

OLYMPUS

User Manual

**3 MegaPixel CMOS Color Camera
for Light Microscopy**

SC30

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Printed in Germany
SC30_EN_07April2009

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The SC30 Camera.....	5
Image Acquisition Software getIT	7
Camera and light microscope.....	8
White Balance	8
Monitor Settings for White Balance	9
Executing White Balance	9
The (GUI) User Interface of getIT	10
Acquiring and saving images	13
Set Input	14
Acquire Image	16
Define calibration	20
Apply calibration	23
Save As	24
Image Information	25
Additional commands.....	27
Open	27
Print Directly	29
Print Setup...	30
Print...	31
File list	32
Exit	33
Scale Bar, Show in Viewport	33
Scale Bar, Burn into Image	33
Delete Image	34
Image Manager	34
Status Bar	34
Standard Button Bar	35
About...	35
Appendix I:	
Microscope settings	37
Illumination	37
Objective, Total Magnification and Useful Magnification	39
Appendix II:	
Installing the camera	41
General Warnings	41
Before the installation	42
USB 2.0 interface	42
Installing the camera with Windows XP	44
Installing the camera with Windows Vista	52

Appendix III: In case of problems with the camera.....	59
Appendix IV: WEEE declaration.....	61
Appendix V: EMC declaration - SC30	62
Appendix VI: RoHS declaration - SC30	63
Index	64

The SC30 Camera

What is the SC30? The SC30 is a quick, high resolution CMOS color camera used for biomedical and material sciences applications. It was especially developed for acquisitions using light microscopy, has a special compact design, and can be connected to all types of light-microscopes via the C-mount.

Technical data		SC30
Chip Type		CMOS
Chip Size	Inch	1/2
Effective Area, (H) x (V)	mm x mm	6.55 x 4.92
Pixel Size	$\mu\text{m} \times \mu\text{m}$	3.2 x 3.2
Binning		Color binning 2x, 3x, 4x
Resolutions (H) x (V)		
at full resolution	pixels	2048 x 1532
Color binning 2x	pixels	1024 x 768
Color binning 3x	pixels	680 x 512
Color binning 4x	pixels	508 x 384
Frame Rate in the resp. resolutions ¹⁾		
at full resolution	fps	10
Color binning 2x	fps	28
Color binning 3x	fps	37
Color binning 4x	fps	49
Analog to Digital Converter	Bit	10
Exposure times		61 μs - 1745 ms
PC-interface		USB 2.0
Camera Mount		Standard C-Mount

¹⁾ Under the following conditions:
Pentium D 3 GHz Hyperthreading, 1 ms exposure time

System Requirements To ensure that you can use your SC30 properly, the following system requirements for your PC and your software need to be met:

	Hardware / Software
Processor	Intel® Pentium D better than, or equal to, 3.0 GHz Intel® Xeon (DP / MP) Intel® Core™ Duo SSE2 compatible processor
System memory capacity (RAM)	512 MB
Hard disk Removable data media	30 GB hard disk space DVD-ROM
Monitor	1280 x 1024 resolution with 32-bit video card
Interface	USB 2.0 with Intel® 82801DB/DBM USB2 ENHANCED HOST CONTROLLER
Operating system	Microsoft Windows® XP Professional (32 Bit) SP2 Microsoft Windows® Vista (32 Bit)
Internet browser	Microsoft Internet Explorer 6.0 or higher

A certain minimum amount of performance will be required of the PC you use to drive your camera if the speeds specified are to be reached in the live mode. The hardware recommendations are based on typical systems and processors. These recommendations can't include all of the systems, resp. hardware combinations, that are possible.

Image Acquisition Software getIT

In addition to your camera, you have also received the image acquisition software getIT. The software offers the basic functions you need to acquire, view, calibrate, save, load, and print images.

For more complicated tasks, you can connect your camera to a special software environment for image analysis and management. Olympus offers you a wide range of imaging system solutions which can be adapted to your individual needs in many different fields of application in the areas of sciences, industry, and medicine. They provide you with much more possibilities than getIT as they enable integrated acquisition, processing, visualization, and analysis of images, as well as device control, automatization, administration, networking, database archiving, and the results documentation.

Warning



Install the image acquisition software getIT before connecting your camera to your PC. This is necessary so that the operating system does not install the wrong TWAIN camera driver. The TWAIN camera driver which is necessary for using the camera is installed together with the software. See page 13 for more information about TWAIN.

Installation of the software including the camera driver

The following step-by-step instructions outline the principles of a generic installation. You'll find more detailed step-by-step instructions in the appendix (see page 41). They apply for any camera.

- 1) Close any and all application programs.
- 2) Place the installation CD into your computer's CD-ROM drive.
 - ▶ The setup program will start automatically - unless you have deactivated the autorun function. If so, start the setup.exe file via Windows Explorer with a doubleclick.
- 3) An installation wizard guides you through the entire software installation. Simply follow the onscreen instructions and select the relevant entries. Select the camera you wish to use.
 - ▶ The TWAIN camera driver which is necessary for using the camera is installed together with the software.
- 4) After you have successfully installed your software, you may now connect your camera to your PC.
 - ▶ The camera driver is not signed and therefore not used automatically under your operating system. So you will have to register the camera driver with your operating system.
- 5) Doubleclick the getIT program symbol to start the software.
- 6) Within the image acquisition software click the **Set Input** button to check to see if the camera driver has been integrated successfully into the software.
 - ▶ Your camera driver has been integrated successfully if the camera is shown in the **Set Input** dialog box.
 - ▶ If your camera does not appear in the **Set Input** dialog box, click the **New Channel** button. Select your camera from the **Available devices** list and click **OK**. Your camera driver should now be integrated successfully.





- 7) Click the button with the cross located in the upper right corner of the Set Input dialog box to close it.

Camera and light microscope

Both the correct camera settings and the correct microscope settings are essential prerequisites for acquiring high quality images. The most important rules for the microscope settings are mentioned here; a more thorough explanation to the topic can be found in the appendix.

- 1) Use ND-filters to reduce the illumination intensity; do not alter the lamp voltage.
- 2) Establish Köhler illumination conditions.
- 3) Select the appropriate total magnification and the objective for the task in question.

White Balance

When using white balance, the individual color channels are scaled in a way that the white or neutral gray area of the image displayed on the monitor is displayed correctly as white or gray. The white balance can be carried out automatically on each image or manually for individual images.

Mode of operation Select an area on the image that is uniformly gray or white. Such an area contains an equal intensity of the three color components: red, green and blue. White balance sets the color channels in such a way that this requirement is satisfied in the best possible way for the area selected.

White balance is carried out on a part of the image (ROI). Your software alters the color settings in such a way that the image area in the ROI appears as white, resp. gray, as possible. After you have once carried out the white balance, you can reapply it any time, also to a running live-acquisition.

Automatic White Balance For the automatic white balance, a test image is acquired under optimal illumination conditions. The individual color channels are then set so that the acquisition also appears white or gray on the monitor. These channel settings are saved and used automatically for all additional acquisitions.

Separate White Balance You carry out a separate white balance on the current image. To do this, you should select an area in the image which is, for the most part, gray or white.

Microscope settings When you make an acquisitions prior to performing a white balance, your microscope's settings must be the same as those you use in normal practice. This especially holds true for the filter and the lamp voltage settings. The lamp voltage of a 12 V halogen lamp should be set to 9 V. It should, however, not be set lower than 5 V. Use the color neutral ND-filter, should you have to reduce light intensity.

Monitor Settings for White Balance

Monitor Settings The monitor settings are decisive for the image you see on the monitor. Set your monitor to the appropriate color temperature, should your device allow this. To do this, compare the image's color impression on the monitor and in the eyepiece.

Note



The color temperature setting can be altered on most monitors via the monitor menu buttons located on the monitor. In other cases, the color temperature can be altered via the operating system.

Changing the color temperature using the operating system

- 1) Right click on Desktop.
 - ▶ The Desktop's context menu is opened.
- 2) Select the entry **Properties** from the context menu.
 - ▶ The Display Properties dialog box is opened.
- 3) Select the **Settings** tab.
- 4) Click the **Advanced** button.
 - ▶ Another Display Properties dialog box is opened. The appearance and function of this dialog box depends on the graphics card installed on your system and your monitor.
 - ▶ Search for a tab with the name **Color** or **Color Management**.

Note



The appearance of the operating elements might differ from the one being described here because the adaptation of the color temperature is not part of the operating system, but rather is made accessible by the monitor manufacturer or the graphics card being used.

- 5) Select a color temperature whose color impression best corresponds to that seen in the eyepiece.
 - ▶ Should your system offer a slide control with the options **warm** and **cold**, do not alter your color temperature with these.

Executing White Balance

Specialized microscopy techniques	It may be difficult to execute a white balance in some microscopic methods, e.g. DIC or polarization. In these cases, execute the white balance using the bright field method and only then change to the special methods.
Transmitted Light	When using the transmitted light method, look for a position through which the light passes through the cover slip, embedding material, and microscope slide, but not through the specimen. Should such a position not exist, remove the sample and carry out the white balance without a sample.
Reflected light	When using the reflected light method, you need a reference surface. Standardized gray cards are best for this. Should one not be available, you can also use white laboratory porcelain or neutral ND-filter paper. Should your samples contain very reflective areas, defocus your microscope when setting the white balance.

The (GUI) User Interface of getIT

GUI The graphical user interface influences the appearance of a program. It determines which menus there are, how the individual functions can be called up, how and where files, e.g., images, are displayed, and much more. This chapter describes the basic elements of GUI.

Button bars The most important commands are linked to a button providing you with quick and easy access to them.

Menu bar Some commands can be accessed through the corresponding menu.

Status bar The status bar contains the name of the camera and the current zoom factor of the active image.

Image buffer box Your software assigns an individual image buffer to each image. When you start up your image acquisition software all available image buffers will be empty. While working with the program, you fill each individual image buffer by loading or acquiring images. This means that many images are simultaneously accessible during any given work session. Only one image buffer however, may be active at a time.

You can hide the image buffer box to create more room for other windows, for example: use the [Alt + 2] shortcut.

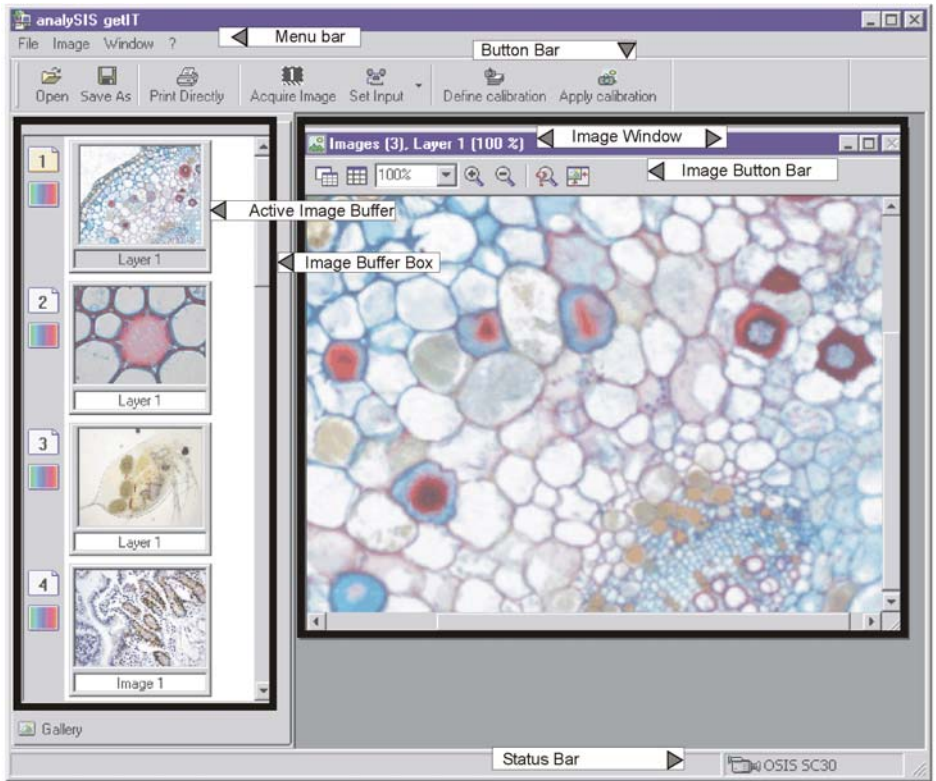
Image window The image window is a special window which enables you to view all of your loaded images. It is possible to view up to 9 images simultaneously. To display them, the image window is divided up into several windows, i.e. viewports. Each viewport can display a single image.

Viewport

Images button bar The image window contains a button bar with which you can quickly alter the appearance of the images in the image window.

Zoom factor The zoom factor shows you by what percentage you have zoomed the image in or out.

- An automatic zoom factor is set by default. This means that the zoom factor is adapted to the current size of the Viewport. Alter the size of the window; in doing so, the image will be zoomed out so that it can always be viewed in its entirety. In doing so, the zoom factor will not be greater than 100%.
- You can enter a different zoom factor for each Viewport.
- The current zoom factor will be shown in the Viewport's header.
- When using a zoom factor of 100%, a pixel on the monitor corresponds exactly to one image pixel.
- A fixed zoom factor does not change when you change the size of the Viewport. Thus, in certain cases, only an image segment will be displayed in the Viewport.
- As soon as an image is larger than the Viewport, a slide control appears which enables you to move the image in the Viewport to and fro.
- Move the image directly via Pan&Scroll. Click into the image and keep the mouse button depressed. If the image is larger than the Viewport, the pointer changes its form. You now move the image by moving the mouse.



