

TXCAMLITE4K Series C-mount CMOS Camera with Touch Function



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1 TXCAMLITE4K Series Camera Application



Figure 1 The TXCAMLITE4K Series Camera

The TXCAMLITE4K 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/STARVIS back illuminated CMOS sensor
- 4K HDMI/USB multiple video outputs
- 4K/1080P auto switching according to the display resolution
- SD card/USB flash drive for the captured image and video storage, support local preview and playback
- Embedded XCamView for the controls of the camera with touch screen or mouse
- The touch or mouse control mode can be switched
- With strong ISP and other related processing functions
- ToupView/ToupLite software for PC

2 TXCAMLITE4K Series Camera's Datasheet and Functions(2)

Order Code	Sensor & Size(mm)	Pixel(μm)	G Sensitivity	FPS/Resolution	Binning	Exposure(ms)
TXCAMLITE4K8MPA	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
TXCAMLITE4K8MPB	Sony IMX485(C) 1/1.2"(11.14x6.26)	2.9x2.9	2188mv with 1/30s 0.39mv with 1/30s	30@3840*2160(HDMI) 20@3840*2160(USB)	1x1	0.04~1000



Figure 2 Available Ports on the Back Panel of the Camera Body

TXCAMLITE4K Series C-mount CMOS Camera with Touch Function

Interface	Function Description
USB Mouse	If the touch function is used, this interface does not need to be connected, and the XCamView software is directly controlled by touching; If the interface is switched to the mouse operation mode, the USB mouse interface can be connected for the control of the built-in 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 or 12V/2A)
SD	Comply with SDIO3.0 standard and SD card could be inserted for video and images storage
USB	In touch mode, using USB Type-A to Type-C cable to connect with touch screen ; In mouse mode, USB Flash Drive can be inserted.
LED	LED status indicator
ON/OFF	Power switch
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
Other Function	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 or USB flash drive
Measurement Saving	Measurement information saved in layer mode with image content Measurement information is saved together with image content in burn in mode
ISP Function	Exposure(Automatic / Manual Exposure) / Gain, White Balance(Manual / Automatic / ROI Mode), Sharpening, 3D Denoise, Saturation Adjustment, Contrast Adjustment, Brightness Adjustment, Gamma Adjustment, 50HZ/60HZ Anti-flicker Function
Image Operations	Zoom In/Zoom Out, Mirror/Flip, Freeze, Embedded Files Browser, Video Playback, Measurement Function
Embedded RTC(Optional)	To support accurate time on board
Restore Factory Settings	Restore camera parameters to its factory status
Multiple Language Support	English / Simplified Chinese / Traditional Chinese / Korean / Thai / French / German / Japanese / Italian / Russian
Software Environment under USB Video Output	
White Balance	Auto White Balance
Color Technique	Ultra-Fine™ Color Engine
Capture/Control SDK	Windows/Linux/macOS/Android Multiple Platform SDK(Native C/C++, C#/VB.NET, Python, Java, DirectShow, Twain, etc)
Recording System	Still Picture or Movie
Operating System	Microsoft® Windows® XP / Vista / 7 / 8 / 8.1 / 10 / 11(32 & 64 bit) OSx(Mac OS X) Linux
PC Requirements	CPU: Equal to Intel Core2 2.8GHz or Higher
	Memory: 4GB or More
	Display:19" or Larger
	CD-ROM
Operating Environment	
Operating Temperature (in Centidegree)	-10°~ 50°
Storage Temperature (in Centidegree)	-20°~ 60°
Operating Humidity	30~80%RH
Storage Humidity	10~60%RH
Power Supply	DC 12V/1A Adapter or DC 12V/2A Adapter

3 Dimension of TXCAMLITE4K Series Camera



Figure 3 Dimension of TXCAMLITE4K Series

4 TXCAMLITE4K Series Camera Packing Information(TBD)





Figure 4 The TXCAMLITE4K Series Camera Packing Information

Standard Packing List			
A	Gift box : L:33cm W:21.5cm H:6.8cm		
B	4K or 1080P touch screen		
C	TXCAMLITE4K series camera		
D	Power Adapter: Input: AC 100~240V 50Hz/60Hz, Output: DC 12V 1A American standard: Model: POWER-U-12V1A(MSA-C1000IC12.0-12H-US) European standard:Model: POWER-E-12V1A(MSA-C1000IC12.0-12H-DE) OR Power Adapter: Input: AC 100~240V 50Hz/60Hz, Output: DC 12V 2A American standard: Model: POWER-12V2A(MX24Z1-1202000) + American standard plug European standard:Model: POWER-12V2A(MX24Z1-1202000) + European standard plug		
E	USB2.0 Type A to Type C data cable /0.5M (Adapt to the situation that the screen is relatively close to the camera)		
F	USB2.0 Type A to Type C data cable/1.5M (Adapt to the situation that the screen is far away from the camera)		
G	HDMI data cable/0.5M (Adapt to the situation that the screen is relatively close to the camera)		
H	HDMI data cable /1.5M (Adapt to the situation that the screen is far away from the camera)		
I	USB2.0 A male to A male data cable /2.0M		
J	CD (Driver & utilities software, Ø12cm)		
Optional Accessory			
K	Mouse		
L	SD card(32G or above; Speed: class 10)		
M	USB 3.0 Flash Drive(32G or above)		
N	Adjustable lens adapter(Not given)	C-Mount to Dia.23.2mm eyepiece tube (Please choose 1 of them for your microscope)	108001/AMA037 108002/AMA050 108003/AMA075

