



Neousys Technology Inc.

Nuvo-9650AWP Series

User Manual

Revision 1.0

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Declaration of Conformity

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

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

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Safety Precautions

- Read these instructions carefully before you install, operate, or transport the system.
- Install the system or mounting system (eg. DIN rail, wall-mount), at a sturdy location
- Install the power socket outlet near the system where it is easily accessible
- Secure each system module(s) using its retaining screws
- Place power cords and other connection cables away from foot traffic. Do not place items over power cords and make sure they do not rest against data cables
- Shutdown, disconnect all cables from the system and ground yourself before touching internal modules
- Ensure that the correct power range is being used before powering the device
- Should a module fail, arrange for a replacement as soon as possible to minimize down-time
- By means of a power cord connected to a socket-outlet with earthing connection
- This product is intended to be supplied by a Listed Power Adapter or DC power source, rated 8-35Vdc, 16A, Tma 70 degree C and 5000m altitude during operation. If further assistance is required, please contact Neosys Technology
- If the system is not going to be used for a long time, disconnect it from mains (power socket) to avoid transient over-voltage

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 and demonstrates installation procedures of Neosys Nuvo-9650AWP series systems.

Revision History

| Version | Date | Description |
|---------|-----------|-----------------|
| 1.0 | Sep. 2024 | Initial release |

1 Introduction

Nuvo-9650AWP is a cost-effective IP66 waterproof computer with Intel® 13th/12th-Gen Core™ processor designed for harsh and demanding environments. Thanks to its streamlined waterproof chassis and standardized cable kit, Nuvo-9650AWP redefines affordable total cost of ownership (TCO) for industrial computing with significant enhancements including ruggedness against extended operating temperature, intensive shock and vibration, dust, humidity and salinity.



Nuvo-9650AWP



Nuvo-9650AWP-PoE

Nuvo-9650AWP offers abundant I/O functionality for generic application requirements, including multiple 2.5GbE/ GbE, USB 2.0 and isolated RS-232 and RS-422/485 ports, all through waterproof M12 connectors. It also has a specialized waterproof type-C connector supporting Type-C alternative mode, or it can enable both 5 Gbps USB3 data transmission speed and 4K DisplayPort video output via a Type-C hub. Moreover, Nuvo-9650AWP is equipped with 8-48V wide-range DC input with ignition power control, and is compliant with MIL-STD-810H shock/ vibration certification for in-vehicle installation, such as mining trucks and farming vehicles.

The integration of IP66 waterproof capability with embedded computer eliminates environmental limitations where exposure to dust or liquids may be of concern. Its affordable waterproof design further reduces the gap in TCO for budget-conscious projects which is defining a new category of embedded computer that strikes a sweet spot between ruggedness performance and cost.

1.1 Specification of Nuvo-9650AWP


| System Core | |
|----------------------|--|
| Processor | <p>Supports Intel® 14th-Gen Core™ CPU (LGA1700 socket, 65W/ 35W TDP)</p> <ul style="list-style-type: none"> - Intel® Core™ i9-14900/ i9-14900T - Intel® Core™ i7-14700/ i7-14700T - Intel® Core™ i5-14500/ i5-14400/ i5-14500T - Intel® Core™ i3-14100/ i3-14100T <p>Supporting Intel® 13th-Gen Core™ CPU (LGA1700 socket, 65W/ 35W TDP)</p> <ul style="list-style-type: none"> - Intel® Core™ i9-13900E/ i9-13900TE - Intel® Core™ i7-13700E/ i7-13700TE - Intel® Core™ i5-13500E/ i5-13400E/ i5-13500TE - Intel® Core™ i3-13100E/ i3-13100TE <p>Supporting Intel® 12th-Gen Core™ CPU (LGA1700 socket, 35W/ 65W TDP)</p> <ul style="list-style-type: none"> - Intel® Core™ i9-12900E/ i9-12900TE - Intel® Core™ i7-12700E/ i7-12700TE - Intel® Core™ i5-12500E/ i5-12500TE - Intel® Core™ i3-12100E/ i3-12100TE - Intel® Pentium® G7400E/ G7400TE - Intel® Celeron® G6900E/ G6900TE |
| Chipset | Intel® H610E platform controller hub |
| Graphics | Integrated Intel® UHD Graphics 770 (32EU)/ 730 (24EU) |
| Memory | Up to 96 GB non-ECC DDR5 4800 (two SODIMM slots) |
| TPM | Supports dTPM2.0 |
| I/O Interface | |
| Ethernet | <p>1x Gigabit Ethernet port by Intel® I219-LM (M12 X-coded)</p> <p>3x 2.5GBASE-T Ethernet ports by Intel® I226-IT (M12 X-coded)</p> |
| Optional PoE+ | Optional IEEE 802.3at PoE+ PSE for 4x2.5GbE ports 100 W total power budget |
| USB 3.2 | 1x USB 3.2 Gen1 (5 Gbps) port in Type-C waterproof connector |

| | |
|---|--|
| | 1x reserved USB 3.2 Gen1 Type-A connector (rear side) |
| USB 2.0 | 2x USB 2.0 (M12 A-coded) 1x USB 2.0 (internal) |
| Video Port (Integrated Graphics) | 1x DisplayPort in Type-C waterproof connector, supporting 4096 x 2304 resolution 1x VGA (M12 A-coded), supporting 1920 x 1200 resolution 1x reserved DisplayPort, supporting 4096 x 2304 resolution (rear side) |
| Serial Port | 1x isolated RS-232 (COM1) 1x isolated RS-422/ 485 ports (COM2) via M12 A-coded, 8-pin connector |
| Storage Interface | |
| SATA HDD | 2x internal SATA ports for 2.5" HDD/ SSD installation |
| M.2 | 1x M.2 2280 M key socket (PCIe Gen4 x4) for NVMe SSD |
| Internal Expansion Bus | |
| Mini PCI Express | 2x full-size mini PCI Express sockets (PCIe + USB2) |
| M.2 B Key | 1x M.2 2242/ 3052 B key socket with SIM slot for M.2 5G/ 4G module |
| Power Supply | |
| DC Input | 1x 3-pin pluggable terminal block for 8-48V DC input with ignition power control |
| Power Consumption | 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 | 225mm (W) x 286 mm (D) x 90 mm (H) |
| Weight | 5.25 kg |
| Mounting | Wall-mount (optional) |
| Environmental | |
| Operating Temperature | With 35W CPU -25°C to 70°C * |

| | |
|----------------------------|--|
| | With 65W CPU -25°C to 70°C * (configured as 35W TDP mode) -25°C to 50°C * (configured as 65W TDP mode) |
| Storage Temperature | -40°C to 85°C |
| Humidity | 10%~90% , non-condensing |
| Vibration | MIL-STD-810H, Method 514.8, Category 4 |
| Shock | MIL-STD-810H, Method 516.8, Procedure I |
| EMC | CE/FCC Class A, according to EN 55032 & EN 55035 |

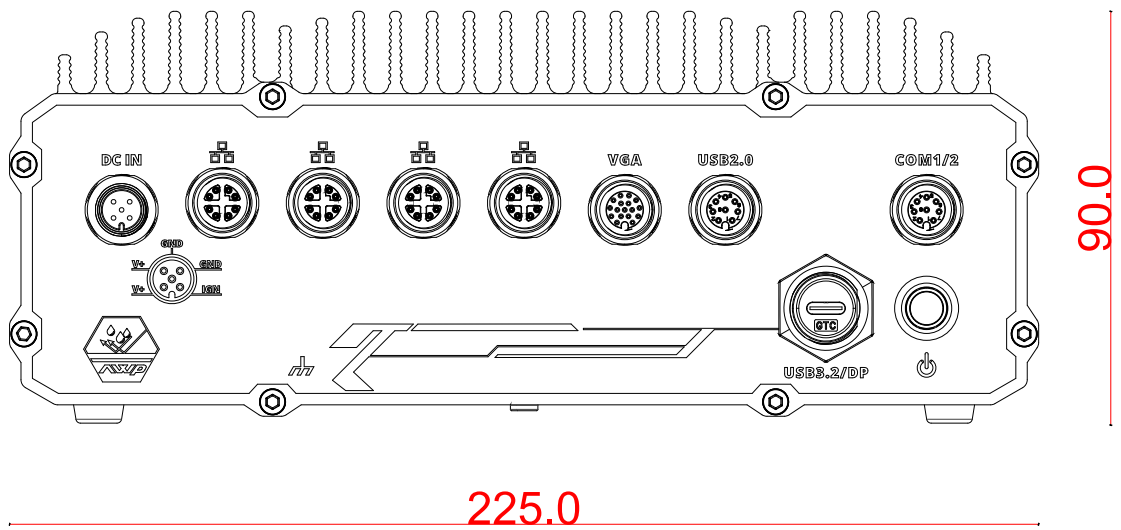
** For wide temperature use condition, a wide temperature/industrial M.2 M key SATA SSD module is required.*

1.2 Dimension

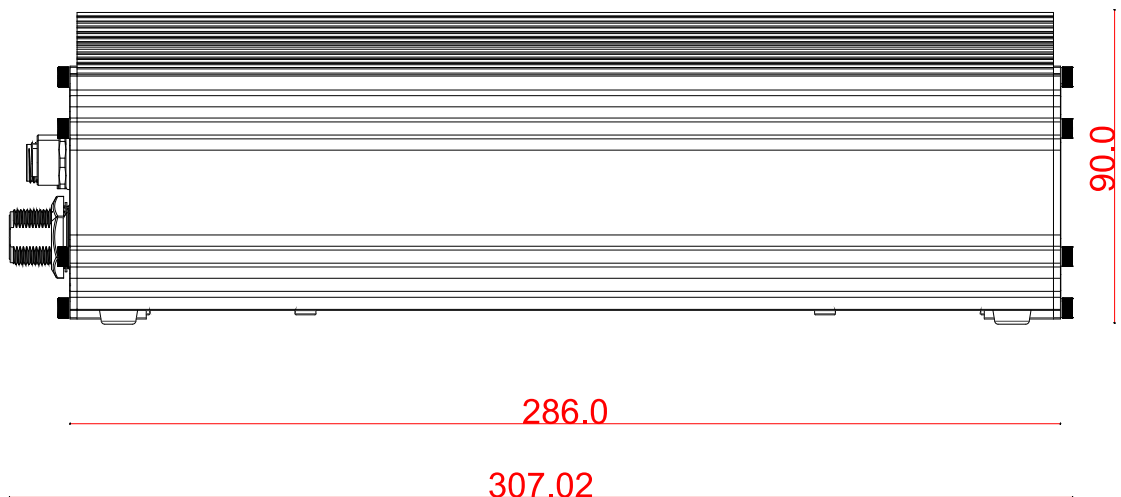
 **NOTE**

Nuvo-9650AWP and Nuvo-9650AWP-PoE share the same dimensions. Nuvo-9650AWP will be shown for demonstration purposes.

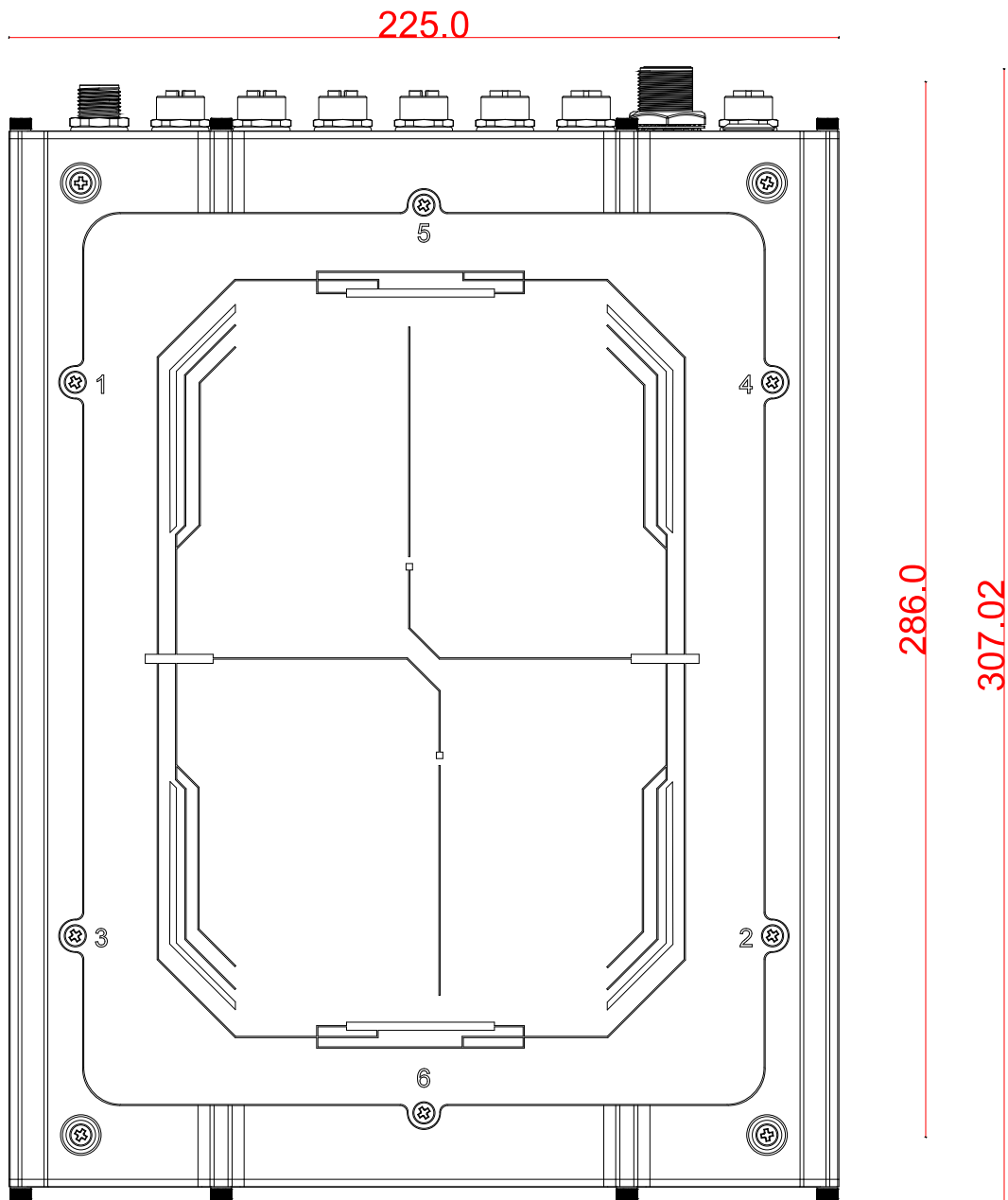
1.2.1 I/O Panel View



1.2.2 Side View

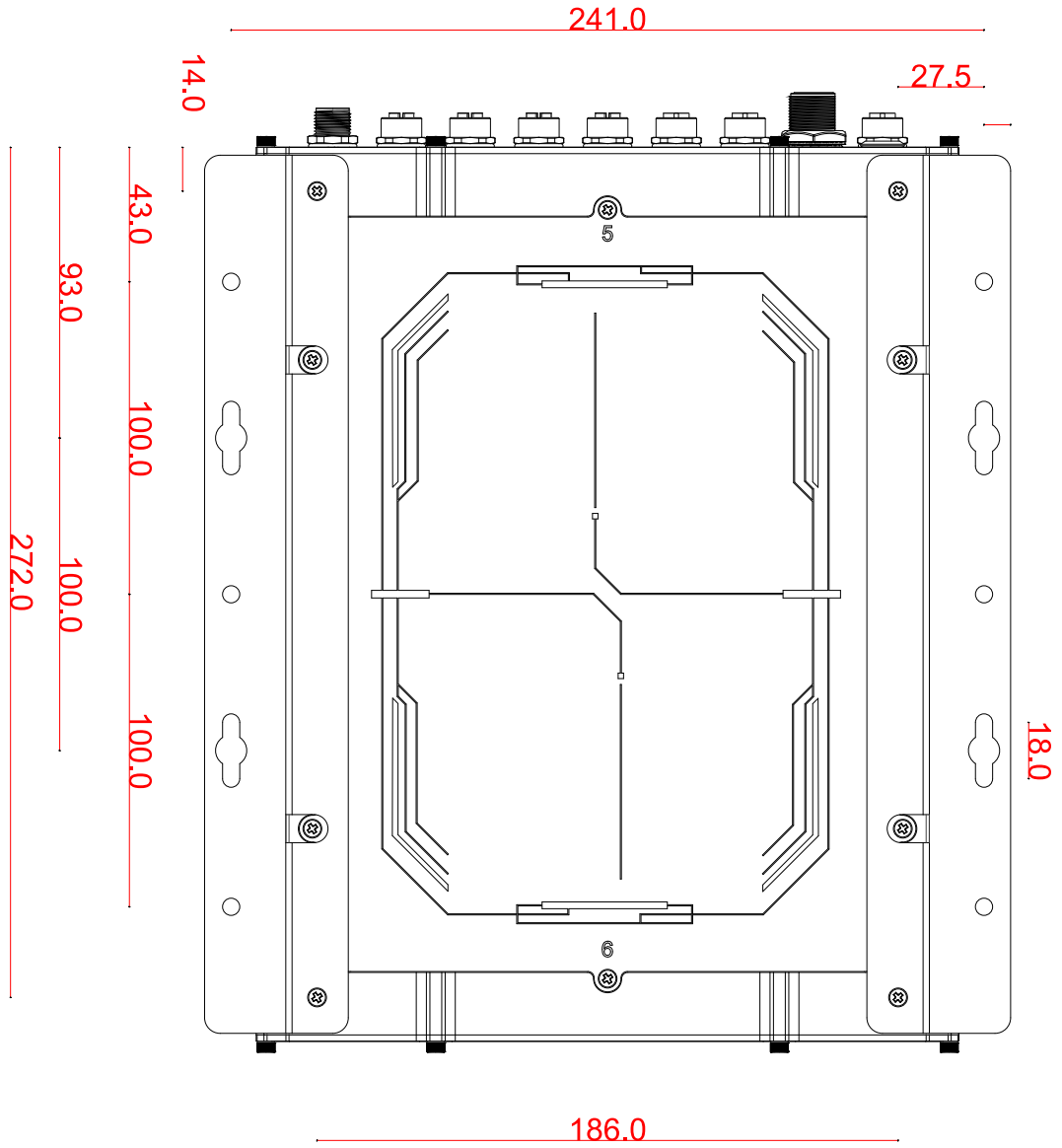


1.2.3 Bottom View



1.2.4 Wall Mount Bracket Dimensions (Optional)

The system comes with an optional wall mount bracket.



