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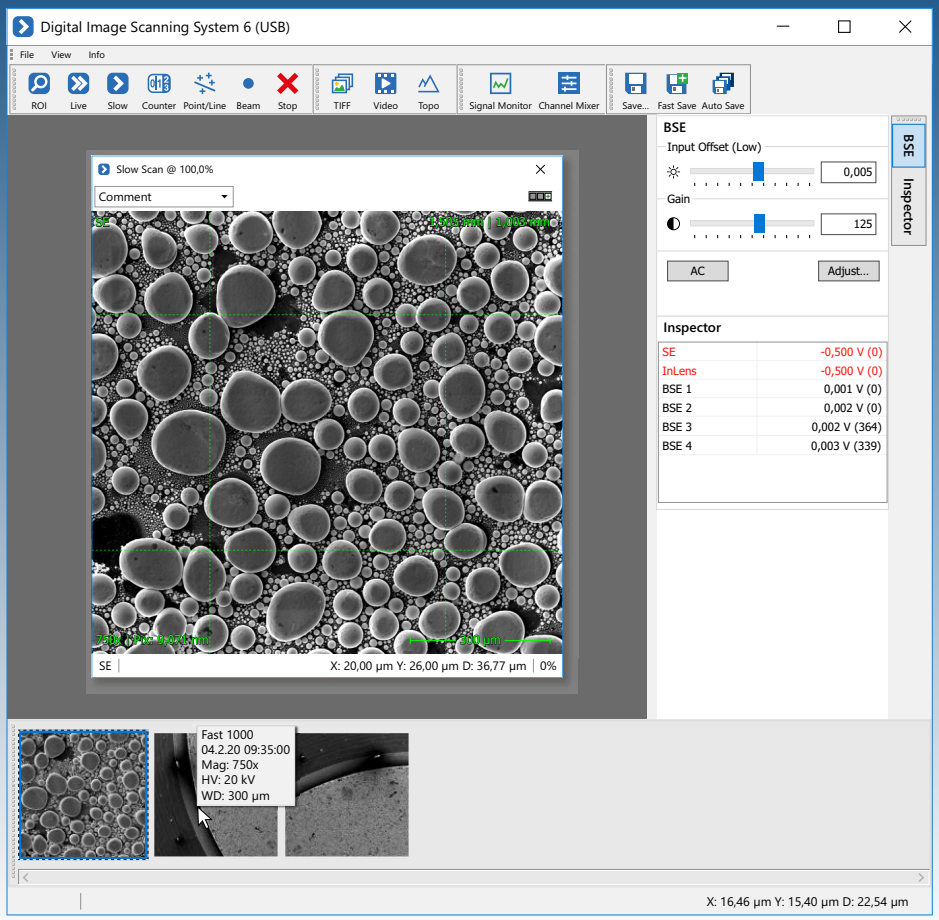

DISS 6 Software

Image Acquisition

Reference guide
Version: 6.4.0.0
Date of issue: 26.02.2025
Translation of German original

point electronic

Important Anybody working with DISS 6 Software has to have read and understood the relevant parts of this manual.

Access The staff working with the DISS 6 Software has to have constant access to the manual to prevent handling errors and guarantee trouble-free operation.

Reproduction

Notice Every endeavor has been made to make sure that the information contained in this document is complete and correct at the printing date. This manual describes all units and functions known of at the current point of time.

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Product information Product: Image Acquisition, 6th generation
Name: PE-DISS6
Manufacturer: point electronic GmbH

Table of contents

1 Introduction

Chapter overview

Purpose This chapter contains information to simplify working with this manual.

Contents This chapter contains the following information:

User groups of this manual

Operators

"Operators" are persons with right of disposal over the DISS 6 Software using this right for purchase or other purposes.

Technical staff

"Technical staff" are those persons that the operators entrust with tasks related to use and operation. Technical staff are trained by the operators to carry out their assigned tasks and are informed on the potential hazards that may arise due to improper handling.

Technical staff need to undergo a training by point electronic GmbH or a partner company of point electronic GmbH covering the following topics:

- Handling of the connected SEM
- Areas of application of the DISS 6 Software
- Handling of the DISS 6 Software
- Handling of the hardware
- Basic maintenance tasks and troubleshooting

Service technicians

"Service technicians" are staff members whose specialist training, knowledge and experience as well as familiarity with the relevant safety regulations mean they are able to assess the tasks they have been entrusted with and anticipate potential hazards.

Service technicians may be:

- Employees of point electronic GmbH or
- Employees of partner companies of point electronic GmbH

Structure of this manual

Purpose This user guide describes installation, structure and calibration of the DISS 6 Software.

Composition This user guide is composed of chapters which are organized by technical aspects.

Numbering The chapters are numbered with Arabic numerals. Chapters may be composed of sections. Sections are numbered as second numbering level (e. g. 3.1). Sections are used to structure large chapters into sub-chapters.

All pages of this user guide are numbered consecutively.

Overviews Each chapter and section contains an overview detailing contents and page numbers. This allows for direct access to a topic and independent use of single parts of this user guide.

Related information Related information within the user guide is marked by the note “Continuation next page …” resp. “... continuation:”. Please pay attention to the completeness of the information when copying parts of the user guide.

Cross references The content of this user guide is structured by topics. If further information on one topic may be found elsewhere in the user guide, the relevant chapter and page are pointed out.

Representations in this guide

Illustrations Illustrations used in this manual do not always contain all details or special cases. They only represent the relevant information.

Menu functions In this manual, the various menu functions are presented as follows:

Finding a menu point: File > Open

Keyboard shortcuts Frequently used functions and instructions may be activated by using certain key combinations. These are presented as follows:

Keyboard shortcut	Representation
Key	[Ctrl]
Key combination	[Ctrl]+[Alt]

Inputs and outputs Certain recurring symbols or descriptions are used to symbolize possible screen inputs and outputs. These are used as follows:

Inputs and outputs	Representation
Buttons	**Button**
Dialog window	Dialog window
Elements of the user interface	GUI element

Mouse functions The following table explains the concepts used in this manual to describe the handling of the mouse:

Concept	Explanation
Click	Singular pressing of the left mouse button.
Double-click	Quick double pressing of the left mouse button.
Right-click	Singular pressing of the right mouse button.
Pressed mouse button	Left or right mouse button is kept pressed during a process.
Drag & Drop	"Drag & Drop" Click on an element of the user interface, drag the element with pressed mouse button to another position, drop the element to this position.

Continuation next page …

Icons The following icons are used to mark certain information visually:

Icon	Meaning
	Notice For example:  The selected parameter will not be inserted in the parameter order.
	Reference to another part of this guidebook For example:  see “Cross references” on page 8
	Use of a tool For example:  Screwdriver TX 10

Notes Important notes are marked as follows:

NOTICE

Mind the notices in this guidebook!

Notes explain relations that even for expert users might not be evident at first glance.

The neglect of a note is no direct security risk. However, it can lead to disturbances in the operating procedure.

Identification of the warning notices

Purpose

This operating manual includes warning notices that may lead to serious consequences if disregarded. Warning notices are not only listed in the “Safety regulations” chapter, but especially in places where hazards for people, equipment and operation may arise.

Identification of warnings

There are three classes of warnings. These classes are indicated by specific signal words and colors. They include the following:

Signal word	Meaning
DANGER	Warning notice, which if disregarded will probably or very likely result in death or serious injury.
WARNING	Warning notice, which if disregarded may result in serious injury, permanent damage to health or serious property loss.
CAUTION	Warning notice, which if disregarded may result in injury or property loss including financial losses due to operational impairment.

2 System overview

Chapter overview

Purpose This chapter describes the DISS 6 Software. It contains information on system requirements as well as general descriptions of the software functions.

Contents This chapter contains the following information:

System requirements

Computer system

The following table contains information on the minimum requirements of the computer's system:

Component	Minimum requirement
Computer	IBM-compatible from Core i3 Recommendation: Core i5
Operating system	From Windows 10 (32/64 Bit)
RAM	8 GB
Graphics	Resolution at least 1280 x 1024 pixels, true color Recommended resolution: 1920 × 1200 pixels
Interfaces	Minimum one available USB 2.0 or USB 3.0 slot
Periphery	Mouse with mouse wheel

System description

Introduction

DISS 6 is an active image acquisition and processing system for scanning electron microscopes (SEM), scanning transmission electron microscopes (STEM) and electron microprobe analyzers (EMPA).

DISS 6 may be installed on all commercially available optoelectronic devices. The installation will not affect any functions of these devices.

During the digital image acquisition, the internal scan generator will be turned off, and the beam control of DISS 6 will take over.

Components

The overall systems consists of:

- DISS 6 hardware,
- DISS 6 Software and
- digital image processing system DIPS.

DISS 6 hardware

The DISS 6 hardware completes the following tasks during image acquisition:

- switches the optoelectronic device via hardware or software to external beam control (device-dependent)
- generates X and Y deflecting voltages
- digitizes the analog image signals (SE, BSE, CL)
- counts the impulses of an EDX or WDX system for each pixel for the creation of elemental mapping images or concentration profiles (optional)

DISS 6 Software

In standard configuration, image acquisition is simultaneously possible from up to 4 analog and 12 impulse signals. The analog input signal channels may be extended by 4, 8 or 16 channels.

Image format and resolution are freely selectable. A region scan with zoom function facilitates focusing and astigmatism correction. Apart from adjustable scan time, functions like line averaging and frame averaging improve the signal-to-noise ratio.

Image processing software

With DIPS, all digitized images may be processed, labeled, measured, printed and saved easily. A special layout technique facilitates the processing of several related images as well as documentation and archiving of image data.

Sliders and input fields

Operation of the sliders

Use of the sliders with the mouse allows for a very fine setting for high-resolution D/A converters as well as simple manipulation for fast coarse setting.

As a default, the slider function Standard is activated, however, this might be changed in the file DISS6.ini.

The following table contains information on operating the sliders with the mouse:

Slider function	Operation
Standard Entry in DISS6.ini: HiResSliders=1	The mouse button does not have to be held during slider setting. 1. Click a slider. → The slider is coupled to the mouse pointer (X/Y). 2. Any further click: Switches between fine and coarse setting. In the coarse setting, the slider is displayed in red. 3. Move the mouse to change the slider value. 4. Right-click the slider to uncouple the slider from the mouse pointer. → The slider flashes. 5. Optional: Adjust the slider value by turning the mouse wheel (see slider function Blink). 6. Perform any other action (e. g. select a different slider, click a button, ...) to end mouse operation. ℹ Pressing the [Esc] key cancels the mouse operation and resets the slider to its initial value.
Alternative Entry in DISS6.ini: HiResSliders=2	The mouse button has to be held during slider setting. 1. Click a slider and keep the mouse button pressed. 2. Press the space bar to switch between fine and coarse setting. In the coarse setting, the slider is displayed in red. 3. Move the mouse or turn the mouse wheel (see slider function Blink) to modify the slider value. 4. Release the mouse button. → Mouse operation ends. → The preset values are saved.
Basic Entry in DISS6.ini: HiResSliders=0	Direct control of the slider with the mouse button. 1. Click a slider and keep the mouse button pressed. 2. Press the space bar to switch between coarse and fine setting. In the fine setting, the slider is displayed in green. 3. Move the mouse or turn the mouse wheel (see slider function Blink) to modify the slider value. 4. Release the mouse button. → Mouse operation ends. → The preset values are saved.

Continuation next page …

… Continuation: Sliders and input fields

Slider function	Operation
Blink	Operating the sliders with the mouse wheel in the Standard, Alternative and Basic functions. 1. Right-click a slider. → The slider is selected and flashes. 2. Turn the mouse wheel to change the slider value as follows: – Turning the mouse wheel: Changes the value in X direction. – Pressing [Shift] and turning the mouse wheel: Changes the value in Y direction. – Additionally holding the [Ctrl] key: Changes the value by the factor 10. – Additionally holding the [Ctrl]+[Alt] keys: Changes the value by the factor 100. 3. Optional: Set the slider to a central position as follows: – Press [*] for horizontal central position – Press [Shift]+[*] for vertical central position 4. Perform any other action (e. g. select a different slider, click a button, ...) to end mouse operation. → Mouse operation ends.

Input fields The preferred values may be entered in the white input fields. When the values are confirmed with the Return key, the numbers change from red to black.

3 Installation

Chapter overview

Purpose This chapter contains information and instructions on the installation of the DISS 6 Software and adjustment of the DISS 6 hardware.

Contents This chapter contains the following information:

Software installation

Installer

The DISS 6 Software is provided on a flash drive. Running the file “diss6setup.exe” launches the installer.

The installer installs the following components:

- PE USB driver (compatible from Windows 10, 32/64 bit)
- DISS 6 Software
- Digital Image Processing System DIPS
- Configuration files
- Documentation

NOTICE

Install the software before connecting the hardware!

Always install the DISS 6 Software first before connecting the hardware to the PC.

Steps

Complete the following steps to install the DISS 6 Software:

1. Connect the provided flash drive to the computer.
2. Start the file “diss6setup.exe” from the flash drive.
3. Follow the instructions on the screen.
   → The installation proceeds. Application and necessary driver are installed.

NOTICE

User interface language

The user interface of the DISS 6 Software is only available in English.

⚠ CAUTION

Maintain software settings during upgrades!

During upgrading an older version, two confirmation prompts will appear on the screen. You will have to confirm whether or not the current installation is to override the existing configuration files.

- Click **No** in both confirmation prompts to maintain your software settings and to use them for the DISS 6 Software.

Adjustment of the DISS 6 hardware

Objective

The objective of the adjustment is matching the images on the SEM screen with the DISS image window regarding brightness, contrast and image dimensions.

A test sample with known geometric structures is necessary for the adjustment of the DISS 6 hardware.

Before getting started

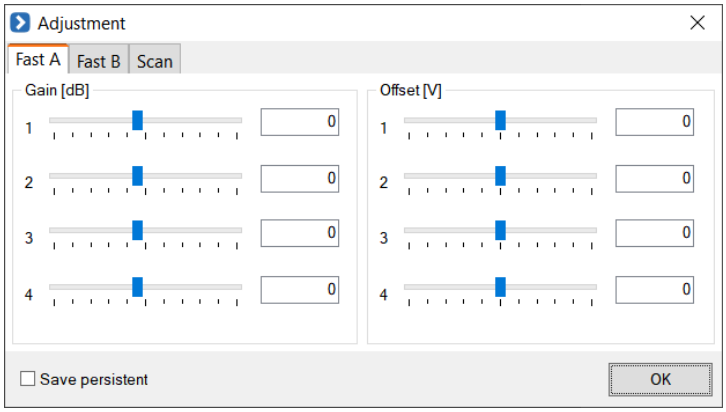
Complete the following steps before starting to adjust the DISS 6 hardware:

1. Open the DISS 6 Software on your computer.
2. Press the [Ctrl]+[Alt]+[A] key combination.
   → The **Adjustment** dialog window opens
3. Start a live scan.
   see “Live Scan” on page 73

Adjustment

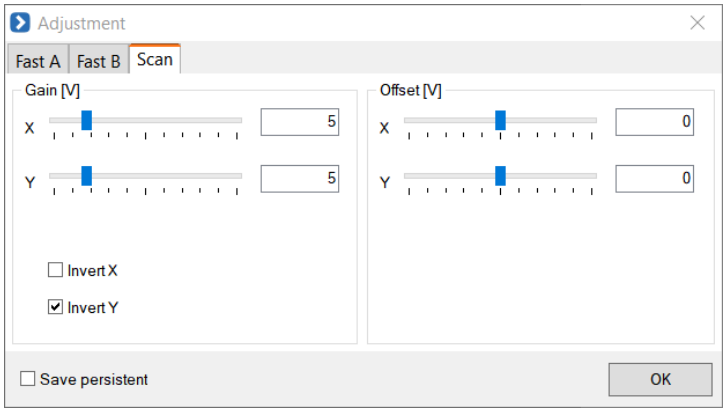
Complete the following steps to adjust the DISS 6 hardware:

1. Adjust brightness and contrast in the Fast A and Fast B tabs.
   By adjusting the input A1, A2, A3 or A4 used by (contrast) and (brightness), the analog inputs are adapted to the image signals. The inputs A3 and A4 are only included as options.



Continuation next page …

2. Adjust image dimensions in Scan tab.
With the sliders, image position (Gain) and image dimensions (Offset) may be adjusted to the SEM in X direction (line) and Y direction (frame).



NOTICE

Adjusting the scan polarity

If the image is mirrored horizontally or vertically, the scan polarity may be adjusted with help of the Invert X and / or Invert Y checkboxes.

This adjustment will only be applied after a restart of the image.

3. Checking the adjustment in a slow scan.

see “Slow Scan” on page 77

Saving adjustment settings in the device

If the Save persistent checkbox is activated, the adjustment settings of the DISS 6 hardware will be saved within the device.

4 Stage control (optional)

Chapter overview

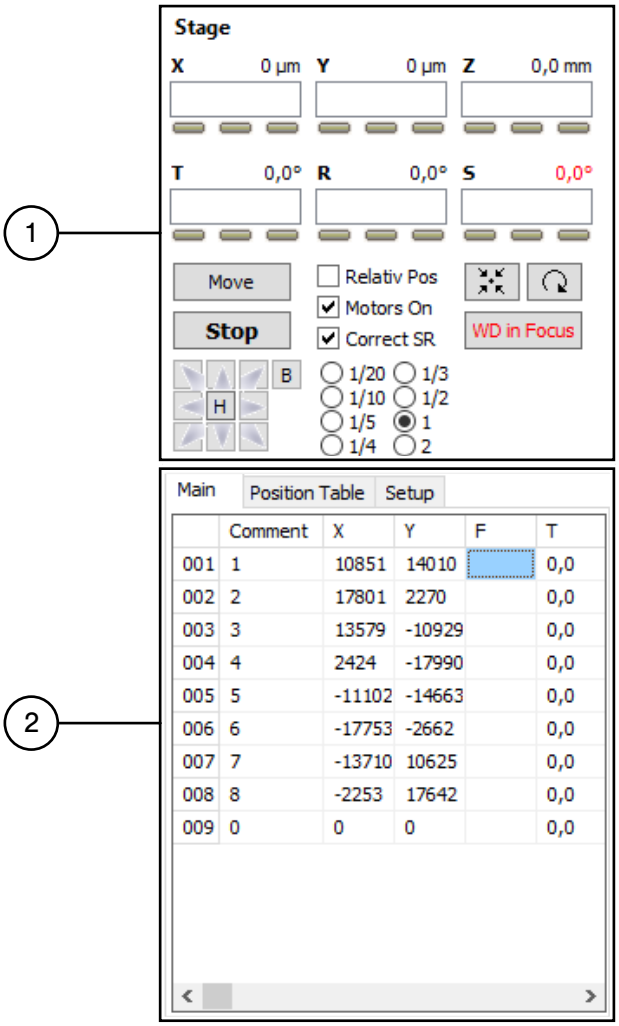
Purpose This chapter contains descriptions on the structure and function of the Stage optional control panel.

Contents This chapter contains the following information:

Control panel

Description The Stage control panel controls a motorized sample stage. This means that fixed positions may be saved and approached. It also allows to move the stage by image fields or to optionally move it with a connected joystick.

Structure The following figure shows the Stage control panel with the following components:



Continuation next page …

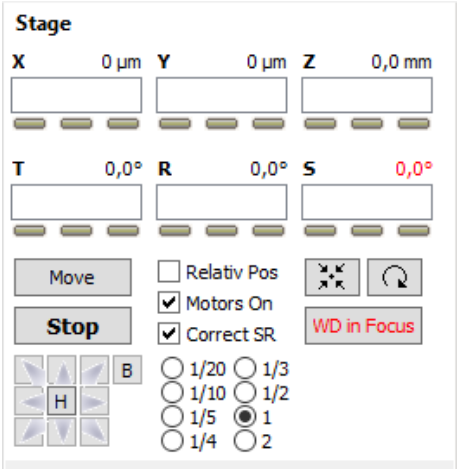
… Continuation: Control panel

Function The following table contains information on the main components of the Stage control panel:

No.	Main component	Function
1	Main field (Page 24)	Contains functions for controlling and monitoring the sample stage.
2	Tabs	
	– Main (Page 29)	Shows a set (table) of predefined positions. By double-clicking a table row, the stage will be moved to the corresponding position.
	– Position Table (Page 31)	Allows for creating, saving, loading and using customized position sets.
	– Setup (Page 33)	Contains functions for setting up the sample stage control.

Main field

Structure The following figure shows the main field of the Stage control panel with the following components:

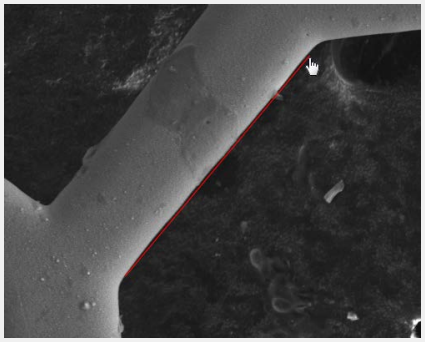
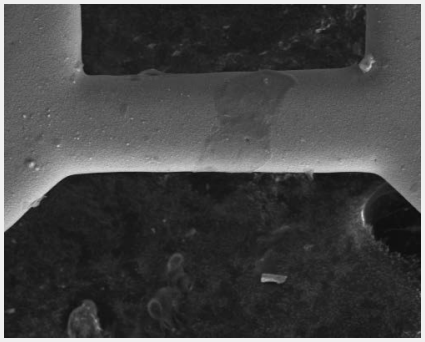


Function The following table contains information on the components of the main field:

Component	Function
Input fields X, Y, Z, T, R, S	Entering of values for moving the sample stage: – X and Y for planar moves – Z for distance from the sample (with motorized Z axis only) – T for sample stage tilt (device-dependent) – R for sample stage rotation (with motorized R axis only) – S for Z fine tune (device-dependent) The current position of the axis is displayed above the input fields. Underneath the input fields, 3 status displays are visible, see “Status” on page 26
Move	Moving the sample stage to the set position.
Stop	Stopping the sample stage.
Relative Pos	With activated checkbox, the positions entered in the input fields will be approached relative to the respective current position.
Motors On	Activation/deactivation of the sample stage motors.
Correct SR	Correction of scan rotation. Activating/deactivating the approach correction of the sample stage. With activated checkbox, the move of the sample stage will be corrected according to the preset scan rotation. This means that the sample stage always takes the correct approach to the SEM image. With deactivated checkbox, the sample stage takes the correct approach to the camera image.

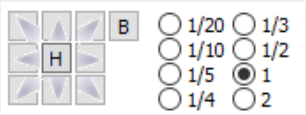
Continuation next page …

… Continuation: Main field

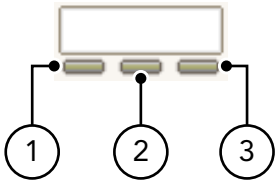
Component	Function
	Activation/deactivation of the mouse click shift. If shifting by mouse click has been activated, the double-clicked image area is moved to the center of the image.
	Activates / deactivates rotating by mouse click (only available with motorized rotation). If rotating by mouse click has been activated, a line can be drawn in the image acquisition window by moving the mouse:  The first click sets the beginning of the line. The second click sets the end. → After the second click, the sample stage will be rotated so that the line drawn in the image acquisition window will be horizontal:  ℹ If you keep the Shift key pressed during the second click, the line will be turned vertical. ℹ The sample is rotated in the sample center. This means, X and Y will also be shifted. The accuracy of this functions depends on the used device. ℹ This function only works if the rotation center of the sample stage is the home position.

Continuation next page …

… Continuation: Main field

Component	Function
WD in Focus	Working distance is in focus (only available with motorized Z axis). 1. Focus on the sample and click **WD in Foc** to couple the sample stage's Z axis to the focus. → **WD in Foc** remains activated, and the label of the input field Z is changed to F. 2. In the input field F, enter the particular value for the working distance (inverted to Z). → When shifting the height, the focus will follow automatically. Additionally, a software limit is activated to prevent collision with the pole piece. By clicking the activated button **WD in Foc**, the function will be deactivated, and Z axis and focus will become uncoupled. The limit will be calculated from current working distance and current sample position minus a configurable safety distance: $Z_{max} = WD_{current} + Z_{current}$ – safety distance
	Set movement of the sample stage: – Click the **H** button to return the sample stage to Home position. – Click the **B** button to perform a manual backlash (e. g. when using a trackball or joystick). – Click the arrow buttons to move the sample stage by image fields in the indicated direction. The settings in the checkboxes on the right-hand side define the distance of the stage's movements. Setting 1 corresponds to moving along the length of the image in the image acquisition window, 1/2 corresponds to one half of the image length, 1/3 corresponds to one third etc.

Status Underneath each of the X, Y, Z, T, R and S input fields, three different status displays are visible:



The following table contains information on the different status displays:

No.	Status display	Color	Status
1	Left-side limit	gray	No limit
		green	Software limit
		red	Hardware limit
2	Motor status	gray	Motor off
		green	Motor on

Continuation next page …

… Continuation: Main field

No.	Status display	Color	Status
		red	Motor error The motors have to be turned off via the Motors On checkbox and turned on again.
3	Right-side limit	gray	No limit
		green	Software limit
		red	Hardware limit

Initialization

If the control happened electroless, the sample stage is not initialized anymore. During starting SEM control, the dialog window **Stage Reference Position** will be displayed:

Click the button **Initialization Run** in the **Stage Reference Position** dialog window to initialize the sample stage.

During the initialization run:

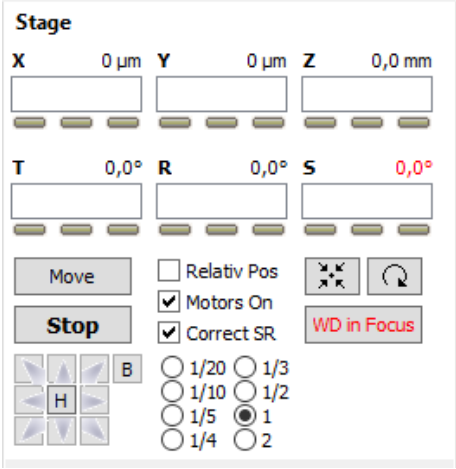
1. The lower limit of Z will be searched for and the sample will be moved downwards.
2. The limit of all other axes will be searched for.
3. The sample stage will be moved to Home position after successful initialization.

Continuation next page …

… Continuation: Main field

Use Uninitialized

If you click the button **Use Uninitialized** in the **Stage Reference Position** dialog window, no initialization run will be performed. The limits will not be determined. An uninitialized sample stage will be displayed with red numbers in the main field panel:

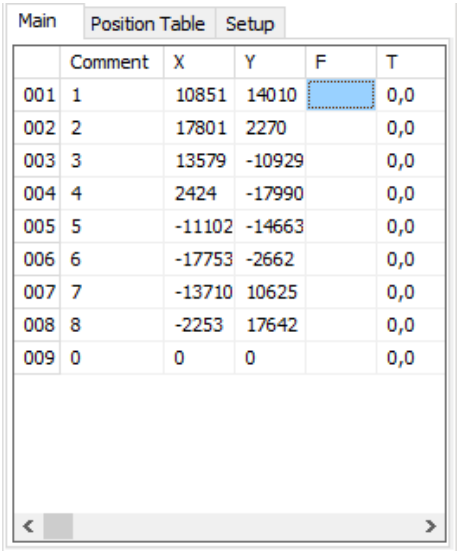


NOTICE

If the sample stage has not been initialized, the absolute position cannot be determined. The calibration of the axes will not be affected. Thus relative travel paths will still be correct.

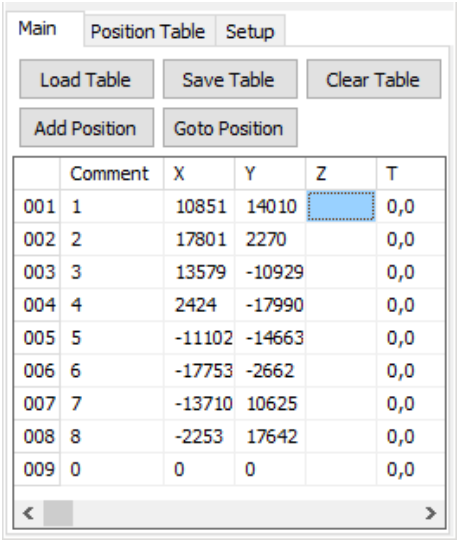
Main tab

Structure The following figure shows the Main tab of the Stage control panel:



Function The Main tab contains a table with a set of preset positions. By double-clicking a line, the stage will be moved to the corresponding position.

Main Table editing mode If the Main Table editing mode checkbox is activated in the Setup tab, the Main tab will display additional buttons for changing the table values:



In Main Table editing mode, the values in the Main tab as well as the values in the Position Table tab may be modified.

Continuation next page …

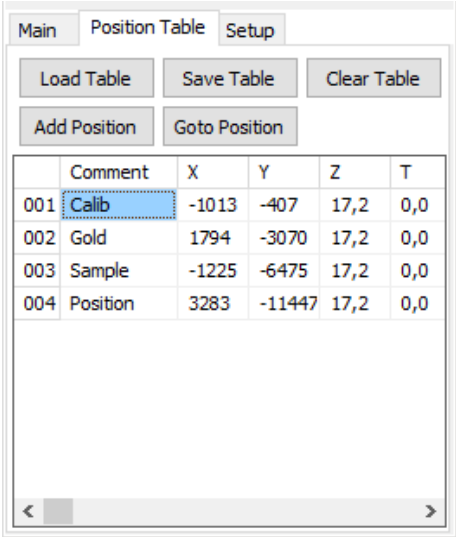
… Continuation: Main tab

The following table contains information on the additional buttons in the Main Table editing mode:

Button	Function
Load Table	Loads a set of positions from an excel file.
Save Table	Saves a set of positions to an excel file.
Clear Table	Deletes all values from the table.
Add Position	Adds the current stage position to the table.
Goto Position	Moves the sample stage to the position selected in the table.

Position Table tab

Structure The following figure shows the Position Table tab of the Stage control panel:



Function The following table contains information on the components of the Position Table tab:

Component	Function
Table	Defining customized position sets. Each line contains the data of a sample stage position as well as a comment on this position. By double-clicking a line, the stage will be moved to the corresponding position. By clicking a cell in the Comment column, the corresponding comment may be modified. A right-click on a line opens a context menu with the following items: – Goto Position: Moves the sample stage to the position of the selected line. – Insert Position: Inserts the current position as new line after the selected line. – Replace Position: Replaces the selected line with the current position. – Delete Position: Deletes the selected line. – Set Inputs: Transfers the positions of the selected line to the input fields in the main field. – Load Table: Loads a set of positions from an excel file. – Save Table: Saves a set of positions to an excel file.
Load Table	Loads a set of positions from an excel file.
Save Table	Saves a set of positions to an excel file.
Clear Table	Deletes all values from the table.
Add Position	Adds the current stage position to the table.

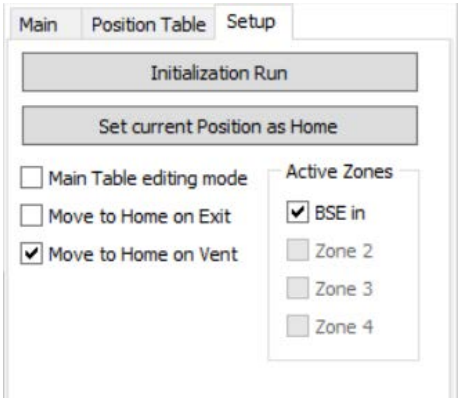
Continuation next page …

… Continuation: Position Table tab

Component	Function
Goto Position	Moves the sample stage to the position selected in the table.

Setup tab

Structure The following figure shows the Setup tab of the Stage control panel:



Function The following table contains information on the components of the Setup tab:

Component	Function
Initialization Run	Manually starts an initialization run. see “Initialization” on page 27
Set current Position as Home	Defines the current position as Home.
Main Table editing mode	If activated, the values in the Main tab may be modified as well as the values in the Position Table tab.
Move to Home on Exit	If activated, the sample stage will be moved to Home position when the program is closed.
Move to Home on Vent	If activated, the sample stage will be moved to Home position when the sample chamber is vented.
Active Zones	Activation/deactivation of up to 4 cuboid zones that the sample stage will not enter. These zones may be defined by an administrator.

5 Image acquisition

Chapter overview

Purpose This chapter gives information on the image acquisition of DISS 6 Software. It contains descriptions of structure and function of the image acquisition.

Contents This chapter contains the following sections:

5.1 User interface

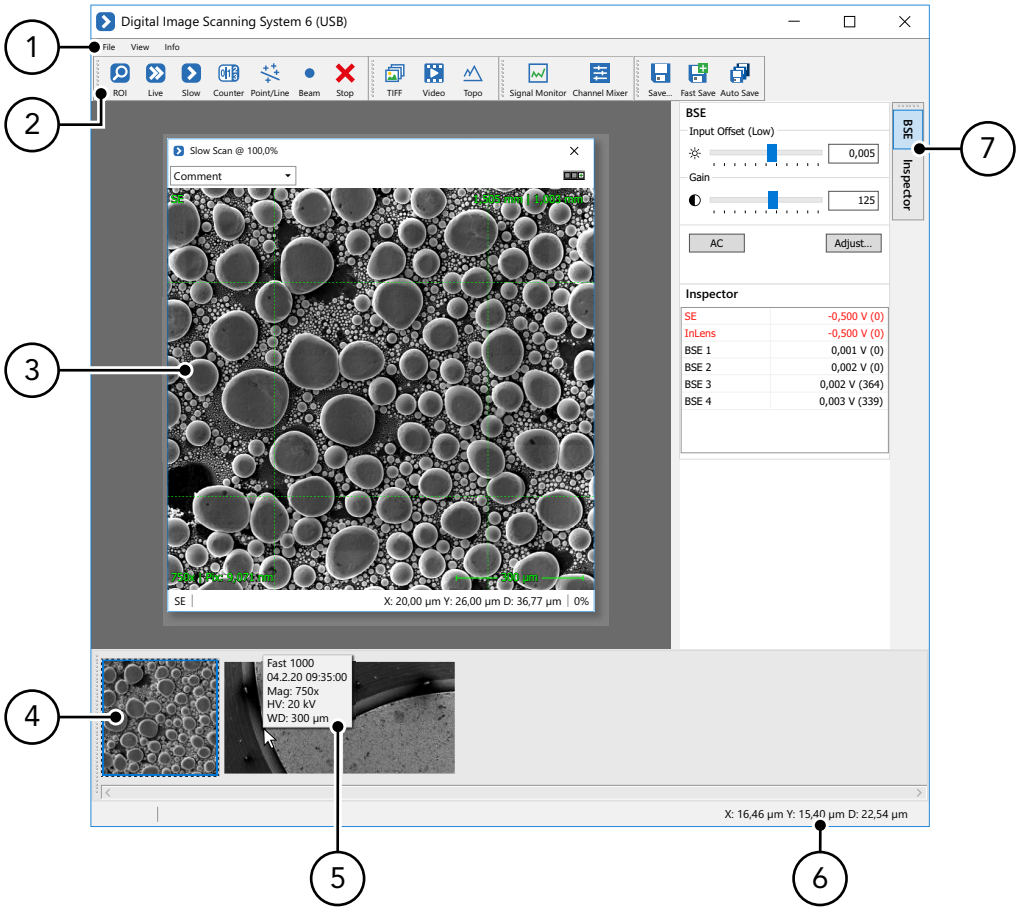
Overview

Purpose This section contains descriptions on the structure and function of the image acquisition software's user interface.

