The AIOCAM4K Series All-in-One Camera Help Manual

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1 AIOCAM4K Series All-in-One Camera Application

Figure 1 The AIOCAM4K Series All-in-One Camera

The AIOCAM4K is a multifunctional all-in-one camera that integrates a 13.3-inch display screen and a 4K image acquisition and processing system for capturing digital images of stereo microscopes, biological microscopes, or online interactive teaching. The basic characteristic is listed as below:

- The camera and display screen are integrated together, eliminating wiring and facilitating installation
- Sony STARVIS 2 back-illuminated CMOS sensor
- The average delay of display screen output is 40ms
- Support HDMI2.0 interface connection to external displays for synchronous output, 4K/1080P auto switching according to monitor resolution
- Support USB 3.0 interface for synchronous output of real-time video
- Provide real-time video WDR output function
- Provide real-time video EDF function
- USB flash drive for captured image and video storage, support local preview and playback
- Excellent ISP with local tone mapping and 3D denoising
- Provide two sets of default ISP parameters for biological microscope and stereo microscope
- Embedded XCamView for the control of the camera and image processing, supporting automatic edge finding and measurement functions
- New browsing function, providing rich file operation functions, image to image comparison, image to real-time video comparison, multi-image EDF and other functions
- ToupView/ToupLite software for PC
- iOS/Android applications for smart phones or tablets

2   AIOCAM4K Series All-in-One Camera Datasheet and Functions

Order Code	Sensor & Size(mm)	Pixel(μm)	G Sensitivity Dark Signal	Sensor Output (FPS/Resolution)	Binning	Exposure(ms)
AIOCAM4K8MPA	Sony IMX678(C) 1/1.8"(7.68x4.32)	2.0x2.0	3541mv with 1/30s 0.15mv with 1/30s	60@3840*2160	1x1	0.019~1000

Camera Model	Video Saving(FPS/Resolution)	HDMI2.0(FPS/Resolution)	USB3.0(FPS/Resolution)	WiFi(FPS/Resolution)
AIOCAM4K8MPA	60@3840*2160 60@1920*1080	60@3840*2160 60@1920*1080	30@3840*2160 45@2688*1512 60@1920*1080	30@3840*2160 60@1920*1080 60@1280*720

Figure 2 Available Ports on the Panel of the Camera Body

Interface or Button	Function Description
USB 2.0	Connect USB mouse for easy operation with embedded XCamView software
USB Video	Connect PC or other host device to realize video image transmission
USB3.0	Connect USB flash drive to save pictures and videos Connect 5G WiFi module to transfer video wirelessly in real time Connect USB microphone for audio and video recording
ON/OFF	Power switch (Short press to turn on, long press to turn off)
HDMI OUT	Comply with HDMI2.0 standard. Used to extend 4K/1080P format video output and supporting automatic switch between 4K and 1080P format according to the connected monitors
LED	LED status indicator
+/-	Display brightness adjustment button
MENU	Display menu key
DC 12V2A	Power adapter connection (12V/2A)
Video Output Interface	**Function Description**
HDMI Interface	Synchronize video output through HDMI OUT interface, comply with HDMI2.0 standard; 60fps@4K Or 60fps@1080P
WiFi Interface	Connecting 5G WiFi adapter (USB3.0 slot) in AP/STA mode
USB Video Interface	Connecting USB Video port of PC for video transfer H264/MJPEG format video
Other Function	**Function Description**
Video Saving	Video format：8M (3840*2160) H264/H265 encoded MP4 file Video saving frame rate：60fps in Low Delay mode; 30fps in WDR mode
Image Capture	8M (3840*2160) JPEG/TIFF image in USB flash drive
Measurement Saving	Measurement information saved in different layer with image content Measurement information is saved together with image content in burn in mode
ISP	Exposure(Automatic / Manual Exposure) / Gain，White Balance(Manual / Automatic / ROI Mode)，Sharpening，3D Denoise，Saturation Adjustment，Contrast Adjustment，Brightness Adjustment，Gamma Adjustment，Hue Adjustment, Color to Gray，50HZ/60HZ Anti-flicker Function
Image Operation	Zoom In/Zoom Out (Up to 10X), Mirror/Flip, Freeze, Video EDF, Cross Line, Overlay, PIP, Browser (including Picture Browsing, Video Playback, Video Compare, Picture Compare, Picture EDF, Image Processing), 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 / Thailand / French / German / Spanish / Japanese / Italian / Russian / Dutch / Portuguese
Software Environment under WiFi/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® 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
	Ethernet Port: RJ45 Ethernet Port
	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/2A Adapter

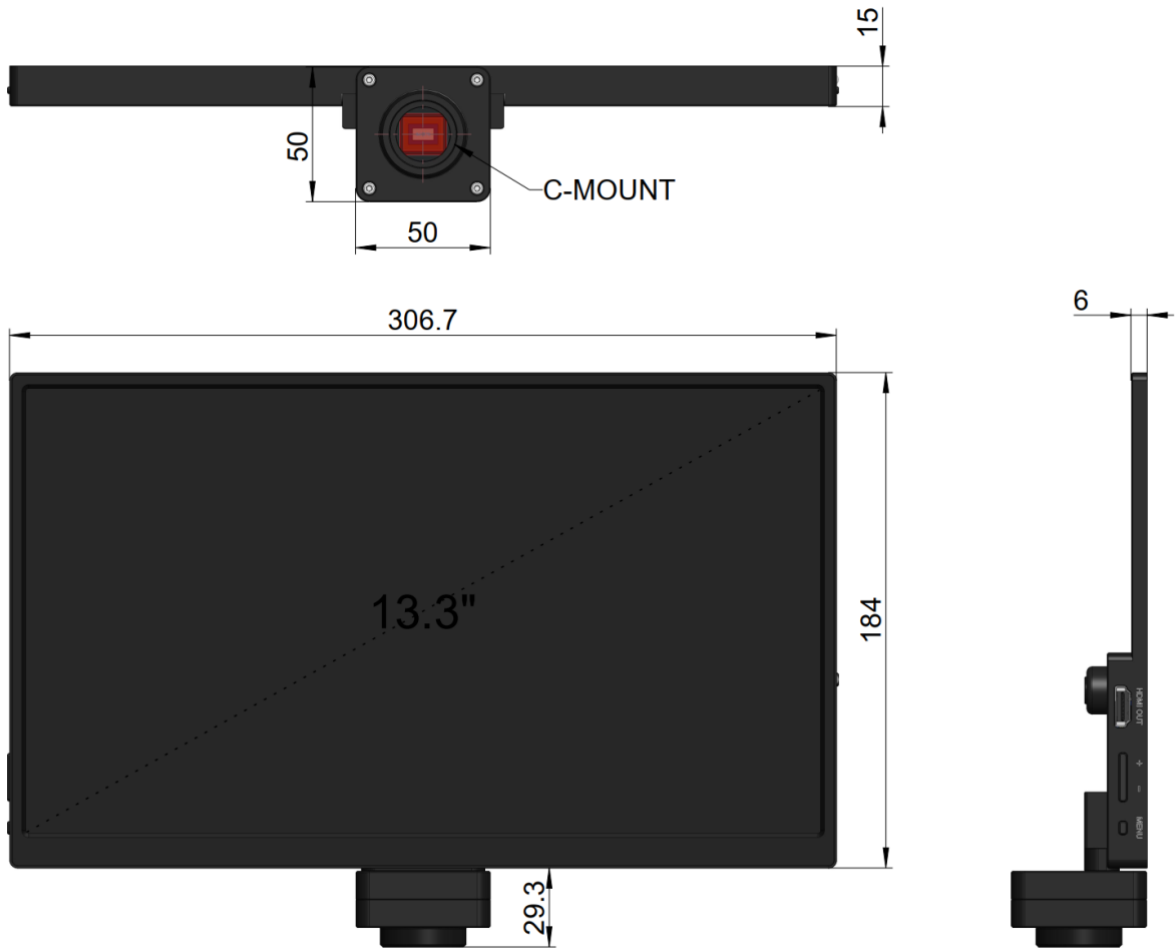## 3   Dimension of AIOCAM4K Series All-in-One Camera

Figure 3 Dimension of AIOCAM4K Series All-in-One Camera

4   AIOCAM4K Series All-in-One Camera Packing Information

Figure 4 AIOCAM4K Series All-in-One Camera Packing Information

Standard Packing List		
A	Gift box: L:35.6cm W:24.9cm H:7.5cm (1pcs, 1.68Kg/ box)	
B	AIOCAM4K Series All-in-One Camera	
C	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	
D	USB wireless mouse	
E	USB3.0 A male to A male gold-plated connectors cable /2.0m	
F	CD (Driver & utilities software, Ø12cm)	
Optional Accessory		
G	HDMI Cable	
H	USB flash drive	
I	USB WiFi adapter	
J	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
K	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
	Note: For J and K 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;		
L	108015(Dia.23.2mm to 30.0mm Ring)/Adapter rings for 30mm eyepiece tube	
M	108016(Dia.23.2mm to 30.5mm Ring)/ Adapter rings for 30.5mm eyepiece tube	
N	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.)

5   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/

iOS: https://itunes.apple.com/us/app/toupview/id911644970

Android: https://play.google.com/store/apps/details?id=com.touptek.tpview

6   AIOCAM4K Series All-in-One Camera Configurations

You can use the AIOCAM4K series all-in-one camera in 4 different ways. Each application requires different hardware environment.

