

# 4K Series Camera Help Manual



# Contents

Contents .....	I
1 The Application of the 4K Series Camera .....	1
2 4K Series Camera's Datasheet .....	1
3 Available Ports on the Back of the Camera Body .....	1
4 4K Series Camera Function Description .....	2
4.1 Video Output .....	2
4.2 Image Capture and Video Saving in SD Card .....	2
4.3 ISP Function .....	2
4.4 Image Operation Function .....	2
4.5 Other Functions .....	2
5 4K Series Camera Packing Information .....	3
6 Software and App .....	3
7 4K Series Camera Application Configurations .....	3
7.1 Camera Working Standalone with Built-in XCamView Software .....	4
7.2 Connecting camera to the PC with USB port .....	4
8 Brief Introduction of 4K Series Camera's UI and Its Functions .....	5
8.1 XCamView UI .....	5
8.2 The Camera Control Panel on the Left Side of the Video Window .....	6
8.3 The Measurement Toolbar on Top of the Video Window .....	6
8.4 Icons and Functions of the Synthesis Camera Control Toolbar at the Bottom of the Video Window .....	8
9 Sample Photos Captured with 4K Series Camera .....	14
10 Contacting Customer Service .....	14

## 1 The Application of the 4K Series Camera



Figure 1-1

The 4K series camera is intended to be used for the acquisition of digital images from the stereo microscope and biological microscope. The basic characteristic is listed as below:

- Sony Exmor back illuminated CMOS sensor
- 4K HDMI/USB multiple video outputs
- 4K/1080P auto switching according to the display resolution
- SD card for the captured image and video storage
- Embedded XCamView for the control of the camera
- With strong ISP and other related processing functions
- ToupView software for PC

## 2 4K Series Camera's Datasheet

Order Code	Sensor & Size(mm)	Pixel(μm)	G Sensitivity	FPS/Resolution	Binning	Exposure(ms)
CAM4K8MP	Sony IMX334(C) 1/1.8"(7.68x4.32)	2.0x2.0	505mv with 1/30s 0.1mv with 1/30s	30@3840*2160(HDMI) 20@3840*2160(USB)	1x1	0.04~1000

## 3 Available Ports on the Back of the Camera Body



Figure 3-1 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;
USB Video	Connect PC or other host device to realize video image transmission;
HDMI	Comply with HDMI1.4 standard. 4K or 1080P format video output for standard monitor;
DC12V	Power adapter connection (12V/1A);
SD	Comply with SDIO3.0 standard and SD card could be inserted for video and images storage;
LED	LED status indicator;
ON/OFF	Power switch;

## 4 4K Series Camera Function Description

### 4.1 Video Output

Video Output Interface	Function Description
HDMI Interface	Comply with HDMI1.4 standard; 30fps@4K or 30fps@1080P;
USB Video Interface	Connecting USB port of PC for video transfer ; MJPEG format video;

### 4.2 Image Capture and Video Saving in SD Card

Function Name	Function Description
Video Saving	Video format: 8M(3840*2160) H264/H265 encoded MP4 file; Video saving frame rate: 30fps;
Image Capture	8M (3840*2160) JPEG/TIFF image in SD card ;
Measurement Saving	Measurement information saved in layer mode with image content; Measurement information is saved together with image content in burn in mode.

### 4.3 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

### 4.4 Image Operation Function

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

### 4.5 Other Functions

Function Name	Function Description
Embedded RTC(Optional)	To support accurate time on board
Restore Factory Settings	Supported
Multiple Language Support	English / Simplified Chinese / Traditional Chinese / Korean / Thai / French / German / Japanese / Italian / Russian

## 5 4K Series Camera Packing Information



Figure 5-1 The 4K Series Camera Packing Information

Standard Packing List	
A	Gift box : L:25.5cm W:17.0cm H:9.0cm (1pcs,1.43kg/ box)
B	4K series camera
C	<b>Power Adapter:</b> 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
D	USB Mouse
E	HDMI cable
F	USB2.0 A male to A male gold-plated connectors cable /2.0m

## 6 Software and App

The software or the APP can be downloaded from the following link:

Windows: <http://www.optisystems.net/support/>

## 7 4K Series Camera Application Configurations

You can use the 4K series camera in two different ways. Each application requires different hardware environments.

## 7.1 Camera Working Standalone with Built-in XCamView Software



Figure 7-1 4K Series Camera with the HDMI Displayer

For this application, apart from the microscope, the user only needs an 4K series camera, an HDMI display, an HDMI cable, an SD card, a USB mouse and a power adapter that come with the camera. The steps to start the camera are listed as below:

- Connect the camera to a HDMI display using the HDMI cable;
- Insert the supplied USB mouse to the camera's USB port;
- Insert the supplied SD card into the 4K series camera SD card slot;
- Connect power adapter to the camera the and switch it on.;
- Switch on the display 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.

## 7.2 Connecting camera to the PC with USB port

For Windows user (Windows XP (32bit), Windows 7/8/10 (32/64 bit) ), please use [ToupView](#).

