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All-in-one Zoom Digital Microscope Manual

NYMCS-VM701



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1. Application

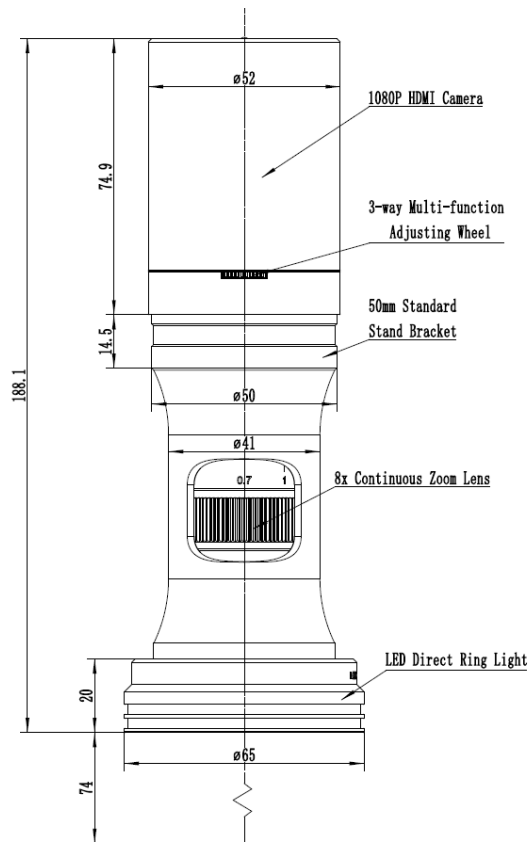


Figure 1, The main body

1.1. Basic Characteristic

The all-in-one zoom digital microscope is shown in Figure 1. It has 8x continuous zoom lens, 1080p HDMI camera and LED ring light source.

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

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Main features:

Optical Parameters	
Zoom Lens	0.7x-5.6x zoom range
Working Distance	37.5mm-160mm (Determined by the auxiliary objective)
NA	0.018-0.092 (with 1x auxiliary objective)
Resolution	18.6um-3.65um (with 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
HDMI Digital Camera Module	
HDMI 1080P Camera	Integrated with zoom lens
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	0.01~1000ms
Output Mode	HDMI output
Image Saving	Use SD card (not included) to save the captured image or video
Software	Use the built-in XCamView software to control the camera
ISP	Having powerful ISP and other related processing functions
Lighting Module	
LED Ring Light	LED direct ring light with adjustable brightness (No power cable)
LED Ring Polarization Light	LED direct ring polarization light with adjustable brightness (No power cable)
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

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1.2. Optical Specifications with Optional Objective



Figure 2

Auxiliary Objective	Specification	TV Lens for 1/3" Sensor	
		Low	High
1.0x (80mm WD)	PMAG	0.35X~2.80X	
	FOV	17.14mm	2.14mm
	NA	0.018	0.092
0.5x (160mm WD)	PMAG	0.18X~1.40X	
	FOV	34.28mm	4.28mm
	NA	0.009	0.046
0.75x (105mm WD)	PMAG	0.26X~2.10X	
	FOV	20.81mm	2.86mm
	NA	0.013	0.069
1.5x (51.5mm WD)	PMAG	0.53X~4.20X	
	FOV	11.43mm	1.43mm
	NA	0.026	0.138
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 depends on the parameters of the objectives.		

WD: Working Distance, **PMAG:** Primary Magnification, **FOV:** Field of View, **NA:** Numerical Aperture

Note: Infinity corrected objectives limit system's usable zoom range due to uneven illumination. The maximum sensor format is 2/3".

