

PE-6004H USER

PCI Express x4/ 4-channel 2.5G LAN,
IEEE 802.3bt Compliant Intel® I226-IT PoE++ PCIe Expansion Card

Manual

Record of Revision

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1.00	2025/10/14	All	Official Release	

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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 it is not installed and used in accordance with the instruction manual, it 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 products described in this manual comply 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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Order Information

Part Number	Description
PE-6004H	4-Port 2.5GbE 802.3bt PoE++ PCIe Card with Intel® I226IT, up to 140W Total PoE, Heatsink, -25°C to 55°C
PE-6004HF	4-Port 2.5GbE 802.3bt PoE++ PCIe Card with Intel® I226IT, up to 200W Total PoE, Fansink, -25°C to 65°C

Recommended Accessories

Part Number	Description
61-1400003-0G5	ATX 8-pin to 6-pin cable for RCX Series
61-1300020-100	ATX 6-pin to 6-pin cable for ECX Series

Table of Contents

CHAPTER 1	GENERAL INTRODUCTION	1
	1.1 Overview	1
	1.2 Features	2
	1.3 Product Specification	3
	1.3.1 Specifications of Vecow PE-6004H	3
	1.3.2 Specifications of Vecow PE-6004HF	4
	1.4 Mechanical Dimension	5
	1.4.1 PE-6004H with Heatsink	5
	1.4.2 PE-6004HF With Fansink	5
CHAPTER 2	GETTING TO KNOW YOUR PE-6004H	6
	2.1 Packing List	6
	2.2 PE-6004H I/O and Indication	7
CHAPTER 3	SYSTEM SETUP	10
	1.1 Installing PE-6004H	10
CHAPTER 4	DRIVER INSTALLATION AND SETTING	12
	4.1 Driver Installation	12
	4.2 Jumbo Frame	16
	APPENDIX A : PoE Guide	18
	APPENDIX B : Software Functions	21

1

GENERAL INTRODUCTION

1.1 Overview

PE-6004H is a 4-ports 2.5GigE PCIe Expressx4 Expansion Card, supporting IEEE 802.3bt PoE++ up to 200W power input. Powered by Intel® I226-IT LAN chipset, PE-6004H adopts 4-port Independent 2.5GigE Ethernet controller and it supports up to 2.5Gbps data rate each port with teaming functions, Fault Tolerance, IEEE 802.3ad Link Aggregation and Load Balancing, up to 9KB Jumbo Frame. Vecow PE-6004H is an ideal PCIe expansion card for industrial applications in Scientific Research, real-streaming video, AI Surveillance, real-time inspection, and Industry 4.0/IIoT applications.

1.2 Features

- IEEE 802.3bt PoE++ PSE compliant, up to 90W per port
- Total PoE power budget up to 200W across 4 ports
- 4x 2.5GBASE-T ports with Intel® I226-IT controller
- Supports 2.5G / 1G / 100M / 10M link speeds
- x4, Gen2 PCI Express interface
- Standard RJ-45 connectors
- -25°C to 65°C operating temperature
- Per-port PoE++ power on/ off control by software API, supports IEEE 1588

1.3 Product Specification

1.3.1 Specifications of Vecow PE-6004H

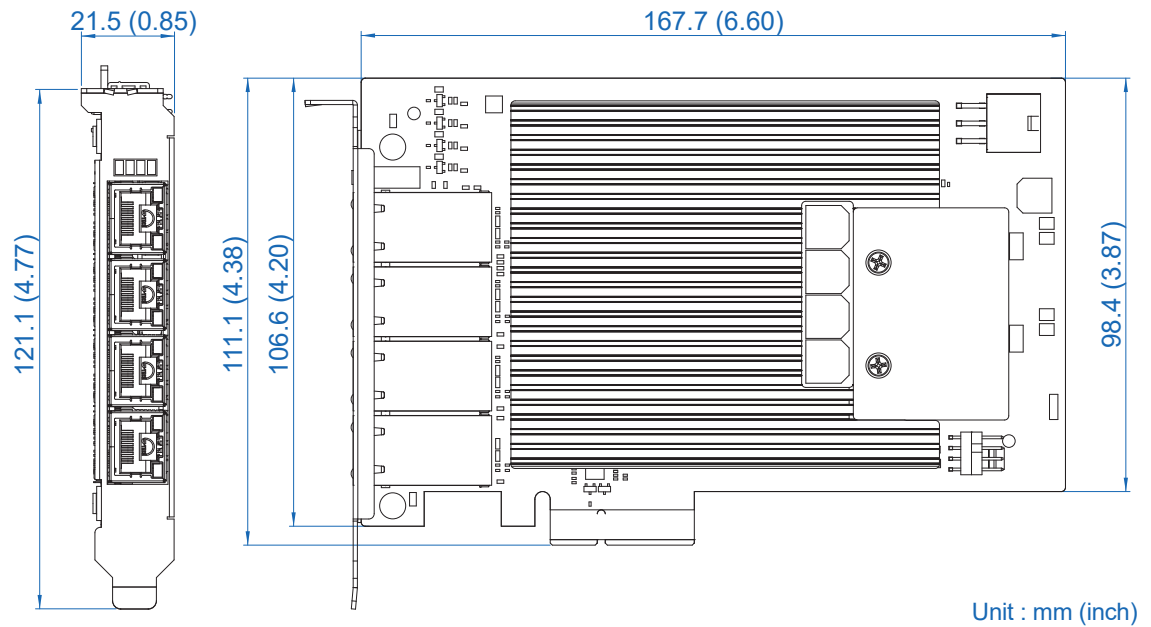
Ethernet	
Bus Interface	x4, Gen2 PCI Express
Lan Controller	Intel® Ethernet Controller I226-IT
LAN Controller Qty	4
Data Rate	2.5 Gbps/1 Gbps/100Mbps /10 Mbps
Number of Port	4
Ethernet Connector	RJ-45 connectors
PoE Standard	• In compliant with IEEE 802.3bt PoE++ Type 3 and Type 4 PSE, maximal 90W output on a single PoE++ port • Compatible with 802.3at (PoE+) and 802.3af (PoE) PD
Power Requirements	
Input	Maximum 12V from on-board 6-pin ATX Power Connector
Software Support	
OS	Windows 10/11, Linux
Mechanical	
Dimensions	167mm x 111mm (6.6" x 4.37")
Bracket	Full height
Environment	
Operating Temperature	-25°C to 55°C (-13°F to 131°F)
Storage Temperature	-40°C to 85°C (-40°F to 185°F)
Humidity	5% to 95% Humidity, non-condensing
Relative Humidity	95% @ 55°C
EMC	CE, FCC

