The OCAM Series HDMI Camera Help Manual

Contents

1 OCAM Series HDMI Camera Application

Figure 1 The OCAM Series HDMI Camera

The OCAM Series HDMI Camera is intended for acquisition of digital images from stereo microscopes, biological microscopes. Here are basic characteristics of the camera:

- HDMI camera with Sony Exmor/STARVIS back-illuminated CMOS sensor
- Embedded XCamView software for controlling cameras with measurement, grid line overlay, and custom templates functions
- Providing automatic measurement functions such as automatic edge finding, parallel line distance measurement and rectangle measurement
- USB flash drive for captured image and video storage, support local preview and playback， picture to picture, picture to video comparison functions
- Excellent ISP with functions such as dark enhancement, sharpening, and 3D denoising
- Supports quick switching of default modes for biological and stereoscopic microscopes, making it convenient for users to in different scenarios

2 OCAM Series HDMI Camera Datasheet and Functions (2)

Order Code	Sensor & Size(mm)	Pixel(μm)	G Sensitivity Dark Signal	FPS/Resolution	Binning	Exposure(ms)
OCAM4K8MPA	Sony IMX678(C) 1/1.8"(7.68x4.32)	2.0x2.0	1364mv with 1/30s 0.15mv with 1/30s	30@3840*2160(HDMI)	1x1	0.04~1000
OCAM1080P2MPA	Sony IMX385(C) 1/2"(7.2x4.05)	3.75x3.75	1175mv with 1/30s 0.15mv with 1/30s	60@1920*1080(HDMI)	1x1	0.04~1000

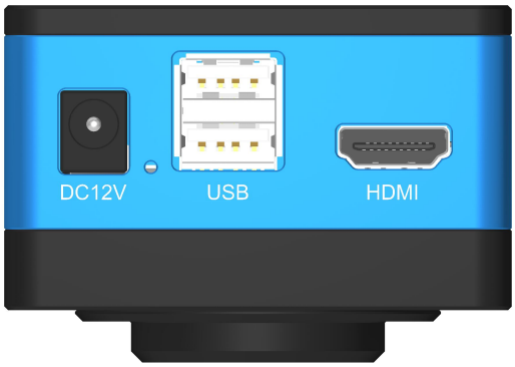


Figure 2 OCAM Series HDMI Camera Interface Panel Diagrams

Interface or Button	Function Description
DC12V	Power adapter connector (12V/1A)
LED	LED status indicator
USB	Connect USB mouse for easy operation with embedded XCamView software Connect USB flash drive to save pictures and videos
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 (OCAM4K8MPA) Comply with HDMI1.4 standard. 1080P format video output (OCAM1080P2MPA)
Video Output Interface	**Function Description**
HDMI Interface	Comply with HDMI1.4 standard 30fps@4K or 30fps@1080P(OCAM4K8MPA);60fps@1080P(OCAM1080P2MPA)
Other Function	**Function Description**
Video Record	Video format： 8M(3840*2160) H264/H265 encoded MP4 file(OCAM4K8MPA) 8M(3840*2160) H264/H265 encoded MP4 file(OCAM1080P2MPA) Frame rate during video record：30fps(OCAM4K8MPA);60fps(OCAM1080P2MPA)
Image Capture	8M (3840*2160,OCAM4K8MPA) JPEG/TIFF image in USB flash drive 2M (1920*1080,OCAM1080P2MPA) JPEG/TIFF image in USB flash drive
Measurement Saving	Measurement information saved in different layer with image content in Layered mode. Measurement information is saved together with image content in Burn in Mode
ISP	Exposure (Automatic / Manual Exposure) / Gain, White Balance, Sharpness, 3D Denoising, Saturation Adjustment, Contrast Adjustment, Brightness Adjustment, Gamma Adjustment, Color to Gray, 50HZ/60HZ Anti-flicker Function
Image Operation	Zoom In/Zoom Out (Up to 10X), Mirror/Flip, Freeze, Cross Line, Compare(Comparison function between real-time video and pictures on storage media, image to image comparison), Embedded Files Browser, Video Playback, various Measurement Function
Embedded RTC(Optional)	To support accurate time on board
Restore Factory Settings	Restore camera parameters to its factory status
Multiple Language Support	English / Simplified Chinese
Operating Environment	
Operating Temperature (in Centidegree)	-10°~ 50°
Storage Temperature (in Centidegree)	-20°~ 60°
Operating Humidity	30~80%RH
Storage Humidity	10~60%RH
Power Supply	DC 12V/1A Adapter

