UNITRON®

microFOCUS 4K

Autofocus Inspection Microscope

MANUAL for Installation and Stand-Alone Operation

Contents

1 Introduction to microFOCUS 4K

microFOCUS 4K is an autofocus, electronic zoom, all-in-one digital microscope with a large field of view. It is integrated with HDMI camera, Electric Controlled Continuous Zoom Auto-focus Objective and LED Integrated Illumintaion Light.

microFOCUS 4K can be assembled with various brackets or arms and offer a continuous zooming ratio with different lens. microFOCUS 4K also supports autofocus mode and manual focus mode.

microFOCUS 4K 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 built-in software, 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 microFOCUS 4K can be saved on an SD card for on-site analysis and follow-up research.

microFOCUS 4K can be widely used in industrial inspection, medical observation, teaching and scientific research, automation system, and other fields.

microFOCUS 4K supports HDMI/USB/ETH/WiFi control and video output (AccuView). The frame rate of the output is 4K/30FPS, and the zoom range is 1X~18X. It also supports electric zoom and auto focusing.

Figure 1-1 microFOCUS 4K's Front and Back View

Figure 1-2 microFOCUS 4K's Side and Front(with LED light) View

1.1 The Module Specifications Of microFOCUS 4K

1.1.1 microFOCUS 4K Camera Module Datasheet

Sensor & Size(mm)	Pixel(μm)	G Sensitivity/	FPS/Resolution	Binning	Exposure(ms)

		Dark Signal			
Sony IMX415LQR-C 1/2.8"(5.57x3.13)	1.45x1.45	300mv/0.13 with 1/30s	30@3840*2160(HDMI) 30@3840*2160(NETWORK) 30@3840*2160(USB)	1x1	0.04~1000

1.1.2 microFOCUS 4K Lens Module Datasheet

Working Distance(mm)	Zoom Range	MTF(lp/mm)	Distortion	FOV@1X(mm)	FOV@18X(mm)
205~255	0.021X~0.39X	160	0.5%	255x145	14.2x8

1X and 18x are defined as the normalized magnification, which is only used to represent the relative relationship between the lowest and highest magnification. Here, the normalized equations are 1x = 0.021/0.021; 18X=0.39/0.021;

1.1.3 microFOCUS 4K Light Module

LED	Power	Inner Dia.(mm)	Out Dia.(mm)
8 CREE XPEs	3V/3A	50	76

DRL: LED direct ring light with adjustable brightness; NPC: No power cable

1.2 microFOCUS 4K Characteristic And Specification

The microFOCUS 4K comes with HDMI camera, zoom lens and LED light source;

1.2.1 The Basic Characteristic of microFOCUS 4K

- 5 groups 16 elements zoom lens with 0.0218~0.392X, 18X zoom ratio, supports auto and manual focus
- **250mm standard working distance** with 205~255mm depth of field
- At standard working distance, the large field of view 255mm*145mm at low magnification, helping users to quickly locate the target object, the small field of view 14.2mm*8mm at higher magnification, helping users to observe microscopically
- Sony 1/2.8” 4K Starvis CMOS with high signal-to-noise ratio
- 4K HDMI/USB/ETH/WiFi multiple video outputs
- 4K/1080P auto switching according to monitor resolution
- SD card/USB flash drive for captured image and video storage, support local preview and playback
- Built-in mouse control software, all functions can be realized with USB mouse
- Embedded mouse Camera Control Panel, Measurement Toolbar, Synthesis Control Toolbar, AF Control Panel
- Multi-language support
- Head attachable LED ring light, the brightness can be directly controlled by built-in software
- With the adapter bracket of 76mm diameter, a electric controlled continuous zoom microFOCUS 4K can be built

Figure 1-3 microFOCUS 4K with ball-bearing boom stand (CAT# 21006)

1.2.2 Specification of microFOCUS 4K

Interface & Button Functions	
USB Mouse	USB mouse for control via built-in software
USB2.0	Connect USB flash drive to save pictures and videos Connect 5G WLAN module to transfer video wirelessly in real time with AccuView/AccuView Lite
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 AccuView/AccuView Lite
LAN	LAN port to connect router and switch to transfer video with AccuView/AccuView Lite
ON/OFF	Power on/off switch
LED	Power LED indicator
SD	Comply with SDIO3.0 standard and SD card could be inserted for video and images saving
DC12V3A	DC12V3A power input
XFCAMView Software Funcitons	
UI Operation	With USB mouse to operate on the embedded built-in software
Image Capture	8M (3840*2160) JPEG/TIFF image in SD card or USB flash drive
Video Record	Video format：8M(3840*2160) H264/H265 encoded MP4 file 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	Including Calibration, Measurement, and measurement parameter Export functions
Synthesis Control Toolbar	Including software Zoom, Flip, Freeze, Crosshair, LED Control, Auto-focus, Comparison, Browser , Setting, Version Check function
Auto Focus Control Panel	Including Zoom, Auto Focus, One Push, Manual Focus, Reset, and other functions
Software AccuView/AccuView Lite Environment under LAN/WLAN/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(32 & 64 bit)/AccuView OSx(Mac OS X)/AccuView Lite Linux/AccuView Lite

PC Requirements	CPU: Equal to Intel Core2 2.8GHz or Higher
	Memory: 4GB or More
	Ethernet Port: RJ45 Ethernet Port (if using LAN connection)
	Display:19” or Larger
Operating Environment	
Operating Temperature(in Centidegree)	-10~ 50
Storage Temperature(in Centidegree)	-20~ 60
Operating Humidity	30~80%RH
Storage Humidity	10~60%RH
Dimension	
Length x Width x Height	80mm x 80mm x 80mm
Shipping Weight	0.75kg

1.2.3 Dimension of microFOCUS 4K

Figure 1-4 Dimension of microFOCUS 4K

1.2.4 Packing Information of microFOCUS 4K

Standard Packing List	
Box: L:220cm W:220cm H:110cm (1pcs, 2.0kg/box)	
microFOCUS 4K	
Attachable LED ring light	
Power Adapter: Input: AC 100~240V 50Hz/60Hz, Output:	American Standard: UL/CE/FCC(With American Standard AC Power Cable) EMI Standard: FCC Part 15 Subpart B EMS Standard: EN61000-4-2,3,4,5,6

DC 12V 3A	
USB Mouse (wireless)	
HDMI Cable	
USB2.0 Type A male to Type A male gold-plated connectors cable /2.0m	
USB stick: includes AccuView software	
USB stick: Empty, for image capture and storage	
Optional Accessory (not included)	
Ethernet cable	
SD card (16G)	
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.)

2 Installation and Operation of microFOCUS 4K

Before use, please install the microFOCUS 4K series product on an adaptive bracket.

1. Plug HDMI cable into the HDMI port to connect microFOCUS 4K and HDMI monitor;

2. Plug a wireless mouse dongle into USB Mouse port, to get control of the microFOCUS 4K by using built-in software;

3. Plug DC12V3A power adapter into DC12V3A port, to supply power for the microFOCUS 4K, the LED Indicator will turn into red;

4. Insert blank USB stick into USB 2.0 port;

5. OPTIONAL: Insert SD card into SD card Slot for saving captured images and recorded videos. SD card is not included.

6.Press ON/OFF button to start the microFOCUS 4K, LED Indicator will turn blue;

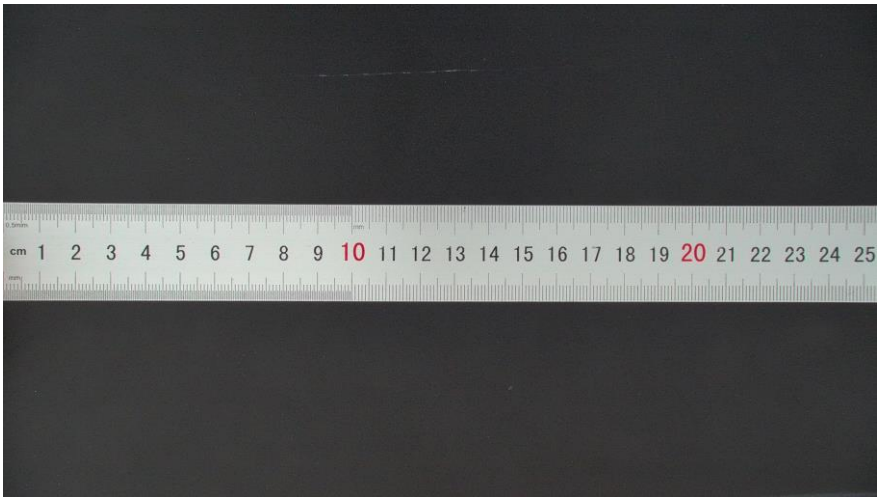
7. Move mouse to the left side of the video window to reveal the Camera Control Panel. It includes Manual/Automatic Exposure, White Balance, Sharpness, Denoise, and other functions, please refer to section 3.2 for details;

8. Move mouse to the upper side of the video window, the Measurement Toolbar will appear. It includes calibration, measurement of lines, angles, rectangles, circles, etc, and supports data export(*.CSV format), please refer to section 3.3 for detail;

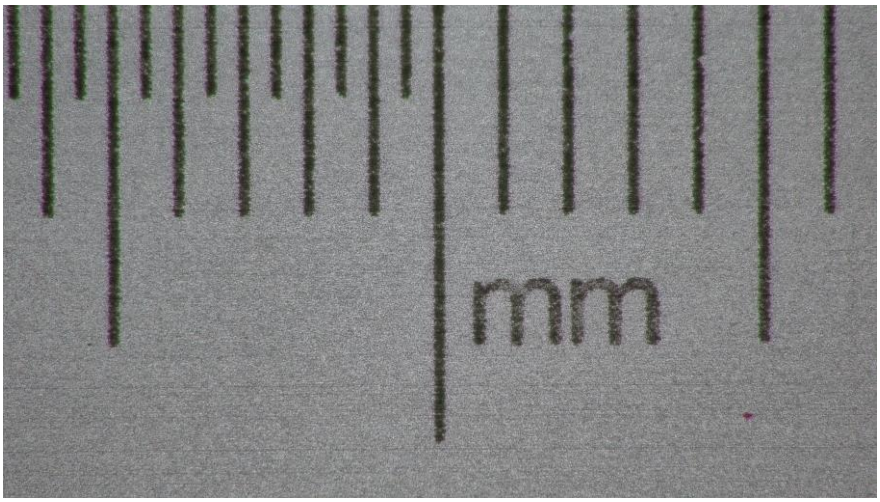
9. Move mouse to the bottom side of the video window, the Synthesis Camera Control Toolbar will appear. Operations like Zoom In, Zoom Out, Flip, Freeze, Crossline, LED brightness control, Autofocus, SD card contents browsing, Settings, and Camera Version can be executed. See section 3.4 for details;

10. 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 18X optical zoom, Autofocus, Manual Focus, Reset, and One Push operation. See section 3.5 for details.