1.3.2 Specifications of Vecow PE-6004HF

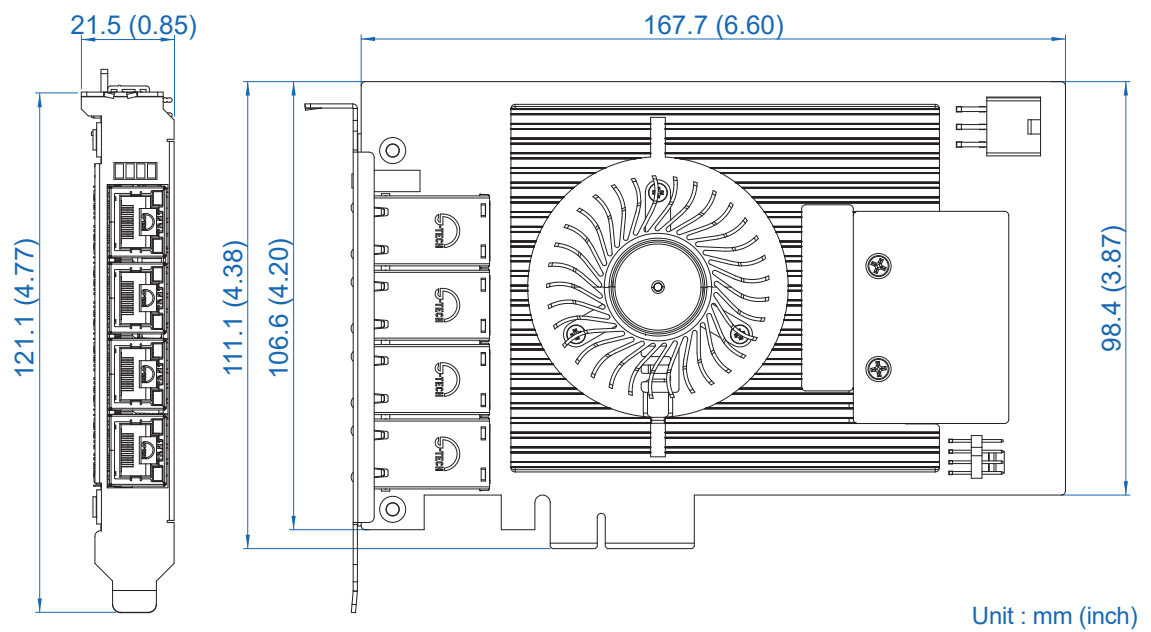
Ethernet	
Bus Interface	x4, Gen2 PCI Express
Lan Controller	Intel® Ethernet Controller I226-IT
LAN Controller Qty	4
Data Rate	2.5 Gbps/1 Gbps/100Mbps /10 Mbps
Number of Port	4
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Input	Maximum 12V from on-board 6-pin ATX Power Connector
Software Support	
OS	Windows 10/11, Linux
Mechanical	
Dimensions	167mm x 111mm (6.6" x 4.37")
Bracket	Full height
Environment	
Operating Temperature	-25°C to 65°C (-13°F to 149°F)
Storage Temperature	-40°C to 85°C (-40°F to 185°F)
Humidity	5% to 95% Humidity, non-condensing
Relative Humidity	95% @ 65°C
EMC	CE, FCC

1.4 Mechanical Dimension

1.4.1 PE-6004H with Heatsink



1.4.2 PE-6004HF with Fansink



2

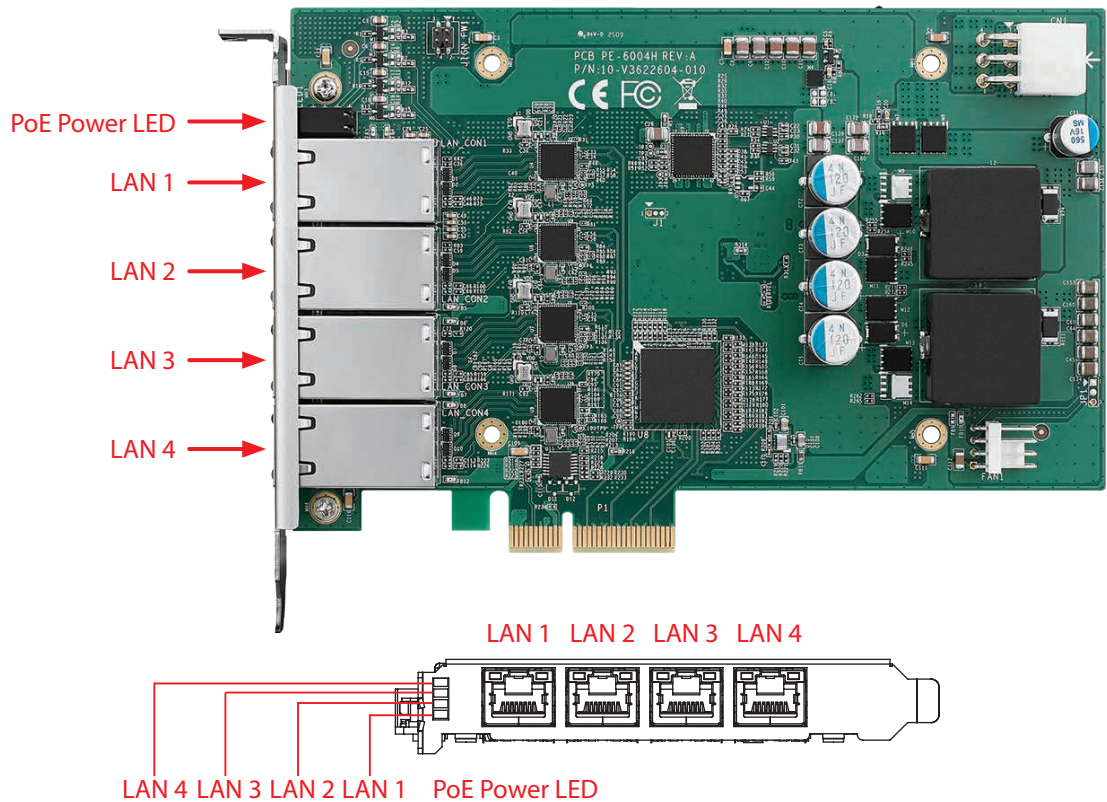
GETTING TO KNOW YOUR PE-6004H

2.1 Packing List

Item	Description	Qty
1	PE-6004H, Intel I226-IT 4-port 2.5GigE PoE++ PCI Express Expansion Card	1

2.2 PE-6004H I/O and Indication

2.2.1 PoE (Power over Ethernet) Ports



PE-6004H is equipped with 4 IEEE 802.3bt PoE++ ports for transmitting power as much as 90W / 54V per port and 1G/2.5G GBASE-T gigabit data signals over standard Ethernet CAT-5/CAT-6 cable.