6.1   Camera working standalone with built-in XCamView software

For this application, in addition to the microscope, all you need is the AIOCAM4K series all-in-one Camera, a USB flash drive, the USB wireless mouse that came with the camera, a power adapter, and the camera's embedded XCamView software. The steps to start the camera are listed as below:

Figure 5 AIOCAM4K Series All-in-One Camera with the HDMI Monitor

Insert the supplied USB mouse to the USB 2.0 interface on the right side of the AIOCAM4K series all-in-one camera;
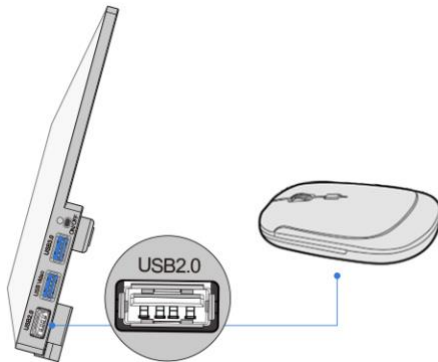
Insert the USB flash drive into the right side of the AIOCAM4K series all-in-one camera USB3.0 slot;
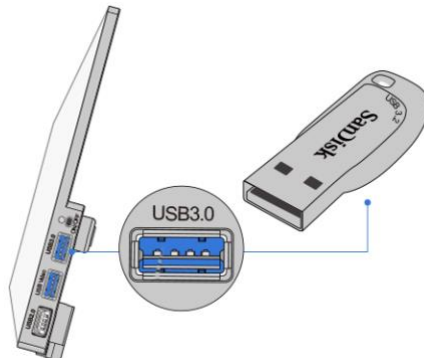
Connect the camera to the power adapter;
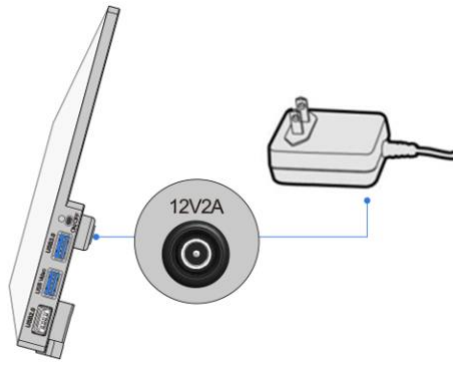
Short press the power switch on the right side of the AIOCAM4K series all-in-one camera and view the video in the XCamView software. Move the mouse to the left, top or bottom of the XCamView UI, different control panel or toolbar will pop up and users could operate with the mouse at ease.
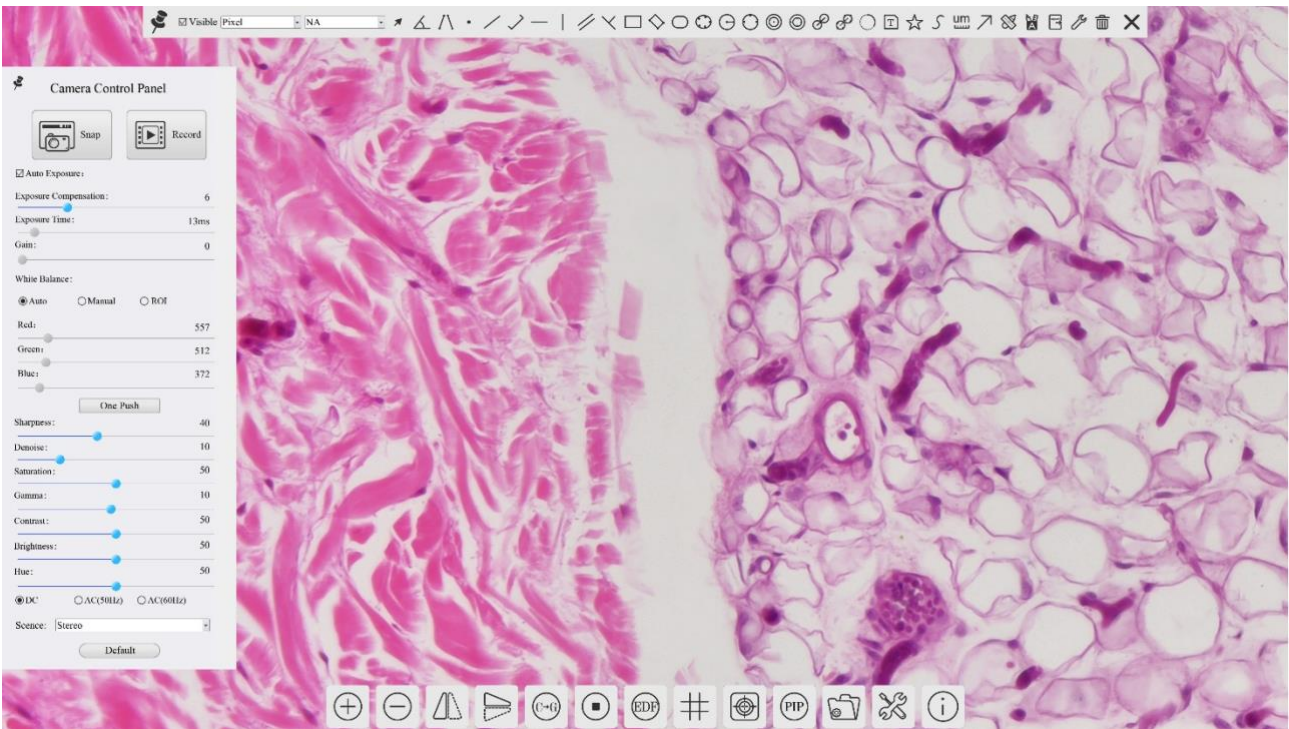

Figure 6 XCamView And AIOCAM4K Series All-in-One Camera in HDMI Mode

6.2   Connecting camera to computers with USB3.0 port

For Windows user (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:

Start the camera according to Sec. 6.1. After the camera is running, connect camera to computer with USB cable. Please use "USB Video" slot, The upper left corner of the HDMI graphics interface displays "USB3.0 Mode" or "USB2.0 Mode", indicating that a connection has been established with the PC.
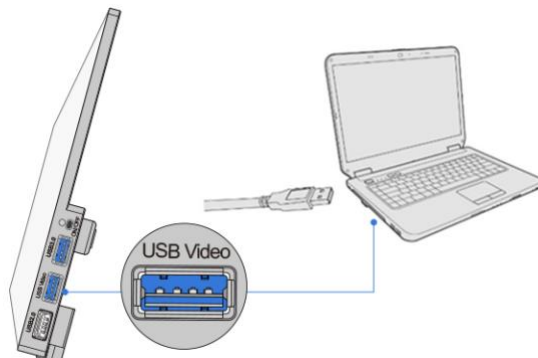
Install ToupView/ToupLite on your PC or install ToupView App on the mobile device; Run the software

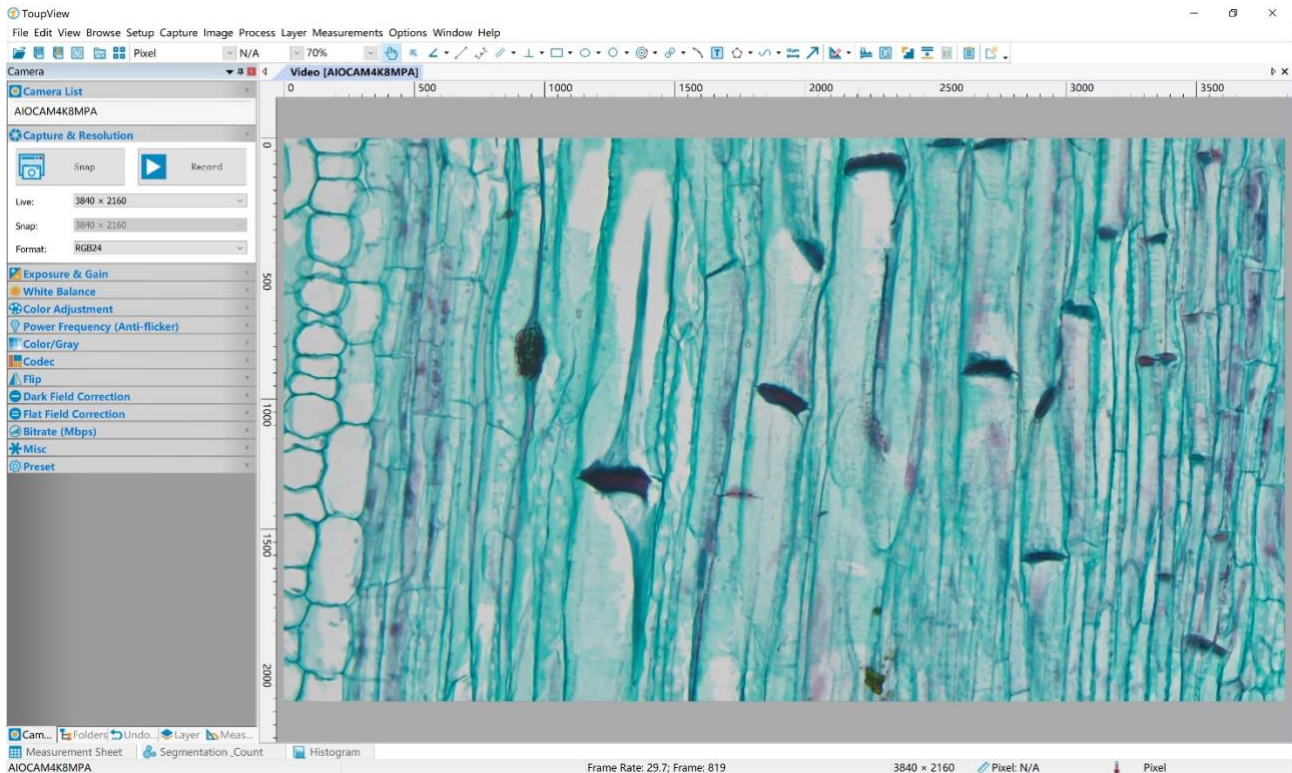ToupView/ToupLite, clicking the camera name in the Camera List group to start the live video as shown in Figure 7.

Figure 7 ToupView and AIOCAM4K Series All-in-One Camera in USB Mode

6.3   Camera working in WiFi mode (AP mode)

Please make sure your PC is WiFi enabled.

Figure 8 The PC or Mobile Device Connect to the Camera through WiFi

For Windows user (Windows 8/10/10/11 (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. When connecting the camera with a mobile device, the free ToupView App is required. Just make sure that the mobile device uses iOS 11 or higher/Android 5.1 or higher operating systems.

