

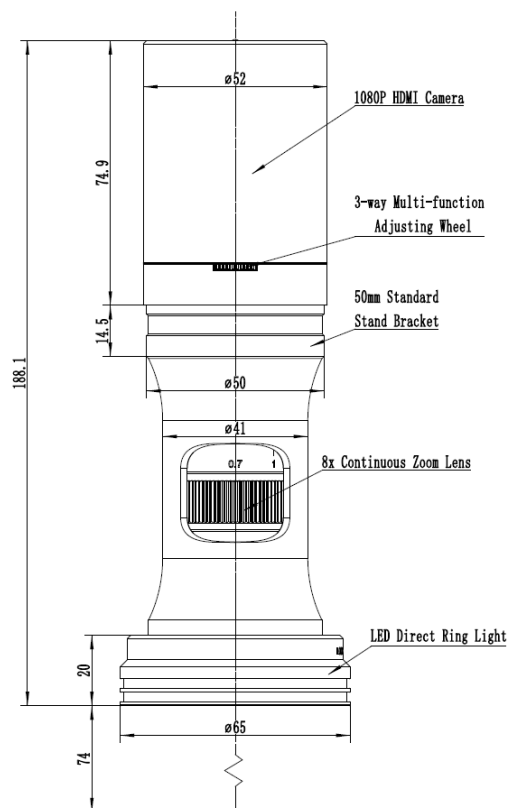
## 2. BS-1008D Series HDMI Digital Zoom Microscope



### Introduction

BS-1008D series all-in-one zoom digital microscope is shown as follows. It has 8x continuous zoom lens BS-1008-WXXX-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.



The main body of BS-1008D

## Specification

The main parameters of BS-1008D are as follows:

<b>Optical Parameters</b>	
Zoom Lens	BS-1008-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
<b>HDMI Digital Camera Module</b>	
HDMI 1080P Camera	H1080PA, 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 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
<b>Lighting Module</b>	
LED Ring Light	LED direct ring light with adjustable brightness (No power cable) (BS-1008DRL-NPC)
LED Ring Polarization Light	LED direct ring polarization light with adjustable brightness (No power cable), (BS-1008DRPL-NPC)
Coaxial Light Module	LED Coaxial Light Module with adjustable brightness (No power cable), (BS-1008CL_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

## Optical Specification



The BS-1080D and LED ring light source

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 <a href="#">Auxiliary Lens Module</a> (adapter available), the <a href="#">PMAG</a> , <a href="#">FOV</a> and <a href="#">NA</a> of the <a href="#">BS-1008</a> depends on the parameters of the objectives.		

**WD:** Working Distance;

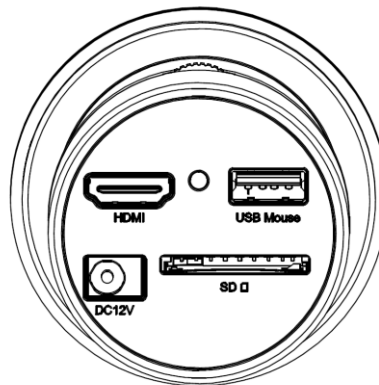
**PMAG:** Primary Magnification;

**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".

## Available Ports on the Back of the Camera Body



The top panel of BS-1008D

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

## BS-1008D's Camera H1080PA Function

### Video Output

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

### Image Capture and Video Saving in SD card

Function Name	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

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

### 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

### 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

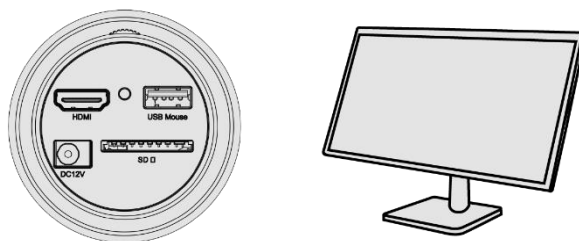
### Installation Procedure of BS-1008D

Apart from the BS-1008D, you only need an HDMI monitor, the supplied HDMI cable, USB mouse, SD card and power adapter(12V/1A). The steps to start the BS-1008D are listed as below:

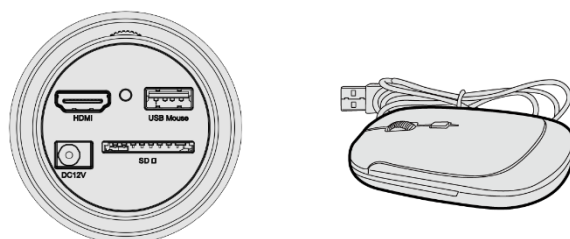


BS-1008D and its accessory

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



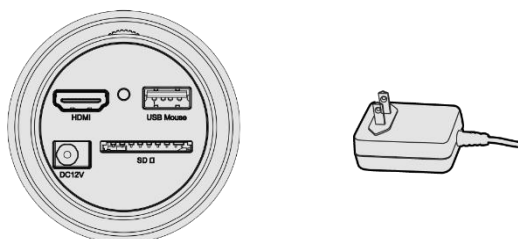
- Insert the supplied USB mouse to the camera's USB port;



- Insert the supplied SD card into the 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.

## BS-1008D's Packing Information



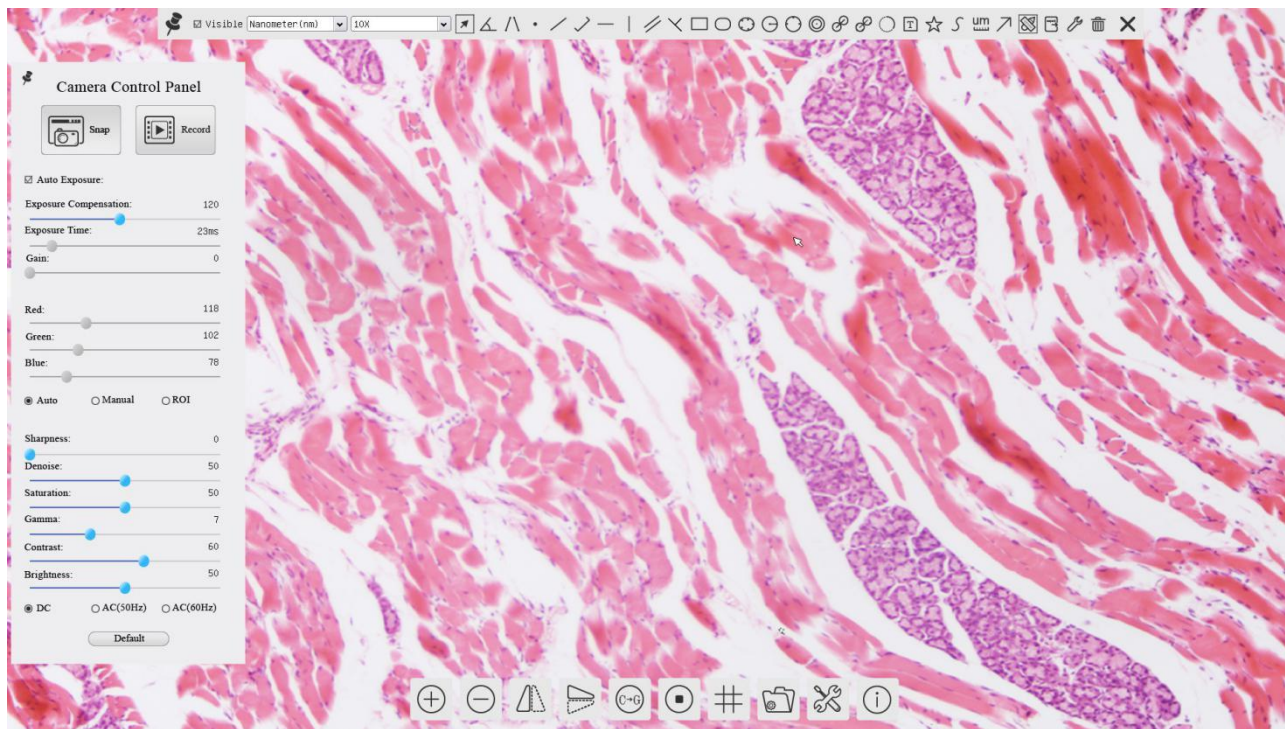
BS-1008D's packing Information

Standard Packing List				
<b>A</b>	Gift box: L:17.5cm W:17.5cm H:8.5cm (1pcs, 0.85kg/ box)			
<b>B</b>	The BS-1008D main body			
<b>C</b>	HDMI cable			
<b>D</b>	<table border="1"> <tr> <td rowspan="2">                     Power adapter: Input: AC                      100~240V 50Hz/60Hz,                      Output: DC 12V 1A                 </td> <td>                     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                 </td> </tr> <tr> <td>                     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                 </td> </tr> </table>	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
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<b>E</b>	USB mouse/USB wireless mouse			
Optional Accessory				
<b>F</b>	SD card (16G)			
<b>G</b>	Coaxial light module			
<b>H</b>	The other auxiliary lens (not shown)			
<b>I</b>	The other LED light source (shown)			





## Brief Introduction of BS-1008D camera's UI and Its Functions

### XCamView UI

The BS-1008D camera's UI shown in following figure 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.



