

Prima **EXPERT** DIGITAL MICROSCOPE

USER'S MANUAL



ЦИФРОВОЙ МИКРОСКОП
ЭКСПЕРТ

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SPECIFICATION

Magnification	10x ~ 100x (continuously tunable built-in objective)
Field of view, mm	20 ~ 2
Minimum visible size, μm	8
Image sensor	1/4" CMOS VGA 640x480
Operation modes	on-stand and handheld
Illumination	independently controlled white LED (top & bottom light)
Capture	snapshot, streaming and time lapsed video, set of slides
Function of linear size measurement	yes
Interface	USB 1.1.
Dimensions, mm	less than 120x170x250
Weight, kg	less than 0.5

SAFETY PRECAUTIONS

- Do not attempt to disassemble and service the product yourself. Opening the covers may expose you to dangerous voltage points.
- Using the opto-electronical module in handheld mode be sure that electrical terminals are covered by protective rubber stopper.
- Do not use the appliance in a wet location. Avoid contact with liquids as it might short circuit parts and cause a fire or electric shock of the appliance or computer.
- Unplug the appliance from the computer and refer to an authorized service center if the appliance has been damaged or there are noticeable signs of overheating during the work.

CONTENTS

Main parts of the microscope are shown in fig.1:

1. Opto-electronical module **$\mu\text{View}^{\text{TM}}$** .
2. Stand.
3. USB cable for connecting to PC.
4. Slide.
5. Cover glass.
6. CD with application software and User's Manual.
7. Tweezers.
8. Calibration plate.
9. Quickguide.

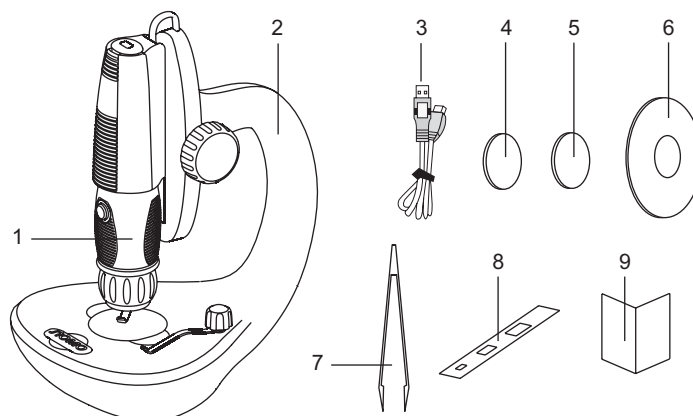


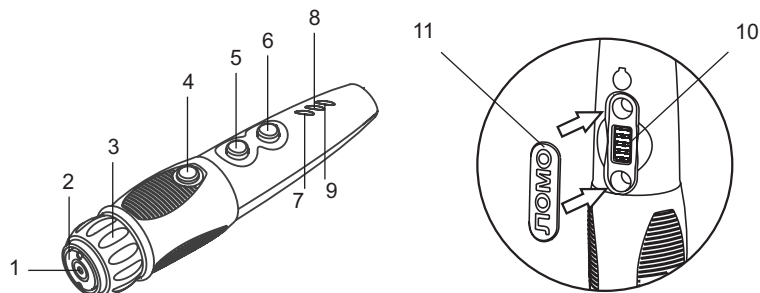
Fig.1. General view and main parts.

MAIN PARTS

Opto-electronical module **$\mu\text{View}^{\text{TM}}$**

General view and details of the opto-electronical module **$\mu\text{View}^{\text{TM}}$** are shown in fig.2:

1. Objective.
2. LED illumination (top light).
3. Magnification ring.
4. Snapshot button.
5. Illumination light control (decrease).
6. Illumination light control (increase).
7. Power indicator.
8. Operation indicator.
9. Saving mode indicator.
10. Electric terminals to plug the opto-electronical module **$\mu\text{View}^{\text{TM}}$** to the stand for bottom light energizing in on-stand operation mode.
11. Rubber stopper to protect the electric terminals of the opto-electronical module **$\mu\text{View}^{\text{TM}}$** in handheld operation mode.

Fig.2. Opto-electronical module $\mu\text{View}^{\text{TM}}$.

Stand

General view and details of the stand are shown in fig.3:

1. Base.
2. LED illumination (bottom light).
3. Slide and cover glass.
4. Holder of the opto-electronical module $\mu\text{View}^{\text{TM}}$.
5. Focus adjustment knob.
6. Fixing clips.
7. Transparent cover.
8. Racks.
9. Electrical terminals.

