AcquireControl Software

User manual
Version 3.5.2

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Technical details are subject to change

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VDS Vosskühler

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1 Quickstart

☑ **Connect camera to PC and switch on camera.**

☑ **Insert AcquireControl CD and start setup program.**

setup.exe

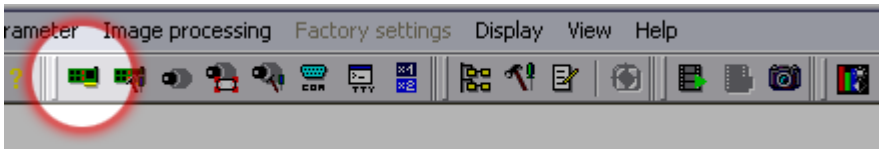
☑ **Install grabber driver from grabber subdirectory of AcquireControl CD:**

IEEE1394	Pleora GigE	Matrix Vision
IEEE1394 DriverInstaller	DriverTool.exe	install.bat

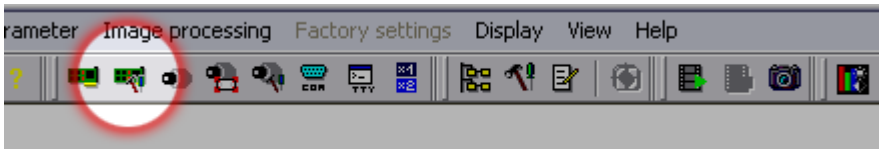
☑ **Start AcquireControl program!**

AcquireControl

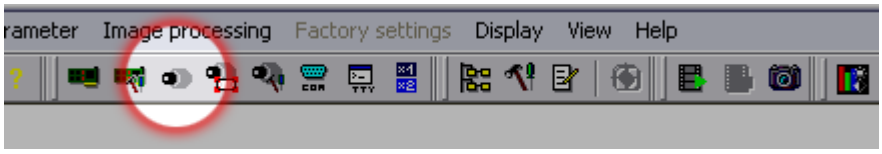
☑ **Select grabber:**



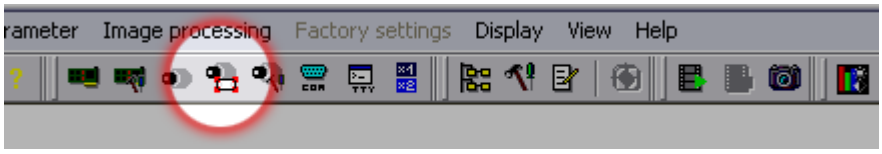
☑ **With GigE cameras → Select filter driver and IP address:**



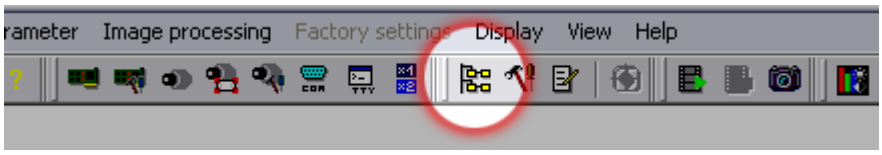
☑ **Select camera type:**



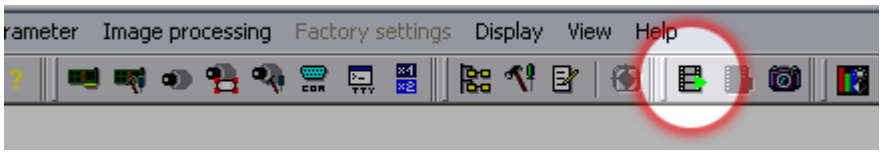
☑ **Select camera resolution:**



Select camera image processing chain:

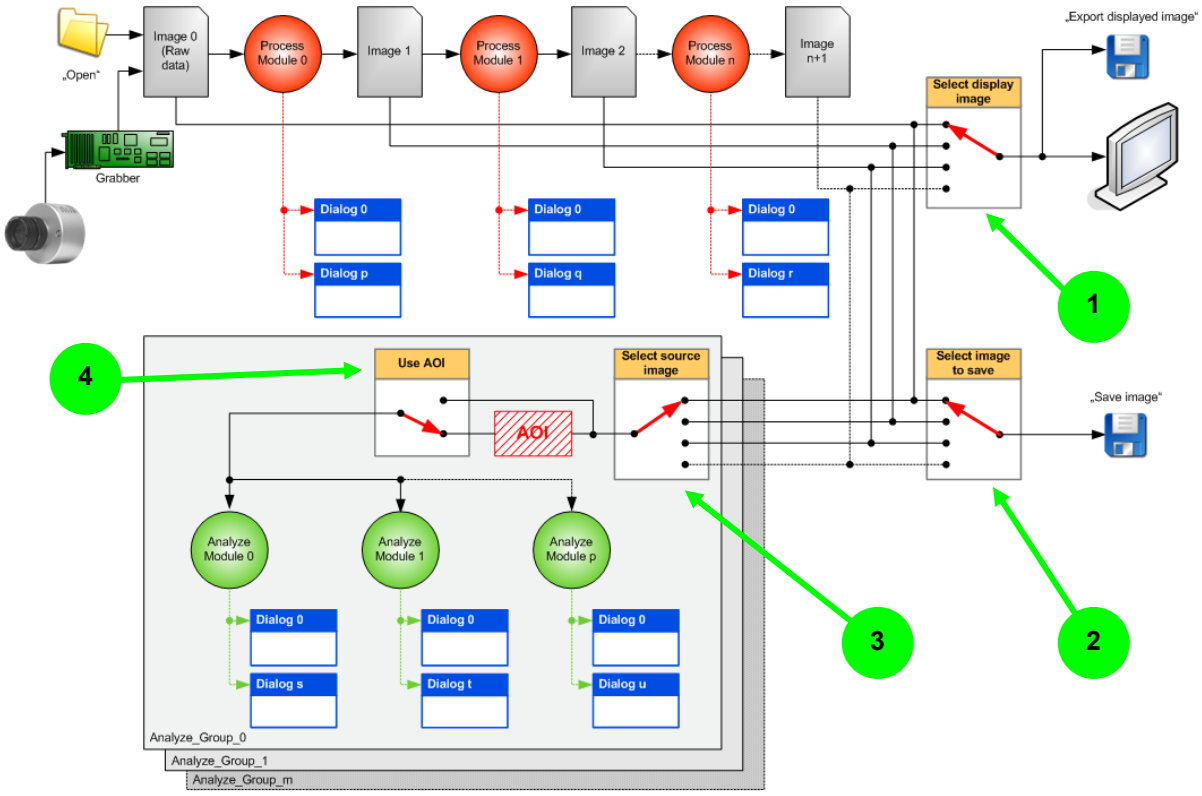


Start image acquisition:



2 Software Concept

The AcquireControl software is used to control a VDS Vosskühler digital camera in connection with a framegrabber, an IEEE1394 or a GigE interface. A single instance of the application can work with a single camera only.
The software is structured chain-like and offers miscellaneous possibilities of interaction for the user. The following diagram shows the structure of such a image processing chain. distinguishes in this case fundamentally between image processing modules („Process Module“) and analysis modules („Analyse Module“).



Every image processing module requires an input image and delivers a modified image at its output.

Image processing modules are:
- Color interpolation: Transformation from RGB-CFA data to RGB data.
- LUT: **L**ook **U**p **T**able for adjustment of brightness, contrast and gamma of the image.
- Background correction
- Recursive fiter
- Pseudo color LUT: Conversion of grey data to RGB data (e.g. for visualization of temperature data)

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

Analysis modules are:
- Histogram
- Statistics
- Pixel table
- Temperature display

In the AcquireControl software 6 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**.	• Greyscale LUT
Pseudo color for greyscale data	This image processing chain is used for **greyscale cameras** or **loaded greyscale images**. Additionally a pseudo color LUT im used here.	• Pseudo Color LUT
RGB-CFA data	This chain is used for **Bayer Mosaic Filter cameras** of corresponding **loaded CFA images**.	• Bilinear Interpolation • Color LUT
RGB-CFA data (CCD-4100)	With this image processing chain CFA images from the **CCD-4100** can be displayed.	• Pixelsorter • Bilinear Interpolation • Color LUT
RGB data	With this chain **loaded RGB images** can be displayed.	• Color LUT
Data from NIR-xxx(P)CL/GE	With this image processing chain images of the **NIR-300** and **NIR-600** camera series can be displayed.	• Background Correction • Recursive Filter • Pseudo Color LUT
Data from XR cameras	With this chain images from **X-Ray cameras** can be displayed.	• Flip Image • Background Correction • Recursive Filter • Greyscale LUT
IRC-300CL/GE Temperature data [-30°C…+92.85°C]	This chain is used for **infrared cameras** with the given temperature range.	• Background Correction • Recursive Filter • Pseudo Color LUT
IRC-300CL/GE Temperature data [0°C…+204.75°C]	This chain is used for **infrared cameras** with the given temperature range.	• Background Correction • Recursive Filter • Pseudo Color LUT
IRC-300CL/GE Temperature data [0°C…+327°C]	This chain is used for **infrared cameras** with the given temperature range.	• Background Correction • Recursive Filter • Pseudo Color LUT
IRC-300CL/GE with aperture f/1.7 Temperature data [-55°C…+506°C]	This chain is used for **infrared cameras** with the given temperature range.	• Background Correction • Recursive Filter • Pseudo Color LUT
IRC-300CL/GE Temperature data [-50°C…+523.30°C]	This chain is used for **infrared cameras** with the given temperature range.	• Background Correction • Recursive Filter • Pseudo Color LUT

The adjustment is done via the “Parameter toolbar” or via the menu item “Parameter → Select image processing chain“.

The display, storage and analysis can be applied to the final image or an interim image. The adjustment is done via software switches, which are described in the following chapters.

2.1 Display switch (Switch 1)

For the display on the moitor can according to the image processing chain different interim images be chosen via the display switch (*see also chapter 3.3.3 Selection of the displayed image*).

Name of the image processing chain	Available processing modules	Options for switch ***„Select display image“***
Greyscale data	• Greyscale LUT	• Grabber Image (raw data) • Greyscale LUT
Pseudo color for greyscale data	• Pseudo Color LUT	• Grabber Image (raw data) • Pseudo Color
RGB-CFA data	• Bilinear Interpolation • Color LUT	• Grabber Image (raw data) • Bilinear Interpolation

		• Color LUT
RGB-CFA data (CCD-4100)	• Pixelsorter • Bilinear Interpolation • Color LUT	• Grabber Image (raw data) • Bilinear interpolation • Color LUT
RGB data	• Color LUT	• Grabber Image (raw data) • Color LUT
Data from NIR-xxx(P)CL/GE	• Background Correction • Recursive Filter • Pseudo Color LUT	• Prezoomed Data • Background Correction • Recursive Filter • Pseudo Color
Data from XR cameras	• Flip Image • Background Correction • Recursive Filter • Greyscale LUT	• Grabber Image (raw data) • Flip image • Background Correction • Recursive Filter • Greyscale LUT
IRC-300CL/GE Temperature data [-30°C…+92.85°C]	• Background Correction • Recursive Filter • Pseudo Color LUT	• Grabber Image (raw data) • Background Correction • Recursive Filter • Pseudo Color LUT
IRC-300CL/GE Temperature data [0°C…+204.75°C]	• Background Correction • Recursive Filter • Pseudo Color LUT	• Grabber Image (raw data) • Background Correction • Recursive Filter • Pseudo Color LUT
IRC-300CL/GE Temperature data [0°C…+327°C]	• Background Correction • Recursive Filter • Pseudo Color LUT	• Grabber Image (raw data) • Background Correction • Recursive Filter • Pseudo Color LUT
IRC-300CL/GE with aperture f/1.7 Temperature data [-55°C…+506°C]	• Background Correction • Recursive Filter • Pseudo Color LUT	• Grabber Image (raw data) • Background Correction • Recursive Filter • Pseudo Color LUT
IRC-300CL/GE Temperature data [-50°C…+523.30°C]	• Background Correction • Recursive Filter • Pseudo Color LUT	• Grabber Image (raw data) • Background Correction • Recursive Filter • Pseudo Color LUT

Via the menu item “Display → Select display image“ the displayed image can be chosen.

2.2 Storage switch (Switch 2)

During image storage the final image (as RGB data) or miscellaneous interim images can be chosen, depending on the used image processing chain (*see also chapter 3.3.6 Saving images*). 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.

Name of the image processing chain	Available processing modules	Options for switch ***„Select image to save“***
Greyscale data	• Graustufen LUT	• Grabber Image (raw data) • Greyscale LUT
Pseudo color for greyscale data	• Pseudocolor LUT	• Grabber Image (raw data) • Pseudo Color
RGB-CFA data	• Bilineare Interpolation • Color LUT	• Grabber Image (raw data) • Bilinear Interpolation • Color LUT
RGB-CFA data (CCD-4100)	• Pixelsorter • Bilineare Interpolation • Color LUT	• Grabber Image (raw data) • Bilinear Interpolation • Color LUT
RGB data	• Color LUT	• Grabber Image (raw data) • Color LUT
Data from NIR-xxx(P)CL/GE	• Background Correction	• Prezoomed data

	• Recursive Filter • Pseudocolor LUT	• Background Correction • Recursive Filter • Pseudo Color
Data from XR cameras	• Flip Image • Background Correction • Recursive Filter • Greyscale LUT	• Grabber Image (raw data) • Flip image • Background Correction • Recursive Filter • Greyscale LUT
IRC-300CL/GE Temperature data [-30°C…+92.85°C]	• Background Correction • Recursive Filter • Pseudo Color LUT	• Grabber Image (raw data) • Background Correction • Recursive Filter • Pseudo Color LUT
IRC-300CL/GE Temperature data [0°C…+204.75°C]	• Background Correction • Recursive Filter • Pseudo Color LUT	• Grabber Image (raw data) • Background Correction • Recursive Filter • Pseudo Color LUT
IRC-300CL/GE Temperature data [0°C…+327°C]	• Background Correction • Recursive Filter • Pseudo Color LUT	• Grabber Image (raw data) • Background Correction • Recursive Filter • Pseudo Color LUT
IRC-300CL/GE with aperture f/1.7 Temperature data [-55°C…+506°C]	• Background Correction • Recursive Filter • Pseudo Color LUT	• Grabber Image (raw data) • Background Correction • Recursive Filter • Pseudo Color LUT
IRC-300CL/GE Temperature data [-50°C…+523.30°C]	• Background Correction • Recursive Filter • Pseudo Color LUT	• Grabber Image (raw data) • Background Correction • Recursive Filter • Pseudo Color LUT

The image to be saved is selected via the menu item “File → Select image to save“.

2.3 Image analysis and postprocessing (Switch 3 / Switch 4)

The software disposes of diverse image analysis methods, which can work as well on the entire image as also on sections (AOI, **A**rea **O**f **I**nterest), like rectangles, circles and rings. (*see also chapter 3.4.12 Flip image*)

Actually, the following modules are implemented:

- Histogram
- Image statistics
- Row & column statistics
- Pixel table
- Temperature display

2.3.1 Histogram and statistics

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.

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

For these two analysis modules the final image or an interim image result can be selected (*see also chapter 3.4.1 Options for an analyze group*).

Name of the image processing chain	Available processing modules	Options for switch *„Select source“*
Greyscale data	• Graustufen LUT	• Grabber image (raw data) • Greyscale LUT
Pseudo color for greyscale data	• Pseudocolor LUT	• Grabber image (raw data) • Pseudocolor
RGB-CFA data	• Bilineare Interpolation • Color LUT	• Grabber image (raw data) • Bilinear interpolation • Color LUT
RGB-CFA data (CCD-4100)	• Pixelsorter • Bilineare Interpolation • Color LUT	• Grabber image (raw data) • Bilinear interpolation • Color LUT
RGB data	• Color LUT	• Grabber image (raw data) • Color LUT
Data from NIR-xxx(P)CL/GE	• Background Correction • Recursive Filter • Pseudocolor LUT	• Prezoomed data • Background correction • Recursive Filter • Pseudocolor LUT
Data from XR cameras	• Flip Image • Background Correction • Recursive Filter • Greyscale LUT	• Grabber Image (raw data) • Flip image • Background Correction • Recursive Filter • Greyscale LUT
IRC-300CL/GE Temperature data [-30°C…+92.85°C]	• Background Correction • Recursive Filter • Pseudo Color LUT	• Grabber Image (raw data) • Background Correction • Recursive Filter
IRC-300CL/GE Temperature data [0°C…+204.75°C]	• Background Correction • Recursive Filter • Pseudo Color LUT	• Grabber Image (raw data) • Background Correction • Recursive Filter
IRC-300CL/GE Temperature data [0°C…+327°C]	• Background Correction • Recursive Filter • Pseudo Color LUT	• Grabber Image (raw data) • Background Correction • Recursive Filter
IRC-300CL/GE with aperture f/1.7 Temperature data [-55°C…+506°C]	• Background Correction • Recursive Filter • Pseudo Color LUT	• Grabber Image (raw data) • Background Correction • Recursive Filter
IRC-300CL/GE Temperature data [-50°C…+523.30°C]	• Background Correction • Recursive Filter • Pseudo Color LUT	• Grabber Image (raw data) • Background Correction • Recursive Filter

2.3.2 Temperature display

The AcquireControl software can handle up to five different temperature measurement windows. For every measurement window the emission factor can be adjusted. The average temperature level within the measurement window.
The source image for the temperature data is as a rule 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.

2.3.3 Pixeltable

For a detailed pixel analysis of an RGB image the pixel table dialog is available. This analysis module is only available after loading an RGB image and is called with the “Pixel table” button on the „Image Processing Toolbar“.

2.4 Image data storage

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

2.5 Image acquisition devices

AcquireControl is able to work with miscellaneous framegrabbers. Due to the development of an universal-framegrabber-interface also an extension to future grabbers is no problem. Actually, cameras or rather grabbers are supported with the following interfaces:

- GigE
- IEEE1394
- Camera Link
- RS644 / LVDS

The software works with nearly all VDS Vosskühler cameras from 1 Megapixels up to actually 16 Megapixels. Due to the universal-framegrabber-interface adaptations to new cameras can be implemented with minimal expenditure.
The image acquisition always works with unmodified camera raw data. These data are the basis for later postprocessings.

2.6 System Requirements

PC / Notebook:

- Microsoft® Windows 2000, Microsoft® Windows XP or Microsoft® Windows Vista
- Intel® Pentium® III 700MHz (Intel® Pentium® 4 1GHz recommended)
- 512MB RAM (1024MB recommended)
- 20MB available hard disk space for installation
- Hard disk space for sequence record according to each image size & format
- Microsoft® DirectX 7 compatible graphic card 64MB (128MB recommended)
- CD- / DVD-drive

Camera:

- VDS Vosskühler digital camera, monochrome or color, with IEEE1394, RS644, Camera Link or GigE interface

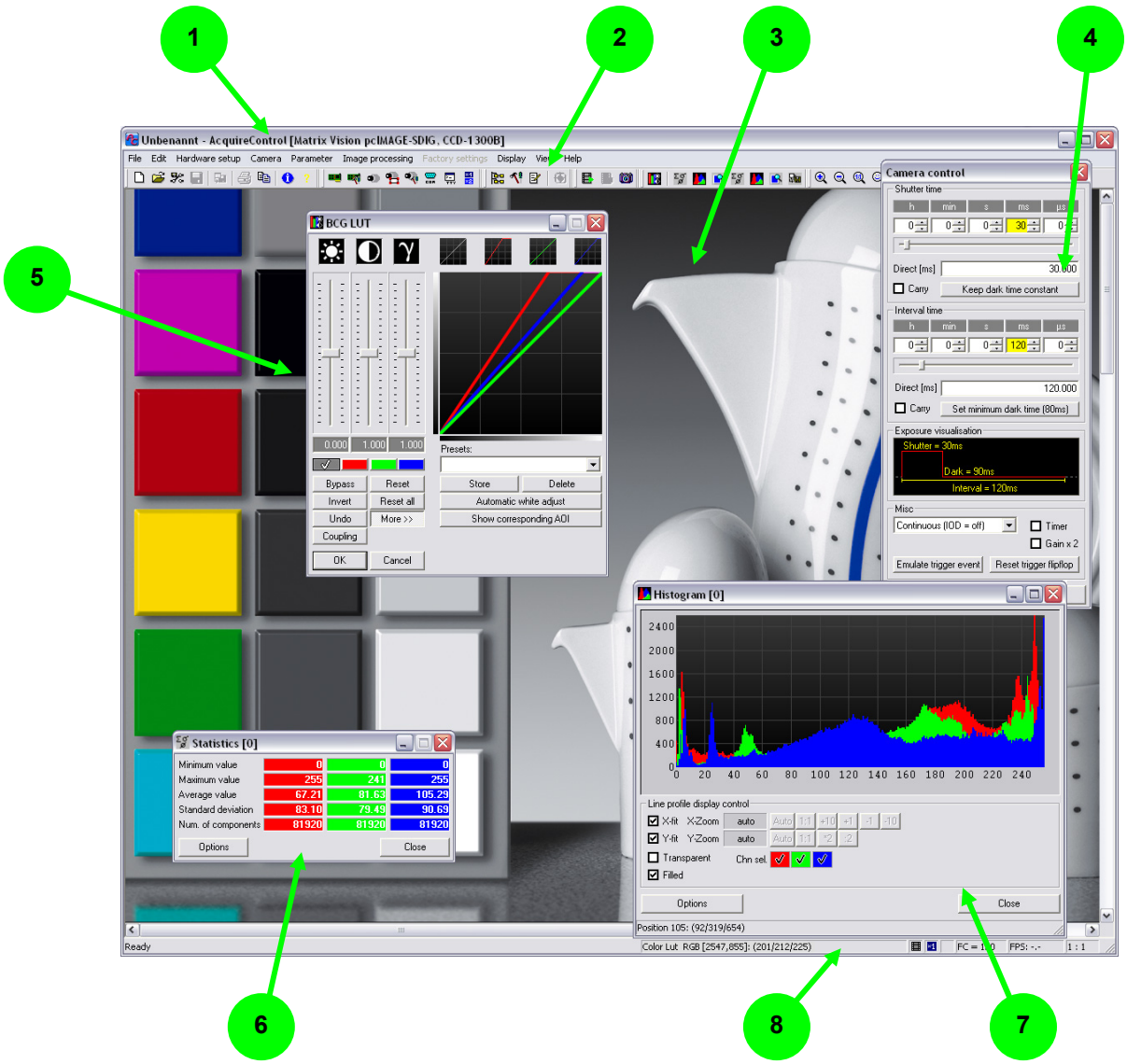
Framegrabber:

- Gigabit Ethernet Port
- IEEE1394a card, OHCI compatible (TI chip set 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)

3 Operation of the software

3.1 Program surface

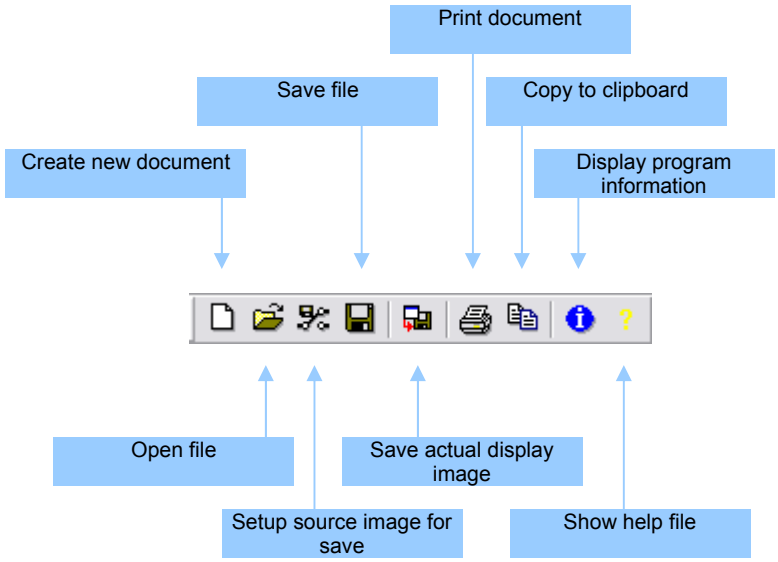
The following overview image shows the typical AcquireControl user interface with some main dialogs.



