Neousys Technology Inc.

Nuvo-8111

User Manual

Revision 1.1

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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

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Safety Precautions

- Read these instructions carefully before you install, operate, or transport the system.

- Install the system or DIN rail associated with, at a sturdy location

- Install the power socket outlet near the system where it is easily accessible

- Secure each system module(s) using its retaining screws

- Place power cords and other connection cables away from foot traffic. Do notplace 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 tominimize 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 yrofoam 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-8111 Series featuring Intel®9th/ 8thGen Core™ I hexa/ octa core 35W LGA1151 processors with up to 5 slot expandability. The system is capable of supporting one 200W NVIDIA® graphics card for modern AI applications.

The guide also demonstrates the system's installation procedures.

Revision History

Version	Date	Description
1.0	Apr. 2023	Initial release
1.1	Jul. 2023	Specification update

1 Introduction

Nuvo-8111 series is a cost-effective box-PC with 3 expansion slots designed specifically to support an advanced mid to high-end 200W NVIDIA® graphics card, such as an RTX 3060/ 3060 Ti, to offer stunning edge AI performance. Offering tremendous GPU power up to 20 TFLOPS in FP32 for emerging GPU-accelerated applications, they boost the performance and efficiency of factory automation, image recognition, product inspection, pick and place robots, etc.

Nuvo-8111 series leverages an Intel® 9th/ 8th-Gen Core™ processor with H310 chipset. It has one x16 Gen3 PCIe slot for accommodating a GPU card, and an additional x4 PCIe and a PCI slot for industrial I/O cards such as DIO, AIO, communication or motion control card. It features front-accessible I/Os including two GbE, four USB 3.1 Gen1 and five COM ports for easy access when it is rack-mounted or placed inside a cabinet. Storage-wise, the system supports two 2.5" SATA SSDs/ HDDs plus one mSATA socket to house an mSATA SSD.

As edge AI demand continues to grow for traditional production and factory automation, Neousys Nuvo-8111 seeks to fulfill this need. With mid to high-end GPU support, expansion capability, compact and rugged design that play important roles in bringing artificial intelligence to the edge and factory floors, the Nuvo-8111 is no doubt the most cost-effective AI platform for automation in its class!

1.1 Product Specifications

1.1.1 Nuvo-8111 Specifications

System Core	
Processor	Supporting Intel® 9th/ 8th-Gen Core™ CPU (LGA1151 socket) - Intel® Core™ i7-8700*/ i7-8700T/ i7-9700TE - Intel® Core™ i5-8500*/ i5-8500T/ i5-9500TE - Intel® Core™ i3-8100*/ i3-8100T/ i3-9100TE - Intel® Pentium® G5400T (4M Cache, 3.1GHz, 35W TDP) - Intel® Celeron® G4900T (2M Cache, 2.9GhHz, 35W TDP)
Chipset	Intel® H310 platform controller hub
Graphics	Integrated Intel® UHD Graphics 630, or independent 120W GPU via x16 PEG port
Memory	Up to 32 GB DDR4 2666 SDRAM (one SODIMM slot)
I/O Interface	
Ethernet	1x Gigabit Ethernet port by Intel® I219-LM 1x Gigabit Ethernet port by Intel® I210-IT
Native Video	2x DVI-D connector, supporting 1920 x 1200 resolution
Serial Port	1x software-programmable RS-232/ 422/ 485 ports (COM1) 1x software-programmable RS-422/ 485 ports (COM2) 3x 3-wire RS-232 ports (COM3/ COM4/ COM5)
USB	4x USB 3.1 Gen1 (5 Gbps) ports 2x USB 2.0 ports (internal for dongle use)
Audio	1x 3.5mm jack for mic-in and speaker-out
Storage Interface	
SATA	2x internal SATA ports for 2.5" HDD/ SSD installation
mSATA	2x full-size mSATA port
Expansion Bus	
PCI Express	1x PCIe x16 slot@Gen3, 16-lanes 1x PCIe x8 slot@Gen2, 4-lanes 1x PCIe x4 slot@Gen2, 1-lanes
PCI	N/A
mSATA	1x full-size mSATA socket (mux with USB 2.0 signals)
Power Supply	
DC Input	1x 3-pin pluggable terminal block for 8-35V DC input
Max. power	68.2W @ 24V (i7-9700TE @ 35W TDP)

consumption	
Mechanical	
Dimension	174 mm (W) x 330 mm (D) x 174 mm (H)
Weight	4.5 Kg
Mounting	Wall-mounting (optional)
Environmental	
Operating temperature	-25°C ~ 60°C
Storage temperature	-40°C ~85°C
Humidity	10%~90% , non-condensing
Vibration	Operating, MIL-STD-810G, Method 514.6, Category 4
Shock	Operating, MIL-STD-810G, Method 516.6, Procedure I, functional shock=20g
EMC	CE/ FCC Class A, according to EN 55024 & EN 55032

1.2   Nuvo-8111Dimensions

✎ NOTE

All measurements are in millimeters (mm).

1.2.1   Nuvo-8111 I/O Panel View
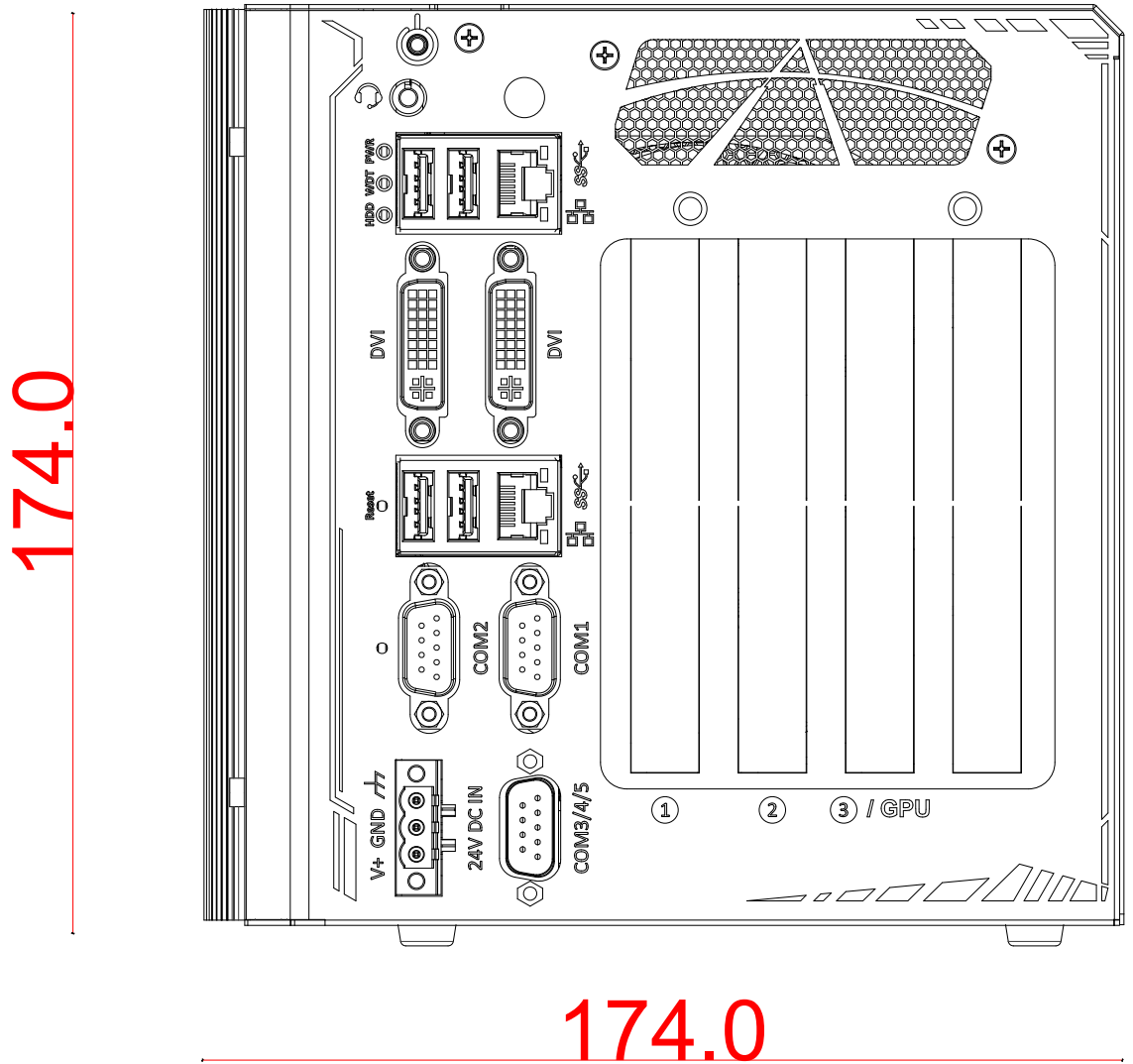
1.2.2 Nuvo-8111 Side View
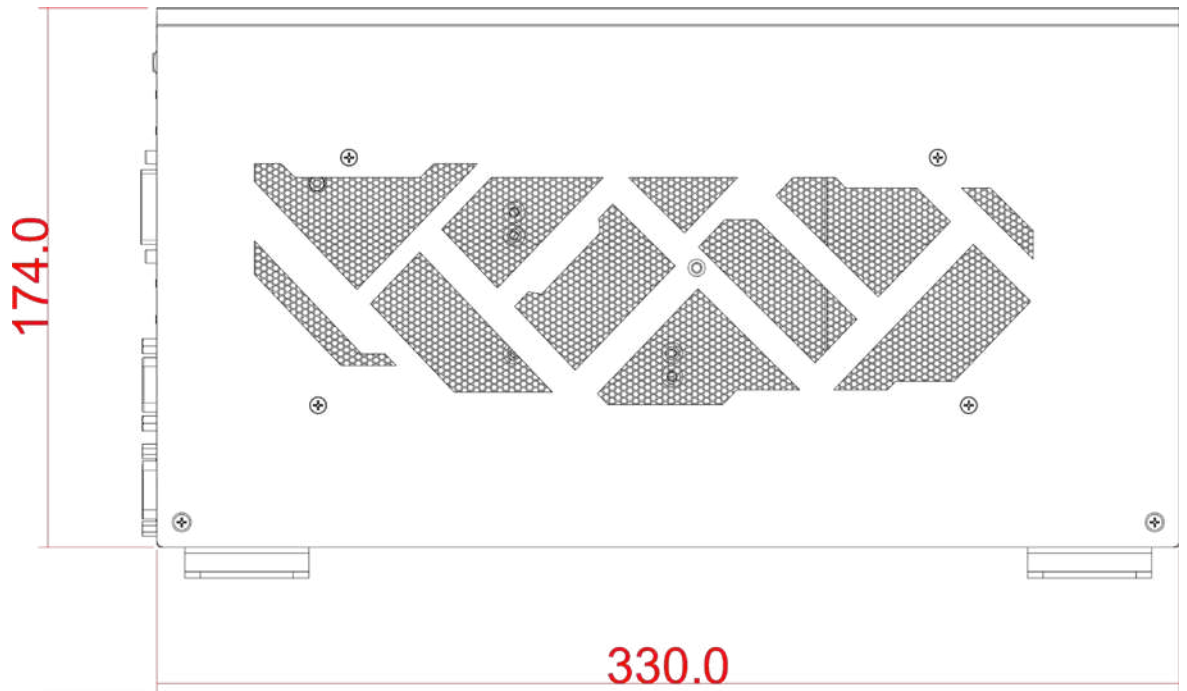
2 Overview

Upon receiving and unpacking your Nuvo-8111 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-8111 Packing List

System Pack	Nuvo-8111 series	Qty
1	Nuvo-8111series system (If you ordered CPU/ RAM/ HDD, please verify these items)	1
2	Accessory box, which contains	
	● CPU bracket	1
	● Neousys drivers & utilities DVD	1
	● Wall-mount bracket	2
	● Foot pad	4
	● 3-pin power terminal block	1
	● Screw pack	1

2.2 Nuvo-8111 Series I/O Panel

Nuvo-8111 series I/O Panel

The Nuvo-8111 I/O panel features Gen1 USB3.0, DVI, Ethernet and COM ports.
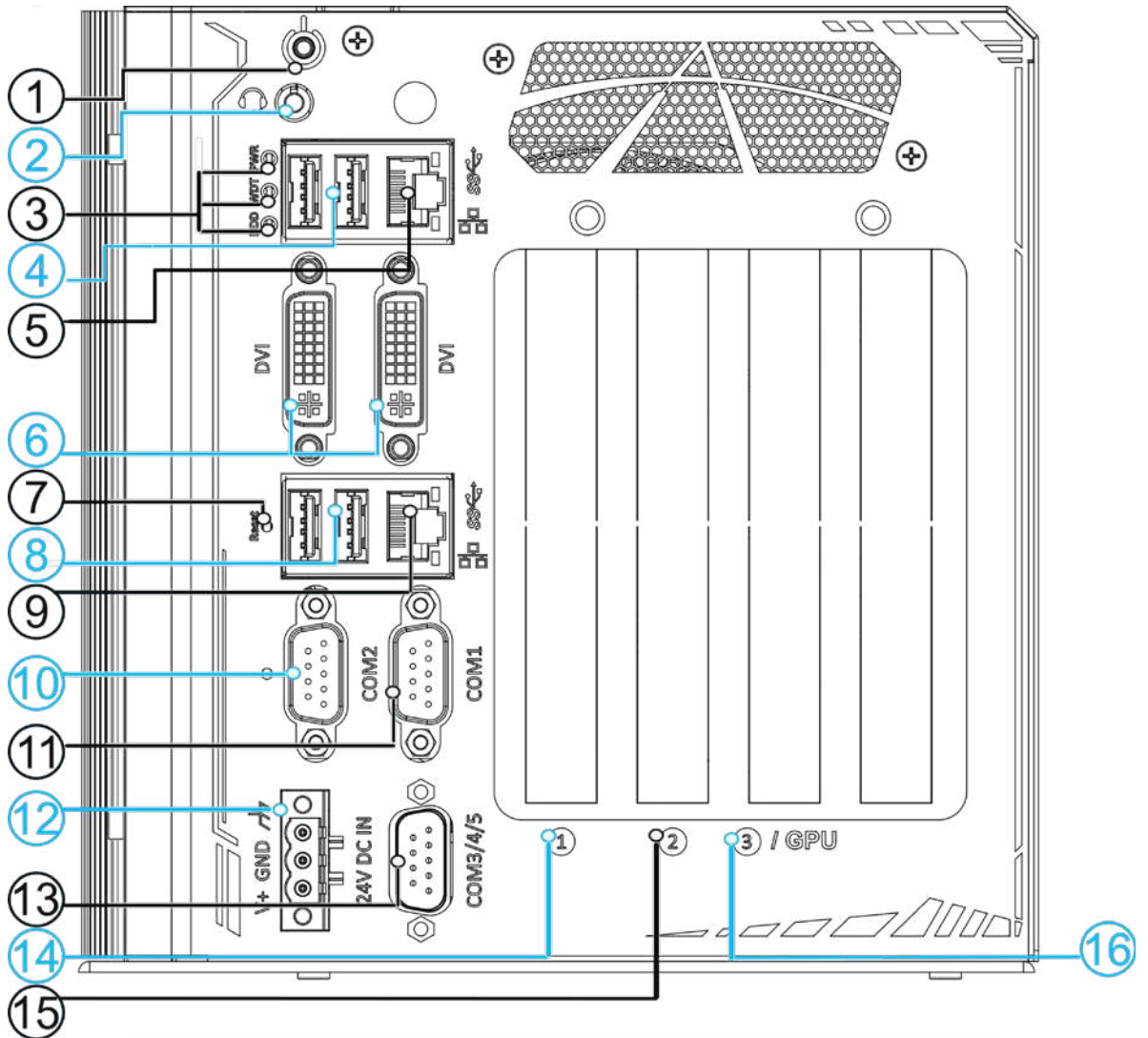
No.	Item	Description
1	Power button	Use this button to turn on or shutdown the system.
2	4-Pole 3.5mm headphone/ microphone jack	The 4-pole 3.5mm jack accepts microphone voice input and headphone speaker sound output.
3	LED indicator	From top to bottom, the LEDs are PWR (system power), WDT (watchdog timer), HDD (hard disk drive).
4	USB 3.1 Gen1 port	USB3.1 Gen 1 offers up to 5Gbps of data-throughput performance
5	Ethernet port	Gigabit Ethernet port by Intel® I210-IT

6	DVI port	DVI-D output supports resolution up to 1920x1200@60Hz and is compatible with other digital connections via an adapter.
7	Reset button	Use this button to manual reset the system.
8	USB 3.1 Gen1 port	USB3.1 Gen 1 offers up to 5Gbps of data-throughput performance
9	Ethernet port	Gigabit Ethernet port by Intel® I219-LM
10	COM 2	COM 2 port is a software-selectable RS-422/ 485 port. The operation mode can be set in the BIOS.
11	COM 1	COM 1 port is a software-selectable RS-232/422/485 port. The operation mode can be set in BIOS.
12	3-pin terminal block	The system accepts 24V DC power input.
13	COM port 3/ 4/ 5	COM3, COM4 and COM5 are 3-wire RS-232portsthat share a single DB9 connector.
14	PCIe slot	PCIe x4 slot @Gen2, 4-lane signal
15	PCI slot	33MHz/ 32-bit 5V PCI slot
16	PCIe slot	PCIe x16 slot @Gen3, 16-lane (supports up to a 200W NVIDIA graphics card)

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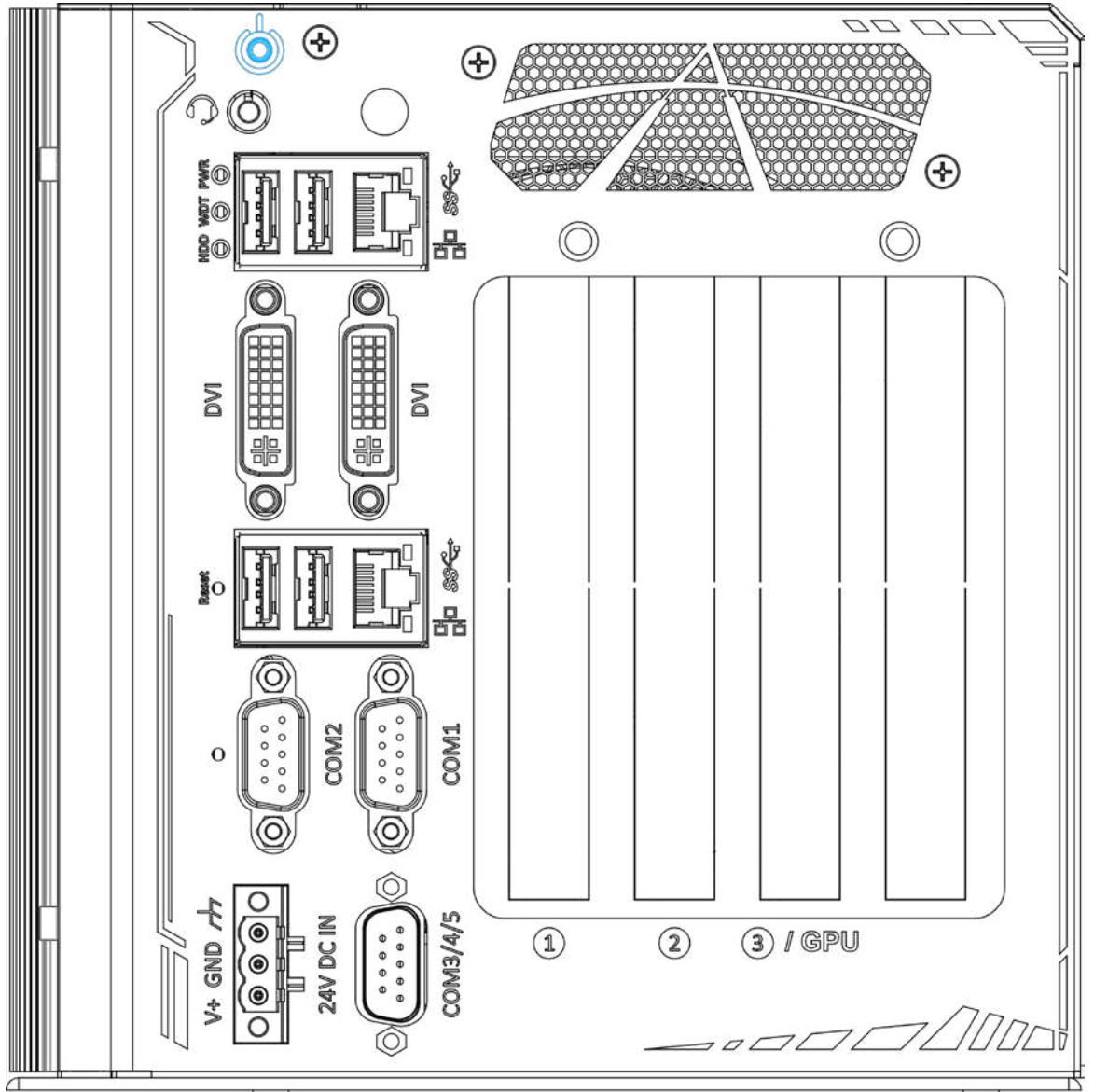
The power button is a non-latched switch for ATX mode on/off operation. To turn on the system, press the power button and the PWR LED should light-up green. To turn off the system, issuing a shutdown command in OS is preferred, or you can simply press the power button. To force shutdown when the system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

2.2.2 3.5mm Speaker/ Headphone Output Jack
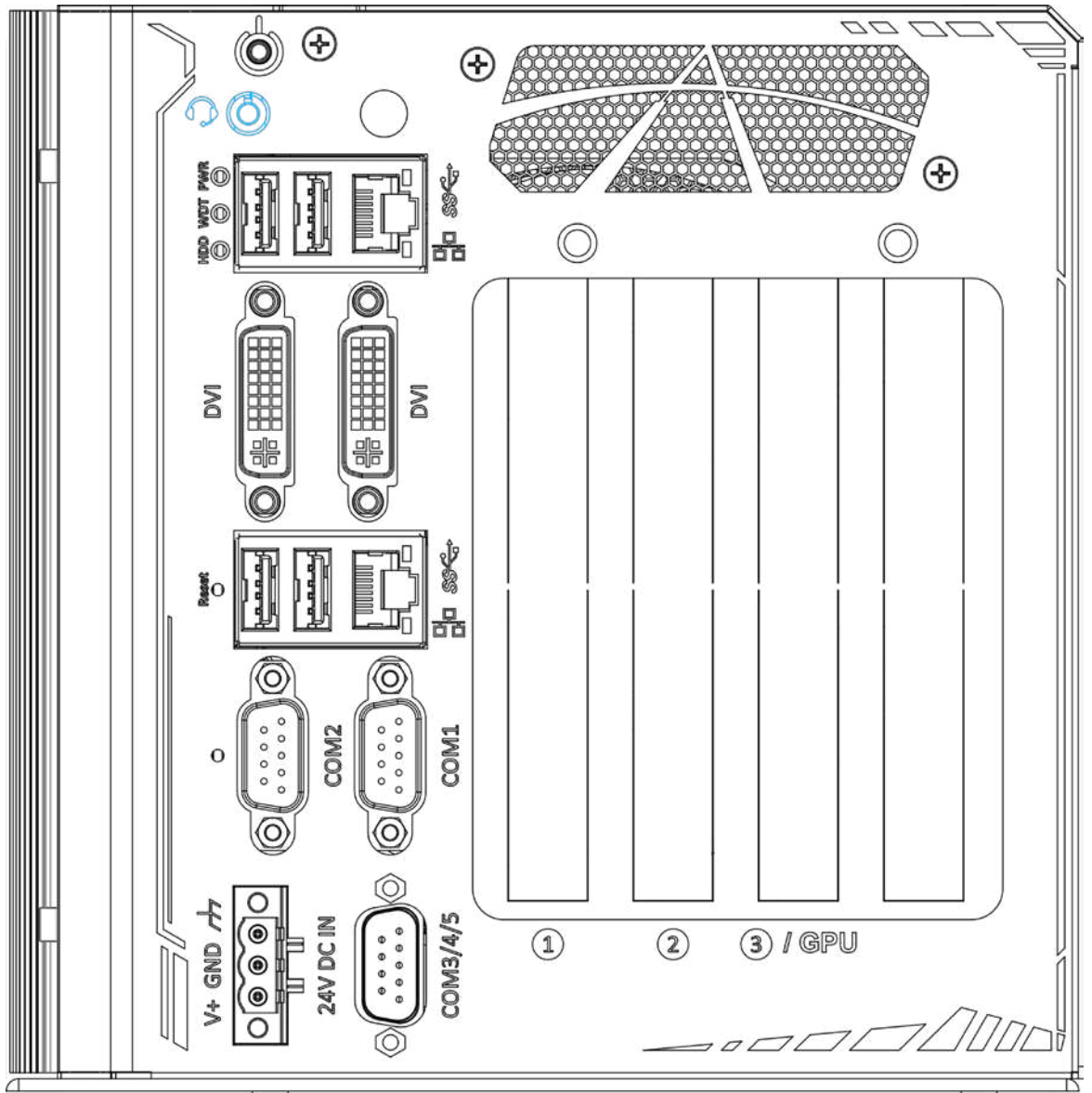
The system audio function uses high definition audio chip. There is a female 4-pole ⌒audio jack for headphone (speaker) output and microphone input . To utilize the audio function in Windows, you need to install corresponding drivers for both Intel®C246 chipset and audio device drivers.