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1.3. Available Ports

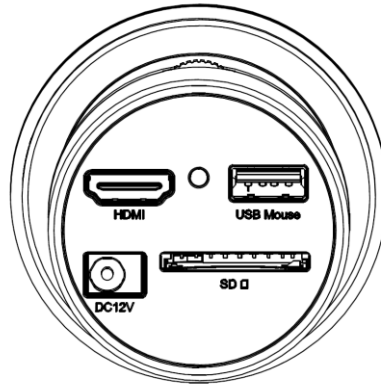


Figure 3

Interface	Function Description
USB Mouse	Connect USB mouse for easy operation with embedded XCamView software
HDMI	Comply with HDMI1.4 standard. 1080P format video output for standard FHD monitor
SD	Comply with SDIO3.0 standard and SD card could be inserted for video and images storage
DC12V	Power adapter connection (12V/1A)
LED	LED status indicator

2. Camera Functions

2.1. Video Output

Video Output Interface	Function Description
HDMI Interface	Comply with HDMI1.4 standard; 60fps@1080P

2.2. Image Capture and Video Saving in SD card

Function Name	Function Description
Video Saving	Video format: 2M (1920x1080) 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 (not included)
Measurement Saving	Measurement information saved in different layer with image content. Measurement information is saved together with image content in burn in mode.

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2.3. ISP Function

Function Name	Function Description
Exposure / Gain	Automatic / Manual Exposure
White Balance	Manual / Automatic / ROI Mode
Sharpening	Supported
3D Denoise	Supported
Saturation Adjustment	Supported
Contrast Adjustment	Supported
Brightness Adjustment	Supported
Gamma Adjustment	Supported
50HZ/60HZ Anti-flicker Function	Supported

2.4. Image Operation Function

Function Name	Function Description
Zoom In/Zoom Out	Up to 10X
Mirror/Flip	Supported
Freeze	Supported
Cross Line	Supported
Embedded Files Browser	Supported
Video Playback	Supported
Measurement Function	Supported

2.5. Other Functions

Function Name	Function Description
Restore Factory Settings	Supported
Multiple Language Support	English / Simplified Chinese / Traditional Chinese / Korean / Thai / French / German / Japanese / Italian / Russian

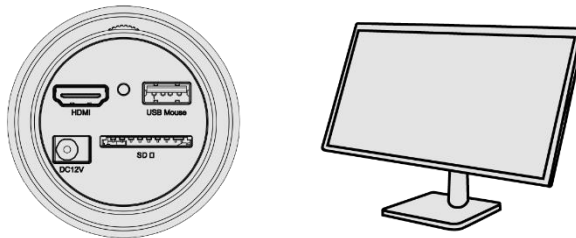
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3. Installation Procedure

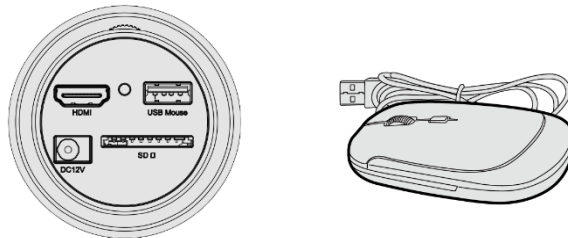


Figure 4

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



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

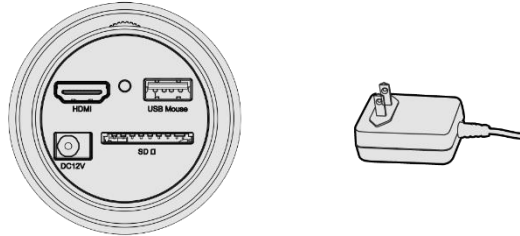


- Insert the supplied SD card into the HDMI camera SD card.



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- 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.

4. Brief Introduction to the UI and its Functions

4.1. XCamView UI

The camera's UI shown in Figure 6 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.

