LANOPTIK
Technologies

HDMI Microscope

CE210T

User's Manual

www.lanoptik.com

Content

CHAPTER 1 NOTES AND SAFETY REQUIREMENTS ..... - 1 -

1.1 CAUTIONS AND NOTES ..... - 1 -

CHAPTER 2 PACKING LIST ..... - 2 -

CHAPTER 3 FUNCTION INTRODUCTION OF EACH PART ..... - 3 -

3.1 NAME AND FUNCTION FOR EACH PART OF THE CAMERA ..... - 3 -

3.2 ACCESSORY ..... - 4 -

CHAPTER 4 INSTALLATION GUIDE ..... - 4 -

4.1 NAME AND FUNCTION FOR EACH PART OF THE CAMERA ..... - 4 -

CHAPTER 5 SPECIFICATIONS ..... - 5 -

CHAPTER 6 THE CONTROL PANEL ..... - 5 -

CHAPTER 7 INSTRUCTIONS OF OPERATION ..... - 6 -

7.1 ARTICULATING ARM ..... - 6 -

7.2 FOCUS ..... - 6 -

7.3 ILLUMINATION ..... - 7 -

7.4 OPERATING MODE: HDMI ..... - 7 -

7.4.1 Recording Media ..... - 8 -

7.4.2 Imaging Modes ..... - 8 -

7.4.3 Photo and Video Modes ..... - 8 -

7.4.4 Photo and Video Settings Menus Page 1/5 ..... - 9 -

7.4.5 Photo and Video Settings Menus Page 2/5 ..... - 10 -

7.4.6 Photo and Video Settings Menus Page 3/5 ..... - 12 -

7.4.7 Photo and Video Settings Menus Page 4/5 ..... - 13 -

7.4.8 Photo and Video Settings Menus Page 2/5 ..... - 14 -

7.4.9 Playback Mode ..... - 15 -

7.4.10 Playback Menu ..... - 16 -

7.5 OPERATING MODE: PC ..... - 17 -

CHAPTER 8 DISCLAIMER ..... - 18 -

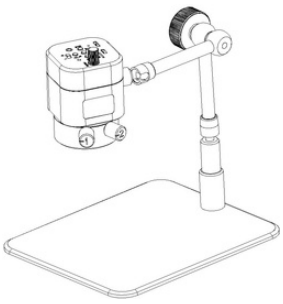
Chapter 1 Notes and Safety Requirements

1.1 Cautions and Notes

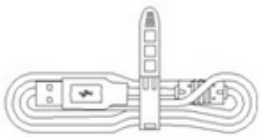
- To avoid danger or damage incurred to the lens, do not touch the lens or sensor directly with your fingers.
- To avoid failure or electric shock hazard and so on, do not disassemble or modify the internal structure of the device.
- Do not plug in or unplug the Power connection port when hands are wet.
- Do not use alcohol and other organic solvents to clean.
- If the lens or sensor is dirty or damp, you should better use dry and non-linen fabric or professional lens tissue to wipe them. To avoid scratches on the surface, do not touch the lens with your fingers. Wipe the lens or sensor lightly.
- The products are not specifically designed for an outdoor use. Do not expose it to outdoor environment without any protection. Excessive temperature and humidity will damage the lens. Please avoid using the product under the following environment: high temperature or high humidity environment, places with direct sunlight, dirt or vibration and places near heat source.
- Please use and store in the following environment:
  Operating temperature：0℃~ 40℃
  Storage temperature：-20℃~ 60℃
  Operating Humidity：30~60%RH
  Storage Humidity：10~80%RH
- If any foreign matter, water or liquid enter into the device by accident, disconnect the Power line immediately. Please send it to the maintenance center and do not use the hair dryer to dry it by yourself.
- To prevent microscope from being tripped over or dropped, please put away the device’s connect cable in use or standby.
- To avoid electric shock by accident, please power off microscope before you move your computer or laptop.
- The cleanliness of the device lens will directly affect clarity degree of contents from the computer screen during preview. Problems like various circles or spots on the screen may mostly be incurred by dirt on the lens. When cleaning, please use professional lens tissue or other professional detergent to clear the dirt on the lens.
- Registered trademark and copyright: Copyright ownership of this produc belongs to Lanoptik Technologies Ltd. Without written authorization of this company, any organizations or individuals shall not photocopy, print, or translation to another language to any part of this document.

