point electronic

DIPS

Reference Manual

Version 5.7.7.1

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Important Anybody assigned to work with DIPS is required to have read and to have understood the relevant parts of this manual.

Accessibility For avoidance of operating errors and to guarantee failure-free operation of DIPS the manual must be accessible for the assigned personnel at any time.

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Note All efforts have been made to ensure that the information contained in this document is complete and correct at the time of printing. This manual describes all units and functions known of today.

Address point electronic GmbH

Ackerweg 104

D-06130 Halle (Saale)

Tel: +49 (0)345 1201190

Fax: +49 (0)345 1201223

E-Mail: info@pointelectronic.de

http://www.pointelectronic.de

This manual was created by
LenzKD – Kommunikation und Dokumentation
www.lenz-kd.de

Table of Contents

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E Introduction

Chapter overview

Purpose This chapter contains information to simplify the work with this manual.

Table of Contents This chapter contains the following information:

Structure of this manual

Structure This manual is structured into chapters which are organized by technical aspects.

Numbering The chapters are numbered with Arabic numerals. Chapters can be structured in sections. Sections are numbered as second numbering level (e.g. 3.1). Sections are used to structure large chapters into sub-chapters. Page numbers always consist of the chapter number and page number. Each chapter starts with page 1. The page number 3-11 for example means page 11 in chapter 3.

Chapter overview Each chapter and section contains an overview with content and page numbers. This allows a direct entrance into a topic and the independent use of parts of this manual.

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

Cross references The content of this manual is structured by topics. If more information on one topic can be found on another place in the manual, the relevant chapter and page are pointed out.

Representations in this manual

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: Open → File

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

Keyboard shortcut	Representation
Key	Ctrl
Key combination	Ctrl+Alt+Del

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	**Field name**

Continued on next page ...

... Continuation: Representations in this manual

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	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, a standard mouse procedure:	Click on an element of the user interface, drag the element with pressed mouse button to another position, drop the element to this position

Notes Important notes are marked as follows:

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.

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1 Structure and Function

Chapter overview

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

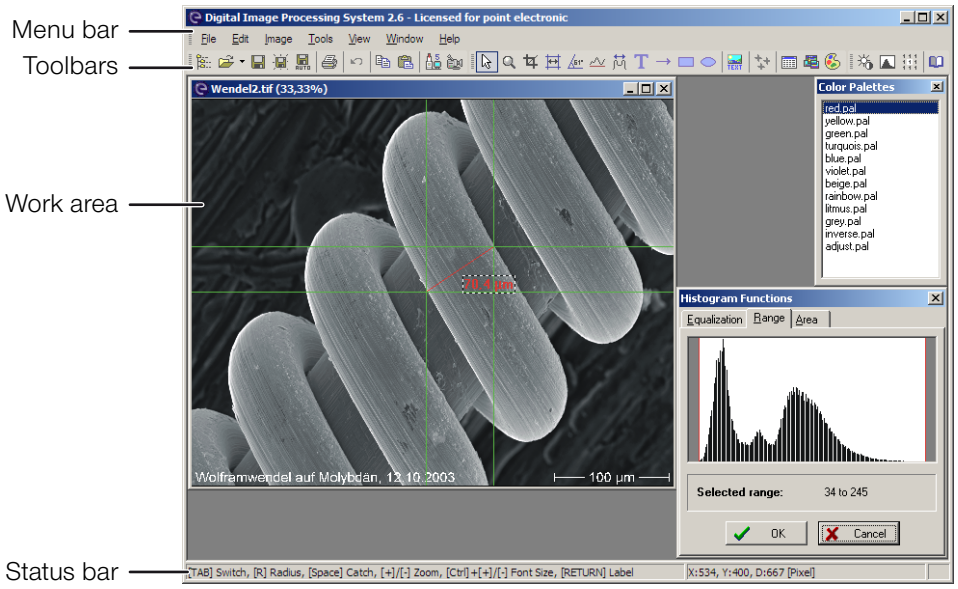
Table of Contents This chapter contains the following information:

User interface

Description With DIPS, the digital imaging processing system of DIPS, all digitized images can 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 user interface of DIPS with its components:



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

Component	Function
Menu bar	Contains all functions of DIPS The display of the menus can be adjusted (Page 1-5)
Toolbars	Contain functions of DIPS as command buttons The content of the toolbars can be adjusted either via the preferences or according to user-specific requirements (Page 1-4)
Work area	Contains all opened image windows as well as dialog windows of the active tools or functions

Continued on next page ...

... Continuation: User interface

Component	Function
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

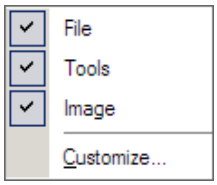
Toolbars contain some frequently used menu functions. The functions are represented in three groups. DIPS provides the following options to organize the functions according to own requirements:

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

Context menu

The context menu allows to display, hide or customize all available toolbars. The context menu can be opened by a right-click into the toolbars or menu bars.

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



Customizing toolbars

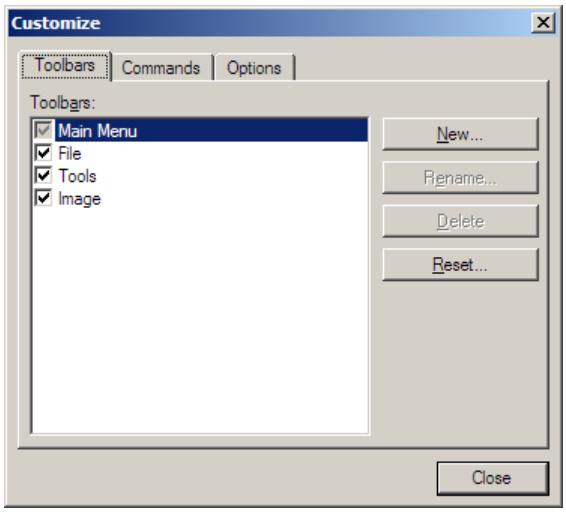
Using the context menu, the **Customize** window with three tabs can be opened to adjust the toolbars.

Continued on next page ...

... Continuation: Toolbars

"Toolbars" tab

The following figure shows the **Customize** 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 can be shown or hidden by using the checkbox.
New...	Opens a dialog window to create a new toolbar
Rename...	Opens a dialog window to rename 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) can be reset.

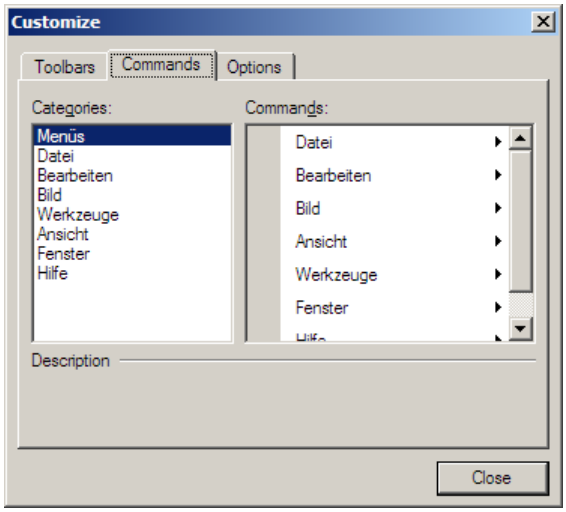
Continued on next page ...

... 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 can be deleted or moved via Drag & Drop.

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



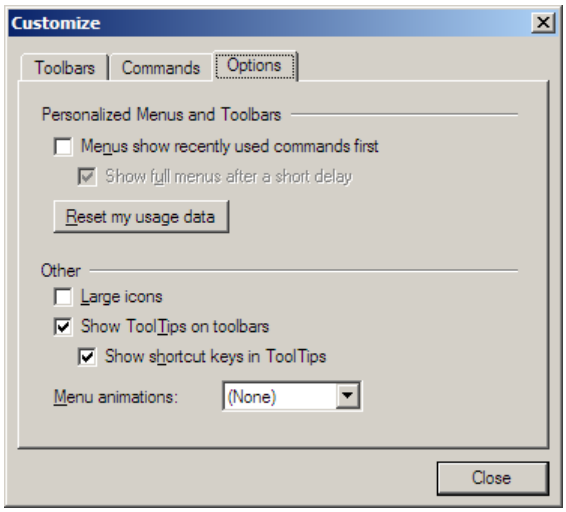
The following table contains information on the components of the **Commands** tab:

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

Continued on next page ...