Contents This sections contains the following information:

Overview

Structure The following figure shows the Image acquisition user interface of the DISS 6 Software with its main components:



Function The following table contains information on the main components of the user interface:

No.	Main component	Function
1	Menu bar	Global settings. see “Menu bar” on page 38
2	Toolbars	Tools for acquisition, settings and management of images. see “Toolbars” on page 40
3	Image acquisition window	Shows the current scanning process of one or more signal sources with differing parameter values (depending on settings). see “Image acquisition window” on page 43
4	Image preview	Clipboard of acquired images. see “Image preview” on page 46

Continuation next page …

… Continuation: Overview

No.	Main component	Function
5	Hint	Displays selected meta data of images. see “Hint” on page 47
6	Status bar	Shows the values of the current measurement (e. g. X/Y position and working distance).
7	Sidebar	Includes control panels for differing functions. The available control panels depend on the specific configuration of the DISS 6 Software. see “Optional control panels” on page 124

Menu bar

File menu

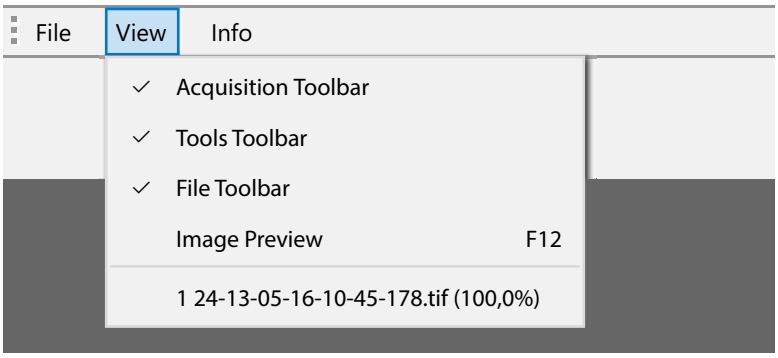
The following figure shows the File menu with the following components:

The following table contains information on the components of the File menu:

Component	Function
Preferences...	Opens the **Preferences** dialog window for global preferences to save and name the images.

View menu

The following figure shows the View menu with the following components:

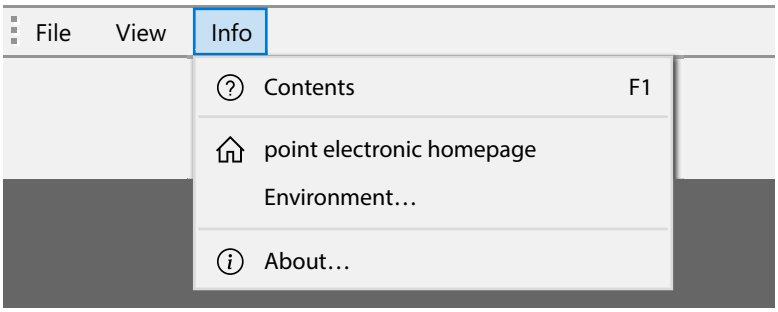


The following table contains information on the components of the View menu:

Component	Function
Acquisition Toolbar	Activates/deactivates the “Acquisition” toolbar with scanning functions.
Tools Toolbar	Activates/deactivates the “Tools” toolbar.
File Toolbar	Activates/deactivates the “File” toolbar with saving functions.
Image Preview	Activates or deactivates the image preview.
File name	Shows the name of the current image.

Continuation next page …

Info menu The following figure shows the Info menu with the following components:



The following table contains information on the components of the Info menu:

Component	Function
Contents	Opens the reference guide in a separate window.
point electronic homepage	– Establishes a connection to the Internet. – Opens the website pointelectronic.de in a browser window.
Environment...	Opens a dialog window that shows the saving locations of the configuration files and loaded plug-ins.
About...	Opens a dialog window with information on the installed version of the DISS 6 Software and the connected DISS 6 hardware.

Toolbars

Acquisition The following figure shows Acquisition toolbar with its buttons:

The following table contains information on the Acquisition toolbar buttons:

Button	Function	Description
	Region Scan (Page 70)	Starts a Region Scan.
	Live Scan (Page 73)	Starts a continuous live preview.
	Slow Scan (Page 77)	Starts a slow scan.
	Counter Scan (Page 81)	Starts a counter scan for counting TTL impulses.
	Line scan/point measurement (Page 85)	Opens a dialog window for set-up and operation of line and point measurements.
	Beam positioning (Page 102)	For positioning the electron beam on the sample.
	Stop (Page 103)	Cancels an ongoing scanning process.

Continuation next page ...

… Continuation: Toolbars

Optional extensions The following figure shows the optional extensions toolbar with its buttons:

The following table contains information on the optional extensions buttons:

Button	Function	Description
	TIFF Recorder (optional) (Page 104)	Opens a dialog window for setting and recording bitmap images in a continuous scan.
	Video Recorder (optional) (Page 106)	Opens a dialog window for setting and recording videos in a continuous scan.
	BSE Topography (optional) (Page 109)	Opens a dialog window for generation, visualization and export of a 3D surface model in live mode.

Tools The following figure shows the Tools toolbar with its buttons:

The following table contains information on the Tools toolbar buttons:

Button	Function	Description
	Signal Monitor (Page 115)	Opens the signal monitor.
	Channel Mixer (Page 117)	Opens a dialog window for live mixing of image signals.

Continuation next page …

… Continuation: Toolbars

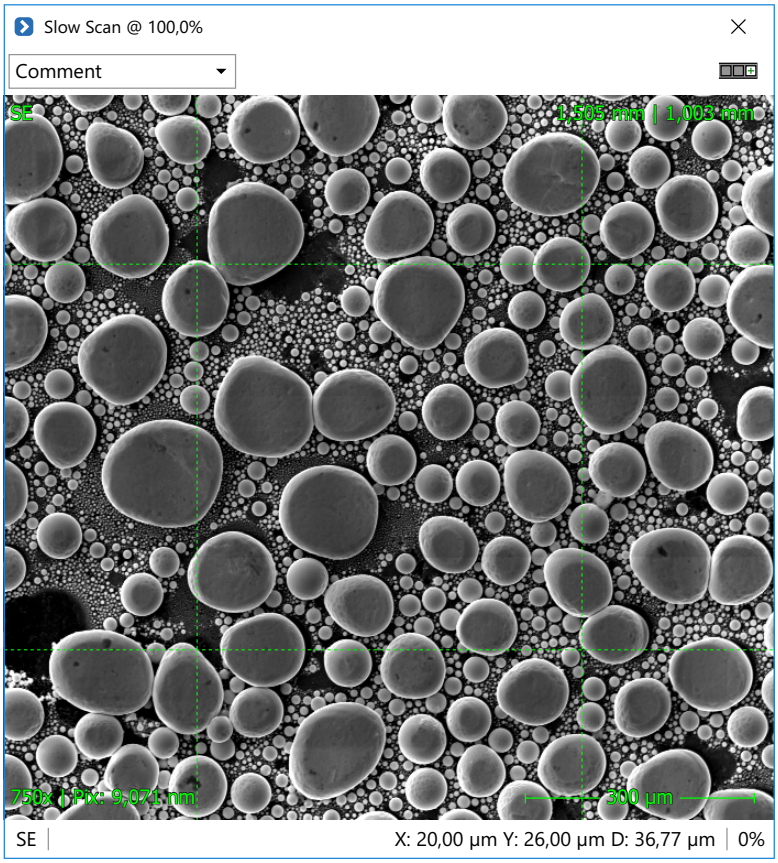
File The following figure shows the File toolbar with its buttons:

The following table contains information on the File toolbar buttons:

Button	Function	Description
	Save (Page 121)	Opens a dialog window for saving the current image or layout.
	Fast Save (Page 122)	Saves the current image or layout without opening an image window. The current image or layout will be saved in the set saving location under the set automatically assigned file name.
	Auto Save (Page 123)	If Auto Save is activated, the current image or layout will be saved automatically after completion of the scanning process. The current image or layout will be saved in the set saving location under the set automatically assigned file name.

Image acquisition window

Structure The following figure shows the image acquisition window with its components:



Function The following table contains information on the components of the image acquisition window:

Component	Function
Title bar	Shows the name of the current scan and the window magnification as percentage.
Comment field	For entering an image comment. Previously entered comments may be chosen from a history.
	Deposits the scanned image in the image preview bar.
Image	Shows the current scanning process.
Header within image Page 61	Shows values of several parameters that may be set in the live overlay settings.

Continuation next page …

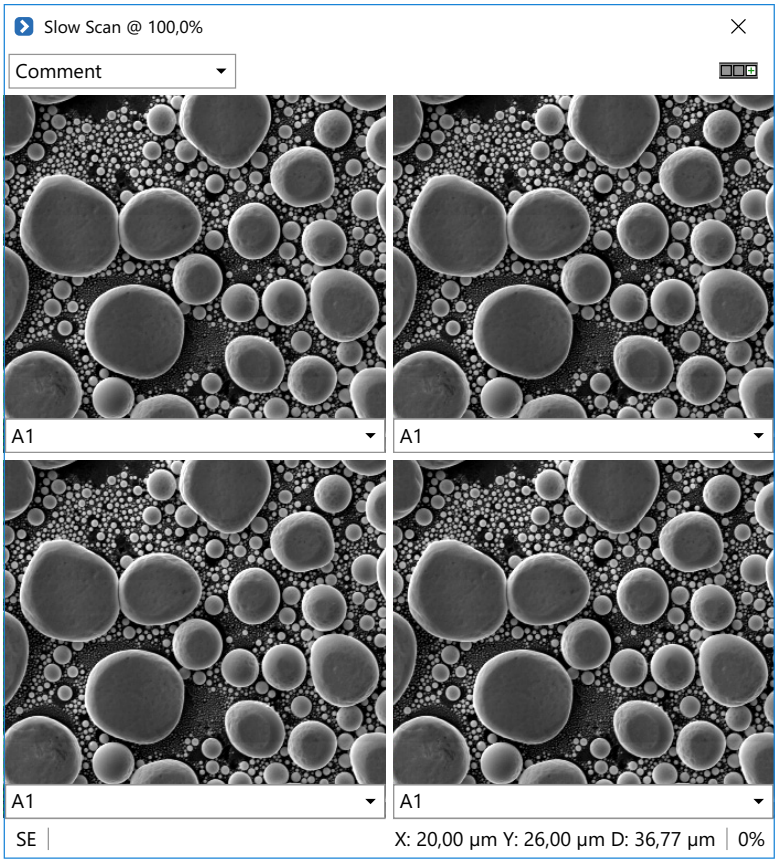
… Continuation: Image acquisition window

Component	Function
Footer within image Page 60	– Shows values of several parameters that may be set in the live overlay settings. – On the bottom right in the footer, the Micron bar showing the scale of the image will always be displayed.
Status bar	Shows information on the current scanning process: – Current input signal source – Measurement data – Scanning progress in percent

Multiple input signal sources

Depending on the scan settings, multiple (analog and digital) signal sources may be acquired and displayed in the image acquisition window.

The following figure shows the image acquisition window with several input signal sources:



Continuation next page …

… Continuation: Image acquisition window

The following table contains information on further components of the image acquisition window with several input signal sources:

Component	Function
Comment field	For entering or selecting a global comment. The global comment applies to all input signal sources.
Input fields of the individual input signal sources	For entering or selecting a comment for each input signal source. In the input fields, the default signal name may be replaced by personal inputs.

Context menu

Right-clicking the image acquisition window opens a context menu.

The following table contains information on the components of the context menu:

Component	Function
Measurement Lines	Activates or deactivates horizontal and vertical measurement lines.

Image preview

Description The acquired images are temporarily saved in the image preview and will be shown there as thumbnails.

By clicking on a thumbnail, the corresponding image opens up. The selected thumbnail is highlighted in blue.

Structure The following figure shows the image preview with the hint:

Context menu Right-clicking a thumbnail opens a context menu.

The following table contains information on the components of the context menu:

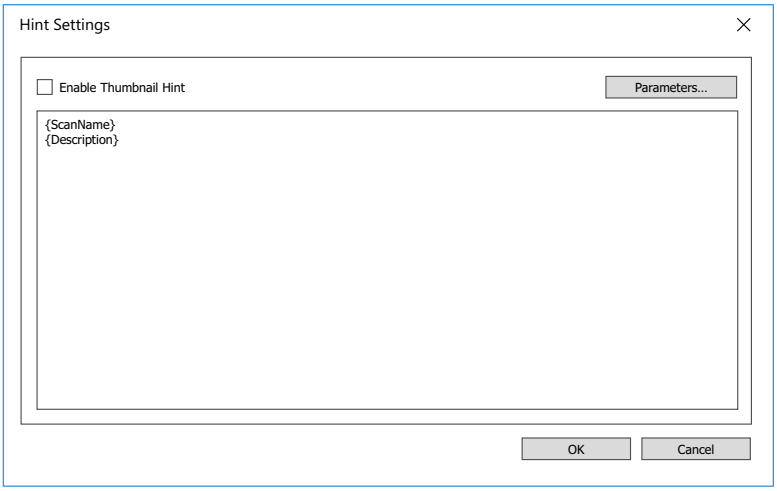
Component	Function
Delete	Deletes the image.
Hint Settings...	Opens the **Hint Settings** dialog window. see "Hint Settings" on page 47

Hint

Description The Hint field shows image data of an image in the image preview. Image hints will be displayed as soon as the mouse cursor is placed on that image.

The information shown is saved as meta data in XMP format with the acquired image. Such meta data may for instance contain image comments, acquisition date or magnification.

Hint Settings Use the right mouse button to click on an image in the image preview and choose Hint Settings... from the context menu to open the **Hint Settings** dialog window:



The following table contains information on the components of the **Hint Settings** dialog window:

Component	Function
Enable Thumbnail Hint	Activates/deactivates the display of hints in the image preview.
Parameters... Page 63	Opens the **Parameters** dialog window for setting and inserting global parameters for hints display.
Parameter field	In the Parameter field, parameters are inserted and arranged. Parameters are displayed symbolically as parameter name in curly brackets. Between parameters, any text (including special characters or breaks) may be inserted.
OK	Closes the dialog window. The preset parameters are saved.
Cancel	Closes the dialog window. The preset parameters are rejected.

5.2 Functions in the File menu

Overview

Purpose This section contains descriptions on the structure and function of the File menu components.

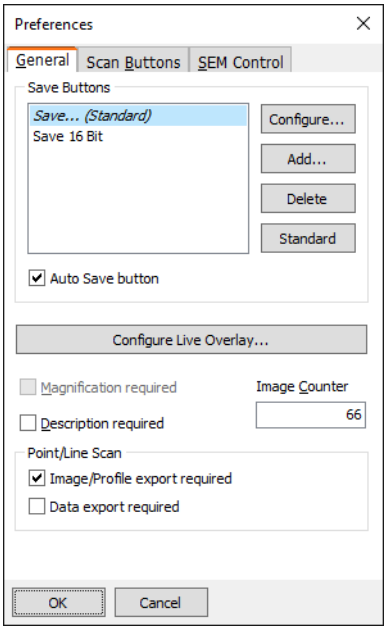
Contents This sections contains the following information:

Preferences

Description The Preferences function sets the global preferences for the DISS 6 Software.

General tab In the General tab, general settings for the DISS 6 Software can be found.

The following figure shows the **Preferences** dialog window with the General tab:



The following table contains information on the components of the General tab:

Component	Function
Save Buttons	Shows the configured Save buttons. Save buttons may be selected by clicking on them.
– **Configure...** (Page 53)	Configures the selected Save button. Opens the **Save Settings** dialog window.
– **Add...**	For adding Save buttons. Opens the **Save Settings** dialog window.
– **Delete**	Deletes the selected Save button.
– **Standard**	For defining the selected Save button as default. The default Save button will be used: – for the **Save Image...** function in the channel mixer – for the **Image Export...** function in line scan / point measurement
– Auto save button	Hiding or unhiding the Auto save button.

Continuation next page ...

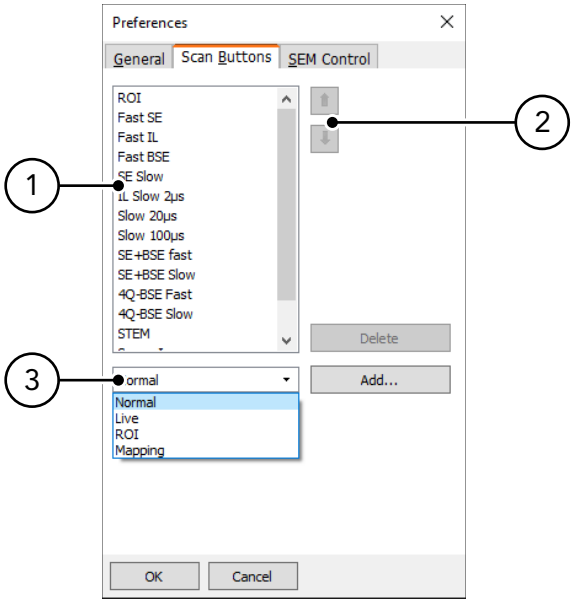
… Continuation: Preferences

Component	Function
Configure Live Overlay… (Page 59)	Configures header and footer of the image acquisition window. Opens the **Live Overlay Settings** dialog window.
Magnification required	Activates a warning if no value is entered in the Mag field. ℹ This function will be deactivated if the magnification is read out automatically.
Description required	Activates a warning if no image description has been entered for the image acquisition.
Image Counter	Enables setting/resetting the consecutive image number.
Point/Line scan	Activates warnings when closing the **Point/Line Measurement** dialog window.
– Image/Profile export required	Activates a warning if no image or diagram is exported.
– Data export required	Activates a warning if no data is exported.
OK	Closes the dialog window. The settings are applied.
Cancel	Closes the dialog window. All settings are rejected.

Scan Buttons tab

The Scan Buttons tab contains functions for configuring the Scan buttons.

The following figure shows the **Preferences** dialog window with the Scan Buttons tab:



Continuation next page …

… Continuation: Preferences

The following table contains information on the components of the Scan Buttons tab:

No.	Component	Function
1	Button order	Preview of the Scan buttons order in the image acquisition bar. Scan buttons may be selected by clicking on them.
2	Sorting buttons	 selected Scan button up  selected Scan button down
	Delete	Deletes the selected Scan button from the button order.
3	Template selection	Selecting a configured template for a Scan button.
	Add...	Creating a new Scan button from a selected template. Opens the **Scan Button Caption** dialog window for defining a Scan button caption.
	OK	Closes the dialog window. The settings are applied. After creating new Scan buttons and clicking **OK**, a warning tells you that you have to close and restart the software. Without restarting the software, new Scan buttons will not be displayed, and all changes to existing Scan buttons settings from this point on will be lost.
	Cancel	Closes the dialog window. All settings are rejected.

Continuation next page …

… Continuation: Preferences

Configuring Save buttons

Description Save button saving parameters may be configured in the **Save Settings** dialog window. Saving parameters may include image format and image captions among others.

The **Save Settings** window opens after a right-click on a Save button or after clicking the **Configure...** or **Add...** buttons in the **Preferences** dialog window in the General tab.

General settings The general settings in the **Save Settings** dialog window may be entered regardless of the chosen tab.

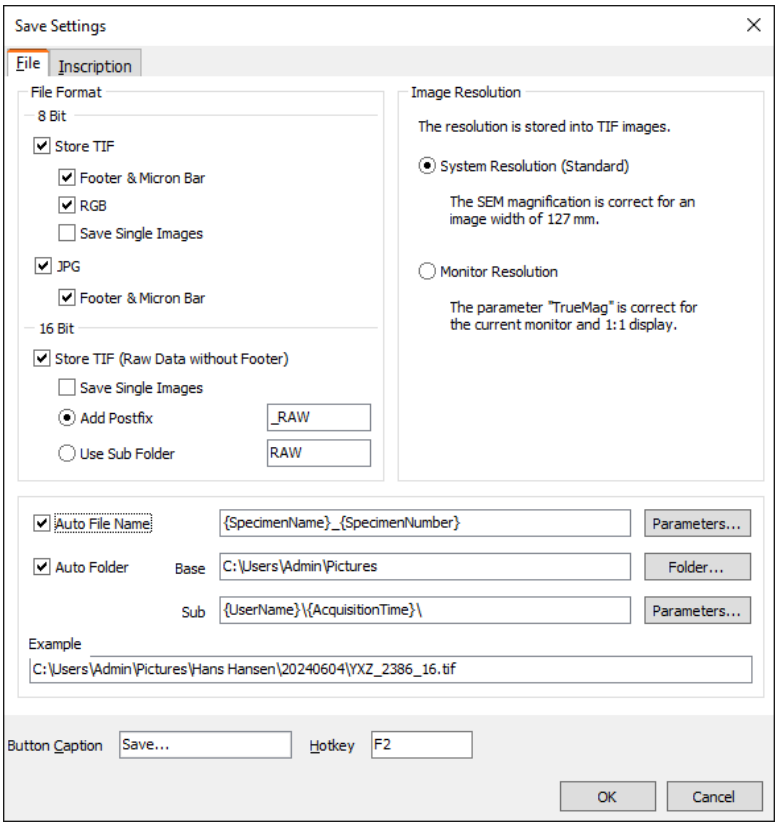
The following table contains information on the general settings in the **Save Settings** dialog window:

Component	Function
Button Caption	For entering the Save button caption.
Hotkey	For entering a Save button hotkey. For recording a hotkey, place the cursor in the Hotkey text field and press the particular key or key combination.
OK	Closes the dialog window. The settings are applied.
Cancel	Closes the dialog window. All settings are rejected.

Continuation next page ...

… Continuation: Configuring Save buttons

File tab The following figure shows the **Save Settings** dialog window with the File tab:



The following table contains information on the components of the File tab:

Component	Function
File Format	Setting one or more formats for saving the acquired images.
8 Bit	Settings for the 8 Bit format.
– Store TIF	Activated: Acquired images are saved as 8 Bit TIFF file.
– Footer & Micron Bar	Activated: Footer and Micron Bar are saved within the 8 Bit TIFF image.
– RGB	Activated: The image is saved in RGB colors. Deactivated: The image is saved in 256 gray scales.
– Save Single Images	Activated: Images acquired with multiple input signal sources are saved as single frames. The signal names will be added as file name extension. Deactivated: The images are saved in a 8 Bit multipage TIFF file.
– JPG	Activated: Acquired images are saved as 8 Bit JPG file.
– Footer & Micron Bar	Activated: Footer and Micron Bar are saved within the 8 Bit JPG image.

Continuation next page …

… Continuation: Configuring Save buttons

Component	Function
16 Bit	Settings for the 16 Bit format.
– Store TIF (RAW Data without Footer)	Activated: Acquired images are saved as 16 Bit TIFF file in RAW format. Only the image's raw data will be saved. It is not possible to save footers in the image.
– Save Single Images	Activated: Images acquired with multiple input signal sources are saved as single frames. The signal names will be added as file name extension. Deactivated: The images are saved in a 16 Bit multipage TIFF file.
– Add Postfix	Enter a postfix. The entered postfix will be added to the file name of the images in 16 Bit format during saving.
– Use Sub Folder	Enter the name of the subfolder. When saving the images, a subfolder will be generated at the selected saving location under the entered name. The images in 16 Bit format will be saved in this folder.
Image Resolution	For setting the image resolution that will be saved in the TIFF files (8 Bit and 16 Bit format).
– System Resolution (Standard)	The magnification set in SEM will be used as resolution and is correct at an image width of 127 mm.
– Monitor Resolution	The resolution set for the connected monitor will be used. Thus, the {TrueMag} parameter will be correct at display at true size (1:1).
Auto File Name	For activating/deactivating the automatic generation of file names. The chosen file name is automatically suggested when images are saved.
– Text field	For inserting and arranging the parameters of the automatically generated file name. Parameters are displayed symbolically as parameter name in curly brackets. Between the parameters, text, space and/or dividers may be entered.
– **Parameters…** (Page 63)	Opens the **Parameters** dialog window for selecting, setting and inserting the global parameters for the automatic generation of file names.
Auto Folder	For activating/deactivating the automatic generation of folders.
– Base	Displays the path of the selected saving location.
– Folder…	Opens a dialog window for selection of the saving location.
– Sub	For inserting and arranging the parameters of the automatically generated subfolder structure. This structure will be generated during saving of images at the selected saving location. Parameters are displayed symbolically as parameter name in curly brackets.

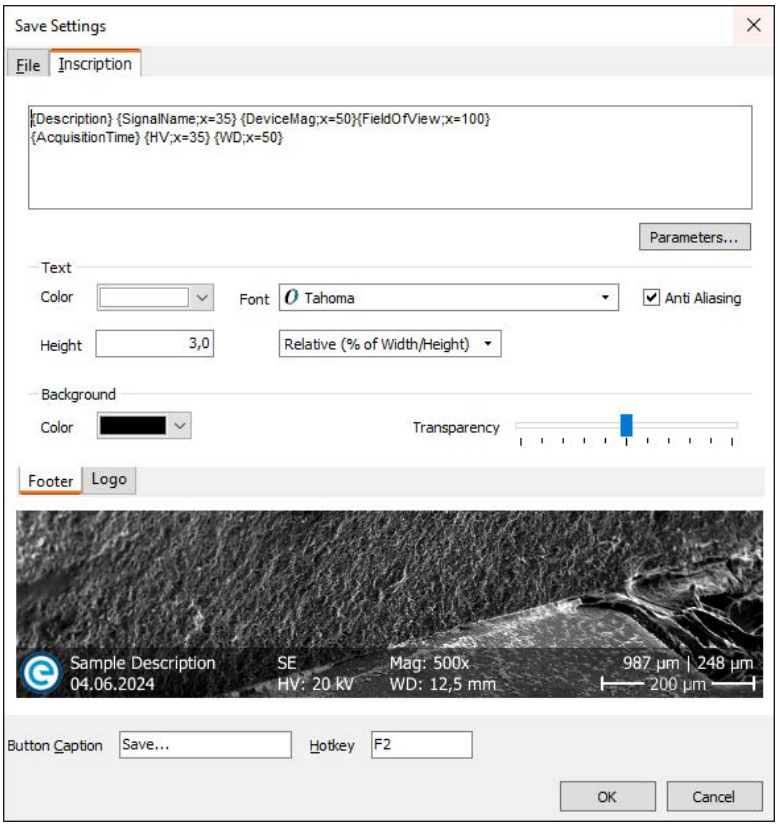
Continuation next page …

… Continuation: Configuring Save buttons

Component	Function
– **Parameters...** (Page 53)	Opens the **Parameters** dialog window for selecting, setting and inserting the global parameters of the automatic generation of folders.
Example	Shows a preview of the automatic file name in the automatic folder structure.
OK	Closes the dialog window. The settings are applied.
Cancel	Closes the dialog window. All settings are rejected.

Inscription tab for footer

The following figure shows the **Save Settings** dialog window with the **Inscription** tab and the settings for the footer within the image:



Continuation next page …

… Continuation: Configuring Save buttons

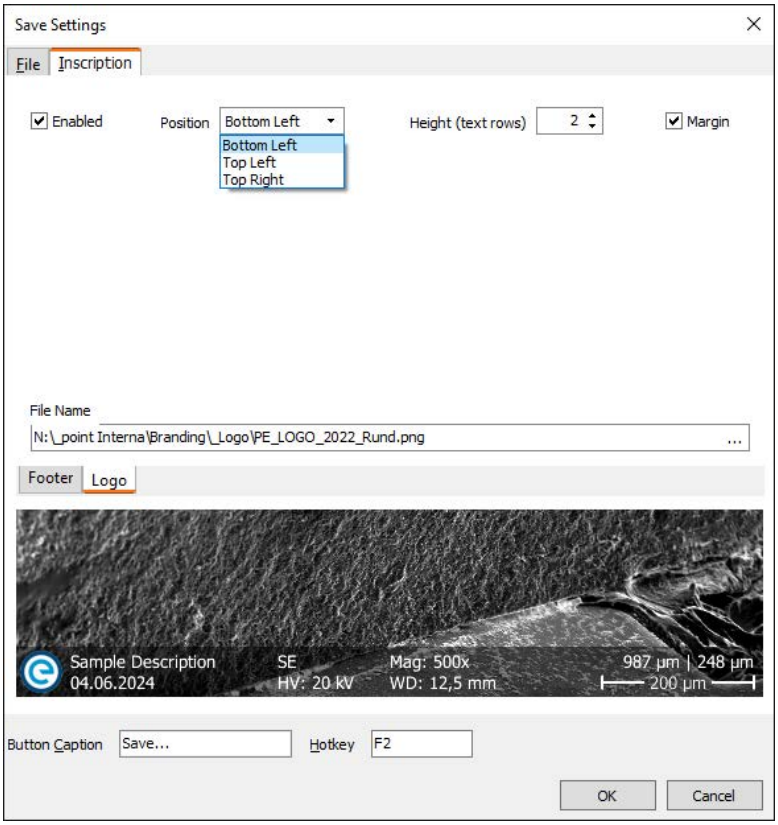
The following table contains information on the settings of the footer in the Inscription tab:

Component	Function
Text field	For inserting and arranging the parameters in the footer. Parameters are displayed symbolically as parameter name in curly brackets. After the parameter name, within the curly brackets, the percentage of the parameter indentation (from left) may be inserted separated by a semicolon, e. g.: – {SignalName;x=35} – This parameter will be indented to the left by 35% of the total image width in the footer. – {FieldOfView;x=100} – This parameter will be aligned in the footer to the right-hand margin of the image. Between parameters, any text (including special characters or breaks) may be inserted.
Parameters… (Page 63)	Opens the **Parameters** dialog window for selecting, setting and inserting the footer parameters.
Text	
– Color	Setting the text color.
– Font	Setting the font.
– Anti-Aliasing	Activating/deactivating anti-aliasing.
– Height	Setting the font size.
– Height selection list	Setting the font size unit: – Relative (% of Width/Height) – Font size as percentage relative to image width and image height. – Relative (% of Height) – Font size as percentage relative to image height. – Absolute (dots) – Font size as absolute value in pixels.
Background	
– Color	Setting the background color.
– Transparency	Setting the background transparency.
Preview	Preview of the footer with the selected settings.

Continuation next page …

Inscription tab for the logo

The following figure shows the **Save Settings** dialog window with the Inscription tab and the settings for a logo within the image:



The following table contains information on the settings of the logo in the Inscription tab:

Component	Function
Enabled	Activating/deactivating the logo within the image.
Position	Selection of a predefined position of the logo within the image.
Height (text rows)	Setting the logo height in text rows. The height of a text row always depends on the font size that has been set in the Height field of the footer settings.
Margin	Activating/deactivating the logo distance from the image frame and/or the footer text.
File Name	Selecting the logo file's saving location. Displays the path of the selected saving location.

Configuring live overlay

Description Live overlay shows parameters in the header and/or footer of the image acquisition window. The parameters displayed and the formatting of header and footer may be configured.

Live Overlay Settings For opening the **Live Overlay Settings** dialog window:

1. Click Preferences... in the File menu.
2. Click **Configure Live Overlay...** in the General tab.

General settings The general settings in the **Live Overlay Settings** dialog window may be entered regardless of the chosen tab.

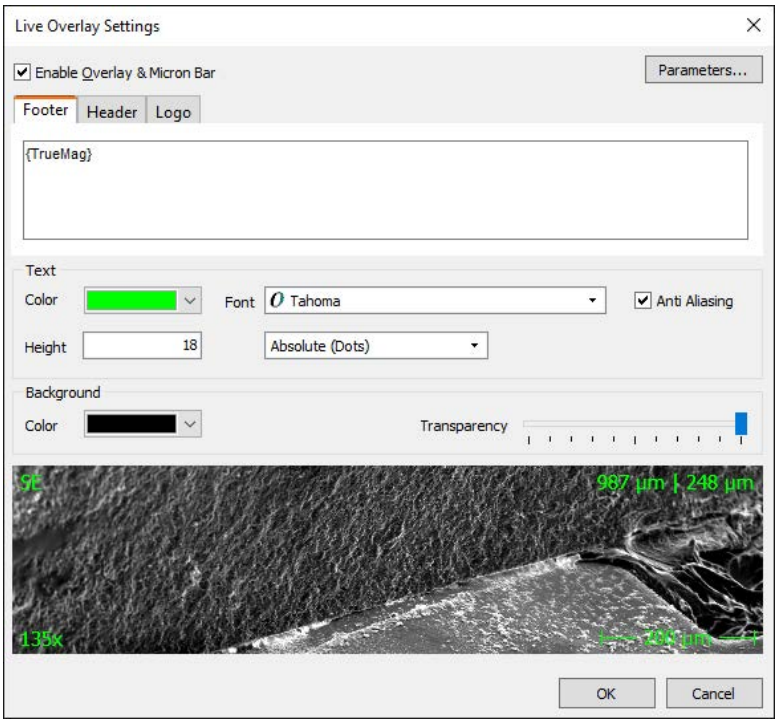
The following table contains information on the general settings in the **Live Overlay Settings** dialog window:

Component	Function
Enable Overlay & Micron Bar	Activates/deactivates live overlay. If live overlay is active, the Micron bar (image scale) will always be visible on the bottom right in the footer.
Parameters... Page 63	Opens the **Parameters** dialog window for selecting, setting and inserting the global parameters for live overlay entries (header and footer).
Text	
– Color	Setting the text color.
– Font	Setting the font.
– Anti Aliasing	Activating/deactivating anti-aliasing.
– Height	Setting the font size.
– Height selection list	Setting the font size unit: – Relative (% of Width/Height) – Font size as percentage relative to image width and image height. – Relative (% of Height) – Font size as percentage relative to image height. – Absolute (dots) – Font size as absolute value in pixels.
Background	
– Color	Setting the background color.
– Transparency	Setting the background transparency.
Preview	Preview of the live overlay with selected settings.
OK	Closes the dialog window. The settings are applied.
Cancel	Closes the dialog window. All settings are rejected.

Continuation next page ...

