QuickPHOTO MICRO 3.1

User Guide

QuickPHOTO MICRO 3.1

QuickPHOTO MICRO 3.1 program is not designed for diagnosis and determining of medical procedures!

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Installation

> **Important**
>
> It is necessary to have the administrator's privileges for installation. If you do not have administrator's privileges, contact your administrator.

When installing the QuickPHOTO MICRO 3.1 program proceed according to the following steps:

1. **Installation of an Imaging Device** - for more information see "Installation of an Imaging Device" on page 7.

2. **Installation of a Dongle** - for more information see "Installation of a Dongle" on page 13.

3. **Installation of the QuickPHOTO MICRO 3.1 Program** - for more information see "Installation of the QuickPHOTO MICRO 3.1 Program" on page 13.

4. **Installation Completion** - for more information see "Installation Completion" on page 15.

Individual steps are described in the following chapters.

1. Installation of an Imaging Device

1.1. Installation of PROMICAM USB 3.0 Digital Cameras

1. The PROMICAM USB 3.0 digital cameras are being supplied with additional USB 3.0 interface card. The card is either PCI Express type for desktop computers or ExpressCard type for laptops. In case the PCI Express card is a part of the camera package, switch off your computer and insert the USB 3.0 interface card to a free **PCI Express 2.0** slot of your computer's main board. Then turn the computer on again. In case the ExpressCard is a part of the camera package, simply insert the card to a free ExpressCard slot of your laptop. The installation of USB 3.0 interface card device

drivers will be done automatically during the QuickPHOTO MICRO 3.1 program installation.

2. For now, do not connect the PROMICAM USB 3.0 camera to your computer. If it is connected, disconnect it.
3. Continue with steps *Installation of the QuickPHOTO MICRO 3.1 Program* - for more information see "Installation of the QuickPHOTO MICRO 3.1 Program" on page 13 and *Installation Completion* - for more information see "Installation Completion" on page 15.

1.2. Installation of PROMICAM USB 2.0 Digital Cameras

1. For now, do not connect the PROMICAM USB 2.0 camera to a computer. If it is connected, disconnect it.
2. Continue with steps *Installation of the QuickPHOTO MICRO 3.1 Program* - for more information see "Installation of the QuickPHOTO MICRO 3.1 Program" on page 13 and *Installation Completion* - for more information see "Installation Completion" on page 15.

1.3. Installation of Lumenera® INFINITY USB 2.0 Digital Cameras

1. For now, do not connect the Lumenera® INFINITY camera to the computer. If it is connected, disconnect it.
2. Continue with steps *Installation of the QuickPHOTO MICRO 3.1 Program* - for more information see "Installation of the QuickPHOTO MICRO 3.1 Program" on page 13 and *Installation Completion* - for more information see "Installation Completion" on page 15.

1.4. Installation of Canon® EOS Digital SLR Cameras

1. Connect the Canon® EOS digital SLR camera to your running computer, turn it on and switch the mode dial to the *Av* (automatic mode) or *M* (manual mode) position.
2. Wait until the camera's device drivers are automatically installed.
3. Continue with step *Installation of the QuickPHOTO MICRO 3.1 Program* - for more information see "Installation of the QuickPHOTO MICRO 3.1 Program" on page 13.

1.5. Installation of IDS uEye® USB 2.0 Digital Cameras

> **Important**
>
> IDS uEye® UI-1440 camera is compatible with Microsoft® Windows® XP/Vista operating systems only.

1. For now, do not connect the IDS uEye® camera to the computer. If it is connected, disconnect it.
2. Continue with steps *Installation of the QuickPHOTO MICRO 3.1 Program* - for more information see "Installation of the QuickPHOTO MICRO 3.1 Program" on page 13 and *Installation Completion* - for more information see "Installation Completion" on page 15.

1.6. Installation of PathScan Enabler IV Scanner

1. For now, do not connect the PathScan Enabler IV device to the computer. If it is connected, disconnect it.
2. Continue with steps *Installation of the QuickPHOTO MICRO 3.1 Program* - for more information see "Installation of the QuickPHOTO MICRO 3.1 Program" on page 13 and *Installation Completion* - for more information see "Installation Completion" on page 15.

1.7. Installation of ARTRAY ARTCAM USB 2.0 Digital Cameras

1. For now, do not connect the ARTRAY ARTCAM camera to the computer. If it is connected, disconnect it.
2. Continue with steps *Installation of the QuickPHOTO MICRO 3.1 Program* - for more information see "Installation of the QuickPHOTO MICRO 3.1 Program" on page 13 and *Installation Completion* - for more information see "Installation Completion" on page 15.

1.8. Installation of OLYMPUS® Consumer and DSLR Digital Cameras (E-system, CAMEDIA® and SP series)

Installation of OLYMPUS® cameras consists of two steps:

- Installation of a device for displaying of live view.
- Installation of OLYMPUS® digital camera.

These steps are described in the following chapters.

Installation of a Device for Displaying of Live View (frame grabber)

Installation of device drivers will be performed by the installer during the installation of the QuickPHOTO MICRO 3.1 program. Just select the corresponding check-box on page *Select Additional Tasks* in the *Frame Grabber Device Drivers Installation* part during the QuickPHOTO MICRO 3.1 program installation.

Installation of OLYMPUS® Digital Camera

When installing the OLYMPUS® digital camera, proceed according to the following steps:

- Switching the camera to a PC control mode.
- Connecting the camera with the computer.
- Installation of the digital camera device drivers.

Individual steps are described in the following chapters.

Switching the Camera to the PC Control Mode

To control the OLYMPUS® camera from the QuickPHOTO MICRO 3.1 program, it is necessary to switch it to the PC control mode. Proceed as follows:

- **OLYMPUS® DSLR E-system Series Cameras:**

  Make sure the USB cable is disconnected from the camera. Switch the mode dial to the *P* position and turn the camera on.

> **Note**
>
> In the camera's menu, make sure the *Live View Boost* function is turned off.

- **OLYMPUS® E-330, E-510, E-410 DSLR Cameras**

  In the camera's menu, in the *Settings 2* menu (symbol of a key with the number 2) move the cursor to the *USB MODE* item. Press the right arrow button and select the *CONTROL* option. Confirm by pressing the *OK* button.

- **OLYMPUS® E-3, E-30, E-620, E-520, E-450, E-420 DSLR Cameras**

  In the camera's menu, in the *Settings 1* menu (symbol of a key with the number 1) or for the type E-620, the *User Menu* (cogwheel symbol), move the cursor to the *DISP/sound/PC* item and press the right arrow button. Move the cursor to the *USB MODE* item, press the right arrow button and select the *CONTROL* option. Confirm by pressing the *OK* button.

- **OLYMPUS® E-600 DSLR Camera**

  In the camera's menu, in the *Settings* menu (symbol of a key) move the cursor to the *MENU DISPLAY* item and press the right arrow button. Using the arrow buttons set the value *ON*. Confirm by pressing the *OK* button. Further on, in the camera's menu, in the *User Menu* (cogwheels symbol) move the cursor to the *DISP/PC* item and press the right arrow button. Move the cursor to the *USB MODE* item, press the right arrow button and select the *CONTROL* option. Confirm by pressing the *OK* button.

• **OLYMPUS® CAMEDIA® and SP Series Digital Cameras:**

Make sure the USB cable as well as the TV output cable is disconnected from the camera. Switch the camera to the *P* mode using the mode dial, turn it on and open the memory card cover. *Card cover open* warning will appear. Then first press the *OK/menu* (1) button and along with it the *Quick View* button (with older types *turn on/off the LCD screen*) (2). Hold both buttons for about 3 seconds. Menu *CAMERA/SDK SETUP* will appear. In the *USB* part, select the *CONTROL* option (with older types the option *On*), confirm by pressing the *OK* button and close the memory card cover.

Olympus C-5060WZ
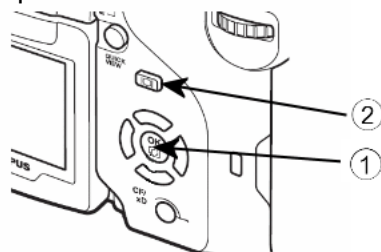
Olympus 8080WZ
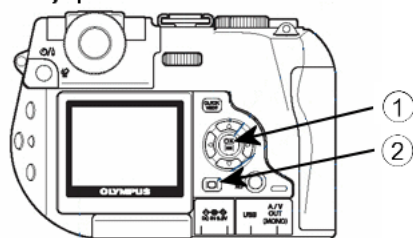
Olympus SP-350
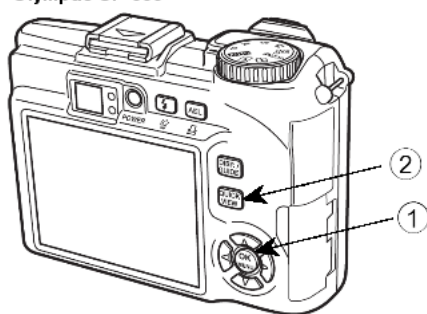
Olympus SP-500UZ
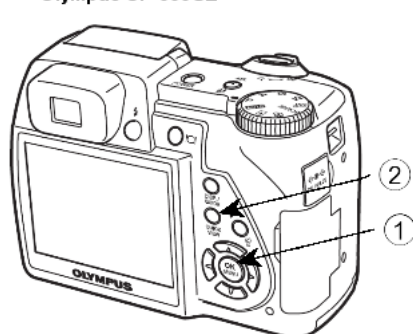
Camera should be now ready for computer control. The camera will not be accessible as a Mass Storage disk drive after switching to the PC control mode. If you want to download images from the camera like from a disc unit, the camera must be switched back to the *STORAGE* mode (with older types *OFF*).

Connecting the OLYMPUS® Camera to a Computer

1. To control OLYMPUS® (E-system and SP series) cameras from a computer, it is necessary to use a special dual cable (USB+live view). CINCH connector of this cable should be connected with the CINCH connector of the device for live view display. Connect the USB connector of the dual cable to the USB port of the computer. In case of need, use extension cables.

2. Make sure the camera's mode dial is set to the *P* position and the camera is on.

Installation of Digital Camera Device Drivers

• **OLYMPUS® DSLR E-system Series Cameras:**

Device drivers of the OLYMPUS® DSLR E-system series cameras will be installed during program installation.

• **OLYMPUS® CAMEDIA® and SP Series Digital Cameras:**

Device drivers of the OLYMPUS® CAMEDIA® and SP series cameras will be installed automatically after connecting of the camera to the computer and turning it on.

2. Installation of a Dongle

Connect the dongle (included in the delivery) to the USB port of your computer. If a *Found New Hardware* wizard appears, terminate it. Dongle device drivers will be installed during program installation.

3. Installation of the QuickPHOTO MICRO 3.1 Program

Note

Administrator's privileges are required for QuickPHOTO MICRO 3.1 program installation. If you do not have the administrator's privileges, contact your administrator.

> **Important**
>
> Do not install, into the operating system, any codec packs, e.g. All In 1, K-Lite Mega Codec Pack and so on. These packages may cause incorrect function of the program. If you do have some of these packages installed in your system, we strongly recommend to uninstall such packages. If you need to install some codec, use the particular codec installer, instead of installing the whole codec pack.

After signing in with the administrator's privileges, proceed as follows:

1. If you are going to install the program from the installation disk, insert it to the DVD drive and wait for a home screen to appear. If the home screen does not show automatically, run, from the installation disk, *autorun.exe* program manually. Then start the installation of the QuickPHOTO MICRO 3.1 program by clicking the *Install QuickPHOTO MICRO 3.1* button at the home screen.

   In case you are going to install the QuickPHOTO MICRO 3.1 program using a downloaded installation package, run it and select the destination folder, where the installation files should be extracted. Wait until all files will be extracted. A home screen should appear automatically. Then click the *Install QuickPHOTO MICRO 3.1* button at the home screen.

2. *Setup Wizard* of the QuickPHOTO MICRO 3.1 program will open. Continue according to the on screen guidelines. On page *Select Components - Imaging Devices* select the support of the desired imaging devices. If you want to use an imaging device controlled via the TWAIN interface, select the *Imaging Devices Controlled via TWAIN Interface* option. Continue according to the on screen guidelines.

3. If you want to use some of the magnification encoders, select the corresponding control unit(s) on page *Select Additional Components - Magnification Encoders*. Continue according to the on screen guidelines.

4. If you want to use some of the computer controlled illuminators, select the corresponding control unit(s) on page *Select Additional Components - PC Controlled Illuminators*. Continue according to the on screen guidelines.

5. On page *Select Additional Tasks* part select the device drivers which should be installed for the used devices (if applicable).

6. On page *Select Additional Tasks - File Types Associations* it is possible to set association of the QuickPHOTO MICRO 3.1 program for opening of files of the BMP, JPEG, PNG or TIFF types. If you check one or more of the mentioned options, the QuickPHOTO MICRO 3.1 program will always be used for opening of the corresponding file types.

Finish the installation by clicking the *Finish* button. If prompted, restart your computer.

4. Installation Completion

4.1. Installation Completion for PROMICAM USB 3.0 Digital Cameras

1. If you have restarted your computer, sign in again to the administrator's account.
2. Connect the PROMICAM USB 3.0 camera to the USB 3.0 port of the installed USB 3.0 interface card using the enclosed USB 3.0 cable. Do not use additional extension cord.
3. Installation and commissioning of the camera device drivers will take place automatically.

4.2. Installation Completion for PROMICAM USB 2.0 Digital Cameras

1. If you have restarted your computer, sign in again to the administrator's account.
2. Connect the PROMICAM USB 2.0 camera to the USB 2.0 or USB 3.0 port of your computer using the enclosed USB cable. Do not use additional extension cord.
3. Installation and commissioning of the camera device drivers will take place automatically.

4.3. Installation Completion for Lumenera® INFINITY USB 2.0 Digital Cameras

1. If you have restarted your computer, sign in again to the administrator's account.
2. Connect the Lumenera® INFINITY camera to the USB 2.0 or USB 3.0 port of your computer using the enclosed USB cable.

3. Installation and commissioning of the camera device drivers will take place automatically.

4.4. Installation Completion for IDS uEye® USB 2.0 Digital Cameras

1. If you have restarted your computer, sign in again to the administrator's account.
2. Connect the IDS uEye® camera to the USB 2.0 or USB 3.0 port of your computer using the USB cable.
3. Continue with device drivers installation as follows:

   • **Microsoft® Windows® 7/8.1/10**

   Installation and commissioning of the camera device drivers will take place automatically.

   • **Microsoft® Windows® Vista**

   Found New Hardware window will appear. Select *Locate and install driver software (recommended)* option.
   User Account Control window will appear. Select *Continue* option.
   Windows Security window will appear. Select *Install this driver software anyway* option. Camera device drivers will be installed.

When you finish the above described process a green LED should light up on the camera (if the camera is equipped with this LED). This LED signals that the camera has been properly installed and is ready to use. If the LED light remains red, the camera probably is not connected to the USB 2.0 port or there has been a problem with the device drivers installation.

4.5. Installation Completion for PathScan Enabler IV Scanner

1. If you have restarted your computer, sign in again to the administrator's account.
2. Connect the PathScan Enabler IV scanner to the USB 2.0 or USB 3.0 port of your computer using the enclosed USB cable and turn it on.

3. Installation and commissioning of the scanner device drivers will take place automatically.

4.6. Installation Completion for ARTRAY ARTCAM USB 2.0 Digital Cameras

1. If you have restarted your computer, sign in again to the administrator's account.
2. Connect the ARTRAY ARTCAM camera to the USB 2.0 or USB 3.0 port of your computer using the enclosed USB cable.
3. Installation and commissioning of the camera device drivers will take place automatically.

4.7. Installation Completion for OLYMPUS® CAMEDIA® and SP Series Digital Cameras

> **Note**
>
> In 64bit versions of Microsoft® Windows® operating systems, the QuickPHOTO MICRO 3.1 program needs to be run with administrator privileges in order to be able to control OLYMPUS® CAMEDIA® and SP series digital cameras. OLYMPUS® CAMEDIA® and SP series cameras cannot be used from the Guest account.

If you want to control the cameras from the administrator account, all you have to do is to turn on the camera and then run the QuickPHOTO MICRO 3.1 program with administrator privileges.

If you want to control the cameras from standard user accounts or administrator accounts with User Account Control (UAC) feature enabled, it is necessary to obey the following procedure after program installation (speaking only about the very first run of the program):

1. Turn off the camera, and sign off from the administrator's account.
2. Sign in to your user account, and turn on the camera. Wait until communication between the camera and the operating system is established (an icon will appear in the right bottom part of the screen).
3. Then run the QuickPHOTO MICRO 3.1 program.

5. Adding the Support of a New Hardware

5.1. Adding the Support of a New Imaging Device

If you want to install the support of a new imaging device into an already installed QuickPHOTO MICRO 3.1 program, run the installation program again. On page *Installation Type Selection* select the *Update Existing Installation - Add Components* option and select, from the list, desired devices whose support would you like to add. Continue according to the on screen guidelines.

5.2. Adding the Support of Magnification Encoder

If you want to install the support of a new device into an already installed QuickPHOTO MICRO 3.1 program, run the installation program again. On page *Installation Type Selection* select the *Update Existing Installation - Add Components* option and select, from the list, the desired devices whose support would you like to add. Continue according to the on screen guidelines.

5.3. Adding the Support PC Controlled Illuminator

If you want to install the support of a new device into an already installed QuickPHOTO MICRO 3.1 program, run the installation program again. On page *Installation Type Selection* select the *Update Existing Installation - Add Components* option and select, from the list, the desired devices whose support would you like to add. Continue according to the on screen guidelines.

6. Troubleshooting or Change of OLYMPUS® Camera Type (CAMEDIA® and SP series)

Note

In 64bit versions of Microsoft® Windows® operating systems, the QuickPHOTO MICRO 3.1 program needs to be run with administrator privileges in order to be able to control OLYMPUS® CAMEDIA® and SP series digital cameras.

If there appears a problem with connecting the camera or you want to start using a different OLYMPUS® camera (of a new type or a different device of the original type) in 32bit version of Microsoft® Windows® operating system, it is necessary to obey the following procedure:

1. Sign in to the account with the administrator's privileges.
2. Connect the new camera switched to the PC control mode - for more information see see "Switching the Camera to the PC Control Mode" on page 10, turn it on, and turn the mode dial to the *P* position.
3. Wait until the camera device drivers have been installed (in case of a new camera).
4. Run the tool *OLYMPUS® SP and CAMEDIA® Series Camera Change Utility* from the *Start → Programs → QuickPHOTO → QuickPHOTO MICRO 3.1 → OLYMPUS® CAMEDIA® and SP Series Camera Change*.
5. Click the *OK* button in the *OLYMPUS® SP and CAMEDIA® Series Camera Change Utility* window.
6. When asked, turn the camera off and back on.
7. Finish the change by clicking the *OK* button.
8. Sign off from the administrator's account.
9. After you have signed in to your standard user account the QuickPHOTO MICRO 3.1 program should be ready to work with the new camera.

The whole procedure (change of camera) must be repeated each time before the first use of the new camera. If you decide to use the original camera you do not need to repeat the above mentioned procedure.

Initial Configuration of the Program

First Run of the Program

When you run the QuickPHOTO MICRO 3.1 program for the first time, a *Configuration Wizard* will open which will help you to configure the program correctly. Settings can be later changed manually by the *Options* from the menu *Edit → Options...* or by repeated running of the *Configuration Wizard* from the *Edit → Configuration Wizard...* menu.

Important

Full completion of the configuration using the *Configuration Wizard* is in case of the first run of the QuickPHOTO MICRO 3.1 program, necessary. When you finish the *Configuration Wizard*, the QuickPHOTO MICRO 3.1 will run automatically.

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1. Configuration Wizard

This wizard consists of several pages through which you can browse using the *Next* and *Back* buttons. When configuring, proceed according to the wizard's guidelines.

Imaging Device Selection

Second page of the wizard offers the choice of imaging device which will be used for image acquiring. You can make your selection among only those devices whose support was selected during program installation. Select the desired imaging device and click the *Next* button.
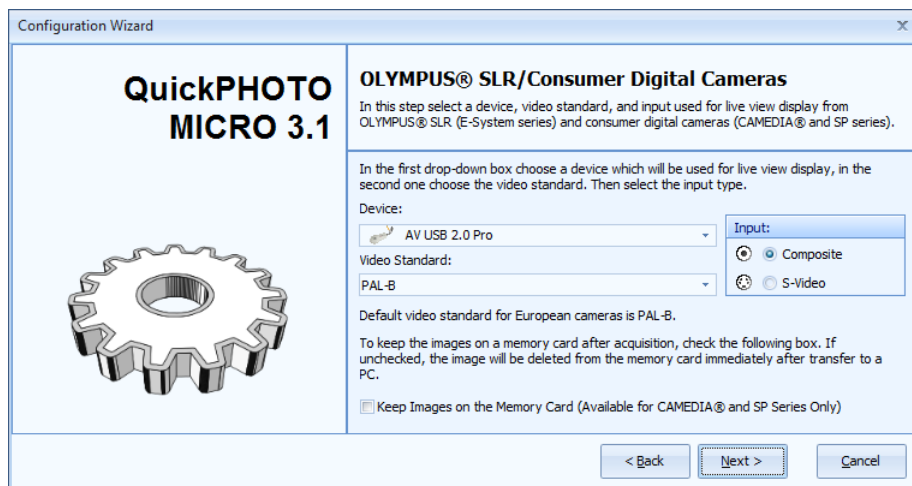
TWAIN Device Selection

If you have selected the *TWAIN Device* option, a list of available TWAIN devices will appear. Select the device which you want to use for image acquiring and click the *Select* button.

OLYMPUS® Digital Cameras (all types)

This page will appear only in case the support of OLYMPUS® CAMEDIA® and SP series or OLYMPUS® E-system DSLR cameras has been installed and it is intended to set the

device for display of live view from these cameras. If you are using a device delivered with the QuickPHOTO MICRO 3.1 program, it will be configured automatically after you see this page. When using a different device, select this device from the *Device* drop-down menu and select the norm of the video signal from the *Video Standard* menu. In the *Input* menu the option *Composite* should be selected. Checking of the *Keep Images on the Memory Card* option will cause that the acquired image will remain, after transfer to a computer, saved on the memory card (this function is available only for CAMEDIA$^®$ and SP series cameras). If you leave this option unchecked (recommended), the acquired image will be, after transfer to a computer, from the camera's memory card automatically deleted. To continue click the *Next* button.


Analog Video Sources

This page will appear only if the support of analog video sources has been installed and it is intended to set the digitalization device for acquiring images from these sources. If you are using a digitalization device delivered with the QuickPHOTO MICRO 3.1 program, it will be configured automatically after you see this page. When using a different digitalization device, select the device from the *Device* drop-down menu and select the norm of the video signal from the *Video Standard* menu. In the *Input* part you may select the desired type of the used connector. To continue click the *Next* button.
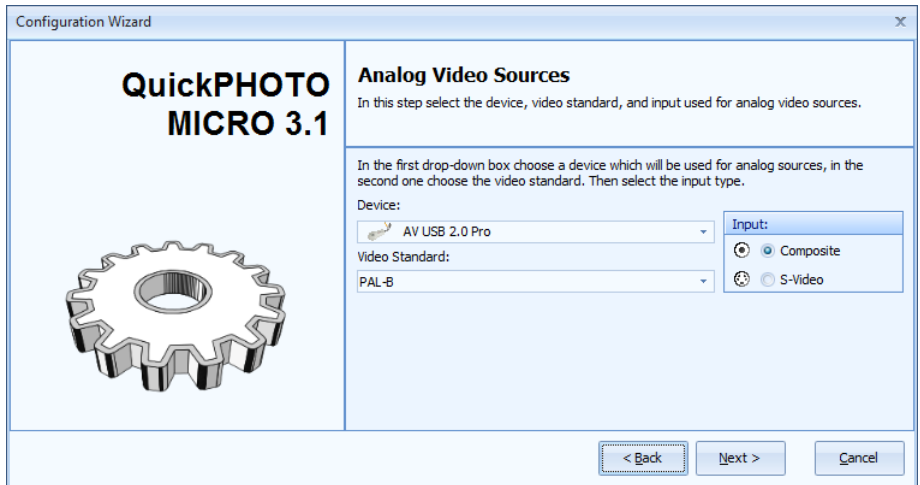
Default Folders

Next page of the wizard enables to set the folders, which will be offered as default when saving images, exporting measured values, and saving reports. This way you will not have to browse the whole directory structure of the computer to select the desired folder, where you want to save the files. To continue click the *Next* button.
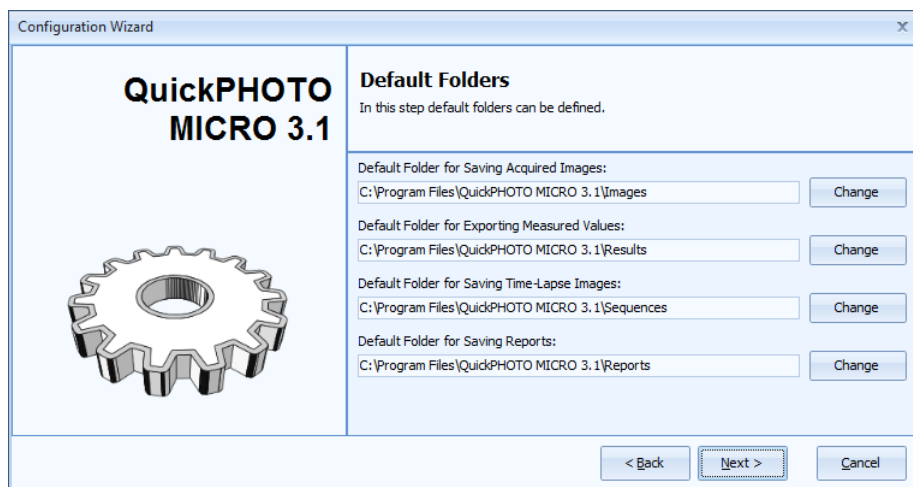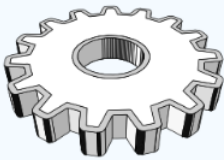
Scale Bar and Units

On this page of the wizard you may select the type and size of the calibrated scale bar. In the part *Scale Bar Type* you may set the type of the scale bar: *Ruler*, *Line Segment*, *Staple* and *Stripe*. In the part *Scale Bar Size* you may select one of the two automatic sizes (*Small*, *Large*) or you may select the *Custom* option and type in your own desired length of the scale bar into the field *Custom Size.* In the part *Preview* you will see what the scale bar will look like when using the current settings. In the part *Units* select units in which the measured values will be displayed: micrometers or millimeters. To continue click the *Next* button.
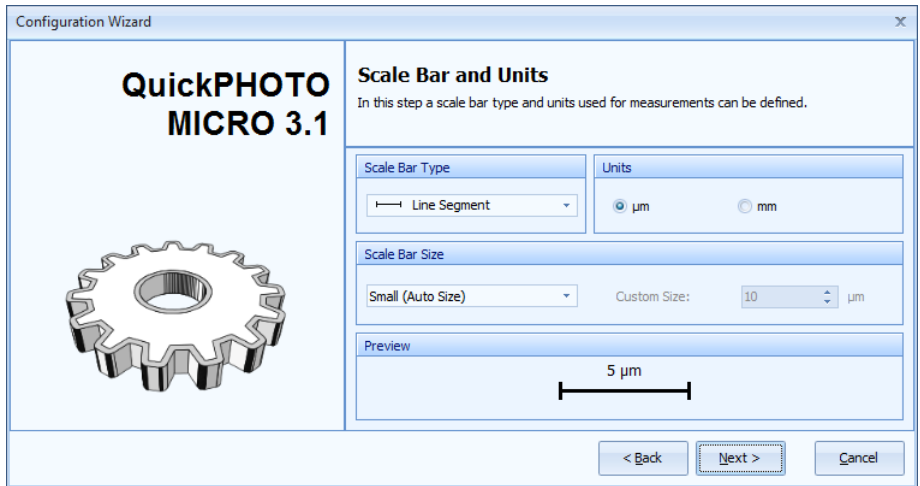
Measurands

Next page of the wizard is used to select the measurands which will be measured by individual measuring tools (length, diameter, radius, perimeter, area, angle) and the text label of individual measurands (row *Label*). Select the measurands which are supposed to be measured by checking them. To change the label, rewrite the appropriate text in the line *Label*. If the option *Display Measurement Numbers in Images* is checked, corresponding serial number of the measurement will be displayed by each measured value in the image. These settings will become default for the whole program and they will be valid for all newly acquired images. To continue click the *Next* button.

Remote Trigger

This page is used for setting and verification of the remote trigger's functionality. Remote trigger is an optional accessory which can be connected via serial or USB port. If you want to use the remote trigger, check the *Use Remote Trigger* option and select the COM port to which it is connected (in case of the USB trigger we are talking about the USB Serial Port (COM#)). In the part *Remote Trigger Type* select the type of the used remote trigger. Trigger with two buttons (for example the two-button foot switch) is designed for image acquiring and for capturing of video recordings using the optional module for video recording. Functionality of the remote trigger can be verified by pressing its button(s). If the small square(s) change color to green after you press the button(s) and they turn back to black after you release the button(s), the remote trigger is set correctly and it is ready to be used. To continue click the *Next* button.
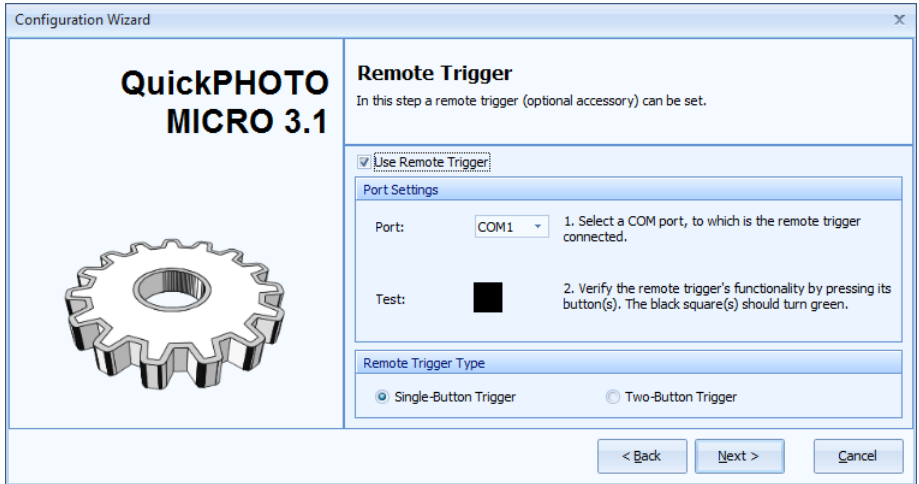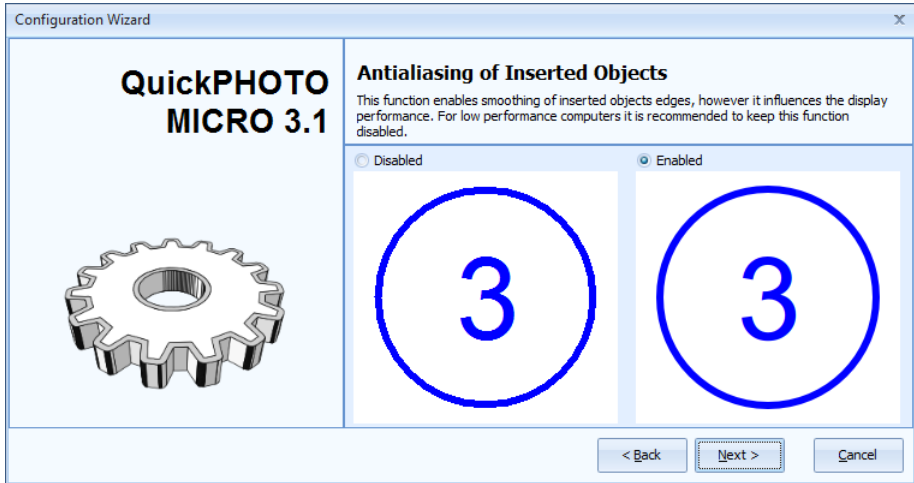
Color Theme Selection

On this page of the wizard you may select color theme of the program. To continue click the *Next* button.
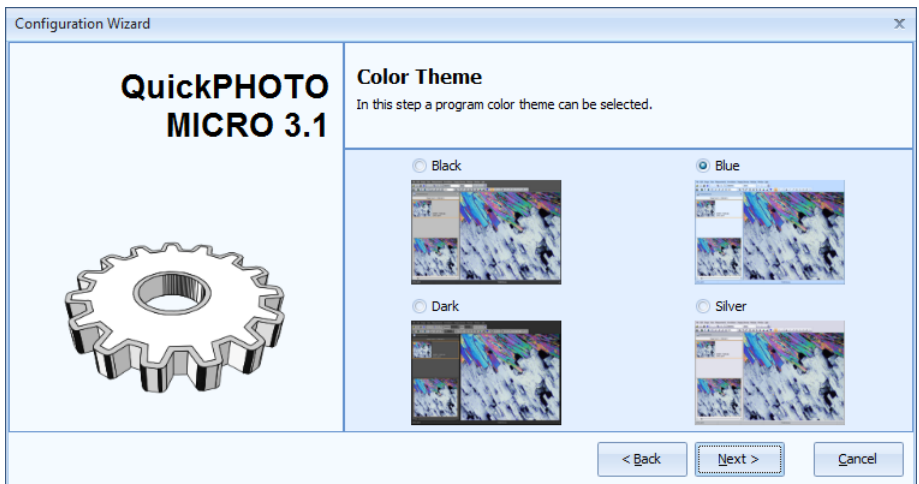
Antialiasing of Inserted Objects

On this page of the wizard you may enable the antialiasing of inserted objects feature. This feature is disabled in a default state. To continue click the *Next* button.

Finish the configuration by clicking the *Finish* button. QuickPHOTO MICRO 3.1 program will then run automatically.

Calibration of the Program for Measurements

1. Opening Information about Calibrations

Before it is possible to start measuring in the QuickPHOTO MICRO 3.1 program, it is necessary to calibrate the program for a particular microscope–imaging device set.

Calibration is necessary for all available magnifications of the microscope which you plan to use for your measuring. What is meant by magnification of the microscope in this program, is a combination of the objective's magnification and the zoom's or the magnification changer's magnification. If you are using an upright or inverted microscope without the magnification changer, the number of magnifications for calibration is given by the number of used objectives (value of the zoom equals 1 for all objectives). If you are using an upright or inverted microscope with the magnification changer, the number of magnifications for calibration equals the number of objectives x the number of magnifications of the magnification changer. When using a stereomicroscope with a zoom, the number of magnifications for calibration equals the number of objectives x the number of magnifications (click-stop positions) of the zooming unit.

> **Important**
>
> You will need a calibration scale (a stage micrometer) for the calibration.

2. Calibration Manager

> **Note**
>
> What is meant by calibration in this program is the process of calibration as well as the set of calibration values for individual magnifications of the microscope–imaging device sets marked by *Calibration Name*. If you want to use various types of imaging devices or microscopes for your measurements, it is necessary to calibrate (create a calibration for) each used set of microscope–imaging device. It is possible to switch between the created calibrations according to the actual set in use.

There is a program function named *Calibration Manager* for creating of and subsequent administration of calibrations, which can be found in the menu *Measurements → Calibration Manager...* [Ctrl+Alt+C]. *Calibration Manager* is used for creating and administrating of all calibrations created for individual microscope–imaging device measuring sets.
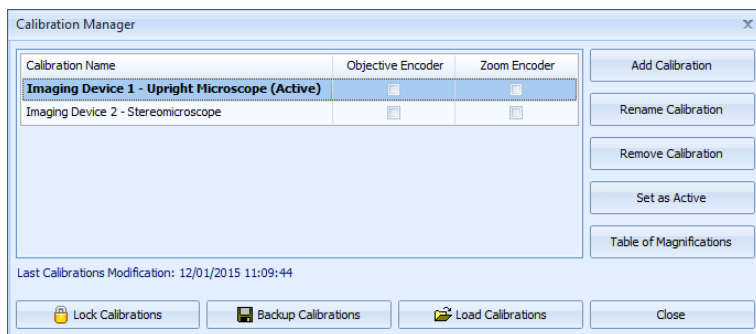
To create a new calibration click the *Add Calibration* button in the *Calibration Manager* dialog box. To delete a chosen calibration from the list, click the *Remove Calibration* button. To change the name of a created calibration, click the *Rename Calibration* button. If there is more than one listed calibration, calibration chosen for measuring can be activated by clicking the *Set as Active* button - for more information see "Setting an Active Calibration" on page 54.

After a calibration is marked by the mouse click and you click the *Table of Magnifications* button a *Table of Magnifications - Calibration: "Calibration Name"* dialog box, containing calibration values for each magnification of the microscope–imaging device set opens.

It is possible to lock all the calibrations from unauthorized changes with password protection. For locking click the *Lock Calibration* button and enter new password. After locking it will not be possible to make any changes in calibrations until calibrations are unlocked again by clicking the *Unlock Calibration* button and entering the password which was used for locking.

It is possible to export all the created calibrations into a backup file (xml type) by clicking the *Backup Calibrations* button. If calibrations need to be restored, it is possible to load the saved calibrations from the backup file by clicking the *Load Calibrations* button and choosing the particular file containing calibration backup.

In the bottom left part of the *Calibration Manager* dialog box there is a date and time of the last change made.

3. Creating a New Standard Calibration (Manual Magnification Assignment Mode)

> **Note**
>
> In case you use magnification encoder, follow the instruction in one of the following chapters describing calibration procedure for use of magnification encoder.

Before creating a new calibration put the stage micrometer under the microscope, set the lowest magnification, and focus the microscope.

The process of creating a new calibration consists of two main steps:

• adding a new standard calibration.
• standard calibration of the individual magnifications.

Adding a New Calibration

To add a new calibration use the following procedure:

1. Open the *Calibration Manager* dialog box by activating the *Measurements →
   Calibration Manager...* [Ctrl+Alt+C] option.
2. After clicking the *Add Calibration* button a guide *Add Calibration* opens where, in
   the first step, you choose the name of the calibration being created. The name of
   a calibration consists of two parts: from the name of the imaging device and from the
   microscope type. At first, choose the type of the used imaging device from the
   drop-down list in the *Imaging Device* part or click *Custom* option and enter your own
   name of the imaging device (we use the name *Imaging Device 1* or *Imaging Device
   2* as general examples in following chapters). In the *Microscope* part enter the type
   of the used microscope (we use *upright microscope* or *stereomicroscope* as general
   examples in following chapters). Continue by clicking the *Next* button.
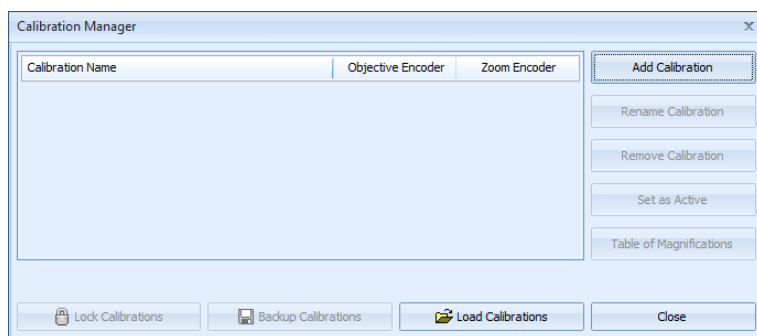
3. Next page of the guide *Magnification Encoder Selection* will have only one active option - *No Magnification Encoder (Manual Magnification Assignment Mode)*. Continue by clicking the *Next* button.

4. Next page of the guide *Zoom/Magnification Changer Selection* asks about the microscope equipment, zooming unit or the magnification changer. If the microscope

in use is equipped with a zoom or a magnification changer, check the corresponding option *Zooming Unit* or *Magnification Changer Unit*. If the microscope is not equipped with either of these elements, check the *No Zoom/Magnification Changer* option. In this case the value of zoom/magnification changer in this calibration will automatically be set for all objectives on the value 1. Continue by clicking the *Next* button. A dialog box *Table of Magnifications - Calibration: "Calibration Name"* will open. This step will finish adding of a new calibration and you may continue with the actual calibration of particular magnifications.
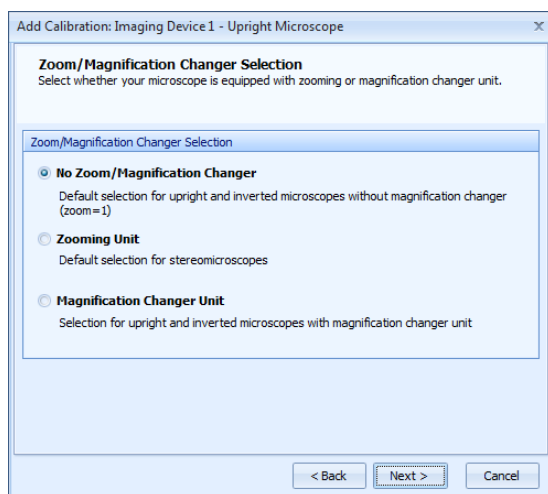

Calibration of Individual Magnifications

In the next step calibration of individual magnifications will be done. Proceed according to the following instructions:

1. In the open dialog box *Table of Magnifications - Calibration: "Calibration Name"* the actual process of calibration will be done. In the *Table of Calibration Values* part you will find columns named *Objective*, *Position* and *Zoom/Magnification Changer Magnification*. If you have chosen the *No Zoom/Magnification Changer* option in step 4 while adding a calibration, there will automatically be given the value 1 in the last column. If you have chosen, in step 4, one of the options *Zooming Unit* or *Magnification Changer Unit*, this column will be empty and individual values of the zoom/magnification changer will be gradually added to the table during the process

of calibration of the particular magnifications. Column *Position* is not used in this case. In the right part of the dialog box there is only one active button in this moment - *Calibrate New Magnification*. There is a *Graph of Calibration Values* in the bottom part of the dialog box, which is used for checking of the correctness of the calibration procedure. To continue click the *Calibrate New Magnification* button.
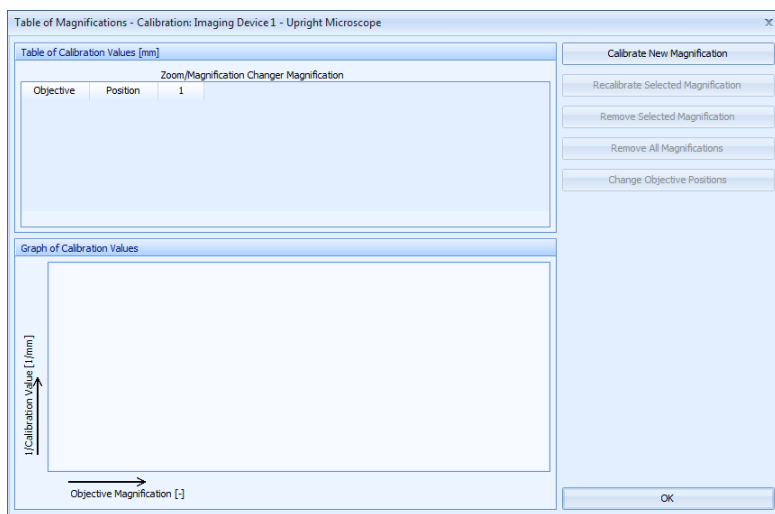
2. *Calibrate New Magnification - Calibration: "Calibration Name"* guide will open on the first page *1. Magnification Selection*. In the *Magnification for Calibration* part type in to the *Current Objective Magnification* field the value of objective magnification of the objective currently in use. If you have chosen the *No Zoom/Magnification Changer* option in step 4, while adding a calibration, there will be an automatically given value 1 in the *Zoom/Magnification Changer Magnification* part and you will not be able to change this value. If you have chosen, in step 4, one of the options *Zooming Unit* or *Magnification Changer Unit*, the *Zoom/Magnification Changer Magnification* field will be empty. In this case fill in the value of the currently used zooming unit's magnification or the magnification changer's. Continue by clicking the *Next* button.

Calibration of the new magnification – upright microscope without the magnification changer

Calibration of the new magnification – stereomicroscope with a zooming unit

3. Next page of the guide *2. Image Source Selection* offers a choice whether to acquire the calibration image from the active imaging device or whether to use the already existing image opened in *Display Window*. In the *Image Source* part choose *Acquire a New Image from the Imaging Device*. Continue by clicking the *Next* button.
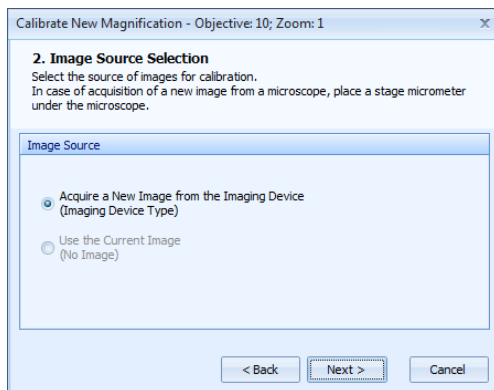
4. Control panel of the active imaging device with a live view of the stage micrometer opens. Place the micrometer horizontally to the center of the imaging device's field of view and focus the microscope. Click the *Capture* button. Next page of the guide *3. Calibration* will open with the image of the stage micrometer. If the quality of the calibration image is not satisfactory, it is possible to open the imaging device control panel again, to acquire a new calibration image, using the ⚙ icon. In the displayed image, mark the highest possible number of the stage micrometer segments with a line segment (by dragging the mouse while holding the left button or by clicking the left mouse button on the beginning and end point). Insertion of a precisely horizontal or vertical line segment can be done by holding the [Shift] key while inserting the line segment. To achieve the highest possible accuracy, it is good to enlarge the image using icons in the upper left part of the dialog box or by using the mouse wheel before inserting the calibration line segment. Lead the line segment from the left edge of the initial guideline to the left edge of the ending guideline of the calibration scale. Incorrect insertion of the line segment can be corrected by inserting a new calibration line segment. Calculate the real length of the marked part of the calibration scale according to the number of marked segments and type the value in the *Actual Length of the Line Segment* field according to the measuring units chosen in the *Units* section. To save the calibration value, click the *Finish* button. Value for new magnification will be added in the *Table of Calibration Values* and *Graph of Calibration Values*.
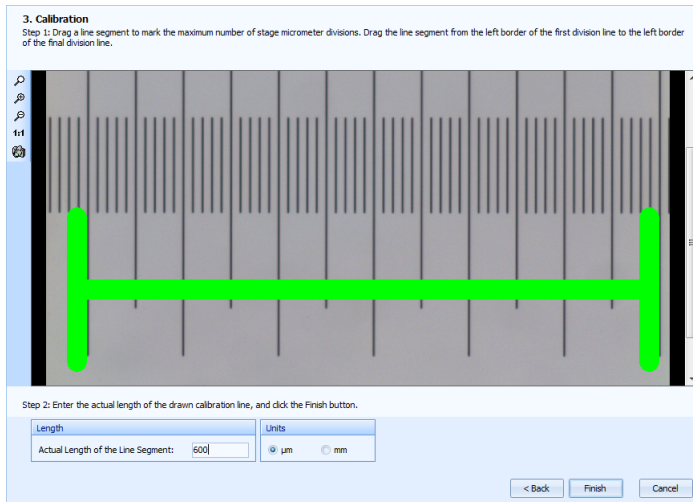
5. Set another magnification for calibration on the microscope. (Change the objective in use, or set a different value of magnification of the zooming unit/magnification changer).

6. Complete calibration of the microscope - imaging device set for all available microscope magnifications is done by repeating this procedure (steps 1 to 5). The result of this procedure should be a situation when all the points in the *Graph of Calibration Values* in the *Table of Magnifications - Calibration: "Calibration Name"* dialog box will lay on a straight line, respectively on straight lines. If some of the graph points significantly stand out from the line, it means that there has been a mistake in the calibration process. In this case, choose the deviating magnification by clicking the relevant value in *Table of Calibration Values* or by clicking the deviating point in the *Graph of Calibration Values* and click the *Recalibrate Selected Magnification* button. Then, in a similar manner as in steps 2 to 4, recalibrate the chosen magnification to the correct value.

Table of Magnifications after a correctly done calibration might, for an upright microscope without the magnification changer, look, for example, like this one:
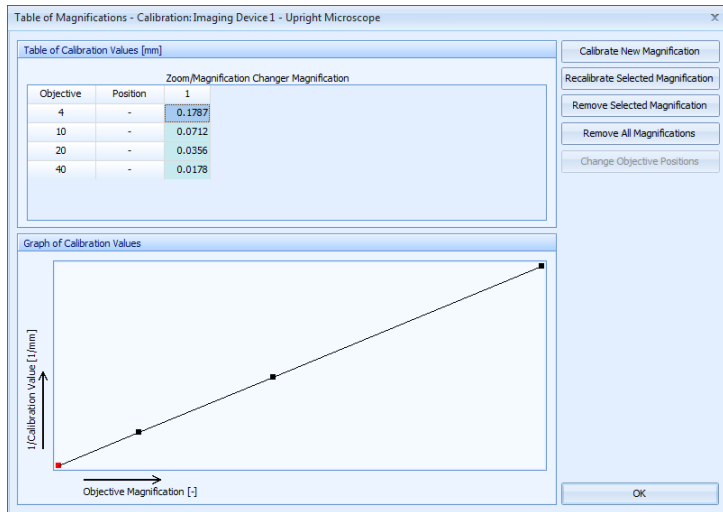
Table of Magnifications after a correctly done calibration might, for an upright microscope with the magnification changer, look, for example, like this one:
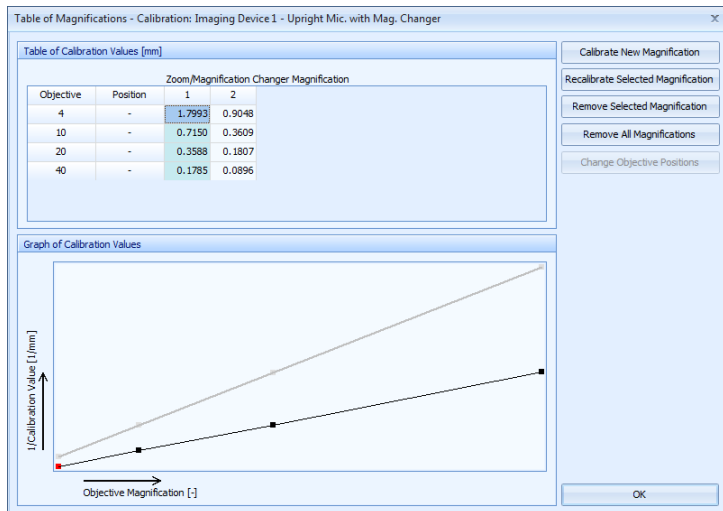
Table of Magnification after a correctly done calibration might, for a stereomicroscope with one objective and a zooming unit, look, for example, like this one:
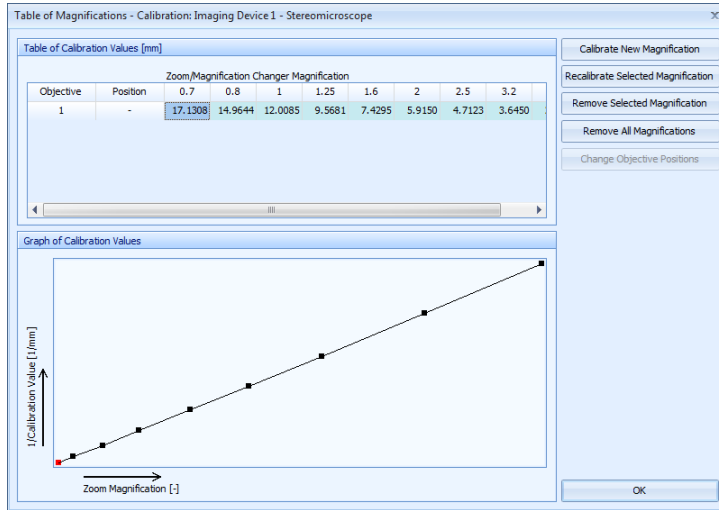
Table of Magnifications after a correctly done calibration might, for a stereomicroscope with two objectives and a zooming unit, look, for example, like this one:
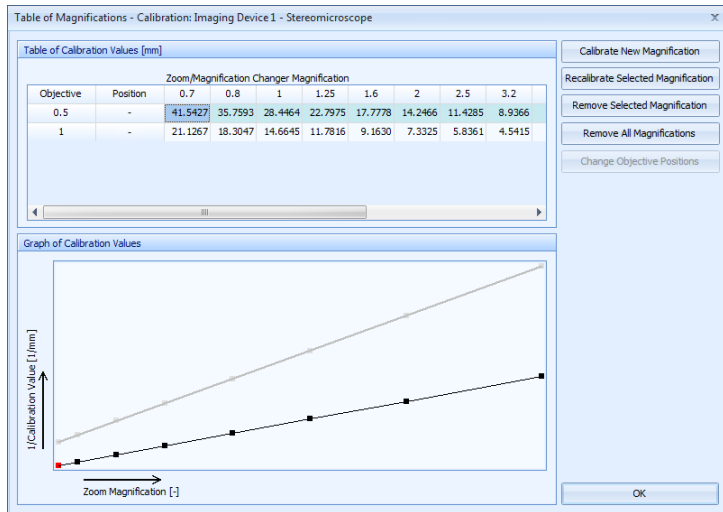
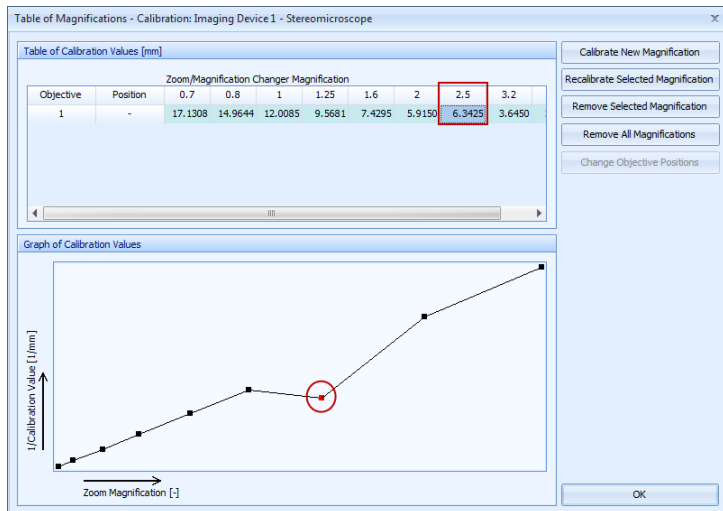If there has been a mistake in the calibration process, all values in the *Graph of Calibration Values* will not lay on a straight line. On the following image, there has been an incorrect calibration of the zoom magnification 2.5. This particular value must be recalibrated.

4. Creating a New Calibration Using the Magnification Encoder for Upright and Inverted Microscopes

To make measurements in the QuickPHOTO MICRO 3.1 program more comfortable, it is possible to, for upright and inverted microscopes, use the so called magnification encoder. It is an optional equipment connectible to the computer, which automatically determines current position of the encoded nosepiece with objectives. When acquiring an image, corresponding magnification is automatically assigned to the newly acquired image. Therefore, it is not necessary to assign the microscope's magnification, used for obtaining of every image, manually before measuring.

Before creating a new calibration, put the stage micrometer under the microscope, set the lowest magnification, and focus the microscope.

The process of creating a new calibration using the magnification encoder consists of three main steps:
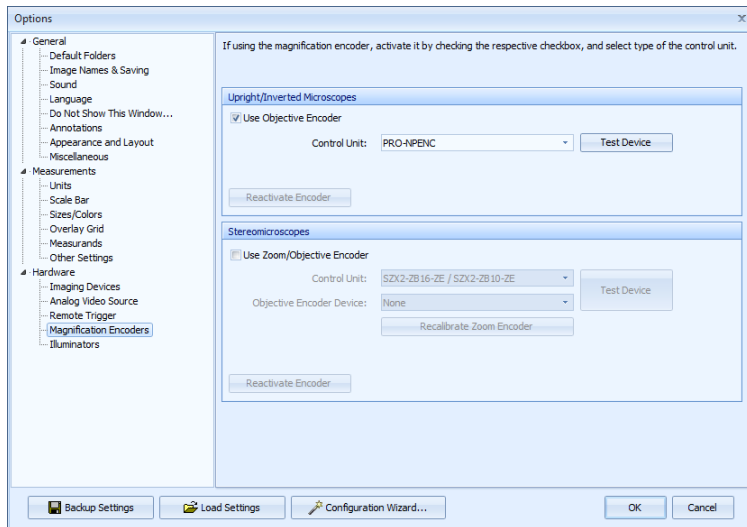
- setting of the magnification encoder
- adding a new calibration with the magnification encoder for upright and inverted microscopes
- calibration of individual magnifications using the magnification encoder for upright and inverted microscopes

Setting the Magnification Encoder

1. Connect the magnification encoder to the control unit, connect it to the computer, and install its drivers according to the manual supplied with this device.

2. Run the QuickPHOTO MICRO 3.1 program and activate *Options* of the program (*Edit → Options...*). In the *Hardware* part, activate the *Magnification Encoders* tab. In the *Upright/Inverted Microscopes* part check the *Use Objective Encoder* option and in the *Control Unit* drop-down menu choose the control unit of the magnification encoder. Correct function of the magnification encoder can be verified by clicking the *Test Device* button. In case of a successful verification of the device's functionality close the *Options* window by clicking the *OK* button.

Note

Only those control units, whose support was chosen during program installation, will appear in the list. If your control unit is not available in the list, exit the QuickPHOTO MICRO 3.1 program and run the program installation, from the installation disk, again. On page *Installation Type Selection* choose the *Update Existing Installation - Add Components* option and on page *Select Additional Components - Magnification Encoders* choose, from the list, a control unit whose support would you like to add.

