# Neousys Technology Inc.

# PCIe-PoE354at/PCIe-PoE352at

## *4-Port / 2-Port Server-grade Gigabit 802.3at PoE+ Frame Grabber Card*

# User's Manual

# Rev. A1

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|---|---|---|
| 2015/06/18 | First formal release | A1 |

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# Declaimer

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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 his 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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# Chapter 1 Introduction

## 1.1 Overview

PCIe-PoE354at is world's first PoE frame grabber card combing server-grade GigE controller and 802.3at PoE+ capability. Inheriting Neousys' expertise in PoE technology, PCIe-PoE354at further implements the updated 802.3at-2009 standard and offers up to 25.5W of power each port.

PCIe-PoE354at is designed with state-of-the-art Intel® I350 Gigabit Ethernet controller. This server-grade GigE controller incorporates advanced features, such as checksum offloading, segmentation offloading and intelligent interrupt generation/moderation, to increase overall Ethernet performance and reduce CPU utilization. In addition, its single-bus, multi-port topology minimizes the compatibility issue with off-the-shelf motherboards when installing multiple cards.

Machine vision applications can be benefited by PCIe-PoE354at's server-grade network performance. Its 25.5W PoE+ can now power PTZ (pan-tilt-zoom) cameras for surveillance applications. PCIe-PoE354at presents the best cost/performance ratio for your Power over Ethernet solution.

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# 1.2 Product Specification

## 1.2.1 Specification of PCIe-PoE354at

| | |
|---|---|
| Bus Interface | x4, Gen2 PCI Express |
| Gigabit Ethernet Port | 4x GigE ports by Intel® I350-AM4 controller,<br>supporting 9.5 kB jumbo frame, teaming and IEEE 1588 |
| PoE Capability | In compliant with IEEE 802.3at-2009 (PoE+)<br>Each port delivers up to 25.5 W of power |
| Cable Requirement | CAT-5e or CAT-6 cable, 100 meters maximal |
| Power Requirement | Maximal 1.2 A @ 3.3 V from PCI Express bus<br>Maximal 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 | 167.7 mm (W) x 111.2 mm (H) |

** PCIe-PoE354at is designed to obtain 12 VDC for PoE devices from either PCI Express bus or on-board 4-pin power connector according to a user-configurable jumper.*

## 1.2.2 Specification of PCIe-PoE352at

| | |
|---|---|
| Bus Interface | x4, Gen2 PCI Express |
| Gigabit Ethernet Port | 2x GigE ports by Intel® I350-AM2 controller,<br>supporting 9.5 kB jumbo frame, teaming and IEEE 1588 |
| PoE Capability | In compliant with IEEE 802.3at-2009 (PoE+)<br>Each port delivers up to 25.5 W of power |
| Cable Requirement | CAT-5e or CAT-6 cable, 100 meters maximal |
| Power Requirement | Maximal 0.9 A @ 3.3 V from PCI Express bus<br>Maximal 4.8 A @ 12 V from PCI Express bus** |
| Operating Temperature | 0°C ~ 55°C with air flow |
| Dimension | 167.7 mm (W) x 111.2 mm (H) |

*** PCIe-PoE352at is designed to obtained 12 VDC for PoE devices directly from PCI Express bus. No external 12 VDC is needed.*

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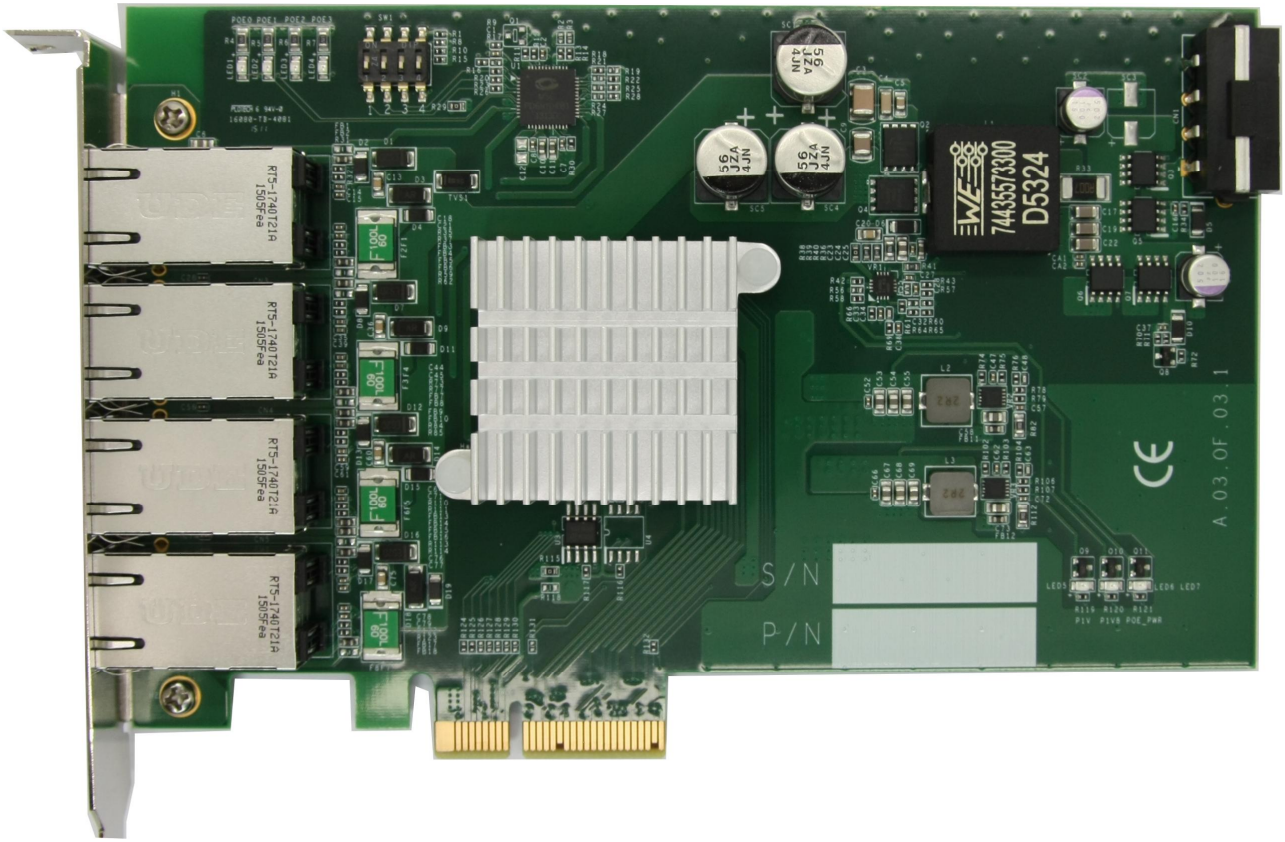
# Chapter 2 Know your PCIe-PoE354at/352at

## 2.1 Unpacking your PCIe-PoE354at/352at

When you receive the package of PCIe-PoE354at/352at, please check immediately if the package contains all the items listed in the following table. If any item is missing or damaged, please contact your local dealer or Neousys Technology Inc. for further assistance.

| Item | Description | Qty |
|---|---|---|
| 1 | PCIe-PoE354at or PCIe-PoE352at frame grabber card | 1 |
| 2 | Neousys Drivers & Utilities DVD | 1 |