2 System Overview

Upon receiving and unpacking your Nuvo-9650AWP series, 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 Neosys Technology.

2.1 Unpacking the System

| Item | Description | Qty |
|------|--|-----|
| 1 | Nuvo-9650AWP series fanless waterproof computer (Please verify additionally purchased accessories such as memory module, M.2 SSD, etc.) | 1 |

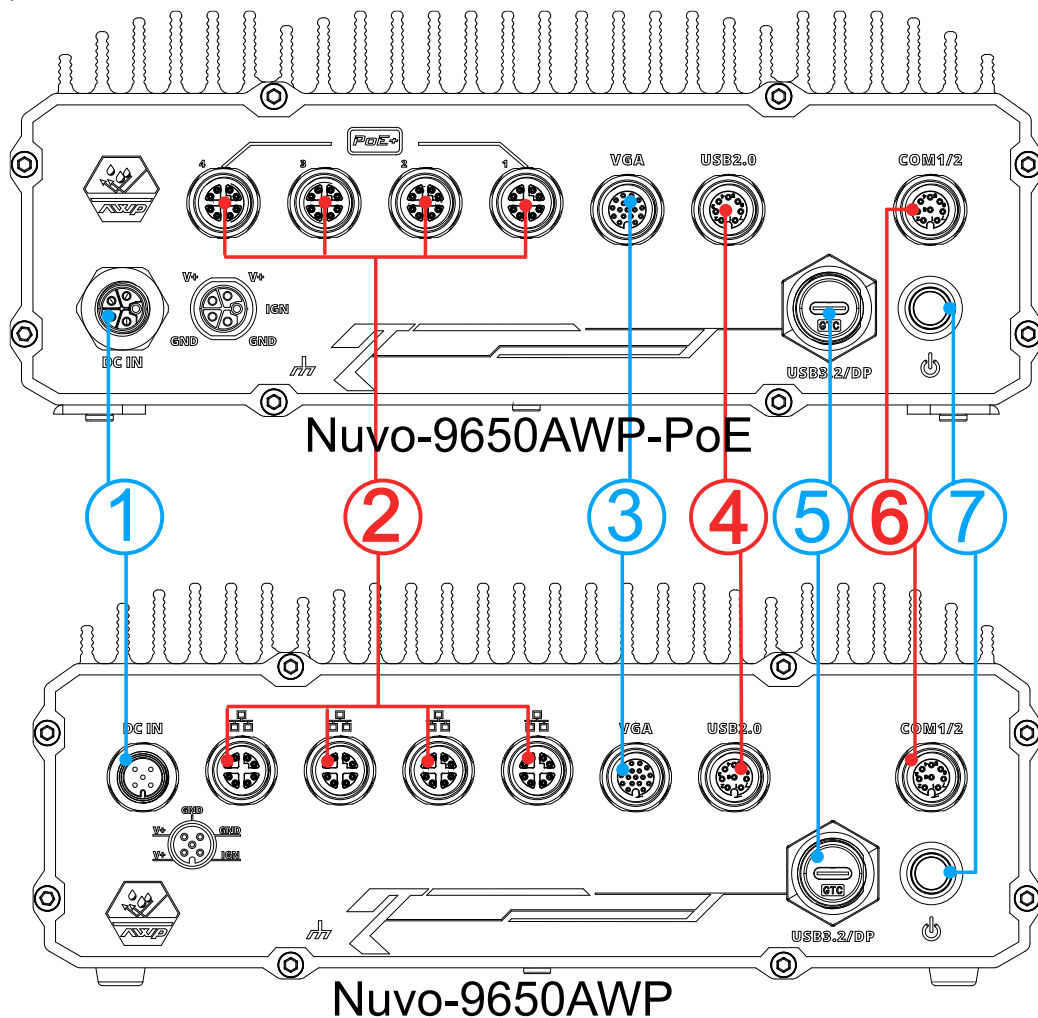
For optional M12 cable kit, please refer to the “Optional Accessories” section on the [datasheet](#).

2.2 Nuvo-9650AWP Series Front Panel

NOTE

Nuvo-9650AWP and Nuvo-9650AWP-PoE share the similar I/O ports, therefore Nuvo-9650AWP will be used for demonstration purposes. Additional illustration(s) will be shown to indicate difference(s).

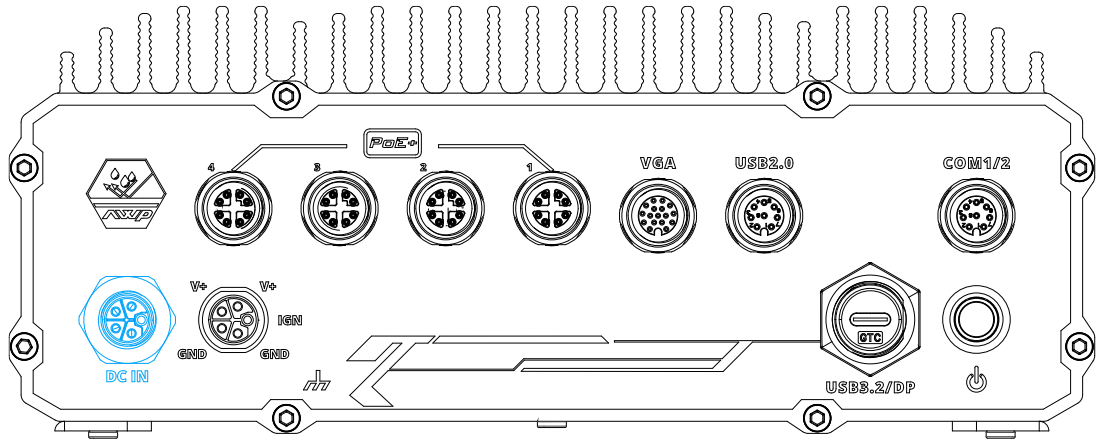
The IO panel of Nuvo-9650AWP features M12 connectors that include an isolated COM, DC input, VGA, Gigabit Ethernet, Type-C USB, DisplayPort, and USB2.0 ports.



| No. | Connector | Description |
|-----|---------------------------------------|--|
| 1 | M12 DC-in with ignition power control | Nuvo-9650AWP-PoE: M12 L-coded 8V to 48V DC input with built-in ignition power control Nuvo-9650AWP: M12 A-coded 8V to 48V DC input with built-in ignition power control |

| | | |
|---|--|--|
| 2 | M12 X-coded Ethernet | Port 1: 1Gb Ethernet via Intel I219 Port 2 – 4: 2.5Gb Ethernet via Intel I226 |
| 3 | M12 A-coded VGA | VGA output supports resolution up to 1920x1200@60Hz |
| 4 | M12 A-coded USB 2.0 | The USB 2.0 ports offer up to 480Mbit/s bandwidth and are backward compatible with USB 1.1/ 1.0. |
| 5 | Type-C USB/ DisplayPort | Type-C USB 3.2 Gen1x1 (5Gbps) port or DisplayPort output mode |
| 6 | M12 A-coded Isolated COM | COM 1 is isolated RS-232 port with 15 kV ESD protection COM 2 is RS422/485 port with 15 kV ESD protection |
| 7 | Power button | Press the button to turn on/ off the system. |

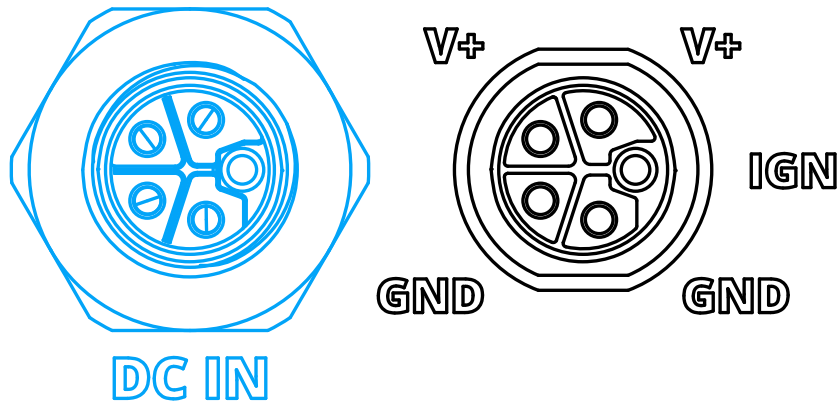
2.2.1 M12 L-coded DC-in Port with Ignition Power Control (Nuvo-9650AWP-PoE)



The system accepts a wide range of DC power input from 8V to 48V via a M12 L-coded connector. The M12 L-coded connectors offer COTS availability and ultra-rugged connection reliability when wiring DC power.

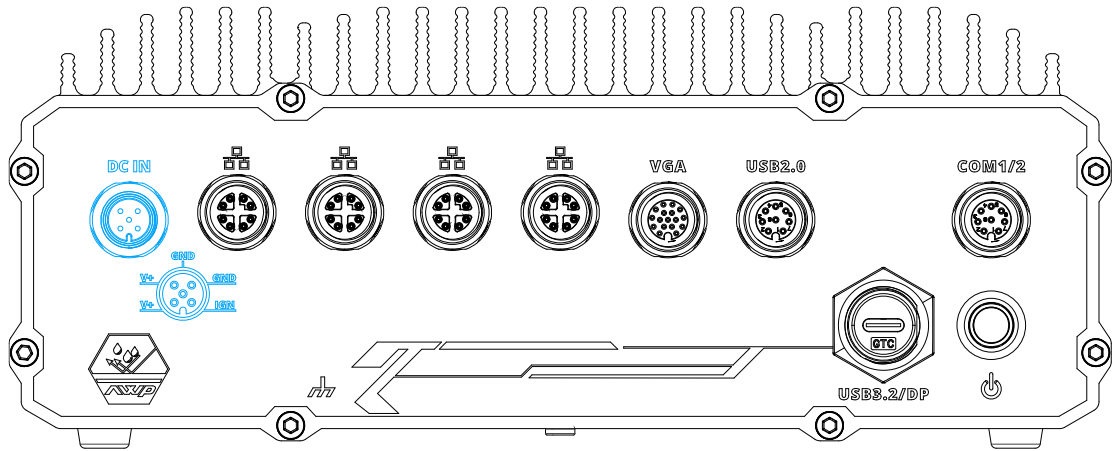
⚠ WARNING
 Please make sure the voltage of DC power is correct before you connect it to the system. Supplying a voltage over 48V will damage the system.

Connector Pin Definition




| Signal | Wire color |
|--------|------------|
| IGN | Yellow |
| V+ | Red |
| V+ | Red |
| GND | Black |
| GND | Black |

2.2.2 M12 A-coded DC-in port with Ignition Power Control (Nuvo-9650AWP)

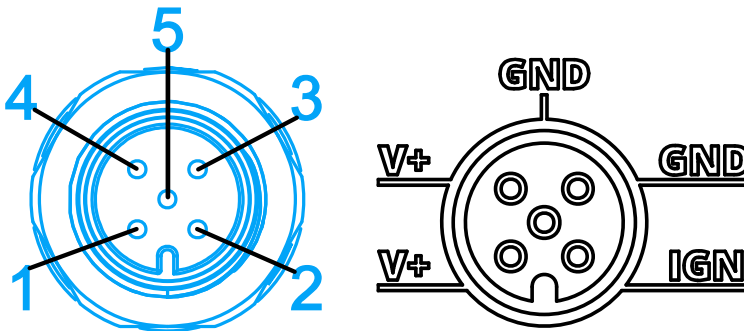


The system accepts a wide range of DC power input from 8V to 48V via a M12 A-coded connector. The M12 A-coded connectors offer COTS availability and ultra-rugged connection reliability when wiring DC power.



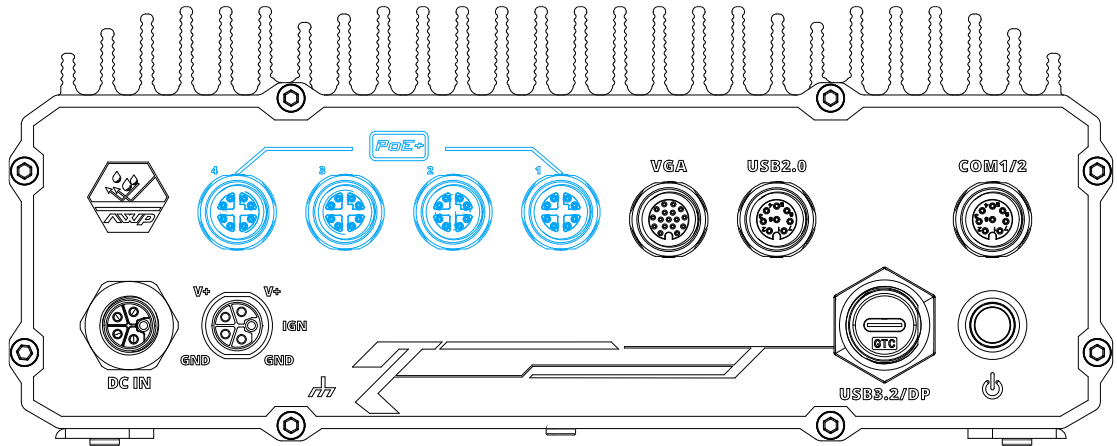
WARNING

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



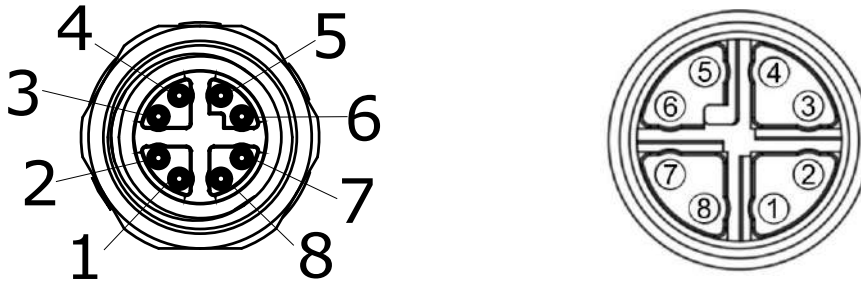
| Pin No. | Signal | Wire color |
|---------|--------|------------|
| 1 | V+ | Red |
| 2 | IGN | Yellow |
| 3 | GND | Black |
| 4 | V+ | Red |
| 5 | GND | Black |

2.2.3 M12 X-coded 802.3at Gb PoE+ Port



The system offers four Ethernet ports via an M12 X-coded, 8-pin connector with optional Power over Ethernet (802.3at). Port 1 is Gb and ports 2-4 are 2.5Gb specifications.

