

# BlueLine

LCD



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## General safety instructions

### Intended use: a non-medical device

This microscope is intended for general observation of cells and tissues, with transmitted/reflected illumination and with the specimen fixed on a slide

### Dangers associated with the operation

- Improper use could result in injury, malfunction or damage to property. It must be ensured that the operator informs every user of existing hazards
- Danger of electrocution. Disconnect the power to the entire lighting system before installing, adding or changing any component
- Not to be used in corrosive or explosive environments
- Avoid direct exposure of eyes to the collimated light beam or direct light from the light guides or fibres
- To avoid a hazard to children, account for all parts and keep all packing materials in a safe place

### Photobiological safety LED, important safety instructions

- Avoid direct eye exposure to any LED light source while switched on
- Before looking through the eyepieces of the microscope, lower the intensity of the LED illumination
- Avoid long and high-intensity exposure to LED light because this may cause acute damage to the retina of the eye

### Prevention of biological and infectious hazards

Infectious, bacterial or viral biohazard substances under observation may be a risk to the health of humans and other living organisms. Special precautions should be taken during in vitro medical procedures:

- **Biological hazards:** keep a logbook of all the biological substances or pathogenic microorganisms that were under observation with the microscope and show it to everybody before they use the microscope or before they do some maintenance work on the microscope! Agents can be bacterial, spores, enveloped or non-enveloped virus particles, fungi or protozoa
- **Contamination hazard:**
  - A sample that is properly enclosed with a cover glass never comes in direct contact with the microscope parts. In that case prevention of contamination lies in the handling of the slides; as long as the slides are decontaminated before use and are undamaged and treated normally, there is virtually zero risk of contamination
  - A sample that is mounted on a slide without cover glass, can come in contact with components of the microscope and may be a hazard to humans and/or the environment. Therefore, check the microscope and accessories on possible contaminations. Clean the microscope surfaces and its components as thoroughly as possible. Should you identify a possible contamination, inform the local responsible person in your organisation
  - Microscope operators could be contaminated from other activities and cross-contaminate components of the microscope. Therefore, check the microscope and accessories on possible contaminations. Clean the microscope surfaces and its components as thoroughly as possible. Should you identify a possible contamination, inform the local responsible person in your organisation. It is recommended to wear sterile gloves when preparing the slides and handling the microscope in order to reduce contamination by the operator
- **Infection hazard:** direct contact with the focusing knobs, stage adjustments, stage and eyepieces/tubes of the microscope can be a potential source of bacterial and/or viral infections. The risk can be limited by using personal eyeshades or eyepieces. You can also use personal protections such as operation gloves and/or safety goggles, which should be changed frequently to minimize the risk
- **Disinfectant hazards:** before cleaning or disinfecting, check if the room is adequately ventilated. If not, wear respiratory protective gear. Exposure to chemicals and aerosols can harm human eyes, skin and respiratory system. Do not inhale vapours. During disinfection, do not eat, drink or smoke. Used disinfectants must be disposed of according to local or national regulations for health and safety

## Disinfection and decontamination:

- Exterior casing and mechanical surfaces must be wiped with a clean cloth, dampened with a disinfectant
- Soft plastic parts and rubber surfaces can be cleaned by gently wiping a clean cloth, dampened with a disinfectant. Discoloration can occur if alcohol is used
- The front lens of eyepieces and objectives are sensitive to chemicals. We recommend not to use aggressive disinfectants but to use lens paper or a soft fibre-free tissue, dampened in cleaning solution. Cotton swabs may also be used. We recommend you use personal eyepieces without eyeshades in order to minimize risk
- Never immerse or dip the eyepiece or objective into a disinfectant liquid! This will damage the component
- Never use abrasive compounds or cleaners that may damage and scratch optical coatings
- Properly clean and disinfect all possible contaminated surfaces of the microscope or contaminated accessories before storing for future use. Disinfection procedures must be effective and appropriate
- Leave the disinfectant on the surface for the required exposure time, as specified by the manufacturer. If the disinfectant evaporates before the full exposure time, reapply disinfectant on the surface
- For disinfection against bacteria, use a 70% aqueous solution of isopropanol (isopropyl alcohol) and apply for at least 30 seconds. Against viruses, we recommend to refer to specific alcohol or non-alcohol based disinfection products for laboratories

