Allied Vision
a **TKH Vision** brand
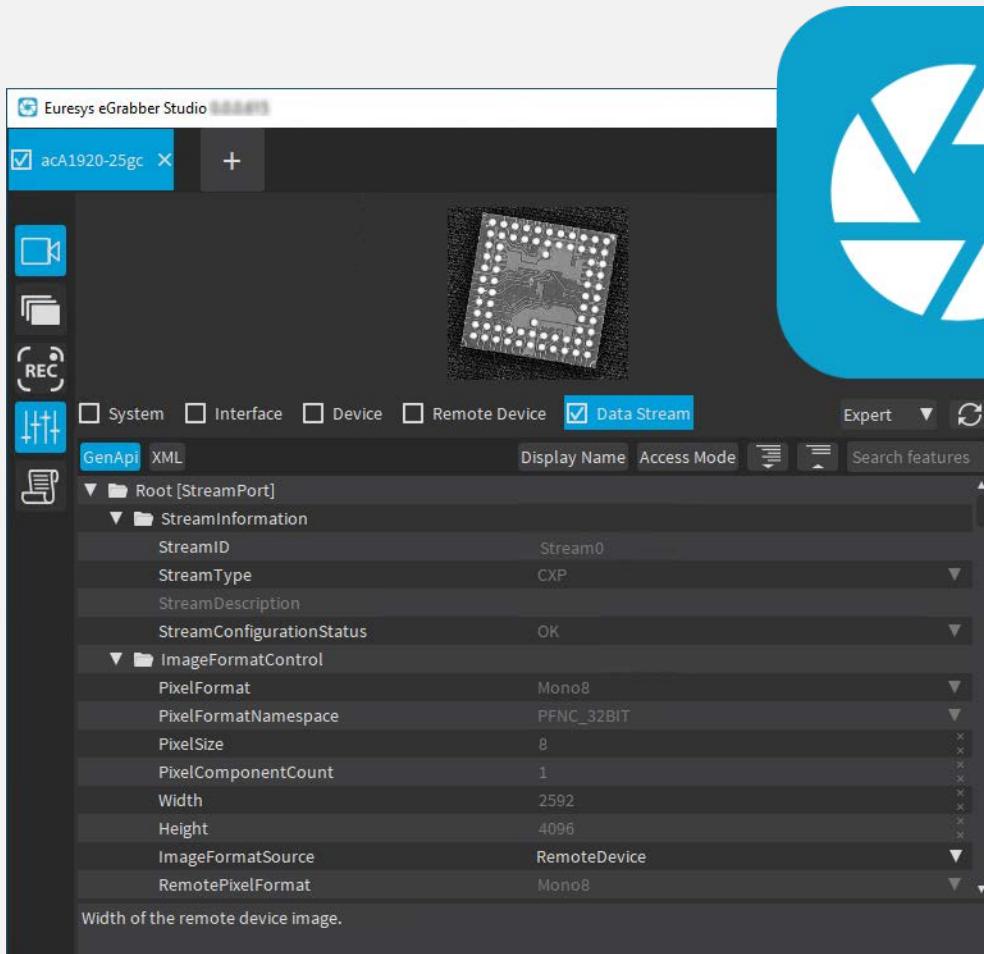
eGrabber

Using eGrabber Studio

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This documentation is provided with **eGrabber 25.12.1** (doc build **2209**).
https://www.alliedvision.com

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1. Getting Started

1.1. About eGrabber Studio

Description

The **eGrabber Studio** application is the evaluation and demonstration application of the **eGrabber** library.

It is compatible with **CoaXPress**[1] cameras (with the **Coaxlink series** cards), **Camera Link**[2] cameras (with **Grablink Duo**) and **GigE Vision**[3] cameras (with the optional **eGrabber Gigelink** library).

It is available for **Windows** , **Linux** and **macOS** operating systems.

> **See also:** "Supported Operating Systems" in the eGrabber Release Notes

Main Features

- Testing the image acquisition from CoaXPress cameras with **Coaxlink frame grabbers**.

- Testing the image acquisition from Camera Link cameras with **Grablink Duo**.

- Testing the image acquisition from GigE Vision cameras with **Gigelink**.

- Configuring the **GenApi**[4] features of your camera and frame grabber.

- Managing the embedded firmware of **eGrabber-driven frame grabbers**.

- Controlling your camera and the camera registers manually or using scripts.

- Saving the buffered images into files after acquisition.

- Saving images, while being acquired, to proprietary raw-format files (available with the optional **eGrabber Recorder** library). The images can later be exported to MKV files or a collection of TIFF images.

- Acquiring images from **eGrabber Recorder** containers with **Playlink**

- Providing live images to the **new Open eVision Studio** with **Open eVision Link**.

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[1]Interface and communication standard for industrial cameras using single or multiple coaxial cables. It supports the asymmetric high-speed transmission of images and related control data. This digital interface standard, hosted by the JIIA (Japan Industrial Imaging Association), has been developed for high-speed image data transmission in machine vision applications. (Source: http://www.coaxpress.com/)

[2]Interface and communication standard for industrial cameras based on the National Semiconductor interface Channel Link. The standard is maintained and administered by the Automated Imaging Association or AIA, the global machine vision industry's trade group.

[3]Interface standard for industrial cameras ransmitting high-speed video and related control data over Ethernet networks. The Association for Advancing Automation (A3) oversees the ongoing development and administration of the standard.

[4]GenTL module that contains the camera settings relating to the Device Module. Sibling of the Device Module.

1.2. Open eGrabber Studio

eGrabber Studio is included in the **eGrabber** package and is consequently automatically installed with the frame grabber driver.

- On **Windows** operating systems, **eGrabber Studio** is installed by default in C:\Program Files\Euresys\eGrabber\studio and available via the Windows Start menu.

- On **Linux** operating systems, **eGrabber Studio** is installed by default in /opt/euresys/egrabber/studio

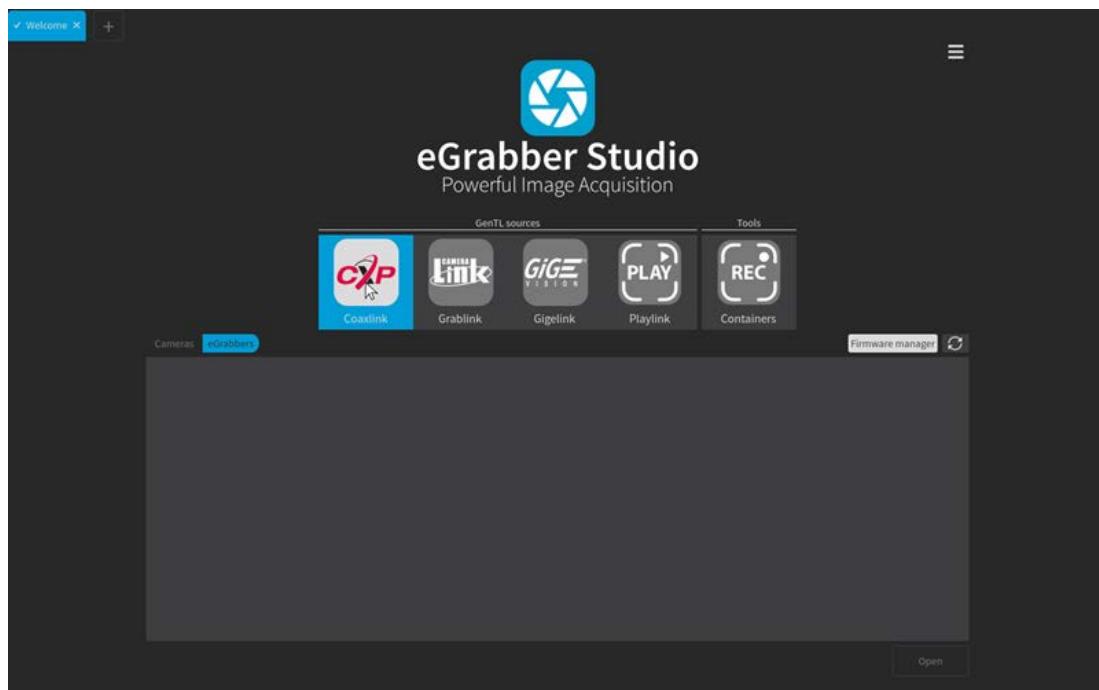- On **macOS** operating systems, **eGrabber Studio** is installed by default in /usr/local/opt/euresys/egrabber/studio.

1.3. Welcome Screen

Introduction

When you have opened **eGrabber Studio**, you can connect to the source you want to work with from the Welcome screen.

This section details the information available in the Welcome screen. See also " Connect to a Source" on page 13.

Welcome screen - Cameras view with Coaxlink frame grabbers

GenTL sources and tools

Welcome screen – GenTL sources and tools

The GenTL sources area displays the icons of the sources you can connect to when the **eGrabber** package is installed:

- For Coaxlink sources, you need to set up the connection of the camera and the **Coaxlink** frame grabber, as well as install the desired firmware variant to interact with the connected camera. See *Getting Started* section of Coaxlink series mini-site.

- For Grablink sources, you need to set up the connection of the camera and the **Grablink** frame grabber to interact with the connected camera. See *Getting Started* section of Coaxlink series mini-site.

- For Gigelink sources, you need to set up the connection with the camera, as well as install and activate the **Gigelink** license to interact with the connected camera. Otherwise, the application displays the warning message "*No License*" at the bottom of the window. See *Getting Started* section of Gigelink mini-site.

- For Playlink sources, you need to update the *Playlink configuration file* to register new **eGrabber Recorder** containers as **Playlink** sources. A new source can be easily added using the + button on the right side of the screen or the configuration file can be manually edited after clicking on the Configuration file button.

The Tools area displays the icons of the tool(s) you can use when the **eGrabber** package is installed:

- For Recorder containers, you need to install the **eGrabber Recorder** library and activate the **eGrabber Recorder** license. Otherwise, the application displays the warning message *No license* at the bottom of the window, and opens a tooltip when you click the **Recorder** icon.

Cameras view vs. eGrabbers view

When you have selected a GenTL source, you can display the available sources in the Cameras view or in the eGrabbers view.

> **NOTE**
>
> These views allow you to open the same eGrabbers, but present them from a different perspective. This makes a slight difference when using a multi-bank camera, as shown in the table below:
>
> | | Cameras view | eGrabbers view |
> | --- | --- | --- |
> | **One-bank camera** | • Selecting a stream opens the stream of the single eGrabber (1 bank = 1 eGrabber).
 • The open eGrabber contains the full image. | |
> | **Multi-bank camera** | • Selecting a camera opens *all streams of the eGrabbers in multi-bank mode* (several eGrabbers).
 See "Using Multi-Bank Cameras" on page 63
 • The open eGrabber contains *the full image*. | • Selecting a stream opens *the stream of one of the eGrabbers* (1 bank = 1 eGrabber).
 • The open eGrabber contains *one part of the image*. |

Cameras view

The Cameras view lists the discovered cameras of the selected source. For each camera, the underlying GenTL components are specified.

This view gathers all interfaces and devices: it lets you easily connect to a **multi-bank camera**[1] and get directly a full image in the Output pane.

With a **Coaxlink** and **Grablink** sources, the following information is displayed (from left to right) :

- Manufacturer of the CoaXPress camera

- Model of the camera

- Interface index + device index (first box brackets)

- Host connectors connected to the camera (second box brackets)

When a camera is made up of several interfaces and/or devices, each set of interface, device and connectors is separated by a comma.

---

[1]Camera that consists of several (independent) CoaXPress devices (GenTL remote devices). Each camera device is connected to a Coaxlink device (GenTL device) that will only receive a part (lines or regions) of the whole camera output.
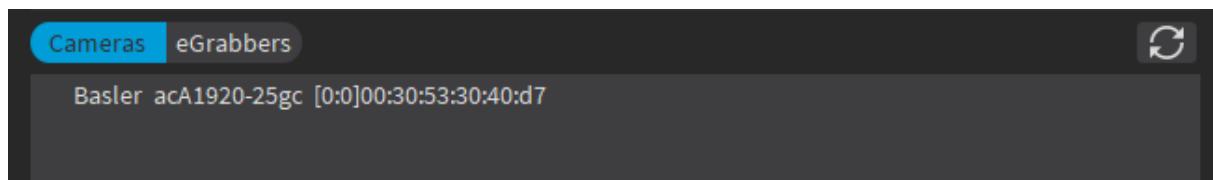
Welcome screen - Cameras view with CoaXPress camera

> **NOTE**
> - If the firmware on the frame grabber is too old, an error message appears in the eGrabbers view to let you update it.
> - If a fan error is detected, a warning message appears in the Cameras and eGrabbers views.

With a **Gigelink** source, the following information is displayed (from left to right):

- Manufacturer of the GigE Vision camera
- Model of the camera
- Interface index + device index (box brackets)
- MAC address of the camera
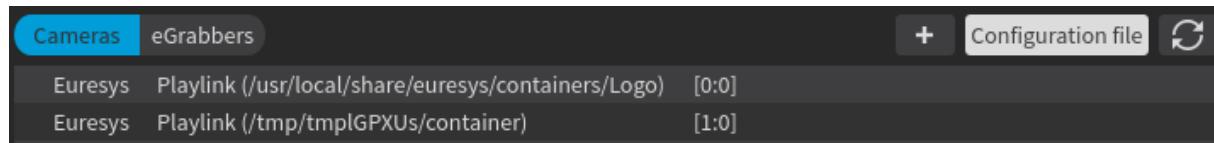

Welcome screen - Cameras view with GigE Vision camera

> **NOTE**
> If the **Gigelink** license is not valid, the license status is displayed in the eGrabbers view.

With a **Playlink** source, the following information is displayed (from left to right):

- Manufacturer (Euresys)
- Model of the camera (Playlink)
- Container path
- Interface index + device index (box brackets)

Welcome screen - Cameras view with Playlink sources

eGrabbers view

The eGrabbers view lists the discovered eGrabbers of the selected source. The GenTL components of each discovered eGrabber are presented in a tree view: interface (frame grabber), device (camera) and stream.

The following table describes the information displayed for a **Coaxlink** and **Grablink** sources:

Levels	Displayed information (from left to right)
1 - Interface	• Product reference and model name of the connected **Coaxlink** board • Serial number of the board used
2 - Device	• Name of the device • Manufacturer of the remote device • Model of the remote device • Host connectors connected to the remote device
3 - Stream	• Name of the stream
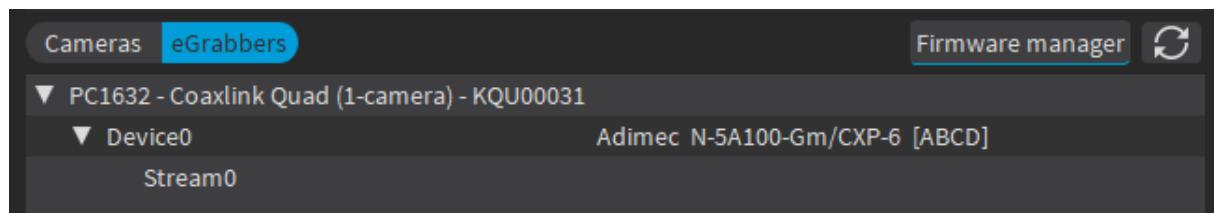
Welcome screen - eGrabbers view with Coaxlink frame grabber

The following table describes the information displayed for a **Gigelink** source:

Levels	Displayed information (from left to right)
1 - Interface	• Name of the **Gigelink** interface (based on the UID of the network interface connected to the **Gigelink** device)
2 - Device	• Name of the device • Manufacturer of the remote device • Model of the remote device • MAC address of the remote device
3 - Stream	• Name of the stream
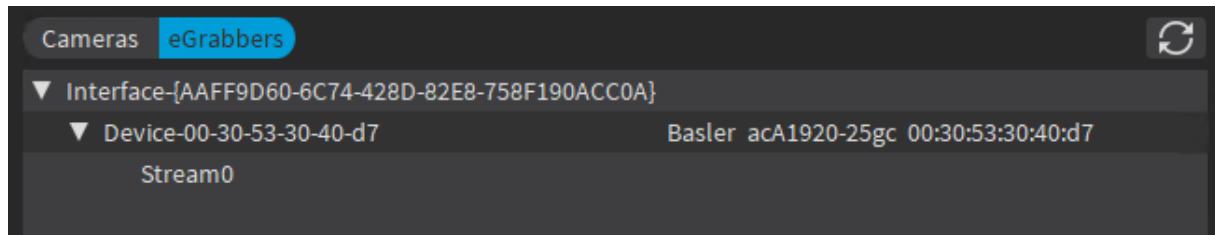
Welcome screen - eGrabbers view with Gigelink library

The following table describes the information displayed for a **Playlink** source:

Levels	Displayed information (from left to right)
1 - Interface	• Name of the InterfaceID registered in the *Playlink configuration file*
2 - Device	• Name of the DeviceID registered in the Playlink configuration file • Container path • Manufacturer (Euresys) • Model (Playlink)
3 - Stream	• Name of the stream
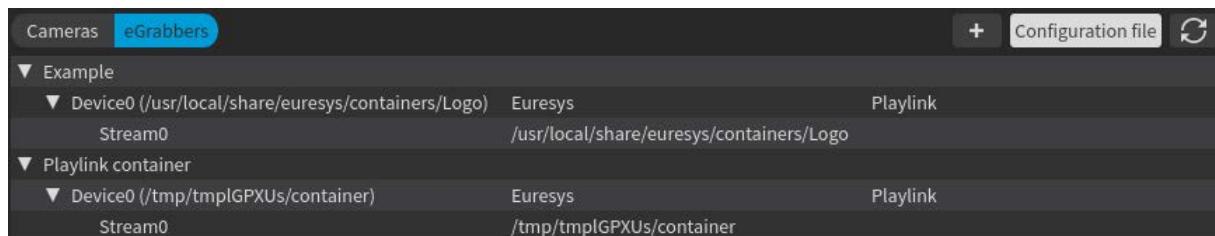
Welcome screen - eGrabbers view with Playlink sources

Recent area

When you have selected a recorder container in the Sources area, the Recent area shows the discovered recorder containers with the information detailed below.

