

## BLC-221 LCD Digital Camera



### Introduction

The BLC-221 LCD digital camera is intended to be used for the acquisition of digital images from the stereo microscopes, biological microscopes and other optical microscopes. This LCD digital camera is a combination of BHC4-1080A HDMI digital camera and HD1080P133A full HD LCD screen. The basic characteristic is listed as below:

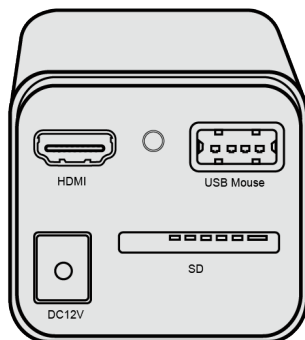
1. 2.0MP Sony Starvis back illuminated CMOS sensor.
2. FHD HDMI video outputs.
3. SD card for the captured image and video storage.
4. Embedded XCamView for the control of the camera, with measurement function.
5. With strong ISP and other related processing functions.
6. 11.6 inch 1080P LCD screen, the perfect match of camera and LCD screen resolution.

### Application

The possible applications of BLC-221 are as follows:

1. Scientific research, education (teaching, demonstration and academic exchanges).
2. Digital laboratory, medical research.
3. Industrial visual (PCB examination, IC quality control, mechanical part inspection).
4. Medical treatment (pathological observation).
5. Food (microbial colony observation and counting).

### Interface on the Camera Body



Available Ports on the Back Panel of the Camera Body

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

## Camera Datasheet

Order Code	Sensor & Size(mm)	Pixel(μm)	G Sensitivity	FPS/Resolution	Binning	Exposure(ms)
BLC-221	Sony IMX307(C) 1/2.8"(5.57x3.13)	2.9x2.9	1300mv with 1/30s	60@1920*1080(HDMI)	1x1	0.01~1000

## Camera Function Description

### 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

### 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

### Other Functions

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

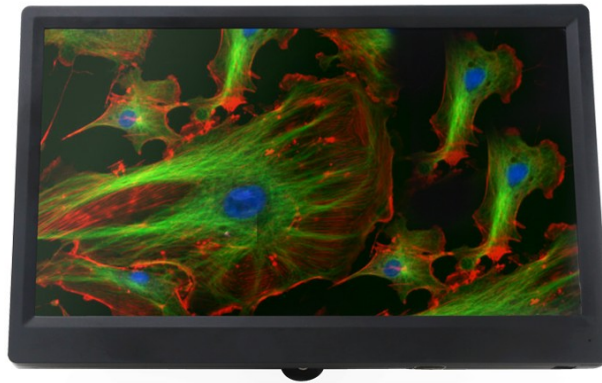
## HD1080P133A Datasheet

Order Code	Active Area(Inch)	Video Fomat	Resolution	Contrast	Color(Million)	View Angle
<b>HD1080P133A</b>	11.6	HDMI	1080P	1000:1	16.7	IPS Full View

<b>Basic Performance</b>	
LCD Panel	Panasonic IPS LCD Screen(Super TFT)
Input Video Format	HDMI
Native Resolution	1920 x 1080
Display Type	16:9 Ratio 11.6 Inch Active Matrix Super TFT LCD
Typical Contrast Ratio	1000:1
Colors	16.7 Million
Viewing Angle(L/R/U/D)	IPS Full Vew
Active Display Area	258mm(W) x 145mm(H)
Pixel Pitch	0.134(W) X 0.134(H) mm
Brightness	350 cd/ sq.m ;400cd sq.m / Optional
Backlight	LED Backlight, 50000 hours
<b>Outline Parameter</b>	
Color	Black
Dimension	281(L)*179(H)*15.6(W) mm
Weight	400g
<b>Operating Environment</b>	
Operating Temperature	-15 Degree~55 Degree
Humidity Non Condensing	Operating:10%-90%, Storage: 5%-90%
Synchronization Range	30-80 KHz Horizontal, 55-75 Hz Vertical
Power Supply	AC110V-220V /DC12V(1A )
Power Consumption	Max 12W

## Packing Information





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BLC-221 FHD HDMI Camera Packing Information