3 Dimension of OCAM Series HDMI Camera

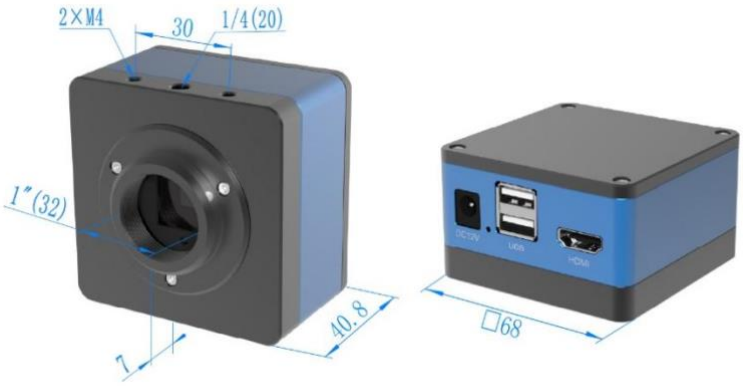


Figure 3 Dimension of OCAM Series

4 OCAM Series HDMI Camera Packing Information

Figure 4 OCAM Series HDMI Camera Packing Information

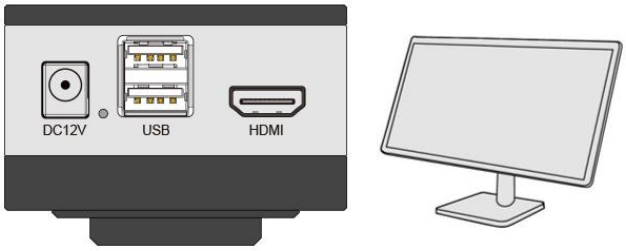
Standard Packing List			
A	Gift box: L:18.4cm W:17.8cm H:8.1cm		
B	OCAM Camera (pls specify which model you want)		
C	Power Adapter: Input: AC 100~240V 50Hz/60Hz, Output: DC 12V 1A American standard: Model: POWER-U-12V1A(MSA-C1000IC12.0-12W-US) European standard: Model: POWER-E-12V1A(MSA-C10001C12.0-12W-DE)		
D	USB Mouse		
E	HDMI Cable		
Optional Accessory			
F	USB flash drive		
G	Adjustable lens adapter	C-Mount to Dia.23.2mm Eyepiece Tube (Please choose 1 of them for your microscope)	108001/AMA037 108002/AMA050 108003/AMA075
H	Fixed lens adapter	C-Mount to Dia.23.2mm Eyepiece Tube (Please choose 1 of them for your microscope)	108005/FMA037 108006/FMA050 108007/FMA075
	Note: For G and H optional items, please specify your camera type (C-mount, microscope camera or telescope camera), ToupTek engineer will help you to determine the right microscope or telescope camera adapter for your application;		
I	108015(Dia.23.2mm to 30.0mm Ring)/Adapter rings for 30mm eyepiece tube		
J	108016(Dia.23.2mm to 30.5mm Ring)/ Adapter rings for 30.5mm eyepiece tube		
K	Calibration kit		106011/TS-M1(X=0.01mm/100Div.); 106012/TS-M2(X, Y=0.01mm/100Div.); 106013/TS-M7(X=0.01mm/100Div., 0.10mm/100Div.)

5 OCAM Series HDMI Camera Configurations

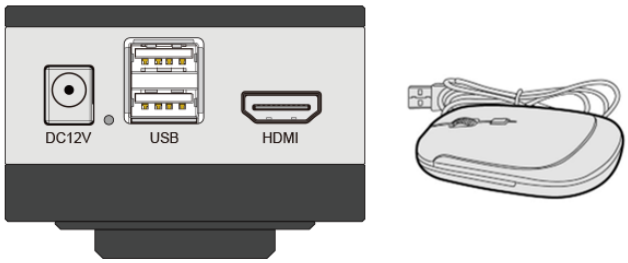
Camera working standalone with built-in XCamView software.

This application requires an OCAM Series HDMI Camera, monitor with HDMI interface, HDMI cable, USB flash drive (Optional), USB mouse supplied with the camera, and power adapter. The setting steps are as follows:

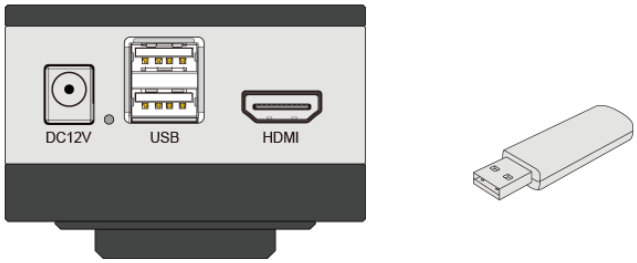
Connect the camera to a HDMI monitor using the supplied HDMI cable;



