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Find the *National Instruments CVS-1456* at our website: ***Click HERE***

Rugged Real-Time Compact Vision Systems

NI CVS-1454, NI CVS-1455, NI CVS-1456

- Real-time FireWire image acquisition, analysis, and storage
- 3 FireWire camera inputs
- High-performance processor ensures fast inspection times
- 0 to 55 °C operating temperature
- Ethernet and RS232 ports
- Control triggers, cameras, lighting, and PLCs with 15 digital inputs and 14 digital outputs
- 128 MB onboard DRAM memory
- 32 to 256 MB nonvolatile storage
- 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
- LabVIEW
- LabVIEW Real-Time Module
- LabVIEW Vision Development Module
- OCR Software



Overview

National Instruments CVS-145x compact vision systems give you 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-145x systems are equipped to handle any inspection task. A diverse range of digital I/O options means that CVS-145x systems can communicate with a wide range of automation devices including PLCs, relays, and robotics. CVS-145x 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	NI CVS-1456	Typical Smart Camera
Configurable software	Vision Builder for Automated Inspection			Available
Programmable software	LabVIEW and the Vision Development Module			Not available
Typical processor performance	833 MIPS*	1436 MIPS*	1623 MIPS*	60-360 MIPS*
Digital I/O lines	29	29	29	2 to 20
Cameras	Up to 3	Up to 3	Up to 3	1
Resolution	Up to 2000 x 2000	Up to 2000 x 2000	Up to 2000 x 2000	640 x 480
Frame rate	Up to 100 fps	Up to 100 fps	Up to 100 fps	30 fps
Nonvolatile storage	32 MB	128 MB	256 MB	4-16 MB
Base price	$2,995	$3,995	$4,495	$3,295

*MIPS: Millions instructions per second

Table 1. Use CVS-145x systems in a wide range of applications.

Choose Your Compact Vision System

There are three CVS-145x products. The CVS-1456 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 CVS-1455. The CVS-1454 is ideally suited for applications that require a few simple inspections from a single camera. All compact vision systems have 29 digital I/O lines to communicate with a variety of automation devices.

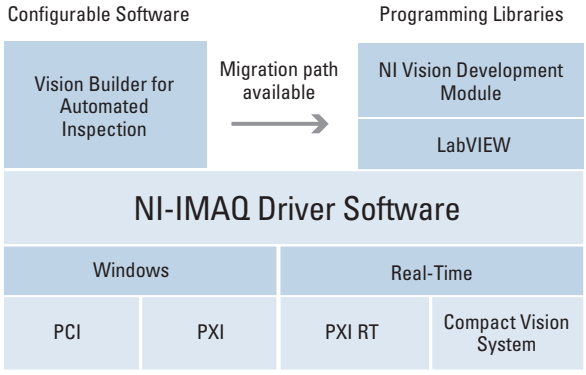


Figure 1. Choose your software from an easy to use configurable environment or a flexible and powerful programming environment. Migrate your configured inspection to LabVIEW with NI Vision Builder for Automated Inspection LabVIEW code generation.

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, which 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

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Rugged Real-Time Compact Vision Systems

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, 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 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-145x 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-145x system with a real-time OS. 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

A CVS-145x system 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 NI 145x systems in a wide range of applications.

Choice of Sensor

By using FireWire image acquisition, CVS-145x systems give 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-145x systems are ready for them.

External Device Control

CVS-145x systems have 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.

CVS-145x systems have 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-145x systems can send commands and data to other devices, such as PLCs, via Ethernet and RS232 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.

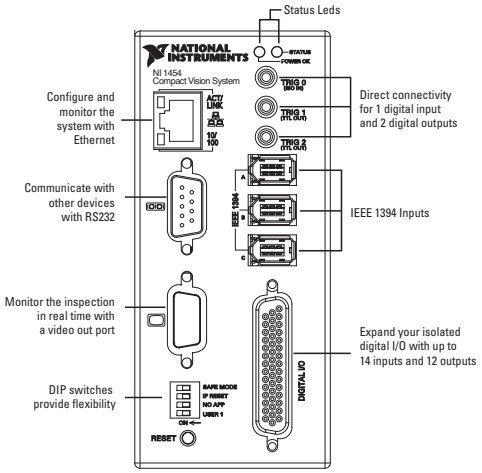


Figure 2. Connect to all types of sensors and devices with varied connectivity options.

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Rugged Real-Time Compact Vision Systems

Connect to Compact FieldPoint

CVS-145x 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-145x system, you can connect them easily. You can use either RS232 or NI DataSocket technology to communicate with individual channels on Compact FieldPoint modules. Use this data for decision making on a CVS-145x system or show the data on the real-time display.

Rugged, Reliable Design

Run your application with confidence. CVS-145x systems use 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.

CVS-145x systems were designed with harsh industrial environments in mind. The temperature range of 0 to 55 °C ensures that uptime is kept at a maximum. The absence of 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-145x 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-1455 778638-01
NI CVS-1456 778986-01

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 Software 778670-01

Step 4. Select your power options.