The steps to start the camera are listed below:

Start the camera according to Sec. 6.1. After the camera is running, move the mouse to the bottom of the GUI and clicking the ⚒ button on the Synthesis Camera Control Toolbar at the bottom of the video window, a small window called Settings will pop up as shown below. Click Network> WiFi property page and choose the AP in the WiFi Mode edit box(The factory default configuration is AP mode).
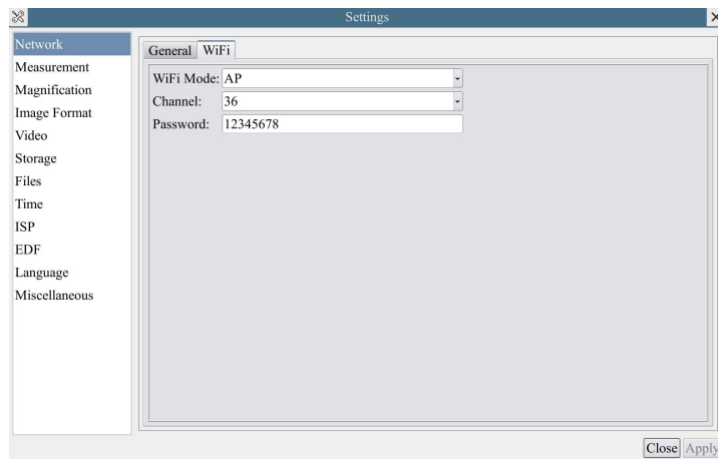
Plug the USB WiFi adapter into the camera's USB3.0 port, the upper left corner of the HDMI graphics interface will display "AP mode";
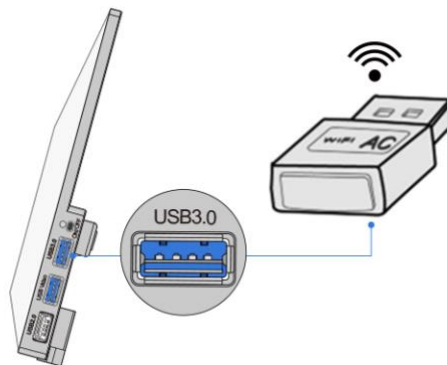
Install ToupView/ToupLite on your PC or install ToupView App on the mobile device, connect the PC or mobile device to the camera's WiFi AP point; The network name (SSID) and the WiFi password (The default one is 12345678) can be found on the camera's Setting>Network> WiFi page in AP mode.
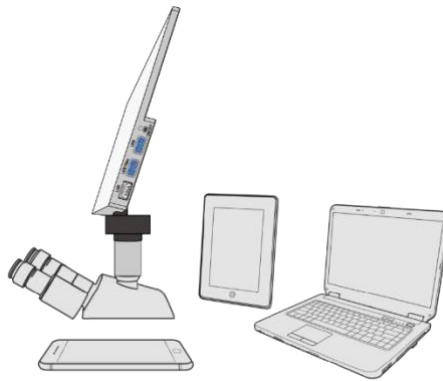
Start ToupView/ToupLite software or ToupView App and check the configuration. Normally, the active AIOCAM4K series all-in-one cameras will be automatically recognized. The live image of each camera is shown in Figure 9. For the display, the Camera List group is used in ToupView/ToupLite software, and the Camera Thumbnail is used in ToupView App.
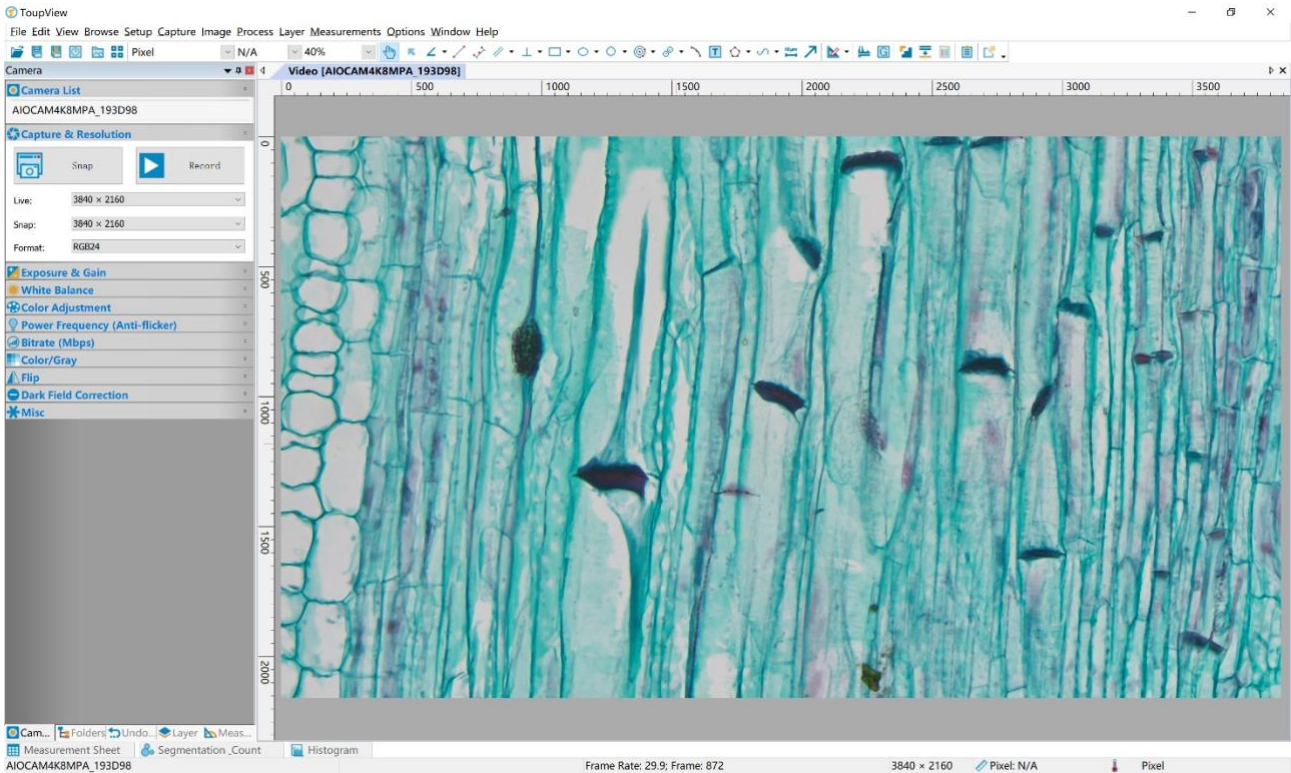
Figure 9 ToupView and AIOCAM4K Series All-in-One Camera in WiFi AP Mode

6.4   Connecting multi-cameras to the router through the WiFi STA mode for the network application

Multi AIOCAM4K series all-in-one cameras are connected to router through the WiFi STA mode, and the user can control the HDMI camera on the computer or mobile device through WiFi.
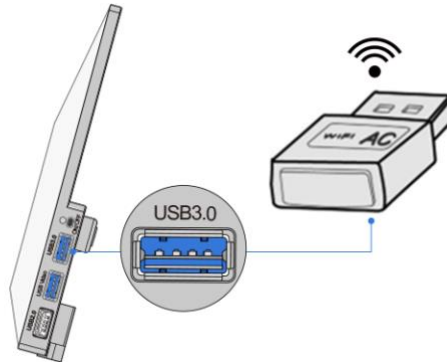

Figure 10 Multi AIOCAM4K Series All-in-One Cameras Connecting to the Router through the WiFi Style

Start the camera according to Sec. 6.1. After the camera is running, move the mouse to the bottom of the video window and clicking the ⚙ button on the Synthesis Camera Control Toolbar at the bottom of the video window, a small window called Settings will pop up as shown below. Clicking Network> WiFi property page and choosing the STA in the WiFi Mode edit box (The factory default configuration is AP mode). Input the to be connected router's SSID and Password as shown below:
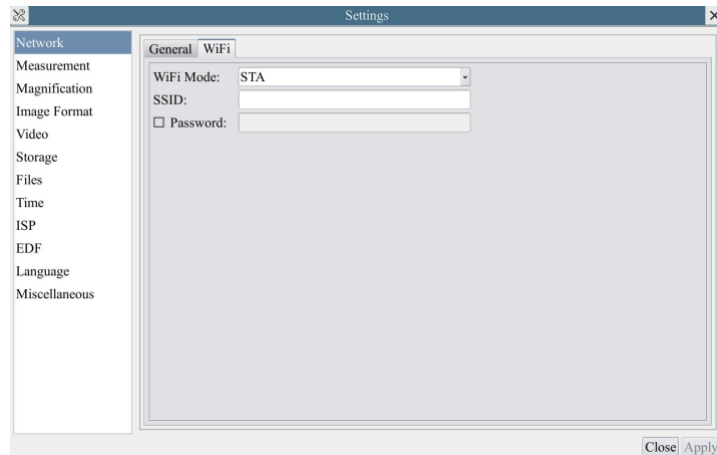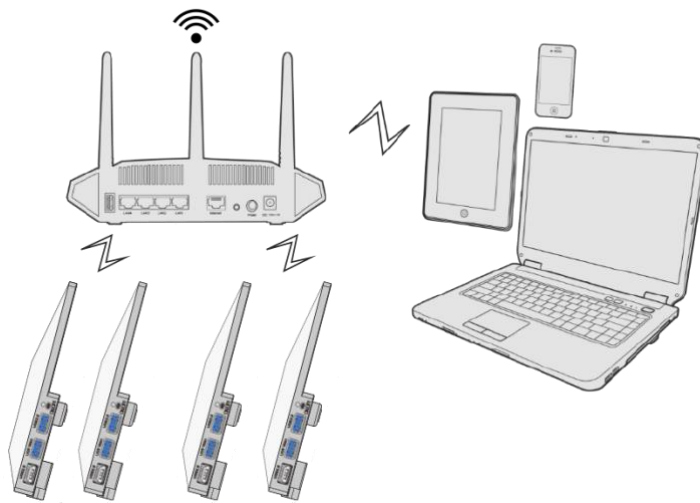
Install ToupView /ToupLite software on your PC. Alternatively, install the free ToupView App on the mobile device;

Plug the USB WiFi adapter into the camera's USB3.0 port(for those connected to router with WiFi STA mode), the upper left corner of the HDMI graphics interface will display "STA Mode";

Finally, as shown below, 4 AIOCAM4K series all-in-one cameras are connected to the same router with WiFi STA mode (The number of the cameras are determined by the router performance).