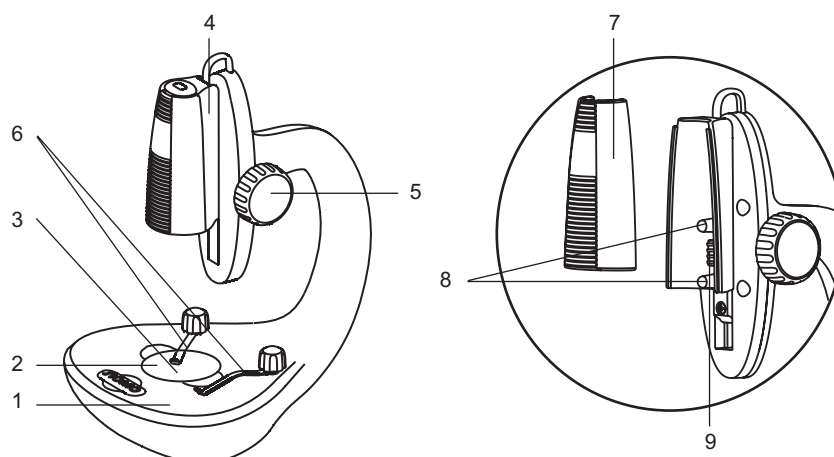


Fig.3. Stand.

Calibration plate

The calibration plate pattern is represented in fig.4:

The pattern comprises three calibration grids which may be used for definition of the magnification index during the measuring procedure.

The smallest grid should be applied for calibration at highest values of magnification and *vice versa*.

The plate is marked by grid width values as well by values of separate strip width.

More detailed information about the function of linear size measurement may be found in present User's Manual below.

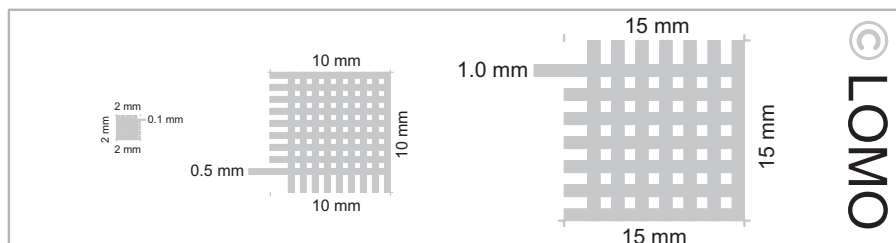


Fig.4. Calibration plate.

INSTALLATION

System requirements

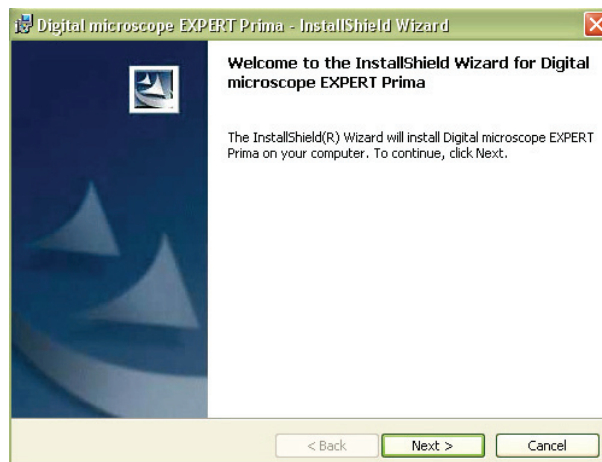
OS	Windows 2000, XP
Processor	Pentium III, Celeron, AMD Athlon
RAM	128 MB
Free space on hard drive	20 MB
Video	16 bit
CD-ROM drive	4X
USB	1.1

Software installation

Place the installation CD into CD-ROM driver. The installation program should be started automatically. Otherwise, please, execute the Setup.exe file directly from the CD. Select the installation language and click the **Install** button in **Setup** window.

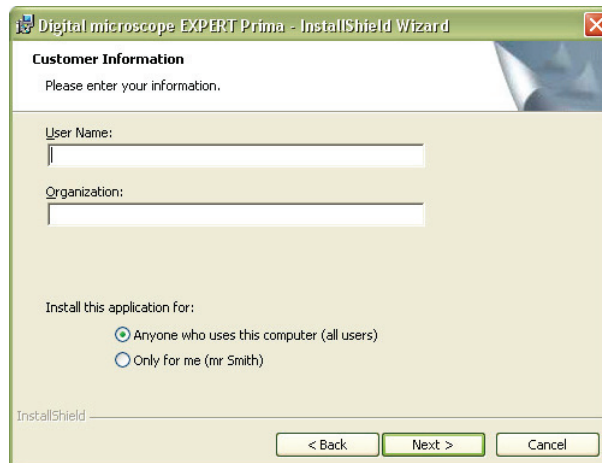


Then click **Next**.



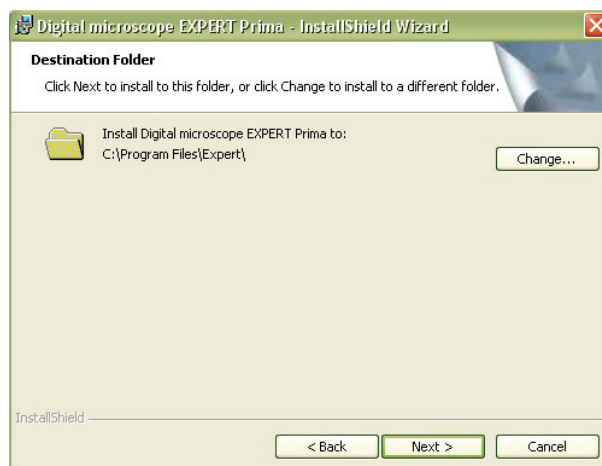
Fill the data fields concerning the user name and organization.