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O	Fixed lens adapter(Not given)	C-Mount to Dia.23.2mm eyepiece tube (Please choose 1 of them for your microscope)	108005/FMA037 108006/FMA050 108007/FMA075
	Note: For I and J optional items, please specify your camera type(C-mount, microscope camera or telescope camera), ToupTek engineer will help you to determine the right microscope or telescope camera adapter for your application;		
P	108015(Dia.23.2mm to 30.0mm Ring)/Adapter rings for 30mm eyepiece tube (Not given)		
Q	108016(Dia.23.2mm to 30.5mm Ring)/ Adapter rings for 30.5mm eyepiece tube (Not given)		
R	Calibration kit (Not given)	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.)	

5 Extension of TXCAMLITE4K Series Camera with Microscope Adapter

Extension	Picture	
<p>C-mount Camera</p>	 <p>Machine vision; Medical imaging; Semiconductor equipment; Test instruments; Document scanners; 2D barcode readers; Web camera and security video; Microscope imaging;</p>	
<p>Microscope Camera</p>	 <p>TXCAMLITE4K+AMAXXX(23.2mm Adapter)</p> <p>TXCAMLITE4K+FMAXXX(23.2mm Adapter)</p>	

6 Connection Modes of TXCAMLITE4K Series Camera



Figure 5 TPS-210A50(Stand) + TZM0480(0.4X~8X Monocular Zoom Objective) + TXCAMLITE4K(HDMI/USB Output CMOS Camera with Touch Function) + Touch Screen, the Touch Screen Can Be Tilted on the Table Through Its Own Stand (Long HDMI Cable and USB Type A To Type C Data Cable Are Required To Connect the Camera and Touch Screen)



Figure 6 TPS-210A50(Stand)+TZM0480 (0.4x-8.0x Monocular Zoom Objective) +TXCAMLITE4K Camera(HDMI/USB Output CMOS Camera with Touch Function)+Touch Screen, the Touch Screen Is Fixed on the Fixing Block at the Front of the Camera through the Mounting Hole on the Built-in Bracket (Front View, Short HDMI Cable and USB Type A to Type C Data Cable Can Be Used to Connect the Camera and Touch Screen)

TXCAMLITE4K Series C-mount CMOS Camera with Touch Function



Figure 7 TPS-210A50(Stand)+TzM0480 (0.4x-8.0x Monocular Zoom Objective) +TXCAMLITE4K Camera(HDMI/USB Output CMOS Camera with Touch Function)+Touch Screen, the Touch Screen Is Fixed on the Fixing Block at the Front of the Camera through the Mounting Hole on the Built-in Bracket (Left side View, Short HDMI Cable and USB Type A to Type C Data Cable Can Be Used to Connect the Camera and Touch Screen)



Figure 8 TPS-210A50-G(Stand)+TzM0480 (0.4x-8.0x Monocular Zoom Objective) +TXCAMLITE4K Camera(HDMI/USB Output CMOS Camera with Touch Function)+Touch Screen, the Touch Screen Is Fixed on the Cross Bar of Stand through the Mounting Hole on the Built-in Bracket (Front View, Short HDMI Cable and USB Type A to Type C Data Cable Can Be Used to Connect the Camera and Touch Screen)

7 Software and App

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

Windows: <https://www.touptekphotonics.com/download/>

Linux & macOS: <https://www.touptekphotonics.com/download/>

8 TXCAMLITE4K Series Camera Application Configurations

You can use the TXCAMLITE4K series camera in two different ways. Each application requires different hardware environment.

8.1 Camera Working Standalone with Built-in XCamView Software



Figure 9 TXCAMLITE4K Series Camera with the HDMI Displayer

For this application, apart from the microscope, the user only needs a [TXCAMLITE4K](#) series camera, a touch screen, a HDMI cable, a USB Type A to Type C data cable, a SD card, a power adapter . The steps to start the camera are listed as below:

- Connect the HDMI output on the camera to the touch screen using the HDMI cable;
- Connect the USB interface of the camera to the touch screen with the USB Type-A to Type-C cable;
- Insert the supplied SD card into the [TXCAMLITE4K](#) series camera SD card slot;
- Connect power adapter to the camera the and switch it on;
- After startup,the touch screen will display real-time image of sensor. Clicking the left side of the touch screen , the camera control panel will display for the control of the camera.

