

Rugged Real-Time Compact Vision System

NI CVS-1454, NI CVS 1455

- Rugged system for real-time FireWire image acquisition, analysis, and storage
- 3 FireWire camera inputs
- High-performance processor ensures fast inspection times
- Operating temperature of 0 to 55 °C
- Ethernet and RS-232 ports
- Control triggers, cameras, lighting, and PLCs with 15 digital inputs and 14 digital outputs
- 128 MB onboard DRAM memory (typically 85 MB accessible by user)
- 32 MB nonvolatile storage (typically 20 MB accessible by user)
- VGA output for real-time display of results
- Extended analog I/O, digital I/O, and motion control with NI Compact FieldPoint and PXI

Recommended Software

- Vision Builder for Automated Inspection, or
- LabVIEW
- LabVIEW Real-Time Module
- LabVIEW Vision Development Module
- OCR Software

NEW



Overview

The National Instruments CVS-1450 series of Compact Vision systems gives you the flexibility, integration, and ruggedness for all of your inspection, alignment, gauging, and identification applications. A high-performance processor integrated with three FireWire ports means that NI CVS-1450 systems are equipped to handle any inspection task. A diverse range of digital I/O options means that CVS-1450 systems can communicate with a wide range of automation devices including PLCs, relays, and robotics. CVS-1450 systems are designed for extreme operating temperatures common in manufacturing environments. No longer are you confined to the limited image processing capability, sensor size, and sensor speed of traditional smart cameras.

	NI CVS 1454	NI CVS 1455	Typical Smart Camer
Configurable software	Vision Builder for Automated Inspection	Vision Builder for Automated Inspected	Available
Programmable software	LabVIEW Real-Time	LabVIEW Real-Time	Not available
Typical processor performance	833 MIPS*	1436 MIPS*	60-360 MIPS*
Digital I/O	29 DIO	29 DIO	2-20 DIO
Cameras	Up to 3	Up to 3	1
Resolution	Up to 1300 x 1030	Up to 1300 x 1030	640 x 480
Frame rate	2000 x 2000	2000 x 2000	30 fps
Non-volatile storage	32 MB	128 MB	4-16 MB
Base price	\$2,995	\$3,995	\$3,295

*MIPS: Millions instructions per second

Table 1. Use the NI 1450 Series in a wide range of applications.

Choose your Compact Vision System

There are two products in the NI CVS 1450 series. The NI CVS 1455 provides high performance image processing and analysis along with ample storage for images and data. If you need color processing or want to inspect from multiple cameras, choose the NI CVS 1455. The NI CVS 1454 is ideally suited for applications that require a few simple inspections from a single camera. Both Compact Vision Systems have 29 digital I/O lines to communicate with a variety of automation devices.

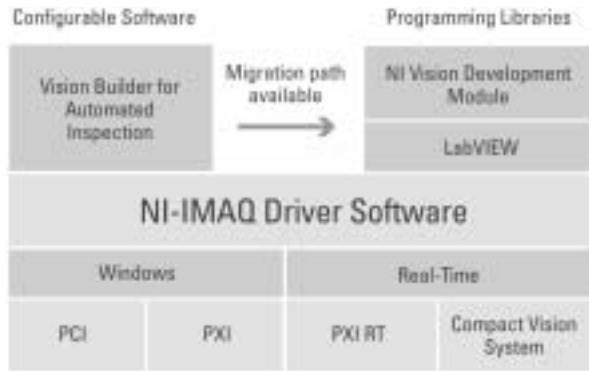


Figure 1. Choose your software from an easy to use configurable environment or a flexible and powerful programming environment. Migrate your configured inspection to LabVIEW with NI Vision Builder for Automated Inspection LabVIEW code generation.

Software for Fast Development or Performance – You Choose

With the National Instruments machine vision software approach, you no longer need to make a trade-off between the power and flexibility of a programming language such as LabVIEW and the ease of use of a menu-driven environment such as Vision Builder for Automated Inspection. Vision Builder for Automated Inspection simplifies the development process by replacing programming complexity with an interactive development environment. Vision Builder for Automated Inspection is designed to solve gauging, part present/not present, alignment, and optical character recognition applications. Overall, if you need the power and flexibility of a full application development environment, you should use LabVIEW. With LabVIEW, you develop your own custom image processing algorithms, optimize your image processing application for speed,

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optimize memory usage, develop a custom user interface, and extend the I/O capabilities to PXI and Compact FieldPoint. To bridge from a configuration environment for fast development to an easy-to-use programming environment such as LabVIEW, Vision Builder for Automated Inspection generates LabVIEW code so that you can customize and optimize your inspection algorithms to meet the requirements of the most complex applications.

