The ZM0756H1080PA All-in-one Zoom Monocular HDMI Digital Microscope Help Manual

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1.1 The ZM0756H1080PA's Basic Characteristic

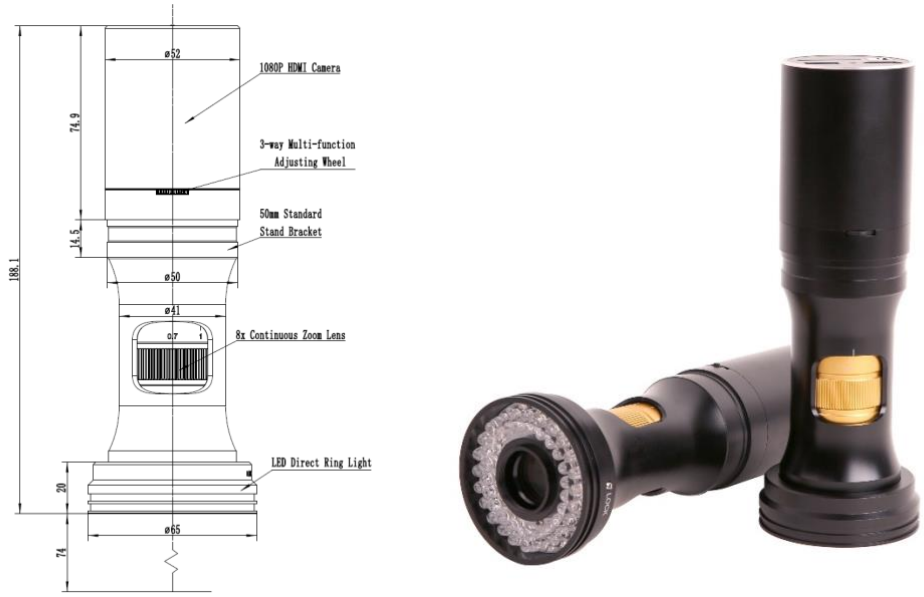


Figure 1 The main body of ZM0756H1080PA

ZM0756H1080PA All-in-one Zoom Monocular HDMI Digital Microscope is shown in Figure 1. It has 8x continuous zoom lens ZM0756-W100-TV050, 1080p HDMI camera H1080PA and LED ring light source.

The H1080PA module can directly complete the video and image acquisition without a computer, and the LED ring light source module is directly connected to the H1080PA module through the main body of the optical continuous zoom lens with no need of the external power supply.

1.2 The ZM0756H1080PA's Main Zoom Body TZM0756-W100-TV050's Characteristics

Optical Parameters	
Zoom Lens	TZM0756-W100-TV050 zoom lens，0.7X-5.6X zoom range
Working Distance	37.5mm-160mm (Determined by the auxiliary objective)
NA	0.018-0.092（With W100，1x auxiliary objective）
Resolution	18.6um-3.65um（With W100，1x auxiliary objective）
Field	0.99mm-34.28mm
Optional Objective	0.50x，0.75x，1.00x，1.50x，2.00x（Optional）
Other Optional Objective	Infinite microscope objective (Both biological microscope objective and metallographic microscope objective can be used)
Dimensions	188mm x 52mm
Bracket Interface	Standard 50mm

1.3 The Optional Objective Wxxx for TZM0756-Wxxx-TV50

Auxiliary Objective	Specification	TV Lens TV050 for 1/3" Sensor	
		Low	High
W100，1.0X(80mm WD)	PMAG	0.35X~2.80X	
	FOV	17.14mm	2.14mm
	NA	0.018	0.092
W050，0.5X(160mm WD)	PMAG	0.18X~1.40X	
	FOV	34.28mm	4.28mm
	NA	0.009	0.046
W075，0.75X(105mm WD)	PMAG	0.26X~2.10X	
	FOV	20.81mm	2.86mm
	NA	0.013	0.069
W150，1.5X(51.5mm WD)	PMAG	0.53X~4.20X	

	FOV	11.43mm	1.43mm
	NA	0.026	0.138
W200，2.0X(37.5mm WD)	PMAG	0.70X~5.60X	
	FOV	8.57mm	1.07mm
	NA	0.035	0.182
Remarks	When using coaxial lighting, low magnification may produce vignetting. When using infinity objectives as Auxiliary Lens Module (adapter available), the PMAG、FOV and NA of the TZM0756 depends on the parameters of the objectives.		