Make sure that your PC or your mobile device is connected to the LAN or WiFi of the router; Start ToupView/ToupLite software or ToupView App and check the configuration. Normally, active AIOCAM4K series all-in-one cameras are automatically recognized. The live image of each camera is displayed. For the display, Camera List group is used in ToupView/ToupLite software, and Camera Thumbnail is used in ToupView App; Select theAIOCAM4K all-in-one series camera you are interested in. To do so, double click the camera's name in Camera List tool window if you use ToupView /ToupLite software; If you use ToupView App, tap the camera's thumbnail in Camera List page(See Figure 11)

About the routers/switches

It is suggested that routers/switches supporting WiFi 5G should be selected to achieve better wireless connection experience.

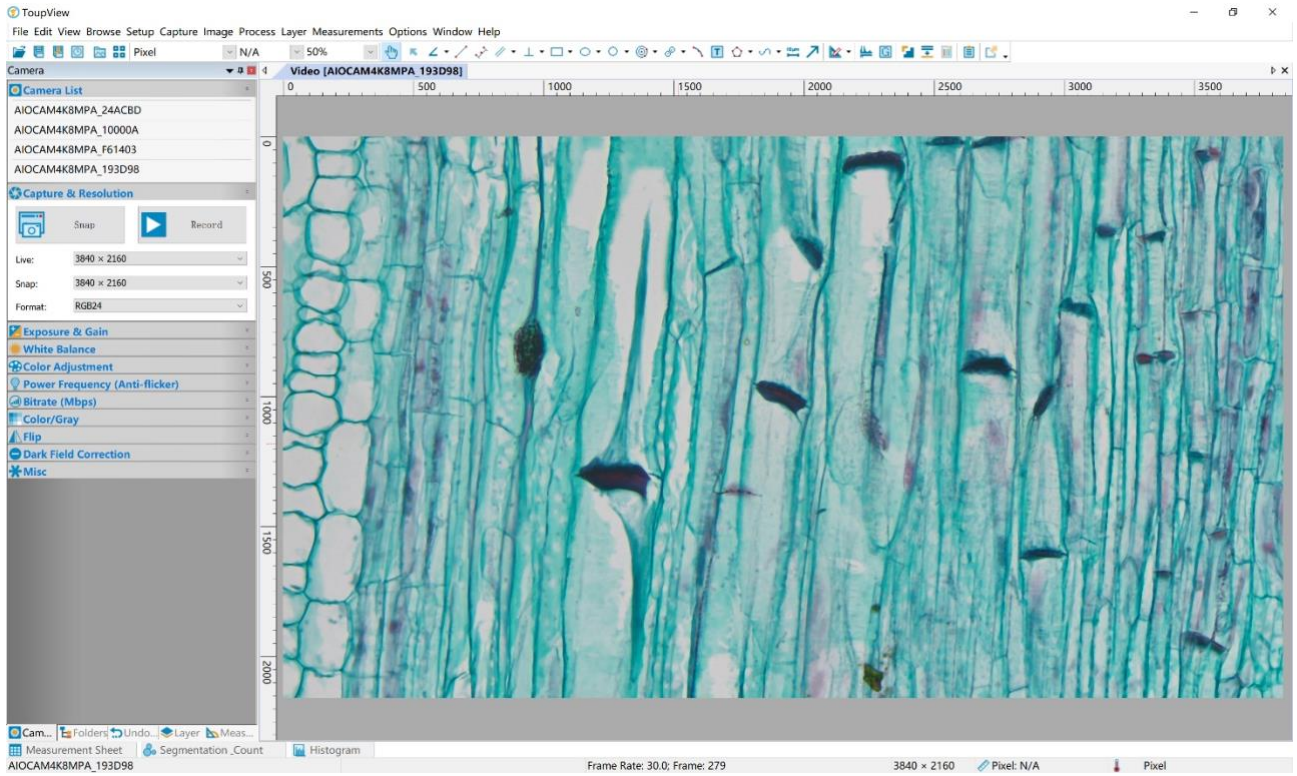Figure 11 ToupView and AIOCAM4K Series All-in-One Camera in WiFi STA mode

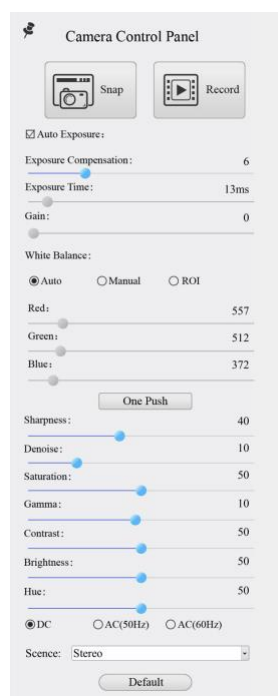## 7   Brief Introduction of AIOCAM4K UI and Its Functions

7.1   XCamView UI

The AIOCAM4K UI shown in Figure 6 includes a Camera Control Panel on the left of the video window, a Measurement Toolbar on the top of the video window and a Synthesis Camera Control Toolbar on the bottom of the video window.

Notes	
	Notes
1	To show the Camera Control Panel, move your mouse to the left or right of the video window. See Sec.7.2 for details
2	Move the mouse cursor to the top of the video window, a Measurement Toolbar will pop up for calibration and measurement operations. When user left-clicks the Float/Fixed button 📌 on the Measurement Toolbar, the Measurement Toolbar will be fixed. In this case the Camera Control Panel will not pop up automatically even if users move mouse cursor to left or right side of the video window. Only when user left-clicks the ✖ button on the Measurement Toolbar to exit from measuring procedure will they be able to do other operations on the Camera Control Panel, or the Synthesis Camera Control Toolbar. During the measuring process, when a specific measuring object is selected, an Object Location & Attributes Control Bar ⌃ ⌄ ⟨ ⟩ 🔴 🗑 will appear for changing location and properties of the selected object. See Sec.7.3 for details.
3	When users move mouse cursor to the bottom of the video window, the Synthesis Camera Control Toolbar will pop up automatically. ⊕ ⊖ ◁ ⊿ ⊙ ⦿ EDF ▦ ◎ PIP 📷 ✂ ⓘ See Sec.7.4 for details.

7.2   The camera control panel on the left or right 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 or right 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 process is 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
	Snap	Capture image and save it to the USB flash drive
	Record	Record video and save it to the USB flash drive
	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
	Red	Slide to left or right to decrease or increase the proportion of Red in RGB on video
	Green	Slide to left or right to decrease or increase the proportion of Green in RGB on video
	Blue	Slide to left or right to decrease or increase the proportion of Blue in RGB on the video
	Auto	White Balance 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
	One Push	Perform a global White Balance based on image conditions
	Sharpness	Adjust Sharpness level of the video
	Denoise	Slide left or right to denoise the video
	Saturation	Adjust Saturation level of the video
	Gamma	Adjust Gamma level of the video. Slide to the right side to increase Gamma and to the left to decrease Gamma.
	Contrast	Adjust Contrast level of the video. Slide to the right side to increase Contrast and to the left to decrease Contrast.
	Brightness	Adjust Brightness level of the video. Slide to the right side to increase Brightness and to the left to decrease Brightness.
	Hue	Adjust Hue level of the video. Slide to the right side to increase Hue and to the left to decrease Hue.
	DC	For DC illumination, there will be no fluctuation in light source so no need for compensating light flickering
	AC(50HZ)	Check AC (50HZ) to eliminate flickering caused by 50Hz illumination
	AC(60HZ)	Check AC (60HZ) to eliminate flickering caused by 60Hz illumination
	Scence	Select different default parameters according to the type of microscope
	Default	Restore all the settings in the Camera Control Panel to default values

7.3   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:

Figure 12 The Measurement Toolbar on the Upper Side of the Video Window

Icon	Function
	Float/ Fix switch of the Measurement Toolbar
☑ Visible	Show / Hide Measurement Objects
Pixel	Select the desired Measurement Unit
NA	Select Magnification for Measurement after Calibration
	Object Select
	Angle
	4 Points Angle
	Point (Point Counter)
	Arbitrary Line
	3 Points Line
	Horizontal Line
	Vertical Line
	3 Points Vertical Line
	Parallel
	Rectangle
	3 Points Rectangle
	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
	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.
	Auto Measurement: Two Points Parallel, Circle Detect, Annulus Detect, Rectangle Detect
	Export the Measurement information to CSV file(*.csv)
	Measurement Setup
	Delete all the measurement objects
	Exit from Measurement mode
	When the measurement ends, left-click on a single measuring object and the Object Location & Properties Control Bar will show up. User could move the object by dragging the object with the mouse. But more accurate movement could be done with the control bar. The icons on the control bar mean Move Left, Move Right, Move Up, Move Down, Color Adjustment and Delete.

Note:

1) When user left-clicks Display/Hide button on Measurement Toolbar, Measurement Toolbar will be fixed. In this case 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 Measurement Toolbar to exit from the measurement mode will they be able to doing other operations on Camera Control Panel or Synthesis Camera Control Toolbar.

2) When a specific Measurement Object is selected during the measurement process, Object Location & Attributes Control Bar ⬡ ⬡ ⬡ ⬡ 🔵 🗑 will appear for changing the object location and properties of the selected objects.

7.4 Icons and functions of the Synthesis Camera Control Toolbar at the bottom of the video window

Figure 13 The Synthesis Camera Control Toolbar on the Bottom of the Video Window

Icon	Function	Icon	Function
⊕	Zoom In the Video Window	⊖	Zoom Out the Video Window
◁	Horizontal Flip	▷	Vertical Flip
C→G	Color/gray	⊙	Video Freeze
EDF	EDF	╬	Display Cross Line
◎	Image Overlay	PIP	PIP
🗁	Browse images and videos in the SD Card	✂	Settings
ⓘ	Check the Version of XCamView		

The 🗁 Browsing function, for detailed introduction, please refer to Section 7.4.1.

The ✂ Setting function, for detailed introduction, please refer to Sections 7.4.2 to7.4.14.