1	**Main window**
2	**Program toolbars**
3	**Document window**
4	**Camera control dialog:** Is used for the control of diverse camera parameters.
5	**LUT dialog:** Is used for the adjustment of color balance and white adjustment.
6	**Statistics dialog:** Display of statistical image data.
7	**Histogram Dialog:** Display of a histogram.
8	**Status bar**

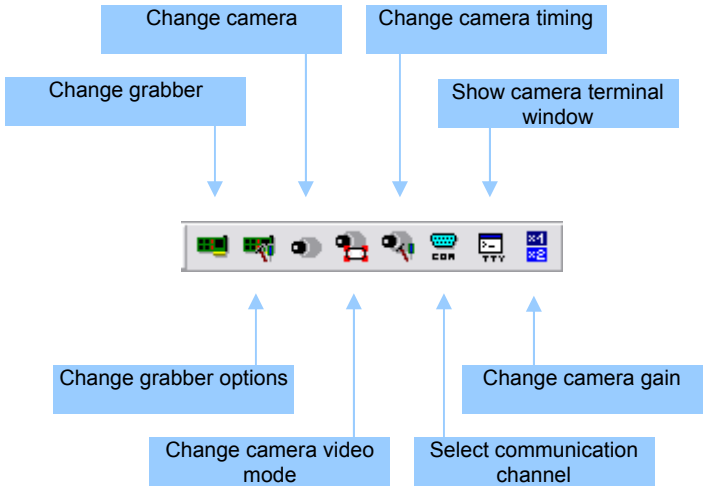
Following all symbols of the toolbar and the status bar are explained:

Main Toolbar

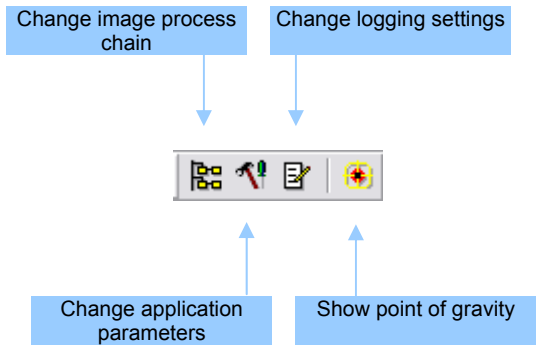


Note: If a new document is cereated, the old document will be closed and it's camera connection will be dis-connected.

Hardware Setup Toolbar



Parameter Toolbar



Camera Control Toolbar

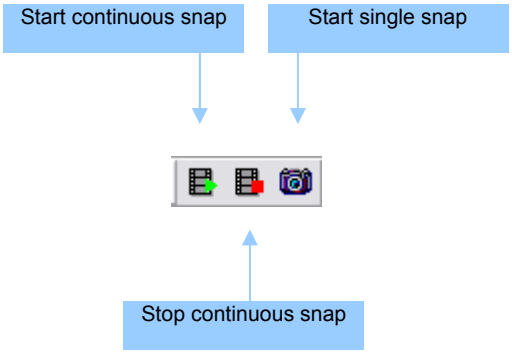
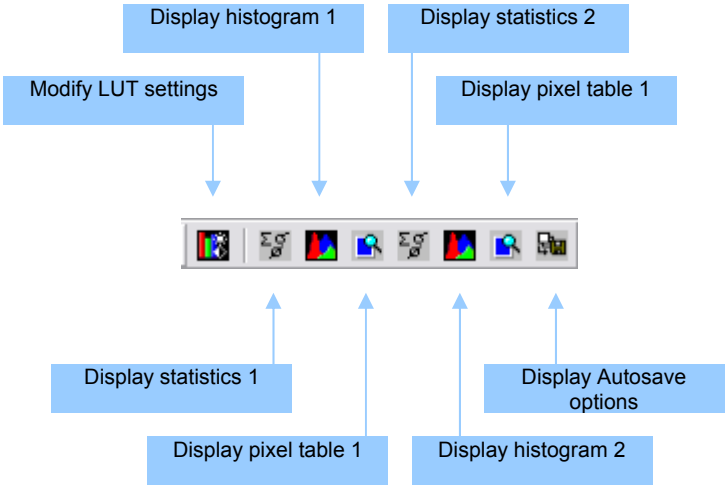
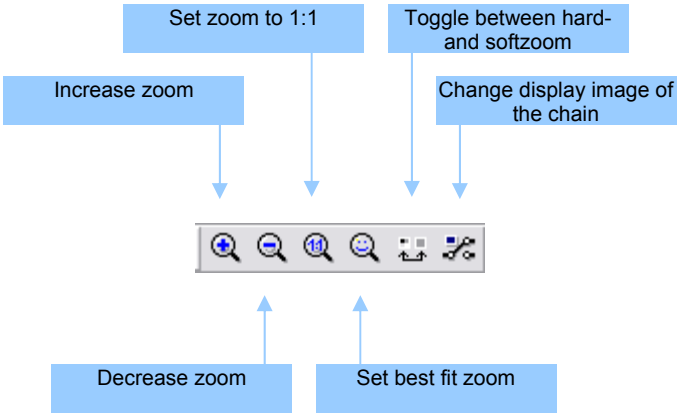


Image Processing Toolbar



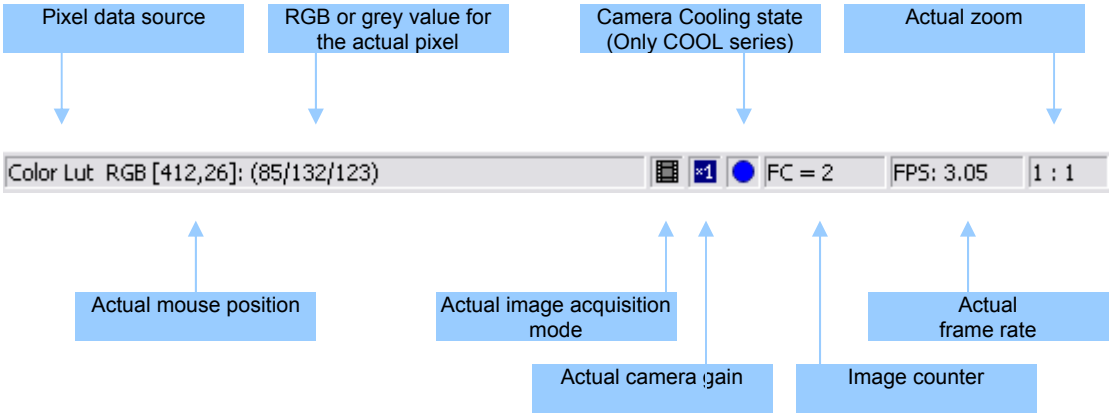
Note: This toolbar is created dynamically in dependence of the chosen image process chain.

Display Toolbar

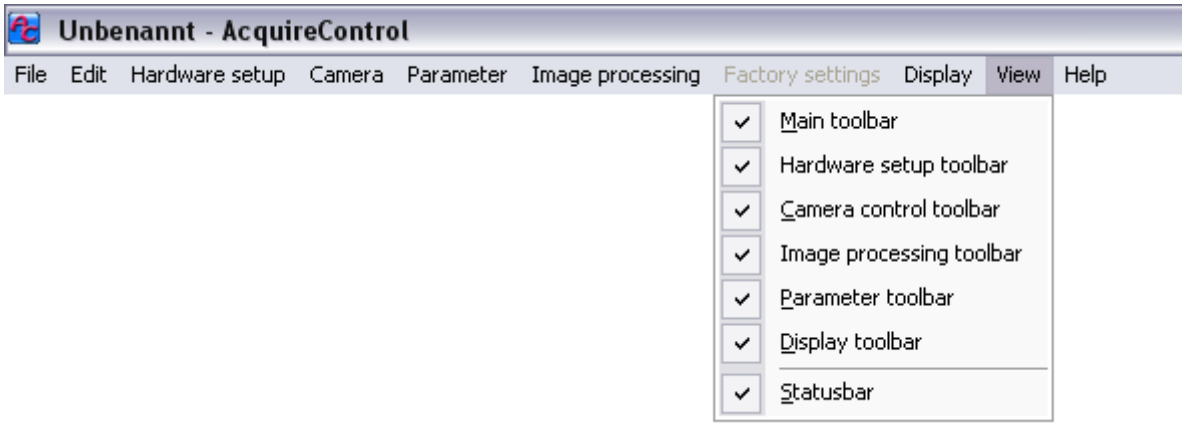


Note: While using *hard zoom* setting the enlargement of the image is done by simple pixel repetition. While using the *soft zoom* setting on the other hand the enlargement is done by interpolation between pixels. This algorithm generates softer images, however, the processing speed is reduced. The *soft zoom* works only in combination with DirectX.

Status bar

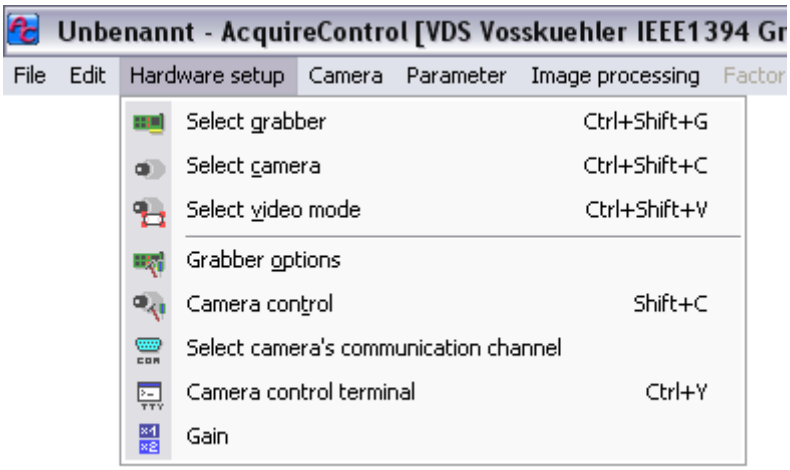


The status bar as well as also the toolbars can be shown or hidden via the menu „View“.



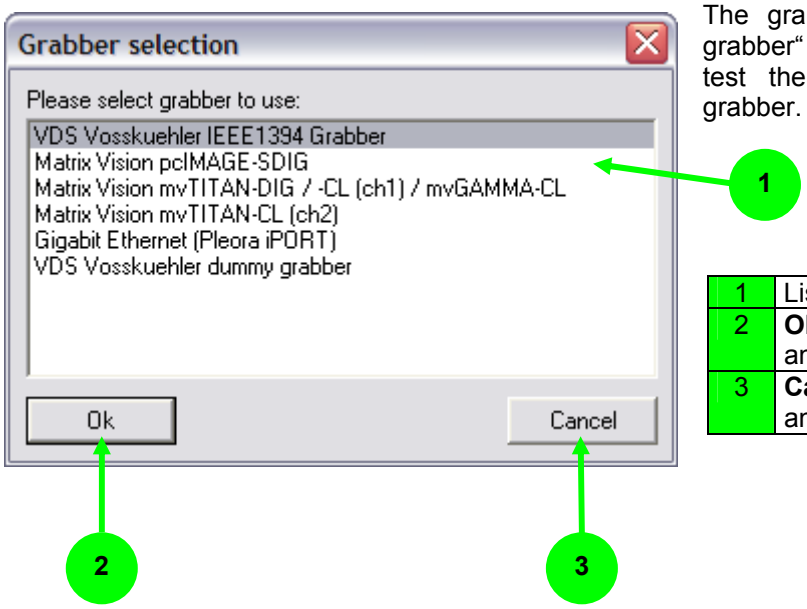
3.2 Hardware Setup

All hardware relevant parameters like grabber type, camera and video mode can be configured within the „Hardware Setup Toolbar“ or the „Hardware setup“ menu.



3.2.1 Selection of a framegrabber

In the dialog „Hardware setup“ the user can reach the grabber selection via the button „Grabber“. The following dialog offers all available types of grabbers. After a click on „OK“ the application tries to open the grabber. In case of a failure an error message will be displayed.

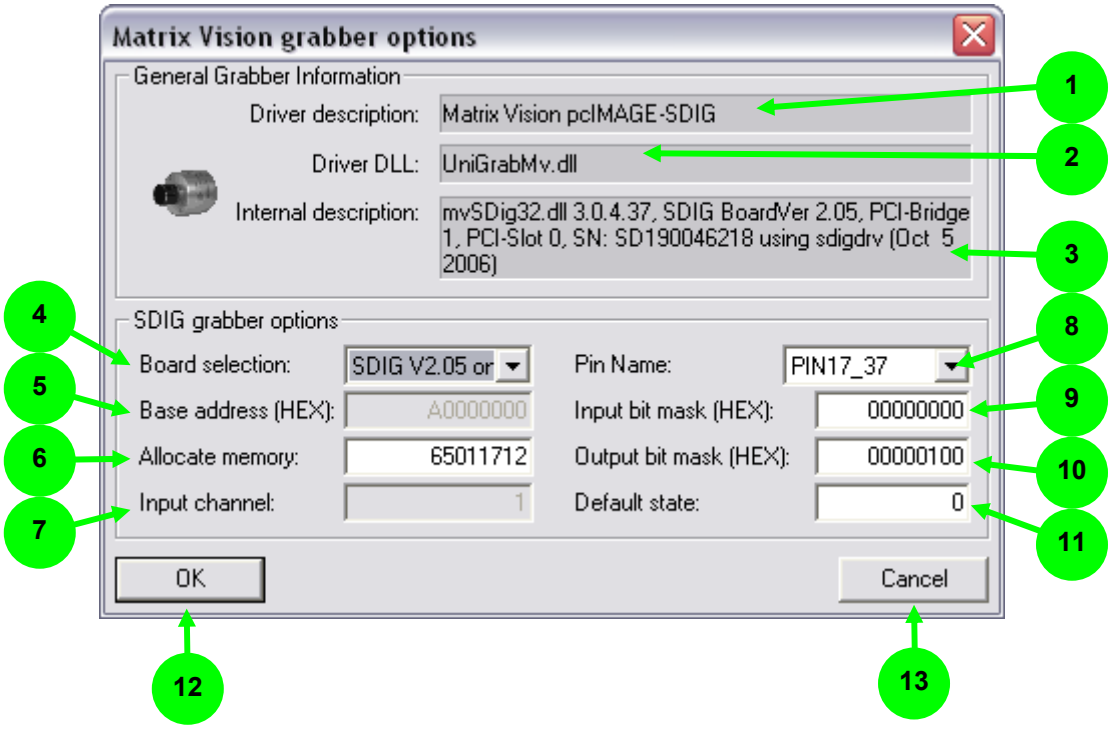


The grabber „VDS Vosskuehler dummy grabber“ is a virtual grabber enabling to test the software without a physically grabber.

1	List of all supported grabbers.
2	**OK:** Confirmation of adjustments and closing of dialog.
3	**Cancel:** Rejection of adjustments and closing of dialog.

3.2.1.1 Adjustment of framegrabber parameters (Matrix Vision)

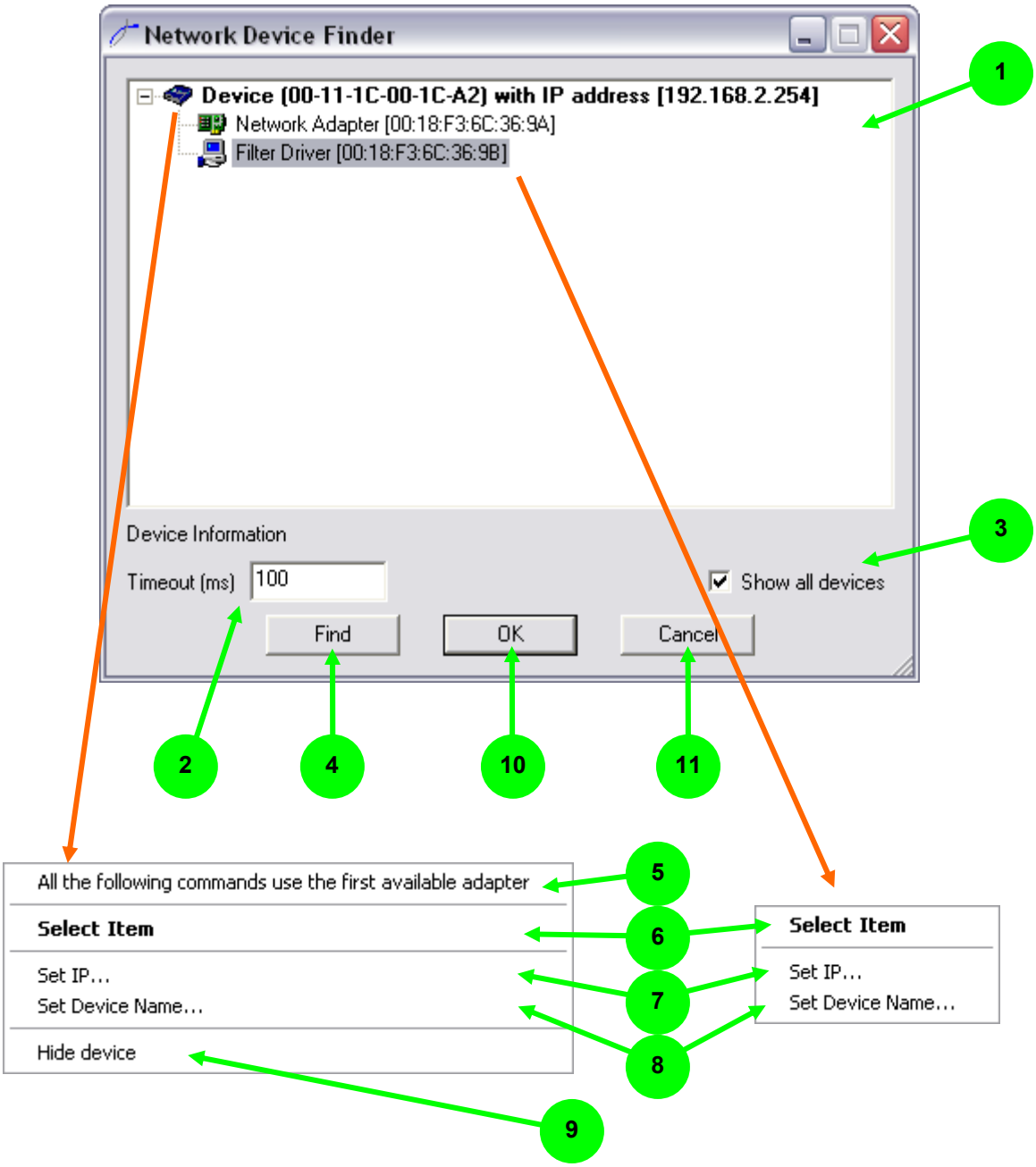
In case the user selects a Matrix Vision grabber, a dialog for detail configuration can be opened via the button „Grabber Options“ in the dialog „Hardware Setup“. In most cases however, one can work here with the basic settings.



