

PZM0840H1080PA-EDRL/DRL Series Portable Zoom Microscope with HDMI Interface



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1 PZM0840H1080PA-EDRL/DRL Portable Zoom Microscope with HDMI Interface

1.1 PZM0840H1080PA-EDRL/DRL Basic Characteristic



Figure 1 Dimension of PZM0840H1080PA-EDRL



Figure 2 Side View of PZM0840H1080PA-EDRL

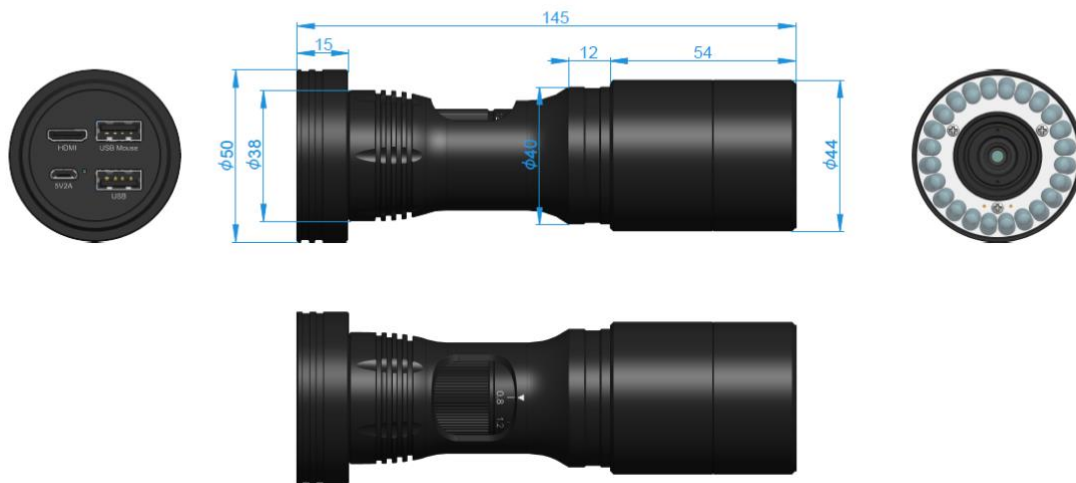


Figure 3 Dimension of PZM0840H1080PA- DRL



Figure 4 Side View of PZM0840H1080PA- DRL

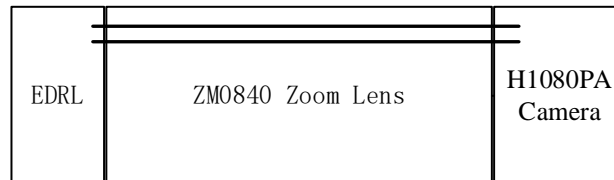


Figure 5 Configuration of PZM0840H1080PA- EDRL

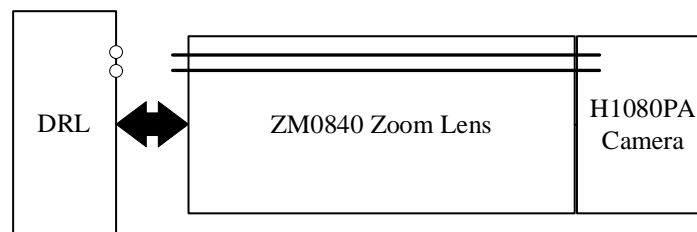


Figure 6 Configuration of PZM0840H1080PA- DRL

The PZM0840H1080PA-EDRL (with embedded LED light source) and the PZM0840H1080PA-DRL (with additional external magnetic attachable LED light source for a larger and brighter illumination range) portable zoom microscope with HDMI interface is shown in Figure 1 and Figure 3. It consists of ZM0840 zoom lens, 1080P HDMI camera H1080PA, and LED ring light source EDRL/DRL. The H1080PA module does not need a computer to complete the video and image acquisition, and the illumination light source module EDRL/DRL is directly connected to the H1080PA module through the ZM0840 zoom lens.

1.2 PZM0840H1080PA-EDRL/DRL's H1080PA Camera Parameters

Ordering Code	Sensor Size (mm)	Pixel (μm)	G Light Sensitivity	FPS/Resolution	Sampling Average	Exposure Time (ms)
H1080PA	Sony IMX307(C) 1/2.8" (5.57x3.13)	2.9x2.9	1300mv with 1/30s	60@1920*1080(HDMI)	1x1	0.01~1000

