AcquireControl

User Guide

Viewer application

V2.3.0

30 August 2012

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

///ALLIED
Vision Technologies

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Managing Director: Mr. Frank Grube
Tax ID: DE 184383113

Headquarters:

Taschenweg 2a
D-07646 Stadtroda, Germany
Tel.: +49 (0)36428 6770
Fax: +49 (0)36428 677-28
e-mail: info@alliedvisiontec.com

Contents

Contacting Allied Vision Technologies

Info

- **Technical information:**
  http://www.alliedvisiontec.com

- **Support:**
  support@alliedvisiontec.com

Allied Vision Technologies GmbH (Headquarters)
Taschenweg 2a
07646 Stadtroda, Germany
Tel.: +49 36428-677-0
Fax.: +49 36428-677-28
e-mail: info@alliedvisiontec.com

Allied Vision Technologies Canada Inc.
101-3750 North Fraser Way
Burnaby, BC, V5J 5E9, Canada
Tel: +1 604-875-8855
Fax: +1 604-875-8856
e-mail: info@alliedvisiontec.com

Allied Vision Technologies Inc.
38 Washington Street
Newburyport, MA 01950, USA
Tel.: +1 978-225-2030
Fax: +1 978-225-2029
e-mail: info@alliedvisiontec.com

Allied Vision Technologies Asia Pte. Ltd.
82 Playfair Road
#07-02 D'Lithium
Singapore 368001
Tel: +65 6634-9027
Fax: +65 6634-9029
e-mail: info@alliedvisiontec.com

Introduction

This **Manual** describes the usage of the AcquireControl application in combination with AVT cameras, especially GigE cameras like Bigeye/Pearleye/Goldeye. For details see Chapter Camera on page 12.

Advantages for users:

- Unified user interface for various camera models
- Display of monochrome, color and temperature images
- Various image correction modules available
- Various image analyzing modules available

Note	**Please read through this manual carefully.**

For more information, see

- **How to install a GigE camera (Bigeye P/Pearleye P/ Goldeye P)**
- **How to install a GigE camera (Manta and Bigeye G)**
- **AVT GigE Installation Manual (Prosilica GE, GC, GS, GB, GX)**

http://www.alliedvisiontec.com/emea/support/downloads/product-literature.html

Document history

Version	Date	Description
V2.0.0	03.11.11	New Manual AcquireControl User Guide
V2.1.0	16.03.12	Some minor corrections
V2.3.0	30.08.12	New AcquireControl application V4.0.0

Table 1: Document history

Manual overview

This **manual overview** outlines the contents of each chapter of this manual.

- Chapter Contacting Allied Vision Technologies on page 6 lists AVT contact data (phone numbers and URLs) for both:
    - Technical information / ordering
    - Commercial information

- Chapter Introduction on page 7 (this chapter) contains the document history, a manual overview (short description of each chapter), and conventions used in this manual (styles and symbols).
- Chapter Quick start on page 10 is available for quick reference on how to use AcquireControl.
- Chapter System requirements on page 12 lists the requirements for hardware and software.
- Chapter Installing drivers on page 16 describes how to install 3rd party drivers.
- Chapter Installing AcquireControl application on page 13 describes how to install the AcquireControl program on your computer.
- Chapter AcquireControl concept on page 21 gives you a quick overview of the processing chain and its functions.
- Chapter Operating AcquireControl on page 27 describes the application and its usage in depth.
- Chapter Index on page 119 gives you quick access to all relevant terms in this manual.

Conventions used in this manual

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

Styles

Style	Function	Example
Bold	Programs, inputs or highlighting important things	**bold**
Courier	Code listings etc.	`Input`
Upper case	Register	REGISTER
Italics	Modes, fields	*Mode*
Parentheses and/or blue	Links	(Link)

Table 2: Styles

Symbols

Note   This symbol highlights important information.

Caution This symbol highlights important instructions. You have to follow these instructions to avoid malfunctions.

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

Example:

http://www.alliedvisiontec.com

Before operation

Target group This **Manual** is the guide for all users who want to operate their cameras with AcquireControl.

Note **Please read through this manual carefully before operating the camera.**

Quick start

In this chapter you can find step-by-step instructions on how to get an image from the camera.

Note

(i)

- For detailed information, see Chapter Installing drivers on page 16 and Chapter Installing AcquireControl application on page 13.
- For detailed information about camera operation, see
  - Chapter AcquireControl concept on page 21 or
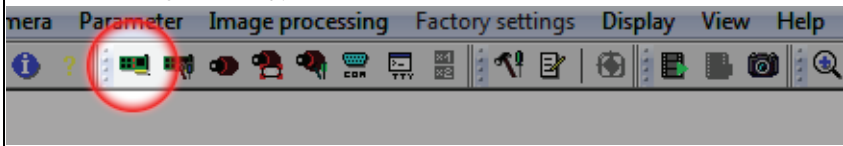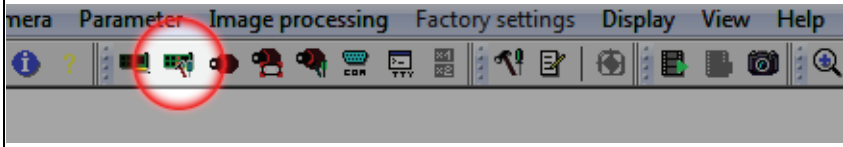 - Chapter Operating AcquireControl on page 27.
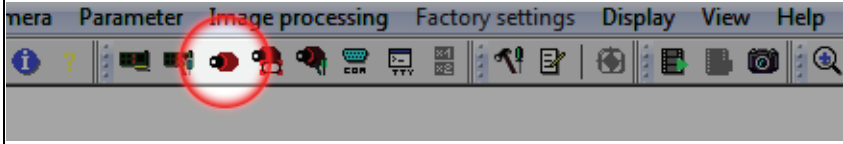
Step	Description
Step 1	Connect camera to PC and supply camera with power.
Step 2	Download AcquireControl application from the AVT website and start setup.
Step 3	Install frame grabber driver / camera driver if necessary. For GigE cameras, read the following manuals: • How to install a GigE camera (Bigeye P/Pearleye P/Goldeye P) • How to install a GigE camera (Manta and Bigeye G) • AVT GigE Installation Manual (Prosilica GE, GC, GS, GB, GX)
Step 4	Start AcquireControl application
Step 5	Select frame grabber type:
Step 6	If a Pleora GigE camera is used, set IP address and select camera:
Step 7	Select camera model:

Table 3: First steps: How to get an image from the camera

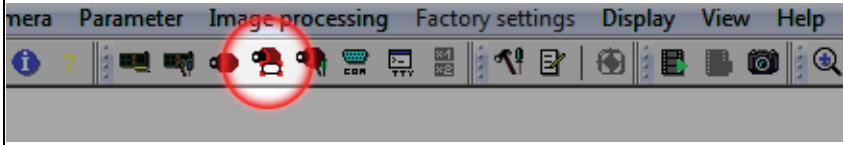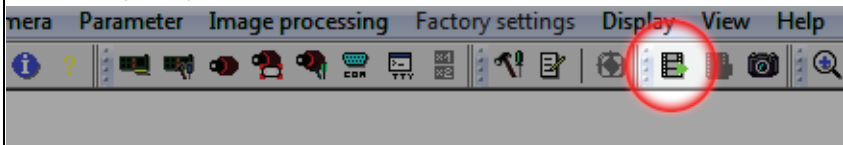| Step	Description
Step 8	Select camera graphics mode:
Step 9	Select image processing chain that fits to your camera model:
Step 10	Start image acquisition:

Table 3: First steps: How to get an image from the camera

System requirements

PC / Notebook

- Microsoft® Windows XP or Vista or Windows 7 (32-bit and 64-bit)
- Current Intel® processor (dual core or better)
- 2 GB RAM or more
- Microsoft® DirectX 7 compatible graphic card 128 MB
  (256 MB recommended)
- 200 MB hard disk space for installation

Note

ⓘ

Hard disk space for image storage depending on the size and format of the images: 120 GB or more

Camera

- AVT Goldeye/Pearleye/Bigeye camera, monochrome or color, with Camera Link or GigE interface
- AVT Manta camera
- AVT Prosilica GC/GX/GT/GE/GS or GB camera

Frame grabber

- Gigabit Ethernet Port (Jumbo packets support recommended)
- IEEE 1394a card, OHCI compatible (TI chipset recommended)
- Matrix Vision pcIMAGE-SDIG (RS644 / LVDS)
- Matrix Vision mvTITAN-DIG (RS644 / LVDS)
- Matrix Vision mvTITAN-CL (Camera Link)
- Matrix Vision mvGAMMA-CL (Camera Link)

Note

ⓘ

Ask the AVT Application Engineering Team (Technical Support) for suitable Camera Link frame grabbers.

http://www.alliedvisiontec.com/emea/support/contact-support.html

Installing AcquireControl application

To install AcquireControl, perform the following steps:

1. Download the ***.zip file** of the AcquireControl application from the AVT website: Unpack it and start the corresponding *.exe.

    http://www.alliedvisiontec.com/emea/products/software/windows.html
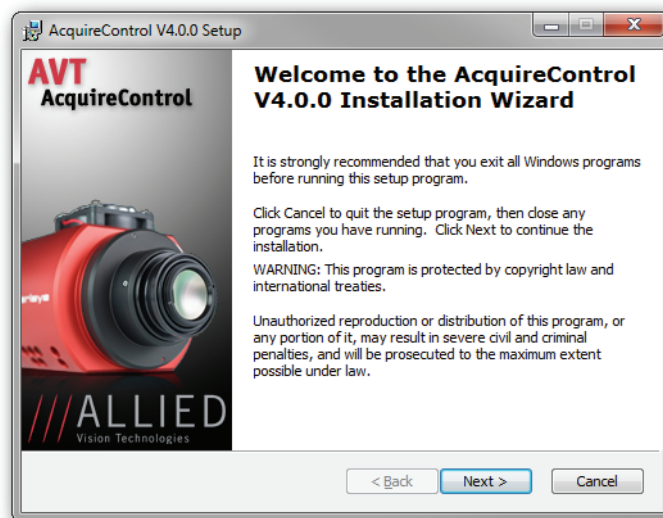
Figure 1: **AcquireControl** setup: Welcome

2. In the welcome dialog click **Next**.
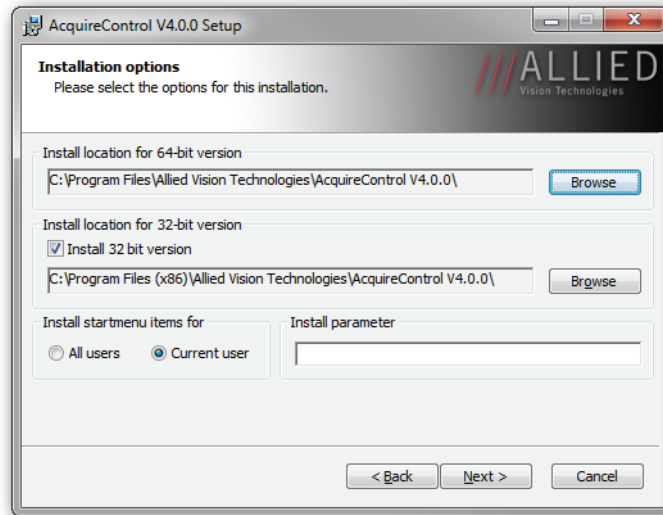
Figure 2: **AcquireControl** setup: Installation Options

3. Select installation options:
    – If the application is installed on a 64-bit operating system, you can
       choose to install the 32-bit version additionally.
    – Choose whether the startmenu items should be installed for **All users**
       or for the **Current user** only.
4. Click **Next** and then **Install** to start the installation.

Figure 3: **AcquireControl** setup: Finish

5. In the final dialog you can choose
    – to show the **Release Notes**
    – to start the Pleora Driver Package Installer
    – to start **AcquireControl**

6. Click **Finish** to exit the installer.

7. Working with AcquireControl:
    For a quick tour: Chapter Quick start on page 10.
    For detailed information: Chapter Operating AcquireControl on page 27.

Installing drivers

The following chapters describe the supported frame grabber drivers.

GigE drivers

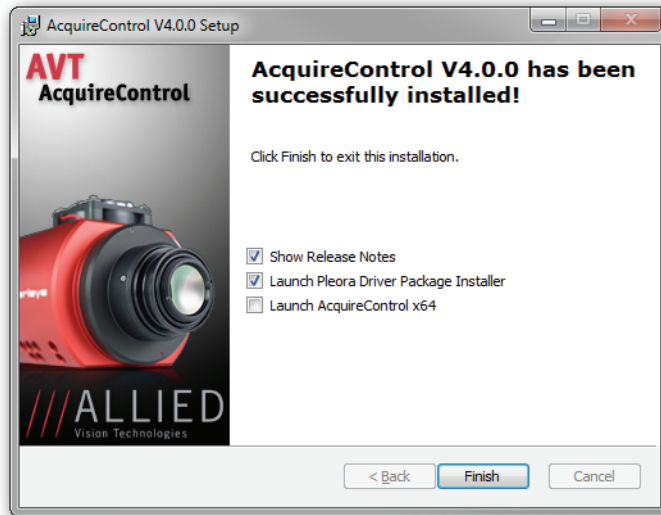**Note**   The installation of a filter driver may interfere with existing VPN drivers.

We recommend a separate network card for GigE cameras only (without any other interfering drivers).

Make sure that your firewall or antivirus solution is not blocking the camera network traffic.

Installing AVT GigE driver

Optionally, for better performance you can install the AVT GigE driver for the following camera families:
*   AVT Manta, AVT Bigeye G
*   AVT Prosilica GC, GX, GT, GE, GS, or GB

Perform the following steps:

1.   In the start menu choose the **AVT GigE Filter Driver Installer**.

2.   Follow the instructions.

Installing Pleora GigE driver

To get a better performance: install the Pleora GigE driver for the following GigE camera families:
*   AVT Bigeye P
*   AVT Goldeye P
*   AVT Pearleye P

Perform the following steps:

1.   In the start menu choose **AVT Setup for Pleora Driver Package**.

     Or: If the driver package is already installed, start the **Driver Installation Tool** manually in the start menu.

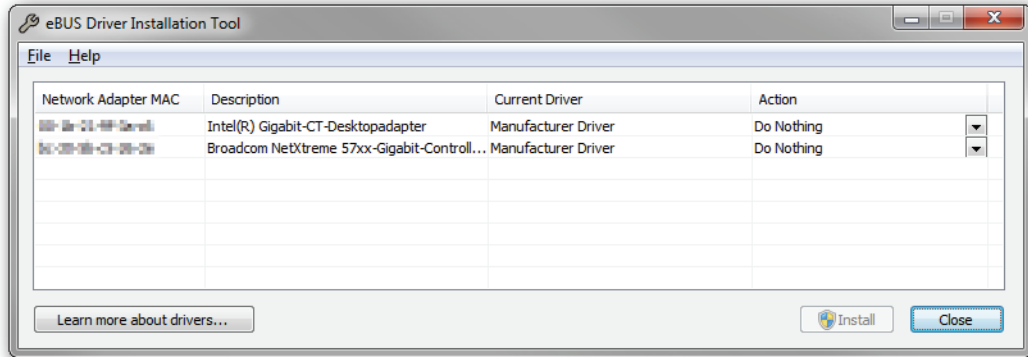The **Pleora Driver Installation Tool** starts.

Figure 4: Pleora Driver Installation Tool

All network adapters found in your system are listed.

2. To choose your desired driver, click the action column.

Driver type	Description
Manufacturer driver	Default driver from the manufacturer of your network card: - low performance, especially when high-resolution cameras are used
eBUS Universal Pro driver	**We recommend to install this driver.** Filter driver from Pleora: + high flexibility and reliability combined with low CPU usage + ideal for most real-time vision applications + runs on almost any vendor's NIC
eBUS Optimal driver	+ maximum performance and the lowest CPU usage + ideal for applications with very high data rates and heavy processing overhead - for Intel PRO/1000 family of network cards only
High-Performance IP Device Driver	High performance driver - for Intel PRO/1000 family of network cards only

Table 4: Pleora GigE driver: advantages/disadvantages of driver types

Camera Link drivers

Installing driver for Matrix Vision Camera Link frame grabber

The installation package of the Matrix Vision frame grabber contains a corresponding CD ROM for the installation.

Matrix Vision frame grabber drivers are available from the AVT support team.

Note

For the installation, refer to the **frame grabber installation manual for Matrix Vision**. Following a correct installation, the frame grabber should be listed under the device manager of the Windows control panel.

Legacy drivers

Installing IEEE 1394 legacy driver for VDS cameras

In order to work with legacy VDS Vosskühler IEEE 1394 cameras, you have to install the corresponding driver. The driver files are copied to your local hard disk while installing AcquireControl.

Due to a limitation in the original Microsoft bus driver, it is not possible to grab isochronous data on 64-bit operating systems with a RAM size equal or greater than 4GB. In this case, we can offer you our own bus driver v1394bus. Please contact AVT Technical Support for further details.

Architecture ╱ Platform	vds1394 Device Driver + Microsoft Bus Driver (NOT runtime-based)			vds1394 Device Driver + v1394bus Bus Driver (runtime-based)	
	x86	x64 (< 4GB RAM)	x64 (≥ 4GB RAM)	x86	x64
Windows 7	☑	☑	-	☑	☑
Windows Vista	☑	☑	-	☑	☑
Windows Server 2003	☑	☑	-	☑	☑
Windows XP	☑	☑	-	☑	☑

Table 5: vds1394 device driver + v1394BusDriver

Perform the following steps:

1. Connect the camera to your IEEE 1394 card.

2. Open the windows device manager (WINDOWS key + PAUSE). Find the entry labeled **Generic 1394 Desktop Camera**. If you have worked with a different IEEE 1394 driver in the past, Windows might have already connected your old driver with the camera. Find the new entry in the list and right-click.

3. Select **Update Driver Software**.
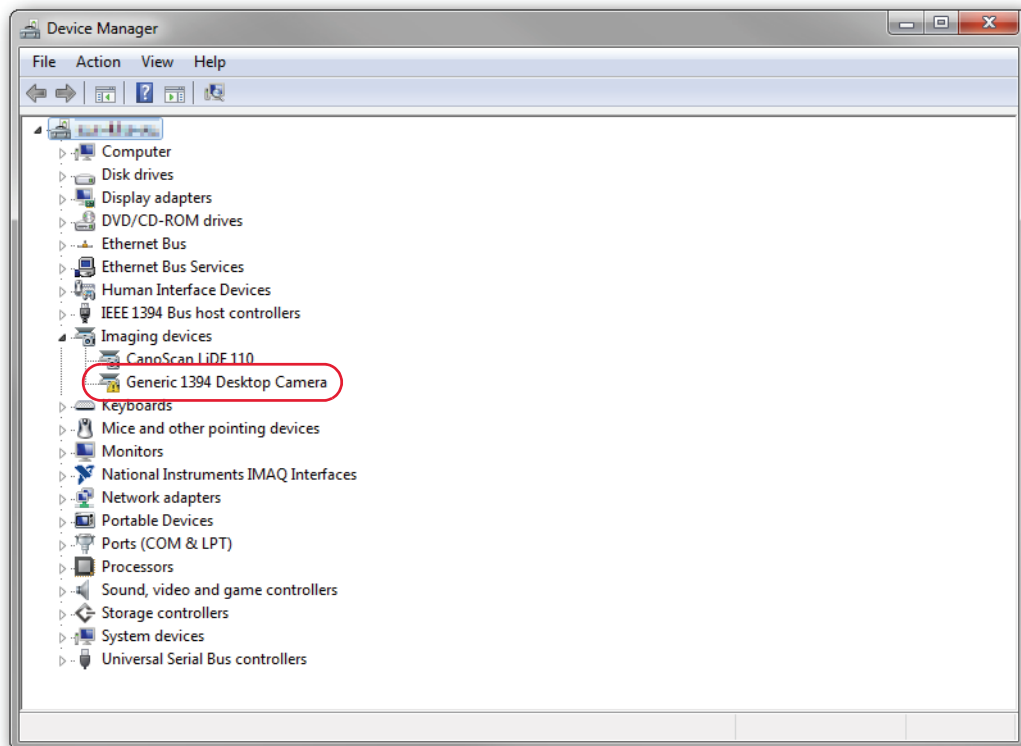
Figure 5: Device Manager: Generic 1394 Desktop Camera entry

4. Select **Browse my computer for driver software**.

Figure 6: Update Driver Software

5. Go to the following path to find the IEEE 1394 driver:

<Your AcquireControl installation path>\Allied Vision Technologies\AcquireControl Vx.x.x\IEEE1394Driver

The default installation path for AcquireControl is:

C:\Program Files\Allied Vision Technologies\AcquireControl Vx.x.x

6. Click **Next** to finish the installation.
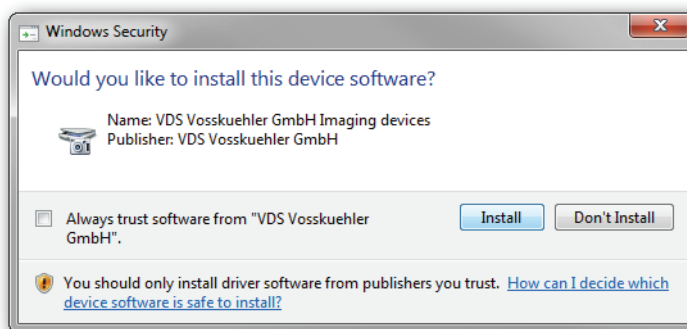
Figure 7: Windows Security

AcquireControl concept

The AcquireControl application can be used to control AVT cameras, equipped either with:

- an AVT GigE Vision compliant interface module (Camera name G-...), or
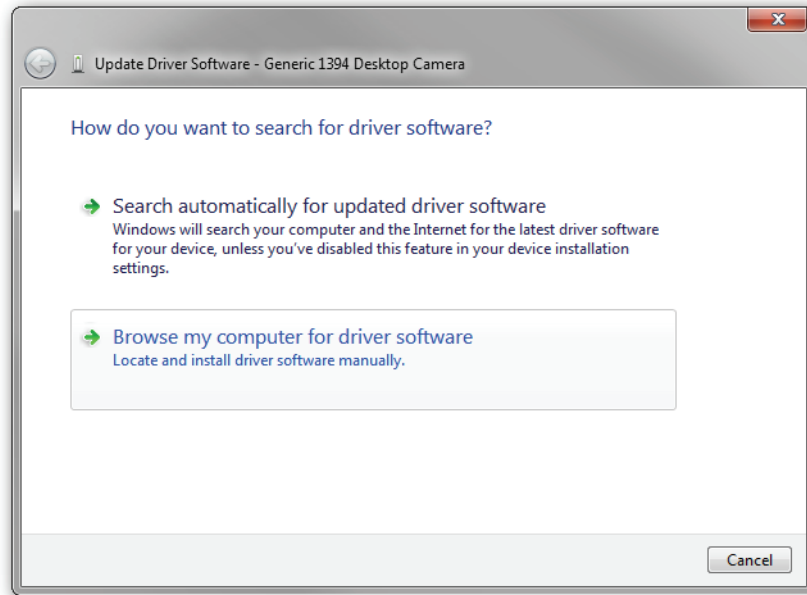- a Pleora GigE Vision compliant interface module (Camera name P-...), or
- an IEEE 1394 legacy interface, or
- a Camera Link interface and a frame grabber.