Recent	Size (MiB)	Record count	Status
/tmp/tmpyRTUMV/container	1024	94	Ready

Welcome screen - Recent area

With a recorder container, the following information is displayed (from left to right):

- Path to the container
- Container size in MiB
- Count of recorded frames
- Container status

The following table describes the possible values of "Container status"

Status	Description
Ready	The license allows to open it
Opened	It is already opened in **Studio**
No license	No license found
Not available	The container has no records

Menu button

The Menu button, in the top-right hand corner, includes the following menu items:

Clear settings...
Open online documentation
About...
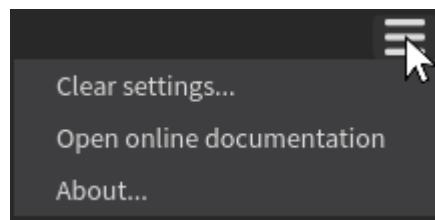
Menu option	Description
Clear Settings	- When you work in **eGrabber Studio**, all your actions are automatically saved as user settings for the next sessions (selected source type, source name, user level, default file names, selected options in Buffer and Recorder panes, etc.). - To reset all settings to the default values, click Clear settings and confirm the setting reinitialization in the dialog box.
Open online documentation	Open the latest public edition of the **eGrabber Studio** online documentation.
About	Provides more information about the **eGrabber Studio** version and the **Qt** and third-party licenses.

Possible error messages

The following error messages appear on the Welcome screen when an issue prevents you from opening the selected source:

| Error message	What to do?
● No available source	Make sure that you have properly set up your device before using **eGrabber Studio**. For Coaxlink sources, refer to the *Getting Started* section in the *Coaxlink series mini-site* of the eGrabber online documentation. For Gigelink sources, refer to the *Getting Started* section in the *eGrabber Gigelink mini-site* of the eGrabber online documentation.
● Firmware too old	Click Firmware Manager to start the **Firmware Manager** tool and upgrade your firmware.
● Firmware too recent	Click Firmware Manager to start the **Firmware Manager** tool and downgrade your firmware.
● Firmware in recovery mode	The firmware recovery switch is in recovery position. Refer to the *Hardware Manual* section in the *Coaxlink series mini-site* of the eGrabber online documentation.
● PCIe gen 1 not supported	Connect the frame grabber to a PCIe slot of a more recent generation on the motherboard.
● Fan speed not OK	Check if the fan is blocked or is not working properly. In the latter case, contact the Support team.
● eGrabber Gigelink library license not found	Contact our Sales department to purchase a license for the **eGrabber Gigelink** library.
● eGrabber Recorder library license not found	Contact our Sales department to purchase a license for the **eGrabber Recorder** library.

1.4. Connect to a Source

Open an eGrabber source

1. In the Welcome screen, in the ⌗GenTL sources⌗ area, select an **eGrabber source**[1] that you want to connect to:

2. In the bottom area, select the **eGrabbers view**[2] or **Cameras view**[3].
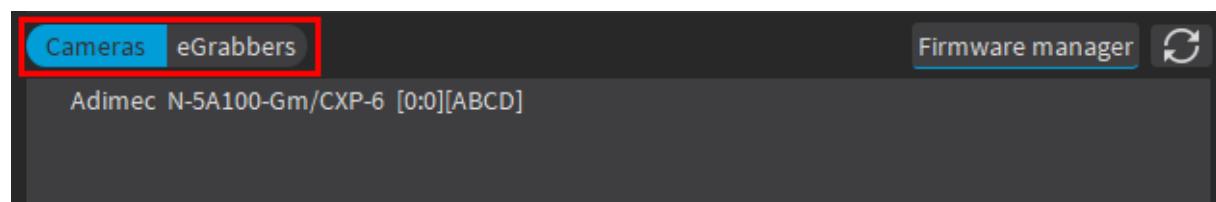
3. When working with **Coaxlink series** or **Grablink Duo** frame grabbers, click ⌗Firmware manager⌗ to check if a firmware is available and install it (recommended).

    When the current firmware for the frame grabber is too old, a warning is displayed: install the latest firmware update to be able to connect to the **Coaxlink series** or **Grablink**sources.

4. In the selected view, identify the requested **eGrabber**[4] or camera.

    If your camera or eGrabber has recently been connected and is not visible yet, try refreshing the list by clicking .

    For a detailed description of the displayed information, see "Welcome Screen" on page 5.

5. Select the desired item and click ⌗Open⌗, or double-click the item, to open it.

The selected item opens in the **eGrabber Studio** main window. See also "Main Window" on page 16.

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[1]Corresponds to the GenTL producer in GenICam (for example coaxlink.cti)

[2]List of the discovered eGrabbers of the selected source in the Welcome screen of eGrabber Studio. The GenTL components of each discovered eGrabber are presented in a tree view: interface (frame grabber), device (camera) and stream.

[3]Lists of the discovered cameras of the selected source in the Welcome screen of eGrabber Studio. For each camera, the underlying GenTL components are specified.

[4]Object that encapsulates a GenTL stream (with a number of buffers), its parent modules (GenTL system, interface, device), as well as the GenTL remote device. You can configure an eGrabber using a GenApi XMLfile. eGrabber Studio creates and presents instances of eGrabbers, called "grabbers" using the Euresys::EGrabber class of the eGrabber library.

Concurrent accesses

If a stream or a device is already open in a tab, you can open its parent elements in another tab. Other tabs are dynamically refreshed.
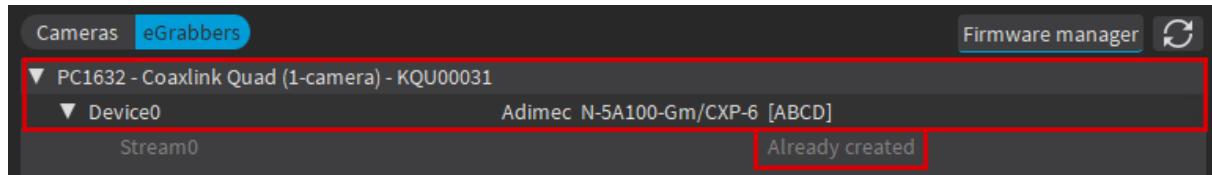
Welcome screen - Stream already created

If an interface or device is already open in a tab, you are not able to open its child elements in another tab.
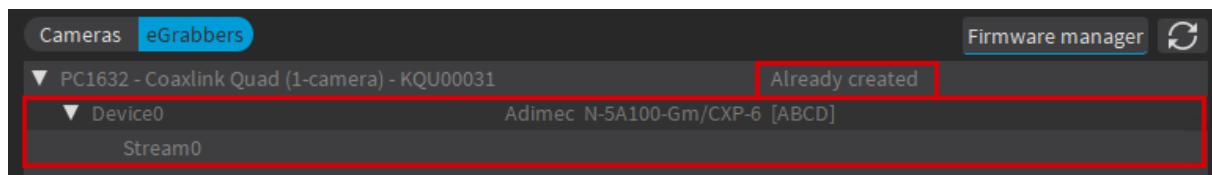
Welcome screen - Interface already created

If an interface, device or stream is already open in another application, it is displayed and accessible in read-only mode (RO) in **eGrabber Studio**.
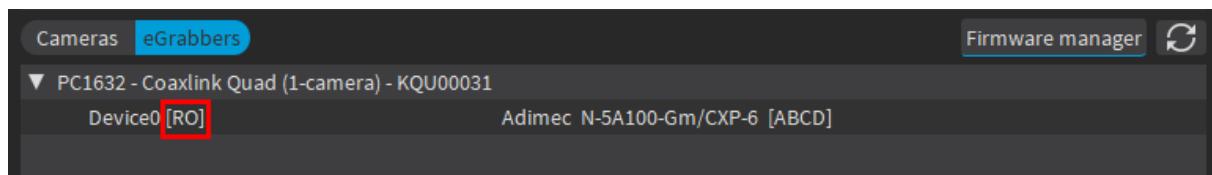
Welcome screen - Device accessible in read-only mode

Open a recorder container

1. In the Tools section, click the Containers icon.

    The most recent recorder containers are displayed in bottom area.

2. To open the recording, do one of the following actions:

    □ If the recording is displayed in the list, select it and click Open (or double-click the recording).

    □ If the recording is less recent and not displayed in the list, click Browse and select the folder with the desired container.

A new tab for the selected recording opens in the **eGrabber Studio** main window.

See also .

1.5. Main Window

Overview

When you display a source on the **eGrabber Studio** main window (called *main window* in this user manual), this window is made up of the following areas.
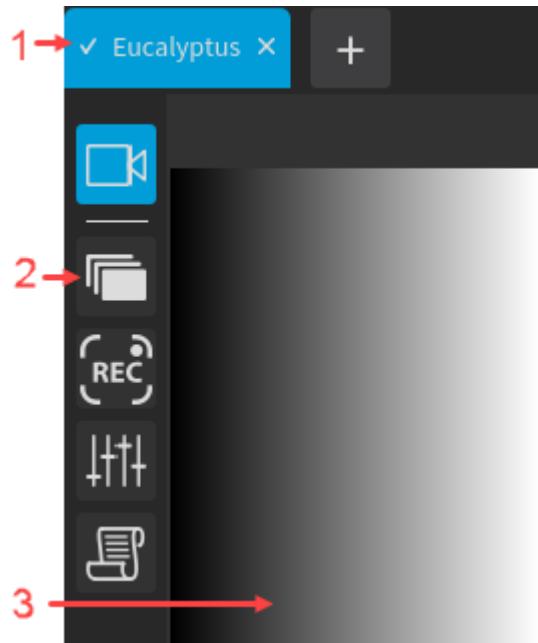
1. The Tab bar displays the open sources as tabs.

2. From the Toolbar, you can display/hide a dedicated pane on the main window.

3. From the Output pane, you can view the images being acquired, an image stored in a buffer or saved in a recorder container.

Tab bar (1)

The Tab bar displays the open sources as tabs.

- To open a new source, click in the Tab bar and select the requested source.
- To display a single source on the main window, click the tab name.
- To display several sources on the main window, select the check boxes corresponding to the tabs you want to display.

The selected tabs are highlighted in blue.

When sources from several tabs are displayed, each source is displayed in a sub-window.

> **TIP**
> When several sources are displayed on the main window and you move the mouse cursor over a sub-window or tab, the corresponding tab and sub-window are surrounded by a light-grey border to help you visualize which tab corresponds to which sub-window.

Toolbar (2)

From the Toolbar, you can display/hide a dedicated pane on the main window.

You cannot open more than two panes at a time: the Output pane and a second pane at the bottom.

The available controls are listed below:

Control	Command / Pane / Link
	Output pane See "Overview of the Output Pane" on page 27.
	Buffer pane Buffers allow you to store images in the allocated memory on the hard disk. In this pane, you can perform the following actions: • "Modify the Buffer Configuration" on page 19 • "View images" on page 25 • "Save Buffered Images to Files" on page 25
	Recorder pane In this pane, you can record images to a container as they are being acquired. See "Record Images on the Fly" on page 54.
	Features pane In this pane, you can configure the **GenApi** features of a device and execute commands on the connected device. See "Edit GenApi Features" on page 39.

Control	Command / Pane / Link
	Scripts pane In this pane, you can save and execute scripts to configure your device. See "Overview of the Scripts Pane" on page 46.
	New Open eVision Studio link Cliking on that icon starts up a new instance of the **new Open eVision Studio** with an EGrabber source tool preconfigured to receive the images of the current source. The icon of the **new Open eVision Studio** is shown at the bottom of the toolbar when a compatible version is detected on the computer.

Output pane (3)

The Output pane is the only pane displayed by default when you open a source.

In this pane, you can view the images being acquired, an image stored in a buffer or saved in a recorder container. See "Acquire and Browse through Images" on page 24.

When you hover over an image in the Output pane, the visualization tools display and you can:

- view information related to the image (e.g.: transfer speed, pixel components)

- analyze the image (e.g.: zoom, histogram, line profile)

- perform various actions (e.g.: share image with Open eVision studio 1.0)

2. Acquiring Images

2.1. Overview of the Buffer Pane

You can open the `Buffer` pane by clicking the `Buffer` icon ▢ in the toolbar.

In this pane, you can perform the following actions:

1. (Optional) Modify the buffer configuration using the `Advanced setup` button in the `Buffer queue` area.

2. Browse through the buffered images in the `Buffer queue` area.

3. Save the buffered images to files in the `Save buffer` area.

On the screenshot below, the numbers correspond to the above-mentioned actions:
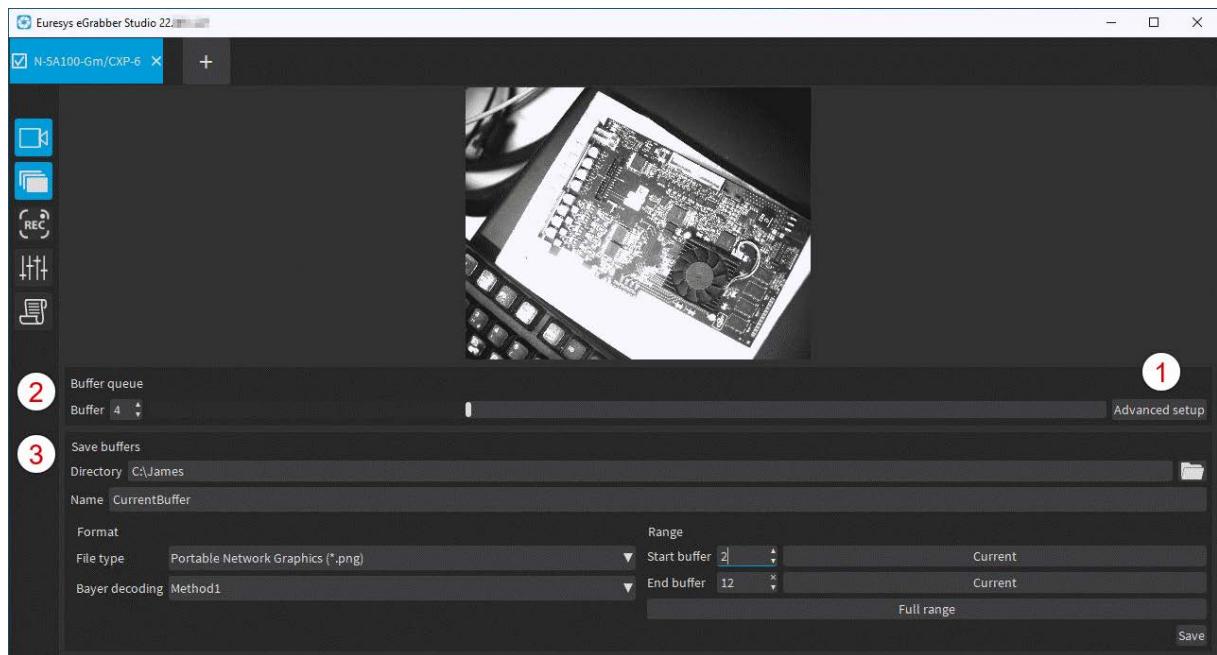
2.2. Modify the Buffer Configuration

Using the advanced buffer setup in the `Buffer` pane, you can modify the default or current configuration of buffers to be created and allocated during the image acquisition.

Concepts of "replay buffers" and "additional buffers"

The total number of buffers created and allocated in the memory space is divided into "replay buffers" and "additional buffers".

- The Replay buffers are retained with their current content in the replay queue.

  This makes it possible to replay the last buffers when the acquisition is stopped.

- The Additional buffers remain empty and available to receive new content.

  This avoids running out of buffers during the acquisition. It is recommended to configure at least 3 additional buffers.

Refer to "Buffer allocation process" on page 23 to learn more on how buffers are managed during the acquisition process.

> **NOTE**
> You should dimension the number of additional buffers according to your system as a whole (camera speed, image sizes, PC performance, etc.).

Modify the buffer configuration

> ✅ **TIP**
> Starting from **eGrabber** 24.04, the buffer queue allocation is no longer automatically performed when opening a grabber. This allows to change the configuration before starting the acquisition.

By default, 13 buffers are allocated in memory, of which 10 replay buffers and 3 additional buffers.

You can change the default or current configuration of buffers as follows:

1. Click to open the Buffer pane
2. In the Buffer queue area, click the Advanced setup button.
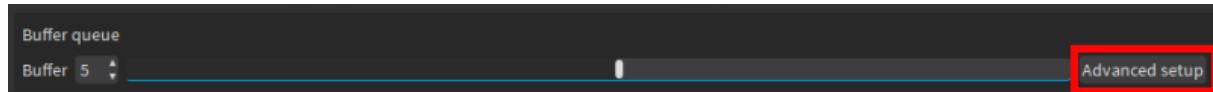
   The Buffer queue area changes to the following display:
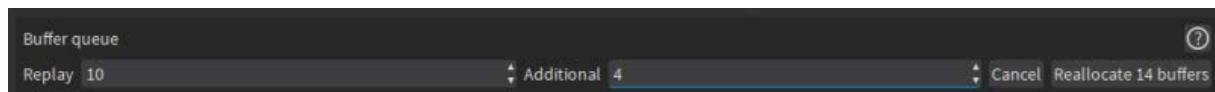
3. In the Replay and Additional fields, adapt the requested number of buffers.

