AFDM434 Electric Controlled Continuous Zoom and Autofocus Digital Microscope

Contents

1 The Basic Characteristic of AFDM Series

AFDM is a series of electric controlled continuous zoom and autofocus all-in-one digital microscope with a large field of view by ToupTek Photonics. It is integrated with HDMI camera, Electric Controlled Continuous Zoom Auto-focus Objective. AFDM is the abbreviation of Auto-focus Digital Microscope. Different products in the AFDM series can be formed with different parts to satisfy the application requirement.

AFDM can be assembled with various brackets or arms and offer a continuous zooming ratio with different lens. AFDM also supports autofocus mode and manual focus mode.

AFDM comes with a high-performance SONY CMOS sensor. It also has an embedded ARM core, allowing the camera to be connected directly to the HDMI monitor. The camera has XCamView software built within it, including Camera Control Panel, Auto Focus Control Panel, Measurement Toolbar, and Synthesis Camera Control Toolbar. Users can directly control the camera and perform various operations through a USB mouse. The images and videos captured by AFDM can be saved on a USB flash drive for on-site analysis and follow-up research.

AFDM can be widely used in industrial inspection, medical observation, teaching and scientific research, automation system, and other fields.

AFDM434 supports HDMI/NETWORK/USB control and video output (ToupView). The frame rate of the output is 4K/30FPS, and the focal length range is 5.1mm~91.9mm. It also supports electric zoom and auto focusing.

AFDM434 supports handset, enabling electric zoom, autofocus, manual focus, and image flip functions to meet remote adjustment and snap control requirements.

Figure 1 AFDM434's Front and Back View and Remote Controller

Figure 2 AFDM434's Side and Front View

1.1 The Module Specifications of AFDM Series Product

1.1.1 AFDM Camera Module Datasheet

Order Code	Sensor & Size(mm)	Pixel(μm)	G Sensitivity/ Dark Signal	Sensor Output (FPS/Resolution)	Binning	Exposure(ms)
H4KPA	Sony IMX715(C) 1/2.8"(5.57x3.13)	1.45x1.45	348mv with 1/30s 0.13 with 1/30s	30@3840*2160	1x1	0.04~1000

Order Code	Video Saving (FPS/Resolution)	HDMI2.0 (FPS/Resolution)	USB3.0 (FPS/Resolution)	NETWORK (FPS/Resolution)
H4KPA	30@3840*2160	30@3840*2160 30@1920*1080	30@3840*2160 30@2688*1512 30@1920*1080	30@1920*1080

1.1.2 AFDM Lens Module Datasheet

Order Code	Working Distance (mm)	Focal Length Range (mm)	Distortion (TV) Obj=0.3m		Projection Resolution				FOV@260 (mm)		FOV@1000 (mm)	
			Wide	Tele	Wide (d=0.3m)		Tele (d=0.3m)		1X (mm)	18X (mm)	1X (mm)	18X (mm)
					Center	0.8 Field	Center	0.8 Field				
EMZO-18XA-1000	260~1000	5.1~91.9	-1.54%	-0.05%	240lp/mm	200lp/mm	200lp/mm	170lp/mm	332*181	37.5*26	1235*684	115*65

1X and 18X are magnification values defined based on the focal length range, used only to indicate the relative relationship between the minimum and maximum focal lengths. Here, the normalized values are: 1X = 5.1 mm; 18X = 91.9 mm.

1.2 AFDM434 Characteristic and Specification

The AFDM434 comes with H4KPA HDMI camera, EMZO-18XA-1000 lens;

1.2.1 The Basic Characteristic of AFDM434

- 5 groups 11 elements 14 lenses EMZO with 5.1mm~91.9mm focal length range, supports auto and manual focus
- Working distance with 260~1000mm depth of field
- Sony IMX715 1/2.8” 4K Starvis CMOS with high signal-to-noise ratio
- 4K HDMI/NETWORK/USB multiple video outputs
- 4K/1080P auto switching according to monitor resolution
- USB flash drive for captured image and video storage, support local preview and playback
- Supports handset for snap, video recording, autofocus, and image flip operations.
- Built-in mouse control software XCamView, all functions can be realized with USB mouse
- Embedded mouse Camera Control Panel, Measurement Toolbar, Synthesis Control Toolbar, AF Control Panel
- Excellent ISP with local tone mapping and 3D denoising
- ToupView/ToupLite software for PC
- iOS/Android applications for smart phones or tablets

- With the adapter bracket of 76mm diameter, an electric controlled continuous zoom AFDM can be built

1.2.2 Specification of AFDM434

Interface & Button Functions		
	USB Mouse	USB mouse for XCamView control
	USB2.0	Connect USB flash drive to save pictures and videos Connect 5G WiFi module to transfer video wirelessly in real time with ToupView/ToupLite
	HDMI	Comply with HDMI1.4 standard. 4K/1080P format video output and supporting automatic switch between 4K and 1080P format according to the connected monitors
	USB Video	Connect PC or other host device to realize video image transmission with ToupView/ToupLite
	LAN	LAN port to connect router and switch to transfer video with ToupView/ToupLite
	LED	Power LED indicator
	DC12V1A	DC12V1A power input

XCamView Software Functions	
UI Operation	With USB mouse to operate on the embedded XCamView
Image Capture	8M (3840*2160) JPEG/TIFF image in USB flash drive
Video Record	Video format：8M （3840*2160）H264encoded MP4 file Maximum Video saving frame rate:30fps
Camera Control Panel	Including Exposure, Gain, White Balance, Sharpness, Denoise, Denoise, Saturation, Gamma, Contrast, Brightness, Power Frequency control
Measurement Toolbar	The measurement tool is for reference only and should not be used as an actual measurement standard.
Synthesis Control Toolbar	Including software Zoom, Horizontal/ Vertical Flip, Color Conversion, Freeze, Grids, Overlay, Auto-focus, Compare Image, Browser, Setting, Version Check function
Auto Focus Control Panel	Including Focal Length, Auto Focus, One Push, Manual Focus, Reset, and other functions

Software ToupView/ToupLite Environment under USB/NETWORK 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)/ToupView OSx(Mac OS X)/ToupLite Linux/ToupLite
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 Centigrade)	-10~ 50
Storage Temperature (in Centigrade)	-20~ 60
Operating Humidity	30~80%RH
Storage Humidity	10~60%RH

Power Supply	DC 12V/1A or above Adapter
Dimension	
Length x Width x Height	80mm x 80mm x 118mm
Shipping Weight	0.75kg

1.2.3 Dimension of AFDM434

Figure 3 Dimension of AFDM434

1.2.4 Dimension of Handset

Figure 4 Dimension of Handset

1.2.5 Packing Information of AFDM434

Figure 5 Packing Information of AFDM434

Standard Packing List	
A	Gift box: L:220cm W:220cm H:110cm (1pcs, 2.0kg/box)
B	AFDM434
C	HDMI Cable
D	USB Mouse
E	Power Adapter: Input: AC 100~240V 50Hz/60Hz, Output: DC 12V 1A American standard: Model: POWER-U-12V1A(MSA-C1000IC12.0-12W-US): UL/CE/FCC European standard: Model: POWER-E-12V1A(MSA-C10001C12.0-12W-DE): UL/CE/FCC British Standard: Model: POWER-UK-12V1A(NGE12I12-P1J)
F	USB2.0 A male to A male gold-plated connectors cable /2.0m
G	Handset
Optional Accessory	
H	USB WiFi adapter
I	Ethernet cable
J	USB flash drive

2 Installation and Operation of AFDM Series Product

Before use, please install the AFDM series product on an adaptive bracket.

1.Plug HDMI cable into the HDMI port to connect AFDM and HDMI monitor;

2.Plug a USB mouse into USB Mouse port, to get control of the AFDM by using built-in software XCamView;

3.Plug DC12V1A power adapter into DC12V1A port, to supply power for the AFDM, the AFDM camera starts automatically, and the LED indicator changes from red to blue.;

4.Insert USB flash drive into USB2.0 port for saving captured images and recorded videos;

5.Move mouse to the left side of the video window, the Camera Control Panel will appear. It includes Manual/Automatic Exposure, White Balance, Sharpness, Denoise, and other functions, please refer to section 6.2 for details;

6.Move mouse to the upper side of the video window, the Measurement Toolbar will appear. Only measurements of lines, angles, rectangles, circles, etc. are for reference viewing and should not be used as actual measurement data, please refer to section 6.3 for detail;

7.Move mouse to the bottom side of the video window, the Synthesis Camera Control Toolbar will appear. Operations like Zoom In, Zoom Out, Flip, Color Conversion, Freeze, Grids, Overlay, Autofocus, Compare Image, USB flash drive contents browsing, Settings, and Camera Version can be executed. See section 6.4 for details;

8.Move mouse to the bottom side of the video window, the Synthesis Camera Control Toolbar will pop up automatically. Click AF button, and Auto Focus Control Panel will show up for autofocus operation, it supports 5.1mm~91.9mm focal length range, Autofocus, Manual Focus, Reset, and One Push operation. See section 6.5 for details.

