# NEOUSYS Nuvo-9000VTC Series Rugged Embedded Computer Installation Guide



**Nuvo-9100/9200VTC Series**
**Quick Introduction Guide**

Contents



## Warning

- Only qualified service personnel should install and service this product to avoid injury.
- Observe all ESD procedures during installation to avoid damaging the equipment.

### 1. Preparing tools

Unpack the equipment and make sure the following tools are available and delivered contents are correct.

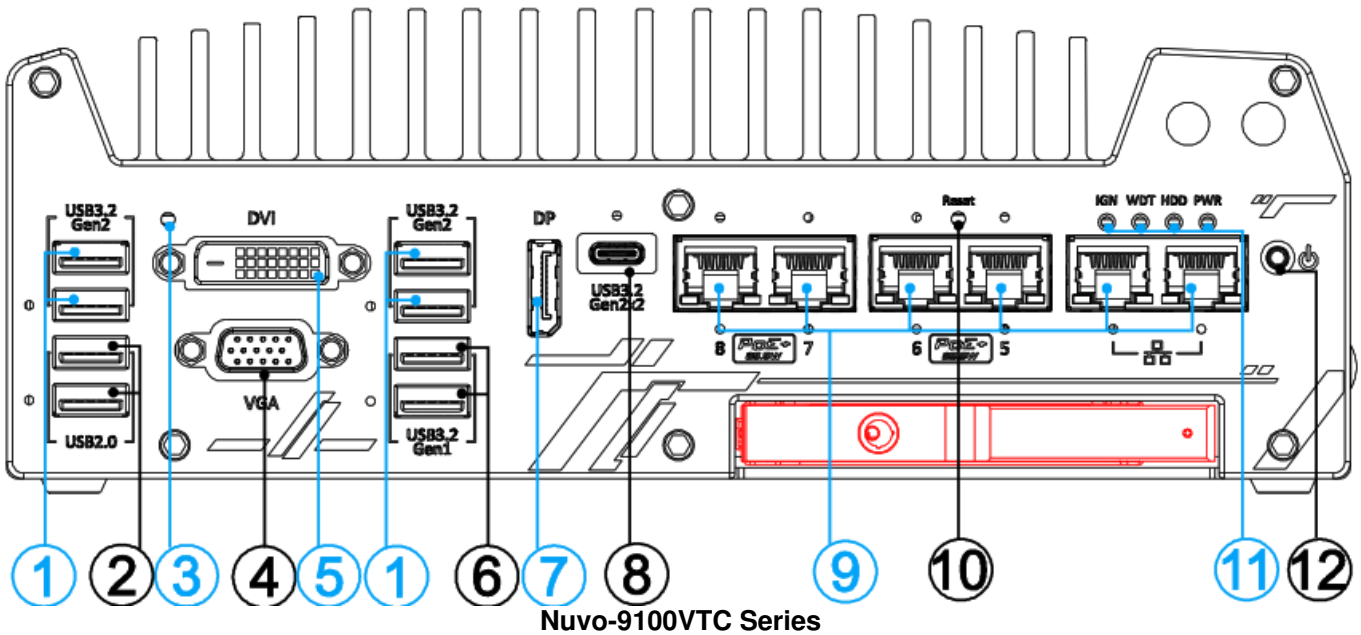
1-1. User-provided tools

- **Anti-static wrist wrap**

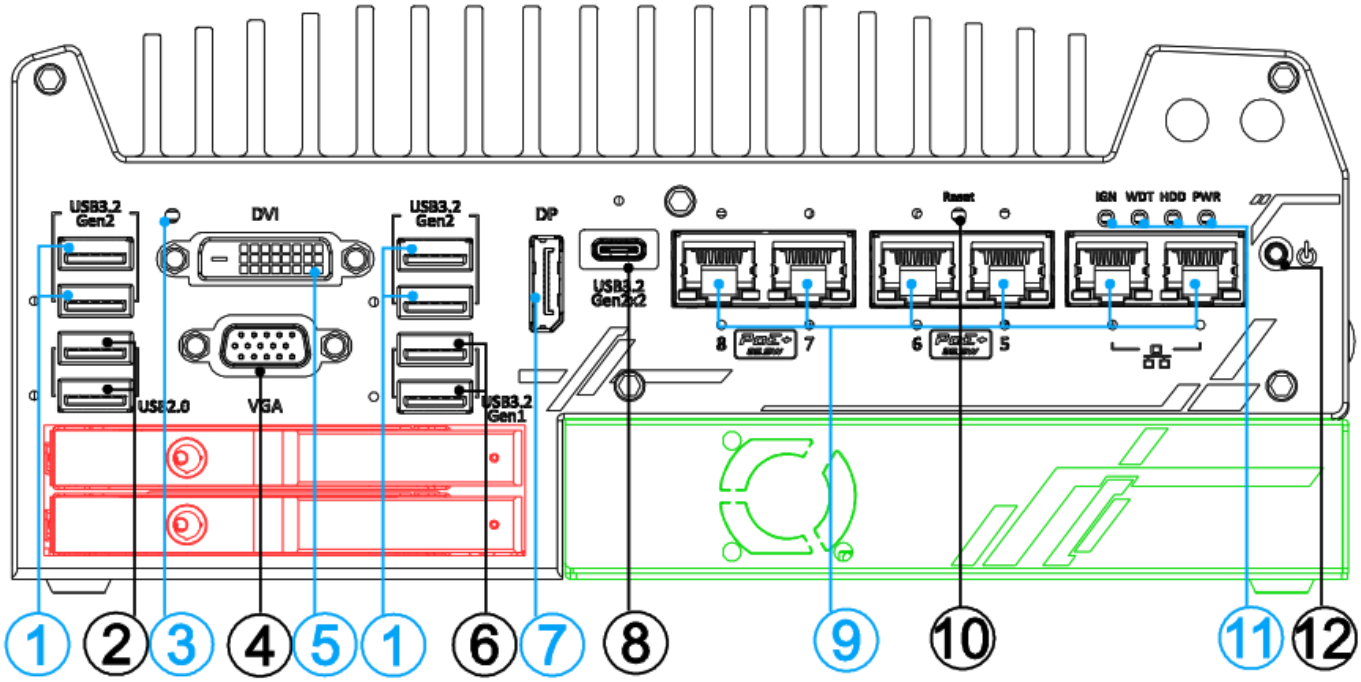
### 1-2. Packing List

| Item | Description | Quantity |
|---|---|---|
| 1 | Nuvo-9000VTC series system | 1 |
| 2 | CPU bracket | 1 |
| 3 | Nuvo-9100VTC damping bracket<br>Nuvo-9200VTC damping bracket | 1<br>1 |
| 4 | Foot pad | 4 |
| 5 | 3-pin pluggable terminal block | 2 |
| 6 | 2.5″ HDD/SSD thermal pad (if FIDD not installed) | 1 |
| 7 | Rubber spacer (barebone system only) | 4 |
| 8 | Screw pack | 1 |
| 9 | 12x grommets (Nuvo-9100VTC)<br>4x grommets + 4x sleeves (Nuvo-9200VTC) | |

## Overview – Front Panel



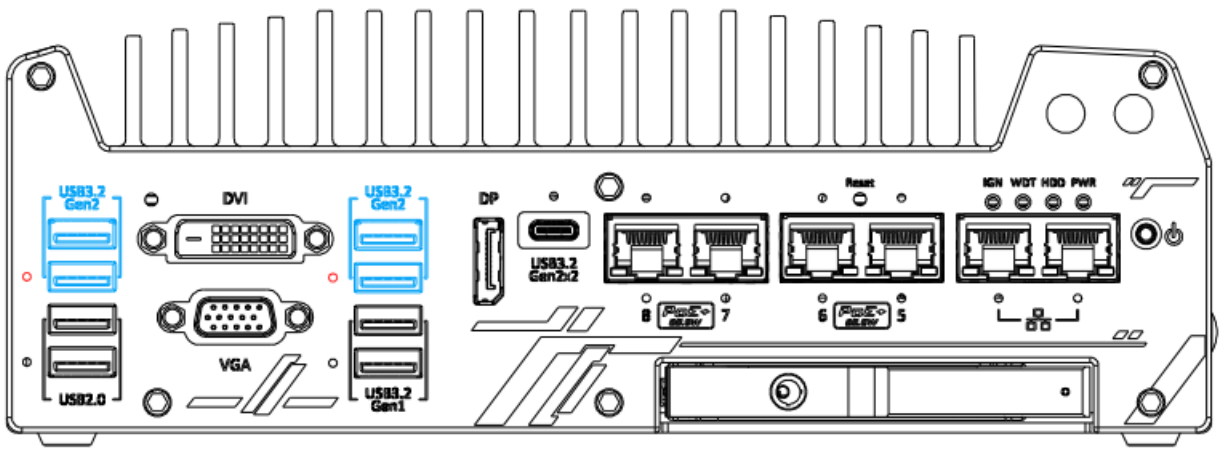

**Nuvo-9100VTC Series**




**Nuvo-9200VTC Series**

| No. | Item | Description |
|---|---|---|
| 1 | USB3.2 Gen2x1 port | USB3.1 G2 ,n 2 port (SuperSpeed+) offers up to 10Gbps, twice the bandwidth over existing SuperSpeed USB3.123en. 1 connection. It is also backwards compatible with USB3.0 and USB2.0 |
| 2 | USB2.0 port | The USB 2.0 ports offer up to 480MbiVs bandwidth and are backward compatible with USB 1.1/ 1.0 |
| 3 | CMOS reset button | Use this button to manually to reset the CMOS to load default BIOS |
| 4 | VGA port | VGA output supports resolution up to 1920 x 1200©60Hz |
| 5 | DVI port | DVI-D output supports resolution up to 1920 x 1200@60Hz and is compatible with other digital connections via an adapter |
| 6 | USB3.1 Gen1x1 port | USB3.1 Gen 1 offers up to 5Gbps of data-throughput performance |
| 7 | DisplayPort | Support display resolutions up to 4096 x 2304 a 60Hz. Compatible with HDIv11/ DVI via respective adapter/ cable (resolution may vary) |
| 8 | USB3.2 Gen2x2 Type-C port | The USB 3.2 Gen2x2 type-C port offers up to 20Gbps of bandwidth connectivity for fast data exchange with external devices |
| 9 | Ethernet & PoE+ port | lx 2.5GbE by 1225 and lx GbE by 1219 with screw-lock<br>Additional 4x 2.5GbE by 1225 (Nuvo-9108!9208VTC) with screw-lock |
| 10 | Reset button | Use this button to manually reset the system |
| 11 | Status LED indicators | From left to right, the LEDs are IGN (ignition control), WDT (•atchdog tinier). HOD (hard disk drive) and PWR (system power) |
| 12 | Power button | Use this button to turn on or shutdown the system |
| Area in Green | Cassette module | The cassette module offers a separate compartment to manage thermal conditions and reduce installation complications of an add-on card |
| Area in Red | 2.5″ HDD/SSD Tray | The HDD expansion tray offer hot-swap ability (lx tray for Nuvo-9100VTC systems and 2x trays for Nuvo-9200VTC systems) |