Connector Pin Definition

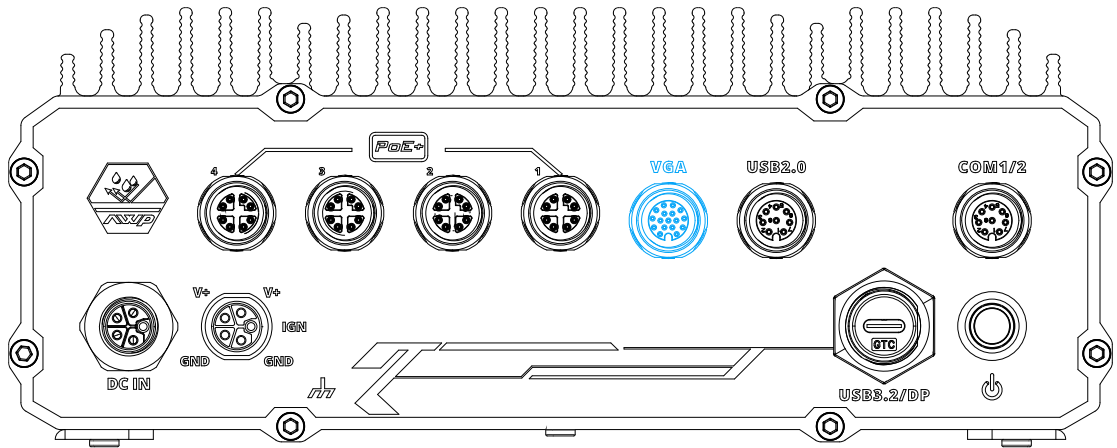


Panel side

Cable connector end

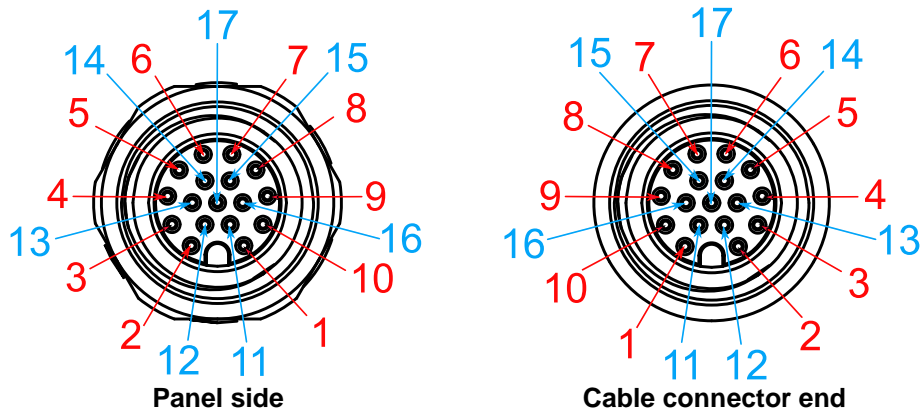
| Signal | M12 panel side | M12 cable connector end | Wire color |
|--------|----------------|-------------------------|------------|
| LAN P3 | 1 | 1 | Brown |
| LAN N3 | 2 | 2 | White |
| LAN N2 | 3 | 3 | Blue |
| LAN P2 | 4 | 4 | White |
| LAN P0 | 5 | 5 | Orange |
| LAN N0 | 6 | 6 | White |
| LAN P1 | 7 | 7 | Green |
| LAN N1 | 8 | 8 | White |

2.2.4 M12 A-coded VGA Port



VGA connector is the most common video display connection. The VGA output supports up to 1920x1200@60Hz resolution. To support VGA display output and achieve best VGA output resolution in Windows, you need to install corresponding graphics drivers. Please refer to section [OS Support and Driver Installation](#) for details.

VGA Connector Pin Definition



| Signal | M12 panel side | M12 cable connector end |
|----------|----------------|-------------------------|
| Red | 1 | 1 |
| GREEN | 9 | 9 |
| BLUE | 7 | 7 |
| GND | 6 | 6 |
| GND | 8 | 8 |
| GND | 10 | 10 |
| GND | 12 | 12 |
| GND | 13 | 13 |
| GND | 14 | 14 |
| GND | 11 | 11 |
| GND | 16 | 16 |
| GND | 15 | 15 |
| P5V_VGA | 17 | 17 |
| VGA_SDA | 5 | 5 |
| HSYNC_CN | 3 | 3 |

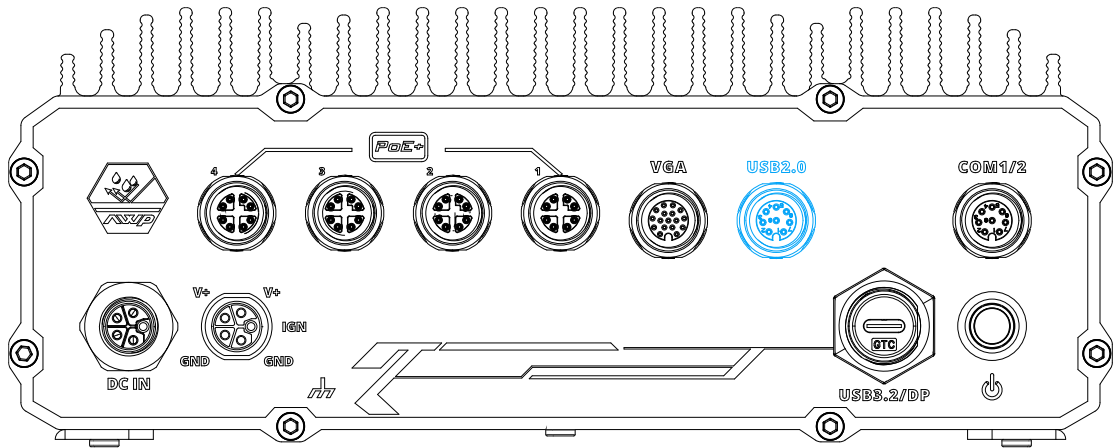
| | | |
|----------|---|---|
| VSYNC_CN | 2 | 2 |
| VGA_SCL | 4 | 4 |



NOTE

Please make sure your VGA cable includes SDA and SCL (DDC clock and data) signals for correct communication with monitor to get resolution/timing information. A cable without SDA/SCL can cause blank screen on your VGA monitor due to incorrect resolution/timing output.

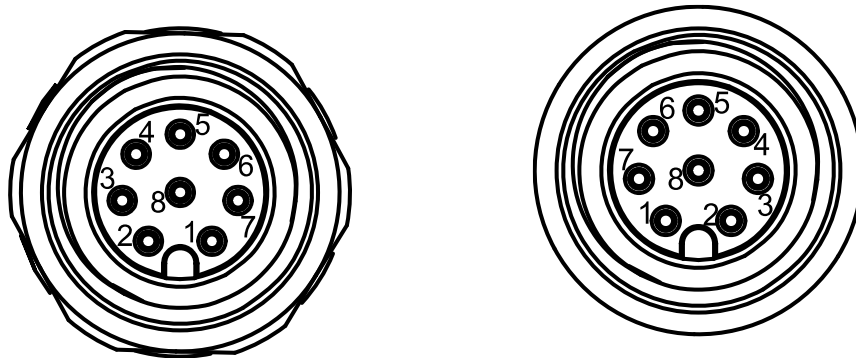
2.2.5 M12 A-coded USB 2.0 Port



The USB2.0 ports are implemented via native xHCI (eXtensible Host Controller Interface) and are backward compatible with USB 1.1 and USB 1.0 devices. UEFI USB support is also provided so you can use USB keyboard/ mouse in UEFI shell environment.

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

Connector Pin Definition

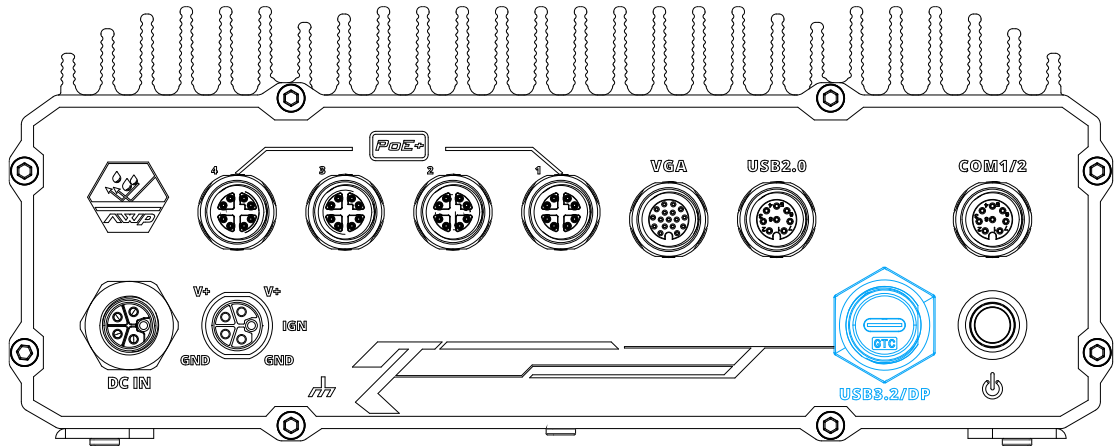


Panel side

Cable connector end

| Signal | M12 panel side | M12 cable connector end | Wire color |
|---------|----------------|-------------------------|------------|
| D1+ | 1 | 1 | Green |
| D1- | 2 | 2 | White |
| VCC_USB | 3 | 3 | Red |
| GND | 4 | 4 | Black |
| GND | 5 | 5 | Black |
| VCC_USB | 6 | 6 | Red |
| D2- | 7 | 7 | White |
| D2+ | 8 | 8 | Green |

2.2.6 USB3.2/ DisplayPort



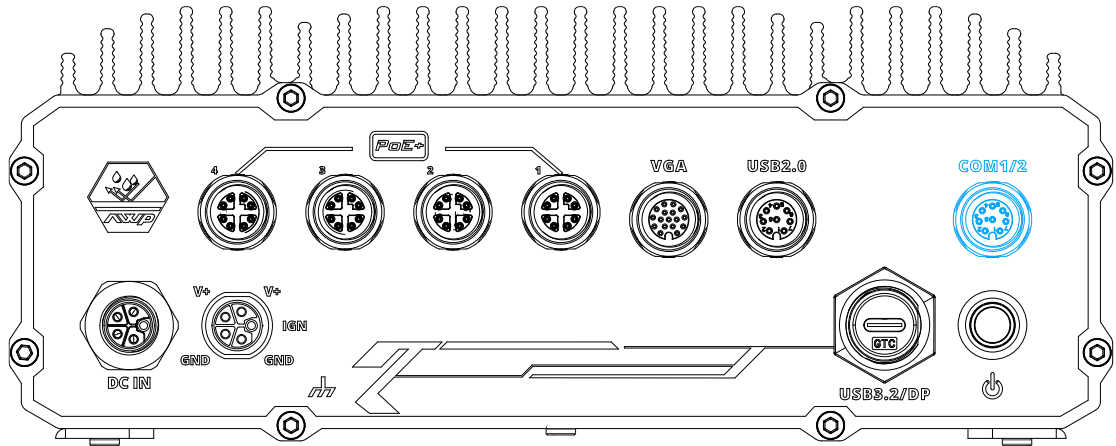
The system's USB 3.2 Gen1x1 type-C port offers up to 5Gbps of data transfer bandwidth, and is implemented via the native xHCI (eXtensible Host Controller Interface) controller. The port is backward compatible with USB3.2 Gen.1, USB 2.0, USB 1.1 and USB 1.0 devices via a USB hub (not included) to connect to external devices.

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

The USB Type-C port can also has an alternative mode for DisplayPort output to support resolutions up to 4096 x 2304 (4K).

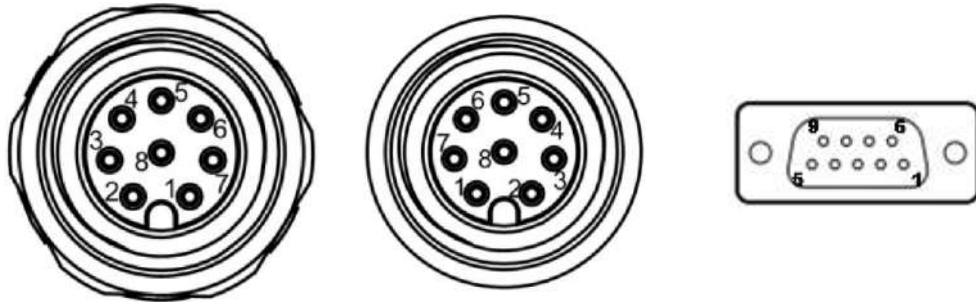
Or by plugging in a USB Type-C hub, you may use USB and DisplayPort simultaneously.

2.2.7 M12 A-coded COM Port



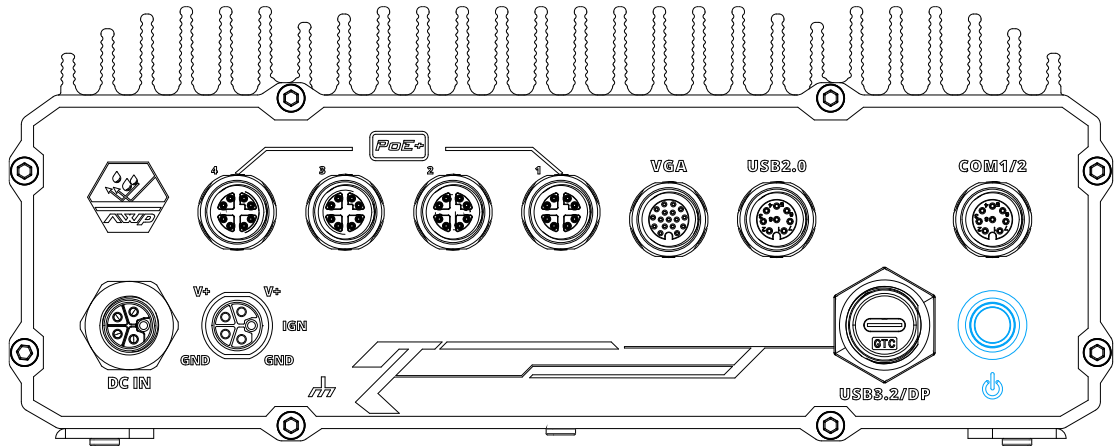
The system provides two isolated COM ports via an M12 A-coded connector for communicating with external devices. COM 1 is a RS-232 specifications port and provide up to 115200 bps baud rate while COM2 port is RS-422/485 specifications.

Connector Pin Definition



| M12 Panel side | | M12 Cable end | COM cable | Signal |
|----------------|---------------|---------------|-----------|--------|
| Signal | M12 panel pin | M12 cable pin | COM pin | |
| RXD1 | 1 | 1 | 2 | COM1 |
| TXD1 | 6 | 6 | 3 | |
| GND | 7 | 7 | 5 | |
| TXPS | 2 | 2 | 2 | COM2 |
| TXN2 | 3 | 3 | 8 | |
| RXP2 | 4 | 4 | 3 | |
| RXN2 | 5 | 5 | 4 | |
| GND | 8 | 8 | 5 | |

2.2.8 Power Button



The power button is a non-latched switch for ATX mode on/off operation. Press to turn on the system, the button should light up and to turn off, you can either issue a shutdown command in the OS, or just press the power button. In case of system halts, you can press and hold the power button for 5 seconds to force-shutdown the system. Please note that there is a 5 seconds interval between two on/off operations (i.e. once turning off the system, you will need to wait for 5 seconds to initiate another power-on operation).

2.3 Nuvo-9650AWP Series Internal I/O

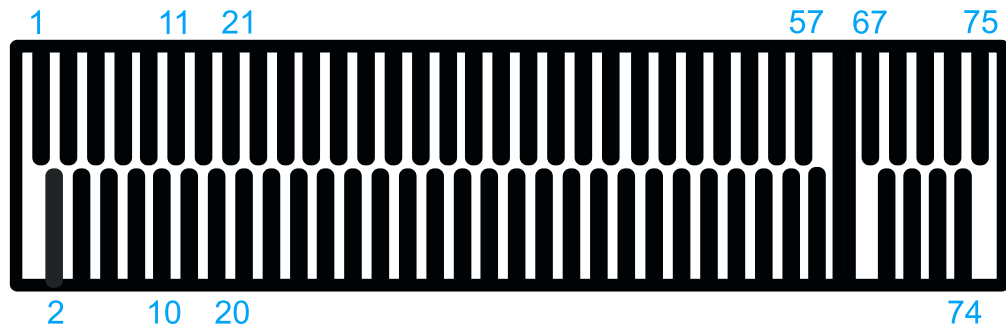
The system's internal I/O connectors consist of a M.2 2280 M key PCIe Gen4 x4 interface slot, two mini-PCIe slots with SIM slots, and a M.2 B key slot with SIM slot.

2.3.1 M.2 2280 M Key Slot



The system has an M.2 2280 slot Gen4 x4 slot for you to install an M.2 NVMe SSD for faster access over traditional hard disk drives.