Note   A single instance of the application works with a single camera only.

The application is structured in a chain-like fashion and offers miscellaneous interaction options to the user. The following diagram shows the structure of such an image processing chain. The diagram distinguishes between image processing modules (**Process Module**) and analysis modules (**Analyze Module**).

Figure 8: Application concept

Each image processing module requires an input image and outputs a modified image.
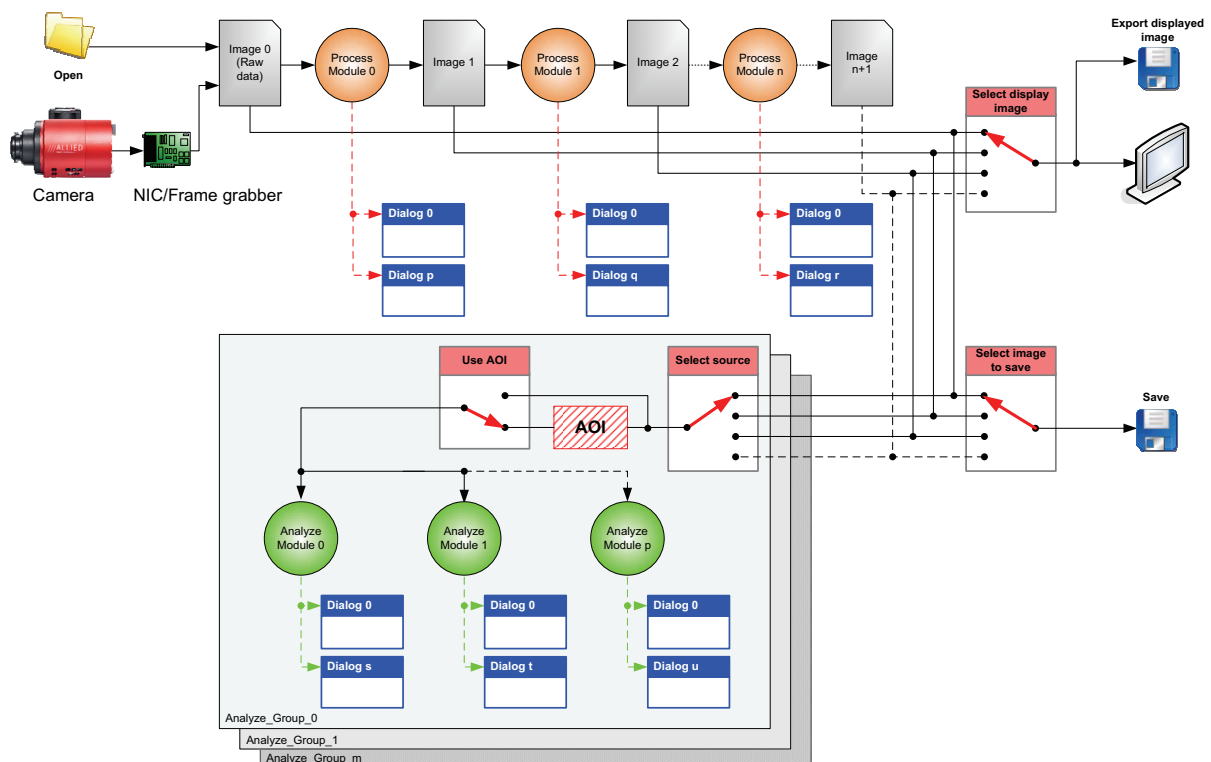
Image processing modules:

- Color interpolation: Transformation from RGB-CFA data to RGB data.
- BCG LUT: look-up table for adjustment of brightness, contrast, and gamma.
- Background correction
- Recursive filter
- Pseudo color LUT: Conversion of grey-scale data to RGB data (e.g. for visualization of temperature data)
- Image flip: Flip the live image horizontally and/or vertically.
- Image rotation: Rotate the live image.

In contrast to the image processing module, analysis module requires only an input image. The data can be displayed on the monitor or the data can be written to a LOG file.

Analysis modules:

- Histogram
- Statistics
- Pixel table
- Temperature display
- Row/column statistics
- Time-based statistics
- Line profile
- Autosave

In the AcquireControl application, 12 different image processing chains are available:

Name of the image processing chain	Description	Available processing modules
Greyscale Data	This image processing chain is used for greyscale cameras or loaded greyscale images.	• BCG LUT
Pseudo Color for Greyscale Data	This image processing chain is used for greyscale cameras or loaded greyscale images. In addition to the *Greyscale Data* chain, a pseudo color LUT and an image flipping can be applied.	• Pseudo Color LUT • Flip image

Table 6: Image processing chain

Name of the image processing chain	Description	Available processing modules
Goldeye series/NIR-xxx(P)CL/GE	This image processing chain is used for the following camera series: • Goldeye P-008/NIR-300 • Goldeye-P-032/NIR-600	• Background Correction • Recursive Filter • Flip image • Pseudo Color LUT
Data from XR cameras	This chain is used for X-Ray cameras.	• Gain/Offset Correction • Background Correction • Recursive Filter • Flip Image • Image Rotation • BCG LUT
Pearleye series/IRC-xxxCL/GE with aperture f/1.7 [-55°C...+506°C] [-50°C...+523.30°C] [-30°C...+92.85°C] [0°C...+204.75°C] [0°C...+327°C] [0°C...+409°C]	This chain is used for **LWIR** cameras with the given temperature range.	• Background Correction • Recursive Filter • Pseudo Color LUT • Background Correction • Recursive Filter • Pseudo Color LUT
RGB-CFA Data	This chain is used for Bayer Mosaic Filter cameras or corresponding loaded CFA images.	• Bilinear Interpolation • BCG LUT
RGB Data	With this chain, loaded RGB images can be displayed.	• BCG LUT

Table 6: Image processing chain

To adjust the image processing chain:

1. In the **Image processing toolbar,** click [icon] or
   In the **menu bar**, choose **Image processing → Select image processing chain**.

2. Decide which image is displayed, saved and used for analysis.

Note   The adjustment is done via software switches, which are described in the following chapters.

Display switch (Switch 1)

This is **Select display image** switch in Figure 8: Application concept on page 21.

Select the image to be displayed on the screen.

To display images:

1. In the **Display** toolbar, click 🖼 or
   In the **menu bar**, choose **Display → Select display image.**

The corresponding menu will show a list with all available image sources.

Note   For more information see Chapter Select the displayed image
               on page 58.

Storage switch (Switch 2)

This is **Select image to save** switch in Figure 8: Application concept on page 21.

During image storage, the final image (as RGB data) or miscellaneous interim images can be chosen, depending on the used image processing chain.

Note   For more information see Chapter Saving images on page 65.

To save the image:

1. In the **Main** toolbar, click 🖼 or
   In the **menu bar**, choose **File → Select image to save.**
- If the images are stored before the pseudo color LUT, they can still be changed subsequently after loading.
- Images which are stored as RGB data can be changed subsequently only in their colors.

Image analysis and postprocessing (Switch 3 / Switch 4)

These are the **Use AOI** and **Select source** switches in Figure 8: Application concept on page 21.

The application provides diverse image analysis methods, which can work on the entire image as well as on sections (AOI=area of interest), like rectangles, circles, rings, lines, and cross hairs.

The following modules are implemented:

- Histogram
- Image statistics
- Row & column statistics
- Pixel table
- Temperature display
- Time-based statistics
- Line profile
- Autosave

Histogram

Definition A histogram is a bar chart indicating a frequency distribution of all occurring pixel values. The X-axis indicates the pixel value and the Y-axis indicates the frequency. The determined area for the **Histogram AOI** is analyzed.

Image statistics

The application offers the possibility to evaluate statistical data for any AOI or for the full image.

For these analysis modules you can select the final image or an interim image result (see also Chapter Options for an analyze group on page 66).

Row & column statistics

In addition to the default statistics dialog, the **Row/Column** statistics calculates the standard deviation within rows and columns only.

Time-based statistics

The time-based statistics dialog offers a calculation of the standard deviation for each pixel in a defined AOI over a defined number of images.

Temperature display

The AcquireControl application handles up to five different temperature measurement windows. In each measurement window, you can adjust the emission factor.

The average temperature level within the measurement window is displayed.

The source image for the temperature data is the corrected image before the color conversion. When using an image processing chain with recursive filter, the temperature data before or after the filter can be calculated.

It is possible to store the temperature values for every image into a LOG file for later utilization.

Pixel table

For a detailed pixel analysis of an image, the pixel table dialog is available. This dialog displays the values of a group of pixels during live display.

Line profile

The line profile dialog measures pixel values along a line within a source image.

For example, this tool is useful to measure shading within an image.

Autosave

The **Autosave** module saves every incoming image as single image or as movie (AVI) sequence.

Image data storage

The recorded image data can be saved in miscellaneous formats with bit depths up to 16 bit.

Image acquisition devices

AcquireControl is able to work with miscellaneous frame grabbers. Due to the development of a universal frame grabber interface, an extension to future frame grabbers is possible. Cameras or rather frame grabbers are supported with the following interfaces:

*   GigE
*   Camera Link
*   IEEE 1394

The application works with nearly all AVT cameras. The universal frame grabber interface adaptations allow to easily implement new cameras.

Operating AcquireControl

Graphical user interface (GUI)

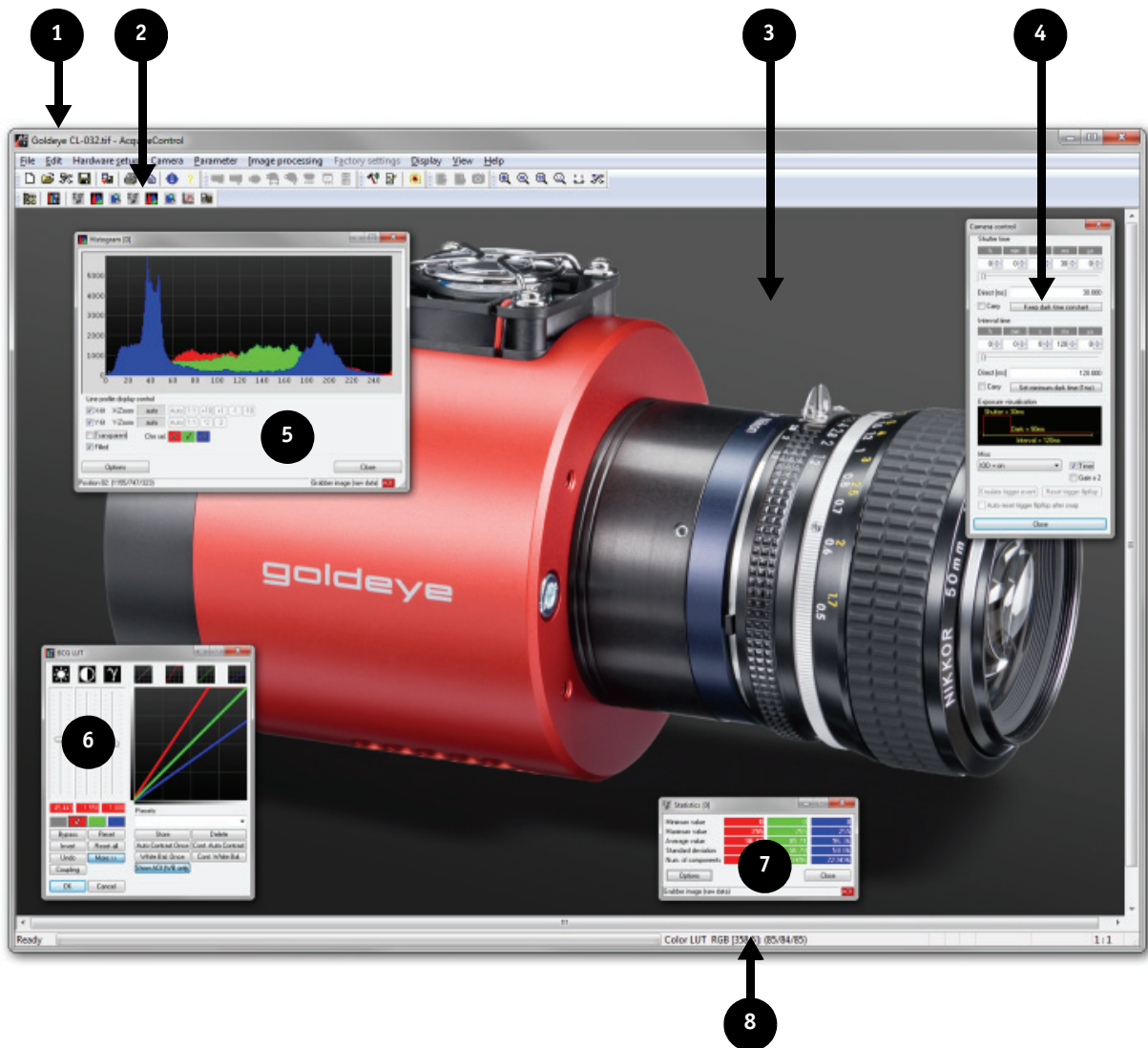The following overview image shows the typical AcquireControl user interface with some main dialogs.

Figure 9: AcquireControl: Graphical User Interface (GUI)

Number	Description
1	Main window
2	Program toolbars
3	Document window
4	Camera control dialog: Controls miscellaneous camera parameters.
5	LUT dialog: Adjusts color balance and white balance.
6	Statistics dialog: Display of statistical image data
7	Histogram Dialog: Display of a histogram
8	Status bar

Figure 10: GUI descriptions

Note   If a new document is created, the old document is closed and its camera connection is disconnected.

Toolbar icons are described here:

Main toolbar

Figure 11: Main toolbar

Icon	Description		
	Creates new document.		
	Opens file.	**Note**	If a new document is created, the old document is closed and its camera connection is disconnected.
	Setups source image for save.		
	Saves file.		
	Saves current display image.		
	Prints document.		
	Copies to clipboard.		
	Displays program information.		
	Shows help file.		

Figure 12: Main toolbar (description)

Hardware setup toolbar

Figure 13: Hardware setup toolbar

Icon	Description
	Changes frame grabber.
	Changes frame grabber options.
	Changes camera.
	Changes camera video mode.
	Changes camera timing.
	Selects communication channel.
	Shows camera terminal window.
	Changes camera gain.

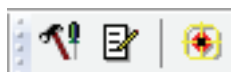Figure 14: Hardware setup toolbar (description)

Parameter toolbar

Figure 15: Parameter toolbar

Icon	Description
	Changes application parameters.
	Changes logging settings.
	Shows point of gravity.

Figure 16: Parameter toolbar (description)

Camera control toolbar

Figure 17: Camera control toolbar

Icon	Description
	Starts continuous snap.
	Stops continuous snap.
	Starts single snap.

Figure 18: Camera control toolbar (description)

Image processing toolbar

Figure 19: Image processing toolbar

Icon	Description		
	Change image processing chain.		
	Modify LUT settings.	**Note**	This toolbar is created dynamically in dependence of the chosen image process chain.
	Display statistics (Analyze group 0).		
	Display histogram (Analyze group 0).		
	Display pixel table (Analyze group 0).		
	Display statistics (Analyze group 1).		
	Display histogram (Analyze group 1).		
	Display pixel table (Analyze group 1).		
	Display line profile (Analyze group 0).		
	Display line profile (Analyze group 1).		
	Display autosave options.		

Figure 20: Image processing toolbar (description)

Display toolbar

Figure 21: Display toolbar

Icon	Description		
	Increase zoom		
	Decrease zoom	**Note**	**Hard zoom:** setting the enlargement of the image is done by simple pixel repetition.
	Set zoom to 1:1		**Soft zoom:** the enlargement is done by interpolation between pixels. This algorithm generates softer images, but the processing speed is reduced. Soft zoom works only in combination with DirectX.
	Set best fit zoom		
	Toggle between hard- and soft zoom		
	Change display image of the chain		

Table 7: Display toolbar (description)

Status bar

Color Lut RGB [412,26]: (85/132/123)   ▣ ×1 ● FC = 2   FPS: 3.05   1 : 1
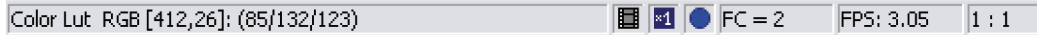
Figure 22: Status bar

Icon	Description
Color Lut RGB	Pixel data source
[412,26]:	Current mouse position
(85/132/123)	RGB or grey value for the current pixel
▣	Current image acquisition mode
×1	Current camera gain
●	Camera cooling state
FC = 2	Image counter
FPS: 3.05	Current frame rate
1 : 1	Current zoom

Figure 23: Status bar (description)

To show or hide the status bar and the toolbars: Go to **View** menu and check/
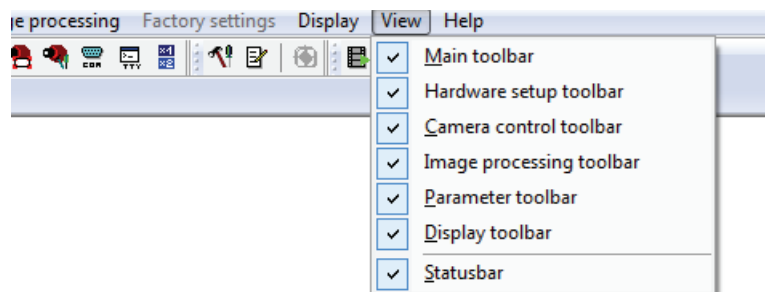uncheck the corresponding item.

Figure 24: Show or hide the status bar and the toolbars

Hardware setup

All hardware relevant parameters like frame grabber type, camera and video mode can be configured within the **Hardware setup toolbar** or the **Hardware setup** menu.
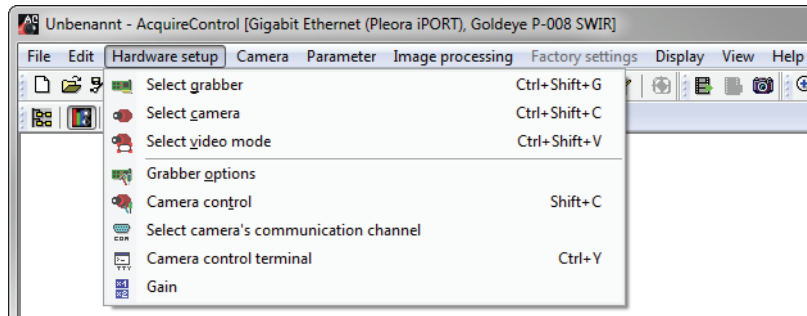
Figure 25: Hardware setup

Select a frame grabber

To select a frame grabber:

1. In the **Grabber Selection** dialog, click the **Select Grabber** button.

2. The following dialog offers all available types of frame grabbers.

3. Click **OK.**

4. The application tries to open the frame grabber. In the case of a failure, an error message is displayed.

The frame grabber **dummy grabber** is a virtual frame grabber that enables the user to test the application without an actual frame grabber and camera.

Figure 26: Grabber Selection

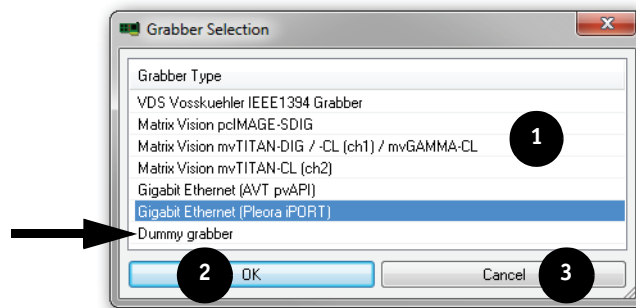| Number	Element	Description
1		List of all supported frame grabbers
2	OK	Confirms the adjustments and closes the dialog.
3	Cancel	Rejects the adjustments and closes the dialog.

Table 8: Grabber selection

Adjustment of frame grabber parameters (Pleora)

If you work with a Pleora iPORT GigE camera, you have to assign an IP address to the GigE interface after powering on the camera.

Use the **Grabber Options** dialog.

The following dialog lists all network adaptors of the PC and the cameras connected to them.

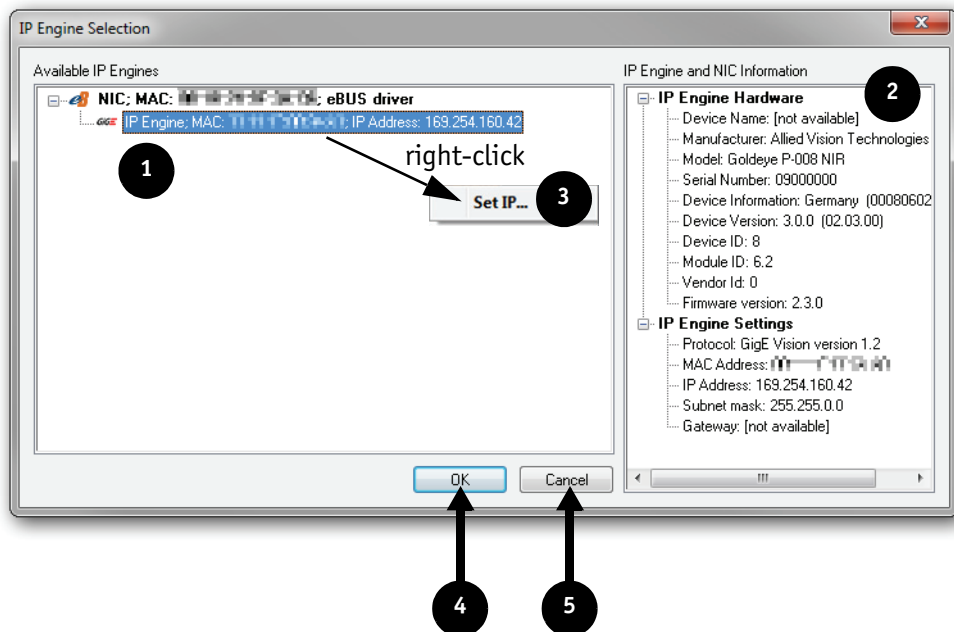**Note** If a yellow exclamation mark is displayed on the camera icon, right-click the camera entry and choose **Set IP…** .

Figure 27: IP Engine selection

Number	Element	Description
1	List	List of all found NICs (Network interface cards), iPORT and eBUS IP devices (cameras).
2	IP Engine and NIC information	Shows detailed information about the used network card and the selected camera.
3	Set IP...	Right-click a camera entry. In the context menu, click **Set IP...** to change the IP address of the camera.
4	OK	Confirms the adjustments and closes the dialog.
5	Cancel	Rejects the adjustments and closes the dialog.

Figure 28: IP engine selection (description)

Note

If a yellow exclamation mark is displayed on the camera icon, there is a conflict regarding the IP address of the camera.

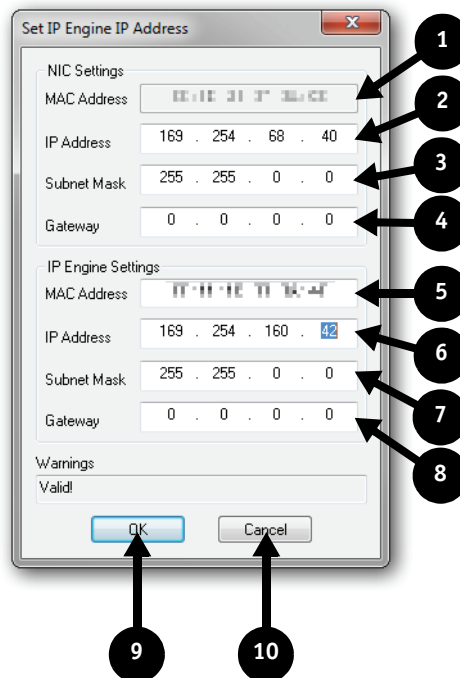Right-click the camera name and open the IP dialog to change the settings.