Select either you wish to install the application for private use or for anyone who uses the computer. Then click **Next** to continue.



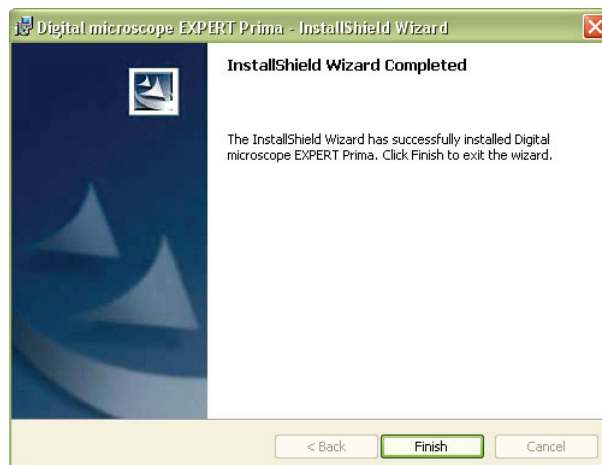
The screenshot shows the 'Customer Information' screen of the 'Digital microscope EXPERT Prima - InstallShield Wizard'. The title bar includes the application icon and the text 'Digital microscope EXPERT Prima - InstallShield Wizard'. The main area has a header 'Customer Information' with a sub-header 'Please enter your information.' Below this are two text input fields: 'User Name:' and 'Organization:'. Further down, there is a section 'Install this application for:' with two radio button options: 'Anyone who uses this computer (all users)' (which is selected) and 'Only for me (mr Smith)'. At the bottom left, the 'InstallShield' logo is visible. At the bottom right, there are three buttons: '< Back', 'Next >' (highlighted with a green border), and 'Cancel'.

Select the destination folder where you prefer to place the application file and click **Next**.



The screenshot shows the 'Destination Folder' screen of the 'Digital microscope EXPERT Prima - InstallShield Wizard'. The title bar includes the application icon and the text 'Digital microscope EXPERT Prima - InstallShield Wizard'. The main area has a header 'Destination Folder' with a sub-header 'Click Next to install to this folder, or click Change to install to a different folder.' Below this, there is a folder icon and the text 'Install Digital microscope EXPERT Prima to: C:\Program Files\Expert\'. To the right of this text is a 'Change...' button. At the bottom left, the 'InstallShield' logo is visible. At the bottom right, there are three buttons: '< Back', 'Next >' (highlighted with a green border), and 'Cancel'.

Click **Finish** to complete the installation.



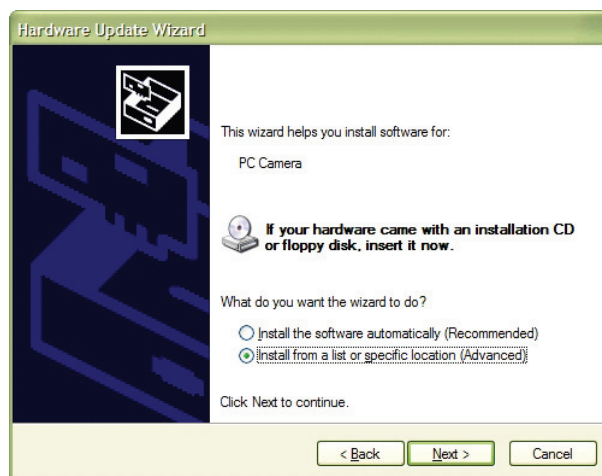
The screenshot shows the 'InstallShield Wizard Completed' screen of the 'Digital microscope EXPERT Prima - InstallShield Wizard'. The title bar includes the application icon and the text 'Digital microscope EXPERT Prima - InstallShield Wizard'. The main area has a header 'InstallShield Wizard Completed' and a message: 'The InstallShield Wizard has successfully installed Digital microscope EXPERT Prima. Click Finish to exit the wizard.' On the left side, there is a blue graphic with a white square icon. At the bottom right, there are three buttons: '< Back', 'Finish' (highlighted with a green border), and 'Cancel'.

The application icon will appear on PC desktop.