Optimizing display

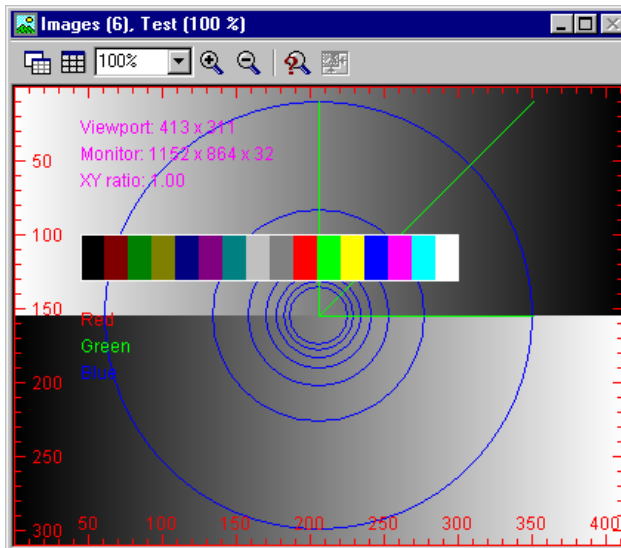
- 1) Use the [Ctrl + Alt + T] shortcut to create a test image.
 - ▶ The image window contains a button bar with which you can quickly alter the appearance of the images in the image window.

Press [Ctrl + Alt + T] to generate a test image. Among other things, it shows you the current monitor resolution.

Press [Ctrl + Alt + Shift + T] to generate a color test image.

The test image is automatically the same size as the active viewport.

The test image will always be displayed at 100% zoom.



- 2) Click the Arrange Viewports button to redefine the number and arrangement of viewports. Select a 1x2 arrangement.
 - ▶ The image window will be divided up into two viewports. The test image is in the left viewport. Image buffers will be reassigned. Zoom factors will be set to Auto. Though reduced in size somewhat, the entire test image will be shown.



- 3) Click the Single View button to display just one image in the image window - the active viewport image.
 - ▶ The viewport arrangement and what image buffers are shown in which viewports remain unchanged.
 - ▶ The Single View button changes to Tile View.

- 4) Select one of the entries of the Zoom Factor dropdown list - or enter any zoom factor desired into the field directly; e.g., 30%.
 - ▶ The test image will be reduced to 30% zoom. The viewport will no longer be totally taken up by the image. Where the patterned background starts (in the viewport) is where the image stops.



- 5) Click the Zoom In button to double the current zoom factor.
 - ▶ The test image will now be displayed at a zoom factor of 60%.



- 6) Click the Adjust Zoom button to have the zoom factor adjusted to fit current viewport size.

- The length/width ratio of the image will not change. Unlike the automatic zoom factor, the new zoom factor is not linked to the size of a window - i.e., even when you adjust the size of a window, the zoom factor stays the same. Automatic zoom factor is set by selecting the **Auto** entry from the **Zoom Factor** list.
- 7) Alter the size of the image window.
 - 8) Click the **Adjust Zoom** to adjust the size of the window to the size of the current image (only available for single view).



Acquiring and saving images

This chapter describes how you can use your camera and software to acquire images and to save them to a storage medium. A step-by-step instruction briefly describes a typical sequence of steps. Afterwards, the commands used with all of the options will be described in more detail.

TWAIN The image acquisition is executed with your image acquisition software, via TWAIN. This abbreviation stands for "Technology Without An Interesting Name". TWAIN is a standardized software interface between software programs and image acquisition hardware such as digital cameras or scanners.

Your camera is controlled by a TWAIN driver. This allows you to make image acquisitions with other application programs which have access to a TWAIN interface. Examples for this are MS-Word and Adobe Photoshop.

Note




If you are using an imaging system solution provided by Olympus instead of the image acquisition software sent with your order, your camera will not require the TWAIN interface. Your camera will then be controlled directly by the corresponding software and entirely incorporated into the respective procedures.

Acquiring, calibrating, and saving images

- 1) Click the **Set Input** button to select your camera.
 - ▶ This step is only necessary if also a scanner is connected to your PC or if you manage several cameras with your image acquisition software and would like to choose another camera.
- 2) In the image buffer box, use your left mouse button to click the image buffer you would like to use to store your image.
 - ▶ The selected image buffer will be highlighted in color. If it already contains an image, the next image buffer will be reserved for your image.
- 3) Click the **Acquire Image** button to open the TWAIN dialog box.
 - ▶ The image will be shown live in the TWAIN dialog box.
 - ▶ Use the live image to optimize the camera settings. Normally you only have to click the **Auto** button located in the **Exposure time** group. Sometimes also a white balance might be necessary.
 - ▶ Click the **Scan** button to place the image into the selected image buffer, thus finalizing the actual image acquisition.





Define calibration



Apply calibration



Save As

- 4) Click the **Define calibration** button to determine the calibration data required for the X/Y calibration of your images.
 - ▶ This step is only necessary if you would like to carry out a XY calibration of your images and the required calibration data is not yet available.
- 5) Click the **Apply calibration** button.
 - ▶ This step is only necessary if you would like to calibrate the acquired image.
 - ▶ You can always calibrate an image at a later time.
- 6) Click the **Save As** button to save the image as an image file to a storage medium.

Set Input



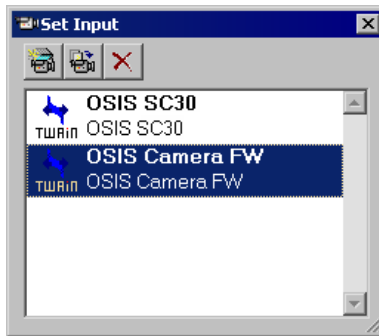
Set Input

Click this button to select a camera. This is only necessary when several cameras are available and the wrong camera has been selected.

Your image acquisition software enables you to manage several cameras. Each camera is assigned to a predefined "logical input channel" within the software - if the camera driver has been correctly installed. If you want to acquire an image with a camera, the corresponding input channel must be activated.

Only one input channel can be activated. It will be highlighted in color in the dialog box's list and additionally displayed in the lower right part of the program window's status bar.

The *Set Input* command opens the dialog box with the with the same name.



Click the **New Channel** button to create a new input channel for an additional camera.

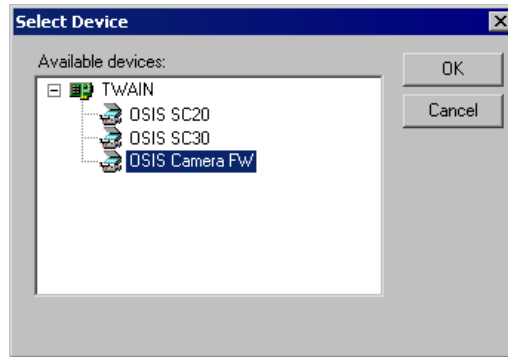
Related Topics

Define calibration 20

Apply calibration 23

Save As 24

The *New Channel* command opens a dialog box in which all of the image sources, that can be currently selected by your image acquisition software, are listed. Select the desired image source. To display all image sources, click on the plus symbol.



Note



You can also use the *New Channel* button, if you have deleted an input channel by mistake or if the camera driver has not been integrated successfully into the software.



Click the *Delete Channel*, to delete a camera's input channel. You will receive a message if you really want to do this. If you select *Yes*, the input channel will be deleted and the corresponding entry from the *Set Input* dialog box's list will also be deleted.



Click the button with the cross located in the upper right corner of the *Set Input* dialog box to close it.

Acquire Image

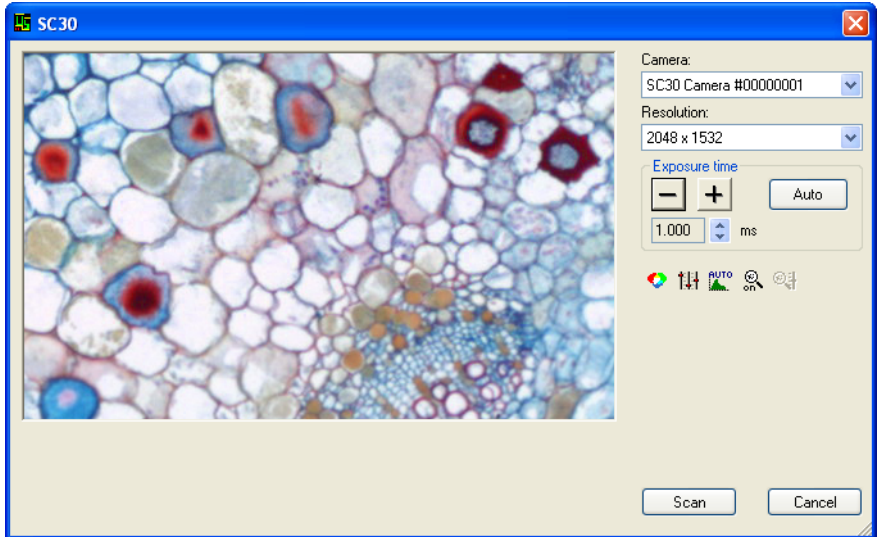


Click this button to open the TWAIN dialog box for the image acquisition.

Before calling up the command, select the image buffer into which the image is to be stored. If it already contains an image, then the next image buffer will be reserved for the image.

Description of the TWAIN dialog box

This is what the TWAIN dialog box looks like for the SC30 camera.



Live image You will find your camera's live image in the left side of the TWAIN dialog box. The live image enables you to comfortably align, illuminate, and focus on the object, as well as the possibility to optimally set your camera's settings.

Camera

The **Camera** field shows you the selected cameras with their serial numbers.

Resolution

The **Resolution** list enables you to select which XY-resolution is to be used for acquiring the image. A lower resolution results from combining numerous neighboring pixels ("binning") or from partially reading out the pixels ("subsampling"). That depends on the camera type. The frame rate is increased both for binning and for subsampling. In addition the camera is more sensitive for binning. The SC30 type camera is able to use resolutions of 2048 x 1532, 1024 x 768, 680 x 512 and 508 x 384 pixels, for example.

Exposure time

You can set the exposure time in the **Exposure time** group.

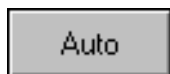
Exposure time shorter
than 1 ms

The exposure time required for high-quality acquisitions depends on the illumination, the properties of the sample, and the camera being used. The exposure time should be longer than 1 ms and shorter than 125 ms. Should the exposure time be outside of these limits, you can take the following actions.

The best means of increasing the exposure time is by placing neutral density filters in your microscope's light path. If no neutral density filters are available, you should reduce your lamp voltage. But make sure that the voltage of a halogen lamp doesn't drop to below 5 V. When you have reduced your lamp voltage you will need to carry out a white balance again.

Exposure time longer
than 125 ms

To reduce the exposure time, first remove any ND-filters that are in use. On the microscope, you can also additionally set the prism or the phototube's mirror to "only photo". Should the result still not be adequate, you can then increase the lamp voltage. After you have increased the lamp voltage, you should carry out another white balance.



Click the [-] and [+] buttons to change the exposure time in pseudo-logarithmic intervals. You can also click the arrow buttons next to the display field to alter the exposure time in linear intervals.

Click the Auto button to automatically set the exposure time.

White Balance



Click the White Balance button to correct a tinge. During a white balance, the individual color channels for red, green, and blue are set in such a way, that a white or gray area of an object will be portrayed correctly in white, i.e., gray. All of the other colors will be shown correctly, as well.

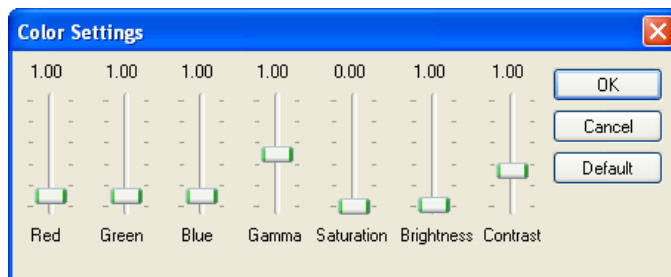
A red rectangle appears in the image. Move it with the mouse to a position as uniformly white or gray as possible. Change the size of the rectangle by moving the mouse and simultaneously depressing the mouse button. Rightclick to adopt position and size of the rectangle and execute the white balance.

Color Settings



Click the Color Settings button to manually alter your camera's color settings. Based on the type of camera you are using, this may be done via numerous slide controls.

This is what the Color Settings dialog box looks like for the SC30 camera.



- Red, Green, Blue** The **Red**, **Green** and **Blue** slide controls can be moved from 0,00 to 10,0. The set value is the factor with which the signals of the corresponding color channel are multiplied.
- Gamma** Use the **Gamma** slide control to result in a nonlinear contrast enhancement.
- What is gamma? The numerical value of gamma influences how the illumination intensity on the CCD chip's pixels is converted into the color value of the respective pixels in the image buffer. Please note that this also applies for the other slide controls. If gamma equals 1, the conversion from illumination intensity into gray value i.e., color value is linear. A nonlinear contrast enhancement is the result if gamma is not equal to 1. If gamma is less than 1, the light gray values are spread more than the dark ones. This results in an improvement of contrast in the image's light areas. The image, in general, will become darker as a whole. If gamma is more than 1, the dark gray values are spread more than the light ones. This results in an improvement of contrast in the image's dark areas. The image, in general, will become lighter as a whole.
- Saturation** Use the **Saturation** slide control as an alternative to the slide controls of the individual color channels. The **Saturation** slide control enables you to alter the color reproduction from black and white to a maximum color saturation.
- Brightness** Use the **Brightness** slide control to change the image's intensity. Values smaller than 1 lower the image's intensity. Values greater than 1 increase the image's intensity.
- Contrast** Use the **Contrast** slide control to change the image's contrast. Values smaller than 1 lower the image's contrast. Values greater than 1 increase the image's contrast.
- Default** Click the **Default** button to set all of the slide controls to a predefined default value.

Auto Contrast



Click the **Auto Contrast** button, to activate or deactivate the automatic contrast enhancement. Now the image will always be shown with enhanced contrast onscreen no matter what the actual exposure conditions are, provided there is no over exposure. For this purpose, the system automatically calculates two sensible limits for displaying the intensity from the intensity distribution in the image. Intensity values below the minimal value and above the maximum values will be cut off. The intensity values in between will be spread out on the entire dynamic range of the camera.

Sharpen filter



Sharpen Filter On/Off



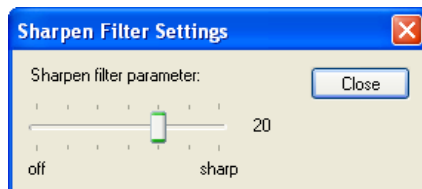
Use the sharpen filter to increase the sharpness using edge enhancement already with the live acquisition.

