

Neousys Technology Inc.

PCIe-AE304bp

User Manual
Revision 1.0

Table of Contents

Table of Contents	2
Legal Information	3
Contact Information	4
Notices	5
Safety Precautions	6
Service and Maintenance	7
ESD Precautions	7
About This Manual	8
1 Introduction	
1.1 PCIe-AE304bp Specification.....	10
1.2 Dimension	11
2 Setting Up Your PCIe-AE304bp Card	
2.1 Unpacking Your PCIe-AE304bp.....	12
2.2 Status LEDs	13
3 PCIe-AE304bp Card Installation	
3.1 Hardware Installation	15
3.2 Software Installation	17
4 Driver and Network Settings	

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FCC Conformity	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 Conformity	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.

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 and describes how to setup/ install Neosys Technology PCIe-AE304bp. A wide-temperature, fanless, four-port Automotive 100/1000BASE-T1 Ethernet PCIe card designed for in-vehicle test, validation, and edge computing applications.

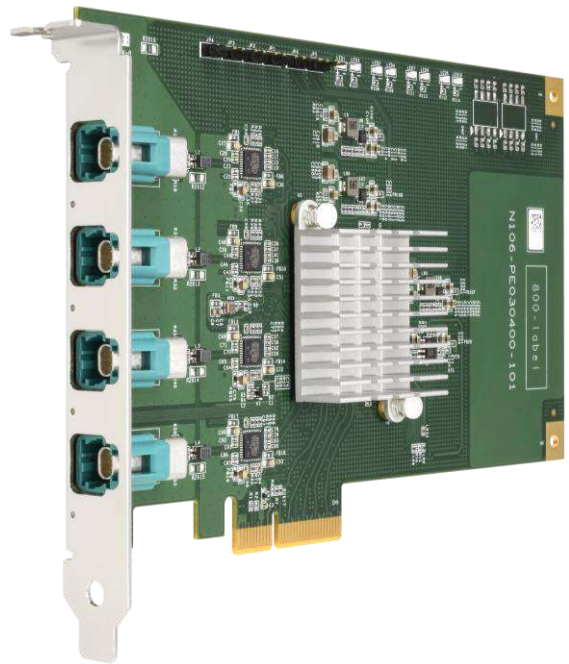
Revision History

Version	Date	Description
1.0	Jul. 2026	Initial release

1 Introduction

PCIe-AE304bp is a wide-temperature, fanless, four-port Automotive Ethernet PCIe card designed for in-vehicle test, validation, and edge computing applications. It provides direct 100/1000BASE-T1 connectivity for x86-based test platforms and edge systems interfacing with high-bandwidth sensors such as LiDARs and radars.

The adoption of Automotive Ethernet adoption is accelerating across ADAS and autonomous driving applications, where 100/1000BASE-T1 enables high-bandwidth, scalable communication over single twisted-pair cabling. By reducing cable weight, space requirements, and wiring complexity, BASE-T1 technology provides an efficient networking backbone for the next-generation vehicle electronics. 1000BASE T-1 supports data-intensive sensors such as LiDAR, while 100BASE-T1 is widely adopted for radar and other automotive devices. As more in-vehicle sensors transition to Ethernet-based communication, BASE-T1 has become a critical interface for ADAS development, autonomous driving validation, and automotive electronics testing.



Designed as a single-slot, half-length PCIe add-on card, PCIe-AE304bp integrates four Marvell 88Q2221 Automotive Ethernet PHYs, enabling software-configurable 100/1000BASE-T1 communication with flexible master/slave configuration. Requiring a PCIe Gen2 x4 lane signal in standard x4 slot, the card installs directly into standard host systems without additional external media converters, or cabling. The locking automotive interface also eliminates the vibration-related connection issues commonly associated with traditional RJ45-based solutions. Support for IEEE 1588 Precise Time Protocol (PTP) enables accurate time synchronization with connected sensors, achieving sub-microsecond accuracy.

