NEON-1021-M

Quad Core x86 Smart Camera

User's Manual



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Revision Date:	June 9, 2017
Part No:	50-1Z235-1000

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Leading **EDGE COMPUTING**

Revision History

Revision	Release Date	Description of Change(s)
1.0	June 9, 2017	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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Table of Contents

Preface ..... **iii**

List of Figures ..... **vii**

List of Tables ..... **ix**

1 Introduction **1**

1.1 Overview 1
1.2 Features 2
1.3 Specifications 2
1.4 Schematics 4
1.5 Indicators 7
1.6 I/O Connectors 8
1.6.1 Digital I/O and Power 9
1.6.2 Ethernet 11
1.6.3 VGA/USB 12
1.7 General Purpose Digital Signals 13
1.7.1 General Purpose Digital Output (EDO) 13
1.7.2 General Purpose Digital Input (EDI) 14
1.7.3 Hardware Trigger Input 14
1.7.4 PWM Light Control Output 14

2 Getting Started **17**

2.1 Unpacking Checklist 17
2.2 Connecting a VGA/USB cable 17
2.3 Connecting an Ethernet cable 18
2.4 Connecting a power cable 19
2.5 Getting Started with MVTec MERLIC 19

Important Safety Instructions **23**

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Getting Service 27

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List of Figures

Figure 1-1: NEON-1021-M Front View 4
Figure 1-2: NEON-1021-M Rear View 5
Figure 1-3: NEON-1021-M Side View 6
Figure 1-4: NEON-1021-M LED Array 7
Figure 1-5: NEON-1021-M I/O Array 8
Figure 1-6: Digital I/O and Power Connector 9
Figure 1-7: Ethernet Connector 11
Figure 1-8: VGA/USB Connector 12
Figure 1-9: General Purpose Digital Output (EDO) Circuit 13
Figure 1-10: General Purpose Digital Input (EDI) Circuit 14
Figure 1-11: Hardware Trigger Input Circuit 14
Figure 1-12: PWM Light Control 15
Figure 2-1: VGA/USB Alignment Pin (device side) 18
Figure 2-2: Ethernet Alignment Channel (device side) 18
Figure 2-3: Power Alignment Pin (device side) 19

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List of Tables

Table 1-1: NEON-1021-M LED Function 7
Table 1-2: NEON-1021-M I/O Array Legend..... 8
Table 1-3: Digital I/O and Power Pin Assignment..... 10
Table 1-4: Ethernet Pin Assignment 11
Table 1-5: VGA/USB Pin Assignment..... 13

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1 Introduction

1.1 Overview

ADLINK's new NEON-1021-M Intel® AtomTM E3845 processor-based ready-to-go smart camera with MVTec MERLIC equips a state-of-the-art quad-core smart camera with easy-to-use machine vision software. The NEON-1021-M significantly increases competitive advantage, exceeding basic smart camera advantages for machine vision development.

ADLINK's NEON-1021-M features high performance quad-core Intel® AtomTM processors, speedy multi-ROI image capture, 2MP global shutter image sensors, and PWM lighting control support. High-speed multi-barcode capture by multi-ROI function shortens image processing cycle time, and optimized I/O includes one additional slave GigE Vision camera connection, 4x isolated input, 4x isolated output, and VGA output for maximized integration with external devices. Rugged construction with IP67-rated housing and M12 connectors enables the NEON-1021-M to withstand the harshest industrial environments.

MVTec MERLIC is an all-in-one tool for quickly building machine vision applications with no programming requirement. Based on MVTec's extensive machine vision expertise and combining reliable, fast performance with ease of use, the PC-based complete software solution features an image-centric user interface, intuitively guiding the user through the application. Similar to a WYSIWYG editor, developers can focus on the image- based display rather than complex lines of code or parameter lists. MERLIC is particularly suited to operations that favor a clear, graphical user interface for configuring imaging functions.

ADLINK's NEON-1021-M smart camera and integration of the easy-to-use machine vision software MERLIC makes it a simple matter for system integration to fulfill a wide variety of inspection application needs.

