VC.3045

UHD-4K camera

euromex
microscopes holland

user manual

v.521291

Contents

1. Introduction

The VC.3045 camera is intended for acquisition of digital images from stereo microscopes, biological microscopes, or online interactive teaching

2. Application

2.1 Basic characteristics

- Sony IMX678 CMOS sensor
- 4K HDMI/ NETWORK/ USB 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
- Embedded ImageFocusAlpha for the control of the camera and image processing
- Excellent ISP with local tone mapping and 3D denoising
- ImageFocusAlpha/ImageFocusAlpha software for PC
- iOS/Android applications for smart phones or tablets

2.2 VC.3045 camera data and functions

Available ports on the back panel of the camera body

Interface or button	Function description
A. USB 3.0	Connect USB flash drive to save pictures and videos Connect 5G WLAN module to transfer video wirelessly in real time
B. USB mouse	Connect USB mouse for easy operation with embedded ImageFocusAlpha software
C. 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
D. USB video	Connect PC or other host device to realize video image transmission
E. LAN	LAN port to connect router and switch to transfer video
F. LED	LED status indicator
G. SD	Comply with SDIO3.0 standard and SD card could be inserted for video and images saving
H. DC12V	Power adapter connection (12V/1A)
I. ON/OFF	Power switch

3. Dimension of VC.3045 camera

The VC.3045 camera body - made from tough, CNC aluminum alloy - ensures a heavy duty workhorse solution. The camera is designed with a high quality IR-CUT to protect the camera sensor. No moving parts included. This design ensures a rugged, robust solution with an increased lifespan when compared to other industrial camera solutions

The software or the App can be downloaded from resp. the Euromex website or the app store/play store

5. Configurations

You can use the VC.3045 camera in 5 different ways. Each application requires a different hardware environment

5.1 Camera working standalone with built-in ImageFocusAlpha software

For this application, apart from the microscope, you only need an HDMI monitor, the supplied USB mouse, and the camera embedded ImageFocusAlpha software. A computer or a network connection is not required to operate the camera in this application. The steps to start the camera are listed as below:

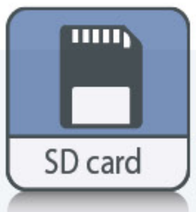
1. 

Connect the camera to a HDMI monitor using the HDMI cable (C)

2. 

Insert the supplied USB mouse to the camera's USB port (B)

3. 



Insert the supplied SD card/USB flash drive (USB 3.0 slot) into the SD card slot/USB 3.0 slot (G, A)

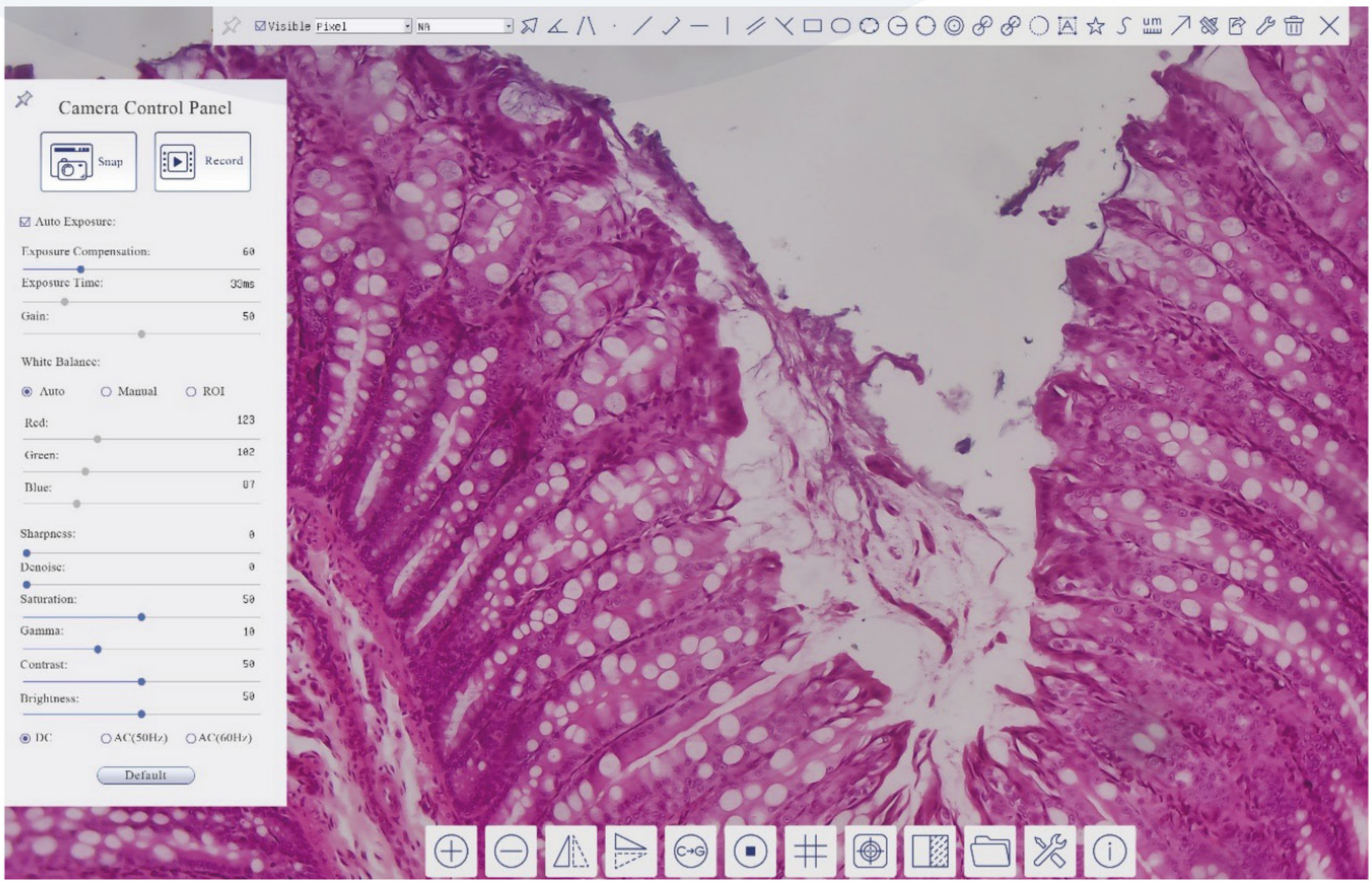
4. 

Connect the camera to the power adapter and switch it on (H)

5. 

Turn on the monitor and view the video in the ImageFocusAlpha software. Move the mouse to the left, top or bottom of the ImageFocusAlpha user interface (UI), different control panel or toolbar will pop up and you can operate at ease by using the mouse

ImageFocusAlpha in HDMI mode

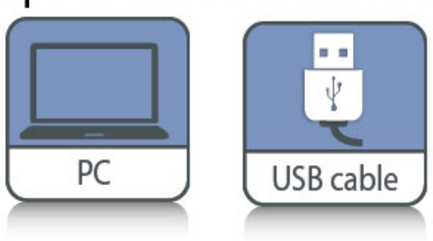


5.2 Connecting camera to computers with USB 3.0 port

Please use ImageFocusAlpha for

- Windows 10/11 (32/64 bit),
- Mac OS and Linux user (Mac OS 10.10 or above or Linux distributions with kernel 2.6.27 or higher)

The steps to start the camera are listed below:

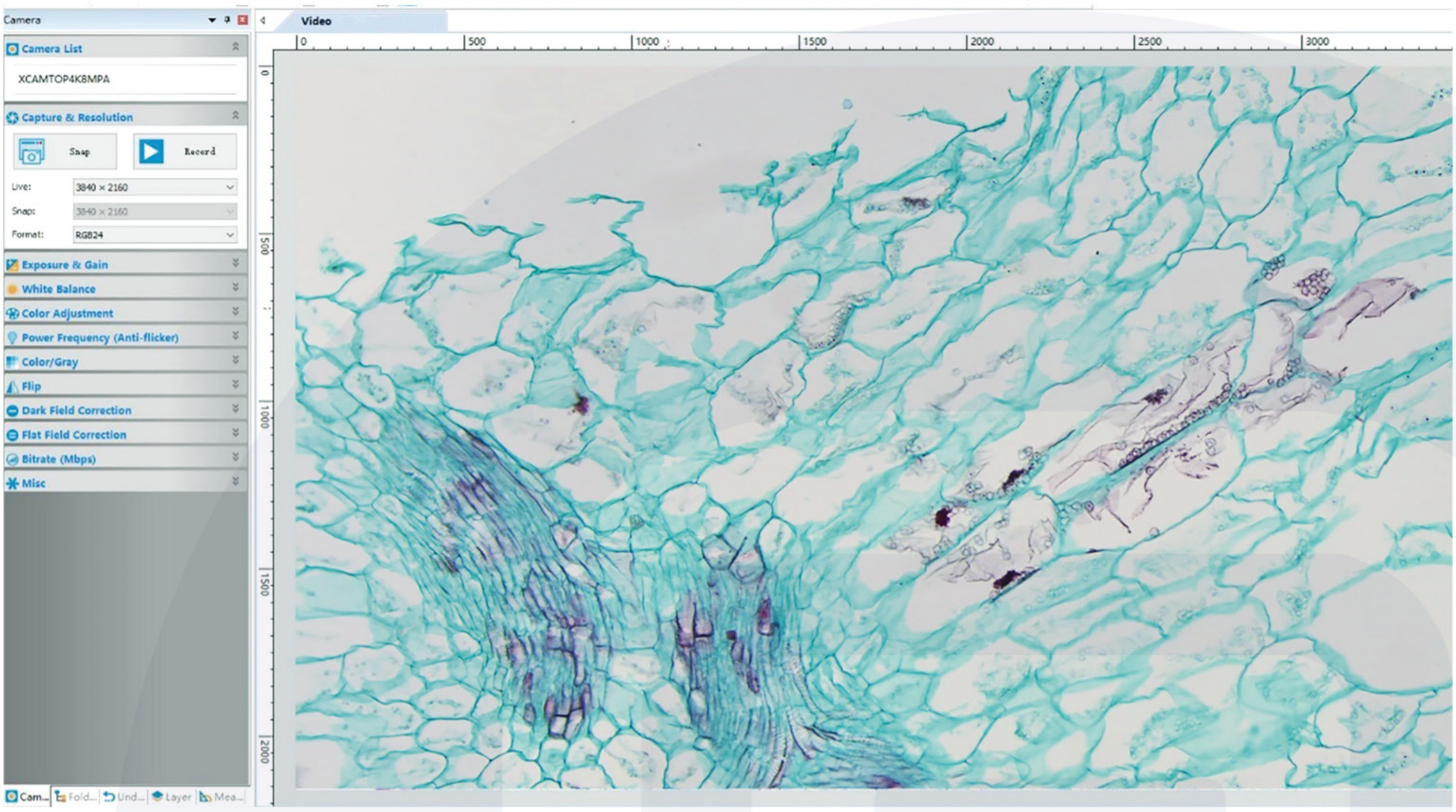
1. 

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 (D, p3), NOT “USB Mouse” slot (B, p3)

2. 

