

# RELEASE NOTES

## NI Vision Acquisition Software

This document describes how to install and configure NI Vision Acquisition Software. NI Vision Acquisition Software allows you to acquire, display, and save images; control the digital I/O on IEEE 1394 hardware; and configure your drivers and hardware. NI Vision Acquisition Software includes the following features:

- **NI-IMAQ 3.7.1**—The latest generation driver in the NI Vision product line. Using NI-IMAQ, you can program your image acquisition device to acquire, display, and save images.
- **NI-IMAQdx 3.0.1**—The National Instruments driver software for IEEE 1394 and GigE Vision cameras. NI-IMAQdx gives you the ability to use IEEE 1394 and GigE Vision industrial digital video cameras to acquire images.
- **NI-IMAQ I/O 2.0.2**—The National Instruments I/O device driver software for controlling the digital I/O on IEEE 1394 hardware.
- **NI Measurement & Automation Explorer (MAX) 4.2**—The National Instruments graphical configuration utility you can use to configure NI software and hardware, execute system diagnostics, add new channels and interfaces, and view the devices you have connected to your computer.

The `readme.rtf` file for each NI Vision Acquisition Software driver is installed to the following default locations, where `<NI>` is the location to which National Instruments software is installed.

- **NI-IMAQ**—`<NI>\NI-IMAQ\Docs\readme.rtf`
- **NI-IMAQdx**—`<NI>\NI-IMAQdx\Docs\readme.rtf`
- **NI-IMAQ I/O**—`<NI>\NI-IMAQ IO\Docs\readme.rtf`

Refer to the `readme.rtf` files for late-breaking information and known issues.

## New Features

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This release of Vision Acquisition Software includes the following features:

- **NI-IMAQ**
  - Support for Microsoft Windows Vista
  - Digital signing of the driver
  - Firmware update utility for the NI PCIe-1427/1429/1430 to support native 64-bit addressing
- **NI-IMAQdx**
  - Support for Microsoft Windows Vista
  - Digital signing of the driver
  - Support for raw Bayer data acquisition from Bayer sensors
- **NI-IMAQ I/O**
  - Support for Microsoft Windows Vista, 32-bit version only
  - Digital signing of the driver

# Minimum System Requirements

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The development computer must meet the following requirements to run NI Vision Acquisition Software:

- Pentium 4 1 GHz or equivalent processor
- 512 MB RAM
- Free hard disk space
  - NI-IMAQ: 460 MB
  - NI-IMAQdx: 360 MB
  - NI-IMAQ I/O: 850 MB
- 1024 × 768 resolution video adapter and monitor
- Internet Explorer 5.0 or later to view online documentation

## Upgrade Considerations for NI-IMAQ for IEEE 1394 Cameras Customers

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NI-IMAQdx introduces a new, though similar, application programming interface (API) for acquiring images from IEEE 1394 and GigE Vision cameras. National Instruments recommends that you use the NI-IMAQdx API for future applications. The following information is important to those upgrading to NI-IMAQdx from NI-IMAQ for IEEE 1394 Cameras.

## Existing Applications Will Continue to Work

NI-IMAQ for IEEE 1394 Cameras 2.0.5 files will be installed on the target machine. Existing compiled applications will continue to call into this driver and will run exactly as they did in NI-IMAQ for IEEE 1394 Cameras 2.0.5. This is also true for existing applications run from the development environment including National Instruments LabVIEW, LabWindows™/CVI™, Microsoft Visual Basic, and Visual C.

## Modifying Existing Applications

National Instruments recommends that you use the NI-IMAQdx API for future applications. However, you can still modify existing NI-IMAQ for IEEE 1394 Cameras 2.0.5 applications using the legacy NI-IMAQ for IEEE 1394 Cameras API if you are not ready to port your complete application. LabVIEW users can access the legacy VIs from the **Vision and Motion»NI-IMAQdx»Legacy** palette. LabWindows/CVI users can access the legacy functions by loading the `niimaq1394.lib` through the **Library»Customize** menu. MSVC and Visual Basic users can access these libraries the same way you have in the past.

## Driver Selection

Once NI-IMAQdx is installed, most Windows machines will have three drivers capable of recognizing and controlling IEEE 1394 cameras—NI-IMAQdx, NI-IMAQ for IEEE 1394 Legacy driver, and the Windows Generic 1394 Camera driver. Only one of these drivers can be assigned to a camera at any given time. You can choose which driver is installed by right-clicking the item in MAX and selecting the proper driver. The assigned driver must correspond with the API your application is using.