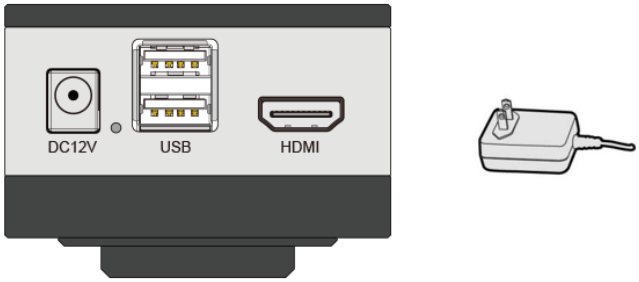
Insert the supplied USB mouse to the camera's USB port;



Insert the supplied USB flash drive into the OCAM Series HDMI Camera's USB port;



Connect the camera to the power adapter;



Turn on the monitor and view the live video in the XCamView software.

6 Brief Introduction of OCAM UI and Its Functions

6.1 XCamView UI

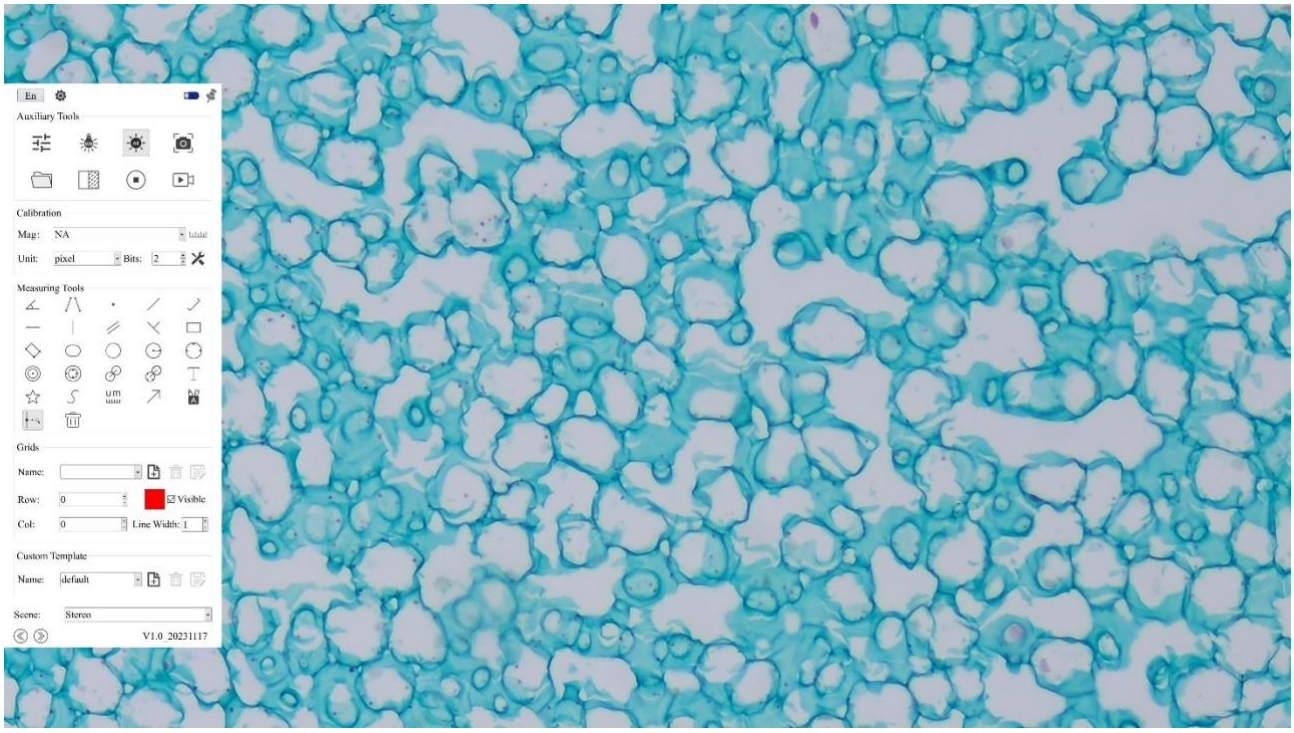
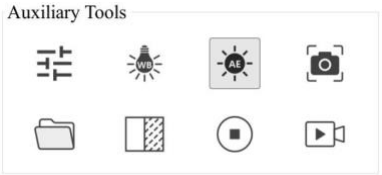


Figure 5 OCAM Series HDMI Camera Main Interface

- Click on the En to switch between English and Chinese;
- will turn into blue after the USB flash drive is inserted into the camera;
- Float/Fix switch button;
- The scene can be switched between biological and stereoscopic views;
- can make the control bar switch between left and right side on the screen;

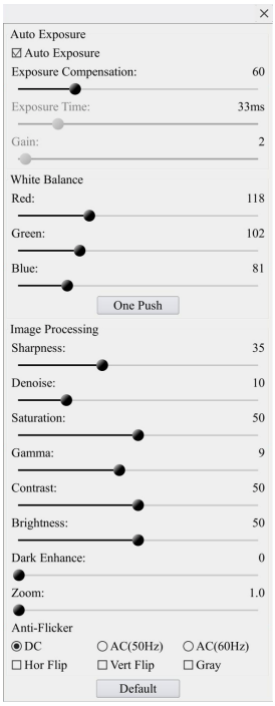
Note: Right click mouse on the screen can bring up the control bar, please refer to section 6.2~6.7 for more details.