Install ImageFocusAlpha on your PC or install ImageFocusAlpha App on the mobile device; Run the software ImageFocusAlpha, clicking the camera name in the camera list to start the live video as shown below

Notice: After the USB cable is connected, the mouse will not work. If you want to use the mouse, please unplug the USB cable and restart the camera

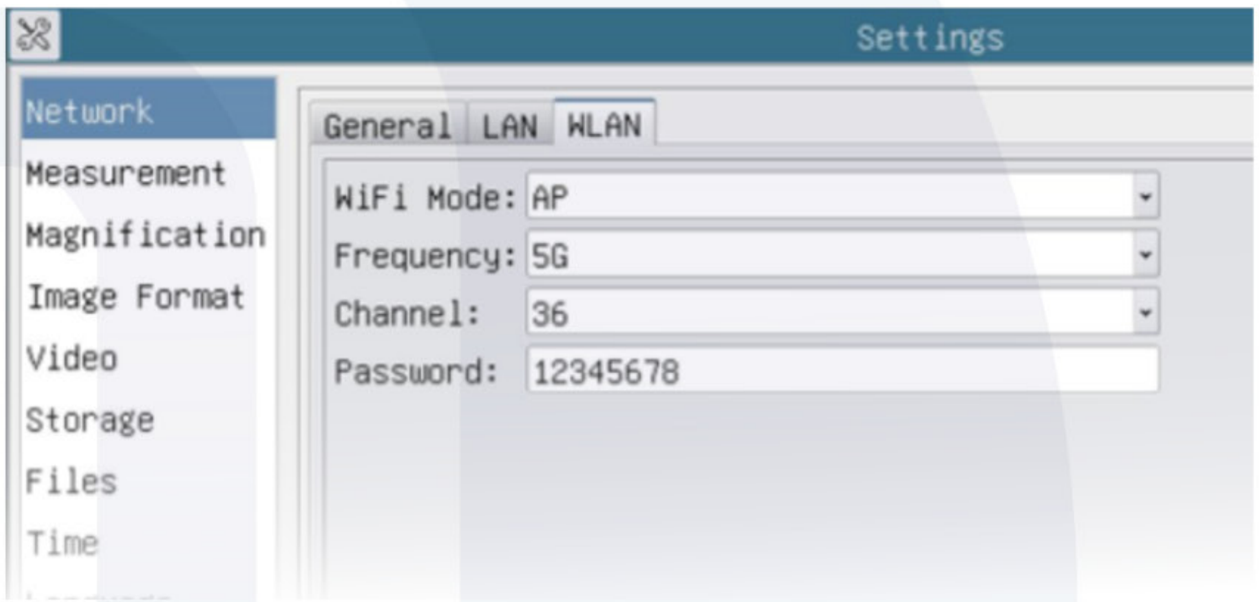


ImageFocusAlpha in USB Mode and in WLAN AP mode

5.3 Camera working in WLAN mode (AP mode)

Please make sure your PC is WLAN enabled. When connecting the camera with a mobile device, the free ImageFocusAlpha App is required. 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:



1. Start the camera according to Sec. 5.1.
2. After the camera is running, move the mouse to the bottom of the GUI and click the button -  - on the **Synthesis Camera Control Toolbar** at the bottom of the video window,

   -
   

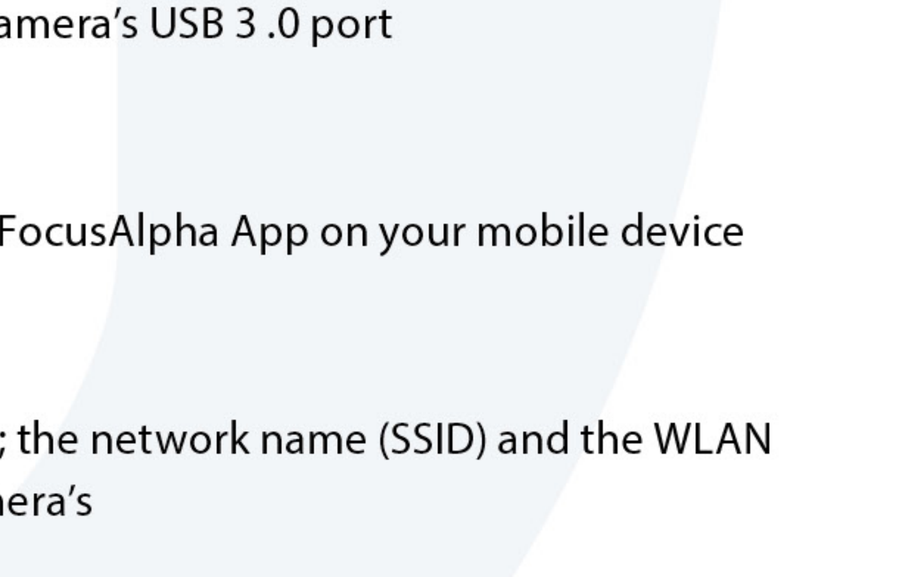
   - a small window called **Settings** will pop up as shown on the right.
   Click Network>WLAN property page and choose the AP in the WiFi Mode edit box (The factory default configuration is AP mode)
3. 

   Plug the USB WLAN adapter (WiFi dongle) into the camera's USB 3 .0 port
4. 

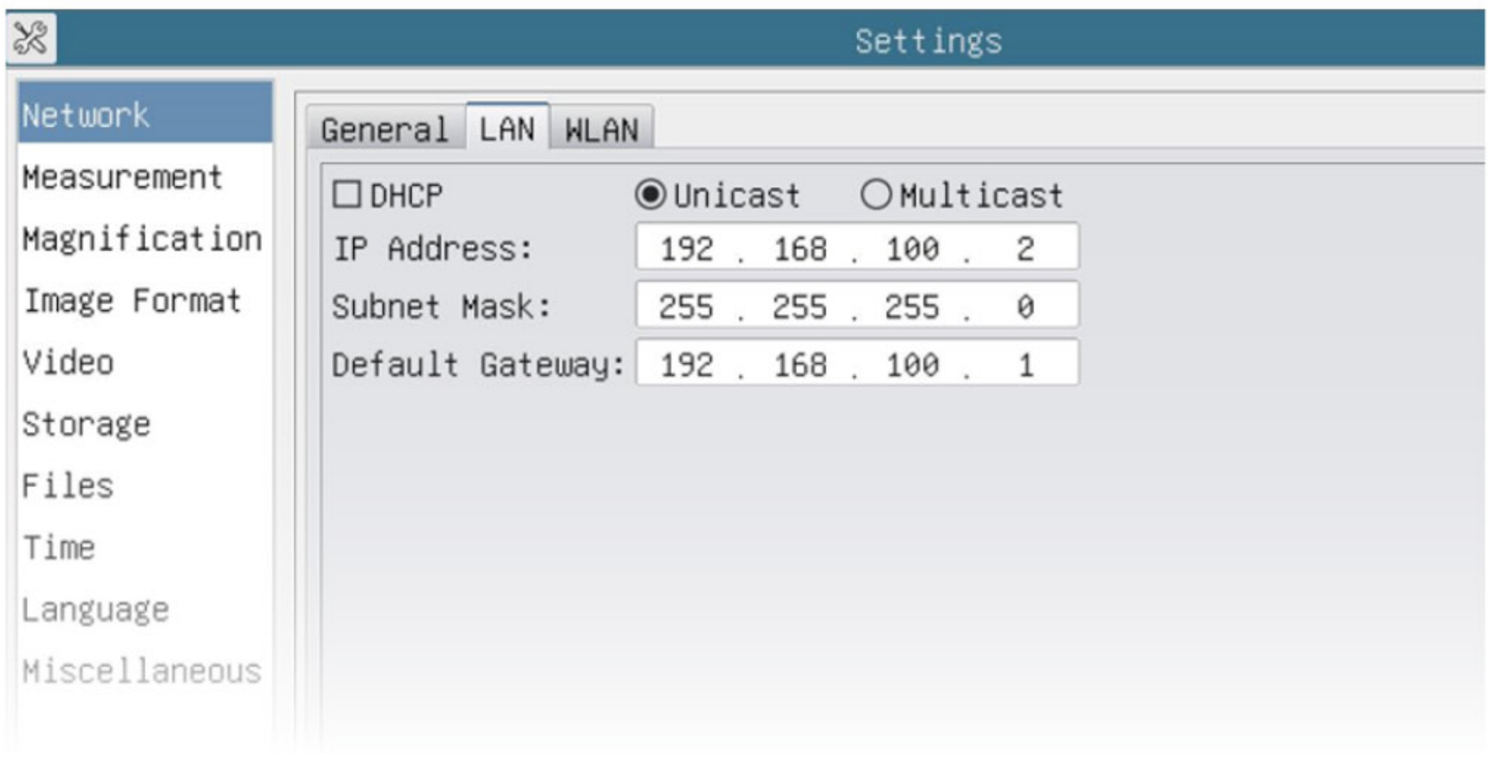
   Install ImageFocusAlpha on your PC or install ImageFocusAlpha App on your mobile device
5. Connect the PC or mobile device to the camera's WLAN AP point; the network name (SSID) and the WLAN password (The default one is 12345678) can be found on the camera's **Setting>Network>WLAN** page in AP mode
6. Start ImageFocusAlpha software or ImageFocusAlpha App and check the configuration. Normally, the active VC.3045 camera will be automatically recognized. The live image of each camera is shown in image on previous page. For the display, the **Camera List tool** window is used in ImageFocusAlpha software, and the **Camera Thumbnail** is used in ImageFocusAlpha App

5.4 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



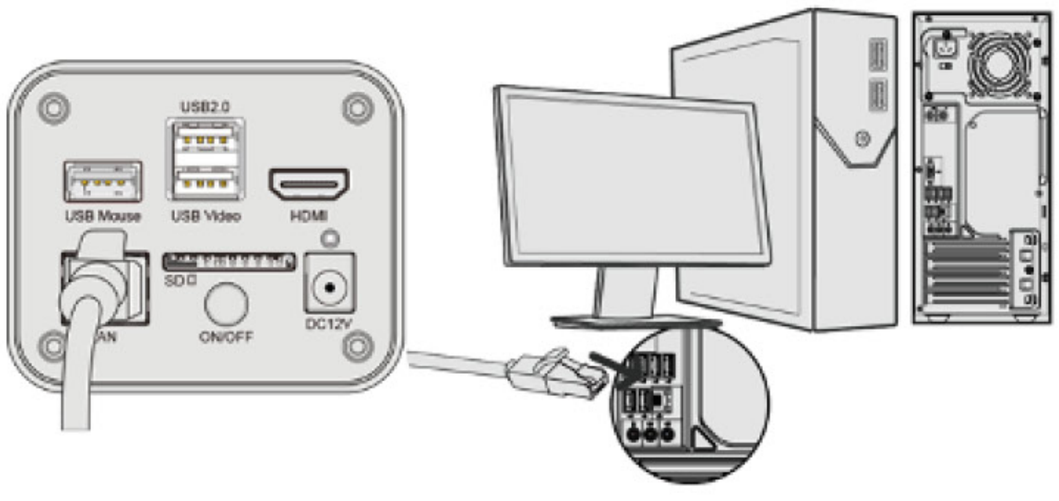
1. Start the camera according to Sec. 5.1
2. After the camera is running, click -  - button on the **Synthesis Camera Control Toolbar** at the bottom of the video window -  -, a small window called **Settings** will pop up as shown below on the left side



Configure the VC.3045 Series Camera IP

Configure the PC's IP

3. Click LAN property page, uncheck the DHCP item
4. Input ip address, subnet mask and default gateway for the camera
5. Designate internet protocol version 4 (TCP/IPv4) settings page's IP address on the PC with similar configuration as shown on p 7 below on the right side but with different IP address
6. After the above configurations are finished, user can connect the VC.3045 camera to the computer through the ethernet cable as shown below



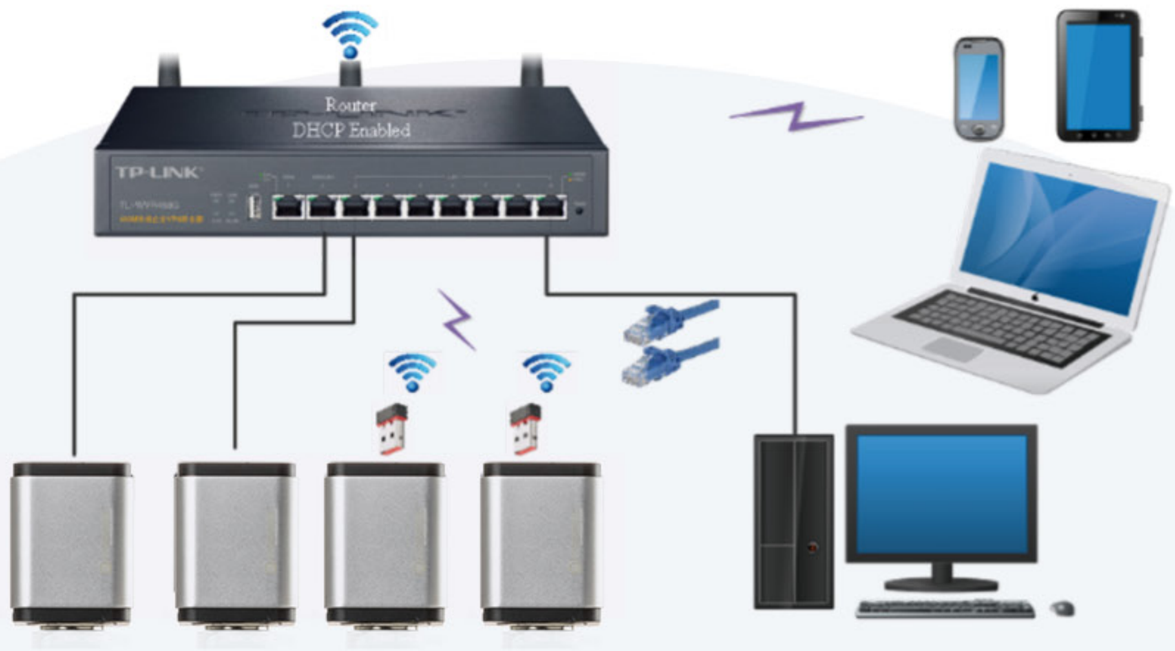
7. Connect the LAN port with the ethernet cable to the PC's network port
8. Insert the supplied SD card/USB flash drive (USB 3.0 slot) into the VC.3045 camera's SD card slot/USB 3.0 slot

