GigE Vision LAG

Acquisition Applets with Link Aggregation

Getting Started
Imprint

Silicon Software GmbH
Steubenstraße 46
68163 Mannheim, Germany
Tel.: +49 (0) 621 789507 0
Fax: +49 (0) 621 789507 10

© 2015 Silicon Software GmbH. All rights reserved.

Document Version: 2.0
Document Language: en (US)

Last Change: June 2015
Contents

1 Introduction .......................................................................................................................... 4
  1.1 GigE Vision LAG/Dual Link Cameras and Silicon Software Frame Grabbers .................. 4
    1.1.1 Supported Cameras ................................................................................................. 4
    1.1.2 Standard and Custom Applets Available ............................................................... 5
  1.2 Requirements ................................................................................................................ 5

2 Installation and Configuration .............................................................................................. 6
  2.1 Installation .................................................................................................................... 6
  2.2 Setting the Link Topology for LAG ............................................................................. 6
  2.3 Configuration ................................................................................................................ 8
    2.3.1 Matching Parameters ............................................................................................ 8
    2.3.2 Configuring Camera and Firmware ....................................................................... 9
    2.3.3 Configuring the Applet ......................................................................................... 12
  2.4 Using the SDK ............................................................................................................. 14

3 Image Acquisition .............................................................................................................. 14

4 Troubleshooting ................................................................................................................ 15
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 Acquisition Applets 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 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 Acquisition Applets, you need the following prerequisites:

- Frame Grabber: microEnable IV AQ4-GE/-GpoE or microEnable IV VQ4-GE/-GpoE
- Silicon Software Runtime
- Frame Grabber Firmware
- Acquisition Applets
  - 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](image)

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](image)

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](image)
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:

<table>
<thead>
<tr>
<th>Applet Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FG_MTU_SIZE</td>
<td>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.</td>
</tr>
<tr>
<td>FG_CAMERA_WIDTH</td>
<td>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 &quot;Width&quot;.</td>
</tr>
<tr>
<td>FG_SWAP_CHANNELS</td>
<td>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.</td>
</tr>
<tr>
<td>FG_WIDTH</td>
<td>ROI width. Has nothing to do with the settings in the camera. You should use a value less than FG_CAMERA_WIDTH.</td>
</tr>
<tr>
<td>FG_HEIGHT</td>
<td>ROI height. Has nothing to do with the settings in the camera.</td>
</tr>
</tbody>
</table>

*Table 1: Description of Parameters that have to match*
2.3.2 Configuring Camera and Firmware

To configure camera and firmware:

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

Important

For information on the other parameters and functionalities of the LAG Acquisition Applets, refer to the respective Applet Documentation in PDF or HTML format.
7. Select a Link Group and connect to the camera by clicking the **Quick Connect** button.

8. Go to the **Connection** tab.

9. 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.
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.

10. Go to the GenICam tab.
11. Change the camera parameters to your requirements:

![Camera Settings in the GenICam Explorer](image)

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](image)

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

7. Repeat the last three steps for the second camera.
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.

![Global Settings in microDisplay](image)

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

```c
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`
Contact Details

Silicon Software GmbH
Steubenstrasse 46
D - 68163 Mannheim, Germany
Phone: +49(0)621.789 507 39
Fax: +49(0)621.789 507 10
Email: vertrieb@silicon-software.de
Web: www.silicon-software.info

Silicon Software Inc.
1 Tara Boulevard, Suite 200
Nashua, NH 03062, USA
Phone: +1 603 324 7172
Fax: +1 603 324 7101
Email: info@silicon-software.com
Web: www.silicon-software.info

Disclaimer
While every precaution has been taken in the preparation of this manual, Silicon Software GmbH assumes no responsibility for errors or omissions. Silicon Software GmbH reserves the right to change the specification of the product described within this manual and the manual itself at any time without notice and without obligation of Silicon Software GmbH to notify any person of such revisions or changes.

Trademarks
All trademarks and registered trademarks are the property of their respective owners.

Copyright Note
© Copyright 2000–2015 Silicon Software GmbH. All rights reserved. This document may not in whole or in part, be reproduced, transmitted, transcribed, stored in any electronic medium or machine readable form, or translated into any language or computer language without the prior written consent of Silicon Software GmbH.