For macOS and Linux user (macOS 10.10 or above or Linux distributions with kernel 2.6.27 or higher), please use [ToupLite](#).

The steps to start the camera are listed below:

- Install the [ToupView/ToupLite](#) on your PC;
- Connect power adapter to the camera the and switch it on. After starting the camera, plug one end of the USB cable into the USB 2.0 port of the 4K series camera, and plug the other end into the USB port of the PC;
- Open [ToupView/ToupLite](#) software. The 4Kseries camera will be recognized automatically by software. In [ToupView/ToupLite](#) software, select the corresponding 4K series camera by clicking the camera name in the camera list.

### Note:

When the USB cable and the mouse are plugged into the camera at the same time, the USB cable is preferred and the mouse is not available; when the USB cable is unplugged, the mouse can be used normally.

## 8 Brief Introduction of 4K Series Camera's UI and Its Functions

### 8.1 XCamView UI

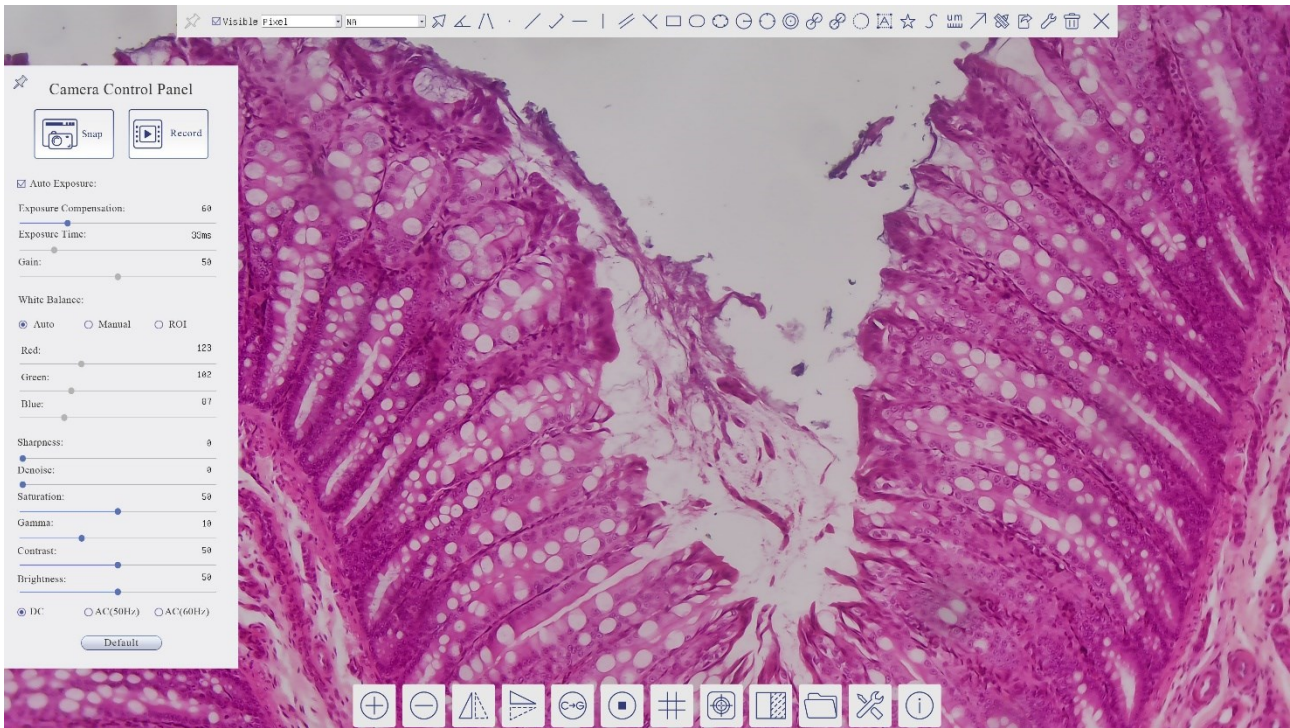







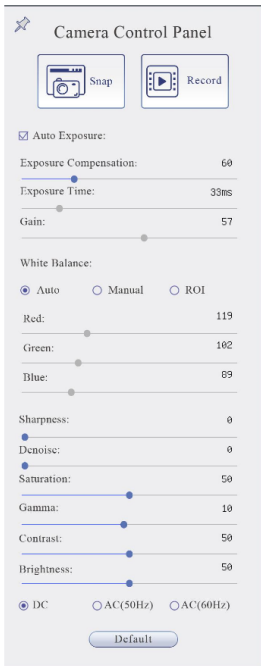
Figure 8-1 The 4K Series Camera Control GUI

Notes	
1	To show the <b>Camera Control Panel</b> , move your mouse to the left of the video window. See Sec.0 for details.
2	Move the mouse cursor to the top of the video window, a <b>Measurement Toolbar</b> will pop up for calibration and measurement operations. When user left-clicks the <b>Float/Fixed</b> button  on the <b>Measurement Toolbar</b> , the <b>Measurement Toolbar</b> will be fixed. In this case the <b>Camera Control Panel</b> 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 <b>Measurement Toolbar</b> to exit from measuring operations will they be able to do other operations on the <b>Camera Control Panel</b> , or the <b>Synthesis Camera Control Toolbar</b> . During the measuring operations, when a specific measuring object is selected, an <b>Object Location &amp; Attributes Control Bar</b>  will appear for changing location and properties of the selected object. See Sec.8.4 for details.
3	When users move mouse cursor to the bottom of the video window, the <b>Synthesis Camera Control Toolbar</b> will pop up automatically.  . See Sec.0 for details.