WD: Working Distance;
PMAG: Primary Magnification;
FOV: Field of View in the object side;
NA: Numerical Aperture;
Note: Infinity corrected objectives limit system's usable zoom range due to uneven illumination. The maximum sensor format is 2/3".

1.4 The H1080PA Camera of ZM0756H1080PA

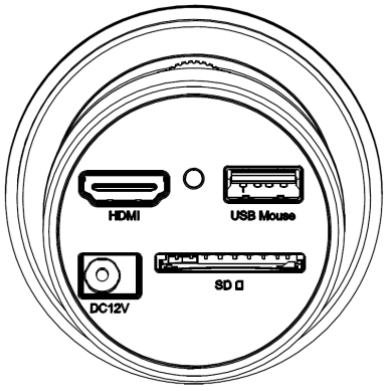


Figure 2 The top panel of ZM0756H1080PA

Interface and Button	Function 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
DC12V	Power adapter connection (12V/1A)
SD	Comply with SDIO3.0 standard and SD card could be inserted for video and images storage
Camera Hardware	**Function Description**
HDMI 1080P Camera	Comply with HDMI1.4 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
Software	**Function 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
Embedded RTC(Optional)	To support accurate time on board
Restore Factory Settings	Restore camera parameters to its factory status
Multiple Language Support	English / Simplified Chinese / Traditional Chinese / Korean / Thai / French / German / Japanese / Italian / Russian

Operating Environment	
Operating Temperature (in Centidegree)	-10°~ 50°
Storage Temperature (in Centidegree)	-20°~ 60°
Operating Humidity	30~80%RH
Storage Humidity	10~60%RH
Power Supply	DC 12V/1A Adapter
Lighting Module	
LED Ring Light	LED direct ring light with adjustable brightness(No power cable) (TZM0756DRL-NPC)
LED Ring Polarization Light	LED direct ring polarization light with adjustable brightness(No power cable)，（TZM0756DRPL-NPC）
Coaxial Light Module	LED Coaxial Light Module with adjustable brightness(No power cable)，(TZM0756CL_NPC)
Power Supply	Integrated power supply, no power cable winding trouble, sample observation more freely
Installation Method	Express second-level suction type installation, convenient and simple
Brightness Control	Through the 3-way multi-function adjusting wheel or software GUI, both the hardware and software can adjust the light intensity synchronously with no hassle

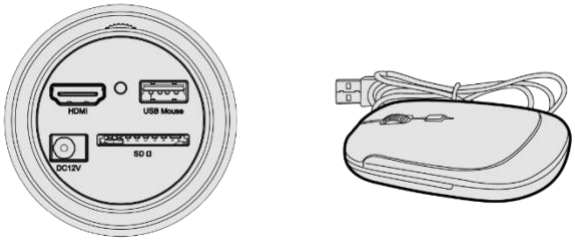
2 Installation of ZM0756H1080PA

Apart from the ZM0756H1080PA, you only need an HDMI monitor, the supplied HDMI cable, USB mouse, SD card and power adapter(12V/1A). The steps to start the ZM0756H1080PA are listed as below:

Figure 3 ZM0756H1080PA and its accessary

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

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



- Insert the supplied SD card into the HDMI camera SD card;

- 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 ZM0756H1080PA's Packing Information