3 Images Captured with AFDM434

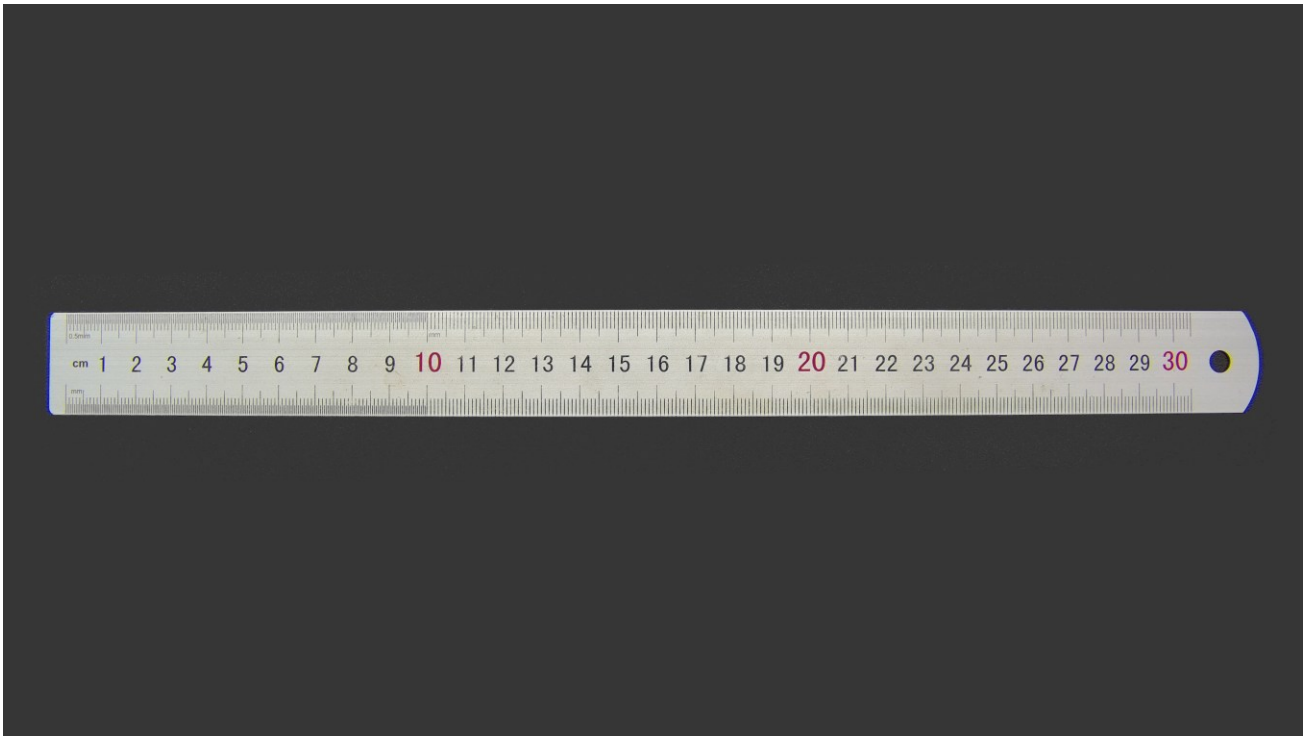


Figure 6 Ruler Captured with AFDM434

Figure 7 Flowers Captured with AFDM434

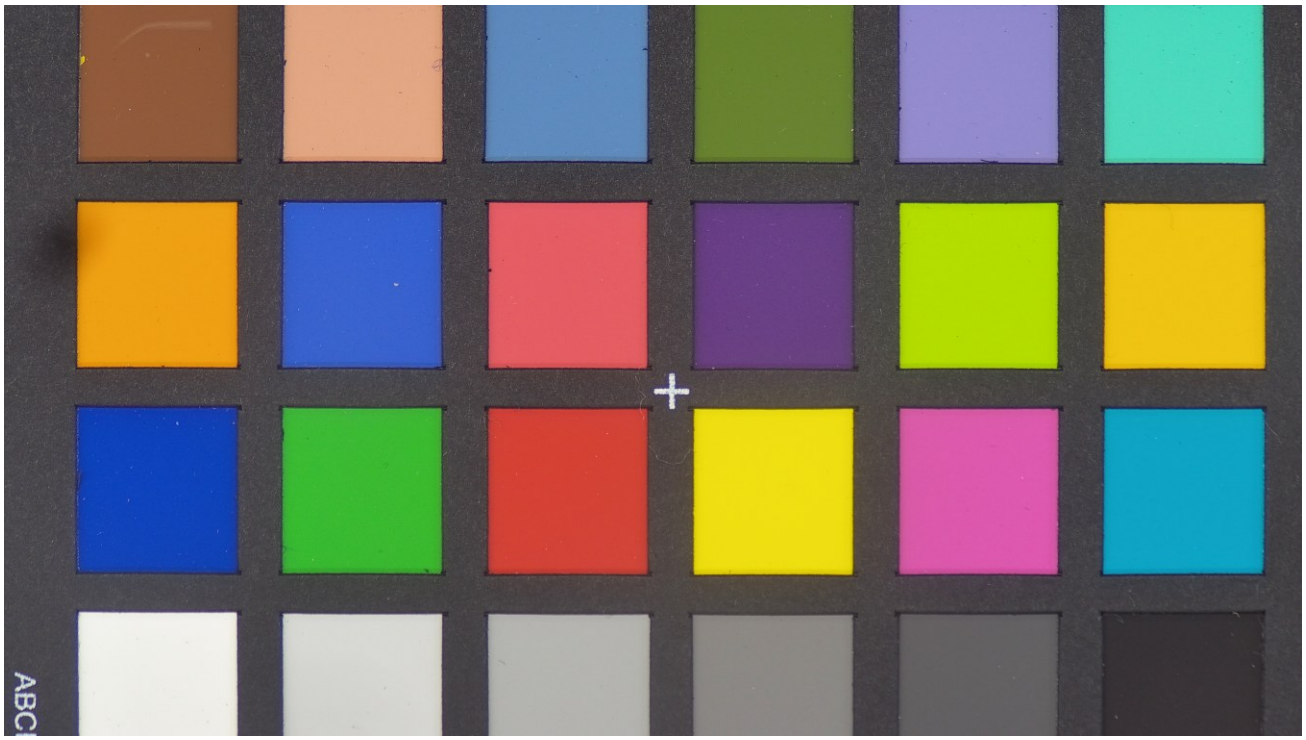


Figure 8 24-Color Chart Captured with AFDM434

Figure 9 Lavender Captured with AFDM434

4 Software and App

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

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

macOS: https://www.touptekphotonics.com/download/?category=macOS

Linux: https://www.touptekphotonics.com/download/?category=Linux

Android: https://www.touptekphotonics.com/download/?category=Android

iOS: https://www.touptekphotonics.com/download/?category=iOS

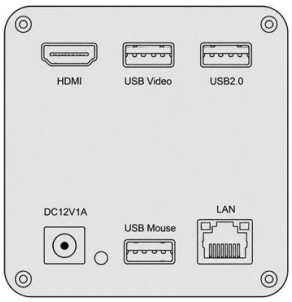
5 AFDM434 Camera Configurations

You can use the AFDM434 camera in 5 different ways. Each connection requires different hardware configurations.

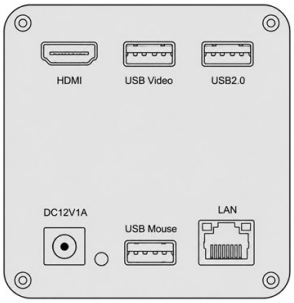
5.1 Camera Working Standalone with Built-in XCamView Software

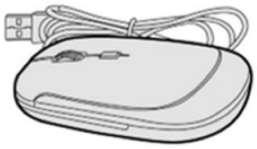
For this application, apart from the microscope, you only need an HDMI monitor, USB flash drive, the supplied USB mouse, and the camera embedded with XCamView software. The steps to start the camera are listed as below:

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

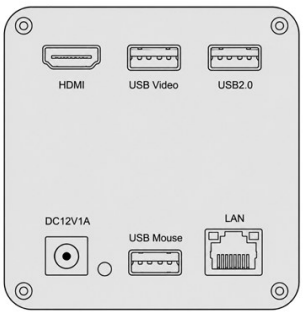


- Insert the supplied USB mouse to the camera's USB port;

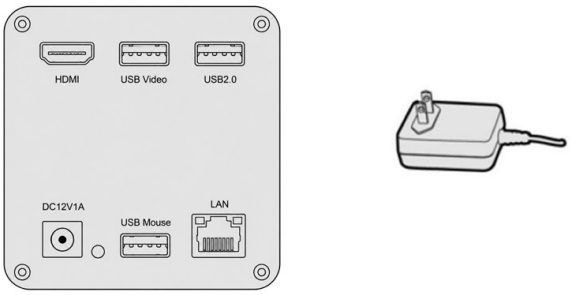




- Insert the supplied USB flash drive (USB2.0 slot) into the AFDM434 camera USB2.0 slot;



- Connect the camera to the power adapter and it will turn on automatically;



- Turn on the monitor and view the video in the XCamView software. Move the mouse to the left, top or bottom of the XCamView UI, different control panels or toolbar will pop up and users could operate with the mouse at ease.

