

NI PCIe-8231 Quick Start Guide

The NI PCIe-8231 is a Gigabit Ethernet (GigE) interface device for PCI Express. The following sections describe how to install and configure the NI PCIe-8231.

What You Need to Get Started

You need the following items to set up and use the NI PCIe-8231.

- NI Vision Acquisition Software 8.2.1 or later
- NI Vision Acquisition Software Release Notes*
- NI PCIe-8231 GigE interface device
- Computer running Windows 2000/XP with at least one PCIe slot
- GigE Vision Camera
- Ethernet cable
- Optional software packages and documentation:
 - NI Vision Development Module
 - NI Vision Builder for Automated Inspection
 - LabVIEW
 - LabWindows™/CVI™
 - Microsoft Visual Basic

Safety Information



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

Do *not* operate the device in a manner not specified in the documentation. Misuse of the device may result in a hazard and may compromise the safety protection built into the device. If the device is damaged, turn it off and do

not use it until service-trained personnel can check its safety. If necessary, return the device to National Instruments for repair.

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 ($>30 V_{\text{rms}}$, $42.4 V_{\text{pk}}$, or $60 V_{\text{dc}}$), 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.

Do *not* operate the device in an explosive atmosphere or where flammable gases or fumes may be present. Operate the device only at or below the pollution degree stated in the specifications. 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.
- Pollution Degree 2—Normally only nonconductive pollution occurs. Occasionally, nonconductive pollution becomes conductive because of condensation.
- Pollution Degree 3—Conductive pollution or dry, nonconductive pollution occurs. Nonconductive pollution becomes conductive because of condensation.

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.

You *must* insulate signal connections for the maximum voltage for which the device is rated. Do *not* exceed the maximum ratings for the device. Remove power from signal lines before connection to or disconnection from the device.



Caution National Instruments measurement products may be classified as either Measurement Category I or II. Operate products at or below the Measurement Category level specified in the hardware specifications.

Measurement Category¹: Measurement circuits are subjected to working voltages² 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 (Installation³) Categories:

- Measurement Category I is for measurements performed on circuits *not* directly connected to the electrical distribution system referred to as MAINS⁴ voltage. This category is for measurements of voltages from specially protected secondary circuits. Such voltage measurements include signal levels, special equipment, limited-energy parts of equipment, circuits powered by regulated low-voltage sources, and electronics.
- Measurement Category II is for measurements performed on circuits directly connected to the electrical distribution system. This category refers to local-level electrical distribution, such as that provided by a standard wall outlet (e.g., 115 V for U.S. or 230 V for Europe). Examples of Measurement Category II are measurements performed on household appliances, portable tools, and similar products.
- Measurement Category III is for measurements performed in the building installation at the distribution level. This category refers to measurements on hard-wired equipment such as equipment 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 (<1,000 V). Examples include electricity meters and measurements on primary overcurrent protection devices and on ripple control units.

¹ Measurement Categories as defined in electrical safety standard IEC 61010-1.

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

³ Measurement Category is also referred to as Installation Category.

⁴ MAINS is defined as the (hazardous live) electrical supply system to which equipment is designed to be connected for the purpose of powering the equipment. Suitably rated measuring circuits may be connected to the MAINS for measuring purposes.

Unpacking

The NI PCIe-8231 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:

- Ground yourself via a grounding strap or by holding a grounded object, such as the computer chassis.
- 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.

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 PCIe-8231 in the antistatic package when not in use.

Installation

The following instructions are for general installation. Refer to the documentation provided by your computer manufacturer for specific instructions and warnings. Refer to the [Specifications](#) section for a list of the typical power requirements for the device.

1. Install the NI-IMAQdx driver software before installing the NI PCIe-8231 device. NI-IMAQdx is located on the NI Vision Acquisition Software CD. Refer to the *NI Vision Acquisition Software Release Notes* for installation and configuration instructions.
2. Power off and unplug the computer.



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

3. Remove the computer cover to expose access to the expansion slots.



Caution Installing a PCIe device into a PCI, PCI-X, AGP or any non-PCIe slot can damage both the computer motherboard and the device. If you are unsure of the differences between the 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 NI PCIe-8231.

4. Touch a metal part of the computer to discharge any static electricity that might be on your clothes or body.
5. Choose an unused PCIe slot, and remove the corresponding expansion slot cover on the back panel of the computer.



Note The NI PCIe-8231 is intended for a x1 PCIe slot. The NI PCIe-8231 will fit into, and can be used in, a x4, x8 or x16 PCIe slot.