7.4.1 Browse

Clicking the 🗁 to browse the dxf, images, videos, and other files saved on the USB flash drive, as shown in the following figure.
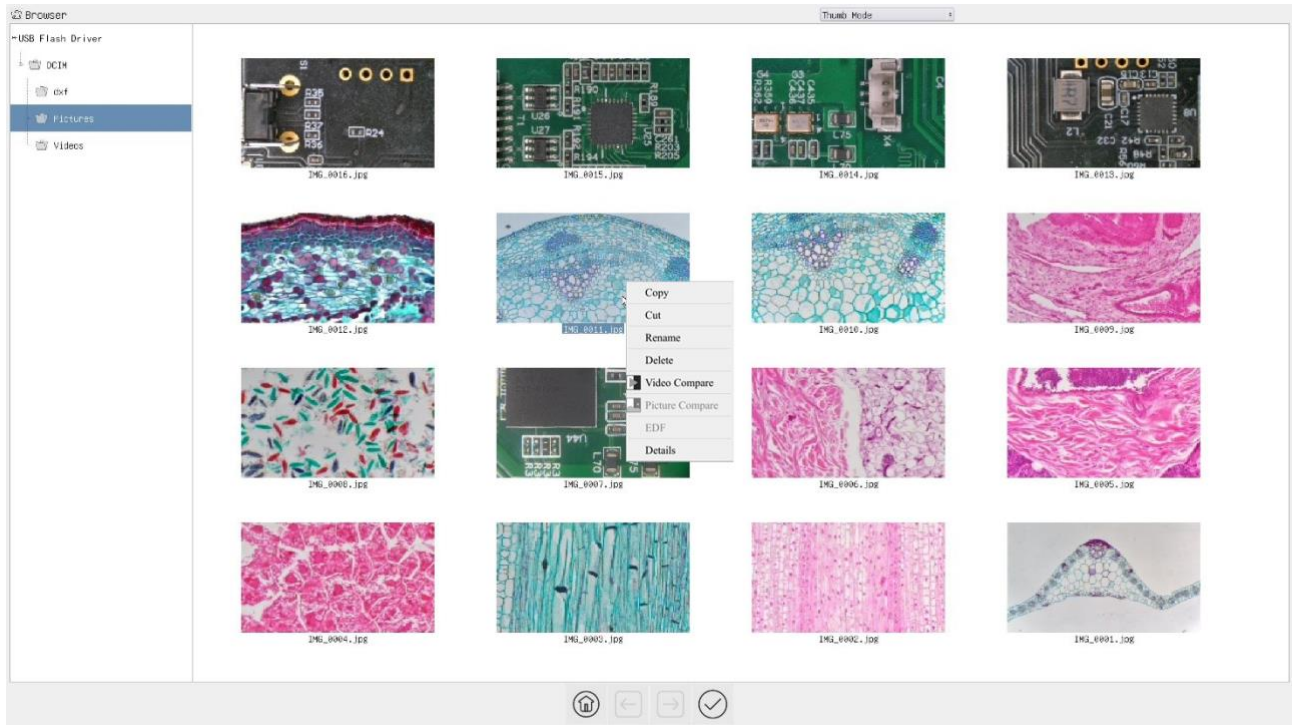
Figure 14 Browsing UI

There are two browsing modes: List mode and Thumb mode. The default is Thumb mode.

Right click on an empty area to create a new folder.

Right click on an image file to Copy, Cut, Rename, Delete, Video Compare, and view detailed information(Details). Clicking on a thumb to select the 1st image, and clicking on another thumb to select the 2nd image (or selecting 2 images with frame), then clicking the right mouse button to bring up the context menu and select Picture Compare to analyze and compare the two images. Clicking on a thumb to select 2~5 (or box select 2~5) pictures focusing on different targets in the same scene, you can perform depth of field compositing on the selected pictures (up to 5 pictures).

Right click on a video file to Copy, Cut, Rename, Delete, Video Compare, and view detailed information(Details).

Figure 15 Image Processing

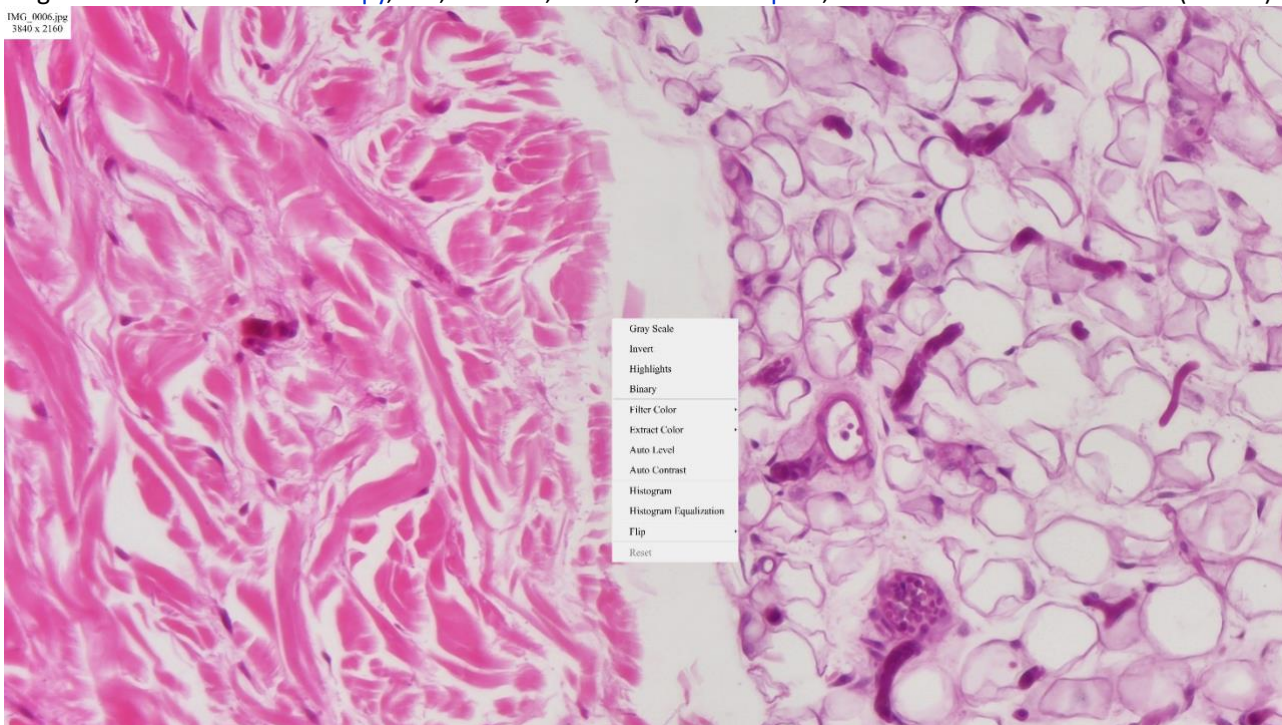Double-click the thumbnail of the picture with the left mouse button to open the picture, and then right-click the picture to Gray Scale , Invert , Highlights , Binary , Filter Color, Extract Color , Auto Level , Auto Contrast , Histogram, Histogram Equalization, Flip, and other image processing functions, and then after the processing is completed, you can choose reset to revert back to the original picture, and also you can choose save or save as in the lower sidebar of the picture. The description of each function is as follows:

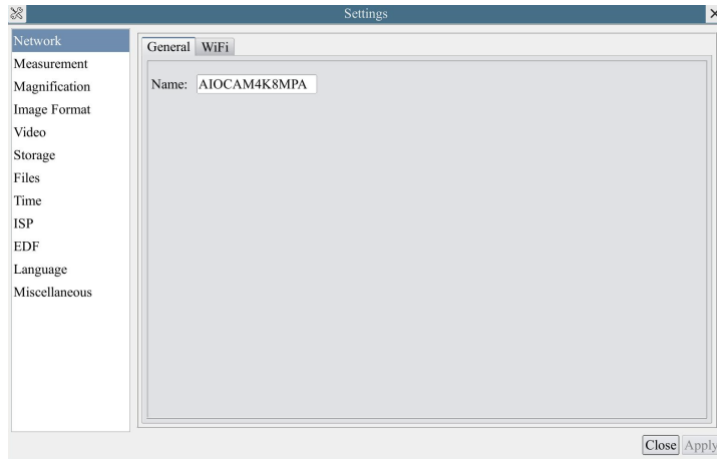|	
Gray Scale	Choose Gray Scale command to convert a color image to a Gray Scale image
Invert	Choose Invert command to reverse the pixel values of the active image
Highlights	Choose Hightlights command to adjust the Hightlight parts of the images
Binary	Binary is a kind of gray level process. If the gray of the pixel is greater than the given threshold, the pixel's color will be changed into white. Otherwise, the pixel's color will be changed into black
Filter Color	Choose Filter Color command to filter a special color channel from a color image. Select either Red, or Green, or Blue color to filter. For every pixel, if select Red color to filter, only information about the Red channel will be discarded, the Green and Blue information will remain there.
Extract Color	Choose Extract Color command to extract a special color channel from a color image. Select either Red or Green, or Blue color to extract.For every pixel, if selecting Red color to extract, only information about the Red channel will be kept, the Green and Blue information will be discarded.
Auto Level	The Auto Level command moves the level's sliders automatically to set highlight and shadow. It defines the lightest and darkest pixels in each color channel as white and black and then redistributes the pixels' color values proportionately
Auto Contrast	The Auto Contrast command automatically adjusts the overall contrastin an RGB image
Histogram	Used to show the distribution of brightness, R, G, B of an image over an image
Histogram Equalization	Used to improved image contrast
Flip	Flip image Horizontally/Vertically

7.4.2   Settings>Network>General

Figure 16 Comprehensive Network General Settings Page

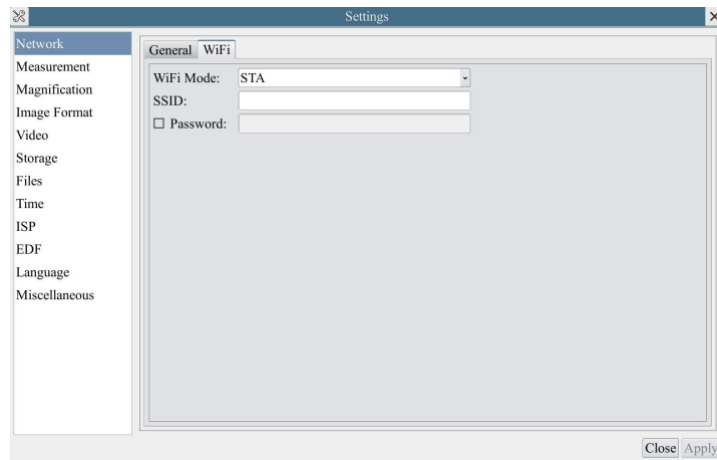| Name	The current camera name recognized as the network name