Standard Packing List			
A	Gift box : L:17.5cm W:17.5cm H:8.5cm (1pcs, 0.85kg/ box)		
B	BHC4-1080A		
C	Power Adapter: Input: AC 100~240V 50Hz/60Hz, Output: DC 12V 1A American standard: Model: GS12U12-P1I 12W/12V/1A: UL/CUL/BSMI/CB/FCC EMI standard:EN55022,EN61204-3, EN61000-3-2,-3, FCC Part 152 class B, BSMI CNS14338		
	EMS standard:EN61000-4-2,3,4,5,6,8,11,EN61204-3, class A light industry standard European standard:Model:GS12E12-P1I 12W/12V/1A; TUV(GS)/CB/CE/ROHS EMI Standard:EN55022,EN61204-3, EN61000-3-2,-3, FCC Part 152 class B, BSMI CNS14338 EMS standard:EN61000-4-2,3,4,5,6,8,11,EN61204-3, class A light industry standard		
D	HDMI cable		
E	USB mouse/USB wireless mouse		
L	HD1080P133A screen		
Optional Accessory			
F	Adjustable lens adapter	C-Mount to Dia.23.2mm eyepiece tube (Please choose 1 of them for your microscope)	108001/AMA037 108002/AMA050 108003/AMA075
		C-Mount to Dia.31.75mm eyepiece tube (Please choose 1 of them for your telescope)	108008/ATA037 108009/ATA050 108010/ATA075
G	Fixed lens adapter	C-Mount to Dia.23.2mm eyepiece tube (Please choose 1 of them for your microscope)	108005/FMA037 108006/FMA050 108007/FMA075
		C-Mount to Dia.31.75mm eyepiece tube (Please choose 1 of them for your telescope)	108011/FTA037 108012/FTA050 108013/FTA075
<b>Note: For F and G optional items, please specify your camera type(C-mount, microscope camera or telescope camera), ToupTek engineer will</b>			

	<b>help you to determine the right microscope or telescope camera adapter for your application;</b>	
<b>H</b>	108015(Dia.23.2mm to 30.0mm Ring)/Adapter rings for 30mm eyepiece tube	
<b>I</b>	108016(Dia.23.2mm to 30.5mm Ring)/ Adapter rings for 30.5mm eyepiece tube	
<b>J</b>	Calibration kit	106011/TS-M1(X=0.01mm/100Div.); 106012/TS-M2(X,Y=0.01mm/100Div.); 106013/TS-M7(X=0.01mm/100Div., 0.10mm/100Div.)
<b>K</b>	SD card(4G or 8G)	

## Application Configurations

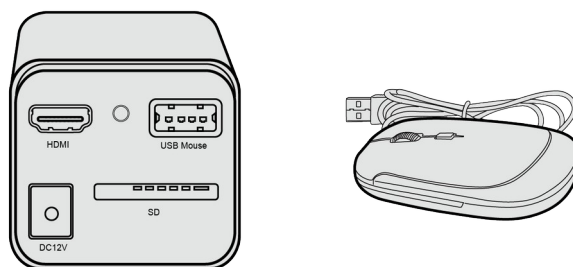
### Camera working standalone with built-in XCamView software

For this application, apart from the microscope, you only need the supplied HDMI monitor, USB mouse and the camera embedded [XCamView](#) software. The steps to start the camera are listed as below:

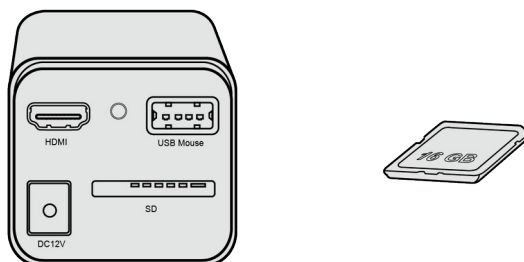


BLC-221 HDMI Camera on Leica Microscope

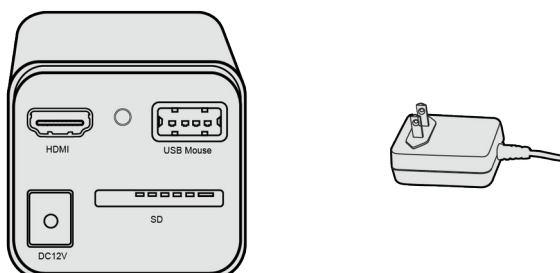
- Connect the camera to the HD1080P133A HDMI monitor using the HDMI cable;
- Insert the supplied USB mouse to the camera's USB port;