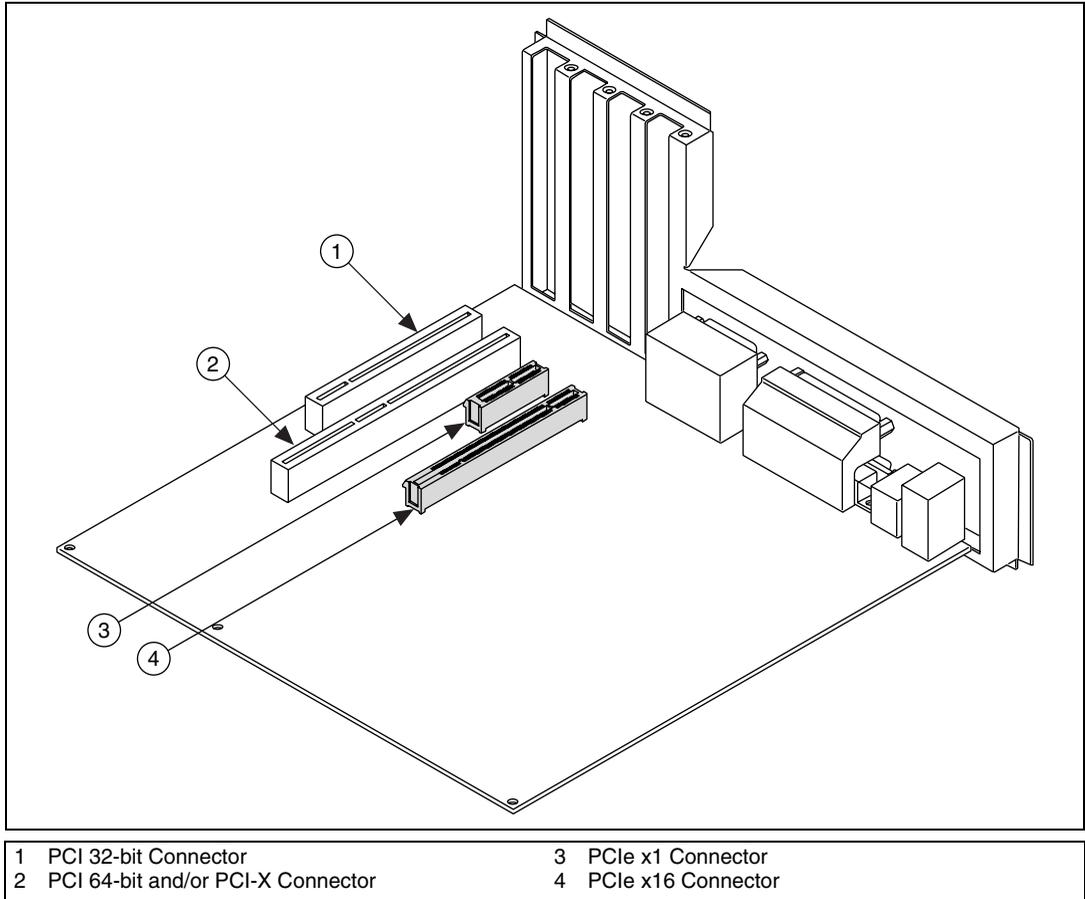


Figure 1. PC Expansion Slots

6. Remove the NI PCIe-8231 from the antistatic package and gently rock the NI PCIe-8231 into the slot. The connection may be tight, but do *not* force the device into place.



Note Check that the bracket of the NI PCIe-8231 lines up with the hole in the back panel rail of the computer chassis.

7. Unless your computer secures expansion devices in a different manner, screw the mounting bracket of the device to the back panel rail of the computer.
8. Replace the cover.
9. Connect the Ethernet cable to your camera. Refer to your camera manufacturer documentation for specific instructions about how to connect the Ethernet cable to your camera.
10. Connect the Ethernet cable to the RJ-45 connector on the NI PCIe-8231 front panel.
11. Plug in and power on the computer.

The NI PCIe-8231 is now installed.

Configuring the NI 8231

After you have installed the NI PCIe-8231 and powered on your computer, Windows will recognize the device and assign resources to it. Use Measurement & Automation Explorer (MAX), the National Instruments configuration utility, to configure a GigE Vision compliant camera connected to the NI PCIe-8231 for acquisition.



Note You must install NI Vision Acquisition Software 8.2.1 or later before configuring your camera in MAX. Refer to the *NI Vision Acquisition Software Release Notes* for more information about how to configure your camera.

Specifications

These specifications are typical at 25 °C, unless otherwise stated.



Caution Misuse of this equipment may impair the protection features included.

Physical Characteristics

Dimensions

PCIe 12.9 cm × 12.0 cm
(5.1 in × 4.725 in.)