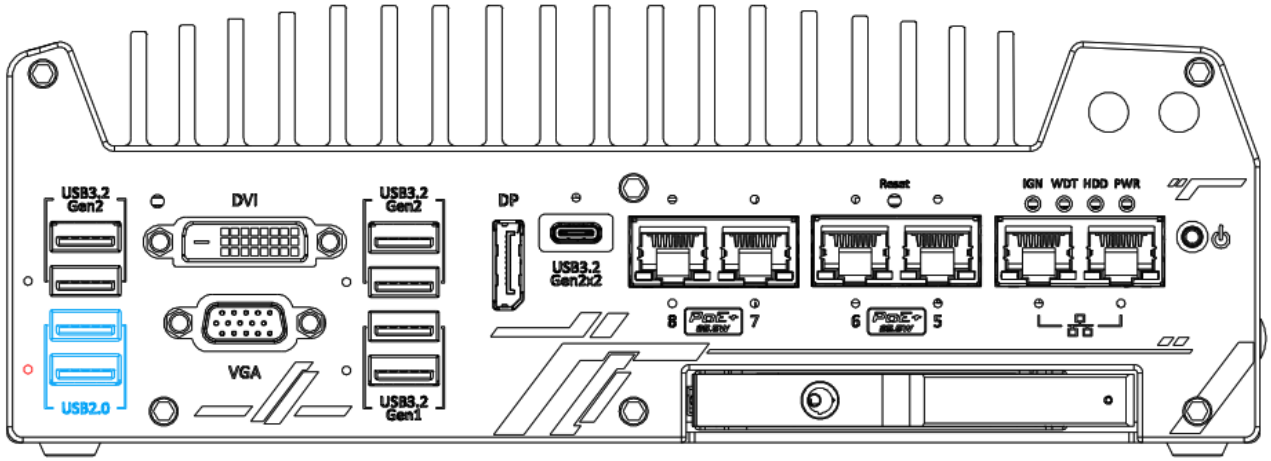
**USB3.2 Gen2x1 Port**




The system's USB 3.2 Gen2x1 ports (10Gbps) are implemented via native xHCI (eXtensible Host Controller Interface) controller and are backward compatible with USB3.2 Gen.1 USB 2.0, USB 1.1 and USB 1.0 devices. UEFI USB is also supported so you can use USB keyboard/ mouse in UEFI shell environment. Indicated in are

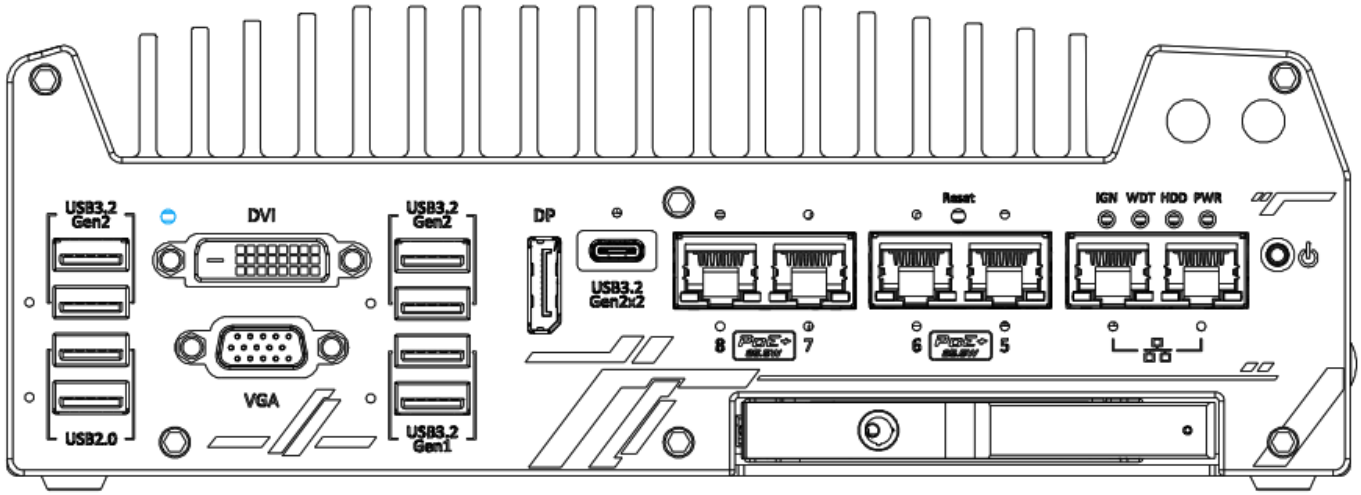
screw-lock holes for the corresponding USB port.
xHCI driver is supported natively in Windows 10, therefore you do not need to install the xHCI driver prior to utilizing USB functions.

**USB2.0 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. Indicated in is red a screw-lock hole for the corresponding USB port.
xHCI driver is supported natively in Windows 10, therefore you do not need to install xHCI driver to utilize USB functions. ‘

## CMOS Reset Button

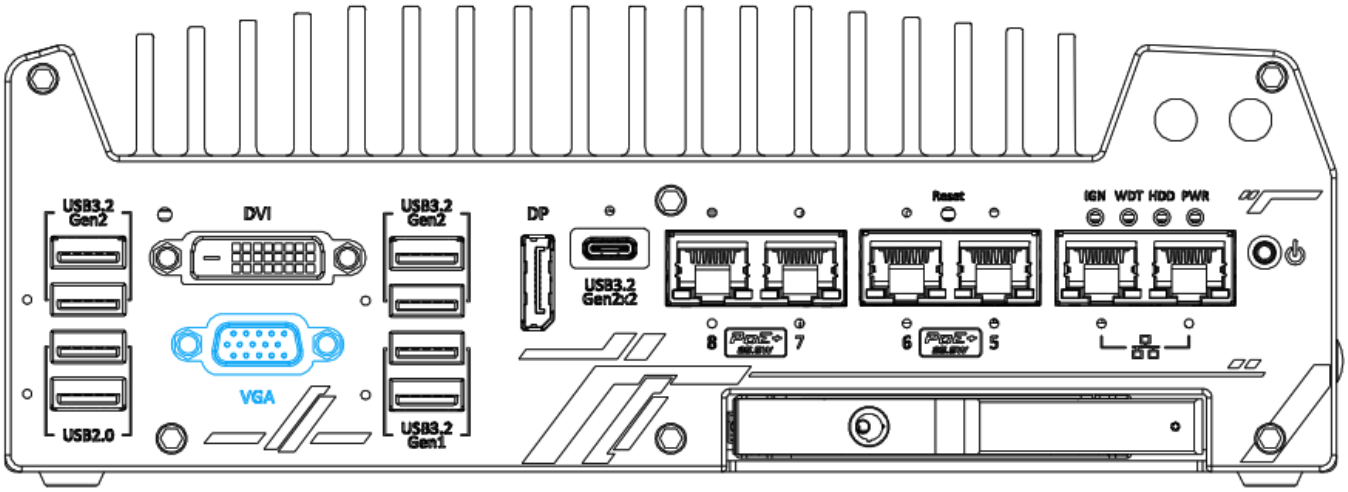



The CMOS Reset button is used to manually reset the motherboard BIOS in case of system halt or malfunction. To avoid unexpected operation, it is purposely placed behind the panel. To reset, disconnect the DC power input, and use the tip of a pen to press and
hold for at least 5 seconds to reset the BIOS.

**Note**
You MUST unplug the DC connection to the system before resetting the CMOS.

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

**VGA Port**

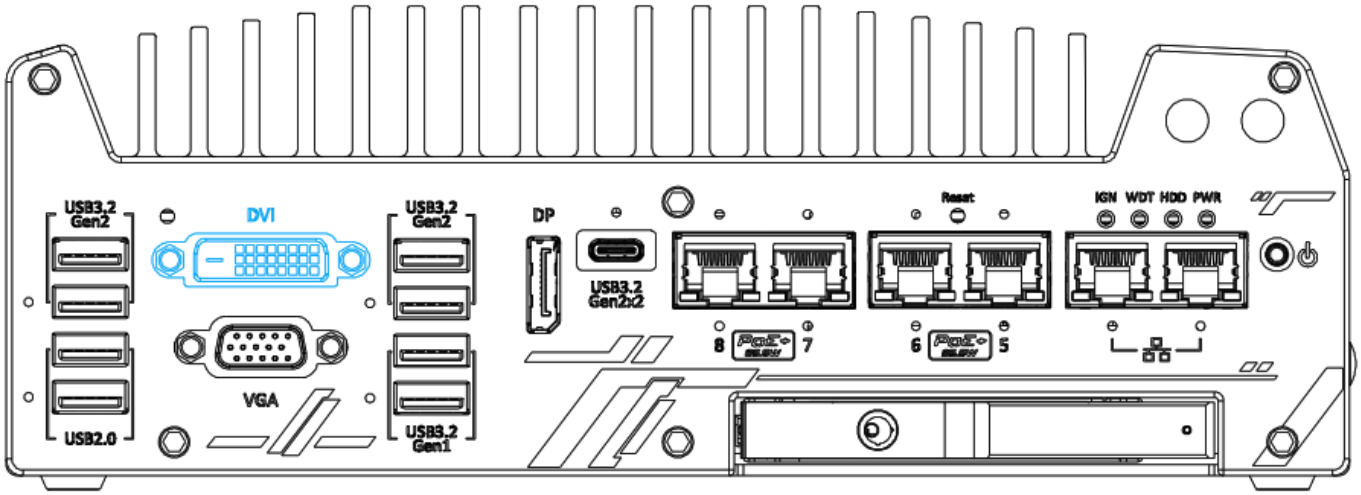



VGA connector is the most common video display connection.
The VGA output supports up to 1920×1200@60Hz resolution.
The system supports triple independent display outputs by connecting display devices to VGA, DVI and DisplayPort connection. To support multiple display outputs and achieve best VGA output resolution in Windows, you need to install corresponding graphics drivers.

