

GigE Vision LAG

**Advanced AcquisitionApplets
with Link Aggregation**

Version 1.0

Getting Started

Imprint

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1 Introduction

1.1 GigE Vision LAG/Dual Link Cameras and Silicon Software Frame Grabbers

1.1.1 Supported Cameras

The GigE Vision standard 2.0 introduced – apart from other improvements – Link Aggregation (LAG). At present, Silicon Software supports a specific implementation for the packet distribution over two physical links.



Important

With Silicon Software frame grabbers, you can use all GigE Vision cameras that offer two links for streaming and work with the same GigE Vision LAG protocol as the frame grabbers. Please contact the [Silicon Software Sales](#) or [Silicon Software Support](#) departments to get to know which cameras are compatible.

The Silicon Software frame grabber models supporting GigE Vision LAG /Dual Link (in the following LAG) are:

- microEnable IV AQ4-GE
- microEnable IV AQ4-GPoE
- microEnable IV VQ4-GE
- microEnable IV VQ4-GPoE

1.1.2 Standard and Custom Applets Available

When using Silicon Software frame grabbers with LAG cameras, you have two options. You can either

- use one of the off-the-shelf, ready-to-run Advanced AcquisitionApplets provided by Silicon Software which offer each a defined set of pre-processing functions, or
- use a custom applet (which you can either design yourself using VisualApplets, or order with Silicon Software).

This document describes how to use LAG cameras with Advanced AcquisitionApplets. If you are interested in developing a custom applet for your specific LAG application, contact Silicon Software and/or refer to the [VisualApplets Documentation](#).

1.2 Requirements

To use the AcquisitionApplets, you need the following prerequisites:

- Frame Grabber: microEnable IV AQ4-GE/-GpoE or microEnable IV VQ4-GE/-GpoE
- Silicon Software Runtime
- Frame Grabber Firmware
- AcquisitionApplets
 - Acq_DualLAGBaumerAreaGray12 or
 - Acq_DualLAGBaumerAreaBayer8
- GigE Vision LAG camera(s) with two GigE Vision links that use the same GigE Vision LAG transfer protocol as the Silicon Software frame grabbers – for details on which cameras are supported, please contact the Silicon Software [Sales](#) or [Support](#) departments.



Use matching firmware, applet, and driver versions

Each runtime installation contains the matching frame grabber firmware, drivers, and acquisition applet versions.

Make sure you always use the firmware, applet, and driver versions that come with the runtime you install on your system. For details on how to do that, refer to the document [Getting Started](#).

2 Installation and Configuration

2.1 Installation

To prepare your system for using the LAG applets:

1. Install runtime and hardware devices as described in [Getting Started](#). The LAG applets are available for the Windows 32Bit and Windows 64Bit runtime.
2. Test the frame grabber and your installation:
 - a. Start the program microDiagnostics.
 - b. Start the board test.

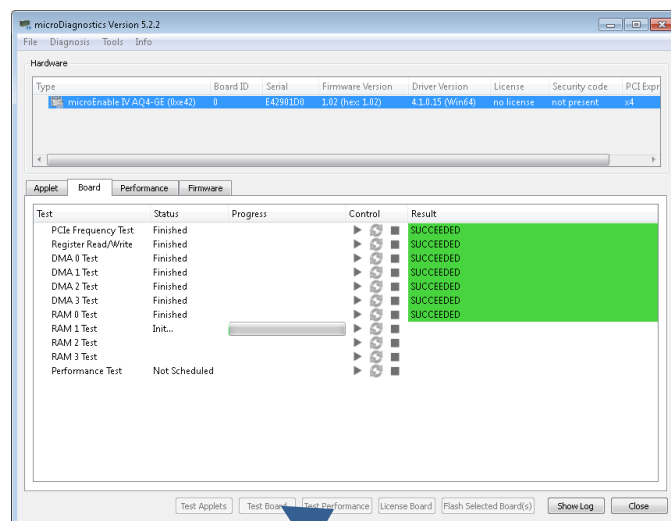


Figure 1: Board Test in microDiagnostics

2.2 Setting the Link Topology for LAG

To run the LAG applets, you have to set up two link groups out of the four gigabit Ethernet ports of your frame grabber:

1. Start the GenICam Explorer.
After startup, the GenICam main program window is displayed. There is no need to connect the cameras at this point.