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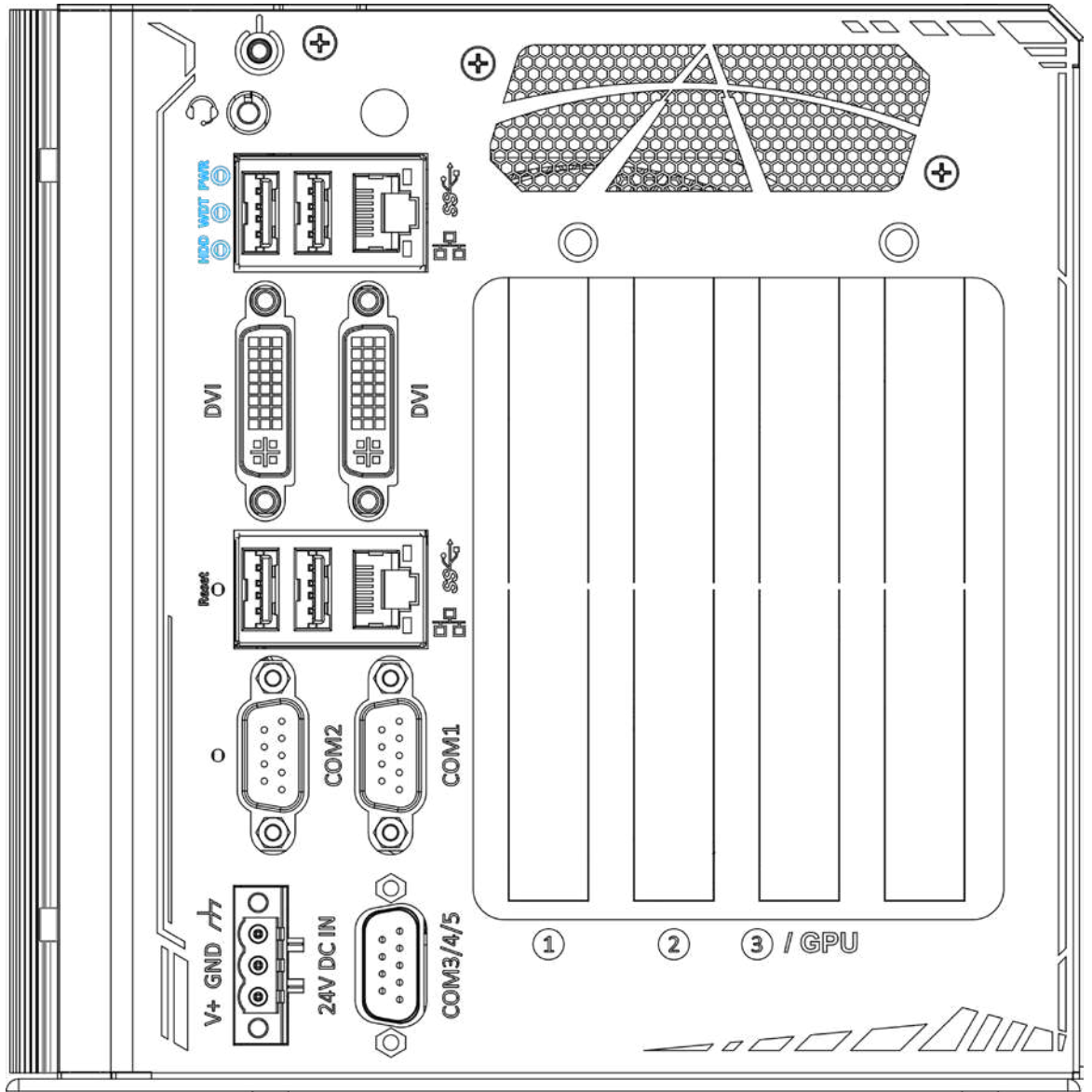
There are three LED indicators on the I/O panel. From top to bottom, they are power (PWR), Watchdog timer (WDT) and hard disk drive activity (HDD).   The descriptions of these three LEDs are listed in the following table.

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.

2.2.4   USB3.1 Gen 1 Port
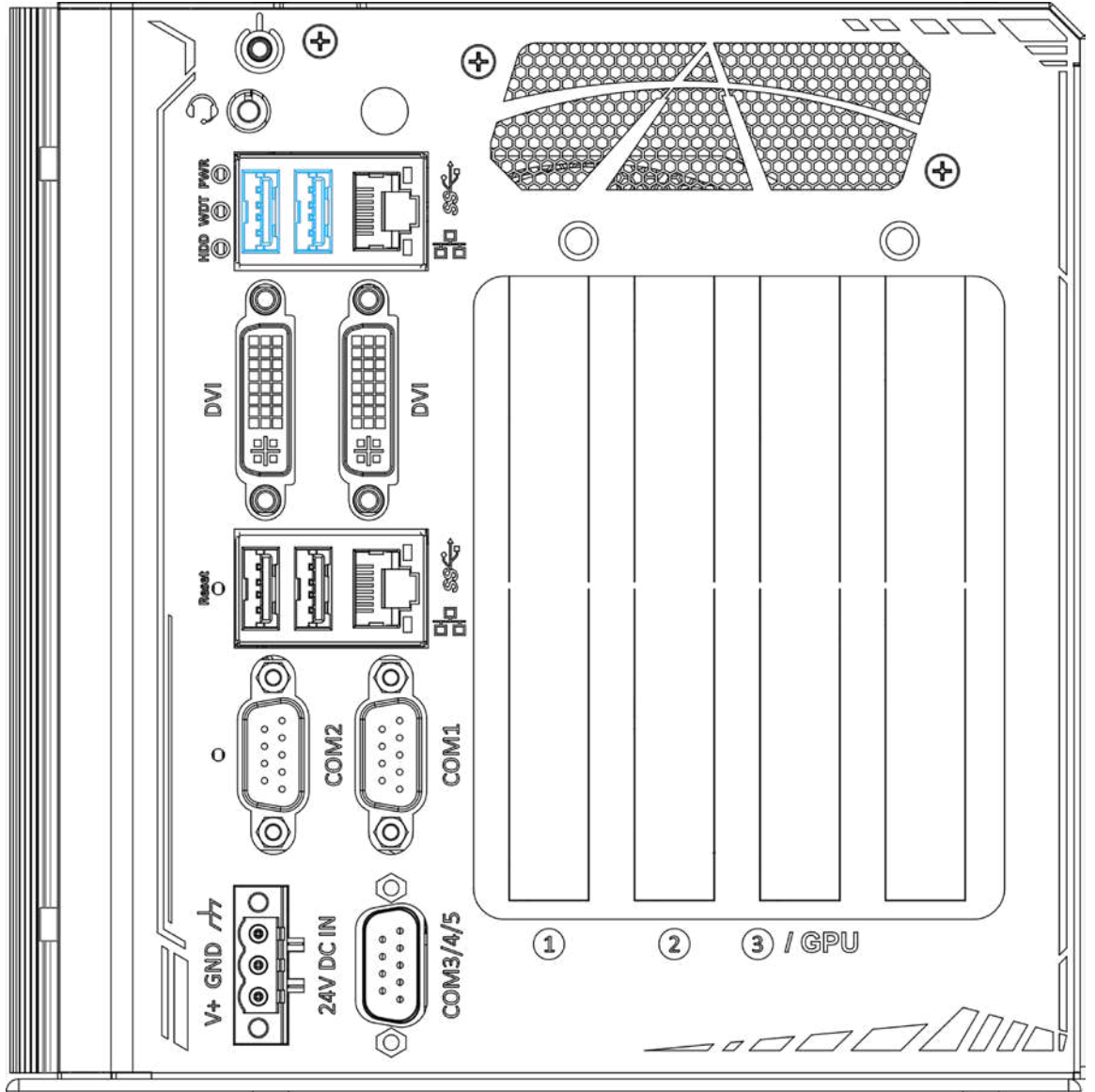
The system's USB 3.0 Gen 1 ports (5Gbps) are implemented via nativexHCI (eXtensible Host Controller Interface) controller and are backward compatible with USB 2.0, USB 1.1 and USB 1.0 devices. Legacy USB is also supported so you can use USB keyboard/mouse in DOS environment. xHCI driver is supported natively in Windows 10, therefore you do not need to install xHCI driver in prior to utilize USB functions.

2.2.5 I210 Gigabit Ethernet Port
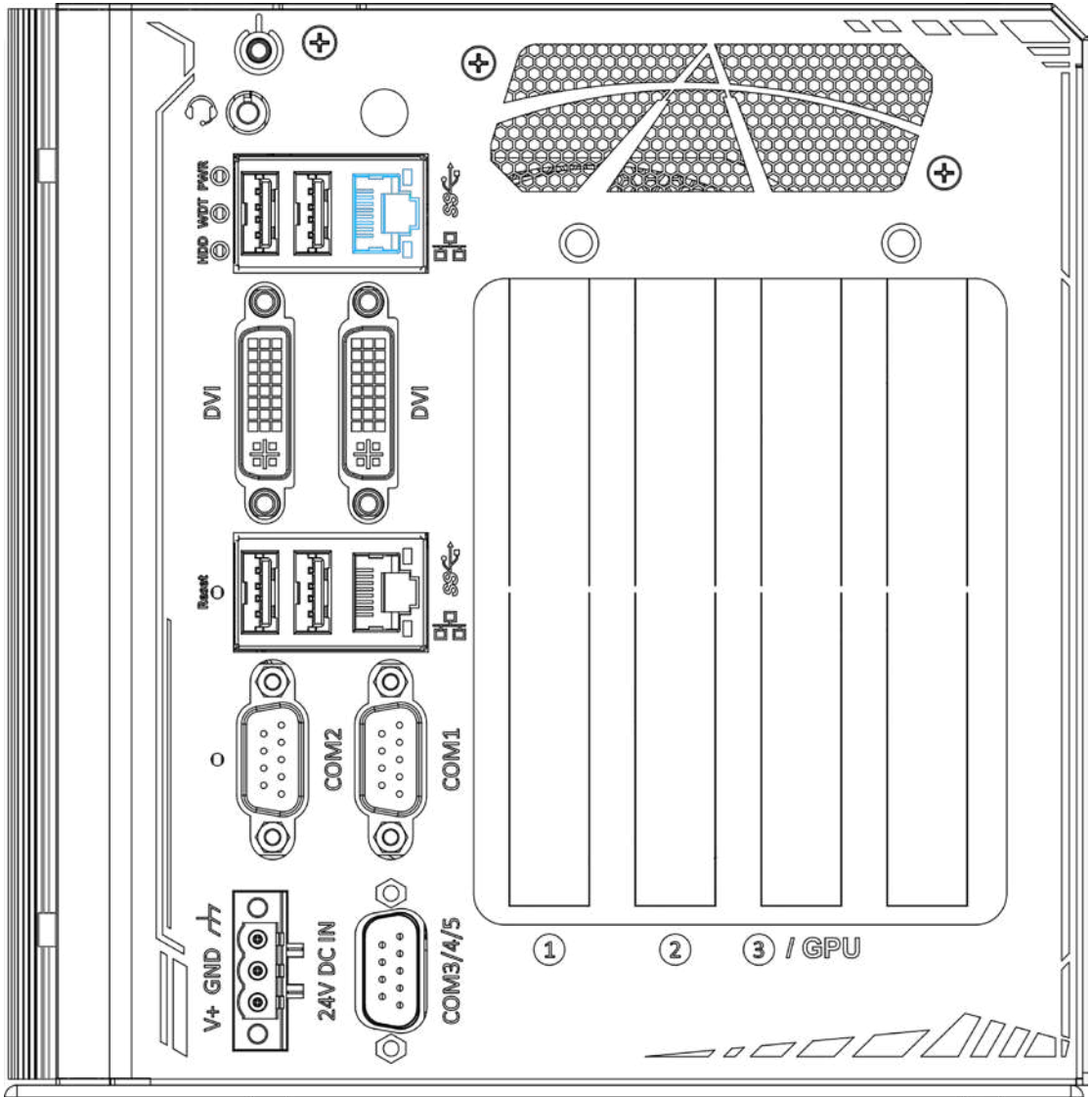
This Gigabit Ethernet port is implemented using Intel® I210-IT controller. The Ethernet port has one dedicated PCI Express link for maximum performance.Please refer to the table below for LED connection statuses.

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

To utilize the GbE port in Windows, you need to install corresponding driver for Intel®

I210-IT/ I219-LM GbE controller.

2.2.6 DVI Port
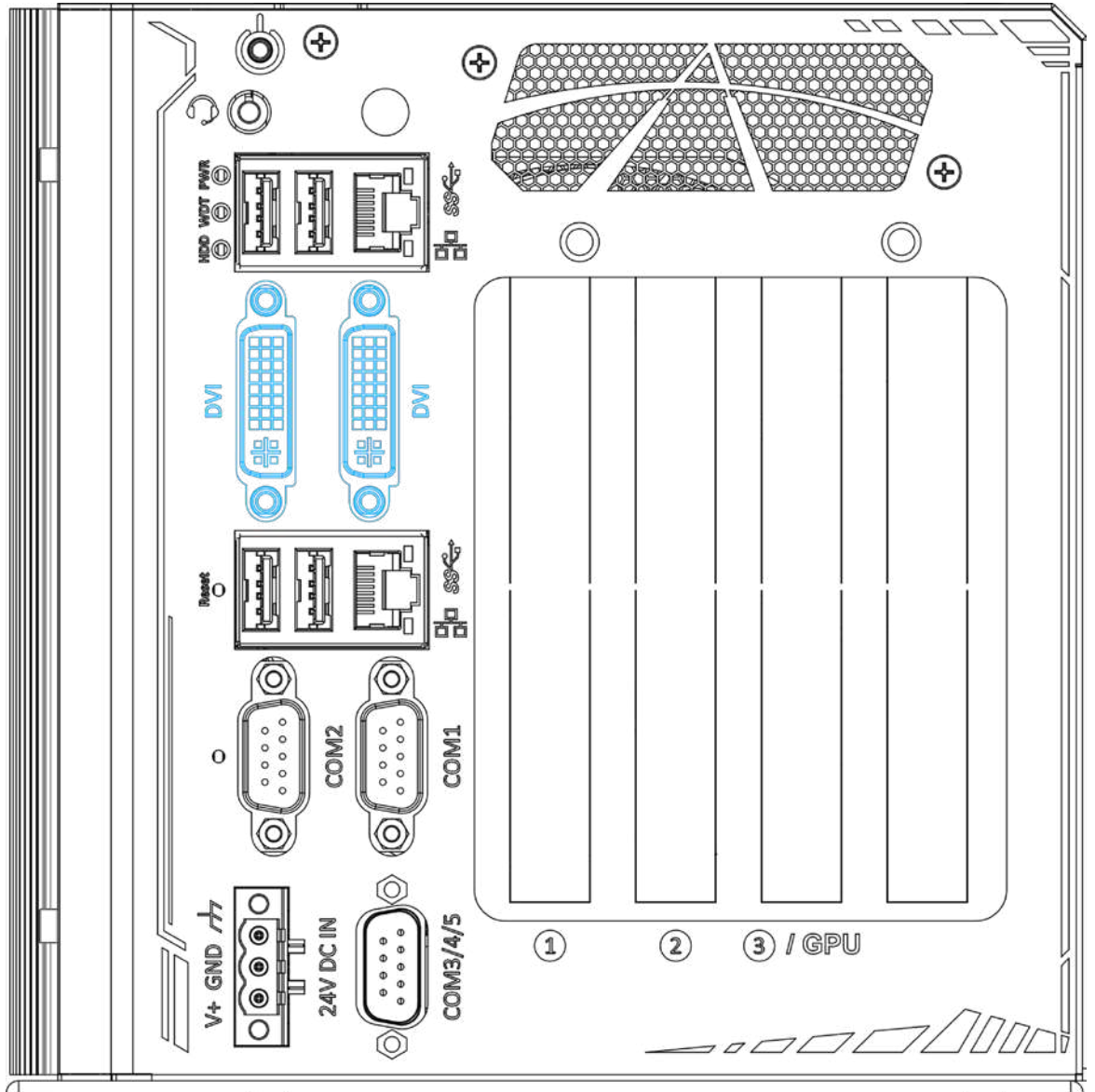
DVI-D transmits graphics data in digital format and therefore can deliver better image quality at high resolution. The DVI connector on the front panel can either output DVI signals or other digital signals (via an adapter/ cable) depending on the display device connected. It supports resolutions up to 1920x1200@60Hz.

The system supports dual independent display outputs by connecting display devices to the two DVI ports. To support multiple display outputs and achieve best DVI output resolution in Windows, you need to install corresponding graphics driver. Please refer to section OS Support and Driver Installation for details.

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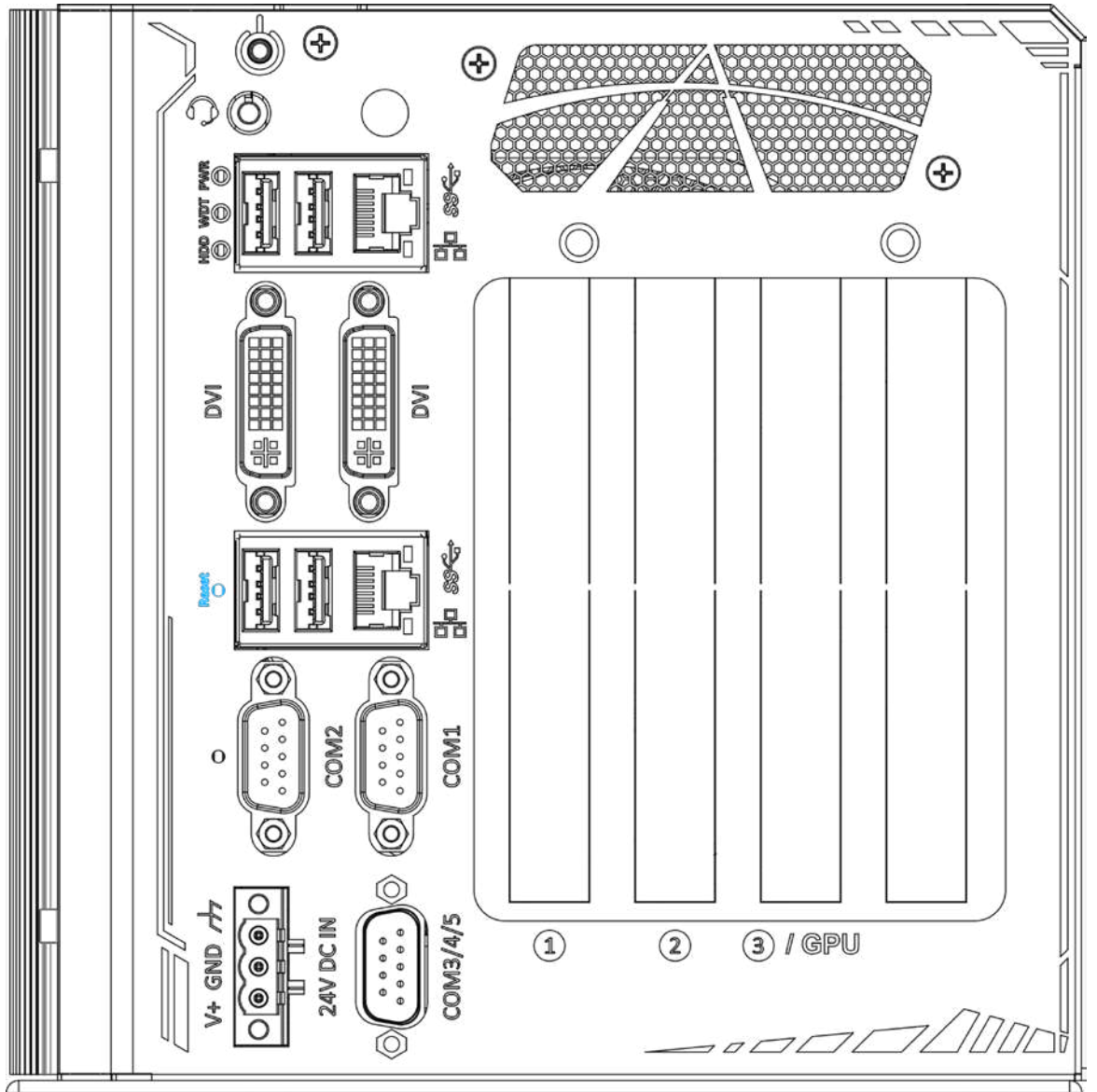
The reset button is used to manually reset the system in case of system halt or malfunction. To avoid unexpected reset, the button is purposely placed behind the panel. To reset, please use a pin-like object (eg. tip of a pen) to access the reset button

2.2.8 USB3.1 Gen 1 Port
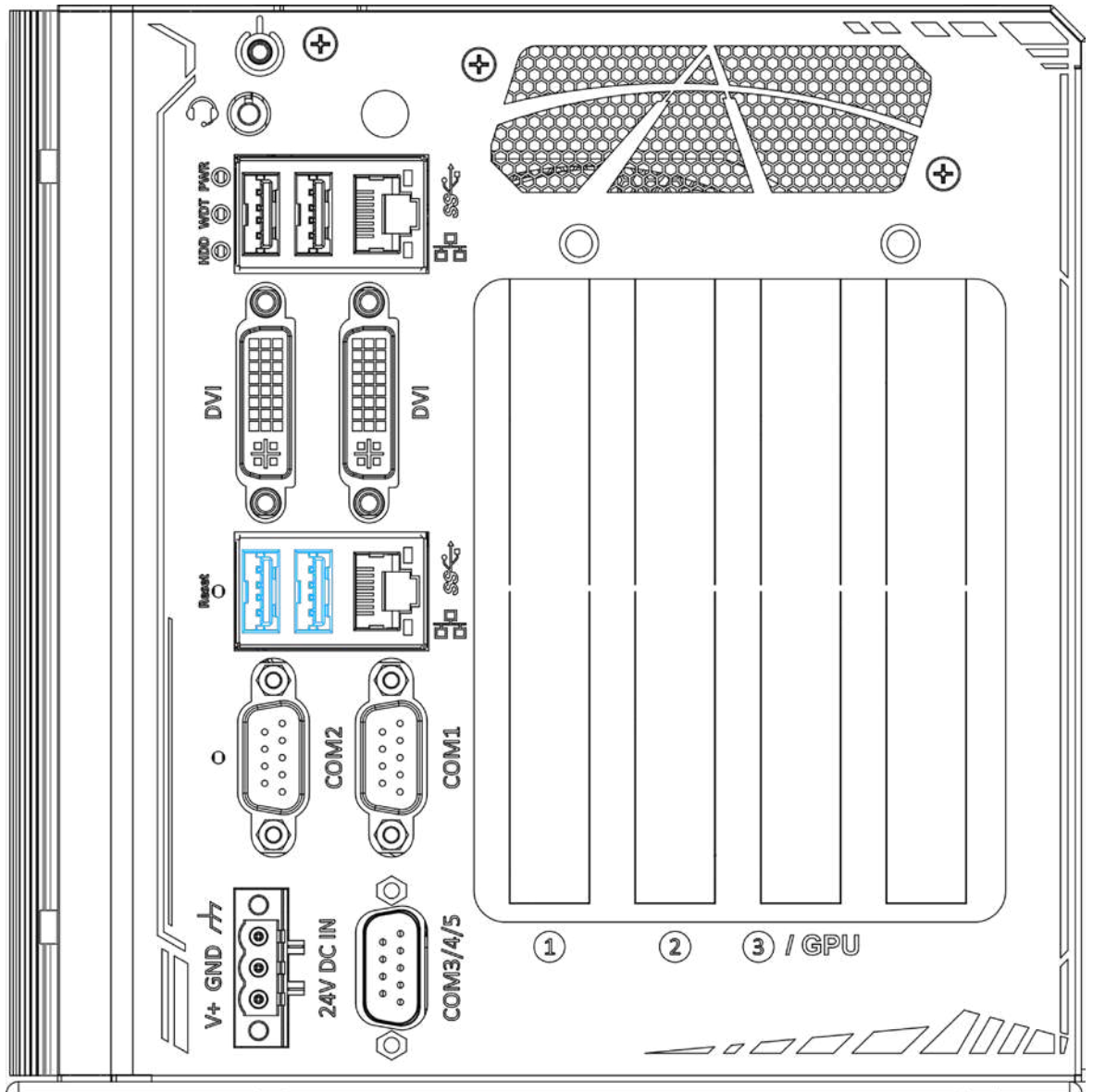
The system's USB 3.0 Gen 1 ports (5Gbps) are implemented via nativexHCI (eXtensible Host Controller Interface) controller and are backward compatible with USB 2.0, USB 1.1 and USB 1.0 devices. Legacy USB is also supported so you can use USB keyboard/mouse in DOS environment. xHCI driver is supported natively in Windows 10, therefore you do not need to install xHCI driver in prior to utilize USB functions.