The BS-1008D camera's control UI

Notes	
1	To show the <a href="#">Camera Control Panel</a> , move your mouse to the left of the video window. See Sec.0 for details
2	<p>Move the mouse cursor to the top of the video window, a <a href="#">Measurement Toolbar</a> will pop up for calibration and measurement operations. When user left-clicks the <a href="#">Float/Fixed</a> button  on the <a href="#">Measurement Toolbar</a>, the <a href="#">Measurement Toolbar</a> will be fixed. In this case the <a href="#">Camera Control Panel</a> 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 <a href="#">Measurement Toolbar</a> to exit from measuring procedure will they be able to do other operations on the <a href="#">Camera Control Panel</a>, or the <a href="#">Synthesis Camera Control Toolbar</a>. During the measuring process, when a specific measuring object is selected, an <a href="#">Object Location &amp; Attributes Control Bar</a>  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 <a href="#">Synthesis Camera Control Toolbar</a> will pop up automatically. . See Sec.0 for details.</p>

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

## 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**:



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 <a href="#">Calibration</a> to determine the corresponding relation between magnification and resolution, which will establish the corresponding relationship between measurement unit and the sensor pixel size. <a href="#">Calibration</a> needs to be done with the help of a micrometer. For detailed steps of carrying out <a href="#">Calibration</a> please refer to <a href="#">ToupView</a> help manual.
	Export the Measurement information to CSV file(*.csv)
	<a href="#">Measurement Setup</a>
	<a href="#">Delete</a> all the measurement objects
	Exit from <a href="#">Measurement mode</a>
	When the measurement ends, left-click on a single measuring object and the <a href="#">Object Location &amp; Properties Control Bar</a> 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 <a href="#">Move Left</a> , <a href="#">Move Right</a> , <a href="#">Move Up</a> , <a href="#">Move Down</a> , <a href="#">Color Adjustment</a> and <a href="#">Delete</a> .

**Note:**

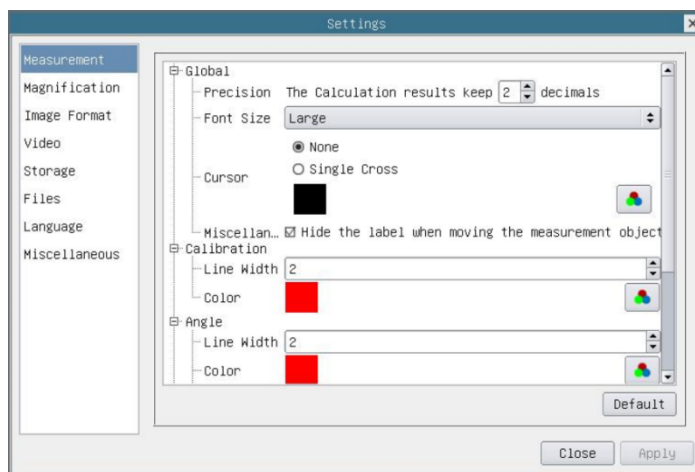
1) When user left-clicks [Display/Hide](#) button on the [Measurement Toolbar](#), the [Measurement Toolbar](#) will be fixed. In this case the [Camera Control Panel](#) will not pop up automatically even if moving the mouse cursor to the left edge of the video window. Only when user left-click the button 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.

