CÁMARA HDMI PARA MICROSCOPIO
HDMI CAMERA FOR MICROSCOPE
CAMERA HDMI POUR MICROSCOPE

REF. - CODE - RÉF. - HGB008

Este manual es parte inseparable del aparato por lo que debe estar disponible a todos los usuarios del equipo. Le recomendamos leer atentamente el presente manual y seguir rigurosamente los procedimientos de uso para obtener las máximas prestaciones y una mayor duración del mismo.

This manual should be available for all users of these equipments. To get the best results and a higher duration of this equipment it is advisable to read carefully this manual and follow the processes of use.

Ce manuel est une partie indissociable de l'appareil et doit être mis à la disposition de tous les utilisateurs de l'équipement. Nous vous recommandons de lire attentivement ce manuel et de suivre scrupuleusement les procédures d'utilisation afin d'obtenir des performances maximales et une plus longue durée de vie de l'appareil.

LANGUAGE INDEX

TABLE OF CONTENTS

1 BASIC FEATURES

■ C-mount CMOS camera with high-sensitivity Sony sensor
■ HDMI+ Wi-Fi outputs at the same time
■ HDMI output can be controlled by XCamView via the USB mouse
■ Wi-Fi output can be activated with USB wireless network adapter, and can be controlled with ToupView/ToupLite application
■ Ultra-thin colour engine with perfect colour reproduction capability (Wi-Fi)
■ 2.0MP image resolution (1920*1080) can be captured and saved for viewing; For video, 1080P video stream (asf format) can be captured and saved.
■ SDK for multiple Windows/Linux/OSX platforms.
■ CNC Enclosure
■ Can be used for industrial inspection, education and research, material analysis, precision measurement, medical analysis, etc.

2 CAMERA SPECIFICATIONS

2.1 Camera datasheet

Code	Sensor and size (mm)	Pixel (µm)	GS Sensitivity/Dark Signal	FPS/Resolution	Binning	Exposure/ (ms)
HGB008	1080P/2M/Sony IMX185(C) 1/1.9"(7.20x4.05)	3.75x3.75	1120mv with 1/30s 0,15mv with 1/30s	30/1920*1080(HDMI) 25/1920x1080 (NETWORK)	1x1	0.06~918

C: Colour; M: Monochrome;

Figure 1 Rear Panel

Interface and button functions	
USB	USB Mouse/ USB Wi-Fi Adapter
HDMI	HDMI Output
DC12V	12V Power
SD	SD card slot
ON/OFF SWITCH	On/Off switch
LED	Power indicator
Other specifications for HDMIO output	
User interface operation	With USB mouse for operation on the integrated XCamView
Image capture	JPEG format with 2MP resolution on SD card
Video recording	ASF 1080P 30fps format on SD Card (8G)
Camera control panel	Includes exposure, gain, white balance, colour adjustment, sharpness and denoising control.
Toolbar	Includes Zoom, Mirror, Compare, Freeze, Cross, Navigator Function, Multi-language and XCamView Version. Information

Other specifications for Wi-Fi output	
Operation of the user interface	ToupView or ToupLite on Windows/Linux/OSX/Android platforms
Wi-Fi Performance	802.11n 150Mbps; RF Power 20dBm (Max)
Maximum Connected Devices	3~6(Depending on Environment and Connection Distance)
White Balance	Auto White Balance
Colour Technology	Ultra-fine colour engine (Wi-Fi)
Capture/control SDK	Windows/Linux/macOS/Android Multi-platform SDK(Native C/ C++, C#/VB.NET, Python, Java, DirectShow, Twain, etc) (Wi-Fi)
Recording system	Still image or movie (Wi-Fi)
Software environment (for USB2.0 connection)	
Operating system	Microsoft® Windows® XP / Vista / 7 / 8 / 8.1/10(32 and 64 bit) OSx (Mac OS X) Linux
PC requirements	CPU: Equal to Intel Core2 2.8GHz or higher
	Memory:4GB or higher
	USB port: Hi-Speed USB 2.0 port (power only, no USB data transfer)
	Display: 19" or higher
	CD-ROM
Operating Environment	
Operating environment Temperature (in degrees Celsius)	-10~ 50
Storage (in degrees Celsius)	-20~ 60
Operating humidity	30~80%HR
Storage humidity	10~60%HR
Power supply	adapter DC 12V/1A