Figure 29: Set IP: Engine IP Address

Number	Element	Description
1	MAC Address	MAC address of the network interface card (NIC)
2	IP Address	IP address of the NIC. The GigE camera and the NIC must work in the same IP address range. Example: NIC IP address: **169.254.68**.40 NIC subnet mask: **255.255.0**.0
3	Subnet Mask	Subnet address of the NIC
4	Gateway	IP address of the gateway If the Ethernet interface is not used for other communication, then you can set the gateway to 0.0.0.0
5	MAC Address	MAC address of the GigE camera.
6	IP Address	IP address of the GigE camera. The GigE camera and the NIC must work in the same IP address range. Example: GigE camera IP address: **169.254.160**.42 GigE camera subnet mask: **255.255.0**.0
7	Subnet Mask	Subnet address of the GigE camera
8	Gateway	IP address of the gateway If the Ethernet interface is not used for other communication, then you can set the gateway to 0.0.0.0
9	OK	Confirms the adjustments and closes the dialog.
10	Cancel	Rejects the adjustments and closes the dialog.

Table 9: Set IP: Engine IP Address (description)

Adjustment of frame grabber parameters (Matrix Vision)

For AVT GigE cameras (*eye-P) incorporating a Pleora GigE Vision module, it is required to assign an IP address after power-up. To do so, use the **Grabber Options** button in the **Hardware Setup** dialog. In most cases however, work with the basic settings.
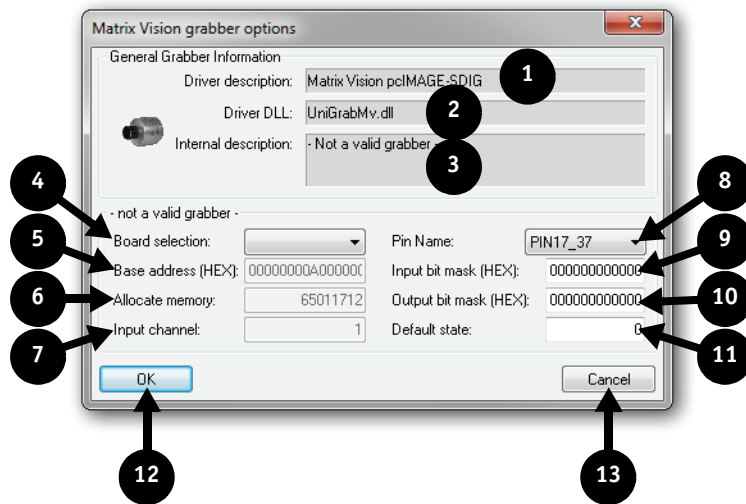

Figure 30: Matrix Vision frame grabber options

Number	Element	Description
1	Driver description	Name of the frame grabber.
2	Driver DLL	Used frame grabber library.
3	Internal description	Further information on the driver and the used low-level driver.
4	Board selection	Choose the hardware frame grabber. This is necessary if you work with more than one frame grabber.
5	Base address (HEX)	For pcImage-SDIG boards older than V2.05, the base address has to be adjusted as a hexadecimal value. Standard: A0000000.

Table 10: Matrix Vision frame grabber options (description)

Number	Element	Description
6	Allocate memory	Allocated frame grabber memory in bytes. This value has to be at least as big as **Camera resolution** x **Number of buffers from Application options dialog.** (Adjustment is only valid for pcImage-SDIG frame grabbers, standard: 65011712). Note: In case of an mvTITAN-DIG/mvTITAN-CL or an mvGAMMA-CL frame grabber, the memory is adjusted with the Matrix Vision tool **SetDMA.**
7	Input channel	Input channel for Matrix Vision mvTITAN-CL frame grabbers.
8	Pin Name	Name of the frame grabber I/O port-pin to be configured.
9	Input bit mask (HEX)	Hexadecimal bit mask for an input signal.
10	Output bit mask (HEX)	Hexadecimal bit mask for an output signal.
11	Default state	Standard value for the actual port (0 or 1).
12	OK	Confirms the adjustments and closes the dialog.
13	Cancel	Rejects the adjustments and closes the dialog.

Table 10: Matrix Vision frame grabber options (description)

Select a camera

Depending on the frame grabber used, different dialogs for camera selection appear.

Cameras with Pleora GigE or Camera Link interface

If you work with a Pleora GigE interface or a Matrix Vision frame grabber, the following camera selection dialog appears.

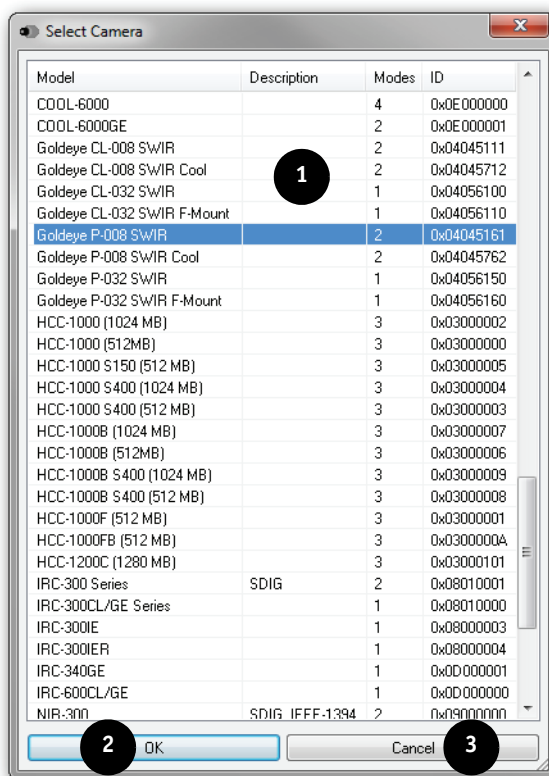If the selection does not match the real camera hardware, no correct image display occurs.

Figure 31: Select camera

Number	Element	Description
1	List	Shows all camera configurations including the number of defined graphic modes and the camera ID.
2	OK	Confirms the adjustments and closes the dialog.
3	Cancel	Rejects the adjustments and closes the dialog.

Table 11: Select camera (description)

Cameras with AVT GigE interface

If you work with an AVT GigE interface, the following camera selection dialog appears.

If the selection does not match the real camera hardware, no correct image display occurs.
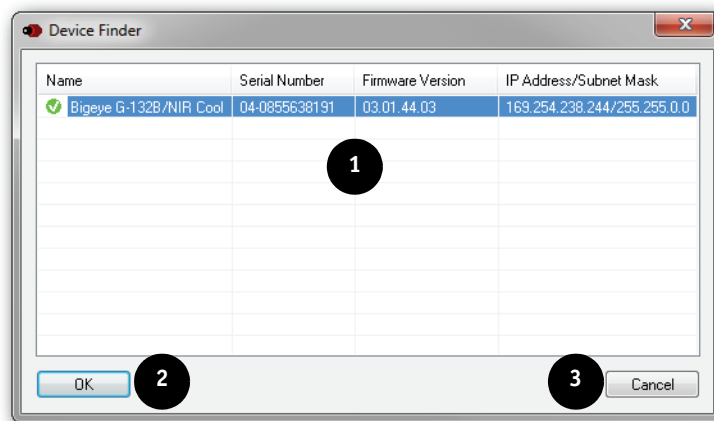

Figure 32: Select camera

Number	Element	Description
1	List	Lists found GigE cameras including the name, serial number, firmware version, and the IP address / subnet mask.
2	OK	Confirms the adjustments and closes the dialog.
3	Cancel	Rejects the adjustments and closes the dialog.

Table 12: IP configuration (description)

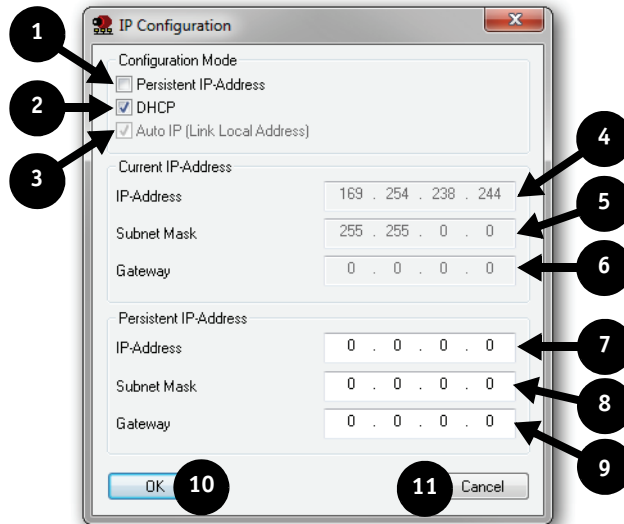Right-click a camera entry. In the context menu, configure the IP address of the camera.

Figure 33: IP configuration

Number	Element	Description
1	Persistent IP address	If you want to set the IP address for the GigE camera manually, activate this check box and enter the data in fields 7/8/9.
2	DHCP	If there is a DHCP server in your network, then the IP address for the GigE camera is distributed from the DHCP server.
3	Auto IP (Link Local Address)	If there is no DHCP server in your network, then the Link-Local Address mechanism (APIPA or Auto IP) provides the GigE camera with an IP address.
4	IP address	**Current** IP address of the GigE camera
5	Subnet Mask	**Current** subnet address of the GigE camera
6	Gateway	IP address of the gateway
7	IP Address	**Persistent** IP address of the GigE camera
8	Subnet Mask	**Persistent** subnet address of the GigE camera
9	Gateway	IP address of the gateway
10	OK	Confirms the adjustments and closes the dialog.
11	Cancel	Rejects the adjustments and closes the dialog.

Table 13: IP configuration (description)

Virtual cameras

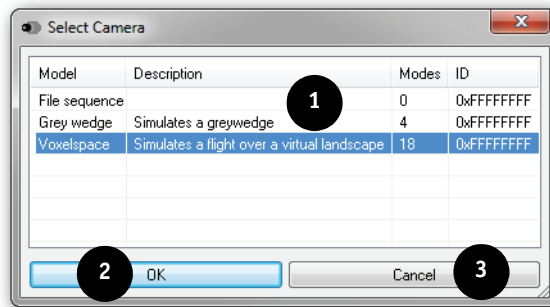If you work with the virtual frame grabber **dummy grabber**, the camera can be simulated completely.

Figure 34: Select virtual camera

Number	Element	Description
1	List	Shows all camera configurations. • File sequence: A predefined image sequence. • Grey wedge: Grey or color wedge animation. • Voxelspace: Scenery animation.
2	OK	Confirms the adjustments and closes the dialog.
3	Cancel	Rejects the adjustments and closes the dialog.

Table 14: Select virtual camera (description)

Select camera resolution

Also in this case miscellaneous frame grabbers may appear, according to the used frame grabber.

Cameras with Pleora GigE, AVT GigE or Camera Link interface

If you work with Pleora GigE, AVT GigE or Camera Link interface, the following dialog appears.
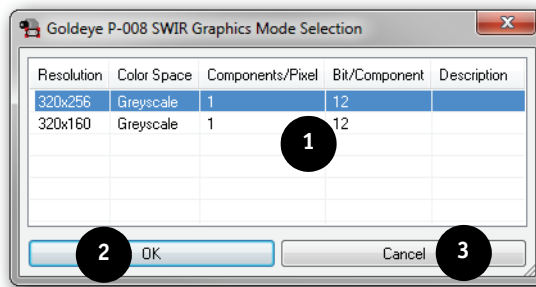

Figure 35: Graphics mode selection

Number	Element	Description
1	List	Shows all camera resolutions, color space, components/pixel and bits/component.
2	OK	Confirmation of adjustments and closing of the dialog.
3	Cancel	Rejection of adjustments and closing of the dialog.

Table 15: Graphics mode selection (description)

Note

The resolution listed in this dialog is the resolution of RAW images. This resolution does not have to correspond with the resolution displayed in the main application.

Virtual cameras

If you work with a virtual camera, select the video mode or image sequence.

Camera control (standard cameras)

For the control of the camera timing, 3 different dialogs are available which appear according to the connected camera. All modifications regarding the timing and other adjustments of camera parameters are directly transferred to the camera.
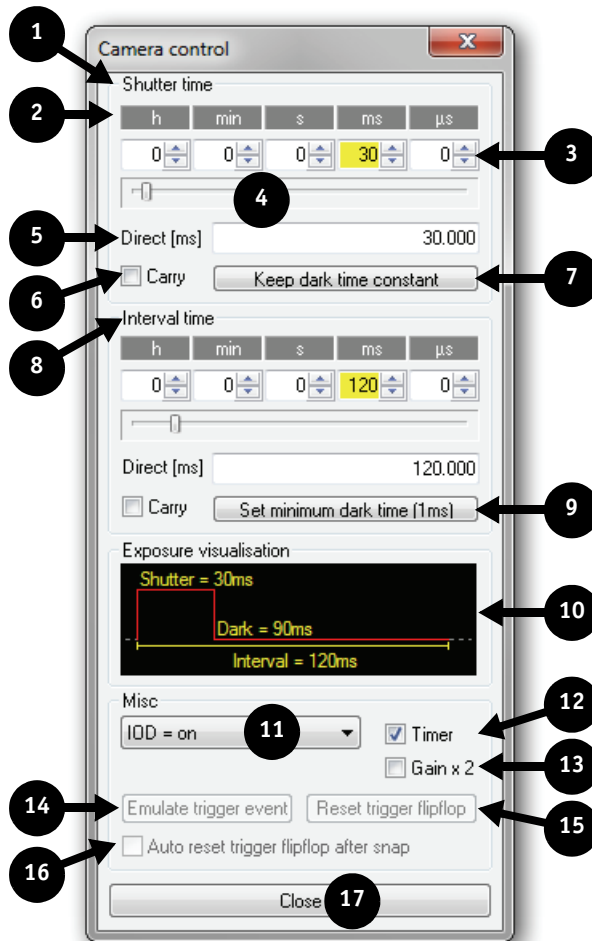

Figure 36: Camera control (standard cameras)

Number	Element	Description
1	Shutter time	Within this group, all parameters regarding the active exposure time are determined.
2	Time units of the input controls	Click on the time unit to set the accompanying value to zero. The value that is adjustable via the main slider is highlighted in color.

Table 16: Camera control (standard cameras)

Number	Element	Description
3	Input controls for the value per time unit	The input field of the last active time unit is highlighted in color.
4	Main slider	Controls the active exposure time unit. The active unit is always highlighted in color.
5	Direct [ms]	Input control for direct input of the shutter time in milliseconds.
6	Carry	If enabled, an automatic carry to the next time unit occurs.
7	Keep dark time constant	If selected, the dark time is kept constant.
8	Interval time	Within this group, all parameters regarding the interval time are determined. The adjustment mechanism is similar to the shutter adjustments.
9	Set minimum dark time	Sets the minimum possible value for the dark time. Due to this, the camera works with the maximum frame rate.
10	Exposure visualisation	Graphic display of the exposure time signal.
11	Misc	Here the frame output mode is adjusted. The number of available modes depends on the selected camera. • Continuous: Select continuous frame output of the camera. The exposure time adjustment controls have no function. • IOD = on: Enables the Image On Demand mode. The camera now generates a frame only when an external trigger or timer pulse occurs. • Trigger once: A frame is generated once when a trigger pulse occurs. The exposure time is controlled by the pulse length. • Start timer by trigger: Start the timer when a trigger pulse occurs. • Stop timer by trigger: Stop the timer when a trigger pulse occurs. • Start/Stop timer by trigger: Start or stop the timer with every trigger pulse.
12	Timer	Via this switch the timer is enabled.
13	Gain x 2	Changes the camera amplification.
14	Emulate trigger event	Emulates a trigger pulse. The pulse is stored within a flip-flop.
15	Reset trigger flip-flop	Erases the trigger pulse within the flip-flop.
16	Auto reset trigger flip-flop after snap	If activated, the flip-flop resets itself after a trigger has been recognized. The camera is ready for the next trigger without user interaction.
17	Close	Closes the dialog.

Table 16: Camera control (standard cameras)

Note	This dialog is not available for LWIR cameras.

(i)

Camera control (AVT GigE cameras)

For cameras with AVT GigE interface, the camera control dialog gives access to all GigE Vision features supported by the camera.
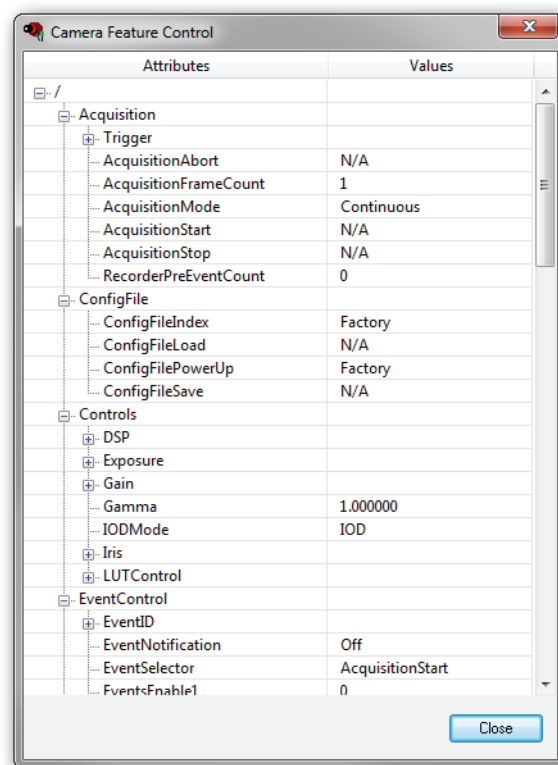

Figure 37: Camera feature control

The controls window is used to configure the camera frame rate, exposure time, color balance, imaging mode, strobe functionality, pixel format, and much more.

www	A detailed explanation of the controls can be found in the following manuals:

AVT Manta camera controls manual
AVT Bigeye G camera controls manual
AVT GigE Camera and Driver Attributes manual

http://www.alliedvisiontec.com/emea/support/downloads/product-literature.html

Camera control (LWIR cameras)

To control the camera, select the menu item **Hardware setup → Camera control** or the corresponding icon on the hardware setup toolbar.

Note	This dialog is **only available for LWIR** cameras.
	Most LWIR cameras don't need this dialog anymore. Therefore the controls may be grayed out.

Figure 38: Camera control (LWIR cameras)

Number	Element	Description
1	Off	Switch dark value control off.
2	On	The lowest line of the image is used as a reference line for controlling the dark value.
3	Lock	Locks the last determined reference value.
4	Off	Switch off the temperature regulated reference area for dark value control in the camera.

Table 17: Camera control (LWIR cameras)

Number	Element	Description
5	On	Switch on the temperature regulated reference area for dark value control in the camera (only available if supported by the camera).
6	Close	Closes the dialog.

Table 17: Camera control (LWIR cameras)

Camera communication

For some cameras, you can open a serial communication channel in order to change, for example, configuration values.

COM port selection

Depending on the selected frame grabber, different ports are listed here.
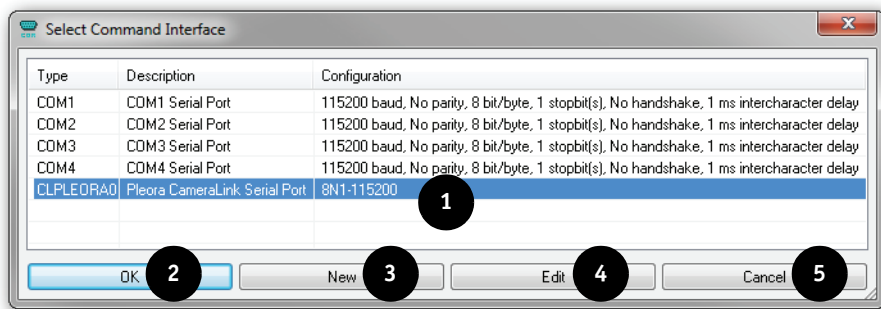
Figure 39: Select serial command interface

Number	Element	Description
1	List	Lists all available communication ports.
2	OK	Confirms adjustments and closes the dialog.
3	New	Creates a new communication port. Opens a pop-up menu. Add a new COM port to the list.

Table 18: Select serial command interface (description)

Number	Element	Description
4	Edit	Shows a dialog for configuring the selected COM port. **Note** If using the **Pleora Camera Link Serial Port**, choose the interface **Serial port 0**. For detailed information, see: • Chapter RS232 COM port on page 51 • Chapter Camera Link Serial port on page 52 • Chapter Pleora GigE Serial Port on page 54
5	Cancel	Rejection of adjustments and closing of the dialog.

Table 18: Select serial command interface (description)

RS232 COM port

To configure a system COM port, use the following dialog:
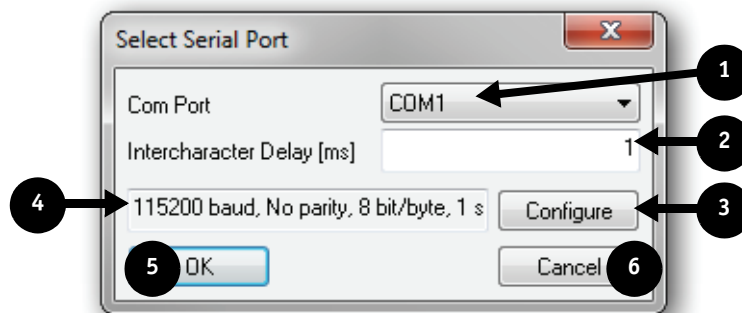
Figure 40: Select Serial Port

Number	Element	Description
1	Com Port	Selects the COM port to configure.
2	Intercharacter delay [ms]	Adjusts the delay between characters.
3	Configure	Opens the system dialog for COM port setup.
4		Current configuration

Table 19: DeviceConfig: Select Serial Port

Number	Element	Description
5	OK	Confirms adjustments and closes dialog.
6	Cancel	Rejects adjustments and closes dialog.

Table 19: DeviceConfig: Select Serial Port

Camera Link Serial port

In order to use a Camera Link serial port the Camera Link frame grabber manufacturer has to provide a standardized library.

The naming scheme of these libraries is **clser*.dll.** After selecting the library, all available grabber communication channels are listed within the dialog.

Note

The channels are only listed when the grabber is available.

The architecture of the selected library must fit to the architecture of the DeviceConfig application:

- The **32**-bit (x86) application needs a **32**-bit clser*.dll.
- The **64**-bit (x64) application needs a **64**-bit clser*.dll.
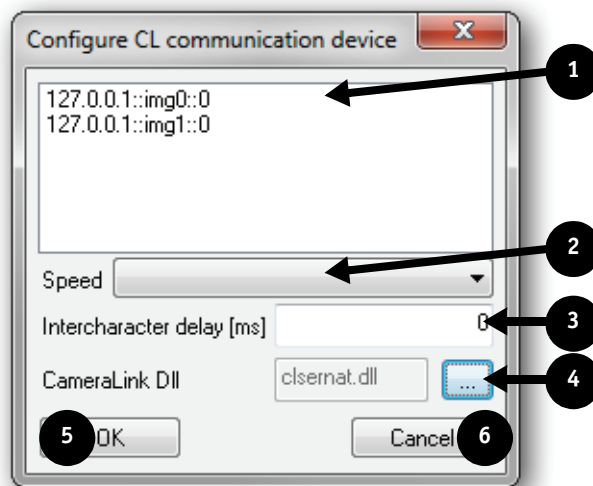
Figure 41: DeviceConfig: Configure CL communication device

Number	Element	Description
1	List	Lists all available ports that the grabber supplies. The name of the port depends on the grabber manufacturer.
2	Speed	Used baud rate. The default value is 115200 baud.
3	Intercharacter delay [ms]	Adjusts the delay between characters.
4	…	Browse for the Serial-Over-Camera Link library.
5	OK	Confirms adjustments and closes dialog.
6	Cancel	Rejects adjustments and closes dialog.