## 8.2 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 (in measurement status, the **Camera Control Panel** will not pop up. The **Camera Control Panel** will only pop up when the measurement operations are finished or terminated while user's cursor on the left edge 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 <b>Exposure Time</b> , 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>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> slide bar to set the video <b>White Balance</b> .
	<b>ROI White Balance</b>	<b>White Balance</b> could be adjusted when the <b>ROI</b> region is changed according to content inside the <b>ROI</b> region.
	<b>Red</b>	Slide to left or right to decrease or increase the proportion of <b>Red</b> item in RGB on video
	<b>Green</b>	Slide to left or right to decrease or increase the proportion of <b>Green</b> item in RGB on video
	<b>Blue</b>	Slide to left or right to decrease or increase the proportion of <b>Blue</b> item in RGB on the video
	<b>Sharpness</b>	Adjust <b>Sharpness</b> level of the video
	<b>Denoise</b>	Slide left or right to <b>Denoise</b> 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 <b>Gamma</b> and to the left to decrease <b>Gamma</b> .
	<b>Contrast</b>	Adjust <b>Contrast</b> level of the video. Slide to the right side to increase <b>Contrast</b> and to the left to decrease <b>Contrast</b> .
	<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	

## 8.3 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**:


Icon	Function
	Float/ Fix switch of the <b>Measurement Toolbar</b>
<input checked="" type="checkbox"/> Visible	Show / Hide Measurement Objects
Nanometer (nm)	Select the desired <b>Measurement Unit</b>
4X	Select <b>Magnification</b> for measurement after <b>Calibration</b>
	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 <a href="#">Measurement Unit</a> 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 help manual</a> .
	Export the Measurement information to CSV file(*.csv)
	Measurement Setup
	Delete all the measurement objects from
	Exit from <a href="#">Measurement</a> mode
	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 operation, the [Object Location & Attributes Control Bar](#)  will appear for changing the object location and properties of the selected objects.

8.4 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		Overlay
	Compare Image with the current video		Browse Images and Videos in the SD Card
	Settings		Check the Version of XCamView

The Setting function is relatively more complicated than the other functions. Here are more details about it:

8.4.1 Setting>Measurement

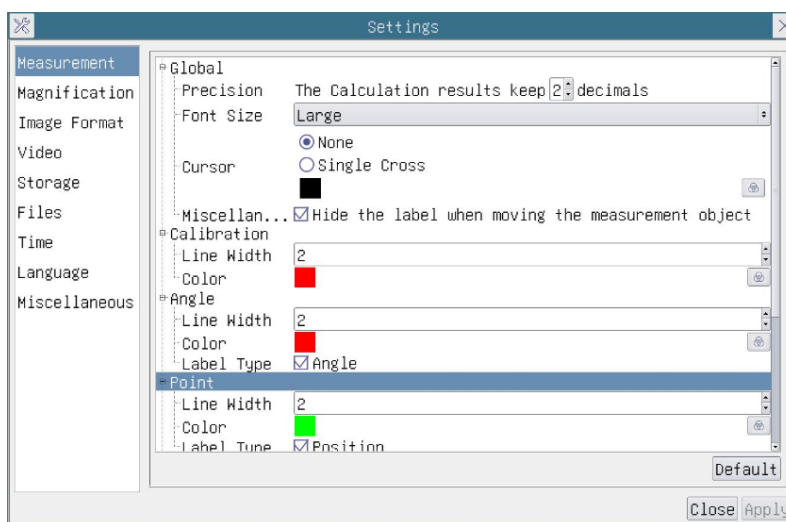


Figure 8-2 The Measurement Setup

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 Endpoint of lines for calibration: Null means no Endpoint, rectangle means rectangle type of Endpoint. 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.