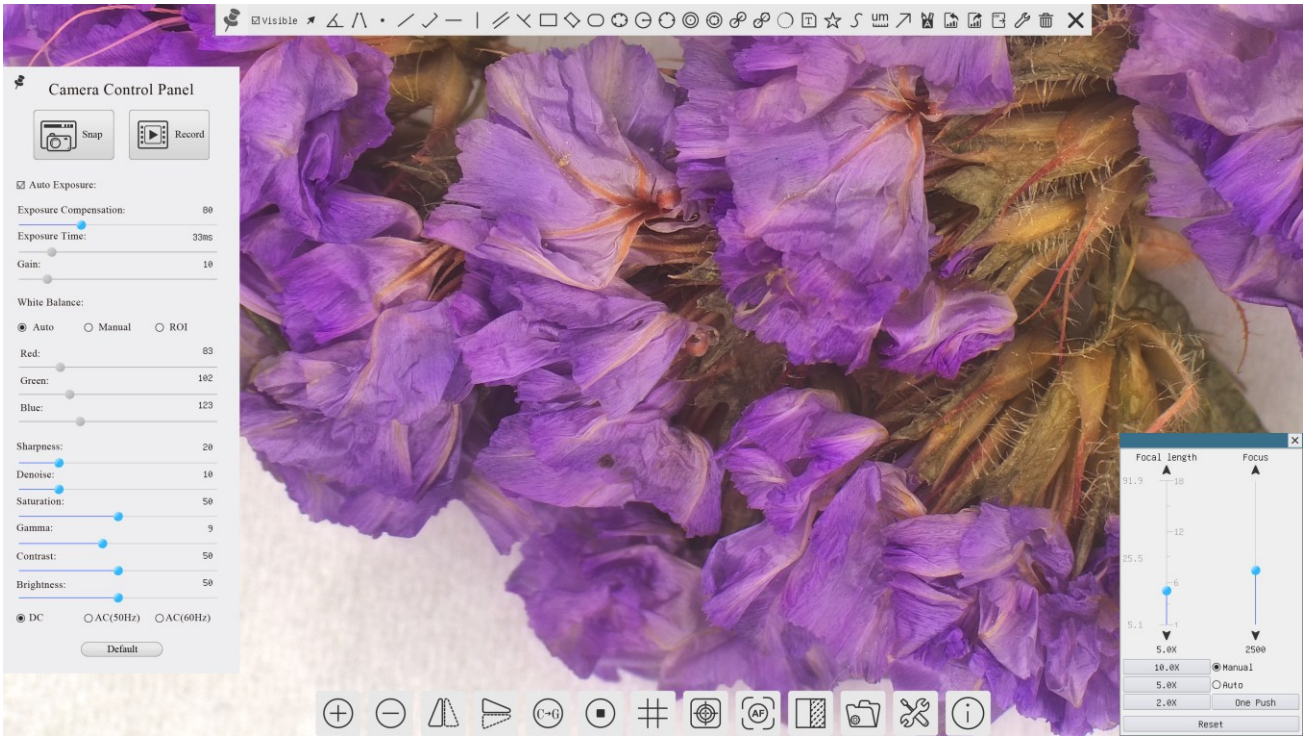


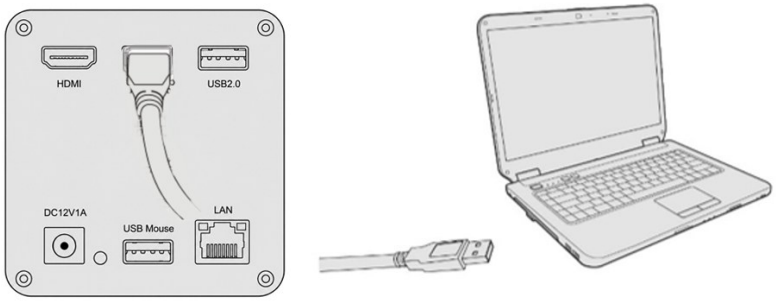
Figure 10 XCamView and AFDM434 Camera in HDMI Mode

5.2 Connecting Camera to Computers with USB2.0 Port

For Windows users (Windows 8/10/11 (32/64 bit)), please use ToupView.

For macOS and Linux users (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. 5.1. After the camera is running, connect camera to computer with USB cable. Please use "USB Video" slot, not "USB Mouse" slot as shown below.
- 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 n to start the live video as shown in Figure 11.



- After the USB cable is connected, the mouse will not work. If you want to use the mouse for HDMI application (XCamView), please unplug the USB cable to activate it.

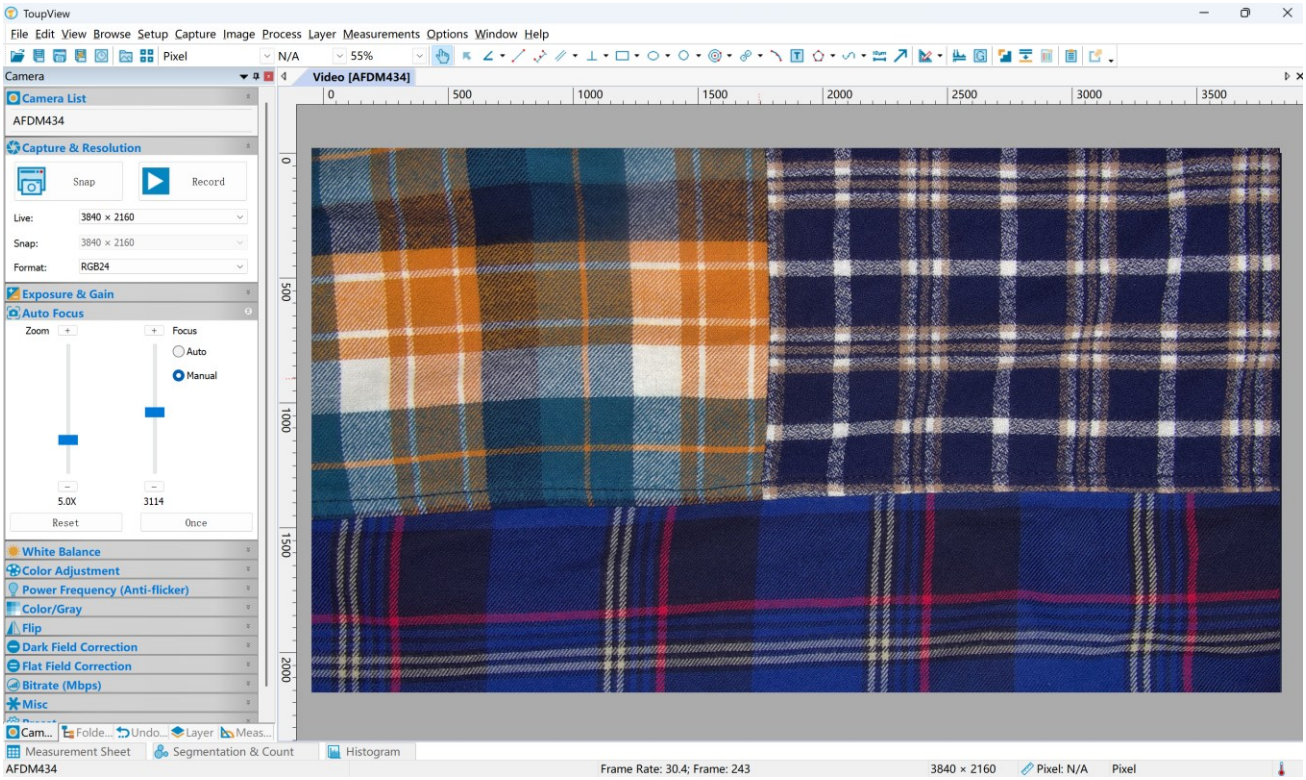


Figure 11 ToupView and AFDM434 Camera in USB Mode

5.3 Camera Working in WiFi Mode (AP Mode)

Please make sure your PC is WiFi enabled.

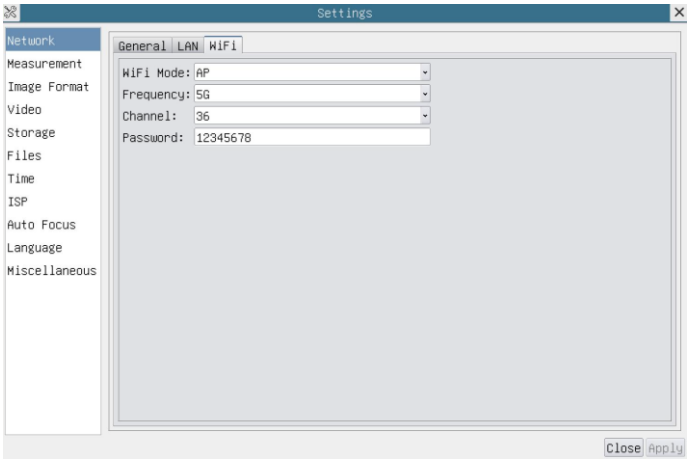
For Windows user (Windows 8/10/10/11 (32/64 bit)), please use ToupView.

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.

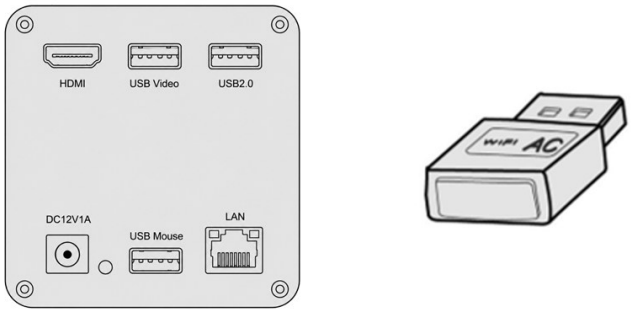
The steps to start the camera are listed below:

Start the camera according to Sec. 5.1. After the camera is running, move the mouse to the bottom of the GUI

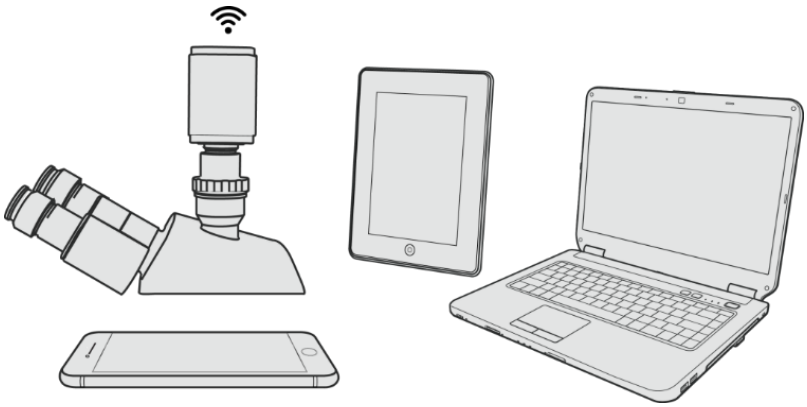
and clicking the button on the Synthesis Camera Control Toolbar at the bottom of the video window, a small window called Settings will pop up as shown below. Click Network>WiFi property page and choose the AP in the Wi-Fi Mode edit box(The factory default configuration is AP mode).