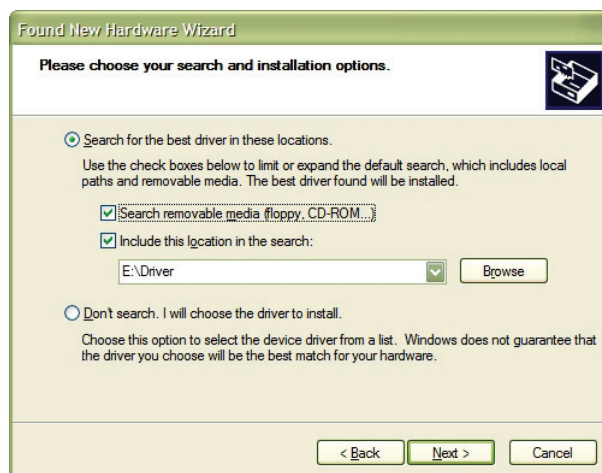
Connect the digital microscope EXPERT to the PC using the USB cable. Select **"No, not this time"** in the window **"Found New Hardware Wizard"** and click **Next**.



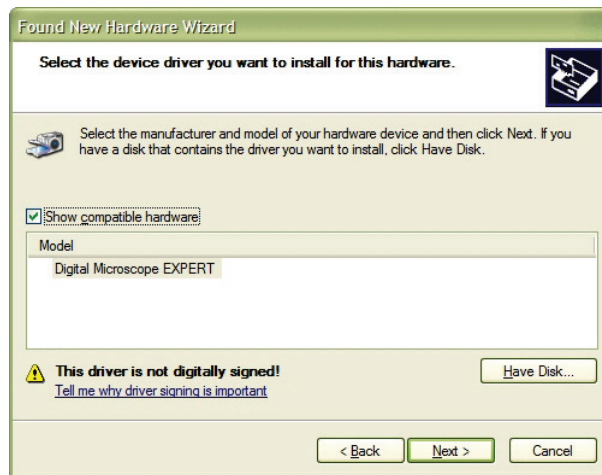
Select **"Install from a list or specific location (Advanced)"** in the window **"Hardware Update Wizard"** and click **Next**.



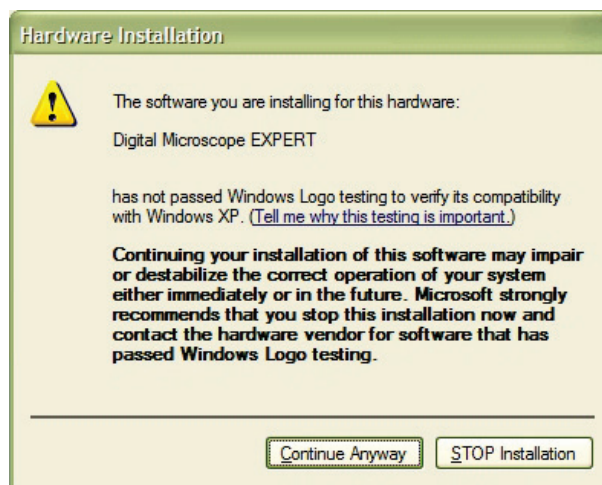
Set the path to the folder **Driver** on the installation CD and click **Next**.



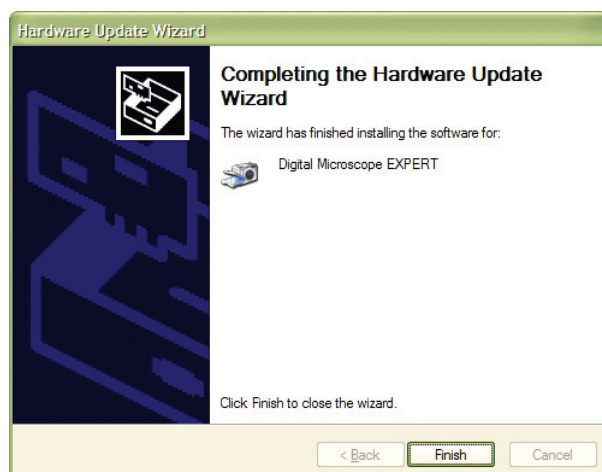
Select **Digital Microscope EXPERT** driver and click **Next**.



When the “**Hardware installation**” warning message appears, click **Continue Anyway**.

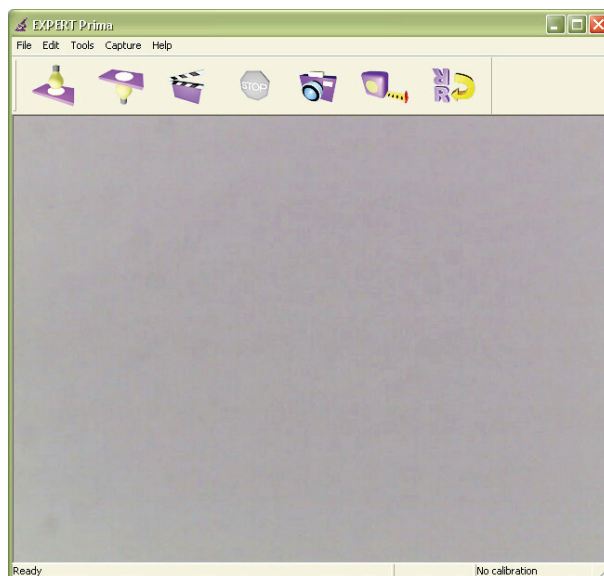


Click **Finish** to complete the installation of the hardware drivers.