- Insert the supplied SD card/USB flash disk (USB3.0 interface) into the HDMI camera SD card slot/USB3.0 interface;



- Connect the camera to the power adapter and switch it on;

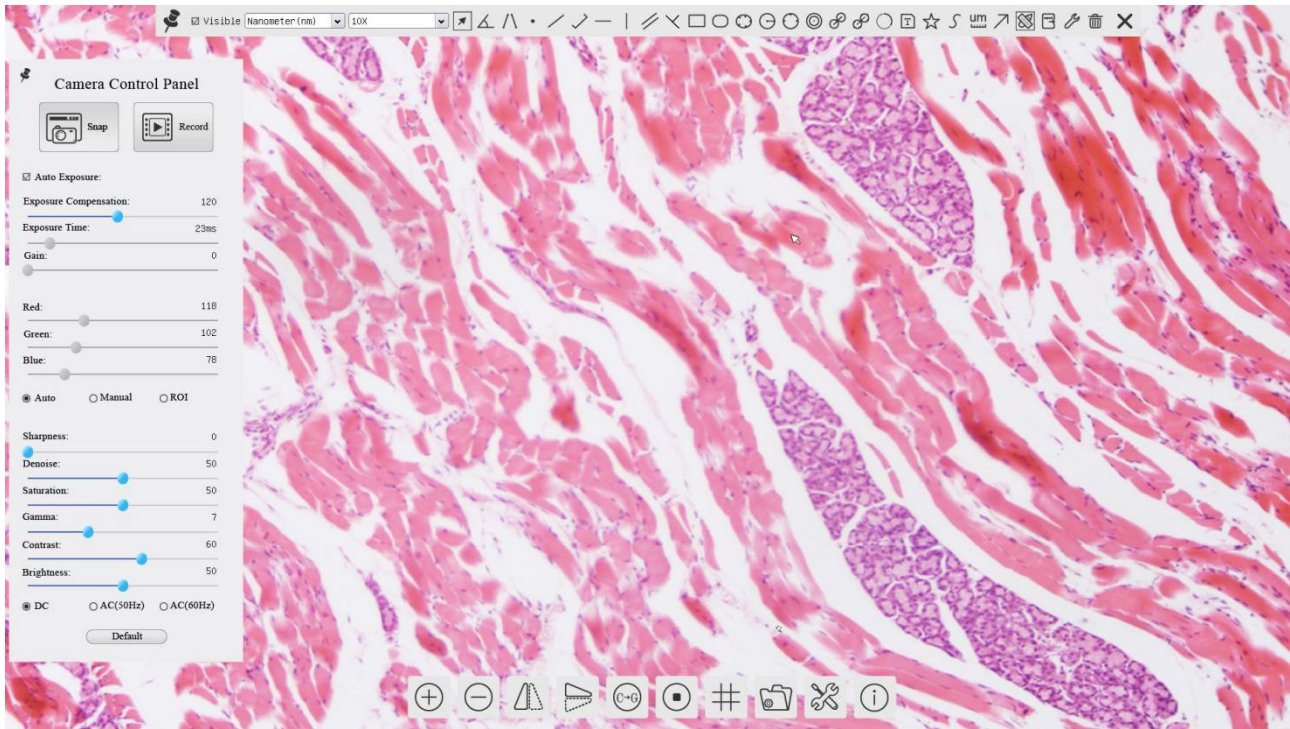


- Turn on the monitor and view the video in the [XCamView](#) software. Move the mouse to the left or bottom of the [XCamView](#) UI, different control panel or UI will pop up and users could operate with the mouse at ease.

## BLC-221 LCD FHD HDMI Camera UI and Its Functions



















### 1. XCamView UI

The [BLC-221](#) LCD camera's UI shown in following picture 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 BLC-221 LCD Camera Control GUI



Notes	
1	To show the <a href="#">Camera Control Panel</a> , move your mouse to the left of the video window. See Sec. Error: Reference source not found for details
2	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
3	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. for details.