1	**Driver description:** Name of the grabber.
2	**Driver DLL:** Used grabber library.
3	**Internal description:** Further information regarding the driver and the used low level driver.
4	**Board Selection:** Here one can choose the hardware grabber board. This is necessary in case the user works with more than one 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.
6	**Allocate memory:** Allocated 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 grabbers, standard: 65011712). Note: In case of a mvTITAN-DIG/mvTITAN-CL or a mvGAMMA-CL grabber, the memory is adjusted with the Matrix Vision tool „SetDMA“.
7	**Input channel:** Input channel for Matrix Vision mvTITAN-CL grabbers.
8	**Pin Name:** Name of the 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:** Confirmation of adjustments and closing of the dialog.
13	**Cancel:** Rejection of the adjustments and closing of the dialog.

3.2.1.2 Adjustment of framegrabber parameters (Pleora)

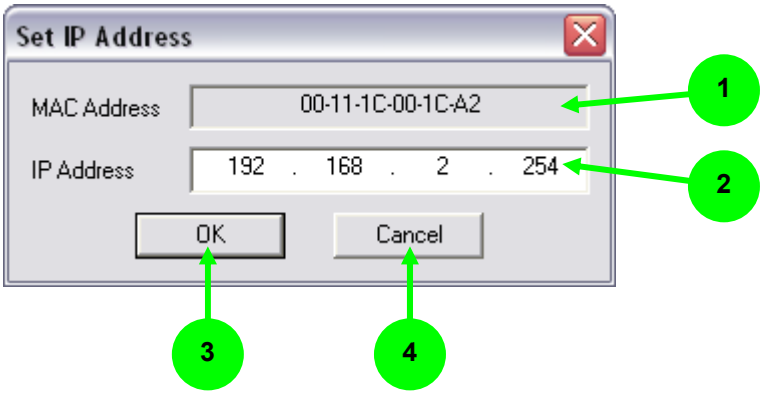
In case the user works with a GigE camera after powering on the camera the user has to assign a IP address to the GigE interface. This can be done via the “Grapper Options” dialog.



1	List of all found iPort IP devices. The following types can be listed here: • iPort High-Performance IP Device Driver: The connection will be established over the Intel driver. • Network adapter: The connection will be established over the Windows network stack.. • iPort Universal IP Filter driver: The connection will be established over the filter driver (*Recommended*).
2	**Timeout (ms):** Specifies the maximum time, in milliseconds, to wait for a detection response.
3	**Show all devices:** Indicates if the dialog will show all devices or only those not marked as hidden.
4	**Find:** Searches for new devices in the network.
5	**All the following commands use the first available adapter:** Infotext.
6	**Select item:** Confirmation of adjustments and closing of the dialog.

7	**Set IP...:** Set IP address of this device.
8	**Set device name...:** Set name of this device.
9	**Hide device:** Hide device.
10	**OK:** Confirmation of adjustments and closing of the dialog.
11	**Cancel:** Rejection of the adjustments and closing of the dialog.

If, after turning on the GigE camera, the camera is selected the first time, an IP address must be set. The following dialog is automatically shown if no IP address was set and can also be called, however, manually as describe above.



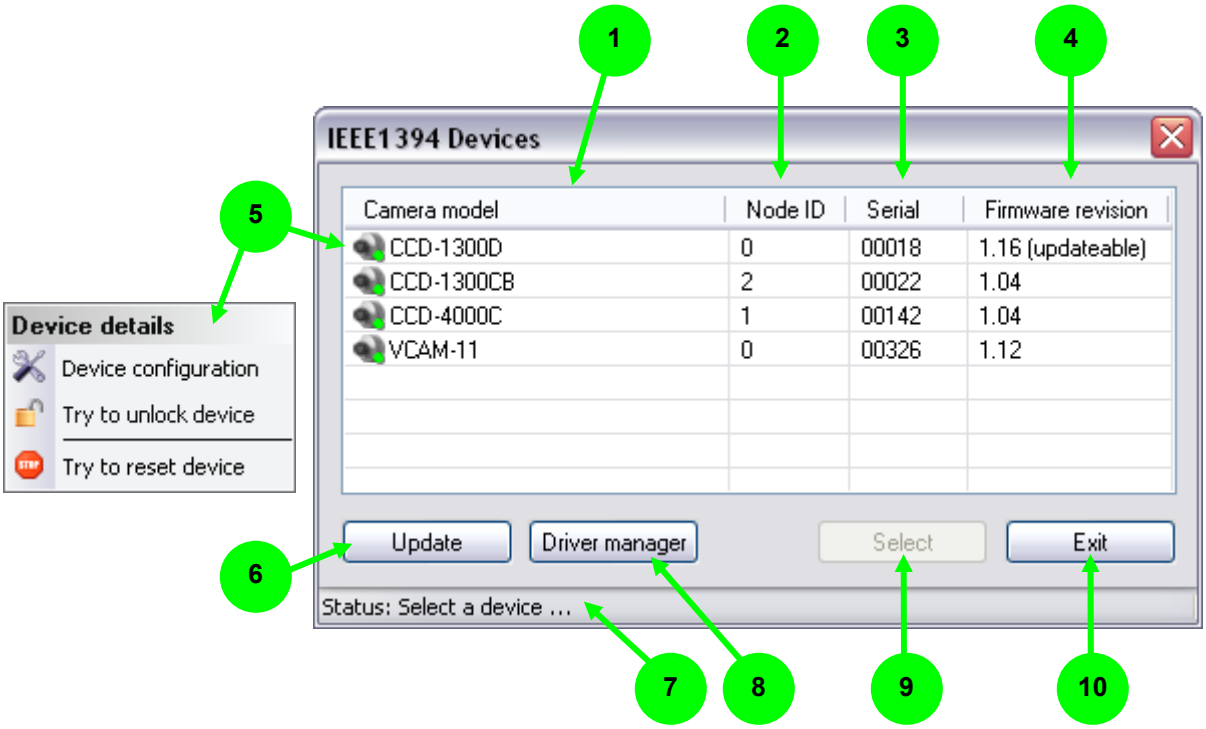
1	**MAC Address:** MAC address of the device.
2	**IP Address:** IP address of the GigE camera. The address must be within the same subnet as the IP address of the network card. Example: IP address network card: **192.168.2**.1 IP address GigE camera: **192.168.2**.254
3	**OK:** Confirmation of adjustments and closing of the dialog.
4	**Cancel:** Rejection of the adjustments and closing of the dialog.

3.2.2 Selection of a camera

According to the used grabber hardware different dialogs for camera selection may appear.

3.2.2.1 Cameras with IEEE1394 Interface

In case the user works with IEEE1394 devices, the following dialog appears.

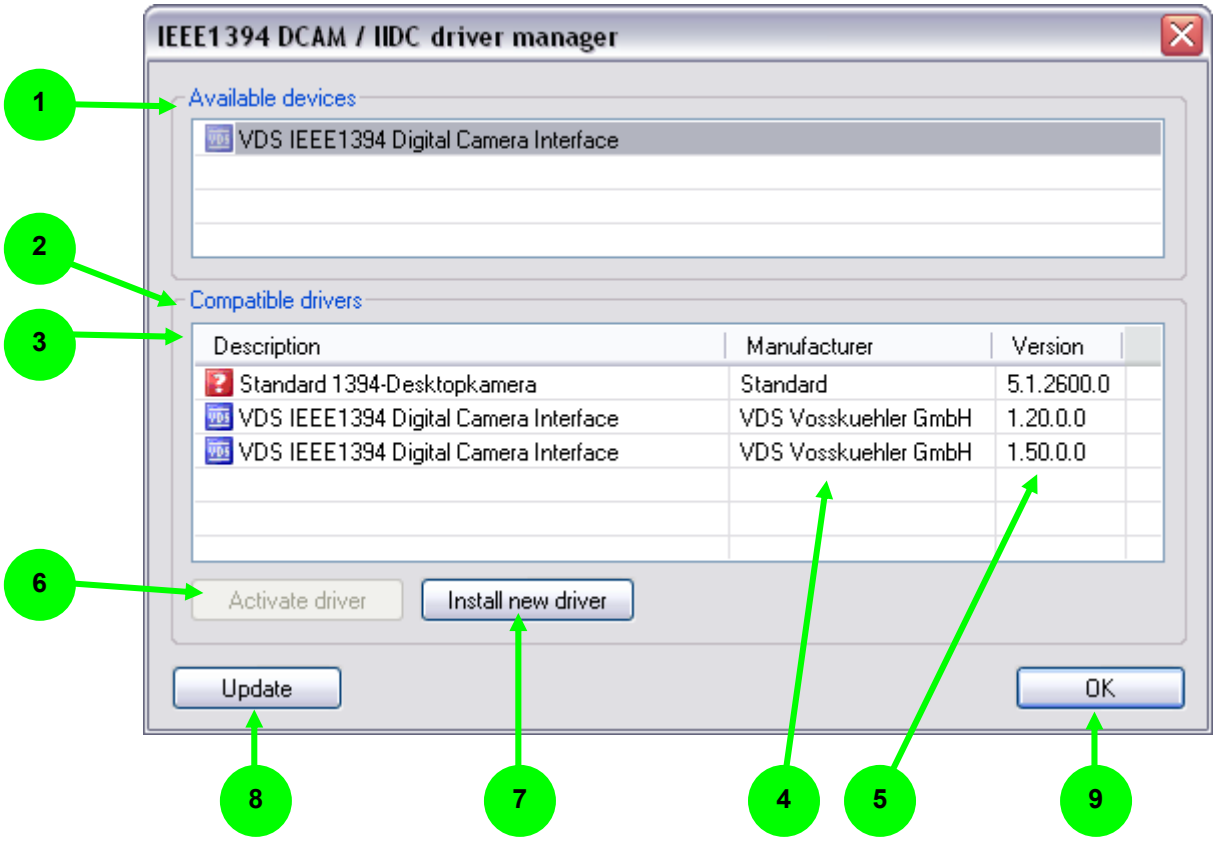


1	**Camera model:** In this column all cameras that have been found at the IEEE1394 bus and for which a driver was installed are shown. The symbol in front of the camera name shows the actual status of the camera: The camera is ready and not locked. The camera transfers isochronous video data but is not locked. In this case the camera cannot be selected. The camera has already been locked by another node and therefore cannot be selected. The camera is not supported by this software. It was not possible to correctly identify the camera. The IEEE1394 interface shows an error.
2	**Node ID:** In this column is indicated the IEEE1394 node number of the device.
3	**Serial:** In this column is indicated the serial number of the IEEE1394 Interface.
4	**Firmware revision:** In this column is indicated the Firmware version of the IEEE1394 Interface.
5	By clicking with the right mouse button on a device an additional context menu appears. This menu contains the following entries: • **Device configuration:** Here the user can directly call the configuration dialog (*see chapter 3.2.2.3 IEEE1394 interface configuration*). • **Try to unlock device:** With this option the user can try to unlock a device. This is only possible if the device was locked by the current node. • **Try to reset device:** With this command the user can try to stop the isochronous datatransfer, reset and unlock the device. This is only possible if the device was locked by the current node.
6	**Update:** Regarding alterations at the IEEE1394 Bus the dialog will in a normal case, automatically update the list of the available cameras. In addition, this switch offers the possibility to manually look for a new device.

7	**Status bar:** Here is indicated further information regarding the status of the selected device.
8	**Driver manager:** With this button a driver manager dialog can be opened. With that it is possible to install or activate the windows driver directly (*see chapter 3.2.2.2 IEEE1394 DCAM / IIDC driver manager*). This button is available only on systems with at least Microsoft® Windows 2000. Furthermore the current user must have administration rights.
9	**Select:** Confirmation of adjustments and closing of the dialog.
10	**Exit:** Rejection of the adjustments and closing of the dialog.

3.2.2.2 IEEE1394 DCAM / IIDC driver manager

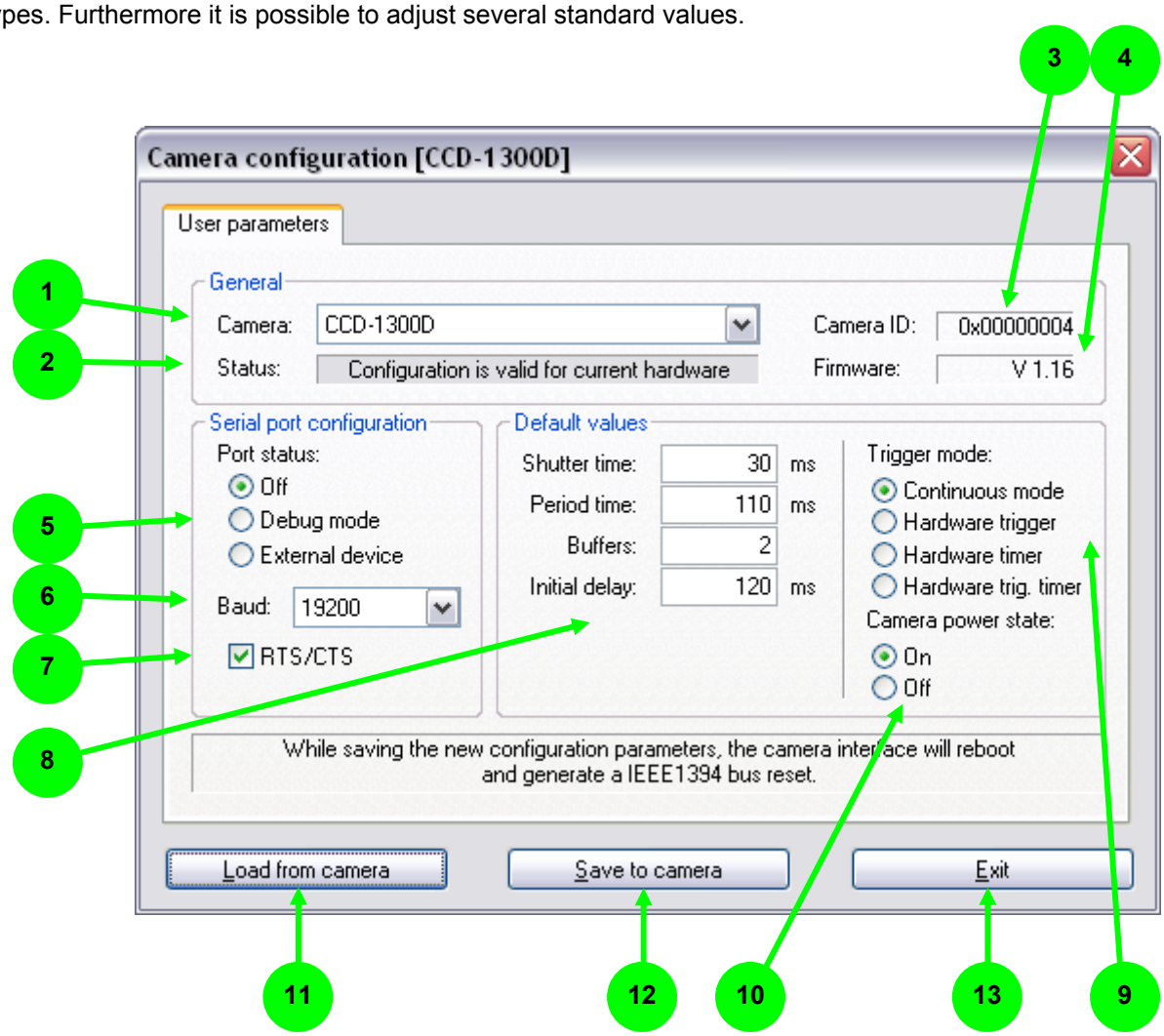
The IEEE1394 DCAM / IIDC driver manager is used for easy activation or installation of Windows drivers for DCAM / IIDC devices.



1	**Available devices:** Here all DCAM / IIDC compatible devices found by windows are listed. If available, the version of the driver is also displayed. As soon as a device is selected with the mouse all known compatible drivers are displayed in the list „Compatible drivers“. The first construction of this list can last some seconds.
2	**Compatible drivers:** Here all drivers that are compatible the the actual device are listed. The actual activated driver will be displayed in red. The icon in front of the name shows the state of the driver: VDS Vosskühler driver. Driver of an unknown vendor. After selecting a driver in this list the driver can be activated with the button „Activate driver“
3	**Description:** Name of the driver device.
4	**Manufacturer:** Manufacturer of the driver.
5	**Version:** Version of the driver.
6	**Activate driver:** Activates the selected driver. If another software is using the previous driver, it may be necessary to switch the device off and on once.
7	**Install new driver:** Installs a new driver.
8	**Update:** Updates the device list.
9	**OK:** Close dialog.

3.2.2.3 IEEE1394 interface configuration

The IEEE1394Control applikation can configure a connected IEEE1394 interface for different camera types. Furthermore it is possible to adjust several standard values.



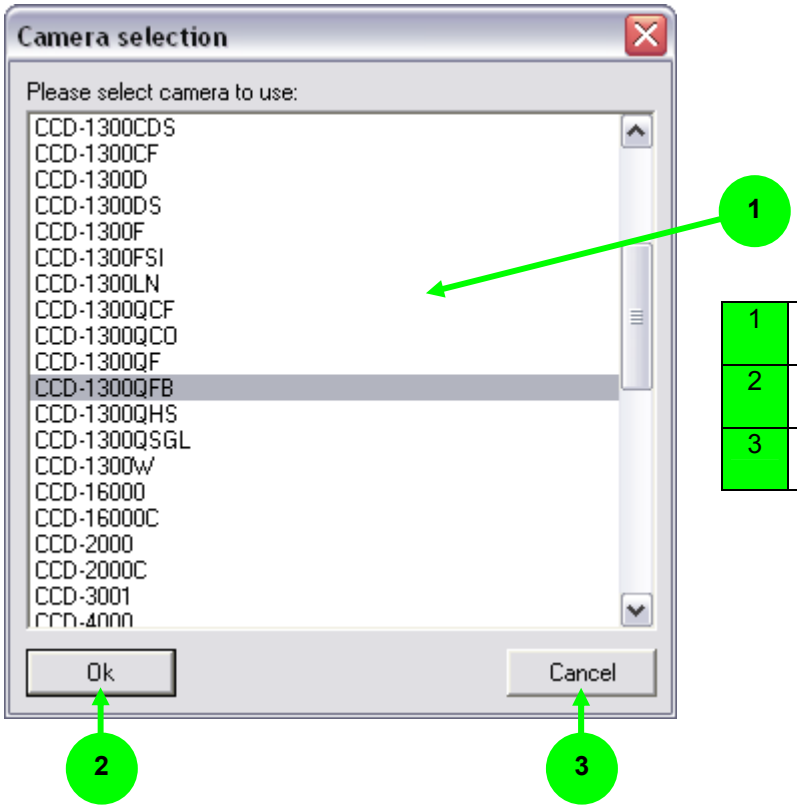
1	**Camera:** Selection of the configuration data set of the connected camera.
2	**Status:** Display the compatiblity of the chosen configuration to the connected camera.
3	**Camera ID:** Hexadecimal camera ID.
4	**Firmware:** Current firmware version.
5	**Port status:** Configuration of the serial port: • ***Off:*** Deactivate serial port. • ***Debug mode:*** Deactivate debug messages. • ***External device:*** Use serial port to control connected camera.
6	**Baud:** Baud rate.
7	**RTS/CTS:** Turn on or off the RTS/CTS handshake.
8	Configuration of the default values. These values are used after turning on the IEEE1394 interface until they are overwritten. • ***Shutter time:*** The initial shutter (exposure) time in milliseconds. • ***Period time:*** The initial interval time in milliseconds. • ***Buffers:*** The initial number of hardware buffers of the interface. Larger values can influence the maximum frame rate positively but they also increase the latency time. • ***Initial delay:*** The initial delay time in milliseconds. This value describes the time that passes before the TREX signal of the camera is set the very first time. This is necessary because the camera needs some time after having switched from continuous mode to IOD mode before the next TREX signal is accepted.
9	**Trigger mode:** Defines the trigger mode after turning on the camera.

10	**Camera power state:** Initial power state of the connected camera.
11	**Load from camera:** Loads the current configuration from the camera.
12	**Save to camera:** Saves the current configuration into the camera.
13	**Exit:** Close dialog.

Note: These settings do not have to be changed as a rule. False configurations can lead to a incorrect function of the IEEE1394 interface.

3.2.2.4 Cameras with RS644, Camera Link or GigE Interface

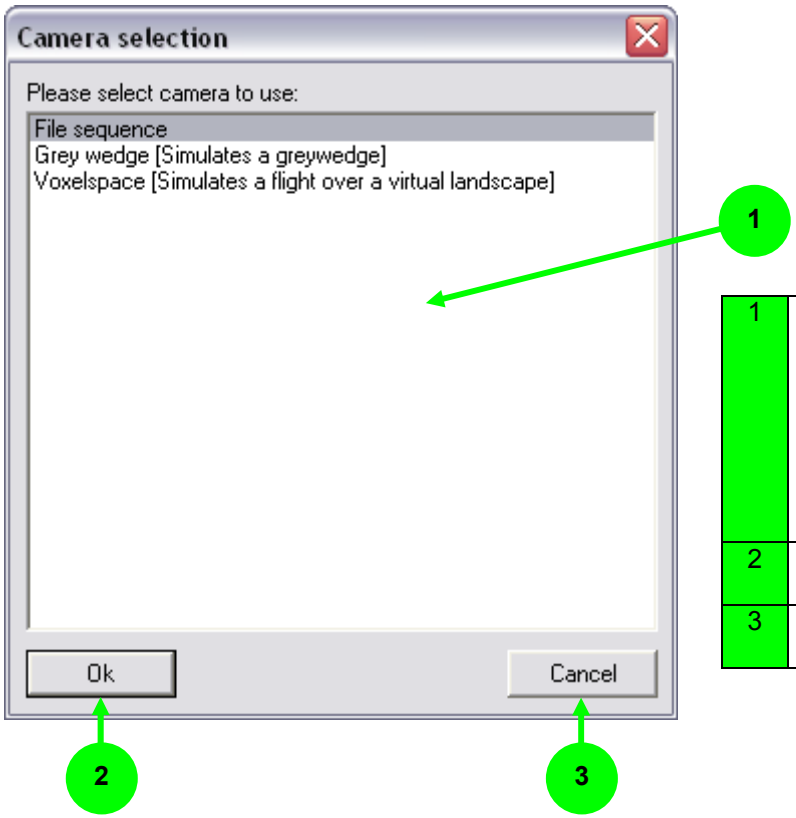
In case the user works with a Matrix Vision grabber or GigE interface, the following camera selection dialog appears. If the selection does not match the real camera hardware, no correct image display can occur.