8.2 Connecting TXCAMLITE4Kamera to the PC with USB Video Interface

For Windows user (Windows XP (32bit), Windows 7/8/10/11 (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 [TXCAMLITE4K](#) series camera, and plug the other end into the USB port of the PC;
- Open [ToupView/ToupLite](#) software. The [TXCAMLITE4K](#) series camera will be recognized automatically by software. In [ToupView/ToupLite](#) software, select the corresponding [TXCAMLITE4K](#) series camera by clicking the camera name in the camera list.

Note:






The video output function of the USB Video interface and the touch function of the USB interface cannot be used at the same time. When the USB 2.0 A male to A male cable (see Item I in Figure 4 in Section 3) and USB Type-A to Type-C data cable are inserted into the camera at the same time, the USB Video function is preferred, and the touch function is not available; When the USB cable is unplugged, the touch function can be used normally.

9 Brief Introduction of TXCAMLITE4K Series Camera's UI and Its Functions

9.1 XCamView UI



Figure 10 The TXCAMLITE4K Series Camera's Control GUI


Notes	
1	When user touches the left side of the video window, the Camera Control Panel will pop up automatically; Refer to Section Sec.9.2 for details.
2	When the user touches the button  on the bottom-left of the Camera Control Panel , a Measurement Toolbar  will be displayed above the video window for measurement and calibration. Click anywhere else in the video window to exit the measurement mode. During the measurement process, the user can slide left and right on the Measurement Toolbar to select the required measurement tool. When user selects a single measurement object, the Object Position & Attribute Control Bar  will automatically pop up at the bottom of the video window to modify the position and attribute of the measurement object. See Sec.9.3 for details.
3	When user touches the  button on the bottom-left of the Camera Control Panel , the Image Adjustment Toolbar  will displayed on the bottom of the video window , which allows image adjustment operations. See Sec.9.4 for details.

9.2 The Camera Control Panel on the Left Side of the Video Window

Camera control panel is used to control the camera to obtain the best video according to the specific situation; When touching the left side of the Video Window, it will pop up automatically;




Camera Control Panel	Function	Function Description
	Snap	Capture image and save it to the SD card or USB flash drive
	Record	Record video and save it to the SD card or USB flash drive
	Video Freeze	Make preview Video Freeze
	Browse	Browse images and videos in the SD Card or USB flash drive
	Compare	Compare image with the current video
	Zoom In	Zoom In the Video Window
	Zoom Out	Zoom Out the Video Window
	Settings	Comprehensive Settings
	About	Check the version of XCamView
	Measurement	Measuring objects
	Image Adjustment	Adjust the image effect

9.3 The Measurement Toolbar on the Top of the Video Window

When touching the button  on the bottom-left of the Camera Control Panel, the Measurement Toolbar will be displayed. The commands are explained as follows:









Icon	Function
	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)
	Delete all the measurement objects from the Video Window
	Angle
	4 Points Angle
	Point
	Arbitrary Line
	3 Points Line
	Horizontal Line
	Vertical Line
	Parallel
	3 Points Vertical Line
	Rectangle
	3 Points Parallel
	Ellipse
	5 Points Ellipse
	Circle
	3 Points Circle
	Annulus
	3 Points Annulus
	Two Circles and Its Center Distance
	3 Points Two Circles and Its Center Distance
	Arc
	Text
	Polygon
	Curve

	Scale Bar
	Arrow
	When the measurement ends, left-click on a single measurement object and the Object Location & Properties Control Bar will show up. User could move the object by dragging the object with hand or mouse. But more accurate movement could be done with the buttons. The icons on the control bar mean Move Up , Move Down , Move Left , Move Right , Color Adjustment and Delete .

