NEON-1020/1040

Quad Core x86 Smart Camera

User's Manual



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Revision Date:	June 13, 2014
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Recycled Paper

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Revision History

Revision	Release Date	Description of Change(s)
2.00	June 13, 2014	Initial release

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Preface

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Conventions

Take note of the following conventions used throughout this manual to make sure that users perform certain tasks and instructions properly.



Additional information, aids, and tips that help users perform tasks.



Information to prevent ***minor*** physical injury, component damage, data loss, and/or program corruption when trying to complete a task.



Information to prevent ***serious*** physical injury, component damage, data loss, and/or program corruption when trying to complete a specific task.

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1 Introduction

1.1 Overview

The NEON-1040 is a powerful new generation x86 smart camera that features the Intel® Atom™ Processor E3845 1.9 GHz, 4 MP at 60 fps, global shutter image sensor, and PWM lighting control support. The NEON-1040 stands out with its minimal footprint and superior computing power, and rugged IP67-rated construction and M12 connectors enable the NEON-1040 to withstand the harshest industrial environments.

High-end quad-core processor with FPGA coprocessors, GPU and up to 32GB storage for image processing, programs, and archiving, all provide advanced image processing ability ideally suited to high speed high resolution industrial imaging. Optimal I/O connectivity includes one additional slave GigE Vision camera connection, 4x digital inputs, 4x digital outputs, and VGA output, all maximizing integration with external devices.

Flexible software development support, including GenTL support for image acquisition and Open CV and Open CL programming, further significantly benefits developers by easing migration from x86 platforms.

1.2 Features

- Intel® Atom™ Quad-Core Processor E3845 1.91GHz
- 4MP, 60fps, monochrome global shutter CMOS sensor
- IP67-rated housing and M12 connectors
- Advanced image processing support
- Additional GigE Vision slave camera support
- Built-in PWN lighting control
- 4x digital inputs, 4x digital outputs, USB 2.0 port, RS-232 ports
- VGA output, max. 2560x1600 @60 Hz
- Flexible software support with STEMMER Common Vision Blox, MVTec HALCON, and many others
- GeniCam , GenTL, Open CV and Open CL compatible with image acquisition

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1.3 Specifications

		NEON-1020	NEON-1040
Processing & Memory			
Processor		Quad core Intel Atom E3845 @ 1.91GHz	
Display		VGA output, max 2560x1600 at 60 Hz.	
RAM		2GB DDR3L	
Storage		8 to 32 GB solid state drive	
Advanced Processing		ROI, LUT, Shading Correction	
Sensor			
Image Sensor		CMV2000	CMV4000
Resolution		2048 x 1088	2048 x 2048
Sensor Size		2/3”	1”
Frame Rate		120fps (8bit) 60fps (12bit)	60fps (8bit) 30fps (12bit)
Format		Monochrome	
Pixel Size (µm)		5.5	
Shutter		Global	
Trigger Mode		External trigger, software trigger, free run	
I/O			
Trigger Input		1x Opto-isolated trigger input	
Digital Output		4x sink type output, max sink 100mA sink voltage max 30VDC	
Digital Input		4x TTL level input	
PWM Lighting Control	Drive Method	Constant current 500 mA	
	Intensity	PWM control, max. 125 KHz	
	Applicable Light Units	12 VDC to 24 VDC illuminators	
	20KHz	1000 steps	
Ethernet		1 x GbE	
Serial Communication		1 x RS-232 (TX and RX only)	
USB		1 x USB 2.0	
Physical			
Dimensions		68.5W x 110D x 52.7H mm	
Lens mount		C mount	

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	NEON-1020	NEON-1040
Connectors	1xM12 8-pin female, 1xM12 17-pin male, 1x M12 12-pin male	
Software		
OS	Windows 7, Windows Embedded Standard 7	
Environmental & Electrical		
Power Consumption	12 to 24 VDC +/-10%, 13W (typical)	
Operating Temperature	0 to 50°C	
Vibration	Operating, 5 Grms, 5-500 Hz, 3 axes	
Certification	IP67, CE, FCC Class A	

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1.4 Schematics

NOTE:

- All units are in millimeters (mm)
- External dimensions for the NEON-1020 and NEON-1040 are identical