Each PoE connection is powered by Intel® I226-IT 2.5GBASE-T Gigabit Ethernet.

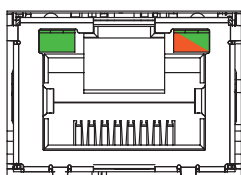
Controller and independent PCI express interface to connect with multi-core processor for networking and data transmit optimization. Only when PoE port starts to supply power to power devices, the dedicated LED will be lightened.

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

Pin No.	100 Mbps	1G/2.5Gbps	PoE
1	E_TX+	MDI0_P	PoE-
2	E_TX-	MDI0_N	PoE-
3	E_RX+	MDI1_P	PoE+
4	----	MDI2_P	PoE+
5	-----	MDI2_N	PoE+
6	E_RX-	MDI1_N	PoE+
7	-----	MDI3_P	PoE-
8	-----	MDI3_N	PoE-

Each LAN port is supported by standard RJ-45 connector with LED indicators to present Active/Link/Speed status of the connection.

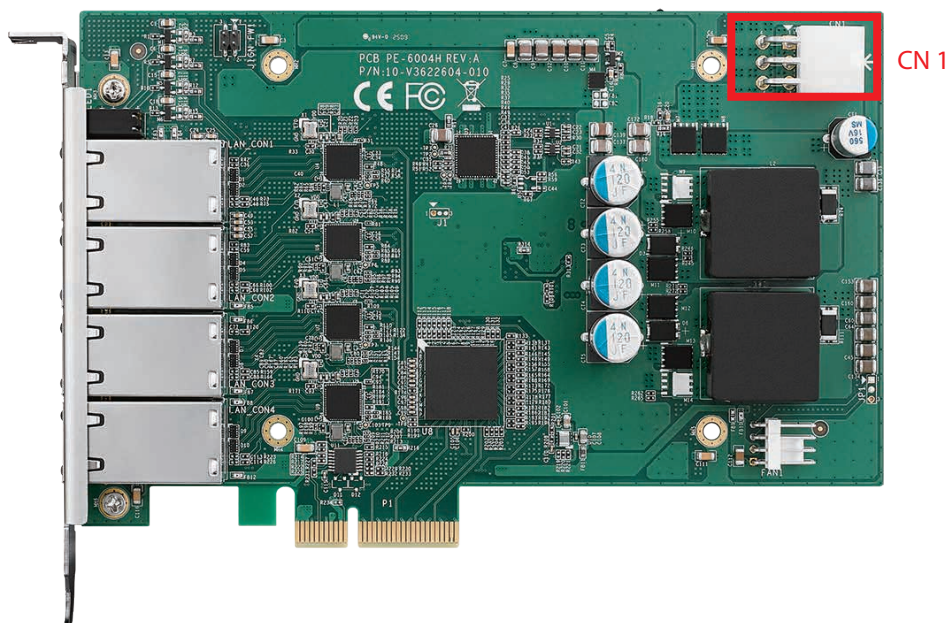
The LED indicator on the right corner lightens in OFF when the cable is properly connected to a 10M/100Mbps Ethernet network; The LED indicator on the right corner lightens in solid yellow when the cable is properly connected to a 1000Mbps Ethernet network; The LED indicator on the right corner lightens in solid green when the cable is properly connected to a 2.5Gbps Ethernet network. The left LED will keep twinkling/off when Ethernet data packets are being transmitted/received.



LED Status	10M/100Mbps	1000Mbps	2.5Gbps
Right LED	off	Solid Yellow	Solid Green
Left LED	Flash Green	Flash Green	Flash Green

PoE LED	LED Color	PoE Status
LED1-4	Solid Green	PoE On

2.2.2 Power Input



The PE-6004H is equipped with a 6-pin ATX power plug (12V, maximum 8A) for PoE power. PoE power cannot be supplied from the PCIe bus. If PoE functionality is required, the internal 6-pin ATX power connector must be used. Before plugging the onboard 6-pin power connector, be sure to check the pin polarity.

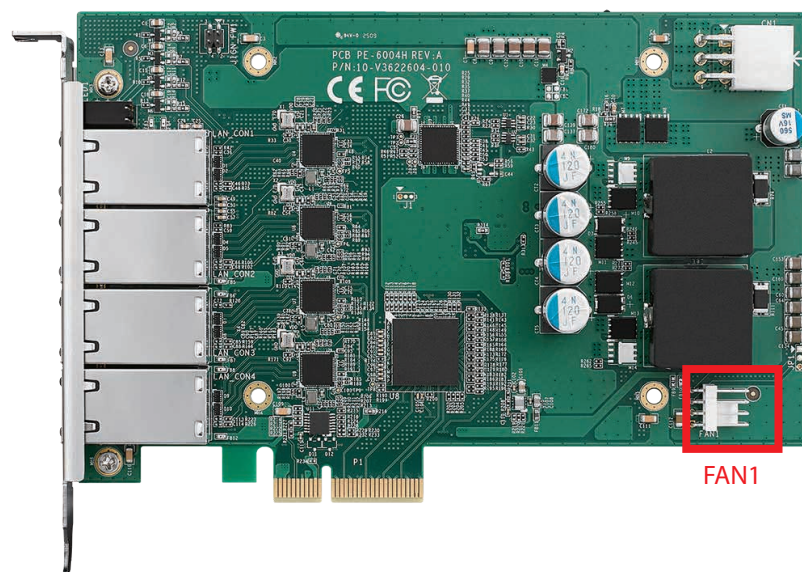
6 5 4 3 2 1	Pin No.	Definition	Pin No.	Definition
	1	+12V(8A max)	4	GND
	2	+12V(8A max)	5	GND
	3	+12V(8A max)	6	GND

2.2.3 PoE Power On/Off

PE-6004H's PoE Power is provided by the external power supply of CN1.

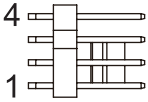
If PoE function is not required, please unplug the external power supply of CN1.