## 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
	<a href="#">Snap</a>	Capture image and save it to the SD card
	<a href="#">Record</a>	Record video and save it to the SD card
	<a href="#">Auto Exposure</a>	When <a href="#">Auto Exposure</a> is checked, the system will automatically adjust exposure time and gain according to the value of exposure compensation
	<a href="#">Exposure Compensation</a>	Available when <a href="#">Auto Exposure</a> is checked. Slide to left or right to adjust <a href="#">Exposure Compensation</a> according to the current video brightness to achieve proper brightness value
	<a href="#">Exposure Time</a>	Available when <a href="#">Auto Exposure</a> is not checked. Slide to left or right to reduce or increase exposure time, adjusting brightness of the video
	<a href="#">Gain</a>	Adjust <a href="#">Gain</a> to reduce or increase brightness of video. The Noise will be reduced or increased accordingly
	<a href="#">Red</a>	Slide to left or right to decrease or increase the proportion of <a href="#">Red</a> in RGB on video
	<a href="#">Green</a>	Slide to left or right to decrease or increase the proportion of <a href="#">Green</a> in RGB on video
	<a href="#">Blue</a>	Slide to left or right to decrease or increase the proportion of <a href="#">Blue</a> in RGB on the video
	<a href="#">Auto White</a>	<a href="#">White Balance</a> adjustment according to the video continuously

	<a href="#">Balance</a>	
	<a href="#">Manual White Balance</a>	Adjust the <a href="#">Red</a> or <a href="#">Blue</a> item to set the video White Balance.
	<a href="#">ROI White Balance</a>	<a href="#">White Balance</a> could be adjusted when the ROI region is changed according to content inside the ROI region.
	<a href="#">Sharpness</a>	Adjust <a href="#">Sharpness</a> level of the video
	<a href="#">Denoise</a>	Slide left or right to denoise the video
	<a href="#">Saturation</a>	Adjust <a href="#">Saturation</a> level of the video
	<a href="#">Gamma</a>	Adjust <a href="#">Gamma</a> level of the video. Slide to the right side to increase gamma and to the left to decrease gamma.
	<a href="#">Contrast</a>	Adjust <a href="#">Contrast</a> level of the video. Slide to the right side to increase contrast and to the left to decrease contrast.
	<a href="#">DC</a>	For <a href="#">DC</a> illumination, there will be no fluctuation in light source so no need for compensating light flickering
	<a href="#">AC(50HZ)</a>	Check <a href="#">AC(50HZ)</a> to eliminate flickering caused by 50Hz light source
	<a href="#">AC(60HZ)</a>	Check <a href="#">AC(60HZ)</a> to eliminate flickering caused by 60Hz light source
	<a href="#">Default</a>	Restore all the settings in the <a href="#">Camera Control Panel</a> to default values






















### 3. The Measurement Toolbar on 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 <a href="#">Measurement Toolbar</a>
<input checked="" type="checkbox"/> Visible	Show / Hide Measurement Objects
Nanometer (nm)	Select the desired <a href="#">Measurement Unit</a>
4X	Select <a href="#">Magnification for Measurement after Calibration</a>
	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 <b>Calibration</b> to determine the corresponding relation between magnification and resolution, which will establish the corresponding relationship between measurement unit and the sensor pixel size. <b>Calibration</b> needs to be done with the help of a micrometer. For detailed steps of carrying out <b>Calibration</b> please refer to <b>ToupView</b> help manual.
	Export the <b>Measurement</b> information to <b>CSV</b> file(*.csv)
	Measurement Setup
	<b>Delete</b> all the measurement objects
	Exit from Measurement mode
	When the measurement ends, left-click on a single measuring object and the <b>Object Location &amp; Properties Control Bar</b> 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 <b>Move Left</b> , <b>Move Right</b> , <b>Move Up</b> , <b>Move Down</b> , <b>Color Adjustment</b> and <b>Delete</b> .