9.4 The Image Adjustment Toolbar at the Bottom of the Video Window

When the  button on the bottom-left of the [Camera Control Panel](#), the [Image Adjustment Toolbar](#) will be displayed. The commands are explained as follows:

Icon	Function	Icon	Function
	Exposure and Gain		White Balance
	Color Adjustment		Sharpness and Denoise
	Flip		Light Source Frequency (Anti Flicker)

The following describes the above functions in detail:

9.4.1 Exposure and Gain

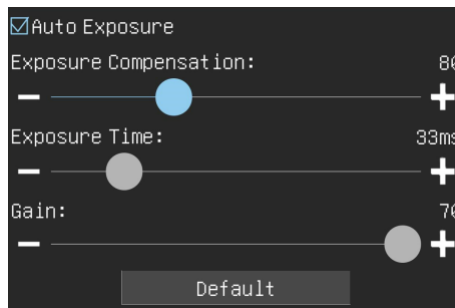


Figure 11 Exposure and Gain Adjustment

After touching , the [Exposure and Gain](#) dialog box will be displayed;

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 unchecked. 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;
Default	Restore the Exposure Time and Gain settings to the default values when the camera leaves the factory;

9.4.2 White Balance

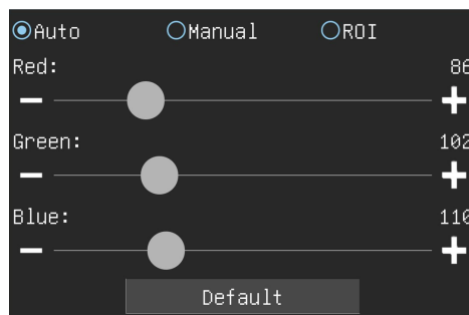


Figure 12 White Balance Adjustment

After touching , the [White Balance](#) dialog box will be displayed;

Auto	White Balance adjustment according to the window video every time the button is clicked;
Manual	Adjust the Red 、 Green or Blue item to set the video White Balance ;
ROI	Check the ROI item will display a red ROI rectangle on the video window, drag it to the interested area will perform the White Balance according to the area video data;
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;
Default	Restore the White Balance setting to the default value when the camera leaves the factory;

9.4.3 Color Adjustment



Figure 13 Color Control

After touching , the **Color Adjustment** dialog box will be displayed;

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 ;
Brightness	Adjust Brightness level of the video. Slide to the right side to increase Brightness and to the left to decrease Brightness ;
Default	Restore the settings of color adjustment to the Default values when the camera leaves the factory;

9.4.4 Sharpness and Denoise

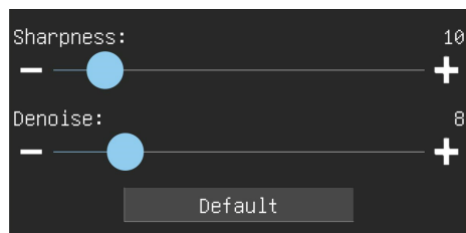


Figure 14 Sharpness and Denoise Adjustment


After touching , the **Sharpness and Noise** reduction dialog box will be displayed;

Sharpness	Adjust Sharpness level of the video;
Denoise	Slide left or right to Denoise the video;
Default	Restore the Sharpness and Denoise settings to the default values when the camera leaves the factory;

9.4.5 Flip



Figure 15 Flip Adjustment

After touching , the **Flip** dialog box will be displayed;

Horizontal	After opening, it will flip in Horizontal mode;
Vertical	After opening, it will flip Vertical mode;

9.4.6 Light Source Frequency



Figure 16 Light Source Frequency Adjustment

After touching , the **Light Source Frequency** dialog box will be displayed;

AC(50HZ)	Check AC(50HZ) to eliminate flickering caused by 50Hz illumination;
AC(60HZ)	Check AC(60HZ) to eliminate flickering caused by 60Hz illumination;
DC	For DC illumination, there will be no fluctuation in light source so no need for compensating light flickering;

9.5 Setting

In the **Camera Control Panel**, the **Setting** function is relatively complex, and the details are as follows:

9.5.1 Setting>Magnification

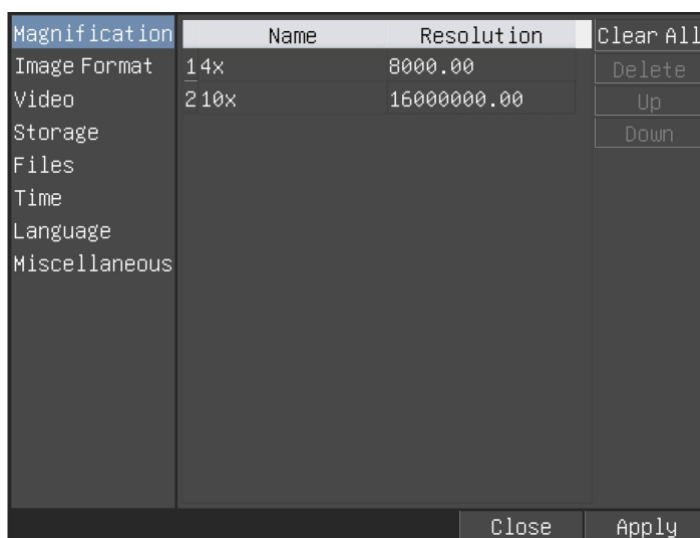


Figure 17 Comprehensive Magnification Calibration Settings Page

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, 40X, 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 Magnification ;
Delete	Click Delete to delete the selected Magnification ;
Up	Click Move Up to move up the selected Magnification ;
Down	Click Move Down to move the selected Magnification down;