M.2 2280 M Key Pin Definition



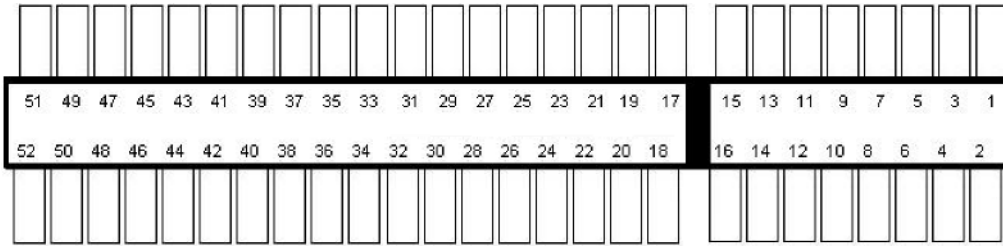
| Pin # | Signal | Pin # | Signal |
|-----------------------|---------|-------|-----------|
| 1 | GND | 2 | +3V3 |
| 3 | GND | 4 | +3V3 |
| 5 | PERN3 | 6 | - |
| 7 | PERP3 | 8 | - |
| 9 | GND | 10 | DAS/DSS_N |
| 11 | PETN3 | 12 | +3V3 |
| 13 | PETP3 | 14 | +3V3 |
| 15 | GND | 16 | +3V3 |
| 17 | PERN2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

2.3.2 mini-PCIe Slot with micro SIM Socket




The system provides mini-PCIe sockets (indicated in **blue**) that is in compliance with mini-PCIe specification rev. 1.2. This mini-PCIe socket is designed with SIM card (slot indicated in **red**) support. With a SIM card installed, your system can access the internet via your network provider's 5G/ 4G network.

mini-PCle socket definition



| Pin | Signal (mPCle) | Pin # | Signal (mPCle) |
|-----------------------|--------------------|-------|----------------|
| 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**

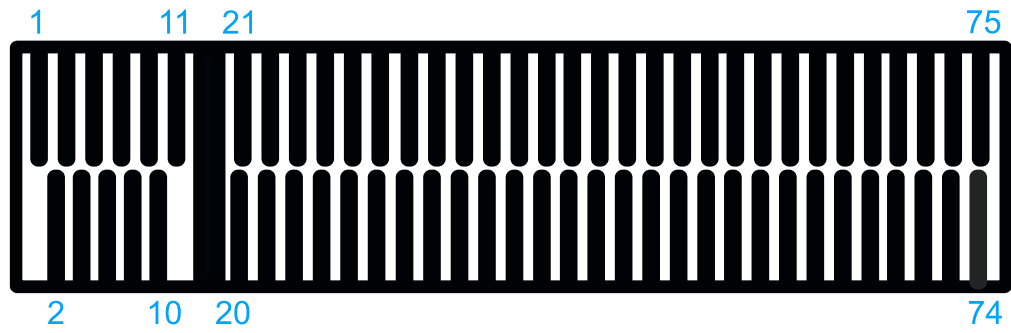
Some off-the-shelf mini-PCle modules are not compliant to standard mini-PCle interface. They use 1.8V I/O signals instead of standard 3.3V I/O and may cause signal conflict. Please consult with Neosys for compatibility when in doubt! Installing an incompatible 4G module may damage the system or the module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

2.3.3 M.2 B Key Slot



The system has an M.2 B key 2242/ 3052 slot (indicated in **blue rectangle**) with a 5G/ 4G SIM slot (indicated in **red rectangle**). A copper standoff is provided for you to secure onto the motherboard into the **red arrow** location for an M.2 2242 module, or into the **blue arrow** location for an M.2 3052 module. By installing a 5G or 4G M.2 module and SIM card, you can access the internet via the provider's network.

M.2 (B Key) Slot Pin Definition



| Pin # | Signal | Pin # | Signal | | |
|-------|-----------------|-----------------------|-----------------------|----|------------|
| 1 | - | 2 | +3V3 | | |
| 3 | GND | 4 | +3V3 | | |
| 5 | GND | 6 | FULL_CARD_POWER_OFF_N | | |
| 7 | USB_D+ | 8 | W_DISABLE_N | | |
| 9 | USB_D- | 10 | - | | |
| 11 | GND | Mechanical Key | | | |
| 21 | - | | | 20 | - |
| 23 | - | | | 22 | - |
| 25 | - | | | 24 | - |
| 27 | GND | | | 26 | - |
| 29 | USB3.0-RX- | | | 28 | - |
| 31 | USB3.0-RX+ | | | 30 | UIM1-RESET |
| 33 | GND | | | 32 | UIM1-CLK |
| 35 | USB3.0-TX- | | | 34 | UIM1-DATA |
| 37 | USB3.0-TX+ | | | 36 | UIM1-PWR |
| 39 | GND | | | 38 | - |
| 41 | PERn0 / SATA-B+ | | | 40 | UIM2-DET |
| 43 | PERp0 / SATA-B- | | | 42 | UIM2-DATA |
| 45 | GND | | | 44 | UIM2-CLK |
| 47 | PETn0 / SATA-A- | 46 | UIM2-RST | | |
| 49 | PETp0 / SATA-A+ | 48 | UIM2-PWR | | |
| 51 | GND | 50 | PERST_N | | |
| 53 | REFCLKN | 52 | - | | |
| 55 | REFCLKP | 54 | - | | |
| 57 | GND | 56 | - | | |
| 59 | - | 58 | - | | |
| 61 | - | 60 | - | | |
| 63 | - | 62 | - | | |
| 65 | - | 64 | - | | |
| 67 | RESET_N | 66 | UIM1_DETECT | | |
| 69 | CONFIG_1 | 68 | - | | |
| 71 | GND | 70 | +3V3 | | |
| 73 | GND | 72 | +3V3 | | |
| 75 | - | 74 | +3V3 | | |

2.3.4 Ignition Rotary Switch



The ignition power control switch features multiple modes for pre and post ignition settings. Please refer to the section [Ignition Power Control](#) for details.

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 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 Enclosure

To install components such as M.2 modules or mPCIe modules, you need to disassemble the Nuvo-9650AWP system enclosure:

1. To disassemble Nuvo-9650AWP, turn the system upside down and place it on a secured flat surface. Unfasten the screws in the following order.



2. Gently open the bottom panel.



3. Accessible user expansion slots after removing the bottom panel.



3.2 Installing Internal Components

3.2.1 M.2 2280 M Key Module Installation

There is one M.2 2280 M key module expansion slot for Nuvo-9650AWP system. Please follow the procedures below to install the module.

1. [Disassemble the system enclosure](#)
2. The M.2 2280 M key slot can be located once the enclosure has been removed.



3. Insert the M.2 M key module on a 45 degree angle.



4. Secure the module by fastening the screw.



5. [Reinstall the system enclosure.](#)
6. If you need to install other components, please refer to respective sections.

3.2.2 mini-PCIe Module & SIM Card Installation



NOTE

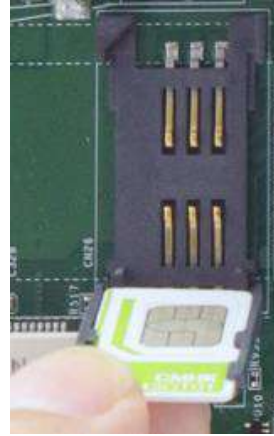
Due to waterproof IP66 rating, for SMA antenna installation, please contact Neusys Technology or your authorized dealer for compatible enclosure panel.

There are mini-PCIe slots and SIM card sockets for Nuvo-9650AWP system. Please follow the procedures below for installation.

1. [Disassemble the system enclosure.](#)
2. The mini-PCIe slot and SIM card sockets can be located once the enclosure has been removed.



- If you need to install a SIM card, please do so before installing the mini-PCle module. If not, please skip to step 5. To install a SIM card, slide the SIM bracket in the direction indicated and lift the bracket.

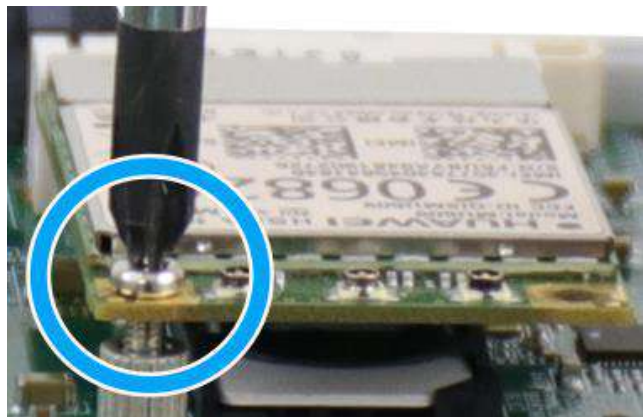


Slide and lift SIM card holder Insert SIM card with pins facing up

- Gently press and slide the bracket in the direction shown to secure the SIM card.

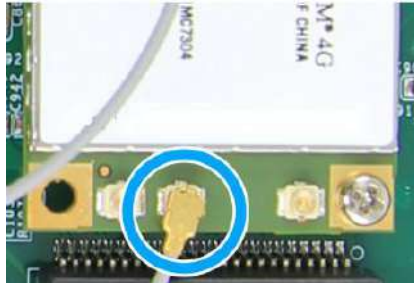


- Install the mini-PCle card by inserting it at a 45 degree angle, and secure it with a screw.



Insert at 45 degree angle Secure with a screw

6. Connect 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



NOTE

Due to waterproof IP66 rating, for SMA antenna installation, please contact Neosys Technology or your authorized dealer for compatible enclosure panel.

7. [Reinstall the system enclosure.](#)
8. If you need to install other components, please refer to respective sections.

3.2.3 M.2 B Key Installation



NOTE

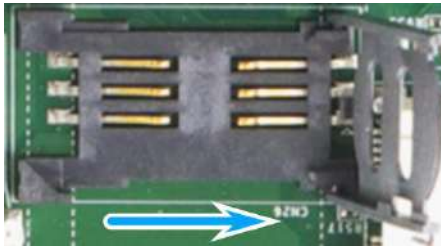
Due to waterproof IP66 rating, for SMA antenna installation, please contact Neusys Technology or your authorized dealer for compatible enclosure panel.

There is one M.2 2242/ 3052 B key module expansion slot for Nuvo-9650AWP system. Please follow the procedures below to install the module.

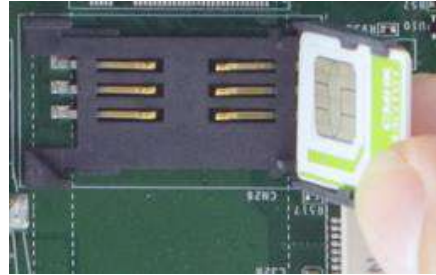
1. [Disassemble the system enclosure](#)
2. The M.2 2242/ 3052 B key and SIM slot can be located once the enclosure has been removed.



3. If you need to install a SIM card, please do so before installing the M.2 module.
To install a SIM card, slide the SIM bracket in the direction indicated and lift the bracket.

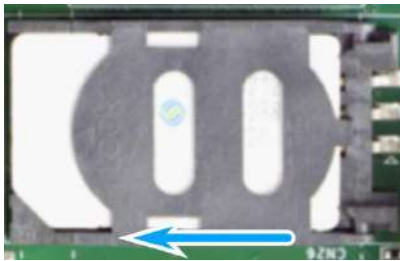


Slide and lift SIM card holder



Insert SIM card with pins facing up

4. Gently press and slide the bracket in the direction shown to secure the SIM card.



5. Insert the module on a 45 degree angle.



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



7. 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



NOTE

Due to waterproof IP66 rating, for SMA antenna installation, please contact Neosys Technology or your authorized dealer for compatible enclosure panel.

8. [Reinstall the system enclosure](#) and panel when done.
9. If you need to install other components, please refer to respective sections.

3.2.4 HDD/ SSD Installation

There are two HDD/ SSD brackets within the system. Please follow the procedures below to install the module.

1. Turn the system upside down and place it on a secured flat surface. Unfasten the screws in the following order.



2. Gently open the bottom panel.



3. The brackets can be found underneath the panel. Place an HDD/ SSD into the bracket and secure with screws (two on each side).



4. Take the SATA/ power cable out of the accessory box, and connect it to the motherboard, and the other end to the HDD/ SSD.



5. Repeat the above steps if you need to install another HDD/ SSD.
6. With the system upside down, position it on a secured flat surface, and make sure the O-ring is properly positioned in the groove (indicated in **red**).



7. Place the panel back onto the enclosure and secure the screws in the order indicated to complete the installation.



NOTE

Please secure each screw with a torque range of 8.1 – 9.9 kgf for waterproof capability.

3.3 Installing the System Enclosure

1. With the system upside down, position it on a secured flat surface, and make sure the O-ring is properly positioned in the groove (indicated in **red**).



2. Place the bottom panel onto the enclosure.



NOTE

Please make sure the O-ring is seated properly in the groove to ensure the system's IP66 functionality.

- Secure the screws on the panel in the following order to complete installing the system enclosure.



NOTE

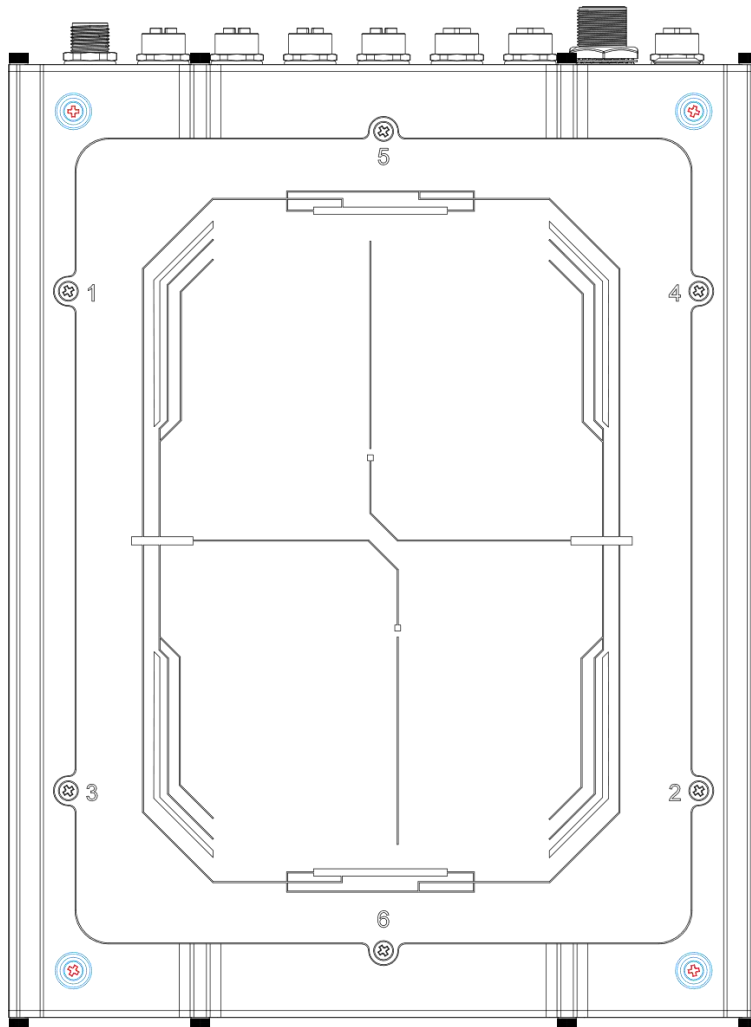
Please secure each screw with a torque range of 8.1 – 9.9 kgf for waterproof capability.