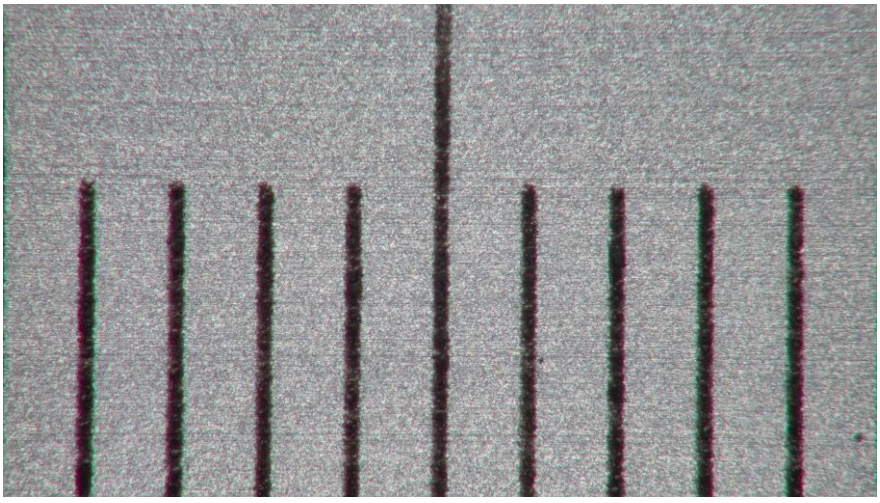
3 Images Captured with microFOCUS 4K



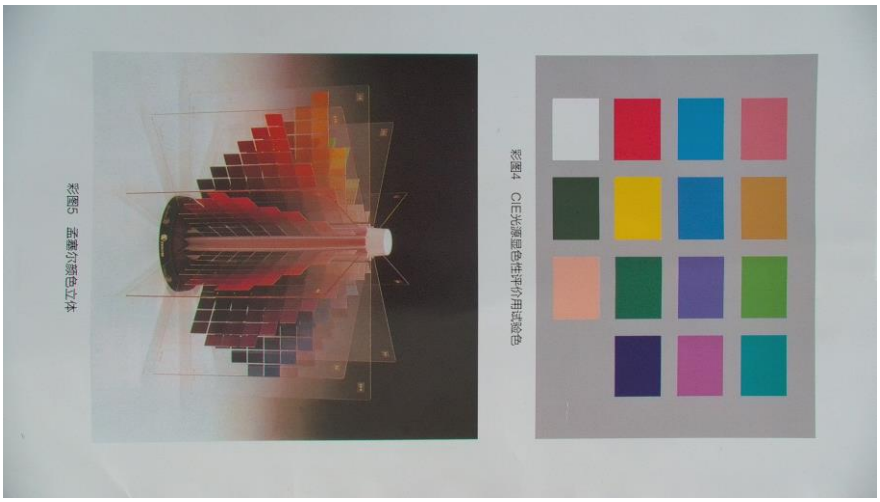
Ruler Captured with microFOCUS 4K at 1X



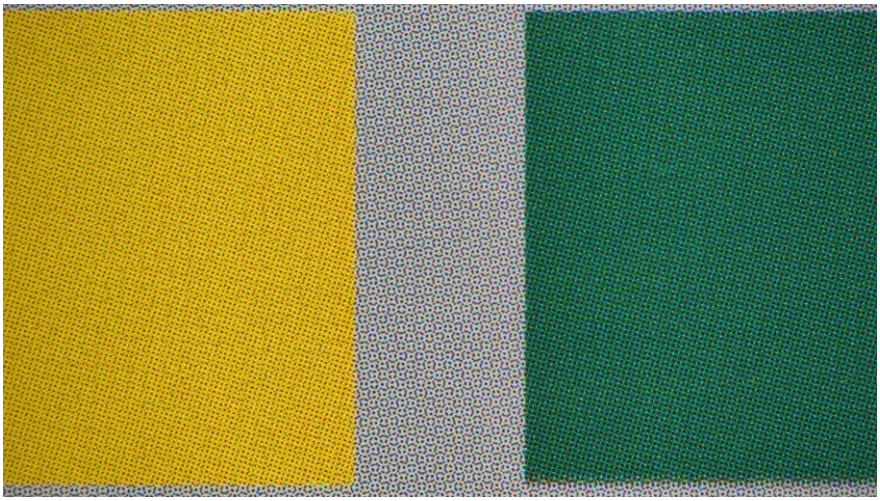
Ruler Captured with microFOCUS 4K at 10X



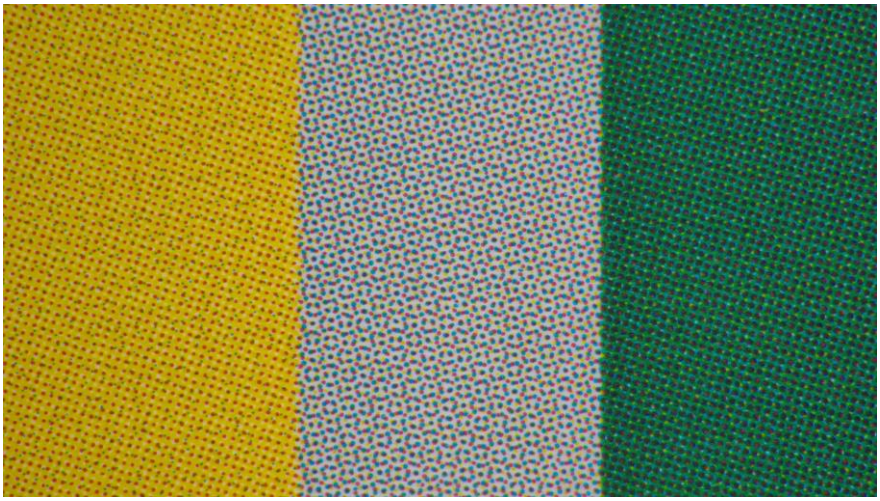
Ruler Captured with microFOCUS 4K at 18X



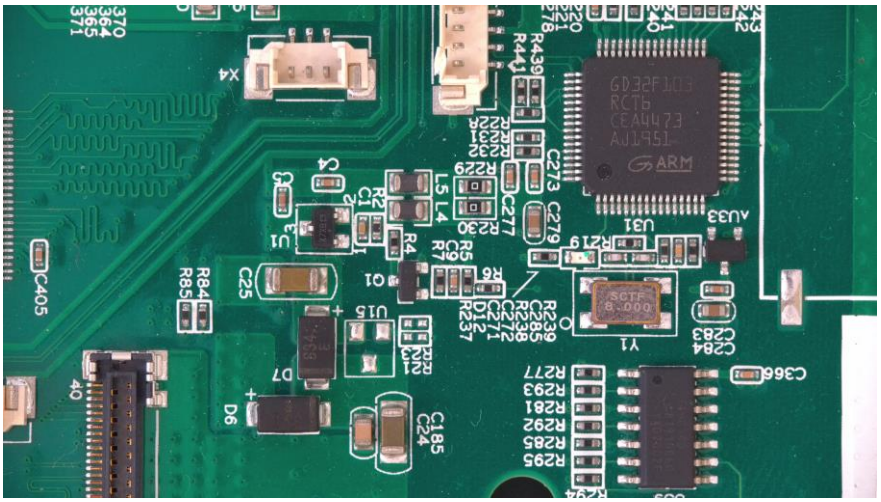
Print Captured with microFOCUS 4K at 1.0X



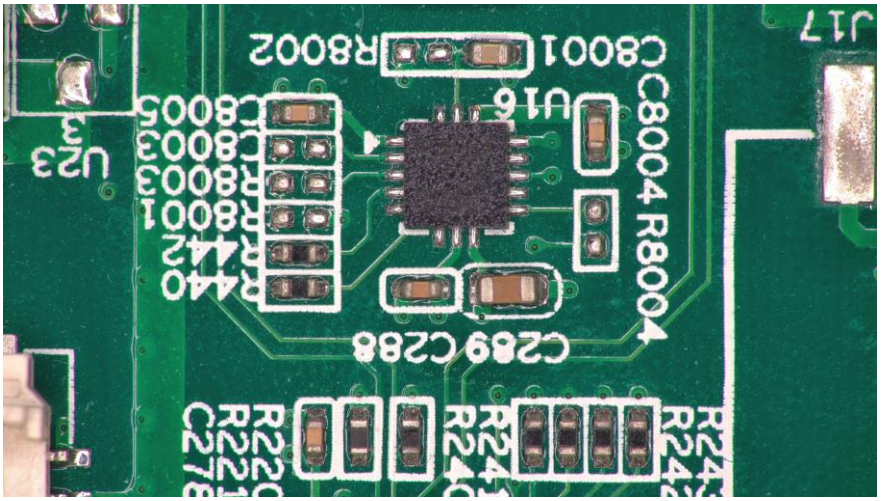
Print Captured with microFOCUS 4K at 10X