Getting started with the application software

Run the file **Prima** from **Start** bar or click the icon . The main window of the application software will appear on display.



Settings and parameters of user's interface

To set the parameters of the user's interface select the menu items **Tools** → **Options**. The window **Options** will appear (fig.5).

The fields and radio buttons of this window have the following meanings:

1. Folder where files with snapshot images will be saved.
2. Video filename.
3. Hard disk space reserved for video file.
4. Video duration.
5. Time interval between frames in time lapsed video.
6. Streaming video.
7. Time lapsed video.
8. Sequence of slides with time interval.
9. Date and time of snapshot.
10. Automatic image rotation while docking the opto-electronical handpiece **μView™** on the stand.

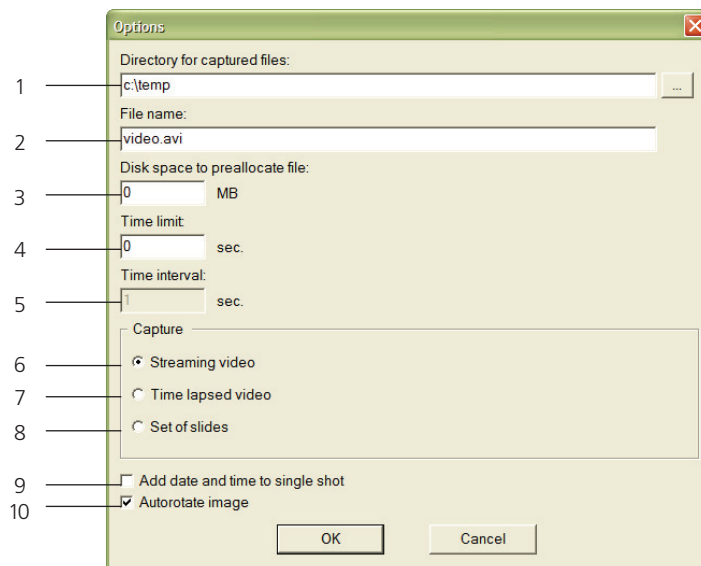


Fig.5. Settings of the user's interface.

To set the parameters of the image source select the menu items **Tools** → **Parameters**. The window **Video Source** will appear (fig.6).

The fields and radio buttons of this window have the following meanings:

1. Capture source selection folder. If your PC is connected to several image sources select **Digital microscope EXPERT** in this window.
2. Image controls.
3. White balance.
4. Exposure.
5. USB bandwidth.
6. Default value of the parameters.
7. Vertical flip of image.
8. Mirror flip of image.
9. Color or B&W image.
10. Backlight compensation.
11. No flicker.
12. Low light.

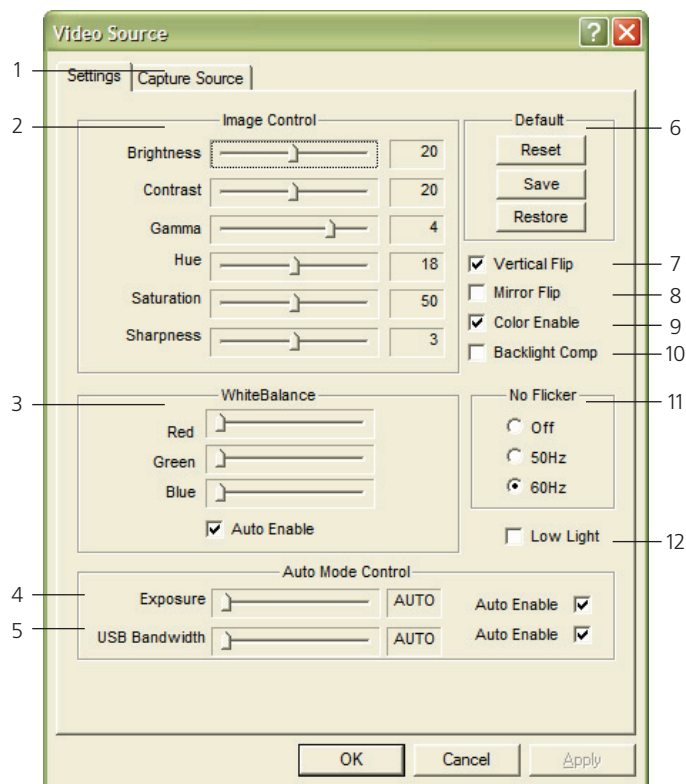


Fig.6. Parameters of the image source.

Control panel



Menu of top light illumination control.



Menu of bottom light illumination control.

Note:

- The values of brightness of top & bottom illumination light are saved and restored automatically under the next execution of the application file.
- Bottom illumination light is off in handheld operation mode and out of control. The control goes on automatically while docking the opto-electronical handpiece **µView™** on the stand.



Video capture start.

