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GETTING STARTED

NI PCIe-8242

Dual Port USB 3.0 Interface Device

The NI PCIe-8242 (NI 8242) is a dual port PCI Express (PCIe) USB 3.0 interface device. This document describes how to install and configure the necessary hardware and software components to begin using the NI 8242.

What You Need to Get Started

☐ NI 8242 USB 3.0 interface device.

☐ USB3 Vision camera.

☐ USB 3.0 cable. Use only USB 3.0 cables that are SuperSpeed-certified or supplied by NI.



Caution To ensure the specified EMC performance, the length of connected USB cables must not exceed 3 m (10 ft).

☐ Computer running Microsoft Windows 7 (32-bit or 64-bit versions)/Vista (32-bit or 64-bit versions)/XP (32-bit or 64-bit versions)/ Server 2008 R2 with at least one available x4 or larger PCIe slot, or a x1 slot rated for 25 W cards.

☐ NI-IMAQdx 4.1 or later driver software, shipped with the device and included with NI Vision Acquisition Software February 2013 or later.

☐ Renesas µPD720202 driver software, included on the separate driver DVD shipped with the device.

☐ Software for developing machine vision applications:

- NI Vision Builder for Automated Inspection
- NI Vision Development Module, which requires one of the following application development environments:
  - LabVIEW
  - LabWindows™/CVI™
  - Microsoft Visual Studio

NATIONAL INSTRUMENTS™

Safety Information

Caution The following paragraphs contain important safety information you *must* follow when installing and operating the device.

Caution The protection provided by this product may be impaired if it is used in a manner not described in this document.

Do *not* operate the hardware in a manner not specified in the documentation. Misuse of the hardware can result in a hazard. You can compromise the safety protection if the hardware is damaged in any way. If the hardware is damaged, return it to National Instruments for repair.

Clean the device and accessories by brushing off light dust with a soft, nonmetallic brush. Remove other contaminants with a stiff, nonmetallic brush. The unit *must* be completely dry and free from contaminants before returning it to service.

Do *not* operate the hardware in an explosive atmosphere or where there may be flammable gases or fumes.

Keep away from live circuits. Do *not* remove equipment covers or shields unless you are trained to do so. If signal wires are connected to the device, hazardous voltages can exist even when the equipment is turned off. To avoid a shock hazard, do *not* perform procedures involving cover or shield removal unless you are qualified to do so. Disconnect all field power prior to removing covers or shields.

If the device is rated for use with hazardous voltages (>30 V_{rms}, 42.4 V_{pk}, or 60 V_{dc}), it may require a safety earth-ground connection wire. Refer to the device specifications for maximum voltage ratings. Because of the danger of introducing additional hazards, do *not* install unauthorized parts or modify the device. Use the device only with the chassis, modules, accessories, and cables specified in the installation instructions. All covers and filler panels must be installed while operating the device.

Because of the danger of introducing additional hazards, do *not* install unauthorized parts or modify the device. Use the device only with the chassis, modules, accessories, and cables specified in the installation instructions. All covers and filler panels *must* be installed while operating the device.

Operate the device only at or below Pollution Degree 2. Pollution consists of any foreign matter—solid, liquid, or gas—that may reduce dielectric strength or surface resistivity. The following is a description of Pollution Degrees.

- Pollution Degree 1—No pollution or only dry, nonconductive pollution occurs. The pollution has no effect. Typical level for sealed components or coated PCBs.
- Pollution Degree 2—Only nonconductive pollution occurs in most cases. Occasionally, however, a temporary conductivity caused by condensation must be expected. Typical level for most products.
- Pollution Degree 3—Conductive pollution or dry, nonconductive pollution occurs. Nonconductive pollution becomes conductive because of condensation.