2.2.4 Fan Connector



Fan power connector supports for additional thermal requirements. The pin assignments of FAN1 is listed in the following diagram:

Pin input :

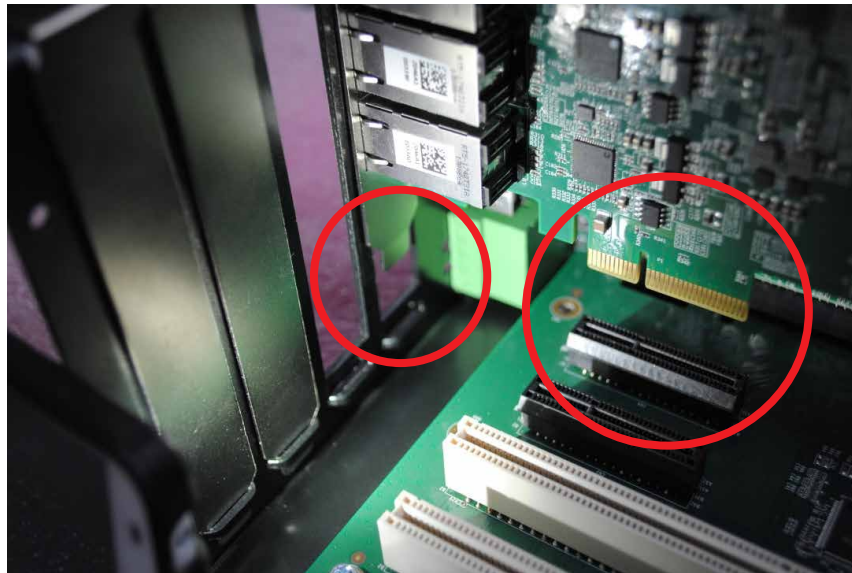
	Pin No.	Definition	Pin No.	Definition
	1	GND	2	+12V (1.5A max)
	3	-----	4	-----

3

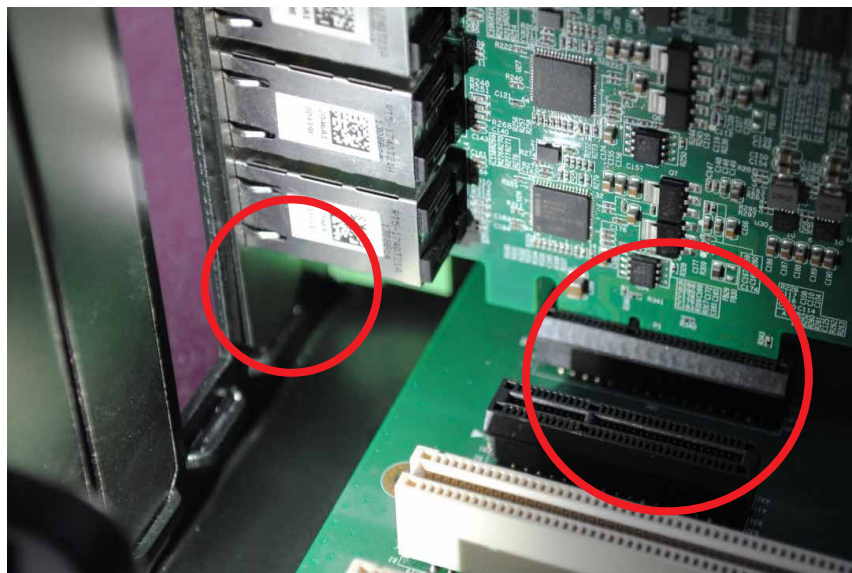
SYSTEM SETUP

1.1 Installing PE-6004H

Step 1. Insert edge-finger and PCI Express I/O bracket into PCI Express vertical edge card connector carefully.



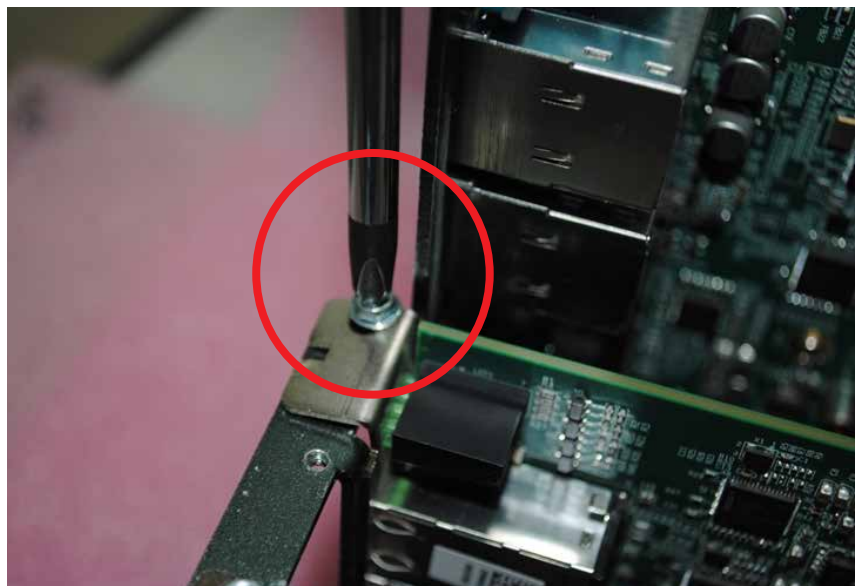
Step 2. Make sure edge-finger and PCI Express I/O bracket are inserted smoothly.



Step 3. Make sure the bracket aligns screw hole.



Step 4. Fasten the M3 or #6-32 screw.