9. Install ImageFocusAlpha on your PC or install ImageFocusAlpha App on your mobile device; Run the software ImageFocusAlpha, click the camera name in the camera list

5.5 Connecting multiple cameras to the router

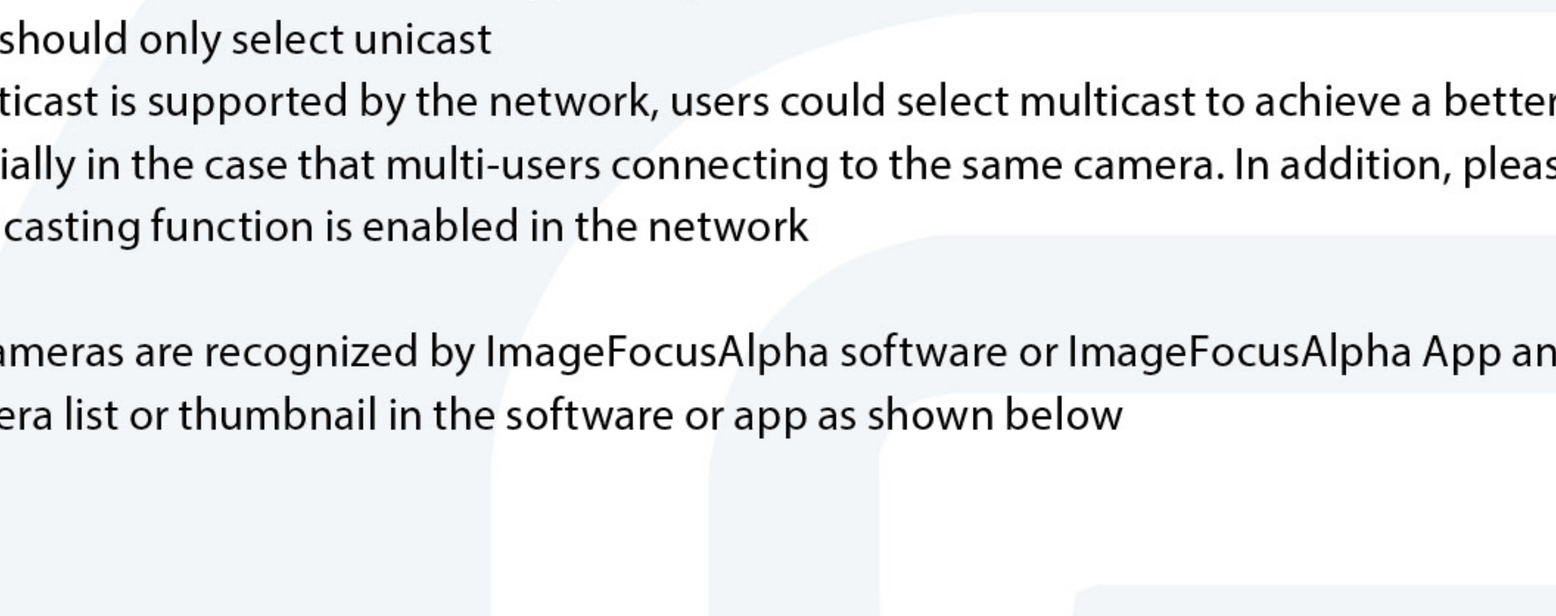
through the LAN port/WLAN STA mode for the network application

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 can connect the router with Ethernet cable/WLAN to control the camera



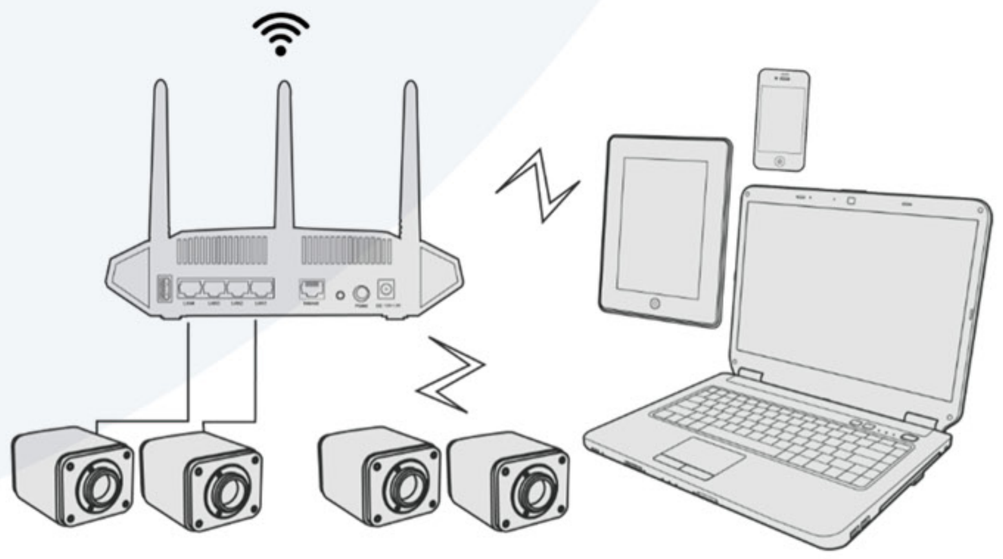
1. The connection and configuration are the same as in Sec. 5.1 or Sec. 5.4. But here, users need to check DHCP
   - If multicast is disabled or is not supported, users should only select unicast
   - If multicast is supported by the network, users could select multicast to achieve a better performance, especially in the case that multi-users connecting to the same camera. In addition, please make sure that the broadcasting function is enabled in the network

2. Active cameras are recognized by ImageFocusAlpha software or ImageFocusAlpha App and they are displayed in a camera list or thumbnail in the software or app as shown below



3. You can also start the camera according to Sec. 5.1. After the camera is running, move the mouse to the bottom of the video window and click the -  - button on the **Synthesis Camera Control Toolbar** at the bottom of the video window. A small window **Settings** will pop up as shown below. Click Network>WLAN property page and choose the STA in the WiFi Mode edit box (The factory default configuration is AP mode). Input your router's SSID and password to complete connection

4. Install ImageFocusAlpha software on your PC or install the free ImageFocusAlpha App on your mobile device
5. 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)
6. Or plug the USB WLAN adapter into the camera's USB 3.0 port (for those connected to router with WLAN STA mode)
7. 2 cameras are connected to the router with LAN cable and 2 cameras are connected to the same router with WLAN STA mode (The number of the cameras connected to the router are determined by the router performance)



8. Make sure your PC or your mobile device is connected to the LAN or WLAN of the router
9. Start ImageFocusAlpha software or ImageFocusAlpha App and check the configuration. Generally, active cameras are automatically recognized. The live image of each camera is displayed. For the display, **Camera List control panel** window is used in ImageFocusAlpha software, and **Camera Thumbnail** is used in ImageFocusAlpha App
   - Select the camera you are interested in. To do so, double click the camera's name in Camera List tool window if you use ImageFocusAlpha /ImageFocusAlpha software
   - If you use ImageFocusAlpha App, tap the camera's thumbnail in Camera List page

6. About the routers/switches

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

7. Brief introduction of UI and its functions

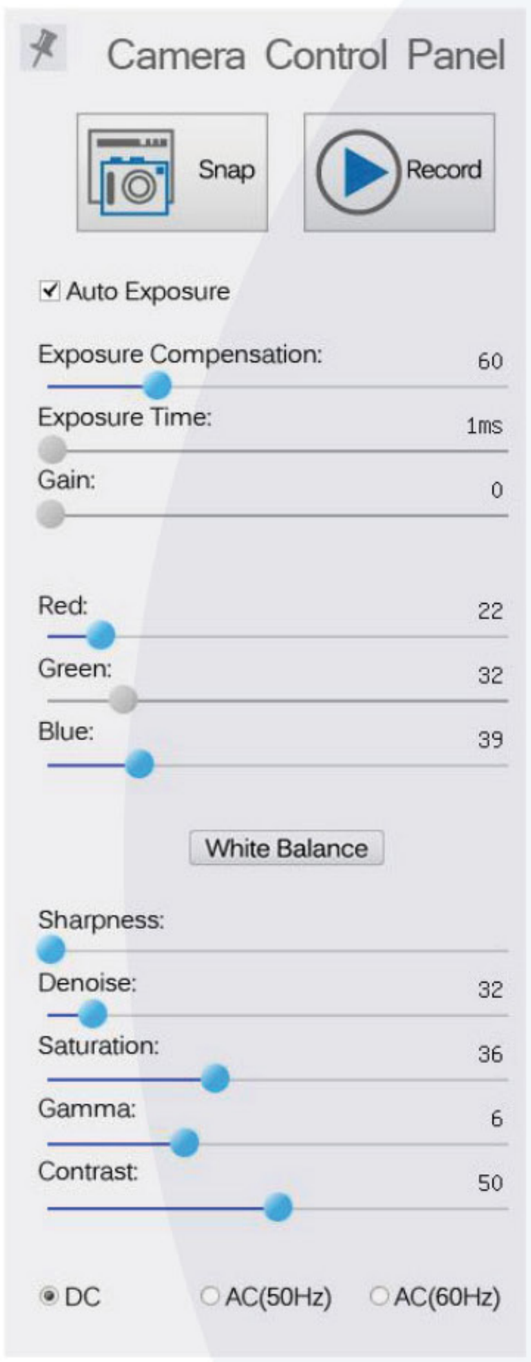
7.1 ImageFocusAlpha UI

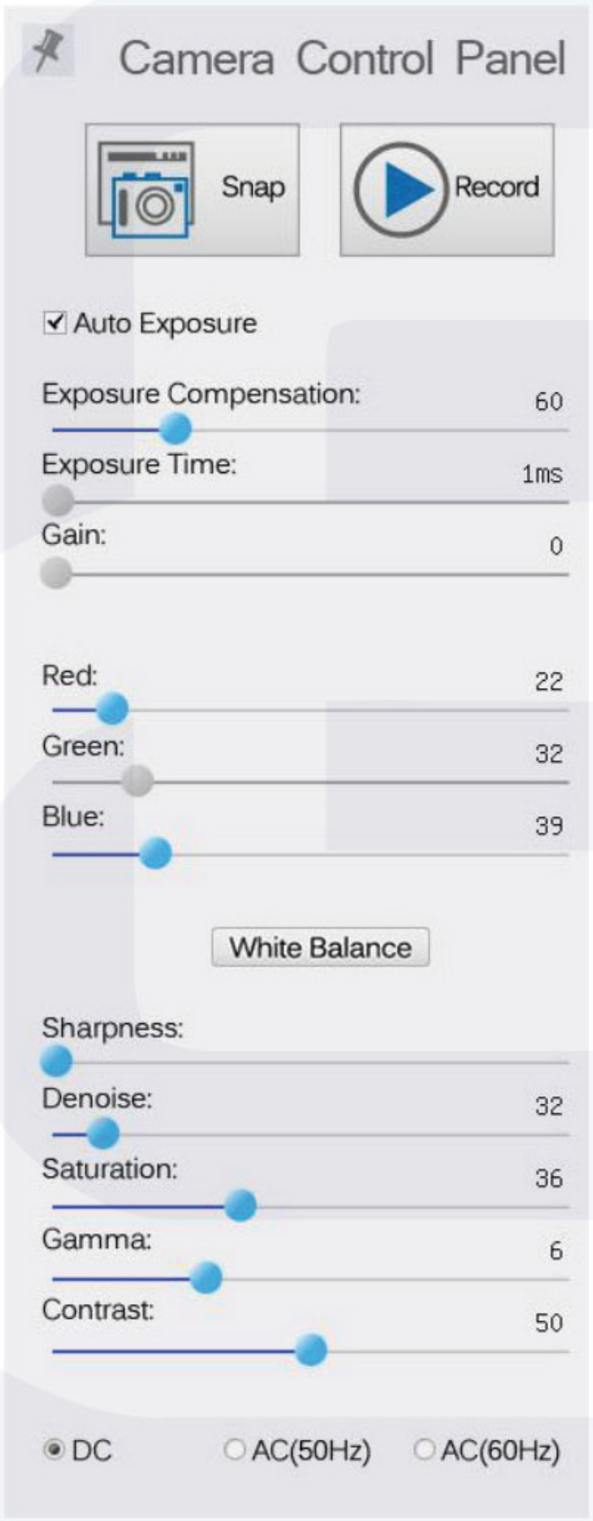
The VC.3045 UI includes a **Camera Control Panel** on the left of the video window, a **Measurement Toolbar** on the top of the video window and a **Synthesis Camera Control Toolbar** on the bottom of the video window