2.2.9 I219 Gigabit Ethernet Port
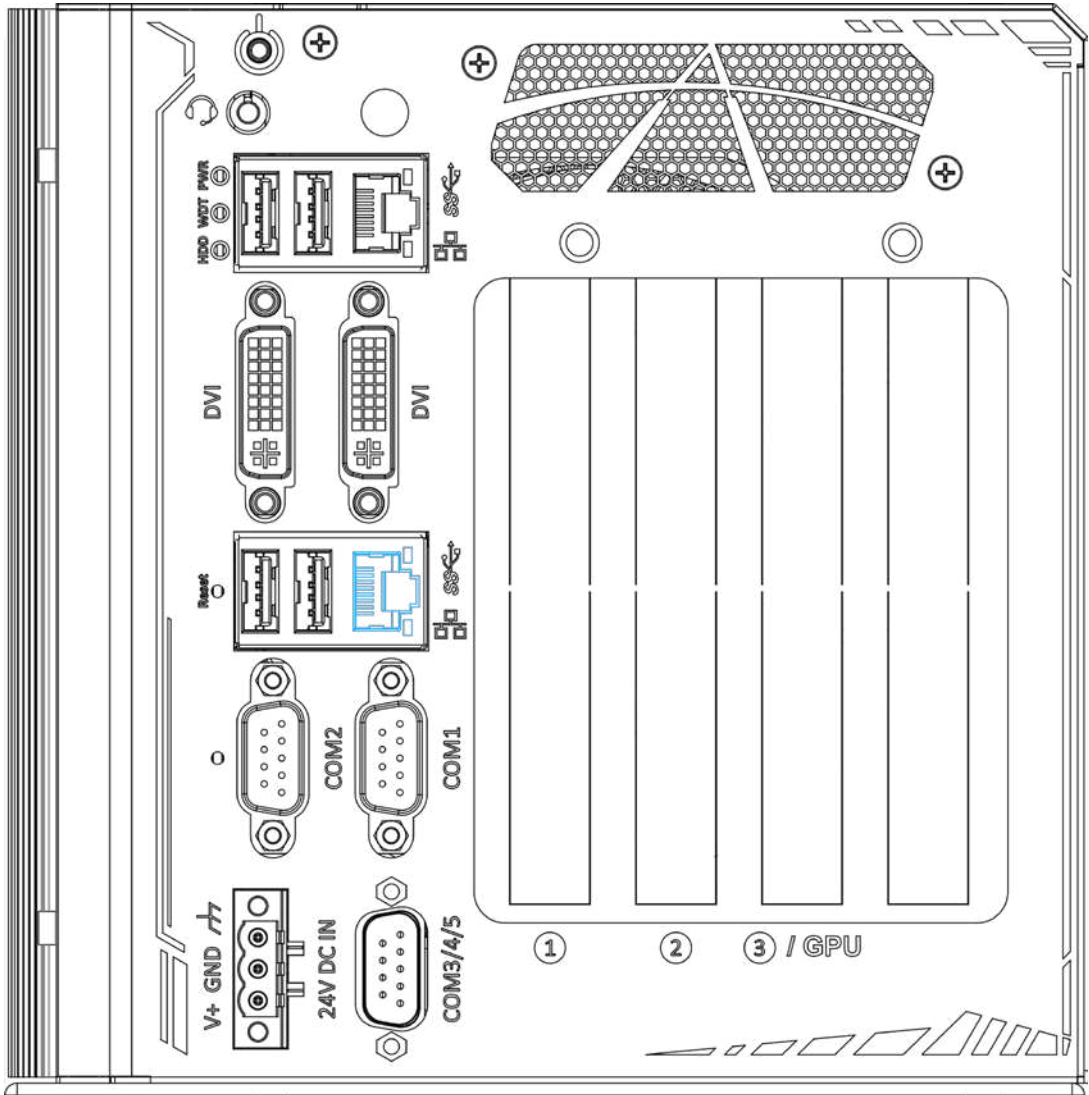
This Gigabit Ethernet port is implemented using Intel® I219-LM controller that supports Wake-on-LAN and is also compatible with Intel® AMT (Active Management Technology) to support advanced features such as remote SOL desktop and remote on/ off control. Each port has one dedicated PCI Express link for maximum performance.Please refer to the table below for LED 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

To utilize the GbE port in Windows, you need to install corresponding driver for Intel® I210-IT/ I219-LM GbE controller.

2.2.10 COM2 Port
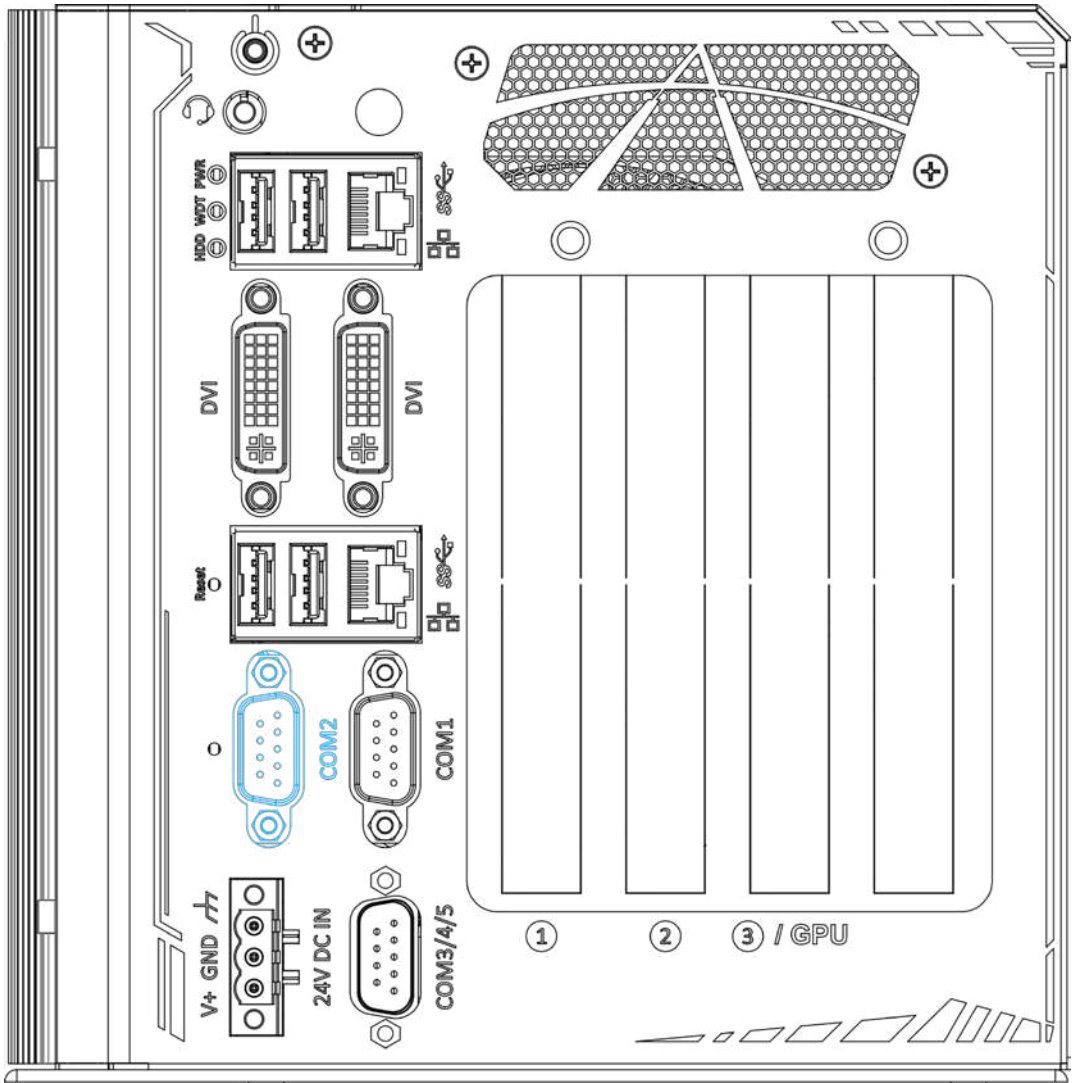
COM2 is a software-configurable RS-422/485 port. The operation mode of COM2 can be set in BIOS setup utility. Please note that there is no termination for RS-422/485. The following table describes the pin definition of COM port.
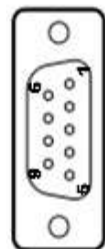
Pin#	COM2	
	RS-422 Mode	**RS-485**
1		
2	422 TXD+	485 TXD+/RXD+
3	422 RXD+	
4	422 RXD-	
5	GND	GND
6		
7		
8	422 TXD-	485 TXD-/RXD-
9		

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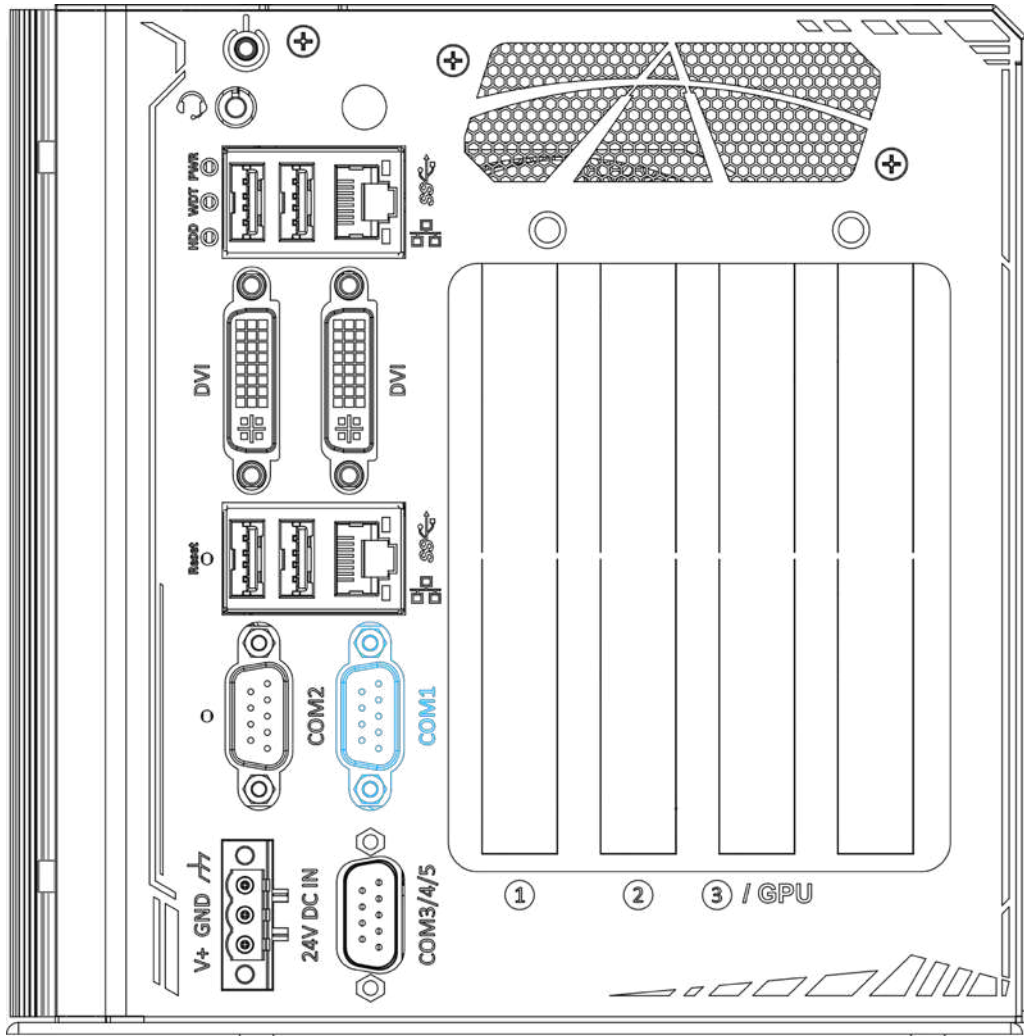
The COM1 port is implemented using industrial-grade ITE8786 Super IO chip (-40 to 85°C) and provide up to 115200 bps baud rate. It is a software-configurable RS-232/422/485 port.The operation mode of can be set in BIOS setup utility. The following table describes the pin definition of the COM port.
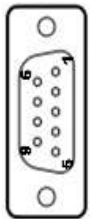
COM Port Pin Definition

	COM1		
Pin#	RS-232Mode	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		

2.2.12 3-Pin Terminal Block for DC Input
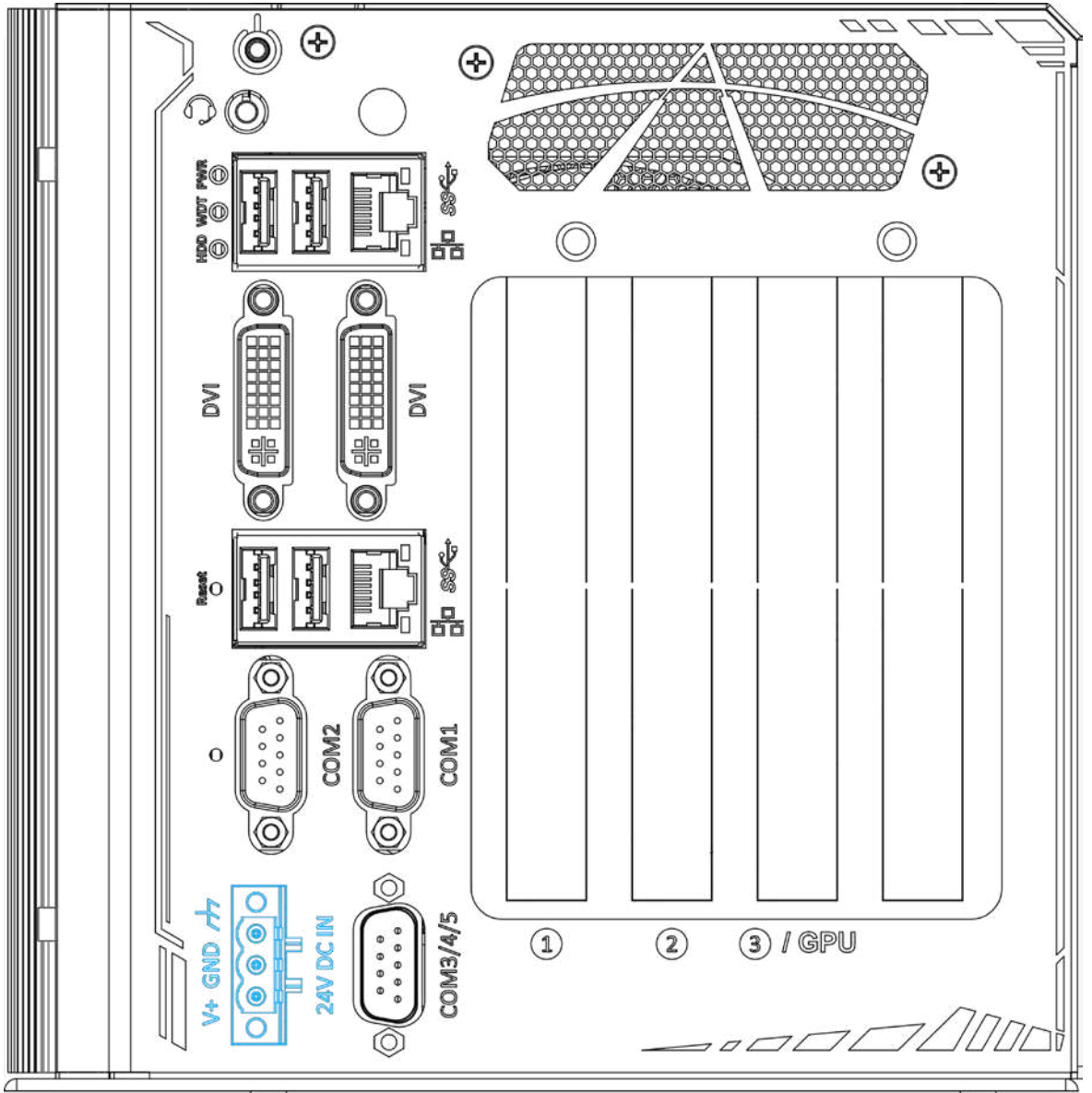
The system accepts a 24V DC power input via 3-pin pluggable terminal block, which is fit for field usage where DC power is provided. And the screw clamping connection of the terminal block gives a very reliable way of wiring DC power.

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 24V will damage the system.

2.2.13 COM3/4/5 Port
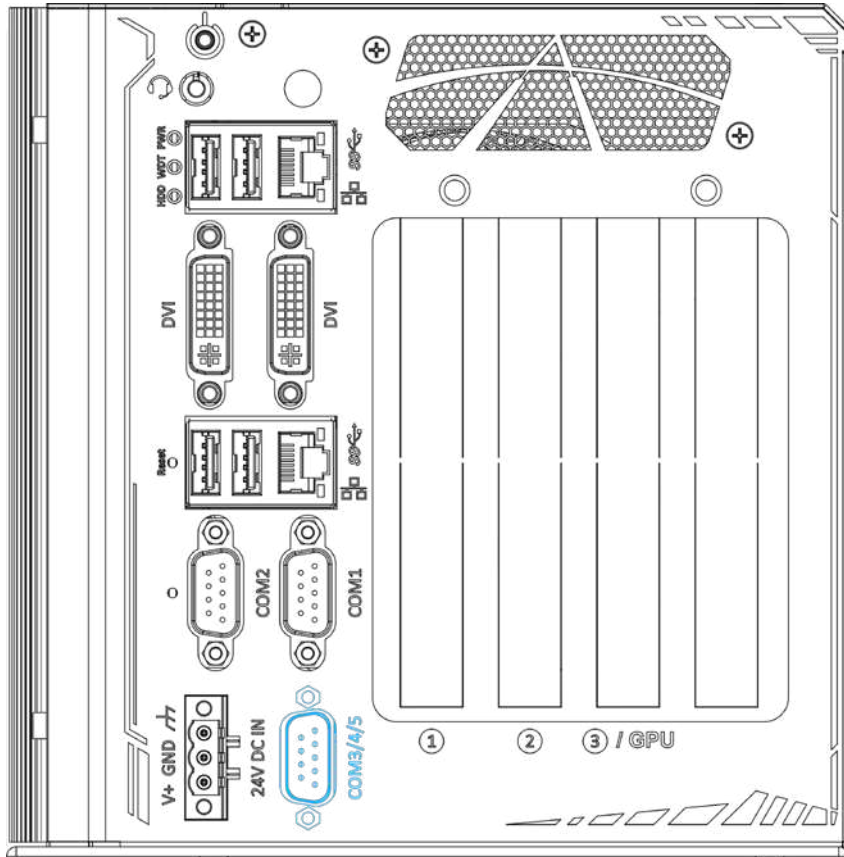
COM3, COM4 and COM5 are 3-wire RS-232 ports share single DB9 connector. You can directly connect this to one external device with 3-wire RS-232 interface, or use an optional 1-to-3 Y-cable to have three DB9 connectors for more devices. The following table describes the pin definition of the DB9 connector as well as the Y-cable.
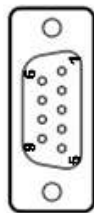
	COM3/4/5 DB9		
Pin#	COM3	COM4	COM5
1			
2	RX		
3	TX		
4		TX	
5	GND	GND	GND
6		RX	
7			TX
8			RX
9			

	Y-Cable DB9
Pin#	COM3 (A)
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 single module DDR4 2666MHz SODIMM up to 32GB capacity.
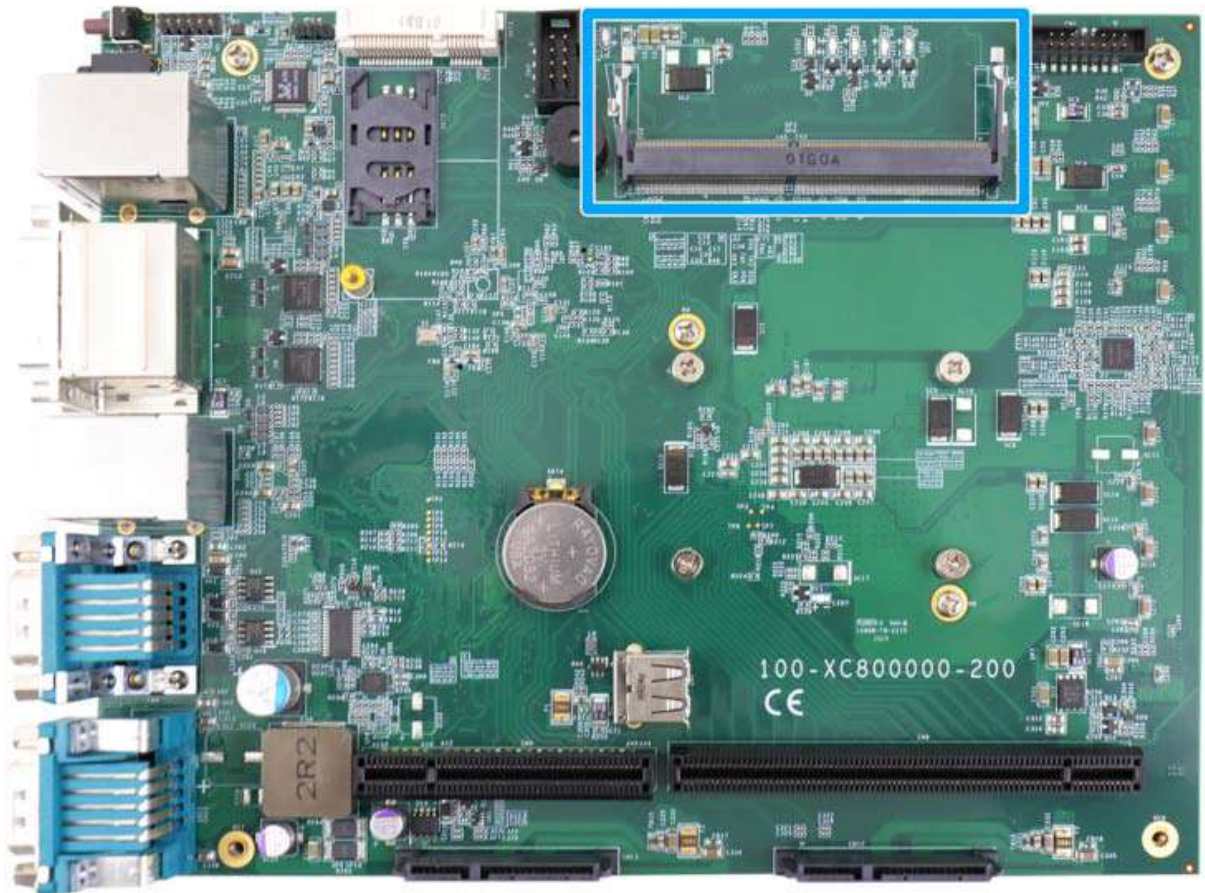
📝 **NOTE**

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   mSATA Slot & Pin Definition

The system provides an mSATA slot (indicated in **blue**) mux with USB 2.0 signal to accommodate an mSATA flash disk module. The mSATA flash disk module is a solid-state storage device with SATA interface and is reliable for harsh environments and has high tolerance for intense vibration/shock conditions. The system recognizes mSATA as a native storage device and accordingly you can install any operating system on the mSATA module. This mSATA socket is 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/ 5G network.
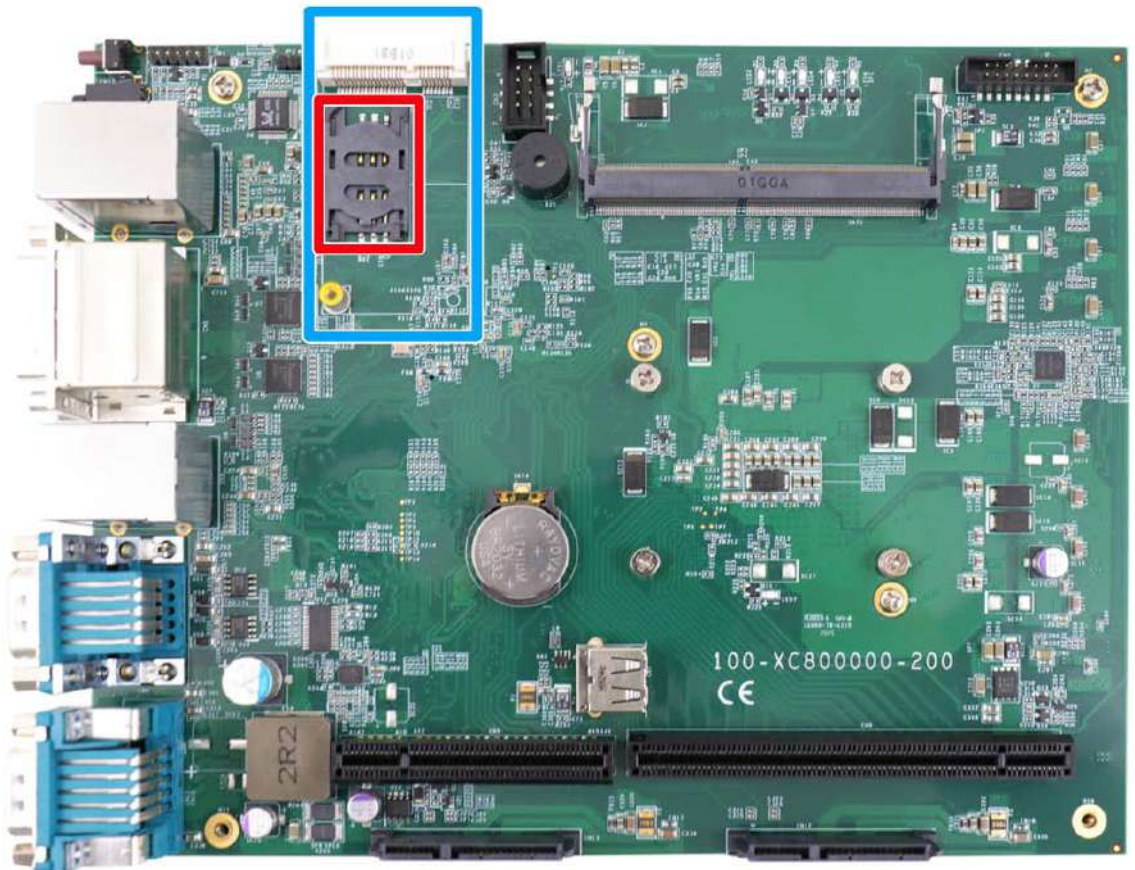
For wireless (WIFI/ 3G/ 4G) communication, an SMA antenna aperture can be located on the front panel.
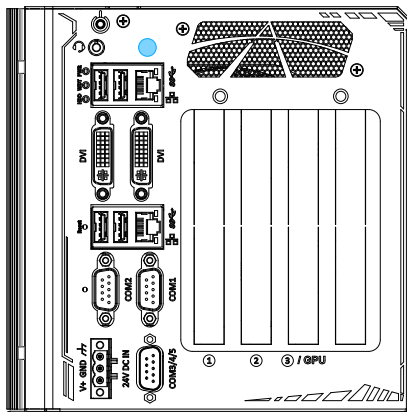
mSATA/ USB2.0 signal definition
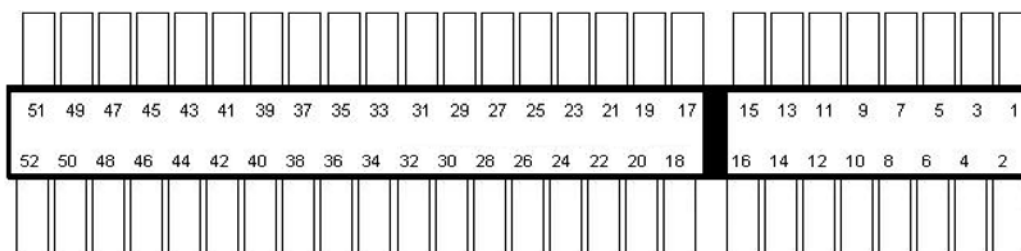
Pin#	Signal (USB)	Signal (mSATA)	Pin #	Signal (USB)	Signal (mSATA)
1	-	-	2	+3.3V	3.3V
3	-	-	4	GND	GND
5	-	-	6	+1.5V	+1.5V
7	-	-	8	UIM_PWR	-
9	GND	GND	10	UIM_DATA	-
11	-	-	12	UIM_CLK	-
13	-	-	14	UIM_RESET	-
15	GND	GND	16	UIM_VPP	-
Mechanical Key					
17	-	-	18	GND	GND
19	-	-	20	W_DISABLE#	-
21	GND	GND	22	-	-
23	-	SATA_Rxp	24	3.3V	3.3V
25	-	SATA_Rxn	26	GND	GND
27	GND	GND	28	+1.5V	+1.5V
29	GND	GND	30	SMB_CLK	SMB_CLK
31	-	SATA_Txn	32	SMB_DATA	SMB_DATA
33	-	SATA_Txp	34	GND	GND
35	GND	GND	36	USB_D-	-
37	GND	GND	38	USB_D+	-
39	3.3V	3.3V	40	GND	GND
41	3.3V	3.3V	42	-	-
43	GND	-	44	-	-
45	-	-	46	-	-
47	-	-	48	+1.5V	+1.5V
49	-	-	50	GND	GND
51	-	-	52	3.3V	3.3V