“Options” tab

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

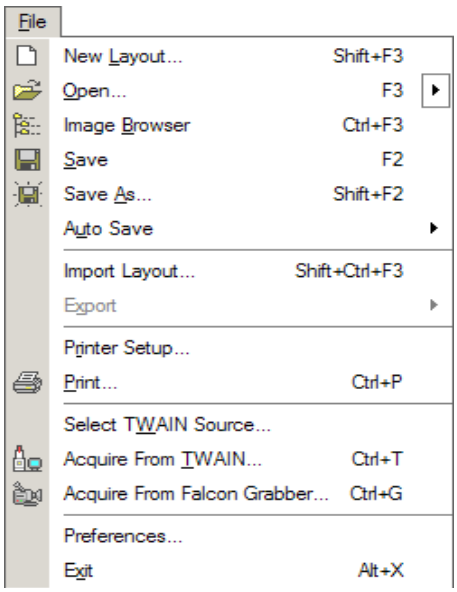


The following table contains information on the components of the **Options** tab:

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 tool bars
– 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 ⇧+F3	Opens a dialog window for creating layout templates. (Page 2-2) A layout template consists of several empty fields in which different images can be arranged.
Open F3	Opens the **Load Image** 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 Ctrl+F2	Opens the visual image management where saved images are displayed in a preview. (Page 2-3)

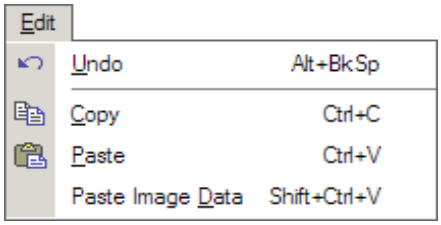
Continued on next page ...

... Continuation: File menu

Component	Function
Save F2	Saves the active image window or layout window. If the active image or layout has not previously been saved, the **Save Image** window opens.
Save as... ⇧+F2	Opens the **Save Image** window. Images and layouts can be saved with another name in specific folders. (Page 2-4) Images and layouts can 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 2-6)
Import Layout... ⇧+Ctrl+F3	Can only be used in combination with AutoSEM
Export	Exports pointscan or linescan data acquired from the DIPS TWAIN source to ASCII or Excel format
Printer Setup...	Opens a dialog window for selecting or configurating the connected printers
Print... Ctrl+P	Opens the **Print** window with functions to prepare and execute the printing of the active image or layout. (Page 2-7)
Select TWAIN Source...	Shows all available TWAIN sources. One source can be selected as standard.
Acquire from TWAIN... Ctrl+T	Opens the standard TWAIN source for acquiring images or layouts
Acquire from Falcon Grabber... Ctrl+G	Opens the TWAIN source for acquiring analog video signals (e.g. from an optical microscope) with a frame grabber card
Preferences...	Opens the **Preferences** window for setting user-specific defaults (Page 2-9)
Exit Alt+X	Closes the application

Edit menu

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

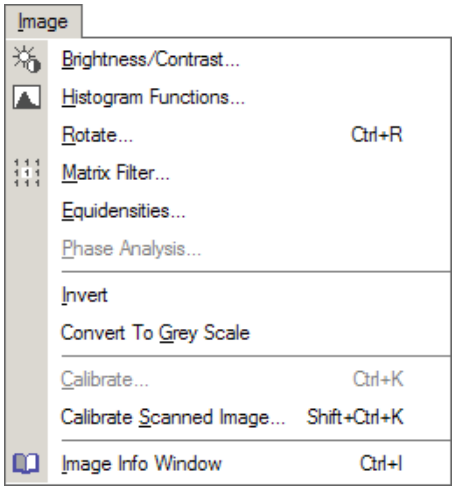


Function The following table contains information on the components of the Edit menu:

Component	Function
Undo Alt + ←	Undoes the last action
Copy Ctrl + C	Copies the selected image to the clipboard of the computer
Paste Ctrl + V	Pastes an image from the clipboard into a new image window
Paste Image Data ⇧ + Ctrl + V	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 to adjust brightness and contrast (Page 3-2)
Histogram Functions...	Opens a dialog window to adjust functions for modifying the histogram (Page 3-3)
Rotate... Ctrl+R	Opens a dialog window to rotate the selected image (Page 3-5)
Matrix Filter...	Opens a dialog window to adjust different filters (Page 3-6)
Equidensities...	Opens a dialog window to set and dye several gray areas of an image (Page 3-8)
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

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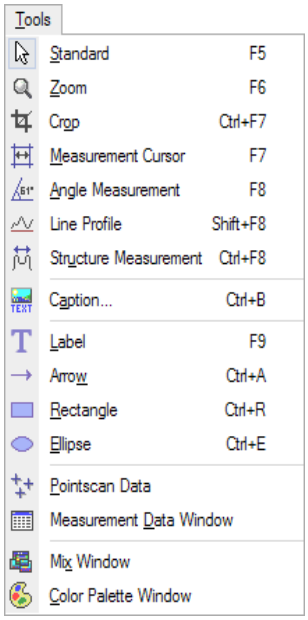
... Continuation: Image menu

Component	Function
Calibrate... Ctrl+K	Opens a dialog window to calibrate DIPS (Page 3-12) This function is only available in the Measurement mode.
Calibrate Scanned Image... ⇧+Ctrl+K	Opens a dialog window to calibrate images acquired with another source (e.g. frame grabber or scanner) (Page 3-14)
Image Info window Ctrl+I	Opens a dialog window that shows information saved with the active image (Page 3-15)

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 F5	Switches to Standard mode. Zoom mode and Measurement mode will be deactivated. Drag & Drop is only available in the Standard mode.
Zoom F6	Activates the Zoom mode (Page 4-2)
Crop Ctrl+F7	Crops rectangular sections from the selected image (Page 4-3)
Measuring Cursor F7	Activates the Measurement mode (Page 4-4)
Angle Measurement F8	Activates the Angle Measurement mode (Page 4-6)
Line Profile ⇧+F8	Activates the Line Profile Measurement mode (Page 4-7)

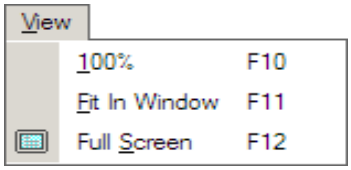
Continued on next page ...

... Continuation: Tools menu

Component	Function
Structure Measurement Ctrl+F8	Activates the Structure Measurement mode (Page 4-8)
Caption... Ctrl+B	Opens a dialog window to create an image caption (Page 4-10)
Label F9	Entering text on any position in the image (Page 4-13)
Arrow Ctrl+A	Labeling Tool: Creates an arrow on any position in the selected image (Page 4-15)
Rectangle Ctrl+R	Labeling Tool: Creates a rectangle on any position in the selected image (Page 4-15)
Ellipse Ctrl+E	Labeling Tool: Creates an ellipse on any position in the selected image (Page 4-15)
Pointscan Data	Actives the display mode for pointscan data (Page 4-18) This mode is only available if the system is equipped with the DDEPlus option and if the selected image contains pointscan data.
Measurement Values window	Opens the **Measurement Values** window in which the measured distances, radii and angles of the selected image are displayed as tables. The data can be saved either as XLS, HTML or TXT format (Page 4-21)
Mix Window	Opens a dialog window to dye and mix images (Page 4-22)
Color Palette window	Opens the Color Palette window. Via Drag & Drop, a color palette can 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:

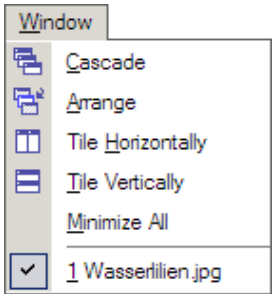


Function The following table contains information on the components of the View menu:

Component	Function
100% F10	Displays the current image or layout in standard view. One screen pixel corresponds to one image pixel.
Fit in Window F11	Fits the current image or layout into the image window while maintaining the aspect ratio.
Full Screen F12	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 bottom 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 F1	Opens the help file
Registration...	Opens the **Registration** window to enter registration information. This information can be sent to point electronic GmbH via email or can be saved as TXT file.
About...	Opens a window with copyright information, software version and serial number

(Empty page for technical reasons.
Include in double-page printings or copies!)

2 Functions in the File menu

Chapter overview

Purpose This chapter contains descriptions of selected functions in the File menu.

Table of Contents This chapter contains the following information:

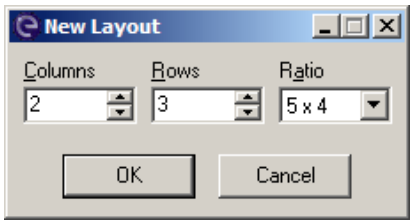
New Layout

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** window in which new layout templates for the arrangement of several images can be created.