   Click to get a detailed explanation of your configuration.

4. Click the button Reallocate <xx> buffers to validate the changes and come back to the default area display.
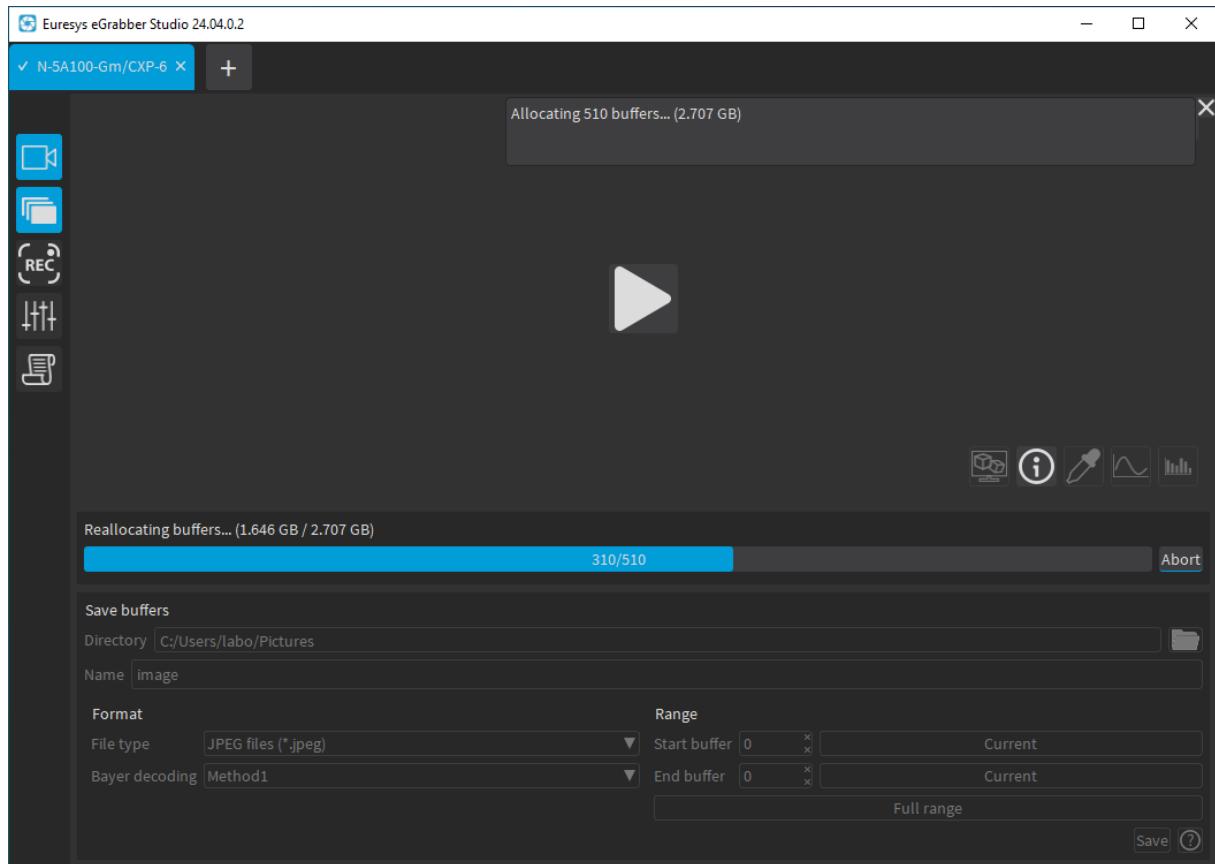
Allocating buffers

> ✓ **TIP**
> The reallocation can be aborted at any time by clicking on the Abort button..

Buffer allocation process

The buffer allocation works as follows during the acquisition:

1. When an image is acquired, it is stored in an empty buffer that is then placed in the replay queue:

Allocated buffers (13) = Replay buffers (9) + Additional buffers (4)

Buffer 0

Replay buffers = 9
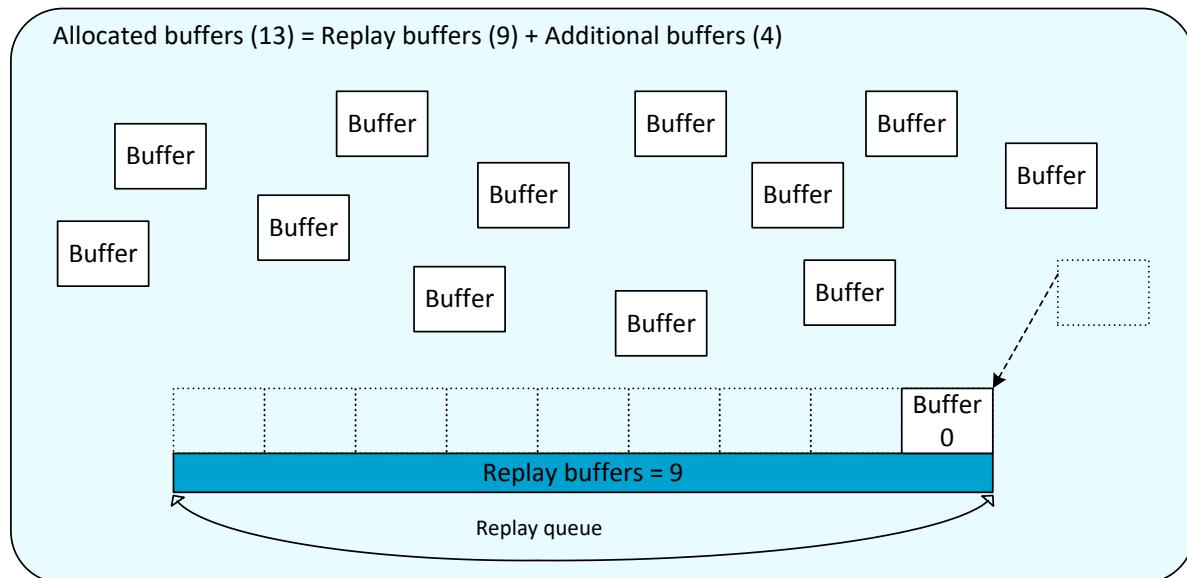
Replay queue

2. The buffers are progressively placed in the replay queue as they are filled with new images that come in:

Allocated buffers = 13 : Replay buffers (9) + Additional buffers (4)

Buffer 8 | Buffer 7 | Buffer 6 | Buffer 5 | Buffer 4 | Buffer 3 | Buffer 2 | Buffer 1 | Buffer 0

Replay buffers = 9
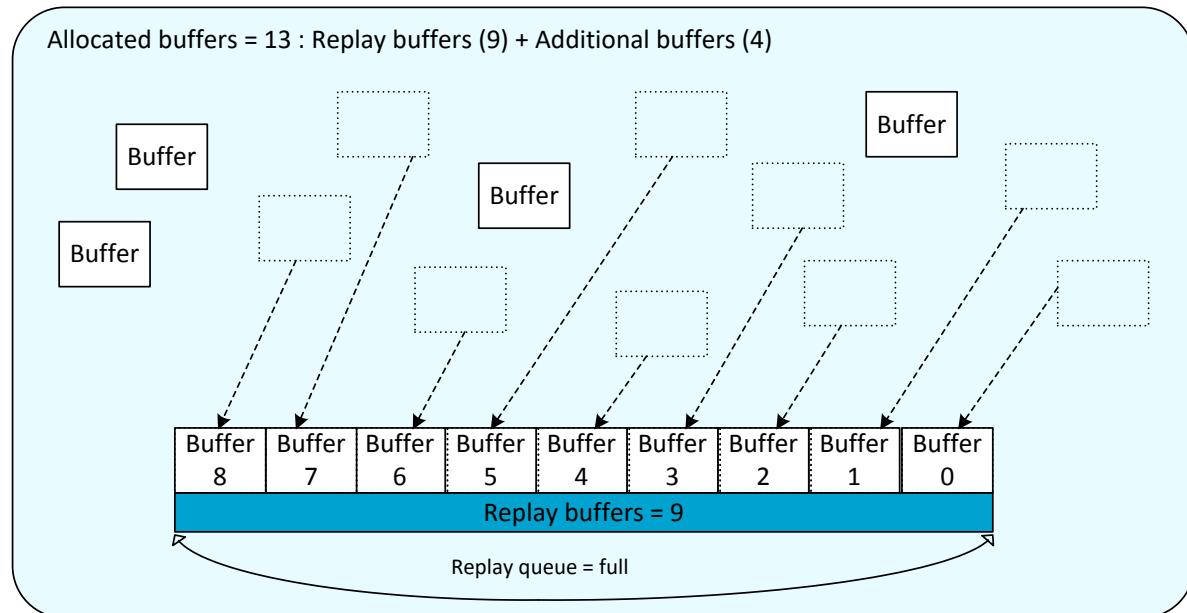
Replay queue = full

3. When the replay queue is full and a new image comes in:

   a. This new image is stored in an empty buffer out of the replay queue

   b. The oldest buffer in the replay queue is returned to the empty buffers

   c. The buffer with the new image shifts to the replay queue

   This ensures that the number of empty buffers (= additional buffers) and the number of buffers in the replay queue (= replay buffers) remain unchanged.

Allocated buffers = 13 : Replay buffers (9) + Additional buffers (4)

Buffer	Buffer	Buffer	Buffer	Buffer	Buffer	Buffer	Buffer
8	7	6	5	4	3	2	1

Replay buffers = 9

Replay queue
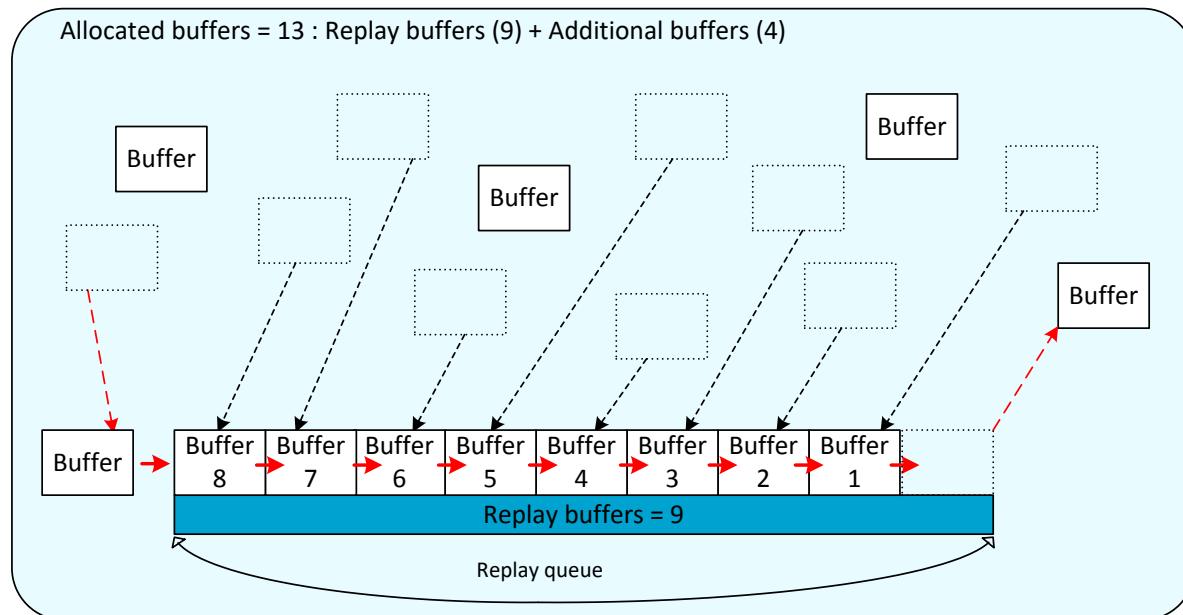
2.3. Acquire and Browse through Images

Acquire images

When you have configured the buffers, start the image acquisition as follows:

- To start a single grabber, click ▶ on its Output pane. The play button toggles to ⬜.

- To stop a single grabber, click ⬜ on its Output pane.

- To start all open grabbers, click ▷ on the top right corner of the main window.

- To stop all open grabbers, click ◻ on the top right corner of the main window.

View images

When the image acquisition is stopped, you can view the images stored in the buffers in the Buffer pane. The following browsing actions are possible:
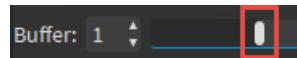
- Moving rapidly through the buffers with the slider:

- Loading a desired buffer by tying the buffer index in the Buffer field:

- Browsing the buffers one by one by clicking the Up Arrow or Down Arrow next to the Buffer field:

A cross replaces the Down Arrow or Up Arrow when you have reached respectively the oldest or latest buffer.

Alternately, you can select the Buffer field and use the Up Arrow and Down Arrow on your keyboard.

2.4. Save Buffered Images to Files

When you have stopped the image acquisition, you can save the images stored in one buffer or a range of buffers to files from the Buffer pane. You can do this in the Save buffers area displayed below.

Each image is saved in a separate file. The file name contains an incremented number corresponding to the buffer number.
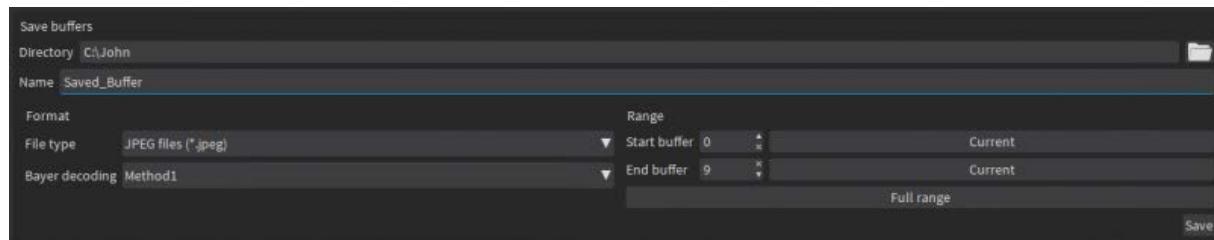
The following table provides useful information on some fields:

Field	Description
Directory	• If you do not specify any directory, the files are stored in the standard user directory for pictures. • If you specify a directory and use it for a save process, it will be stored in the user settings for the future. • If you specify a directory that does not exist, it is created when you save the images.
Name	If you have already specified the file extension in the Name field, the corresponding file format is automatically detected and selected in the Format area below. The file extension in the Name field and the value selected in the Format area are then synchronized.
Bayer decoding	For Bayer images, select the Bayer decoding method to be applied when you save the buffers to files.

<div style="background:red; color:white">

3. Analyzing Images

</div>

3.1. Overview of the Output Pane

Access and Purpose

Clicking on the [Output] icon in the toolbar shows the [Output] pane. This pane is however open by default when you create an eGrabber.

In this pane, you can perform the following actions:

- View the images being acquired or an image stored in a buffer or saved in a recorder container. See "Acquire and Browse through Images" on page 24.

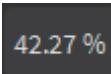- Use the visualization tools that help you configure your system.

> **NOTE**
> The controls to access the visualization tools become visible when hovering over the image in the [Output] pane.

Output pane - controls

Visualization tools

Top-right buttons

Control	Name	Click this button to ...
42.27 %	Zoom factor	Indicates the current zoom factor
⊕	Zoom in	Zoom in manually in an image. Alternatively, press CTRL while rotating the mouse wheel away from you.
⊖	Zoom out	Zoom out manually in an image. Alternatively, press CTRL while rotating the mouse wheel toward you.
1:1	Zoom 100%	Reset zoom to 100%
⟦ ⟧	Fit to view	Enable the fit-to-view zoom. The fit-to-view zoom is disabled when you zoom in or out manually.
⬚	Fullscreen	Display the image in full screen.
⧉	Undock	Undock the output pane

Bottom-left buttons

Control	Name	Click this button to ...
▶ vs. ⬛	Play vs. Stop	Start vs. stop the image acquisition. The Play / Stop button is a toggle control that corresponds to the action you can perform.
⚪ vs. 🔴	Record off vs. Record on	Record vs. stop recording acquired images in the recorder container. The Record off / Record on button is a toggle control that corresponds to the current recording status.

Bottom-right buttons

Control	Name	Click this button to …
	Bayer decoding method	Select the requested decoding method for Bayer images: ● method 1: linear interpolation on a 3x3 kernel (legacy method) ● method 2: median-based interpolation on a 3x3 kernel (advanced method) ● method 3: gradient-based interpolation on a 5x5 kernel ● method 5: average-based interpolation on a 2x2 kernel The button is only displayed when Bayer images are stored in the buffers.
	Share with Open eVision Studio	Save the current image to make it available in Open eVision Studio. See "Share an image with Open eVision Studio 1.0" on page 32.
	Source information	Enable/Disable the display of source information in the upper left corner of the Output pane. See "Display of source information" on page 30.
	Pixel components	Enable/Disable the display of pixel components when hovering over the image with the mouse. See "Display of pixel components" on page 31.
	Line profile	Display a line profile on the top of the displayed image, and the corresponding line profile plot at the bottom of the Output pane. See "More About the Line Profile" on page 34.
	Histogram	Display the image histogram at the bottom of the Output pane. See "More About the Image Histogram" on page 33.