Vision Builder for Automated Inspection

NI Vision Builder for Automated Inspection is configurable machine vision software with which you can prototype, benchmark, and deploy applications. Vision Builder for Automated Inspection does not require programming yet is scalable to powerful programming environments such as LabVIEW. A built-in deployment interface is included so you can quickly deploy your inspection, guidance, and identification applications. It also includes the ability to set up complex pass/fail decisions to control digital I/O devices and to communicate with serial devices such as PLCs.

LabVIEW

National Instruments LabVIEW, the LabVIEW Real-Time Module, and a CVS-1450 series system with cameras and accessories deliver deterministic, real-time inspection. Using LabVIEW graphical programming, you develop your LabVIEW Real-Time applications on a desktop machine, and then download the program to run on a CVS-1450 series system compact vision system with a real-time operating system. Thus, you can use all the powerful development tools of LabVIEW to develop real-time, reliable solutions.

The NI Vision Development Module is for scientists, engineers, and technicians who are developing LabVIEW machine vision and scientific imaging applications. It includes IMAQ Vision, a library of powerful functions for vision processing, and Vision Assistant, an interactive environment for developers who need to quickly prototype and test LabVIEW machine vision applications.

Multicamera Inspection

The CVS-1450 series provides a low-cost way to inspect from multiple angles. With three FireWire ports, you can directly connect three cameras to the compact vision system with ease. Each camera shares a portion of the 400 Mb/s bandwidth.

Automotive	Inspect part presence, measure distances
Electronics	Verify component placement, inspect displays, verify patterns
Pharmaceutical	Read lot codes, inspect packaging, match colors
Semiconductor	Read wafer codes, guide motion control, align wafers to probers
Consumer products	Inspect labels, packaging, packaging text
Packaging	Read text, ensure proper placement of labels, identify components

Table 2. Use the NI 1450 Series in a wide range of applications

Choice of Sensor

By using FireWire image acquisition, the CVS-1450 series gives you the option of choosing the sensor that is right for your application. You can choose a low-cost, low-resolution sensor or a high-performance sensor. In addition, as new improved industrial FireWire cameras enter the marketplace, CVS-1450 series systems are ready for them.

External Device Control

The CVS-1450 series has 29 digital I/O lines with built-in functionality for communicating with external devices, such as reading quadrature encoder inputs, generating strobe pulses, and writing to or reading from digital lines. Using these signals, you can dynamically control your lighting or cameras, synchronize with a conveyor belt, or communicate with relays that control solenoids and other actuators.

The CVS-1450 series has 15 digital input lines – 13 isolated 24 V lines and two dedicated TTL lines. There are 14 digital output lines – four isolated 24 V and 10 dedicated TTL.

In addition, CVS-1450 series systems can send commands and data to other devices, such as PLCs, via Ethernet and RS-232 Serial. Connect the system to any network to monitor the inspection. Send images over the network for viewing or store them in a database for future reference. In addition you can use NI VI Server technology to publish your data and results in real time to a Web browser.

Real-Time Display

Using the VGA output, you can see the product under inspection in real time, as well as pass/fail and inspection data. All of the overlays are user definable; with LabVIEW you can change the overlays programmatically and create custom user displays.

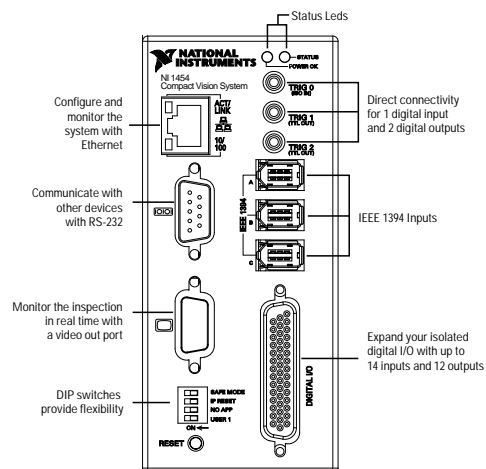


Figure 2. Connect to all types of sensors and devices with the many and varied connectivity options.