## 2.2 PCIe-PoE354at Top View

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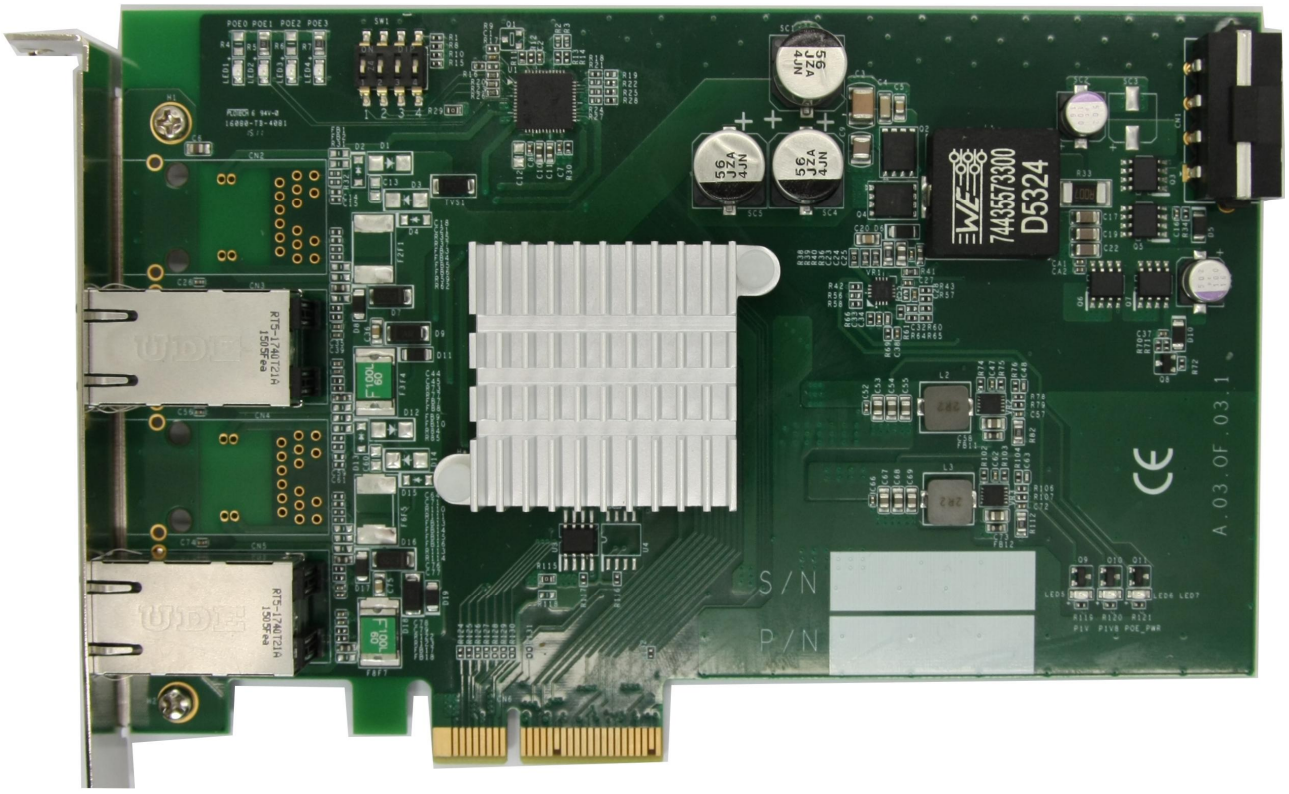
# 2.3 PCIe-PoE352at Top View

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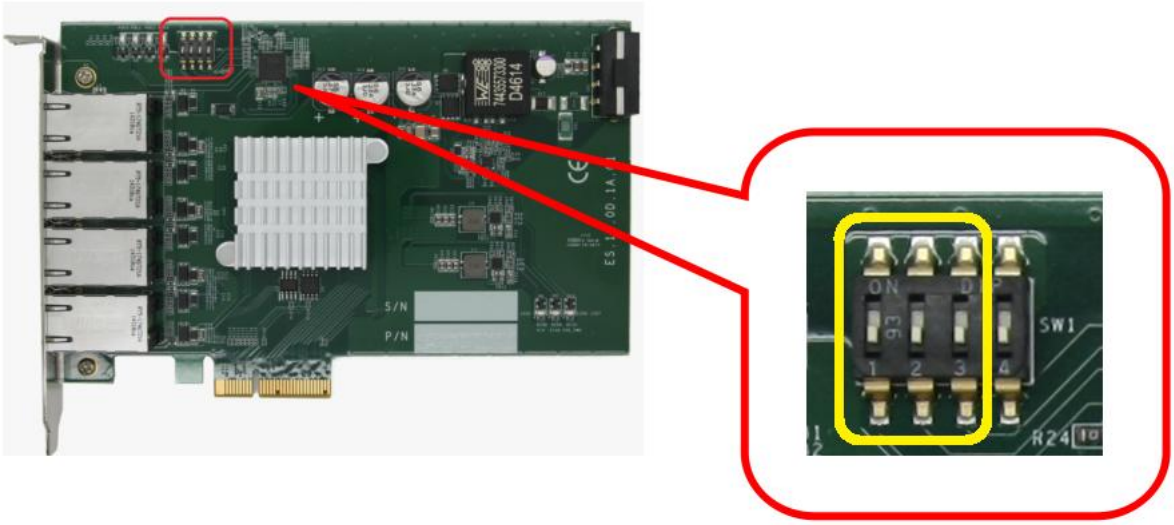
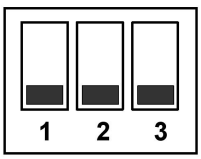
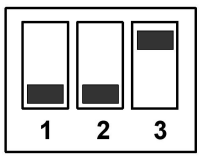
# Chapter 3 Getting Start

## 3.1 Configure Board ID of PCIe-PoE354at/352at

PCIe-PoE354at/352at offers the feature of per-port power on/off control. You can manually cut off or resume the power delivered to connected PoE+ PD device using Neousys' provided API. This feature enables the capability of failure recovery in the field as you have the way to rest each PD device. To support per-port on/off control for multiple cards, PCIe-PoE354at/352at incorporates a DIP switch to configure user-defined board ID. The board ID can be used as a parameter in API to specify the PCIe-PoE354at/352at 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 (P1 ~ P3) |
|---|---|
| 0 |   |
| 1 |   |

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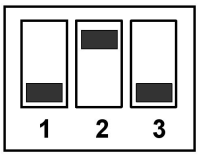
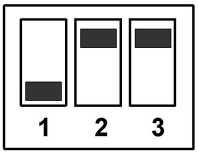
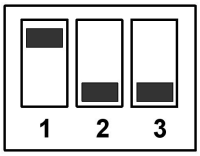
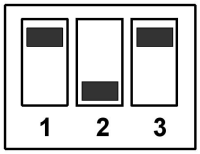
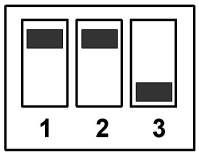
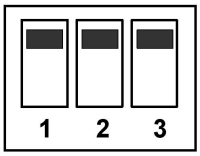
| | |
|---|---|
| 2 |  |
| 3 |  |
| 4 |  |
| 5 |  |
| 6 |  |
| 7 |  |

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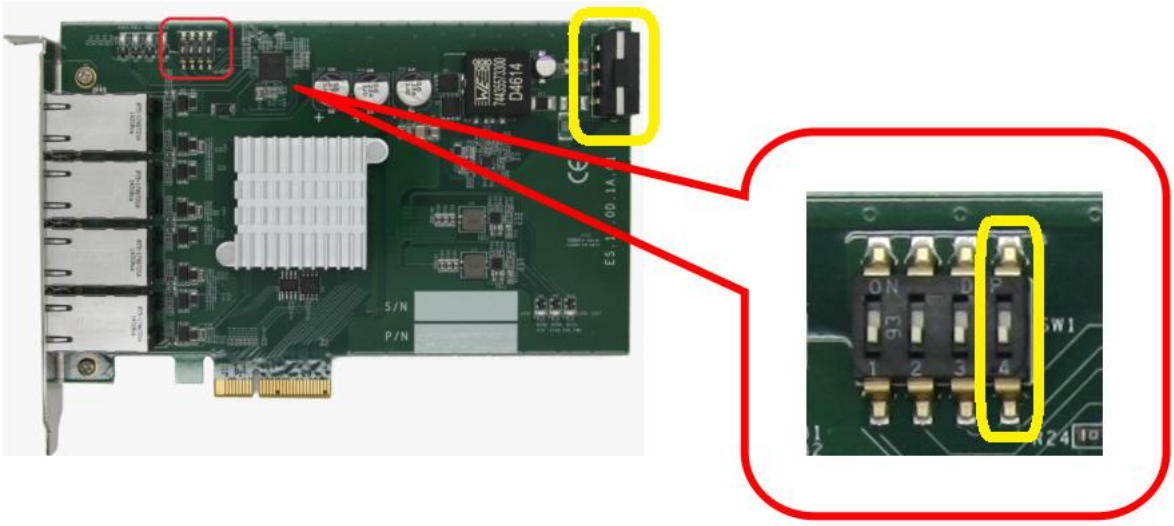
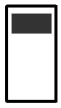
# 3.2 Configure 12 VDC Source (PCIe-PoE354at Only)

PCIe-PoE354at/352at requires 12 VDC power for its PoE+ PSE function. By default, both PCIe-PoE354at and PCIe-PoE352at obtain 12 VDC directly from the PCI Express connector so no external power plug is needed.