8.4.2 Setting>Magnification

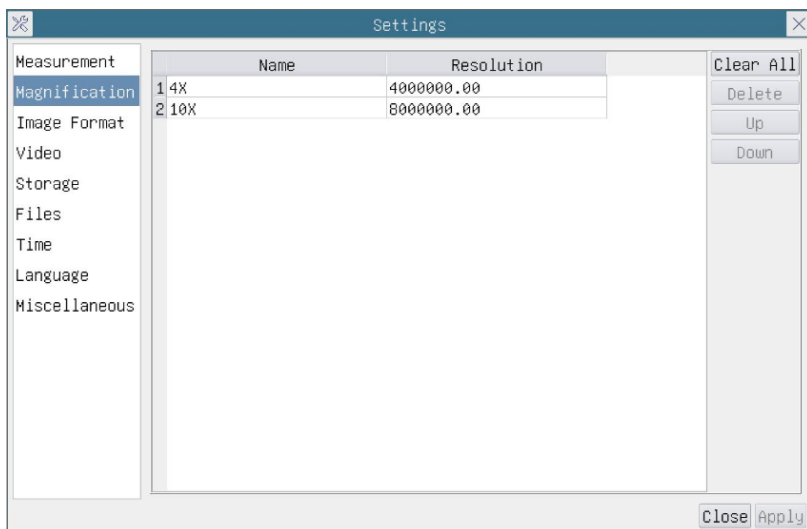


Figure 8-3 Comprehensive Magnification Calibration Settings Page

<b>Name</b>	The name of the <b>Magnification</b> , usually the <b>Magnification</b> of the objective of the microscope is used as the <b>Magnification</b> name when calibration, such as 4X, 10X, 100X, etc. Besides, other user-defined information could be added into the <b>Magnification</b> 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 <b>Magnification</b> ;
<b>Delete</b>	Click <b>Delete</b> to delete the selected <b>Magnification</b> ;
<b>Up</b>	Click <b>Move Up</b> to move up the selected <b>Magnification</b> ;
<b>Down</b>	Click <b>Move Down</b> to move the selected <b>Magnification</b> down;

8.4.3 Settings>Image Format

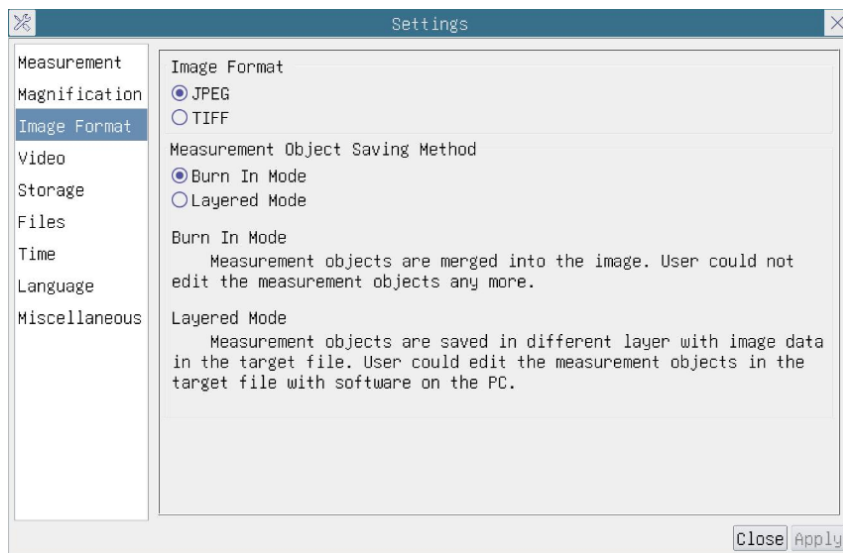


Figure 8-4 Comprehensive Image Format Settings Page

<b>Image Format</b>	<b>JPEG:</b> The extension of JPEG file can get very high compression rate and display very rich and vivid images by removing redundant images and color data. In other words, it can get better image quality with the least disk space. If <b>Measurement Objects</b> are available, the <b>Measurement Objects</b> will be burned into the image and the <b>Measurement Objects</b> cannot be edited. <b>TIFF:</b> Tag Image File Format(TIFF) is a flexible bitmap format that is mainly used to store images including photos and artistic images.
<b>Measurement Object Save Method</b>	<b>Burn in Mode:</b> The <b>Measurement Objects</b> are merged into the current image. User could not edit the <b>Measurement Objects</b> anymore. This mode is not reversible. <b>Layered Mode:</b> The <b>Measurement Objects</b> are saved in different layer with current image data in the target file. User could edit the <b>Measurement Objects</b> in the target file with some software on the PC. This mode is reversible.