2.2 Function Camera

Code	HDMIO Output	Wi-Fi	USB to Ethernet	Multi-camera network application
HGB008	√	√	√	√

3 CAMERA LED FUNCTIONS

Red LED lights up	Camera is switched off
Blue LED flashes 1x per second	Camera is initialising
The blue LED flashes 4 times per second	Camera is updating firmware
Blue LED lights up	Camera is ready

4 CAMERA DIMENSIONS

Figure 2 Camera dimensions

5 PACKAGING INFORMATION

Standard packing list	
A	Box: L:25.5cm W:17.0cm H:9.0cm (1pcs, 1.43Kg/box)
B	Camera
C	Power adapter: Input: AC 100~240V 50Hz/60Hz, Output: DC 12V 1A
D	HDMI cable
E	USB Mouse
F	Wireless network adapter with USB interface
G	CD (driver and utility software, Ø12cm)

6 CAMERA APPLICATION SETTINGS

You can use the camera in 4 different ways. Each application requires a different hardware environment.

6.1 Camera running standalone with built-in XCamView software

For this application, in addition to the camera and microscope, you only need an HDMI display, the supplied USB mouse and the XCamView software built into the camera. No computer or network connection is required to use the camera in this application. Below are the steps to get the camera up and running:

- Connect the camera to an HDMI display using the HDMI cable.
- Insert the supplied USB mouse into the USB port of the camera.
- Insert the supplied SD card into the SD card slot of the camera.
- Connect the camera to the power adapter and turn it on.
- Turn on the viewfinder and view the video in the XCamView software.
- If you move the mouse to the left, up or down the screen, different control interfaces will appear, and users can use the mouse.

6.2 Camera operating in Wi-Fi mode (AP Mode)

The PC must be Wi-Fi enabled.
For Windows users (Windows XP (32 bit), Windows 7/8/10 (32/64 bit)), use ToupView.
For macOS and Linux users (macOS 10.10 or higher or Linux distributions with kernel 2.6.27 or higher), use ToupLite. When connecting the camera with a mobile device, the free ToupView app is required. Make sure that the mobile device uses iOS 11 or later/Android 5.1 or later operating systems. Below are the steps to start the camera:

- Install the ToupView/ToupLite on your PC or install the ToupView app on the mobile device.
- Connect the Wi-Fi adapter to the USB port of the camera.
- Connect the camera to the power adapter and turn it on.
- Connect the PC or mobile device with the Wi-Fi provided by the camera.
- The network name is (SSID) and the Wi-Fi password is (default is 12345678).

6.3 The camera works with a USB to Ethernet adapter to connect the PC.

This application uses the camera as a network camera. The user must set the IP of the camera and PC manually and make sure that their IP addresses are in the same network. The subnet mask and gateway of the camera and PC must be the same.

Start the camera as described in section 6.1. Once the camera is running, click on the  button in the Summary Camera Control Toolbar at the bottom of the video window. Enter the IP address, subnet mask and default gateway of the camera. Designate the IP address from the Internet Protocol version 4 (TCP/IPv4) configuration page on the PC with settings similar to those shown in Figure 4.

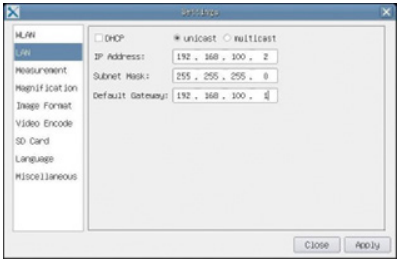

Figure 3 Camera IP configuration

Figure 4 PC IP configuration

Once the above settings have been completed, the user can connect the camera to the computer via the USB to Ethernet adapter as shown below:

- Install ToupView/ToupLite on your PC or install the ToupView application on the mobile device.
- Insert the USB port of the USB Ethernet into the USB port of the camera.
- Connect the USB Ethernet network port with the network cable and the network port of the PC.
- Insert the supplied SD card into the SD card slot of the camera.
- Connect the camera to the power adapter and switch it on.
- Launch the ToupView/ToupLite software, clicking on the camera name in the camera list starts the live video.

6.4 Connecting multiple cameras to the router via USB-to-Ethernet adapter for network applications

In LAN mode, the camera is connected to a switch or router (LAN) via the USB Ethernet adapter and Ethernet cable. If a router with Wi-Fi capability is used, users could connect the router wirelessly and control the camera.