2. In the **Tools** menu, select **Hardware** to open the Hardware Dialog.
The *Hardware Dialog* window opens:

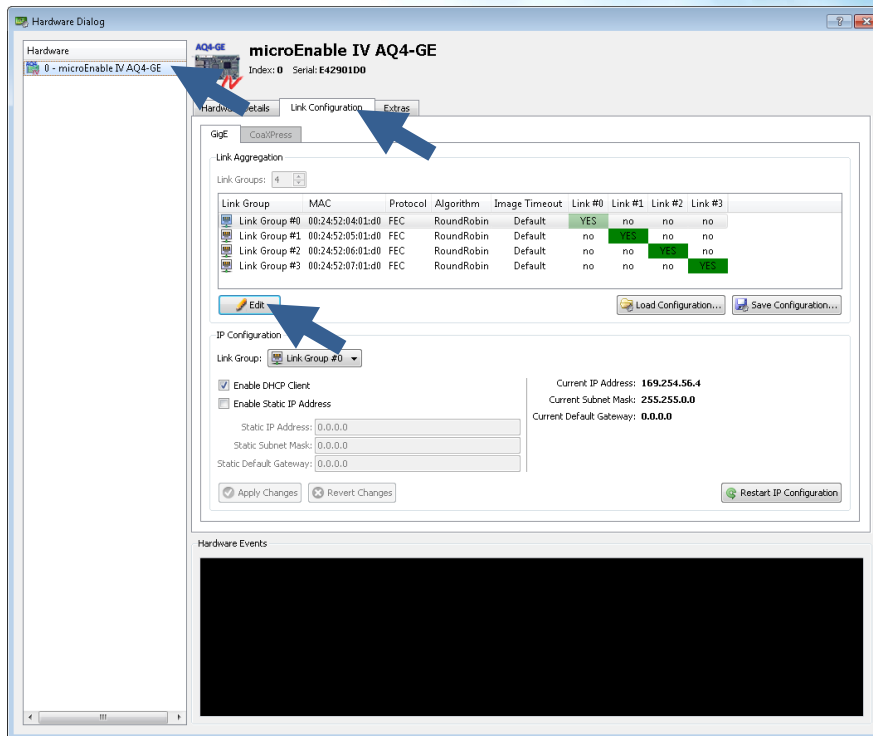


Figure 2: Hardware Dialog

3. Select a Gigabit Ethernet frame grabber and go to the **Link Configuration** tab.
4. In the *Link Aggregation* panel, click on **Edit** and set the number of **Link Groups** to **2**.
5. Adapt your configuration so that it matches the settings shown in the following figure.
Don't forget to use algorithm **RoundRobin (GVCP Primary Only)**.

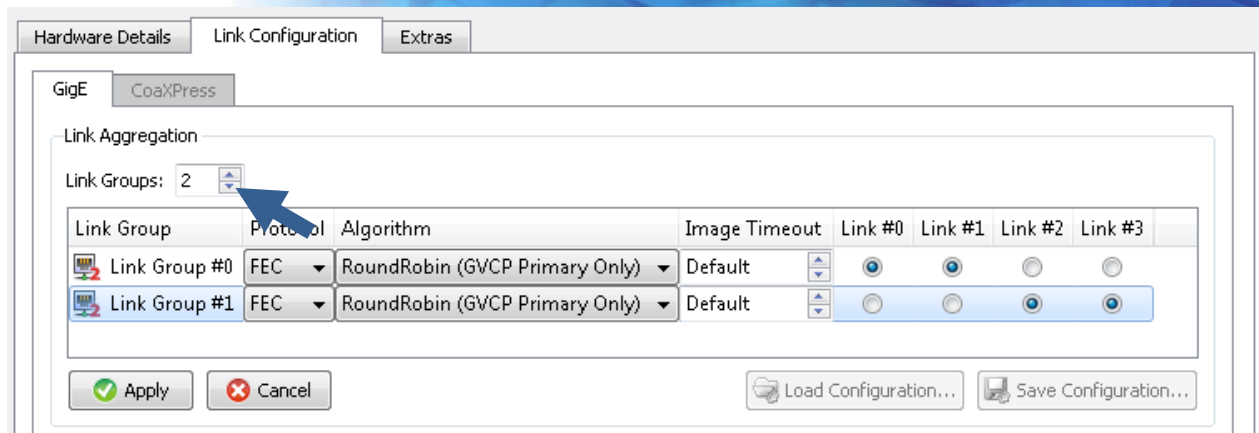


Figure 3: Link Configuration

6. Click the **Apply** button.

The four links of the frame grabber have now been grouped into two groups using 2 links each.

