# PE-3000 USER Manual

PCI Express x4/ 4-channel Gigabit LAN,
IEEE 802.3at Compliant Intel® I350 PoE+/LAN Bypass Expansion Card

Vecow

1.2.0 Edition 20260402

# Record of Revision

| Version | Date | Page | Description | Remark |
|---|---|---|---|---|
| 1.0 | 05/25/2018 | All | Official Release | |
| 1.1 | 6/20/2023 | 5 | Update | |
| 1.2 | 4/2/2026 | 7 | Update | |

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**CE**

The products 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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| Part Number | Description |
|---|---|
| PE-3004 | Intel® I350 4-Channel PCI Express Card with PoE+ |
| PE-3014 | Intel® I350 4-CH PCI Express Card with advanced 2-pair LAN Bypass |

# Table of Contents


CHAPTER 1 GENERAL INTRODUCTION 1

1.1 Overview 1

1.2 Features 1

1.3 Product Specification 2

1.3.1 Specifications of Vecow PE-3004/3004M 2

1.3.2 Specifications of Vecow PE-3014/3014M 3

1.4 Mechanical Dimension 4

1.4.1 PE-3004/3014 4

1.4.2 PE-3004M/3014M 4

CHAPTER 2 GETTING TO KNOW YOUR PE-3000 5

2.1 Packing List 5

2.2 PE-3004(M) I/O and Indication 6

2.3 PE-3014(M) I/O and Indication 10

CHAPTER 3 GETTING START 13

3.1 Installing PE-3004/ PE-3014 13

APPENDIX A : PoE Guide (PE-3004/3004M only) 15

APPENDIX B : Software Functions 19

# 1

# GENERAL INTRODUCTION

## 1.1 Overview

PE-3000 is a series 4-port independent gigabit Ethernet (GigE) card supporting 4-port Gigabit IEEE 802.3at PoE+, or dual LAN Bypass mode. Powered by Intel® Ethernet Server Adapter I350 supports 4-port Independent Gigabit Ethernet and performance enhancing LAN features, IEEE 802.3az Energy Efficient Ethernet (EEE) and DMA Coalescing (DMAC) Power Management functions. Just simply by RJ45 or optional rugged M12 connections, Vecow PE-3000 is enabled to provide up to 1000Mbps data rate each port with teaming functions, link aggregation (LAG), 9.7K Jumbo Frame, IEEE 1588 Precision Time Protocol (PTP), IEEE 802.3AS and easy maintenance. Vecow PE-3000 is a great solution for Industrial Ethernet, Intelligent Surveillance, Factory Automation, Mobile DVR/NVR, Intelligent Transportation System (ITS), Machine Automation and any Industry 4.0/IIoT applications.

## 1.2 Features

- Intel® Ethernet Server Adapter I350 supports 4-port Independent Gigabit Ethernet and performance enhancing LAN features
- Supports IEEE 802.3az Energy Efficient Ethernet (EEE) and DMA Coalescing (DMAC) Power Management Features
- All-in-one, fully-integrated single-chip GigE switching solution with lower power consumption
- IEEE 802.3at Power over Ethernet (PoE+), up to 25.5W Power Output at 48V DC per port
- Supports 2-port hardware LAN Bypass mode
- 4-port Independent Gigabit Ethernet, optional supports rugged M12 connections
- IEEE 1588 Precision Time Protocol (PTP) and IEEE 802.1AS implementation
- Up to 9.7K Jumbo Frame, Link Aggregation, Teaming Functions
- -25°C to 70°C Operating Temperature

# 1.3 Product Specification

## 1.3.1 Specifications of Vecow PE-3004/3004M

| **Ethernet** | |
|---|---|
| Interface | PCI Express x4 |
| Chipset | 1 Intel® Ethernet Controller I350 |
| Data Rate | 10/100/1000 Mbps |
| Jumbo Frame | Up to 9728 byte |
| Link Aggregation (LAG) | Present |
| Connector | • 8-pin RJ45<br>• A-coded M12 (Optional) |
| PoE Standard | IEEE 802.3at compliant |
| **Power Requirements** | |
| Output | • 4 RJ45 PoE Port<br>• 4 A-coded M12 PoE Port (Optional)<br>• Up to 25.5W Power Output at 48V DC per port |
| Power Connector | 1 4-pin ATX 12V Power Connector |
| **Environment** | |
| Operating Temperature | -25°C to 70°C (-13°F to 158°F) |
| Storage Temperature | -40°C to 85°C (-40°F to 185°F) |
| Certifications | FCC, CE, RoHS compliant |
| **Mechanical** | |
| Dimension (W x D x H) | 168mm x 121mm x 21mm (6.6" x 4.8" x 0.8") |

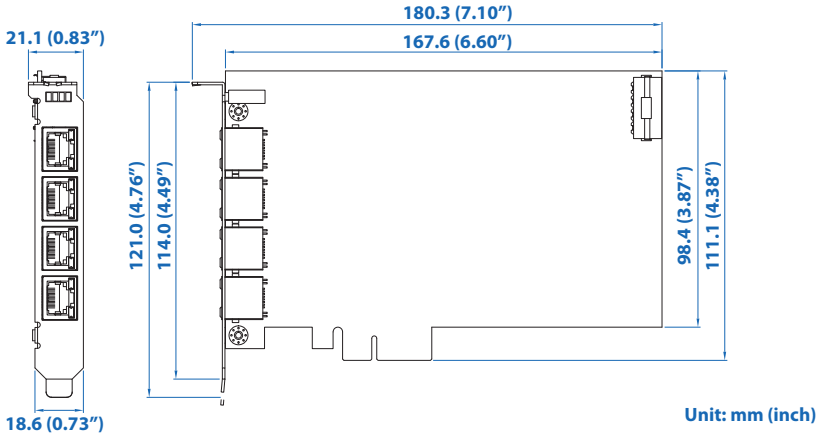
### 1.3.2 Specifications of Vecow PE-3014/3014M

| **Ethernet** | |
|---|---|
| Interface | PCI Express x4 |
| Chipset | 1 Intel® Ethernet Controller I350 |
| Data Rate | 10/100/1000 Mbps |
| Jumbo Frame | Up to 9728 byte |
| Link Aggregation (LAG) | Present |
| Connector | • 8-pin RJ45<br>• A-coded M12 (Optional) |
| **Environment** | |
| Operating Temperature | -25°C to 70°C (-13°F to 158°F) |
| Storage Temperature | -40°C to 85°C (-40°F to 185°F) |
| Certifications | FCC, CE, RoHS compliant |
| **Mechanical** | |
| Dimension (W x D x H) | 168mm x 121mm x 21mm (6.6" x 4.8" x 0.8") |