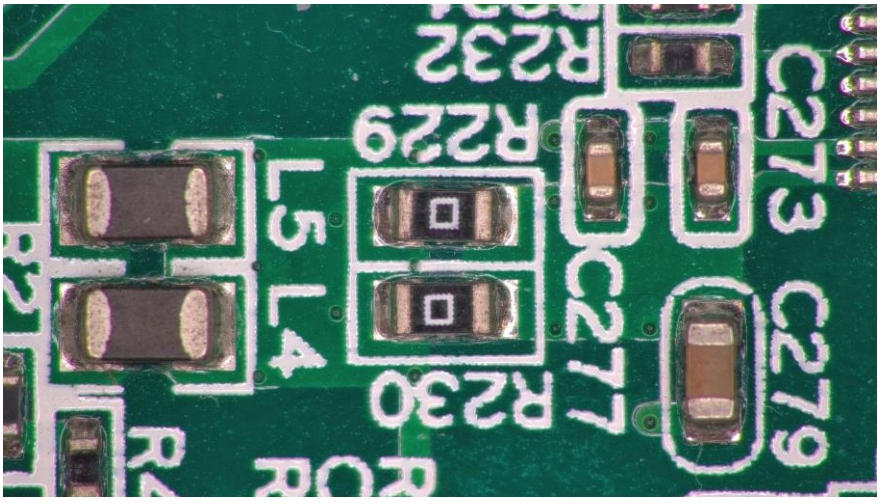
Print Captured with microFOCUS 4K at 18X



PCB Captured with microFOCUS 4K at 4.0X



PCB Captured with microFOCUS 4K at 10X



PCB Captured with microFOCUS 4K at 18X

4 Software and App

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

Windows:
https://www.dropbox.com/scl/fi/8jhuehq8opsxi3d5u023b/AccuView_Setup_220727.zip?rlkey=29gpr2df3sslgffsfqey3qyjs&st=b9vp08x9&dl=1

macOS: https://www.dropbox.com/scl/fi/gyhmit8smtr47ciinjxpm/AccuViewLITE-20220829.dmg?rlkey=5cpfoa3eyuwjgkvd4mqiut4fm&st=ne53mx4x&dl=1

iOS: https://apps.apple.com/us/app/accuview/id6450072020

Android: https://play.google.com/store/apps/details?id=com.accu.accuview

For AccuView Lite, the Auto-focus and LED Brightness Control are not avaiable

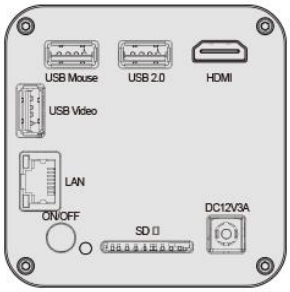
5 microFOCUS 4K Camera Configurations

You can use the microFOCUS 4K camera in 5 different ways. Each connection requires different hardware configuration.

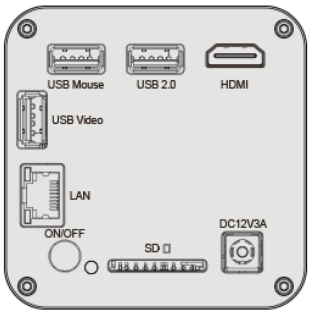
5.1 Camera Working Standalone with Built-in Software

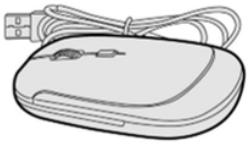
For this application, apart from the microscope, you only need an HDMI monitor, the supplied USB mouse, and the camera embedded with built-in software. The steps to start the camera are listed as below:

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

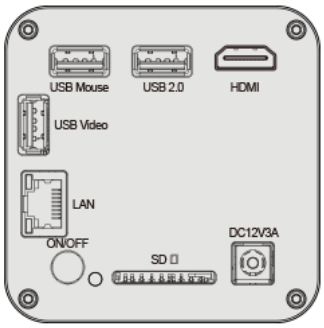


- Insert the supplied USB mouse to the camera's USB port;

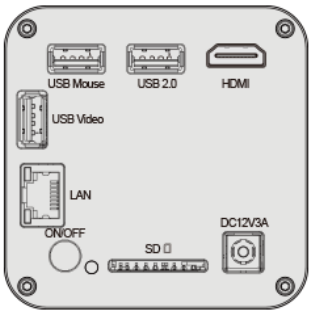


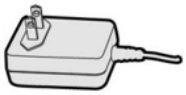


- Insert the supplied SD card/USB flash drive (USB2.0 slot) into the microFOCUS 4K camera SD card slot/USB2.0 slot;



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





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

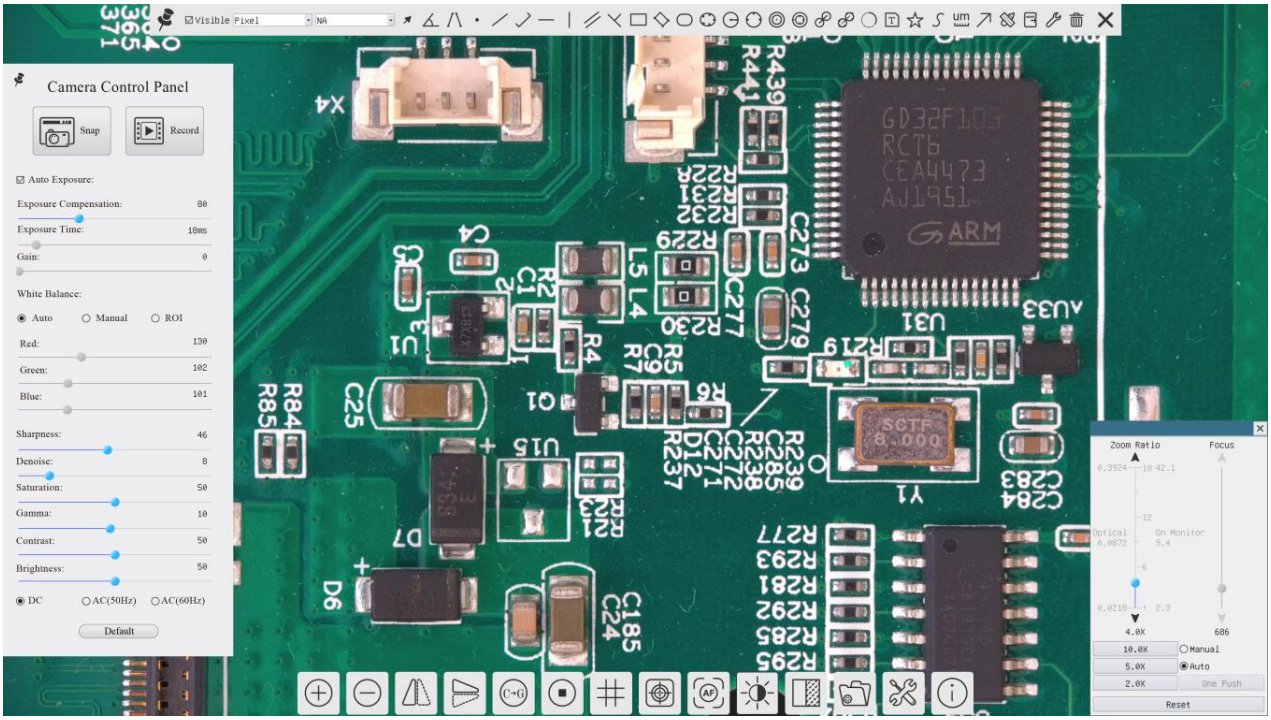


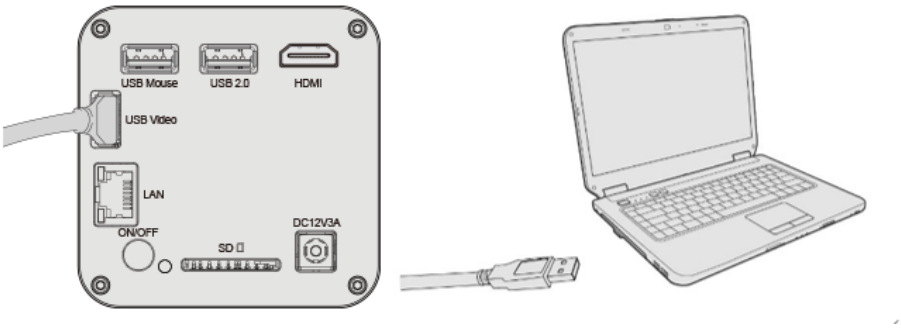
Figure 5-1 Built-in software and microFOCUS 4K in HDMI Mode

5.2 Connecting Camera to Computers with USB2.0 Port

For Windows user (Windows XP (32bit), Windows 7/8/10/11 (32/64 bit)), please use AccuView.

For macOS user (macOS 10.10 or above), please use AccuView Lite. 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 AccuView/AccuView Lite on your PC or install AccuView App on the mobile device; Run the software AccuView/AccuView Lite, clicking the camera name in the camera list n to start the live video as shown in Figure 5-2.



- After the USB cable is connected, the mouse will not work. If you want to use the mouse for HDMI application (built-in software), please unplug the USB cable and restart the camera to activate it.