**Note**

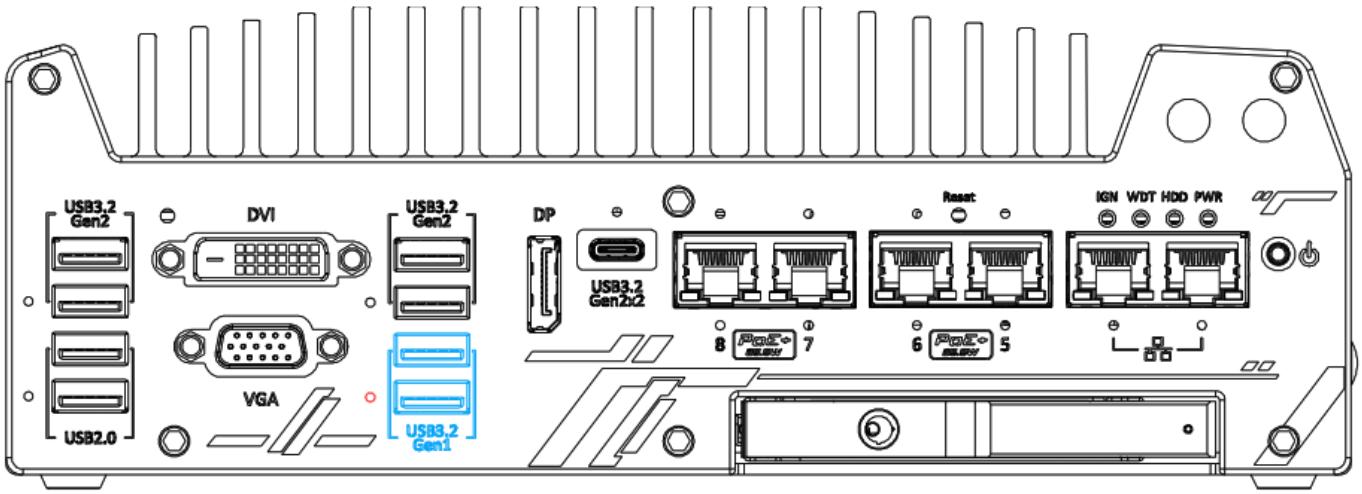
Please make sure your VGA cable includes SDA and SCL (DDC clock and data) signals for correct communication with monitor to get resolution/timing information. A cable without SDA/ SCL can cause blank screen on your VGA monitor due to incorrect resolution/timing output.

**DVI Port**



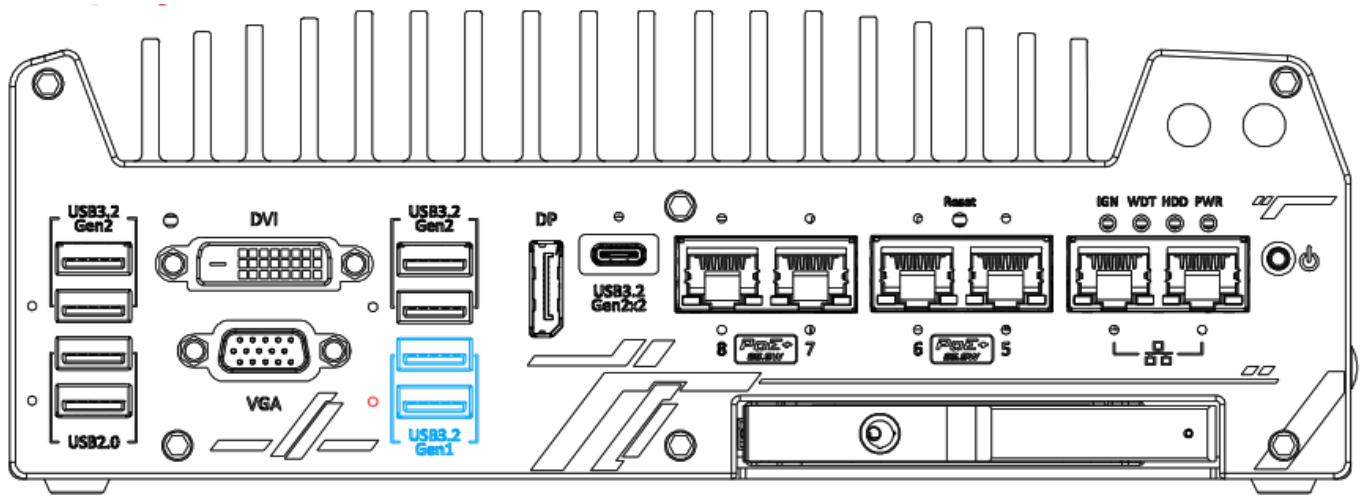

DVI-D transmits graphics data in digital format and therefore can deliver better image quality at high resolution. The DVI connector on the front panel can either output DVI signals or other digital signals (via an adapter/ cable) depending on the display device connected. It supports resolutions up to 1920×1200@60Hz.The system supports triple independent display outputs by connecting display devices to VGA, DVI and DisplayPort connection. To support multiple display outputs and achieve best DVI output resolution in Windows, you need to install corresponding graphics driver.

**USB3.2 Gen1x1 Port**




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

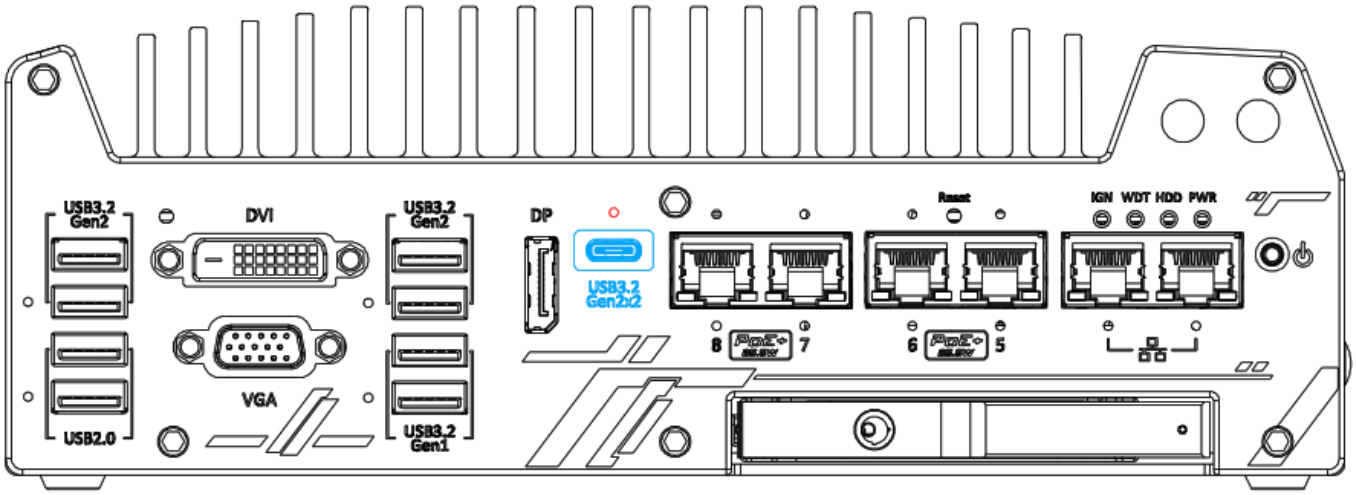
**DisplayPort**




The system has a DisplayPort (DP) output which is a digital display interface that mainly connect video source and carry audio to a display device. When connected to a DP, it can deliver up to 8K UHD (7680 x 4320 @ 60Hz) in resolution. The system is designed
to support passive DP adapter/ cable. You can connect to other display devices using DP-to-HDMI cable or DP-to-DVI cable.

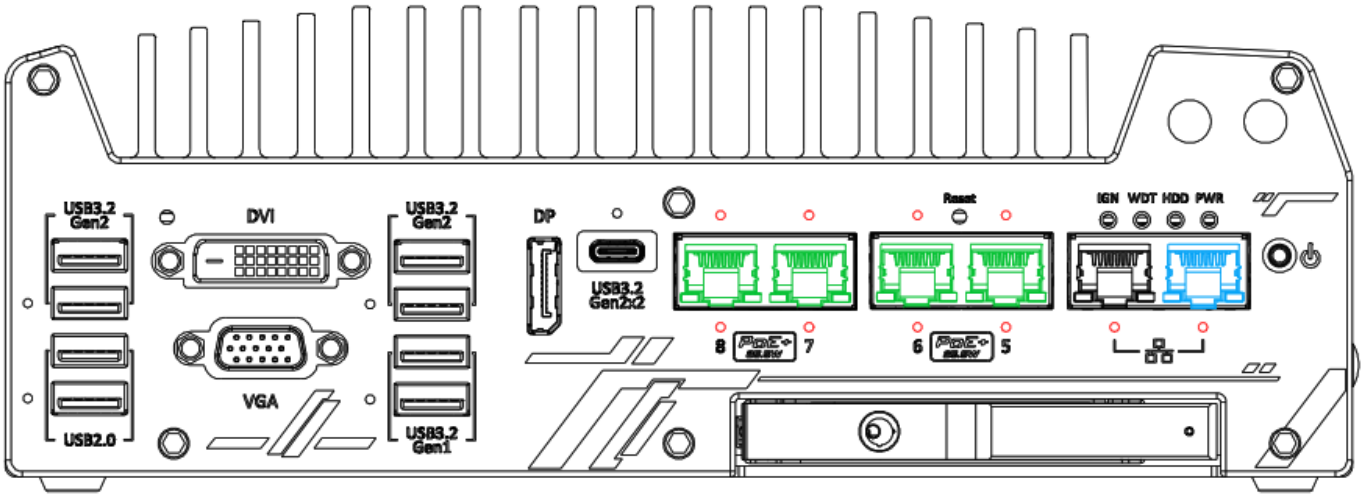
The system supports triple independent display outputs by connecting display devices to VGA, DVI and DisplayPort connection. To support multiple display outputs and achieve best DisplayPort output resolution in Windows, you need to install corresponding graphics drivers.

