NATIONAL INSTRUMENTS

NI-IMAQ FOR WINDOWS 95/98/NT

NI-IMAQ for Windows 95/98/NT is the imaging acquisition software for all National Instruments IMAQ devices. The NI-IMAQ software is compatible with Windows 95, Windows 98, and Windows NT 4.0 or later.

These release notes describe how to install your NI-IMAQ software. Also included is information about upgrading from NI-IMAQ 1.x to NI-IMAQ 2.1. Please also see the readme.txt file included with your software for the most up-to-date information about this release of NI-IMAQ.

Contents

NI-IMAQ Documentation

Your NI-IMAQ software documentation is online. Refer to the *About the Online Manual Set* section later in these notes for more information about using the online manuals.

Software Components

Your NI-IMAQ software kit contains the following components:

❑ NI-IMAQ device driver software

❑ NI-IMAQ Microsoft Visual C/C++, Borland, Watcom, and Symantec import libraries

❑ NI-IMAQ VIs for G

❑ IMAQ Configuration Utility

❑ NI-IMAQ for Windows 95/98/NT installer

❑ NI-IMAQ sample code

❑ Online documentation

Installation Procedures

Insert the NI-IMAQ CD into your drive. An autorun screen will appear, as shown in Figure 1.
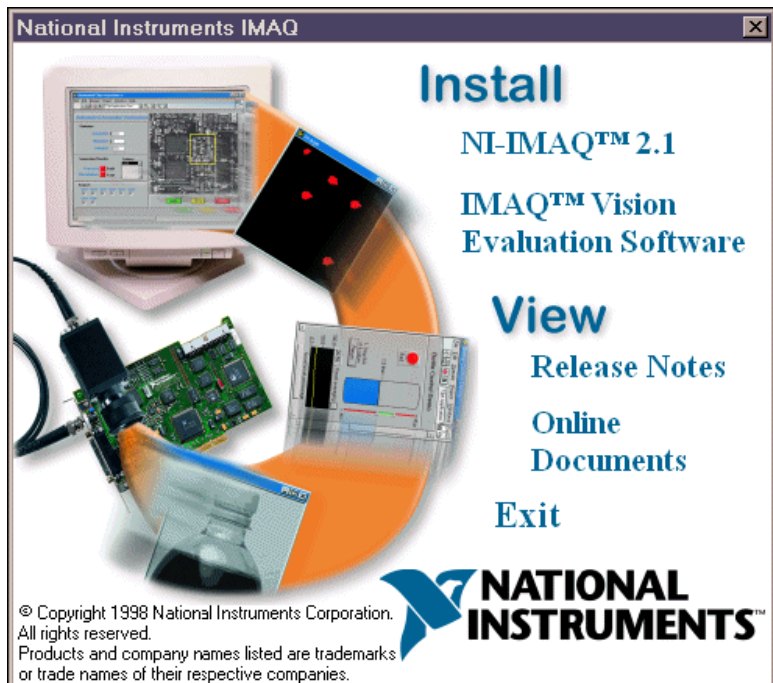

Figure 1. Initial Installer Screen

Click on **Install»NI-IMAQ 2.1** to launch the NI-IMAQ 2.1 installer and follow the instructions on the installation screens. You must install NI-IMAQ before installing your IMAQ hardware device.

The **Install»IMAQ Vision Evaluation Software** option allows you to install evaluation versions of IMAQ Vision for LabVIEW, BridgeVIEW, LabWindows/CVI, and ComponentWorks. IMAQ Vision adds high-level machine vision and image processing functions to your application development environment.

The **View»Release Notes** and **View»Online Documents** options allow you to view the online documentation for NI-IMAQ 2.1 and your IMAQ device. These documents are provided in Adobe Acrobat portable document format (pdf). If you do not have Acrobat Reader installed on your system, you will be prompted to install it using the installer provided on the CD.

IMAQ Hardware Configuration

Configure and test your IMAQ hardware by running the IMAQ Configuration Utility. Refer to the set up and test document for your device and the IMAQ Configuration Utility online help for configuration, installation, and testing instructions.

LabVIEW/BridgeVIEW Compatibility between NI-IMAQ 1.*x* and 2.*x*

The NI-IMAQ VIs changed between NI-IMAQ 1.5 and 2.*x* to increase ease of use and to add more functionality. The following changes were made:

- All VIs now have a **IMAQ Refnum In** and **IMAQ Refnum Out** parameter. This is similar to the **TaskID** input/output used with the data acquisition VIs.

- The underscore has been removed from all VI names.

- Low-level acquisition VIs have been added. These VIs add more functionality such as asynchronous acquisitions, accessing buffers during acquisition, ring acquisitions, and the ability to download custom look-up tables (LUTs) to your IMAQ device.