Chapter 2 Packing List

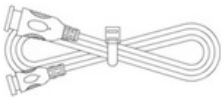
- HDMI Microscope



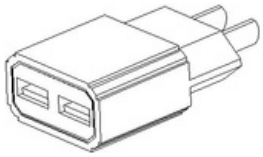
- USB cable



- HDMI cable



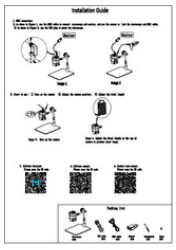
- Adapter



- Screwdriver

- Screw

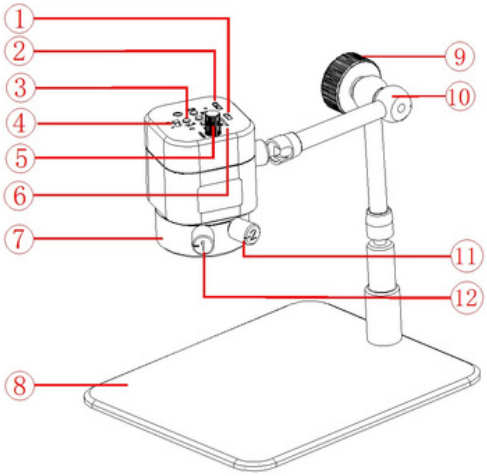
- Quick installation guide



- Wired controller

Chapter 3 Function Introduction of Each Part

3.1 Name and Function for Each Part of Microscope



1. **HDMI port** : Connect to the display with HDMI to realize signal transmission.
2. **USB port** : Connect to the adapter with USB to supply power for HDMI microscope.
3. **Push-button** : 5 buttons can match to each other to achieve different functions.

   Left button: Menu/return/frozen (hot key) function. “Menu” function will be activated in the mode of photographing, playing back and recording. In the mode of photographing and recording, long press (2 seconds) will trigger “frozen” function. After entering the menu, “return” function will be on.

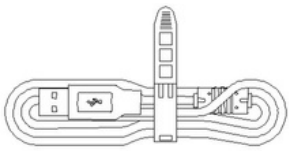
   Bottom button: Zoom out/downward/video fast forward function. “Reduction” function is on in the mode of photographing and recording. “Downward” function is on after entering the menu or in the mode of playing back. Video playing will be changed into “fast rewind” function in the mode of playing back.

   Top button: Zoom in/upward/speed retreat function. “Magnification” function will be activated in the mode of photographing and recording.“Upward” function be activated after entering the menu or during browsing. Video playing will be changed into “fast rewind” function in the mode of playing back.

   Middle button: Record/camera/play back function. “Recording” function is for the mode of recording. “photographing” function is for the mode of photographing. In the mode of playing back, the recording file carries the function of “playing back”.

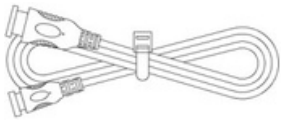
   Right button: Mode/sure/crosshair (hot key) function. Mode includes “camera”, “play back” and “record”. Without entering the menu, “Mode switch” function will be activated and can be switched successively among three modes, namely photographing, playing back and recording. “Confirm” function will be on after entering the menu. Long press in the mode of photographing and recording activates the mode of “cross line” shortcut key.
4. **Camera Switch** : Put the switch to right: turn on the camera; put the switch to left: turn off the camera.
5. **Focus knob** : Rotate the knob to implement the focus function; Rotate clockwise: back focal length decreases and object distance increases; Rotate anticlockwise: back focal length increases and object distance decreases.
6. **TF card slot** : The location of TF card, photos and videos will be stored in TF card.
7. **LED light** : The coaxial light and the diffuse reflection coexist, and the two effect lights are respectively controllable; the coaxial light lamp adopts a circular distribution of 13 light beads at a small angle; the diffuse reflection light is distributed by 18 high brightness light beads, and the brightness is uniform.
8. **Bottom plate** : Aluminium alloy bottom plate.
9. **Mobile Knob** : loosen the knob anticlockwise and the stand will be adjusted in any degree; tighten the knob clockwise and the current position of the electronic eyepiece can be fixed.
10. **Stand** : Can rotate by 360 degree.
11. **Adjustment knob of the coaxial light** : Rotate Clockwise: turn on the coaxial light/strengthen coaxial lightness; rotate counterclockwise: REDUCE the coaxial lightness/turn off the coaxial light.
12. **Adjustment knob of the diffuse light** : Rotate Clockwise: turn on the diffuse reflected light/strengthen the diffuse reflected lightness; rotate counterclockwise: weaken the diffuse reflected lightness/turn off the diffuse reflected light.

3.2 Accessory



USB Cable

The HDMI microscope can be powered by connecting to the adapter.



HDMI Cable

Connecting the electron microscope to the display can realize signal

Chapter 4 Installation Guide

4.1 Name and Function for Each Part of Microscope

4.1.1 Connection Methods:

- PC connection: Use the USB cable to connect microscope and computer.
- HDMI connection:

1) As shown in Figure 1, use the HDMI cable to connect microscope and monitor, and use the screws to lock the microscope and HDMI cable.

2) As shown in Figure 2, use the USB plug to power the microscope.