## USB3.2 Gen2x2 Type-C Port




The system's USB 3.2 Gen2x2 type-C port offers up to 20Gbps 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.

**2.5G Ethernet and PoE+ Ports**




The ports marked in green/ black blue are Power over Ethernet (PoE) ports implemented with Intel I225-IT 2.5G Ethernet controller, and marked in is implemented using Intel® I219-LM controller that supports Wake-on-LAN and is also compatible with to support Intel® AMT (Active Management Technology) advanced features such as remote SOL desktop and remote on/ off control. The PoE+ ports feature panel screw fix holes (indicated in ) for a firm and secure red connection. The ports supply electrical power and data on a standard CAT-5/CAT6 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), and the system has a total 100W power PoE budget.

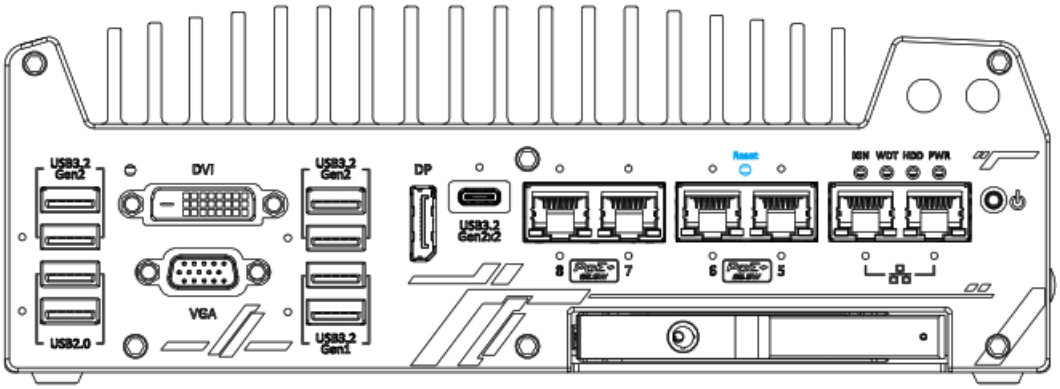
**Active /Link LED (Right)**

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

**SPEED LED (Left)**

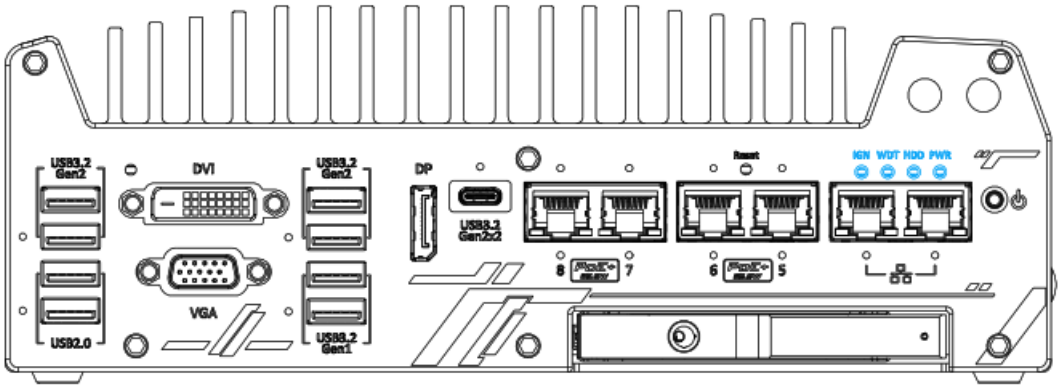
| LED Color | Status | Description |
|---|---|---|
| Green or Orange | Off | 10 Mbps |
| | Green | 100 Mbps |
| | Orange | 1000/2500 Mbps |

### 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.

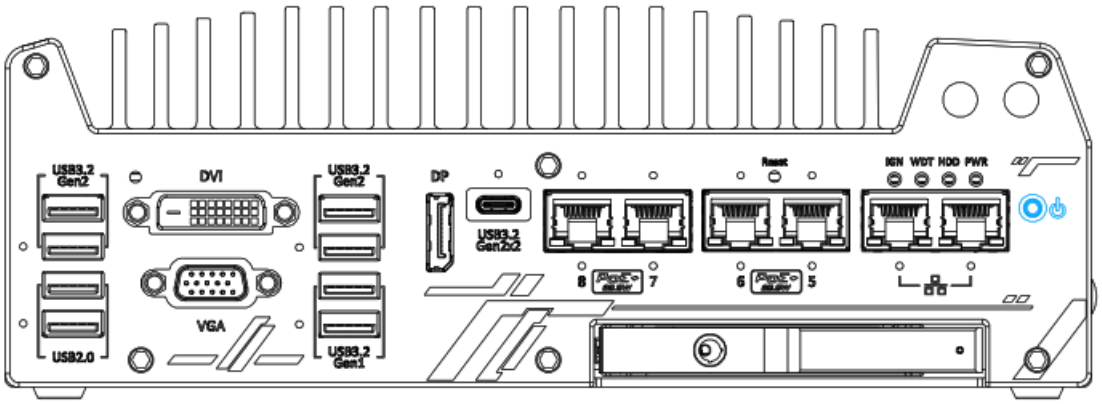
#### Status LED Indicator




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

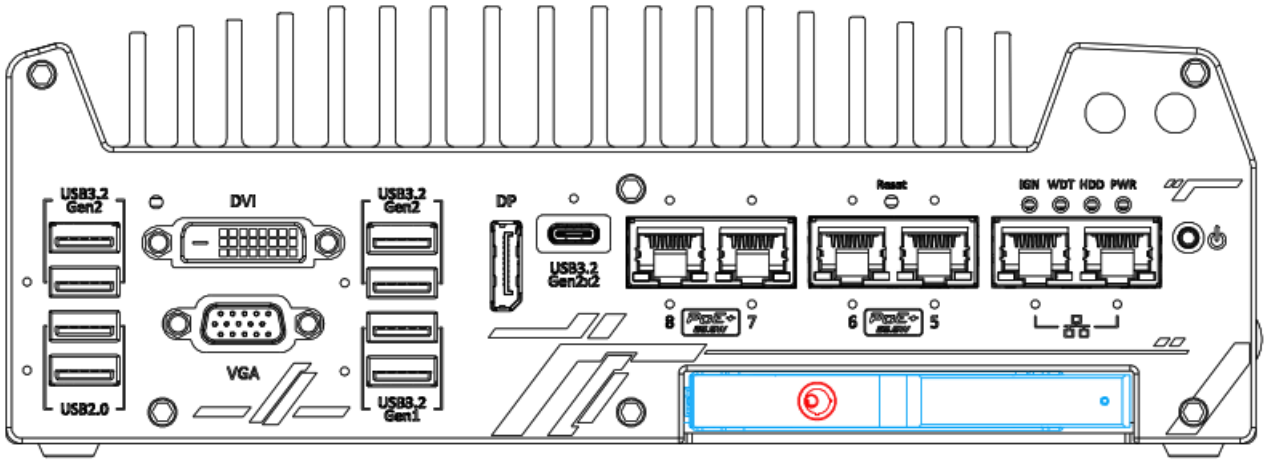
There are four LED indicators on the I/O panel: IGN, WDT, HDD and PWR. The descriptions of these four LED are listed in the following table.

#### Power Button

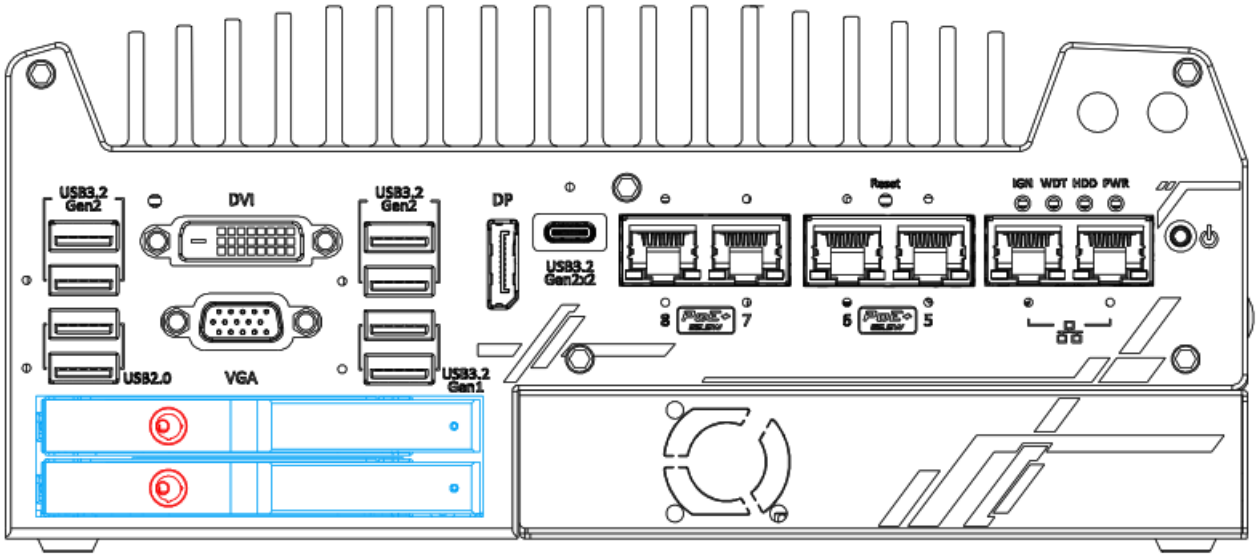



he power button is a non-latched switch for ATX mode on/off operation. To turn on the system, press the power button and the PWR LED should light-up green. To turn off the system, issuing a shutdown command in OS is preferred, or you can simply press the
power button. To force shutdown when the system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

