | |
|---|---|
| Processor | Supporting Intel® 14th-Gen Core™ CPU (LGA1700 socket, 65W/ 35W TDP)<br>- Intel® Core™ i9-14900/ i9-14900T<br>- Intel® Core™ i7-14700/ i7-14700T<br>- Intel® Core™ i5-14500/ i5-14400/ i5-14500T<br>- Intel® Core™ i3-14100/ i3-14100T<br><br>Supporting Intel® 13th-Gen Core™ CPU (LGA1700 socket, 65W/ 35W TDP)<br>- Intel® Core™ i9-13900E/ i9-13900TE<br>- Intel® Core™ i7-13700E/ i7-13700TE<br>- Intel® Core™ i5-13500E/ i5-13400E/ i5-13500TE<br>- Intel® Core™ i3-13100E/ i3-13100TE<br><br>Supporting Intel® 12th-Gen Core™ CPU (LGA1700 socket, 35W/ 65W TDP)<br>- Intel® Core™ i9-12900E/ i9-12900TE<br>- Intel® Core™ i7-12700E/ i7-12700TE<br>- Intel® Core™ i5-12500E/ i5-12500TE<br>- Intel® Core™ i3-12100E/ i3-12100TE<br>- Intel® Pentium® G7400E/ G7400TE<br>- Intel® Celeron® G6900E/ G6900TE |
| Chipset | Intel® Q670E platform controller hub |
| Graphics | Integrated Intel® UHD Graphics 770 (32EU)/ 730 (24EU) |
| Memory | Up to 64 GB DDR5 4800 SDRAM (two SODIMM slots) |
| AMT | Supports Intel vPro/ AMT 16.0 |
| TPM | Supports dTPM 2.0 |
| I/O Interface | |
| Ethernet | 1x 2.5G Ethernet port by I226-IT<br>1x Gigabit Ethernet port by I219-LM |
| Video port | 1x HDMI 1.4b, supporting 3840 × 2160 resolution<br>1x DisplayPort, supporting 4096 x 2304 resolution |
| Serial Port | 2x software-programmable RS-232/422/485 ports (COM1/ COM2)<br>3x 3-wire RS-232 ports (COM3/ COM4/ COM5) |
| USB3.2 | 4x USB 3.2 Gen2 (10 Gbps) ports |

| | 4x USB 3.2 Gen2 (5 Gbps) ports |
|---|---|
| USB2.0 | 1x USB 2.0 port with Type-A connector (internal) |
| Audio | 1x 3.5mm jack for mic-in and speaker-out |
| **Storage Interface** | |
| SATA | 2x SATA ports for internal 2.5" HDD/ SSD installation |
| M.2 | 1x M.2 2280 SATA interface |
| **Expansion Bus** | |
| PCI Express | 2x PCIe x16 slot @ Gen3, 8-lanes |
| | 3x PCIe x8 slot @ Gen3, 4-lanes |
| | 2x PCIe x4 slot @ Gen3, 2-lanes |
| mini PCIe | 2x full-size mini PCI Express socket |
| **Power Supply** | |
| DC Input | 1x 3-pin pluggable terminal block for 12V to 35V DC input |
| Remote Ctrl. & LED Output | 1x 10-pin (2x5) wafer connector for remote on/off control and status LED output |
| Max. power consumption | For reference only, actual consumption may vary depending on configuration. |
| | With i7-12700 (65W mode): 141.4W (Max.) @ 24V |
| | With i7-12700 (65W mode): 146.4W (Max.) @ 48V |
| | With i7-12700TE (35W mode): 106.6W (Max.) @ 24V |
| | With i7-12700TE (35W mode): 111.8W (Max.) @ 48V |
| | With i5-12400 (35W mode): 105.1W (Max.) @ 24V |
| | With i5-12400 (35W mode): 110.9W (Max.) @ 48V |
| | With i5-12400 (65W mode): 120.5W (Max.) @ 24V |
| | With i5-12400 (65W mode): 126.2W (Max.) @ 48V |
| **Mechanical** | |
| Dimension | 240.7(W) x 280(D) x 188.3(H) mm |
| Weight | 5.2kg |
| Mounting | Wall-mount (standard) |
| **Environmental** | |
| Operating temperature | -25°C to 60°C |
| Storage temperature | -40°C to 85°C |
| Humidity | 10% to 90%, non-condensing |
| Vibration | Operating, MIL-STD-810H, Method 514.6, Category 4 |
| Shock | Operating, MIL-STD-810H, Method 516.6, Procedure I, Table 516.6-II |
| EMC | CE/ FCC Class A, according to EN 55032 & EN 55035 |

\*   When system load is 150W or less, the required DC input range is 12V to 35V; when the system load is between 151W and 320W (with a GPU card), the required DC input is 24V to 35V.

\*\* For sub-zero operating temperature, a wide temperature HDD or solid state disk (SSD) is required.

### 1.1.3    Nuvo-10034 Specifications

| System Core | |
|---|---|
| Processor | Supporting Intel® 14th-Gen Core™ CPU (LGA1700 socket, 65W/ 35W TDP)<br>- Intel® Core™ i9-14900/ i9-14900T<br>- Intel® Core™ i7-14700/ i7-14700T<br>- Intel® Core™ i5-14500/ i5-14400/ i5-14500T<br>- Intel® Core™ i3-14100/ i3-14100T<br><br>Supporting Intel® 13th-Gen Core™ CPU (LGA1700 socket, 65W/ 35W TDP)<br>- Intel® Core™ i9-13900E/ i9-13900TE<br>- Intel® Core™ i7-13700E/ i7-13700TE<br>- Intel® Core™ i5-13500E/ i5-13400E/ i5-13500TE<br>- Intel® Core™ i3-13100E/ i3-13100TE<br><br>Supporting Intel® 12th-Gen Core™ CPU (LGA1700 socket, 35W/ 65W TDP)<br>- Intel® Core™ i9-12900E/ i9-12900TE<br>- Intel® Core™ i7-12700E/ i7-12700TE<br>- Intel® Core™ i5-12500E/ i5-12500TE<br>- Intel® Core™ i3-12100E/ i3-12100TE<br>- Intel® Pentium® G7400E/ G7400TE<br>- Intel® Celeron® G6900E/ G6900TE |
| Chipset | Intel® Q670E platform controller hub |
| Graphics | Integrated Intel® UHD Graphics 770 (32EU)/ 730 (24EU) |
| Memory | Up to 64 GB DDR5 4800 SDRAM (two SODIMM slots) |
| AMT | Supports Intel vPro/ AMT 16.0 |
| TPM | Supports dTPM 2.0 |
| I/O Interface | |
| Ethernet | 1x 2.5G Ethernet port by I226-IT<br>1x Gigabit Ethernet port by I219-LM |
| Video port | 1x HDMI 1.4b, supporting 3840 × 2160 resolution<br>1x DisplayPort, supporting 4096 x 2304 resolution |
| Serial Port | 2x software-programmable RS-232/422/485 ports (COM1/ COM2)<br>3x 3-wire RS-232 ports (COM3/ COM4/ COM5) |
| USB3.2 | 4x USB 3.2 Gen2 (10 Gbps) ports<br>4x USB 3.2 Gen2 (5 Gbps) ports |
| USB2.0 | 1x USB 2.0 port with Type-A connector (internal) |
| Audio | 1x 3.5mm jack for mic-in and speaker-out |

| Storage Interface | |
|---|---|
| SATA | 2x SATA ports for internal 2.5" HDD/ SSD installation |
| M.2 | 1x M.2 2280 SATA interface |
| **Expansion Bus** | |
| PCI Express | 2x PCIe x16 slot @ Gen3, 8-lanes |
| | 2x PCIe x8 slot @ Gen3, 4-lanes |
| mini PCIe | 2x full-size mini PCI Express socket |
| **Power Supply** | |
| DC Input | 1x 3-pin pluggable terminal block for 12V to 35V DC input |
| Remote Ctrl. & LED Output | 1x 10-pin (2x5) wafer connector for remote on/off control and status LED output |
| Max. power consumption | For reference only, actual consumption may vary depending on configuration. |
| | With i7-12700 (65W mode): 141.4W (Max.) @ 24V |
| | With i7-12700 (65W mode): 146.4W (Max.) @ 48V |
| | With i7-12700TE (35W mode): 106.6W (Max.) @ 24V |
| | With i7-12700TE (35W mode): 111.8W (Max.) @ 48V |
| | With i5-12400 (35W mode): 105.1W (Max.) @ 24V |
| | With i5-12400 (35W mode): 110.9W (Max.) @ 48V |
| | With i5-12400 (65W mode): 120.5W (Max.) @ 24V |
| | With i5-12400 (65W mode): 126.2W (Max.) @ 48V |
| **Mechanical** | |
| Dimension | 240.7(W) x 280(D) x 188.3(H) mm |
| Weight | 5.2kg |
| Mounting | Wall-mount (standard) |
| **Environmental** | |
| Operating temperature | -25°C to 60°C |
| Storage temperature | -40°C to 85°C |
| Humidity | 10% to 90%, non-condensing |
| Vibration | Operating, MIL-STD-810H, Method 514.6, Category 4 |
| Shock | Operating, MIL-STD-810H, Method 516.6, Procedure I, Table 516.6-II |
| EMC | CE/ FCC Class A, according to EN 55032 & EN 55035 |

\* When system load is 150W or less, the required DC input range is 12V to 35V; when the system load is between 151W and 320W (with a GPU card), the required DC input is 24V to 35V.

\*\* For sub-zero operating temperature, a wide temperature HDD or solid state disk (SSD) is required.

## 1.2 Nuvo-10003 Dimensions

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

### 1.2.1 Nuvo-10003 I/O Panel View
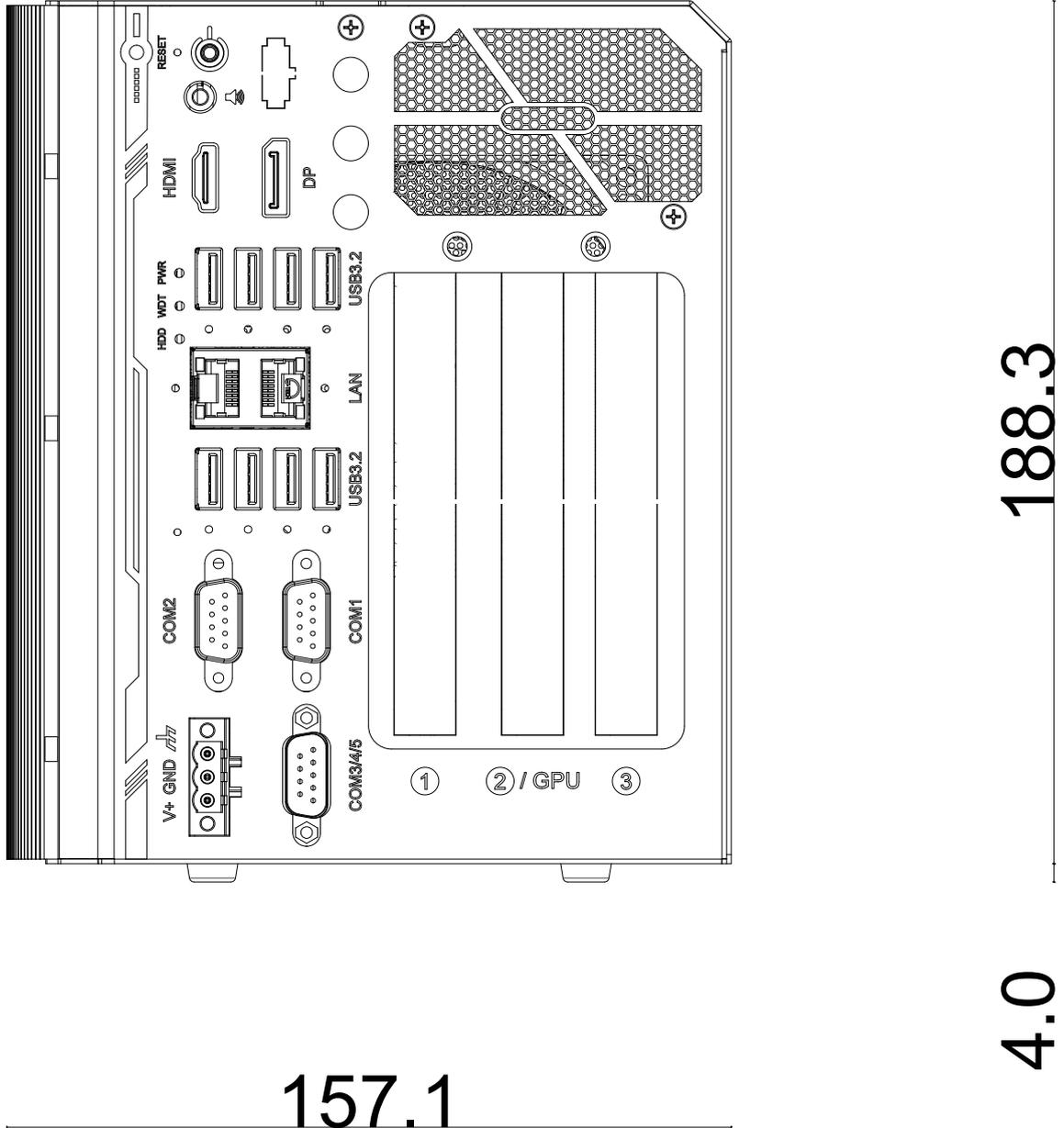
### 1.2.2 Nuvo-10003 Side View

188.3

4.0

280.0
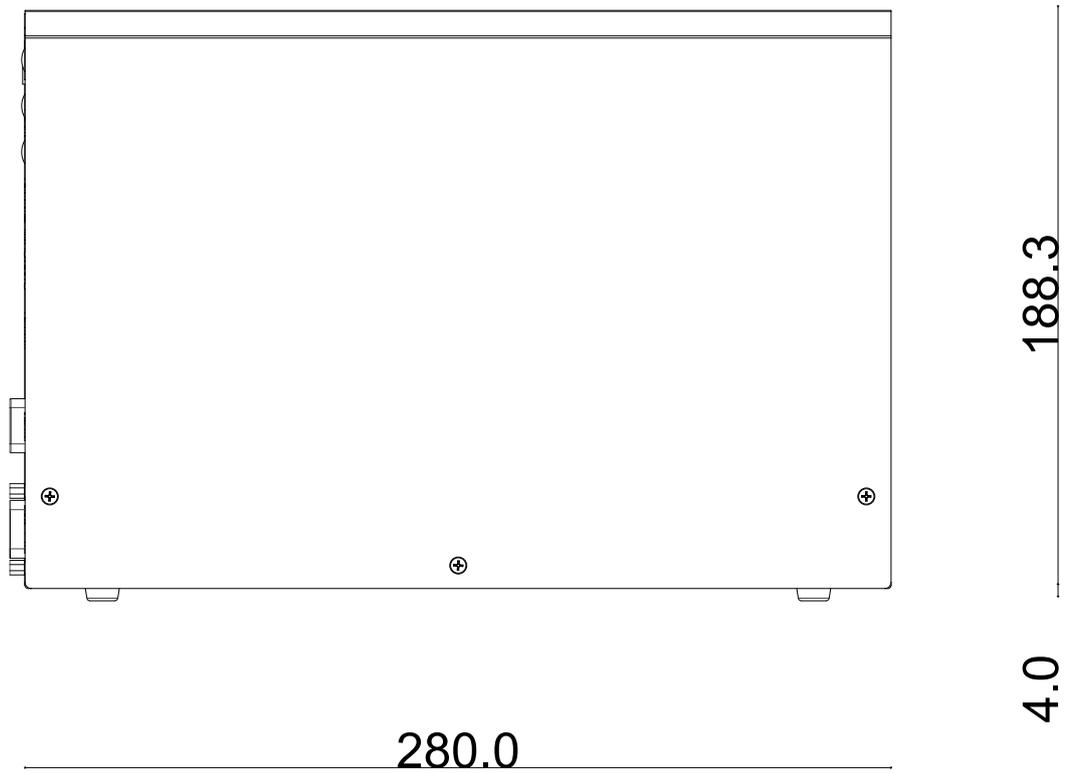
### 1.2.3 Nuvo-10003 Bottom View

31.5

230.0

25.0
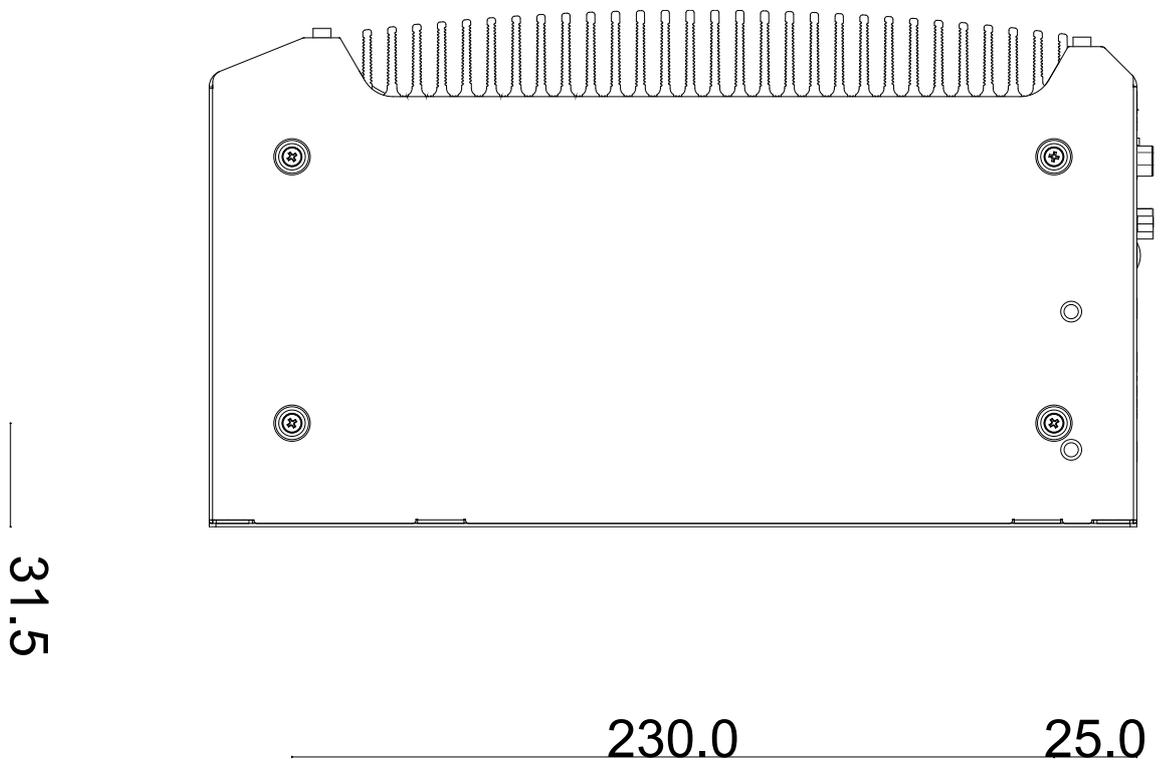
## 1.3   Nuvo-10007/ 10034 Dimension

> ✎ NOTE
>
> *Nuvo-10007/ 10034 systems share the same external dimensions.*
>
> *All measurements are in millimeters (mm).*

### 1.3.1   Nuvo-10007/ 10034 I/O Panel View
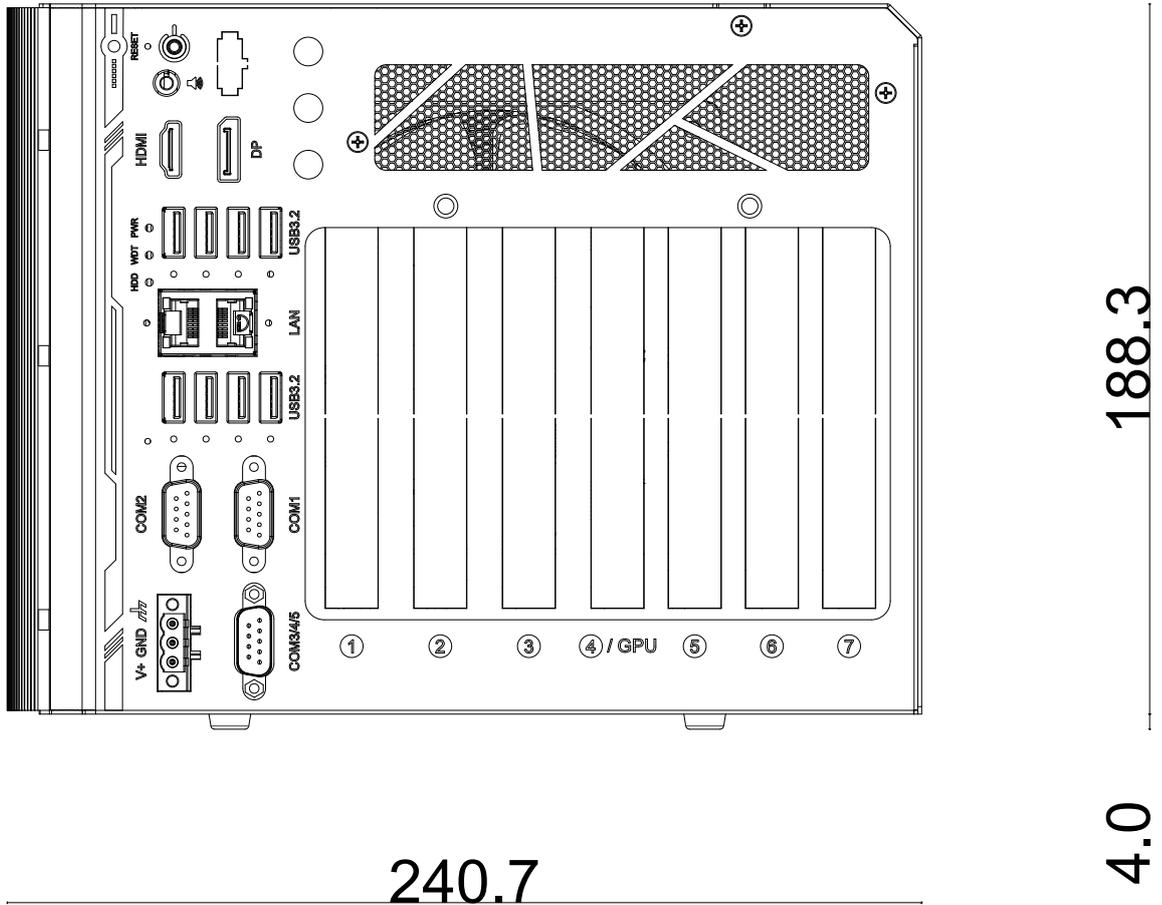
### 1.3.2 Nuvo-10007/ 10034 Side View

188.3

4.0

280.0
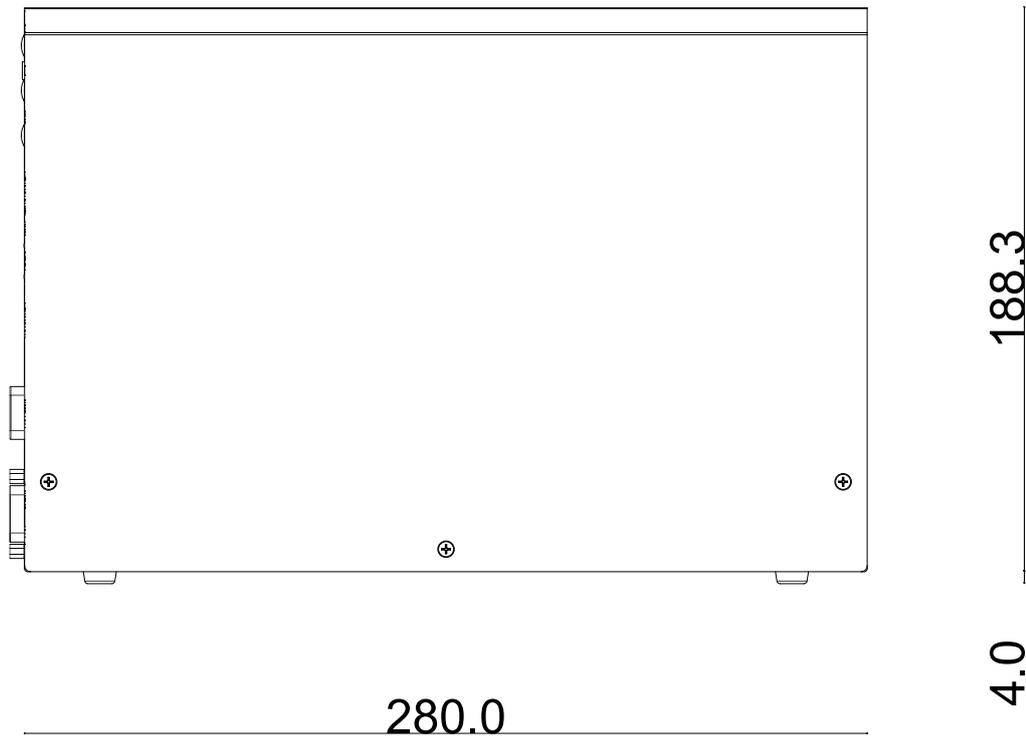
### 1.3.3 Nuvo-10007/ 10034 Bottom View

57.1

230.0    25.0
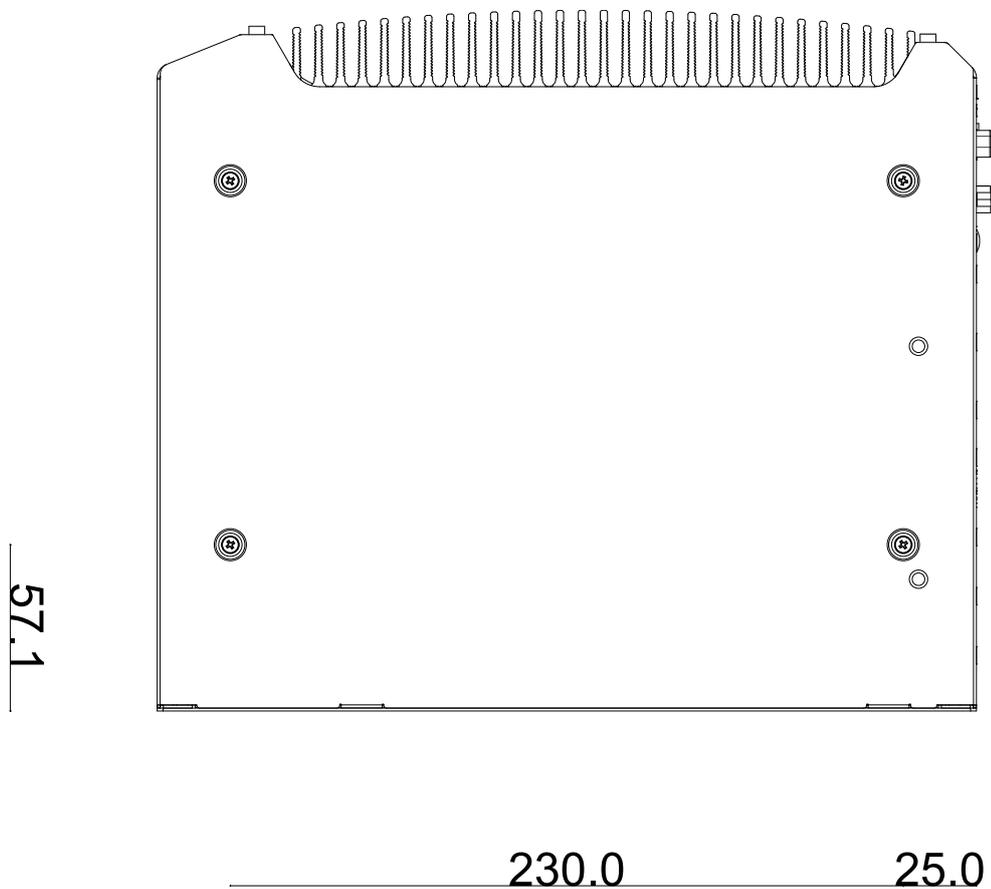
# 2  Overview

Upon receiving and unpacking your Nuvo-10000 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  Nuvo-10000 Packing List

| System Pack | Nuvo-10000 series | Qty |
|---|---|---|
| 1 | Nuvo-10000 series system<br>(If you ordered CPU/ RAM/ HDD, please verify these items) | 1 |
| 2 | Accessory box, which contains<br>● CPU bracket<br>● Wall-mount bracket<br>● 3-pin power terminal block<br>● Screw pack | 1<br>2<br>1<br>1 |

## 2.2 Nuvo-10000 Series I/O Panel

> ✎ NOTE
>
> *Nuvo-10000 series systems share the same I/O connections and differ only in their number of PCIe and PCI slots. For demonstration purposes, an illustration matching Nuvo-10007/ 10034 will be used in the following sections.*

**Nuvo-10000 series I/O Panel**

The Nuvo-10000 I/O panel features HDMI, DisplayPort, USB3.2 Gen2/ Gen1, 2.5Gb Ethernet and COM ports.
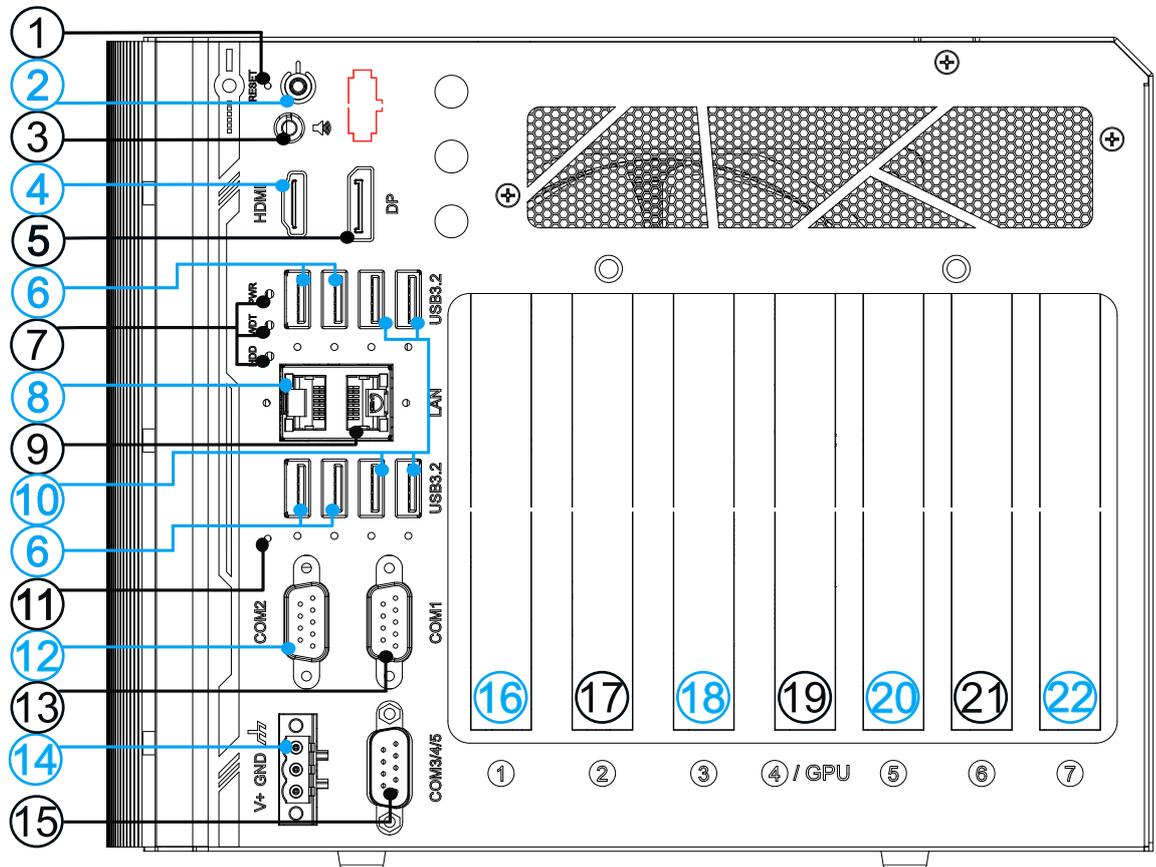


| No. | Item | Description |
|---|---|---|
| 1 | Reset button | Use this button to manually reset the system. |
| 2 | Power Button | Use this button to turn on or shutdown the system. |
| 3 | 3.5mm Speaker/ Headphone Output Jack | The 4-pole 3.5mm jack accepts microphone voice input and headphone speaker sound output. |
| 4 | HDMI port | The HDMI port is a high-resolution graphics/ data port |

| | | supporting up to 3840 x 2160 @ 30Hz. |
|---|---|---|
| **5** | DisplayPort | Support display resolutions up to 4096 x 2304. Compatible with HDMI/ DVI via respective adapter/ cable (resolution may vary). |
| **6** | USB3.2 Gen2x1 port | The ports offer up to 10 Gbps of data-throughput performance |
| **7** | LED indicator | From top to bottom, the LEDs are PWR (system power), WDT (watchdog timer), HDD (hard disk drive). |
| **8** | Gb Ethernet port | Gigabit Ethernet port by Intel® I219-LM |
| **9** | 2.5Gb Ethernet port | 2.5Gb Ethernet port by Intel® I226-IT |
| **10** | USB 3.1 Gen1 port | USB3.1 Gen 1 offers up to 5Gbps of data-throughput performance |
| **11** | Clear CMOS button | Use this button to clear the system CMOS. |
| **12** | COM 2 port | COM 2 port is a software-selectable RS-232/ 422/ 485 port. The operation mode can be set in BIOS. |
| **13** | COM 1 port | COM 1 port is a software-selectable RS-232/ 422/ 485 port. The operation mode can be set in BIOS. |
| **14** | 3-pin terminal block | The system accepts 12-35V DC power input. |
| **15** | COM port 3/ 4/ 5 | COM3, COM4 and COM5 are 3-wire RS-232 ports that share a single DB9 connector. |
| **16** | Expansion slot | PCIe x8 Gen3 4-lanes |
| **17** | Expansion slot | PCIe x8 Gen3 4-lanes (Nuvo-10007/ Nuvo-10034) PCIe x16 Gen3 16-lanes (Nuvo-10003) |
| **18** | Expansion slot | PCIe x16 Gen3 8-lanes (Nuvo-10007/ Nuvo-10034) PCIe x8 Gen3 4-lanes (Nuvo-10003) |
| **19** | Expansion slot | PCIe x16 Gen3 8-lanes (Nuvo-10007/ Nuvo-10034) |
| **20** | Expansion slot | PCIe x8 Gen3 4-lanes (Nuvo-10007) PCI 33MHz/ 32-bit 5V (Nuvo-10034) |
| **21** | Expansion slot | PCIe x4 Gen3 2-lanes (Nuvo-10007) PCI 33MHz/ 32-bit 5V (Nuvo-10034) |
| **22** | Expansion slot | PCIe x4 Gen3 2-lanes (Nuvo-10007) PCI 33MHz/ 32-bit 5V (Nuvo-10034) |
| | | Reserved punch-out panel for On/ Off control and status LED extension. Please refer to its installation for details. |