Plug the USB WiFi adapter into the camera's USB2 .0 port;



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

AFDM434 cameras will be automatically recognized. The live image of each camera is shown in Figure 12. For the display, the Camera List tool window is used in ToupView/ToupLite software, and the Camera Thumbnail is used in ToupView App.

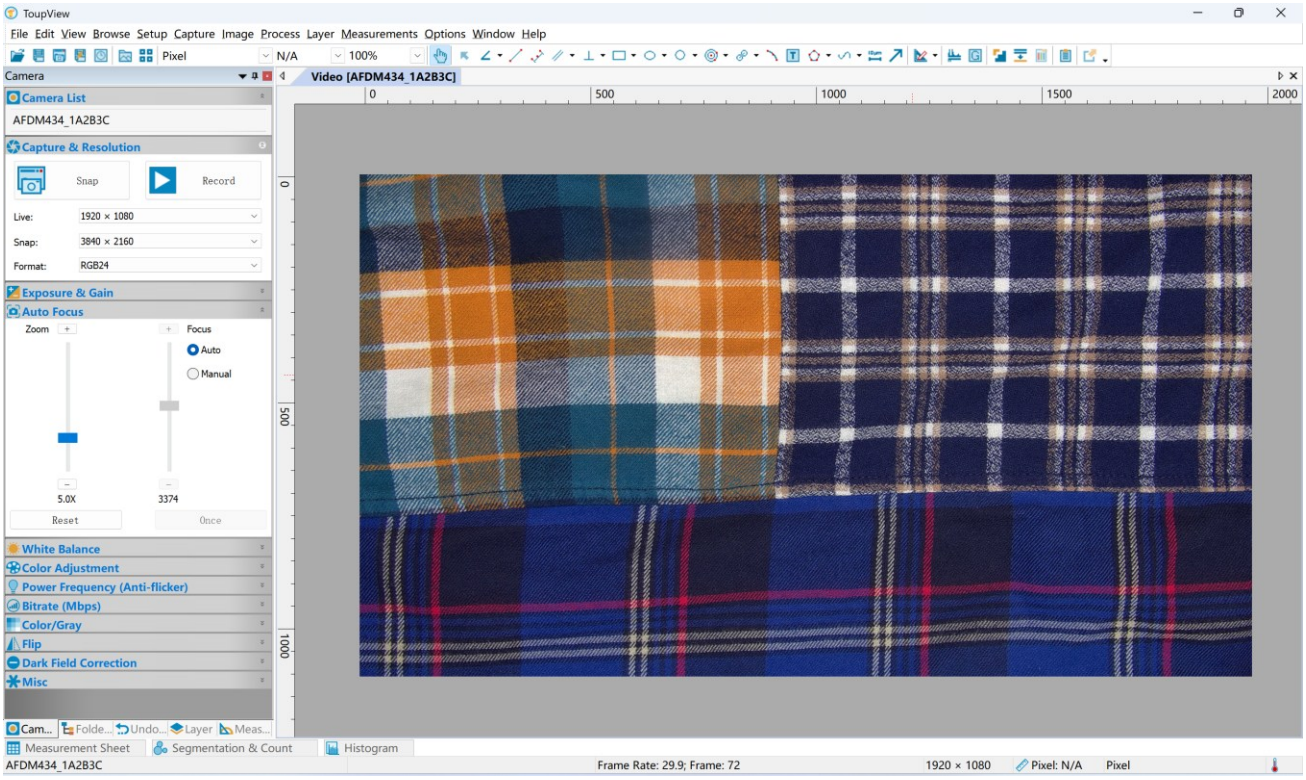


Figure 12 ToupView and AFDM434 Camera in WiFi AP Mode

5.4 Connecting Camera to The PC with LAN Port

This application uses the camera as the network camera. Users must configure the IP of the camera and PC manually and ensure their IP addresses are in the same net. The subnet mask and gateway of the camera and PC must be the same.

Start the camera according to Sec. 5.1 after the camera is running, clicking  button on the Synthesis Camera Control Toolbar at the bottom of the video window(See Figure 10), a small window called Settings will pop up as shown below on the left side, clicking LAN property page, uncheck the DHCP item. Input IP Address, Subnet Mask and Default Gateway for the camera. Designate Internet Protocol Version 4 (TCP/IPv4) Settings page's IP address on the PC with similar configuration as shown below on the right side but with different IP address.

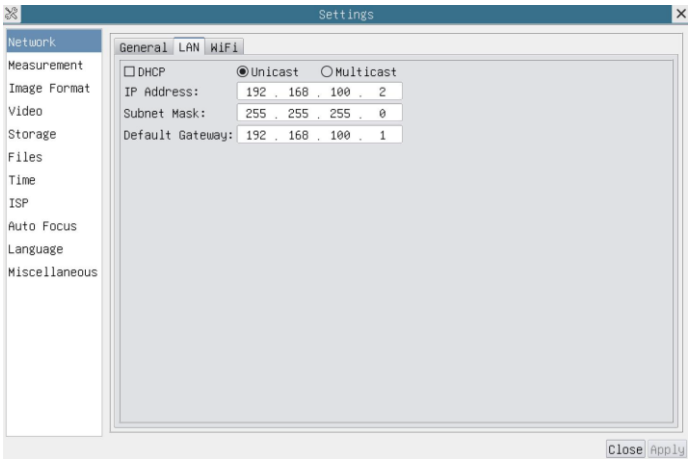


Figure 13 Configure theAFDM434 Camera IP

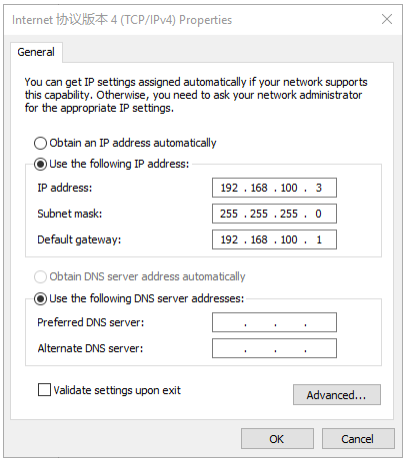
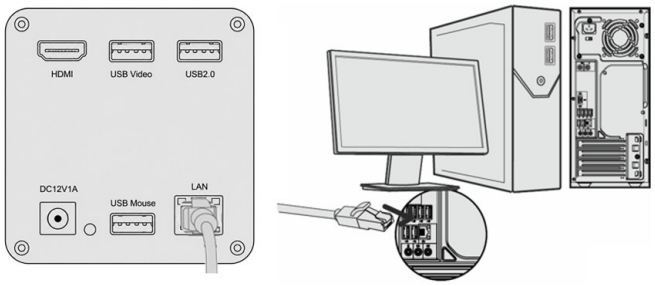


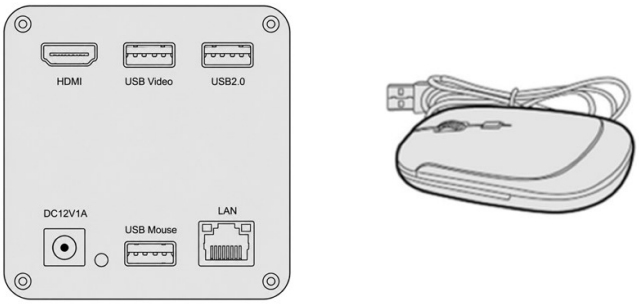
Figure 14 Configure the PC's IP

After the above configurations are finished, user can connect the AFDM434 camera to the computer through the Ethernet cable as shown below:

Connect the LAN port with the Ethernet cable to the PC's network port;



Insert the supplied USB flash drive (USB2.0 slot) into the AFDM434 camera's USB2.0 slot;

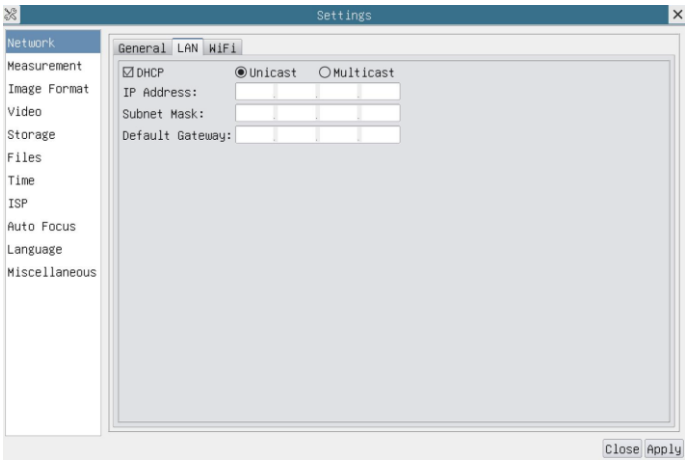


Install ToupView/ToupLite on your PC or install ToupView App on the mobile device; Run the software ToupView/ToupLite, clicking the camera name in the camera list starts the live video as shown in Figure 12.