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Connect to Compact FieldPoint

CVS-1450 series systems connect easily to Compact FieldPoint, the National Instruments real-time modular industrial control and measurement system. If you need analog signals, specialized digital inputs, or other types of distributed control to interface to your CVS-1450 series system, you can connect them easily. You can use either RS-232 or NI DataSocket technology to communicate with individual channels on Compact FieldPoint modules. Use this data for decision making on the CVS-1450 series or show the data on the real-time display.

Rugged, Reliable Design

Run your application with confidence. The CVS-1450 series uses the powerful, award-winning LabVIEW Real-Time engine, a reliable and embedded programming environment. Time-bounded algorithms ensure that you can meet the deterministic demands of your system; configure your inspections to occur in a defined amount of time.

The CVS-1450 series system was designed with harsh industrial environments in mind. The temperature range of 0 to 55 °C ensures that uptime is kept at a maximum. No fans, vents, or moving parts ensures the Compact Vision system to be a reliable addition to your industrial inspection robotics, packaging, or assembly applications. CVS-1450 series systems are ready for panel and DIN rail mounting.

Ordering Information

Step 1. Select your compact vision system.

NI CVS-1454	778638-01
NI CVS-1555	778638-01

Step 2. Select your camera.

640x480, 60 fps FireWire camera	778785-01
1024x768, 15 fps FireWire camera	778849-01
FireWire cable 2.0 m	185797-02

Step 3. Select your software.

Configuration	
NI Vision Builder for Automated Inspection	778649-01
Programming	
NI LabVIEW	776671-03
NI LabVIEW Real-Time Module	777844-03
NI LabVIEW Vision Development Module	777859-03
NI OCR	778670-01

Step 4. Select your power options.

24 VDC, 50 W power supply	778794-01
Power cord, US 120 VAC/Japan 100VAC	763000-01

Power cord, UK 240 VAC	763064-01
Power cord, Swiss 220 VAC	763065-01
Power cord, Australian 240 VAC	763066-01
Power cord, Universal Euro	763067-01
Power cord, North America 240 VAC	763068-01

Step 5. Select your accessories.

12 mm machine vision lens	778789-01
Advanced Illumination LED ring light	778787-01
DIN-rail mount kit	189154-01
Digital I/O breakout box and cable	
Horizontal mount	778790-01
Vertical mount	778791-01
SMB trigger cable	763422-01

Specifications

Hardware

DRAM Memory	128 MB
Nonvolatile Storage	32 MB, 128 MB (NI CVS 1455)
Serial Port	RS-232
Video Out	VGA

Network

Interface	10BaseT and 100BaseTX Ethernet
Compatibility	IEEE 802.3
Maximum distance is 100 m per Ethernet segment	

Digital I/O

Digital input (15)	13 isolated 24 V, 2 dedicated TTL
Digital output (14)	4 isolated 24 V, 10 dedicated TTL

Power Requirement

Main Supply voltage	24 VDC ±10%
Power (excluding camera)	12 W, typical
	22 W, maximum
1394 bus power	18 W, maximum
Isolated supply	5 to 30 VDC

Environment

This product has been tested in accordance with IEC-60068-2-1, IEC-60068-2-2, IEC-60068-2-56	
Operating Temperature	0 to 55 °C
Storage Temperature	-20 to 70 °C
Relative Humidity	10 to 90%, 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.

- EN 61010-1
- IEC 61010-1
- UL 3101-1
- UL 3111-1
- UL 3121
- CAN/CSA c22.2 No. 1010.1

Note: For UL or other safety certifications, refer to the product label or go to ni.com

Electromagnetic Compatibility

Emissions	EN 55011, Class A @ 10 m, FCC Part 15a above 1 GHz
Immunity	EN 61326 and FCC Part 15 (Class A) Compliant

Physical Compatibility

Dimensions	10.2 by 12.7 by 6.4 cm (4 by 5 by 2.5 in.)
Weight	977 g (2.15 lbs.)