# Porting Existing NI-IMAQ for IEEE 1394 Cameras Applications to NI-IMAQdx

In most cases, there is a one-to-one correlation between an NI-IMAQdx VI or function and NI-IMAQ for IEEE 1394 Cameras VI or function. For example, IMAQ1394Snap.vi has been replaced with IMAQdxSnap.vi and takes similar parameters, as show in Figure 1.

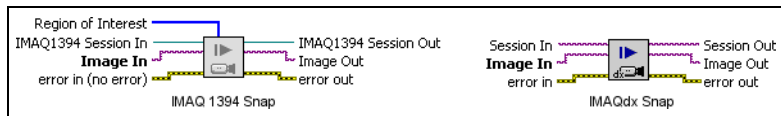


Figure 1. IMAQdxSnap.vi

The way in which you set and get camera attributes differs between drivers. For example, with NI-IMAQ for IEEE 1394 Cameras, you passed in an *enumerated type* that contained the attribute name and a value. With NI-IMAQdx, you pass a *string* with the attribute name and value, as shown in Figure 2.

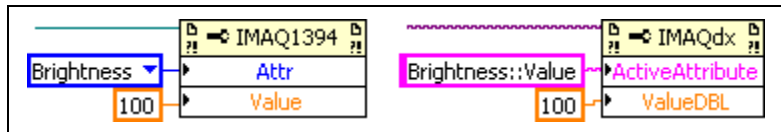


Figure 2. String with attribute name in NI-IMAQdx

Another difference between the two drivers is that NI-IMAQdx now supports the Event Structure in LabVIEW. Rather than using occurrences, as you did with NI-IMAQ for IEEE 1394 Cameras, you can now register the **Frame Done** event to fire in LabVIEW for more readable code, as shown in Figure 3.

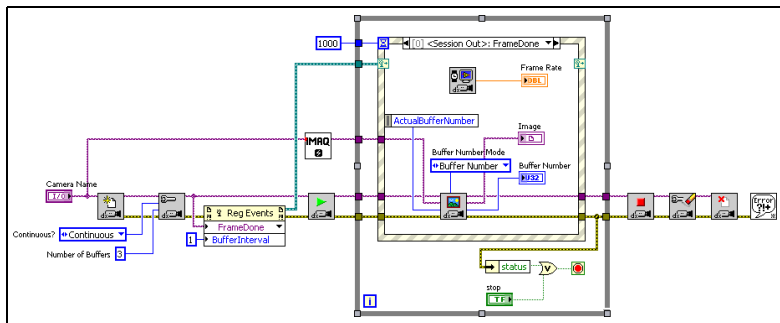


Figure 3. Frame Done event code

## Maintenance and Support Policy

National Instruments recommends that all new applications be developed with NI-IMAQdx. All new features, bug fixes, or other enhancements in the future will be made to the NI-IMAQdx driver and API. NI-IMAQ for IEEE 1394 Cameras is “frozen” to ensure that the behavior of existing applications does not change. National Instruments will continue to include NI-IMAQ for IEEE 1394 Cameras legacy support until at least August 2008. National Instruments Applications Engineers will continue to support the NI-IMAQ for IEEE 1394 Cameras legacy API until December 2008.

# Software Support

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This section describes the operating systems and application development environments (ADEs) supported by NI Vision Acquisition Software.

## Operating Systems

- Microsoft Windows Vista/XP/2000. Refer to Table 1 for more information.

**Table 1.** Device Support for Windows Vista

Device	Windows Vista 32-bit	Windows Vista 64-bit
NI 1405	Yes	Yes*
NI 1407	Yes	Yes*
NI 1408	No	No
NI 1409	Yes	Yes*
NI 1410	Yes	Yes*
NI 1411	Yes	Yes*
NI 1422	Yes	Yes*
NI 1424	Yes	Yes*
NI 1426	Yes	Yes*
NI 1427	Yes	Yes*†
NI 1428	Yes	Yes*

**Table 1.** Device Support for Windows Vista (Continued)

Device	Windows Vista 32-bit	Windows Vista 64-bit
NI 1429	Yes	Yes <sup>*†</sup>
NI 1430	Yes	Yes <sup>*†</sup>
NI 8231	Yes	Yes
NI 8252	Yes	Yes
NI 8254R	Yes	Yes, however, I/O is not currently supported
NI 8255R	Yes	Yes, however, I/O is not currently supported
<p>* Applications developed using LabVIEW 8.2.1 or later will run on systems with more than 3 GB of physical memory. Applications developed using other development environments, such as Microsoft Visual C, Visual Basic, and .Net, are limited to systems with 3 GB or less of physical memory. All 32-bit applications, including those developed using LabVIEW, may not allocate more than 2 GB of memory total.</p> <p>† A firmware update is available for this device to allow non-LabVIEW applications to run on systems with more than 3 GB of physical memory. To update the device firmware, launch MAX and select <b>Tools»NI Vision»Update NI-IMAQ Device Firmware.</b></p>		

- LabVIEW Real-Time Module (LabVIEW RT) 7.1.1 or later



**Note** NI-IMAQdx does *not* support GigE Vision cameras on LabVIEW RT. NI-IMAQdx does support IEEE 1394 cameras on LabVIEW RT.