2.3.3   SATA Ports

NOTE

Supports up to 15mm thickness HDD/ SSD.
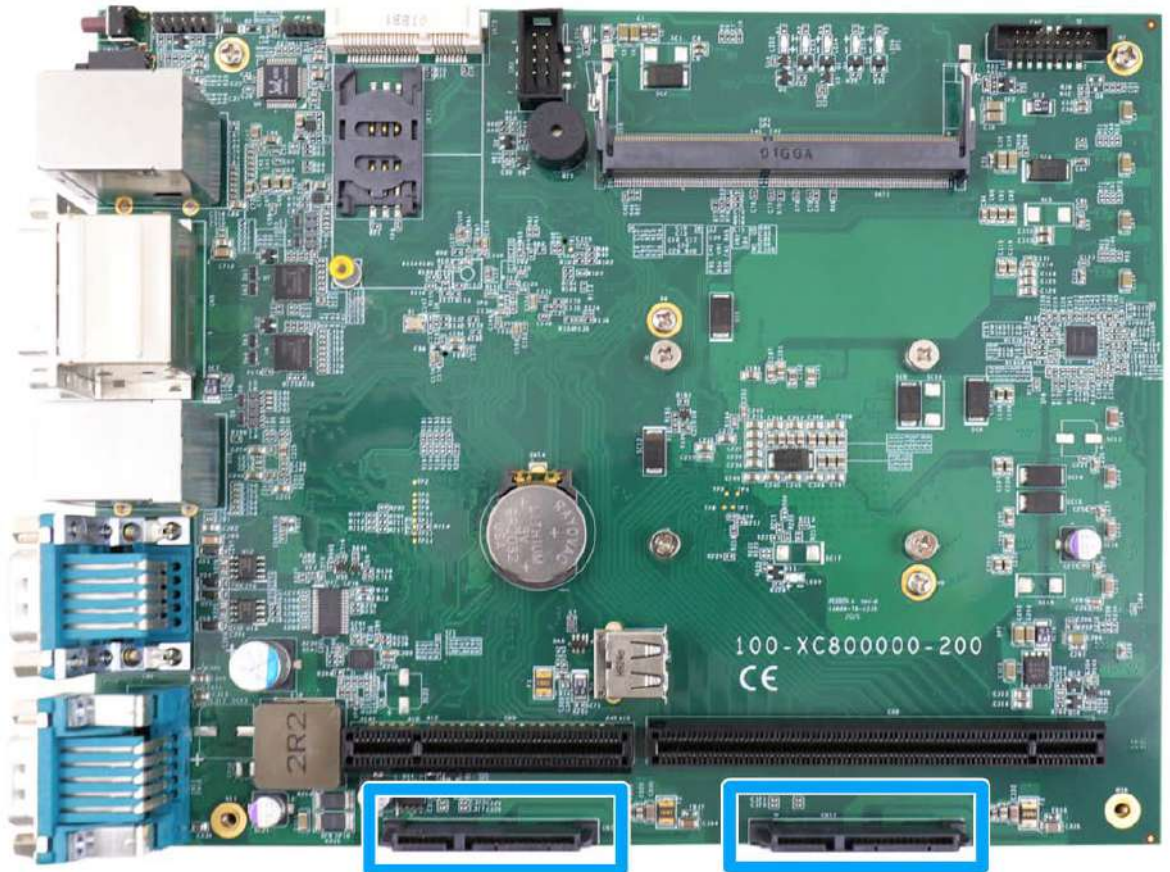
The system provides two SATA ports which support Gen3, 6 Gb/s SATA signalsviastandard
22-pin SATA connectors are provided with the system. You may refer to the SATA Configuration
section for SATA settings.

2.3.4 On/ Off Ctrl & Status Output

For an application which places Nuvo-8111 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-8111 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. The following table describes the pin definition of the status LED output.
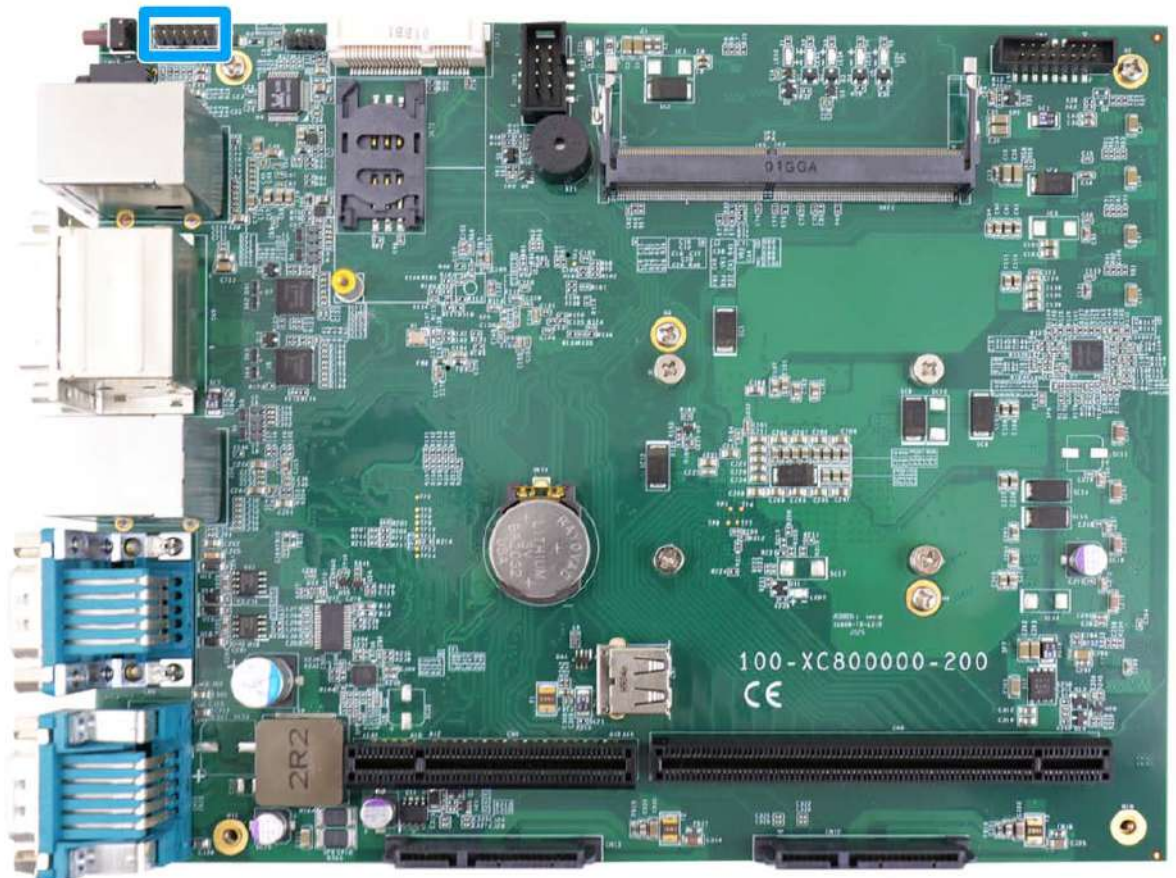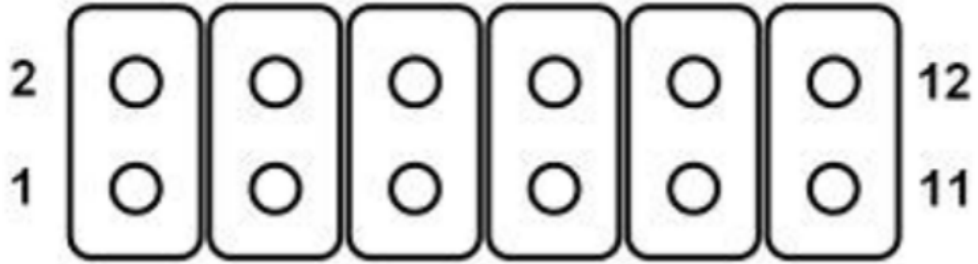
Pin#	Definition	Description
1	WDT_LED-	[Output] Watchdog timer indicator, flashing when Watchdog timer is active
2	WDT_LED+	
3	UID_LED-	[Output] User defined LED, reserved for future usage
4	UID_LED+	
5	HDD-	[Output] Hard drive indicator, flashing when SATA hard drive is active.
6	HDD+	
7	Power_LED-	[Output] System power indicator, on if system is turnedon, off if system is turned off.
8	Power_LED+	
9	Ctrl-	[Input] Remote on/off control, connects to an externalswitch to turn on/off the system (polarity is negligible).
10	Ctrl+	
11	NA	Un-used pin
12	NA	

2.3.5   Internal USB 2.0 Port

The system provides additional two USB 2.0 ports internally via a 2x8 pins, 2.0mm pitch box header. The internal USB ports are designed to allow users attaching additional USB devices inside the chassis. To use the internal USB port, you shall need a dedicated box-header to USB cable. Please contact Neousys for further information.
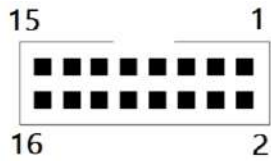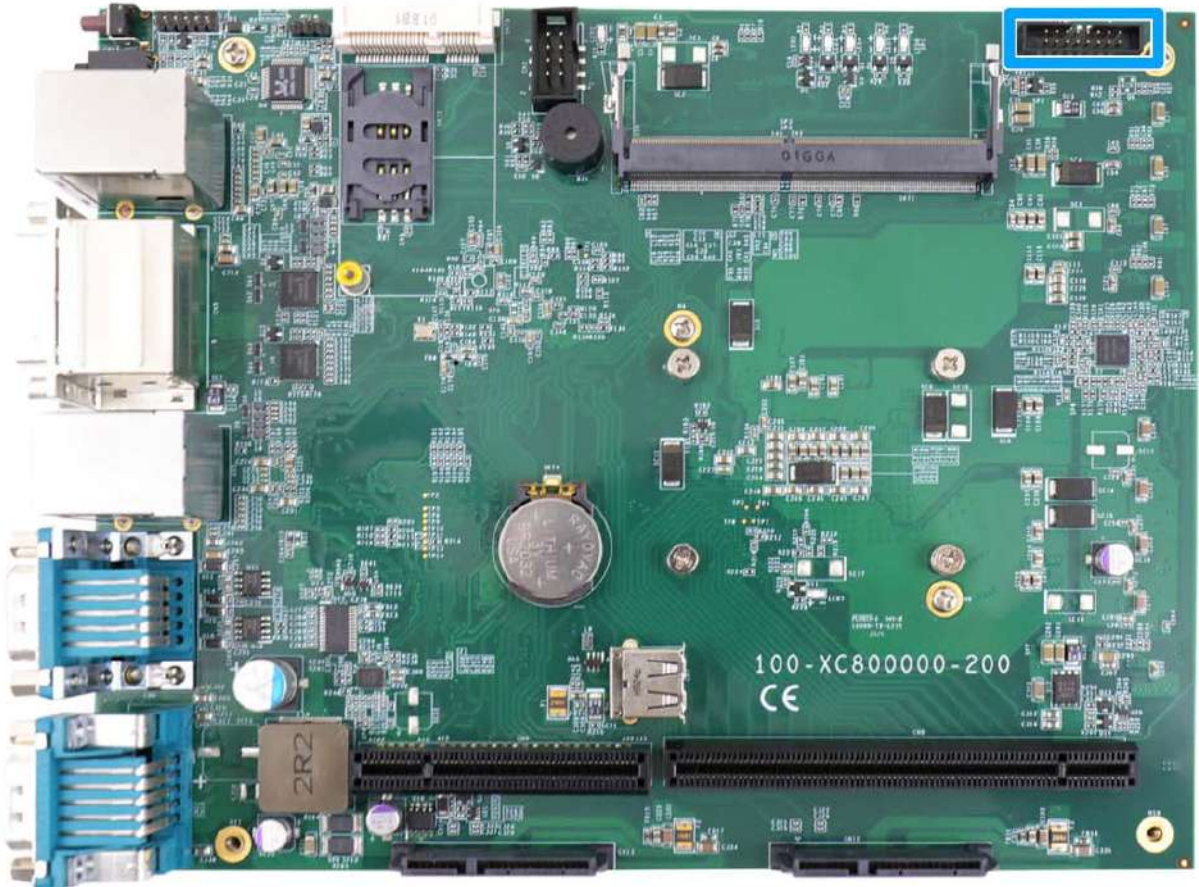
Pin#	Pin Definition
1	USB 5V Power, Max 500mA
2	USB 5V Power, Max 500mA
3	USB6 D-
4	USB7 D-
5	USB6 D+
6	USB7 D+
7	Ground
8	Ground
9 ~ 16	N/C

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.
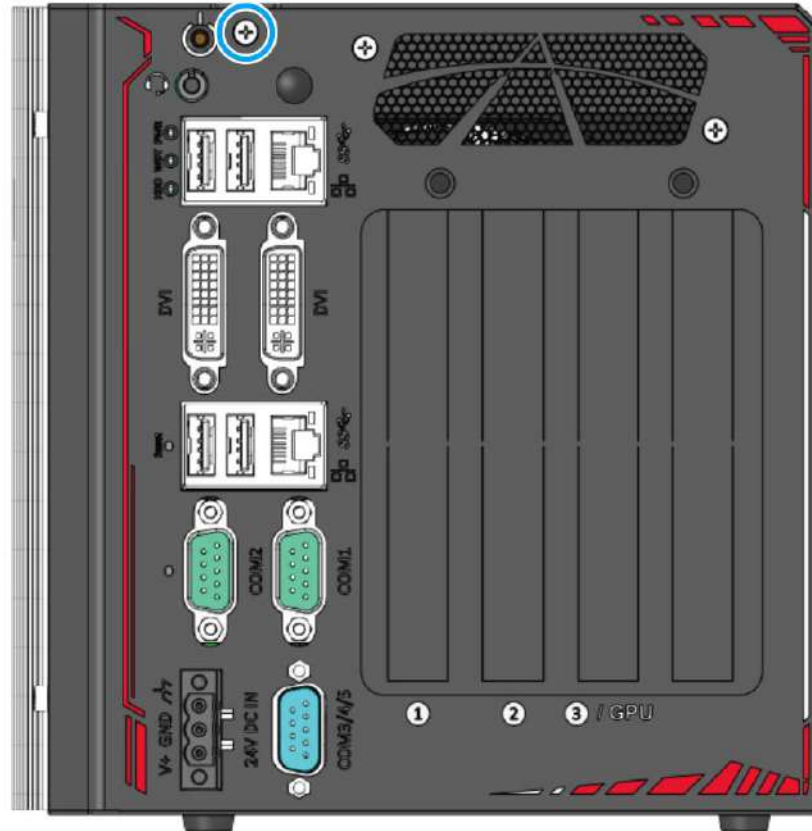
2. Remove the screws indicated on the side panel.
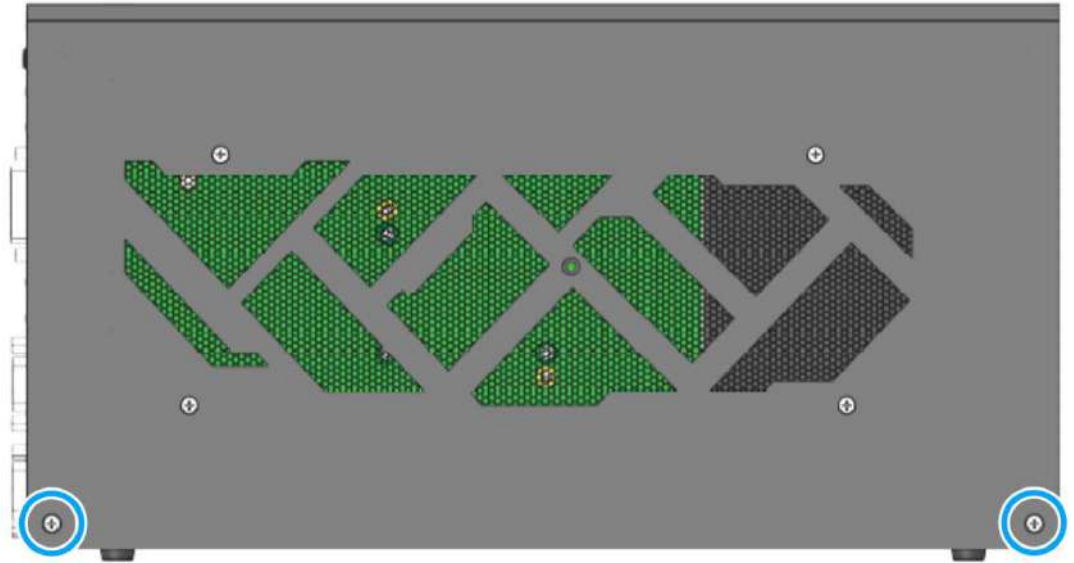
3. Remove the screw indicated on the rear panel.
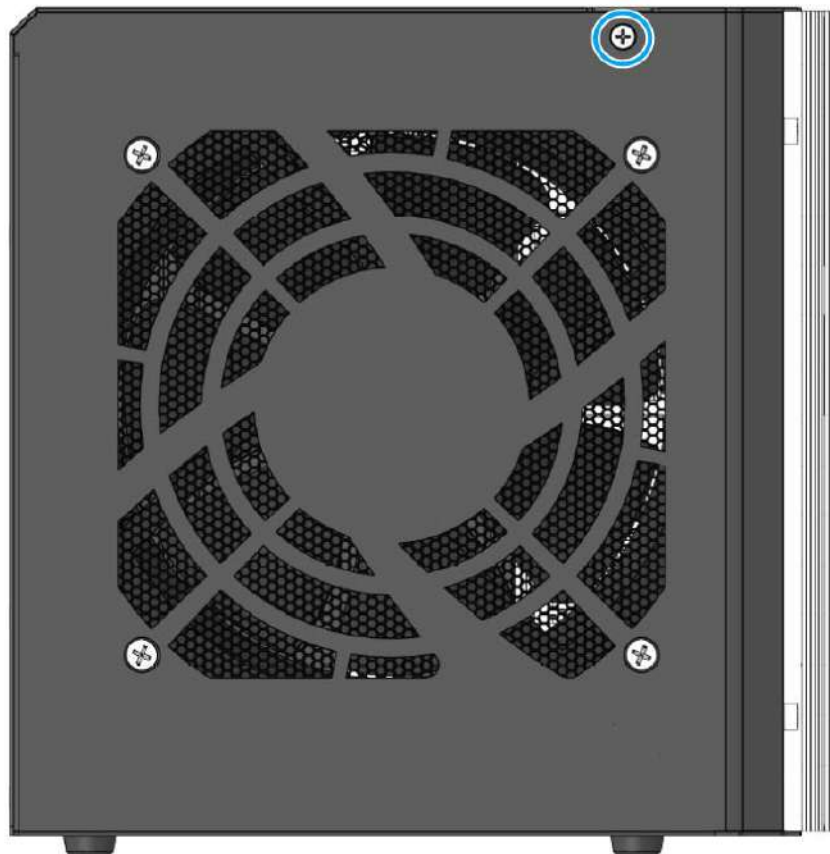
4. Gently lift the L-shape cover panel to separate it from the enclosure.

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 Procedure

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 remove the L-shaped panel, looking from the top, remove the screws indicated securing the daughterboard.

3. Gently wiggle to disengage the daughterboard from the motherboard.
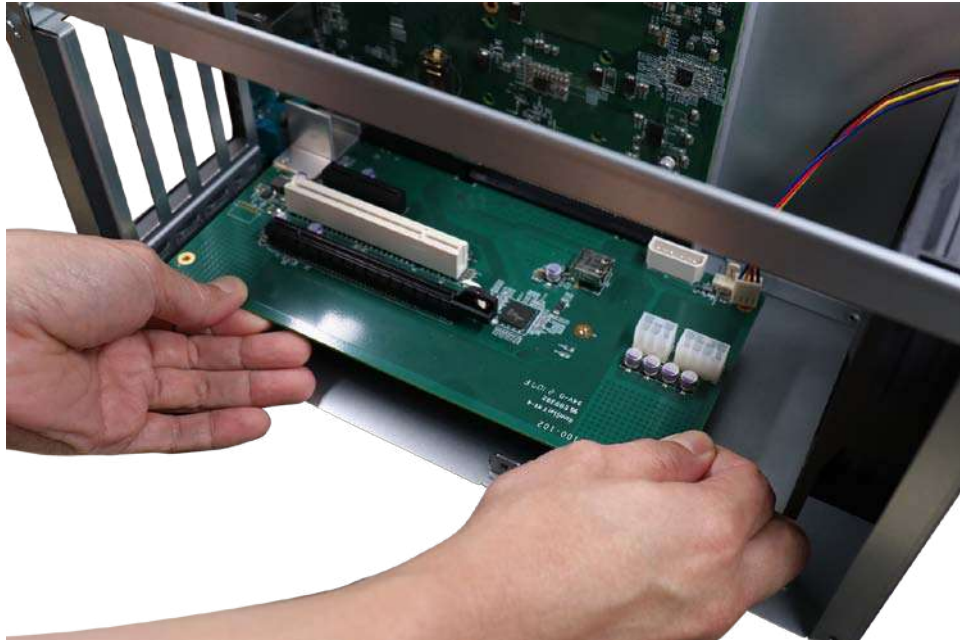
✍ **NOTE**

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. Gently wiggle the reversed T-shaped heatsink that may remain attached to the motherboard.
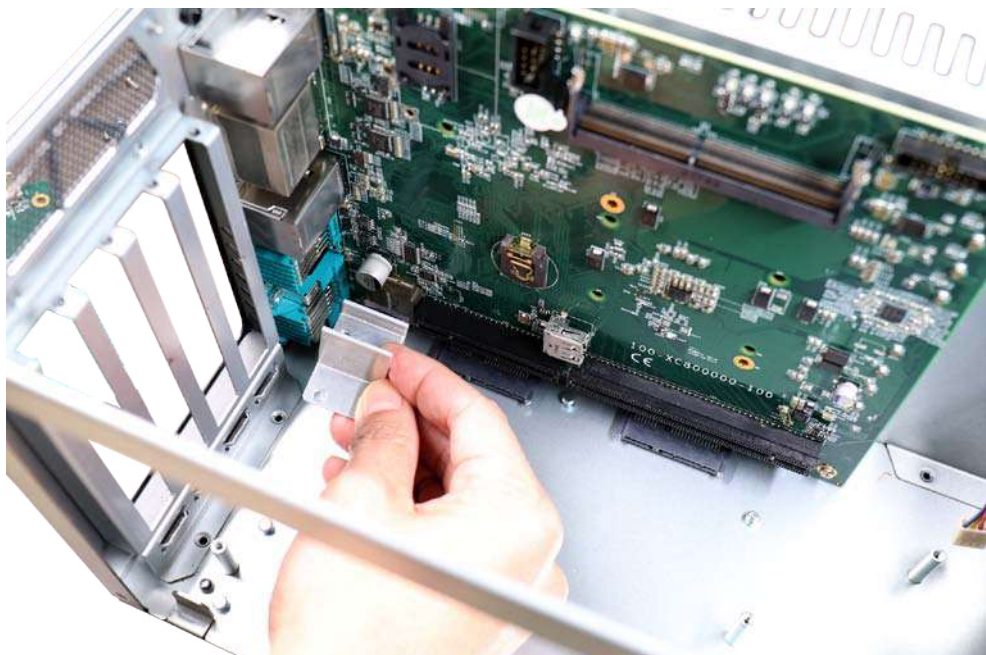
5. To separate the motherboard/heatsink from the enclosure, remove the COM 3/4/5 hexa-screws indicated on the I/O panel.