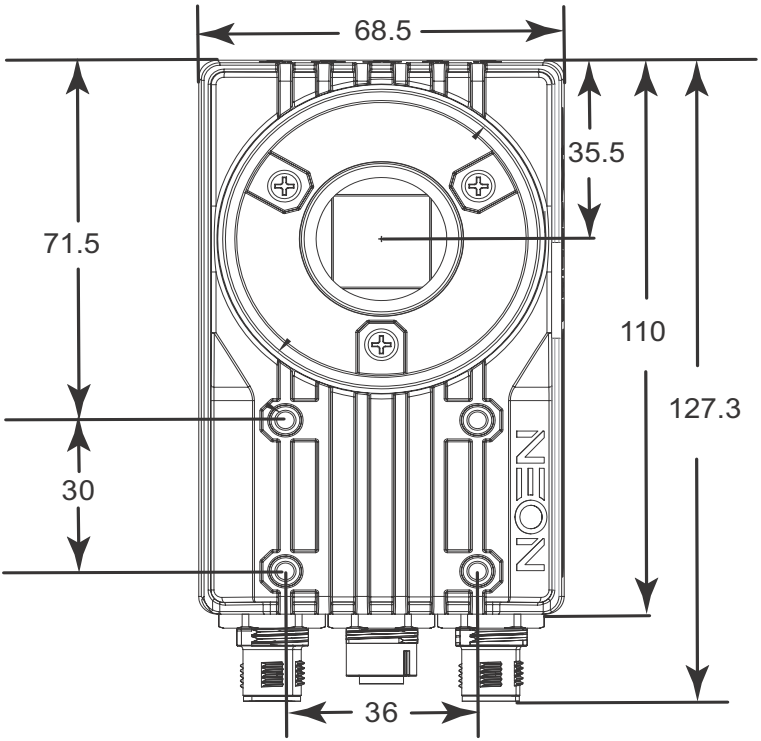


Figure 1-1: NEON-1040 Front View

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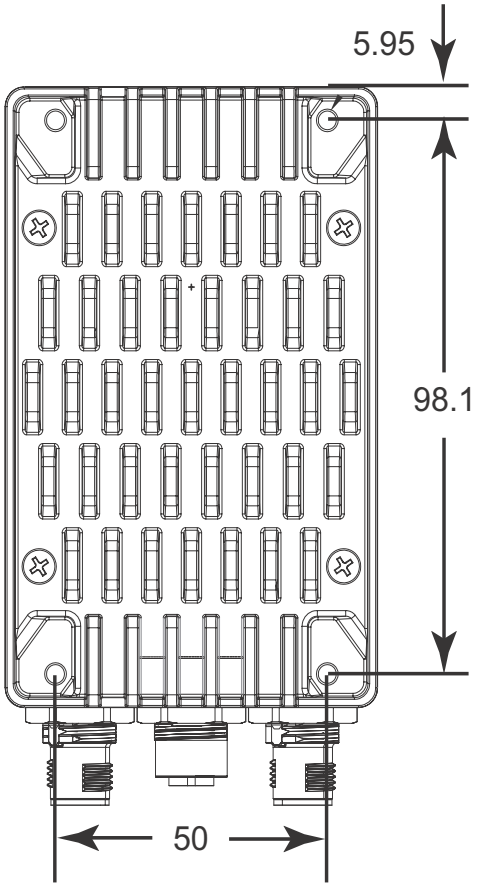


Figure 1-2: NEON-1020/1040 Rear View

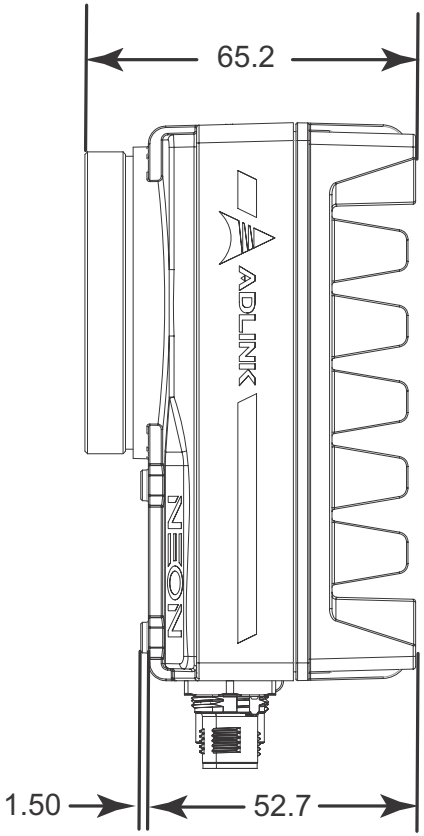


Figure 1-3: NEON-1020/1040 Side View

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1.5 Indicators



Figure 1-4: NEON-1020/1040 LED Array

The NEON 1020/1040 provides five labeled LED indicators on the top side, with function as follows.