### 2.2.1   Reset Button
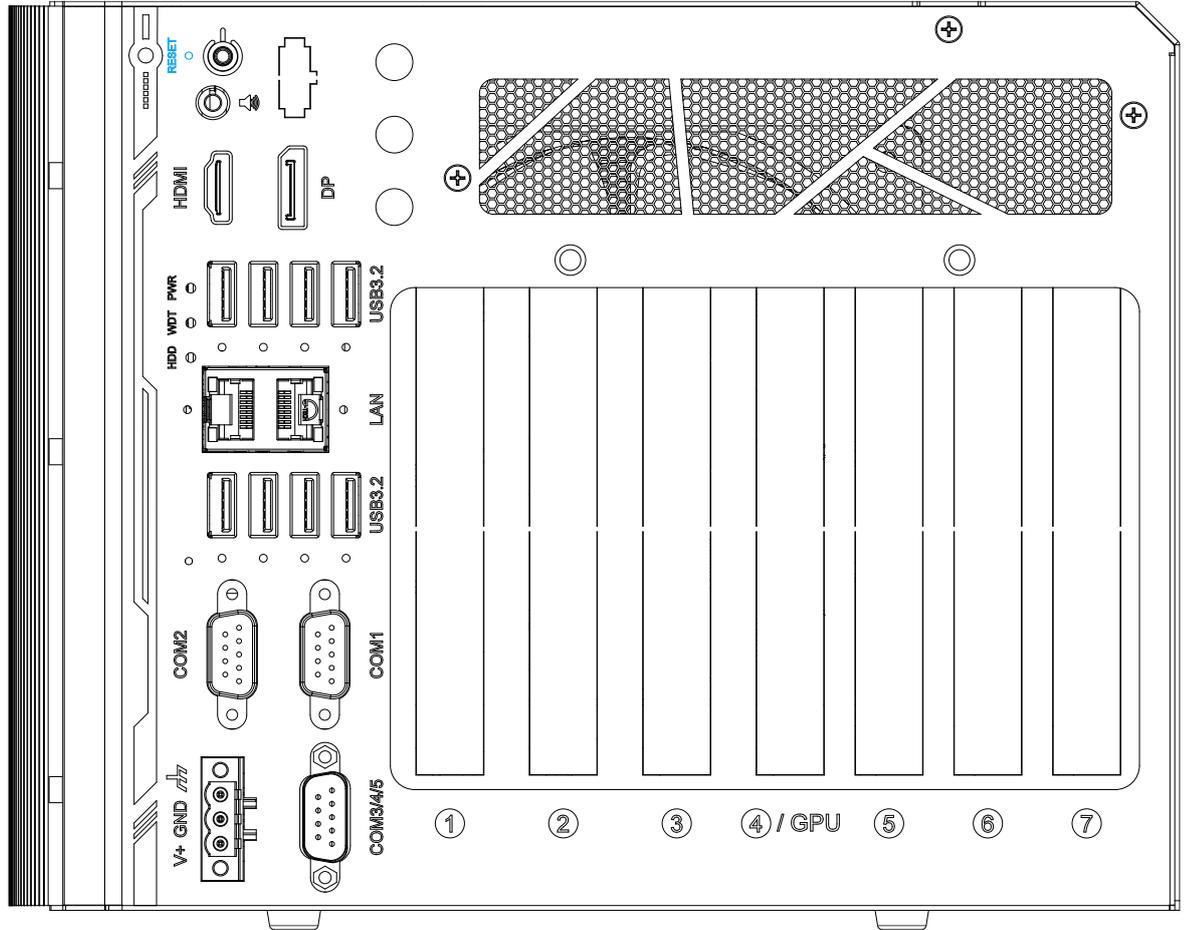


The reset button is used to manually reset the system in case of system halt or malfunction. To avoid unexpected reset, the button is purposely placed behind the panel. To reset, please use a pin-like object (eg. tip of a pen) to access the reset button.

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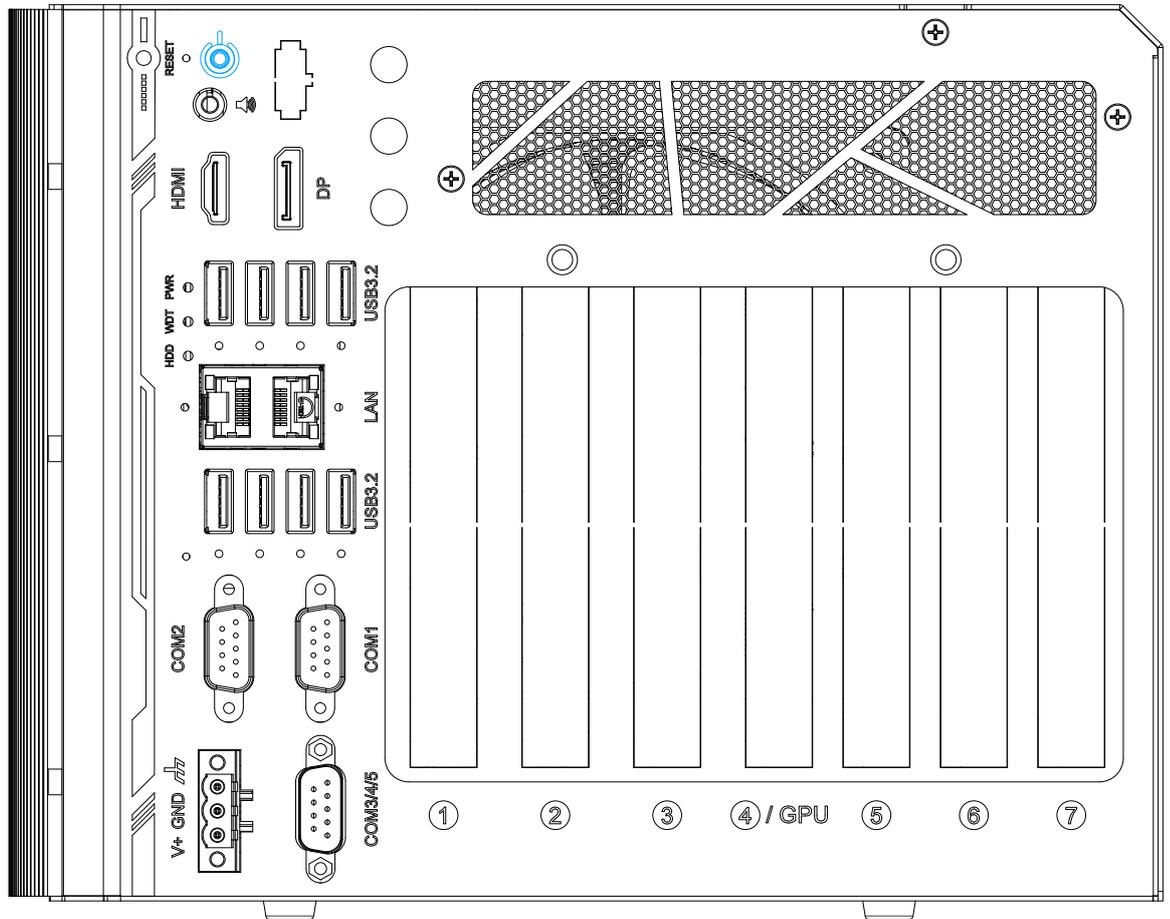
The power button is a non-latched switch for ATX mode on/off operation. To turn on the system, press the power button and the PWR LED should light-up green. To turn off the system, issuing a shutdown command in OS is preferred, or you can simply press the power button. To force shutdown when the system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

### 2.2.3 3.5mm Speaker/ Headphone Output Jack
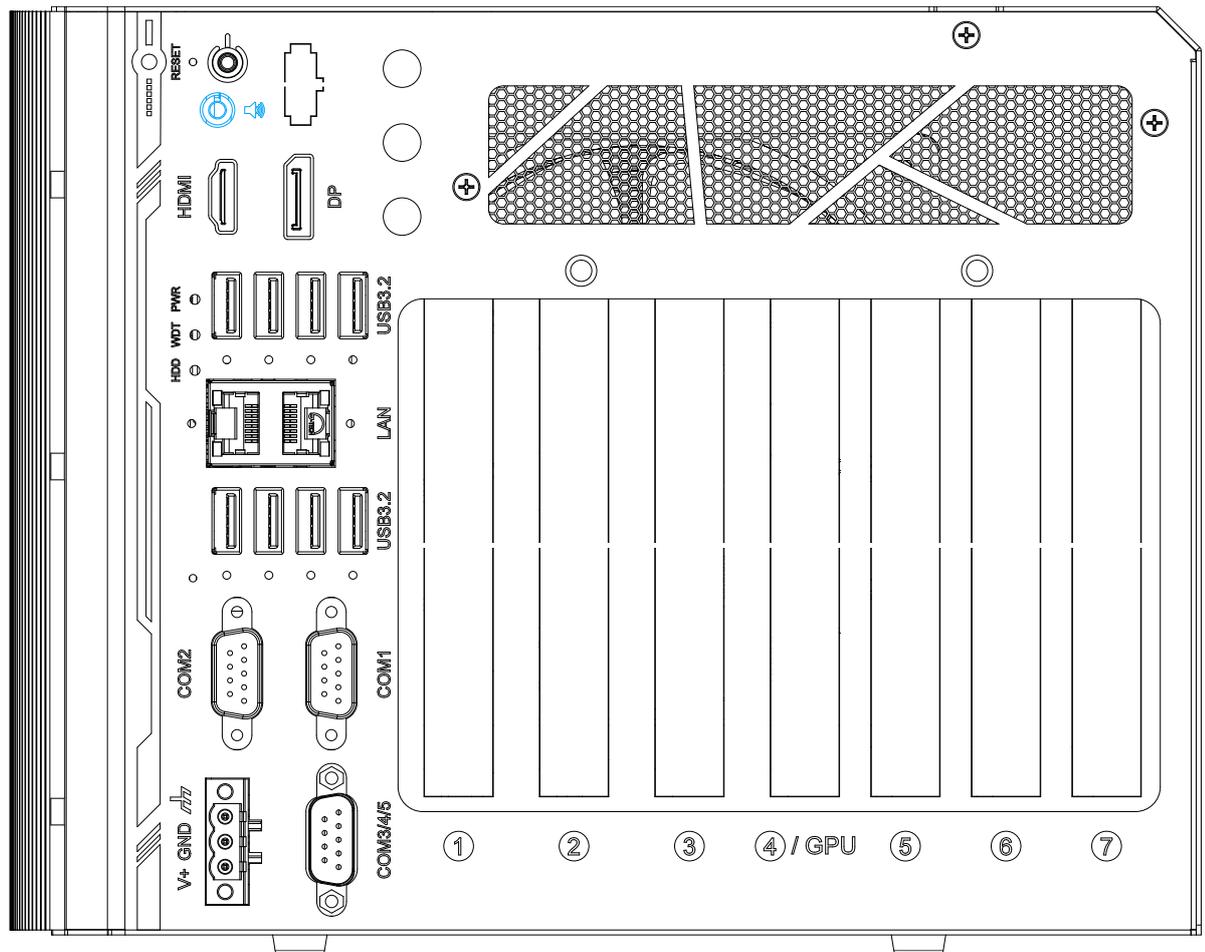


The system audio function uses high definition audio codec. There is a female 4-pole 🔊 audio jack for headphone (speaker) output and microphone input. To utilize the audio function in Windows, you need to install corresponding drivers for both Intel® Q670 chipset and audio device drivers.

### 2.2.4 HDMI Port
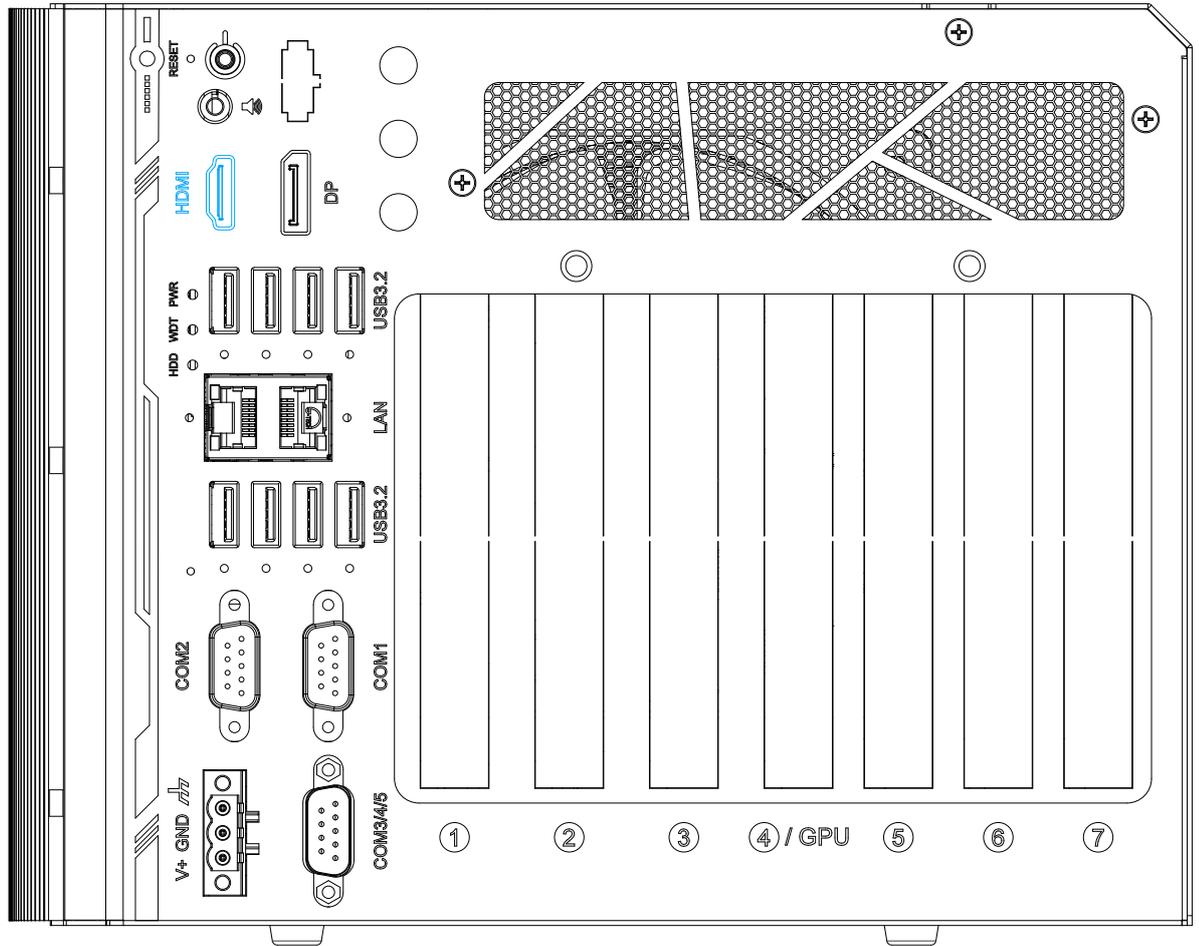


The High-Definition Multimedia Interface (HDMI) port provides uncompressed high-quality digital video and audio transmission between the system and a multimedia display device on a single cable. You can connect to other digital inputs by using a HDMI-to-DVI or HDMI-to-DP cable.

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.



**HDMI-to-DP**

## 2.2.5 DisplayPort
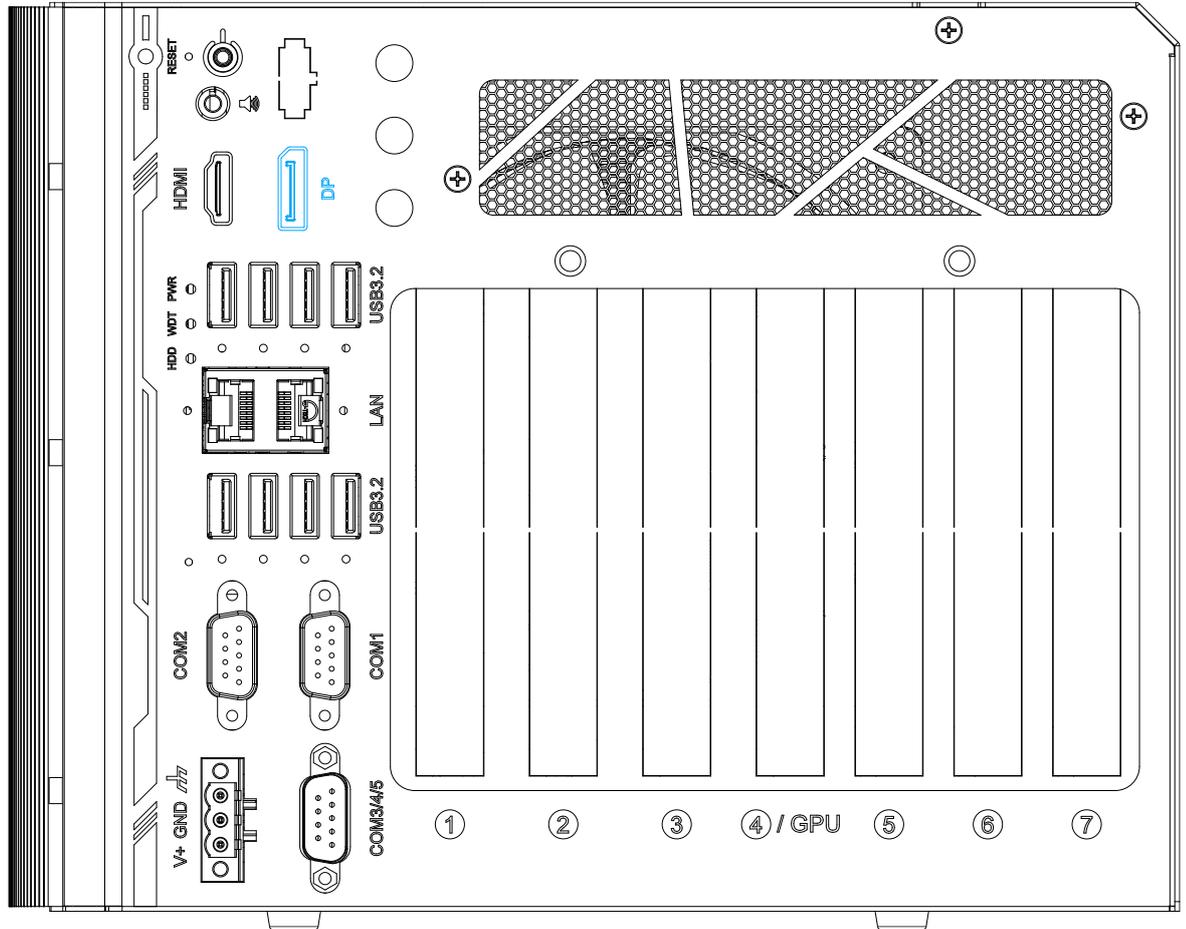


The DisplayPort (DP) output is a digital display interface that mainly connect video source and carry audio to a display device. When connecting a DP, it can deliver up to 4K UHD (4096 x 2304) in resolution. The system is designed to support passive DP adapter/ cable. You can connect to other display 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 USB3.2 Gen2x1
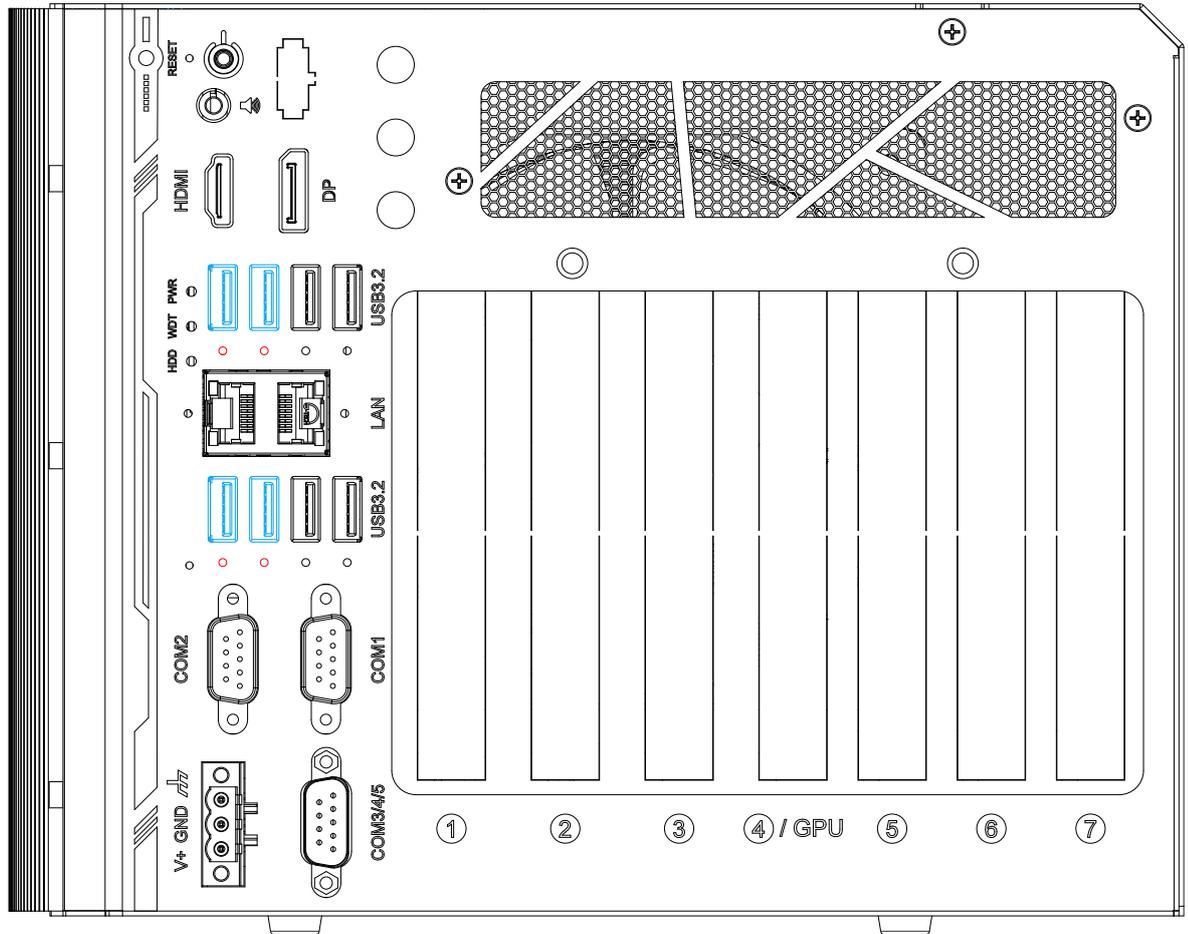
The system's USB 3.2 Gen2x1 ports (10Gbps) feature panel screw fix hole (indicated in **red**), and are implemented via native xHCI (eXtensible Host Controller Interface) controller. They are backward compatible with USB3.2 Gen.1 USB 2.0, USB 1.1 and USB 1.0 devices. Legacy USB is also supported so you can use USB keyboard/mouse in DOS environment.

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

### 2.2.7 LED Indicators
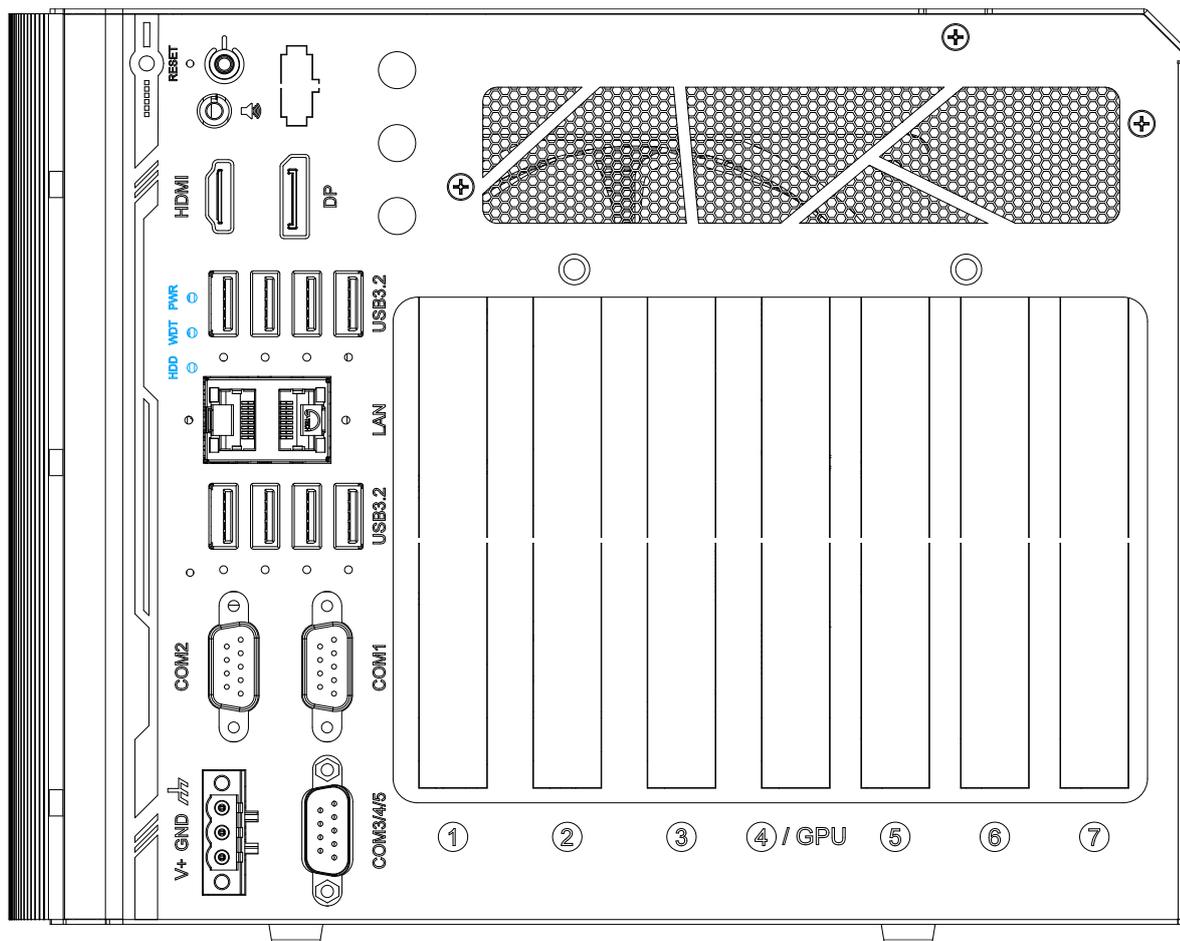


There are three LED indicators on the I/O panel. From top to bottom, they are power (PWR), Watchdog timer (WDT) and hard disk drive activity (HDD). The descriptions of these three LEDs are listed in the following table.

| Indicator | Color | Description |
|-----------|-------|-------------|
| PWR | Green | Power indictor, lid when system is on. |
| WDT | Yellow | Watchdog timer LED, flashing when WDT is active. |
| HDD | Red | Hard drive indicator, flashing when hard disk drive is active. |

## 2.2.8 Gigabit Ethernet Port
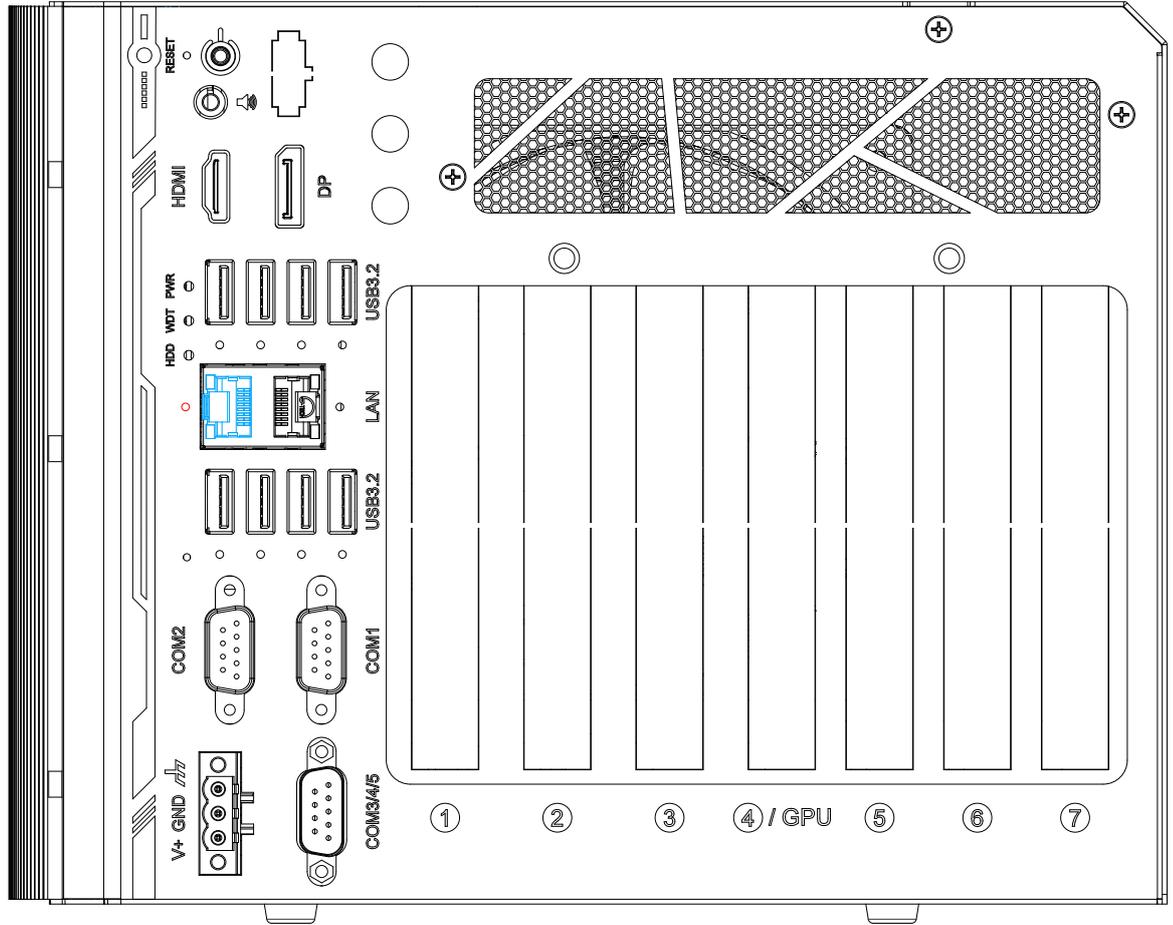


The system has a GbE port featuring panel screw fix hole (indicated in **red**), and it supports Wake-on-LAN functions. The GbE port is implemented with Intel® I219-LM controller with one dedicated PCI Express link for maximum performance. When the Ethernet connection is established, the LED indicators on the RJ45 connector represents the following connection statuses:

**Active/Link LED**

| 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 |

**Speed LED**

| LED Color | Status | Description |
|-----------|--------|-------------|
| Green or Orange | Off | 10 Mbps |
| | Green | 100 Mbps |
| | Orange | 1000 Mbps |

Drivers must be installed to utilize the GbE port in Windows environment.