9.5.2 Settings>Image Format

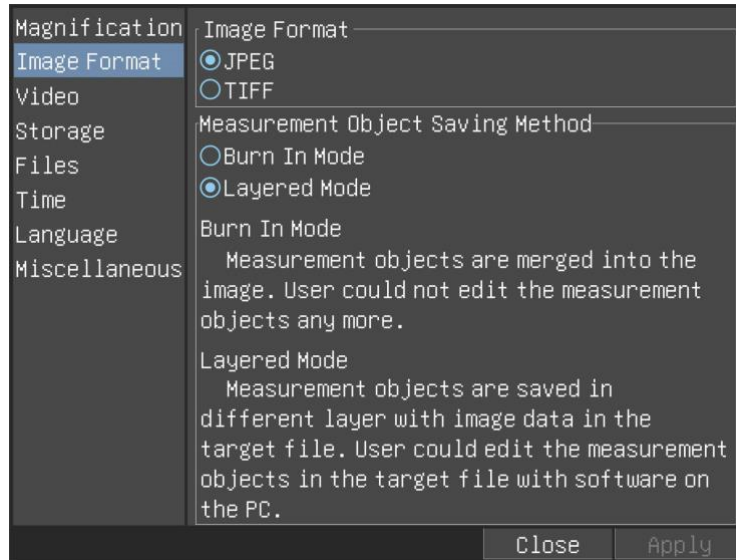


Figure 18 Comprehensive Image Format Settings Page

Image Format	<p>JPEG: 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 Measurement Objects are available, the Measurement Objects will be burned into the image and the Measurement Objects cannot be edited.</p> <p>TIFF: Tag Image File Format(TIFF) is a flexible bitmap format that is mainly used to store images including photos and artistic images.</p>
Measurement Object Saving 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>

9.5.3 Settings>Video

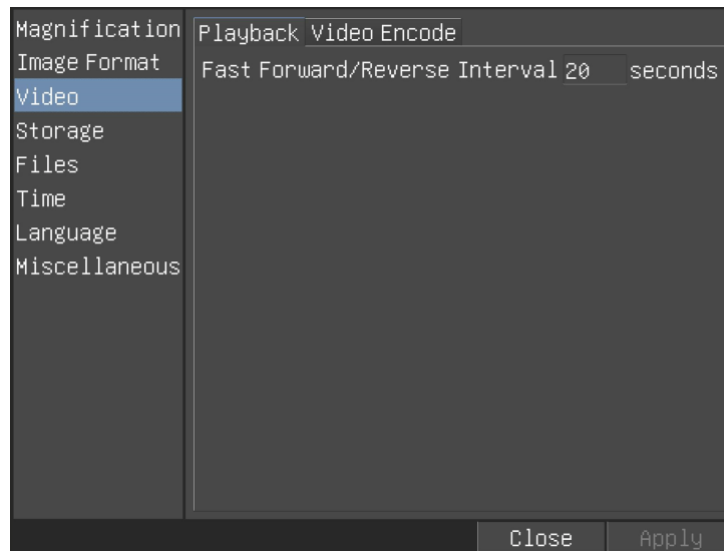


Figure 19 Comprehensive Setting of Video Settings Page-Playback

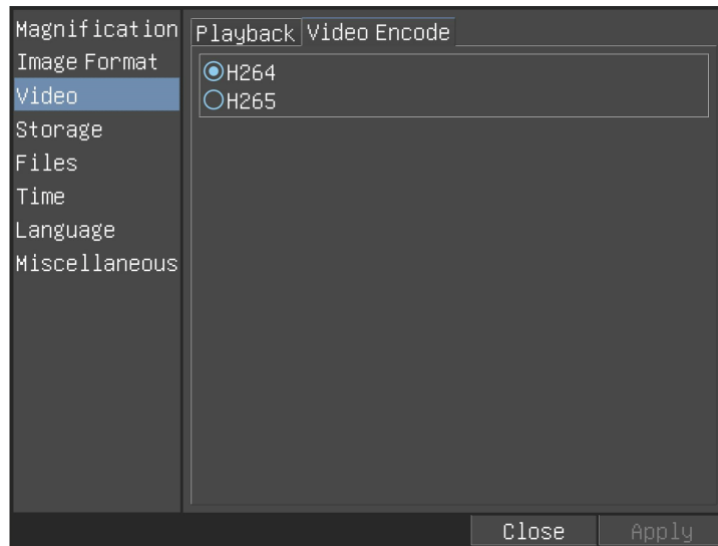


Figure 20 Comprehensive Setting of Video Settings Page-Video Encode

Playback	Fast Forward/Reverse Interval: The time interval of the playback of video files;
Video Encode	You can choose H264 or H265 encoding. H265 encoding can significantly reduce encoding bandwidth and save storage space under the same encoding quality;