1	This list shows all camera configurations.
2	**OK:** Confirmation of adjustments and closing of dialog.
3	**Cancel:** Rejection of adjustments and closing of dialog.

3.2.2.5 Virtual cameras

In case the user works with the virtual grabber „VDS Vosskuehler dummy grabber“, the camera can be simulated completely.



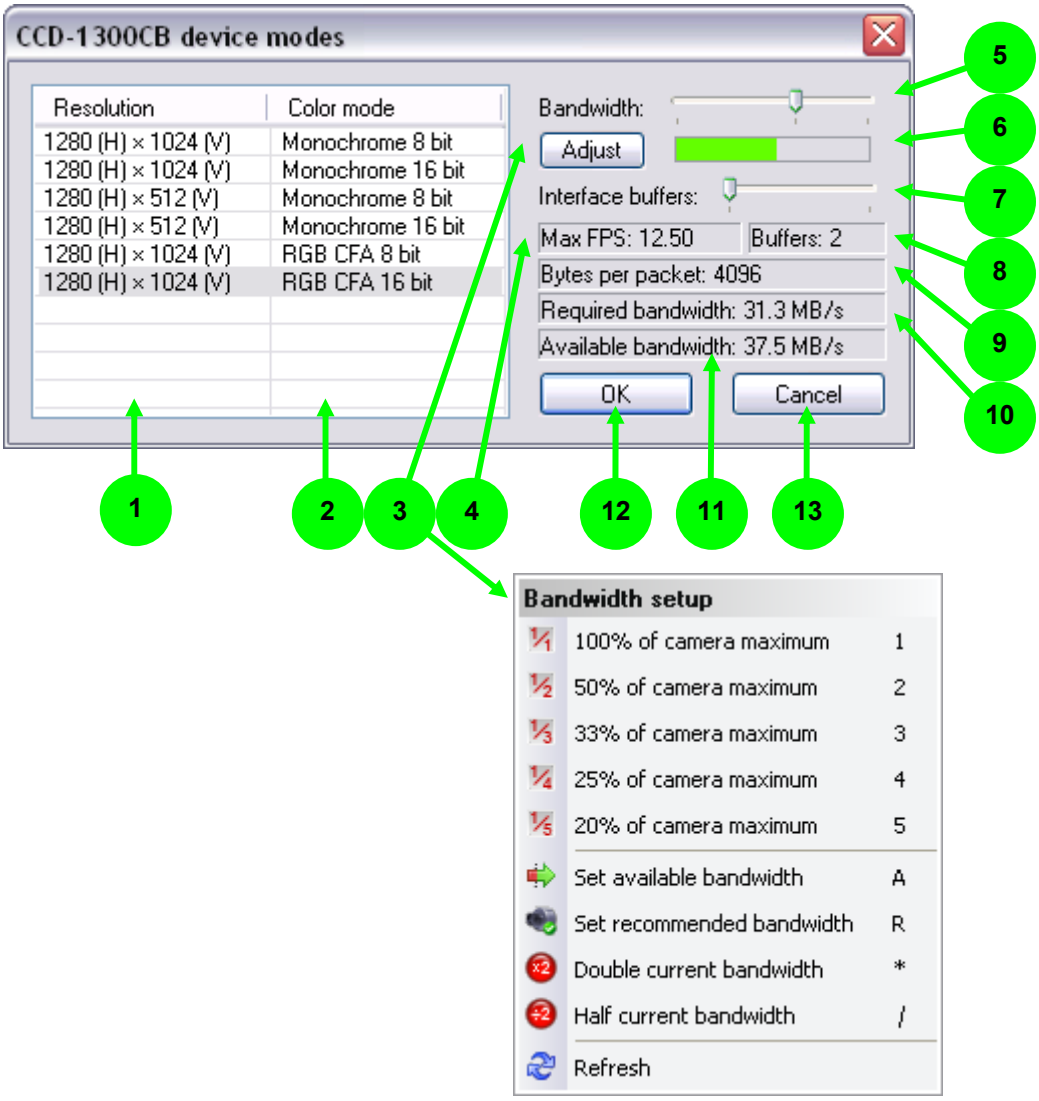
1	This list shows all camera configurations. • **File sequence:** A predefined image sequence. • **Grey wedge:** Grey or color wedge animation. • **Voxelspace:** Scenery animation.
2	**OK:** Confirmation of adjustments and closing of dialog.
3	**Cancel:** Rejection of adjustments and closing of dialog.

3.2.3 Selection of the camera resolution

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

3.2.3.1 Cameras with IEEE1394 Interface

If the user works with IEEE1394 devices, the following dialog appears.



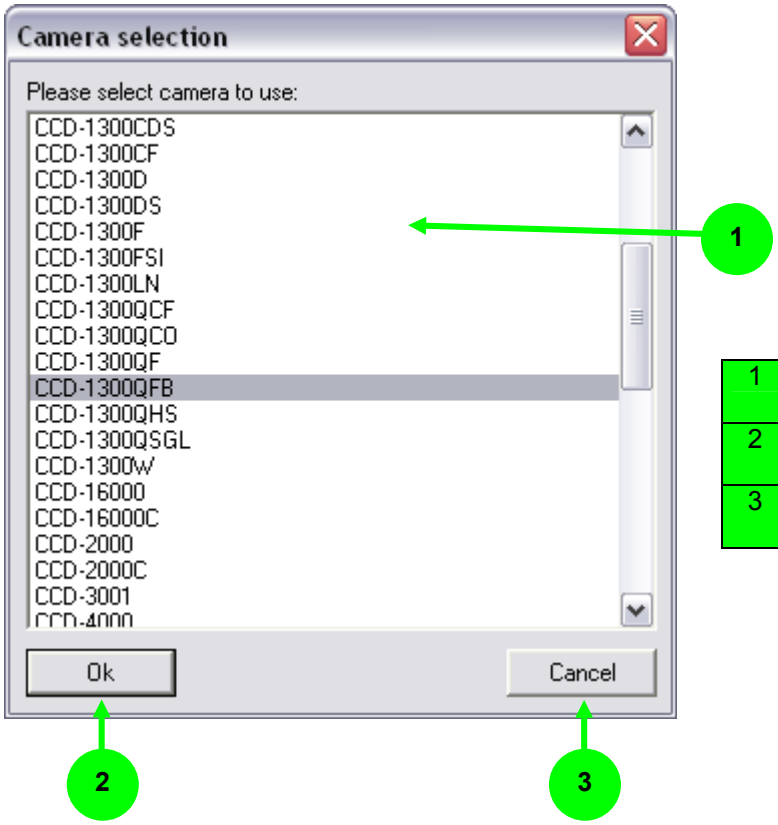
1	**Resolution:** In this column the resolution is indicated.
2	**Color mode:** Here the video mode and the bit depth is shown, e.g. monochrome or RGB CFA (CFA = Color Field Array).
3	**Adjust:** Here a menu for bandwidth adjustment is opened The menu offers different presets to choose: • ***100% of camera maximum:*** Set the maximum bandwidth supported by the camera. • ***50% of camera maximum:*** 50% of the maximum bandwidth. • ***33% of camera maximum:*** 33% of the maximum bandwidth. • ***25% of camera maximum:*** 25% of the maximum bandwidth. • ***20% of camera maximum:*** 20% of the maximum bandwidth. • ***Set available bandwidth:*** Sets the currently available bandwidth. • ***Set recommended bandwidth:*** Sets the recommended bandwidth. • ***Double current bandwidth:*** Doubles the current bandwidth value. • ***Half current bandwidth:*** Halfs the current bandwidth value.+# • ***Refresh:*** Updates values from camera.
4	**Max FPS:** This value indicates the maximum possible frame rate.

5	**Bandwidth:** Here the IEEE1394 bus bandwidth to be reserved is adjusted. The higher the bandwidth available for a camera, the higher the achievable maximum frame rate.
6	Here the IEEE1394 bus bandwidth is displayed. The following color codes are possible: • ***Red:*** Bandwidth, reserved by another device. • ***Green:*** Bandwidth, that will be reserved for this device. • ***Orange:*** Available bandwidth was exceeded..
7	**Interface buffers:** Indicates the number of the used frame buffers in the IEEE1394 interface. Higher values can positively influence the image rate however, but also increase the latency time.
8	**Buffers:** Actual adjusted number of interface buffers.
9	**Bytes per packet:** Number of bytes, being transferred within a data packet via the bus. Per second a maximum of 8000 packets with maximal 4096 bytes can be transferred.
10	**Required bandwidth:** Required bus bandwidth.
11	**Available bandwidth:** Available bus bandwidth.
12	**OK:** Confirms the selection and closes the dialog.
13	**Cancel:** Leaves the dialog without applying the alterations.

Note: The resolution that is listed in this dialog is the RAW resolution. This resolution must not have to agree to the resolution that is displayed in the main application.

3.2.3.2 Cameras with RS644, Camera Link or GigE Interface

In case the user works with a Matrix Vision grabber or a GigE interface, the following graphics mode selection dialog appears.



1	This list shows all camera resolutions and video modes.
2	**OK:** Confirmation of adjustments and closing of the dialog.
3	**Cancel:** Rejection of adjustments and closing of the dialog.

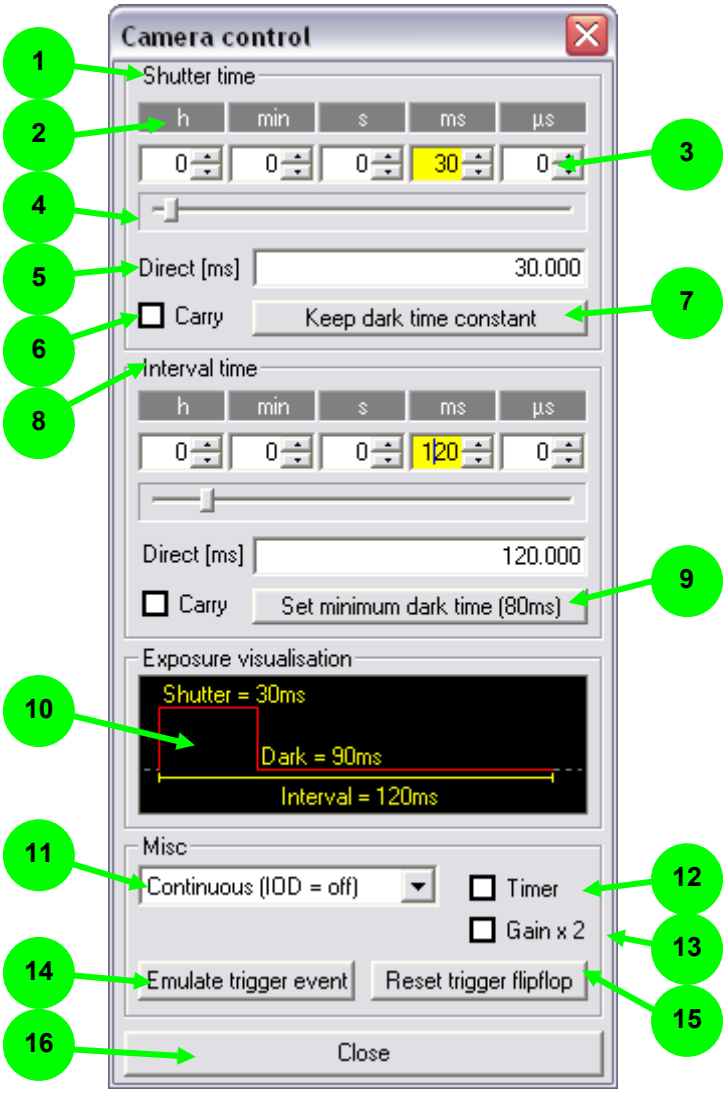
Note: The resolution that is listed in this dialog is the RAW resolution. This resolution must not have to agree to the resolution that is displayed in the main application.

3.2.3.3 Virtual cameras

In case the user works with a virtual camera the video mode or image sequence can be selected here.

3.2.4 Camera control (Standard cameras)

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



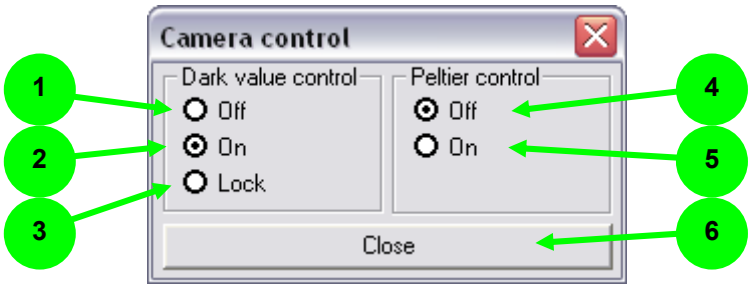
1	**Shutter time:** Within this group all parameters regarding the active exposure time are determined.
2	Here the time units of the input controls are displayed. A mouse click on the time unit will set the accompanying value to zero. The value which is adjustable via the main slider is marked in color.
3	In these input controls the value per time unit can be entered. The input field of the last active time unit is marked in color.
4	Main slider for controlling the active exposure time unit. The active unit is always marked in color.
5	**Direct [ms]:** Input control for direct input of the shutter time in milliseconds.
6	**Carry:** In case this option is enabled, an automatic carry to the next time unit occurs.
7	**Keep dark time constant:** If this option is 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 rate.
10	Graphic display of the exposure time signal.
11	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 **I**mage **O**n **D**emand mode. The camera now generates a frame only when an external trigger or timer pulse occurs. • **Trigger once:** A frame is generated once whe a trigger pulse occurs. The exposure time is controled 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:** Change the camera amplification.
14	**Emulate trigger event:** Emulates a trigger pulse. The pulse is stored within a flip-flop.
15	**Reset trigger flipflop:** Erases the trigger pulse within the flip-flop.
16	**Close:** Closes the dialog.

Note: This dialog is not available for infrared cameras.

3.2.5 Camera control (Infrared cameras)

For controlling of the camera one can select the menu item „Hardware setup → Camera control“ or the corresponding icon on the hardware setup toolbar.



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.
5	**On:** Switch on the temerature regulated reference area for dark value control in the camera (Only availabel, if supported by the camera).
5	**Close:** Closes the dialog.

Note: This dialog is only available for infrared cameras.

3.2.6 IEEE1394 Bus Resets

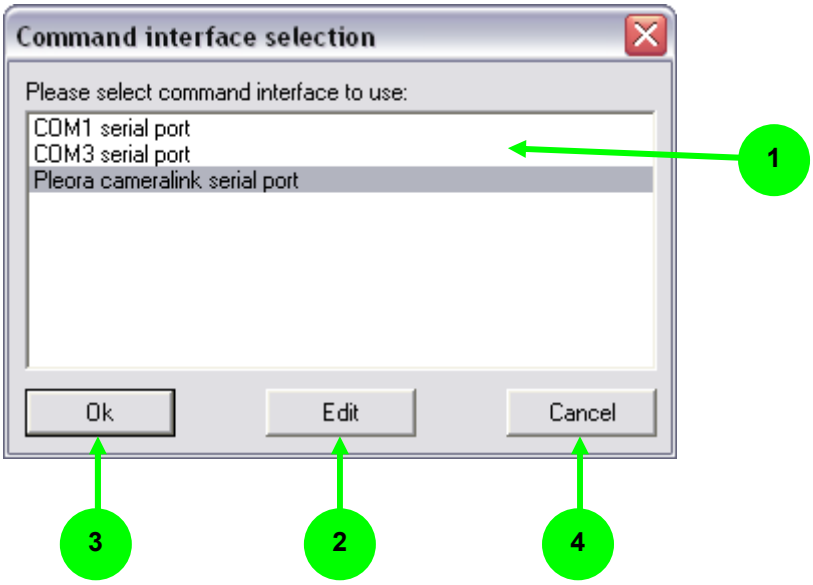
If the user works with an IEEE1394 camera and the IEEE1394 bus configuration is changed (e.g. due to the connection or disconnection of a device), a notification dialog will be shown. If the camera is connected to the PC afterwards, the notification will be hidden and the image acquisition (if started before) starts again.

3.2.7 Camera communication

At some cameras it is possible to open a serial communication channel in order to change for example configuration values.

3.2.8 COM port selection

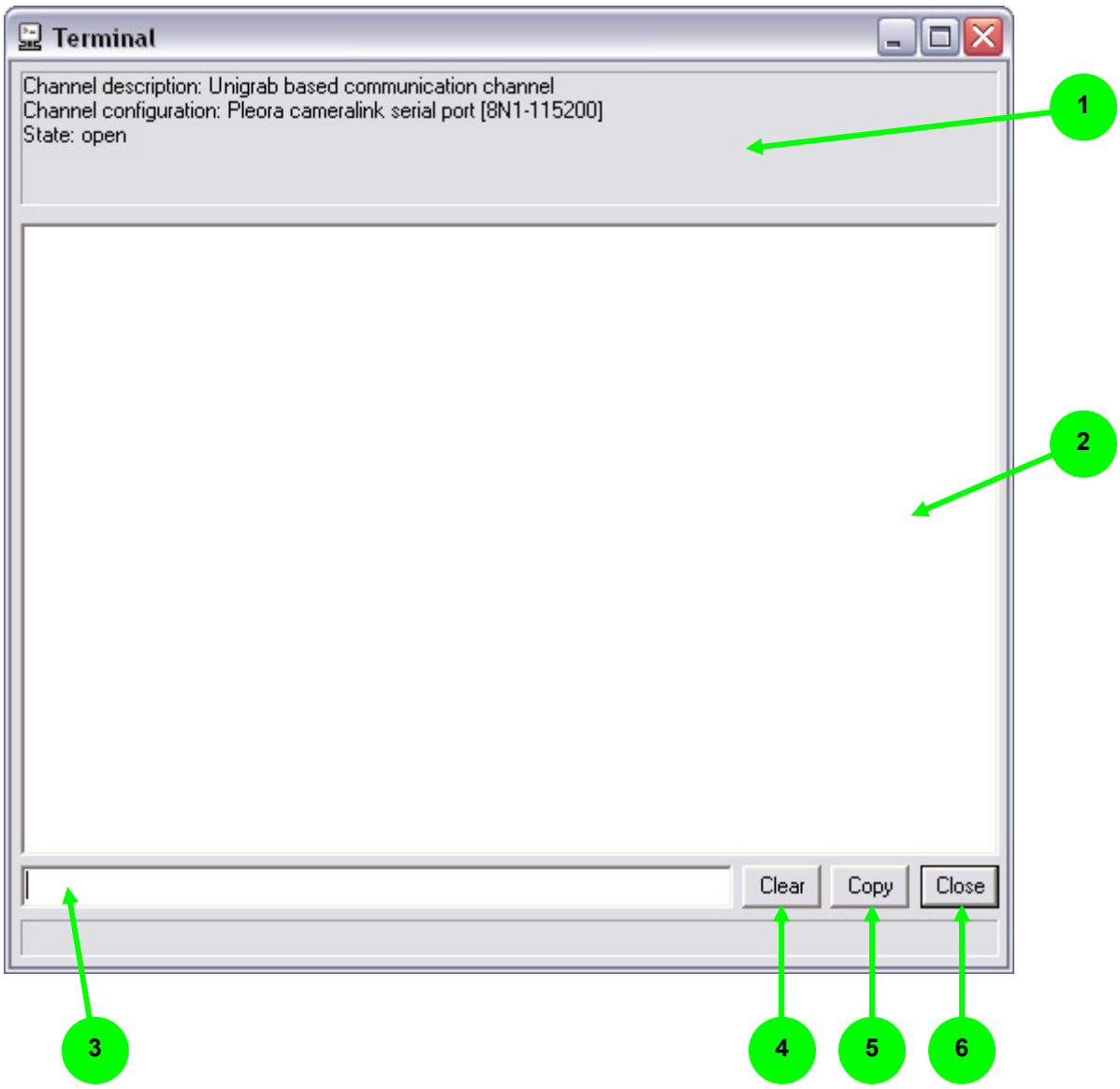
In dependence of the selected grabber different ports are listed here.



1	List with the available communication ports.
2	**Edit:** Shows a dialog for configuration of the selected COM port. Note: In case of use of the „Pleora cameralink serial port“ the interface „Serial port 0“ must be chosen.
3	**OK:** Confirmation of adjustments and closing of the dialog.
4	**Cancel:** Rejection of adjustments and closing of the dialog.

3.2.8.1 COM-Terminal

The terminal window is used for the communication with the camera. The available commands can be found in the camera manual.

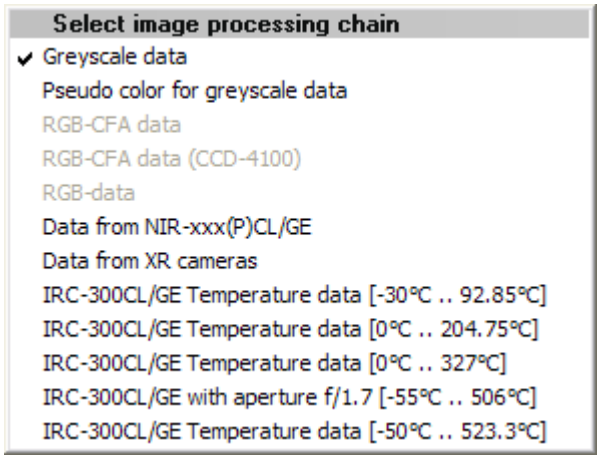


1	This status window displays information about the used COM port and the selected adjustments.
2	Output window.
3	Commandline.
4	**Clear:** Clear the output window.
5	**Copy:** Copy the content of the output window to the windows clipboard.
6	**Close:** Closes the dialog.