Click the **Sharpen Filter On/Off** button to activate/deactivate the sharpen filter. The manner in which the acquired image is affected by the sharpen filter depends on the sharpen filter parameter. You can adjust this parameter by using the **Sharpen Filter Settings** dialog box.

Sharpen Filter Settings



Click on the **Sharpen Filter Settings** button to open a dialog box where you can set the sharpen filter parameter:



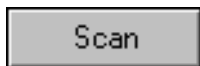
To adjust the numerical value of the sharpen filter parameter, use the mouse to move the slide control to the right or left. Whether the contours of the image appear to be sharper or softer when you apply the sharpen filter, depends on the position of the *Sharpen filter parameter* slide control.

Increasing sharpness will accentuate edges, but also brings out more image noise. Reducing the sharpness makes the image softer. Entering a value of 0 will result in the sharpen filter having no effect at all.

Please note that when you use the sharpen filter you not only alter the monitor display, but the actual image information as well. This means that when you are planning on quantitatively evaluating your images later, you should not use the sharpen filter. Your software provides you with commands with which you can subsequently process an image's sharpness at any time.

The *Sharpen Filter Settings* button is only available if the sharpen filter has been activated.

Scan



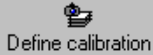
Click the *Scan* button to place the image into the selected image buffer, thus finalizing your image acquisition. The TWAIN dialog box closes. You can now save the image as an image file.

Cancel



Click the *Cancel* button to close the TWAIN dialog box, without acquiring an image. Only a black image will appear in the image buffer. As an alternative, you can cancel an image acquisition by clicking the button with the cross located at the upper right corner of the TWAIN dialog box.

Define calibration

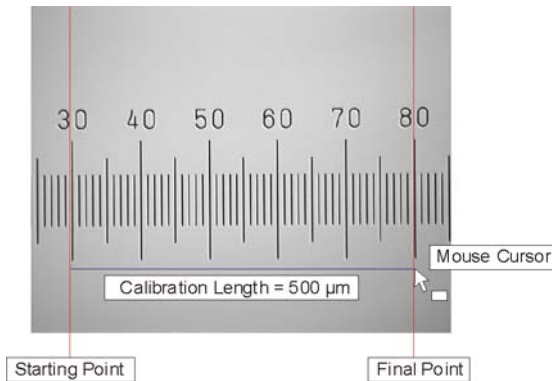


Click this button to determine the calibration data required for the X/Y calibration of your images. Such a calibration is only necessary and reasonable if you use your camera with a microscope or with a macro stand with one or more definite magnification ranges.

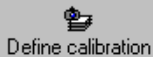
The image acquisition software enables you to calibrate images after acquisition. Calibration means that for each magnification the width and height of an object area is assigned to the pixel representing that object area. This might be, for example, $0,63 \mu\text{m} \times 0,63 \mu\text{m}$ for a magnification of 5x. This calibration data varies for each magnification.

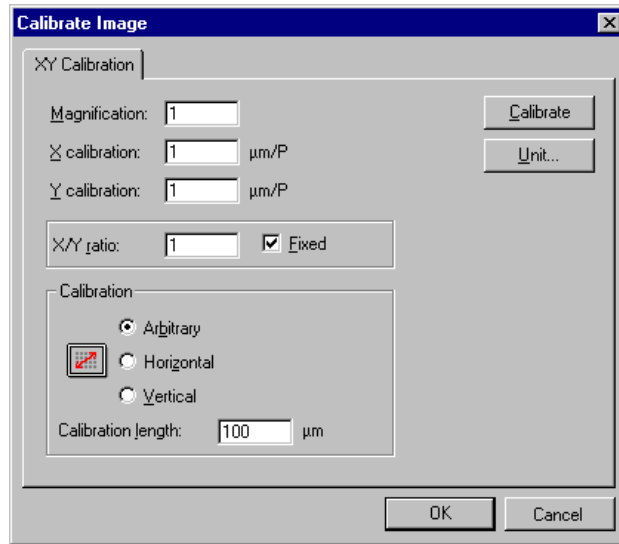
- 1) Place a stage micrometer under your microscope and focus.

The illustration shows a light microscope's micrometer.

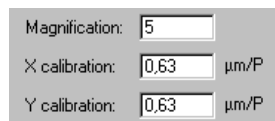


- 2) Click the Acquire Image button to acquire an image of the stage micrometer.
 - ▶ The image will be put into the active image buffer.
- 3) Click the Define calibration button to open the dialog box required to determine the calibration data.
- 4) Click the Calibrate... button.
 - ▶ The Calibrate Image dialog box opens.



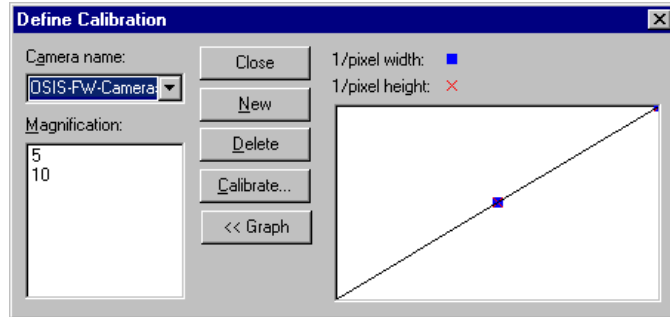


- 5) Click the Unit... button.
 - ▶ Select m (for meters) in the Basic unit list in the Set Unit dialog box.
 - ▶ Select, e.g., μ in the Scale list if you wish the calibration length to be shown in μm . Confirm by clicking OK.
- 6) Enter this magnification level into the Magnification field.
- 7) Enter the length you are using to calibrate with into the Calibration length field.
 - ▶ The distance between the scale marks 30 and 80 in the example shown is 500 μm .
- 8) Select the Arbitrary option in the Calibration group.
- 9) Now click the Calibrate button.
 - ▶ The mouse pointer will appear within the active image.
- 10) Position the mouse pointer at the starting point of the calibration length and leftclick.
- 11) Then position the mouse pointer at the final point of the calibration length and confirm by leftclicking. The blue line must be the exact same length as the calibration length you entered in the Calibrate Image dialog box.
 - ▶ The calibration data for the selected magnification are now shown in the X calibration and Y calibration fields.



- 12) Confirm by clicking OK.
 - ▶ The Calibrate Image dialog box will be closed.
 - ▶ A magnification is now available in the Define Calibration dialog box. You will be asked whether or not you want to replace the old data with the new ones, should data about the calibration already exist for this magnification.
- 13) Finish the calibration by clicking Close.
 - ▶ The calibration will be directly applied to the active image.
 - ▶ You can expand additional calibration data for other magnifications whenever you like.
 - ▶ To calibrate additional images based on the set calibration data, use the Apply calibration button.
 - ▶ You can view the calibration data of an image any time, by double clicking the image buffer to open the Image Information dialog box.

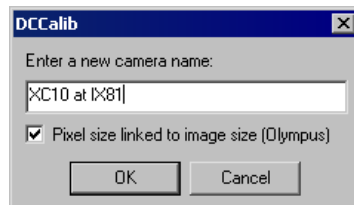
Description of the dialog box



New Click the **New** button to create a new set of calibration data. This set of calibration data appears under the selected camera name. This is, for example, useful if you use your camera on various microscopes.

This is how you create a new set of calibration data:

- 1) Click the **New** button.
 - ▶ The **DCCalib** dialog box is opened.
- 2) Enter a name into the edit field located in the **DCCalib** dialog box.
 - ▶ Please note: The **Pixel size linked to image size** check box should always be marked. In this case, the calibration data are automatically adjusted by the software when setting another image resolution.



3) Confirm by clicking OK.


- ▶ A new entry is added to the Camera name list located in the Define Calibration dialog box. Since there are no calibration data for this camera, the Magnification list will be empty.

Delete Click the Delete button to delete the active set of calibration data.

Calibrate... Click the Calibrate... button to add new calibration data to the active set.

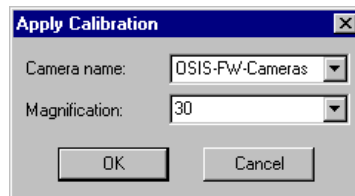
Graph >> Click the Graph >> button to show a diagram with the calibration data. Use this diagram to check your calibration data. The diagram shows the reciprocal pixel size versus magnification. The points should all be along one line.

Apply calibration

 Apply calibration

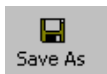
Click this button to calibrate the active image using the available calibration data. Should there not be any appropriate calibration data available, use the Define calibration command to create the calibration data, as described starting on page 20.

- 1) Acquire an image or click on the image buffer in which the image to be calibrated has been stored.
- 2) Click the Apply calibration button.
 - ▶ The Apply calibration dialog box opens.



- 3) Select the appropriate set of calibration data from the Camera name list.
- 4) Select the magnification you used to acquire the image from the Magnification list.
 - ▶ In the list, you will find all of the magnifications which you defined for this camera name using the Define calibration command.
 - ▶ You may also enter a magnification which is not in the list. In this case, the software automatically interpolates the correct calibration data.
- 5) Confirm the message by clicking OK.
- 6) Doubleclick the image buffer to open the Image Information dialog box in order to view the calibration data.
 - ▶ The Magnification, Width and Height values have now been accordingly adapted to the calibration data.
 - ▶ Only if you save the image in TIF file format, will the calibration data be saved together with the image.

Save As



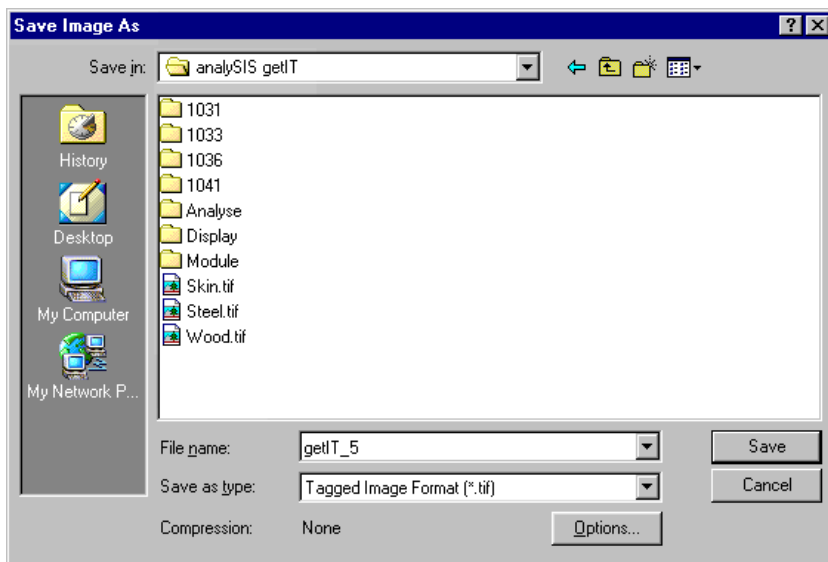
Click this button to save the active image to a storage medium under a new file name or path name.

Before calling up the command, select the image you would like to save from the image buffer box.

Alternative You can also use the **File > Save As...** menu command or the [Ctrl + S] shortcut.

Deleting directories and files You can also additionally use the command to delete directories and document files. To do so, select the desired files and depress the [Del] key.

Description of the dialog box



Save in Select the drive and directory to which the document is to be saved from the Save in list.

File list The dialog box shows all the files with the file extension shown in the Save as type field.

Files of type The Save as type list contains all the file formats under which the active image can be saved. The additional image information including calibration data is only saved together with the image if you choose the Tagged Image Format (*.tif) file format.

File name The File name field offers you a file name. When dealing with newly acquired images, this would be the image name.

Compression The Compression field provides you with the compression method required to save images. The field is only shown for the image file formats TIF and JPG which allow compression. The following compression methods are possible for the image file format TIF: None, Packed Bits, JPEG 2000, JPEG or LZW.

You can alter the compression method and quality of the images. To do so, select either the Tagged Image Format (*.tif), JPEG (JFIF) (*.jpg) or JPEG 2000 (*.jp2) file type. Click the Options... button and open the Save Image Options dialog box. You will find various compression methods and JPEG quality.

Image Information

Doubleclick the image buffer to alter the name of the image, to add a comment to an image, and to display data about the image. Except for the name of the image this image data are only then saved when you save the image in TIF format.

Alternative Use the [Alt + Enter] shortcut to view data about the image in the active image buffer.

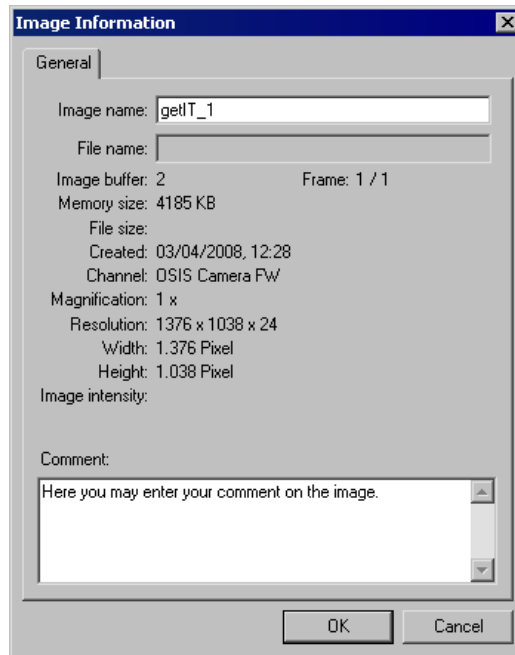


Image Name You may enter a new name for the image in the Image name field. It can be up to 31 signs long.

The image is assigned a standard name during image acquisition, which is compiled of the name of the software, as well as a consecutive number.

File name When you load an image, the File name field will contain that image file's complete path. When acquiring an image using your camera, this field will be blank - until you have saved the image.

When saving an image, your software will automatically suggest the image name for use as the name of the file.

Warning

Image name and file name are not the same. If you assign the name "Pollen 04.05.2006 Image 23" to an image, you can save the same in TIF format under the name "04050623.tif". When you later reload this TIF image, the original image name will appear within the image buffer.