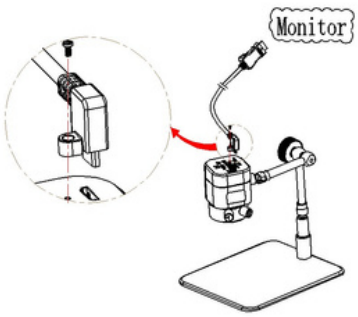


Image 1

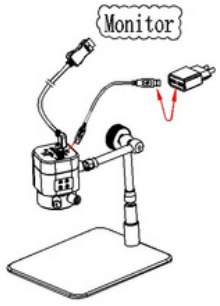


Image 2

4.1.2 Start to use:

1) Turn on the camera; 2) Adjust the camera position; 3) Adjust the focal length

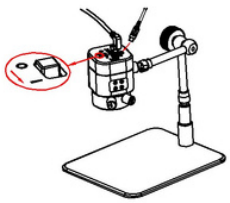


Image 3: Turn on the camera

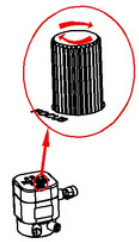
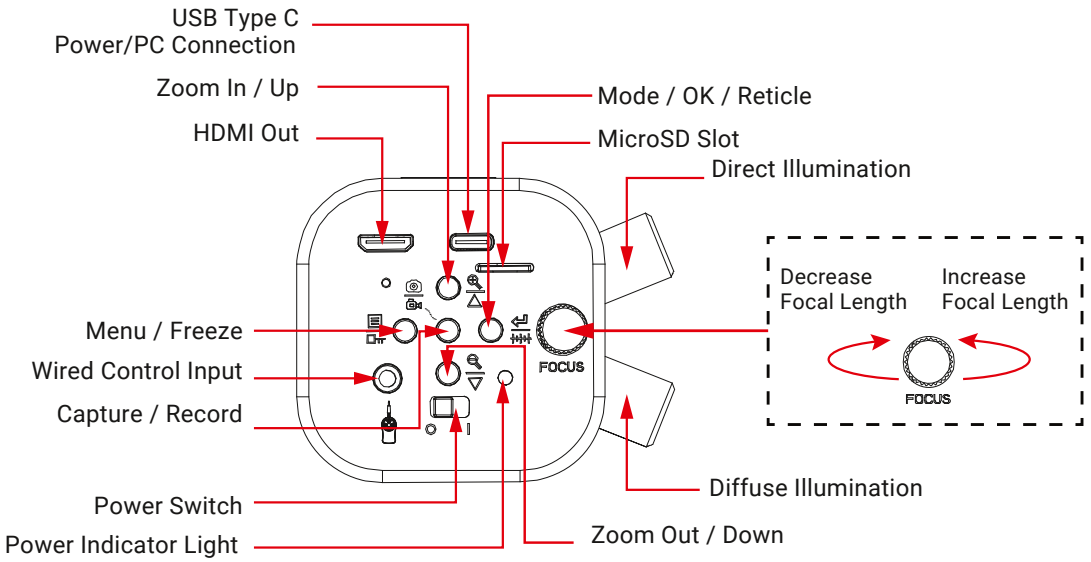


Image 4: Adjust the focal length on the top of camera to produce clear image.

Chapter 5 Specifications

Model	CE210T-C
Optical Magnification	0.11X ~ 0.79X
Working Distance	44mm ~230mm
Depth of Field	0.8mm ~ 6.5mm
Observation Scope	7mmx4mm (49.4X) to 45mmx25mm (4.5X)
Camera Resolution	2.0 MP (1920 x 1080 pixels)
Sensor Type	Sony IMX291 CMOS (color)
Sensor Size	1/2.8" (Diagonal: 6.46mm)
Pixel Size	2.9μm x 2.9μm
Dynamic Range	128 dB
Shutter	Electronic rolling shutter
Sensitivity	1300mV @ 1/30s (f/5.6)
Video Resolutions	1920x1080 30fps, 1280x720 60fps
File Formats	JPG (photo), MOV (video)
Recording Media	MicroSD up to 128GB
I/O	I/O Mini-HDMI (video out), USB-C (data and power)
Ring Light 1	18 LED
Ring Light 2	13 LED
Power Requirements	DC 5V 900mA over USB

Chapter 6 The Control Panel



Chapter 7 Instructions of Operation

This HDMI digital microscope can be used as a standalone device when paired with an HDMI monitor, or as a USB device when connected to a PC. When connected to a PC using USB, the microscope will enter PC mode, taking precedence over the standalone functions.

7.1 Articulating Arm

The articulating arm can be adjusted around three joints to position the microscope at virtually any angle and position within the reach of the arm. All joints are locked simultaneously using the locking knob. Before adjusting the arm, be sure to support the microscope with a hand. Next loosen the locking knob until the arm joints are loose enough to easily move. Position the microscope as desired, then tighten the locking knob. Avoid extending the arm beyond the rear edge of the support plate, as this could lead to the microscope tipping over.

7.2 Focus

The microscope's focus is mechanically controlled using a knob on the control panel. Rotating the knob clockwise will extend the working distance to focus on objects farther away. Rotating the knob counter-clockwise will reduce the working distance to focus on closer objects. Magnification is also affected by these adjustments, increasing as the working distance is shortened.

