SILICONSOFTWARE

microEnable 5

CoaXPress Product Series

Runtime Version 5.3.300

Getting Started

Imprint

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Content

1 How to Use This Book

Image Acquisition – Quick Start

If you want to get started with image acquisition as quickly as possible, just follow the step-by-step instructions of the Quick Start Guide (chapter 2).

Further Set-Up-Options

Solutions for special tasks during setup are described in chapter 3. However, you will find links to the sections of chapter 3 in the Quick Start Guide whenever relevant.

SDK

If you want to use the SDK, refer to chapter 4 which provides you with useful information on how to move on.

Introductions into Various Related Topics

Chapter 5 provides you with information on hardware and technology behind.

Useful Background Information

Click on the links below if you want to get information on these topics:

Where to Find Further Documentation (section 5.4)

The „New Generation“ Interface Standards (section 5.1)

microEnable 5 CoaXPress Frame Grabber Series (section 5.2)

Frame Grabber Applets by Silicon Software (section 5.3)

2 Quick Start Guide

2.1 Getting the Frame Grabber Ready

2.1.1 Installing the Hardware

Requirements: PCIe 2.x (Gen2) interface with 8 available PCIe lanes (your mainboard manual provides information).

Caution

Before installing hardware, ensure that

- the system power is OFF and unplugged from the power outlet,
- proper electrical grounding procedures have been followed.

To install the CoaXPress Frame Grabber Hardware:

1. Shut down your computer.
2. Unplug your computer from the power outlet.
3. Plug the microEnable frame grabber into a free PCIe 2.x (Gen2) x8 slot of your PC.

Powering the Frame Grabber

Frame grabbers of the microEnable 5 family need an extra connection to the power supply.

4. Plug the 4pin Molex PC power supply connector into the frame grabber.
5. Boot the system.
6. After booting, the frame grabber is recognized in the Windows *Device Manager* under M*ultifunction adapters*.

7. There are two ways the frame grabber may be displayed under *Multifunction adapters*.
   If the frame grabber is displayed
   - as *Unknown device*: Proceed as described in the next section (2.1.2 Installing the Software) to install runtime 5.3.x. The relevant driver will be installed together with the runtime.
   - with the full name of the frame grabber: Make sure the frame grabber's driver is the same as the one available in the installation folder of the runtime. Otherwise, update the driver with the driver you find in the installation folder of the Silicon Software runtime 5.3.x.

	**Caution** Make sure you use an adequate ventilation system within your computer. This is of special importance if • there is little space between boards in a multi board installation, • an installation is close to a graphics card. We also recommend leaving enough free space between boards.

Figure 1: Plugged frame grabber board within a PC

2.1.2 Installing the Software

Clear your System

We recommend you first uninstall all Silicon Software runtimes prior to the version you are going to install. Make sure you also delete all related files on your system.

Important

Decide if you need to install the 64 bit version or the 32 bit version of the Silicon Software runtime.

1. Boot the system.
2. Uninstall all Silicon Software runtimes prior to the version you are going to install. Also delete all related folders in the Silicon Software installation folder.
3. Start the installation of runtime 5.3.x:
    a. Run the installer for runtime 5.3.x (64 bit / 32 bit) provided by Silicon Software or your local distributor.
    b. Alternatively, insert the installation DVD. Setup should start automatically. If this is not the case, start the setup within the windows folder of the installation DVD.
4. Install the software by following the installation dialogs.

Saving Disk Space

To use minimum disk space for your installation:

Select only the applets you really need and that comply with the frame grabber model you are using. (For example, if you use an microEnable 5 CXP frame grabber, uncheck all applets for Camera Link and GigE frame grabbers.)

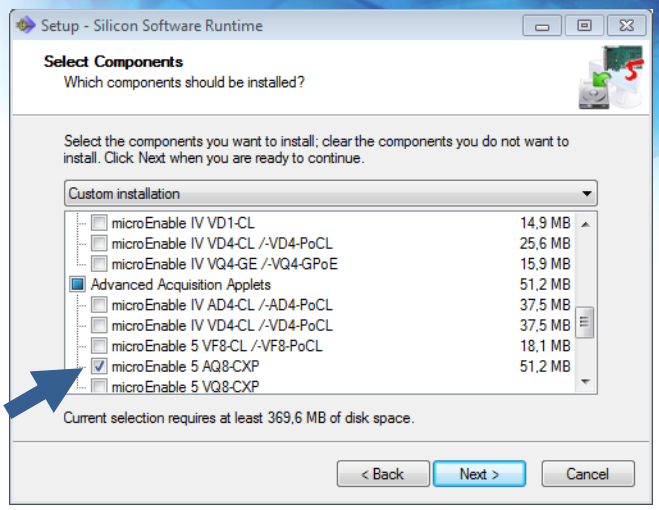


Figure 2: Selecting applets for a specific frame grabber model

2.1.3 Checking Pre-Installed Firmware (microDisplay)

The CoaXPress frame grabber is shipped with pre-installed firmware. Nevertheless, you might need to change this firmware.

For each combination of a certain CoaXPress camera interface with a certain camera type, a specific firmware has to be installed on the frame grabber. Thus, which firmware you need depends on the camera type and link topology you want to use.

The available options are:

Firmware	Number of Cameras	Camera Type	External Frame Grabber Connectors* (BNC or DIN)
Acq_SingleCXP6x4AreaGray8.dll	1	Area Scan	4x BNC/DIN (CXP Ports 1, 2, 3 and 4)
Acq_SingleCXP6x4LineGray8.dll	1	Line Scan	4x BNC/DIN (CXP Ports 1, 2, 3 and 4)
Acq_SingleCXP6x2AreaGray8.dll	1	Area Scan	2x BNC/DIN (CXP Ports 1 and 2)
Acq_SingleCXP6x1AreaGray8.dll	1	Area	1x BNC/DIN (CXP Port 1)

Firmware	Number of Cameras	Camera Type	External Frame Grabber Connectors* (BNC or DIN)
		Scan	
Acq_SingleCXP6x4LineRGB24.dll	1	Line Scan	4x BNC/DIN (CXP Ports 1, 2, 3 and 4)
Acq_SingleCXP6x4AreaGray10.dll	1	Area Scan	4x BNC/DIN (CXP Ports 1, 2, 3 and 4)

Table 1: List of available firmware

* Silicon Software offers CXP frame grabbers with connector type BNC and CXP frame grabbers with connector type DIN.

Speaking File Name

The DLL file name informs which interface and which camera are supported by the firmware:

- Acq = acquisition applet
- Single = the system works with 1 camera
- CXP6 = CXP6 interface standard is used (6 Gigabit per second)
- x4 = number of lanes (4 lanes are used)
- Information on the camera: line/area and color/gray
- Bit depth per pixel

To check which firmware is pre-installed:

1. Start the tool microDisplay.
2. In the dialog *I want to…*, select **Load Applet**.
3. In the *Load Hardware Applet* dialog, select the board you want to get information about (left upper corner).

4. The currently available firmware (supporting a certain camera) is highlighted.
5. Check if the highlighted firmware supports the camera and topology you want to use. (You get the relevant information from the name of the dll file.)
6. Make sure you get the relevant firmware on your grabber:
    - If the pre-installed firmware supports the camera and topology you need, proceed with the next section (2.2 Getting the Camera Ready).
    - If the pre-installed firmware does not support the camera and topology you need, proceed as described in section 3.1 Installing Firmware (microDiagnostics) in order to install the firmware you need on your grabber.

2.2 Getting the Camera Ready

2.2.1 Connecting the Camera Physically

To connect your camera to the frame grabber:

1. Plug all cables of your camera to the connectors of the frame grabber.

   We recommend you stick to the order of the ports:

    - Connect camera port 1 to port CXP 1 of the frame grabber (this is the closest port to the PCIe connector), and proceed accordingly, connecting
    - camera port 2 to frame grabber port CXP 2,
    - camera port 3 to frame grabber port CXP 3, and
    - camera port 4 to frame grabber port CXP 4.

Figure 3: BNC frame grabber ports (as specified in CXP standard 1.0)

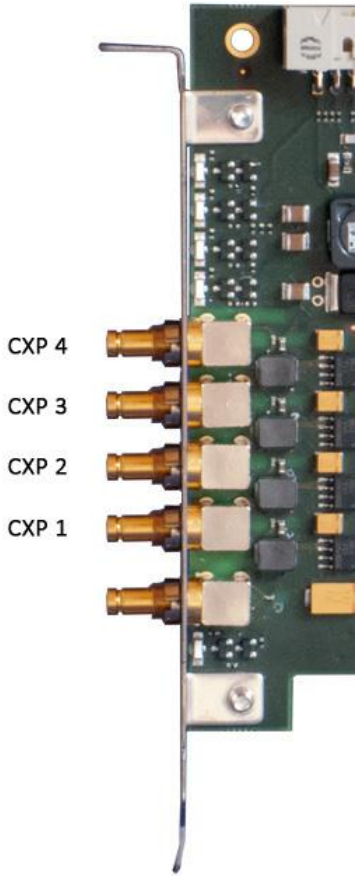


Figure 4: DIN frame grabber ports (The fifth connector is preserved for an additional high speed upconnection)

2.2.2 Autodiscovery (GenICam Explorer)

The *GenICam Explorer*

The tool *GenICam Explorer* comes as part of the runtime installation. The *GenICam Explorer* discovers connected cameras automatically and provides direct access to the GenICam interface of the camera.