Before returning a microscope for repair or maintenance through a Euromex dealer, an RMA (return authorization form) together with a decontamination statement must be filled in! This document - available from Euromex for any reseller - must be shipped together with the microscope at all times

### Reference documents:

#### World Health Organisation:

<https://www.who.int/ihr/publications/biosafety-video-series/en/>

#### Robert Koch Institut:

<https://link.springer.com/content/pdf/10.1007/s00103-013-1863-6.pdf>

#### US Centre for Disease Control and prevention

<https://www.cdc.gov/infectioncontrol/guidelines/disinfection/index.html>

### Handle with care

- This product is a high quality optical instrument. Delicate handling is required
- Avoid subjecting it to sudden shocks and impacts
- Impacts, even small ones, can affect the precision of the instrument

### Handling the LED

**Note:** Always disconnect the power cord from your microscope before handling the LED bulb and power unit and allow the system to cool down approximately 35 minutes to avoid burns

- Never touch the LED with your bare hands
- Dirt or fingerprints will reduce the life span and can result in uneven illumination, lowering the optical performance
- Use only original Euromex replacement LEDs
- The use of other products may cause malfunctions and will void warranty
- During use of the microscope the power unit will get hot; never touch it while in operation and allow the system to cool down approximately 35 minutes to avoid burns

### Dirt on the lenses

- Dirt on or inside the optical components, such as eyepieces, lenses, etc., affects the image quality of your system negatively
- Always try to prevent your microscope from getting dirty by using the dust cover, prevent leaving fingerprints on the lenses and clean the outer surface of the lens regularly
- Cleaning optical components is a delicate matter. Please, read the cleaning instructions further on in this manual



## Model with rechargeable batteries

- Always disconnect the power cord from the microscope before you replace the rechargeable batteries
- The rechargeable batteries must not be thrown away as regular trash but should be taken to special waste collection sites, according your local or national regulations
- Risk of explosion: when removing the rechargeable batteries, do not throw the batteries into fire or any other heat source
- Do not replace the rechargeable batteries with non-rechargeable batteries
- Avoid extreme environmental conditions and temperatures which could affect the rechargeable batteries and lead to fire, explosion or leakage of hazardous substances
- If the rechargeable batteries have leaked, avoid contact of the chemicals with skin, eyes and mucous membranes
- When in contact with the chemicals, flush the affected areas immediately with plenty of fresh water and seek medical attention

## Environment, storage and use

- This product is a precision instrument and it should be used in a proper environment for optimal use
- Install your product indoors on a stable, vibration free and level surface in order to prevent this instrument to fall thereby harming the operator
- Do not place the product in direct sunlight
- The ambient temperature should be between 5 to +40°C and humidity should be within 80% and 50%
- Although the system is anti-mold treated, installing this product in a hot, humid location may still result in the formation of mold or condensation on lenses, impairing performance or causing malfunctions
- Never turn the right and left focus knobs in opposite directions at the same time or turn the coarse focus knob past its farthest point as this will damage this product
- Never use undue force when turning the knobs
- Make sure that the microscope system can dissipate its heat (fire hazard)
- Keep the microscope away from walls and obstructions for at least approximately 15 cm
- Never turn the microscope on when the dust cover is in place or when items are placed on the microscope
- Keep flammable fluids, fabric, etc. well out of the way

### Disconnect power

Always disconnect your microscope from power before doing any maintenance, cleaning, assembling or replacing LEDs to prevent electric shocks

### Prevent contact with water and other fluids

Never allow water or other fluids to come in contact with your microscope, this can cause short circuiting your device, causing malfunction and damage to your system

### Moving and assembling

- The BlueLine microscope is a relatively heavy system, consider this when moving and installing the system
- Always lift the microscope by holding the main body and base of the microscope
- Never lift or move the microscope by its focusing knobs, stage or head
- When needed, move the microscope with two persons instead of one

# 1. Overview

## 1.1 Features

- ARM efficient processor
- Supports the snapping and video recording of microscope images
- With calibration and measurement function
- Stable and reliable upgrade function

## 1.2 Application and scope

Designed for the BlueLine microscopes

## 1.3 Operating environment

- **Ambient temperature:** 0 ~ 60°C
- **Relative humidity:** 0% ~ 95%, no condensation
- **Environment:** no vibration, no dust, corrosive gas, flammable gas, oil fog, water vapor, water drop or salt, etc
- **Atmospheric pressure:** 70 ~ 106 kPa
- **Altitude:** ≤5000 M
- **power input:** 5 V