- Signal I/O VIs have been added. These VIs allow you to control trigger lines, generate specific timing pulses, and wait for a hardware event.

High-Level VI Changes

IMAQ_Grab is now two VIs—IMAQ Grab Setup and IMAQ Grab Acquire. IMAQ Grab Setup starts the grab acquisition. IMAQ Grab Acquire returns a copy of the image currently in the buffer. You can use IMAQ Close to stop the hardware acquisition.

IMAQ Sequence does not have a mode input, which required that you call the VI four times to perform a sequence acquisition. Instead, call IMAQ Sequence once to set up the acquisition, perform the acquisition, and return the acquired images.

IMAQ_1408 Setup Analog has been removed. IMAQ_1408 Setup Analog allowed the white and black reference levels to be set in volts. Use the IMAQ Attribute VI to achieve the same functionality. The **White Reference Level** and **Black Reference Level** attributes in NI-IMAQ 2.1 are now set in volts instead of steps.

IMAQ_Snap Async has been removed because the functionality is now provided in IMAQ Snap. IMAQ Snap is now asynchronous so that you can use it with triggering.

IMAQ_Wait for Event has been changed to IMAQ Wait Signal. The IMAQ Wait Signal VI has the same functionality as IMAQ_Wait for Event with additions for the IMAQ PCI-1424.

IMAQ_Trigger Control has been replaced by three VIs. IMAQ Trigger Configure configures trigger lines to allow an acquisition to start on a trigger. IMAQ Trigger Drive drives a trigger line with a specified signal. IMAQ Trigger Read reads the current value of a trigger line.

IMAQ_Trigger RTSI Map has been removed. The mapping of RTSI lines is now handled internally by NI-IMAQ. If you specify a RTSI line when using the trigger VIs, NI-IMAQ internally maps the RTSI line on the RTSI bus to a RTSI trigger line on the IMAQ board.

IMAQ_Info has been removed. The same functionality is available with IMAQ Attribute.

IMAQ_Channel has been removed. The acquisition VIs now have a channel input that allows you to select a channel on the IMAQ board.

Compatibility VIs

All of the NI-IMAQ 1.5 VIs are available as compatibility VIs. They are installed in the `vi.lib/addons/imaq/compatibility` directory; however, they do not appear on the **imaqview** palette. These VIs allow you to load and run existing IMAQ applications without changing your code. You should replace your NI-IMAQ 1.5 VIs with NI-IMAQ 2.1 VIs at your earliest convenience, because the compatibility VIs will not be included in future NI-IMAQ releases.

NI-IMAQ provides a tool that will convert some of the NI-IMAQ 1.*x* VIs to 2.1 VIs. Using this tool, you can convert the following VIs:

- IMAQ_Snap to IMAQ Snap
- IMAQ_Snap Async to IMAQ Snap
- IMAQ_Init to IMAQ Init
- IMAQ_Close to IMAQ Close
- IMAQ_Attribute to IMAQ Attribute
- IMAQ_StillColor Attribute to IMAQ StillColor Attribute
- IMAQ_StillColor Setup to IMAQ StillColor Setup

To use the conversion tool, launch `lvimaq.exe`, which is located in the `<ni-imaq>/G compatibility` directory. This will launch a special version of LabVIEW that contains the conversion tool. Load your IMAQ application. As your application loads, the appropriate NI-IMAQ VIs will be converted. After your VI loads, save it. You can now load the VI into LabVIEW or BridgeVIEW and convert the VIs that were not converted.

☞ **Note** *This conversion tool will only work with LabVIEW 5.x or BridgeVIEW 2.x VIs. If you have an earlier version of LabVIEW or BridgeVIEW, do not use this tool.*

The following table describes the corresponding NI-IMAQ 2.1 VI for each NI-IMAQ 1.*x* VI.

Table 1. NI-IMAQ VI Equivalents

NI-IMAQ 1.x VI	NI-IMAQ 2.1
IMAQ_Snap	IMAQ Snap
IMAQ_Grab	IMAQ Grab Setup, IMAQ Grab Acquire
IMAQ_Sequence	IMAQ Sequence
IMAQ_Init	IMAQ Init
IMAQ_Close	IMAQ Close
IMAQ_Attribute	IMAQ Attribute
IMAQ_1408 Setup Analog	Removed (same functionality is available with IMAQ Attribute)
IMAQ_Snap Async	Removed (IMAQ Snap provides the same functionality)
IMAQ_Wait for event	IMAQ Wait Signal
IMAQ_Trigger Control	IMAQ Trigger Configure replaces starting an acquisition on a trigger IMAQ Trigger Drive replaces driving trigger lines IMAQ Trigger Read replaces reading trigger lines
IMAQ_Trigger RTSI Map	Removed (VIs will perform this functionality internally)
IMAQ_Info	Removed (same functionality is available with IMAQ Attribute)
IMAQ_Channel	Removed (acquisition VIs now have channel input)