## 8.4.4 Settings&gt;Video

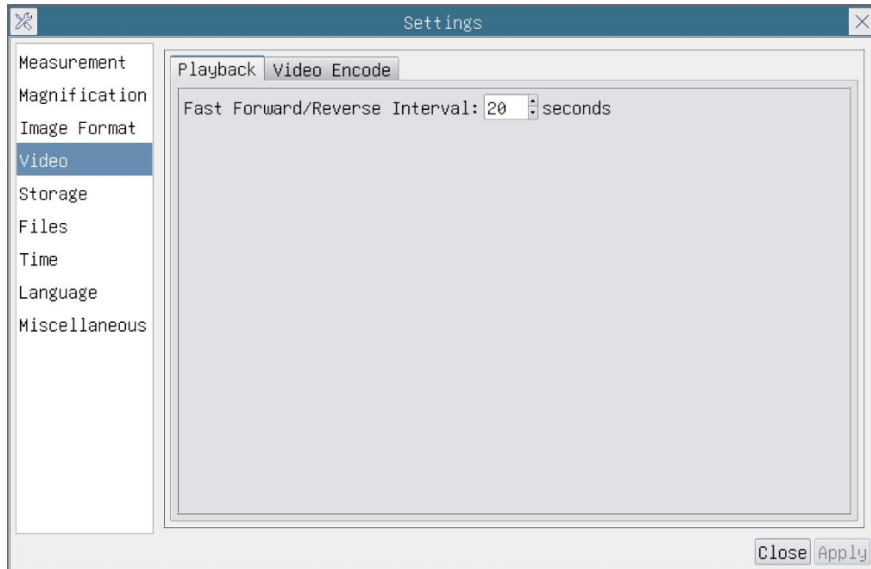


Figure 8-5 Comprehensive Setting of Video Settings Page-Playback

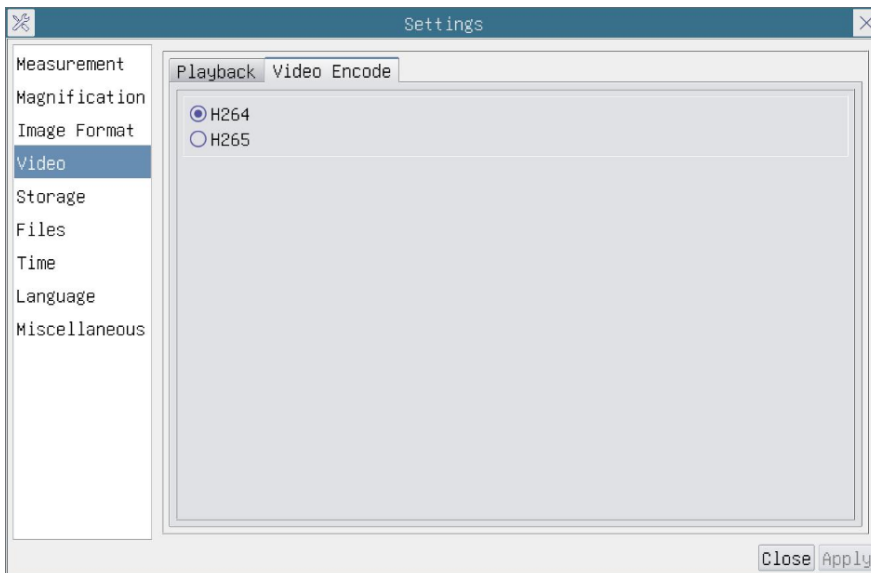


Figure 8-6 Comprehensive Setting of Video Settings Page-Video Encode

<a href="#">Fast Forward/Reverse Interval</a>	The time interval of the playback of video files.
<a href="#">Video Encode</a>	You can choose <a href="#">H264</a> or <a href="#">H265</a> encoding. <a href="#">H265</a> encoding can significantly reduce encoding bandwidth and save storage space under the same encoding quality;

8.4.5 Setting>Storage

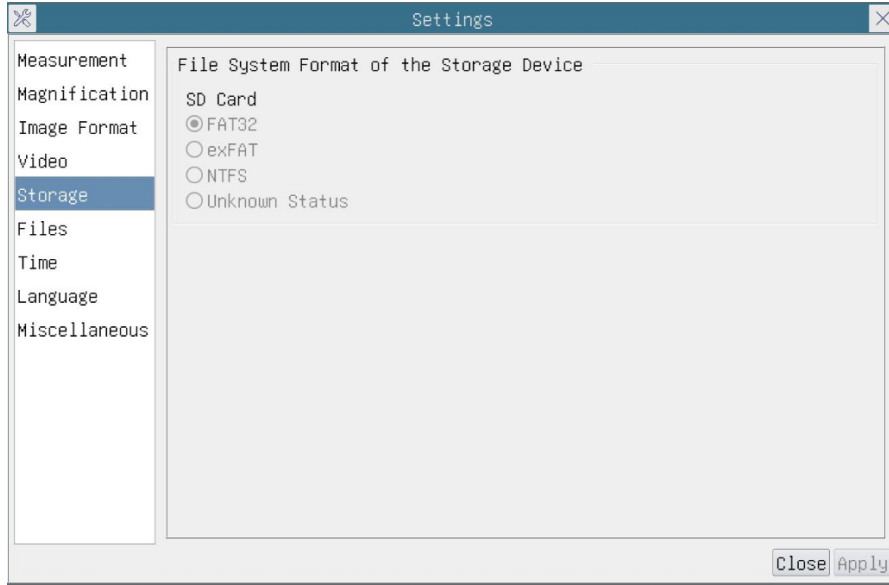


Figure 8-7 Comprehensive Setting of SD Card Setting Page

<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 Card and switch between FAT32, exFat and NTFS. <b>Unknown Status:</b> SD Card not detected or the file system is not identified;