1.3 PZM0840H1080PA-EDRL/DRL's H1080PA Camera Specifications

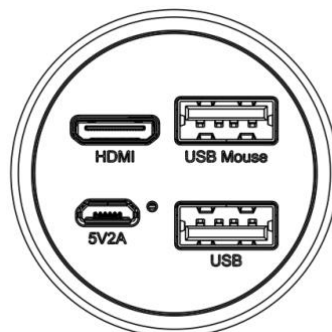


Figure 7 The top panel of PZM0840H1080PA-EDRL/ DRL

H1080PA HDMI Interface Digital Camera Module	
Physical Interfaces and Buttons	Functional Description
HDMI	Comply with HDMI1.4 standard. 1080P format video output for standard FHD monitor
LED	LED status indicator
USB Mouse	Connect USB mouse for easy operation with embedded XCamView software

PZM0840H1080PA-EDRL/DRL Portable Zoom Microscope with HDMI Interface

5V2A	Power adapter connection (5V/2A)
USB3.0	Connect a USB stick for picture and video storage;
Camera Hardware	Functional Description
HDMI 1080P Camera	Comply with HDMI 1.4 standard; 60fps@1080P
Sensor	Sony IMX307(C), 1/2.8"(5.57x3.13), Pixel size 2.9x2.9um
G Sensitivity /Dark Signal / Dynamic Range /SNR	1300mv with 1/30s/NA/NA/NA
FPS/Resolution	60@1920*1080(HDMI)
Exposure Time	0.01~1000ms
Hardware	Functional Description
Video Saving	Video format: 2M(1920*1080) H264 encoded MP4 file; Video saving frame rate: 50~60fps (related with SD card performance);
Image Capture	2M (1920*1080) JPEG image in SD card
Measurement Saving	Measurement information saved in different layer with image content; Measurement information is saved together with image content in burn in mode.
ISP Function	Exposure(Automatic / Manual Exposure) / Gain, White Balance(Manual / Automatic / ROI Mode), Sharpening, 3D Denoise, Saturation Adjustment, Contrast Adjustment, Brightness Adjustment, Gamma Adjustment, Color to Gray, 50HZ/60HZ Anti-flicker Function
Image Operations	Zoom In/Zoom Out, Mirror/Flip, Freeze, Cross Line, Overlay, Embedded Files Browser, Video Playback, Measurement Function
Restore Factory Settings	Restore camera parameters to its factory status
Multi-language Support	English/Simplified Chinese/Traditional Chinese/Korean/Thai/French/German/Japanese/Italian/Russian.
Lighting Modules	
Ring Light Source	Brightness adjustable LED illuminated ring light source (wireless)
Power Supply Method	Integrated power supply, from now on no more power cord tangle trouble, sample observation more comfortable
Installation	Quick second suction mounting for convenience and simplicity
Brightness Adjustment	Light intensity adjustment via software interface

1.4 ZM0840 Zoom Lens Standard Configuration Parameters

Optical Parameter	
Zoom Lens	ZM0840 zoom lens, 0.8X-4.0X zoom range
Working Distance	40mm-160mm (Determined by the auxiliary objective)
Numerical Aperture (NA)	0.015-0.052 (With 1x auxiliary objective)
Resolution	22.98um-6.44um (With 1x auxiliary objective)
Field of View	15.97-1.14mm
Optional Auxiliary Objective	0.50x, 1.00x, 2.00x (Optional)
Dimensions	141.5mm x 44mm (PZM0840H1080PA-EDRL)/145mm x 44mm (PZM0840H1080PA-DRL)
Bracket Interface	Standard 40mm

1.5 Optical Parameters of the ZM0840 with Optional Auxiliary Objective Wxxx(With 1/2.8" Sensor)

Auxiliary Objective	Parameters	Low Magnification	High Magnification
W100, 1.0X (80mm WD)	Magnification	0.8X~4.0X	
	FOV	6.96x3.91mm	1.39x0.78mm
	NA	0.015	0.052
W050, 0.5X (160mm WD)	Magnification	0.4X~2.0X	
	FOV	13.93x7.83mm	2.79x1.57mm
	NA	0.0075	0.026
W200, 2.0X (40mm WD)	Magnification	1.6X~8.0X	
	FOV	3.48x1.96mm	0.70x0.39mm
	NA	0.030	0.104

WD: Working Distance;

NA: Numerical Aperture;

1.6 EDRL/DRL Standard Configuration Parameters

Ordering Code	Power	Diameter/mm	LED Parameters	Installation
EDRL	0.5W	38	8 SMD LEDs	Embedded LED Light Source
DRL	1.5W	50	24 Straw Hat LEDs	External Magnetic Attachable LED Light Source

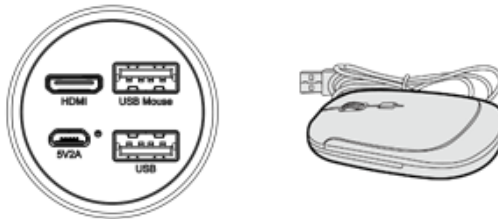
2 Installation of PZM0840H1080PA-EDRL/DRL Portable Zoom Microscope with HDMI Interface