# 2. Parameters and composition

- **Basic structure:** camera with 7-inch IPS display
- **Installation:** mounting on the microscope
- **Weight:** < 25 kg
- **Color:** white, black
- **Surface coating:** spray paint

## 2.1 Parameters

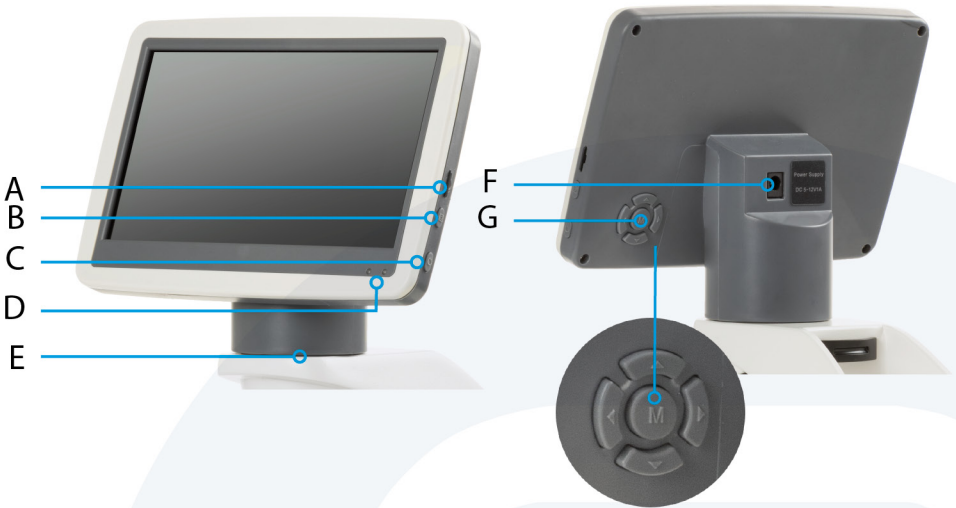
<b>Model</b>	BlueLine LCD
<b>Type of sensor</b>	Color CMOS image sensor
<b>Sensor size</b>	1/2.8 Inch
<b>Pixel size</b>	2.9 μm (H) × 2.9 μm (V)
<b>Resolution ratio</b>	1920 X 1080 p
<b>Exposure control</b>	Auto / manual
<b>Power frequency</b>	DC / 50Hz / 60Hz
<b>White balance control</b>	Auto WB / once WB / manual
<b>Cross-line</b>	4 Sets
<b>Calibration and measurement</b>	Support calibrating and line measuring
<b>Snap</b>	Button snap / timed snap
<b>Video recording</b>	Supported
<b>Frame rate</b>	30 FPS 1920 x 1080
<b>Image adjusting Parameters</b>	Saturation/ Hue / Brightness / Contrast / Monochrome / Flip vertical / Flip horizontal / FOV
<b>Storage for snap and record</b>	micro SD card
<b>Language</b>	English / Chinese / German
<b>Firmware software update</b>	Supported
<b>Overall dimensions</b>	182mm x 125mm x 85mm

## 2.2 Packing List

- 7 Inch display camera system for microscopes (BlueLine LCD)
- 5V/1A power adapter

## 2.3 Appearance

- A.** Micro SD Card Socket
- B.** Snap button
- C.** Power switch
- D.** Power indicator
- E.** Connecting to microscope stand for replacing microscope head (diameter 42 mm)
- F.** Power socket DC 5V
- G.** Menu buttons



## 3. Operation Procedure

Before installing the camera, make sure that all equipment listed in 2.2 is included in the package

### 3.1 Connect the power adapter to the camera

Insert the power adapter of 5V/1A into the power port on the back of the camera. After the power is switched on, the red light will light up. Press the power button at this time, the indicator light will change from red to green and the camera will start up

### 3.2 Use the buttons on the back to operate the interface

Use the buttons on the back to operate the camera functions and adjust the camera parameters. After modifying the parameters exit the interface to save. In the upper left corner of the screen, "Param. saved " appears. This is shown in Figure 3-1