9.5.4 Setting>Storage

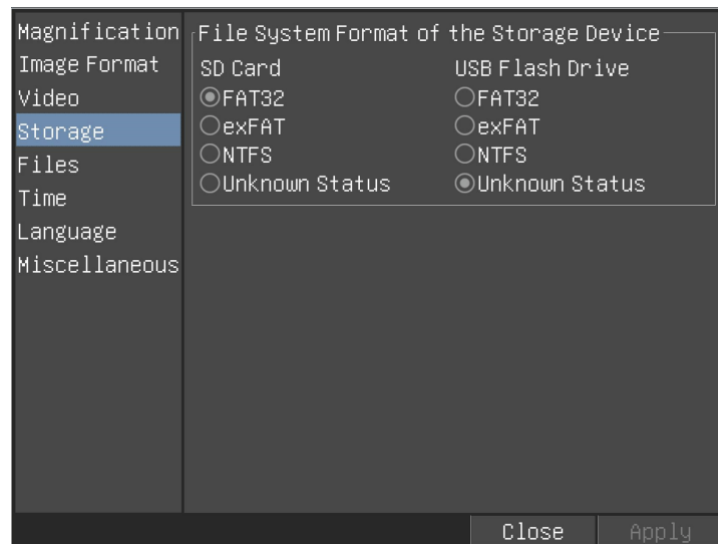


Figure 21 Comprehensive Setting of Storage Page

File System Format of the Storage Device	List the file system format of the current storage device FAT32: The file system of SD Card is FAT32 . The maximum video file size of single file in FAT32 file system is 4G Bytes; exFAT: The file system of SD Card is exFAT . The maximum video file size of single file in FAT32 file system is 16E Bytes; NTFS: The file system of SD Card is NTFS . The maximum video file size of single file is 2T Bytes. Unknown Status: SD Card not detected or the file system is not identified;
Note: When the SD card and USB flash disk exist at the same time, the SD card is preferred. If a USB flash disk is used for storage, a 3.0 USB flash disk is recommended.	

9.5.5 Setting>Files

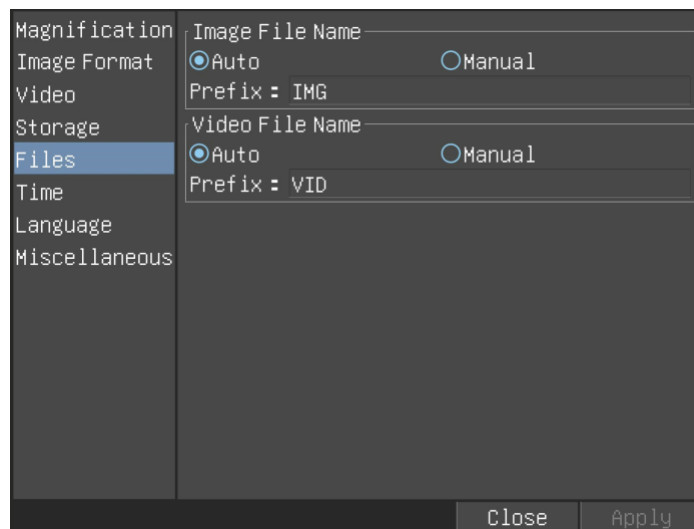


Figure 22 Comprehensive Setting of Files Settings Page

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

9.5.6 Setting>Time

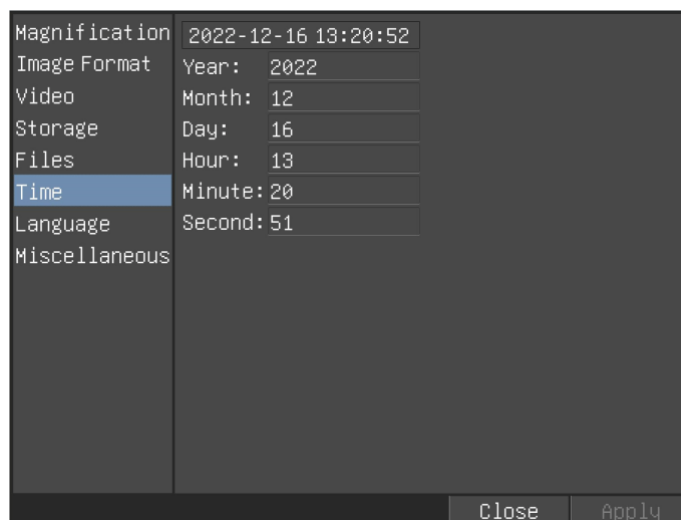


Figure 23 Time Setting

Time	User can set Year, Month, Day, Hour, Minute and Second ital.in this page.
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9.5.7 Setting>Language