Figure 4 ZM0756H1080PA's packing Information

Standard Packing List		
A	Gift box : L:17.5cm W:17.5cm H:8.5cm (1pcs, 0.85kg/ box)	
B	The ZM0756H1080PA main body	
C	LED Direct Ring Light with No Power Connection (TZM0756DRL-NPC)	
D	HDMI cable	
E	Power adapter: Input: AC 100~240V 50Hz/60Hz, Output: DC 12V 1A	American standard: Model: POWER-U-12V1A(MSA-C1000IC12.0-12W-US): UL/CE/FCC EMI standard: FCC Part 15 Subpart B EMS standard: EN61000-4-2,3,4,5,6
		European standard: Model: POWER-E-12V1A(MSA-C10001C12.0-12W-DE): UL/CE/FCC EMI standard: FCC Part 15 Subpart B EMS standard: EN61000-4-2,3,4,5,6
F	USB mouse/USB wireless mouse	
Optional Accessory		
G	The LED Direct Ring Polarization Light with No Power Connection (TZM0756DRPL-NPC)	
H	Coaxial Light Module with No Power Connection (TZM0756CL-NPC)	
I	SD card(4G or 8G)	
J	1 to 2 power splitting cable	
K	The other Auxiliary Lens(Not shown)	

Figure 5 LED Direct Ring Light ZM0756DRL-NPC

Figure 6 LED Direct Ring Polarization Light ZM0756DRPL-NPC

Figure 7 LED Coaxial Light ZM0756CL-NPC

4 Brief Introduction of ZM0756H1080PA camera's UI and Its Functions

4.1 XCamView UI

The ZM0756H1080PA camera's UI shown in Figure 8 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.