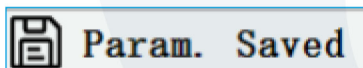


Figure 3-1

### 3.3 Snap

- The snap button is on the right side of the camera, above the power switch. Press it to capture the current image on the screen and store it on the micro SD card
- The screen shows "Snap Succeeded", which means that the picture has been taken successfully. This is shown in Figure 3-2

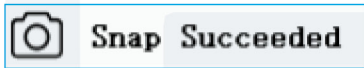


Figure 3-2



**Warning:**

Disconnect the power supply if the equipment is not used for a longer period of time

### 4. Menu and functions



- After turning on the power and pressing the power button, wait for the screen to light up. At this point, press the center button of the menu buttons (marked "M") to call out the menu (figure 4-1). The position of the current cursor (that is, the position of the highlighted icon) is the white balance function option
- Press  for function selection, press  to enter the sub-menu interface of the corresponding functions, press **M** (Menu) to hide the interface, and save all parameters that have been modified



Figure 4-1

The specific functions of this product are shown in figure 4-2

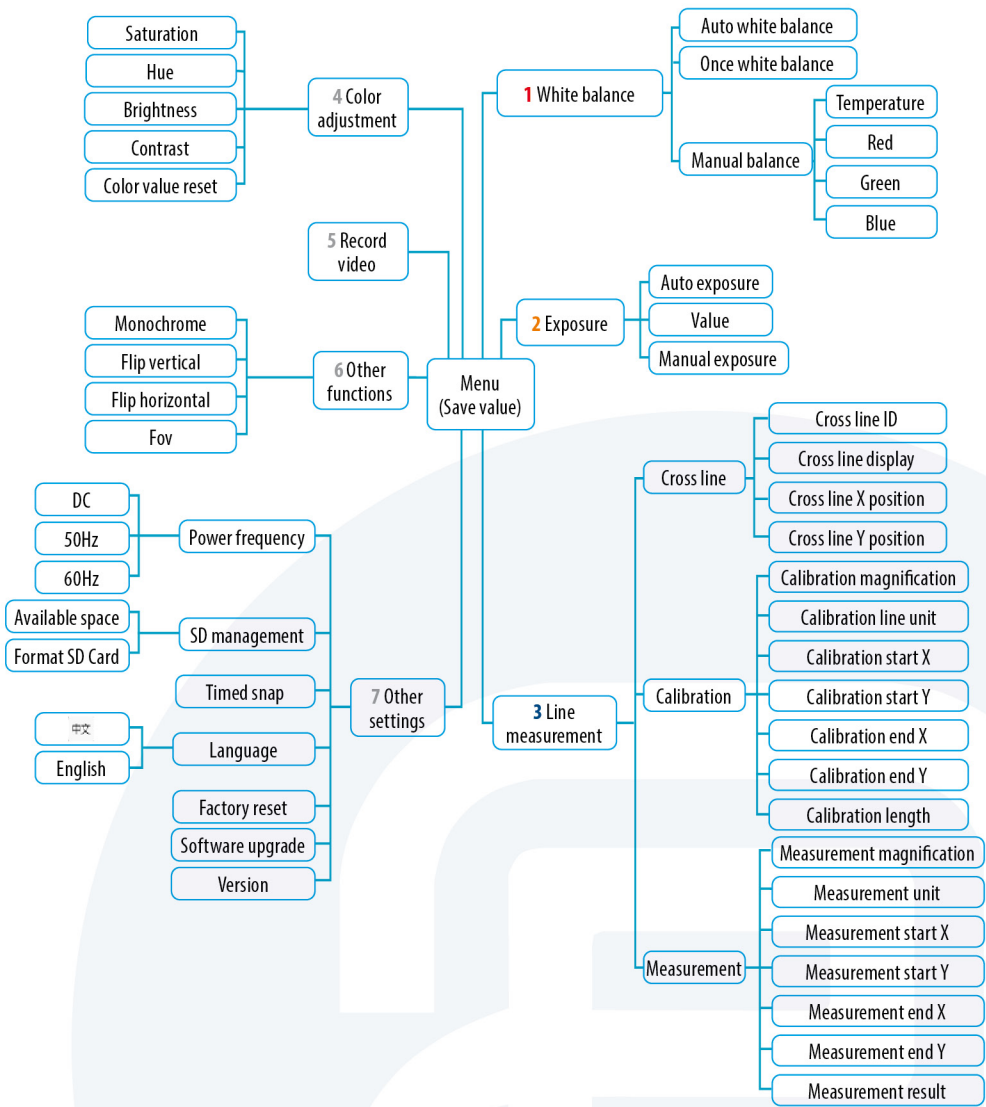


Figure 4-2. Function block diagram of camera

## 5. Operating instructions

### 5.1 White balance

- After entering the white balance menu, the default option is "Auto White Balance", as shown in Figure 5-1
- When the effect of automatic white balance is not ideal due to the difference of color temperature between different light sources, manual white balance can be used to adjust the parameters of color temperature, R, G and B respectively. This is shown in Figure 5-2