8.4.6 Setting>Files

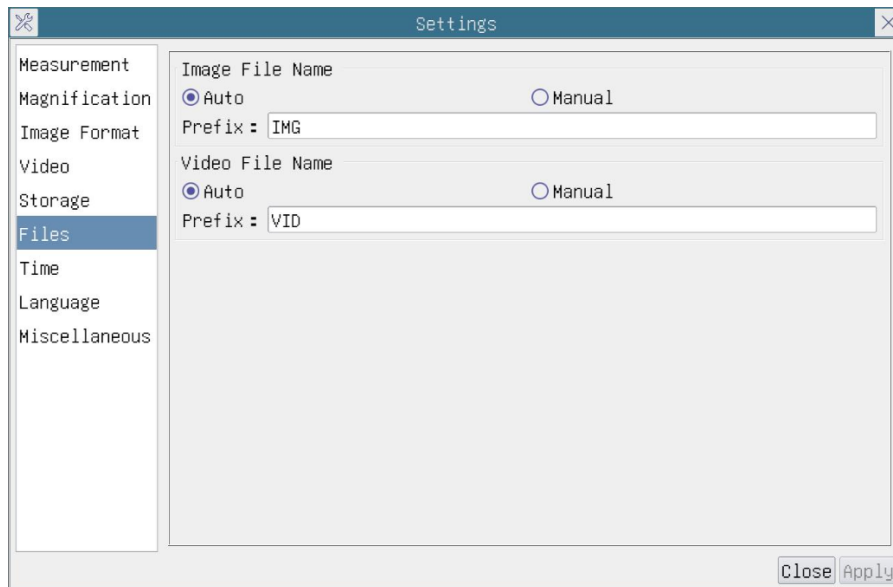


Figure 8-8 Comprehensive Setting of Files Settings Page

<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.

## 8.4.7 Setting&gt;Time

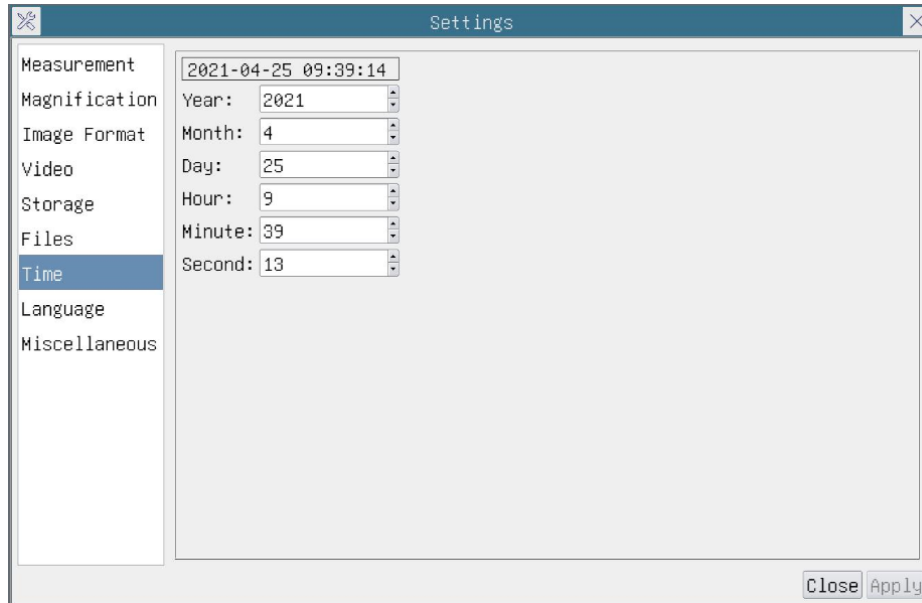


Figure 8-9 Time Setting

Time	User can set <b>Year</b> , <b>Month</b> , <b>Day</b> , <b>Hour</b> , <b>Minute</b> and <b>Second</b> in this page.
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## 8.4.8 Setting&gt;Language