The connection and configuration are the same as in sections 6.1 and 6.3. But here, users only need to check DHCP. If multicast is disabled or not supported, users only need to select unicast. If the network supports multicast, users can select multicast to get better performance, especially in case multiple users connect the same camera. Also, make sure that the broadcasting function is enabled on the network.

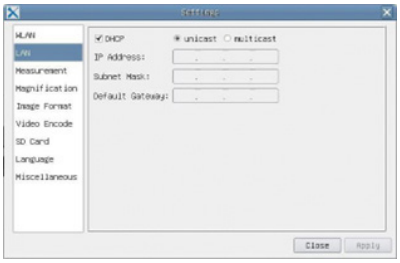

Figure 5 Check the DHCP and Unicast elements to set up the camera

Active cameras are automatically recognised by the ToupView/ToupLite software or ToupView app and are displayed as a camera list or thumbnail in the software or app.

The following are the steps to start the camera:
■ Install the ToupView /ToupLite software on your PC. Alternatively, install the free ToupView app on your mobile device.
■ Plug the USB to Ethernet adapter into the camera and plug in the network cable as well.
■ Connect the camera to the mains and switch it on.
■ Make sure your PC or mobile device is connected to the LAN or Wi-Fi of the router.
■ Start the ToupView/ToupLite software or the ToupView app and check the settings. Normally, active cameras are automatically recognised. The live image of each camera is displayed. The Camera List tool window in the ToupView/ToupLite software and the camera thumbnail in the ToupView app are used for the display.
■ Select the camera you are interested in. To do this, double-click on the camera name in the Camera List tool window if using the ToupView /ToupLite software; If using the ToupView app, tap the camera thumbnail on the Camera List page.

Note on data security
Camera data transfer over LAN or Wi-Fi is not encrypted. Anyone who is connected to the network and has the ToupView software or App installed can view the live image of all active cameras. Operate the camera with the XCamView software, if you want to make sure that nobody on the network can see the live image of the camera.
About routers/switches
It is suggested to select routers/switches that support 802.11ac 5G segment for better wireless connection experience.

7 BRIEF INTRODUCTION OF THE USER INTERFACE AND ITS FUNCTIONS

7.1 XCamView User Interface

The user interface shown in Figure 6 includes a camera control panel on the left side of the video window, a measurement toolbar at the top of the video window, and a synthesis camera control toolbar at the bottom of the video window.

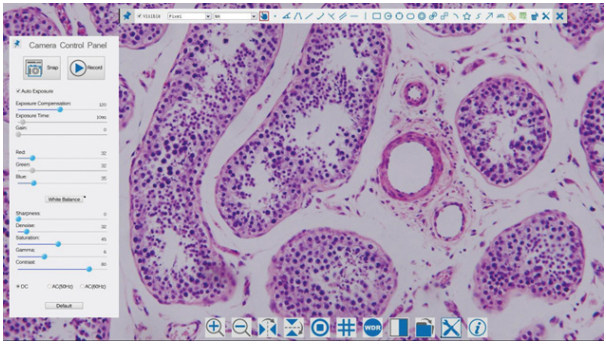

Figure 6 Camera control graphical user interface

Notes	
1	To display the camera control panel, move the mouse to the left of the video window.
2	When users move the mouse cursor to the bottom of the video window, the synthesis camera control toolbar will automatically appear;
3	When moving the mouse cursor to the top of the video window, a Measurement Toolbar for calibration and measurement operations will appear. 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 appear automatically even if the user moves the mouse cursor to the left side of the video window. Only when the user left clicks on the button in the Measurement Toolbar to exit the measurement procedure will the user be able to perform other operations in the Camera Control Panel or in the Synthesis Camera Control Toolbar. During the measurement process, when a specific measurement object is selected, an Object Location and Attributes Control Bar will appear to change the location and properties of the selected object.

7.2 The camera's 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 for specific applications; it will appear automatically when the mouse cursor moves to the left side of the video window (in measurement status, the Camera Control Panel will not appear. The Camera Control Panel will only appear when the measurement process is completed or finished while the user's cursor is on the left edge of the video window). Left click the button to toggle between automatically showing and hiding the Camera Control Panel.

Camera control panel	Function	Description
	Snapshot	Captures the image and saves it to the SD card.
	Record	Records video and saves to SD card.
	Auto Exposure	When Auto Exposure is selected, the system will automatically adjust the exposure time and gain according to the exposure compensation value.
	Exposure Compensation	Available when Auto Exposure is checked. Slide left or right to adjust the Exposure Compensation according to the current brightness of the video to get the appropriate brightness value.