Image buffer The **Image buffer** field displays the number of the image buffer currently containing the image. This number will of course change when you, for example, put the image into another image buffer.

Frame: 1/1 The field next to the Image buffer field is not relevant for your image acquisition software.

Memory size To calculate the amount of memory occupied by the image in your RAM, the system multiplies the number of image pixels with the current bit depth. The memory requirements of the image information will also be taken into consideration. For the RAM memory requirements, it does not matter if the image file has been compressed on the hard disc or not.

File size The **File size** field shows you the file size of a loaded image file. The field is empty directly after image acquisition.

Created The **Created** field shows the acquisition times for images which you acquired with your camera. For other images, the date and time of the last modifications made to the image are shown.

Channel The **Channel** field shows the name of the camera for images acquired with your camera. The field does not contain any information for other images.

Magnification The **Magnification** field shows the selected magnification for images which you acquired with your camera. Use the **Apply calibration** command to define the magnification.

The magnification for images from other applications is set to 1 as a default.

Resolution The **Resolution** field displays image size (in pixels) and information depth (bits/pixel). The entry 1376 x 1038 x 24 means: The image width corresponds to 1376 Pixels, the image height corresponds to 1038 Pixel, and the image can contain 2^{24} different color values.

Width
Height The **Width** and **Height** fields show the absolute measurements of the images which you have acquired with your camera. These values are determined using the current image calibration.

For other images, the fields show the width and height of your images in pixels.

Image intensity The **Image intensity** field is irrelevant for your camera.

Comment You can enter your annotations about the image in the active image buffer into the **Comment** field.

Additional commands

This chapter describes the buttons which have not been described yet in the previous chapter, as well as the commands which cannot be accessed by a button.

Open



Click this button to load images from a data medium.

Before opening the command, select the image buffer into which the first image is to be loaded.

Alternative

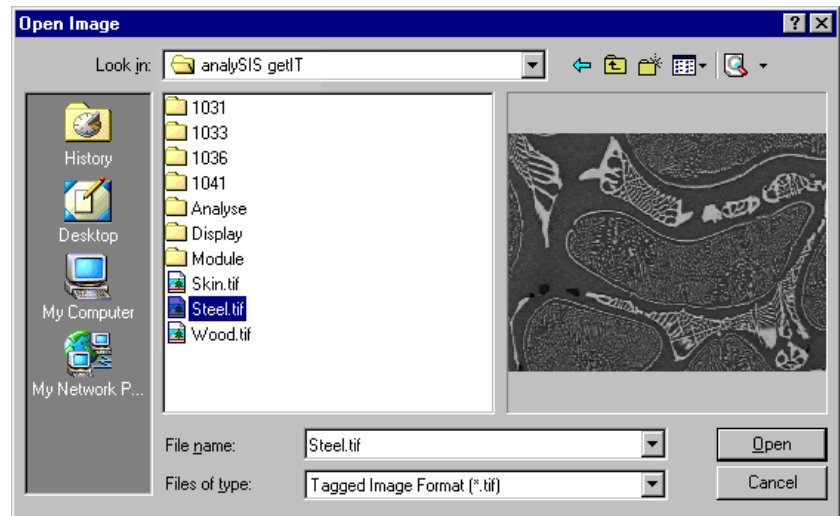
You can also use the **File > Open...** menu command or the [Ctrl + O] shortcut.

Deleting directories
and files

You can also additionally use the command to delete directories and document files. To do so, select the desired files from the corresponding dialog box and click the [Del] key.

Description of the dialog box

Dialog boxes for loading files are based on standard MS Windows dialog boxes. The dialog box for loading images also has a preview function.



Look in Select the drive and directory of the desired files from the **Look in** list.

File list The dialog box shows all of the subdirectories and all files whose format is displayed in the **Files of type** field.

Files of type You can select the desired document type from the **Files of type** list. The **Tagged Image Format (*.tif)** image file format is set by default.

You can also select the **Image Formats** entry to show a list of all the files with every image format available. All the displayed images can be opened with your image acquisition software.

File name Click the document file you are looking for in the file list, to copy it to the **File name** field. You can load several documents simultaneously. To do so, mark a random selection of files by depressing the [Ctrl] key and clicking on the files you require.

Preview

You can view the single images to the right of the dialog box, thus allowing you to check which documents you want to open. To do so, click the **Preview** button and select the individual image files. The selected document will be displayed in reduced size.

Click the **Preview** button a second time to view the file's document properties with various additional information. When using TIF images, the image attribute **Name** gives you the image name, **Created** the date and time the image was acquired or created, **Resolution** the image resolution in height x width (in pixels) x bit depth, **Compression** the method of compression, **User** the name of the user of the image acquisition software, **Application** the program version being used, and **Channel** the camera with which the image was acquired.

A third click enables you to hide preview.

You can also use the commands of the drop-down menu located to the right of the button, to switch back and forth between the preview, properties, and standard view without the preview area.

[Del] Use the [Del] key to delete the selected files or directories.

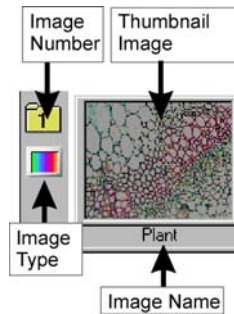
Open **Open** enables you to load images into a sequential image buffer.

Loading images stored on the hard drive

- 1) In the image buffer box, click the image buffer you wish to load the image into, with the left mouse button. Select - for example - image buffer #5.
 - ▶ The selected image buffer will be highlighted in color.
- 2) Click the **Open** button to load an image.
 - ▶ The **Open Image** dialog box will appear.
- 3) Select **Tagged Image Format (*.tif)**, the standard image format, in the **Files of type** list.
 - ▶ This format is the default when you open this dialog box for the first time.
- 4) Click the **Up One Level** button to move up a level in the directory structure of your computer.
 - ▶ In the field below the button bar you will find a list of all sub-folders and documents of the file type selected.
- 5) Doubleclick on one of the folders listed to get a listing of its contents - i.e., all subdirectories and files the folder contains.
- 6) Click the **Preview** button to view thumbnails of image files. Select the image files one at a time.
- 7) Select the images you wish to load.
- 8) Click the **Open** button to load the images selected.
 - ▶ The **Open Image** dialog box will be closed.
 - ▶ The images will be loaded into successive image buffers. You will find the first image in the active image buffer, e.g., #5. The next images can be found in image buffers 6-9, if you have simultaneously loaded a total of 5 images.
 - ▶ The image type and image name will be shown directly in the image buffer box. You will, for example, acquire "true-color images" when using the SC30 camera. A true-color image consists of 2^{24} color values (24 Bit).



You can view the thumbnails of all of the loaded images in the image buffer box.



Using the mouse to drag images into image buffers



- 1) Click the **Open** button.
- 2) Leftclick on the image file you wish to load.
- 3) Drag the file directly onto the desired image buffer, while keeping your left mouse button depressed, (drag&drop).
 - ▶ The image buffer will show a thumbnail of the image you have loaded.
- 4) Repeat the last two steps if you wish to load further images.
- 5) To quit loading, just click the **Close** button.

Use the mouse to drag&drop images into the image buffer desired.

MS Explorer, a file manager, can also be used for drag&drop loading.



Print Directly

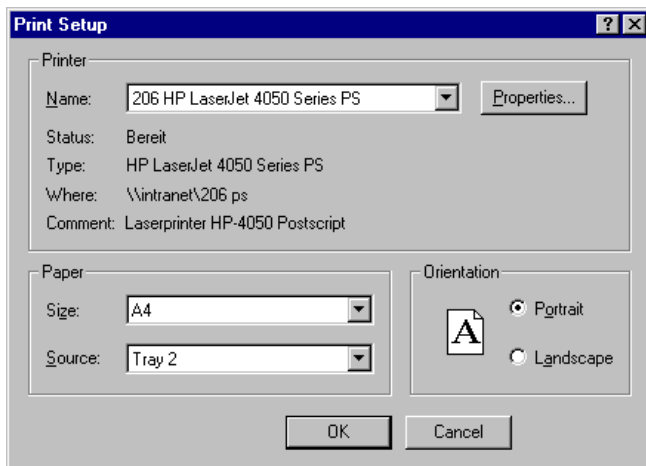


Click this button to quickly print a single image. The **Print Image** dialog box will NOT open. The command always prints an image in default page layout: The header shows the image name, the footer shows the date and time of when printing was started. The button is only available if an image has been loaded into the active image buffer.

Print Setup...

Use this command from the **File** menu to determine a certain printer and printer settings as a default for your image acquisition software.

The selected printer and the corresponding settings remain for future applications using your image acquisition software.



Printer From the **Printer** group, select the **Name** of the desired printer from the list as well as the corresponding properties using the **Properties...** button.

Name The **Name** list contains all of the printers installed under Windows. The printer which has been defined as standard by Windows in the printer settings, is the default printer. Select the printer which you mostly use with your image acquisition software from the printer list.

Status/Type/Where/Comment The **Status**, **Type**, **Where** and **Comment** fields provide information about the selected printer: operating state, printer type, path name, and additional comments.

Properties... Click the **Properties...** button to open the dialog box with the same name. This will allow you to select the printer settings with regards to the configuration, paper, graphics, and font. The exact appearance of the dialog box depends on the selected printer and printer driver.

Paper Select the paper size and source from the **Paper** group.

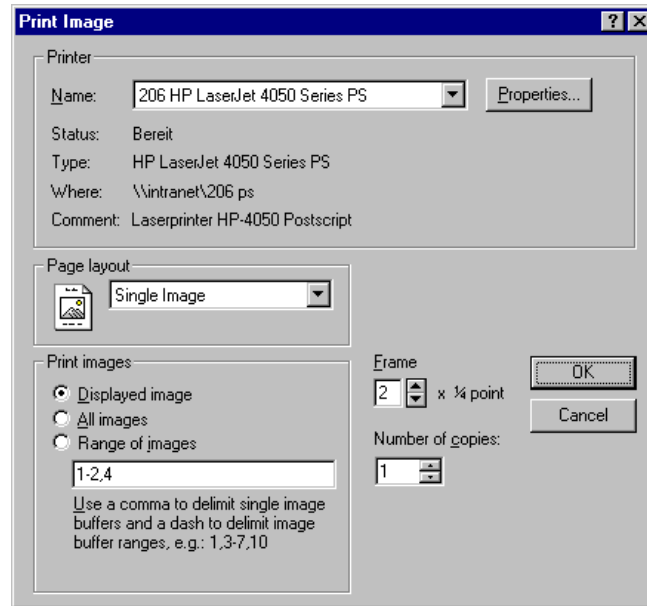
Size/Source Select the desired entries from the **Size** and **Source** lists. The entries depend on the printer you are using.

Format The **Format** group enables you to determine the page alignment.

Portrait/Landscape Select the **Portrait** format to print the pages vertically. Select the **Landscape** format to print the pages horizontally.

Print...

Use this command from the File menu to print images.



Printer From the **Printer** group, select the **Name** of the desired printer from the list as well as the corresponding properties using the **Properties...** button. These settings are lost after closing the program. Use the **Print Setup...** command if you want to set the printer and the corresponding properties as default for your image acquisition software.

Name The **Name** list contains all of the printers installed under Windows. When opening the program, the printer which has been selected as default printer for your image acquisition software in the **Print Setup** dialog box, is preset. The printer selected for the previous prints will be offered for each additional print.

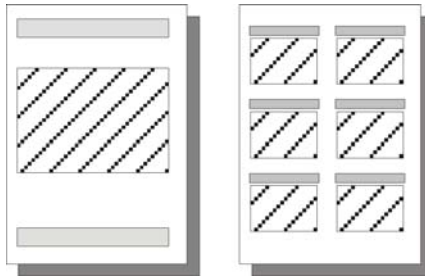
Status/Type/Where/Comment The **Status**, **Type**, **Where** and **Comment** fields provide information about the selected printer: operating state, printer type, path name, and additional comments.

Properties... Click the **Properties...** button to open the dialog box with the same name. This will allow you to select the printer settings with regards to the configuration, paper, graphics, and font. The exact appearance of the dialog box depends on the selected printer and printer driver.

Page layout The **Page layout** list contains the **Single Image** and **Multiple Images** entries. Here you can select which predefined page layout is to be used for printing. The **Print images** group enables you to then decide which images will actually be printed.

Two page layouts are predefined. Print either one or six images on a page.

Each image has its own header when using numerous images.



Single Image

Select the **Single Image** entry when wanting to print one image per page. The header contains the image name, while the footer contains the date and time of print.

Multiple Images

Select the **Multiple Images**, to print 6 images on one page, respectively. Each image then automatically contains a header with the image name.

Print images

The **Print images** group enables you to determine which images you want to print. The selected images are then printed in the page layout which you selected from the **Page layout** list. In doing so, the number of pages printed will automatically refer to the number of images selected. These are, for example, 3 pages, should you want to print 3 images with the **Single Image** page layout.

Displayed image

Choose the **Displayed image** option to only print the image in the active image buffer.

All images

Select the **All images** option to print all of the images in the image buffer box.

Range of images (Option)

Select the **Range of images** option to print a range of images from the image buffer box. To do so, you enter the number of the image buffers whose images you would like to print, into the corresponding field. Each number is separated by a comma. The order of the image buffers in the field corresponds with the order in which the images are to be printed. This allows you to control the order of several images on a page. Several consecutive image buffers can be replaced by an interval. For example, you can write 4-7 instead of 4,5,6,7.

Frame

You can enter the width of the frame which is to be displayed around each image into the **Frame** field. The unit is a 1/4 point. The setting "0" means that no frame is to be printed.

Number of copies

You enter the number of copies you would like to have printed into the **Number of copies** field.

OK

OK enables you to close the dialog box and start printing.

File list

Use the display of the path names at the end of the **File** menu to quickly load the corresponding images.

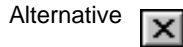
```
1 D:\...\Images\Algrains.tif
2 D:\...\Images\Skin.tif
3 D:\...\Images\Au-label.tif
4 D:\...\Images\Wood.tif
```

The most recent images to be saved and loaded are displayed in the file list. Click the desired file name or type in the corresponding number using your keyboard.

