

Neousys Technology Inc.

PCIe-PoE312M

User Manual

Revision 1.1

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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.
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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 DIN rail associated with, at a sturdy location
- Install the power socket outlet near the system where it is easily accessible
- Secure each system module(s) using its retaining screws
- Place power cords and other connection cables away from foot traffic. Do not place items over power cords and make sure they do not rest against data cables
- Shutdown, disconnect all cables from the system and ground yourself before touching internal modules
- Ensure that the correct power range is being used before powering the device
- Should a module fail, arrange for a replacement as soon as possible to minimize down-time
- If the system is not going to be used for a long time, disconnect it from mains (power socket) to avoid transient over-voltage

Service and Maintenance

- ONLY qualified personnel should service the system
- Shutdown the system, disconnect the power cord and all other connections before servicing the system
- When replacing/ installing additional components (expansion card, memory module, etc.), insert them as gently as possible while assuring proper connector engagement

ESD Precautions

- Handle add-on module, motherboard by their retention screws or the module's frame/ heat sink. Avoid touching the PCB circuit board or add-on module connector pins
- Use a grounded wrist strap and an anti-static work pad to discharge static electricity when installing or maintaining the system
- Avoid dust, debris, carpets, plastic, vinyl and styrofoam in your work area.
- Do not remove any module or component from its anti-static bag before installation

About This Manual

This manual introduces Neosys PCIe-PoE312M, a 4-port M12 x-coded server-grade Gigabit 802.3at PoE+ PCIe card, its setup and installation instructions.

Revision History

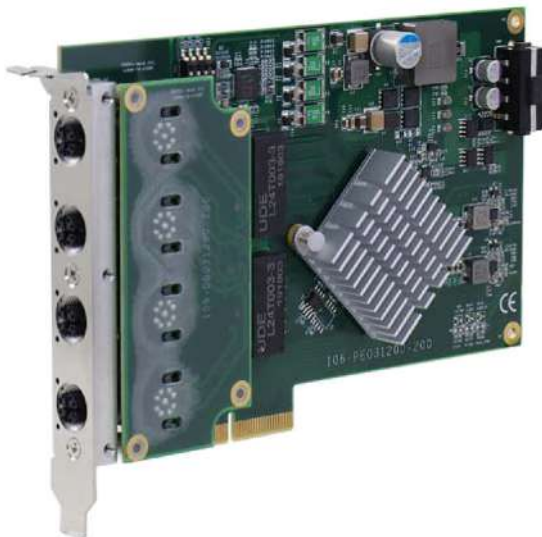
Version	Date	Description
1.0	May. 2020	Initial release
1.1	Oct. 2020	Updated dimensions

1 Introduction

Introducing Neosys PCIe-PoE312M, the world's first PCIe card with M12 x-coded connectors featuring Gigabit Ethernet and PoE+ functionality. Thanks to Neosys' patent-pending housing design, PCIe-PoE312M's M12 connectors utilizes a CNC-milled aluminum block as its connector housing screw that can withstand more than extra stress on the cable/ connector. It offers extremely rugged and reliable cable connection for Ethernet or PoE devices.

PCle-PoE312M has four Gigabit Ethernet ports integrated via server-grade Intel® I350 NIC. It features checksum offloading, segmentation offloading and intelligent interrupt generation/ moderation to increase overall Ethernet performance and reduces CPU utilization. It also integrates IEEE 802.3at PoE+ PSE function to deliver up to 25.5W to attached PD devices.

For fast-growing IoT, edge computing and rugged surveillance applications, reliable Ethernet connection is indispensable. Neosys' PCIe-PoE312M combines reinforced M12 x-coded connectors, PoE+ and Gigabit Ethernet to provide unparalleled connection ruggedness for most off-the-shelf computers.



1.1 PCIe-PoE312M Product Specifications

Bus interface	x4, Gen2 PCI Express
Gigabit Ethernet port	4x ports by Intel® I350-AM4 NIC, supporting 9.5 kB jumbo frame, teaming and IEEE 1588
PoE connector	M12 x-coded connector with Neousys patent-pending housing design
PoE function	In compliance with IEEE 802.3at-2009 (PoE+) with each port delivering up to 25.5W of power
Cable requirement	CAT-5e or CAT-6 cable, 100 meters maximum
Power requirement	Maximum 1.2 A @ 3.3 V from PCI Express bus Maximum 9.6 A @ 12 V from PCI Express bus or on-board 4-pin power connector
Operating temperature	0°C ~ 55°C with air flow
Dimension	167 mm (L) x 111 mm (H) x 20 mm (W)*

** PCIe-PoE312M is slightly thicker than a standard PCIe card and may cause mechanical interference with the card next to it. Please treat it as a dual-slot PCIe card and it is recommended to leave the following slot empty. If you must install another card in the following slot, please proceed with caution!*