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

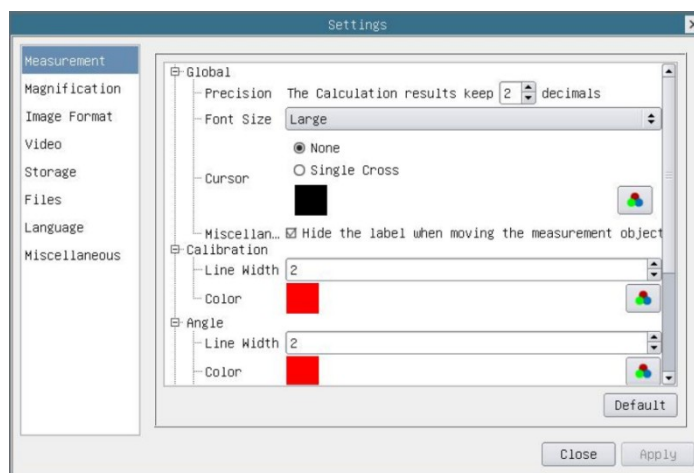


Icon	Function	Icon	Function
	Zoom In the Video Window		Zoom Out the Video Window
	Horizontal Flip		Vertical Flip
	Color/Gray		Video Freeze
	Display Cross Line		Browse Images and Videos in the SD Card

	Settings		Check the Version of XCamView
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The **Setting** is relatively more complicated than the other functions. Here is more information about it:

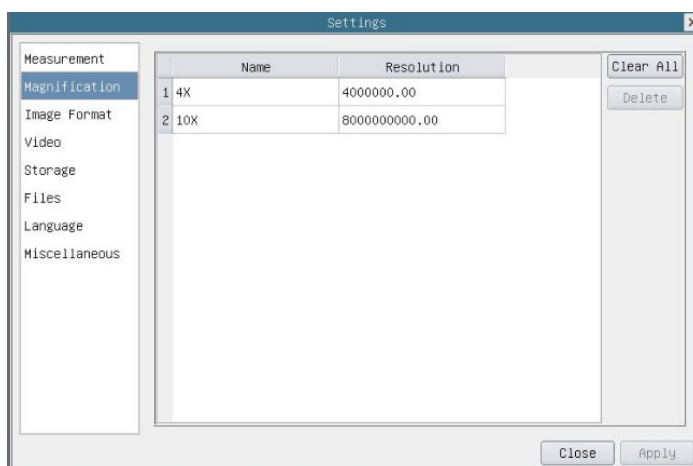
#### 4.1 Setting>Measurement



The Measurement Setup

Global	Precision	Used to set the number of digits after the decimal point of the measurement result
	Font Size	The font size of the measure result, there are big, middle and small font size
Calibration/Angle	Line Width	Used for defining width of the lines for calibration;
	Color	Used for defining color of the lines for calibration;
Angle	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 <b>Measurement</b> command mentioned above will unfold the corresponding attribute settings to set the individual property of the <b>Measurement Objects</b> .		

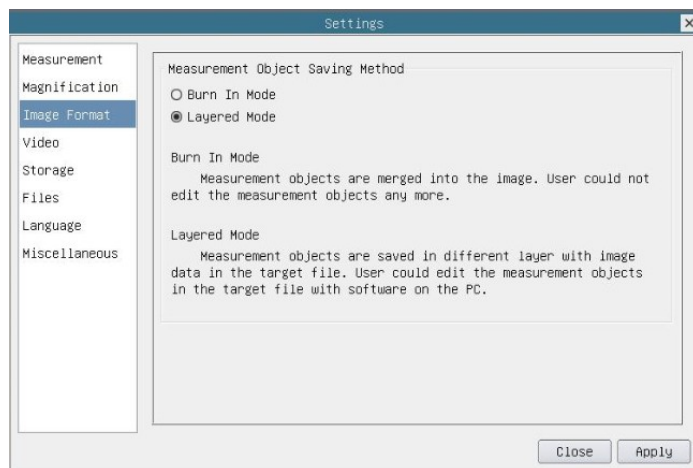
#### 4.2 Setting>Magnification



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 <a href="#">Clear All</a> button will clear the calibrated magnifications;
Delete	Click <a href="#">Delete</a> to delete the selected magnification;