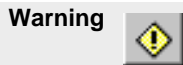
The file name remains even if you exit and restart the program.

Exit

Use the command from the **File** menu to end the program.



Click the button with the cross located at the upper right edge of the program window.



Save all of the loaded images you want to keep. Any unsaved images will be deleted without prior warning.

Image in the clipboard If you have copied an image into the clipboard, you will get a message informing you of this - if the image is larger than 768 x 576 x 8 bits. Click on **Yes** if you wish to keep the image in the clipboard - it will remain available to you for other applications. Any image of smaller size will remain available to you anyway.

Scale Bar, Show in Viewport

Use this command from the **Image** menu to display or hide a standard scale bar in the image window. This setting applies to all loaded images. You will only attain a useful scale bar after you have calibrated the image by clicking the **Apply calibration** button.

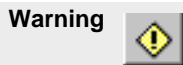


The automatic scale bar in the viewport is not part of the image, but rather a property of the viewport. It appears in a default size in the lower right hand corner, i.e., the size, position and font size of the scale bar does not change if you alter the position of the image within the viewport, or if you alter the image's zoom factor. The calibration length will always be automatically adjusted to fit the current zoom factor of the image in the viewport. You may also have the unit automatically adjusted in order to avoid excessively large or small numeric values.

You can alternatively use the keyboard shortcut [Shift + F4] to be able to quickly switch between views.

Scale Bar, Burn into Image

Use this command to irrevocably insert the scale bar into the image. In doing so, all of the image information below the burned scale bar will be lost.



Please remember that this command cannot be reversed.

A scale bar that has been burned into an image can of course no longer automatically be adjusted to fit image size because it has become a part of that image.

Select numerous images You can simultaneously apply this command to numerous images. To do so, select the desired images from the image buffer box.

What's it for? One of the main reasons for burning a scale bar into an image is when you are preparing to export an image into another application program - e.g., MS Word - which cannot read the image's calibration data. The image calibration remains accessible, if the scale bar has been burnt into the image. If you want to print an image together with its scale bar you also have to burn the scale bar into the image beforehand.

Position and length The scale bar is burnt into the lower right hand corner. The length of the scale bar corresponds to the length which is displayed in the viewport when using a zoom factor of 100%.

Delete Image

Use this command from the **Image** menu, in order to delete the image from the active image buffer.

Alternative Activate the image buffer and depress the [Esc] key.

Why delete images? Use this command to remove images no longer required. Since the program allocates space for every occupied image buffer, using this command will relieve a considerable amount of memory. A true-color image with a resolution of 2576 x 1932 pixels requires about 15 megabytes of RAM. MS Windows will then start swapping memory to disk. If you are using up too much storage your disk will have to be active more and more often thus slowing down the reaction time of this and other applications. By deleting images, you can relieve the corresponding amount of memory in the RAM and thus increase the speed of the program.

Warning



You will not receive a warning message. The image will be lost if it has not been saved to the hard disk.

Which images will not be deleted? Saved files on the hard disk or other storage mediums are NOT affected.

Deleting selected images To delete multiple images all at once, select them in the image buffer box. Press [Shift] or [Ctrl] while selecting the images with the mouse. Now the command in the **Image** menu will be called **Delete Images**.

Delete all images If you keep the [Shift] key depressed while opening the **Image** menu, the command will be **Delete all Images** instead of **Delete Image**. The contents of all buffers will be erased and the allocated memory will become available once again.

Image Manager

Use this command from the **Window** menu to display or hide the image buffer box.

Alternative You can also use the [Alt + 2] keyboard shortcut.

What's it for? You can hide the image buffer box to increase the size of the document area. For example, you will have more room on your monitor for the image window when wanting to display numerous images simultaneously.

What will happen... The command name is marked by a check mark in front of the command when the image buffer box is displayed.

Status Bar

Use this command from the **Window** menu to display or hide the status bar.

What will happen... The command name is marked by a check mark in front of the command when the status bar is displayed.

Standard Button Bar

Use this command from the **Window** menu to display or hide the standard button bar.

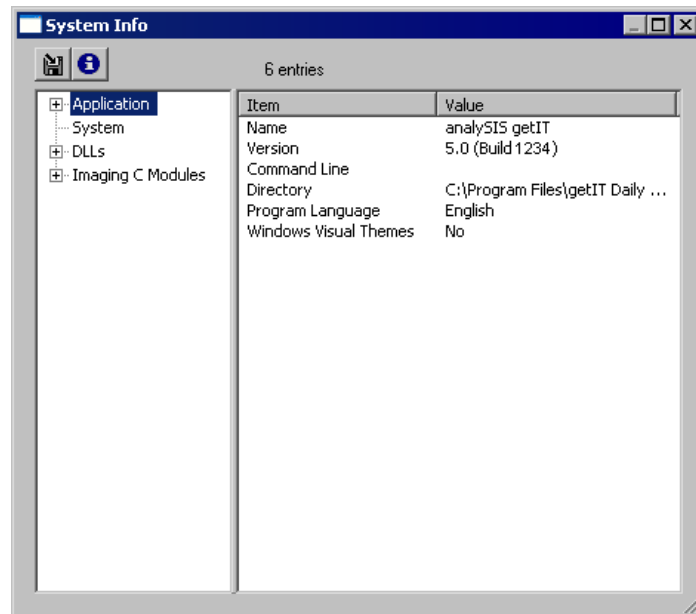
What will happen... The command name is marked by a check mark in front of the command when the standard button bar is displayed.

About...

Use this command from the **?** menu to display information about your program such as: version number, serial number, copyright, as well as system information pertaining to your computer and your MS Windows installation.

System Info... Click the **System Info...** button to open the dialog box with the same name.

What's it for? The dialog box contains various lists with information pertaining to your system: image acquisition software and hardware components such as your camera. It also contains information about your PC and operating system.



Use the tree view located to the left of the dialog box as if it were a table of contents: Click the "+" symbol on the left side to show the "chapter". Select an entry to view its contents to the right.

Save Info



Click the **Save Info** button to open the standard windows I/O dialog box. You can then determine a path in which the contents of this dialog box is to be saved in the "SysInfo.txt" file. Furthermore, the file "SISgetIT.ini" and additional INI and LOG files will be saved.

More Info



Click the **More Info** button to open the **System information** Windows dialog box. This enables you to take a look at the assembly and configuration of your computer, as well as your operating system's settings and components and the loaded Microsoft programs.

Appendix I: Microscope settings

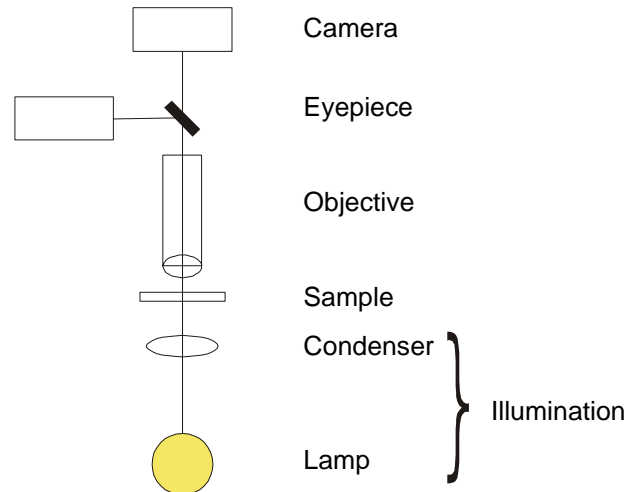
Your digital camera can only achieve high image quality if the microscope has been optimally set. A subsequent correction to the software can never correct deficiencies in the image resulting from faulty settings made to the camera and microscope.

The optical system "microscope" offers numerous setting possibilities. In order to attain best acquisition results, the settings must be made precisely.

In spite of varying models and observation possibilities, the microscope's image producing components are in accordance with each other.

A microscope basically consists of the optical components, objective and eyepiece. An additionally important component is the illuminator.

This illustration clarifies the basic assembly of the components of a microscope in transmitted-light mode.



Illumination

Light is a decisive medium for creating images with a microscope. As a result, the light, i.e. illumination, plays an important role in creating the image in the microscope.

The goal of the illumination settings is the equal distribution of light on the sample with parallel light rays falling on the object. The illumination must be bright enough to make all of the image details visible; however over-illumination leads to images being too bright and low-contrast. In addition, the color of the light has a strong impact on the sample's color rendering.

Lamp Selection The tungsten-halogen lamps and gas discharge lamps are the most commonly used lamps in microscopy. The light creating processes of both lamp types are fundamentally different.

Tungsten-halogen lamps Tungsten-halogen lamps comply with their functionality to a conventional light-bulb. Electricity flowing through a metal wire heats the wire to the extent that light is produced (thermal emitter). In doing so, the wire emits a continuous spectrum, hence a broad spectral band is emitted. One can control the brightness as well as the color (color temperature) of the lamp by controlling the electrical current. Tungsten-halogen lamps can be widely used in microscopy, especially when acquiring color images.

Gas discharge lamp Gas discharge lamps stimulate gas at the atomic level using strong electrical fields. The excited atoms return to their initial state and, in doing so, give off the energy which initially charged them in the form of electromagnetic radiation: light. The resulting photons each have characteristic energy which is typical for the gas being used. As a result, this type of lamp does not emit a broadband spectrum like the halogen lamp, but instead emits discrete wavelengths. This fundamental physical process cannot be externally influenced; hence, such a lamp's perceived color is independent of the operation conditions. Because of this discrete spectrum, gas discharge lamps do not emit a color-neutral illumination. Its adjustable high intensity light and the emission of short-wave spectral bands required for fluorescent microscopy is an advantage.

ND filter Many microscopes can insert ND filters into the light path, thus reducing the intensity of the lamp's light. These ND filters ensure a uniform reduction of light intensity throughout the entire frequency range without altering the color temperature.

Köhler Illumination

This illumination process which was described by Dr. August Köhler as early as 1893, is still an indispensable prerequisite for successful analysis using light microscopy. The Köhler illumination enables an optimal, homogenous illumination of solely the part of the sample to be analyzed.

Condenser The condenser illuminates the sample. The main components are the aperture stop with which the size of the illuminated area is set and the condenser lens which is responsible for the parallel emitted light rays. The condenser can be opened and closed. The condenser is height-adjustable and horizontally adjustable.

Note



Adjust the aperture stop so that it coincides with the aperture of the objective in use. Do not use the aperture stop to modify the light intensity. To do that, you should always use ND filters or a lower lamp voltage.

Principle of Köhler Illumination

You will find comprehensive descriptions of the principle of Köhler illumination in microscopy text books. We will only give you a brief overview of some important settings you should know.

Focussing the Field Diaphragm

One vital step when setting up the Köhler illumination is the sharp view of the field diaphragm at the specimen level.

- 1) Focus the object to be viewed.
- 2) Close the field diaphragm so that only a small bright spot is visible in the eyepiece.

- 3) Focus the image in the field diaphragm by using the condenser's height adjustment.

Adjusting the condenser

Now the illuminated area is optimally set.

- 1) Open the field diaphragm so that its edge is still completely within the visible area.
- 2) Center the image of the field diaphragm using the condenser's adjustment screws.
 - ▶ A precisely adjusted condenser guarantees that only the area of the specimen to be viewed is illuminated.
- 3) Open the field diaphragm, until the edge of the field diaphragm is no longer visible in the visual field.

Adjusting the Lamp You can generally skip adjusting the lamp with modern microscopes, provided that the lamp is located in a frame and the bulb is in a centered socket. When you adjust the lamp, please turn to the corresponding manufacturer's instructions for advice.

Objective, Total Magnification and Useful Magnification

There are no general rules for which objective you select; one should always keep the specimen and reason for observation in mind.

Terminology The two most important parameters of an objective (magnification and numerical aperture) are engraved in the objective. First the magnification and then the numerical aperture which is separated by a diagonal slash. Hence, the code 40 / 0.65 marks an objective with a magnification of 40x and the numerical aperture of 0.65.

Magnification An objective's engraved magnification is considerably important for the total magnification. However, one should note that the range of useful magnification should not be surpassed.

Numerical Aperture The numerical aperture is the characteristic of an objective which determines its capacity. The numerical aperture can also be found engraved on the objective. It is based on the refraction index of the lenses being used as well as the objective's angular aperture. The manufacturers are narrowly limited when dealing with the refraction index, whereas the objective's angular aperture can be increased by using appropriate measures. To achieve this, a fluid with a high refraction index is placed between the cover slip and the objective. The immersion objectives that can be used for this procedure are labeled accordingly, they should only be used with the appropriate immersion fluid.

Total magnification The system's total magnification, to which an installed TV adaptor contributes, is based on the actual size of the final image. This can be the image on the monitor, as well as the image printed on paper. To determine the total magnification, it is best to use a stage micrometer which can be shown on the monitor or the printout. You can determine the total magnification by dividing the length of the object shown by the set length on the micrometer.

Useful magnification You can determine the total magnification by dividing the length of the object shown by the set length on the micrometer. The useful magnification of the optical systems microscope depends on the numerical aperture of the objective being used (engraved on the objective). The useful magnification is in the range of 500x to 1,000x the numerical aperture.

Empty magnification A loss of contrast and sharpness is the result if total magnification is larger than the useful magnification. Check to see if replacing the TV adapter with a 0.5 or 0.63 model sufficiently reduces the total magnification. If this is not possible, you can also use an objective with the same magnification, but with a higher numerical aperture.

Appendix II: Installing the camera

Warning



Please read the following carefully before attempting installation of camera.

General Warnings

Warning



CMOS image sensors are easily damaged by static discharge. Do not disassemble the camera housing.

Warning



Do not attempt to touch the internals of the camera with your bare hands.

Warning



Do not touch cover slip (over the chip) with your hand or have any object come into contact with glass surface. Should dust stick to the cover slip, blow it off gently with an air blower. (For dust stuck due to static electricity, ionized air is recommended.)

Warning



It is best to use a smooth brush to clean the cover slip. Do this only when absolutely necessary.

Warning



Do not expose to strong light (sunlight) for long periods.