7.4.3 Settings>Network> WiFi

Figure 17 Network Setup

Wi-Fi Mode	AP/STA mode to select;
Channel/SSID	Channel for the AP mode and SSID for the STA mode. Here, the SSID is the router's SSID;
Password	Camera Password for the AP mode. Router Password for the STA mode

7.4.4 Settings>Measurement

This page is used for the define of the Measurement Object properties.
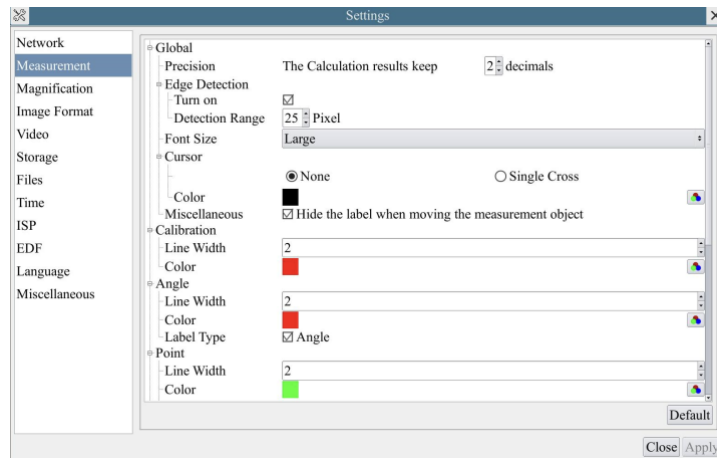
Figure 18 The Measurement Setup

Global	Precision	Used for setting digits behind the decimal point for measurement results;
	Edge Detection	Select whether to enable the automatic edge search function and set the detection range;
	Font Size	The font size of measurement data can be divided into three types: large, Middle, and Small;
	Cursor	Select whether the cursor is a single crosshair and set the color of the single cross;

	Miscellaneous	Whether to hide the label when moving the measurement objects;
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 EndPoint, rectangle means rectangle type of endpoints. It makes alignment more easily;
Point, Angle, Line, Horizontal Line, Vertical Line, Rectangle, Circle, Ellipse, Annulus, Two Circles, Polygon, Curve		
	Left-click the ⊞ along with the Measurement command mentioned above will unfold the corresponding attribute settings to set the individual property of the Measurement Objects.	

7.4.5 Settings>Magnification

This page's items are formed by the Measurement Toolbar's Calibration command.
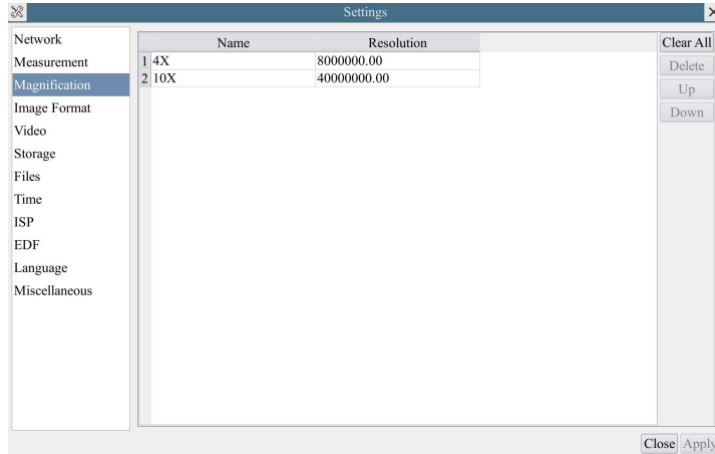

Figure 19 Comprehensive Magnification Settings Page

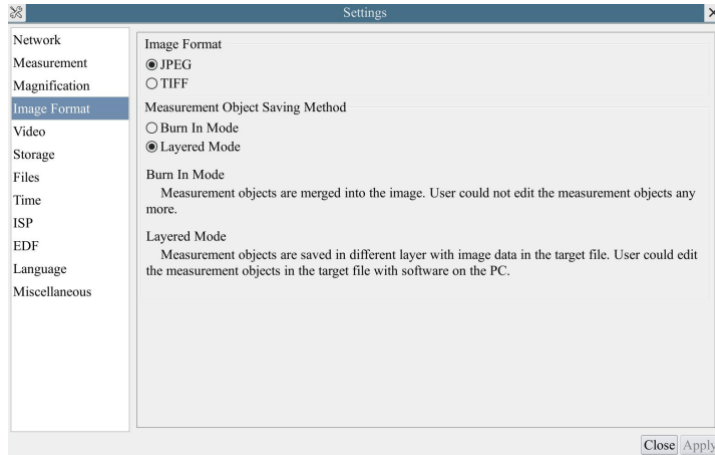| Name	Names such as 10X, 40X, 100X are based on magnification of the microscopes. For continuous zoom microscopes, ensure that the selected magnification coincides with the scale alignment line on the microscope zoom knob; Users could also edit the name of the magnification with other information, for example, microscope mode, users name, etc.
Resolution	Pixels per meter. Image device like microscopes have high Resolution value;
Clear All	Click the Clear All button will clear the calibrated magnifications;
Delete	Click Delete to delete the selected magnification;
Up	Select a row in the magnification and click Move Up to move up the currently selected magnification;
Down	Select a row in the magnification and click Move Down to move up the currently selected magnification;

7.4.6 Settings>Image Format

Figure 20 Comprehensive Image Format Settings Page

| Image Format	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 cannot be edited. TIFF: TIFF is a flexible bitmap format mainly used to store images including photos and artistic images.
Measurement Object Saving Method	Burn in Mode: The measurement objects are merged into the current image. User could not edit the measurement objects any more. This mode is not reversable. 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 reversable.

7.4.7 Settings>Video
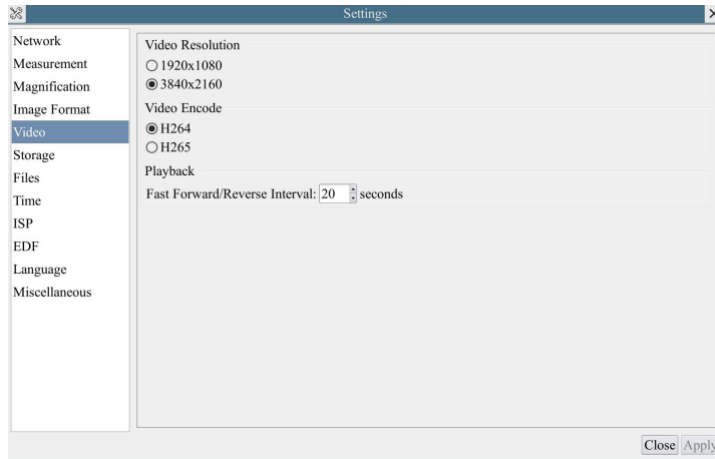
Figure 21 Comprehensive Setting of Video page

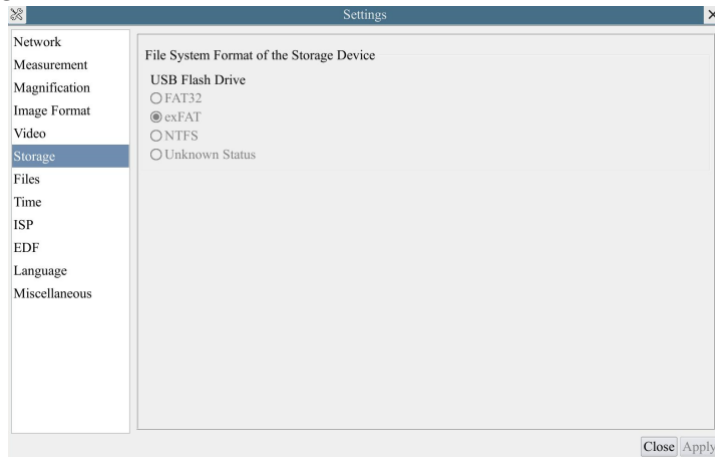| Video Resolution	Select a Video Resolution of 1920x1080 or 3840x2160;
Video Playback	Fast Forward/Reverse internal in second unite for Video Playback
Video Encode	Select the Video Encode format. Can be H264 or H265. Compared with H264, H265 has a higher H265 compression ratio which is primarily used to further reduce the design flow rate, in order to lower the cost of storage and transmission

7.4.8   Settings>Storage

Figure 22 Comprehensive Setting of Storage Page

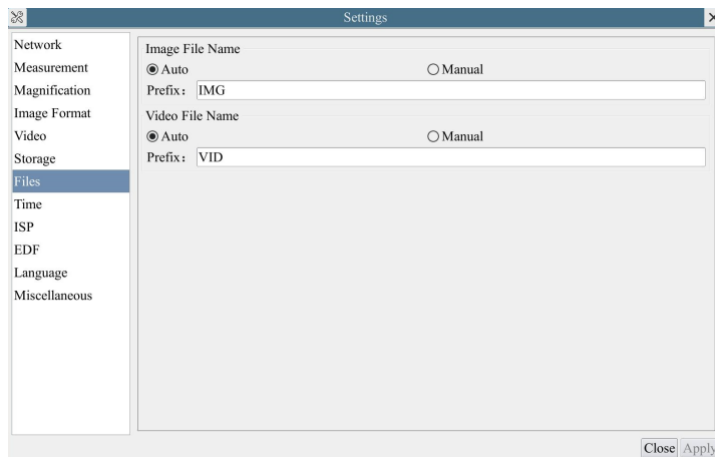| File System Format of the Storage Device	List the file system format of the current storage device FAT32: The file system of USB Flash Drive is FAT32. The maximum video file size of single file in FAT32 file system is 4G Bytes; exFAT: The file system of USB Flash Drive is exFAT. The maximum video file size of single file in FAT32 file system is 16E Bytes; NTFS: The file system of USB Flash Drive is NTFS. The maximum video file size of single file is 2T Bytes. Unknown Status: USB Flash Drive not detected or the file system is not identified;
Note: For USB Flash Drive, USB 3.0 interface is preferred.	