Apart from the PZM0840H1080PA-EDRL/DRL, you only need an HDMI monitor, the supplied HDMI cable, USB mouse, U disk and power adapter(12V/1A). The steps to start the PZM0840H1080PA-EDRL/DRL are listed as below:

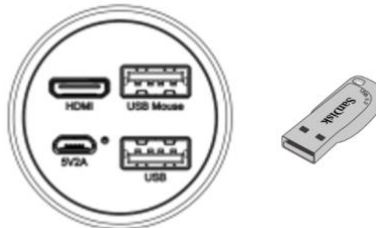
- Connect the camera to a HDMI monitor using the HDMI cable;



- Insert the supplied USB mouse to the camera's USB mouse port;



- Insert the supplied U disk (optional) into the USB port;



- Connect the camera to the power adapter(12V/1A) and switch it on;



- Turn on the monitor and view the video in the XCamView software. Move the mouse to the left, top or bottom of the XCamView UI, different control panel or UI will pop up and users could operate with the mouse at ease.

3 PZM0840H1080PA-EDRL/DRL's Packing Information



Figure 8 PZM0840H1080PA-EDRL packaging information



Figure 1 PZM0840H1080PA-DRL (Magnetic LED light source already mounted) packaging information

Standard Packing List	
A	Box Size: L:22cm W:22cm H: 9cm (0.8Kg/box)
B	PZM0840H1080PA-EDRL or PZM0840H1080PA-DRL
C	Portable Microscope Stand
D	Bracket Extension
E	Power Adapter + Power Cord
F	HDMI Cable
G	USB Mouse
Optional Accessory	
H	U Disk (optional)
I	Other Auxiliary Objectives (not shown)

4 Brief Introduction of PZM0840H1080PA-EDRL/DRL Camera's UI and Its Functions



Figure 2 PZM0840H1080PA-EDRL with HDMI display



Figure 3 PZM0840H1080PA-DRL series camera with HDMI display

4.1 XCamView UI

The PZM0840H1080PA-EDRL/DRL camera's UI shown in Figure 9 includes a **Camera Control Panel** on the left of the video window, a **Measurement Toolbar** on the top of the video window and a **Synthesis Camera Control Toolbar** on the bottom of the video window.