Warning



Exposure to high temperature or humidity will affect the characteristics of the camera. Avoid storage or usage under such conditions.

Warning



Do not subject the camera to too much mechanical shock.

Warning



The USB plug is not symmetrical. You must make sure that the cable plug is facing the same way as the camera socket when you plug the cable into the camera jack.

Warning



Do not disconnect the USB cable while the image acquisition software is running.

Before the installation

The SC30 can be used with the operating systems Windows XP and Windows Vista. The installation procedure for the camera will be described separately for the Windows XP and the Windows Vista operating systems.

In order to avoid problems, you'll have to follow the steps of the procedure in the order given here.

Warning



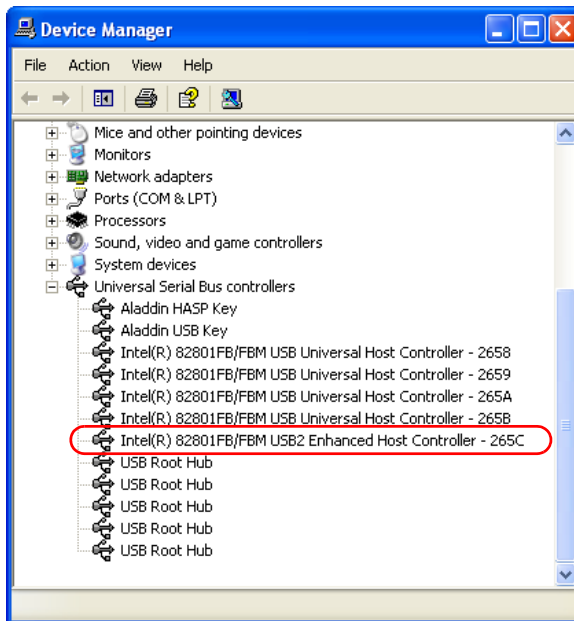
Install the software first, before connecting the camera to the PC.

- 1) Install the software on your PC.
- 2) Mount the camera onto your microscope.
- 3) Connect the camera to your PC and select the camera driver.

USB 2.0 interface

If you want to use the camera, you will need to have a USB 2.0 interface available on your PC. If you are not sure whether a USB 2.0 interface is available on your PC, open the Windows Device Manager via **Start > Settings > Control Panel > System > Hardware > Device Manager...**

Checking the interface



An entry with, e.g., the name 'Intel®82801FB/FBM USB2 ENHANCED HOST CONTROLLER' in the USB Controller area indicates that the required interface is available.

USB Controller on a board

Should your PC's USB controller not be on the motherboard, but is built in on a separate board, no guarantee can be made that the camera can be used without any problems. The *Device Manager* dialog box provides no information as to whether the interface is available on the computer's motherboard. Please either check this out in the computer's manual, or ask your system administrator for help.

Installing the camera with Windows XP

SC20 The following step-by-step instructions describe the installation procedure for the
SC30 getIT software under the Microsoft Windows XP operating system. These
XM10 instructions apply for the following Olympus light microscopy cameras:
XC10 SC20, SC30, XM10, XC10, UC30, XC30, UC50, XC50.
UC30
XC30
UC50
XC50

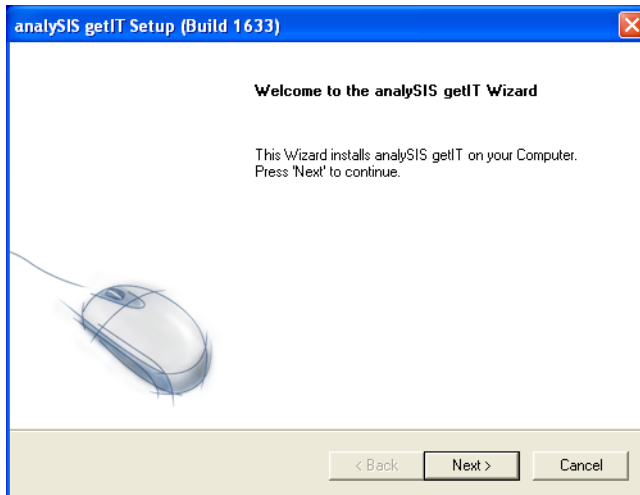
Installing the image acquisition software getIT

Warning

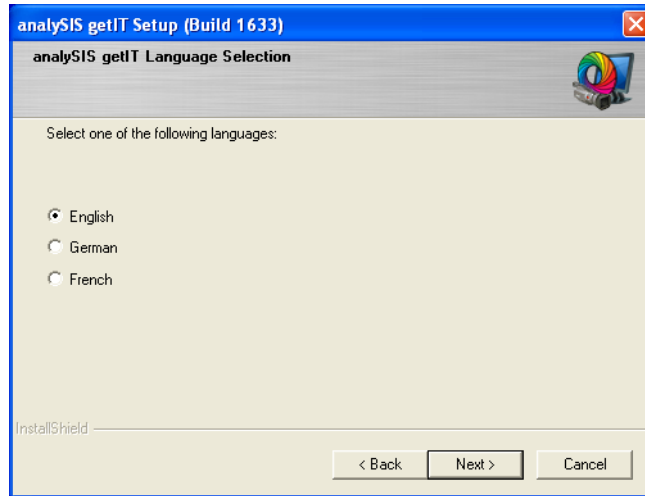


Install the image acquisition software before connecting your camera to your PC. This is necessary so that the operating system does not install the wrong TWAIN camera driver.

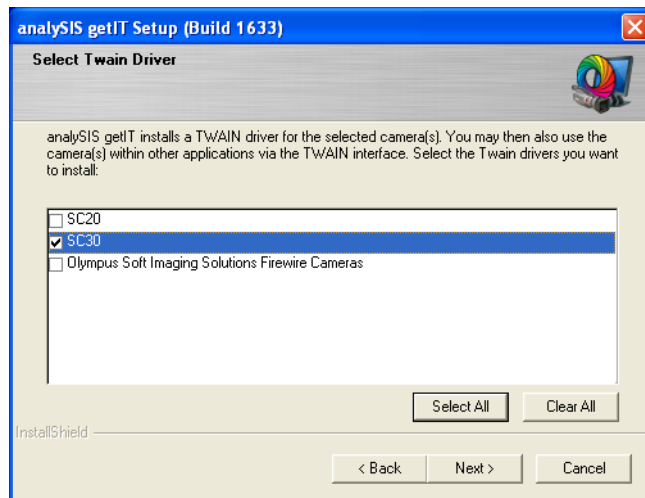
- 1) Place the CD that has been supplied into the CD-ROM drive.
 - ▶ The installation program will start automatically - unless you have deactivated the autorun function. If so, please start the setup.exe file manually.



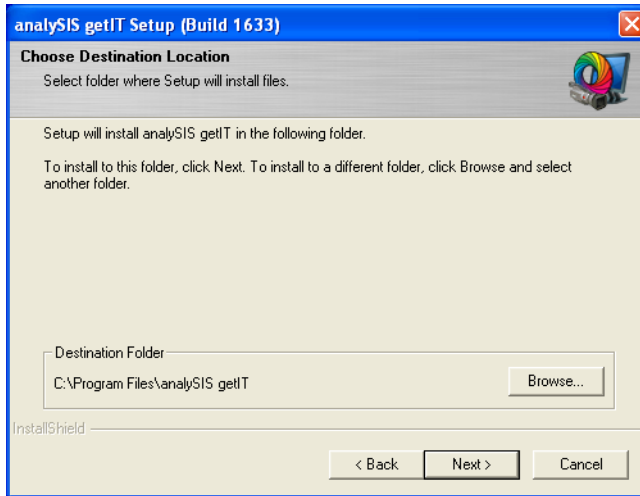
- 2) Click the Next > button.
 - ▶ The following dialog box opens.



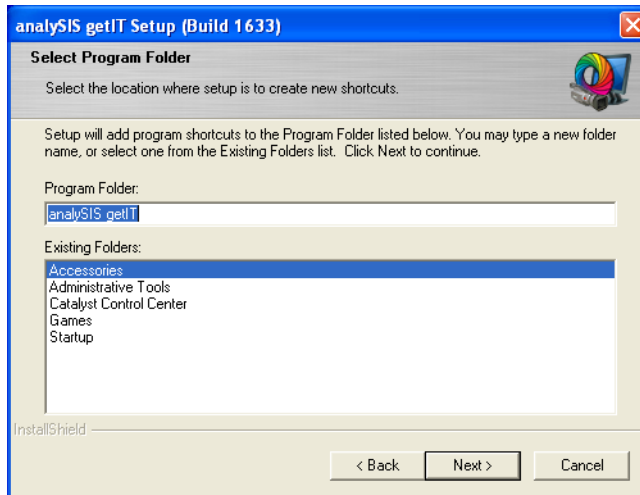
- 3) Select the language of your getIT software. The default language is your operating system's language.
Click the **Next >** button.
 - ▶ The **Select Twain Driver** dialog box opens.



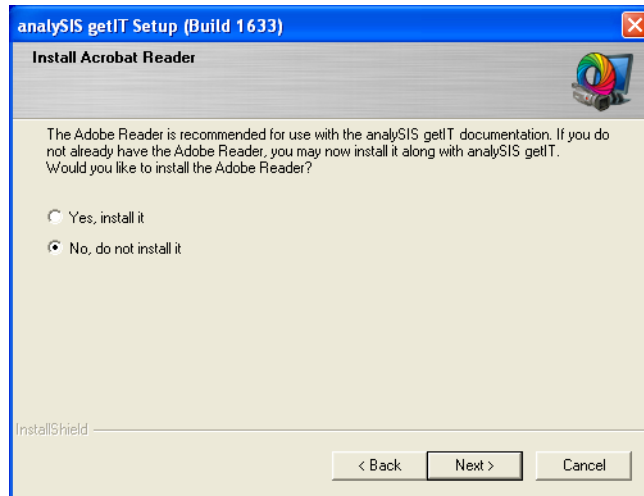
- 4) Select the TWAIN driver for your camera.
Please note: a special driver is required for the SC20 and the SC30 cameras. Select the SC20, resp. SC30, check box.
Select the **Olympus Soft Imaging Solutions Firewire Cameras** check box with all the other cameras (XM10, XC10, UC30, XC30, UC50, XC50).
- 5) Click the **Next >** button.
 - ▶ The **Choose Destination Location** dialog box opens.



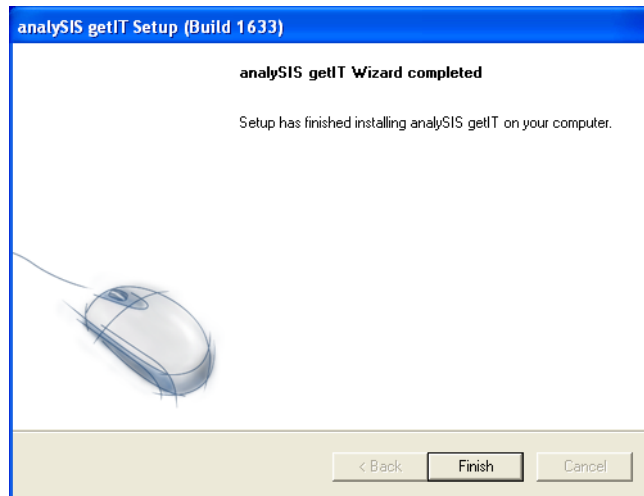
- 6) If you want to change the directory on which the getIT image acquisition software is to be installed, click the **Browse...** button. Select the desired directory.
- 7) Click the **Next >** button.
 - ▶ The Choose Folder dialog box opens.



- 8) Select the installation folder. You can either browse to an existing folder or create a new one.
- 9) Click the **Next >** button.
 - ▶ The getIT software manual is available as a PDF file. In the next dialog box you decide whether the Acrobat Reader program should be installed automatically together with the getIT image acquisition software.



- 10) Select the **Yes, install it** option if you want to automatically install the Acrobat Reader program. You'll need this program in order to read the getIT software manual.
Select the **No, do not install it** option for instance if the Acrobat Reader program is already installed.
- 11) To start the actual installation, click the **Next >** button.
- 12) Wait until the following dialog box opens.



- 13) Click the **Finish** button to finalize the installation.
 - ▶ The getIT image acquisition software has now been installed.

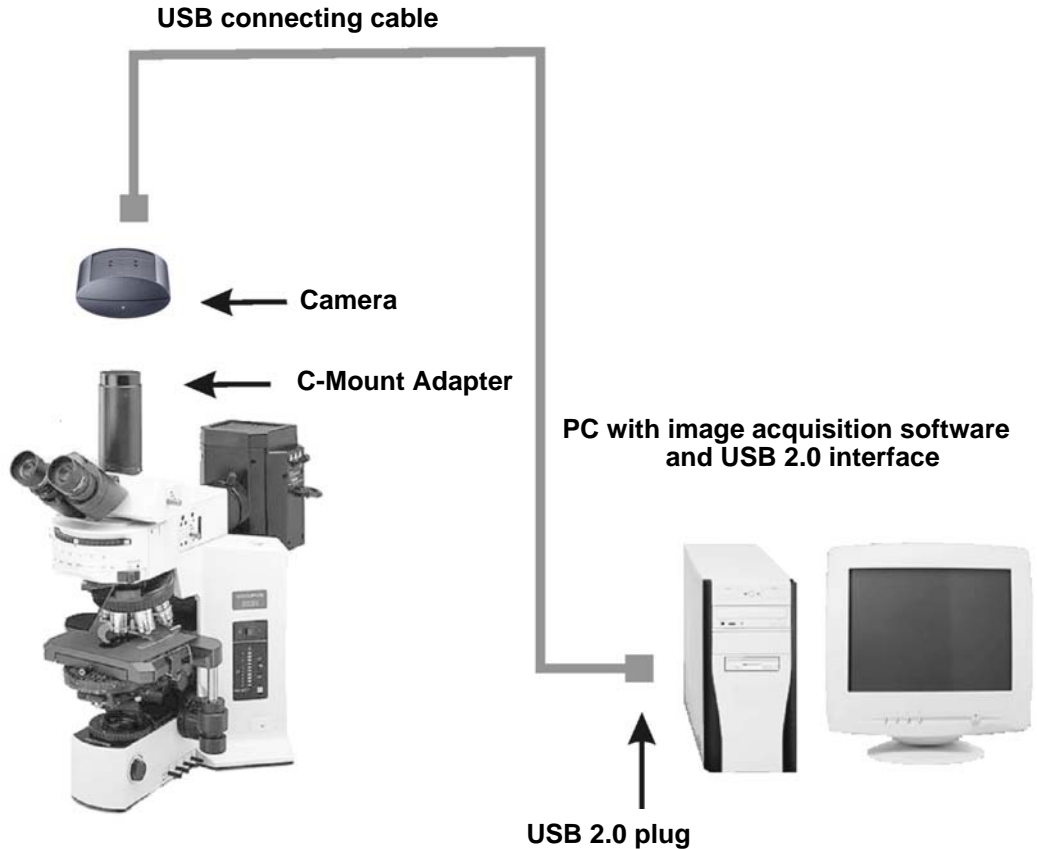
Mounting the camera

Warning



Install the image acquisition software before connecting your camera to your PC. This is necessary so that the operating system does not install the wrong TWAIN camera driver.