Camera control panel	Function	Description
	Exposure Time	Available when Auto Exposure is not checked. Slide left or right to decrease or increase the exposure time, adjusting the brightness of the video.
	Gain	Adjust the Gain to reduce or increase the brightness of the video. Noise will be reduced or increased accordingly.
	Red	Slide left or right to reduce or increase the ratio of Red to RGB in the video.
	Green	Green is a reference base and cannot be adjusted.
	Blue	Slide left or right to increase or decrease the proportion of Blue in RGB in the video.
	White balance	Adjust the white balance according to the video in the window each time the button is pressed.
	Sharpness	Adjust the sharpness level of the video
	Noise removal	Slide left or right to remove noise from the video.
	Saturation	Adjust the saturation level of the video
	Gamma	Adjusts the gamma level of the video. Slide to the right to increase the gamma and to the left to decrease the gamma.
	Contrast	Adjusts the contrast level of the video. Slide right to increase contrast and left to decrease contrast.
	DC	For DC illumination, there will be no fluctuation in the light source so there is no need to compensate for flicker in the video. compensate for light flicker.
	AC(50HZ)	Check AC (50HZ) to eliminate the flicker caused by 50Hz lighting.
	AC(60HZ)	Check AC (60HZ) to eliminate flicker caused by 60Hz lighting.
	Default	Resets all Camera Control Panel settings to default values.

7.3 The Measurement Toolbar at the top of the video window

The Measurement Toolbar will appear when you move the mouse cursor anywhere near the top edge of the video window. The following are the various functions of the Measurement Toolbar:

Figure 7 Measuring Toolbar button at the top of the video window.

Icon	Function
	Float/Fix switch on the measurement toolbar
Visible	Define measurement object in Show/Hide mode
Pixel	Select the desired unit of measurement
NA	Choose the same Magnification as the microscope to ensure the accuracy of the measurement result when the measurement unit is not in Pixel unit
	Select object
	Point
	Angle
	4-point angle
	Arbitrary line
	3 Points Line
	3 Points Vertical Line
	Parallel
	Horizontal Line
	Vertical Line
	Rectangle
	Circle
	Circle of 3 points
	Ellipse
	Annulus
	Two Circles and Centre Distance
	3 Point Two Circles and Centre Distance
	Arc
	Polygon

Icon	Function
	Curve
	Arrow
	Scale Bar
	Perform Calibration to determine the corresponding relationship between magnification and resolution, this will establish the corresponding the corresponding relationship between the unit of measurement and the pixel size of the sensor. Calibration should be performed with the aid of a micrometre. For detailed steps to perform the calibration, please refer to the ToupView help manual.
	Export measurement information to a CSV (*.csv) file.
	Delete all measurement objects
	Configure
	Exit Measurement mode
	When the measurement is finished, left click on a measurement object and the Object Location and Properties control bar appears. Users could move the object by dragging it with the mouse. But a more precise movement can be done with the control bar. The icons on the control bar mean Move left, move right, move up, move down, Colour adjustment and Delete.

Note:
1) When the user left clicks on the Show/Hide button  on the Measurement Toolbar, the Measurement Toolbar will be fixed. In this case, the Camera Control Panel will not appear automatically even if the mouse cursor is moved to the left edge of the video window. Only when the user clicks with the left mouse button on the  button in the Measurement Toolbar to exit the measurement mode will the user be able to perform other operations in the Camera Control Panel or in the Synthesis Camera Control Toolbar.
2) When a specific measurement object is selected during the measurement process, the Object Location and Attributes Control Bar  will appear to change the 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	Icon	Function
	Zoom in the video window		Zoom out video window
	Flip horizontal		Flip vertical
	Freeze video		Display cross line
WDR	Wide dynamic range mode		Compare image with current video
	Browse images and video on SD card		Settings
	Check XCamView version		

The function Setting is relatively more complicated than the other functions. You can find more information about it here:

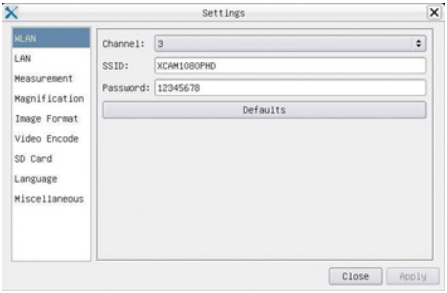

Figure 8 Complete Wi-Fi configuration page

Channel	Wireless communication channel, also known as wireless "Channel", is a data transmission channel with wireless signals as transmission medium;
SSID	Name of the camera sent by USB to the Wi-Fi adapter;
Password	Wi-Fi password, default is 12345678;