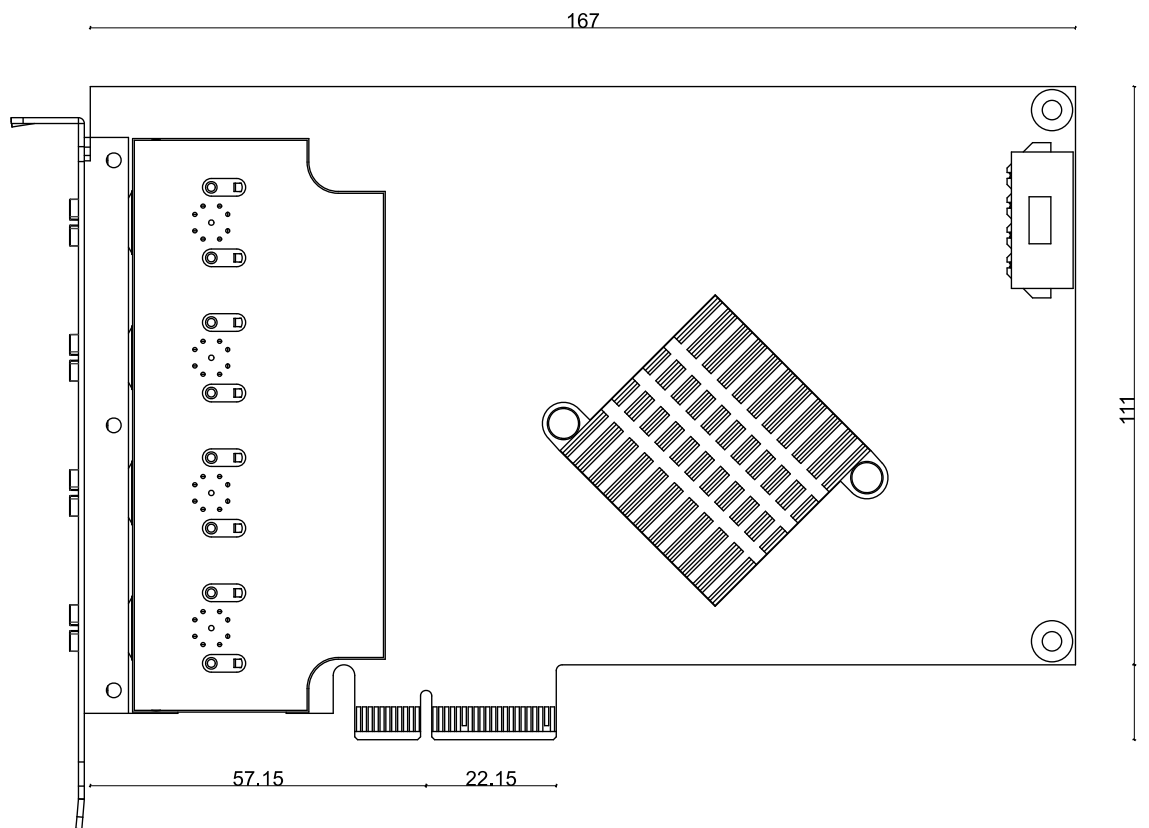
2 PCIe-PoE312M Dimension



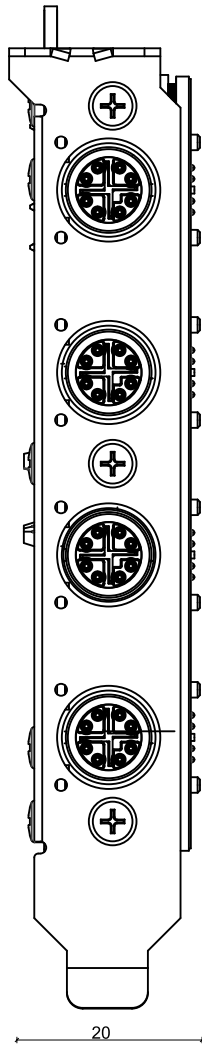
NOTE

All measurements are in millimeters (mm).

2.1 Side View



2.2 Connector (Width) View



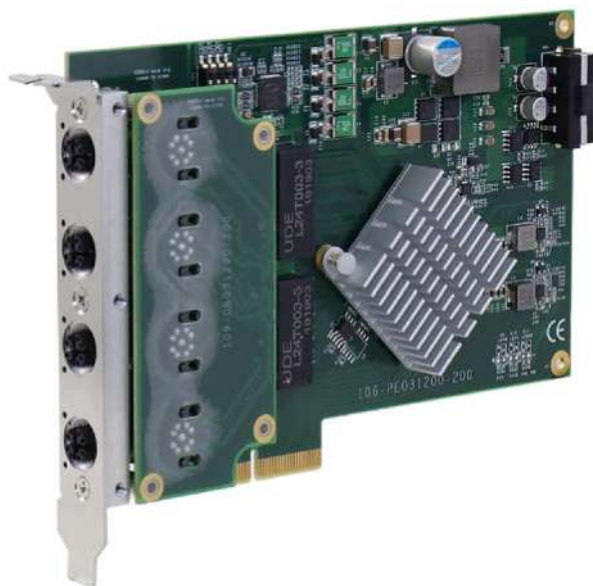
3 System Overview

Upon receiving and unpacking your PCIe-PoE312M system, please check immediately if the package contains all the items listed in the following table. If any item(s) are missing or damaged, please contact your local dealer or Neosys Technology.

3.1 PCIe-PoE312M Packing List

Item	Description	Qty
1	4-port x-coded PCIe-PoE312M card	1
2	Neosys drivers & utilities DVD	1
3	Screw pack	1

3.2 45° View



4 System Installation

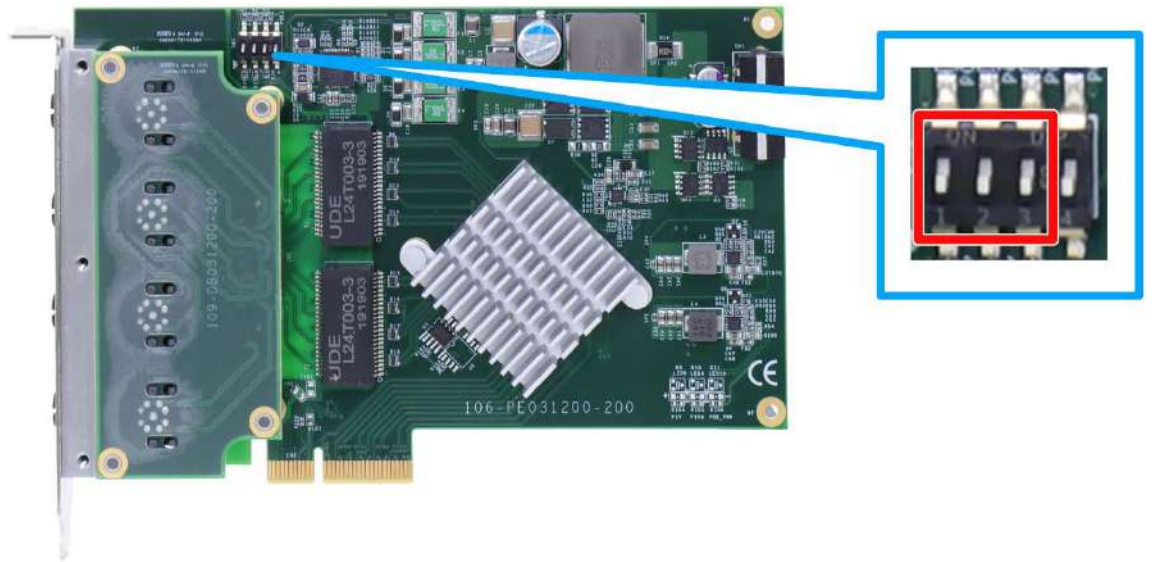
Before disassembling the system enclosure and installing components and modules, please make sure you have done the following:

- It is recommended that only qualified service personnel should install and service this product to avoid injury or damage to the system.
- Please observe all ESD procedures at all times to avoid damaging the equipment.
- Before disassembling your system, please make sure the system has powered off, all cables and antennae (power, video, data, etc.) are disconnected.
- Place the system on a flat and sturdy surface (remove from mounts or out of server cabinets) before proceeding with the installation/ replacement procedure.


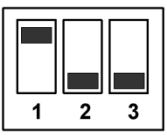
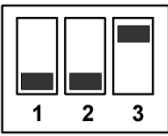
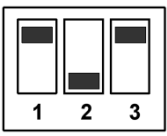
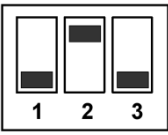
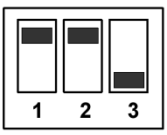
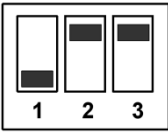
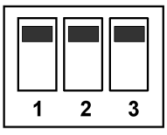
4.1 Configure Board ID for PCIe-PoE312M

You can install multiple PCIe-PoE312M cards to your system and the card offers manual per-port power on/ off control. The on/ off control acts as a function that allows you to manually reset connected PoE+ PD devices via Neousys' API. To support per-port on/ off control for multiple cards, you must set board IDs for each PCIe-PoE312M installed. The PCIe-PoE312M incorporates a DIP switch to configure user-defined board ID. The board ID can be used as a parameter in API to specify a PCIe-PoE312M card.

The DIP switch is located on the upper-left corner of PCB. P1 ~ P3 of DIP switch are used to specify the board ID.



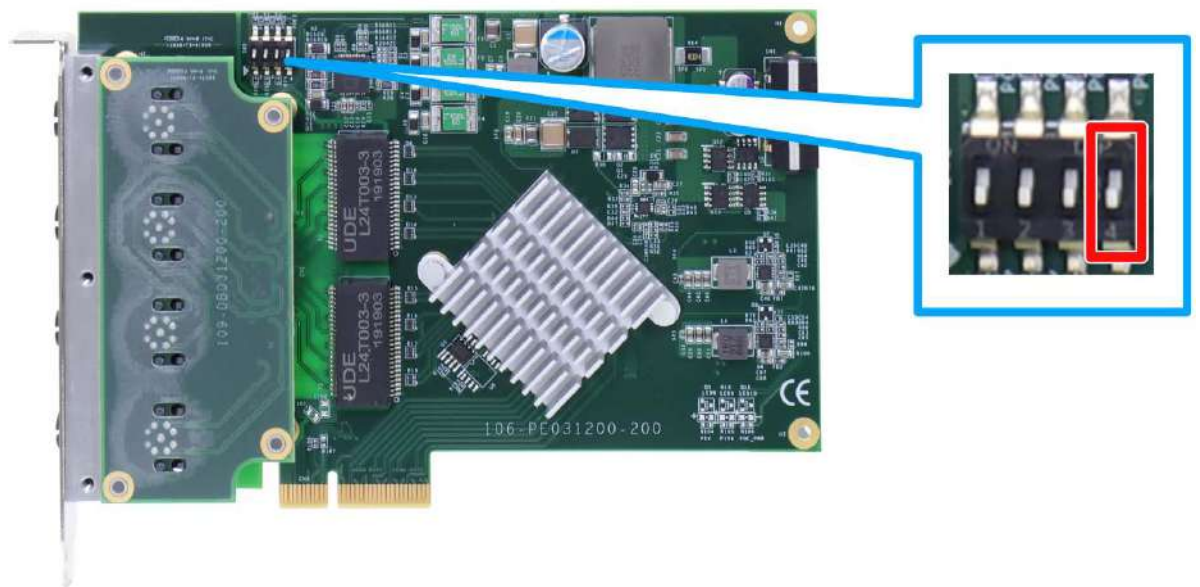
You can configure the board ID by set the position of P1 ~ P3 according to the following table.



Board ID	DIP switch position	Board ID	DIP switch position
0		4	
1		5	
2		6	
3		7	

4.2 Configuring 12V DC Source

PCIe-PoE312M requires 12V DC power and 9.6A maximum current for its PoE+ PSE function. By default, PCIe-PoE312M can obtain 12V DC directly from the motherboard's PCI Express connector if the motherboard can supply enough amperage.

As PCIe-PoE312M requires 9.6A maximum current and some motherboards may not supply sufficient current on its PCI Express connector. In this case, you need to supply 12V DC from the standard ATX power supply via a 4-pin power plug. P4 of the DIP switch on PCIe-PoE312M allows users to manually configure the source of 12V DC.



Position of P4	12 VDC Source
	12 VDC is from PCI Express connector
	12 VDC is from 4-pin power connector

4.3 Installing PCIe-PoE312M

PCle-PoE312M utilizes the x4 PCI Express bus to communicate with the host computer.

Before you install the PCIe-PoE312M, please make sure that there is a x4 PCI Express slot available on your host computer.