6. Remove the screws indicated on the heatsink.
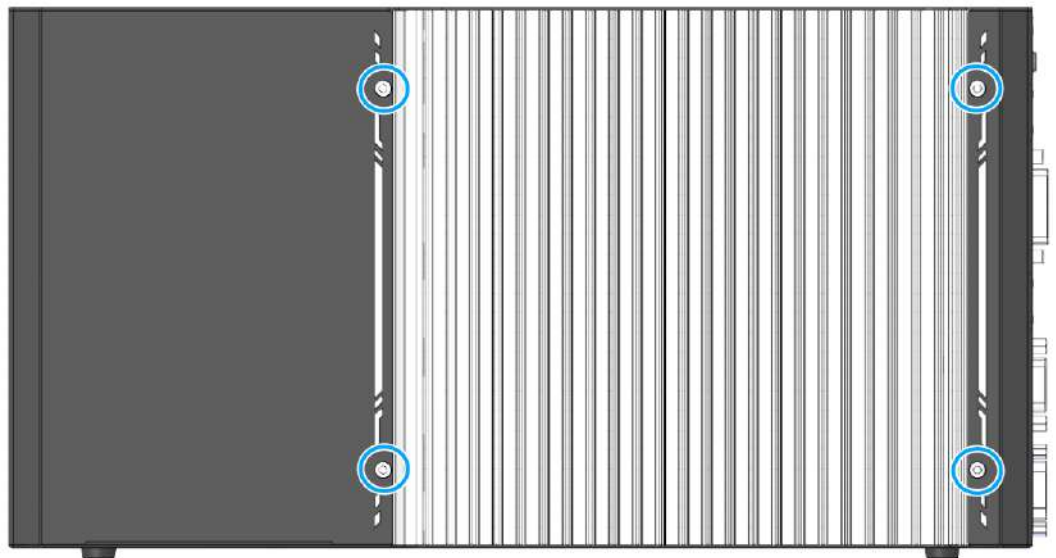
7. Gently lift and separate the motherboard/ heatsink from the enclosure.
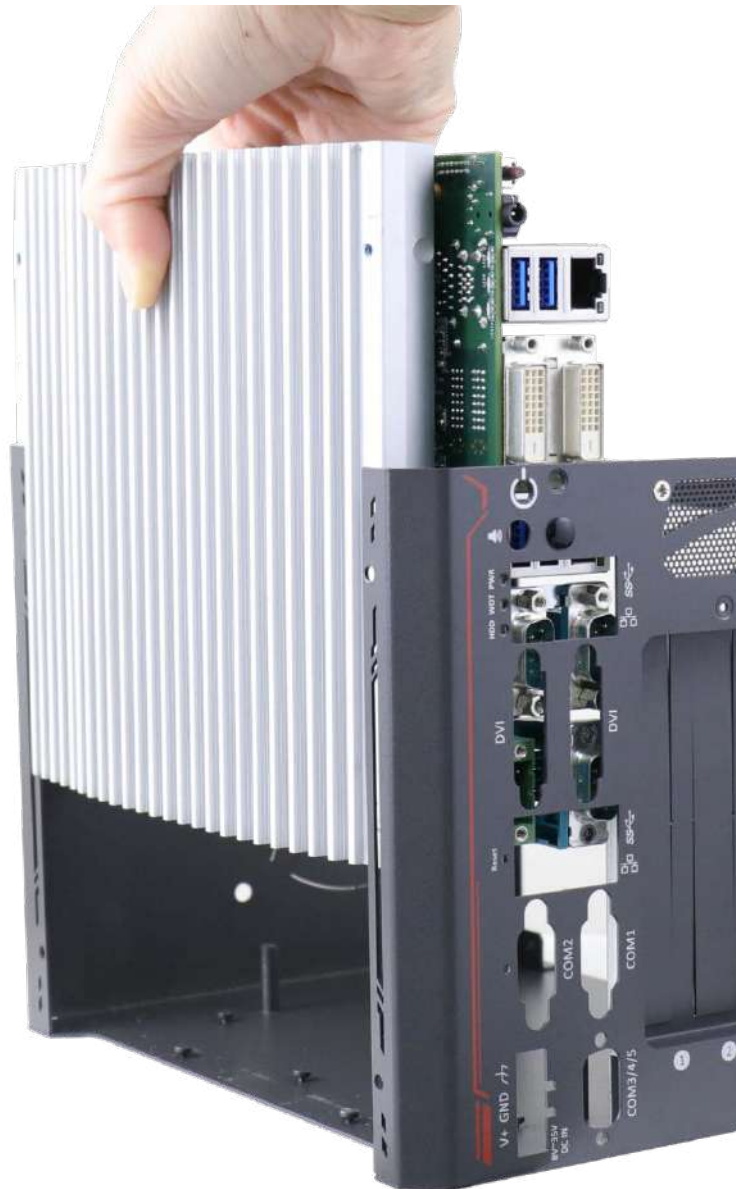
8. To separate the motherboard from the heatsink, remove the screws indicated **blue** and if there are screws (indicated in **red**) secured in the following locations, please remove them as well before separating the motherboard from the heatsink.
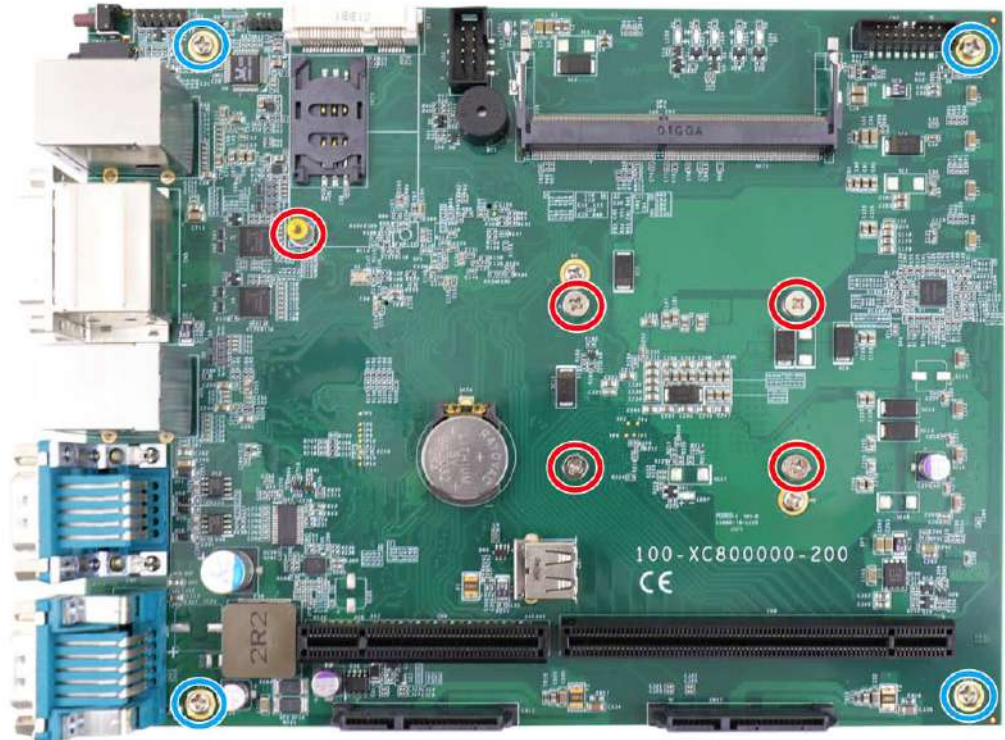
8. If you are installing the CPU for the first time, you will see the CPU socket protective cover, place finger tips underneath the sign "REMOVE" for leverage and gently lift the cover.
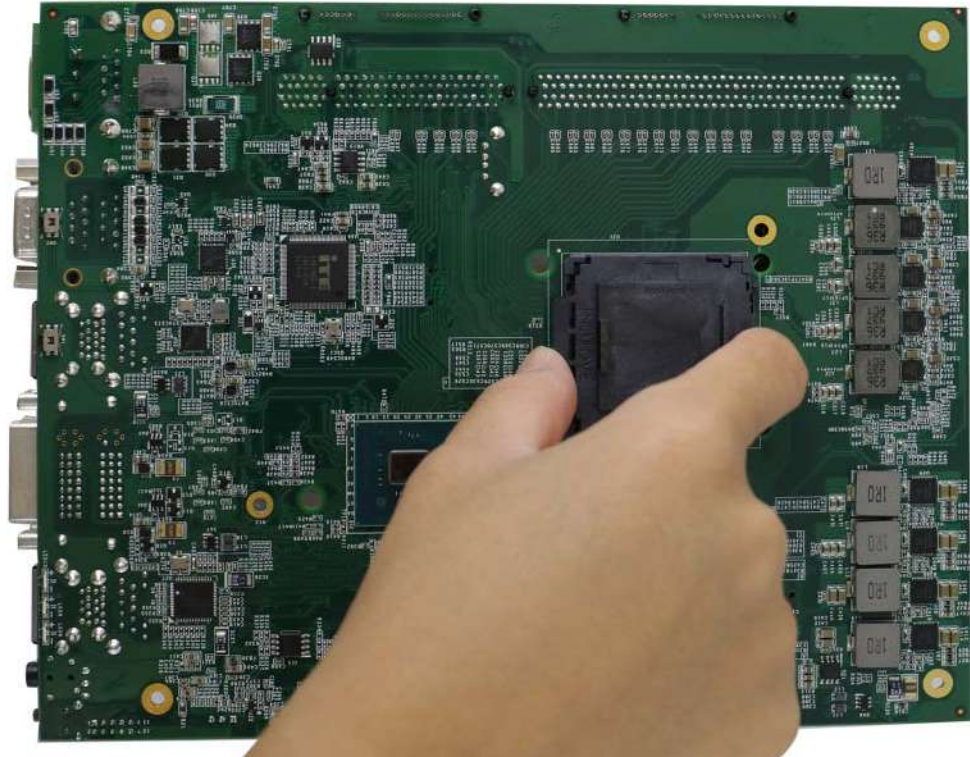
⚠️ **WARNING**

With the protective cover removed, please be careful when handling the motherboard. DO NOT touch the pins in the LGA socket!
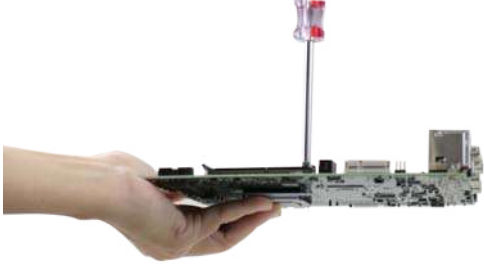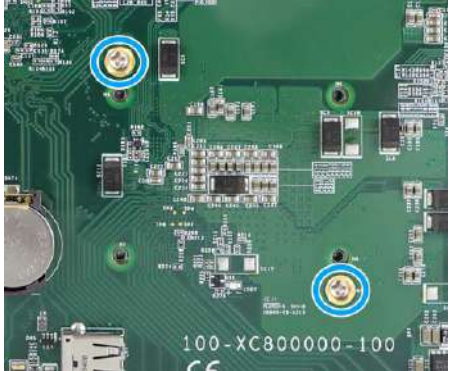
9. Remove the CPU from its container/ tray. Match the two notches on the side to the protrusions in the socket, gently lower the CPU into the socket.

10. Locate the CPU retention bracket from the accessory box. Place the retention bracket on the CPU and hold it in place.

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

Hold the bracket in place and turn the motherboard around	**Secure the bracket using the two M3 P-head screws provided**

12. If you are installing the CPU for the first time, remove thermal pads' protective films on the heatsink.
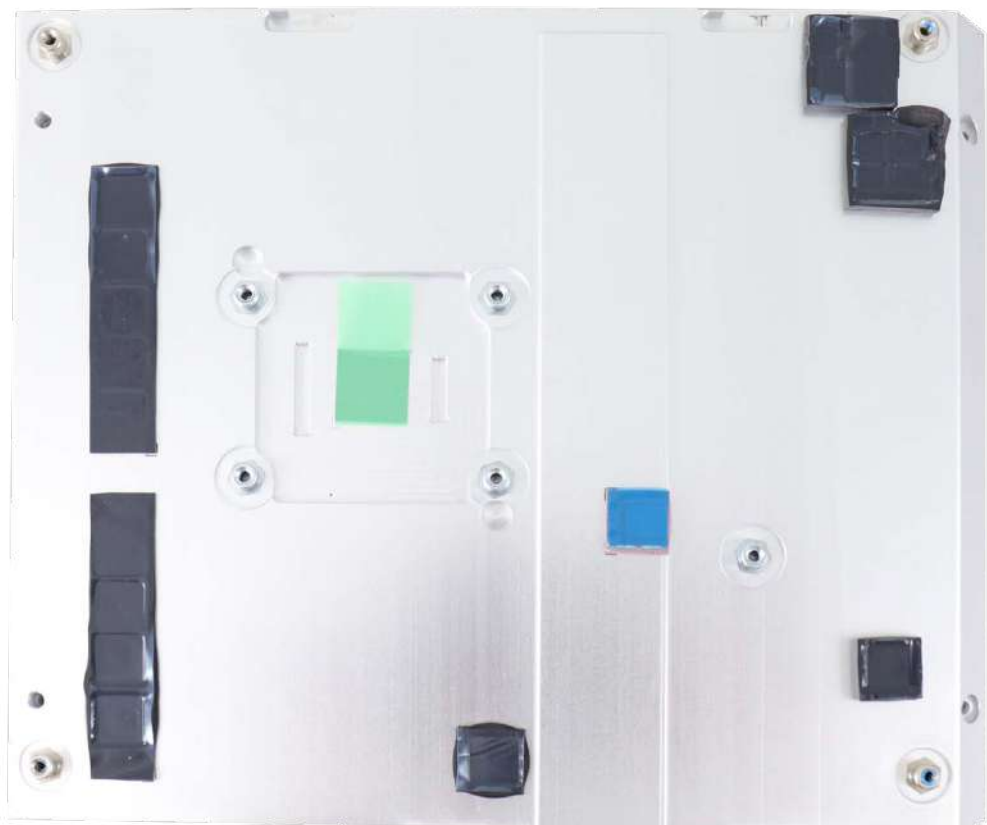
13. With the four motherboard standoffs aligned, gently lower the motherboard onto the heatsink and secure the four screws.
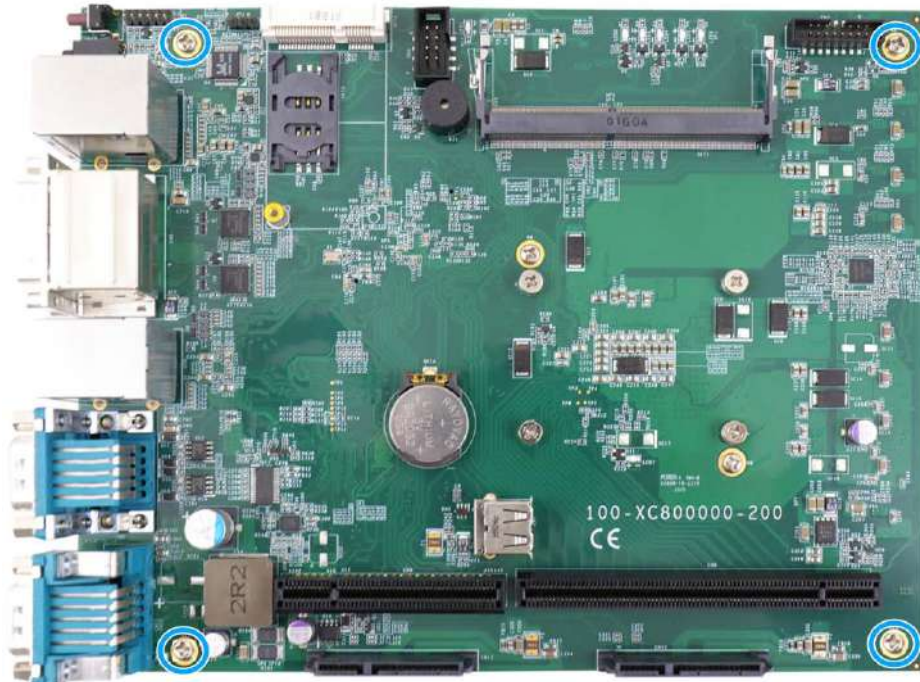
14. Once the motherboard has been installed, you're ready to secure the screws that help the heatsink apply pressure to the CPU/ chipset die. You'll want to apply even pressure to the corners by gradually tightening each screw. Please refer to the recommended order when tightening the screws.
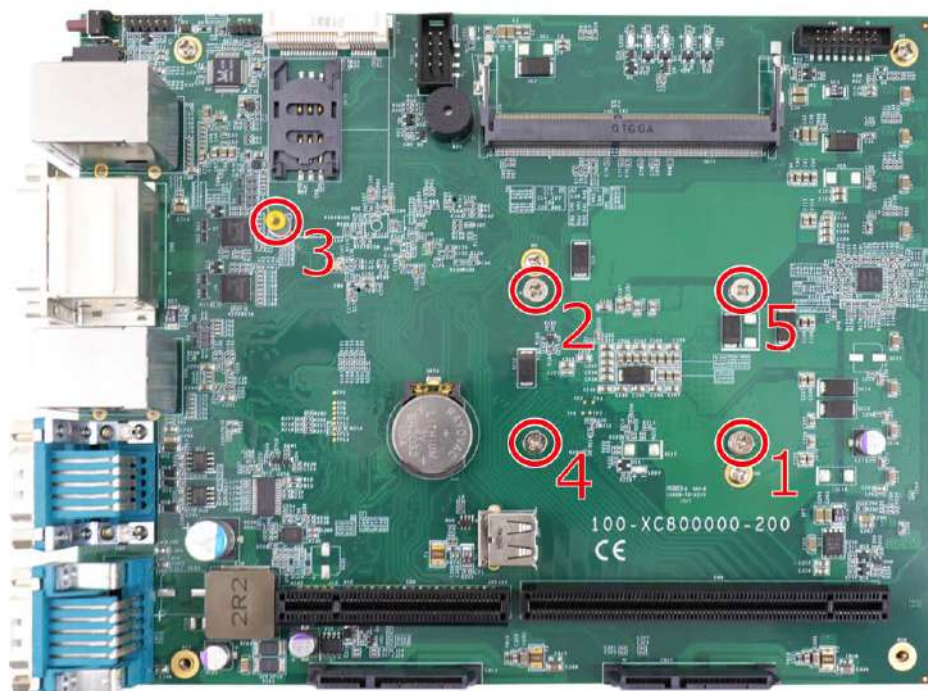
15. To install other components, please refer to respective sections.

3.2.2 DDR4 SO-DIMM Installation

There is a SO-DIMM memory slot (indicated in **blue**) on the motherboard that supports a total maximum of 32GBnon-ECC DDR4-2666. Please follow the procedures below to replace or install the memory modules.

1. Please refer to the section "Disassembling the System".
2. Locate the SODIMM memory module slots on the motherboard.
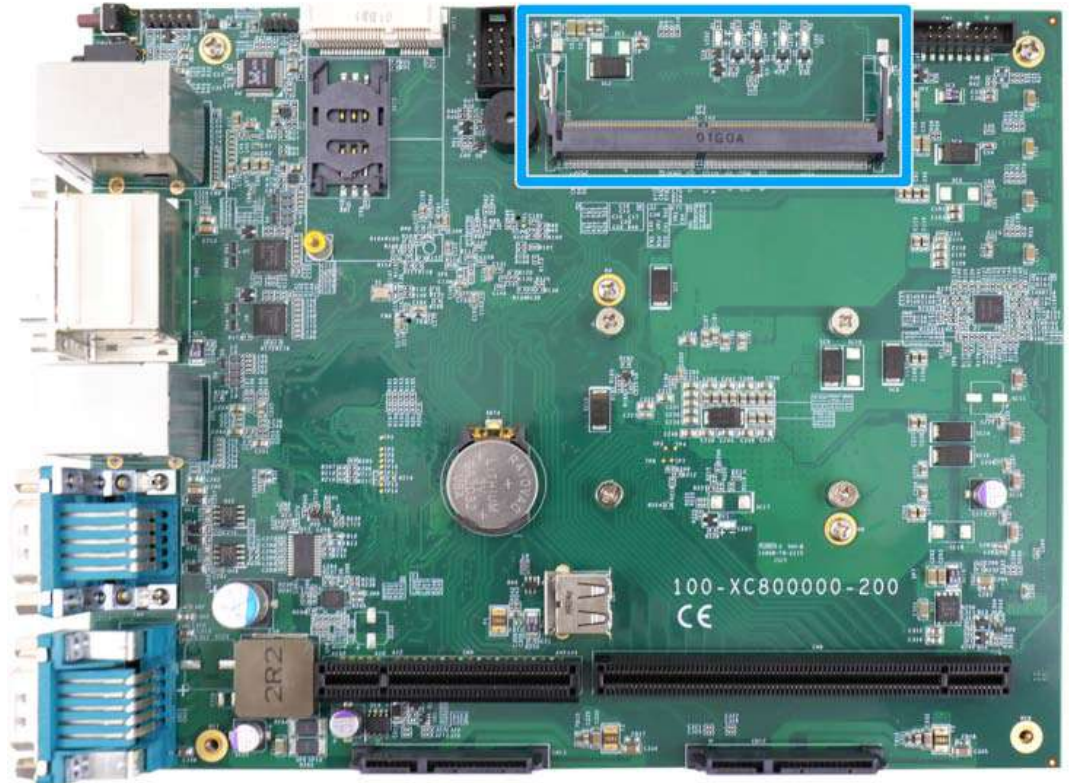
3. To install the memory module, insert gold fingers into the slot at 45-degree angle, push down on the memory module to clip the module into position.

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

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

6. Reinstall the system enclosure and panel when done.

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

3.2.3 mSATA, Mini-SIM (2FF) Card and Antenna Installation

The system has an mSATA slot (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 mSATA and SIM card slots on the motherboard.
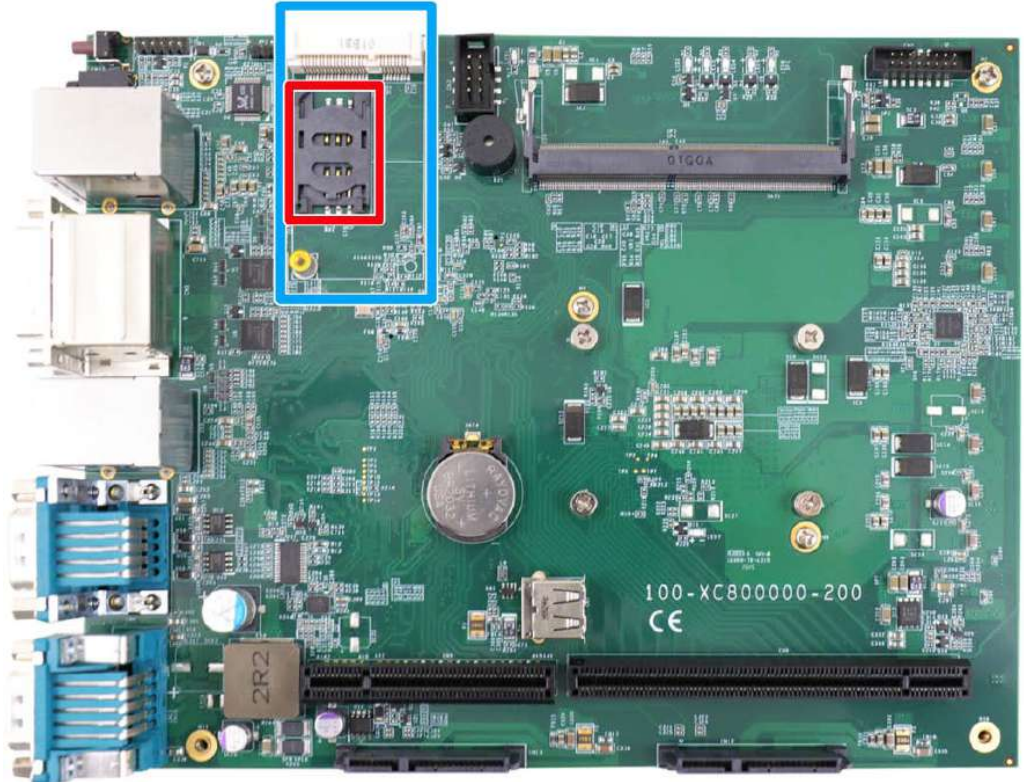
3. Before installing the mSATA module, you need to insert the Mini-SIM card. Slide the SIM slot holder and lift the SIM card holder. Insert the Mini-SIM card (pins facing up), shut the SIM holder and slide it to lock the SIM card in-place.

Insert SIM with pins facing upward   Close and slide the holder to secure SIM

4.   Insert the mPCIe module on a 45 degree angle into the mPCIe slot and secure the module with an M3 P-head screw.

5.   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.
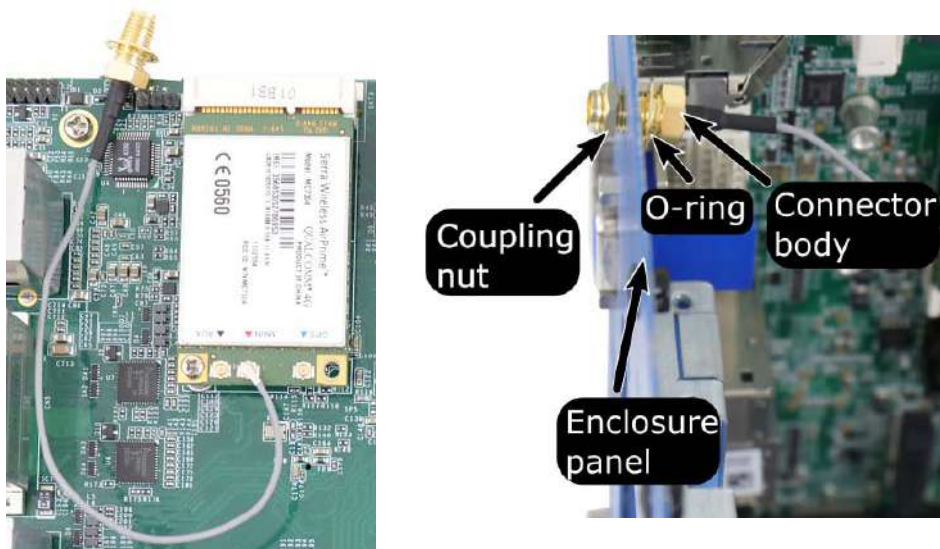
Clip on IPEX-to-SMA cable   **Secure antenna to rear panel**

6.   Secure the external antenna to complete the installation.

7.   Reinstall the system enclosure and panel when done.

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

3.2.4 HDD/ SSD Installation

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

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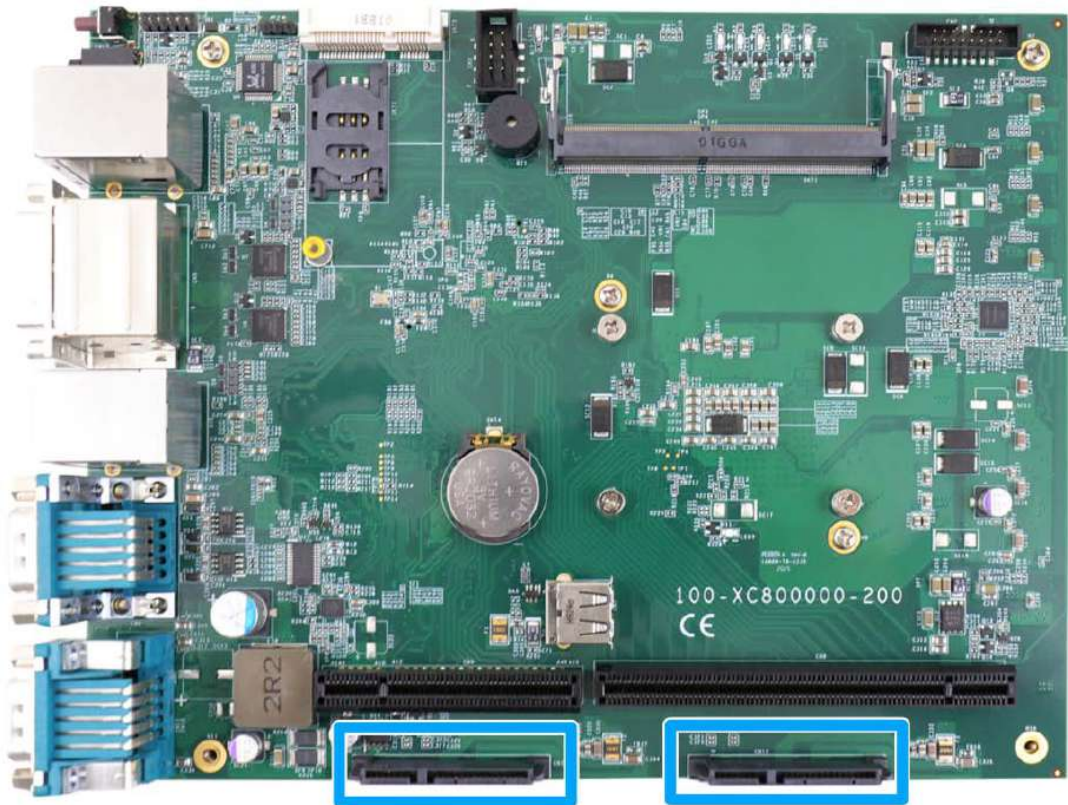
1.   Please refer to the section "Disassembling the System".