7.3 Illumination

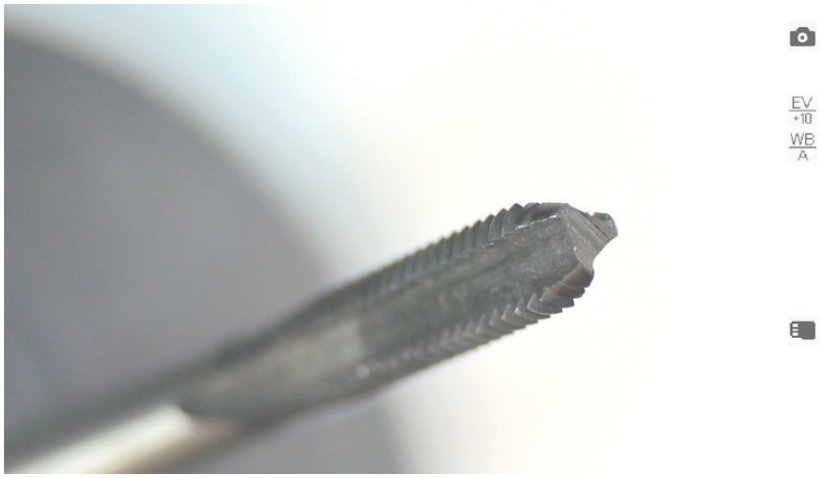
The microscope is equipped with two independent ring lights. Each ring light is controlled by a separate knob on the side of the microscope. While the microscope is connected to a power source, the ring lights will operate independent of the microscope's power switch. The knob engraved with the number 1 controls the outer ring light which provides diffuse illumination which is suitable for most observation as it more even. The knob engraved with the number 2 controls the inner ring light which provides direct illumination which is well-suited for viewing surface details such as scratches and textures. Rotate either knob clockwise to increase brightness, or counter-clockwise to decrease brightness.

7.4 Operating Mode: HDMI

To operate in HDMI mode, the microscope must be attached to a power supply using the included USB cable. The cable has a type-C connector on one end, and a type-A connector on the other. The USB-C connector must be connected to the microscope's USB/Power port. To power the microscope using AC power, plug the included AC-USB adapter into an AC outlet, then plug the USB cable's type-A connector into the USB port on the adapter. Alternatively, a 5V USB power bank can be used as long as it can supply at least 900mA. In this case, the USB cable's type-A connector would plug directly into one of the power bank's type-A USB ports.

To connect this microscope to an HDMI monitor, television, or other compatible viewing device, use the included HDMI cable or another compatible cable with the appropriate connectors. The included cable has a mini-HDMI connector on one end, and a standard HDMI connector on the other. Plug the mini-HDMI connector into the microscope's HDMI port. Plug the other end into the viewing device's HDMI input. Move the microscope's power switch to the "I" (on) position. After a few seconds, a live image will be displayed on the screen.

While in HDMI mode, the microscope uses internal software to capture images and video, as well as to control the imaging device's settings. Several icons may be displayed on the screen, displaying such things as the imaging mode, exposure, white balance, and media status. The icons will be hidden after 10 seconds of inactivity, but will display again when a control button is pressed.



7.4.1 Recording Media

In order to capture or play photos/videos in any mode, a formatted MicroSD card must be inserted into the MicroSD slot. When compatible media is present, the icon will be displayed. If no compatible media is found, the icon will be displayed. Captured photos will be automatically saved in JPEG format to the MicroSD card using a sequential naming convention: photo_00001.jpg, photo_00002.jpg, etc..

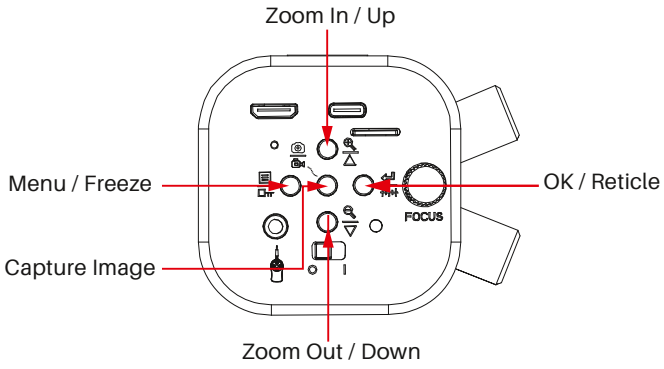
Captured videos will be automatically saved in MOV format to the MicroSD card using a sequential naming convention: video_0001.jpg, video_0002.jpg, etc.. This microscope is compatible with MicroSD cards up to 128GB. In the case that a 64GB or larger card is not recognized by this device, and the formatting function does not work, it is recommended to format the card as FAT32 using a computer.

7.4.2 Imaging Modes

This microscope has three imaging modes: Photo, Video, and Playback. Each mode will have access to settings and functions which are accessed by using the control panel. The control buttons may have different functions depending on the mode and which screen is currently displayed. Additionally, pressing and holding certain buttons for 2 seconds will activate specific functions depending on the mode. While no menu is displayed, pressing the right button will cycle through the imaging modes.