… Continuation: Configuring live overlay

Footer tab The following figure shows the **Live Overlay** dialog window with the Footer tab:



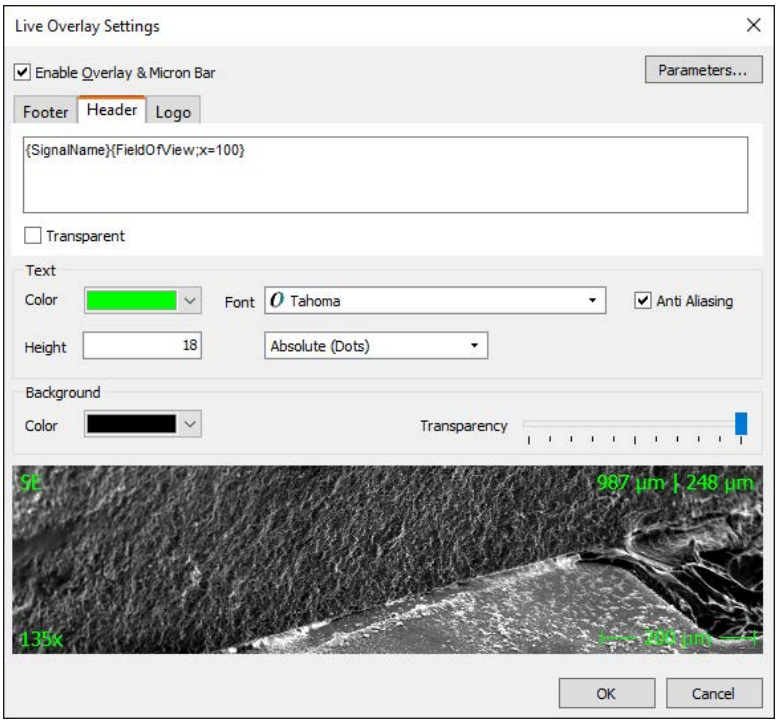
The following table contains information on the components of the Footer tab:

Component	Function
Text field	For inserting and arranging the parameters in the footer. Parameters are displayed symbolically as parameter name in curly brackets. After the parameter name, within the curly brackets, the percentage of the parameter indentation (from left) may be inserted separated by a semicolon, e. g.: – {Description;x=35} – This parameter would be indented to the left by 35% of the total image width in the footer. – {Description;x=100} – This parameter would be aligned in the footer to the right-hand margin of the image. Between parameters, any text (including special characters or breaks) may be inserted. On the bottom right in the footer, the Micron bar showing the scale of the image will always be displayed.

Continuation next page …

… Continuation: Configuring live overlay

Header tab The following figure shows the **Live Overlay Settings** dialog window with the Header tab:



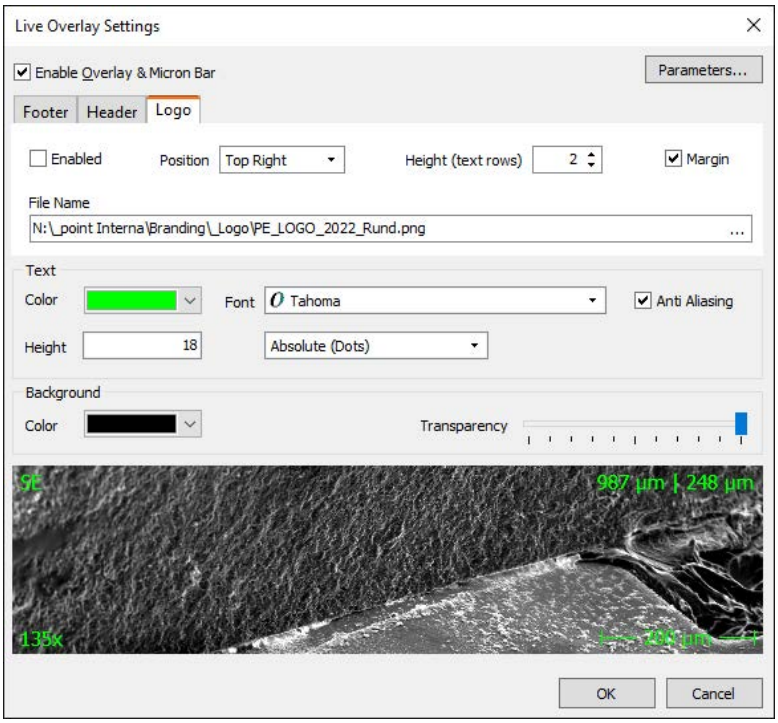
The following table contains information on the components of the Header tab:

Component	Function
Text field	For inserting and arranging the parameters in the header. Parameters are displayed symbolically as parameter name in curly brackets. After the parameter name, within the curly brackets, the percentage of the parameter indentation (from left) may be inserted separated by a semicolon, e. g.: – {Description;x=35} – This parameter would be indented to the left by 35% of the total image width in the header. – {Description;x=100} – This parameter would be aligned in the header to the right-hand margin of the image. Between parameters, any text (including special characters or breaks) may be inserted.
Transparent	Activates/deactivates the background color of the header. If the checkbox is activated, the header background color is turned off (100% transparent).

Continuation next page …

… Continuation: Configuring live overlay

Logo tab The following figure shows the **Live Overlay Settings** dialog window with the Logo tab:



The following table contains information on the components of the Logo tab:

Component	Function
Enabled	Activates/deactivates the logo within the image.
Position	Selection of a predefined position of the logo within the image.
Height (text rows)	Setting the logo height in text rows. This means, the height of a text row always depends on the font size that has been set in the Height field of the general settings.
Margin	Activates/deactivates the logo's distance to the image frame and/or footer text.
File Name	Selecting the logo file's saving location. Displays the path of the selected saving location.

Configuring parameters

Description

In addition to the image data, meta data in XMP format will be saved with each image acquired in DISS 6. These meta data include information like image comment, acquisition date or magnification.

Meta data in XMP format may be displayed and processed with XMP-compatible image processing software.

These meta data may be displayed as live overlay, as footer in the saved image or as hint in the image preview and may be used for the automatic assignment of file names.

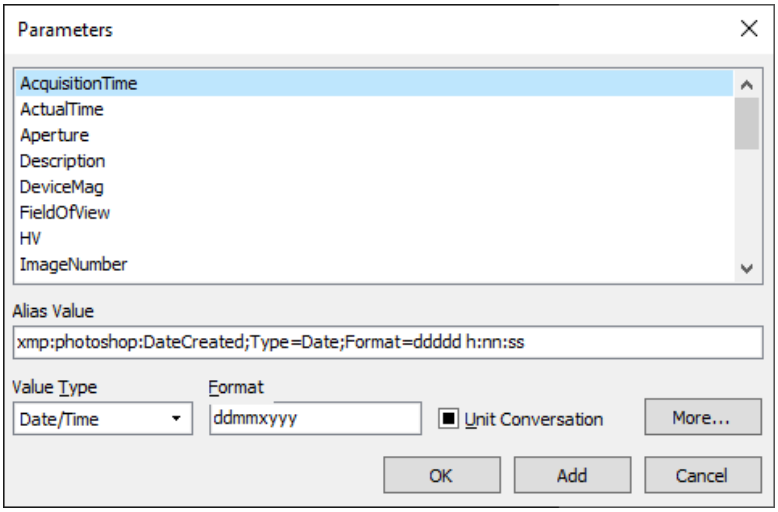
In the Parameters dialog window, the parameters to be displayed and their format may be configured.

Parameters dialog window

The Parameters dialog window may be opened via the following windows:

- Live Overlay Settings (see Page 59)
- Hint Settings (see Page 47)
- Save Settings (see Page 53)

The following figure shows the Parameters dialog window with the following components:



Continuation next page …

… Continuation: Configuring parameters

The following table contains information on the components of the Parameters dialog window:

Component	Function
Parameter list	– Contains all available preconfigured parameters. – Parameters may be selected by clicking them. – By double-clicking, parameters may be inserted in the parameter list.
Alias Value	Shows name and attributes of the selected parameter in XMP format. Name and each single attribute will be separated by semicolons.
Value Type	Changes the default data type of the selected parameter. [default] maintains the default data type of the selected parameter. ℹ Generally, [default] may be used for the Value Type.
Format	Changes the display format of the parameter. For example: The display of the acquisition time is to be changed from the preconfigured default format (d.m.yy h:nn:ss) including date and time to only display the date. Select the parameter "AcquisitionTime" in the parameter list and enter the following value in the Format field: dd.mm.yyyy → Thus, only the date will be displayed. Days and months will alway be displayed with two digits, years with four digits, for instance 13.05.2024.
Unit Conversation	Sets the automatic conversion of units: – ■ Maintain default. – ☑ Enable unit conversion. – ☐ Disable unit conversion.
More...	Opens a dialog window for displaying and adapting the changed parameter properties.
OK	Closes the dialog window, the settings for the selected parameter are applied. ℹ The selected parameter will not be inserted in the parameter list.
Add	Inserts the selected parameter into the parameter list.
Cancel	Closes the dialog window, the settings for the selected parameter are rejected.

5.3 Functions in the Info menu

Overview

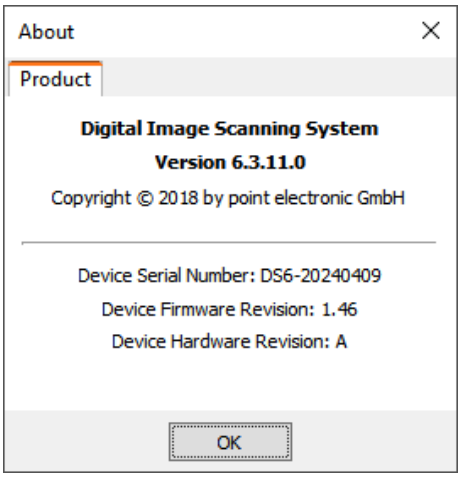
Purpose This section contains descriptions on the structure and function of the Info menu components.

Contents This sections contains the following information:

About...

Description The About function opens a dialog window with product information on the version of the installed image acquisition software as well as the connected image acquisition electronics.

Dialog window The following figure shows the **About** dialog window:

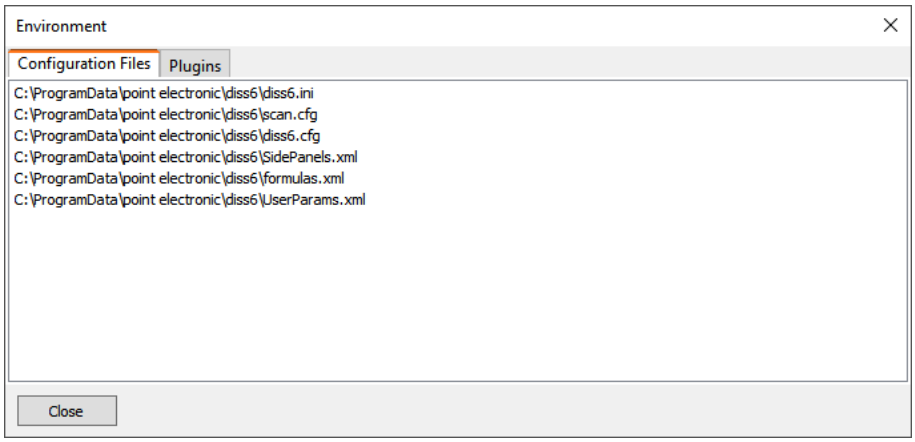


Environment...

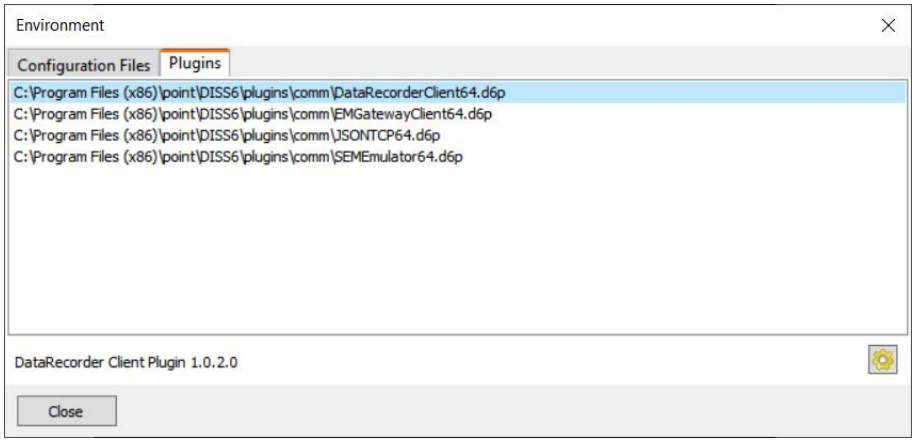
Description The Environment function opens a dialog window which shows the saving locations of the configuration files and installed plug-ins.

The savings locations may not always be the same but instead depend on the operation system. The **Environment** dialog window shows the saving locations' paths.

Configuration Files tab The Configuration Files tab shows the saving locations of all configuration files.



Plugins tab The Plugins tab shows all currently loaded plug-ins including their version numbers.



Continuation next page ...

… Continuation: Environment…

Opening a configuration file

Complete the following steps to open the configuration files or savings locations:

1. Switch to the Configuration Files tab in the **Environment** dialog window.
2. Click an item within the configuration file list to select it.
3. Click this item with the right mouse button and select the needed function in the context menu.

Configuring a plug-in

Complete the following steps to configure a plug-in:

1. Switch to the Plugins tab in the **Environment** dialog window.
2. Click the needed plug-in in the list to select it.
3. Click the cog icon.
   → A dialog window for configuring the selected plug-in opens.

5.4 Toolbar functions

Overview

Purpose This section contains descriptions on the structure and function of the toolbar elements.

Contents This sections contains the following information:

Region Scan

Description Region scan is a fast continuous scan of a selected image area. Among other things, it is suitable for setting the focus.

Region scan may be started in an acquired live or slow scan image.

By pressing the region scan button, a scan will be started within the size of the displayed selection box.

The size of the selection box may be rescaled by changing its frame with the mouse or via scan settings.

Zoom function Region scan contains a Zoom function.

The image in the selected area may be zoomed in and out with the mouse wheel.

Button Pressing the following button initializes a region scan:

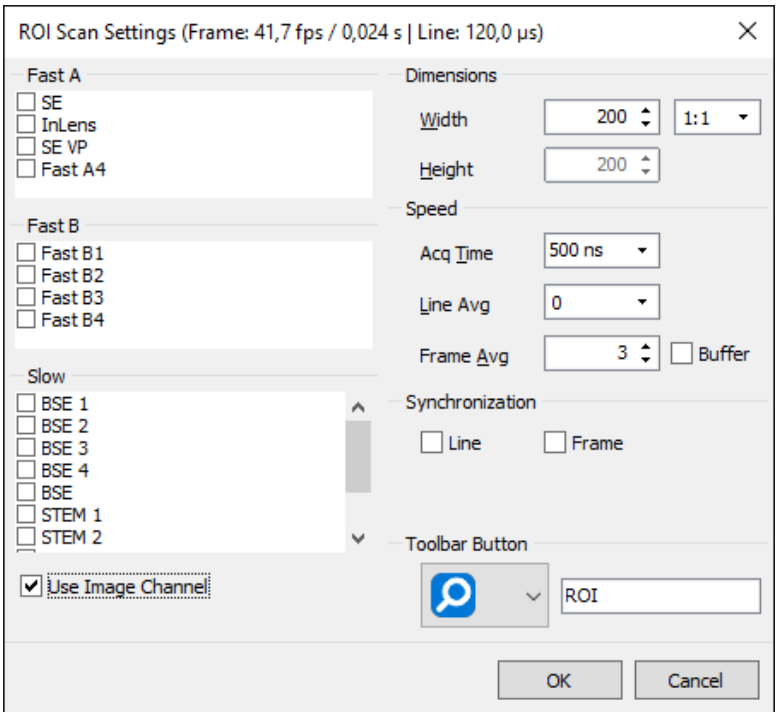
Cancel Region scan will be canceled when the **Stop** button or another scan button is pressed.

Set-up of region scan A right-click on the region scan button opens the **Scan Settings** dialog window to set up the relevant parameters.

Continuation next page …

… Continuation: Region Scan

Scan Settings The following figure shows the **Scan Settings** dialog window with the following components:



The following table contains information on the components of the **Scan Settings** dialog window:

Component	Function
Title bar	Displays the calculated scan time per frame based on the scan settings.
Fast A Fast B Slow	Contain checkboxes for selecting an analog input signal source.
Use Image Channel	The input channel of the ROI uses the input of the image on which it is applied if the checkbox is activated.
Dimensions	
– Width	Sets the width of a displayed image in pixels. Depending on the aspect ratio selected in the **Ratio** field, any entry in the Width field leads to an automatic change of the **Height** value.
– Ratio	Sets the aspect ratio of the displayed image. The available values are 1:1, 5:4, 4:3 and Any.
– Height	Sets the height of a displayed image in pixels. Depending on the aspect ratio selected in the **Ratio** field, any entry in the Height field leads to an automatic change of the **Width** value.
Speed	

Continuation next page …

… Continuation: Region Scan

Component	Function
– Acq Time	Sets the acquisition time per pixel. The value may be set manually within a 10 ns grid. Thus, the signal-to-noise ratio (SNR) may be improved. The acquisition time may be changed by using the [left arrow] and [right arrow] keys.
– Line Avg.	Activates line averaging. This means that each line is repeatedly scanned with a preset amount of scans. Image signals per line are shown averaged. ℹ The use of line averaging is not possible if line synchronization is activated.
– Frame Avg	Activates frame averaging. This means that images are shown averaged by a preset frame rate. Frame averaging may be changed by using the [arrow up] and [arrow down] keys.
Synchronization	
– Line	Activates line synchronization. With every new line, the scan is synchronized to the mains voltage in order to reduce interferences. ℹ The use of line synchronization is not possible if line averaging is activated.
– Frame	Activates image synchronization. With every new image, the scan is synchronized to the mains voltage in order to reduce interferences.
Toolbar button	– Selecting the Scan button to be shown in the toolbar. – Entering a name to be displayed below the Scan button.
OK	Closes the dialog window. The preset parameters are saved.
Cancel	Closes the dialog window. The preset parameters are rejected.

Live Scan

Description Live scan is a fast, continuous scan exclusively intended for image preview.

The images displayed in the live scan cannot be saved.

The display size of the image may be rescaled by changing the frame with the mouse or via scan settings.

In the live scan, the amount of pixels of the displayed image corresponds to the amount of scanned pixels.

Full screen mode Full screen mode can be activated by double-clicking the live scan image. In this mode, the image is only scanned with half the displayed pixels.

Example image resolution of 1024 × 768:
If the full screen mode is activated, the image will be scanned with a resolution of 512 × 384 pixels.

For smoothing the image, use the key combination [Ctrl]+[I] to switch to an interpolated display.

Button Pressing the following button starts a live scan:

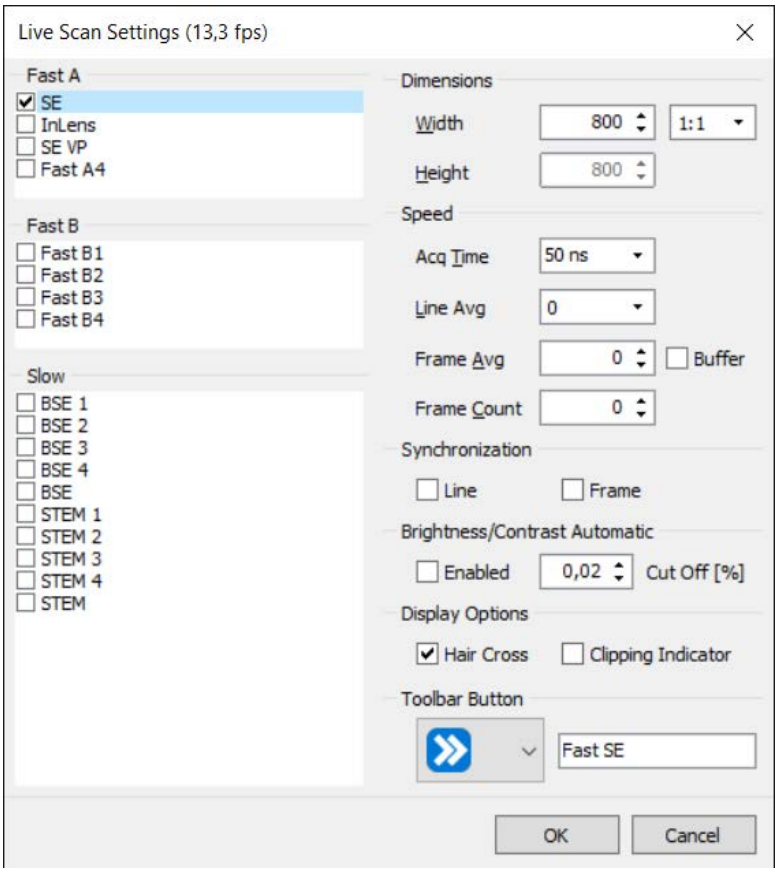
Cancel Live scan will be canceled when the **Stop** button or another scan button is pressed.

Continuation next page …

… Continuation: Live Scan

Set-up of live scan A right-click on the live scan button opens the **Scan Settings** dialog window to set up the relevant parameters.

Scan Settings The following figure shows the **Scan Settings** dialog window with the following components:



The following table contains information on the components of the **Scan Settings** dialog window:

Component	Function
Title bar	Displays the calculated scan time per frame based on the scan settings.
Fast A Fast B Slow	Contain checkboxes for selecting an analog input signal source.
Dimensions	
– Width	Sets the width of a displayed image in pixels. Depending on the aspect ratio selected in the **Ratio** field, any entry in the Width field leads to an automatic change of the **Height** value.

Continuation next page …

… Continuation: Live Scan

Component	Function
– Ratio	Sets the aspect ratio of the displayed image. The available values are 1:1, 5:4, 4:3 and Any.
– Height	Sets the height of a displayed image in pixels. Depending on the aspect ratio selected in the **Ratio** field, any entry in the Height field leads to an automatic change of the **Width** value.
Speed	
– Acq Time	Sets the acquisition time per pixel. The value may be set manually within a 10 ns grid. Thus, the signal-to-noise ratio (SNR) may be improved. The acquisition time may be changed by using the [left arrow] and [right arrow] keys.
– Line Avg	Activates line averaging. This means that each line is repeatedly scanned with a preset amount of scans. Image signals per line are shown averaged. ℹ The use of line averaging is not possible if line synchronization is activated.
– Frame Avg	Activates frame averaging. This means that images are shown averaged by a preset frame rate. Frame averaging may be changed by using the [arrow up] and [arrow down] keys.
– Frame Count	Sets the frame count.
Synchronization	
– Line	Activates line synchronization. With every new line, the scan is synchronized to the mains voltage in order to reduce interferences. ℹ The use of line synchronization is not possible if line averaging is activated.
– Frame	Activates image synchronization. With every new image, the scan is synchronized to the mains voltage in order to reduce interferences.
Brightness/Contrast Automatic	Regulates the brightness/contrast ratio of analog image signals.
– Enabled	Activates the brightness/contrast automatic.
– Cut Off (%)	The percentage of the brightest and darkest pixels set in the **Cut Off** field will not be included in the calculation of brightness and contrast to ignore outliers.
Display Options	
– Hair Cross	Shows a hair cross for adjustment of the grid in the center of the image.
– Clipping Indicator	Activates/deactivates the display of an overdriven image signal. If the checkbox is ticked, all absolutely white pixels will be displayed in red and all absolutely black pixels will be displayed in green.

Continuation next page …

… Continuation: Live Scan

Component	Function
Toolbar Button	– Selecting the scan button to be shown in the toolbar. – Entering a name to be displayed below the scan button.
OK	Closes the dialog window. The preset parameters are saved.
Cancel	Closes the dialog window. The preset parameters are rejected.

Slow Scan

Description Slow scan is used for the simultaneous image acquisition from up to four analog signal sources.

The display size of the images may be rescaled by changing the frame with the mouse.

The image resolution is set in scan settings. The number of scanning cycles may also be set in scan settings.

Images simultaneously acquired from several sources are displayed in a multi-divided window.

Button Pressing the following button starts a slow scan:

Ending The following table contains information on ending the slow scan and the corresponding actions:

Ending	Action
At the end of a scan	When the preset amount of scans is reached.
At the end of the current image rolling	After repeated pressing of the Slow Scan button.

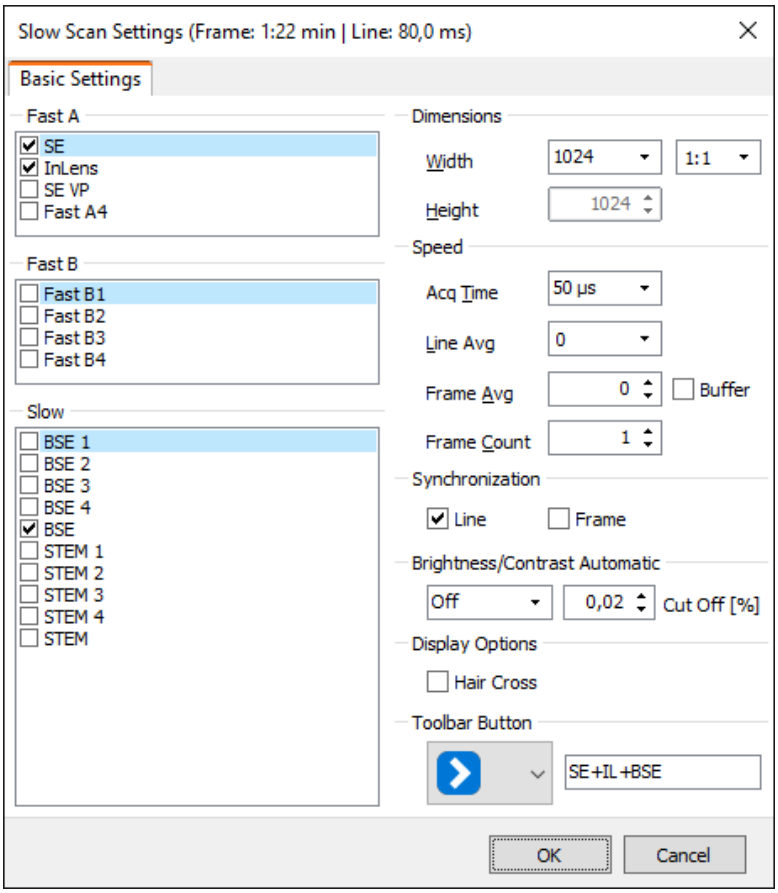
Cancel Slow scan will be canceled when the **Stop** button or another scan button is pressed.

Set-up of slow scan A right-click on the slow scan button opens the **Scan Settings** dialog window to set up the relevant parameters.

Continuation next page …

… Continuation: Slow Scan

Scan Settings The following figure shows the **Scan Settings** dialog window with the following components:



The following table contains information on the components of the **Scan Settings** dialog window:

Component	Function
Title bar	Displays the calculated scan time per frame based on the scan settings.
Fast A Fast B Slow	Contain checkboxes for selecting analog input signal sources.
Dimensions	
– Width	Sets the width of a displayed image in pixels. Depending on the aspect ratio selected in the Ratio field, any entry in the Width field leads to an automatic change of the Height value.
– Ratio	Sets the aspect ratio of the displayed image. The available values are 1:1, 5:4, 4:3 and Any.

Continuation next page …

… Continuation: Slow Scan

Component	Function
– Height	Sets the height of a displayed image in pixels. Depending on the aspect ratio selected in the Ratio field, any entry in the Height field leads to an automatic change of the Width value.
Speed	
– Acq Time	Sets the acquisition time per pixel. The value may be set manually within a 10 ns grid. Thus, the signal-to-noise ratio (SNR) may be improved. The acquisition time may be changed by using the [left arrow] and [right arrow] keys.
– Line Avg	Activates line averaging. This means that each line is repeatedly scanned with a preset amount of scans. Image signals per line are shown averaged. ℹ The use of line averaging is not possible if line synchronization is activated.
– Frame Avg	Activates frame averaging. This means that images are shown averaged by a preset frame rate. Frame averaging may be changed by using the [arrow up] and [arrow down] keys.
– Frame Count	Sets the frame count.
Synchronization	
– Line	Activates line synchronization. With every new line, the scan is synchronized to the mains voltage in order to reduce interferences. ℹ The use of line synchronization is not possible if line averaging is activated.
– Frame	Activates image synchronization. With every new image, the scan is synchronized to the mains voltage in order to reduce interferences.
Brightness/Contrast Automatic	Regulates the brightness/contrast ratio of analog image signals.
– Options	– **Off:** Deactivates the brightness/contrast automatic. – **Single:** Brightness/contrast minimum and maximum will be determined for each image signal and applied accordingly. – **Global:** Brightness/contrast minimum and maximum will be determined for each image signal. The resulting minima and maxima will be applied to all image signals to keep the image signal ratio.
– Cut Off (%)	The percentage of the brightest and darkest pixels set in the **Cut Off** field will not be included in the calculation of brightness and contrast to ignore outliers.
Display Options	
– Hair Cross	Shows a hair cross for adjustment of the grid in the center of the image.

Continuation next page …

… Continuation: Slow Scan

Component	Function
Toolbar Button	– Selecting the scan button to be shown in the toolbar. – Entering a name to be displayed below the scan button.
OK	Closes the dialog window. All preset parameters are saved and used for the next scanning process.
Cancel	Closes the dialog window. The preset parameters are rejected.

Counter Scan

Description The counter scan is used for image acquisition of digital mapping images and analog signal sources. It is possible to acquire images simultaneously from up to twelve digital and up to four analog signal sources (optional).

The display size of the images may be rescaled by changing the frame with the mouse or via scan settings.

Image resolution and measure time of the images to be scanned may be set in scan settings.

Images simultaneously acquired from several sources are displayed in a multi-divided window.

Button Pressing the following button initializes a counter scan:

Ending The following table contains information on ending the counter scan and the corresponding actions:

Ending	Action
At the end of a scan	When the preset amount of scans is reached.
At the end of the current image rolling	By repeated pressing of the **Counter** button.

Cancel Counter scan will be canceled when the **Stop** button or another scan button is pressed.

Continuation next page …

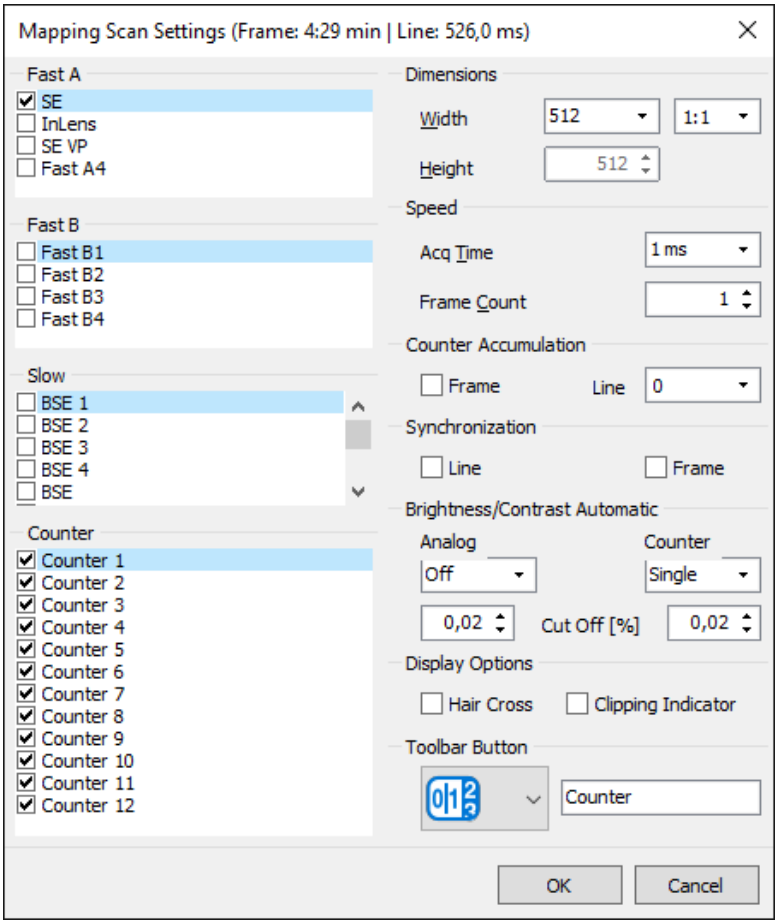
… Continuation: Counter Scan

Set-up of counter scan

A right-click on the counter scan button opens the **Scan Settings** dialog window to set up the counter scan parameters.

Scan Settings

The following figure shows the **Scan Settings** dialog window with the following components:



The following table contains information on the components of the **Scan Settings** dialog window:

Component	Function
Title bar	Displays the calculated scan time per frame based on the scan settings.
Fast A Fast B Slow	Contain checkboxes for selecting analog input signal sources.
Counter	Contain checkboxes for selecting up to twelve digital input signal sources.
Dimensions	

Continuation next page …

… Continuation: Counter Scan

Component	Function
– Width	Sets the width of a displayed image in pixels. Depending on the aspect ratio selected in the Ratio field, any entry in the Width field leads to an automatic change of the Height value.
– Ratio	Sets the aspect ratio of the displayed image. The available values are 1:1, 5:4, 4:3 and Any.
– Height	Sets the height of a displayed image in pixels. Depending on the aspect ratio selected in the Ratio field, any entry in the Height field leads to an automatic change of the Width value.
Speed	
– Acq Time	Sets the acquisition time per pixel. The value may be set manually within a 10 ns grid. Thus, the signal-to-noise ratio (SNR) may be improved. The acquisition time may be changed by using the [left arrow] and [right arrow] keys.
– Frame Count	Sets the frame count.
Counter Accumulation	Counter Accumulation is used to add up the impulses at each pixel for the set number of line repetitions.
– Frame	Activates/deactivates Counter Accumulation.
– Line	Sets the number of line repetitions.
Synchronization	
– Line	Activates line synchronization. With every new line, the scan is synchronized to the mains voltage in order to reduce interferences.
– Frame	Activates image synchronization. With every new image, the scan is synchronized to the mains voltage in order to reduce interferences.
Brightness/Contrast Automatic	Regulates the brightness/contrast ratio of image signals.
– Analog	Contains options for brightness/contrast automatic of the analog image signals (see Options).
– Counter	Contains options for brightness/contrast automatic of the digital image signals (see Options).
– Options	– Off: Deactivates the brightness/contrast automatic. – Single: Brightness/contrast minimum and maximum will be determined for each image signal and applied accordingly. – Global: Brightness/contrast minimum and maximum will be determined for each image signal. The resulting minima and maxima will be applied to all image signals to keep the image signal ratio.