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1.2 Features

- Image-centered user interface
- Machine vision application with no need for programming
- Integrated tool library
- 2MP 60 fps resolutions, monochrome global shutter CMOS sensors
- Multi-ROI function replaces multi-camera barcode reader solution
- Additional GigE Vision 1 slave camera support
- IP67-rated housing and M12 connectors
- EMVA 1288-verified superior image quality

1.3 Specifications

Processing & Memory	
Processor	Quad core Intel Atom E3845 @ 1.91GHz
Display	VGA output, max 2048x1152 at 60 Hz.
RAM	4GB DDR3L
Storage	16GB/32GB solid state drive
Advanced Processing	ROI, Multi-ROI, LUT, Shading Correction, Binning
Sensor	
Image Sensor	EV76C570
Resolution	1600 x 1200
Sensor Size	1/1.8”
Frame Rate	60fps (8bit) 30fps (10bit)
Format	Monochrome
Pixel Size (μm)	4.5 x 4.5
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

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PWM Lighting Control	Drive Method	Constant current, max. 500 mA
	Applicable Light Units	24 VDC illuminators
	Dimming Resolution	1000:1, 18kHz
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 52.7 mm
Lens mount		C mount
Connectors		1xM12 8-pin female, 1xM12 17-pin male, 1x M12 12-pin male
Software		
OS		Windows Embedded Standard 7
Application		MVTec MERLIC v. 3.*x*
Environmental & Electrical		
Power Consumption		24 VDC +/-10%, 13W, 0.62A(typical)
Operating Temperature		-20 to 50°C
Vibration		Operating, 5 Grms, 5-500 Hz, 3 axes
Certification		IP67, CE, CB, FCC Class A. UL

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1.4 Schematics

NOTE:

All units are in millimeters (mm)

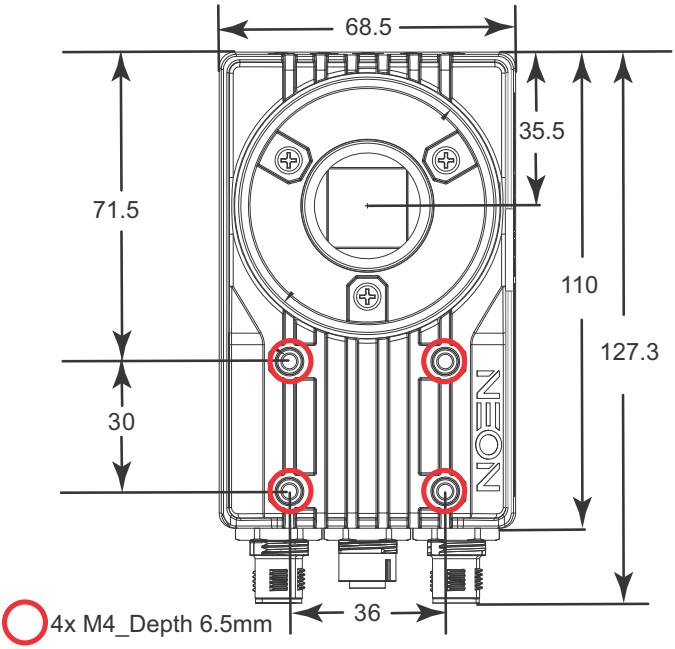


Figure 1-1: NEON-1021-M Front View

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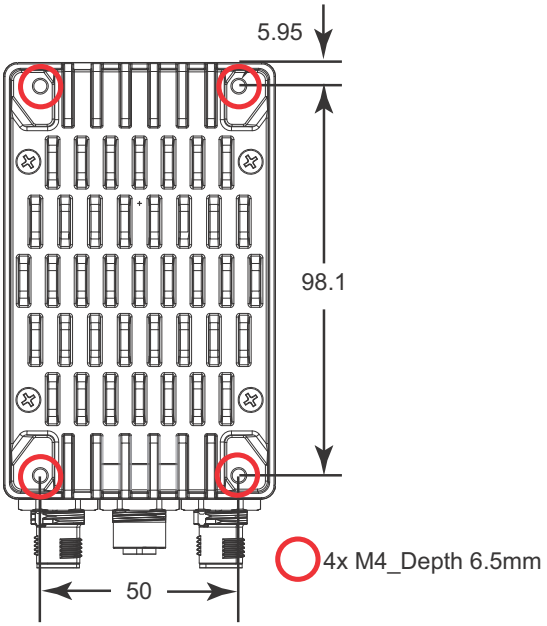