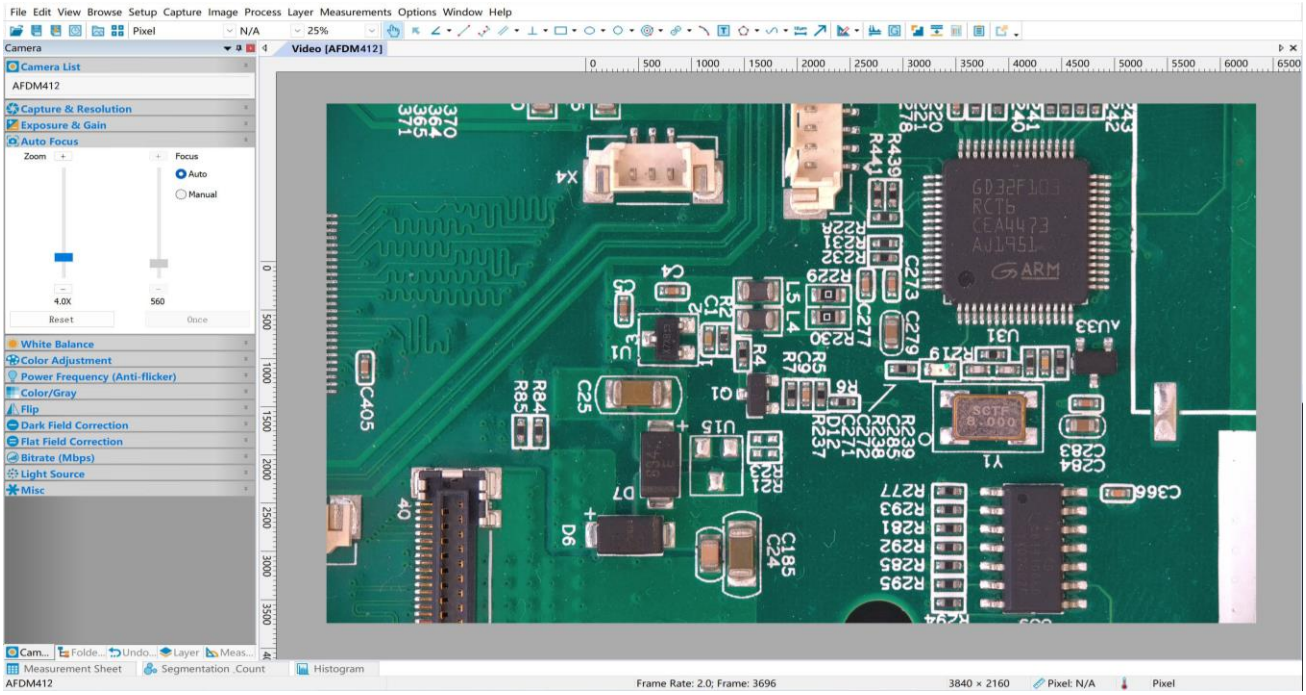


Figure 5-2 AccuView and microFOCUS 4K Camera in USB Mode

5.3 Connecting Camera to the PC with LAN Port

This application uses the camera as the network camera. User 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 5-1), 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.

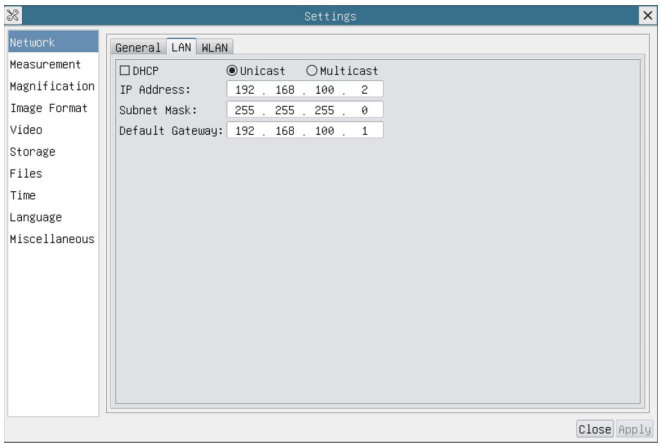


Figure 5-3 Configure themicroFOCUS 4K Camera IP

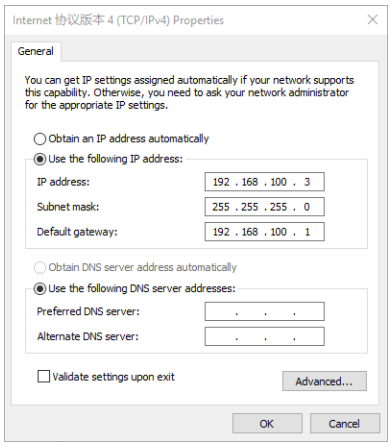
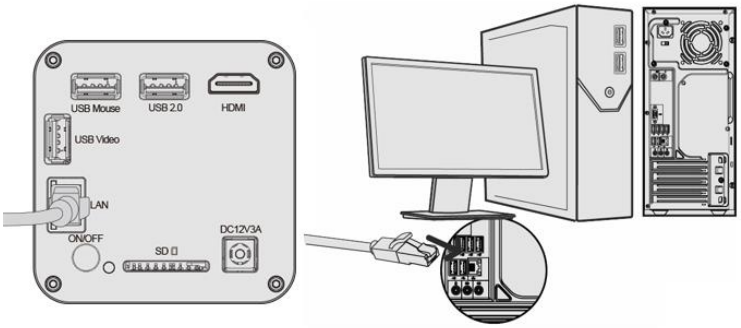


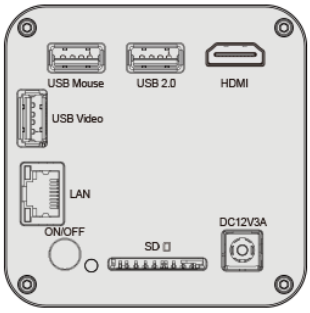
Figure 5-4 Configure the PC's IP

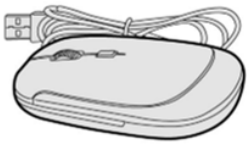
After the above configurations are finished, user can connect the microFOCUS 4K camera to the computer through the Ethernet cable as shown below:

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



Insert the supplied SD card/USB flash drive (USB2.0 slot) into the microFOCUS 4K camera's SD card slot/USB2.0 slot;





Install AccuView/AccuView Lite on your PC or install AccuView App on the mobile device; Run the software AccuView/AccuView Lite, clicking the camera name in the camera list starts the live video as shown in Figure 5-3.

5.4 Camera Working in WLAN Mode (AP Mode)

Please make sure your PC is WLAN enabled.

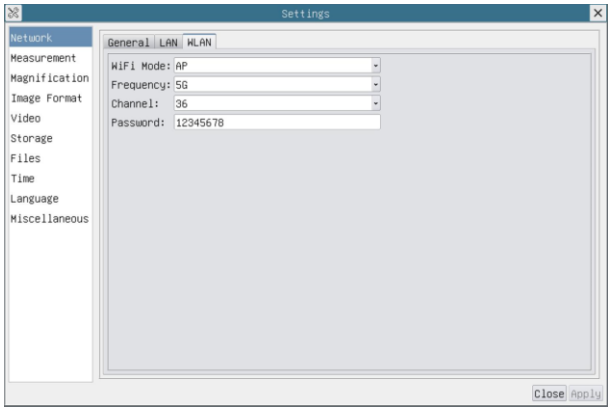
For Windows user (Windows XP (32bit), Windows 7/8/10/10/11 (32/64 bit)), please use AccuView.

For macOS user (macOS 10.10 or above), please use AccuView Lite. When connecting the camera with a

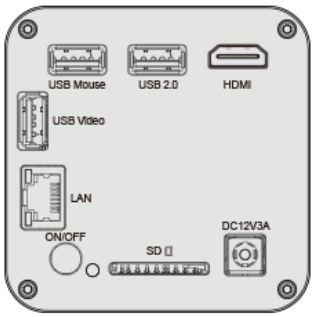
mobile device, the free AccuView App is required. Just make sure that the mobile device uses iOS 11 or higher/Android 5.1 or higher operating systems.

The steps to start the camera are listed below:

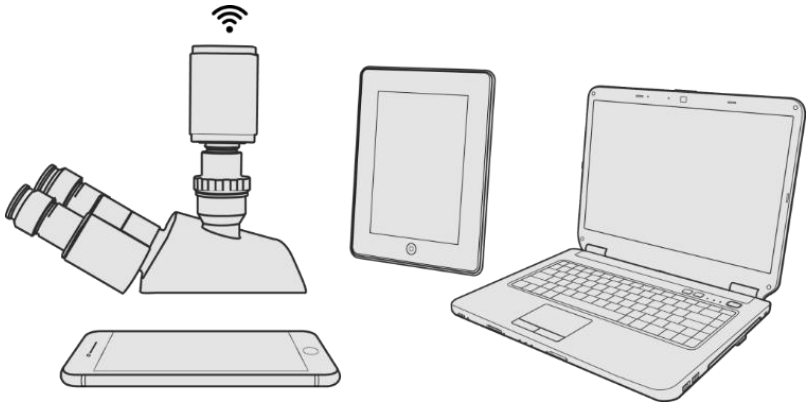
Start the camera according to Sec. 5.1. After the camera is running, move the mouse to the bottom of the GUI and clicking the button on the Synthesis Camera Control Toolbar at the bottom of the video window, a small window called Settings will pop up as shown below. Click Network>WLAN property page and choose the AP in the Wi-Fi Mode edit box(The factory default configuration is AP mode).



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



Install AccuView/AccuView Lite on your PC or install AccuView App on the mobile device, Connect the PC or mobile device to the camera's WLAN AP point; The network name (SSID) and the WLAN password (The default one is 12345678) can be found on the camera's Setting>Network>WLAN page in AP mode.



Start AccuView/AccuView Lite software or AccuView App and check the configuration. Normally, the active AFDM412 cameras will be automatically recognized. The live image of each camera is shown in Figure 5-3. For the display, the Camera List tool window is used in AccuView/AccuView Lite software, and the

Camera Thumbnail is used in AccuView App.

