

Camera Link Image Acquisition

NI PCI-1426, NI 1428, NI PCIe-1427, NI PCIe-1429, NI PCIe-1430 **NEW!**

- High-resolution and high-speed image acquisition for base, medium, and full-configuration Camera Link cameras
- Onboard programmable region of interest
- Pixel decimation and image scaling
- Digital I/O lines for triggering and communication
- RTSI or PXI trigger bus synchronization with data acquisition, motion, and CAN

Operating Systems

- Windows 2000/XP
- LabVIEW Real-Time

Recommended Software

- LabVIEW
- Vision Development Module
- Vision Builder for Automated Inspection

Other Compatible Software

- LabWindows/CVI
- Visual Basic
- C/C++

Driver Software (included)

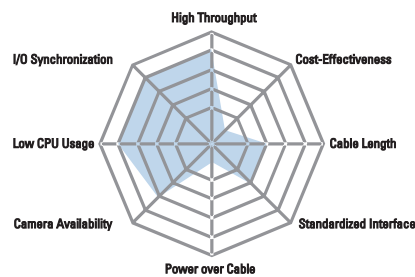
- Vision Acquisition software



Features	NI PCI-1426	NI PCIe-1427	NI 1428	NI PCIe-1429	NI PCIe-1430
Camera Link configuration	Base	Base	Base and medium	Base, medium, and full	Base
Video inputs	1	1	1	1	2
Pixel clock range	20 to 50 MHz	20 to 85 MHz	20 to 50 MHz	20 to 85 MHz	20 to 85 MHz
Onboard memory	16 or 32 MB	Not necessary	16 MB	Not necessary	Not necessary
Interface	PCI	PCI Express	PCI or PXI	PCI Express	PCI Express
Digital I/O	4 ISO/TTL	16 ISO/TTL ¹	4 TTL	16 ISO/TTL ¹	16 ISO/TTL ¹
Quadrature encoder compatible	✓	✓	–	✓ ¹	✓ ¹

¹When used with the NI Camera Link I/O Extension Board

Camera Link



Camera Link comes in three configurations – base, medium, and full. The base configuration uses three 8-bit taps (input channels) to acquire up to 24 bits of data at a rate of 255 MB/s. The medium configuration uses six 8-bit taps to acquire up to 48 bits of data at a rate of 510 MB/s. The full configuration uses eight 8-bit taps to acquire up to 64 bits of data at a rate of 680 MB/s.

Serial Interface

Use the serial interface on the Camera Link connector to easily configure and control the camera with Vision Acquisition and Measurement & Automation Explorer software. For precise camera control, NI Camera Link image acquisition devices include a National Instruments counter/timer ASIC that generates real-time control signals.

Camera Compatibility

NI Camera Link image acquisition devices can work with any base, medium, or full-configuration Camera Link camera. Visit ni.com/camera for a current list of compatible cameras.

Video I/O Connector

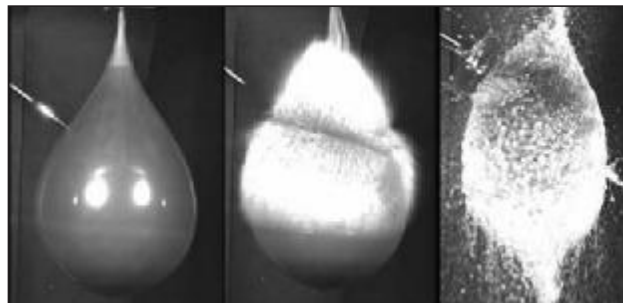
NI Camera Link image acquisition devices feature a standard 26-pin connector compatible with all Camera Link video inputs, camera control outputs, and the serial interface.

Overview

With NI Camera Link image acquisition devices, you can acquire images from any Camera Link camera at even the highest speeds, resolutions, and bit depths available.

Camera Link

Camera Link is an industrial high-speed serial data and cabling standard developed by National Instruments, camera vendors, and other image acquisition companies. Created for easy connectivity between the PC and the camera, Camera Link provides simple, flexible cabling for high-speed, high-resolution digital cameras. A Camera Link cable is a slender 26-pin cable with 24-bit data, clock, and enables, as well as control signals. You can control camera functionality by asynchronous serial control or LVDS differential lines through a Camera Link cable.



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Digital I/O and Camera Power Connections

The PCI-1426 and NI PCIe-1427 feature both isolated and TTL logic level on one simple 15-pin D-Sub connector. The 68-pin connector on NI 1428 devices connects to the external trigger signals using the IMAQ-D6804 cable.