Adding a New Calibration with the Magnification Encoder for Upright and Inverted Microscopes

Adding of a new calibration shall be done in a similar manner as described above - for more information see "Adding a New Calibration" on page 32, with the following differences:

- In point 3. of the guide named *Add Calibration "Calibration Name"* on *Magnification Encoder Selection* page check the *Objective Encoder for Upright/Inverted Microscopes* option and continue by clicking the *Next* button.
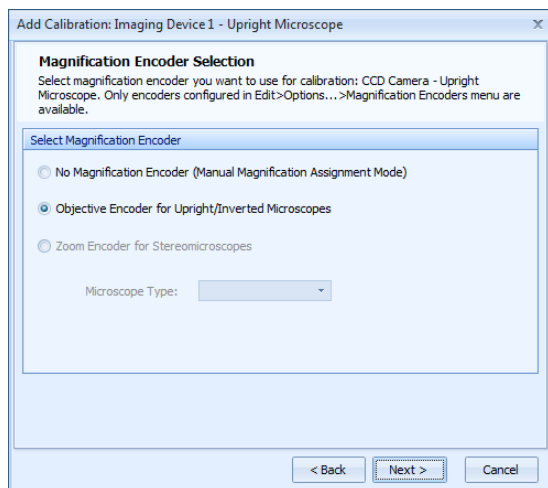
- On page *Assignments of Objective Magnifications to Nosepiece Positions* set the corresponding magnifications of objectives in use to individual nosepiece positions. Continue as follows: by turning of the nosepiece, choose gradually all available positions and assign them, from the drop-down menus, with the corresponding magnification of the objectives in use. Mark empty positions with "-". Continue by clicking the *Next* button.
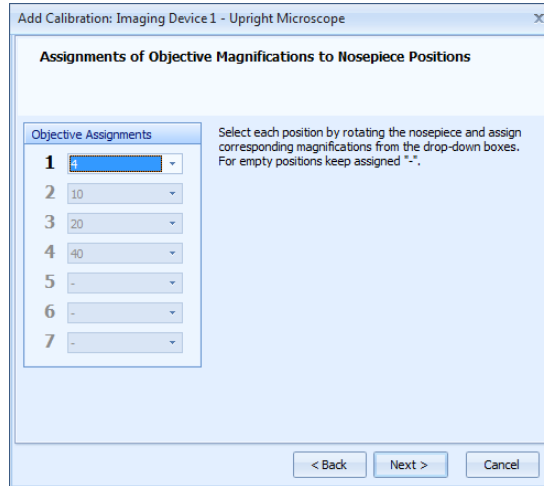
- Dialog box named *Table of Magnifications - Calibration: "Calibration Name"* will open and in the *Table of Calibration Values* part magnifications of the objectives in use, and their corresponding positions of the magnification encoder, will be filled in. In this dialog box will now also be active the *Change Objective Positions* button, which opens the *Assignments of Objective Magnifications to Nosepiece Positions* dialog box, which enables you to make changes in the assignment of the objectives to the positions of the magnification encoder.
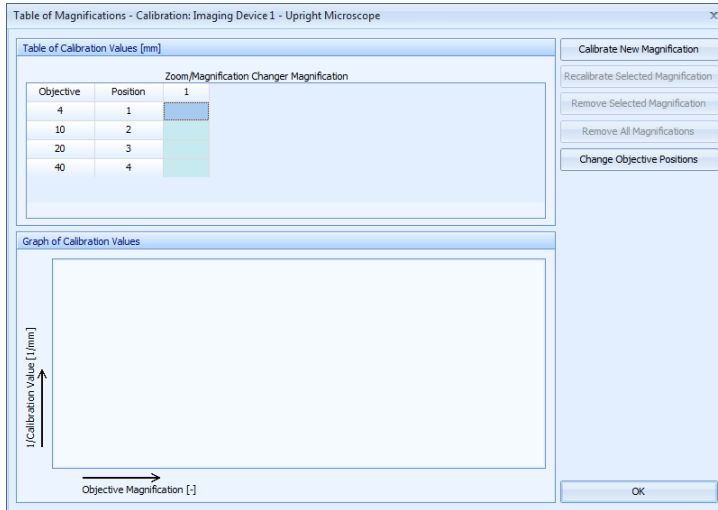
Calibration of Individual Magnifications Using the Magnification Encoder for Upright and Inverted Microscopes

When calibrating the individual magnifications, proceed in a similar manner as described above - for more information see "Calibration of Individual Magnifications" on page 34.

Major difference from the standard calibration of individual magnifications is the automatic filling of the *Current Objective Magnifications* field on *1. Magnification Selection* page in the *Calibrate New Magnification - Calibration: "Calibration Name"* guide with values from the magnification encoder.
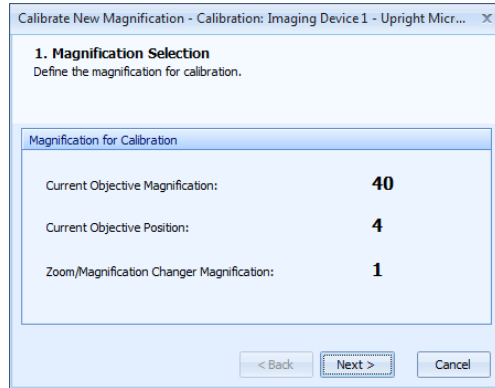
Table of Magnifications after a correctly done calibration might, for an upright microscope with the magnification encoder without the magnification changer look, for example, like this one:
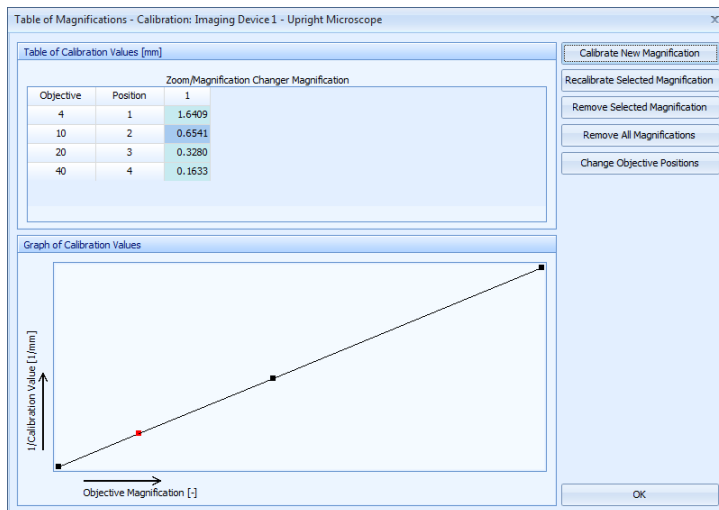
5. Creating a New Calibration Using the Magnification Encoder for Stereomicroscopes

To make measurements in the QuickPHOTO MICRO 3.1 program more comfortable, it is possible to use stereomicroscopes with the so called magnification encoder. It is a device connectible to the computer, which detects the current zooming unit's magnification and also the position of the encoded nosepiece with objectives. When acquiring an image, corresponding magnification is automatically assigned to the newly acquired image. Therefore, it is not necessary to assign the microscope's magnification used for obtaining of every image manually before measuring.

Before you create a new calibration, put the stage micrometer under the microscope, set the lowest magnification, and focus the microscope.

The process of creating a new calibration using the magnification encoder consists of three main steps:

- setting of the magnification encoder
- adding of a new calibration with the magnification encoder for stereomicroscopes
- calibration of individual magnifications using the magnification encoder for stereomicroscopes
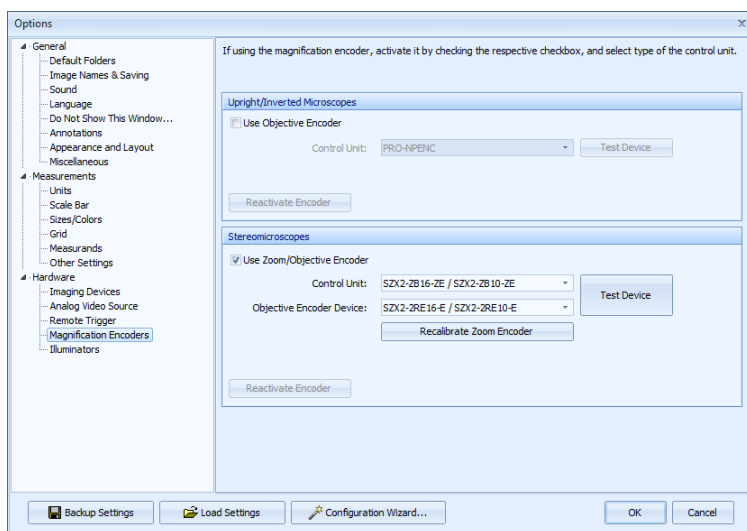
Setting the Magnification Encoder

1. Connect the AC adapter and the connecting cable to the control unit and connect it to the computer.

2. Run the QuickPHOTO MICRO 3.1 program and activate *Options* of the program (*Edit → Options...*). In the *Hardware* part activate the *Magnification Encoders* tab. In the *Stereomicroscopes* part check the *Use Zoom/Objective Encoder* option and in the *Control Unit* drop-down menu choose the control unit of the magnification encoder. If you also have connected the magnification encoder for objectives, choose it from the *Objective Encoder Device* drop-down menu. Correct function of the magnification encoder can be verified by clicking the *Test Device* button. In case of successful verification of the device's functionality close the *Options* dialog box by clicking the *OK* button. You will be asked to set the zooming unit to the 0.8 position to calibrate

the zoom encoder. Set the required zoom value and continue by clicking the *OK* button.


Note

Only those control units, whose support was chosen during program installation, will appear in the list. If your control unit is not available in the list, exit the QuickPHOTO MICRO 3.1 program and run the program installation, from the installation disk, again. On page *Installation Type Selection* choose the *Update Existing Installation - Add Components* option and on page *Select Additional Components - Magnification Encoders* choose, from the list, a control unit whose support would you like to add.

Adding a New Calibration with the Magnification Encoder for Stereomicroscopes

Adding of a new calibration shall be done in a similar manner as described above - for more information see "Adding a New Calibration" on page 32, with the following differences:

• In point 3. of the guide named *Add Calibration "Calibration Name"* on *Magnification Encoder Selection* page check the *Zoom and Objective Encoder for Stereomicroscopes* option (if you have installed only the zoom encoder without the objective encoder, the option *Zoom Encoder for Stereomicroscopes* will be displayed). From the *Microscope Type* drop-down menu choose the corresponding type of the stereomicroscope in use and continue by clicking the *Next* button. You will be prompted to set the zooming unit to the 0.8 position to calibrate the zoom encoder. Set the required zoom value and continue by clicking the *OK* button.
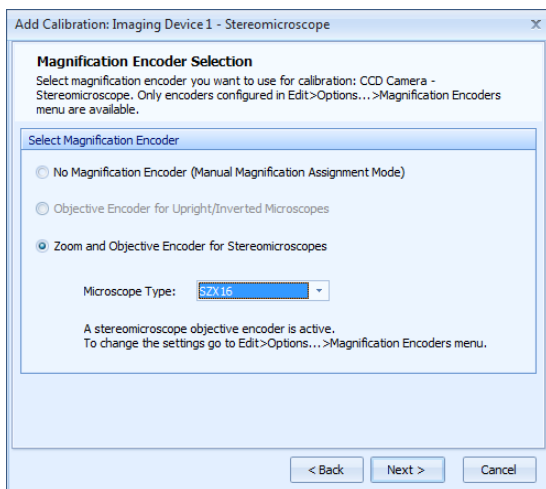
• If you have installed, and also activated the objective encoder for stereomicroscopes in the program *Options*, a page *First Objective - Position and Magnification Assignment* will be displayed. Continue according to the displayed instructions for assigning of the first objective magnification with the corresponding position of the objective encoder. In the next step do the assigning for the second objective in a similar manner. If you have not installed or activated the objective encoder, these pages will not be displayed at all. Continue by clicking the *Next* button.

> **Note**
>
> If you have the objective encoder active, you must assign the corresponding nosepiece position to at least the first objective. The second objective may remain unassigned.

Dialog box named *Table of magnifications - Calibrations: "Calibration Name"*, which will have in the *Table of Calibration Values* part filled in the zoom magnifications, will open. If you have also activated the objective encoder, magnifications of the used objectives, and their corresponding encoder positions, will also be filled in. There will now be also active the *Change Objective Positions* button in this dialog box, which opens the *Change Objective Positions* dialog box, which enables to make changes in assigning of the objectives to the positions of the magnification encoder.
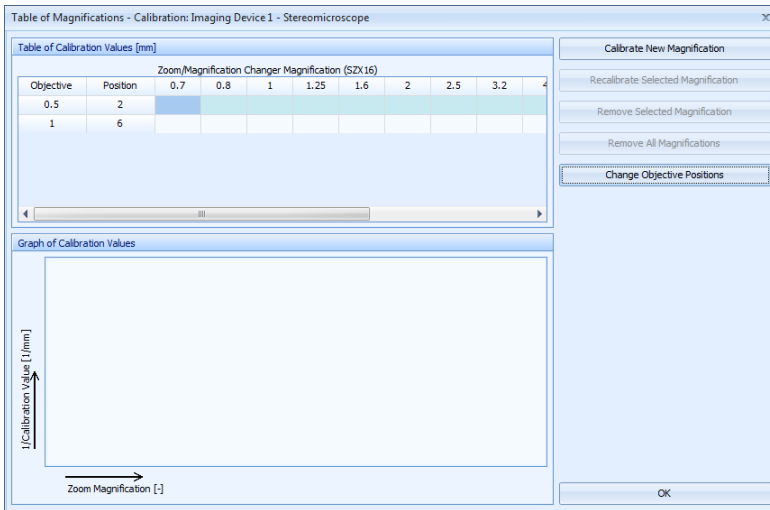
Calibration of Individual Magnifications Using the Magnification Encoder for Stereomicroscopes

When calibrating the individual magnifications, proceed in a similar manner as described above - for more information see "Calibration of Individual Magnifications" on page 34.

Major difference from the standard calibration of individual magnifications is the automatic filling of the *Zoom/Magnification Changer Magnification* field. If you have also activated the objective encoder, values of the objective magnification will also be automatically filled in the *Current Objective Magnification* field on *1. Magnification Selection* page in the *Calibrate New Magnification - Calibration: "Calibration name"* guide.
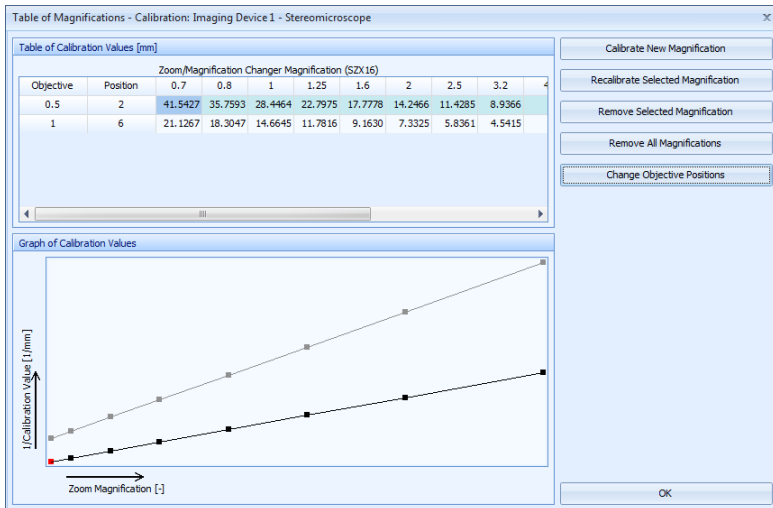
Note

Recalibrate Zoom Encoder button is intended for correction of the zoom encoder's calibration. Use this button only if the zoom encoder's values are not correct.

Table of Magnification, after a correctly done calibration, might for stereomicroscope with the zoom and objective magnification encoder look, for example, like this one:
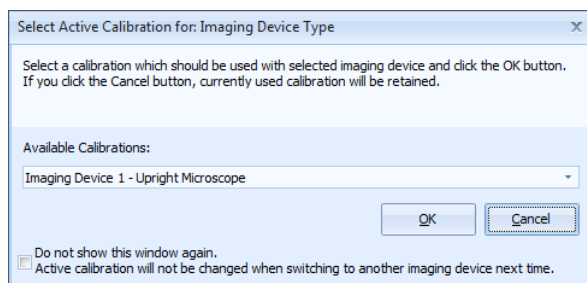
6. Setting an Active Calibration

If you are using QuickPHOTO MICRO 3.1 program with multiple microscope-imaging device sets and you have created, in the *Calibration Manager*, more than one calibration, it is important to set the corresponding calibration as active, when you change the active imaging device. This particular calibration will be used for newly acquired images. Setting an active calibration can be done three different ways:

- In the *Calibration Manager* choose the requested calibration from the list and click the *Set as Active* button. Next to the name of the active calibration will appear a sign: *(Active)*.

- From the menu bar using the *Measurements → Set Active Calibration* option. Calibration will be set as active if you choose it from the displayed list. This listed calibration will be marked by the check mark.
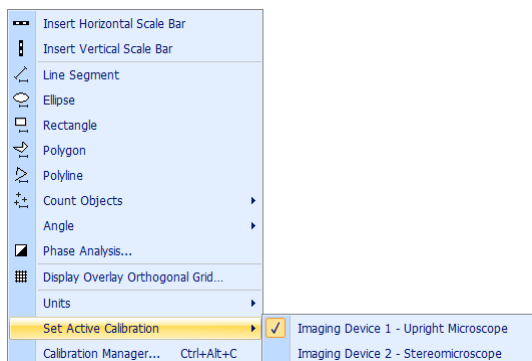
- If you activate another imaging device in the *Imaging Devices* menu, dialog box *Select Active Calibration for: "Imaging Devices Name"* will be displayed. In this dialog box choose, from the *Available Calibrations* drop-down menu, calibration which you would like to set as active for the newly selected imaging device and confirm it by clicking the *OK* button.

Select Active Calibration for: Imaging Device Type ✕

Select a calibration which should be used with selected imaging device and click the OK button.
If you click the Cancel button, currently used calibration will be retained.

Available Calibrations:

Imaging Device 1 - Upright Microscope ▼

[OK] [Cancel]

☐ Do not show this window again.
Active calibration will not be changed when switching to another imaging device next time.

Main Program Window

Main Program Window of QuickPHOTO MICRO 3.1 program is an image editor in which images are displayed right after they were acquired or opened. This editor is equipped with functions for measuring, editing, and saving of images. *Main Program Window* is designed for working with more than one image at the same time. It is possible to display 1, 2 or 4 images next to each other at the same time. All opened images are displayed in the *Thumbnail Browser*. The *Navigator* field makes orientation in the enlarged image easier.

The following functions for editing of images are available in the QuickPHOTO MICRO 3.1 program:

- crop
- clockwise and counter clockwise rotation
- rolling along the axes
- resize
- brightness adjustment, contrast adjustment, color balance, and gamma correction adjustment
- histogram adjustment
- using filters (sharpen, blur, negative, grey scale, median filter, black and white balance)
- adding text annotations to an image
- labeling with drawings (tools: line, arrow, rectangle, circle, ellipse, polygon, freehand drawing)

QuickPHOTO MICRO 3.1 program is also equipped with a number of measuring functions:

- inserting a calibrated scale bar (with the option to define the look and position of the scale bar)
- distance measurement (line segment, polyline)
- measuring of perimeters and areas of objects (tools: ellipse, rectangle, polygon)
- angle measurement (arbitrary angle, angle from the horizontal axis, angle from the vertical axis)
- display of the overlay grid (orthogonal)
- counting of objects
- phase analysis

All inserted objects (drawings, annotations, measurements) are displayed in a separate layer "above the image" and it is possible to modify (change of the line's color and thickness, change of size, change of position), delete, or hide them at any time. It is also possible to delete a whole layer with inserted objects or it is possible to merge this layer with the image.

1. Description of the Graphical User Interface

Main Program Window is divided into several parts:

- *Menu Bar* - contains options with individual functions
- *Toolbar* - contains tool icons
- *Thumbnail Browser* - displays all opened images
- *Navigator* - is used for orientation in the enlarged image
- *Display Window* - is used for image editing
- *Table of Measured Values* - contains results of measurements
- *Status Bar* - contains information about the current program status
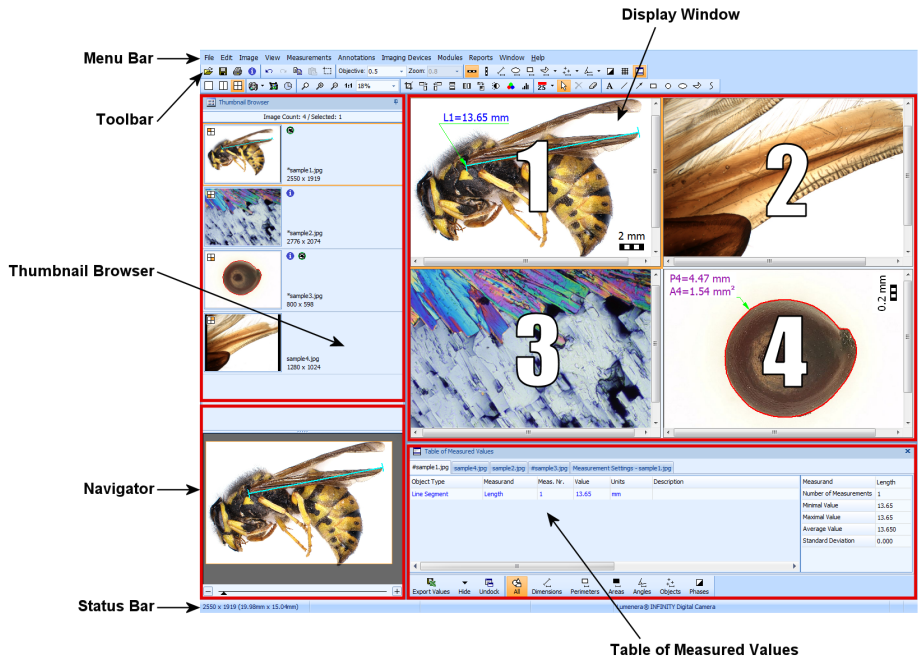
Size ratios of individual parts of the *Main Program Window* described above can be changed. This change can be done in the following way: shift your mouse over the border separating individual parts. Mouse cursor will change to ◆. Click and hold the left mouse button and define the new size by moving the mouse. Then release the button.

Note

The default program layout can be restored using the *Restore Default Program Layout* option in the *Window* menu.

1.1. Menu Bar

Menu File

File menu contains the following functions: *Open...* opens images in the *Main Program Window*. In the opened *Open* dialog box you may select one or more images and load them at once. Option *Open Recent* offers up to ten lately used images for opening.

Options *Save* and *Save All* save images selected in the *Thumbnail Browser* respectively all opened images. If the images being saved, have already been saved before, they will be saved again into their original locations. If we are speaking about newly acquired images, a dialog box *Save As...*, will be displayed and you may choose the location, name, and type of the files being saved. Options *Save As...* and *Save All As...* will open the *Save As* dialog box, which enables you to choose the location, name, and type of the files being saved. For more information about image saving see "Image Saving" on page 91.

Options *Export Measured Values from Selected Images...* and *Export Measured Values from All Images...* will export the measured values from the images selected in the *Thumbnail Browser*, respectively from all opened images. Measured values can be exported into a file of the Microsoft® Excel® (*.xls) format or of the text file (*.txt) format. For more information about export of the measured values see "Exporting Values from the Table of Measured Values" on page 128.

Options *Close Selected Images* and *Close All Images* will close images selected in the *Thumbnail Browser*, respectively all opened images.

Option *Open Imaging Device Control Panel...* will open a separate window for acquiring images using the imaging device. For more information about work with control panels of the imaging devices see "*Control Panels of Imaging Devices*" on page 173.

Option *Print...* will open a dialog box for image printing. For more information about print see "Image Printing" on page 102.

Option *Exit* will end the program.

File	Edit	Image	View	Measurements	Annotations	Imaging De

	Open...	Ctrl+O
	Open Recent	▶
	Save	Ctrl+S
	Save As...	Shift+Ctrl+S
	Save All	Ctrl+Alt+S
	Save All As...	Shift+Ctrl+Alt+S
	Export Measured Values from Selected Images...	Ctrl+M
	Export Measured Values from All Images...	Ctrl+Alt+M
	Close Selected Images	Ctrl+W
	Close All Images	Ctrl+Alt+W
	Open Imaging Device Control Panel...	F4
	Print...	Ctrl+P
	Exit	Alt+X

Menu Edit

The following options are available in the *Edit* menu: *Undo* will take back the last performed action. It is possible to take back as many consecutively performed actions as you wish. Option *Redo* will again perform the action taken back using the *Undo* function.

Option *Copy* inserts an image or its chosen part into a clipboard. Option *Paste* will insert the content of the clipboard as a new image. Option *Select Region* is used for selection of a part of an image to be copied into a clipboard.

Change of color and thickness of the lines of the objects being inserted can be done using the options *Object Line Color...* and *Object Line Thickness*.

Option *Compose New Image from Layout of Displayed Images...* will compose the images displayed in the *Display Window* (for layout of 2 or 4 images next to each other) and the result will be inserted as a new image. For a more detailed description see "Compose New Image from Layout of Displayed Images" on page 145.

Option *Restore Original Image* will restore the original form of the image in which it was opened or acquired (all inserted objects will be deleted). Option *Delete Selected Objects* will delete all selected objects from the current image. Option *Delete All Objects* will delete all inserted objects from the current image. Option *Merge Objects with an Image (Flatten Layers)* will merge layers containing inserted objects with the image. After merging it will no longer be possible to edit the inserted objects – they will become a fixed part of the image.

Option *Configuration Wizard...* will open a guide for basic program setup. For detailed description of work with *Configuration Wizard* see "Configuration Wizard" on page 21.

Option *Options...* will open a dialog box for setting of program parameters. For detailed description of the setting options see "Options" on page 148.

Menu Image

In the menu *Image* it is possible to display *Image Information...* There are also available the following options for image editing – crop, rotation, flip, mirror, resize, automatic white balance, white balance defined by point, sharpen, blur, median filter, negative, grey scale, black balance defined by point, and functions for brightness adjustment, contrast adjustment, gamma correction, color balance adjustment, and histogram adjustment. For detailed description of individual functions see "Image Editing" on page 78.
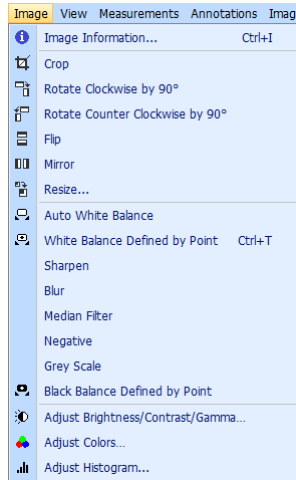
Menu View

In the *View* menu there are the following options: *Layout - Single Image*, *Layout - Two Images*, *Layout - Four Images*. These options switch between the modes for displaying of 1, 2, or 4 images in the *Display Window*.

Option *Display Objects in the Current Image* will display/hide all objects inserted into the current image. Option *Display Labels with Measured Values in the Current Image* will display/hide labels with measured values in the current image. Option *Display Table of Measured Values* will display/hide *Table of Measured Values* in the bottom part of the *Main Program Window*.

Option *Best Fit Zoom* will display the current image in such a size so it would fit into the *Display Window*. Options *Zoom In* and *Zoom Out* will enlarge/reduce display of the current image by one step. Option *Zoom - Actual Size (100%)* will display the current image zoomed in by 100 % so that one image pixel corresponds with one pixel of the monitor.

Option *Start Slideshow* will activate full screen view of all the opened images (in case only one image is selected) or images selected in the *Thumbnail Browser*. Display of all or only of selected images will take place successively in a time interval which can be chosen in the program options.

Option *Display in Full Screen Mode* will display an image/images opened in the *Display Window* full screen. You may return to the standard mode by pressing any key.
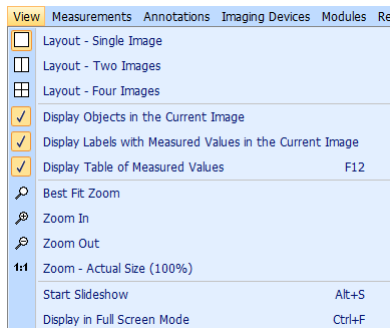
Menu Measurements

Menu *Measurements* contains the following tools for measuring: calibrated scale bar insertion, measuring of the line segment length and polyline length, measuring of the perimeter and area of an ellipse, rectangle, and polygon, counting of objects, measuring of angles, measuring of the distance between two parallel lines, and measuring of the length, angle, and diameter of an arc. Option *Phase Analysis...* activates the *Phase Analysis* control panel. For more detailed description see "Phase Analysis" on page 116.

Option *Display Overlay Orthogonal Grid...* is used for displaying/hiding of an overlay calibrated grid in the current image. For description of work with the grid see "Displaying an Overlay Grid of Defined Dimensions" on page 115.

Using the *Units* option you may set the units using for measuring: micrometers or millimeters.

Option *Set Active Calibration* enables quick switching between the active calibrations used for measuring, if you have created more than one calibration for various microscope - imaging device sets. Option *Calibration Manager...* opens a dialog box with functions for calibrations' managing. For more information see "Calibration Manager" on page 30.

For more information about measurements see "Measurements" on page 108.
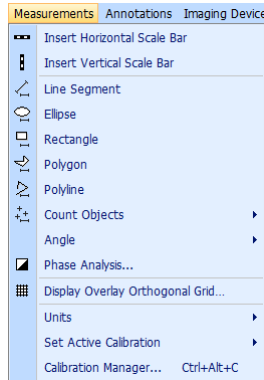
Menu Annotations

Menu *Annotations* contains tools for indication of interesting areas in the image. These are the tools available: *Text...*, *Line*, *Arrow*, *Rectangle*, *Circle*, *Ellipse*, *Polygon*, and *Freehand*.

Menu Imaging Devices

Menu *Imaging Devices* is used for the choice of an active imaging device. Only those devices, whose support was chosen during program installation, are on the list.

Menu Modules

Menu *Modules* is used for activation of modules (built-in modules or optional modules).

Menu Reports

Menu *Reports* contains functions for creating reports in the Microsoft® Word. Option *Create Report...* will export images selected in the *Thumbnail Browser* and measured values into a new report. Option *Template Manager...* opens the *Report Template Manager* dialog box, which enables creating of new report templates, and management of the already existing templates - for more information see "Reports" on page 132.
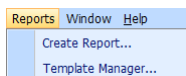
Menu Window

Option *Restore Default Program Layout* is used for setting of the original layout of all parts of the *Main Program Window*.
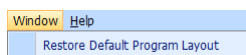
Menu Help

Menu *Help* contains the following items: *Help...* opens an electronic user manual. You can also use the [F1] key. Option *What Is New...* displays a file containing a list of all new functions of the current program version.

Option *Send Dongle Number...* is used for displaying and sending off of the dongle number via e-mail to obtain new modules or program upgrades.

Option *Licence...* opens a document with the description of licence conditions. Option *About...* displays information about QuickPHOTO MICRO 3.1 program.

1.2. Toolbar

Individual program functions can also be activated using the following icons from the *Toolbar*:

Open: displays a dialog box for opening of images from the available disc drives (for example HDD, CD/DVD-ROM, connected network drives, flash memory and so on). [Ctrl+O]

Save: saves an image/images selected in the *Thumbnail Browser*. [Ctrl+S]

Print: initiates printing of selected images. [Ctrl+P]

Image Information: displays information about the current image. [Ctrl+I]

Undo: undoes the last performed image editing. [Ctrl+Z]

Redo: does again the last undone image editing. [Ctrl+Y]

Copy: inserts a selected area or a whole image displayed in the *Display Window* into a clipboard. [Ctrl+C]

Paste: inserts the clipboard content as a new image. [Ctrl+V]

Select region: after clicking on this icon, you may select an area of the image by clicking and dragging the mouse while holding the left mouse button.
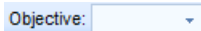
Objective: drop-down menu for the choice of the objective which was used to acquire the image. It is used to assign the correct calibration for measurements.
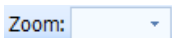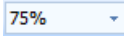
Zoom: drop-down menu for the choice of zooming unit/magnification changer magnification, which was used for acquiring of the image. It is used for assigning of the correct calibration for measurements. If you are not using either the zooming unit or the magnification changer, value 1 will automatically be filled into this field after you choose an objective.

Insert Horizontal Scale Bar: inserts a calibrated horizontal scale bar into the right bottom corner of the image.

Insert Vertical Scale Bar: inserts a calibrated vertical scale bar into the right upper corner of the image.

Measure Line Segment: activates a tool for measuring of the length of a line segment.

Measure Ellipse: activates a tool for measuring of the perimeter and area of an ellipse.

Measure Rectangle: activates a tool for measuring of the perimeter and area of a rectangle.

Measure Polygon/Polyline: click on the arrow offering a drop-down menu, and choose one of the options: *Polygon* or *Polyline*. After you choose one of the options a tool for measuring of the polygon's perimeter and area or for measuring of the polyline's length will be activated.

Count Objects: after clicking on the arrow offering the drop-down menu, you may choose one of the options: *Count Objects (New Group)* to initiate counting of the new group of objects, or *Add Objects to the Current Group* for adding of further objects to an already existing group.

Measure Angle: after clicking on the arrow offering the drop-down menu, choose one of the options: *Arbitrary Angle*, *Angle from the X Axis* or *Angle from the Y Axis*. After you choose one of the options a tool for angle measuring will be activated.

Phase Analysis: opens a dialog box of the *Phase Analysis* function.

Display Overlay Orthogonal Grid: displays/hides an orthogonal grid of defined dimensions.

Display Table of Measured Values: displays/hides a *Table of Measured Values*. [F12]

Layout - Single Image: switches the *Display Window* to a display mode for one image.

Layout - Two Images: switches the *Display Window* to a display mode for two images next to each other.

Layout - Four Images: switches the *Display Window* to a display mode for four images next to each other.

Open Imaging Device Control Panel: opens a control panel of the active imaging device (device chosen in the *Imaging Devices* menu). An arrow in the right part of the icon is used for a quick choice of the imaging device. [F4]

Time-Lapse Video: activates a built-in *Time-Lapse Video* module, designed for creating of video files from the acquired time-lapse images.

Timer: activates a built-in *Timer* module designed for an automatic acquiring of images in an adjustable time interval.

Best Fit Zoom: displays the current image in such a size, so it fits into the *Display Window*.

Zoom In: increases the size of display of the current image by one step.

Zoom Out: decreases the size of display of the current image by one step.

Zoom - Actual Size (100%): displays the current image in its real size (100 %).

Display Size: this field indicates current displayed image size. It enables you to pick your desired size from the drop-down menu of various values, or you can, using the keyboard, type in a new value.

Crop: after clicking on this icon, you may select an area of the image, which should be preserved. Remaining part of the image will be removed.

Rotate Clockwise by 90°: rotates the image to the right.

Rotate Counter Clockwise by 90°: rotates the image to he left.

Flip: flips the image around the horizontal axis.

Mirror: mirrors the image around the vertical axis.

Resize: opens a dialog box used for a change of the image size.

Adjust Brightness/Contrast/Gamma: opens a dialog box for brightness, contrast, and gamma correction adjustment.

Adjust Colors: opens a dialog box for color balance adjustment. It is possible to independently adjust the red, green, and blue channel.

Adjust Histogram: opens a dialog box for the histogram adjustment.

Object Line Color/Thickness: is used for a change of color and thickness of the lines of inserted objects. Left part of the icon enables a change of color, right part with an arrow enables change of the line's thickness.

Select: is used for selection of inserted objects.

Delete Selected Objects: deletes objects selected with the *Select* tool. [Del]

Delete All Objects: deletes all objects inserted in the image.

Insert Text Annotation: activates a dialog box for inserting of a text annotation.

Draw Line: activates a tool for drawing of a line.

Draw Arrow: activates a tool for drawing of an arrow.

Draw Rectangle: activates a tool for drawing of a rectangle.

Draw Circle: activates a tool for drawing of a circle.

Draw Ellipse: activates a tool for drawing of an ellipse.

Draw Polygon: activates a tool for drawing of a polygon.

Draw Freehand: activates a tool for freehand drawing.

1.3. Thumbnail Browser

Thumbnails of the opened images are displayed in the *Thumbnail Browser* together with their names and sizes. Image opened in the *Thumbnail Browser* can be displayed in the *Display Window* by clicking the left mouse button on the thumbnail or by dragging of the thumbnail (drag-and-drop) into the *Display Window*. If you have set a display of more than one image next to each other in the *Display Window*, use the method of dragging (drag-and-drop) or select a field in the *Display Window* at first, in which would you like the image to be displayed, and then click the left mouse button on the thumbnail of the desired image.

If you move the mouse over the thumbnail of one of the opened images, several buttons will appear in its right upper part. These buttons activate functions only for this particular image.

Save Image button will save the image. *Print* button will print the image. *Image Information* button displays information about the image including meta data (if those are available), description, and possible assigned calibration. If measurements have been done in the image, *Export Measured Values* button will also be active for export of the

measured values into a file. *Mark as Important* ! button will frame the thumbnail with a red frame for its highlighting. Image can be closed using the *Close* × button.

If some changes have been done to the image, you will be asked whether you want to save these changes before you close this image. New images that have not yet been saved, and images that have been edited will have an asterisk displayed in front of their name, for example: *P00001.jpg . If measurements have been done in the image, there will be an indicator ⊠ - *Image contains unsaved measured values* displayed by the thumbnail. This indicator will disappear after the image is saved or measured values are exported into a file. If the description of an image is filled-in, there will be an indicator ⓘ - *Image contains description* displayed by the thumbnail.

Selection of one image in the *Thumbnail Browser* can be done by one click of the left mouse button on the corresponding thumbnail. Continuous selection of several images in the *Thumbnail Browser* is possible by clicking the mouse on the first thumbnail and then on the very last one of your selection, while holding the [Shift] key. Discontinuous selection of images in the *Thumbnail Browser* can be done by selection of desired thumbnails with the left mouse button, while holding the [Ctrl] key. Selection of all images at the same time can be done by the [Ctrl+A] key shortcut. Canceling of the selection of more thumbnails can be done by clicking the left mouse button on a random thumbnail. Order of thumbnails may be changed by dragging them with a mouse (drag-and-drop).

To gain a larger work area, you may hide (slip in to the left) the *Thumbnail Browser* by clicking the ⊞ button, in its right upper corner. This button then will change to ⊞ button. This way the *Thumbnail Browser* will free up and if you move the mouse cursor outside of the *Thumbnail Browser* it will be slipped in to the left. In this case, you may work with *Thumbnail Browser* by moving the mouse onto the vertically oriented *Thumbnail Browser* tab on the left side of the *Main Program Window -Thumbnail Browser* will be pulled out. Its anchoring may be done by clicking the ⊞ button.
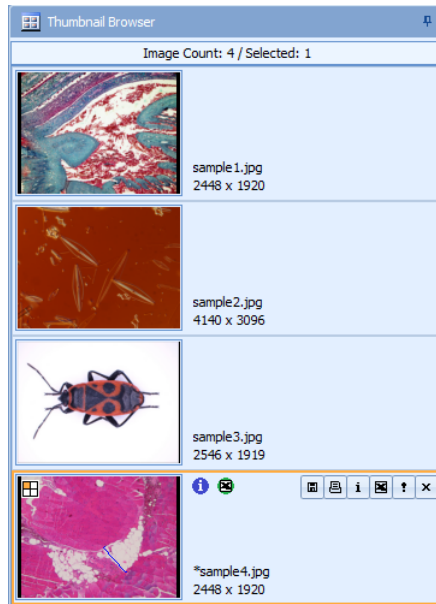
1.4. Navigator

In the left bottom part of the *Main Program Window* there is a *Navigator* displayed with the current image. In the *Navigator* window there is a framed area of the image, which is visible in the *Display Window* at the current display size. Display of the current image can be enlarged or reduced with the mouse wheel, slider, or with the ⊞ or ⊟ buttons under the *Navigator* window. It is possible to move the frame by clicking the left mouse button inside the frame and by moving the mouse while holding the left button. By moving with the frame, you will achieve the desired display of a particular image area in the *Display Window*.
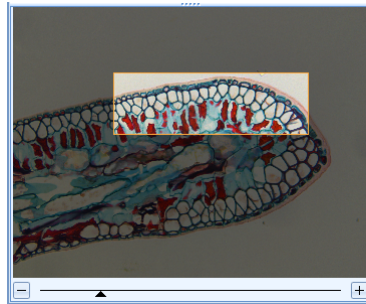
1.5. Display Window

Display Window is designed for work with images. In case you need to work with more than one image, this window may be divided into two or four parts using the *Layout - Two Images* ⊡ or *Layout - Four Images* ⊞ options. Switching to the default mode for one image is possible by the *Layout - Single Image* ☐ option. These functions can also be activated by the corresponding options from the *View* menu.

1.6. Table of Measured Values

In the bottom part of the *Main Program Window* there is the *Table of Measured Values*. This table contains a tab/tabs with values measured in the image/images displayed in the *Display Window* (number of these tabs corresponds with the set layout of the *Display Window*) and a tab with the name *Measurement Settings - "Current Image Name"*. For a more detailed description see "Work with the Table of Measured Values" on page 124.

Object Type	Measurand	Meas. Nr.	Value	Units	Description		Measurand	Length
Line Segment	Length	1	199	µm			Number of Measurements	4
Line Segment	Length	2	199	µm			Minimal Value	199
Line Segment	Length	3	200	µm			Maximal Value	201
Line Segment	Length	7	201	µm			Average Value	199.8
Ellipse	Perimeter	4	1292	µm			Standard Deviation	0.8
Ellipse	Perimeter	5	1887	µm				

1.7. Status Bar

Status bar placed in the bottom part of the *Main Program Window* displays the following information:

- size of the current image in pixels, and if the current image has an assigned calibration, real size of the image in mm or µm
- if the magnification encoder is being used, magnification of the current objective or possibly the zoom
- currently selected imaging device
- if you have set the automatic saving of images to a folder, there will be an 🖼 icon in the right corner of the status bar. If you move the mouse over this icon, a hint will be displayed with currently set folder for automatic saving of images.

2. Acquiring of New Images

To acquire new images, proceed according to the following steps:

1. Select the imaging device.
2. Open the control panel of the imaging device.
3. Perform the image acquisition.

2.1. Selection of the Imaging Device

In the *Imaging Devices* menu choose the imaging device, which you want to use for image acquisition. In this menu you will find those imaging devices whose support was selected during the program installation. Below is given the list of all imaging devices being currently supported by QuickPHOTO MICRO 3.1 program:

> **Note**
>
> If you want to add another device to the *Imaging Devices* menu, proceed according to the following chapter - see "Adding the Support of a New Imaging Device" on page 18.

- *PROMICAM USB 3.0 Digital Camera* - option for PROMICAM USB 3.0 digital cameras. Type of the camera in use will be detected automatically.

- *PROMICAM USB 2.0 Digital Camera* - option for PROMICAM USB 2.0 digital cameras. Type of the camera in use will be detected automatically.

- *LUMENERA® Infinity Digital Camera* - option for LUMENERA® Infinity USB 2.0 digital cameras. Type of the camera in use will be detected automatically.

- *Canon® EOS Digital SLR Camera* - option for Canon® EOS series DSLR cameras. Type of the camera in use will be detected automatically.

- *uEye Digital Camera* - option for IDS uEye® USB 2.0 digital cameras. Type of the camera in use will be detected automatically.

- *OLYMPUS Digital Camera* - option for OLYMPUS® CAMEDIA® and SP series cameras. Type of the camera in use will be detected automatically.

- *OLYMPUS E-system SLR camera* - option for OLYMPUS® E-system DSLR cameras. Type of the camera in use will be detected automatically.

- *ARTRAY ARTCAM camera* - option for ARTRAY ARTCAM USB 2.0 digital cameras. Type of the camera in use will be detected automatically.

- *OLYMPUS® DP72 camera*

- *OLYMPUS DP20 camera*

- *OLYMPUS DP70/DP71/DP30BW*

- *Histology Slide Scanner* - option for PathScan Enabler IV histology slide scanner.

- *Basler A601fc*

- *Analog video source* - option for acquiring images from analog video cameras or other devices with analog video output (video-endoscopic systems, ultrasonographs, video recorders, DVDs and so on).

- *TWAIN Device* - option for acquiring images from devices supporting TWAIN standard. Using this interface, it is possible to acquire images from a number of digital devices, which are not natively supported by the program, for example from digital video cameras, scanners, and many others.

2.2. Opening of the Imaging Device's Control Panel

To open control panel of the selected imaging device, click the [icon], activate the *Open Imaging Device Control Panel...* option from the *File* menu or use a [F4] key shortcut.

2.3. Acquiring an Image

In the open control panel of imaging device set the required parameters of exposition and acquire an image using the *Capture* button. Acquired image will be immediately transferred to the computer and displayed in the *Display Window*.

For more detailed information about imaging devices' control panels see "*Control Panels of Imaging Devices*" on page 173.

3. Work with Images

Description of work with images is divided into the following chapters:

1. Image Opening
2. Image Editing
3. Indication and Annotating of Interesting Areas
4. Image Saving
5. Image Printing

3.1. Image Opening

It is possible to open images using the *File → Open...* option, by clicking the [icon], or by a [Ctrl+O] key shortcut. In the opened *Open* dialog box you may select one or more images and open them all at the same time. Another possibility for opening of images is to drag them with a mouse into the *Display Window* (drag-and-drop) for example from the *Windows*[®] *Explorer* or another file manager. Thumbnails of the opened images will appear in the *Thumbnail Browser* together with their names, types, and sizes.

Menu *File → Open Recent* offers up to ten last used images on a list for opening.
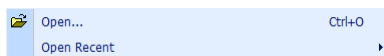
3.2. Image Editing

> **Note**
>
> All editing is always done to the currently displayed image in the *Display Window*.

Options for image editing may be activated from the *Image* menu. Some of these options may also be activated using the icons in the *Toolbar*. Menu *Image* contains the following options for image editing:

- *Crop*
- *Rotate Clockwise by 90°* and *Rotate Counter Clockwise by 90°*
- *Flip* vertically and *Mirror* horizontally
- *Resize*
- *Auto White Balance*
- *White Balance Defined by Point*
- Filters: *Sharpen, Blur, Median Filter, Negative, Grey Scale*
- *Black Balance Defined by Point*
- *Adjust Brightness/Contrast/Gama, Adjust Colors, Adjust Histogram*

Detailed description of individual functions is in the following paragraphs:

Cropping Image

Function *Crop* is used for removal of undesirable image areas. Activate *Crop* function from the *Image → Crop* menu or by clicking the ⛝ icon. Drag your mouse, while holding the left button, over the area which shall be preserved – the rest of the image will be cropped. In the left upper corner of the selected area will appear a field showing its size. Size is displayed in pixels, and if there has been a calibration assigned, also in length units.
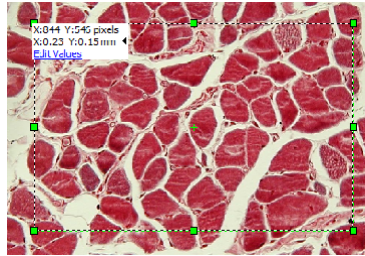
Clicking on the field displaying size, will switch it to a mode in which it is possible to type in the values, and to define precisely the desired size of the chosen area.
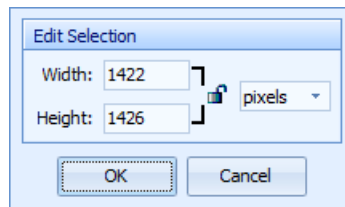
Right from the field displaying size values is a lock icon. If an open lock is displayed (default state) it is possible to enter both dimensions of the area independently. After clicking on this icon a closed lock will be displayed. This way the program will remember (lock) the ratio of the area's dimensions. Then after you have entered one dimension the second one will automatically be calculated in the locked ratio. If the image has an assigned calibration, it is possible to, after selection of units from the drop-down menu on the right from the lock icon, define the area dimensions in units of length. New size can be confirmed by the *OK* button. Recalculation of the area size will take place according to the entered values. Field displaying the size can be, for better clarity, hidden using the ◄ button. To display the area size values again, use the ► button.

It is also possible to change the area size using the green grasp points. When dragging the corner grasp points with a mouse while holding the [Shift] key, ratio of the area dimensions will be preserved.

It is possible to move the chosen area by dragging the mouse while holding the left mouse button by the inside of the chosen area.

In case of need, it is possible to cancel the *Crop* function by pressing the [Esc] key or by clicking the right mouse button (rectangle defining the area will disappear).

Cropping itself is done by a mouse double-click on the inside of the chosen area or by clicking on the ⊐ icon. Only the chosen part of the image will remain. The rest of it will be removed.

Copying Image, or its Part, to the Clipboard

To copy the whole image displayed in the *Display Window* to the clipboard, activate the *Edit → Copy* option, click the 📋 icon, or you may use the [Ctrl+C] key shortcut.

If you want to copy only a part of the image displayed in the *Display Window* to the clipboard, activate the *Edit → Select Region* option, or click the ⊡ icon first, select the desired area for copying to the clipboard (same way as was described in the previous paragraph *Image Cropping*). To copy the chosen area to the clipboard, activate the *Edit → Copy* option, click the 📋 icon, or use the [Ctrl+C] key shortcut.

Pasting Image from the Clipboard

Content of the clipboard (if it contains image information) can be pasted into the QuickPHOTO MICRO 3.1 program as a new image. This way you may paste an image from a different program or an image (or its chosen area) from the QuickPHOTO MICRO 3.1 program. When you paste an image from the QuickPHOTO MICRO 3.1 program, the new image will be pasted with merged layers. To activate the paste function use the *Edit → Paste* option, click the 📋 icon, or use the [Ctrl+V] key shortcut.

Flipping and Rotating the Image

It is possible to rotate the image by 90° clockwise or counter clockwise using the options *Image → Rotate Clockwise by 90°* and *Image → Rotate Counter Clockwise by 90°* or using the 🔄 and 🔄 icons.

For vertical flipping or horizontal image mirroring, use one of the options *Image → Flip* or *Image → Mirror* or one of the 🔃 and 🔁 icons.

Resizing Image

To change the image size, activate the *Image → Resize...* option or click the ⬚ icon. A *Resize* dialog box will open. Type in one new image dimension, second dimension will be calculated automatically in the original aspect ratio. Ratio of the dimensions is always kept the same to maintain accuracy of measurements. Confirm the new image size by clicking the *OK* button.

Resize	✕
Current Size	
Width: 2447 pixels	
Height: 1919 pixels	
New Size	
Width: 800 pixels	
Height: 627 pixels	
Aspect ratio will be maintained to preserve measurement accuracy.	
OK Cancel	
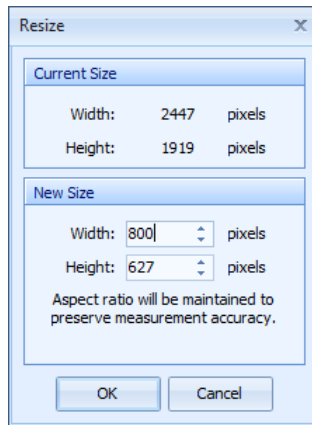
Automatic White Balance

After you have activated the *Image → Auto White Balance* option, automatic balancing of the white color will take place in the whole image.

White Balance Defined by Point

After you have activated the *Image → White Balance Defined by Point* option, click the left mouse button to such a point in the image, which will define the reference white color for the whole image. White balance based on the chosen reference value will take place in the whole image.

Sharpen

After you have activated the *Image → Sharpen* option, the whole image will be sharpened.

Blur

After you have activated the *Image → Blur* option, the whole image will be blurred.

Median Filter

After you have activated the *Image → Median Filter* option, median filter will be applied to the whole image. This function will remove some point defects, such as the so called "hot pixels" or some types of image noise, from the image. This function is suitable especially for fluorescence applications.

Negative

After you have activated the *Image → Negative* option, the image will be transferred to a negative. If you repeat this function, image will be brought to its original state.

Grey Scale

After you have activated the *Image → Grey Scale* option, the image will be transferred to a grey scale image.

Black Balance Defined by Point

After you have activated the *Image → Black Balance Defined by Point* option, click the left mouse button on such a point of the image, which will define the reference black color for the whole image. Black balance will take place in the whole image, based on the defined reference value. This function is designed for fluorescence applications.

Adjust Brightness/Contrast/Gamma, Adjust Colors

Options *Image → Adjust Brightness/Contrast/Gamma...* and *Image → Adjust Colors...* or corresponding icons 🔆 and 🎨 open an *Image Adjustment* dialog box with tabs *Brightness/Contrast/Gamma* and *Red/Green/Blue*. In the top part of both tabs, there are sliders for individual options and in the bottom part, there are previews of the image before any changes and after changes have been made. Buttons 🔍 and 🔍 between both previews are there for the change of display size of both previews. After previews have been zoomed in, it is possible to, by dragging the mouse while holding the left mouse button, move both previews. Using sliders of individual functions, it is possible to adjust the desired image parameters. Changes will immediately be visible in the right hand side preview. *Default*

Values button in the bottom part of the window will bring all settings in this dialog box to the original state. Changes made can be applied to the whole image by clicking the *OK* button.
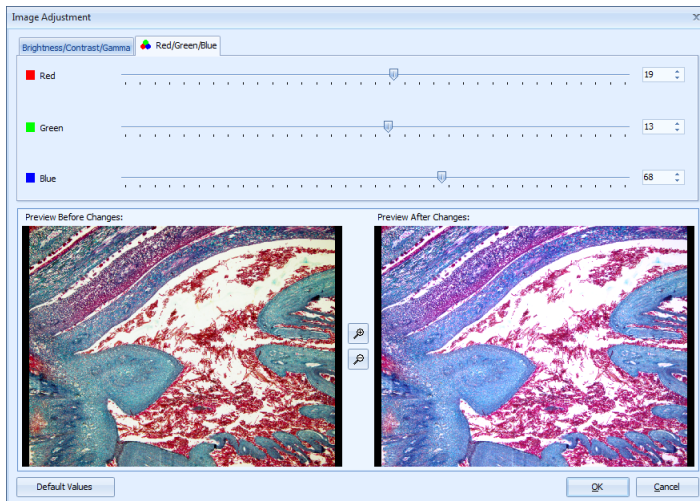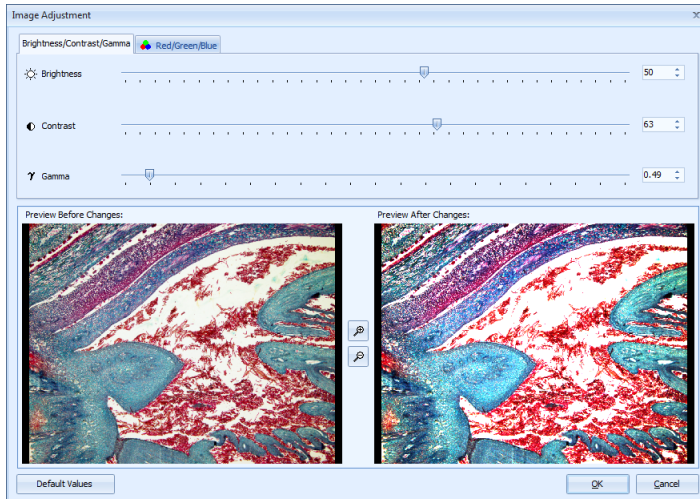
Histogram Adjustment

Option *Image → Adjust Histogram...* and the ▫ icon open a *Histogram Adjustment* dialog box.
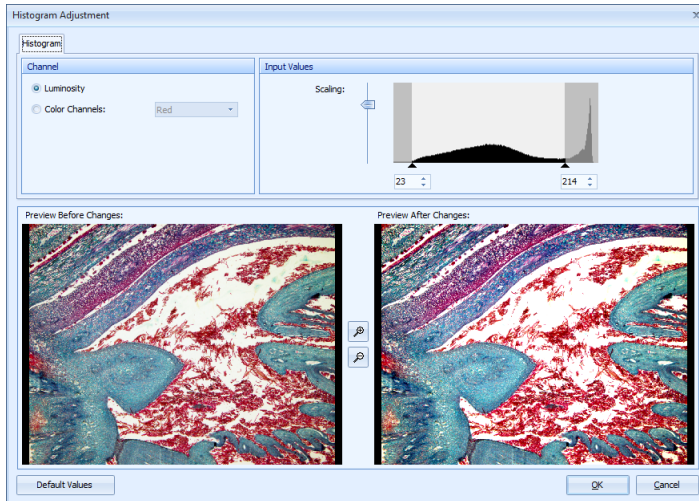
This dialog box consists of several parts:

In the *Channel* part you can choose in which color channel of the image will the histogram adjustment take place. Option *Luminosity* affects the whole image (all color channels at the same time). If you check the option *Color Channels*, it is possible to adjust individual color channels independently.

In the *Input Values* part actual histogram adjustments take place. Displayed graph represents a histogram for a channel selected in the *Channel* part. Histogram scale can be changed using the vertical *Scaling* slider. Under the histogram graph, there are small triangles displayed on the edges. These small triangles can be moved and thus set the border histogram values, the so called black point (left triangle), and the so called white point (right triangle). Set values are displayed in editable fields under the histogram.

In the bottom part of the window, there are image previews before and after changes have been made. Buttons ▫ and ▫ between both previews are there for the change of display size of both previews. After previews have been zoomed in, it is possible to, by dragging

the mouse while holding the left mouse button, move both previews. *Default Values* button in the bottom part of the window will bring all settings in this dialog box to the original state. Changes made can be applied to the whole image by clicking the *OK* button.

3.3. Indication and Annotation of Interesting Areas

Program QuickPHOTO MICRO 3.1 is equipped with functions for indication of interesting areas in the image using drawings and text labels. You may use the following tools:

• Text Annotation
• Draw Line
• Draw Arrow
• Draw Rectangle
• Draw Circle
• Draw Ellipse
• Draw Polygon
• Draw Freehand

The use of individual tools is described in the following paragraphs.

Note

The use of the above mentioned tools can be canceled anytime by the right mouse button click or by the [Esc] key.

Annotations Insertion Mode

Program QuickPHOTO MICRO 3.1 offers two modes of annotations inserting. Make your selection in *Options* of the program in section *General* at the *Annotations* tab (*Edit → Options... → General → Annotations*), in the part *Annotations Insertion Mode*. There are two options available:

• *Continuous Inserting Mode* - if this option is active, the selected tool will remain active, for the current image, until it is deactivated. This way you may repeat inserting of the same type of object into the image without the need to activate the same tool over manually.

- *Single Insertion Mode* - if you activate this option, the selected tool will be automatically deactivated after one object has been inserted.

Setting the Line Color and Thickness

To set the line color and thickness of the drawn objects use the *Edit → Object Line Color...* and *Edit → Object Line Thickness* options or corresponding icon 3 in the *Toolbar*.

After the option *Edit → Object Line Color...* was activated or after clicking the left part of the 3 icon, select the desired color from the displayed color palette.

After the option *Edit → Object Line Thickness* was activated or after clicking the right part of the 3 icon, select the desired line thickness from the displayed list.

Icon 3 also serves as an indicator of the currently set line color and thickness. Selected line color and thickness will be used for inserting of all new objects.