2. The HDD/ SSD tray is situated at the bottom, just underneath the daughterboard. To retrieve the tray, remove the screws indicated and gently pull out the tray.

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.
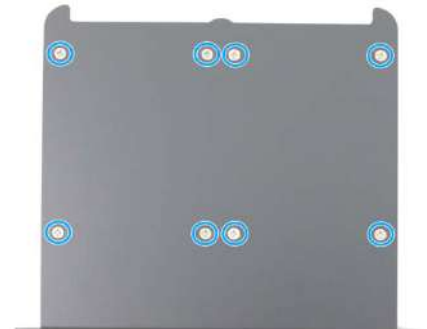
SATA connectors facing inwards   Secure HDD/ SSD with flathead screws
                                         from underneath

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. <u>Reinstall the system enclosure</u> and panel when done.

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

3.2.5 Graphics Card Installation

⚠️ **WARNING**

*To reduce the risk of damage, **DO NOT** remove the graphics card from the antistatic bag before it is ready to be installed into the Cassette module!*

📝 **NOTE**

For installation compatibility, please consult with Neousys before purchasing a graphics card.

The system supports an NVIDIA graphics card up to 200W TDP. To install a graphics card, please refer to the following installation procedure.

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

2. Remove the last two PCIe panel cover.

3. Gently lower the graphics card into the slot, making sure the gold finger is properly inserted into the PCIe slot, I/O panel is properly inserted, and secure with a screw.
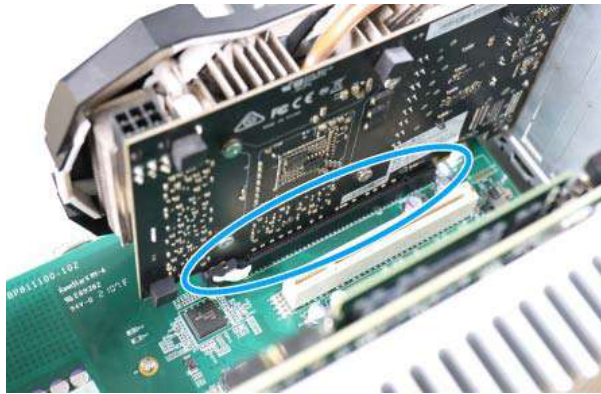
Gold finger properly inserted into PCIe slot   **I/O panel properly inserted**
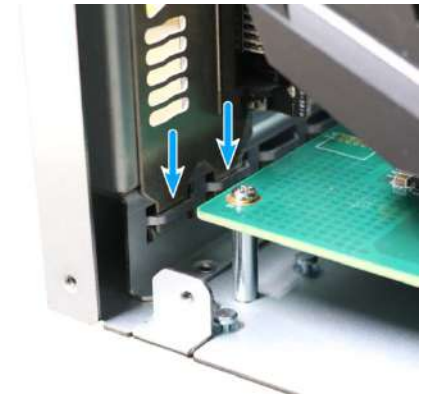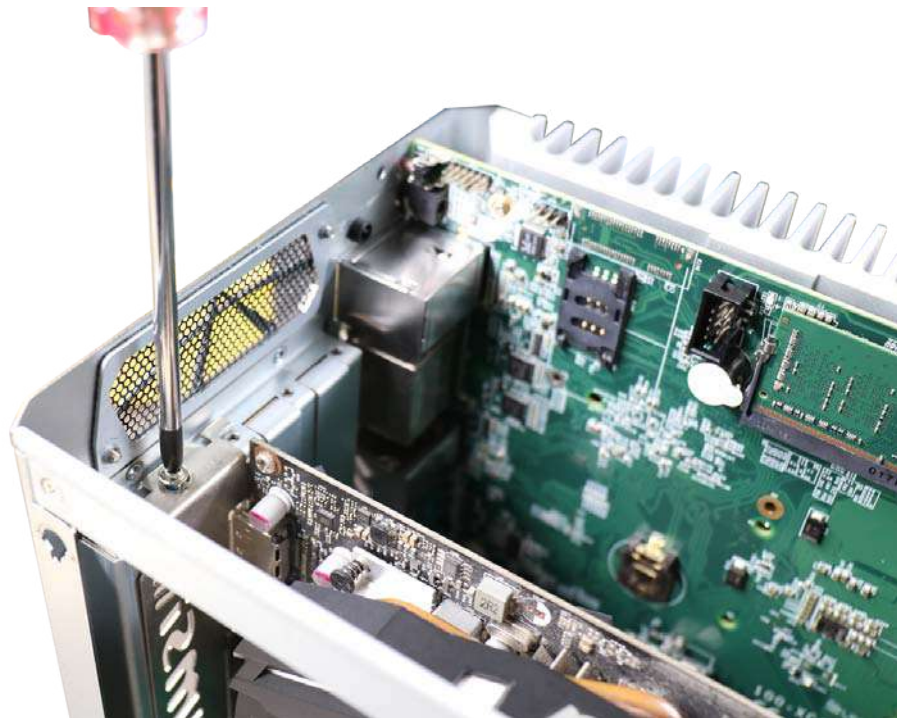
Secure the graphics card with a screw

4. Depending on your graphics card power demands, connect the corresponding 6-pin and/or 8-pin power cable onto the daughter board, and onto the graphics card.
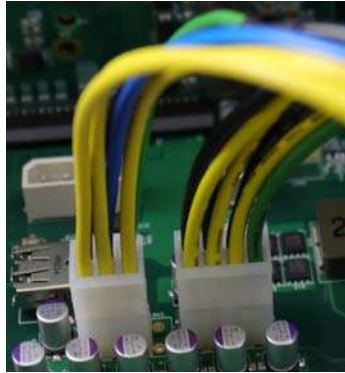
Plug cable onto daughter board   Plug cable onto graphics card

5. Reinstall the system enclosure and panel when done.

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

3.3   Installing the System Enclosure

1.   With the motherboard installed onto the heatsink, gently lower then into the enclosure and secure the screws indicated.
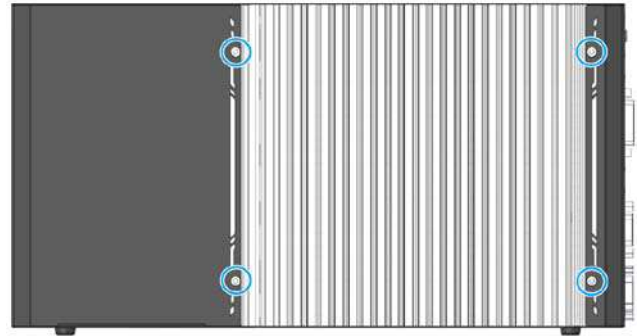
Gently lower the motherboard and heatsink back into the enclosure

Secure the screws indicated

2.   To reinstall the system enclosure, take the L-shaped panel, make sure the two notches inside the panel have been properly inserted into the slide-and-lock hinges on enclosure frames.

Make sure notches meet when placing L-shaped panel back into position

Make sure the notch is properly inserted into the slide-and-lock holes

3. Secure the screws (indicated in **blue**) on the I/O panel.
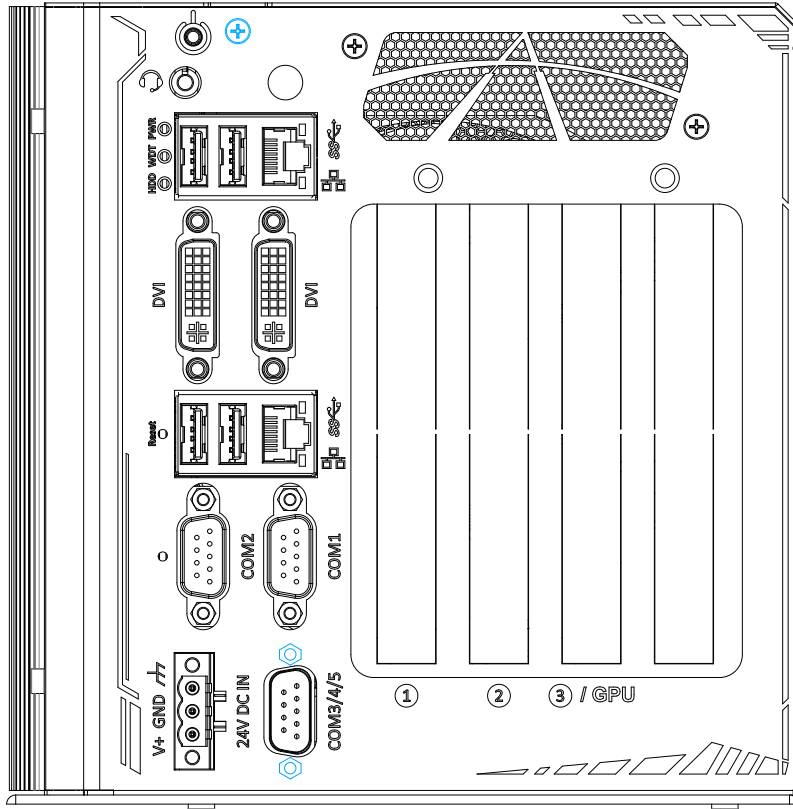
4. Secure the screws indicated on the side panel.
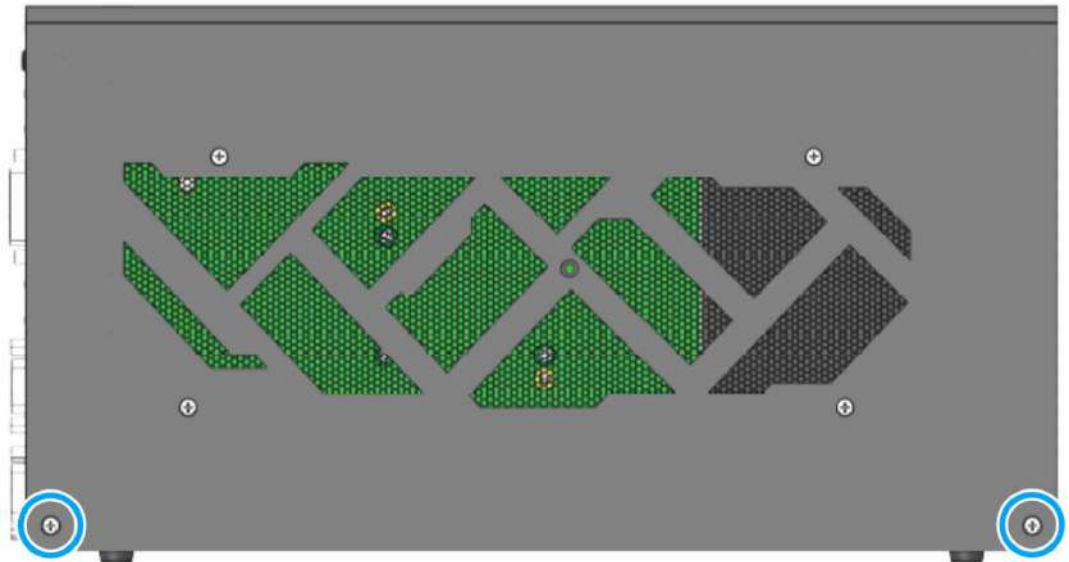
5. Secure the screw indicated at the rear to complete the enclosure installation.
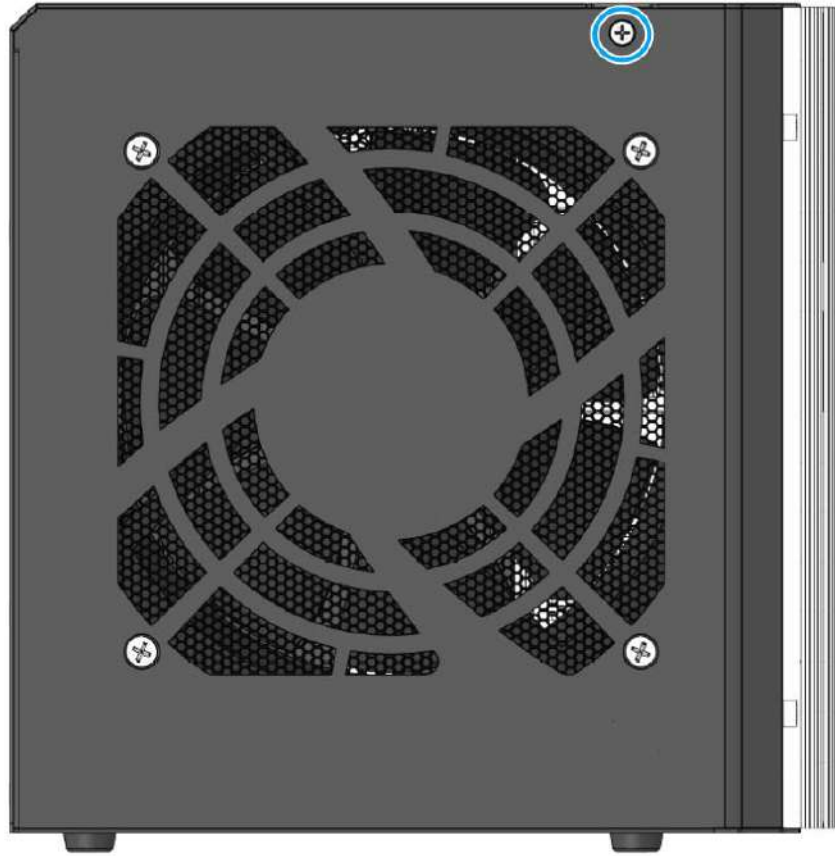
3.4   Wall-mount Bracket Installation

To install the wall-mount bracket, please refer to the exploded illustration below on installing the wall-mount bracket. 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**).

2-Wall Mount Bracket

4-M4 Screw
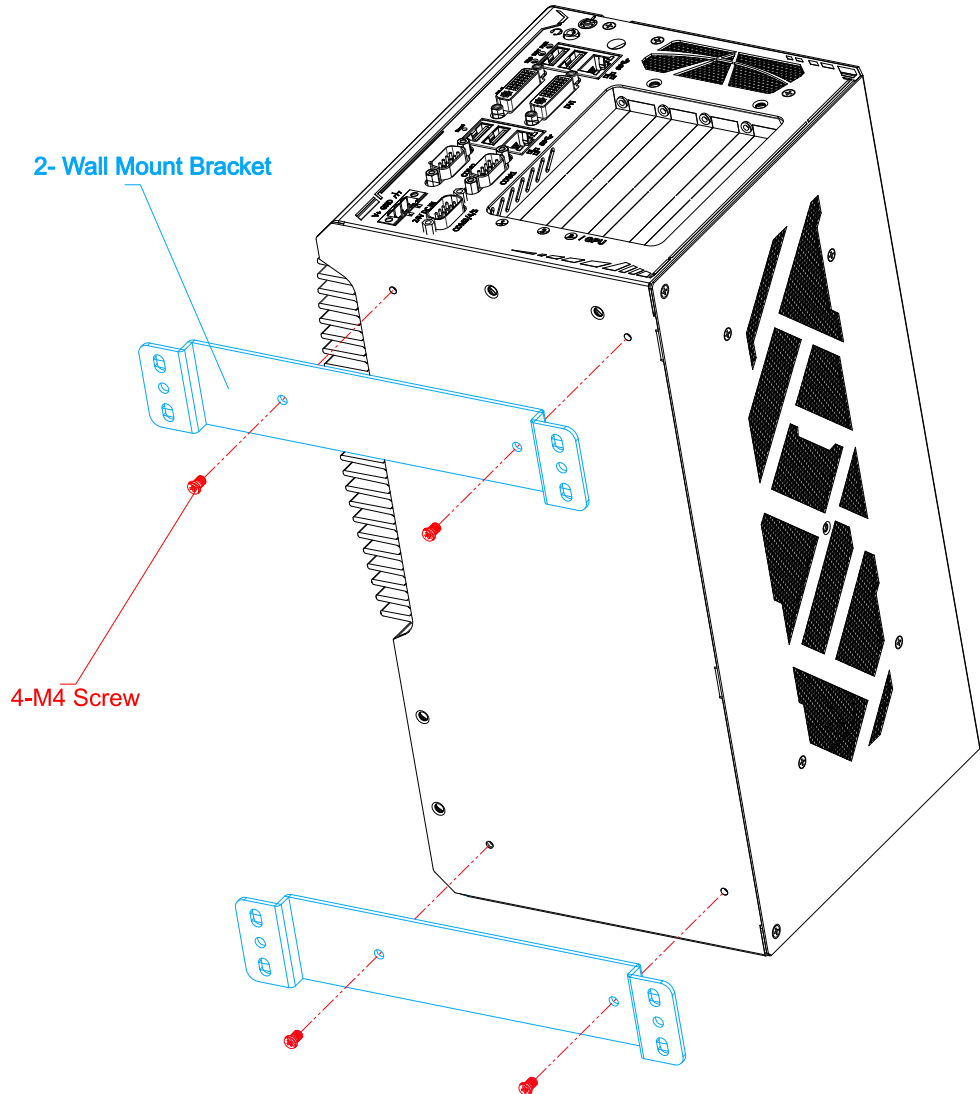
2.   Place the system on a flat surface and secure it with screws.

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.
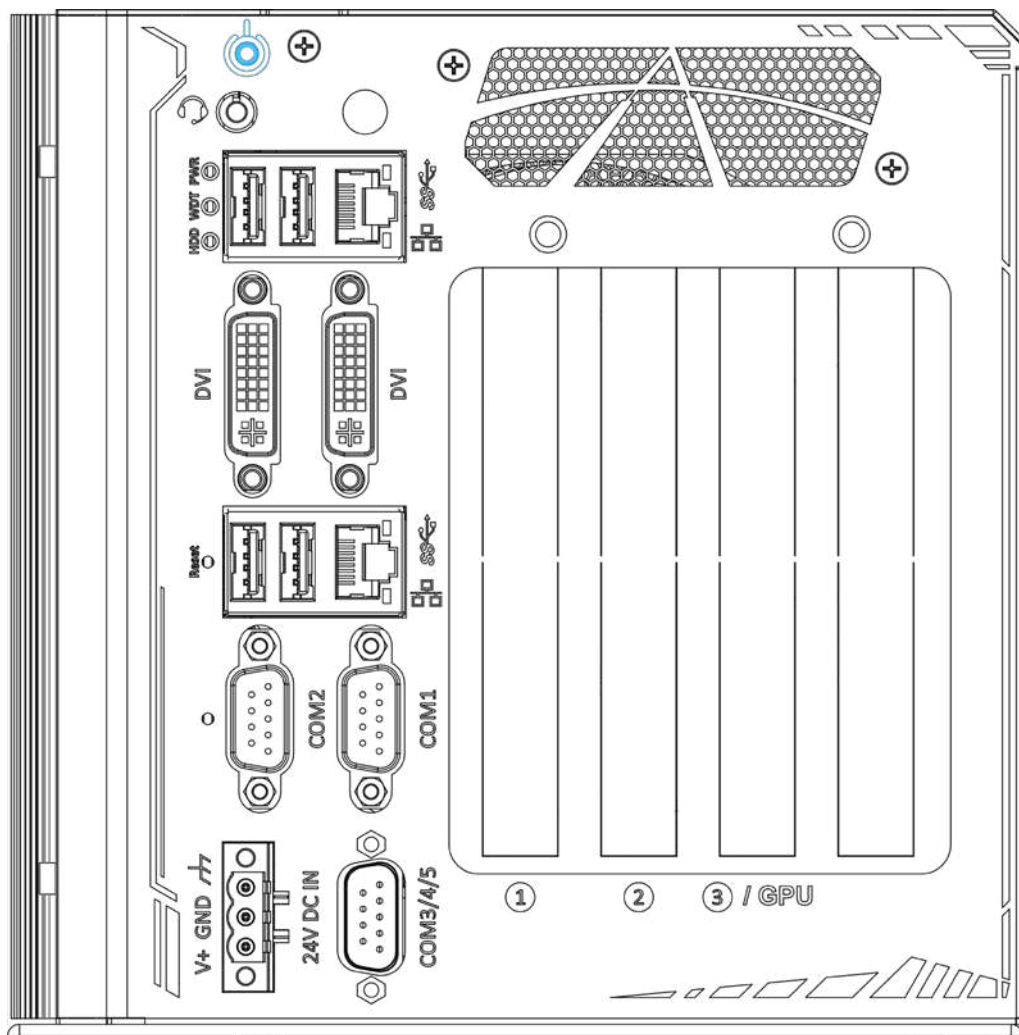
3.5.2 Powering On Using Wake-on-LAN

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.
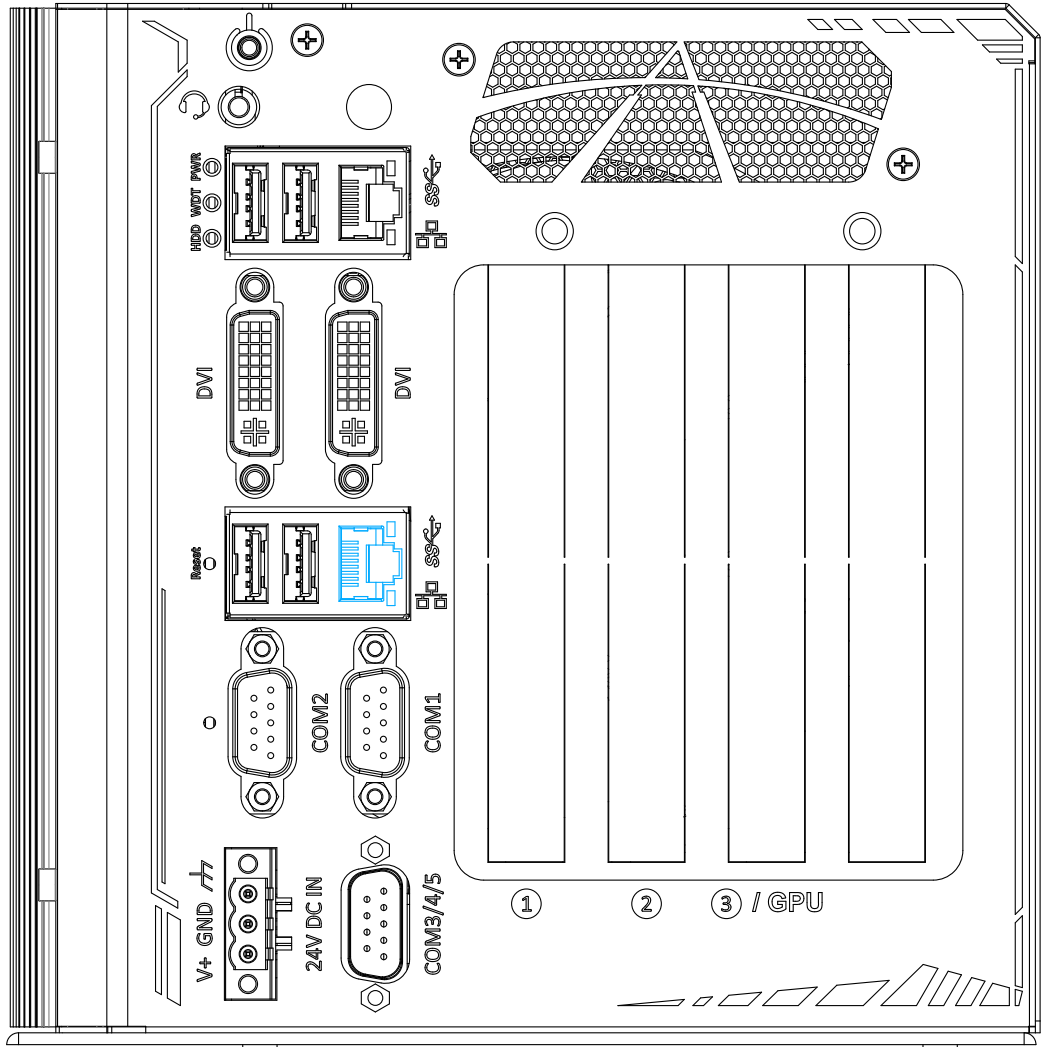
NOTE

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.
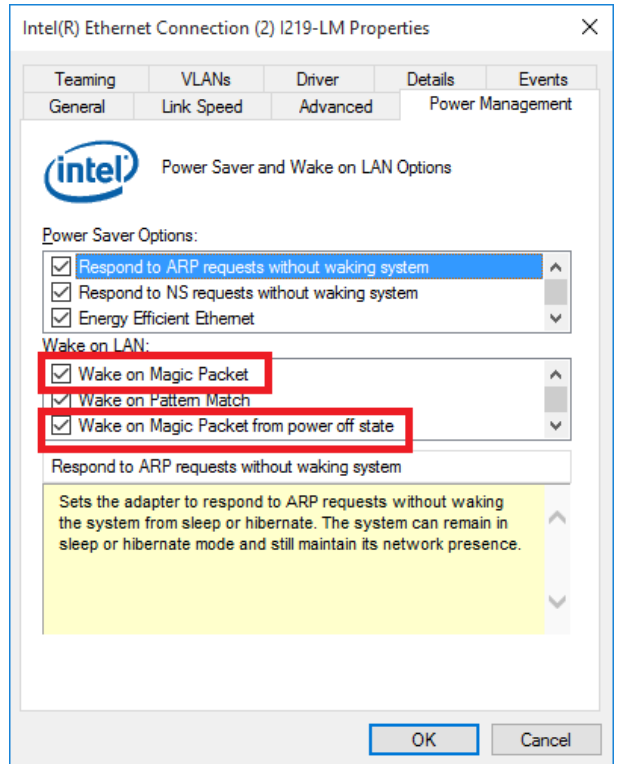
Magic Packet

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

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

78 D0 04 0A 0B 0C 78 D0 04 0A 0B 0C
78 D0 04 0A 0B 0C 78 D0 04 0A 0B 0C
78 D0 04 0A 0B 0C 78 D0 04 0A 0B 0C
78 D0 04 0A 0B 0C 78 D0 04 0A 0B 0C
78 D0 04 0A 0B 0C 78 D0 04 0A 0B 0C
78 D0 04 0A 0B 0C 78 D0 04 0A 0B 0C
78 D0 04 0A 0B 0C 78 D0 04 0A 0B 0C
78 D0 04 0A 0B 0C 78 D0 04 0A 0B 0C
MISC   CRC
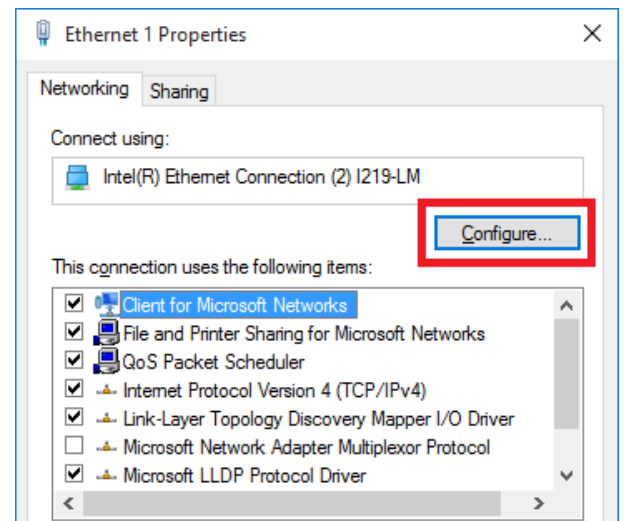
There are some free tools available on Internet that can be used to send a magic packet. Please refer to the following link to understand more about Magic Packet.