As PCIe-PoE354at requires 9.6 A maximal current, some motherboards may not supply sufficient current on its PCI Express connector. In this case, you need to supply 12 VDC from the standard ATX power supply via a 4-pin power plug. P4 of the DIP switch on PCIe-PoE354at allows users to manually configure the source of 12 VDC.



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

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# 3.3 Install the PCIe-PoE352at

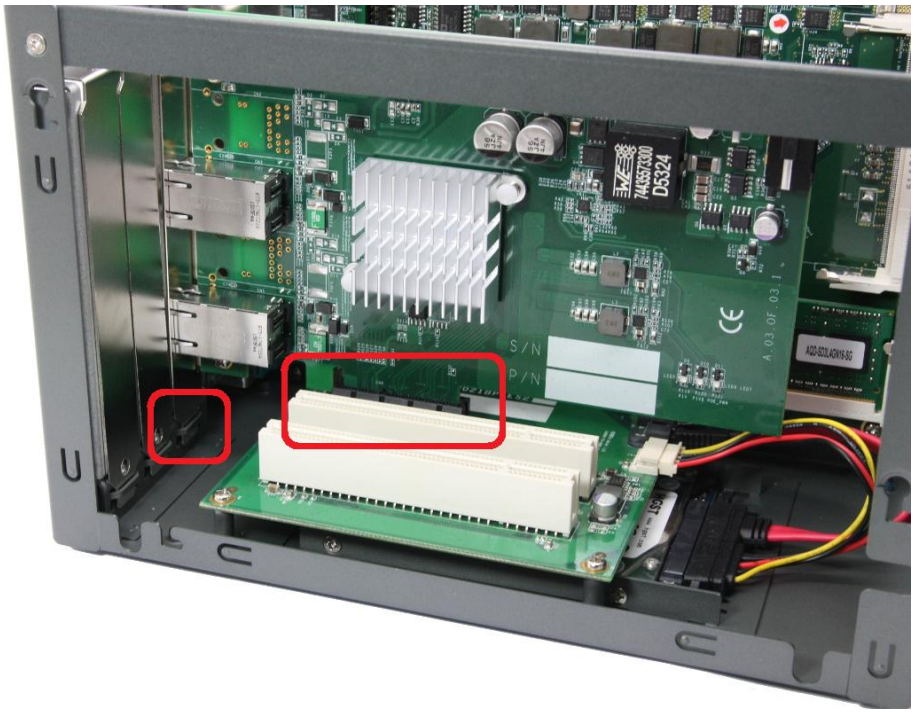
PCIe-PoE352at utilizes the x4 PCI Express bus to communicate with the host computer. Before you install the PCIe-PoE352at, please make sure that there is a x4 PCI Express slot available on your host computer.

**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-PoE352at can be fitted into your x16 PCI Express slot.*

You can install the PCIe-PoE352at PoE+ frame grabber card by following the steps listed below.

1. Configure Board ID if necessary according to section 3.1.
2. Open the chassis of the host computer and expose the x4 PCI Express slot (or a compatible x16 PCI Express slot).
3. Align and insert the golden-finger connector of PCIe-PoE352at into the PCI Express slot until it's firmly contacted.



4. Fix the PCIe-PoE352at to the host computer using with a screw.

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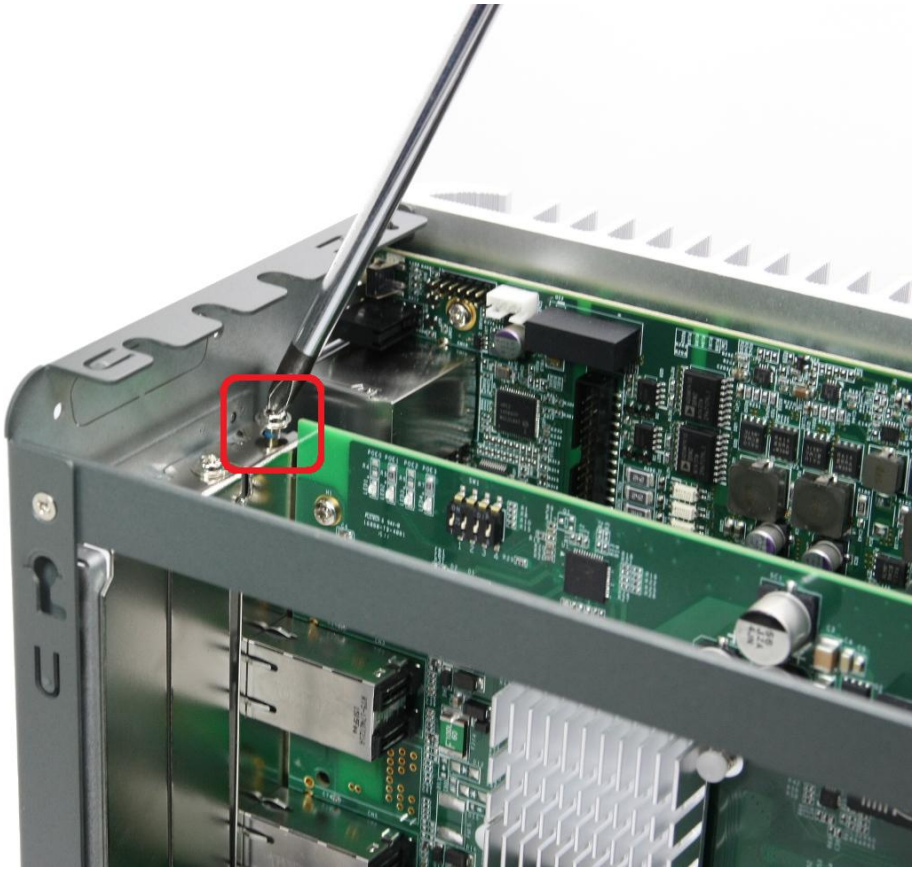

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# 3.4 Install the PCIe-PoE354at Frame Grabber Card

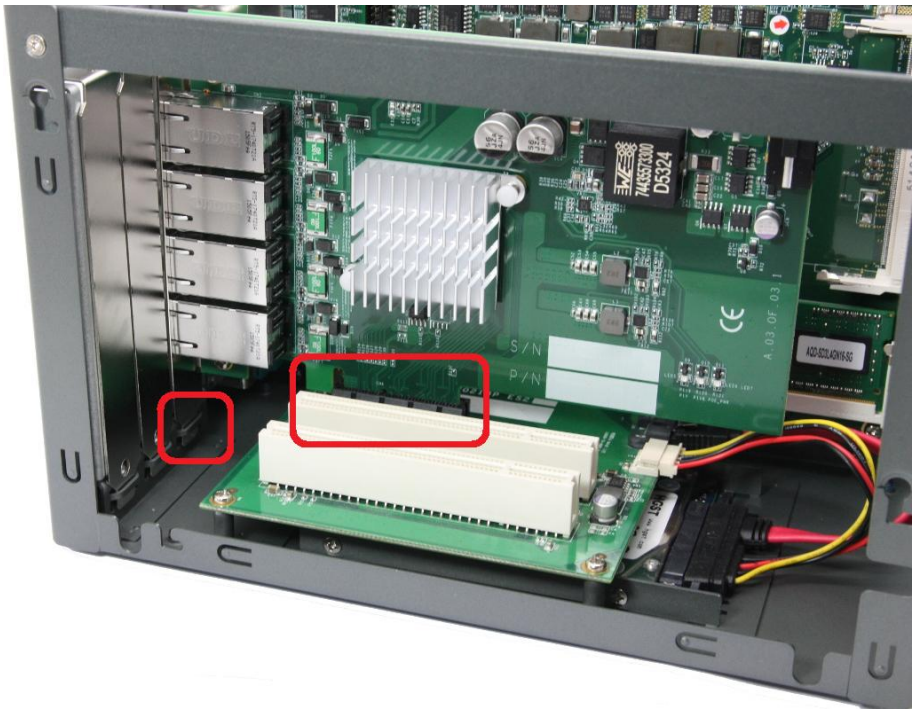
PCIe-PoE354at utilizes the x4 PCI Express bus to communicate with the host computer. Before you install the PCIe-PoE354at, please make sure that there is a x4 PCI Express slot available on your host computer.