Draw Line

Tool *Draw Line* can be activated by the *Annotations → Line* option or by clicking the ✏ icon. Then by clicking into the image and by dragging the mouse, while holding the left mouse button, or by clicking the left mouse button into the starting point and then the endpoint, a line may be drawn. Precisely horizontal or vertical line may be drawn if you hold the [Shift] key while drawing it.

Draw Arrow

Tool *Draw Arrow* can be activated by the *Annotations → Arrow* option or by clicking the ✏ icon. Then by clicking into the image and dragging the mouse, while holding the left mouse button, or by clicking the left mouse button into the starting point and then into the endpoint, an arrow may be drawn. The arrowhead will be placed to the endpoint. Precisely horizontal or vertical arrow may be drawn if you hold the [Shift] key while drawing it.

Draw Rectangle

Tool *Draw Rectangle* is activated by the *Annotations → Rectangle* option or by clicking the □ icon. Then by clicking into the image and by dragging the mouse, while holding the left mouse button, draw a rectangle.

Draw Circle

Tool *Draw Circle* is activated by the *Annotations → Circle* option or by clicking the ⭘ icon. Then by clicking into the image and by dragging the mouse, while holding the left mouse button, draw a circle.

Draw Ellipse

Tool *Draw Ellipse* is activated by the *Annotations → Ellipse* option or by clicking the ⬯ icon. Then by clicking into the image and by dragging the mouse, while holding the left mouse button, draw an ellipse. It is possible to rotate the ellipse by dragging the green grasp point displayed inside the ellipse.

Draw Polygon

Tool *Draw Polygon* is activated by the *Annotations → Polygon* option or by clicking the ⇨ icon. Then by clicking the left mouse button, into the selected area in the image, insert the first polygon's vertex. Repeated mouse clicks of the left mouse button will insert other vertexes of the polygon. Precisely horizontal or vertical edges can be drawn if you hold the [Shift] key. To finish drawing of the polygon, click the right mouse button – the last vertex will be connected with the first one and that way the polygon will be closed.

Draw Freehand

Tool *Draw Freehand* is activated by the *Annotations → Freehand* option or by clicking the ꟿ icon. Then by clicking into the image and by dragging the mouse, while holding the left mouse button, draw the desired curve.

Insert Text Annotation

Tool *Insert Text Annotation* is activated by the *Annotations → Text...* option or by clicking the **A** icon. Cursor will change into a cross with the letter A. Then click the left mouse button into the image to the spot, where the text annotation should be placed. A *Text Annotation* dialog box will open.
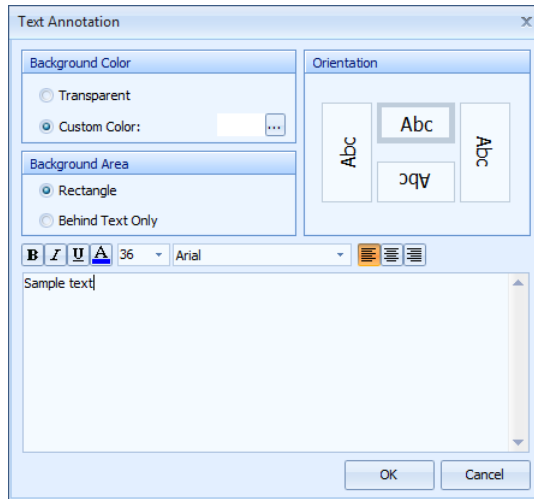
Type the text content into the bottom field. Setting of the font properties can be done using the: *Bold* $\boxed{B}$, *Italic* $\boxed{I}$ or *Underline* $\boxed{U}$ buttons. Font color can be chosen from the color palette, which will show after clicking the *Text Color* $\boxed{A}$ button. Font size and type can be selected from the $\boxed{28}$ $\boxed{\text{Arial}}$ drop-down menus. To align a multiline text use the following buttons: *Align Multiline Text Left*, *Center Multiline Text*, and *Align Multiline Text Right* $\boxed{\equiv\equiv\equiv}$.

Orientation of the text can be chosen in the *Orientation* part by clicking the corresponding button with the *Abc* text on it.
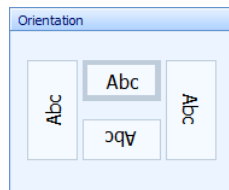
Background of the text annotation can be set in the *Background Color* and *Background Area* parts. If you, in the *Background Area* part, check the *Transparent* option, text annotation will be inserted into the image with a see-through background. If you check

the *Custom Color* option it will be possible, after clicking the ⋯ button, to choose the annotation's background color from the displayed color palette. After checking the *Custom Color* option, the *Background Area* part with two choices will be made available. Option *Rectangle* will fill-in the whole rectangle area defined by the text annotation with the set background color. Option *Behind Text Only* will fill-in only the area behind text with the set background color.

To insert a text annotation click the *OK* button.

Note

Text writing and all above mentioned editing are continuously displayed directly in the image. Parameters of the text annotation can be selected interactively. If the window *Text Annotation* covers the inserted text annotation in the image, we recommend to move this window to a different area by dragging it by its upper strip.

Inserted text annotation can be easily moved around in the image. Click on the text annotation with the left mouse button and move the text by dragging the mouse, while holding the left mouse button, to the desired area.

To edit an already inserted text annotation, double-click on it with the left mouse button. A *Text Annotation* dialog box will open again and you will be able to edit the text as you wish.

Selection of the Inserted Objects for Editing

If you want to edit objects that have already been inserted into the image, it is necessary to select those objects first. Proceed according to the following instructions:

Activate the *Select* ⬉ tool and by clicking the contour line of the desired object, select it. Selected object will be highlighted with a green dash line and on its perimeter, green grasp points will be activated (except for an object created with the *Draw Freehand* tool). Object selected this way is ready for editing.

To select more objects at the same time, press and hold the [Shift] key and select all objects, which you want to edit, with the left mouse button.

To cancel the object selection, click the left mouse button anywhere outside the objects or click the right mouse button. Selection of objects will be canceled.

Note

Select tool ⓘ is automatically activated every time no other tool is active.

Change of Line Color and Thickness of the Drawn Objects

In order to edit inserted objects, select them first - for more information see "Selection of the Inserted Objects for Editing" on page 89.

The color and line thickness of selected objects may be changed. For these purposes use the following options *Edit → Object Line Color...*, *Edit → Object Line Thickness* or the corresponding icon ③˙ in the *Toolbar*.

New line color of the selected objects can be chosen from the displayed palette after the option *Edit → Object Line Color...* was activated or after clicking the left part of the ③˙ icon.

New line thickness of the selected objects can be chosen from the displayed list after the option *Edit → Object Line Thickness* was activated or after clicking on the right part of the ③ icon.

Relocation, Change of Size and Shape of the Drawn Objects/Relocation of Text Annotations

In order to edit inserted objects, select them first - for more information see "Selection of the Inserted Objects for Editing" on page 89.

If you want to move the selected object in the image, move the mouse cursor to its contour line. Cursor will change to ✛. By clicking on the object's outline and by dragging the mouse, while holding the left mouse button, the object can be moved to the desired area. In the middle of selected objects of the ellipse, rectangle, and circle types, there is a cross. Using this cross you may also move these objects in the above mentioned way. Use a similar process to move text annotations.

In the ellipse there is also a green grasp point connected, by a dash line, with its center. Using this point you can rotate the ellipse any way you wish.
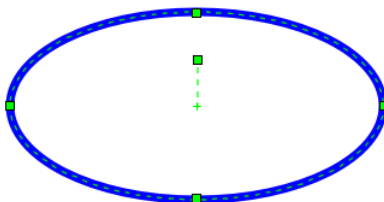
To change the size/shape of the selected object, proceed as follows: move the mouse cursor to one of the green grasp points. Cursor will change to ⬉. By clicking on the grasp point and by dragging the mouse, while holding the left mouse button, you can change the size/shape of the object.

Deleting of Inserted Objects and Text Annotations

In order to edit inserted objects, select them first - for more information see "Selection of the Inserted Objects for Editing" on page 89.

To delete a selected object from the image, press the [Del] key, activate the *Edit → Delete Selected Objects* option or click the ✕ icon. To delete all (not only selected objects) inserted objects from the image, activate the *Edit → Delete All Objects* option or click the ✎ icon.

3.4. Image Saving

Information about Work with Layers

QuickPHOTO MICRO 3.1 program uses, for work with inserted objects an independent layer "above the image". Thanks to this function, it is possible to edit, hide, or delete all inserted objects. There are two possible ways to save the images: with layers kept as they are or with flattened (merged) layers. The saving option named *Flattening Layers* is available in the *Saving Parameters,* and *Save As* windows, and contains the following options:

1. Keep Inserted Objects in a Separate Layer
2. Merge Objects with an Image (Flatten Layers)

Both saving options have their specifics:

1. Keep Inserted Objects in a Separate Layer

It is possible to keep the layers separate only when saving images as the **JPEG** or **TIFF** type. Images of the BMP and PNG type do not support saving of layers. If you save the image as a JPEG or TIFF type with the layers kept, all its functions will be available next time you open it in the QuickPHOTO MICRO 3.1 program. Which means that the image will have an assigned calibration which was used for measurements, it will be possible to edit all inserted objects, description of the image will be maintained, the table of measured values will contain measurement results with possibly added comments. Image saved in such a way will (in case a calibration was assigned to this image before saving) contain complete information about the calibration, and it will be possible to continue with measurements in the image also at a different workstation equipped with the QuickPHOTO MICRO 3.1 program, even if this workstation does not have the calibration, which was used for acquiring of the image, available for the used microscope-imaging device set.

Important is the fact that after opening of an image saved in such a way in other programs for work with images, the layer containing inserted objects will not be visible – only the image without inserted objects will be displayed.

2. Merge Objects with an Image (Flatten Layers)

If you need the inserted objects in the image to be visible also in other programs for work with images (for example if you need to insert the image to a text document or a presentation), it is necessary to save the image with flattened layers. In such case, the layer "above the image" containing inserted objects will be merged with the image. When you flatten layers, all additional information (image calibration, the content of the table of measured values, description of the image) will be removed from the image. When you open an image, saved in such a way, in other programs for work with images, the image will be displayed with all inserted objects.

If you open such an image in the QuickPHOTO MICRO 3.1 program, it will no longer be possible to edit the inserted objects in any way. The image will not contain information about the used calibration, table of the measured values will be empty, and the image's description will not be available.

To save images with flattened layers, you can use all supported image types: JPEG, TIFF, PNG as well as BMP.

Types of Files Supported by the QuickPHOTO MICRO 3.1 Program

QuickPHOTO MICRO 3.1 program works with images of the JPEG, TIFF, PNG, and BMP types. The following paragraphs contain basic information about these file types:

- **Information about JPEG File Type/JPEG Quality**

  The JPEG (Joint Photographic Experts Group - suffix .jpg) file type is the most commonly used type of file for saving photomicrographic images. This is a file type utilizing the so called lossy compression. Result of this is a relatively small data file size at the expense of loss of image quality. This loss of quality however, means no problems for most photomicrographic applications. Quality of the saved image can be affected by a parameter named JPEG quality. This parameter has influence on the level of JPEG compression, that way it affects the quantity of information (details) which will be preserved in the image. Higher JPEG quality means lower level of compression, that way a larger saved file and vice versa.

  JPEG type enables you to save, besides the actual image data, additional information - metadata (for example sensor sensitivity, aperture number, exposure time, focal length, information about the use of flash, and other data) thanks to the Exif extension. Exif extension enables the QuickPHOTO MICRO 3.1 program to use this file type for saving of images with the layers kept as they are.
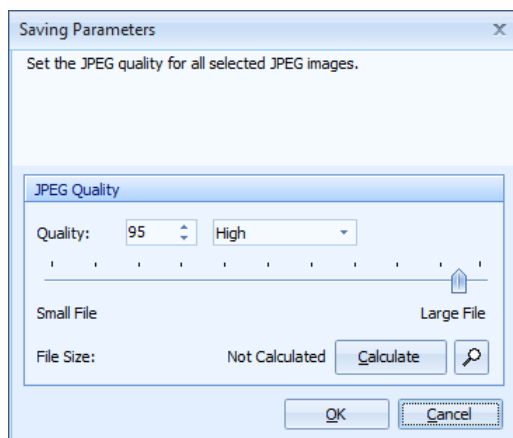
> **Note**
>
> Default value of the JPEG quality is in the QuickPHOTO MICRO 3.1 program set at the value 95. You can set the default value by the *Default JPEG Quality* parameter in the *Edit → Options... → General → Image Names & Saving* program setting.

> **Note**
>
> JPEG type file is not very suitable for saving of images with measured phases. We recommend to use the TIFF file type for such images.

- **Information about TIFF File Type**

  TIFF file type (Tag Image File Format - suffix .tif) represents a commonly used option for image saving using a lossless compression. There is no decline in quality of the saved file which makes this type of file very suitable for the need of high quality print. Disadvantage of this file type is its large data size. This file type does not allow the user to set the quality. TIFF type enables to save not only the image information but also additional data. Thanks to this, it is possible to use the TIFF type to save images in the QuickPHOTO MICRO 3.1 program, with the layers kept as they are. QuickPHOTO MICRO 3.1 program uses LZW compression algorithm for saving of TIFF files.

- **Information about PNG File Type**

  PNG file type (Portable Network Graphics - suffix .png) also uses the lossless compression for saving image data. PNG type produces, unlike the TIFF type, significantly smaller files but it does not allow, in the QuickPHOTO MICRO 3.1 program, to save images with the layers kept as they are. PNG type is especially suitable for publishing of smaller images on the internet.

- **Information about BMP File Type**

  BMP file type (Windows Bitmap – suffix .bmp) represents, in terms of how to save image data, the most primitive way of saving images to a file. BMP type saves image

information to a file without compression, and because of that the result is a very large file. BMP type does not allow, in the QuickPHOTO MICRO 3.1 program, saving of images with the layers kept as they are.

> **Note**
>
> QuickPHOTO MICRO 3.1 program saves images to files in the 24bit RGB mode, and sets the DPI parameter to value 300.
>
> The images can also be saved as 8bit grey scale TIFF files.

Image Saving

There are several options for saving images in the *File* menu. These are the following options: *Save*, *Save As..*, *Save All*, *Save All As...* You can also use key shortcuts to activate individual options.

🖫	Save	Ctrl+S
🖫	Save As...	Shift+Ctrl+S
🖫	Save All	Ctrl+Alt+S
🖫	Save All As...	Shift+Ctrl+Alt+S

Option Save

Option *File → Save* or the 🖫 icon in the *Toolbar* will save only those images selected in the *Thumbnail Browser*. If the images being saved have already been saved before, they will be saved again into their original locations. If the JPEG or TIFF types of images are being re-saved into their original locations, a *Saving Parameters* dialog box will be displayed. Other types of images (BMP and PNG) will be re-saved automatically. If you are saving newly acquired images a *Save As* dialog box will be displayed, which will enable you to choose the location, names, and types of the files being saved. If all selected images have already been saved, this option will be inactive.

Option Save All

Option *File → Save All* saves all images displayed in the *Thumbnail Browser*. If the images being saved have already been saved before, they will be saved again into their original locations. If the JPEG or TIFF types of images are being re-saved into their original locations a *Saving Parameters* dialog box will be displayed. Other types of images (BMP a PNG)

will be re-saved automatically. If you are saving newly acquired images a *Save As* dialog box will be displayed, which will enable you to choose the location, names, and types of files being saved. If all images have already been saved, this option will be inactive.

Saving Parameters Window

Saving Parameters window will be displayed after one of these functions *File → Save* or *File → Save All* has been activated while re-saving the JPEG or TIFF type images into their original locations.
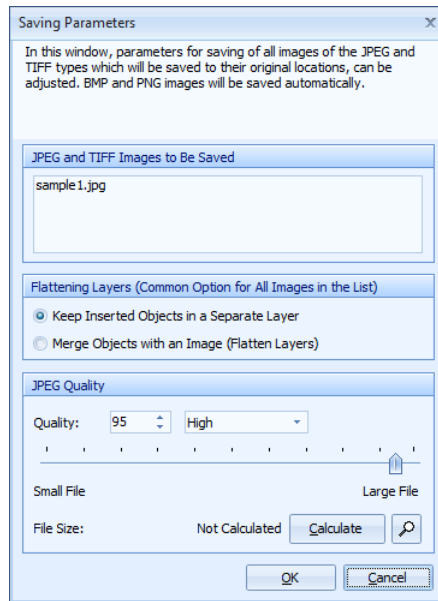
In the top part of the window there is a list *JPEG and TIFF Images to Be Saved*, which contains names of images, which will be involved in the settings. The same settings will be used for all images on this list.

In the middle part of the window there is a *Flattening Layers* option available - for more information see "Information about Work with Layers" on page 91.

If there is at least one JPEG type image in the list, there is a *JPEG Quality* section in the bottom part of the window. Controls in this section enable setting of quality for the JPEG

type images. (This option has no influence on other types of images.) *Calculate* and *Preview* 🔍 buttons are available only if there is only one JPEG type image on the list of images to be saved. *Calculate* button calculates the resulting image size at the set JPEG quality. *Preview* 🔍 button displays a window with the image preview as it will look at the chosen JPEG quality.

Option Save As...

Option *File → Save As...* saves images selected in the *Thumbnail Browser* using the *Save As* window, which enables to choose the location, names, and types of files being saved.

Option Save All As...

Option *File → Save All As...* saves all images displayed in the *Thumbnail Browser* using the *Save As* window, which enables you to choose the location, names, and types of files being saved.

Window Save As

Window *Save As* replaces the standard Windows® dialog box for saving files into a chosen location. This window contains an expanded functionality, and it enables saving of more images at the same time. This window consists of several parts:

- Thumbnails of Images for Saving
- Location
- File Name and Type
- Additional File Name Tags
- Flattening Layers
- Information

Thumbnails of Images for Saving   Location

File Name and Type

Flattening Layers

Information

Additional File Name Tags
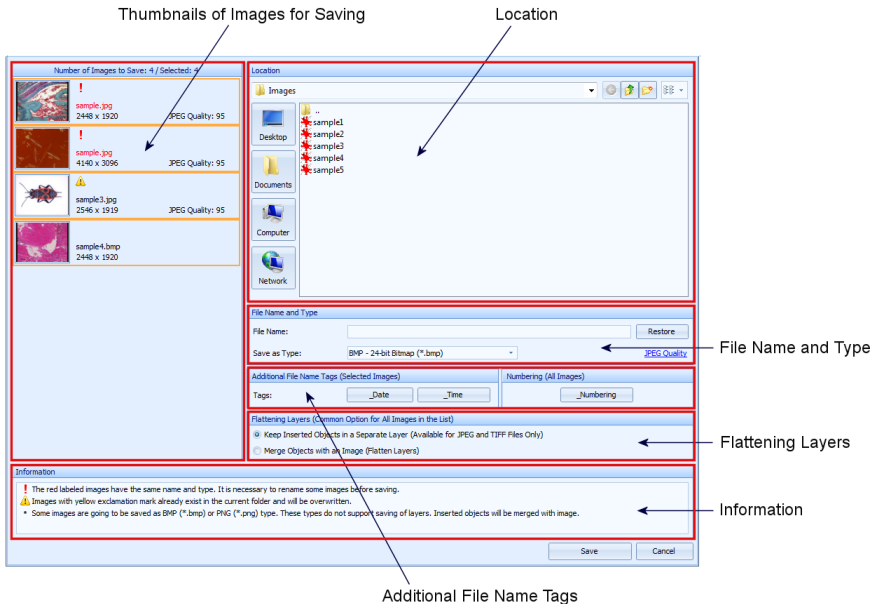
Part Thumbnails of Images for Saving

This part contains thumbnails of all images to be saved. After the *Save As* dialog box has been opened all thumbnails of the images to be saved will be selected with an orange frame. Thumbnails can be selected/deselected in a similar way as the thumbnails in the *Thumbnail Browser* in the *Main Program Window* - for more information see "Thumbnail Browser" on page 71. Settings done in the *File Name and Type* and *Additional File Name Tags* parts will always be applied to selected images from this list. So you can set, in bulk, the name, type, and quality for more images at the same time.

Order of thumbnails on the list can be changed by dragging them with a mouse (drag-and-drop). Information about the number of images for saving, and the number of selected images are displayed in the bar above the thumbnails.

If you move the mouse over one of the thumbnails, several buttons will be displayed on the right side next to the particular thumbnail. These buttons call for functions for a specific image. Image preview in the full size can be displayed by clicking the *Preview* 🔍 button

(for JPEG image types the quality of the preview will be influenced by the set *JPEG Quality* parameter), information about the image can be displayed using the *Image Information* [i] button. This function is useful, for example, if you want to add a description to the image before you save it. Images can be removed from the saving list by clicking the *Close* [×] button (thumbnail will disappear from the list).
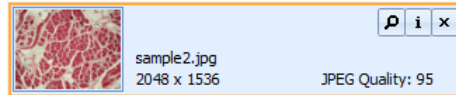
Two indicators may be displayed in the thumbnail area according to the current situation. If there is an already existing image with the same name and type in the folder chosen in the *Location* part, an indicator ⚠ will be displayed by the thumbnail. Unless you change the name or type of the image, the already existing image in the folder will be overwritten.

If the ! indicator is displayed by some of the thumbnails, it means that there has been a collision of the names as well as the types of the images on the list. In such a case saving of the images cannot take place unless you change the name or type of these images. Legend for the displayed indicators will be displayed in the *Information* part.
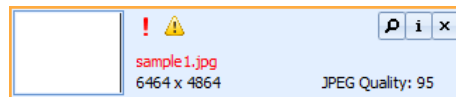
Part Location

In this part it is possible to select a folder into which all images displayed in the *Thumbnails of Images for Saving* part will actually be saved. Control in this part is similar to the standard Windows® dialog box for saving files.
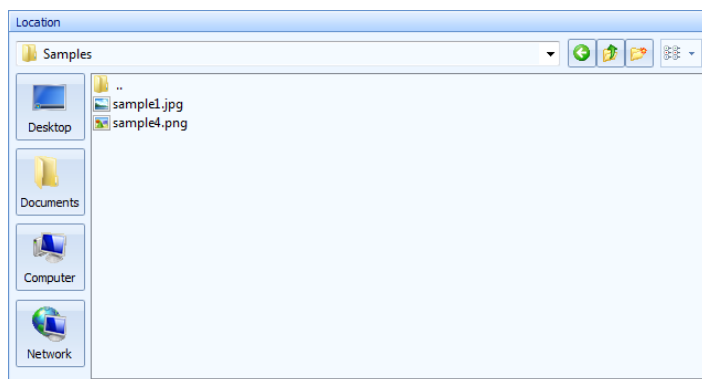
Part File Name and Type

In this part it is possible to choose the names and types of images selected in the *Thumbnails of Images for Saving* part. If you have selected more than one thumbnail and you type in a new name to the *File Name* field, the name of all selected images will be changed at the same time, and the *_Numbering* function will also be activated. This function will ensure distinction of individual images. Changes will immediately appear in *Thumbnails of Images for Saving* part. If you want to restore the original names of the selected images, click the *Restore* button.

*Save as Type* drop-down menu enables to select the type (format) of the images selected in the *Thumbnails of Images for Saving* part. If you leave the default option *Original Type* active, images will be saved in the same format in which they were opened/acquired in the program. If you choose one of the available types from this menu, the selected type will be set to the images selected in the *Thumbnails of Images for Saving* part. If you choose the JPEG type, indicator of the set JPEG quality will also be displayed by the corresponding thumbnails (for example *JPEG Quality: 95*) and at the same time *JPEG Quality* link will be made available right from the *Save as Type* drop-down menu. This link will open a window in which it will be possible to set the desired quality of the JPEG type images.
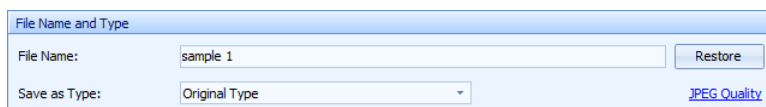
Part Additional File Name Tags

In the part *Additional File Name Tags* there are three buttons. Button *_Date* will add the current date to the image names selected in the *Thumbnails of Images for Saving* part. Button *_Time* will add the current time to the image names selected in the *Thumbnails of Images for Saving* part. Button *_Numbering* adds a serial number to the image names selected in the *Thumbnails of Images for Saving* part. Images will always be numbered from the number 00001. This function is useful, for example, in case you want to save several images from the same series with the same name and you want to distinguish them with a serial number. The use of particular buttons can be freely combined.

Part Flattening Layers

In this part of the window there is the *Flattening Layers* option available - for more information see "Information about Work with Layers" on page 91. Setting of this option will affect all images to be saved. The first option, *Keep Inserted Objects in a Separate Layer*, is valid only for JPEG and TIFF type images. With the BMP and PNG types layers will always be merged automatically.

Part Information

In the *Information* part explanatory notes are displayed for indicators and warnings about important facts about saving of images.
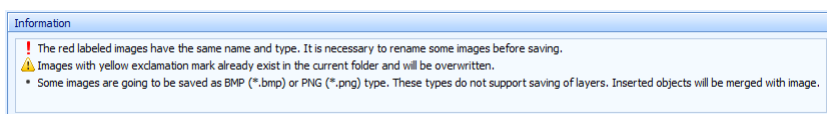
Saving of Images When Exiting the Program

When exiting the QuickPHOTO MICRO 3.1 program you will be asked whether you wish to save the not yet saved images. Option *Save* called from the displayed message window works the same way as the option *File → Save All*.

3.5. Image Printing

Program QuickPHOTO MICRO 3.1 enables to print 1-4 images next to each other on one page. Select images for printing (max 4) in the *Thumbnail Browser* and activate the *File* → *Print...* option or click the 🖨 icon.

Function *Print* can also be activated for a particular image by clicking the *Print* 🖨 button in the controls of the corresponding thumbnail.

> **Note**
>
> If you select more than 4 images in the *Thumbnail Browser* and you activate the *Print* function only the first four images of the selection will be printed.

If there are 2 or 4 images displayed next to each other in the *Display Window* and you have selected only one thumbnail in the *Thumbnail Browser*, first a window *Selecting the Source of Images for Print* will open when activating the print function.
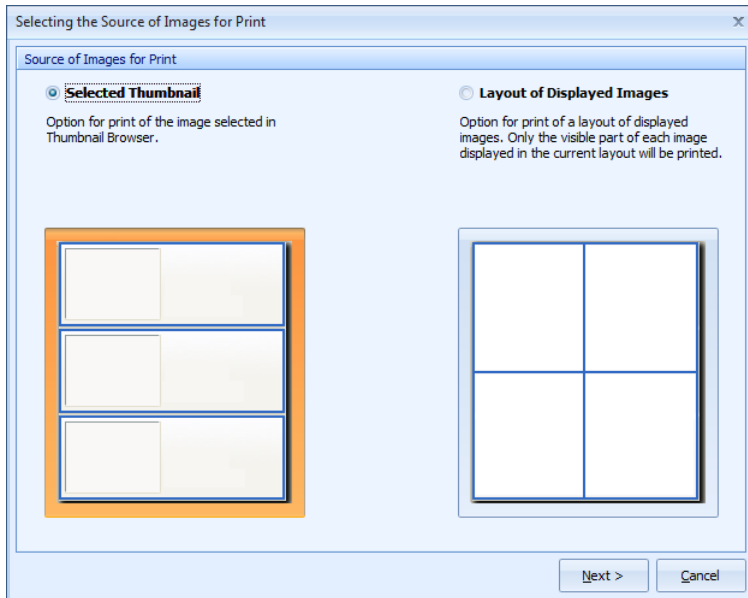
This window gives two options where to get images for printing:

Option *Selected Thumbnail* activates the print function for an image selected in the *Thumbnail Browser*.

Option *Layout of Displayed Images* is used for printing of the current image layout displayed in the *Display Window*. This option prints, on one page, currently visible image parts displayed in the *Display Window* next to each other. You may use this function, for example, if you want to print, on one page, various details of one image next to each other, or if you want to, for comparison, print details of various images next to each other.

When using this function proceed as follows:

1. Switch the *Display Window* to the mode for display of two or four images next to each other.
2. Display the desired images in individual *Display Window* fields. This way you can also display one image in more than one field of the *Display Window*.

3. Set the display size in individual fields according to your need and display the desired details.
4. Activate the *Print* function, in the *Selecting the Source of Images for Print* window, choose the *Layout of Displayed Images* option, and click the *Next* button.

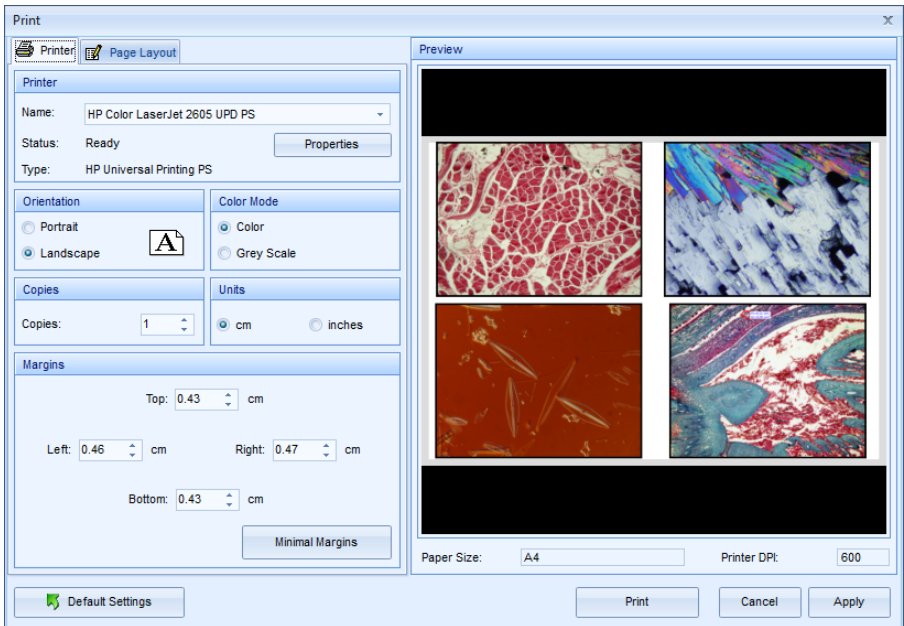After you click the *Next* button a *Print* window will open.

The resulting print layout may, for two images displayed next to each other in the *Display Window* look, for example, like this one:

Print Window

Print window consists of several parts:

- Preview
- Printer tab
- Page Layout tab
- buttons in the bottom part

Part Preview

In the right part of the *Print* window is displayed the page *Preview* as it will be printed out. Settings made are continuously updated in the *Preview* field. It is then possible to make required print settings interactively.

Under the *Preview* there are displayed information about the currently selected paper format and the set print quality (units DPI - Dots Per Inch).

Printer Tab

In the *Printer* part choose the desired printer from the *Name* drop-down menu which contains the list of available printers. *Properties* button opens a dialog box with advanced settings for the chosen printer.

Orientation part contains two options of the page orientation: *Portrait* and *Landscape*. To print one and four images next to each other, the default orientation will be landscape, to print two images next to each other, the default orientation will be portrait.

Color Mode part contains two options of the print mode: *Color* and *Grey Scale*.

Set the number of copies in the *Copies* part.

In the *Units* part choose units for setting of margins and the print size. You can choose between *cm* or *inches*.

In the *Margins* part set the desired page margins for printing. *Minimal Margins* button will set the minimal margin size, which the currently selected printer allows.

Page Layout Tab

Image Size part contains the following options:

- *Original Size (from Image DPI)* - this option sets the original print size according to the image DPI. QuickPHOTO MICRO 3.1 program assigns to the acquired images the 300 DPI quality.

- *Fit to Page (Keep Aspect Ratio)* - this option uses the whole page area for printing and it keeps the original aspect ratio of the image.

- *Stretch to Page (No Aspect Ratio)* - this option uses the whole page area for printing. Original aspect ratio will not be preserved.

- *Custom* - options in this part enable to set custom image print size in length units. If the *Constrain Proportions* option is checked and you will type in the first dimension, the second dimension will be calculated automatically in the original aspect ratio of the image. This option is available only for print of one image on a page.

- *Scale* - options in this part enable to set custom image print size in percents compared to the original size. If the *Constrain Proportions* option is checked and you will type in the first dimension, the second dimension will be automatically calculated in the original aspect ratio of the image. This option is available only for print of one image on a page.

In the *Image Alignment* part you can set the alignment of images on the page by clicking one of the 9 buttons.

Part *Image Information* sets print of additional information about the image. Along with the image it is possible to print, after checking the corresponding options: *Image Name*, *Date and Time of Image Origin*, and *Description* - for more information see "Image Information" on page 143. Buttons in the *Position* part determine the position towards the image, where additional information will be located. Information is, for better orientation, highlighted with a green color in the *Preview*. This highlight will not show in the final print.

In the *Image Borders* part select whether the printed images should have a black frame.

When printing more images on one page, it is possible to set the *Image Spacing* in the chosen length units.

Buttons in the Bottom Part

Default Settings button returns all settings in the *Print* window to the original values.

Print button will begin print on the selected printer, it will close the *Print* window and it will also store the set parameters for further opening of the *Print* window.

Cancel button will close the *Print* window without storing the set parameters.

Apply button will store the set parameters for further opening of the *Print* window (actual print will not take place).

Note

Print parameters are always stored only within the current QuickPHOTO MICRO 3.1 program run.

---

4. Measurements

QuickPHOTO MICRO 3.1 program is equipped with many functions for measurements in the image. These functions can be found in the *Measurements* menu. Corresponding icons are located in the *Toolbar*. There are the following functions available: inserting a calibrated scale bar ▭ ▯ , measuring of the line segment length ∡, measuring of the perimeter and area of an ellipse ◯, measuring of the perimeter and area of a rectangle ▭, measuring of the perimeter and area of a polygon ▱, measuring of the polyline's length ◺, counting of objects ⁺⁺, measuring of arbitrary angle ∡, angle from the X axis ⊿, angle from the Y axis ◺. It is also possible to insert a rectangular ⊞ overlay grid of defined dimensions into the image.

> **Note**
>
> To use the functions for measurements, it is necessary to calibrate the QuickPHOTO MICRO 3.1 program first - for more information see "Opening Information about Calibrations" on page 29.
>
> To achieve correct measuring results, it is necessary to have set the corresponding active calibration for the microscope-imaging device set in use - for more information see "Setting an Active Calibration" on page 54.

4.1. Preparation for Measuring

Selecting Magnification which Was Used for Acquiring of the Image

Before you begin measuring, first you must assign the corresponding microscope magnification, which was used when acquiring the image intended for measuring. Proceed as follows:

1. Display the desired image in the *Display Window*.
2. In the *Toolbar* choose from the *Objective* or eventually *Zoom* menu the corresponding magnification. In the list you can only choose from those values for which calibration was created. If your microscope is not equipped with a magnification changer or a zooming unit, there will be, after you choose an objective, in the *Zoom* menu automatically set the value 1.

After this step functions for measuring will be activated:

Mode of Assigning Magnifications to Images

If the same microscope magnification is being used frequently, manual assigning of the used magnification to each new image might be uncomfortable. For such cases offers the QuickPHOTO MICRO 3.1 program, in the *Options* dialog box, in section *Measurements* on the *Other Setting* tab (*Edit → Options... → Measurements → Other Setting*), the option *Mode of Assigning Magnifications to Images*. This option offers two possibilities:

- *Manual Magnification Assignment to Each Image* – if this option is active (default option), it is necessary to manually set magnification from the *Objective* or eventually *Zoom* menu to each image intended for measurements.

- *Automatically Assign the Last Used Magnification to a New Image* – if you activate this option, each new image will automatically be assigned the last magnification assigned to an image.

> **Note**
>
> If you are using one of the magnification encoders, values of magnifications in the *Objective* or eventually *Zoom* menu will be automatically filled in when the image is acquired, and values completed in such a way cannot be changed manually.

Setting the Line Color and Thickness of the Measuring Objects

To set the line color and thickness of the measuring objects, use the *Edit → Object Line Color...* and *Edit → Object Line Thickness* options or corresponding icon in the *Toolbar*.

After the *Edit → Object Line Color...* option was activated or after clicking the left part of the icon, select the desired color from the displayed color palette.

After the *Edit → Object Line Thickness* option was activated or after clicking the right part of the icon, select the desired line thickness from the displayed list.

The icon also serves as an indicator of the currently set line color and thickness. Selected line color and thickness will be used for inserting of all new objects.

Measurement Settings

For all newly acquired images and for all opened images which have not yet been saved (with the layers kept including some measurements or a scale bar) by the QuickPHOTO MICRO 3.1 program, default settings selected in the *Sizes/Colors* and *Measurands* tabs in *Options* of the program (*Edit → Options... → Measurements → Sizes/Colors; Measurands*) will be used automatically.

For the current image displayed in the *Display Window*, these settings can be changed, after the first measuring has been done, in the *Table of Measured Values* on the *Measurement Settings - "Image Name"* tab. Changes done on this tab will only relate to the current image. For detailed description see "Work with the Table of Measured Values" on page 124.

When saving an image containing some measurements or a scale bar with the layers kept, the above mentioned settings are saved as a part of the file, and when you open it in the QuickPHOTO MICRO 3.1 program next time, they will be applied for this image.

4.2. Scale Bar

Inserting a Calibrated Scale Bar

For a basic idea about the dimensions, you can insert into the current image a calibrated scale bar.

Option *Measurements → Insert Horizontal Scale Bar* or the ▬ icon inserts into the right bottom corner a horizontal scale bar.

Option *Measurements → Insert Vertical Scale Bar* or the ▮ icon inserts into the right upper corner of the image a vertical scale bar.

By clicking again on the corresponding icon, you can remove the scale bar which was inserted into the image.

The value displayed above the scale bar shows its full length. Scale bar is inserted in a layer "above the image" and if you change the display size of the image, scale bar size and value will continuously recalculate.

Scale Bar Settings

If you want to change the properties of the inserted scale bar, click on the scale bar with the right mouse button. A context menu with several choices will appear:

| Scale Bar Options... |
| Profiles: |
| ▪ Profile 1 |
| ▪ Profile 2 |
| ▪ Profile 3 |
| ▪ Profile 4 |

Option *Scale Bar Options...* opens an *Options* dialog box on the *Scale Bar* tab (*Edit →
Options... → Measurements → Scale Bar*). This tab contains number of choices for type,
size, and the appearance settings of the scale bar. Created settings can be saved into one
of the four available profiles with the option to choose your own name. If you activate the
option *Insert Scale Bar into Image Automatically after Magnification Assignment* a scale
bar will be automatically inserted into images after you select magnification (in *Objective*
and *Zoom* menus in the *Toolbar*) which was used for their acquisition. For more information
about the scale bar settings see "Tab Scale Bar" on page 159.

Further in the context menu there are four preset scale bar profiles. These items correspond
with the user definable profiles described in the previous paragraph. Activation of the
selected scale bar profile can be done by selecting a profile name with a mouse.

Scale bar modifications will be reflected in all images.

4.3. Standard Measuring Tools

Measuring Mode Selection

QuickPHOTO MICRO 3.1 program offers two measuring modes. Make your choice in
Options of the program in section *Measurements* on the *Other Settings* tab (*Edit →
Options... → Measurements → Other Settings*) in the *Measurement Mode* part. Select one
of the options:

- *Continuous Measurement Mode* - if this option is active (default option), the selected
  measuring tool will remain active for the current image until turned off. That way you
  can proceed with repeated measurements in the image without the necessity to manually
  activate the same measuring tool for each measurement.

- *Single Measurement Mode* - if you activate this option, the measuring tool will be, after
  one performed measurement, automatically deactivated.

> **Note**
>
> Active measuring tool can always be terminated by clicking the right mouse button, by repeated clicking on its icon or by the [Esc] key.

Measure Line Segment

Tool *Measure Line Segment* can be activated by the *Measurements → Line Segment* option or by clicking the ⊿ icon. Then by clicking into the image and by dragging the mouse, while holding the left mouse button, or by clicking the left mouse button into the beginning and then the end point, a measuring line segment can be inserted. Precisely horizontal or vertical line can be created if you hold the [Shift] key while inserting the line segment. The length of the inserted line segment will be measured.

Measure Ellipse

Tool *Measure Ellipse* can be activated by the *Measurements → Ellipse* option or by clicking the ⬯ icon. Then by clicking into the image and by dragging the mouse, while holding the left mouse button, insert the measuring ellipse. You can rotate the ellipse, after you have selected it, by dragging the green grasp point displayed inside the ellipse. You can measure a perimeter and area of an ellipse.

Measure Rectangle

Tool *Measure Rectangle* can be activated by the *Measurements → Rectangle* option or by clicking the ▫ icon. Then by clicking into the image and by dragging the mouse while holding the left mouse button, insert the measuring rectangle. You can measure a perimeter and area of a rectangle.

Measure Polygon

Tool *Measure Polygon* can be activated by the *Measurements → Polygon* option or by clicking the ⬠ icon. Then by clicking the left mouse button on a chosen point in the image, insert the first polygon's apex. Repeated clicking of the left mouse button will define further apexes of the polygon. Precisely horizontal or vertical edge can be created if you hold the [Shift] key while inserting the apex. To finish inserting of a polygon, click the right mouse

button - the last apex will be connected with the first one and a polygon will be closed. You can measure a perimeter and area of a polygon.

> **Note**
>
> If the edges of the inserted polygon will cross each other in a certain point, value of the area will equal 0. Only the polygon's perimeter will be calculated.

Measure Polyline

Tool *Measure Polyline* can be activated by the *Measurements → Polyline* option or by clicking on an arrow on the right next to the ⤼ icon and by selecting the *Polyline* ⤹ option. Then by clicking the left mouse button on a chosen point in the image, insert the beginning point of a polyline. Repeated clicking on the left mouse button will define the break points. Precisely horizontal or vertical line can be created by holding the [Shift] key while creating it. To finish inserting of the polyline, click the right mouse button. Length of the polyline will be measured.

Count Objects

This function can be activated by the *Measurements → Count Objects → Count Objects (New Group)* option or by clicking the ⤯ icon. Click the left mouse button on every object which you want to include in the counting. Each counted object will be indicated with a cross and the number of counted objects will be displayed in the *Table of Measured Values*. Counting can be terminated by clicking the right mouse button, repeated clicking the ⤯ icon, or by pressing the [Esc] key. All objects of the same group will be indicated with crosses of the same color. The same color will be used for the corresponding row in the *Table of Measured Values*. If you activate the function *Count Objects (New Group)* again in the same image, further counted objects will be indicated with crosses of a different color, and in the *Table of Measured Values* there will be another line displayed with the number of elements of another group of objects. If you want to add further objects to one of the already existing groups of objects, mark one of the elements from this group using the *Select* tool or mark the corresponding row in the *Table of Measured Values* by clicking on it, and activate the option *Measurements → Count Objects → Add Objects to the Current Group* or click on the arrow on the right next to the ⤯ icon and select the option ⤶ *Add Objects to the Current Group*. Now you can continue in counting of objects from the selected group.

If you want to change the color or size of the crosses of the whole group of objects, mark one of the elements of this group using the *Select* tool or select it by clicking the corresponding row in the *Table of Measured Values* and using the options *Edit → Object Line Color...* and *Edit → Object Line Thickness* or using the ⬛ icon select the desired parameters.

Measure Angle

Tools for angle measurement can be activated by the options *Measurements → Angle → Arbitrary Angle*, *Angle from the X Axis*, *Angle from the Y Axis* or by clicking on the arrow on the right from the ∡ icon and by selecting the corresponding type of measurement from the displayed menu.

In the *Measure Arbitrary Angle* ∡ mode by clicking and dragging the mouse while holding the left mouse button or by clicking the left mouse button into the beginning and then the end point, insert the first arm of an angle. Then by clicking the left mouse button, insert the second arm of an angle. If you want to create precisely horizontal or vertical arm of an angle, hold the [Shift] key while creating it. Convex angle will be measured. If you want to measure an angle of more than 180°, drag, with a mouse, the label with the measured value to the second half-plane.

In the *Measure Angle from the X Axis* ∡ or *Measure Angle from the Y Axis* ∡ mode by clicking and dragging the mouse, while holding the left mouse button, or by clicking the left mouse button into the beginning and then the end point, insert the first arm of an angle. This arm of an angle will automatically be completed with the corresponding axis and an angle defined in such a way will be calculated. If you want to measure the side angle to the given axis, drag, with a mouse, the label with the measured value to the second half-plane.

4.4. Displaying an Overlay Grid of Defined Dimensions

There can be inserted an overlay orthogonal grid of defined dimensions into the current image displayed in the *Display Window*.

Displaying an Overlay Orthogonal Grid

Tool for displaying an overlay orthogonal grid can be activated by the *Measurements →*
Display Overlay Orthogonal Grid... option or by clicking the ▦ icon. In the displayed
*Overlay Orthogonal Grid* dialog box in the *Spacing* part enter the desired grid spacing for
the X or Y axis. Spacing can be defined in pixels and in current length units (μm or mm).
Color and thickness of the grid's lines can be set in the *Line Options* part. Grid can be
displayed in the image by clicking the *OK* button. You can move the grid freely by dragging
it by the cross in the middle of it. Another activation of the *Measurements → Display*
Overlay Orthogonal Grid... option or repeated clicking the ▦ icon will cancel displaying
of the grid in the image.

> **Note**
>
> Overlay orthogonal grid is, same as other objects being inserted into the image,
> displayed in the layer "above the image" and if you save the image with the layers
> kept, its full functionality will be preserved.
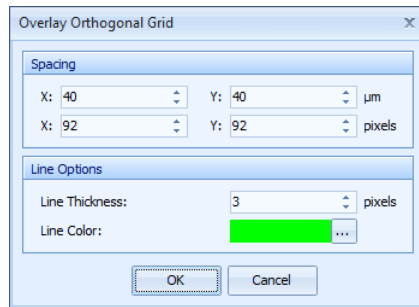
Default values of the grid can be selected in *Options* of the program (*Edit → Options... →*
Measurements → Overlay Grid).

4.5. Phase Analysis

Phase Analysis function enables to measure percentage amount of a particular color/shade
of grey – the so called phase – in the image. It is possible to measure up to four phases in
one image.

> **Important**
>
> If you want to edit the image (for example adjust the brightness, contrast, color balance, histogram and so on) it is important to make these adjustments before you begin with the phase analysis. Above mentioned adjustments may have affect on the results of phase analysis.

> **Note**
>
> You can, in case of need, convert a color image to a grey scale image using the function *Image → Grey Scale*.

Phase Analysis function can be activated by the *Measurements → Phase Analysis...* option or by clicking the ◨ icon. In the right part of the monitor a *Phase Analysis* dialog box will appear.
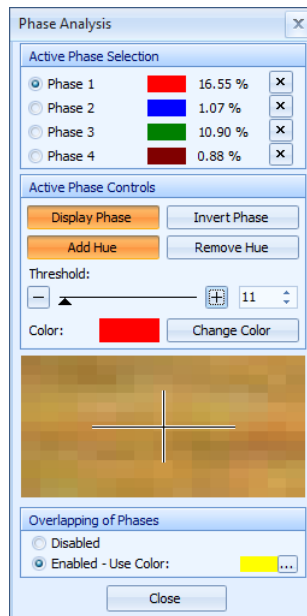
Description of the Phase Analysis Dialog Box

Phase Analysis dialog box consists of the following parts:

• *Active Phase Selection*
• *Active Phase Controls*
• *Preview*
• *Overlapping of Phases*

Part Active Phase Selection

In this part select the active phase which you want to measure in the image. It is possible to measure up to 4 phases. Colored rectangles indicate colors for marking of individual phases in the image. To change the color, click the colored rectangle and from the opened palette select a new color. Numerical values next to the colored rectangles represent measured values of the percentage amount of individual phases. These values are also displayed in the *Table of Measured Values*. Buttons with crosses on the right hand side are there for removing of a specific phase from the image.

Part Active Phase Controls

This part contains controls for a phase selected in the *Active Phase Selection* part.

If the *Display Phase* button is pressed (color-coded), a phase measured in the image, will be indicated with the selected color. If you want to, for better clarity, hide the phase indication undo the pressing of this button. Indication of the phase will be hidden but the phase itself will remain included in the image. This setting does not affect the measured values.

Invert Phase button will invert the phase.

If the *Add Hue* button is pressed (color-coded), after marking of another color/shade of grey in the image, by the *Measure Phase - Pick Color from Image* tool (cursor in the shape of a dropper), selected color/shade of grey will be added to the active phase.

If you click the *Remove Hue* button, after marking of another color/shade of grey in the image, by the *Measure Phase - Pick Color from Image* tool (cursor in the shape of a dropper), the particular color/shade of grey will be removed from the active phase.

Using a *Threshold* slider you can set the accuracy with which should the color/shade of grey, to be included in the phase, correspond to the color/shade of grey picked by the *Measure Phase - Pick Color from Image* tool. For finer setting of accuracy, you can use a field with a numerical value next to the slider. All phases will be, after change of threshold, recalculated and the change will then show in the image.

Part Preview

Preview field displays enlarged part of an image around the cursor. This enlarged preview helps to refine the choice of color/shade of grey using the *Measure Phase - Pick Color from Image* tool.

Part Overlapping of Phases

In this part you can define whether individual phases may have common areas (intersections) or not. If you choose the *Disabled* option, then the area which was already calculated in one phase cannot be calculated in any other phase. If you choose the *Enable - Use Color:* option, any image area can be calculated in any number of phases. Common areas will be indicated in the image with a color which is defined by a rectangle next to the *Enable - Use Color*: option. After clicking the colored rectangle, you can choose a different color for the common areas from the color palette.

> **Note**
>
> If the *Phase Analysis* function is active, it is not possible to work with other measuring objects in the image.

How to Use Phase Analysis Function

To perform the *Phase Analysis* function proceed as follows:

1. *Select an Image for Phase Analysis*

   Display the image, in which you want to perform phase analysis, in the *Display Window*.

2. *Activate the Phase Analysis Function*

Activate the *Phase Analysis* function by the *Measurements → Phase Analysis...* option or by clicking the ◪ icon.

3. *Measure the Phase*

   Using the *Measure Phase - Pick Color from Image* tool (cursor in the shape of a dropper) pick the desired color/shade of grey in the image. For a more precise determination of the desired color/shade of grey use the enlarged *Preview*.

4. *Adjust the Threshold, Set the Phase Color*

   In the *Active Phase Controls* part select the desired *Threshold* and possibly select a different phase color.

5. *Measuring of Other Phases*

   If you want to measure other phases in the image, select, in the *Active Phase Selection* part, another phase and repeat steps 3 and 4.

6. *Set Overlapping of Phases*

   In the part *Overlapping of Phases* part select the desired mode of overlapping.

Measured values will be displayed in the *Phase Analysis* dialog box in the *Active Phase Selection* part, and also in the *Table of Measured Values*.
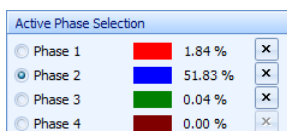
Recommendation for Saving of Images with Measured Phases

To preserve the measuring accuracy it is recommended to save images with measured phases, with the layers kept, as TIFF type. Images of the JPEG type are being saved using a lossy compression and because of that a certain loss of information takes place. As a result of this loss of information, slight variations may appear in the phase analysis results when you open the image again.

4.6. Editing of the Measuring Objects

Selection of the Measuring Objects for Editing

If you want to edit some of the already inserted measuring objects in the image, it is necessary to make their selection first. Proceed as follows:

Activate the *Select* ▷ tool and make the selection by clicking the contour line or the label with the measured value of the desired object. Selected object will be highlighted with a green dash line and on its perimeter green grasp points will be activated. Object selected this way is ready for editing.

To select more objects at the same time, press and hold the [Shift] key while making your selection and select all objects, which you want to edit, with the left mouse button.

To cancel the object selection, click the left mouse button anywhere outside the objects or click the right mouse button. Selection of the objects will be canceled.

Note

Select ▷ tool is automatically activated every time no other tool is active.

Change of Line Color and Thickness of the Measuring Objects

In order to edit inserted objects, select them first - for more information see "Selection of the Measuring Objects for Editing" on page 121.

The color and line thickness of selected measuring objects may be changed. For these purposes use the following options *Edit → Object Line Color...*, *Edit → Object Line Thickness* or the corresponding icon ③ in the *Toolbar*.

New line color of the selected objects can be chosen from the displayed color palette after the option *Edit → Object Line Color...* was activated or after clicking the left part of the ⊞ icon.

New line thickness of the selected objects can be chosen from the displayed list after the option *Edit → Object Line Thickness* was activated or after clicking the right part of the ⊞ icon.
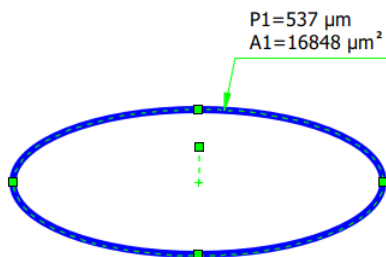
Relocation, Change of Size and Shape of the Measuring Objects

In order to edit inserted objects, select them first - for more information see "Selection of the Measuring Objects for Editing" on page 121.

If you want to move the selected measuring object in the image, move the mouse cursor to its contour line. Cursor will change to ✛. Clicking on the object's outline and by dragging the mouse, while holding the left mouse button, the object can be moved to the desired area. In the middle of selected objects of the ellipse and rectangle types, there is a cross. Using this cross you may also move these objects in the above mentioned way.

In the ellipse there is also a green grasp point connected, by a dash line, with its center. Using this point you can rotate the ellipse any way you wish.

P1=537 μm
A1=16848 μm²

To change the size/shape of the selected object, proceed as follows: move the mouse cursor to one of the green grasp points. Cursor will change to ↘. By clicking on the grasp point and by dragging the mouse, while holding the left mouse button, you can change the size/shape of the object. Measured values will be recalculated.

Relocating the Label with the Measured Value(s) in the Image

In order to edit inserted objects, select them first - for more information see "Selection of the Measuring Objects for Editing" on page 121.

You can relocate labels with measured values in the image as you please. Move the mouse cursor over the label with the measured value(s) of the selected object. Cursor will change to ✛. In this moment you can, by dragging the mouse, while holding the left mouse button, relocate the label with measured value(s) to the desired area in the image. Label with the measured value(s) will be connected with the measuring object by an auxiliary line. Type and shape of the auxiliary lines will be automatically set depending on the current label with the measured value(s) position due to the location of the measuring object.
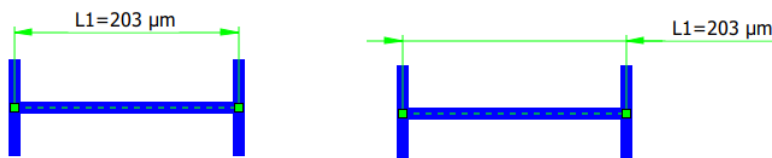
Default color and thickness of the dimension and extension lines and leaders is predefined on the *Sizes/Colors* tab in *Options* of the program (*Edit → Options... → Measurements → Sizes/Colors*).

You may change the color and thickness of these lines for a specific image in the *Table of Measured Values* on the *Measurement Settings - "Image Name"* tab in the *Dimension and Extension Lines, and Leaders* part.

Deleting Measuring Objects

In order to edit inserted objects, select them first - for more information see "Selection of the Measuring Objects for Editing" on page 121.

To delete selected objects from the image, press the [Del] key, activate the *Edit → Delete Selected Objects* option or click the ✕ icon.

To delete all (not only the selected objects) objects from the image activate the *Edit → Delete All Objects* option or click the ✎ icon.

4.7. Work with the Table of Measured Values

Measured values are continuously being displayed in a well-arranged table named *Table of Measured Values* in the bottom part of the *Main Program Window*. The table contains 1-4 tabs with the measured values for individual images displayed in the *Display Window* (number of tabs corresponds with the set layout mode of the *Display Window*) and a tab named *Measurements Settings - "Image Name"*.

Measured values of other opened images (displayed in the *Thumbnail Browser*) can be displayed in the *Table of Measured Values* by opening of the desired images in the *Display Window*.

Tabs with Names of Images

Tabs with names of images contain the measured values for the corresponding images displayed in the *Display Window*. Individual tabs contain the following elements:

- table of measured values
- statistics
- toolbar buttons

> **Note**
>
> If the tab with the image name contains measured values which have not yet been saved or exported, symbol # will be displayed in front of the image name.
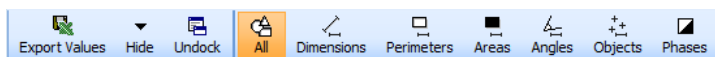
Table of Measured Values

Table of Measured Values contains values measured in the current image. Individual rows are, for better orientation, displayed in a color which corresponds with the color of the measured value displayed in the image. If the number of rows in the table exceeds the visible part of the window, you can browse the table using the scrollbar on the right hand side, the mouse wheel, or the [Page Up] and [Page Down] keys. If you select a row in the table using the mouse, the corresponding measuring object in the image will be selected and vice versa – if you select a measuring object in the image, corresponding row will be highlighted in the *Table of Measured Values*.

You may enter a short comment for each measurement into a column named *Description*. To enter your comment use a mouse to select the appropriate field, type in your text into the *Description* column and confirm it by pressing the [Enter] key. Proceed in the same way to edit an already inserted comment.

Statistics

On the right hand side next to the table of measured values are displayed statistics calculated from the measured values. Statistics are always calculated only from measurands of the same type, for example only dimensions, perimeters and so on. Selected measurand, from which statistics should be calculated (in case of more types of measurands measured in the image), can be selected by selecting the desired row in the table.

Toolbar Buttons

Measured values displayed in the table can be exported into the Microsoft® Excel® file or a text file using the *Export Values* button. A dialog box *Export Measured Values* will open, after you click this button, offering options for location, name, and type of the file.

Table of Measured Values can be, to gain more working space, hidden by the *Hide* ▾Hide button. To display the hidden *Table of Measured Values* again use the ▣ icon in the *Toolbar,* activate the *View → Display Table of Measured Values* option or use the [F12] key shortcut.

If there is a greater number of measured values in the table, it might be useful to, for a better clarity, undock the *Table of Measured Values* as a separate window using the *Undock* Undock button. The *Table of Measured Values* will be displayed in a separate window and the

Undock button will change to the *Dock* Dock button. Clicking this button will return the table to the original position.

Buttons in the right hand part of the toolbar act as filters and they display, in the *Table of Measured Values*, from all measured values only the corresponding measurands. Other measurands contained in the table will be hidden.

All All button will display, in the *Table of Measured Values*, all values measured in the image.

Dimensions Dimensions button will leave displayed, in the *Table of Measured Values*, only values of measured dimensions.

Perimeters Perimeters button will leave displayed, in the *Table of Measured Values*, only values of the measured perimeters.