Indicator	Color	Status	Description
POWER	Blue	On	System power on
		Off	System power off
STATUS	Red	On	Image capture in progress
		Off	Image capture idle
LAN ACT	Green	On	Ethernet port connected and inactive
		Off	Ethernet port disconnected.
		Flashing	Ethernet port connected and active
USER1	Orange	On/Off/ Flashing	User defined LED1
USER2	Green	On/Off/ Flashing	User defined LED2

Table 1-1: NEON-1020/1040 LED Function

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1.6 I/O Connectors

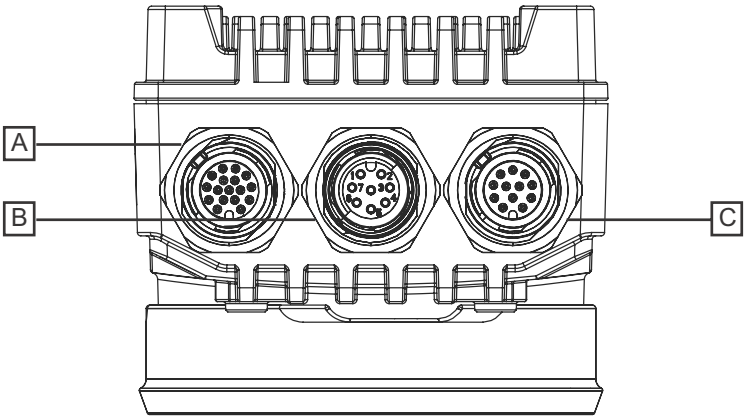


Figure 1-5: NEON-1020/1040 I/O Array

A	Power/IO/UART
B	Ethernet
C	VGA/USB

Table 1-2: NEON-1020/1040 I/O Array Legend

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1.6.1 Digital I/O and Power

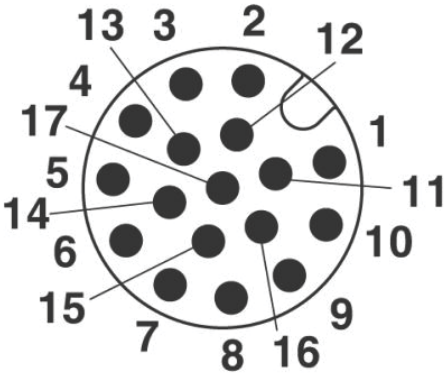


Figure 1-6: Digital I/O and Power Connector

Pin	Signal	Type	Description	17-Pin M12 Pigtail
1	RS232 RXD	Input	RS-232 receive.	Brown
2	DO3/ Strobe out 3	Output	Open-collector output 3 or strobe out 3	Blue
3	DO1/ Strobe out 1	Output	Open-collector output 1 or strobe out 1	White
4	Hardware trigger input (+)	Input	Hardware Trigger input positive	Green
5	Hardware trigger input (-)	Input	Hardware Trigger input negative	Pink
6	PWM light control out (+)	Output	PWM LED control out positive, for connection to LED lighting device; Power source of LED current control is shared System PWR	Yellow

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Pin	Signal	Type	Description	17-Pin M12 Pigtail
7	PWM light control out (-)	Output	PWM LED control out negative, for connection to LED lighting device; Power source of LED current control is shared System PWR	Black
8	System PWR	Input	Power input w/ input range +12V ~ +24V +/-10%	Gray
9	System PWR	Input	Power input w/ input range +12V ~ +24V +/-10%	Red
10	RS232 TXD	Output	RS-232 transmit	Violet
11	DO2/ Strobe out 2	Output	Open-collector output 2 or strobe out 2	Gray/Pink
12	DO0/ Strobe out 0	Output	Open-collector output 0 or strobe out 0	Red/Blue
13	DI3	Input	Digital input signal source 3	White/Green
14	DI0	Input	Digital input signal source 0	Brown/Green
15	DI2	Input	Digital input signal source 2	White/Yellow
16	DI1	Input	Digital input signal source 1	Yellow/Brown
17	GND	GND	Ground, reserved for use with ground from power supply	White/Gray

Table 1-3: Digital I/O and Power Pin Assignment

NOTE:

The negative pin of Digital OUT and Digital IN is GND.

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1.6.2 100/GbE

M12 8-pin (female) connector that provides communication capabilities at 10 Mbit/sec, 100 Mbit/sec, or 1 Gbit/sec(1000 Mbit/sec).