5.5 Connecting Multi-Cameras to the Router Through the LAN Port/WiFi STA Mode for The Network Application

In LAN/WiFi STA mode, the camera connects to the router by LAN port/WiFi STA mode. If a router with

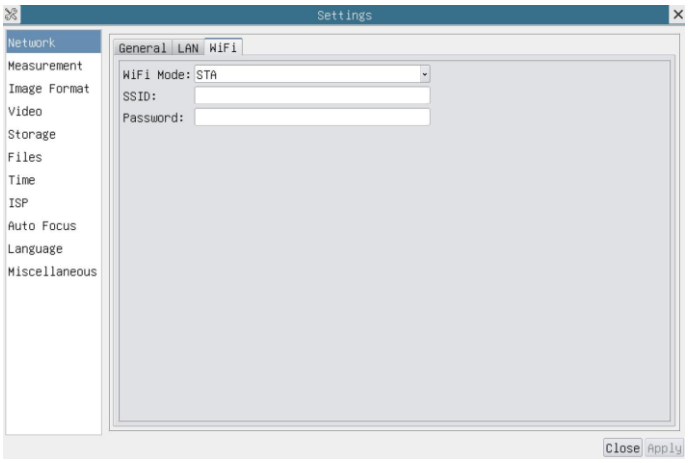
LAN/WiFi capability is used, users could connect the router with Ethernet cable/WiFi to control the camera.



The connection and configuration are just the same as in Sec.5.1. But here, users need to check DHCP. If Multicast is disabled or is not supported, users should only select Unicast. If Multicast is supported by the network, users could select Multicast to achieve a better performance, especially in the case that multi-users connecting to the same camera. In addition, please guarantee that the broadcasting function is enabled in the network.

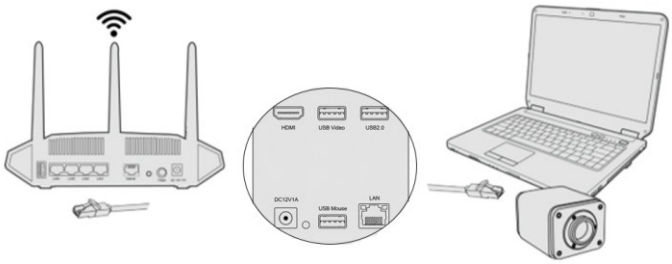
Active AFDM434 camera is recognized by ToupView/ToupLite software or ToupView App and they are displayed as a camera list or thumbnail in the software or app as shown in Figure 11.

Or start the camera according to Sec. 5.1. 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 Wi-Fi Mode edit box(The factory default configuration is AP mode). Input the to be connected router's SSID and Password as shown below:

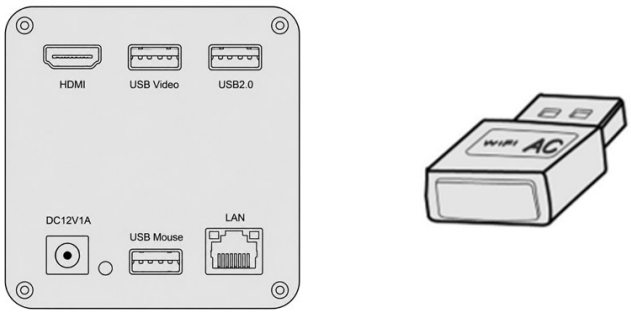


Install ToupView /ToupLite software on your PC. Alternatively, install the free ToupView App on the mobile device;

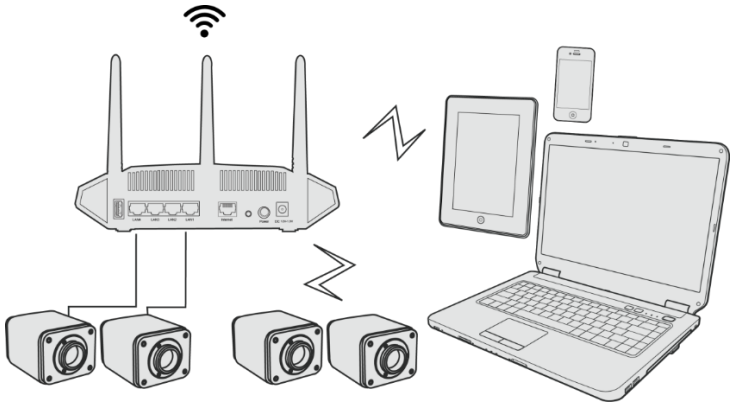
Plug the Ethernet cable into the camera's LAN port and the other end to the PC (for those connected to router with WiFi STA mode);



Or plug the USB WiFi adapter into the camera's USB2.0 port(for those connected to router with WiFi STA mode);



Finally, as shown below, 2 AFDM434 cameras are connected to the router with LAN cable and 2 AFDM434 cameras are connected to the same router with WiFi STA mode (The number of the cameras, the connection mode (LAN or WiFi STA)) connected to the router 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 AFDM434 cameras are automatically recognized. The live image of each camera is displayed. For the display, Camera List control panel window is used in ToupView/ToupLite software, and Camera Thumbnail is used in ToupView App; Select the AFDM434 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 15)

About the routers/switches

It is suggested that routers/switches supporting 802.11ac 5G segment should be selected to achieve better wireless connection experience.

