

Interfacing SWIR Vision Systems Devices to National Instruments MAX and LabVIEW

Important notes before you begin:

USB3 Vision and GigE Vision

This application note is provided under the assumption that the user understands the USB3 Vision and GigE Vision standards. SWIR Vision Systems devices are USB3 Vision and GigE Vision compliant. This makes it simple to control image streaming and camera features when using third-party software that supports USB3 Vision and GigE Vision devices. Modifications to the GenICam parameters are recalled and used unless expressly changed in MAX or LabVIEW. Changes will persist a power cycle only if you execute the **Save Settings** feature after changing the parameters and before cycling the device's power.

MAX and LabVIEW Compatibility

A USB3 Vision and GigE Vision compliant version of National Instruments' Vision Acquisition Software is required. The following tutorial uses NI Vision Acquisition Software 19.0 (compatible with 32-bit and 64-bit applications). The tutorial uses NI LabVIEW 2019 (32-bit) and NI MAX version 19.0. When installing the NI Vision Acquisition Software, you should also opt to install the NI-IMAQdx driver and support for LabVIEW.

Choosing the Correct Driver

Before interfacing to MAX and LabVIEW, reference the **Acuros 1.1 Quick Start Guide** to install the appropriate software, power up the camera, and perform the first operation of camera. You should understand the software and image controls as described in the **Acuros 1.1 User Manual**. First, we recommend learning to use your product in the SVSImagIR software. Connecting to SVSImagIR is a simple way to ensure that your device is supplied with power and properly connected to the PC. The SVSImagIR software should be closed while you are interfacing to MAX or LabVIEW.

By performing the installation described in **Acuros 1.1 Quick Start Guide**, you should have already installed the eBUS Universal Pro for Ethernet driver and eBUS Universal Pro for USB3 Vision drivers. **If you are using a GigE device, please skip to the *Interfacing to NI MAX* or *Interfacing to NI LabVIEW* section of this application note.** To use USB3 Vision devices with NI software, you will need to use the NI-IMAQdx USB3 driver. To verify that you are using the correct USB3 driver, please use the following procedure:

1. Plug in the USB3 device
2. Open **Device Manager**
3. Right click on the USB3 device in Device Manager
4. Select **Update Driver**→**Browse my computer for driver software**→**Let me pick from a list of available drivers on my computer**
 - (a) If you want to use MAX or LabVIEW, select **NI-IMAQdx USB3 Vision Device**
 - (b) If you want to use SVSImagIR or eBUS Player, select **USB3 Vision device**
5. Click **Next** and then **Close**

Interfacing to NI MAX

Open MAX and follow this procedure to stream video and adjust GenICam parameters:

1. Depending on your device:
 - (a) If using a GigE Camera: Go to **My System**→**Devices and Interfaces**→**Network Devices** and you should see a device listed as **Pleora Technologies Inc. iPORT NTx-GigE device**. Left-click on this device to select it.
 - (b) If using a USB3 camera: Go to **My System**→**Devices and Interfaces**→**Open Device Manager** and you should see a device listed as **Pleora Technologies Inc. iPORT NTx-U3 device**. Left-click on this device to select it (if you get an error here, please see **Appendix A** of this application note).
2. Once the camera is finished loading, some navigation tabs will appear at the bottom of the screen. Select the **Acquisitions Attributes** tab, and then click **Grab** at the top of the screen to begin streaming video (Fig. 1).
3. Select the **Camera Attributes** tab. To change the GenICam features that are specific to this SWIR Vision Systems camera, navigate to the **CameraHeadFeature** section and choose one of the options. In the example image, we change the **NucTable** parameter from **TableZero** to **TableOne**. Common GenICam parameters can be found in other areas under **Camera Attributes**. For example, go to **Camera Attributes**→**Image Format Control** to adjust the ROI. You can go to **Camera Attributes**→**Acquisition Control** to adjust Exposure Time.