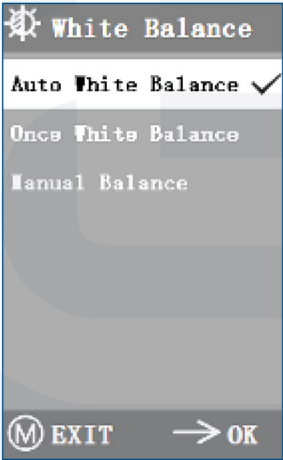


Figure 5-1

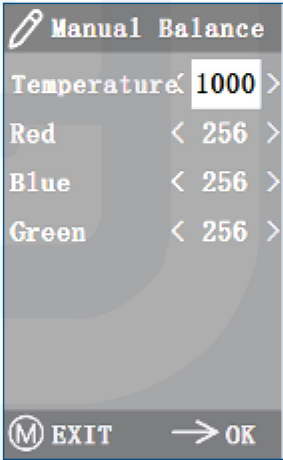


Figure 5-2

### 5.2 Exposure

After entering the exposure menu, the default option is "Auto Exposure", as shown in Figure 5-3. Under automatic exposure, you can adjust the target "Value" to adjust the degree of exposure. In Manual Exposure, you can also adjust the exposure by adjusting the value of exposure "Time ( $\mu$  sec.)". As shown in Figure 5-4

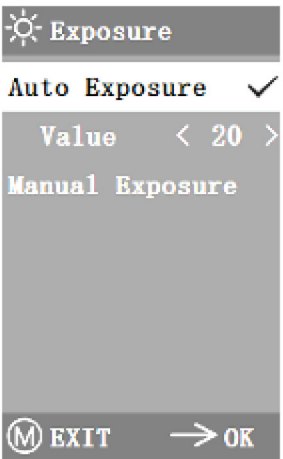


Figure 5-3



Figure 5-4



5.3 Line measurement

This menu includes Cross Line, Calibration and Measurement. As shown in Figure 5-5

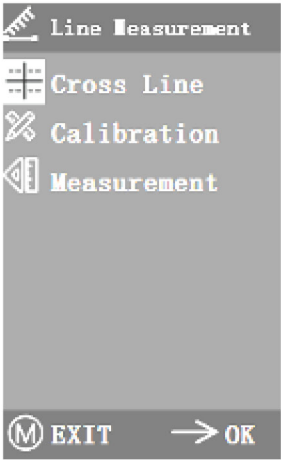


Figure 5-5

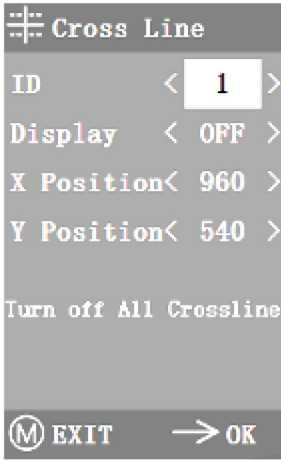


Figure 5-6

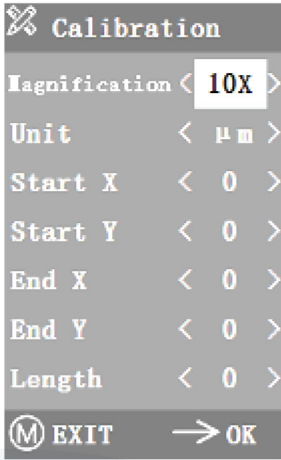


Figure 5-7

5.3.1 Cross Line

- Four groups of crosslines are provided in red, blue, green and white colors. You can choose according to your requirements
- Enter the Cross Line menu, as shown in Figure 5-6. "ID" refers to the number of each group of crosslines. "Display" adjusts whether the reticle is displayed. "X position" and "Y Position" adjust the position of the center point of the reticle
- You can select and press the "Turn off All Crosslines" to close all crosslines