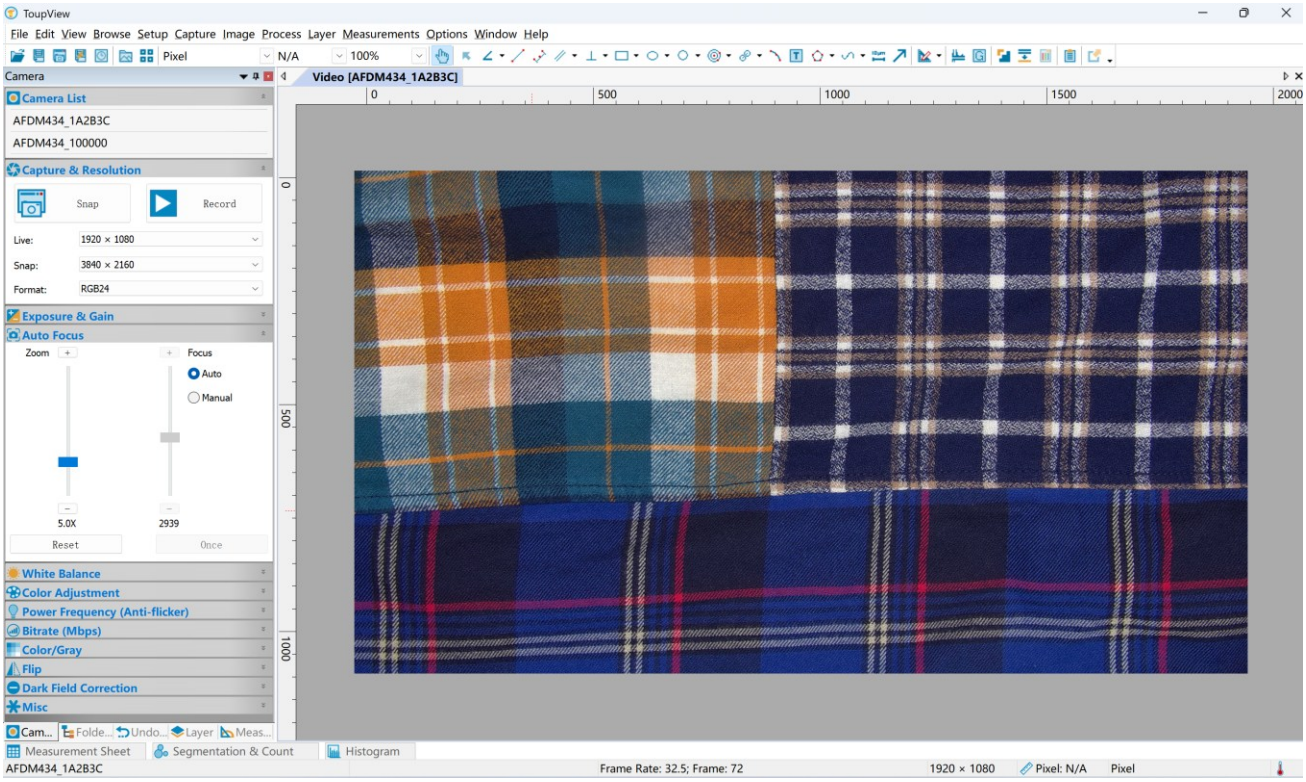


Figure 15 ToupView and AFDM434 camera in LAN port/WiFi STA mode

6 Introduction of XCamView UI and Functions

6.1 Control UI

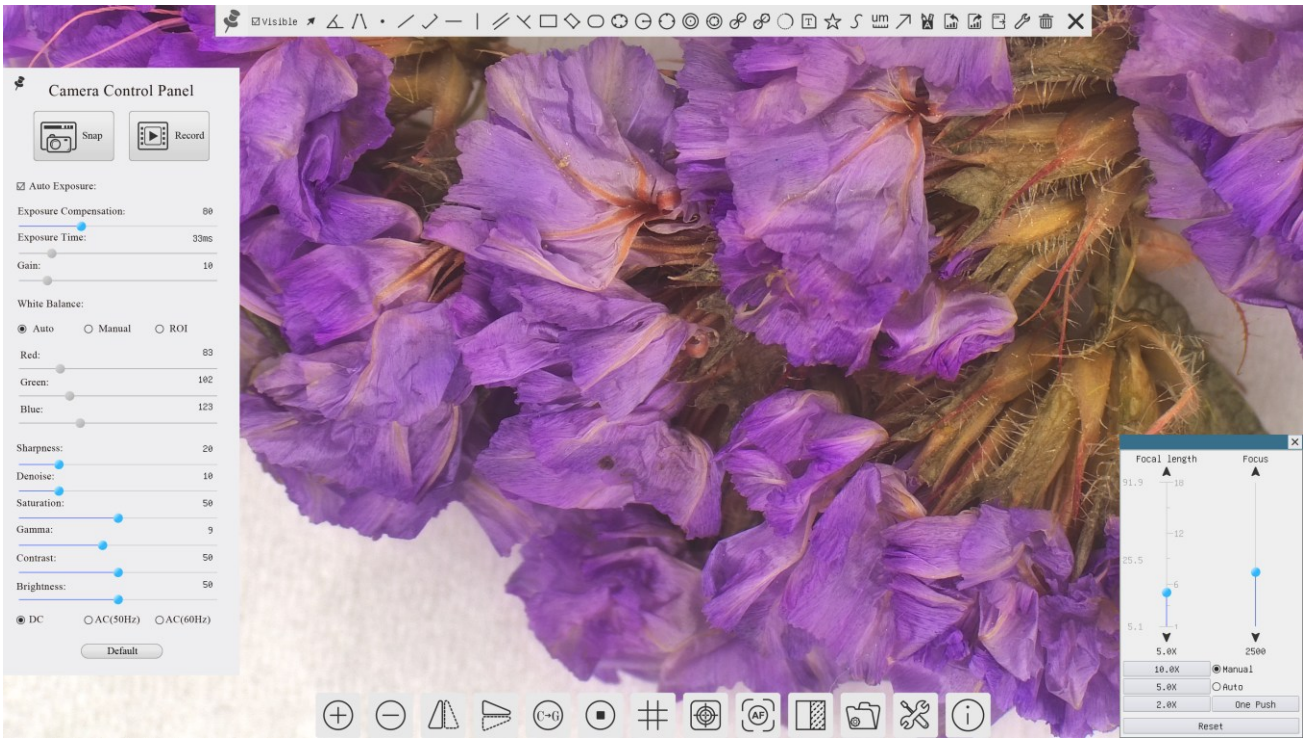
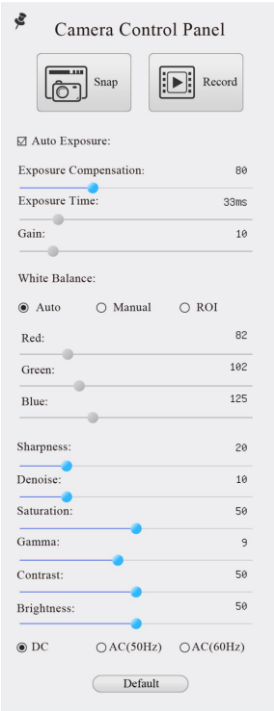


Figure 16 XCamView and Its Control UI

AFDM 's XCamView software operation UI is shown in Figure 16. It includes Camera Control Panel on the left side of the video window, Measurement Toolbar on the top of the video window, Synthesis Camera Control Toolbar, and Autofocus Control Panel on the right side of the video window.

Software Toolbar / Control Bar / Control Panel	
1	Move the mouse to the left side of the video window, the Camera Control Panel will pop up automatically;
2	Move the mouse to the bottom of the video window, the Synthesis Camera Control Toolbar will pop up automatically;
3	Move the mouse to the bottom of the video window, the Synthesis Camera Control Toolbar will pop up automatically. Click the button and the Auto Focus Control Panel will appear for autofocus operation;
4	Move the mouse to the upper side of the video window, the Measurement Toolbar will pop up. The measurement toolbar is for reference only and should not be used as an actual measurement standard. When the 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 user moves mouse to the left side of the video windows. Only when the user left clicks the button on the Measurement Toolbar to exit from the measuring procedure will he be able to do other operations on Camera Control Panel, Autofocus Control Panel, or 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 objects.

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

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 current video brightness to achieve proper video brightness
	Exposure Time	Available when Auto Exposure is unchecked. Slide to left or right to decrease or increase the exposure time to adjust the video brightness
	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
	Sharpness	Adjust Sharpness level of the video window
	Denoise	Adjust Denoise level of the video window
	Saturation	Adjust Saturation level of the video window
	Gamma	Adjust Gamma level of the video. Slide to the right to increase the gamma value and to the left to decrease the gamma value.
	Contrast	Adjust Contrast level of the video. Slide to the right side to increase and to the left to decrease video contrast
	Brightness	Adjust Brightness level of the video. Slide to the right side to increase Brightness and to the left to decrease Brightness.
	DC	For DC illumination, there will be no fluctuation under the light source so no need for compensating light flickering
	AC (50HZ)	Check AC (50HZ) to eliminate flickering “strap” caused by 50Hz illumination
	AC (60HZ)	Check AC (60HZ) to eliminate flickering “strap” caused by 60Hz illumination
	Default	Set all the settings in the Camera Control Panel to the default values.

The Camera Control Panel controls the camera to achieve the best image quality according to the specific applications; It will pop up automatically when the mouse is moved to the left side of the video window (in measurement status, the Camera Control Panel will not pop up. Only when the measurement process is terminated will the Camera Control Panel pop up by moving mouse to the left side of the video window). Left-clicking button to achieve Display/ Auto Hide switch of the Camera Control Panel;

6.3 The Measurement Toolbar on the Upper Side of the Video Window

6.3.1 Introduction to Measurement Toolbar

The Measurement Toolbar will pop up when moving the mouse to any place near the upper side of the video window. The measurement tool is for reference only and should not be used as an actual measurement standard. Here

is the introduction of the various functions on the Measurement Toolbar:

Icon	Function	Icon	Function
	Float/ Fix switch of the Measurement Toolbar	Visible	Define measuring object in Show up/ Hide mode
	Object Selection		Angle
	Four Point Angle		Point
	Arbitrary Line		Three Point Line
	Horizontal Line		Vertical Line
	Parallel Line		Three Point Vertical
	Rectangle		3 Points Rectangle
	Ellipse		5 Points Ellipse
	Center + Radius Circle		Three-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
	Auto Measurement: Two Points Parallel, Circle Detect, Annulus Detect, Rectangle Detect, Polygon		
	Import		Export
	Export the measurement information to CSV file(*.csv)		
	Delete all the Measurement Objects		
	Setting		Exit from Current Measurement Mode
	When the measurement ends, left click on a single measuring object and the Object Location & Properties Control Bar will show up. The icons on the control bar mean Move Left, Move Right, Move Up, Move Down, Color Adjustment, and Delete.		

Note:1) When the 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 side of the video window. Only when users left-click the button on the Measurement Toolbar to exit from the measurement mode will they be able to perform other operations in the Camera Control Panel, the Autofocus Control Panel, or the Synthesis Camera Control Toolbar.

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

6.4 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 Conversion		Video Freeze
	Grids		Overlay
	Auto Focus Control Panel		Compare Image
	Browse Images Videos		Settings
	Check the Version of XCamView		

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

6.4.1 Settings>Network

6.4.1.1 Settings>Network>General

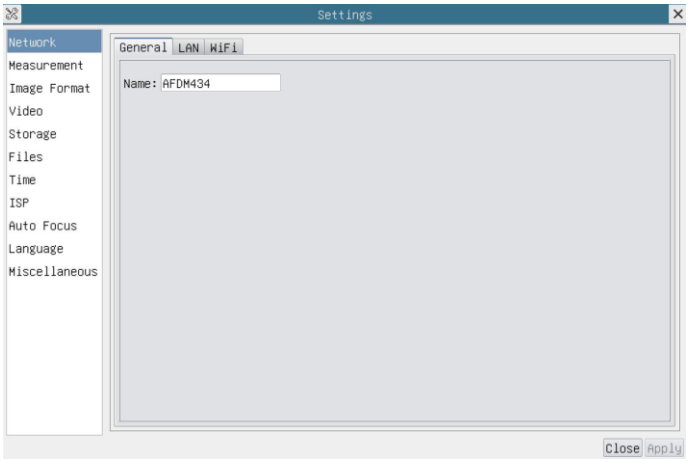


Figure 17 Comprehensive Network General Settings Page

Name	The current camera name recognized as the network name

6.4.1.2 Settings>Network>LAN

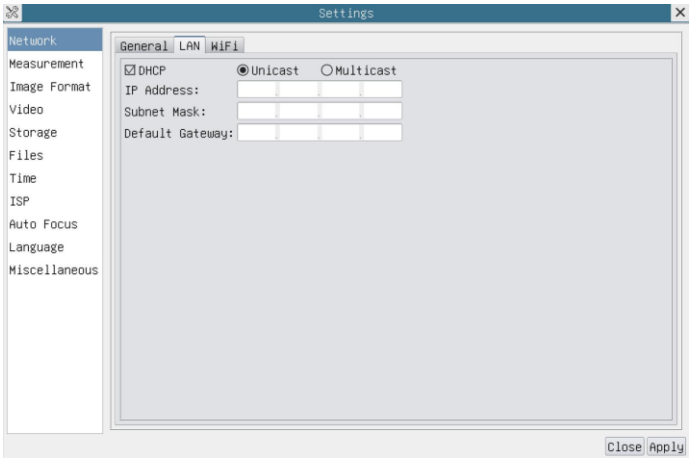


Figure 18 Comprehensive Network LAN Settings Page

DHCP	Dynamic host control protocol allows DHCP server to automatically assign IP information to the camera. Only in Sec 5.4 LAN networking should this item be checked, so that cameras can automatically get IP information from routers/switches to facilitate networking operation;
Unicast/Multicast	By default, unicast function is used. Only in Sec 5.5 networking environment, when the router/switch has multicast function, camera can switch to multicast mode, which can save the network bandwidth consumed by the camera and facilitate the connection of more cameras in the same network;
IP Address	Every machine on a network has a unique identifier. Just as you would address a letter to send in the mail, computers use the unique identifier to send data to specific computers on a network. Most networks today, including all computers on the Internet, use the TCP/IP protocol as the standard for how to communicate on the network. In the TCP/IP protocol, the unique identifier for a computer is called IP address. There are two standards for IP address: IP Version 4 (IPv4) and IP Version 6 (IPv6). All computers with IP addresses have an IPv4 address, and many are starting to use the new IPv6 address system as well. Users must manually configure their IP addresses on the camera side and computer side. The IP addresses set on the camera side and computer side should be in the same network segment. The specific settings are shown. It's usually a private address. Private address is a non-registered address used exclusively within an organization. The internal private addresses retained are listed below: Class A 10.0.0-10.255.255; Class B 172.16.0-172.31.255.255; Class C 192.168.0-192.168.255.255. The suggested IP address is Class C.
Subnet Mask	Subnet Mask is used to distinguish network domain from host domain in 32-bit IP address;
Default Gateway	A default gateway allows computers on a network to communicate with computers on another network. Without it, the network is isolated from the outside. Basically, computers send data that is bound for other networks (one that does not belong to its local IP range) through the default gateway; Network administrators configure the computer's routing capability with an IP range's starting address as the default gateway and point all clients to that IP address.