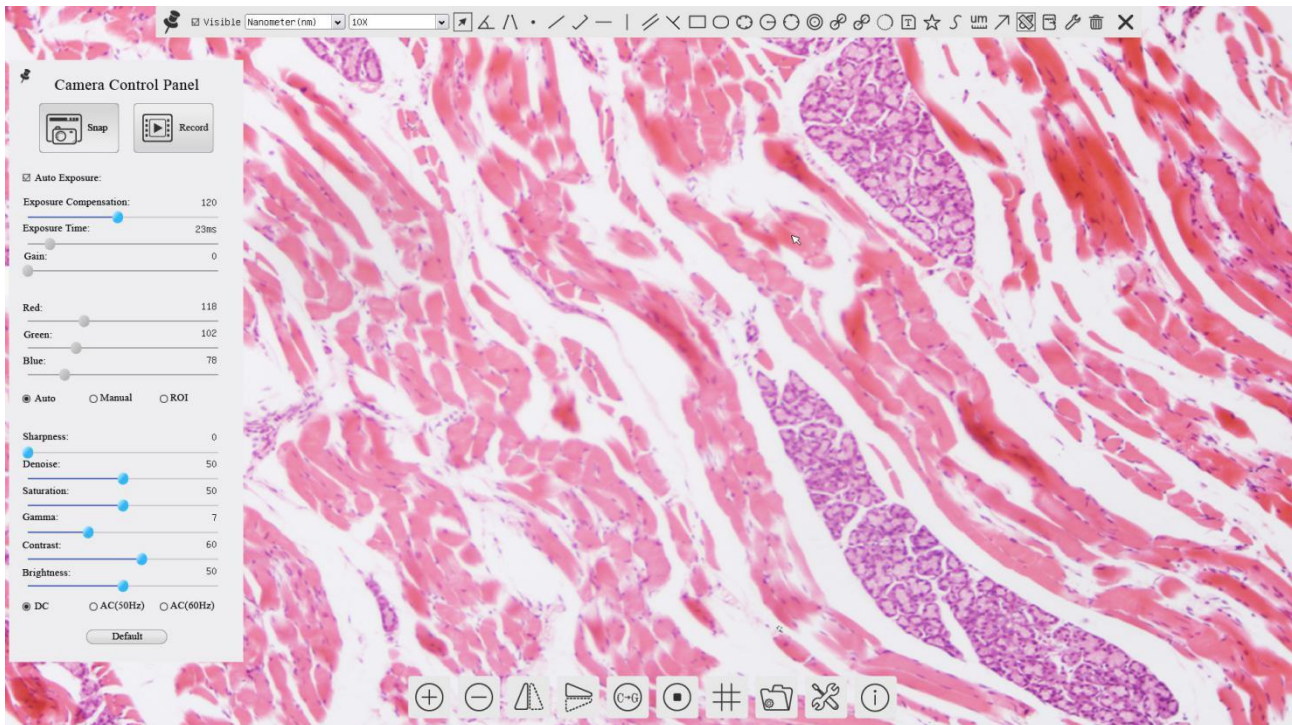





















Figure 6

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Notes	
1	To show the Camera Control Panel, move your mouse to the left of the video window. See section 5.2 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. 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.</p>
3	<p>When users move mouse cursor to the bottom of the video window, the Synthesis Camera Control Toolbar will pop up automatically.           . See section 5.4 for details.</p>

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4.2. Camera Control Panel

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.

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















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4.3. Measurement Toolbar


















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



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


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Icon	Function
	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.

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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



Figure 8

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:

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4.4.1.Setting>Measurement

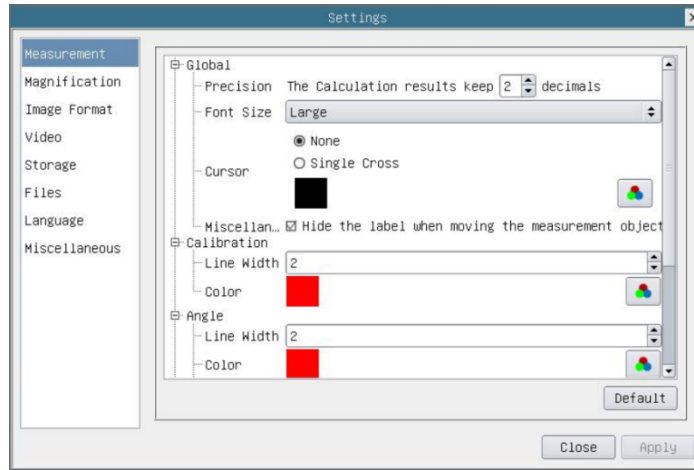



Figure 9

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

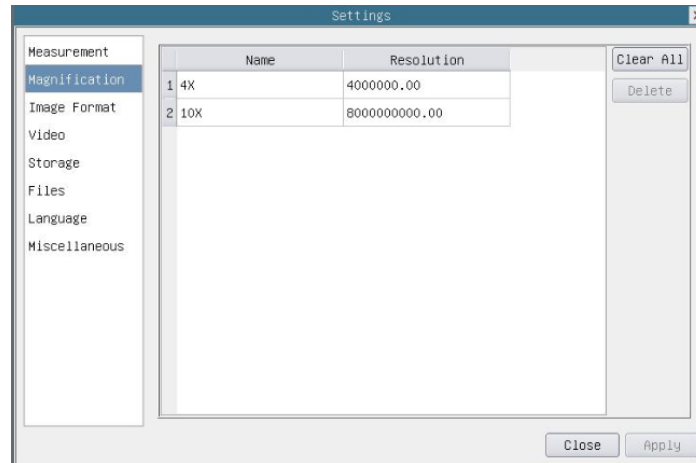


Figure 10

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

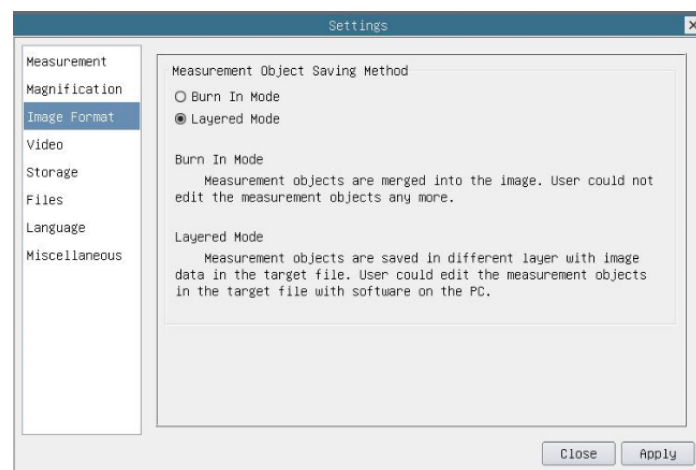


Figure 11

Measurement Object Save Method	<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

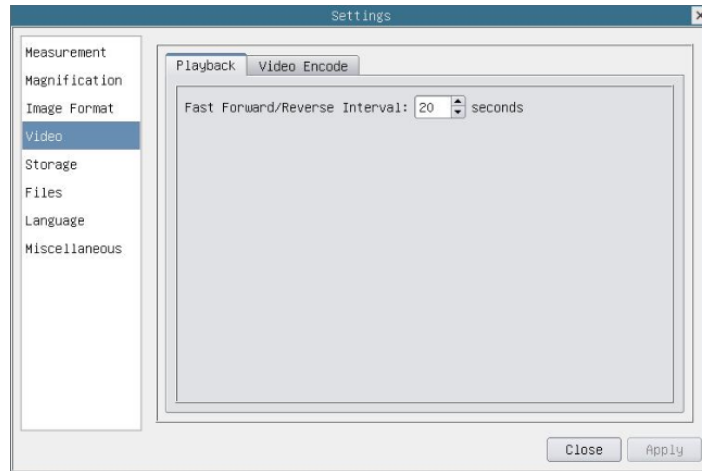


Figure 12

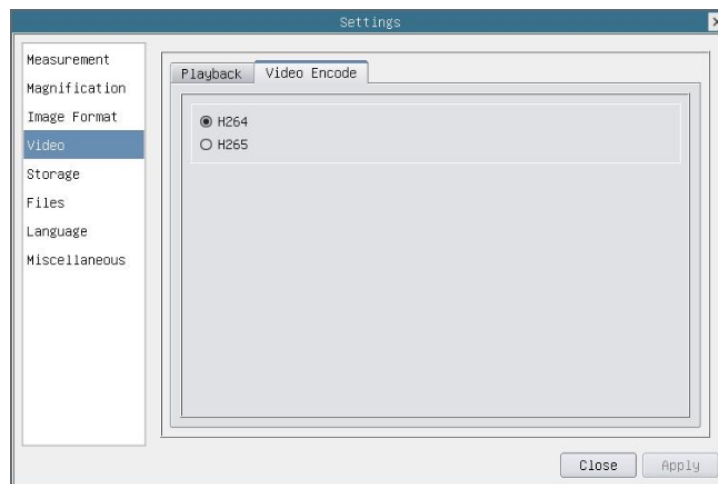


Figure 13

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.