### 2.2.9   2.5G Ethernet Port
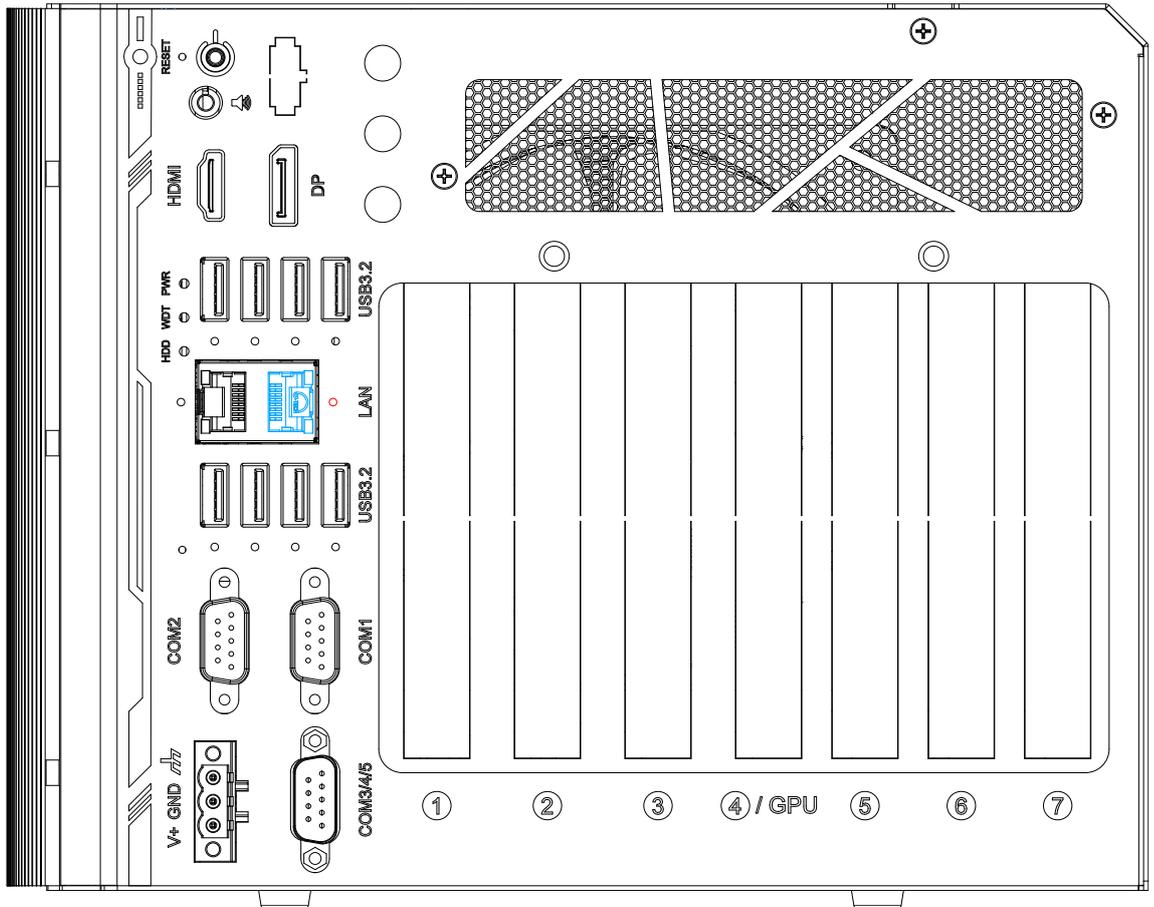


The system has a 2.5Gb Ethernet port featuring panel screw fix hole (indicated in **red**).

The port has one dedicated PCI Express link for maximum network performance. Please refer

to the table below for LED connection statuses.

**Active/Link LED**

| 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**

| LED Color | Status | Description |
|---|---|---|
| Red or Green | Off | 10 Mbps |
| | Green | 100 Mbps |
| | Red | 1000/ 2500 Mbps |

To utilize the Ethernet port in Windows, you need to install corresponding driver for the

Ethernet controller.

### 2.2.10  USB3.2 Gen1x1 Port



The system's USB 3.2 Gen1x1 ports (5Gbps) feature panel screw fix hole (indicated in **red**), and are implemented via native xHCI (eXtensible Host Controller Interface) controller. They are backward compatible with USB 2.0, USB 1.1 and USB 1.0 devices.

Legacy USB is also supported so you can use USB keyboard/mouse in DOS environment. xHCI driver is supported natively in Windows 10, therefore you do not need to install xHCI driver in prior to utilize USB functions.

## 2.2.11 Clear CMOS Button



Indicated by the **blue arrow**, 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, please use the tip of a pen, press and hold for at least 5 seconds to reset the BIOS.

## 2.2.12 COM2 Port
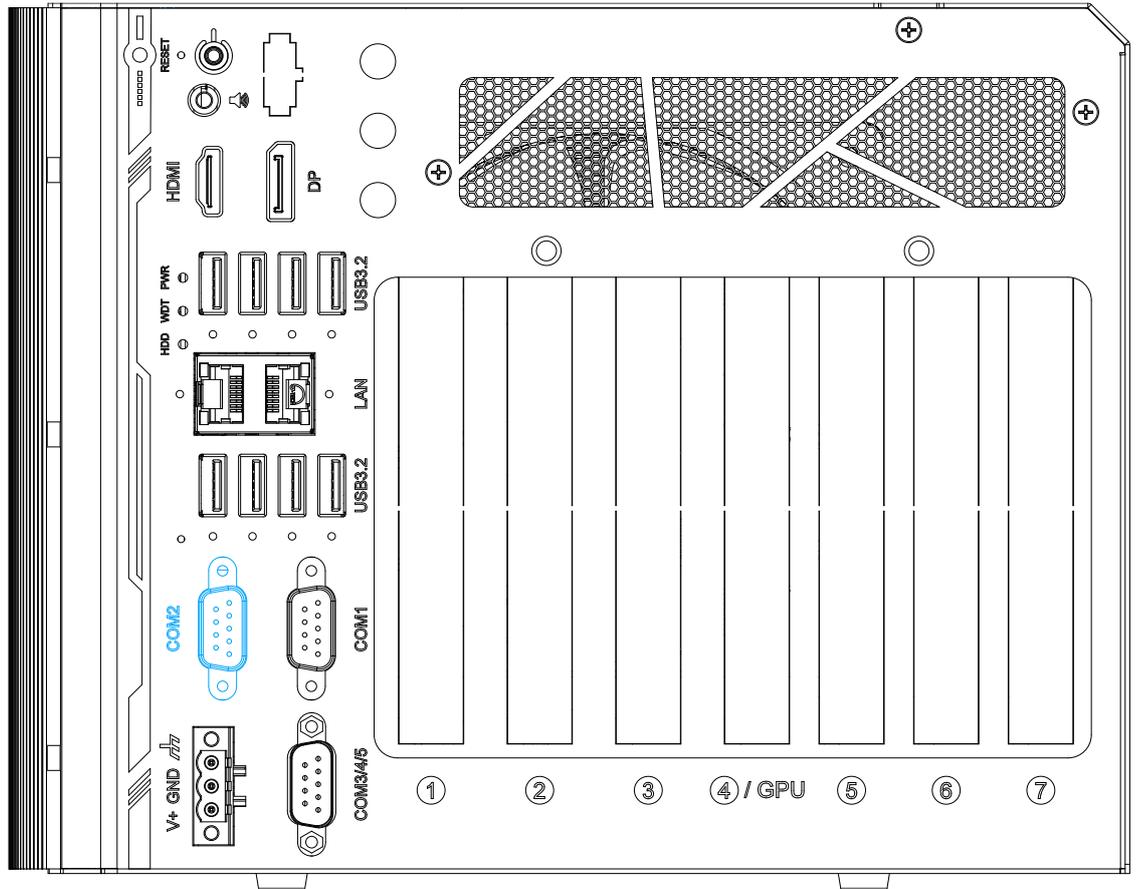


The COM port is implemented using industrial-grade ITE8786 Super IO chip (-40 to 85°C) and provide up to 115200 bps baud rate. It is a software-configurable RS-232/422/485 port. The operation mode of can be set in BIOS setup utility. The following table describes the pin definition of the COM port.

**COM Port Pin Definition**



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

### 2.2.13 COM1 Port
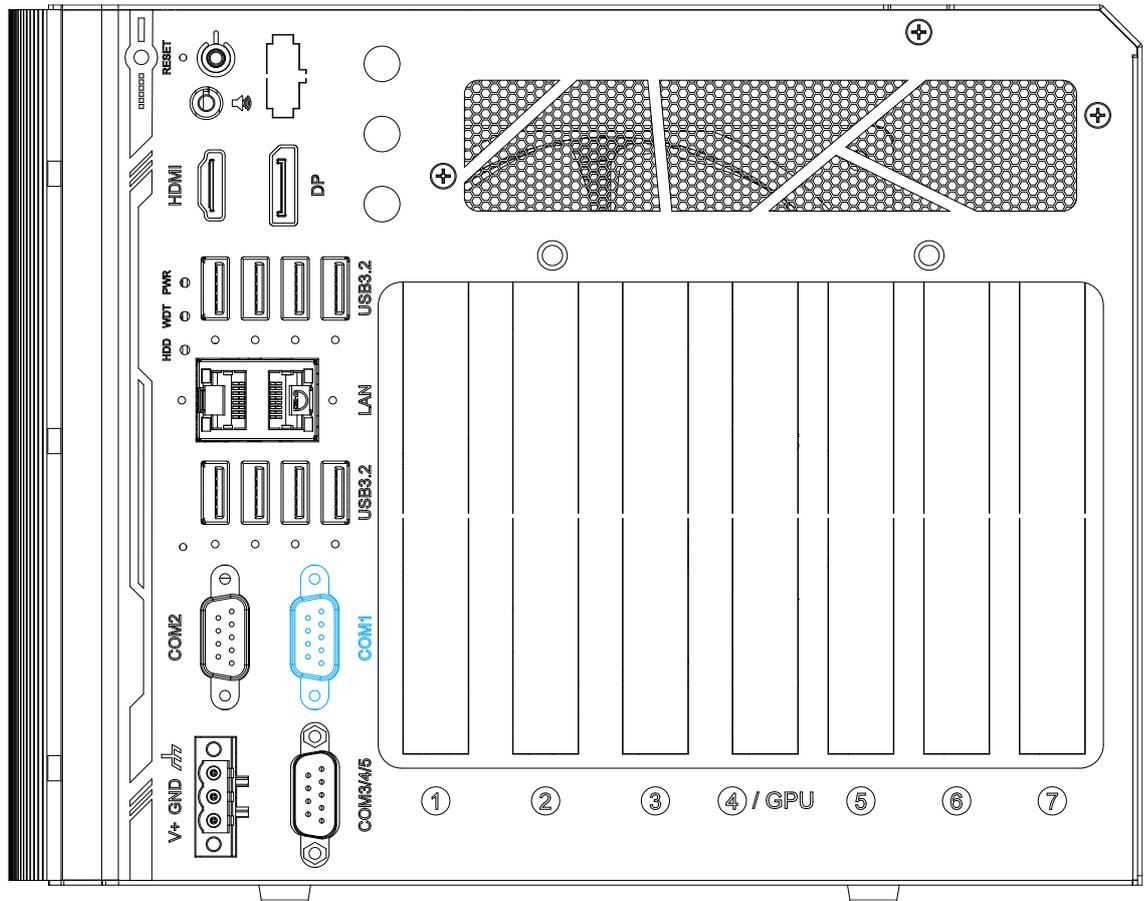


The COM1 port is implemented using industrial-grade ITE8786 Super IO chip (-40 to 85°C) and provide up to 115200 bps baud rate. It is a software-configurable RS-232/422/485 port. The operation mode of can be set in BIOS setup utility. The following table describes the pin definition of the COM port.

**COM Port Pin Definition**

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

## 2.2.14  3-pin Terminal Block for DC Input
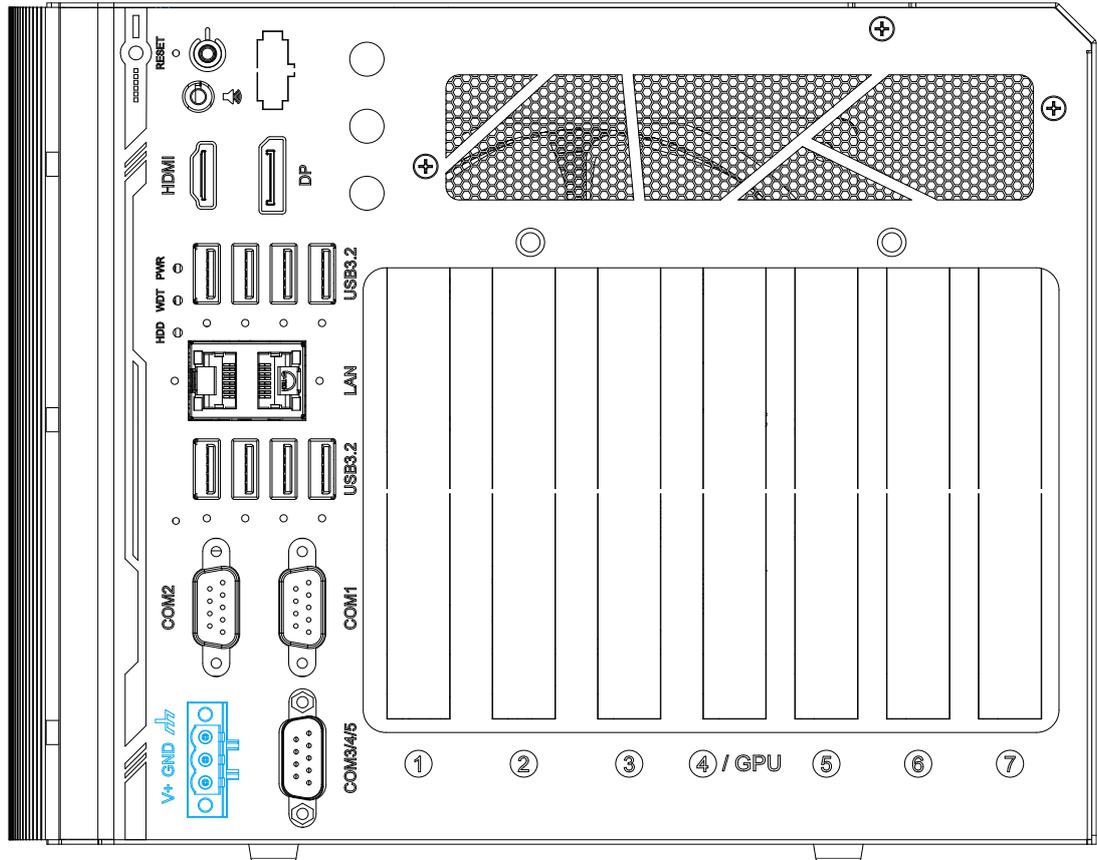


The system accepts a wide range of DC power input from 12 to 35V via 3-pin pluggable terminal block, which is fit for field usage where DC power is provided. And the screw clamping connection of the terminal block gives a very reliable way of wiring DC power.

| Symbol | Description |
|--------|-------------|
| ⏚ | Chassis ground (connected to the earth ground) |
| GND | Negative polarity (ground) of DC input |
| V+ | Positive polarity of DC input |

⚠ **WARNING**

*Please make sure the voltage of DC power is correct before you connect it to the system. Supplying a voltage over 35V will damage the system.*

📝 NOTE

When system load is 150W or less, the required DC input range is 12V to 35V; when the system load is between 151W and 320W (with a GPU card), the required DC input is 24V to 35V.

### 2.2.15 COM3/ 4/ 5 Port
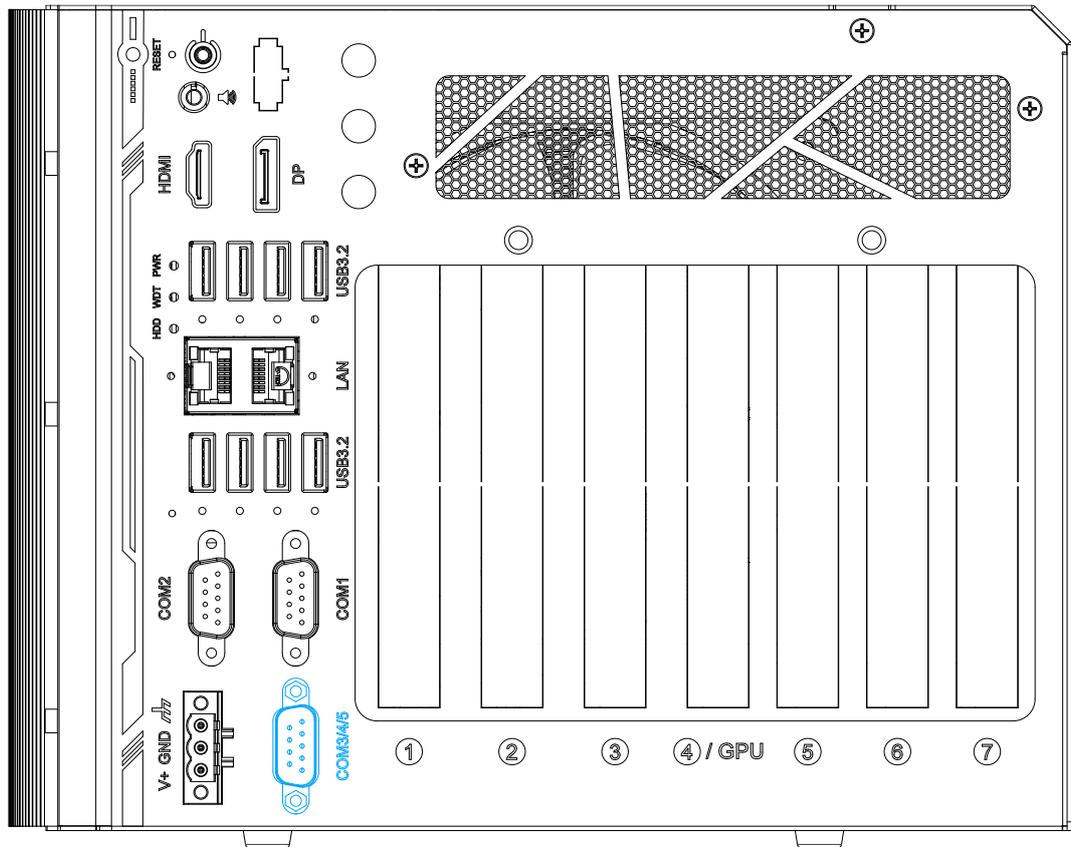


COM3, COM4 and COM5 are 3-wire RS-232 ports share single DB9 connector. You can directly connect this to one external device with 3-wire RS-232 interface, or use an optional 1-to-3 Y-cable to have three DB9 connectors for more devices. The following table describes the pin definition of the DB9 connector as well as the Y-cable.
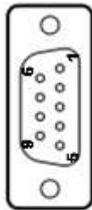


|      | COM3/ 4/ 5 DB9 | | |
|------|------|------|------|
| Pin# | COM3 | COM4 | COM5 |
| 1 | | | |
| 2 | RX | | |
| 3 | TX | | |
| 4 | | TX | |
| 5 | GND | GND | GND |
| 6 | | RX | |
| 7 | | | TX |
| 8 | | | RX |
| 9 | | | |

| Pin# | Y-Cable DB9 |
|------|------|
| 1 | |
| 2 | RX |
| 3 | TX |
| 4 | |
| 5 | GND |
| 6 | |
| 7 | |
| 8 | |
| 9 | |

## 2.3 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.

### 2.3.1 SODIMM DRAM Slot

The system motherboard supports two DDR5 4800MHz SODIMM modules up to 64GB capacity. The slots are situated on both the expansion slot and CPU socket sides of the motherboard.
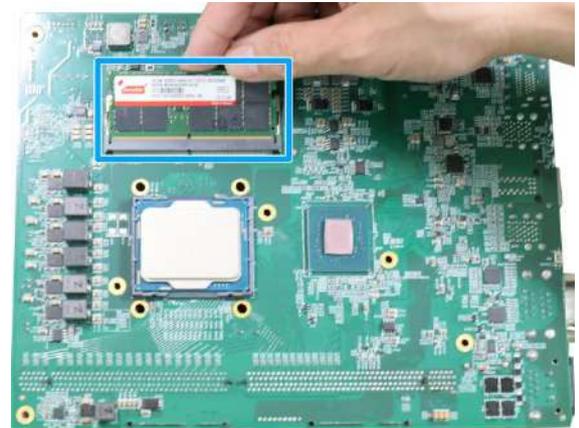


**Expansion slot side**                    **CPU socket side**

---

✎ NOTE

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

---

## 2.3.2 mini-PCIe Slot & Pin Definition

The system provides two mini-PCIe sockets (indicated in **blue**) that is in compliance with mini-PCIe specification rev. 1.2. The mini-PCIe sockets are designed with a SIM card (slot indicated in **red**) support. With a SIM card installed, your system can access the internet via your network provider's 4G/ 3G network.

For wireless (WiFi/ 4G/ 3G) communication, multiple SMA antenna apertures can be located on the IO panel.
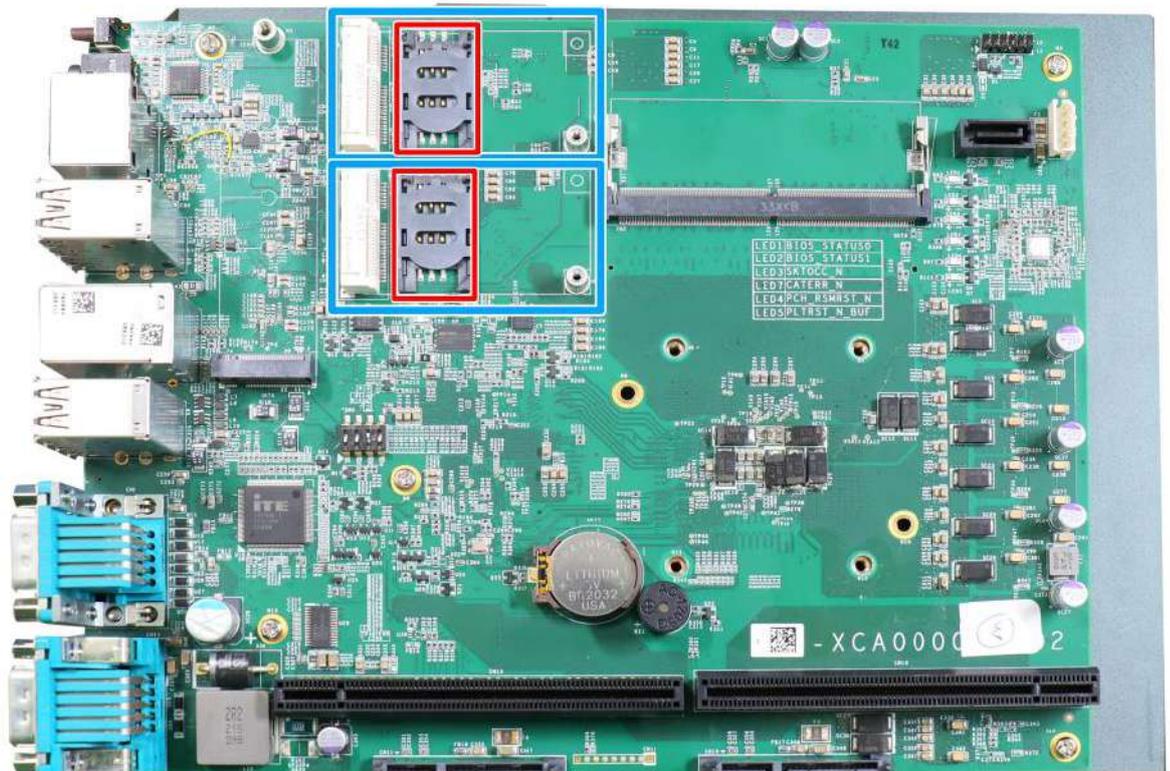


For wireless (WiFi/ 3G/ 4G) communication, SMA antenna apertures can be located on the front panel.
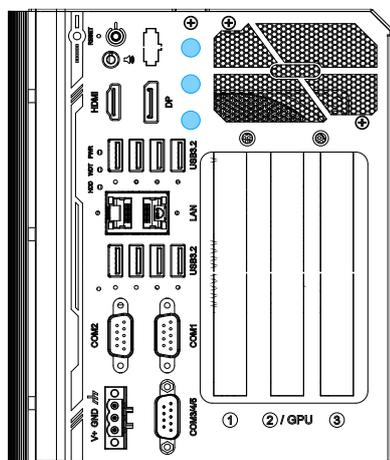


**Nuvo-10003**
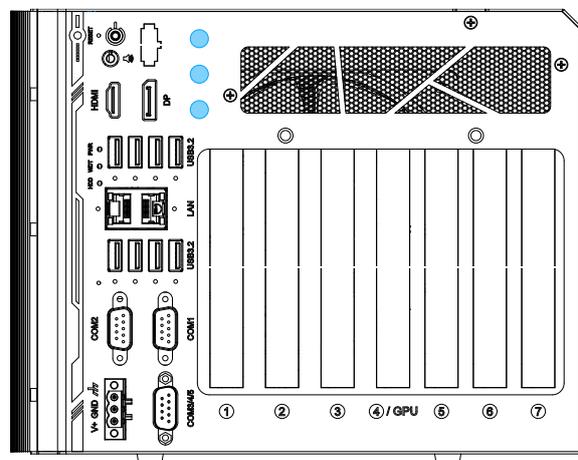


**Nuvo-10007/ 10043**

### mini-PCIe socket definition
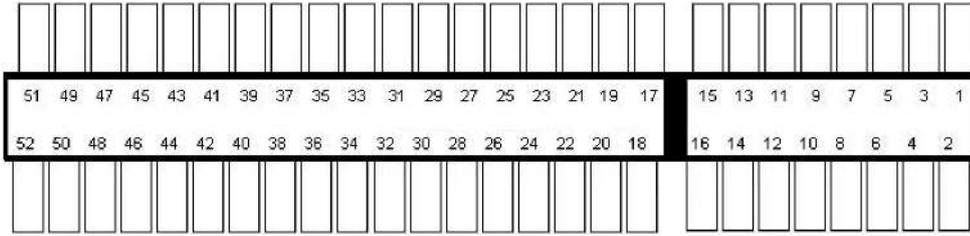


| Pin # | Signal (mPCIe) | Pin # | Signal (mPCIe) |
|---|---|---|---|
| 1 | WAKE# | 2 | +3.3Vaux |
| 3 | - | 4 | GND |
| 5 | - | 6 | +1.5V |
| 7 | CLKREQ# | 8 | UIM_PWR |
| 9 | GND | 10 | UIM_DATA |
| 11 | REFCLK- | 12 | UIM_CLK |
| 13 | REFCLK+ | 14 | UIM_RESET |
| 15 | GND | 16 | UIM_VPP |
| **Mechanical 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 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 have 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.*

### 2.3.3　M.2 2280 M Key Slot (SATA Signal Only)
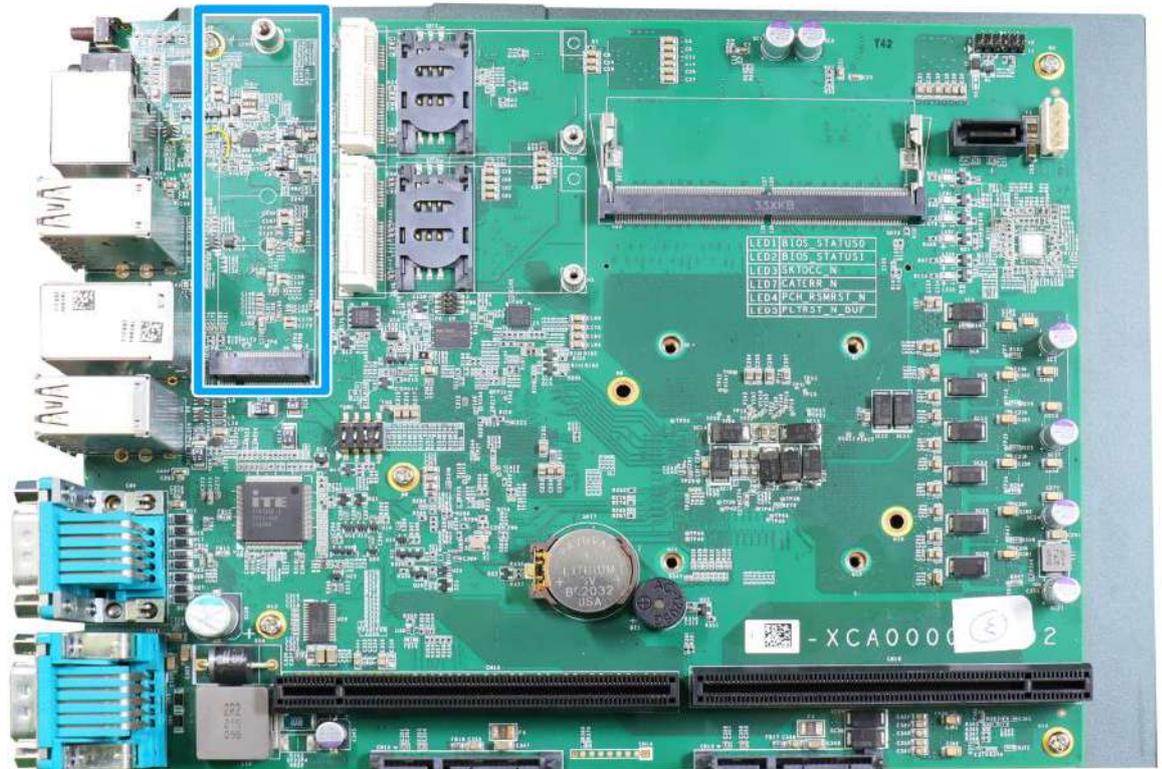


The system has an M.2 2280 slot (SATA signal only) for you to install an M.2 SATA SSD for faster access over traditional hard disk drives.