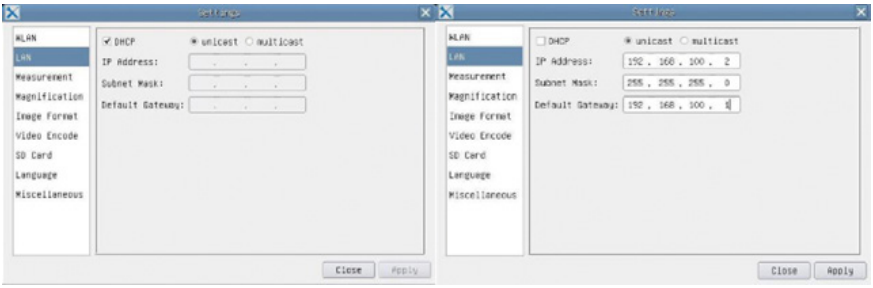

Figure 9 Complete LAN configuration page

DHCP	The Dynamic Host Control Protocol allows the DHCP server to automatically assign IP information to the camera. Only in Section 6.4 LAN Networks should this option be checked, so that the cameras can automatically obtain IP information from the routers/switches to facilitate network operation;
Unicast/multicast	By default, the unicast function is used. Only in Sec 6.4 network environment, when the router/switch has multicast function, the 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	Users need to manually configure their IP addresses on the camera side and on the computer side. The IP addresses configured on the camera side and the computer side should be in the same network segment. The suggested IP address is Class C.
Subnet Mask	The subnet mask is used to distinguish the network domain from the host domain in the 32-bit IP address;
Default Gateway	A default gateway allows computers on one network to communicate with computers on another network. Without it, the network is isolated from the outside.

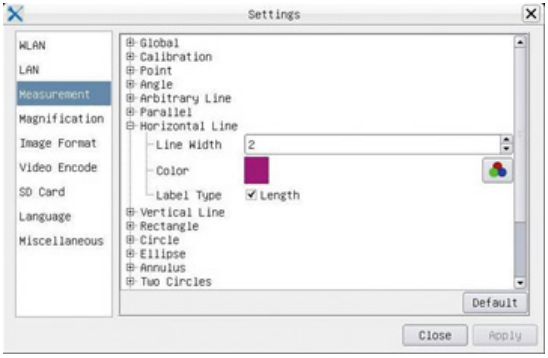

Figure 10 Global measurement configuration page

Global	Used to configure the digits behind the decimal point for measurement results;	
Calibration	Line Width	Used to set the width of the lines for calibration;
	Colour	Used to set the colour of the lines for calibration;
	End point	Type: Used to define the shape of the endpoints of the lines for calibration: Null means no endpoint; rectangle means rectangle type of endpoints. Facilitates alignment;
Point, Angle, Line, Horizontal Line, Vertical Line, Rectangle, Circle, Ellipse, Annular, Two Circles, Polygon, Curve.		
	By left clicking on together with the above-mentioned measurement pattern names, the corresponding attribute settings will be displayed to set the individual property of the measurement objects.	

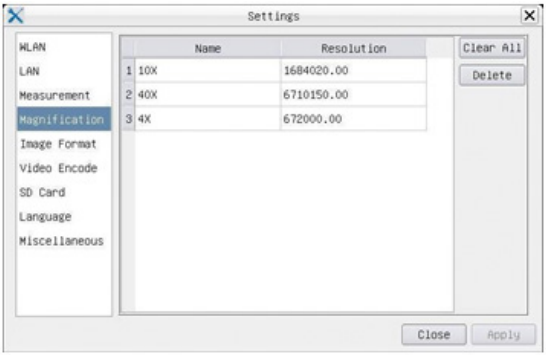

Figure 11 Global management of magnification calibration settings page

Name	Names such as 10X, 40X, 100X are based on the magnification of the microscopes. For continuous zoom microscopes, make sure that the selected magnification matches the scale alignment line on the microscope zoom knob; users could also edit the magnification name with other information, e.g. microscope mode, username, etc.
Resolution	Pixels per metre. Imaging devices such as microscopes have a high-resolution value;
Clear all	Click the Clear All button to clear the calibrated magnifications;
Delete	Click Delete to delete the selected magnification;