Operate the hardware at or below the measurement category[1] in the hardware specifications. Measurement circuits are subjected to working voltages[2] and transient stresses (overvoltage) from the circuit to which they are connected during measurement or test. Measurement Category establishes standardized impulse withstand voltage levels that commonly occur in electrical distribution systems. The following is a description of measurement categories:

- Measurement Categories CAT I and CAT O (Other) are equivalent and are for measurements performed on circuits not directly connected to the electrical distribution system referred to as MAINS[3] voltage. This category is for measurements of voltages from specially protected secondary circuits. Such voltage measurements include signal levels, special hardware, limited-energy parts of hardware, circuits powered by regulated low-voltage sources, and electronics.
- Measurement Category II is for measurements performed on circuits directly connected to MAINS. This category refers to local-level electrical distribution, such as that provided by a standard wall outlet (for example, 115 AC voltage for U.S. or 230 AC voltage for Europe). Examples of Measurement Category II are measurements performed on household appliances, portable tools, and similar hardware.
- Measurement Category III is for measurements performed in the building installation at the distribution level. This category refers to measurements on hard-wired hardware such as hardware in fixed installations, distribution boards, and circuit breakers. Other examples are wiring, including cables, bus bars, junction boxes, switches, socket outlets in the fixed installation, and stationary motors with permanent connections to fixed installations.
- Measurement Category IV is for measurements performed at the primary electrical supply installation typically outside buildings. Examples include electricity meters and measurements on primary overcurrent protection devices and on ripple control units.

[1] Measurement categories, also referred to as overvoltage or installation categories, are defined in electrical safety standards IEC 61010-1 and IEC 60664-1.

[2] Working voltage is the highest rms value of an AC or DC voltage that can occur across any particular insulation.

[3] MAINS is defined as a hazardous live electrical supply system that powers hardware. Suitably rated measuring circuits may be connected to the MAINS for measuring purposes.

Electromagnetic Compatibility Guidelines

This product was tested and complies with the regulatory requirements and limits for electromagnetic compatibility (EMC) stated in the product specifications. These requirements and limits provide reasonable protection against harmful interference when the products are operated in the intended operational electromagnetic environment.

This product is intended for use in industrial locations. However, harmful interference may occur in some installations, when the product is connected to a peripheral device or test object, or if the product is used in residential or commercial areas. To minimize interference with radio and television reception and prevent unacceptable performance degradation, install and use this product in strict accordance with the instructions in the product documentation.

Furthermore, any modifications to the product not expressly approved by National Instruments could void your authority to operate it under your local regulatory rules.

Caution To ensure the specified EMC performance, the length of connected USB cables must not exceed 3 m (10 ft). Use only USB 3.0 cables that are SuperSpeed-certified or supplied by NI.

Installing Application Software and Driver

Before installing the NI 8242, you must install the application software and device drivers. Start by installing the Renesas driver for the USB host controller.

Installing the Renesas Driver

Insert the separate driver DVD into the host machine and follow the onscreen instructions.

Next, install one of the following programs to develop machine vision applications:

- **NI Vision Builder for Automated Inspection** (Vision Builder AI)—Interactive, menu-driven configuration software for developing, benchmarking, and deploying machine vision applications. You must also install NI-IMAQdx.
- **NI Vision Development Module**—Programming library for developing machine vision and scientific imaging applications. The NI Vision Development Module requires an application development environment—LabVIEW, LabWindows/CVI, or Visual Studio—and NI-IMAQdx.

Installing Vision Builder AI

Install the following software to use Vision Builder AI to develop applications.

1. **NI-IMAQdx**—Refer to the *NI Vision Acquisition Software Release Notes* on the NI Vision Acquisition Software installation media for system requirements and installation instructions for the NI-IMAQdx driver.

   Documentation for the NI-IMAQ driver software is available by selecting **Start»All Programs»National Instruments»Vision»Documentation»NI-IMAQ**.

2. **Vision Builder AI**—Refer to the *NI Vision Builder for Automated Inspection Readme* for installation instructions.

   Documentation for Vision Builder AI is available by selecting **Start»All Programs» National Instruments»Vision Builder AI»Documentation**.

Installing the Vision Development Module

Install the following software to use the Vision Development Module to develop applications.