4

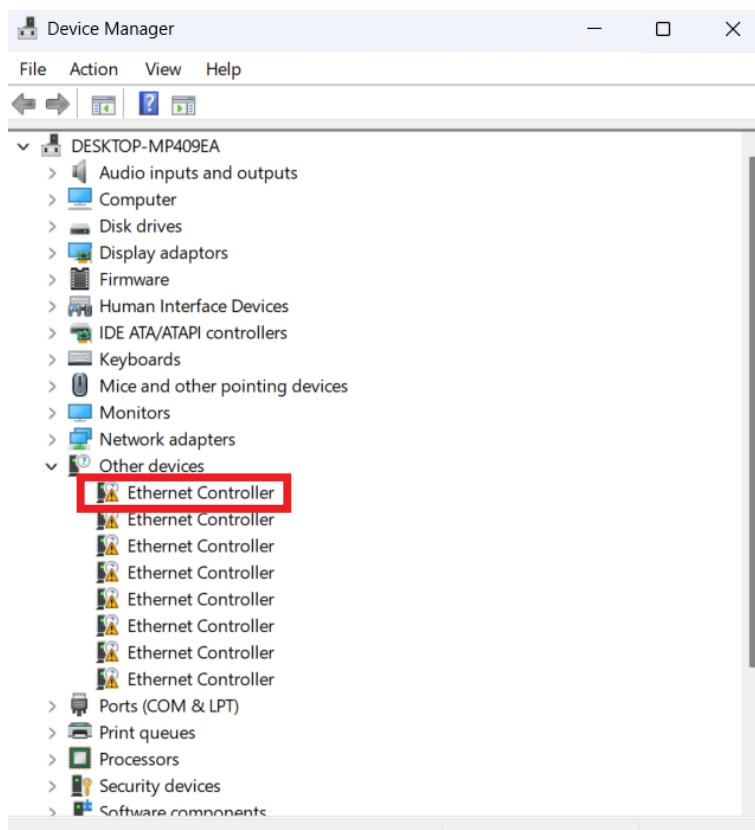
DRIVER INSTALLATION AND SETTING

4.1 Driver Installation

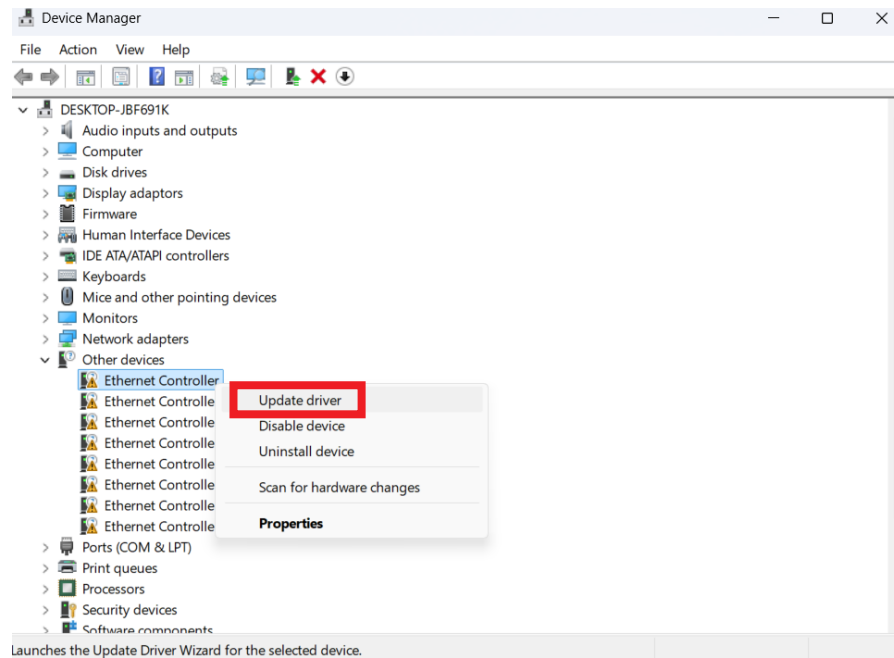
This section describes :
How to install drivers for PE-6004H PoE Card.

System OS :
Windows 11-64bit

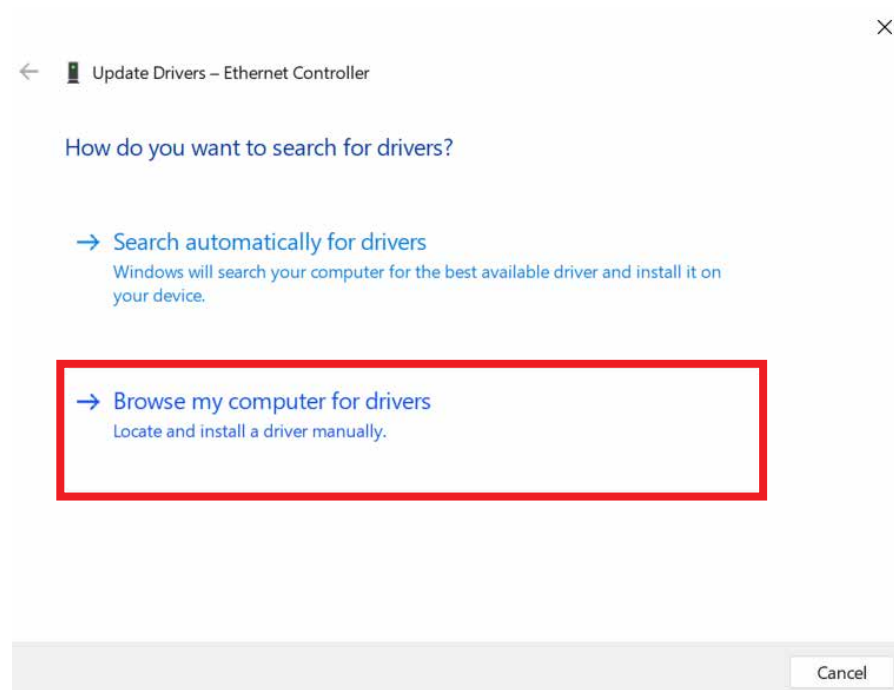
Step 1. Install 638910-I225-I226-NDIS-Win-x64-1.1.4.43 and then go Open the "Right-click  → Device Manager → Ethernet Controller".



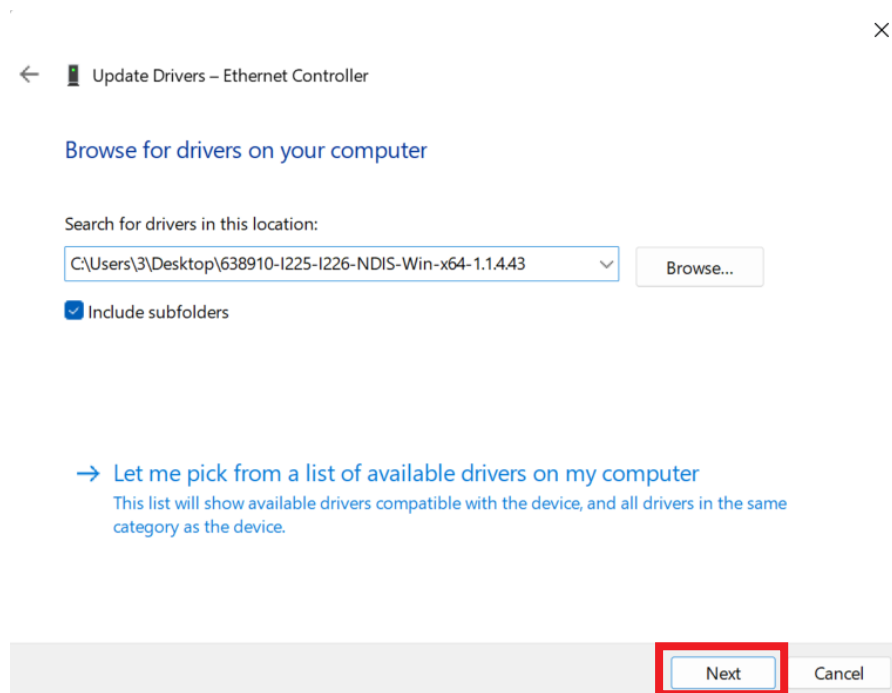
Step 2. "Right-click →Ethernet contraller →Update driver".