Video capture stop.

Snapshot capture.

Calibration.

Image rotation.

Note:

If "Autorotate image" (fig.5) option is ON the image is rotated around the horizontal axis while docking the opto-electronical handpiece **µView™** on the stand.

OPERATION

ON-STAND OPERATION MODE

On-stand operation mode (fig.7) is recommended under high values of magnification. Ensure that the microscope is connected to PC and red power indicator goes on.

Run the file **Prima** from **Start** bar or click the icon . Blue indicator will go on and the main window of the application software with the image viewed by the opto-electronical handpiece **µView™** (1) will appear on display.

Place the object in the field of view of the microscope on the slide (2) of inspection stage of stand (3). Use the cover glass and fixing clips (4) if necessary.

Set the suitable magnification rotating the adjusting ring (5).

Rotating the focus adjustment knob (6) get the contrast image on the display.

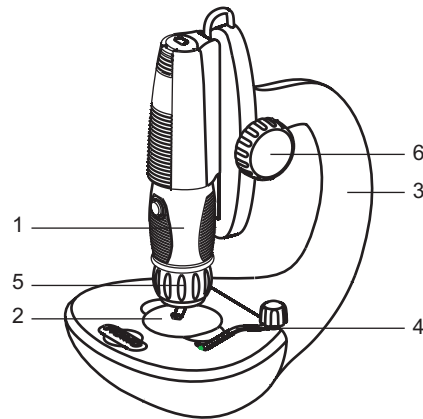


Fig.7. On-stand operation mode.

- To control top light illumination click the icon .
- To control bottom light illumination click the icon .
- To start video capture click the icon . To stop video capture click the icon .
- To take a picture as a snapshot click the icon .
- If you wish to rotate an image around the horizontal axis click the icon .

HANDHELD OPERATION MODE

To make the necessary arrangements before the work with the digital microscope EXPERT in handheld operation mode the opto-electronical module **μView™** (1) should be removed from the stand (2) as shown in fig.8.

Make the following steps.

- disconnect the USB cable from the socket (3) of the opto-electronical module **μView™** (1);
- remove the fixing cover (4) sliding it up as shown in fig.8a;

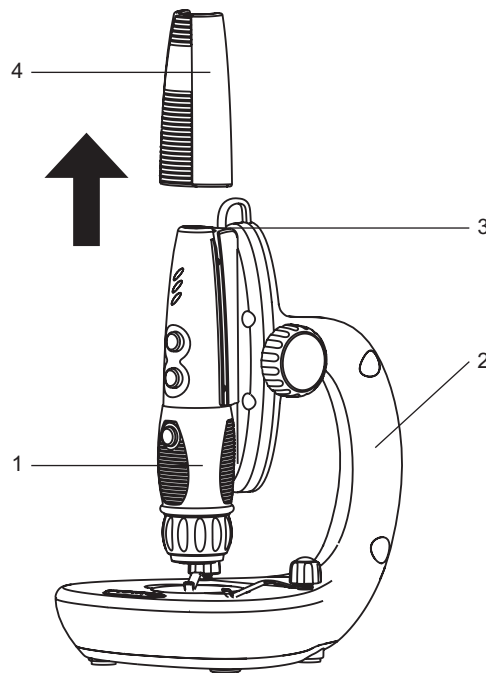


Fig.8a. Getting started to handheld operation mode.

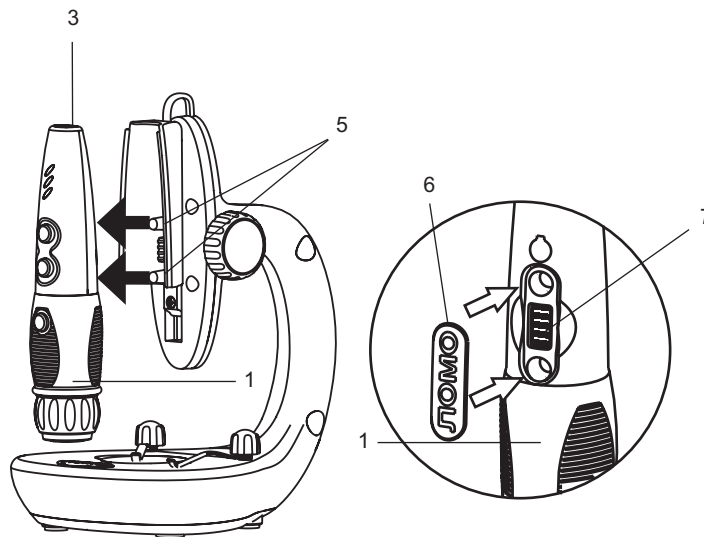


Fig.8b. Getting started to handheld operation mode.

- remove the opto-electronical module **μView™** (1) from the racks (5) in the direction shown by the arrows in fig.8b;
- put the rubber stopper (6) on the opto-electronical module **μView™** (1) to protect the electrical terminals (7) against the accidental contact;
- connect the USB cable to the socket (3) of the opto-electronical module **μView™** (1).