**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

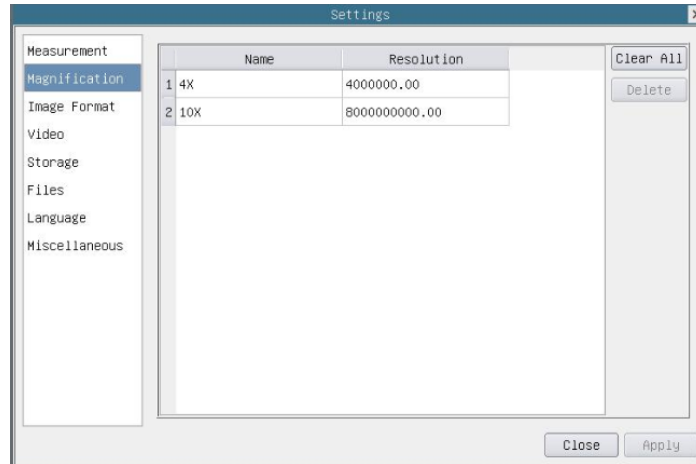
The setting is relatively more complicated than the other functions. Here is more information about it:

**Setting>Measurement**


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;
<a href="#">Point</a> , <a href="#">Angle</a> , <a href="#">Line</a> , <a href="#">Horizontal Line</a> , <a href="#">Vertical Line</a> , <a href="#">Rectangle</a> , <a href="#">Circle</a> , <a href="#">Ellipse</a> , <a href="#">Annulus</a> , <a href="#">Two Circles</a> , <a href="#">Polygon</a> , <a href="#">Curve</a>		
		Left-click the  along with the <a href="#">Measurement</a> command mentioned above will unfold the corresponding attribute settings to set the individual property of the <a href="#">Measurement Objects</a> .

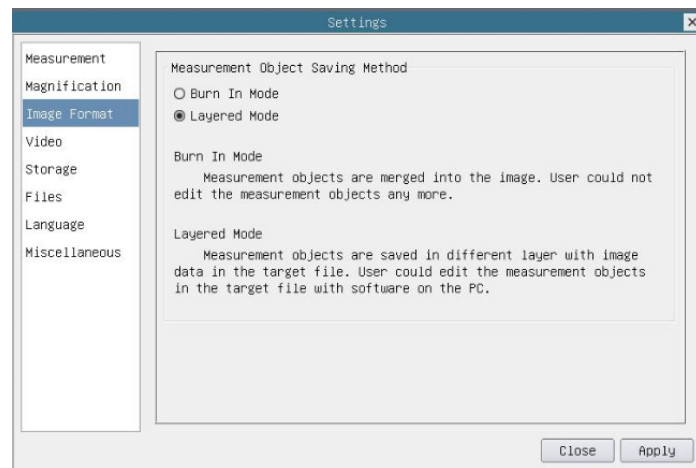
Setting>Magnification



Comprehensive magnification calibration settings page

<b>Name</b>	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.
<b>Resolution</b>	Pixels per meter. Image device like microscopes have high resolution value;
<b>Clear All</b>	Click the <b>Clear All</b> button will clear the calibrated magnifications;
<b>Delete</b>	Click <b>Delete</b> to delete the selected magnification;

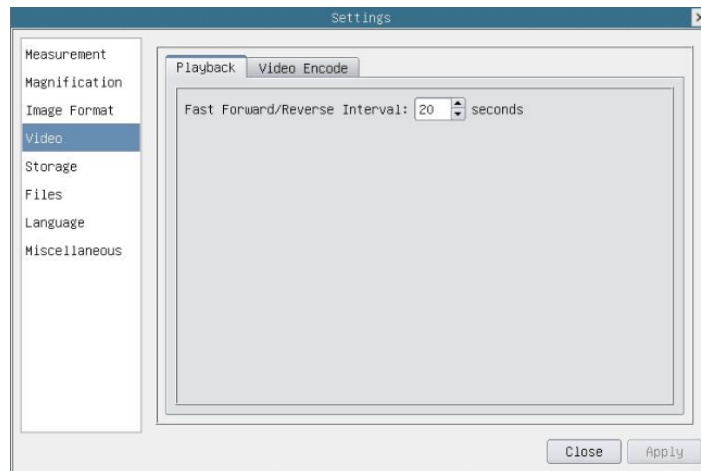
Settings>Image Format



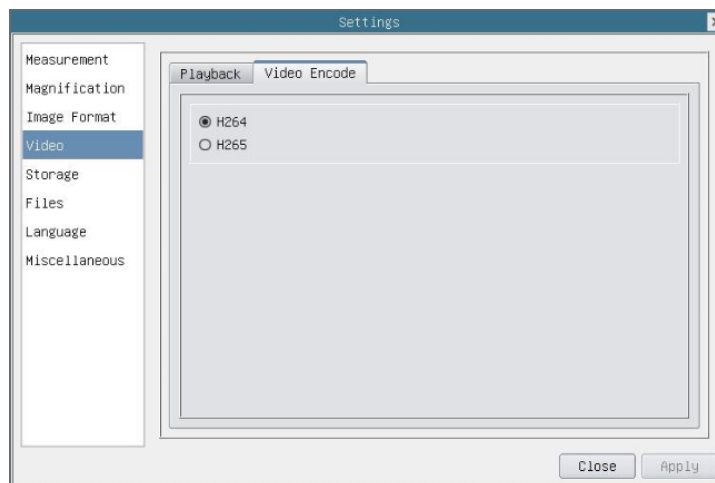
Comprehensive image format settings page