Continuation next page …

… Continuation: Counter Scan

Component	Function
– Cut Off (%)	The percentage of the brightest and darkest pixels set in the Cut Off field will not be included in the calculation of brightness and contrast to ignore outliers. This percentage may be set differently for analog and digital image signals.
Display Options	
– Hair Cross	Shows a hair cross for adjustment of the grid in the center of the image.
– Clipping Indicator	Activates/deactivates the display of an overdriven image signal. If the checkbox is ticked, all absolutely white pixels will be displayed in red and all absolutely black pixels will be displayed in green.
Toolbar Button	– Selecting the scan button to be shown in the toolbar. – Entering a name to be displayed below the scan button.
OK	Closes the dialog window. All preset parameters are saved and used for the next scanning process.
Cancel	Closes the dialog window. The preset parameters are rejected.

Line scan / point measurement

Description The Line scan / point measurement function scans any line or point on the sample.

Thus captured signals may be displayed graphically or exported as table.

Before a line scan may be started, a slow scan image has to be acquired and the magnification of the microscope has to be entered. Entering the magnification is not necessary for devices with automatic parameter transfer controlled by image acquisition.

Button Pressing the following button opens the **Point/Line Measurement** dialog window to set up and to do line scans and/or point measurements:

NOTICE

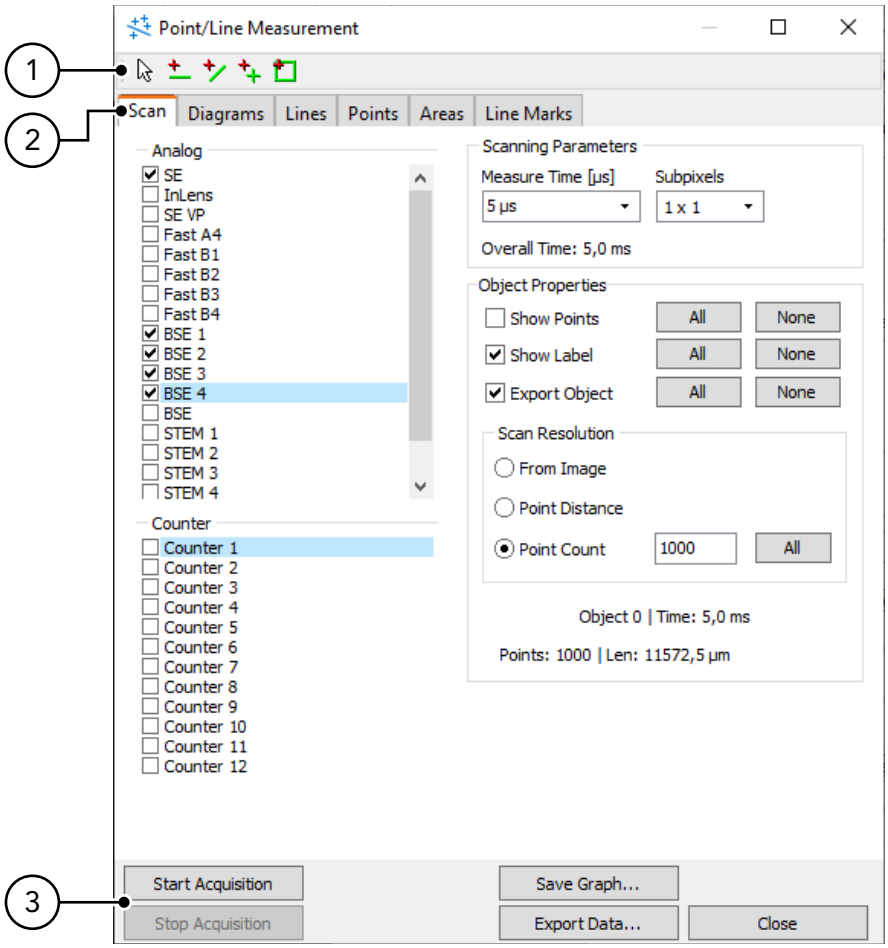
No other scan function may be processed during activity of the line scan / point measurement function.

Ending Function will be ended by closing the **Point/Line Measurement** window.

Continuation next page ...

… Continuation: Line scan / point measurement

User interface The following figure shows the Line Scan user interface with its main components:



The following table contains information on the main components of the user interface of the Line Scan:

No.	Component	Function
1	Measurement tools	Buttons for selection or creation of the following measuring objects: – Horizontal measurement lines (Page 96) – Free measurement lines (Page 97) – Measurement points (Page 99) – Measurement areas (Page 100)
2	Tabs	
	– Scan	Contains functions to set up the scan (Page 88).
	– Diagrams	Contains functions to set up the diagram display (Page 90).
	– Lines	– Shows the values of the created measurement lines in a table. – Modification of shown values. – Contains checkboxes for activating/deactivating single measurement lines for the **Export Data...** function.

Continuation next page …

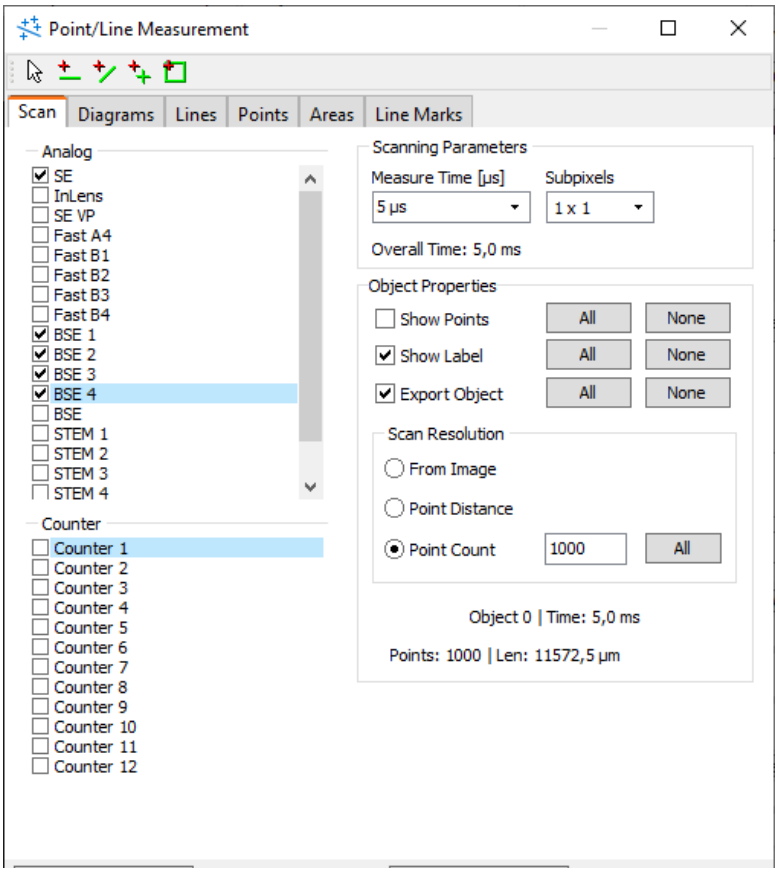
… Continuation: Line scan / point measurement

No.	Component	Function
	– Points	– Shows the values of the created measurement points in a table. – For changing the displayed values and deletion of the applied measurement points. – Contains checkboxes for activating/deactivating single measurement points for the **Export Data...** function.
	– Areas	– Shows the values of the created measurement areas in a table. – For changing the displayed values and deletion of the applied measurement areas. – Contains checkboxes for activating/deactivating single measurement areas for the **Export Data...** function.
	– Line Marks	Shows the markers set in the diagram with their position and the measured value in a table. Markers may be set in the diagram and deleted with a right-click. ℹ Setting/deleting markers is only possible if the per Line option is activated in the Line/Diagram Assignment.
3	Function keys	
	– Start Acquisition	Starts the scanning process with the preset values.
	– Stop Acquisition	Ends the scanning process.
	– Save Graph...	– Opens a dialog window for exporting the acquired image with measurement lines, measurement points and diagrams as TIFF file. Additionally, the data export can be activated. Thus, the measuring object's tables will be saved as XLS or CSV file with the same file name.
	– Export Data...	Opens a dialog window for exporting the line, point and area tables as XLS or CSV file.
	– Save Table...	Opens a dialog window for saving the currently displayed measuring object table. ℹ Will only be displayed with the Points oder Lines, Areas and Line Marks tabs.
	– Close	Closes the dialog window. The scan is canceled, all settings are rejected.

Continuation next page …

… Continuation: Line scan / point measurement

Scan tab The following figure shows the Scan tab with its components:



The following table contains information on the components of the Scan tab:

Component	Function
Analog	Contain checkboxes for selecting up to four analog input signal sources.
Counter	Contains checkboxes for selecting up to twelve digital input signal sources.
Scanning Parameters	Contains global settings for line scan / point measurement.
– Measure Time	Sets the measure time of the mapping counters. During that time, digital image signals for each pixel are accumulated.
– Subpixels	Contains a selection of possible subpixel ranges that may additionally be measured around each measuring point. If a subpixel range larger than 1 × 1 is selected, the measuring points will be displayed as squares instead of crosses if the Show Points function is activated.
– Overall Time	Displays the calculated scan time based on the scan settings.

Continuation next page …

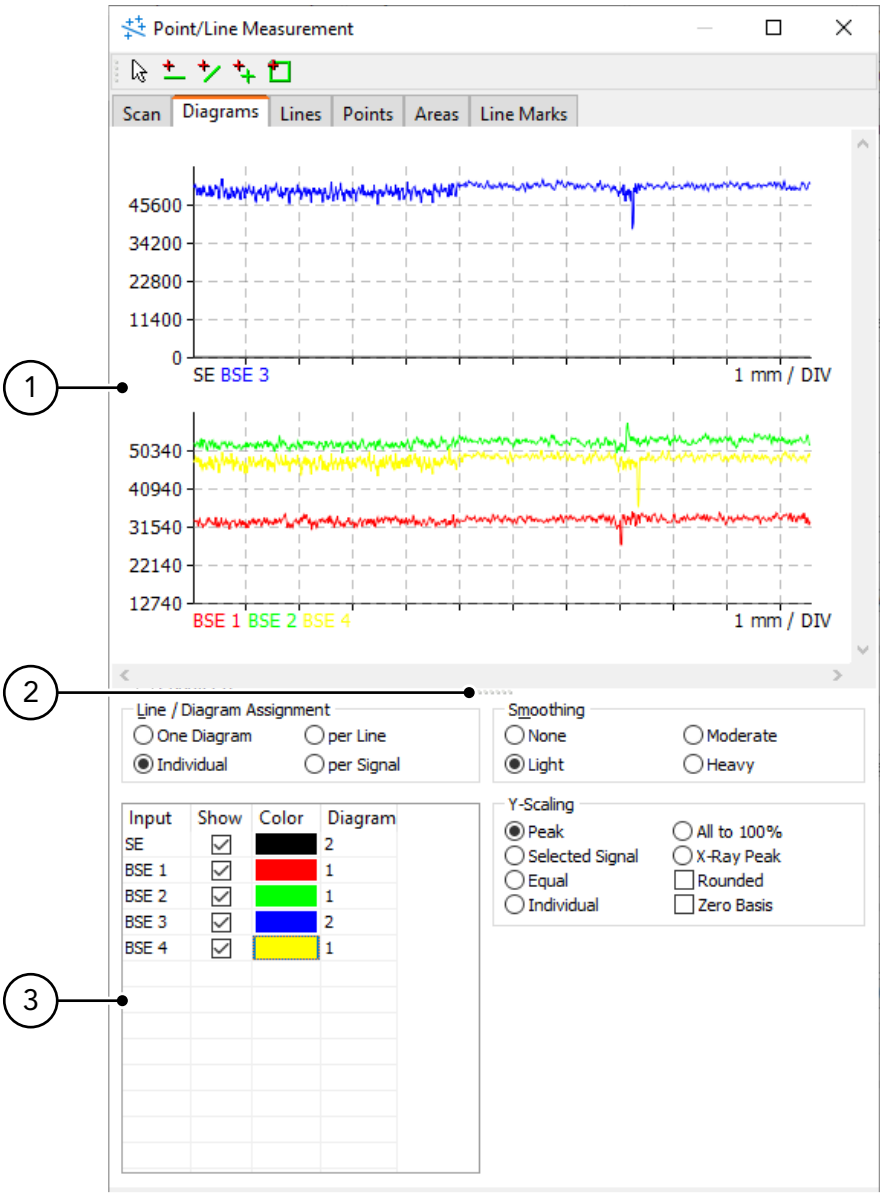
… Continuation: Line scan / point measurement

Component	Function
Object Properties	Contains settings of the currently selected measuring object.
– Show Points	Activates or deactivates the display of measurement points on the selected measuring object. – **All** activates the display for all measuring objects created. – **None** deactivates the display for all measuring objects created. If the display is activated, the measuring points will be displayed as crosses.
– Show Label	Activates or deactivates the display of the numbering of the selected measuring object. – **All** activates the display for all measuring objects created. – **None** deactivates the display for all measuring objects created.
– Export Object	Activates or deactivates the Export Data function of the selected measuring object. – **All** activates the export for all measuring objects created. – **None** deactivates the export for all measuring objects created.
Scan Resolution	– Contains functions for scan resolution set-up within the Object Properties. – The scan resolution is defined by the amount of measurement points for the currently selected measuring object.
– From Image	The scan resolution for the currently selected measuring object conforms with the resolution of the current image in pixels.
– Point Distance	Direct input (in µm) of the distance between the measurement points of the currently selected measuring object in the input field.
– Point Count	Direct input of the amount of measurement points for the currently selected measuring object in the input field.
– All	Applies the set value for Point Distance and/or Point Count to all measuring objects.

Continuation next page …

… Continuation: Line scan / point measurement

Diagrams tab The following figure shows the Diagrams tab with its components:



The following table contains information on the components of the Diagrams tab:

No.	Component	Function
1	Diagram display	Shows diagrams for created measurement lines on the basis of values set in the Diagrams tab.
2	View switch	Enlarges or reduces the diagram view in the dialog window.
	Line/Diagram Assignment	Contains functions to display input signal sources in one or multiple diagrams.

Continuation next page …

… Continuation: Line scan / point measurement

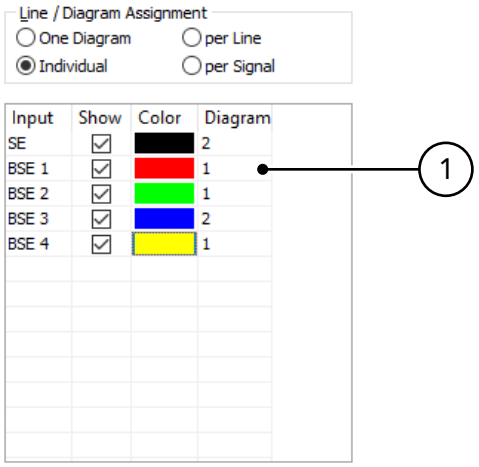
No.	Component	Function
	– One Diagram	All input signal sources will be displayed in one diagram.
	– Individual (Page 94)	Individual display of the input signal sources in one or multiple diagrams. In the Lines field, the individual input signal sources may be attributed to the individual diagrams.
	– per Line	For each created measurement line, a diagram which shows all contained input signal sources will be generated. ℹ In this view, markers (line marks) may be set in a diagram or deleted from it by right-click.
	– per Signal	Each input signal source will be displayed in a diagram.
3	Lines	– Contains specifications for all created measurement lines. – Distributes input signal sources to different diagrams.
	– L	– Activates or deactivates measurement lines. – Only shown if several measurement lines were applied.
	– Input	Contains the created measurement lines and the corresponding input signal sources.
	– Show	Activates or deactivates input signal sources.
	– Signal	Contains the elements of the input signal sources as comment.
	– Color	– Shows the current color for each measurement line. – Sets a color for each measurement line.
	Smoothing	Contains functions to smooth the signal curve(s) in the diagram.
	– None	No smoothing of the signal curve(s).
	– Moderate	Normal smoothing of the signal curve(s).
	– Light	Light smoothing of the signal curve(s).
	– Heavy	Intense smoothing of the signal curve(s).
	Y-Scaling	Contains functions on setting the diagram scaling in Y direction.
	– Peak	The scaling of individual diagrams ends at the maximum value of the contained input signal source.
	– Selected Signal (Page 93)	The scaling of all displayed diagrams follows one selected input signal source.
	– Equal (Page 93)	Manual setting of scaling for all displayed diagrams. The lowest and the highest value of the Y axis may be set. The sectioning of the Y axis will be calculated automatically.
	– Individual (Page 94)	Manual setting of scaling for each displayed diagram. For each diagram, the lowest and the highest value of the Y axis may be set. The sectioning of the Y axis will be calculated automatically.
	– Zero Basis	If the checkbox is activated, scaling of all diagrams starts at zero.

Continuation next page …

… Continuation: Line scan / point measurement

Line/Diagram Assignment – Individual

The following figure shows a detail of the Diagrams tab with the components of the Line/Diagram Assignment – Individual function:



The following table contains information on the components of the Line/Diagram Assignment – Individual function:

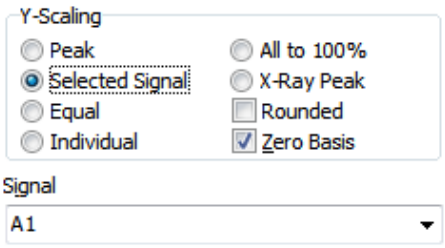
No.	Component	Function
1	Diagram assignment	distribution and/or combination of the input signal sources in different diagrams.

Continuation next page …

… Continuation: Line scan / point measurement

Y-Scaling – Selected Signal

The following figure shows a detail of the Diagrams tab with the components of the Y-Scaling – Selected Signal function:

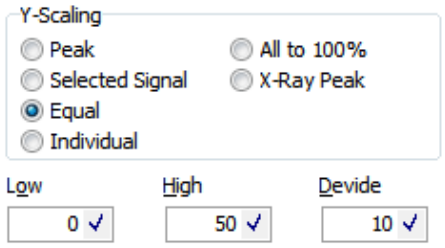


The following table contains information on the components of the Y-Scaling – Selected Signal function:

Component	Function
Signal	Defines the preferred input signal source to whose amplitude the scaling of all displayed diagrams will conform.

Y-Scaling – Equal

The following figure shows a detail of the Diagrams tab with the components of the Y-Scaling – Equal function:



The following table contains information on the components of the Y-Scaling – Equal function:

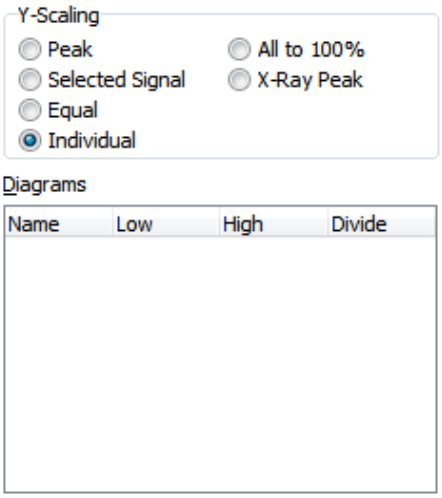
Component	Function
Low	Sets the lowest scale interval for all diagrams.
High	Sets the highest scale interval for all diagrams.
Divide	Sets the scale divider for all diagrams.

Continuation next page …

… Continuation: Line scan / point measurement

Y-Scaling – Individual

The following figure shows a detail of the Diagrams tab with the components of the Y-Scaling – Individual function:



The following table contains information on the components of the Y-Scaling – Individual function:

Component	Function
Diagrams	Contains functions on setting the diagram scaling in Y direction.
– Name	– Contains all created measurement lines when the function Line/Diagram Assignment – per Line is activated. – Contains all input signal sources when the function Line/Diagram Assignment – per Signal is activated.
– Low	Sets the lowest scale interval for each measurement line or input signal source.
– High	Sets the highest scale interval for each measurement line or input signal source.
– Divide	Sets the scale divider for every diagram.

Measurement tools in line scan/point measurement

Description

In a captured slow scan image, different measurement points, measurement lines and measurement areas may be determined.

After clicking the **Start Acquisition** button, the scan will be carried out on exactly these determined positions.

Measurement tools

The following table contains an overview of the measurement tools in the **Point/Line Measurement** dialog window:

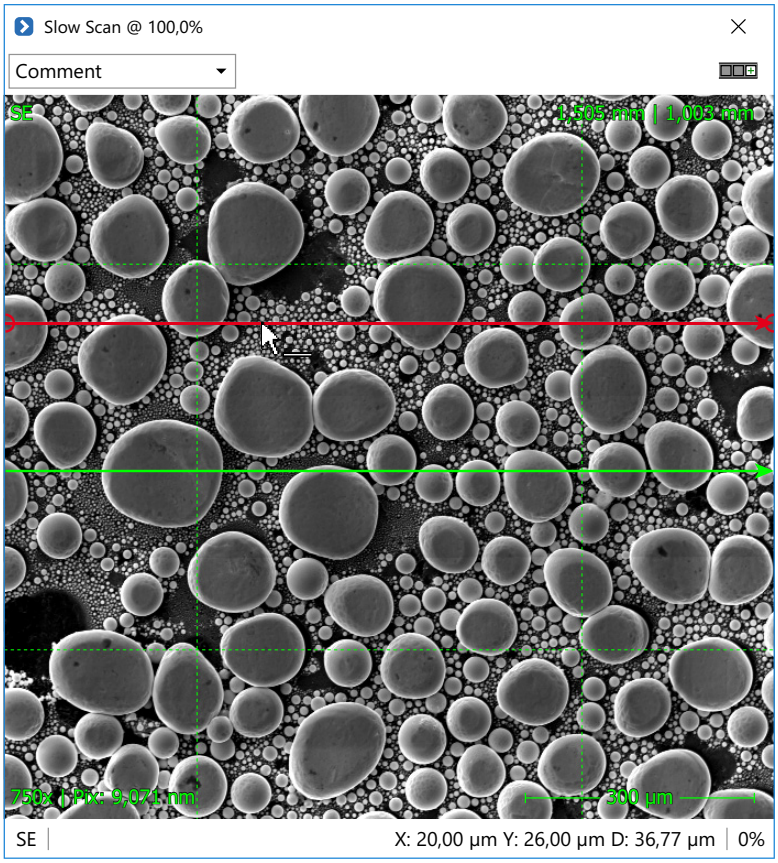
Measurement tool	Function
	Selection of created measurement lines, measurement points and measurement areas.
	Creation of horizontal measurement lines in an acquired image (Page 96).
	Creation of free measurement lines in an acquired image (Page 97).
	Creation of measurement points in an acquired image (Page 99).
	Creation of rectangular measurement areas in an acquired image (Page 100).

Continuation next page …

… Continuation: Measurement tools in line scan/point measurement

Creation of horizontal measurement lines

In the image acquisition window, horizontal lines that cross the whole scan with a 0° angle from left to right will be created. The arrow indicates the measurement direction.



The following table contains information on options for creating and changing horizontal measurement lines:

Measurement line …	Steps
Creation	– Click the tool for horizontal measurement lines in the **Point/Line Measurement** dialog window. – Click into the image acquisition window. → A horizontal measurement line will be created.
Selection	Use the selection tool to click the particular measurement line in the image acquisition window. → The measurement line is selected and highlighted in red.
Moving	– Select the particular measurement line. – Click the selected measurement line and keep the mouse button pressed while moving the line.
Copy	– Select the particular measurement line. – Keep the [Ctrl] key pressed, click the selected measurement line and keep the mouse button pressed while moving the line. → During moving, the measurement line will be copied.

Continuation next page …

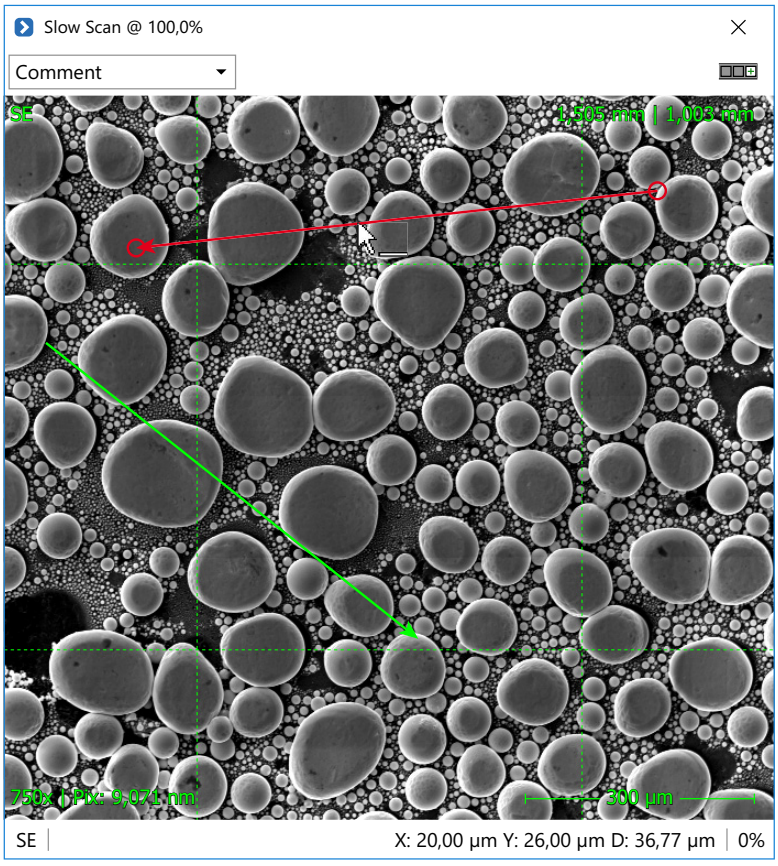
… Continuation: Measurement tools in line scan/point measurement

Measurement line …	Steps
Deletion	– Select the particular measurement line. – Press the [Del] key. → The selected measurement line will be deleted.

The values of the created measurement lines (e. g. coordinates, length, angle) may be read and changed in the Lines tab in the **Point/Line Measurement** dialog window. In this tab, several measurement lines may also be selected by clicking them while keeping the [Ctrl] or [Shift] key pressed and may then be deleted with the [Del] key.

Creation of free measurement lines

In the image acquisition window, free measurement lines of any length, direction and angle may be created. The arrow indicates the measurement direction.



Continuation next page …

… Continuation: Measurement tools in line scan/point measurement

The following table contains information on options for creating and changing free measurement lines:

Measurement line …	Steps
Creation	– Click the tool for free measurement lines in the **Point/Line Measurement** dialog window. – Click into the image acquisition window to set the zero point of the free measurement line. – Click again into the image acquisition window to set the final point of the free measurement line. → The free measurement line is created. Measurement direction will be indicated by an arrow. Measurement will always take place from zero to final point.
Selection	Use the selection tool to click the particular measurement line in the image acquisition window. → The measurement line is selected and highlighted in red.
Change	– Select the particular measurement line. – Click the zero or final point of the selected measurement line and keep the mouse button pressed while moving it. ℹ Zero and final points of selected measurement lines will be highlighted with little circles when moving the mouse cursor over them.
Creation with determined angle	Keep the [Ctrl] key pressed to lock the line angle in 45° steps while completing one of the following actions: – determining the final point of a free measurement line. – moving the zero point or final point of a selected free measurement line.
Moving	– Select the particular measurement line. – Click the selected measurement line and keep the mouse button pressed while moving the line.
Copy	– Select the particular measurement line. – Keep the [Ctrl] key pressed, click the selected measurement line and keep the mouse button pressed while moving the line. → During moving, the measurement line will be copied.
Deletion	– Select the particular measurement line. – Press the [Del] key. → The measurement line will be deleted.

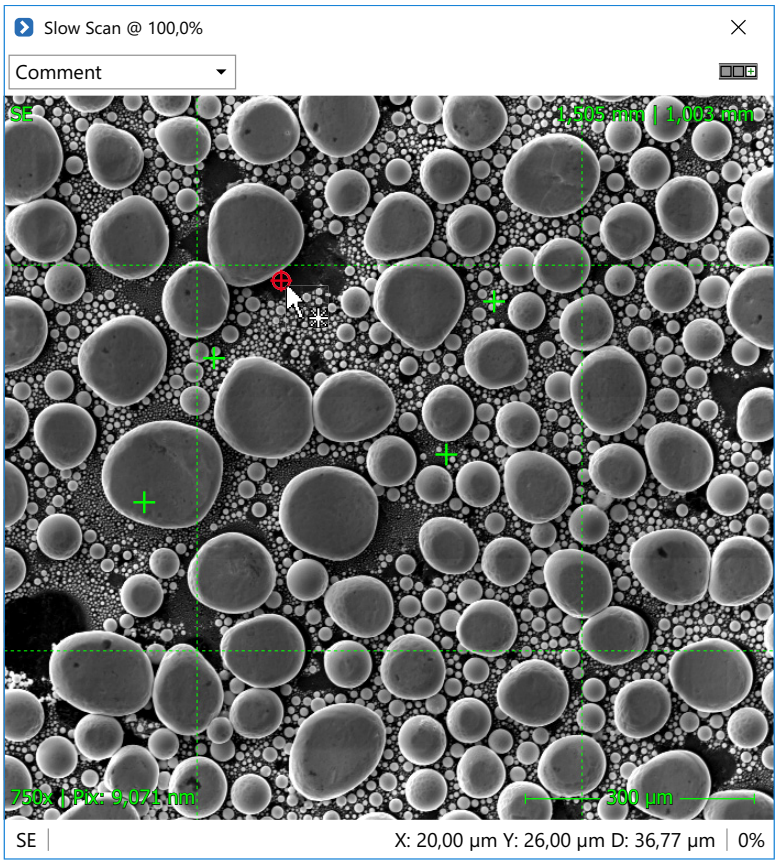
The values of the created measurement lines (e. g. coordinates, length, angle) may be read and changed in the **Lines** tab in the **Point/Line Measurement** dialog window. In this tab, several measurement lines may also be selected by clicking them while keeping the [Ctrl] or [Shift] key pressed and may then be deleted with the [Del] key.

Continuation next page …

… Continuation: Measurement tools in line scan/point measurement

Creation of measurement points

Creates measurement points in the image acquisition window.



The following table contains information on options for creating and changing measurement points:

Measurement point …	Steps
Creation	– Click the tool for measurement points in the **Point/Line Measurement** dialog window. – Click into the image acquisition window. → A measurement point will be created.
Selection	Use the selection tool to click the particular measurement point in the image acquisition window. → The measurement point is selected and highlighted in red.
Moving	– Select the particular measurement point. – Click the selected measurement point and keep the mouse button pressed while moving it.
Deletion	– Select the particular measurement point. – Press the [Del] key. → The measurement point will be deleted.

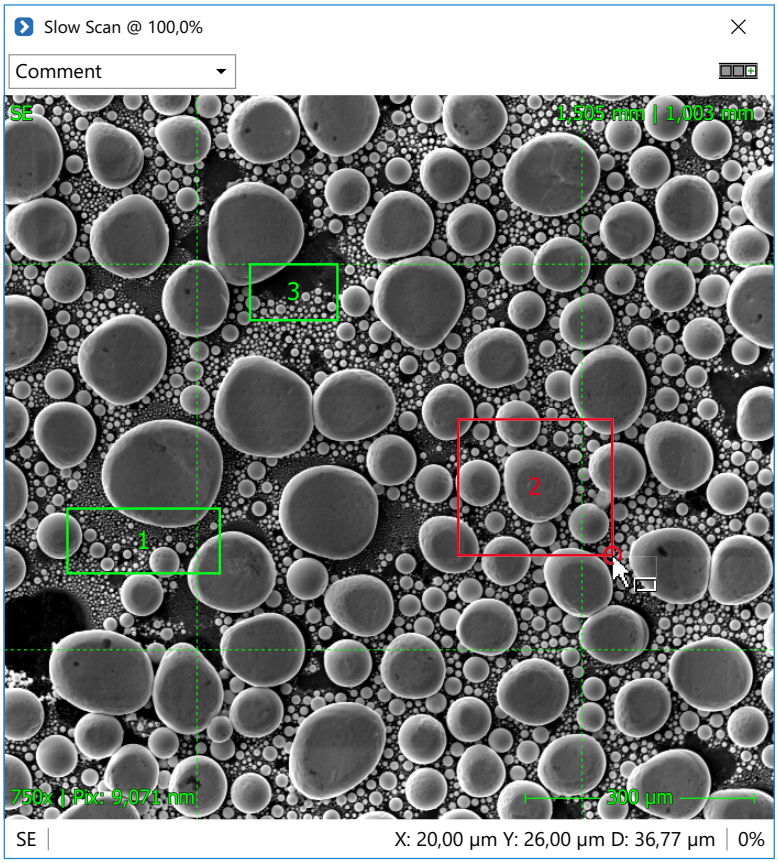
Continuation next page …

… Continuation: Measurement tools in line scan/point measurement

The values of the created measurement points (e. g. coordinates) may be read and changed in the **Points** tab in the **Point/Line Measurement** dialog window. In this tab, several measurement points may also be selected by clicking them while keeping the [Ctrl] or [Shift] key pressed and may then be deleted with the [Del] key.

Creation of rectangular measurement areas

Creates rectangular measurement areas of any size in the image acquisition window.



The following table contains information on options for creating and changing rectangular measurement areas:

Measurement area …	Steps
Creation	– Click the tool for rectangular measurement areas in the **Point/Line Measurement** dialog window. – Click into the image acquisition window to determine the upper left corner of the measurement area. – Click again into the image acquisition window to determine the bottom right corner of the measurement area. → The rectangular measurement area will be created.

Continuation next page …

… Continuation: Measurement tools in line scan/point measurement

Measurement area …	Steps
Selection	Use the selection tool to click the particular measurement area in the image acquisition window. → The measurement area is selected and highlighted in red.
Change	– Select the particular measurement area. – To change height and width at the same time, click one of the corners of the selected measurement area. Keep the mouse button pressed while moving the corner. – To change either height or width, click one of the edges (between 2 corners) of the selected measurement area. Keep the mouse button pressed while moving the edge. ℹ The corners of the selected measurement area will be highlighted with little circles when moving the mouse cursor over them.
Deletion	– Select the particular measurement area. – Press the [Del] key. → The measurement area will be deleted.

The values of the applied measurement areas (e. g. coordinates) may be read and changed in the Area tab in the **Point/Line Measurement** dialog window. In this tab, several measurement areas may also be selected by clicking them while keeping the [Ctrl] or [Shift] key pressed and may then be deleted with the [Del] key.

Beam positioning

Description Beam positioning allows to position the electron beam on the sample.

Button Beam positioning may be started and ended with the following button:

Positioning of the electron beam Complete the following steps to position the electron beam on the sample:

4. Perform a slow scan.
5. Click the button in the Image acquisition toolbar to start Beam positioning.
   → The mouse cursor will change when placed in the image acquisition window.
6. Click on any position in the image acquisition window.
   → The electron beam will be placed on the corresponding position on the sample.