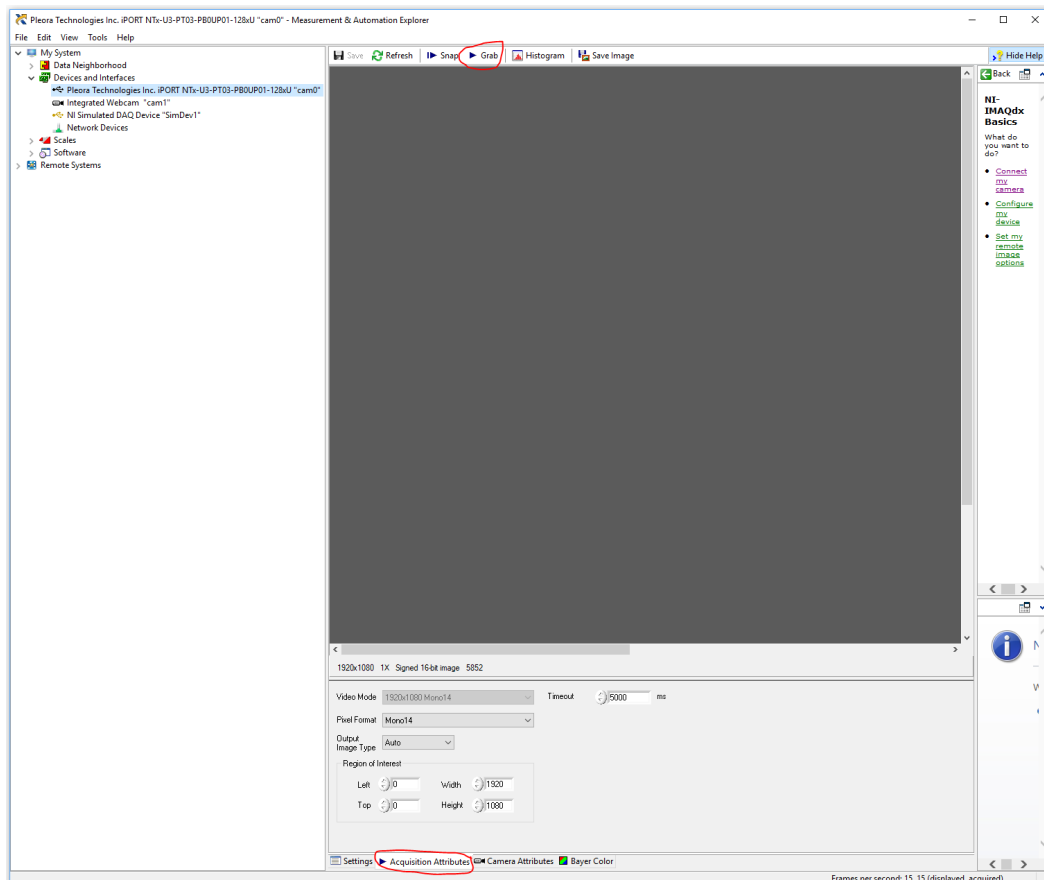


Figure 1: A SWIR Vision Systems USB3 Camera connected to NI MAX. Notice the **Acquisition Attributes** tab is selected (circled in red) and the **Grab** button (also circled in red) can be used to initiate video capture. The **Camera Attributes** tab is available next to the Acquisition Attributes tab.

Interfacing to NI LabVIEW

You can communicate with your SWIR Vision Systems device using the NI-IMAQdx driver in LabVIEW. There are several example VIs that are installed along with LabVIEW and are designed specifically for generic USB3 Vision and GigE Vision interfacing. These examples can be found in *C:\Program Files (x86)\National Instruments\LabVIEW 2019\examples\Vision Acquisition\NI-IMAQdx*. We encourage you to start with the example VI called **Camera Attributes**. This example VI covers connecting to the camera, streaming video, and changing the **Width** and **Height** GenICam parameters (see Fig. 2 and Fig. 3).

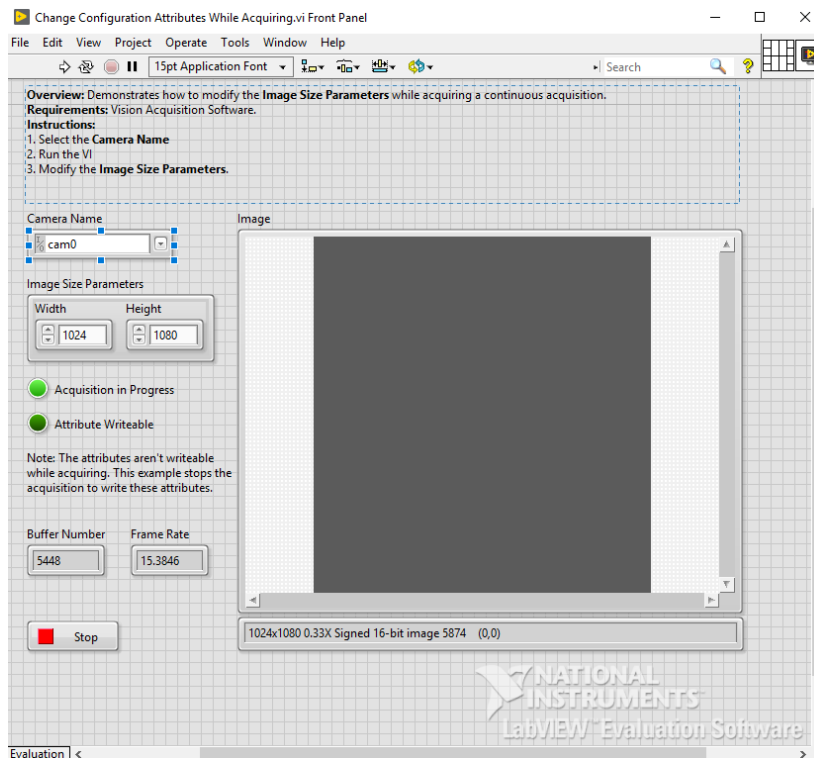


Figure 2: Front panel of the LabVIEW example VI called **Camera Attributes**. If only one camera is connected, you will select **cam0** from the **Camera Name** dropdown menu to begin streaming video. Adjust the **Width** and **Height** editors to experiment with the GenICam parameters.