Using the *GenICam Explorer*, you can

- configure and control the camera connection.
- configure the camera.

To connect the camera to the frame grabber:

1. Open the *GenICam Explorer* (Start -> All Programs -> Silicon Software -> Runtime x.x.x -> *GenICam Explorer*).

   On program start:

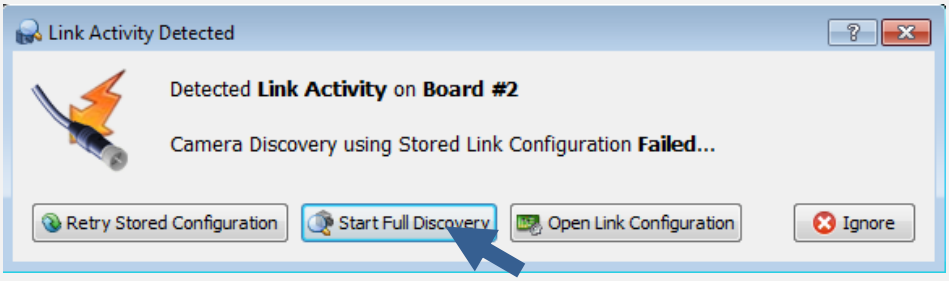
   - The start window of the *GenICam Explorer* opens.
   - The *GenICam Explorer* starts the automatic camera discovery.
   - The *GenICam Explorer* connects to the discovered camera.

Important

You can define if you want the GenICam Explorer to take all this steps automatically. If you prefer user interaction, you can configure the program behavior, see section 3.5 Configuring the Program Behaviour of the GenICam Explorer at Program Start.

Full Discovery

If the camera cannot be discovered on starting GenICam, the following dialog pops up:



1. Click on **Start Full Discovery**.

You see the current status of the camera discovery and the connecting process in the task bar:

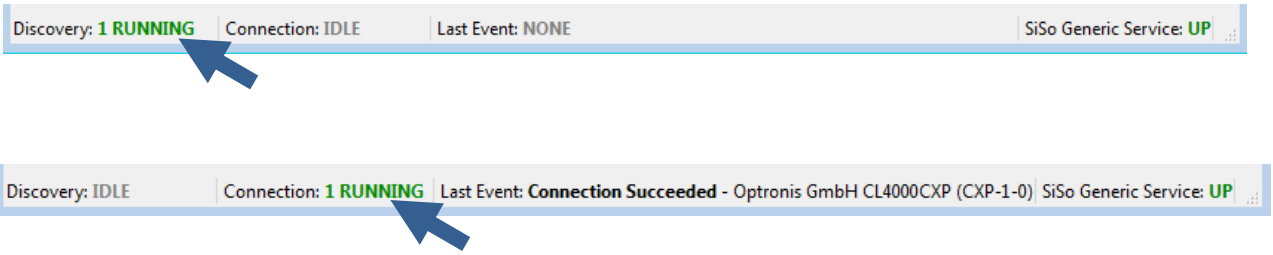


Figure 5: Enlarged Taskbar of Program Window during automatic Camera Discovery and automatic Camera connect

After successful camera discovery, all information on the detected camera and link topology is displayed:

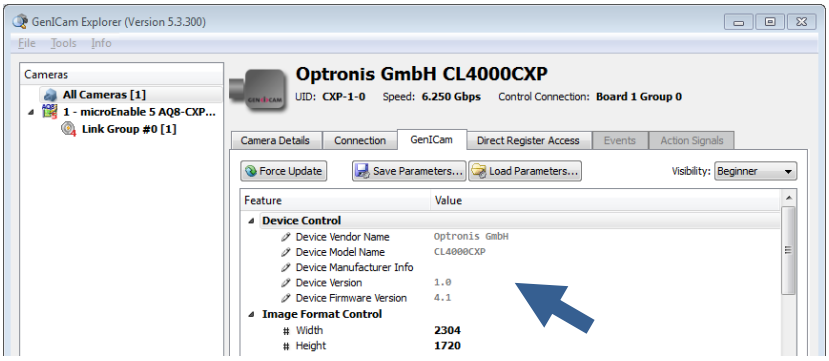


Figure 6: After automatic camera discovery, camera information is displayed

2. Use the scroll bar to go down to the link topology information:

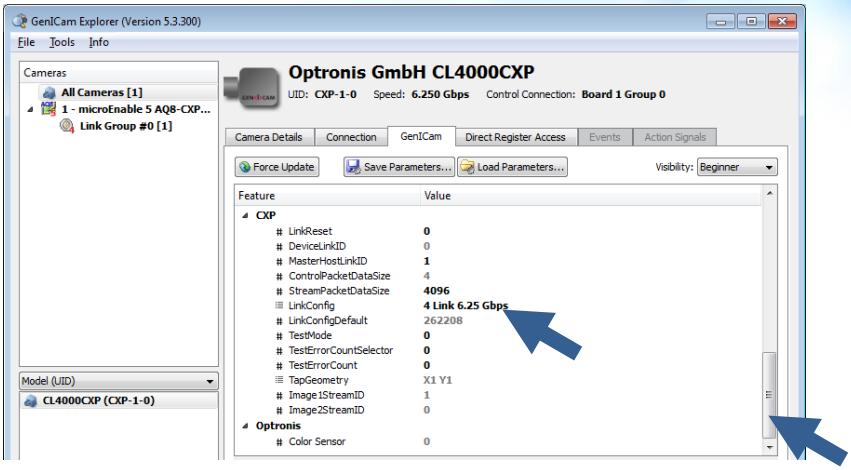


Figure 7: Link topology information being displayed after camera connection

3. Check if the link topology meets your requirements. (If more than one cameras are connected, you can select the camera in the left bottom panel *Model UID*).

   - If so, proceed as described in the next section (2.2.3 Configuring the Camera (GenICam Explorer).
   - If not, proceed as described in section 3.2 Adapting the Link Topology (GenICam Explorer).

2.2.3 Configuring the Camera (GenICam Explorer)

Prerequisites: The GenICam Explorer is started. On program start, the camera has been successfully discovered and connected.

	Connecting the Camera Manually If the camera is not connected yet, click the **Quick Connect** button. **Using External XML FIles** If you want to use an external configuration file for setting the camera parameters, see section 3.4 Using an External XML File.

The parameters of the GenICam interface with current settings are displayed in the *GenICam Explorer* directly after connecting to the camera. You are ready to start the actual camera configuration.

1. Adapt the settings of the GenICam parameters to your needs.
   In the column *Value*, type in or select the new value.
2. Scroll down to access all parameters.

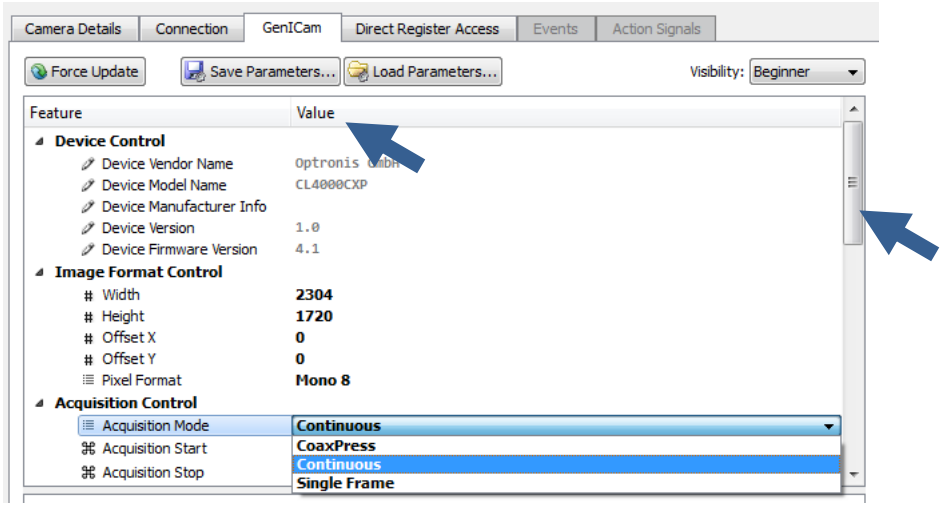


Figure 8: Changing parameter values under *Value*

To see your changes after modifying parameter values:

3. Click on the **Force Update** button. The display will be updated immediately.

	Writing Data Directly into the Camera During image acquisition, the camera will use the settings you define here, since you are writing the data directly into the camera. There is no need to load the XML file onto the camera.