**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-PoE354at can be fitted into your x16 PCI Express slot.*

You can install the PCIe-PoE354at frame grabber card by following the steps listed below.

1. Configure Board ID if necessary according to section 3.1.
2. Configure 12 VDC source if necessary according to section 3.2.
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-PoE354at into the PCI Express slot until it's firmly contacted.



5. Fix the PCIe-PoE354at to the host computer using with a screw.

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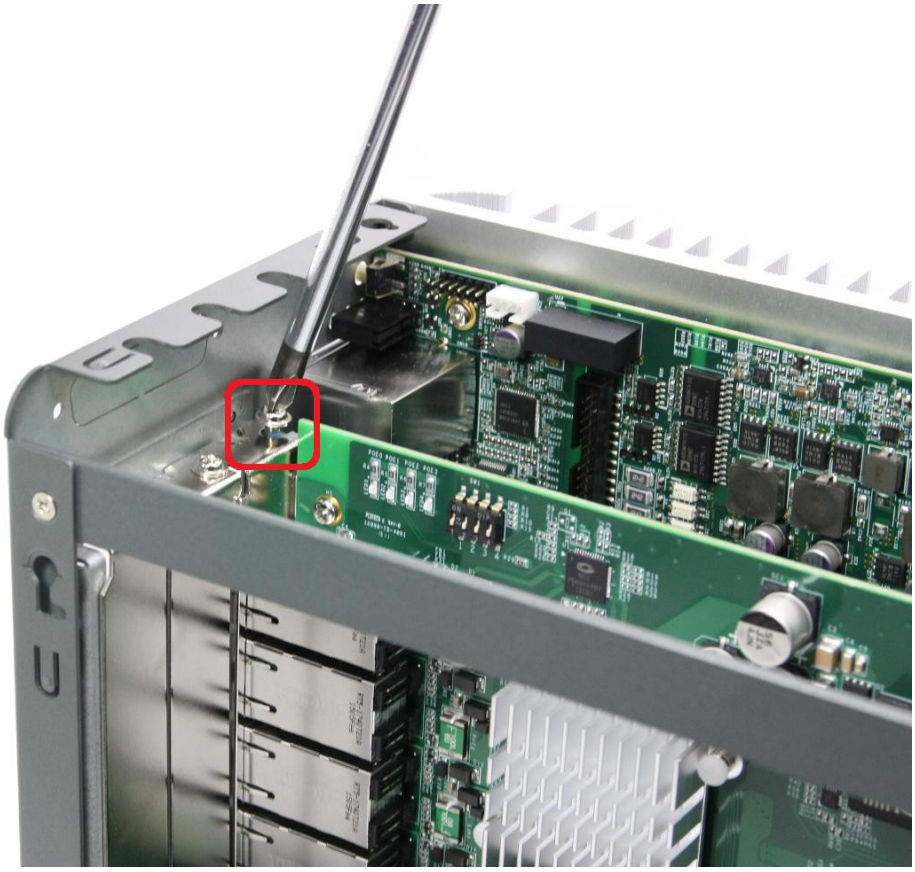
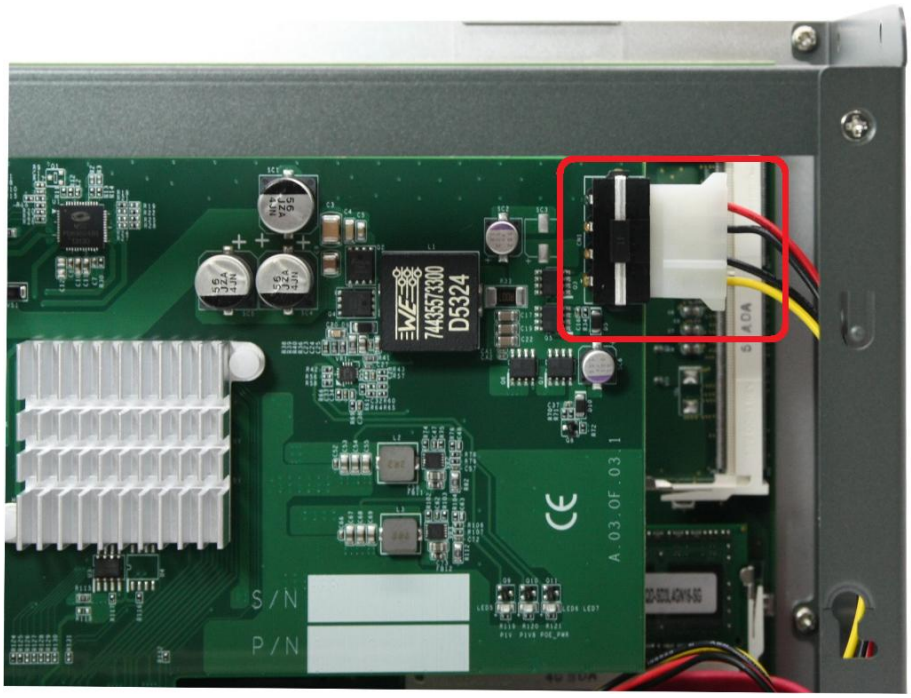


6. If the PCIe-PoE354at is configured to obtain 12 VDC from 4-pin power connector, plug in the 4-pin power plug from your ATX power supply and make sure they are firmly contacted.




**Note**

*When configuring PCIe-PoE354at to obtain 12 VDC from 4-pin power connector. For most*

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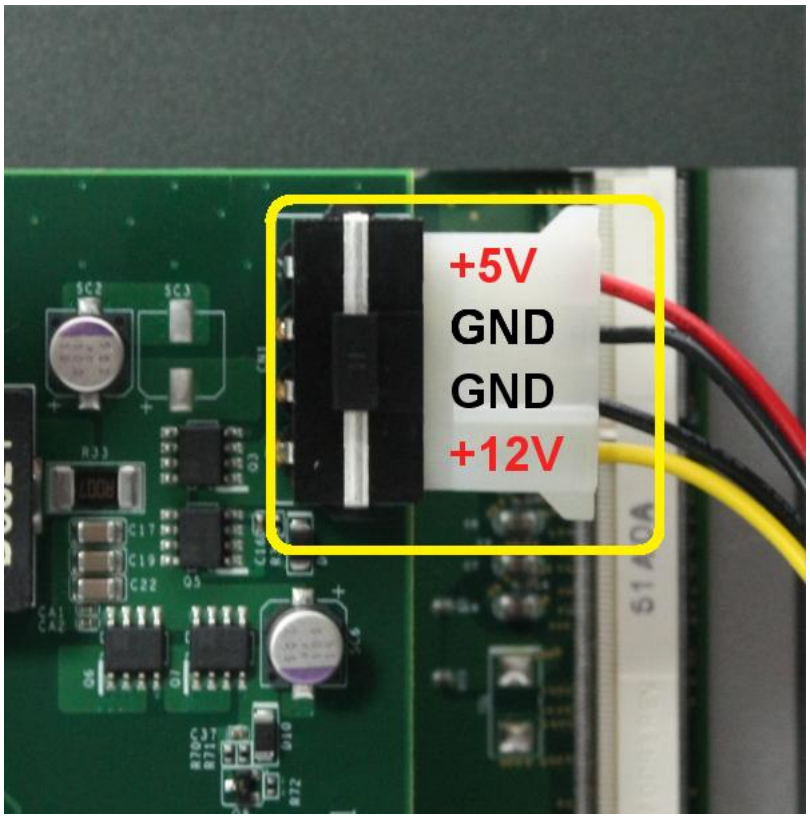
*cases, you can use the 4-pin power plug (+5V/Red, GND/Black, GND/Black, +12V/Yellow) from the ATX power supply inside the host computer. Please always confirm the polarity before you plug the external power into the on-board 4-pin power connector.*




# 3.5 Connect a PoE or Non-PoE Device

PoE, or Power over Ethernet, is a technology to supply electrical power along with data on a standard Ethernet cable. By detecting and classifying the connected device before supplying power to device, PCIe-PoE354at and PCI-PoE352at can work with **both PoE Powered Devices (PD) and regular Ethernet devices.**

A CAT5 or CAT6 cable is usually used for PoE applications. Since PCIe-PoE354at and PCIe-PoE352at are designed for Gigabit Ethernet connectivity, a CAT-6 cable is highly recommended. Per IEEE 802.3at specification, each port of PCIe-PoE354at/352at can delivers 25.5 W of power to a PoE PD device over a cable of up to 100 meters.