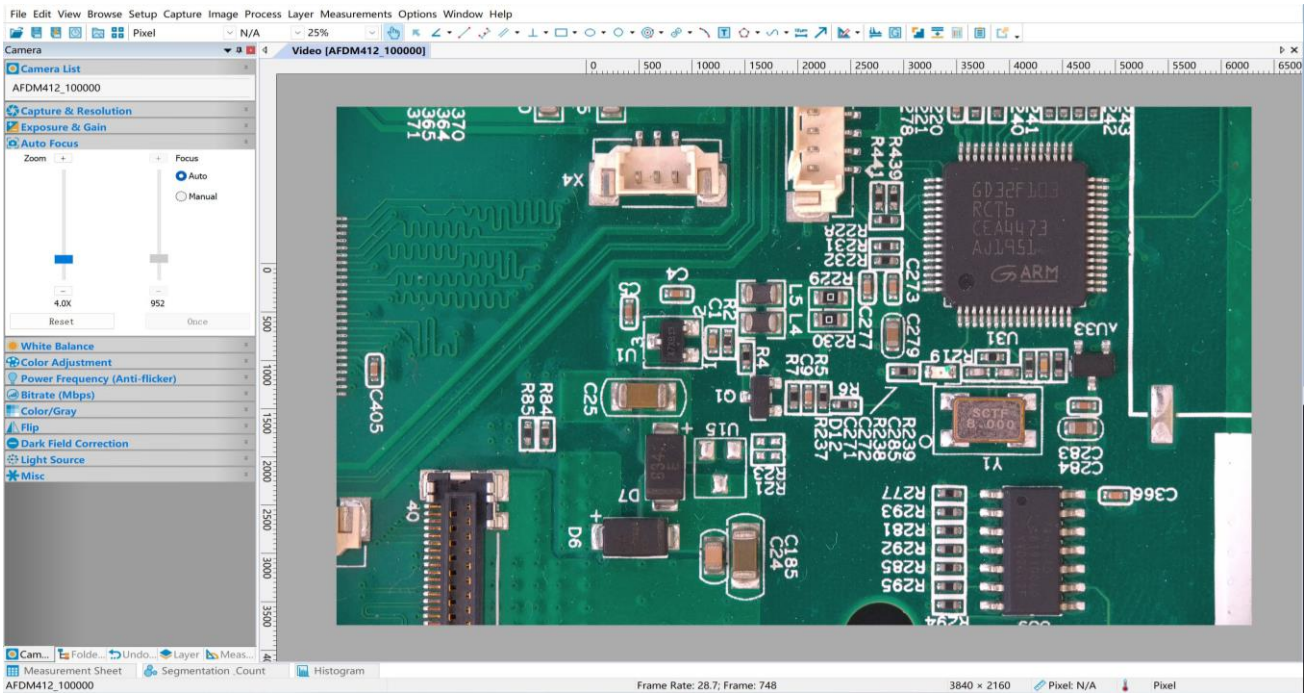
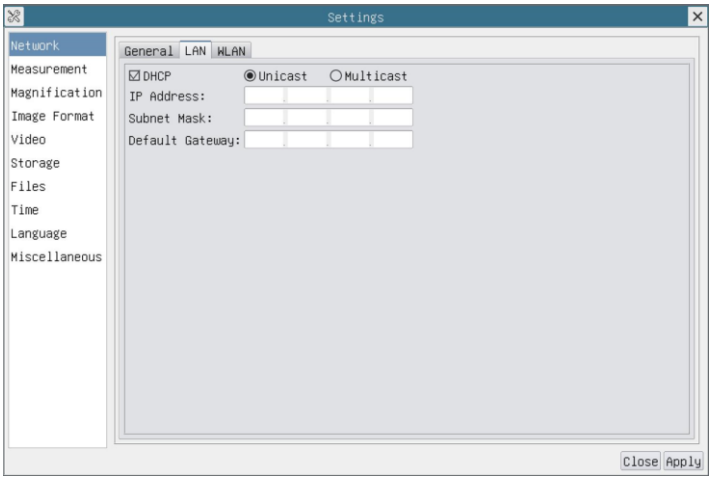


Figure 5-3 AccuView and microFOCUS 4K in WLAN AP Mode

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

In LAN/WLAN STA mode, the camera connects to the router by LAN port/WLAN STA mode. If a router with LAN/WLAN capability is used, users could connect the router with Ethernet cable/WLAN to control the camera.

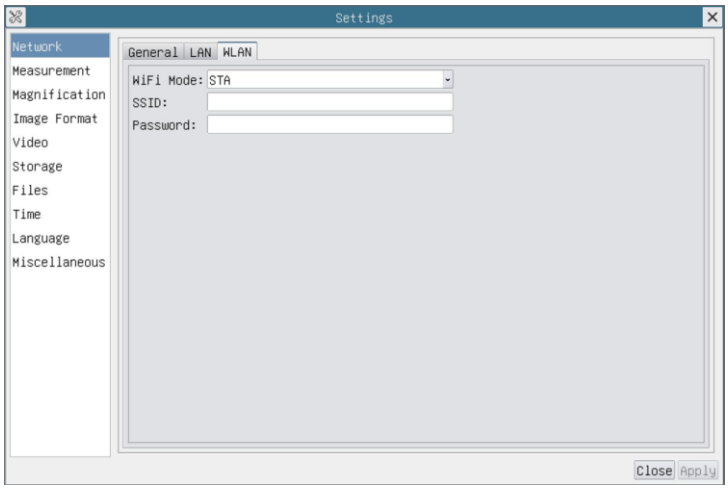


The connection and configuration are just the same as in Sec.5.1 or Sec. 5.3. But here, users need to check DHCP. If Multicast is disabled or is not supported, users should only select Unicast. If Multicast is supported by the network, users could select Multicast to achieve a better performance, especially 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 AFDM412 camera is recognized by ToupView/ToupLite software or ToupView App and they are

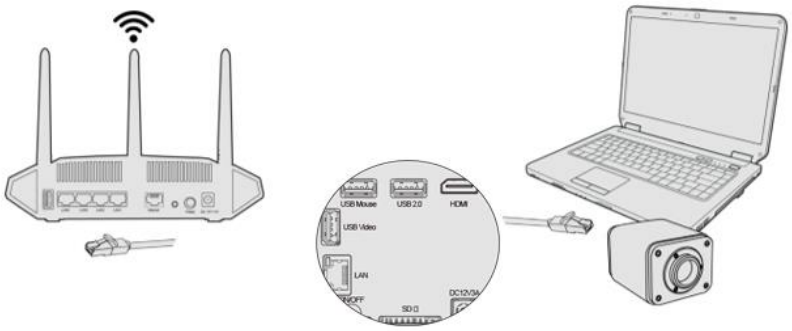
displayed as a camera list or thumbnail in the software or app as shown in Figure 5-2.

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>WLAN 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:

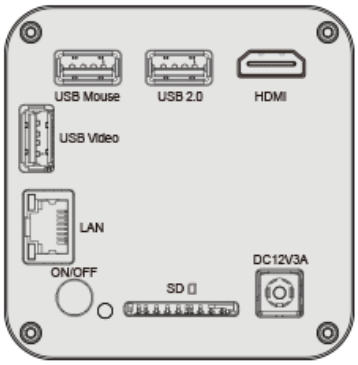


Install AccuView /AccuView Lite software on your PC. Alternatively, install the free AccuView App on the mobile device;

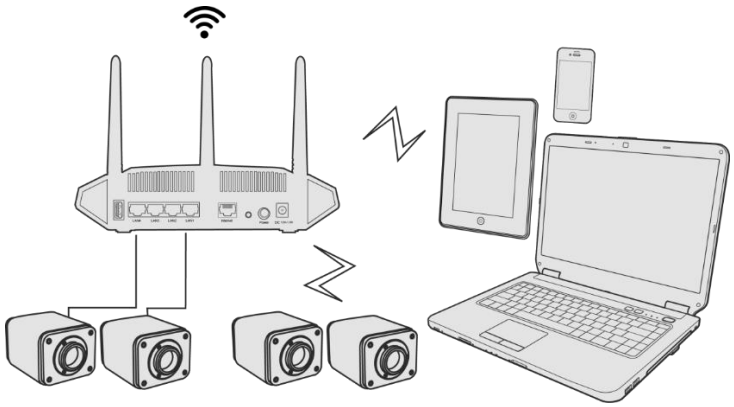
Plug the Ethernet cable into the camera's LAN port and the other end to the PC (for those connected to router with WLAN STA mode);



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



Finally, as shown below, 2 microFOCUS 4K microscopes are connected to the router with LAN cable and 2 microFOCUS 4K microscopes are connected to the same router with WLAN STA mode (the number of the microscopes and the connection mode (LAN or WLAN 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 the router; Start AccuView/AccuView Lite software and check the configuration. Normally, active microFOCUS 4K cameras are automatically recognized. The live image of each camera is displayed. For the display, Camera List control panel window is used in AccuView/AccuView Lite software, and Camera Thumbnail is used in AccuView App; Select the microFOCUS 4K camera you are interested in. To do so, double click the camera's name in Camera List tool window if you use AccuView /AccuView Lite software; If you use AccuView App, tap the camera's thumbnail in Camera List page(See Figure 5-)

