Allied Vision

CAMERA LINK SWIR CAMERAS

Goldeye CL

Installation Manual

V2.0.0

Allied Vision Technologies GmbH // Taschenweg 2a, D-07646 Stadtroda, Germany

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Allied Vision

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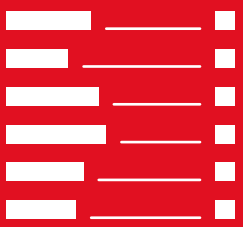

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Contacting Allied Vision

Support

Technical information and support:

To obtain further technical information and request technical support, use the link on the *Allied Vision website* below:

http://www.alliedvision.com/en/contact.html

If you are a registered customer you may also contact *Allied Vision support* via e-mail:

support@alliedvision.com

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Getting started

This chapter describes the components required for your camera system.

Camera Link camera

This guide can be applied to all cameras of the Allied Vision Goldeye CL family. Follow the links below to learn more about Camera Link cameras from Allied Vision.

Cameras:

Follow this link to learn about Goldeye CL cameras from Allied Vision.

http://www.alliedvision.com/en/products/cameras

Optics

Allied Vision Goldeye CL cameras provide lens mounts in various sizes for installing a lens: C-Mount, F-Mount, and M42-Mount. Lenses for IR cameras can be purchased directly from Allied Vision or from an Allied Vision distributor. Users need to select the desired focal length and appropriate optical format for the target camera model.

Cameras

The Allied Vision Modular Concept provides more information on lens mount options for specific Allied Vision Camera Link cameras:

https://www.alliedvision.com/en/support/technical-documentation.html

Frame grabber

Basically every frame grabber compatible to Camera Link Base can be used to operate a Goldeye CL.

Technical manual

Please refer to the Goldeye G/CL Technical manual for detailed requirements:

https://www.alliedvision.com/en/support/technical-documentation/goldeye-cl-documentation.html

Cables

Technical manual

A list with a selection of compatible Camera Link cables can be found in the Goldeye G/CL Technical manual:

https://www.alliedvision.com/en/support/technical-documentation/goldeye-cl-documentation.html

Allied Vision software

Allied Vision provides the Vimba SDK for accessing all camera features to control the Goldeye CL. In order to acquire images the frame grabber SDK has to be used.

Download software

VIMBA is Allied Vision's future-proof SDK for all current and upcoming Allied Vision cameras with Camera Link, GigE Vision, FireWire (IEEE 1394) and USB Vision interfaces. Visit the link below for more information:

https://www.alliedvision.com/en/products/software.html

Overview of installation

Below you find an overview of the installation process — follow the hyperlinks to read the step-by-step instructions.

- Install the frame grabber card:
  Refer to Installing hardware and software on page 15.
- Install the frame grabber software:
  Refer to Installing hardware and software on page 15.
- Install Allied Vision SDKs plus corresponding Viewers:
  Refer to Installing hardware and software on page 15.
- Connect camera to frame grabber card and ensure that the camera is powered:
  Refer to Starting the camera on page 19.
- Use the Vimba Viewer to configure and control the camera. Use the frame grabber software to acquire images.
  Read Camera control and image viewing on page 22

Introductory information

This chapter includes

- Short description of the document contents
- The document history
- Conventions used in this manual (styles and symbols)

Document introduction

This **Camera Link Installation Guide** provides instructions for first time use of Allied Vision Goldeye CL cameras. Powering up the camera, installing Allied Vision drivers and related software, and enabling users to get the camera up and running are the focus of this document.

For information on camera dimensions, feature overview, I/O definition, trigger timing waveforms, frame rate performance, and camera cleaning instructions please refer to the Allied Vision **Goldeye G/CL Technical manual**.

For detailed information on camera features and controls specific to the Allied Vision Goldeye CL camera refer to the **Goldeye G/CL Features Reference** document.

Document history

Version / date	
V2.0.0 / 2016-Jun-29	Name change into **Installation Manual**.
V1.0.0 / 2016-Feb-29	First release of the **Installation Guide**.

Table 1: Document history

Conventions used in this manual

To give this manual an easily understandable layout and to emphasize important information, the following typographical styles and symbols are used:

Style (example)	Function
Emphasis	Some important parts or items of the text are emphasized to make them more visible.
`Features and registers names`	GenICam Features names and Camera Link register's names are displayed as monospaced text.
`Features and registers options`	Features options and registers options that can be selected by the user are displayed as mono-spaced italicized text.
User interface elements	Text that is displayed, or output, by the system for the user, like parts of the GUI, dialog boxes, buttons, menus, important information, windows titles, etc.