2.3 Image Acquisition with the Tool microDisplay

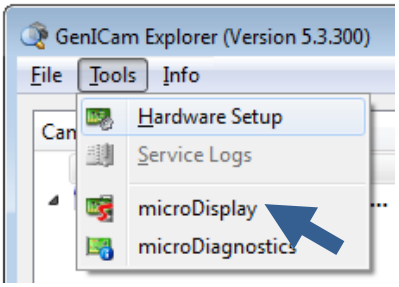
2.3.1 Starting the Image Acquisition

To start the image acquisition:

1. Start the tool microDisplay either by

   - clicking on the microDisplay icon 

   - clicking on ***START -> All programs -> SiliconSoftware -> RT 5.3 CXP -> microDisplay***, or
   - directly from the GenICam Explorer menu:



2. Load the appropriate applet into microDisplay. The applet is contained in the same DLL file as the firmware. To load the applet into microDisplay:

   a. In the start dialog *I want to…*, select **Load Applet**.

   b. In the dialog *Load Hardware Applet*, select the board (frame grabber) you want to work with.

   c. One applet (supporting a certain camera) is highlighted. It corresponds to the firmware currently installed on the frame grabber.

Tip

If you need another applet than the highlighted one: Install the firmware that comes with the applet you need, see section 3.1 Installing Firmware (microDiagnostics).

   d. Select the highlighted applet and click on the load button:

Figure 9: Load button in microDisplay

   e. Close the Load Hardware Applet dialog.

3. Enter the corresponding values for image width and height in the parameter panel -> ROI:

   a. Right-click directly on the value and select **Edit**.

   b. Enter the value.

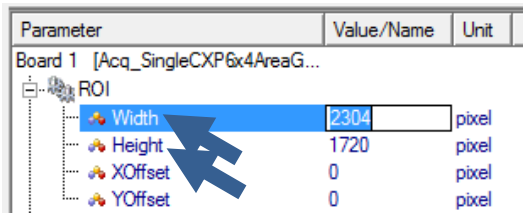


Figure 10: Entering ROI parameters

4. Start image acquisition on the frame grabber by clicking on the button *Grab and display an infinite number of frames*  .

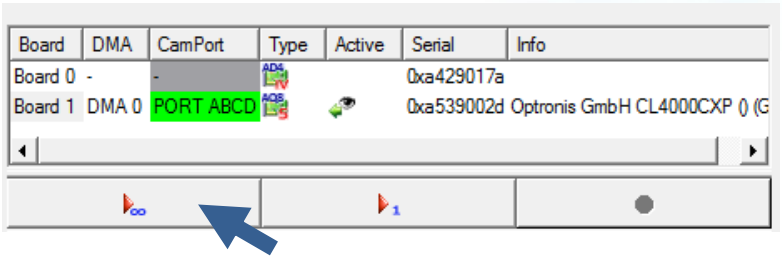


Figure 11: Starting image acquisition on the frame grabber

The grabbed images are now displayed in *microDisplay*:

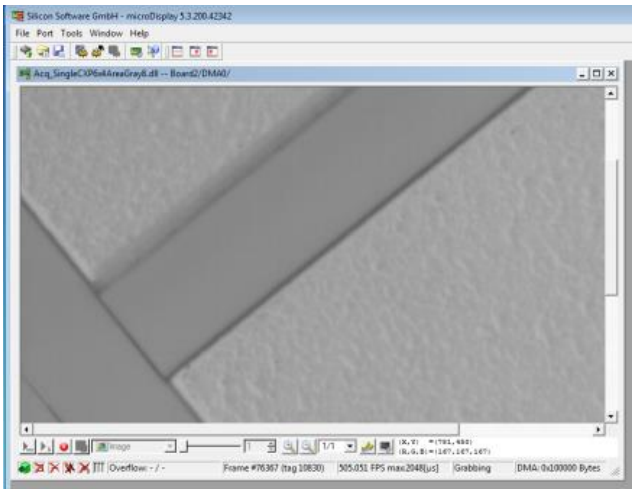


Figure 12: Display of grabbed images in the tool *microDisplay*

5. To stop the acquisition, click on the stop button in *microDisplay*:

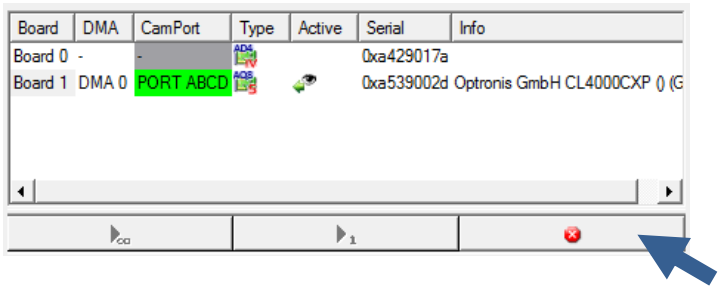


Figure 13: Stopping acquisition on the frame grabber via microDisplay

2.3.2 Using the Shading/FPN Correction Feature

Details on how to use Shading/FPN Correction can be found in the according applet documentation.

In the following, you get a quick introduction on how to use offset correction.

Generation of correction coefficients, pixel by pixel – Offset correction

1. Start microDisplay and load the applet (see section 2.3.1).
2. Set the camera to the desired exposure time.
3. Cover the sensor / the camera objective (no light should come on the sensor).
4. Record a black image by clicking the button  as shown in the picture below.
5. Save the black image as a TIFF file to the hard drive.

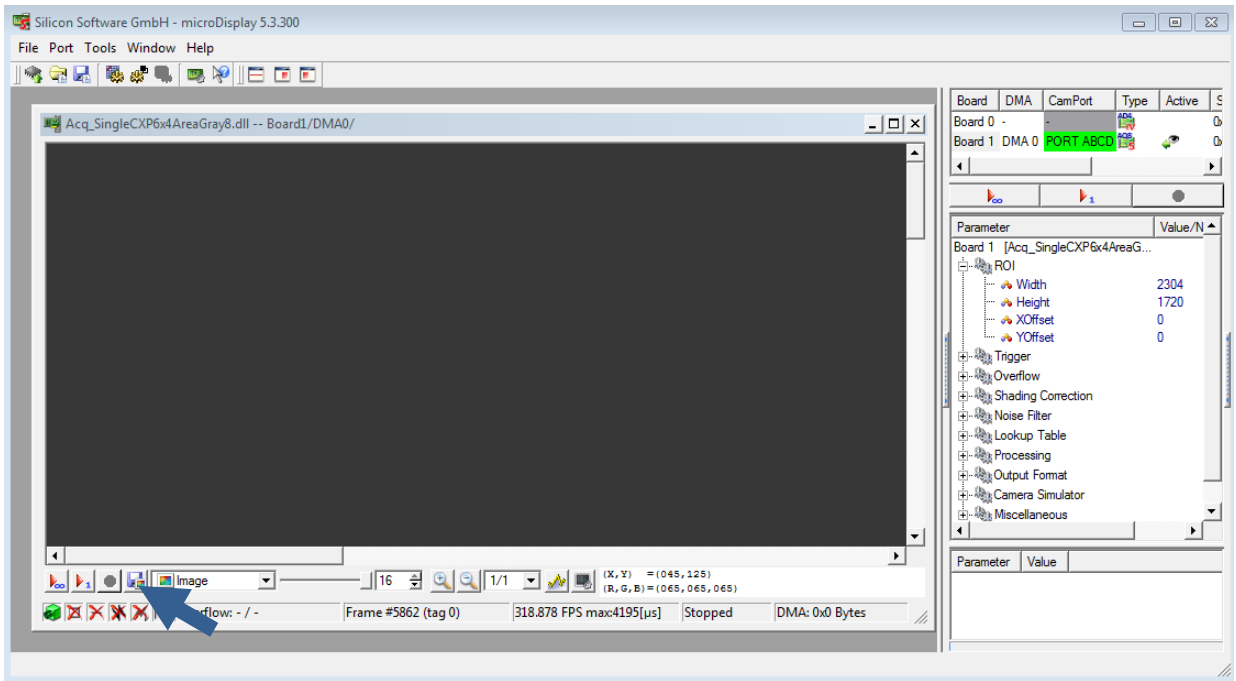
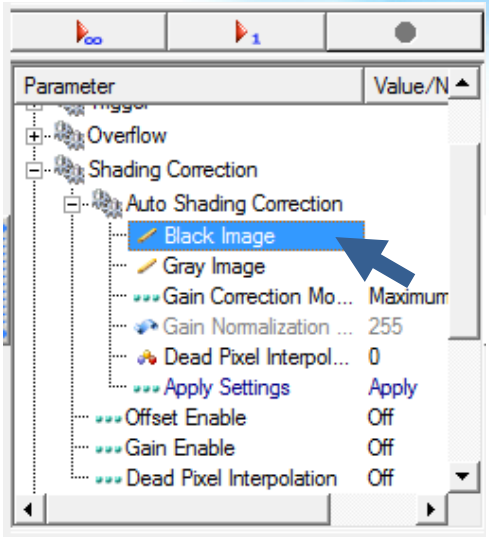


Figure 14: Button for recording and saving an image

In the middle panel on the right hand side of the Program Window, go to **Black Image**:



6. Right-click on **Black Image** and load the black image you just created.
7. Set *Apply Settings* to **Apply** (via right click).
8. Set *Offset Enable* to **On** (via right click).