7.4.3 Photo and Video Modes

Photo and Video modes allow you to view live video and capture images. An assortment of settings and functions are available in both modes to optimize image quality and user experience. Some settings or functions are exclusive to their respective modes. The control panel's buttons provide the same functionality in both modes aside from the Capture button which saves still images in Photo mode, and starts or stops recording in Video mode.



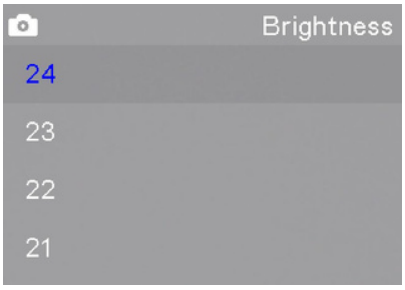
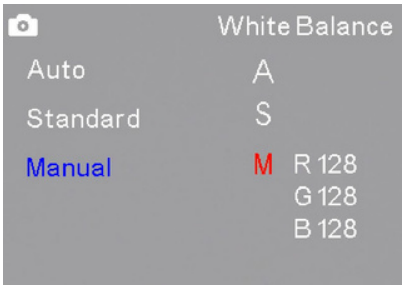
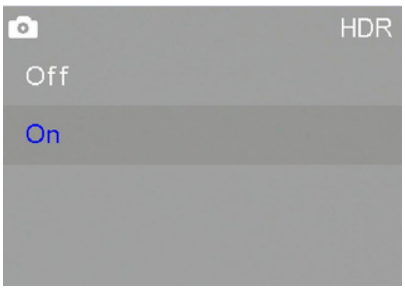
When the menu is closed, the buttons control the following functions:

- Press the center button to capture a photo (Photo mode) or to start/stop recording (Video mode).
- Press the top button to increase digital zoom up to 4X.
- Press the bottom button to decrease digital zoom.
- Press the left button to open the settings menu.
- Press and hold the left button for 2 seconds to freeze the image.
- Press and hold the right button for 2 seconds to display a reticle.

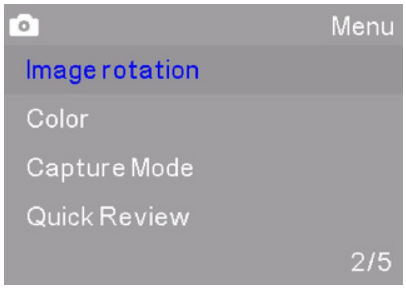
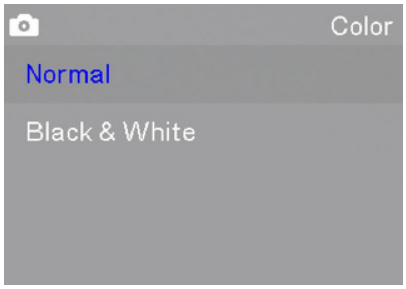
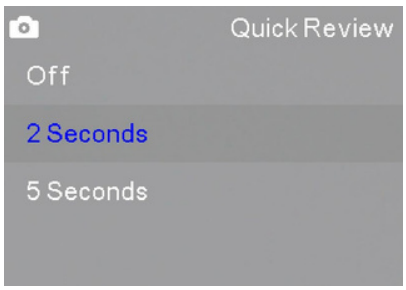
When the menu is open, the buttons control the following functions:

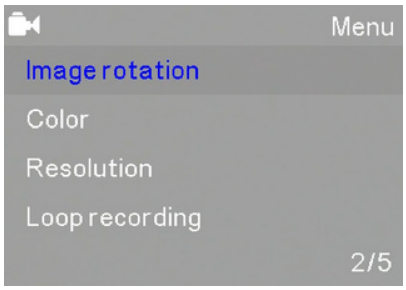
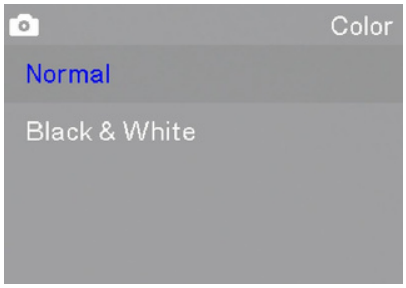
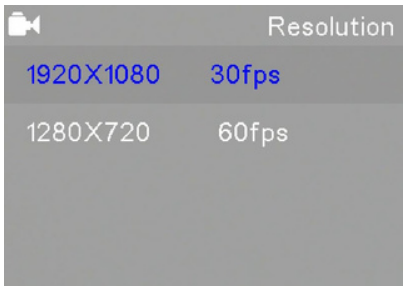
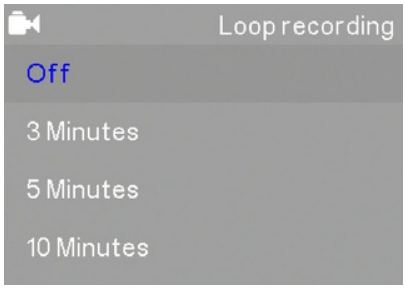
- Press the top button to navigate up.
- Press the bottom button to navigate down.
- Press the left button to exit the current setting or menu.
- Press the right button to select a menu or option.