Notes	
1	To show the **Camera Control panel**, move your mouse to the left of the video window. See Sec.7.2 for details
2	Move the mouse cursor to the top of the video window, a **Measurement toolbar** will pop up for calibration and measurement operations. When user left-clicks the **Float/Fixed button** - - on the Measurement toolbar, this toolbar will be fixed. In this case the **Camera Control panel** will not pop up automatically even if users move mouse cursor to left side of the video window. Only when user left-clicks the - - button on the **Measurement toolbar** to exit from measuring operations will they be able to do other operations on the Camera Control panel, or the Synthesis Camera Control toolbar. During the measuring operations, when a specific measuring object is selected, an **Object Location & Attributes Control bar** will appear for changing location and properties of the selected object - -. See Sec.7.4 for details
3	When users move mouse cursor to the bottom of the video window, the **Synthesis Camera Control toolbar** will pop up automatically - -. See Sec.7.4 for details

7.2 The Camera Control Panel on the left side of the video window

The **Camera Control Panel** controls the camera to achieve the best video or image quality according to the specific applications; It will pop up automatically when the mouse cursor is moved to the left side of the video window (in measurement status, the Camera Control Panel will not pop up. The Camera Control Panel will only pop up when the measurement process is finished or terminated while user's cursor on the left edge of the video window). Left-clicking button to achieve Display/Auto Hide switch of the Camera Control Panel

Camera Control Panel	Function	Function Description
	Snap	Capture image and save it to the SD card
	Record	Record video and save it to the SD card
	Auto Exposure	When Auto Exposure is checked, the system will automatically adjust exposure time and gain according to the value of exposure compensation
	Exposure Compensation	Available when Auto Exposure is checked. Slide to left or right to adjust Exposure Compensation according to the current video brightness to achieve proper brightness value
	Exposure Time	Available when Auto Exposure is not checked. Slide to left or right to reduce or increase exposure time, adjusting brightness of the video
	Gain	Adjust Gain to reduce or increase brightness of video. The noise will be reduced or increased accordingly
	Auto White Balance	White Balance adjustment according to the video continuously
	Manual White Balance	Adjust the red or blue slide bar to set the video white balance
	ROI White Balance	White Balance could be adjusted when the ROI region is changed according to content inside the ROI region
	Red	Slide to left or right to decrease or increase the proportion of red item in RGB on video
	Green	Slide to left or right to decrease or increase the proportion of green item in RGB on video



Blue	Slide to left or right to decrease or increase the proportion of blue item in RGB on the video
Sharpness	Adjust Sharpness level of the video
Denoise	Slide left or right to Denoise the video
Saturation	Adjust Saturation level of the video
Gamma	Adjust Gamma level of the video. Slide to the right side to increase gamma and to the left to decrease gamma
Contrast	Adjust Contrast level of the video. Slide to the right side to increase contrast and to the left to decrease contrast
Brightness	Adjust Brightness level of the video. Slide to the right side to increase brightness and to the left to decrease brightness
DC	For DC illumination, there will be no fluctuation in light source, so no need for compensating light flickering
AC(50HZ)	Check AC(50HZ) to eliminate flickering caused by 50Hz light source
AC(60HZ)	Check AC(60HZ) to eliminate flickering caused by 60Hz light source
Default	Restore all the settings in the Camera Control Panel to default values

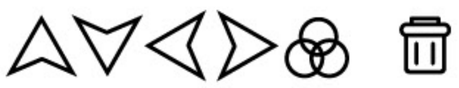
7.3 The Measurement Toolbar on top of the video window

The Measurement Toolbar will pop up when moving mouse cursor to any place near the upper edge of the video window. Here is the introduction of the various functions on the Measurement Toolbar:

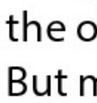
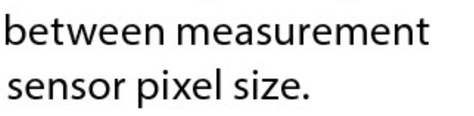
Icon	Function
	Float/ Fix switch of the Measurement Toolbar
Visible	**Show / Hide** measurement objects
Nanometer (nm)	Select the desired **measurement unit**
4X	Select **Magnification** for measurement after calibration
	Object select
	Angle
	4 Points angle
	Point
	Arbitrary line
	3 Points line
	Horizontal line

Icon	Function
	Vertical line
	3 Points vertical Line
	Parallel
	Rectangle
	Ellipse
	5 Points ellipse
	Circle
	3 Points circle
	Annulus
	Two circles and its center distance

Icon	Function
	3 Points two circles and its center distance
	Arc
	Text
	Polygon
	Curve
	Scale Bar
	Arrow
	Execute **Calibration** to determine the corresponding relation between magnification and resolution, which will establish the corresponding relationship between measurement unit and the sensor pixel size. Calibration needs to be done with the help of a micrometer. For detailed steps of carrying out calibration, please refer to ImageFocusAlpha help manual

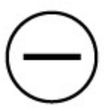
Icon	Function
	**Export the measurement information** to CSV file(*.csv)
	Measurement setup
	**Delete** all the measurement objects
	**Exit** from measurement mode
	When the measurement ends, left-click on a single measuring object and the **Object Location & Properties Control Bar** will show up. User could move the object by dragging the object with the mouse. But more accurate movement could be done with the control bar. The icons on the control bar mean Move Left, Move Right, Move Up, Move Down, Color Adjustment and Delete

Note:

1. When user left-clicks **Display/Hide** button - - on the **Measurement toolbar**, this toolbar will be fixed. In this case the **Camera Control panel** will not pop up automatically even if moving the mouse cursor to the left edge of the video window. Only when user left-click the -  - button on the Measurement toolbar to exit from the measurement mode will they be able to doing other operations with the **Camera Control panel** or the **Synthesis Camera Control toolbar**
2. When a specific **Measurement Object** is selected during the measurement operation, the **Object Location & Attributes Control bar** -  - will appear for changing the object location and properties of the selected objects

7.4 Icons and functions of the Synthesis Camera Control Toolbar

at the bottom of the video window

Icon	Function
	Zoom In the video Window
	Zoom Out the video Window
	Horizontal Flip

Icon	Function
	Vertical Flip
	Color/Gray
	Video Freeze

Icon	Function
	Display Cross Line
	Overlay
	Compare Image with the current video

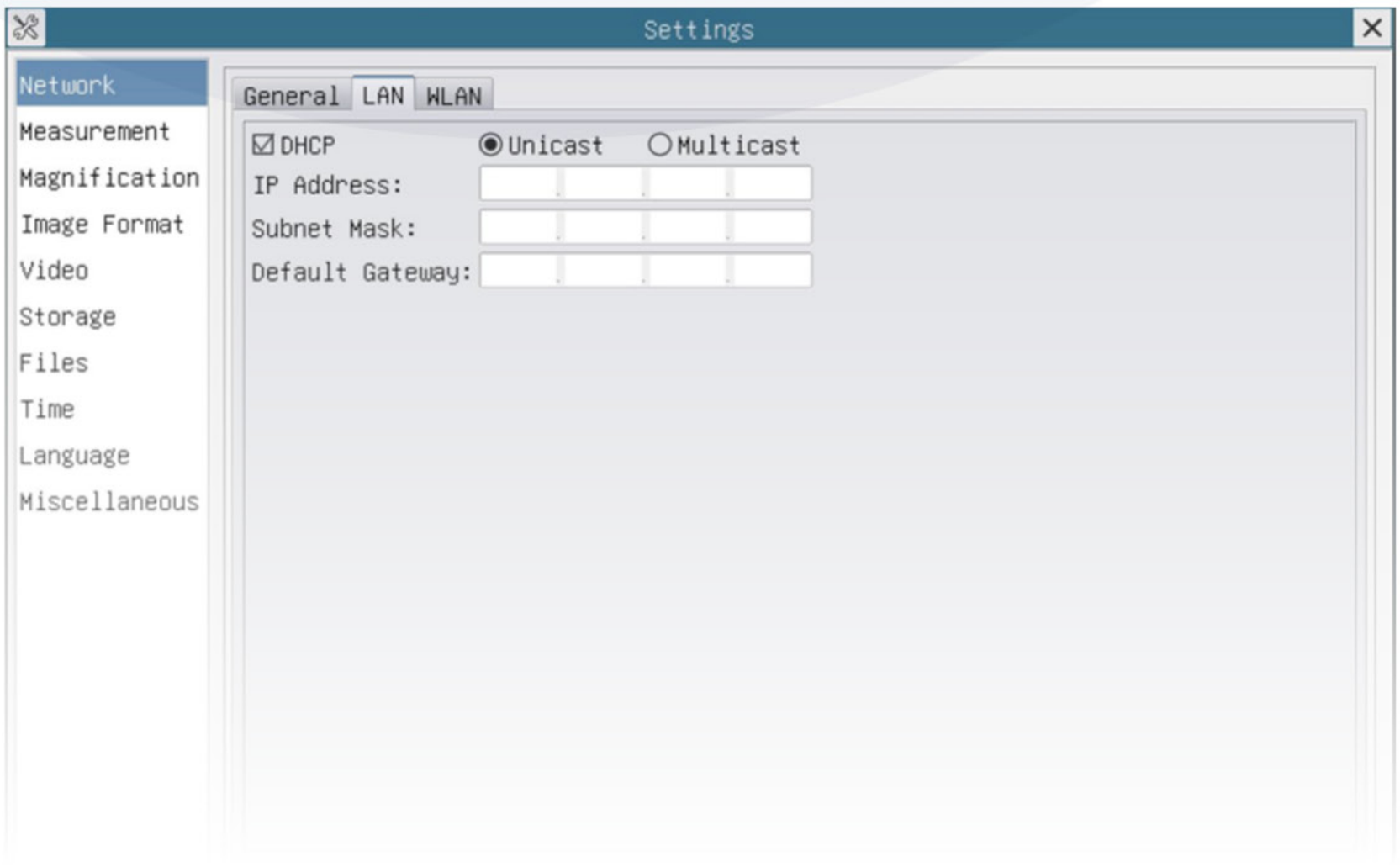
Icon	Function
	Browse Images and Videos in the SD Card
	Settings
	Check the Version of embedded software

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

7.4.1 Setting>Network>LAN

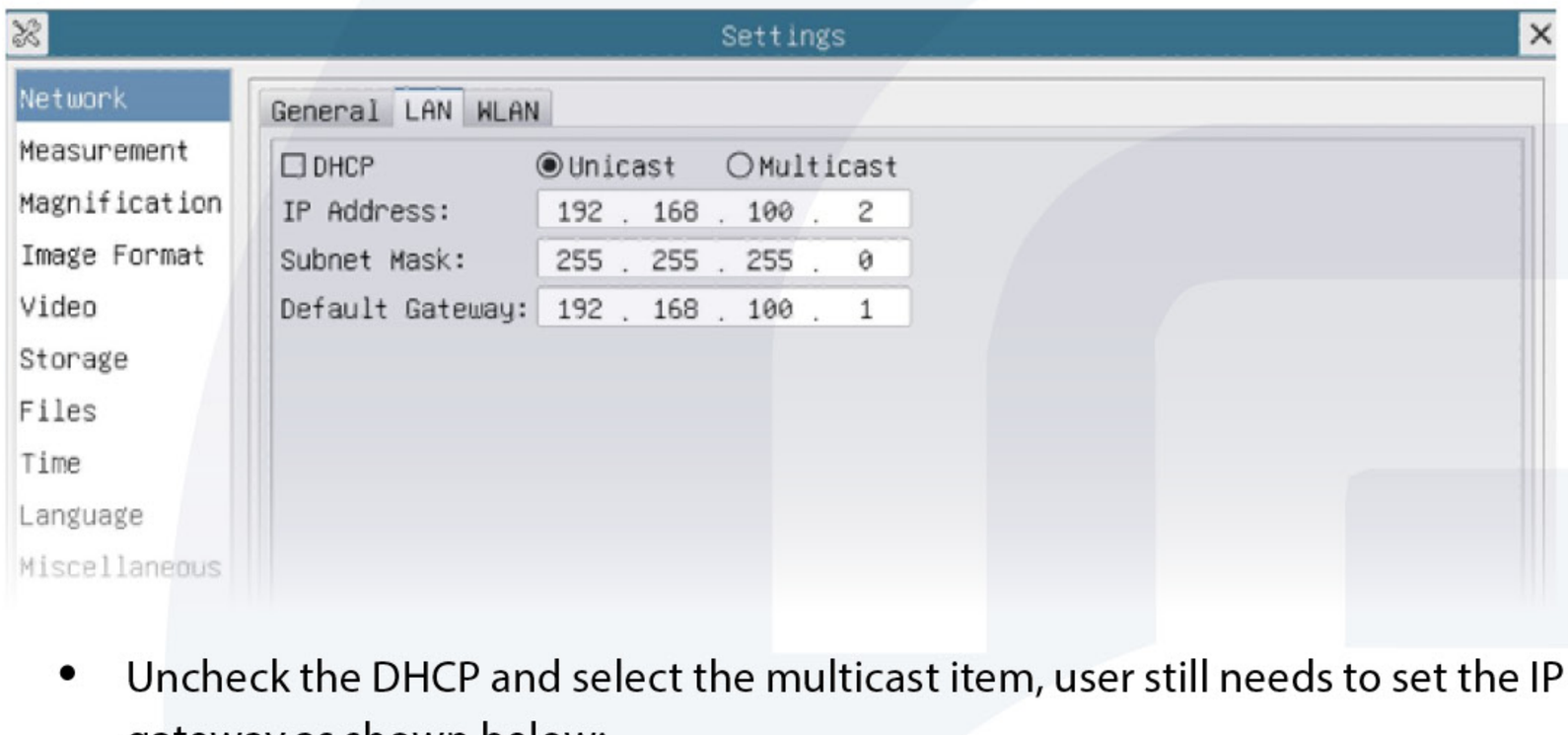
Name	The current camera name recognized as the network name

7.4.2 Setting>Network>LAN



DHCP	Dynamic host control protocol allows DHCP server to automatically assign IP information to the camera. Only in 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 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 is 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.