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



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

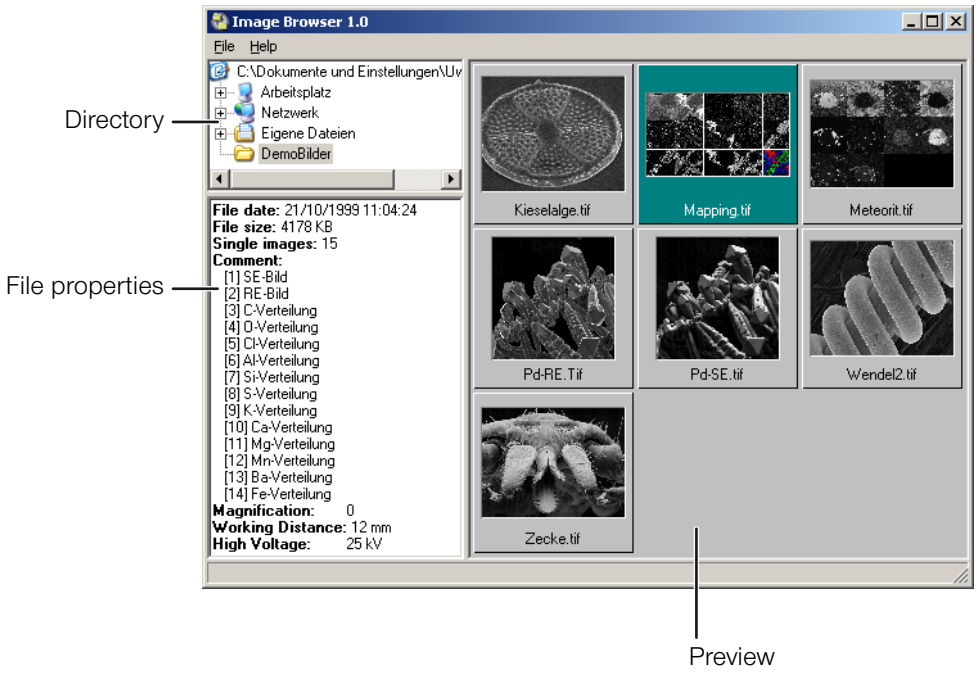
Component	Function
Columns	For entering a preferred number of columns for a layout template
Rows	For entering a preferred number of rows for a layout template
Ratio	For entering a preferred aspect ratio of a layout template
OK	Closes the dialog window. A new layout template is generated with the given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

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:

Main component	Function
Directory	Displays disk drives and folders of the computer
File properties	Displays information saved with a selected image
Preview	Displays thumbnails and file names of the images in a selected folder

Save as...

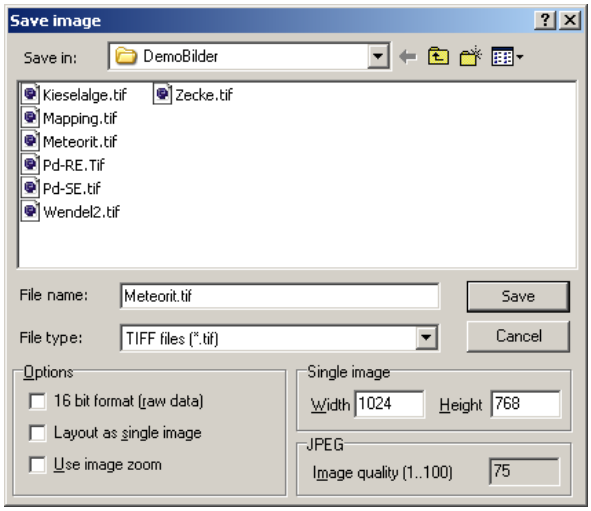
Description With the Save as... function, selected images or layouts can be saved under a different name in the following file formats:

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

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

This function opens the **Save Image** window.

Structure The following figure shows the **Save Image** window with its main components:



Continued on next page ...

... Continuation: Save as...

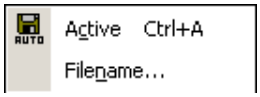
Function The following table contains information on the main components of the **Save Image** window:

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 can 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	Adjusts width and height of an image in pixels
JPEG	Adjusts the quality of the image 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 allows 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:

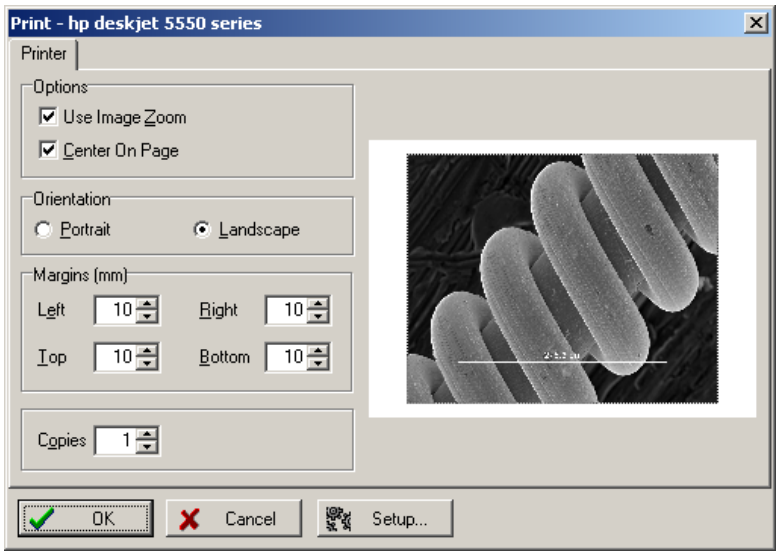
Component	Function
Active Ctrl+A	Activates the Auto Save mode
File name...	Opens the file name window for choosing a file name and to set saving options This dialog window is basically the same as the **Save Image** window (Page 2-4). In the **Options** field, a **Close image automatically** function 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** window.

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



Function The following table contains information on the components of the **Print** 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. 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

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... Continuation: Print...

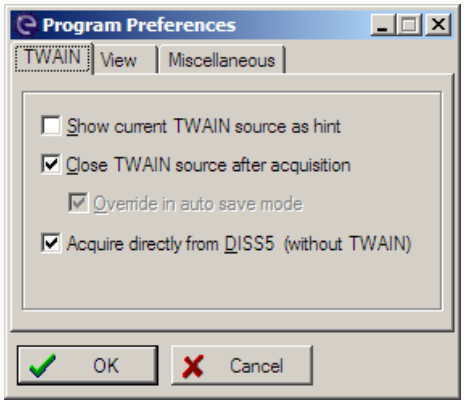
Component	Function
OK	Closes the dialog window. The image is printed with the adjusted settings
Cancel	Closes the dialog window. The image is not printed. The adjusted settings are rejected.
Setup	Opens a dialog window for selecting and configuring the printer

Preferences...

Description With the Preferences function, some user-specific defaults for DIPS can be set.

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

"TWAIN" tab The following figure shows the **Preferences** 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 selected 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 opened until the image acquisition is canceled. This mode allows to acquire several images one after another and to deliver them to DIPS 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 the direct transfer of DIPS data If a version is available, it will be opened automatically as soon as the **Acquire from TWAIN...** function is applied without using the TWAIN source. If the DIPS button **| Send to DIPS |** is pressed, the current image is transferred to DIPS.

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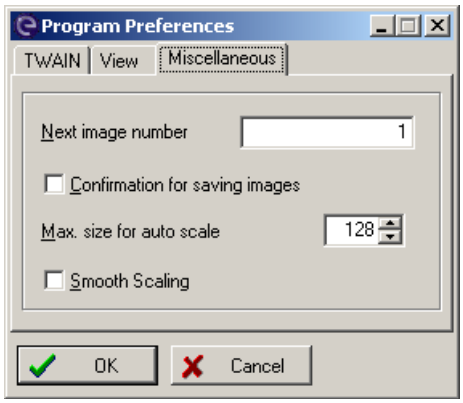
... Continuation: Preferences...

"View" tab

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

"Miscellaneous" tab

The following figure shows the **Preferences** 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
Confirm 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. This function should always be activated.
Max. size for auto scale	When an image is acquired from the DIPS 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 if they will be provided with a caption under each image. The automatic scaling can be prevented if the value "0" is entered in this field.
Smooth Scaling	Activates an interpolating procedure used for automatic scaling. Otherwise, the image is scaled with a simple pixel duplication.

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... Continuation: Preferences...

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

Fig. 1) No Scaling

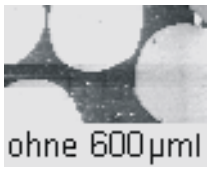


Fig. 2) Standard Scaling

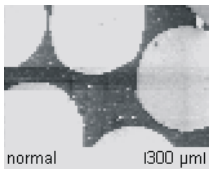
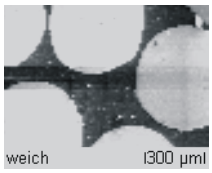


Fig. 3) Smooth Scaling



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Include in double-page printings or copies!)