---

📝 **NOTE**

*The M.2 slot is only compatible with SATA signal M.2 SSD only.*

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**M.2 2280 M Key Pin Definition**
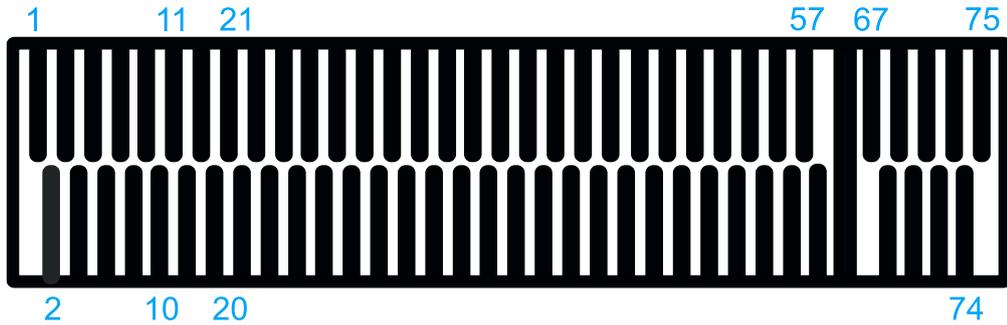


| Pin # | Signal | Pin # | Signal |
|-------|--------|-------|--------|
| 1 | GND | 2 | +3V3 |
| 3 | GND | 4 | +3V3 |
| 5 | | 6 | - |
| 7 | | 8 | - |
| 9 | GND | 10 | DAS/DSS_N |
| 11 | | 12 | +3V3 |
| 13 | | 14 | +3V3 |
| 15 | GND | 16 | +3V3 |
| 17 | | 18 | +3V3 |
| 19 | | 20 | - |
| 21 | GND | 22 | - |
| 23 | | 24 | - |
| 25 | | 26 | - |
| 27 | GND | 28 | - |
| 29 | | 30 | - |
| 31 | | 32 | - |
| 33 | GND | 34 | - |
| 35 | | 36 | DEVSLP |
| 37 | | 38 | - |
| 39 | GND | 40 | - |
| 41 | SATA-B+ | 42 | - |
| 43 | SATA-B- | 44 | - |
| 45 | GND | 46 | - |
| 47 | SATA-A- | 48 | - |
| 49 | SATA-A+ | 50 | PERST N |
| 51 | GND | 52 | - |
| 53 | | 54 | - |
| 55 | | 56 | - |
| 57 | GND | 58 | - |
| **Mechanical Key** | | | |
| 67 | - | 68 | SUSCLK |
| 69 | PEDET | 70 | +3V3 |
| 71 | GND | 72 | +3V3 |
| 73 | GND | 74 | +3V3 |
| 75 | GND | | |

### 2.3.4 SATA Ports

NOTE

*Supports up to 15mm thickness HDD/ SSD.*
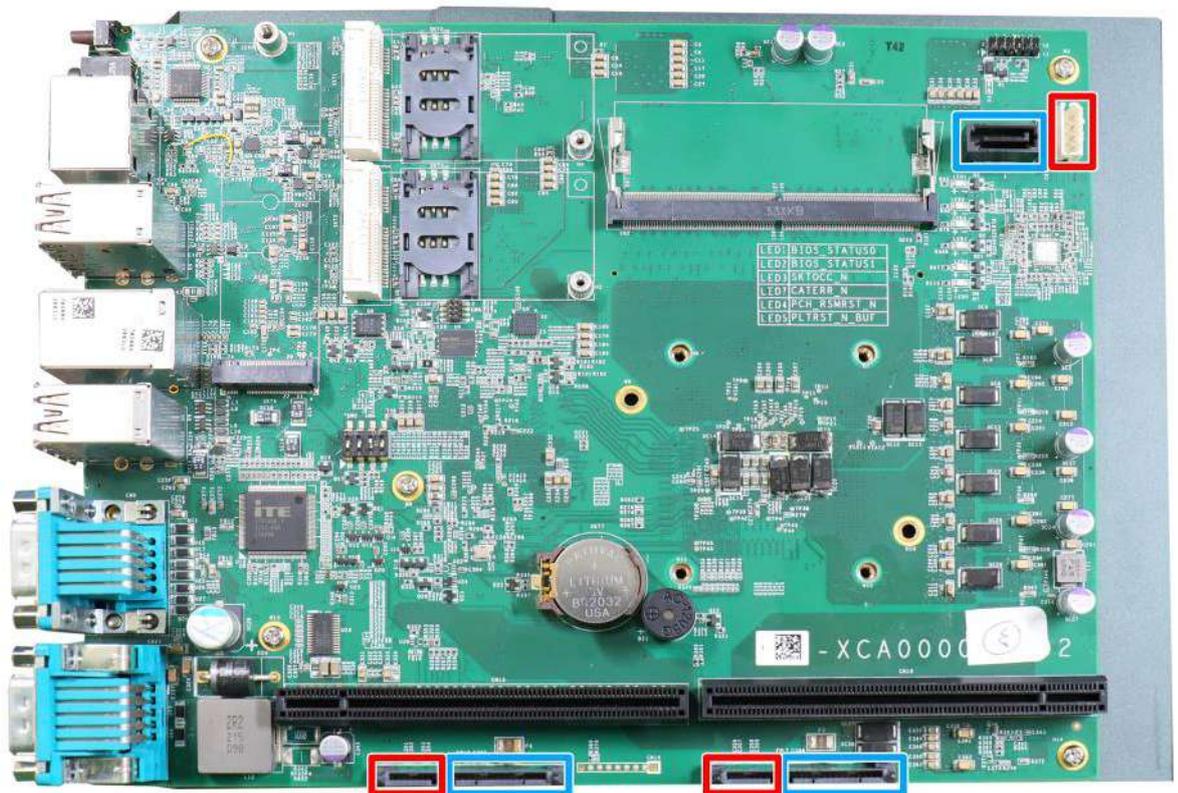


The system provides three SATA ports which support Gen3, 6 Gb/s SATA signals. The SATA ports are indicated in **blue**, and each of their power connectors (indicated in **red**) are situated along side.

### 2.3.5 On/ Off Ctrl & Status Output

For an application which places Nuvo-10000 inside a cabinet, it's useful to output the system status to external LED indicators so that users can check how the system's running. Nuvo-10000 provides a 2x6, 2.0mm pitch pin header to output system status such as power, HDD, watchdog timer, and control system on/off remotely. 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.
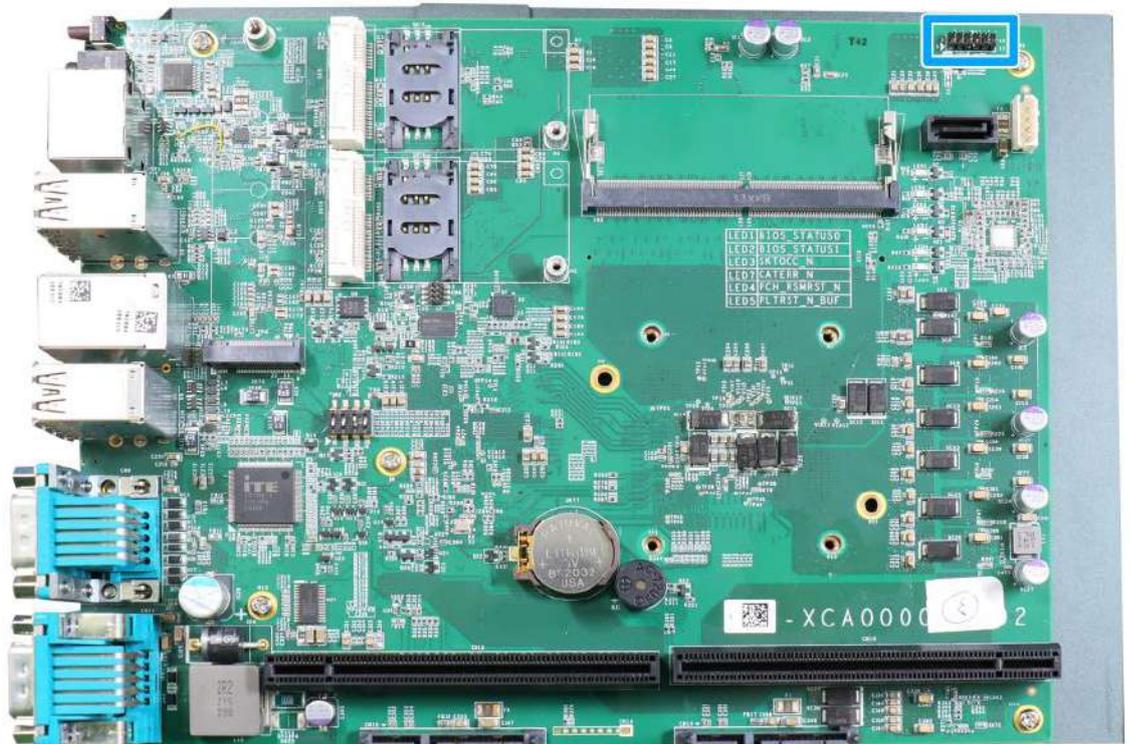


An optional cable is available to connect the output pins to the I/O panel of the system. If you purchased the optional cable and wish to install it, please refer to this section.

**On/Off Status Control Pin Definition**
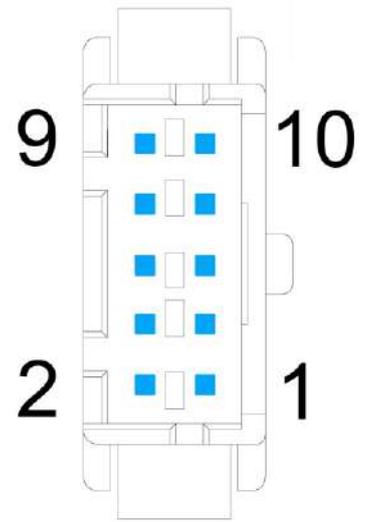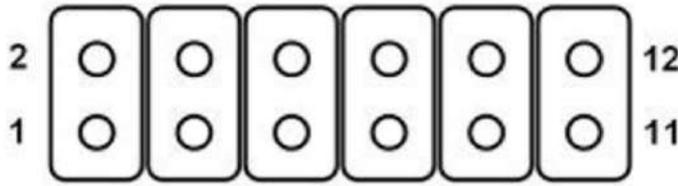


**Motherboard pins**                                    **I/O panel pins**

| Pin# | Definition | Description |
|------|-----------|-------------|
| 1 | WDT_LED- | [Output] Watchdog timer indicator, flashing when |
| 2 | WDT_LED+ | Watchdog timer is active |
| 3 | UID_LED- | [Output] User defined LED, reserved for future usage |
| 4 | UID_LED+ | |
| 5 | HDD- | [Output] Hard drive indicator, flashing when SATA hard |
| 6 | HDD+ | drive is active. |
| 7 | Power_LED- | [Output] System power indicator, on if system is turned on, |
| 8 | Power_LED+ | off if system is turned off. |
| 9 | Ctrl- | [Input] Remote on/off control, connects to an external |
| 10 | Ctrl+ | switch to turn on/off the system (polarity is negligible). |
| 11 | NA | Un-used pin |
| 12 | NA | |

### 2.3.6 4-Pin Power Connector
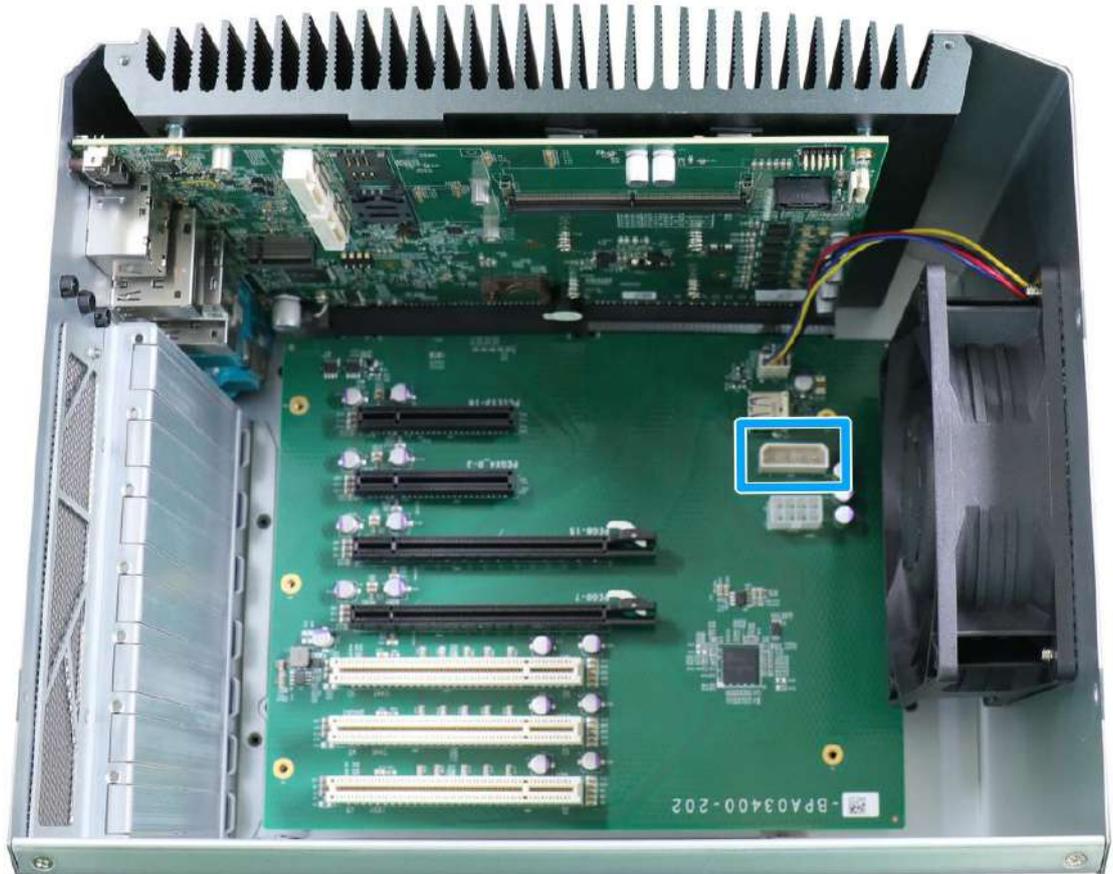


The system's daughter board features a 4-pin connector to supply additional power for users who install add-on PCIe USB3 or Power over Ethernet (PoE) cards that may require extra power delivery.

**Pin Definition**
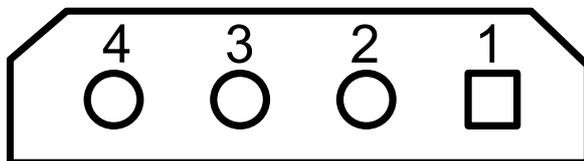


| Pin | 4 | 3 | 2 | 1 |
|------------|-----|-----|-----|-----|
| Definition | 5V | GND | GND | 12V |

### 2.3.7    8-pin Connector for GPU (up to 115W)
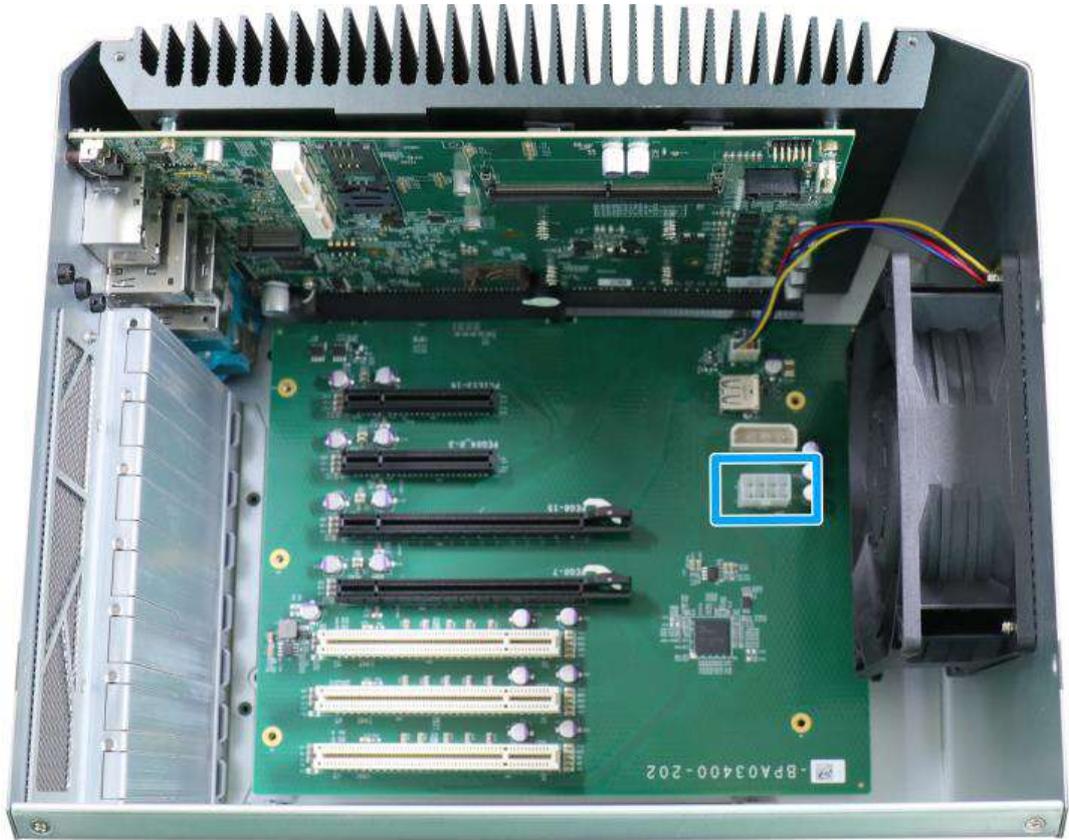


The system supports an NVIDIA graphics inference accelerator up to 115W. The 8-pin connector can supply additional power delivery to the graphics card for operation stability.

**Pin Definition**
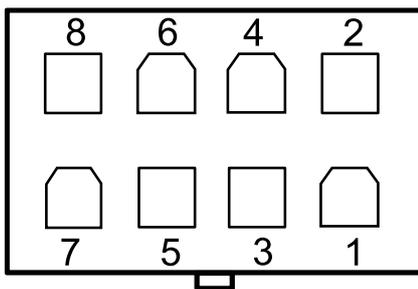


| Pin | 8 | 6 | 4 | 2 |
|---|---|---|---|---|
| Definition | GND | 12V | 12V | 12V |
| Pin | 7 | 5 | 3 | 1 |
| Definition | GND | GND | GND | GND |

### 2.3.8    Internal USB



The system's daughter board 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.

# 3    System Installation

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

● It is recommended that only qualified service personnel should install and service this product to avoid injury or damage to the system.

● Please observe all ESD procedures at all times to avoid damaging the equipment.

● Before disassembling your system, please make sure the system has powered off, all cables and antennae (power, video, data, etc.) are disconnected.

● Place the system on a flat and sturdy surface (remove from mounts or out of server cabinets) before proceeding with the installation/ replacement procedure.

## 3.1   Disassembling the System

To access system internal components, the system needs to be disassembled. To disassemble the system enclosure, you need to remove the Chassis and screws on both I/O panels.

1. One the I/O panel, remove the screw indicated.



**Nuvo-10007/ 10034**                          **Nuvo-10003**

2. Remove the screws indicated on the side panel.
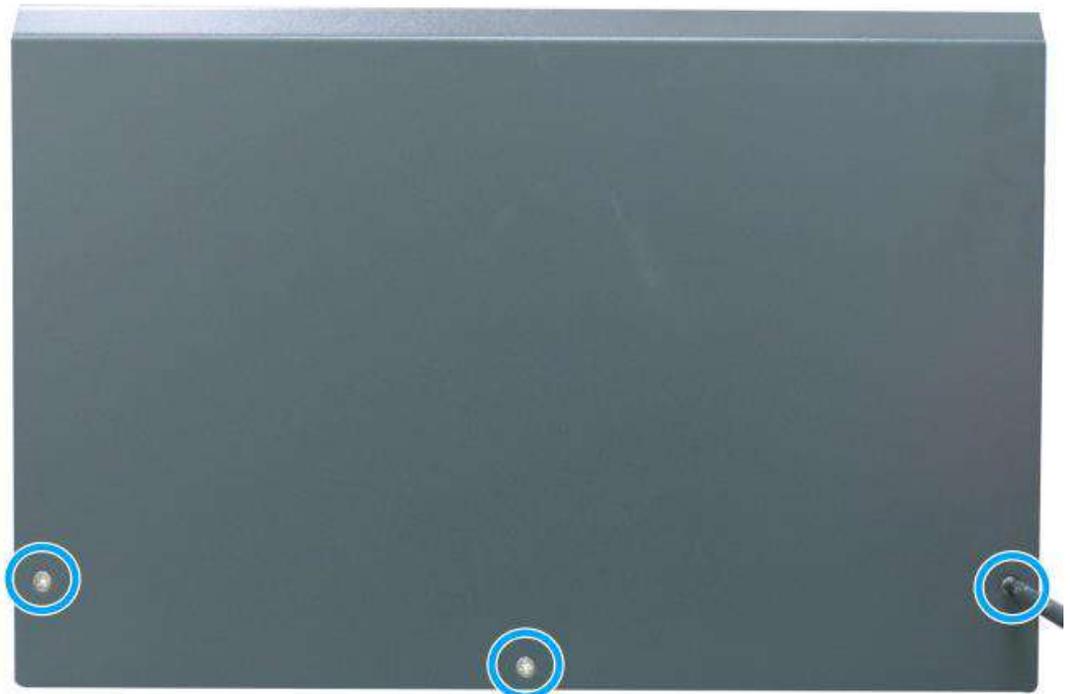
3. Remove the screws indicated on the rear panel.
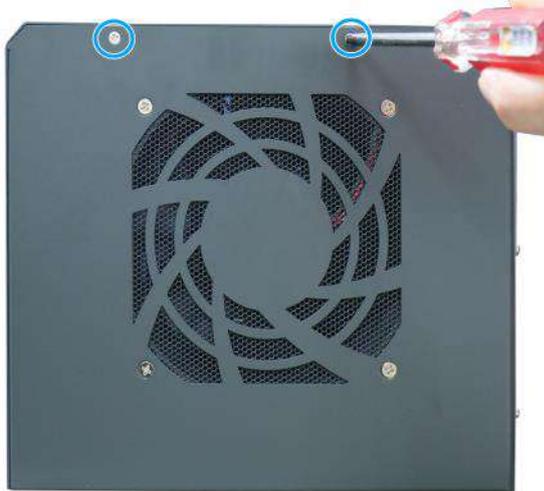


**Nuvo-10007/ 10034**               **Nuvo-10003**

4. Gently lift the L-shape cover panel to separate it from the enclosure.



5. Once the L-shaped panel has been removed, you can gain access to all internal expansion slots and components.

## 3.2 Installing Internal Components

### 3.2.1 CPU Installation for Barebone System

1. To install the CPU, you will need to separate the heatsink and the motherboard, please refer to the section "Disassembling the System".

2. Once you have removed the L-shaped panel, looking from the top, remove the screws indicated securing the daughterboard.

3. Disconnect the fan power cable and gently wiggle to disengage the daughterboard from the motherboard.
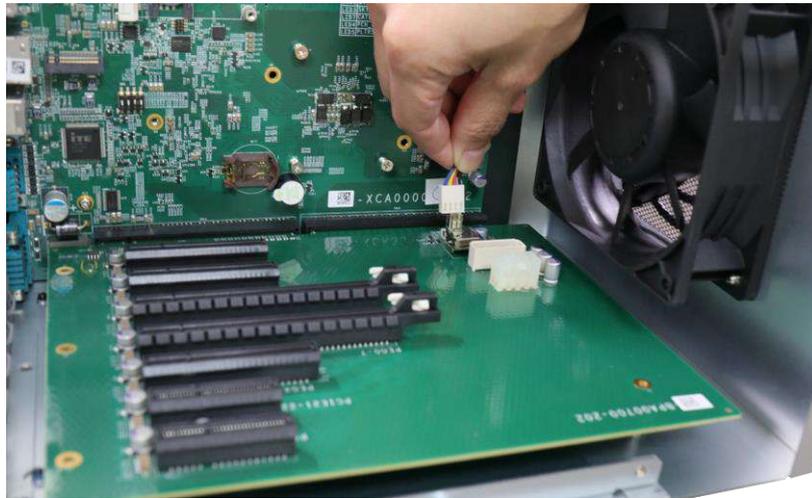


**Disconnect fan power cable**



---
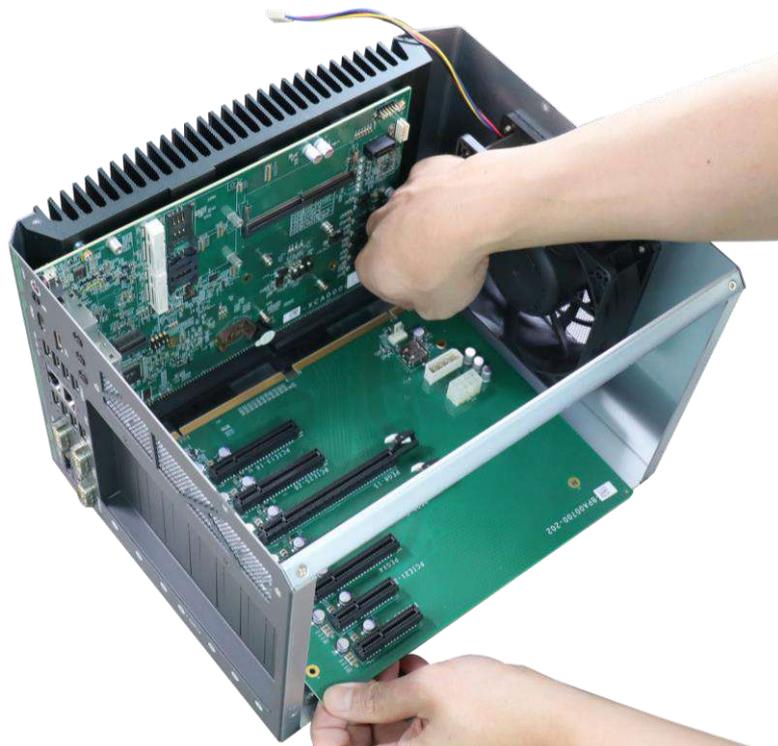
📝**NOTE**

*Please disengage the daughter-board gradually as there are capacitors situated underneath the PCIe slots that may come in contact with enclosure structures when removed with excessive force.*

---

4.    Remove the screws indicated on the heatsink.
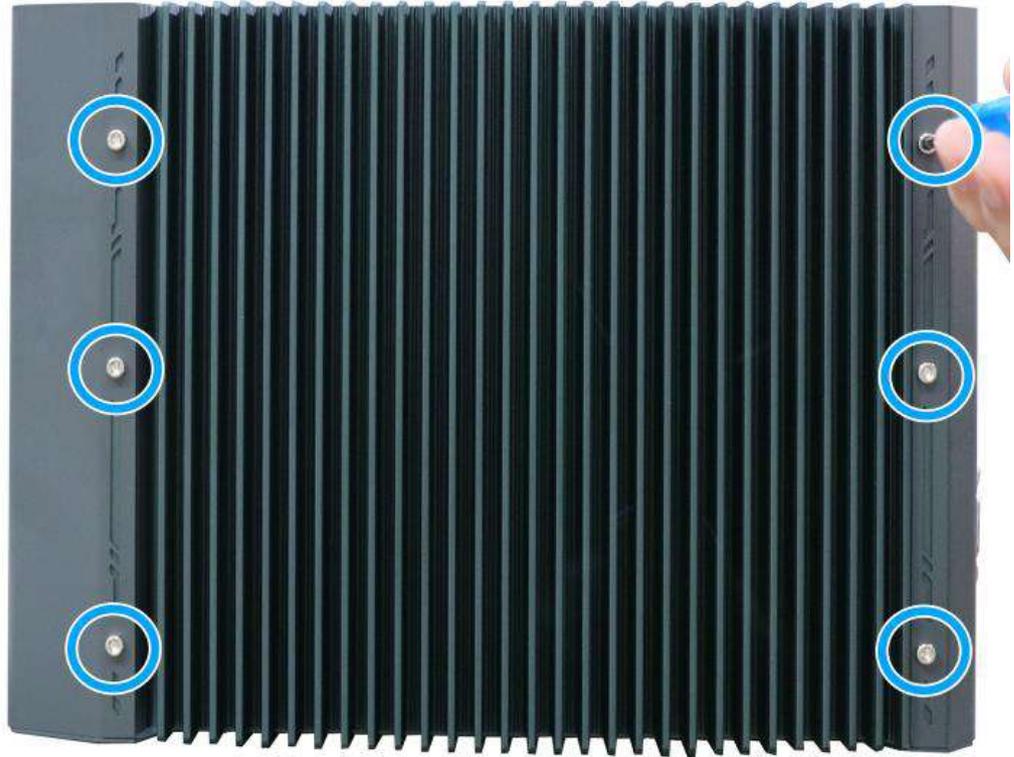


5.    Gently lift and separate the motherboard/ heatsink from the enclosure.
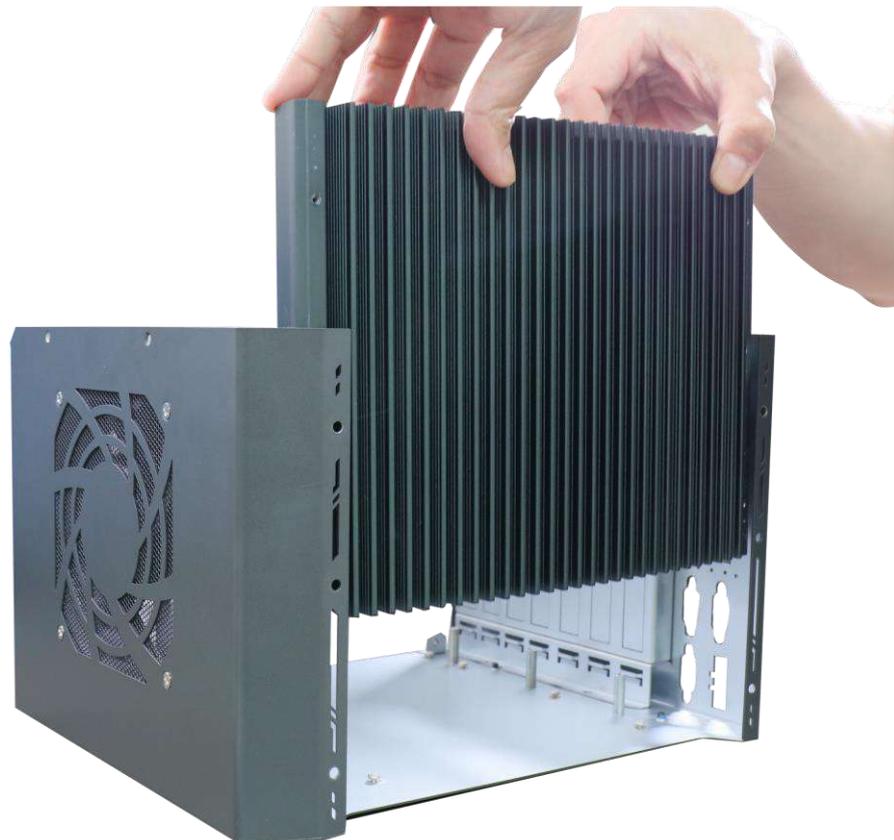
6.    To separate the motherboard from the heatsink, remove the screws indicated in **red** to separate the motherboard from the heatsink.
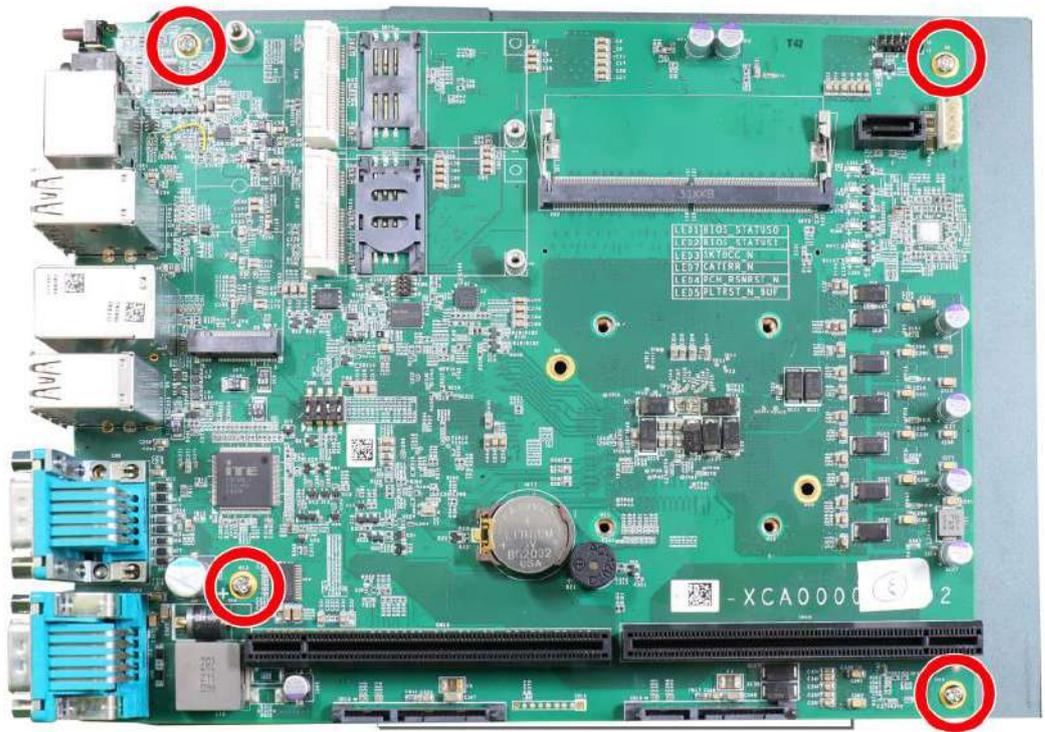


8.    Once the motherboard has been separated from the heatsink, turn the motherboard upside-down to access the CPU socket. Gently lift and remove CPU socket protector.



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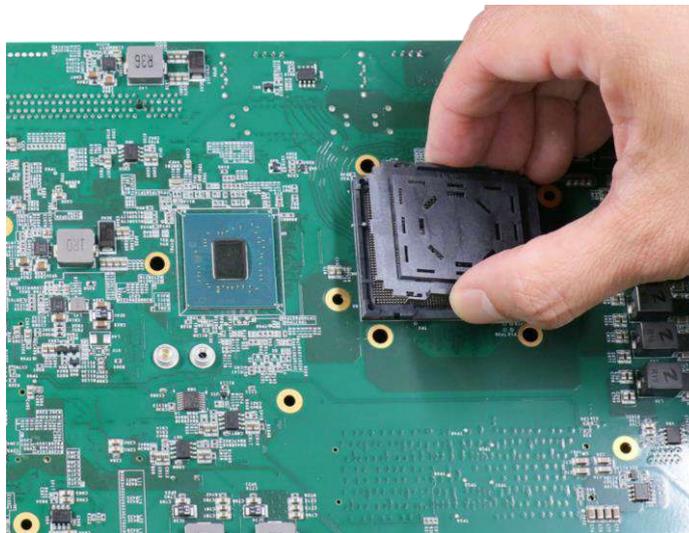
*With the protective cover removed, please be careful when handling the motherboard. DO NOT touch the pins in the LGA socket!*

9.  Remove the CPU Remove the CPU from its container/ tray. Match the four notches on the side (indicated by the **blue arrows**) to the protrusions in the socket, gently lower the CPU into the socket. Pay attention to the seating orientation, notice there is a short side (indicated by **green lines**), and a long side (indicated by **red lines**).