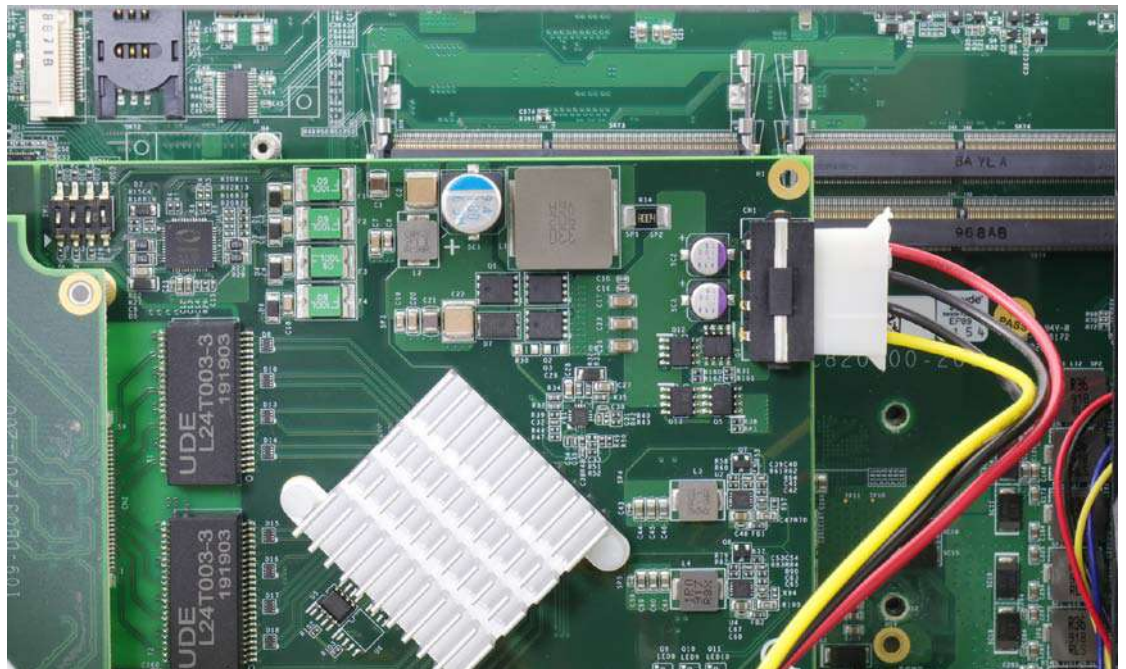
NOTE

Most modern computers have x16 PCI Express slot(s) for installing a graphics card. It can be possibly configured as a PCI Express Root Port for installing a general PCI Express card. Please contact the vendor of your computer to check if PCIe-PoE312M can be fitted into your x16 PCI Express slot.

Please refer to you system's instruction or user manual on accessing the PCI Express slot for installation.

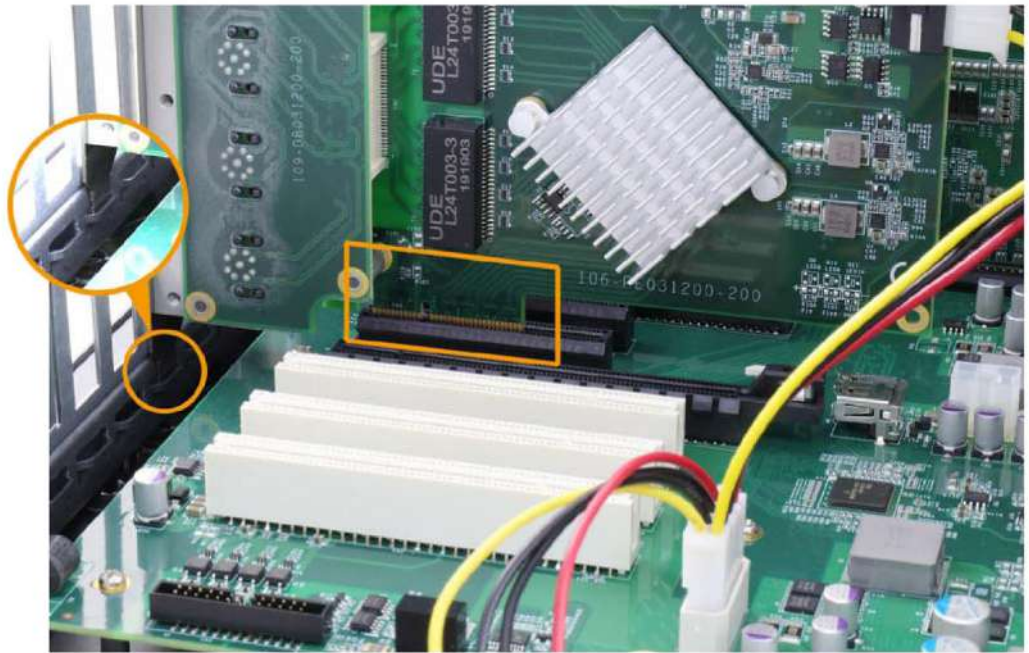
You can install the PCIe-PoE312M frame grabber card by following the steps listed below.

1. Configure Board ID if necessary according to section 4.1.
2. Configure 12 VDC source if necessary according to section 4.2. If the power source is set to draw power from the 4-pin molex connector, please make sure it is connected.



3. Open the chassis of the host computer and expose the x4 PCI Express slot (or a compatible x16 PCI Express slot).

4. Align and insert the golden-finger connector of PCIe-PoE312M into the PCI Express slot.



5. Secure the PCIe-PoE312M to finalize the installation.



5 Driver Installation and Settings

5.1 Driver Installation

Neosys provides a convenient utility in “Drivers & Utilities DVD” to allow the “One-Click” driver installation. This utility automatically detects your Windows operating system and installs corresponding driver for your PCIe-PoE312M with just one mouse click.

5.1.1 Install Driver Using “One-Click” Driver Installation

1. Insert the “Drivers & Utilities DVD” into a DVD-drive attached to your host computer. A setup utility launches and the following dialog appears.



2. Click on the “**Automatic Driver Installation**”. The setup utility will automatically detect your operating system and install corresponding drivers for PCIe-PoE312M. The installation process takes about 2 ~ 3 minutes. Once driver installation is done, the setup utility reboots your Windows and your system works normally afterward.

5.1.2 Install Drivers Manually

You can also manually install drivers for PCIe-PoE312. Please refer to the following information about installing the driver for different operating system.