Table 2: (Sheet 1 of 2) Markup conventions used in this manual

Style (example)	Function
`Commands and inputs`	Text or command to type in by the user, selected menu options, etc.
Weblinks and references	References to other documents or web pages, like weblinks, hypertext links, e-mails, but also cross references, that include a link the user can follow by clicking.

Table 2: (Sheet 2 of 2) Markup conventions used in this manual

Symbols and notes

Practical Tip

This symbol highlights a practical tip that helps to better understand the camera's features and functions, and to make better use of it.

Further information available online

This symbol highlights URLs for further information. The URL itself is shown in blue.

Example:

http://www.alliedvision.com

Safety-related instructions to avoid malfunctions

This symbol indicates important or specific instructions or procedures that are related to product safety. You need to follow these instructions to avoid malfunctions.

Possible damage

This symbol is used to address important information to avoid physical or material damage; however, is not related to bodily injury.

Additional documentation

Goldeye G/CL Features Reference for GigE Vision and Camera Link SWIR cameras:

For detailed information on camera controls, read the Allied Vision Goldeye G/CL Features Reference document, which is available on the Allied Vision Technical Papers and Knowledge Base web page. It describes the standard and advanced camera controls for GigE Vision and Camera Link SWIR cameras as seen from the Vimba Viewer or GenICam compliant 3rd-party software solutions.

http://www.alliedvision.com/en/support/technical-papers-knowledge-base.html

Software download:

The Vimba SDK software package applicable to Goldeye CL cameras can be downloaded from the Allied Vision software website (including documentation and release notes):

http://www.alliedvision.com/en/support/software-downloads.html

Allied Vision accessories

Accessories for Camera Link

Allied Vision offers a range of accessories for the use of Allied Vision Camera Link cameras and the easy integration in already existing applications.

Camera Link accessories including standard Camera Link components as well as framegrabbers.

Lenses for corresponding sensor sizes and resolutions (Contact Allied Vision Support for further information.)

Accessories:

Please contact Allied Vision sales representative or your local Allied Vision dealer for information on accessories:

https://www.alliedvision.com/en/about-us/where-we-are.html

Allied Vision software

All software packages provided by Allied Vision are free of charge and contain the following components:

- Drivers
- Software Development Kit (SDK) for camera control and image acquisition
- Examples based on the provided APIs of the SDK
- Documentation and release notes
- Viewer application to operate/configure the cameras

Software:

All software packages (including documentation and release notes) provided by Allied Vision can be downloaded at:

https://www.alliedvision.com/en/support/software-downloads.html

Third-party software

In addition to the software provided by Allied Vision, there are numerous Camera Link standards-compliant third-party software options available. In general, third-party software provides increased functionality such as image processing and video recording.

Allied Vision's Vimba SDK is based on the GenICam standard. GenICam-based third-party software automatically connects with Vimba's transport layers. Additionally, Vimba includes the Cognex Adapter for VisionPro.

Safety instructions

This chapter describes safety instructions/cautions valid for Allied Vision Camera Link cameras and special safety instructions/cautions depending on the camera model used.

General Safety instructions

Note

- There are no switches or parts inside the camera that require adjustment. The guarantee becomes void upon opening the camera casing.
- If the product is disassembled, reworked or repaired by anyone other than a recommended service person, Allied Vision or its suppliers are not responsible for the subsequent performance or quality of the camera.
- The camera does not generate dangerous voltages internally.

Sensor safety instructions

Sensor may be damaged

Light intensity or exposure time exceeding the saturation of the sensor may damage the sensor irreparably.

This may occur in the following situations:

- Laser light hitting the sensor directly
- Bright light sources (e.g. sunlight) hitting the sensor directly
- Camera is exposed to X-rays

Damages may be caused by:

- Overheating of color filters, microlenses or pixel structures
- Accelerated aging of color filters or pixel structures

Avoiding sensor damage

- Use light source with lower intensity
- Use external shutter
- Use optical filters
- Use lens cap (when camera not in use)
- Vary local light spot / laser spot on sensor
- X-rays:
  - Keep camera out of X-ray path. Guide light source via mirrors to the sensor
  - Use lead glass to protect lens and sensor
  - Use lead jacket for the body of the camera

The warranty does not cover damaged cameras caused by X-ray applications or too much light/laser light.