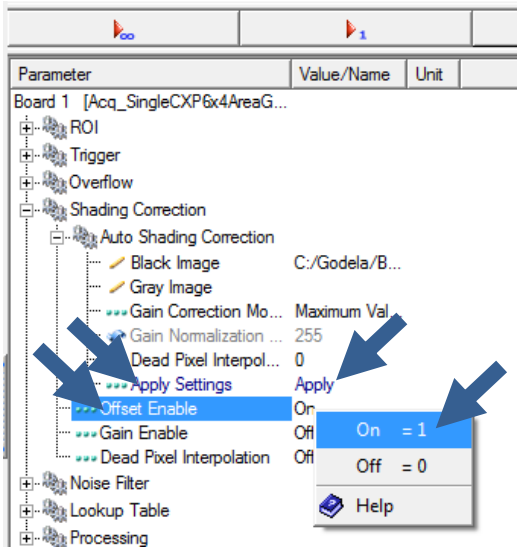


Figure 15: Setting the parameters to enable offset correction

Now you can start acquisition. Image quality should be much better than without Shading/FPN correction.

Note

In almost the same manner, gain correction can be configured and used.

2.3.3 Using SmartApplets 3D Laser Triangulation – Peak Detector

Important

SmartApplets 3D Laser Triangulation can only be used on V Series frame grabbers.

Details on how to use SmartApplets 3D Laser Triangulation (Peak Detector) can be found in the according applet documentation.

In the following you get a quick introduction on how to use it.

Take the following steps:

1. Start *microDisplay* and load the applet.
2. Set the following parameters:
   - Camera (Image) Width,
   - (RoI) Width, and
   - (RoI) Height.
3. Select the image output you want to get.
   The parameter Image Output allows to control the output. You have three possibilities:
   - (1) *Laser Line and Image*,
   - (2) only *Laser Line*,
   - (3) only *Image*.

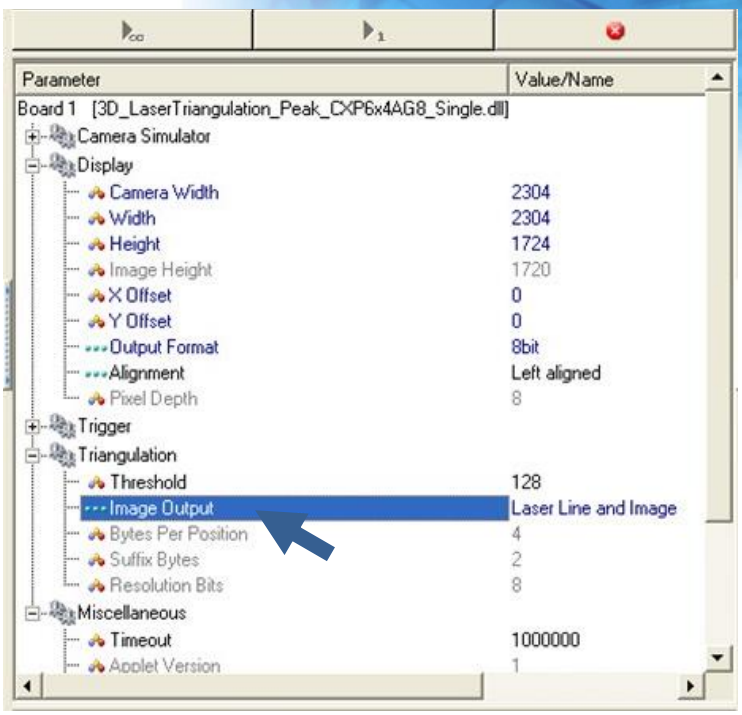


Figure 16: Setting parameters to enable 3D laser triangulation

4. Start the acquisition.

2.4 Overall Image Acquisition Procedure – Summary

1. Camera and CXP link topology (number of links and speed) are discovered automatically. The camera is connected automatically.
   Option: You can configure CXP link topology and speed manually.
2. The GenICam file is loaded from the camera automatically. Option: Alternatively, you can load a GenICam file from the hard disc to control the camera.
3. Configure the camera, if necessary.
4. Start acquisition in *microDisplay*.
5. ….
6. Stop acquisition in *microDisplay*.
7. Quit or go back to step (4).

3 Further Setup Options

3.1 Installing Firmware (microDiagnostics)

To install another firmware on the frame grabber:

1. Close the *tool microDisplay*.
2. Start the tool *microDiagnostics*.
3. Select the frame grabber you want to use.

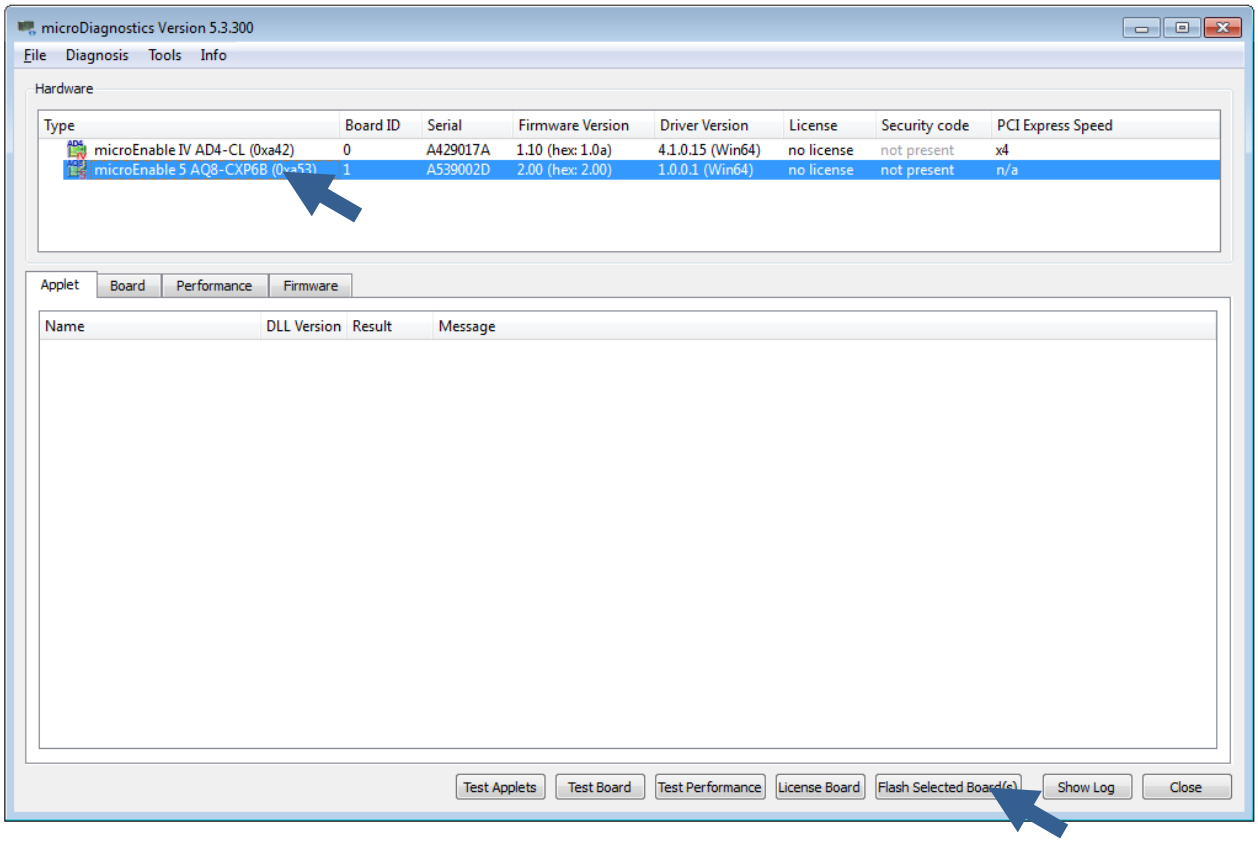


Figure 17: Start window of microDiagnostics

4. Click the button **Flash Selected Board(s)**. A new window opens.
5. Open the folder which has the name of your frame grabber.
   Here, you find all firmware files available for this frame grabber.