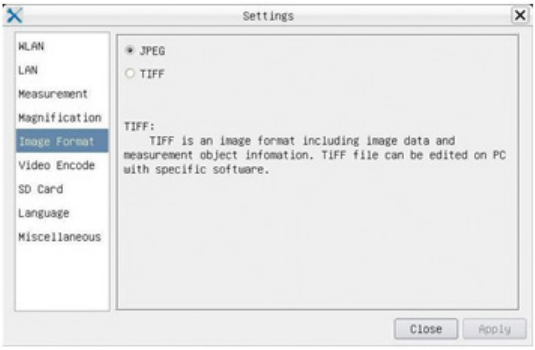

Figure 12 Image format full configuration page

JPEG	The JPEG file extension can obtain better image quality with minimum disk space.
TIFF	TIFF is an image format that can include both the image data and the measurement object. The measurement objects are saved separately from the image data and can be edited later with the specified software.

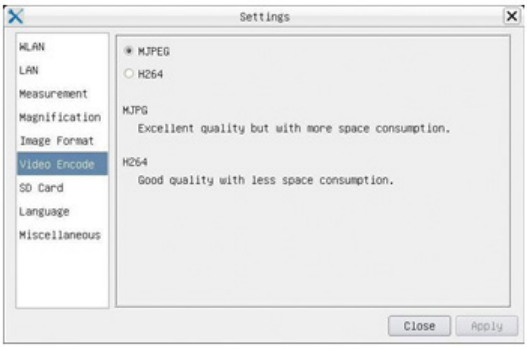

Figure 13 Comprehensive video coding configuration page

MJPEG	The codec format for video is MJPEG. Excellent quality but more space consuming than H264;
H264	Codec format for video is H264. Good quality with less space consumption;

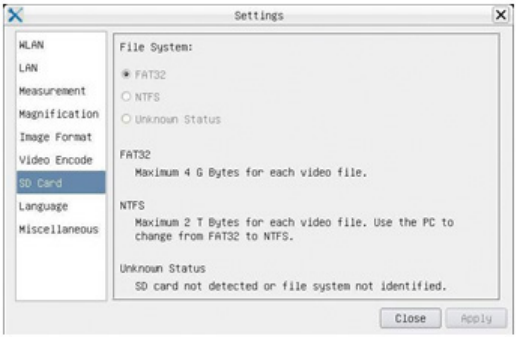

Figure 14 Full configuration of the SD card configuration page

File system	FAT32: The file system of the SD card is FAT32. The maximum single file video file size in FAT32 file system is 4G Bytes; NTFS: The file system of the SD card is NTFS. The maximum file size of a single video file is 2T Bytes. Use PC to format the SD cards and switch between FAT32 and NTFS. Unknown status: SD card is not detected, or file system is not identified;

Figure 15 Full configuration of the language selection setting page

English	Set the language of all software to English;
Chinese Simplified	Set the language of all software to Simplified Chinese;
Traditional Chinese	Set the language of all software to Traditional Chinese;
Korean:	Set the language of all software to Korean;
Thai	Set the language of all software to Thai;

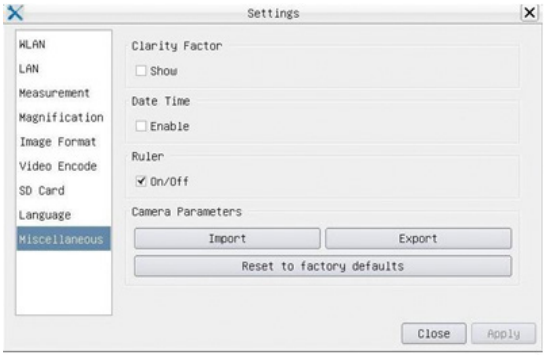

Figure 16 General Settings Page

Clarity Factor	The Clarity Factor can indicate whether the sample is in focus or not. The higher the Clarity Factor, the better the sample is in focus. Check Show to see if the video is in focus or not;
Date Time	For cameras without RTC settings, users can set the system time after the camera is declared, which is not saved because there is no built-in RTC;
Rule (On/Off)	Select this option to display the ruler in the video window;
Import	Import the saved parameters from the SD card;
Export	Exports the current camera settings to the SD card for later use;
Reset a factory setting	Restore camera settings to factory default;