Changing filters safety instructions

Cleaning precautions:

- Mount/dismount lenses and filters in a **dust-free environment**, and **do not** use compressed air (which can push dust into cameras and lenses).
- Use only **optical quality tissue/cloth** if you must clean a lens or filter.

Ask your dealer if you are not familiar with these procedures.

Installing hardware and software

This chapter includes:

- Install a frame grabber
- Connect a frame grabber to a camera
- Install frame grabber software
- Install camera software

Installing a frame grabber

For the installation of a frame grabber, the computer must meet the minimum system requirements of the frame grabber.

Find the requirements in the technical manual of the frame grabber.

Please also refer to the frame grabber installation manual provided by the manufacturer regarding installation details.

More information about frame grabbers:

For more information about compatibility of various frame grabber models and system installation refer to the application note *Usage of Frame grabbers with Goldeye CL Cameras,* which is downloadable from the Allied Vision website:

https://www.alliedvision.com/en/support/technical-documentation/goldeye-gcl-documentation.html

Technical information and support:

To receive advice on suitable frame grabbers for your application, contact the Allied Vision support team.

support@alliedvision.com

Installing camera software

This chapter presents instructions for software installation specific to Windows 7. Allied Vision GigE cameras can be operated under other versions of Windows including XP. Suggestions specific to Linux, QNX and OSX are also offered when applicable. Allied Vision offers Vimba as the main SDK for its Camera Link cameras.

Software installation overview

This is an overview for the software installation: follow the hyperlinks to read the step-by-step instructions.

- Install the frame grabber software.
- Read the frame grabber software installation guide provided by the frame grabber manufacturer
- Install Vimba SDK plus corresponding Vimba Viewer:
  Read Installing Vimba Viewer on Windows on page 17 .

Frame grabber configuration files

Some frame grabbers applications use configuration files to setup the grabber for a certain camera. Allied Vision can provide files for the Goldeye CL series for various frame grabbers.

For more information, contact the Allied Vision support team.

support@alliedvision.com

Download Vimba Viewer

Download the Vimba Viewer for Windows and for Linux from the Allied Vision web-site:

https://www.alliedvision.com/en/products/software.html

Installing Vimba Viewer on Windows

You can install the Vimba Viewer on Windows 7, Windows 8.1 and Windows 10.

To install the Vimba Viewer on Windows, follow the steps below:

Step 1: To start the installation, run the file **`Vimba_v2.0_Windows.exe`**.

Step 2: Select an installation level suitable for you.

Step 3: Click **`Start`**. The installer will guide you through the installatiion process.

Installing the Vimba Viewer on Linux

(Currently there is no Linux support for Camera Link with Vimba.)

Starting the camera

This chapter includes:

- information about how to power up the camera and connect it to a host application.

Power up the camera

To power up the camera, plug the 12-pin Hirose connector into the camera and wait for the boot phase to complete. The boot phase is indicated by a 1 Hz steady red-green flashing of the Camera Link status LED.

Power adapter for Goldeye CL

A camera power adapter for the Goldeye CL series is available from Allied Vision.

Please consult the camera technical manual for connector definition and voltage specifications.

https://www.alliedvision.com/en/support/technical-documentation.html

Warning:
Observe safety when using electrical connections.

For connections to any power outlet, only use connectors that fit, and/or adapters with a grounding lead.

Use sufficient grounding to minimize the risk of damage.

Caution:
Avoid electrostatic discharge.

Electrostatic sensitive device.

To prevent equipment damage, use proper grounding techniques.

Connecting to host application

To connect the camera to the host application, use a Camera Link cable with an SDR-26 connector for the camera side.

To retrieve information about the required connector type for the frame grabber (either MDR-26 or SDR-26), refer to the frame grabber manual.

More on accessories:

For more information on accessories contact Allied Vision sales representative or your local Allied Vision dealer:

https://www.alliedvision.com/en/about-us/where-we-are.html

A list with a selection of compatible Camera Link cables can be found in the Goldeye G/CL Technical manual.

https://www.alliedvision.com/en/support/technical-documentation/goldeye-cl-documentation.html

Camera control and image viewing

This chapter includes:

- Different options about how to control the camera and view images

Use Vimba with frame grabber specific viewer

Overview

Vimba offers a GenTL compatible configuration transport layer to access a GenCP compatible Camera Link camera. This transport layer offers access to all camera features and is used to setup and control a camera.