# 1.4 Mechanical Dimension

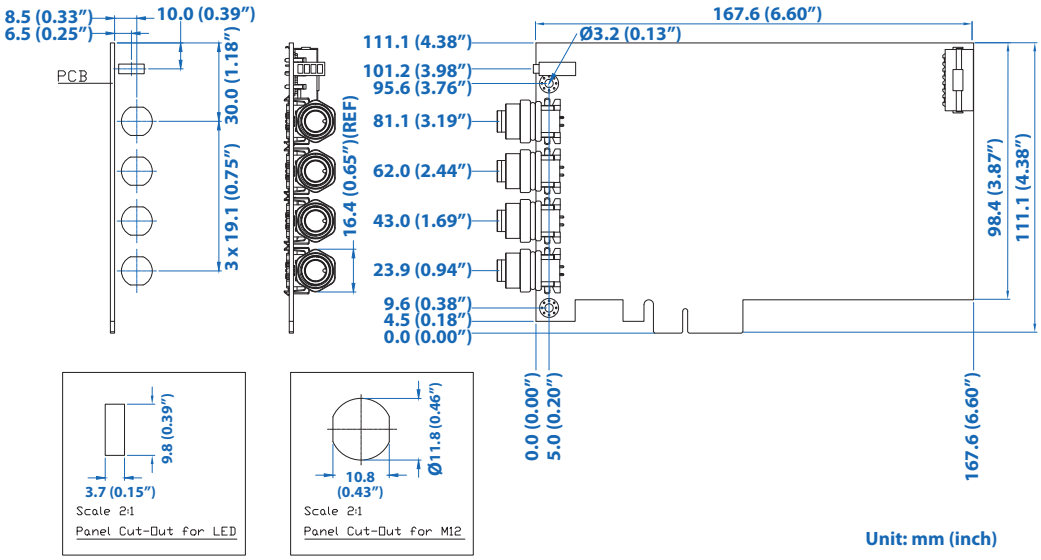
## 1.4.1 PE-3004/3014

(PE-3014 is w/o LED.)




## 1.4.2 PE-3004M/3014M

(Due to M12 connector, it is over the space and not in PCI Express standard.)
(PE-3014M is w/o LED.)



# 2

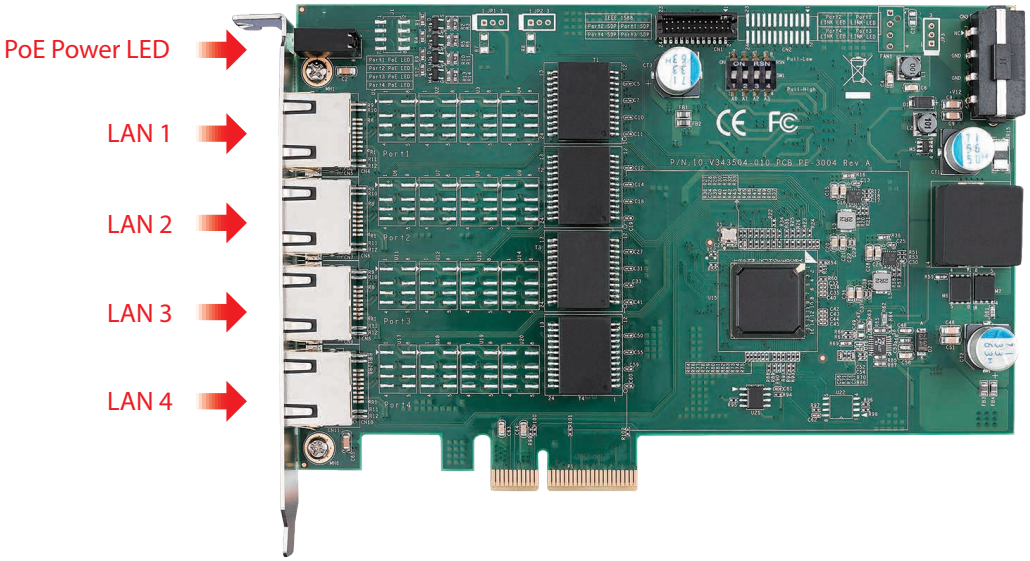
# GETTING TO KNOW YOUR PE-3000

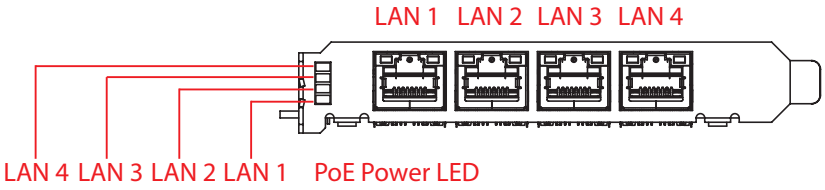
## 2.1 Packing List

| Item | Description | Qty |
|---|---|---|
| 1 | PE-3000, PCI Express x4 PoE+/LAN Bypass, 4-Channel, GigE, IEEE 802.3at Compliant Intel® I350 PCI Express Expansion Card<br>(It is based on the configuration you ordered.) | 1 |