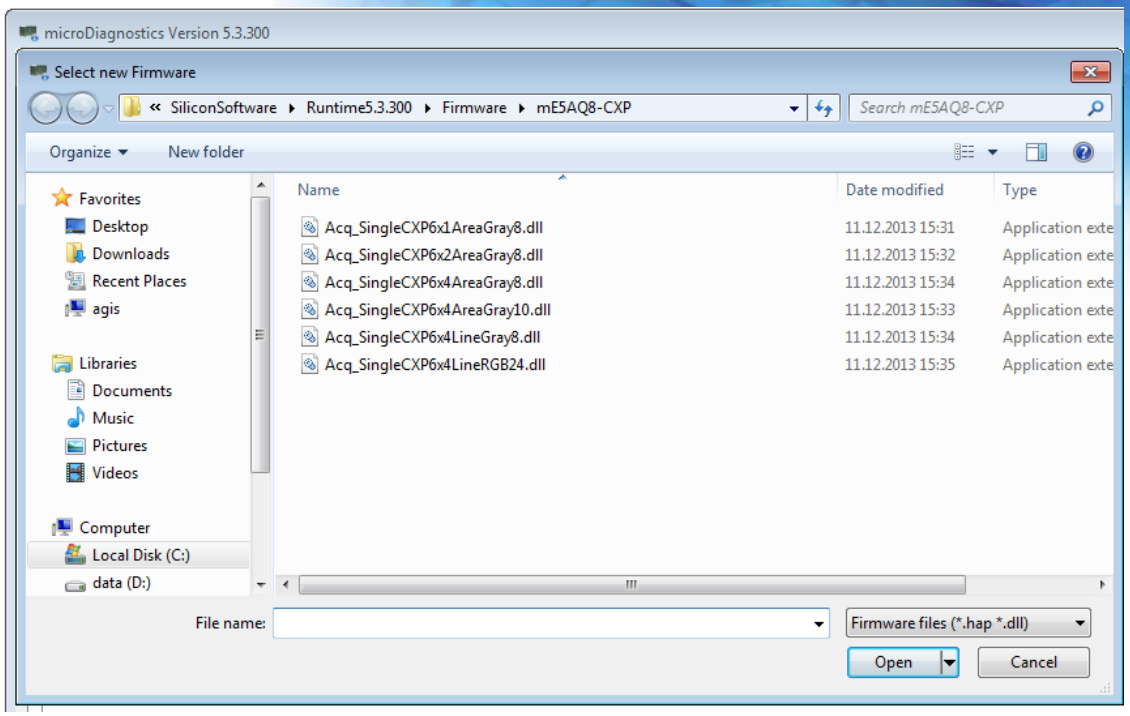


Figure 18: List of firmware files available for flashing the selected frame grabber board

7. Select the firmware you need. (The file name gives information which interface and which camera are supported by the firmware, see above.)

	Important When working in a 32-bit environment, use the firmware DLL files that come with the 32-bit installer. When working in a 64-bit environment, use the firmware DLL files that come with the 64-bit installer.

8. Click on **Open** and confirm by clicking on **Yes**.

	Hands off! During firmware installation, stay away from keyboard and mouse to make sure you don't interrupt the process accidentally.

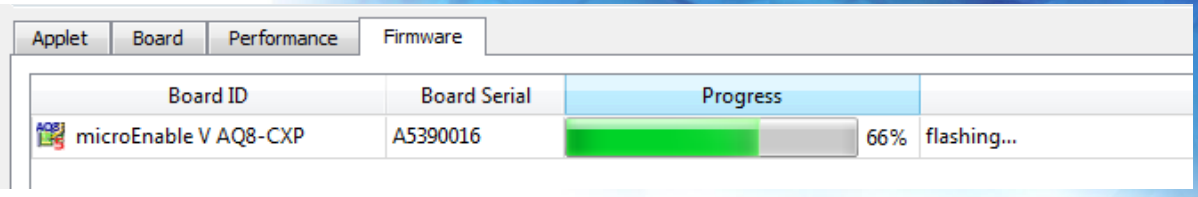


Figure 19: Flashing in progress – as displayed in microDiagnostics

9. Wait until the new firmware is completely installed. You get an according message in microDiagnostics:

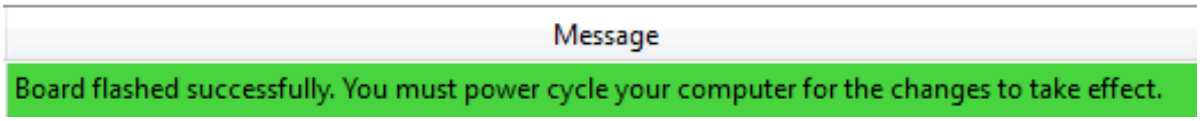


Figure 20: Message after successful flashing

10. Power cycle your computer:
    a. Shut down your computer.
    b. After the computer is completely off, wait for some seconds.
    c. Start the computer again.

	**Complete Shut Down Essential** For power cycling, it is not enough use the *Restart* option of Windows. Complete shut down and following new start are essential when you need to power cycle your computer.

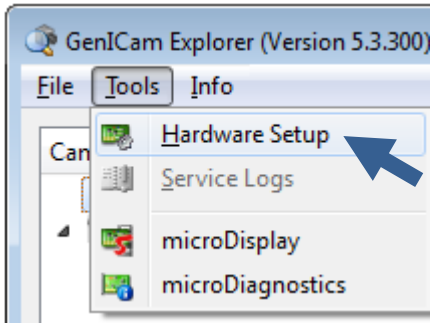
11. Proceed with section 2.2 Getting the Camera Ready or go back to section 2.3.1 Starting the Image Acquisition.

3.2 Adapting the Link Topology (GenICam Explorer)

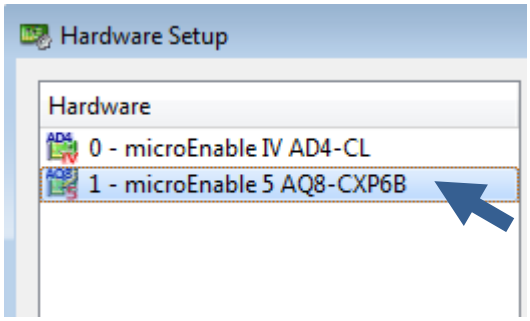
To adapt the link topology to your needs:

1. Open the *GenICam Explorer*.

2. On the **Tools** menu, select **Hardware Setup**.

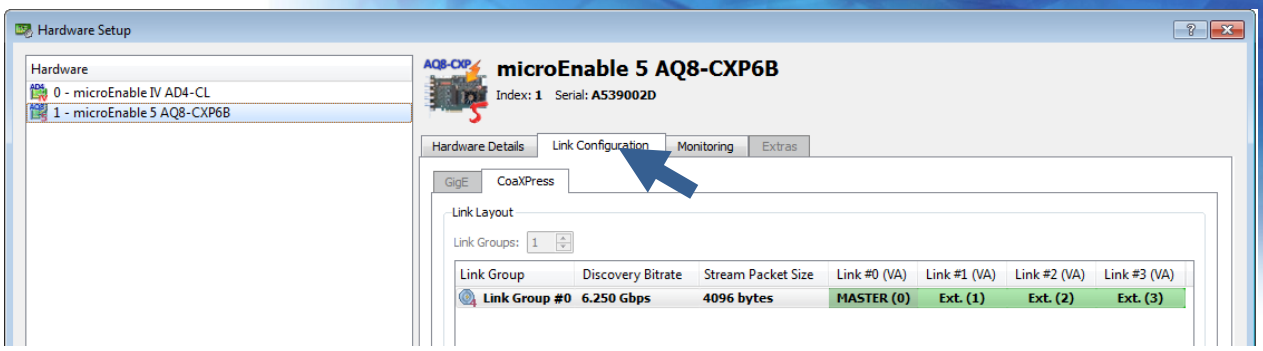


3. In the window that opens, select the frame grabber you are working with.



4. Go to the tab **Link Configuration**.

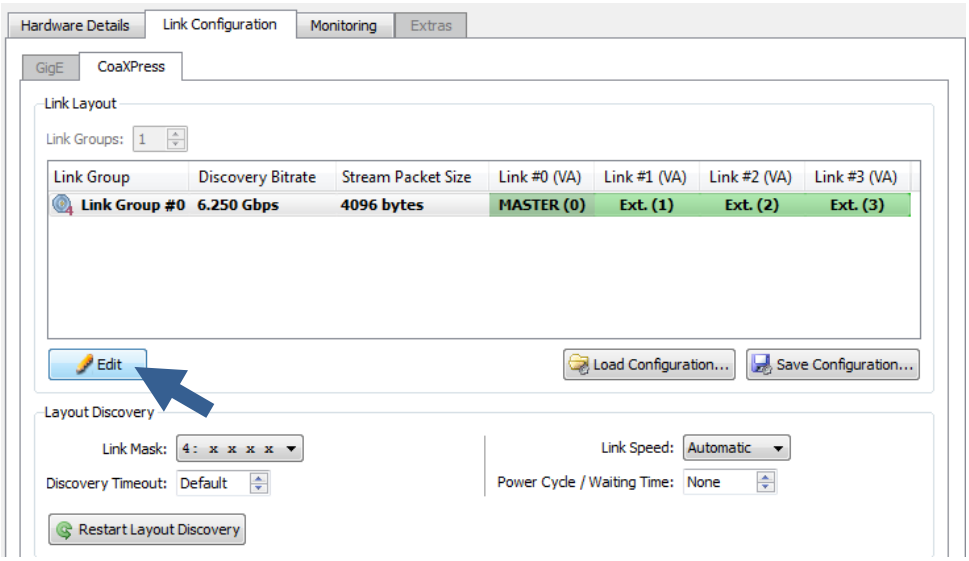
The current link topology is displayed:



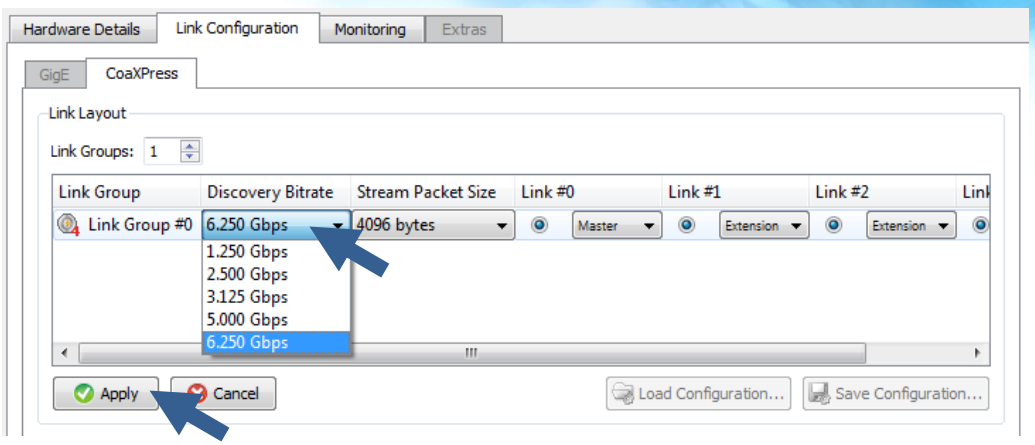
	Note If the current link topology cannot be detected, or if you changed the cable connection(s), see section 3.3 Starting Link Topology Detection Manually

When the link topology is discovered:

5. Click on the **Edit** button.

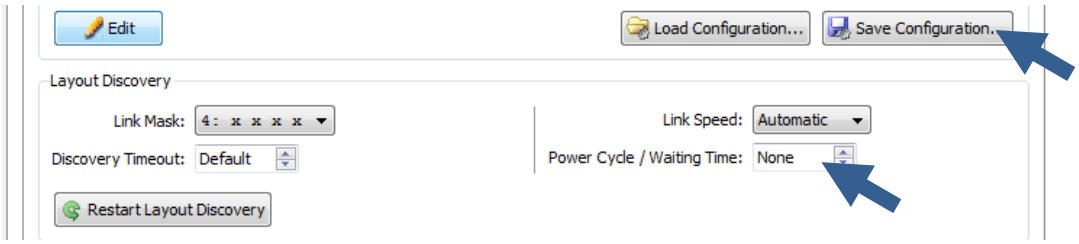


Now, the parameters are editable:



6. Adapt the parameter settings to your needs.
7. Confirm by clicking the **Apply** button.

	Important Each configuration can be saved to a file. You can also load configurations available as file by clicking on the **Load Configuration…** button.



8. Save your configuration by clicking the **Save Configuration…** button.
9. In the field *Power Cycle / Waiting Time*, enter the specific camera's booting time, for example 50000 ms.
10. Close the *Hardware Dialog* window.

11. Verify the speed under *Camera Details / Link Configuration*: **4 links @ 6.250 Gbps** should be available.

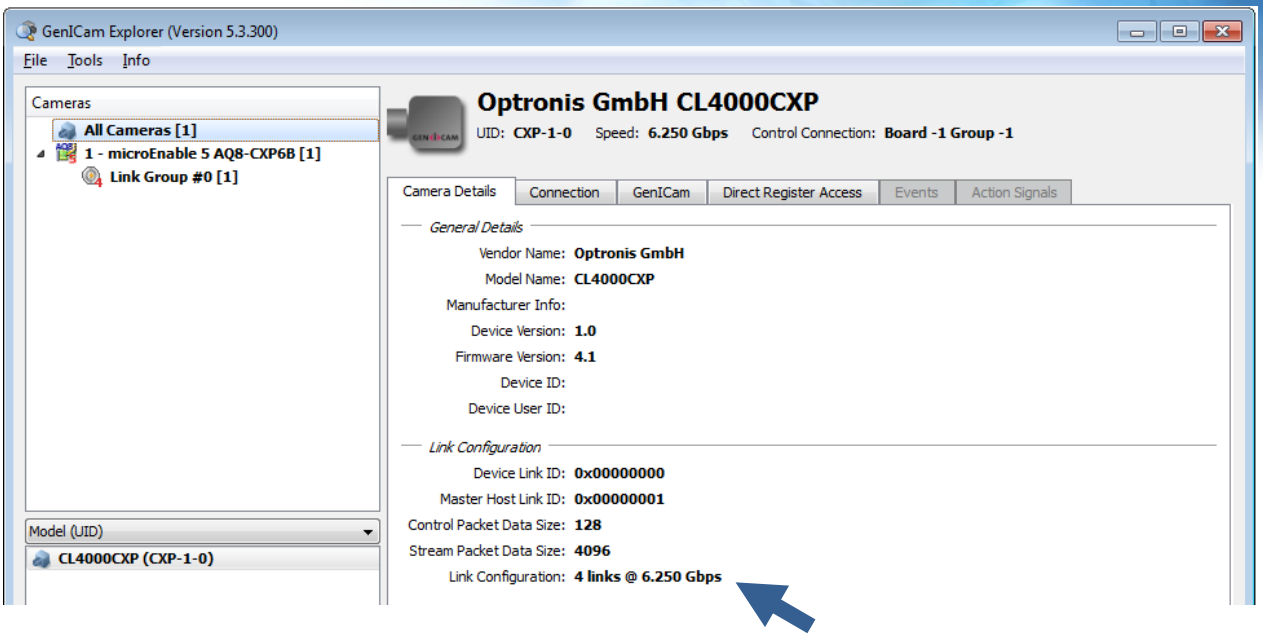


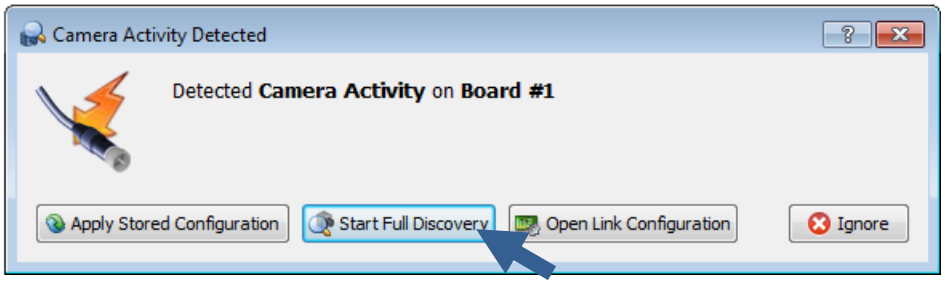
Figure 21: Link speed for maximal use of CoaXPress

12. Proceed with the section 2.2.3 Configuring the Camera (GenICam Explorer).

3.3 Starting Link Topology Detection Manually

If the current link topology cannot be detected, or after you changed cable connections, one of the following two situations will appear. Proceed as described below to discover the camera and the link topology.

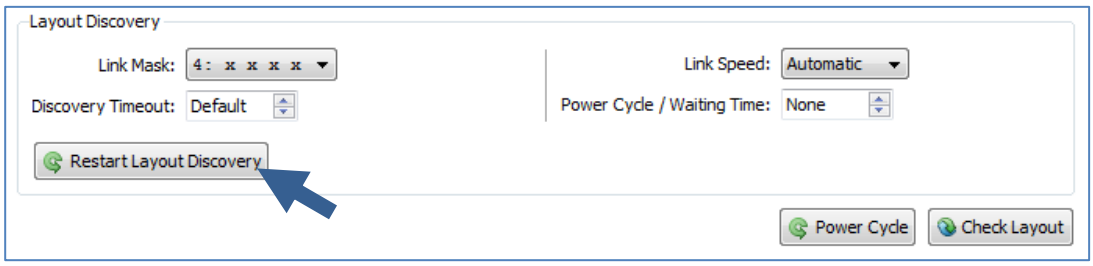
a) The following dialog appears. In this case, simply click on **Start Full Discovery**.



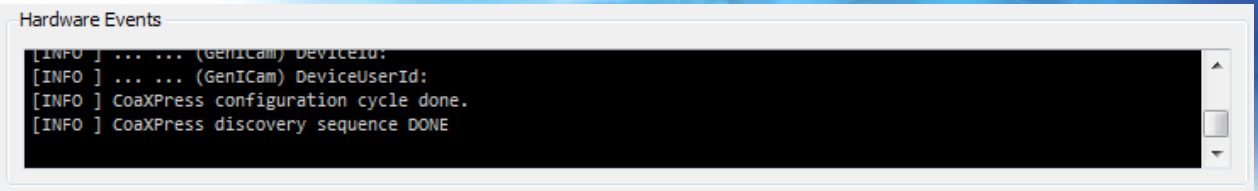
b) There is no dialog.