10. 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 screw holes match the CPU retention bracket's screw holes (indicated by **red circles**).



**Screw holes for CPU retention bracket**

**Place the CPU retention bracket on while matching the screw holes**

11. Turn the motherboard around and secure the CPU retention bracket by tightening two M3 P-head screws.
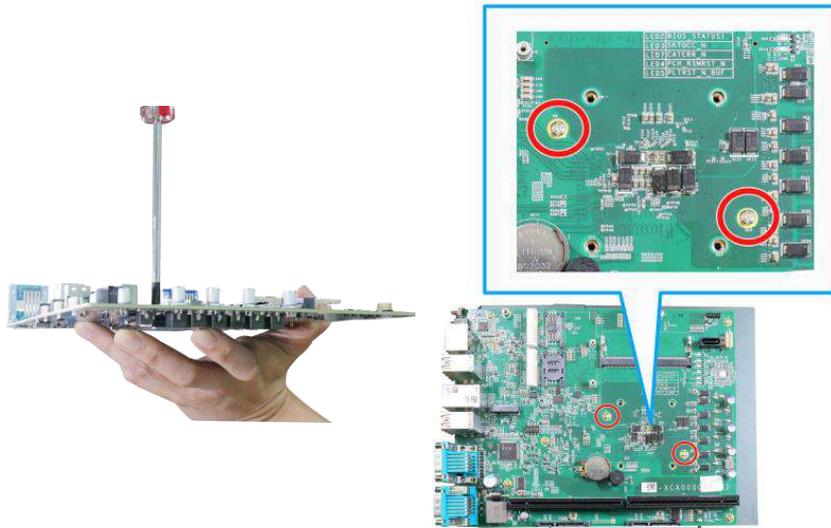


**Hold CPU retention bracket firmly and turn the motherboard around**   **Secure two M3 P-head screws**

12. Remove the protector film on the heatsink.
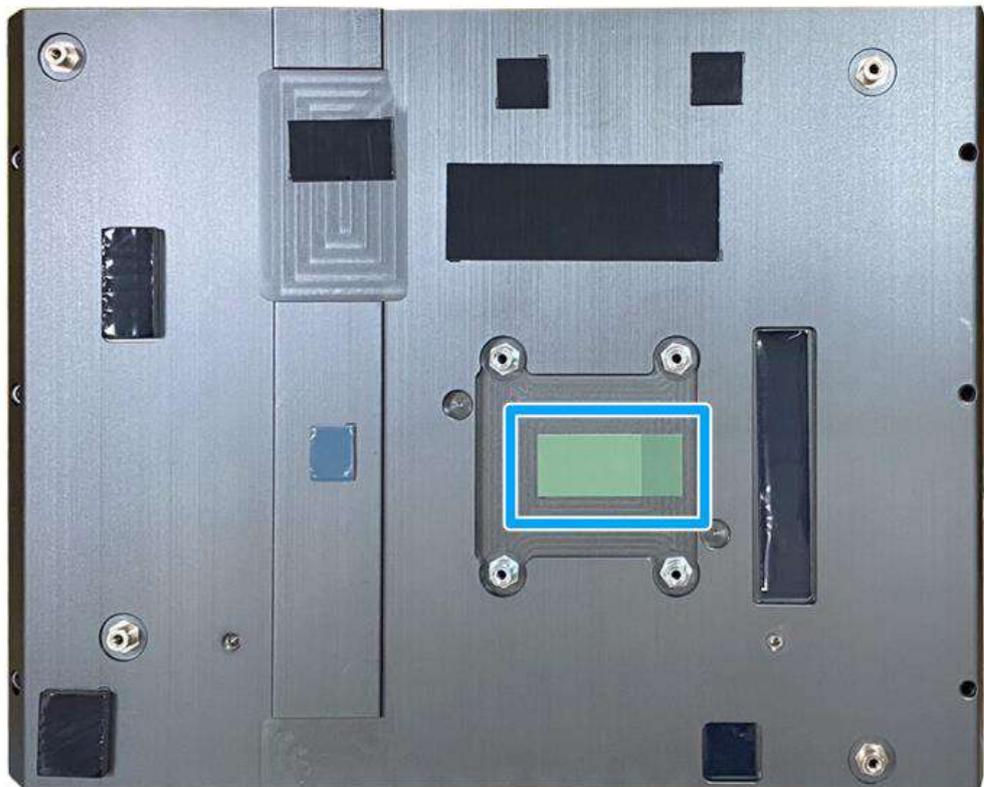
13. With the four motherboard standoffs aligned, gently lower the motherboard onto the heatsink and secure the four screws.



**Four standoffs on the heatsink**



**Secure motherboard with screws**

14. Once the motherboard has been installed, you're ready to secure the 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.



15. Reinstall the system enclosure when done.

16. 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/ motherboard from the enclosure, please refer to Disassembling the System.

2.  To separate the heatsink and the motherboard, remove the eight screws indicated below.
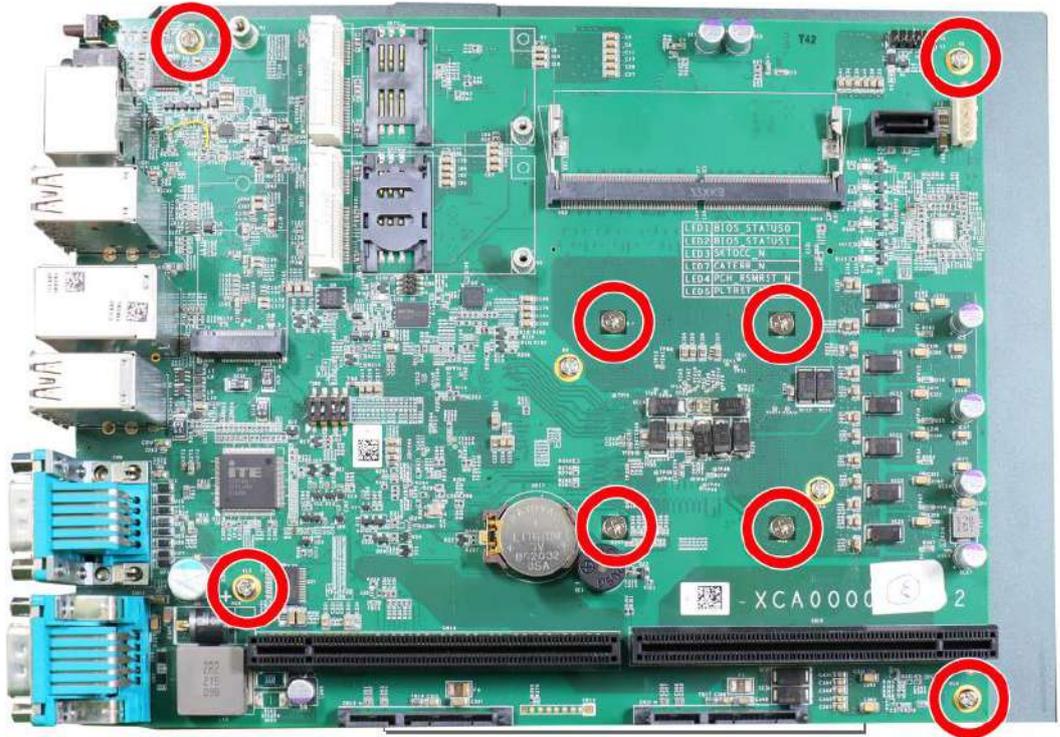


3.  Gently separate the motherboard from the heatsink. With a hand on the CPU retention bracket, remove the screws indicated to remove the CPU holder from the CPU.
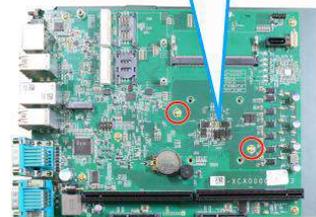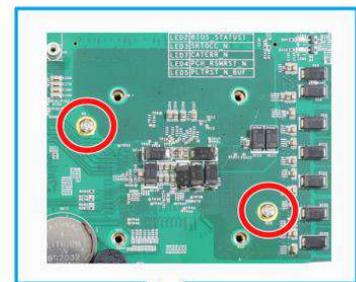


**With a hand on the CPU retention bracket**    **Remove the screws to remove the CPU retention bracket**

64

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/ retention bracket 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.
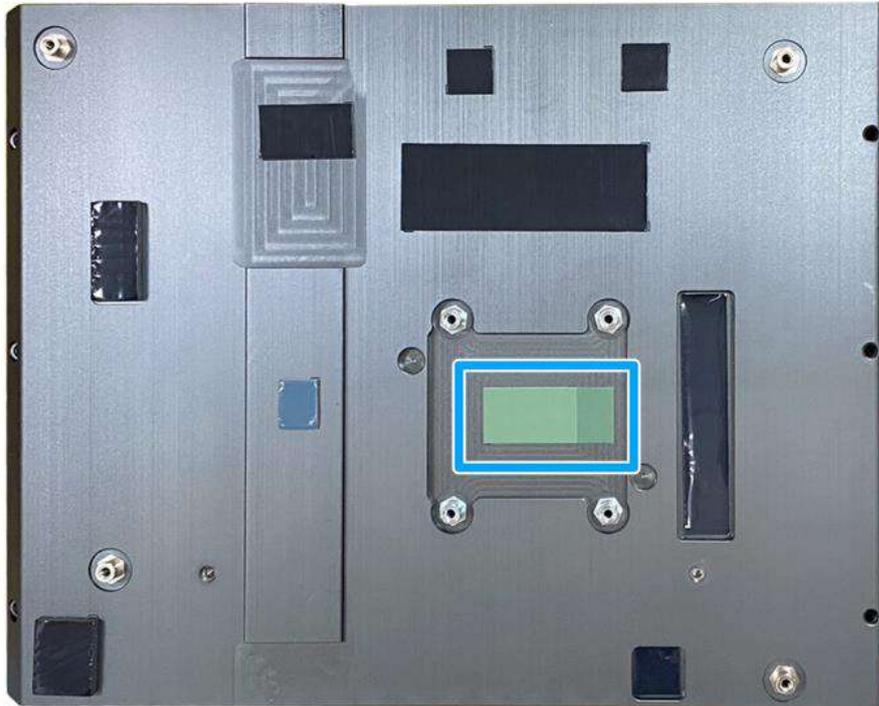


7.    Remove and clean off any thermal pad residues around the socket/ motherboard. Gently place the new CPU into the socket by matching the four notches (indicated by **blues arrows**) on the side to the protrusions in the socket. Pay attention to the seating orientation, notice there is a short side (indicated by **green lines**), and a long side (indicated by **red lines**).

8.   Make sure all thermal pad residues have been cleaned on both sides of the retention bracket. Place the CPU retention bracket (holder) on top of the CPU and hold it in place. Make sure the screw holes match the CPU retention bracket's screw holes (indicated by **red circles**).



**Screw holes for CPU retention bracket**



**Place the CPU retention bracket on while matching the screw holes**

9.   Turn the motherboard around and secure the CPU retention bracket by tightening two M3 P-head screws.
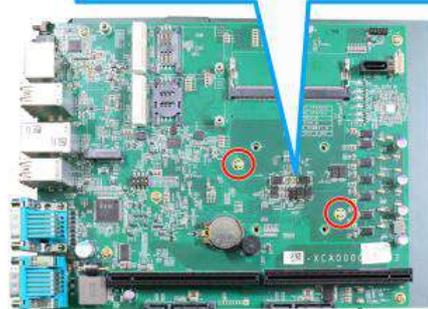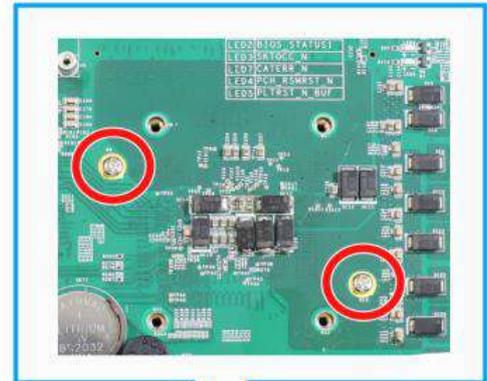


**Hold CPU retention bracket firmly and turn the motherboard around**



**Secure two M3 P-head screws**

10. Remove the protector film on the heatsink.
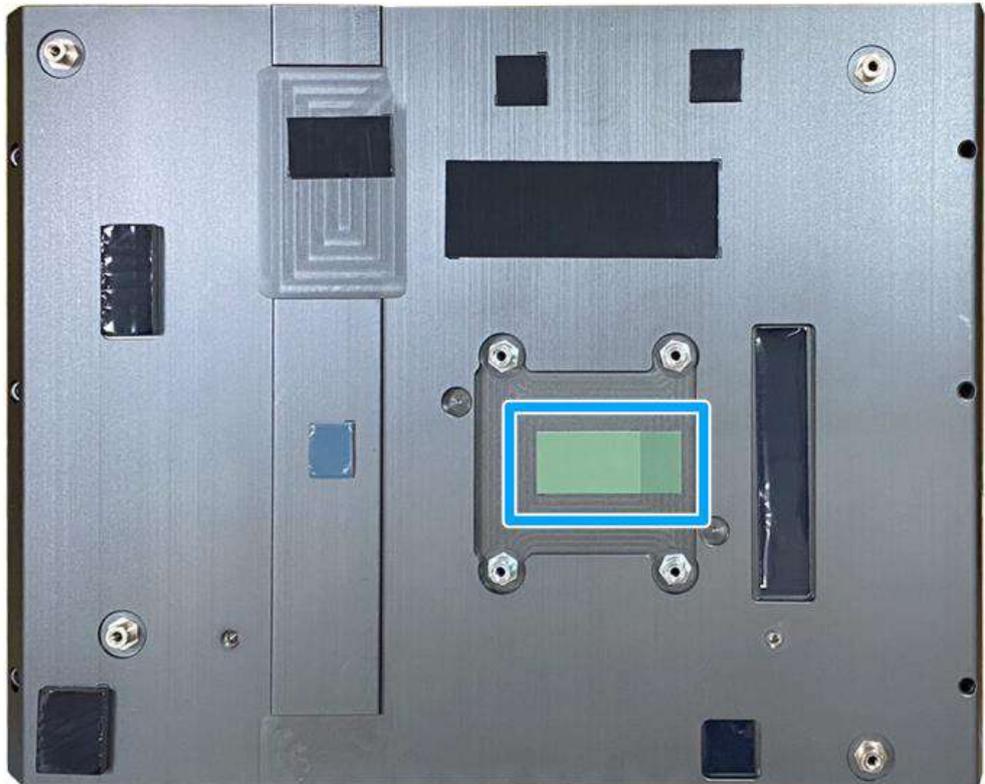
11. With the four motherboard standoffs aligned, gently lower the motherboard onto the heatsink and secure the four screws.



**Four standoffs on the heatsink**



**Secure motherboard with screws**

12. Once the motherboard has been installed, you're ready to secure the 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 enclosure when done.

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 support a total maximum of 64GB non-ECC DDR5-4800. Please follow the procedures below to replace or install the memory modules.

1.  Please refer to the sections "Disassembling the System" and "Remove and Replace the Existing CPU" to gain access to the DRAM slot on the CPU socket side.

2.  Locate the SODIMM memory module slots on the motherboard.



**Expansion slot side**                    **CPU 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.  If you are installing the memory module on the CPU socket side, please remember to

remove the thermal pad protection film indicated below.
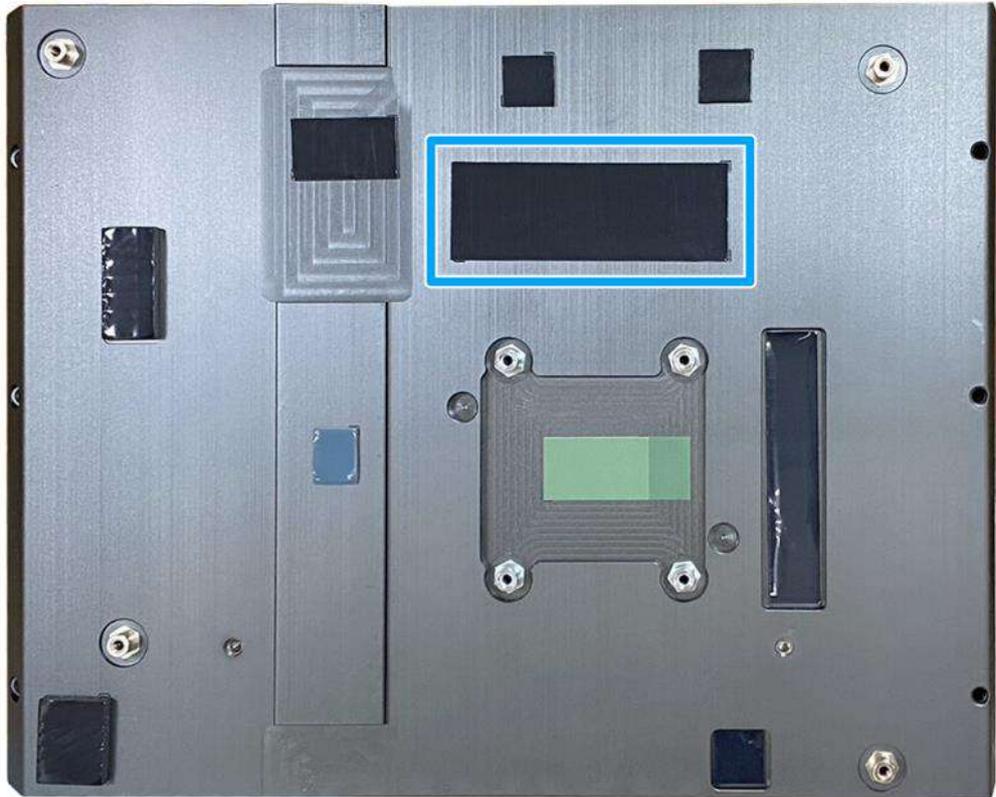


6.  Repeat steps 3 and 4 to install the other module.

7.  Reinstall the system enclosure and panel when done.

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

### 3.2.4 M.2 2280 M Key SATA SSD Installation


**NOTE**

*The M.2 slot is only compatible with SATA signal M.2 SSD only.*

The system supports an M.2 2280 slot for you to install an M.2 SATA SSD for faster access over traditional hard disk drives. Please follow the procedures below to install an M.2 SATA SSD.

1. Please refer to the section "Disassembling the System".
2. Locate the M.2 M key slot on the motherboard.



3. Insert the module on a 45 degree angle.

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



5.	Reinstall the system enclosure when done.

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

### 3.2.5 mini-PCIe slot, Mini-SIM (2FF) Card and Antenna Installation

The system has two mini-PCIe slots (indicated in **blue**) coupled with mini-SIM socket (indicated in **red**) for installing 4G/ 5G module. For installation, please refer to the following instructions.

1. Please refer to the section "Disassembling the System".

2. Locate the mini-PCIe and SIM slots on the motherboard.
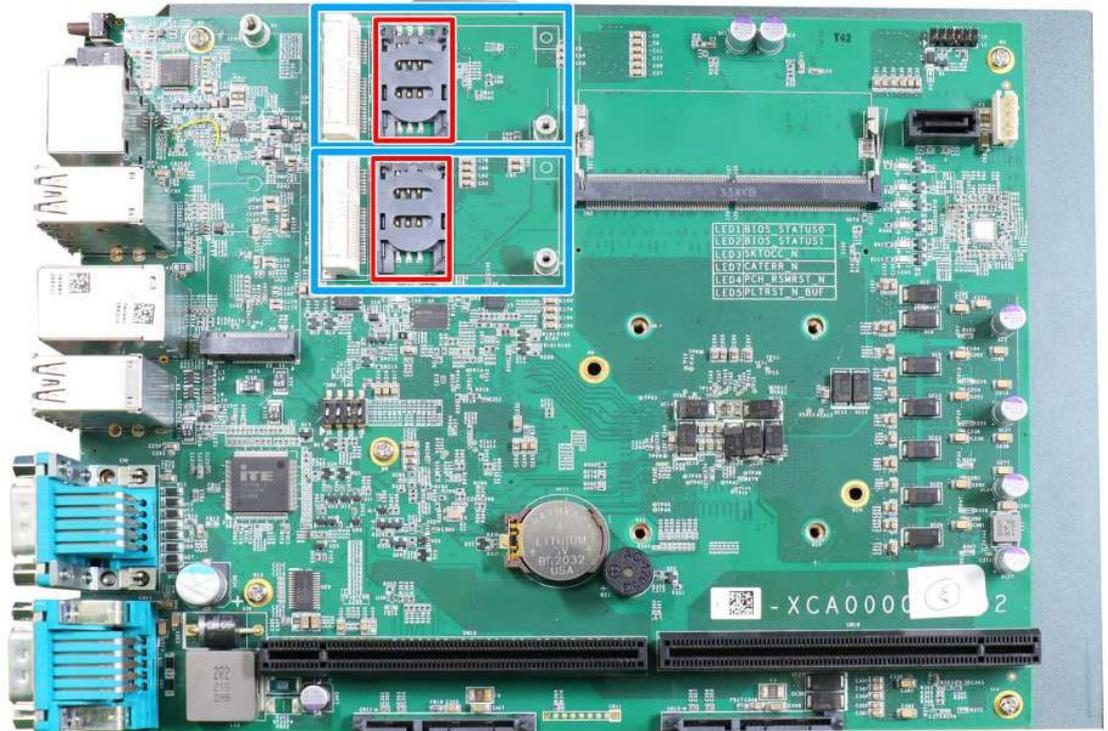


3. Before installing the module, you need to insert the mini-SIM card. Slide the SIM slot holder and lift the SIM card holder. Insert the Mini-SIM card (pins facing up), shut the SIM holder and slide it to lock the SIM card in-place.
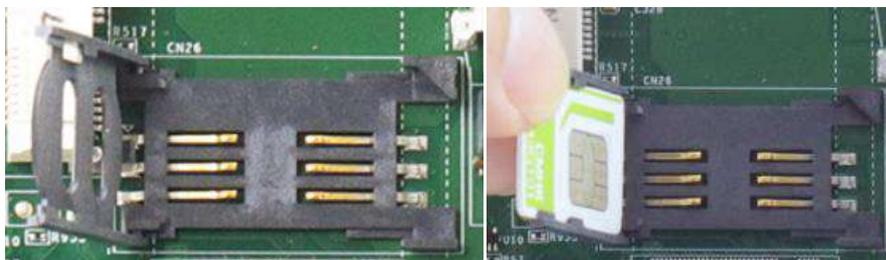


**Slide and lift SIM card holder**          **Insert SIM card with pins facing up**

4. Secure the SIM card by sliding the holder.
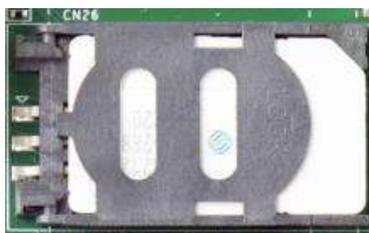
5. Insert the module on a 45 degree angle into the slot and secure the module with an M3 P-head screw.



**Insert on 45 degree angle**                    **Secure the module**
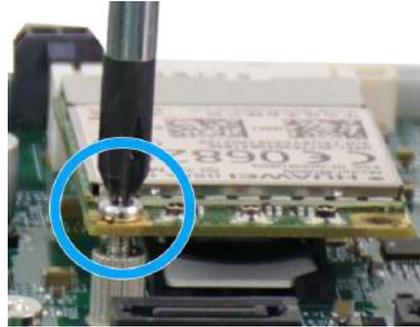
6. Clip on the IPEX-to-SMA cable to the module and secure the antenna to the front or rear panel. Please refer to the module's manual for clip-on connection.



**Clip on IPEX-to-SMA cable**          **Secure antenna to rear panel**
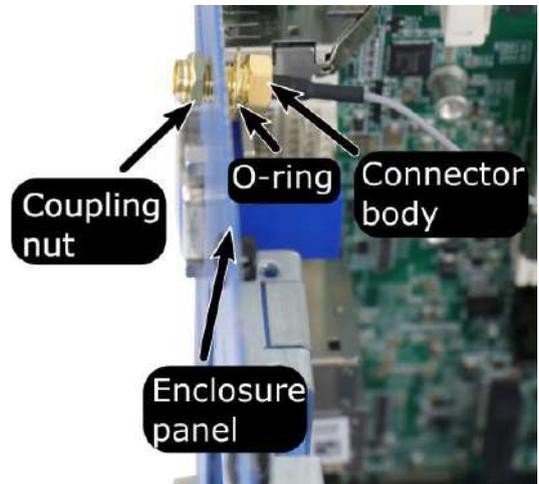
7. Secure the external antenna to complete the installation.



8. [Reinstall the system enclosure](#) and panel when done.

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

### 3.2.6    HDD/ SSD Installation

> ✏️ NOTE
>
> *Supports up to 15mm thickness HDD/ SSD.*

The system has three SATA ports (indicated in **blue)**. Please refer to the following instructions on how to install 2.5" SATA HDD/ SSD.
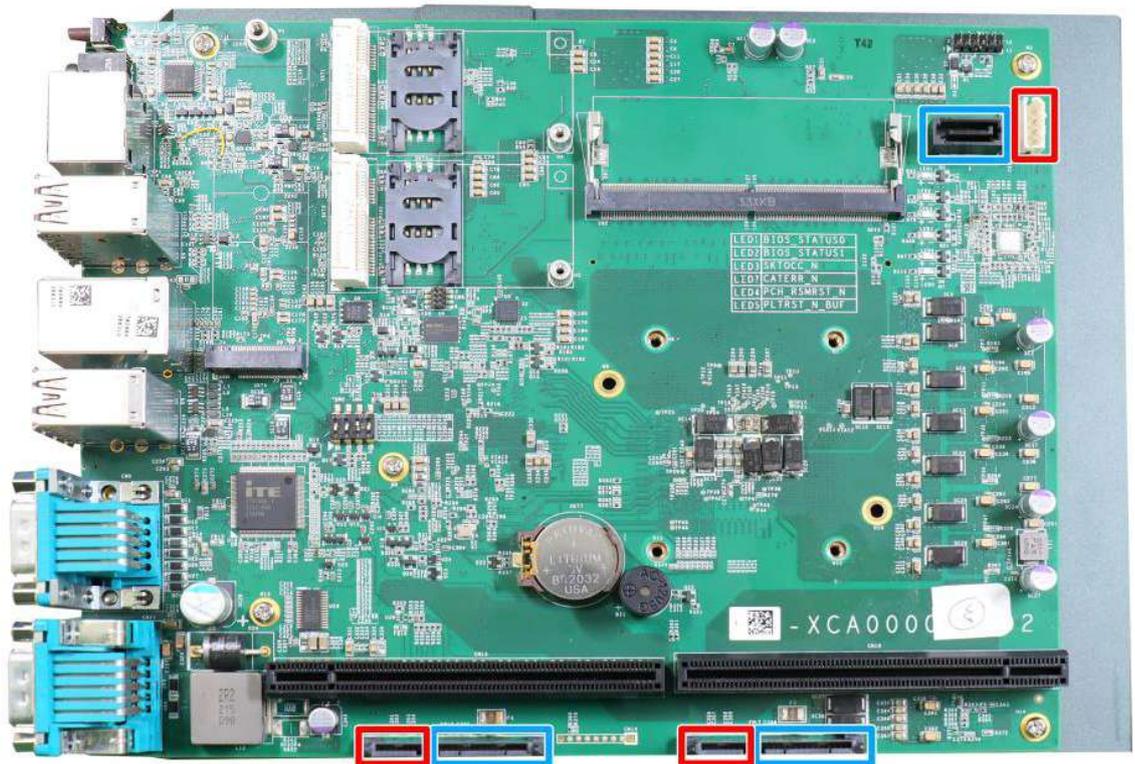


1.    Please refer to the section "<u>Disassembling the System</u>".
2.    The HDD/ SSD tray is situated at the bottom, just underneath the daughterboard. You do not have to remove the daughterboard to retrieve the tray, but the daughterboard has been removed to better illustrate the procedure.



**Remove the screws indicated**          **Pull out the tray**

3. With the SATA connectors facing inwards (indicated in blue), secure the HDD/ SSD with flathead screws from underneath the tray. You may install just one or two HDDs/ SSDs.

**SATA connectors facing inwards        Secure underneath with flathead screws**

4. Once the HDDs/ SSDs have been secured, insert the tray 3/4 of way in, firmly and gently push the tray into place. When HDDs/ SSDs have properly engaged the connector, secure the screws holding the tray in place.

5. Reinstall the system enclosure and panel when done.

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

### 3.2.7 On/ Off Control & Status LED Cable Installation (Optional)

When the system is placed inside a cabinet, it's useful to connect the on/ off controls and the system status to the external panel. Nuvo-10000 provides a 2x6, 2.0mm pitch pin header to output system status such as power, HDD, watchdog timer, and control system on/off remotely. To install the optional cable, please refer to the following procedure:

1.  Please refer to the section "Disassembling the System".

2.  Locate the 2x6 pins for On/Off control & Status LED output on the top right corner of the motherboard.
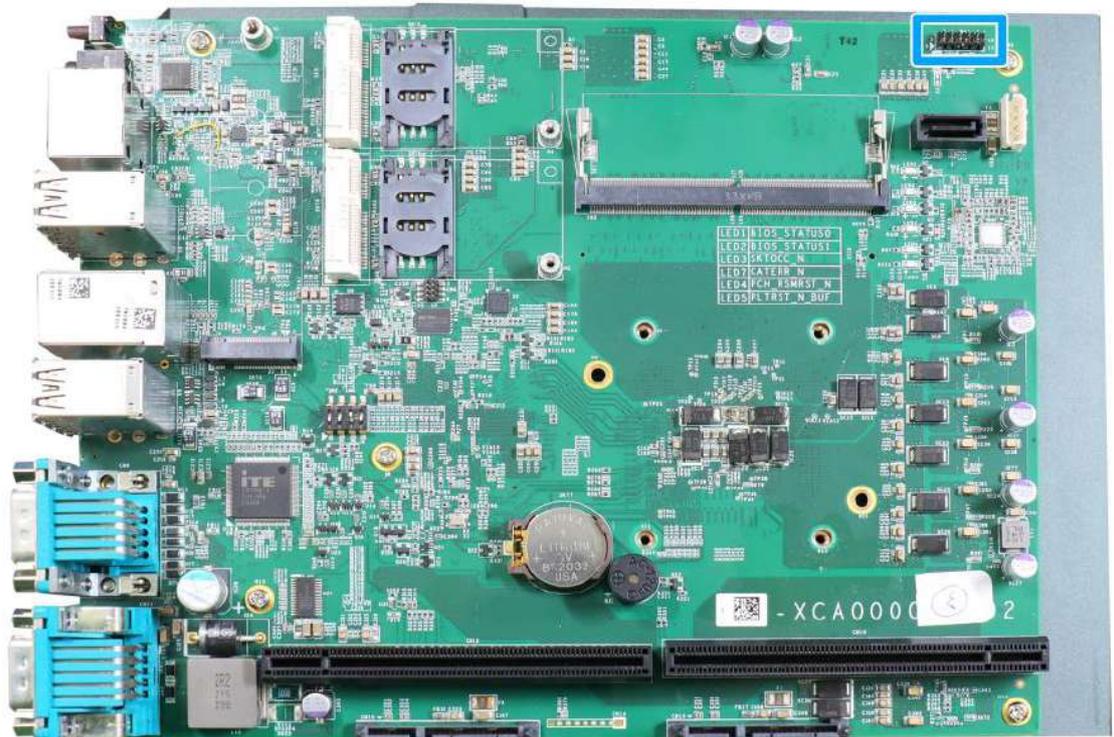


3.  Remove the reserved punch-out panel on the I/O panel.

4. Note the pin order, and make sure Pin 1 on cable (indicated in **blue**) is plugged into Pin 1 on the motherboard (indicated in **red**).
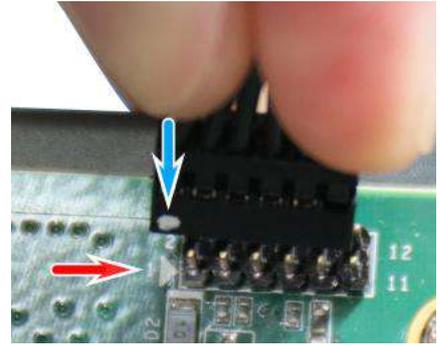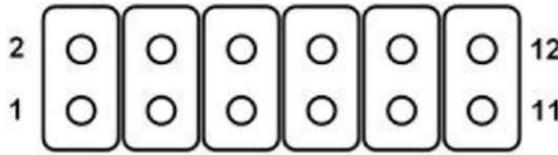
**Pin allocation on motherboard**                **Pin 1 (cable) plugged into Pin 1 (MB)**

5. When inserting the connector to the I/O panel, make sure the orientation of the plug matched the I/O panel.
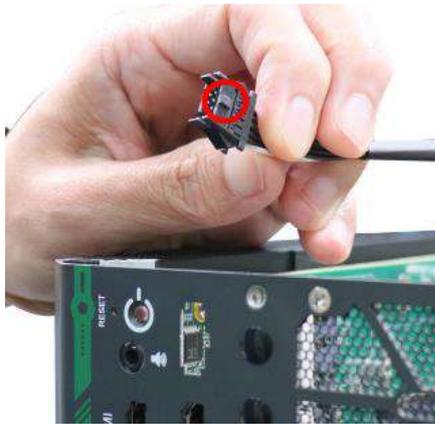
6. Push the plug inside-out, make sure it is clipped onto the I/O panel to complete the optional cable installation.
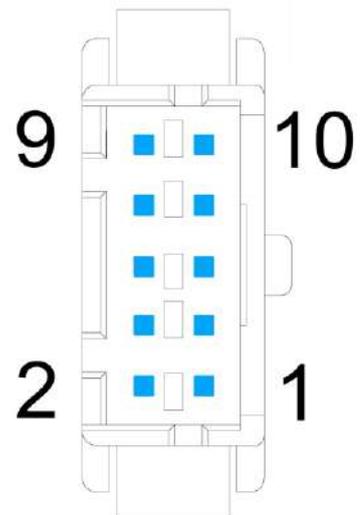
7. For front panel pin definitions, please refer to this section.