NI-IMAQ 1.*x* and 2.*x* Compatibility

The following changes have been made to NI-IMAQ:

- Functions

    - `imgSessionSetTrigger` has been replaced with `imgSessionTriggerConfigure` and `imgSessionTriggerDrive`. `imgSessionTriggerConfigure` configures a trigger to start an acquisition. `ImgSessionTriggerDrive` drives a trigger with a specified signal. `ImgSessionSetTrigger` is still supported; however, you should use the new trigger functions.

    - `imgSessionSaveBuffer` has been replaced with `imgSessionSaveBufferEx`, which takes a buffer pointer instead of a buffer number to determine which buffer to save to file.

    - New LUT functions, `imgSessionSetUserLUT8bits` and `imgSessionSetUserLUT16bits`, allow you to download custom LUTs to your IMAQ device. See the *Custom LUT Function and VI Descriptions* section for more information on these new functions.

- Camera attributes

    - The camera attributes allow you to control camera functions, such as integration time and pixel binning, directly from NI-IMAQ with the IMAQ PCI-1424. Consult the *Camera Attributes* section in the *NI-IMAQ User Manual* for more information.

- Attributes

    - IMG_ATTR _WHITE_REF, IMG_ATTR _BLACK_REF, and IMG_ATTR_GAIN have been replaced by IMG_ATTR_BLACK_REF_VOLT and IMG_ATTR_WHITE_REF_VOLT. This allows you to set the black and white reference in volts instead of steps.

    - IMG_ATTR_LUT is now a session attribute instead of an interface attribute.

    - IMG_ATTR_FRAME_FIELD is now a session attribute instead of an interface attribute.

    - IMG_ATTR_INTERFACE_TYPE has been removed.

Custom LUT Function and VI Descriptions

This section describes the two new custom LUT functions and the new custom LUT G VI.

imgSessionSetUserLUT8bits Function

rval = `imgSessionSetUserLUT8bits`**(SESSION_ID sid, uInt32 lutType, uInt8* lut)**

Purpose

Downloads a custom 8-bit LUT to your IMAQ device. If your camera has more than one LUT, you must program all of them. Call this function at least once with the default constant (IMG_LUT_TYPE_DEFAULT) to initialize all LUTs, or make successive calls using different constants for each LUT. You can also override the default LUT on a per-tap basis. This function works with analog IMAQ devices or digital cameras with 8-bit taps.

Parameters

Name	Type	Direction	Description
sid	SESSION_ID	input	session ID
lutType	uInt32	input	LUT to be downloaded
lut	uInt8*	input	pointer to user buffer containing the LUT
rval	Int32	output	no error

Parameter Discussion

sid is a valid SESSION_ID type variable.

lutType indicates the type of LUT to be written. Valid values are:

IMG_LUT_TYPE_DEFAULT	default LUT used to initialize all LUTs
IMG_LUT_TYPE_RED	red channel LUT for RGB digital cameras
IMG_LUT_TYPE_GREEN	green channel LUT for RGB digital cameras
IMG_LUT_TYPE_BLUE	blue channel LUT for RGB digital cameras
IMG_LUT_TYPE_TAP0	tap 0 LUT for digital boards
IMG_LUT_TYPE_TAP1	tap 1 LUT for digital boards
IMG_LUT_TYPE_TAP2	tap 2 LUT for digital boards
IMG_LUT_TYPE_TAP3	tap 3 LUT for digital boards

lut points to an area of memory that contains the LUT to be downloaded to the image acquisition board. This array must contain 256 elements.

rval returns the following status codes:

IMG_ERR_GOOD	no error
IMG_ERR_PAR1	invalid session ID
IMG_ERR_PAR2	unknown LUT type
IMG_ERR_PAR3	null buffer passed as LUT
IMG_ERR_EMEM	not enough memory to perform the operation
IMG_ERR_HWNC	the board does not support this LUT type

ImgSessionSetUserLUT16bits Function

rval = `imgSessionSetUserLUT16bits`(**SESSION_ID sid, uInt32 lutType, uInt16* lut**)

Purpose

Downloads a custom 16-bit LUT to your IMAQ device. If your camera has more than one LUT, you must program all of them. Call this function at least once with the default constant (IMG_LUT_TYPE_DEFAULT) to initialize all LUTs, or make successive calls using different constants for each LUT. You can also override the default LUT on a per-tap basis. This function works with digital cameras of 10-, 12-, 14-, or 16-bit pixel depths.