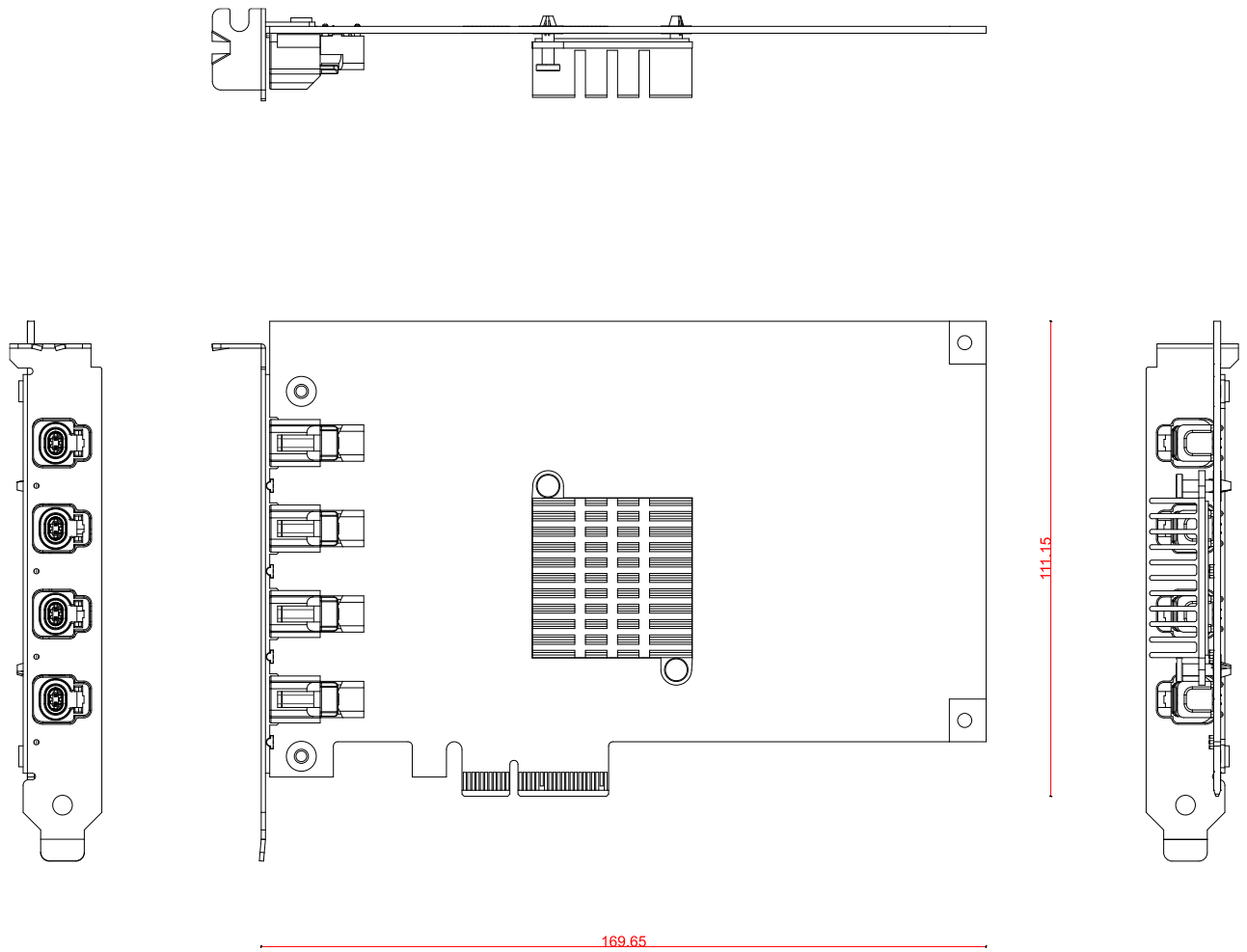
Compared with external media convertor architectures that add cost, latency, cabling complexity, and system footprint, PCIe-AE304bp offers four native Automotive Ethernet ports through a single PCIe slot. It simplifies BASE-T1 integration for engineers developing ADAS test benches, autonomous driving solutions, and vehicle electronics validation systems using standard computing platforms.

1.1 PCIe-AE304bp Specification

Bus Interface	Gen2 x4 PCI Express
1000/100BASE-T1	4× IEEE 802.3bw/bp 100/1000BASE-T1 H-MTD ports powered by four Marvell 88Q2221M transceivers, supporting 100/1000Mbps link speeds
Cable Requirement	Supports up to 15 meters of unshielded twisted pair (UTP) cable
H-MTD connector type	Z code
Dimension	167.7 mm (W) x 111 mm (H)
Storage Temperature	-40°C to 85°C
Operating Temperature	-25°C to 70°C fanless operation
Humidity	10% to 90%, non-condensing
EMC	CE/ FCC Class A, according to EN 55032 & EN 55035

*The recommended airflow under the specific operating temperature range is to ensure operation and longevity of the card.

1.2 Dimension



All measurements are in millimeters (mm).