Figure 1-2: NEON-1021-M Rear View

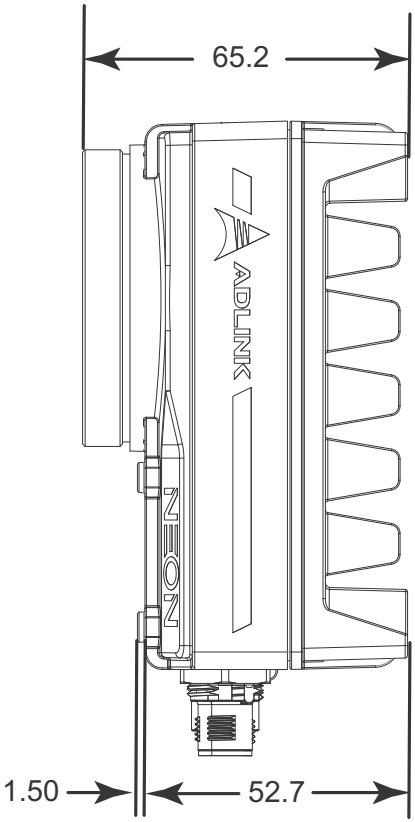


Figure 1-3: NEON-1021-M Side View

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1.5 Indicators



Figure 1-4: NEON-1021-M LED Array

The NEON 1021 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	Amber	On/Off/ Flashing	User defined LED1
USER2	Green	On/Off/ Flashing	User defined LED2

Table 1-1: NEON-1021-M LED Function

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1.6 I/O Connectors

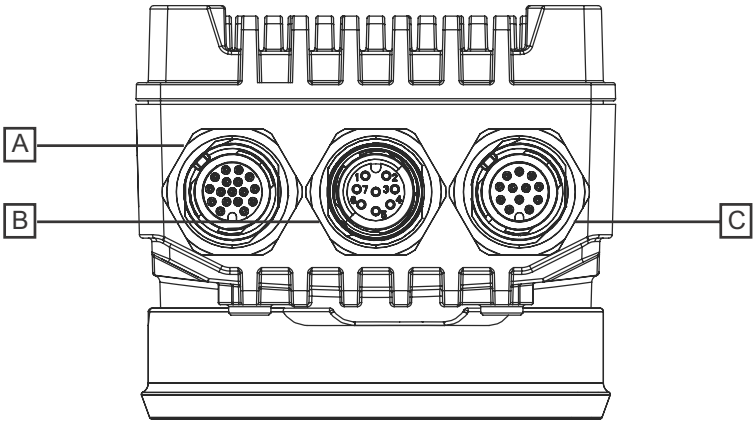


Figure 1-5: NEON-1021-M I/O Array

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

Table 1-2: NEON-1021-M I/O Array Legend

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1.6.1 Digital I/O and Power

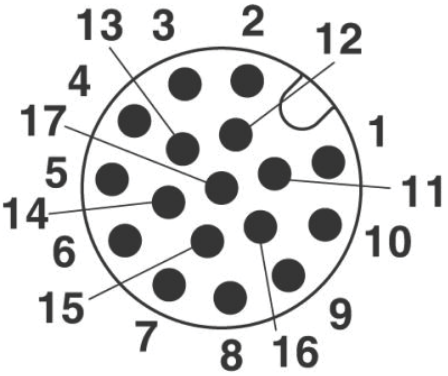


Figure 1-6: Digital I/O and Power Connector

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 +24V +/-10%	Gray
9	System PWR	Input	Power input w/ input range +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 Ethernet

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

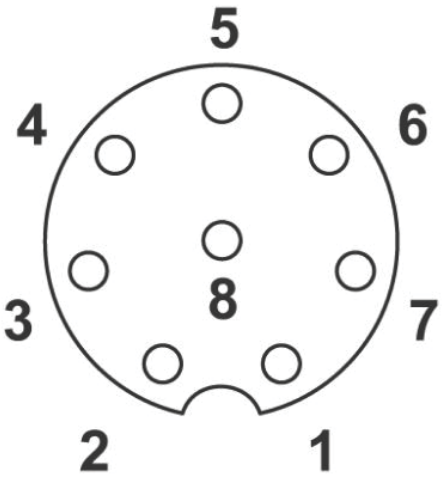


Figure 1-7: Ethernet Connector

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: Ethernet 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.