About the routers/switches

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

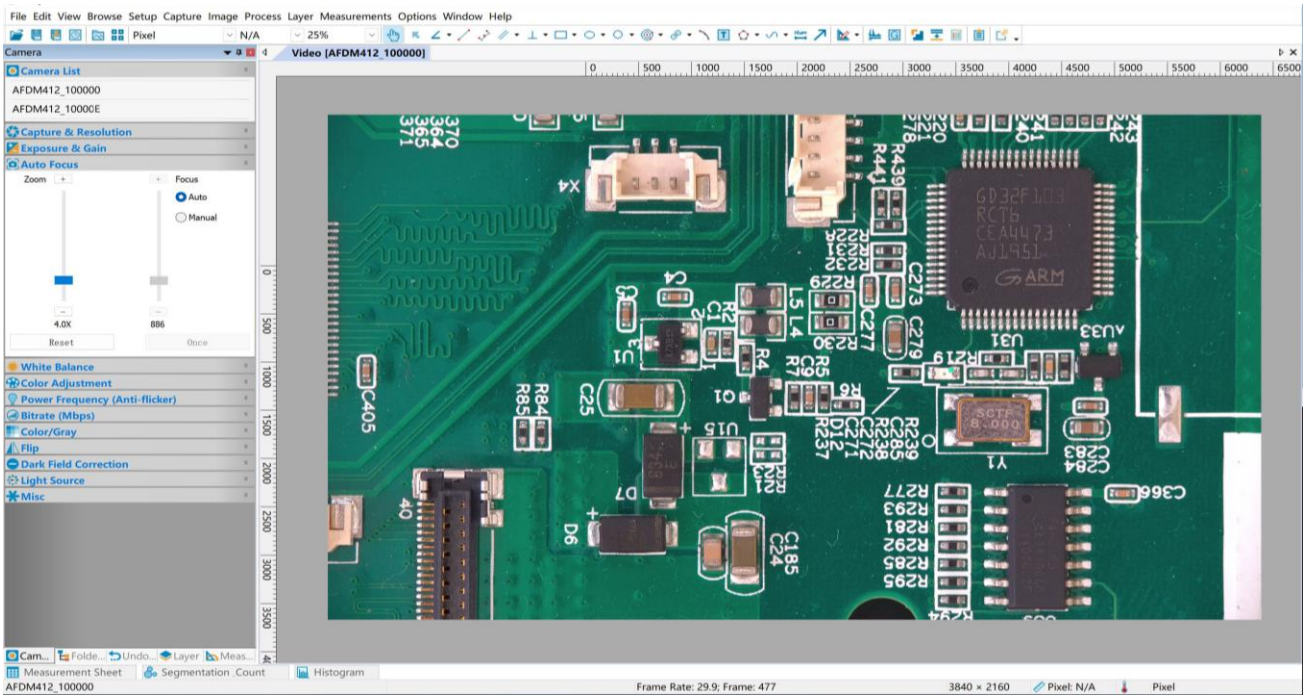


Figure 5-4 AccuView and microFOCUS 4K camera in LAN mode

6 Introduction of Built-In Software User Interface (UI) and Functions

6.1 Control UI

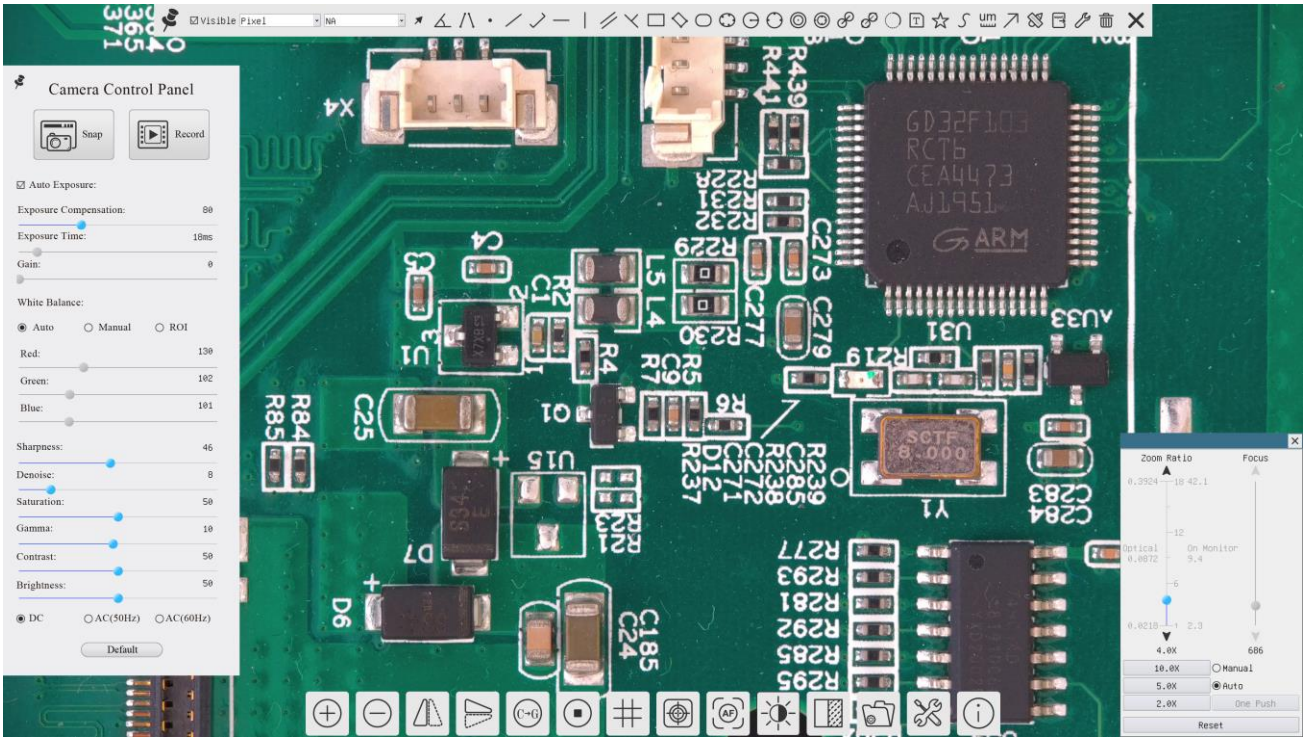
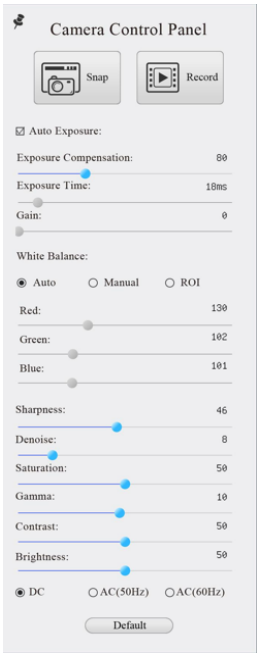


Figure 6-1 Built-in Software and its Control UI

microFOCUS 4K 's built-in software operation UI is shown in Figure 6-1. 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 for the calibration and measurement operations. 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** or **Snap** image from the current video window
	Record	**Record** video from the current video window
	Auto Exposure	Checking **Automatic Exposure** box will automatically adjust exposure time according to the **Exposure Compensation** value
	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 the **Gain** value to decrease or increase the video brightness. The noise will be reduced or increased accordingly
	Red	Slide to left or right to decrease or increase the proportion of **Red** in the video window
	Green	**Green** is a base for reference and cannot be adjusted
	Blue	Slide to left or right to decrease or increase the proportion of **Blue** for the video
	White Balance	**Auto White Balance** adjustment according to the video window
	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
	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. Here is the introduction of the various functions on the Measurement Toolbar:

Icon	Function	Icon	Function

Float/ Fix switch of the Measurement Toolbar

Define measuring object in **Show** up/ **Hide** mode

Select the desired **Measurement Unit**

Choose the same **Magnification** as the digital microscope current **Zoom Ratio** to ensure accuracy of measurement result when measurement unit is not in **Pixel** unit

	**Object Select**		**Point**
	**Angle**		**Four-point** method to measure the angle
	**Arbitrary Line**		**Three-Point** method to measure the spacing
	**Three-Point** method to measure vertical line		**Parallel Line**
	Horizontal Line		**Vertical Line**
	**Rectangle**		**Center + Radius Circle**
	**Three-points Circle**		**Ellipse**
	**Annulus**		**Two Circles**
	**Three-points Two Circles**		**Arc**
	**Polygon**		**Curve**
	**Arrow**		**Scale Bar**

Make Calibration to determine the corresponding relation between magnification and resolution, this will establish the corresponding relationship between the measurement unit and the sensor pixel size. The monitor's size can be input to achieve the accurate value of the digital magnification. The Calibration needs to be done with the aid of a ruler with an accuracy of more than 1mm. The detailed Calibration process is described in Sec. 6.3.2

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.

3) To ensure accuracy of the measurement, after the calibration is turned on, the camera will automatically reset, and then sets the normalization magnification to 18X, and adjusts the focus to the required standard object distance. If the "Calibration Object" on the stage is not clear on the monitor, you need to manually adjust the height of the bracket to the clearest position, which is the standard object distance. After the Calibration is completed, use the Measurement Toolbar to measure the 1mm physical distance on the ruler, which should display 1mm on the monitor.

4) Even if the Calibration has been completed and the user needs to measure, it is not certain that the

microscope is at the standard object distance position that was used for the calibration. ALWAYS reset the microscope height to correspond to the height used for the calibration, then ensure the sample is clearly in focus priort to making measurements.

6.3.2 Calibration Method

User needs to prepare an Calibration Object such as ruler before Calibration;

Move the mouse to the upper side of the video window, the Measurement Toolbar will appear. Clicking Calibration on the Measurement ToolBar to start the calibration.

1)The builti-in will pop up a message box: "1. Camera resetting for calibration..."

2)After the reset is finished, a message box: "2. Please put the calibration object on the stage (if not), adjust the height of the stand until the calibration object is in focus, then click OK button; " will pop up.