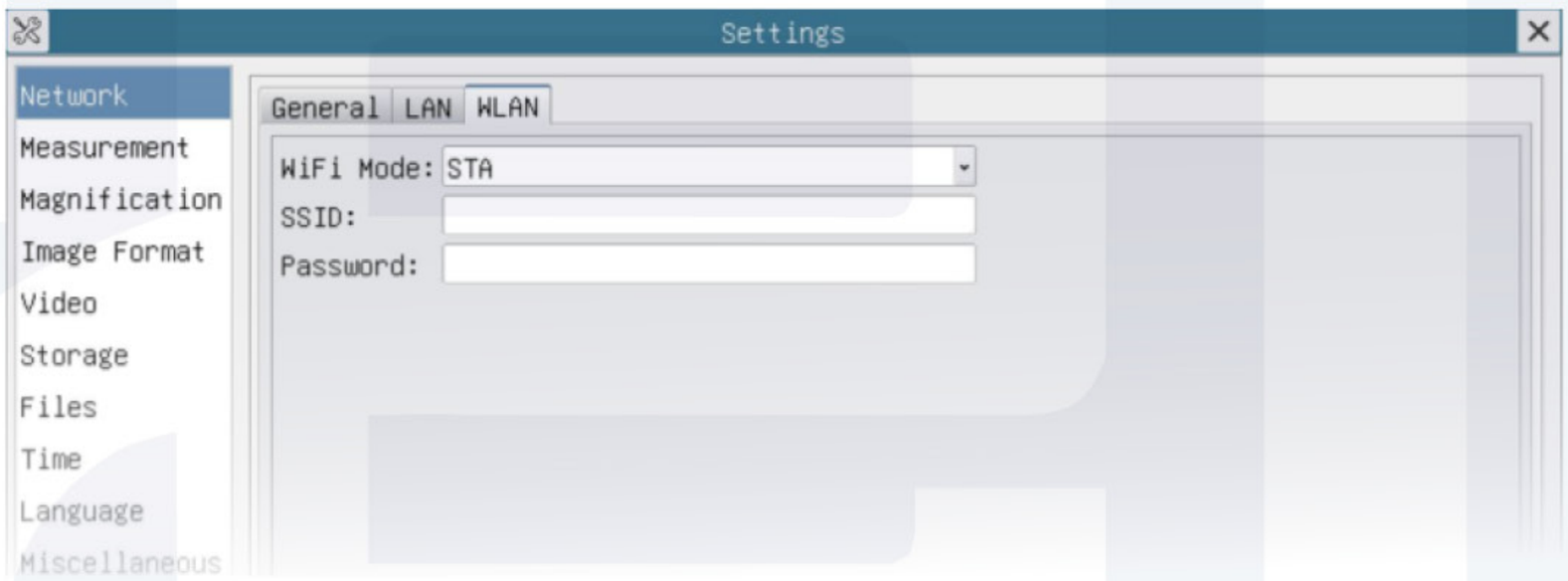
- Uncheck the DHCP and select the unicast item, user still needs to set the IP address, subnet mask and default gateway as shown below:



- Uncheck the DHCP and select the multicast item, user still needs to set the IP address, subnet mask and default gateway as shown below:

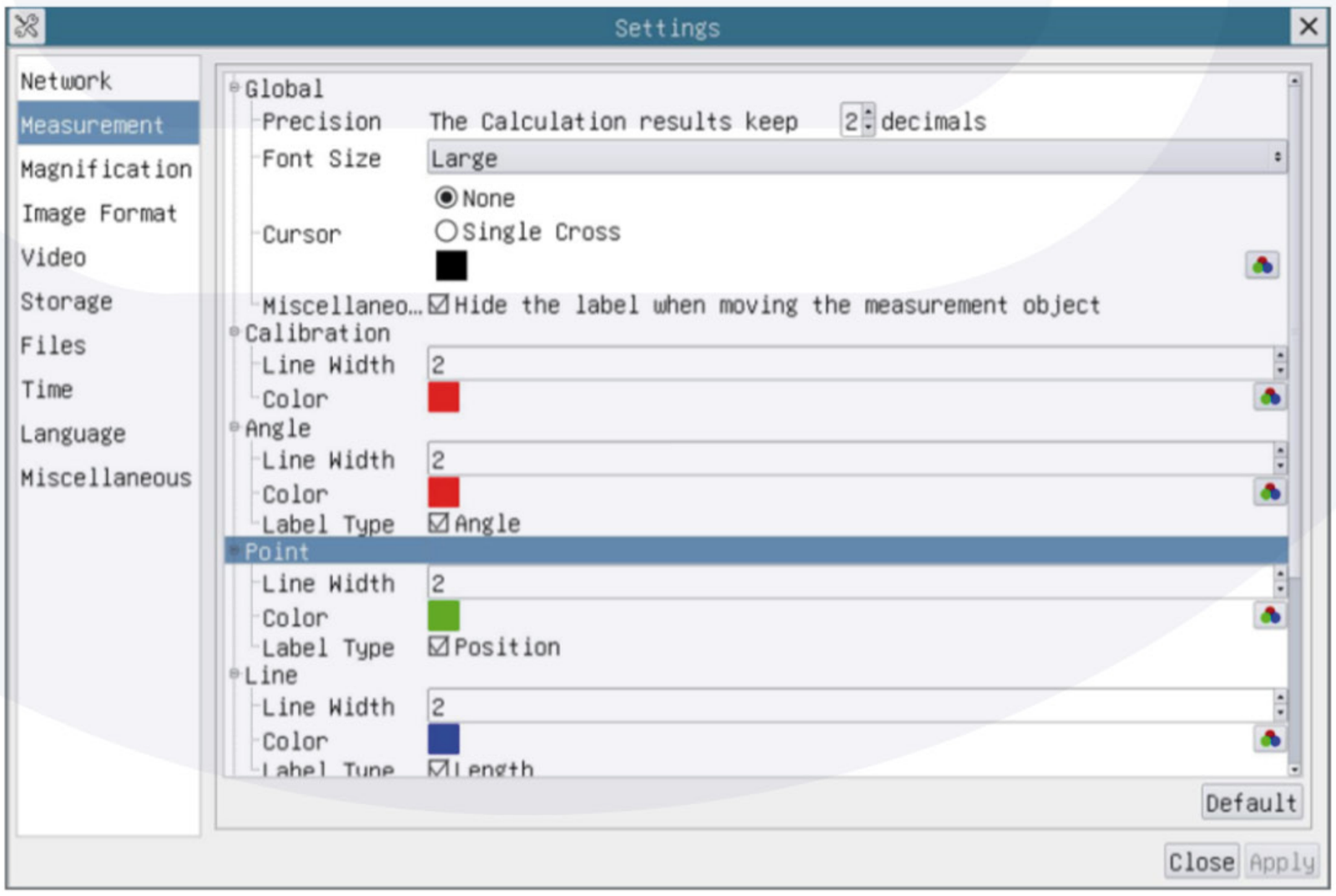
7.4.3 Setting>Network>WLAN

WiFi mode	AP/STA mode to select;
Channel/SSID	Channel for the AP mode and SSID for the STA mode. Here, the SSID is the router's SSID;
Password	Camera password for the AP mode. Router password for the STA mode



7.4.4 Setting>Measurement

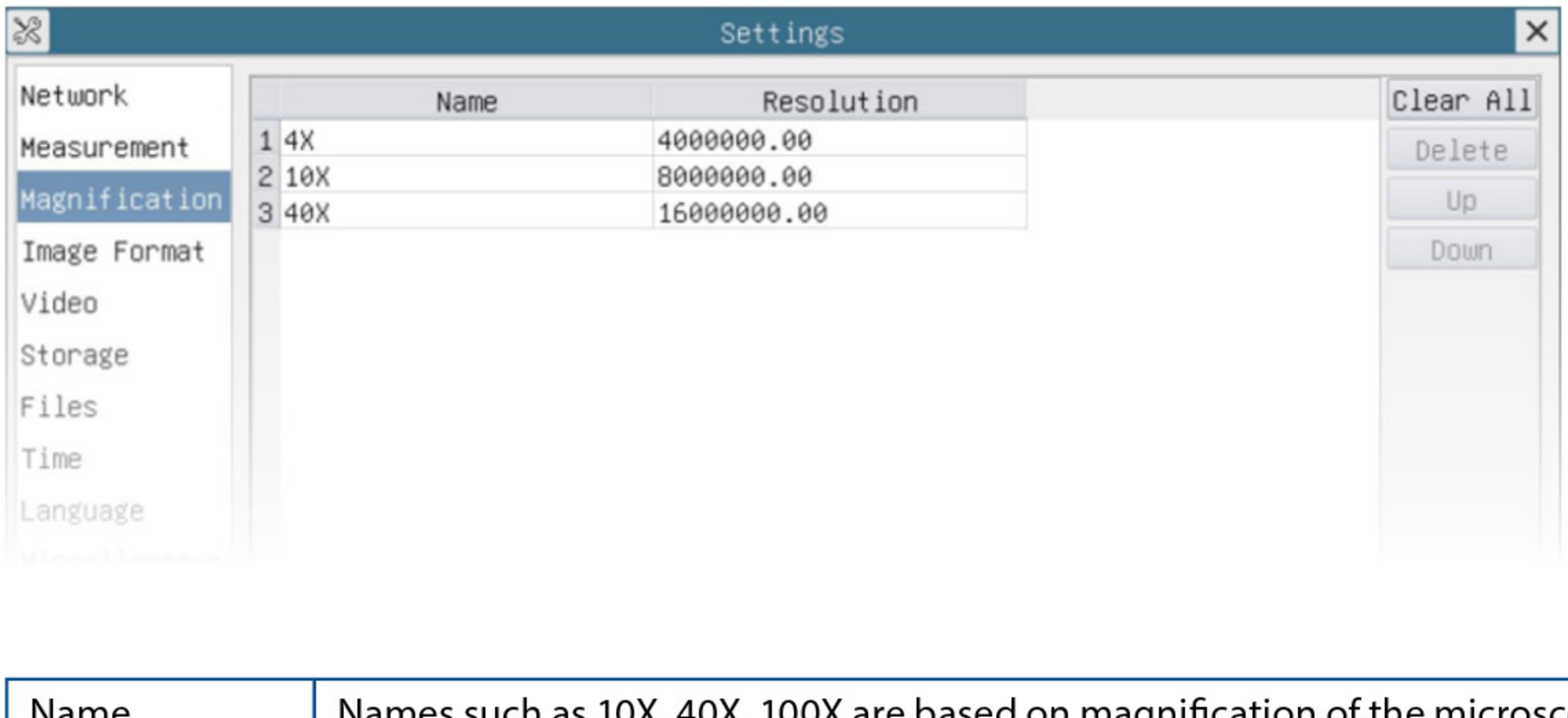
This page is used for the define of the measurement object properties



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 - ⊞ - along with the measurement command mentioned above will unfold the corresponding attribute settings to set the individual property of the measurement objects	