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# Chapter 4 Driver Installation and Settings

## 4.1 Driver Installation

Neousys provides a very 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-PoE354at/352at with just one mouse click.

### 4.1.1 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 driver for PCIe-PoE354at/352at. 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.

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### 4.1.2 Install Driver Manually

You can also manually install the driver for PCIe-PoE354at/352at. Please refer to the following information about installing the driver for different operating system.

**Windows XP**

1. 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**

1. 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**

1. Execute x:\Driver_Pool\GbE_I350\Win7_8_64\APPS\PROSETDX\Winx64\DxSetup.exe , where x: denotes the volume of your DVD drive

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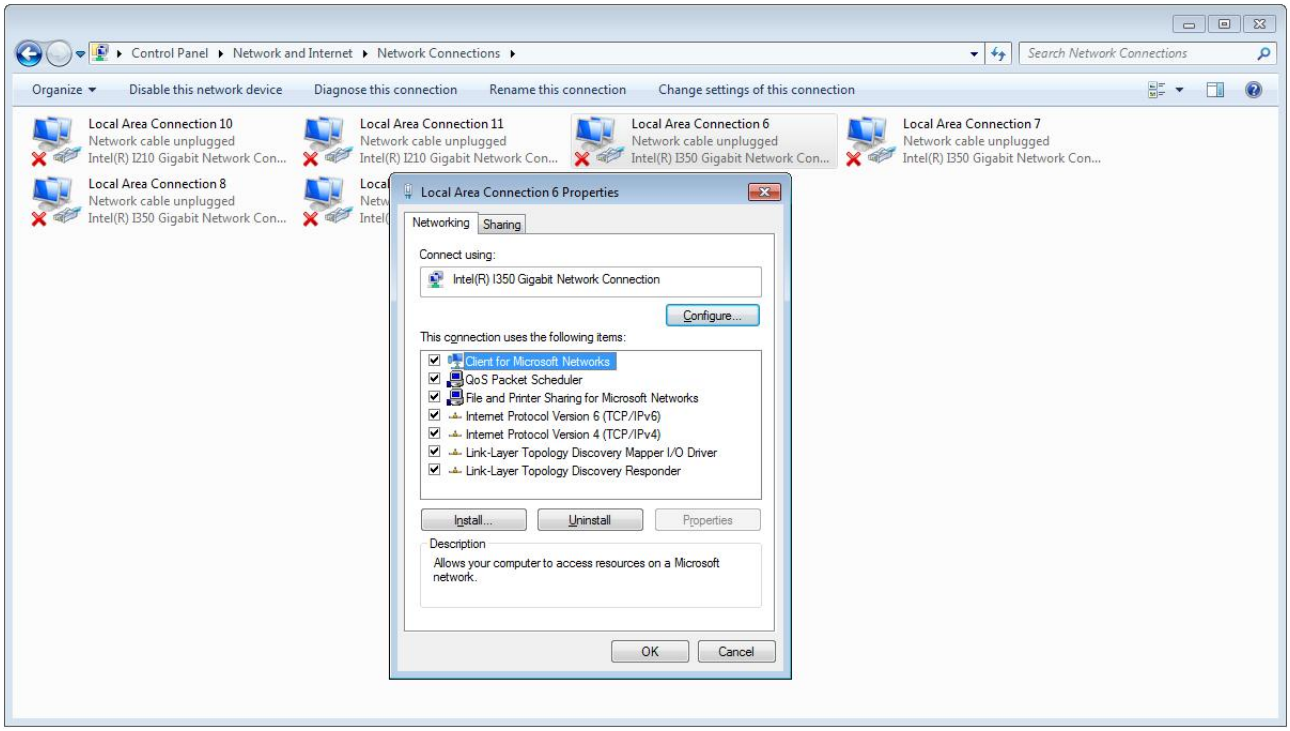
# 4.2 Driver Settings

PCIe-PoE354at and PCIe-352at offer 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.

## 4.2.1 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 date rate (e.x. 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**.

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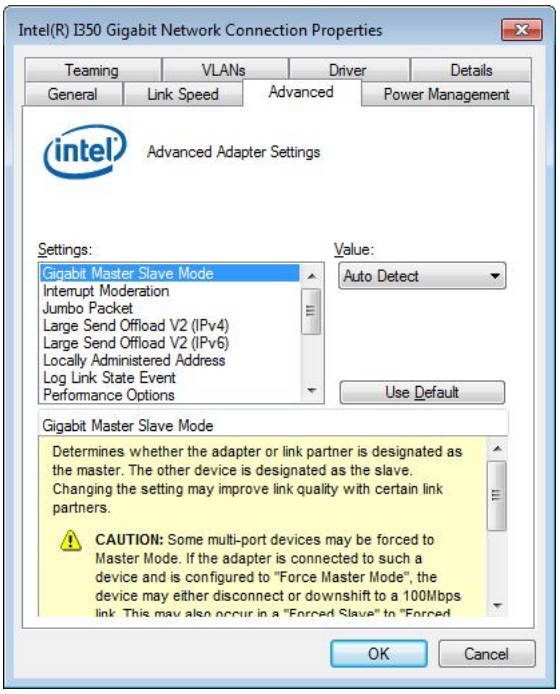
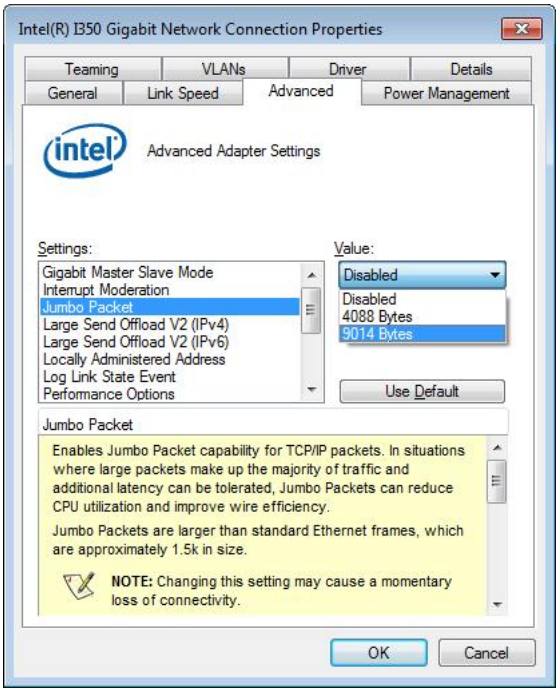
2. Click **Configure** button and a property dialog appears. Click on the **Advanced** tab.




3. 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)