Areas Areas button will leave displayed, in the *Table of Measured Values*, only values of the measured areas.

Angles Angles button will leave displayed, in the *Table of Measured Values*, only values of the measured angles.

Objects Objects button will leave displayed, in the *Table of Measured Values*, only the object counts.

Phases button will leave displayed, in the *Table of Measured Values*, only values of measured phases.

Tab Measurement Settings - "Image Name"

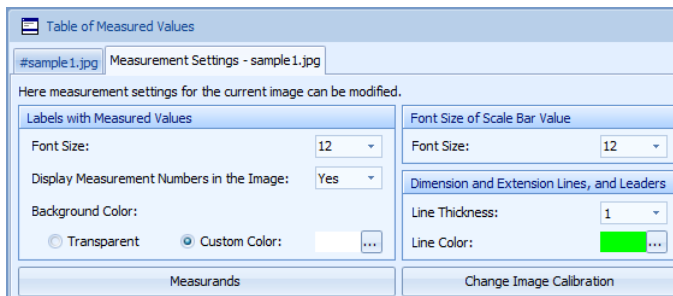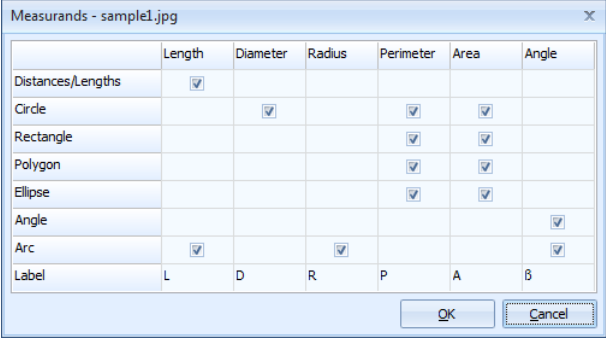*Measurement Settings - "Image Name"* tab contains control elements for changes of settings for measuring in the current image displayed in the *Display Window*. Control elements on this tab are activated after the first measuring has been done in the image or after inserting of the scale bar.

> **Note**
>
> All changes of settings done on this tab apply only to the current image. Other images opened in the program will remain without changes. If you want to change the settings for all new images, use settings in *Options* of the program on the tabs *Sizes/Colors* and *Measurands* (*Edit → Options... → Measurements → Sizes/Colors; Measurands*).

In the *Labels with Measured Values* part you may change *Font Size*, set the *Display Measurement Numbers in the Image* option, and select the *Background Color* of labels with measured values in the current image. After you click the *Measurands* button in the left bottom part of this tab, *Measurands* dialog box will open. In this dialog box you can, using the checkboxes, select which measurands should be measured by individual measuring tools and their text labels.

In the *Font Size of Scale Bar Value* part it is possible to select the font size of the scale bar value, and in the *Dimension and Extension Lines, and Leaders* part thickness and color of these lines.

Performed changes are interactively being displayed in the current image.

Change Image Calibration button opens a *Change Image Calibration* dialog box, in which you may change the calibration and the magnification assigned to the current image. Calibration can also be removed from the image by clicking the *Remove Calibration* button.

4.8. Exporting Measured Values

Exporting Values from the Table of Measured Values

Measured values with eventual descriptions can be exported into a file in the xls format for further elaboration in the Microsoft® Excel® program or into the form of a text file for import to other spreadsheet programs (values are separated with a tab symbol).

> **Important**
>
> For exporting of measured values into the xls format, it is necessary to have, on your computer, installed the Microsoft® Excel® program.

To export measured values from the current image displayed in the *Display Window*, click the *Export Values* ![Export Values] button in the bottom part of the *Table of Measured Values* or activate the *File → Export Measured Values from Selected Image...* option. For exporting of measured values from the image you may also use the ▣ icon in the controls of the thumbnail in the *Thumbnail Browser*.

For exporting of the measured values from all opened images, activate the *File → Export Measured Values from All Images...* option.

Export Measured Values dialog box, which replaces the standard Windows® dialog box for saving of files, will open. This dialog box contains expanded functionality and enables saving of more files at the same time. This dialog box is very similar to the dialog box for saving of images and it consists of the following parts:

• Files for Export
• Location
• File Name and Type
• Additional File Name Tags
• Export Image
• Information
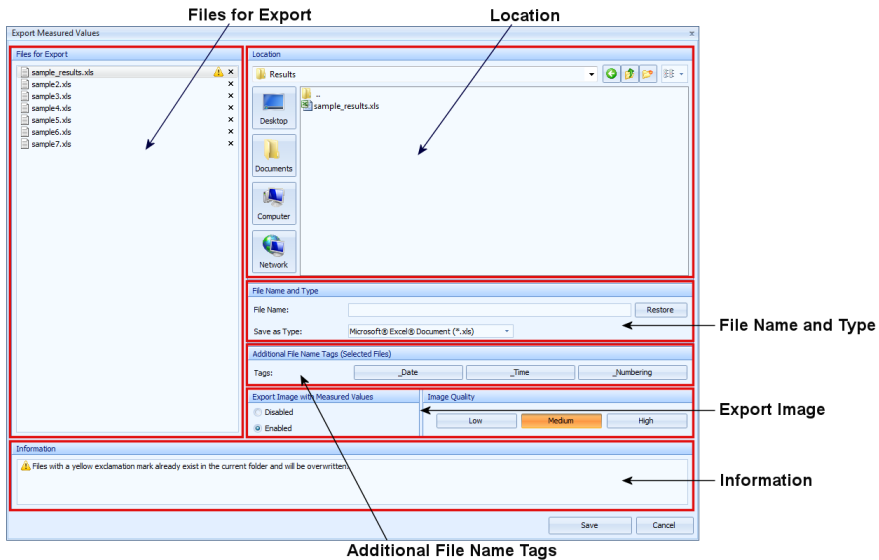
Part Files for Export

This part contains a list of all files intended for export. All files intended for export will be indicated with a frame after you have opened the *Export Measured Values* dialog box. Files can be selected/deselected in a similar way as thumbnails in the *Thumbnail Browser* in the *Main Program Window* - for more information see "Thumbnail Browser" on page 71. Settings done in the *File Name and Type* and *Additional File Name Tags* parts will always be applied on the files selected in this list. That way you may set the name and type for more files at the same time.

Besides the file names, according to the current situation, two indicators may be displayed. If some of the files already exist in the folder selected in the *Location* part, there will be an ⚠ indicator displayed next to the file names. If you do not rename the files or if you do not select another type the already existing files in the folder will be overwritten. In case there is an ❗ indicator displayed next to some of the file names, it means that there has been a collision in the names and types of the files from the list. In this case it will not be possible to save these files without a change of their name or type. Legend for the displayed indicators will be displayed in the *Information* part.
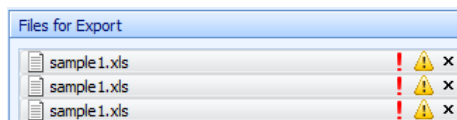
Part Location

In this part it is possible to select a folder into which will all the files intended for export be saved. Control in this part is similar as for the standard Windows® dialog for saving of files.
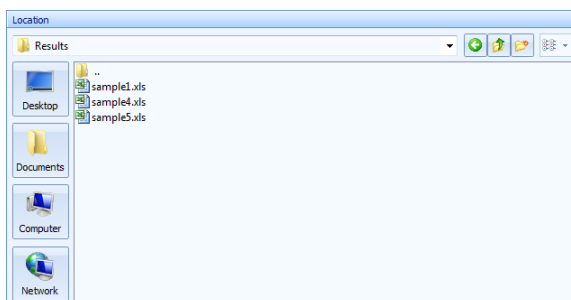
Part File Name and Type

In this part it is possible to choose the names and types of files intended for export. If you have selected more than one file in the *Files for Export* list and you will enter a new file name into the *File Name* field, the name of all selected files will be changed at the same time and the *Numbering* function, which will ensure resolution of individual files, will also be activated. Changes will immediately be visible in the *Files for Export* list. If you want to restore the original file names of selected images, click the *Restore* button.

Save as Type drop-down menu enables to select the type (format) of files being exported. There are two options available: Microsoft® Excel® Document (*.xls) and Text file (*.txt).

Part Additional File Name Tags

In the *Additional File Name Tags* part there are three buttons. Button *_Date* adds the current date to the names of files selected in the list of *Files for Export*. Button *_Time* adds the current time to the names of files selected in the list of *Files for Export*. Button *_Numbering* adds a serial number to file names on files selected in the list of *Files for Export*. Files will

always be numbered beginning with the number 00001. This function is useful for example if you want to save several files with the same name and distinguish them with a serial number. The use of particular buttons can be freely combined.

Part Export Image

In this part you can choose (in case of exporting to Microsoft® Excel® file), if the original image in which the measurements have been performed should be also exported with the measured values. The image quality of the exported image can be also defined. The image will be exported below the measured values and it will contain all the measuring objects merged with the image.

Part Information

In the *Information* part the explanatory notes for indicators are displayed.

5. Reports

Program QuickPHOTO MICRO 3.1 enables export of images with measured values to reports in the Microsoft® Word format. Created reports are in the form of a standard Microsoft® Word document and you may edit them in Microsoft® Word program as you please.

> **Important**
>
> To use the function for creating reports, it is necessary to have the Microsoft® Word program installed on your computer in the XP or higher version.

QuickPHOTO MICRO 3.1 program uses the predefined templates for creating of reports. These templates are files in the Microsoft® Word format and they contain information about the header, structure, the number of images, and tables of measured values of the resultant report. They may also contain texts or images (for example a logo) which will be contained in the resultant report. In the QuickPHOTO MICRO 3.1 program, numerous different templates can be created and those can be used for creating of reports according to your current need. Creating a report template is a one-act action. Once you have created the template, it will be saved in the program and you will be able to use it for creating of reports at any time.

5.1. Creating New Report Template

Necessary preparatory step for using of the function for creating reports is creating of the report template. To create a new report template use the *Template Manager* (*Reports → Template Manager...*) function. New template is created in the QuickPHOTO MICRO 3.1 program based on the previously created Microsoft® Word document, the so called "pattern document". Creating of a template consists of two steps:

1. Creating of a pattern document in the Microsoft® Word.
2. Creating of a report template in the QuickPHOTO MICRO 3.1 program based on the pattern document.

1. Creating of a Pattern Document in the Microsoft® Word

First step in creating of a new template is creating of a pattern document, in the Document Word 97-2003 (.doc) format, which will define the layout and structure of the report template. This document may contain a header with texts and logos, images, tables and texts.

Create a new pattern document in the Microsoft® Word program which will correspond with your layout and structure requirements for the resultant report according to the following rules.

Pattern document should contain:

- at least one image in whose place, in the report, will be placed an image from the QuickPHOTO MICRO 3.1 program,
- at least one table in whose place, in the report, will be exported a table of the measured values.

Images inserted to the pattern document may have two different purposes. They may be:

- images which are supposed to be, in an unchanged form, a part of the resultant report, for example a company logo,
- substitute images which will, in the template, represent the so called "marks" which means they will define the location and size of the images which will be exported to the report from the QuickPHOTO MICRO 3.1 program. Any images may be used as substitute images. Important is only their size and location. Their graphic content is

not relevant because these images will not be a part of the resultant report, they only serve as "marks" for placement of images from the QuickPHOTO MICRO 3.1 program.

Tables inserted to the sample document may have two different purposes. These may be:

- tables which shall be preserved in the resultant report, for example tables defining the format and layout of the document,
- substitute tables which will, in the template, represent the so called "marks" which means they will define the location of tables with measured values which will be exported to the report from the QuickPHOTO MICRO 3.1 program. Table format (number of columns, rows, formatting) can be of one's own choice because the resulting format of the exported tables will be adjusted to the measured values from the QuickPHOTO MICRO 3.1 program.

> **Note**
>
> To achieve proper functionality of report creation, it is necessary, to the tables and images in the pattern document, set the text wrapping style to "*square*" or "*in line with text*".

Pattern document may also contain any amount of texts. These texts will be, in an unchanged form, preserved in the resultant report.

Save the pattern document as **Document Word 97-2003 (.doc)** type and close the Microsoft® Word program.

> **Important**
>
> QuickPHOTO MICRO 3.1 program is not compatible with documents in the Document Word (.docx) format. Pattern document for the template must be saved as the **Document Word 97-2003 (.doc)** type.

Decision about the purpose of individual images and tables contained in the pattern document, will be done by the user in the second step - *Creating a New Template* in the QuickPHOTO MICRO 3.1 program.

QuickPHOTO MICRO 3.1 program contains several beforehand predefined pattern documents. They can be found in the ...*QuickPHOTO MICRO 3.1\Reports* folder. Individual

sample pattern documents are prepared for 1-4 exported images including tables of measured values.

Above described instructions are clearly marked on the following picture of a sample pattern document *example_1_image.doc*:
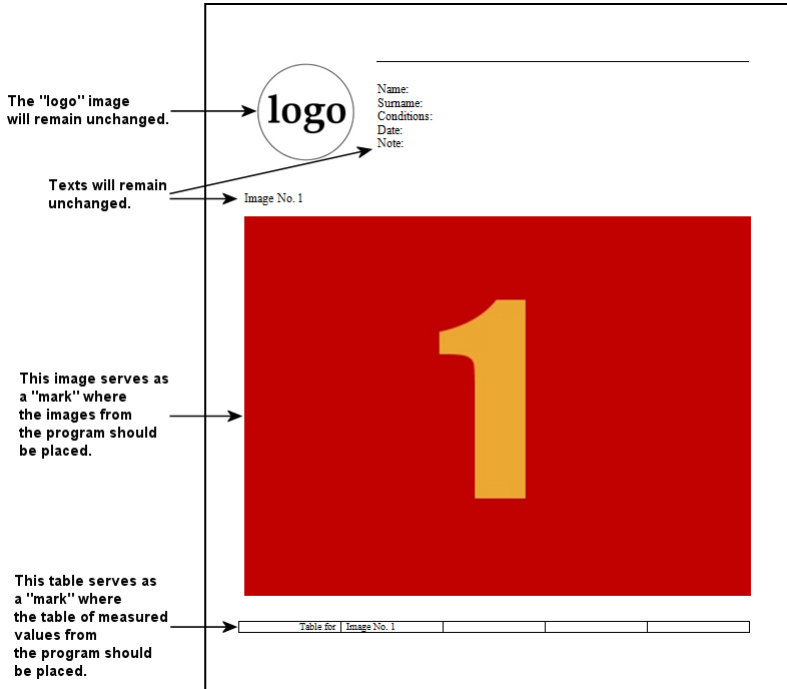
2. Creating a New Template

If you have created and saved the pattern document in the (.doc) format, activate the *Report Template Manager* (*Reports → Template Manager...*) function. *Report Template Manager* dialog box will open.
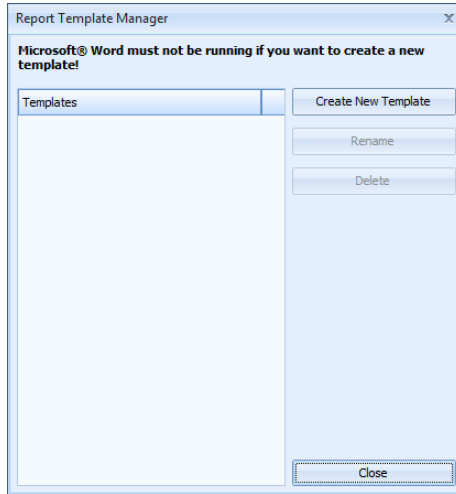
> **Important**
>
> While creating a template, Microsoft® Word program must not be running.

Click the *Create New Template* button. The *New Report Template Wizard* will open. Continue in the following way:

1. First page of the wizard informs in sum about the steps which will take place. Click the *Next* button.

2. On the next page of the wizard named *Pattern Document Selection and Typing of a New Template Name* click the *Browse...* button and in the opened dialog box select the saved pattern document. Type in the template name into the *Type in a new report template name* field. Under this name the template will be available in the *Template Manager*. Continue by clicking the *Next* button.
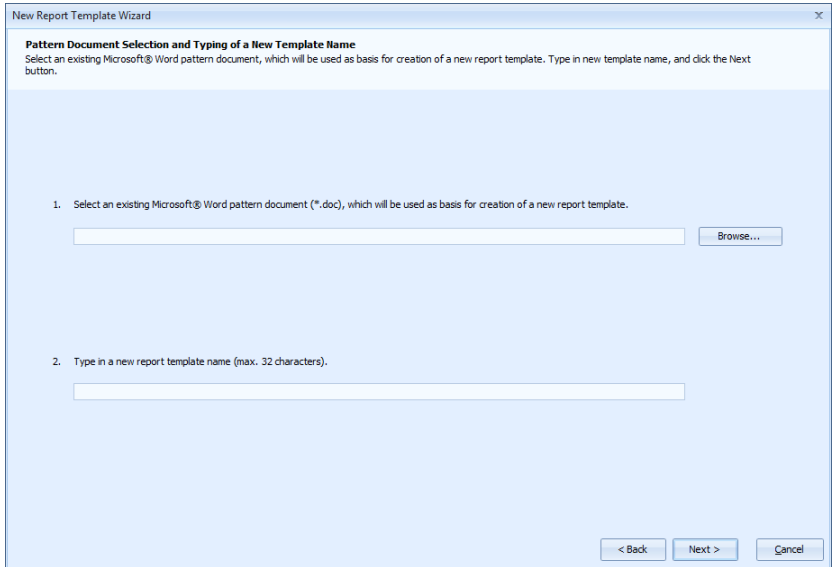
3. After clicking the *Next* button a pattern document will be loaded by the QuickPHOTO MICRO 3.1 program. On *Processing Image # of #* page all images found in the pattern document will be gradually displayed. The wizard will give you a chance to decide, with each image, what shall be the purpose of the currently displayed image in the template. If the image is supposed to be a fixed part of the report (for example a logo), check the first option *No, this image is a fixed part of the report (e. g. logo) and should be retained*. If the displayed image serves as a "mark" for inserting of images from the QuickPHOTO MICRO 3.1 program, check the option *Yes, this image is a mark, where the image, from the program, should be inserted when creating a new report*. If you check the second option, it is possible to change the image size in the template. To preserve the original layout of the pattern document, it is recommended to keep the original image sizes. Continue by clicking the *Next* button.
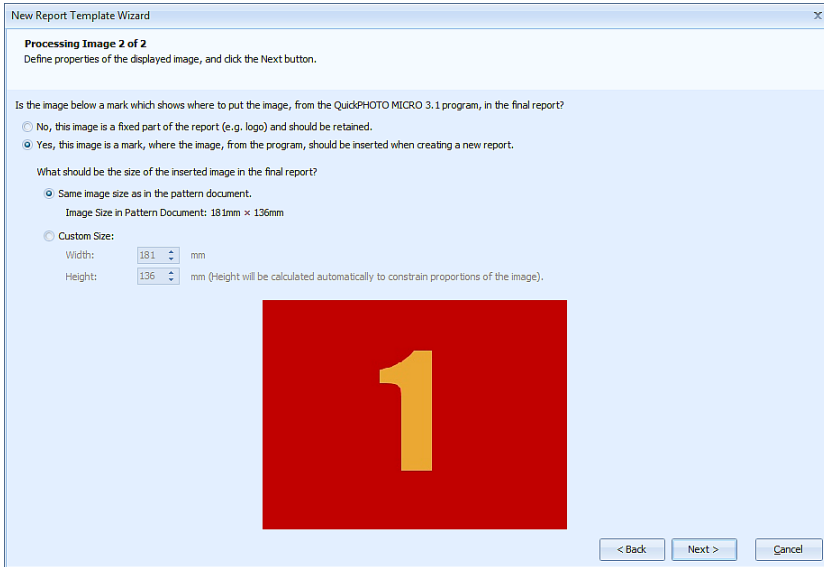
4. In the next step all tables found in the pattern document will gradually be evaluated, on the *Processing Table # from #* page, in a similar way. The wizard will give you a chance to decide, with every found table, what shall be the purpose of each currently displayed table in the template. If the table is supposed to be a fixed part of the report, check the first option *No, this table is a part of the report and should be retained.* If the displayed table serves as a "mark" for determination of the place for inserting of the table of measured values from the QuickPHOTO MICRO 3.1 program, check the option *Yes, link this table with measured values from image number:* and from the drop-down menu select an image number with which the table should be linked. In the bottom part of this page, it is possible to select the measurands and columns which the table should contain. In the default state, all measurands and columns are checked. If you do not want to have some of the measurands or columns in the table, uncheck them. In the right bottom part a preview of the final table is displayed.

Continue by clicking the *Next* button.

5. After elaboration of the tables is finished, a page of the wizard containing a summary will be displayed. After clicking the *Finish* button, template will be created and saved into the ...*QuickPHOTO MICRO 3.1\Templates* folder.

Note

All report templates are saved in the ...*QuickPHOTO MICRO 3.1\Templates* folder. Possible backup/restoration of templates can be done by simple copying of these files from/to this folder.

5.2. Creating a New Report

Important

Microsoft® Word must not be running while creating a report.

To create new reports proceed as follows:

1. Select images in the *Thumbnail Browser* which you want to insert into a new report.
2. Activate the *Reports → Create Report...* function.
3. *Create Report* dialog box will open containing a list of available report templates. Select a template which you want to use for creating of a new report and click the *Create Report* button.
4. *Save New Report As* dialog box will open. Select the desired location, enter the name of a new report, and click the *Save* button.
5. *Select Output Image Quality* dialog box will open. In this dialog box select the desired quality which will be used for insertion of images into the report. Quality of the inserted images will affect the final size of the report file. Following image quality options are available:
   • *Low Quality (Small File Size - for E-mail)* - images will be inserted to the report in a low quality. The result will be a small report file suitable for sending via e-mail.
   • *Medium Quality (Medium File Size - for Standard Printing)* - images will be inserted to the report in a medium quality. The result will be a medium size report file suitable for standard print.
   • *High Quality (Large File Size - for High Quality Printing)* - images will be inserted to the report in a high quality. The result will be a large report file suitable for high quality print.
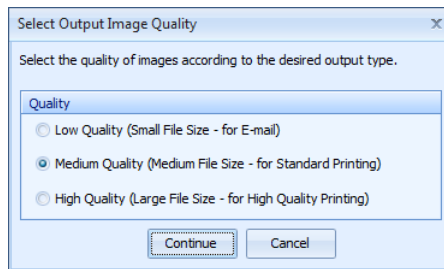
Warning

If you insert several images into the report in high quality, the resulting file can be up to several tens of megabytes large.

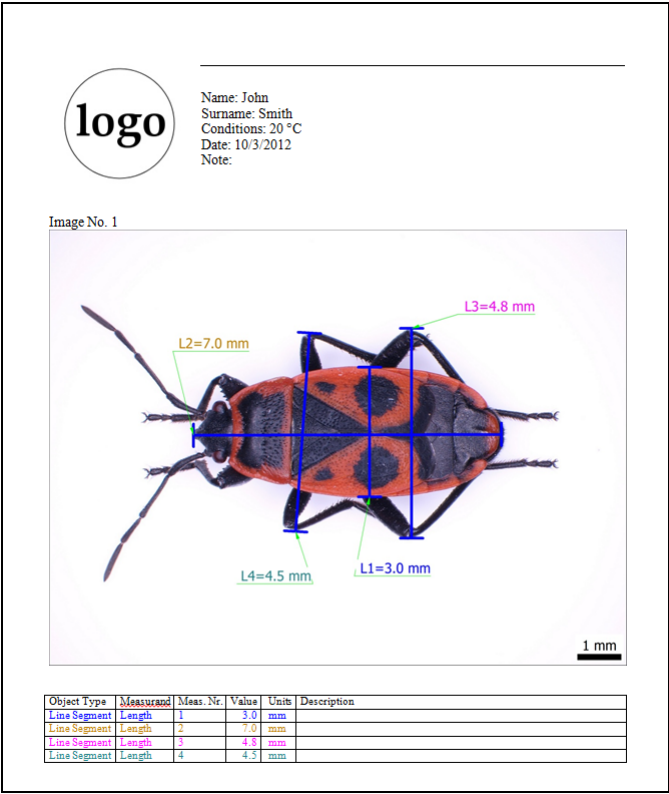Continue by clicking the *Continue* button.

6. Creating of a new report will begin. You will be informed about the process by the progress bar displayed in the status bar of the program. You may not work with the QuickPHOTO MICRO 3.1 program while creating a report. Duration time of creation of the report depends on the number and size of the images being inserted and on the performance of the used computer. After a report has been created an option to open it in the Microsoft® Word program will appear. You will be able to continue with standard work with the document in the Microsoft® Word program.


Note

If you select more images in the *Thumbnail Browser* than the selected template can contain, a reduced number of images will be inserted to the report.

Created report based on the sample pattern document *example_1_image.doc* may look, for example, like this one:

| Object Type	Measurand	Meas. Nr.	Value	Units	Description
Line Segment	Length	1	3.0	mm	
Line Segment	Length	2	7.0	mm	
Line Segment	Length	3	4.8	mm	
Line Segment	Length	4	4.5	mm	

5.3. Report Template Manager

Report Template Manager (*Reports → Template Manager...*) dialog box is designed for managing of all of the already existing templates. Selected template can be renamed or deleted.
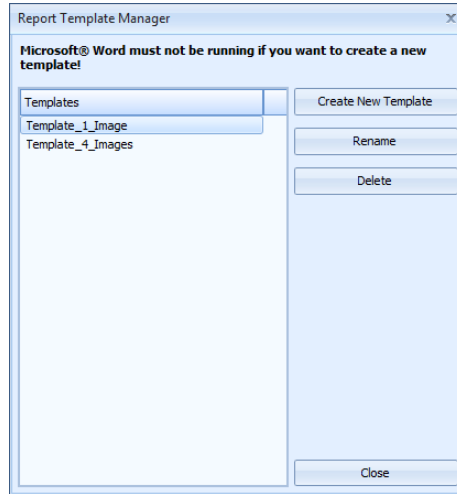
6. Other Functions

6.1. Image Information

Information about the current image can be displayed by activating the *Image → Image Information...* option, by clicking the 🛈 icon in the *Toolbar* or by clicking the *Image Information* ⓘ button in the controls of the corresponding thumbnail in the *Thumbnail Browser*.

Image Information: "Image Name" dialog box, which can have up to three tabs - *Image*, *Metadata* and *Calibration* will open.

Image Tab

This tab gives the following information:

- *Path* - displays information about the image's location.
- *Name* - corresponds with the image's name.
- *Size* - shows the size of the saved image file.
- *Width* and *Height* - show the image size in pixels.

- *Actual Width* and *Actual Height* - show the real size of the image in length units, if the image has an assigned calibration.
- *Quality* - displays the image quality in DPI scale.
- You may enter a text comment for the image to the *Description* field. If the description field is filled in for the image, an indicator 🛈 - *Image contains description* will be displayed next to the image thumbnail in the *Thumbnail Browser*. If the image is saved with the layers kept, description will be saved as a part of the image file.

Metadata Tab

Some imaging devices save into JPEG type images additional information about the image acquisition, the so called metadata (for example sensor's sensitivity, aperture number, exposure time, focal length, information about the use of flash and so on). This tab will display metadata of the image if they are available.

Calibration Tab

This tab will only be displayed if the image has an assigned calibration. On this tab, information about the assigned calibration and the microscope magnification which was used for acquiring of the image, are displayed.

Change Image Calibration button opens a *Change Image Calibration - "Image Name"* dialog box, in which you can change calibration and magnification assigned to the image. Calibration may also be removed from the image by clicking the *Remove Calibration* button.
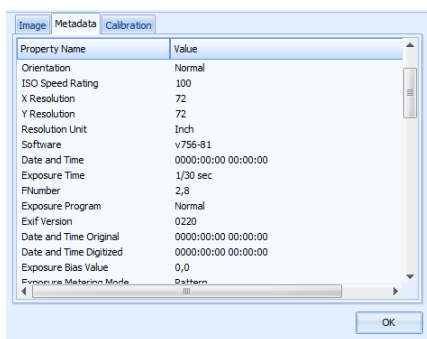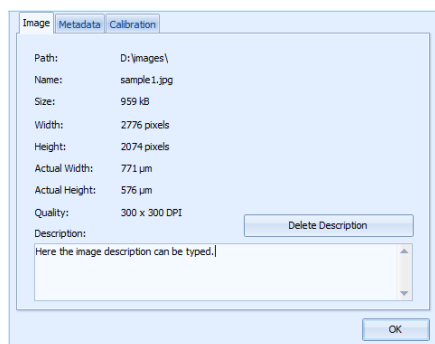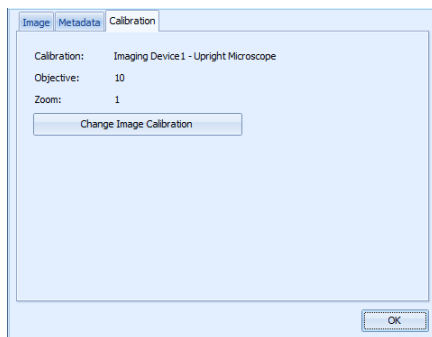
# 6.2. Compose New Image from Layout of Displayed Images

QuickPHOTO MICRO 3.1 program is equipped with a function which enables us to compose, two to four images displayed next to each other in the *Display Window* into one new image. Composed image will contain those parts of the images which are currently visible in the *Display Window*. To compose a new image proceed as follows:

1. Switch the *Display Window* to a mode for displaying of two or four images next to each other.
2. Display the desired images intended for composing in the individual fields of the *Display Window* and set the desired display size.
3. Activate the *Edit → Compose New Image from Layout of Displayed Images...* [Ctrl+L] option.

Note

Edit → Compose New Image from Layout of Displayed Images... option is available only when the *Display Window* is switched to the mode for displaying of two or four images next to each other.

Compose New Image from Layout of Displayed Images dialog box will open.
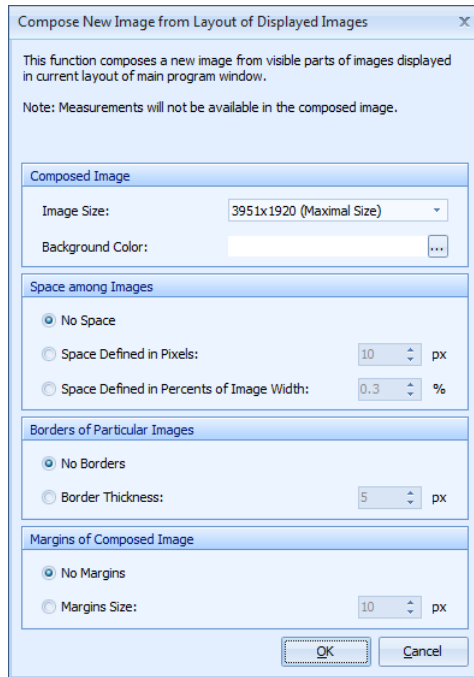
This dialog box consists of the following parts:

- *Composed Image* part contains two options. In the *Image Size* drop-down menu there are the available sizes of the composed image. By the *Background Color* option you can choose the background color of the space between the images and the color of the borders around them.
- In the *Space among Images* part you can choose whether the individual composed images should be offset from each other and you can define the size of the space between them. The space will have the color selected in the *Background Color* part.
- In the *Borders of Particular Images* part you can select the width of the black frame around individual images.
- In the *Margins of Composed Image* part you can select the size of borders which will be added around the inserted images. The borders will have the color selected in the *Background Color* part.

After setting of all desired parameters of the new image, click the *OK* button for creation of the new image.

Composed image will be inserted as a new image. In the composed image most of the functions for measuring will not be available.

Image composed from two images displayed next to each other can look, for example, like this one:

6.3. Slideshow

Option *View → Start Slideshow* runs a full-screen presentation of the opened images. If only one thumbnail is selected in the *Thumbnail Browser* all opened images will gradually be displayed. If you select more images in the *Thumbnail Browser*, the presentation will contain only these selected images. Display of images in the presentation will be gradual in a regular time interval.

During the presentation, you may browse through individual images using the keys [Page Up] – previous image and [Page Down] – next image. While you browse through images, gradual projection of images will be suspended. To continue the presentation press the [Space] key.

Parameters of the presentation can be adjusted in the *Options* of the program (*Edit → Options... → General → Miscellaneous*). For the presentation you can set the delay between images and the way of its termination.

6.4. Display in Full Screen Mode

Option *View → Display in Full Screen Mode* displays the content of the *Display Window* full screen. You may return back to the original way of display by pressing any key, by a mouse double-click or a right mouse button click.

7. Options

Edit → Options... [F11] option opens an *Options* dialog box with three main sections: *General*, *Measurements* and *Hardware* and it contains all options for settings of the program.

For application of the made settings, click the *OK* button. After clicking the *Cancel* button, made settings will not be applied.

The whole setting of the QuickPHOTO MICRO 3.1 program can be backed up into a file of the xml format by the *Backup Settings* button in the bottom part of the *Options* window. If you need to restore the program settings, you can do so by loading of the backup file, after clicking the *Load Settings* button.

Configuration Wizard... button opens the *Configuration Wizard* - for more information see "Configuration Wizard" on page 21.

Individual sections of the *Options* window will be described in the following chapters.

## 7.1. Section General

This section contains the following tabs:

Tab Default Folders

This tab enables to set the folders which will be offered as default when saving images, exporting measured values, and saving reports. This way you will not have to browse the whole directory structure of the computer to select the desired folder where you want to save the files.

Default folders can be changed anytime. Standard dialog box for folder selection will open after clicking the *Change* button. Change of the folder can also be done by typing in of

the desired path into the corresponding field. If the selected folder does not exist, it will be created.
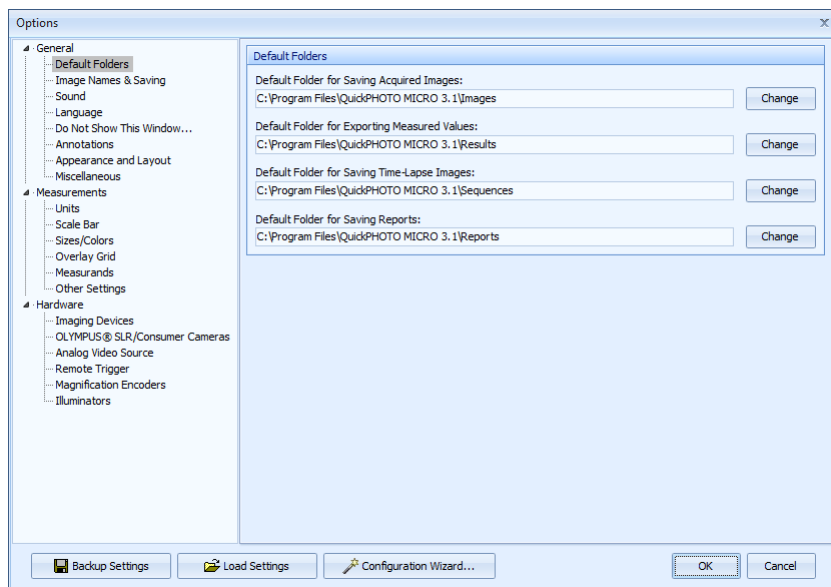

Tab Image Names & Saving

This tab contains the following parts:

Names of New Images part contains preferences for naming of new images.

Default name of all new images acquired by the imaging device can be determined by typing in of a text string into the *Acquired Images* field. Serial number will automatically be attached to the selected string for each new image. Current date can also be attached next to the serial number when acquiring an image – using the *_Date* button, or possibly current time – using the *_Time* button. Preview of the set name is displayed in the *Example* field. *Default* button renews the default settings of the name.

Images from Time-Lapse Capturing part contains identical elements for setting of names of the time-lapse images, such as the *Acquired Images* part. Settings will take effect for images acquired by the *Timer* module directly into the program.
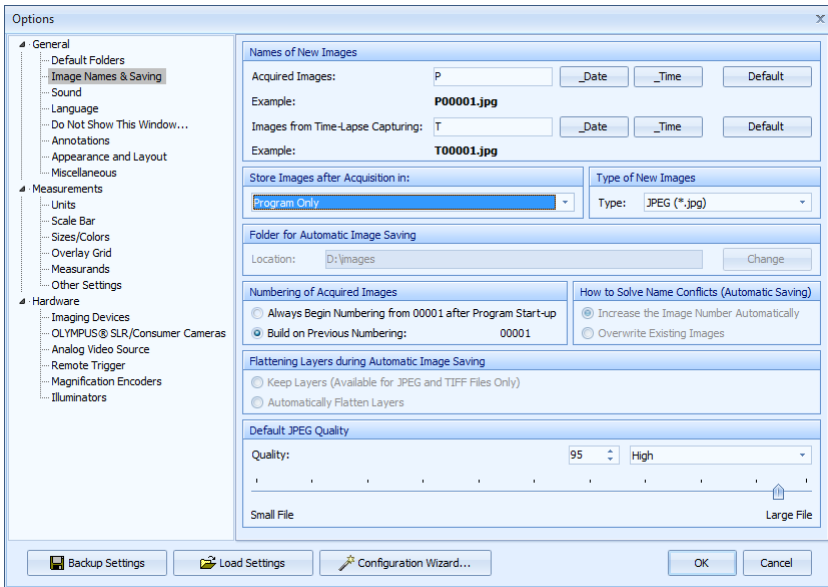
In the *Store Images after Acquisition in:* part it is possible to select one of three options, where the acquired images are supposed to be stored.

- *Program Only* - new images will, after acquiring, be displayed in the *Main Program Window*. Saving of images will be fully in the hands of the user.

- *Program and Folder (Automatic Saving)* - if you activate this option, acquired images will be displayed in the *Main Program Window* and at the same time they will automatically be saved into the folder selected in the *Folder for Automatic Image Saving* part. For this function a folder selected as the default folder for image saving is set in the default state. Active mode for automatic image saving will be indicated by the icon in the status bar in the right bottom corner of the program. If you move the mouse over this icon, information about the folder where the images are being saved, will be displayed.

- *Folder Only (Automatic Saving)* - if you activate this options, newly acquired images will be automatically saved to a folder selected in the *Folder for Automatic Image Saving* part and they **will not show** in the *Main Program Window* at all. For this function

a folder selected as the default folder for image saving is set in the default state. Active mode for automatic image saving will be indicated by the ▣ icon in the status bar in the right bottom corner of the program. If you move the mouse over this icon, information about the folder where images are being saved, will be displayed.

In the *Type of New Images* part it is possible to select the type (format) which shall have the newly acquired images. *Original Type* option preserves the image type which is provided by the active imaging device. If you select one of the JPEG, BMP, TIFF or PNG types from the list, all newly acquired images will be converted to the selected type. This option is valid even for automatic image saving.

If automatic image saving is set, you may set or change the folder, into which the acquired images will be saved, in the *Folder for Automatic Image Saving* part.

If the option *Program Only* is active in the *Store Images after Acquisition in:* part, it is possible to, in the *Numbering of Acquired Images* part, select the *Always Begin Numbering from 00001 after Program Start-up* mode. When this mode is active, numbering of acquired images will begin with 00001 after each start of the QuickPHOTO MICRO 3.1 program. If you select the *Build on Previous Numbering:* option, numbering of acquired images will start from the last used number. QuickPHOTO MICRO 3.1 program will remember the last number of the acquired image when being terminated and when you run the program again, numbering of the acquired images will continue.

When automatic image saving is set, only the *Build on Previous Numbering:* option will be available. At the same time the *How to Solve Name Conflicts (Automatic Saving)* part will be made available. This option defines the program's behavior in cases a conflict appears during automatic image saving, in the names of the newly saved and previously saved images. There are two options available: *Increase the Image Number Automatically* - newly saved image will be labeled with a one step higher number than the number of the image with the highest number in the folder. Further on the program will, for newly acquired images, pick up where this numbering has ended. *Overwrite Existing Images* option will cause automatic overwriting of already saved images by the newly acquired ones without displaying any warning!

For automatic saving of new images is also available a *Flattering Layers during Automatic Image Saving* part. If you activate the *Keep Layers* option, acquired images being saved as JPEG or TIFF type will be saved with layers kept. This option is suitable for example for applications when a microscope is equipped with a magnification encoder and on the

Measurements → Scale Bar tab, the *Automatic Scale Bar Insertion* function is active. If the *Automatically Flatten Layers* options is active, images of all types will be saved with the flattened layers.

For images of the PNG and BMP type will the layers always be automatically flattened during automatic image saving.

In the *Default JPEG Quality* part it is possible to preset the default quality for saving of images of the JPEG type. This setting will be used for the automatic saving of JPEG type images and it will also be used as the default setting for manual image saving.

Tab Sound

This tab offers the option of setting the sound played during acquiring of images. If the *Play a Sound when Image Has Been Acquired (*.wav file)* option is checked a sound file of the wav type will be played when acquiring an image. To choose the sound file click the *Change* button and select the desired file. After clicking the ▶ button the selected file will be played.
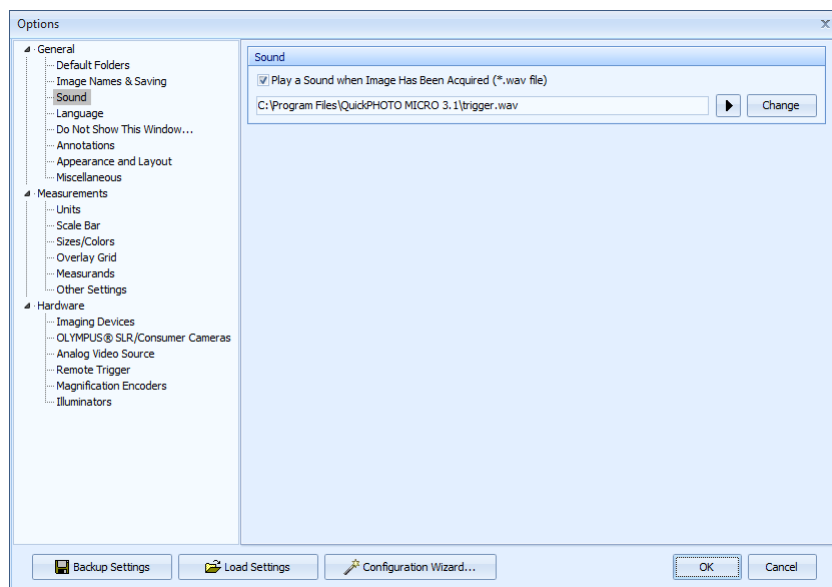
Tab Language

This tab offers the option to choose a language of the QuickPHOTO MICRO 3.1 program. To change the language select the desired language from the list and click the *Change Language* button. This operation may take a while.
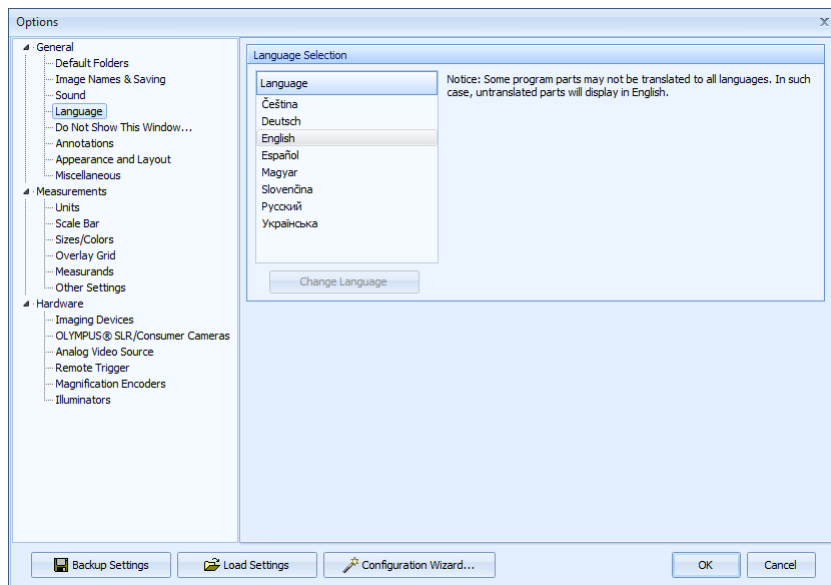

Tab Do Not Show This Window...

Some dialog boxes in the QuickPHOTO MICRO 3.1 program contain the *Do Not Show This Window...* option. If you check this option in some of the dialog boxes, this dialog will not be displayed during the next activation of the corresponding function and the default action will be automatically done. The corresponding option on this tab will be unchecked. This setting will be remembered for the next run of the QuickPHOTO MICRO 3.1 program. If you want to restore displaying of some of the dialog boxes, check its corresponding option on this tab.
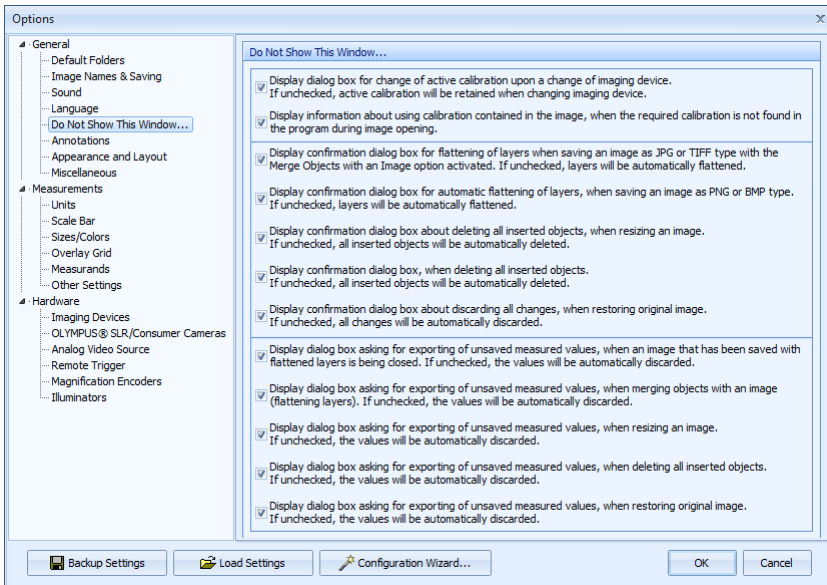
Tab Annotations

On this tab you may set the mode of inserting annotations and drawings. If the *Continuous Inserting Mode* option is active, the selected tool for annotating or drawings will be active until its manual deactivation. If you activate the *Single Insertion Mode* option, selected tool will be, after inserting of one object, automatically deactivated.
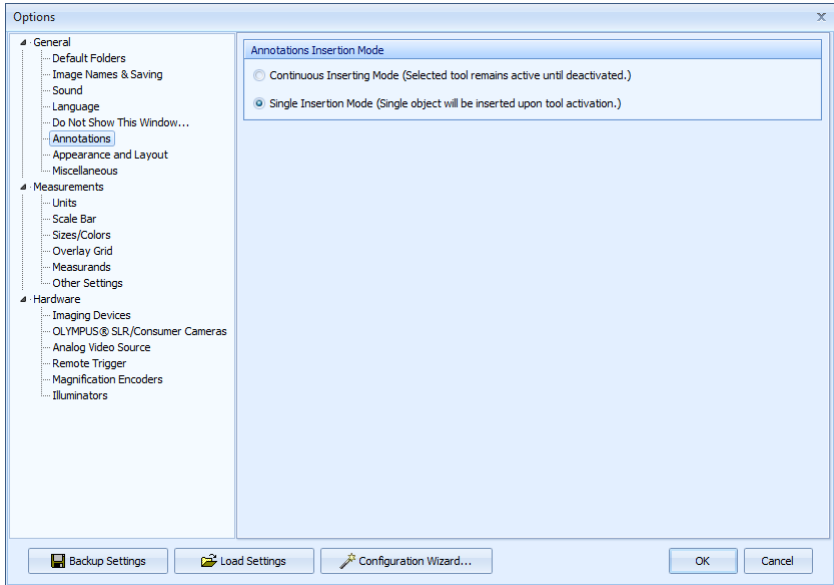
Tab Appearance and Layout

On this tab you may select the program's color theme, size of the thumbnails in the *Thumbnail Browser*, and the appearance and layout of the *Toolbar*. In the *Color Theme* part select one of the options and click the *Change Theme* button. In the *Thumbnail Browser* part it is possible to select the *Thumbnails Size* by selection from the drop-down menu.
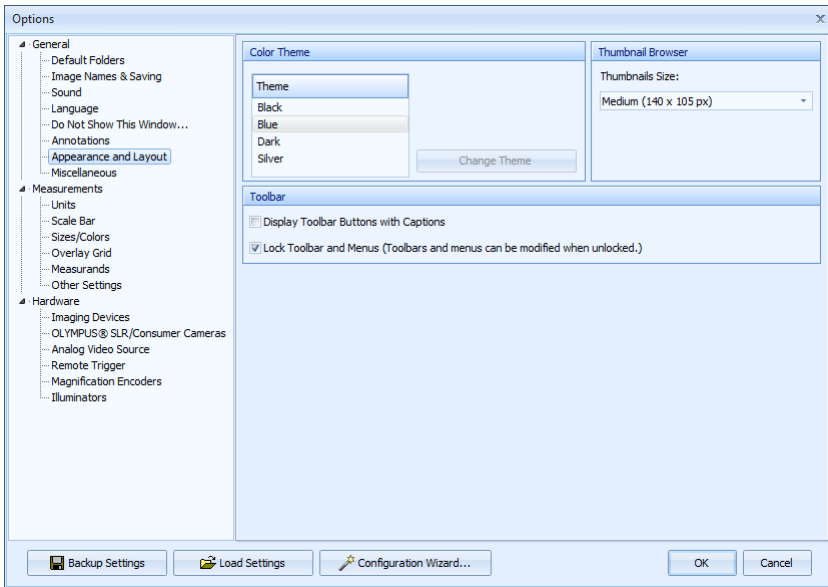
In the *Toolbar* part there are two options available:

If you check the *Display Toolbar Buttons with Captions* option, all icons in the toolbar will change into buttons containing also their names. If all buttons do not fit on the monitor,

arrows ⬍ which will offer the remaining buttons in the drop-down menus, will also be displayed in the *Toolbar*. Example of the displayed buttons is on the following picture:
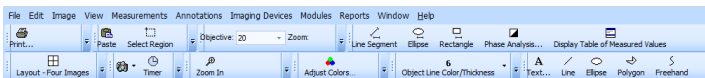
If you want to change the arrangement of the *Toolbar*, uncheck the *Lock Toolbar and Menus* option. *Toolbar* (as well as *Menu bar*) will switch to the mode, when it is possible to hide or change the location of individual items. This way it is possible to set your own user defined interface of the program. When you finish arrangements in the *Toolbar* or menus, lock them again by checking the *Lock Toolbar and Menus* option.

Tab Miscellaneous

In the *Slideshow* part it is possible to set *Delay Between Images* in seconds. Default delay is set at three seconds. If the *Terminate Slideshow after the Last Image Display* option is not checked, the last image of the presentation will remain displayed on the monitor.

Maximum image size, which can be opened in the QuickPHOTO MICRO 3.1 program or which can be acquired can be set in the *Maximal Image Size* part.

In the *Antialiasing of Inserted Objects (measurements, drawings, annotations)* the feature for smoothing of inserted objects can be enabled/disabled. Enabling of this feature slows down the display performance especially in case, when there are multiple objects inserted into an image, therefore this feature is not recommended for slower computers.
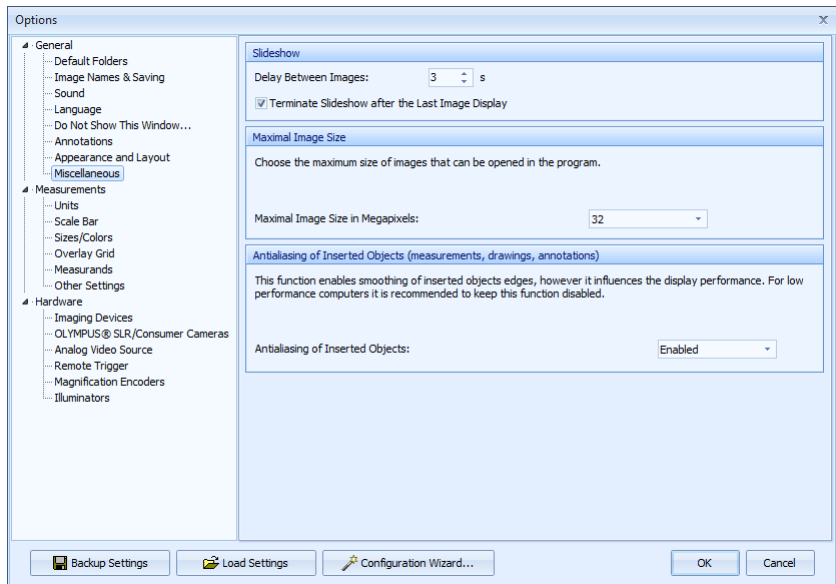
7.2. Section Measurements

Tab Units

On this tab you may choose units which will be used for measuring – micrometers or millimeters. For the chosen units you may also choose the number of decimal places for displaying of the measured values.
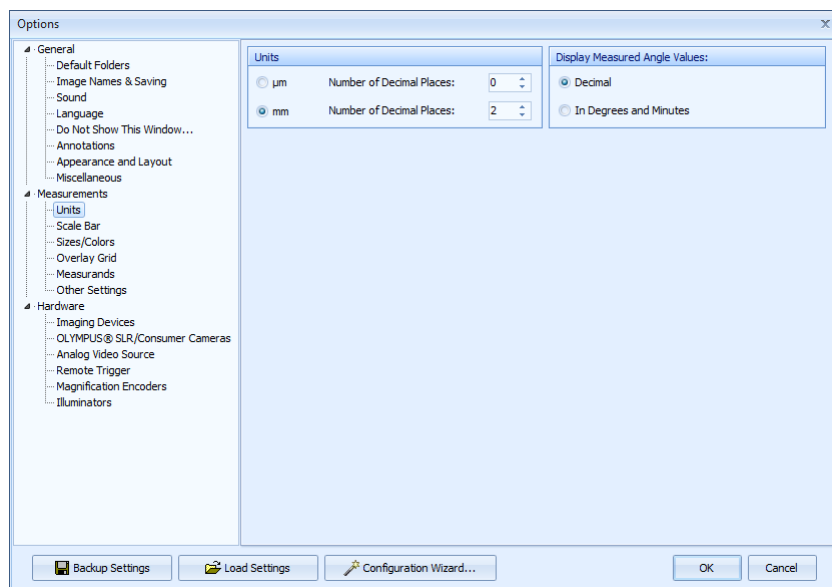

Important

The use of measuring accuracy in tenths of micrometers will only be relevant when the used microscope-imaging device set provides such accuracy.

Way of expressing of the measured angle values can be set in the *Display Measured Angle Values* part. Values can be displayed in *Decimal* form or *In Degrees and Minutes*.

Note

Measured angle values will always be exported into Microsoft® Excel® program in decimal form irrespective of the settings of this option.

Tab Scale Bar

This tab contains options for setting of the calibrated scale bar.

In the *Scale Bar Type* you may set the type of the scale bar: *Ruler*, *Line Segment*, *Staple* and *Stripe*.

In the *Scale Bar Size* you may select one of the two automatic sizes (*Small*, *Large*) or you may select the *Custom* option and type in your own desired length of the scale bar into the *Custom Size* field.

Color of the scale bar and its value can be chosen in the *Scale Bar Options* part by the *Color of Scale Bar and its Value* option.

Options *Background Area* and *Background Color* can change the area and color of the scale bar's background.

In the *Preview* part you can immediately see what will the scale bar look like when using the current settings.

User defined settings of the scale bar can be saved into one of the four profiles. To save the user defined settings to a profile proceed as follows:

1. Make all the desired scale bar settings.
2. Click the *Save* button in the *Profiles* part. *Save Profile* dialog box will open.
3. Select one of the four profiles, you want to save the settings to, from the *Save Settings to Profile* drop-down menu.
4. Enter the new profile name into the *New Profile Name* field.
5. Save the settings by clicking the *OK* button.

If you check the *Insert Scale Bar into Image Automatically after Magnification Assignment* option in the *Automatic Scale Bar Insertion* part, a scale bar will be inserted into images automatically after magnification, which was used for image acquisition, has been assigned. You can select whether to insert the *Horizontal Scale Bar* or the *Vertical Scale Bar*.

> **Note**
>
> Font size of the scale bar's values is set on the *Measurements → Sizes/Colors* tab.
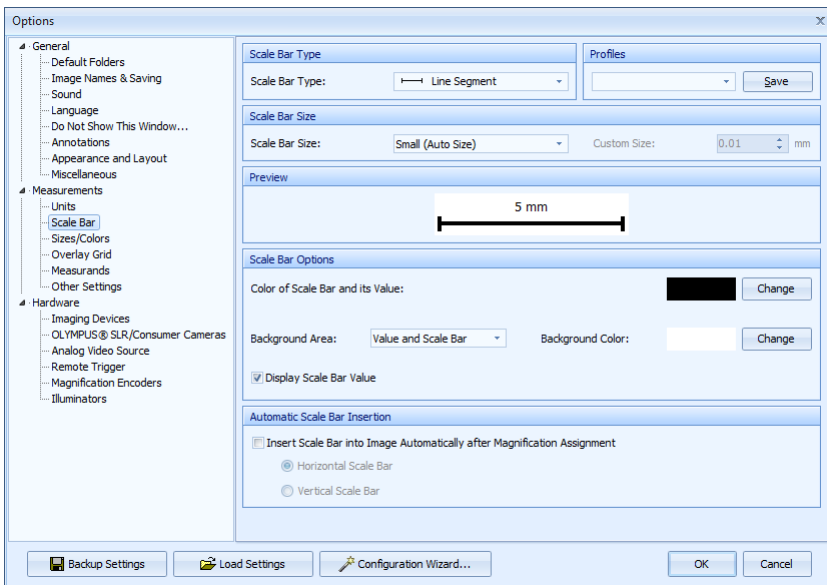
Tab Sizes/Colors

On this tab you may set the default properties for all newly acquired images.

In the *Font Size of Scale Bar Value* part you may set the font size of the scale bar's value by selecting it from the *Font Size* drop-down menu.

In the *Dimension and Extension Lines, and Leaders* part it is possible to set the color and thickness of these lines.

In the *Font Color of Measured Values* part you may set two modes for the font color of the measured values: *Cycle Colors in the Following Order* option will cause that individual measurements performed in the image will cyclically have font colors assigned in the displayed order. There are 10 colors set on the list which can be changed by the user. To change some of the colors, make its selection, click the *Change* button and select a new color from the opened color palette. If you activate the *Use Custom Color for All Measurements* option, all measurements will have the same font color which can be selected after clicking the *Change* button.

Background of Labels with Measured Values part provides the following options: *Transparent* or *Custom Color*.