Display of source information

eGrabber source

The following information on images being acquired or being stored to the recorder container is displayed:

- image size (width/height)
- pixel format
- frame rate (frames/sec)
- line rate (lines/sec)
- data rate (Megabytes/sec)
- delivered buffers
- diagnostic counters for Coaxlink sources:
  - rejected scans: number of scans completely missed (line-scan camera)
  - rejected frames: number of frames completely missed (area-scan camera)
- diagnostic counters for Gigelink sources:
  - lost frames: number of frames completely missed
  - lost packets: number of GigE Vision stream packets missed
- buffer metadata (only when Buffer metadata insertion is enabled)

Width	1280
Height	1024
Pixel format	Mono8
Frames/s	36.0211
Lines/s	36885.6
Megabytes/s	47.8038
Delivered buffers	533
Rejected frames	0
BufferMetadataContent0	GPC1Value: 0x00000457
BufferMetadataContent1	GPC2LatchedValue: 0x000008ae
BufferMetadataContent2	LineStatusAllHi: 0x00001e61
BufferMetadataContent3	LineStatusAll: 0x000022b8

Source information with Buffer metadata

Width	1280
Height	1024
Pixel format	Mono8
Frames/s	36.3963
Lines/s	37269.8
Megabytes/s	47.7054
Delivered buffers	130
Rejected frames	0

Without Buffer metadata

Recorder container opened for playback

The following information related to the records stored in the container is displayed:

- timestamp
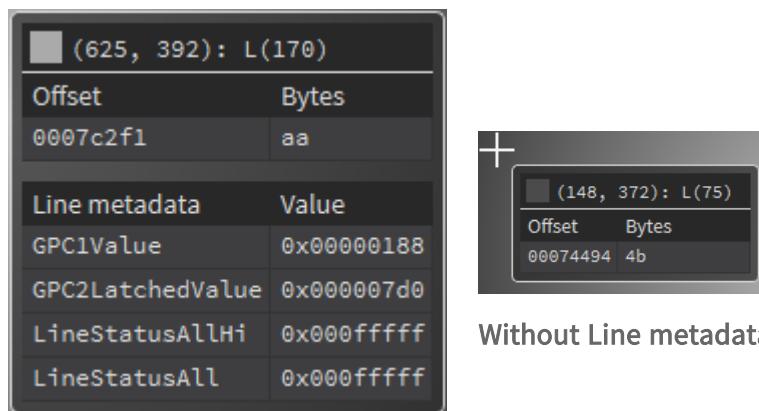- pixel format
- image size (width/height)

Display of pixel components

When you click to enable the pixel component display, the mouse cursor turns into .

As you hover over the image, a small table displays the components of hovered-over pixel, as shown on the screenshots below:

- X/Y: horizontal/vertical position of the pixel on the image
- L: luminance decimal value
- RGB: red/green/blue decimal values
- Offset: pixel position in bytes in the pixel definition table
- Bytes: luminance or RGB expressed in hexadecimal values
- Line metadata (only when Line metadata insertion is enabled)

Pixel components with Line metadata

Without Line metadata

With Bayer pixel formats, the offset and bytes values are displayed in two lines as the red, green and blue data are spread in two pixel lines.
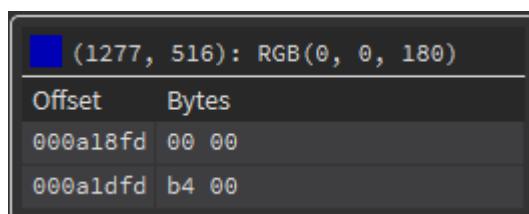
Pixel components with BayerGR8 pixel format

When the Pixel Components overlay tool of the Output Pane is enabled, a rectangle identifying the current pixel is now displayed when the zoom level is high enough

Share an image with Open eVision Studio 1.0

You can share an image with **Open eVision Studio** 1.0 installed on the same computer as **eGrabber Studio**.

- When you click in the Output pane when an image is displayed, the image is saved to a dedicated folder.

In **Open eVision Studio**, you can load the shared image in one of the following ways:

- Select Image > Open from eGrabber Studio from the menu bar.

- Click the eGrabber icon in the toolbar.

- Right-click in an open image and select Load from eGrabber Studio.

> ⊘ **WARNING**
> This sharing feature does not work with the **new Open eVision Studio**!

> ⊘ **TIP**
> The link wih the **new Open eVision Studio** provides a richer user experience as the current source can be used as "live" input source to build processing sequences.

3.2. More About the Image Histogram

Overview

The histogram feature, available by clicking ![histogram icon] in the Output pane, is a graph that shows the number of pixels in an image at each different intensity value found in that image.

For a grayscale image, the graph displays the intensity values showing the distribution of pixels amongst the grayscale values from left to right, from the darkest to the lightest tones.

For a color image, individual graphs of red, green and blue are superimposed on the same histogram, with intensity values also displayed from left to right, from the darkest to the lightest tones.

Histogram of a color image
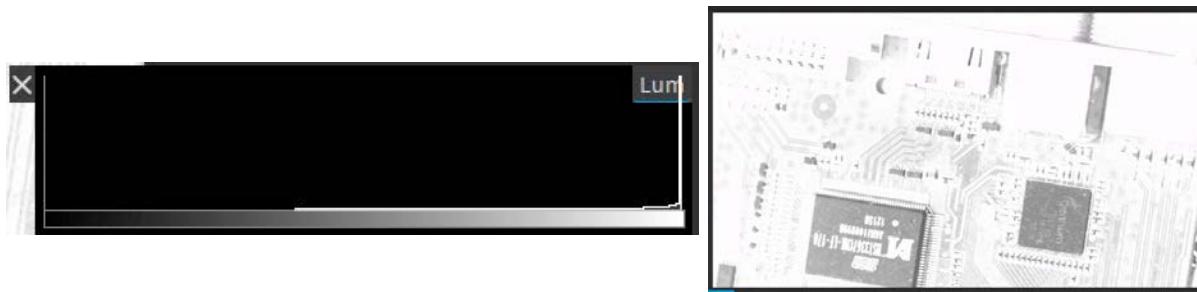
Examples

The histogram below shows that the intensity values are concentrated towards the left: The image contains too many dark pixels:

The histogram below shows that the intensity values are concentrated towards the right: The image contains too many light pixels:

The histogram below shows that the intensity values cover a broad and more central range of intensity values: The image shows a better brightness balance, although it still contains more dark pixels:
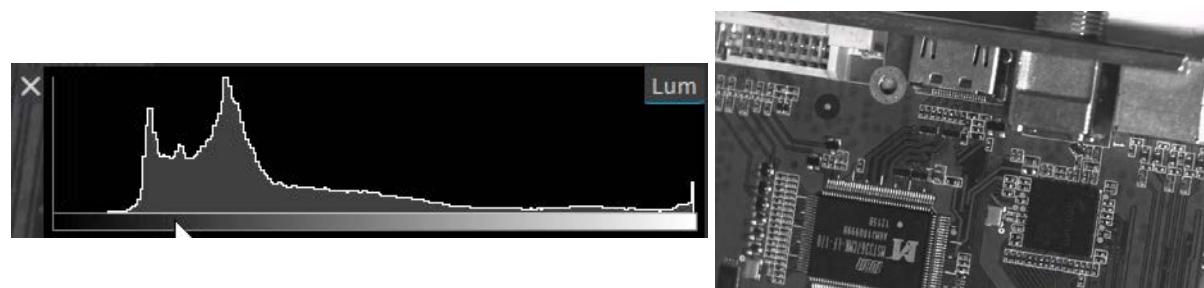
Possible actions

In order to ...	Proceed as follows:
View each pixel channel in a color image	Click one or more times on RGB.
Enlarge or reduce the Histogram pane	Click the arrow on the right of the Histogram pane.
Close the Histogram pane	Click the cross on the left of the Histogram pane.

> **NOTE**
> If an image format is not supported, the histogram is displayed as RGB values.

3.3. More About the Line Profile

Overview

The line profile feature, available by clicking [icon] in the Output pane, draws a line on the top of the displayed image, and shows the corresponding line profile plot at the bottom of the pane.

The line profile plot shows the light intensity values (monochrome image) or color intensity values (color image) on the various points along the line segment (line profile) drawn on the image.

Examples

When the image is not sharp enough, the line profile plot shows a rather flat profile.
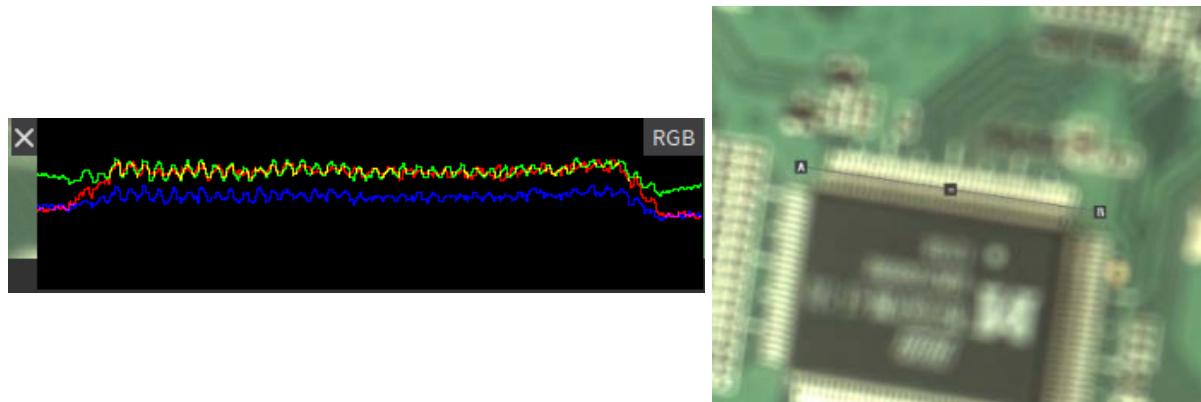
When the image is sharp, the line profile plot shows a uneven or jagged profile.

Possible actions

In order to ...	Proceed as follows:
Move or resize the line profile	• To move the line profile, click the central handle and drag the line profile to the desired position on the image. • To resize and modify the line profile, click and move one of the outer handles (A & B) to the desired position on the image.
View line profile of each color component	In the line profile plot, click one or more times RGB in the upper right corner.
Close the line profile	In the line profile plot, click the cross on the left of the Line Profile pane.

4. Configuring GenApi Features

4.1. Overview of the Features Pane

Access and purpose

Click the Features button ![icon] in the toolbar to open the Features pane.

On this pane, you can perform the following actions:

- View, sort and filter the **GenApi**[1] features of the **GenTL**[2] modules related to the eGrabber you are connected to.

- View various information related to the current GenTL module & port, the bootstrap registers of the remote device and the latest buffer information from the Data Stream module.

- Perform a manual configuration of your eGrabber.

> See also: "Edit GenApi Features" on page 39 for detailed information on sorting, filtering and editing features in the Features pane.

Displayed items

In the Features pane, the features are organized in different tabs named according to the five GenTL modules.

---
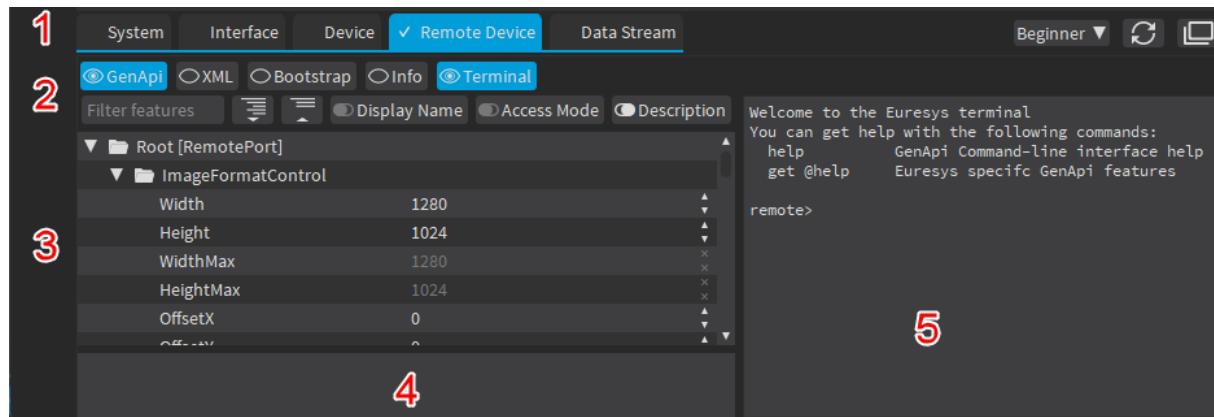
[1]GenICam standard that deals with camera and frame grabber configuration.

[2]GenICam standard that deals with data transport. TL stands for Transport Layer.

The items displayed on this pane are briefly presented from top to bottom, and from left to right.

1. Controls applicable to the whole Features pane (from left to right):

   ◻ Tabs to select a module (System, Interface …)

   ◻ Drop-down field to select the user profile (Beginner, Expert, Guru)
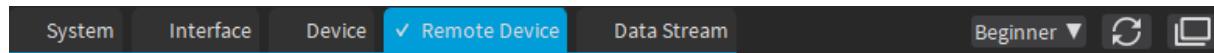
   ◻ Button to refresh the pane

   ◻ Button to undock the Features pane and have it available in a separated window

2. Controls specific to a features module:

   Top row left to right

   ◻ GenApi button to display the GenApi tree view

   ◻ XML button to display the XML file

   ◻ Bootstrap button (for remote devices only) to show the transport layer specific bootstrap registers of the remote device

   ◻ Info button to show the GenTL INFO commands related to the current GenTL module & port (and Buffer INFO for the Data Stream module)

   ◻ Terminal button to open the Terminal tool

   Bottom row left to right

   ◻ Filter features field to enter a search pattern

   ◻ Expand and Collapse buttons to expand/collapse the whole feature tree

   ◻ Display Name button to show the display name of the GenApi feature, when available

   ◻ Access Mode button to show/hide the access modes (RW, WO, RO, NA) of the features

   ◻ Description button to show/hide the description filed
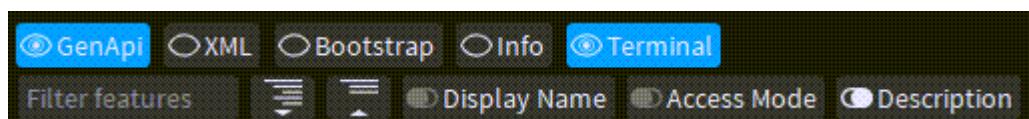
3. Feature tree view with the following columns: feature name, feature value, access mode.
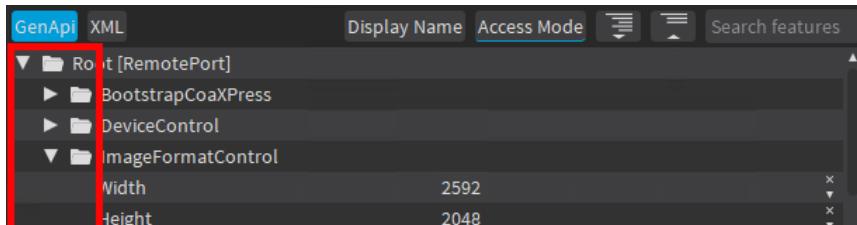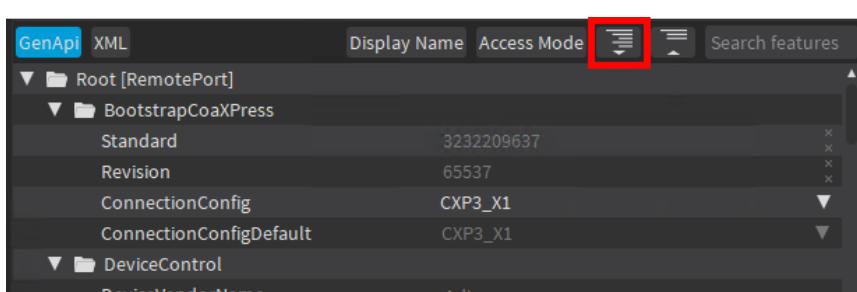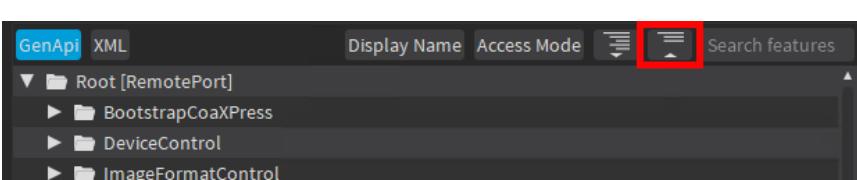
NOTE: By default, the features of the GenTL module selected in the Welcome screen are displayed in a fully expanded feature tree, based on the Beginner user profile.

4. Short description of the selected feature, when available.

5. "Terminal" on page 49 tool.