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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 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.
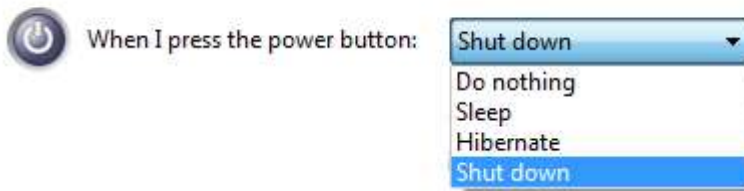
4 System Configuration

4.1 BIOS Settings

The system is shipped with factory-default BIOS settings meticulously programmed for optimum performance and compatibility. In this section, we'll illustrate some of BIOS settings you may need to modify. Please always make sure you understand the effect of change before you proceed with any modification. If you are unsure of the function you are changing, it is recommended to change one setting at a time to see its effect(s).
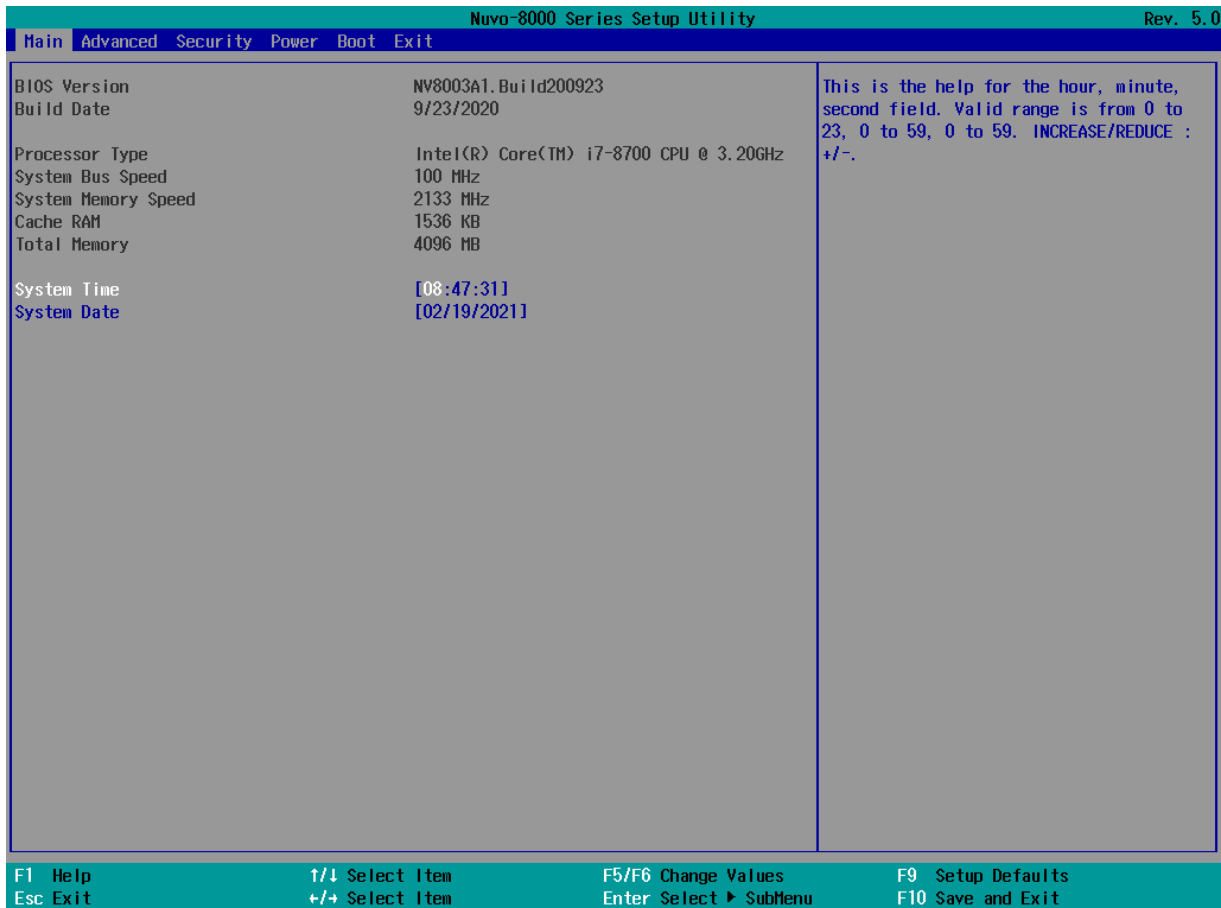
> ✎ NOTE
>
> *Not all BIOS settings will be discussed in this section. If a particular setting/ function you are after requires specific BIOS settings but is not discussed in this section, please contact Neousys Technical Support staff.*

4.1.1 COM Port Configuration

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

```
                       Nuvo-8000 Series Setup Utility                          Rev. 5.0
  Advanced

Peripheral Configuration                              Set COM1 as RS-232 (Full-Duplex), RS422
                                                      (Full-Duplex) or RS-485 (Half-Duplex).
COM1                            <Enabled>
  HS Mode                       <Disabled>
  Set COM1 as                   <RS-232>
  Slew Rate                     <Low>
  RS-422/485 Termination        <Disabled>

COM2                            <Enabled>
  HS Mode                       <Disabled>
  Set COM2 as                   <RS-422>
  Slew Rate                     <Low>
  DCE Setting                   <Disabled>
                                            ┌─────────────────┐
COM3                            <Enabled>   │   Set COM1 as   │
  HS Mode                       <Disabled>  │                 │
                                            │ RS-232          │
COM4                            <Enabled>   │ RS-422          │
  HS Mode                       <Disabled>  │ RS-485          │
                                            └─────────────────┘
COM5                            <Enabled>
  HS Mode                       <Disabled>

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 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-8000 Series Setup Utility                        Rev. 5.0
    Advanced

Peripheral Configuration                                   Enable/Disable COM1.

COM1                            <Enabled>
  HS Mode                       <Disabled>
  Set COM1 as                   <RS-232>
  Slew Rate                     <Low>
  RS-422/485 Termination        <Disabled>

COM2                            <Enabled>
  HS Mode                       <Disabled>
  Set COM2 as                   <RS-422>
  Slew Rate                     <Low>
  DCE Setting                   <Disabled>

COM3                            <Enabled>
  HS Mode                       <Disabled>      ┌─────────┐
                                                │  COM1   │
COM4                            <Enabled>       ├─────────┤
  HS Mode                       <Disabled>      │Disabled │
                                                │Enabled  │
COM5                            <Enabled>       └─────────┘
  HS Mode                       <Disabled>

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-8000 Series Setup Utility                    Rev. 5.0
      Advanced

 PEG Port Configuration                                  Delay in milli-seconds for PEG port
                                                         initialization and PCI enumeration.
 x16 PEG Port                       Not Present          Increasing this value may help to
   Enable Root Port                 <Enabled>            eliminate compatibility issue with some
   Max Link Speed                   <Auto>               PCIe add-on cards.


 Delay for PEG Init                 [100]










                                        ┌──────────┐
                                        │          │
                                        │          │
                                        │[Yes] [No]│
                                        └──────────┘











 F1  Help                   ↑/↓ 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]**>**[PEG Port Configuration]**>**[Delay for PEG Init]** and press ENTER.

3. A small window appears and you may enter a maximum delay value of up to 30,000ms.

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

4.1.4 SATA and mSATA Configuration

The SATA and mSATA port of your system can be Enabled or Disabled through the BIOS.

```
                            Nuvo-8000 Series Setup Utility                        Rev. 5.0
   Advanced

 SATA And RST Configuration                                  Enable/Disable SATA Device.

 SATA Controller(s)              <Enabled>
 SATA Mode Selection             <AHCI>

 SATA Port #1                    Empty
   Port Enable/Disable           <Enabled>
   SATA Device Type              <Hard Disk Drive>

 SATA Port #2                    Empty
   Port Enable/Disable           <Enabled>
   SATA Device Type              <Hard Disk Drive>

 mSATA                           Empty
   Port Enable/Disable           <Enabled>
   SATA Device Type              <Solid Stat┌SATA Controller(s)─┐
                                            │                   │
                                            │Enabled            │
                                            │Disabled           │
                                            └───────────────────┘




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

To enable or disable the SATA controller:

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

2. Go to **[Advanced]** > **[SATA Configuration]**.

3. Highlight the SATA Controller(s) or mSATA, press ENTER to bring up Enabled/ Disabled setting options. Scroll to and highlight the setting you wish to set and press ENTER.

4. Press F10 to "Exit Saving Changes".

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4.1.5 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-8000 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
  ▶PCI Express Configuration
  ▶SATA And RST Configuration
  ▶USB Configuration
  ▶ME 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]**
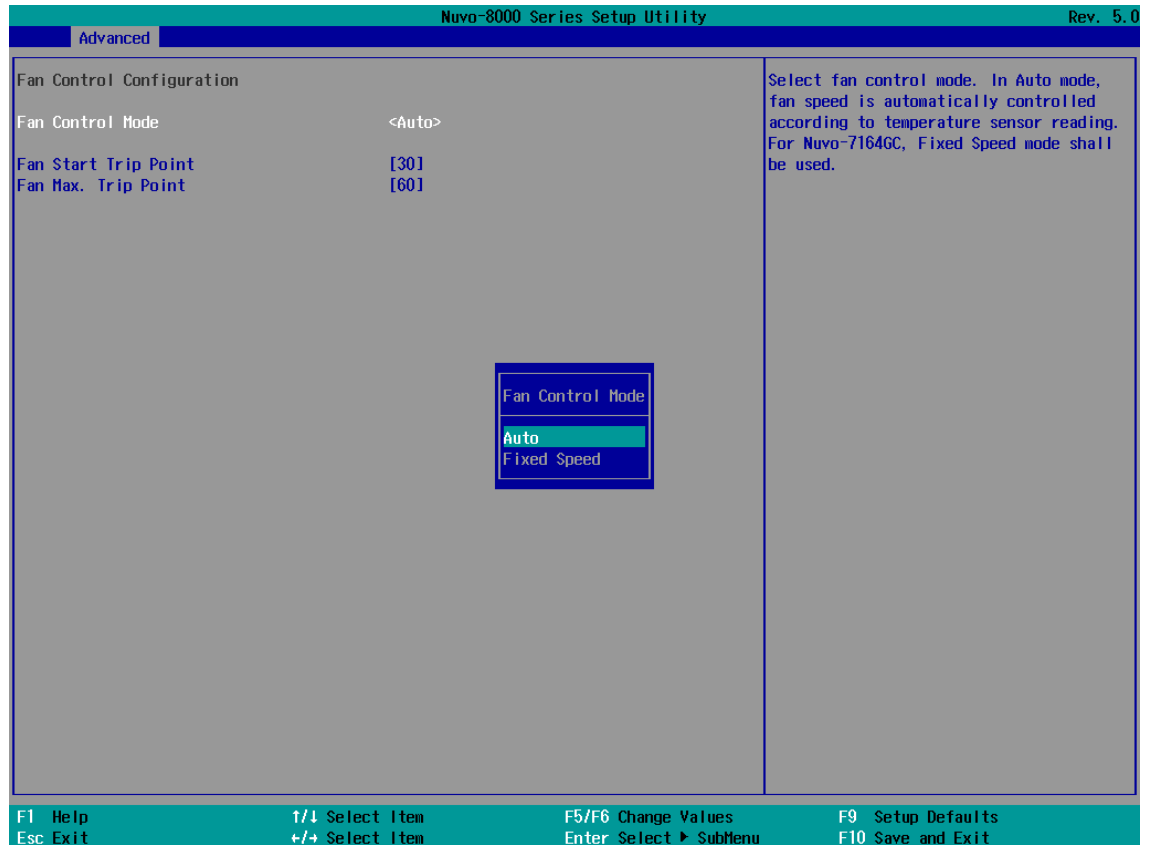
4. Use the up/ down arrow keys to highlight Fan Start Trip Point or Fan Max. Trip Point and press ENTER, a window appears and you may enter the temperature in degree Celsius.

   ● **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].**

```
                          Nuvo-8000 Series Setup Utility                          Rev. 5.0
      Advanced

 Fan Control Configuration                                    Select fan control mode.  In Auto mode,
                                                              fan speed is automatically controlled
 Fan Control Mode                    <Auto>                   according to temperature sensor reading.
                                                              For Nuvo-7164GC, Fixed Speed mode shall
 Fan Start Trip Point                [30]                     be used.
 Fan Max. Trip Point                 [60]




                                        Fan Control Mode

                                        Auto
                                        Fixed Speed












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

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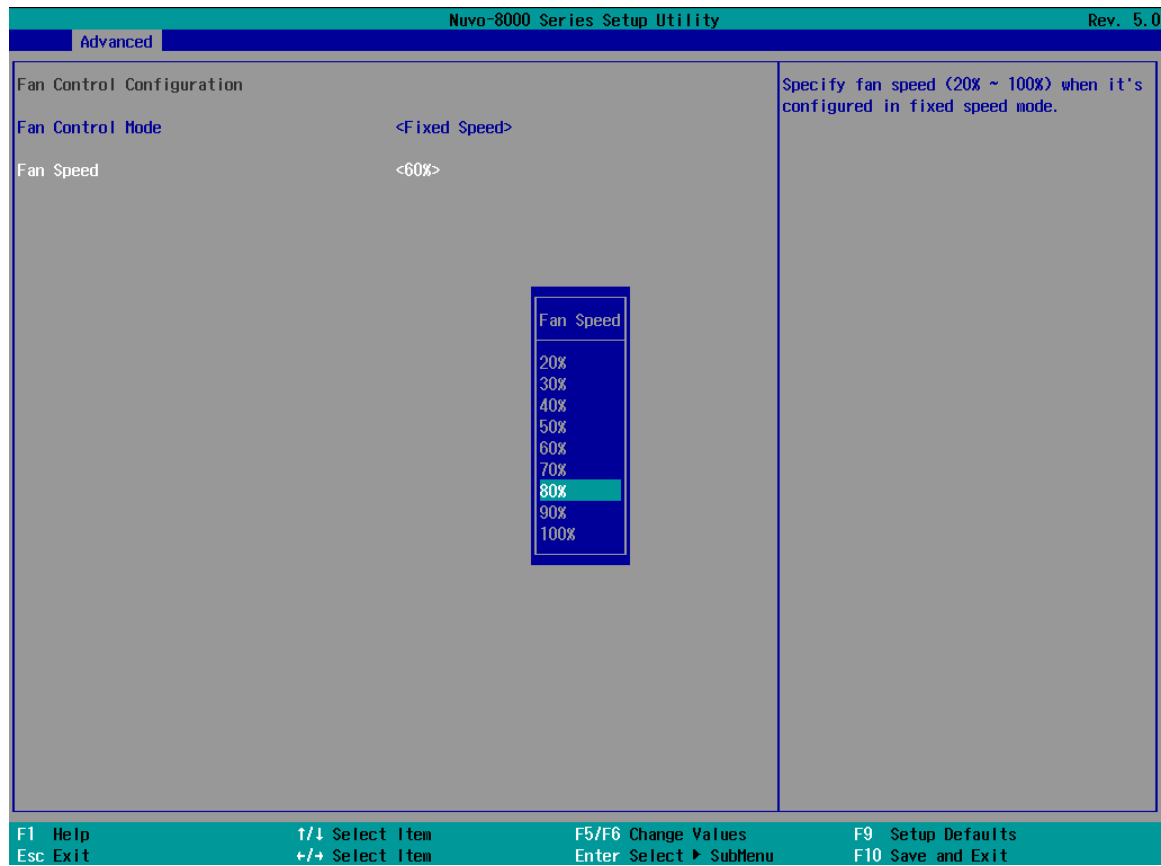
6.   When done, press F10 to "Exit Saving Changes".

4.1.6 Power On After Power Failure Option

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

```
                        Nuvo-8000 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>

 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".