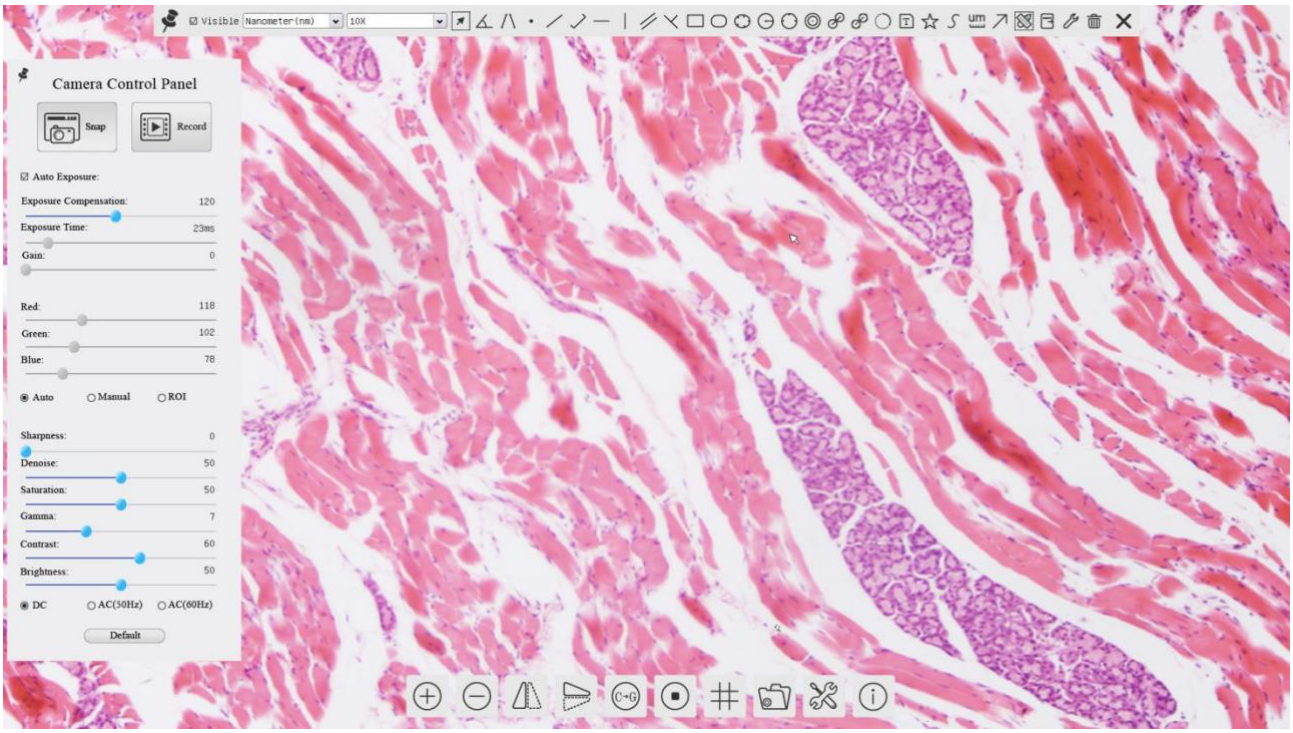


Figure 8 The ZM0756H1080PA camera's control UI

	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	Move the mouse cursor to the top of the video window, a Measurement Toolbar will pop up for calibration and measurement operations. 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
3	When users move mouse cursor to the bottom of the video window, the Synthesis Camera Control Toolbar will pop up automatically. . See Sec.4.4 for details.

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
	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
	Show / Hide Measurement Objects
	Select the desired Measurement Unit
	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

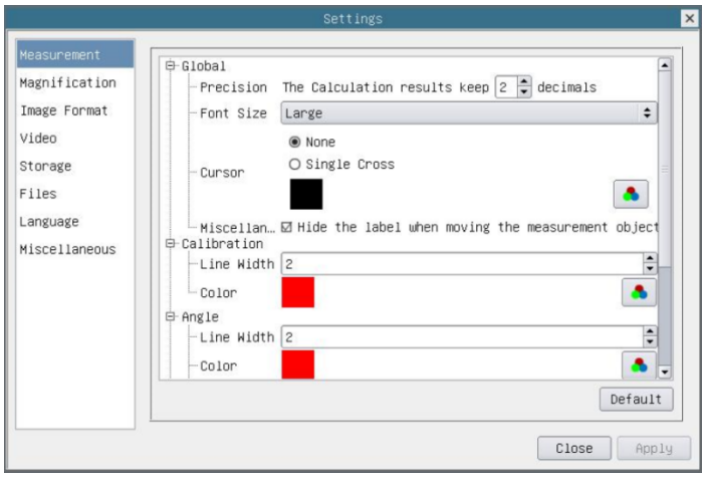


Figure 9 The measurement setup

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

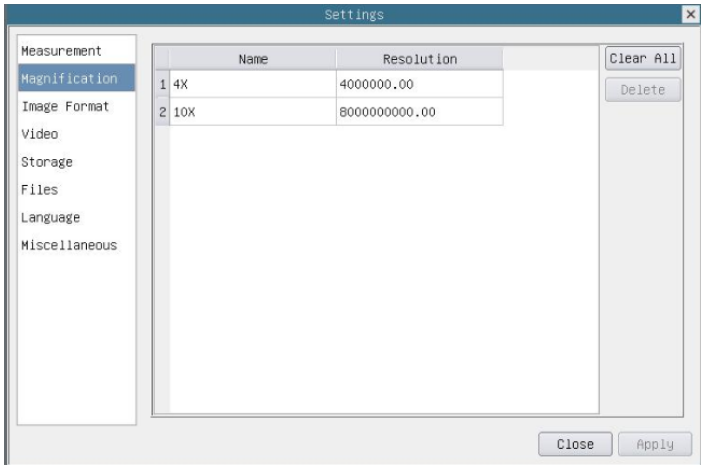


Figure 10 Comprehensive magnification calibration settings page

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

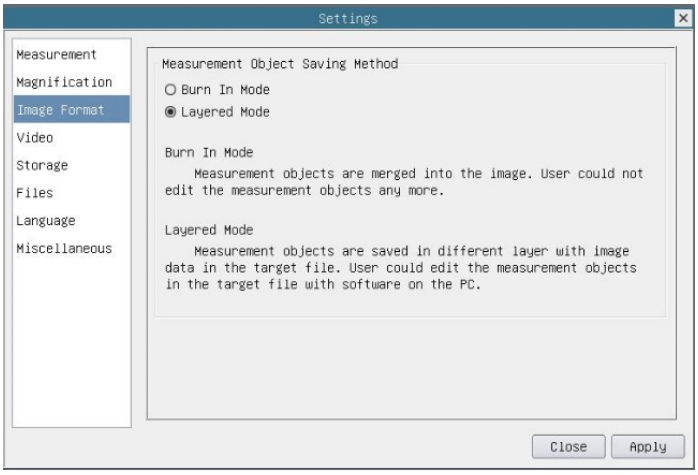


Figure 11 Comprehensive image format settings page

Measurement Object Save Method	Burn in Mode: The measurement objects are merged into the current image. User could not edit the measurement objects anymore. This mode is not reversable. 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 reversable.