Connector

Ethernet.....RJ-45

PCI Express Interface

PCI Express compliance Version 1.1

Native link width..... x1

Up-plugging link width availability x4, x8, x16

Signaling

Ethernet 1000Base-T compliant on four pairs of Category 5 cable

Power Consumption

Typical 1 A at 3.3 V = 3.3 W maximum
375 mA at 3.3 V_{aux} = 1.24 W maximum

Operating Environment

The NI PCIe-8231 device is intended for indoor use only.

Ambient temperature range..... 0 °C to 55 °C

Operating relative humidity 85%, noncondensing

Pollution Degree 2

Altitude..... 2,000 m (at 25 °C ambient temperature)



Caution Do *not* use the NI PCIe-8231 for connection to signals within Measurement Categories II, III, or IV.

Storage Environment

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

Relative humidity 50% to 85%, noncondensing

Safety

The NI PCIe-8231 is designed to meet the requirements of the following standards of safety:

- IEC 60950-1, EN 60950-01
- UL 60950-1, CSA 60950-1

Electromagnetic Compatibility

The NI PCIe-8231 is designed to meet the requirements of the following EMC Standards:

- FCC Part 15—Radiated and Conducted Emissions (USA)
- ICES -003—Radiated and Conducted Emissions (Canada)
- CISPR 22—Radiated and Conducted Emissions (International)
- EN55022—Radiated and Conducted Emissions (European Union)
- EN55024—(Immunity) (European Union)
- VCCI—Radiated and Conducted Emissions (Japan)
- CNS13438—Radiated and Conducted Emissions (Taiwan)
- AS/NZS3548—Radiated and Conducted Emissions (Australia/New Zealand)
- MIC notice 1997-41, EMI and MIC notice 1997-42—EMS (Korea)

CE Compliance

The NI PCIe-8231 meets the essential requirements of applicable European Directives, as amended for CE marking, as follows:

- 73/23/EEC; Low-Voltage Directive (safety)
- 89/336/EEC; Electromagnetic Compatibility Directive (EMC)

FCC Class B User Information

This equipment has been tested and found to comply with the limits for the class B digital device pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. The equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to television or radio reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following means:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.



Caution If the device is changed or modified, the user may void his or her authority to operate the equipment.



Note This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.



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

Waste Electrical and Electronic Equipment (WEEE)



EU Customers At the end of their life cycle, all products *must* be sent to a WEEE recycling center. For more information about WEEE recycling centers and National Instruments WEEE initiatives, visit ni.com/environment/weee.htm.

Where to Go for Support

The National Instruments Web site is your complete resource for technical support. At ni.com/support you have access to everything from troubleshooting and application development self-help resources to email and phone assistance from NI Application Engineers.

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 electronic 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.

National Instruments corporate headquarters is located at 11500 North Mopac Expressway, Austin, Texas, 78759-3504. National Instruments also has offices located around the world to help address your support needs. For telephone support in the United States, create your service request at ni.com/support and follow the calling instructions or dial 512 795 8248. For telephone support outside the United States, contact your local branch office:

Australia 1800 300 800, Austria 43 0 662 45 79 90 0,
Belgium 32 0 2 757 00 20, Brazil 55 11 3262 3599,
Canada 800 433 3488, China 86 21 6555 7838,
Czech Republic 420 224 235 774, Denmark 45 45 76 26 00,
Finland 385 0 9 725 725 11, France 33 0 1 48 14 24 24,
Germany 49 0 89 741 31 30, India 91 80 41190000,
Israel 972 0 3 6393737, Italy 39 02 413091, Japan 81 3 5472 2970,
Korea 82 02 3451 3400, Lebanon 961 0 1 33 28 28,
Malaysia 1800 887710, Mexico 01 800 010 0793,
Netherlands 31 0 348 433 466, New Zealand 0800 553 322,
Norway 47 0 66 90 76 60, Poland 48 22 3390150,
Portugal 351 210 311 210, Russia 7 495 783 68 51,
Singapore 1800 226 5886, Slovenia 386 3 425 42 00,
South Africa 27 0 11 805 8197, Spain 34 91 640 0085,
Sweden 46 0 8 587 895 00, Switzerland 41 56 200 51 51,
Taiwan 886 02 2377 2222, Thailand 662 278 6777,
United Kingdom 44 0 1635 523545

National Instruments, NI, ni.com, and LabVIEW are trademarks of National Instruments Corporation. Refer to the *Terms of Use* section on ni.com/legal for more information about National Instruments trademarks. Other product and company names mentioned herein are trademarks or trade names of their respective companies. For patents covering National Instruments products, refer to the appropriate location: **Help»Patents** in your software, the `patents.txt` file on your CD, or ni.com/patents.