The diagram shows a typical installation on a light microscope. You should have all of the required components ready at hand.



- 1) Remove the protective cap from the camera.
- 2) Firmly screw the TV adaptor and the C-Mount (0.5x or bigger") onto the camera. This should be done with the microscope mount facing down to minimize the chance of dust landing on its surface.
- 3) Install this assembly onto the microscope's camera mount. Some microscopes may require additional optical elements installed between the camera mount and the C-mount adapter. You may also need to align the orientation of the microscope with that of the stage, and also match the

focus of the camera image with that of the eyepiece image. These settings can be done later when you are able to obtain an image on the screen.

- 4) Plug the end of the camera's USB 2.0 cable into a free socket of your PC. Should more than one USB slot be available, you can make an arbitrary choice of which jack you use.
- 5) Continue with the camera driver registration before starting your software.

Selecting the camera driver

- ▶ After connecting the camera to your PC, the Found New Hardware Wizard will automatically start.

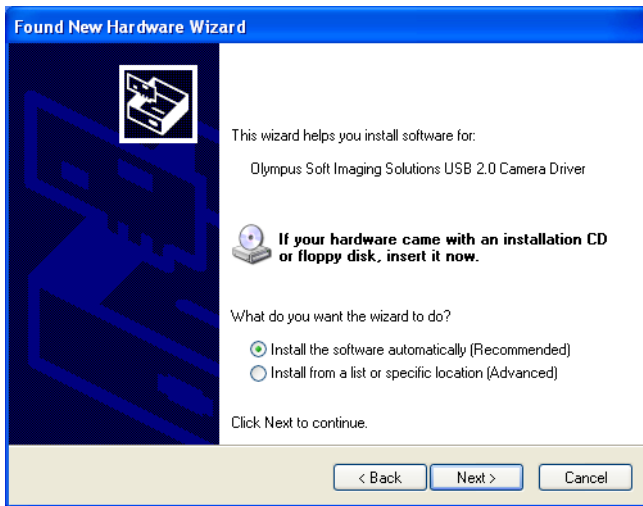
Registering the camera driver

The camera driver is automatically installed when setting up your image acquisition software. The camera driver is not signed and therefore will not be used automatically by Windows XP. After having installed the image acquisition software and having connected the camera to the computer, you must register the camera driver with Windows XP.

- 1) Windows XP opens the Found New Hardware Wizard dialog box.



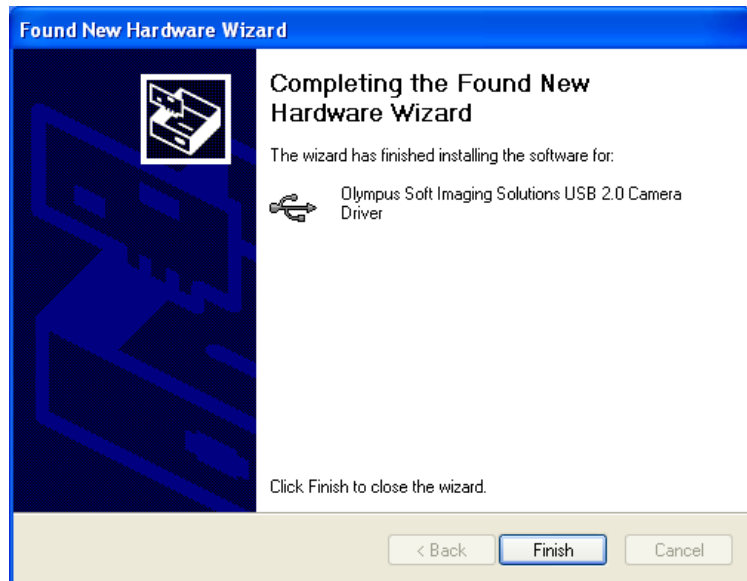
- 2) Select the No, not this time option and click the Next > button.
 - ▶ An additional Found New Hardware Wizard dialog box opens.



- 3) Insert the image acquisition software CD and select the Install the software automatically (Recommended) option and click the Next > button.
 - ▶ The installation begins. After a little while, the Hardware Installation dialog box will pop up.



- 4) Click the Continue Anyway button.
 - ▶ An additional Found New Hardware Wizard dialog box opens.



- 5) Click the Finish button.
 - ▶ In doing so, the registration of your camera driver with Windows XP is not yet finished. Windows XP opens the Found New Hardware Wizard dialog box a second time.
- 6) Repeat steps 2 to 5.
 - ▶ In doing so, the registration of your camera driver with Windows XP is finished.

Installing the camera with Windows Vista

SC20 The following step-by-step instructions describe the installation procedure for the
SC30 getIT software under the Microsoft Windows Vista operating system. These
XM10 instructions apply for the following Olympus light microscopy cameras:
XC10 SC20, SC30, XM10, XC10, UC30, XC30, UC50, XC50.
UC30
XC30
UC50
XC50

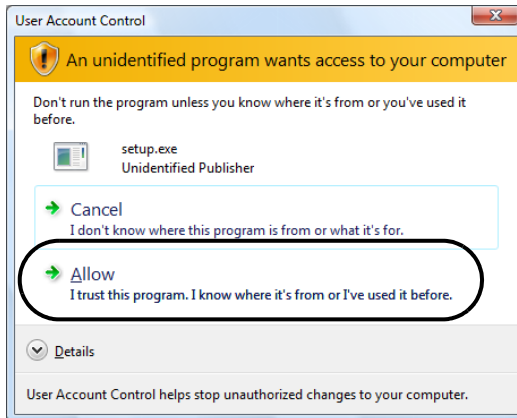
Installing the image acquisition software getIT

Warning

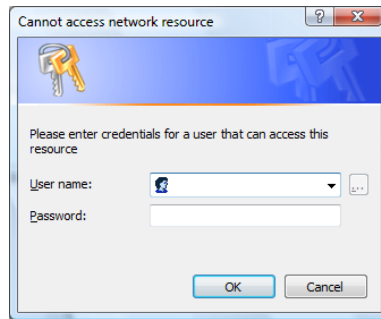


Install the image acquisition software before connecting your camera to your PC. This is necessary so that the operating system does not install the wrong TWAIN camera driver.

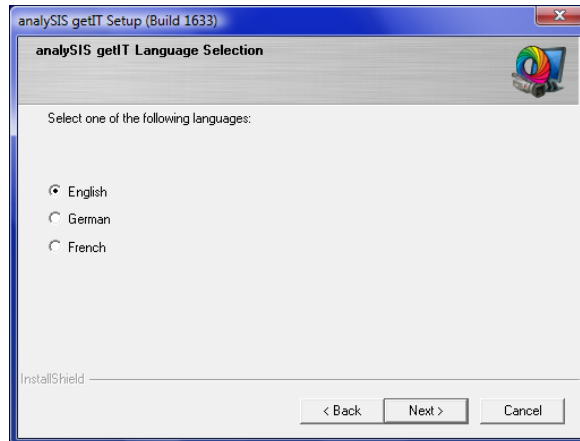
- 1) Place the CD that has been supplied into the CD-ROM drive.
 - ▶ The installation program will start automatically - unless you have deactivated the autorun function. If so, please start the setup.exe file manually.
- 2) If Microsoft Windows Vista opens the Open File - Security Warning dialog box, click the Run button.
 - ▶ Microsoft Windows Vista will automatically switch to the Security Desktop.



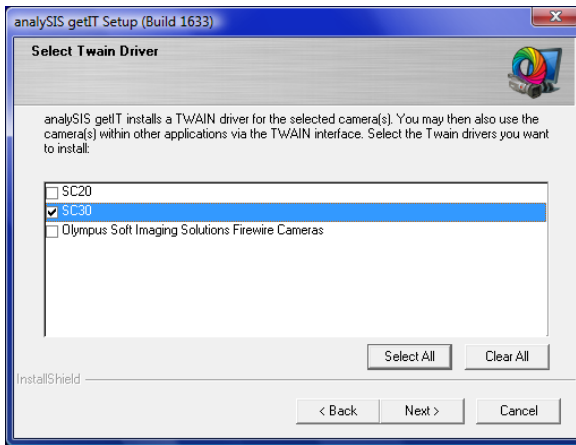
- 3) Click the Allow entry to start the installation.
 - ▶ Before the installation can be started you will possibly have to prove your authorization.



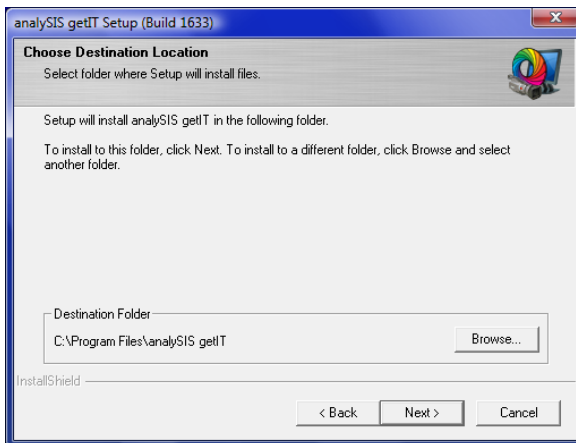
- 4) Enter your MS-Windows user name and your password and confirm them with **OK**.
 - ▶ The installation of the getIT image acquisition software will be prepared.
 - ▶ The following dialog box opens.



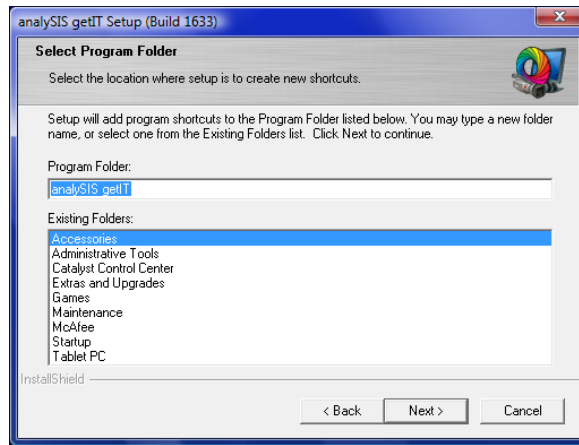
- 5) Select the language of your getIT software. The default language is your operating system's language.
Click the **Next >** button.
 - ▶ The **Select Twain Driver** dialog box opens.



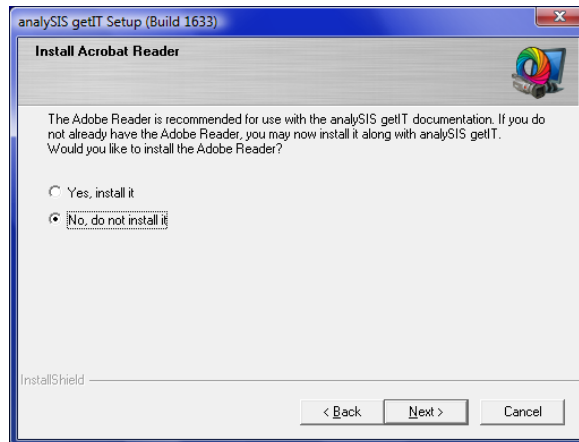
- 6) Select the TWAIN driver for your camera.
 Please note: a special driver is required for the SC20 and the SC30 cameras. Select the SC20, resp. SC30, check box. Select the Olympus Soft Imaging Solutions Firewire Cameras check box with all the other cameras (XM10, XC10, UC30, XC30, UC50, XC50).
 ▶ The Choose Destination Location dialog box opens.



- 7) If you want to change the directory on which the getIT image acquisition software is to be installed, click the Browse... button. Select the desired directory.
 8) Click the Next > button.
 ▶ The Choose Folder dialog box opens.

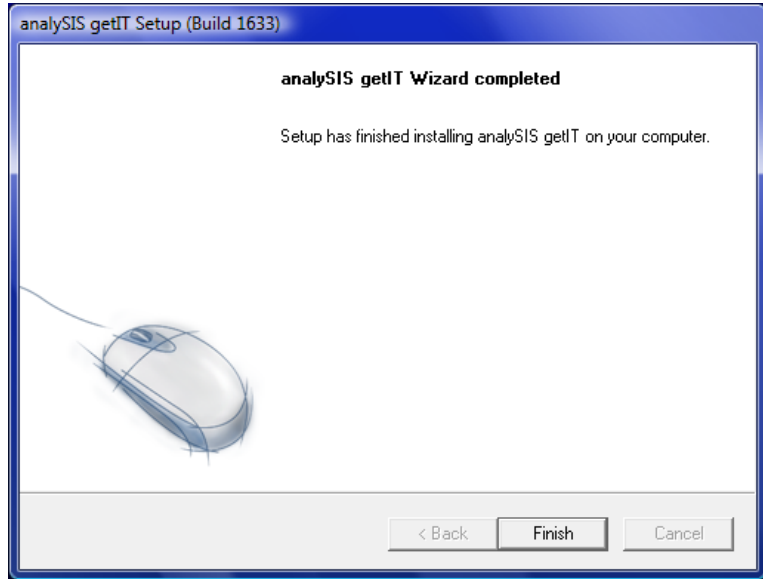


- 9) Select the installation folder. You can either browse to an existing folder or create a new one.
- 10) Click the **Next >** button.
 - ▶ The getIT software manual is available as a PDF file. In the next dialog box you decide whether the Acrobat Reader program should be installed automatically together with the getIT image acquisition software.