Table 20: DeviceConfig: Configure CL communication device

Depending on the used Camera Link frame grabber, the **clser*.dll** is located in different folders:

Camera Link frame grabber	Used folder for clser*.dll
National Instruments	C:\Windows\system32\clsernat.dll or C:\Windows\SysWOW64\clsernat.dll
Silicon Software	C:\Windows\system32\clserme4.dll or C:\Windows\SysWOW64\clserme4.dll or C:\CameraLink\clserme4.dll
BitFlow	C:\Program Files\BitFlow SDK x.xx\Bin
Matrox	C:\Windows\system32\clsermtx.dll or C:\Windows\SysWOW64\clsermtx.dll

Table 21: Used folders of different Camera Link frame grabbers

Pleora GigE Serial Port

To configure a Pleora GigE port, use the following dialog:
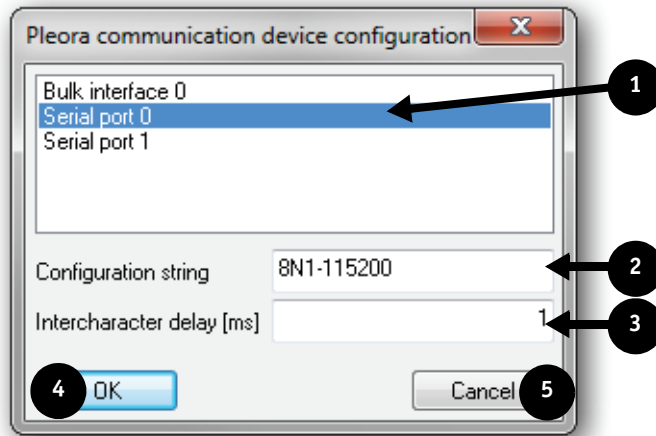
Figure 42: Configure Pleora communication device

Number	Element	Description
1		Lists all available ports. The default port is **Serial port 0**.
2	Configuration string	Configuration string for the selected port. The default string is **8N1-115200**.
3	Intercharacter delay [ms]	Adjusts the delay between characters.
4	OK	Confirms adjustments and closes the dialog.
5	Cancel	Rejects adjustments and closes the dialog.

Table 22: DeviceConfig: Configure Pleora communication device

COM terminal

The terminal window is used for the communication with the camera. The available commands are listed in the camera manual.
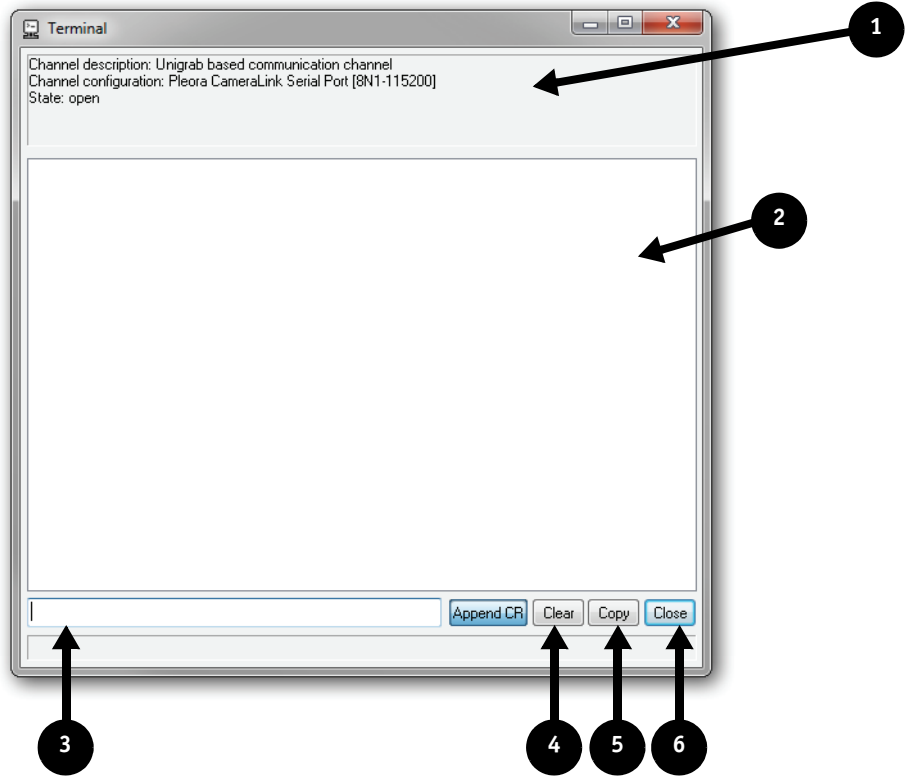
Figure 43: COM terminal

Number	Element	Description
1		This status window displays information about the used COM port and the selected adjustments.
2		Output window
3		Command line
4	Clear	Clears the output window.
5	Copy	Copies the content of the output window to the windows clipboard.
6	Close	Closes the dialog.

Table 23: COM terminal (descriptions)

Record and image management

Image processing chain

Depending on the format of the input data of the image processing chain, predefined process chains are available. The change is done via the **Image processing toolbar** or via the menu item **Image processing → Select image processing chain**.

The basic structure of the image process chain is shown in Chapter AcquireControl concept on page 21.
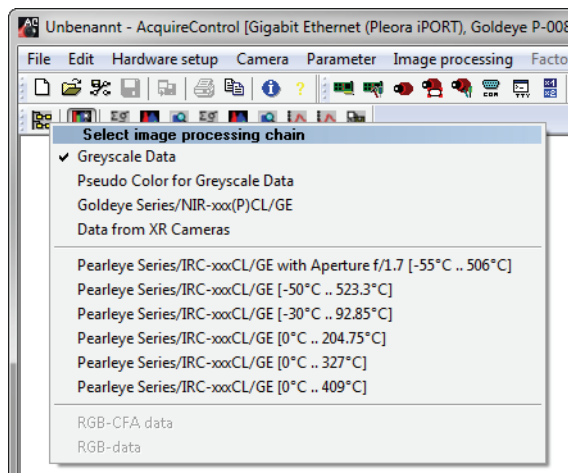
Figure 44: Select image processing chain

Name of the image processing chain	Description	Available processing modules
Greyscale Data	This image processing chain is used for greyscale cameras or loaded greyscale images.	• BCG LUT
Pseudo Color for Greyscale Data	This image processing chain is used for greyscale cameras or loaded greyscale images. In addition to the *Greyscale Data* chain, a pseudo color LUT and an image flip can be applied.	• Pseudo Color LUT • Image flip
Goldeye series/NIR-xxx(P)CL/GE	This image processing chain is used for the following camera series: • Goldeye P-008/NIR-300 • Goldeye-P-032/NIR-600	• Background Correction • Recursive Filter • Flip image • Pseudo Color LUT

Table 24: Image processing chain

Name of the image processing chain	Description	Available processing modules
Data from XR cameras	This chain is used for X-Ray cameras.	• Gain/Offset Correction • Background Correction • Recursive Filter • Flip Image • Image Rotation • BCG LUT
Pearleye series/IRC-xxxCL/GE with aperture f/1.7 [-55°C…+506°C] [-50°C…+523.30°C] [-30°C…+92.85°C] [0°C…+204.75°C] [0°C…+327°C] [0°C…+409°C]	This chain is used for **LWIR** cameras with the given temperature range.	• Background Correction • Recursive Filter • Pseudo Color LUT • Background Correction • Recursive Filter • Pseudo Color LUT
RGB-CFA Data	This chain is used for Bayer Mosaic Filter cameras or corresponding loaded CFA images.	• Bilinear Interpolation • BCG LUT
RGB Data	With this chain loaded RGB images can be displayed.	• BCG LUT

Table 24: Image processing chain

Live image display

To control the live image display: In the **Camera** menu:
- Start the continuous display (**Start continuous snap**) or
- Start the single snap (**Start single snap**)
- Stop a previously started image acquisition (**Stop snap**).
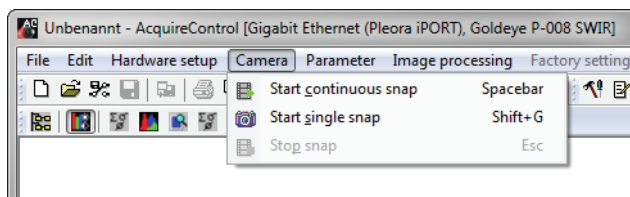
Figure 45: Control live image display

Select the displayed image

With the menu **Display → Select display image** you can change the image to be displayed. Depending on which image process chain is available or rather, was chosen, more or less images are available. After every passed image processing module, a display image can be set up.
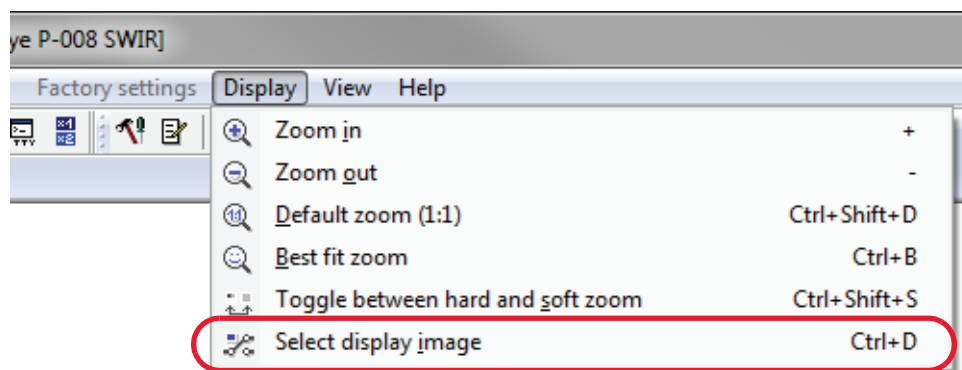
Figure 46: Select display image

As an example, the menu for a grey-scale image is shown here:
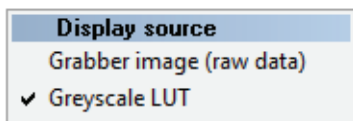
Figure 47: Sample **Display source** menu

Zoom

With the **Display Toolbar**, you can enlarge or reduce the image displayed in the document window. Click the **1:1** button to set the zoom to default.

Note

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Hard zoom: setting the enlargement of the image is done by simple pixel repetition.

Soft zoom: the enlargement is done by interpolation between pixels. This algorithm generates softer images, but the processing speed is reduced. Soft zoom works only in combination with DirectX.
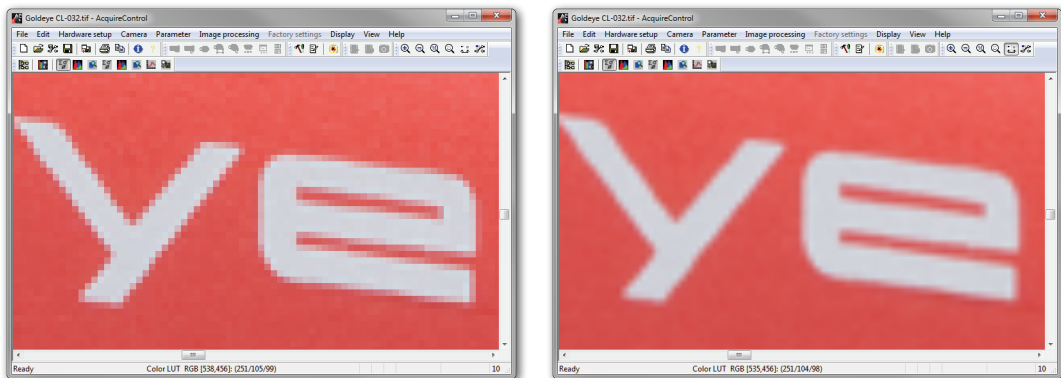
Figure 48: Comparison: hard zoom vs. soft zoom

Loading images

The AcquireControl application is able to load miscellaneous image formats.

The following types are supported:

*   TIFF: Tag Image File Format, TIFF-images can be saved with a bit depth of up to 16 bit. Supported are both monochrome formats and RGB formats (uncompressed).
*   BMP: Windows Bitmap Format, a maximum of 8 bits per pixel is possible.
*   RAW: Raw data format, only the pure image information without additional information is loaded, image resolution, bit depth etc. must be set by the user.
*   PGM: (Portable GrayMap) is a proprietary file format for image storage.

Files are loaded via the menu command **File → Open**, the corresponding icon on the main toolbar or simply via drag & drop.

If you work with the **File open** dialog, you can adjust some additional options (click **Options**), in dependence of the image format.

TIFF file loading options
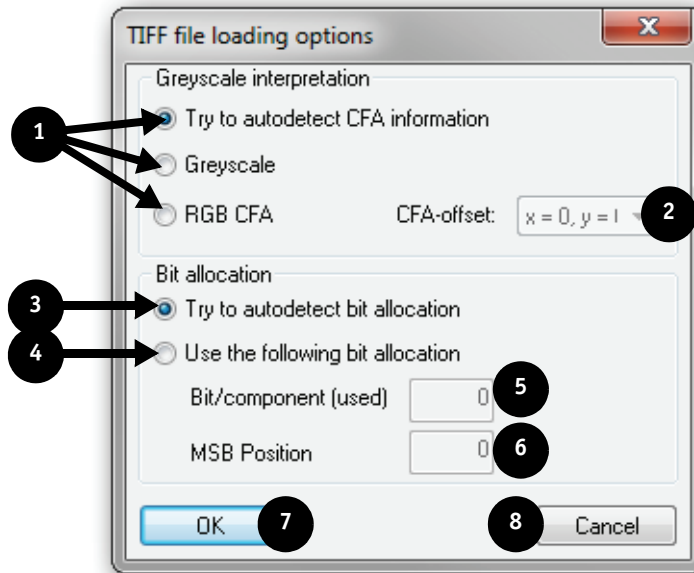
Figure 49: Tiff file loading options

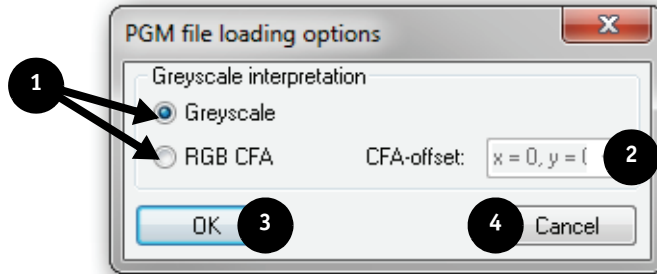| Number	Element	Description
1	Grey-scale interpretation	Indicates if image data are interpreted as: • Autodetection • Grey-scale values or • RGB CFA (Color Field array)
2	CFA offset	Indicates the CFA offset regarding to the pixel within the upper left corner on the sensor.
3	Try to autodetect bit allocation	Tries to automatically detect how the bits are used.
4	Use the following bit allocation	Enter the real used bits per component and the MSB position.
5	Bits/component (used)	Actual number of bits used per component
6	MSB position	**M**ost **S**ignificant **B**it position
7	OK	Confirms the selection and closes the dialog.
8	Cancel	Closes the dialog without applying any changes.

Table 25: TIFF file loading options (description)

BMP file loading options
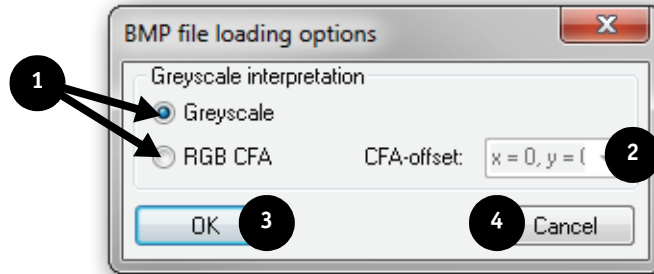
Figure 50: BMP file loading options

Number	Element	Description
1	Greyscale interpretation	Indicates if image data are interpreted as: • Grey-scale values or • RGB CFA (Color Field array)
2	CFA offset	Indicates the CFA offset regarding to the pixel within the upper left corner on the sensor.
3	OK	Confirms the selection and closes the dialog.
4	Cancel	Closes the dialog without applying any changes.

Table 26: BMP file loading options (description)

RAW file loading options

Files in RAW format do not contain any kind of image meta information (such as image resolution or pixel format) so it has to be provided from a separate source.
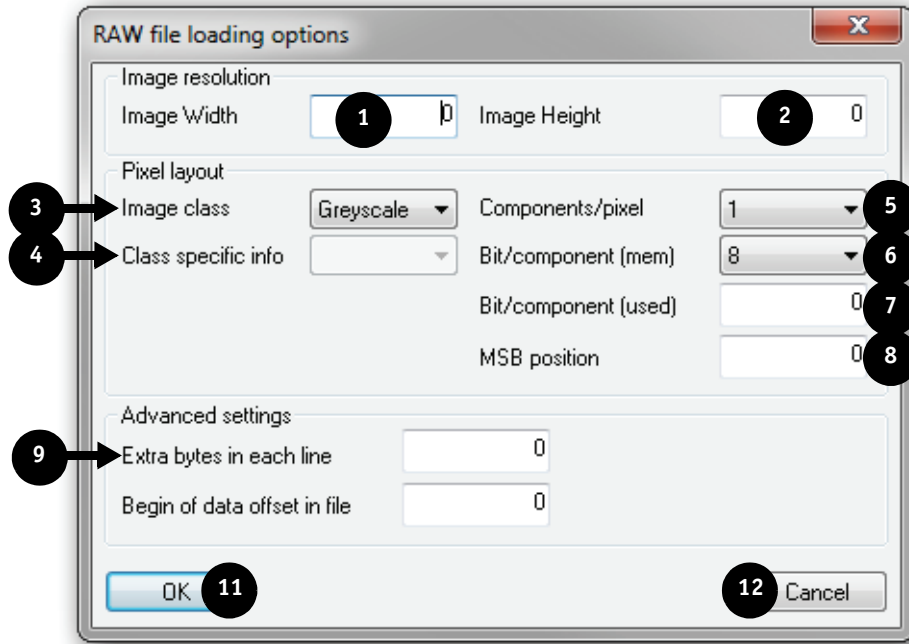
Figure 51: RAW file loading options

Number	Element	Description
1	Image Width	Width of the images in pixels
2	Image Height	Height of the images in pixels
3	Image	Image type
4	Class specific info	Additional parameters depending on image type: e.g. CFA offset
5	Components/ pixel	Number of components per pixel: e.g. 3 (for RGB data)
6	Bits/component (mem)	Memory bits per component
7	Bits/component (used)	Actual number of bits used per component
8	MSB position	**M**ost **S**ignificant **B**it position

Table 27: RAW file loading options (description)

Number	Element	Description
9	Extra bytes in each line	Number of extra bytes per image line
10	Begin of data offset in file	If the file contains a header, indicate here the position of the first image byte.
11	OK	Confirms the selection and closes the dialog.
12	Cancel	Closes the dialog without applying any changes.

Table 27: RAW file loading options (description)

PGM file options

Figure 52: PGM file loading options

Number	Element	Description
1	Greyscale interpretation	Indicates if image data are interpreted as: • Grey scale values or • RGB CFA (Color Field array)
2	CFA offset	Indicates the CFA offset regarding to the pixel within the upper left corner on the sensor.
3	OK	Confirms the selection and closes the dialog.
4	Cancel	Closes the dialog without applying any changes.

Table 28: PGM file loading options

Note

To create a new frame grabber document after loading an image:

Click **File → New**

(see Chapter Closing the camera and frame grabber on page 117)

Saving images

In order to save a recorded image, several options are available.

In menu **Select image to save,** define how an image should be saved.

The menu items **Save** and **Save as...** store the defined image.

If at program end an unsaved document exists, a warning is displayed.

The menu item **Select image to save** displays more or less entries, in dependence of the used image process chain.
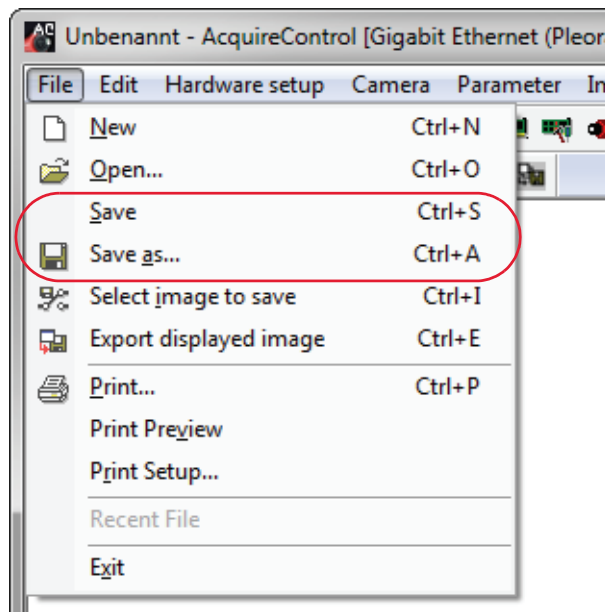
Figure 53: Select image to save

The image which is created in the chain after the menu entry will be saved. The image below shows an example menu for a greyscale image. With this setting, the raw-data image is saved.
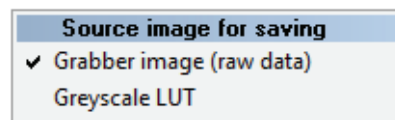
Figure 54: Example menu for **Source image for saving**

Clipboard

Via the command **Edit → Copy**, the image displayed in the actual document is copied to the Windows clipboard.
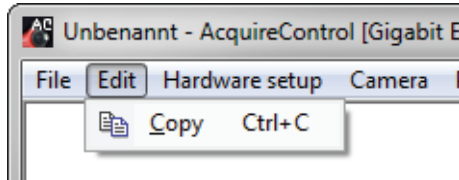
Figure 55: Copy to clipboard

Image parameters and program parameters

AcquireControl offers miscellaneous adjustment and display options for image parameters. All accompanying options are listed on the **Image Processing Toolbar**. This toolbar is created dynamically and depends on the used image process chain.