3 Functions in the Image menu

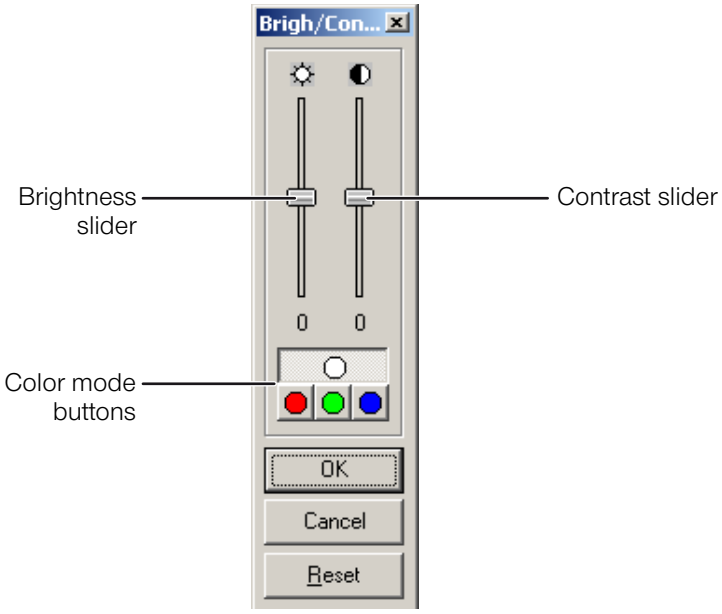
Chapter overview

Purpose This chapter contains descriptions of selected functions in the Image menu.

Table of Contents This chapter contains the following information:

Brightness/Contrast...

Structure The following figure shows the **Brigh/Con** window with its main components:



Function The following table contains information on the main components of the **Brigh/Con** window:

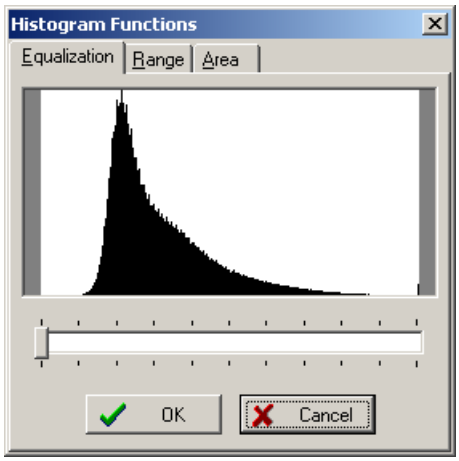
Main component	Function
Brightness slider	Modifies the brightness of the selected image within a range of -100% to +100%
Contrast slider	Modifies the contrast of the selected image within a range of -100% to +100%
Color mode buttons	Selects a color mode (gray scales, red, green or blue) for which the values of brightness and/or contrast can be adjusted
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** window with three tabs containing several functions to change the histogram of a selected image.

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



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

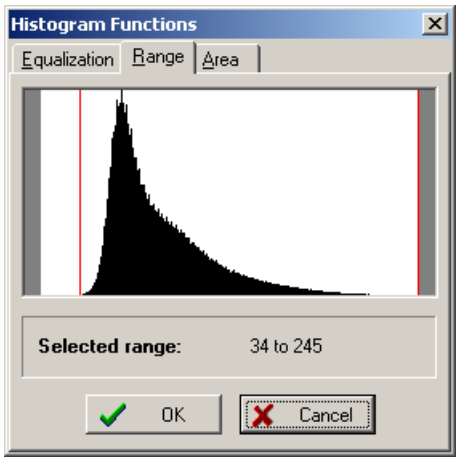
With the slider, the intensity of the histogram equalization can be adjusted within a range from 0% to 100%. After recalculation, these modifications will instantly be visible in the histogram as well as the image. As these recalculations might take some time with larger images, the status will be displayed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

Continued on next page ...

... Continuation: Histogram Functions...

"Range" tab

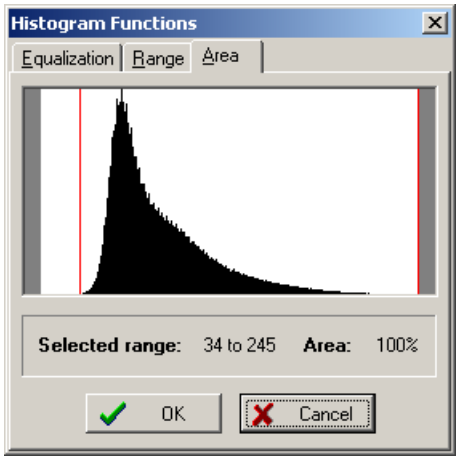
The following figure shows the **Histogram Functions** window with the **Range** tab:



Using the mouse, the two red bars from the right and/or left edge can 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

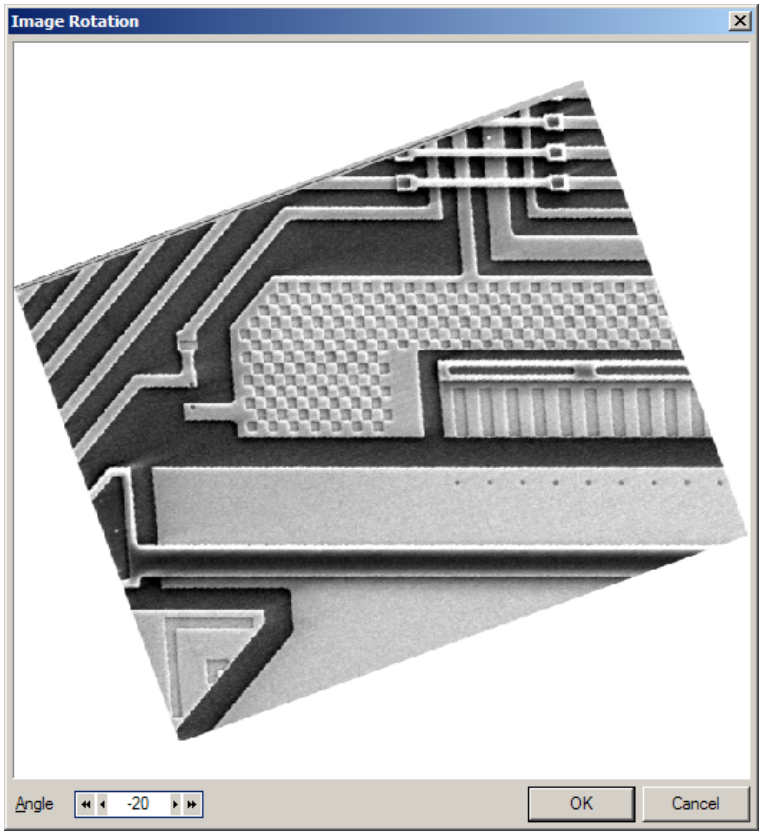
The following figure shows the **Histogram Functions** window with the **Area** tab:



Using the mouse, the two red bars from the right and/or left edge can 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** with its components:



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

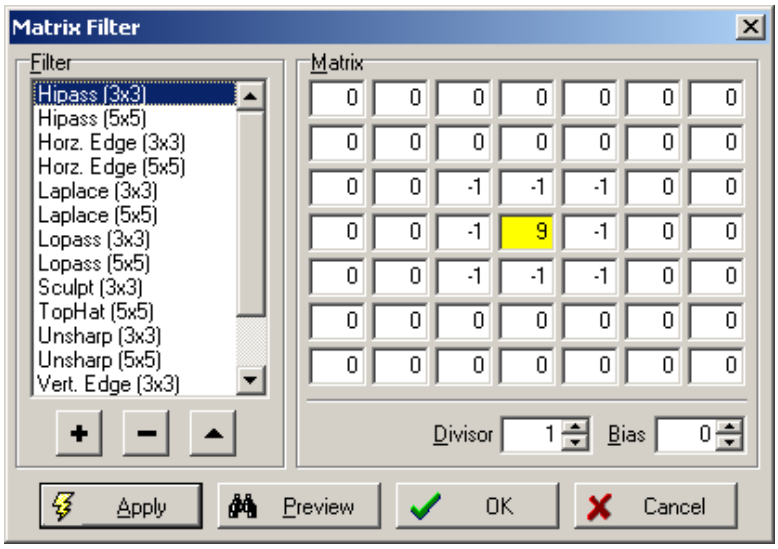
Component	Function
Angle	For entering an angle around which the image is rotated
– Arrow buttons	Raise or lower the value of the angle in single steps
– Double arrow buttons	Raise or lower the value of the angle in steps of ten
OK	Closes the dialog window The image is rotated with the entered value.
Cancel	Closes the dialog window The entered 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** window, existing filters can be selected or modified, and new filters can be defined.

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



Continued on next page ...

... Continuation: Matrix Filter...

Function The following table contains information on the components of the **Matrix Filter** 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 can 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
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.