**2.5″HDD/SSD Hot Swappable Tray**




**Nuvo-9100VTC**

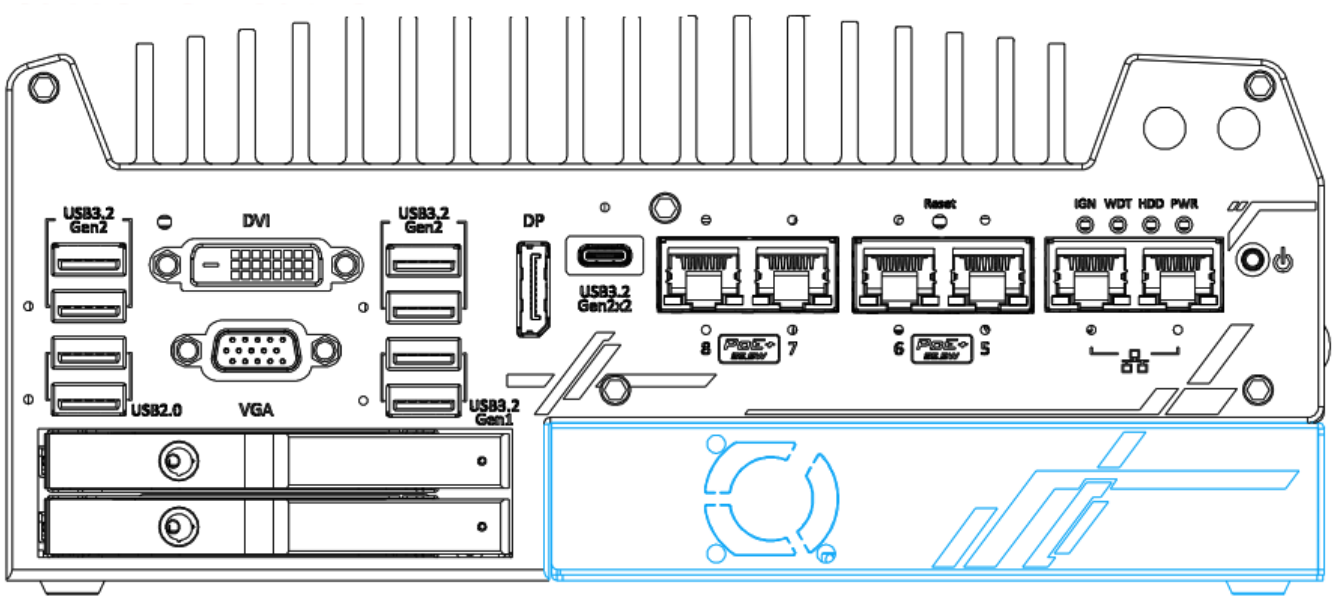



**Nuvo-9200VTC**

The Nuvo-9100VTC systems support an external 2.5″ HDD/ SSD via a hot-swappable slot while Nuvo-9200VTC systems support two external 2.5″ HDD/ SSD via hot-swappable slots. Designed for easy access, the HDD/ SSD slot is secured by a lock (indicated in
red.

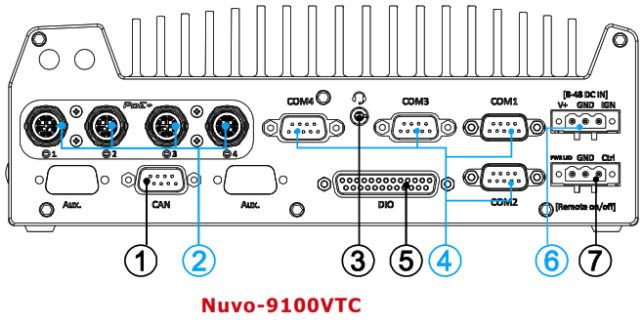
**Note**
The tray supports up to 9.5mm thickness HDD/ SSD.

### Cassette Module

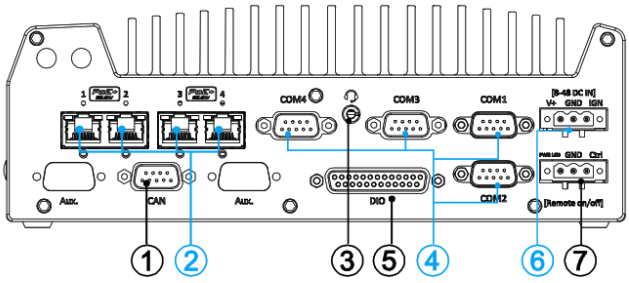



The Nuvo-9200VTC systems features a Neousys' patented expansion Cassette (R.O.C. Patent No. M456527) that provides a separated compartment to accommodate an add-on card. It effectively manages thermal conditions of both the system and the add-on card. The modular concept brought by Cassette module also reduces the complexity of installing and replacing an add-on card in the fanless controller.