Furthermore, all modules are listed within the **Image processing** menu. The numbers of the analysis modules represent the group number. Each group has one common AOI.
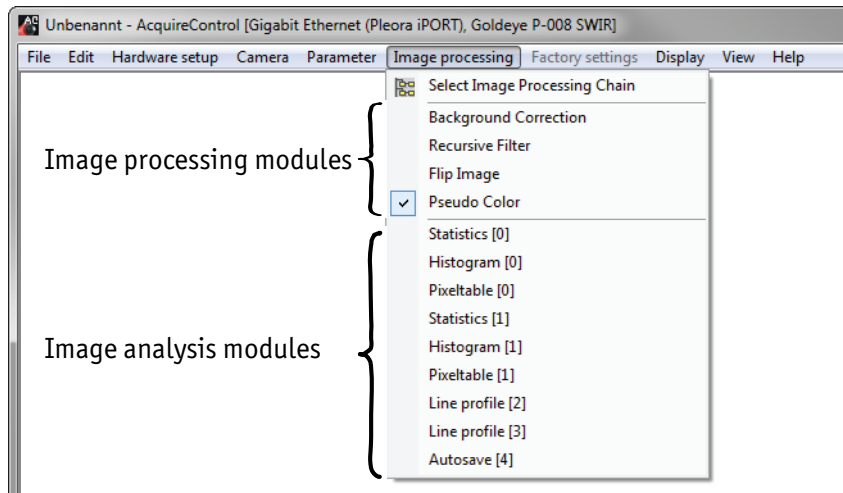
Figure 56: Image processing menu

Options for an analyze group

An analyze group can be configured by the respective button within the analysis dialog. The following menu is shown. An analyze group consists of an AOI, a certain number of analysis modules and a reference to the image in the image process chain to be analyzed (see Chapter AcquireControl concept on page 21).
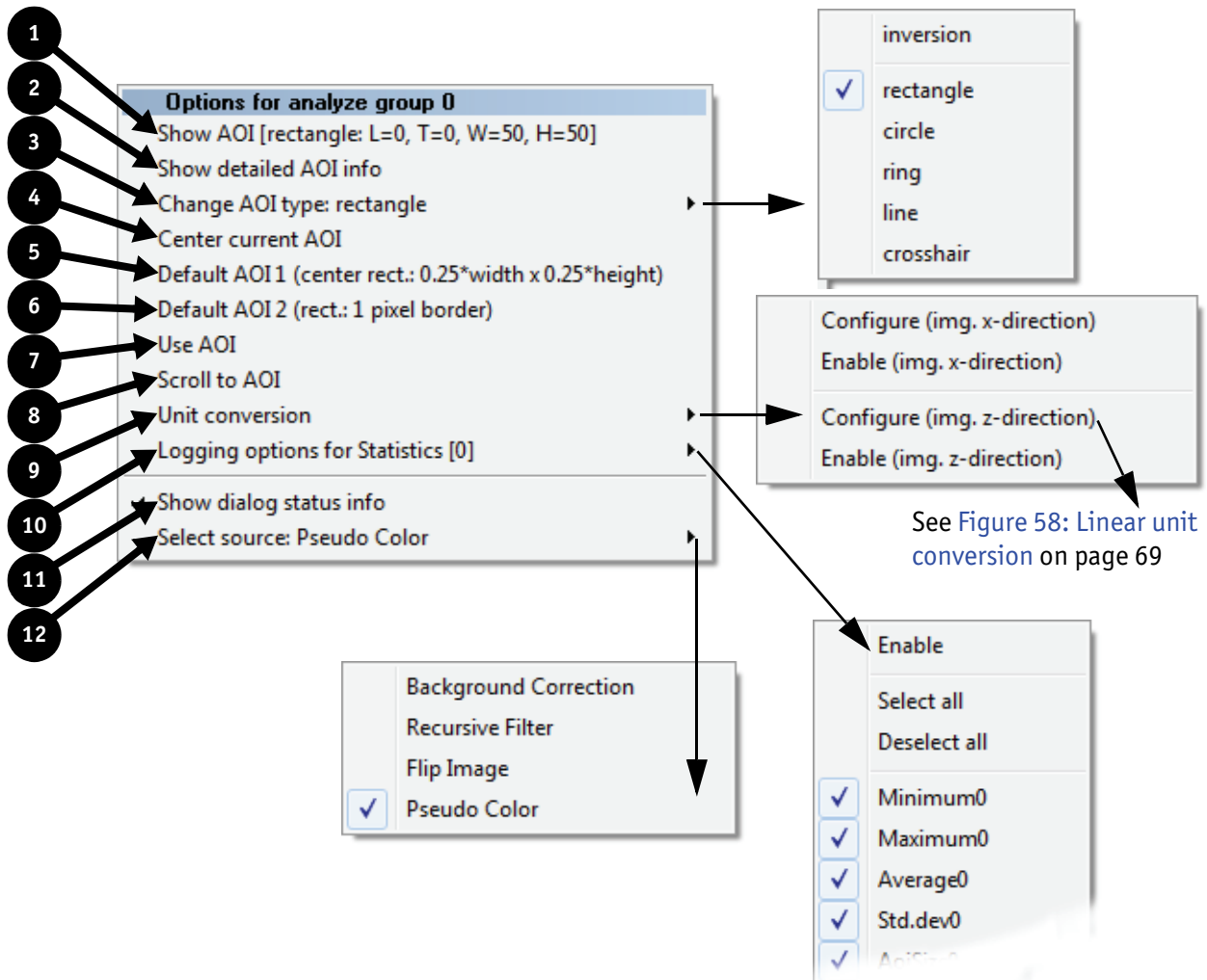
Figure 57: Options for analyze group 0

Number	Element	Description
1	Show AOI	Shows or hides the corresponding AOI.
2	Show detailed AOI info	Shows additional details for this AOI.

Table 29: Options for an analyze group (description)

Number	Element	Description
3	Change AOI type	Changes the AOI form: • Inversion: If this option is chosen, the AOI is inverted. • Rectangle • Circle • Ring • Line • Crosshair
4	Center current AOI	Moves the current AOI to the center of the image.
5	Default AOI1	Sets the default configuration for this AOI. That is: 0.25 x width of the image and 0.25 x height of the image
6	Default AOI2	Sets the AOI to a rectangle covering the full image except a 1 pixel border.
7	Use AOI	Switches this AOI on or off. If the AOI is disabled, the whole image is used for the analysis module.
8	Scroll to AOI	Scrolls the main window to the AOI.
9	Unit conversion	Configure (img. x-direction): Currently without function. Enable (img. x-direction): Currently without function. Configure (img. z-direction): Shows the dialog for z-direction (grey-scale) conversion setup. Enable (img. z-direction): Turns conversion on or off. See Figure 58: Linear unit conversion on page 69. See Table 30: Linear unit conversion (description) on page 70.
10	Logging options for …	Enables the logging options for the calling dialog (e.g. Histogram dialog) (Chapter Logging on page 112). This menu entry is only available if the menu is displayed from a dialog. Use the submenu to configure the logging: • **Enable:** Enables or disables the logging for the calling module. • **Select all:** Selects all values. • **Deselect all:** Deselects all values. Subsequently all selectable values of the module are listed.
11	Show dialog status info	Enables or disables the status bar of the corresponding dialog.
12	Select source	Changes the source image for the analyze group. In dependence of the used image process chain, more or less images are available here.

Table 29: Options for an analyze group (description)

Linear unit conversion

Use the linear unit conversion dialog to convert incoming pixel count values into a user-defined unit according the following formula:

$$y(x) \ = \ m \times \frac{x}{maxX} + b$$

Formula 1: Linear unit conversion (z direction)

Note

x is an input pixel value to be converted

y is the converted output pixel value of the given input pixel value in the desired unit

z-dir means: the unit conversion is applied to the intensity of the pixel value

maxX is calculated by 2^{bits-1}

The adjustments made in this dialog affect all analyze modules within the same group.
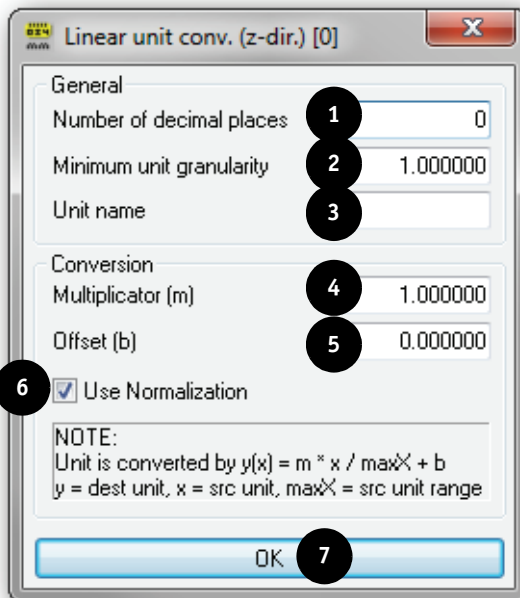
Figure 58: Linear unit conversion

Number	Element	Description
1	Number of decimal places	Number of decimal places
2	Minimum unit granularity	Minimum granularity for unit rounding
3	Unit name	Name of the unit
4	Multiplicator (m)	Multiplicator for conversion
5	Offset (b)	Offset for conversion
6	Use Normalization	The output value is normalized to the bit depth of the acquired image.
7	OK	Confirms the selection and closes the dialog.

Table 30: Linear unit conversion (description)

Brightness, contrast and color adjustments

Menu: **Image processing → BCG LUT**
or
Image processing toolbar: click

To modify brightness, contrast, and gamma, use the LUT dialog (look-up table). After a restart of the application, the last adjustment of the LUT is reconstructed for the camera document.

Monochrome LUT

The following dialog controls brightness, contrast and gamma for monochrome or temperature images.
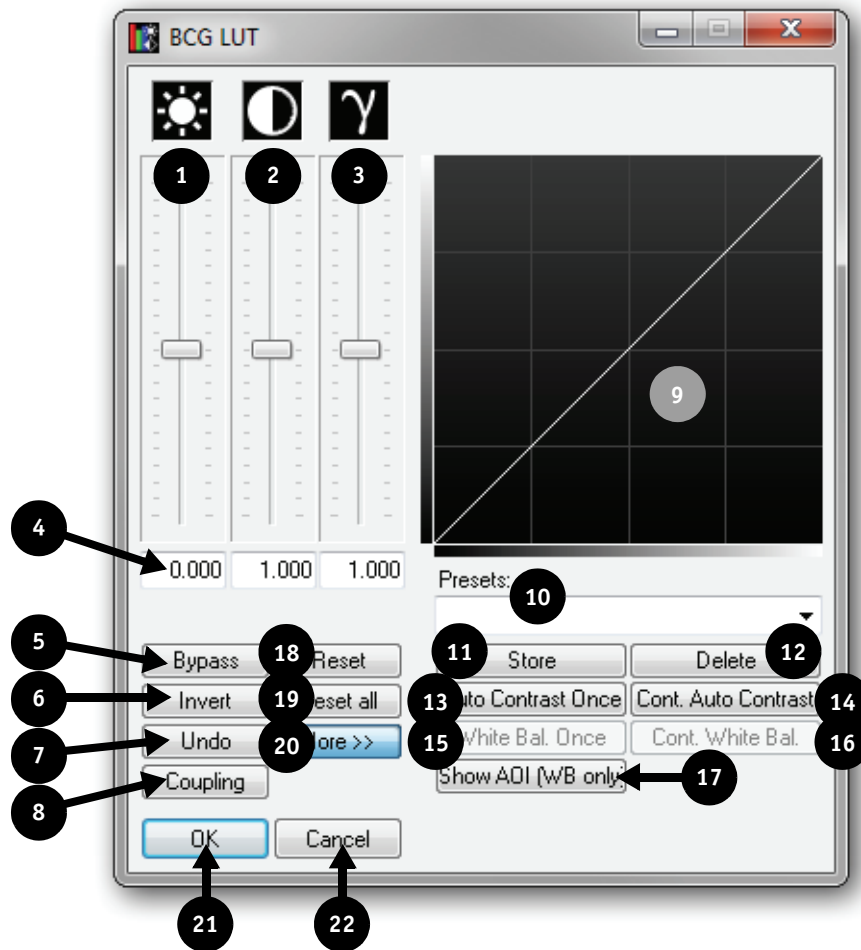
Figure 59: Monochrome LUT

Number	Element	Description
1		Control for brightness
2		Control for contrast
3		Control for gamma value
4		Decimal value for the control adjustments
5	Bypass	If this button is active, the LUT becomes invalidated. Therefore a rapid comparison of before and after is possible.
6	Invert	Inverts the LUT.
7	Undo	Cancels the executed adjustments.
8	Coupling	With this button the sliders for brightness and contrast can be coupled.
9		This main graphic shows the LUT characteristic curve resulting from all channel adjustments.
10	Presets	Selects predefined and user characteristic curves.
11	Store	Stores the actual adjustments under the preset name to be input beforehand.
12	Delete	Deletes the actual user characteristic curve.
13	Auto contrast once	Auto contrast once Adjusts the contrast of the incoming image to its optimal value.
14	Cont. auto contrast	Continuous auto contrast Adjusts continuously the contrast of the incoming image to its optimal value.
15	White bal. once	White balance once Applies **once** an automatic white balance to the image. The AOI is used for this operation.
16	Cont. white bal.	Continuous white balance **Continuously** adjusts the white balance to its optimal value. The AOI is used for this operation.
17	Show AOI (WB only)	Show AOI (white balance only) Shows the AOI which is used for the white balance operation.
18	Reset	Sets all adjustments for the actual channel to neutral.
19	Reset all	Sets all adjustments for all channels to neutral.
20	More >>	Switches between standard and extended view of the dialog.
21	OK	Confirms the selection and closes the dialog.
22	Cancel	Closes the dialog without applying any alterations.

Table 31: Monochrome LUT (description)

RGB LUT

Via this dialog, the white adjustment can be applied, which is necessary for color cameras.
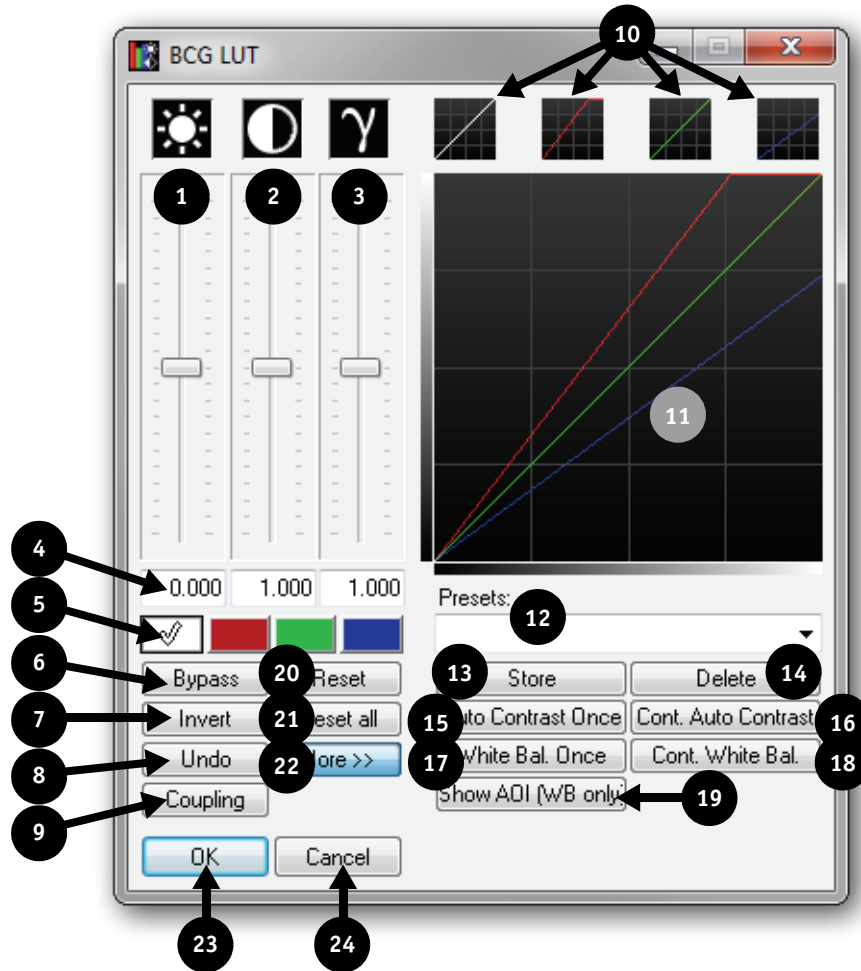
Figure 60: RGB LUT

Number	Element	Description
1		Control for brightness
2		Control for contrast
3		Control for gamma value
4		Decimal value for the control adjustments.

Table 32: RGB LUT (description)

Number	Element	Description
5		Select the channel for which the slider control adjustments should be valid. Available channels are: Total, red, green and blue.
6	Bypass	If this button is active, the LUT becomes invalidated and for this reason a rapid comparison of before and after is possible.
7	Invert	Inverts the LUT.
8	Undo	Cancels the executed adjustments.
9	Coupling	With this button the sliders for brightness and contrast can be coupled.
10		Select channel to be displayed: Total, red, green or blue.
11		This main graphic shows the LUT characteristic curve resulting from all channel adjustments.
12	Presets	Selects predefined and user characteristic curves.
13	Store	Stores the actual adjustments under the preset name to be input beforehand.
14	Delete	Deletes the actual user characteristic curve.
15	Auto contrast once	Auto contrast once Adjusts the contrast of the incoming image to its optimal value.
16	Cont. auto contrast	Continuous auto contrast Adjusts continuously the contrast of the incoming image to its optimal value.
17	White bal. once	White balance once Applies **once** an automatic white balance to the image. The AOI is used for this operation.
18	Cont. white bal.	Continuous white balance **Continuously** adjusts the white balance to its optimal value. The AOI is used for this operation.
19	Show AOI (WB only)	Show AOI (white balance only) Shows the AOI which is used for the white balance operation.
20	Reset	Sets all adjustments for the actual channel to neutral.
21	Reset all	Sets all adjustments for all channels to neutral.
22	More >>	Switches between standard and extended view of the dialog.
23	OK	Confirms the selection and closes the dialog.
24	Cancel	Closes the dialog without applying any changes.

Table 32: RGB LUT (description)

White balance

The basis for a good white adjustment is a good measurement window in the image. Use the **Whitebalance AOI** for this. To change the AOI, click **Show AOI (WB only)** in the LUT dialog. Move the AOI to an image section, if possible containing a neutral grey area in reality. Overexposed and underexposed areas negatively influence the result of the white adjustment. The following images illustrate a typical white adjustment with the corresponding histogram.
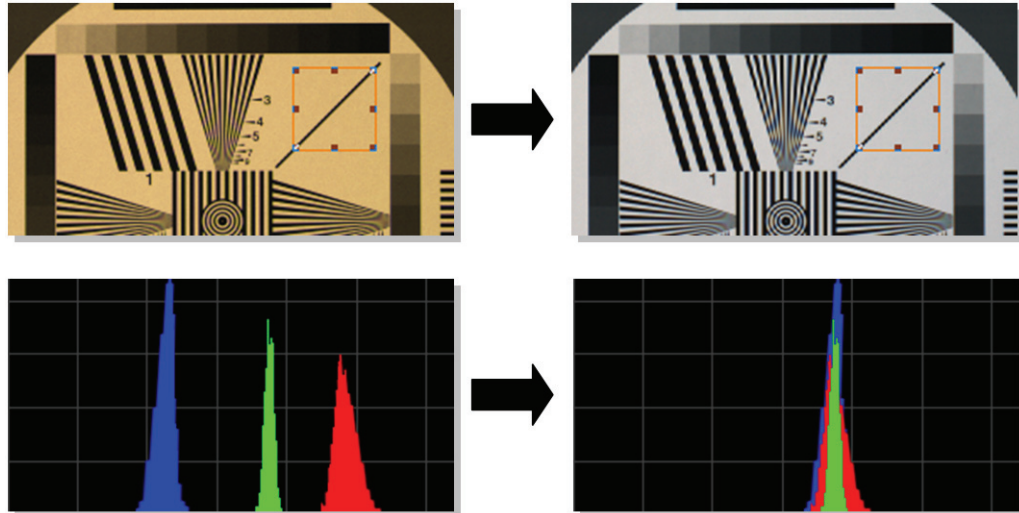
Figure 61: White adjustment

Histogram

Menu: **Image processing → Histogram**
or
Image processing toolbar: click

Definition   A histogram is a bar chart indicating a frequency distribution of all occurring pixel values. The X-axis indicates the pixel value and the Y-axis indicates the frequency.

The determined area for the **Histogram AOI** is analyzed.

Monochrome histogram
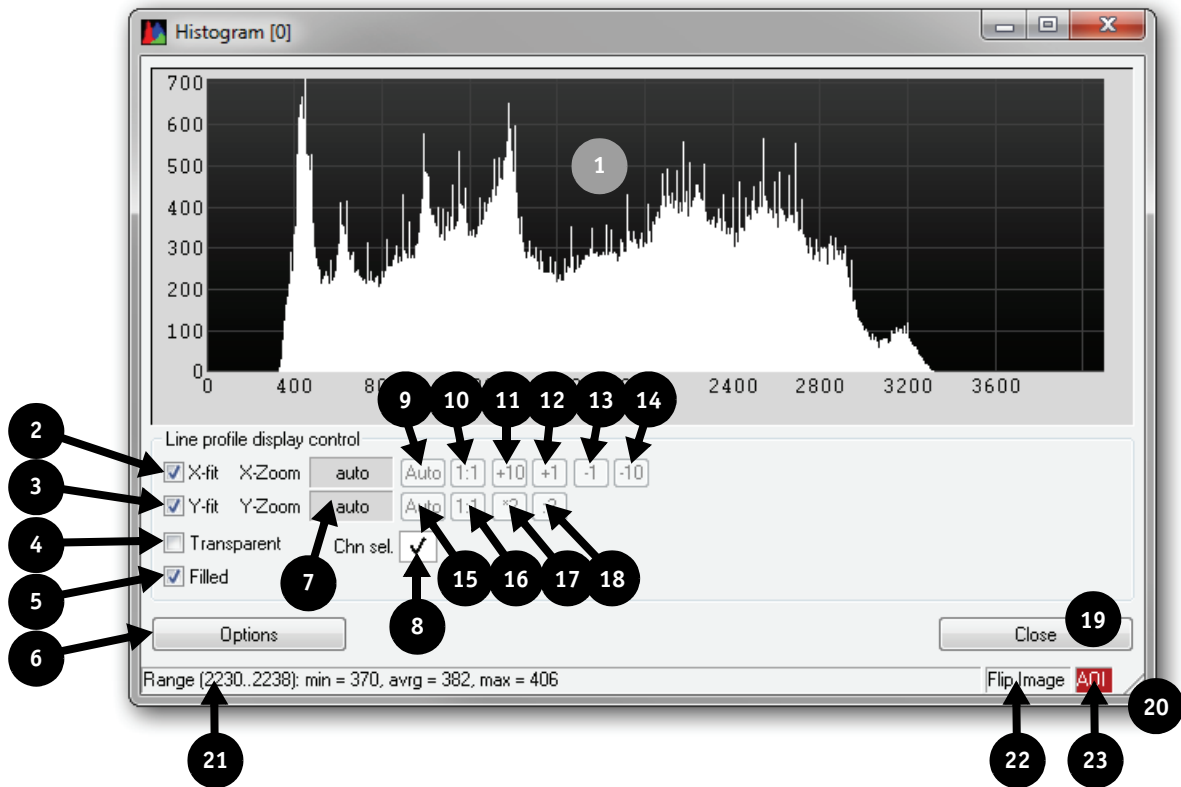
Figure 62: Monochrome histogram

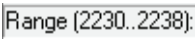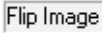| Number	Element	Description
1		Histogram window
2	X-fit	Adapts the scale in X-direction to the actual size of the histogram window.
3	Y-fit	Adapts the scale in Y-direction to the actual size of the histogram window.
4	Transparent	Draws the histogram channels transparent.
5	Filled	Changes the draw mode of the histogram display from a bar chart to a point chart.
6	Options	A menu with all options regarding this analyze group is shown (Chapter Options for an analyze group on page 66).
7	X-Zoom / Y-Zoom	Actual zoom ratio for the display window

Table 33: Monochrome histogram (description)
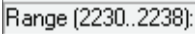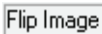
Number	Element	Description
8	Chn. sel.	Individual color channels can be deactivated here.
9	Auto	Click **Auto**. An integer is determined for the **X-zoom** so all values fit in the display area.
10	1:1	Adjusts the X-zoom-ratio to 1:1.
11	+10	Increments the X-zoom-ratio by 10.
12	+1	Increments the X-zoom-ratio by 1.
13	-1	Decrements the X-zoom-ratio by 1.
14	-10	Decrements the X-zoom-ratio by 10.
15	Auto	Click **Auto**. An integer is determined for the **Y-zoom** so all values fit in the display area.
16	1:1	Adjusts the Y-zoom-ratio to 1:1.
17	x2	Multiplies the Y-zoom-ratio with 2.
18	:2	Divides the Y-zoom-ratio by 2.
19	Close	Closes the dialog.
20		Click here and move mouse cursor to change the size of the histogram window manually.
21	Status bar Range (2230..2238):	The status bar has three panes: • To show the frequency of a pixel value, move the mouse cursor over the histogram window.
22	Flip Image	• The source image for the histogram is displayed here. **Click this pane to open the source image selection menu.**
23	AOI	• Shows if the histogram is calculated within an AOI or over the whole image. **Click this pane to switch between AOI and full image calculation.**

Table 33: Monochrome histogram (description)

RGB histogram

Figure 63: RGB histogram

Table 34: RGB histogram (description)

Number	Element	Description
1		Histogram window.
2	X-fit	Adapts the scale in X-direction to the actual size of the histogram window.
3	Y-fit	Adapts the scale in Y-direction to the actual size of the histogram window.
4	Transparent	Draws the histogram channels transparent.
5	Filled	Changes the draw mode of the histogram display from a bar chart to a point chart.
6	Status line	In the status line, the frequency of a pixel value is indicated, as soon as the mouse cursor is moved over the histogram window.