## 2.2 PE-3004(M) I/O and Indication

### 2.2.1 PoE (Power over Ethernet) Ports



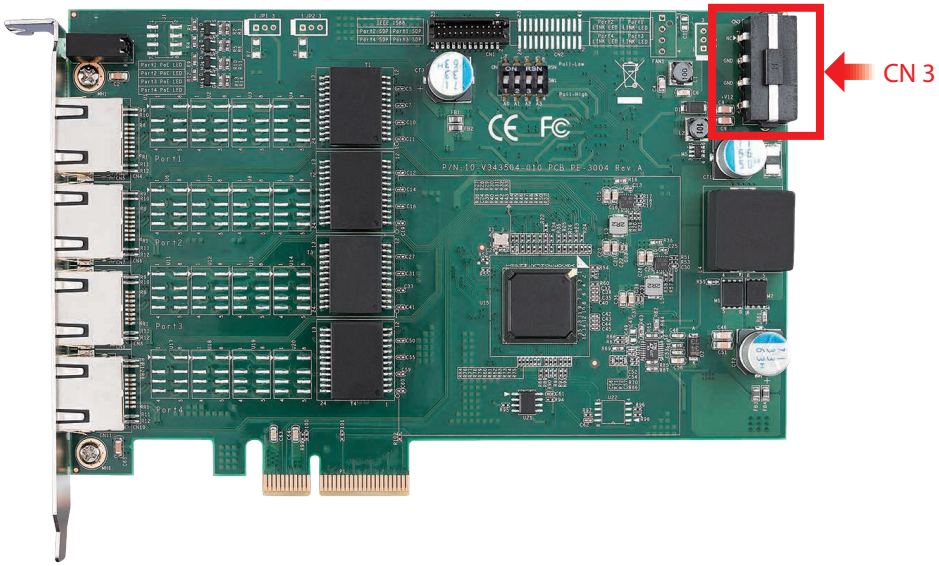

PE-3004 is equipped with 4 IEEE 802.3at PoE+ ports for transmitting power as much as 25.5W / 48V per port and 1000BASE-T gigabit data signals over standard Ethernet CAT-5/CAT-6 cable.
Each PoE connection is powered by Intel® I350 Gigabit Ethernet controller and independent PCI express interface to connect with multi-core processor for networking and data transmit optimization. Only when PoE port starts to supply power to power devices, the dedicated LED will be lightened.

The pin-outs of LAN 1 and LAN 4 are listed as follows:

| Pin No. | 10/ 100 Mbps | 1000 Mbps | PoE |
|---|---|---|---|
| 1 | E_TX+ | MDI0_P | PoE+ |
| 2 | E_TX- | MDI0_N | PoE+ |
| 3 | E_RX+ | MDI1_P | PoE- |
| 4 | ---- | MDI2_P | ---- |
| 5 | ----- | MDI2_N | ---- |

| | | | |
|---|---|---|---|
| 6 | E_RX- | MDI1_N | PoE- |
| 7 | ----- | MDI3_P | ---- |
| 8 | ------ | MDI3_N | ---- |

### 2.2.2 Power Input

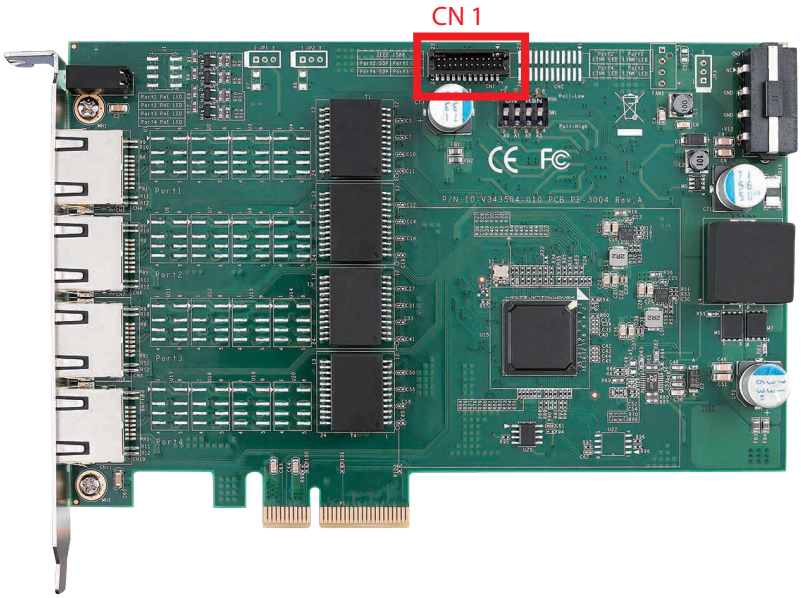



The PE-3004 is also equipped with one 4-pin power plug (12V, 10A max) for additional power supply. For most cases, the power obtained from PCIe bus is sufficient for the PoE devices, and you do not need to supply extra power to the card.
In case the external power is needed, you can use 4-pin ATX power connector (+5V/Red, GND/Black, GND/Black, +12V/Yellow) inside the host computer. Please always confirm the polarity before you plug into the onboard 4-pin power plug.

CN3:

| Pin No. | Definition | Pin No. | Definition |
|---|---|---|---|
| 1 | NC | 3 | GND |
| 2 | GND | 4 | +12V |

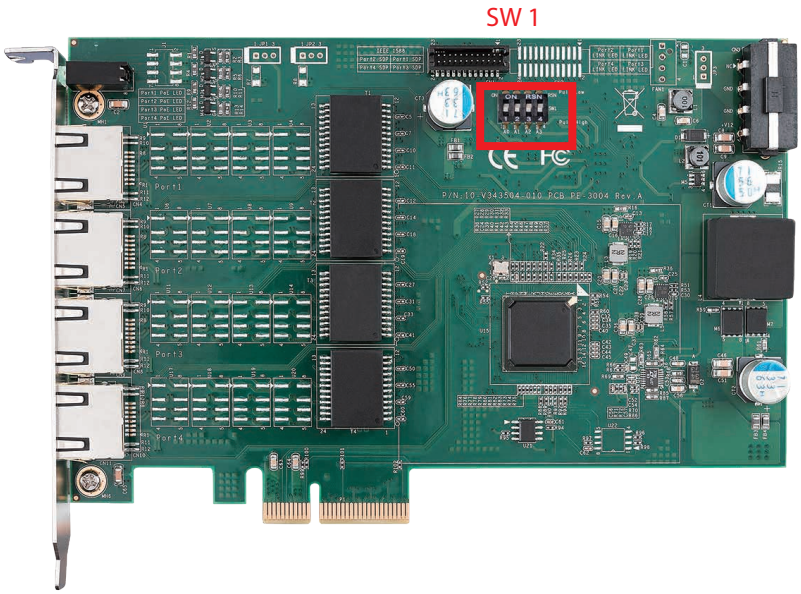
### 2.2.3 IEEE 1588




Intel i350 supports a header for IEEE 1588 related applications.