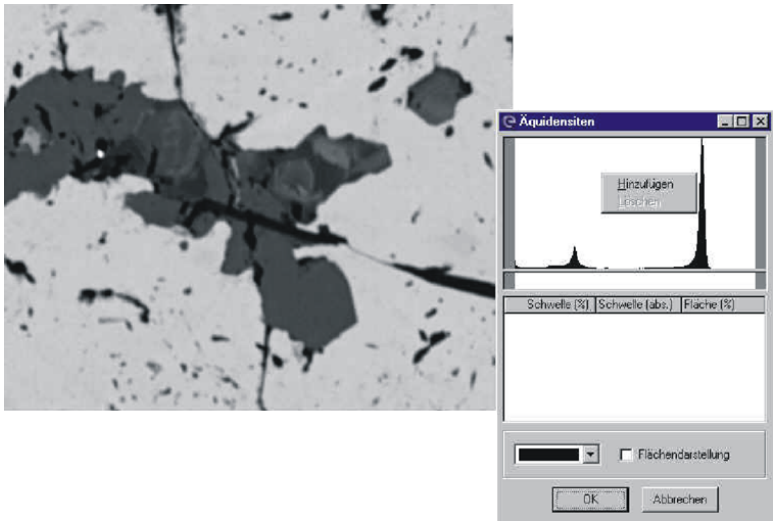
Equidensities...

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

Equidensities can 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** window. There, one gray value range can be selected and its percentage calculated. With the Equidensities function, several gray value ranges can be defined and allocated to different colors. The percentages of each area will also be calculated.

Fig. 1) Original image and Equidensities window



Continued on next page ...

... Continuation: Equidensities...

Fig. 2) Equidensities as area display

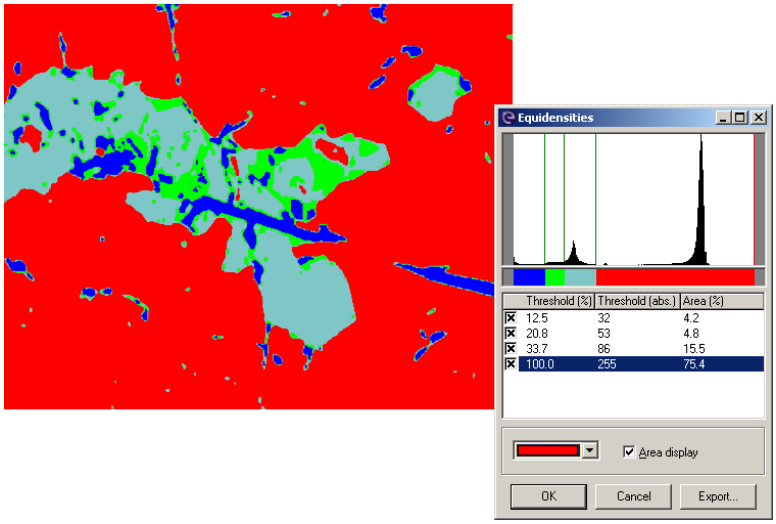
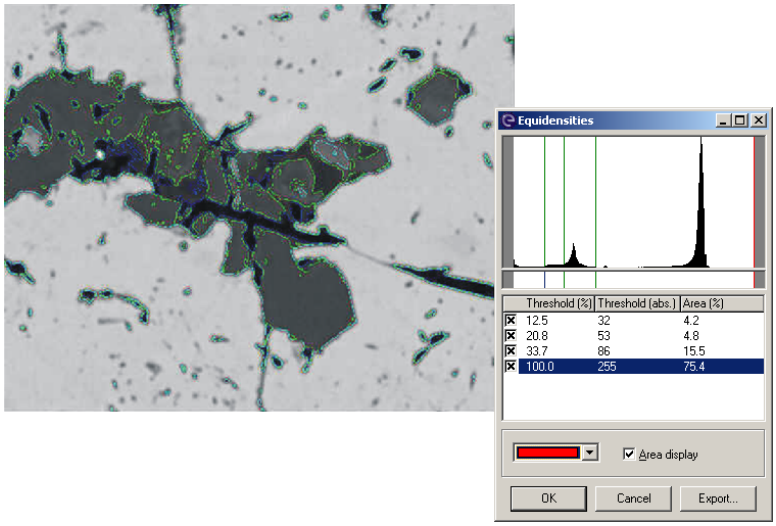


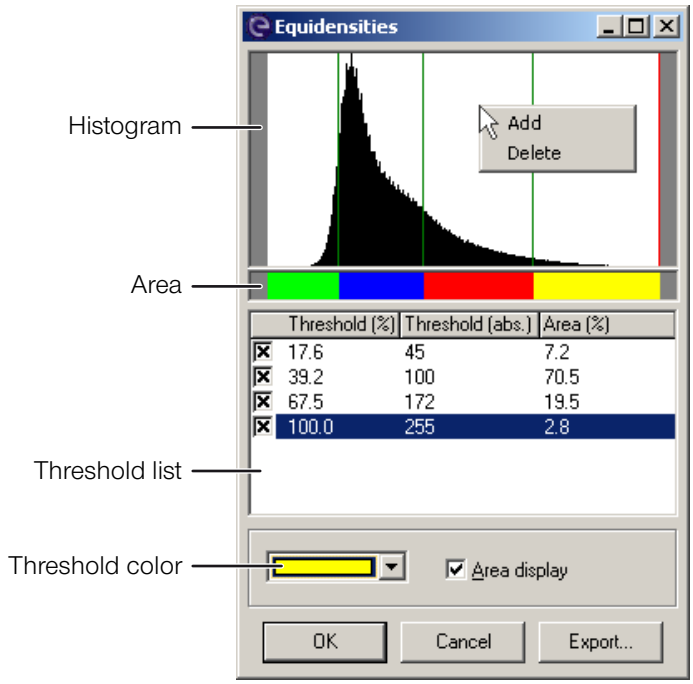
Fig. 3) Equidensities as dotted graphic



Continued on next page ...

... Continuation: Equidensities...

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



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

Component	Function
Histogram	Displays the distribution of gray scales in the selected image: – left: 0=black – right: 255=white A right-click into the histogram opens a context menu with two functions: – **Add**: Adds a new threshold to the histogram. A vertical bar is displayed It can be shifted with the mouse to set the threshold. – **Delete**: Deletes the selected threshold All activated thresholds are displayed as vertical bars. All bars can be moved with the mouse to readjust the thresholds.
Area	Displays a threshold in the selected color

Continued on next page ...

... Continuation: Equidensities...

Component	Function
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 into the threshold list opens a context menu with two functions: – **Add**: Opens the **New Threshold** window with two input fields to define the percentage or the absolute position of a new threshold – **Delete**: Deletes the selected threshold
Color field	Assigns a color to the selected threshold
Area display	Colors 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. 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** window to export the threshold list as an XLS file.

Calibrate...

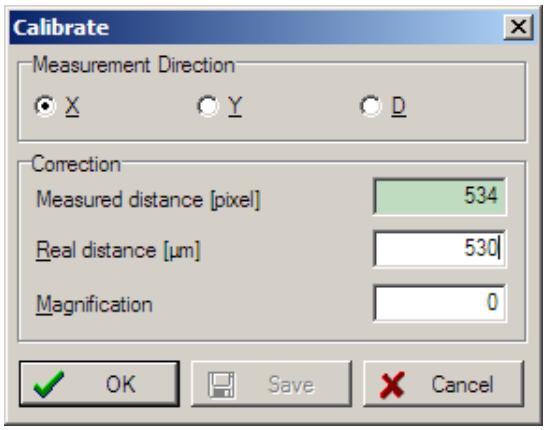
Description The Calibrate function is only available in the Measurement mode.

With this function, DIPS can 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 the Measurement mode, the corresponding vertical or horizontal Measuring Cursors are placed on these structures.

The function opens the **Calibrate** window.

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



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

Component	Function
Measurement Direction	Contains checkboxes **X, Y** for the selection of the measuring 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 pixel

Continued on next page ...

... Continuation: Calibrate...

Component	Function
– 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.
Save	Closes the dialog window All settings are saved. This button should only be clicked after the calibration of DIPS.
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 can also be calibrated later. For this, the Measuring 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.

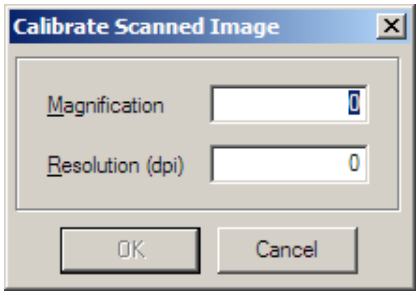
If the system was calibrated after installation, the **| Save |** button must not be clicked when recalibrating an image. Clicking this button would override the calibration.

Calibrate Scanned Image...

Description The Calibrate Scanned Image... function is used to calibrate images not acquired from the DIPS 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** window.