4.2. Edit GenApi Features

Display features in the feature tree view

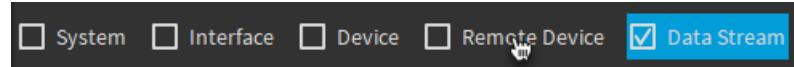| In order to ...	Proceed as follows:
Display another (single) tab on the Features pane	Click the tab name. □ System □ Interface □ Device □ Remote Device ☑ Data Stream
Display several tabs on the Features pane	Select the check boxes corresponding to the tabs you want to display. □ System □ Interface □ Device ☑ Remote Device ☑ Data Stream

Expand and/or collapse a feature group	Click the arrows in front of the feature group:
	
	GenApi XML Display Name Access Mode Search features
	▼ 📁 Root [RemotePort]
	  ▶ 📁 BootstrapCoaXPress
	  ▶ 📁 DeviceControl
	  ▼ 📁 ImageFormatControl
	       Width 2592
	       Height 2048

Expand all features (in a module)	Click the Expand all button in the requested tab:
	
	GenApi XML Display Name Access Mode Search features
	▼ 📁 Root [RemotePort]
	  ▼ 📁 BootstrapCoaXPress
	       Standard 3232209637
	       Revision 65537
	       ConnectionConfig CXP3_X1
	       ConnectionConfigDefault CXP3_X1
	  ▼ 📁 DeviceControl
	       DeviceVendorName Adimec

Collapse all features (in a module)	Click the Collapse all button in the requested tab:
	
	GenApi XML Display Name Access Mode Search features
	▼ 📁 Root [RemotePort]
	  ▶ 📁 BootstrapCoaXPress
	  ▶ 📁 DeviceControl
	  ▶ 📁 ImageFormatControl

Show feature display name	Click Display Name to show the display name of the GenApi feature, when available.

In order to …	Proceed as follows:
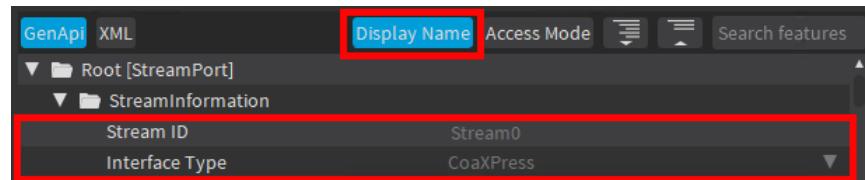
When it is not available or when the DisplayName is not selected, the name of the GenApi feature is displayed.

	Click Access Mode to display the feature access mode (see Feature access modes).
Show access mode	
	Otherwise, nothing is mentioned, and the non-editable features are dimmed.
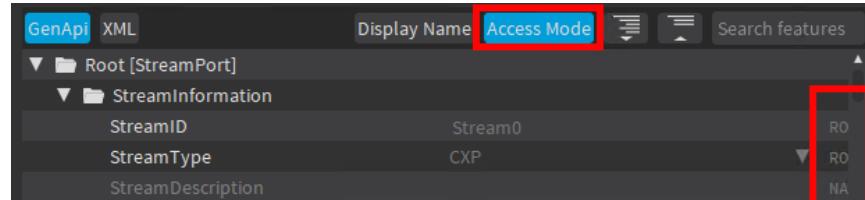
Display features in the XML view

In order to …	Proceed as follows:
Display the features of a module in the tree view and/or in the XML file	Click the GenApi and/or XML buttons:
Display a feature node in XML view	From the feature tree view, do one of the following actions: • Double-click the feature node. • Select the feature node and press F12.
Display a feature value in XML view	Hover over a feature name in the XML view, and a pop-up message displays the feature value.
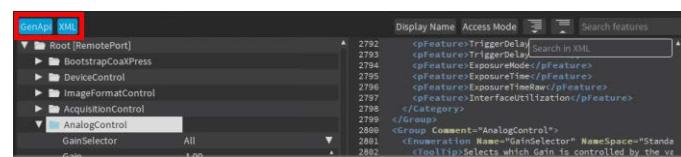
Filter and Search features

You can filter the displayed features as explained below:

In order to …	Proceed as follows:
Filter the displayed features by user profile (for all modules)	Select a user profile Beginner, Expert, Guru on the right of the Features pane:
Search for features or categories based on their name in the tree view (in a single module)	1. Click the Search features field. 2. Type the text string corresponding to (part of) the feature name you are looking for. The features are automatically filtered based on the entered text string, and displayed in their respective categories.
Search in the XML file (in a single module)	1. When a module is open in XML view (XML button selected), click the Search in XML field. 2. Type the text string corresponding to (part of) the feature name you are looking for. The first occurrence of the searched string is highlighted in blue in the XML file and arrow buttons make it possible to go to the next and previous occurrences.
Clear the search	Whether you search in the feature tree or in the XML file, click next to the relevant search field to clear its content:
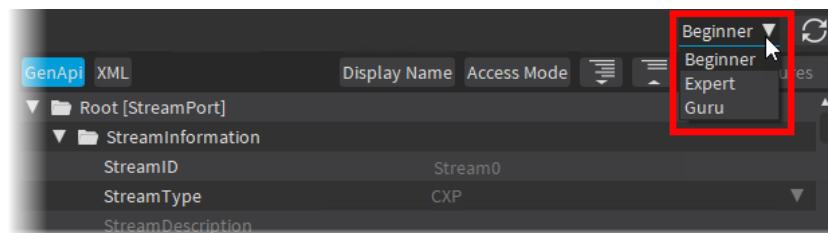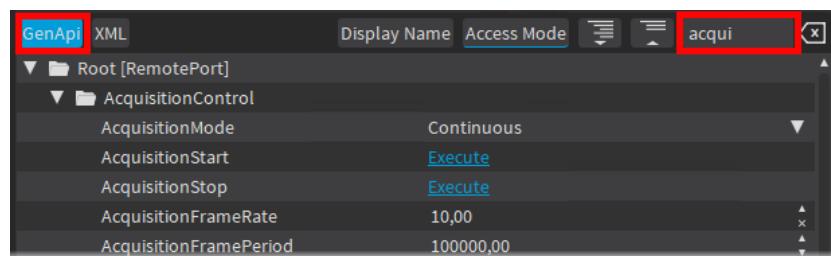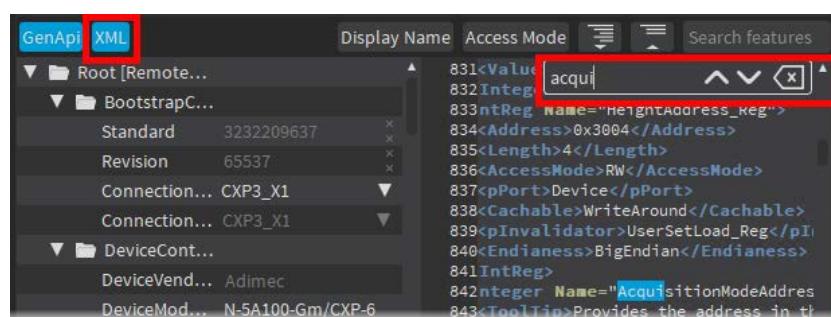
41

In order to ...
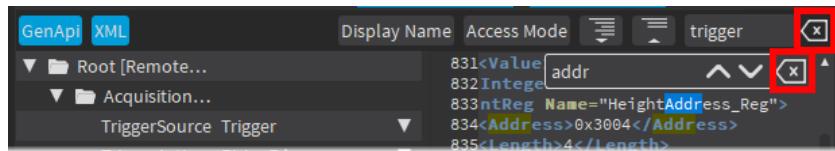
Proceed as follows:

Advanced functionality with specific features

In order to …	Proceed as follows:
	Click the Dump Selected button next to the feature selector. For example, clicking Dump Selected next to the Errors selector in the Data Stream feature pane displays a pane with the error count for all values of the Errors selector:

(with selectors)

Display all values
linked to
a feature selector in
a dedicated pane
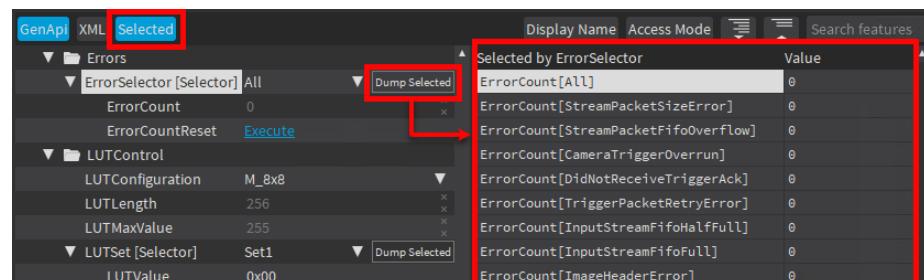
Once the dedicated pane is displayed, click Selected on the top to hide or show the pane again.

Click the Register button next to the feature whose value corresponds to a register content on the device.

(with features having
a value pointing to a
register)

- Display a register content in an hexadecimal editor
- Load register values from a file
- Save register values to a file
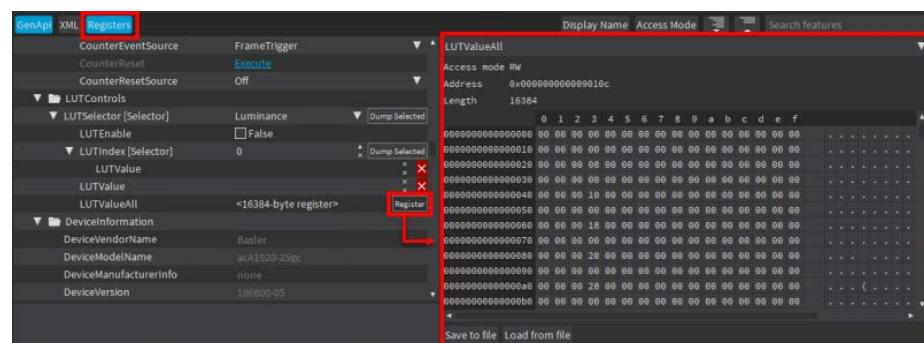
From the hexadecimal editor, load register values from a file or save them to a file with the Save to file and Load from file controls.
Once the dedicated pane is displayed, click Registers on the top to hide or show the pane again.

Click the FileAccess button on the right of the FileAccessControl category (defined in SFNC standard).

(with the File
AccessControl
category)

- Upload a file to the remote device
- Download a file from the remote device
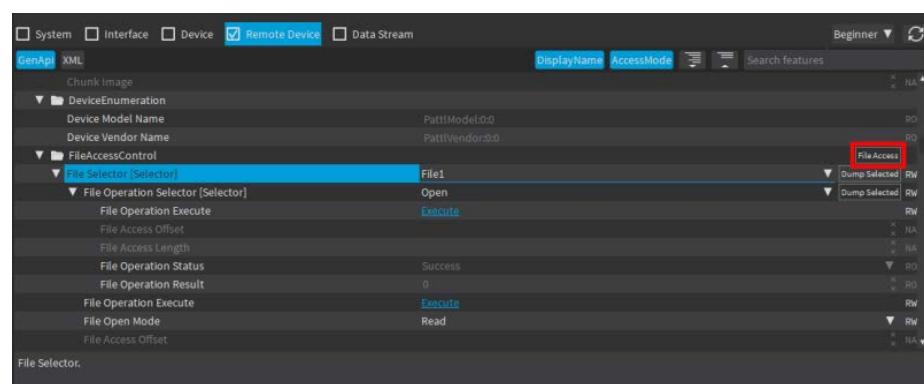
In order to ...	Proceed as follows:
	You can then select a file (LUT table, new firmware, etc.) and upload it to or download it from the current remote device.

Edit features

In the Features pane, the feature name, feature value, and access mode (when enabled) are displayed from left to right.

Editable features vs commands

You can modify or interact with RW (Read-Write) and WO (Write-Only) features. Non-editable features are dimmed.

- For editable *Parameter* features (RW and WO), enter the requested value in the second column using the available controls.

- For *Command* features, click Execute in the second column to trigger the command.

Automatic rounding of integer feature values

When you enter a non-supported value in an integer feature field, the value is automatically adapted based on the minimum value, maximum values, or increment steps (value = minimum + x * increment).

Example: The ExposureTimeRaw field with a given camera has an increment step of 35. If you type the value 4000, it will be automatically rounded to the closest supported increment value: 3990.

Feature access modes

The following access modes, which are displayed when you click Access Mode in the feature pane of a module, are possible:

- RW (Read-Write) allows you to read and edit the feature value.

- WO (Write Only) allows you to set the feature value. The value of a write-only feature cannot be retrieved.

- RO (Read Only) allows you to read the feature value, but not to edit it.

- NA (Not Available) refers to a feature that you can neither read nor edit. Such features or categories are dimmed and their child elements are not displayed.

A red cross is displayed next to the access mode if an error occurs when accessing the corresponding register or reading the feature value in the register.

An error pane will display if you enter a wrong value for a given feature.

Specific GenICam features

Remote Device Events

When **eGrabber Studio** receives GenICam remote device events from a camera, an Events button is displayed in the Features pane, Remote Device module, with a general event counter.
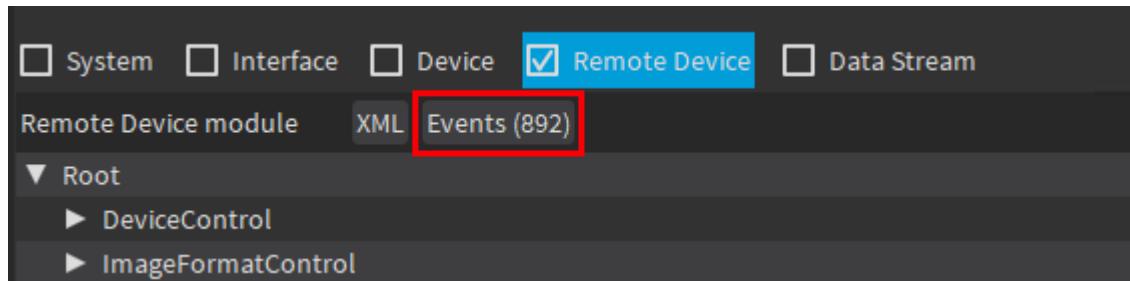
Clicking the Events button opens an Events pane showing a counter of received events for each EventID.

Metadata Insertion

For boards featuring *metadata insertion*, the Features pane, Data Stream module, shows the MetadataInsertion category.
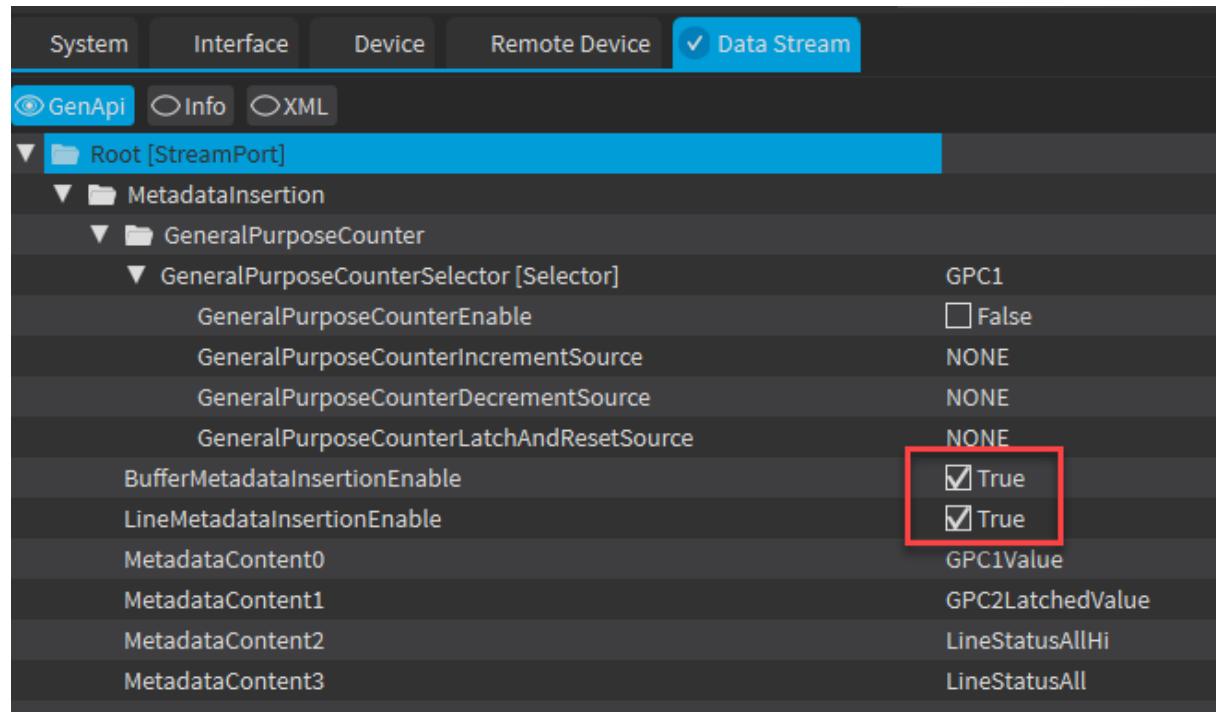
To enable the insertion of Buffer metadata, check the BufferMetadataInsertionEnable button.

To enable the insertion of Line metadata, check the LineMetadataInsertionEnable button.

4.3. Overview of the Scripts Pane

Access and Purpose

You can open the Scripts pane by clicking the Scripts button in the toolbar.

In this pane, you can perform the following actions:

1. Save a configuration performed manually in **eGrabber Studio** to a **Euresys GenApi** script.

2. Load and run a **Euresys GenApi** script (.js file) previously created.

On the screenshot below, the numbers corresponding to the above-mentioned actions show where you can perform these actions:

Save a configuration to a script

When you set the **GenApi** features or execute **GenApi** commands to configure a device manually in **eGrabber Studio**, your configuration is automatically logged into the User setup log script area.