3)After clicking the OK Button, built-in will pop up a Calibration dialog shown below:

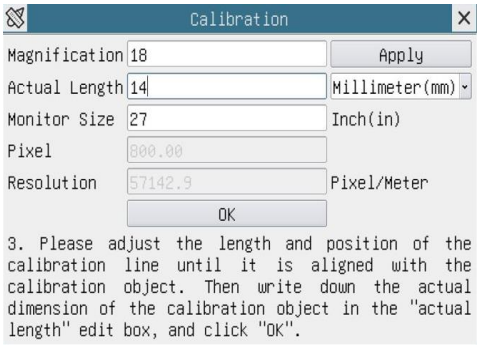


Figure 6-2 Calibration Dialog

Magnification:	the Magnification edit box, can be set from 1 to 18 as user want, Click **Apply** button to confirm;
Actual Length:	the **Actual Length** of the **Calibration** object on the stage, the unit can be selected with the right drop-down list box. Read the hint on the **Calbration** dialog to get the correct **Calibration** result;
Monitor Size:	the **Monitor Size** in Inch for the magnification calculation of the object displayed on the monitor;
Pixel:	the length in **Pixel** of the **Calibration Line** on the monitor;
Resolution:	the resolution in **Pixel/Meter** unit which is arrived by **Pixel/Actual Length**;
OK:	Click **OK** button to end the Calibration;

Users can refer to the message: **"3. Please adjust the length and position of the calibration line until it is aligned with the calibration object. Then write down the actual dimension of the calibration object in the actual length edit box, and click OK."** to get the correct calibration result.

The default monitor size is 27.0 inches. Users can enter the Monitor Size for the monitor in use.

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/gray		**Video Freeze**
	Display Cross Line		**Image Overlay**

	Auto Focus Control Panel		**LED Brightness Control**
	Compare Image with the Current Video		**Browse Images Videos**
	Settings		**Check the Version of XFCAMView**

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

6.4.1 Setting>Network

6.4.1.1 Setting>Network>General

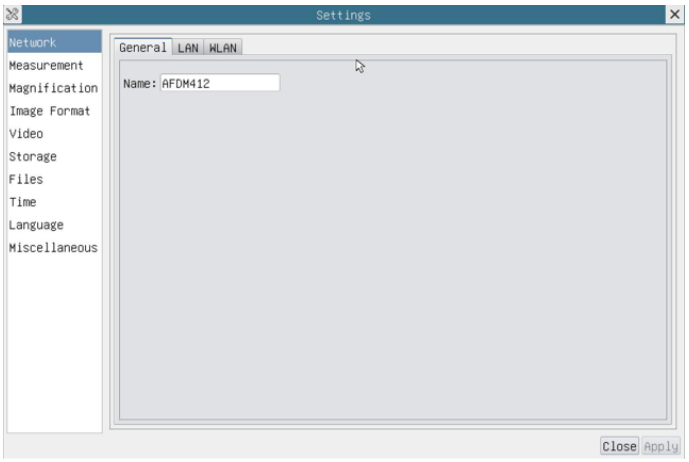


Figure 6-3 Comprehensive Network General Settings Page

Name	The current camera name recognized as the network name

6.4.1.2 Setting>Network>LAN

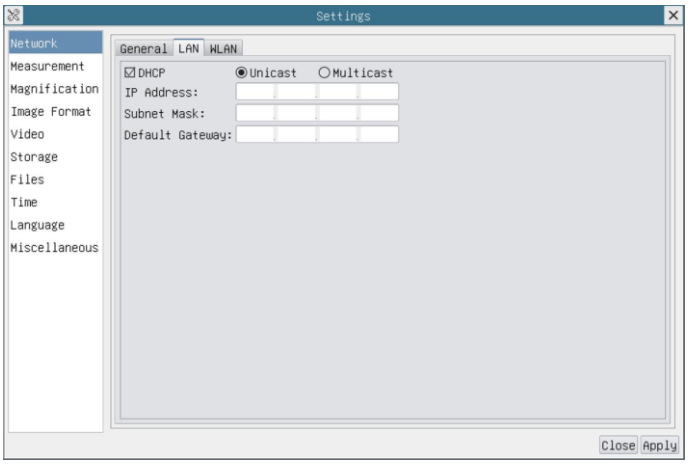


Figure 6-4 Comprehensive Network LAN Settings Page

DHCP	Dynamic host control protocol allows **DHCP** server to automatically assign IP information to the camera. Only in Sec 6.4 LAN networking this item should 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 6.4 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

Figure 6-. 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, user still need to set the IP address, Subnet mask and Default Gateway as shown below:

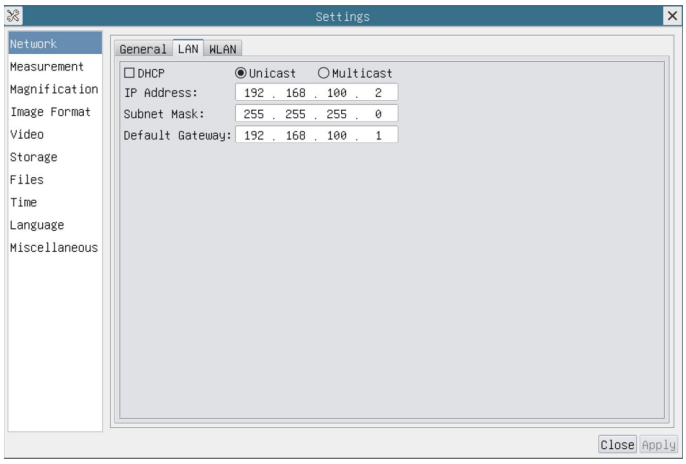


Figure 6-5 Manual DHCP and Unicast

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

6.4.1.3 Setting>Network>WLAN

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**

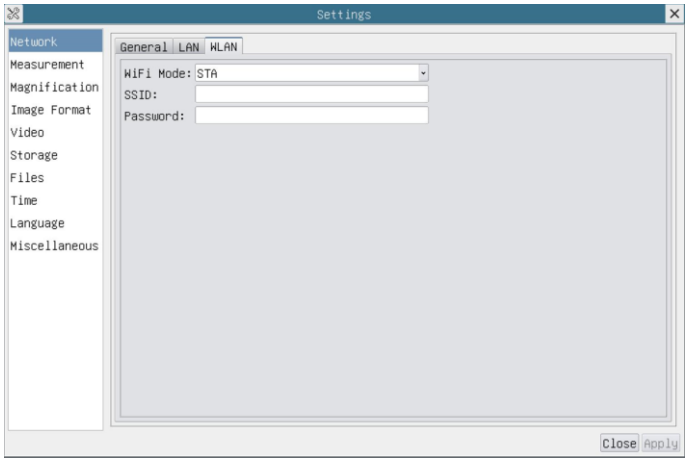


Figure 6-6 Network Setup

6.4.2 Setting>Measurement

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

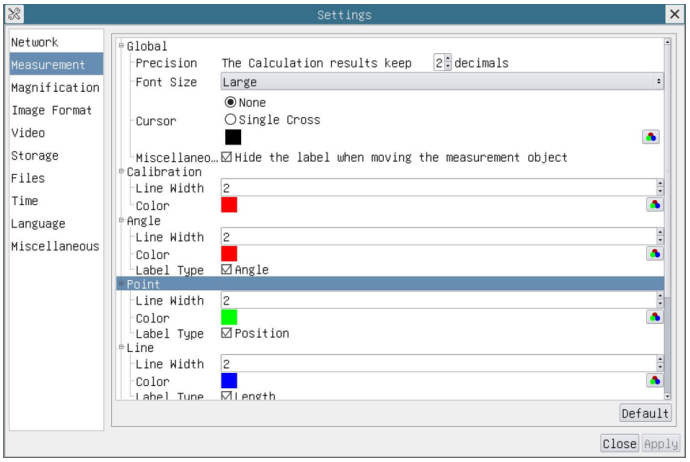


Figure 6-7 The Measurement Setup

Global Used for setting digits behind the decimal point for measurement results;

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**.

6.4.3 Setting>Magnification

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

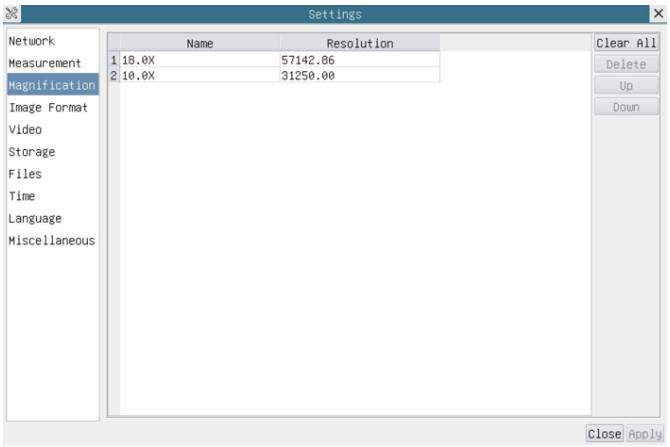


Figure 6-8 Comprehensive Magnification Settings Page

Name	**Names** such as 4X,10X, 18X， are based on magnification of the digital microscopes.
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 ratio and click **Up** to move up the currently selected magnification ratio;
Down	Select a row in the magnification ratio and click **Down** to move down the currently selected magnification ratio;

6.4.4 Settings>Image Format

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.