3.4 Wall Mount Installation (Optional Accessory)

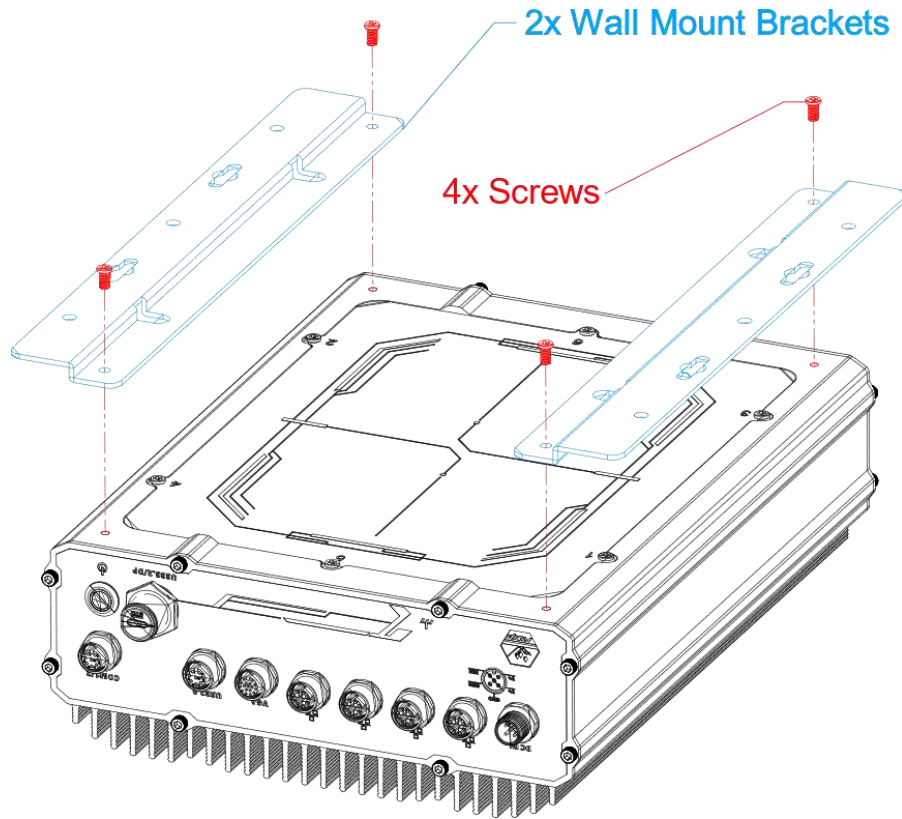
The optional wall mount bracket allows the system to be mounted horizontally.

Please refer to the following installation procedure to install the wall mount.

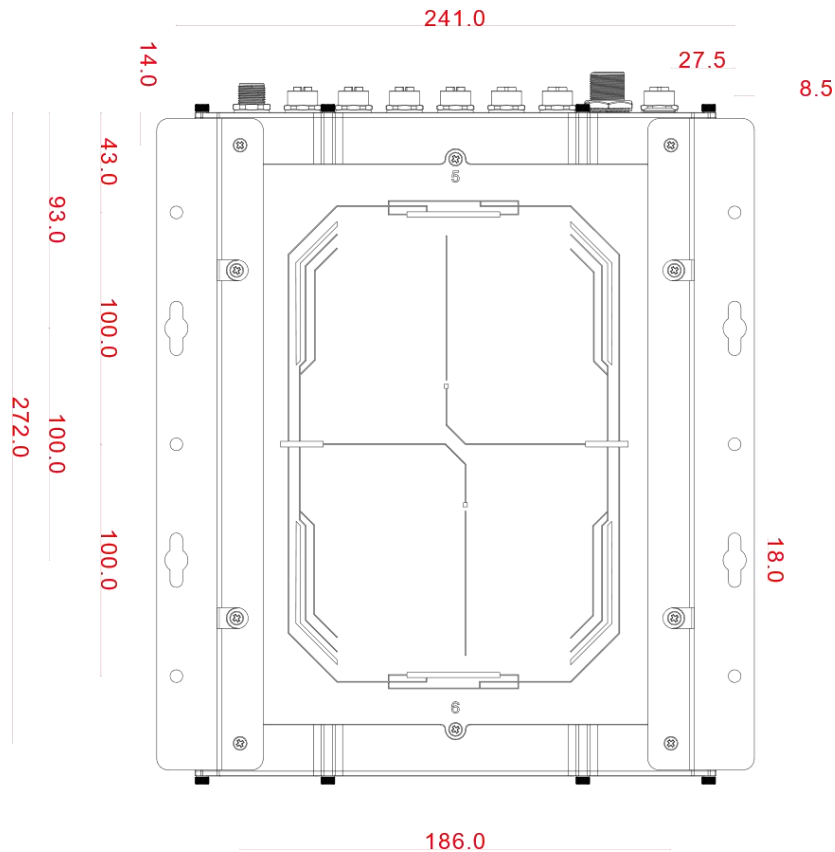
1. To install the optional wall mount bracket, you need to remove the rubber stands (indicated in **blue**) at the bottom of the system. Remove the rubber stands by removing the screws (indicated in **red**).



- Secure the two wall mount brackets (indicated in blue) to the bottom of the system enclosure using the M4 screws (indicated in red) provided.



- Dimension illustration of the installed wall mount bracket for your reference.



3.5 Powering On the System

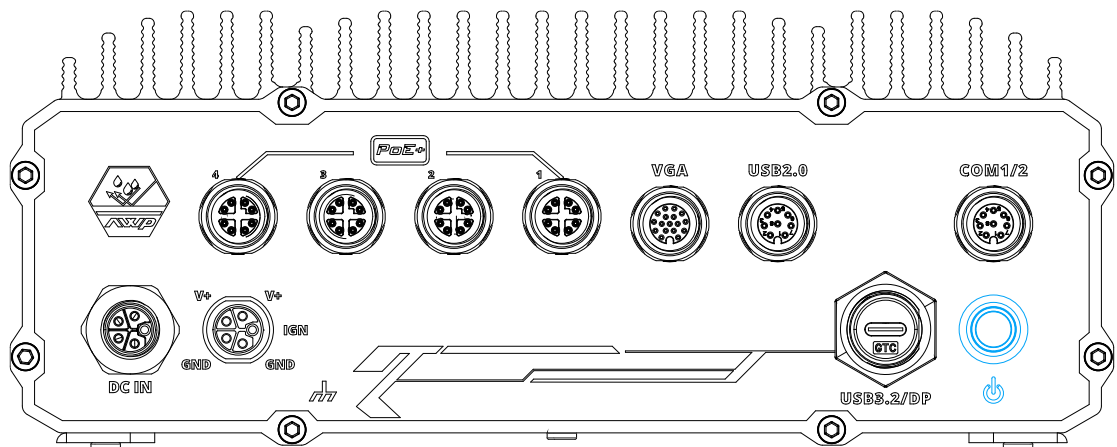
There are various methods to power on the system

- Pressing the power button
- Sending a LAN packet via Ethernet (Wake-on-LAN)
- [Using the ignition signal input](#)

We will describe the processes and actions involved for most of the methods in this section and the ignition signal input method will be described in its dedicated section.

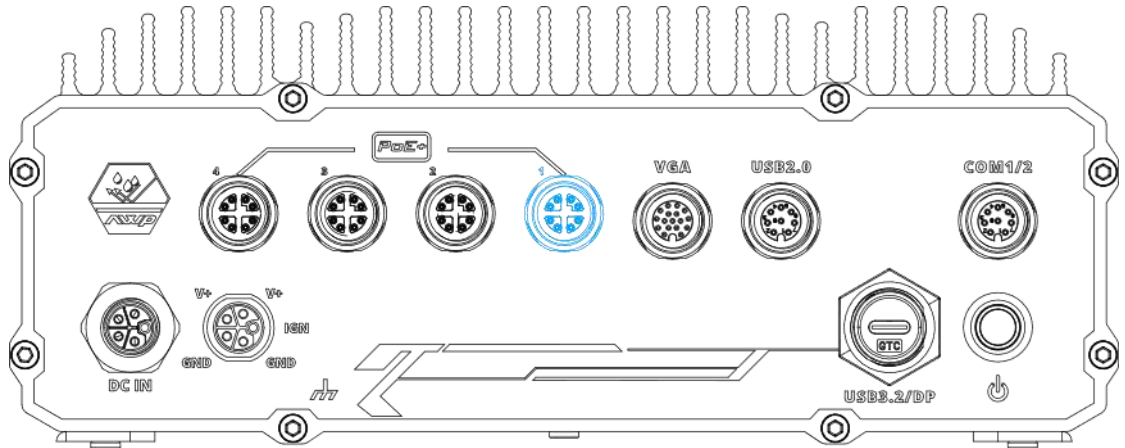
3.5.1 Powering On Using the Power Button

This is the simplest way to turn on your system. The power button on the front panel is a non-latched switch and behaves as the ATX-mode on/off control. With DC power connected, pushing the power button will turn on the system and the power button should 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.



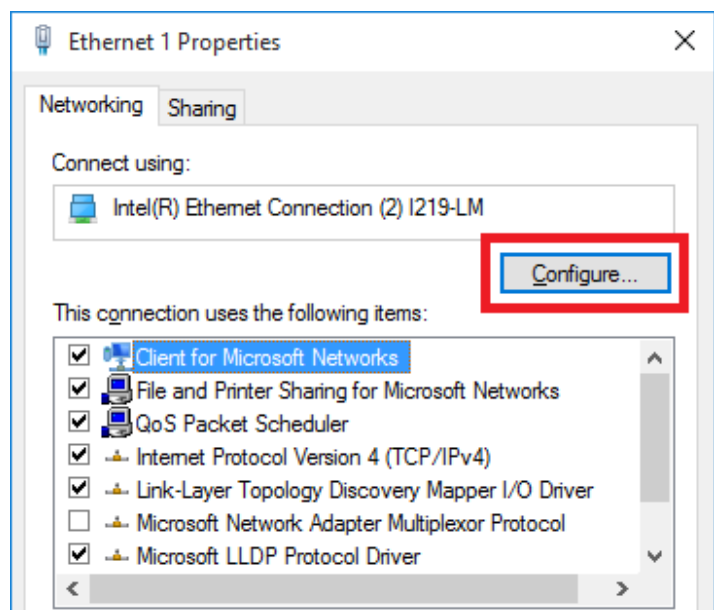
3.5.2 Powering On Using Wake-on-LAN

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 implements the Wake-on-LAN function for the GbE port #1 shown below.



To enable WOL function and power on your system, please follow the steps below.

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



- **Wake on Magic Packet**

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

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

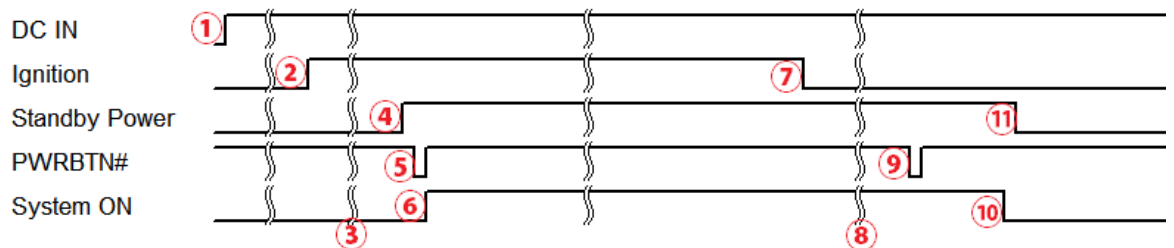
There are some free tools available on Internet that can be used to send a magic packet. Please refer to the following link to understand more about [Magic Packet](#).

3.6 Ignition Power Control

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

3.6.1 Principles of Ignition Power Control

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



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

3.6.2 Additional Features of Ignition Power Control

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

- **Low battery detection**

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

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

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

- **System hard-off**

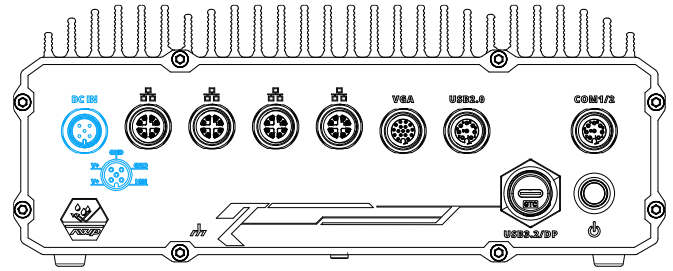
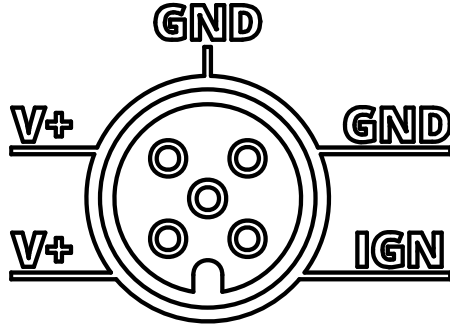
In some cases, system may fail to shutdown via a soft-off operation due to system/ application halts. The ignition power control module offers a mechanism called “hard-off” to handle this unexpected condition. By detecting the system status, it can determine whether the system is shutting down normally.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

- **Smart off-delay**

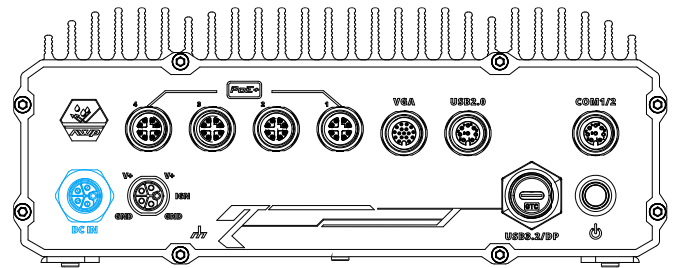
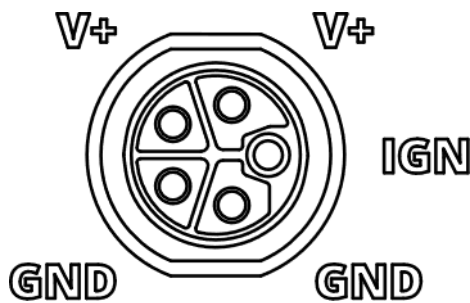
The ignition power control module offers two modes (mode 6 & mode 7) which have very long power-off delay duration for applications require additional off-line time to process after the vehicle has stopped. In these two modes, the ignition power control module will automatically detect the system status during the power-off delay duration. If the system has shutdown (by the application software) prior to power-off delay expiring, it will cut off the system power immediately to prevent further battery consumption.

3.6.3 Wiring Ignition Signal

Nuvo-9650AWP M12 A-coded




Nuvo-9650AWP-PoE M12 L-coded



To have ignition power control for in-vehicle usage, you need to supply IGN signal to the system. The IGN input is located on the M12 L-coded/A-coded connector (shared with DC power input).

1. Connect car Battery+ line (12V for sedan, 24V for bus/truck) to V+.
2. Connect car Battery-/ GND line to GND.
3. Connect ACC line to IGN.

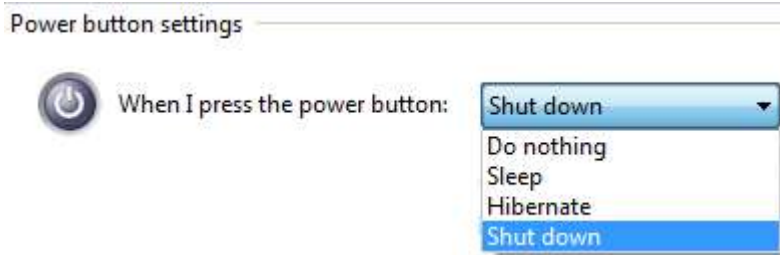


WARNING

Please make sure your DC power source and IGN signal share the same ground. IGN input accepts 8V - 48V DC. Supply a voltage higher than 48VDC may damage the system.

3.6.4 Configure your Windows system

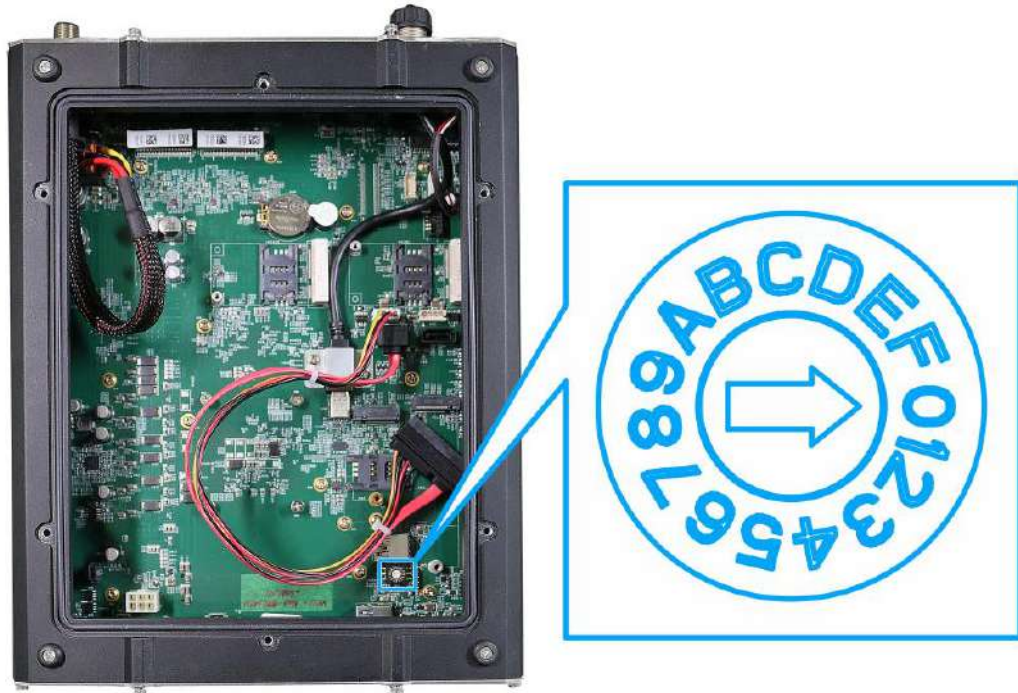
When applying ignition power control to your system, please make sure you've configured your Windows system to initiate a shutdown process when pressing the power button. By default, Windows 10 goes to sleep (S3) mode when power button is pressed. As sleep (S3) is not a complete shutdown behavior, the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



3.6.5 Operation Modes of Ignition Power Control

You can use the rotary switch to configure the operation mode. The system offers 16 (0~15) operation modes with different power-on/power-off delay configurations.