In this case, to discover the current link topology:

1. Open the *GenICam Explorer*.
2. On the **Tools** menu, select **Hardware Setup**. The *Hardware Setup* dialog opens.
3. In the left upper corner, select the frame grabber you are working with.
4. Go to the **Link Configuration** tab.
5. Click on **Restart Layout Discovery**.



6. Wait until the process is finished. You get an according message:



The current link topology is displayed now.

7. Continue with adapting the link topology as described in section 3.2 at "When the link topology is discovered …".

3.4 Using an External XML File

Alternatively, you can also use an external XML file to configure the camera. In this case, you load the XML file from your file system and not from the camera.

To load an external XML file into the GenICam Explorer and on the camera:

1. Go to the **Connection** tab.
2. Activate the radio button **User Supplied GenICam XML File**.
3. Select the GenICam XML file you want to use. (Use only files supplied by the camera vendor).
4. Click on **Connect**.

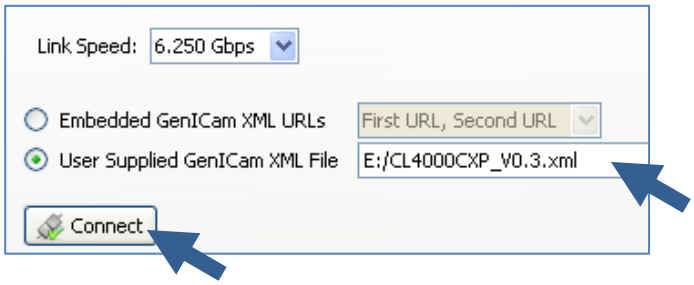


Figure 22: Loading an external XML file

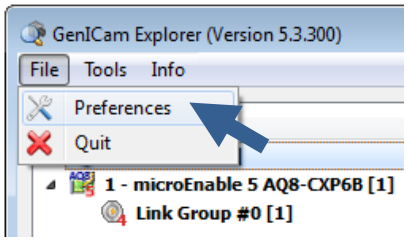
It might take some seconds to load the file. The parameters of the GenICam interface with current settings are displayed. You are ready to start the actual camera configuration.

5. Proceed with step 1 in section 2.2.3 Configuring the Camera (GenICam Explorer).

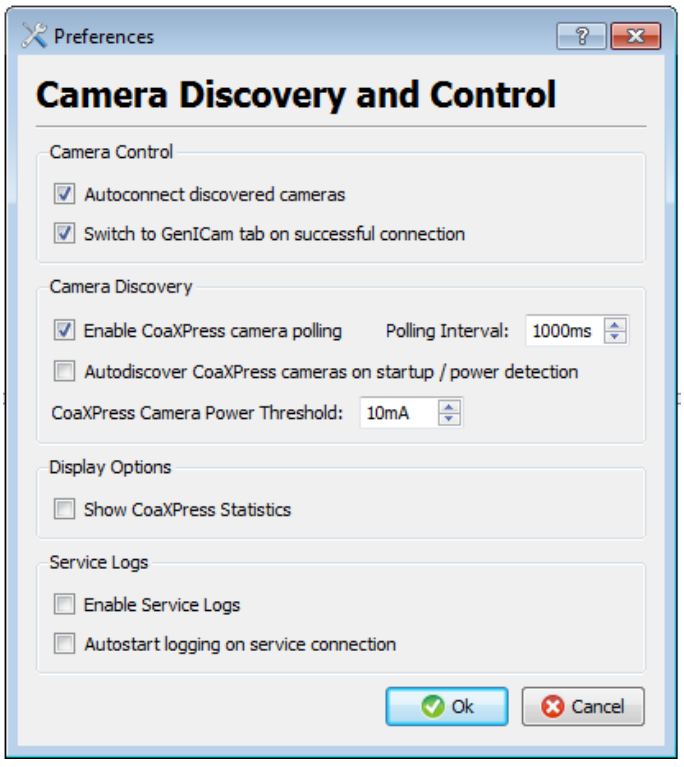
3.5 Configuring the Program Behaviour of the GenICam Explorer at Program Start

To configure the program behavior at program start:

1. In the **File** menu, select **Preferences**.



2. Select the options according to your needs:



If you want to go on with getting your camera ready, proceed with section 2.2.2 at "You see the current status of the camera discovery …".

3.6 Resetting the Global Settings in microDisplay

To change microDisplay's *Global Settings* Dialog:

1. Select **Tools** -> **Options (Global Settings)**.

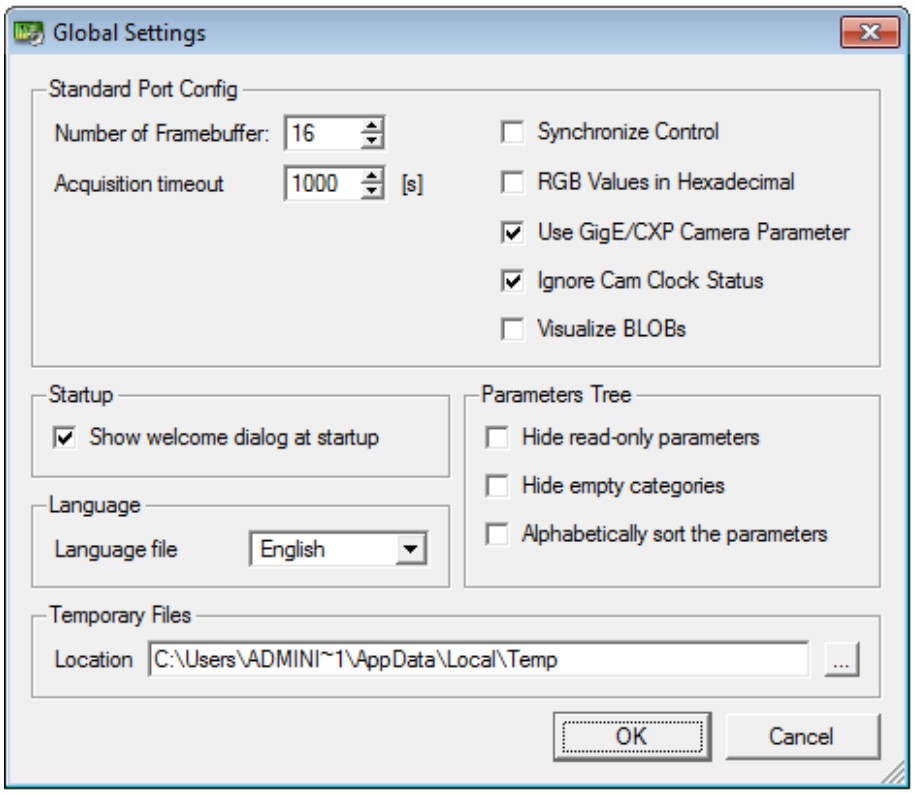


Figure 23: Global Settings Dialog in microDisplay

2. Under *Standard Port Config*, change the following settings in order to allow image acquisition:
    a. Set *Acquisition timeout* to 100 s. This is the expected time gap between starting the image acquisition in microDisplay and the camera sending the first frame.
    b. Activate *Ignore Cam Clock Status*.
    c. Click the **OK** button.

4 Image Acquisition using the Silicon Software SDK

For detailed information on the Silicon Software SDK, please refer to the SDK documentation that comes with the runtime documentation:

Figure 24: Documentation set for the microEnable 5 CXP & Runtime

Here, you will find all SDK documentation, including a general function reference and a CoaXPress specific function reference.

Silicon Software also provides a set of SDK examples which comes together with the SDK documentation.

5 Additional Information

5.1 The „New Generation“ Interface Standards

With the release of the Camera Link standard in 2000, the basis was laid for a fast data transfer between camera and frame grabber which also met the high demands on temporal and communication behavior. With the current generation of high resolution and high speed sensors, the common understanding of what is meant by *High Bandwidth* has been exceeded. The need of a succeeding standard has become urgent.

With CoaXPress and Camera Link HS, two legitimate successors have been specified that found the „next generation” of high-speed applications. Both standards include recent technology developments and customer demands for comfort and ease of use in Machine Vision. With data bandwidths up to 2.4 GByte/s, cable lengths over 100 meters, power management over data cables, highly accurate timing, simple handling, and interoperability by the Gen<i>Cam software interface, the standards are not only the currently most powerful, but also the most flexible ones.

Nevertheless, the two standards differ in their technical focusses and designs. This is ideal since it allows to use their specific strength in individual applications. The synergy of both standards provides perfect solutions for nearly all professional requirements in Machine Vision and allows for a wide range of products, reaching from replacements of analog image processing technology up to use in highest speed applications.

Silicon Software is one of the very few manufacturers that offer a comprehensive product portfolio supporting the „new generation” standards. The brand new generation of frame grabber products, ***microEnable 5***, has been developed for CoaXPress and Camera Link HS. It is based on the PCI Express bus technology for the PC and implemented with a PCIe x8 version 2.0 interface. To use the full bandwidth of the interface, Silicon Software developed the DMA3600 data transfer technology with up to 3.6 GByte/s as a practical benchmark, which is slightly below the theoretical data transfer bandwidth of 4 GByte/s. Thus, the 2.4 GByte/s necessary for cameras with 4*CXP-6 transfer mode are provided, and even a surplus of data bandwidth is available for on-board image processing or color reconstruction from CFA cameras (Bayer filter).