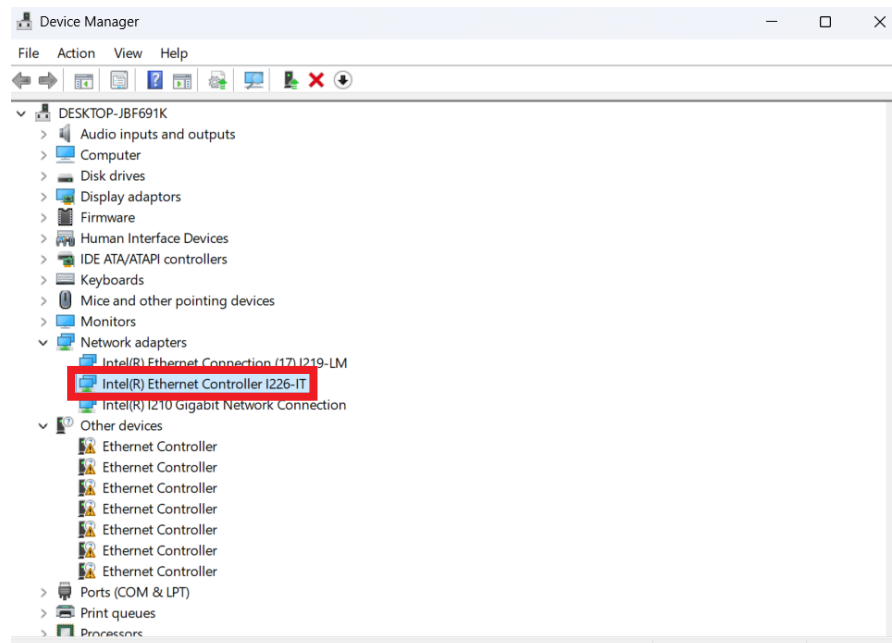
Step 3. Select the "Browse my computer for drivers".



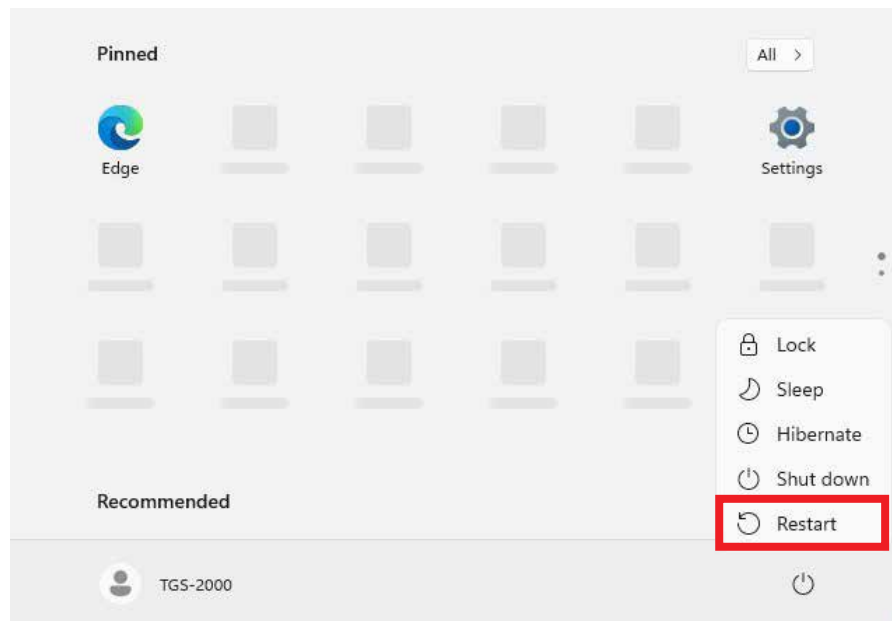
Step 4. Browse "638910-I225-I226-NDIS-Win-x64-1.1.4.43→ Next".



Step 5. Detect in one "Intel(R) Ethernet Controller I226-IT".

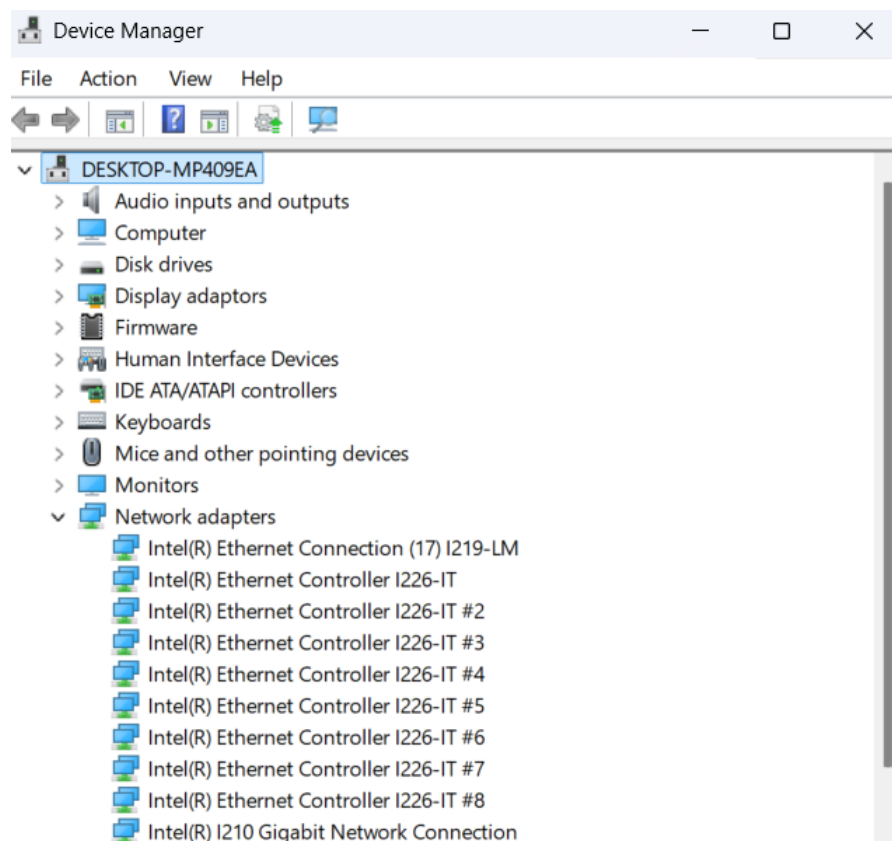


Step 6. Right-click  → Restart.



Once you need this network driver, you could remove this program on Control panel directly.