<b>Measurement Object Save Method</b>	<p><b>Burn in Mode:</b> The measurement objects are merged into the current image. User could not edit the measurement objects anymore. This mode is not reversible.</p> <p><b>Layered Mode:</b> 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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Settings>Video



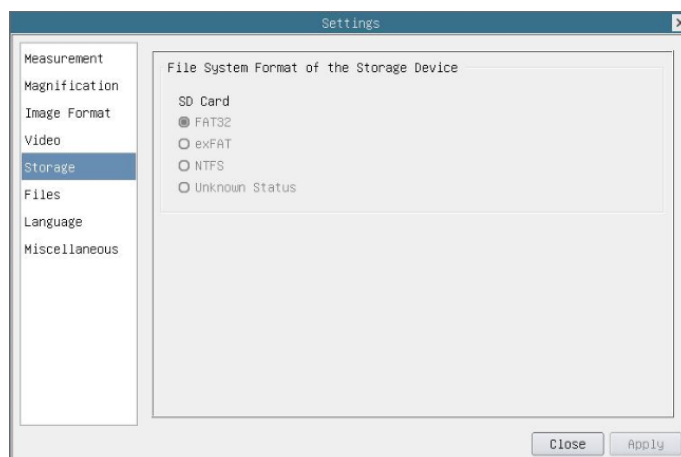
Comprehensive setting of video settings page-playback



Comprehensive setting of video settings page-video encode

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

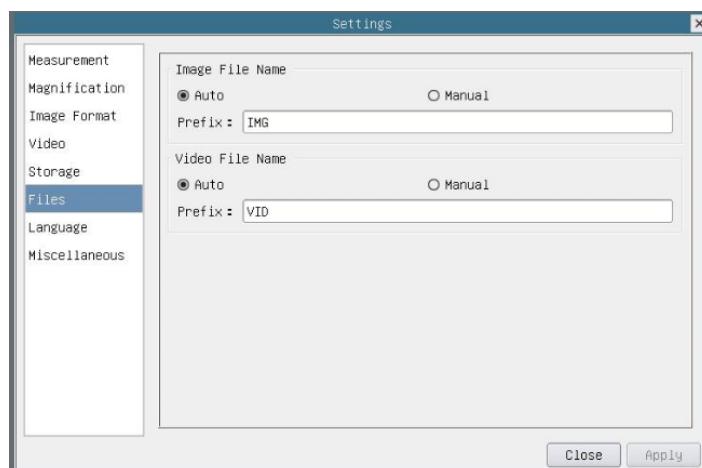
## Setting&gt;Storage



Comprehensive setting of SD card setting page

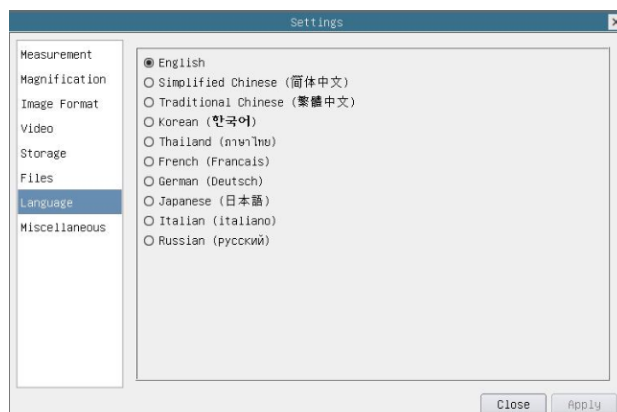
<b>Storage Device</b>	<b>SD Card:</b> SD Card is only supported as the storage device.
<b>File System Format of the Storage Device</b>	List the file system format of the current storage device <b>FAT32:</b> The file system of SD card is FAT32. The maximum video file size of single file is 4G Bytes; 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