7.4.9   Settings>Files

Figure 23 Comprehensive Setting of Files Name

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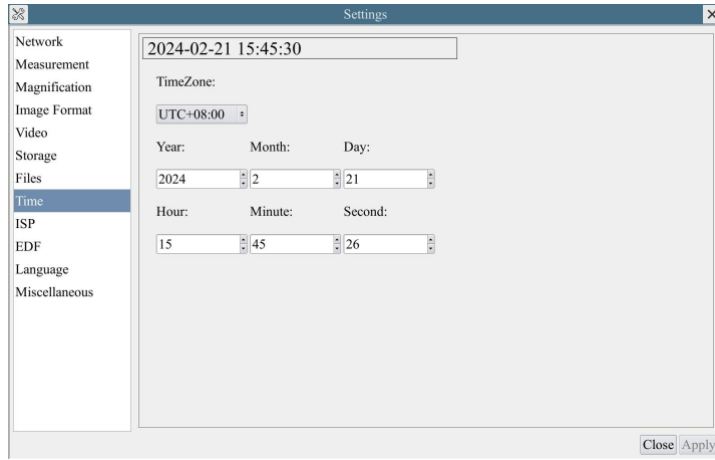| Image or Video File Name Paradigm	Provide Auto or Manual naming paradigm for Image or Video file;
Auto	With specified name as the Prefix and XCamView will add digital after the Prefix for the Image or Video file;
Manual	A file dialog will pop up to enter the Image or Video file name for the captured Image or Video.

7.4.10   Settings>Time

Figure 24 Time Setting

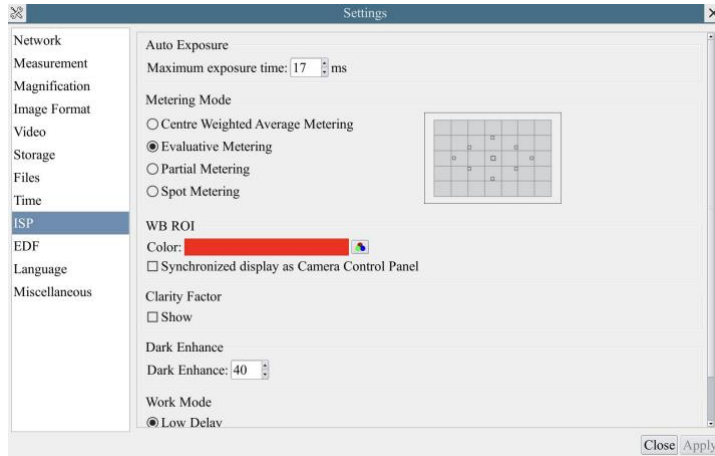| Time	User can set Year, Month, Day, Hour, Minute and Second ital.in this page.

7.4.11   Settings>ISP

Figure 25 Comprehensive Setting of ISP Page

| Auto Exposure	Define the maximum automatic exposure time;
Metering Mode	Select the Metering mode as the Central Weighted Average Metering, Evaluative Metering, Partial Metering, or Spot Metering;
WB ROI Color	Choosing the ROI rectangle line color and whether it is synchronized display as Camera Control Panel;
Clarity Factor	Select to display the clarity factor in the video window, otherwise the clarity factor will not be displayed;
Dark Enhance	Define the intensity value of dark enhancement;
Work Mode	Select the working mode as Low Delay/WDR, and adjust the exposure ratio when selecting the WDR mode; Low Delay: The average delay is 40ms, and the highest frame rate is 60fps; WDR: By synthesizing 2 frames into 1 frame, the dynamic range is improved, and the highest frame rate is 30fps;

7.4.12   Settings>EDF
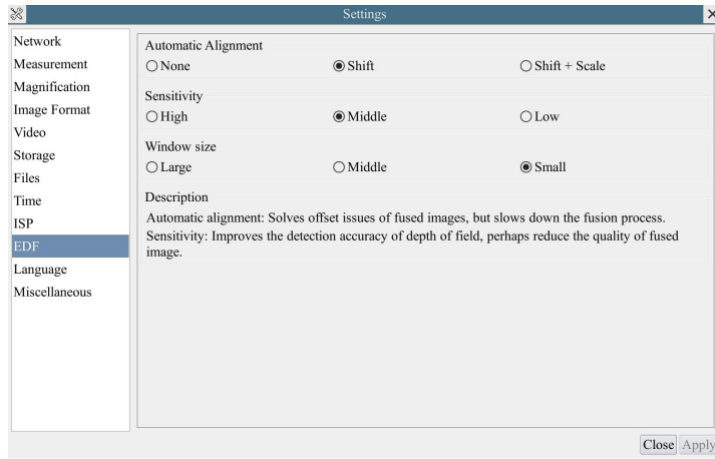
Figure 26 Comprehensive Setting of EDF

Automatic Alignment	Optionally turn on auto-alignment when there is significant displacement or scaling between images;
Sensitivity	Select the sensitivity of EDF;
Window size	Select the window size for displaying real-time images during EDF;
Description	Automatic alignment: Solves offset issues of fused images, but slows down the fusion process. Sensitivity:Improves the detection accuracy of depth of field,perhaps reduce the quality of fused image.

7.4.13　Settings>Language

Figure 27 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;
Spanish	Set language of the whole software into Spanish;
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;
Dutch	Set language of the whole software into Dutch;
Portuguese	Set language of the whole software into Portuguese;

7.4.14　Settings>Miscellaneous
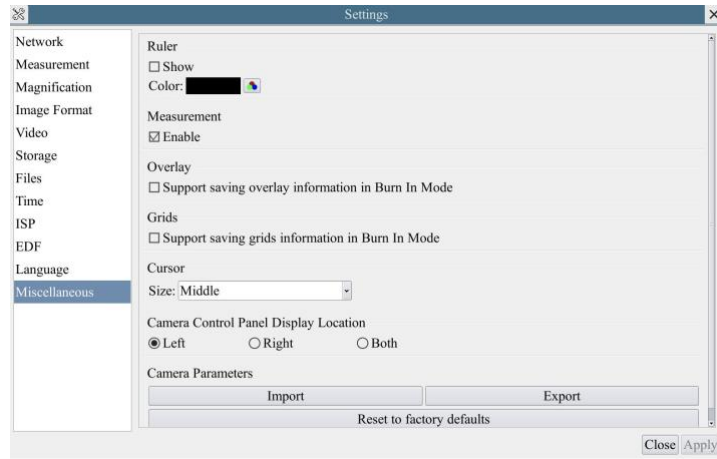
Figure 28 Comprehensive Miscellaneous Settings Page

Ruler	Select to display the ruler in the video window, otherwise not to display the ruler. You can choose the ruler color;
Measurement	Select to display the measurement toolbar in the video window, otherwise not to display the measurement toolbar;
Overlay	Select to support saving graphics overlay information in fusion mode, otherwise it will not support;
Grids	Select to support saving mesh information in fusion mode, otherwise not to support;
Cursor	Choosing the Cursor size according to the screen resolution or personal preference
Camera Control Panel Display Location	Select the camera control panel to display on the left, right, or both sides of the HDMI interface;
Camera Parameters Import	Import the Camera Parameters from the SD Card or USB flash drive to use the previously exported Camera Parameters
Camera Parameters Export	Export the Camera Parameters to the SD Card or USB flash drive to use the previously exported Camera Parameters
Reset to factory defaults	Restore camera parameters to its factory status;