Parameters

Name	Type	Direction	Description
sid	SESSION_ID	input	session ID
lutType	uInt32	input	LUT to be downloaded
lut	uInt6*	input	pointer to user buffer containing the LUT
rval	Int32	output	no error

Parameter Discussion

sid is a valid SESSION_ID type variable.

**lutType** indicates the type of LUT to be written. Valid values are:

IMG_LUT_TYPE_DEFAULT	default LUT used to initialize all LUTs
IMG_LUT_TYPE_TAP0	tap 0 LUT for digital boards
IMG_LUT_TYPE_TAP1	tap 1 LUT for digital boards

lut points to an area of memory that contains the LUT to be downloaded to the IMAQ device. This array must contain 2^n elements where n is the bit depth of the camera (1,024 for 10-bit cameras, 2,048 for 12-bit cameras, and so on).

rval returns the following status codes:

IMG_ERR_GOOD	no error
IMG_ERR_PAR1	invalid session ID
IMG_ERR_PAR2	unknown LUT type
IMG_ERR_PAR3	null buffer passed as LUT
IMG_ERR_EMEM	not enough memory to perform the operation
IMG_ERR_HWNC	the board does not support this LUT type

IMAQ Set User LUT VI
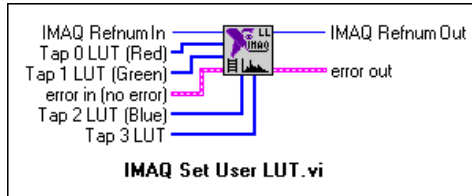
Downloads a custom LUT to an IMAQ device. This VI can download 8-bit or 16-bit LUTs for analog or digital devices. If your IMAQ device has multiple LUTs, you must call this VI once for each LUT.

IMAQ Refnum In is a unique identifier that identifies the Interface file. If you are using the default interface, img0, no connection is needed.

Tap 0 LUT (Red) is used for analog monochrome devices, the red channel for RGB digital cameras, or tap 0 on digital devices. If your device is an 8-bit device, wire an array of 8-bit unsigned integers containing 256 elements. If your device is greater than 8-bits, wire an array of 16-bit unsigned integers containing 2^n elements where n is the bit depth of the camera (1,024 for 10-bit, 2,048 for 12-bit, and so on).

Tap 1 LUT (Green) is used for the green channel for RGB digital cameras or tap 1 on digital devices. If your device is an 8-bit device, wire an array of 8-bit unsigned integers containing 256 elements. If your device is greater than 8-bits, wire an array of 16-bit unsigned integers containing 2^n elements where n is the bit depth of the camera (1,024 for 10-bit, 2,048 for 12-bit, and so on).

Tap 2 LUT (Blue) is used for the blue channel for RGB digital cameras or tap 2 on digital devices. If your device is an 8-bit device, wire an array of 8-bit unsigned integers containing 256 elements.

`[U8]` **Tap 3 LUT** is used for tap 3 on digital devices. If your device is an 8-bit device, wire an array of 8-bit unsigned integers containing 256 elements.

`[I32]` **IMAQ Refnum Out** has the same value as **IMAQ Refnum In**.

☞ *See Appendix C,* Error Codes, *of the* NI-IMAQ VI User Manual *for error input and output information and error codes.*

About the Online Manual Set

The IMAQ hardware and software documentation set ships with your software as Adobe Acrobat portable document format (PDF) files.

To view one of these documents, double-click on the `DocList.pdf` file, located in the `Documents` folder on your NI-IMAQ CD. Click on any document name to launch the document you want to view.

☞ **Note** *If you do not already have Acrobat Reader installed on your system, the installer will create a new directory,* `<target install dir>\ACROREAD`, *and insert the Adobe Acrobat Installer into it. Run this installer before viewing your online documentation. You must have Acrobat Reader 3.0 or later installed to use the online documentation.*

Using the NI-IMAQ Online Manual Set

The NI-IMAQ software online help and PDF documentation also is installed onto your hard drive with the NI-IMAQ software.

To view the online help, click the **Start** button on the taskbar, point to **Start»Programs»National Instruments IMAQ** and choose either **NI-IMAQ Function Help** or **NI-IMAQ VI Help**.

To view the PDF documents, click the **Start** button on the taskbar, point to **Start»Programs»National Instruments IMAQ»Documentation**, and choose the appropriate document. This will automatically launch the Acrobat Reader and open the selected PDF file. You can assemble your own printed manuals by printing either the entire documentation set or only the sections relevant to your application.

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