6.2 Auxiliary Tools

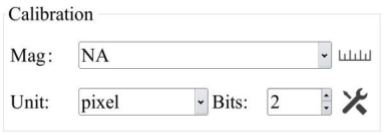


Icon	Function	Icon	Function
	Image Settings		White Balance, each time light source is changed please make the white balance again
	Auto Exposure		Snap
	Browser the captured images or recorded videos from USB flash drive		Compare Image
	Freeze		Record

The image settings functions are quite complex. It is listed in the table below:

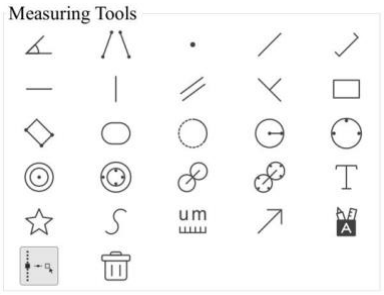
Image Settings Panel	Function	Function Description
	Auto Exposure	When Auto Exposure is checked, the system will automatically adjust exposure time and gain according to the value of exposure compensation
	Exposure Compensation	Available when Auto Exposure is checked. Slide to left or right to adjust Exposure Compensation according to the current video brightness to achieve proper brightness value
	Exposure Time	Available when Auto Exposure is unchecked. Slide to left or right to reduce or increase Exposure Time, adjusting brightness of the video
	Gain	Adjust Gain to reduce or increase brightness of video. Noise will be reduced or increased accordingly
	Red	Slide to left or right to decrease or increase the proportion of Red in RGB on video
	Green	Slide to left or right to decrease or increase the proportion of Green in RGB on video
	Blue	Slide to left or right to decrease or increase the proportion of Blue in RGB on the video
	One Push	White balance adjustment according to the window video every time the button is clicked
	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
	Dark Enhance	Adjust Dark Enhance level of the video. Slide to the right side to increase Dark Enhance and to the left to decrease Dark Enhance
	Zoom	Adjust magnification level of the video. Slide to the right side to increase Magnification and to the left to decrease Magnification.(Or controlled by the mouse wheel)
	DC	For DC illumination, there will be no fluctuation in light source so no need for compensating light flickering
	AC(50HZ)	Check AC(50HZ) to eliminate flickering caused by 50Hz illumination
	AC(60HZ)	Check AC(60HZ) to eliminate flickering caused by 60Hz illumination
	Hor Flip	When checked the current video will Flip Horizontally
	Vert Flip	When checked the current video will Flip Vertically
	Gray	When checked the current video will switch from Color to Gray
	Default	Restore all the settings in the Camera Control Panel to default values

6.3 Calibration



Icon	Function
	Select Magnification for Measurement after Calibration. Make sure actual magnification of the microscope is the same as the selected magnification. Ensure accurate results when measuring in non pixel units
	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 should be done with the help of a micrometer
	Select the desired Measurement Unit
	Used to set the number of digits after the decimal point in the measurement result
	This setting can manage calibration results

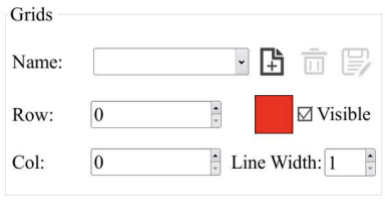
6.4 Measuring Tools



Icon	Function	Icon	Function
	Angle		4 Points Angle
	Point		Arbitrary Line
	3 Points Line		Horizontal Line
	Vertical Line		Parallel
	3 Points Vertical Line		Rectangle
	3 Points Rectangle		Ellipse
	Arc		Circle
	3 Points Circle		Annulus
	3 Points Annulus		Two Circles and its Center Distance
	3 Points Two Circles and its Center Distanc		Text
	Polygon		Curve
um	Scale Bar		Arrow
	Auto Measurement		Delete all the measurement objects
	Edge Detection		
	When the measurement completes, left-click on a single measuring object 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 respectively		

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

6.5 Grids



Icon	Function
Name:	Select Custom Grid
	Add Custom Grid
	This Setting allows for preset management of custom grids
	Delete Custom Grid
	Save the current Custom Grid settings
Row: 0	Set the Row grid number
Col: 0	Set the Column grid number
	Set the Color of the grid, and display the current color used
Visible	Set grid object Visible/Invisible
Line Width: 1	Set the grid Line Width