The NI PCIe-1427, NI PCIe-1429, and NI PCIe-1430 boards feature at least one trigger connector for quick trigger connectivity. To provide camera power or to add more digital I/O to the NI PCIe-14xx boards, use the NI Camera Link I/O Extension Board. It is installed in an adjacent PCI computer slot and connects by a ribbon cable directly to the NI PCIe-14xx board. With this accessory board, you can connect up to 14 additional digital I/O lines plus encoder inputs. The board also furnishes 12 V power, commonly needed on Camera Link cameras.

About PCI Express

PCI Express is a high-performance, point-to-point serial interconnect that improves PCI by providing scalable bus bandwidth. PCI Express features a layered model that offers backward compatibility with existing PCI applications on Windows. PCI Express is currently not compatible with LabVIEW Real-Time.

For PC-based machine vision systems, PCI has been the bus of choice for plug-in image acquisition boards for many years. However, as the PC has evolved, the PCI bus (with its parallel architecture) has not scaled linearly with the rest of the platform. PCI Express answers these issues and provides benefits across five main areas:

- **High Performance** – The x1 PCI Express bandwidth is more than double that of PCI and grows linearly as more lanes are added. An additional benefit that is not immediately evident is that this bandwidth is simultaneously available in both directions on each link. In addition, the initial signaling speed of 2.5 Gb/s is expected to increase, yielding further speed improvements.
- **I/O Simplification** – PCI Express is taking the place of both chip-to-chip and internal user accessible buses, such as AGP, PCI-X, and HubLink. This feature reduces the complexity of design and cost of implementation.
- **Layered Architecture** – PCI Express establishes an architecture that can adapt to new technologies, while preserving software investment. Two key areas that benefit from the layered architectures are the physical layer, with increased signaling rates, and software compatibility.
- **Next-Generation I/O** – PCI Express provides new capabilities for data acquisition and multimedia through isochronous data transfers. Isochronous transfers provide a type of quality of services (QOS) guarantee that ensures on-time data delivery through deterministic, time-dependent methods.

All of these features will ensure that PCI Express evolves into an increasingly attractive platform for the next generation of PC-based vision systems.

Specifications

Typical at 25 °C, unless otherwise stated.

External Connections

Trigger sense	TTL (TTL and isolated on PCI-1426 and NI PCIe-1427 or with the NI Camera Link I/O Extension Board)
Trigger polarity	Programmable (active-high or active-low)
Pixel clock	Camera Link-compatible
Enables	Camera Link-compatible
Control signal	Camera Link-compatible
Video data	Camera Link-compatible

Performance

PCI-1426, PCI-1428, PXI-1428	100 MB/s
NI PCIe-1427	200 MB/s
NI PCIe-1429, NI PCIe-1430	680 MB/s

Power Requirements

Product	3.3 VDC	5 VDC	+12 VDC	-12 VDC
PCI-1426	–	1.5 A	24 mA	20 mA
NI PCIe-1427	–	1.5 A	250 mA	–
PCI-1428	–	1.5 A	24 mA	20 mA
PXI-1428	1.2 A	250 mA	–	–
NI PCIe-1429	–	–	1.25 A	–
NI PCIe-1430	–	–	1.25 A	–

Physical

Dimensions	
PCI	10.7 by 17.5 cm (4.2 by 6.9 in.)
PXI	10 by 16 cm (3.9 by 6.3 in.)
PCI Express	10.7 by 17.5 cm (4.2 by 6.9 in.)

Environment

Operating temperature.....	0 to 55 °C 0 to 40 °C (NI PCIe-1429, NI PCIe-1430)
Storage temperature	-20 to 70 °C
Relative humidity	5 to 90%, noncondensing
MTBF	544,562 h at 25 °C
Emissions.....	EN 55011 Class A at 10 m FCC Part 15A above 1 GHz

Ordering Information

NI PCI-1426	779210-01
NI PCI-1428	778315-01
NI PXI-1428	778775-01
NI PCIe-1427	779706-01
NI PCIe-1429	779191-01
NI PCIe-1430	779479-01

Includes Vision Acquisition software.

Accessories

Camera Link I/O Extension Board	779352-01
Camera Link cable (2 m)	187676-02
IMAQ-D6804 cable.....	187804-01

BUY NOW!

For complete product specifications, pricing, and accessory information, call 866 265 9891 (U.S. only) or go to ni.com/vision.