2.3 Configuration


2.3.1 Matching Parameters

To use the LAG applets, you need to set some parameters of the applet, the firmware and the camera to values that match each other. These are the following parameters:

Applet Parameter	Description
FG_MTU_SIZE	Specify the MTU size set for the link. This has to be the same setting as shown in the GenICam Explorer. The MTU - 4 has to be a multiple of 8, i.e., $(MTU - 4) \% 8 == 0$
FG_CAMERA_WIDTH	The parameter specifies the width of the image send by the camera to the frame grabber. Set this parameter to exactly the same value as specified in the camera. Keep in mind that this parameter is not the

	width of the sensor, it is the width of the ROI set in the camera. The equivalent GenICam parameter is "Width".
FG_SWAP_CHANNELS	If the gigabit Ethernet cables are crossed and the image is corrupted, you can swap the channels. This parameter can be changed while the acquisition is running.
FG_WIDTH	ROI width. Has nothing to do with the settings in the camera. You should use a value less than FG_CAMERA_WIDTH.
FG_HEIGHT	ROI height. Has nothing to do with the settings in the camera.

Table 1: Description of Parameters that have to match

	<p>Important</p> <p>For information on the other parameters and functionalities of the LAG Advanced AcquisitionApplets, refer to the respective Applet Documentation in PDF or HTML format.</p>
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2.3.2 Configuring Camera and Firmware

To configure camera and firmware:

1. Start the GenICam Explorer.

As you can see, the system has already detected the camera on one of the link groups:

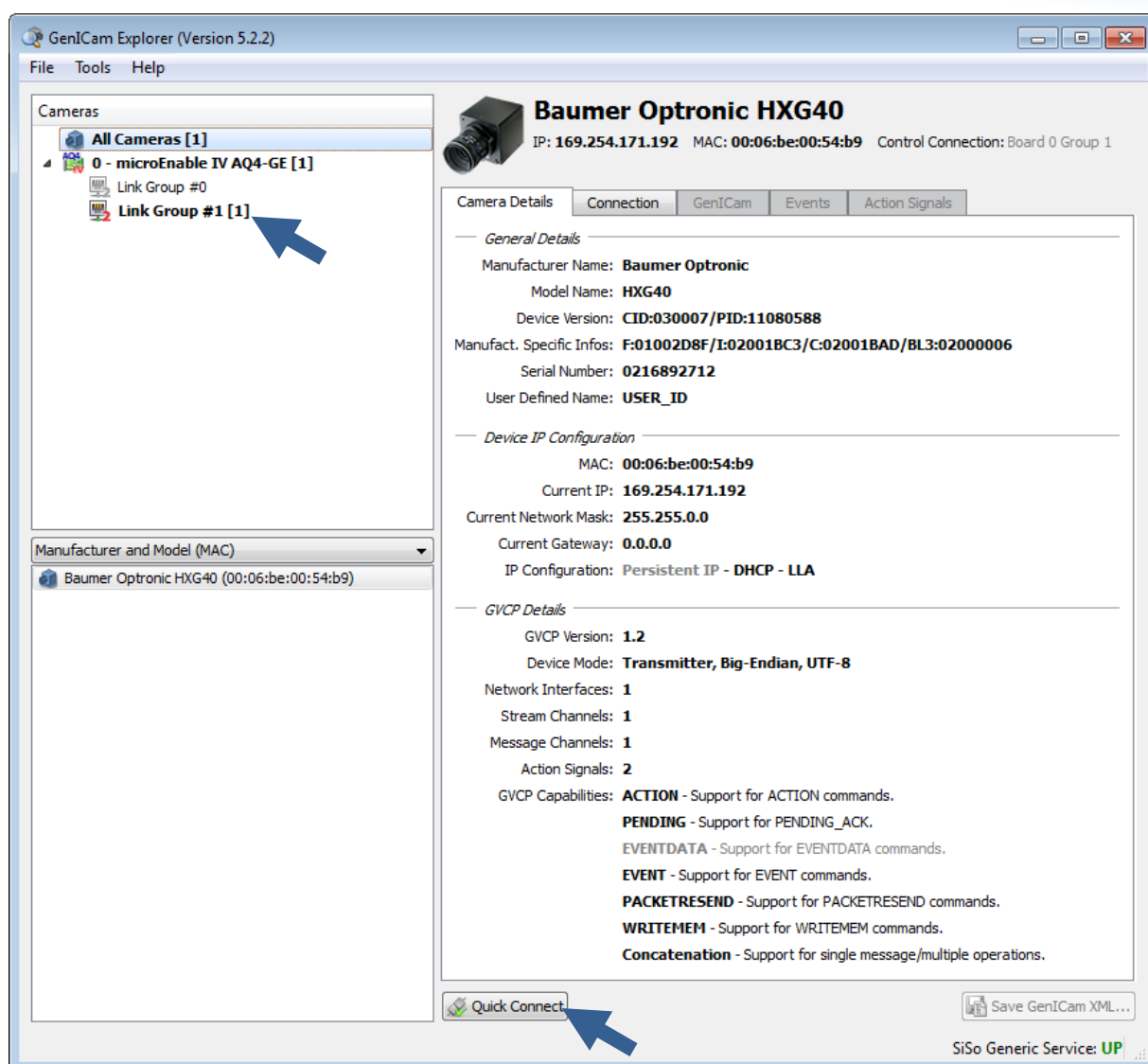


Figure 4: Detected camera as displayed in the GenICam Explorer

2. Select a Link Group and connect to the camera by clicking the **Quick Connect** button.

3. Go to the **Connection** tab.

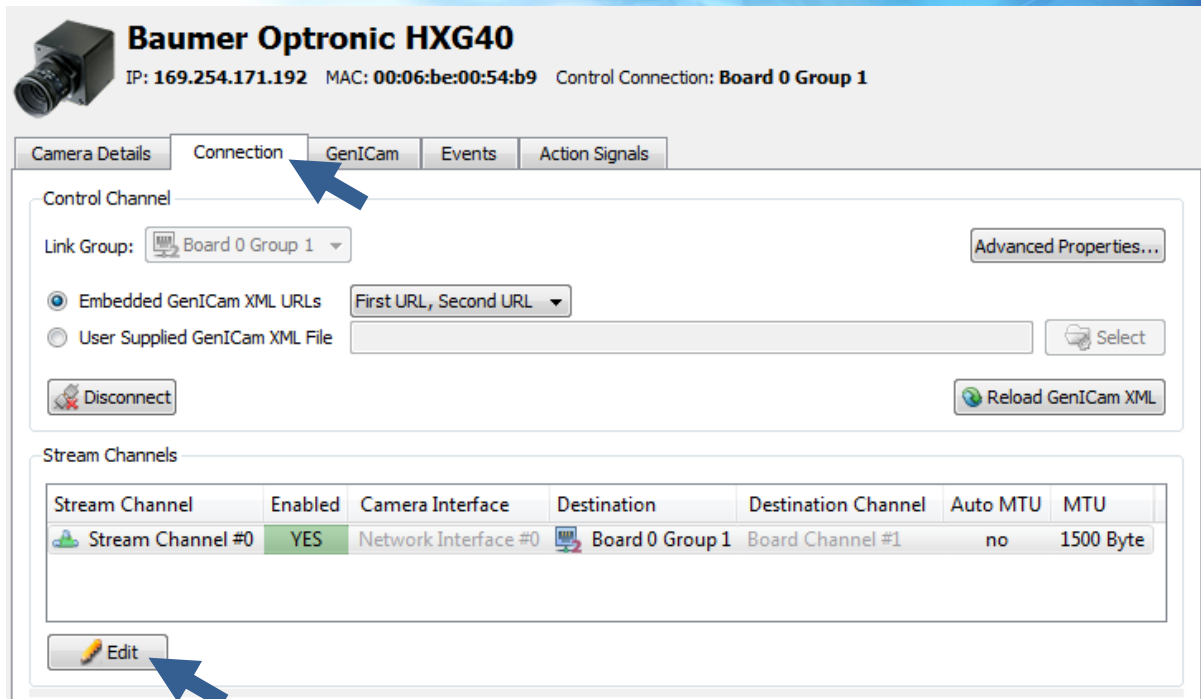


Figure 5: Connection Tab

4. Set the MTU size to your requirements:

- In the *Stream Channels* panel, click the **Edit** button.
- Ensure **Auto MTU** is disabled and set your own **MTU** value.
- Click the **Apply** button.