7.4.5 Setting>Magnification

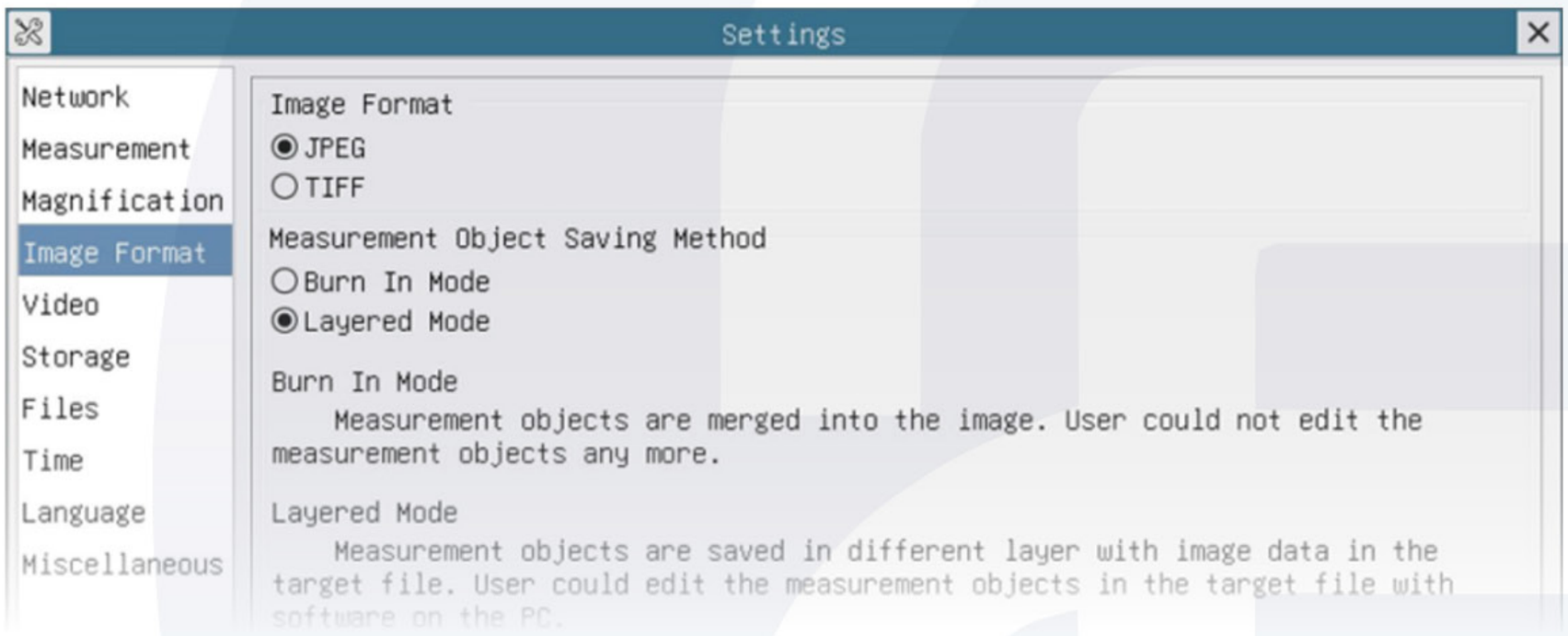
These page's items are formed by the Measurement Toolbar's Calibration command



Name	Names such as 10X, 40X, 100X are based on magnification of the microscopes. For continuous zoom microscopes, ensure that the selected magnification coincides with the scale alignment line on the microscope zoom knob; Users could also edit the name of the magnification with other information, for example, microscope mode, users name, etc
Resolution	Pixels per distance unit. 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

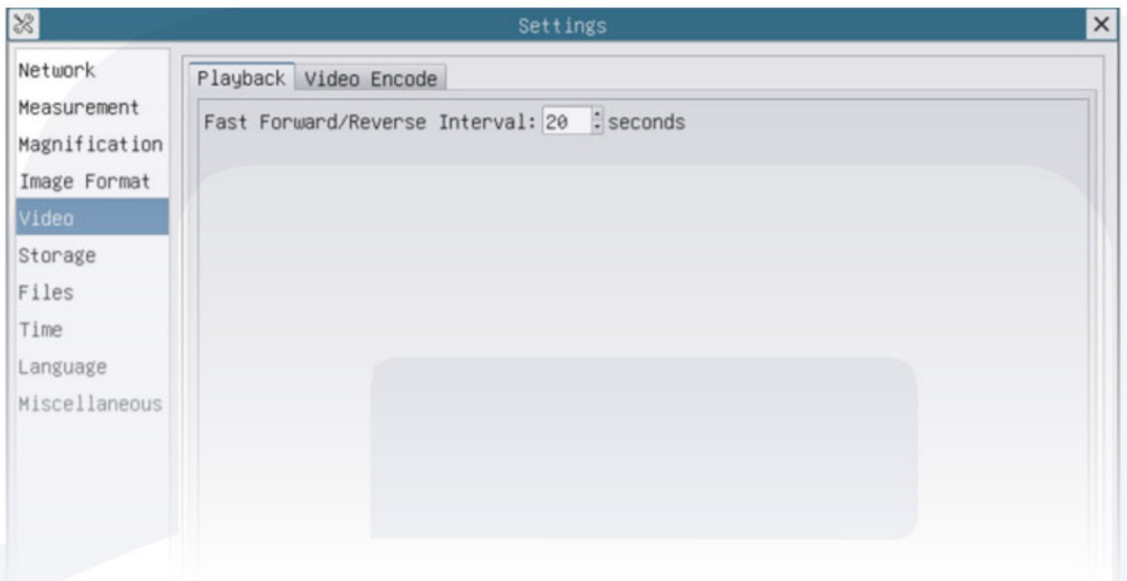
7.4.6 Settings>Image Format

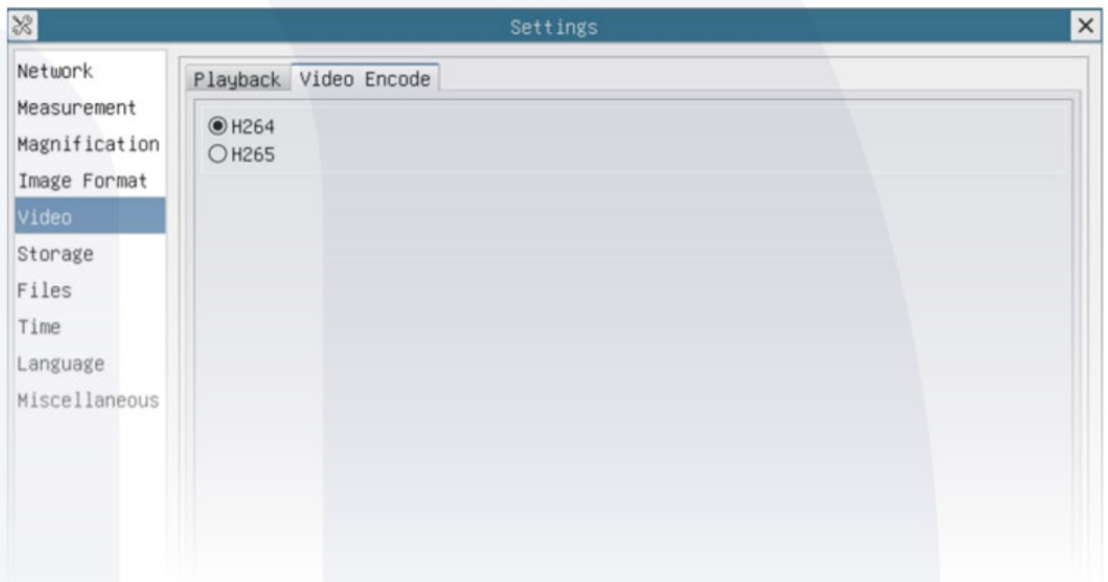
Image format	**JPEG**: The extension of JPEG file can get very high compression rate and display very rich and vivid images by removing redundant images and color data. In other words, it can get better image quality with the least disk space. If measurement objects are available, the measurement objects 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



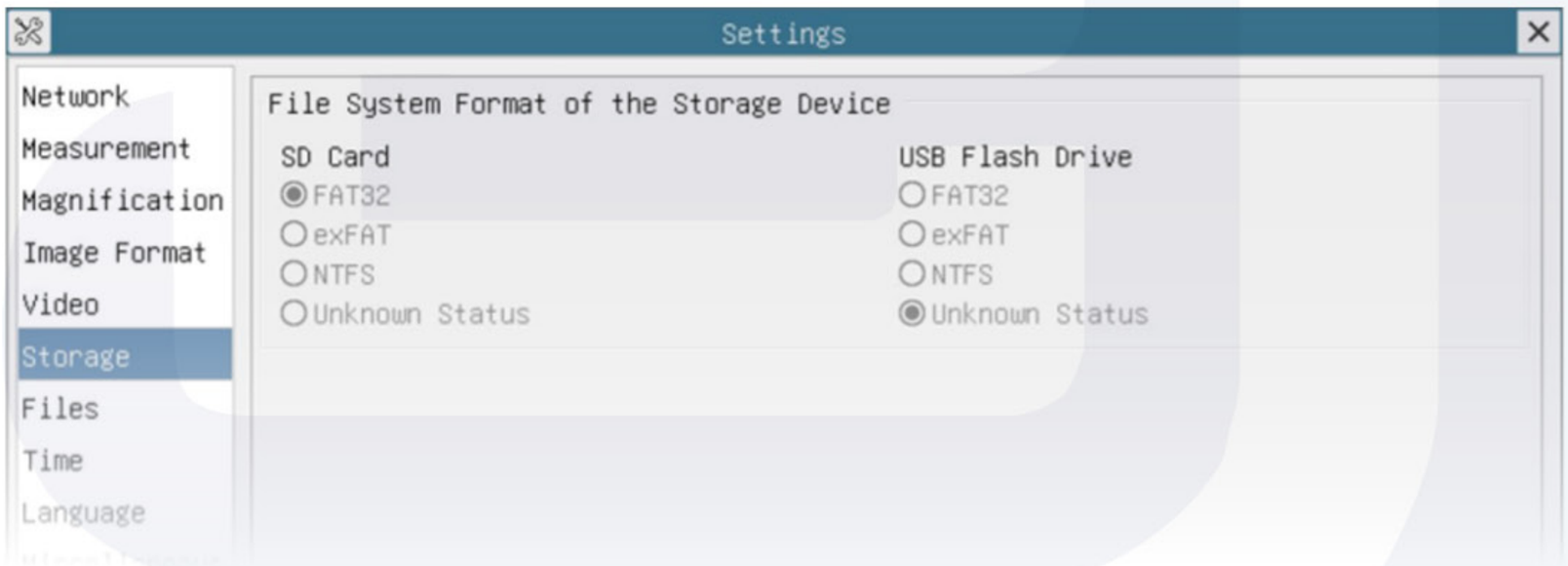
7.4.7 Setting>Video

Video Playback	Fast forward/Reverse internal in second unite for video playback
Video Encode	Select the Video Encode format. That can be H264 or H265. Compared with H264, H265 has a higher compression ratio which is primarily used to further reduce the design flow rate, in order to lower the cost of storage and transmission





7.4.8 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 4GB; **exFAT**: The file system of SD Card is exFAT. The maximum video file size of single file in FAT32 file system is 16GB; **NTFS**: The file system of SD Card is NTFS. The maximum video file size of single file is 2TB **Unknown status**: SD Card not detected or the file system is not identified;
Note: For USB Flash Drive, USB 3.0 interface is preferred.	