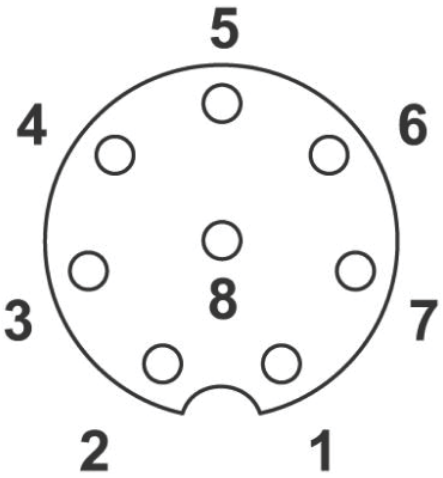


Figure 1-7: 100/GbE Connector

Pin	Signal	Description
1	MDI_3-	Data C-
2	MDI_4+	Data D+
3	MDI_4-	Data D-
4	MDI_1-	Data A-
5	MDI_2+	Data B+
6	MDI_1+	Data A+
7	MDI_3+	Data C+
8	MDI_2-	Data B-

Table 1-4: 100/GbE Pin Assignment

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1.6.3 VGA/USB

M12 12-pin (male) connector that transmits output video and USB 2.0 signals. The output video signal is a standard RGB analog video output transferring the OS desktop to connected independent display devices. The video output can display an extended Windows and/or an exclusive display.

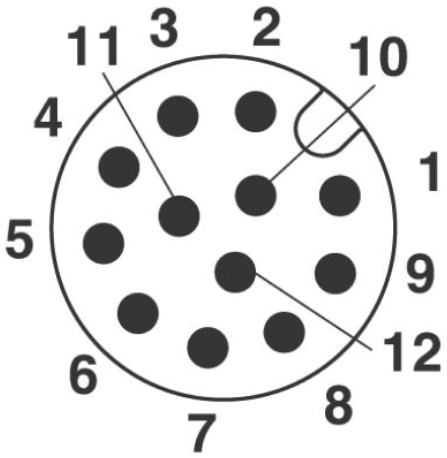


Figure 1-8: VGA/USB Connector

Pin	Signal	Type	Description
1	USB Power	Output	5 V supplied to USB peripherals
2	USB DATA (+)	Bidirectional	USB data +
3	USB_DATA (-)	Bidirectional	USB data -
4	GND	GND	Ground
5	VGA RED	Output	Red of RGB video signal
6	VGA BLUE	Output	Blue of RGB video signal
7	VGA VSYNC	Output	Vertical sync of RGB video signal

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Pin	Signal	Type	Description
8	VGA HSYNC	Output	Horizontal synch of RBG video signal
9	VGA GREEN	Output	Green of RGB video signal
10	GND	GND	Ground
11	VGA DDC SCL	Bidirectional	DDC serial clock line
12	VGA DDC SDA	Bidirectional	DDC serial data line

Table 1-5: VGA/USB Pin Assignment

1.7 General Purpose Digital Signals

1.7.1 General Purpose Digital Output (EDO)

Four digital output channels are provided, such that, in the common ground connection of digital output, as shown, when a 1 (logic high) is written by FPGA to a DO channel, sink current passes through the transistors and the DO channel goes low, and when a 0 (logic low) is written by FPGA to a DO channel, no current passes through the transistors and the DO channel goes high.

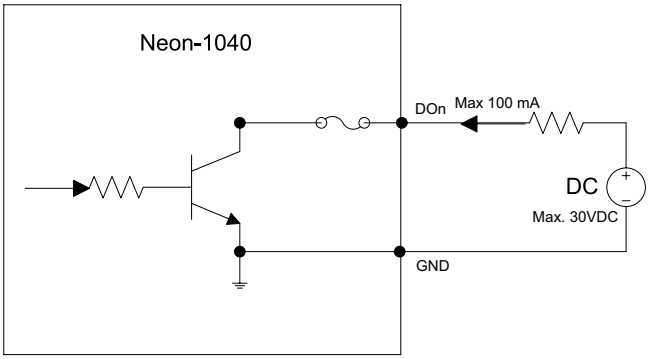


Figure 1-9: General Purpose Digital Output (EDO) Circuit

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1.7.2 General Purpose Digital Input (EDI)

Four digital input channels are provided.