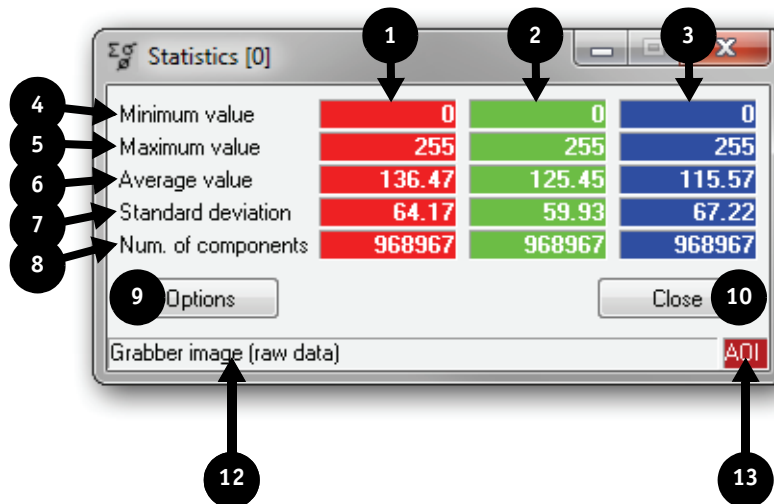| Number	Element	Description
7	Options	A menu with all options regarding this analyze group is shown (see Chapter Options for an analyze group on page 66).
8	Chn. sel.	Individual color channels can be deactivated here.
9	Auto	Click **Auto**. An integer is determined for the X-zoom so all values fit in the display area.
10	1:1	Adjusts the X-zoom-ratio to 1:1.
11	+10	Increments the X-zoom-ratio by 10.
12	+1	Increments the X-zoom-ratio by 1.
13	-1	Decrements the X-zoom-ratio by 1.
14	-10	Decrements the X-zoom-ratio by 10.
15	Auto	Click **Auto**. An integer is determined for the Y-zoom so all values fit in the display area.
16	1:1	Adjusts the Y-zoom-ratio to 1:1.
17	x2	Multiplies the Y-zoom-ratio with 2.
18	:2	Divides the Y-zoom-ratio by 2.
19	Close	Closes the dialog.
20		Click here and move mouse cursor to change the size of the histogram window manually.
21	Status bar Range (2230..2238):	The status bar has three panes: • To show the frequency of a pixel value, move the mouse cursor over the histogram window.
22	Flip Image	• The source image for the histogram is displayed here. **Click this pane to open the source image selection menu.**
23	AOI	• Shows if the histogram is calculated within an AOI or over the whole image. **Click this pane to switch between AOI and full image calculation.**

Table 34: RGB histogram (description)

Statistics

Menu: **Image processing → Statistics**
or
Image processing toolbar: click

You can evaluate statistic data for any AOI area or for the entire image.

Monochrome statistics
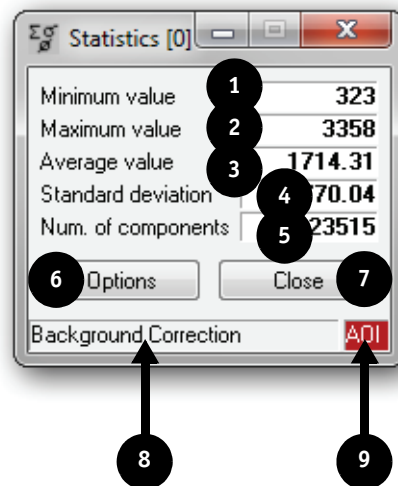
Figure 64: Monochrome statistics

Number	Element	Description
1	Minimum value	Indicates the minimal pixel value within the determined AOI.
2	Maximum value	Indicates the maximum pixel value within the determined AOI.
3	Average value	Indicates the arithmetic average value of all pixels within the AOI.
4	Standard deviation	Indicates the standard deviation within the AOI.
5	Num. of components	Number of pixels used for calculating the statistics.
6	Options	A menu with all options regarding this analyze group is shown (see Chapter Options for an analyze group on page 66).
7	Close	Closes the dialog.

Table 35: Monochrome statistics (description)

Number	Element	Description
8	Status bar ![Background Correction]	The status bar has two panes: • The source image for the statistics is displayed here. **Click this pane to open the source image selection menu.**
9	![AOI]	• Shows if the histogram is calculated within an AOI or over the whole image. **Click this pane to switch between AOI and full image calculation.**

Table 35: Monochrome statistics (description)

RGB statistics

Figure 65: RGB statistics

Number	Element	Description
1		Statistics data for the red channel
2		Statistics data for the green channel
3		Statistics data for the blue channel
4	Minimum value	Indicates the minimal pixel value within the determined AOI.
5	Minimum value	Indicates the maximum pixel value within the determined AOI.
6	Average value	Indicates the arithmetic average value of all pixels within the AOI.

Table 36: RGB statistics (description)

Number	Element	Description
7	Standard deviation	Indicates the standard deviation within the AOI.
8	Num. of components	Number of pixels used for calculating the statistics.
9	Options	A menu with all options regarding this analyze group is shown (see Chapter Options for an analyze group on page 66).
10	Close	Closes the dialog.
11	Status bar Grabber image (raw data	The status bar has two panes: • The source image for the statistics is displayed here. **Click this pane to open the source image selection menu.**
12	AOI	• Shows if the histogram is calculated within an AOI or over the whole image. **Click this pane to switch between AOI and full image calculation.**

Table 36: RGB statistics (description)

Row/column statistics

Menu: **Image processing → Row/column statistics**
or
Image processing toolbar: click

The row/column statistics calculates the standard deviation of the row/column statistic data only.
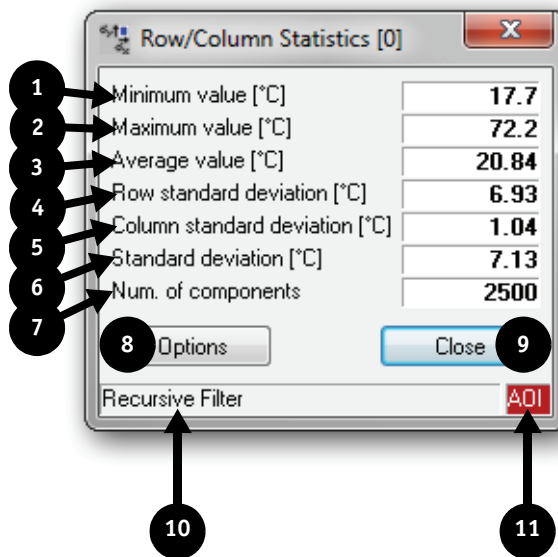
Figure 66: Row/column statistics
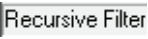
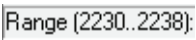| Number	Element	Description
1	Minimum value	Indicates the minimal pixel row/column value.
2	Maximum value	Indicates the maximum pixel row/column value.
3	Average value	Indicates the arithmetic average row/column value of all pixels.
4	Row standard deviation	Indicates the standard deviation of rows only.
5	Column standard deviation	Indicates the standard deviation of columns only.
6	Standard deviation	Indicates the standard row/column deviation.
7	Num. of components	Number of pixels used for calculating the statistics.
8	Options	A menu with all options regarding this analyze group will be shown (see Chapter Options for an analyze group on page 66).
9	Close	Closes the dialog.
10	Status bar `Recursive Filter`	The status bar has two panes: • The source image for the statistics is displayed here. **Click this pane to open the source image selection menu.**
11	AOI	• Shows if the histogram is calculated within an AOI or over the whole image. **Click this pane to switch between AOI and full image calculation.**

Table 37: Row/column statistics (description)

Time-based statistics

Menu: **Image processing → Time-based statistics**
or
Image processing toolbar: click

The time-based statistics calculates the standard deviation on every pixel within the AOI separately over the time.

$$\frac{1}{n} \sum_{i=0}^{n-1} \sigma_{P_i} \quad = \quad \text{time-based statistics value}$$

where

$$\sigma_{P_i} \quad = \quad \sqrt{\frac{1}{T-1} \left[\left(\sum_{t=0}^{T-1} P_{i,t}^2 \right) - \frac{1}{T} \left(\sum_{t=0}^{T-1} P_{i,t} \right)^2 \right]}$$

Formula 2: Time-based statistics value

P_i: value of the pixel with index i
σ_{P_i}: Standard deviation of the pixel with index i
n: number of pixels of the AOI
i: index of the pixel inside the AOI
t: index of the image in the sequence of the statistics (calculated over time)
T: total number of images (calculated over time), $T \geq 2$
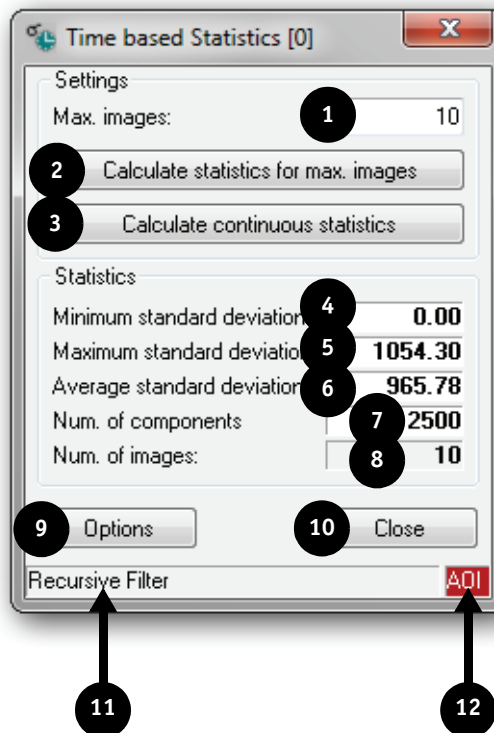
Figure 67: Time-based statistics
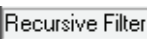
Number	Element	Description
1	Max. images	Limits the calculation to a defined number of images.
2	Calculate statistics for max. images	Calculates the statistics for the defined number of images only.
3	Calculate continuous statistics	Calculates the statistics continuously.
4	Minimum standard deviation	Indicates the minimum standard deviation within the AOI and for the defined number of images.
5	Maximum standard deviation	Indicates the maximum standard deviation within the AOI and for the defined number of images.
6	Average standard deviation	Indicates the average standard deviation within the AOI and for the defined number of images.
7	Num. of components	Number of pixels used for calculating the statistics.
8	Num. of images	Number of images used for calculating the statistics.
9	Options	A menu with all options regarding this analyze group will be shown (see Chapter Options for an analyze group on page 66).
10	Close	Closes the dialog.
11	Status bar Recursive Filter	The status bar has two panes: • The source image for the statistics is displayed here. **Click this pane to open the source image selection menu.**
12	AOI	• Shows if the histogram is calculated within an AOI or over the whole image. **Click this pane to switch between AOI and full image calculation.**

Table 38: Time-based statistics (description)

Line profile

Menu: **Image processing → Line profile**
or
Image processing toolbar: click

The line profile measures pixel values along a line within a source image.

This tool is useful e.g. to measure shading within an image.
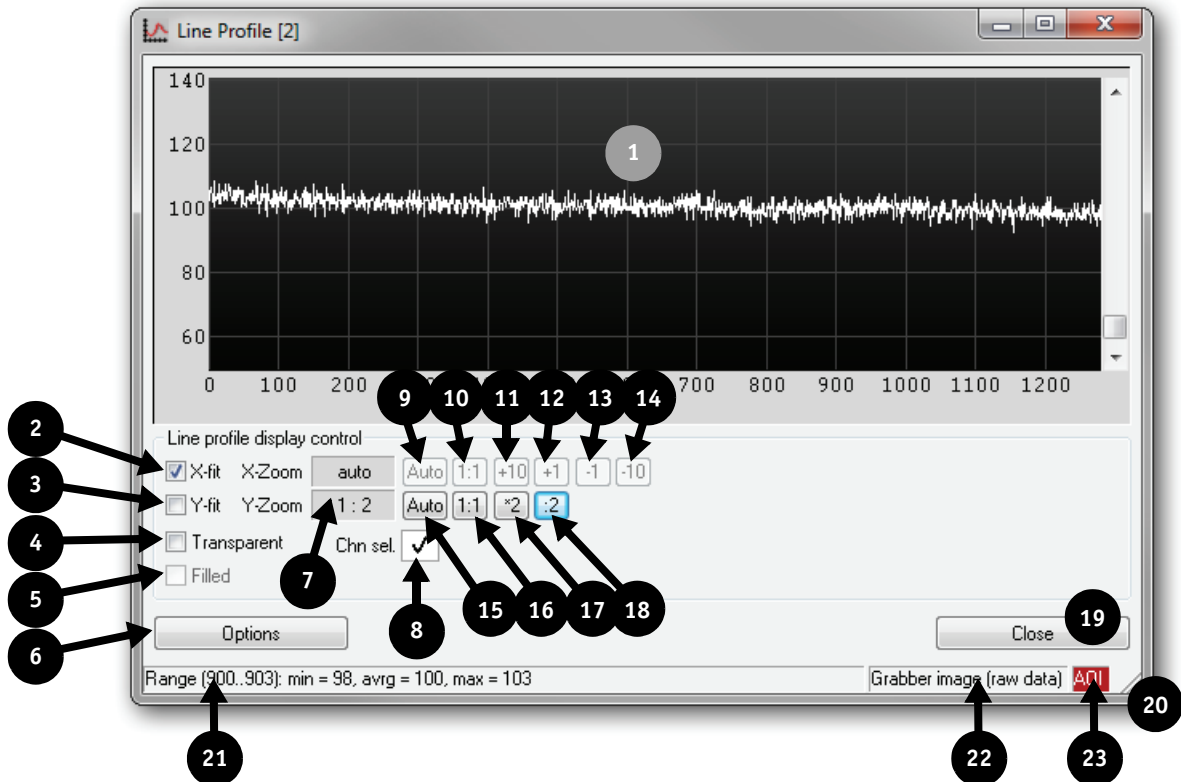
Figure 68: Line profile

Number	Element	Description
1		Histogram window
2	X-fit	Adapts the scale in X-direction to the actual size of the histogram window.
3	Y-fit	Adapts the scale in Y-direction to the actual size of the histogram window.
4	Transparent	Draws the histogram channels transparent.
5	Filled	Changes the draw mode of the histogram display from a bar chart to a point chart.

Table 39: Line profile (description)

Number	Element	Description
6	Options	A menu with all options regarding this analyze group will be shown (Chapter Options for an analyze group on page 66).
7	X-Zoom / Y-Zoom	Actual zoom-ratio for the display window
8	Chn. sel.	Individual color channels can be deactivated here.
9	Auto	Click **Auto**. An integer is determined for the X-zoom so all values fit in the display area.
10	1:1	Adjusts the X-zoom-ratio to 1:1.
11	+10	Increments the X-zoom-ratio by 10.
12	+1	Increments the X-zoom-ratio by 1.
13	-1	Decrements the X-zoom-ratio by 1.
14	-10	Decrements the X-zoom-ratio by 10.
15	Auto	Click Auto. An integer is determined for the Y-zoom so all values fit in the display area.
16	1:1	Adjusts the Y-zoom-ratio to 1:1.
17	x2	Multiplies the Y-zoom-ratio with 2.
18	:2	Divides the Y-zoom-ratio by 2.
19	Close	Closes the dialog.
20		Click here and move mouse cursor to change the size of the histogram window manually.
21	Status bar Range (2230..2238):	The status bar has three panes: • To show the frequency of a pixel value, move the mouse cursor over the histogram window.
22	Flip Image	• The source image for the histogram is displayed here. Click this pane to open the source image selection menu.
23	AOI	• Shows if the histogram is calculated within an AOI or over the whole image. Click this pane to switch between AOI and full image calculation.

Table 39: Line profile (description)

Background correction

Menu: **Image processing** → **Background correction**
or
Image processing toolbar: click

Use this image processing module for the suppression of the visible underground structure of digital cameras. This module acquires first a predefined number of camera dark images and puts them in a reference image. This reference image will be charged with the input data according the following formula:

$$Y(x, y) = E(x, y) - D(x, y) + K$$

Formula 3: Background correction

with

Y(x,y) = Output data

E(x,y) = Input data

D(x,y) = Reference data (Dark image)

K = Additive constant factor (offset)

Set the additive constant factor to the average value.
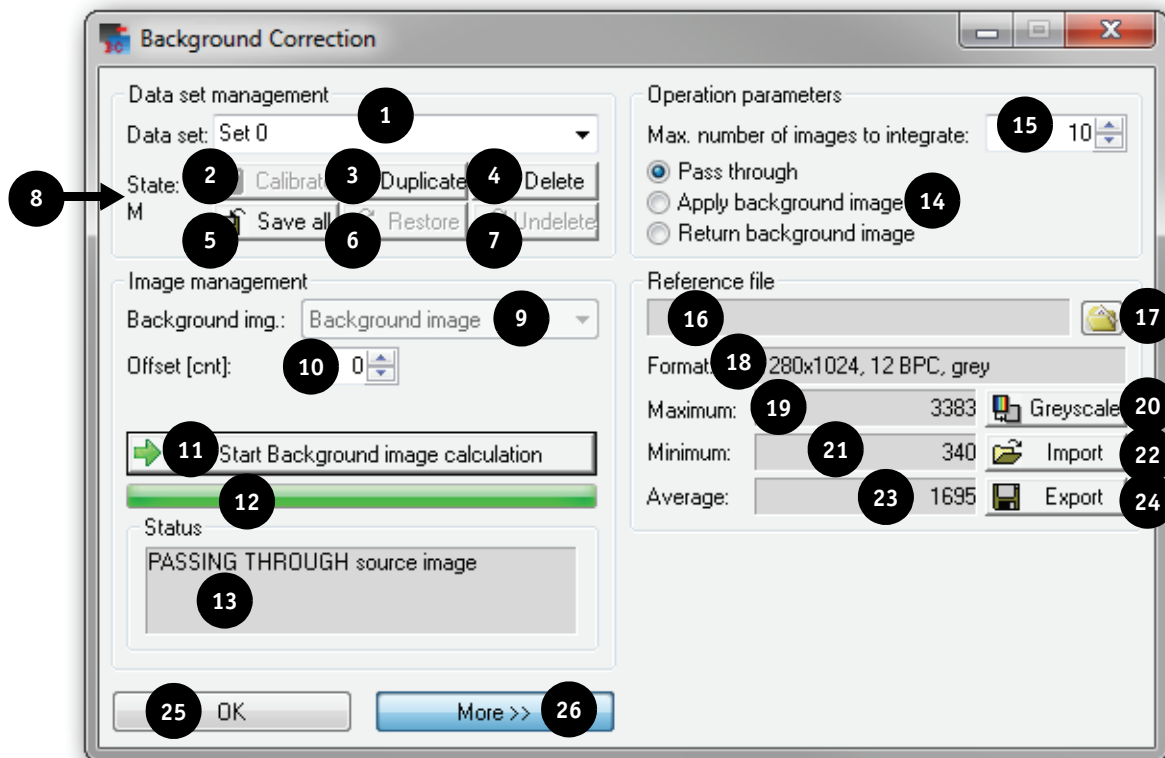
Figure 69: Background correction

Number	Element	Description
1	Data set	Correction image data set consists of a low-light and a high-light image (or a low-temperature and a high-temperature image).
2	Calibrate	Search automatically for the best correction data set.
3	Duplicate	Duplicate the currently selected data set.
4	Delete	Marks the currently selected data set for deletion.
5	Save all	Saves all correction data set on hard disk.
6	Restore	Restore the previous data set from hard disk including ideal value.
7	Undelete	Delete the data set delete mark.
8	State	Data set state: • **M:** Modified: Data set was modified. • **L:** Loaded: Data set was loaded from hard disk. • **D:** Delete: Data set is highlighted for deletion.
9	Background image	Name of the background image
10	Offset [cnt]	Offset value for the background image (refers to 12 bit).
11	Start background image calculation	Starts the integration of the input data. Afterwards you have to start the image acquisition in the main application with **Start continuous snap**.
12		Progress bar for the integration process.
13	Status	Module state
14		Type of correction operation: • **Pass through:** The background correction is disabled and the original data is passed through. • **Apply background image:** Activates the background correction. • **Return background image:** The background image is returned.
15	Max. number of images to integrate	Number of images to integrate
16		Shows the current import / export path.
17		Enter the import / export path.
18	Format	Information about the image format
19	Maximum	Displays the maximum grey value of the integration image. Click the value to set the value as offset.
20	Greyscale	If the input image is a color image, click **Greyscale** to convert the reference image to a grey image.
21	Minimum	Displays the minimum grey value of the integration image. Click the value to set the value as offset.
22	Import	Imports the reference image.
23	Average	Displays the average grey value of the integration image. Click this value to set the average value as offset for the background correction module.
24	Export	Exports the reference image.
25	OK	Closes the dialog.
26	More >>	Switches between the standard and extended view of the dialog.

Table 40: Background correction (description)

Gain / offset correction

Menu: **Image processing → Gain / offset correction**
or
Image processing toolbar: click

The gain/offset correction is used for a linear characteristic curve correction per pixel.