5.3.2 Calibration

There are default calibration values for this product. However, due to the different objective standards of the microscope, the calibration value may have errors, so it is suggested to recalibrate. The following is the calibration process

1. Calibration requires a micrometer. Put the micrometer on the object platform and adjust the microscope so that the micrometer scale is clearly displayed on the screen. In order to facilitate calibration it is suggested to rotate the micrometer so that it is placed horizontally in the screen without being blocked by the menu
2. After entering the Calibration menu, as shown in Figure 5-7 adjust the positions of the starting and ending points of calibration to make the calibration line coincide with the micrometer scale and try to select the length containing as many scales as possible, so as to make the measurement more accurate

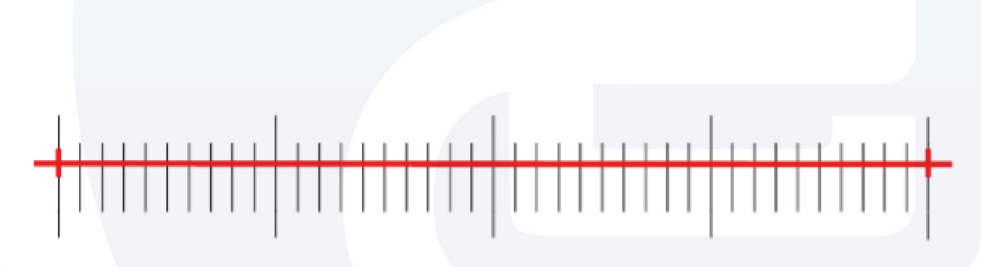


Figure 5-8

- 3. The minimum range of the selected micrometer is 0.01 mm (10 micron). Figure 5-8 shows the image under a 10x objective. At this time the "magnification" is set to "10X", the "unit" is marked as "μm", and the "length" is set to "40"
- 4. After adjusting the parameters, exit the calibration interface, and the calibration is completed

5.3.3 Measurement

- The image needs to be calibrated before it can be measured. Since the calibration ruler of different magnifications is different, it needs to be calibrated separately under different objective lenses
- Enter the Measurement menu. Select the measurement magnification, adjust the starting and ending point, and the measurement length is displayed at the bottom in real time, as shown in Figure 5-9
- Changes in the field of vision do not affect the measurements

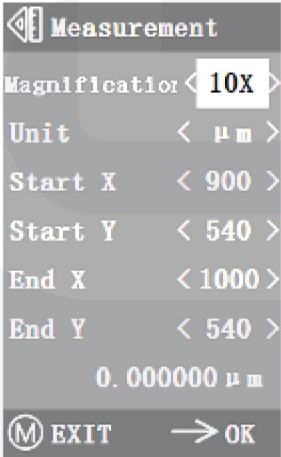


Figure 5-9

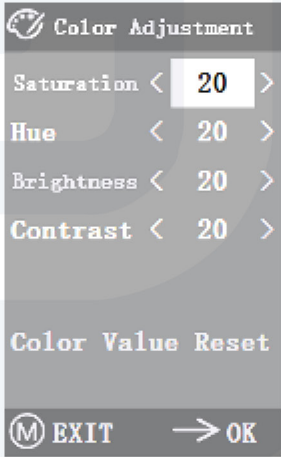


Figure 5-10

5.4 Color Adjustment

After entering the Color Adjustment menu, as shown in Figure 5-10, Saturation, Hue, Brightness and Contrast can be adjusted to make the picture reach the required level. In order to facilitate the color adjustment, the "Color Value Reset" option is added in the menu. When selected and pressed, all the color values in the menu will be restored to the default value

5.5 Record Video

Before recording the video, you should check if a Micro SD-card with a FAT32 file system and free space is inserted. You cannot take a photos during the recording process. The recording time is shown in Figure 5-11

00:00:00

Figure 5-11

### 5.6 Other Functions

The menu includes functions of Monochrome, Flip vertical, Flip horizontal and FOV. The numerical option can be adjusted by the ◀▶ keys and the switch options can be opened and closed by the ▶ key. After the adjustment is completed and the main menu is closed, the function states will be saved. The function states will be retained when the next boot is started. As shown in Figure 5-12