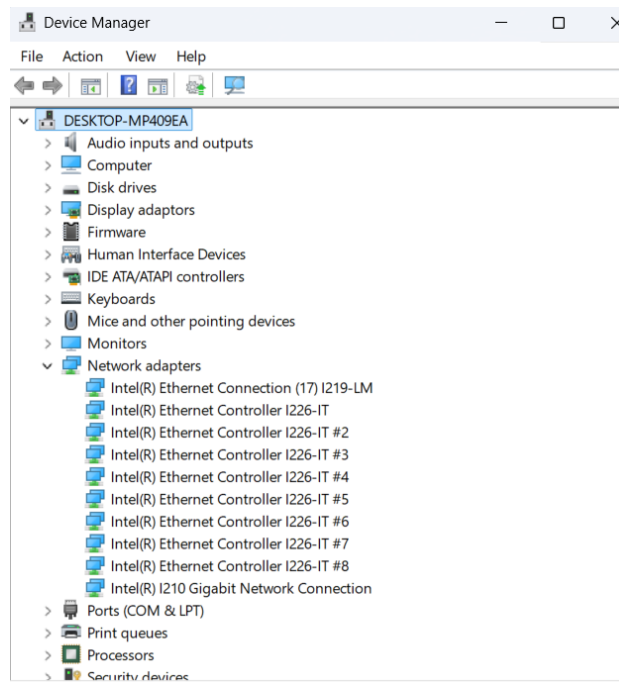
Step 7. Detect in "Four Intel(R) Ethernet Controller I226-IT #xx".



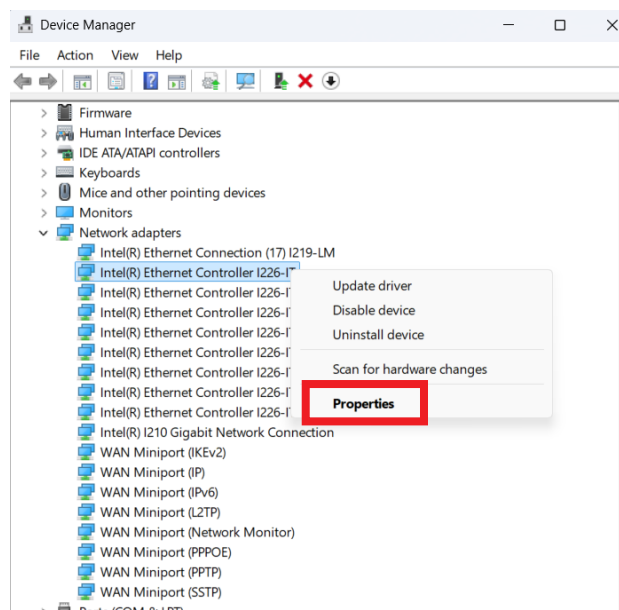
4.2 Jumbo Frame

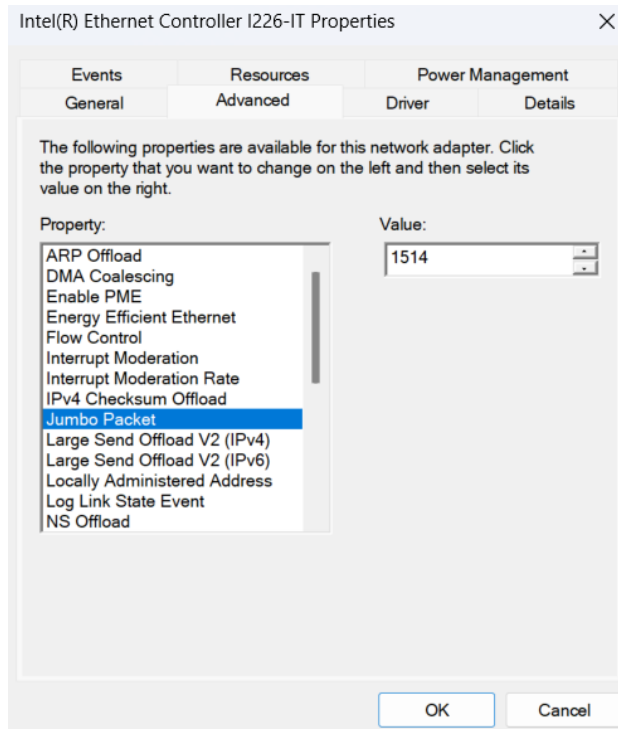
After installing the driver for Intel® I226-IT controller, you can get the enhance function that called jumbo frame, please find more instruction as below.

Step 1. "Right-click  → Device Manager → Network adapters".

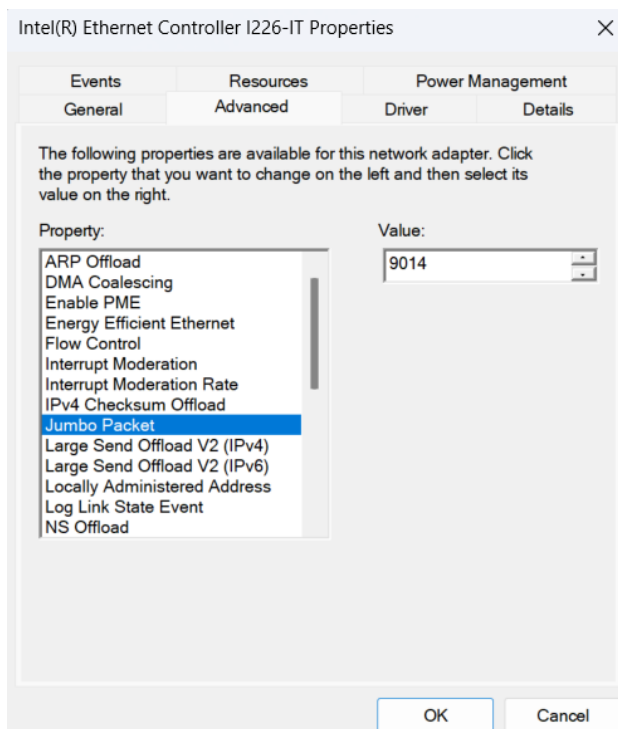


Step 2. Select anyone "Intel Ethernet Converged Network Adapter I226-IT #xx", right Click and select "Properties", a property dialog appears and Click on the Advanced page.





Step 3. Select the "Jumbo Packet" and enter the desired jumbo frame size.