4.4.4 Settings>Video

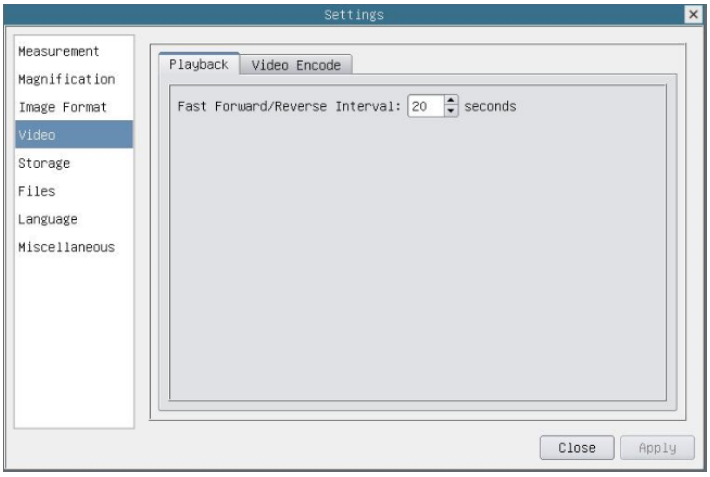


Figure 12 Comprehensive setting of video settings page-playback

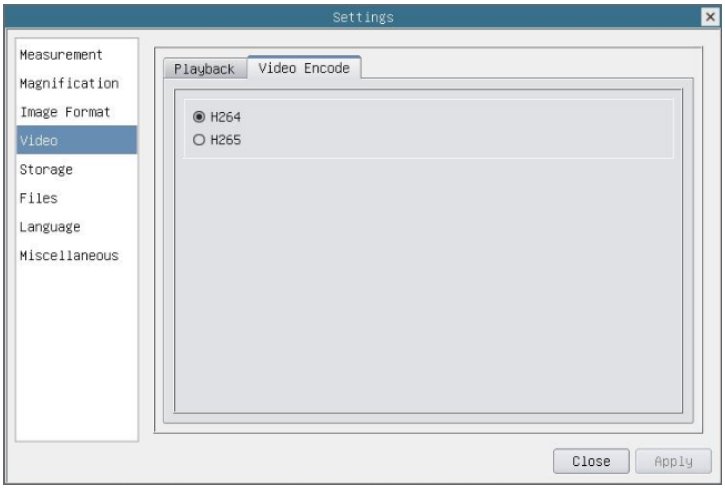


Figure 13 Comprehensive setting of video settings page-video encode

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

4.4.5 Setting>Storage

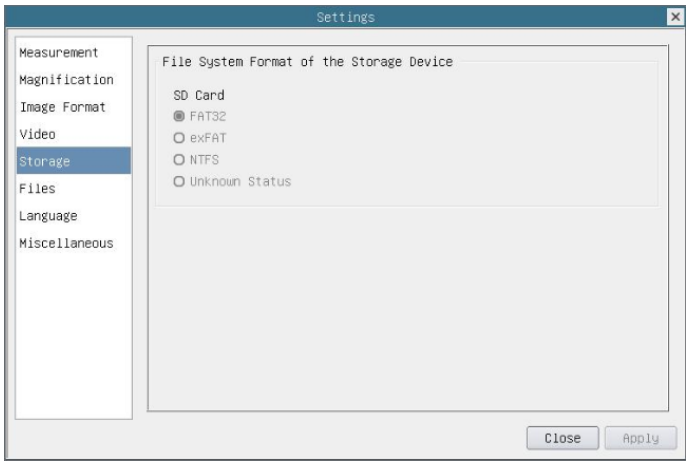


Figure 4-14 Comprehensive setting of SD card setting page