6.6 Custom Template

Icon	Function
Name default	Select Custom Template
	Click "Add" to enter Custom Template mode, adjust or draw measurement graphics
	Delete the current Custom Template
	Save the current Custom Template settings

6.7 Settings

6.7.1 Settings>Measurement

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

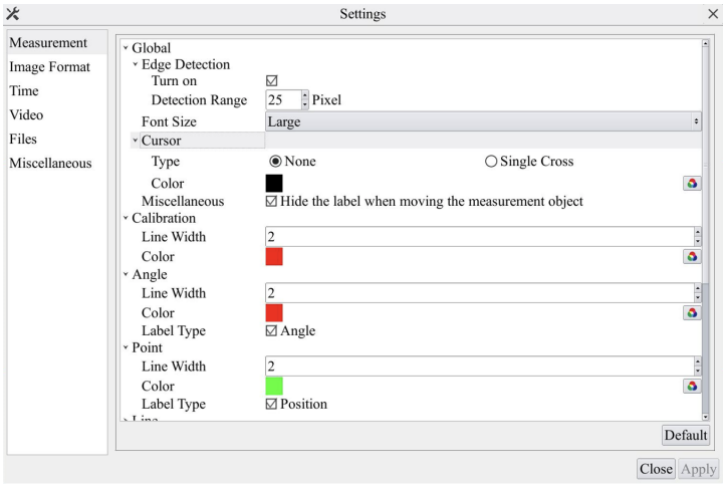


Figure 6 The Measurement Setup

Global	Edge Detection	Select whether to enable the Edge Detection and set the detection range;
	Font Size	The Font Size of measurement data can be changed to Large, Middle, and Small;
	Cursor	Select whether the Cursor is a single crosshair and set the color of the single cross;
	Miscellaneous	Whether to hide the label when moving the measurement objects;
Angle	Line Width	Used for defining Line Width for calibration;
	Color	Used for defining Line Color for calibration;
	Lable 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.	

6.7.2 Settings>Image Format

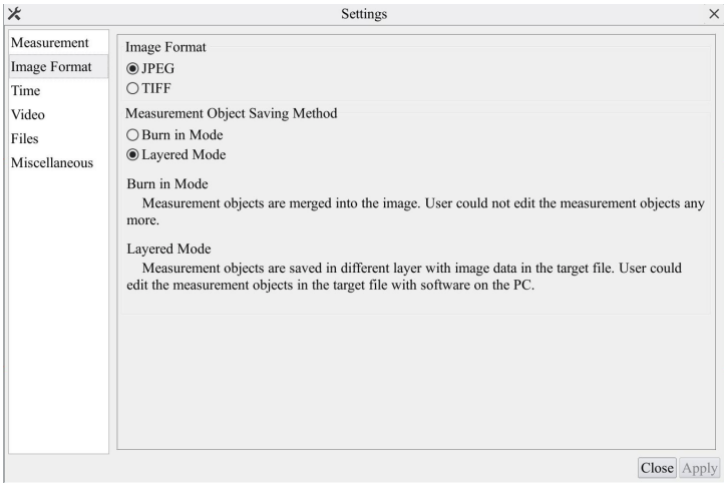


Figure 7 Comprehensive Image Format Settings Page

Image Format	JPEG: The extension of JPEG file can get very high compression rate and display very rich and vivid images by removing redundant images and color data. In other words, it can get better image quality with the least disk space. If measurement objects are available, the measurement objects will be burned into the image and the measurement cannot be edited. TIFF: TIFF is a flexible bitmap format mainly used to store images including photos and artistic images.
Measurement Object Saving Method	Burn in Mode: The measurement objects are merged into the current image. User could not edit the measurement objects any more. In this mode the measurement info is not editable. 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. In this mode the measuremnent info is editable.