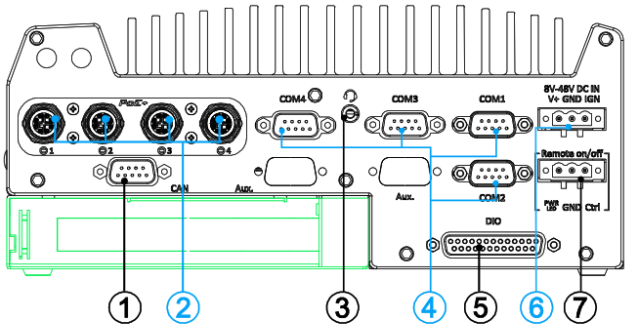
## Rear Panel IO



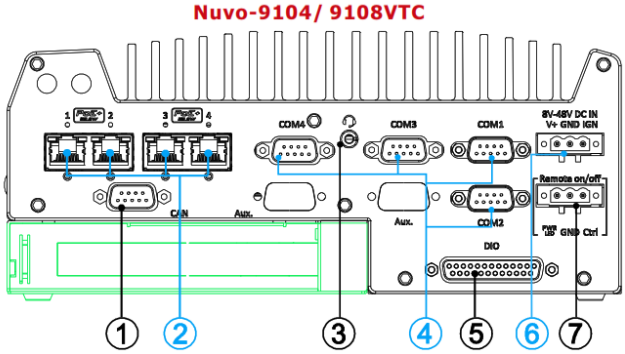

Nuvo-9100VTC




Nuvo-9104/ 9108VTC

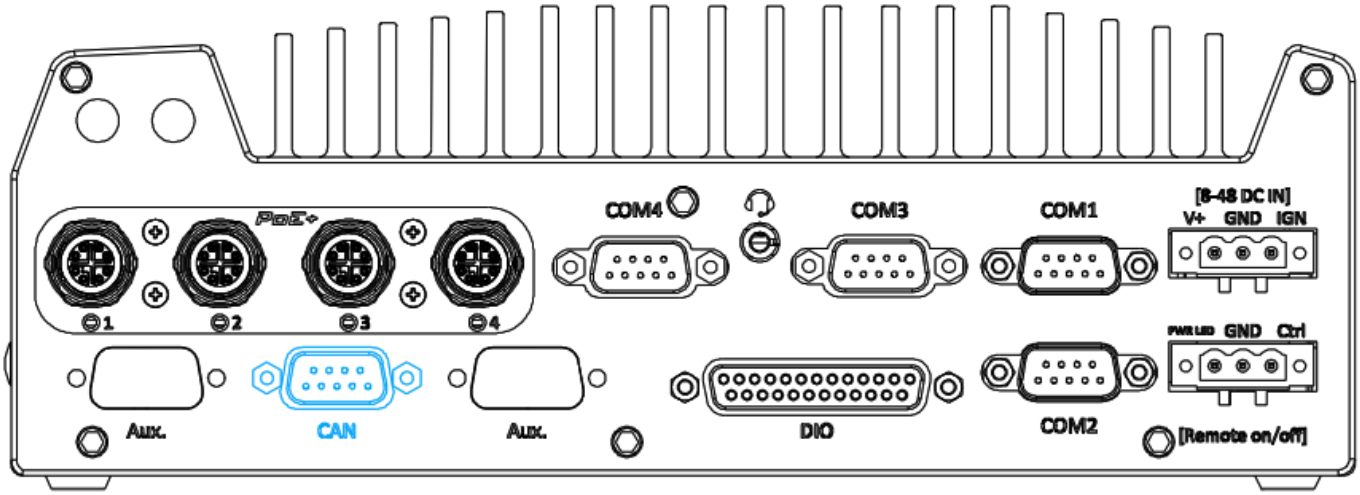



Nuvo-9200VTC



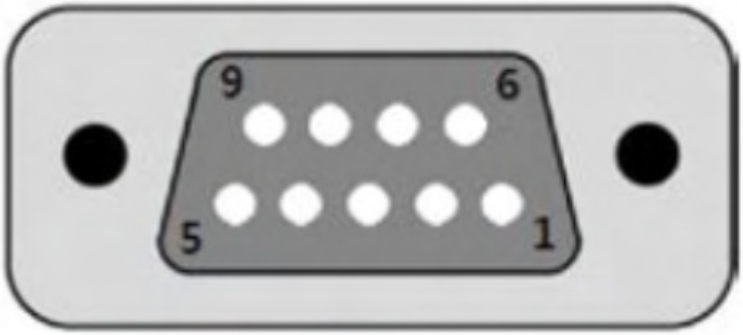

Nuvo-9204/ 9208VTC

### CAN bus Port



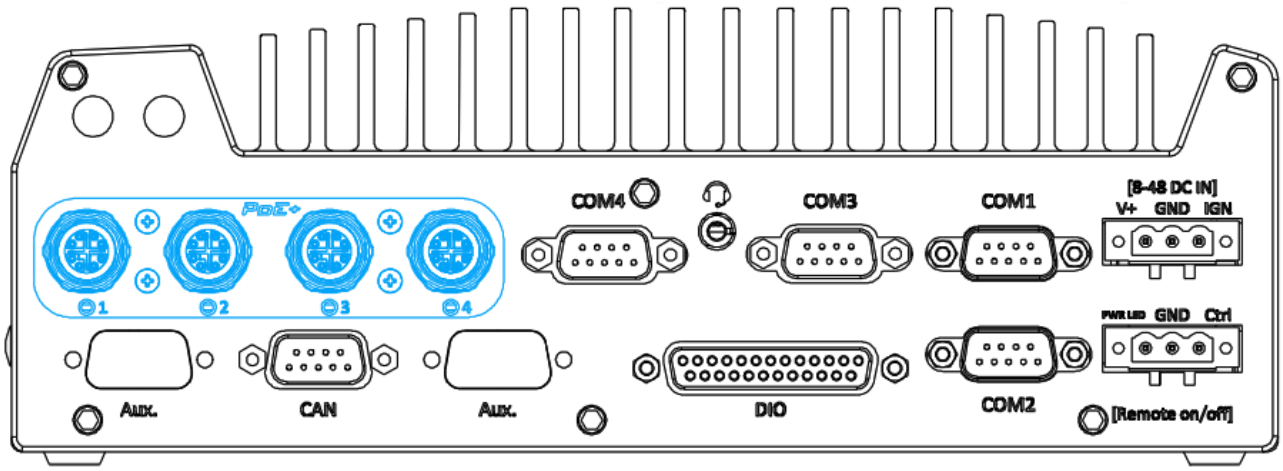

CAN bus is a robust industrial bus with a pair of differential signals and is commonly used in various industrial and in-vehicles applications. The system is equipped with a CAN bus DB9 port that is compatible with both industrial and in-vehicle applications. The CAN bus port supports CAN2.0A and CAN2.0B up to 1Mbps.

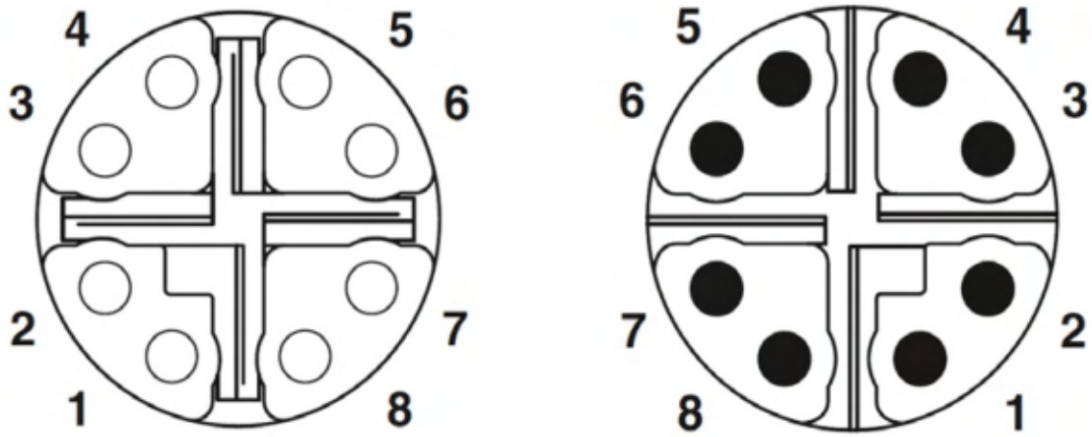
**Pin Definition**




| Pin No. | Definition | I/O | Description |
|---|---|---|---|
| 1 | GND | – | GND |
| 2 | Reserved | – | Reserved pin. Keep unconnected |
| 3 | CAN _H | I/O | CAN Bus High-level voltage |
| 4 | Reserved | – | Reserved pin. Keep unconnected |
| 5 | CAN _L | I/O | CAN Bus Low-level voltage |
| 6 | Reserved | – | Reserved pin. Keep unconnected |
| 7 | Reserved | – | Reserved pin. Keep unconnected |
| 8 | Reserved | – | Reserved pin. Keep unconnected |
| 9 | Reserved | – | Reserved pin. Keep unconnected |

**M12 Power over Ethernet Port (Nuvo-9100/ 9200VTC)**




M12 socket (panel side)

M12 plug (cable side)

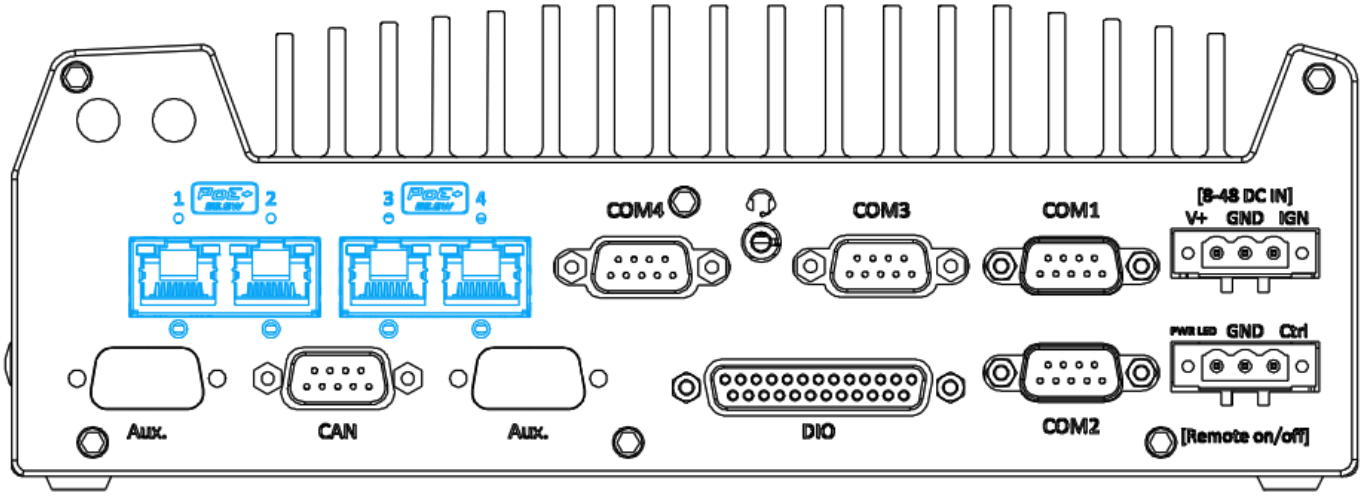
**M12 Pin Corrsponding RJ45 Wire Connection**

| Wire color | Signal | M12 Pin | RJ45 Wire |
|---|---|---|---|
| | D1+ | 1 | 1 |
| | D1- | 2 | 2 |
| | D2+ | 3 | 3 |
| | D3+ | 8 | 4 |
| | D3- | 7 | 5 |
| | D2- | 4 | 6 |
| | D4+ | 5 | 7 |
| | D4- | 6 | 8 |

PoE ports are provided via 8pole, x-coded M12 connectors, offering extraordinary reliability for Ethernet connection. Power over Ethernet (PoE) supplies electrical power along with data on a standard Ethernet cable. As an IEEE 802.3at compliant PSE (Power Sourcing Equipment), each PoE port can deliver up to 25W of power to a

Powered Device (PD), such as an IP camera. PoE is able to automatically detect the device connected and determine whether to dispatch power thus it is also compatible with traditional Ethernet devices.

**RJ45 Power over Ethernet Port (Nuvo-9×04/ 9x08VTC)**




The ports supply electrical power along with data on a standard CAT-6 Ethernet cable. Acting as a Power Source Equipment (PSE), compliant with IEEE 802.3at standard, each port can deliver up to 25W of power to a Powered Device (PD), such as a PoE IP camera. PoE is able to automatically detect the device connected and determine whether to dispatch power thus it is also compatible with traditional Ethernet devices.

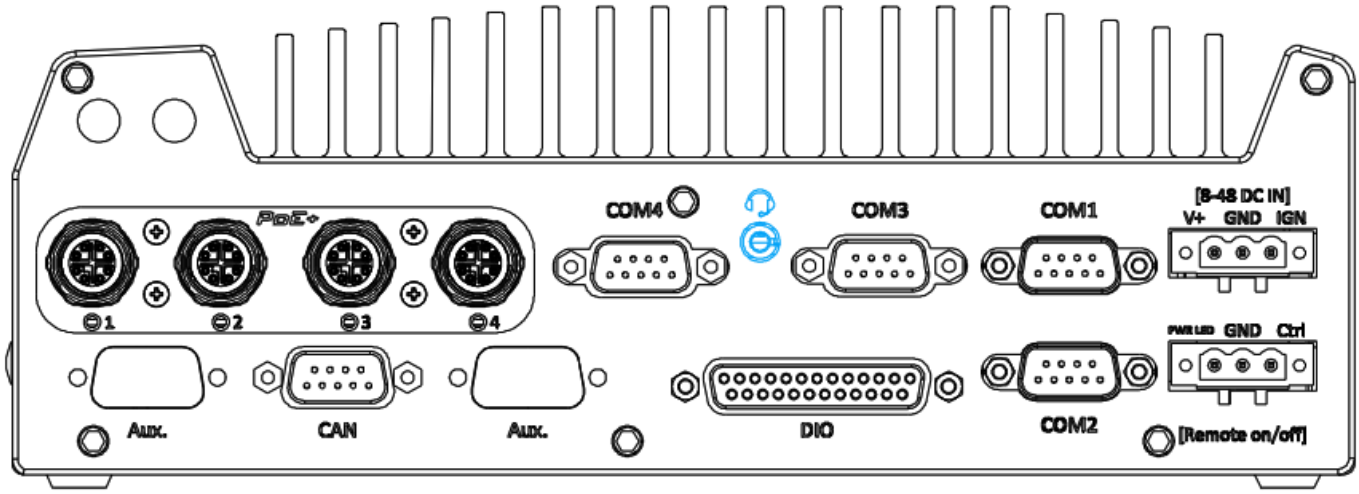
**Active /Link LED**

| LED Color | Status | Description |
|---|---|---|
| Yellow | 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**