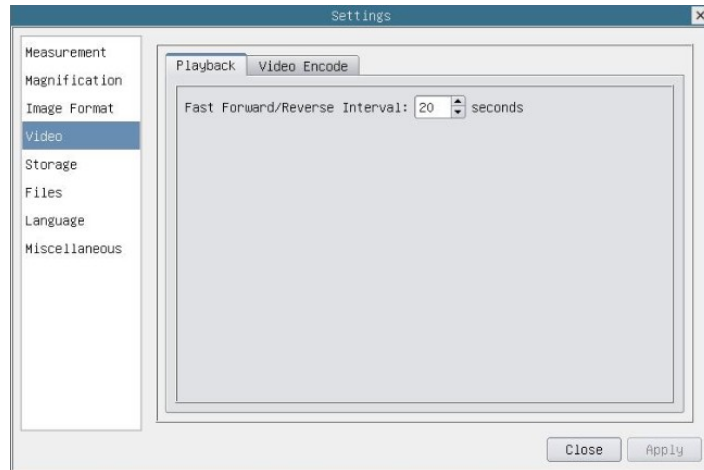
#### 4.3 Settings>Image Format



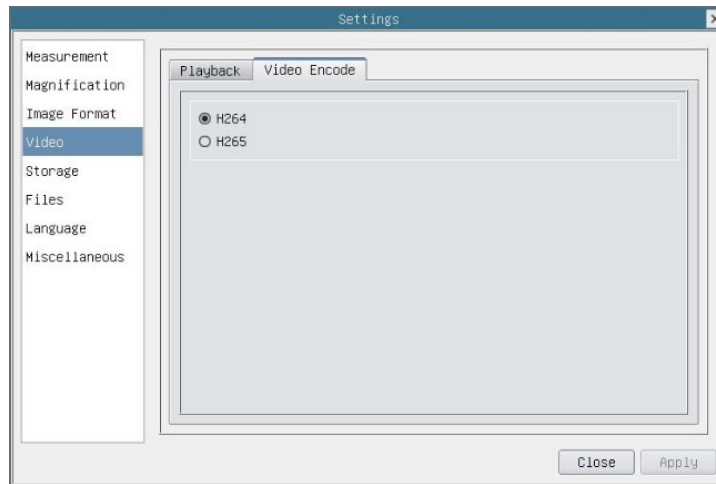
Comprehensive Image Format Settings Page

Measurement Object Save Method	<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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#### 4.4 Settings>Video



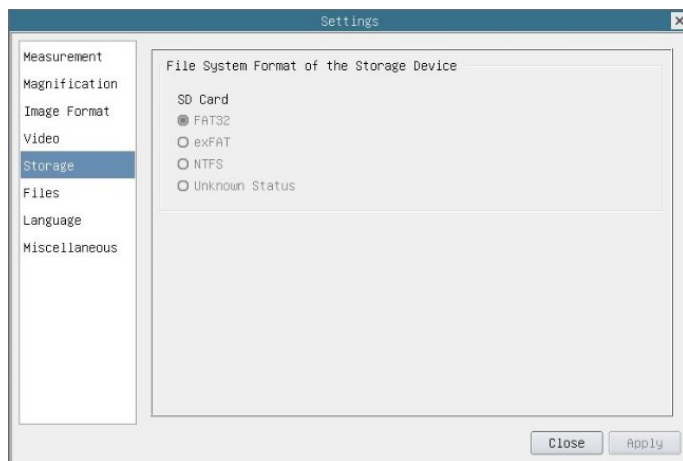
Comprehensive Setting of Video Settings Page-Playback



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.

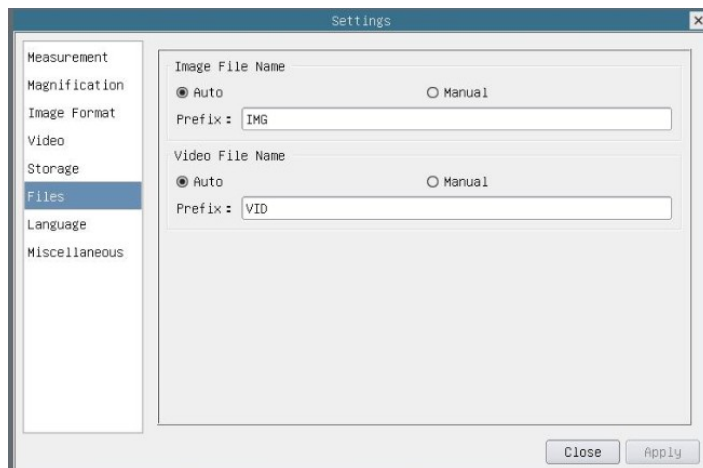
4.5 Setting>Storage



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>	<p>List the file system format of the current storage device</p> <p><b>FAT32:</b> The file system of SD card is FAT32. The maximum video file size of single file is 4G Bytes;</p> <p><b>exFAT:</b> The file system of SD card is exFAT. The maximum video file size of single file is 4G Bytes;</p> <p><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.</p> <p><b>Unknown Status:</b> SD card not detected or the file system is not identified;</p>