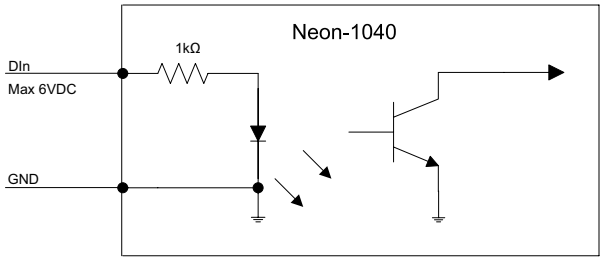


Figure 1-10: General Purpose Digital Input (EDI) Circuit

1.7.3 Hardware Trigger Input

Four digital input channels are provided.

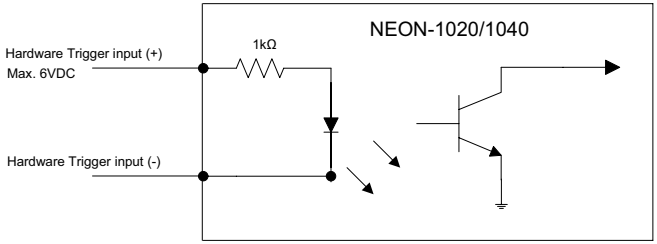


Figure 1-11: Hardware Trigger Input Circuit

1.7.4 PWM Light Control Output

One channel constant-current sink LED driver, constant 500mA output current with 1000 level light control controls brightness of LED lighting devices, sharing the NEON-1020/1040 System PWR input, requiring that System PWR voltage matches the LED lighting device's operating voltage.

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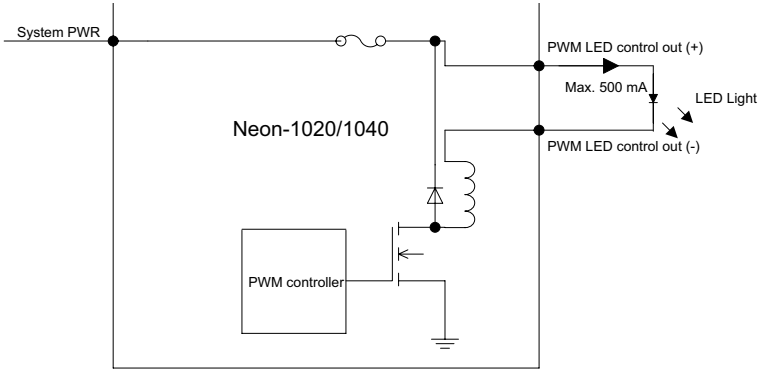


Figure 1-12: PWM Light Control Output Circuit

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2 Getting Started

This chapter describes connection and configuration of the NEON-1020/1040.

2.1 Unpacking Checklist

Before unpacking, check the shipping carton for any damage. If the shipping carton and/or contents are damaged, inform your dealer immediately. Retain the shipping carton and packing materials for inspection. Obtain authorization from your dealer before returning any product to ADLINK. Ensure that the following items are included in the package.

- NEON-1020/1040
- Quick Start Guide

2.2 Connecting a VGA/USB cable

1. Align the alignment pin (device side) with the alignment channel (cable side)

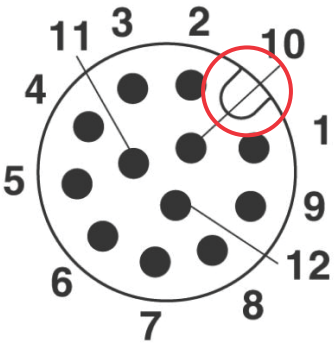


Figure 2-1: VGA/USB Alignment Pin (device side)

2. Fully insert the cable connector.
3. Tighten the threaded collar (cable side) to fix the connection.

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2.3 Connecting an Ethernet cable

1. Align the alignment pin (cable side) with the alignment channel (device side)

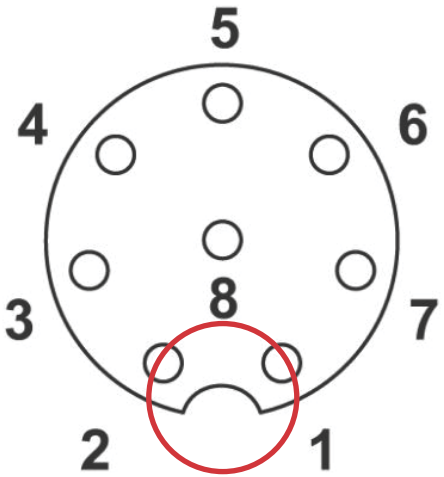


Figure 2-2: Ethernet Alignment Channel (device side)