In the *Font Size of Measured Values Displayed in Images* part it is possible to select the font size which will have the measured values displayed in the image.
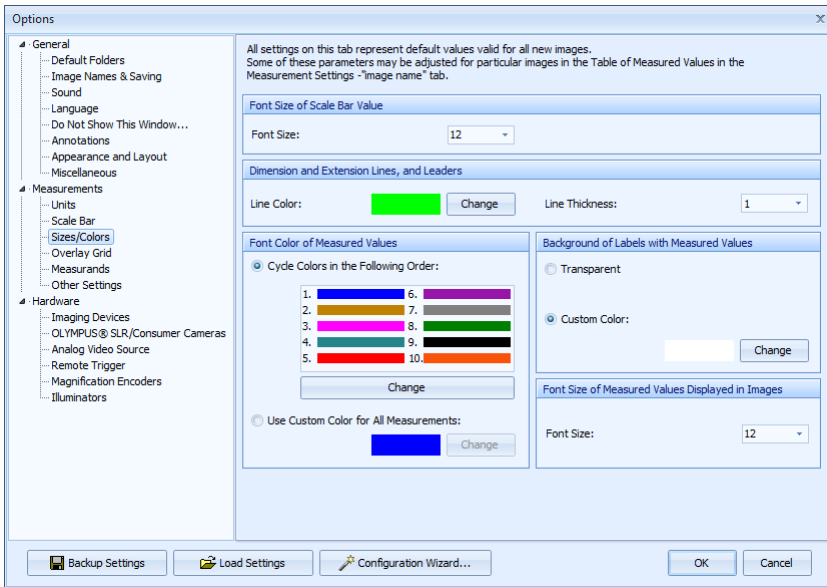
Tab Overlay Grid

On this tab it is possible to select the default parameters of the overlay grid. It is possible to set the default *Spacing* and *Default Overlay Grid Line Parameters: Line Color* and *Line Thickness*.
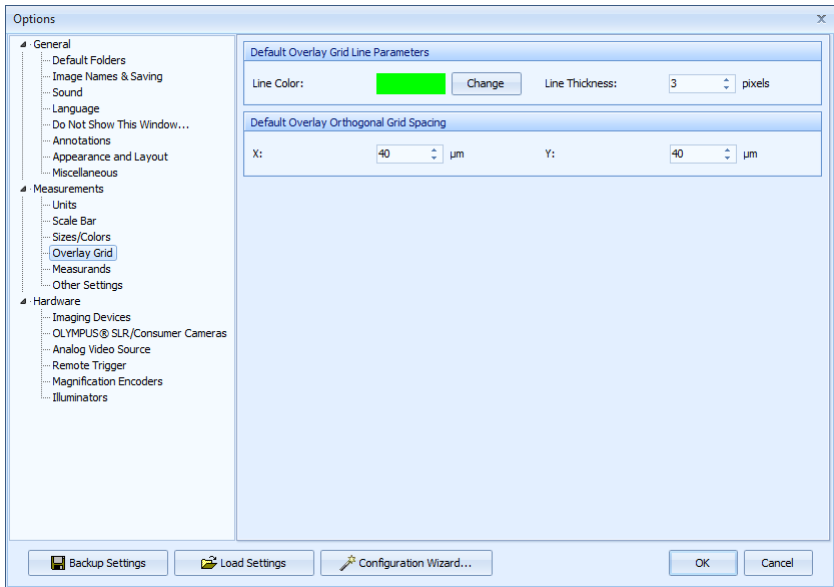
Tab Measurands

This tab serves for selection of measurands, which will be measured by individual measuring tools, and for text labeling of individual measurands. Measurands to be measured should be checked. To change the label rewrite the appropriate field in the *Label* row.

Display Measurement Numbers in the Image option determines whether each measured value in the image will have the appropriate serial measuring number displayed by it.
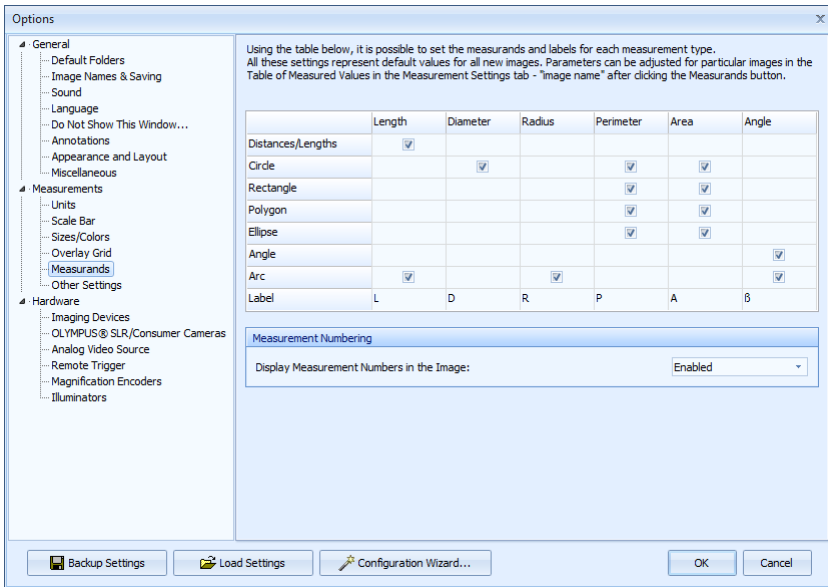
Tab Other Settings

Mode of Assigning Magnifications to Images part offers two options:

- *Manual Magnification Assignment to Each Image* - if this option is active (default option), it is necessary to manually set magnification from the *Objective* or eventually *Zoom* menu to each image intended for measurements.

- *Automatically Assign the Last used Magnification to a New Image* - if you activate this option, to each new image will be automatically assigned the last magnification assigned to some image.

In the *Settings for the Function - Merge Objects with an Image (Flatten Layers)* part it is possible to set the size of the "virtual" window which will be used for flattening of layers. Setting of the *Window Size* value has affect on the font size of the measured values and scale bar size in the flattened image. Larger window size will cause smaller font and scale bar size, and vice versa. Default option is 1024 x 768 pixels.

Measurement Mode part offers two options:

- *Continuous Measurement Mode* - if this option is active (default option), the selected measuring tool will remain active for the current image until manually deactivated. That way you can proceed with repeated measurements in the image without the necessity to manually activate the same measuring tools for each measurement.

- *Single Measurement Mode* - if you activate this option, the measuring tool will be, after one performed measurement, automatically deactivated.
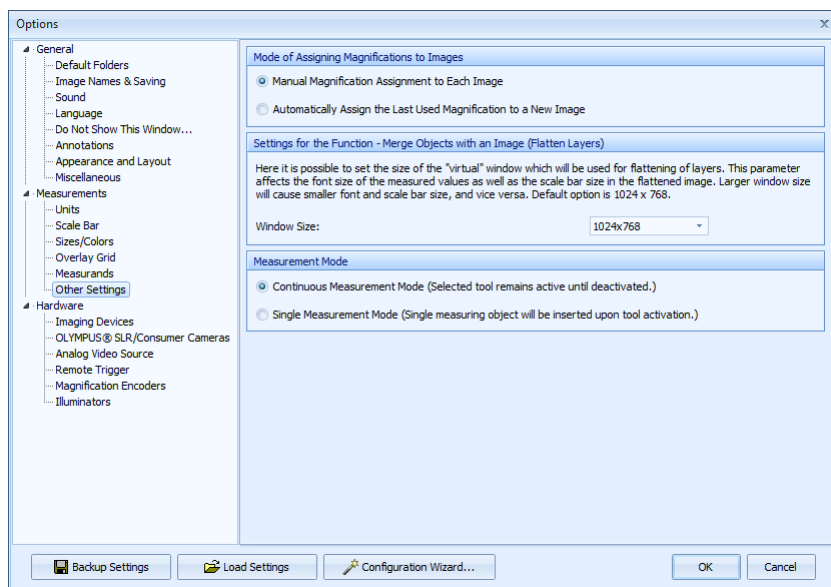
7.3. Section Hardware

Tab Imaging Devices

Properties of the Imaging Device's Control Panels part contains the following options:

> **Note**
>
> These options do not apply to imaging devices controlled via the TWAIN interface.

- *Minimize Imaging Device Control Panel after Image Acquisition* - if this option is checked, control panel of the imaging device will be minimized after acquiring of a new image.
- *Display Imaging Device Control Panel on the Second Monitor (for Dual-Monitor Workstations)* - if you check this option, control panel of the imaging device will be displayed on the second monitor.
- *Display Imaging Device Control Panel after Program Start-up* - if this option is checked, control panel of the imaging device will be automatically activated after launching of the QuickPHOTO MICRO 3.1 program.

If you check the *Close Twain Control Panel after Image Acquisition* option in the *Properties of TWAIN Imaging Devices Control Panels* part, control panel of the imaging device controlled via TWAIN interface will be automatically terminated after acquisition of an image. If you leave this option unchecked, TWAIN control panel will be active until terminated manually.
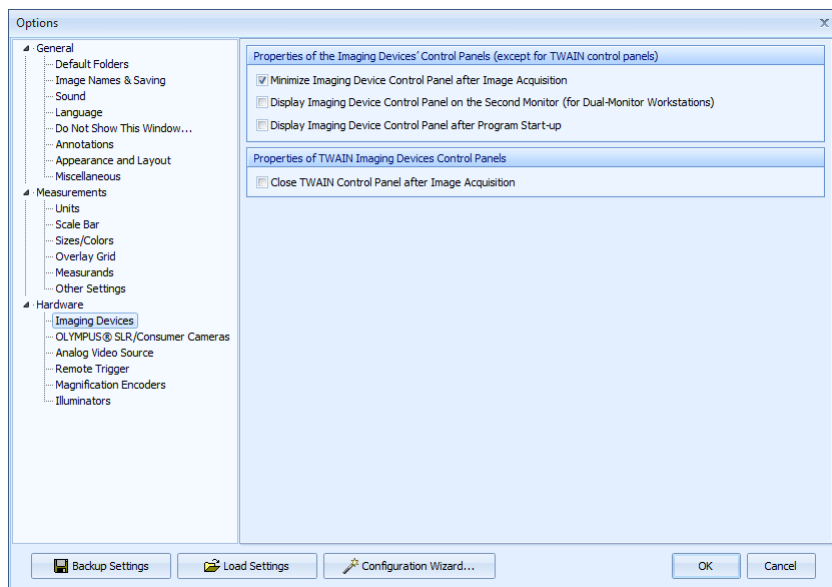
Tab Olympus® SLR/Consumer Cameras

This tab is available only in case the support of OLYMPUS® CAMEDIA® and SP series or OLYMPUS® E-system DSLR cameras has been installed and it is intended to set the device for display of live view (frame grabber) from these cameras. If you are using a device delivered with the QuickPHOTO MICRO 3.1 program, it will be configured automatically after you see this tab. When using a different device, select this device from the *Device* drop-down menu and select the norm of the video signal from the *Video Standard* menu. In the *Input* menu the option *Composite* should be selected. Checking of the *Keep Images on the Memory Card* option will cause that the acquired image will remain, after transfer to a computer, saved on the memory card (this function is available only for CAMEDIA® and SP series cameras). If you leave this option unchecked (recommended), the acquired image will be, after transfer to a computer, from the camera's memory card automatically deleted.

The *Restore* button in the *Restore Default Device Settings* part will restore the default settings of the device. The *Open* button in the *Advanced Settings* opens the advanced settings of the device for manual setup.
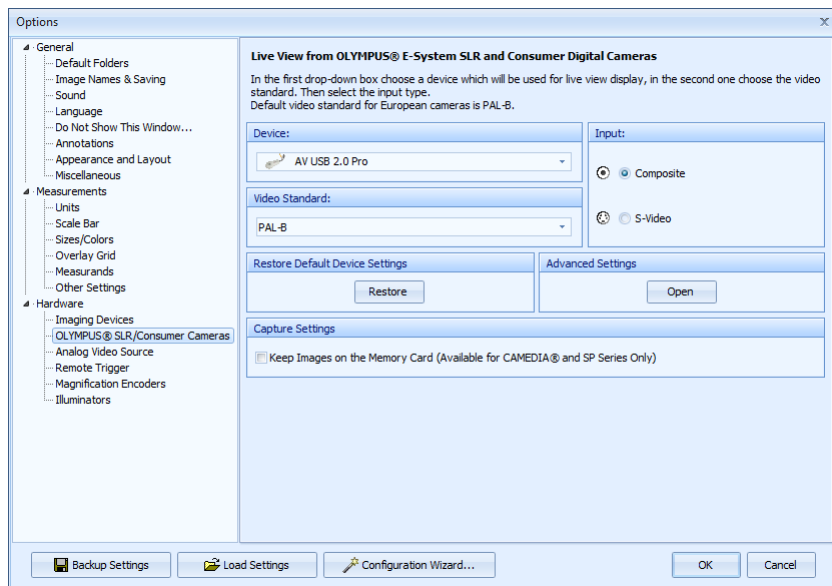
Tab Analog Video Source

This tab will be available only if the support of analog video sources has been installed and it is intended to set the digitalization device for acquiring images from these sources. If you are using a digitalization device delivered with the QuickPHOTO MICRO 3.1 program, it will be configured automatically after you see this tab. When using a different digitalization device, select the device from the *Device* drop-down menu and select the norm of the video signal from the *Video Standard* menu. In the *Input* part select the desired type of the used connector.

The *Restore* button in the *Restore Default Device Settings* part will restore the default settings of the device. The *Open* button in the *Advanced Settings* opens the advanced settings of the device for manual setup.
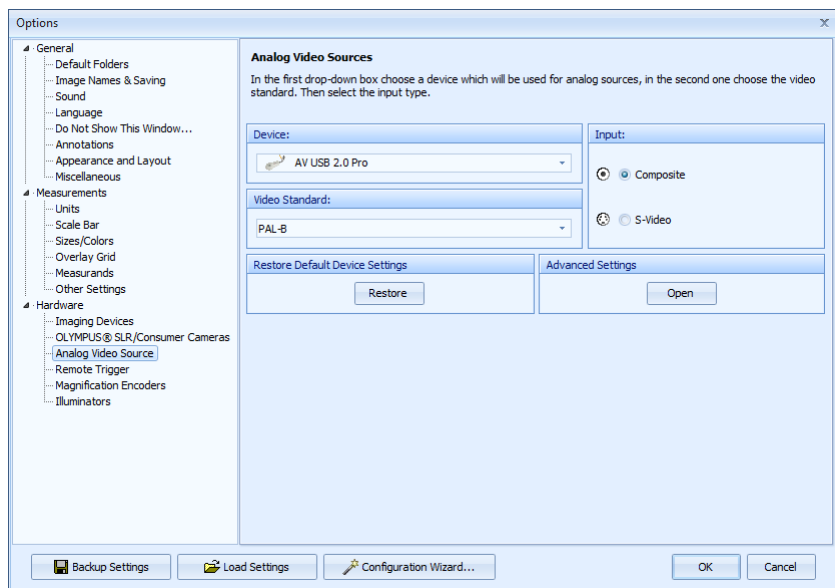
Tab Remote Trigger

This page is used for setting and verification of the remote trigger's functionality. Remote trigger is an optional accessory which can be connected via serial or USB port. If you want to use the remote trigger, check the *Use Remote Trigger* option and select the COM port

to which it is connected (in case of the USB trigger we are talking about the USB Serial Port (COM#)). In the *Remote Trigger Type* part select the type of the used remote trigger. Trigger with two buttons (for example the two-button foot switch) is designed for image acquiring and for capturing of video recordings using the optional module for video recording. Functionality of the remote trigger can be verified by pressing its button(s). If the small square(s) change color to green after you press the button(s) and they turn back to black after you release the button(s), the remote trigger is set correctly and it is ready to be used.
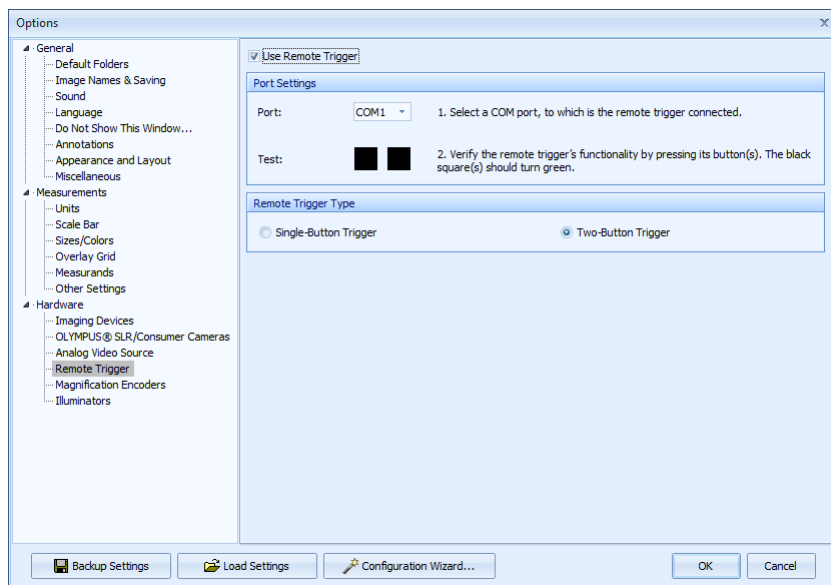
Tab Magnification Encoders

This tab is intended for setting of the magnification encoders.

To set the magnification encoder for upright and inverted microscopes check, in the *Upright/Inverted Microscopes* part the *Use Objective Encoder* option and from the *Control Unit* drop-down menu select the desired control unit of the magnification encoder. Correct functionality of the magnification encoder can be verified by clicking the *Test Device* button.

To set the magnification encoder for stereomicroscopes check, in the *Stereomicroscopes* part the *Use Zoom/Objective Encoder* option and from the *Control Unit* drop-down menu select the control unit of the magnification encoder. If the magnification encoder for objectives is also connected, select it from the *Objective Encoder Device* drop-down menu. Correct functionality of the magnification encoder can be verified by clicking the *Test Device* button.

Note

Only those control units, whose support was chosen during program installation, will be displayed in the list. If your control unit is not available in the list, exit the QuickPHOTO MICRO 3.1 program and run the program installation again. On page *Installation Type Selection* select the *Update Existing Installation - Add Components* option and on page *Select Additional Components - Magnification Encoders* choose, from the list, a control unit whose support you want to add.
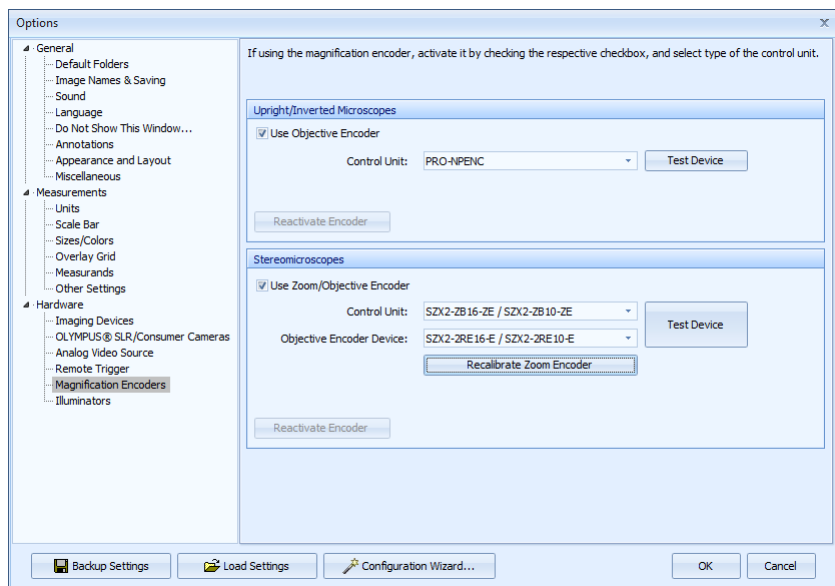
Tab Illuminators

This tab is intended for setting of computer controlled illuminators. In the *Illuminator Settings* part check the *Use PC Controlled Illuminator* option and from the *Control Unit* drop-down menu select the control unit of the used illuminator. Correct functionality of the illuminator can be verified by clicking the *Test Device* button.

> **Note**
>
> Only those control units, whose support was chosen during program installation, will be displayed in the list. If your control unit is not available in the list, exit the QuickPHOTO MICRO 3.1 program and run the program installation again. On page *Installation Type Selection* select the *Update Existing Installation - Add Components* option and on page *Select Additional Components - PC Controlled Illuminators* choose, from the list, a control unit whose support you want to add.
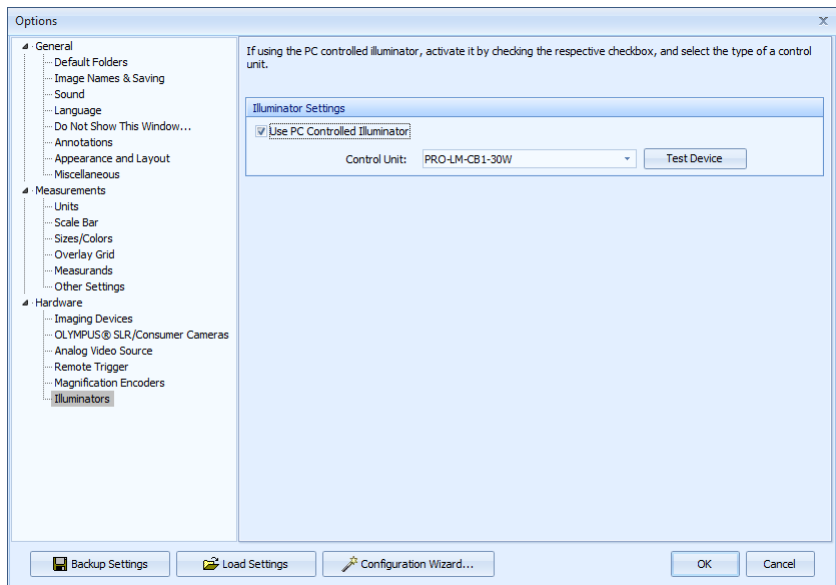
Control Panels of Imaging Devices

QuickPHOTO MICRO 3.1 program is able to capture images from several types of imaging devices. These devices can be controlled via dedicated control panels.

1. PROMICAM USB 3.0 Digital Cameras
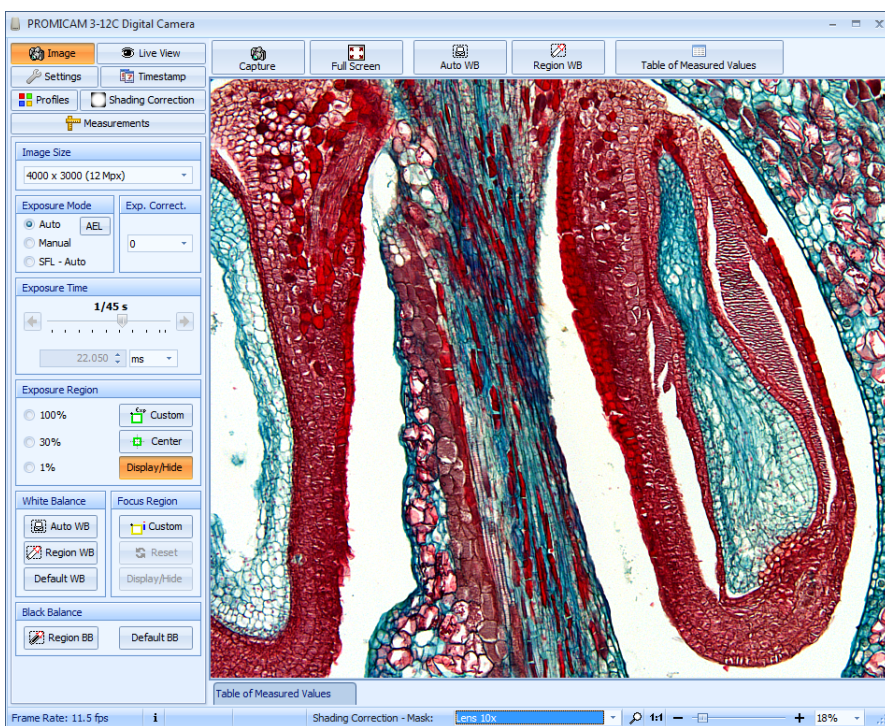
Control panel of PROMICAM USB 3.0 digital cameras enables to work with several types of PROMICAM USB 3.0 cameras. Type of the connected camera is determined automatically at the startup of the control panel.

If more than one PROMICAM USB 3.0 camera is connected to the computer, a dialog box will be displayed, at the startup of the control panel, for selection of a camera which is supposed to be connected.

Control panel of the PROMICAM USB 3.0 cameras is designed for control of camera functions, displaying of the live view and image acquisition. It consists of a toolbar, tabs with control elements, live view and a status bar.

Note

A performance test will take place automatically during the first run of the control panel. Several test images will be acquired, during the test, which can be deleted right after the test.

Toolbar

Toolbar, which is placed above the live view, contains the following buttons:

Capture [Ctrl+Enter]: after clicking this button, an image will be acquired and automatically transferred to the computer. If the camera is not connected, the button will change to *Connect* button.

Full Screen [Ctrl+F]: this button is used for displaying of live view full screen. Using this type of display you can control the program using the *Capture [Ctrl+Enter]* , *Best Fit Zoom* and *Exit Full Screen Mode* buttons, which are placed in the upper part of the screen.

Automatic White Balance: this button activates the function for automatic white balance. It is best to do this balancing when the camera is capturing a white area.

White Balance on a Defined Region: clicking on this button and successive dragging of the mouse in the live view, while holding the left mouse button, will define a region which will be used as reference for the white balance.

Display/Hide Table of Measured Values: if you click this button, the *Table of Measured Values* will be displayed in the bottom part of the control panel. If you click the button again, the table will be hidden again.

Status Bar

Status Bar, which is located below the live view, displays information about current frame rate and dimensions of a live view, magnification currently set in the *Measurements* tab and active mask set for the *Shading Correction* function (active mask can be selected here). At the right side of the *Status Bar* there are located control elements for adjustment of the live view size. The ⓘ *Camera Information* icon opens dialog window with diagnostic information about a connected camera.

Image Tab

This tab contains control elements for setting of main camera's parameters. Settings will apply to the live view as well as to the acquired images.

Image Size: from this menu you may select the size in which the images will be acquired.

Exposure Mode: if the exposure mode is set to the *Auto* option, exposure time is automatically set according to the illumination of the camera's field of view. *SFL - Auto* option represents automatic exposure mode for fluorescence imaging. When using the *Auto* and *SFL - Auto* modes, the AEL button (*Auto Exposure Lock*) will also be active. This button "locks" the exposure time on the current value. If the *Manual* option is active, value of the exposure time is set by user, using the control elements in the *Exposure Time* part.

Exp. Correct: this function enables you to lighten or darken the images when using the *Auto* and *SFL-Auto* modes.

Exposure Time: if a manual exposure mode is active, you may, using the arrow buttons or by dragging of the slider, manually set the desired value of the exposure time. To change the exposure time you may also use the [+] and [-] keys on the numerical keyboard or the [Page Up] and [Page Down] keys. Exposure time can also be set directly by its value using the editable field under the slider. This way is especially useful for setting of long exposure times. When longer exposure times are manually set by the editable field, the live view may not correspond to the acquired images. In such cases the value of the exposure time displayed above the slider will change its color to blue.

Exposure Region: this control element is designed for defining of an area of the live view which will be used for measuring of exposition in the *Auto* and *SFL-Auto* modes. You may select one of the predefined exposure region sizes (*100%* - the whole area of the live view, *30%* and *1%*) or you may select your own size of the region. If you select the *30%* or *1%* option, a frame will be displayed in the middle of the live view, which will define the exposure region. The frame can be moved to the desired area in the image: move the mouse into the region and by dragging the mouse while holding the left mouse button relocate the frame to the desired position. If you place the cursor above the frame's edge or above one of its corners, the cursor will change shape, and by dragging the mouse while holding the left mouse button, you may change the size of the frame as you please. By clicking the *Center* button, you may place the frame to the center of the camera's field of view. Using the *Display/Hide* button, it is possible to hide or display the frame. If the frame is hidden, the selected region is still being used for measuring of exposition. The frame is only not visible, in order not to disturb in the live view. To define your own exposure region, click the *Custom* button, move the cursor to the live view and then by dragging the mouse, while holding the left mouse button, insert the frame of a desired size.
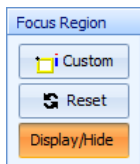
> **Note**
>
> If the frame of the exposure region will change its color to red, it means that the camera's automatics have reached the limit value of the exposure time. The range of exposure times in the automatic mode may be smaller than in the manual mode.

White Balance: using this function you may adjust the white balance. Clicking the *Auto WB* button will activate the automatic white balance function. This function uses the whole image area for white balancing. It is best to perform the white balance when the camera is capturing a white area. If you click the *Region WB* button, and then drag the mouse in the live view while holding the left mouse button, you may define a region, which will be used as reference for the white balance. The *Default WB* button is designed for renewal of the default white balance. Manual setting of the white balance can be done using the *White Balance* sliders on the *Settings* tab.

Focus Region: this function makes it easier to focus the selected area of the image. To use this function proceed as follows:

1. Using the focus knob, roughly focus the microscope. Click the *Custom* button in the *Focus Region* part. Move the cursor into the live view and insert the frame in the live view, by dragging the mouse, while holding the left mouse button, to a place, where you want to do the focusing.
2. Focus indicator will be displayed next to the frame. Blue strip represents the current focus value and the red guideline maximum reached focus value. Both values are at the same level at the beginning. Both values are also displayed in a numerical form in the title of the frame in the *current value/maximal reached value* form.
3. If you start rotating the microscope focus knob now, the blue strip will start to decline respectively rise according to the fact, whether the focus level in the framed area will decrease or rise. Select such a direction so the strip starts to rise. Continue rotating the focus knob until the blue strip starts to decline. Red guideline will remain on the position of the maximum reached focus value. Gently rotate the focus knob in the opposite direction, now achieve that the blue strip reaches as closely as possible to

the red guideline – in this position, image of the selected area will be as sharp as possible. You can use numerical values, in a similar way, for focusing.
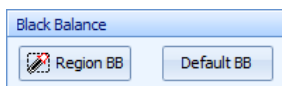

Note

Focus level is measured relatively. That means the indicator shows, whether the focus value is rising or declining towards the default value which is calculated after the frame is positioned. If the focus value exceeds the indicator's range, it is initialized again to about three quarters of the range. That does not mean that the focus value would decline rapidly. If you continue rotating the knob in the same direction and the strip rises again, it means that the focus level continues to rise.

Reset button initializes the focus indicator again into the default state. That means the maximum reached value of focus level is set along with the current value approximately to three quarters of the range.

Using the *Display/Hide* button you can hide or display the frame of the focus region.

Note

If you relocate or change the size of the focus region, automatic reset of the focus indicator will take place (see *Reset* button).

Black Balance: using this function you may adjust the black balance. By clicking the *Region BB* button and successive dragging of the mouse in the live view, while holding the left mouse button, you may define an area which will be used as reference for black balance. *Default BB* button is used for restoration of the default black balance. This function is designed primarily for fluorescence imaging.

Live View Tab

This tab is designed for setting of live view parameters.

Live View Resolution: from this drop-down menu, you can select the size, in which the live view will be displayed.
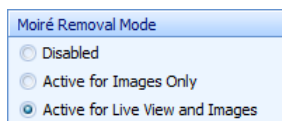
Moiré Removal Mode: this feature is useful in case disruptive stripes or possibly squares on the background are visible. This phenomenon can appear with some types of illumination. Activating the option *Active for Images Only* will apply the remove moiré correction only to acquired images. This feature does not have any impact on frame rate of displayed live view. The option *Active for Live View and Images* will apply the remove moiré correction to acquired images as well as to a live view. This option decreases the frame rate of displayed live view.

Orientation option enables to select the following options of orientation of the live view (this option will also apply to acquired images):

Default: sets the default orientation of the live view.

Mirror: mirrors the live view along the vertical axis.

Flip: flips the live view along the horizontal axis.

Rotate by 180°: rotates the live view by 180 degrees.

Cross: displays/hides the central cross.

Grey Scale: turns on/off the grey scale mode.

Performance Test: after clicking the [Performance Test] button, several test images will be acquired, to determine the minimum reachable time interval between capturing of images. Several test images will be acquired, during the test, which can be deleted right after the test. This test is automatically done during the first run of the control panel and normally, there is no need to run this test again.

Settings Tab

This tab contains control elements which are intended for adjustment of the parameters of the live view. Changes in the settings will apply to the live view as well as to the acquired images.

Image Settings part:

Gain: the slider affects the signal's strength coming from the camera. With higher gain values, noise in the image may be more visible.

Brightness: the slider is used for setting of the image brightness.

Gamma: the slider is used to set gamma correction (combination of the brightness and contrast adjustment).

Hue: the slider is used for setting of the color hue.

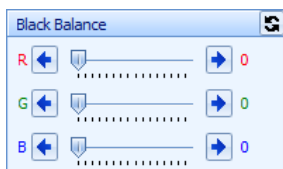*Saturation:* the slider is used for setting of the color saturation.

Sharpness: the slider is used for setting of the image sharpness.

- *Restore Default Settings:* clicking this button sets all values of the control elements in the *Image Settings* part to the default values.
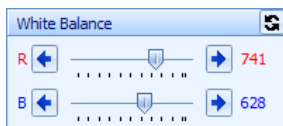
 White Balance: sliders enable to manually adjust the level of red and blue channel (R-red, B-blue).

 Restore Default White Balance Settings: clicking this button sets all values of the sliders in the *White Balance* part to the default values.
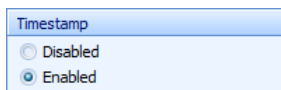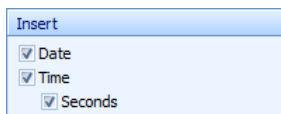
 Black Balance: sliders R, G, B (R-red, G-green, and B-blue) enable to manually set the black balance. In case the camera is set to grey scale mode or if you are using a monochromatic camera, only one slider is available.

 Restore Default Black Balance Settings: clicking this button sets all values of the sliders in the *Black Balance* part to the default values.

Timestamp Tab

This feature enables automatic insertion of date and time of acquisition – the so called "timestamp", into the acquired images. The timestamp will, after acquisition of the image, become a solid part of the image and it is not possible to remove it from the image other way than by cropping it.
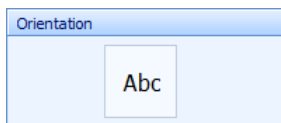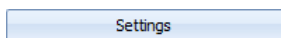
Timestamp: this option turns the *Timestamp* function on/off.

Insert: by checking of individual options it is possible to define which components of the timestamp will be inserted into the acquired images.
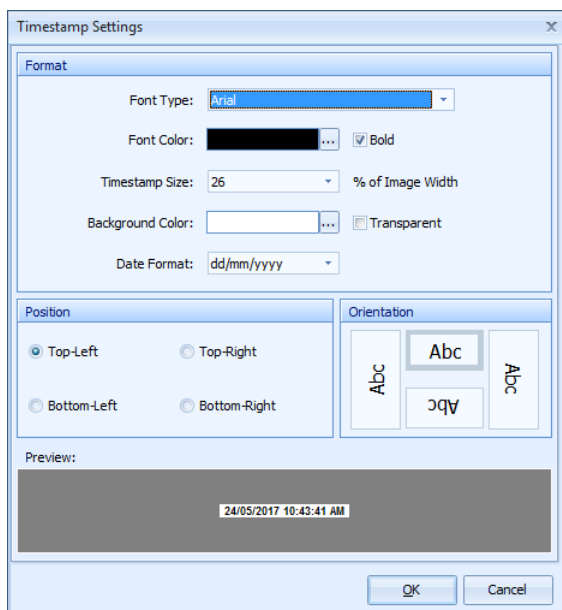
Orientation: this field serves as an indicator of the set orientation of the timestamp. If you double-click into this field, a *Timestamp Settings* dialog box will open.

Settings: if you click this button a dialog box for setting of timestamp parameters will open.

Timestamp Settings

If you click the *Settings* button, or if you double-click into the *Orientation* field, a dialog box for setting of the timestamp will open.

Format: using the options in this part, it is possible to set the appearance of the timestamp.

Position: this option enables to select into which corner of the acquired images should the timestamp be inserted.
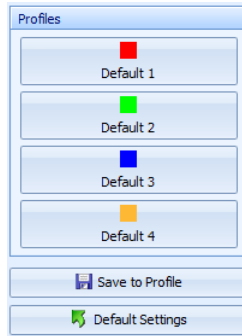
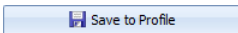*Orientation:* using this option, it is possible to select the orientation of the timestamp's text.

Preview: in this field, preview of the timestamp is displayed the way it will be inserted into the acquired images, except for the orientation option.
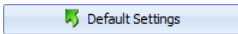
Profiles Tab

All settings of the control panel can be saved into one of the four profiles and at any time loaded again.

Profiles: buttons in the *Profiles* part are used for loading of the saved profiles.

 Save to Profile: if you click this button, a dialog box will be displayed for saving of the current control panel's settings into one of the profiles.
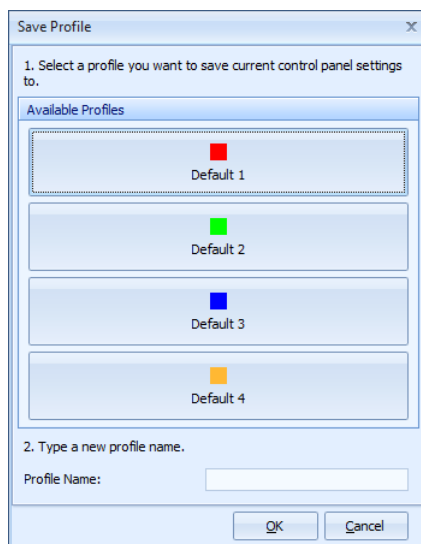
 Default Settings: if you click this button, all elements of the control panel will be set to the default values. Saved profiles will not be affected in any way by this action.

Saving of the Control Panel's Settings into the Profile

To save the settings into the profile proceed as follows:

1. Set the desired parameters of the control panel.

2. On the *Profiles* tab click the *Save to Profile* button. *Save Profile* dialog box will open:
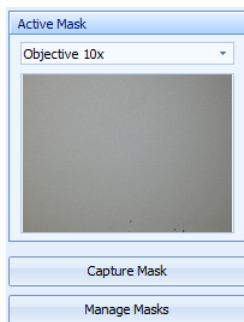
3. In the *Available Profiles* part select, by clicking the corresponding button, one of the profiles you want to save the current control panel's settings to.

4. Type in a new profile name into the *Profile Name* field.

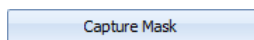5. Confirm by clicking the *OK* button.

Loading a Profile

Loading of a desired profile can be done by clicking the corresponding button of the profile on the *Profiles* tab. Automatic adjustment of the control panel's elements will take place.
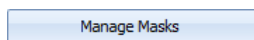
Shading Correction Tab

This tab contains control elements of the *Shading Correction* function. This function may be used to remove deficiencies in the image caused by inhomogeneous illumination (removal of the darker corners of the image) or by dust on the sensor.

Active Mask: in this drop-down menu select the stored calibration mask you want to apply for image acquisition. The thumbnail displays a preview of the selected mask.

Capture Mask: click this button to acquire a new mask.

Manage Masks: open a dialog window for management of stored masks.
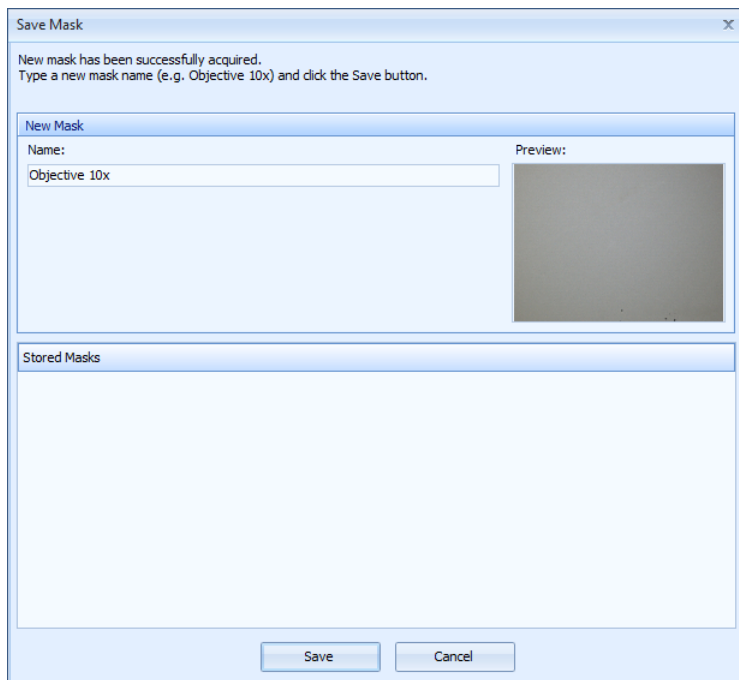
How to Create New Mask

Prior to use of the *Shading Correction* feature it is necessary to acquire mask for each microscope magnification intended for use with this feature.

Procedure of New Masks Acquisition:

1. Put the specimen under the microscope, set the desired magnification, adjust the illumination and focus the microscope.
2. Remove the specimen from a microscope.
3. Click the *Auto WB* button (automatic white balance).

4. Switch to the *Shading Correction* tab, then click the *Capture Mask* button. Wait until the mask will be acquired and the *Save Mask* dialog window will appear.
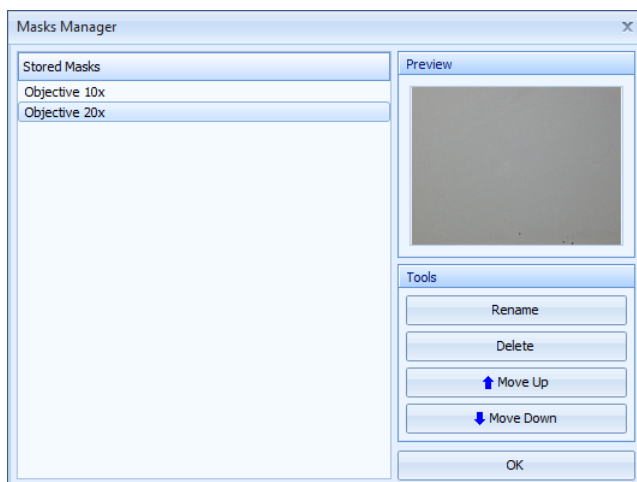

5. Type a new mask name, under which the mask will be stored on a hard drive (e.g. Objective 10x, or 10x etc.). Then click the *Save* button. The mask will be stored on a hard drive for future use.
6. Perform the steps 1. - 5. for all other magnifications to be used with *Shading Correction* feature.

Important

When acquiring new mask, there should not be visible any sharp structures in the camera's field of view. In case there are some sharp structures visible in the camera's field of view (e.g. when being used on a stereomicroscope), defocus the microscope slightly prior to acquisition of a new mask.

Managing the Stored Masks

The stored masks can be renamed, deleted or sorted in a *Masks Manager* dialog window, which can be displayed by clicking the *Manage Masks* button.

In order to rename or delete the particular stored mask, first select the mask by left button mouse click, then click the *Rename* or *Delete* button according to the desired operation. The order of the stored mask can be managed by moving the selected mask up or down in the list by *Move Up* and *Move Down* buttons. Stored masks will be displayed in the defined order in the *Active Mask* drop-down menu at the *Shading Correction* tab as well as in the *Shading Correction - Mask:* drop-down menu in the status bar.

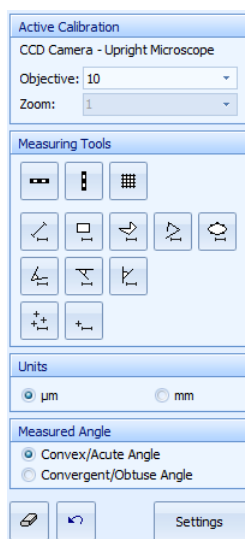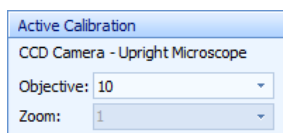## How to Use the Shading Correction Feature

In order to use the *Shading Correction* feature, simply select one of the stored mask, in the *Active Mask* drop-down menu at the *Shading Correction* tab or *Shading Correction - Mask:* drop-down menu in the status bar, according to the currently used magnification. All newly acquired images will be automatically enhanced by the *Shading Correction* function until the *None (Disabled)* option will be set in one of the menus.

> **Important**
>
> In order to acquire the correctly enhanced images, always remember to select the corresponding *Active Mask*, when changing the magnification on a microscope!

Measurements Tab

Control panel of PROMICAM USB 3.0 cameras is equipped with functions for measuring in live view. Thanks to this function it is not necessary to acquire the image before measuring. This tab contains control elements for measuring in the live view.

Active Calibration: in this part the name of a calibration which is set as active, and is used for measuring in the QuickPHOTO MICRO 3.1 program is displayed. To activate functions for measuring in the live view, first select value of the current microscope magnification from the *Objective* and *Zoom* menus. If you are using a magnification encoder, these values will be filled in automatically.

In the *Measuring Tools* part the following measuring tools are available:

Insert Horizontal Scale Bar: after you click this button a horizontal scale will be inserted into the right bottom corner of the live view.

Insert Vertical Scale Bar: after you click this button a vertical scale will be inserted into the right upper corner of the live view.

Display Overlay Orthogonal Grid: after you click this button, an *Overlay Orthogonal Grid* dialog box will be displayed. In this window in the *Spacing* part, enter the desired spacing of the grid for the X and Y axis. Color and thickness of the grid lines can be set in the *Line Options* part. Grid settings can be confirmed by clicking the *OK* button.

Measure Line Segment: after you click this button, the function for line segment measuring will be activated. Then by clicking into the live view and dragging the mouse, while holding the left mouse button or by clicking the left mouse button into the beginning and then the end point, insert the measuring line segment. Precisely horizontal or vertical line segment can be created if you hold the [Shift] key when inserting it. Length of the inserted line segment will be measured.

Measure Rectangle: after you click this button, function for rectangle measuring will be activated. Then by clicking into the live view and dragging the mouse, while holding the left mouse button, insert a rectangle. You can measure the rectangle's perimeter and area.

Measure Polygon: after you click this button, function for measuring of a polygon will be activated. Then by clicking the left mouse button into the selected point in the live view, insert the first vertex of the polygon. Repeated clicking of the left mouse button will define other vertexes of the polygon. Precisely horizontal or vertical edge can be created if you, while inserting the vertex, hold the [Shift] key. To finish inserting of the polygon, click the right mouse button – the last vertex will be connected with the first one and a polygon will be created. You can measure the polygon's perimeter and area.

> **Note**
>
> If the edges of the inserted polygon will cross each other somewhere, the value of the calculated area will equal 0. Only the polygon's perimeter will be calculated.

Measure Polyline: after you click this button, function for measuring of a polyline will be activated. Then by clicking the left mouse button into the selected point in the live view, insert the beginning point of the polyline. Repeated clicking of the left mouse button will define the break points. Precisely horizontal or vertical line can be created if you hold the [Shift] key while inserting it. To finish inserting of the polyline, click the right mouse button. Length of the polyline will be measured.

Measure Ellipse Defined by 5 Points: after you click this button, function for measuring of an ellipse will be activated. Then click the left mouse button gradually into five points in the live view through which the ellipse will be interspaced. You can measure ellipse's perimeter and area.

Measure Arbitrary Angle: after you click this button, function for measuring of an angle will be activated. Clicking and dragging the mouse, while holding the left mouse button or by clicking the left mouse button into the beginning and the end point, insert the first arm of an angle. Then by clicking the left mouse button, insert the second arm of an angle. If you want to create a precisely horizontal or vertical arm, hold the [Shift] key while creating it.

Measure Angle from the X Axis: after you click this button, function for measuring of an angle from the X axis will be activated. By clicking and dragging the mouse while holding the left mouse button or by clicking the left mouse button into the beginning and the end point, insert the first arm of an angle. This arm will automatically be completed with a horizontal axis and this way defined angle will be calculated.
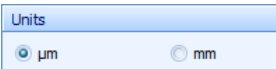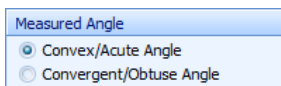
Measure Angle from the Y Axis: after you click this button, function for measuring of an angle from the Y axis will be activated. By clicking and dragging the left mouse button or by clicking the left mouse button into the beginning and the end point, insert the first arm of an angle. This arm will automatically be completed with the vertical axis and this way defined angle will be calculated.

Count Objects: after you click this button, click the left mouse button on every object which you want to include in the counting. Each counted object will be indicated with a cross and the number of counted objects will be displayed in the *Table of Measured Values*. Counting can be terminated by clicking the right mouse button, repeated clicking this button, or by pressing the [Esc] key. All objects of the same group will be indicated with crosses of the same color. The same color will be used for the corresponding row in the *Table of Measured Values*. If you activate this function again, further counted objects will be indicated with crosses of a different color, and in the *Table of Measured Values* there will be another line displayed with the number of elements of another group of objects.

Add Objects to the Current Group: if you want to add further objects to one of the already existing groups of objects, first mark the corresponding row in the *Table of Measured Values* by clicking on it, and click this button. Now you can continue in counting of objects from the selected group.

In this part it is possible to select units in which measured values will be displayed/exported.
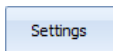
If you want to measure the convex or acute angle, check in the *Measured Angle* part the option *Convex/Acute Angle*. If you want to measure convergent or obtuse angle, check the *Convergent/Obtuse Angle* option. This option will be applied to the last measured angle and all other newly measured angles.

Delete All Measuring Objects from Live View: this button will erase all measuring objects from the live view. Values in the *Table of Measured Values* will not be affected by this function.

Undo Last Measurement [Ctrl+Z]: this button will undo the last done measurement from the live view and at the same time it will remove the corresponding measured value from the *Table of Measured Values*.

Settings: this button opens a dialog box for settings of measurements in the live view.

Table of Measured Values

Values measured in the live view are continuously being displayed in the *Table of Measured Values* in the bottom part of the control panel. Measuring objects in the live view and measured values displayed in the *Table of Measured Values* behave independently – meaning that the measuring objects can be deleted from the live view without having any effect on the values in the *Table of Measured Values* and vice versa. It is possible to write a short description to each measurement in the *Table of Measured Values*.

Display/Hide Table of Measured Values button in the *Toolbar* enables to hide or display again the *Table of Measured Values*. If the *Table of Measured Values* is hidden, a *Table of Measured Values* tab will appear in the bottom part of the control panel. If you move the mouse over this tab, the table will be temporarily displayed. If you move the mouse to a different area, the table will automatically be hidden again. It is possible to display the table permanently also by clicking the button in its right upper corner.

Object Type	Measurand	Meas. Nr.	Value	Units	Description		Measurand	Length
Line Segment	Length	1	261	µm			Number of Measurements	5
Line Segment	Length	2	185	µm			Minimal Value	106
Line Segment	Length	3	158	µm			Maximal Value	261
Line Segment	Length	4	139	µm			Average Value	169.8
Line Segment	Length	5	106	µm			Standard Deviation	52.4

Export Values   Clear All Measured Values   Delete Selected Value(s)

In the bottom part of the *Table of Measured Values* there is a toolbar with buttons, which are enabled immediately after the first done measurement.

Export Values: this button enables to export all measured values from the *Table of Measured Values* to the Microsoft® Excel® file or text file.

Important

For export of measured values to the file of the xls format, it is necessary to have the Microsoft® Excel® program installed in your computer.

Clear All Measured Values: this button clears the *Table of Measured Values* and deletes all measuring objects from the live view.

Delete Selected Value(s): this button deletes selected (by mouse click) value(s) from the *Table of Measured Values*.

Settings

Click the *Settings* button to open a dialog box with the measurement settings.

Note

Original values of all parameters of the *Settings* dialog box can be restored anytime by clicking the *Restore Default Settings* button.
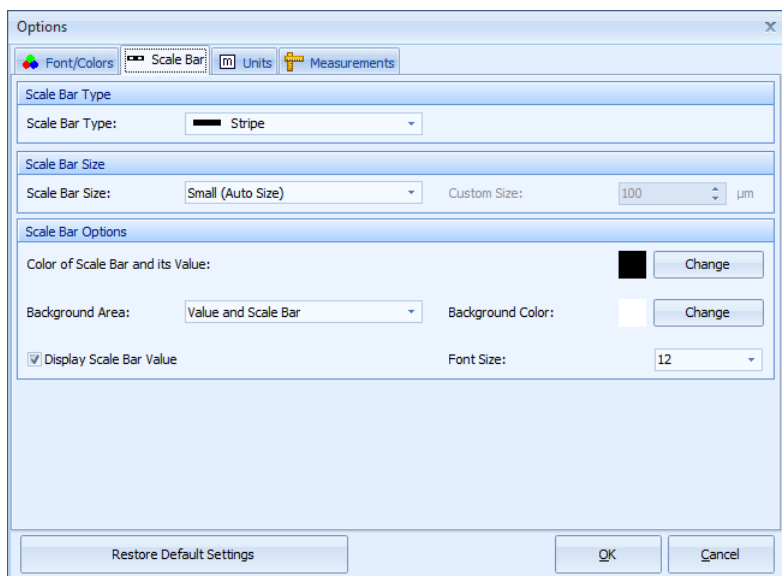
Font/Colors Tab

On the *Font/Colors* tab it is possible to set the lines of measuring objects, color of the labels with measured values, and the font size of measured values displayed in the live view.

Scale Bar Tab

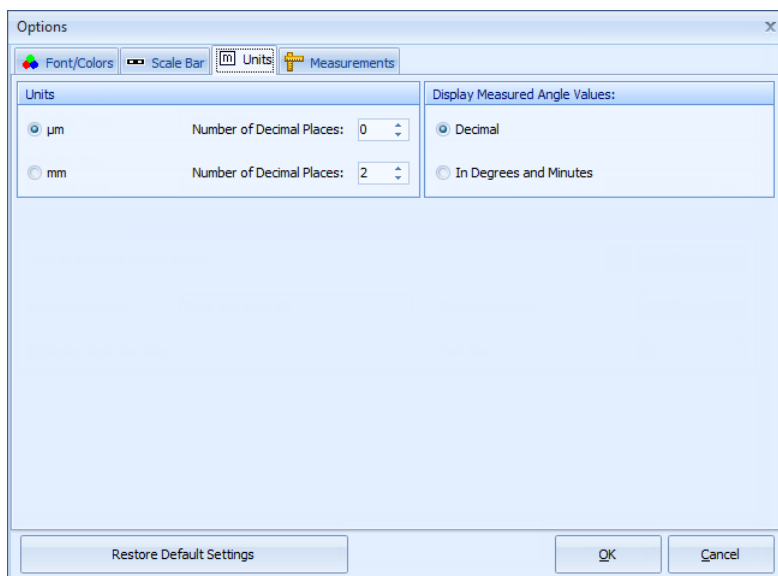*Scale Bar* tab contains the options for settings of the calibrated scale bar displayed in the live view.

In the *Scale Bar Type* part there are the following options available: *Bar*, *Line Segment*, *Staple*, and *Stripe*.

In the *Scale Bar Size* part you may select one out of two automatic sizes: *Small* or *Large*. Option *Custom* enables to define custom scale bar size. After activation of this option a *Custom Size* field will be available with the option to set the desired scale bar length.

Color of the scale bar and its value can be selected in the *Scale Bar Options* part by the *Color of Scale Bar and its Value* option.

Background Area and *Background Color* options enable you to set the area and color of the scale bar's background. If the *Display Scale Bar Value* option is checked, the scale bar's value will also be displayed by the scale bar in the live view. *Font Size* option enables to set the font size of the scale bar's value.

Units Tab

On this tab you may choose units which will be used for measuring/exporting – micrometers or millimeters. For the chosen units you may also choose the number of decimal places for displaying of the measured values.

Important

The use of measuring accuracy in tenths of micrometers will only be relevant when the used microscope-imaging device set provides such accuracy.

Way of expressing of the measured angle values can be set in the *Display Measured Angle Values:* part. Values can be displayed in *Decimal* form or *In Degrees and Minutes*.

Note

Measured angle values will always be exported into Microsoft$^{®}$ Excel$^{®}$ program in decimal form irrespective of the settings of this option.

Measurements Tab

Control elements in the top part of this tab are designed for selection of measurands, which will be measured by individual measuring tools and for text labeling of individual measurands. Measurands to be measured should be checked. To change the label rewrite the appropriate field in the *Label* row.

Measurement Mode part offers two possibilities:

- *Continuous Measurement Mode:* if this option is active (default option), the selected measuring tool will remain active until turned off. That way you can proceed with repeated measurements in the live view without the necessity to manually activate the same measuring tool for each measurement.

- *Single Measurement Mode:* if you activate this option, the measuring tool will be, after one performed measurement, automatically deactivated.

In the *Display Mode - Measuring Objects* part there are two options available:

- *Keep Displayed Only the Last Measuring Object:* if this option is active (default option), only the last measuring object will always be displayed in the live view. When new

measuring is being performed, the previous measuring object will always be deleted from the live view.

- *Keep Displayed All Measuring Objects:* this option will leave all measuring objects displayed in the live view.

2. PROMICAM USB 2.0 Digital Cameras
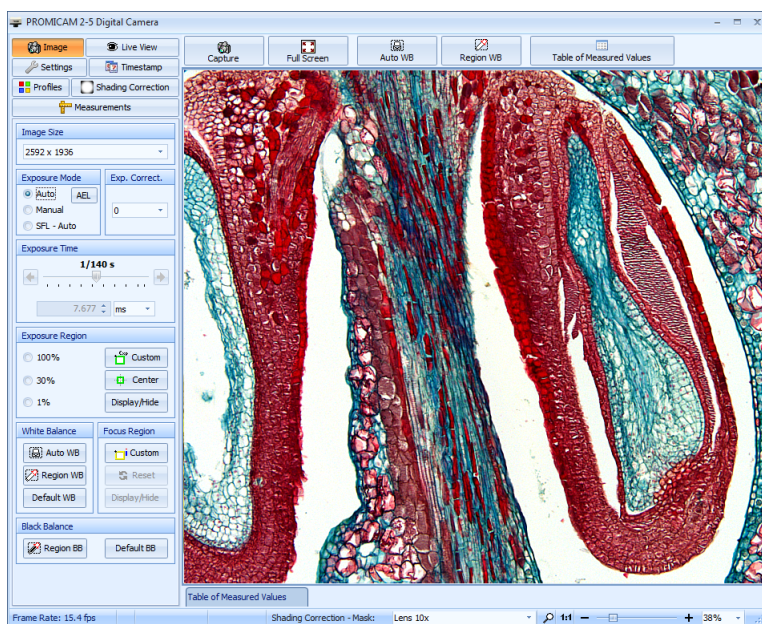
Control panel of PROMICAM USB 2.0 digital cameras enables to work with several types of PROMICAM USB 2.0 cameras. Type of the connected camera is determined automatically at the startup of the control panel.