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

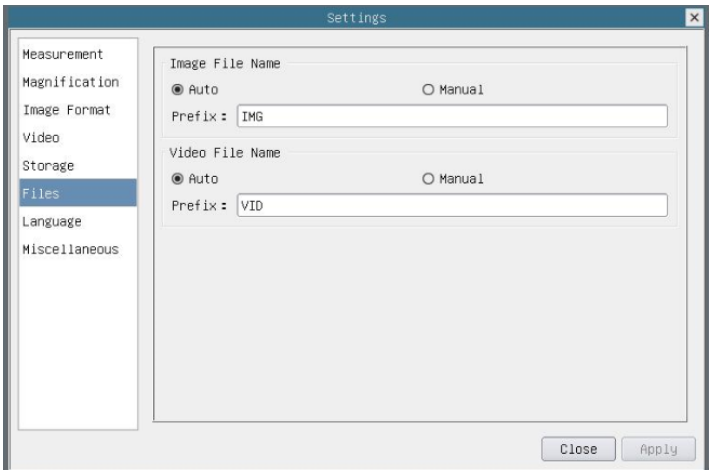


Figure 15 Comprehensive setting of files settings page

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

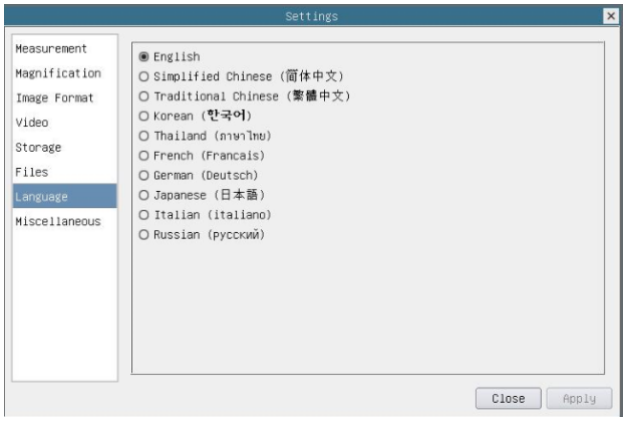


Figure 16 Comprehensive setting of language selection setting page

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

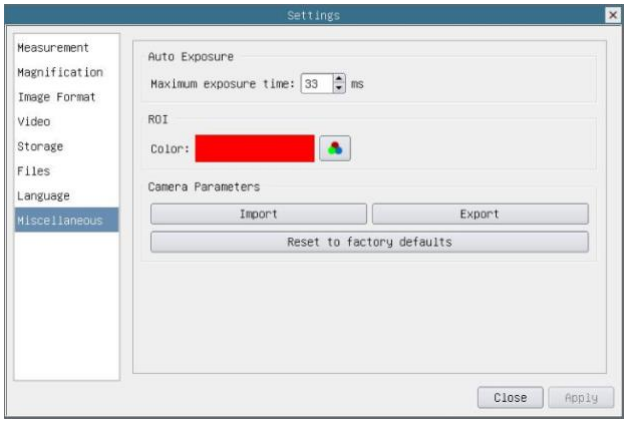


Figure 17 Comprehensive miscellaneous settings page