Uncheck the DHCP and select the Unicast item, users still need to set the IP address, Subnet mask and Default Gateway as shown below:

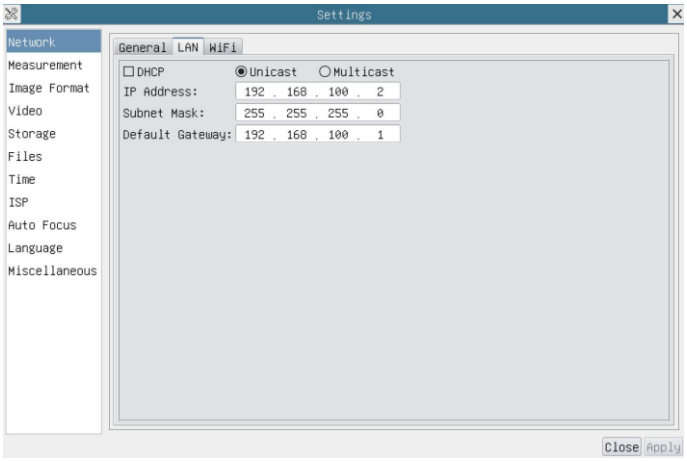


Figure 19 Manual DHCP and Unicast

Uncheck the DHCP and select the Multicast item, users still need to set the IP address, Subnet Mask and Default Gateway as shown below:

6.4.1.3 Settings>Network>WiFi

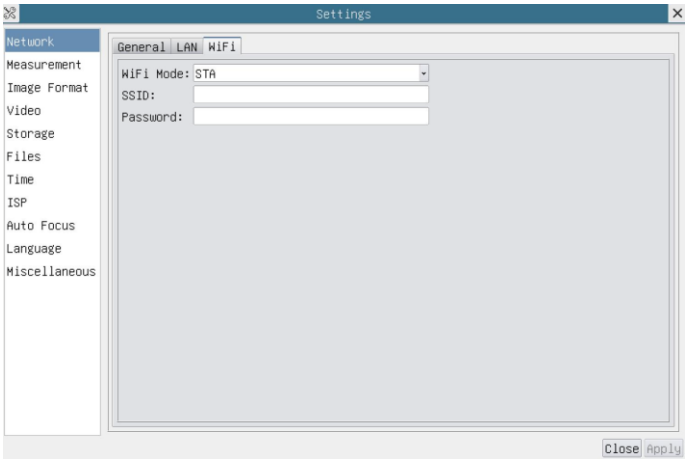


Figure 20 Network Setup

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;

6.4.2 Settings>Measurement

This page is used for the definition of the Measurement Object properties.

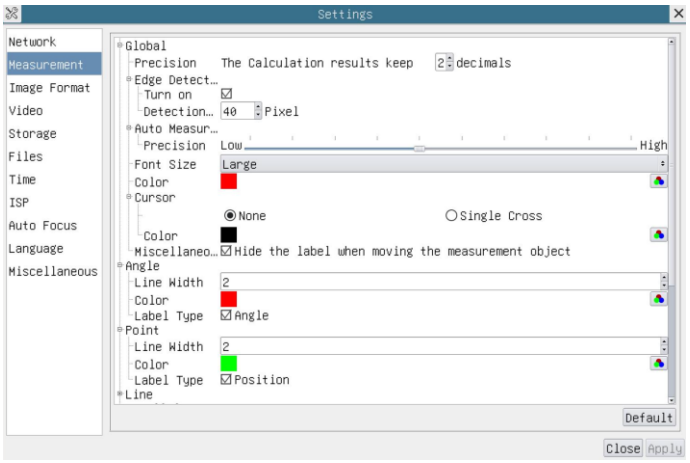


Figure 21 The Measurement Setup

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;
	Auto Measurement	Used for defining the level of accuracy used for auto measurement;
	Fort 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;
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.	

6.4.3 Settings>Image Format

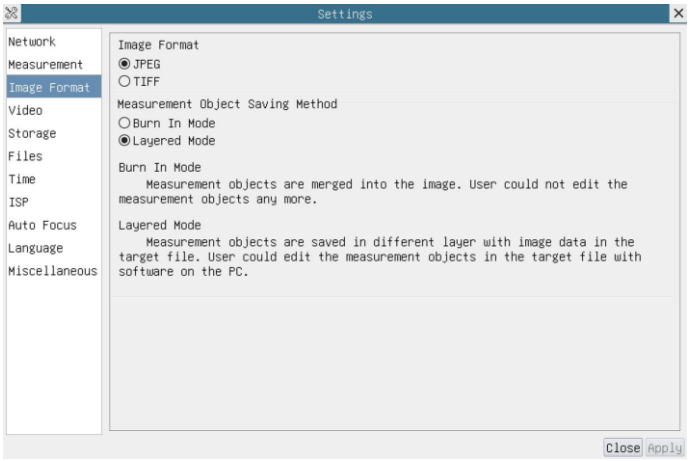


Figure 22 Comprehensive Image Format Settings Page

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. Users could not edit the measurement objects anymore. This mode is not reversable. Layered Mode: The measurement objects are saved in different layer with current image data in the target file. Users could edit the measurement objects in the target file with some software on the PC. This mode is reversable.

6.4.4 Settings>Video

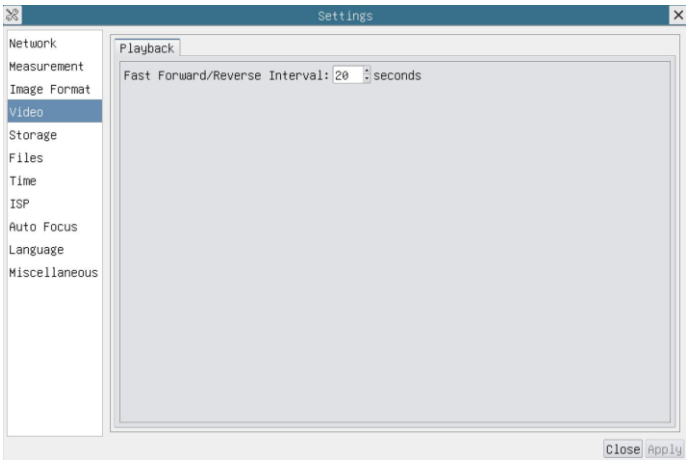


Figure 23 Comprehensive Setting of Video page

Video Playback	Fast Forward/Reverse internal in second unit for Video Playback;

6.4.5 Settings>Storage

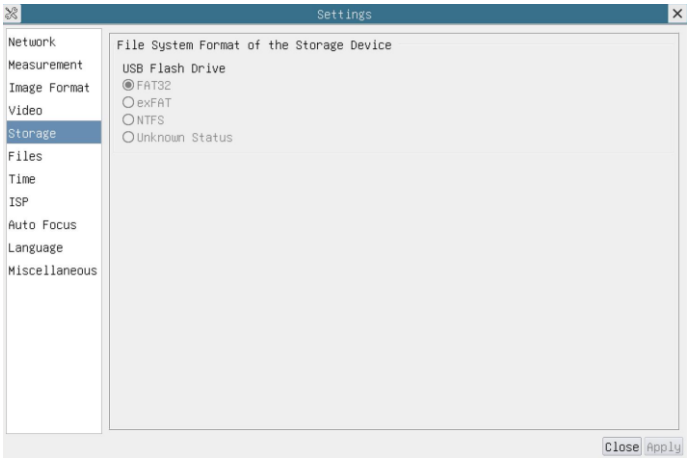


Figure 24 Comprehensive Setting of Storage Page

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.	

6.4.6 Settings>Files

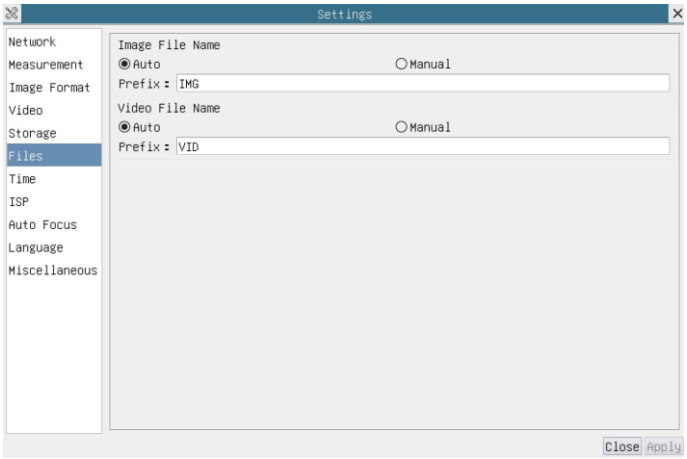


Figure 25 Comprehensive Setting of Files Name

Image/Video File Name	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.