## Setting&gt;Files



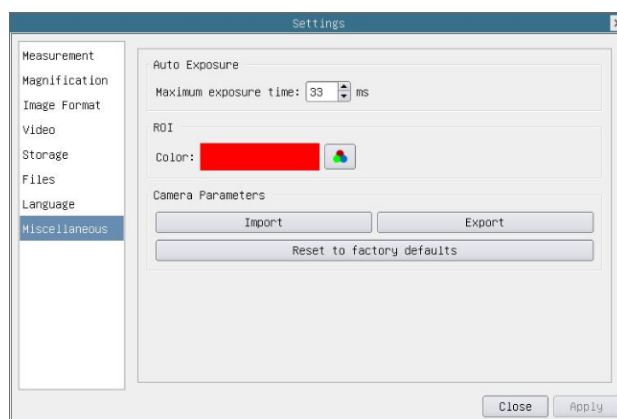
Comprehensive setting of files settings page

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

**Setting>Language**


Comprehensive setting of language selection setting page

<b>English</b>	Set language of the whole software into English;
<b>Simplified Chinese</b>	Set language of the whole software into Simplified Chinese;
<b>Traditional Chinese</b>	Set language of the whole software into Traditional Chinese;
<b>Korean</b>	Set language of the whole software into Korean;
<b>Thailand</b>	Set language of the whole software into Thailand;
<b>French</b>	Set language of the whole software into French
<b>German</b>	Set language of the whole software into German
<b>Japanese</b>	Set language of the whole software into Japanese
<b>Italian</b>	Set language of the whole software into Italian
<b>Russian</b>	Set language of the whole software into Russian

**Setting>Miscellaneous**


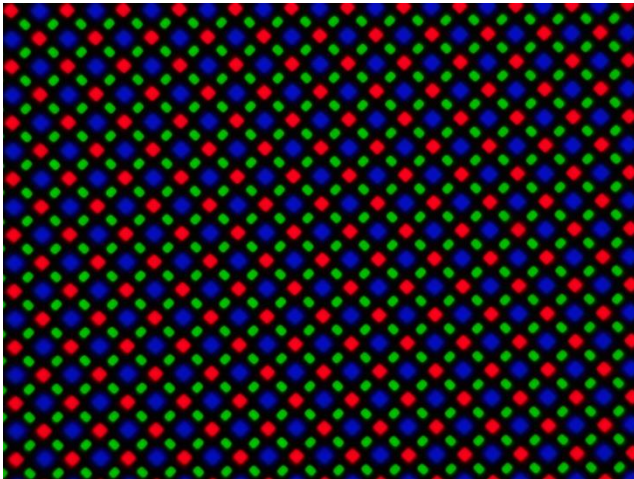
Comprehensive miscellaneous settings page

<b>Auto Exposure</b>	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.
<b>ROI Color</b>	Choosing the ROI rectangle line color
<b>Camera Parameters Import</b>	Import the Camera Parameters from the SD card to use the previously exported Camera Parameters

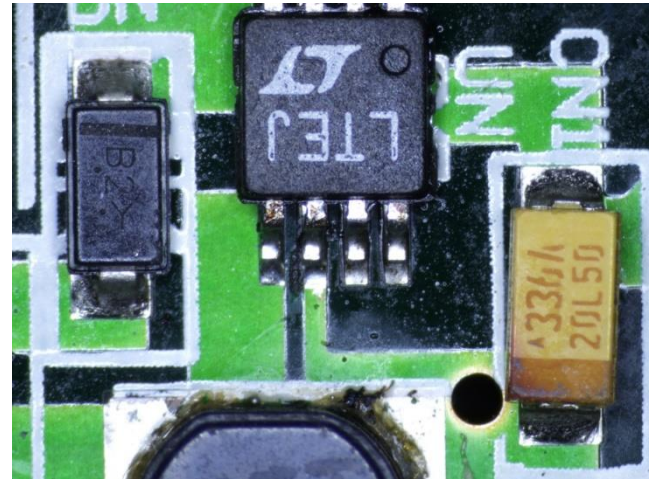


<a href="#">Camera Parameters Export</a>	Export the <a href="#">Camera Parameters</a> to the SD card to use the previously exported <a href="#">Camera Parameters</a>
<a href="#">Reset to factory defaults</a>	Restore camera parameters to its factory status;

### Sample Images



LCD pixel array captured with BS-1008D



Circuit board captured with BS-1008D