4.1.7 Power & Performance (CPU SKU Power Configuration)

The system supports Intel 9th-Gen Coffee Lake LGA1151 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.

```
                          Nuvo-8000 Series Setup Utility                        Rev. 5.0
              Power

Power & Performance                                       Configure SKU power limit according to
                                                          performance consideration and operating
Processor Type              Intel(R) Core(TM) i7-8700 CPU @ 3.20GHz   environment.
Package TDP Limit           65 W

SKU Power Config            <Max. TDP>

▶CPU - Power & Performance Control
▶GT - Power & Performance Control

                            ┌─────────────────────┐
                            │ SKU Power Config    │
                            │                     │
                            │ Max. TDP            │
                            │ 45 W                │
                            │ 35 W                │
                            │ 25 W                │
                            │ 15 W                │
                            └─────────────────────┘




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

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".

4.1.8 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.
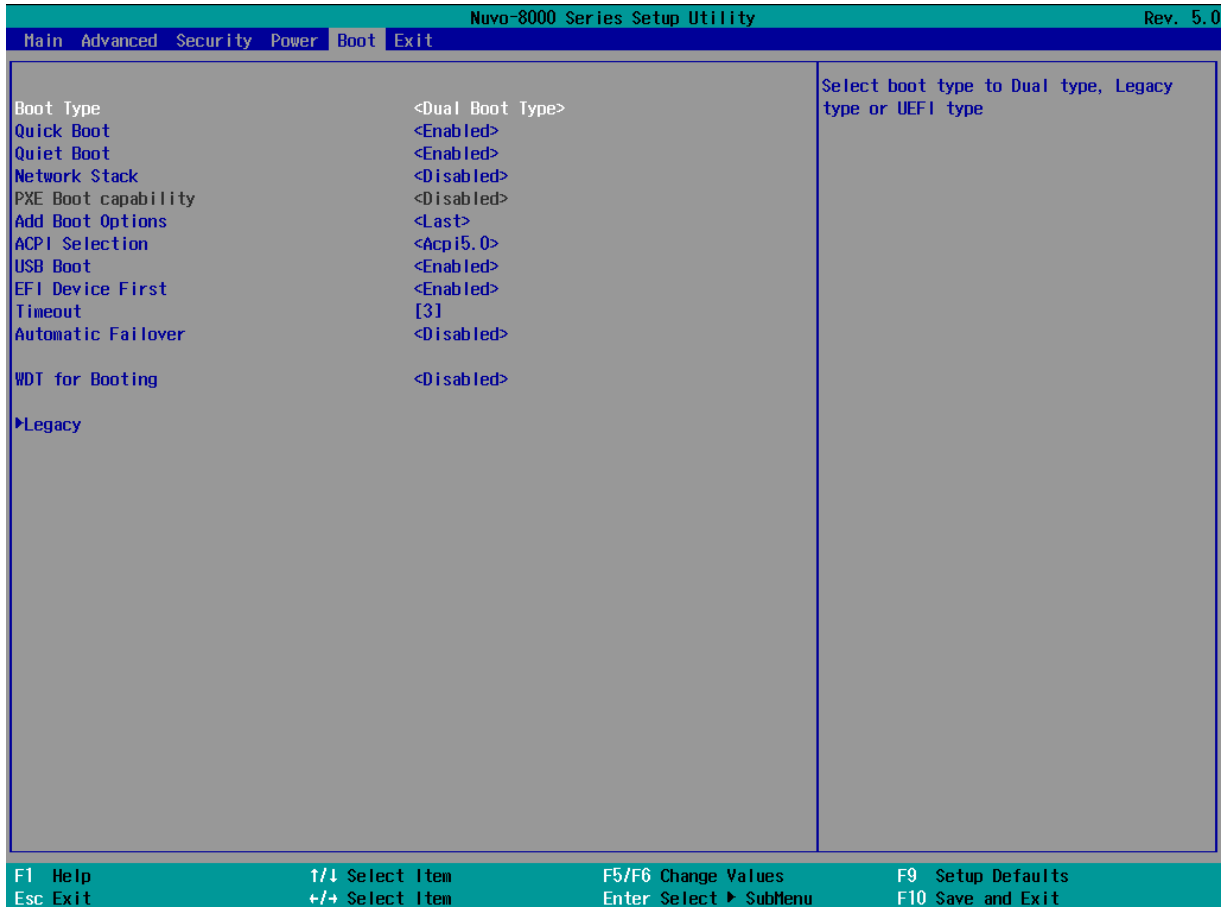

To enable/disable "Wake on LAN" option:

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.

4.1.9　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-8000 Series Setup Utility                       Rev. 5.0
  Main  Advanced  Security  Power  Boot  Exit

                                                         Select boot type to Dual type, Legacy
  Boot Type                       <Dual Boot Type>       type or UEFI type
  Quick Boot                      <Enabled>
  Quiet Boot                      <Enabled>
  Network Stack                   <Disabled>
  PXE Boot capability             <Disabled>
  Add Boot Options                <Last>
  ACPI Selection                  <Acpi5.0>
  USB Boot                        <Enabled>
  EFI Device First                <Enabled>
  Timeout                         [3]
  Automatic Failover              <Disabled>

  WDT for Booting                 <Disabled>

  ▶Legacy




  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
Boot Type	Dual Boot Type	Both legacy and EFI boot media listed are approved as boot media.
	Legacy Boot Type	Only legacy boot media listed are approved as boot media.
	UEFI Boot Type	Only legacy boot media listed are approved as boot media.
Quick Boot	Enabled	The system starts up faster because BIOS skips various hardware function tests
	Disabled	The system starts up slower because BIOS goes through various hardware functions tests
Network Stack	Enabled	The system is available for network access using UEFI.
	Disabled	The system is not available for network access

		using UEFI.
PXE Boot capability	Disabled	Only UEFI Network Stack is supported: PrebooteXecution 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

4.1.10 Boot Type (Legacy/ UEFI)

The system supports both Legacy and Unified Extensible Firmware Interface (UEFI) boot modes. UEFI is a specification proposed by Intel to define a software interface between operating system and platform firmware. Most modern operating systems, such as Windows 7/8/10 and Linux support both Legacy and UEFI boot modes. The Legacy boot mode uses MBR partition for disk and VBIOS for video initialization, the UEFI boot mode uses GPT partition which supports greater than 2TB partition size and GOP driver for faster video initialization.
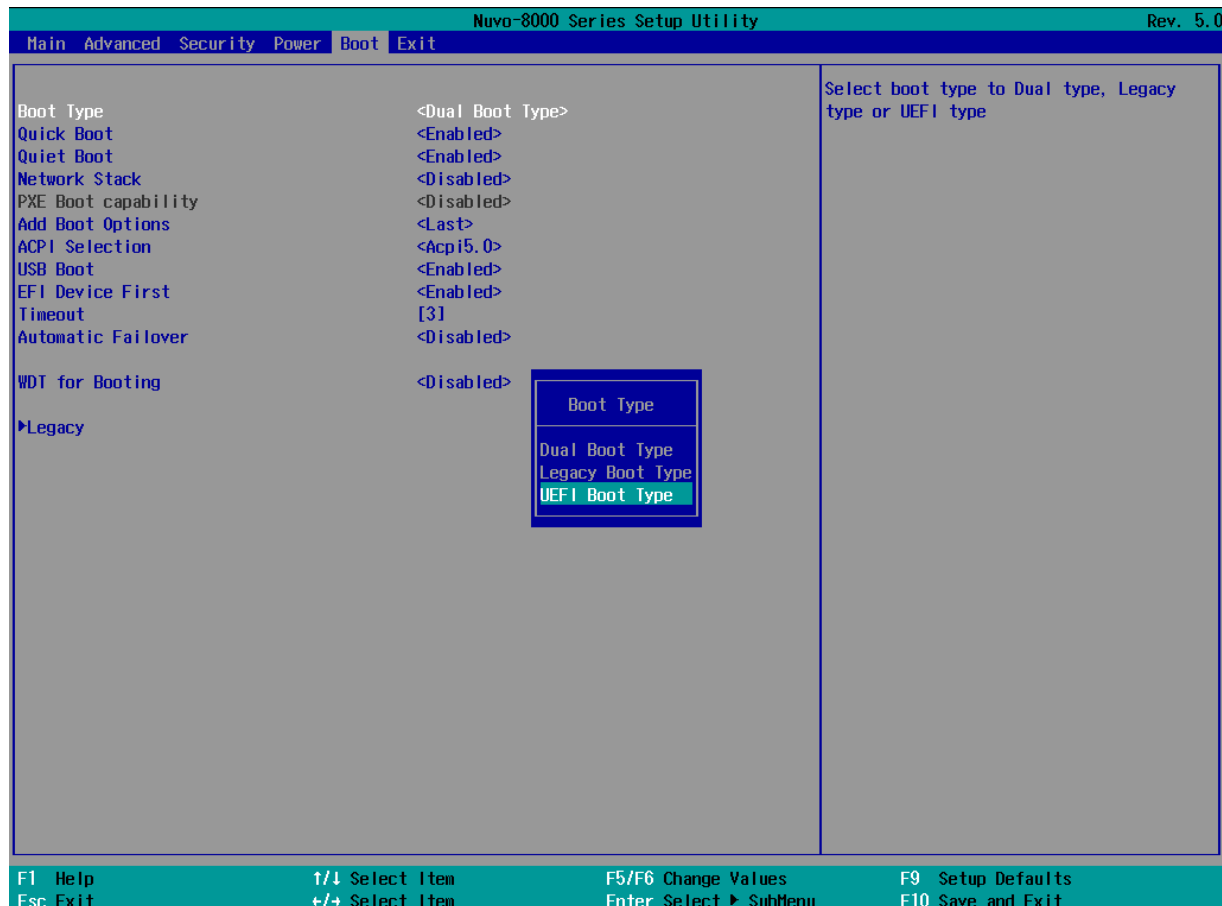
NOTE

If you choose Legacy mode, you will not be able to create disk partitions greater than 2TBor use TPM 2.0 function.

To configure Boot Type:

1. When system boots up, press F2 to enter BIOS setup utility.
2. Go to **[Boot]>[Boot Type]**, press Enter to bring up options, Dual Boot (Legacy+UEFI), Legacy Boot Type, UEFI Boot Type.
3. Highlight your selection and press Enter.
4. Press F10 to "Exit Saving Changes".

4.1.11 Position New Boot Device

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

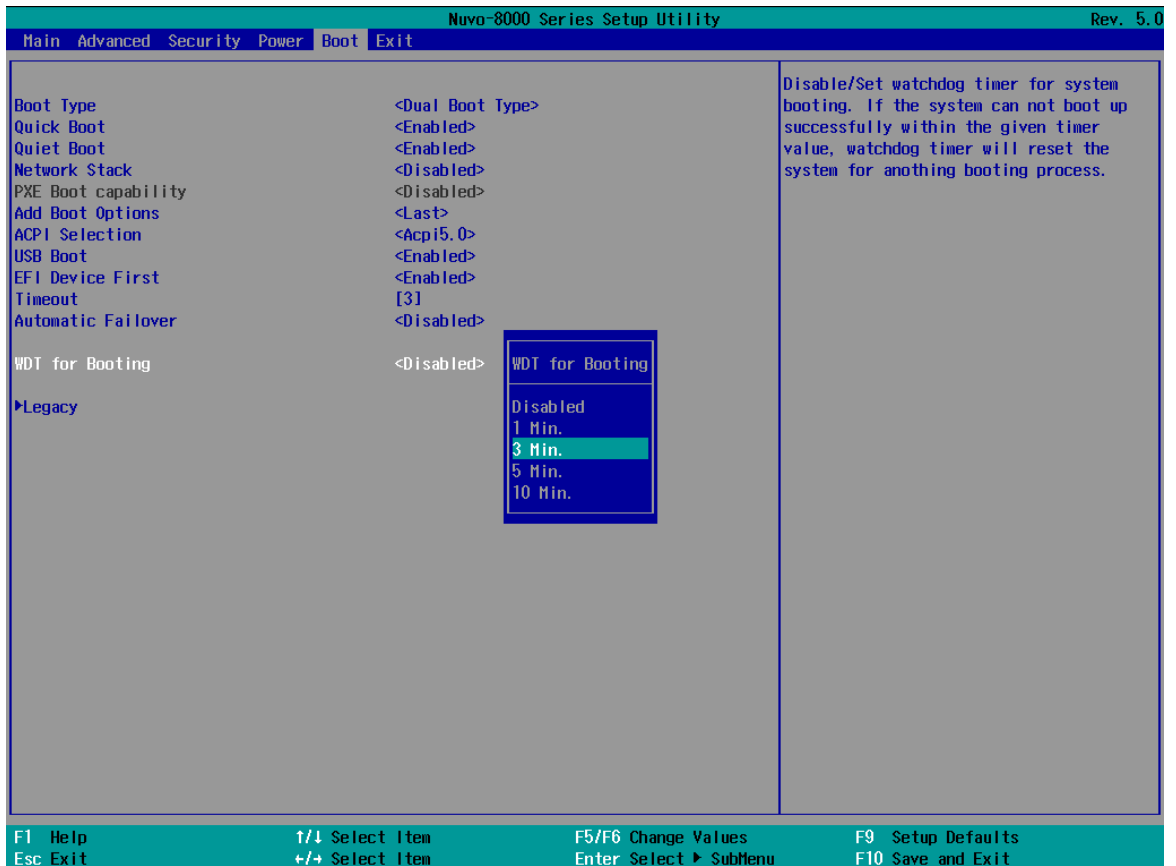To set the newly-installed boot device as the first or last boot device:

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

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

3.   Select **[First]** or **[Last]** for your newly-added boot device and press ENTER.
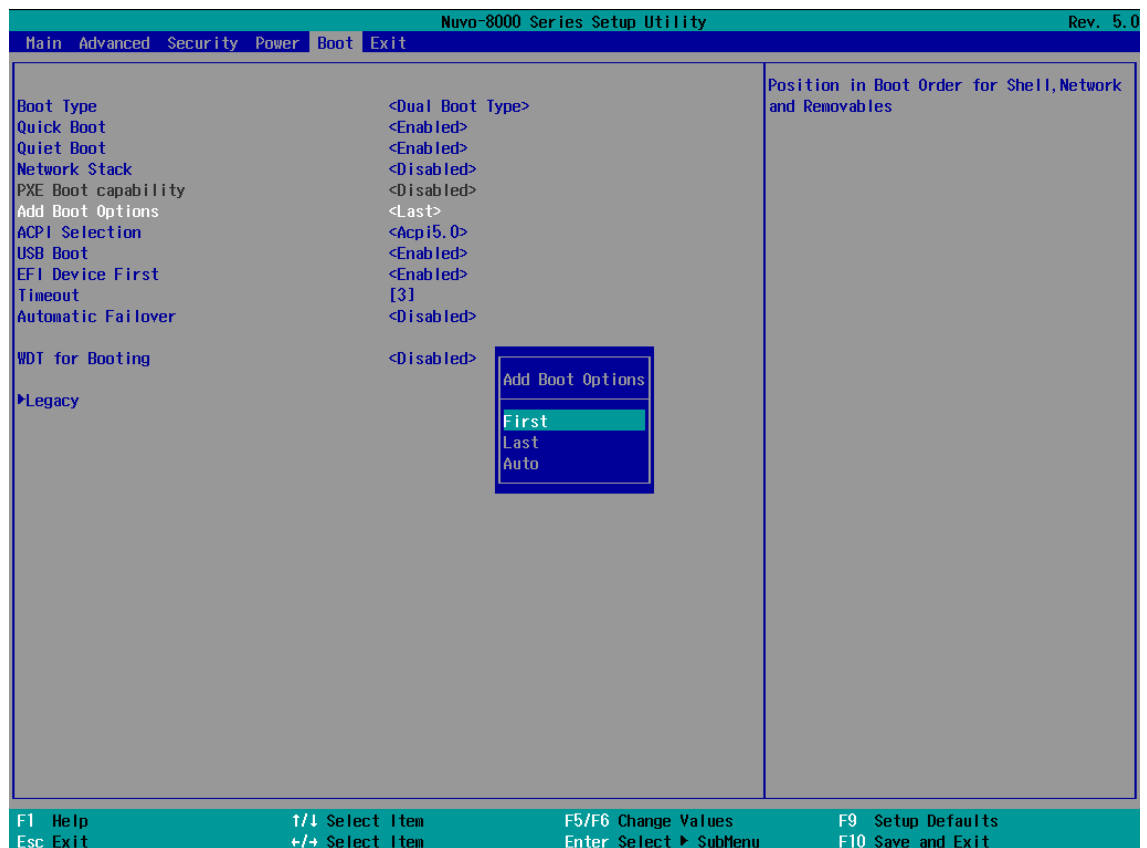
4.   Once set, press **F10** to save setting and exit.

4.1.12 Watchdog Timer for Booting

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

```
                        Nuvo-8000 Series Setup Utility                    Rev. 5.0
  Main  Advanced  Security  Power  Boot  Exit

  Boot Type                  <Dual Boot Type>       Disable/Set watchdog timer for system
  Quick Boot                 <Enabled>              booting. If the system can not boot up
  Quiet Boot                 <Enabled>              successfully within the given timer
  Network Stack              <Disabled>             value, watchdog timer will reset the
  PXE Boot capability        <Disabled>             system for anothing booting process.
  Add Boot Options           <Last>
  ACPI Selection             <Acpi5.0>
  USB Boot                   <Enabled>
  EFI Device First           <Enabled>
  Timeout                    [3]
  Automatic Failover         <Disabled>

  WDT for Booting            <Disabled>   WDT for Booting

  ▶Legacy                                 Disabled
                                          1 Min.
                                          3 Min.
                                          5 Min.
                                          10 Min.



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

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.

4.1.13 Legacy/ UEFI Boot Device

When you wish to set a designated boot device, you may set it as the first device to boot in Legacy or UEFI Boot Device setting. Or if you wish to manually select a boot device, you may do so by pressing F12 when the system boots up.
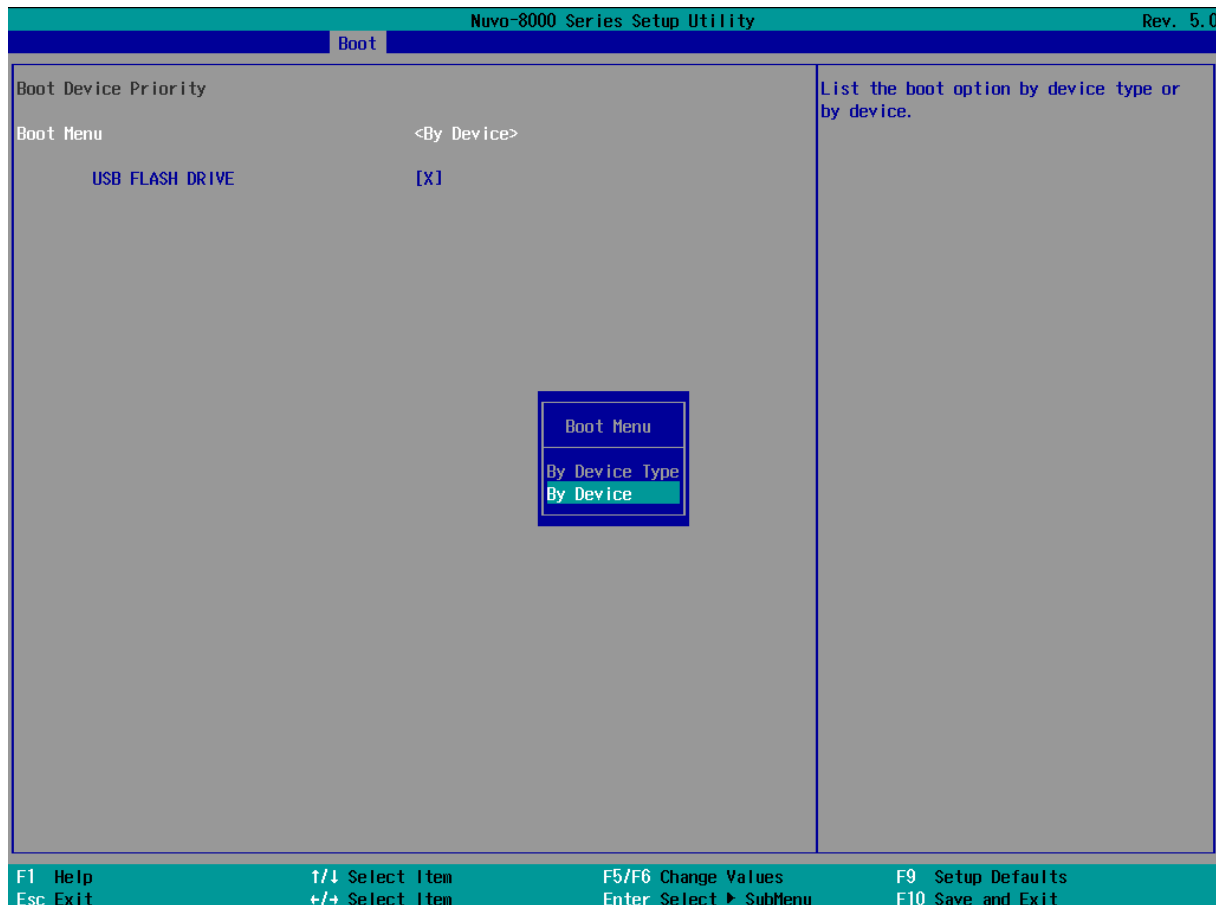
To set boot order for devices in UEFI Boot Device:

1. When system boots up, press F2 to enter BIOS setup utility
2. Go to **[Boot] > [UEFI Boot Device]**
3. Highlight the device you wish to make boot order changes to and press F5/ F6 or +/ - to change device boot order.

To select boot order for devices in Legacy Boot Device:

1. When system boots up, press F2 to enter BIOS setup utility
2. Go to **[Boot] > [Legacy Boot Device]**, you can choose the type of device to list by selecting "By Device or By DeviceType".
3. Highlight the device you wish to make boot order changes to and press F5/ F6 or +/ - to change device boot order.
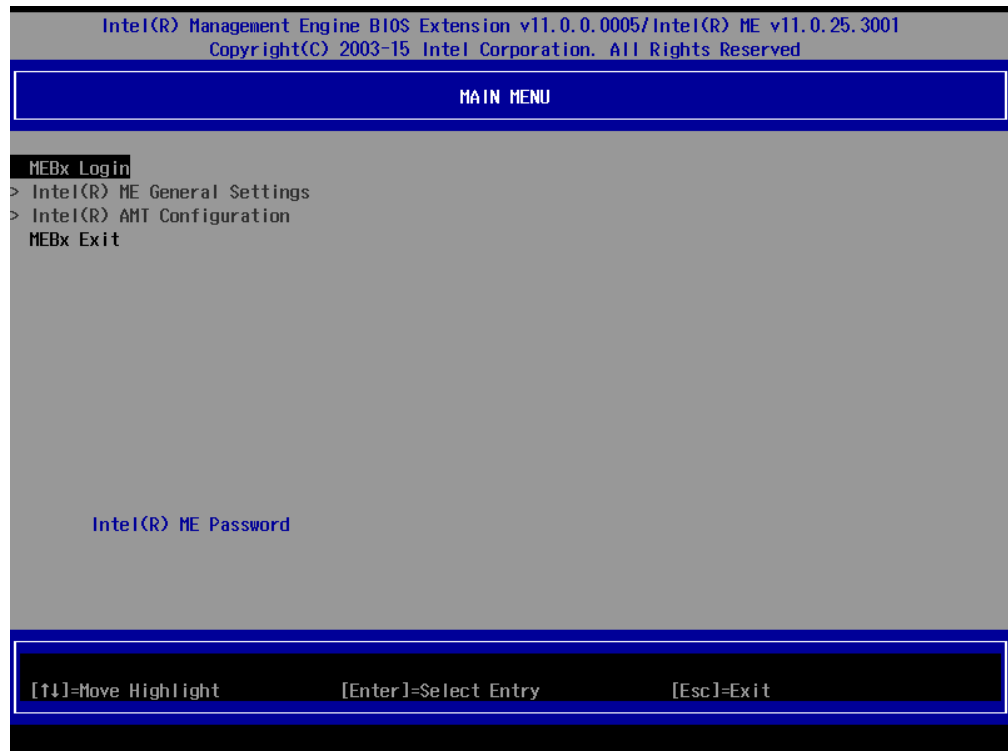
4.2 AMT Configuration

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.
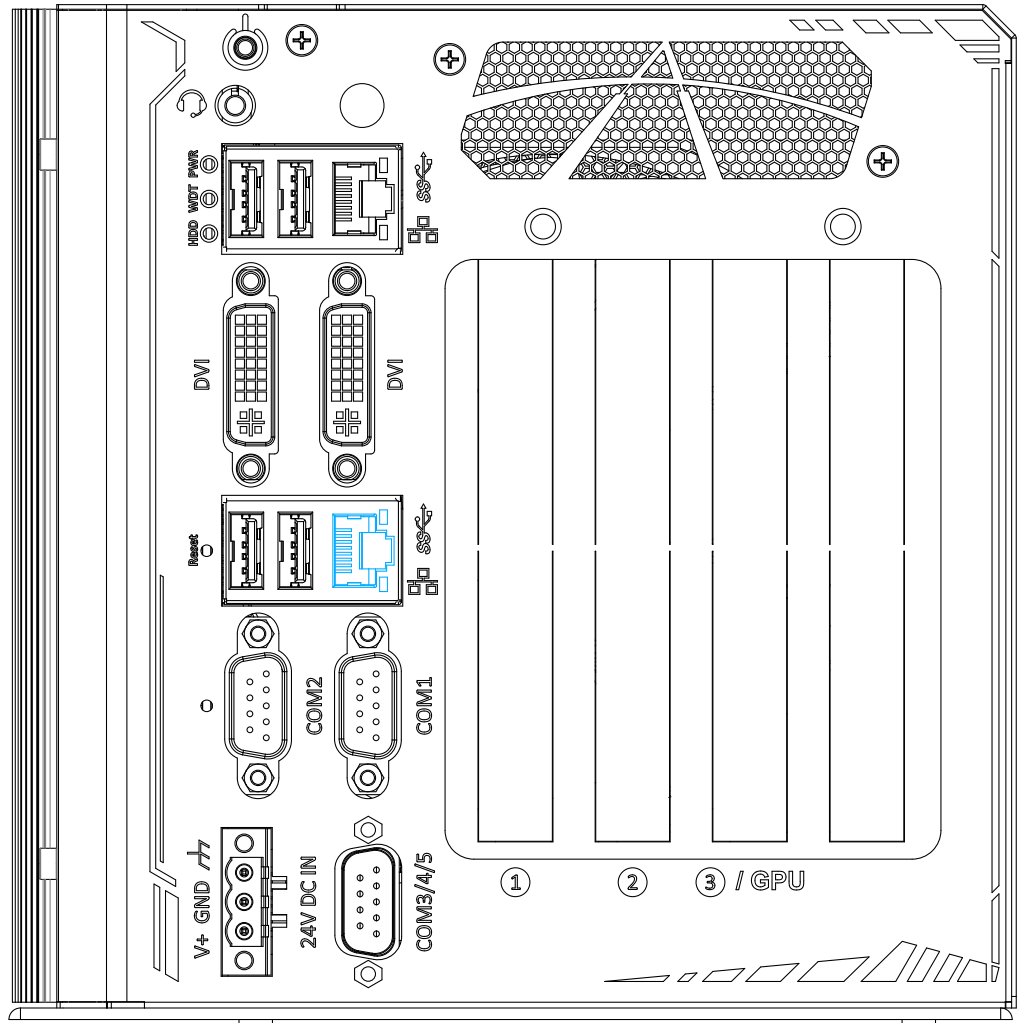
2. When the system boots up, press F10 to enter the MEBx configuration menu.

3. Highlight MEBx Login and press Enter, a prompt will appear asking for password. The default password is "admin". For further MEBx configuration details, please refer to Intel® MEBX User Guide.

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 Window 10 (x64)

- Fedora 29**

- Ubuntu 16.04.5 LTS**& Ubuntu18.04.0 LTS**

NOTE

For other Linux OS, Linux kernel should upgrade to 4.15.18.

*For Linux system, user may need to manually compile and install the driver for Intel graphics or I210 GbE controller if the driver is not embedded in kernel. You can visit Intel website for further information.

**For distributions, graphics driver function may not be completely implemented in its kernel. You may encounter restrictions when using these features, such as multiple displays. 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_v2.3.2.0 or later versions.

Please refer to this link to download WDT_DIO.

Appendix A Using WDT & DIO

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

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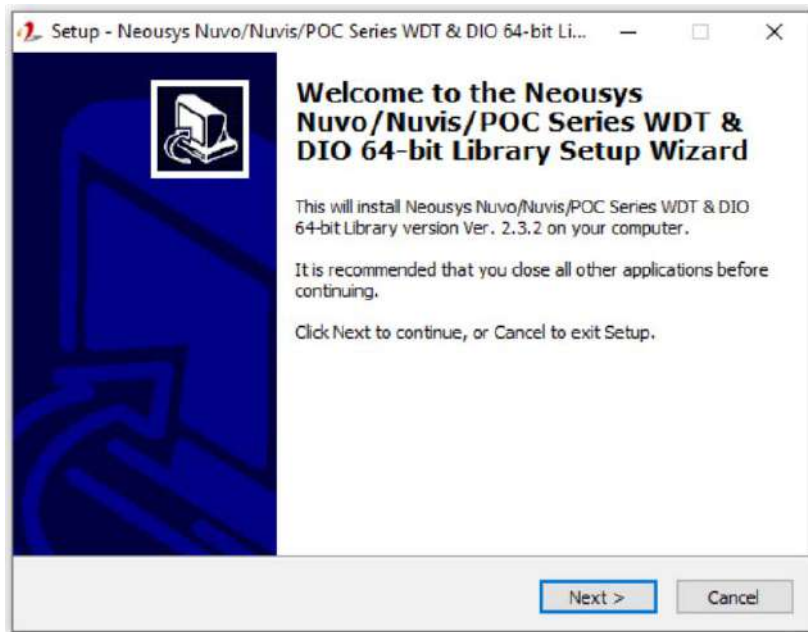
Installing WDT_DIO Library

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

- For Windows 10 64-bit OS with 64-bit application (x64 mode), please install WDT_DIO_Setup_ v2.3.2.0 (x64).exe or later version.

- For Windows 10 64-bit OS with 32-bit application (WOW64 mode), please install WDT_DIO_Setup_ v2.3.2.0 (wow64).exe or later version.
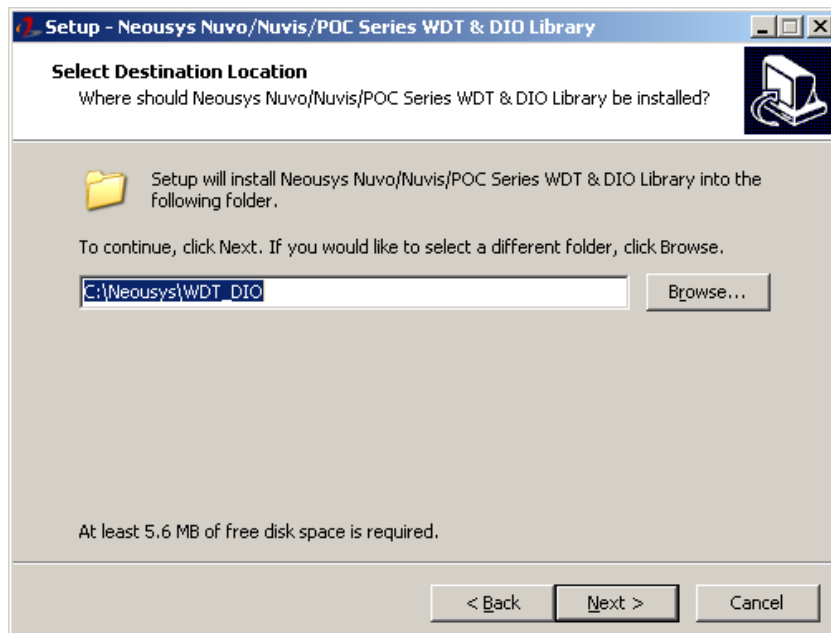
WDT and DIO Library Installation

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

1. Execute **WDT_DIO_Setup.2.3.2.0.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.
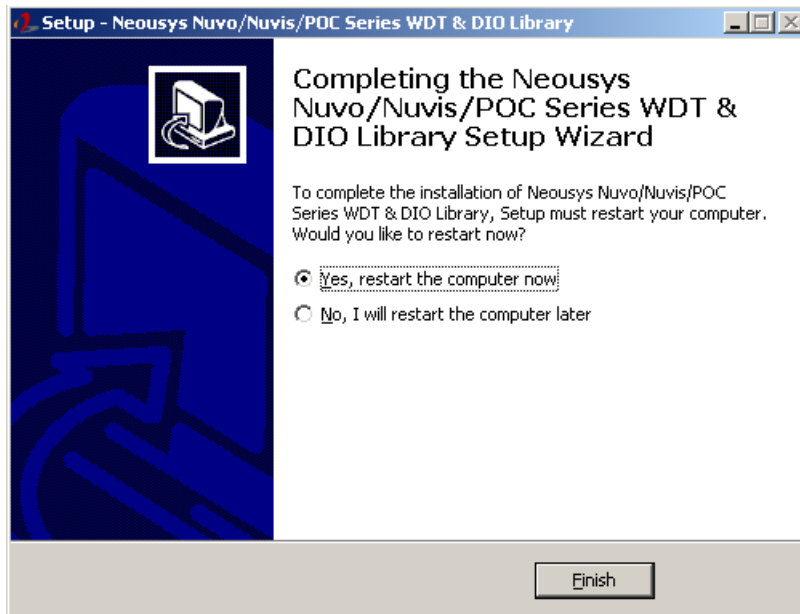
4. When programming your WDT or DIO program, the related files are located in

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()