The ignition control rotary switch can be located on the motherboard. Please refer to the “Disassembling the enclosure” section on how to remove the bottom panel and gaining access to the rotary switch.



- **Mode 0**

Mode 0 is the ATX mode without power-on and power-off delay. User can only use the power button on the front panel to turn on or turn off the system.

| Mode | Power-on Delay | Power-off Delay | Hard-off Timeout |
|------|----------------|-----------------|------------------|
| 0 | N/A | N/A | N/A |

- **Mode 1**

Mode 1 is AT mode without power-on and power-off delay. The system automatically turns on when DC power is applied. A retry mechanism is designed to repeat the power-on cycle if the system fails to boot up.

| Mode | Power-on Delay | Power-off Delay | Hard-off Timeout |
|------|----------------|-----------------|------------------|
| 1 | N/A | N/A | N/A |

- **Mode 2**

Mode 2 is designed to have a very minor power on/ off delay of 160ms for applications that requires the system to start up almost at the same as the rest of the equipment it is working in collaboration with.

| Mode | Power-on Delay | Power-off Delay | Hard-off Timeout |
|------|----------------|-----------------|------------------|
| 2 | 160ms | 160ms | 10 minutes |

● **Mode 3 ~ Mode 12**

Mode 3 ~ Mode 12 have various power-on delay and power-off delay. Each mode supports a hard-off timeout of 10 minutes.

| Mode | Power-on Delay | Power-off Delay | Hard-off Timeout |
|--------|----------------|-----------------|------------------|
| 3 | 10 seconds | 10 seconds | 10 minutes |
| 4 | 10 seconds | 1 minute | 10 minutes |
| 5 | 10 seconds | 5 minutes | 10 minutes |
| 6 | 30 seconds | 1 minute | 10 minutes |
| 7 | 30 seconds | 5 minutes | 10 minutes |
| 8 | 30 seconds | 10 minutes | 10 minutes |
| 9 | 3 minutes | 1 minute | 10 minutes |
| 10 (A) | 3 minutes | 10 minutes | 10 minutes |
| 11 (B) | 3 minutes | 30 minutes | 10 minutes |
| 12 (C) | 10 minutes | 30 minutes | 10 minutes |

● **Mode 13 (D) / Mode 14 (E)**

Mode 13 and Mode 14 are ignition power control modes with very long power-off delay. Both modes support the feature of “smart off-delay”, which automatically detect system status during power-off delay duration and cut off system power if system is off in prior to power-off delay expired.

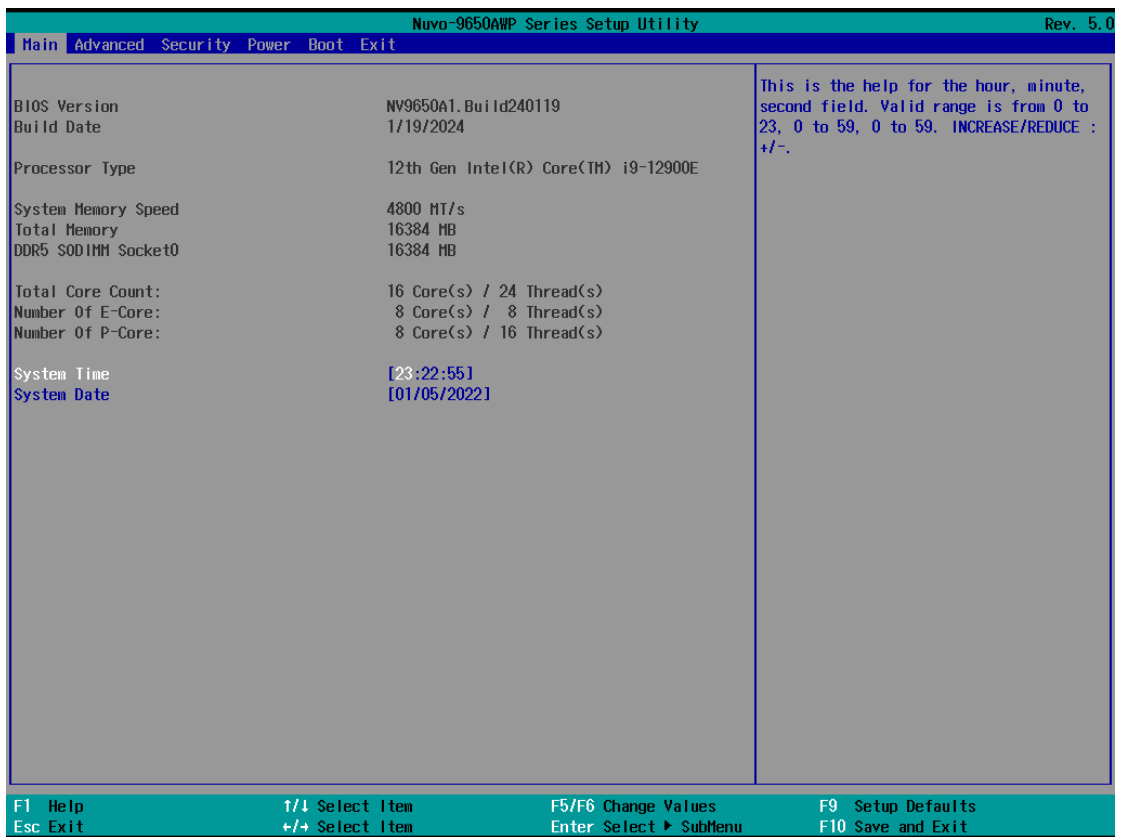
| Mode | Power-on Delay | Power-off Delay | Hard-off Timeout |
|--------|----------------|-----------------|------------------|
| 13 (D) | 30 seconds | 2 hours | 10 minutes |
| 14 (E) | 3 minutes | 2 hours | 10 minutes |

● **Mode 15 (F)**

Reserved

4 BIOS Settings

The system is shipped with factory-default BIOS settings optimized for best performance and compatibility. In this section, we'll illustrate some BIOS settings you may need to set or change prior to operating system installation. Please always make sure you understand the effect of change before you proceed with any changes. 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).

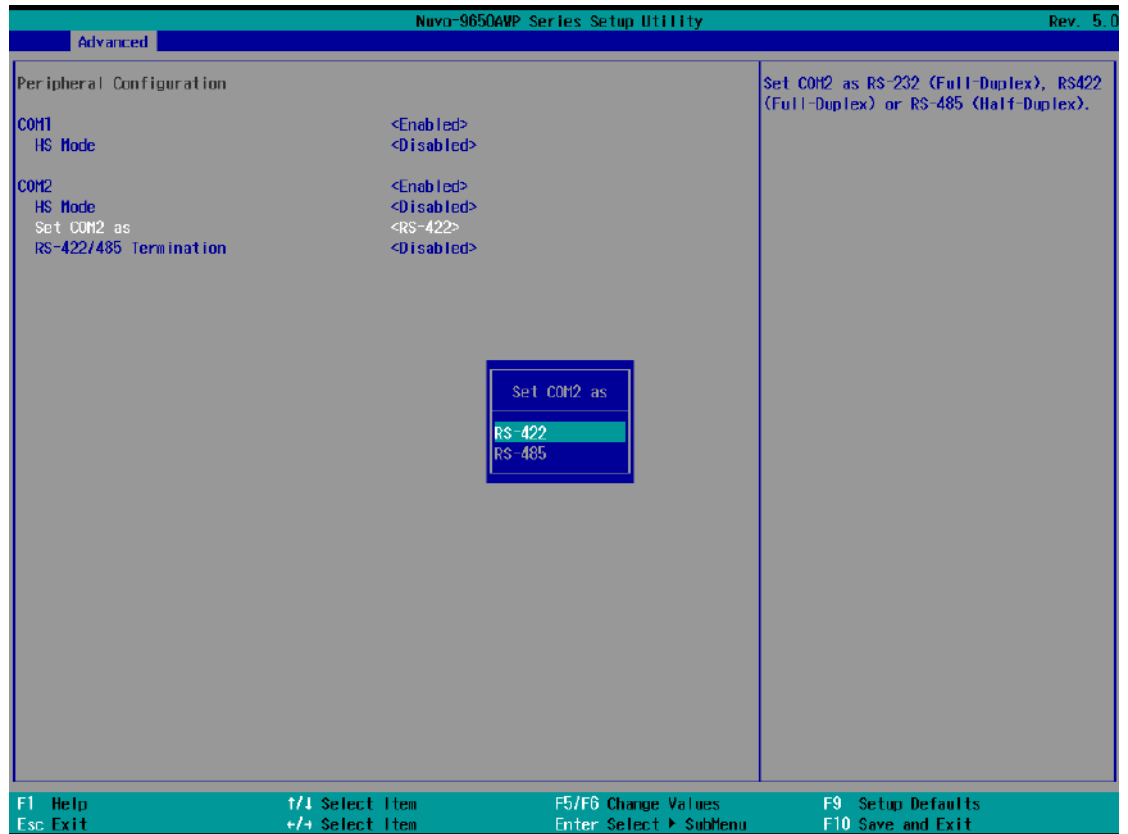


4.1 COM Port Configuration

The system's COM1 port supports isolated RS-232 while COM2 supports isolated 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 COM1&2 operating mode:

1. Press **F2** when the system boots up to enter the BIOS setup utility.
2. Go to **[Advanced]** → **[Peripheral Configuration]**.
3. You can **Enable/ Disable** COM1 or select COM2 to **[Set COM2 as]** option to the desired mode.



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

4.1.1 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 highspeed mode for your COM port (COM1 used as an example).



To set COM port high speed mode:

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

4.2 TPM Availability

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

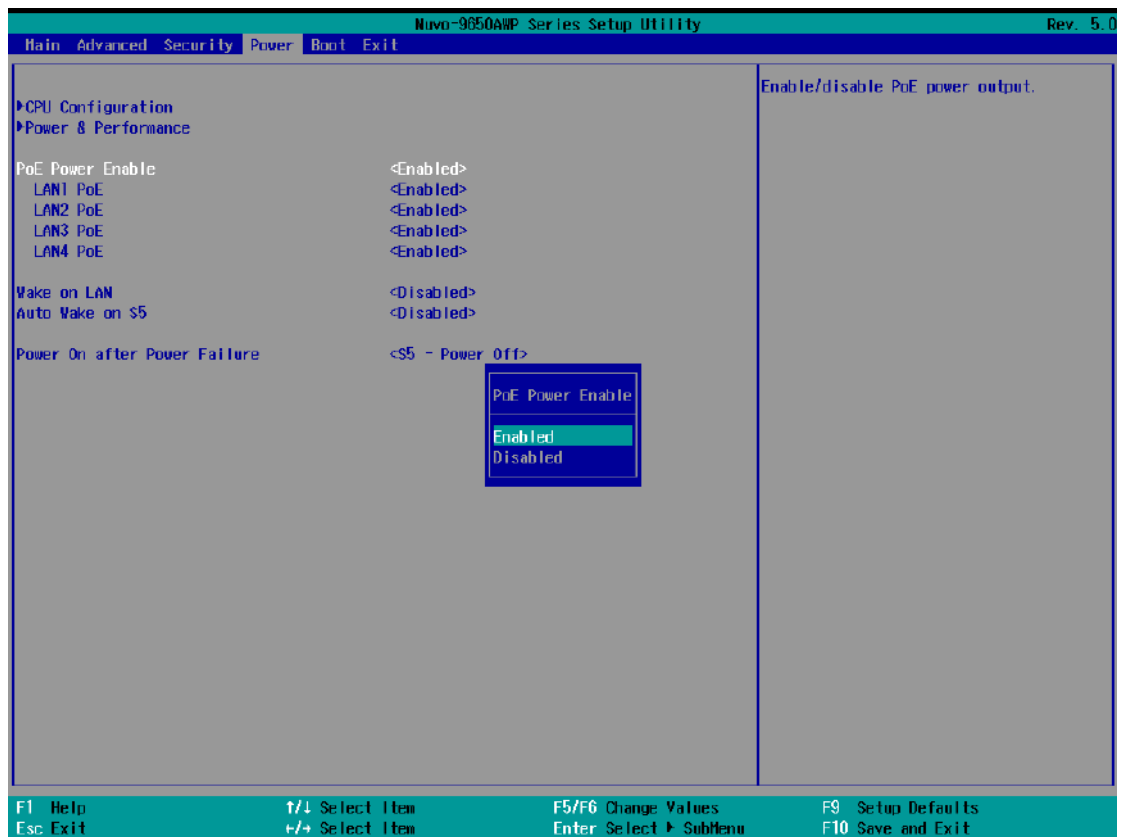


To enable TPM availability:

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

4.3 Power over Ethernet (PoE) Power Enable

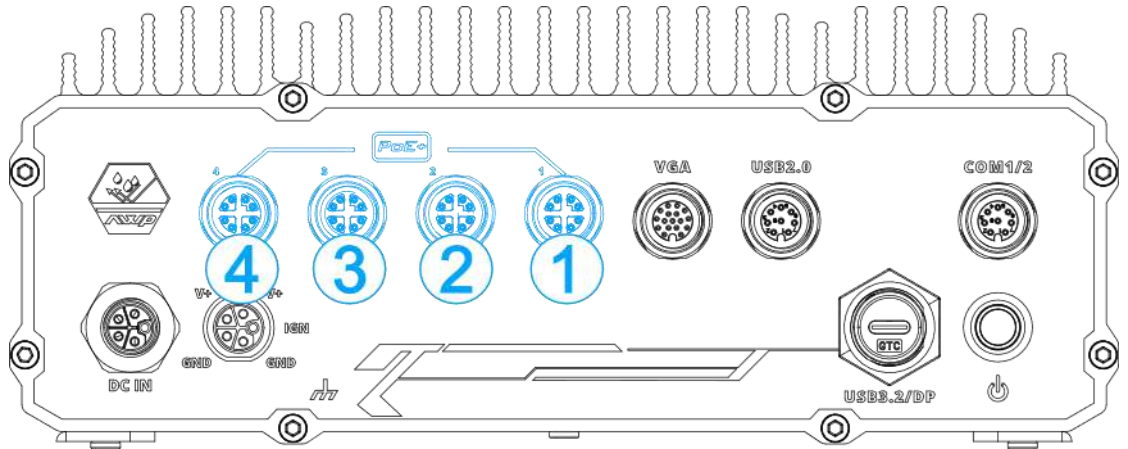
Power over Ethernet (PoE) supplies electrical power and data on a standard CAT-5/CAT-6 Ethernet cable. Acting as a PoE PSE (Power Sourcing Equipment), compliant with IEEE 802.3at, each PoE port delivers up to 25W to a Powered Device (PD). The system has a total 100W power budget. The PoE power can be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