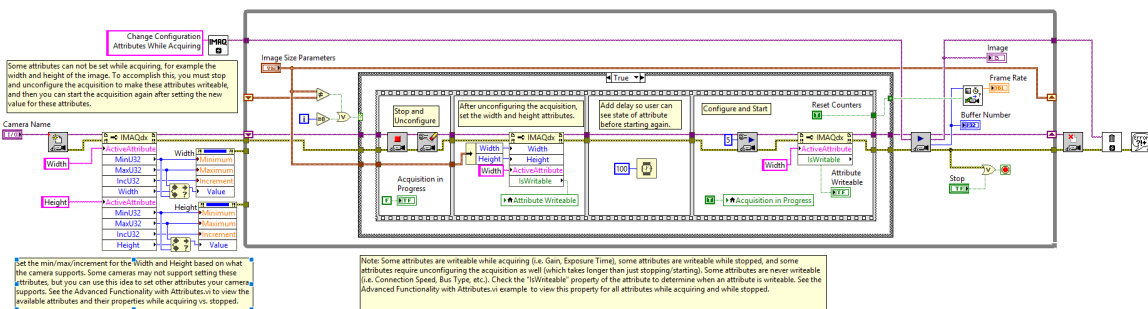


Figure 3: Block diagram of the LabVIEW example VI called **Camera Attributes**. With the block diagram open, you can go to **Help** → **NI-IMAQdx VI Reference** for more information about each component in the VI.

Appendix A

If you get this error message (see Fig. 4), your XML file is out of date and you must generate a new one. Follow these steps:

1. Go to *C:\Users\Public\Documents\National Instruments\NI-IMAQdx* and delete the folder labeled "Data".
2. Open Command Prompt as administrator and enter the following commands (see Fig. 5):

cd "C:\Program Files (x86)\National Instruments\NI-IMAQdx\Utility"

CameraValidator.exe/ATTRIBUTE

3. There should be a new folder generated at *C:\Users\Public\Documents\National Instruments\NI-IMAQdx\Data*
4. Power cycle your device
5. You should now be able to connect to MAX without any problems.

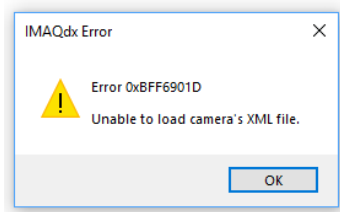


Figure 4: The error message that will appear if your XML file needs to be updated.

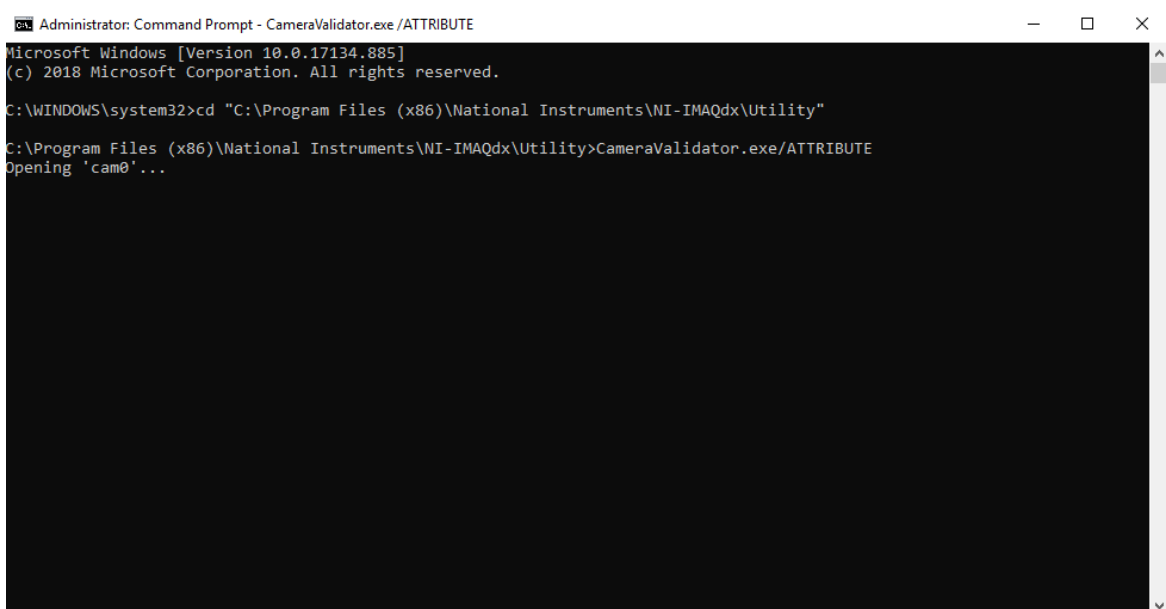


Figure 5: An example command prompt where the necessary scripts have been entered to recreate the XML file.