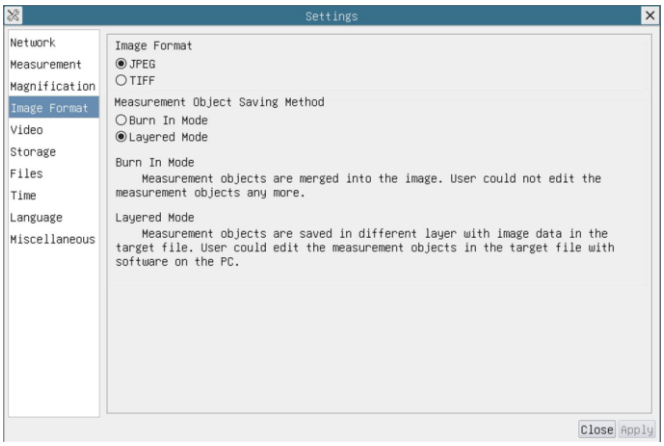


Figure 6-9 Comprehensive Image Format Settings Page

6.4.5 Setting>Video

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

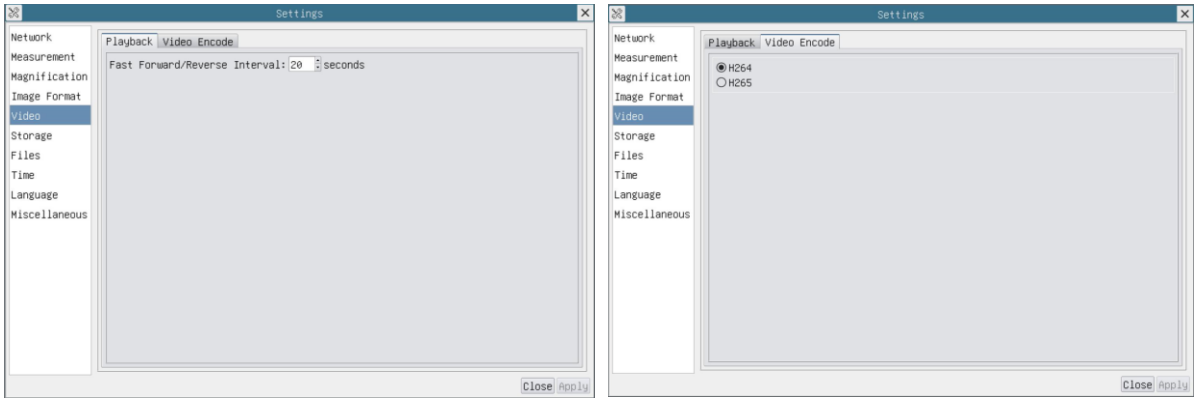


Figure 6-10 Comprehensive Setting of Video page

6.4.6 Setting>Storage

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: For USB Flash Drive, USB 3.0 interface is preferred.

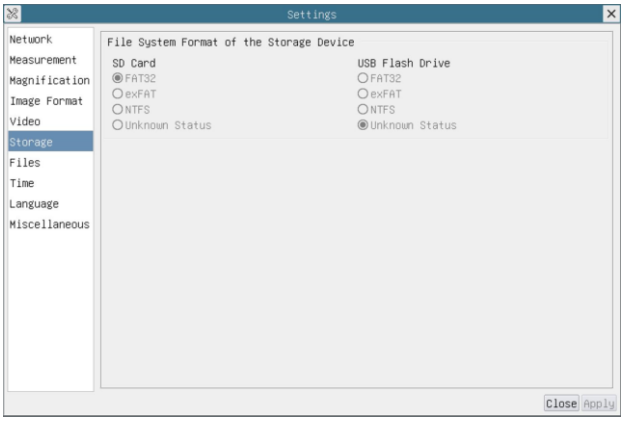


Figure 6-11 Comprehensive Setting of Storage Page

6.4.7 Setting>Files

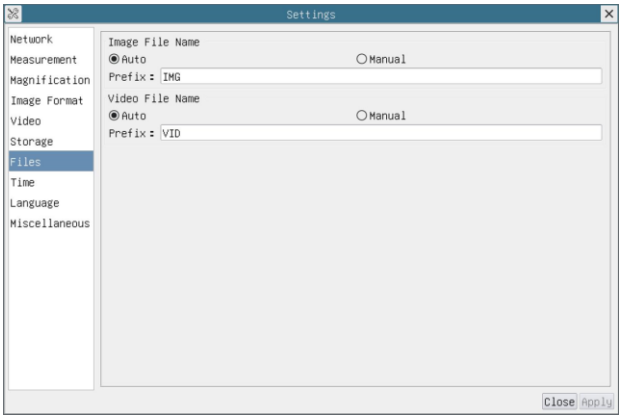


Figure 6-12 Comprehensive Setting of Files Name

Image/Video File Name	Provide Auto or Manual naming paradigm for Image or Video file;
Auto	With specified name as the Prefix and XFCAMView 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.

6.4.8 Setting>Time

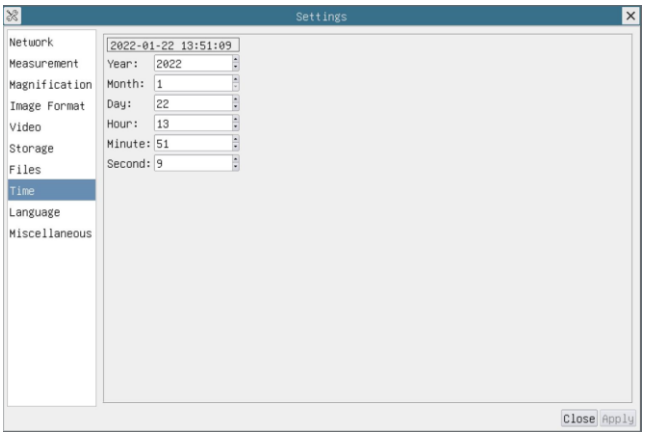


Figure 6-13 Time Setting

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

6.4.9 Setting>Language

Figure 6-14 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**;

6.4.10 Setting>Miscellaneous

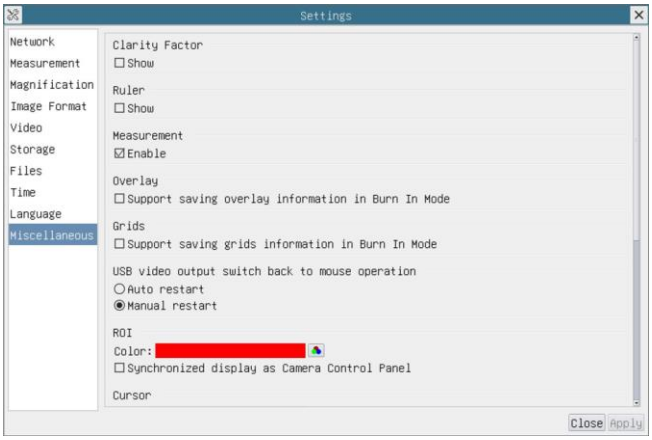
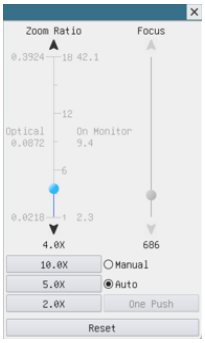


Figure 6-15 Comprehensive Miscellaneous Settings Page

Clarity Factor	Check this will show the **Clarity Factor** on the video window screen to tell if the camera is focused correctly or not;
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;
USB video output switch back to mouse operation	Select automatic restart or manual restart to switch from USB video output to mouse operation;
ROI Color	Choosing the **ROI** rectangle line color
Cursor	Choosing the **Cursor** size according to the screen resolution or personal preference
Auto Exposure	Define the maximum automatic exposure time;
Auto Exposure Region	Select the **AE** reference area;
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;

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



Zoom Slider	Move the **Zoom Slider** to change the **Zoom Ratio**, the value will be displayed below the slider. It can be edited to set the desired **Zoom Ratio**
Zoom Button	There are 3 **Zoom Buttons**, users can set specific zoom ratio for the quick control
Optical Magnification	**Optical Magnification** is the designed lens magnification
Digital Magnification	**Digital Magnification** is the object length on the monitor divided by the actual object length
Focus Slider	Move the **Focus Slider** to change the focus lens position; The focus lens position value will be displayed below the slider. It can be edited to set the desired focus lens position;
Manual Focus	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
Autofocus	With Autofocus radio button is checked, the system will automatically focus the object on the stage, the focus lens position value 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
One Push	Clicking **One Push** button will perform a **Autofocus** operation at a time
Reset	Click Reset button to reset the **Zoom** and **Focus** modules. After the process is finished, the **Zoom** is set to 18X normalized magnification, and the **Focus** is fixed at the standard object distance(195mm in this model), if the object(such as a ruler for **Calibration**) is not clear, adjust the stand bracket to move the object to the standard object distance. Note: (see **Measurement Toolbar>Calibration** items for details).

6.4.12 Focus Region On the Video Window

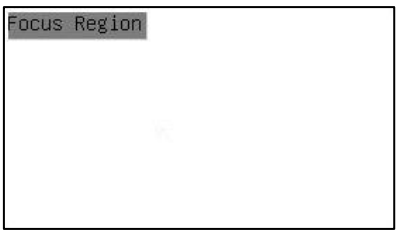


Figure 6-16 Focus region

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 Autfoocus 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.

7 Warranty Details

7.1 Warranty Information

Limited Warranty

This digital microscope is warranted to be free from defects in material and workmanship for a period of one (1) year from the date of invoice to the original (end user) purchaser. This warranty does not cover damage caused in-transit, damage caused by misuse, neglect, abuse or damage resulting from either improper servicing or modification by other than UNITRON-approved service personnel. This warranty does not cover any routine maintenance work or any other work that is reasonably expected to be performed by the purchaser. No responsibility is assumed for unsatisfactory operating performance due to environmental conditions such as humidity, dust, corrosive chemicals, deposition of oil or other foreign matter, spillage or other conditions beyond the control of UNITRON Ltd. This warranty expressly excludes any liability by UNITRON Ltd. for consequential loss or damage on only grounds, such as (but not limited to) the non-availability to the End User of the product(s) under warranty or the need to repair work processes.

All items returned for warranty repair must be sent freight prepaid and insured to UNITRON Ltd., 73 Mall Drive, Commack, NY 11725 – USA. All warranty repairs will be returned freight prepaid to any destination within the Continental United States of America. Charges for repairs shipped back outside this region are the responsibility of the individual/company returning the merchandise for repair.