6.7.3 Settings>Time

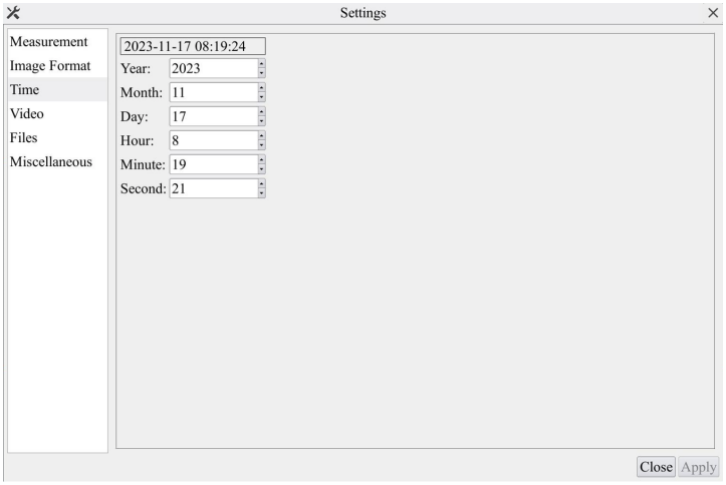


Figure 8 Time Setting

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

6.7.4 Settings>Video

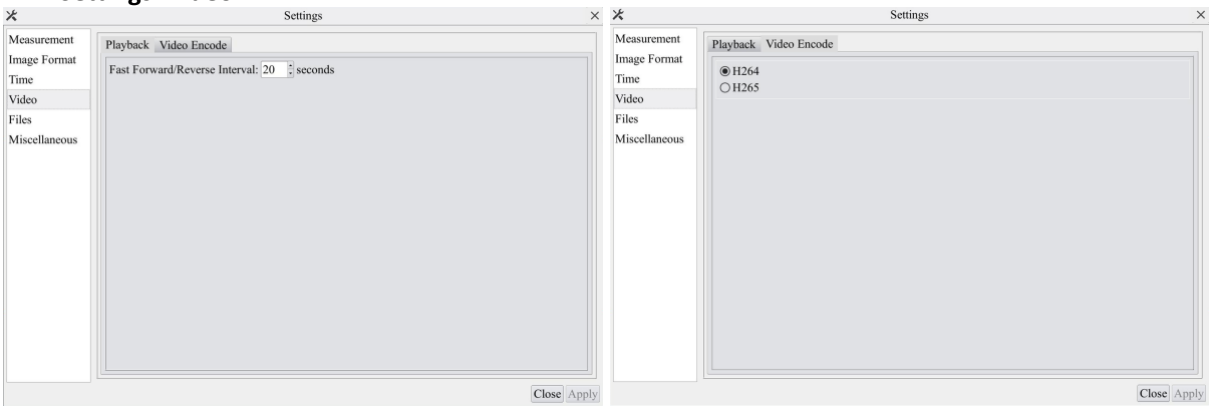


Figure 9 Comprehensive Setting of Video page

Video Playback	Adjust the fast forward and rewind interval for Video file Playback. The unit is second;
Video Encode	Select the Video Encode format from 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.

6.7.5 Settings>Files

Figure 10 Comprehensive Setting of Files Name

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

6.7.6 Settings>Miscellaneous

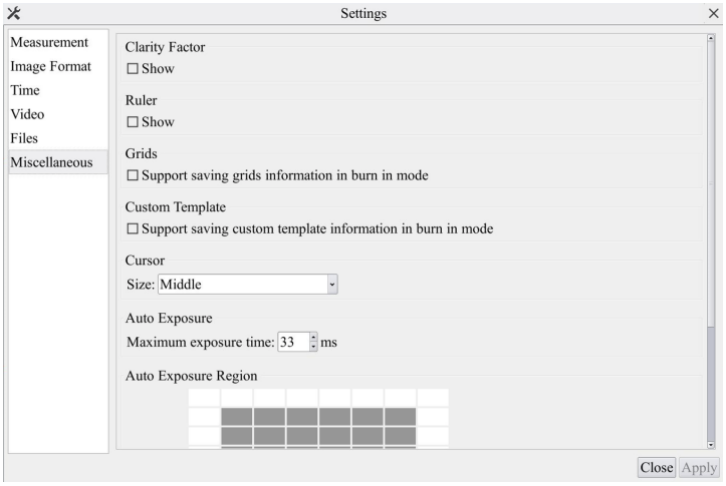


Figure 11 Comprehensive Miscellaneous Settings Page

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	When checked, the Ruler will be displayed in the video window, otherwise the ruler will not be displayed;
Grids	When checked, the Grids info will be saved in Burn in Mode, otherwise grids info will not be saved in Burn in Mode.
Custom Template	Selecting to support saving Custom Template information in Burn in Mode, otherwise not to support;
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 Exposure Region (ROI);
Camera Parameters Import	Import the Camera Parameters from the USB flash drive to use the previously exported Camera Parameters;
Camera Parameters Export	Export the Camera Parameters to the USB flash drive to use the previously exported Camera Parameters;
Reset to factory defaults	Restore camera parameters to its factory status.