2. Fully insert the cable connector.
3. Tighten the threaded collar (cable side) to fix the connection.

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2.4 Connecting a power cable

1. Align the alignment pin (device side) with the alignment channel (cable side)

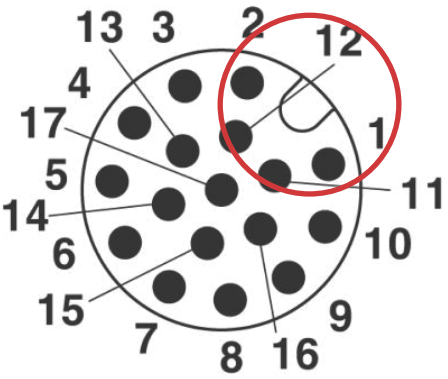


Figure 2-3: Power Alignment Pin (device side)

2. Fully insert the cable connector.
3. Tighten the threaded collar (cable side) to fix the connection.

2.5 Operating System Installation

The NEON-1020/1040 is compatible with Windows Embedded Standard 7 (WES7E),and supports File-Based Write Filter (FBWF), providing a stable, secure, and high performance software operating environment. The device OS is pre-installed. For other OS support, please contact ADLINK directly.

2.6 Driver Installation

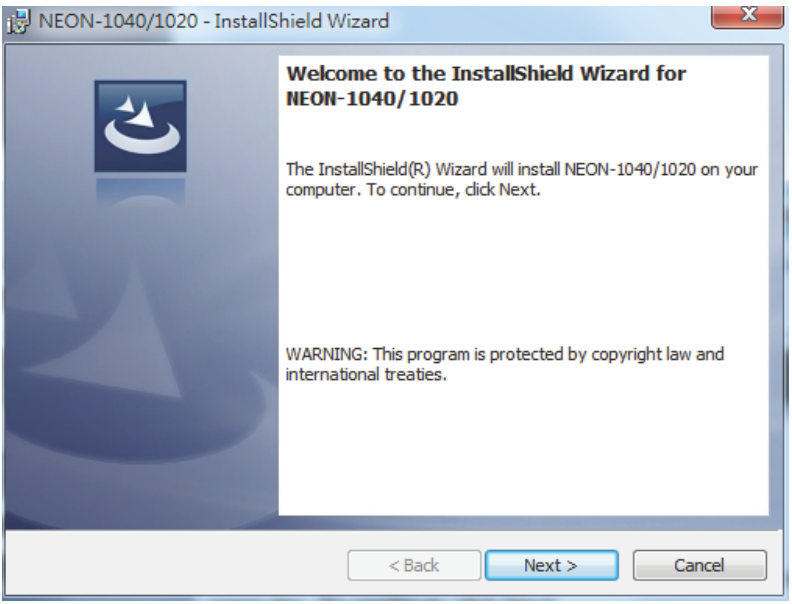
While the following describes NEON-1020/1040 driver installation for WES 7 and Windows 7, with other Windows systems following similar procedures.