Windows XP

Execute x:\Driver_Pool\GbE_I350\XP\APPS\PROSETDX\XP2K3_32\DxSetup.exe

, where x: denotes the volume of your DVD drive

Windows 7 or Windows 8/8.1 32-bit

Execute x:\Driver_Pool\GbE_I350\Win7_8_32\APPS\PROSETDX\Win32\DxSetup.exe

, where x: denotes the volume of your DVD drive

Windows 7 or Windows 8/8.1 64-bit

Execute x:\Driver_Pool\GbE_I350\Win7_8_64\APPS\PROSETDX\Winx64\DxSetup.exe

, where x: denotes the volume of your DVD drive

5.2 Driver Settings

PCIe-PoE312M offers the Gigabit Ethernet connectivity via Intel® I350 GbE controller. When connecting to a high-speed PoE device, such as a GigE camera, you can adjust some driver settings to have better transmission throughput and connection stability.

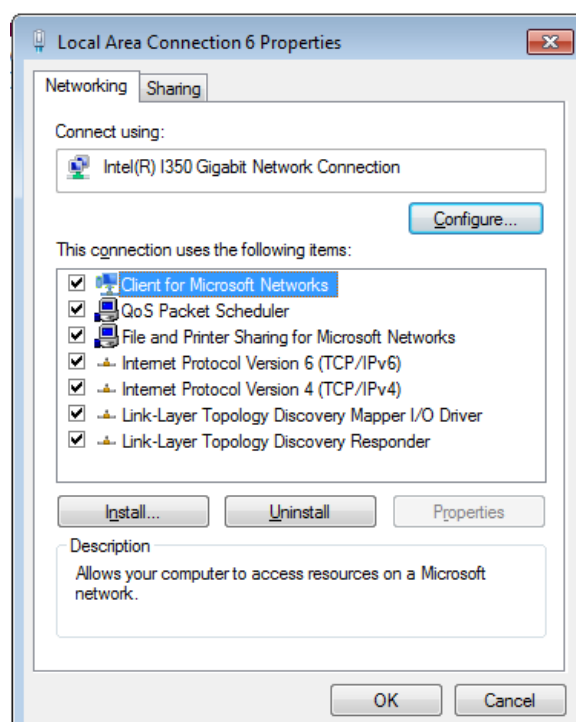
In this section, we'll discuss these settings. You can refer to the information to fine tune your system.

5.2.1 Jumbo Frame

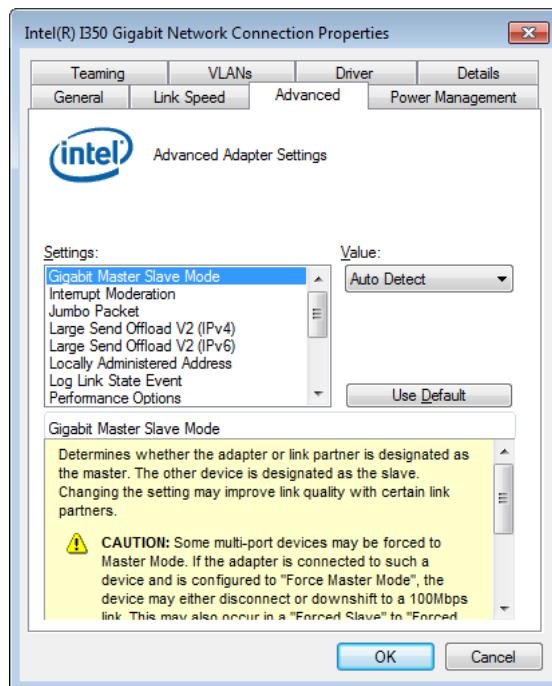
Jumbo frames are Ethernet frames with more than 1500 bytes of payload. By increasing the payload size, a certain large amount of data can be transferred with less interrupts generated, which reduces the CPU utilization and increases overall data throughput. Intel® I350 GbE controller supports jumbo frame size of up to 9.5 Kbytes. When you connecting an Ethernet device with high data rate (eg. a Gigabit Ethernet camera), enabling jumbo frame feature is highly recommended.

After installing the driver for Intel® I350 GbE controller, you can change the jumbo frame settings by following the steps listed below.

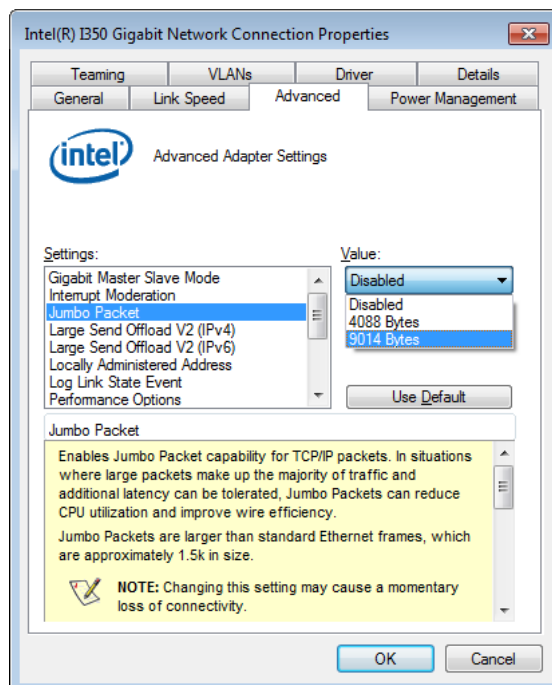
1. Open the **Network Connections** and double-click on a corresponding **Local Area Connection**.



- Click **Configure** button and a property dialog appears. Click on the **Advanced** tab.