7.4.4 Photo and Video Settings Menus Page 1/5

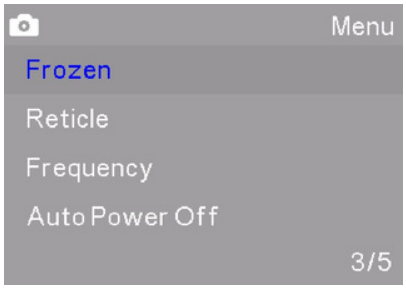
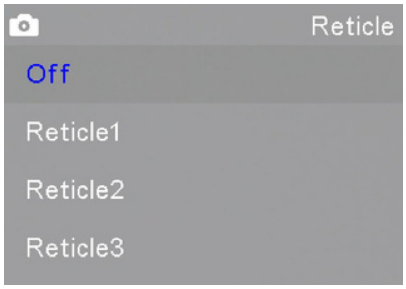
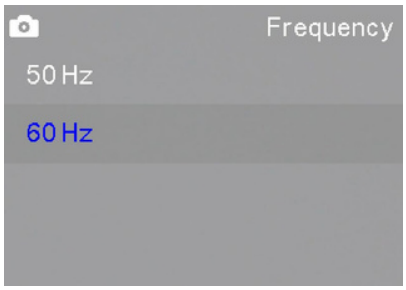
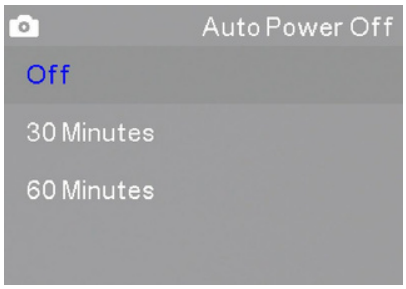
	The first page in Photo and Video modes includes settings which control qualities of the image including Brightness, Exposure, White Balance, and High Dynamic Range (HDR).
	The Brightness setting can only be used when the Exposure mode is set to Auto. Since Auto Exposure attempts to render an average middle-grey exposure, Brightness will increase the exposure target incrementally using values from 1 to 24.
	Exposure controls the amount of light gathered to form an image. Auto mode continuously uses an average of the levels seen across the field of view, and attempts to achieve a middle grey. Single Auto mode performs the same function as Auto, but only at the time it is selected rather than continuously. Manual allows you to select a value from 1 to 10 to manually target the appropriate level.
	White Balance is used to compensate for color casts caused by various light sources. Auto mode attempts to compensate for detected color biases to render a more neutral image. Standard mode uses a predefined color temperature as the neutral target. Manual mode allows you to adjust each primary color (red, green, blue) independently using values from 1 to 128.
	HDR (High Dynamic Range) compresses exposure values across the image to limit excess highlights and shadows. This setting can be toggled on or off.

7.4.5 Photo and Video Settings Menus Page 2/5

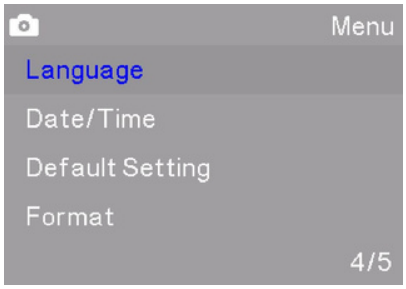
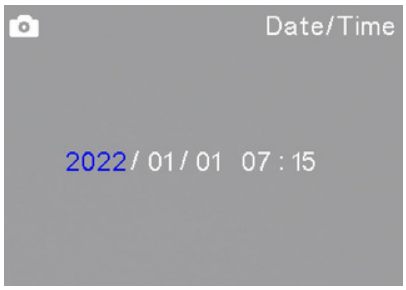
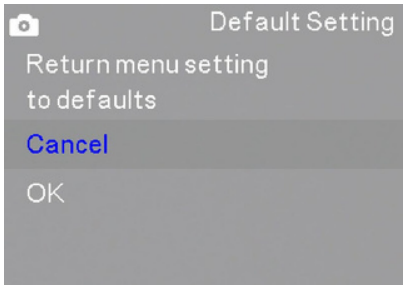
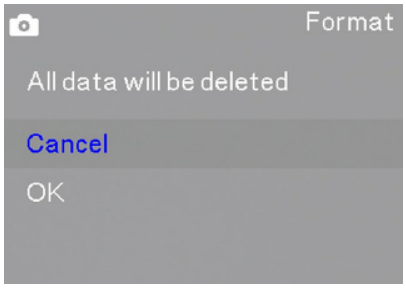
	The second page in Photo mode includes Image Rotation, Color, Capture Mode, and Quick Review.
	Image Rotation allows you to change the orientation of the on-screen image. Mirror flips the image from left to right. Rotate 180° rotates the image. Flip inverts the image vertically.
	Color allows you to toggle the color mode between Normal (color) and Black & White for a greyscale image.
	Capture Mode determines allows you to set a delay between the time you press the capture button and the time at which the image is captured. This is useful to avoid camera shake, or when manipulation of the subject is needed which would require the use of your hands.
	Quick Review sets the amount of time an image will remain on-screen after it is captured.