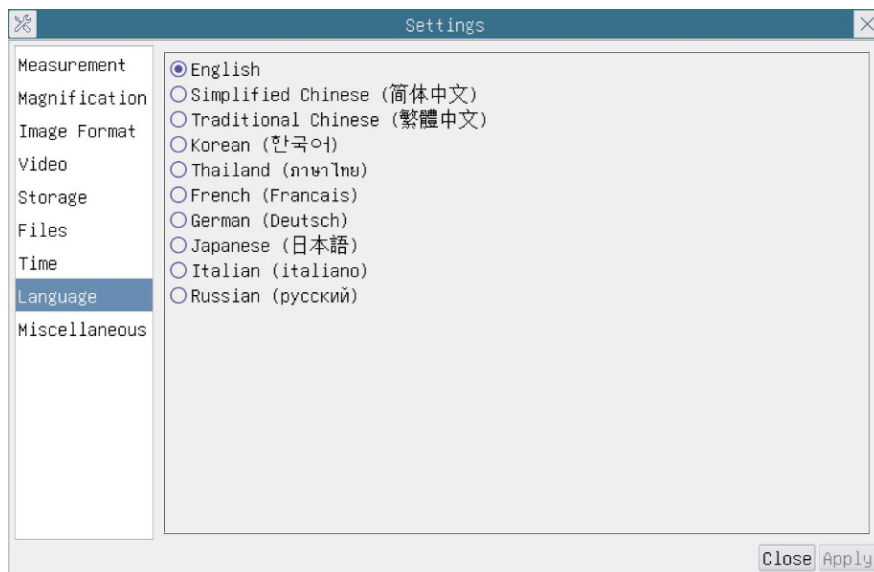


Figure 8-10 Comprehensive Setting of Language Selection Setting Page

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

## 8.4.9 Comprehensive Miscellaneous Settings Page

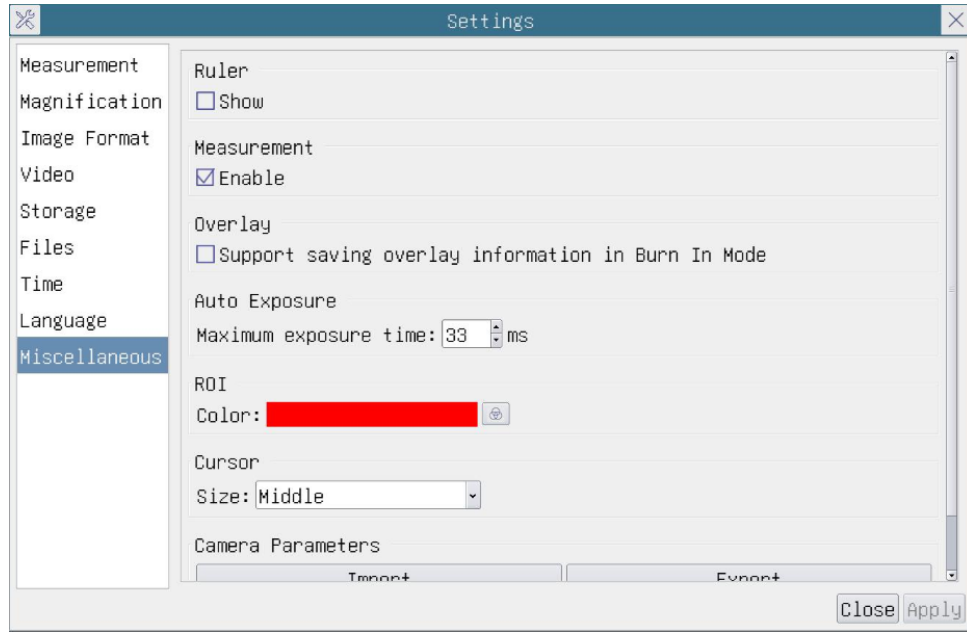


Figure 8-11 Comprehensive Miscellaneous Settings Page

<b>Ruler</b>	Select to display the <b>Ruler</b> in the video window, or not to display the <b>Ruler</b> ;
<b>Measurement</b>	Select to display the <b>Measurement</b> toolbar in the video window, otherwise, the <b>Measurement</b> toolbar will not be displayed;
<b>Overlay</b>	Select to support saving graphics <b>Overlay</b> information in fusion mode, and not to save graphics <b>Overlay</b> information in fusion mode;
<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 <b>Auto Exposure</b> ;
<b>ROI Color</b>	Choosing the <b>ROI</b> rectangle line color ;
<b>Camera Parameters Import</b>	Import the <b>Camera Parameters</b> from the SD card to use the previously exported <b>Camera Parameters</b> ;
<b>Camera Parameters Export</b>	Export the <b>Camera Parameters</b> to the SD card to use the previously exported <b>Camera Parameters</b> ;
<b>Reset to factory defaults</b>	Restore camera parameters to its factory status;