Cancel Beam positioning will be canceled when the button in the Image acquisition toolbar, the **Stop** button or any other scan button is pressed.

Stop

Description With the stop function, the various scan modes may be canceled.

Button The scanning process may immediately be canceled by pressing the following button:

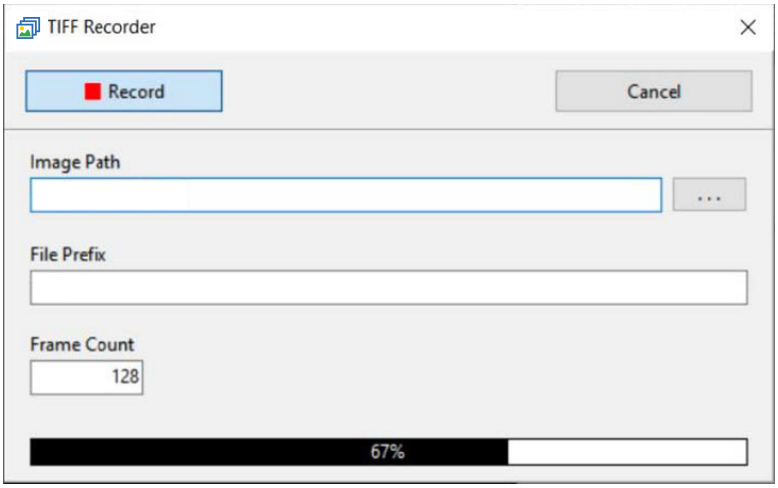
TIFF Recorder (optional)

Description The optional TIFF recorder plug-in records bitmaps in a continuous scan and saves them in a 8 Bit multipage TIFF file.

In the case of multiple channels, one TIFF file per channel will be created and saved.

Button Pressing the following button opens the **TIFF Recorder** window:

Dialog window The following figure shows the **TIFF Recorder** dialog window with the following components:



The following table contains information on the components of the **TIFF Recorder** dialog window:

Component	Function
Record	Starts/ends the recording. If the recording is stopped before reaching the set bitmap number, all TIFF files are saved with the bitmap number reached by the end of the recording.
Cancel	Cancels the recording. No TIFF files will be saved.
Image Path	Display and selection of the saving location.
File Prefix	Entering the prefix for the file name.
Frame Count	Setting the number of bitmaps that will be saved in a multipage TIFF file.

Continuation next page ...

… Continuation: TIFF Recorder (optional)

Component	Function
Progress bar	Shows the scanning progress.

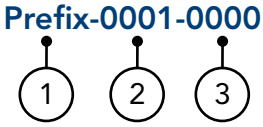
Recording

Complete the following steps to record images with the TIFF recorder plug-in:

1. Start a continuous scan (Frame Count = 0).
2. Click the **TIFF Recorder** button.
   → The TIFF Recorder dialog window opens.
3. Select the preferred saving location in the Image Path field.
4. Enter the preferred file name in the File Prefix field.
5. Enter the preferred number of bitmaps per multipage TIFF file in the Frame Count field.
6. Click the **Record** button.
   → Recording starts. During the recording, the images will be saved in a TEMP folder. As soon as the number entered in the Frame Count field is reached, all TIFF files will be saved in the selected saving location.

TIFF file name

The TIFF files are saved with a file name that consists of the following elements:



No.	Description
1	Text entered in the File Prefix field.
2	Number of recorded TIFF files. ℹ The numbers are counted starting from zero: – 0000 = TIFF 1 – 0001 = TIFF 2 – …
3	Channel number. ℹ The numbers are counted starting from zero: – 0000 = Channel 1 – 0001 = Channel 2 – …

Video Recorder (optional)

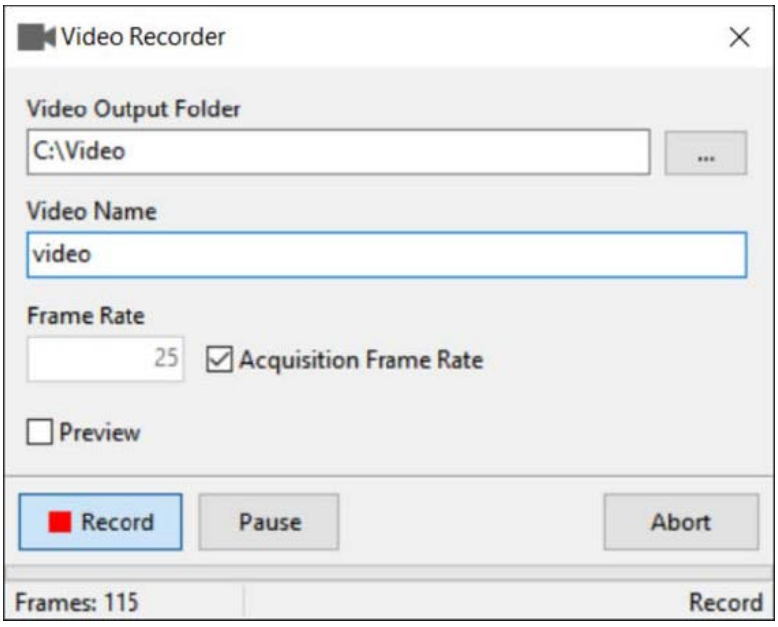
Description The optional video recorder plug-in acquires the shown images in a continuous scan and creates a video in H2g4 Codec.

In the case of multiple channels, one video per channel will be created and saved.

The encoder bitrate may be configured in the file C:\ProgramData\point electronic\DISS6\plug-ins\ui\VideoRec\VideoRec.ini.

Button Pressing the following button opens the **Video Recorder** dialog window:

Dialog window The following figure shows the **Video Recorder** dialog window with the following components:



Continuation next page …

… Continuation: Video Recorder (optional)

The following table contains information on the components of the **Video Recorder** dialog window:

Component	Function
Video Output Folder	Display and selection of the saving location.
Video Name	Setting a file name for the video. ℹ In the case of multiple channels, the channel number will be added to each video file name. The channel numbers are counted starting from zero: – video_0000 = video of channel 1 – video_0001 = video of channel 2 – …
Frame Rate	Manual setting of the video frame rate. ℹ May only be used with deactivated checkbox Acquisition Frame Rate.
Acquisition Frame Rate	With activated checkbox, the image acquisition frame rate will be used for the video frame rate.
Preview	Activates/deactivates a live preview of the video during encoding.
Record	Starts/ends a video recording.
Pause	Pauses/continues a video recording.
Abort	Cancels a video recording.
Progress bar	Shows the progress of the video encoding.
Status bar	Shows the number of currently acquired frames and the status of the video recording.

Recording

Complete the following steps to record a video with the video recorder plug-in:

1. Start a continuous scan (Frame Count = 0).
2. Click the **Video Recorder** button.
   → The **Video Recorder** window opens.
3. Select the preferred saving location in the Video Output Folder field.
4. Enter the preferred file name in the Video Name field.
5. Manually enter the video frame rate in the Frame Rate field or activate the Acquisition Frame Rate checkbox to use the image acquisition frame rate.
6. Optional: Activate the Preview checkbox to show a live preview during encoding of the video.
7. Click the **Record** button to start the video recording.

Continuation next page …

… Continuation: Video Recorder (optional)

8. Click the **Record** button again to end the video recording.
   → The video will be encoded and saved at the selected saving location.

BSE Topography (optional)

Description In connection with a four-quadrant BSE signal source, the 3D topography module allows for generation, visualization and export of a 3D surface model in Live mode.

The resolution of the calculated 3D model depends on the resolution of the SEM image data.

Supported formats The following formats are available for saving and export of the generated 3D data:

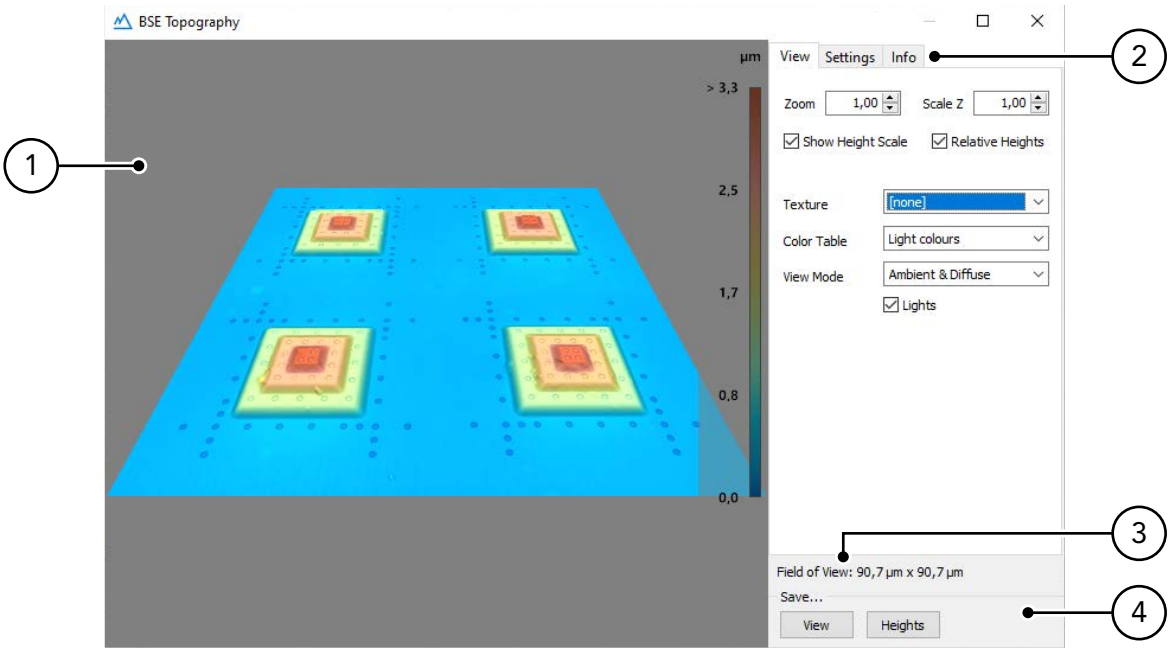
Format	Data
Surface Data Format (*.sdf)	Topography (3D model)
Alicona 3D (*.al3d)	Topography (3D model) and BSE total (mean)
Tagged Image File Format (.tif)	Topography (3D model) and BSE total (mean) 16 bit data, scaling will be saved in the XMP header
Windows Bitmap (.bmp)	Topography (3D model)
Calibration file in ASCII format (*.cal)	Settings for corrections including respective correction values.

Button Pressing the following button opens the **BSE Topography** dialog window:

Continuation next page …

… Continuation: BSE Topography (optional)

User interface The following figure shows the **BSE Topography** dialog window with its main components:



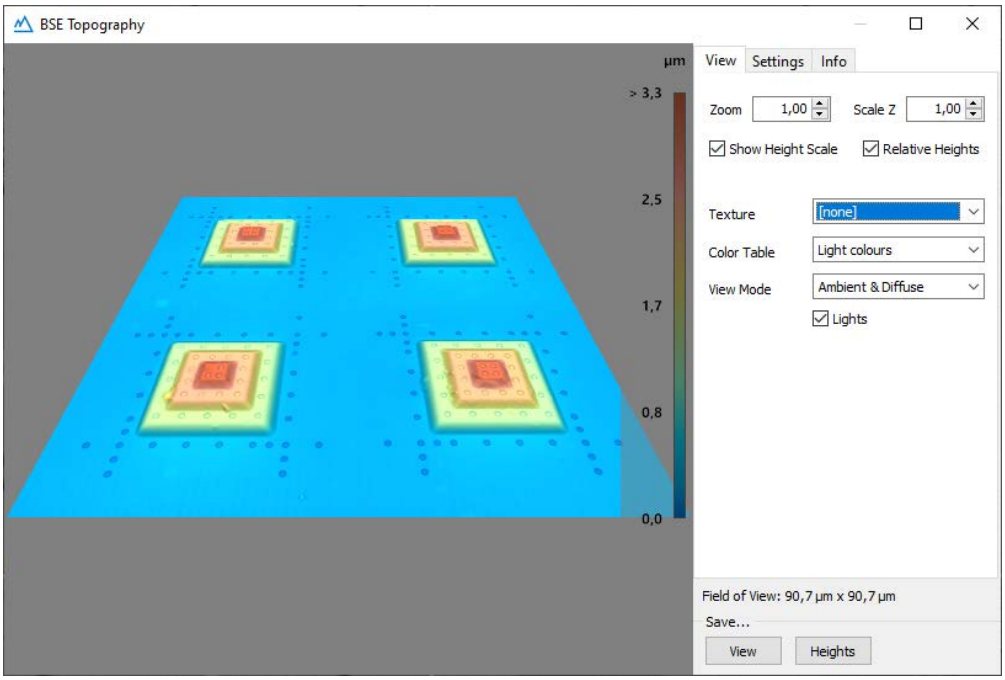
The following table contains information on the main components of the **BSE Topography** dialog window:

No.	Component	Function
1	3D view	– Rotating the view with the mouse and pressed left mouse key. – Shifting the view with the mouse and pressed right mouse key. – Changing the zoom factor with the mouse wheel. – Resetting the view by double-clicking.
2	Tabs	
	– View	Contains settings for displaying the calculated surface model (Page 111).
	– Settings	Contains settings for scan and scale corrections (Page 112).
	– Info	Shows information on the installed 3D topography module (Page 114).
3	Field of View	Shows the dimensions of the scan area.
4	Save...	
	View	Saves the current 3D view in an image file.
	Heights	Saves the data of the calculated 3D model in a supported format (see "Supported formats" on page 109) The saved data may be opened in a suitable application for further evaluation.

Continuation next page …

… Continuation: BSE Topography (optional)

View tab The following figure shows the **BSE Topography** window with the View tab:



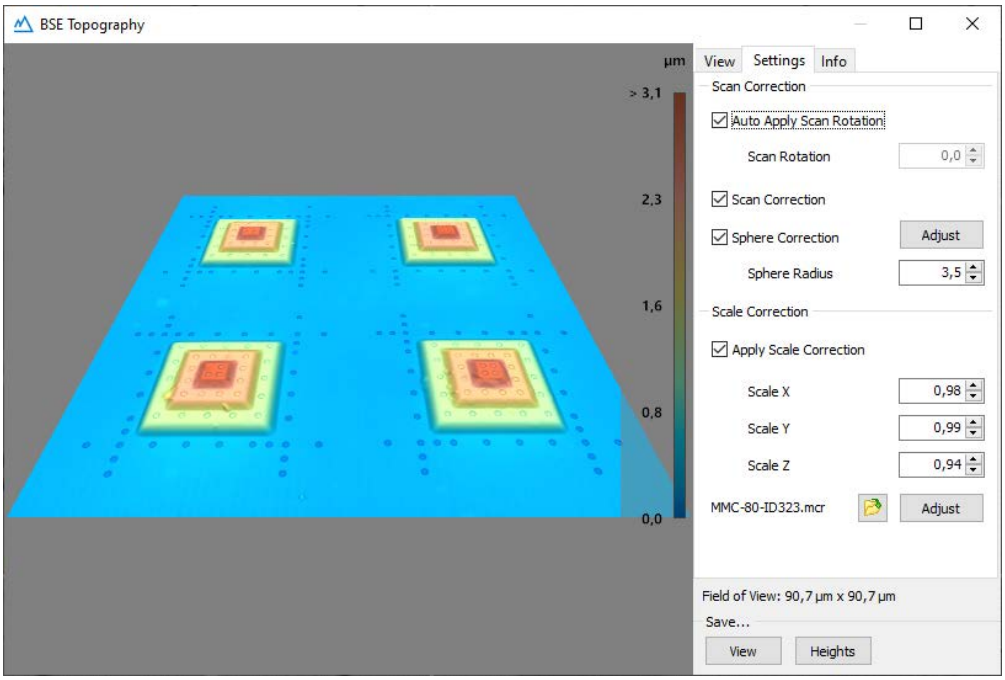
The following table contains information on the components of the View tab:

Component	Function
Zoom	Set-up of the zoom factor for the 3D view.
Scale Z	Set-up of the scaling factor for the heights in the 3D view. The setting will exclusively be used for the 3D view and will not be taken into account when saving the data.
Show Height Scale	Activates or deactivates the display of the scale for the heights in the 3D view.
Relative Heights	Shows the height scale zero-based.
Texture	Selection of the texture of the 3D view: – None: no texture – BSE mean image: texture value is the mean of all four channels – BSE values: calculation of the backscatter value in consideration of topography – Gradient norm: standardized gradient of the surface element as texture value – Gradient direction: direction of the gradient as texture value – Gradient x: gradient in x direction as texture value – Gradient y: gradient in y direction as texture value
Color Table	Selection of a color palette for the heights display in the 3D view.
View Mode	Selection of the display mode for the rendering of the 3D view.
Lights	Activates or deactivates the lighting for the rendering of the 3D view.

Continuation next page …

… Continuation: BSE Topography (optional)

Settings tab The following figure shows the **BSE Topography** dialog window with the Settings tab:



The following table contains information on the components of the Settings tab:

Component	Function
Scan Correction	
– Auto Apply Scan Rotation	Activates or deactivates the automatic reading of the current scan rotation. ℹ The value of the scan rotation needs to be known for the correct calculation of the topography. ℹ This function should only be deactivated if automatic reading of the scan rotation is not possible.
– Scan Rotation	– Shows the value of the scan rotation with activated Auto Apply Scan Rotation function. – Manual entering of the value of the scan rotation with deactivated Auto Apply Scan Rotation function.
– Scan Correction	Activates or deactivates scan correction. This takes into account deviations of the electron beam off the perpendicular. These deviations are particularly common for acquisitions with low magnification. Scan correction should always be activated.

Continuation next page …

… Continuation: BSE Topography (optional)

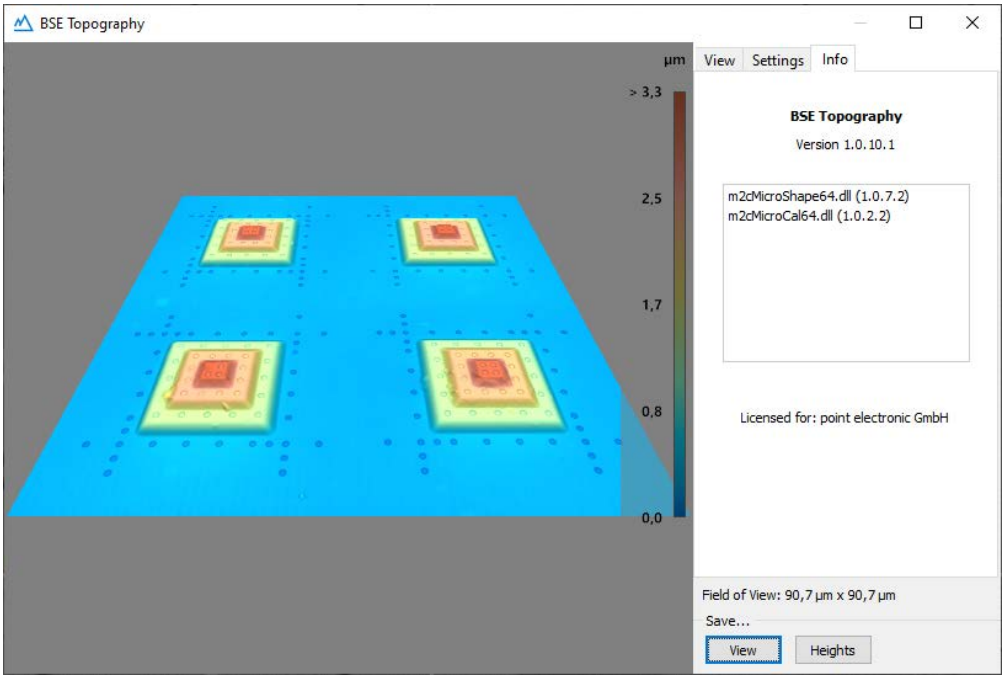
Component	Function
– Sphere Correction	Activates or deactivates sphere correction. This takes into account the decrease of backscatter intensity from the center point to the edge of the scan. This decrease leads to a spherical deviation in the height data. Before activating the sphere correction, the radius of the spherical deviation needs to be determined or entered (particularly for acquisitions with low magnification).
– Adjust	Automatically determines the radius of the spherical deviation if a flat calibration sample is used. This automatic determination should be performed before activating sphere correction.
– Sphere Radius	Manual setting of the radius of the spherical deviation. The manual setting is necessary whenever no automatic determination is performed.
Scale Correction	
– Apply Scale Correction	Activates or deactivates the use of indicated scales for the scale correction. The indicated scales will be used for the 3D view and for saving the data. The correction values of the scales have to be reloaded from a calibration file after each modification of acquisition parameters or have to be determined again by a new calibration sample.
– Scale X	Set-up of the correction value for the X axis scale.
– Scale Y	Set-up of the correction value for the Y axis scale.
– Scale Z	Set-up of the correction value for the Z axis scale.
– Display of mcr file	Shows the name of the loaded reference file (*.mcr) Will only be displayed when a reference file has been loaded.
	Selection and loading of the reference file for the calibration pyramid.
– Adjust	Automatically determines the correction values for the scales of all axes. Before this automatic determination, it is necessary to: 1. insert a calibration pyramid in the sample chamber, 2. load the reference file for the calibration pyramid and 3. start an image acquisition with Slow Scan with 1000 x 1000 pixels and as little noise as possible.

Continuation next page …

… Continuation: BSE Topography (optional)

Component	Function
Context menu	A right-click within the tab opens a context menu with the following items: – Save Settings: All settings will be saved in the device configuration. – Load Calibration: Opens a dialog window for selection and loading of a calibration file with saved settings for the corrections and the respective correction values. – Save Calibration: Opens a dialog window for saving the settings of the corrections and the respective correction values in a calibration file. The Save Calibration function should be used if the task requires differing application settings, especially for SEM parameters (high voltage, aperture current, working distance).

Info tab The Info tab shows information on the installed version of the 3D topography module, the used driver packages as well as the software license:

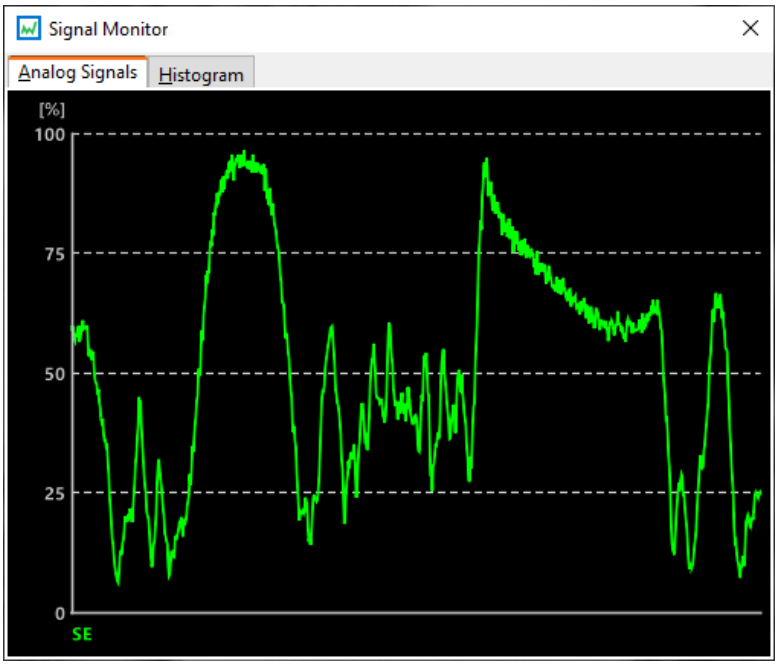


Signal Monitor

Description The signal monitor shows the levels of the input signals during the scanning process in a separate window.

Button Pressing the following button opens the signal monitor:

Analog Signals tab The following figure shows the signal monitor with the Analog Signals tab:

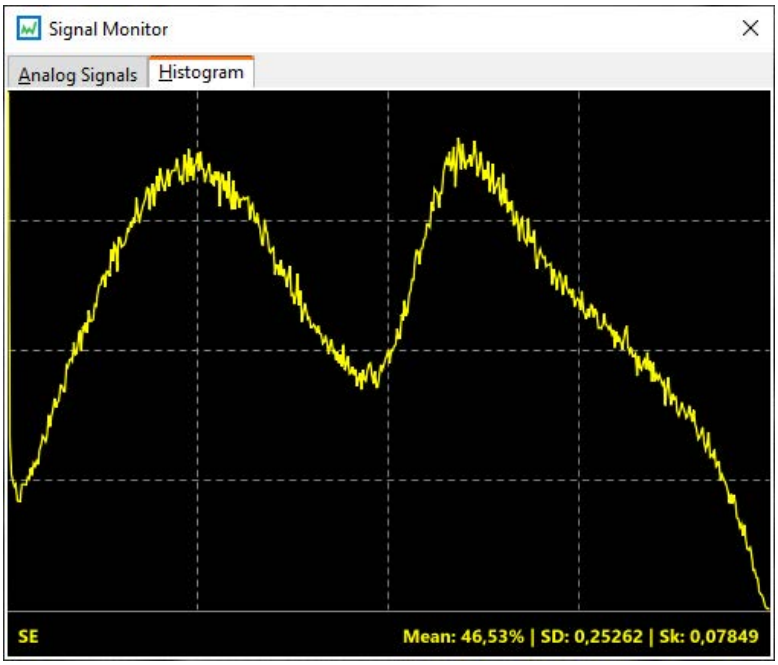


Continuation next page …

… Continuation: Signal Monitor

Histogram Tab The Histogram tab shows a live histogram as well as a specifications of the mean value and standard deviation.

The following figure shows the signal monitor with the Histogram tab:



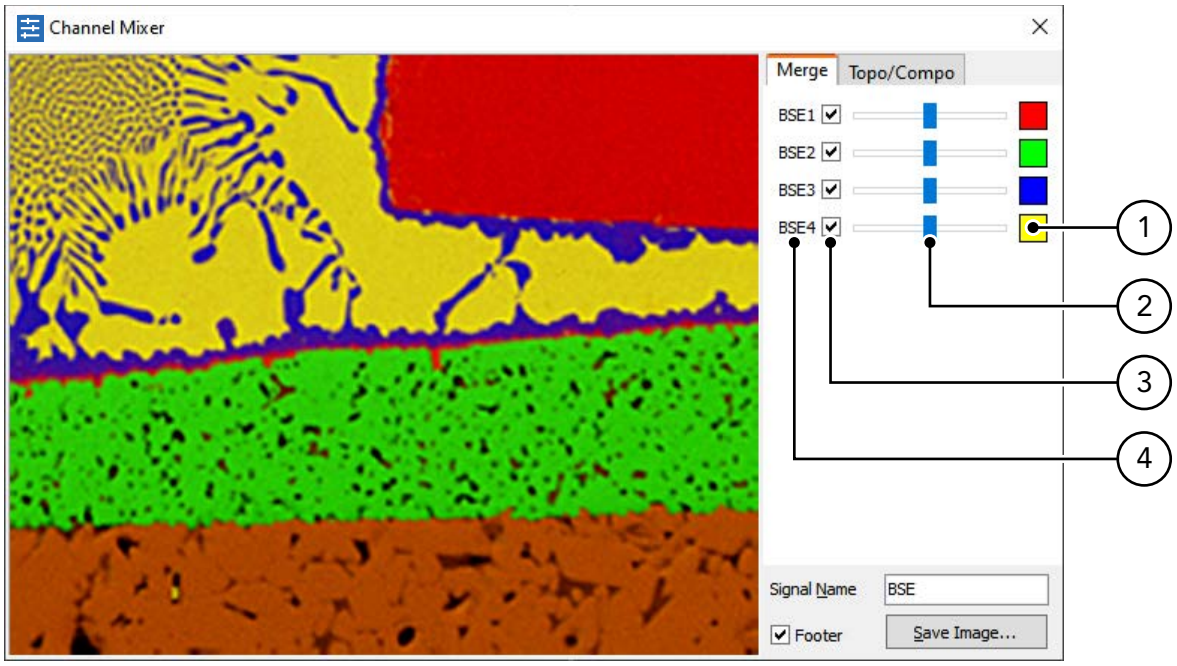
Channel Mixer

Description Channel mixer allows to live-mix image signals. All image signals of the current active scan may be mixed. Each image signal may be allocated a color.

Button Pressing the following button opens the channel mixer:

Merge tab In the Merge tab, all image signals of the active scan may be dyed and mixed.

The following figure shows the **Channel Mixer** dialog window with the Merge tab:



Continuation next page ...

… Continuation: Channel Mixer

The following table contains information on the components of the Merge tab:

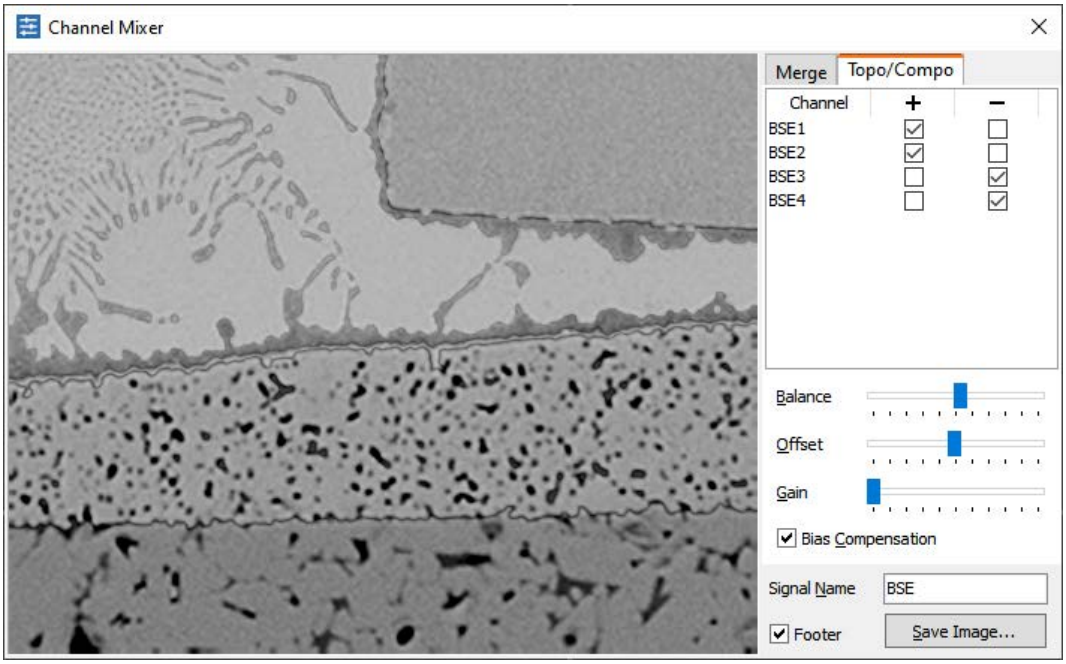
No.	Component	Function
1	Threshold color	Shows the color that symbolizes a channel in the mixer. By clicking the color, b/w and color mode may be switched. In color mode, a right-click opens a dialog window for choosing colors.
2	Slider	Sets channel intensity.
3	Checkbox	Activates or deactivates the channel.
4	Name	Name of the channel.
	Image	Shows the result of the mixed images. Double-clicking the image activates the full screen mode. A right-click on the image opens a context menu (XREF context menu) with the following functions: – Hair Cross – Draw Circle – Interpolation
	Signal Name	The text entered into the Signal Name text field determines the parameter "SignalName".
	Save Image...	Opens the Save Image dialog window to save the mixed image as calibrated TIFF.

Continuation next page …

… Continuation: Channel Mixer

Topo/Compo tab In the Topo/Compo tab, up to 4 image signals of analog signal sources can be added or subtracted. In the topo mode (subtraction), the balance of subtracted signals may be changed with a slider. With opposite BSE detectors, the material contrast may be minimized to a degree that only the topography of the sample is visible.

The following figure shows the **Channel Mixer** dialog window with the Topo/Compo tab:



The following table contains information on the components of the Topo/Compo tab:

Component	Function
Channel	– Displays the available BSE signal sources. – Defines which channel (-) is subtracted from which channel (+).
Balance	Sets the ratio between the channels to be combined.
Offset	Sets the brightness of the mixed image.
Gain	Sets the contrast of the mixed image.
Bias Compensation	Activates or deactivates the automatic brightness adaptation.
Signal Name	The text entered into the Signal Name text field determines the parameter “SignalName”.
Save Image...	Opens the **Save Image** dialog window to save the mixed image as calibrated TIFF. For the footer, the settings of the Save button set as default will be applied (Page 49).

Continuation next page …

… Continuation: Channel Mixer

Reference image Reference images are used to compare image acquisition results. After completed image acquisition, an image may be added by Drag & Drop as reference image. It will be archived as "Ref" in the channel mixer.

The images (channels) of the next scan will be added to the reference image.

After completed image acquisition, the reference image may be deleted with the [Esc].

Save

Description Use the Save function to save the currently acquired image or layout.

Button Pressing the following button opens the **Save Image** dialog window:

Configuring the function The Save function's parameters may be configured in the **Save Settings** dialog window. This dialog window may be opened as follows:

- By right-clicking the button.
- In the **Parameters** dialog window.

see “Configuring Save buttons” on page 53

Fast Save

Description The Fast Save function saves the currently acquired image or layout with an automatically assigned file name directly to a predefined saving location.

If the Auto File Name and Auto Folder fields of a Save button have been accordingly configured, this button will be activated as Fast Save in the toolbar.

Button By clicking the following button, the currently acquired image or layout will be saved directly:

Configuring the function The Fast Save function's parameters may be configured in the **Save Settings** dialog window. This dialog window may be opened as follows:

- By right-clicking the button.
- In the **Parameters** dialog window.

see “Configuring Save buttons” on page 53

Auto Save

Description The Auto Save function saves the currently acquired image or layout with an automatically assigned file name to a predefined saving location after completion of the scanning.

The Auto Save function's button may be activated or deactivated in General tab of the **Preferences** dialog window.

Button Clicking the following button activates or deactivates the Auto save function:

Configuring the function The Auto save function's parameter may be configured in the **Save Settings** dialog window. This dialog window may be opened as follows:

- By right-clicking the button.
- In the **Parameters** dialog window.

see "Configuring Save buttons" on page 53

6 Optional control panels

Chapter overview

Purpose This section contains descriptions on the structure, function and usage of the optional control panels.

Contents This chapter contains the following sections:

6.1 BSE

Overview

Purpose This section contains descriptions on the structure and function of the optional BSE control panel.

Contents This sections contains the following information:

Control panel

Description The BSE control panel sets brightness and contrast of a backscattered electron detector.

The BSE panel will only be displayed with the Multi Channel Signal Amplifier (MICS) hardware option.