Before the work with the microscope in handheld operation mode (fig.9) ensure that the microscope is connected to PC and red power indicator goes on.

Run the file **Prima** from **Start** bar or click the icon . Blue indicator will go on and the main window of the application software with the image captured by the opto-electronical handpiece **μView™** (1) will appear on display.

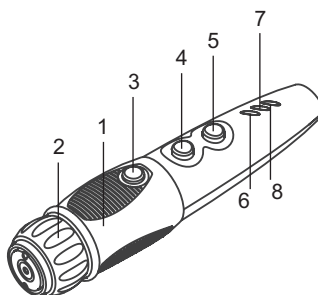


Fig.9. Handheld operation mode.

Set the suitable magnification rotating the adjusting ring (2).

Get the contrast image on the display keeping the opto-electronical handpiece **μView™** (1) at proper distance from the object.

To control top light illumination use buttons (4) and (5). The same control may be done using the user's interface under the icon .

It is recommended to use low values of magnification during the work in handheld operation mode as the uncontrolled tremor of hands makes the image contrast worse. In other aspects handheld operation is similar to on-stand operation mode.

FUNCTION OF LINEAR SIZE MEASUREMENT

The digital microscope EXPERT allows to measure the real linear size of an object under visual inspection. In order to make the correct measurements the preliminary calibration of the microscope should be carried out under the selected value of magnification. To carry out the calibration use the calibration plate enclosed and make the following steps:

- o Place the calibration plate in the field of view of the microscope and get the contrast image on the display. The current status of the microscope **"No calibration"** will be displayed in the bottom right corner of main user's interface.
- o Select one of three calibration grid most suitable for current magnification.
- o Click the icon .
- o Point the cross-like cursor at the edge of a grid's strip as shown in fig.10a and click the left button of the mouse.

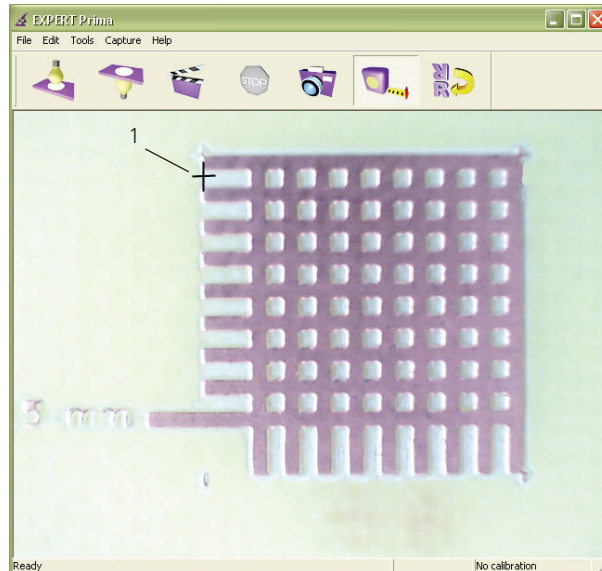


Fig.10a. Calibration.

- o Point the cross-like cursor at the opposite edge of the grid's strip as shown in fig.10b and click the left button of the mouse.

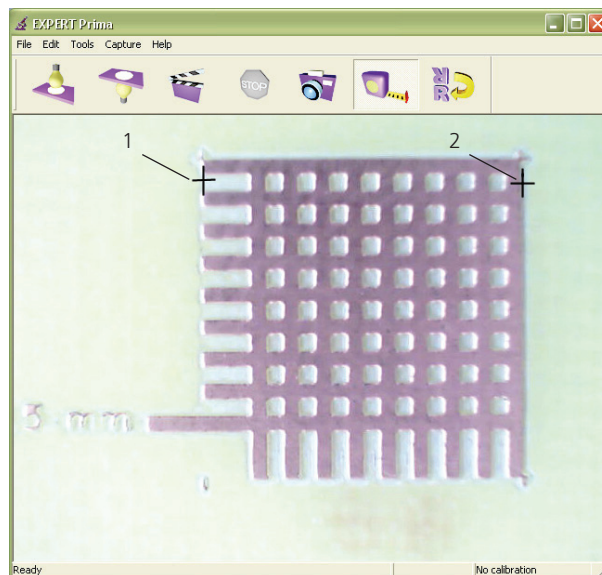


Fig.10b. Calibration.

- o Type the size of the etalon (fig.10c).

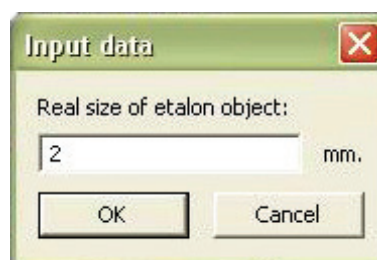


Fig.10c. Calibration.

- o The current value of magnification will be displayed in the bottom right corner of main user's interface.