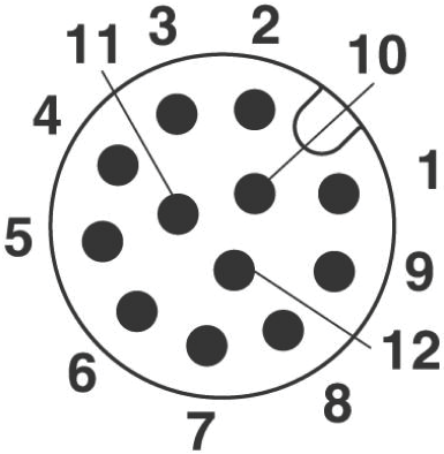


Figure 1-8: VGA/USB Connector

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.

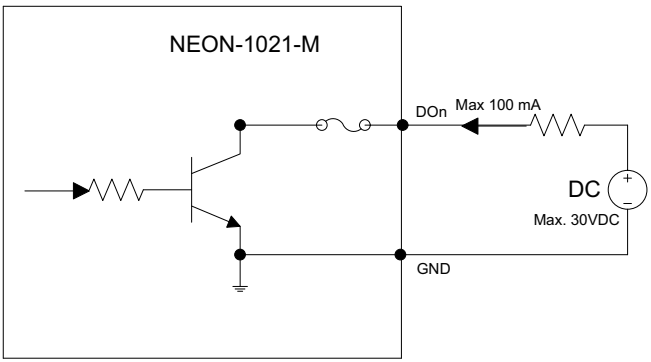


Figure 1-9: General Purpose Digital Output (EDO) Circuit

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1.7.2 General Purpose Digital Input (EDI)

Four digital input channels are provided.

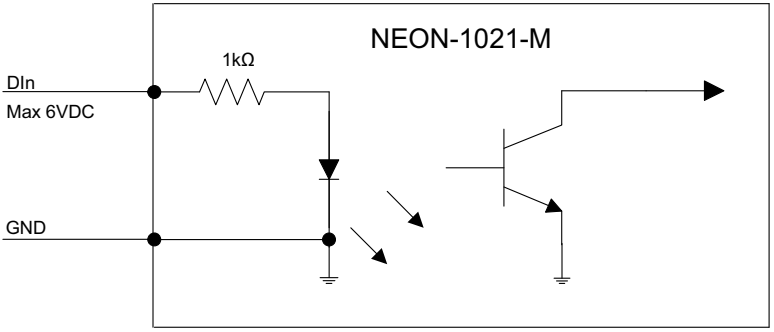


Figure 1-10: General Purpose Digital Input (EDI) Circuit

1.7.3 Hardware Trigger Input

Four digital input channels are provided.

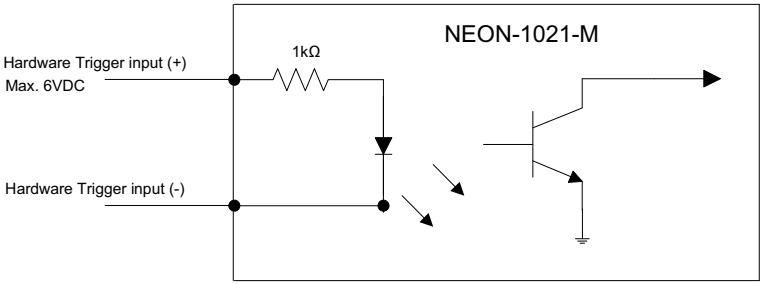


Figure 1-11: Hardware Trigger Input Circuit

1.7.4 PWM Light Control Output

One channel constant-current sink LED driver, max. constant 500mA output current with 1000 level light control regulates brightness of LED lighting devices, sharing the NEON-1021-M System

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PWR input, requiring that System PWR voltage matches the LED lighting device's operating voltage.