#### 4.6 Setting>Files



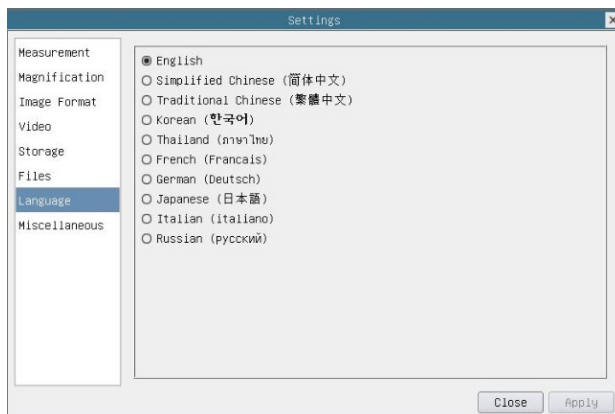
Comprehensive Setting of Files Settings Page

<b>Image File Name</b>	<p><b>Auto:</b> The image files will be saved automatically with the specified prefix.</p> <p><b>Manual:</b> Users has to specify the file name before image saving.</p>
<b>Video File Name</b>	<p><b>Auto:</b> The video file will be saved automatically with the specified prefix.</p> <p><b>Manual:</b> Users has to specify the video file name before video recording.</p>



**Note:** The maximum video file size is 4G Bytes. Multiple video files may be generated automatically during long time video recording.