## Development Environments

- LabVIEW 7.1.1 or later
- LabVIEW Real-Time Module 7.1.1 or later
- LabWindows/CVI 7.1.1 or later
- Microsoft Visual C/C++ 6.0 or later
- Microsoft Visual Basic 6.0 or later
- Microsoft Visual Studio .NET 2003 and later (except NI-IMAQ)

## Additional Software

You can also use NI-IMAQ, NI-IMAQdx, and NI-IMAQ I/O with the following National Instruments software packages to prototype, benchmark, and deploy your applications.

- NI Vision Development Module 7.1 or later
- NI Vision Builder for Automated Inspection (Vision Builder AI) 2.5 or later.



**Note** GigE Vision support requires Vision Builder AI 3.0 or later.

## Considerations for NI-IMAQ I/O Devices

The following sections provide specific information about updating your software for use with your NI-IMAQ I/O device. NI-IMAQ I/O devices include the NI CVS-1450 Series compact vision system, the NI PCI-8254R, and the NI PCIe-8255R.

## Vision Builder for Automated Inspection

If you are using Vision Builder AI with your CVS-1450 device, you must have Vision Builder AI 2.5 or later installed. If you have Vision Builder AI 2.0 installed, go to [ni.com/support](http://ni.com/support), and click the **Drivers and Updates** link to find and install the latest downloadable update. Without this support, you cannot configure the CVS-1450 device. Refer to the Vision Builder AI `readme.txt` file for additional information about this update.

## Upgrading NI-IMAQ I/O Host VIs for Use with LabVIEW 8.x

A host VI is a VI that communicates with an FPGA VI to control an FPGA target. A host VI can run on a Windows computer or on a real-time (RT) target. If you previously used LabVIEW 7.x to program your NI-IMAQ I/O device and you upgrade to LabVIEW 8.x, host VIs that use the digital I/O functionality of the NI-IMAQ I/O device may have a broken **Run** arrow when you open the VIs in LabVIEW 8.x.

Complete the following steps to correct the broken **Run** arrow:

1. In LabVIEW 8.x, select **Tools»Update 7.X VIs using NI-IMAQ I/O** in the Getting Started window or in the Project Explorer window of an open project.
2. Click **Add** to add the host VIs that you want to upgrade to the **VIs** list.
3. Choose the location to save the VIs.
4. Click **Continue**. The **Update 7.X VIs using NI-IMAQ I/O** window will automatically close when the update is complete.

## Upgrading FPGA VIs for Use with LabVIEW 8.x

An FPGA VI is a VI that runs on an FPGA target. If you created FPGA VIs using LabVIEW 7.x and the LabVIEW FPGA Module 1.x, you can update the VIs for use with LabVIEW 8.x and the LabVIEW FPGA Module 8.x. Refer to *Upgrading FPGA VIs, Host VIs, and Embedded Projects from LabVIEW FPGA Module 1.x to 8.2* in the *LabVIEW Help* for more information about upgrading FPGA VIs to LabVIEW 8.x.

After you have updated the NI-IMAQdx software on your host computer, you must also update the software on your RT target. Refer to the [Configuring NI-IMAQdx for the LabVIEW Real-Time Module](#) section for information about updating software on your RT target.

## Installation

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Complete the following steps to install NI Vision Acquisition Software:



**Note** You must have administrator access to install the NI Vision Acquisition Software.

1. Insert the NI Vision Acquisition Software installation CD in the CD-ROM drive.
2. If you do not have autorun enabled, double-click `autorun.exe`. If you have autorun enabled, `autorun.exe` runs automatically.
3. Follow the onscreen instructions.

NI-IMAQ and NI-IMAQdx integrate with MAX, the National Instruments utility for configuring and testing your measurement and automation system. The MAX icon appears on your desktop after you install NI Vision Acquisition Software.