8. Reinstall the system enclosure and panel when done.

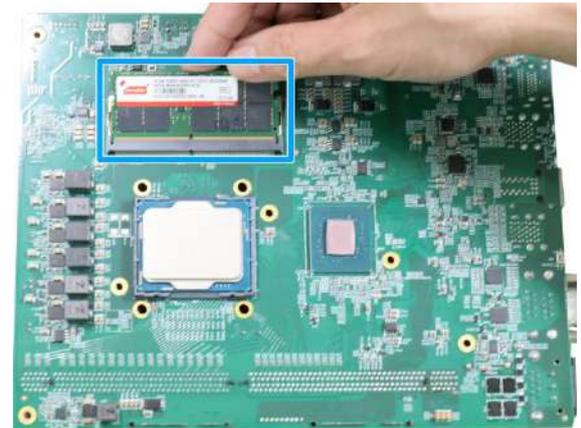If you need to install other components, please refer to respective sections.

## 3.3    Installing the System Enclosure

1.    To reinstall the system enclosure, place the L-shaped panel back onto the system enclosure frame.



2.    Secure the screw indicated on the I/O panel.



**Nuvo-10007/ 10034**                    **Nuvo-10003**

3.    Secure the screws indicated on the side panel.

4.     Secure the screw indicated at the rear to complete the enclosure installation.



**Nuvo-10007/ 10034**                                          **Nuvo-10003**

## 3.4    Wall-mount Bracket Installation

To install the wall-mount bracket, turn the system upside-down and secure the wall-mount bracket onto the bottom of the system enclosure. The bracket and screws can be found in the accessory box.

1.    Secure the wall-mount bracket (in **blue**) with the supplied M4 screws (in **red**).
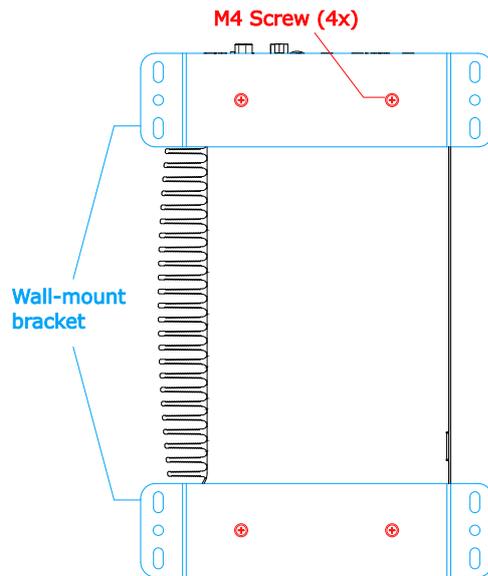


**Nuvo-10003**
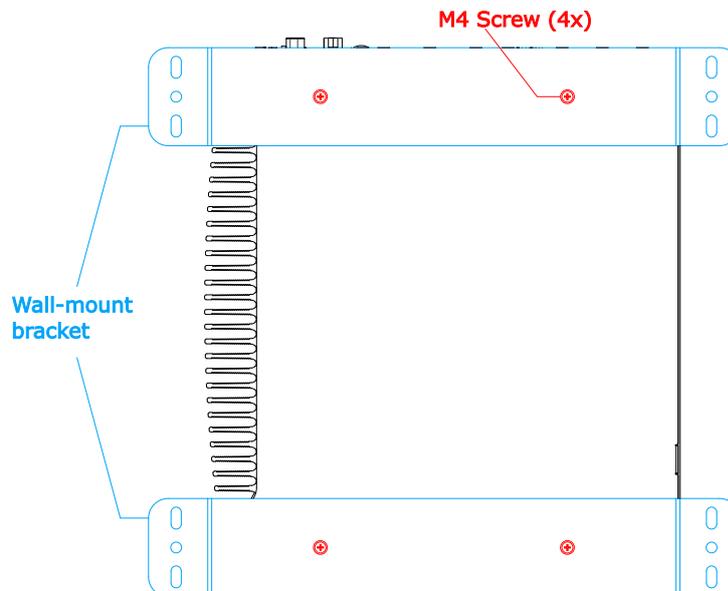


**Nuvo-10007/ 10034**

2.    Place the system on a flat surface and secure it with screws.

## 3.5   Powering On the System

There are three methods to power on the system

● Pressing the power button

● Sending a LAN packet via Ethernet (Wake-on-LAN)

### 3.5.1   Powering On Using the Power Button

This is the simplest way to turn on your system. The power button 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.
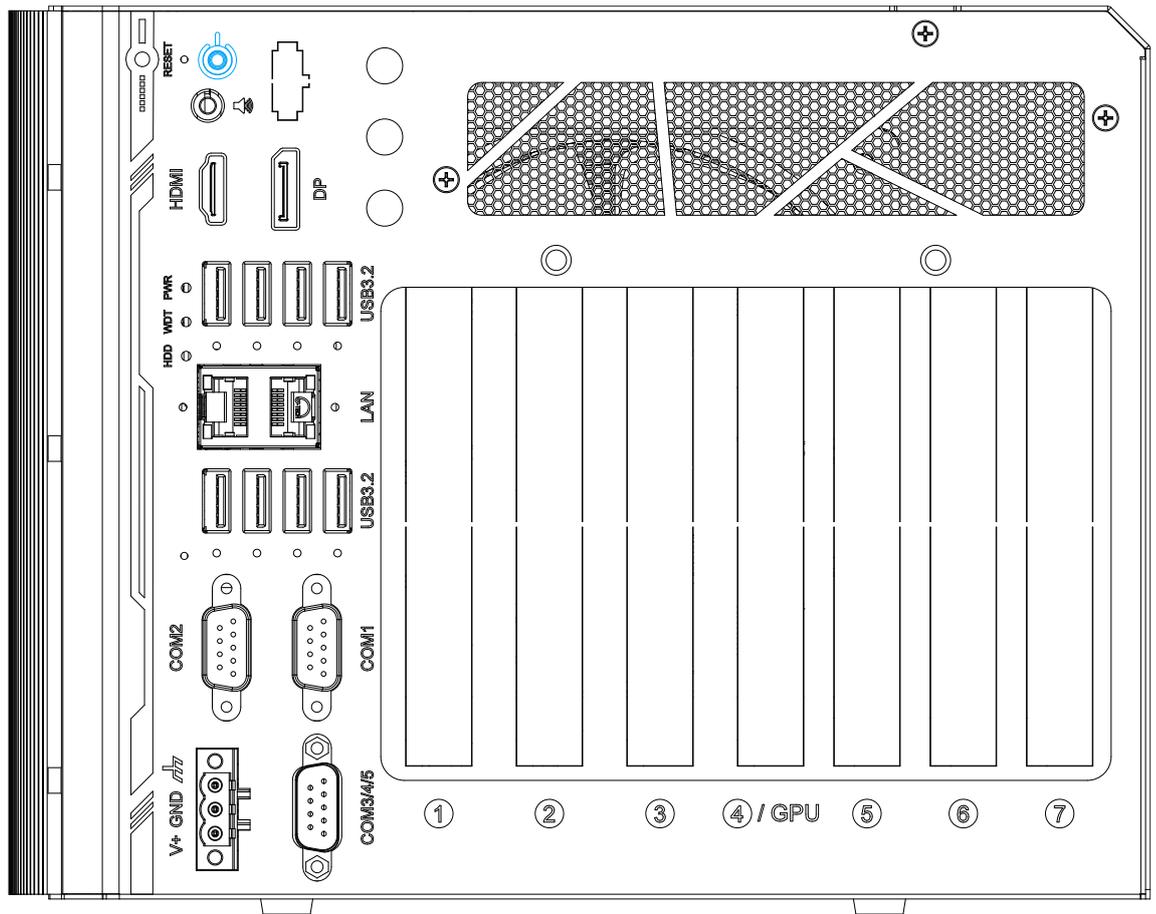
### 3.5.2    Powering On Using Wake-on-LAN

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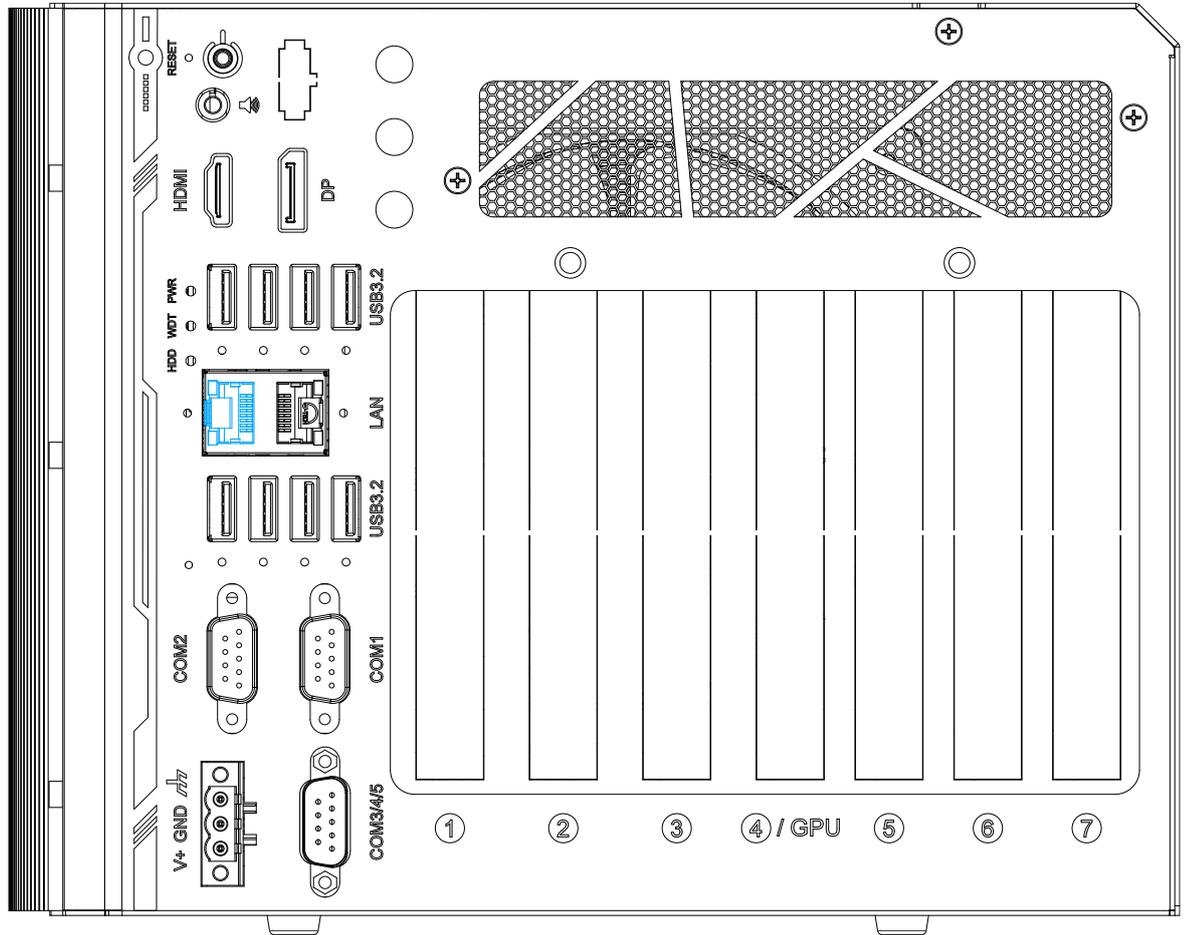


📝 NOTE

*Please make sure the Intel chipset and Ethernet driver has been properly installed prior to setting up WOL function.*

To enable WOL function, please set up WOL 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]** 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® I219 Gigabit Network Connection, click on **Configure...**

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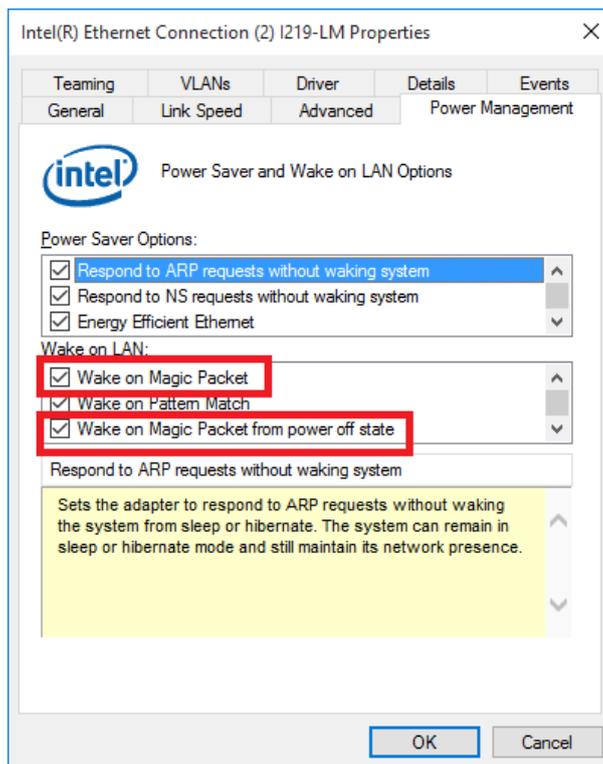
**Magic Packet**

The magic packet is a broadcast frame containing anywhere within its payload 6 bytes of all 255 (FF FF FF FF FF FF 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 FF FF FF FF FF

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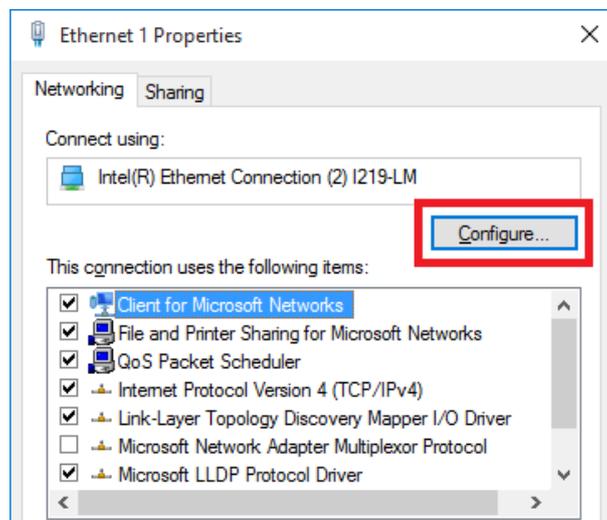
There are some free tools available on Internet that can be used to send a magic packet. Please refer to the following link to understand more about Magic Packet.

### 3.5.3   Configure your Windows system

When applying ignition power control to your system, please make sure you've configured your Windows system to initiate a shutdown process when pressing the power button. By default, Windows 7/ 8/ 10 goes to sleep (S3) mode when power button is pressed. As sleep (S3) is not a complete shutdown behavior, the ignition control function does not recognize the finish of a normal shut down process and thus users will encounter a system hard-off (power cut-off after 10 minutes). Please configure "When I press the power button" to "Shut down" in your Windows system settings.

Power button settings

When I press the power button:   Shut down   ▼
Do nothing
Sleep
Hibernate
Shut down
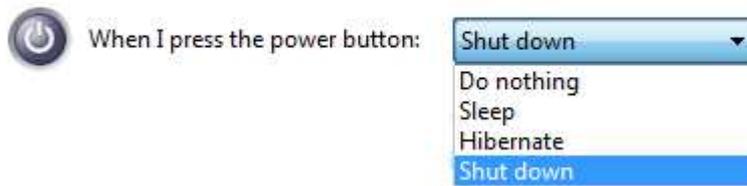
# 4  System Configuration

## 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).

```
                           Nuvo-10007 Series Setup Utility                        Rev. 5.0
 Main  Advanced  Security  Power  Boot  Exit

                                                        This is the help for the hour, minute,
 BIOS Version                 NV10KA01.Build240222      second field. Valid range is from 0 to
 Build Date                   2/22/2024                 23, 0 to 59, 0 to 59. INCREASE/REDUCE :
                                                        +/-.
 Processor Type               13th Gen Intel(R) Core(TM) i7-13700E

 System Memory Speed          4800 MT/s
 Total Memory                 32768 MB
 DDR5 SODIMM Socket1          32768 MB

 Total Core Count:            16 Core(s) / 24 Thread(s)
 Number Of E-Core:             8 Core(s) /  8 Thread(s)
 Number Of P-Core:             8 Core(s) / 16 Thread(s)

 System Time                  [09:31:09]
 System Date                  [03/07/2024]















 F1  Help              ↑/↓ Select Item        F5/F6 Change Values       F9  Setup Defaults
 Esc Exit              ←/→ Select Item        Enter Select ▶ SubMenu    F10 Save and Exit
```

📝 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).
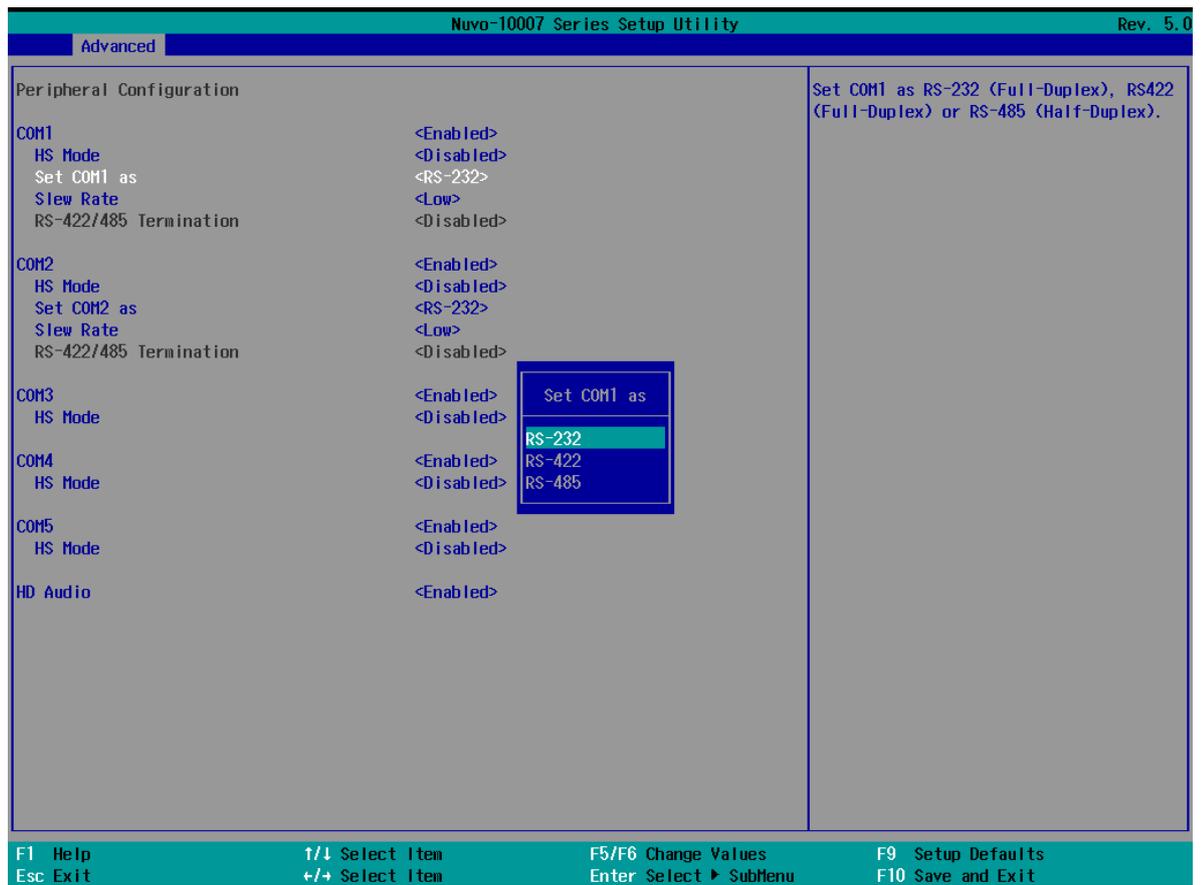


**To set COM port operating mode:**

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 save setting and exit.

## 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).

```
                         Nuvo-10007 Series Setup Utility                        Rev. 5.0
    Advanced
 Peripheral Configuration                                   Enable/Disable high-speed mode for
                                                            COM1. When enabled, input clock for
 COM1                          <Enabled>                    baud rate generator is multiplied by 8.
   HS Mode                     <Disabled>                   Consequently baud rate configured in
   Set COM1 as                 <RS-232>                     user's application will actually
   Slew Rate                   <Low>                        operate at 8x speed. This option allows
   RS-422/485 Termination      <Disabled>                   a maximal baud rate of 921,600 bps
                                                            (115,200 x 8) for COM1.
 COM2                          <Enabled>
   HS Mode                     <Disabled>
   Set COM2 as                 <RS-232>
   Slew Rate                   <Low>
   RS-422/485 Termination      <Disabled>

 COM3                          <Enabled>
   HS Mode                     <Disabled>        ┌─────────────────┐
                                                 │     HS Mode     │
 COM4                          <Enabled>         ├─────────────────┤
   HS Mode                     <Disabled>        │ Disabled        │
                                                 │ Enabled         │
 COM5                          <Enabled>         └─────────────────┘
   HS Mode                     <Disabled>

 HD Audio                      <Enabled>




 F1  Help              ↑/↓ Select Item      F5/F6 Change Values       F9  Setup Defaults
 Esc Exit              ←/→ Select Item      Enter Select ▶ SubMenu    F10 Save and Exit
```

**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 save setting and exit.

### 4.1.3    Delay for PEG Initialization

This setting offers delay in milliseconds for PEG port initialization and PCI enumeration. By increasing the delay value, it may eliminate compatibility issue(s) with some PCIe add-on cards.

```
                          Nuvo-10034 Series Setup Utility                    Rev. 5.0
   Advanced

CPU PCI Express Configuration                              Delay in milli-seconds before PCIe
                                                          reset signal. Increasing this value to
►CPU PCIe Root Port Slot #2                               extend time between PCIe card power-on
►CPU PCIe Root Port Slot #3                               and PCIe reset.
►CPU PCIe Root Port Slot #4

Init Delay Before PCIe Reset          [0]
Init Delay After PCIe Reset           [100]




F1  Help              1/↓ Select Item      F5/F6 Change Values       F9  Setup Defaults
Esc Exit              ←/→ Select Item      Enter Select ► SubMenu    F10 Save and Exit
```

**To set PEG delay in milliseconds**:

1.  When system boots up, press F2 to enter BIOS setup utility.

2.  Go to **[Advanced]** > **[System Agent (SA) Configuration]** > **[CPU PCIe Express Configuration]** and press ENTER.

3.  A small window appears and you may enter delay value before or after PCIe reset in ms.

4.  When done, press F10 to "Exit Saving Changes"

### 4.1.4   Fan Control Configuration

The fan control configuration allows users to set the fan operation mode to auto or fixed speeds operation. The auto mode configuration also offers minimum temperature setting to trigger the fan and the maximum temperature setting before the fan operates at 100% rotation speed.

```
                          Nuvo-10007 Series Setup Utility                          Rev. 5.0
 Main  Advanced  Security  Power  Boot  Exit

                                                          Configure fan control mode and
 ▶Boot Configuration                                      activation trip points.
 ▶Peripheral Configuration
 ▶System Agent (SA) Configuration
 ▶PCH PCI Express Configuration
 ▶SATA Configuration
 ▶USB Configuration
 ▶PCH-FW Configuration
 ▶Fan Control Configuration















 F1  Help              ↑/↓ Select Item      F5/F6 Change Values     F9  Setup Defaults
 Esc Exit              ←/→ Select Item      Enter Select ▶ SubMenu  F10 Save and Exit
```

**To set Fan Control Configuration to Auto mode**:

1.　When system boots up, press F2 to enter BIOS setup utility.

2.　Go to **[Advanced]** > **[Fan Control Configuration]** and press ENTER.

3.　To set auto fan control, highlight **[Fan Control Mode]** and press ENTER, highlight **[Auto]**

4.　Use the up/ down arrow keys to highlight Fan Start Trip Point or Fan Max. Trip Point and press ENTER, a window appears and you may enter the temperature in degree Celsius.

- **Fan Start Trip Point**: The minimum temperature which the fan being to operate

- **Fan Max. Trip Point**: The maximum temperature where the fan begins to operate at 100% rotation speed
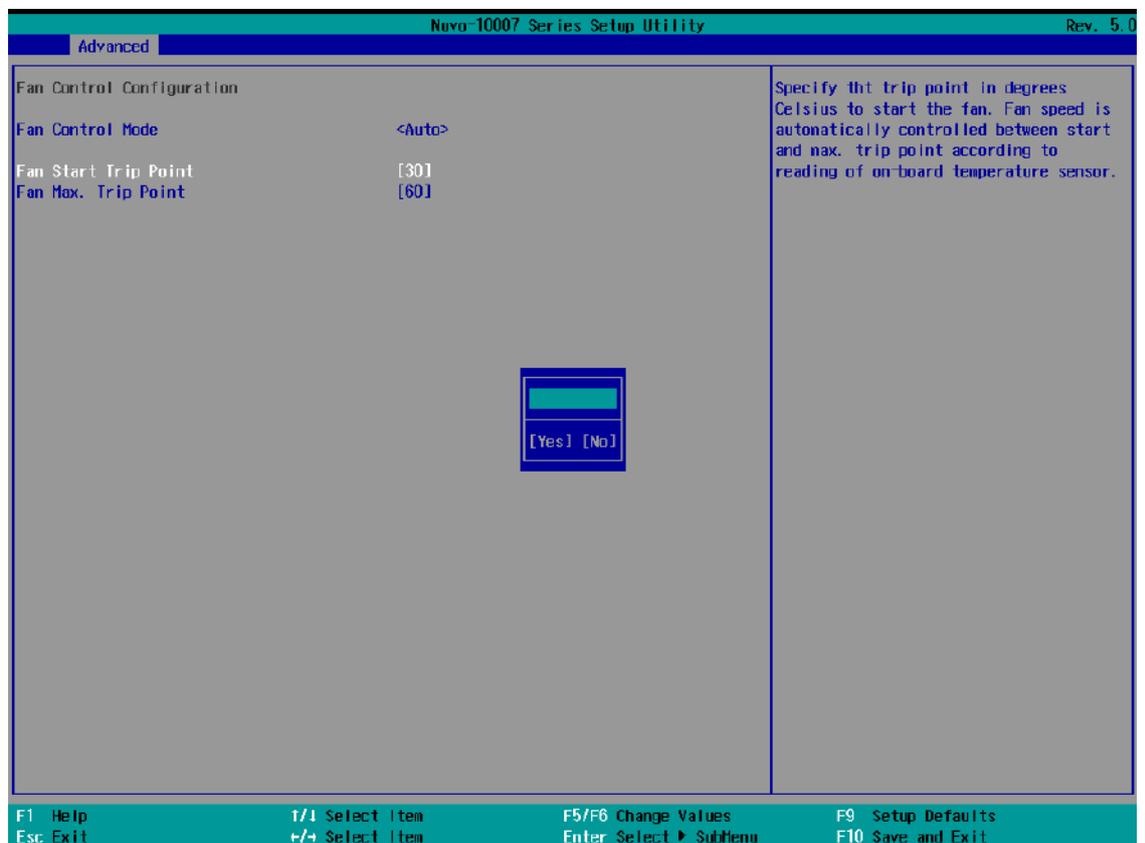


5.　When done, press F10 to "Exit Saving Changes".

**To set Fan Control Configuration to Fixed Speed mode**:

1. When system boots up, press F2 to enter BIOS setup utility.

2. Go to **[Advanced]** > **[Fan Control Configuration]** and press ENTER.

3. To set auto fan control, highlight **[Fan Control Mode]** and press ENTER, highlight **[Fixed Speed].**
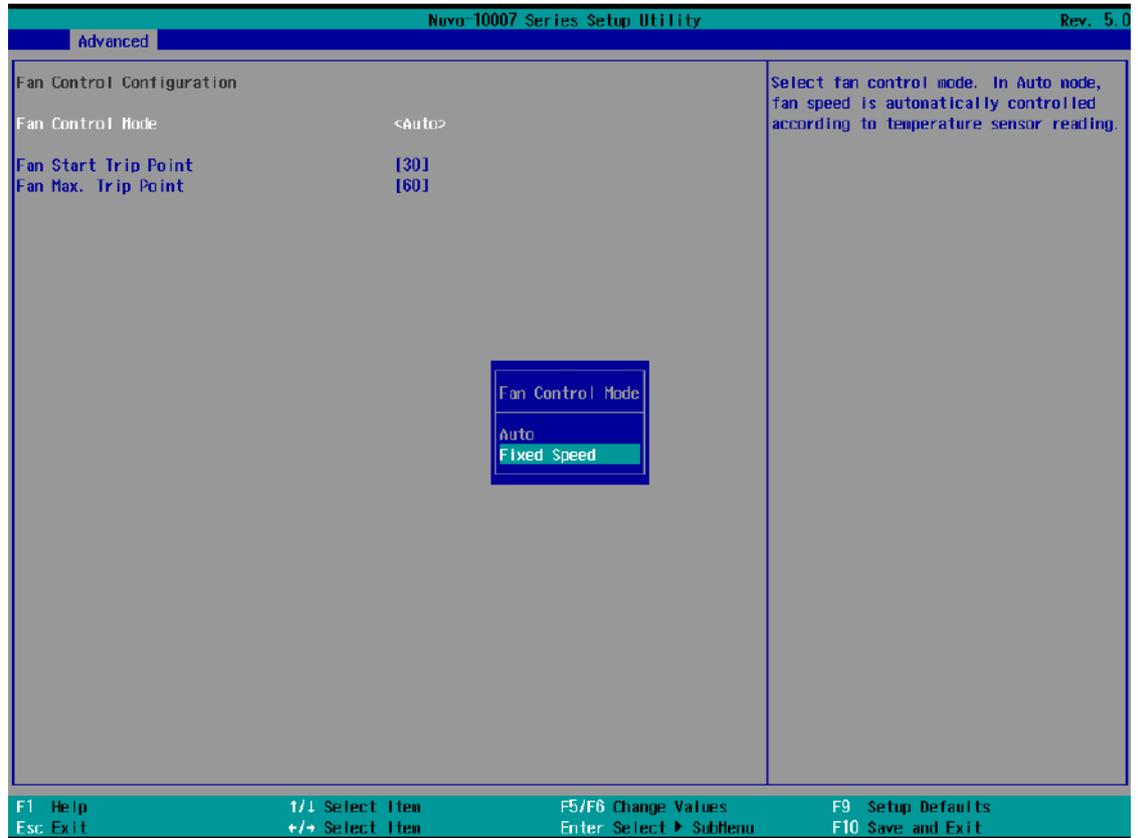
4.    Highlight **[Fan Speed]** and press ENTER.