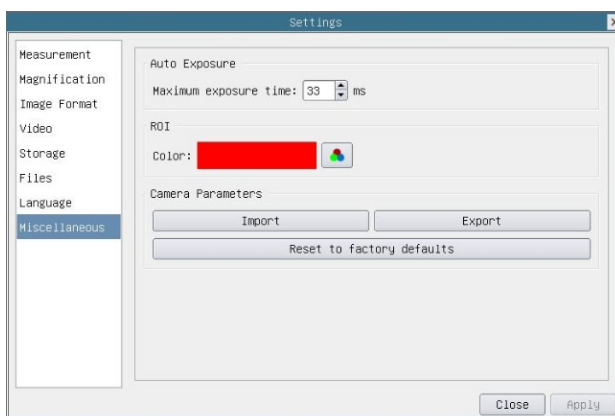
#### 4.7 Setting>Language



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

#### 4.8 Setting>Miscellaneous

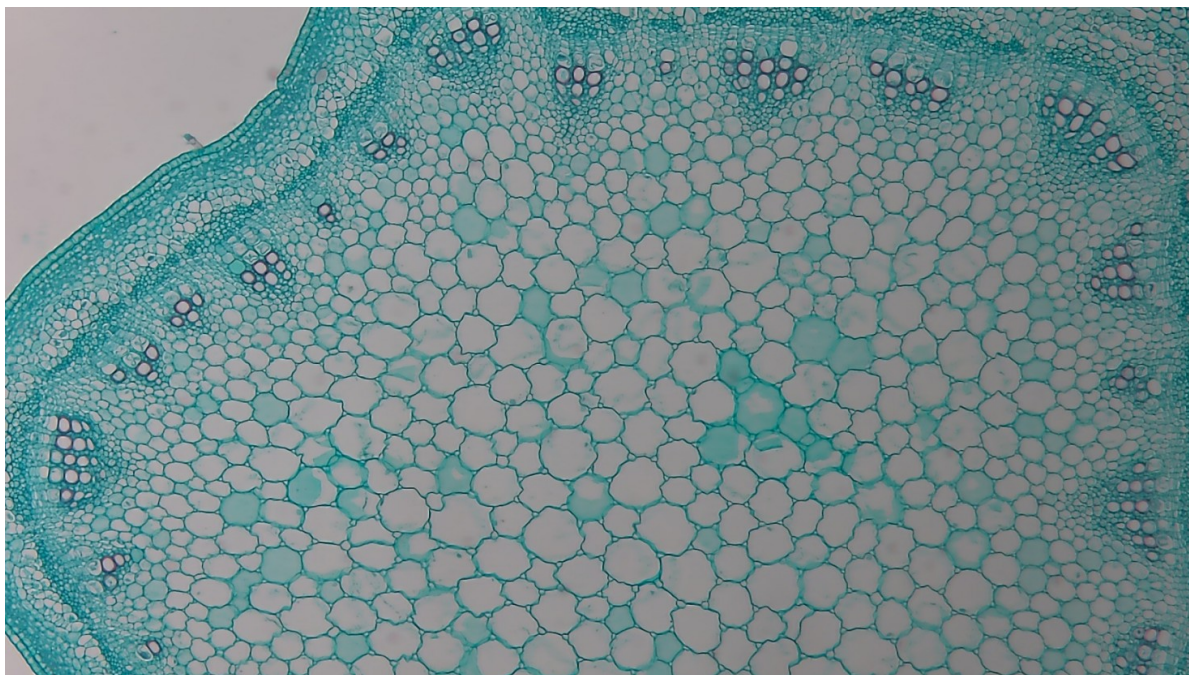


Comprehensive Miscellaneous Settings Page

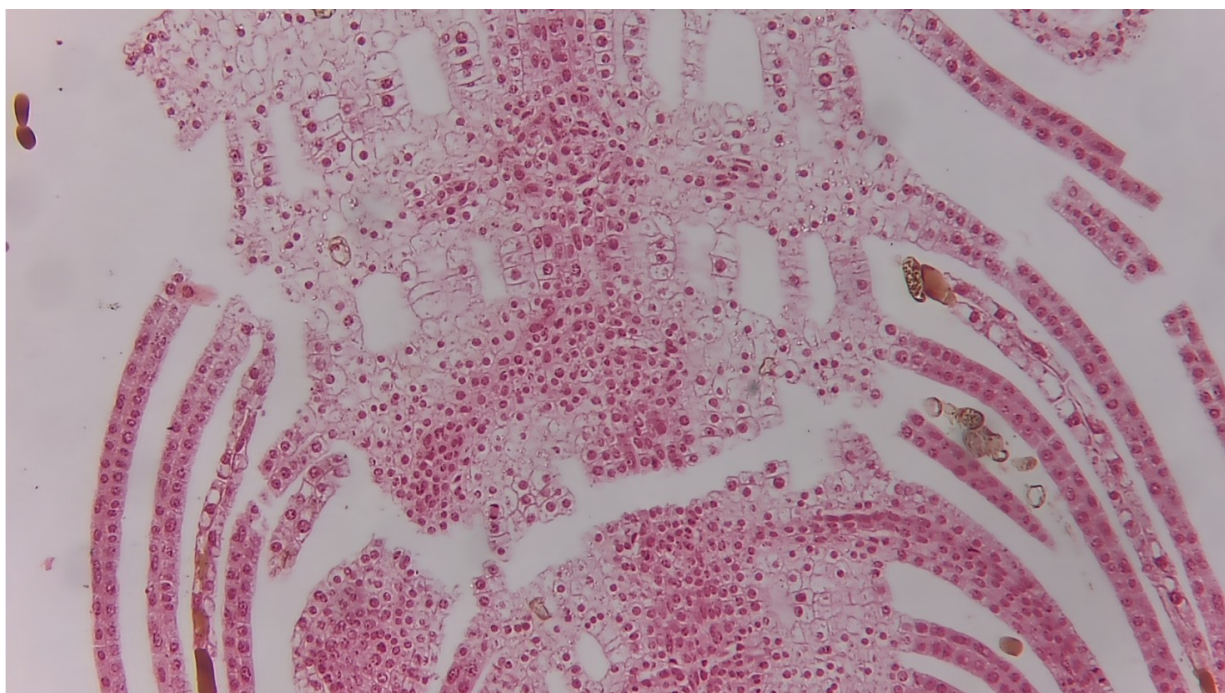
Auto Exposure	The maximum exposure time during auto exposure process could be specified. Setting this item to a lower value could guarantee a faster frame rate during auto exposure.
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<a href="#">ROI Color</a>	Choosing the <a href="#">ROI</a> rectangle line color
<a href="#">Camera Parameters Import</a>	Import the <a href="#">Camera Parameters</a> from the SD card to use the previously exported <a href="#">Camera Parameters</a>
<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



Alfalfa Stem Captured with BLC-221



Верхний бутон снят с помощью VLC-221