The Vimba Viewer is used as control application only. Images of the camera are grabbed via the viewer application that comes with the frame grabber software installation.

Figure 1 below shows the corresponding block diagram.

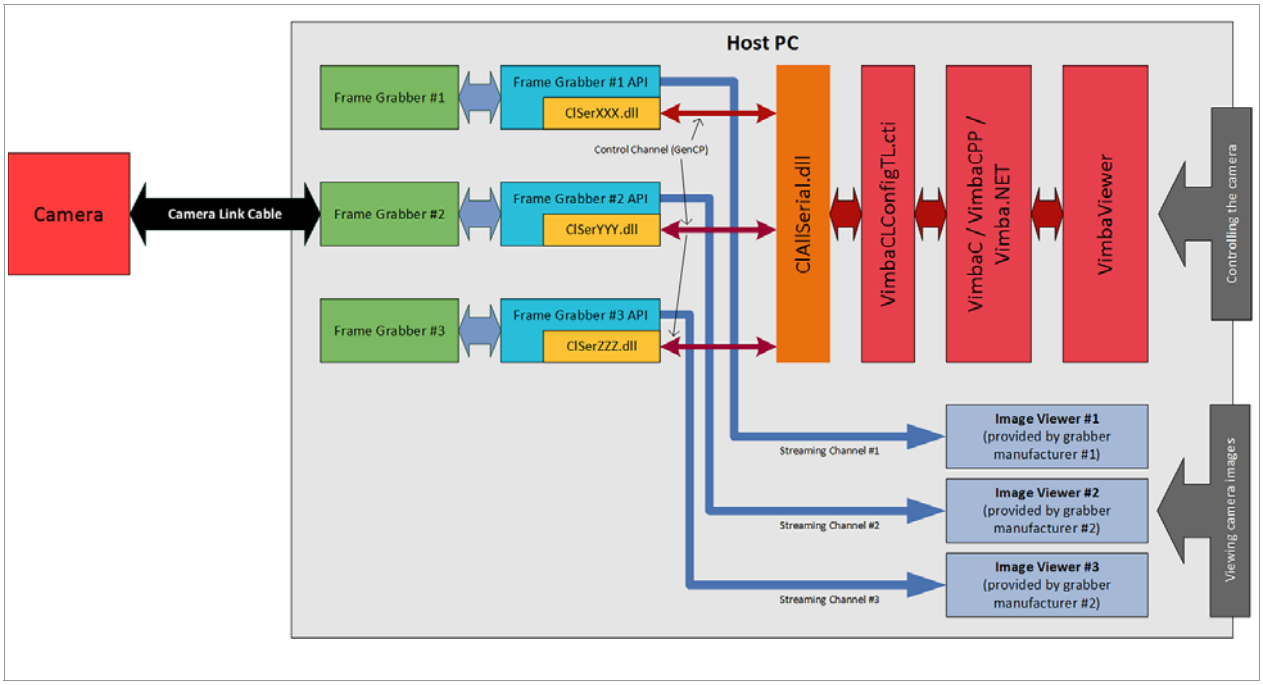

Figure 1: Vimba Config TL block diagram

Launch the applications

1. Power up the camera and wait until the Camera Link Status LED stops blinking. This indicates booting has been finished.
2. Launch the Vimba Viewer application and wait for the camera to appear in the **`Detected Cameras`** list. This may take a few seconds, depending on the num-

ber of cameras connected to the PC and the number of installed frame grabbers.

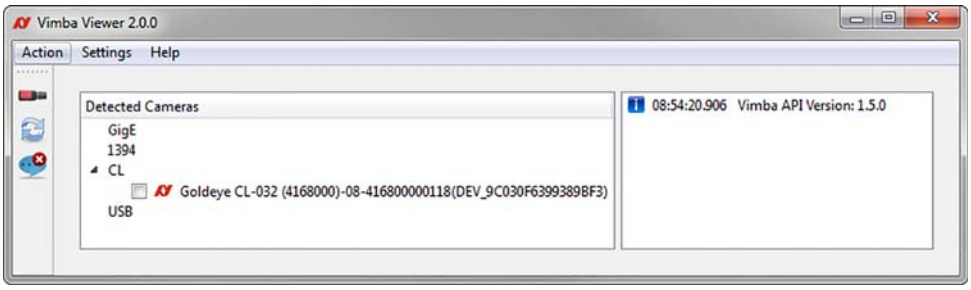

Figure 2: Vimba Viewer - camera detection window

If the camera does not appear after some time, check the following:

- Is the camera connected to the correct grabber port? If the frame grabber has two CL connectors it should be connected to port 1.
- Has the camera been powered up and booted completely before the Vimba Viewer was started? The boot process is indicated by a 1 Hz green/red flashing of the camera. After booting has been finished the LED stays green. It starts flickering if:
  - serial communication is taking place
  - images are transferred to the host

3. Select the desired camera from **`Detected Cameras`** list.
4. A new camera window appears, as shown in Figure 3 on page 25. This camera window consists of the following components:
   - Viewer toolbar: controls to customize the live camera view
   - Controller window: shows camera controls
   - Information window: displays camera and event information
   - Camera stats: Statistical information
5. Launch the frame grabber manufacturers viewing application.

Note

With Camera Link, no Plug-And-Play mechanism is available. If a camera is attached to the frame grabber after the transport layer is loaded (during start of Vimba Viewer), the new camera will not be detected. If a camera is removed after it has been opened it can also not be detected. The **`Refresh`** button in the Vimba Viewer does not detect a new Camera Link camera.

Since the transport layer is for controlling the camera only, a live image will not be shown in the Vimba Viewer window. Therefore the histogram window will also not show any data. Image display and analysis is done via applications provided by the frame grabber manufacturer.

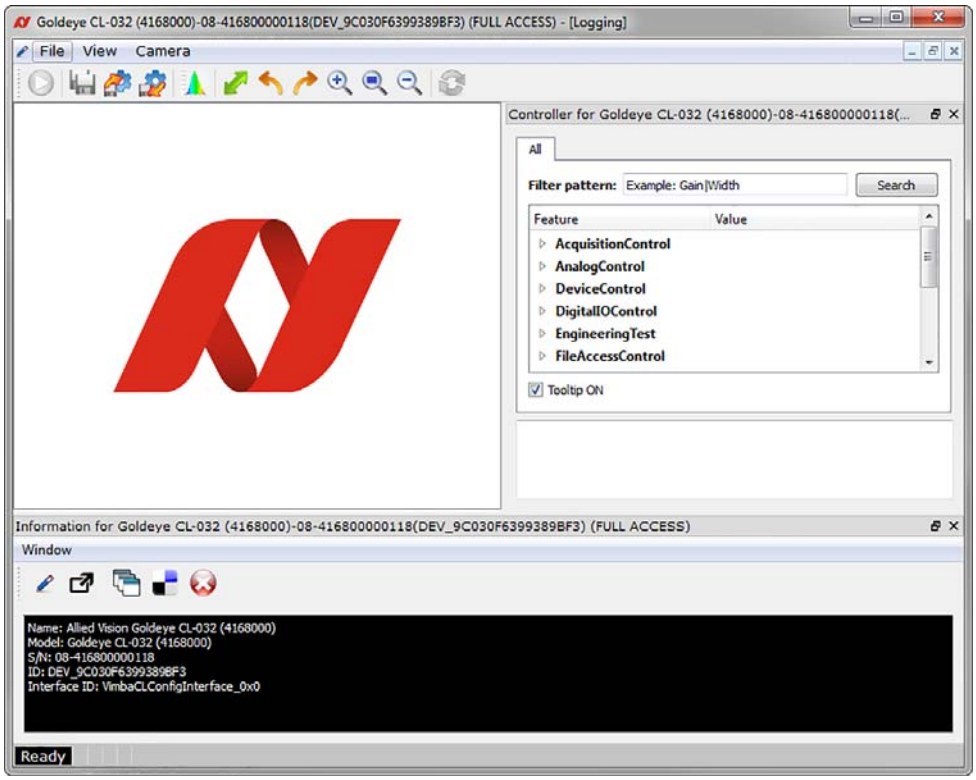

Figure 3: Vimba Viewer window

Dockable Layout:

The camera window supports a fully dockable layout that allows user to customize their workspace.

If components are missing in camera window:

If any of the above components of the camera window is missing, then do the following:

- Right-click on menu or toolbar
- Select the missing component

Adjust camera controls: Controller window

The controller window is displayed in the top right section of the Vimba window, refer to Figure 3 above. It is used to configure the camera frame rate, exposure time, pixel format, and much more.