| Pin No. | Description | LAN Port | Pin No. | Description | LAN Port |
|---|---|---|---|---|---|
| 1 | Ground | --- | 2 | Ground | --- |
| 3 | SPD0_0 | LAN 1 | 4 | SPD2_0 | LAN 3 |
| 5 | SPD0_1 | LAN 1 | 6 | SPD2_1 | LAN 3 |
| 7 | SPD0_2 | LAN 1 | 8 | SPD2_2 | LAN 3 |
| 9 | SPD0_3 | LAN 1 | 10 | SPD2_3 | LAN 3 |
| 11 | Ground | --- | 12 | Ground | --- |
| 13 | Ground | --- | 14 | Ground | --- |
| 15 | SPD1_0 | LAN 2 | 16 | SPD3_0 | LAN 4 |
| 17 | SPD1_1 | LAN 2 | 18 | SPD3_1 | LAN 4 |
| 19 | SPD1_2 | LAN 2 | 20 | SPD3_2 | LAN 4 |
| 21 | SPD1_3 | LAN 2 | 22 | SPD3_3 | LAN 4 |
| 23 | Ground | --- | 24 | Ground | --- |

## 2.2.4 PoE Power On/Off

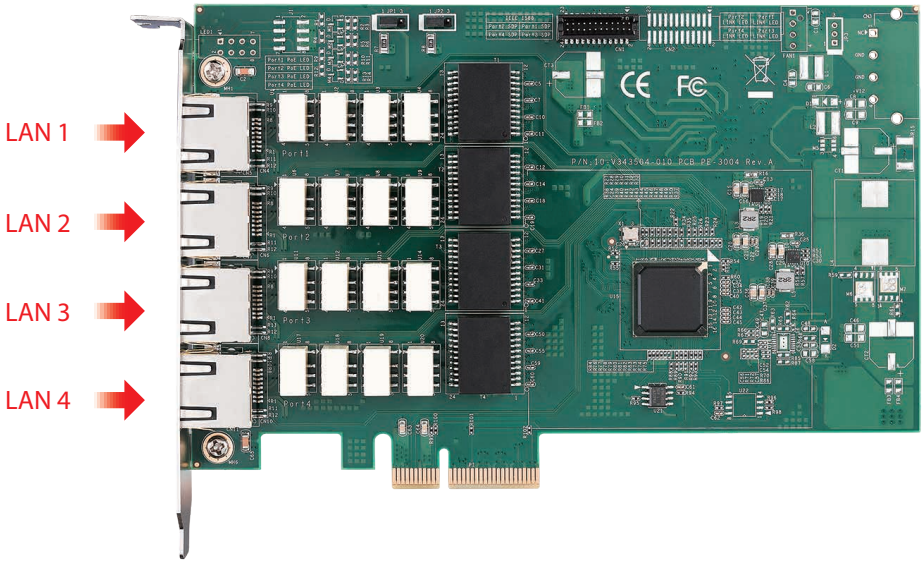



PE-3004 controls LTC4266 PoE Power ON/OFF via SMBUS.
LTC4266 Address Setting as below:

| | | | | | SW 1 | | | |
|---|---|---|---|---|---|---|---|---|
| A3 | A2 | A1 | A0 | Address | A0 | A1 | A2 | A3 |
| 0 | 0 | 0 | 0 | 0x40 | 1-ON | 2-ON | 3-ON | 4-ON |
| 0 | 0 | 0 | 1 | 0x42 (Default) | 1-OFF | 2-ON | 3-ON | 4-ON |
| 0 | 0 | 1 | 0 | 0x44 | 1-ON | 2-OFF | 3-ON | 4-ON |
| 0 | 0 | 1 | 1 | 0x46 | 1-OFF | 2-OFF | 3-ON | 4-ON |
| 0 | 1 | 0 | 0 | 0x48 | 1-ON | 2-ON | 3-OFF | 4-ON |
| 0 | 1 | 0 | 1 | 0x4A | 1-OFF | 2-ON | 3-OFF | 4-ON |
| 0 | 1 | 1 | 0 | 0x4C | 1-ON | 2-OFF | 3-OFF | 4-ON |
| 0 | 1 | 1 | 1 | 0x4E | 1-OFF | 2-OFF | 3-OFF | 4-ON |
| 1 | 0 | 0 | 0 | 0x50 | 1-ON | 2-ON | 3-ON | 4-OFF |
| 1 | 0 | 0 | 1 | 0x52 | 1-OFF | 2-ON | 3-ON | 4-OFF |
| 1 | 0 | 1 | 0 | 0x54 | 1-ON | 2-OFF | 3-ON | 4-OFF |
| 1 | 0 | 1 | 1 | 0x56 | 1-OFF | 2-OFF | 3-ON | 4-OFF |
| 1 | 1 | 0 | 0 | 0x58 | 1-ON | 2-ON | 3-OFF | 4-OFF |
| 1 | 1 | 0 | 1 | 0x5A | 1-OFF | 2-ON | 3-OFF | 4-OFF |
| 1 | 1 | 1 | 0 | 0x5C | 1-ON | 2-OFF | 3-OFF | 4-OFF |
| 1 | 1 | 1 | 1 | 0x5E | 1-OFF | 2-OFF | 3-OFF | 4-OFF |

## 2.3 PE-3014(M) I/O and Indication

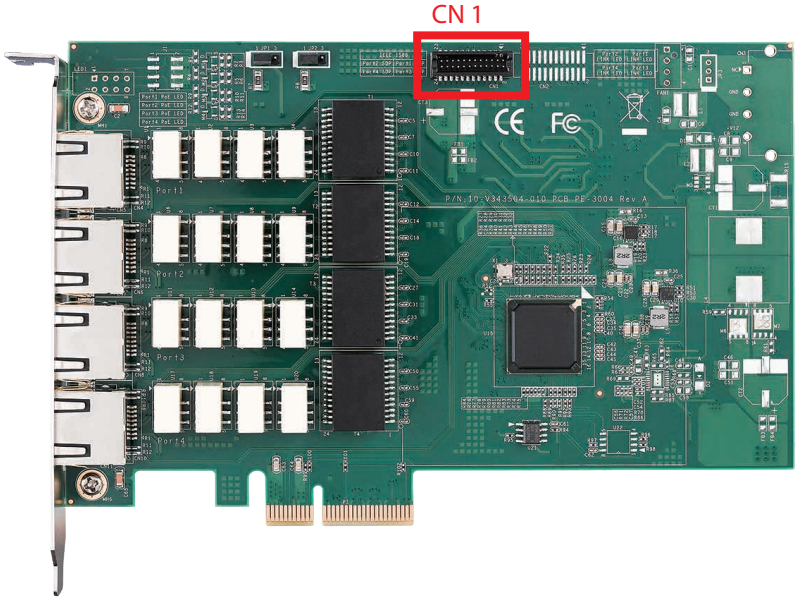
### 2.3.1 Ethernet connections




There are four 8-pin RJ-45 jacks supporting 10/100/1000 Mbps Ethernet connections in PE-3014.