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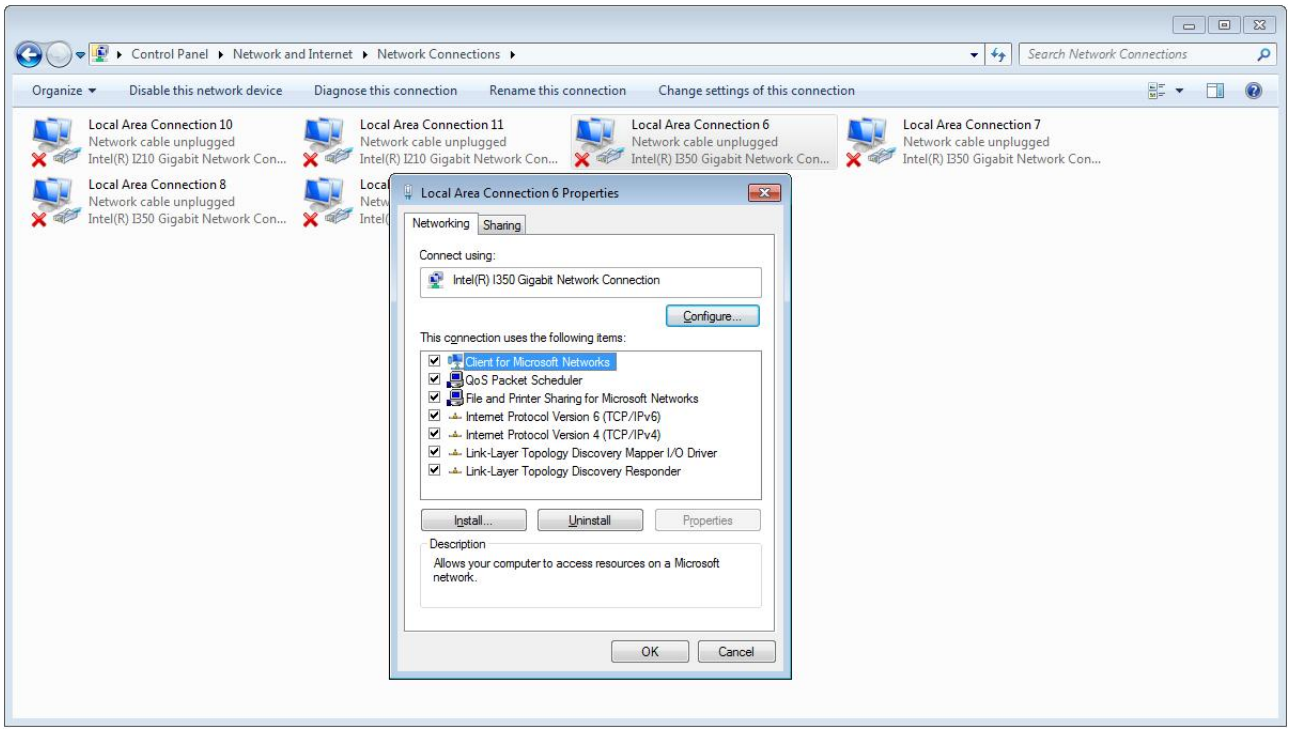
# 4.2.2 Receive Buffer

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**.

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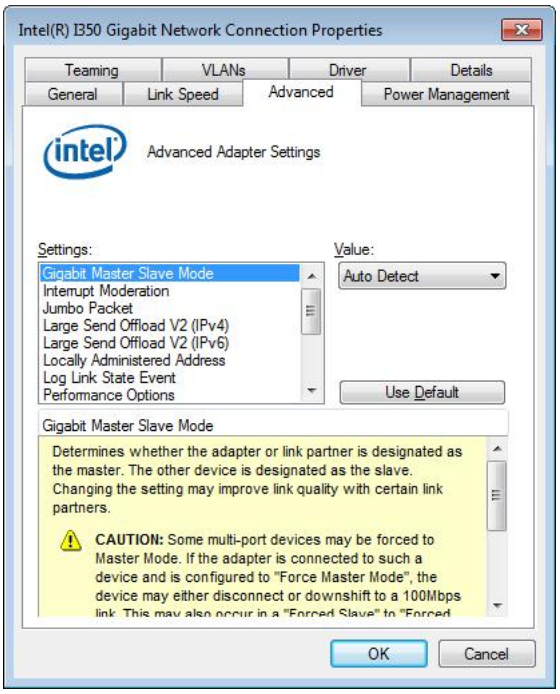
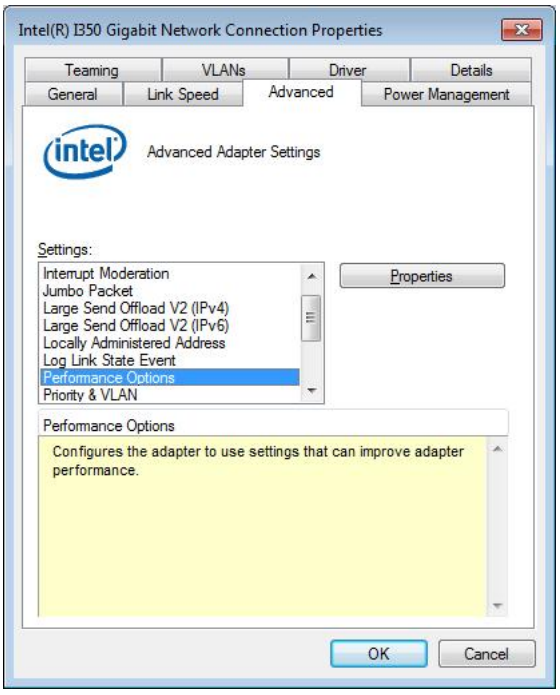
2. Click **Configure** button and a property dialog appears. Click on the **Advanced** tab.




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

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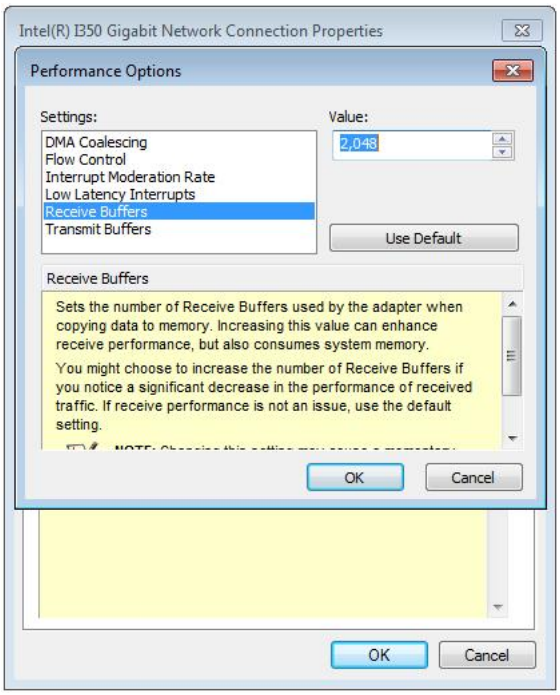
4. Adjust the value of **Receive Buffers**. (for connecting a Ethernet device with high data rate, 2048 Bytes is suggested)

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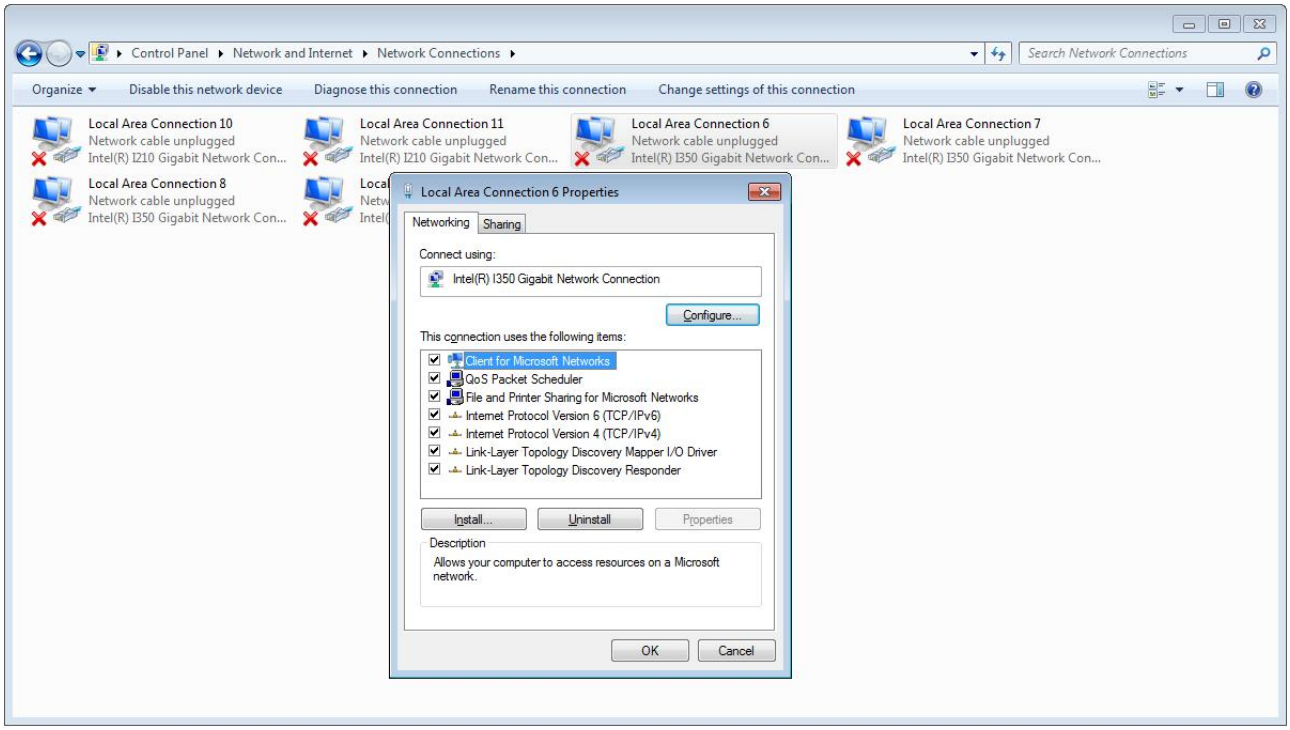
# 4.2.3 Transmit Buffers

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**.