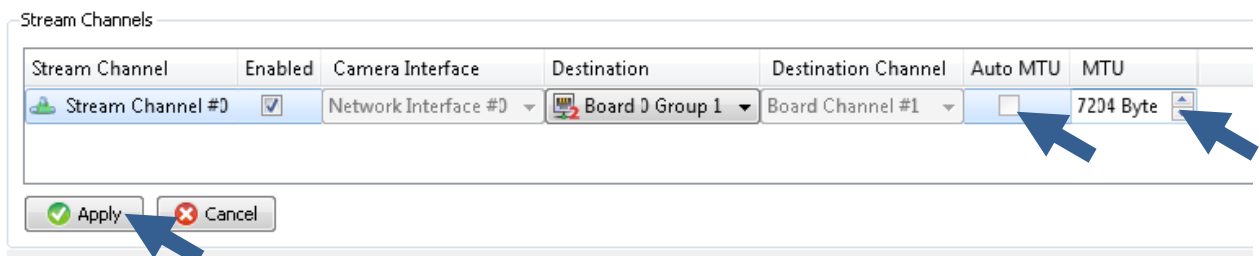


Figure 6: Setting a new MTU

Important



Note that the MTU size minus four has to be an integer multiple of 8, i.e.,
 $(MTU - 4) \% 8 == 0$.

You must not change the MTU while an acquisition is running. You do not need to restart the PC after setting the MTU.