- Select the **Jumbo Packet** settings, and select the expected jumbo frame size. (for connecting a Ethernet device with high data rate, 9014 Bytes is suggested)

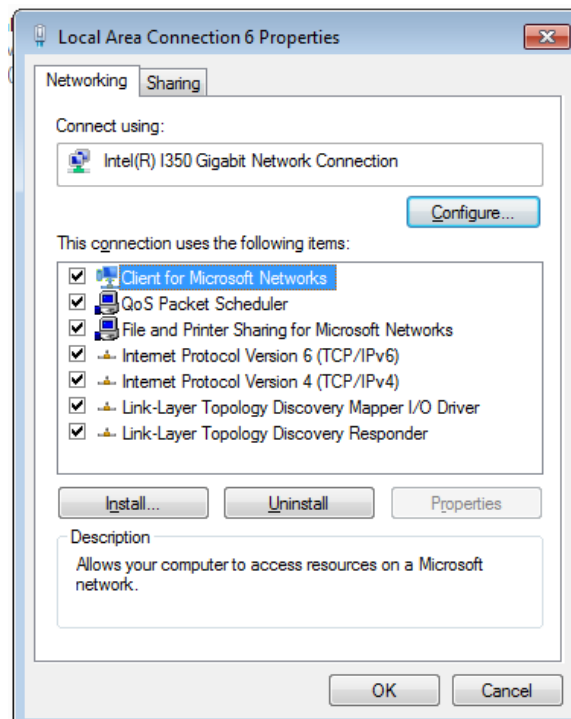


5.2.2 Receive Buffer

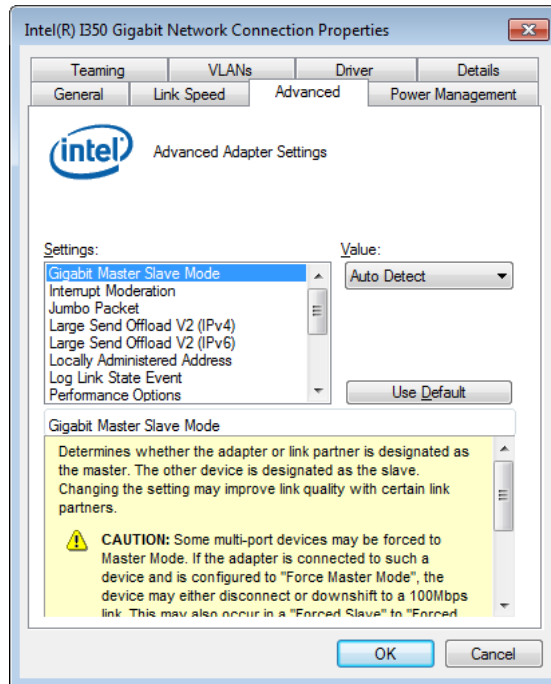
Receive buffer is another option which can affect data throughput. It determines the size of memory buffer allocated for receiving data. Increasing size of receive buffer can improve the performance of receiving data. The default settings of receive buffer is 256 bytes. When connecting to an Ethernet device that generates large amount of data, you can set this option to a larger value (maximal 2048 bytes) for better performance.

You can change the settings of receive buffer by following the steps listed below.

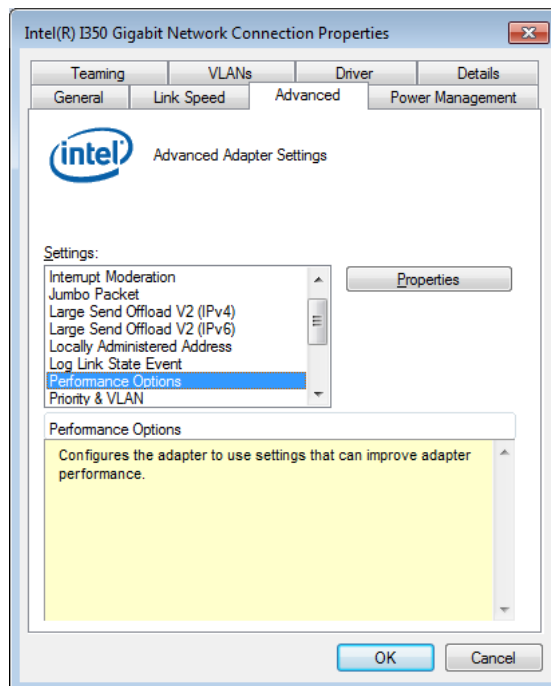
1. Open the **Network Connections** and double-click on a corresponding **Local Area Connection**.



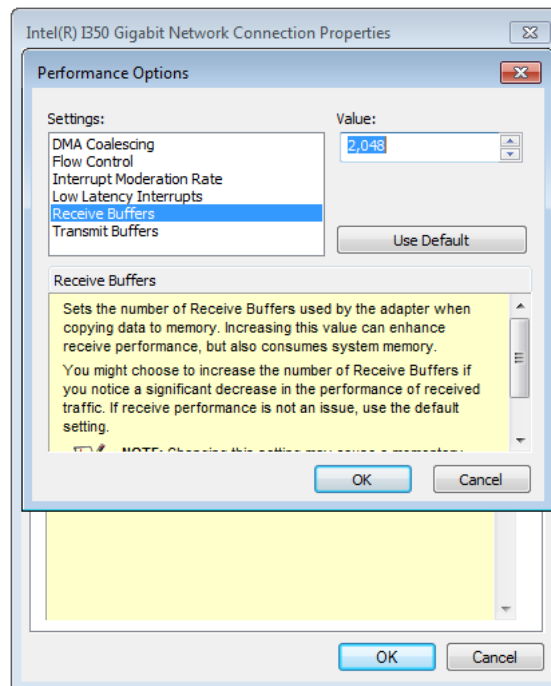
- Click **Configure** button and a property dialog appears. Click on the **Advanced** tab.



- Select the **Performance Options** settings and click the **Properties** button.