Explanation of camera controls:

A detailed explanation of camera controls can be found in Goldeye G/CL Features Reference document:

https://www.alliedvision.com/en/support/technical-documentation/goldeye-cl-documentation.html

Grabbing images

To grab images use the viewer application provided by the frame grabber manufacturer. It is necessary to configure the viewer application regarding the incoming image format of the camera.

Best practice:

1. Set the features `Width`, `Height` and `PixelFormat` of the camera within the Vimba Viewer controller window.
2. Configure the equivalent parameters of the incoming image format for the frame grabber with the frame grabber viewing application identically.
3. Use the Vimba Viewer features `AcquisitionStart` and `AcquisitionStop` to start and stop image acquisition.

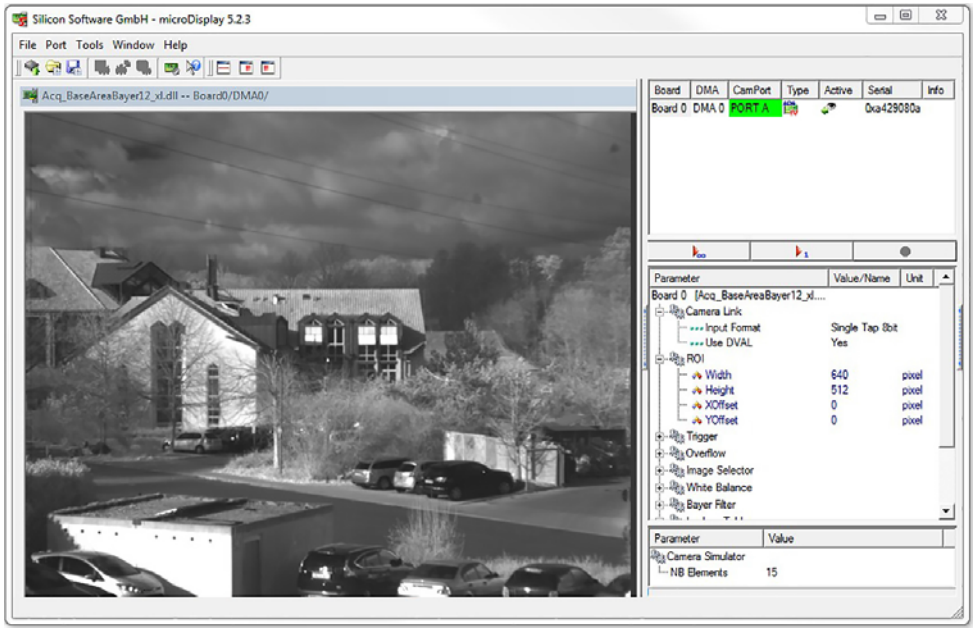

Figure 4: Example frame grabber viewer application

Grabber configuration files:

You can adjust the image parameters within the application or via an external grabber configuration file, depending of the used frame grabber.

Refer to the frame grabber documentation for more information on parameter adjustment.

To obtain frame grabber configuration files, contact our technical support team:

support@alliedvision.com

Camera information: Information window

The information window is displayed in the bottom section of the Vimba window, see Figure 7 on page 29. It consists of the functionalities described below.

To open the Logging window, click the logging icon, shown left. The logging window provides camera identifying information including the serial and ID number.