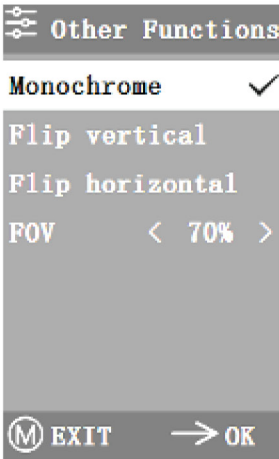


Figure 5-12



Figure 5-13

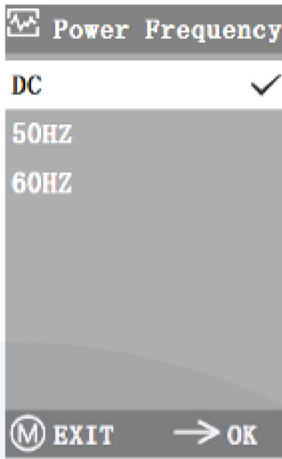


Figure 5-14

#### 5.6.1 Monochrome

This function produces visual images in varying tones of a single color (such as gray)

#### 5.6.2 Filp

This function is divided into Flip Vertical and Flip Horizontal

#### 5.6.3 Field of View

This function can adjust the range of the observation field. Use the ◀▶ key in the menu to adjust the size. You can however adjust the FOV without entering the menu: press the ◀▶ key to adjust, and the percentage will appear in the upper left corner

### 5.7 Other Settings

This menu contains Power Frequency, SD Management, Timed Snap, Language, factory Reset, Software Upgrade, Version. As shown in Figure 5-13

#### 5.7.1 Power Frequency

CMOS detectors have a rolling curtain effect that can causes flicker problems in the image. This can be resolved by adjusting the settings as shown in Figure 5-14 according to your local power situation

### 5.7.2 SD Management

- After inserting the micro SD card, the remaining space and total space of the micro SD card can be seen in "Available Space", as shown in Figure 5-15
- If "0.00 Gb / 0.00 Gb" shows (see Figure 5-16), the micro SD card was not successfully mounted, please try to reinsert it
- Enter "Format SD card" to format, as shown in Picture 5-17. Please backup important files onto your computer before formatting micro SD card

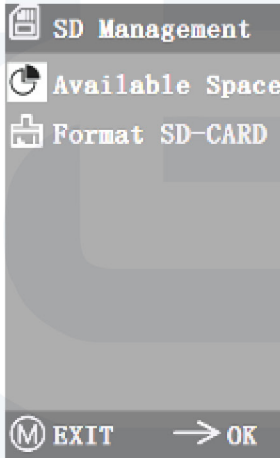


Figure 5-15

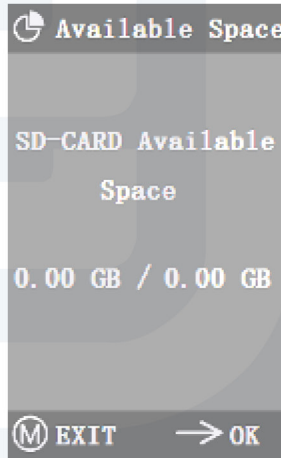


Figure 5-16

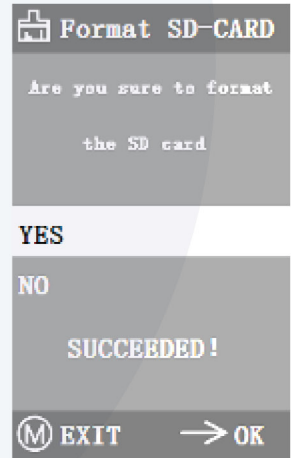


Figure 5-17

### 5.7.3 Timed Snap

- "Hours, Minutes and Seconds" refers to the time interval or timed snap (time lapse), and "Counts" refers to the number of timed snaps. After setting the parameters, move the cursor to "Timed Snap Start" and press ► to start timed snap. At this point the number of photos that has been successfully taken so far is shown at the bottom of the menu. (figure 5-18)
- If the available space of micro SD card is insufficient during the process of timed snap, it will exit

### 5.7.4 Language

The current version can switch between Chinese and English. As shown in Figure 5-19

### 5.7.5 Factory Reset

Press the ► key to reset the menu settings to factory settings. This is shown in Figure 5-20