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



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

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

Image Info window

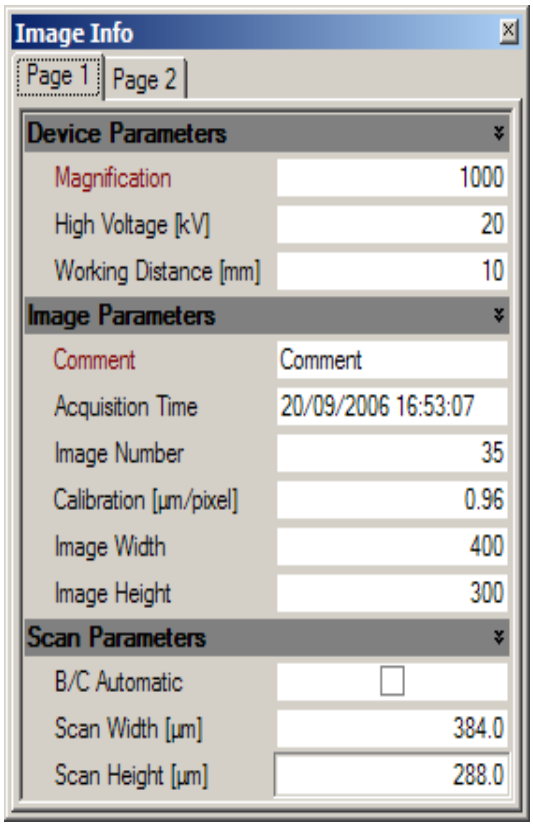
Description The Image Info window displays information saved with the current image. In the window, the information is grouped as hardware, image and scan parameters.

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

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

This function opens the **Image Info** window with two tabs.

Structure The following figure shows the **Image Info** window:



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4 Functions in the Tools menu

Chapter overview

Purpose This chapter contains descriptions of selected functions in the Tools menu.

Table of Contents This chapter contains the following information:

Zoom

Description The Zoom function activates the 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 the 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

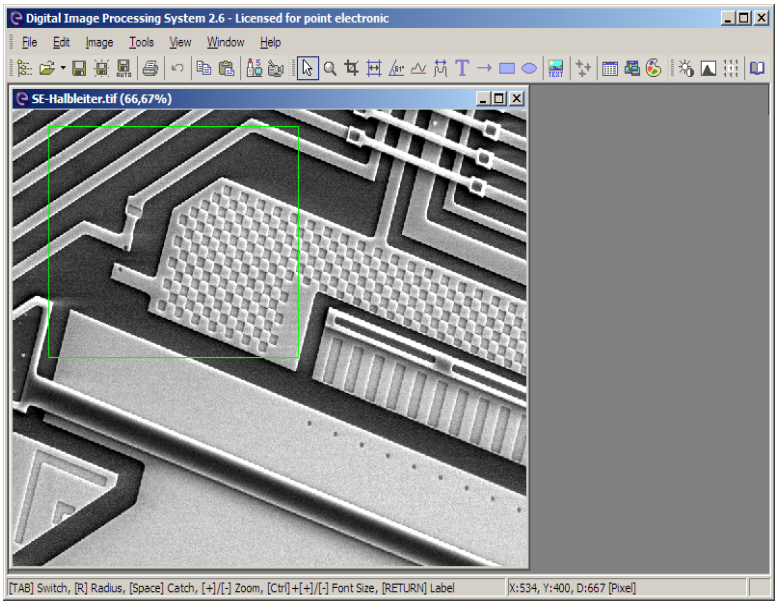
Description

The Crop function allows to crop a rectangular section from the image. The cropped sections can 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 ↵ key, a new image with the data of the selected section will be created.

The following figure shows the Crop function:



Measuring Cursor

Description The Measuring 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 Measuring Cursor.

Measurement values 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 the DIPS software are automatically calibrated provided the SEM magnification has been entered or automatically read-out after the image acquisition.

The double cross Measuring Cursor can be positioned with the mouse. Lines or corners of the Measuring Cursor can 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 Measuring Cursor in the active image section.

In high resolution images, the Measuring Cursor can easily be positioned when zooming the image. With the + and - keys of the numeric keypad, the zoom can be changed in the Measuring mode.

While directly switching from Measuring to Zoom mode, the deactivated Measuring Cursor will remain visible. Thus, the relevant image section can be zoomed before switching back to Measuring mode for positioning the Measuring Cursor.

The highlighted measuring length of the Measuring Cursor including the dimensioning can be added to the image. Pressing the ↵ key opens the **Caption** window (Page 4-13) for entering the standard caption.

Continued on next page ...

... Continuation: Measuring Cursor

When pressing the ⇆ key, another measuring length of the Measuring Cursor will be selected for a caption.

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

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

A confirmed caption 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 caption can 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 can be modified. The nearest point will be caught.

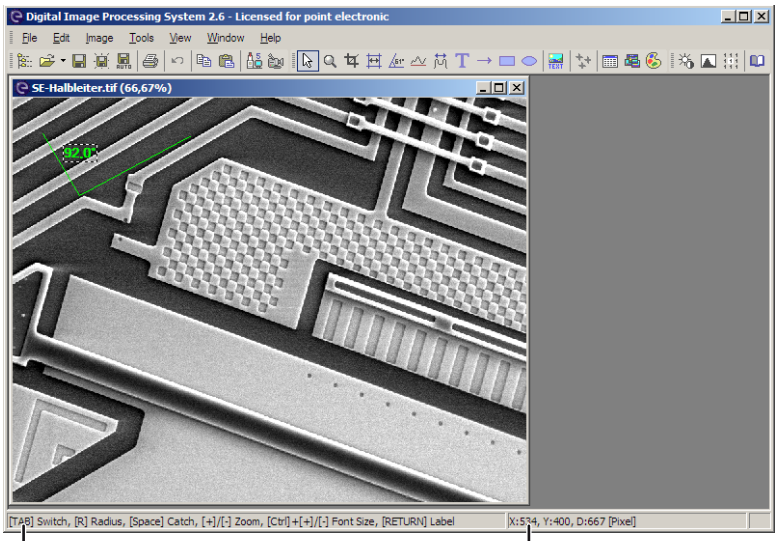
Use the mouse to move the angle caption to another position. To modify the font size, use Ctrl++ or - on the numeric keypad.

By pressing the ↵ key, the shown angle is integrated into the image. The **Caption** window (Page 4-13) opens where you can confirm or change the angle caption.

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

- Description of the buttons for angle measurement settings including function
- Size of the currently measured angle

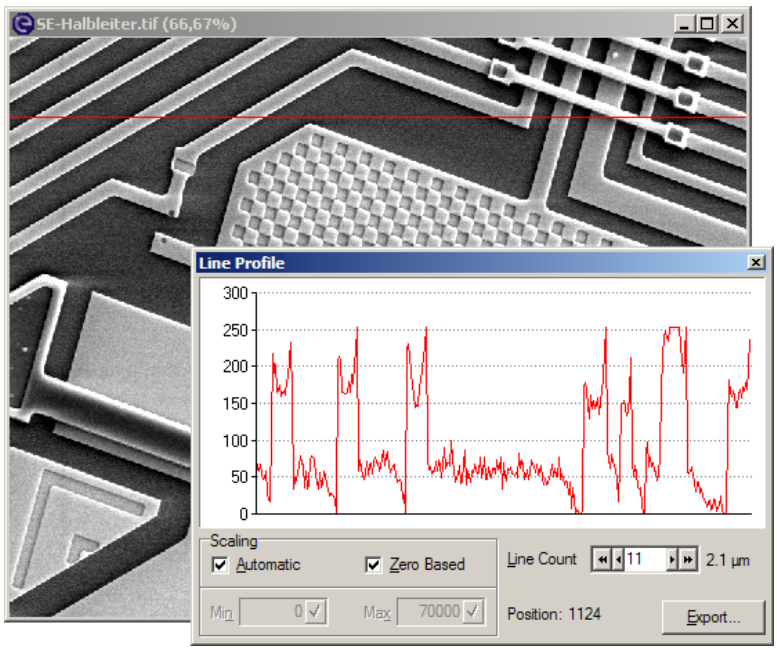
The following figure shows the angle measurement:



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** window with its components:



Function The following table contains information on the components of the **Line Profile** 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 values as CSV format

Structure Measurement (optional)

Description

The Structure Measurement allows measurements in a SUB pixel range. Measurements can be averaged over one or several lines.