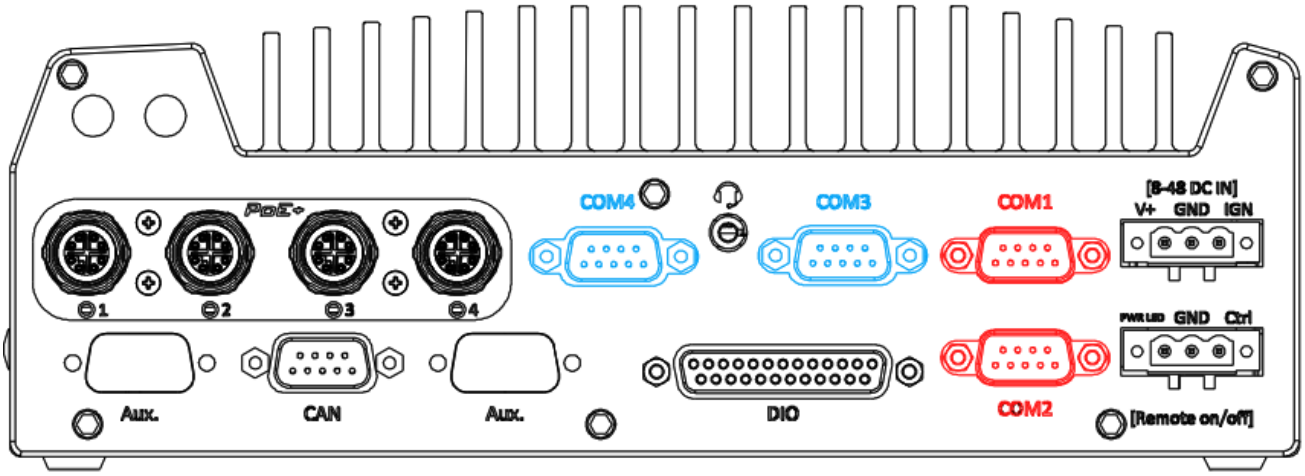
| LED Color | Status | Description |
|---|---|---|
| Green or Orange | Off | 10 Mbps |
| | Green | 100 Mbps |
| | Orange | 1000 Mbps |

**3.5mm Headphone/ Microphone Jack**

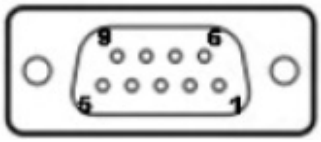



The system audio function uses high definition audio. There is a female 4-pole audio jack for headphone (speaker) output and microphone input.
The HD audio codec is natively supported in Windows 10 and 11, and no additional drivers are required.

**COM Ports**

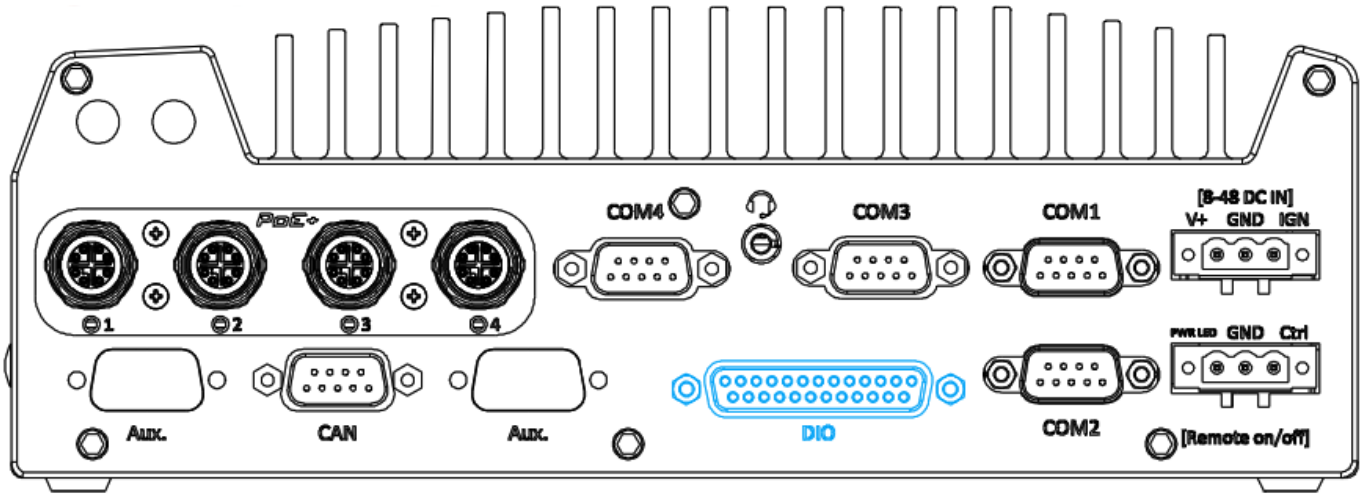



COM1 and COM2 (in red) are softwareconfigurable RS-232/ 422/ 485 ports.
COM3 and COM4 (in blue) are standard 9-wire RS-232 ports.
The operation mode of COM1 and COM2 can be set in BIOS setup utility.
The following table describes the pin definition of COM ports.



| | COM1 & COM2 | | | COM3 & COM4 |
|---|---|---|---|---|
| **PIn#** | **RS-232 Mode** | **RS-422 Mode** | **RS-485 Mode (TWo-wire 485)** | **RS-232 Mode** |
| 1 | DCD | | | DCD |
| 2 | RX | 422 TXD* | 485 TXDAIRXD+ | RX |
| 3 | TX | 422 RXD+ | | TX |
| 4 | DTR | 422 RXD- | | DTR |
| 5 | GND | GND | GND | GND |
| 6 | DSR | | | DSR |
| 7 | RTS | | | RTS |
| 8 | CTS | 422 TXD- | 485 TXD-/RXD- | CTS |
| 9 | RI | | | RI |

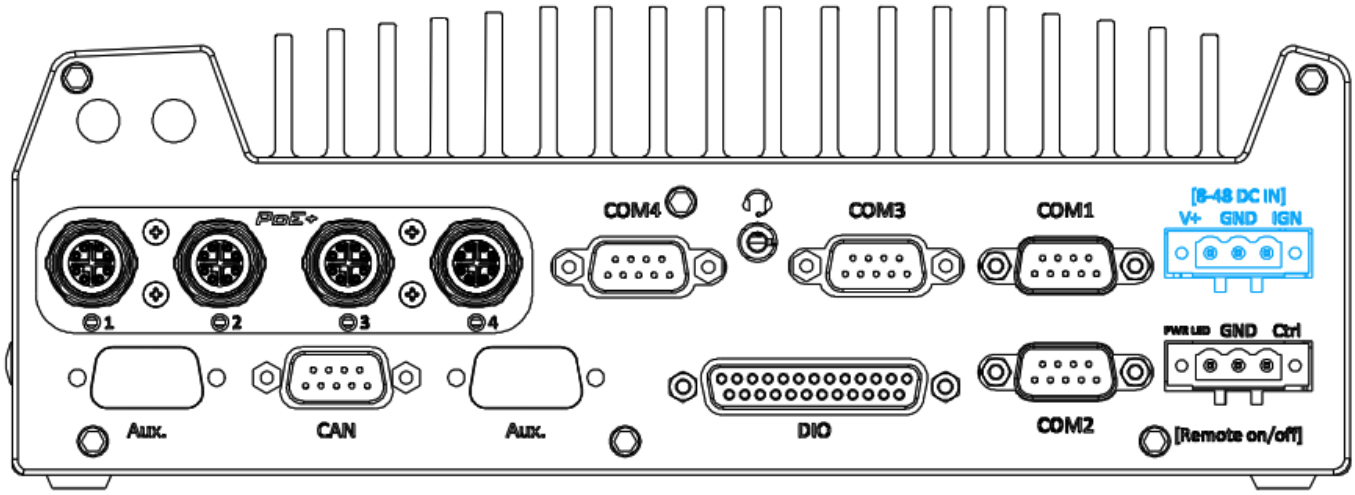
### Digital Input/ Output




The system provides 4x isolated digital input channels and 4x isolated digital output channels. The DIO functions support polling mode I/O access and DI change-of-state interrupt.

| | |
|---|---|
| **Isolated Digital Input** | |
| No. of Channel | 4-CH Isolated Digital Input Channels |
| Logic Level | Logic High: 5 to 24V<br>Logic Low: 0 to 1.5V |
| Isolated Voltage | 2500 Vrms |
| Input Resistance | 1k0 |
| Operation Mode | Polling I/O, Change-of-State Interrupt |
| **Isolated Digital Output** | |
| No. of Channel | 4-CH Isolated Digital Output Channels |
| Sink Current (per channel) | 100 mA (sustained loading) 250 mA (peak loading) |
| Isolated Voltage | 2500 Vrms |
| Operation Mode | Polling, Change-of-State Interrupt |
| Output Type | Power MOSFET + Analog Device Coupler® |
| Operation Mode | Polling I/O and Change-of-State interrupt for DI |

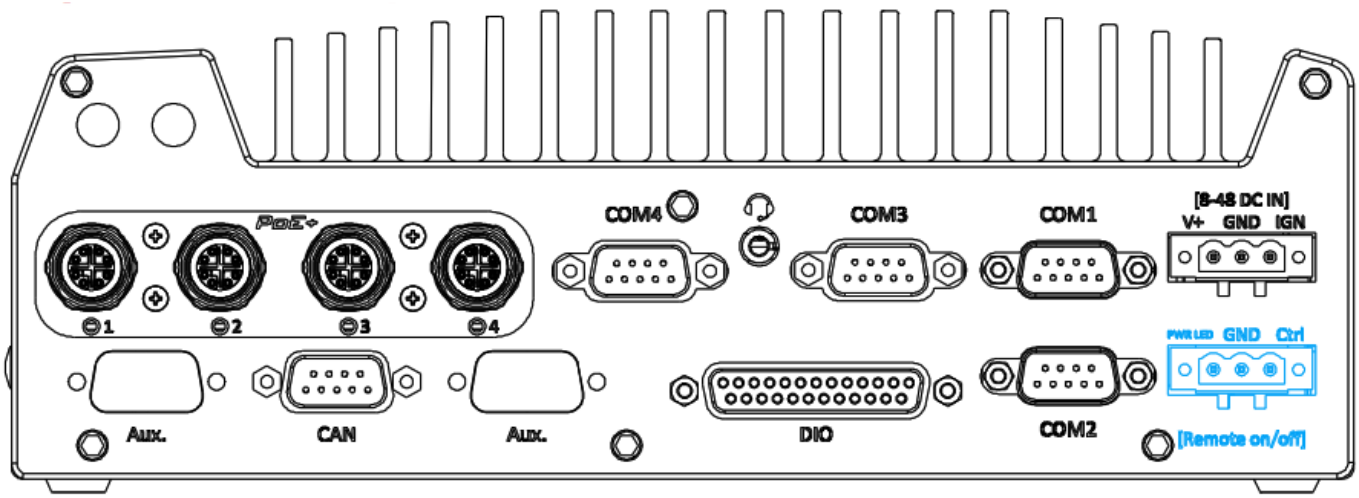
**3-pin Terminal Block for DC and Ignition Input**