8   Sample Photos Captured with AIOCAM4K Series All-in-One Camera
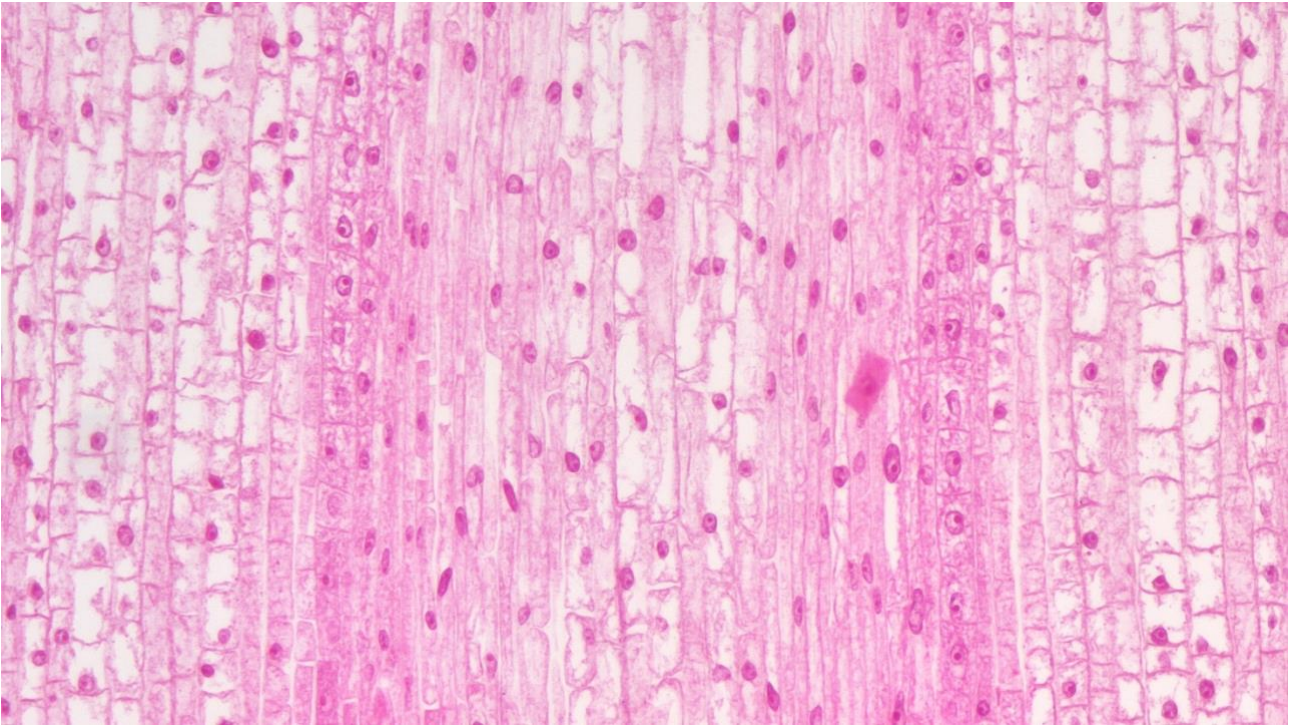

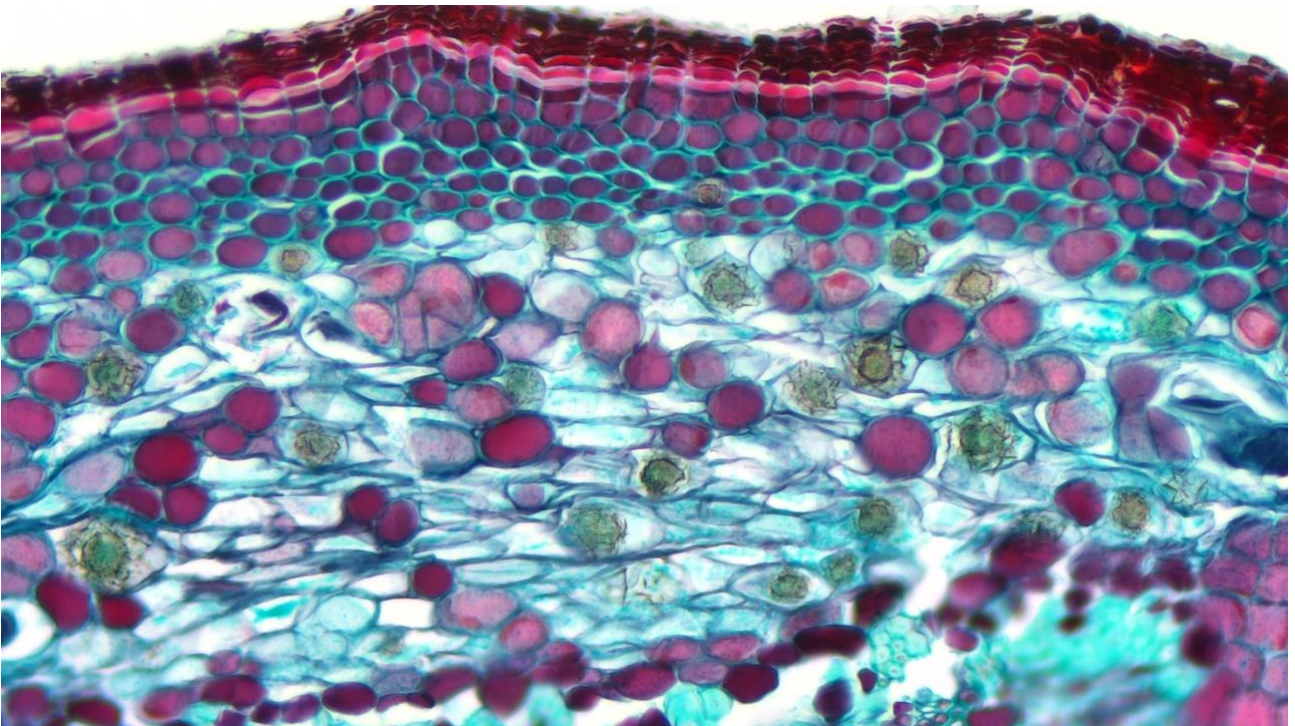Figure 29 Corn Root Tip.L.S Captured with AIOCAM4K8MPA

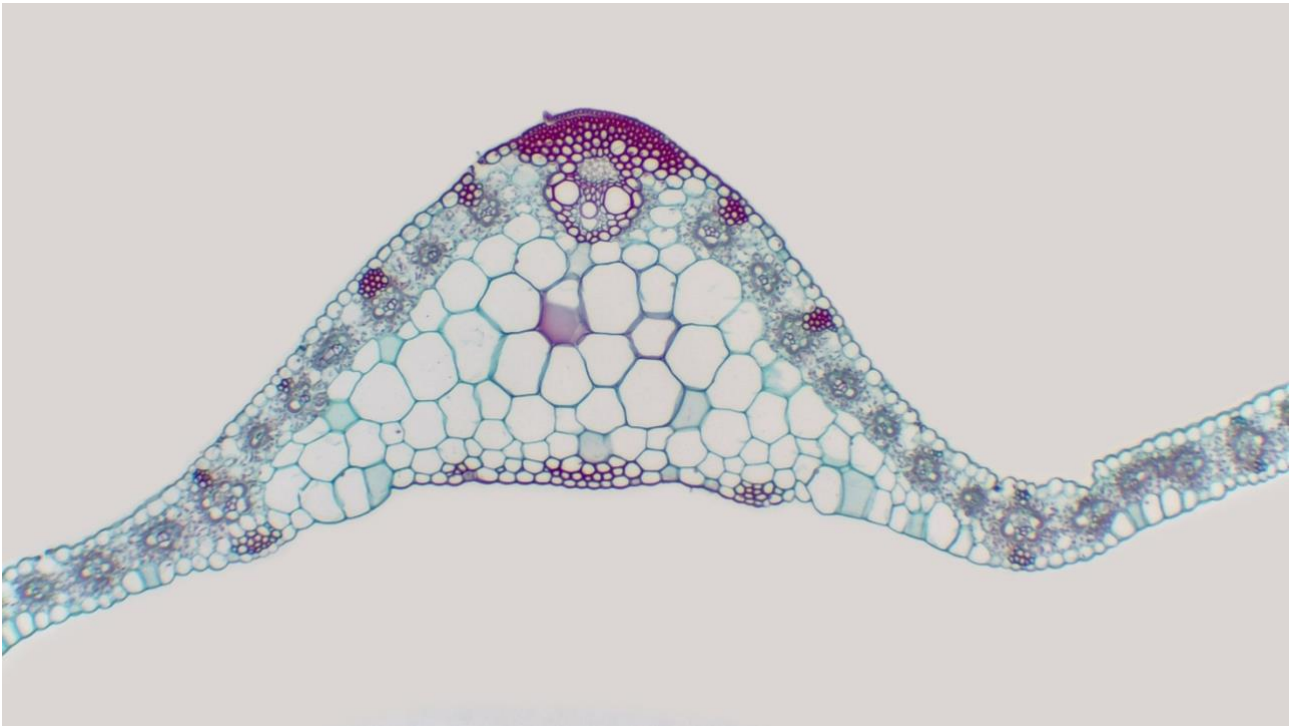Figure 30 Three Year Tilia Stem.C.S Captured with AIOCAM4K8MPA

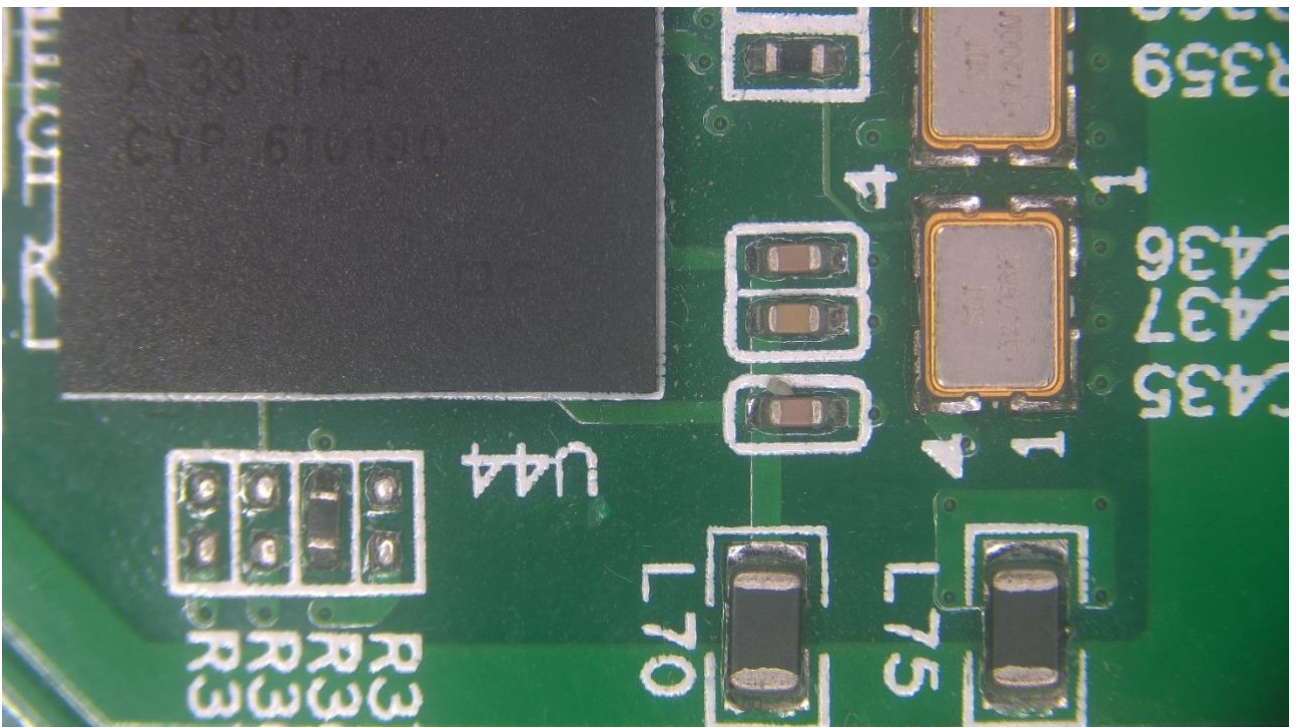Figure 31 Corn Leaf Captured with AIOCAM4K8MPA

Figure 32 Circuit Board Captured with AIOCAM4K8MPA

9 Contacting Customer Service

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