1. One of the following application development environments:
   - **LabVIEW**—Refer to the *LabVIEW Release Notes* for installation instructions and system requirements for the LabVIEW software. Refer to the *LabVIEW Upgrade Notes* for additional information about upgrading to the most recent version of LabVIEW.
   - Documentation for LabVIEW is available by selecting **Start»All Programs» National Instruments»LabVIEW»LabVIEW Manuals**.
   - **LabWindows/CVI—**Refer to the *LabWindows/CVI Release Notes* for installation instructions and system requirements for the LabWindows/CVI software.
   - Documentation for LabWindows/CVI is available by selecting **Start»All Programs» National Instruments»LabWindows CVI**.
   - **Visual Studio**—Refer to the Visual Studio product documentation for installation instructions.
2. **NI-IMAQdx**—Refer to the *NI Vision Acquisition Software Release Notes* on the NI Vision Acquisition Software installation media for system requirements and installation instructions for the NI-IMAQdx driver.

   Documentation for the NI-IMAQdx driver software is available by selecting **Start»All Programs»National Instruments»Vision»Documentation»NI-IMAQdx**.
3. **NI Vision Development Module**—Refer to the *NI Vision Development Module Readme* on the NI Vision Development Module installation media for system requirements and installation instructions.

   Documentation for the NI Vision Development Module is available by selecting **Start»All Programs»National Instruments»Vision»Documentation»NI Vision**.

Installing the Hardware

This section describes how to unpack and install the device. You must install the software before installing the hardware.

Unpacking

The NI 8242 ships in an antistatic package to prevent electrostatic discharge from damaging device components. To avoid such damage in handling the device, take the following precautions:

1. Ground yourself using a grounding strap or by touching a grounded object, such as the computer chassis.

2. Touch the antistatic package to a metal part of the computer chassis before removing the device from the package.

Caution *Never* touch the exposed pins of connectors.

3. Remove the device from the package and inspect it for loose components or any other signs of damage. Notify National Instruments if the device appears damaged in any way. Do *not* install a damaged device in the computer.

Store the NI 8242 in the antistatic package when not in use.

Installing

The following are general instructions for installation. Refer to the documentation provided by your computer manufacturer for specific instructions and warnings.

1. Power off and unplug the computer.

Caution To protect yourself and the hardware from electrical hazards, the computer *must* remain unplugged until the installation is complete.

2. Remove the computer cover to expose the expansion slots.

Caution Installing a PCIe device into any non-PCIe slot can damage both the computer motherboard and the device. If you are unsure of the difference between connector types, do not install the device. Refer to the documentation provided by your computer manufacturer to determine the correct slot in which to install the device.

3. Touch a metal part of the computer to discharge any static electricity that might be on your clothes or body. Static electricity can damage the device.
4. Choose an unused x4 or larger PCIe slot. The 8242 can also be installed in a x1 PCIe slot if the slot supports 25 W cards. Remove the corresponding expansion slot cover on the back panel of the computer.

Caution Do *not* install the 8242 in a PCIe slot that does not supply at least 25 W of power.

5. Remove the device from the antistatic package and gently rock the device into the PCIe slot. The connection may be tight, but do *not* force the device into place.

Note Check that the bracket of your device aligns with the hole in the back panel rail of the computer chassis.

6. Secure the device mounting bracket to the back panel rail of the computer.
7. Replace the computer cover.
8. Connect a USB 3.0 cable to a USB3 Vision camera, then connect the other end of the cable to a USB port on the NI 8242.

9. Plug in and power on the computer.

Note The first time you start the development computer after installing the hardware, allow several seconds for the drivers to load.

The NI 8242 is now installed and the camera is now connected.

Confirming the Device is Recognized

To confirm that the device is properly installed and the hardware is recognized, complete the following steps:

1. Select **Start»All Programs»National Instruments»NI MAX** to open Measurement & Automation Explorer (MAX).
2. Verify that the camera connected to the NI 8242 appears under **My System»Devices and Interfaces»NI-IMAQdx Devices**.

Configuring the Device in MAX

After you have installed the device and powered on the computer, the computer recognizes the device and assigns resources to it. Use MAX to configure the device for acquisition. For additional information about configuring your device, refer to the *Measurement & Automation Explorer Help for NI-IMAQdx* by opening MAX and selecting **Help»Help Topics»NI Vision» NI-IMAQdx**.