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 ZM0756H1080PA

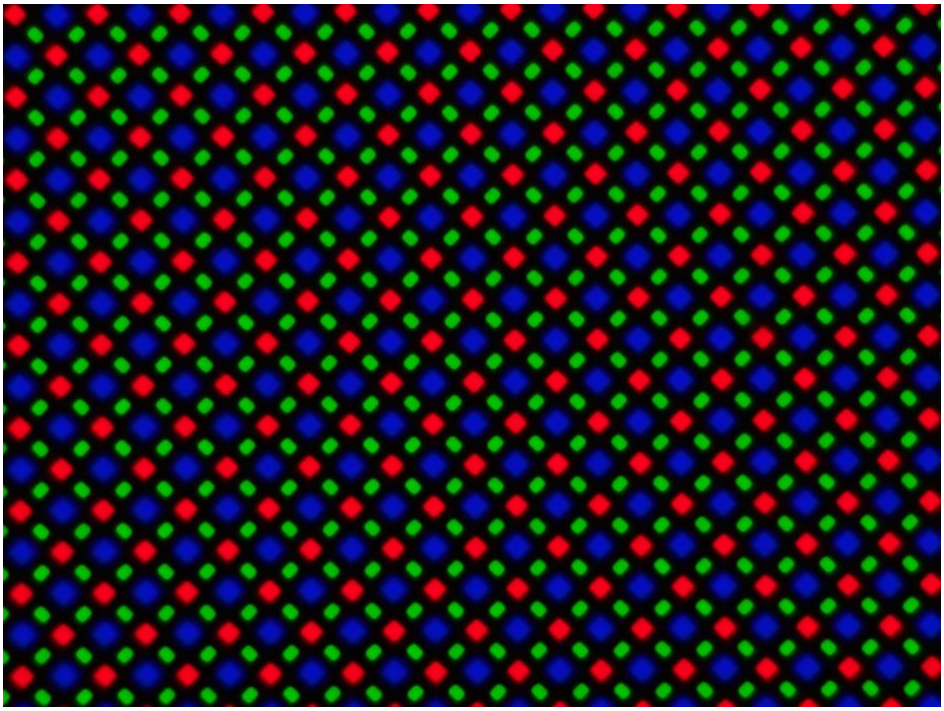


Figure 18 LCD pixel array captured with ZM0756H1080PA

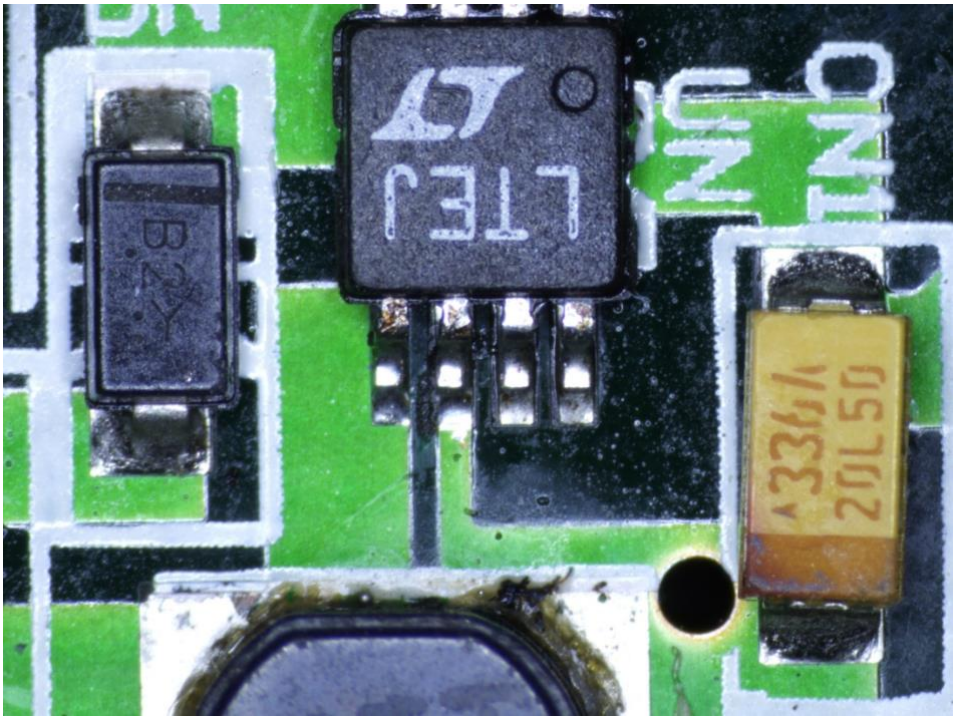


Figure 19 Circuit board captured with ZM0756H1080PA

6 Contacting Customer Service

Please contact your local distributor if you have any questions about the product.

Web: www.touptekphotonics.com