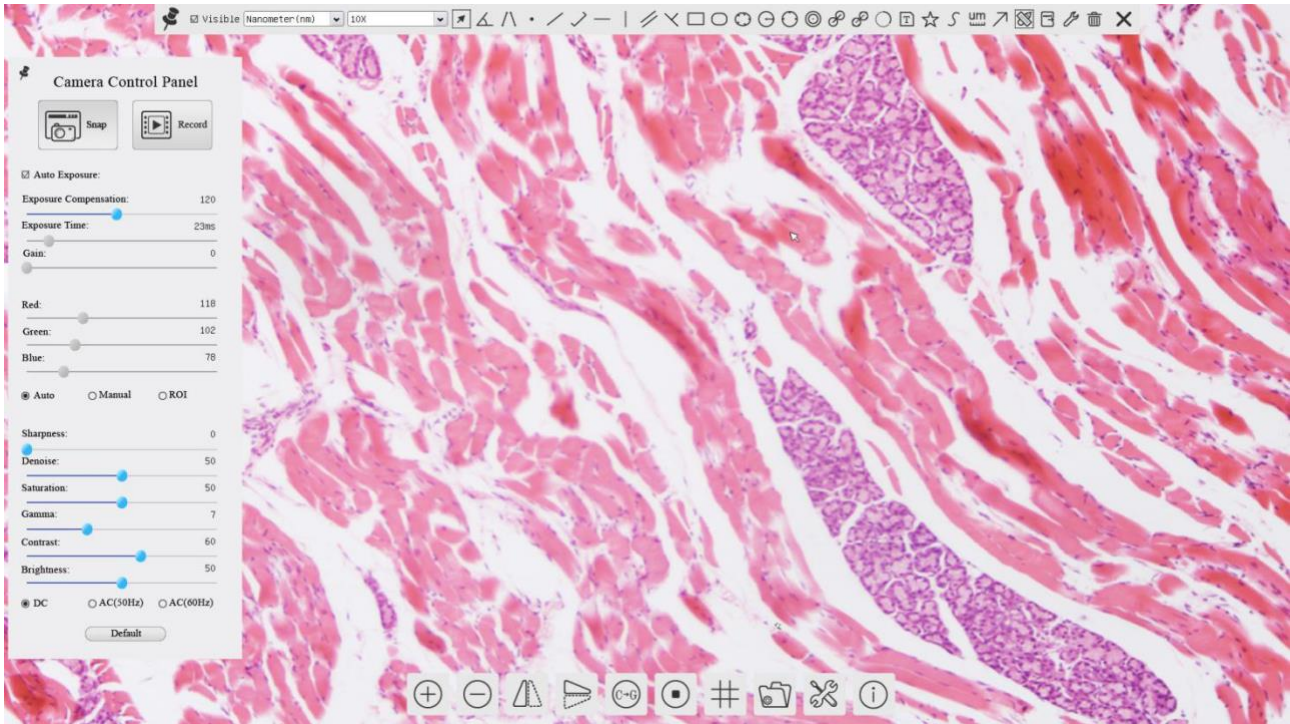





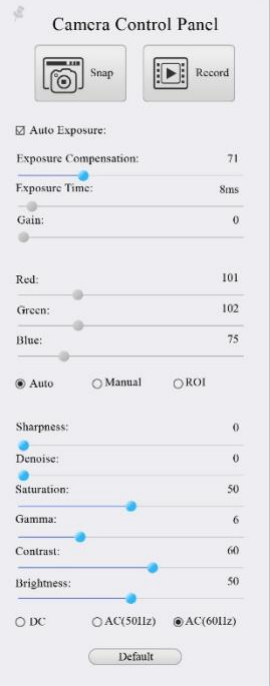


Figure 9 The PZM0840H1080PA-EDRL/DRL camera's control UI

Notes	
1	To show the Camera Control Panel , move your mouse to the left of the video window. See Sec.4.2 for details
2	<p>Move the mouse cursor to the top of the video window, a Measurement Toolbar will pop up for calibration and measurement operations.</p> <p>When user left-clicks the Float/Fixed button  on the Measurement Toolbar, the Measurement Toolbar will be fixed. In this case the Camera Control Panel will not pop up automatically even if users move mouse cursor to left side of the video window. Only when user left-clicks the  button on the Measurement Toolbar to exit from measuring procedure will they be able to do other operations on the Camera Control Panel, or the Synthesis Camera Control Toolbar. During the measuring process, when a specific measuring object is selected, an Object Location & Attributes Control Bar  will appear for changing location and properties of the selected object. See Sec.7.3 for details</p>
3	<p>When users move mouse cursor to the bottom of the video window, the Synthesis Camera Control Toolbar will pop up automatically.</p> <p> . See Sec.4.4 for details.</p>

4.2 The Camera Control Panel on the Left Side of the Video Window

The **Camera Control Panel** controls the camera to achieve the best video or image quality according to the specific applications; It will pop up automatically when the mouse cursor is moved to the left side of the video window. Left-clicking  button to achieve **Display/Auto Hide** switch of the **Camera Control Panel**.

Camera Control Panel	Function	Function Description
 <p>The screenshot shows the Camera Control Panel with the following settings: Snap and Record buttons; Auto Exposure checked; Exposure Compensation: 71; Exposure Time: 8ms; Gain: 0; Red: 101; Green: 102; Blue: 75; White Balance: Auto; Sharpness: 0; Denoise: 0; Saturation: 50; Gamma: 6; Contrast: 60; Brightness: 50; AC(60Hz) selected; and a Default button.</p>	Snap	Capture image and save it to the SD card
	Record	Record video and save it to the SD card
	Auto Exposure	When Auto Exposure is checked, the system will automatically adjust exposure time and gain according to the value of exposure compensation
	Exposure Compensation	Available when Auto Exposure is checked. Slide to left or right to adjust Exposure Compensation according to the current video brightness to achieve proper brightness value
	Exposure Time	Available when Auto Exposure is not checked. Slide to left or right to reduce or increase exposure time, adjusting brightness of the video
	Gain	Adjust Gain to reduce or increase brightness of video. The Noise will be reduced or increased accordingly
	Red	Slide to left or right to decrease or increase the proportion of Red in RGB on video
	Green	Slide to left or right to decrease or increase the proportion of Green in RGB on video
	Blue	Slide to left or right to decrease or increase the proportion of Blue in RGB on the video
	Auto White Balance	White Balance adjustment according to the video continuously
	Manual White Balance	Adjust the Red or Blue item to set the video White Balance.
	ROI White Balance	White Balance could be adjusted when the ROI region is changed according to content inside the ROI region.
	Sharpness	Adjust Sharpness level of the video
	Denoise	Slide left or right to denoise the video
	Saturation	Adjust Saturation level of the video
	Gamma	Adjust Gamma level of the video. Slide to the right side to increase gamma and to the left to decrease gamma.
	Contrast	Adjust Contrast level of the video. Slide to the right side to increase contrast and to the left to decrease contrast.
	DC	For DC illumination, there will be no fluctuation in light source so no need for compensating light flickering
	AC(50HZ)	Check AC(50HZ) to eliminate flickering caused by 50Hz light source
	AC(60HZ)	Check AC(60HZ) to eliminate flickering caused by 60Hz light source
Default	Restore all the settings in the Camera Control Panel to default values	