If more than one PROMICAM USB 2.0 camera is connected to the computer, a dialog box will be displayed, at the startup of the control panel, for selection of a camera which is supposed to be connected.

Control panel of the PROMICAM USB 2.0 cameras is designed for control of camera functions, displaying of the live view and image acquisition. It consists of a toolbar, tabs with control elements, live view and a status bar.

Note

A performance test will take place automatically during the first run of the control panel. Several test images will be acquired, during the test, which can be deleted right after the test.

Toolbar

Toolbar, which is placed above the live view, contains the following buttons:

Capture [Ctrl+Enter]: after clicking this button, an image will be acquired and automatically transferred to the computer. If the camera is not connected, the button will change to *Connect* button.

Full Screen [Ctrl+F]: this button is used for displaying of live view full screen. Using this type of display you can control the program using the *Capture [Ctrl+Enter]* , *Best Fit Zoom* and *Exit Full Screen Mode* buttons, which are placed in the upper part of the screen.

Automatic White Balance: this button activates the function for automatic white balance. It is best to do this balancing when the camera is capturing a white area.

White Balance on a Defined Region: clicking on this button and successive dragging of the mouse in the live view, while holding the left mouse button, will define a region which will be used as reference for the white balance.
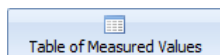
Display/Hide Table of Measured Values: if you click this button, the *Table of Measured Values* will be displayed in the bottom part of the control panel. If you click the button again, the table will be hidden again.

Status Bar

Status Bar, which is located below the live view, displays information about current frame rate and dimensions of a live view, magnification currently set in the *Measurements* tab and active mask set for the *Shading Correction* function (active mask can be selected here). At the right side of the *Status Bar* there are located control elements for adjustment of the live view size.
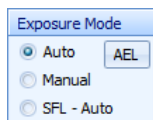
Image Tab

This tab contains control elements for setting of main camera's parameters. Settings will apply to the live view as well as to the acquired images.
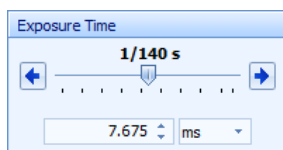

Image Size: from this menu you may select the size in which the images will be acquired.

Exposure Mode: if the exposure mode is set to the *Auto* option, exposure time is automatically set according to the illumination of the camera's field of view. *SFL - Auto* option represents automatic exposure mode for fluorescence imaging. When using the *Auto* and *SFL - Auto* modes, the AEL button (*Auto Exposure Lock*) will also be active. This button "locks" the exposure time on the current value. If the *Manual* option is active, value of the exposure time is set by user, using the control elements in the *Exposure Time* part.
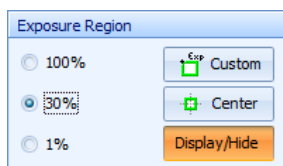
Exp. Correct: this function enables you to lighten or darken the images when using the *Auto* and *SFL-Auto* modes.

Exposure Time: if a manual exposure mode is active, you may, using the arrow buttons or by dragging of the slider, manually set the desired value of the exposure time. To change the exposure time you may also use the [+] and [-] keys on the numerical keyboard or the [Page Up] and [Page Down] keys. Exposure time can also be set directly by its value using the editable field under the slider. This way is especially useful for setting of long exposure times. When longer exposure times are manually set by the editable field, the live view may not correspond to the acquired images. In such cases the value of the exposure time displayed above the slider will change its color to blue.

Exposure Region: this control element is designed for defining of an area of the live view which will be used for measuring of exposition in the *Auto* and *SFL-Auto* modes. You may select one of the predefined exposure region sizes (*100%* - the whole are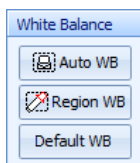a of the live view, *30%* and *1%*) or you may select your own size of the region. If you select the *30%* or *1%* option, a frame will be displayed in the middle of the live view, which will define the exposure region. The frame can be moved to the desired area in the image: move the mouse into the region and by dragging the mouse while holding the left mouse button relocate the frame to the desired position. If you place the cursor above the frame's edge or above one of its corners, the

cursor will change shape, and by dragging the mouse while holding the left mouse button, you may change the size of the frame as you please. By clicking the *Center* button, you may place the frame to the center of the camera's field of view. Using the *Display/Hide* button, it is possible to hide or display the frame. If the frame is hidden, the selected region is still being used for measuring of exposition. The frame is only not visible, in order not to disturb in the live view. To define your own exposure region, click the *Custom* button, move the cursor to the live view and then by dragging the mouse, while holding the left mouse button, insert the frame of a desired size.
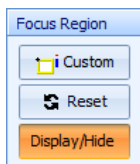

Note

If the frame of the exposure region will change its color to red, it means that the camera's automatics have reached the limit value of the exposure time. The range of exposure times in the automatic mode may be smaller than in the manual mode.

White Balance: using this function you may adjust the white balance. Clicking the *Auto WB* button will activate the automatic white balance function. This function uses the whole image area for white balancing. It is best to perform the white balance when the camera is capturing a white area. If you click the *Region WB* button, and then drag the mouse in the live view while holding the left mouse button, you may define a region, which will be used as reference for the white balance. The *Default WB* button is designed for renewal of the default white balance. Manual setting of the white balance can be done using the *White Balance* sliders on the *Settings* tab.

Focus Region: this function makes it easier to focus the selected area of the image. To use this function proceed as follows:

1. Using the focus knob, roughly focus the microscope. Click the *Custom* button in the *Focus Region* part. Move the cursor into the live view and insert the frame in the live view, by dragging the mouse, while holding the left mouse button, to a place, where you want to do the focusing.

2. Focus indicator will be displayed next to the frame. Blue strip represents the current focus value and the red guideline maximum reached focus value. Both values are at the same level at the beginning. Both values are also displayed in a numerical form in the title of the frame in the *current value*/*maximal reached value* form.

3. If you start rotating the microscope focus knob now, the blue strip will start to decline respectively rise according to the fact, whether the focus level in the framed area will decrease or rise. Select such a direction so the strip starts to rise. Continue rotating the focus knob until the blue strip starts to decline. Red guideline will remain on the position of the maximum reached focus value. Gently rotate the focus knob in the opposite direction, now achieve that the blue strip reaches as closely as possible to the red guideline – in this position, image of the selected area will be as sharp as possible. You can use numerical values, in a similar way, for focusing.
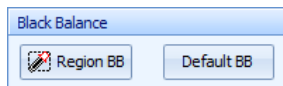

Note

Focus level is measured relatively. That means the indicator shows, whether the focus value is rising or declining towards the default value which is calculated after the frame is positioned. If the focus value exceeds the indicator's range, it is initialized again to about three quarters of the range. That does not mean that the focus value would decline rapidly. If you continue rotating the knob in the same direction and the strip rises again, it means that the focus level continues to rise.

Reset button initializes the focus indicator again into the default state. That means the maximum reached value of focus level is set along with the current value approximately to three quarters of the range.

Using the *Display/Hide* button you can hide or display the frame of the focus region.

Note

If you relocate or change the size of the focus region, automatic reset of the focus indicator will take place (see *Reset* button).
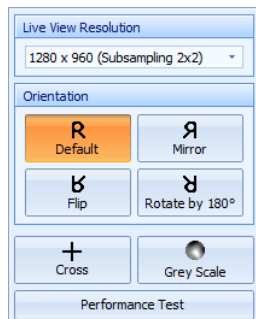

Black Balance: using this function you may adjust the black balance. By clicking the *Region BB* button and successive dragging of the mouse in the live view, while holding the left

mouse button, you may define an area which will be used as reference for black balance. *Default BB* button is used for restoration of the default black balance. This function is designed primarily for fluorescence imaging.
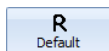
Live View Tab

This tab is designed for setting of live view parameters.

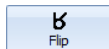*Live View Resolution:* from this drop-down menu, you may select the size, in which the live view will be displayed.

Orientation option enables to select the following options of orientation of the live view (this option will also apply to acquired images):

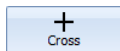 *Default:* sets the default orientation of the live view.

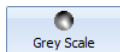 *Mirror:* mirrors the live view along the vertical axis.
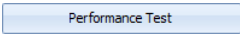
 Flip: flips the live view along the horizontal axis.
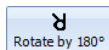
 Rotate by 180°: rotates the live view by 180 degrees.

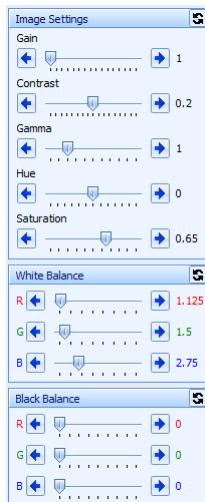 *Cross:* displays/hides the central cross.

 Grey Scale: turns on/off the grey scale mode.

Performance Test: after clicking the button, several test images will be acquired, to determine the minimum reachable time interval between capturing of images. Several test images will be acquired, during the test, which can be deleted right after the test. This test is automatically done during the first run of the control panel and normally, there is no need to run this test again.

Settings Tab

This tab contains control elements which are intended for adjustment of the parameters of the live view. Changes in the settings will apply to the live view as well as to the acquired images.
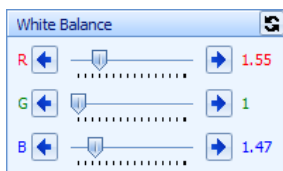

Image Settings part:

Gain: the slider affects the signal's strength coming from the camera. With higher gain values, noise in the image may be more visible.

Contrast: the slider sets the camera's contrast.

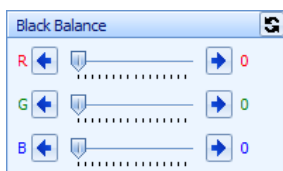*Gamma:* the slider is used to set gamma correction (combination of the brightness and contrast adjustment).

Saturation: the slider is used for setting of the color saturation.

⟳ *Restore Default Settings:* clicking this button sets all values of the control elements in the *Image Settings* part to the default values.

White Balance: sliders enable to manually adjust the level of each of the three color channels (R-red, G-green and B-blue).

⟳ *Restore Default White Balance Settings:* clicking this button sets all values of the sliders in the *White Balance* part to the default values.

Black Balance: sliders R, G, B (R-red, G-green, and B-blue) enable to manually set the black balance. In case the camera is set to grey scale mode or if you are using a monochromatic camera, only one slider is available.

⟳ *Restore Default Black Balance Settings:* clicking this button sets all values of the sliders in the *Black Balance* part to the default values.

Timestamp Tab

This feature enables automatic insertion of date and time of acquisition – the so called "timestamp", into the acquired images. The timestamp will, after acquisition of the image, become a solid part of the image and it is not possible to remove it from the image other way than by cropping it.

Timestamp: this option turns the *Timestamp* function on/off.

Insert: by checking of individual options it is possible to define which components of the timestamp will be inserted into the acquired images.
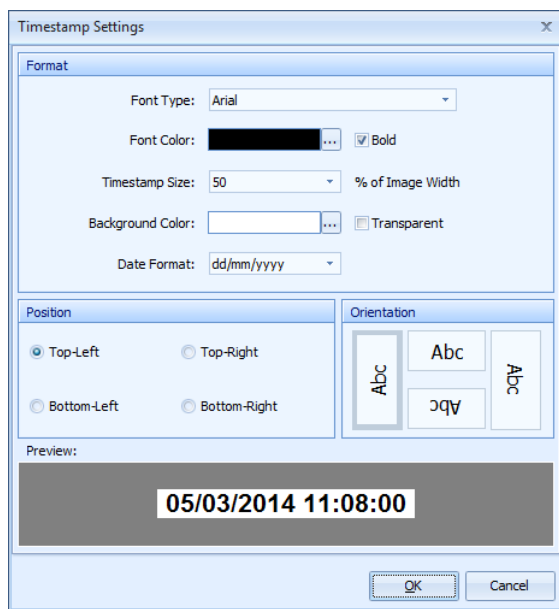
Orientation: this field serves as an indicator of the set orientation of the timestamp. If you double-click into this field, a *Timestamp Settings* dialog box will open.

Settings: if you click this button a dialog box for setting of timestamp parameters will open.

Timestamp Settings

If you click the *Settings* button, or if you double-click into the *Orientation* field, a dialog box for setting of the timestamp will open.

Format: using the options in this part, it is possible to set the appearance of the timestamp.

Position: this option enables to select into which corner of the acquired images should the timestamp be inserted.
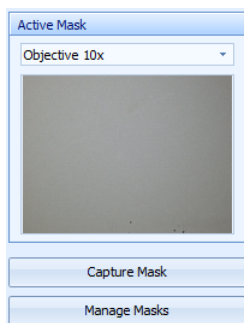
Orientation: using this option, it is possible to select the orientation of the timestamp's text.
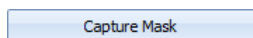
05/03/2014 11:08:00   *Preview:* in this field, preview of the timestamp is displayed the way it will be inserted into the acquired images, except for the orientation option.
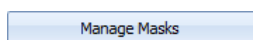
Shading Correction Tab

This tab contains control elements of the *Shading Correction* function. This function may be used to remove deficiencies in the image caused by inhomogeneous illumination (removal of the darker corners of the image) or by dust on the sensor.

Active Mask: in this drop-down menu select the stored calibration mask you want to apply for image acquisition. The thumbnail displays a preview of the selected mask.

Capture Mask: click this button to acquire a new mask.

Manage Masks: open a dialog window for management of stored masks.
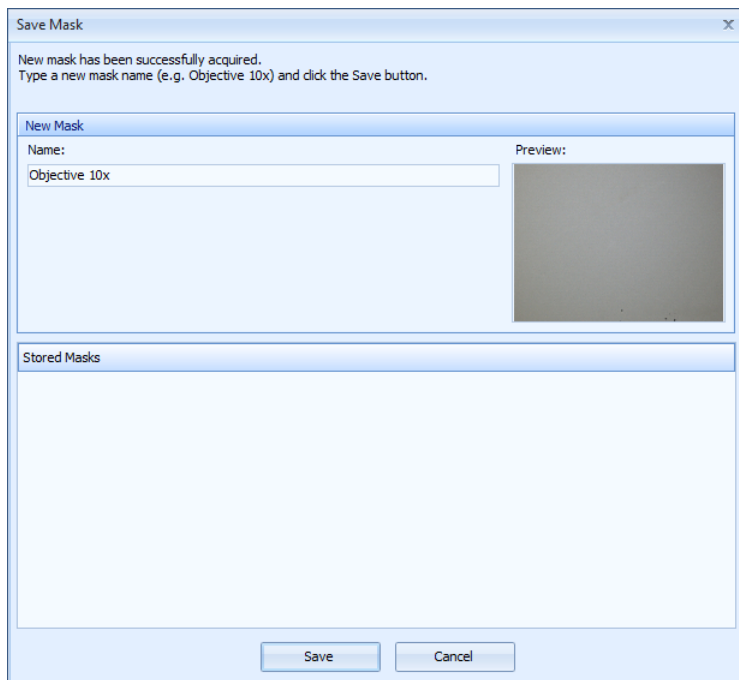
How to Create New Mask

Prior to use of the *Shading Correction* feature it is necessary to acquire mask for each microscope magnification intended for use with this feature.

Procedure of New Masks Acquisition:

1. Put the specimen under the microscope, set the desired magnification, adjust the illumination and focus the microscope.
2. Remove the specimen from a microscope.
3. Click the *Auto WB* button (automatic white balance).

4. Switch to the *Shading Correction* tab, then click the *Capture Mask* button. Wait until the mask will be acquired and the *Save Mask* dialog window will appear.
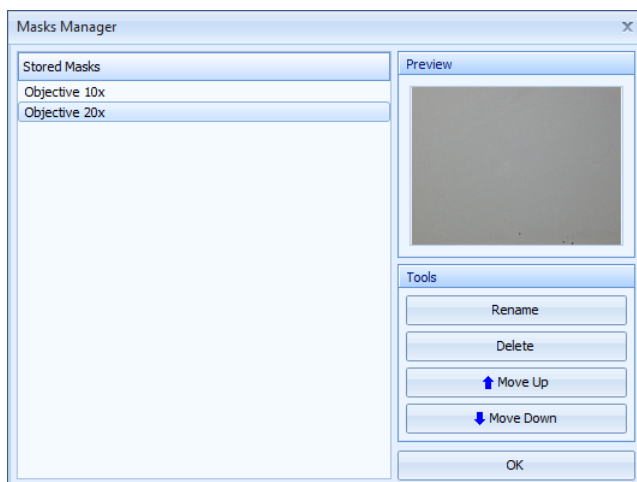

5. Type a new mask name, under which the mask will be stored on a hard drive (e.g. Objective 10x, or 10x etc.). Then click the *Save* button. The mask will be stored on a hard drive for future use.

6. Perform the steps 1. - 5. for all other magnifications to be used with *Shading Correction* feature.

Important

When acquiring new mask, there should not be visible any sharp structures in the camera's field of view. In case there are some sharp structures visible in the camera's field of view (e.g. when being used on a stereomicroscope), defocus the microscope slightly prior to acquisition of a new mask.

Managing the Stored Masks

The stored masks can be renamed, deleted or sorted in a *Masks Manager* dialog window, which can be displayed by clicking the *Manage Masks* button.

In order to rename or delete the particular stored mask, first select the mask by left button mouse click, then click the *Rename* or *Delete* button according to the desired operation. The order of the stored mask can be managed by moving the selected mask up or down in the list by *Move Up* and *Move Down* buttons. Stored masks will be displayed in the defined order in the *Active Mask* drop-down menu at the *Shading Correction* tab as well as in the *Shading Correction - Mask:* drop-down menu in the status bar.

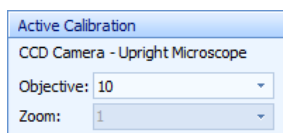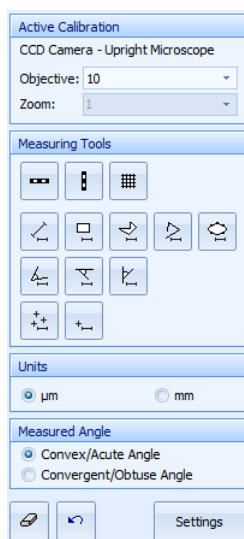## How to Use the Shading Correction Feature

In order to use the *Shading Correction* feature, simply select one of the stored mask, in the *Active Mask* drop-down menu at the *Shading Correction* tab or *Shading Correction - Mask:* drop-down menu in the status bar, according to the currently used magnification. All newly acquired images will be automatically enhanced by the *Shading Correction* function until the *None (Disabled)* option will be set in one of the menus.

> **Important**
>
> In order to acquire the correctly enhanced images, always remember to select the corresponding *Active Mask*, when changing the magnification on a microscope!

Measurements Tab

Control panel of PROMICAM USB 2.0 cameras is equipped with functions for measuring in live view. Thanks to this function it is not necessary to acquire the image before measuring. This tab contains control elements for measuring in the live view.

Active Calibration: in this part the name of a calibration which is set as active, and is used for measuring in the QuickPHOTO MICRO 3.1 program is displayed. To activate functions for measuring in the live view, first select value of the current microscope magnification from the *Objective* and *Zoom* menus. If you are using a magnification encoder, these values will be filled in automatically.

In the *Measuring Tools* part the following measuring tools are available:

Insert Horizontal Scale Bar: after you click this button a horizontal scale will be inserted into the right bottom corner of the live view.

Insert Vertical Scale Bar: after you click this button a vertical scale will be inserted into the right upper corner of the live view.

Display Overlay Orthogonal Grid: after you click this button, an *Overlay Orthogonal Grid* dialog box will be displayed. In this window in the *Spacing* part, enter the desired spacing of the grid for the X and Y axis. Color and thickness of the grid lines can be set in the *Line Options* part. Grid settings can be confirmed by clicking the *OK* button.

Measure Line Segment: after you click this button, the function for line segment measuring will be activated. Then by clicking into the live view and dragging the mouse, while holding the left mouse button or by clicking the left mouse button into the beginning and then the end point, insert the measuring line segment. Precisely horizontal or vertical line segment can be created if you hold the [Shift] key when inserting it. Length of the inserted line segment will be measured.

Measure Rectangle: after you click this button, function for rectangle measuring will be activated. Then by clicking into the live view and dragging the mouse, while holding the left mouse button, insert a rectangle. You can measure the rectangle's perimeter and area.

Measure Polygon: after you click this button, function for measuring of a polygon will be activated. Then by clicking the left mouse button into the selected point in the live view, insert the first vertex of the polygon. Repeated clicking of the left mouse button will define other vertexes of the polygon. Precisely horizontal or vertical edge can be created if you, while inserting the vertex, hold the [Shift] key. To finish inserting of the polygon, click the right mouse button – the last vertex will be connected with the first one and a polygon will be created. You can measure the polygon's perimeter and area.

> **Note**
>
> If the edges of the inserted polygon will cross each other somewhere, the value of the calculated area will equal 0. Only the polygon's perimeter will be calculated.

Measure Polyline: after you click this button, function for measuring of a polyline will be activated. Then by clicking the left mouse button into the selected point in the live view, insert the beginning point of the polyline. Repeated clicking of the left mouse button will define the break points. Precisely horizontal or vertical line can be created if you hold the [Shift] key while inserting it. To finish inserting of the polyline, click the right mouse button. Length of the polyline will be measured.

Measure Ellipse Defined by 5 Points: after you click this button, function for measuring of an ellipse will be activated. Then click the left mouse button gradually into five points in the live view through which the ellipse will be interspaced. You can measure ellipse's perimeter and area.

Measure Arbitrary Angle: after you click this button, function for measuring of an angle will be activated. Clicking and dragging the mouse, while holding the left mouse button or by clicking the left mouse button into the beginning and the end point, insert the first arm of an angle. Then by clicking the left mouse button, insert the second arm of an angle. If you want to create a precisely horizontal or vertical arm, hold the [Shift] key while creating it.

Measure Angle from the X Axis: after you click this button, function for measuring of an angle from the X axis will be activated. By clicking and dragging the mouse while holding the left mouse button or by clicking the left mouse button into the beginning and the end point, insert the first arm of an angle. This arm will automatically be completed with a horizontal axis and this way defined angle will be calculated.
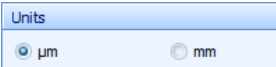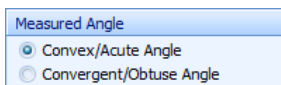
Measure Angle from the Y Axis: after you click this button, function for measuring of an angle from the Y axis will be activated. By clicking and dragging the left mouse button or by clicking the left mouse button into the beginning and the end point, insert the first arm of an angle. This arm will automatically be completed with the vertical axis and this way defined angle will be calculated.

Count Objects: after you click this button, click the left mouse button on every object which you want to include in the counting. Each counted object will be indicated with a cross and the number of counted objects will be displayed in the *Table of Measured Values*. Counting can be terminated by clicking the right mouse button, repeated clicking this button, or by pressing the [Esc] key. All objects of the same group will be indicated with crosses of the same color. The same color will be used for the corresponding row in the *Table of Measured Values*. If you activate this function again, further counted objects will be indicated with crosses of a different color, and in the *Table of Measured Values* there will be another line displayed with the number of elements of another group of objects.

Add Objects to the Current Group: if you want to add further objects to one of the already existing groups of objects, first mark the corresponding row in the *Table of Measured Values* by clicking on it, and click this button. Now you can continue in counting of objects from the selected group.

In this part it is possible to select units in which measured values will be displayed/exported.
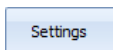
If you want to measure the convex or acute angle, check in the *Measured Angle* part the option *Convex/Acute Angle*. If you want to measure convergent or obtuse angle, check the *Convergent/Obtuse Angle* option. This option will be applied to the last measured angle and all other newly measured angles.

Delete All Measuring Objects from Live View: this button will erase all measuring objects from the live view. Values in the *Table of Measured Values* will not be affected by this function.

Undo Last Measurement [Ctrl+Z]: this button will undo the last done measurement from the live view and at the same time it will remove the corresponding measured value from the *Table of Measured Values*.

Settings: this button opens a dialog box for settings of measurements in the live view.

Table of Measured Values

Values measured in the live view are continuously being displayed in the *Table of Measured Values* in the bottom part of the control panel. Measuring objects in the live view and measured values displayed in the *Table of Measured Values* behave independently – meaning that the measuring objects can be deleted from the live view without having any effect on the values in the *Table of Measured Values* and vice versa. It is possible to write a short description to each measurement in the *Table of Measured Values*.

Display/Hide Table of Measured Values button in the *Toolbar* enables to hide or display again the *Table of Measured Values*. If the *Table of Measured Values* is hidden, a *Table of Measured Values* tab will appear in the bottom part of the control panel. If you move the mouse over this tab, the table will be temporarily displayed. If you move the mouse to a different area, the table will automatically be hidden again. It is possible to display the table permanently also by clicking the button in its right upper corner.

Table of Measured Values - Contains Unsaved Values							📌
Object Type	Measurand	Meas. Nr.	Value	Units	Description	Measurand	Length
Line Segment	Length	1	261	µm		Number of Measurements	5
Line Segment	Length	2	185	µm		Minimal Value	106
Line Segment	Length	3	158	µm		Maximal Value	261
Line Segment	Length	4	139	µm		Average Value	169.8
Line Segment	Length	5	106	µm		Standard Deviation	52.4

Export Values   Clear All Measured Values   Delete Selected Value(s)

In the bottom part of the *Table of Measured Values* there is a toolbar with buttons, which are enabled immediately after the first done measurement.

Export Values *Export Values:* this button enables to export all measured values from the *Table of Measured Values* to the Microsoft® Excel® file or text file.

Important

For export of measured values to the file of the xls format, it is necessary to have the Microsoft® Excel® program installed in your computer.

Clear All Measured Values *Clear All Measured Values:* this button clears the *Table of Measured Values* and deletes all measuring objects from the live view.

Delete Selected Value(s) *Delete Selected Value(s):* this button deletes selected (by mouse click) value(s) from the *Table of Measured Values*.

Settings

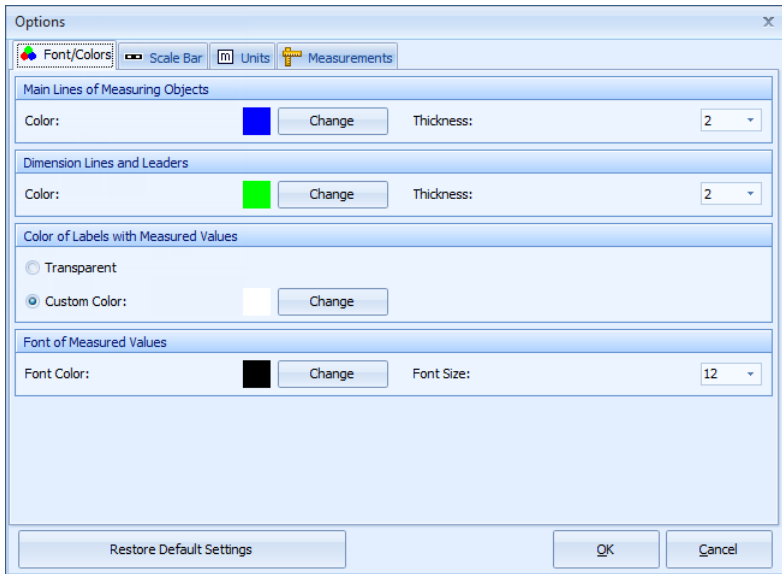Click the *Settings* [Settings] button to open a dialog box with the measurement settings.

Note

Original values of all parameters of the *Settings* dialog box can be restored anytime by clicking the *Restore Default Settings* button.
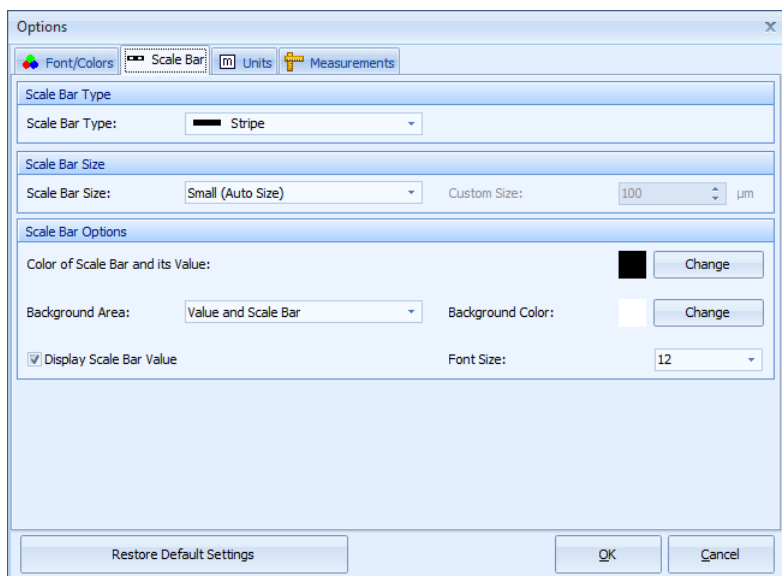

Font/Colors Tab

On the *Font/Colors* tab it is possible to set the lines of measuring objects, color of the labels with measured values, and the font size of measured values displayed in the live view.

Scale Bar Tab

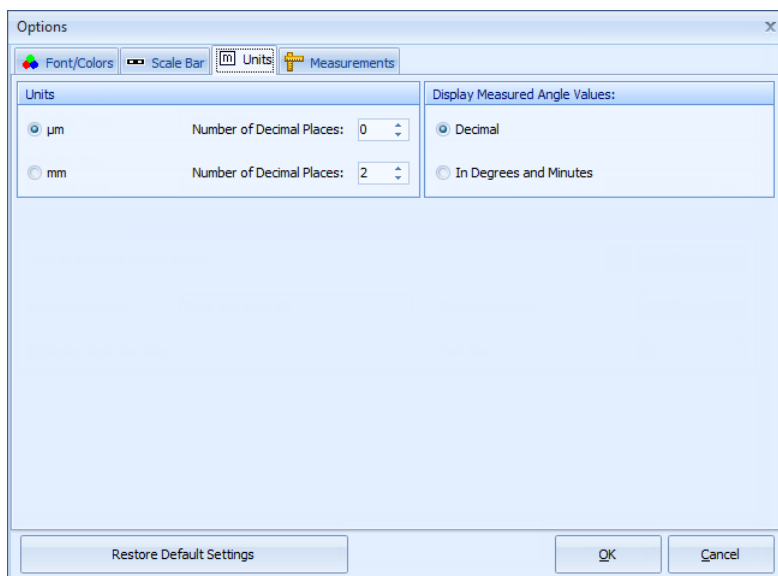*Scale Bar* tab contains the options for settings of the calibrated scale bar displayed in the live view.

In the *Scale Bar Type* part there are the following options available: *Bar*, *Line Segment*, *Staple*, and *Stripe*.

In the *Scale Bar Size* part you may select one out of two automatic sizes: *Small* or *Large*. Option *Custom* enables to define custom scale bar size. After activation of this option a *Custom Size* field will be available with the option to set the desired scale bar length.

Color of the scale bar and its value can be selected in the *Scale Bar Options* part by the *Color of Scale Bar and its Value* option.

Background Area and *Background Color* options enable you to set the area and color of the scale bar's background. If the *Display Scale Bar Value* option is checked, the scale bar's value will also be displayed by the scale bar in the live view. *Font Size* option enables to set the font size of the scale bar's value.

Units Tab

On this tab you may choose units which will be used for measuring/exporting – micrometers or millimeters. For the chosen units you may also choose the number of decimal places for displaying of the measured values.

Important

The use of measuring accuracy in tenths of micrometers will only be relevant when the used microscope-imaging device set provides such accuracy.

Way of expressing of the measured angle values can be set in the *Display Measured Angle Values:* part. Values can be displayed in *Decimal* form or *In Degrees and Minutes*.

Note

Measured angle values will always be exported into Microsoft® Excel® program in decimal form irrespective of the settings of this option.

Measurements Tab

Control elements in the top part of this tab are designed for selection of measurands, which will be measured by individual measuring tools and for text labeling of individual measurands. Measurands to be measured should be checked. To change the label rewrite the appropriate field in the *Label* row.

Measurement Mode part offers two possibilities:

- *Continuous Measurement Mode:* if this option is active (default option), the selected measuring tool will remain active until turned off. That way you can proceed with repeated measurements in the live view without the necessity to manually activate the same measuring tool for each measurement.

- *Single Measurement Mode:* if you activate this option, the measuring tool will be, after one performed measurement, automatically deactivated.

In the *Display Mode - Measuring Objects* part there are two options available:

- *Keep Displayed Only the Last Measuring Object:* if this option is active (default option), only the last measuring object will always be displayed in the live view. When new

measuring is being performed, the previous measuring object will always be deleted from the live view.

- *Keep Displayed All Measuring Objects:* this option will leave all measuring objects displayed in the live view.

3. Lumenera® INFINITY USB 2.0 Digital Cameras
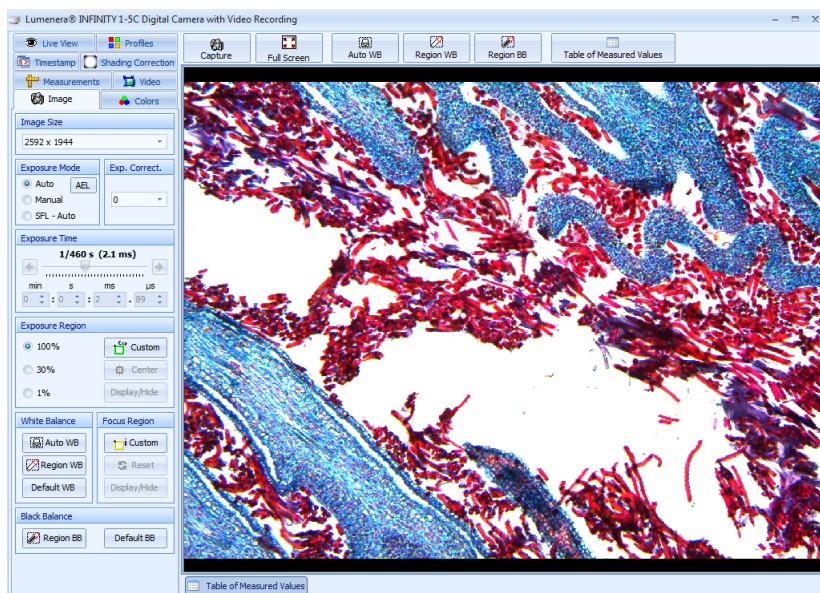
Control panel of Lumenera® INFINITY digital cameras enables to work with several types of digital cameras from the Lumenera Corp. Type of the connected camera is determined automatically at the startup of the control panel. If more than one Lumenera® INFINITY camera is connected to the computer, a dialog box will be displayed, at the startup of the control panel, for selection of a camera which is supposed to be connected.

Control panel of the Lumenera® INFINITY cameras is designed for control of camera functions, displaying of the live view and image acquisition. It consists of a toolbar, tabs with control elements and the live view.

> **Note**
>
> A performance test will take place automatically during the first run of the control panel. Several test images will be acquired, during the test, which can be deleted right after the test.

Toolbar

Toolbar, which is placed above the live view, contains the following buttons:

Capture [Ctrl+Enter]: after clicking this button, an image will be acquired and automatically transferred to the computer. If the camera is not connected,

the button will change to *Connect* button.

Full Screen [Ctrl+F]: this button is used for displaying of live view full screen. Using this type of display you can control the program using the *Capture [Ctrl+Enter]* button, which is placed in the left upper corner of the screen and the *Exit Full Screen Mode* button, placed in the right upper part of the screen.

Automatic White Balance: this button activates the function for automatic white balance. It is best to do this balancing when the camera is capturing a white area.

White Balance on a Defined Region: clicking on this button and successive dragging of the mouse in the live view, while holding the left mouse button, will define a region which will be used as reference for the white balance.
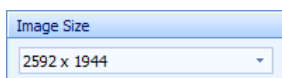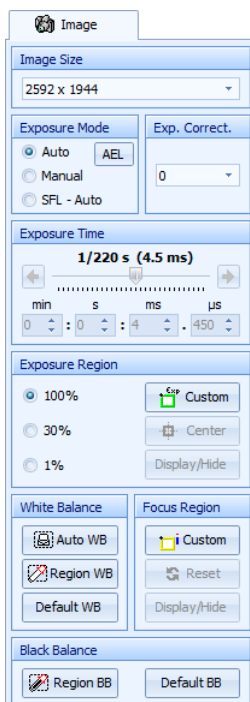
Black Balance on a Defined Region: clicking on this button and successive dragging of the mouse in the live view, while holding the left mouse button, will define a region which will be used as reference for the black balance.
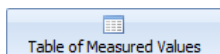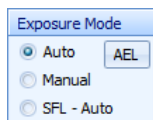
Display/Hide Table of Measured Values: if you click this button, the *Table of Measured Values* will be displayed in the bottom part of the control panel. If you click the button again, the table will be hidden again.
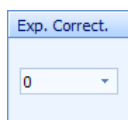
Image Tab

This tab contains control elements for setting of main camera's parameters. Settings will apply to the live view as well as to the acquired images.
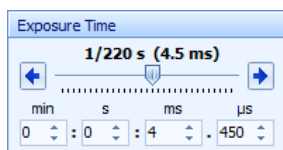
Image Size: from this menu you may select the size in which the images will be acquired.

Exposure Mode: if the exposure mode is set to the *Auto* option, exposure time is automatically set according to the illumination of the camera's field of view. *SFL - Auto* option represents automatic exposure mode for fluorescence imaging. When using the *Auto* and *SFL - Auto* modes, the AEL button (*Auto Exposure Lock*) will also be active. This button "locks" the exposure time on the current value. If the *Manual* option is active, value of the exposure time is set by user, using the control elements in the *Exposure Time* part.
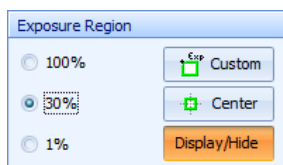
Exp. Correct: this function enables you to lighten or darken the images when using the *Auto* and *SFL-Auto* modes.

Exposure Time: if a manual exposure mode is active, you may, using the arrow buttons or by dragging of the slider, manually set the desired value of the exposure time. To change the exposure time you may also use the [+] and [-] keys on the numerical keyboard or the [Page Up] and [Page Down] keys. Value of the exposure time can also be set directly in minutes, seconds, milliseconds and microseconds using the corresponding editable fields under the slider. This way is especially useful for setting of long exposure times. When longer exposure times are manually set by the editable fields, the live view may not correspond to the acquired images. In such cases the value of the exposure time displayed above the slider will change its color to blue.

Exposure Region: this control element is designed for defining of an area of the live view which will be used for measuring of exposition in the *Auto* and *SFL-Auto* modes. You may select one of the predefined exposure region sizes (*100%* - the wh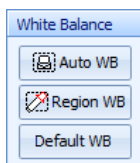ole area of the live view, *30%* and *1%*) or you may select your own size of the region. If you select the *30%* or *1%* option, a frame will be displayed in the middle of the live view, which will define the exposure region. The frame can be moved to the desired area in the image: move the mouse into the region and by dragging the mouse while holding the left mouse button relocate the frame to the desired

position. If you place the cursor above the frame's edge or above one of its corners, the cursor will change shape, and by dragging the mouse while holding the left mouse button, you may change the size of the frame as you please. By clicking the *Center* button, you may place the frame to the center of the camera's field of view. Using the *Display/Hide* button, it is possible to hide or display the frame. If the frame is hidden, the selected region is still being used for measuring of exposition. The frame is only not visible, in order not to disturb in the live view. To define your own exposure region, click the *Custom* button, move the cursor to the live view and then by dragging the mouse, while holding the left mouse button, insert the frame of a desired size.
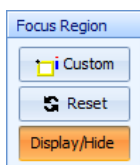
> **Note**
>
> If the frame of the exposure region will change its color to red, it means that the camera's automatics have reached the limit value of the exposure time. The range of exposure times is in the automatic mode smaller than in the manual mode.

White Balance: using this function you may adjust the white balance. Clicking the *Auto WB* button will activate the automatic white balance function. This function uses the whole image area for white balancing. It is best to perform the white balance when the camera is capturing a white area. If you click the *Region WB* button, and then drag the mouse in the live view while holding the left mouse button, you may define a region, which will be used as reference for the white balance. The *Default WB* button is designed for renewal of the default white balance. Manual setting of the white balance can be done using the *White Balance* sliders on the *Colors* tab.

Focus Region: this function makes it easier to focus the selected area of the image. To use this function proceed as follows:

1. Using the focus knob, roughly focus the microscope. Click the *Custom* button in the *Focus Region* part. Move the cursor into the live view and insert the frame in the live view, by dragging the mouse, while holding the left mouse button, to a place, where you want to do the focusing.

2. Focus indicator will be displayed next to the frame. Blue strip represents the current focus value and the red guideline maximum reached focus value. Both values are at the same level at the beginning. Both values are also displayed in a numerical form in the title of the frame in the *current value*/*maximal reached value* form.

3. If you start rotating the microscope focus knob now, the blue strip will start to decline respectively rise according to the fact, whether the focus level in the framed area will decrease or rise. Select such a direction so the strip starts to rise. Continue rotating the focus knob until the blue strip starts to decline. Red guideline will remain on the position of the maximum reached focus value. Gently rotate the focus knob in the opposite direction, now achieve that the blue strip reaches as closely as possible to the red guideline – in this position, image of the selected area will be as sharp as possible. You can use numerical values, in a similar way, for focusing.

Note

Focus level is measured relatively. That means the indicator shows, whether the focus value is rising or declining towards the default value which is calculated after the frame is positioned. If the focus value exceeds the indicator's range, it is initialized again to about three quarters of the range. That does not mean that the focus value would decline rapidly. If you continue rotating the knob in the same direction and the strip rises again, it means that the focus level continues to rise.

Reset button initializes the focus indicator again into the default state. That means the maximum reached value of focus level is set along with the current value approximately to three quarters of the range.

Using the *Display/Hide* button you can hide or display the frame of the focus region.

Note

If you relocate or change the size of the focus region, automatic reset of the focus indicator will take place (see, *Reset* button).
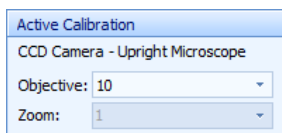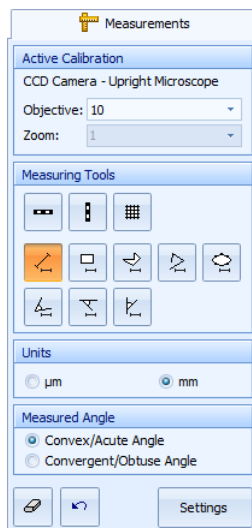

Black Balance: using this function you may adjust the black balance. By clicking the *Region BB* button and successive dragging of the mouse in the live view, while holding the left

mouse button, you may define an area which will be used as reference for black balance. *Default BB* button is used for restoration of the default black balance. This function is designed primarily for fluorescence imaging.

Measurements Tab

Control panel of Lumenera® INFINITY camera is equipped with functions for measuring in live view. Thanks to this function it is not necessary to acquire the image before measuring. This tab contains control elements for measuring in the live view.

Active Calibration: in this part the name of a calibration which is set as active, and is used for measuring in the QuickPHOTO MICRO 3.1 program is displayed. To activate functions for measuring in the live view, first select value of the current microscope magnification from the *Objective* and *Zoom* menus. If you are using a magnification encoder, these values will be filled in automatically.

In the *Measuring Tools* part the following measuring tools are available:

Insert Horizontal Scale Bar: after you click this button a horizontal scale will be inserted into the right bottom corner of the live view.

Insert Vertical Scale Bar: after you click this button a vertical scale will be inserted into the right upper corner of the live view.

Display Overlay Orthogonal Grid: after you click this button, an *Overlay Orthogonal Grid* dialog box will be displayed. In this window in the *Spacing* part, enter the desired spacing of the grid for the X and Y axis. Color and thickness of the grid lines can be set in the *Line Options* part. Grid settings can be confirmed by clicking the *OK* button.

Measure Line Segment: after you click this button, the function for line segment measuring will be activated. Then by clicking into the live view and dragging the mouse, while holding the left mouse button or by clicking the left mouse button into the beginning and then the end point, insert the measuring line segment. Precisely horizontal or vertical line segment can be created if you hold the [Shift] key when inserting it. Length of the inserted line segment will be measured.

Measure Rectangle: after you click this button, function for rectangle measuring will be activated. Then by clicking into the live view and dragging the mouse, while holding the left mouse button, insert a rectangle. You can measure the rectangle's perimeter and area.

Measure Polygon: after you click this button, function for measuring of a polygon will be activated. Then by clicking the left mouse button into the selected point in the live view, insert the first vertex of the polygon. Repeated clicking of the left mouse button will define other vertexes of the polygon. Precisely horizontal or vertical edge can be created if you, while inserting the vertex, hold the [Shift] key. To finish inserting of the polygon, click the right mouse button – the last vertex will be connected with the first one and a polygon will be created. You can measure the polygon's perimeter and area.

> **Note**
>
> If the edges of the inserted polygon will cross each other somewhere, the value of the calculated area will equal 0. Only the polygon's perimeter will be calculated.

Measure Polyline: after you click this button, function for measuring of a polyline will be activated. Then by clicking the left mouse button into the selected point in the live view, insert the beginning point of the polyline. Repeated clicking of the left mouse button will define the break points. Precisely horizontal or vertical line can be created if you hold the [Shift] key while inserting it. To finish inserting of the polyline, click the right mouse button. Length of the polyline will be measured.

Measure Ellipse Defined by 5 Points: after you click this button, function for measuring of an ellipse will be activated. Then click the left mouse button gradually into five points in the live view through which the ellipse will be interspaced. You can measure ellipse's perimeter and area.

Measure Arbitrary Angle: after you click this button, function for measuring of an angle will be activated. Clicking and dragging the mouse, while holding the left mouse button or by clicking the left mouse button into the beginning and the end point, insert the first arm of an angle. Then by clicking the left mouse button, insert the second arm of an angle. If you want to create a precisely horizontal or vertical arm, hold the [Shift] key while creating it.
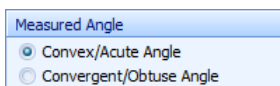
Measure Angle from the X Axis: after you click this button, function for measuring of an angle from the X axis will be activated. By clicking and dragging the mouse while holding the left mouse button or by clicking the left mouse button into the beginning and the end point, insert the first arm of an angle. This arm will automatically be completed with a horizontal axis and this way defined angle will be calculated.

Measure Angle from the Y Axis: after you click this button, function for measuring of an angle from the Y axis will be activated. By clicking and dragging the left mouse button or by clicking the left mouse button into the beginning and the end point, insert the first arm of an angle. This arm will automatically be completed with the vertical axis and this way defined angle will be calculated.

In this part it is possible to select units in which measured values will be displayed/exported.

If you want to measure the convex or acute angle, check in the *Measured Angle* part the option *Convex/Acute Angle*. If you want to measure convergent or obtuse angle, check the *Convergent/Obtuse Angle* option. This option will be applied to the last measured angle and all other newly measured angles.

Delete All Measuring Objects from Live View: this button will erase all measuring objects from the live view. Values in the *Table of Measured Values* will not be affected by this function.

Undo Last Measurement [Ctrl+Z]: this button will undo the last done measurement from the live view and at the same time it will remove the corresponding measured value from the *Table of Measured Values*.

Settings: this button opens a dialog box for settings of measurements in the live view.

Table of Measured Values

Values measured in the live view are continuously being displayed in the *Table of Measured Values* in the bottom part of the control panel. Measuring objects in the live view and measured values displayed in the *Table of Measured Values* behave independently – meaning that the measuring objects can be deleted from the live view without having any effect on the values in the *Table of Measured Values* and vice versa. It is possible to write a short description to each measurement in the *Table of Measured Values*.

Display/Hide Table of Measured Values [Table of Measured Values] button in the *Toolbar* enables to hide or display again the *Table of Measured Values*. If the *Table of Measured Values* is hidden, a *Table of Measured Values* [Table of Measured Values] tab will appear in the bottom part of the control panel. If you move the mouse over this tab, the table will be temporarily displayed. If you move the mouse to a different area, the table will automatically be hidden again. It is possible to display the table permanently also by clicking the [⊡] button in its right upper corner.

Object Type	Measurand	Meas. Nr.	Value	Units	Description		Measurand	Length
Line Segment	Length	1	261	µm			Number of Measurements	5
Line Segment	Length	2	185	µm			Minimal Value	106
Line Segment	Length	3	158	µm			Maximal Value	261
Line Segment	Length	4	139	µm			Average Value	169.8
Line Segment	Length	5	106	µm			Standard Deviation	52.4

Export Values   Clear All Measured Values   Delete Selected Value(s)

In the bottom part of the *Table of Measured Values* there is a toolbar with buttons, which are enabled immediately after the first done measurement.

Export Values: this button enables to export all measured values from the *Table of Measured Values* to the Microsoft® Excel® file or text file.

Important

For export of measured values to the file of the xls format, it is necessary to have the Microsoft® Excel® program installed in your computer.


 Clear All Measured Values: this button clears the *Table of Measured Values* and deletes all measuring objects from the live view.

 Delete Selected Value(s): this button deletes selected (by mouse click) value(s) from the *Table of Measured Values*.
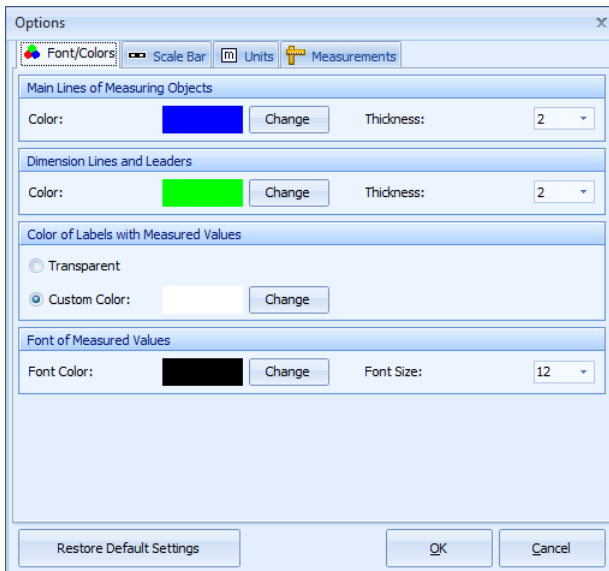
Settings

Click the *Settings* button to open a dialog box with the measurement settings.

Note
Original values of all parameters of the *Settings* dialog box can be restored anytime by clicking the *Restore Default Settings* button.

Font/Colors Tab

On the *Font/Colors* tab it is possible to set the lines of measuring objects, color of the labels with measured values, and the font size of measured values displayed in the live view.

Scale Bar Tab

Scale Bar tab contains the options for settings of the calibrated scale bar displayed in the live view.

In the *Scale Bar Type* part there are the following options available: *Bar*, *Line Segment*, *Staple*, and *Stripe*.

In the *Scale Bar Size* part you may select one out of two automatic sizes: *Small* or *Large*. Option *Custom* enables to define custom scale bar size. After activation of this option a *Custom Size* field will be available with the option to set the desired scale bar length.

Color of the scale bar and its value can be selected in the *Scale Bar Options* part by the *Color of Scale Bar and its Value* option.

Background Area and *Background Color* options enable you to set the area and color of the scale bar's background. If the *Display Scale Bar Value* option is checked, the scale bar's value will also be displayed by the scale bar in the live view. *Font Size* option enables to set the font size of the scale bar's value.

Units Tab

On this tab you may choose units which will be used for measuring/exporting – micrometers or millimeters. For the chosen units you may also choose the number of decimal places for displaying of the measured values.

> **Important**
>
> The use of measuring accuracy in tenths of micrometers will only be relevant when the used microscope-imaging device set provides such accuracy.

Way of expressing of the measured angle values can be set in the *Display Measured Angle Values:* part. Values can be displayed in *Decimal* form or *In Degrees and Minutes*.

> **Note**
>
> Measured angle values will always be exported into Microsoft® Excel® program in decimal form irrespective of the settings of this option.

Measurements Tab

Control elements in the top part of this tab are designed for selection of measurands, which will be measured by individual measuring tools and for text labeling of individual measurands. Measurands to be measured should be checked. To change the label rewrite the appropriate field in the *Label* row.

Measurement Mode part offers two possibilities:

- *Continuous Measurement Mode:* if this option is active (default option), the selected measuring tool will remain active until turned off. That way you can proceed with repeated measurements in the live view without the necessity to manually activate the same measuring tool for each measurement.

• *Single Measurement Mode:* if you activate this option, the measuring tool will be, after one performed measurement, automatically deactivated.

In the *Display Mode - Measuring Objects* part there are two options available:

• *Keep Displayed Only the Last Measuring Object:* if this option is active (default option), only the last measuring object will always be displayed in the live view. When new measuring is being performed, the previous measuring object will always be deleted from the live view.

• *Keep Displayed All Measuring Objects:* this option will leave all measuring objects displayed in the live view.

Live View Tab

This tab is designed for setting of live view parameters.
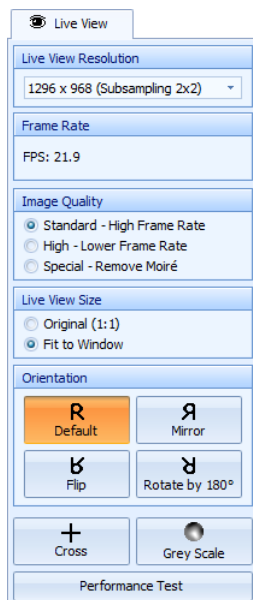
Live View Resolution: from this drop-down menu, you may select the size, in which the live view will be displayed.

Frame Rate: displays how many images per second (Frames per Second, FPS) is the camera currently displaying in the live view.

Image Quality: Standard - High Frame Rate option displays the live view with the highest possible frame rate. *High - Lower Frame Rate* option improves the quality of the live view at the cost of possible frame rate decrease. Use the *Special - Remove Moire* option in case disruptive stripes or possibly squares on the background are visible in the live view. This phenomenon can appear with some types of illumination.

Live View Size: here select whether you want to display the live view in the original size (1:1) - *Original (1:1)* option, or if you want to fit its size to the control panel's window. If the *Fit to Window* option is active, a decrease in the frame rate may appear.

Orientation option enables to select the following options of orientation of the live view (this option will also apply to acquired images):

Default: sets the default orientation of the live view.

Mirror: mirrors the live view along the vertical axis.

Flip: flips the live view along the horizontal axis.

Rotate by 180°: rotates the live view by 180 degrees.

Cross: displays/hides the central cross.

Grey Scale: turns on/off the grey scale mode.

Performance Test: after clicking the [Performance Test] button, several test images will be acquired, to determine the minimum reachable time interval between capturing of images. Several test images will be acquired, during the test, which can be deleted right

after the test. This test is automatically done during the first run of the control panel and normally, there is no need to run this test again.

Colors Tab

This tab contains control elements which are intended for adjustment of the parameters of the live view. Changes in the settings will apply to the live view as well as to the acquired images.
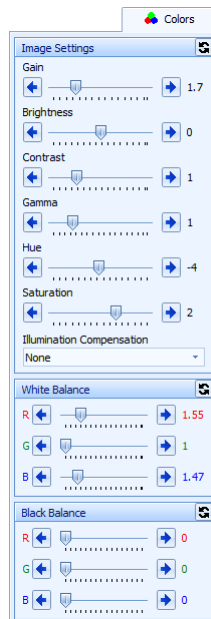
Image Settings part:

Gain: the slider affects the signal's strength coming from the camera. With higher gain values, noise in the image may be more visible.

Brightness: the slider sets the camera's brightness.

Contrast: the slider sets the camera's contrast.

Gamma: the slider is used to set gamma correction (combination of the brightness and contrast adjustment).

Hue: the slider enables to change image hue.

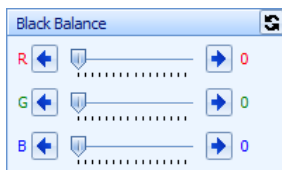*Saturation:* the slider is used for setting of the color saturation.
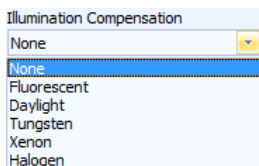
 Illumination Compensation: the color balancing of the image can be adjusted according to the used type of illumination.

 Restore Default Settings: clicking this button sets all values of the control elements in the *Image Settings* part to the default values.

 White Balance: sliders enable to manually adjust the level of each of the three color channels (R-red, G-green and B-blue).

 Restore Default White Balance Settings: clicking this button sets all values of the sliders in the *White Balance* part to the default values.
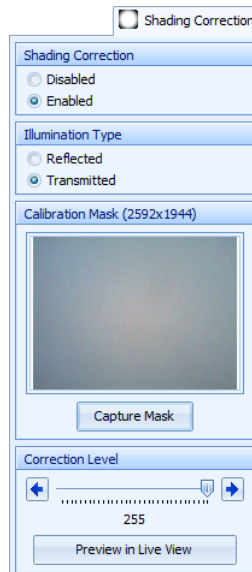
 Black Balance: sliders R, G, B (R-red, G-green, and B-blue) enable to manually set the black balance. In case the camera is set to grey scale mode or if you are using a monochromatic camera, only one slider is available.
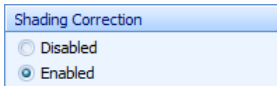
 Restore Default Black Balance Settings: clicking this button sets all values of the sliders in the *Black Balance* part to the default values.

Shading Correction Tab

This tab contains control elements of the shading correction function. This function may be used to remove deficiencies in the image caused by inhomogeneous illumination (removal of the darker corners of the image) or by dust on the sensor.
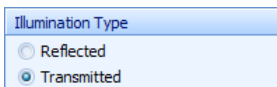

Shading Correction: this option is used for turning the *Shading Correction* function on/off.

Illumination Type: in dependence on the type of the used illumination select *Reflected* or *Transmitted* option. The correction method is different for each illumination type.

Calibration Mask: if you click the *Capture Mask* button an image which will be used as a calibration mask for shading correction function, will be acquired. In the field above the button will be displayed the preview of the captured mask and information about its size.

Correction Level: using this slider you may set the strength with which will be the shading correction applied. If you click the *Preview in Live View* button, you will see the effect of the shading correction function reflecting the current settings. Using the slider you may set the level of correction interactively.