3.3 Record & image management

3.3.1 Image process chain

Depending on whether, which format the input data of the image process chain has, predefined process chain are available. The change is done via the „Parameter Toolbar“ or via the menu item „Parameter → Select image processing chain“. The basic structure of the image process chain is shown in *chapter 1.*



Name of the image processing chain	Description	Available processing modules	Available analysis modules
Greyscale data	This image processing chain is used for **greyscale cameras** or **loaded greyscale images**.	• Greyscale LUT	• Statistics • Histogram • Pixel table • Autosave
Pseudo color for greyscale data	This image processing chain is used for **greyscale cameras** or **loaded greyscale images**. Additionally a pseudo color LUT im used here.	• Pseudo Color LUT	• Statistics • Histogram • Pixel table • Autosave
RGB-CFA data	This chain is used for **Bayer Mosaic Filter cameras** of corresponding **loaded CFA images**.	• Bilinear Interpolation • Color LUT	• Statistics • Histogram • Pixel table • Autosave
RGB-CFA data (CCD-4100)	With this image processing chain CFA images from the **CCD-4100** can be displayed.	• Pixelsorter • Bilinear Interpolation • Color LUT	• Statistics • Histogram • Pixel table
RGB data	With this chain **loaded RGB images** can be displayed.	• Color LUT	• Statistics • Histogram • Pixel table • Autosave
Data from NIR-300(P)CL/GE	With this image processing chain images of the **NIR-300** and **NIR-600** camera series can be displayed.	• Background Correction • Recursive Filter • Pseudo Color LUT	• Statistics • Histogram • Pixel table • Autosave
Data from NIR-xxx(P)CL/GE	With this chain images from **X-Ray cameras** can be displayed.	• Background Correction • Recursive Filter • Pseudo Color LUT	• Statistics • Histogram • Pixel table • Autosave
Data from XR cameras	This chain is used for **infrared cameras** with the given temperature range.	• Flip Image • Background Correction • Recursive Filter • Greyscale LUT	• Statistics • Histogram • Pixel table • Line profile • Autosave
IRC-300CL/GE Temperature data [-30°C…+92.85°C]	This chain is used for **infrared cameras** with the given temperature range.	• Background Correction • Recursive Filter • Pseudo Color LUT	• Temperature display • Statistics • Histogram • Pixel table • Linie profile • Row- & column statistics • Autosave

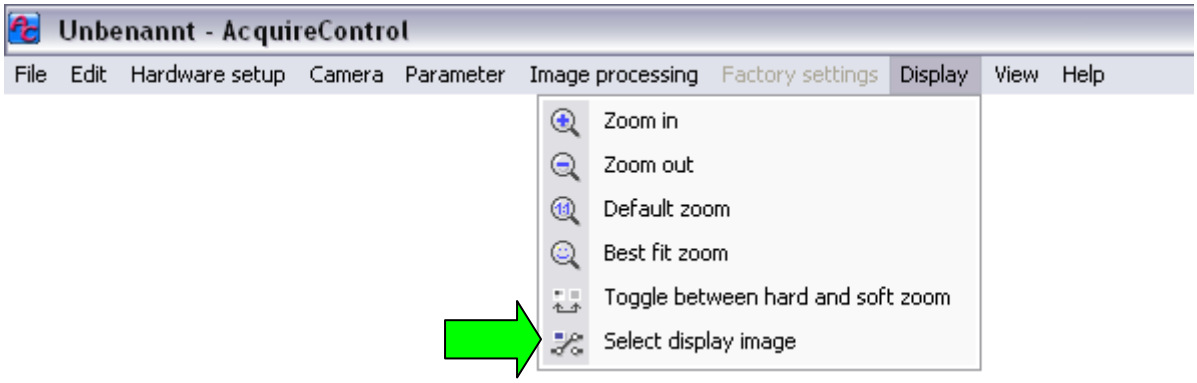
IRC-300CL/GE Temperature data [0°C…+204.75°C]	This chain is used for **infrared cameras** with the given temperature range.	• Background Correction • Recursive Filter • Pseudo Color LUT	• Temperature display • Statistics • Histogram • Pixel table • Linie profile • Row- & column statistics • Autosave
IRC-300CL/GE Temperature data [0°C…+327°C]	This chain is used for **infrared cameras** with the given temperature range.	• Background Correction • Recursive Filter • Pseudo Color LUT	• Temperature display • Statistics • Histogram • Pixel table • Linie profile • Row- & column statistics • Autosave
IRC-300CL/GE with aperture f/1.7 Temperature data [-55°C…+506°C]	This chain is used for **infrared cameras** with the given temperature range.	• Background Correction • Recursive Filter • Pseudo Color LUT	• Temperature display • Statistics • Histogram • Pixel table • Linie profile • Row- & column statistics • Autosave
IRC-300CL/GE Temperature data [-50°C…+523.30°C]	With this image processing chain images of the **NIR-300** and **NIR-600** camera series can be displayed.	• Background Correction • Recursive Filter • Pseudo Color LUT	• Temperature display • Statistics • Histogram • Pixel table • Linie profile • Row- & column statistics • Autosave

3.3.2 Live image display

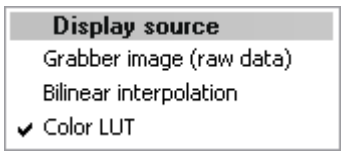
In order to control the live image display, one can start the continuous display („Start continuous snap“) or the single snap („Start single snap“) within the “Camera” menu. A previously started image acquisition con be stopped with “Stop snap”.

3.3.3 Selection of the displayed image

With the menu „Display → Select display image“ one can change the image to be displayed. In dependence which image process chain is available or rather, was chosen, more or less images are available here. After every passed image processing module a display image can be set up.



As an example the menu for a RGB-CFA image is shown here:



3.3.4 Zoom

The image displayed in the document window can be enlarged or rather reduced via the „Zoom Toolbar”. With the button „1:1“ the zoom can be set to default.

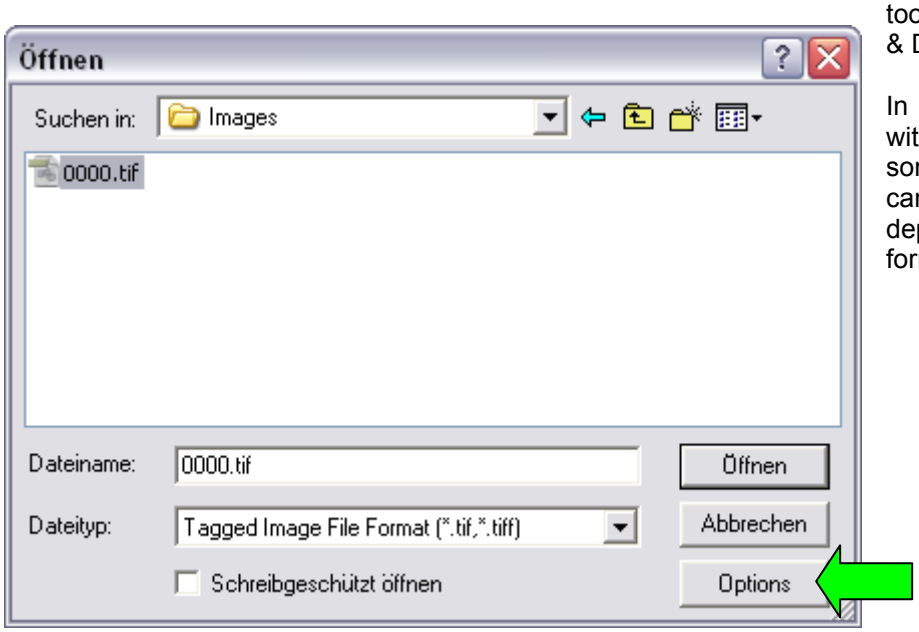
3.3.5 Loading images

The AcquireControl software is able to load miscellaneous image formats. Actually, the following types are supported:

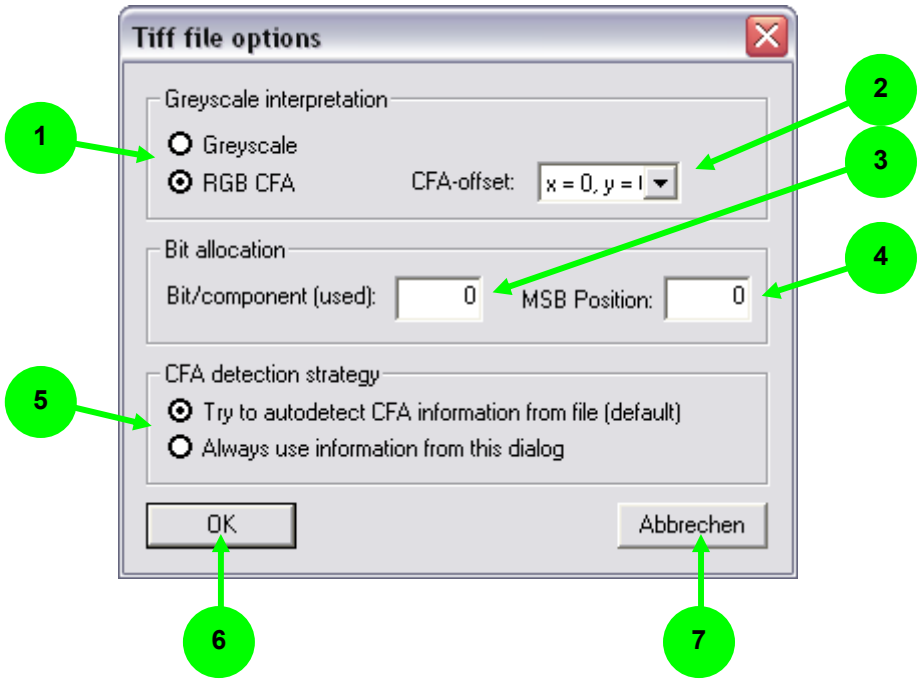
- **TIF:** Tag Image File Format, TIF-images can be saved with a bit depth of up to 16 bit. Supported are both monochrome formats and also RGB formats (uncompressed).
- **BMP:** Windows Bitmap Format, a maximum of 8 bit per pixel is possible here.
- **RAW:** Raw data format, only the pure image information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

Files can be loaded via the menu command „File → Open“, the corresponding icon on the main toolbar or simply via Drag & Drop.

In case the user works with the dialog „File open “ some additional options can be adjusted, in dependence of the image format:

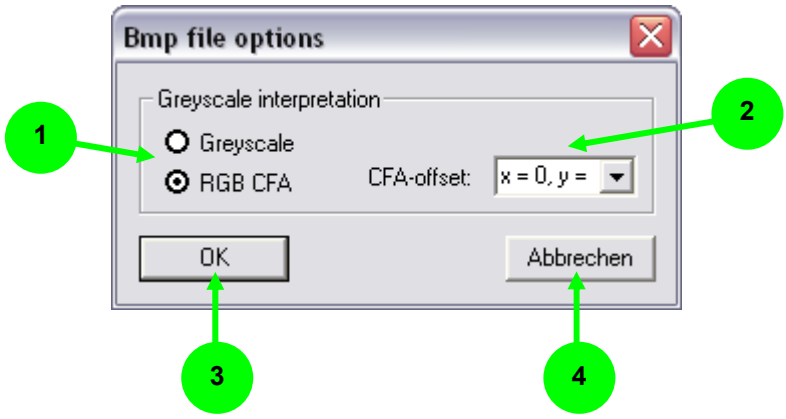


- TIFF file options:



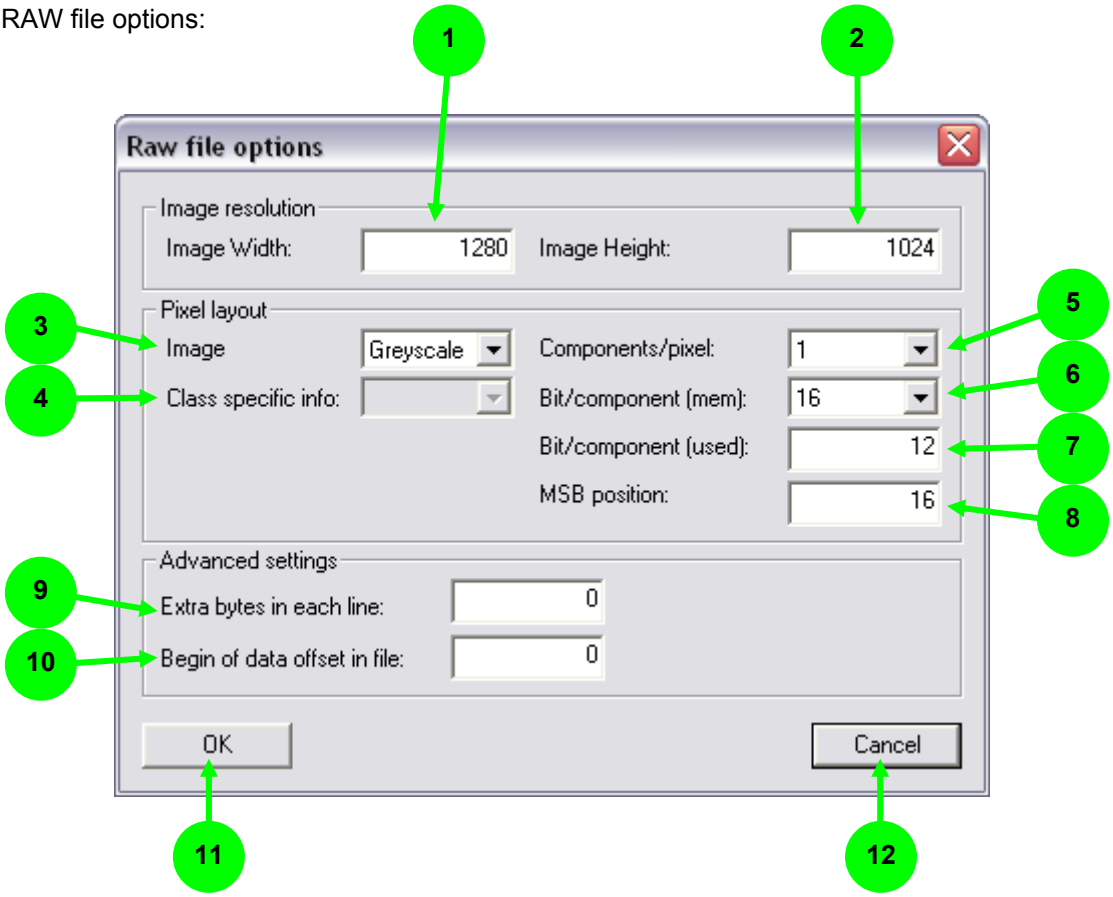
1	Indicates whether the image data shall be interpreted as grey scale values or as CFA (Color Field Array).
2	**CFA-Offset:** Indicates the CFA Offset regarding to the pixel within the upper left corner on the sensor.
3	**Bit/component used:** Number of used bits per component.
4	**MSB Position: M**ost **S**ignificant **B**it Position.
5	**CFA detection strategy:** • Try to autodetect CFA information from file: Tries to read the CFA information from the file first. If no information is available there the adjustments of the dialog are used. • Always use information from this dialog: Always uses the CFA adjustments of the user.
6	**OK:** Confirms the selection and closes the dialog.
7	**Cancel:** Closes the dialog without applying any alterations.

- BMP file options:



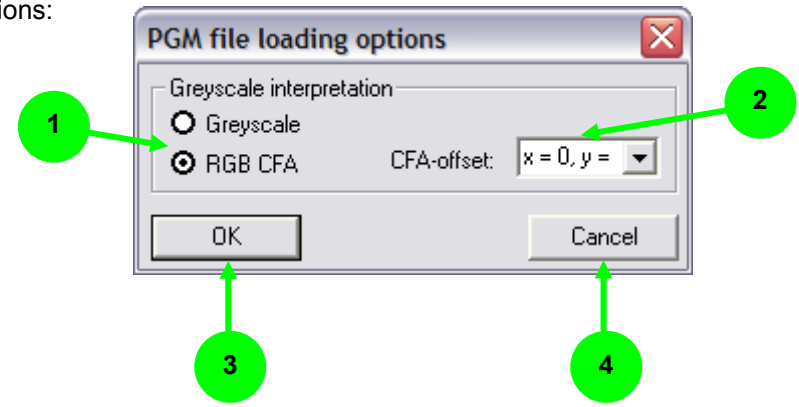
1	Indicates whether the image data shall be interpreted in grey scale values or as CFA (Color Field Array). This setting is only relevant for images in greyscale format.
2	**CFA-Offset:** Indicates the CFA Offset with regard to the pixel within the upper left corner on the sensor.
3	**OK:** Confirms the selection and closes the dialog.
4	**Cancel:** Closes the dialog without applying any alterations.

- RAW file options:



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 from the image type, as e.g. CFA Offsets.
5	**Components/pixel:** Number of components per pixel, e.g. 3 for RGB data.
6	**Bit/component (mem):** Memory bits per component.
7	**Bit/component (used):** Real used bits per component.
8	**MSB position: M**ost **S**ignificant **B**it Position.
9	**Extra bytes in each line:** Number of extra bytes per image line.
10	**Begin of data offset in file:** In case the file contains a header the position of the first image byte can be indicated here.
11	**OK:** Confirms the selection and closes the dialog.
12	**Cancel:** Closes the dialog without applying any alterations.

- PGM file options:

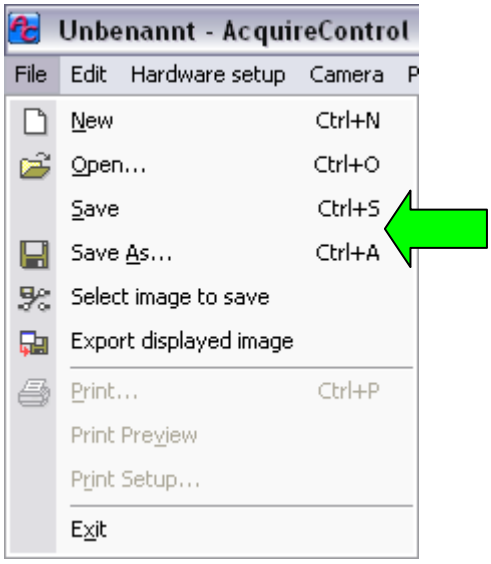


1	Indicates whether the image data shall be interpreted in grey scale values or as CFA (Color Field Array). This setting is only relevant for images in greyscale format.
2	**CFA-Offset:** Indicates the CFA Offset with regard to the pixel within the upper left corner on the sensor.
3	**OK:** Confirms the selection and closes the dialog.
4	**Cancel:** Closes the dialog without applying any alterations.

Note: To create a new grabber document after loading an image it is neccessary click „File → New“ (*see chapter 3.5.1 Closing the camera and grabber*).

3.3.6 Saving images

In order to save a recorded image several options are available. The menu items „Save“ and „Save as...“ store the previously under menu entry „Select image to save“ defined image.

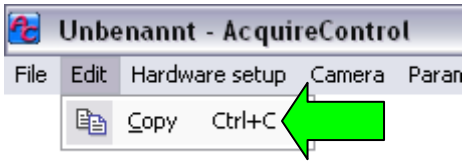


If at program end an unsaved document exist, a warning will be displayed.

The menu item „Select image to save“ displays in dependence of the used image process chain more or less entrys. The image, which is created in the chain after the menu entry will be saved. The image below shows an example menu for a RGB-CFA image. With this setting the image which was processed by the color will be saved.

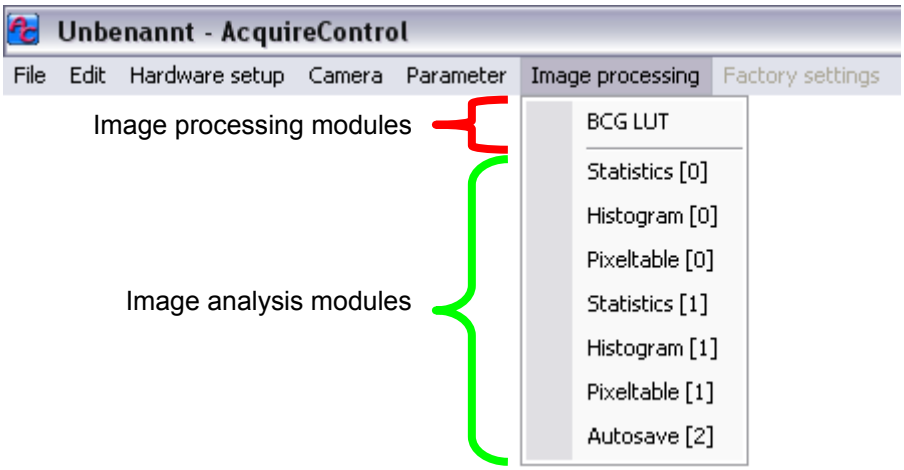
3.3.7 Clipboard

Via the command „Edit → Copy“ the image displayed in the actual document can be copied into the Windows clipboard.