5. Go to the **GenICam** tab.
6. Change the camera parameters to your requirements:

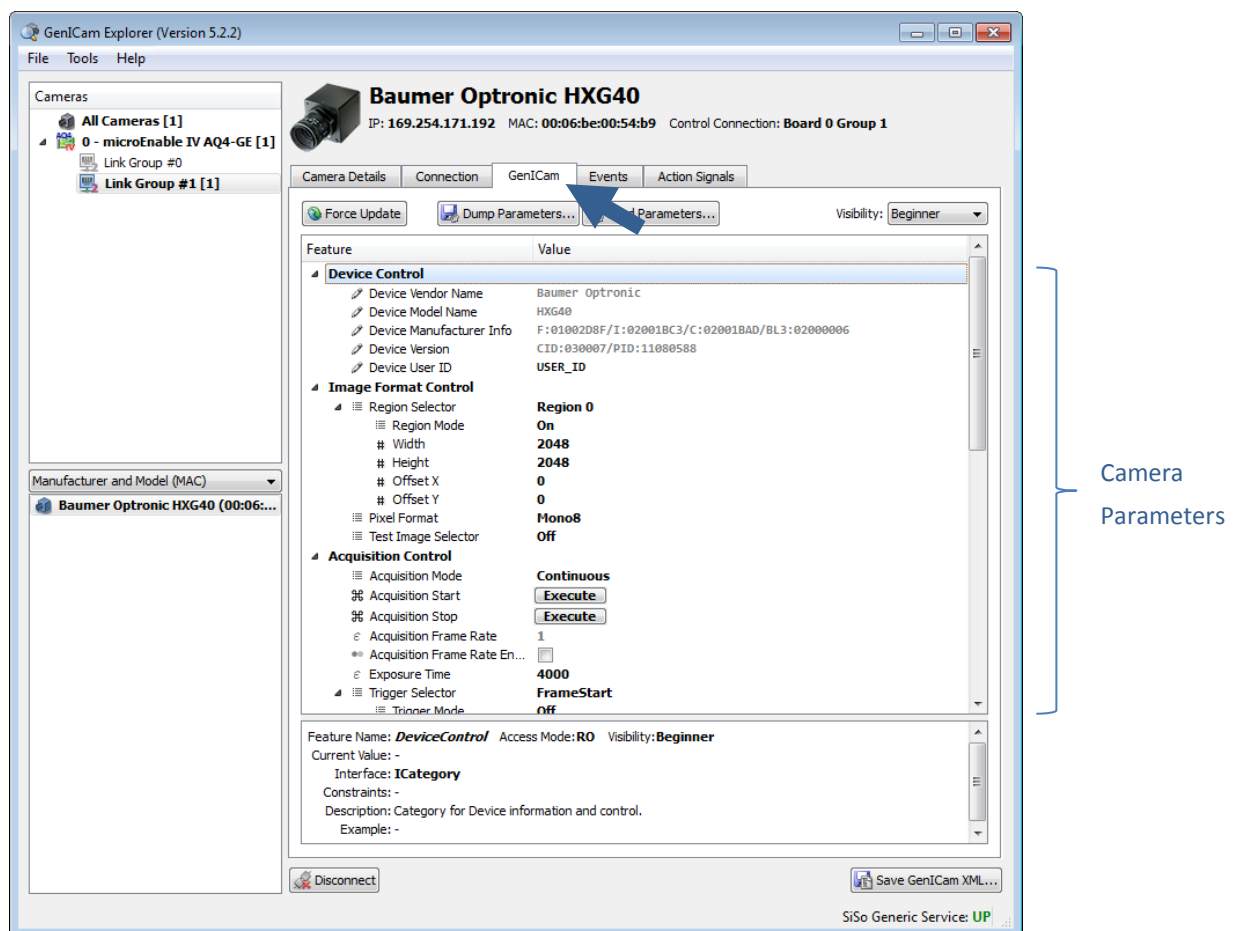


Figure 7: Camera Settings in the GenICam Explorer

2.3.3 Configuring the Applet

To load and parameterize the applet:

1. Start microDisplay.
2. Select the applet you need to load onto your frame grabber.
3. Start Loading by clicking on the appropriate button:

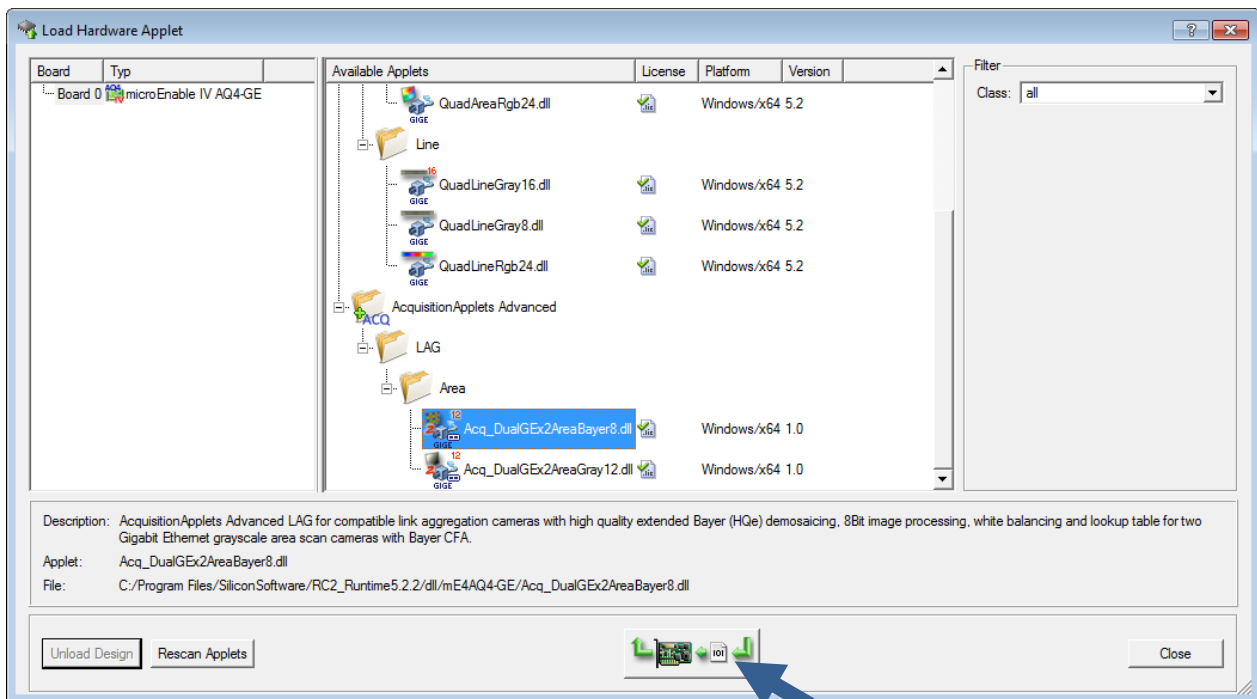


Figure 8: Loading an applet in microDisplay

microDisplay now displays one window per camera. You need to set up the parameters for all cameras you are using.