You can then save this log into a **Euresys GenApi** script, that you can freely modify and apply on the same device or on other devices.

> **NOTE**
>
> Other interactions with the **eGrabber Studio** application are logged as comments. They are only used for information's sake and will not trigger any action if you run an exported script containing such information.

Run a script

Some information on loading and running a script:

- A notification informs you when the script has been successfully run.

- When an error occurs, a Script Failed error is displayed.

- The Abort command stops the script execution but does not roll it back.

You should therefore include log functions in your script to be able to trace back the executed actions.

4.4. Resources on Scripts

Introduction

This section is intended to provide introductory information on **Euresys GenApi** scripts and includes the following items:

- A sample configuration script to help you create basic scripts to set the GenApi features in the various GenTL modules of your eGrabber.

- A short description of the scripts already available with the **eGrabber** package.

> **See also:** Refer to the "Euresys GenApi scripts" section of the D204ET-eGrabber Programmer Guide PDF document

Sample configuration script

```
// This file is a sample configuration script for a CoaXPress camera connected
// to a Coaxlink card.

var grabber = grabbers[0];

// Configure the Line Input Tool LIN1
grabber.InterfacePort.set("LineInputToolSelector", "LIN1");
grabber.InterfacePort.set("LineInputToolSource", "TTLIO11");
grabber.InterfacePort.set("LineInputToolActivation", "RisingEdge");

// Configure the Camera and Illumination Controller
grabber.DevicePort.set("CameraControlMethod", "RG");
grabber.DevicePort.set("CycleTriggerSource", "LIN1");
grabber.DevicePort.set("ExposureReadoutOverlap", true);
grabber.DevicePort.set("ExposureTime", 10000); // 10ms

// Configure the remote device (i.e., the camera)
grabber.RemotePort.set("PixelFormat", "Mono8");
grabber.RemotePort.set("TriggerSource", "Trigger");
grabber.RemotePort.set("ExposureMode", "TriggerWidth");
```

Initialize the eGrabber

The following instruction initializes the grabber variable for the grabbers[0] instance.

When working with a standard camera, you will have only one eGrabber instance: grabbers[0] created in **eGrabber Studio**.

```
var grabber = grabbers[0];
```

Set a feature value

The following instruction allows you to set the value "LIN1" to the feature "LineInputToolSelector" that is stored in the GenTL Interface module for the grabbers[0] instance.

```
grabber.InterfacePort.set("LineInputToolSelector", "LIN1");
```

Use instructions with the following syntax to set or change a feature value:

<grabber>.<GenTL_module>.<function> ("<feature_name>","<feature_value>");

Element	Description
<grabber>	Variable grabber initialized earlier in the script
<GenTL_ module>	GenTL module where the desired feature is stored. Each module corresponds to a specific GenTLPort: ● TLPort for the GenTL System module ● InterfacePort for the GenTL Interface module ● DevicePort for the GenTL Device module ● RemotePort for the GenTL Remote Device module ● StreamPort for the GenTL Stream module
<function>	Function to be used, in the above example "set" to set a feature value
<feature_ name>	Feature name to be set, in the above example "LineInputToolSelector"
<feature_ value>	Feature value to be set, in the above example "LIN1"

Make sure you use the proper syntax, including the dots, brackets, quotation marks, colons and semi-colons when appropriate.

Available scripts

The following scripts are available in ...\Euresys\eGrabber\scripts and can be used for the following purposes:

Script name	Description	Source
check-config.js	Perform consistency checks between the **Coaxlink series** frame grabber and the camera settings.	**Coaxlink series**
cxptest.js	Test the CoaXPress connection in both directions on connected remote device(s).	**Coaxlink series**
export-xml.js	Export GenApi features to an XML file	**Coaxlink seriesGigelink**
lamps.js	Control the bracket lamps of a **Coaxlink series** frame grabber.	**Coaxlink series**
load-ffc.js	Load Flat Field Correction coefficients.	**Coaxlink series**
lut-builder.js	Populate the **Coaxlink series** LUT using a parametric method.	**Coaxlink series**
monitor-io.js	Monitor the I/O state forever.	**Coaxlink series**
pocxp-auto.js	Enable automatic power control over CoaXPress	**Coaxlink series**
pocxp-cycle.js	Perform power cycle over CoaXPress and wait for remote device(s) to be ready	**Coaxlink series**
pocxp-off.js	Turn off power over CoaXPress	**Coaxlink series**
show-mio-config.js	Show I/O extension module configuration	**Coaxlink series**

4.5. Terminal

A Terminal tool is available for each GenApi module in the Features Pane, it provides a command-line interface to perform advanced operations on the GenApi nodes of the module or to execute Euresys Scripts on the grabber.

NOTE: The Terminal tool is similar to the command-line tool gentl genapi but it's integrated into **eGrabber Studio**.

```
Welcome to the Euresys terminal
You can get help with the following commands:
  help         GenApi Command-line interface help
  get @help    Euresys specifc GenApi features

remote> get Width
2592
remote> get Height
2048
remote> get PixelFormat
Mono8
remote> |
```

For example, on the Remote Device module, you can query camera features using the command get

The Terminal provides a help command that shows the available commands:

```
remote> help
Euresys GenApi command-line commands:
  dump [C]     dump exposed features [of category C]
  get F        get value of feature F
  set F V      set feature F to V
  execute F    execute command F
  done F       check if processing of command F is done
  run S        run script S (inline or script path)
  open FILE    open file FILE with default editor
  attributes   list camera file attributes
  categories   list categories
  features C   list features of category C
  source N     show GenApi source of node N
  ? N WHAT     query information WHAT about node N
               (e.g., ? Gain tooltip)
  help         Command-line interface help
```

In addition to those commands, the Terminal provides various utility features:

- the Terminal editor is split into two parts:
  - □ the prompt line, which is the last line of the editor, this is where a command can be entered
  - □ the previous lines of the editor, this is where last issued commands and the results are displayed, this part is read-only
- ctrl + home moves the cursor to the beginning of the Terminal
- ctrl + end moves the cursor to the end of the Terminal
- the Terminal can be cleared using one of the commands cls or clear
- entered commands and command outputs have different background color to improve readability
- command error outputs are displayed in red

When the cursor is on the prompt line:

- a command can be entered
- command-line history can be accessed using ↑ and ↓
- command-line history is saved per provider/module so that history of commands can be accessed between application sessions
- command (and argument) completion is available using →, so you can enter the beginning of a command, press → then enter the beginning of an argument and press →
    - □ the completion either auto completes the prompt or shows a list of possible candidates
- text command can be dropped (drag&drop) directly to the prompt line
- `ctrl` + `a` moves the cursor to the beginning of the prompt line
- `ctrl` + `e` moves the cursor to the end of the prompt line
- `ctrl` + `k` deletes what's on the right-hand side of the cursor in the prompt line
- `ctrl` + `c` cancels the current prompt and prepares a fresh prompt line

When a script is running (command run), it can be interrupted using `ctrl` + `c`

5. Using Recorder Containers

5.1. Overview of the Recorder Pane

Access

Click the Recorder icon **[REC]** in the toolbar to open the Recorder pane.

The Recorder pane gives access to the **eGrabber Recorder** feature. This feature makes it possible to store high-bandwith streams on the fly for long time periods in so-called recorder containers.

> **NOTE**
>
> To be able to use the **eGrabber Recorder** feature, you need to buy a license for the **eGrabber Recorder** library, and activate your license key. Refer to the **Neo License Manager** manual.

Possible actions

On this pane, you can perform the following actions:

1. Create a recorder container in the Create recorder area.

2. Start the recording process with the Record button.

3. Create chapters in the Create chapter area.

4. View statistics in the Recorder statistics area.

5. Close the recorder container or play back the recorder container in the Close container area.

On the screenshots below, the numbers show where you can perform the above-mentioned actions:
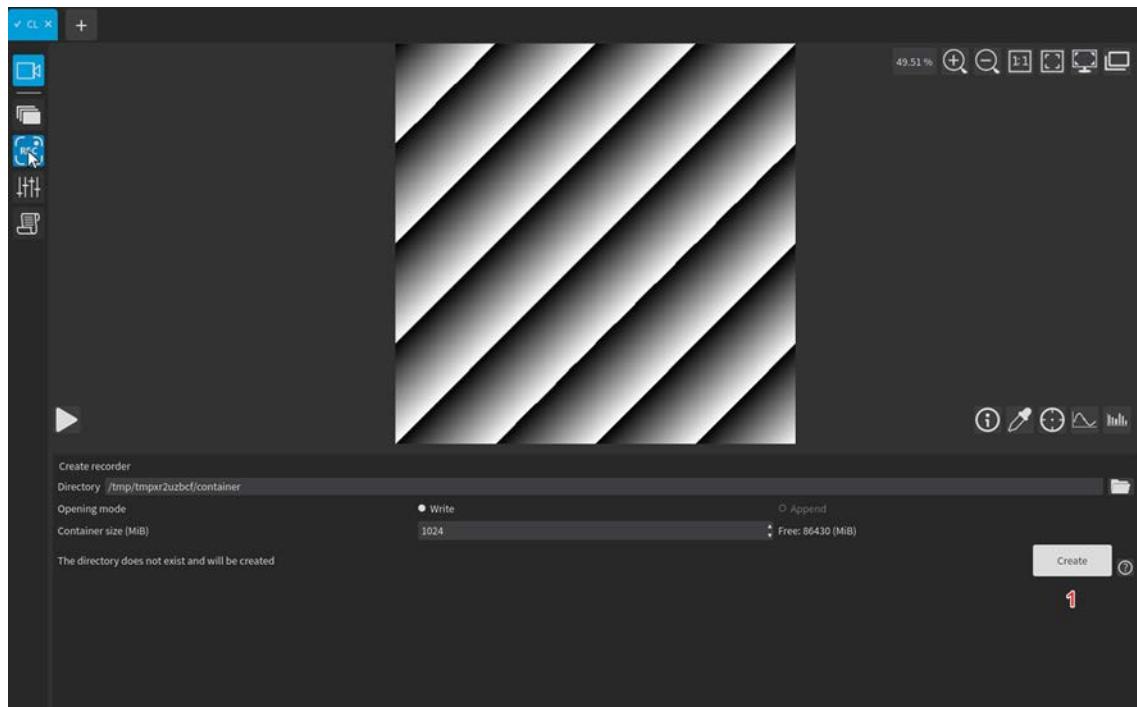
Recorder Pane - Before Creating a Recorder Container
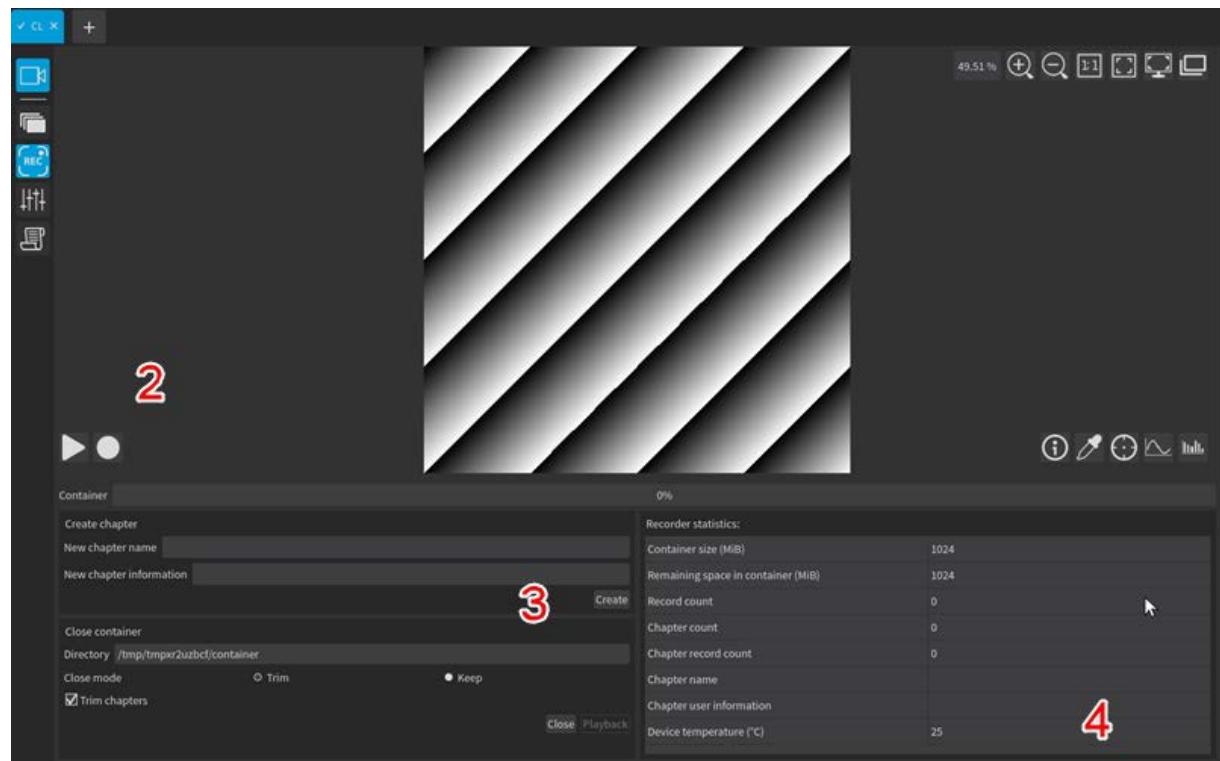
Recorder Pane - After Creating a Recorder Container

5.2. Record Images on the Fly

Introduction

Using recorder containers, you can record images on the fly as they are being acquired. This section explains various steps of the recording process.

Don't forget to purchase and activate your **eGrabber Recorder** license key to be able to use the recorder feature. Refer to the Neo License Manager manual.

> **NOTE**
> The recording performance depends on the performance of the disk system where your recorder containers are stored.

Recording Process

In the Recorder pane, you can perform the following consecutive actions to store a stream in a recorder container:

1. Create a recorder container in the Create recorder area.

2. Record images in the container with the Recorder button.

3. Close the recorder container in the Close container area.

In addition, you can create chapters in the container before or after you start recording.

> **NOTE**
> You have to close the recorder container to be able to access it from the Welcome screen and view its content.
> See Play back a recorder container for more information on viewing the content of a recorder container.

Create a recorder container

Depending on whether you use an existing or a new recorder container, the Create recorder area in the Recorder pane slightly varies:

Existing Recorder Container

If you select an existing directory in the Directory field:

- The message "A container already exists in the directory" is displayed at the bottom of the pane.
- The Opening mode controls let you choose between following options:
  - □ Overwrite overwrites the previously recorded content in the existing container.
  - □ Append appends the new images to be recorded after the existing content in the container.
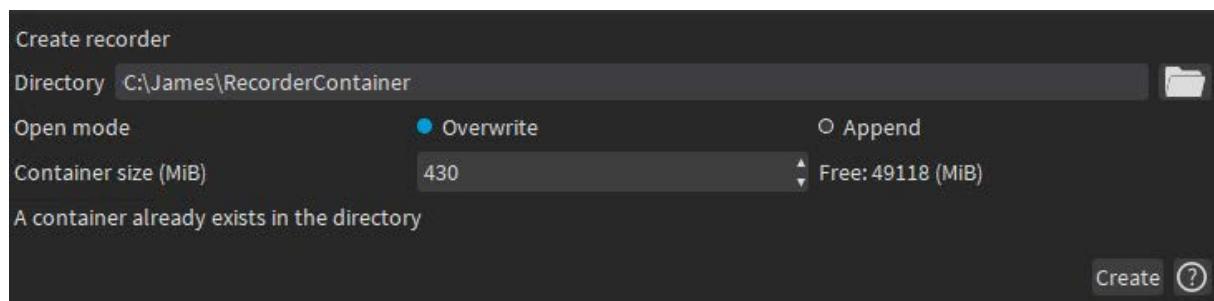
Create recorder area - Existing recorder

New Recorder Container

If you specify a new directory name in the Directory field,

- The message "The directory does not exist and will be created" is displayed at the bottom of the pane.
- As Opening mode, you can only select the Write mode as the images will be written directly from the beginning of the container.

Create recorder area - New recorder

Container Size

In the Container size field, type the requested size for the container (in MiB), taking into account the remaining free storage space on the disk specified on the right.

> **NOTE**
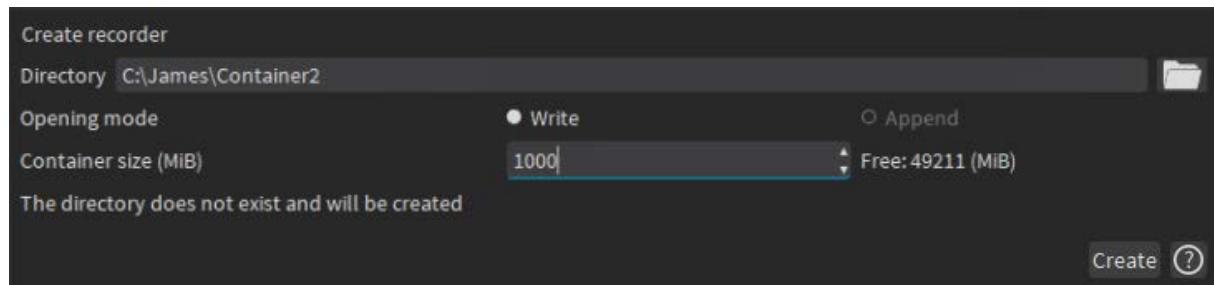> When a container is created or restored, the Recorder pane displays the Close recorder area.