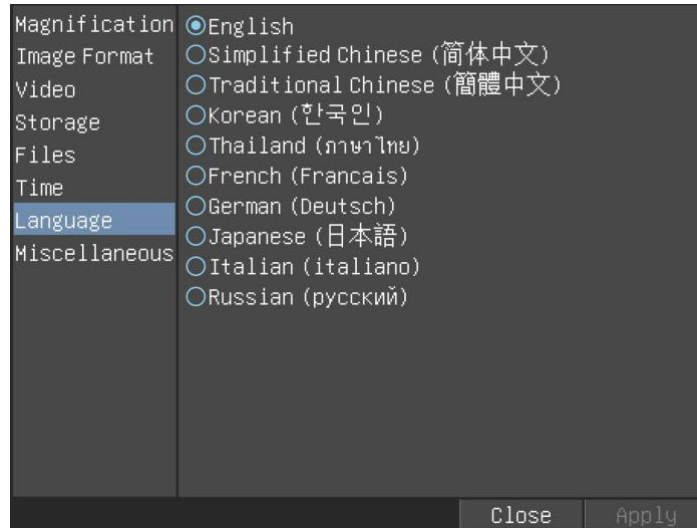


Figure 24 Comprehensive Setting of Language Selection Setting Page

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 ;

9.5.8 Comprehensive Miscellaneous Settings Page

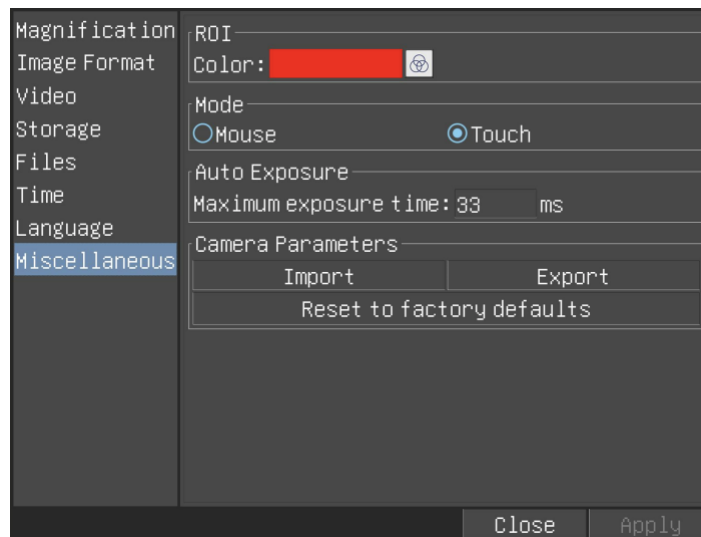


Figure 25 Comprehensive Miscellaneous Settings Page

ROI Color	Choosing the ROI rectangle line color ;
Mode	Mouse mode or touch mode can be selected;
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 ;
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;