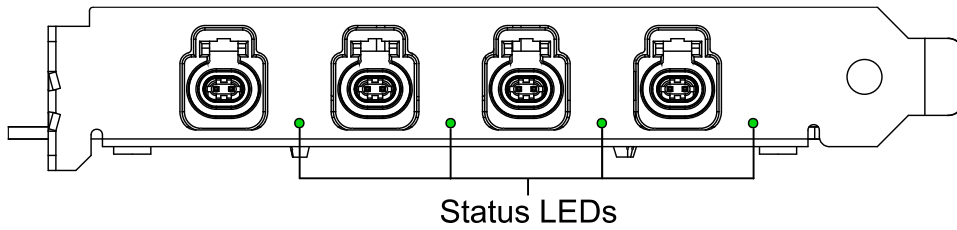
2 Setting Up Your PCIe-AE304bp Card

2.1 Unpacking Your PCIe-AE304bp

Upon receiving the PCIe-AE304bp package, 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 Neosys Technology.

Item	Description	Qty
1	PCIe-AE304bp	1
2	Standoff pack (for multi-card installation)	1

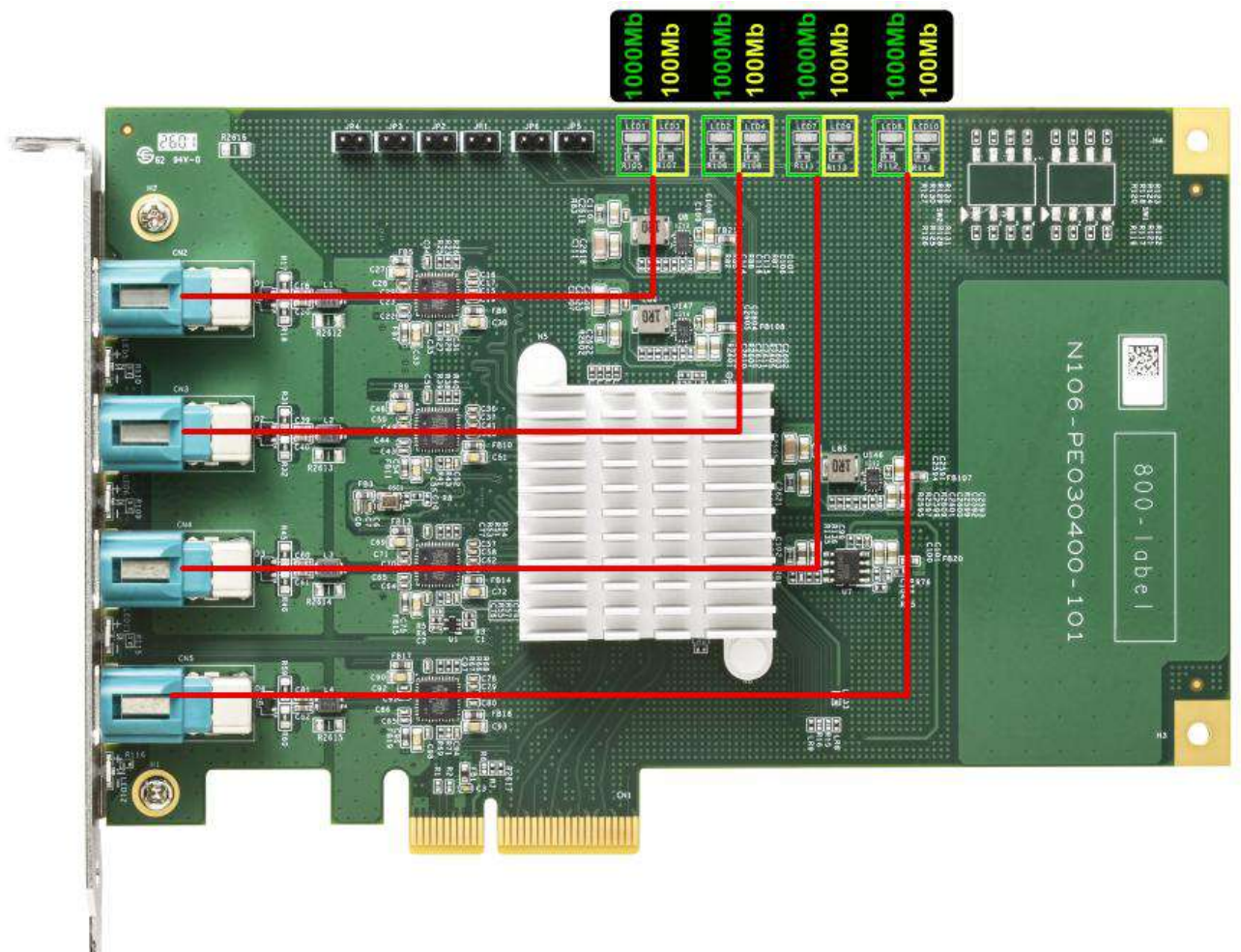
2.2 Status LEDs



Status LED

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

The connection speed can be determined from the LED's located on the card's PCB.