4. Adjust the value of **Receive Buffers**. (for connecting a Ethernet device with high data rate, 2048 Bytes is suggested)

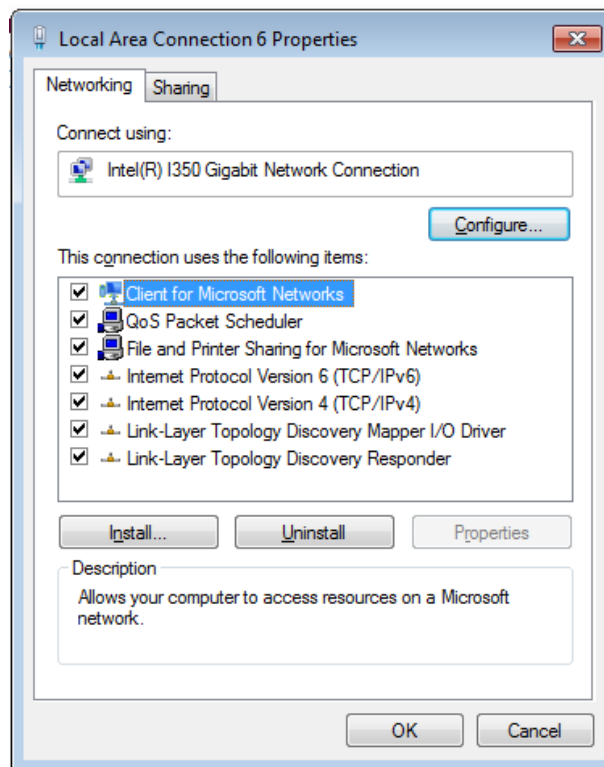


5.2.3 Transmit Buffers

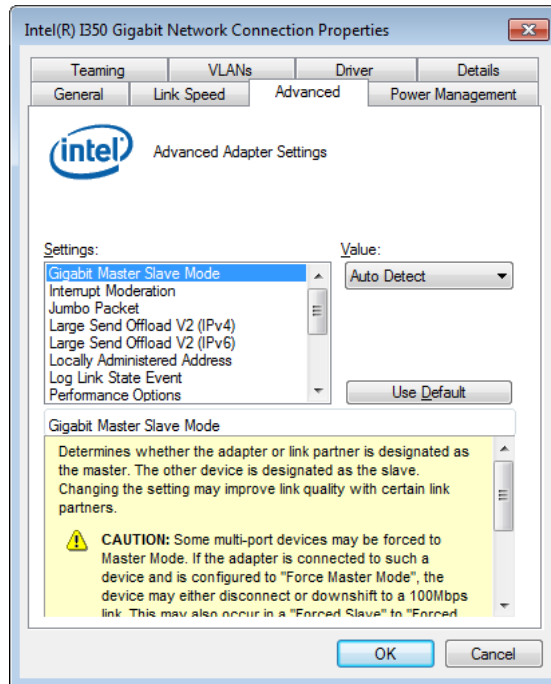
Like receive buffer, transmit buffer can affect the performance of transmitting data. The default settings of receive buffer is 256 bytes. If you encounter a performance issue while transmitting data, you can adjust the size of transmit buffer to a larger value (maximal 2048 bytes) for better performance.

You can change the settings of transmit buffer by following the steps listed below.

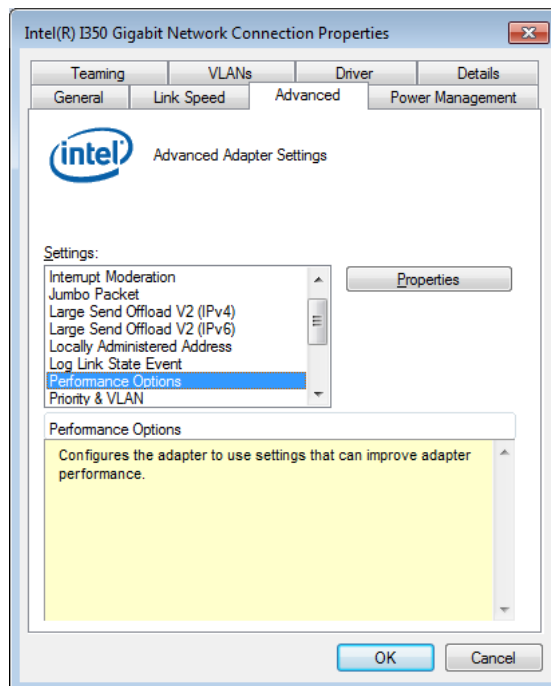
1. Open the **Network Connections** and double-click on a corresponding **Local Area Connection**.



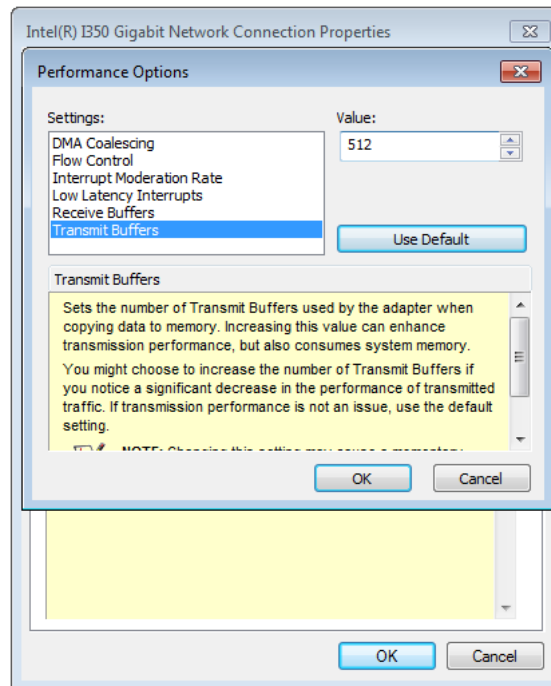
- Click **Configure** button and a property dialog appears. Click on the **Advanced** tab.



- Select the **Performance Options** settings and click the **Properties** button.



4. Adjust the value of **Transmit Buffers**.



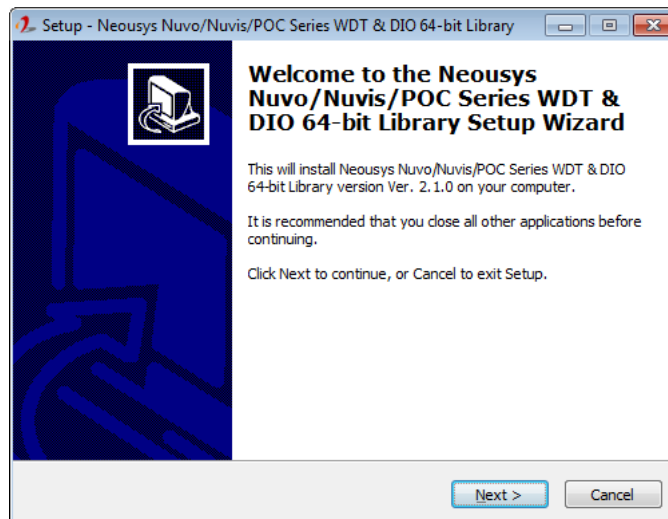
Appendix A Using Per-Port PoE On/Off Control

PCle-312M supports a unique feature of per-port power on/off control for each of its PoE ports. With provided function APIs, users can turn on or turn off the power of each PoE port manually for fault-recovery or device power reset purpose.