| Pin No. | 10/ 100 Mbps | 1000 Mbps |
|---|---|---|
| 1 | E_TX+ | MDI0_P |
| 2 | E_TX- | MDI0_N |
| 3 | E_RX+ | MDI1_P |
| 4 | ---- | MDI2_P |
| 5 | ----- | MDI2_N |
| 6 | E_RX- | MDI1_N |
| 7 | ----- | MDI3_P |
| 8 | ------ | MDI3_N |

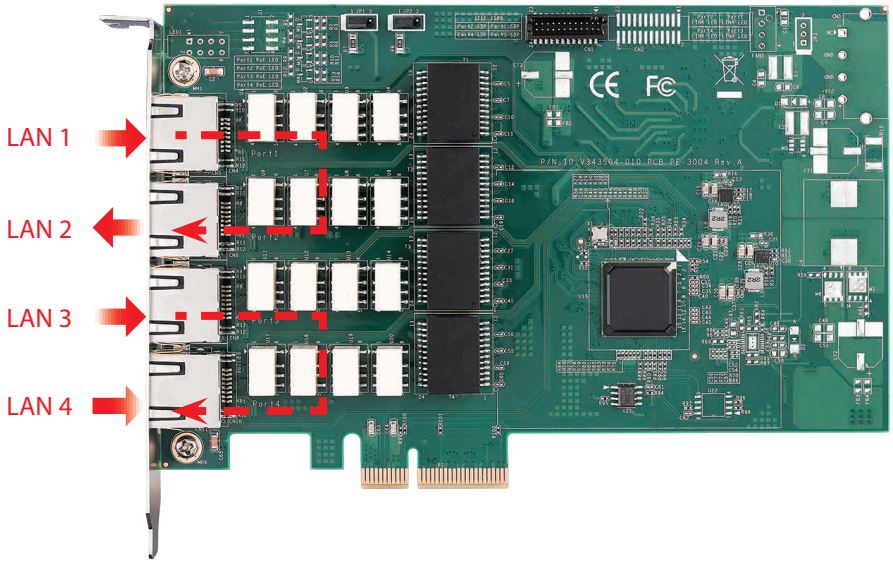
### 2.3.3 IEEE 1588




Intel i350 supports a header for IEEE 1588 related applications.

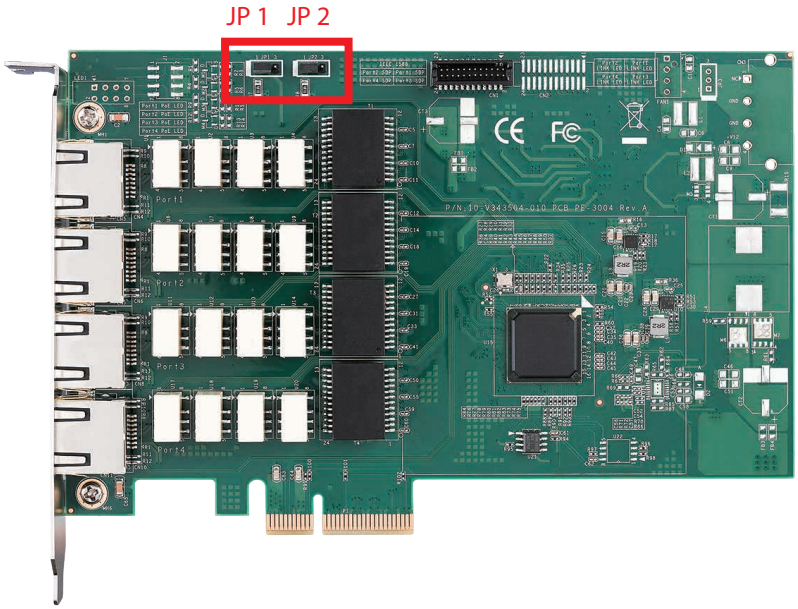
| Pin No. | Description | LAN Port | Pin No. | Description | LAN Port |
|---|---|---|---|---|---|
| 1 | Ground | --- | 2 | Ground | --- |
| 3 | SPD0_0 | LAN 1 | 4 | SPD2_0 | LAN 3 |
| 5 | SPD0_1 | LAN 1 | 6 | SPD2_1 | LAN 3 |
| 7 | SPD0_2 | LAN 1 | 8 | SPD2_2 | LAN 3 |
| 9 | SPD0_3 | LAN 1 | 10 | SPD2_3 | LAN 3 |
| 11 | Ground | --- | 12 | Ground | --- |
| 13 | Ground | --- | 14 | Ground | --- |
| 15 | SPD1_0 | LAN 2 | 16 | SPD3_0 | LAN 4 |
| 17 | SPD1_1 | LAN 2 | 18 | SPD3_1 | LAN 4 |
| 19 | SPD1_2 | LAN 2 | 20 | SPD3_2 | LAN 4 |
| 21 | SPD1_3 | LAN 2 | 22 | SPD3_3 | LAN 4 |
| 23 | Ground | --- | 24 | Ground | --- |

### 2.3.3 LAN Bypass Function




PE-3014 supports LAN bypass mode. If PE-3014 does not insert with power cord or malfunctions, LAN1 will bypass LAN2 and LAN3 will bypass LAN4. (2-pair bypass)

### 2.3.4 LAN Bypass Enable and Disable Jumper Setting




JP1/JP2 controls LAN bypass enabling and disabling. Jumper Setting:

| Jumper | Setting | Description |
|---|---|---|
| JP1 | 1-2 | *LAN1 LAN2 LAN bypass Enable |
| | 2-3 | LAN1 LAN2 LAN bypass Disable |