Silicon Software's product development is continuously considering improvement and changes in the CoaXPress standard and offers solutions upon release of succeeding specifications and camera availability.

5.2 microEnable 5 CoaXPress Frame Grabber Series

Silicon Software offers a broad portfolio to support "new generation" cameras. Frame grabbers for the CoaXPress standard with four camera connectors (BNC and DNC available) have been designed that can achieve 600 Mbyte/s per input (CXP-6). The ports are back-ward compatible (CXP-1, CXP-2, CXP-3, CXP-5) and can be operated with various camera performance categories and numbers (e.g., four single-port cameras with 1*BNC/DIN connector, two dual-port cameras, each with 2*BNC/DIN connectors, 1 quad-port camera with 4*BNC/DIN connectors, and others). The specified maximum bandwidth of 2.4 GByte/s is achieved.

Currently, the microEnable 5 CoaXPress frame grabber series comprise four frame grabber models:

1. microEnable 5 AQ8-CXP6B: four CXP links (on BNC connectors) running at up to CXP-6 speed
   - supporting AcquisitionApplets with diverse features, e.g., shading correction or trigger
2. microEnable 5 AQ8-CXP6D: four CXP links (on DIN connectors) running at up to CXP-6 speed
   - supporting AcquisitionApplets with diverse features, e.g., shading correction or trigger
3. microEnable 5 VQ8-CXP6B: four CXP links (on BNC connectors) running at up to CXP-6 speed
   - supporting AcquisitionApplets with diverse features, e.g., shading correction or trigger

- supporting SmartApplets, e.g., 3D laser triangulation methods (CoG, Peak detector/Aqsense)
- supporting VA Applets, i.e., real-time image and signal processing solutions running on the on-board FPGA that have been programmed with VisualApplets

4. microEnable 5 VQ8-CXP6D: four CXP links (on DIN connectors) running at up to CXP-6 speed
   - supporting AcquisitionApplets with diverse features, e.g., shading correction or trigger
   - supporting SmartApplets, e.g., 3D laser triangulation methods (CoG, Peak detector/Aqsense)
   - supporting VA Applets, i.e., real-time image and signal processing solutions running on the on-board FPGA that have been programmed with VisualApplets

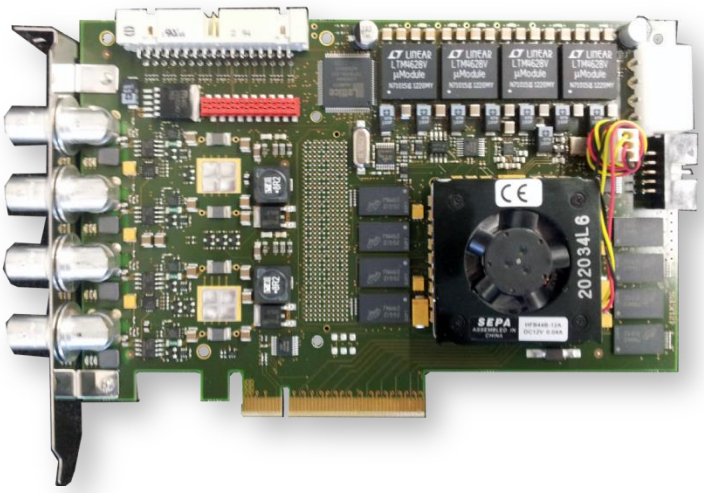


Figure 25: microEnable 5 CXP frame grabber board

5.3 Frame Grabber Applets by Silicon Software

Real-time on-board image processing functions running on Silicon Software frame grabbers are basically grouped and represented by applets. This section gives an introduction into the world of applets and the availability of different types of applets for certain frame grabber models.

An applet represents a certain, pre-defined set of acquisition and image processing functions. For example, an applet may incorporate a Camera Link Full interface in combination with noise filter, Bayer decoding, flat field correction, a LookUp-table (LUT), and a trigger module. Or an applet provides support for a CoaXPress camera with 4 physical links, each running at CXP-6 speed. Applets can generally be parameterized.

An applet has to be loaded onto the frame grabber for using its functionality as defined part of a certain image acquisition system. The applet concept and handling is comparable to the concept of using Apps for a Smartphone: Without a certain App being installed on a Smartphone, the Smartphone does not support the specific function. The same is true with our frame grabbers: Only with a certain applet loaded onto the frame grabber, the applet's specific set of image processing and image acquisition functions can be executed.

Tip

Even during power on phase, you can load, unload and reload applets unlimited times by overwriting the currently installed applet.

Effects on Power off

Please note that with powering off the frame grabber, the applet disappears. After power on, the applet needs to be (re-)loaded.

Silicon Software's two frame grabber flavors: A-Series and V-Series

Silicon Software offers two different frame grabber series: A-Series and V-Series.

Both series support various camera interfaces – at the moment, these are Camera Link, GigE Vision, LVDS, CoaXPress, and Camera Link HS.

There are three different applet types available:

- AcquisitionApplets and Advanced AcquisitionApplets,
- SmartApplets, and
- VA Applets.

AcquisitionApplets cover a basic set of acquisition and real-time image processing functions. AcquisitionApplets are available for all A-Series and V-Series frame grabber – Camera Link, GigE Vision, LVDS, CoaXPress, and Camera Link HS based.

Advanced AcquisitionApplets cover a set of advanced acquisition and real-time image processing functions. Advanced AcquisitionApplets are currently available for the following A-Series and V-Series frame grabbers (Camera Link based):

- microEnable IV AD4-CL
- microEnable IV AD4-PoCL
- microEnable IV VD4-CL
- microEnable IV VD4-PoCL

SmartApplets are application-related image processing libraries. SmartApplets related to the same thematic area are grouped together, forming SmartApplets families which might address a certain industry, application, or technology. SmartApplets are continuously enhanced. SmartApplets are available for V-Series frame grabber.

VA Applets (VisualApplets applets) are customized, individually created applets with a custom functionality programmed with the graphical FPGA design environment VisualApplets.

Frame Grabber Series	[Advanced] AcquisitionApplets	SmartApplets	VA Applets
microEnable IV Camera Link **A**-Series	Yes		
microEnable IV Camera Link **V**-Series	Yes	Yes	Yes
microEnable IV GigE Vision **A**-Series	Yes		
microEnable IV GigE Vision **V**-Series	Yes	Yes	Yes
microEnable 5 CoaXPress **A**-Series	Yes		
microEnable 5 CoaXPress **V**-Series	Yes	Yes	Yes
microEnable 5 Camera Link HS **A**-Series	Yes		
microEnable 5 Camera Link HS **V**-Series	Yes	Yes	Yes

Table 1: Frame grabber series and applet support

5.4 Where to Find Further Documentation

Silicon Software provides deep and comprehensive documentation for its frame grabber series.

The documentation is part of the installation package. After installation of the runtime software package, you find the documentation in the Windows start menu.

	Where to find the Documentation *START -> All Programs -> SiliconSoftware -> Runtime 5.3 CXP -> Documentation*

The most relevant information for running your CXP frame grabber for the first time is:

Figure 26: Documentation set for the microEnable 5 CXP & Runtime

You get the following information:

1) Image Acquisition

   Information on

   - How frame grabber applets work
   - Applets for individual frame grabber models
   - How to set up an image acquisition
   - Trigger boards and how to use them

2) Frame Grabber Hardware

   Information on

   - Individual frame grabber boards and accessories

3) Software Development Kit (API)

   - Introduction to this powerful image acquisition library
   - SDK Manual
   - SDK Reference
   - SDK examples as a quick and simple starting point for your own C/C++ projects

4) Tools

   Information on

   - Camera configuration with *GenICam Explorer*
   - Image acquisition with *microDisplay*

6 Additional Applets and Patches

Our products are under continuous development. New applets, providing advanced new features, are constantly added to our portfolio to meet the needs of our customers.

As the microEnable 5 CXP is constantly improved and enhanced, there are also some patches available.

All new developments will be part of the next release. If you want to get information on new applets and patches in advance, or if you want to get these enhancements prior to the next release, feel free to contact our SiliconSoftware support team:

mailto:support@silicon-software.de

Phone: +49 621 789 50 70

6.1 How to Install New Firmware and Applets

To make new applets available on your system, proceed as follows:

1. Obtain the DLL File(s) you need from the Silicon Software support team (as described above).
2. Make sure you copy the DDL-File you need into both following folders:
   - [SiliconSoftwareInstallDir]\Dll\mE5AQ8-CXP
   - [SiliconSoftwareInstallDir]\Firmware\mE5AQ8-CXP
3. Proceed as described in section 3.1 Installing Firmware (microDiagnostics) to flash your frame grabber with the new file.

7 Support

For technical support please contact our support team:

mailto:support@silicon-software.de

Phone: +49 621 789 50 70

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