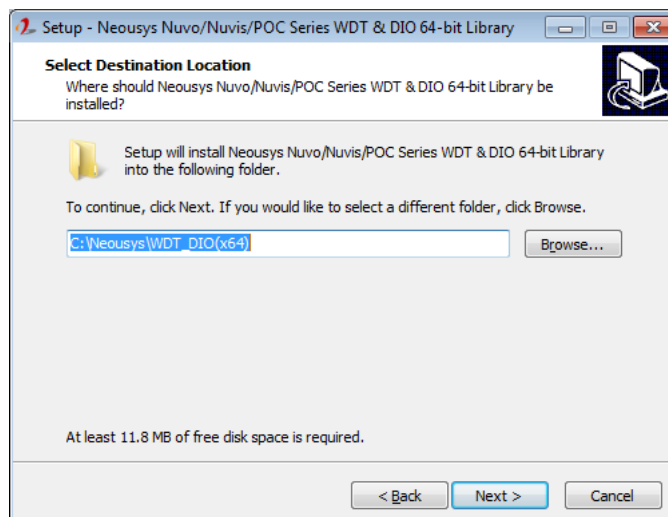
Driver Installation

The per-port PoE on/off control function library is delivered as a part of Neosys driver setup package (WDT_DIO_Setup). For PCle-312M, please use **WDT_DIO_Setup_v2.2.9.11.exe** or later revision.

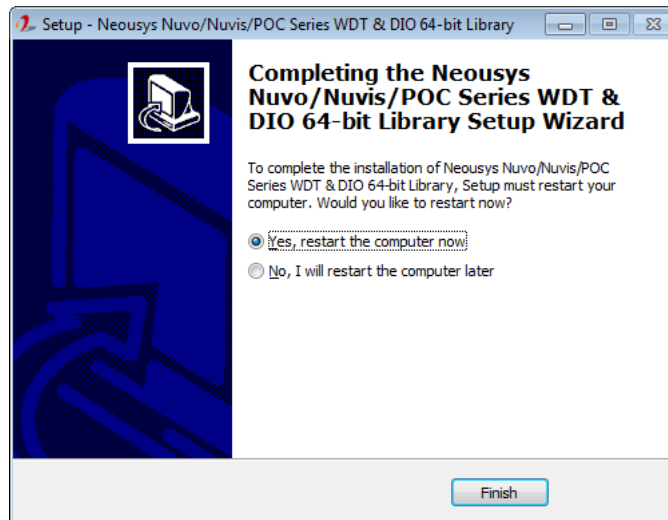
1. Execute **WDT_DIO_Setup_v2.2.9.11.exe**. The following dialog appears.



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



3. Once the installation is finished, a dialog appears to prompt you to reboot the system. The WDT & DIO library will take effect after system rebooting.



4. When you are programming your program, the related files are located in

Header File: \Include

Library File: \Lib

Function Reference: \Manual

Sample Code:

\Sample\CAN_Demo (CAN Bus Demo) *
 \Sample\COS_Demo (Change-of-State Interrupt Demo) *
 \Sample\DIO_Demo (Polling I/O Demo) *
 \Sample\DTFO_Demo (Trigger Fan-out Demo) *
 \Sample\DTIO_Demo (DTIO Demo) *
 \Sample\IGN_Demo (Ignition Control Demo) *
 \Sample\IVIS_DTIO_Demo (iVIS-200 DTIO Demo) *
\Sample\POE_Demo (PoE per-port Control Demo)
 \Sample\PWM_Demo (PWM Control Demo) *
 \Sample\WDT_Demo (Watchdog Demo) *

** These sample programs cannot work with PCle-PoE312M*

Per-Port On/Off Control Function Reference

PCI_GetStatusPoEPort



Description	Get the current power on/off status of designated PoE port.
Parameter	<p><i>boardId</i></p> <p>DWORD value (0 ~ 7) to indicate board ID of selected PCIe-PoE312M card. Please refer to this section to configure the board ID.</p> <p>DWORD value (1 ~ 4) to specify the PoE port.</p>
Return Value	Returns 1 if PoE power is on, 0 if PoE power is off.
Usage	<pre> DWORD boardID; DWORD port; BYTE PoEStatus; //Get PoE power status from board #0, port #1. boardID = 0; port = 1; PoEStatus = PCI_GetStatusPoEPort (boardID, port); </pre>

PCI_EnablePoEPort



Description	Enable (turn on) PoE power for designated PoE port.
Parameter	<p><i>boardId</i></p> <p>DWORD value (0 ~ 7) to indicate board ID of selected PCIe-PoE312M card. Please refer to this section to configure the board ID.</p> <p>DOWRD value (1 ~ 4) to specify the PoE port.</p>
Return Value	Returns TRUE if successes, FALSE if failed.
Usage	<pre> DWORD boardID; DWORD port; BOOL RetVal; //Enable PoE power status from board #0, port #1. boardID = 0; port = 1; RetVal= PCI_EnablePoEPort (boardID, port); </pre>

PCI_DisablePoEPort



Description	Disable (turn off) PoE power for designated PoE port.
Parameter	<p><i>boardId</i></p> <p>DWORD value (0 ~ 7) to indicate board ID of selected PCIe-PoE312M card. Please refer to this section to configure the board ID.</p> <p><i>port</i></p> <p>DWORD value (1 ~ 4) to specify the PoE port.</p>
Return Value	Returns TRUE if successes, FALSE if failed.
Usage	<pre> DWORD boardID; DWORD port; BOOL RetVal; //Disable PoE power status from board #0, port #1. boardID = 0; port = 1; RetVal= PCI_DisablePoEPort (boardID, port); </pre>