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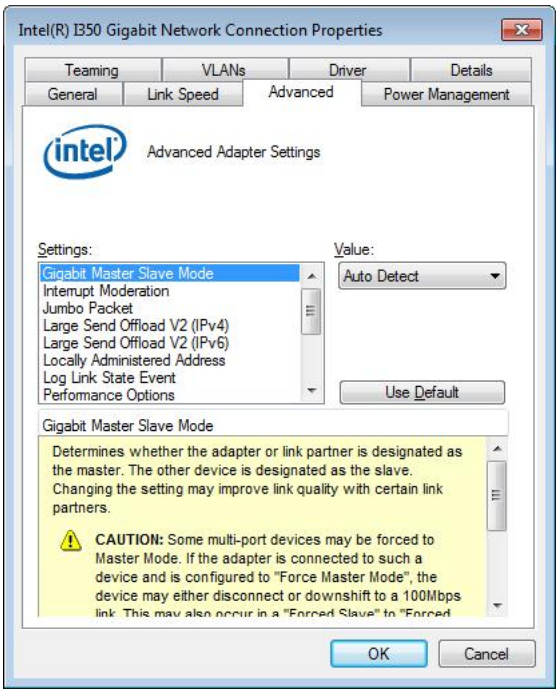
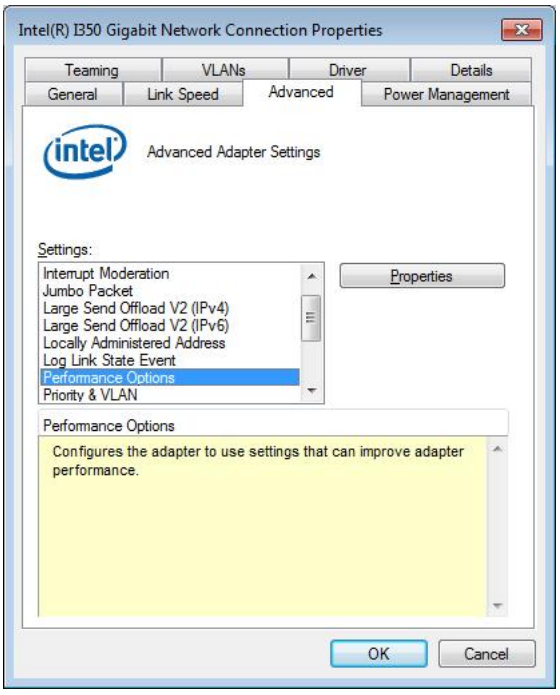
2. Click **Configure** button and a property dialog appears. Click on the **Advanced** tab.




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

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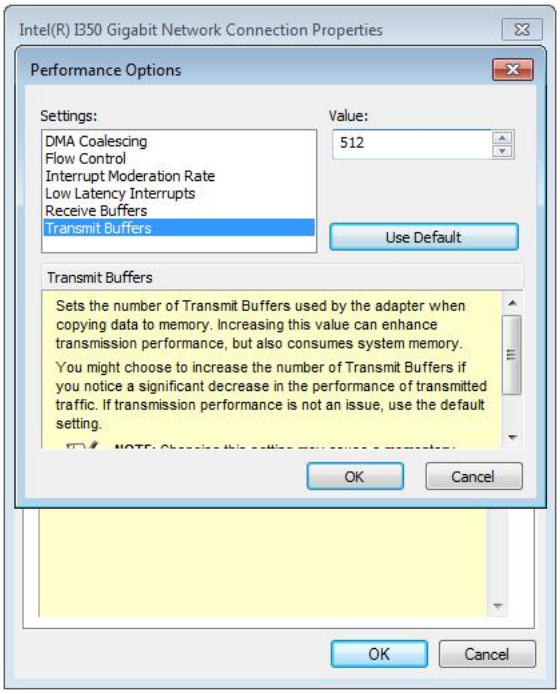
4. Adjust the value of **Transmit Buffers**.

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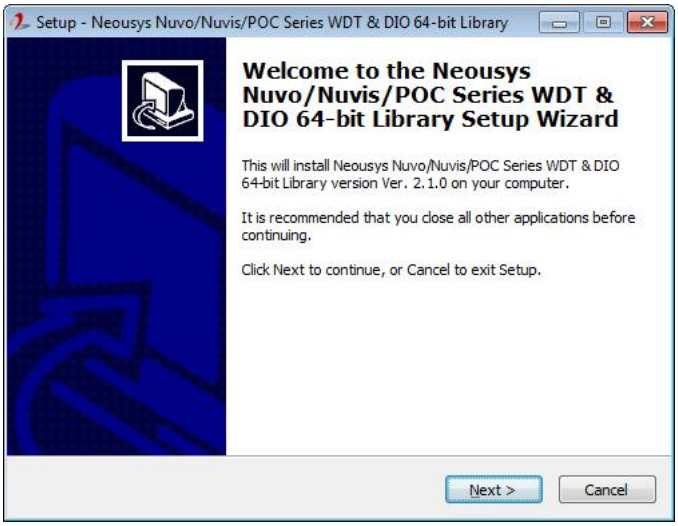
# Appendix A Using Per-Port PoE On/Off Control

PCIe-354at/352at supports a unique feature of per-port power on/off contol 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.

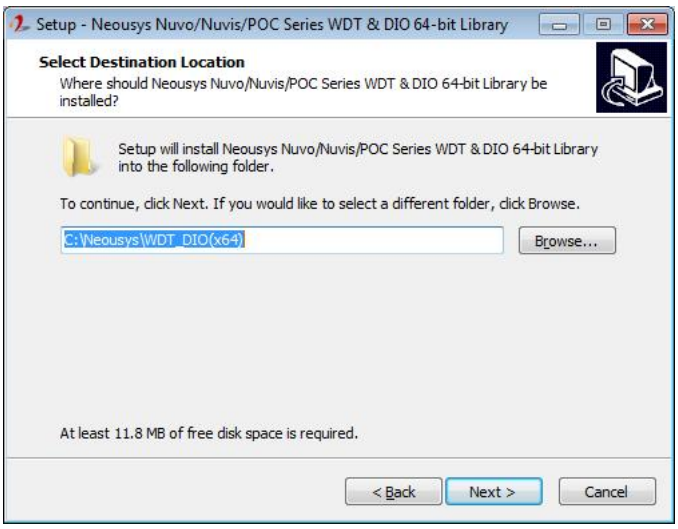
## A.1 Driver Installation

The per-port PoE on/off control function library is delivered as a part of Neousys driver setup package (WDT_DIO_Setup). For PCIe-354at/352at, please use **WDT_DIO_Setup_v2.1.0.exe** or later revision.

1. Execute **WDT_DIO_Setup_v2.1.0.exe**. The following dialog appears.




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




3. Once the installation is finished, a dialog appears to prompt you to reboot the system.

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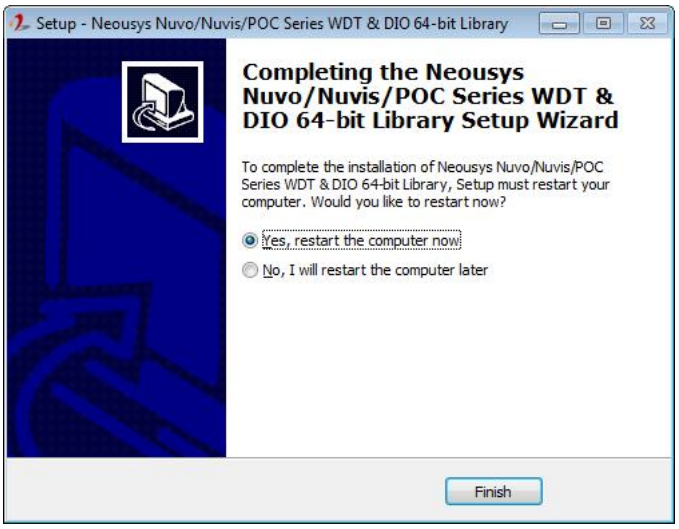
The WDT & DIO library will take effect after system rebooting.