3 PCIe-AE304bp Card Installation

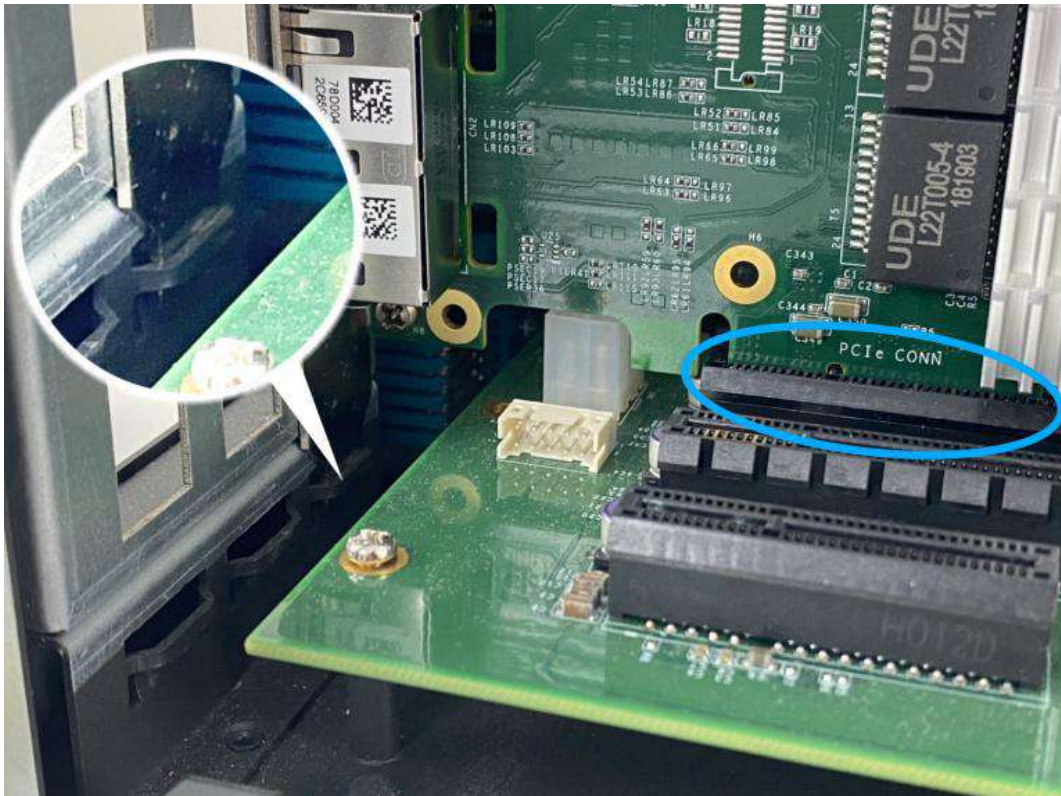
To install the PCIe-AE304bp into the system. Please refer to the following installation procedures.

Before disassembling the system enclosure and installing the card, please read the following instructions:

- **DO NOT** remove the card out of the anti-static until you are ready to install it into the system.
- 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.

3.1 Hardware Installation

1. Save and close all work in progress.
2. Power off and unplug the power cable from the system you wish to install to.
3. Open the chassis (side panel) of the computer you wish to install the PCIe-AE304bp into.
4. Locate the x4 PCIe slot or a spare and compatible x16/ x8 PCIe slot.
5. Align and insert PCIe-AE304bp's gold finger into the PCIe slot.



6. Secure the PCIe-AE304bp to the chassis with a screw.



7. Reinstall the system's chassis (panel) to complete the hardware installation process.

3.2 Software Installation

Some operating systems may have built-in drivers included and automatically complete the installation upon entering the system. However, it is still recommended to run and install drivers provided by Neosys to take advantage of all the functions offered. To install the software component, please click on this [link](#) to download the drivers.

4 Driver and Network Settings

PCIe-AE304bp offers Automotive 100/1000BASE-T1 Ethernet connectivity. For recommended optimized configurations, please refer to the following [link](#).