10 Sample Photos Captured with TCAMLITE4K Series Camera

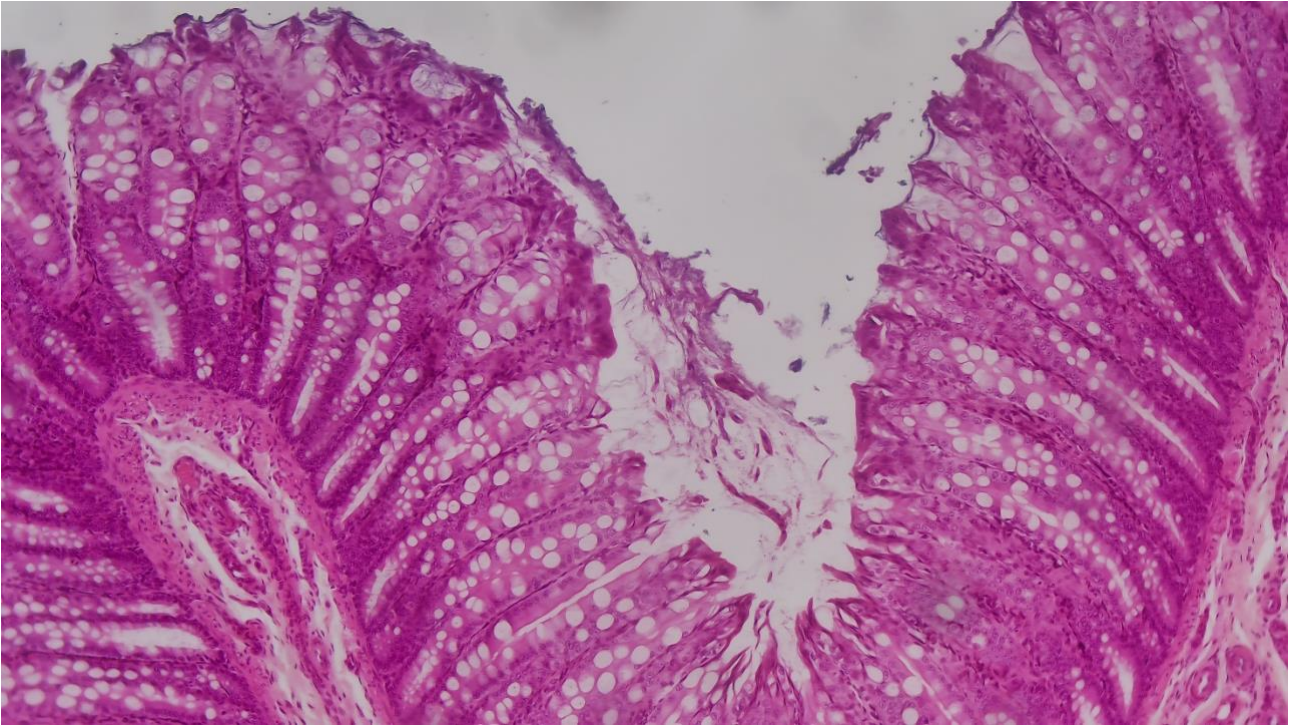


Figure 26 Large Intestine Captured with TXCAMLITE4K8MPA

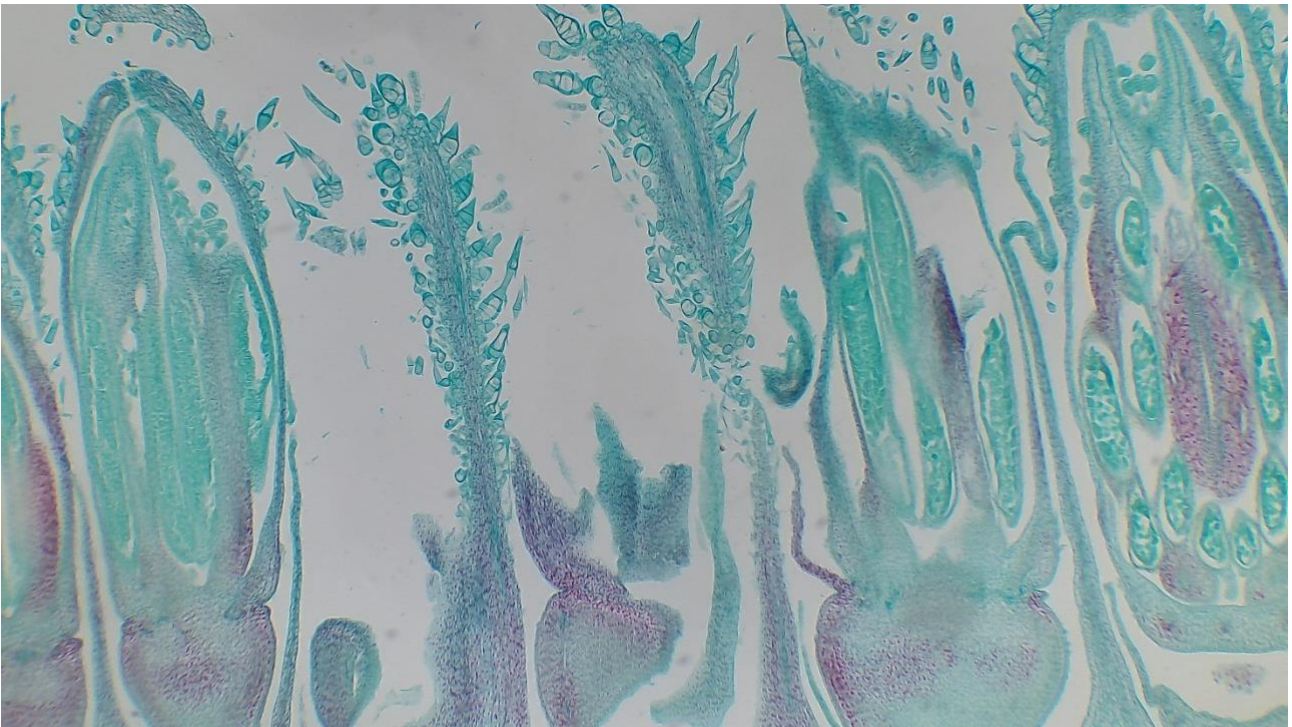


Figure 27 Sunflower Flower Captured with TXCAMLITE4K8MPA

11 Contacting Customer Service

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