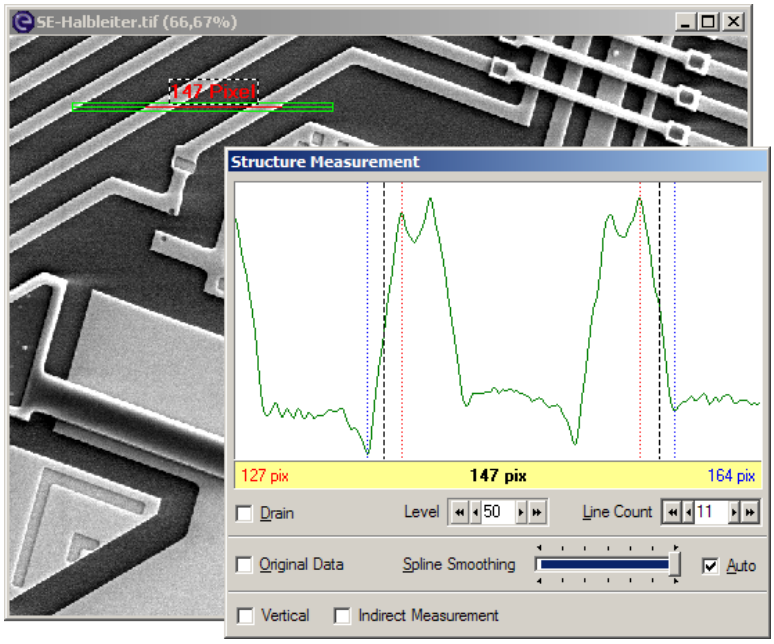
After the activation of Structure Measurement, a measuring line can be put into the image. To do this, starting point and endpoint have to be marked with the mouse.

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

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

Structure

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



Continued on next page ...

... Continuation: Structure Measurement (optional)

Function The following table contains information on the components of the **Structure Measurement** 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
Threshold	Sets the threshold value in single steps or steps of ten
Line Count	Sets the number of the measuring lines in the measuring area. This expands the measuring area in vertical direction.
Original Data	Displays, in addition, 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 can be integrated into the active image.

Pressing the [↵] key opens the **Caption** window. (Page 4-13)

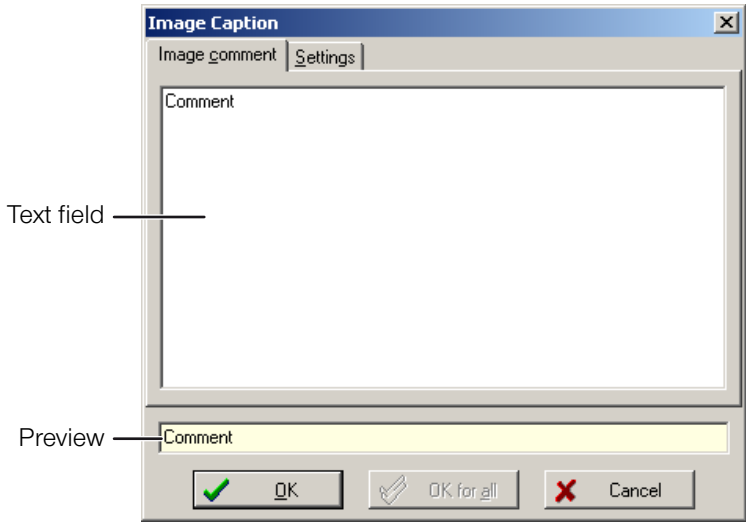
Caption...

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

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

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

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



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

Component	Function
Text Field	For entering, editing and showing 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.
Preview	Displays a preview of the comment text in the active image

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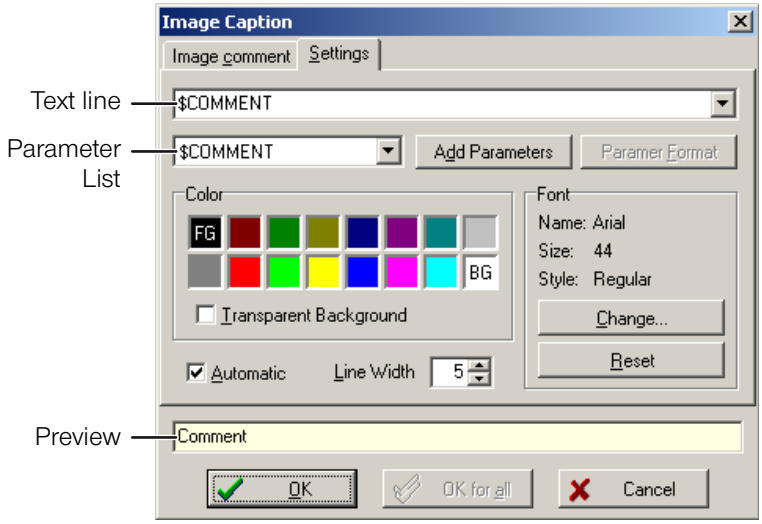
... Continuation: Caption...

"Settings" tab

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



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

Component	Function
Text line	Displays the selected parameter in the given order and the freely definable image comment
Parameter List	Contains all parameters which are available for the image caption
Add Param.	Adds the selected parameter to the text line
Parameter Format	Opens a dialog window to edit 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

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... Continuation: Caption...

Component	Function
Line width	For setting the width of the measuring bar in pixels
Font – Change ... – Reset	Contains information on the used font and functions to change and/or reset the font Opens a dialog window to adjust some font properties Resets the font properties to the default
OK	Closes the dialog window The image caption is displayed with the adjusted settings in the selected image. 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 adjusted settings in all images of a selected layout. This process can only be canceled for the last image of a layout. This function is only available if a layout window with several images is selected on the DIPS surface.
Cancel	Closes the dialog window. The entered values are rejected.

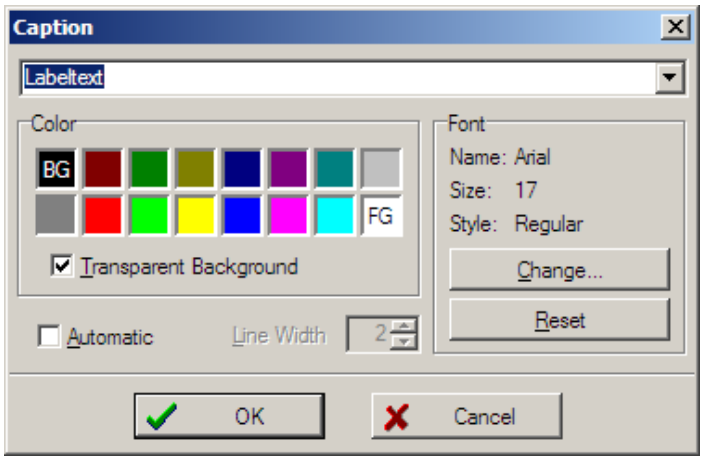
Label

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.

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

The function opens the **Caption** window.

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



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

Component	Function
Text line	For entering a caption 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

Continued on next page ...

... Continuation: Label

Component	Function
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 change and/or reset the font
– Change ...	Opens a dialog window to adjust font properties
– Reset	Resets the font properties to the default
OK	Closes the dialog window The comment is displayed with the adjusted settings in the active image. Use the mouse to move the text to another position. The Labeling mode only ends when another mode is activated.
Cancel	Closes the dialog window. The entered values are rejected.

Labeling tools

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

The following table contains information on the available labeling 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 can be set. Length, position and angle of an inserted arrow can be modified by clicking the red intersections with the mouse. Pressing the ↵ key opens the Pen Settings window to adjust line color and line width 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 can be set. Width and height of the rectangle can 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 can be changed. Pressing the ↵ key opens the Pen Settings window to adjust line color and line width of the rectangle.

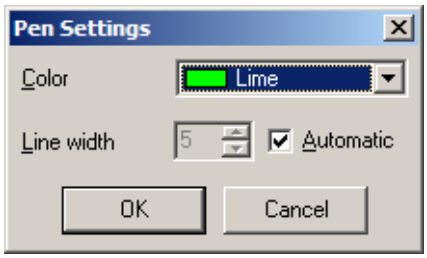
Continued on next page ...

... Continuation: Labeling tools

Icon	Tool	Function
	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 can be set. Width and height of the ellipse can 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 can be changed. Pressing the ↵ key opens the Pen Settings windows to adjust line color and line width of the ellipse.

"Pen Settings" window

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



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

Component	Function
Color	Sets the line color of the drawn element
Line width	Sets the line width of the drawn element
Automatic	Automatically adjusts the line width to the resolution of the active image

Continued on next page ...

... Continuation: Labeling tools

Component	Function
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 changed.
Cancel	Closes the dialog window. The entered values are rejected.

Pointscan Data

Description

The Pointscan Data function activates the display mode for pointscan data.