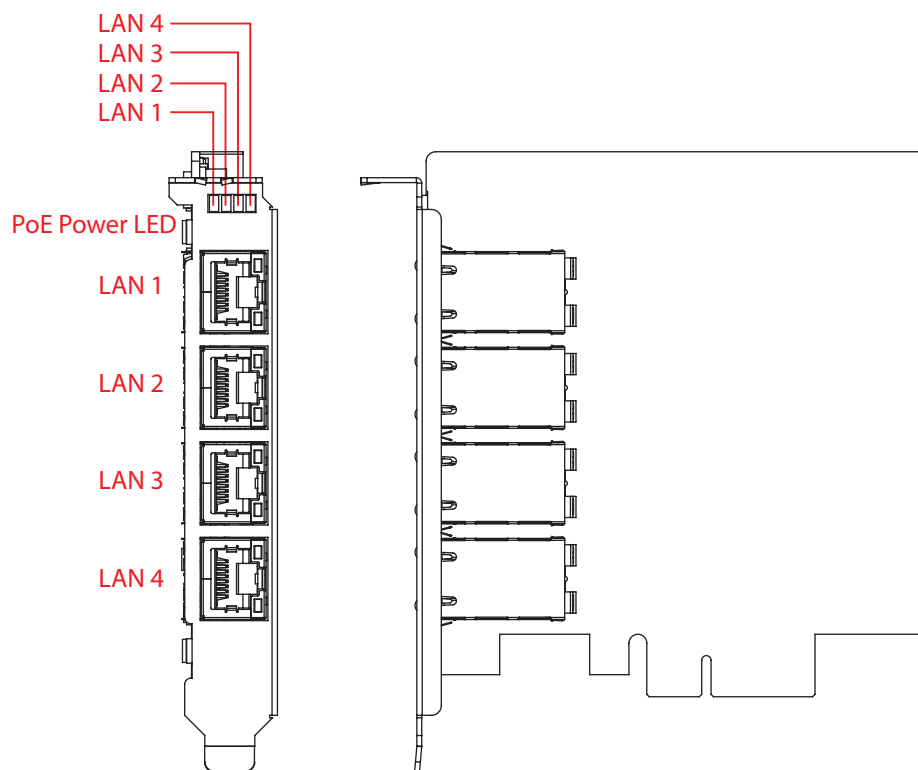
A

APPENDIX A : PoE Guide

A.1 Function Description

The PE-6004 series offers a 4-port PoE⁺.

The PE-6004H address is 0x44(8bit),0x22(7bit),ID=2.



Pin No.	Definition	Pin No.	Definition
LAN 1	POE 0	LAN 3	POE 2
LAN 2	POE 1	LAN 4	POE 3

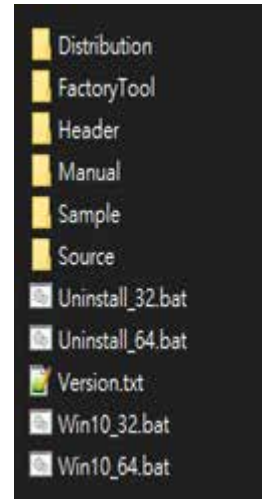
A.2 Software Package Contain

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

Win10_32.bat, and Win10_64.bat :
Installation for driver, and
Uninstall_32.bat, and Uninstall_64.bat :
Uninstallation for driver Run

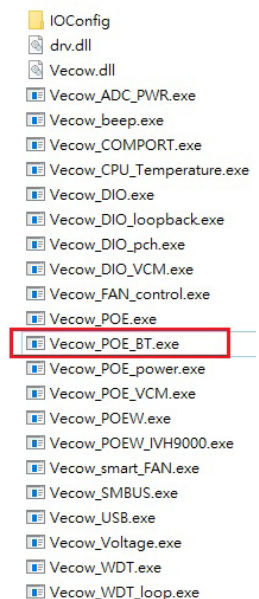
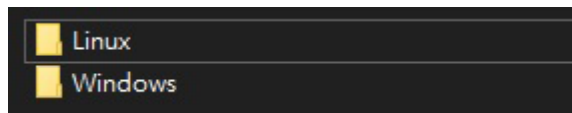
Make sure it is Windows version before installation.

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



A.3 Sample

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



PE-6004H default is Auto power detect mode, you can use the following software control to switch to Auto/manual mode.

```
C:\Users\aaa\Desktop\VecowHWMSample_v1.8.0828\Sample\Windows\x64\Vecow_POE_BT.exe
POE sample version : v1.0.0906.0000
Load Vecow.dll at least v1.8.1409.0608
Vecow.dll Version : v1.57.0408.0000
MACHINE_SERIES=R1000

Initial POE success!
Usable slave address ID :
id=2 ,Mode=0x01,State=0x03

Select slave address ID : 2
Slave address : 0x44
Choose POE BT port : (0~3, 4 = All port) 4
Set Manual/Auto mode : (0/1) 1
Set POE success!
```

```
C:\Users\aaa\Desktop\VecowHWMSample_v1.8.0828\Sample\Windows\x64\Vecow_POE_BT.exe
POE sample version : v1.0.0906.0000
Load Vecow.dll at least v1.8.1409.0608
Vecow.dll Version : v1.57.0408.0000
MACHINE_SERIES=R1000

Initial POE success!
Usable slave address ID :
id=2 ,Mode=0x0f,State=0x03

Select slave address ID : 2
Slave address : 0x44
Choose POE BT port : (0~3, 4 = All port) 1
Set Manual/Auto mode : (0/1) 0
Set POE port OFF/ON : (0/1) 0
Set POE success!
```

```
vecow@vecow-NONE:~/Desktop/VecowHWMSample_v1.9.1230/Sample/Linux/x64$ sudo ./Vecow_POE_BT
POE sample version : v1.0.0906.0000
libvecow.so Version : v1.57.0410.0000
MACHINE_SERIES=R1000

Initial POE success!
Usable slave address ID :
id=2 ,Mode=0x0b,State=0x00

Select slave address ID : 2
Slave address : 0x44
Choose POE BT port : (0~3, 4 = All port) 2
Set Manual/Auto mode : (0/1) 0
Set POE port OFF/ON : (0/1) 1
Set POE success!
```

B

APPENDIX B : Software Functions

B.1 Driver API Guide

In Header folder, Vecow.h and VecowLinux.h contain usable API for Windows/Linux.

BOOL Initial_POE(BYTE Scan, BYTE ID)

Initial card for POE

Scan : POE ID scan type

2 : Auto scan; 1 : Manual setup;

ID ([3:0]) : POE ID by manual setting

Return :

TRUE (1): Success;

FALSE (0): Fail (Driver not exists, or version is too old, or out of range error)

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

Get POE configuration (by variable)

ID ([3:0]) : POE ID

Range:0~15.

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 set_POE_BT(BYTE ID, BYTE CH, BYTE Mode, BYTE POE)

Set POE state.

ID ([3:0]) : POE ID

Range:2(default address:0x44)

B. CH : port number

Mode : Manual/Auto

1 : Auto;

0 : Manual

POE ([3:0]): POE state

1: On; 0: Off

Return :

TRUE (1) : Success;

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



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