### 5.7.6 Software Upgrade

Normally no updates will be needed. Only after Euromex publishes an update. Please note that after the system upgrade, the menu parameters will be restored to the factory settings, so you need to record the parameters before the update, so as to restore after the upgrade

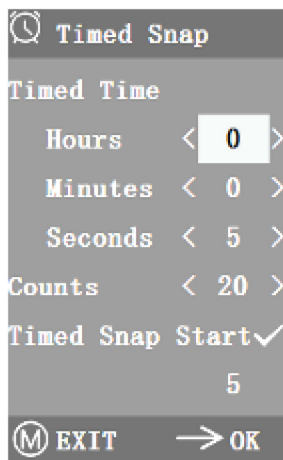


Figure 5-18



Figure 5-19

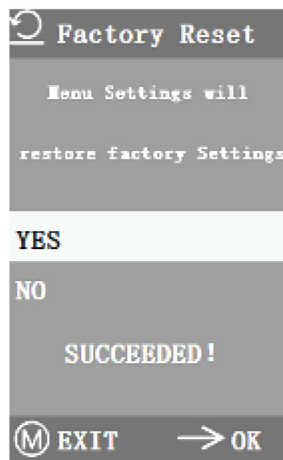


Figure 5-20

### 5.7.6.1 The system is upgraded normally

When system upgrades are published on the Euromex website, the upgrade files can be put onto the micro SD card and a system upgrade can be carried out. The update file name will be similar to the example below:  
main\_app\_v1.0.bin, rootfs\_uclibc\_64k\_v1.0.jffs2

Once the files are copied onto the micro SD card and inserted into the camera the system can be turned on. Select "Yes" to upgrade, and the following message will appear: "UPGRADING..." While the system is being upgraded, as shown in figure 5-21

**Warning:** Please wait for 2-3 minutes, during which time do not operate the device and keep power connected. If "FILES ERROR" or "NO FILE" occurs, please check whether the upgrade file is copied correctly onto the micro SD card and if the version corresponds to the version mentioned on the Euromex website. Try to do the update once more. If problems reoccur, please contact your Euromex dealer

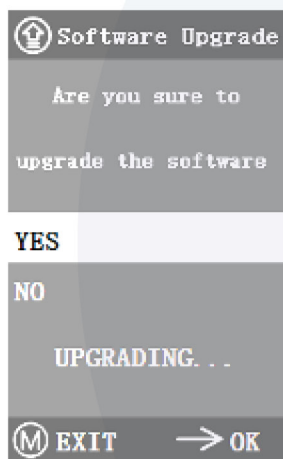


Figure 5-21



Figure 5-22

### 5.7.6.2 System upgrade failed

When a system upgrade fails, it goes into the safe mode, which is used for emergency updates

1. After entering the save mode, "Upgrade Failed", please try again according to the instructions." will be displayed on the screen
2. Insert micro SD card with upgrade files, then the screen shows "Files detected, Press Menu to Upgrade"
3. When you press the Menu key , the screen shows " Upgrading... Please do not power off". When the upgrade is completed, the system will automatically be restarted to complete the upgrade
4. If the screen shows "The version is illegal, please check the file." that means the upgrade file is missing or the version number does not match, please check the version number of the file and update it again

### 5.7.7 Version

You can view the version information of this product, as shown in Figure 5-22

## 6. Failure analysis and troubleshooting

1. When "NO SD-CARD" is displayed while pressing the snap button, recording videos, taking photos at a fixed time, or entering the micro SD card management menu (figure 6-1): please insert a micro SD card with file system FAT32 into the micro SD card slot on the right side of the camera, and then carry out corresponding operations



Figure 6-1

2. When "insufficient available space" is displayed while pressing the snap button, recording videos, and taking photos at a fixed time (figure 6-2): please sort out the micro SD card space on the computer before inserting the card for use

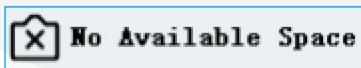


Figure 6-2

3. The camera screen image appears as a wavy pattern: open "Other Settings" - "Power Frequency", select the appropriate power frequency
4. The image is blurry and out of focus: please change the objective or microscope and observe again
5. If an unknown problem occurs and cannot be solved by yourself, please press the power button for 10 sec. to restart. If the problem reoccurs, please contact your dealer