	The second page in Video mode includes Image Rotation, Color, Resolution, and Loop Recording
	Image Rotation allows you to change the orientation of the on-screen image. Mirror flips the image from left to right. Rotate 180° rotates the image. Flip inverts the image vertically.
	Color allows you to toggle the color mode between Normal (color) and Black & White for a greyscale image.
	Resolution sets the video image size and frame-rate. Options include 1920x1080 30fps and 1280x720 60fps.
	Loop Recording can be used to limit the maximum recording time to either 3, 5, or 10 minutes. After the set amount of time has lapsed during recording, video will continue to be recorded, but overwriting the previously recorded video.

7.4.6 Photo and Video Settings Menus Page 3/5

	The third page in Photo and Video modes includes screen tools such as Frozen, Reticle, Frequency, and Auto Power Off.
	Frozen mode freezes the live video stream to display a static image. This can be toggled on and off.
	The Reticle setting sets an on-screen overlay to aid in measurements, segmenting, and counting. Reticle1 is a simple crosshair. Reticle2 is a grid of squares. Reticle3 is a crosshair with concentric circles.
	Frequency sets the capture frequency. This can be set to 50Hz or 60Hz, and should correspond to your power system's frequency to avoid flicker.
	Auto Power Off can be used to automatically disable the video output after a period of inactivity. The enabled options include 30 minutes or 60 minutes.

7.4.7 Photo and Video Settings Menus Page 4/5

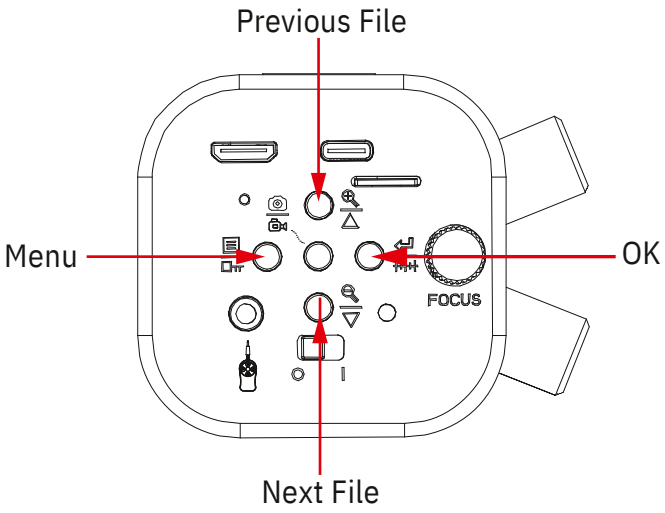
	The fourth page in Photo and Video modes includes Language, Date/Time, Default Settings, and Format.
	Language sets the system's display language. Options include Japanese, English, Simplified Chinese, and Traditional Chinese.
	Date/Time allows you to set the current date and time which can be included in timestamps.
	Default Setting will return the system's settings to their factory defaults.
	Format can be used to format a MicroSD card. This is necessary if the card is not already formatted, or is using an incompatible format. When this function is used, all data on the card will be deleted.

7.4.8 Photo and Video Settings Menus Page 5/5

	The fifth page in Photo and Video modes includes Display Time and Version.
	Display Time determines whether the time will be displayed on-screen. This can be toggled between on and off.
	Version displays the current firmware version.

7.4.9 Playback Mode

The Playback mode allows you to review recorded photos and videos.



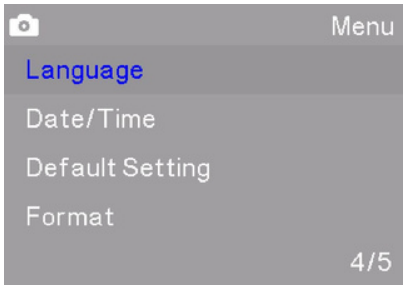
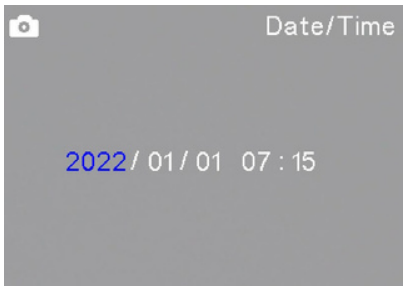
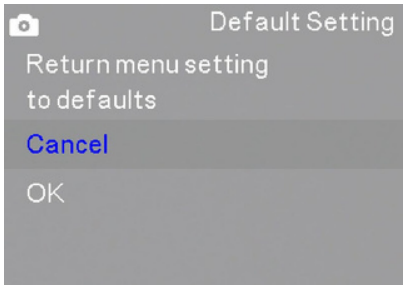
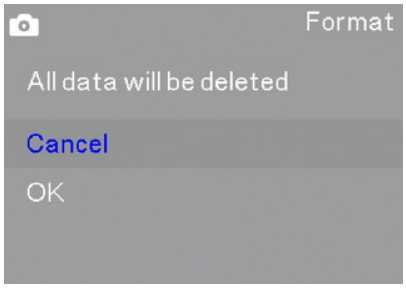
When the menu is closed, the buttons control the following functions:

- Press the top button to display the previous file.
- Press the bottom button to display the next file.
- Press the left button to open the menu.