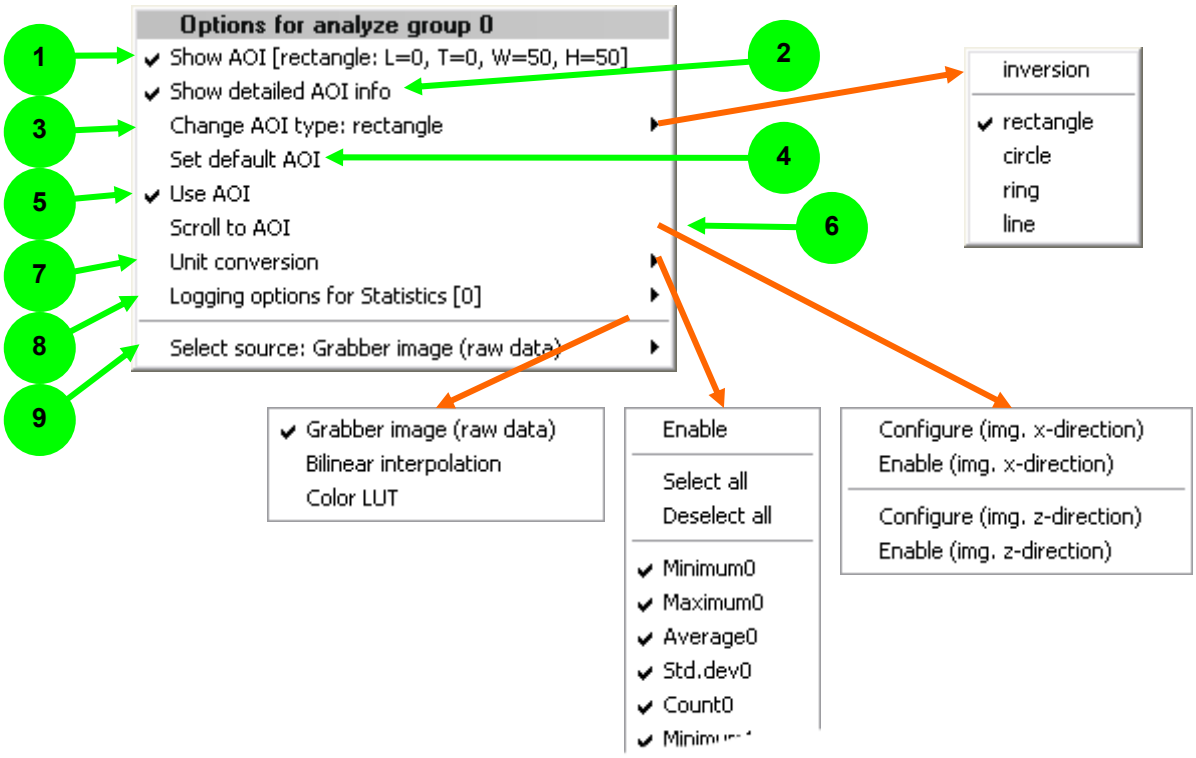
3.4 Image- and program parameters

AcquireControl offers miscellaneous adjustment and display possibilities for image parameters. All accompanying options are 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.

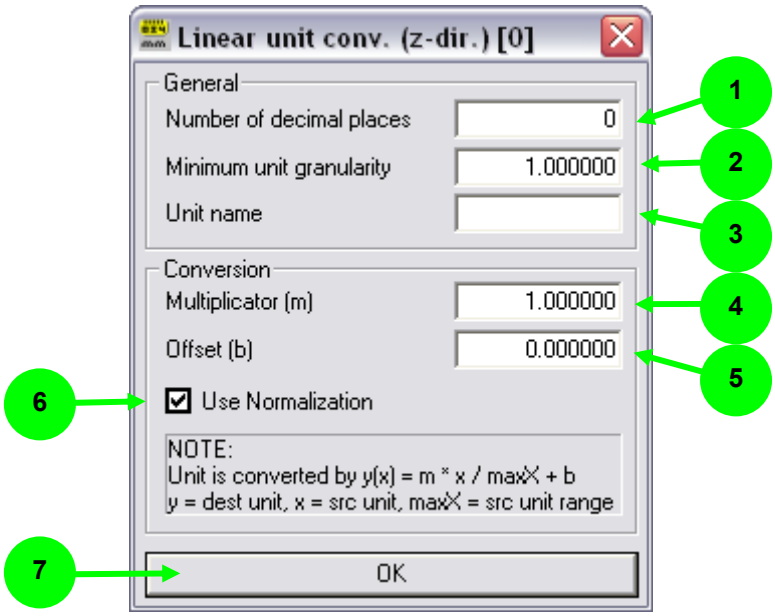


3.4.1 Options for an analyze group

An analysis group can be configured by the respective button within the alalysis dialog. The following menu is shown. An analysis group consists of an AOI, a certain number of analysis moduls and a reference to the image in the image process chain to be analysed (*see chapter 2 Software Concept*).



1	**Show AOI:** Shows or hides the accompanying AOI.
2	**Show detailed AOI info:** Shows additional details for this AOI.
3	Change AOI type: Changes the AOI form. Available are: • Inversion: If this option is chosen the AOI is inverted. • Rectangle • Circle • Ring • Line
4	**Default AOI:** Sets the default configuration for this AOI.
5	**Use AOI:** Switches this AOI on or off. If the AOI is disabled the whole image will be used for the analysis module.
6	**Scroll to AOI:** Scrolls the main window to the AOI.
7	**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 (greyscale) conversion setup. • Enable (img. z-direction): Turns conversion on or off.
8	**Logging options for ...:** Here the logging can be enabled fort he calling dialog (e.g. Histogram dialog) (*see chapter 3.4.14 Logging*). This menu entry is only available, if the menu was displayed from a dialog. THe submenu is used for the configuration of the logging: • **Enable:** Enable or disable the logging fort he calling module. • **Select all:** Select all values. • **Deselect all:** Deselect all values. Subsequently all values of the module which can be selected are listed.
9	**Select source:** Here the source image for the analysis group can be changed. In dependence of the used image process chain more or less images are available here.



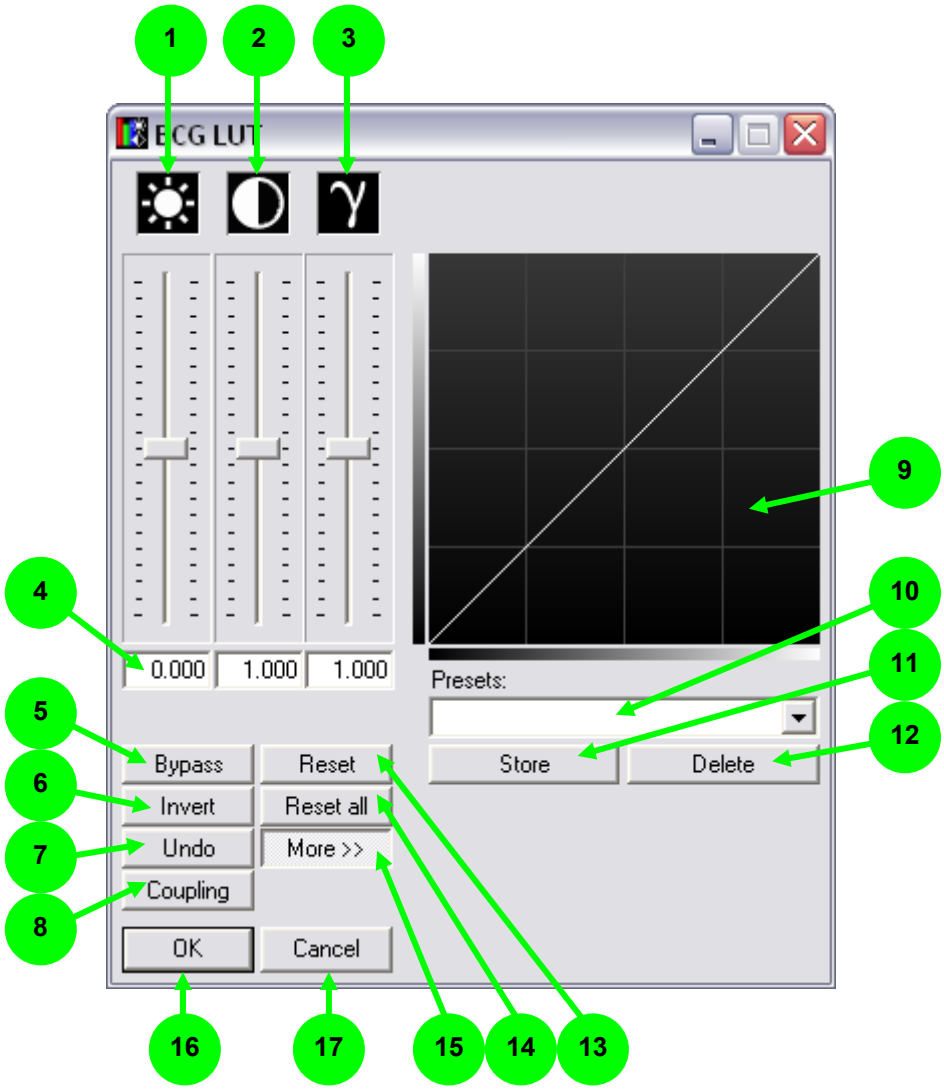
1	**Number of decimal places:** Number of decimal places.
2	**Minimum unit granularity:** Minimum granularity for unit rounding.
3	**Unit name:** Name of the unit.
4	**Multiplicator (m):** Multiplicator for conversion.
5	**Offset (b):** Offset for conversion.
6	**Use normalization:** The output value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

3.4.2 Brightness, contrast & color adjustments

For the modification of brightness, contrast and gamma, the LUT-dialog is available (**L**ook **U**p **T**able). Following a restart of the program the last adjustment of the LUT is reconstructed for the camera document.

3.4.2.1 Monochrome LUT

The following dialog controls brightness, contrast and gamma for monochrome or temperature images.

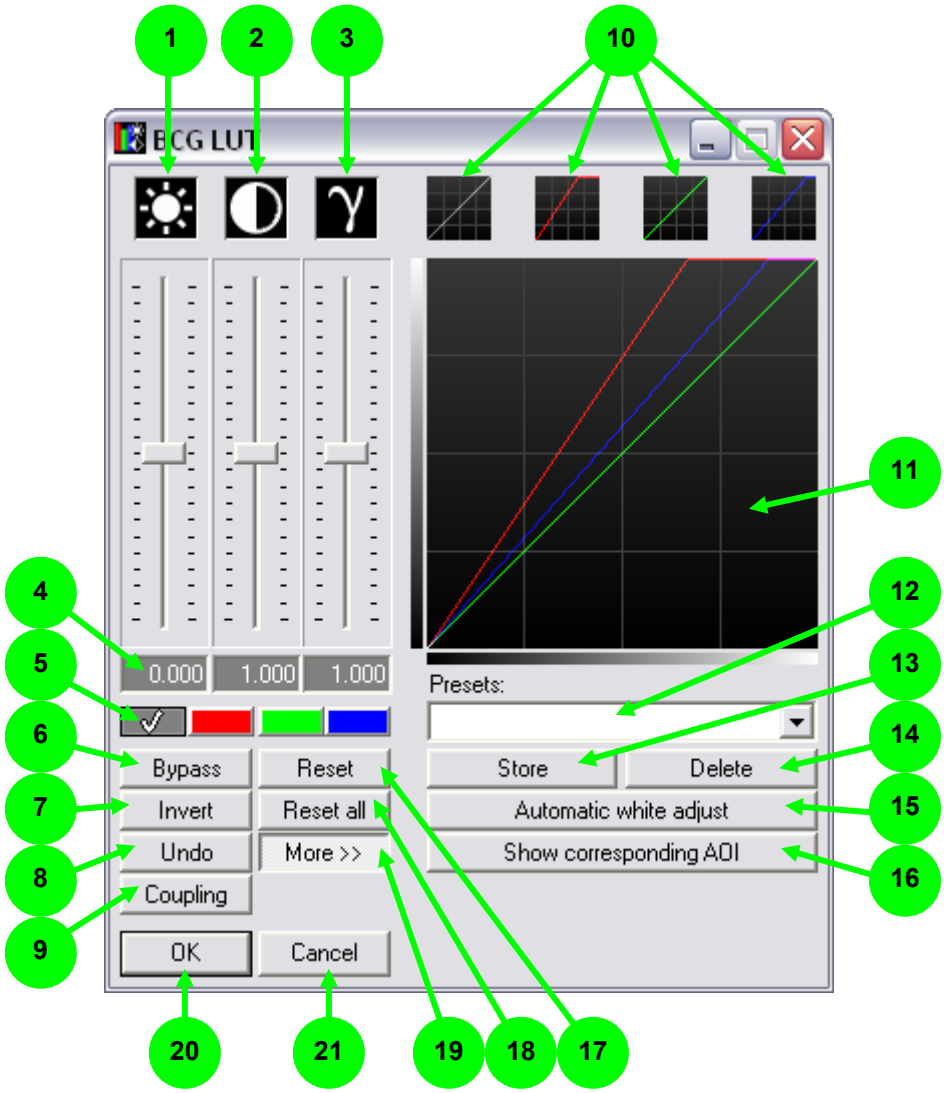


1	Control for brightness.
2	Control for contrast.
3	Control for gamma value.
4	Decimal value for the control adjustments.
5	**Bypass:** If this button is active, the LUT becomes invalidated and for this reason a rapid comparison of before and after is possible.
6	**Invert:** Inverts the LUT.
7	**Undo:** 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:** Selection of pre-defined 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	**Reset:** Sets all adjustments for the actual channel to neutral.
14	**Reset all:** Sets all adjustments for all channels to neutral.
15	**More >>:** Opens and closes the right dialog half.
16	**OK:** Confirms the selection and closes the dialog.
17	**Cancel:** Closes the dialog without applying any alterations.

3.4.2.2 RGB LUT

Via this dialog also the white adjustment can be applied which is necessary for color cameras.

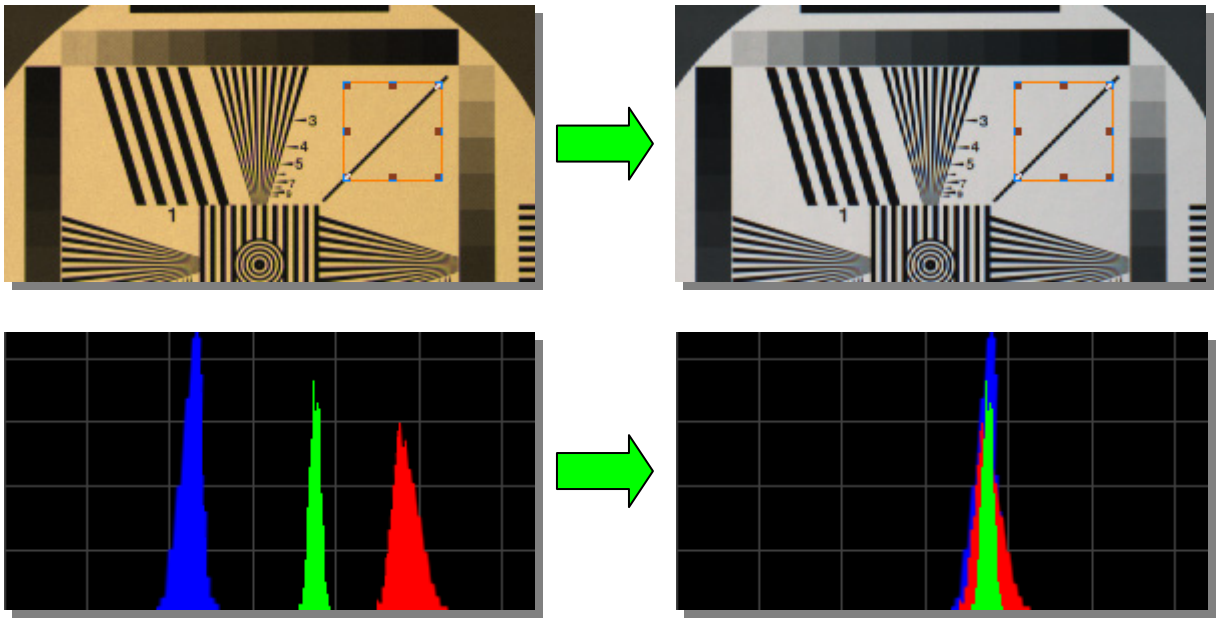


1	Control for brightness.
2	Control for contrast.
3	Control for gamma value.
4	Decimal value for the control adjustments.
5	Via these buttons the channel can be selected, the slider control adjustments shall be valid for. Available channels are: Total, red, green and blue.
6	**Bypass:** If this button 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	In these graphics the individual LUT-characteristic curves are displayed

11	This main graphic shows the LUT characteristic curve resulting from all channel adjustments.
12	**Presets:** Selection of pre-defined 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	**Automatic white adjust:** Here an automatic white adjustment for the indicated AOI is applied (Not for infrared cameras).
16	**Show corresponding AOI:** Shows the AOI for white adjustment.
17	**Reset:** Sets all adjustments for the actual channel to neutral.
18	**Reset all:** Sets all adjustments for all channels to neutral.
19	**More >>:** Opens and closes the right dialog half.
20	**OK:** Confirms the selection and closes the dialog.
21	**Cancel:** Closes the dialog without applying any alterations.

3.4.2.3 White adjustment

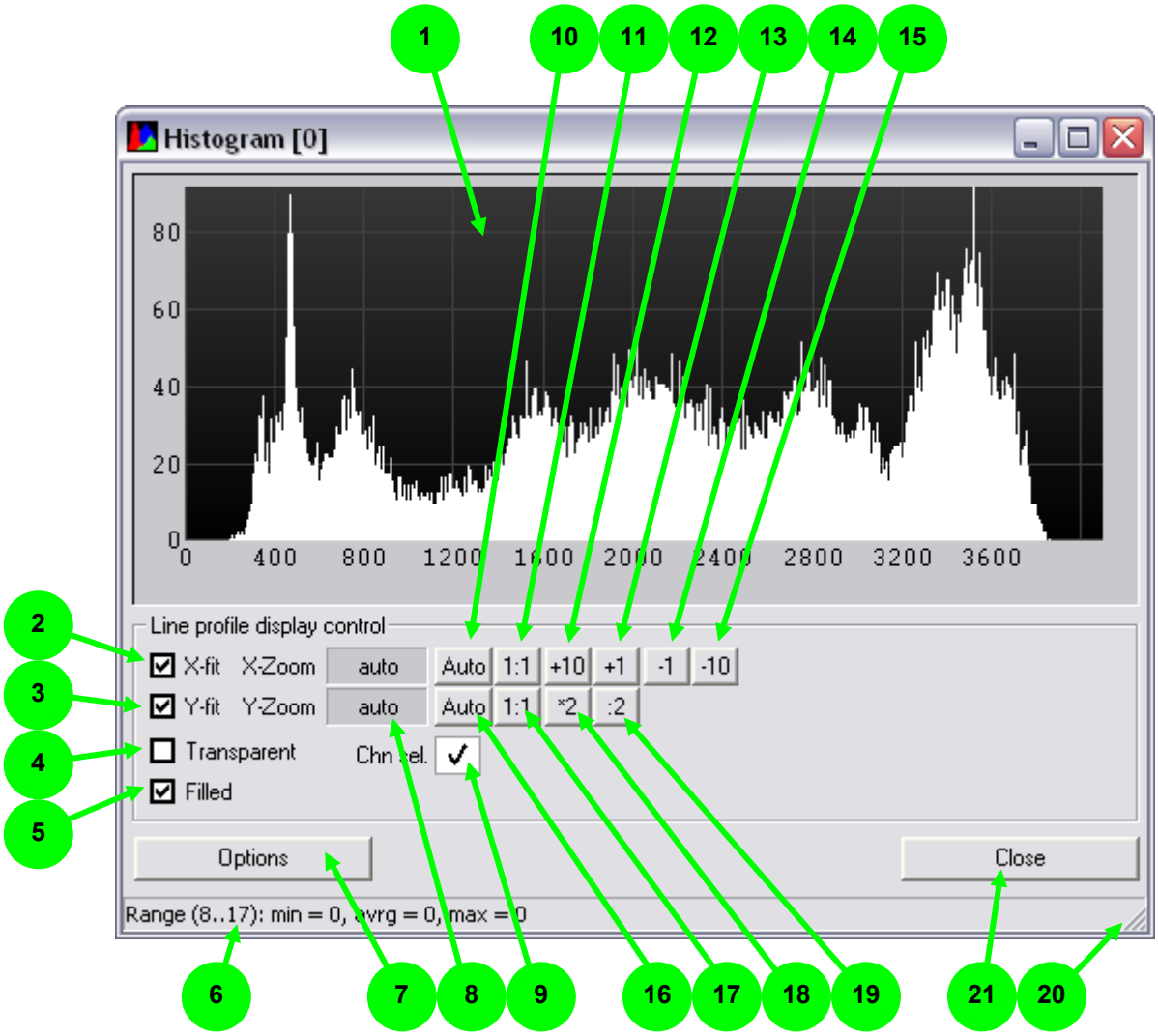
Basis for a good white adjustment is a good measurement window in the image. For this is used the „Whitebalance AOI“. This AOI can be changed by clicking on „AOI for automatic white adjust“ in the LUT dialog or by directly selecting the „Show corresponding AOI“ in the already opened AOI dialog. Now the AOI has to be moved to an image section, possibly containing a neutral grey area in reality. Over-exposed and under-exposed areas can negatively influence the result of the white adjustment. The following images illustrate a typical white adjustment with the corresponding histogram.



3.4.3 Histogram

With the button „Histogram“ on the „Image Processing Toolbar“ a histogram can be displayed. 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.