## 9 Sample Photos Captured with 4K Series Camera

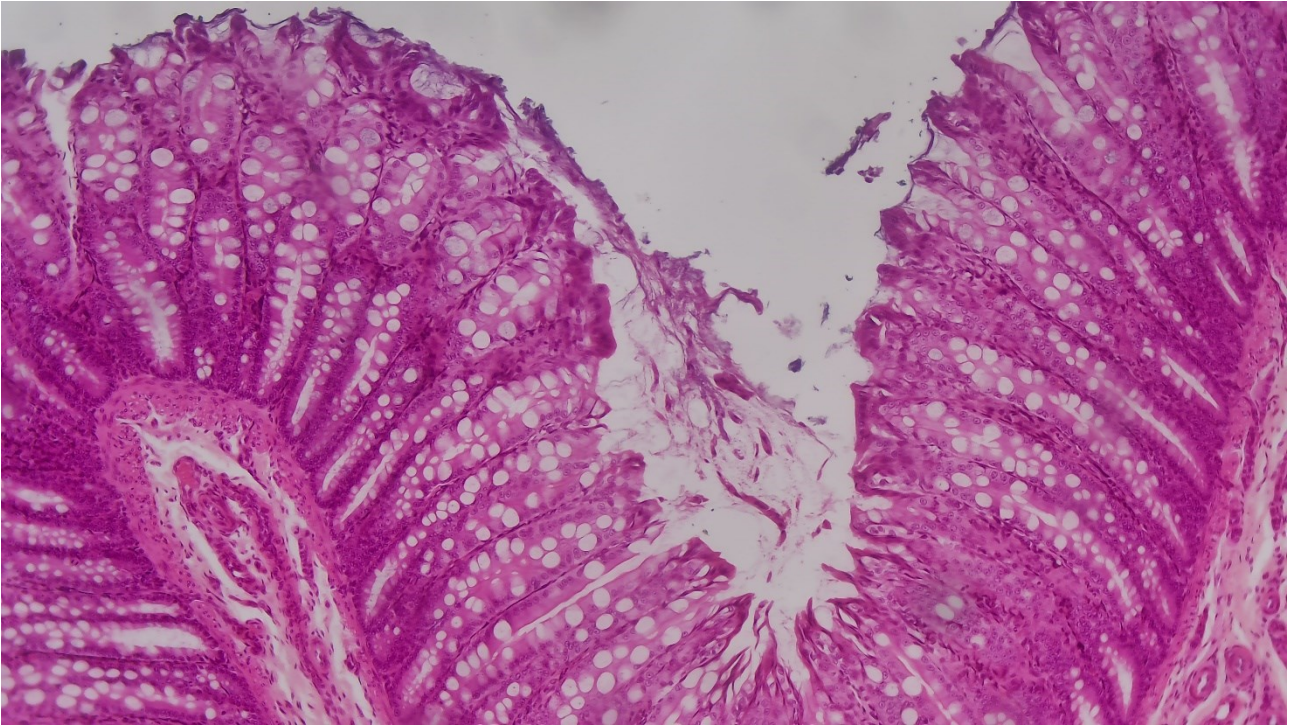


Figure 9-1 Large intestine

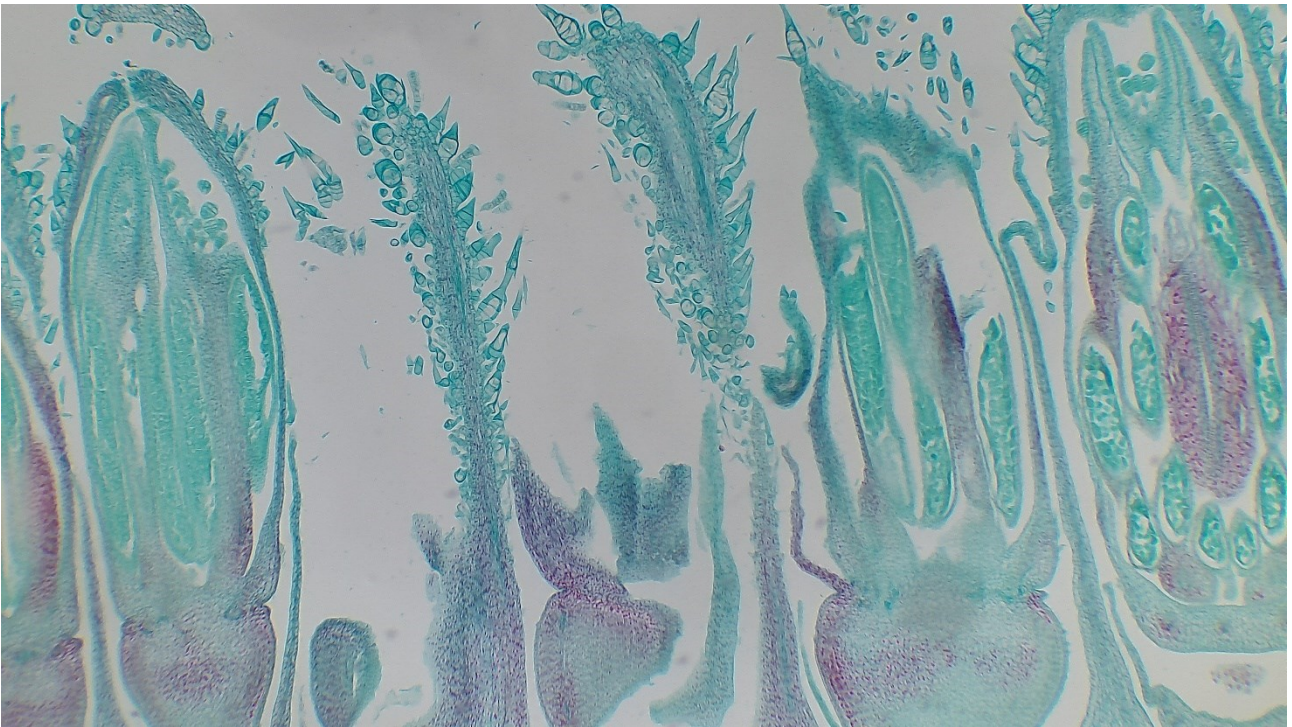


Figure 9-2 Sunflower Flower

## 10 Contacting Customer Service

Please contact OptiSystems Corporation if you have any questions about the product.