6.4.7 Settings>Time

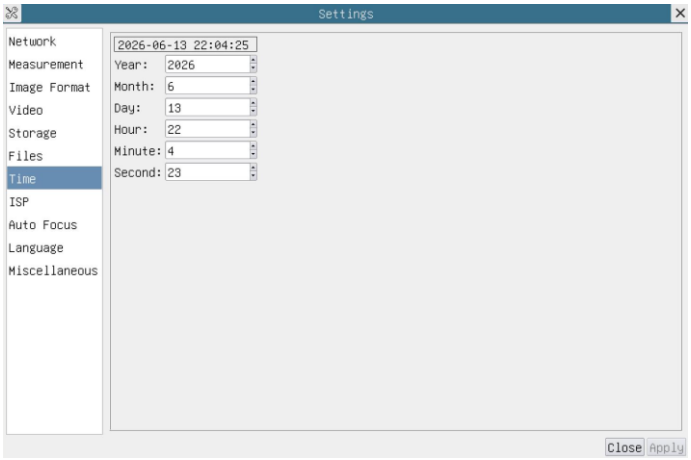


Figure 26 Time Setting

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

6.4.8 Settings>ISP

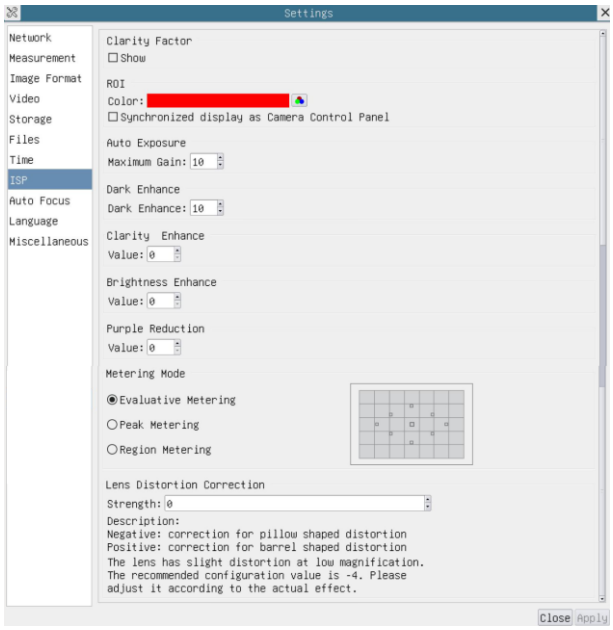


Figure 27 Comprehensive Setting of ISP Setting Page

Clarity Factor	Check this will show the Clarity Factor on the video window screen to tell if the camera is focused correctly or not;
ROI Color	Choosing the ROI rectangle line color;
Auto Exposure	Define Maximum Exposure Gain;
Dark Enhance	Define the intensity value for dark enhancement;
Clarity Enhance	Define the intensity value of Clarity Enhance;
Bringhtness Enhance	Define the intensity value of Bringhtness Enhance;
Purple Reduction	Define the intensity value of Purple Reduction edges;

Metering Mode	Select the Metering mode as the Evaluative Metering, Peak Metering or Region Metering; Peak Metering Mode: Provides metering intensity configuration, default is 8; The larger the value, the stronger the overexposure inhibition
Lens Distortion Correction	Define the strength value for lens distortion correction Description: Negative: correction for pillow shaped distortion Positive: correction for barrel shaped distortion The lens has slight distortion at low magnification; the recommended configuration value is -4. Please adjust it according to the actual effect.

6.4.9 Settings>Auto Focus

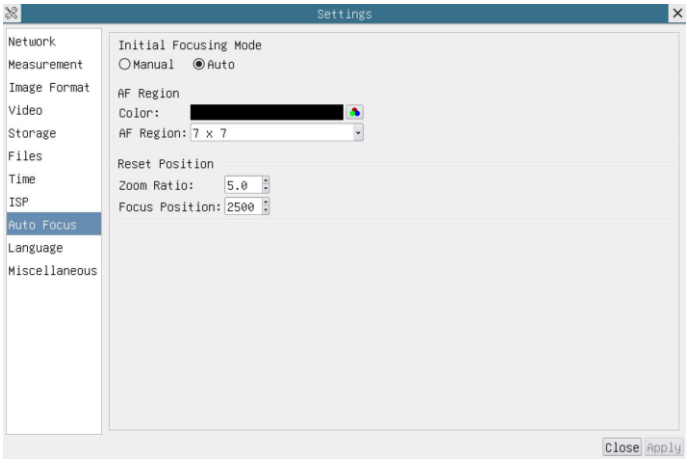


Figure 28 Comprehensive Setting of Auto Focus Setting Page

Initial Focusing Mode	Choose between Manual or Auto mode, which will be displayed after restarting the camera;	
AF Region	Color	Define the color of the AF region border;
	AF Region	Define the size of the AF region border;
Reset Position	Zoom Ratio	Define the zoom ratio value after reset;
	Focus Position	Define the focus position value after reset;

6.4.10 Settings>Language

Figure 29 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;

6.4.11 Settings>Miscellaneous

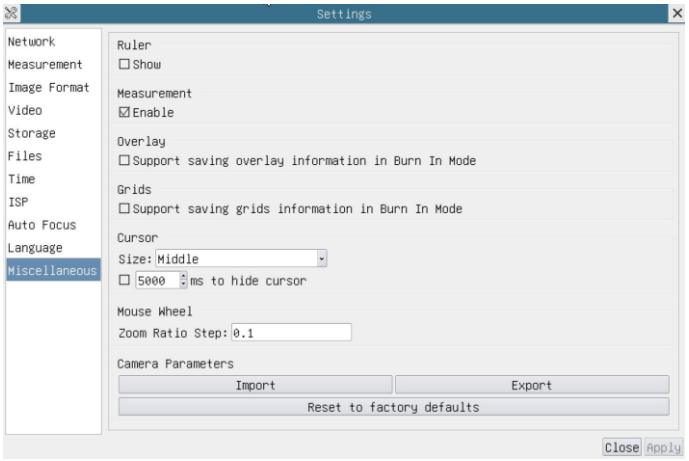
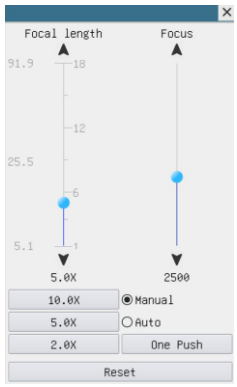


Figure 30 Comprehensive Miscellaneous Settings Page

Ruler	Select to display the ruler in the video window, otherwise not to display the ruler;
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	Select the Cursor size and hide time;
Mouse Wheel	Define the value of mouse wheel zoom ratio step
Camera Parameters Import	Import the Camera Parameters from the USB flash drive to use the previously exported Camera Parameters
Camera Parameters Export	Export the Camera Parameters to the USB flash drive to use the previously exported Camera Parameters
Reset to factory defaults	Restore camera parameters to its factory status;

6.5 Auto Focus Control Panel on the Right Side of Video Window

<table>
<tr><td rowspan="6"> 
</td><td>Focal Length Slider</td><td>Move the Focal Length Slider to change the Focal Length (Zoom Ratio), the value will be displayed below the slider. It can be edited to set the desired Zoom Ratio</td></tr>
<tr><td>Zoom Button</td><td>There are 3 Zoom Buttons, users can set specific zoom ratio for the quick control</td></tr>
<tr><td>Focal Length</td><td>Displays actual lens focal length range and current focal length</td></tr>
<tr><td>Zoom Ratio</td><td>Magnification defined by focal length range: 1X = 5.1 mm, 18X = 91.9 mm</td></tr>
<tr><td>Focus Slider</td><td>Move the Focus Slider to change the focus lens position; The focus lens position will be displayed below the slider. It can be edited to set the desired focus lens position;</td></tr>
<tr><td colspan="2"></td></tr>
<tr><td>Manual Focus</td><td colspan="2">With Manual Focus radio button is checked, users can move the Focus Slider to change the focus lens position to get a clear image. The position value of the focus lens below the slider can be set by the user</td></tr>
<tr><td>Autofocus</td><td colspan="2">With Autofocus radio button checked, the system will automatically focus the object on the stage, the focus lens position under the Focus Slider will be refreshed in real-time; When the ROI or Object state is changed, the camera will perform the Auto Focus operation automatically</td></tr>
<tr><td>One Push</td><td colspan="2">Clicking One Push button will perform a Auto Focus operation at a time</td></tr>
<tr><td>Reset</td><td colspan="2">Click this button to trigger mechanical reset of the zoom group and focus group by the system. After reset completes, the zoom magnification defaults to 5.0X and the focus position defaults to 2500. These default positions post-reset can be modified in Settings.</td></tr>
</table>

6.6 Focus Region on the Video Window

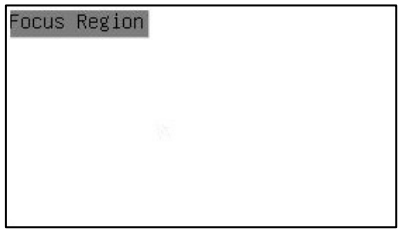


Figure 31 Focus region

The Focus Region is used for selecting the region of interest for Auto Focus operation. When user clicks the button on the Synthesis Camera Control Toolbar, the Focus Region will pop up as well with the Autofocus Control Panel. Users can click any part of the video window to select the focus region for Auto Focus operation.

When users close the Autofocus Control Panel, the Focus Region will be closed automatically.

6.7 Specification of Handset

Button Functions		
	SNAP	Snap
	VIDEO	Video
		Return Button
		Home Button
	OK	OK Button / Enter Browser Interface
		Navigation Buttons
	FLIP	Flip
	MIRROR	Mirror
	AUTO FOCUS	AF/MF Switch
	ONE PUSH	One Push
	ZOOM	Zoom
	FOCUS	Focus