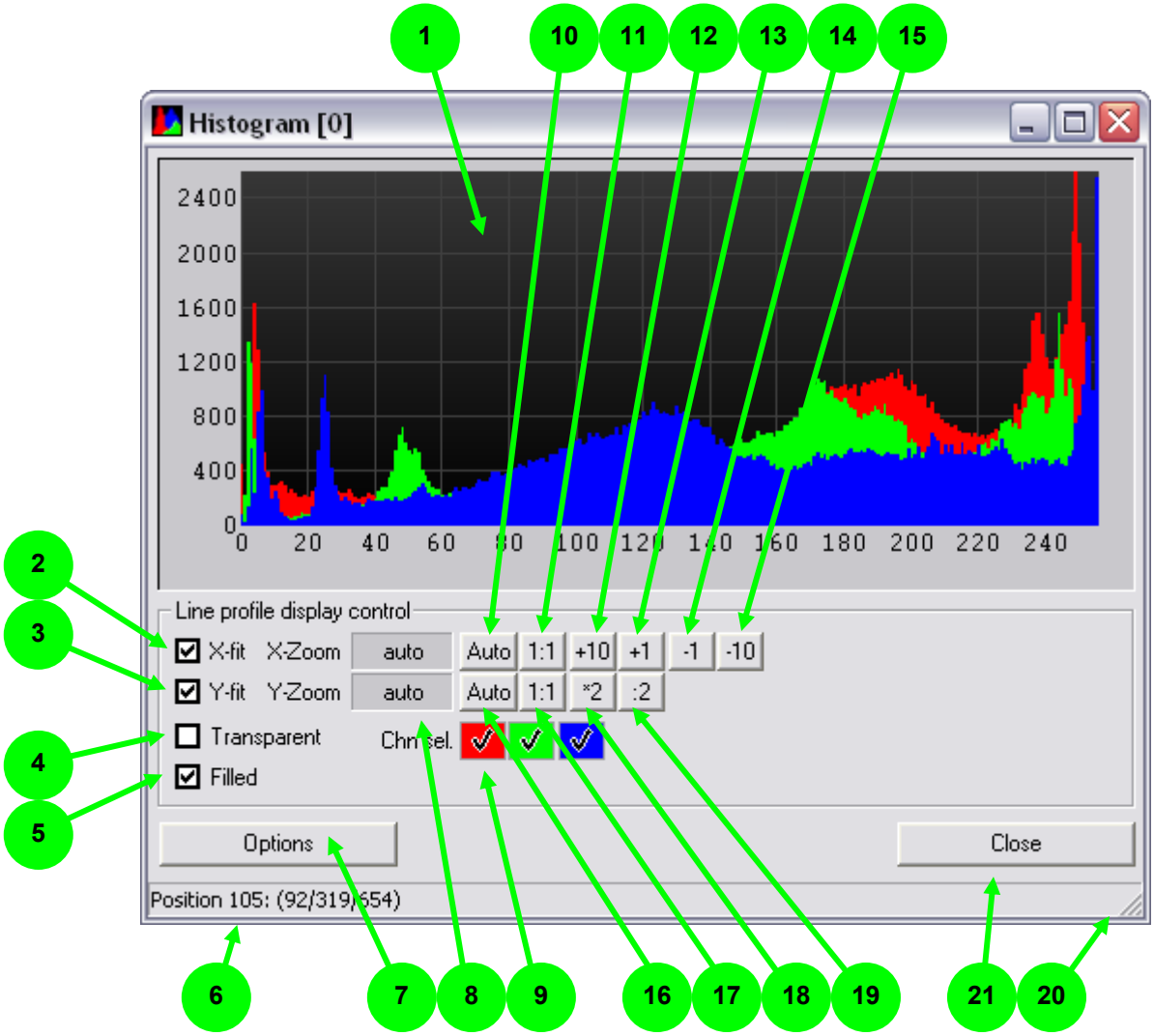
3.4.3.1 Monochrome histogram



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.
7	**Options:** If this button is pressed, a menu with all options regarding this analyse group will be shown (see *chapter 3.4.1 Options for an analyze group*).
8	**X-Zoom / Y-Zoom:** Actual zoom-ratio for the display window.
9	**Chn. sel.:** Individual color channels can be deactivated here.
10	**Auto:** At a click on this control an integer amount is determined for the X-zoom in order that all values fit in the display area.
11	**1:1:** Adjusts the X-zoom-ratio to 1:1.
12	**+10:** Increments the X-zoom-ratio for 10.

13	**+1:** Increments the X-zoom-ratio for 1.
14	**-1:** Decrements the X-zoom-ratio for 1.
15	**-10:** Decrements the X-zoom-ratio for 10.
16	**Auto:** At a click on this control an integer amount is determined for the Y-zoom in order that all values fit in the display area.
17	**1:1:** Adjusts the Y-zoom-ratio to 1:1.
18	**x2:** Multiplies the Y-zoom-ratio with 2.
19	**:2:** Divides the Y-zoom-ratio by 2.
20	Here the size of the histogram window can be modified.
21	**Close:** Closes the dialog.

3.4.3.2 RGB Histogram



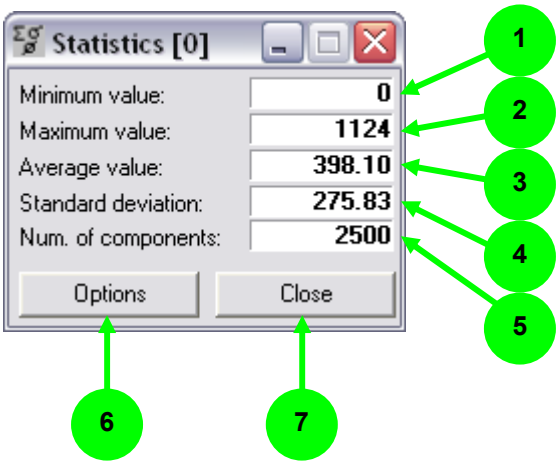
1	Histogram window.
2	**X-Fit:** Adapts the scale in X-direction to the actual size of the histogram window.
3	**Y-Fit:** Adapts the scale in Y-direction to the actual size of the histogram window.
4	**Transparent:** Draws the histogram channels transparent.
5	**Filled:** Changes the draw mode of the 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.
7	**Options:** If this button is pressed, a menu with all options regarding this analyse group will be shown (see *chapter 3.4.1 Options for an analyze group*).
8	**X-Zoom / Y-Zoom:** Actual zoom-ratio for the display window.

9	**Chn. sel.:** Individual color channels can be deactivated here.
10	**Auto:** At a click on this control an integer amount is determined for the X-zoom in order that all values fit in the display area.
11	**1:1:** Adjusts the X-zoom-ratio to 1:1.
12	**+10:** Increments the X-zoom-ratio for 10.
13	**+1:** Increments the X-zoom-ratio for 1.
14	**-1:** Decrements the X-zoom-ratio for 1.
15	**-10:** Decrements the X-zoom-ratio for 10.
16	**Auto:** At a click on this control an integer amount is determined for the Y-zoom in order that all values fit in the display area.
17	**1:1:** Adjusts the Y-zoom-ratio to 1:1.
18	**x2:** Multiplies the Y-zoom-ratio with 2.
19	**:2:** Divides the Y-zoom-ratio by 2.
20	Here the size of the histogram window can be modified.
21	**Close:** Closes the dialog.

3.4.4 Statistics

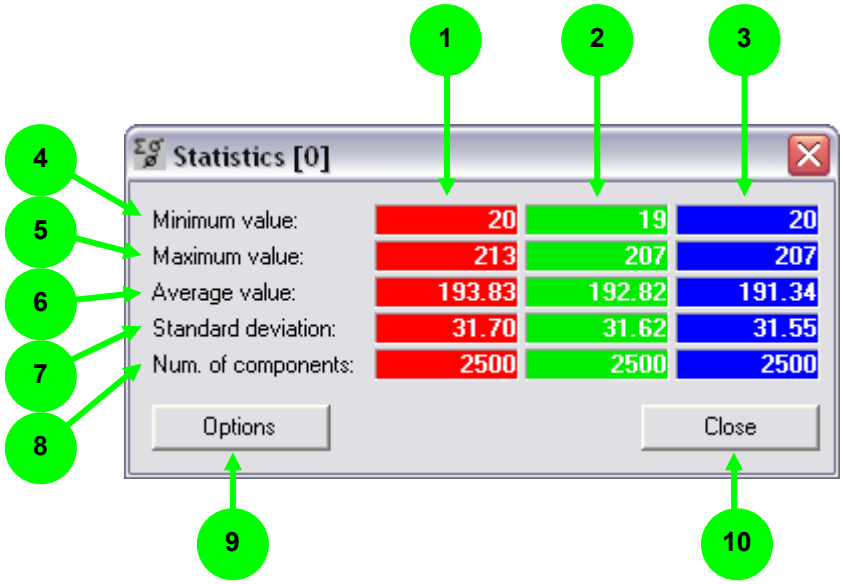
The software offers the possibility to evaluate statistic data for any AOI area or for the entire image. The statistics dialog will be called by the „Statistics“ button on the „Image Process Toolbar“.

3.4.4.1 Monochrome statistics



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 having been included into the calculation.
6	**Options:** If this button is pressed, a menu with all options regarding this analyse group will be shown (*see chapter 3.4.1 Options for an analyze group*).
7	**Close:** Closes the dialog.

3.4.4.2 RGB Statistics



1	Statistics data for red-channel.
2	Statistics data for green-channel.
3	Statistics data for 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.
7	**Standard deviation:** Indicates the standard deviation within the AOI.
8	**Num. of components:** Number of pixels having been included into the calculation.
9	**Options:** If this button is pressed, a menu with all options regarding this analyse group will be shown (*see chapter 3.4.1 Options for an analyze group*).
10	**Close:** Closes the dialog.

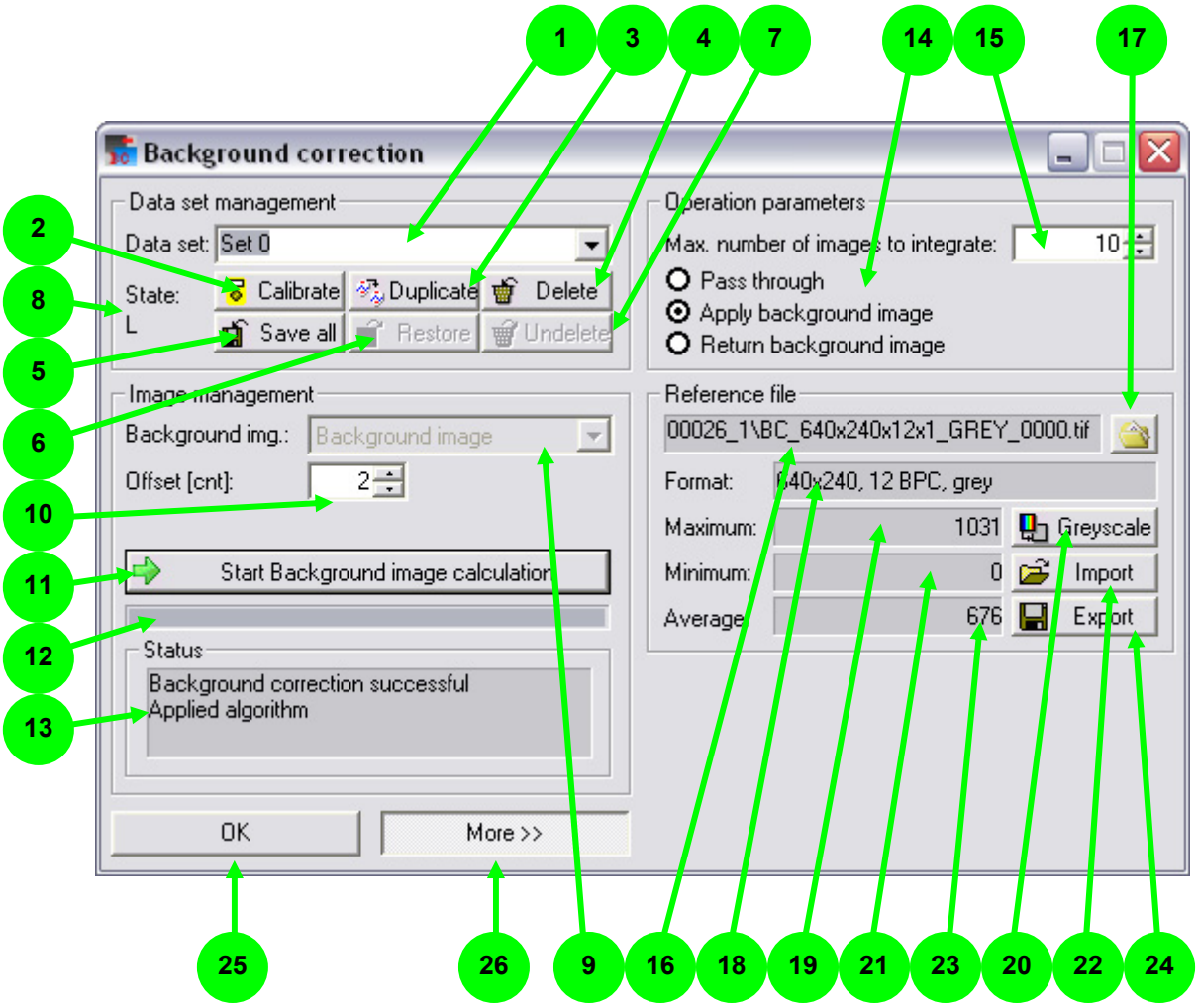
3.4.5 Background correction

The background correction dialog is opened via the image process toolbar. This image process module is used for the suppression of the visible underground structure of digital cameras. This module integrated first a predefined number of camera dark images to a reference image. This reference image will be charged with the input data afterwards. It is valid:

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

with
Y(x,y) = Output data
E(x,y) = Input data
D(x,y) = Reference data (Dark image)
K = Additive constant factor (Offset)

The additive constant factor should be set to the average value.

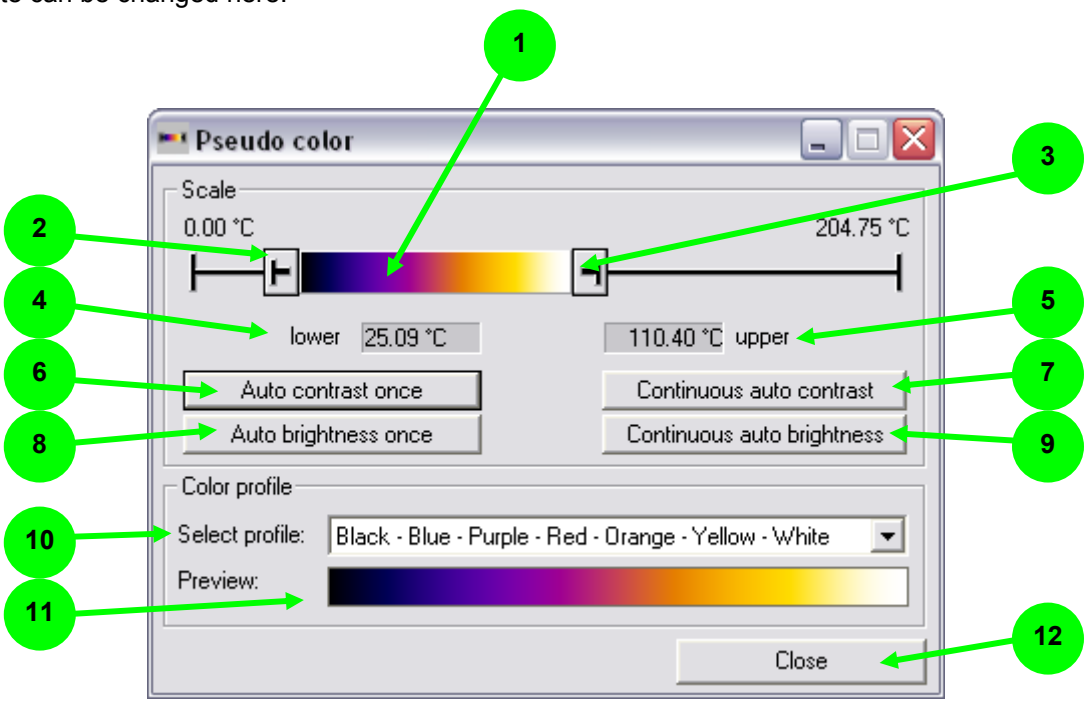


1	**Data set:** Correction image data set consisting from a low- and a high temperate image.
2	**Calibrate:** Search automatically for the best correction data set.
3	**Dublicate:** Dublicate the currently selected data set.
4	**Delete:** Marks the currently selected data set for deletion.
5	**Save all:** Save all correction data set on harddisk.
6	**Restore:** Restore the previous data set from harddisk inclusive ideal value.
7	**Undelete:** Delete the data set delete mark.

8	**State:** Data set state: • **M:** Modified: Data set has been modified. • **L:** Loaded: Data set was loaded from harddisk. • **D:** Delete: Data set is marked for deletion.
9	**Background image:** Name of the background image.
10	**Ideal val. [cnt]:** Digital ideal value for the background image (refers to 12 bit).
11	**Start background image calculation:** Starts the integration of the input data. Parallel to that the image acquisition must be started 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 will be disabled and the original data will be 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:** Number of images to integrate.
16	Actual import / export path
17	Here the import / export path is set.
18	**Format:** Information about the image format.
19	**Maximum:** Maximum grey value of the integration image. On mouse click on the value the value will be set as offset.
20	**Greyscale:** If the input image is a color image the reference image can be converted to a grey image here.
21	**Minimum:** Minimum grey value of the integration image. On mouse click on the value the value will be set as offset.
22	**Import:** Import reference image.
23	**Average:** Average grey value of the integration image. On mouse click on the value the value will be set as offset.
24	**Export:** Export reference image.
25	**OK:** Closes the dialog.
26	**More >>:** Opens and closes the right dialog half.

3.4.6 Selection of the temperature range and the color profile

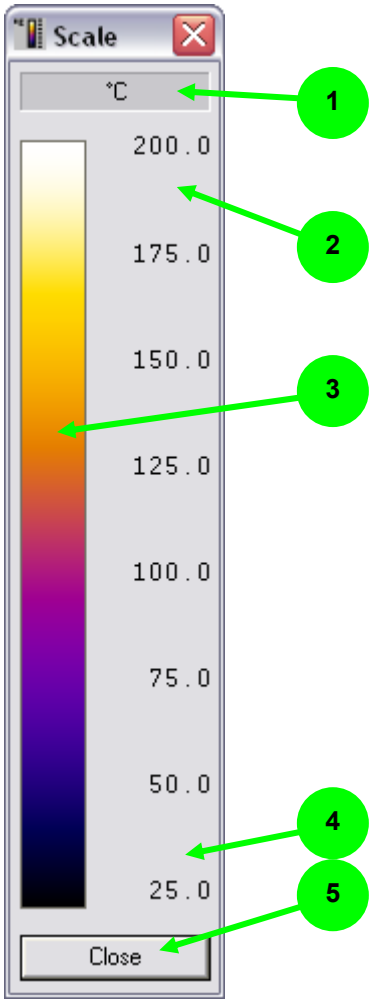
The displayed temperature range of the infrared camera can be spread arbitrary in order to emphasize a specific temperature range. The pseudo color dialog is used for that. Additionally the used color palette can be changed here.



1	Slider with the actual temperature profile. In case of move of this control boundary values of the temperature range change.
2	Slider for the lower border of the temperature range.
3	Slider for the upper border of the temperature range.
4	Display of the lower border of the temperature range.
5	Display of the upper border of the temperature range.
6	**Auto contrast once:** By clicking on this button the contrast is adjusted to it's optimal value by means of the incoming image data.
7	**Continuous auto contrast:** Adjusts the contrast continuously to it's optimal value by means of the imcoming image data.
8	**Auto brightness once:** By clicking on this button the brightness is adjusted to it's optimal value by means of the incoming image data.
9	**Continuous auto brightness:** Adjusts the brightness continuously to it's optimal value by means of the imcoming image data.
10	**Select profile:** Here the actual used color profile can be changed.
11	**Preview:** Preview of the color profile.
12	**Close:** Closes the dialog.

3.4.7 Temperature scale display

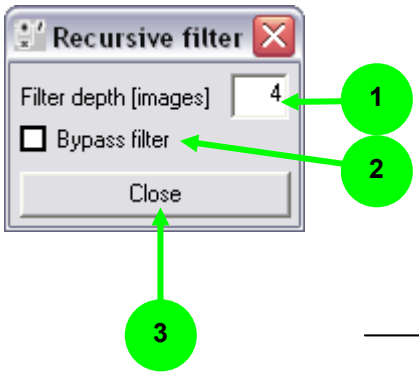
If required the actual temperature scale can be displayed via the image process toolbar.



1	Actual unit of the temperature scale.
2	Current displayable maximum temperature.
3	Actual temperature profile.
4	Current displayable minimum temperature.
5	**Close:** Closes the dialog.

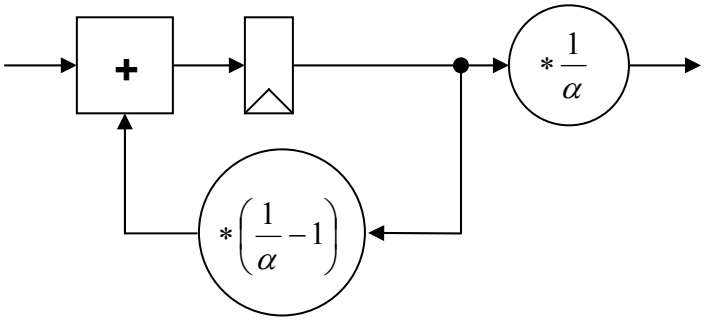
3.4.8 Recursive filter configuration

If the image process chain „Precorrection and recursive filter for temperature data“ is selected, an additional recursive filter can be applied to the input data.