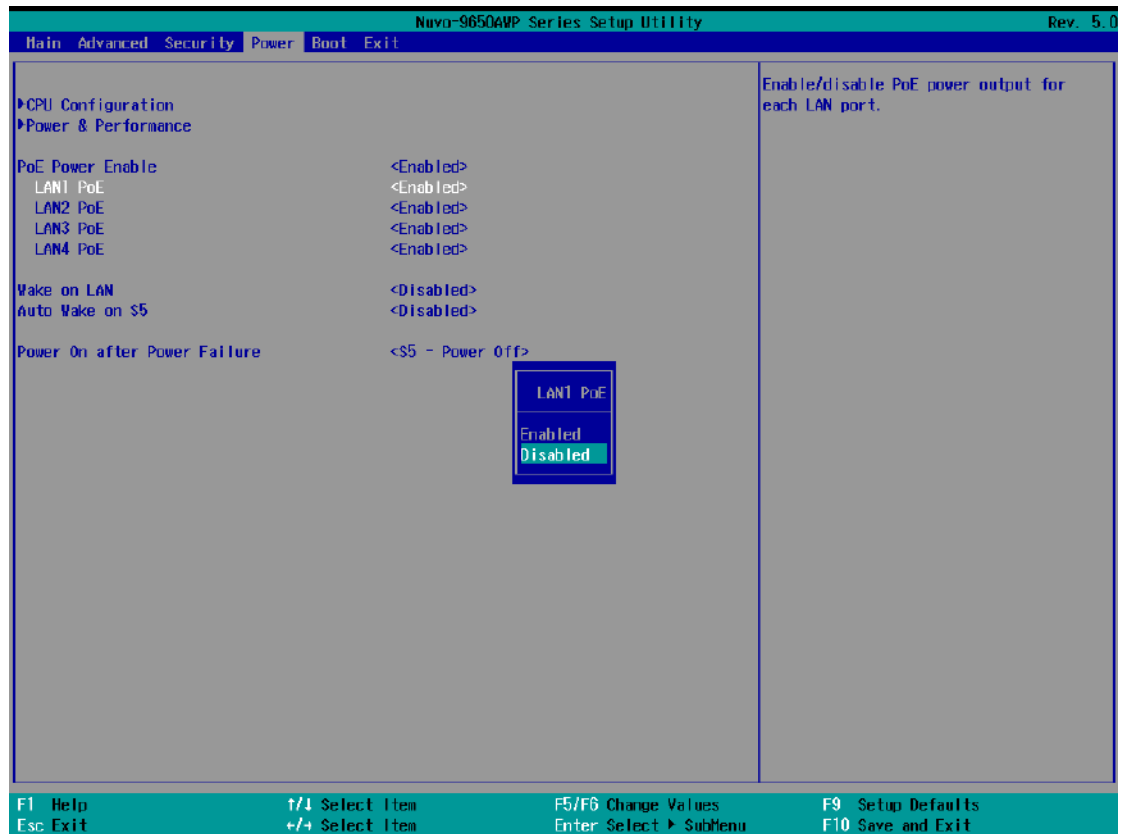
To enable/ disable “PoE Power Enable” option:

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

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



Nuvo-9650AWP-PoE LAN ports



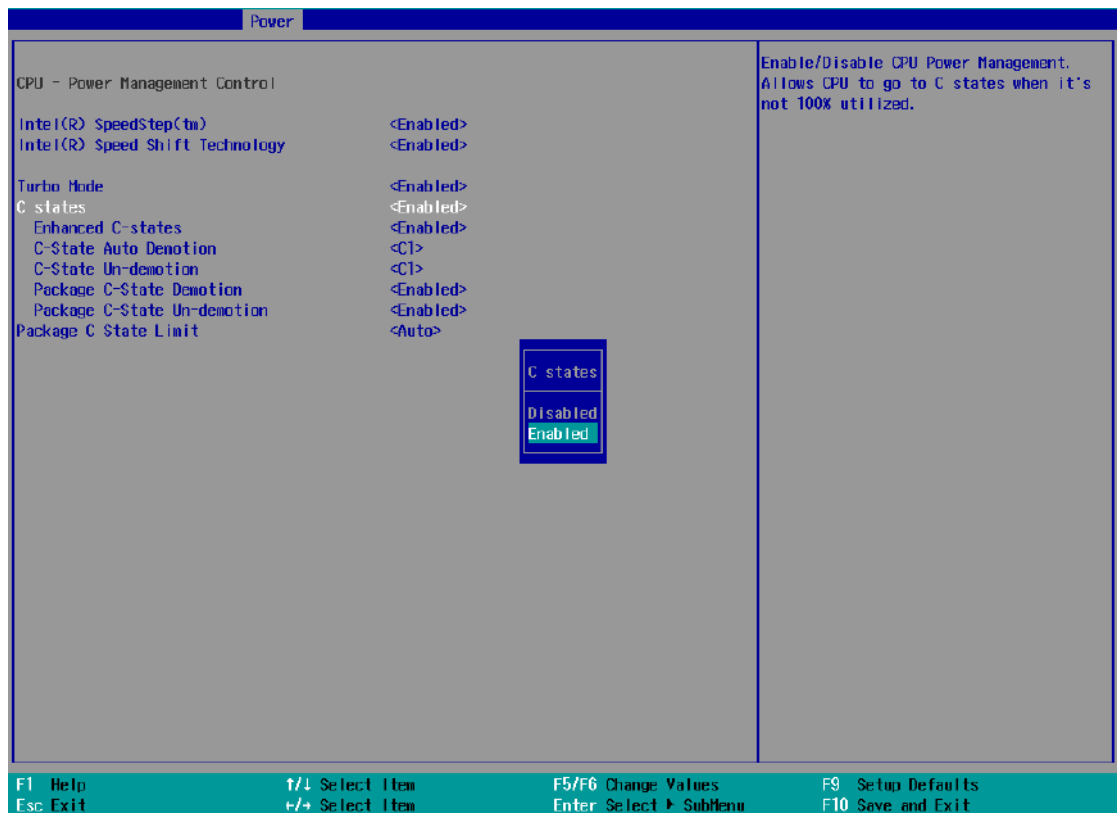
- Press F10 to “Exit Saving Changes.

4.4 C-States

C-States is a power-saving technique implemented in modern Intel processors. It shuts down the clock signals and power for idle logic units inside the CPU to save the energy consumed. The trade-off, however, is a longer latency for CPU to wake up and be 100% operational. Depending on your application, you can configure these options to have higher performance (disable “C-States”) or lower power-consumption (enable “C-States”).

To set C-States and Enhanced C-States:

1. Press **F2** when the system boots up to enter the BIOS setup utility.
2. Go to **[Power] → [CPU Configuration] → [CPU Power Management]**
3. Enable/disable the **[C-States]** option according to your application.
4. Once set, press **F10** to save setting and exit.

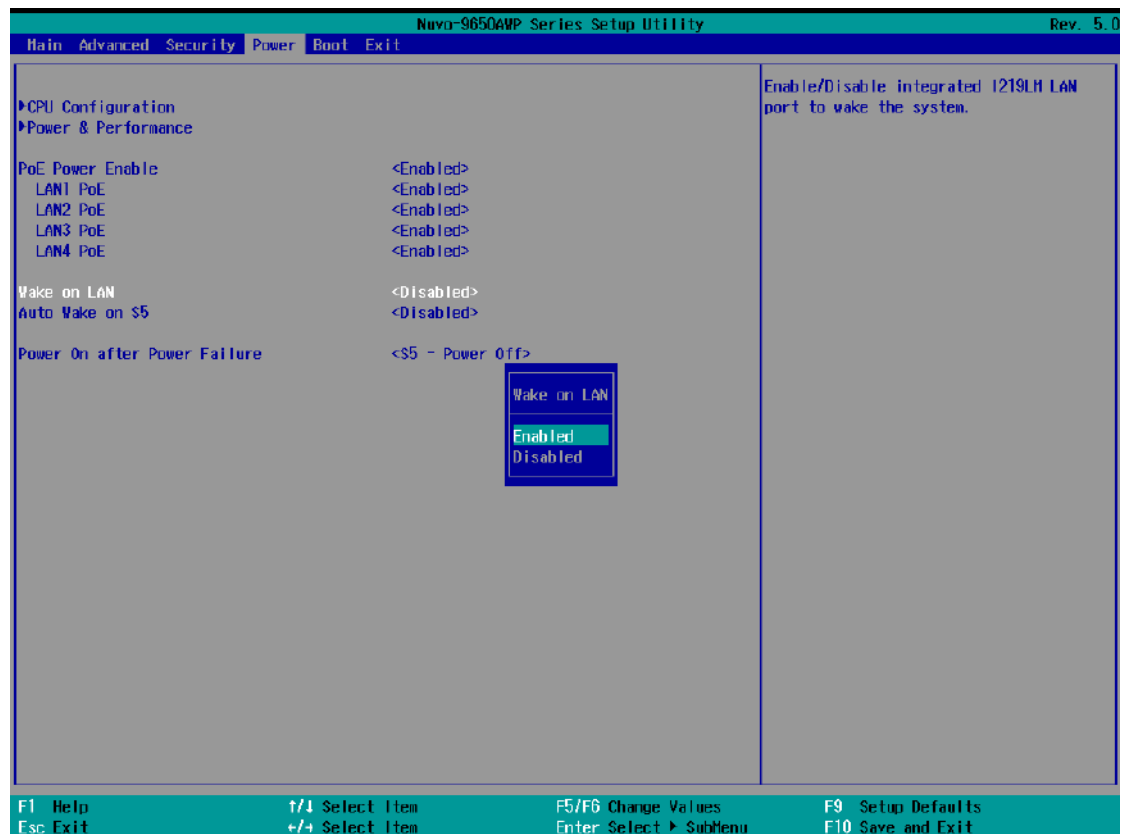


4.5 Wake-on-LAN

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

To enable/disable “Wake on LAN” option:

1. Press **F2** when the system boots up to enter the BIOS setup utility.
2. Go to **[Power]**.
3. You may enable/disable the **[Wake on LAN]** option.



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

4.6 Power On after Power Failure

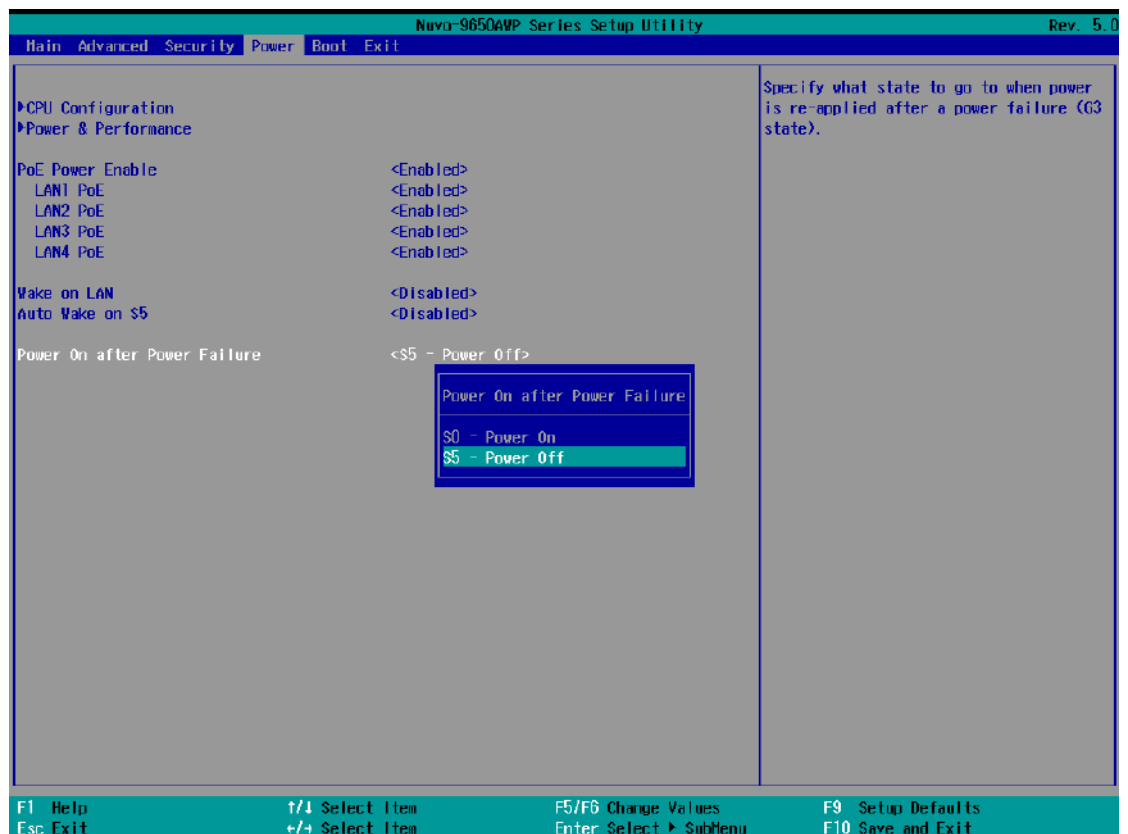
This option defines the system's behavior when DC power is supplied.

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

When you want to use the AT-mode remote on/off control function, you have to set this option to “S0 – Power On”. Please refer to this [section](#) for instructions of using AT-mode remote on/off control function.

To set “Power On after Power Failure” option:

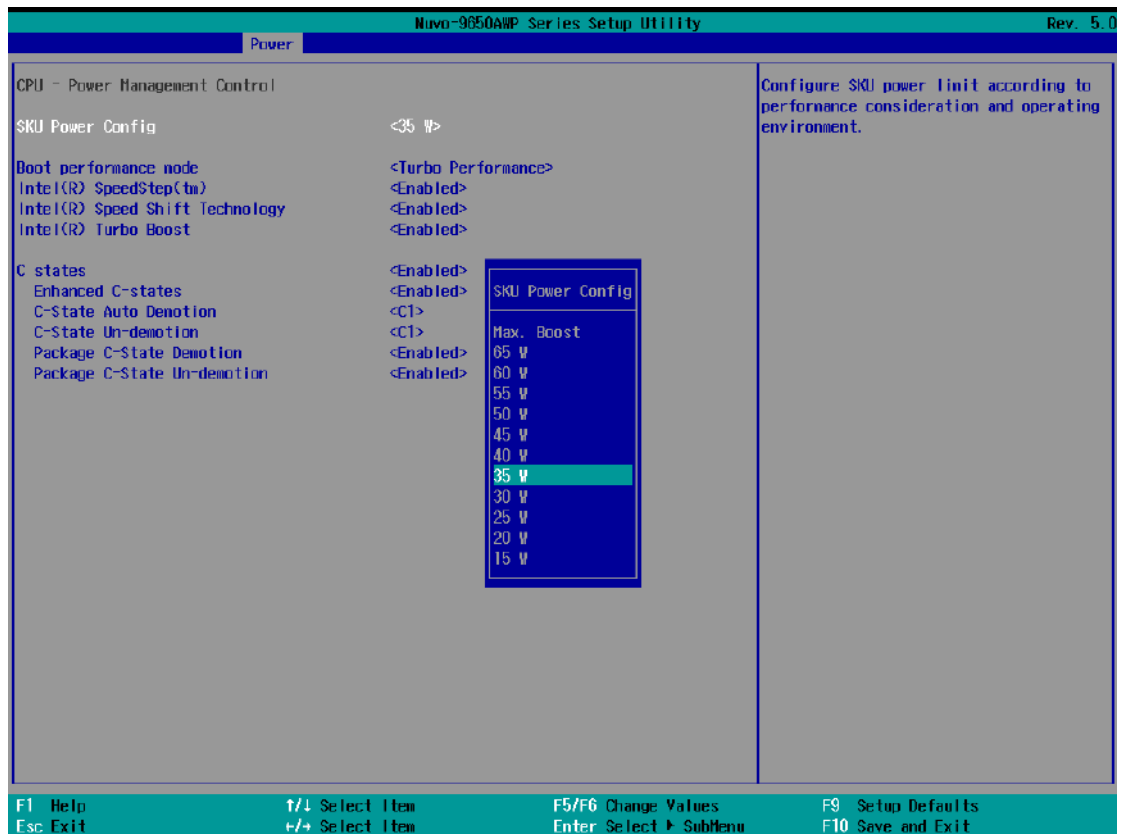
1. Press **F2** when the system boots up to enter the BIOS setup utility.
2. Go to **[Power]**.
3. Set the **[Power On after Power Failure]** option to the desired setting.



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

4.7 Power & Performance (CPU SKU Power Configuration)

The system supports Intel 14th/ 13th/ 12th Gen LGA 1700 CPUs from 35W to 65W TDP. A unique feature, “**SKU Power Config**” is implemented in BIOS to allow users to specific user-defined SKU power limit. Although the system is designed to have best thermal performance with CPUs of 35W TDP, you can install a 65W CPU and limit its SKU power (to 35W) to obtain more computing power. This feature gives you the flexibility of CPU selection and great balance between computing power and operating temperature range.