# Configuring NI-IMAQ

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Complete the following steps to install an image acquisition device and configure NI-IMAQ:



**Note** You must install NI-IMAQ before installing your image acquisition device.



**Caution** Power off and unplug the computer before installing your hardware. Wait for any motherboard LEDs to power off before proceeding, since some computers remain powered for some time after being unplugged.

1. Install your image acquisition device, and connect the camera. Refer to the device documentation for specific hardware installation instructions.
2. Run MAX.



- a. Double-click the MAX icon on the desktop. You can use MAX to modify camera properties. Once you have saved these properties, they become the default settings for all NI-IMAQ applications.
  - b. Expand **Devices and Interfaces** and **NI-IMAQ Devices** to display a list of the image acquisition devices installed on your computer.
3. Select a camera file, and acquire an image.
    - a. Click the plus sign next to the image acquisition device to expand the menu tree and list the available channels or ports. Right-click the channel or port to display a list of available cameras.
    - b. Select the appropriate camera type from the list. Camera type selection varies according to the image acquisition device installed.

- c. To change the camera settings, modify the parameters at the bottom of the image viewer panel.
- d. You can acquire an image in the following ways:



- Use the **Snap** button to acquire and display a single image with the image acquisition device.



- Use the **Grab** button to acquire images continuously. A grab allows you to focus the camera.



**Tip** For a complete list of supported cameras, right-click the channel or port, select **Camera**, and click **Search ni.com**.



**Note** Refer to the right side of the MAX user interface, which displays context-sensitive help, for information about configuring image acquisition devices with MAX.

## Configuring a Remote Image Acquisition Device

Use MAX to install NI-IMAQ for LabVIEW Real-Time from the host machine onto the target system. The NI-IMAQ for LabVIEW Real-Time components enable the remote device to acquire and analyze images as directed by the host machine.



**Note** Install NI-IMAQ and the LabVIEW Real-Time Module on the remote system before you install and configure the image acquisition device. Follow the steps in the MAX help window to install software.



**Tip** Configuring remote image acquisition devices is similar to configuring local image acquisition devices, except that the procedure for working with camera files is different. Refer to the *Measurement & Automation Explorer Help for NI-IMAQ* for information about working with camera files on remote image acquisition devices.

1. Launch MAX.
2. In the Configuration tree, expand **Remote Systems**.
3. Expand the appropriate system.
4. Expand **Devices and Interfaces**.
5. Expand **NI-IMAQ Devices**.
6. Expand the device you want to configure.

Refer to the *Measurement & Automation Explorer Help for NI-IMAQ* for information about configuring specific NI image acquisition devices.

You can access this help file from the MAX **Help** menu by selecting **Help»Help Topics»NI Vision»NI-IMAQ**.

## Configuring NI-IMAQdx

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Complete the following steps to install and configure NI-IMAQdx.

Instructions for configuring an IEEE 1394 or GigE Vision camera are included in the *Measurement and Automation Explorer Help for NI-IMAQdx*. You can access this help file from the MAX **Help** menu by selecting **Help»Help Topics»NI Vision»NI-IMAQdx**.

## Installing IEEE 1394 Hardware

Install your IEEE 1394 interface card. Follow the installation instructions provided by the manufacturer.

## Installing the High Performance GigE Vision Driver

If you have an Intel Pro/1000 Series gigabit Ethernet Network Interface Card (NIC), it is recommended that you install the High Performance GigE Vision Driver. This will ensure optimized performance and minimal configuration. To associate your hardware with the high performance driver, complete the following steps.

1. Install your NIC.
  - a. If Windows does not prompt you to choose a driver, proceed to step 2.
  - b. If Windows prompts you to choose a driver, proceed to step 3.
2. Right-click the NIC in the Device Manager, and select **Update Driver**.
3. Choose not to connect to the Windows Update Web site, and click **Next**.
4. Choose to **Install from a list or a specific location**, and click **Next**.
5. Choose **Don't Search. I will choose the driver to install**.
6. Click **Next**.
7. Select National Instruments GigE Vision driver from the list, and click **Next**.
8. Click **Finish**.



**Note** Windows may return a warning stating that the driver is unsigned. It is safe to ignore the warning.

## Installing the Universal GigE Vision Driver

NI-IMAQdx will work with any standard gigabit Ethernet NIC. To use NI-IMAQdx with a standard gigabit Ethernet NIC, complete the following steps:

1. Install the NIC and any related drivers. Refer to the NIC device documentation for installation instructions.
2. Enable jumbo frames (frame packet size is greater than 1,500 bytes) on your NIC.
  - a. Right-click the NIC in the Device Manager, and select **Properties**.
  - b. Click the **Advanced** tab, and **Jumbo Frames** will appear in the **Property** list if supported by your NIC.
  - c. Select the largest frame size available and click **OK**.