5.    A window appears and you may use the up/ down arrow keys to select between 20~100% as your fixed fan rotation speed.
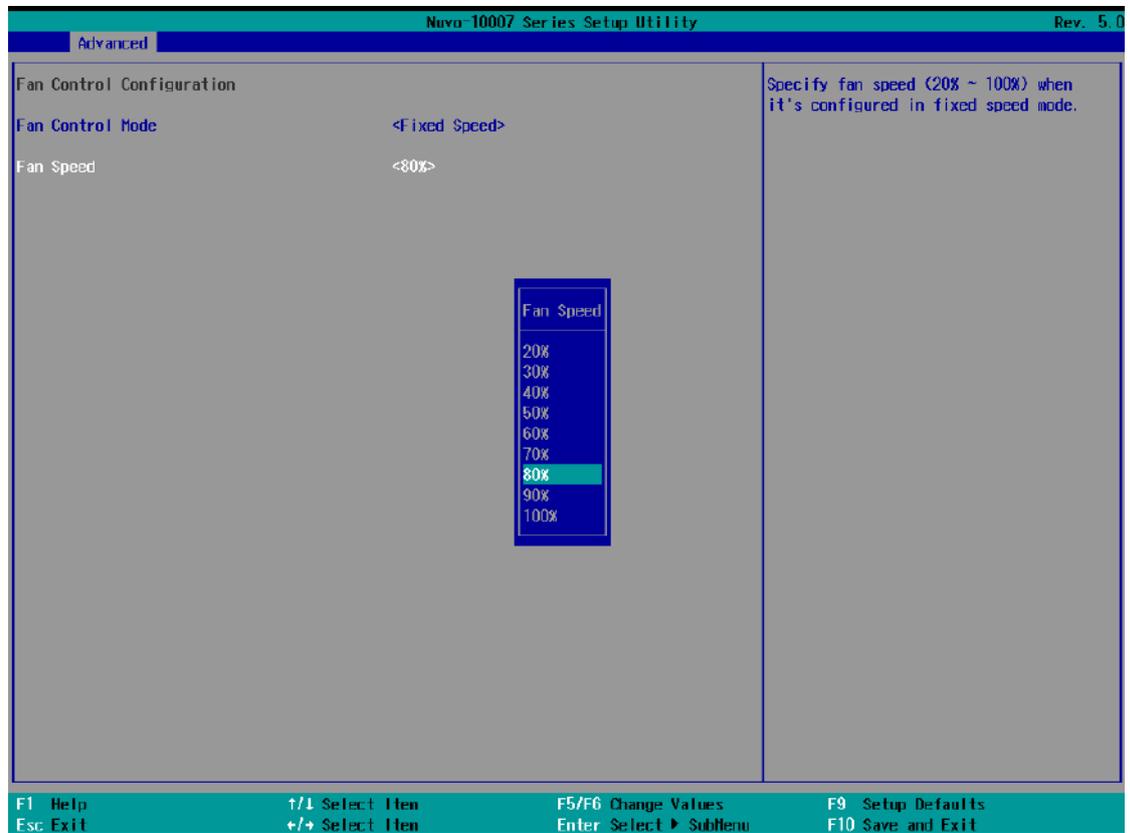


6.    When done, press F10 to "Exit Saving Changes".

### 4.1.5 Power On After Power Failure Option

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

```
                          Nuvo-10007 Series Setup Utility                        Rev. 5.0
 Main  Advanced  Security  Power  Boot  Exit

 ▶CPU Configuration                                    Specify what state to go to when power
 ▶Power & Performance                                  is re-applied after a power failure (G3
                                                       state).
 Wake on LAN                         <Disabled>
 Auto Wake on S5                     <Disabled>

 Power On after Power Failure        <S5 - Power Off>




                                  ┌──────────────────────────┐
                                  │ Power On after Power Failure │
                                  ├──────────────────────────┤
                                  │ S0 - Power On            │
                                  │ S5 - Power Off           │
                                  └──────────────────────────┘





 F1  Help                ↑/↓ Select Item        F5/F6 Change Values      F9  Setup Defaults
 Esc Exit                ←/→ Select Item        Enter Select ▶ SubMenu   F10 Save and Exit
```

| 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".

### 4.1.6 Power & Performance (CPU SKU Power Configuration)

The system supports Intel 14th/ 13th/ 12th Gen. hybrid power/ efficient core CPUs. A unique feature, "**SKU Power Config**" is implemented in BIOS to allow users to specify 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.
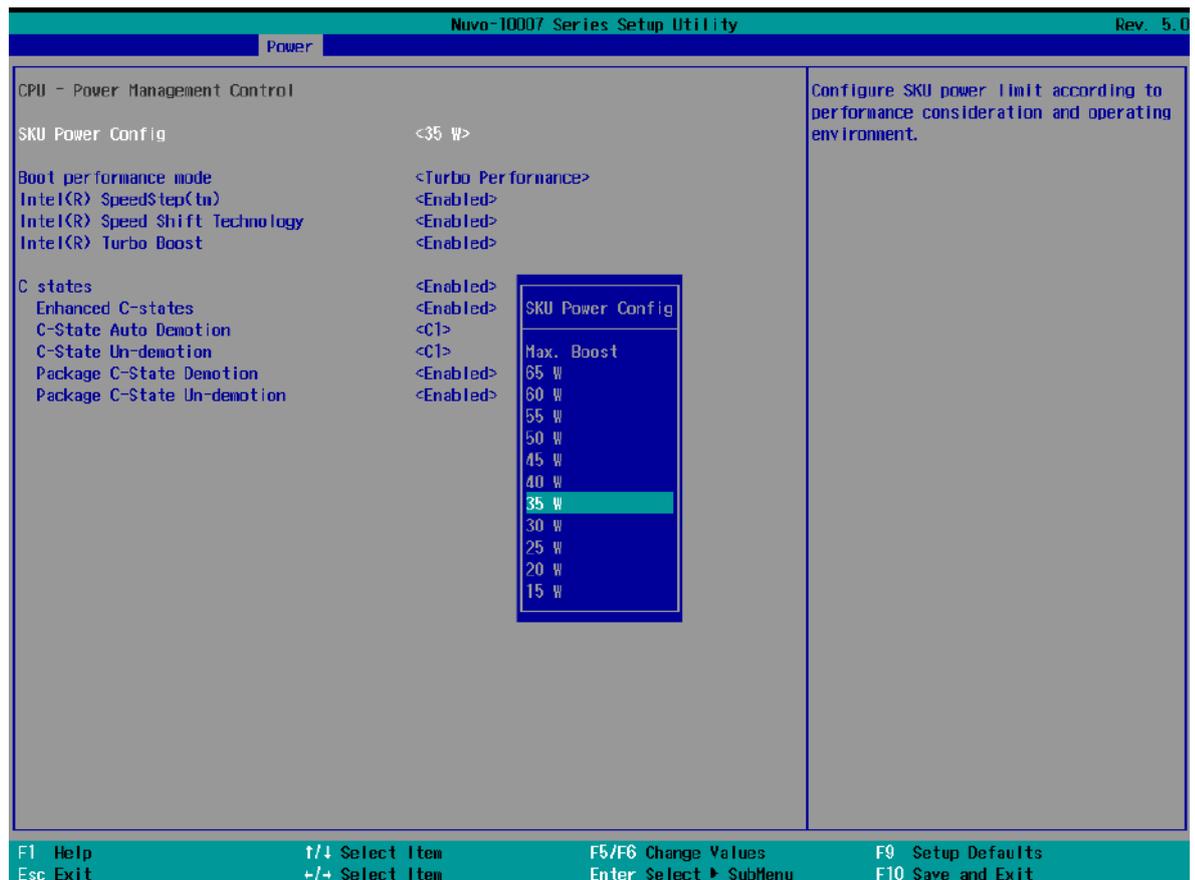


To configure the CPU SKU power limit:

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".

### 4.1.7 Wake on LAN Option

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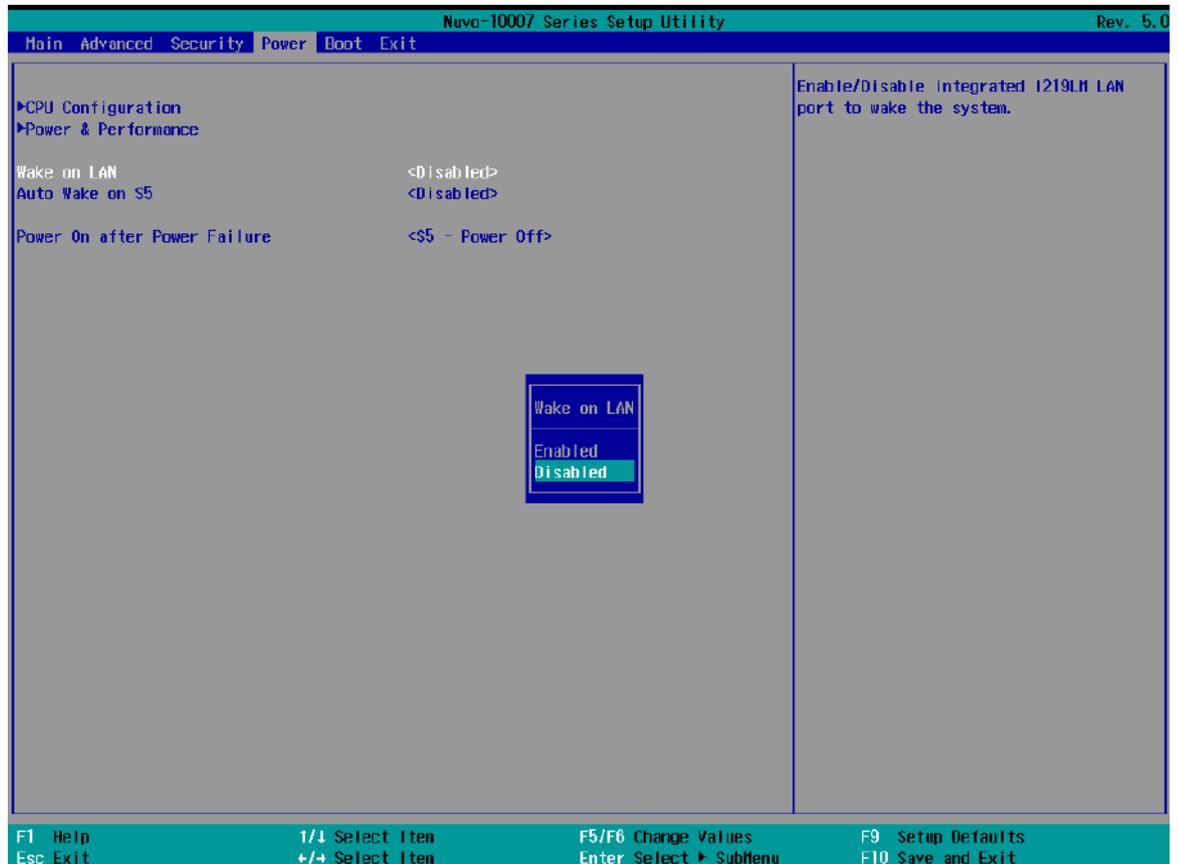


To enable/ disable "Wake on LAN" option:

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.

## 4.1.8 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.

```
                              Nuvo-10007 Series Setup Utility                        Rev. 5.0
   Main  Advanced  Security  Power  Boot  Exit

                                                          Allows BIOS to skip certain tests while
   Boot Type                      <UEFI Boot Type>        booting. This will decrease the time
                                                          needed to boot the system.
   Quick Boot                     <Enabled>
   Quiet Boot                     <Enabled>
   Network Stack                  <Disabled>
   PXE Boot capability            <Disabled>
   Add Boot Options               <Last>
   ACPI Selection                 <Acpi6.3>
   USB Boot                       <Enabled>
   Timeout                        [3]
   Automatic Failover             <Enabled>

   WDT for Booting                <Disabled>












   F1  Help                 ↑/↓ Select Item       F5/F6 Change Values        F9  Setup Defaults
   Esc Exit                 ←/→ Select Item       Enter Select ▶ SubMenu     F10 Save and Exit
```

| Value | Option | Description |
|---|---|---|
| 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**/ **I210 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 |
| EFI Device First | Enabled | Set to boot bootable EFI media first. |
|  | Disabled | Will not boot bootable EFI media first. |
| 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 |
| WDT for booting | Disabled, 1, 3, 5, 10 (minutes) | WDT ensures a successful system boot by specifying a timeout value |

### 4.1.9   Add Boot Options

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

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

1.   Press **F2**when the system boots up to enter the BIOS setup utility.

2.   Go to **[Boot] > [Add Boot Options]** menu.

3.   Select **[First]** or **[Last]** for your newly-added boot device and press ENTER.
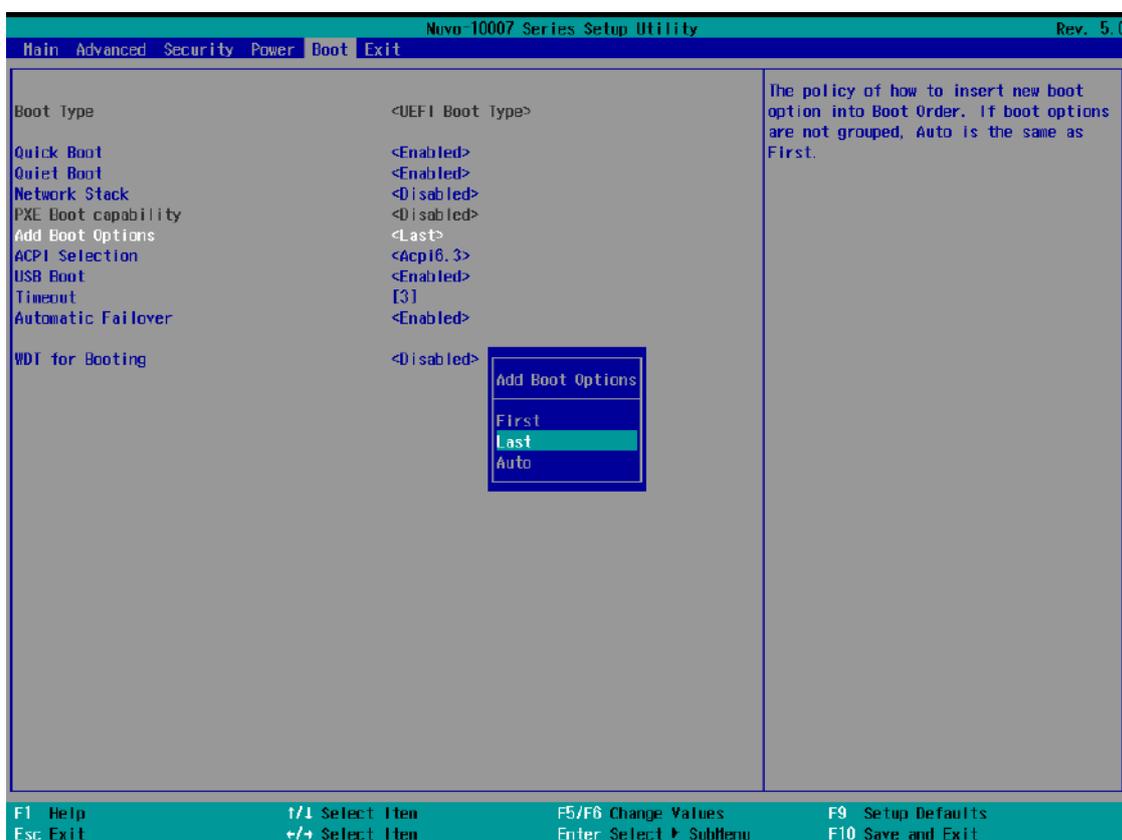


4.   Once set, press **F10** to save setting and exit.

## 4.1.10 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.
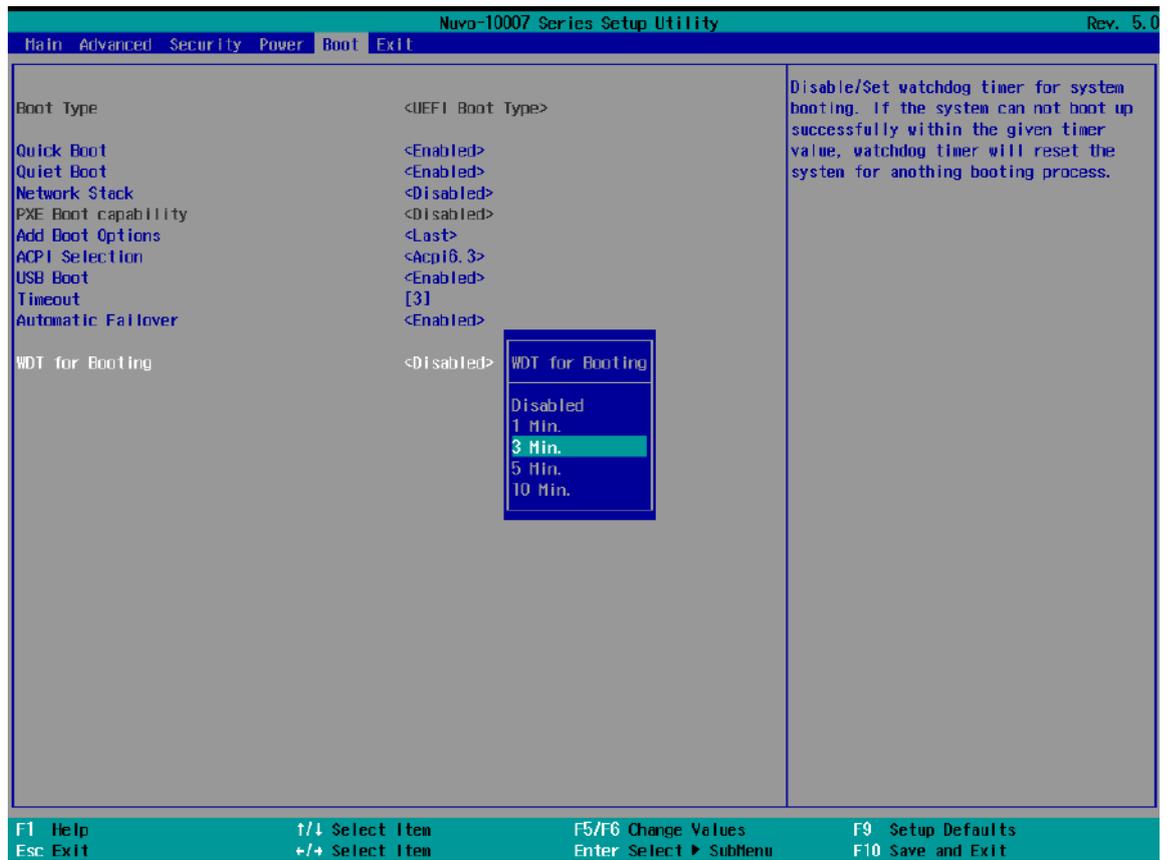


To set the watchdog timer for boot in BIOS:

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 an Ethernet cable to the I219-LM Ethernet port.
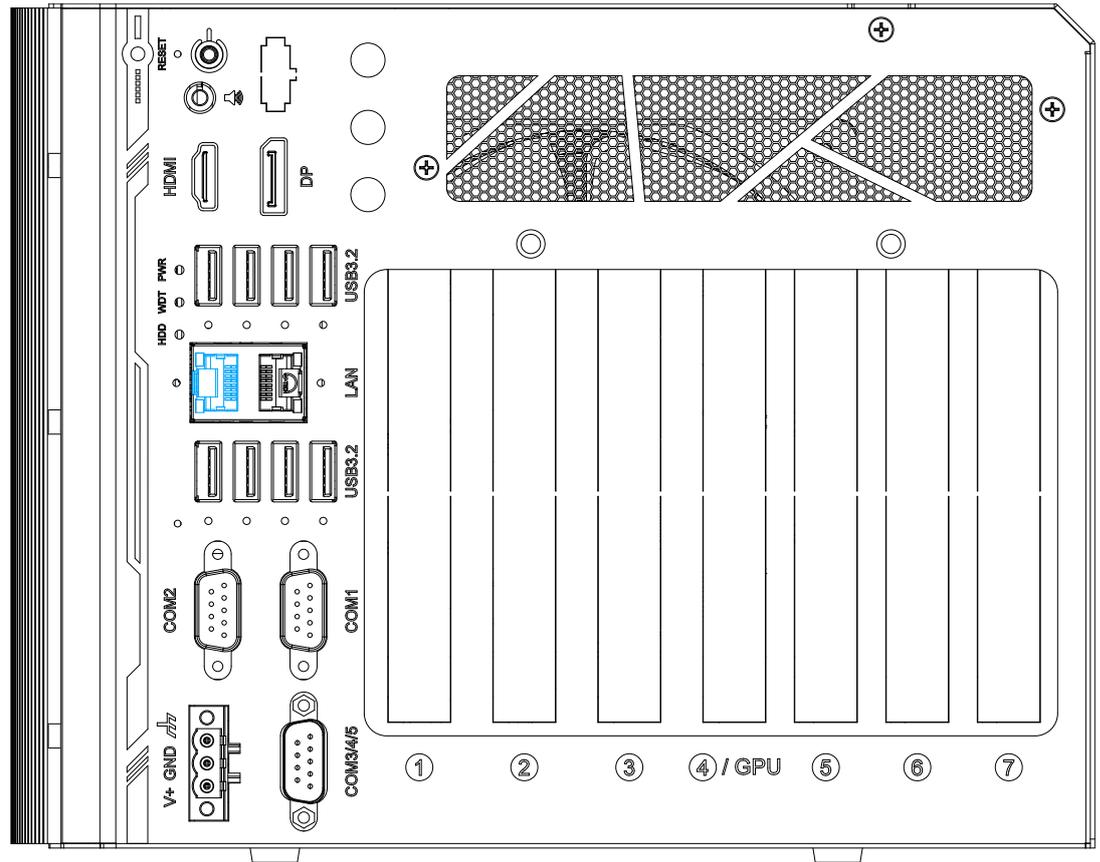
2.   When the system boots up, press F10 to enter the MEBx configuration menu.
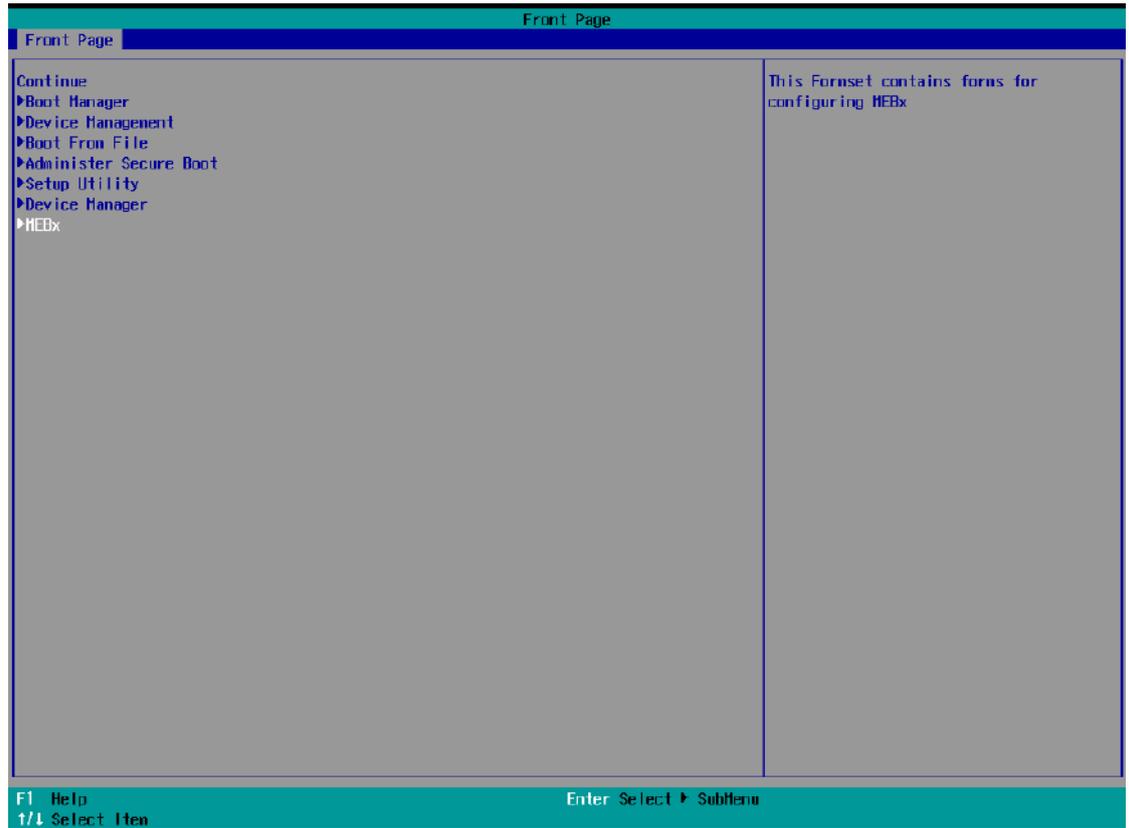


3.   When entering MEBx for the first time, it will ask for the default (old) password. Please type "admin" and press ENTER.



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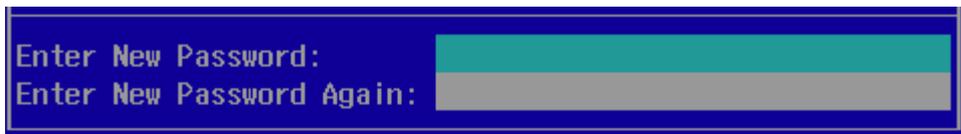
5. After typing your new password, it will bring you to the MEBx settings page. For more MEBx configuration details, please refer to <u>Intel® MEBX User Guide</u>.



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## 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.
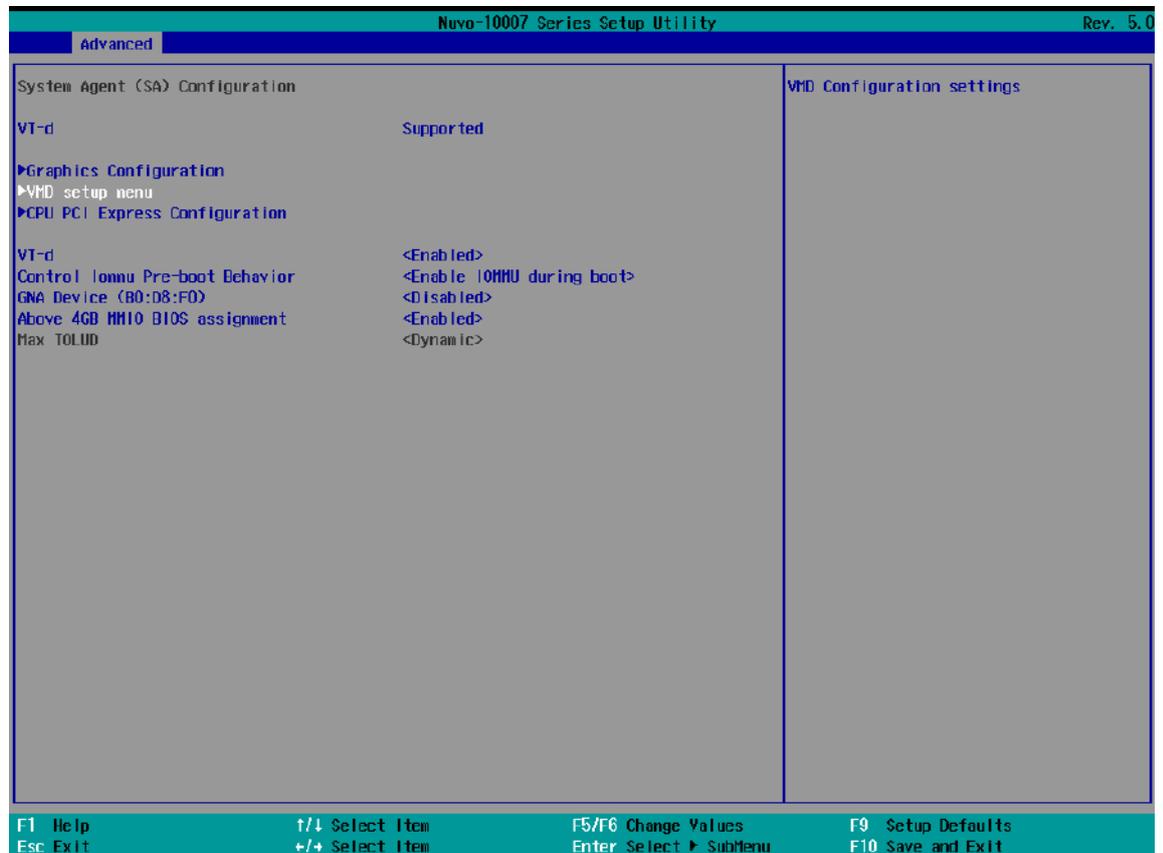