When the menu is open, the buttons control the following functions:

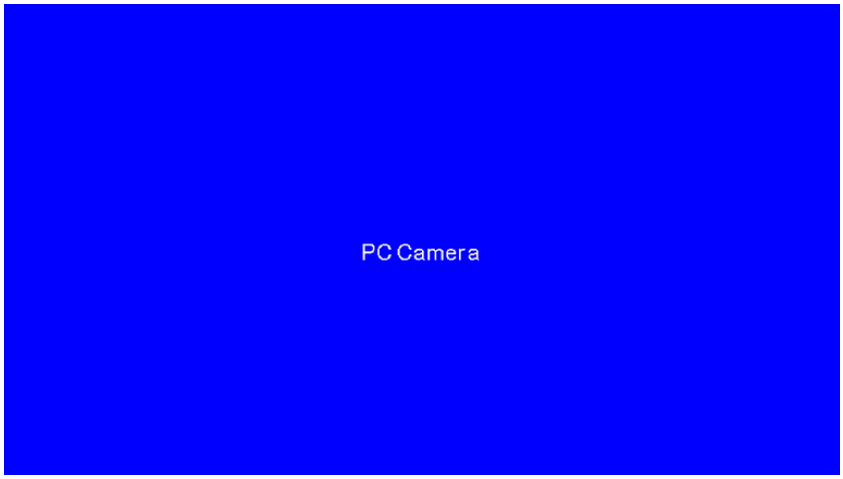
- Press the top button to navigate up.
- Press the bottom button to navigate down.
- Press the left button to exit the current setting or menu.
- Press the right button to select a menu or option

7.4.10 Playback Menu

	The fourth page in Photo and Video modes includes Language, Date/Time, Default Settings, and Format.
	Language sets the system's display language. Options include Japanese, English, Simplified Chinese, and Traditional Chinese.
	Date/Time allows you to set the current date and time which can be included in timestamps.
	Default Setting will return the system's settings to their factory defaults.
	Format can be used to format a MicroSD card. This is necessary if the card is not already formatted, or is using an incompatible format. When this function is used, all data on the card will be deleted.

7.5 Operating Mode: PC

To operate in PC mode, connect the microscope to a Windows computer using a USB connection. The included USB cable has a type-C connector on one end, and a type-A connector on the other. The USB-C connector must be connected to the microscope's USB/Power port. Move the power switch to the "I" (on) position. Once a PC connection is detected, the microscope will enter PC mode. If the microscope is connected to an HDMI display, a blue screen will be displayed stating the microscope is operating in PC mode. The control panel's buttons will not function.



When connected to a PC, the microscope will function as a UVC (USB Video Class) camera. It can be used by compatible Windows software such as the Camera app, or with Pxit Pro software which is available on the Lanoptik website on the software downloads page.

Chapter 8 Disclaimer

1. In order to protect the legitimate rights and interests of users, please carefully read the instructions, disclaimers and safety instructions provided with this product before using it. The company reserves the right to update the above documents. Please operate the product according to the instructions and safety instructions.

2. Once you begin to use the product, you shall be deemed to have read, understood, recognized and accepted all terms and contents of the product's instructions, disclaimers and safety instructions. Users undertake to be responsible for their actions and all consequences. User undertakes to use the product only for legitimate purposes and agrees to these terms and any relevant policies or guidelines that the company may establish.

3. In the process of using this product, please strictly abide by and execute the requirements including but not limited to the instructions and safety instructions. All personal injuries, accidents, property losses, legal disputes and other adverse events that cause conflicts of interest caused by violation of the safety instructions or irresistible factors shall be borne by users themselves, and the company shall not assume any responsibility.

4. Safety instructions:

- Please do not use wet hands to plug and unplug the power supply of the equipment.
- Please be sure to use a regular brand power socket, and make sure the grounding is well grounded to prevent electric shock.
- Please be sure to make regular safety checks on sockets and plugs to avoid potential electrical safety hazards caused by aging and short circuit.
- Please be sure not to use the product in a humid or hot environment to ensure the safety of the product.
- Please be sure to loosen bundle cords of the power cable before using, to avoid electromagnetic induction and heating, thus increasing the heat dissipation speed.
- Please be sure not to use the product equipment or socket or other places in high or easy to fall, so as to avoid damage.
- Before opening the socket power supply, please be sure to turn off the load power switch of the product equipment.
- The company reserves the rights to improve product, upgrade technology and change parameters without prior notice.

Specifications are subject to change without any obligation on the part of the manufacturer.

LANOPTIK TECHNOLOGIES LTD

No. 72 Hongjing Street, Lejia Road, Baiyun District, Guangzhou, China. 510400
Phone: +86 20 3898 6017 | Fax: +86 20 3847 6076
Website: http://www.lanoptik.com | Email: info@lanoptik.com