Using the Shading Correction Function

> **Important**
>
> Shading correction gives good results only if all the settings of the microscope and the camera are the same, while acquiring images, as when capturing a calibration mask. If you change the conditions: change of magnification, change of illumination, change of image size, and so on, it is necessary to acquire the calibration mask again.

To use the *Shading Correction* function it is necessary to create a calibration image (the so called mask) first. Proceed as follows:

Transmitted Light

1. Focus the microscope using the desired microscope's magnification, switch the camera's exposure mode to manual, and manually set the exposure time.
2. Remove the specimen and adjust (shorten) the exposure time so the inhomogeneities of the illumination are visible. Optimal setting is such, the center of the field of view

is white and in the corners there are visible grey inhomogeneities. The darkest areas should be grey, not black.

3. Click the *Auto WB* button (automatic white balance).
4. On the *Image* tab set the desired image size.
5. Switch to the *Shading Correction* tab and select the *Enabled* option. In the *Illumination Type* part select the *Transmitted* option. Then in the *Calibration Mask* part click the *Capture Mask* button. Preview of the mask will be displayed in the control panel.
6. Place the specimen back in and set the desired exposure time.
7. In the *Correction Level* part click the *Preview in Live View* button. According to the need you may, using the *Correction Level* slider, adjust the correction.
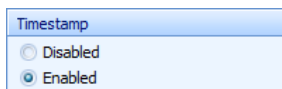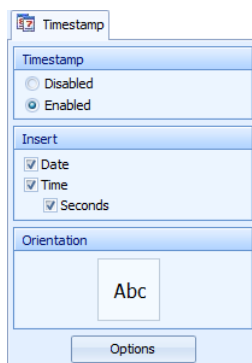
Reflected Light

1. Set the desired microscope's magnification, switch the camera's exposure mode to manual, and manually set the exposure time.
2. Place a white sheet under the microscope, (for example a sheet of white paper). Do not focus the microscope and adjust (shorten) the exposure time so the inhomogeneities of the illumination are visible. Optimal setting is such, the center of the field of view is white and in the corners there are visible grey inhomogeneities. The darkest areas should be grey, not black.
3. Click the *Auto WB* button (automatic white balance).
4. On the *Image* tab set the desired image size.
5. Switch to the *Shading Correction* tab and select the *Enabled* option. In the *Illumination Type* part select the *Reflected* option. Then in the *Calibration Mask* part click the *Capture Mask* button. Preview of the mask will be displayed in the control panel.
6. Place the specimen back in, focus the microscope and set the desired exposure time.
7. In the *Correction Level* part click the *Preview in Live View* button. According to the need you may, using the *Correction Level* slider, adjust the correction.
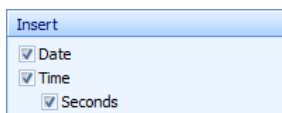
All acquired images will now be automatically adjusted using the *Shading Correction* function until the function is disabled or the control panel is terminated.
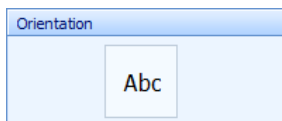
Timestamp Tab

This feature enables automatic insertion of date and time of acquisition – the so called "timestamp", into the acquired images. The timestamp will, after acquisition of the image, become a solid part of the image and it is not possible to remove it from the image other way than by cropping it.
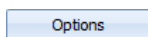
Timestamp: this option turns the *Timestamp* function on/off.

Insert: by checking of individual options it is possible to define which components of the timestamp will be inserted into the acquired images.
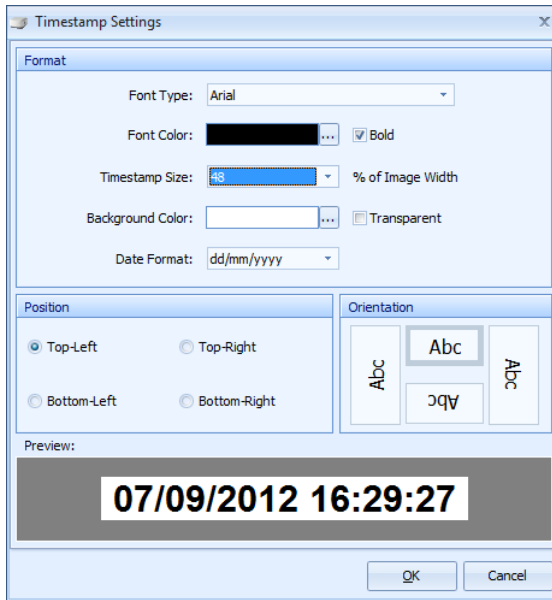
Orientation: this field serves as an indicator of the set orientation of the timestamp. If you double-click into this field, a *Timestamp Settings* dialog box will open.

Options: if you click this button a dialog box for setting of timestamp parameters will open.

Timestamp Settings

If you click the *Options* button, or if you double-click into the *Orientation* field, a dialog box for setting of the timestamp will open.

Format: using the options in this part, it is possible to set the appearance of the timestamp.

Position: this option enables to select into which corner of the acquired images should the timestamp be inserted.
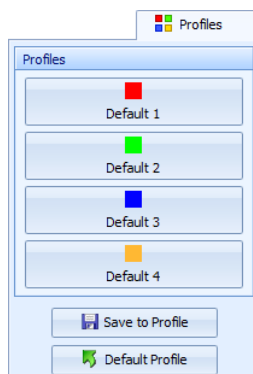
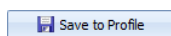*Orientation:* using this option, it is possible to select the orientation of the timestamp's text.

Preview: in this field, preview of the timestamp is displayed the way it will be inserted into the acquired images, except for the orientation option.
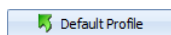
Profiles Tab

All settings of the control panel (except for the settings of the *Shading Correction* function) can be saved into one of the four profiles and at any time loaded again.

Profiles: buttons in the *Profiles* part are used for loading of the saved profiles.

  Save to Profile: if you click this button, a dialog box will be displayed for saving of the current control panel's settings into one of the profiles.
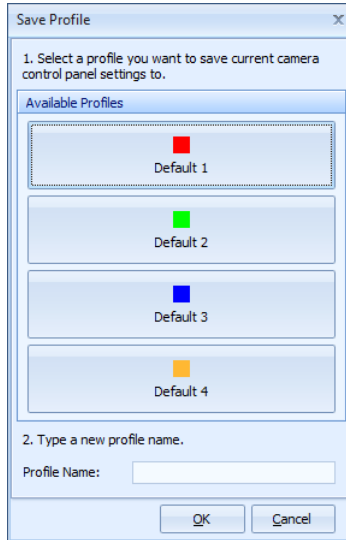
  Default Profile: if you click this button, all elements of the control panel will be set to the default values. Saved profiles will not be affected in any way by this action.

Saving of the Control Panel's Settings into the Profile

To save the settings into the profile proceed as follows:

1. Set the desired parameters of the control panel.

2. On the *Profiles* tab click the *Save to Profile* button. *Save Profile* dialog box will open:

3. In the *Available Profiles* part select, by clicking the corresponding button, one of the profiles you want to save the current control panel's settings to.

4. Type in a new profile name into the *Profile Name* field.

5. Confirm by clicking the *OK* button.

Loading a Profile

Loading of a desired profile can be done by clicking the corresponding button of the profile on the *Profiles* tab. Automatic adjustment of the control panel's elements will take place.
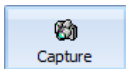
4. Canon® EOS Digital SLR Cameras
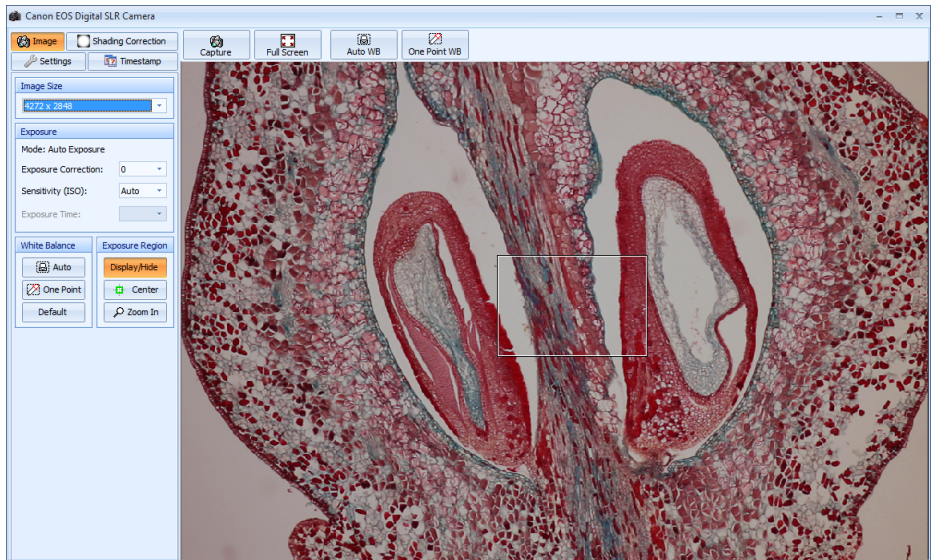
The control panel works with Canon® EOS series digital SLR cameras. Control panel of the Canon® EOS digital SLR cameras is designed for control of camera functions, displaying of the live view and image acquisition. It consists of a toolbar, several tabs with control elements and a live view.

Toolbar

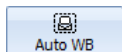The *Toolbar*, which is located above the live view, contains the following buttons:

Capture [Ctrl+Enter]: after clicking this button, an image will be acquired and automatically transferred to the computer. If the camera is not connected, the button will change to *Connect* button.

Full Screen [Ctrl+F]: this button is used for displaying of live view in full screen mode. Using this type of display you can control the program using the *Capture [Ctrl+Enter]* button, which is placed in the left upper corner of the screen and the *Exit Full Screen Mode* button, placed in the right upper part of the screen.

Automatic White Balance: this button activates the function for automatic white balance. It is best to do this balancing when the camera is capturing a white area.

White Balance Defined by Point: after clicking this button, click the left mouse button to such a point in the image, which will define the reference white color for the whole image. White balance based on the chosen reference value will take place in the whole image.
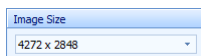
Image Tab

This tab contains control elements for setting of main camera's parameters. Settings will apply to the live view as well as to the acquired images.
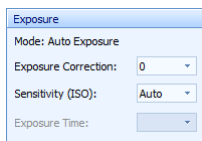
Image Size: from this menu you may select the size in which the images will be acquired. The available sizes will be affected by a potential use of a *Crop Borders* function from the *Settings* tab.

Exposure: this part contains control elements for setting the camera's exposure. The *Mode* indicator displays the current camera's mode set by its mode dial. To acquire images from a microscope set the mode dial to *Av* - automatic mode or *M* - manual mode. The *Exposure Correction* drop-down menu enables you to lighten or darken the images when the automatic exposure mode is set. The *Sensitivity (ISO)* drop-down menu sets the sensitivity of the sensor. The *Exposure Time* drop down menu is enabled only when the manual exposure mode is set. You can set the required exposure time by this menu.
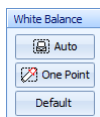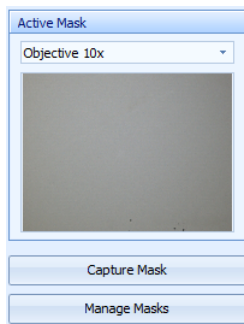
White Balance: the automatic white balance can be done in two ways. If you click the *Auto* button, the white balance will be performed automatically by the camera. Use this function in case you want the digital image to have the same color balancing as the image visible in the eyepieces. If you click the *One Point* button, click the left mouse button to the desired point of the live view, which will define the reference white color. The white balancing will be performed according to the selected reference color. The *Default* button restores the original white balance values. For manual white balance adjustment use the *White Balance* sliders located on the *Settings* tab.
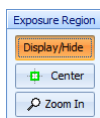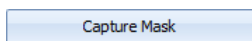
Exposure Region: in case of automatic exposure mode is set, the area defined by the rectangular region displayed in the live view is used for exposure measurement. The region's size cannot be changed, however the frame can be moved by a mouse. Using the *Display/Hide* button, it is possible to hide or display the frame. If the frame is hidden, the selected region is still being used for measuring of exposition. The frame is only not visible, in order not to disturb in the live view. By clicking the *Center* button, you may place the frame to the center of the camera's field of view. The *Zoom In* button zooms in the area defined by the frame. This functions facilitates the microscope focusing. The zooming in of the area defined by the frame can be achieved also by double-clicking into the frame. To return to the standard display mode click the *Zoom In* button again or double-click in the zoomed live view.
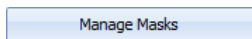
Shading Correction Tab

This tab contains control elements of the *Shading Correction* function. This function may be used to remove deficiencies in the image caused by inhomogeneous illumination (removal of the darker corners of the image) or by dust on the sensor.

Active Mask: in this drop-down menu select the stored calibration mask you want to apply for image acquisition. The thumbnail displays a preview of the selected mask.

Capture Mask: click this button to acquire a new mask.

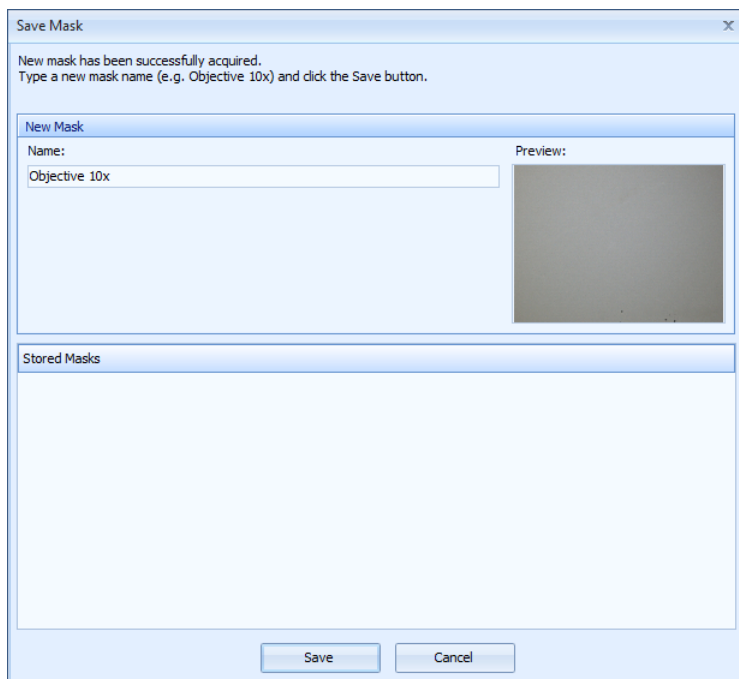*Manage Masks:* open a dialog window for management of stored masks.

How to Create New Mask

Prior to use of the *Shading Correction* feature it is necessary to acquire mask for each microscope magnification intended for use with this feature.

Procedure of New Masks Acquisition:

1. Put the specimen under the microscope, set the desired magnification, adjust the illumination and focus the microscope.
2. Remove the specimen from a microscope.
3. Adjust white balance.
4. Switch to the *Shading Correction* tab, then click the *Capture Mask* button. Wait until the mask will be acquired and the *Save Mask* dialog window will appear.
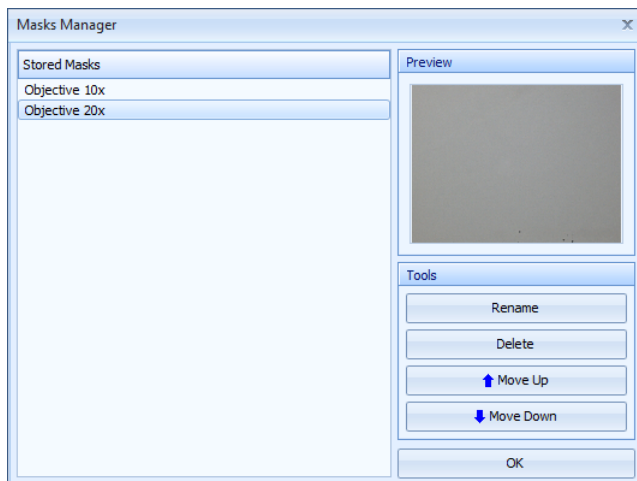

5. Type a new mask name, under which the mask will be stored on a hard drive (e.g. Objective 10x, or 10x etc.). Then click the *Save* button. The mask will be stored on a hard drive for future use.
6. Perform the steps 1. - 5. for all other magnifications to be used with *Shading Correction* feature.

> **Important**
>
> When acquiring new mask, there should not be visible any sharp structures in the camera's field of view. In case there are some sharp structures visible in the camera's field of view (e.g. when being used on a stereomicroscope), defocus the microscope slightly prior to acquisition of a new mask.

Managing the Stored Masks

The stored masks can be renamed, deleted or sorted in a *Masks Manager* dialog window, which can be displayed by clicking the *Manage Masks* button.

In order to rename or delete the particular stored mask, first select the mask by left button mouse click, then click the *Rename* or *Delete* button according to the desired operation. The order of the stored mask can be managed by moving the selected mask up or down in the list by *Move Up* and *Move Down* buttons. Stored masks will be displayed in the defined order in the *Active Mask* drop-down menu at the *Shading Correction* tab as well as in the *Shading Correction - Mask:* drop-down menu in the status bar.

How to Use the Shading Correction Feature

In order to use the *Shading Correction* feature, simply select one of the stored mask, in the *Active Mask* drop-down menu at the *Shading Correction* tab according to the currently used magnification. All newly acquired images will be automatically enhanced by the *Shading Correction* function until the *None (Disabled)* option will be set in one of the menus.
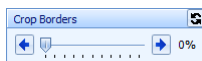
> **Important**
>
> In order to acquire the correctly enhanced images, always remember to select the corresponding *Active Mask*, when changing the magnification on a microscope!

Settings Tab

This tab is designed for adjustments of the image parameters.
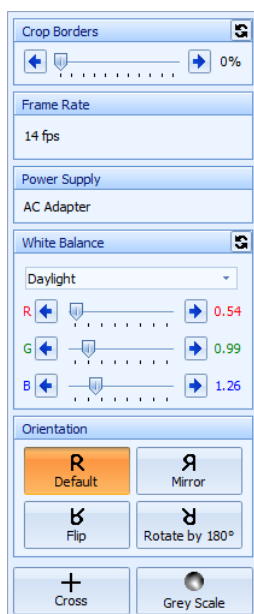
Crop Borders: this slider enables to crop the unwanted borders from the image (symmetrically from all sides). Use this function in case the darker corners are visible in the live view. This phenomenon (called vignetting) may appear when using smaller magnifications on some types of microscopes. The performed setting is interactively displayed in the live view and it will apply also to the acquired images. This function does not have any effect on measurement accuracy. Default value can be restored by clicking the ⟳ button.
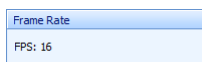
Frame Rate: displays how many images per second (Frames Per Second, FPS) is the camera currently displaying in the live view.
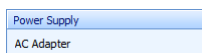
Power Supply: this indicator displays the camera's battery status or the use of the AC power supply.
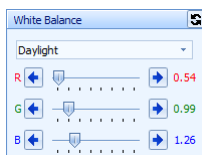
White Balance: control elements in this part display current white balance settings and enable their adjustment. You can select one of the predefined modes from the drop-down menu and manually adjust level of each of the three color channels (R-red, G-green, and B-blue) using R, G, B sliders. Default values can be restored by clicking the ⟳ button.
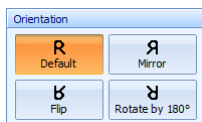
Orientation: in this part you may set the orientation of the live view. The performed setting is interactively displayed in the live view and it will apply also to the acquired images.
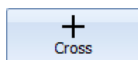
Cross: displays/hides the central cross. The displayed cross will not be visible in the acquired images.
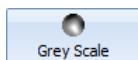
Grey Scale: turns on/off the grey scale mode.

Timestamp Tab

This feature enables automatic insertion of date and time of acquisition – the so called "timestamp", into the acquired images. The timestamp will, after acquisition of the image, become a solid part of the image and it is not possible to remove it from the image other way than by cropping it.

Timestamp: this option turns the *Timestamp* function on/off.

Insert: by checking of individual options it is possible to define which components of the timestamp will be inserted into the acquired images.

Orientation: this field serves as an indicator of the set orientation of the timestamp. If you double-click into this field, a *Timestamp Settings* dialog box will open.

Options: if you click this button a dialog box for setting of timestamp parameters will open.

Timestamp Options

If you click the *Options* button or if you double-click into the *Orientation* field, a dialog box for setting of the timestamp will open.
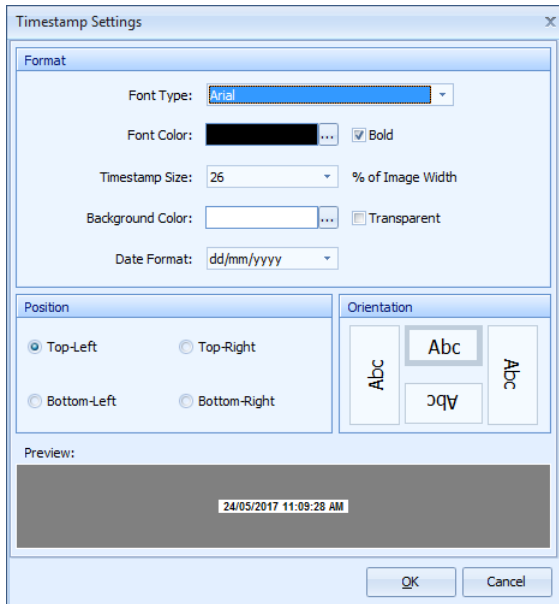
Format: using the options in this part, it is possible to set the appearance of the timestamp.

Position: this option enables to select into which corner of the acquired images should the timestamp be inserted.

Orientation: using this option, it is possible to select the orientation of the timestamp text.

Preview: in this field, preview of the timestamp is displayed the way it will be inserted into the acquired images, except for the orientation option. The text size is the same as will be displayed in the acquired images in the 100 % (1:1) display size.

5. IDS uEye® USB 2.0 Digital Cameras
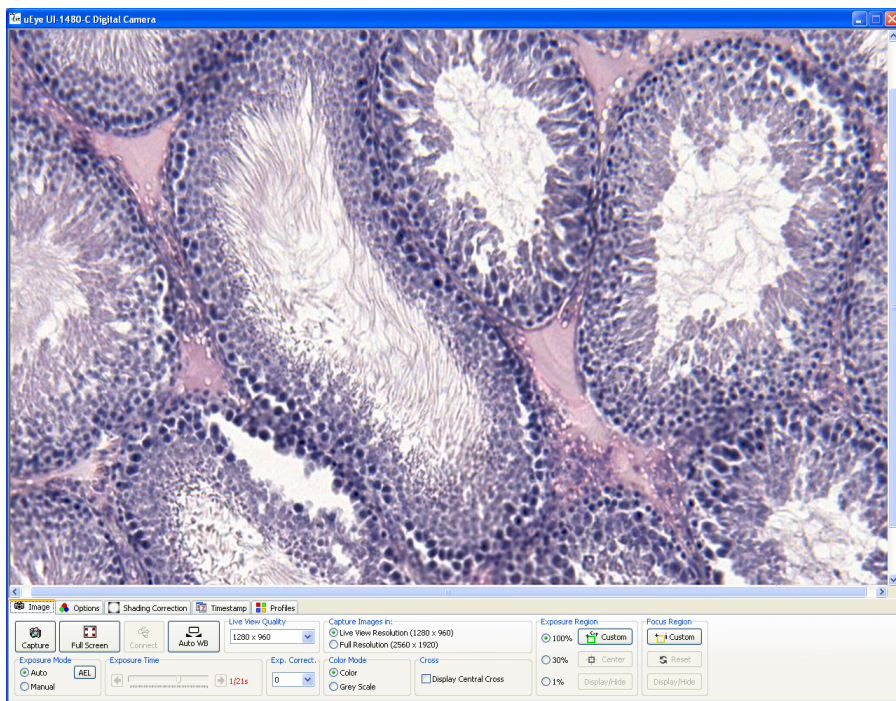
The control panel is able to control several models of IDS uEye® digital cameras. Type of the connected camera is determined automatically at the startup of the control panel. If more than one IDS uEye® digital camera is connected to the computer, a dialog box will be displayed, at the startup of the control panel, for selection of a camera which is supposed to be connected.

The control elements are located in five tabs:

Speed Adjustment

At the very first run of the control panel, a performance test will be launched and the camera's frame rate (FPS) will be adjusted according to the computer's performance. This performance test is performed only once and it will not be launched at next run of the

control panel. If needed, the performance test can be launched manually by clicking the *Speed adjustment* button on the *Options* tab.

Note

There should be no other application with high demand on computer's performance running during the performance test, otherwise the camera will work slower than it could.

Image Tab

This tab contains control elements for setting of main camera's parameters. Settings will apply to the live view as well as to the acquired images.
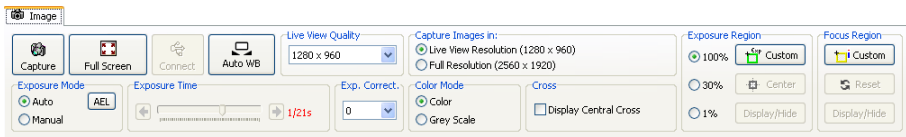
 Capture [Ctrl+Enter]: after clicking this button, an image will be acquired and automatically transferred to the computer.

 Full Screen: this button is used for displaying of the live view full screen. Using this type of display you can control the program using the *Capture [Ctrl+Enter]* and the *Exit Full Screen Mode* buttons, placed in the upper part of the screen.

 Connect: this button is enabled only when the camera is not correctly connected. Click this button to re-establish communication with the camera.
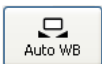
 Auto WB: this button activates the function for automatic white balance. It is best to do this balancing when the camera is capturing a white area.
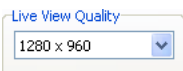
 Live View Quality: here select the desired resolution of the live view.
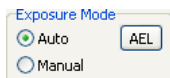
Exposure Mode: if the exposure mode is set to the *Auto* option, exposure time is automatically set according to the illumination of the camera's field of view. When using the *Auto* mode, the *AEL* button (*Auto Exposure Lock*) will also be active. This button "locks" the exposure time on the current value. If the *Manual* option is active, value of the exposure time is set by user, using the control elements in the *Exposure Time* part.

Exposure Region: this control element is designed for defining of an area of the live view which will be used for measuring of exposition in the *Auto* exposure mode. You may select one of the predefined exposure region sizes (*100%* - the whole area of the live view, *30%* and *1%*) or you may select your own size of the region. I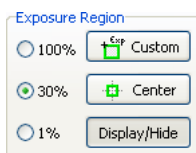f you select the *30%* or *1%* option, a frame will be displayed in the middle of the live view, which will define the exposure region. The frame can be moved to the desired area in the image: move the mouse into the region and by dragging the mouse while holding the left mouse button relocate the frame to the desired position. If you place the cursor above the frame's edge or above one of its corners, the cursor will change shape, and by dragging the mouse while holding the left mouse button, you may change the size of the frame as you please. By clicking the *Center* button, you may place the frame to the center of the camera's field of view. Using the *Show/Hide* button, it is possible to hide or display the frame. If the frame is hidden, the selected region is still being used for measuring of exposition. The frame is only not visible, so it does not disturb in the live view. To define your own exposure region, click the *Custom* button, move the cursor to the live view and then by dragging the mouse, while holding the left mouse button, insert the frame of a desired size.

Note

If the frame of the exposure region will change its color to red, it means that the camera's automatics have reached the limit value of the exposure time. The range of exposure times is in the automatic mode smaller than in the manual mode.

Exposure Time: if a *Manual* exposure mode is active, you may, using the arrow buttons or by dragging of the slider, manually set the desired value of the exposure time. To

change the exposure time you may also use the [+] and [-] keys on the numerical keyboard or the [Page Up] and [Page Down] keys.
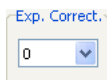
Exposure Correction: this function enables you to lighten or darken the images when using the *Auto* exposure mode.

Capture Images in: here you can select, whether the images should be captured in the resolution of the live view or in full camera's resolution. This option is active only when using certain types of IDS uEye® cameras.

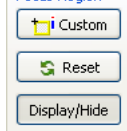*Color Mode*: you can switch between *Color* or *Grey Scale* modes.

Cross: displays/hides the central cross.

Focus Region: this function makes it easier to focus the selected area of the image. To use this function proceed as follows:

1. Using the focus knob, roughly focus the microscope. Click the *Custom* button in the *Focus Region* part. Move the cursor into the live view and insert the frame in the live view, by dragging the mouse, while holding the left mouse button, to a place where you want to do the focusing.
2. Focus indicator will be displayed next to the frame. Blue strip represents the current focus value and the red guideline maximum reached focus value. Both values are at the same level at the beginning. Both values are also displayed in a numerical form in the title of the frame in the *current value/maximal reached value* form.
3. If you start rotating the microscope focus knob now, the blue strip will start to decline respectively rise according to the fact, whether the focus level in the framed area will decrease or rise. Select such a direction so the strip starts to rise. Continue rotating the focus knob until the blue strip starts to decline. Red guideline will remain on the

position of the maximum reached focus value. Gently rotate the focus knob in the opposite direction, now achieve that the blue strip reaches as closely as possible to the red guideline – in this position, image of the selected area will be as sharp as possible. You can use numerical values, in a similar way, for focusing.

> **Note**
>
> Focus level is measured relatively. That means the indicator shows, whether the focus value is rising or declining towards the default value which is calculated after the frame is positioned. If the focus value exceeds the indicator's range, it is initialized again to about three quarters of the range. That does not mean that the focus value would decline rapidly. If you continue rotating the knob in the same direction and the strip rises again, it means that the focus level continues to rise.

Reset button initializes the indicator again into the default state. That means the maximum reached value of focus level is set along with the current value approximately to three quarters of the range.

Using the *Show/Hide* button you can hide or display the frame of the focus region.

> **Note**
>
> If you relocate or change the size of the focus region, automatic reset of the focus indicator will take place (see, *Reset* button).

Options Tab

This tab contains control elements which are intended for adjustment of the parameters of the live view. Changes in the settings will apply to the live view as well as to the acquired images.

Gain: the slider affects the signal's strength coming from the camera. With higher gain values, noise in the image may be more visible.

*Brightness*: the slider sets the camera's brightness.

Contrast: the slider sets the camera's contrast.

*Black Level*: the slider controls the black color level.

Gamma: the slider is used to set gamma correction (combination of the brightness and contrast adjustment).
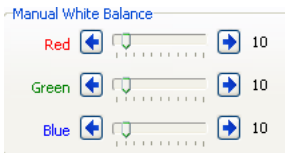
Manual White Balance: sliders enable to manually adjust the level of each of the three color channels (R-red, G-green and B-blue).
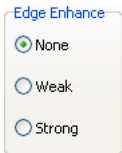
Edge Enhance: this option enables the enhancing of edges. There are three levels available: *None*, *Weak* and *Strong* enhancement.
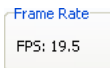
Frame Rate: displays how many images per second (Frames per Second, FPS) is the camera currently displaying in the live view.
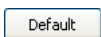
Default: use this button to restore all the settings on the *Options* tab to the default values.
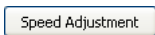
Speed Adjustment: starts the performance test to adjust the camera's speed according to the computer's performance.

Shading Correction Tab

This tab contains control elements for the shading correction function. This function may be used to remove deficiencies in the image caused by inhomogeneous illumination (removal of the darker corners of the image) or by dust on the sensor.

Shading Correction: this option turns the *Shading Correction* function on/off.

Illumination Type: in dependence on the type of the used illumination select *Reflected* or *Transmitted* option. The correction method is different for each illumination type.

Calibration Mask: if you click the *Capture Mask* button, an image, which will be used as a calibration mask for shading correction function, will be acquired. In the field next to the button will be displayed the preview of the captured mask and information about its size.

Correction Level: using this slider you may set the strength, with which will be the shading correction applied. If you click the *Preview in Live View* button, y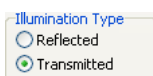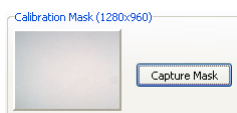ou will see the effect of the shading correction function reflecting the current settings. Using the slider you may set the level of correction interactively.

Using the Shading Correction Function

Important

Shading correction gives good results only if all the settings of the microscope and the camera are the same, while acquiring images, as when capturing a calibration mask. If you change the conditions: change of magnification, change of illumination, change of image size, and so on, it is necessary to acquire the calibration mask again.

To use the *Shading Correction* function it is necessary to create a calibration image (the so called mask) first. Proceed as follows:

Transmitted Light

1. Focus the microscope using the desired microscope's magnification, switch the camera's exposure mode to manual, and manually set the exposure time.
2. Remove the specimen and adjust (shorten) the exposure time so the inhomogeneities of the illumination are visible. Optimal setting is such, the center of the field of view is white and in the corners there are visible grey inhomogeneities. The darkest areas should be grey, not black.
3. Click the *Auto WB* button (automatic white balance) on the *Image* tab.
4. On the *Image* tab set the desired image resolution.
5. Switch to the *Shading Correction* tab and select the *Enabled* option. In the *Illumination Type* part select the *Transmitted* option. Then in the *Calibration Mask* part click the *Capture Mask* button. Preview of the mask will be displayed in the control panel.
6. Place the specimen back in and set the desired exposure time.
7. In the *Correction Level* part click the *Preview in Live View* button. According to the need you may, using the *Correction Level* slider, adjust the correction.
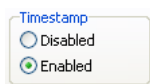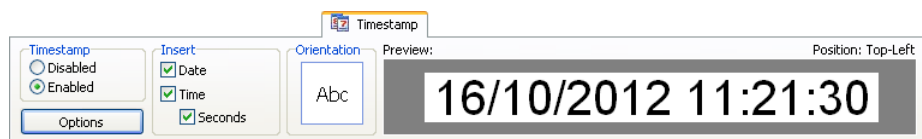
Reflected Light

1. Set the desired microscope's magnification, switch the camera's exposure mode to manual, and manually set the exposure time.
2. Place a white sheet under the microscope, (for example a sheet of white paper). Do not focus the microscope and adjust (shorten) the exposure time so the inhomogeneities of the illumination are visible. Optimal setting is such, the center of the field of view is white and in the corners there are visible grey inhomogeneities. The darkest areas should be grey, not black.
3. Click the *Auto WB* button (automatic white balance) on the *Image* tab.
4. On the *Image* tab set the desired image resolution.
5. Switch to the *Shading Correction* tab and select the *Enabled* option. In the *Illumination Type* part select the *Reflected* option. Then in the *Calibration Mask* part click the *Capture Mask* button. Preview of the mask will be displayed in the control panel.
6. Place the specimen back in, focus the microscope and set the desired exposure time.
7. In the *Correction Level* part click the *Preview in Live View* button. According to the need you may, using the *Correction Level* slider, adjust the correction.
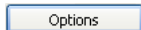
All acquired images will now be automatically adjusted using the *Shading Correction* function until the function is disabled or the control panel is terminated.

Timestamp Tab

It is possible to automatically insert, into the acquired images, date and time of their acquisition – the so called "timestamp". The timestamp will, after acquisition of the image, become a solid part of the image and it is not possible to remove it from the image other way than by cropping it.

Timestamp: this option turns the *Timestamp* function on/off.

Options: if you click this button a dialog box for setting of timestamp parameters will open.

Insert: by checking of individual options it is possible to define which components of the timestamp will be inserted into the acquired images.

Orientation: this field serves as an indicator of the set orientation of the timestamp. If you double-click into this field, a *Timestamp Settings* dialog box will open.

Preview: in this field, preview of the timestamp is displayed the way it will be inserted into the acquired images, except for the orientation option. The text size is the same as will be displayed in the acquired images in the 100 % (1:1) display size.
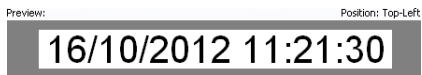
Position: the indicator shows the position, where the timestamp will be inserted in the acquired images.

Timestamp Settings

If you click the *Options* button or if you double-click into the *Orientation* field, a dialog box for setting of the timestamp will open.

Format: using the options in this part, it is possible to set the appearance of the timestamp.

Position: this option enables to select into which corner of the acquired images should the timestamp be inserted.

Orientation: using this option, it is possible to select the orientation of the timestamp's text.

Profiles Tab

All settings of the control panel (except for the settings of the *Shading Correction* function) can be saved into one of the four profiles and at any time loaded again.

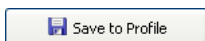*Save to Profile:* if you click this button, a dialog box will be displayed for saving of the current control panel's settings into one of the profiles.

Default Profile: if you click this button, all elements of the control panel will be set to the default values. Saved profiles will not be affected in any way by this action.

Saving of the Control Panel's Settings into the Profile

To save the settings into the profile proceed as follows:

1. Set the desired parameters of the control panel.
2. On the *Profiles* tab click the *Save to Profile* button. *Save Profile* dialog box will open:

3. In the *Available Profiles* part select, by clicking the corresponding button, one of the profiles you want to save the current control panel's settings to.
4. Type in a new profile name into the *Profile Name* field.
5. Confirm by clicking the *OK* button.

Loading a Profile

Loading of a desired profile can be done by clicking the corresponding button of the profile on the *Profiles* tab. Automatic adjustment of the control panel's elements will take place.

6. ARTRAY ARTCAM USB 2.0 Digital Cameras

Control panel of ARTRAY ARTCAM digital cameras enables to work with several types of digital cameras from the ARTRAY Inc. Type of the connected camera is determined automatically at the startup of the control panel.
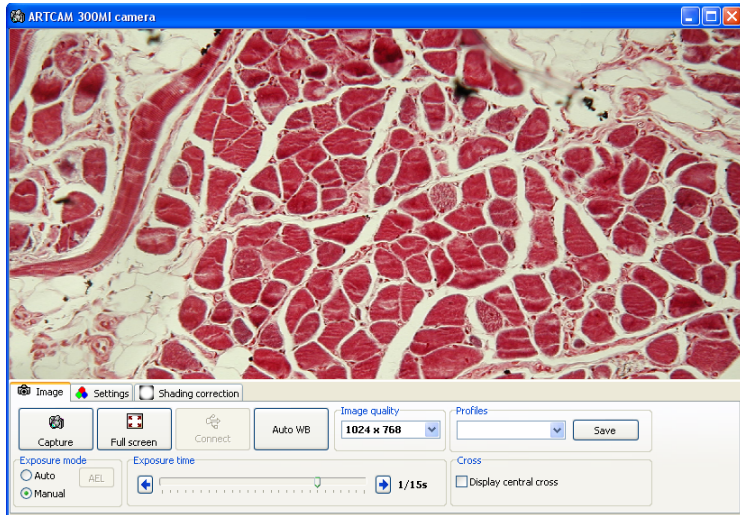
The control elements are located in three tabs.

Image Tab

This tab contains control elements for setting of the main camera's parameters. Settings will apply to the live view as well as to the acquired images.
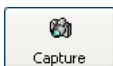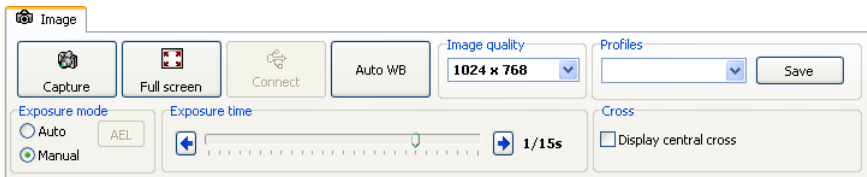
 Capture [Ctrl+Enter]: after clicking this button, an image will be acquired and automatically transferred to the computer.
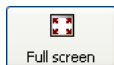
Full screen: this button is used for displaying of live view full screen. Using this type of display you can control the program using the *Capture [Ctrl+Enter]* button and the *Exit full screen mode* button, placed in the upper part of the screen.

Connect: this button is enabled only when the camera is not correctly connected. Click the button to attempt to re-establish the communication.

Auto WB: this button activates the function for automatic white balance. It is best to do this balancing when the camera is capturing a white area.

Image quality: here select the resolution in which the images should be acquired.
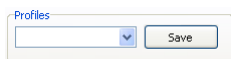
Profiles: the control panel's settings can be saved into one of four available profiles and loaded again any time. If you want to save the current control panel's settings into a profile, click the *Save* button i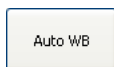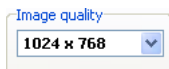n the *Profiles* part. From the *Save as* menu choose the profile you want to save the settings to and enter the name of the profile in the *New name* field. Confirm by clicking the *OK* button. To load a saved profile, just select the profile name from the list.
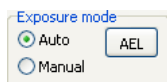
Exposure mode: if the exposure mode is set to the *Auto* option, exposure time is automatically set according to the illumination of the camera's field of view. When using the *Auto* mode, the *AEL* button (*Auto Exposure Lock*) will also be active. This button "locks" the exposure time on the current value. If the *Manual* option is active, value of the exposure time is set by user, using the control elements in the *Exposure time* part.

Note

Auto exposure mode is not available when the camera displays the live view in the highest resolution.

Exposure time: if a manual exposure mode is active, you may, using the arrow buttons or by dragging of the slider, manually set the desired value of the exposure time. To change the exposure time you may also use the [+] and [-] keys on the numerical keyboard or the [Page Up] and [Page Down] keys.
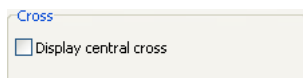
Cross: displays/hides the central cross.

Settings Tab

This tab contains control elements which are intended for adjustment of the parameters of the live view. Changes in the settings will apply to the live view as well as to the acquired images.

Live image quality: here select the resolution of the live view. When the highest resolution is set, the *Auto* exposure mode will not be available.
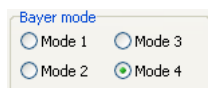
Bayer mode: each of these options differently balances the RGB color levels.

Brightness: the slider sets the camera's brightness.

Contrast: the slider sets the camera's contrast.

Hue: the slider sets the camera's hue.

Sharpness: the slider sets the camera's sharpness.

Gain: the slider affects the signal's strength coming from the camera. With higher gain values, noise in the image may be more visible.

Gamma: the slider is used to set gamma correction (combination of the brightness and contrast adjustment).

Manual white balance: sliders enable to manually adjust the levels of the red and the blue channel.

Saturation: the slider sets camera's saturation.

Default: use this button to restore all the settings on the *Settings* tab to the default values.

Shading Correction Tab

This tab contains control elements for the shading correction function. This function may be used to remove deficiencies in the image caused by inhomogeneous illumination (removal of the darker corners of the image) or by dust on the sensor.
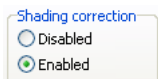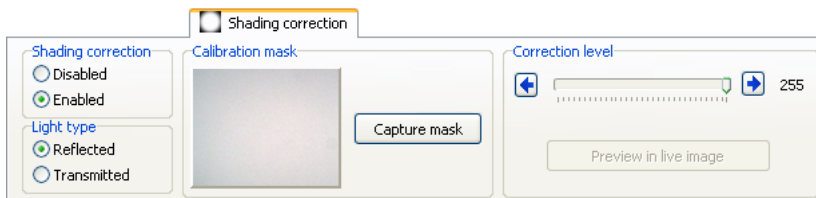
Shading correction: this option turns the *Shading correction* function on/off.
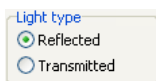
Light type: in dependence on the type of the used illumination select *Reflected* or *Transmitted* option. The correction method is different for each illumination type.

Calibration mask: if you click the *Capture mask* button, an image, which will be used as a calibration mask for shading correction function, will be acquired. In the field next to the button will be displayed the preview of the captured mask and information about its size.

Correction level: using this slider you may set the strength, with which will be the shading correction applied. If you click the *Preview in live image* button, you will see the effect of the shading correction function reflecting the current settings. Using the slider you may set the level of correction interactively.

Using the Shading Correction Function

> **Important**
>
> Shading correction gives good results only if all the settings of the microscope and the camera are the same, while acquiring images, as when capturing a calibration mask. If you change the conditions: change of magnification, change of illumination, change of image quality, and so on, it is necessary to acquire the calibration mask again.

To use the *Shading correction* function it is necessary to create a calibration image (the so called mask) first. Proceed as follows:

Transmitted Light

1. Focus the microscope using the desired microscope's magnification, switch the camera's exposure mode to manual, and manually set the exposure time.
2. Remove the specimen and adjust (shorten) the exposure time so the inhomogeneities of the illumination are visible. Optimal setting is such, the center of the field of view

is white and in the corners there are visible grey inhomogeneities. The darkest areas should be grey, not black.

3. Click the *Auto WB* button (automatic white balance) on the *Image* tab.
4. On the *Image* tab set the desired image quality.
5. Switch to the *Shading correction* tab and select the *Enabled* option. In the *Light type* part select the *Transmitted* option. Then click the *Capture mask* button. Preview of the mask will be displayed in the control panel.
6. Place the specimen back in and set the desired exposure time.
7. In the *Correction level* part click the *Preview in live view* button. According to the need you may, using the *Correction level* slider, adjust the correction.

Reflected light

1. Set the desired microscope's magnification, switch the camera's exposure mode to manual, and manually set the exposure time.
2. Place a white sheet under the microscope, (for example a sheet of white paper). Do not focus the microscope and adjust (shorten) the exposure time so the inhomogeneities of the illumination are visible. Optimal setting is such, the center of the field of view is white and in the corners there are visible grey inhomogeneities. The darkest areas should be grey, not black.
3. Click the *Auto WB* button (automatic white balance) on the *Image* tab.
4. On the *Image* tab set the desired image quality.
5. Switch to the *Shading correction* tab and select the *Enabled* option. In the *Light type* part select the *Reflected* option. Then click the *Capture mask* button. Preview of the mask will be displayed in the control panel.
6. Place the specimen back in, focus the microscope and set the desired exposure time.
7. In the *Correction level* part click the *Preview in live view* button. According to the need you may, using the *Correction level* slider, adjust the correction.

7. PathScan Enabler IV Histology Slide Scanner
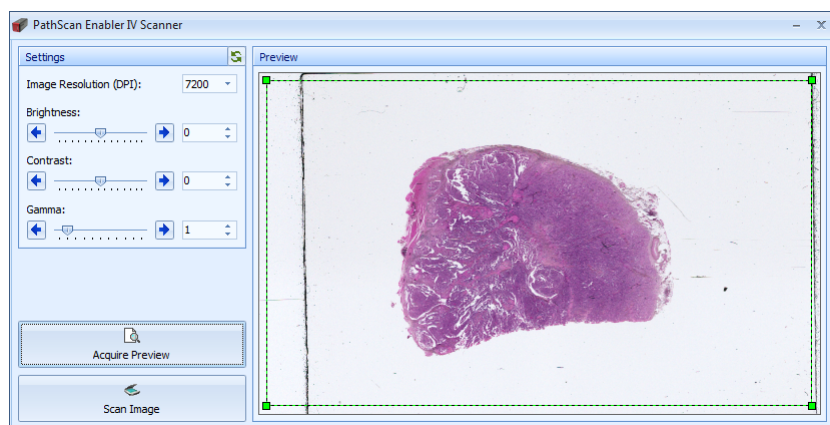
PathScan Enabler IV histology slide scanner enables to acquire images of whole microscopy slides.


Important

The images from PathScan Enabler IV device may have the size up to 63 Megapixels. For scanning images from PathScan Enabler IV device it is necessary to have at least 2 GB of RAM installed in your computer.


Note

After turning the device on, it needs to warm up before first scanning. This process takes 60 seconds.
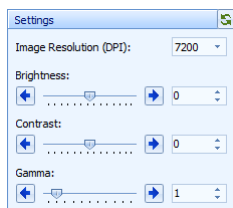
Settings: the *Image Resolution (DPI)* drop-down menu enables to set the required scanning resolution of images. The *Brightness*, *Contrast* and *Gamma* sliders enable to adjust the corresponding parameters of the preview and scanned images. The performed settings will apply to the preview during next preview acquisition. These settings will also apply to the scanned images. The button resets all the control panel's parameters to the default values.
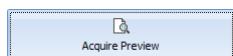
Acquire Preview: after clicking this button a preview of the whole slide will be acquired and displayed in the *Preview* part.
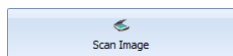
Scan Image: after clicking this button an image of the area defined by a rectangle displayed in the *Preview* part, according to parameters set in the *Settings* part, will be scanned and transferred to the computer.

Connect: this button is displayed instead of the *Scan Image* button in case the device is not properly connected. Click this button to connect the device.
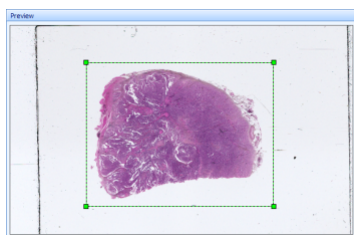
Preview: in this part the preview of the slide is displayed after clicking the *Acquire Preview* button, respecting the settings of *Brightness*, *Contrast* and *Gamma* sliders in the *Settings* part. The green-black frame will be displayed in the preview. This frame defines the area, which will be scanned, in resolution set by the *Image Resolution (DPI)* option, after clicking the *Scan Image* button. The size of the frame can be modified by mouse using the green grasp points in its corners. The default frame's size can be set by double-clicking into the preview area. The next double-click will set the last used frame size.

8. OLYMPUS® E-system Digital SLR Cameras
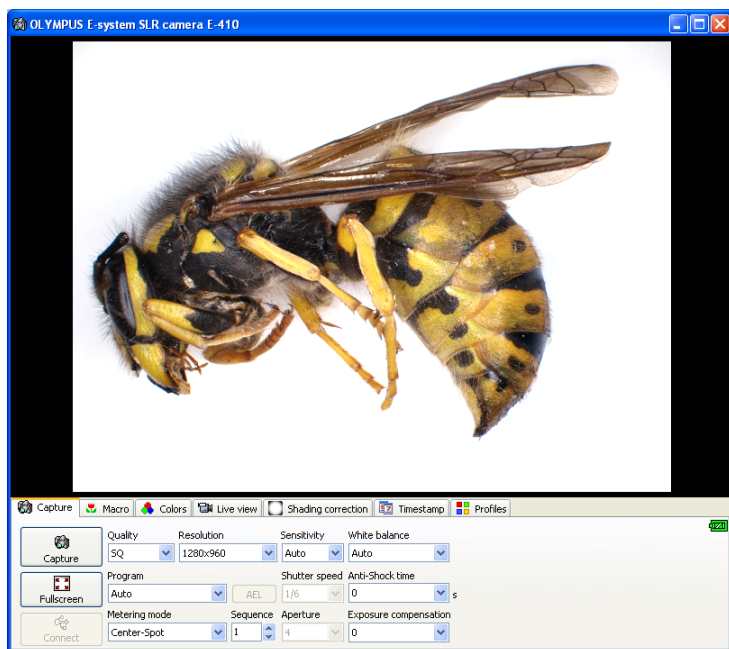
The control panel is intended for displaying a live image, controlling the camera functions and capturing images from OLYMPUS® E-system SLR cameras. The controls are located in seven tabs.

> **Important**
>
> Control panel of OLYMPUS® E-330 SLR camera is not equipped with several functions described below. This camera can not be controlled from the Microsoft® Windows® Vista/7/8.1/10 operating systems.

Capture Tab

The tab contains the controls for setting the camera parameters, setting the exposure and acquiring images.
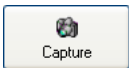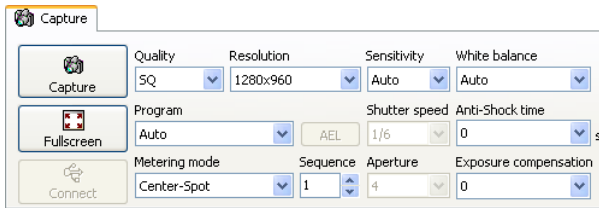
Capture: after clicking this button, an image will be acquired and automatically transferred to the computer. You can also use the [Ctrl+Enter] key shortcut.

Full screen: the button is used for displaying the live view full screen. In this mode, you can control the application using the *Capture* and *Exit full screen mode* buttons in the upper part of the live view.

Connect: the button is enabled only when the camera is not correctly connected. Click the button to re-establish the communication.
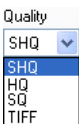
Quality: the image quality can be selected in this menu. For some quality options the image resolution can be selected in the *Resolution* drop-down menu.
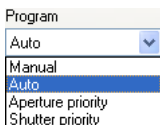
Program: in this drop-down menu you can set the exposure mode. The *Manual* option: aperture and shutter speed can be set manually from *Shutter speed* and *Aperture* drop-down menus. The *Aperture* drop-down menu is enabled only when the lens is attached to the camera body. The *Auto* option: exposure parameters (aperture and shutter speed) are calculated automatically by the camera. The shutter speed can be "locked" by clicking the *AEL* (Auto Exposure Lock) button. The *Aperture priority* option: the aperture value can be selected from the drop-down menu and the shutter speed will be calculated automatically. This option is available only when the lens is attached to the camera body. The *Shutter priority* option: the shutter speed can be selected and the aperture will be automatically calculated.
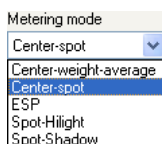
Metering mode: here you can select one of several exposure metering modes. See the user's guide of the camera for more details.
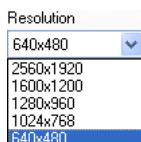
Resolution: for some quality options, the image resolution can be selected from this drop-down menu.

Sequence: here you can set the number of images to be captured in the sequence.
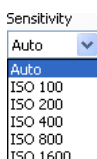
Sensitivity: sets sensitivity of the sensor. The options conform to the sensitivity of traditional photo materials in the ISO scale. When *Auto* option is selected, the camera changes the sensitivity automatically depending on the current illumination conditions.

Shutter speed: when capturing images in the *Manual* or *Shutter priority* mode, here you can set the required shutter speed.

Aperture: when capturing images with the lens attached in the *Manual* or *Aperture priority* mode, here you can set the required aperture value.
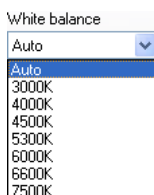
White balance: this option can be used for setting the white balance for various kinds of illumination.
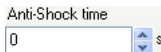
Anti-Shock time: delay between opening the mirror and the image acquisition can be set to avoid capturing of blurred images caused by vibrations.
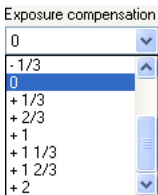
Exposure compensation: this option allows to lighten or darken the images when the automatic exposure mode is set.

Warning

When the battery indicator in the right upper corner of the tab changes its color to red, replace the battery as soon as possible. Low battery can cause unstable behavior of the camera.

Macro Tab

This tab is visible only when a lens is attached to the camera body.
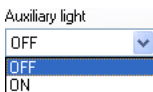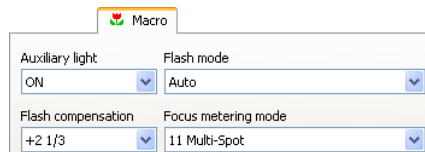
Auxiliary light: auxiliary light helps the camera to focus correctly in dark illumination conditions.
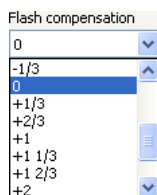
Flash compensation: it is possible to amplify or suppress the flash intensity by selecting the required value from this menu.
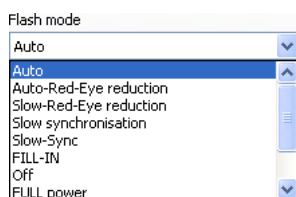
Flash mode: here you can set the flash mode. See the user's guide of the camera for more details.
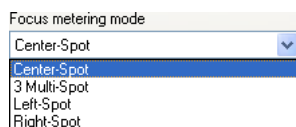
Focus metering mode: here the area, which will be used for evaluating the focus, can be selected. When using the E-330 SLR camera, this menu is accessible only, if there is the *A* mode selected in the *Live view mode* menu. See the user's guide of the camera for more details.
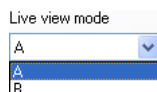
Live view mode (E-330 SLR only): the E-330 SLR camera is equipped with two sensors. In the B mode, the same sensor is used for capturing images and also for displaying the live view (sensor with higher resolution) but automatic focusing is not available due to the construction of the camera.

Colors Tab

On this tab, you can set several parameters influencing the quality of images.
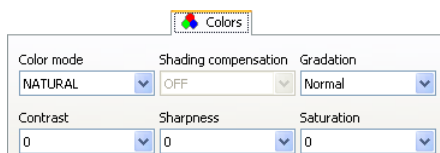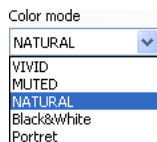
Color mode: here you can set the color mode. Changes will reflect interactively in the live view. The default option is *VIVID*.
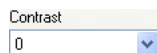
Contrast: contrast of images can be adjusted by this menu.
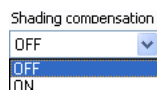
Shading compensation: shading compensation can be activated in this menu. See the user's guide of the camera for more details.
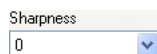
Sharpness: sharpness enhancement can be set in this menu.
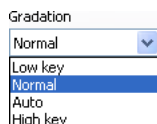
Gradation: color gradation mode can be selected in this menu. Changes will reflect only in the captured images.
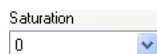
Saturation: value of color saturation can be set in this menu.

Live View Tab

This tab contains the controls intended for setting the live view. The available parameters are: *Brightness*, *Contrast*, *Saturation*, *Hue*, *Crop borders*. These settings do not influence the captured images. Performed changes will apply to the live view only.
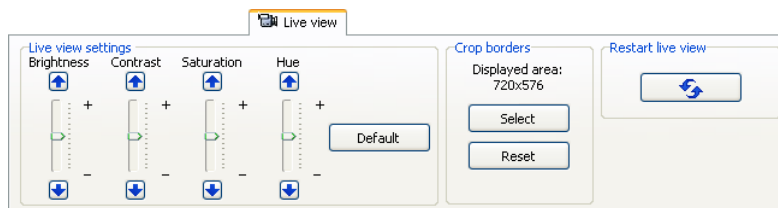
Using the sliders, you can set the properties of the live view. The recommended procedure is:

1. Open the control panel of the OLYMPUS® E-System digital camera, capture the image and display it in the *Display Window*.
2. In the control panel of the OLYMPUS® E-System digital camera activate the *Live image* tab. Move the control panel to see the live view and the captured image at once.
3. Using the sliders, set the live view parameters so that it looks as similar as possible to the captured image.

By clicking the *Default* button you can restore the default settings of all the sliders in the *Live image settings* part.

Using the controls in the *Crop borders* part the unwanted borders of the live view can be cropped.

Displayed area:
(720x576)   *Displayed area:* this indicator shows current size of the live view in pixels.