To set up the parameters for the camera:

4. Click in the window of the camera you want to configure first.
5. Modify the parameters displayed in the right hand parameter panel:



Parameter	Value/Name	Unit
Board 0 [Acq_DualGEx2AreaGray...]		
Camera		
Input Format	Mono 8bit	
MTU size	7204	byte
Swap Channels	Yes	
Camera Width	1024	pixel
ROI		
Width	1024	pixel
Height	1024	pixel
XOffset	0	pixel
YOffset	0	pixel
Trigger		
Overflow		
Lookup Table		
Processing		
Output Format		
Miscellaneous		
Direct Register Access		

Figure 9: Applet Parameters in microDisplay

- When using a color applet, adapt the initial value for the Bayer filter to your needs:

Parameter	Value/Name	Unit
Board 0 [Acq_DualGEx2AreaBayer...]		
Camera		
ROI		
Trigger		
Overflow		
Bayer Filter		
Bayer Init Value	Red Followed By Green	
White Balance	Green Followed By Red = 3	
Lookup Table	Green Followed By Blue = 0	
Processing	Red Followed By Green = 2	
Output Format	Blue Followed By Green = 1	
Miscellaneous		
Direct Register Access		

Figure 10: Setting the initial value for the Bayer filter

- Repeat the last three steps for the second camera.



Saving Your Settings

You can save all these settings:

8. From the **File** menu, select **Save This Configuration**.

2.4 Using the SDK

All changes you make in microDisplay and the GenICam Explorer you can also make in the Silicon Software SDK. For details, refer to the [SDK Section](#) in the [Runtime Documentation](#).

3 Image Acquisition

The system is now fully configured and you can start the acquisition.

1. Click the play button for one of the cameras.



To stop the acquisition, you simply click the stop button:



4 Troubleshooting

If you cannot acquire images, you might need to change the settings in microDisplay.

2. In the **Tools** menu, select **Options**.
3. Disable **Use GigE Camera Parameter**.
4. Enable **Ignore Cam Clock Status**.

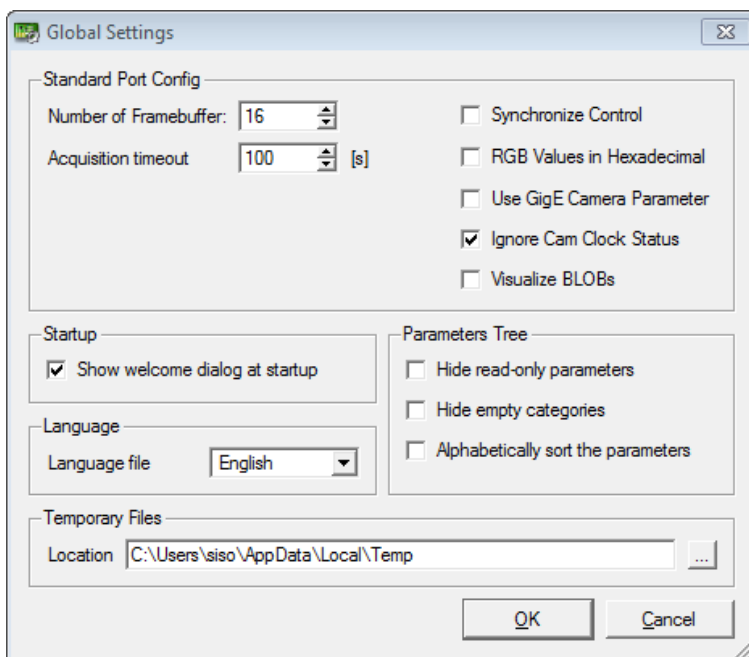


Figure 11: Global Settings in microDisplay



Saving Your Settings

You can save these settings:

5. From the **File** menu, select **Save This Configuration**.

All changes you make in microDisplay and the GenICam Explorer you can also make in the Silicon Software SDK as described in the runtime documentation. The MTU can be changed by function

```
int Gbe_setCameraPropertyWithType(struct CameraHandle *camera_handle, const  
char* propertyName, const void* propertyValuePtr, int propertyType);
```

with

- propertyName = "mtu"
- propertyValuePtr = MTU size
- propertyType = GBE_PROPERTY_TYPE_UINT

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