4.3 The Measurement Toolbar on the top of the Video Window

The **Measurement Toolbar** will pop up when moving mouse cursor to any place near the upper edge of the video window. Here is the introduction of the various functions on the **Measurement Toolbar**:






Figure 7-2 The measurement toolbar on the upper side of the video window

Icon	Function
	Float/ Fix switch of the Measurement Toolbar
<input checked="" type="checkbox"/> Visible	Show / Hide Measurement Objects
Nanometer (nm)	Select the desired Measurement Unit
4X	Select Magnification for Measurement after Calibration
	Object Select
	Angle
	4 Points Angle
	Point
	Arbitrary Line
	3 Points Line
	Horizontal Line
	Vertical Line
	3 Points Vertical Line
	Parallel
	Rectangle
	Ellipse
	5 Points Ellipse
	Circle
	3 Points Circle
	Annulus
	Two Circles and its Center Distance
	3 Points Two Circles and its Center Distance

	Arc
	Text
	Polygon
	Curve
	Scale Bar
	Arrow
	Execute Calibration to determine the corresponding relation between magnification and resolution, which will establish the corresponding relationship between measurement unit and the sensor pixel size. Calibration needs to be done with the help of a micrometer. For detailed steps of carrying out Calibration please refer to ToupView help manual .
	Export the Measurement information to CSV file(*.csv)
	Measurement Setup
	Delete all the measurement objects
	Exit from Measurement mode
	When the measurement ends, left-click on a single measuring object and the Object Location & Properties Control Bar will show up. User could move the object by dragging the object with the mouse. But more accurate movement could be done with the control bar. The icons on the control bar mean Move Left , Move Right , Move Up , Move Down , Color Adjustment and Delete .

Note:

1) When user left-clicks [Display/Hide](#) button  on the [Measurement Toolbar](#), the [Measurement Toolbar](#) will be fixed. In this case the [Camera Control Panel](#) will not pop up automatically even if moving the mouse cursor to the left edge of the video window. Only when user left-click the  button on the [Measurement Toolbar](#) to exit from the measurement mode will they be able to doing other operations with the [Camera Control Panel](#) or the [Synthesis Camera Control Toolbar](#).

2) When a specific [Measurement Object](#) is selected during the measurement process, the [Object Location & Attributes Control Bar](#)  will appear for changing the object location and properties of the selected objects.

4.4 Icons and Functions of the Synthesis Camera Control Toolbar at the Bottom of the Video Window



Icon	Function	Icon	Function
	Zoom In the Video Window		Zoom Out the Video Window
	Horizontal Flip		Vertical Flip
	Color/Gray		Video Freeze
	Display Cross Line		Browse Images and Videos in the SD Card
	Settings		Check the Version of XCamView

The setting is relatively more complicated than the other functions. Here is more information about it:

4.4.1 Setting>Measurement

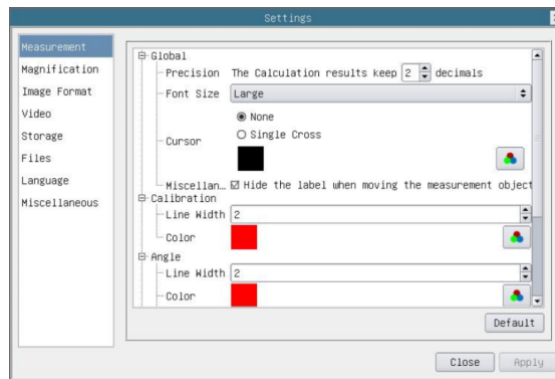


Figure 10 The measurement setup

Global	Precision	Used to set the number of digits after the decimal point of the measurement result
Calibration	Line Width	Used for defining width of the lines for calibration;
	Color	Used for defining color of the lines for calibration;
	EndPoint	Type: Used for defining shape of the endpoints of lines for calibration: Null means no EndPoints, rectangle means rectangle type of endpoints. It makes alignment more easily;
Point, Angle, Line, Horizontal Line, Vertical Line, Rectangle, Circle, Ellipse, Annulus, Two Circles, Polygon, Curve		
	Left-click the along with the Measurement command mentioned above will unfold the corresponding attribute settings to set the individual property of the Measurement Objects.	