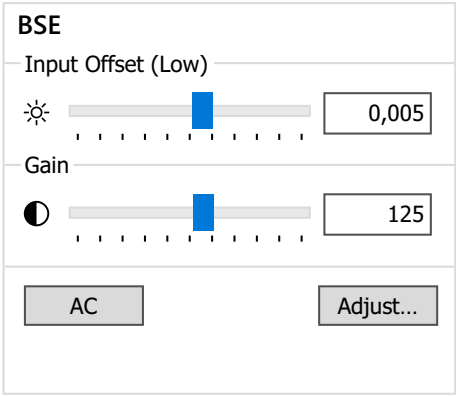
NOTICE

The name of the control panel depends on the active application!

If other detectors are used (e. g. CL), depending on the selected signal, the control panel may also be used for set-up of these signals.

Thus, the name of the panel may vary.

Structure The following figure shows the BSE control panel with the following components:



Function The following table contains information on the BSE control panel components:

Component	Function
Input Offset (Low)	Set-up of the offset method by right-click on the label. The following offset methods are available: – Input Offset: Complete setting range that may be necessary for very high offsets. For input offset, brightness is set before gain. Thus, the sensitivity depends on the gain. – Input Offset (Low): Attenuated setting range. – Output Offset
☼ (Brightness)	Global set-up of the brightness by slider or direct value input.
◐ (Contrast)	Global set-up of the gain (contrast) by slider or direct value input.

Continuation next page …

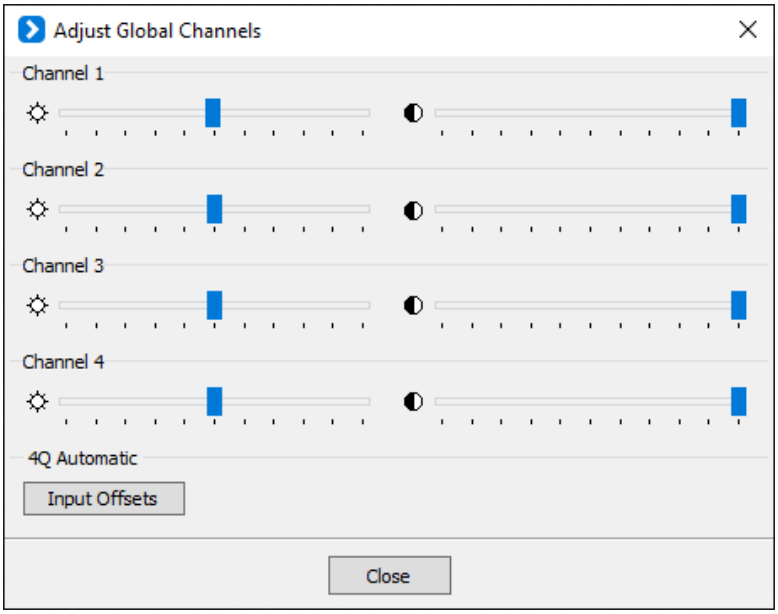
… Continuation: Control panel

Component	Function
AC	Automatic contrast. Sets the contrast automatically.
Adjust... (Page 128)	Opens the **Adjust Global Channels** dialog window for matching the individual channels. The set ratio will be used for the global set-up of brightness and contrast.

Matching of individual channels

Adjust Global Channels

The **Adjust Global Channels** dialog window is used to set the brightness and contrast ratio of individual channels. The set ratio will be used for modifying brightness and contrast in the BSE control panel:



The following table contains information on the components of the **Adjust Global Channels** dialog window:

Component	Function
☼ (Brightness)	Set-up of the brightness of a specific channel.
◐ (Contrast)	Set-up of the gain (contrast) of a specific channel.
Input Offsets	Performs an automatic zero balance. ⚠ **Before the matching, electron beam and the chamber scope illumination need to be turned off.**
Close	Closes the dialog window. All settings are saved.

6.2 Inspector

Overview

Purpose This section contains descriptions on the structure and function of the optional Inspector control panel.

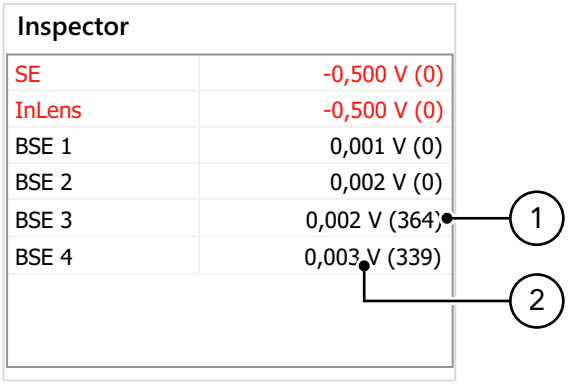
Contents This sections contains the following information:

Control panel

Description The Inspector control panel shows the physical and digital values of the currently acquired signals at the position of the mouse.

For calculation of the physical values, a formula may be entered.

Structure The following figure shows the Inspector control panel with the following components:



Function The following table contains information on the Inspector control panel components:

No.	Function
1	Digital values
2	Physical values

6.3 Project parameters

Overview

Purpose This section contains descriptions on the structure, function and configuration of the optional control panel Project parameters.

Contents This sections contains the following information:

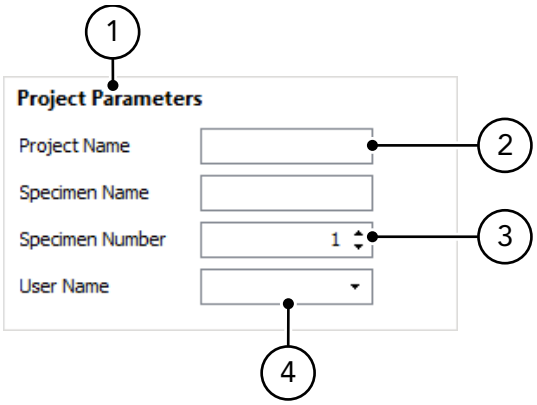
Control panel

Description With the customizable control panel Project Parameters, customized parameters may be added. These will be available for saving and captioning images, together with the standard parameters.

see “Configuring Save buttons” on page 53

After configuration, input fields for the respective parameters will be displayed in the control panel. Depending on the configuration, the parameter values for each image acquisition might be entered manually or counted automatically.

Structure The following figure shows the Project Parameters control panel with the following components:



Function The following table contains information on the components of the Project Parameters control panel:

No.	Function
1	Configurable title of the control panel.
2	Input field of text type.
3	Input field of number type.
4	Selection list with configurable selection options.

Control panel configuration

⚠ CAUTION

Malfunction due to faulty configuration!

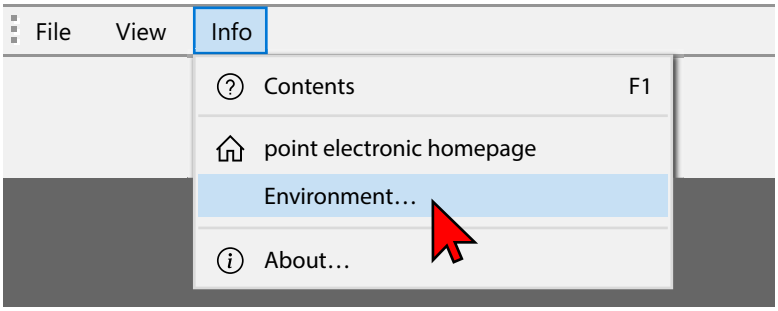
Configuration faults (e. g. write errors, accidental deletion or modification of configuration file entries, …) may lead to malfunction of the DISS 6 Software.

– Configuration should only be performed by a service technician. (see “Service technicians” on page 7)

Before getting started

Complete the following steps before configuring the control panel:

1. In the info menu, open the **Environment** dialog window to locate the configuration file saving location.



2. Close the DISS 6 Software.

Process

To use the control panel and customized parameters, the following process must be followed:

1. Add a control panel.
2. Create a parameter.
3. Activate the parameter.

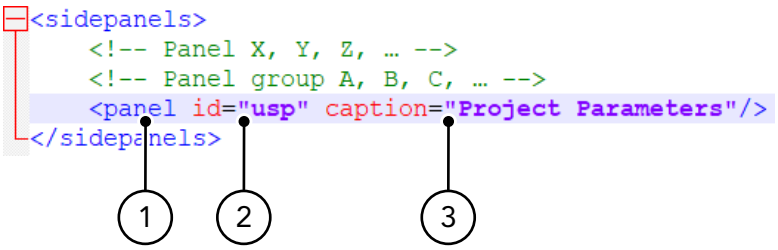
Continuation next page …

Adding a control panel

Complete the following steps to add the control panel:

1. At the saving location of the configuration files, open the file “SidePanels.xml” with a text editor (e. g. Notepad++).
2. Create a line with the following structure:

   ⚠ **Mind the correct writing!**



No.	Component	Description
1	XML element panel	Creates a control panel.
2	Attribute id	Identifies the control panel. ⚠ **The value of the attribute must be “usp”!**
3	Attribute caption	Name of the control panel. ℹ Any value may be used.

3. Save the file “SidePanels.xml” at the saving location of the configuration files (overwrite existing file).

Continuation next page …

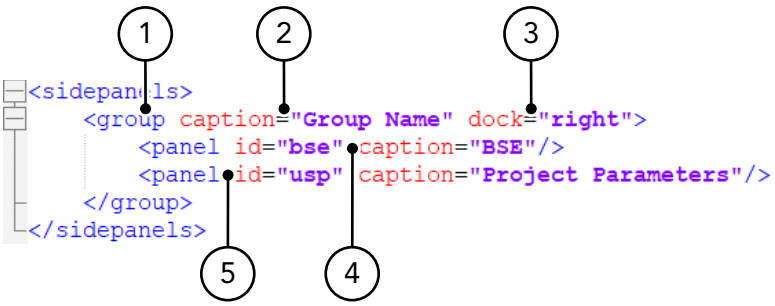
Grouping control panels

Control panels may be grouped. If a control panel of a group is opened in the user interface of the DISS 6 Software, all control panels of this group will be displayed.

Complete the following steps to group control panels:

1. At the saving location of the configuration files, open the file “SidePanels.xml” with a text editor (e. g. Notepad++).
2. Create a block with the following structure:

   ⚠ Mind the correct writing!



No.	Component	Description
1	XML element group	Creates a control panel group.
2	Attribute caption	Name of the control panel group. ℹ Any value may be used.
3	Attribute dock	Defines on which side of the user interface the control panel group is to be displayed. Possible values: left and right
4	First control panel	The order of the control panel sets the order within the user interface.
5	Second control panel	The order of the control panel sets the order within the user interface.

3. Save the file “SidePanels.xml” at the saving location of the configuration files (overwrite existing file).

Continuation next page …

… Continuation: Control panel configuration

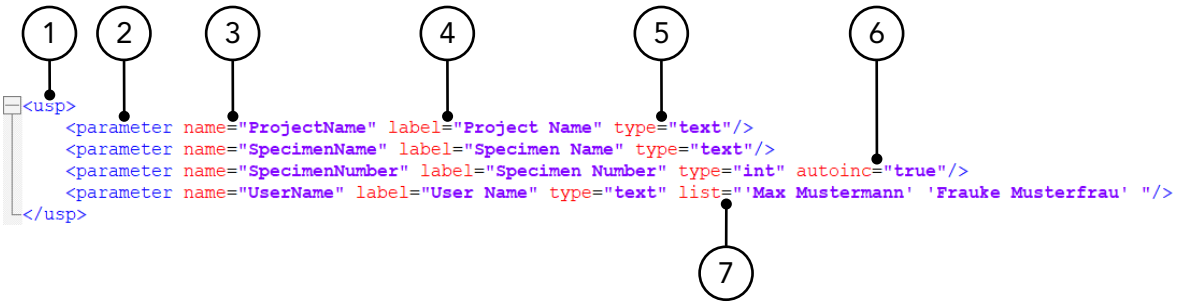
Adding parameters

After the “Project Parameters” control panel has been added, the parameters may be created.

Complete the following steps to create parameters within the control panel:

1. At the saving location of the configuration files, open the file “UserParams.xml” with a text editor (e. g. Notepad++).
2. Create the following block:

   ⚠ **Mind the correct writing!**



No.	Component	Description
1	XML element usp	Defines the Project Parameters control panel. ⚠ **The name of the element must be “usp”!**
2	XML element parameter	Creates a parameter.
3	Attribute name	Defines the name of the parameter. ⚠ **Do not use spaces or special characters in the name!**
4	Attribute label	Defines the parameter label in the user interface. ℹ Any value may be used.
5	Attribute type	Defines the type of the parameter. The following types may be used: – text: Defines a text field. – int: Defines a number field within which the value may be raised or lowered manually with the arrow keys.
6	Attribute autoinc	Activates an automatic counter in number fields. Apart from the automatic count, the value of the number fields may also be edited manually by using the arrow keys. Double-clicking an automatic number field resets the value. ℹ This attribute may only be used for parameters of int type.
7	Attribute list	Modifies a text field to a selection list with predefined options. The options are entered into the attribute as values with single quotation marks and space-delimited. ℹ This attribute may only be used for parameters of text type.

Continuation next page …

3. Save the file “UserParams.xml” at the saving location of the configuration files (overwrite existing file).

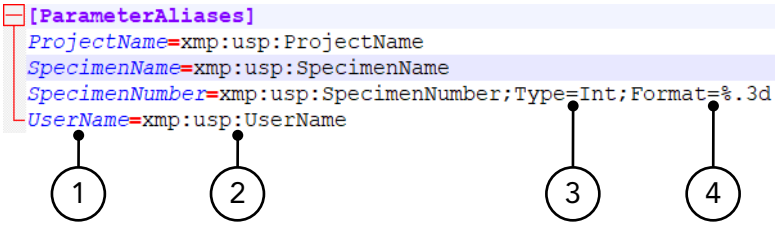
Activating the parameters

To use created parameters, they have to be activated for the DISS 6 Software.

Complete the following steps to activate created parameters:

1. At the saving location of the configuration files, open the file “DISS6.cfg” with a text editor (e. g. Notepad++).
2. In the file “DISS6.cfg” scroll to the [ParameterAliases] part.
3. Create a line for each parameter as follows:

   ⚠ Mind the correct writing!



No.	Component	Description
1	Parameter Name	The defined name of the parameter. ⚠ **Use the same spelling as in UserParams.xml!** see “Adding parameters” on page 136
2	Alias Value	Name of the parameter in XMP format.
3	Alias Type	Type of the parameter in XMP.
4	Alias Format	Format of the parameter in XMP.

4. Save the file “DISS6.cfg” at the saving location of the configuration files (overwrite existing file).

7 Image processing

Chapter overview

Purpose This chapter gives information on the image processing software DIPS. It contains descriptions of structure and function of the software.

Contents This chapter contains the following sections:

7.1 User interface

Overview

Purpose This section contains descriptions on the structure and function of the DIPS image processing software.

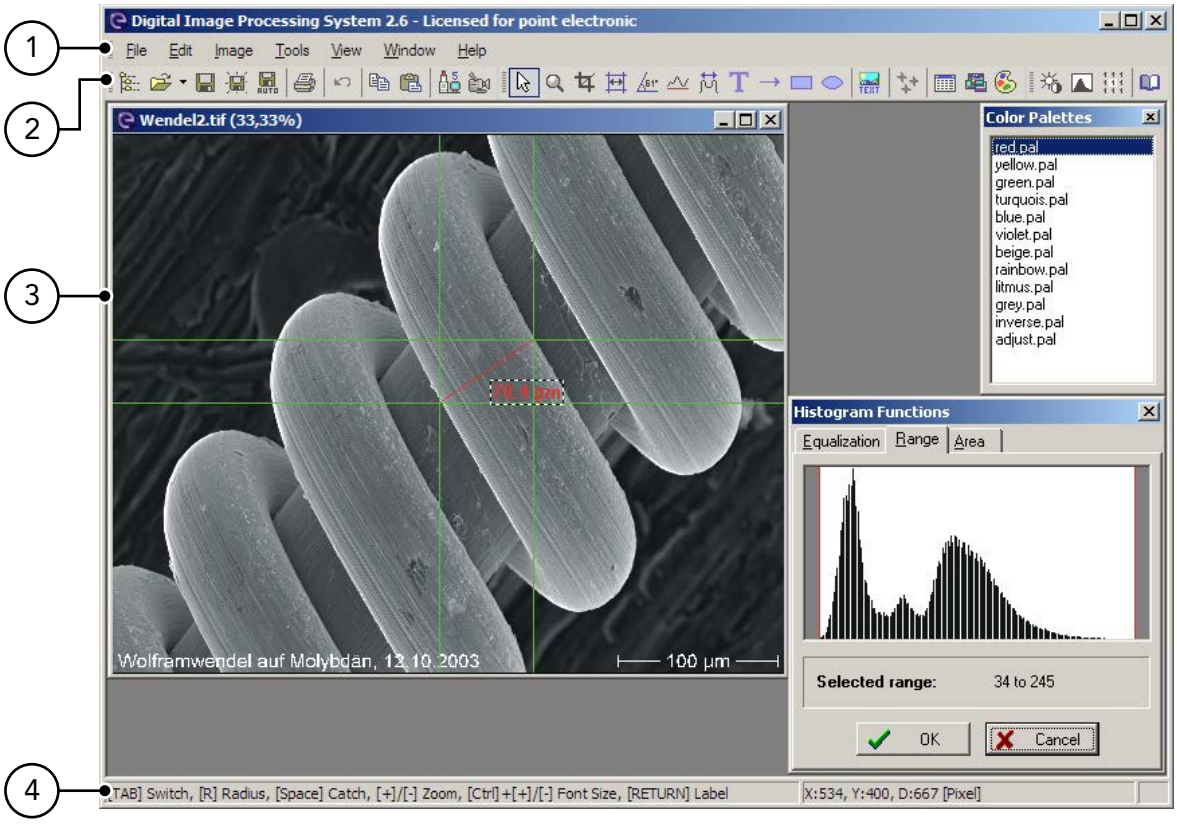
Contents This sections contains the following information:

Overview

Description With DIPS, the digital imaging processing system of DISS 6, digitized images may be processed, labeled, measured, printed and saved easily.

A special layout technique facilitates the processing of several related images as well as their documentation and archiving.

Structure The following figure shows the DIPS user interface with its components:



Function The following table contains information on the components of the DIPS user interface:

No.	Component	Function
1	Menu bar	Contains all DIPS functions. The display of the menus may be customized. see “Commands tab” on page 144

Continuation next page …

… Continuation: Overview

No.	Component	Function
2	Toolbars	Contain functions of DIPS as command buttons. The content of the toolbars may be customized either via the preferences or according to user-specific requirements. see “Toolbars tab” on page 143
3	Work area	Contains all opened image windows as well as dialog windows of the active tools or functions.
4	Status bar	– Displays possible functions or actions of the active tool. – Displays measurement results of the active tool (e. g. size of an angle).

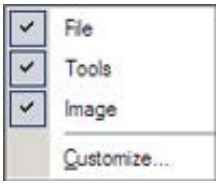
Toolbars

Introduction Toolbars contain some frequently used menu functions. The functions are represented in three groups. DIPS provides the following options to organize the functions according to specific requirements:

- Display or hide toolbars
- Expand existing toolbars
- Delete functions from existing toolbars
- Create user-specific toolbars
- Set-up of display options for menus

Context menu Show, hide or customize all available toolbars via the context menu. The context menu may be opened by a right-click on the toolbars or menu bars.

The following figure shows the context menu of the toolbars and menu bars:

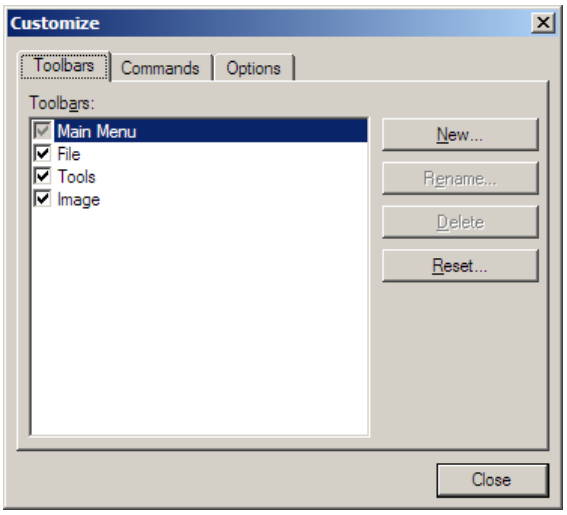


Customizing toolbars Open the **Customize** dialog window with three tabs via the context menu to customize the toolbars.

Continuation next page …

… Continuation: Toolbars

Toolbars tab The following figure shows the **Customize** dialog window with the Toolbars tab:



The following table contains information on the components of the Toolbars tab:

Component	Function
Toolbars	Shows all available toolbars. Each toolbar may be shown or hidden by using the checkbox.
New...	Opens a dialog window for creating a new toolbar.
Rename...	Opens a dialog window for renaming the selected toolbar. The standard toolbars (Main Menu, File, Tools and Image) cannot be renamed.
Delete...	Deletes the selected toolbar. The standard toolbars (Main Menu, File, Tools and Image) cannot be deleted.
Reset...	Resets a modified standard toolbar to default. Only the standard toolbars (Main Menu, File, Tools and Image) may be reset.

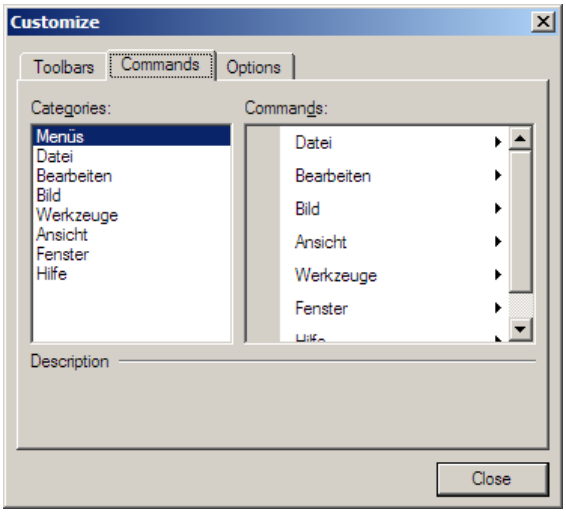
Continuation next page …

… Continuation: Toolbars

Commands tab

As soon as the Commands tab is opened, the edit mode for all menus and toolbars is activated. In this mode, menus and tools may be deleted or moved via Drag & Drop.

The following figure shows the **Customize** dialog window with the Commands tab:

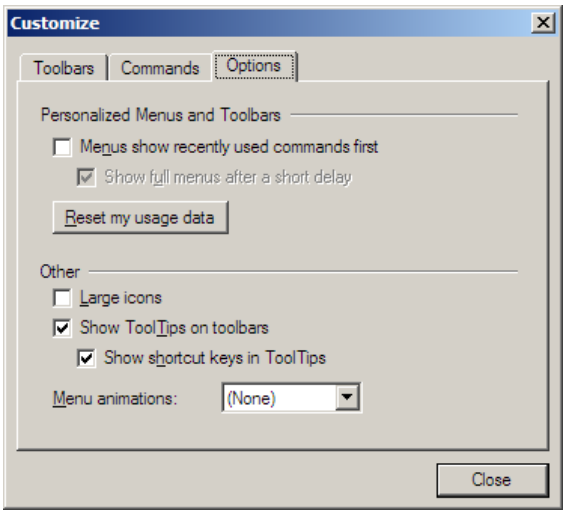


The following table contains information on the components of the Commands tab:

Component	Function
Categories	Displays all available menus.
Commands	Displays the content of the menu which is selected in the Categories field.

Continuation next page …

Options tab The following figure shows the **Customize** dialog window with the Options tab:

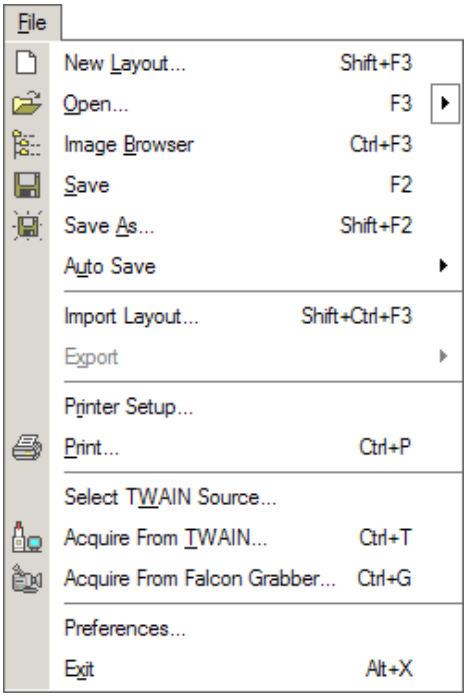


The following table contains information on the components of the Options tab:

Component	Function
Personalized menus and toolbars	
– Menus show recently used commands first	Displays only the most commonly used commands in the menus.
– Show full menus after a short delay	Shows all commands in the menus after a short delay.
– Reset my usage data	Deletes the personal usage data. All menus will be displayed with all commands.
Other	
– Large icons	Shows large icons in the toolbars.
– Show ToolTips on toolbars	Shows a tool tip if the cursor is on an icon in the toolbar.
– Show shortcut keys in ToolTips	Shows shortcut keys in the tool tips.
– Menu animations	Contains a list of animation effects for showing menus.

File menu

Structure The following figure shows the File menu with its components:



Function The following table contains information on the components of the File menu:

Component	Function
New Layout	Opens a dialog window for creating layout templates. (Page 157) A layout template consists of several empty fields in which different images may be arranged.
Open...	Opens the **Load image** dialog window to select image files or layout files and open them in DIPS. DIPS supports the following file formats: – Tagged Image File Format (.TIF) – Windows Bitmap (.BMP) – Joint Picture Expert Group (.JPG) – Portable Network Graphics (.PNG) – Graphics Interchange Format (.GIF) – DOS-DISS (.PSD)
Image browser	Opens the visual image management where saved images are displayed in a preview. (Page 158)

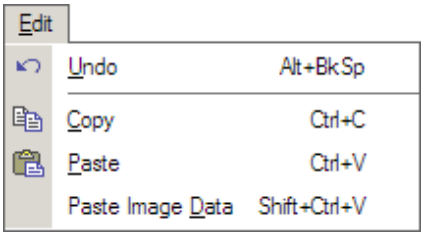
Continuation next page …

… Continuation: File menu

Component	Function
Save	Saves the active image window or layout window. If the active image or layout has not previously been saved, the **Save image** dialog window opens.
Save as...	Opens the **Save image** dialog window. Images and layouts may be saved with another name in specific folders. (Page 159) Images and layouts may be saved in one of the following file formats: – Tagged Image File Format (.TIF) – Windows Bitmap (.BMP) – Joint Picture Expert Group (.JPG) – Portable Network Graphics (.PNG) – Graphics Interchange Format (.GIF) – DOS-DISS (.PSD)
Auto save	Opens a menu for activating or setting further options. (Page 161)
Export	Exports point scan or linescan data acquired from the DISS 6 TWAIN source to ASCII or Excel format.
Printer setup...	Opens a dialog window for selecting and/or setting up the connected printers.
Print...	Opens the **Print** dialog window with functions to prepare and carry out the printing of the active image or layout. (Page 162)
Select TWAIN source	Shows all available TWAIN sources. One source may be selected as standard.
Acquire from TWAIN...	Opens the standard TWAIN source for acquiring images or layouts.
Acquire from Falcon Grabber...	Opens the TWAIN source for acquiring analog video signals (e. g. from an optical microscope) with a frame grabber card.
Program preferences	Opens the **Program preferences** dialog window for setting user-specific defaults. (Page 163)
Ending	Closes the application.

Edit menu

Structure The following figure shows the Edit menu with its components:

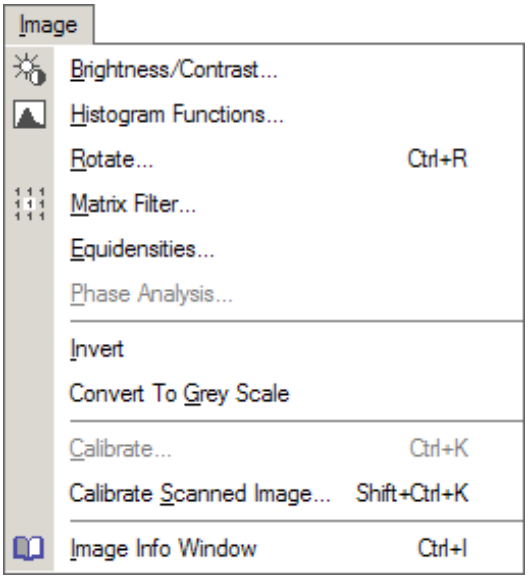


Function The following table contains information on the components of the Edit menu:

Component	Function
Undo	Undoes the last action.
Copy	Copies the selected image to the clipboard of the computer.
Paste	Pastes an image from the clipboard into a new image window.
Paste image data	Pastes an image acquired with another image processing software from the clipboard of the computer.

Image menu

Structure The following figure shows the Image menu with its components:



Function The following table contains information on the components of the Image menu:

Component	Function
Brightness/Contrast...	Opens a dialog window for setting up brightness and contrast. (Page 167)
Histogram functions...	Opens a dialog window for setting up functions for modifying the histogram. (Page 168)
Rotate...	Opens a dialog window for rotating the selected image. (Page 170)
Matrix filter...	Opens a dialog window for setting up different filters. (Page 171)
Equidensities...	Opens a dialog window for setting and dyeing several gray areas of an image. (Page 173)
Phase analysis... (optional)	Starts an application to identify different chemical phases in elemental mapping images.
Invert	Shows the selected image in the inverted mode.
Convert to gray scale	Converts the active image to gray scales.

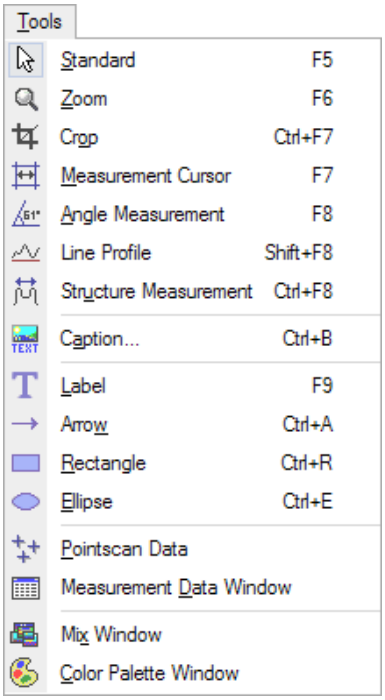
Continuation next page ...

… Continuation: Image menu

Component	Function
Calibrate...	Opens a dialog window for calibrating DIPS. (Page 177) This function is only available in measuring mode.
Calibrate scanned image...	Opens a dialog window for calibrating images acquired with another source (e. g. frame grabber or scanner). (Page 179)
Image info window	Opens a dialog window that shows information saved with the active image. (Page 180)

Tools menu

Structure The following figure shows the Tools menu with its components:



Function The following table contains information on the components of the Tools menu:

Component	Function
Standard	Switches to standard mode. Zoom mode and measuring mode will be deactivated. Drag & Drop is only available in standard mode.
Zoom	Activates zoom mode. (Page 182)
Crop	Crops rectangular sections from the selected image. (Page 183)
Measurement cursor	Activates measuring mode. (Page 184)
Angle measurement	Activates angle measuring mode. (Page 186)
Line Profile	Activates line profile measuring mode. (Page 187)
Structure measurement	Activates structure measuring mode. (Page 188)

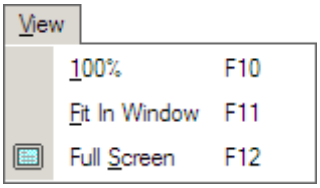
Continuation next page ...

… Continuation: Tools menu

Component	Function
Image caption	Opens a dialog window for creating an image caption. (Page 190)
Label	For entering label text on any position in the image. (Page 193)
Arrow	Callout tools: Creates an arrow on any position in the selected image. (Page 195)
Rectangle	Callout tools: Creates a rectangle on any position in the selected image. (Page 195)
Ellipse	Callout tools: Creates an ellipse on any position in the selected image. (Page 195)
Measurement values window	Opens the **Measurement values** dialog window in which the measured distances, radii and angles of the selected image are displayed as tables. The data may be saved either as XLS, HTML or TXT format. (Page 199)
Mix window	Opens a dialog window for dyeing and/or mixing images. (Page 200)
Color palette window	Opens the Color palette window. Via Drag & Drop, a color palette may be assigned to an image in an image window or a layout window.

View menu

Structure The following figure shows the View menu with its components:

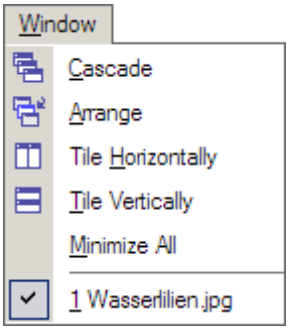


Function The following table contains information on the components of the View menu:

Component	Function
100%	Displays the current image or layout in standard view. One screen pixel corresponds to one image pixel.
Fit in window	Fits the current image or layout into the image window. The aspect ratio will be maintained.
Full screen	Displays the current image or layout in full screen mode. The re-execution of this function switches back to standard view.

Window menu

Structure The following figure shows the Window menu with its components:



Function The following table contains information on the components of the Window menu:

Component	Function
Cascade	Cascades all opened image windows one after the other graded at an angle on the DIPS user interface.
Arrange symbols	Arranges all symbols (minimized image windows) on the lower edge of the DIPS user interface.
Tile horizontally	Arranges all opened image windows one beneath another on the DIPS user interface.
Tile vertically	Arranges all opened image windows side by side on the DIPS user interface.
Minimize all	Minimizes all opened image windows to symbols (minimized image windows).

Help menu

Structure The following figure shows the Help menu with its components:

Function The following table contains information on the components of the Help menu:

Component	Function
Contents	Opens the help file.
Registration...	Opens the **Registration** dialog window for entering registration data. This information may be sent to point electronic GmbH by email or may be saved as TXT file.
About...	Opens a window with copyright information, software version and serial number.

7.2 Functions in the File menu

Overview

Purpose This section contains detailed descriptions of specific functions in the File menu.

Contents This sections contains the following information:

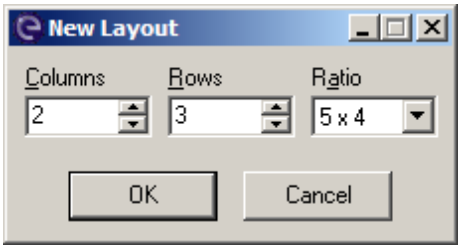
New layout

Description With a layout, several acquired images can be arranged in one window.

This is useful e. g. for a comparison of images with different settings or a creation of print layouts.

This function opens the **New Layout** dialog window in which new layout templates for the arrangement of several images can be created.