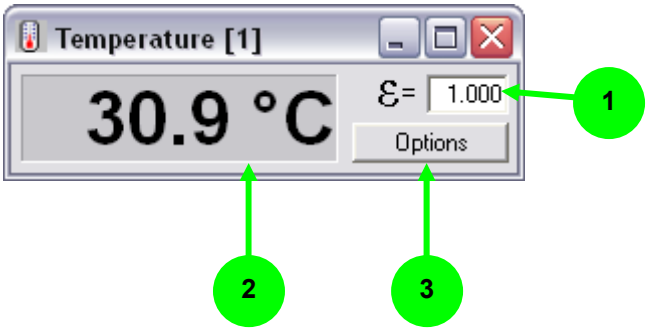
1	Filter depth (α).
2	**Bypass filter:** Bypass the filter processing.
3	**Close:** Closes the dialog.

Principle of a recursive filter:



3.4.9 Temperature display

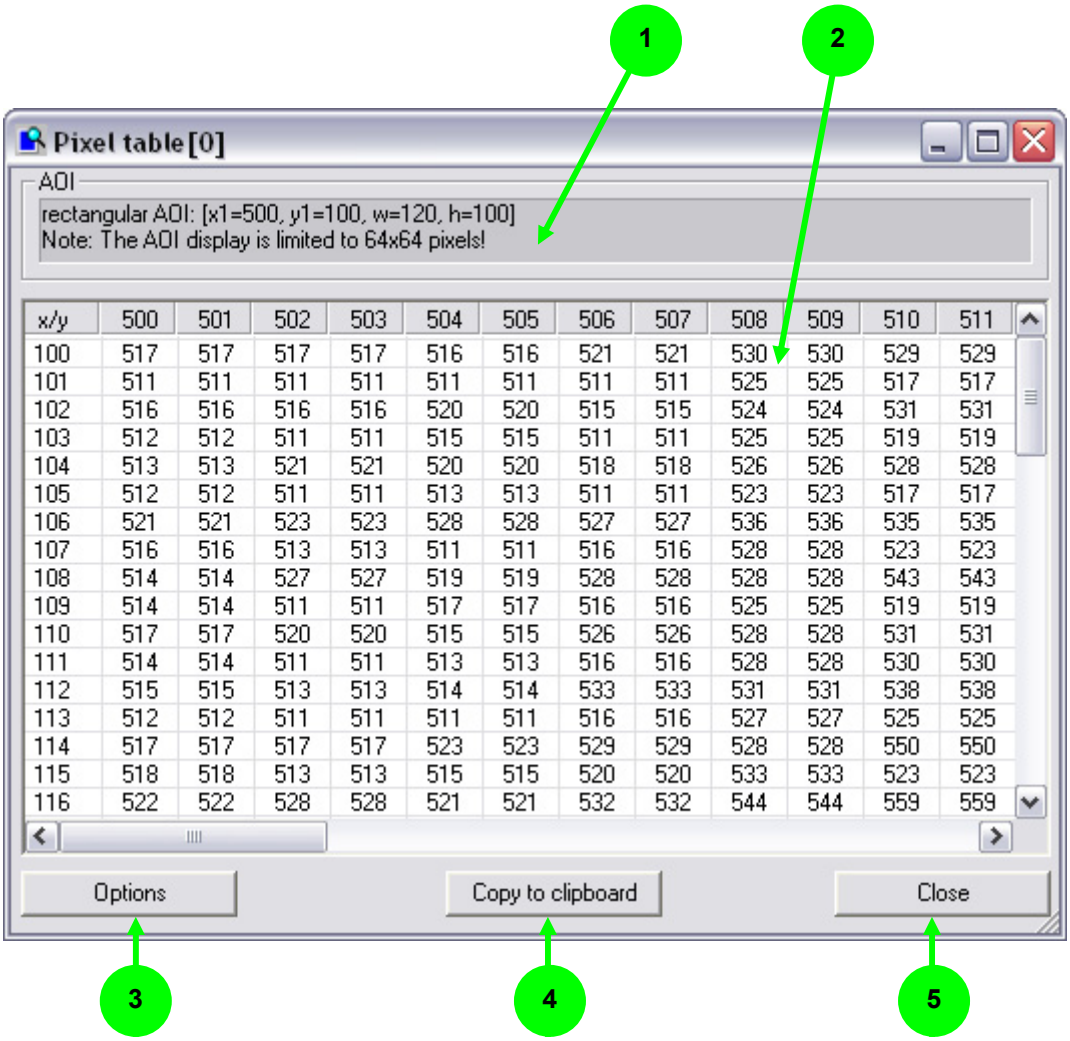
The AcquireControl can analyse up to five temperature measurement areas in the image simultaneously. A temperature measurement dialog can be shown with the image process toolbar.



1	Here the emission value for the measurement window has to be entered.
2	The average temperature value in the measurement window.
3	**Options:** If this button is pressed, a menu with all options regarding this analyse group will be shown (*see chapter 3.4.1 Options for an analyze group*).

3.4.10 Pixel table

For a detailed pixel analysis the pixel table dialog is available. This dialog is called with the “Pixel table” button on the „Image Prozess Toolbar“.

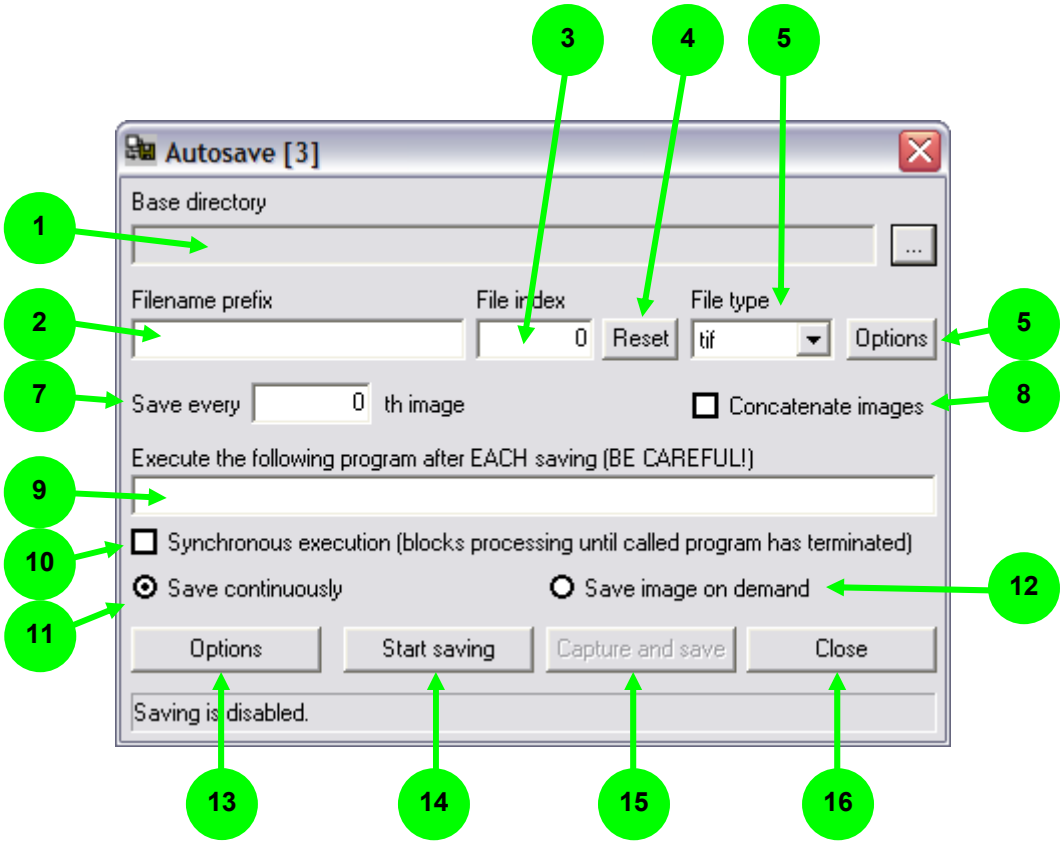


x/y	500	501	502	503	504	505	506	507	508	509	510	511
100	517	517	517	517	516	516	521	521	530	530	529	529
101	511	511	511	511	511	511	511	511	525	525	517	517
102	516	516	516	516	520	520	515	515	524	524	531	531
103	512	512	511	511	515	515	511	511	525	525	519	519
104	513	513	521	521	520	520	518	518	526	526	528	528
105	512	512	511	511	513	513	511	511	523	523	517	517
106	521	521	523	523	528	528	527	527	536	536	535	535
107	516	516	513	513	511	511	516	516	528	528	523	523
108	514	514	527	527	519	519	528	528	528	528	543	543
109	514	514	511	511	517	517	516	516	525	525	519	519
110	517	517	520	520	515	515	526	526	528	528	531	531
111	514	514	511	511	513	513	516	516	528	528	530	530
112	515	515	513	513	514	514	533	533	531	531	538	538
113	512	512	511	511	511	511	516	516	527	527	525	525
114	517	517	517	517	523	523	529	529	528	528	550	550
115	518	518	513	513	515	515	520	520	533	533	523	523
116	522	522	528	528	521	521	532	532	544	544	559	559

1	Here the form and size of the used AOI will be shown. Independend 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:** If this button is pressed, a menu with all options regarding this analyse group will be shown (*see chapter 3.4.1 Options for an analyze group*).
4	**Copy to clipboard:** Copies the table data to the windows clipboard.
5	**Close:** Closes the dialog.

3.4.11 Autosave

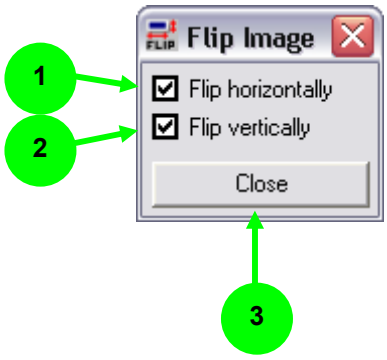
With help of the auto save module every acquired image can be automatically stored into a directory. Thus a simple sequence recording is possible. Normally every image is stored into a separate file. In order to generate a movie (AVI / MPG) file from that, an external software must be used.



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.
6	**Options:** With this button additional settings for the chosen file type can be adjusted.
7	**Save every ... th image:** Store only every nth picture. Since the storage uses 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 subimages. This is only possible when using TIF or RAW images.
9	**Execute ...:** Execute after every storage a program.
10	**Synchronous ...:** Executest he entered programm synchronously. This means that the internal execution of the main application is stopped until the external program has not quit.
11	**Save continuously:** Stores the images continuously.
12	**Save image on demand:** Stores an image only on mouse click.
13	**Options:** If this button is pressed, a menu with all options regarding this analyse group will be shown (*see chapter 3.4.1 Options for an analyze group*).
14	**Start saving:** Start auto save process.
15	**Capture and save:** In the „Save image on demand" mode this button stores one image.
16	**Close:** Closes the dialog.

3.4.12 Flip image

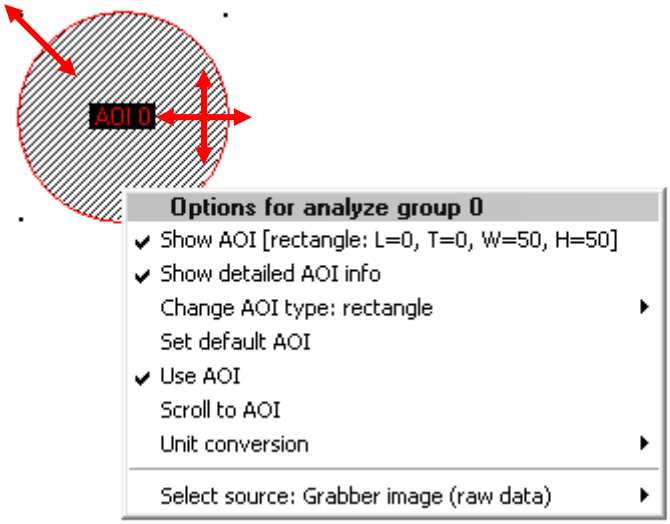
The Flip module is used the mirror images from the camera. This is used for X-Ray cameras.



1	**Flip horizontally:** Mirrors the image horizontally.
2	**Flip vertically:** Mirrors the image vertically.
3	**Close:** Closes the dialog.

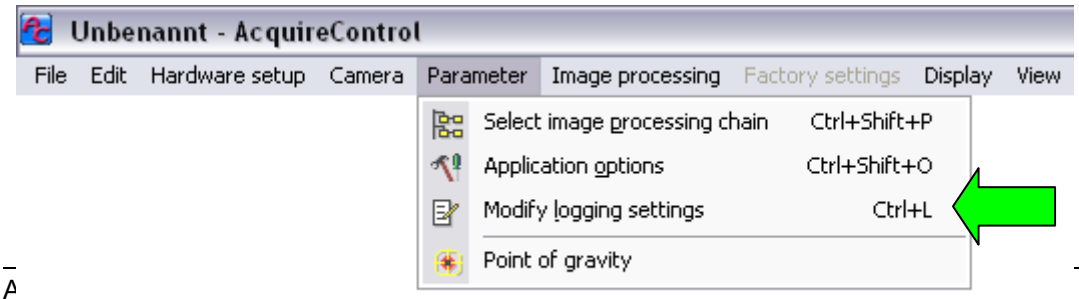
3.4.13 AOI configuration

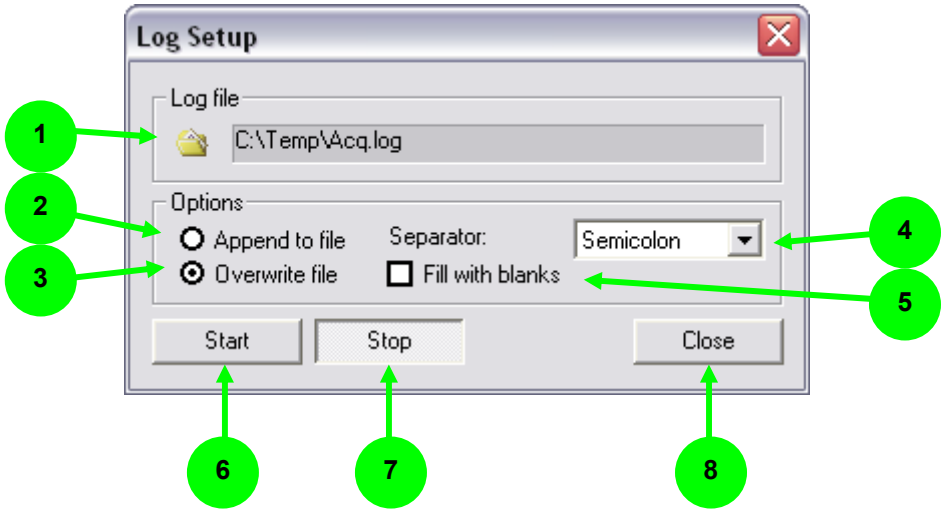
If a AOI for an analysis group was displayed it can be modified on the drawing area with the mouse. If one clicks with the right mouse button on the AOI the accompanying group menu will be shown.



3.4.14 Logging

With the menu item „Parameter → Modify logging settings“ or the corresponding icon on the „Parameter toolbar“ the logging can be enabled. This logging can be used for example in order to determine statistical data over a longer period and afterwards to process the data in a spreadsheet.





1	Set the path to the log file.
2	**Append to file:** Appends the log to the end of a 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 it will be created.
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	**Start:** Starts the logging
7	**Stop:** Stops the logging.
8	**Close:** Closes the dialog.

The logging can be enabled for the data of miscellaneous analysis modules. For every analysis module the logging must be enabled separately (*see chapter 3.4.1 Options for an analyze group*). After every logging start some general parameters were written, like:

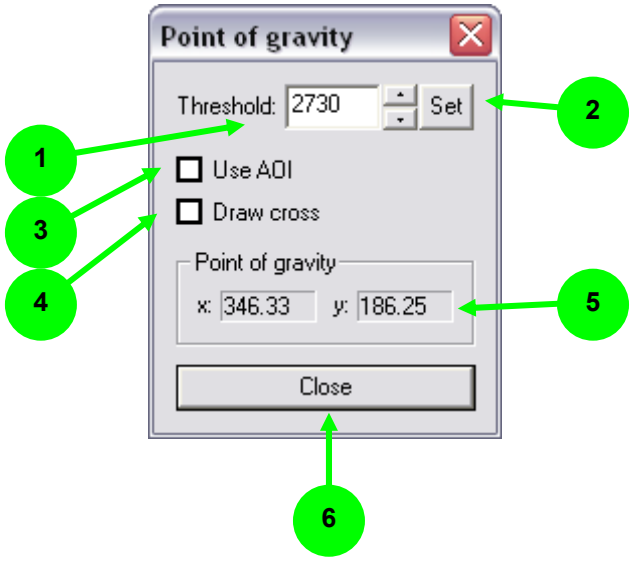
- Name of the application
- Used grabber
- Used camera
- Used image process chain
- AOI parameter
- Source image for the analysis module

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

3.4.15 Image point of gravity

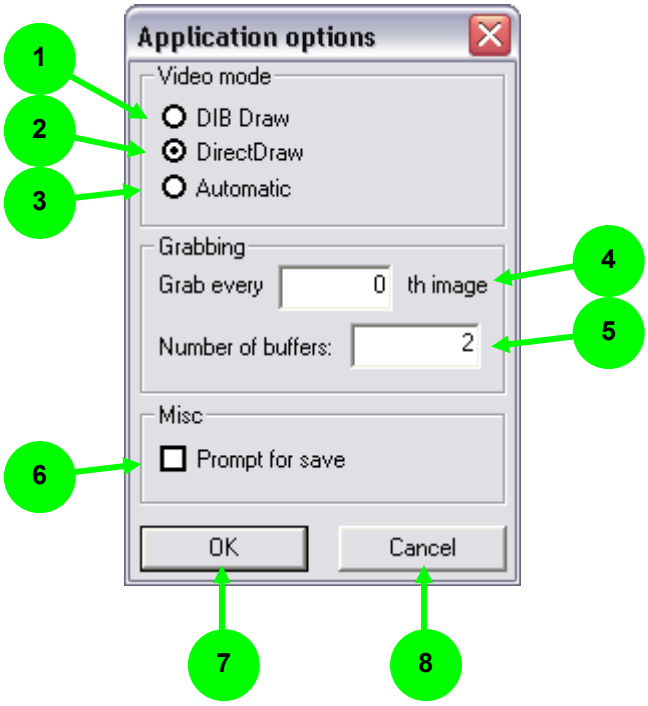
With the menu item „Parameter → Point of gravity“ the point of gravity of an image or an AOI can be displayed.



1	**Threshold:** Only pixel value above this value are included in calculation.
2	**Set:** Sets the current value.
3	**Use AOI:** If this option is activated, only the AOI will be used for the calculation.
4	**Draw Cross:** Draws a coordinate crosshair on the calculated point of gravity.
5	**Point of Gravity:** Point of gravity coordinates.
6	**Close:** Closes the dialog.

3.4.16 Application options

All program parameters will be configure with the menu „Parameter → Application options“ or the corresponding icon on the „Parameter Toolbar“.

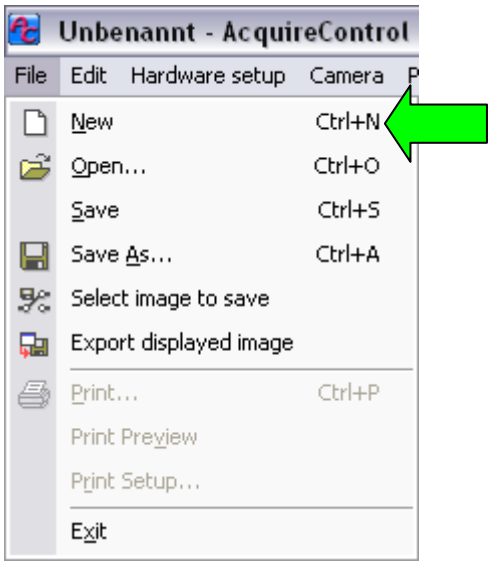


1	**DIB Draw:** This drawing method can be chosen if there is no DirectX installon on the PC or if any display problems occure while using DirectX. Here only standard Windows GDI procedures will be used.
2	**DirectDraw:** Here only DirectX functions are used to draw an image which results in a flicker free and faster drawing.
3	**Automatic:** (Recommended) his 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. It is recommended to adjust this value to 2 and only to experiment on other values in case of speed problems.
6	**Promt for save:** Enables or disables the request to save a changed document.
7	**OK:** Confirms the selection and closes the dialog.
8	**Cancel:** Closes the dialog without applying any alterations.

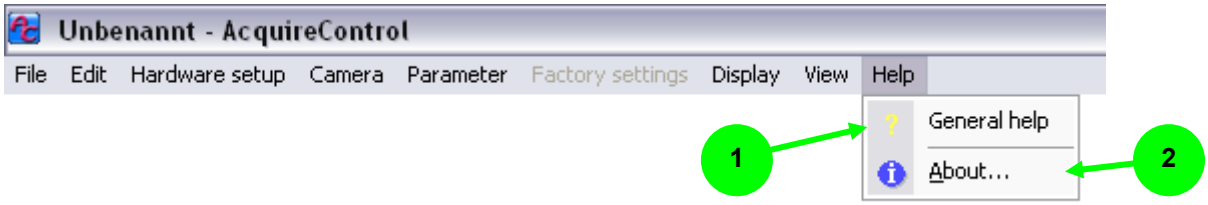
3.5 Miscellaneous

3.5.1 Closing the camera and grabber

In order to close a camera and to initialize the software in the menu „File“ the item „New“ can be chosen. This is also necessary, if an image was loaded and a new image acquisition should be started afterwards.



3.5.2 Help



1	**General help:** Calls this help file.
2	**About…:** Displays program information.

4 Further Information

For further information or support concerning installation or operation of the software you can reach us by internet under www.vdsvossk.de or by telefone under +49 / (0)541 / 80084-0.