4.4.2 Setting>Magnification

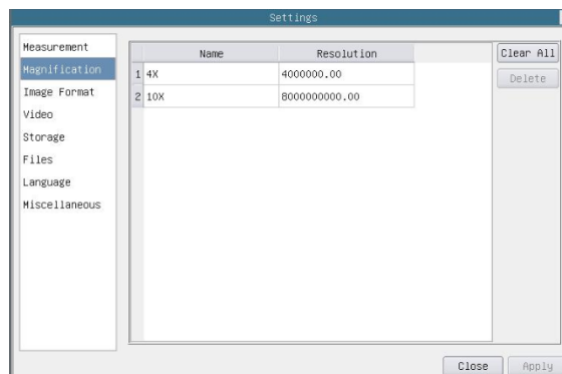


Figure 11 Comprehensive magnification calibration settings page

Name	The name of the magnification, usually the magnification of the objective of the microscope is used as the magnification name when calibration, such as 4X, 10X, 100X, etc. Besides, other user-defined information could be added into the magnification name too, for example, microscope model, operator name, etc.
Resolution	Pixels per meter. Image device like microscopes have high resolution value;
Clear All	Click the Clear All button will clear the calibrated magnifications;
Delete	Click Delete to delete the selected magnification;

4.4.3 Settings>Image Format

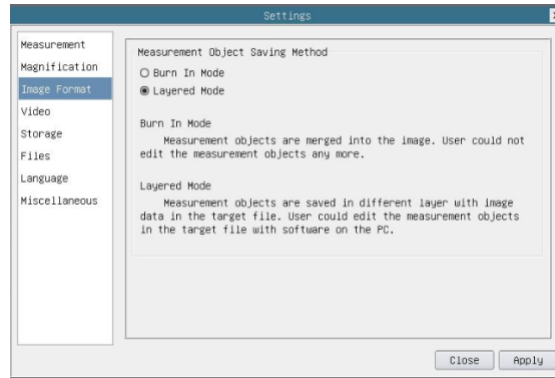


Figure 12 Comprehensive image format settings page

<p>Measurement Object Save Method</p>	<p>Burn in Mode: The measurement objects are merged into the current image. User could not edit the measurement objects anymore. This mode is not reversible.</p> <p>Layered Mode: The measurement objects are saved in different layer with current image data in the target file. User could edit the measurement objects in the target file with some software on the PC. This mode is reversible.</p>
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4.4.4 Settings>Video

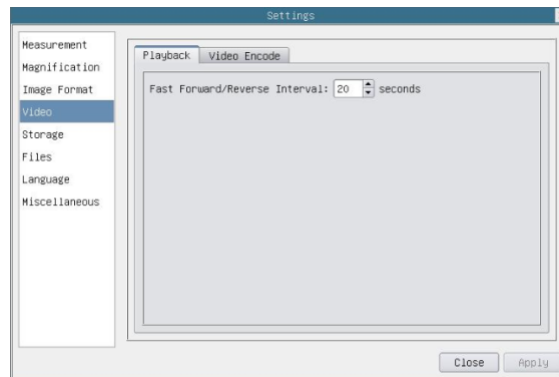


Figure 13 Comprehensive setting of video settings page-playback

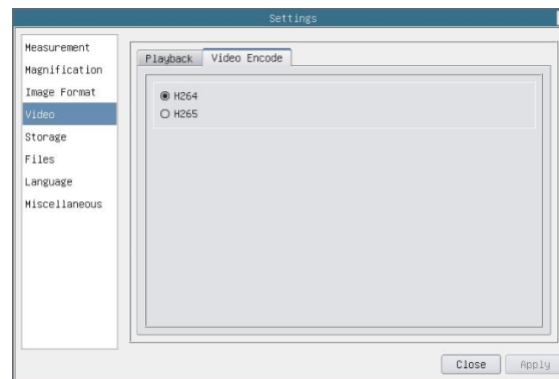


Figure 14 Comprehensive setting of video settings page-video encode

<p>Fast Forward/Reverse Interval</p>	<p>The time interval of the playback of video files.</p>
<p>Video Encode</p>	<p>H264: The encoding format of the video files is H264 format.</p> <p>H265: The encoding format of the video files is H265 format.</p>

4.4.5 Setting>Storage

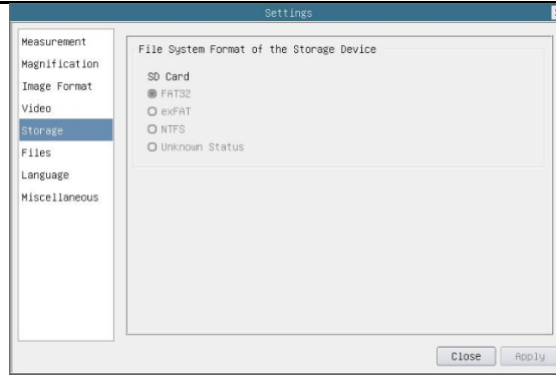


Figure 15 Comprehensive setting of SD card setting page

Storage Device	SD Card: SD Card is only supported as the storage device.
File System Format of the Storage Device	List the file system format of the current storage device FAT32: The file system of SD card is FAT32. The maximum video file size of single file is 4G Bytes; exFAT: The file system of SD card is exFAT. The maximum video file size of single file is 4G Bytes; NTFS: The file system of SD card is NTFS. The maximum video file size of single file is 4G Bytes. Use PC to format the SD cards and switch between FAT32, exFAT and NTFS. Unknown Status: SD card not detected or the file system is not identified;