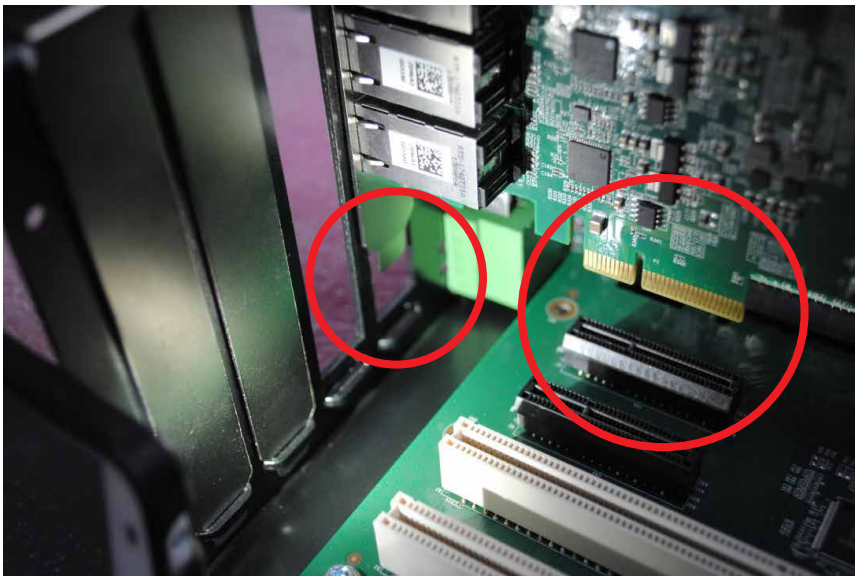
| Jumper | Setting | Description |
|---|---|---|
| JP2 | 1-2 | *LAN3 LAN4 LAN bypass Enable |
| | 2-3 | LAN3 LAN4 LAN bypass Disable |

# 3

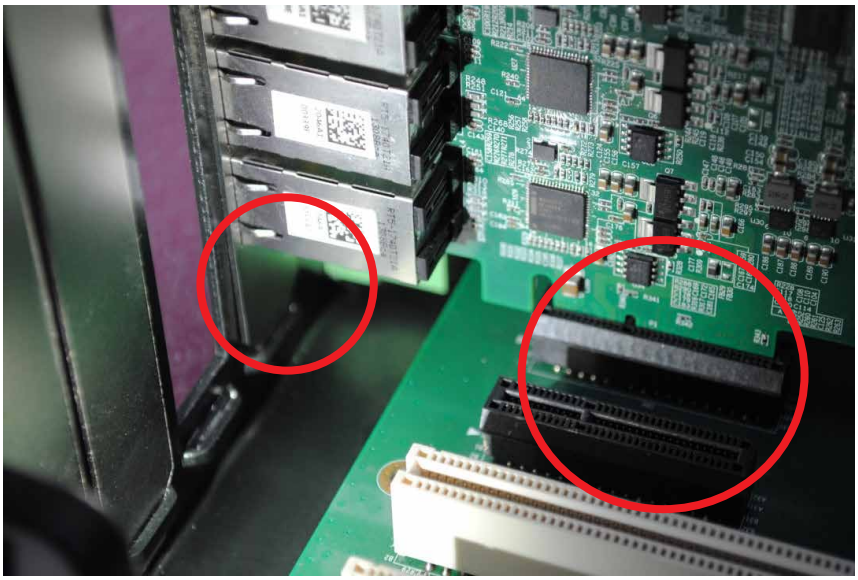
# GETTING START

## 3.1 Installing PE-3004/ PE-3014

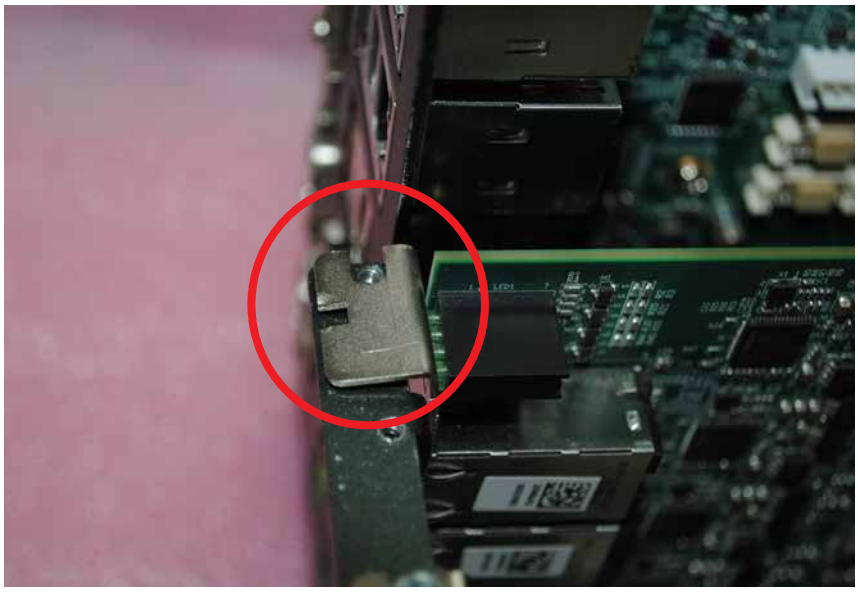
**Step 1.** Insert PE-3000 golden finger and PCI bracket into PCIe socket carefully.



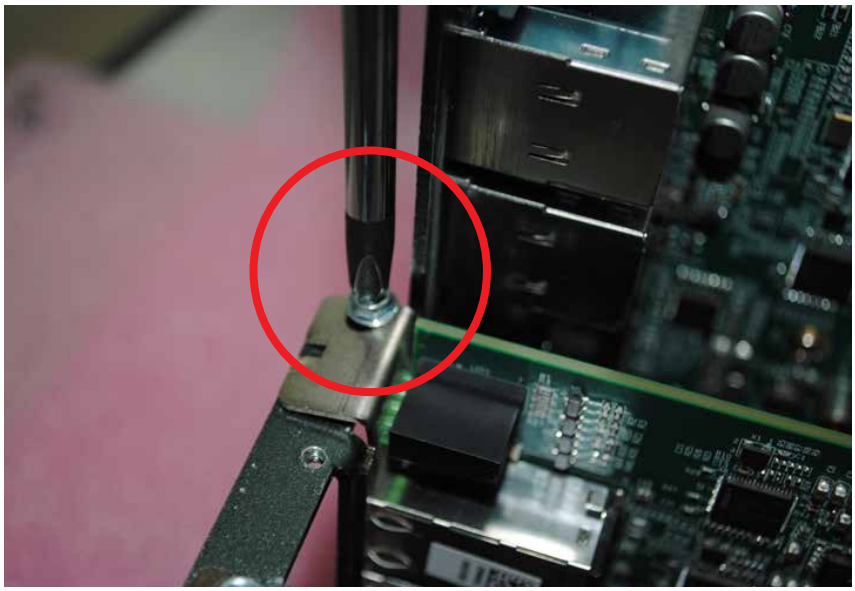
**Step 2.** Make sure golden finger and PCI bracket are inserted smoothly.