Select   *Select:* click this button to display a dialog box for interactive selection of borders to be cropped from the live view.

Reset   *Reset:* click this button to display the full size of the live view - cropping of the borders will be deactivated.

↻   *Restart live view:* click this button in case the live view display fails (this may happen sometimes e.g. after returning from the screen saver mode).

Setting up the Borders to Crop

After clicking the *Select* button there will appear a dialog box with static image from the live view, in which you can select interactively the borders to be cropped. Select the area of the image, you want to retain, by the green rectangle. The rest will be cropped. Borders can also be defined manually by the fields at the bottom of the dialog box. Confirm the settings by clicking the *OK* button. The settings will apply to the live view only.

Shading Correction Tab

This tab contains control elements for the shading correction function. This function may be used to remove deficiencies in the image caused by inhomogeneous illumination (removal of the darker corners of the image) or by dust on the sensor.
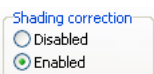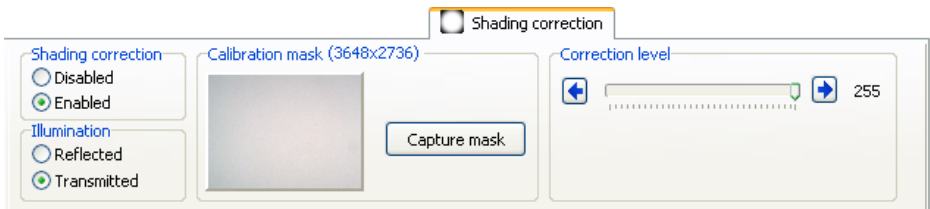
Shading correction: this option turns the *Shading Correction* function on/off.
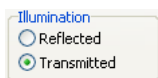
 Illumination: in dependence on the type of the used illumination select *Reflected* or *Transmitted* option. The correction method is different for each illumination type.
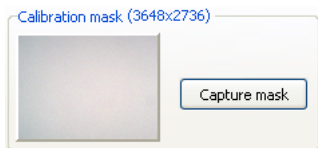
 Calibration mask: if you click the *Capture mask* button, an image which will be used as a calibration mask for shading correction function, will be acquired. In the field next to the button will be displayed the preview of the captured mask and information about its size.

 Correction level: using this slider you may set the strength with which will be the shading correction applied.

Using the Shading Correction Function

> **Important**
>
> Shading correction function gives good results only if all the settings of the microscope and the camera are the same, while acquiring images, as when capturing a calibration mask. If you change the conditions: change of magnification, change of illumination, change of image size, and so on, it is necessary to acquire the calibration mask again.

To use the *Shading correction* function it is necessary to create a calibration image (the so called mask) first. Proceed as follows:

Transmitted Light

1. Focus the microscope using the desired microscope's magnification.
2. Remove the specimen and on the *Capture* tab set the desired image *Quality*, *Resolution* and *White balance*.
3. Switch to the *Shading correction* tab and select *Enabled* option. In the *Illumination* part select the *Transmitted* option. Then click the *Capture mask* button. A thumbnail of the mask will be displayed in the control panel.

4. Place the specimen back in.
5. In the *Correction level* part adjust the correction level using the slider. Acquire an image to check the settings. According to the need you may, using the *Correction level* slider, adjust the correction.

Reflected Light

1. Set the desired microscope's magnification.
2. Place a white sheet under the microscope (for example a sheet of white paper). Do not focus the microscope. On the *Capture* tab set the desired image *Quality*, *Resolution* and *White balance*.
3. Switch to the *Shading correction* tab and select *Enabled* option. In the *Illumination* part select the *Reflected* option. Then click the *Capture mask* button. A thumbnail of the mask will be displayed in the control panel.
4. Insert the specimen under the microscope and focus it.
5. In the *Correction level* part adjust the correction level using the slider. Acquire an image to check the settings. According to the need you may, using the *Correction level* slider, adjust the correction.

All acquired images will now be automatically adjusted using the *Shading correction* function until the function is disabled or the control panel is terminated.

Timestamp Tab

It is possible to automatically insert, into the acquired images, date and time of their acquisition – the so called "timestamp". The timestamp will, after acquisition of the image, become a solid part of the image and it is not possible to remove it from the image other way than by cropping it.

  Timestamp: this option turns the *Timestamp* function on/off.

 Settings: if you click this button a dialog box for setting of timestamp parameters will open.

 Insert: by checking of individual options it is possible to define which components of the timestamp will be inserted into the acquired images.

 Orientation: this field serves as an indicator of the set orientation of the timestamp. If you double-click into this field, a *Timestamp settings* dialog box will open.

 Preview: in this field, preview of the timestamp is displayed the way it will be inserted into the acquired images, except for the orientation option. The text size is the same as will be displayed in the acquired images in the 100 % (1:1) display size.

Position: the indicator shows the position, where the timestamp will be inserted in the acquired images.

Timestamp Settings

After clicking the *Settings* button or double-click to the *Orientation* field the *Timestamp settings* dialog box will open.

Format: using the options in this part, it is possible to set the appearance of the timestamp.

Position: this option enables to select into which corner of the acquired images should the timestamp be inserted.

Orientation: using this option, it is possible to select the orientation of the timestamp's text.

Profiles Tab

All settings of the control panel (except for the settings of the *Shading correction* function) can be saved into one of the four profiles and at any time loaded again.

Save to profile	*Save to profile:* if you click this button, a dialog box will be displayed for saving of the current control panel's settings into one of the profiles.
Default profile	*Default profile:* if you click this button, all elements of the control panel will be set to the default values. Saved profiles will not be affected in any way by this action.

Saving of the Control Panel's Settings into the Profile

To save the settings into the profile proceed as follows:

1. Set the desired parameters of the control panel.
2. On the *Profiles* tab click the *Save to profile* button. *Save Profile* dialog box will open:

Save Profile...

1. Select the profile you want to save current camera control panel settings to.

Available profiles

    Default 1   Default 2

    Default 3   Default 4

2. Type a new profile name.

Profile name:

OK   Cancel

3. In the *Available profiles* part select, by clicking the corresponding button, one of the profiles you want to save the current control panel's settings to.
4. Type in a new profile name into the *Profile name* field.
5. Confirm by clicking the *OK* button.

Loading a Profile

Loading of a desired profile can be done by clicking the corresponding button of the profile on the *Profiles* tab. Automatic adjustment of the control panel's elements will take place.

9. OLYMPUS® Consumer Digital Cameras (SP and CAMEDIA® series)
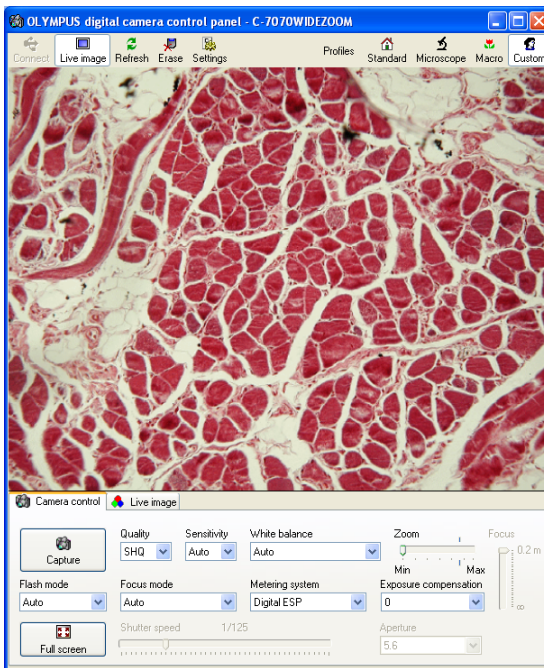
The control panel is intended for displaying a live image, controlling the camera functions and capturing images from OLYMPUS® SP and CAMEDIA series digital cameras. The controls are located in the toolbar and two tabs.

Camera Control Tab

The tab contains the controls for setting the camera parameters, setting the exposure and capturing images.
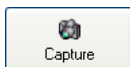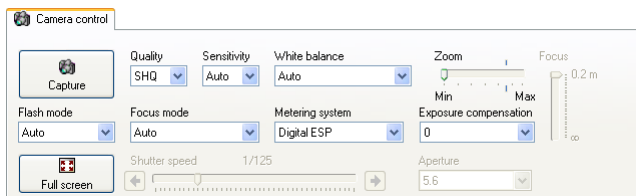
Capture: after clicking this button, an image will be acquired and automatically transferred to the computer. You can also use the [Ctrl+Enter] key shortcut.
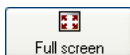
Full screen: the button is used for displaying the live view full screen. In this mode, you can control the application using the *Capture, Refresh live image* and *Exit full screen* buttons in the upper part of the live view.
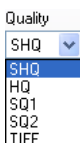
Quality: you can select from five quality levels (*Super High Quality*, *High Quality* and *Standard Quality 1 and 2 and TIFF*). The SHQ and HQ modes capture images in full camera resolution in JPEG format with different compression ratios. SQ1 and SQ2 modes capture images with lower camera resolution in JPEG format. TIFF mode captures images in full camera resolution in TIFF format. When using OLYMPUS$^{®}$ SP-350 and SP-500UZ cameras the TIFF option is not available.
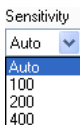
Sensitivity: sets sensitivity of the sensor. The options conform to the sensitivity of traditional photo materials in the ISO scale. When *Auto* option is selected, the camera changes the sensitivity automatically depending on the current illumination conditions.
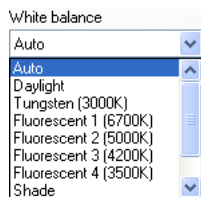
White balance: this option can be used for setting the white balance for various kinds of illumination.
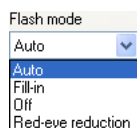
Flash mode: here you can set the flash mode. If you are acquiring the images from a microscope turn the flash off.
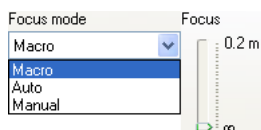
Focus mode: this drop-down menu offers three options: *Auto*, *Manual* and *Macro* mode. If you select the *Manual* mode, you can manually focus by the *Focus* slider.

Warning

Turning the automatic focusing off is necessary to obtain the correct measurement results. To achieve this, select the *Manual* focus mode and move the *Focus* slider to infinity value.
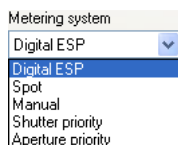
Metering system: here you can select the metering mode. *Digital ESP* and *Spot* modes represent two automatic modes. The *Manual* option enables to set your own exposure parameters using the *Shutter speed* slider and *Aperture* drop-down menu. If you select the *Shutter priority* option you can set the *Shutter speed* by a slider and the corresponding aperture value will be set automatically. If you select *Aperture priority*, you can set the required *Aperture* value and the corresponding shutter speed will be set automatically.
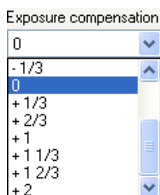
Exposure compensation: this option allows to lighten or darken the images when the automatic exposure mode is set.

Zoom: this slider controls the focal length of the camera's lens. When using certain types of digital cameras, a stop will be indicated at the *Zoom* slider. This stop represents the value, to which the slider should be set for acquiring images from a microscope. If the stop is not indicated, set the *Zoom* slider to its maximum value.

> **Warning**
>
> It is necessary to maintain the fixed *Zoom* slider value in order to achieve correct measurements results.

Shutter speed and Aperture: these options enable manual settings of exposure parameters if *Manual*, *Shutter priority* or *Aperture priority* modes are selected in *Metering system* menu.

Live Image Tab

This tab contains the controls intended for setting the live view. The available parameters are: *Brightness*, *Contrast*, *Saturation*, *Hue*, *Borders*. These settings do not influence the captured images. Performed changes will apply to the live view only.

Using the sliders, you can set the properties of the live view. The recommended procedure is:

1. Open the control panel of the OLYMPUS® SP and CAMEDIA series digital cameras, capture the image and display it in the *Display Window*.

2. In the control panel of the OLYMPUS® SP and CAMEDIA series digital cameras activate the *Live image* tab. Move the control panel to see the live view and the captured image at once.

3. Using the sliders, set the live view parameters so that it looks as similar as possible to the captured image.

Borders slider can be used for setting the optimal size of the live view. Move the slider, so that the live view fills the whole control panel's window and black borders are eliminated.

Click the *Default* button to restore the default settings of all the control elements on the *Live image* tab.
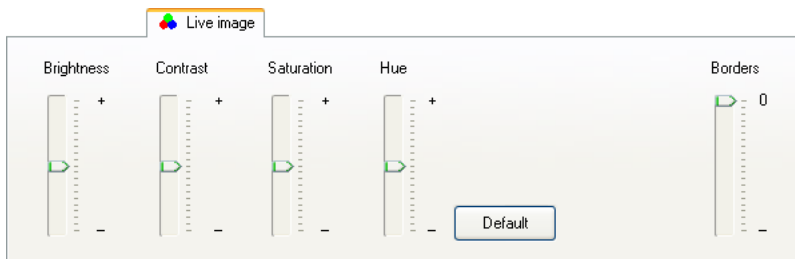
Profiles

Profiles are intended for quick and easy settings of the camera functions. Each profile may contain settings for all the functions of the *Camera control* tab. The *Standard*, *Microscope* and *Macro* profiles are predefined and may be redefined at any time. The *Custom* profile is intended for saving of user settings.

Standard: preset profile for standard digital photography (e.g. using tripod). SHQ resolution is set as well as automatic exposure mode, automatic white balance, automatic flash and focusing and ESP exposure mode.

Microscope: the following parameters of the digital camera will be set for acquiring images from microscopes: maximum zoom, flash switched off, manual focusing mode set to infinity value. The other parameters are identical to the *Standard* profile.

Macro: this is a predefined profile for macro imaging. The camera will be set to macro focusing mode with the spot exposure metering mode.

Custom: this profile is prepared for storing your personal settings.

Note

Upon activation of one of the profiles, a test image will be automatically captured, to set the camera correctly. It is then deleted immediately.

Toolbar - Other Functions

Connect: this button connects the camera when disconnected.

Live image: turns on/off the live view.

Refresh: use this button for refreshing the live view (e.g. in case of over illumination).

Erase: erases the camera's memory card contents.

Settings: opens a dialog box with the options for redefining and restoring the profiles.

Creating a Custom Profile/Editing the Existing Profile

1. To create a custom profile set the required camera control panel's parameters on the *Camera control* tab first.

2.

Click the [Settings] button. A dialog box for setting the profiles will appear. Click the button of the profile you want to save the current control panel's parameters to. The selected profile will be overwritten. If you want to restore the original settings of the *Standard*, *Microscope* and *Macro* profiles, click the *Restore* button.
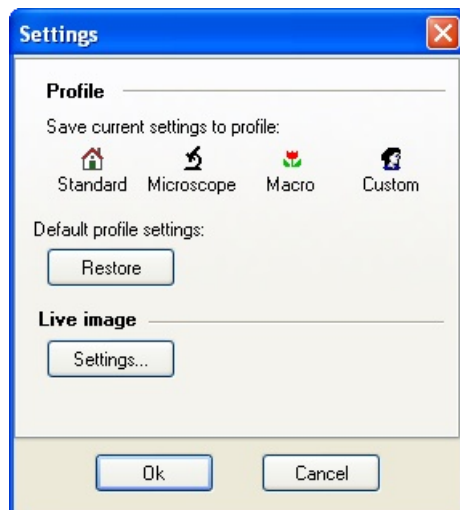
10. Control Panel of Analog Video Sources

The control panel allows acquiring of images from various analog video sources. The images can be acquired e.g. from analog cameras, video-endoscopic systems, ultrasonographs, DVD players, etc.

Capturing Tab

Capture [Ctrl+Enter]: captures an image and transfers it to the computer.

Full Screen Mode [Ctrl+F]: this button is used for displaying of live view in full screen mode. Using this type of display you can control the program using the *Capture* and *Exit Full Screen Mode [Ctrl+F] [Esc]* buttons located in the upper part of the screen.

Image Settings Tab
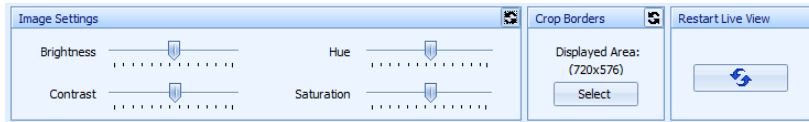
Image Settings: *Brightness*, *Contrast*, *Hue,* and *Saturation* sliders can be used for setting the corresponding image parameters. Click the *Restore Default Settings* button to restore the default values of all sliders.

Using controls in the *Crop Borders* part there can be set the optimal size of the live view. This way e.g. the unwanted black borders can be cropped from the image.

Displayed area: this indicator shows current size of the live view in pixels.

Select: click this button to display a dialog box for interactive selection of borders to be cropped from the live view.

Reset Crop Area: click this button to display the full size of the live view - cropping of the borders will be deactivated.

Restart Live View: click this button in case the live view display fails (this may happen sometimes e.g. after returning from the screen saver mode).

Setting up the Borders to Crop

After clicking the *Select* button there will appear a dialog box with static image from the live view, in which you can select interactively the borders to be cropped. Select the area of the image, you want to retain, by the green rectangle. The rest will be cropped. Borders can also be defined manually by the fields at the bottom of the dialog box. Confirm the settings by clicking the *OK* button.

Device Settings Tab
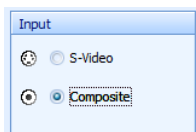
Input: select the input type of the analog video signal depending on the currently used input connector. You can select *S-Video* or *Composite* (see figure) options.
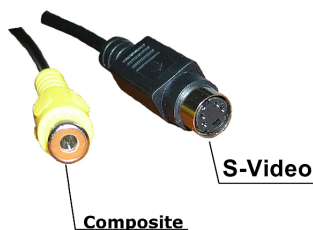
Timestamp Tab

Date and time of image acquisition – the so called "timestamp" may be inserted into acquired images. The timestamp will, after acquisition of the image, become a solid part of the image and it is not possible to remove it from the image other way than by cropping it.
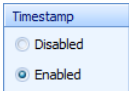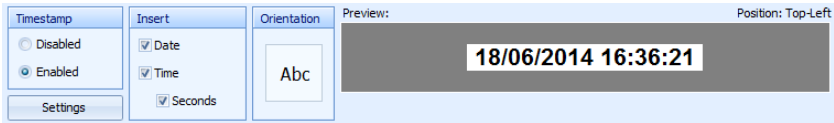
Timestamp: this option turns the *Timestamp* function on/off.
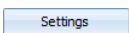
Settings: if you click this button a dialog box for setting of timestamp parameters will open.
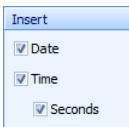
Insert: by checking of individual options you may define which components of the timestamp will be inserted into the acquired images.
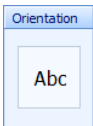
Orientation: this field serves as an indicator of the set orientation of the timestamp. If you double-click into this field, a *Timestamp Settings* dialog box will open.
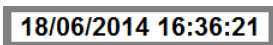
Preview: in this field, preview of the timestamp is displayed the way it will be inserted into the acquired images, except for the orientation option.

Position: the indicator shows the position, where the timestamp will be inserted in the acquired images.

Timestamp Settings

After clicking the *Settings* button or double-click to the *Orientation* field the *Timestamp Settings* dialog box will open.

Format: using the options in this part, it is possible to set the appearance of the timestamp.

Position: this option enables to select into which corner of the acquired images should the timestamp be inserted.

Orientation: using this option, it is possible to select the orientation of the timestamp's text.

Profiles Tab

All settings of the control panel can be saved into one of the four profiles and at any time loaded again.

 Save to Profile: if you click this button, a dialog box will be displayed for saving of the current control panel's settings into one of the profiles.

Default Profile	*Default Profile:* if you click this button, all elements of the control panel will be set to the default values. Saved profiles will not be affected in any way by this action.

Saving of the Control Panel's Settings into the Profile

To save the settings into the profile proceed as follows:

1. Set the desired parameters of the control panel.
2. On the *Profiles* tab click the *Save to Profile* button. *Save Profile* dialog box will open:

3. In the *Available Profiles* part select, by clicking the corresponding button, one of the profiles you want to save the current control panel's settings to.
4. Type in a new profile name into the *Profile Name* field.
5. Confirm by clicking the *OK* button.

Loading a Profile

Loading of a desired profile can be done by clicking the corresponding button of the profile on the *Profiles* tab. Automatic adjustment of the control panel's elements will take place.

Modules

Program QuickPHOTO MICRO 3.1 contains extensive functions in the form of built-in modules. Other optional modules can be added to the program.

1. Timer - Built-in Module for Time-Lapse Image Capturing

QuickPHOTO MICRO 3.1 is equipped with the *Timer* module, which is designed for automatic image capturing in the defined time interval, the so called time-lapse image acquisition. This module can be activated by the *Modules → Timer* option or by clicking the 🕐 icon in the *Toolbar*. *Timer* dialog box will be displayed along with the control panel of the active imaging device. *Timer* dialog box contains a *Capturing* tab only in a default state. If you have activated a computer controlled illuminator (in *Edit → Options... → Hardware → Illuminators*), the *Timer* dialog box will also contain a second tab - *Illumination*.

After setting of the desired parameters described in the following chapters, run the time-lapse image capturing by clicking the Start button. Time-lapse image capturing can be terminated at any time by clicking the Stop button. In the bottom part of the *Timer* dialog box, there are the following information displayed: *Time until Next Capturing*, *Number of Captured Images*, and *Number of Remaining Images*.

> **Note**
>
> If the *Timer* module, for some reason, will not be able to capture images in the defined time interval, the *Time until Next Capturing* label will be red. In such case, a text file containing information about the delay or possibly omission of the concerned images, will be created.

1.1. Tab Capturing

Capturing tab contains control elements for the setting of parameters of the time-lapse image capturing. You may select from two modes:

- Number of Images
- Time Interval

Image Capturing in the Number of Images Mode

After you select the *Number of Images* mode, set the number of images you want to capture in the *Number* field. In the *Interval between Images* part set the desired time interval in hours, minutes and seconds.

Image Capturing in the Time Interval Mode

After you select the *Time Interval* option, set the *Beginning* and *End* of the time interval intended for time-lapse image capturing. Beginning and end of the interval is defined by the date and time. The beginning and end date can be defined by typing in from the keyboard, or by selecting it from a calendar, which can be displayed by clicking the arrow on the right from the displayed date. Time values can be entered from the keyboard or using the arrows on the right hand side next to the corresponding time fields. Then in the *Interval between Images* part set the desired time interval in hours, minutes, and seconds.

> **Note**
>
> Minimal interval between images depends on the size of the images being captured and the set exposure time of the active imaging device. If you set an interval shorter than is the time necessary for image capturing and its transfer to the computer, you will be warned about this fact, and the time interval for image capturing will be set at a minimum applicable value.

Location of the Captured Images

Location of the captured images can be selected in the *Store Images:* part. There are two options available:

- *in the Main Program Window* - images will be displayed after capturing in the *Main Program Window* (this option is suitable for capturing of a smaller number of images).

- *in Folder:* this option is recommended for capturing of larger number of images. Images will be, after capturing, automatically saved into the selected folder and they will not be displayed in the *Main Program Window*. To select the folder, click the 📂 button

and select the desired location. Enter the file name of the sequence being captured into the *File Name* field. Individual images will be automatically differentiated using the five digit serial number attached after the selected name.

In the bottom part of the dialog box there are displayed information about the process of time-lapse image capturing. In the *Time until Next Capturing* part the time remaining until next image capturing will always be displayed. Further you will have information about how many images have already been captured in the current sequence - in the *Number of Captured Images* part, and how many images remain to be captured - in the *Number of Remaining Images* part.

1.2. Tab Illumination

If you have activated control of the computer controlled illuminator (in *Edit → Options...* *→ Hardware → Illuminators*), the *Timer* dialog box will contain also the *Illumination* tab. This tab enables to set turning off the illumination between capturing images in order to avoid undesirable long-term effect of the illumination on the specimen. The illumination will always be turned on only for the time period necessary for the image capturing and then it will be turned off. To turn off the illumination between individual image capturing, check in the *Control during Capturing* part the *Turn off Illumination between Captures* option.

The following information are valid for the checked option *Turn off Illumination between Captures*:

Turn on Illumination before Capturing option sets an advance for turning on the illumination before capturing each image. It is recommended to set the advance of at least couple of seconds for illumination stabilization before capturing.

If you check the *Turn off Illumination when Finished* option, the illumination will be turned off when the whole process of time-lapse image capturing is finished.

In the *Illumination Control* part set the desired illumination intensity. After the beginning of the time-lapse image capturing, the *Current Illumination Intensity* will be set as the *Intensity Set for Capturing*. During the time-lapse capturing it is possible to, in the time when the illumination is turned off, turn the illumination on (for example for the control of the ongoing experiment) using the control elements directly on the illuminator or using the *Turn on* button in the *Illumination Control* part. Change of illumination settings will have no effect on the previously made settings for image capturing. Time-lapse image capturing will continue with the illumination intensity set in the *Intensity Set for Capturing* part.

If you want to, during the time-lapse image capturing, change the illumination intensity set for capturing, change the value in the *Intensity Set for Capturing* part or in the *Illumination Control* part set, while having the illumination turned on, the desired intensity and click the *Use Current* button in the *Intensity Set for Capturing* part. The new illumination intensity value will be set for time-lapse image capturing.
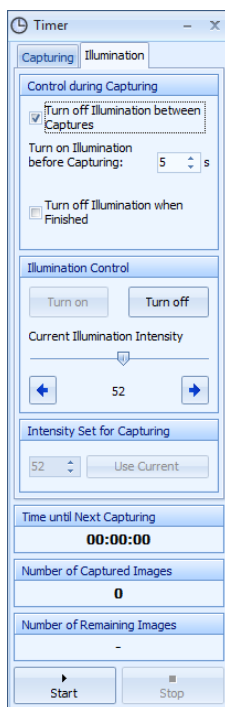
1.3. Recommendations for the Time-Lapse Image Capturing

To achieve optimal results during time-lapse image capturing, we recommend the following:

- Use manual exposure mode of the imaging device for image capturing.

- Turn off the screen saver of the Microsoft® Windows® operating system. Switch the automatic updates function to the manual installation mode. Switch off automatic activation of sleep mode in Power Options.

- Use the computer's UPS.

- Before you start capturing images into the folder, make sure that you are authorized to write into the folder, and there is enough free space on the target drive.

- Because with most illuminators, the illumination intensity decreases after turning on, until temperature stabilization, let the illuminator warm up and thermally equilibrate before you start the time-lapse capturing.

1.4. Time-Lapse Image Capturing from the Imaging Devices Controlled via TWAIN Interface

Timer module enables time-lapse image capturing also from imaging devices controlled via TWAIN interface. These control panels are controlled externally by the *Timer* module, which implies minor limitations.

After you begin the time-lapse image capturing (by clicking the *Start* button) using the TWAIN control panel an informative dialog box will be displayed, which will ask you to click the button for image capturing in the control panel of the imaging device. After you click the corresponding button, initialization image will be captured (which will not be included in the time-lapse sequence), which will enable the *Timer* module to identify the position of the button for image capturing in the TWAIN control panel. Information dialog box will automatically disappear after capturing of this image and the time-lapse image capturing will begin. To ensure successful process of time-lapse image capturing, do not move or click the mouse anymore until the whole time-lapse image capturing process is finished.

2. Time-Lapse Video - Built-in Module

Time-Lapse Video module, which is a standard component of the QuickPHOTO MICRO 3.1 program, is designed for creating of video files from the acquired time-lapse images. For example if you acquire a series of images of a slowly changing sample with the *Timer* module, you can then easily create, using the *Time-Lapse Video* module, a video file in which the movement will be displayed in an accelerated form.

How to Create a Time-Lapse Video

To create a video file, proceed according to the following steps:

1. If you intend to create a video file from images currently opened in the QuickPHOTO MICRO 3.1 program, select them in the *Thumbnail Browser*.

2. Run the *Time-Lapse Video* module from the *Modules → Time-Lapse Video* menu or click the 🎬 icon in the *Toolbar*. The *Time-Lapse Video* wizard will open.

3. On the *Selection of Image Source* tab, select the source of images from which the resulting video file is supposed to be created. There are three options available:

   • *Process Images Selected in the Thumbnail Browser* - select this option if the video file is going to be created from a smaller number of images which are opened in the *Main Program Window* of QuickPHOTO MICRO 3.1 program. Images which were, in the time of running of the *Time-Lapse Video* module, selected in the *Thumbnail Browser*, will be processed.

   • *Select Saved Files for Processing (Up to 2000 Files)* - select this option if the images intended for processing are saved on a hard drive. After clicking the *Next* button a dialog box for files selection will open. Select all files from which you want to create the video file. Maximum number of files is affected by the length of their names and it may reach the maximum value of 2000. In case of long file names, this number may be smaller.

   • *Select the Whole Folder for Processing* - select this option if the images intended for processing are saved in a folder, which does not contain any other images. Processed will be all images from the selected folder, therefore be careful not to forget any unwanted images among the images intended for processing. This option enables processing of virtually any number of images.

   Click the *Next* button.
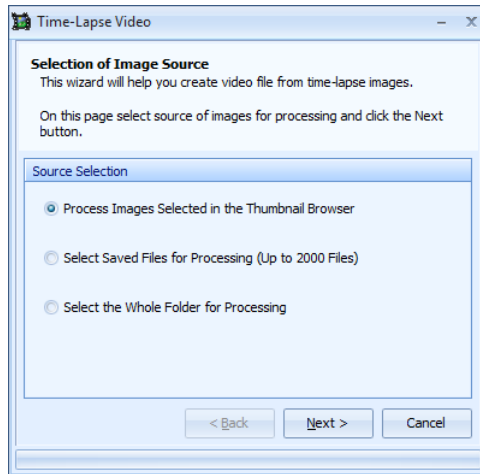
4. Next page of the wizard *Video Properties* enables to set parameters of a new video file. There are two options affecting the speed of the captured action available:

- *Interval between Frames* - this option enables to set the time interval between images. This option is useful, for example, if you want to have control over the speed of the projected action compared to reality.

- *Frame Rate* - this option enables to create a video file with the desired length or fluency. To create a fluent video file, the minimum value of 25 images per second (FPS) is recommended.

According to the set parameters the *Video Duration* will be calculated.

In the *Video Resolution* part you may select the size of the resulting video file in pixels. The larger size you select, the larger will be the resulting video file.
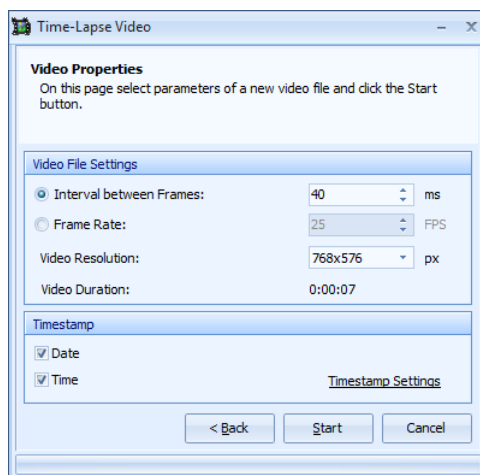
In the *Timestamp* part you may set the insertion of a timestamp into a video file – into each image of the video file will be inserted the information about the date and time of image acquisition. This setting will be visible in the video file in such a way that the time will be running in it. It is possible to insert *Date* and *Time*. Appearance of the timestamp may be set after clicking the *Timestamp Settings* link.

Timestamp Settings

When at least one of the *Date* and *Time* checkboxes is checked, if you click the *Timestamp Settings* link, a dialog box for setting of the timestamp will open.

Format: using the options in this part, it is possible to set the appearance of the timestamp.

Position: this option enables to select into which corner of the video file should the timestamp be inserted.

Orientation: using this option, it is possible to select the orientation of the timestamp's text.
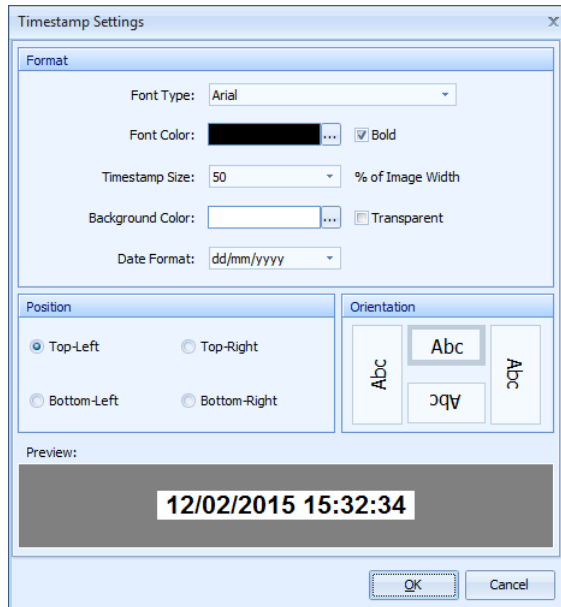
5. To begin creating a video file, click the *Start* button. A dialog box for saving of the file with the .avi extension will be displayed. Select the desired location and enter the file name. By clicking the *Save* button you will run the video file creation itself.

6. You may watch the process of creating of the video file on the *Video Rendering* page. Using the *Rendering Priority* option, it is possible to select how busy will the computer be with creating of the video file. If you want to work with another programs during creation of the video file, you may select the *Low* option. You may pause creating of the video file by clicking the *Pause* button and you may run it again by clicking the *Resume* button.
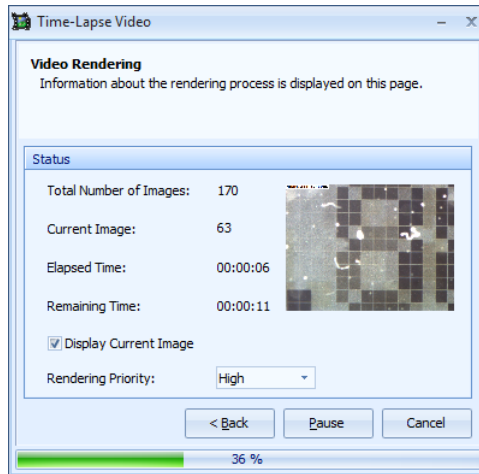
3. Deep Focus (optional)

Deep Focus module is designed for creating of images with much higher depth of field than the standard use of optical microscopes can provide (so called focus stacking or z-stacking). This module can be used with stereomicroscopes as well as other types of optical microscopes for observation in transmitted or reflected light. This module can also be used for macro-imaging.

Principle is in the capturing of a sequence of images with a different focus plane. From each of these images is, by the module, automatically selected and used only the focused area. From these focused areas is composed the resulting, completely focused image.

This module can be combined with HDR optional module.

Standard Image

Image from Deep Focus Module
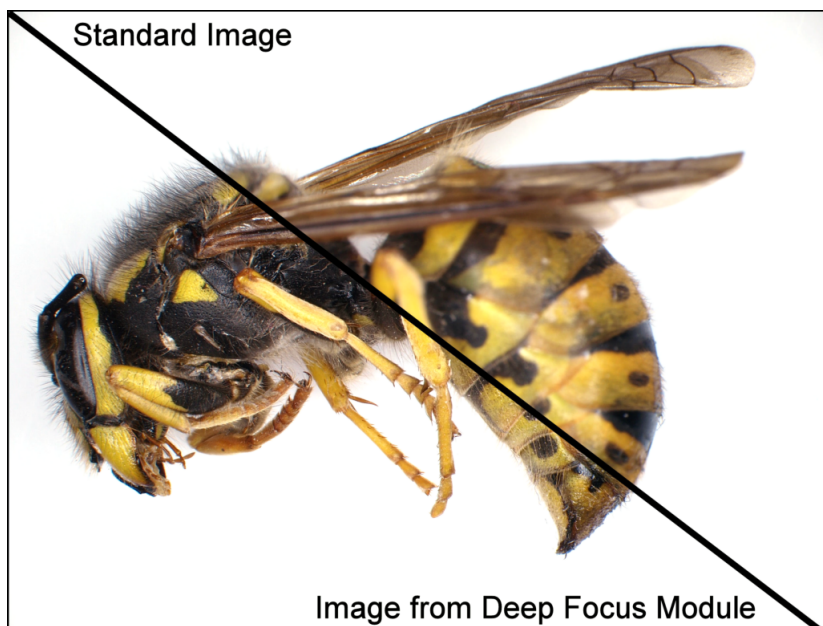
4. HDR (optional)

High Dynamic Range (HDR) module is a powerful visualization tool that allows you to see the entire dynamic range of your microscopic or stereomicroscopic samples. Traditional non-HDR digital cameras can only provide a fraction of a samples luminosity. Information in darker parts of the image are lost as well as information in saturated or extremely bright areas of the sample. Microphotographs with a limited exposure range result in the loss of detail in highlights or shadows. The module can be used for creation of HDR images of static samples acquired using microscopes, for macro images as well as for standard photography. This module can be combined with Deep Focus and Image Stitching optional modules.

5. Image Stitching (optional)

Image Stitching module is intended for stitching of multiple fields of view together. This module can be combined with HDR optional module.

6. RECORD IT (optional)

RECORD IT module is an additional module which enables, in the real time, record digital video from digital and analog cameras and other devices. Using the RECORD IT module, you may easily record for example a microscopic experiment, growth of cell colonies and so on.

7. FLUO+ (optional)

FLUO+ is designed for composing of images acquired using a fluorescence microscope. Up to eight images acquired using various fluorescence filters can be composed into one resulting image.

Adding of Modules and Upgrading

QuickPHOTO MICRO 3.1 program can be extended with additional modules or upgraded to higher version (if available). The first step towards getting a new module or upgrade for your QuickPHOTO MICRO 3.1 program is sending of the dongle identification number via e-mail or its communication to your supplier by another way.

In order to send the dongle number via e-mail proceed as follows:

1. In the *Help* menu activate the *Send Dongle Number...* option.

2. In the open dialog box there will be displayed the identification number of your dongle and an e-mail address.

If you are using one of the e-mail programs (for example Microsoft® Outlook®), click the *Send* button. New e-mail will automatically be opened with the number of your dongle in it. Fill in your contact data and the name of a product you want to purchase and send the e-mail.

If you do not use an e-mail program, create an e-mail the regular way (for example using your internet browser), copy your dongle number into it, write your contact data and the name of a product you want to purchase and send it to the displayed e-mail address.

List of Key Shortcuts

Key shortcuts used in the *Main Window* of the QuickPHOTO MICRO 3.1 program:

Key Shortcut	Action
Ctrl+O	*Open* images from available disc units
Ctrl+S	*Save* images selected in the *Thumbnail Browser*
Shift+Ctrl+S	*Save As...* - saves images selected in the *Thumbnail Browser* into the selected location
Ctrl+Alt+S	*Save All* - saves all opened images
Shift+Ctrl+Alt+S	*Save All As...* - saves all opened images into the selected location
Ctrl+M	*Export Measured Values* from selected images
Ctrl+Alt+M	*Export Measured Values* from all images
Ctrl+W	*Close* selected images
Ctrl+Alt+W	*Close* all images
Ctrl+P	*Print*
Ctrl+Z	*Undo*
Ctrl+Y	*Redo*
Ctrl+C	*Copy*
Ctrl+V	*Paste*
Ctrl+L	*Compose New Image from Layout of Displayed Images*
Del	*Delete* selected objects
Ctrl+E	*Flattening Layers*
Ctrl+I	*Image Information*
Ctrl+T	*White Balance Defined by Point*

Key Shortcut	Action
F1	*Help*
F4	*Open* imaging device control panel
F11	*Options* of the program
F12	*Display/Hide Table of Measured Values*
Alt+S	*Start Slideshow*
Ctrl+F	*Display in Full Screen Mode*
Ctrl+Alt+C	*Calibration Manager*
Alt+X	*Exit* program
Ctrl+A	*Select* all thumbnails in the *Thumbnail Browser*
Ctrl+selection with a mouse	*Selecting* discontinuous selection of thumbnails in the *Thumbnail Browser*
Shift+selection with a mouse	*Selecting* of more inserted object or a continuous selection of thumbnails in the *Thumbnail Browser*
Shift during object insertion	Inserting a horizontal or vertical line
Page Up	Display the previous image in the presentation mode
Page Down	Display the following image in the presentation mode
Space Bar	Continue the slideshow

Key shortcuts used in imaging device control panels:

Key Shortcut	Action
Ctrl+Enter	*Capture* image
Ctrl+F	*Display in Full Screen Mode*
[+] on the numeric keyboard	Extension of the exposure time while using the manual exposure mode
Page Up	Extension of the exposure time while using the manual exposure mode
[-] on the numeric keyboard	Shortening of the exposure time while using the manual exposure mode
Page Down	Shortening of the exposure time while using the manual exposure mode

Troubleshooting - FAQ (Frequently Asked Questions)

Here you can find answers for most common Frequently Asked Questions. You can find more answers at the www.promicra.com website.

1. Canon® EOS DSLR Cameras FAQ

Which position of mode dial should be set to control the camera from a computer?

Switch the mode dial to *Av* position for automatic mode or to *M* position for manual mode.

*How to change Auto Power Off time setting?*

Canon® EOS DSLR cameras come from manufacturing preset for switching to standby mode automatically after 30 seconds of inactivity. When the camera is in the standby mode, it cannot be connected by QuickPHOTO MICRO 3.1 program. To activate the camera again press the shutter button. The following procedure describes, how to change the time, after which the camera goes to standby mode for Canon® EOS 1300D / Rebel T6 DSLR camera. The procedure for other models is similar. You can find more information in the user guide of the camera.

Turn on the DSLR camera and disconnect the USB cable from it. Press *MENU* button and use arrows to select the first tab with yellow wrench symbol. Select *Auto power off* option and press *SET* button. Use arrow keys to select the desired value and confirm by *SET* button. The recommended option is *Disable*.

How to proceed when the DSLR camera cannot be connected by the QuickPHOTO MICRO 3.1 program and it is not recognized in Device manager?

Enabled Wi-Fi feature can cause such DSLR camera behaviour. The following procedure will help you to disable the feature for Canon® EOS 1300D / Rebel T6 DSLR camera. The

procedure for other models is similar. Turn on the DSLR camera, press *MENU* button and use arrows to select the third tab with yellow wrench symbol. Select *Wi-Fi/NFC* option and press *SET* button. Use arrows to select *Disable* option and press *SET* button. Disconnect and reconnect the DSLR camera to a PC using a USB cable. The DSLR camera should be listed in the *Device Manager* in *Portable Devices* section now and should be ready for use. You can find more information in the user guide of the DSLR camera.
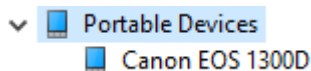
How to proceed when a live view has low frame rate?

1. In *Control Panel* of the Microsoft® Windows® operating system go to *System and Security -> Power Options* section and make sure you are not using *Power saver* plan. Use *Balanced* or eventually *High performance* plan.
2. Make sure you are using the latest version of the QuickPHOTO MICRO 3.1 program including any updates of the Canon® EOS DSLR cameras control panel.
3. It is recommended to use Microsoft® Windows® 7 (x64) or later operating system.
4. Use a more efficient computer. It is recommended to use a processor with high single thread performance, e.g. Intel® Core i5-3470 or better.
5. Try to reduce the size of the Canon® EOS DSLR camera control panel window in order to decrease the live view area.

How to solve an issue when acquired images are dark at the bottom?

This unwanted effect may appear when acquiring images with very short exposure times in the mode of automatic (in some cases also in manual) exposure mode. In the automatic exposure mode decrease the microscope illumination intensity or lower the sensor ISO sensitivity. In case of manual exposure mode set longer exposure time.

2. OLYMPUS® Digital Cameras (E-system, CAMEDIA® and SP series) FAQ

How to switch the OLYMPUS® digital camera to the mode for PC control?

Proceed according to the instructions in see "Switching the Camera to the PC Control Mode" on page 10.

The camera cannot be connected in the QuickPHOTO MICRO 3.1 program.

1. In the QuickPHOTO MICRO 3.1 program, in the *Imaging Devices* menu make sure that you have selected the corresponding control panel for the used camera type:

   • **for OLYMPUS® E-3, E-30, E-620, E-520, E-450, E-420, E-510, E-410 digital SLR cameras:**

   select the *OLYMPUS® E-system SLR camera v.2* option

   • **for OLYMPUS® E-600 digital SLR camera:**

   select the *OLYMPUS® E-system SLR camera* option

   Note: after opening the control panel the text: OLYMPUS® E-system SLR camera v.2 will be displayed in its title.

   • **for OLYMPUS® E-330 digital SLR camera:**

   select the *OLYMPUS® E-system SLR camera* option

   • **for OLYMPUS® CAMEDIA® and SP series consumer digital cameras:**

   select the *OLYMPUS® digital camera* option

   If you do not see the desired item on the list, run the installation of the QuickPHOTO MICRO 3.1 program and install the support for your type of camera.

2. Make sure the camera is turned on and connected to your computer by the USB cable. If you are using a battery, make sure it is fully charged.

3. Make sure the camera is switched to the PC control mode - for more information see see "Switching the Camera to the PC Control Mode" on page 10.

4. Make sure the memory card is inserted in the camera (only in case of OLYMPUS® CAMEDIA® and SP series consumer digital cameras).

5. Make sure the memory card cover is closed.

6. Make sure, in the *Device manager* of the Microsoft® Windows®, the camera device drivers have been properly installed. See examples on the following pictures:

   • **OLYMPUS® E-3, E-30, E-620, E-520, E-450, E-420, E-510, E-410 Digital SLR Cameras:**
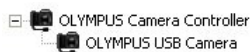
   • **OLYMPUS® E-330 Digital SLR Camera:**

   • **OLYMPUS® CAMEDIA® and SP Series Consumer Digital Cameras:**

   If there is displayed an exclamation mark, next to the device's name in the *Device manager*, click the right mouse button on the name of the device and select the *Uninstall* option. Turn the camera off and back on. The drivers should automatically reinstall.

7. Make sure the device for displaying of live view is correctly installed and set. For more detailed description see the section called "Installation of a Device for Displaying of Live View (frame grabber)" on page 10.

Camera is not responding and it is not possible to turn it off. How do I make the camera work again?

Before you turn the camera off, it is necessary to always close its control panel first. Only then it is possible to turn off and eventually disconnect the camera. If you turn off the camera while running the control panel or if you disconnect the USB cable, it may cause the above mentioned "getting stuck" of the camera. In this case disconnect the USB cable and the mains if it is connected, and take the battery out of the camera. Wait a few seconds, insert the battery back in and turn the camera back on. After all these steps, the camera should work correctly again.

Camera is not available as a Mass Storage device. Is this a standard situation?

Yes, if you switch the camera to the *PC CONTROL* mode, it is not possible to access it as a Mass Storage device. If you want to work with the camera like with a removable disc, it is necessary to turn off the *PC CONTROL* mode – for more information see see "Switching the Camera to the PC Control Mode" on page 10. The necessity to switch the mode of the camera will drop out if you use the USB card reader.

The possibilities to control the OLYMPUS® digital cameras from the QuickPHOTO MICRO 3.1 program from the standard user accounts (without administrator's privileges) in the Microsoft® Windows® XP/Vista/7/8.1/10 operating systems.

- **OLYMPUS® E-330 Digital SLR Camera:**

  This camera cannot be used in the Microsoft® Windows® Vista/7/8.1/10 operating systems at all. To use this camera in the Microsoft® Windows® XP operating system, it is necessary to use an account with the administrator's privileges.

- **OLYMPUS® E-3, E-30, E-620, E-520, E-450, E-420, E-510, E-410 Digital SLR Cameras:**

These cameras can be used from the standard user accounts in the Microsoft® Windows® XP/Vista/7/8.1/10 operating systems.

- **OLYMPUS® CAMEDIA® and SP Series Consumer Digital Cameras:**

These cameras can be used from standard user accounts in the 32bit versions of Microsoft® Windows® XP/Vista/7/8.1/10 operating systems.

To use those cameras in the 64bit versions of Microsoft® Windows® 7/8.1/10 operating systems, it is necessary to use the account with administrator's privileges.

Note
To run the program with administrator's privileges, click the right mouse button on the program shortcut and select the *Run as administrator* option.

OLYMPUS® E-330 Digital SLR Camera

Important
OLYMPUS® E-330 Digital SLR Camera cannot be controlled from the Microsoft® Windows® Vista/7/8.1/10 operating systems. In order to control it from the Microsoft® Windows® XP operating system, it is necessary to use an account with administrator's privileges.

OLYMPUS® E-330 digital SLR camera cannot be connected by the QuickPHOTO MICRO 3.1 program. How to solve this problem?

1. Make sure the camera is turned on and switched to the *PC CONTROL* mode. For more information see the section called "Installation of OLYMPUS® Digital Camera" on page 10.
2. Make sure your Microsoft® Windows® XP operating system has installed the Service Pack 3.

3. Make sure you are signed in to an account with administrator's privileges.
4. Make sure the camera is connected to the computer using the USB cable.
5. Make sure you have selected the correct device for live view displaying, in the QuickPHOTO MICRO 3.1 program's *Options*.
6. Make sure you have selected, in the QuickPHOTO MICRO 3.1 program in *Imaging Devices* menu the *OLYMPUS® E-system SLR camera* option.
7. Make sure the battery in the camera is fully charged.
8. Make sure the firmware version 1.2 or newer is loaded in the camera. Current version of the firmware can be found out the following way: turn on the camera, disconnect the USB cable, press the *MENU* button, go to the *Settings 2* (symbol of a key with the number 2), and here select the item *Firmware* (the last item). *Firmware Body:* 1.2 or newer is necessary. If your firmware version is lower, load a new firmware into your camera using the *OLYMPUS MASTER* program (internet connection is necessary for the update) or you can contact the authorized OLYMPUS® service.
9. Run the *Camera Setup* wizard again (...\Program Files\Common Files\OLYMPUS\service\setupcam.exe) and proceed according to the wizard's instructions.
10. Turn the camera off and back on.

Live view from OLYMPUS® Digital Cameras (E-System, CAMEDIA® and SP series)

Important

Neither the Leadtek WinFast VC100 XP device nor the Grand AV USB 2.0 device (white USB device delivered with the previous versions of the program) is compatible with the Microsoft® Windows® 7/8.1/10 operating systems. In these operating systems use the AV USB 2.0 Pro or CHRONOS USB MOVIE GRABBER device.

Note

When using the AV USB 2.0 Pro device with the control panel of OLYMPUS® CAMEDIA® and SP series digital cameras on the computer where the Grand AV USB 2.0 device has been installed (white USB device delivered with the previous versions of the program) an error message may be displayed because of the *cresprop.ax* file. In this case use the *AV USB 2.0 Driver Cleaner* tool for removing of the Grand AV USB 2.0 device drivers from the operating system. This tool can be found on the QuickPHOTO MICRO 3.1 installation disk in the *Utilities* folder.

In the control panel of the OLYMPUS® digital camera it is not possible to see the live view, it is black and white or it has improper hue.

1. Make sure in the *Device manager* of the Microsoft® Windows® whether the device for displaying of live view has properly installed drivers.

   - **AV USB 2.0 Pro Device:**
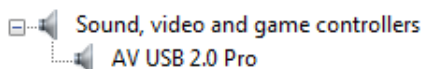
   - **Leadtek WinFast VC100 XP Device:**
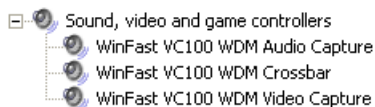
2. Make sure the video output of the camera is connected to the device for live view displaying. Into the yellow CINCH connector of the device for displaying of live view, should be connected the CINCH connector of the cable of the TV output of the camera.

3. Make sure in the QuickPHOTO MICRO 3.1 program *Options (Edit → Options... → Hardware → OLYMPUS SLR/Consumer Cameras)* the *Video Standard* is set to *PAL*

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or *PAL-B* value and the *Input* is set to *Composite*. To restore the default settings of the device for live view displaying, you may use the *Restore* button on this tab.

4. Make sure the video output of the OLYMPUS®camera is set on *PAL*. Proceed as follows:

   • **OLYMPUS® E-system Series Digital SLR Cameras**

   Disconnect all cables from the camera. Activate the camera's menu. In the *Settings 2* submenu (symbol of a key with the number 2 on it) find the *VIDEO OUT* option and make sure the *PAL* option is active.

   • **OLYMPUS® CAMEDIA® and SP Series Consumer Digital Cameras**

   Disconnect all cables from the camera except for the power cable. Activate the camera's menu. In the *Set* submenu find the *VIDEO OUT* option and make sure the *PAL* option is active. Further on find the *ALL RESET* option and set it to *OFF* value.

5. Make sure, on the *Live image* tab in the control panel, the values of brightness, contrast, saturation, and hue has proper values. For setting of the default values use the *Default* button.

6. Make sure in your operating system is not installed any of the codec packages, for example: *K-Lite Codec Pack, Codec Pack All in 1, ACE Mega CoDecS Pack, Vobsub, ffdshow* and so on. If you have some of these packages installed in your computer, uninstall it.

7. In case of using the OLYMPUS® E-system series digital SLR camera and the Grand AV USB 2.0 device for displaying of live view (white USB device delivered with the previous versions of the program) make sure the USB cables of the camera and the Grand AV USB 2.0 device for displaying of live view are not connected into the same USB controller.

Live view from the OLYMPUS® digital camera on the computer monitor has a low quality (it is checkered or snatchy).

If you use, for displaying of the live view on the computer monitor, an external USB device, proceed as follows:

1. Make sure the USB device is connected to the USB 2.0 or USB 3.0 port of your computer. If your computer does not have any free USB ports, install an additional USB 2.0 or USB 3.0 controller into your computer.

2. Make sure your computer's performance corresponds with the minimal system requirements listed in the program specifications.

3. Disconnect all cables from the camera, except for the power cable.

4. Activate the camera's menu. In the *SET* submenu find the *VIDEO OUT* option and make sure the *PAL* option is active. Further find the *ALL RESET* option and set it to *OFF* value.

When running the OLYMPUS® digital camera control panel a message: "No video device is selected. Live view won't be available." pops up.

Device for live view displaying is probably not correctly configured in the QuickPHOTO MICRO 3.1 program. Configure your device in the program *Options (Edit → Options... → Hardware → OLYMPUS SLR/Consumer Cameras*) or by the *Configuration Wizard...* of the program (*Edit → Configuration Wizard...*).

3. Live View from Analog Video Sources FAQ

There is no live view displayed in the control panel of the analog video source.

1. Make sure the video output of the analog video signal source is connected to the device for live view displaying.
2. Make sure in the QuickPHOTO MICRO 3.1 program in the *Options (Edit → Options... → Hardware → Analog Video Source)* there is set the *Video Standard* option corresponding with the analog video source used video standard and the selected *Input* option corresponds with the live view displaying device used input connector. To restore the default settings of live view you may, on this tab use the *Restore* button.

3. Make sure in your operating system is not installed any of the codec packages, for example: *K-Lite Codec Pack, Codec Pack All in 1, ACE Mega CoDecS Pack, Vobsub, ffdshow* and so on. If you have some of the packages installed in your computer, uninstall them.

Live view from the analog video source on the computer monitor has a low quality (it is checkered or snatchy).

If you are using, for displaying of live view on your computer monitor, an external USB device, proceed as follows:

1. Make sure the USB device is connected to the USB 2.0 or USB 3.0 port. If your computer does not have any free USB ports, install an additional USB 2.0 or USB 3.0 controller into your computer.
2. Make sure the performance of your computer corresponds with the minimal system requirements listed in the program specifications.

4. ARTRAY ARTCAM Digital Cameras FAQ

The camera's device drivers cannot be installed.

Make sure the camera is connected to the USB 2.0 or USB 3.0 port of your computer. Do not connect the camera to the USB hub.

Live view does not display or it is broken.

The camera is most likely having a compatibility issue with the USB controller. Do not use an extension USB cable for connecting the camera. Use an additional USB 2.0 or USB 3.0 controller for connecting the camera.

Disconnecting of the camera occurs after running of the control panel.

When using automatic exposure mode, make sure the specimen in the camera's field of view is constantly sufficiently illuminated.

5. IDS uEye® Digital Cameras FAQ

When running the camera's control panel an error message about unsuccessful attempt to connect the digital camera appears.

1. Make sure the camera is connected to the USB 2.0 or USB 3.0 port of your computer.
2. Make sure the LED on the top part of the camera is light up with a green light (if the camera is equipped with such a LED). If the LED is not light up or if the red light is on, the camera's drivers have not most likely been installed properly. In this case run the installation of the QuickPHOTO MICRO 3.1 program again and let the installer reinstall the device drivers of the camera.

> **Important**
>
> Install the device drivers from the QuickPHOTO MICRO 3.1 program installation disk. If you install newer device drivers delivered with the camera or downloaded from the internet, the camera may not be working properly.

Live view is not visible or it is snatchy in the IDS uEye® digital camera control panel.

1. Make sure the performance of your computer corresponds with the minimal system requirements listed in the program's specifications.

2. Make sure no computationally demanding program is running on your computer. If such a program is running, terminate it or wait until it is finished.

3. In the control panel of IDS uEye® digital cameras go to the *Settings* tab. Click the *Speed Adjustment* button. Readjustment of the IDS uEye® digital camera's speed (the number of displayed frames per second) to correspond with your computer's performance, will take place.

6. Dongle FAQ

What to do when a USB dongle is flashing and the QuickPHOTO MICRO 3.1 program cannot find it?

Properly working USB dongle should lit constantly. After installation of dongle device drivers the dongle may flash for about one minute. The flashing dongle signalizes the ongoing update of its firmware. Do not run QuickPHOTO MICRO 3.1 program during this time period, otherwise the dongle may stuck flashing. If the dongle keeps flashing for more than one minute, disconnect and reconnect it to the USB port and eventually restart the computer. If this procedure would not help, connect the dongle to another computer with the dongle drivers installed. Do not run any programs and wait for about one minute. The dongle should stop flashing and start to lit again. After this procedure you can connect the dongle to your original computer; it should be ready to use again.

7. Time-Lapse Video FAQ

It is not possible to play the video file created using the Time-Lapse Video module.

Install a codec from the QuickPHOTO MICRO 3.1 program installation disk (or the extracted folder), from the *Codec* folder, to the computer on which you want to play the created video file. You may also download the codec for free from the website: www.promicra.com.

System Requirements

Minimal System Requirements

- Single-core 2.4 GHz or multi-core processor
- 1 GB RAM
- DVD drive
- 2x USB 2.0/3.0 port

Supported Operating Systems

- Microsoft® Windows® XP(SP3)/Vista/7/8.1/10

Minimal Monitor Resolution:

- 1024 x 768 pixels

Supported Imaging Devices:

You can find the list of currently supported imaging devices on the www.promicra.com website.

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