To configure the CPU SKU power limit:

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



NOTE

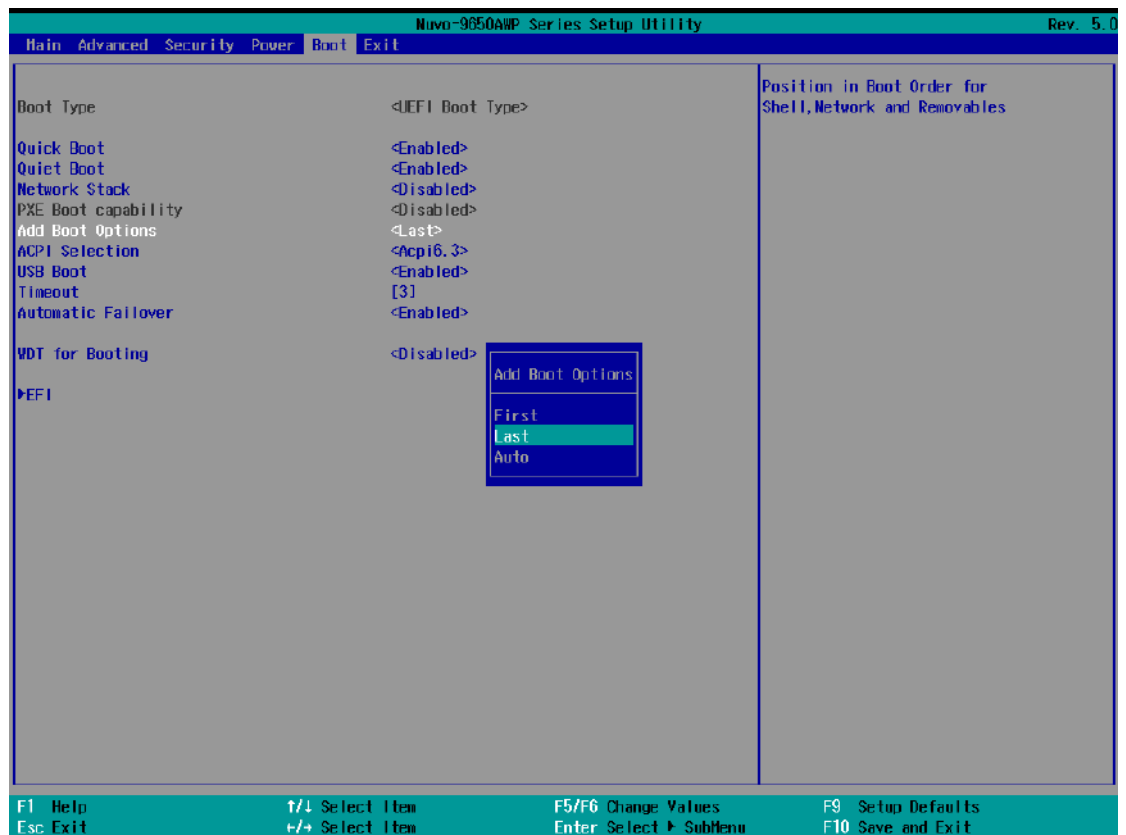
The option "Max. Boost" unleashes the CPU's maximum performance with the highest power consumption. Make sure you're using a power supply with a rated power output four times that of the CPU TDP to ensure reliable system operations.

4.8 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:

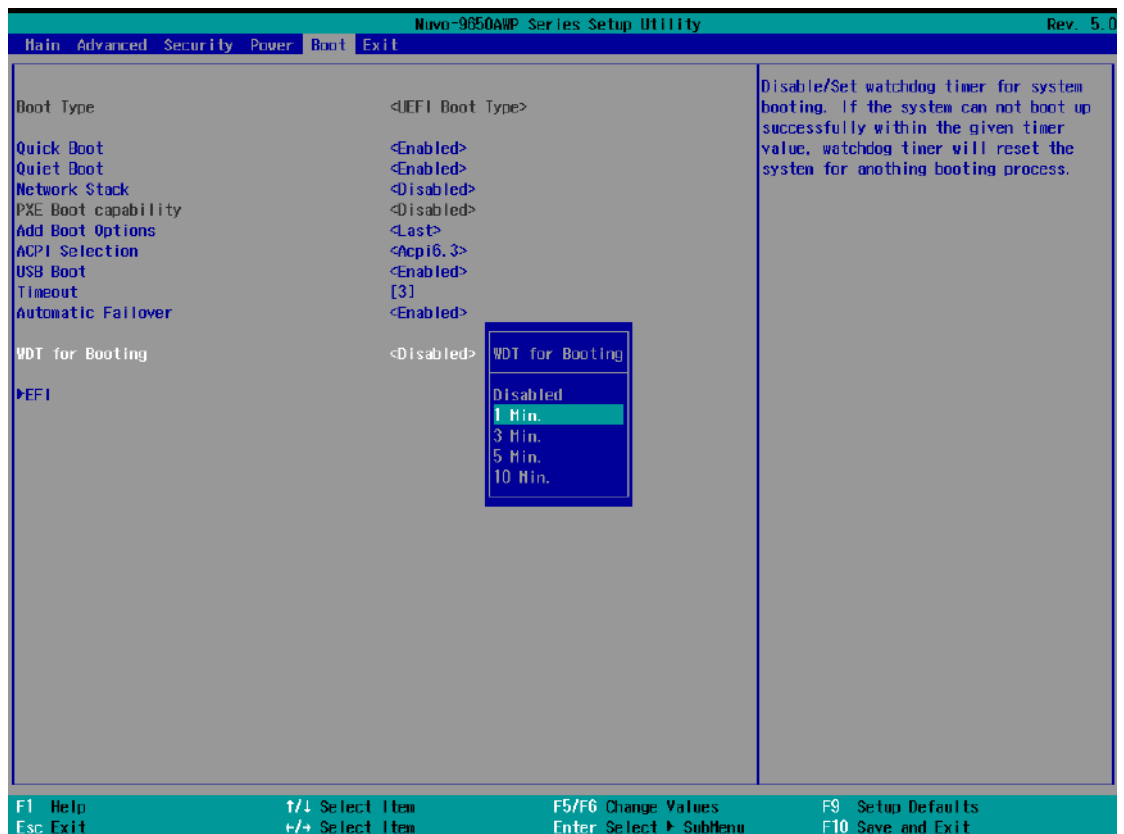
1. Press **F2** when the system boots up to enter the BIOS setup utility.
2. Go to **[Boot] > [Add Boot Options]** menu.
3. Select **[First]** or **[Last]** for your newly-added boot device and press Enter.



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

4.9 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](#) section.



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.”

5 OS Support and Driver Installation

5.1 Operating System Compatibility

Due to Intel's policy, Nuvo-9650AWP series only provide driver support for the following Windows operating systems. For Linux support, please use Linux kernel versions no later than 5.15. The following list contains the operating systems which have been tested in Neosys Technology Inc.

- Microsoft Windows 10 Enterprise LTSC 2021 64-bit
- 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 I226 controller if the driver is not embedded in kernel. You can visit Intel website for further information.*

Neosys 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.

5.2.1 Install Drivers Automatically

Neosys provides a driver package which contain function APIs for Watchdog Timer control function. You should install the driver package (WDT_DIO_Setup.exe) in prior to use these functions. Please note that you must install WDT_DIO_Setup_v2.4.0.0 or later versions.

Please refer to this [link](#) to download WDT_DIO.

Appendix A Using WDT

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 Neosys to program the WDT functions. Currently, WDT driver library supports Windows 10 x64 and WOW64 platform. For other OS support, please contact Neosys Technology for further information.

Installing WDT_DIO Library

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

- For Windows 10 64-bit OS with 64-bit application (x64 mode), please install WDT_DIO_Setup_v2.4.0.0 (x64).exe or later version.



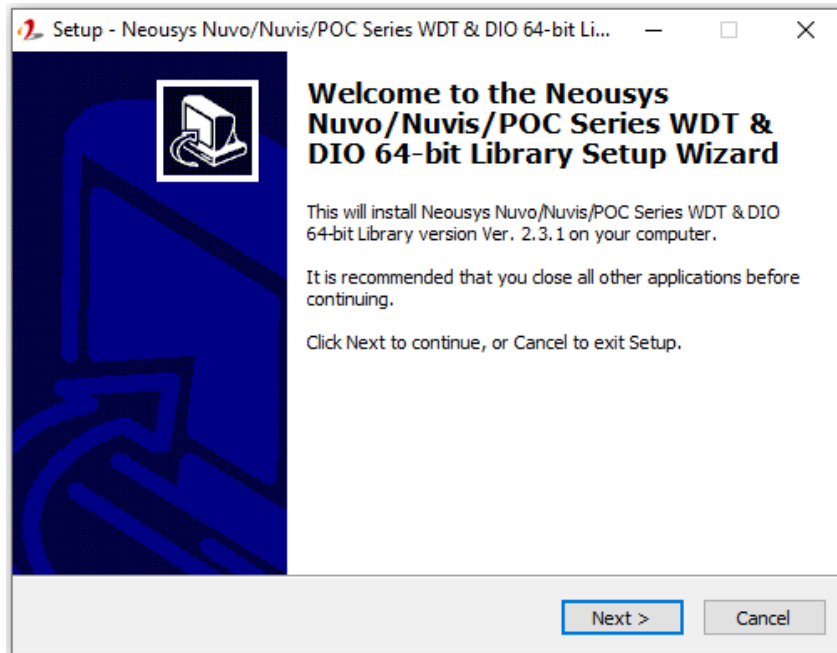
NOTE

DIO is not a function included with Nuvo-9650AWP series.

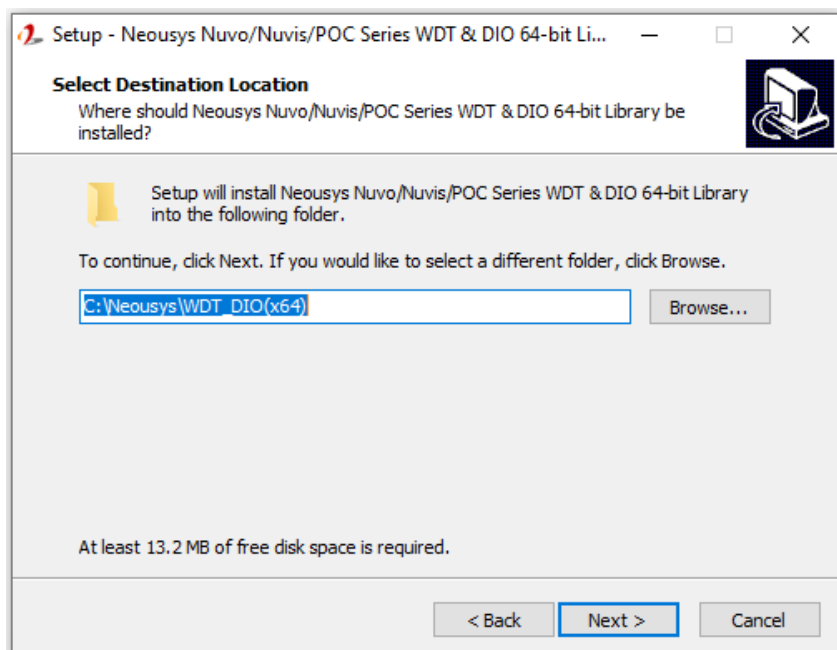
WDT and DIO Library Installation

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

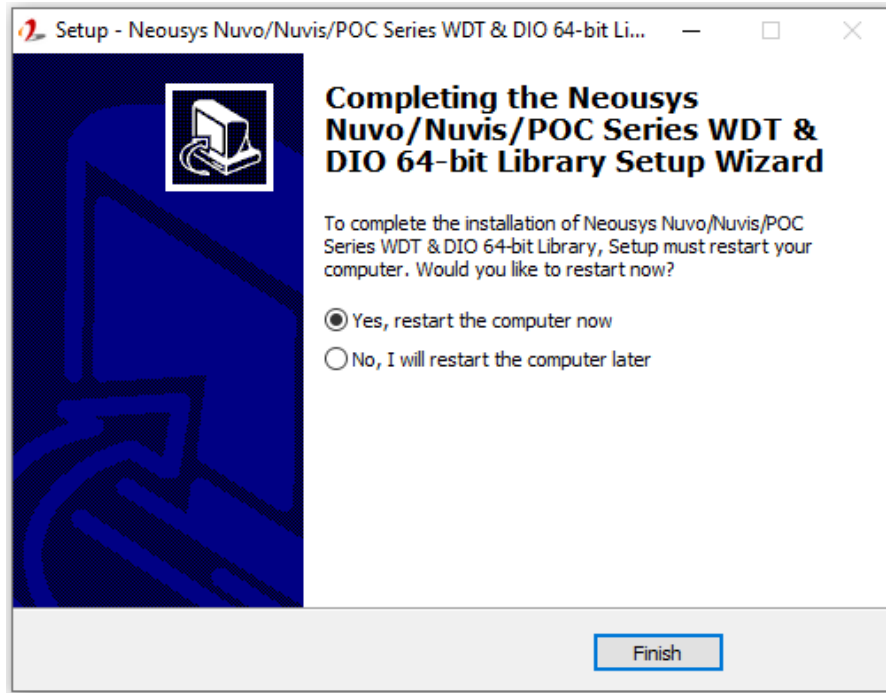
1. Execute **WDT_DIO_Setup.2.4.0.0.exe**. and the following dialog appears.



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



- 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.



- 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 Function Reference

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 | <i>tick</i> WORD value (1 ~ 65535) to indicate timeout ticks. <i>unit</i> BYTE value (0 or 1) to indicate unit of timeout ticks. 0 : unit is minute 1: unit is second |
| Return Value | If value of unit is correct (0 or 1), this function returns TRUE, otherwise FALSE. |
| Usage | WORD tick=255; BYTE unit=1; //unit is second. BOOL bRet = SetWDT(tick, unit); //timeout value is 255 seconds |

StartWDT

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

ResetWDT


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

StopWDT

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

Appendix B PoE On/ Off Control

Nuvo-9650AWP-PoE offers 802.3at PoE+ ports and users are allowed to manually turn on or off the power supply of each PoE port. This can be useful in power device (PD) fault-recovery or power reset. The APIs are part of Neousys WDT_DIO driver package. Please follow the instructions in [Appendix A Watchdog Timer](#) for installation before programming PoE on/off control function.

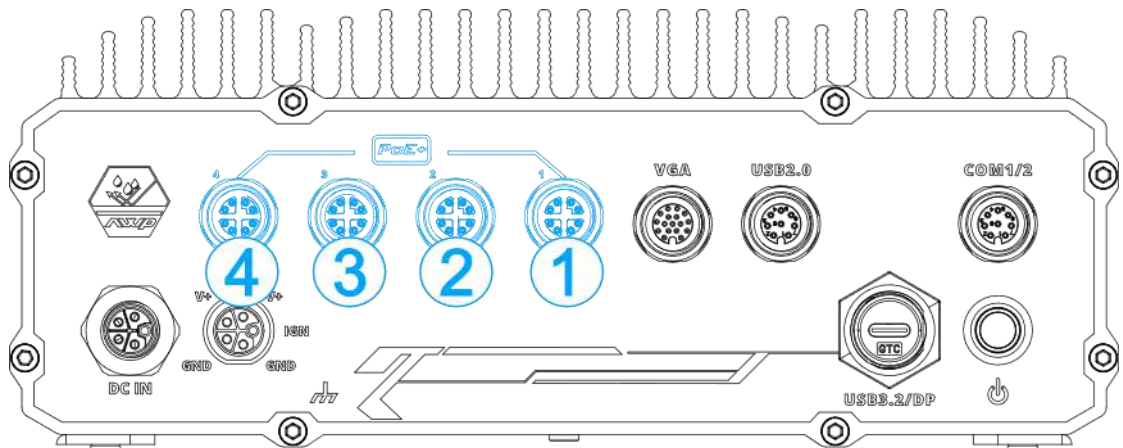


NOTE

Applicable to Nuvo-9650AWP-PoE only.

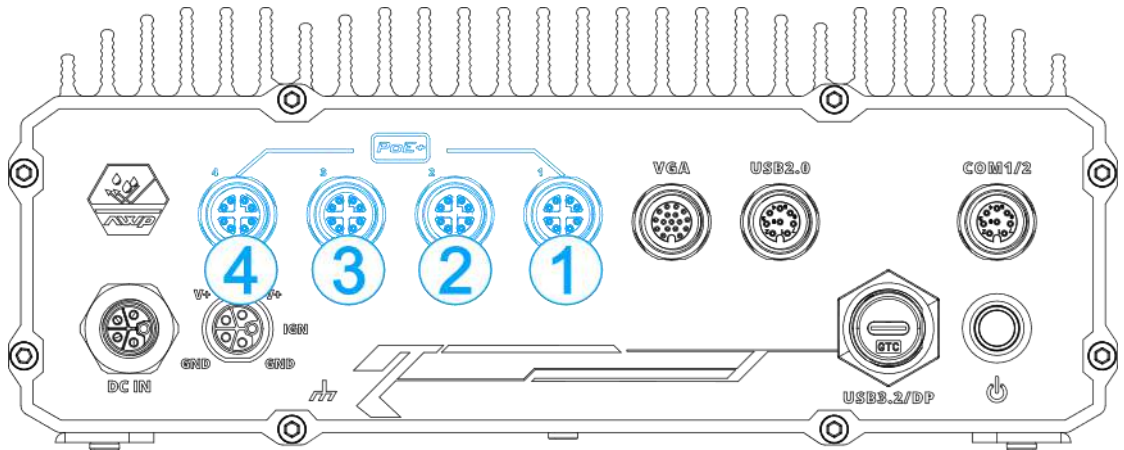
GetStatusPoEPort

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



EnablePoEPort

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



DisablePoEPort

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