**Step 3.** Make sure the bracket aligns screw hole.



**Step 4.** Fasten the M3 screw.

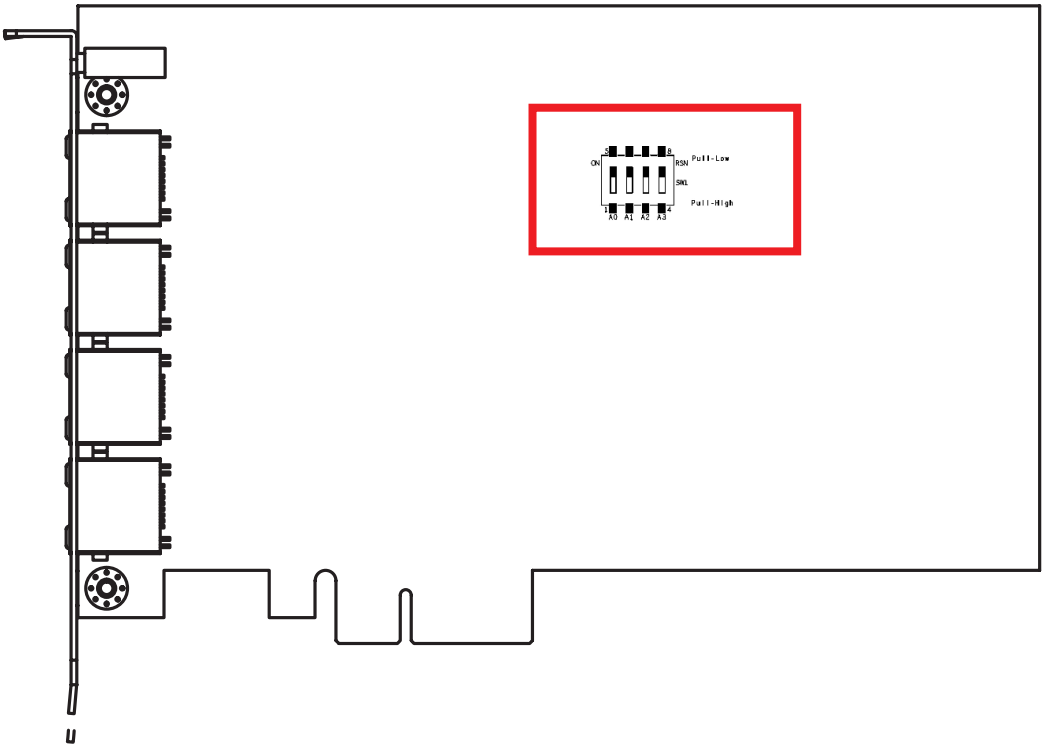


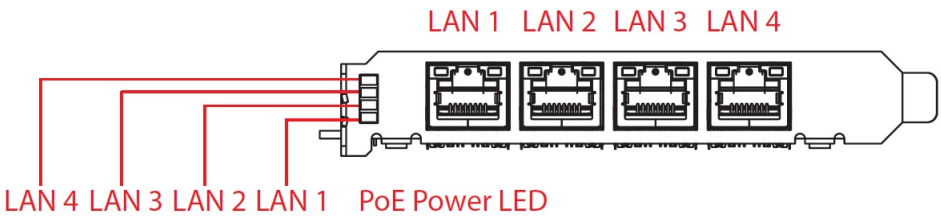
# A

# APPENDIX A : PoE Guide (PE-3004/3004M only)

## A.1 Function Description

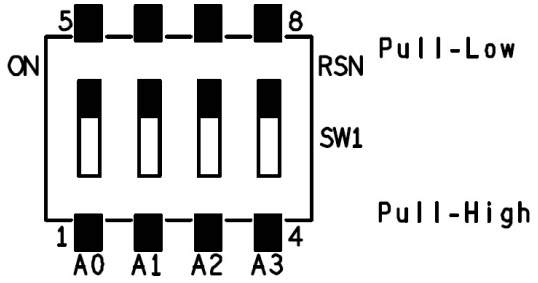
The PE-3000 offers a 4-port PoE or 2-pair LAN Bypass.




| Pin No. | Definition | Pin No. | Definition |
|---|---|---|---|
| LAN1 | POE 0 | LAN3 | POE 2 |
| LAN2 | POE 1 | LAN4 | POE 3 |

Do NOT use these functions in below:
1. ECS-4000: DIO1 (ID = 2), POE (ID = 0)
2. ECS-4500, ECS-9000, ECS-9200, ECS-9700, IVH-7700, IVH-9000, IVH-9200: POE (ID = 0)
3. RCS-7000: GPIO (ID = 0)
4. PE-2000: DIO1 (ID is the same, ID = 0 ~ 7), POE (ID = 0)
5. UE-1000: USB (IDUE-1000 = IDPE-3000 >> 1 & 3 | IDPE-3000 << 2 & 4)




PoE ON/OFF vs Slave address setting as below:

| SW 1 | | | | | |
|---|---|---|---|---|---|
| A0 | A1 | A2 | A3 | Slave Address | ID |
| ON | ON | ON | ON | 0x40 | 0 |
| ON | ON | ON | OFF | 0x42 (Default) | 1 |
| ON | ON | OFF | ON | 0x44 | 2 |
| ON | ON | OFF | OFF | 0x46 | 3 |
| ON | OFF | ON | ON | 0x48 | 4 |
| ON | OFF | ON | OFF | 0x4A | 5 |
| ON | OFF | OFF | ON | 0x4C | 6 |
| ON | OFF | OFF | OFF | 0x4E | 7 |
| OFF | ON | ON | ON | 0x50 | 8 |
| OFF | ON | ON | OFF | 0x52 | 9 |
| OFF | ON | OFF | ON | 0x54 | A |
| OFF | ON | OFF | OFF | 0x56 | B |
| OFF | OFF | ON | ON | 0x58 | C |
| OFF | OFF | ON | OFF | 0x5A | D |
| OFF | OFF | OFF | ON | 0x5C | E |
| OFF | OFF | OFF | OFF | 0x5E | F |