The gain / offset correction uses a low-brightness and a high-brightness image to calculate the optimal pixel characteristic.
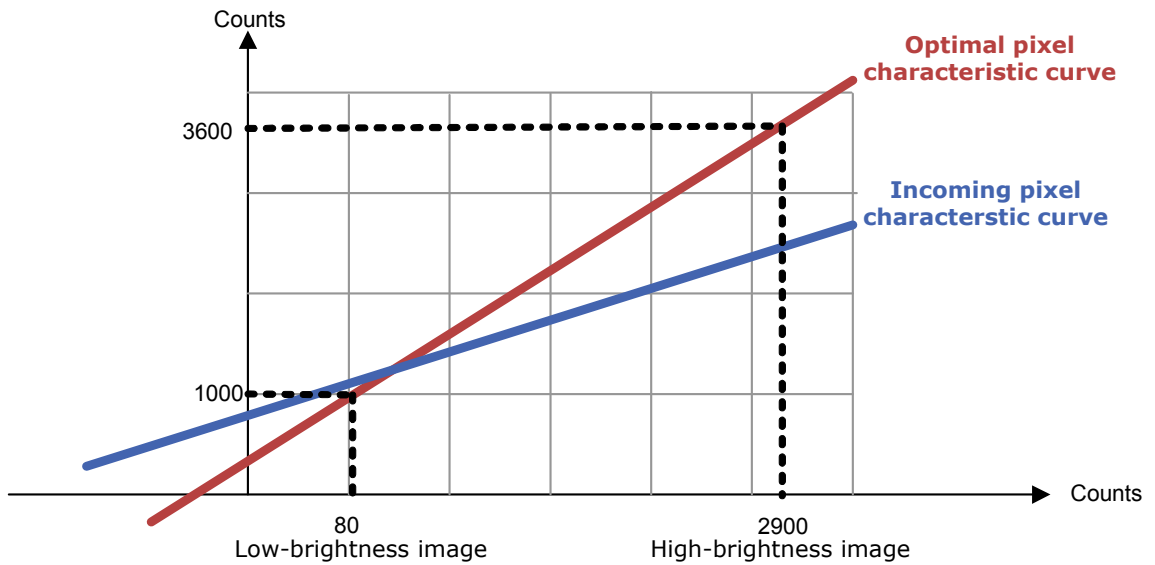
Figure 70: Pixel characteristic curves

In order to always guarantee the optimal correction, the gain/offset correction manages several correction data sets. If required, the gain/offset correction automatically selects the best data set.

A correction data record is built up as follows:
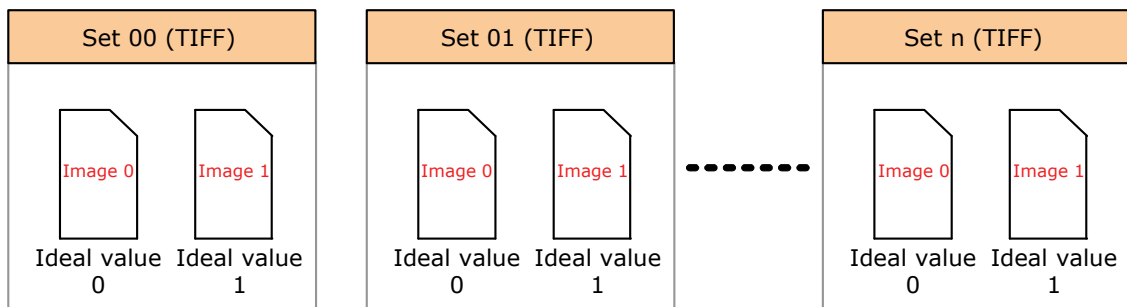
Figure 71: Example of correction data record
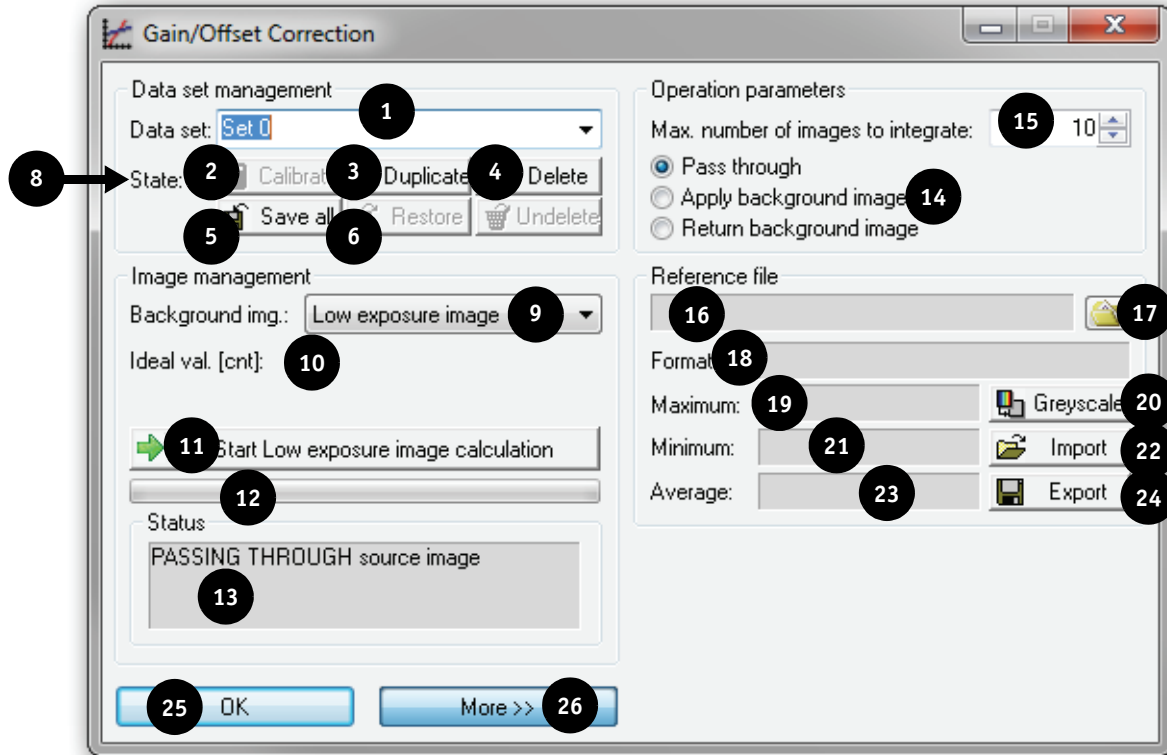
Figure 72: Gain/offset correction

Number	Element	Description
1	Data set	Correction image data set consists of a low-light and a high-light image (or a low-temperature and a high-temperature image).
2	Calibrate	Searches automatically for the best correction data set.
3	Duplicate	Duplicates the currently selected data set.
4	Delete	Marks the currently selected data set for deletion.
5	Save all	Saves all correction data set on hard disk.
6	Restore	Restores the previous data set from hard disk including ideal value.
7	Undelete	Deletes the data set delete mark.
8	State	Data set state: **M:** Modified: Data set has been modified **L:** Loaded: Data set was loaded from hard disk. **D:** Delete: Data set is marked for deletion.

Table 41: Gain/offset correction (description)

Number	Element	Description
9	Background image	Name of the background image.
		Low exposure image: Low-light (or low-temperature) image.
		High exposure image: High-light (or high-temperature) image.
10	Ideal val. [cnt]	Digital ideal value for the background image (refers to 12 bit).
11	Start low exposure image calculation	Starts the integration of the input data. Afterwards you have to start the image acquisition in the main application with **Start continuous snap**.
12	Progress bar	Indicates progress for the integration process.
13	Status	Module state
14	Type of correction operation	**Pass through:** The background correction is disabled and the original data is passed through. **Apply background image:** Activates the background correction. **Return background image:** The background image will be returned.
15	Max. number of images to integrate	Choose the maximal number of images to integrate.

Table 41: Gain/offset correction (description)

Selection of the temperature range and the color profile

Menu: **Image processing** → **Pseudo color**
or
Image processing toolbar: click

The displayed temperature range of the infrared camera can be spread arbitrarily in order to emphasize a specific temperature range.

Additionally, you can change the used color palette:
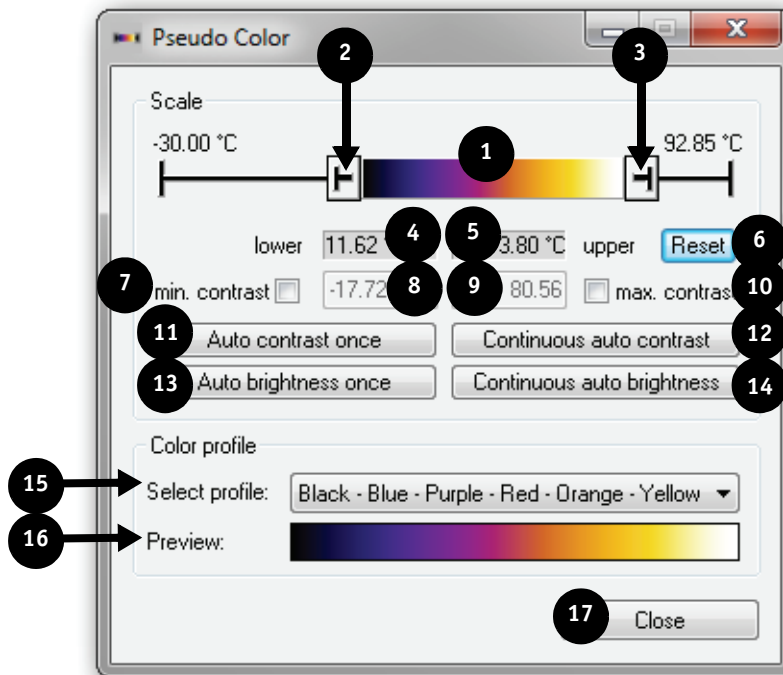
Figure 73: Pseudo color

Number	Element	Description
1		If you move the slider's body, the brightness of the image is changed. • Move the slider **left** to **increase** image brightness. • Move the slider **right** to **decrease** image brightness. The upper and the lower positions are changed simultaneously, but their distance remains constant.
2		Control for the slider's lower position

Table 42: Pseudo color (description)
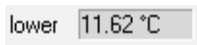
Number	Element	Description
3	⊣	Control for the slider's upper position
4	lower 11.62 °C	Numerical representation of the slider's lower position
5	73.80 °C upper	Numerical representation of the slider's upper position
6	Reset	Resets the slider setting.
7	min. contrast	Enable/disable **minimum contrast** value for auto adjustment.
8	Edit field min. contrast	**Minimum contrast value** for the image.
9	Edit field max. contrast	**Maximum contrast value** for the image.
10	max. contrast	**Maximum contrast value** for the image.
11	Auto contrast once	Adjusts the **contrast** to its optimal value by means of the incoming image data.
12	Continuous auto contrast	Adjusts the **contrast continuously** to its optimal value by means of the incoming image data.
13	Auto brightness once	Adjusts the **brightness** to its optimal value by means of the incoming image data.
14	Continuous auto brightness	Adjusts the **brightness continuously** to its optimal value by means of the incoming image data.
15	Select profile	Changes the current color profile.
16	Preview	Preview of the color profile
17	Close	Closes the dialog.

Table 42: Pseudo color (description)

Temperature scale display

Menu: Image processing → Temperature scale
or
Image processing toolbar: click

If required, the actual temperature scale can be displayed via the image process toolbar. The scale corresponds to the current pseudo color setting.
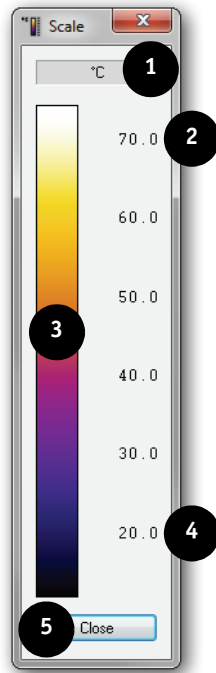
Figure 74: Temperature scale
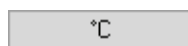
Number	Element	Description
1	°C	Actual unit of the temperature scale
2	70.0	Current displayable **maximum** temperature
3		Actual temperature profile
4	20.0	Current displayable **minimum** temperature
5	Close	Closes the dialog.

Table 43: Temperature scale (description)

Flip image

Menu: **Image processing → Flip image**
or
Image processing toolbar: click

Use the Flip module to mirror images from the camera.

In the **Flip Image** dialog you can flip the image:

* horizontally
* vertically
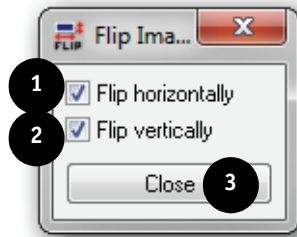
Figure 75: Flip image

Number	Element	Description
1	Flip horizontally	Flips the image horizontally.
2	Flip vertically	Flips the image vertically.
3	Close	Closes the dialog.

Table 44: Flip image (description)

Image rotation

Menu: **Image processing → Flip image**
or
Image processing toolbar: click

In the image processing toolbar click **Image Rotation**. In the **Image Rotation** dialog, you can rotate the image to an adjustable angle.
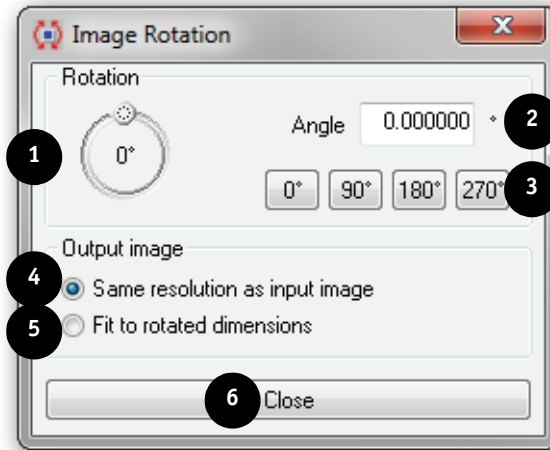
Figure 76: Image rotation

Number	Element	Description	Example image
1	Rotary knob	Rotary knob Adjusts the rotation angle.	
2	Angle	Set numerical value for angle manually.	
3	0°, 90°, 180°, 270°	Angle presets	
4	Same resolution as input image	The size of the resulting image is not changed. The image might be cropped.	
5	Fit to rotated dimensions	The resulting image size is adjusted, so that the complete image is always visible.	
6	Close	Closes the dialog.	

Table 45: Image rotation (description)

Recursive filter configuration

Menu: Image processing → Recursive filter
or
Image processing toolbar: click

Use this image processing module to apply an additional recursive filter to the incoming data.

image storage

$$P_{in_n}(x, y) \qquad + \qquad \times \frac{1}{\alpha} \qquad P_{out_n}(x, y)$$

$$\times \left(1 - \frac{1}{\alpha}\right)$$
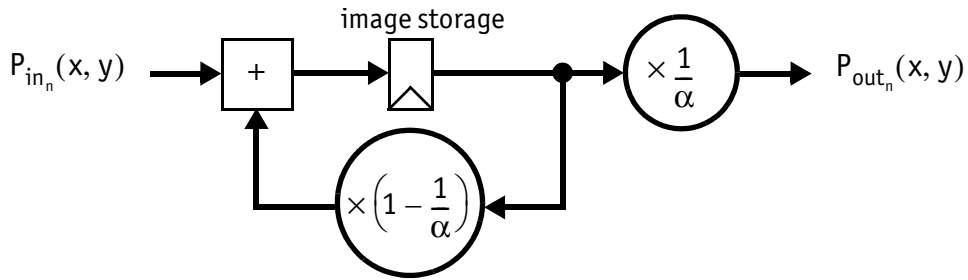
Figure 77: Principle of recursive filter

$$
\begin{aligned}
P_{out_n}(x, y) &= \frac{1}{\alpha} \sum_{i=0}^{n} P_{in_i}(x, y) \left(1 - \frac{1}{\alpha}\right)^{n-i} \\
&= \frac{1}{\alpha} \left(P_{in_n}(x, y) + (\alpha - 1)P_{out_{n-1}}(x, y)\right)
\end{aligned}
$$

$P_{out_n}(x, y)$:   Pixel in destination image at position (x, y) after $n + 1$ processed images
$P_{in_n}(x, y)$:   Pixel in source image at position (x, y) while processing image n
n: Index in image sequence
α: Filter depth

Formula 4: Recursive filter

Note   Buffer is reset when filter depth is changed
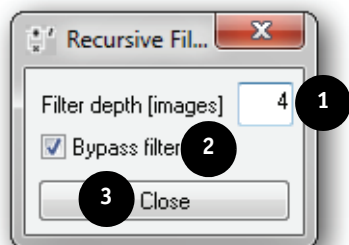
Figure 78: Recursive filter

Number	Element	Description
1		Filter depth (α)
2	Bypass filter	Bypasses the filter processing.
3	Close	Closes the dialog.

Table 46: Recursive filter (description)

Temperature display

Menu: Image processing → Temperature display
or
Image processing toolbar: click

AcquireControl analyzes up to five temperature measurement areas in the image simultaneously. A temperature measurement dialog can be shown with the image process toolbar.
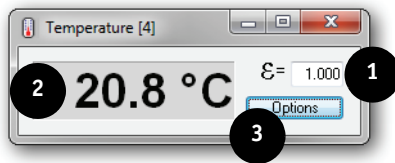
Figure 79: Temperature display

Number	Element	Description
1	ε= 1.000	Enter the emission value for the measurement window.
2	20.8 °C	Displays the average temperature value in the measurement window.
3	Options	Shows a menu with all options of this analyze group (see Chapter Options for an analyze group on page 66).

Table 47: Temperature display (description)

Pixel table

Menu: **Image processing → Pixel table**
or
Image processing toolbar: click

Use the pixel table for a detailed pixel analysis.
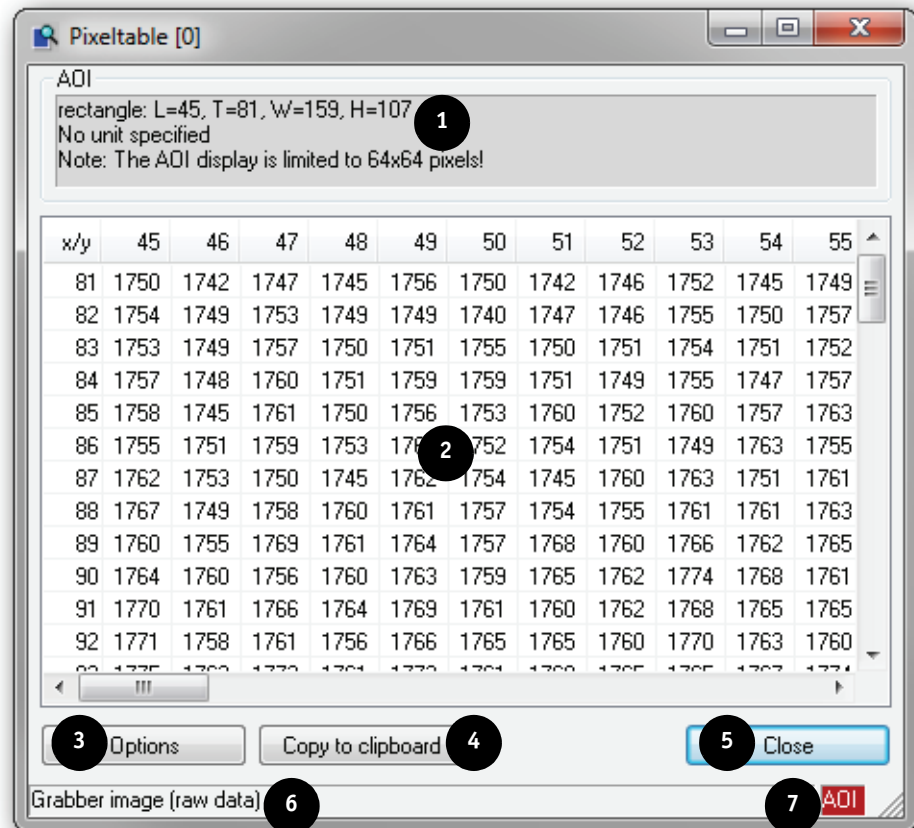
Figure 80: Pixel table

Number	Element	Description
1		Here the form and size of the used AOI is shown. Independent from the size of the AOI, the evaluation is limited to the maximum size of 64x64 pixels, in order not to reduce the execution speed too much.
2		Table with pixel data.
3	Options	Shows a menu with all options regarding this analyze group (see Chapter Options for an analyze group on page 66).
4	Copy to clipboard	Copies the table data to the windows clipboard.
5	Close	Closes the dialog.

Table 48: Pixel table (description)

Number	Element	Description
6	Status bar Grabber image (raw data)	The status bar has two panes: • Displays the source image for the pixel table. **Click this pane open the source image selection menu.**
7	AOI	• Shows if the pixel table is calculated within an AOI or over the whole image. **Click this pane to switch between AOI and full image calculation.**

Table 48: Pixel table (description)

Autosave

Menu: **Image processing → Autosave**
or
Image processing toolbar: click

Use the autosave module to automatically store every acquired image into a directory.

This is a simple sequence recording with the following output formats:

Output format	Description
AVI	Movie file containing all images
BMP	
PGM	Every image is stored separately.
RAW	
TIFF	Images are stored separately or within one single file.
VSQ	

Table 49: Output formats (description)
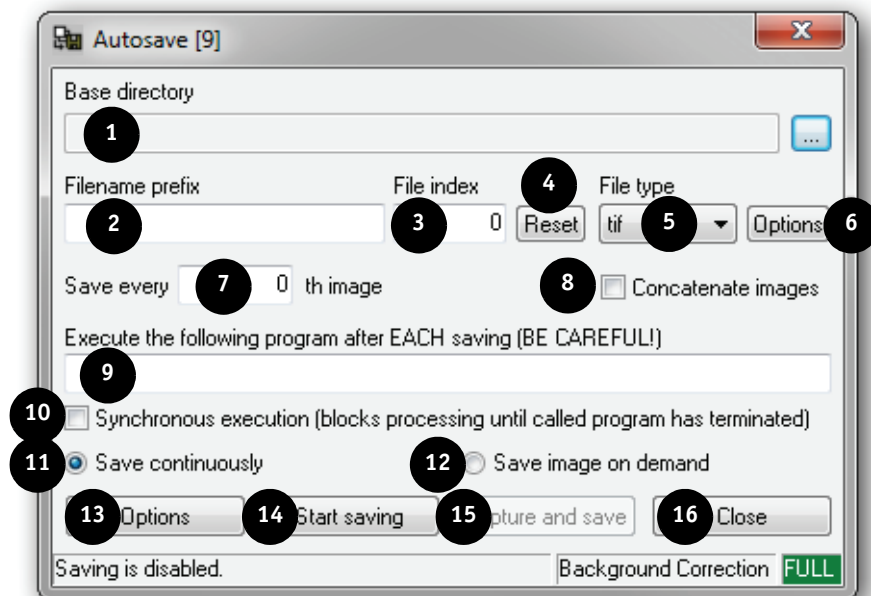
Figure 81: Autosave

Number	Element	Description
1	Base directory	Path for the files to be stored.
2	Filename prefix	Prefix of the filename.
3	File index	Starting index of the file number.
4	Reset	Reset the starting index for file numbering.
5	File type	File type (see Chapter File saving options on page 105)
6	Options	Adjusts additional settings for the chosen file type.
7	Save every … th image	Store only every n-th picture. Since the storage process requires more or less time in dependence of the image size, it is necessary to reduce the storing frequency to a reasonable value.
8	Concatenate images	Store all images into a single file as sub-images. This is only possible when using TIFF or RAW images.
9	Execute …	Executes a program after every storage.
10	Synchronous …	Executes the entered program synchronously. This means that the internal execution of the main application is stopped until the external program has finished.
11	Save continuously	Stores the images continuously.
12	Save image on demand	Stores an image only on mouse click.
13	Options	Shows a menu with all options of this analyze group (see Chapter Options for an analyze group on page 66).
14	Start saving	Start autosave process.
15	Capture and save	In the *Save image on demand* mode this button stores one image.
16	Close	Closes the dialog.
17	Status bar Saving is disabled.	The status bar contains three panes: Current status
18	Background Correction	Displays the source image for auto save. **Click on this pane to open the source image selection menu.**
19	FULL	Shows if the auto save module stores the full image or the content of an AOI only. **Click on this pane to switch between AOI and full image calculation.**

Table 50: Autosave (description)

File saving options

TIFF file saving options

For TIFF images (Tagged Image File Format): Choose bit depth options.
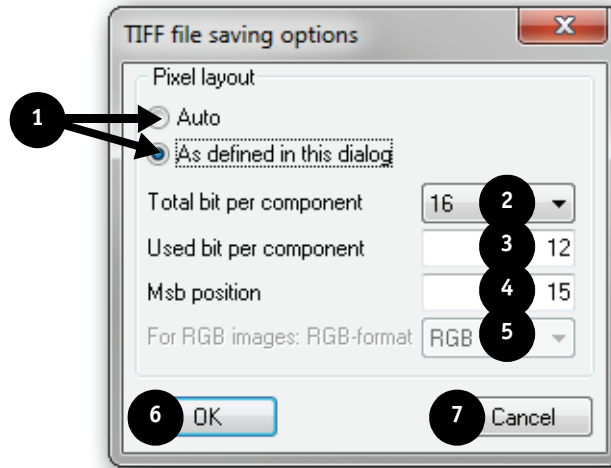
Figure 82: TIFF file saving options

Number	Element	Description
1	Auto or	Choose **Auto** for automatic output format.
	As defined in this dialog	Choose **As defined in this dialog** for manual selection of output format (see elements 2 … 5).
2	Total bits per component	Choose the total number of bits per component: 8, 16 or 32 bits.
3	Bits used per component	Choose the number of bits used per component.
4	MSB position	Choose the most significant bit position.
5	For RGB images	Choose the RGB format of the RGB triple.
6	OK	Confirms your adjustments and closes the dialog.
7	Cancel	Rejects your adjustments and closes the dialog.