Now you can make the linear size measurements:

- o Place the object in the field of view of the microscope and get the contrast image on the display.
- o Point the cross-like cursor at the initial point of measurement and click the left button of the mouse.
- o Point the cross-like cursor at the final point of measurement and click the left button of the mouse.
- o The measured value of the distance will be displayed in the bottom field of main user's interface (fig.11).

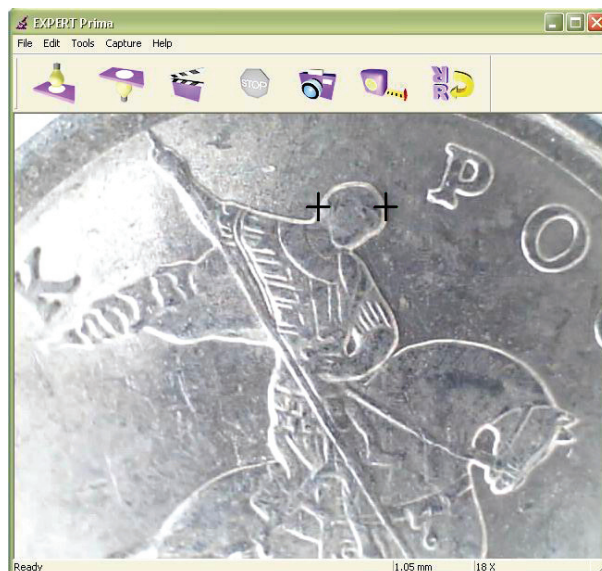


Fig.11. Linear size measurement.

Note:

Calibration should be carried out each time before the measurements after magnification of the microscope is changed.

HOW TO CAPTURE

The user's interface of the digital microscope EXPERT allows to capture and save the images in BMP and AVI files.

Snapshot

In order to capture a still image in handheld operation mode press the button (3) (fig.9) or click the icon . In order to capture a still image in on-stand operation mode click the icon .

Select the folder where you wish to save the file with the image, type the file name and click **Save**.

The picture will be saved as BMP file.

Video

Video may be captured using the user's interface only.

The user's interface allows to capture:

1. «**Streaming video**» which could be saved as AVI file;
2. «**Time lapsed video**» which consists of separate snapshots captured in predetermined time interval and could be saved as AVI file;
3. «**Set of slides**» which consists of separate frames captured in predetermined time interval and could be saved automatically as a set of sequent BMP files.

Note:

Streaming video being saved takes a large amount of hard disk space.

Streaming video

- Open the settings window in the user's interface as **Tools → Options** (fig.5).
- Select «**Streaming video**» in «**Capture**» field.
- Select the folder where you wish to save video file and type its name.
- Predetermine the limitation of hard disk space which would be reserved for video file if necessary.
- Predetermine the limitation of video duration if necessary. The capture will be terminated automatically in the determined time period.
- Click **OK** to save new settings or **Cancel** to restore the previous ones.
- Click the icon  to capture. Green indicator (9) (fig.2) will go on continuously.
- To stop the capture click the icon .

Time lapsed video

- Open the settings window in the user's interface as **Tools → Options** (fig.5).
- Select «**Time lapsed video**» in «**Capture**» field.
- Select the folder where you wish to save video file and type its name.
- Predetermine the limitation of video duration if necessary. The capture will be terminated automatically in the determined time period. Maximum time period does not exceed 2592000 seconds or 30 days.
- Predetermine the time interval between the frames of snapshots. Maximum time interval does not exceed 86400 seconds or one day.
- Click **OK** to save new settings or **Cancel** to restore the previous ones.
- Click the icon  to capture. Green indicator (9) (fig.2) will go on slowly.
- To stop the capture click the icon .
- The frames of snapshots captured in predetermined time interval will be saved as AVI file with predetermined name.

Set of slides

- Open the settings window in the user's interface as **Tools → Options** (fig.5).
- Select «**Set of slides**» in «**Capture**» field.
- Select the folder where you wish to save the files of slides.
- Predetermine the limitation of video duration if necessary. The capture will be terminated automatically in the determined time period. Maximum time period does not exceed 2592000 seconds or 30 days.
- Predetermine the time interval between the frames of snapshots. Maximum time interval does not exceed 86400 seconds or one day.
- Click **OK** to save new settings or **Cancel** to restore the previous ones.
- Click the icon  to capture. Green indicator (9) (fig.2) will go on rapidly.
- To stop the capture click the icon .
- The separate frames captured in predetermined time interval will be saved automatically as a set of sequent BMP files.

MAINTENANCE AND SERVICE

- Remember that your digital microscope is a fine optical instrument comprising the fragile glass components (objective) and shock-sensitive CMOS sensor.
- Do not drop the opto-electronical module **µView™**.
- Keep clean the optical surfaces of the objective and the electrical terminals on the stand and the opto-electronical module.
- Do not use any detergent or volatile solutions which can damage the plastic case and painted surfaces.
- Avoid the liquid entering inside the case as it may cause the damage of the electronic components.