## A.2 Software Package Contain

Distribution folder include x32 and x64 versions, use batch file for installation.
There are included as fallowed:

Win7_32.bat:
Installation for 32-bit driver

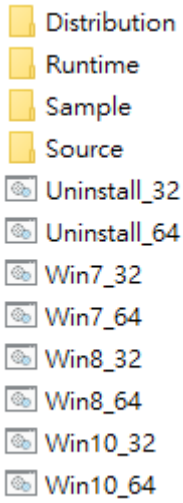
Win7_64.bat:
Windows update package which driver required (need to restart), and
Installation for 64-bit driver

Win8_32.bat, Win8_64.bat:
Installation for driver, and
guideline to Framework 3.5 distribution for sample

Win10_32.bat, and Win10_64.bat
Installation for driver, and
installation to Framework 3.5 distribution for sample

Uninstall_32.bat, and Uninstall_64.bat:
Uninstallation for driver

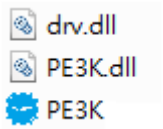
Run batch file as Administrator.
Support Windows 7 above.
Make sure Windows version before installation.



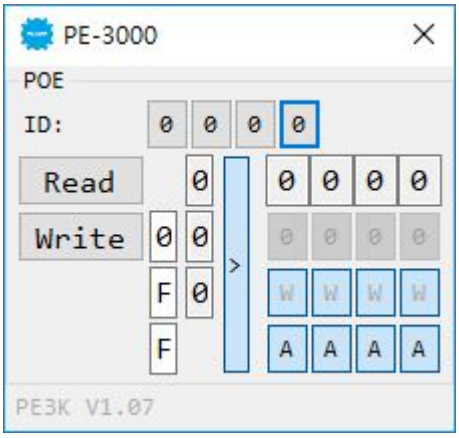

Runtime folder include head file for software developer or System Integration. Sample folder include sample program, driver library, and API library. Source folder include sample program source code that compile on Visual Studio 2008.

## A.3 Sample

Sample folder include x32 and x64 versions, as shown below:




Sample PE3K.exe, as shown below:



2-1. POE group:

a. POE ID check buttons:

User setting, POE ID.

b. Read button:

Set POE configuration to get POE state.

c. Write button:

Set POE configuration to set POE state.

d. POE output text:

User setting, POE output state by hexadecimal bitmask - on / off.

Use for Write button activate.

e. POE writable text:

User setting, POE writable of POE configuration by hexadecimal bitmask - yes / no.

Use for Write button activate.

f. POE mode text:

User setting, POE mode of POE configuration by hexadecimal bitmask - Auto / Manual.

Use for Write button activate.

g. POE input text (read only):

POE input state by hexadecimal bitmask - on / off.

Use for Read button activate.

h. POE text (read only):

POE output state with input state and configuration.

Use for Write button activate.

i. POE output text (read only):

POE output state with configuration.

Use for Write button activate.

j. POE input port texts (read only, port 4 ~ port 1):

POE input port state

Use for Read button activate.

k. POE output port texts (port 4 ~ port 1):

User setting, POE output port state

Use for Write button activate.

l. POE port writable texts (port 4 ~ port 1):

User setting, POE port writable of POE configuration.

Use for Write button activate.

m. POE port mode texts (port 4 ~ port 1):

User setting, POE port mode of POE configuration.

Use for Write button activate.

# B

# APPENDIX B : Software Functions

## B.1 Driver API Guide

**In Runtime folder, on PE3K.h:**

_DLL_IMPORT_ definition is used on LoadLibrary API for PE3K.dll.
PE3K_EXPORTS definition is used on PE3K.dll building.
Otherwise, that is used to compile with PE3K.lib

**BOOL Initial(BYTE Scan, BYTE ID)**

Initial card for POE
Scan: POE ID scan type
2: Auto scan; 1: Manual setup; 0: Not detect
ID ([3:0]): POE ID by manual setting
Return:
TRUE (1): Success;
FALSE (0): Fail (Driver not exists, or out of range error, or initial error (version is too old, or card not match))

**BOOL GetPOEConfig(BYTE ID, BYTE *Auto, BYTE *Mask)**

Get POE configuration (by variable)
ID ([3:0]): POE ID
Auto ([3:0]): Auto mode, pin setting by hexadecimal bitmask
1: Auto; 0: Manual
Mask ([3:0]): DC Enable / Disable, pin setting by hexadecimal bitmask
1: Enable; 0: Disable
Return:
TRUE (1): Success;
FALSE (0): Fail (Initial error, or call by pointer error, or hardware problem)

**BOOL SetPOEConfig(BYTE ID, BYTE Auto, BYTE Mask)**

Set POE configuration
ID ([3:0]): POE ID
Auto ([3:0]): Auto mode, pin setting by hexadecimal bitmask
1: Auto; 0: Manual
Mask ([3:0]): DC Enable / Disable, pin setting by hexadecimal bitmask
1: Enable; 0: Disable
Return:
TRUE (1): Success;
FALSE (0): Fail (Initial error, or out of range error, or hardware problem)

**BOOL GetPOE(BYTE ID, BYTE *POE)**

Get POE input

ID ([3:0]): POE ID

POE ([3:0]): POE state, pin setting by hexadecimal bitmask

1: On; 0: Off

Return:

TRUE (1): Success;

FALSE (0): Fail (Initial error, or call by pointer error, or hardware problem)

**BOOL SetPOE(BYTE ID, BYTE POE)**

Set POE output

ID ([3:0]): POE ID

POE ([3:0]): POE state, pin setting by hexadecimal bitmask

1: On; 0: Off

Return:

TRUE (1): Success;

FALSE (0): Fail (Initial error, or out of range error, or hardware problem)

For further support information, please visit www.vecow.com

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