4. When you 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 can not work with PCIe-354at/352at*

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# A.2 Per-Port On/Off Control Function Reference

## PCI_GetStatusPoEPort

**Description**

Get the current power on/off status of designated PoE port.

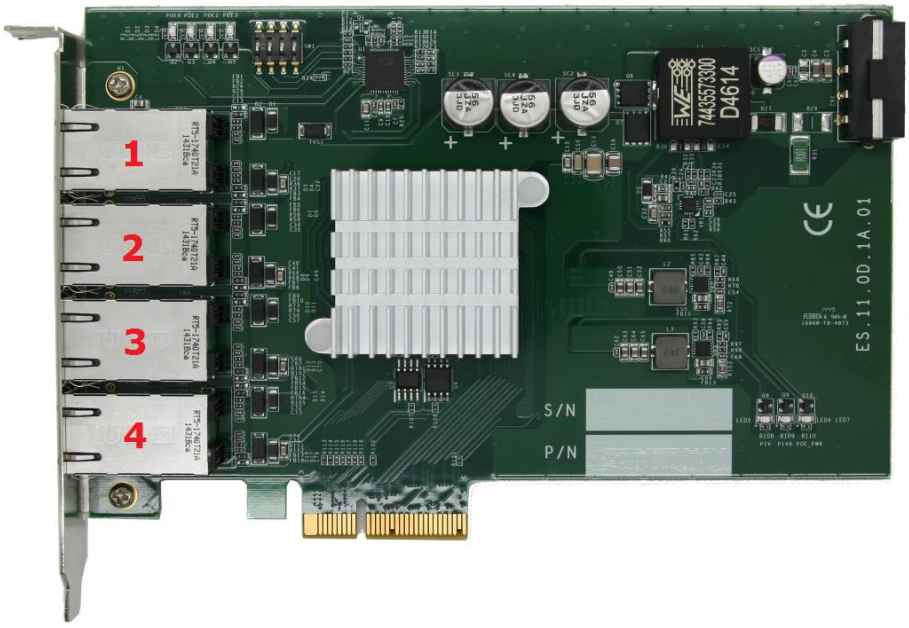
**Parameter**

*boardId*

DWORD value (0 ~ 7) to indicate board ID of selected PCIe-PoE354at/352at card. Please refer to section 3.1 for configuring board ID for your PCIe-PoE354at/352at.

*port*

DOWRD value (1 ~ 4) to specify the PoE port.




**Return Value**

Returns 1 if PoE power is on, 0 if PoE power is off.

**Usage**

```
DWORD     boardID;
DWORD     port;
BYTE      PoEStatus;

//Get PoE power status from board #0, port #1.
boardID = 0;
port = 1;
PoEStatus = PCI_GetStatusPoEPort ( boardID, port);
```

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# PCI_EnablePoEPort

**Description**

Enable (turn on) PoE power for designated PoE port.

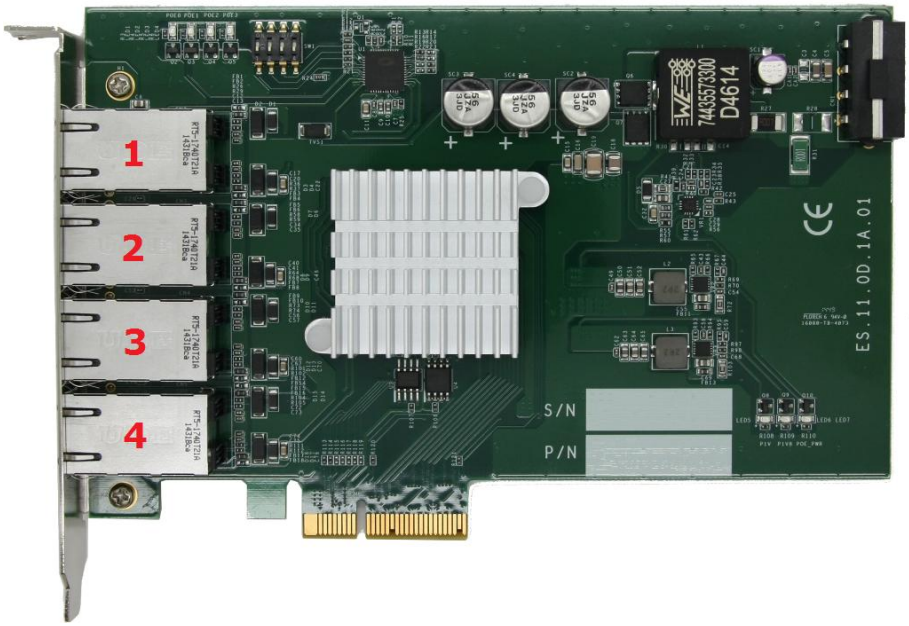
**Parameter**

*boardId*

DWORD value (0 ~ 7) to indicate board ID of selected PCIe-PoE354at/352at card. Please refer to section 3.1 for configuring board ID for your PCIe-PoE354at/352at.

*port*

DOWRD value (1 ~ 4) to specify the PoE port.




**Return Value**

Returns TRUE if successes, FALSE if failed.

**Usage**

```
DWORD     boardID;
DWORD     port;
BOOL      RetVal;

//Enable PoE power status from board #0, port #1.
boardID = 0;
port = 1;
RetVal= PCI_EnablePoEPort ( boardID, port);
```

# PCI_DisablePoEPort

**Description**

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Disable (turn off) PoE power for designated PoE port.

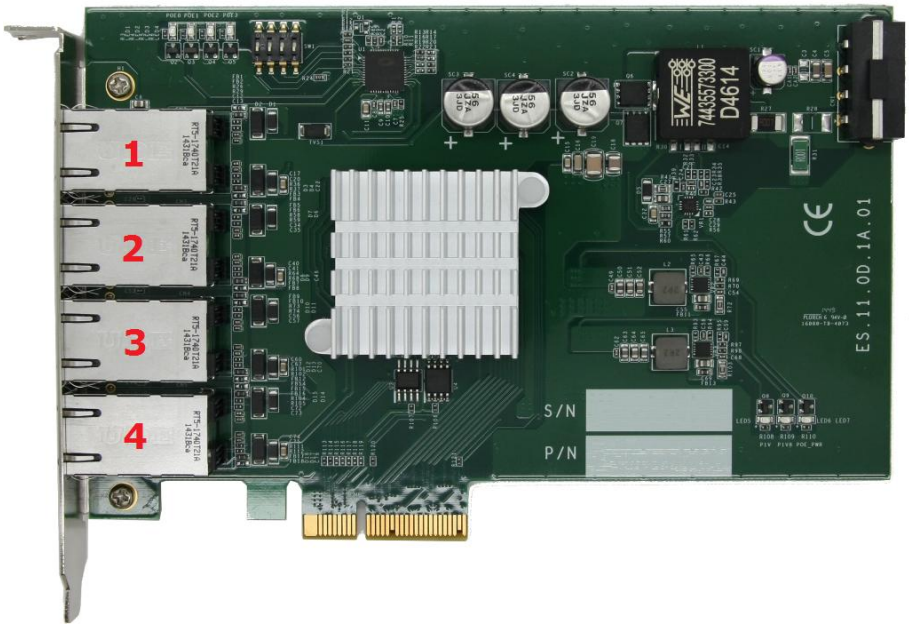
**Parameter**

*boardId*

DWORD value (0 ~ 7) to indicate board ID of selected PCIe-PoE354at/352at card. Please refer to section 3.1 for configuring board ID for your PCIe-PoE354at/352at.

*port*

DOWRD value (1 ~ 4) to specify the PoE port.




**Return Value**

Returns TRUE if successes, FALSE if failed.

**Usage**

```
DWORD     boardID;
DWORD     port;
BOOL      RetVal;

//Disable PoE power status from board #0, port #1.
boardID = 0;
port = 1;
RetVal= PCI_DisablePoEPort ( boardID, port);
```

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