7.4.9 Setting>Files

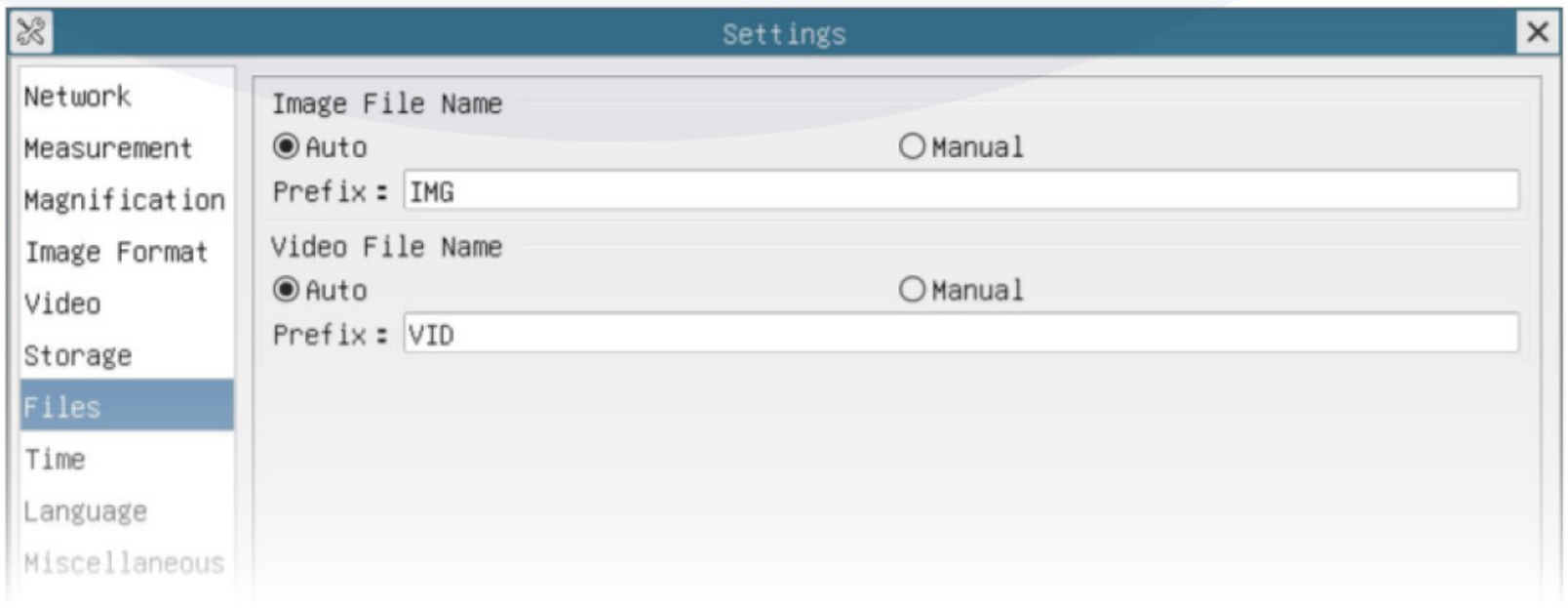
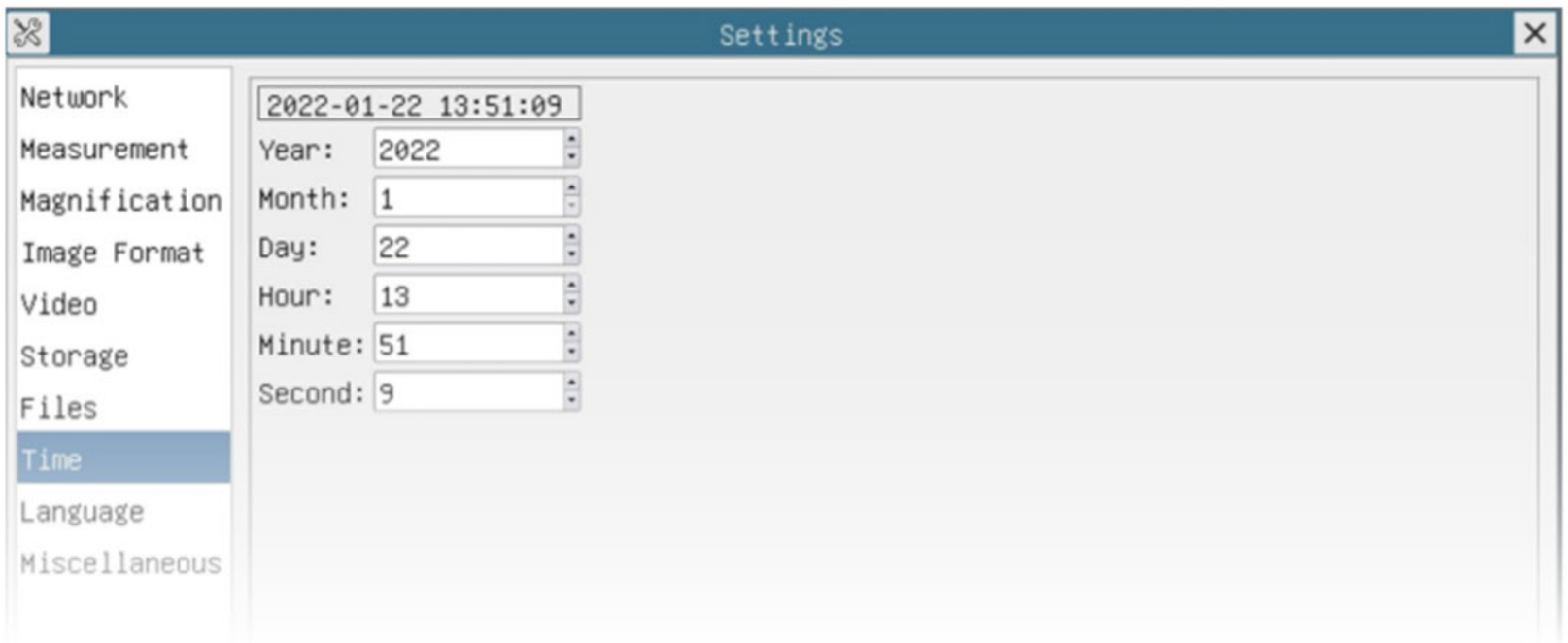


Image file name	**Auto:** The image files will be saved automatically with the specified prefix. **Manual:** Users has to specify the file name before image saving.
Video file name	**Auto:** The video file will be saved automatically with the specified prefix. **Manual:** Users has to specify the Video File Name before video recording.

7.4.10 Setting>Time

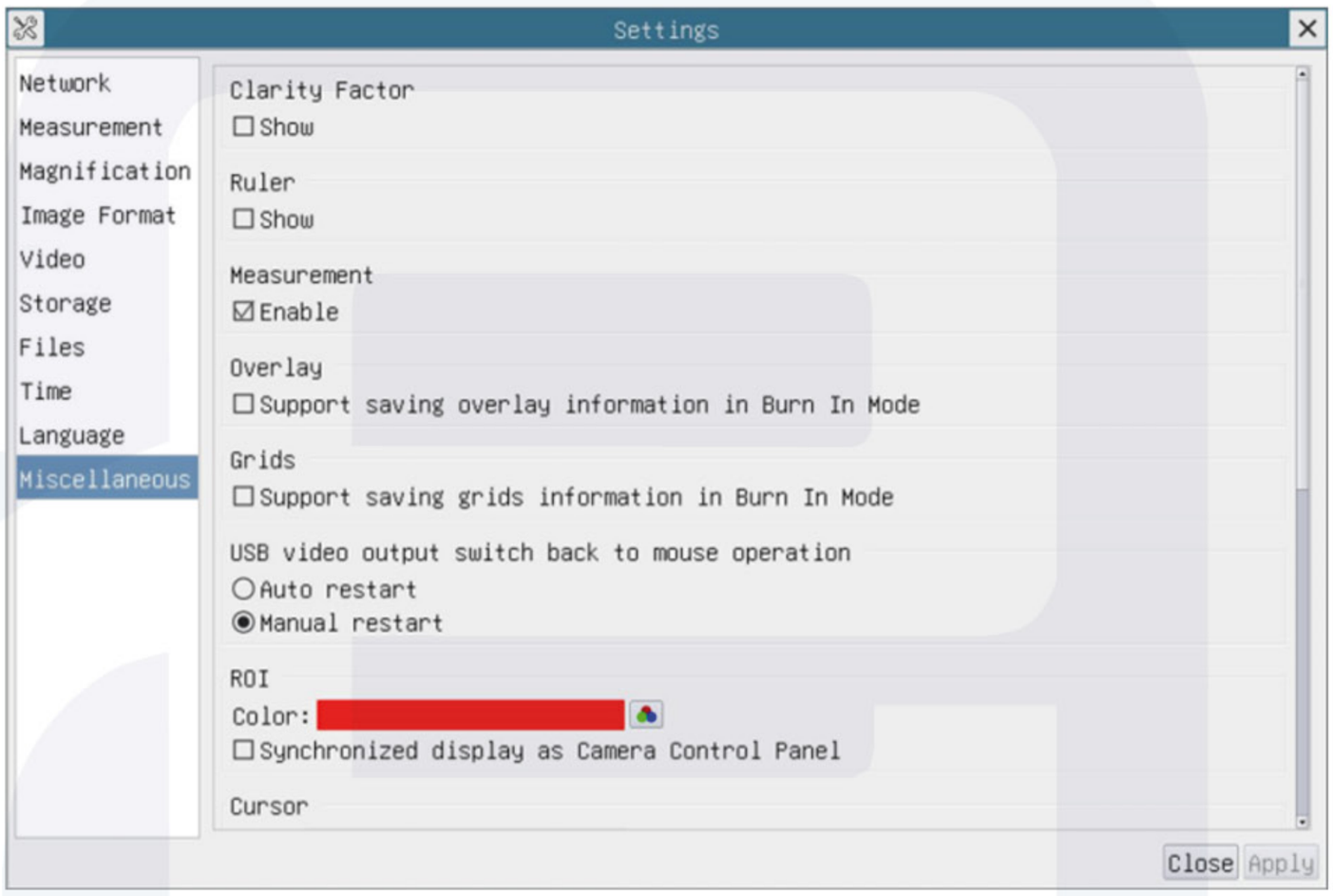


Time	User can set year, month, day, hour, minute and second in this page

7.4.11 Setting>Language

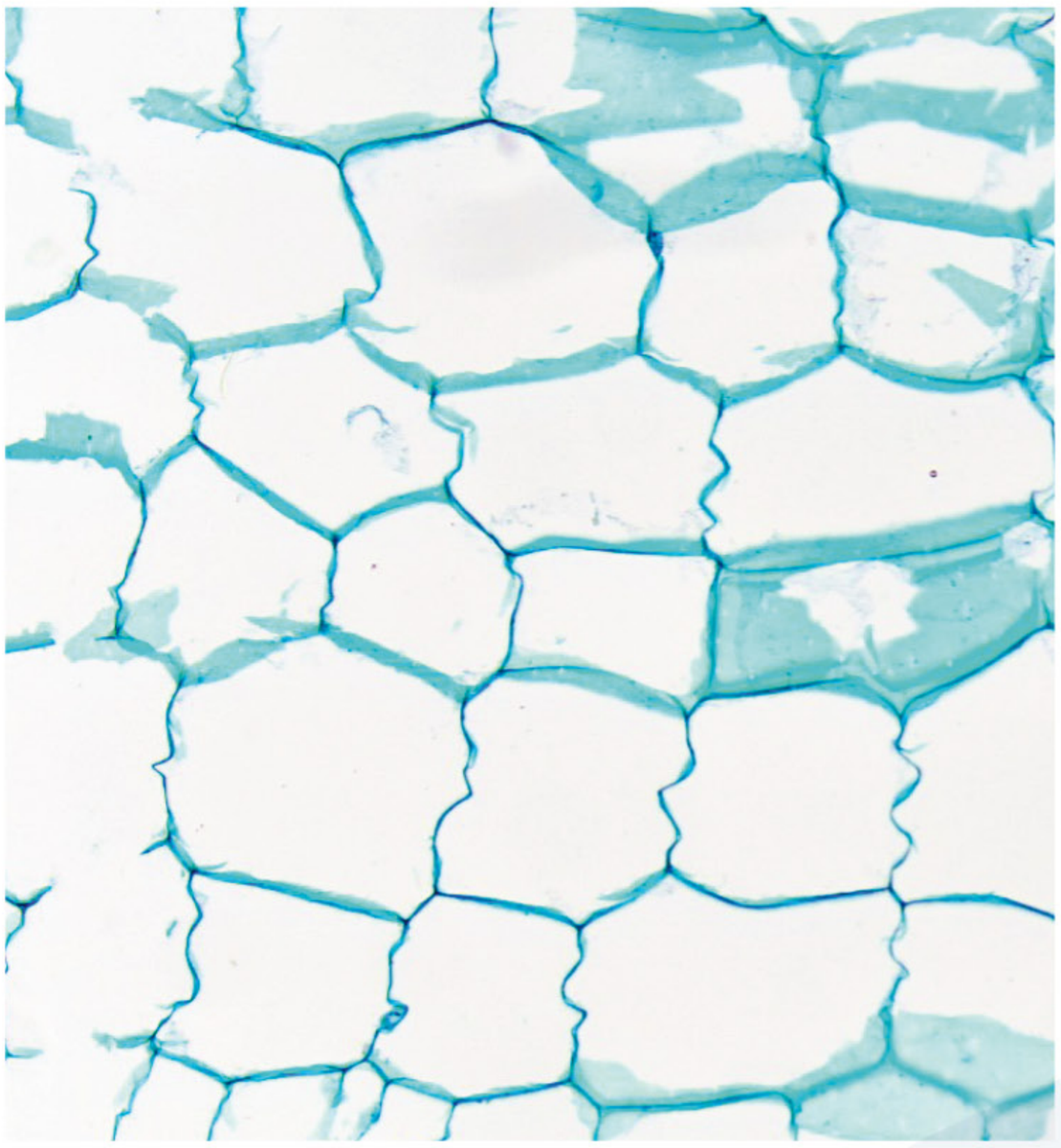
Language	Set language of the whole software into
English	English
Simplified Chinese	Simplified Chinese
Traditional Chinese	Traditional Chinese
Korean	Korean
Thai	Thai
French	French
German	German
Japanese	Japanese
Italian	Italian
Russian	Russian