4.4.6 Setting>Files

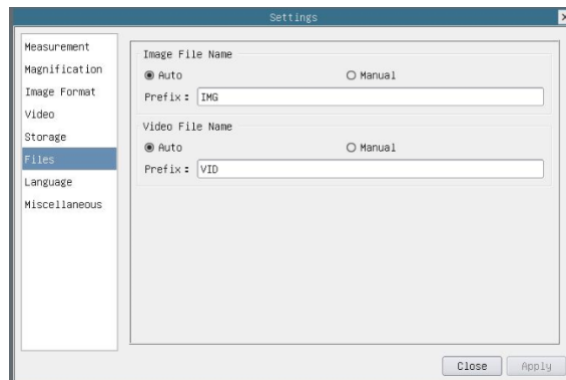


Figure 16 Comprehensive setting of files settings page

Image File Name	Auto: The image files will be saved automatically with the specified prefix. Manual: Users has to specify the file name before image saving.
Video File Name	Auto: The video file will be saved automatically with the specified prefix. Manual: Users has to specify the video file name before video recording.
Note: The maximum video file size is 4G Bytes. Multiple video files may be generated automatically during long time video recording.	

4.4.7 Setting>Language

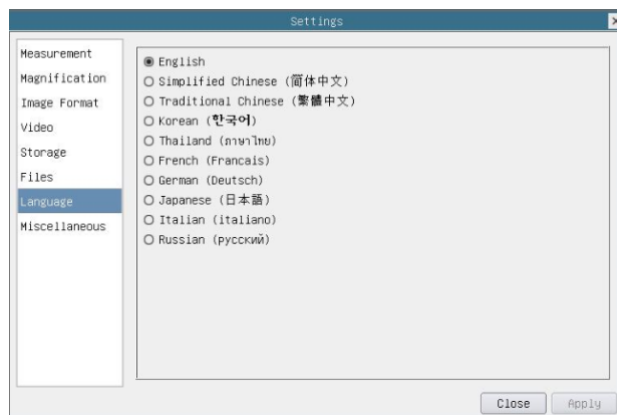


Figure 17 Comprehensive setting of language selection setting page

English	Set language of the whole software into English;
Simplified Chinese	Set language of the whole software into Simplified Chinese;
Traditional Chinese	Set language of the whole software into Traditional Chinese;

Korean:	Set language of the whole software into Korean;
Thailand	Set language of the whole software into Thailand;
French	Set language of the whole software into French
German	Set language of the whole software into German
Japanese	Set language of the whole software into Japanese
Italian	Set language of the whole software into Italian
Russian	Set language of the whole software into Russian

4.4.8 Setting>Miscellaneous

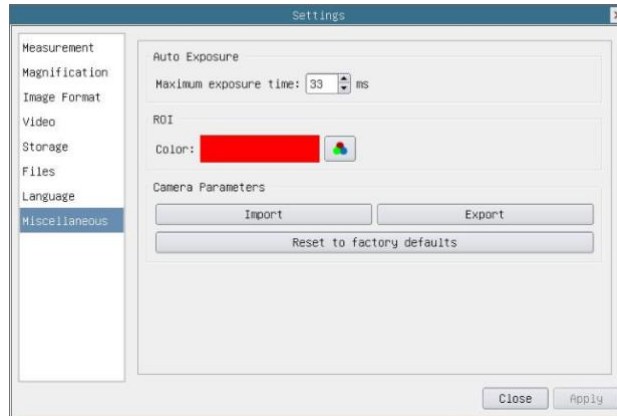


Figure 18 Comprehensive miscellaneous settings page

Auto Exposure	The maximum exposure time during auto exposure process could be specified. Setting this item to a lower value could guarantee a faster frame rate during auto exposure.
ROI Color	Choosing the ROI rectangle line color
Camera Parameters Import	Import the Camera Parameters from the SD card to use the previously exported Camera Parameters
Camera Parameters Export	Export the Camera Parameters to the SD card to use the previously exported Camera Parameters
Reset to factory defaults	Restore camera parameters to its factory status;