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

BUY ONLINE!

*Visit **ni.com/info** and enter **cvs1454.***

Specifications

Hardware

DRAM memory	128 MB
Nonvolatile Storage	
CVS-1454	32 MB
CVS-1455	128 MB
CVS-1456	256 MB
Serial port	RS232
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 Requirements

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 lb)

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NI Vision Accessories for the NI Compact Vision System and NI PCI-8254R



Software – Configure or Program

Vision Builder for Automated Inspection

National Instruments Vision Builder for Automated Inspection (AI) is a configurable machine vision development environment that requires no programming. With the NI Vision Builder AI, you can:

- Build, benchmark, and deploy complete machine vision applications without programming
- Configure more than 40 powerful machine vision tools including geometric matching, OCR, and particle analysis
- Acquire and process images with any NI frame grabber, more than 300 IEEE 1394 cameras, or the NI Compact Vision System
- Communicate triggering and inspection results directly to NI M Series DAQ devices or to industrial devices over serial and Ethernet protocols



LabVIEW Real-Time Vision Development Kit

The National Instruments LabVIEW Real-Time Vision Development Kit includes all the software you need to program a real-time machine vision application with LabVIEW. You must purchase LabVIEW separately. The kit includes:

- LabVIEW Real-Time Module
- LabVIEW Application Builder
- NI Vision Development Module

The NI Vision Development Module is a library of image processing and machine vision functions. The NI Vision Development Module includes Vision Assistant, an interactive prototyping environment that generates ready-to-run code. The NI Vision Development Module delivers:

- Hundreds of image processing functions including pattern and geometric matching, OCR, bar code readers, object classification, and particle analysis
- Tools to enhance images, check for presence, locate features, identify objects, and gauge parts
- Fast application prototyping and code generation with Vision Assistant
- Subpixel accuracy down to 1/10 of a pixel and 1/10 of a degree

Cameras and Camera Accessories

NI Vision is compatible with any DCAM-compliant IEEE 1394 (FireWire) camera. To find a FireWire that fits your application, visit the Camera Advisor at **ni.com/camera**. To simplify purchases, National Instruments provides a few FireWire cameras that address many applications.





High-Speed Camera

Basler A601F, IEEE 1394, 640x480, 60 FPS 778785-01
Trigger cable for Basler 600 series cameras 190264-01



High-Resolution Camera

Sony XCD-X710, IEEE 1394, 1024x768, 30 FPS 778849-01
Trigger cable for Sony XCD-Xxxx series cameras 763422-01

Additional Camera Cables

IEEE 1394 (FireWire) cable 2.0 m 185797-01
IEEE 1394 (FireWire) cable with jackscrews 778796-01
Trigger cable for Prosilica cameras 763422-01

Lens

12 mm Tamron, C-mount.....778789-01



Digital I/O Accessories

Terminal block you can use to prototype and troubleshoot digital I/O for the Compact Vision System and the NI PCI-8254R image acquisition board. A demo mode can simulate triggers, encoder inputs, and product selection lines. Outputs are displayed with LEDs.

SMB Trigger Cable (CVS only).....763422-01
Cable with female SMB connectors at both ends that you can use to trigger certain Prosilica cameras.

SMB to BNC Trigger Cable (CVS only).....763422-01
Cable with female SMB connector at one end and a BNC at the other that you can use to trigger certain Sony cameras.

Terminal Block and Prototyping Accessory 779166-01

Terminal Block – Vertical 778791-01
Terminal Block – Horizontal.....778790-01

Lighting

Advanced Illumination LED Ring Light 778787-01
Ring light comes with power supply and mounting bracket. Other lights are available from Advanced Illumination (**www.advill.com**) and CCS America (**www.ccs.com**).

Compact Vision System Mounting

Panel and DIN-Rail Mount Kit.....189154-01

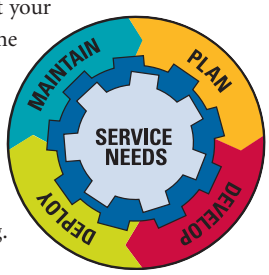
Power Supply

NI 1450 Power Supply, 24 V, 50 W 778794-01
Includes Compact Vision System power connector that you can use to power the isolated input of the PCI-8254R.

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We also offer service programs that provide automatic upgrades to your application development environment and higher levels of technical support. Visit ni.com/ssp.

Hardware Services

NI Factory Installation Services

NI Factory Installation Services (FIS) is the fastest and easiest way to use your PXI or PXI/SCXI™ combination systems right out of the box. Trained NI technicians install the software and hardware and configure the system to your specifications. NI extends the standard warranty by one year on hardware components (controllers, chassis, modules) purchased with FIS. To use FIS, simply configure your system online with ni.com/pxiadvisor.

Calibration Services

NI recognizes the need to maintain properly calibrated devices for high-accuracy measurements. We provide manual calibration procedures, services to recalibrate your products, and automated calibration software specifically designed for use by metrology laboratories. Visit ni.com/calibration.

Repair and Extended Warranty

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