7.4.12 Setting>Miscellaneous

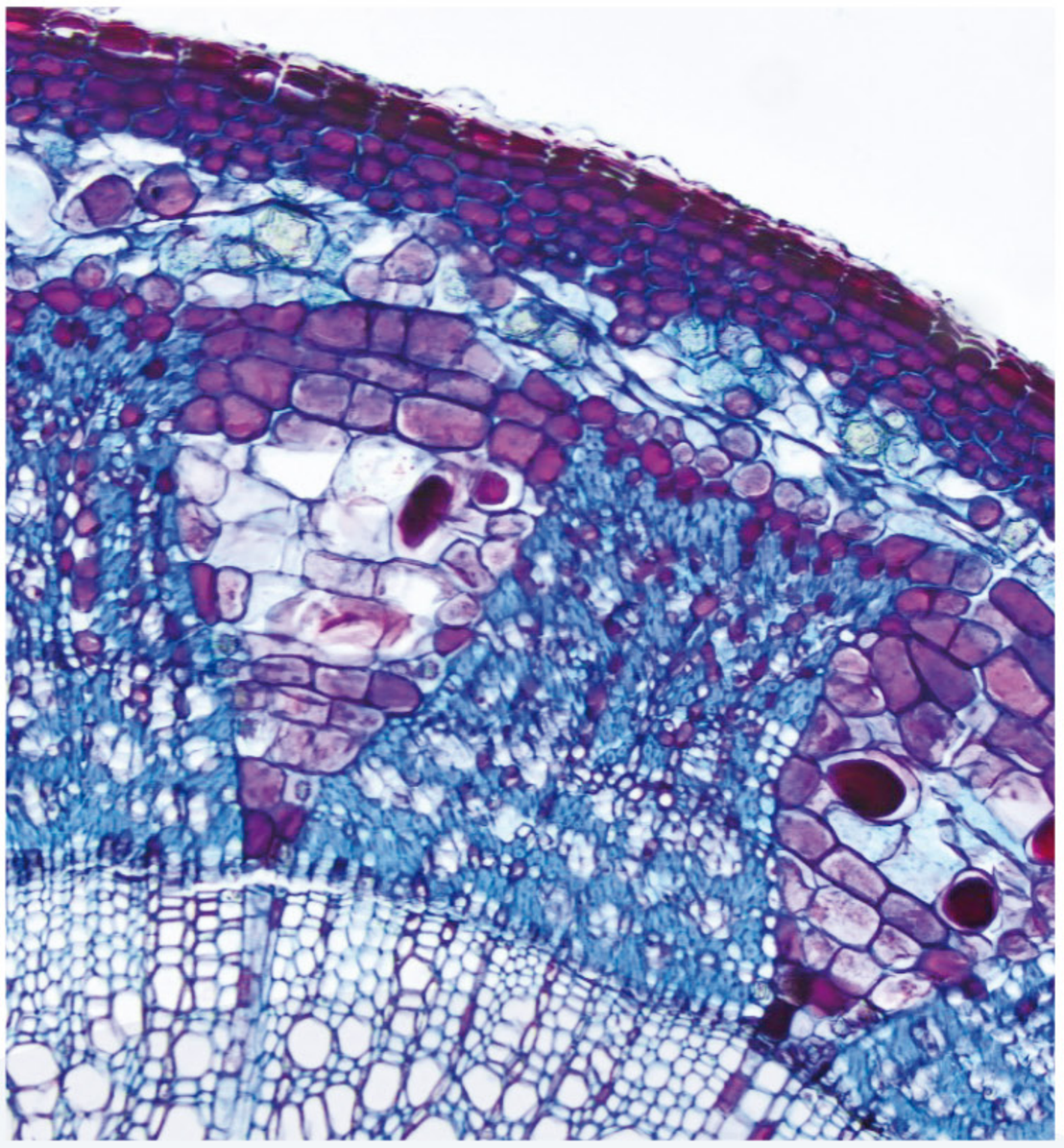


Clarity factor	Check this will show the clarity factor on the video window screen to tell if the camera is focused correctly or not
Ruler	Select to display the ruler in the video window, otherwise not to display the ruler
Measurement	Select to display the measurement toolbar in the video window, otherwise 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

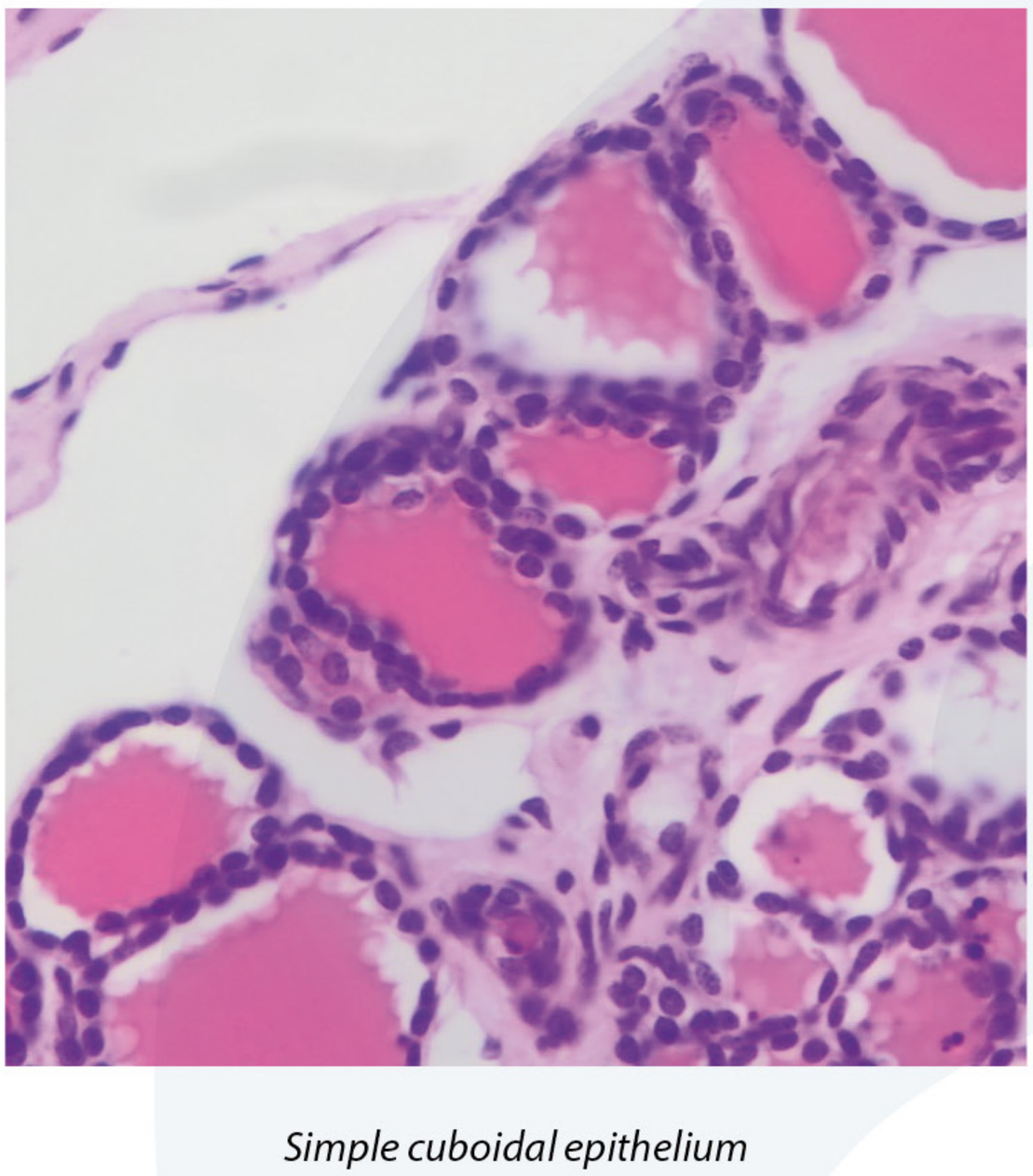
8. Sample photos captured with VC.3045 Camera



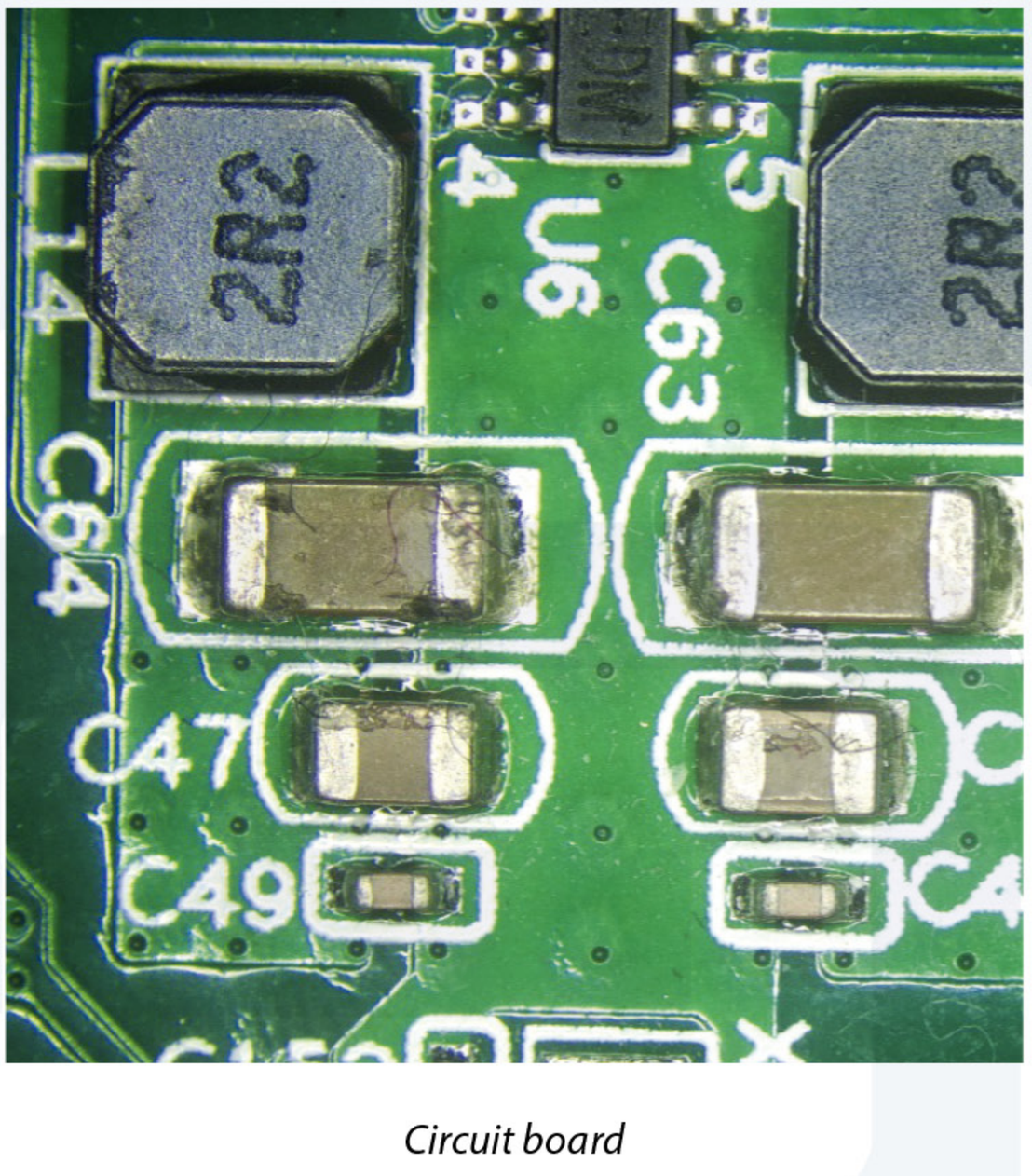
Cucurbit stem



Two year tilia stem



Simple cuboidal epithelium



Circuit board

9. Contact customer service

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