7 Sample Images Captured with OCAM Series HDMI Camera

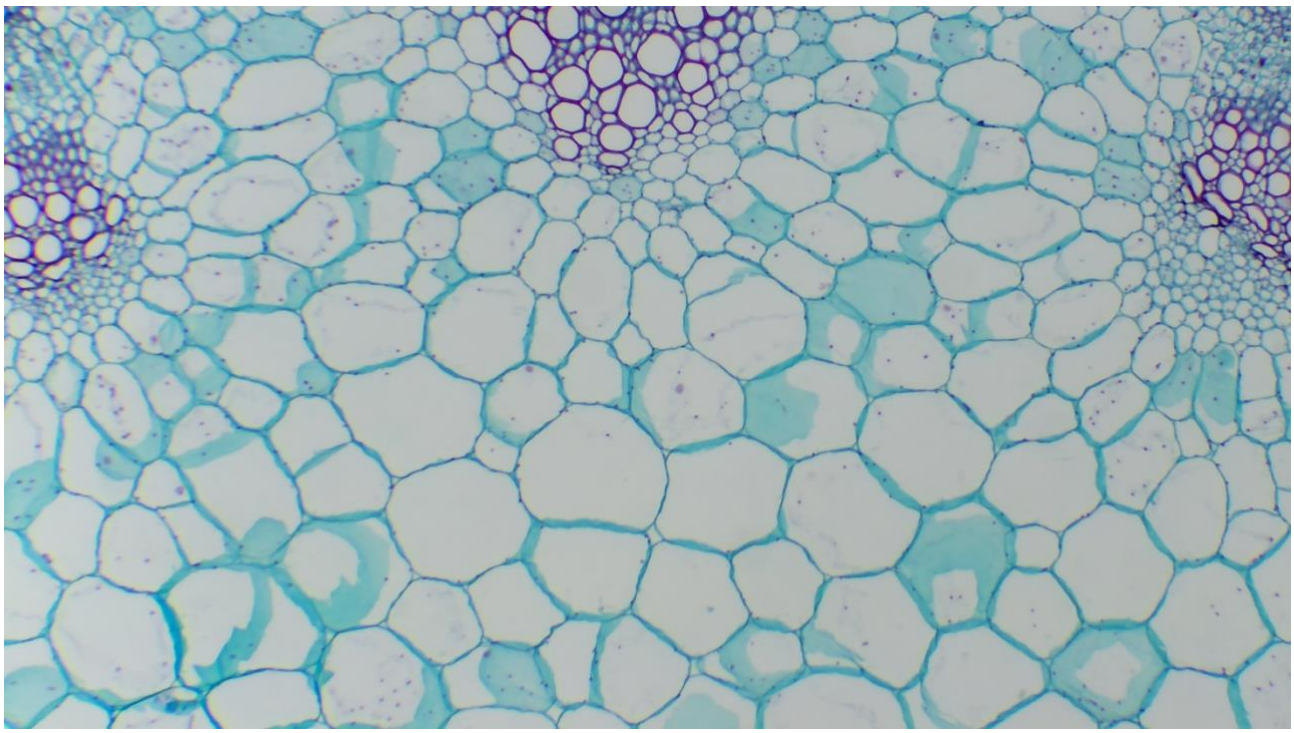


Figure 12 Sunflower Stem.C.S. Captured with OCAM4K8MPA

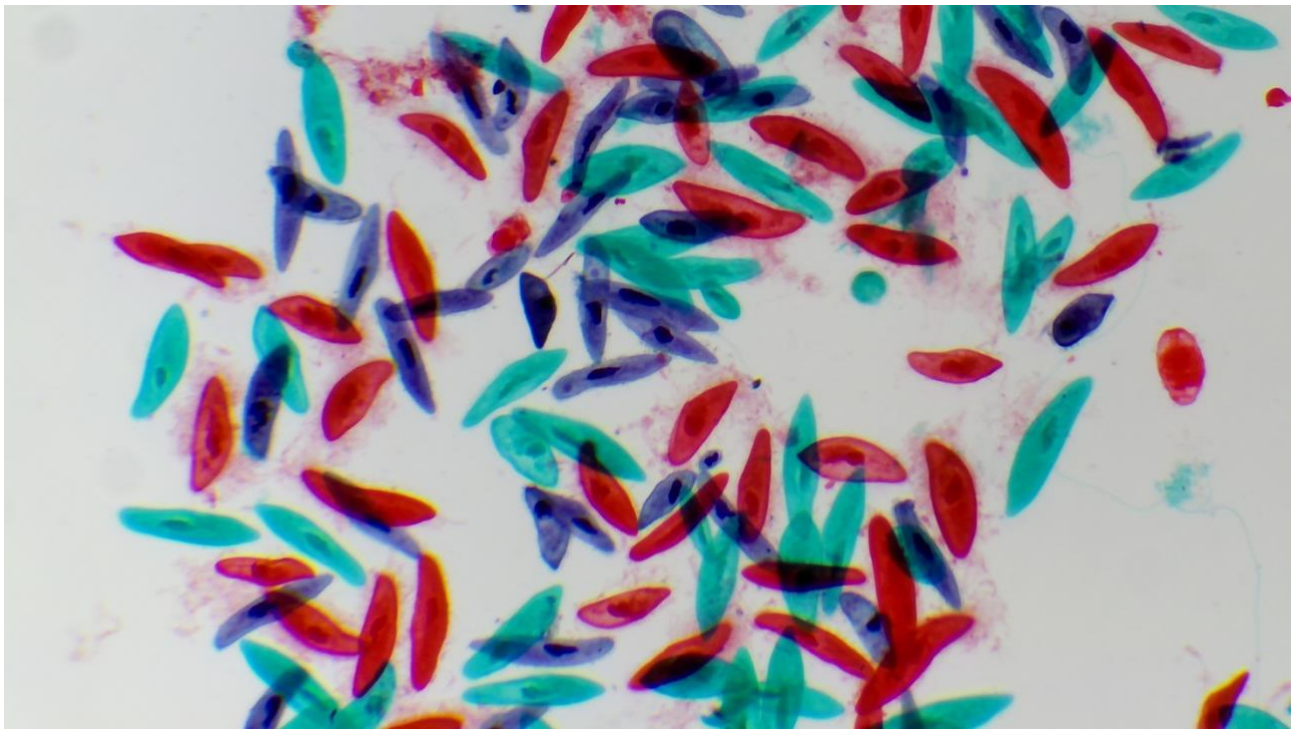