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

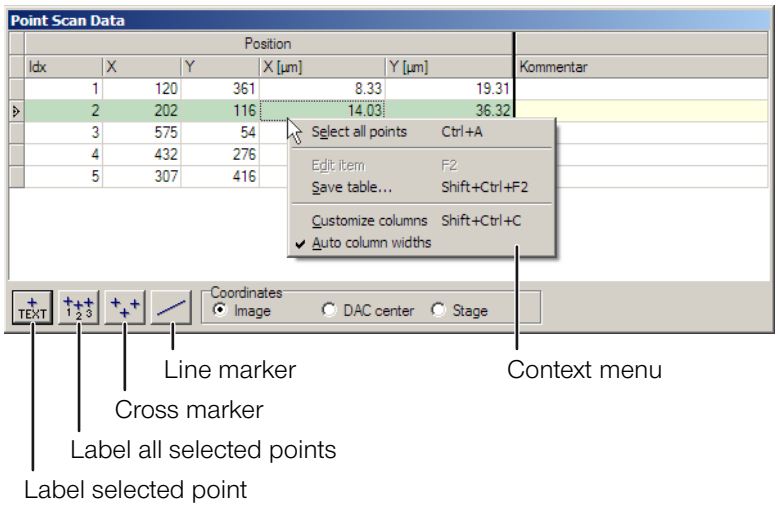
A right-click into the pointscan data table opens a context menu with edit options for the following functions:

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

The function opens the Pointscan Data window.

Structure

The following figure shows the **Pointscan Data** window with its components:



Continued on next page ...

... Continuation: Pointscan Data

Function The following table contains information on the components of the **Pointscan Data** window:

Component	Function
Label selected point	– Marks and labels the point of the image which is selected in the table. – Opens the **Caption** window to adjust the caption settings.
Label all selected points	– Marks and labels all 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 **Caption** window to adjust line width and the color of the marker.
Select all points	– Shows all points in the image The point selected in the table will be highlighted. – Opens the **Caption** window to adjust line width and the color of the marker.
Line marker	– Connects the first and last point with a line. – Opens the **Caption** window to adjust 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	

Continued on next page ...

... Continuation: Pointscan Data

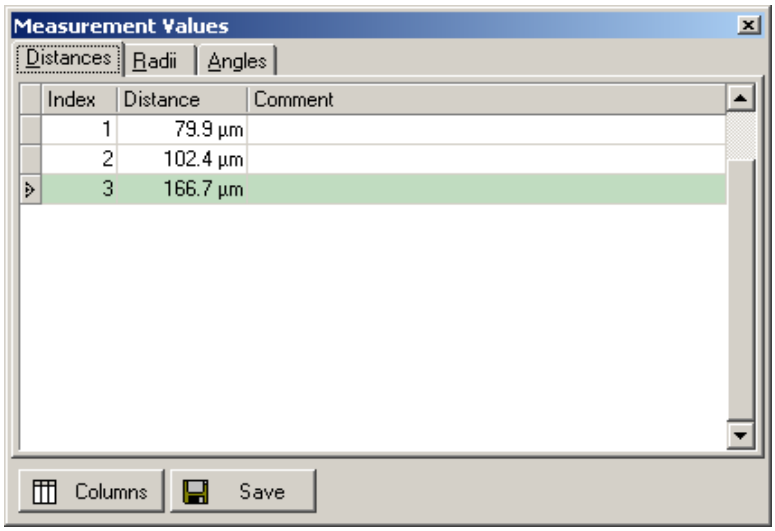
Component	Function
– Select all points Ctrl+A	Selects all points listed in the table
– Edit item F2	For editing a point which is selected in the table
– Save table ⇧+Ctrl+F2	Opens a dialog window for saving the table as XLS, CSV or HTML format
– Customize columns ⇧+Ctrl+C	Opens the **Customizing** window with two tabs to customize the columns
– Auto column widths	Adjusts 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 can be saved either as XLS, HTML or TXT.

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

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



Function The following table contains information on the components of the **Measurement Values** 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** window to customize the table columns
Save	Closes the dialog window All displayed measurement values are saved as tables in XLS, HTML or TXT format.

Mix Window

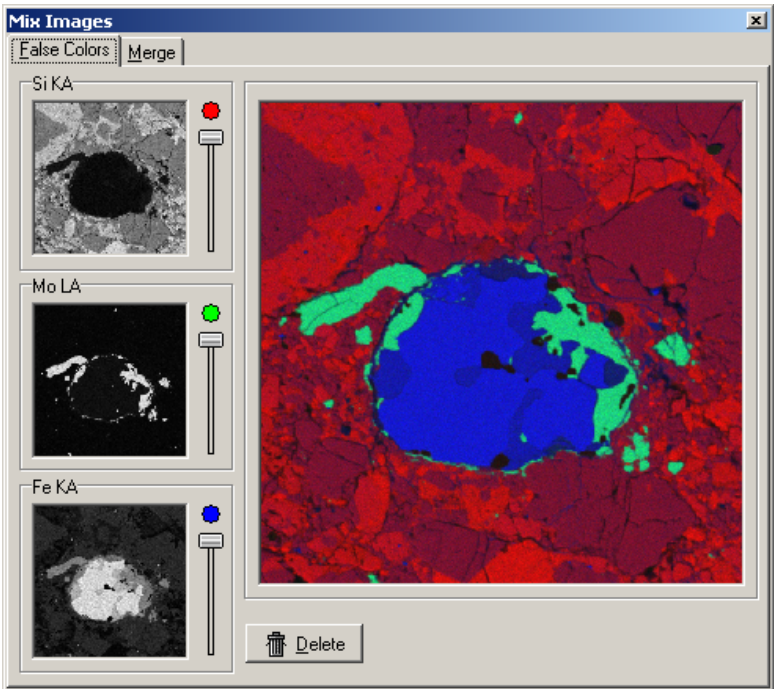
Description

The Mix Window function allows to overlay images, combine images to false color images or color images.

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

"False Colors" tab

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



In the **False colors** tab, elemental mapping images can be overlaid or combined to false color images.

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

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.

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

The colors can be adjusted with the sliders.

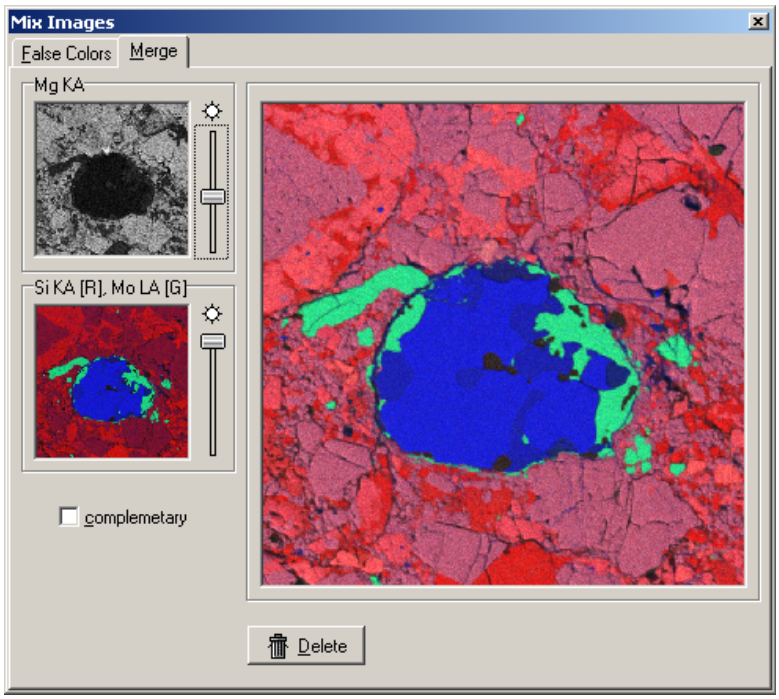
Continued on next page ...

... Continuation: Mix Window

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

"Merge" tab

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



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

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 can be mixed.

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

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

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... Continuation: Mix Window

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

List Of Abbreviations

ASCII	American Standard Code for Information Interchange (character encoding)
AUX	Auxiliary
Avg.	Averaging
AVI	Audio Video Interleave (File format)
BMP	Windows Bitmap (File format)
BNC	Bayonet Nut Connector
BSE	Back Scattered Electron
CL	Cathodoluminescence (Signal)
CSV	Character-Separated Values (File format)
DIPS	Digital Image Processing System
DISS	Digital Image Scanning System
DOC	Document (File format)
EDX	Energy Dispersive X-ray Spectroscopy
EMPA	Electron Microprobe Analyzer
GIF	Graphics Interchange Format (File format)
HTML	Hypertext Markup Language
HV	High Voltage
JPG (JPEG)	Joint Picture Expert Group (File format)
LED	Light Emitting Diode
Mag	Magnification
Param.	Parameter
PNG	Portable Network Graphics (File format)
ROI	Region Of Interest
RTF	Rich Text Format (File format)
SE	Secondary Electron
SEM	Scanning Electron Microscope
STEM	Scanning Transmission Electron Microscope
TIF (TIFF)	Tagged Image File Format (File format)
TWAIN	Tool Without An Important Name (Standard for data exchange with image acquisition devices)

TXT	Text (File format with plain text)
WD	Working Distance
WDX	Wavelength Dispersive X-Ray Spectroscopy
XLS	Microsoft Excel (File format)

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