5 Sample Photos Captured with PZM0840H1080PA-EDRL/DRL

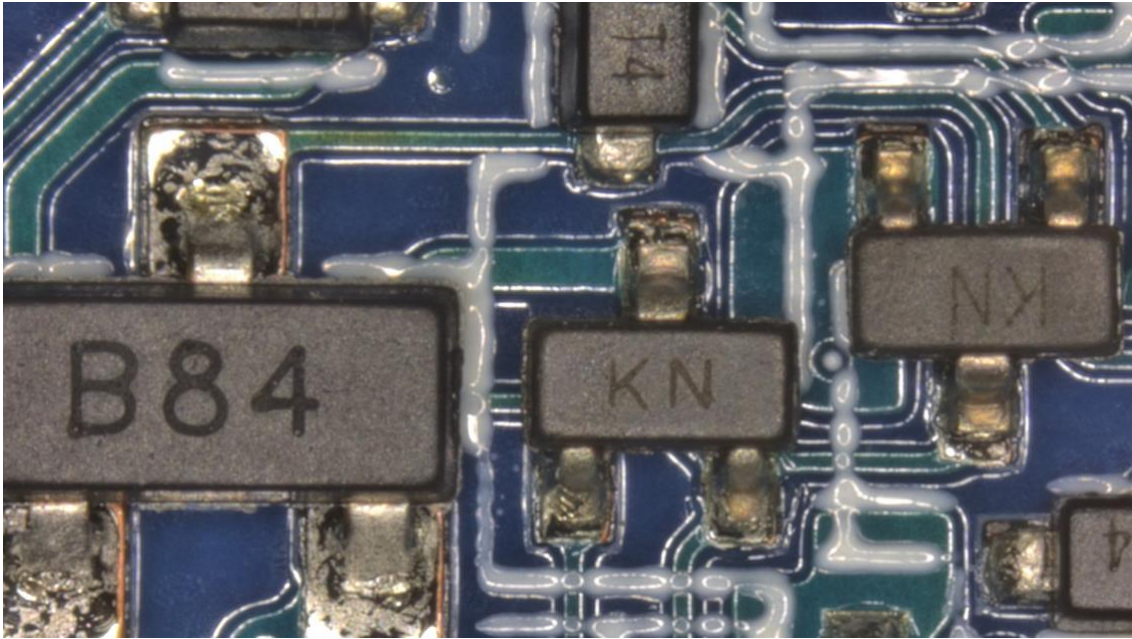


Figure 19 Circuit board captured with PZM0840H1080PA-DRL (0.8X)

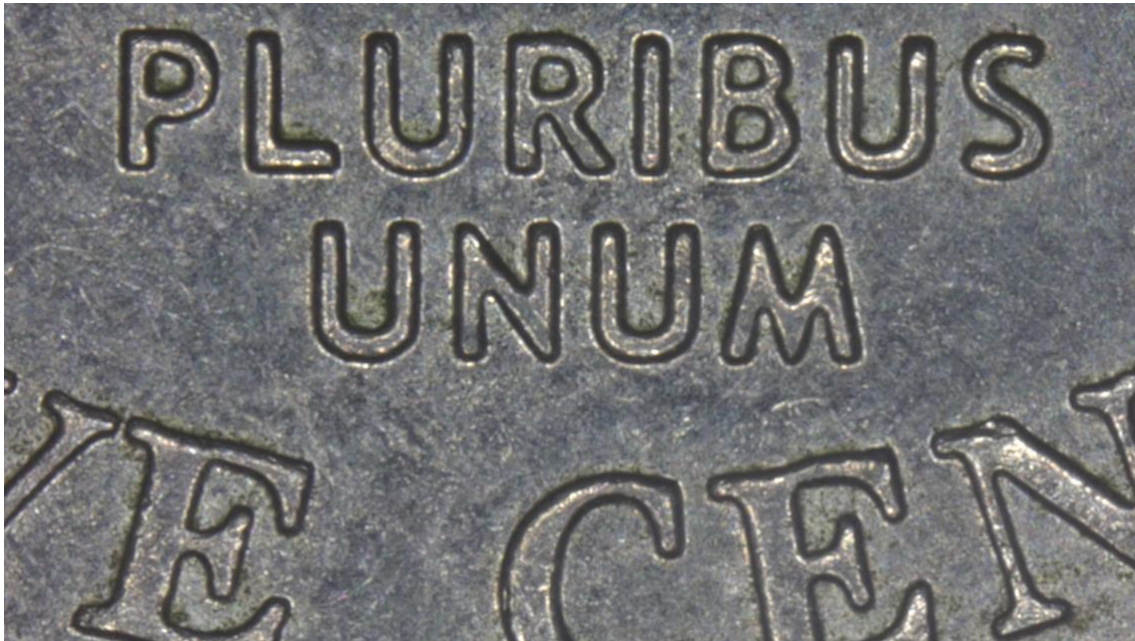


Figure 20 Coins captured with PZM0840H1080PA-DRL (0.8X)

6 ToupTek®-- Contact Information

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7 ToupTek web site

7.1 Microscope/web

English: <https://www.touptek.com>

English: <https://www.touptekphotonics.com>

Chinese: <https://www.touptekphotonics.com.cn>

7.2 Astronomy/web

Chinese: <https://www.touptek-astro.com.cn>

Chinese: <https://www.touptek-astro.cn>

English: <https://www.touptek-astro.com>

7.3 Astronomy/shop

English: <https://www.touptekastro.com>