Structure The following figure shows the **New Layout** dialog window with the following components:



Function The following table contains information on the components of the **New Layout** dialog window:

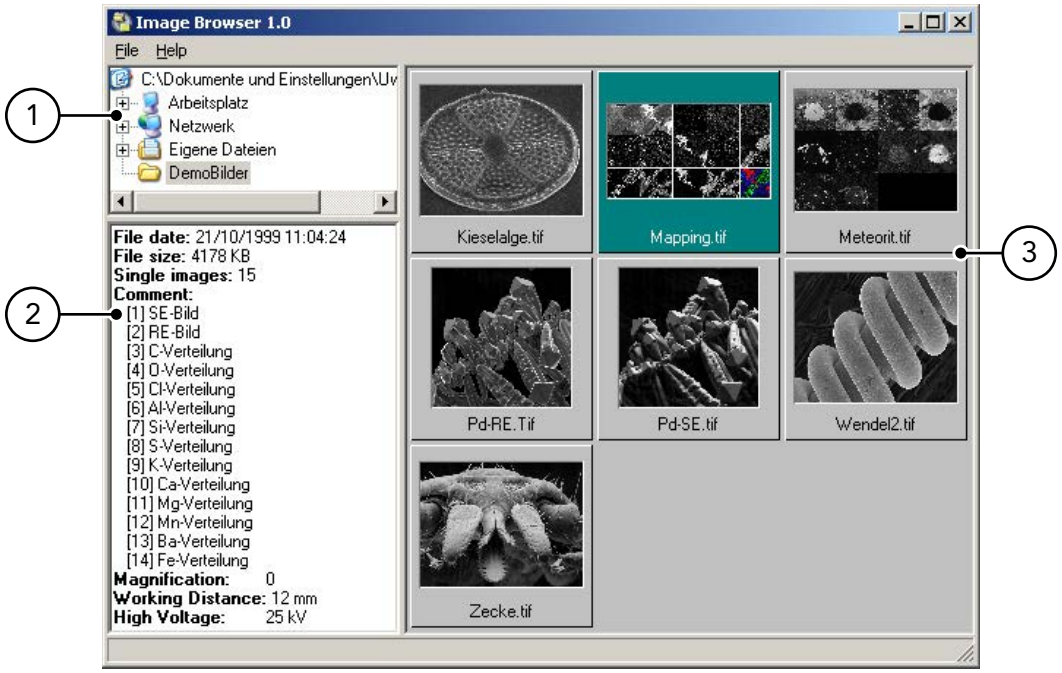
Component	Function
Columns	For entering a preferred number of columns for a layout template.
Rows	For entering a preferred number of rows for a layout template.
Ratio	For entering a preferred aspect ratio of a layout template.
OK	Closes the dialog window. A new layout template is created with the given values and is displayed on the work area of DIPS.
Cancel	Closes the dialog window. The settings are rejected. No new layout template is created.

Image browser

Description The image browser is a visual image manager integrated in DIPS. It allows a preview of saved images as thumbnails.

With a double-click on a thumbnail, the image is opened in DIPS.

Structure The following figure shows the image browser with its main components:



Function The following table contains information on the main components of the image browser:

No.	Main component	Function
1	Directory	Displays disk drives and folders of the computer.
2	File properties	Displays information saved with a selected image.
3	Preview	Displays thumbnails and file names of the images in a selected folder.

Save as...

Description With the Save as... function, selected images or layouts can be saved under a different name in the following file formats:

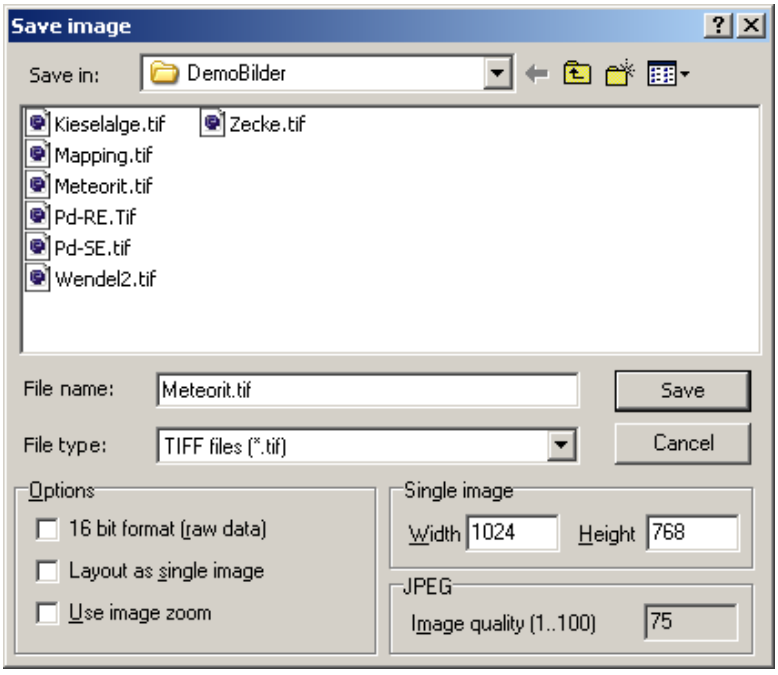
- Tagged Image File Format (.TIF)
- Windows Bitmap (.BMP)
- Joint Picture Expert Group (.JPG)
- Portable Network Graphics (.PNG)
- Graphics Interchange Format (.GIF)

NOTICE

Only in a TIF file, image parameters like calibration and comment may be saved with the image.

The function opens the **Save image** dialog window.

Structure The following figure shows **Save image** dialog window with its main components:



Continuation next page ...

… Continuation: Save as…

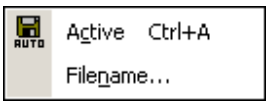
Function The following table contains information on the main components of the **Save image** dialog window.

Main component	Function
Options	
– 16 bit format (raw data)	Saves the raw data of the selected image in 16-bit format. This option is only available if the image data to be saved is available in 16-bit format. If the 16-bit format (raw data) checkbox is activated, all modifications of the image will be rejected.
– Layout as single image	Saves a layout as single image. Such a layout may also be imported into different graphics applications. With layouts saved as single images, it becomes impossible to process the individual images of a layout afterwards.
– Use image zoom	Causes the layout to be saved as shown on the screen. The zooming degree of the individual images of a layout is preserved.
Single image	Sets width and height of the image to be saved in pixels.
JPEG	Sets the quality of the image to be saved by entering a value between 1 and 100. The higher the value, the better the quality of the saved image.

Auto save

Description The Auto save function enables the quick saving of several images with the same name. While saving several images, the chosen file name is extended with a four-digit number starting at 0001. The number is raised by one for any further saving.

Structure The following figure shows the Auto save menu with its components:



Function The following table contains information on the components of the Auto save menu:

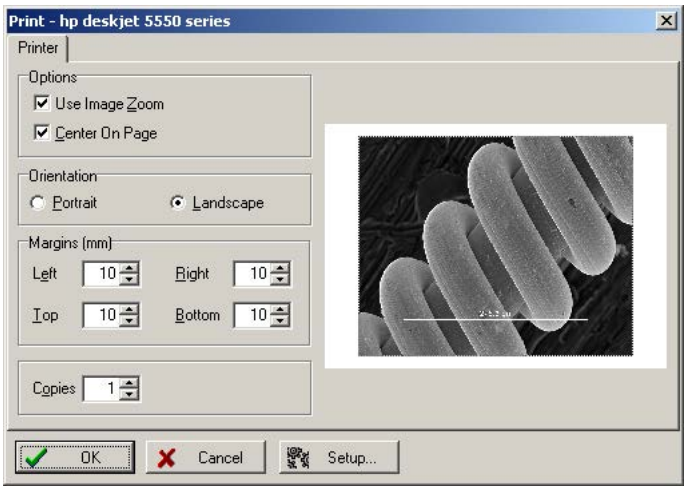
Component	Function
Active	Activates the auto save mode.
File name...	Opens a dialog window for choosing a file name and to set some saving options. This dialog window is basically the same as the Save image dialog window (Page 159). In the Options field, a Close image automatically function is available. If this function is activated, the image is closed directly after the saving. The Layout as single image function cannot be activated.

Print...

Description With the Print function, the active image or layout can be prepared for printing and can be printed out.

The function opens the **Print** dialog window.

Structure The following figure shows the **Print** dialog window with the following components:



Function The following table contains information on the components of the **Print** dialog window:

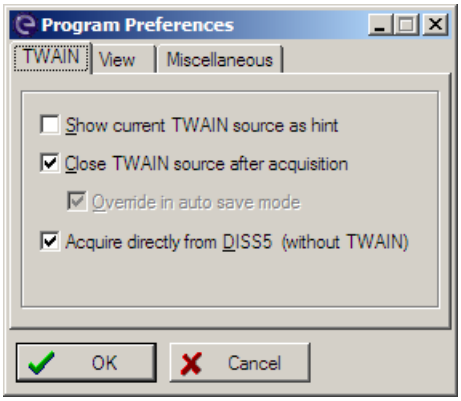
Component	Function
Options	
– Use image zoom	Prints the active image or layout as shown on the screen.
– Center on page	Prints the active image or layout centered on the page.
Orientation	Contains the options Portrait and Landscape to set the page orientation.
Margins (mm)	For setting the page margins in millimeter. ℹ As a default, images and layouts are aligned on the upper left edge.
Copies	For entering the number of image or layout copies to be printed.
OK	Closes the dialog window. The image is printed with the preset settings.
Cancel	Closes the dialog window. The image is not printed. The preset settings are rejected.
Setup...	Opens a dialog window for selecting and setting up the printer.

Program preferences

Description With the Program preferences function, user-specific defaults for DIPS can be set.

The function opens the **Program Preferences** dialog window with three tabs.

TWAIN tab The following figure shows the **Program Preferences** dialog window with the TWAIN tab:



The following table contains information on the components of the TWAIN tab:

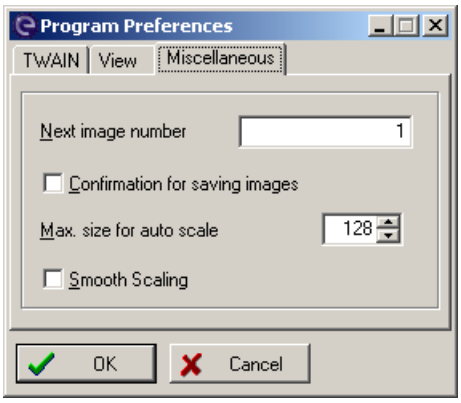
Component	Function
Show current TWAIN source as hint	Displays the current TWAIN source as tool tip if the cursor is placed on the Acquire From TWAIN button.
Close TWAIN source after acquisition	Closes the TWAIN source after acquisition and transfer of an image to DIPS. Otherwise, the TWAIN source stays open until the image acquisition is canceled. This mode allows to acquire several images one after another and to transfer them to the image processing software without having to open the TWAIN source again.
Override in auto save mode	The TWAIN source is not closed in auto save mode.
Acquire directly from DISS 5 (without TWAIN)	Activates direct data transfer from the image acquisition software. If image acquisition software is available, it will open automatically when the Acquire from TWAIN... function is used without using the TWAIN source. Only available as package with DISS 5.

Continuation next page ...

… Continuation: Program preferences

View tab The View tab contains a function that displays the toolbar buttons in a flat style.

Miscellaneous tab The following figure shows the **Program Preferences** dialog window with the Miscellaneous tab:



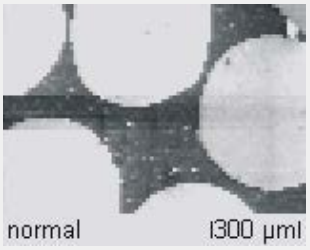
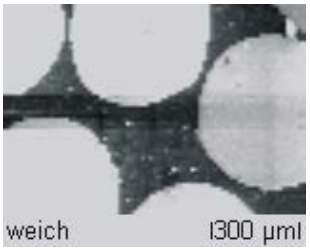
The following table contains information on the components of the Miscellaneous tab:

Component	Function
Next image number	For entering a number to be used for the next image saved.
Confirmation for saving images	If this checkbox is activated, the saving of an existing image must always be confirmed. This prevents an original image from being overwritten. ℹ This function should always be activated.
Max. size for auto scale	When an image is acquired from the TWAIN source and as long as its width and/or height do not exceed the given values, the image will automatically be converted to twice its size. As this function improves the pixel resolution of an image, it is particularly well suited for layouts with small elemental mapping images that are provided with an image caption. ℹ The automatic scaling may be prevented by entering the value "0" in this field.
Smooth Scaling	Activates an interpolating procedure used for automatic scaling. Otherwise, the image is scaled with a simple pixel duplication.

Continuation next page …

… Continuation: Program preferences

Scaling The following images show the effect of scaling. For this purpose, an SE image was acquired with 80 × 64 pixels and labeled with a caption.

Scaling	Image
Without	
Regular	
Smooth	

7.3 Functions in the Image menu

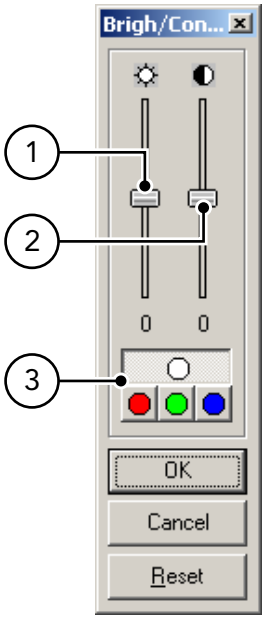
Overview

Purpose This section contains detailed descriptions of specific functions in the Image menu.

Contents This sections contains the following information:

Brightness/Contrast...

Structure The following figure shows the **Brightness/Contrast** dialog window with its main components:



Function The following table contains information on the main components of the **Brightness/Contrast** dialog window.

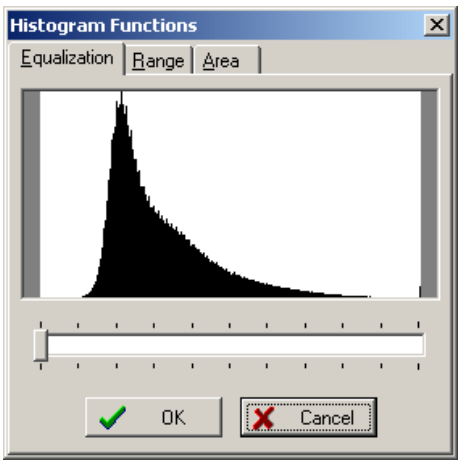
No.	Main component	Function
1	"Brightness" slider	Modifies the brightness of the selected image within a range of -100% to +100%.
2	"Contrast" slider	Modifies the contrast of the selected image within a range of -100% to +100%.
3	Color mode buttons	Selects a color mode (gray scales, red, green or blue) to which the values of brightness and/or contrast may be adapted.
	OK	Closes the dialog window. All settings are applied.
	Cancel	Closes the dialog window. All settings are rejected.
	Reset	Resets the sliders to the value “0” (zero).

Histogram functions...

Description A histogram shows the frequency distribution of the gray values in an image.

This function opens the **Histogram Functions** dialog window with three tabs containing several functions to change the histogram of a selected image.

Equalization tab The following figure shows the **Histogram Functions** dialog window with the Equalization tab:

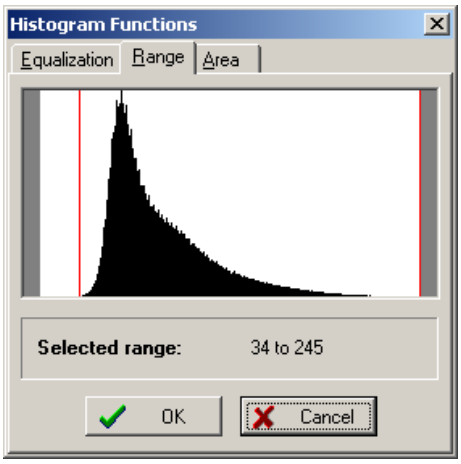


A histogram equalization often leads to an improvement of the image. During equalization, narrow gray scale ranges due to suboptimal image acquisition conditions are widened.

With the slider, the intensity of the histogram equalization may be adjusted within a range from 0% to 100%. After recalculation, these modifications will instantly be visible in the histogram as well as the image. As these recalculations might take some time with larger images, the status will be displayed in the title bar of the dialog window.

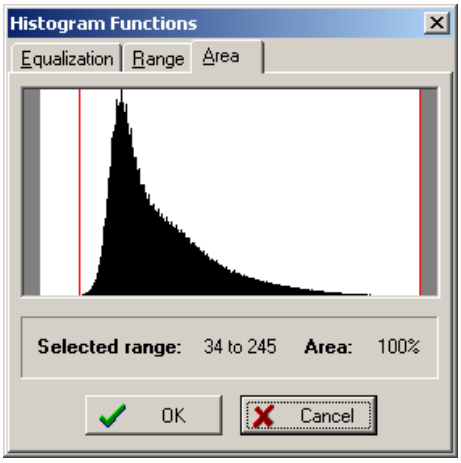
Continuation next page ...

Range tab The following figure shows the **Histogram Functions** dialog window with the Range tab:



Using the mouse, the two red bars from the right and/or left edge may be dragged over the histogram to define a certain range of gray values in the active picture. Only those pixels of the current image will be shown whose gray value lays within the two markers.

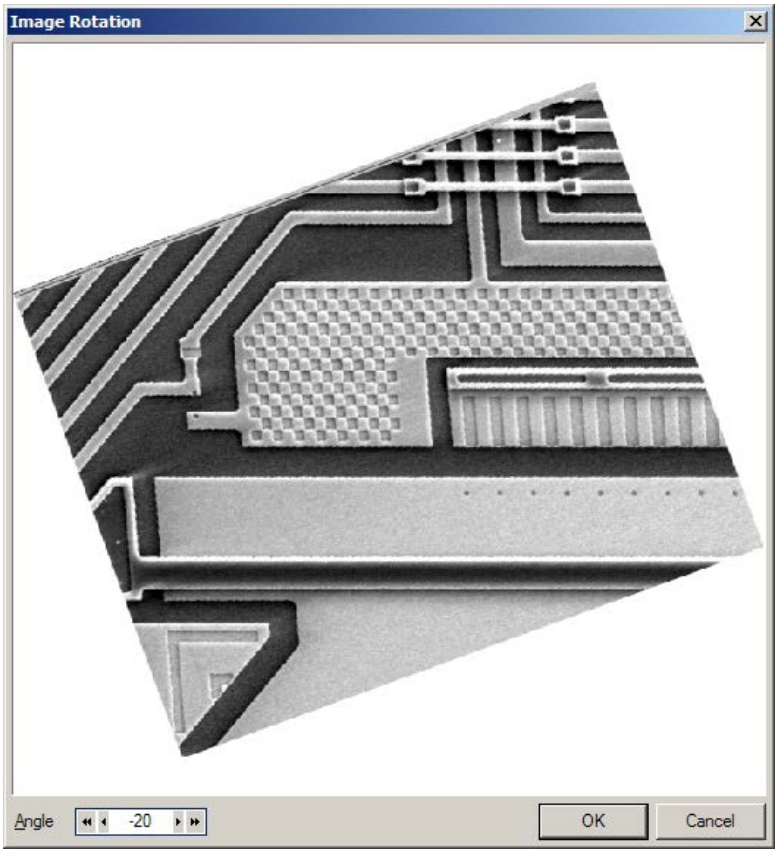
Area tab The following figure shows the **Histogram Functions** dialog window with the Area tab:



Using the mouse, the two red bars from the right and/or left edge may be dragged over the histogram to determine percentages of areas with a certain range of gray values. In the current image window, these areas are shown in red, and the gray value range and percentage will be displayed.

Rotate...

Structure The following figure shows the **Image Rotation** dialog window with the following components:



Function The following table contains information on the components of the **Image Rotation** dialog window:

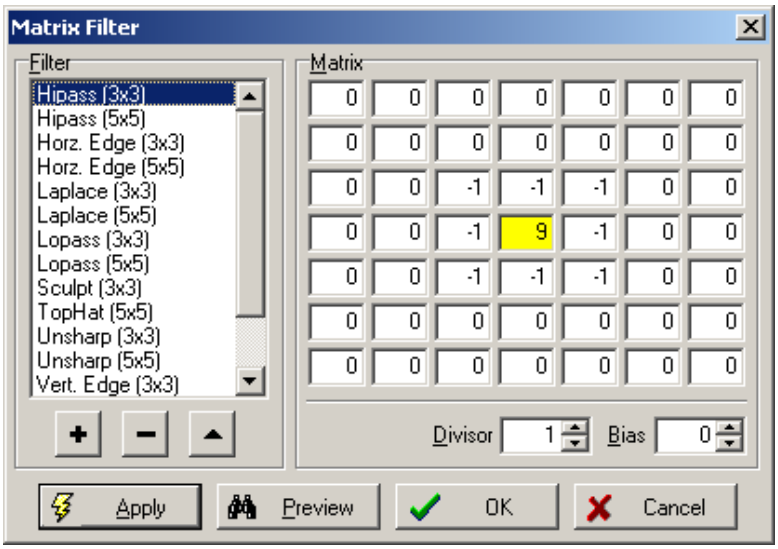
Component	Function
Angle	For entering an angle around which the image is rotated.
– Arrow buttons	Raise or lower the value of the angle in single steps.
– Double arrow buttons	Raise or lower the value of the angle in single steps.
OK	Closes the dialog window. The image is rotated with the entered value.
Cancel	Closes the dialog window. The entered angle value is rejected. The image is not rotated.

Matrix filter…

Description Matrix filters modify a pixel's intensity depending on the intensity of original and surrounding pixels. An appropriate filter matrix leads to certain filter functions, such as smoothing or sharpening of images or emphasizing edges.

With the **Matrix Filter** dialog window, existing filters may be selected or modified, and new filters may be defined.

Structure The following figure shows the **Matrix Filter** dialog window with the following components:



Function The following table contains information on the components of the **Matrix Filter** dialog window:

Component	Function
Filter	Displays a list of all available filters.
– Plus	Adds a new filter for user-specific settings.
– Minus	Deletes the selected filter from the list.
– Arrow	For renaming the selected filter.
Matrix	Displays the coefficients of the selected filter. The coefficients may be modified within a range from -128 to +127.
– Divisor	– Standardizes the calculated intensities after the application of a matrix filter. – Corresponds to the sum of the matrix coefficients.
– Bias	Shifts the calculated intensities by the entered value.

Continuation next page …

… Continuation: Matrix filter…

Component	Function
Apply	Closes the dialog window. The selected filter is applied to the image. Modifications of the filter are saved.
Preview	Shows a preview of the filter on the selected image. The filter is not applied to the image.
OK	Closes the dialog window. Modified and/or newly created filters are saved but not applied to the image.
Cancel	Closes the dialog window. Modified and/or newly created filters are not saved. Modifications are not applied to the image.

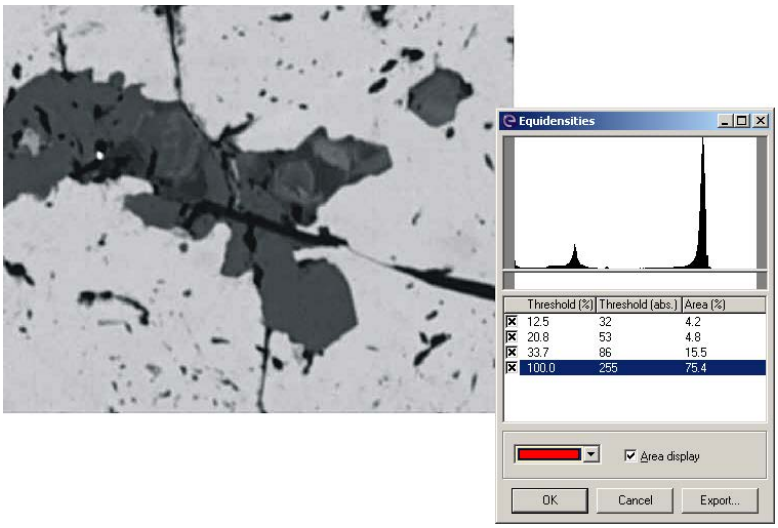
Equidensities...

Description Equidensities are lines or areas which connect pixels with equal optical or color densities. In the **Equidensities** dialog window, threshold values for the optical density may be defined. In the selected image, these densities will be displayed as equidensities in two different ways.

Equidensities may be helpful to highlight image areas that show very little difference in B/W images or to quickly determine percentages of areas with equal optical density, e. g. phases.

The Equidensities function basically is an extension of the Area tab from the **Histogram Functions** dialog window. There, one gray value range may be selected and its percentage calculated. With the Equidensities function, several gray value ranges may be defined and allocated to different colors. The percentages of individual areas will also be determined.

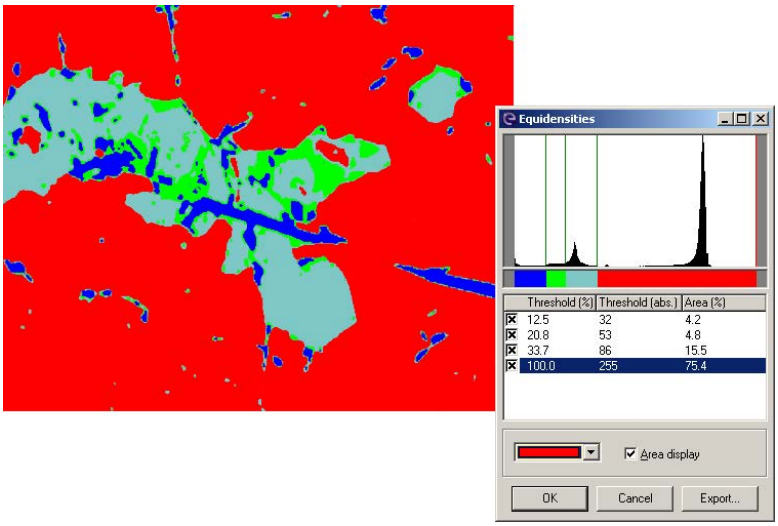
Original image and Equidensities window



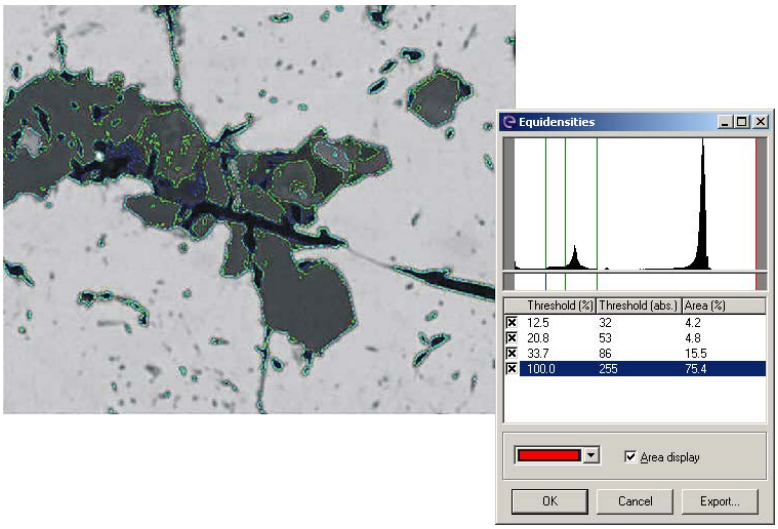
Continuation next page ...

… Continuation: Equidensities…

Equidensities as area display



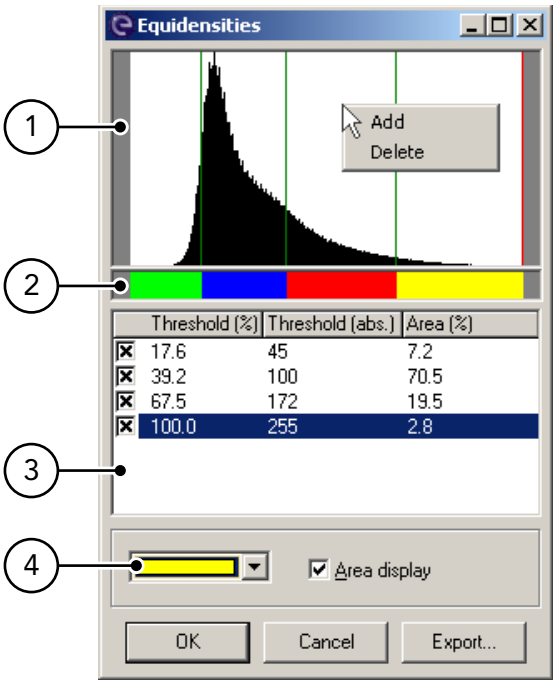
Equidensities as dotted graphics



Continuation next page …

… Continuation: Equidensities…

Structure The following figure shows the **Equidensities** dialog window with the following components:



Function The following table contains information on the components of the **Equidensities** dialog window:

No.	Component	Function
1	Histogram	Displays the distribution of gray scales in the selected image: – left: 0 = black – right: 255 = white A right-click on the histogram opens a context menu with two functions: – Add: Adds a new threshold to the histogram. A vertical bar is displayed. It may be shifted with the mouse to set the threshold. – Delete: Deletes the threshold selected in the image and shows all activated thermosets as vertical bars. All bars may be moved with the mouse to readjust the thresholds.
2	Area	Displays an area of a threshold in the color selected for the threshold.

Continuation next page …

… Continuation: Equidensities…

No.	Component	Function
3	Threshold list	Displays all defined thresholds in a list: – Checkbox: Activates or deactivates the threshold. – Threshold (%): Displays the percentage position of the threshold in the total gray scale area (between 0% and 100%). – Threshold (abs.): Displays the absolute position of the threshold in the total gray scale area (between 0 and 255). – Area (%): Displays the area within a threshold as a percentage of the total area (between 0% and 100%). A right-click on the threshold list opens a context menu with two functions: – Add: Opens the **New Threshold** dialog window with two input fields to define the percentage or the absolute position of a new threshold. – Delete: Deletes the selected threshold.
4	Threshold color	Assigns a color to the selected threshold.
	Area display	Dyes the area of the threshold with the selected color in the active image.
	OK	Closes the dialog window. The selected image is dyed with all defined and activated thresholds. ℹ Dyed images cannot be reconverted to gray scale images.
	Cancel	Closes the dialog window. All thresholds defined for the selected image are rejected.
	Export…	Opens the **Export Table** dialog window to export the threshold list as an XLS file.

Calibrate...

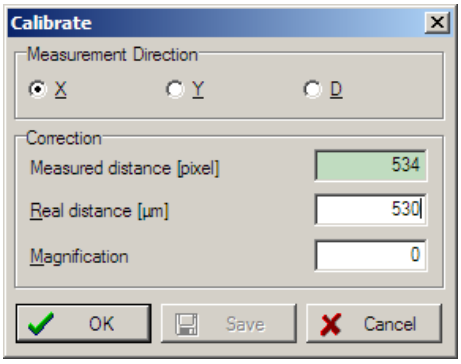
Description The Calibrate function is only available in measuring mode.

With this function, DIPS may be calibrated. For the calibration, an image with structures (test grid) is acquired with a high resolution and known dimensions. After entering the magnification, the image is transferred to the DIPS user interface.

In measuring mode, the corresponding vertical or horizontal measurement cursors are placed on these structures.

The function opens the **Calibrate** dialog window.

Structure The following figure shows the **Calibrate** dialog window with the following components:



Function The following table contains information on the components of the **Calibrate** dialog window:

Component	Function
Measurement direction	Contains checkboxes X, Y for the selection of the measurement direction to be calibrated and checkbox D for the selection of the distance.
Correction	Contains three input fields to calibrate the selected measurement direction.
– Measured distance [pixel]	For entering the measured distance in pixels.
– Real distance [µm]	For entering the real distance in micrometer.
– Magnification	For entering the magnification.
OK	Closes the dialog window. All settings are applied to the active image, but are not saved for further image acquisitions.
Save	Closes the dialog window. All settings are saved. ℹ This button should only be clicked after the calibration of DIPS.

Continuation next page ...

… Continuation: Calibrate…

Component	Function
Cancel	Closes the dialog window. All settings are rejected.

In the dialog window, the real distance is entered in X or Y direction. By clicking the **Save** button, the system is calibrated and the dialog window is closed.

The determined correlations between pixel and micrometer are saved under Registry/DISS5.ini.

If images contain a structure with known dimensions, non-calibrated images may also be calibrated later. For this, the measurement cursor must be positioned at the known structure, and the known value for X or Y distance must be entered. Then click the **OK** button.

NOTICE

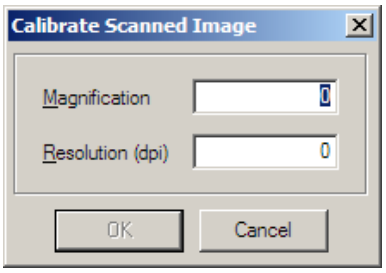
If the system was calibrated after installation, the **Save** button must not be clicked when recalibrating an image. Clicking this button would override the calibration.

Calibrate scanned image...

Description The Calibrate scanned image... function is used to calibrate images not acquired from the DISS 6 Software TWAIN source but from another source (e. g. frame grabber or scanner). An image is calibrated with known structures and with the specification of the used magnification.

This function opens the **Calibrate Scanned Image** dialog window.

Structure The following figure shows the **Calibrate Scanned Image** dialog window with the following components:



Function The following table contains information on the components of the **Calibrate Scanned Image** dialog window:

Component	Function
Magnification	For entering the current magnification.
Resolution (dpi)	For entering the resolution in dpi.
OK	Closes the dialog window. The connected acquisition source is calibrated with the settings.
Cancel	Closes the dialog window. The settings are rejected. The connected acquisition source is not calibrated.

Image info window

Description The Image info window displays information saved with the current image. In the window, the information is grouped as hardware, image and scan parameters.

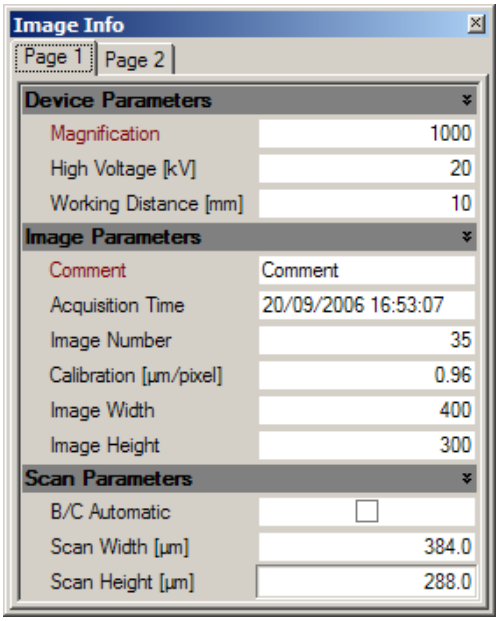
Additional information like an image comment or source name may also be entered.