3. Select **[Enable VMD controller]** and press ENTER, highlight **[Enabled]** and press ENTER.

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.

```
                            Device Manager

Devices List                            This formset allows the user to manage
                                        RAID volumes on the Intel(R) RAID
▶Intel(R) Rapid Storage Technology      Controller

Press ESC to exit.




F1  Help                        ↑/↓  Select Item
Esc Exit                        Enter Select ▶ SubMenu
```
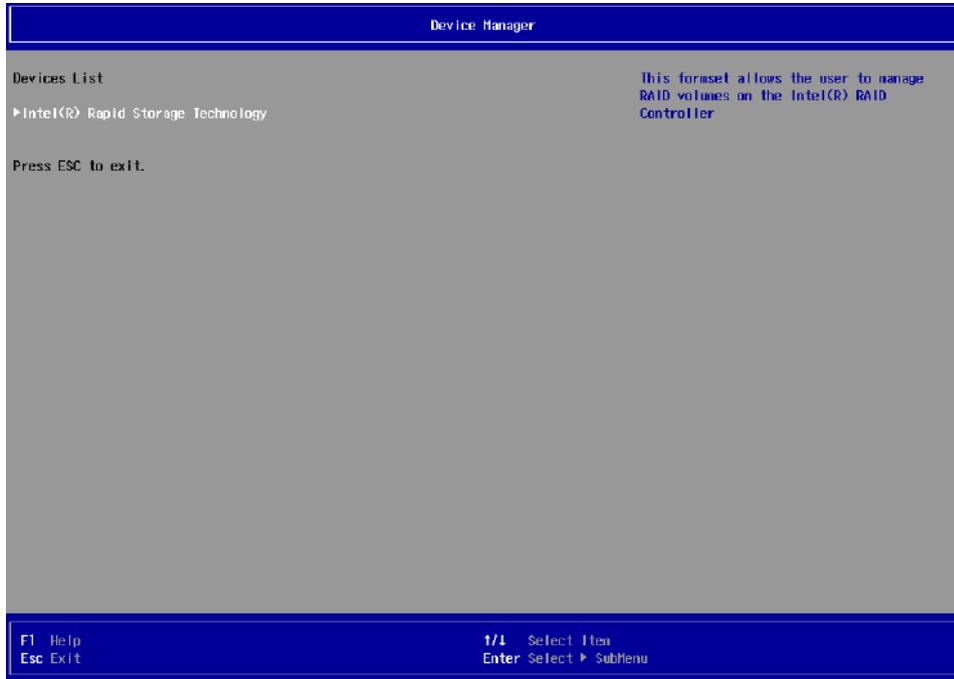
2. The following screen shows Non-RAID physical disks and the option "**Create RAID Volume**". Highlight "**Create RAID Volume**" and press ENTER to begin creating your RAID volume.

```
                      Intel(R) Rapid Storage Technology
 Intel(R) Rapid Storage Technology

Intel(R) RST 19.5.0.5676 RST VMD Driver          This page allows you to create a RAID
                                                 volume
▶Create RAID Volume


Non-RAID Physical Disks:
▶SATA 0.0, 2.5" SATA SSD 3ME3 CA12110160140038, 119.2GB
▶SATA 0.1, 2.5" SATA SSD 3ME3 CA12110160140037, 119.2GB













F1  Help            ↑/↓ Select Item       F5/F6 Change Values    F9  Setup Defaults
Esc Exit            ←/→ Select Item       Enter Select ▶ SubMenu  F10 Save
```
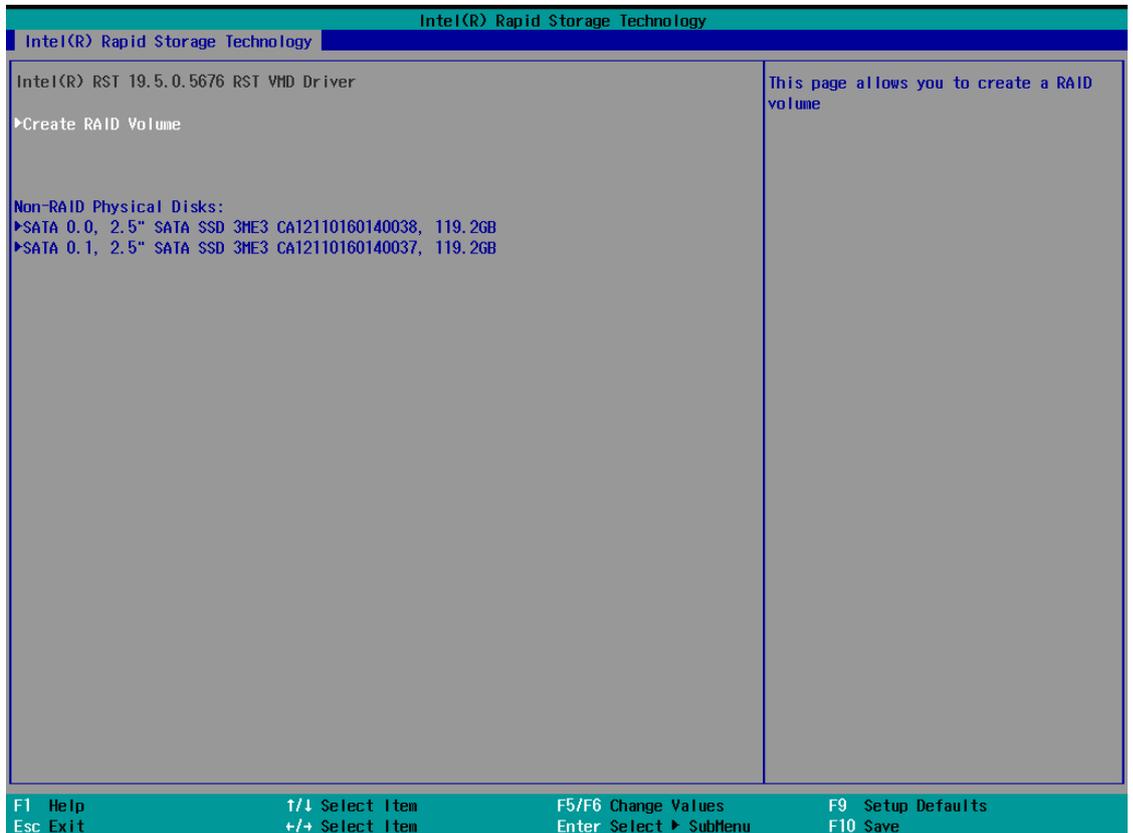
3. The Name option allows you to name your RAID volume. Press ENTER when ready to go to
   the next option.
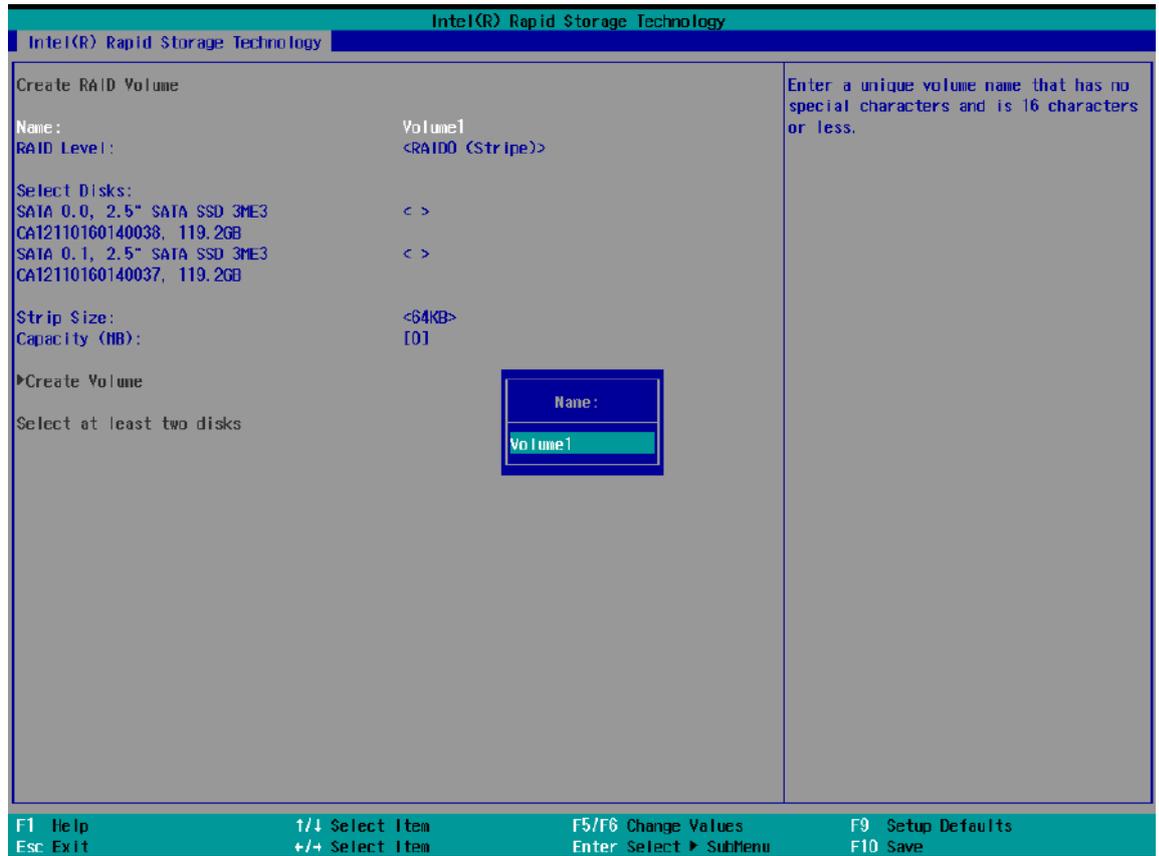
4. The RAID Level option allows you to select RAID-0 (stripping) or RAID-1 (mirror) for your RAID volume. Press ENTER when ready.

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.

```
                        Intel(R) Rapid Storage Technology
   Intel(R) Rapid Storage Technology

   Create RAID Volume                                         X - to Select Disk

   Name:                          Volume1
   RAID Level:                    <RAID0 (Stripe)>

   Select Disks:
   SATA 0.0, 2.5" SATA SSD 3ME3   <X>
   CA12110160140038, 119.2GB
   SATA 0.1, 2.5" SATA SSD 3ME3   < >
   CA12110160140037, 119.2GB

   Strip Size:                    <16KB>
   Capacity (MB):                 [0]

   ▶Create Volume
                         SATA 0.1, 2.5" SATA SSD 3ME3 CA12110160140037, 119.2GB
   Select at least two disks

                         X



   F1  Help             ↑/↓ Select Item      F5/F6 Change Values    F9  Setup Defaults
   Esc Exit             ←/→ Select Item      Enter Select ▶ SubMenu F10 Save
```

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.

```
                           Intel(R) Rapid Storage Technology
   Intel(R) Rapid Storage Technology

  Create RAID Volume                                           Strip size help

  Name:                           Volume1
  RAID Level:                     <RAID0 (Stripe)>

  Select Disks:
  SATA 0.0, 2.5" SATA SSD 3ME3         <X>
  CA12110160140038, 119.2GB
  SATA 0.1, 2.5" SATA SSD 3ME3         <X>
  CA12110160140037, 119.2GB

  Strip Size:                     <64KB>
  Capacity (MB):                  [244204]        Strip Size:
 ▶Create Volume
                                                  4KB
                                                  8KB
                                                  16KB
                                                  32KB
                                                  64KB
                                                  128KB




  F1  Help              ↑/↓ Select Item    F5/F6 Change Values    F9  Setup Defaults
  Esc Exit              ←/→ Select Item    Enter Select ▶ SubMenu F10 Save
```

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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.

```
Strip Size:              <64KB>
Capacity (MB):           [976768]

►Create Volume
                                      ┌──────────┐
                                      │ 976768   │
                                      ├──────────┤
                                      │[Yes] [No]│
                                      └──────────┘
```
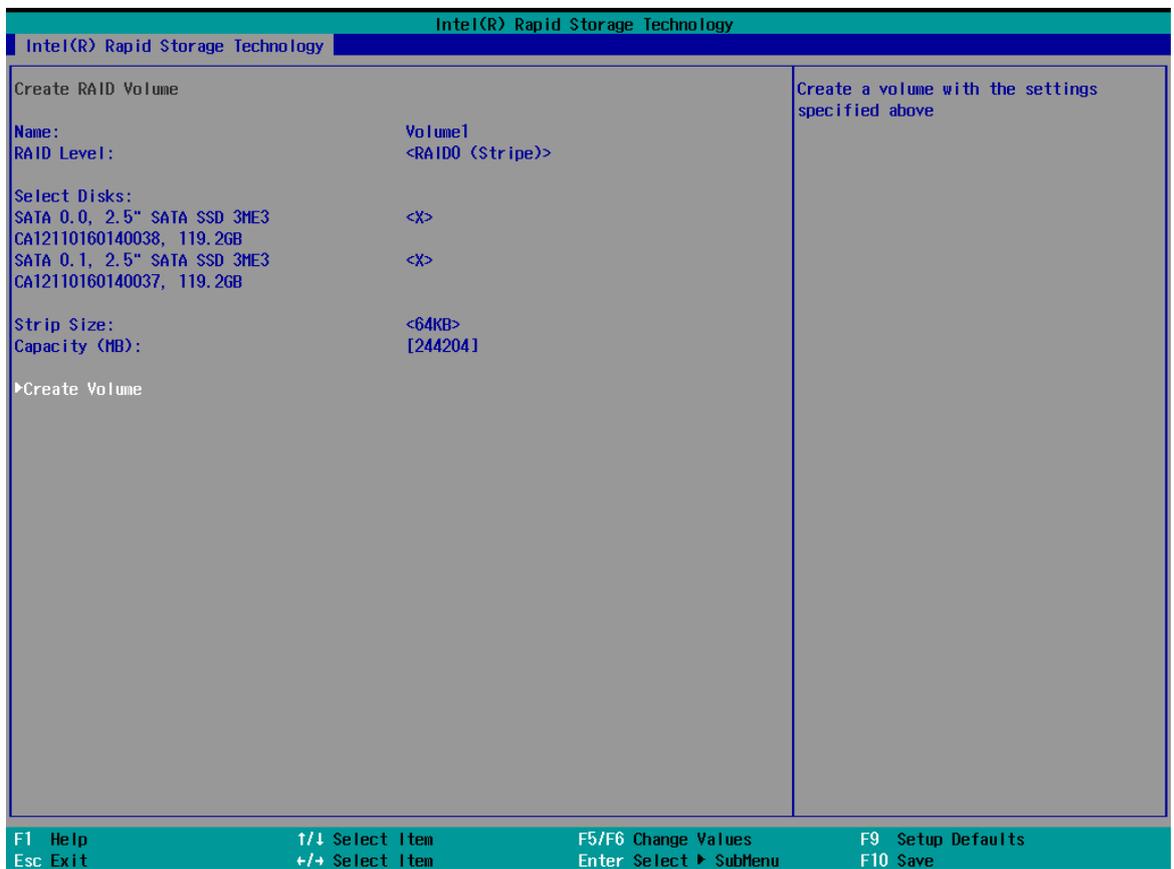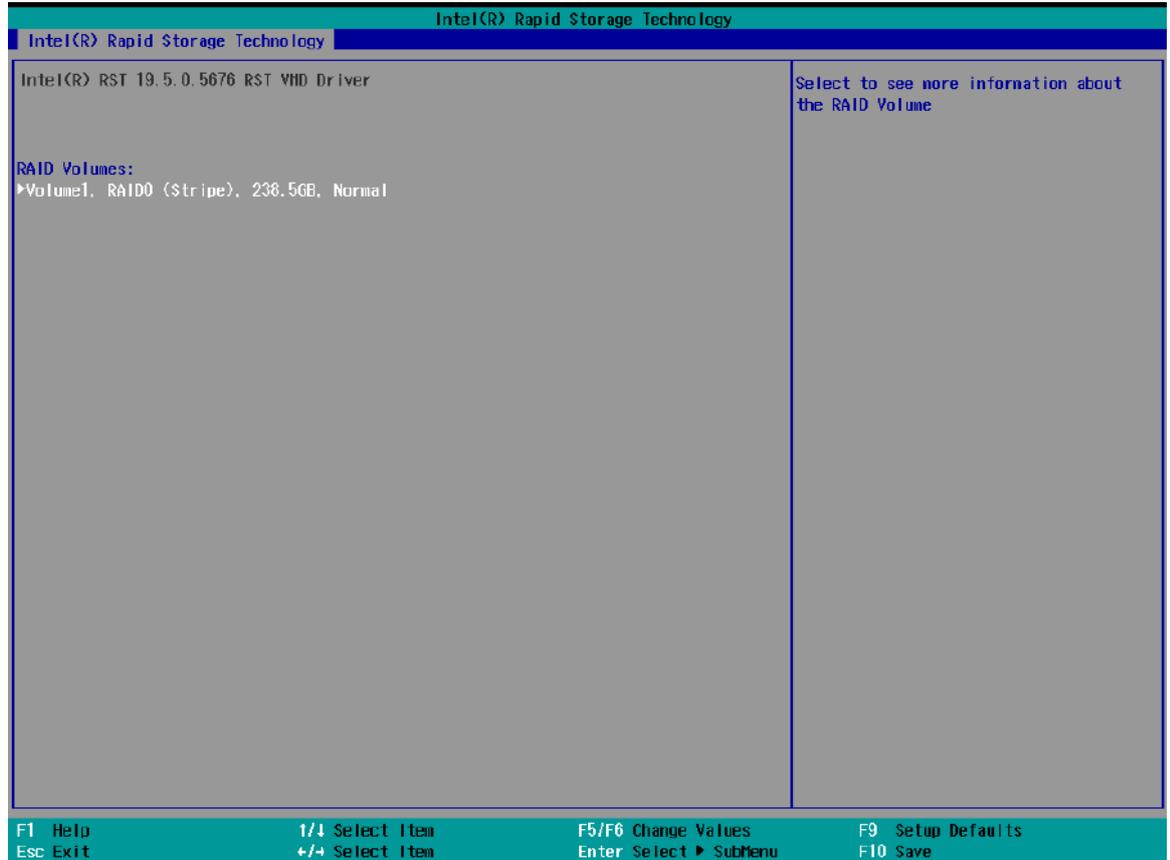
8. The Create Volume option is the final step in the volume creation process. Highlight "**Create Volume**" and press ENTER to begin creating your RAID volume base on the settings you just configured.

```
                        Intel(R) Rapid Storage Technology
  Intel(R) Rapid Storage Technology

 Create RAID Volume                                  Create a volume with the settings
                                                     specified above
 Name:                            Volume1
 RAID Level:                      <RAID0 (Stripe)>

 Select Disks:
 SATA 0.0, 2.5" SATA SSD 3ME3     <X>
 CA12110160140038, 119.2GB
 SATA 0.1, 2.5" SATA SSD 3ME3     <X>
 CA12110160140037, 119.2GB

 Strip Size:                      <64KB>
 Capacity (MB):                   [244204]

 ►Create Volume




 F1  Help           ↑/↓ Select Item    F5/F6 Change Values        F9  Setup Defaults
 Esc Exit           ←/→ Select Item    Enter Select ► SubMenu     F10 Save
```

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

```
                        Intel(R) Rapid Storage Technology
| Intel(R) Rapid Storage Technology |

 Intel(R) RST 19.5.0.5676 RST VMD Driver                    Select to see more information about
                                                            the RAID Volume

 RAID Volumes:
 ▶Volume1, RAID0 (Stripe), 238.5GB, Normal




 F1  Help                 ↑/↓ Select Item        F5/F6 Change Values        F9   Setup Defaults
 Esc Exit                 ←/→ Select Item         Enter Select ▶ SubMenu    F10  Save
```

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 the system.

3.    Windows installation process should automatically begin (if not, please make sure the boot device in BIOS is set properly).
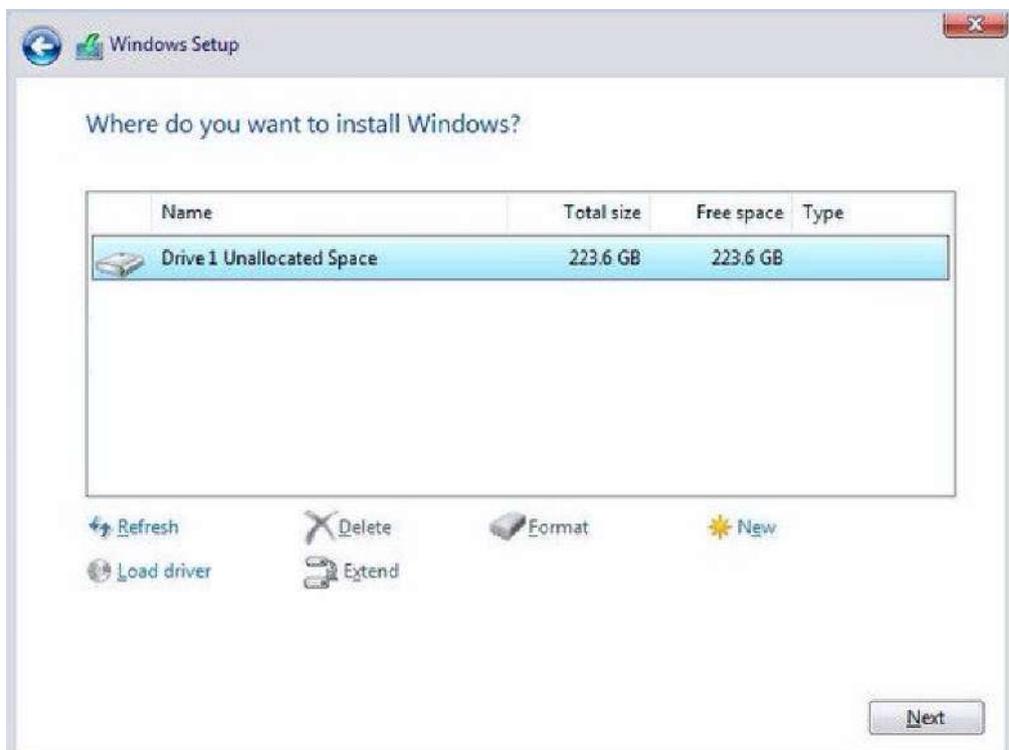
4.    Select the "Load Driver" icon.
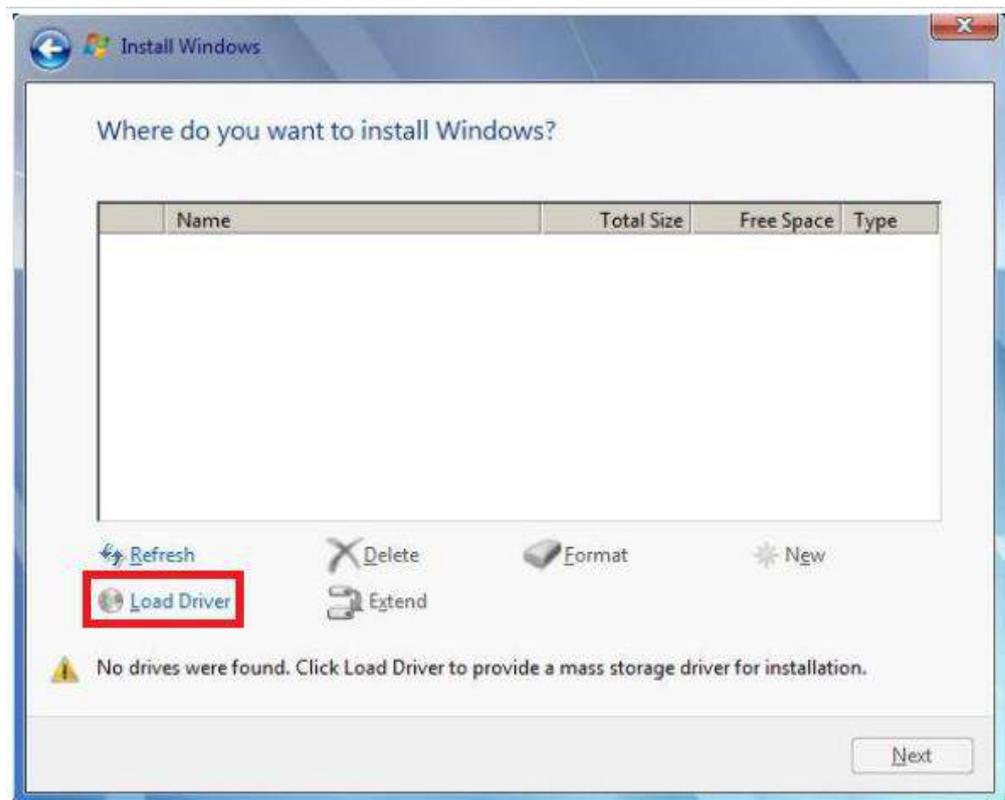
5.  In the pop-up Window, select "Browse", go to the directory where you saved the unzipped drivers "f6vmdflpy-x64", and click OK.





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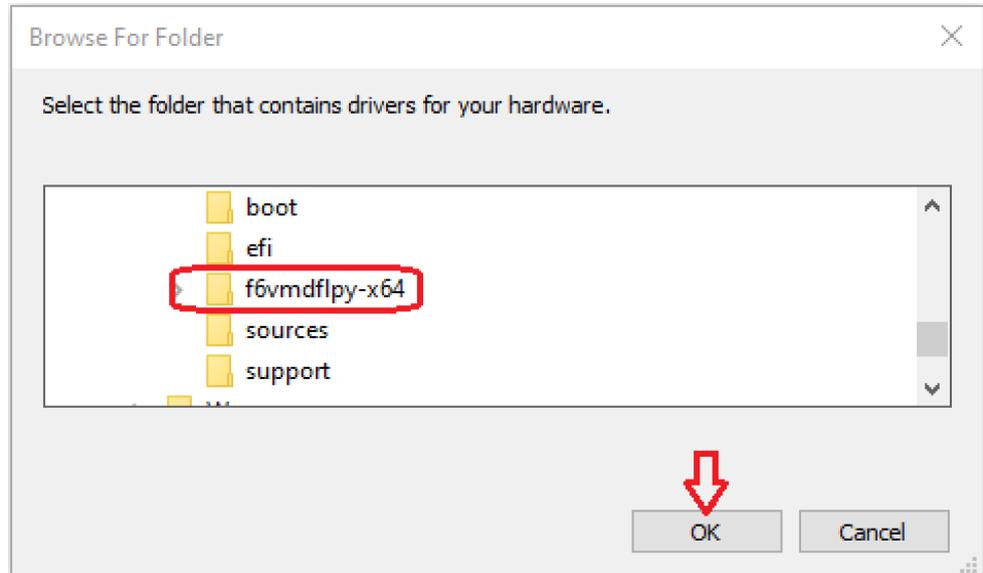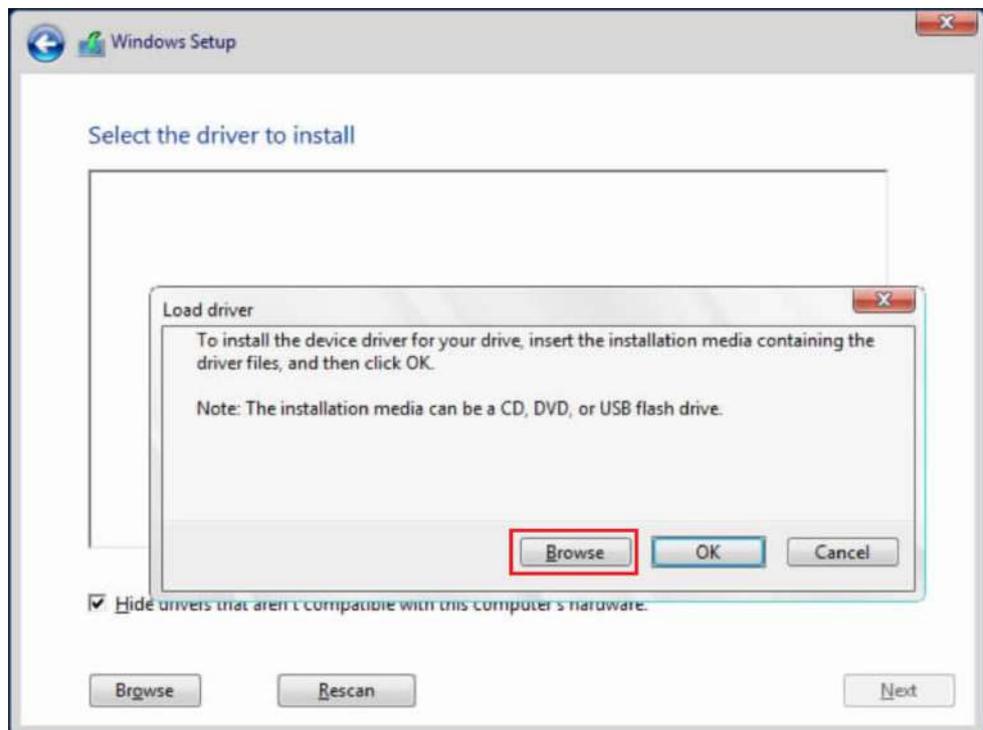
6.   Select the driver "Intel RST VMD Controller 467F" and click on Next.
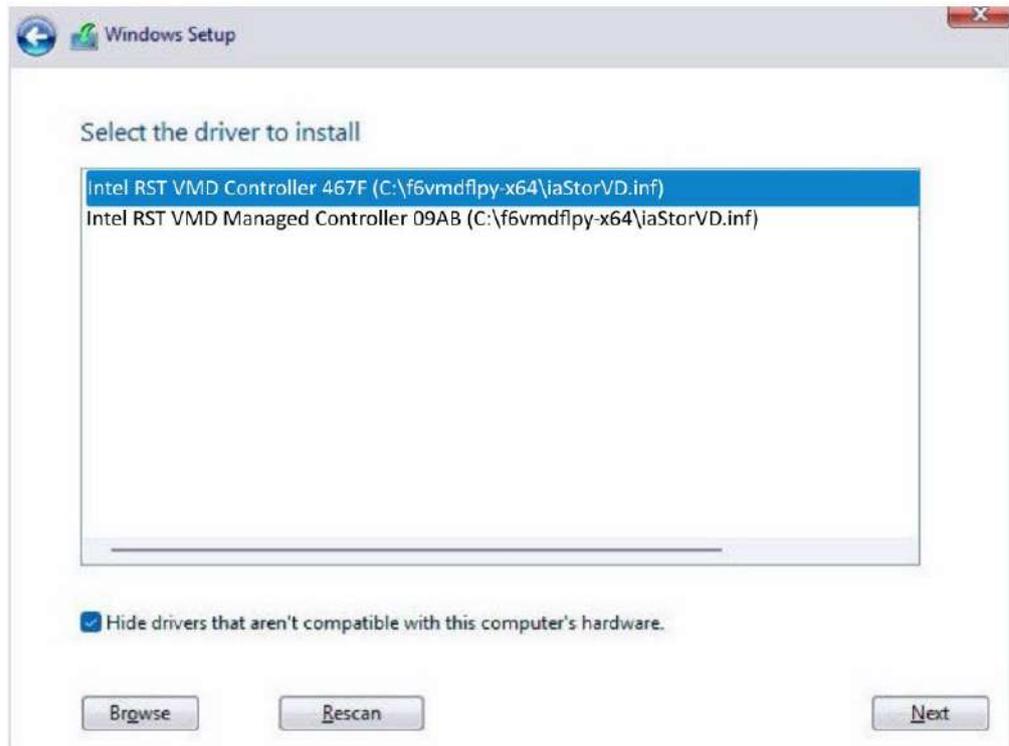


7.   The previous created RAID volume shall appear as unallocated space.



From here, 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 10 LTSC 2021 (x64)

● Microsoft Windows 11 IoT Enterprise 22H2 64-bit

● Ubuntu 20.04.5 LTS, 22.04 LTS, 22.04.1 LTS or other distribution with kernel version ≥ 5.15 */**

---

NOTE

*For Linux system, user may need to manually compile and install the driver for Intel graphics or I225/ 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    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_v2.3.1.9 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 platform. For other OS support, please contact Neousys Technology for further information.

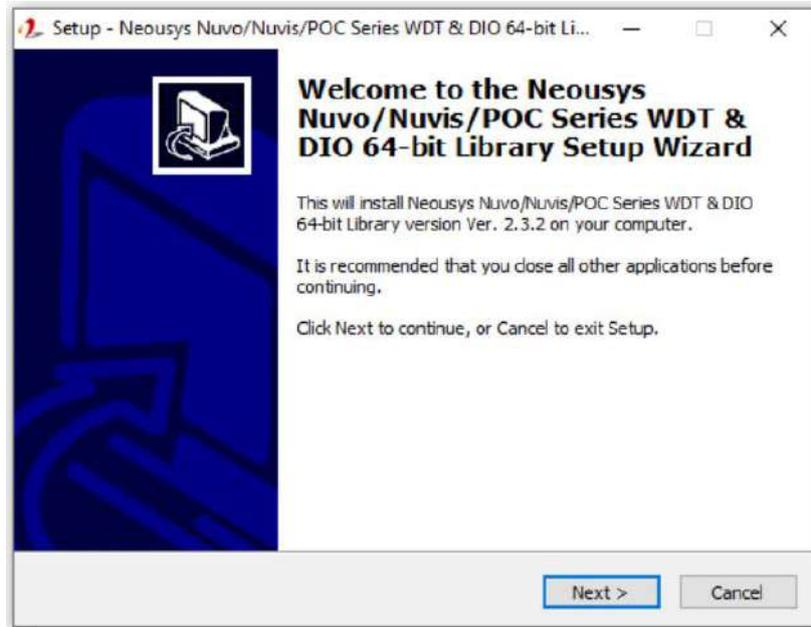**Installing WDT_DIO Library**

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_v2.3.1.9 (x64).exe or later version.
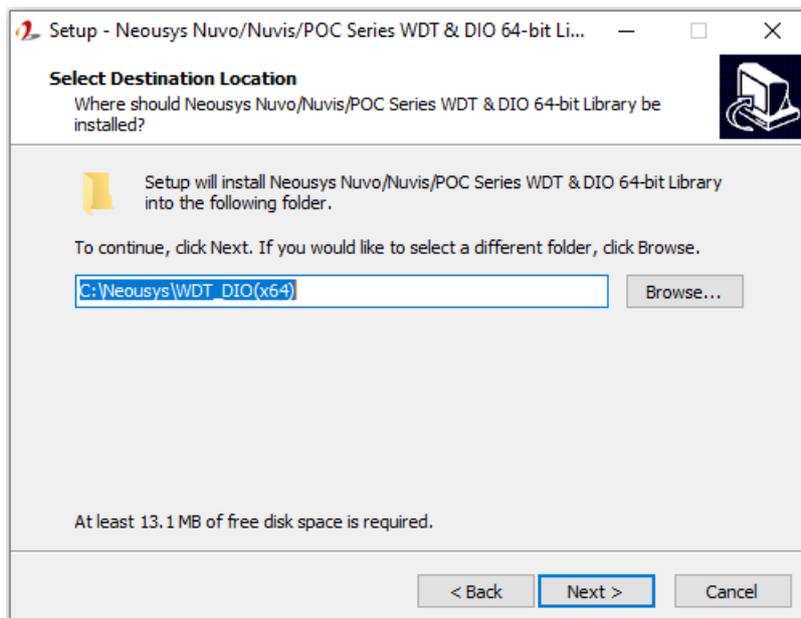
# WDT and DIO Library Installation

To setup WDT & DIO Library, please follow instructions below.
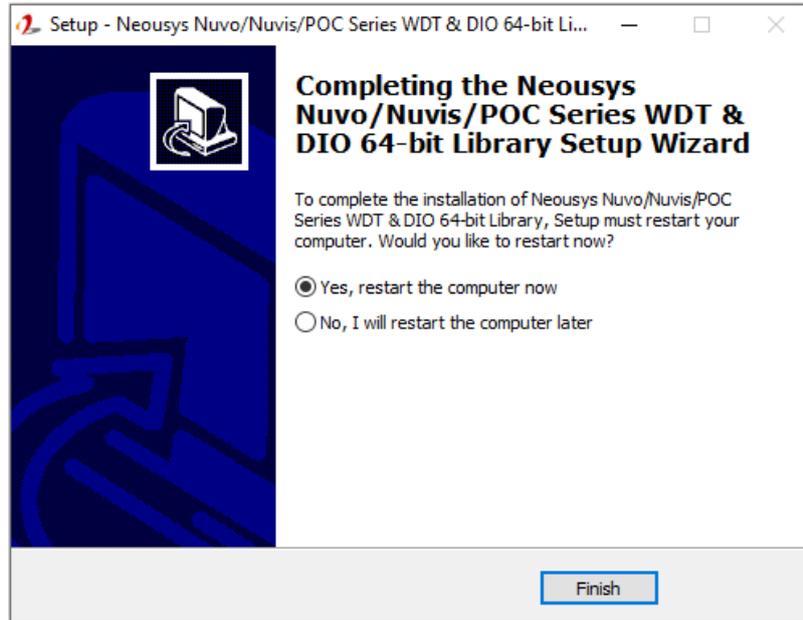
1. Execute **WDT_DIO_Setup.exe**. and the following dialog appears.



2. Click "Next >" and specify the directory of installing related files. The default directory is *C:\Neousys\WDT_DIO*.

3. 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.



4. 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() |