Record images in the recorder container

When a recorder container is open and images are not being recorded, the following controls are displayed at the top of the Recorder pane:

You record images when:

- the image acquisition is started, i.e. you have clicked in the Output pane.

  AND

- the container recording is started, i.e. you have clicked in the Output pane.

When new images are being recorded into the recorder container, the recorder button turns red/blue and a progress bar shows how much the container is filled:

During this process, you can independently pause/resume the recording and/or the image acquisition.

> **WARNING**
> A warning message appears when the recorder container is full. To go on recording, close the recorder and reinstantiate the recorder container choosing either to overwrite the recorded content and/or to increase the container size. You can also create a new recorder container in a different folder.

Create chapters in a container

During the recording process, you can create subdivisions called "chapters" in a recorder container.

You can create chapters at any time in the Create chapter area and associate information to them to find back images more easily.

Principles for chapter creation

- The first chapter, named Chapter0 by default, is created automatically on the first frame of the recorder container.

- A new chapter is created automatically when you close, then recreate the same recorder container.

- As long as a recorder container is displayed in the Recorder pane, you can create a new chapter manually when the recording process is on or off.

Rules for chapter names

- The default chapter name is Chapter<xx> where <xx> is the index of the new chapter.

- The user can specify another name for a chapter before starting the recording.

- The chapter name must be unique within the container.

- The chapter name cannot exceed 255 characters.

- The chapter name can only include the following characters: [A-Za-z0-9_].

Close the recorder container

Procedure

When you want to close a recorder container, proceed as follows:

1. Click to stop recording.
2. Select the desired Close mode before you close the container. See Close mode.
3. Do one of the following actions:

   □ If you want to directly read the container content, click Playback.

     This closes the container and opens it in read mode in a new pane on the right.

   □ If you do not want to directly read the container content, click Close.

     You can play back the container later on from the Welcome screen, Recorder area.

     See "Play Back and Export Container Recorders" on page 60.

When you close the recorder, the flag Trim chapters is selected by default: this removes any trailing chapter that doesn't contain any data.
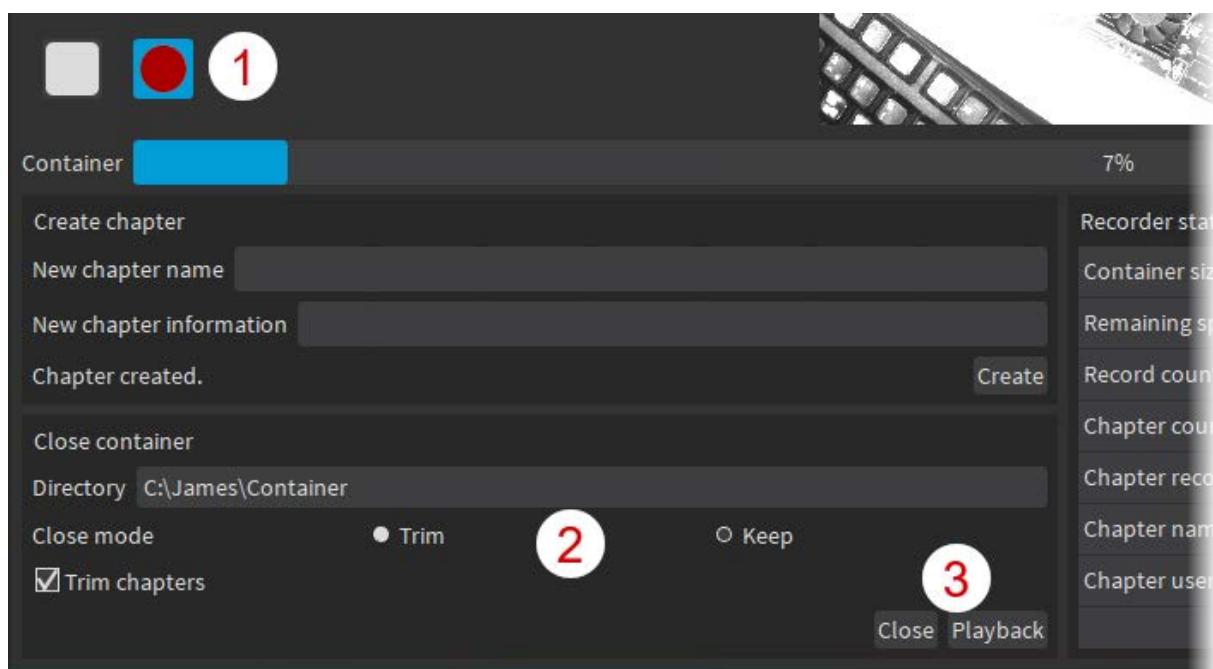
Close mode

The Close mode option allows you to manage any remaining space still available at the end of the recorder container:

- Trim to remove the remaining space on the container when closing the recorder.

  This is useful to reduce the container size when you don't intend to record more images to that container.

- Keep to keep the remaining space on the container when closing the recorder.

  The recorder container can later be reopened in Append mode to record additional images in the remaining space.

5.3. Overview of the Recorder Container Window

Access

You access the Recorder Container window when you open a recorder container from the Welcome screen.

The Recorder Container window gives access to the Output and Buffer tools, like the main window in which you open an eGrabber source. However, the Output pane and the Buffer pane have been adapted to a recorder container.

Possible actions

In the Recorder Container window, you can perform the following actions:

1. Browse the record container and identify which part you want to play back in the Browser container area.
2. Play back the recorder container in the Output pane.
3. Export container records in the Export records area.
4. Configure Playlink in the Playlink configuration area

On the screenshot below, the numbers show where you can perform the above-mentioned actions:
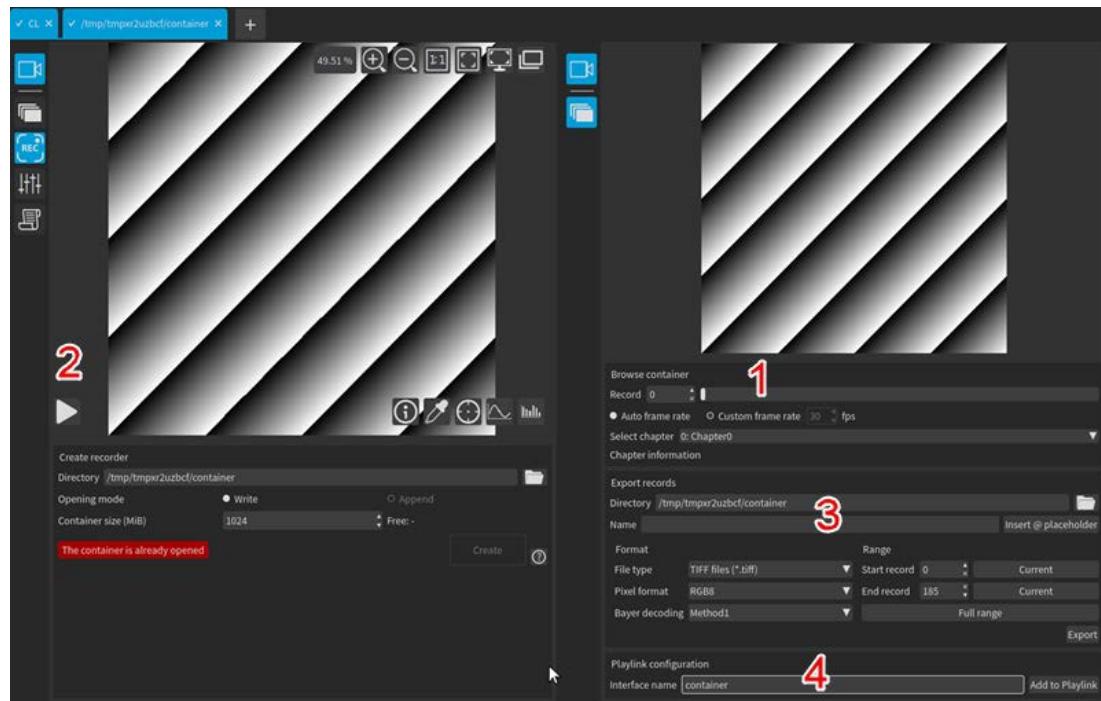
5.4. Play Back and Export Container Recorders

Play back a recorder container

After you have recorded images in a container, you can:

- directly play it back from the Recorder pane using the Playback button.

  This automatically closes the container before reopening it in read mode.

- close it and open it later on from the Welcome screen.

  See also "Close the recorder container" on page 58 or "Open a recorder container" on page 15.

In both cases, the recorder container opens in the Recorder Container window.

Besides the standard playback with the Play button, the following playback options are available in the Browse container area:

Use the following controls	to ...
Record field and slider	browse through the recorder container, just as you browse in the images buffers (see also "View images" on page 25).
Auto frame rate and Custom frame rate radio buttons	define the play back speed: ● The Auto frame rate option plays back the images following the timestamps associated with the recorded buffers. In this mode, **eGrabber Studio** adds a three-second delay when it detects a timestamp discontinuation between successive records. ● The Custom frame rate option allows you to specify the desired playback frame rate.
Select chapter field	jump directly to the start of the selected chapter.

Export container records to files

In the Recorder Container window, you can export the container records and specify several export options:
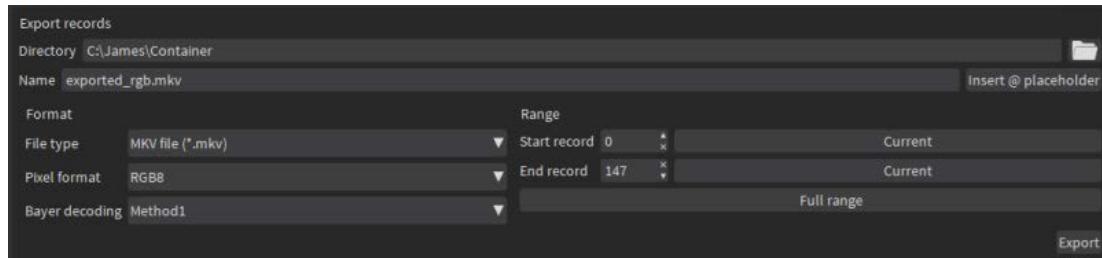
When you export records from the open recorder container in the Export records pane, bear the following in mind:

File name extensions

When you type the file extension in the File Name field, the file type controls update accordingly. You can then change the file type either in the File Name field or in the file type controls.

File name placeholders

By typing @ or clicking the Insert @ placeholder control, you can insert the following placeholders for a variable export file name:

Placeholder	Description
@i	Record index relative to the first buffer of the container (= 0)
@n	Record index relative to the first buffer of the export range (= 0)
@p	Part index. When working with HFR (High Frame Rate) cameras, each buffer contains several parts, and an image is stored in each buffer part. This placeholder displays the buffer part where the image is stored.
@t	Timestamp of the buffer.
@c	Chapter index.
@C	Chapter name.
@@	Character @ is added in the file name.

Add to Playlink

The user can enter a interface name that will be used as InterfaceID while registering the current container to the *Playlink configuration file* using the button "Add to Playlink".

NOTE: The user interface will prevent you from entering an invalid or already registered interface name.

6. Specific Use Cases

6.1. Using Multi-Bank Cameras

The following features allow you to easily configure **multi-bank cameras**[1] with **eGrabber Studio**.

Camera-Oriented discovery in the Welcome screen

In the Welcome screen, the Cameras view allows you to open the streams of a multi-bank camera linked to several eGrabbers, and get the full images in the Output pane.

A 16-connection CoaxPress camera made up of 4 banks of each 4 connections is displayed as follows in the eGrabbers view and Cameras view:

- In the eGrabbers view: Two Coaxlink Octo frame grabbers (GenTL interfaces), configured in the 2-camera variant, receive each two banks (two GenTL devices) of the camera:
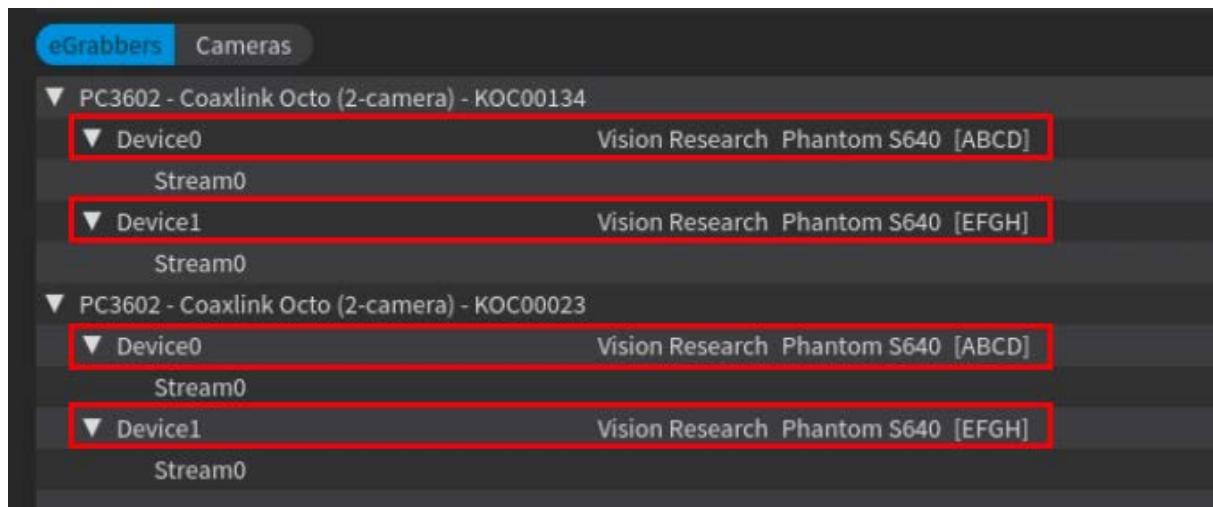
eGrabbers view of a multi-bank camera (4 banks of 4 connections)

[1]Camera that consists of several (independent) CoaXPress devices (GenTL remote devices). Each camera device is connected to a Coaxlink device (GenTL device) that will only receive a part (lines or regions) of the whole camera output.

- In the Cameras view: The camera is made up of two interfaces (0,1), each having two devices (0,1) with 4-connection links on each device: this makes up the four eGrabbers. Each eGrabber is identified as follows: [<interface number>:<device number>][<host connectors>].
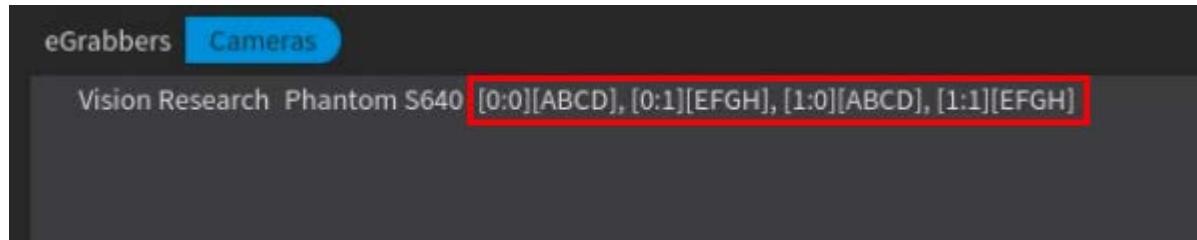
Cameras view of a multi-bank camera (4 banks of 4 connections)

> **NOTE**
> The discovery reorders the devices if they are not connected in the right order, and shows the master device of the camera as the first device.

eGrabber-Specific configuration in the Features pane

When you open the camera in **eGrabber Studio**, it is made up of as many **eGrabbers**[1] as connected camera banks.

From the grabbers list, you can select and configure a given eGrabber. By default, the grabbers[0] instance corresponds to the master device of the camera and is displayed first.


[1]Object that encapsulates a GenTL stream (with a number of buffers), its parent modules (GenTL system, interface, device), as well as the GenTL remote device. You can configure an eGrabber using a GenApi XMLfile. eGrabber Studio creates and presents instances of eGrabbers, called "grabbers" using the Euresys::EGrabber class of the eGrabber library.

eGrabber-Specific Info in the Output pane

In the Output pane, the transfer rate information, accessible from the icon, is displayed specifically for each eGrabber:
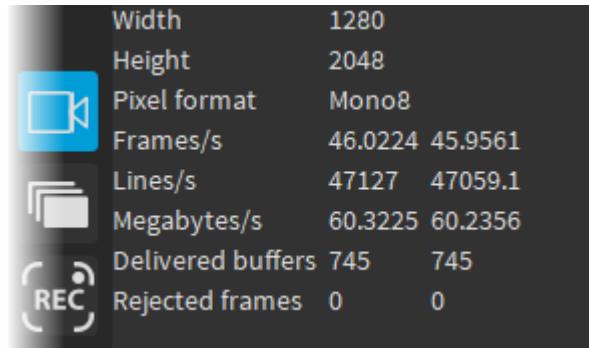
Width	1280	
Height	2048	
Pixel format	Mono8	
Frames/s	46.0224	45.9561
Lines/s	47127	47059.1
Megabytes/s	60.3225	60.2356
Delivered buffers	745	745
Rejected frames	0	0

eGrabber-Specific logging in the Script pane

When configuring a GenApi feature on a given eGrabber, the action log in the Scripts pane specifies the eGrabber on which the feature has been modified:
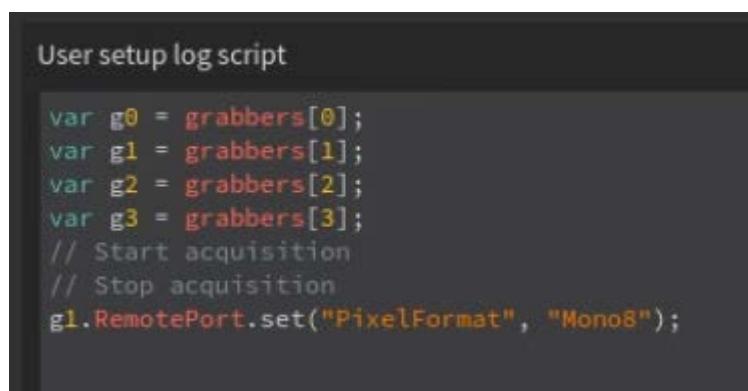

```
User setup log script

var g0 = grabbers[0];
var g1 = grabbers[1];
var g2 = grabbers[2];
var g3 = grabbers[3];
// Start acquisition
// Stop acquisition
g1.RemotePort.set("PixelFormat", "Mono8");
```

You can save the script and reapply it to the same camera later on since the eGrabbers will always be organized in the same order even if the devices are connected in a different order.