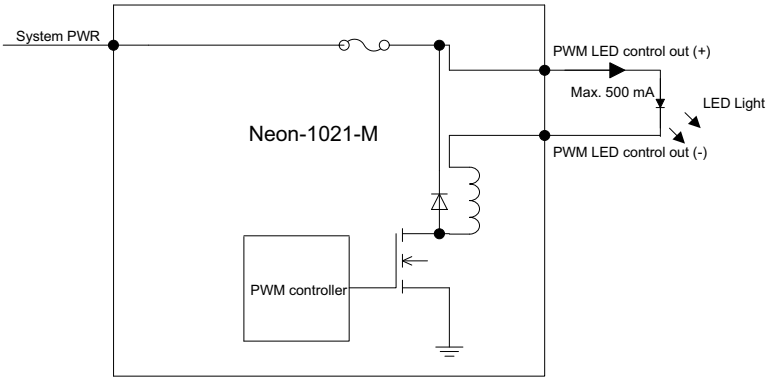


Figure 1-12: PWM Light Control

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2 Getting Started

This chapter describes connection and configuration of the NEON-1021-M.

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-1021-M
- Quick Start Guide



In environments where temperatures approach 50°C or more, seat the camera face down or in an upright position for optimum heat dissipation efficiency.
Dans les environnements où les températures atteignent les 50°C ou plus, placez la caméra vers le bas ou le haut pour une dissipation thermique optimale.

2.2 Connecting a VGA/USB cable

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

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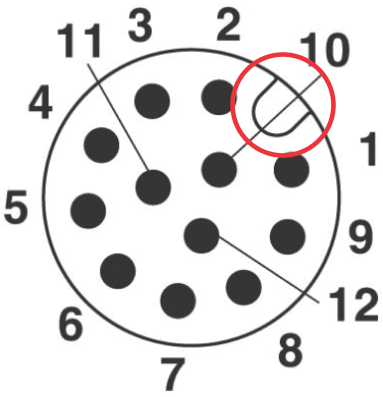


Figure 2-1: VGA/USB Alignment Pin (device side)

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

2.3 Connecting an Ethernet cable

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

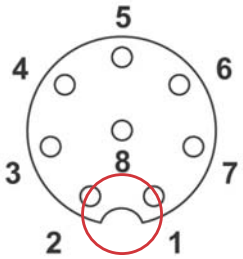


Figure 2-2: Ethernet Alignment Channel (device side)

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)

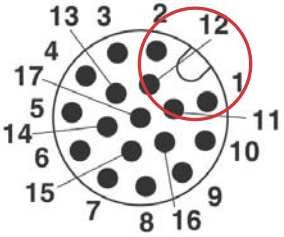


Figure 2-3: Power Alignment Pin (device side)

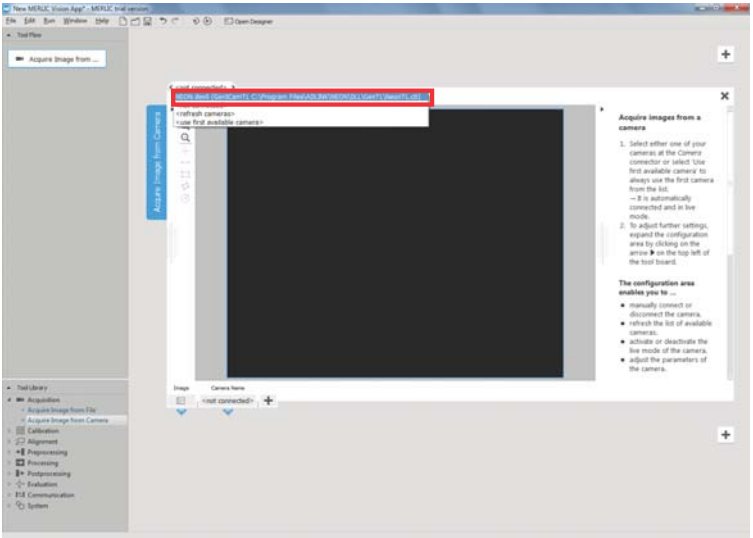
2. Fully insert the cable connector.
3. Tighten the threaded collar (cable side) to fix the connection.