1. Run Setup, installation begins.

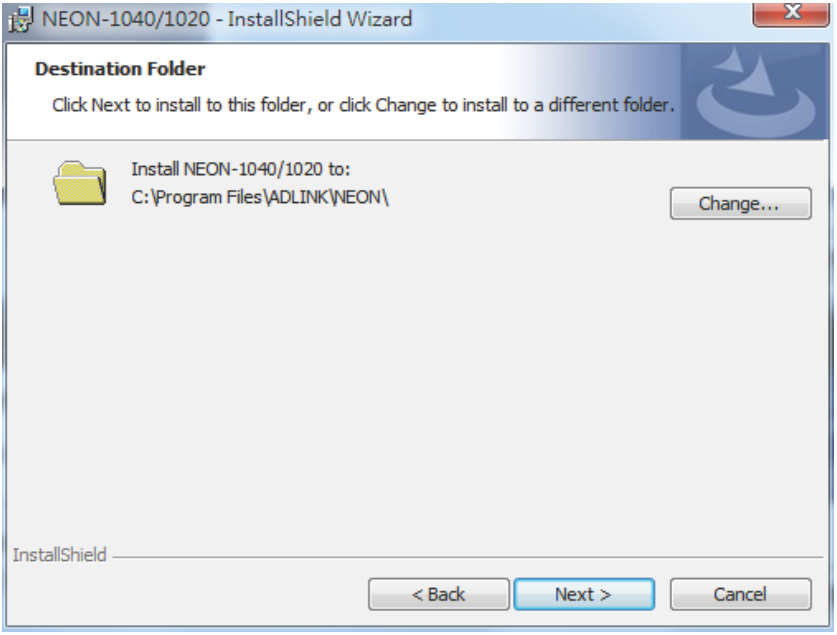
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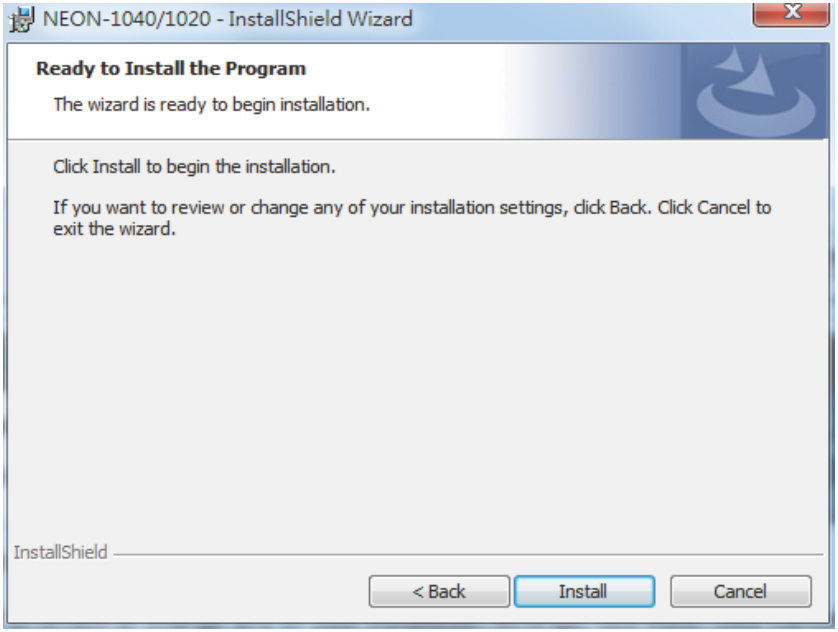
2. Select Next when prompted until installation is complete.



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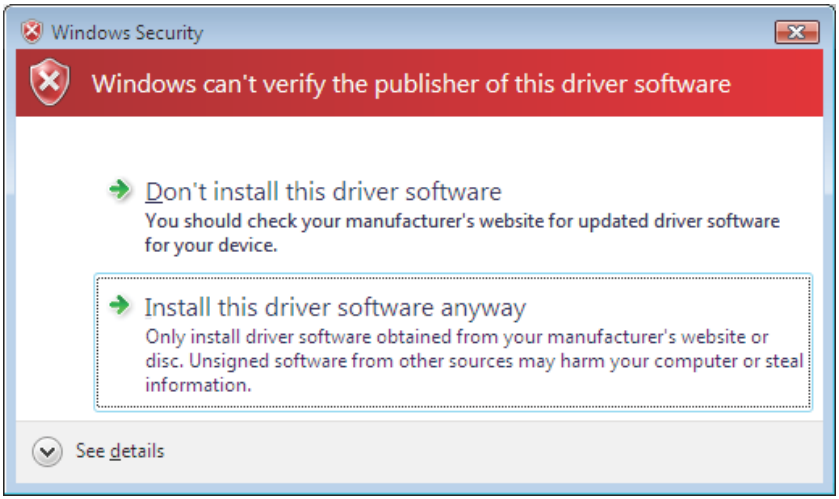


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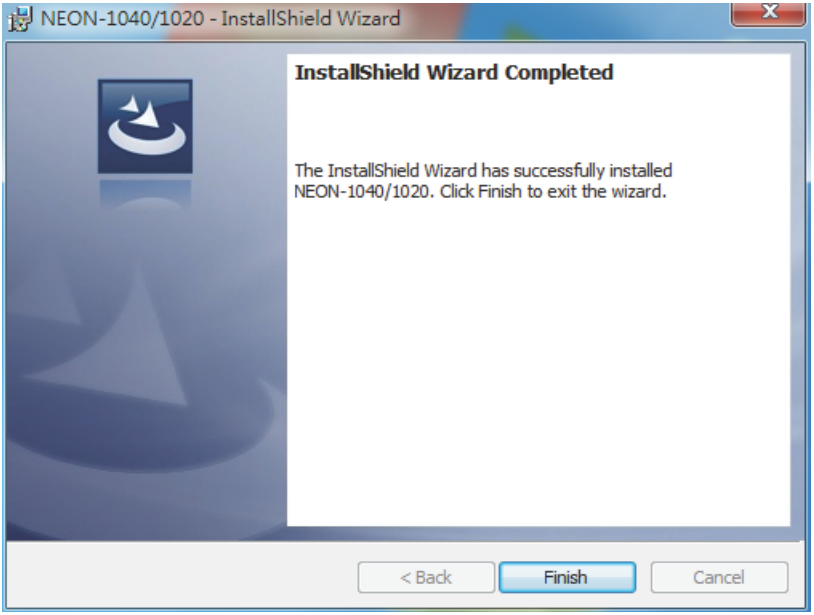