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

**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.

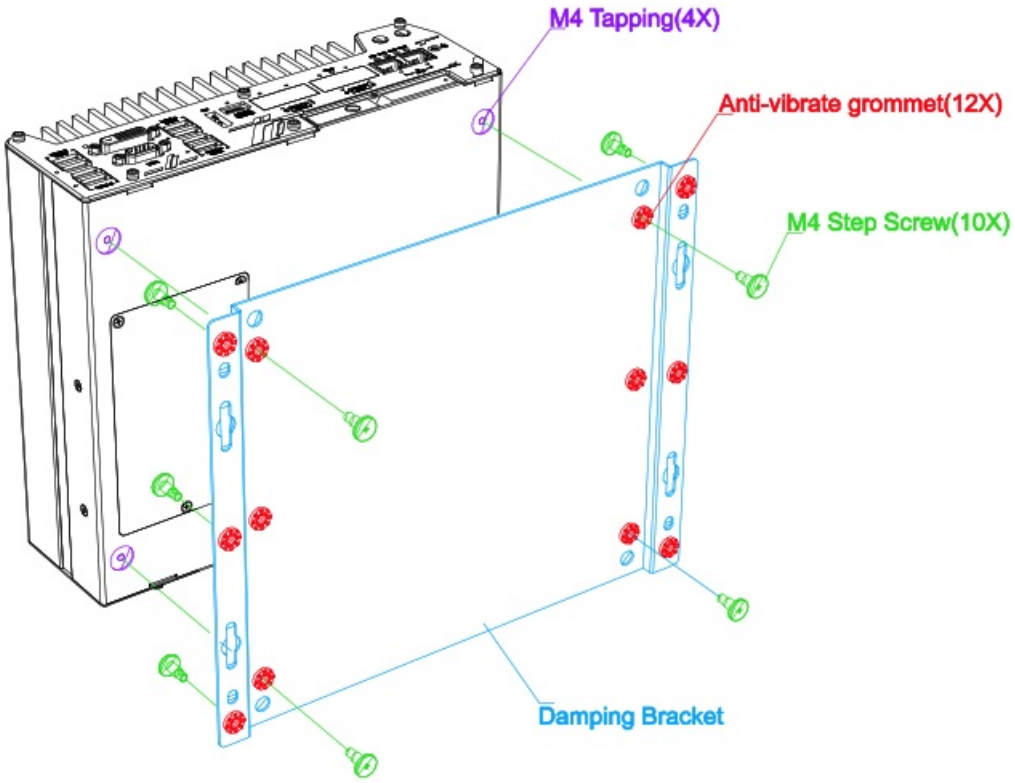
**3 -pin Remote On/ Off**




The “Remote On/ Off” 3-pin connection allows for the connection of an external non-latched switch to turn on/ off the system. It is useful when the system is placed in a cabinet or a not easily accessed location. You may connect an external status LED (20mA) indicator by connecting to PWR LED and GND.

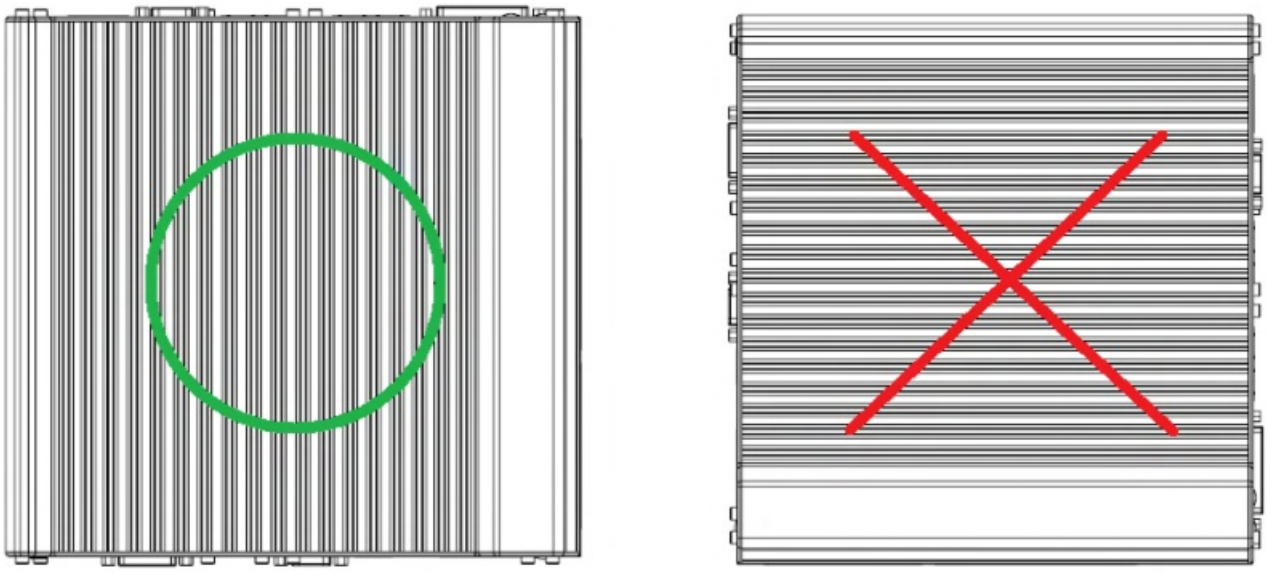
**Nuvo-9100VTC Damping Bracket Installation**

The damping bracket comes standard with the system to provide shock and vibration resistance for in-vehicle conditions. Please refer to the exploded view for wall-mount installation.



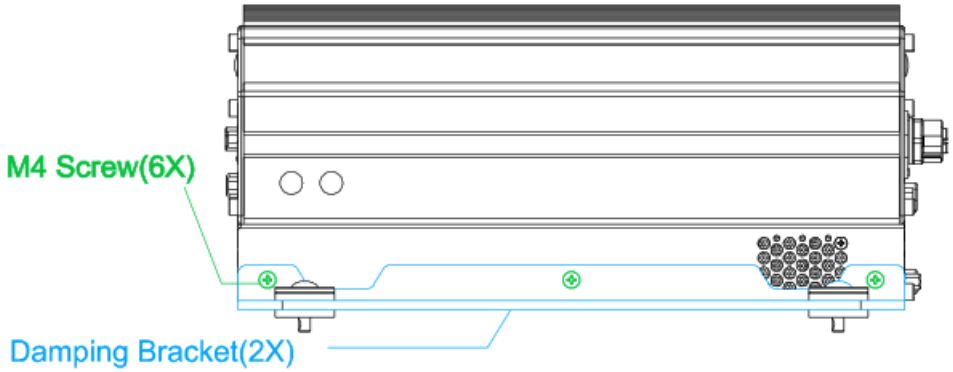

**Note**

If you are mounting the system, place the heatsink fins perpendicular to the ground for better heat dissipation efficiency.

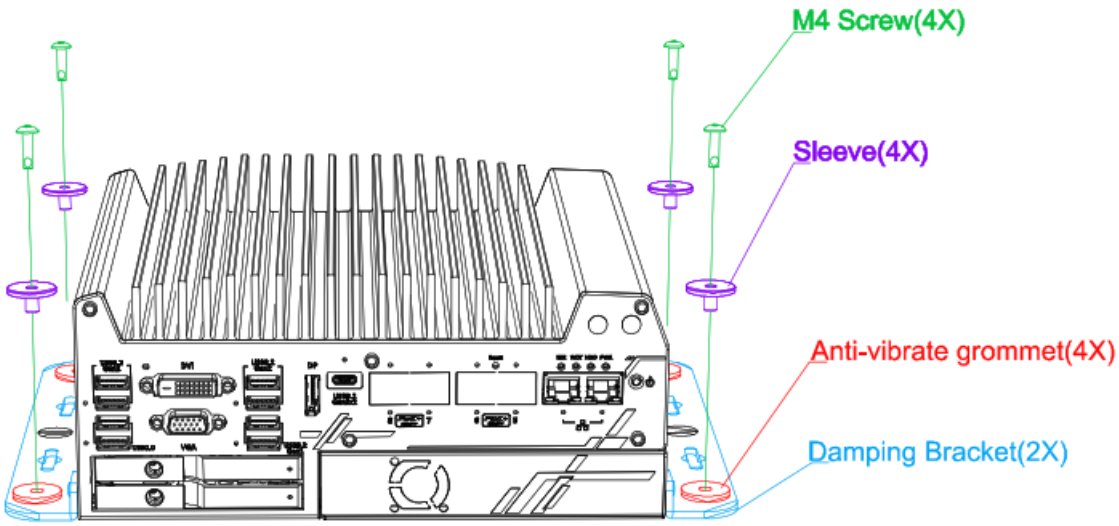


**Nuvo-9200VTC Damping Bracket Installation**

a. Available in the accessory box, take out the two brackets and secure them using the six M4 screws provided.




**b.** Please refer to the exploded view for wall-mount installation.




**Documents / Resources**

| | |
|---|---|
|  | **NEOUSYS Nuvo-9000VTC Series Rugged Embedded Computer** [pdf] Installation Guide<br>Nuvo-9100VTC, Nuvo-9200VTC, Nuvo-9000VTC Series Rugged Embedded Computer, Series Rugged Embedded Computer, Rugged Embedded Computer, Embedded Computer, Computer |