**Note** The procedure for enabling jumbo frames on your NIC may vary by manufacturer. Refer to the NIC device documentation for more information about enabling jumbo frames.

3. Disable the Windows Firewall or any additional third party firewalls on the port. Windows Firewall can be disabled on individual ports from the Advanced tab of the Windows Firewall applet.

## Configuring Multiple Ports

If you plan to use multiple ports with NI-IMAQdx, complete the following steps:

1. Open the **Network Connections** window in Windows, and select all of the ports that cameras will be connected to by holding <Ctrl> while clicking each port.
2. Right-click one of the selected ports, and choose **Bridge Connections**.





**Note** If you are not using the High Performance Driver, you will be unable to use jumbo frames on bridged devices.

## Configuring NI-IMAQdx for Windows

Complete the following steps to configure NI-IMAQdx for Windows:

1. Connect the IEEE 1394 or GigE Vision camera.
2. Run MAX.



- a. Double-click the MAX icon on your desktop. You can use MAX to modify camera attributes. After you have saved these attributes, they become the default settings for all NI-IMAQdx or NI Vision applications.
- b. Expand **Devices and Interfaces»NI-IMAQdx** in the configuration tree to display a list of the cameras installed on your computer.
- c. For IEEE 1394 cameras, NI-IMAQdx may not be associated with the camera. If this is the case, change the associated driver by right-clicking the camera and selecting **Driver»NI-IMAQdx**.
- d. Select the camera from the list. You then can view or modify the camera attributes on the **Camera Attributes** tab located below the image viewer.



**Tip** Click the **Show Help** button to display the help window on the right side of the image viewer. Move your mouse over the properties to view context-sensitive help in the bottom half of the help window.

# Configuring NI-IMAQdx for the LabVIEW Real-Time Module

If you are using a Windows development machine, the LabVIEW Real-Time Module, and an RT target, complete the following steps to install and configure NI-IMAQdx:



**Note** NI-IMAQdx only supports IEEE 1394 cameras on the LabVIEW Real-Time Module.

1. Install NI-IMAQdx software on your Windows development machine.
2. Ensure that your RT target is connected to the same subnet as the Windows development machine.
3. Run MAX.
  - a. Double-click the MAX icon on your desktop.
  - b. Expand the **Remote Systems** list in the configuration tree.
  - c. Select your RT target in the list.
  - d. Configure your network settings. Refer to the *Remote Systems Help* in MAX (**Help»Help Topics»Remote Systems**) for instructions about configuring network settings.
4. Install NI-IMAQdx on the RT target.
  - a. Click the **Software** item below the RT target in the configuration tree.
  - b. Click **Install Software** on the MAX toolbar to launch the LabVIEW Real-Time Install Software Wizard.
  - c. Select **NI-IMAQdx RT**, as well as any additional software you would like to install on the target machine.

- d. Click **Next**. Review the list of software you selected to install.
  - e. Click **Next** to begin downloading the software to the target machine. When MAX has finished downloading the software, it restarts the remote device.
  - f. Click **Finish**.
5. Connect your camera to your remote system.



**Note** If you are using a CVS-1450 Series device with Vision Builder AI, refer to the Vision Builder AI documentation for camera configuration information.

6. Press <F5> to refresh the MAX configuration tree. Your IEEE 1394 camera should be listed in the **Remote Systems** list.



**Tip** Press <F5> to refresh the configuration tree whenever you connect a new device to an RT target.

7. Expand **Devices and Interfaces»NI-IMAQdx** in the configuration tree to display a list of the cameras installed on your computer.
8. Select the camera from the list. You then can view or modify the camera attributes from the **Camera Attributes** panel located below the image viewer.

# Documentation

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The NI Vision Acquisition Software documentation is installed onto your hard drive with NI Vision Acquisition Software. The documentation ships as Adobe Acrobat portable document format (PDF) files and HTML Help files.

To view the NI Vision Acquisition Software documentation, select **Start» All Programs»National Instruments»Vision»Documentation**. You can access the *NI-IMAQ VI Reference Help* and the *NI-IMAQdx VI Reference Help* from the LabVIEW **Help** menu.



**Note** You must have Adobe Acrobat Reader with Search and Accessibility 5.0.5 or later installed to view the PDFs. Refer to the Adobe Systems Incorporated Web site at [www.adobe.com](http://www.adobe.com) to download Adobe Reader.

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