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4.4.5. Setting>Storage

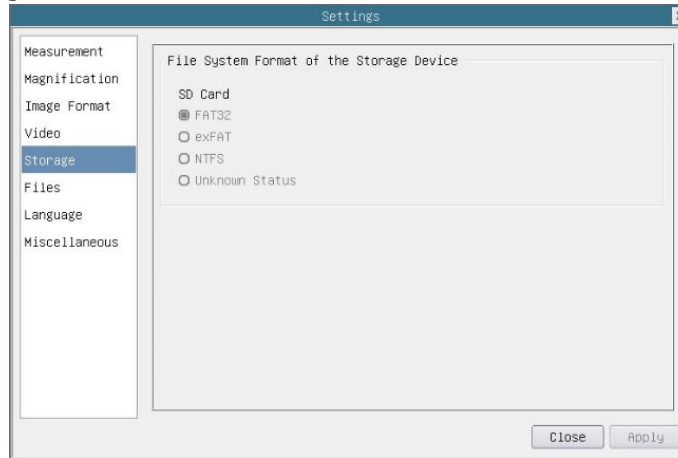


Figure 14

Storage Device	SD Card: SD Card is only supported as the storage device.
File System Format of the Storage Device	<p>List the file system format of the current storage device</p> <p>FAT32: The file system of SD card is FAT32. The maximum video file size of single file is 4G Bytes.</p> <p>exFAT: The file system of SD card is exFAT. The maximum video file size of single file is 4G Bytes.</p> <p>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.</p> <p>Unknown Status: SD card not detected, or the file system is not identified;</p>

4.4.6. Setting>Files

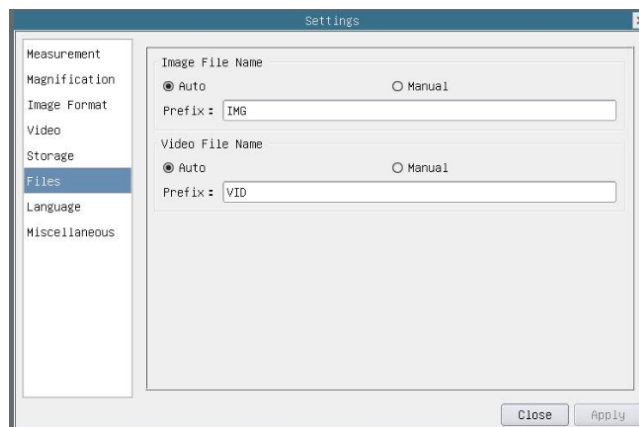


Figure 15

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

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4.4.7.Setting>Language

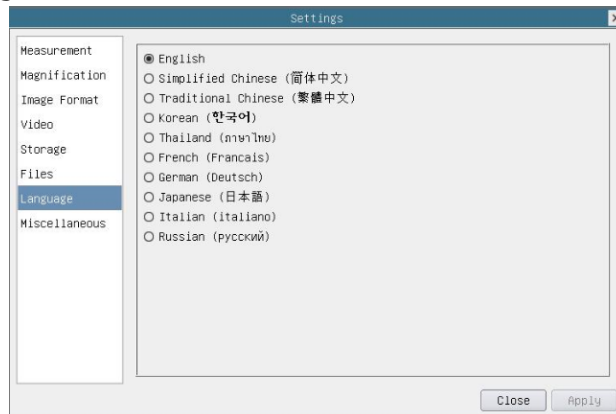


Figure 16

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

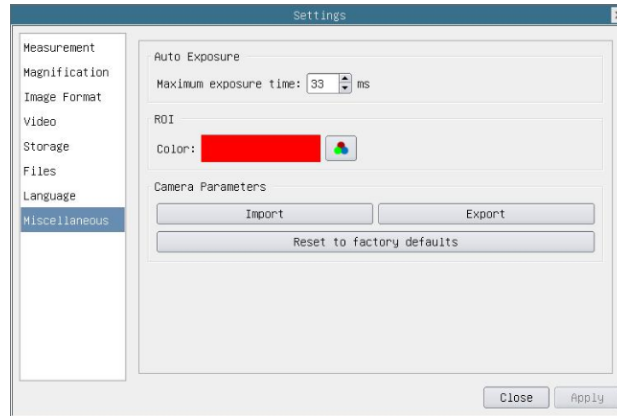


Figure 17

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