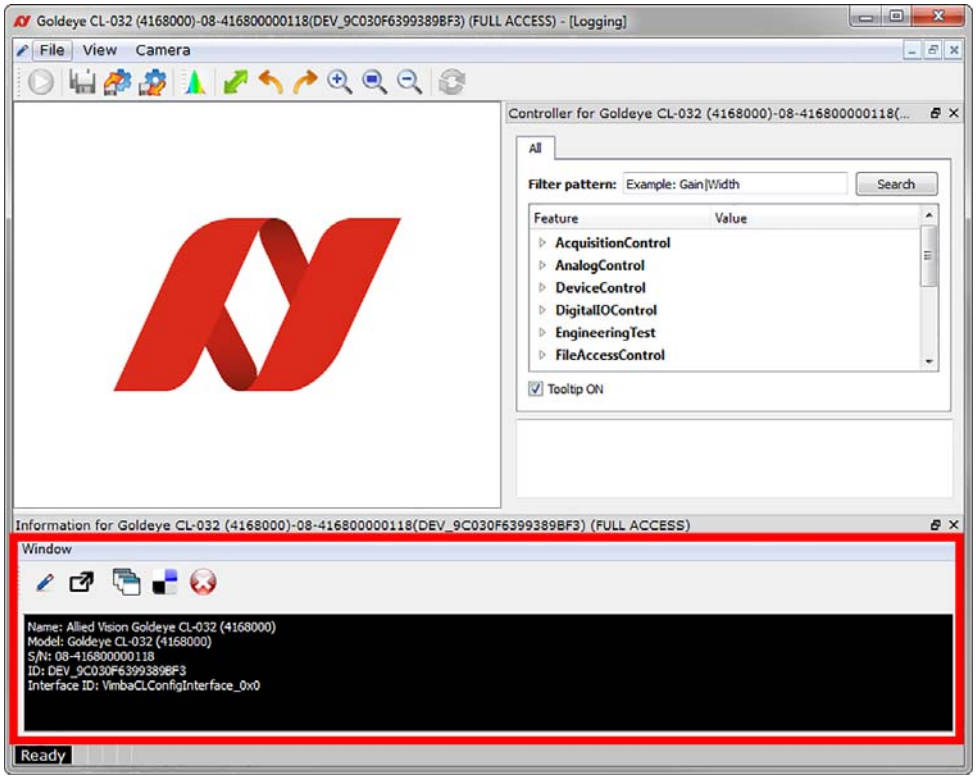

Figure 5: Vimba Viewer with logging window

Using a custom application

It is also possible to access the Goldeye CL camera without using the Vimba configuration transport layer. In this case the custom application has to open the COM port of the grabber via the clallserial.dll (or clserXXX.dll) in order to establish a communication channel between the host and the camera. The protocol used for communication with the camera is GenICam GenCP.

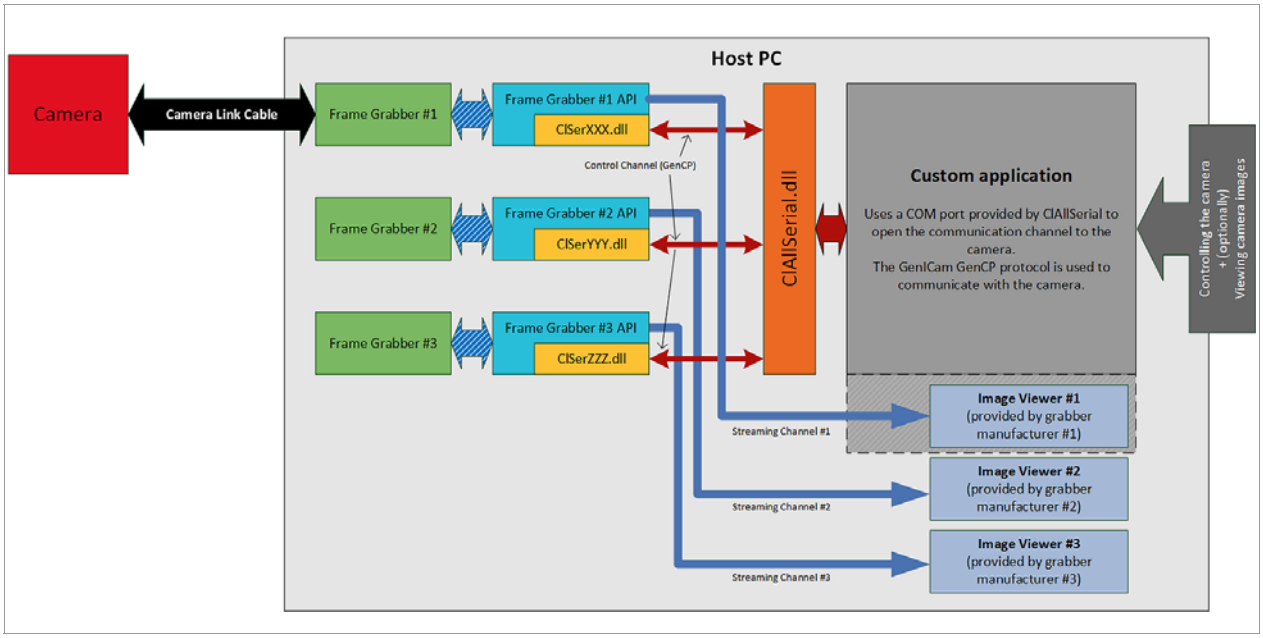

Figure 6: Custom GenCP application block diagram

Applicable standards

Two standards are applicable:

- The Camera Link Specification V2.0- you can download it from the AIA web-site:
  http://www.visiononline.org/vision-standards-details.cfm?type=6
- The GenICam GenCP V1.1. You can download it from the EMVA website:
  http://www.emva.org/standards-technology/genicam/genicam-downloads/

Using frame grabber transport layer

Some frame grabber manufacturers come with their own Camera Link transport layer. In this case the Vimba Viewer is not necessary to control the camera. Adjusting camera features and grabbing images is handled via an application from the frame grabber manufacturer.

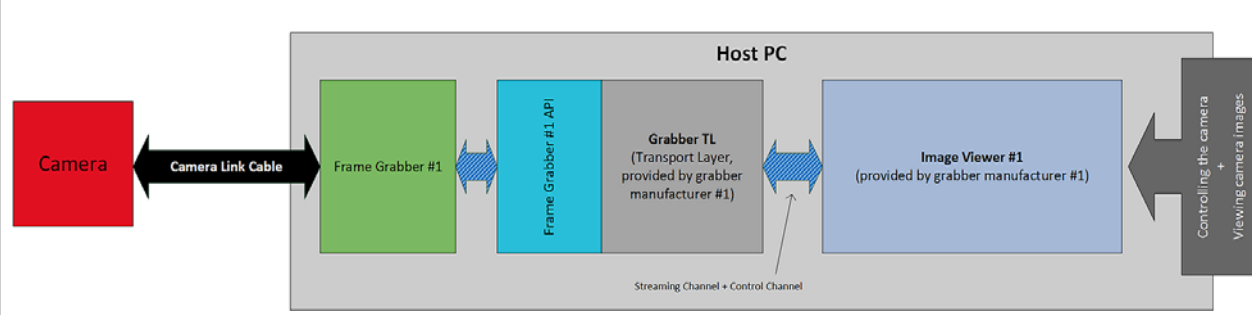

Figure 7: Frame grabber transport layer block diagram

Troubleshooting

This chapter offers basic help and knowledge sources in case the installation of the camera doesn‘t work properly.

Helpful hints

Is the camera getting power?

Check the Camera Link status LED underneath the CL port on the backside of the camera. If the camera is connected to power, the LED should display either or a continouos green color.

A description of the status LED codes can be found in the Goldeye G/CL technical manual. See the *Additional references on page 32* below.

Is the camera powered, but not detected in viewer?

- **Is the camera connected to the correct grabber port?**
  If the frame grabber has 2 CL connectors, it should be connected to port 1. If the grabber has 2 CL connectors, it does not necessarily mean that it is a DUAL-BASE grabber. Refer to the frame grabber manual for more information.
- **Has the camera been powered up and booted completely before the Vimba Viewer was started?**
  During the boot process the CL status LED underneath the cameras CL port flashes with 1 Hz in red/green. After booting has been finished, the LED stays green.
- Note that no Plug-And-Play mechanism is available with Camera Link. If a camera is attached to the frame grabber after the transport layer is loaded (during start of Vimba Viewer), the new camera will not be detected. If a camera is removed after it has been opened it can also not be detected.

Is the camera listed in viewer but images cannot be acquired?

- Compare the incoming image format of the frame grabber with the parameters set in the camera. Verify that width, height and pixel format expected by the frame grabber are equal at the camera side.
- Check if the frame grabber tap configuration is equal to the camera tap configuration (Feature `DeviceTapGeometry`).

Additional references

Product webpage:

http://www.alliedvision.com/en/products/cameras

Product manuals:

http://www.alliedvision.com/en/support/technical-documentation

Vimba SDK:

http://www.alliedvision.com/en/products/software

Knowledge base:

http://www.alliedvision.com/en/support/technical-papers-knowledge-base.html

Software download:

http://www.alliedvision.com/en/support/software-downloads.html

Case studies:

http://www.alliedvision.com/en/applications

Firmware:

http://www.alliedvision.com/en/support/firmware

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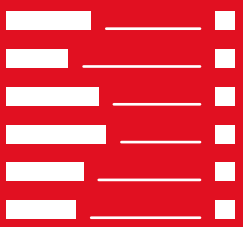

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