2.5 Getting Started with MVTec MERLIC

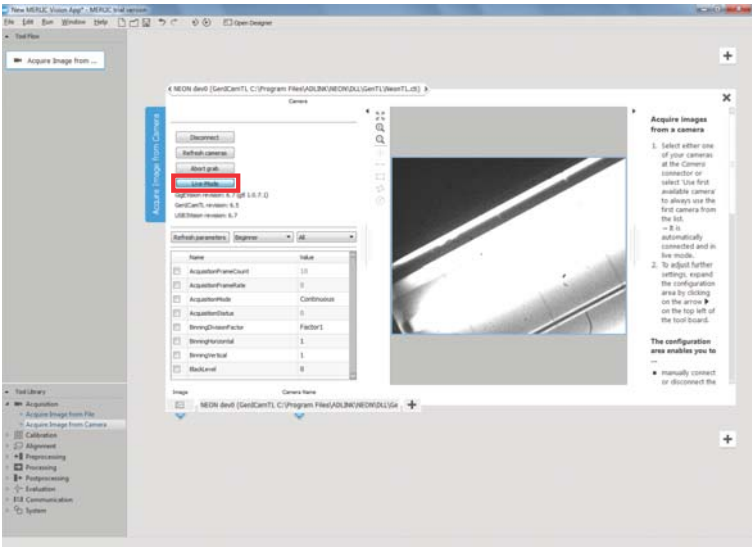
1. Launch MVTec MERLIC (v. 3.x) from Start Menu.
2. Select Acquisition from the Tool Library, and select Acquire Image from Camera. The camera configuration window appears in the MERLIC toolbar. Select the camera connector shown as not connected in the top left corner of the toolbar.

   A list of all connected cameras appears. NEON dev0 is listed if MERLIC is connected properly.

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3. Select the arrow in the top left corner to expand the tool-bar, and select Live-Mode to capture continuous images. Select again to stop capture.



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For detailed operation, refer to the MERLIC manual (Select Help on the toolbar).

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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 device before handling/operating the device, to avoid injury or damage.

S'il vous plaît prêter attention stricte à tous les avertissements et mises en garde figurant sur l'appareil , pour éviter des blessures ou des dommages.

- Read these safety instructions carefully
- Keep the User's Manual for future reference
- Read the Specifications section of this manual for detailed information on the recommended operating environment
- The device can be operated at an ambient temperature of 50ºC
- When installing/mounting or uninstalling/removing device; or when removal of a chassis cover is required for user servicing (See "Getting Started" on page 17.):
  - Turn off power and unplug any power cords/cables
  - Reinstall all chassis covers before restoring power
- To avoid electrical shock and/or damage to device:
  - Keep device away from water or liquid sources
  - Keep device away from high heat or humidity
  - Keep device properly ventilated (do not block or cover ventilation openings)
  - Always use recommended voltage and power source settings
  - Always install and operate device near an easily accessible electrical outlet
  - Secure the power cord (do not place any object on/over the power cord)
  - Only install/attach and operate device on stable surfaces and/or recommended mountings
- If the device will not be used for long periods of time, turn off and unplug from its power source

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- Never attempt to repair the device, which should only be serviced by qualified technical personnel using suitable tools
- 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; please dispose of used batteries appropriately.
Risque d'explosion si la pile est remplacée par une autre de type incorrect. Veuillez jeter les piles usagées de façon appropriée.

- The device must be serviced by authorized technicians when:
  - The power cord or plug is damaged
  - Liquid has entered the device interior
  - The device has been exposed to high humidity and/or moisture
  - The device is not functioning or does not function according to the User's Manual
  - The device has been dropped and/or damaged and/or shows obvious signs of breakage
- Disconnect the power supply cord before loosening the thumbscrews and always fasten the thumbscrews with a screwdriver before starting the system up
- It is recommended that the device be installed only in a server room or computer room where access is:
  - Restricted to qualified service personnel or users familiar with restrictions applied to the location, reasons therefor, and any precautions required
  - Only afforded by the use of a tool or lock and key, or other means of security, and controlled by the authority responsible for the location

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	**BURN HAZARD** Touching this surface could result in bodily injury. To reduce risk, allow the surface to cool before touching. ***RISQUE DE BRÛLURES*** *Ne touchez pas cette surface, cela pourrait entraîner des blessures.* *Pour éviter tout danger, laissez la surface refroidir avant de la toucher.*

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