Table 51: TIFF file saving options (description)

BMP file saving options

For bitmap images (BMP): Select an optional (lossless) compression.
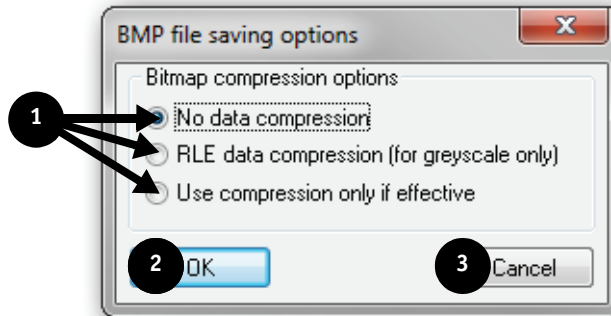
Figure 83: BMP file saving options

Number	Element	Description
1	Bitmap compression options	Select the compression for the bitmap format.
2	OK	Confirms your adjustments and closes the dialog.
3	Cancel	Rejects your adjustments and closes the dialog.

Table 52: BMP file saving options (description)

PGM file saving options

For PGM images (portable gray map): Select desired output format.

PGM is a proprietary image data format for greyscale images with 8 bits per pixel.
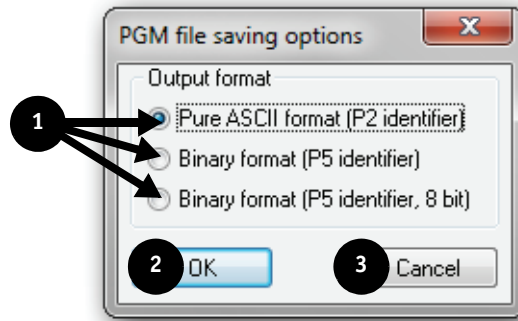
Figure 84: PGM file saving options

Number	Element	Description
1	Output format	Select the output format for PGM files. • Pure ASCII format: results in very large image files • Binary format (P5 identifier): The PGM file is saved as 16-bit data, big endian. Check if your application can read this format. If not: use 8-bit format. • Binary format (P5 identifier, 8 bit): forces 8-bit file format to avoid problems concerning endianness.
2	OK	Confirms your adjustments and closes the dialog.
3	Cancel	Rejects your adjustments and closes the dialog.

Table 53: PGM file saving options (description)

RAW file saving options

For RAW images: Select RAW file options.

RAW image files contain the pure image data only.
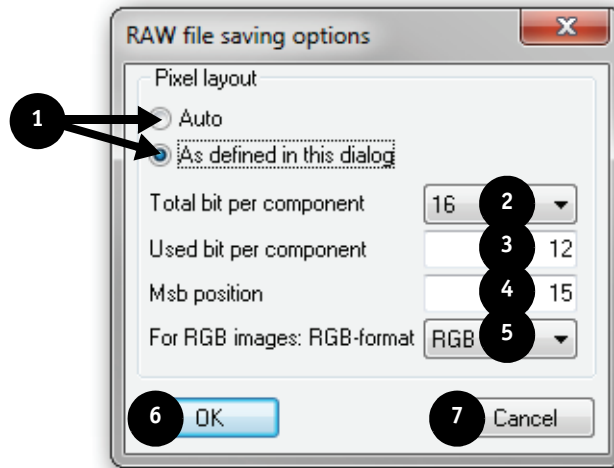
Figure 85: RAW file saving options

Number	Element	Description
1	Auto or As defined in this dialog	Choose **Auto** for automatic output format. Choose **As defined in this dialog** for manual selection of output format (see elements 2 … 5).
2	Total bits per component	Choose the total number of bits per component.
3	Bits used per component	Choose the number of bits used per component.
4	MSB position	Choose the most significant bit position.
5	For RGB images	Choose the RGB format: The following formats are possible: • RGB, XRGB, RXGB, RGXB, RGBX • BGR, XBGR, BXGR, BGXR, BGRX • GRB, XGRB, GXRB, GRXB, GRBX • GBR, XGBR, GXBR, GBXR, GBRX • RBG, XRBG, RXBG, RBXG, RBGX • BRG, XBRG, BXRG, BRXG, BRGX
6	OK	Confirms your adjustments and closes the dialog.
7	Cancel	Rejects your adjustments and closes the dialog.

Table 54: RAW file saving options (description)

AVI file saving options

For AVI files: Set parameters regarding the codec and output quality.
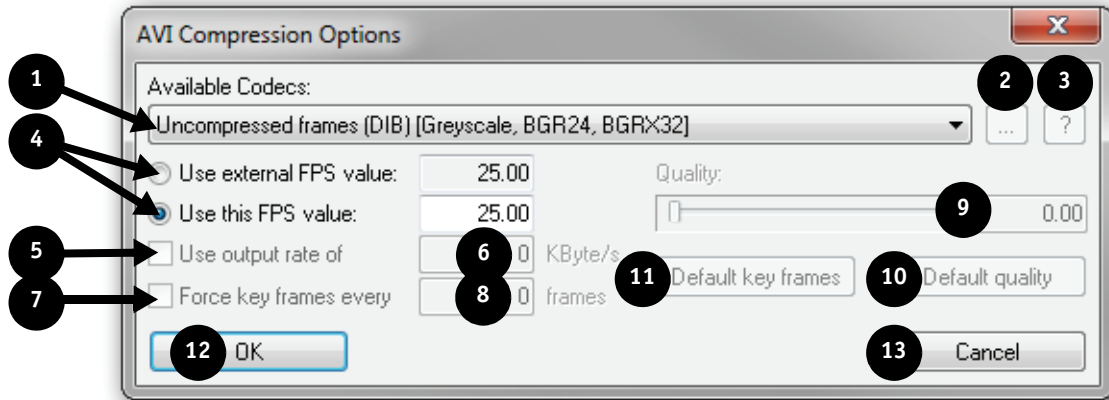
Figure 86: AVI file saving options

Number	Element	Description
1	Available Codecs	Select the AVI codec.
		The number of the codecs can vary depending on the system. The image formats supported by the codec are listed in square brackets.
2	… button	In dependence of the selected codec: Adjusts some fine tuning parameters.
3	? button	Displays information about the selected codec.
4		Adjusts the playback speed of the AVI:
	Use external FPS value or	As display speed, the original speed from the database is used. This is for example necessary, if the AVI should be post-processed with some other video software and the original time code is needed.
	Use this FPS value	The playback speed is adjusted manually.
5	Use output rate of	Adjusts the maximum data rate fort he AVI video.
6		Data rate in kByte/s
7	Force key frames every	Some compressors allow changing the interval of storing a key image in the video. A key image is compressed in the video as full frame. The following images are only stored as the difference to this key image. By using a sensible value here (depending on the codec used), the data file size can be reduced. However, the search speed within the video is reduced with raising key frame intervals.
8		Key frame rate

Table 55: AVI file saving options (description)

Number	Element	Description
9	Quality	If this slider is active, the quality of the video can be modified.
10	Default quality	Set the quality slider to its default value.
11	Default key frames	Set the key frame value to its default value.
12	OK	Confirms your adjustments and closes the dialog.
13	Cancel	Rejects your adjustments and closes the dialog.

Table 55: AVI file saving options (description)

Note   Not all installed compressors in the system may support the selected image format. If the selected compressor is unsuitable, an error message is indicated.

VSQ file saving options

VSQ is an old image format similar to TIFF: Use TIFF or AVI format instead.
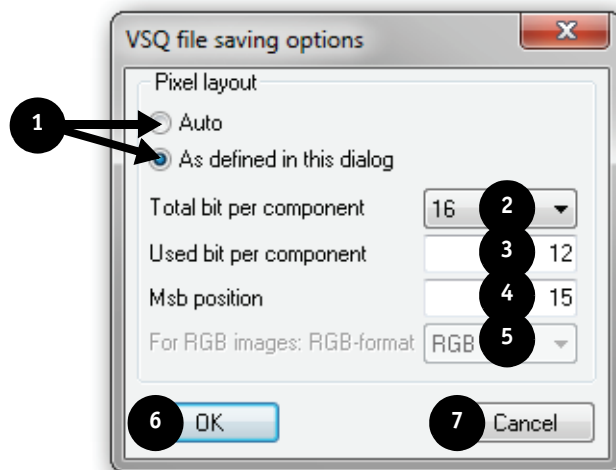
Figure 87: VSQ file saving options

Number	Element	Description
1	Auto or As defined in this dialog	Choose **Auto** for automatic output format. Choose **As defined in this dialog** for manual selection of output format (see elements 2 … 5).
2	Total bits per component	Choose the total number of bits per component: 8, 16 or 32 bits.

Table 56: VSQ file saving options (description)

Number	Element	Description
3	Bits used per component	Choose the number of bits used per component.
4	MSB position	Choose the most significant bit position.
5	For RGB images	Choose the RGB format of the RGB triple.
6	OK	Confirms your adjustments and closes the dialog.
7	Cancel	Rejects your adjustments and closes the dialog.

Table 56: VSQ file saving options (description)

AOI configuration

If an AOI for an analyze group is displayed, right-click the drawing area to show the corresponding group menu.
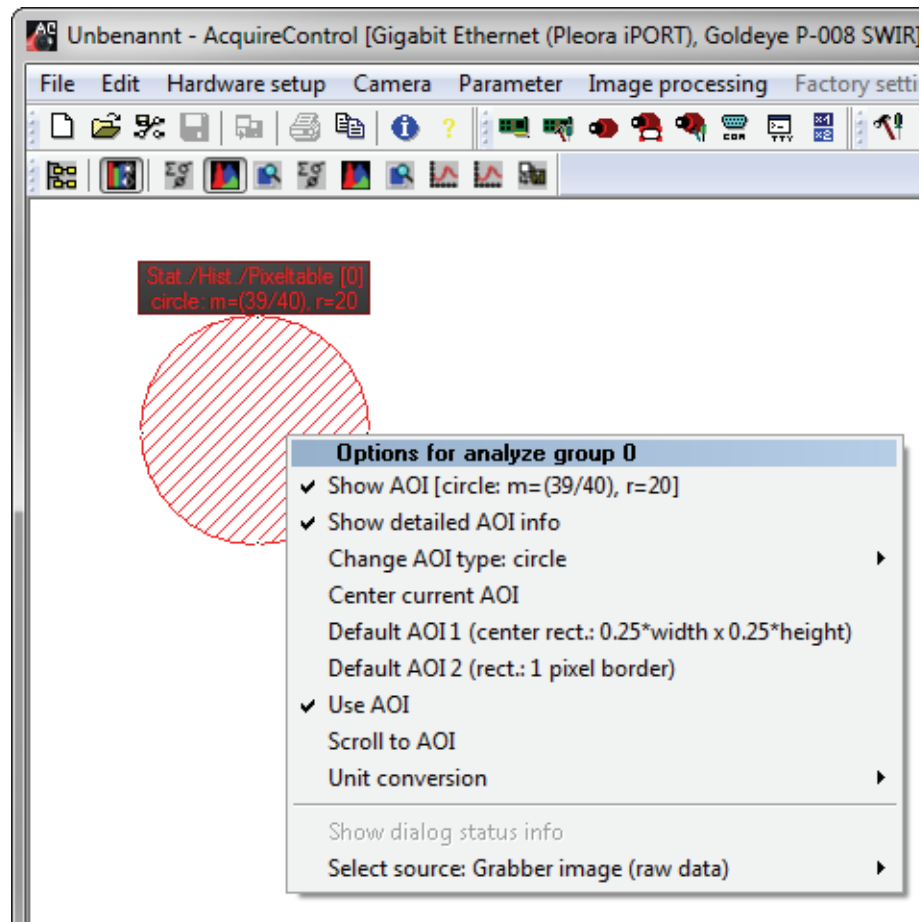
Figure 88: AOI configuration

Logging

Menu: **Parameter → Modify logging settings** or

Parameter toolbar: Click

Use logging, for example, in order to determine statistical data over a longer period and afterwards to process the data in a spreadsheet.
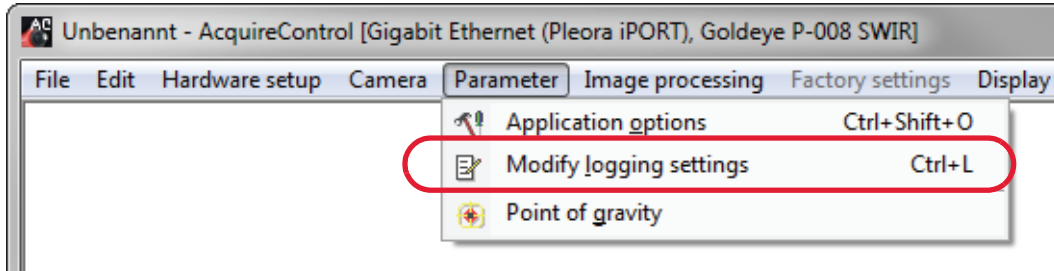
Figure 89: Modify logging settings
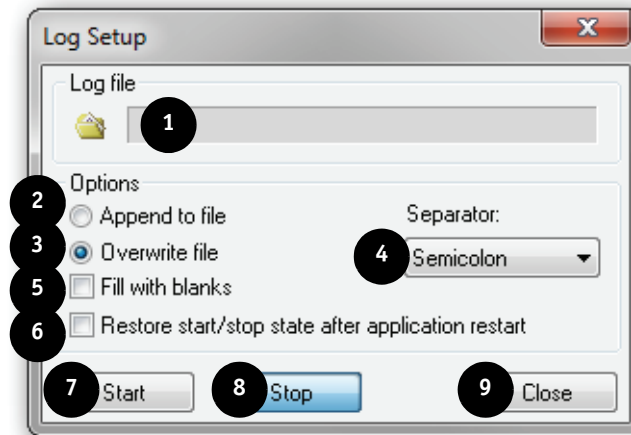
Figure 90: Log setup

Number	Element	Description
1		Set the path to the log file.
2	Append to file	Appends the log to the end of an existing file. If the file does not exist, it will be created.
3	Overwrite file	Overwrites an existing file. If the file does not exist, the file is created.

Table 57: Log setup

Number	Element	Description
4	Separator	Set the separator character for the columns in the log file. • Tabulator • Semicolon (;) • Pipe (|)
5	Fill with blanks	Fills the lines with blanks.
6	Restore start/ stop …	Restores the start or stop state after a restart of the application
7	Start	Starts the logging.
8	Stop	Stops the logging.
9	Close	Closes the dialog.

Table 57: Log setup

The logging can be enabled for the data of miscellaneous analysis modules. For every analysis module, the logging must be enabled separately (see Chapter Options for an analyze group on page 66).

After every logging start some general parameters are written, like:
- Name of the application
- Used frame grabber
- Used camera
- Used image process chain
- AOI parameter
- Source image for the analysis module

Currently the following modules are supported:

Analysis module	Logging data
Statistic	• Image number • Time stamp • Minimum • Maximum • Average value • Standard deviation • Number of evaluated pixels

Table 58: Supported modules for logging

Image point of gravity

Menu: **Parameter → Point of gravity**

Displays the point of gravity of a greyscale image or an AOI.
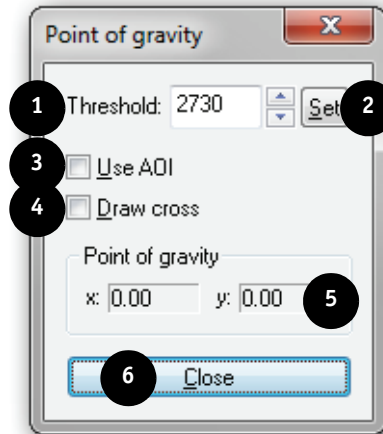
Figure 91: Point of gravity

Number	Element	Description
1	Threshold	Only pixel values above this value are included in the calculation.
2	Set	Sets the current value.
3	Use AOI	If this option is activated, only the AOI is used for the calculation.
4	Draw cross	Draws a coordinate cross hair on the calculated point of gravity.
5	Point of gravity	Point of gravity coordinates.
6	Close	Closes the dialog.

Table 59: Point of gravity (description)

Application options

All program parameters will be configured with the menu **Parameter →
Application options** or the corresponding icon on the **Parameter Toolbar**.
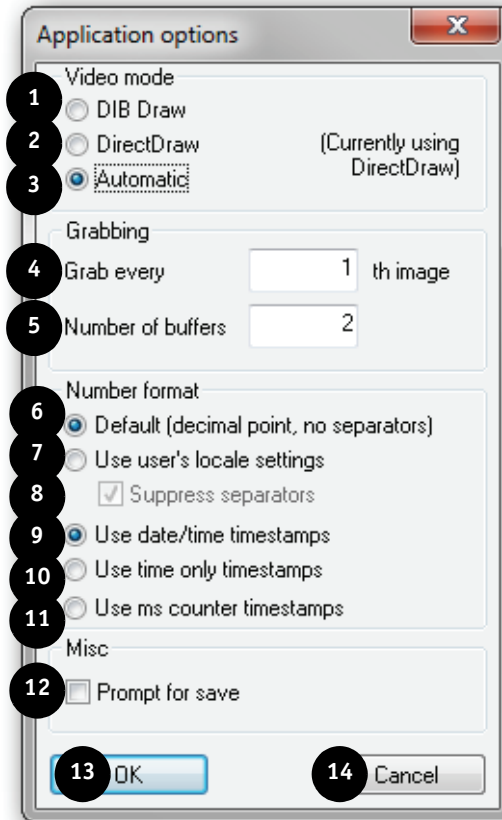
Figure 92: Application options

Number	Element	Description
1	DIB Draw	This drawing method can be chosen if there is no DirectX installation on the PC or if any display problems occur while using DirectX. Here only standard Windows GDI procedures are used.
2	DirectDraw	Here only DirectX functions are used to draw an image which results in a flicker-free and faster drawing.

Table 60: Application options (description)

Number	Element	Description
3	Automatic	(Recommended) This mode tries to give preference to the use of a DirectX display and only changes to DIB Draw in case of missing of the DirectX support. At a repeated opening of the dialog, the automatically determined mode is indicated.
4	Grab every … image	Grabs only every n-th image.
5	Number of buffers	Number of the image storages to be used. We recommended to adjust this value to 2. If you have speed problems, try different values.
6-11	Number format	Use this settings to change the way number formats are used by the application.
12	Prompt for save	Enables or disables the request to save a changed document.
13	OK	Confirms the selection and closes the dialog.
14	Cancel	Closes the dialog without applying any changes.

Table 60: Application options (description)

Miscellaneous

Closing the camera and frame grabber

To close a camera and to initialize the application:

Click **File → New**

This is also necessary if an image is loaded and a new image acquisition should be started afterwards.
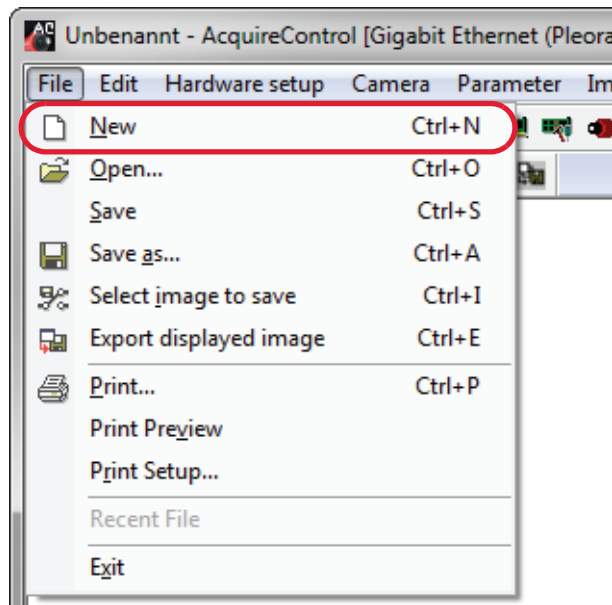
Figure 93: Close camera/initialize application

Help
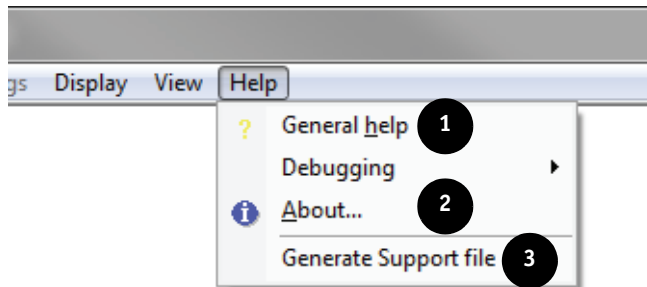
Figure 94: Help
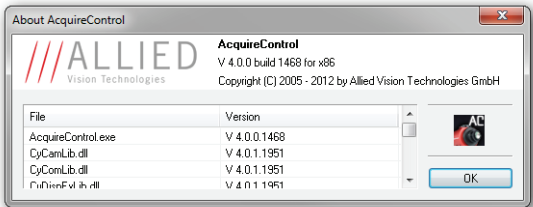
Number	Element	Description
1	General help	Opens this help file
2	About...	Displays information about AcquireControl application.
3	Generate Support file	Generates support file. If you have any problems with this application: Click Generate Support file to generate a file for the AVT support. Send this file to support@alliedvisiontec.com

Table 61: Help

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