3. If a Security Warning window appears, select “Install this driver anyway”.

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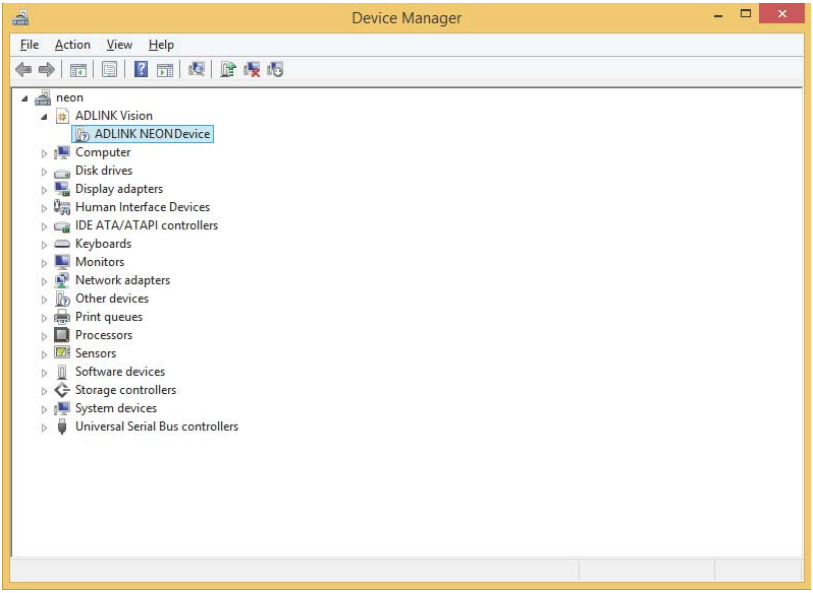


4. If a “Found New Hardware Wizard” window appears, ignore and the window automatically closes after installation is complete.
5. When installation is complete, select Finish.



The device should appear in the Device Manager, as shown

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NOTE:

If an error occurs and installation is rolled back, e-mail the file *setupapi.log* in the Windows folder to ADLINK. Log files on Vista systems are moved to %windir%\inf and renamed to *setupapi.app.log* and *setupapi.dev.log* where windir is the Windows folder.

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Important Safety Instructions

For user safety, please read and follow all **instructions**, **WARNINGS**, **CAUTIONS,** and **NOTES** marked in this manual and on the associated equipment before handling/operating the equipment.

- Read these safety instructions carefully.
- Keep this user's manual for future reference.
- Read the specifications section of this manual for detailed information on the operating environment of this equipment.
- When installing/mounting or uninstalling/removing equipment:
  - Turn off power and unplug any power cords/cables.
- To avoid electrical shock and/or damage to equipment:
  - Keep equipment away from water or liquid sources;
  - Keep equipment away from high heat or high humidity;
  - Keep equipment properly ventilated (do not block or cover ventilation openings);
  - Make sure to use recommended voltage and power source settings;
  - Always install and operate equipment near an easily accessible electrical socket-outlet;
  - Secure the power cord (do not place any object on/over the power cord);
  - Only install/attach and operate equipment on stable surfaces and/or recommended mountings; and,
  - If the equipment will not be used for long periods of time, turn off and unplug the equipment from its power source.

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- Never attempt to fix the equipment. Equipment should only be serviced by qualified personnel.

A Lithium-type battery may be provided for uninterrupted, backup or emergency power.



Risk of explosion if battery is replaced with one of an incorrect type. Dispose of used batteries appropriately.

- Equipment must be serviced by authorized technicians when:
  - The power cord or plug is damaged;
  - Liquid has penetrated the equipment;
  - It has been exposed to high humidity/moisture;
  - It is not functioning or does not function according to the user's manual;
  - It has been dropped and/or damaged; and/or,
  - It has an obvious sign of breakage.

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Getting Service

Contact us should you require any service or assistance.

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