- 11) Select the **Yes, install it** option if you want to automatically install the Acrobat Reader program. You'll need this program in order to read the getIT software manual.
Select the **No, do not install it** option for instance if the Acrobat Reader program is already installed.
- 12) To start the actual installation, click the **Next >** button.

- 13) Wait until the following dialog box opens.



- 14) Click the Finish button to finalize the installation.
- ▶ The getIT image acquisition software has now been installed.

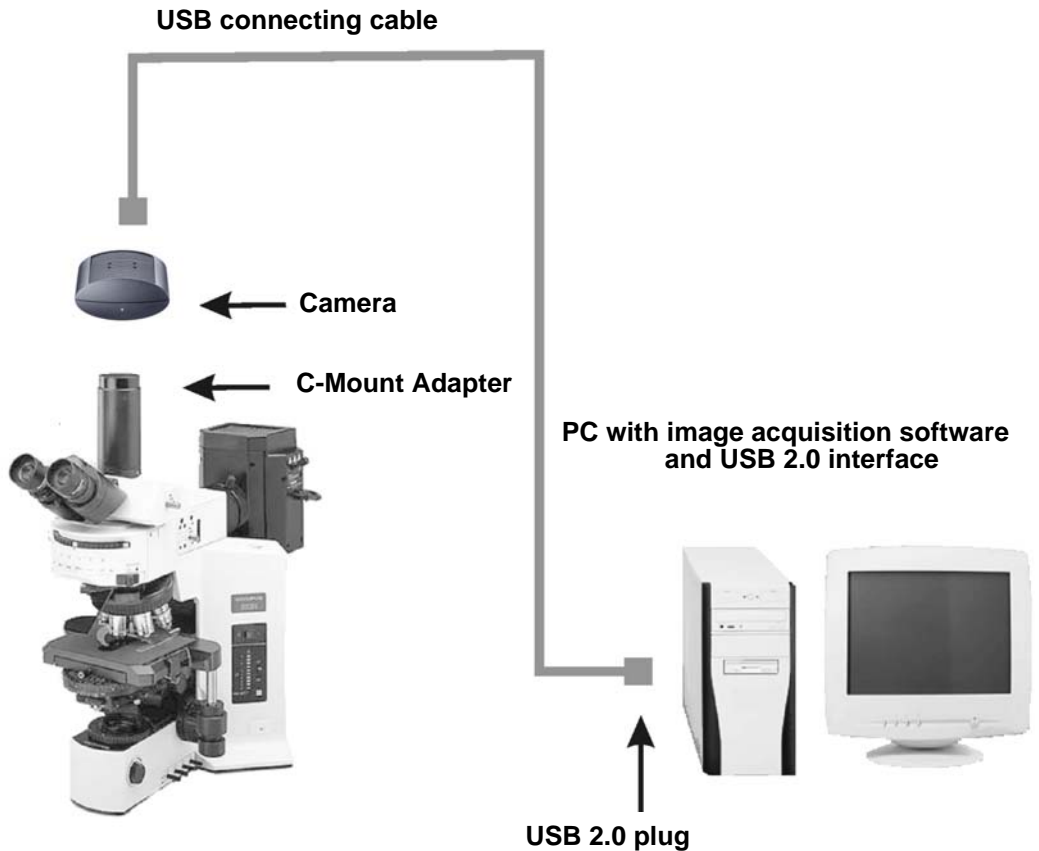
Mounting the camera

Warning



Install the image acquisition software before connecting your camera to your PC. This is necessary so that the operating system does not install the wrong TWAIN camera driver.

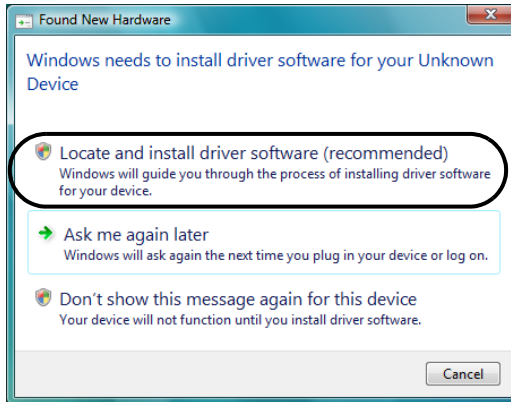
The diagram shows a typical installation on a light microscope. You should have all of the required components ready at hand.



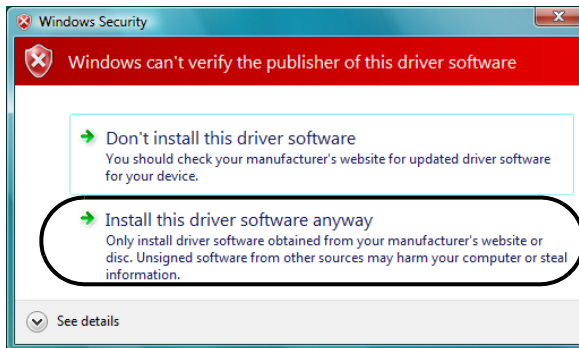
- 1) Remove the protective cap from the camera.
- 2) Firmly screw the TV adaptor and the C-Mount (0.5x or bigger") onto the camera. This should be done with the microscope mount facing down to minimize the chance of dust landing on its surface.
- 3) Install this assembly onto the microscope's camera mount. Some microscopes may require additional optical elements installed between the camera mount and the C-mount adapter. You may also need to align the orientation of the microscope with that of the stage, and also match the focus of the camera image with that of the eyepiece image. These settings can be done later when you are able to obtain an image on the screen.
- 4) Plug the end of the camera's USB 2.0 cable into a free socket of your PC. Should more than one USB slot be available, you can make an arbitrary choice of which jack you use.
- 5) Continue with the camera driver registration before starting your software.

Selecting the camera driver

- ▶ After connecting the camera to your PC, the Found New Hardware Wizard will automatically start.



- 1) Click the Locate and install driver software (recommended) entry.
 - ▶ Microsoft Windows Vista will then ask to be allowed to activate the device driver.
- 2) Confirm the message by clicking the Continue button.
- 3) Wait until Microsoft Windows Vista has opened the displayed security query.



- 4) Click the Install this driver software anyway entry.
 - ▶ Your camera is now ready for use.
- 5) Start the getIT image acquisition software or any application program that supports TWAIN.

Your camera is now registered as a TWAIN device and can be selected.

Appendix III: In case of problems with the camera...

Most problems with the SC30 camera are due to the PC's USB system. Should a problem crop up, please check the following points before you turn to our customer service.

- Is there an Intel®82801FB/FBM USB2 ENHANCED HOST CONTROLLER in your PC?
- Have you connected an extension cable to the SC30's cable?
 - ▶ Remove the extension cable, since in this case the required data rate might not be achieved.
- Are additional USB devices connected to the USB controller?
 - ▶ Remove these devices, since in this case the required data rate might not be achieved. Should the problem have been solved in this manner, you can then reconnect the other devices by using a separate USB controller board plugged into a PCI slot.
- Does your PC have an activated Intel Hyper Thread Function in the BIOS?
 - ▶ Deactivate this function.

Should you have questions or should problems arise which you cannot solve with the help of the documentation provided, please feel free to contact our customer service - preferably via e-mail. Our customer-service personnel will be more than happy to assist you.

- 1) Please clarify before hand when and under what circumstances the problem arose.
 - It would be best if you can clearly reproduce the problem/error. You will therefore make it easier for you and our customer-service personnel to solve the problem.
- 2) Please write down the exact wording of the (error) messages which appear.
 - As an alternative, you can make screenshots of these messages. You can make a screen shot of your active window by using the key combination [Alt+Print]. A copy of the active window is stored to your clipboard and can be easily attached to an e-mail using [Ctrl+V].
 - Since very large e-mails can create transmission problems both for the sender and the receiver, do not copy "screenshots" of the entire contents of the screen. For the same reasons it is advisable to reduce the color depth of the screenshots.
- 3) Should the camera basically work, but problems with image quality arise, save an image in which the problems are clearly visible in TIF format. Insert this example image in your e-mail to our customer service.
- 4) Start the software.

- 5) Use the ? > About... command to open the About dialog box.
 - ▶ The About dialog box shows you information about the software package (Docu, Auto, Pro), the build number and the serial number of your software as well as the operating system being used.
 - The software data mentioned should be at hand when you contact our customer service personnel.
- 6) Please write an e-mail clearly describing the problem (including screenshots and example images), as well as the software data from the About dialog box, to our customer service address.

support@olympus-sis.com



- The quickest and most convenient way is to use the automatic e-mail settings for your customer service query:
Via the ? > About... > System Info... > Send button, an automatic e-mail is created which you can then complete and send to us. If you have made an example in TIF format, please attach this to the e-mail as well. Before you send a mail, please read the notes in your e-mail window about the data that you're sending us in this e-mail.



- Should you not be able to send e-mails from your PC, use the ? > About... > System Info... > Save Info button to save the files and to send them from another computer.
- You may, of course, also contact us via telephone or fax:
Tel.: (+ 49) 2 51 / 7 98 00-6444
Fax: (+ 49) 2 51 / 7 98 00-6445.

Appendix IV: WEEE declaration

**Waste Electrical
and Electronic
Equipment**

In accordance with European Directive 2002/96/EC on Waste Electrical and Electronic Equipment, this symbol indicates that the product must not be disposed of as unsorted municipal waste, but should be collected separately. Refer to your local distributor for return.



Appendix V: EMC declaration - SC30

OLYMPUS

Your Vision, Our Future

Declaration of Conformity

EMC

Product Type	CMOS Camera
Brand Name	Olympus
Model Designation	SC30
Manufacturer	Olympus Soft Imaging Solutions GmbH Johann-Krane-Weg 39 48149 Münster Germany

The product complies with the requirements of the following European directives:

2004/108/EC Directive of the European Parliament and of the Council of 15 December 2004 on the approximation of the laws of the Member States relating to electromagnetic compatibility and repealing Directive 89/336/EEC.

Compliance was proved by the application of the following electromagnetic compatibility standards
EN 61326:1997 + A1:1998 + A2:2000 + A3:2003

FCC Code of Federal Regulations, CFR47, Part 15 Sections 15.107 and 15.109 (Class B)

Münster, 3.2.2009 J. Tuempfer
 Dr. J. Tuempfer
 Section Manager I Core Asset Cameras

Münster, 03. Feb. 2009 M. Luetgen
 M. Luetgen
 Quality Representative

Münster, 03.02.2009 K. P. Schmidt
 Dr. K. P. Schmidt
 CTO

OLYMPUS SOFT IMAGING SOLUTIONS GMBH

1 / 1

62

Appendix VI: RoHS declaration - SC30

OLYMPUS

Your Vision, Our Future

Declaration of Conformity

RoHS

Product Type	CMOS Camera
Brand Name	Olympus
Model Designation	SC30
Manufacturer	Olympus Soft Imaging Solutions GmbH Johann-Krane-Weg 39 48149 Münster Germany

The product complies with the requirements of the following RoHS directives:

2002/95/EG	Directive of the European Union on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)
ACPEIP	Administration on the Control of the Pollution caused by Electronic Information Products (China RoHS) and the related standards SJ/T 11363 – 2006 SJ/T 11364 – 2006

Münster, 3.2.2009 J. Tümpner
Dr. J. Tümpner
Section Manager | Core Asset Cameras

Münster, 03. Feb. 2009 M. Luetgen
M. Luetgen
Quality Representative

Münster, 03.02.09 M - 115
Dr. K. P. Schmidt
CTO

OLYMPUS SOFT IMAGING SOLUTIONS GMBH

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Geschäftsführer: Dr. Helmut Köhler, Masaki Yamagishi, Koji Fujio, Michael Czernopel
VAT-ID: DE 813 446 408, Sitz der Gesellschaft: Münster, Gerichtsstand Münster HR B 10405
Deutsche Bank Münster, BLZ 40270500, Konto: 0270207, SWIFT: DEUTDE33HAN, IBAN: DE59400700900027020700

1/1

Index

B

Brightness **18**

C

Calibration

 Apply **23**

 Define **20**

Camera driver **7**

Camera, Select **14**

Color settings **17**

 Gamma Correction **18**

Color temperature of the monitor **9**

Contrast **18**

 Optimize **18**

Correcting color errors **17**

E

Exposure time **16**

 Automatic **17**

G

Gamma Correction **18**

I

Image

 Acquire **16**

 Calibrate **23**

 Delete **34**

 Load **27**

 Print **29**

 Save **24**

Image acquisition **16**

 Step by Step instruction **13**

Image buffer **10**

Image buffer box **10**

 Hide **34**

Image display

 Optimize **12**

 Single view, Tile view **12**

Image information **25**

Image name **25, 26**

Image window **10**

Input, Set **14**

Installation of software and camera driver **7**

K

Köhler illumination, microscope **38**

L

Live image **16**

M

Microscope **37**

 Controlling illumination intensity **8**

 Empty magnification **40**

 Illumination **37**

 Numerical Aperture **39**

 Objective **39**

 Total magnification **39**

 Useful magnification **39, 40**

Microscope Illumination Intensity **8**

Microscope settings **8, 37**

Monitor Settings **9**

P

PC, Requirements **6**

Print **31**

 Print directly **29**

 Single image, Multiple images **31**

Print setup **30**

R

Resolution **16**

S

Saturation **18**

Save **24**

Scale bar

 Burn into image **33**

 Show in viewport **33**

Scan **19**

Serial Number **60**

Sharpen filter **18**

Special **9**

System Info **35, 60**

System requirements **6**

T

Total magnification, microscope **8**

TWAIN dialog box **16**

TWAIN interface **13**

U

Useful magnification, Microscope **40**

User Interface **10**

V

Viewport **10**

W

White Balance **8, 17**

 Execute **9**

Z

Zoom factor **10**

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