Specifications

The following specifications apply to the NI 8242 interface device. These specifications are typical at 25 °C, unless otherwise stated.

Physical Characteristics

Dimensions ..... 84 mm × 64 mm
(3.31 in. × 2.52 in.)

Weight ..... 45.2 g
(1.59 oz)

Camera Interface ..... 2 USB 3.0 connectors

USB 3.0 Interface

Number of ports 2

Interface ..... USB 3.0

Speed ..... 1.5 Mbps, 12 Mbps, 480 Mbps, 5 Gbps

PCI Express Interface

PCI Express compliance 2.0

Native link width x1

Up-plugging link width availability x4, x8, x16

Power Requirements

PCI Express connector

+12 V ..... 1.2 A

+3.3 V ..... 0.54 A

Operating Environment

Ambient temperature range ..... 0 °C to 45 °C

Operating relative humidity ..... 50% to 85%, noncondensing

Pollution Degree 2

Maximum altitude ..... 2,000 m

Indoor use only.

Storage Environment

Ambient temperature range ..... -40 °C to 70 °C

Relative humidity ..... 50% to 85%, noncondensing

Safety

This product is designed to meet the requirements of the following standards of safety for electrical equipment for measurement, control, and laboratory use:

- IEC 61010-1, EN 61010-1
- UL 61010-1, CSA 61010-1

Note For UL and other safety considerations, refer to the product label, or visit `ni.com/certification`, search by model number or product line, and click the appropriate link in the Certification column.

Electromagnetic Compatibility

This product meets the requirements of the following EMC standards for electrical equipment for measurement, control, and laboratory use:

- EN 61326-1 (IEC 61326-1): Class B emissions; Basic immunity
- EN 55011 (CISPR 11): Group 1, Class B emissions
- EN 55022 (CISPR 22): Class B emissions
- EN 55024 (CISPR 24): Immunity

- AS/NZS CISPR 11: Group 1, Class B emissions
- AS/NZS CISPR 22: Class B emissions
- FCC 47 CFR Part 15B: Class B emissions
- ICES-001: Class B emissions

Note Group 1 equipment (per CISPR 11) is any industrial, scientific, or medical equipment that does not intentionally generate radio frequency energy for the treatment of material or inspection/analysis purposes.

Note For EMC declarations and certifications, and additional information, refer to the *Online Product Certification* section.

CE Compliance CE

This product meets the essential requirements of applicable European Directives, as amended for CE marking, as follows:

- 2004/108/EC; Electromagnetic Compatibility Directive

Online Product Certification

Refer to the Declaration of Conformity (DoC) for these products for any additional regulatory compliance information. To obtain the DoC for these products, visit `ni.com/certification`, search by model number or product line, and click the appropriate link in the Certification column.

Environmental Management

NI is committed to designing and manufacturing products in an environmentally responsible manner. NI recognizes that eliminating certain hazardous substances from our products is beneficial to the environment and to NI customers.

For additional environmental information, refer to the *Minimize Our Environmental Impact* web page at `ni.com/environment`. This page contains the environmental regulations and directives with which NI complies, as well as other environmental information not included in this document.

Waste Electrical and Electronic Equipment (WEEE)

EU Customers At the end of the product life cycle, all products *must* be sent to a WEEE recycling center. For more information about WEEE recycling centers, National Instruments WEEE initiatives, and compliance with WEEE Directive 2002/96/EC on Waste and Electronic Equipment, visit `ni.com/environment/weee`.

电子信息产品污染控制管理办法 （中国 RoHS）



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Worldwide Support and Services

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Visit ni.com/services for NI Factory Installation Services, repairs, extended warranty, and other services.

Visit ni.com/register to register your National Instruments product. Product registration facilitates technical support and ensures that you receive important information updates from NI.

A Declaration of Conformity (DoC) is our claim of compliance with the Council of the European Communities using the manufacturer's declaration of conformity. This system affords the user protection for electromagnetic compatibility (EMC) and product safety. You can obtain the DoC for your product by visiting ni.com/certification. If your product supports calibration, you can obtain the calibration certificate for your product at ni.com/calibration.

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