NOTICE

Additional image information is saved only if the image is saved in TIF format.

This function opens the **Image info** dialog window with two tabs.

Structure The following figure shows the **Image info** dialog window:



7.4 Functions in the Tools menu

Overview

Purpose This section contains detailed descriptions of specific functions in the Tools menu.

Contents This sections contains the following information:

Zoom

Description The Zoom function activates zoom mode.

In this mode, the mouse cursor is displayed as a magnifier over the active image.

A click on the left mouse button magnifies the image, a click on the right mouse button reduces the image magnification. The clicked point is moved to the center of the image.

The current magnifying factor is displayed in the title bar of the image window.

Pressing the [Ctrl] key in zoom mode changes the mouse cursor from magnifier to a hand symbol. This is used to move the section for the image view.

The Zoom function is also available in full screen mode.

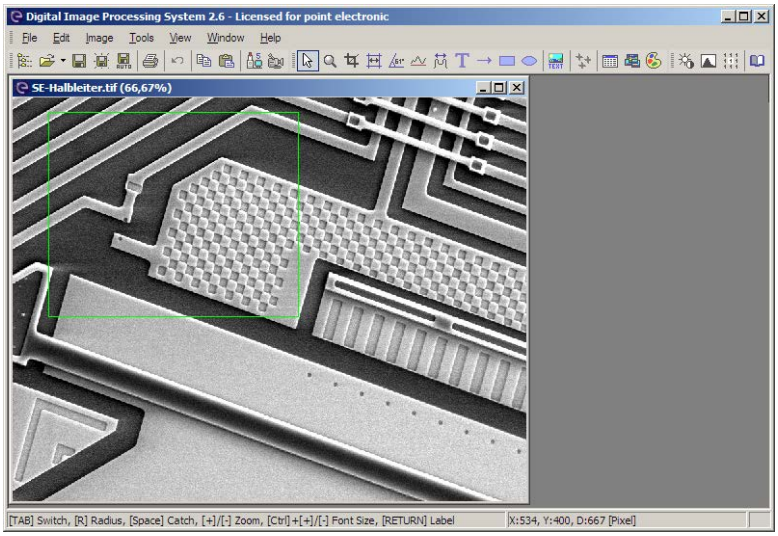
Crop

Description The Crop function allows to crop a rectangular section from the image. The cropped sections may be combined to create a new image.

Position the mouse pointer in the active window, keep the left mouse button pressed and draw the preferred rectangle. Width and height of the rectangular section are displayed in the status bar.

By pressing the return key, a new image with the data of the selected section will be created.

The following figure shows the Crop function:



Measurement cursor

Description The Measurement cursor function activates the measurement function.

The measurement function allows to determine distances in X, Y and diagonal direction with the help of the double cross measurement cursor.

Measurement data for all directions are displayed in the status bar.

For all non-calibrated images, the unit for measuring distances is pixel.

If they contain known structures or a measuring bar, these images might be calibrated later via the Image > Calibrate menu.

All images acquired and transferred into DIPS are automatically calibrated provided the SEM magnification has been entered or automatically read-out after image acquisition.

The double cross measurement cursor may be positioned with the mouse. Lines or corners of the measurement cursor may be moved with pressed left mouse button. By pressing the left mouse button while pressing the [Ctrl] key, the closest corner will be caught. Pressing the space bar catches the whole measurement cursor in the active image section.

In high resolution images, the measurement cursor may easily be positioned when zooming the image. With the [+] and [-] keys of the numeric keypad, the zoom may be changed in the measuring mode.

While directly switching from measuring to zoom mode, the deactivated measurement cursor will remain visible. Thus, the relevant image section may be zoomed before switching back to measuring mode for positioning the measurement cursor.

The highlighted measuring length of the measurement cursor including the dimensioning may be added to the image. Pressing the return key opens the **Label** dialog window (Page 193) for entering the standard caption.

When pressing the tab key, another measuring length of the measurement cursor will be selected for a label.

With the mouse, the dimension caption may be moved to any position in the image.

Continuation next page …

… Continuation: Measurement cursor

To modify the font size, use [Ctrl] + [+] or [-] on the numeric keypad.

A confirmed label is fixedly integrated into the image and saved as image information. Before confirming captions, the original image should be backed-up. Via Edit > Undo or by clicking the mouse on the Undo button in the toolbar, the last label may be rejected.

Angle measurement

Description Use the mouse to select the two end points of the angle arms. Then determine the vertex.

By clicking the mouse on the preferred location, the position of the displayed angle may be modified. The nearest point will be caught.

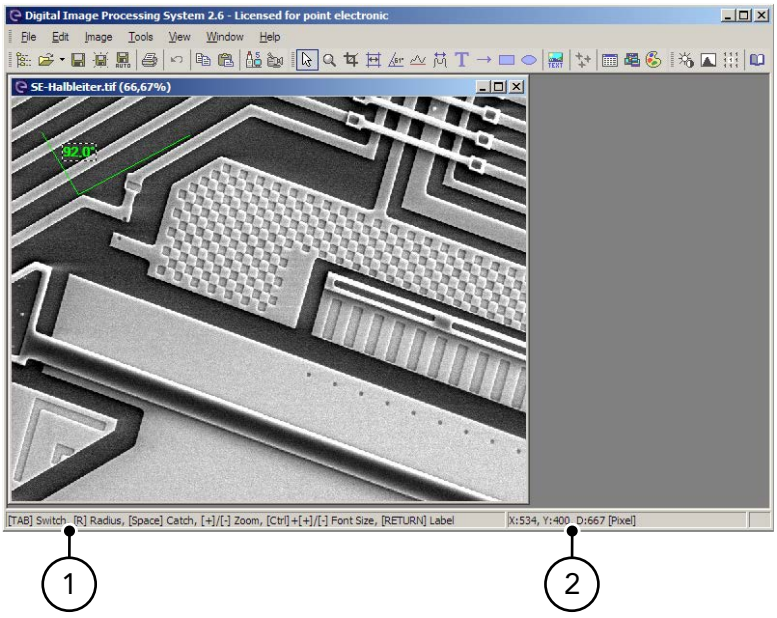
Use the mouse to move the angle caption to another position. To modify the font size, use [Ctrl] + [+] or [-] on the numeric keypad.

By pressing the return key, the shown angle is integrated into the image. The **Label** dialog window (Page 193) opens where you may confirm or change the angle caption.

During angle measurement, the status bar shows the following information:

– 1: Description of the keys for angle measurement settings including function
– 2: Size of the currently measured angle

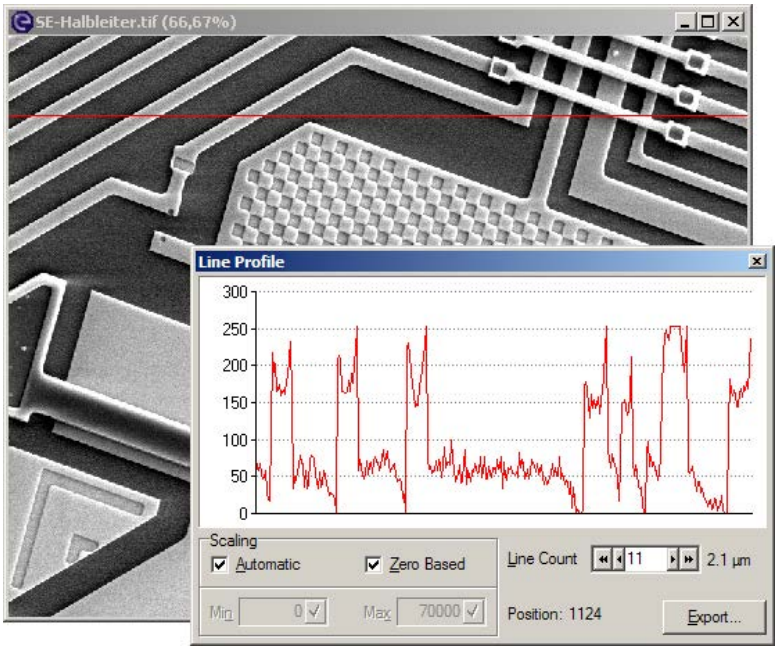
The following figure shows the angle measurement:



Line Profile

Description The line profile displays the structure of a surface along a horizontal measurement line over the entire image.

Structure The following figure shows the **Line Profile** dialog window with the following components:



Function The following table contains information on the components of the **Line Profile** dialog window:

Component	Function
Scaling	
– Automatic	Scales the diagram depending on the minimal and maximal values.
– Zero based	Scales the diagram starting from the zero base.
– Min, max	For manual scaling of the diagram with disabled automatic.
Line count	Expands the measuring area in vertical direction by the measurement line. The measuring area is displayed with green lines.
Position	Displays the vertical position of a measuring line in the active image.
Export...	Exports the measurement data as CSV format.

Structure measurement (optional)

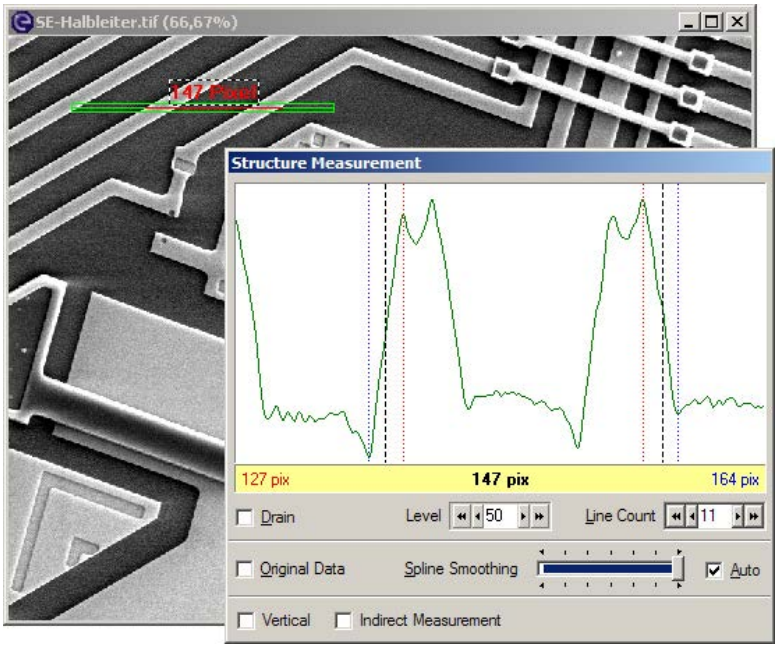
Description The structure measurement allows measurements in a sub-pixel range. Measurements may be averaged over one or several lines.

After the activation of structure measurement, a measuring line may be put into the image. To do this, starting point and final point have to be marked with the mouse.

The structure below this measuring line as well as the thresholds of the measurement are found automatically and are displayed in the **Structure Measurement** dialog window.

The length of the measuring line may be modified by moving the left and right edge with the mouse. The position of the measuring line may be changed by moving the line with the mouse. The position of the label may be changed in the same kind.

Structure The following figure shows the **Structure Measurement** dialog window with the following components:



Continuation next page …

… Continuation: Structure measurement (optional)

Function The following table contains information on the components of the **Structure Measurement** dialog window:

Component	Function
Diagram	Displays the measurement area in graphical and numerical style.
Red value and red bar	Display the minimal value.
Black value and black bar	Display the threshold value.
Blue value and blue bar	Display the maximal value.
Drain	Measures the structure as a drain.
Level	Sets the threshold value in single steps or steps of ten.
Line count	Sets the number of measuring lines in the measuring area. This expands the measuring area in vertical direction.
Original data	Additionally displays the unsmoothed original data.
Spline smoothing	Changes the value of the smoothing.
Auto	Sets the value of the smoothing automatically.
Vertical	Measures distances in vertical direction.
Indirect measurement	Measures distances which do not lie on a line.

Saving of measuring data in the image After the determination of the measuring data, a labeled measuring line may be integrated into the active image.

Pressing the return key opens the **Label** dialog window. (Page 193)

Image caption

Description

The Image caption function allows to create and save an image comment for the active image. The first line of the entered comment is displayed as image caption. Any additional text in the following lines is saved with the image if the image is saved as TIF file.

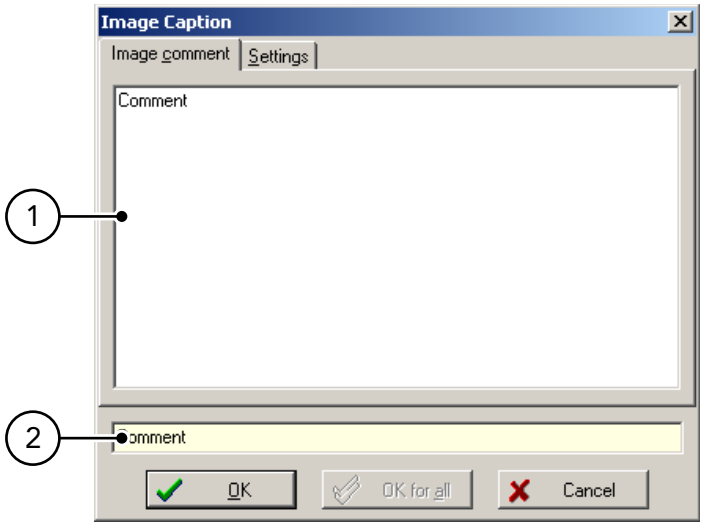
NOTICE

Integrated text overwrites the pixels of the image at the position where it is applied.

The function opens the **Image Caption** dialog window with the Image comment and Settings tabs.

Image comment tab

The following figure shows the **Image Caption** dialog window with the Image comment tab:



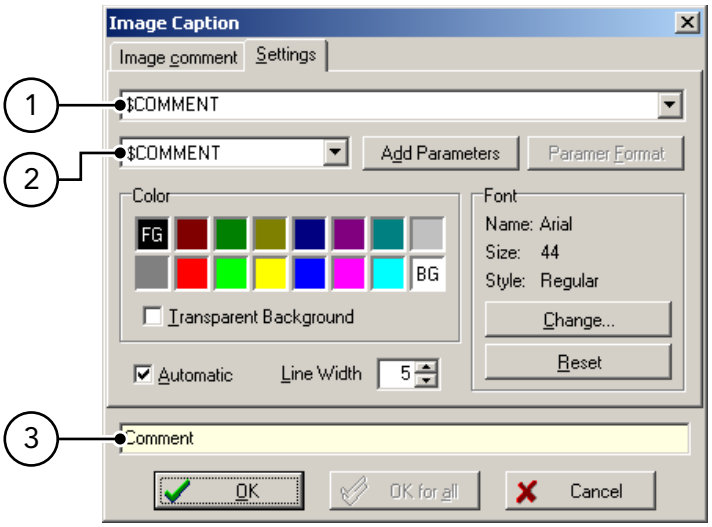
The following table contains information on the components of the Image comment tab:

No.	Component	Function
1	Text field	For entering, editing and displaying the whole text saved with the active image. Only the first text line is displayed in the image. Any additional text in the following lines is saved with the image if the image is saved as TIF file.
2	Preview	Displays a preview of the comment text in the active image.

Continuation next page …

… Continuation: Image caption

Settings tab The following figure shows the **Image Caption** dialog window with the Settings tab:



The following table contains information on the components of the Settings tab:

No.	Component	Function
1	Text line	Displays the selected parameter in the given order and the freely definable image comment.
2	Parameter list	Contains all parameters which are available for the image caption.
	Add Parameters	Adds the selected parameter to the text line.
	Parameter format	Opens a dialog window for editing the display format of the selected parameter.
	Color	Contains two lines with different color fields to select the foreground color and the background color of the text field. A left-click in a color field selects the foreground color. The letters FG are added to the selected color. A right-click in a color field selects the background color. The letters BG are added to the selected color.
	– Transparent background	Displays the text field without background.
	Automatic	Adapts the font size to the resolution of the active image.
	Line width	For setting the width of the measuring bar in pixels.
	Font	Contains information on the used font and functions to modify and/or reset the font.
	– Change...	Opens a dialog window for setting up some font properties.
	– Reset	Resets the font properties to the default.
3	Preview	Displays a preview of the comment text in the active image.

Continuation next page …

… Continuation: Image caption

No.	Component	Function
	OK	Closes the dialog window. The image caption is displayed with the preset settings in the selected image. ℹ In a layout with several images, the image caption is only displayed in the selected single image.
	OK for all	Closes the dialog window. The image caption is displayed with the preset settings in all images of a selected layout. This process may only be canceled for the last image of a layout. ℹ This function is only available if a layout window with several images is selected on the DIPS interface.
	Cancel	Closes the dialog window. The settings are rejected.

Label

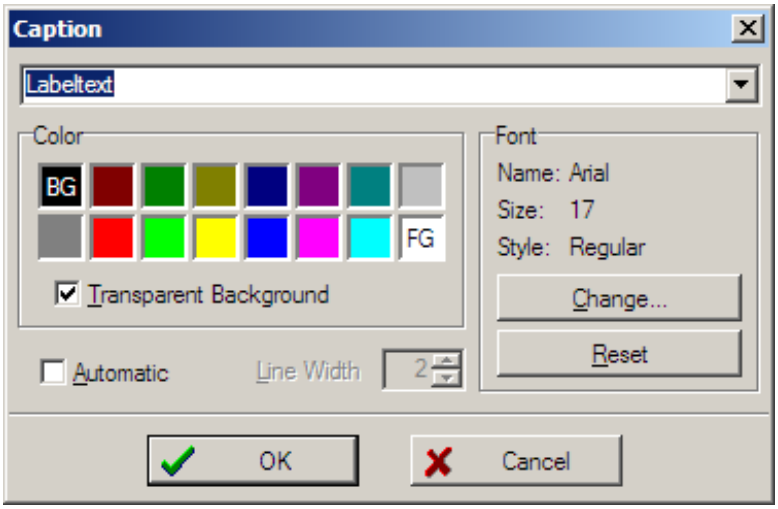
Description The Label function allows to add text to any position in the active image. A left-click into the active image sets the position of the text.

NOTICE

Integrated text overwrites the pixels of the image at the position where it is applied.

The function opens the **Caption** dialog window.

Structure The following figure shows the **Caption** dialog window with the following components:



Function The following table contains information on the components of the **Caption** dialog window:

Component	Function
Text line	For entering a label text.
Color	Contains two lines with different color fields to select the foreground color and the background color of the text field. A left-click in a color field selects the foreground color. The letters FG are added to the selected color. A right-click in a color field selects the background color. The letters BG are added to the selected color.
Transparent background	Displays the text field without background.
Automatic	Adapts the font size to the resolution of the active image.
Line width	For setting the width of the measuring bar in pixels.

Continuation next page …

… Continuation: Label

Component	Function
Font	Contains information on the used font and functions to modify and/ or reset the font.
– Change…	Opens a dialog window for setting up font properties.
– Reset	Resets the font properties to the default.
OK	Closes the dialog window. The comment is displayed with the preset settings in the active image. Use the mouse to move the text to another position. The label function only ends when another mode is activated.
Cancel	Closes the dialog window. The settings are rejected.

Callout tools

Description DIPS contains three callout tools to add graphic elements permanently to the active image.

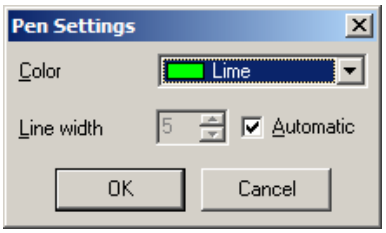
The following table contains information on the available callout tools:

Icon	Tool	Function
	Arrow [Ctrl] + [A]	Adds an arrow to any position in the active image. A click into the image with the left mouse button sets the target point of the arrow. With pressed mouse button, length and angle of the arrow may be set. Length, position and angle of an inserted arrow may be modified by clicking the red intersections with the mouse. Pressing the return key opens the **Pen Settings** dialog window for setting line width and color of the arrow.
	Rectangle [Ctrl] + [R]	Adds a rectangle to any position in the active image. A click into the image with the left mouse button sets the upper left corner of the rectangle. With pressed mouse button, width and height of the rectangle may be set. Width and height of the rectangle may be changed by clicking the red intersections with the mouse. By clicking the mouse button within the rectangle and pulling it while pressing the mouse button, the position of the rectangle may be changed. Pressing the return key opens the **Pen Settings** dialog window for setting line width and color of the rectangle.
	Ellipse [Ctrl] + [E]	Adds an ellipse to any position in the active image. A click into the image with the left mouse button sets the upper left corner of the ellipse. With pressed mouse button, width and height of the ellipse may be set. Width and height of the ellipse may be changed by clicking the red intersections with the mouse. By clicking the mouse button within the ellipse and pulling it while pressing the mouse button, the position of the ellipse may be changed. Pressing the return key opens the **Pen Settings** dialog window for setting line width and color of the ellipse.

Continuation next page …

Dialog window Pen Settings

The following figure shows the **Pen Settings** dialog window with the following components:



The following table contains information on the components of the **Pen Settings** dialog window:

Component	Function
Color	Sets the line color of the drawn element.
Line width	Sets the line width of the drawn element.
Automatic	Automatically adapts the line width to the resolution of the active image.
OK	Closes the dialog window. The settings are applied to the drawn element. After pressing the **OK** button, the drawn element is fixed into the image. Afterwards, the drawn element can neither be shifted nor can its settings be modified.
Cancel	Closes the dialog window. The settings are rejected.

Point scan data

Description The Point scan data function activates the display mode for point scan data.

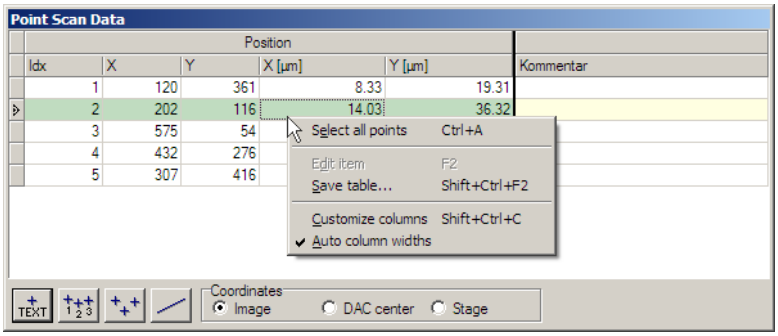
This mode is only available with the DDEPlus option and if the selected image contains point scan data.

A right-click on the point scan data table opens a context menu with edit options for the following functions:

- Labeling scan points in the active image
- Selection of columns to be displayed
- Saving the table in ASCII, HTML or XLS format

The function opens the **Point Scan Data** dialog window.

Structure The following figure shows the **Point Scan Data** dialog window with the following components:



Function The following table contains information on the components of the **Point Scan Data** dialog window:

Component	Function
Label selected point	– Marks and labels the point of the image which is selected in the table. – Opens the **Label** dialog window to set up the label settings.
Label all selected points	– Marks and labels all selected points of the image with a consecutive number. The numbers are assigned according to the index of the points. Thus, point 2 from the table will be labeled with the digit 2. If only one point in the table is selected, only that point will be labeled in the image. All other points will simply be marked. – Opens the **Label** dialog window to set up line width and the color of the marker.
Mark all points	– Shows all points in the image. The point selected in the table will be highlighted. – Opens the **Label** dialog window to set up line width and the color of the marker.

Continuation next page …

… Continuation: Point scan data

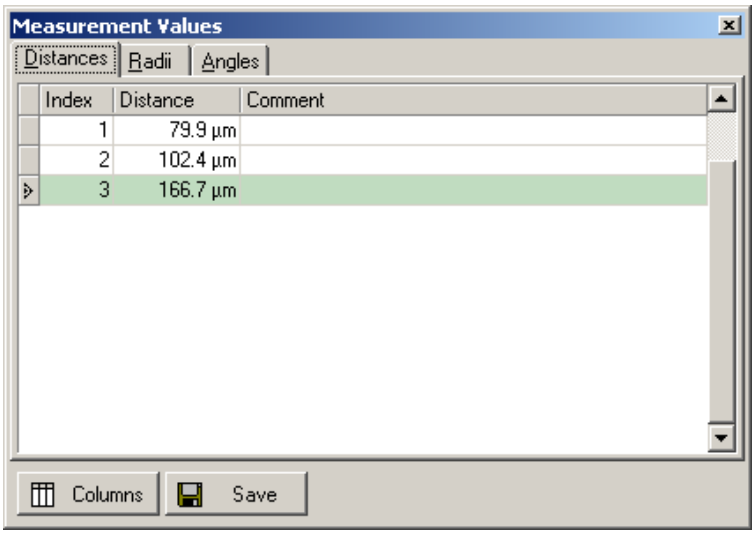
Component	Function
 Line marker	– Connects the first and last point with a line. – Opens the **Label** dialog window to set up line width and the color of the line. This function is useful to display concentration profiles.
Coordinates	
– Image	Displays the coordinates of the points in the table originating in the lower left corner of the image.
– DAC center	Displays the coordinates of the points in the table originating from the center of the image.
– Stage	Displays the coordinates of the points in the table as stage coordinates if the system is connected to a motorized microscope stage.
Context menu	
– Select all points [Ctrl] + [A]	Selects all points listed in the table.
– Edit item [F2]	For editing a point which is selected in the table.
– Save table [Shift] + [Ctrl] + [F2]	Opens a dialog window for saving the table as XLS, CSV or HTML format.
– Customize columns [Shift] + [Ctrl] + [C]	Opens the Customizing dialog window with two tabs to customize the columns.
– Auto column widths	Sets the widths of all columns automatically to fit the table within the window.

Measurement values window

Description In the measurement values window, the measured distances, radii and angles of the selected image are displayed as tables. The data may be saved either as XLS, HTML or TXT.

The function opens the **Measurement Values** dialog window.

Structure The following figure shows the **Measurement Values** dialog window with the following components:



Function The following table contains information on the components of the **Measurement Values** dialog window:

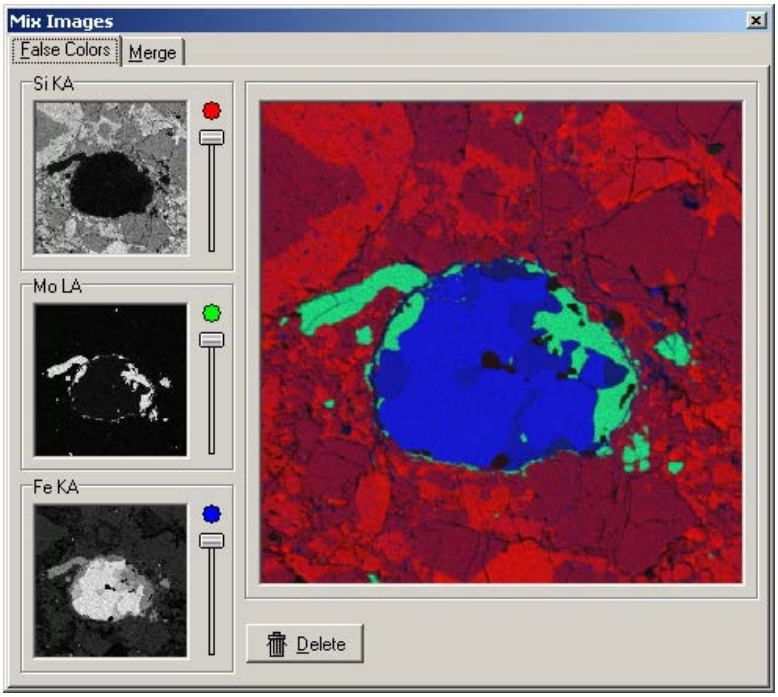
Component	Function
Distances tab	Displays information on all measured distances in the selected image.
Radii tab	Displays information on all measured radii in the selected image.
Angles tab	Displays information on all measured angles in the selected image.
Columns	Opens the **Customizing** dialog window to customize the table columns.
Save	Closes the dialog window. All displayed measurement data are saved as tables in XLS, HTML or TXT format.

Mix window

Description The Mix window function allows to overlay images, to combine images into false color images or to color images.

The function opens the **Mix Images** dialog window with the False Colors and Merge tabs.

False colors tab The following figure shows the **Mix Images** dialog window with the False Colors tab:



In the False colors tab, elemental mapping images may be overlaid or combined into false color images.

The images to be mixed are assigned by Drag & Drop to the three color channel fields in the Mix window.

NOTICE

All three fields must be filled with images in the following order: 1. the upper field 2. the center field 3. the lower field.

The images to be mixed must have the same dimensions and pixel resolution.

Continuation next page ...

… Continuation: Mix window

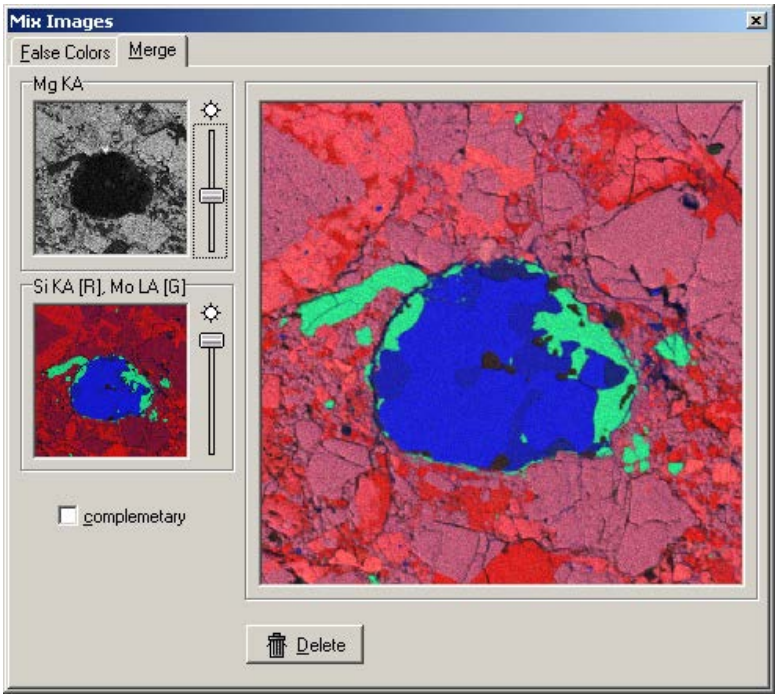
Only gray scale images may be mixed and/or colored.

The colors may be set with the sliders.

Via Drag & Drop, a mixed image may be transferred from the dialog window into the DIPS work area or into an open layout.

Merge tab

The following figure shows the **Mix Images** dialog window with the Merge tab:



The Merge tab contains two fields. Images may be assigned to the fields via Drag & Drop. The tab also contains an empty mix window to display the mixing result.

NOTICE

Both fields must be filled with images in the following order: 1. the upper field, 2. the lower field.

The images to be mixed must have the same dimensions and pixel resolution.

Gray scale images as well as color images may be mixed.

With the sliders, the weighting for each image for entering the mix field may be adjusted.

If the "complementary" checkbox is activated, the sliders move in mutual dependence.

Continuation next page …

… Continuation: Mix window

Via Drag & Drop, a mixed image may be transferred from the dialog window into the DIPS work area or into an open layout.

8 Calibration

Chapter overview

Purpose This chapter contains instructions that support you with calibrating the DISS 6 Software.

Contents This chapter contains the following information:

Calibration of the magnification

Description For calculating the scale bar (Micron Bar) and for distance measurement in the image, the image acquisition uses the SEM magnification and a SEM-specific calibration constant.

To determine the SEM constant, it is necessary to carry out a calibration with a sample with known structures.

NOTICE

Mind authorizations!

You will need admin rights to carry out the calibration.

NOTICE

The precision of measurement depends on the linearity and accuracy of the magnification of the SEM.

Continuation next page …

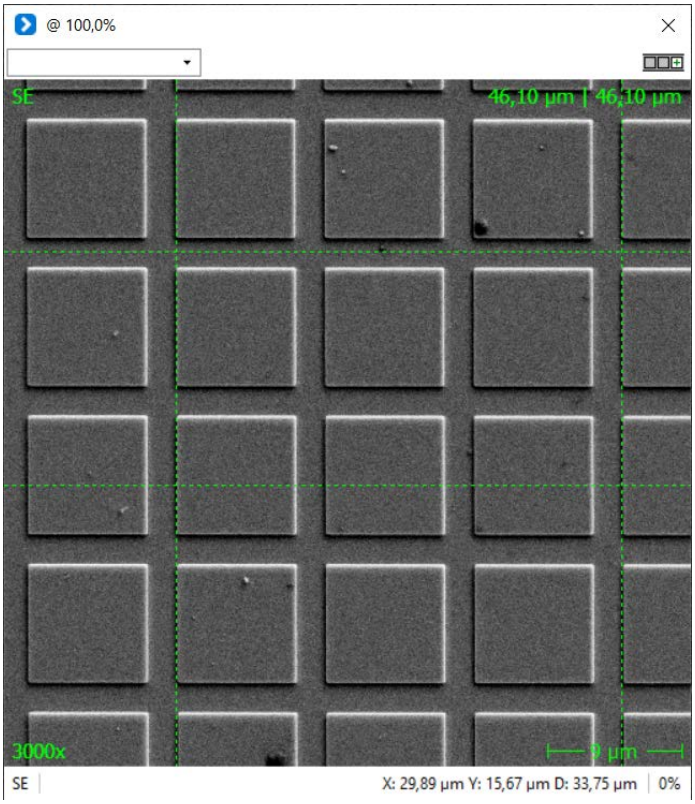
… Continuation: Calibration of the magnification

Steps Complete the following steps to calibrate the magnification:

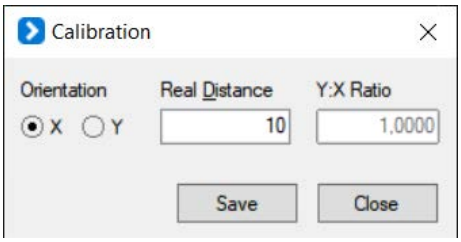
1. Set an image with a known structure in the SEM.
2. Start a slow scan with the following settings:
   - Minimum **Width** 1000 pixels
   - Activated **Line** synchronization

   see “Slow Scan” on page 77
3. During the slow scan, press [Ctrl] + [Alt] + [C] to start calibration.

   → A double cross with green lines appears in the image acquisition window. The lines of the double cross will form a square.



   → Additionally, the **Calibration** dialog window opens:



4. Adjust the vertical green lines to the known structure.

Continuation next page …

By clicking and dragging the lines while pressing the [Ctrl] key, the lines of the double cross will form a square.

5. In the **Calibration** dialog window:
   - Select the direction in the Orientation field.
   - Enter the real distance value in the Real Distance field.

   If the lines of the double cross do not form a square, the aspect ratio of the rectangular double cross will be displayed in the Y:X Ratio field.

   If you enter the distance value without unit, the value is adopted in millimicronmeters. You may also enter the particular unit directly after the distance value.
6. Click the **Save** button in the **Calibration** dialog window to confirm the settings.