7. Firmware Manager

7.1. Overview

eGrabber Studio provides a GUI (Graphical User Interface) to the **Firmware Manager**.

It allows to manage the embedded firmware of any **eGrabber-driven frame grabbers**.

Access

To open the **Firmware Manager** select one of the following methods:

- From the Windows Start Menu: click on Firmware Manager shortcut

- From the Welcome Screen of **eGrabber Studio**, click on the Firmware Manager button.

Displayed items

- The Cards view lists all the cards in the system. It allows to view or modify the installed firmware.

- The Details view lists all the available firmware variants embedded in the release. It also allows to select an alternate source of firmware (file or folder).

7.2. Cards View Description

The Cards view lists all the cards in the system.
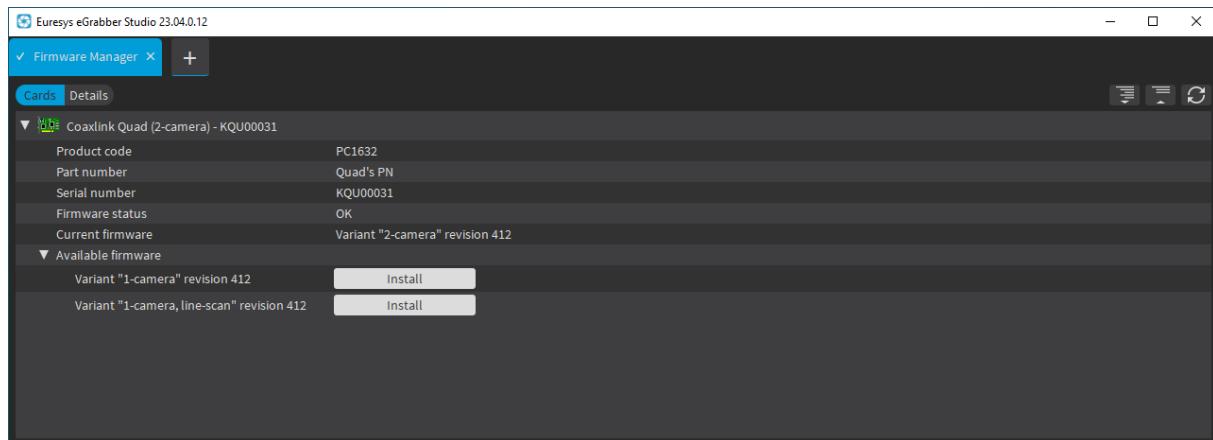
Cards view

Card entry

A card entry line is composed of:

- A card icon,
- A card identifier string,
- An optional tag,
- An additional orange/red tag to report a warning/error related to the card (if any).

Card identifier

The card identifier string is composed of:

- The product name (e.g.'Coaxlink Quad'),
- The currently installed firmware name (e.g. '2-camera'),
- The serial number (e.g. 'KQU00031').

Card properties

The following card properties can be displayed by expanding a card entry:

- Product code (e.g.'PC1632'),
- Part number,
- Serial number (e.g. 'KQU00031'),
- Firmware status (e.g. 'OK'),
- Current firmware variant and revision number (e.g. 'Variant "2-camera" revision 412'),
- A list of available firmware variants.

Available firmware

Each entry in this list provides:

- Variant name and revision (e.g. 'Variant "1-camera" revision 412'),

- An Update button to update the current firmware variant or an Install button to install another variant than the current one.

Power cycle needed tag

A Power cycle needed tag is added after having installed a firmware to inform the user that a power-cycle is now required to finalize the operation. It will disappear after the next power cycle.
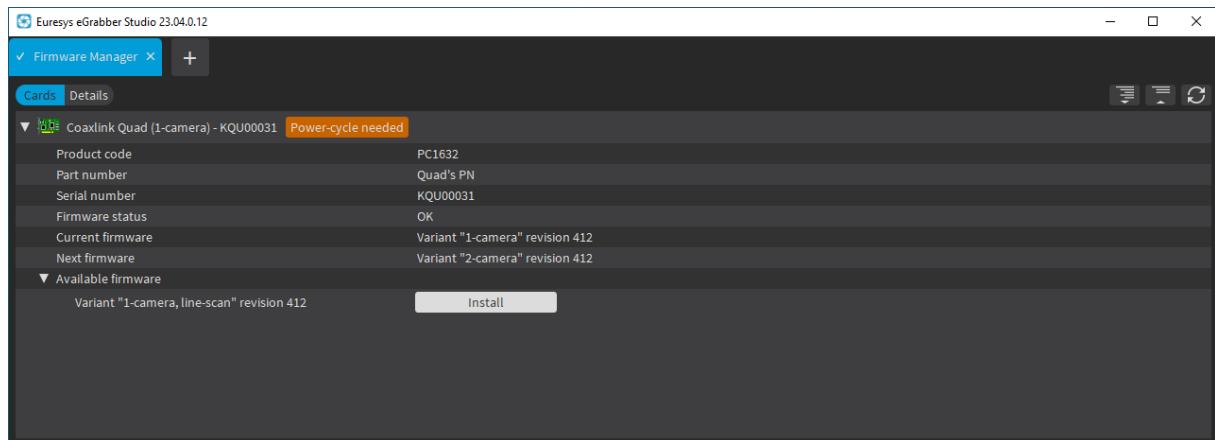
Cards view with "Power-cycle needed" tag

7.3. Details View Description

The [Details] view lists all the available firmware variants in a firmware source.

Firmware sources

Possible firmware sources are:

- [Embedded]: all the firmware variants embedded in the eGrabber installation package. (Default source.)

- [File]: firmware variant(s) within a specific file (to specify)

- [Folder]: firmware variant(s) within a specific folder (to specify)
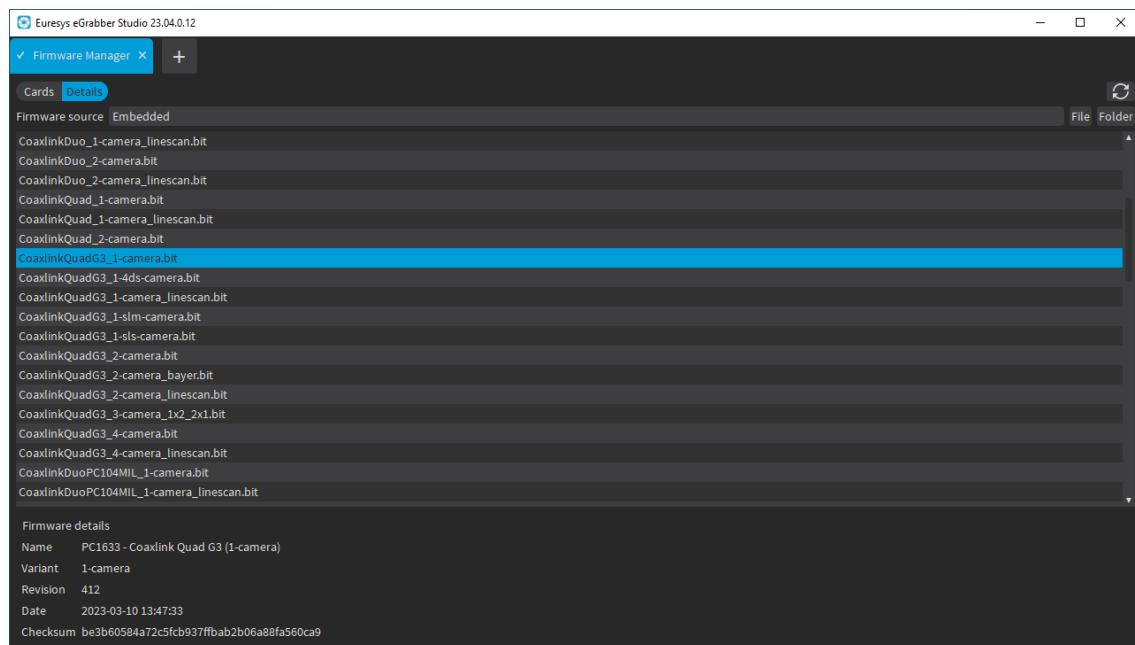
Details view (Embedded firmware source)

Firmware properties

The following firmware properties are shown when selecting a firmware entry:

- Firmware name (e.g.'PC1633 - Coaxlink Quad G3 (1-camera)'),

- Firmware variant (e.g. '1-camera'),

- Firmware revision (e.g. '412'),

- Checksum value.

8. Glossary

B

Buffer module

GenTL module that represents a memory buffer. Buffers must be announced to the data stream that will fill them with image data.

C

Callback model

Defines when and where (in which thread) callback functions are executed. eGrabber supports three callback models named respectively CallbackOnDemand, CallbackSingleThread and CallbackMultiThread.

CIC

Acronym for Camera and Illumination Controller

Camera and illumination controller

Part of a frame grabber card that controls a camera and its associated illumination devices. Hosted in the GenTL Device module.

Camera Link

Interface and communication standard for industrial cameras based on the National Semiconductor interface Channel Link. The standard is maintained and administered by the Automated Imaging Association or AIA, the global machine vision industry's trade group.

Cameras view

Lists of the discovered cameras of the selected source in the Welcome screen of eGrabber Studio. For each camera, the underlying GenTL components are specified.

Coaxlink

Euresys product series of CoaXPress frame grabbers

Coaxlink card

Euresys CoaXPress frame grabber

Coaxlink driver

Legacy Euresys software driver for Coaxlink cards (superseded by eGrabber driver since release 12.8)

Coaxlink series

Euresys product series of CoaXPress frame grabbers

CXP

Acronym for CoaXPress

CoaXPress

Interface and communication standard for industrial cameras using single or multiple coaxial cables. It supports the asymmetric high-speed transmission of images and related control data. This digital interface standard, hosted by the JIIA (Japan Industrial Imaging Association), has been developed for high-speed image data transmission in machine vision applications. (Source: http://www.coaxpress.com/)

Common transport interface

GenTL producer

CTI

Acronym for Common Transport Interface

D

Data Stream module

GenTL module that handles buffers

device

Represents the camera component in the frame grabber driver and corresponds to the GenTL Device module. This module exposes the camera parameters defined in the driver, as opposed to the parameters of the camera actually connected to the frame grabber (remote device). In the context of Coaxlink frame grabbers, the term "Coaxlink device" could be used as a synonym.

Device module

GenTL module that contains the frame grabber settings relating to the camera. Parent of the data stream module.Sibling of the remote device.

E

eGrabber

Object that encapsulates a GenTL stream (with a number of buffers), its parent modules (GenTL system, interface, device), as well as the GenTL remote device. You can configure an eGrabber using a GenApi XMLfile. eGrabber Studio creates and presents instances of eGrabbers, called "grabbers" using the Euresys::EGrabber class of the eGrabber library.

eGrabber card

Euresys frame grabber driven by eGrabber (Coaxlink series and Grablink Duo)

eGrabber driver

Euresys software driver for the latest generation of image acquisition products (Coaxlink series,Grablink Duo, Gigelink, Recorder, Playlink)

eGrabber Gigelink

Optional library of eGrabber that provides a universal, hardware-independent access to GigE Vision cameras

eGrabber in multi-bank mode

Group of eGrabbers, that correspond to all banks of a multi-bank camera. In this group of eGrabbers, one eGrabber is master and holds the reference GenApi configuration, and the others are slave.

eGrabber Recorder

Optional library of eGrabber that provides video recording services to hard drives

eGrabbers view

List of the discovered eGrabbers of the selected source in the Welcome screen of eGrabber Studio. The GenTL components of each discovered eGrabber are presented in a tree view: interface (frame grabber), device (camera) and stream.

EMVA

Acronym for European Machine Vision Association

G

GenApi

GenICam standard that deals with camera and frame grabber configuration.

GenApi feature

Camera or frame grabber feature(s), defined in a GenICam register description file. Either a set/get parameter, or a command with side effects.

GenApi features

Camera or frame grabber feature(s), defined in a GenICam register description file. Either a set/get parameter, or a command with side effects.

GenICam

Set of EMVA standards. It consists of GenApi, GenTL, the SFNC and the PFNC.

GenTL

GenICam standard that deals with data transport. TL stands for Transport Layer.

GenTL Buffer module

GenTL module that represents a memory buffer. Buffers must be announced to the data stream that will fill them with image data.

GenTL Data Stream module

GenTL module that handles buffers

GenTL Device Module

GenTL module that contains the frame grabber settings relating to the camera. Parent of the data stream module.Sibling of the remote device.

GenTL Interface module

GenTL module that represents a frame grabber. Parent of the device module.

GenTL producer

Software library that implements the GenTL API. File with the cti extension (e.g., coaxlink.cti, gigelink.cti).

GenTL Remote Device module

GenTL module that contains the camera settings relating to the Device Module. Sibling of the Device Module.

GenTL System module

GenTL module that represents the GenTL producer. Also known as TLSystem. Parent of the interface module.

GigE Vision

Interface standard for industrial cameras ransmitting high-speed video and related control data over Ethernet networks. The Association for Advancing Automation (A3) oversees the ongoing development and administration of the standard.

Gigelink

Shortname of eGrabber Gigelink

grabber

Short term for "frame grabber" or instance of an "eGrabber" object

Grablink

Euresys product series of Camera Link frame grabbers

Grablink card

Euresys Camera Link frame grabber

Grablink series

Euresys product series of Camera Link frame grabbers

H

histogram

Graphical representation of the tonal distribution in a digital image. It plots the number of pixels for each tonal value. The histogram for a specific image allows a viewer to judge the entire tonal distribution at a glance (<Wikipedia)

Host Connection Map

Specific assignment of the Device connections to the Host connectors

I

I/O toolbox

Part of eGrabber card that controls digital I/O lines and implements tools such as rate converters, delay lines, etc. Hosted in the interface module.

Info command

Numerical identifier used to query a specific piece of information from a GenTL module. Info commands are defined either in the standard GenTL header file, or in a vendor-specific header file (e.g., info commands specific to eGrabber are defined in include/GenTL_v1_5_EuresysCustom.h).

interface

Represents the frame grabber component in the frame grabber driver. This corresponds to the GenTL Interface module.

Interface module

GenTL module that represents a frame grabber. Parent of the device module.

L

Line pitch (geometrical)

In the imaging device context, refers to the distance between two consecutive scan lines in an image sensor. For line-scan imagers,"Line Pitch" is determined by the relative displacement between the camera and the object during a camera cycle period.

line profile

Set of intensity values taken from regularly spaced points along a line segment (or multi-line path) in an image. For an RGB image, the plot includes separate lines for the red, green, and blue intensities. Also called "intensity profile". (< https://www.mathworks.com)

LinePitch (memory)

In the context of a GenTL image buffer, represents the memory offset between two adjacent pixels along a vertical axis. Also known as buffer width.

M

multi-bank camera

Camera that consists of several (independent) CoaXPress devices (GenTL remote devices). Each camera device is connected to a Coaxlink device (GenTL device) that will only receive a part (lines or regions) of the whole camera output.

P

PFNC

Acronym for Pixel Format Naming Convention

Power-over-CoaXPress

Standard power delivery method over the CoaXPress cables

PoCXP

Standard power delivery method over the CoaXPress cables

R

Recorder

Short name for eGrabber Recorder

recorder container

File created by the eGrabber Recorder library to store and save buffer content (metadata and images) to a given location on the computer.

Register description

XML file mapping low-level hardware registers to camera or frame grabber features

remote device

Represents the camera and corresponds to the GenTL Remote Device module. This module exposes the parameters of the camera actually connected to the frame grabber. In the context of Coaxlink frame grabbers, the term "CoaXPress device" could be used as a synonym.

Remote Device module

GenTL module that contains the camera settings relating to the Device Module. Sibling of the Device Module.

S

SFNC

Acronym for Standard Features Naming Convention

source

Corresponds to the GenTL producer in GenICam (for example coaxlink.cti)

stream

Represents the driver component receiving the buffers and their content. This corresponds to the GenTL Data Stream module.

System module

GenTL module that represents the GenTL producer. Also known as TLSystem. Parent of the interface module.

T

Timestamp

The time at which an event occurs. For Coaxlink series and Grablink Duo, timestamps are always 64-bit integers and are expressed as the number of microseconds that have elapsed since the computer was started.