Figure 13 Paramecium.WM. Captured with OCAM4K8MPA

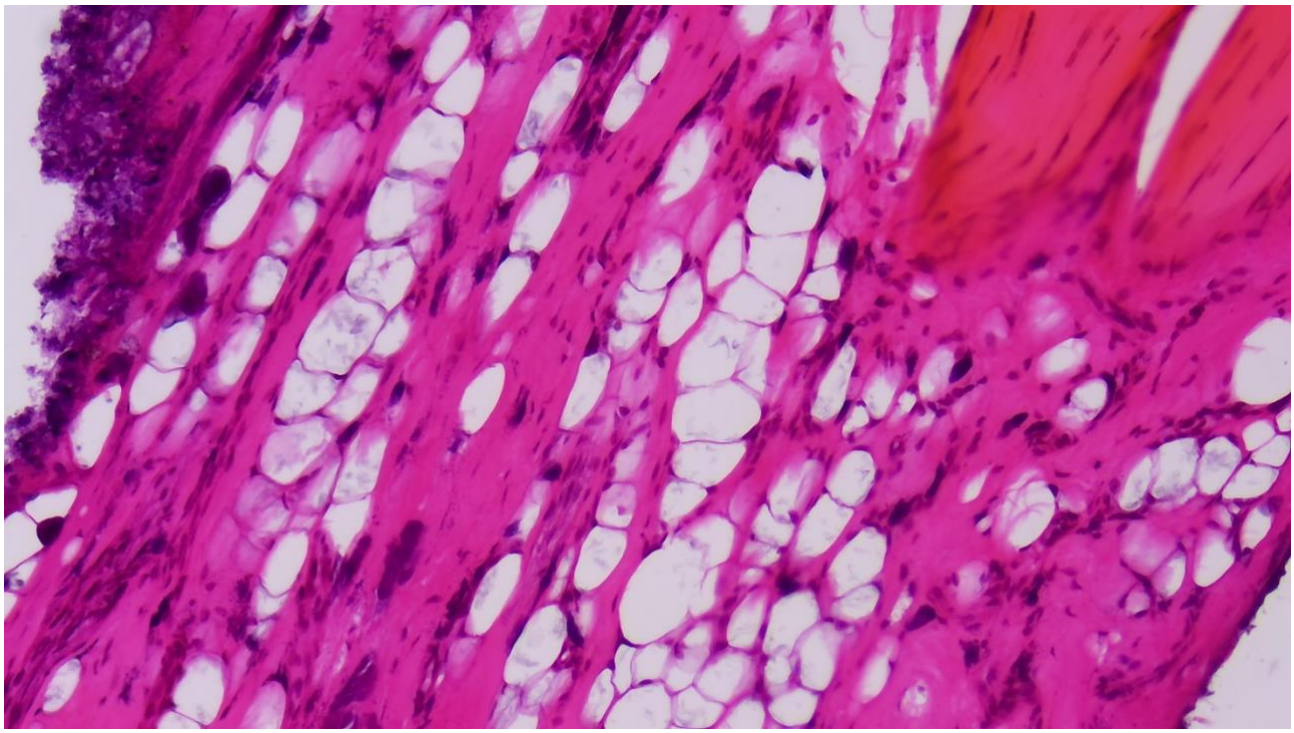


Figure 14 Fiber Connective Tissue.Sec. Captured with OCAM4K8MPA

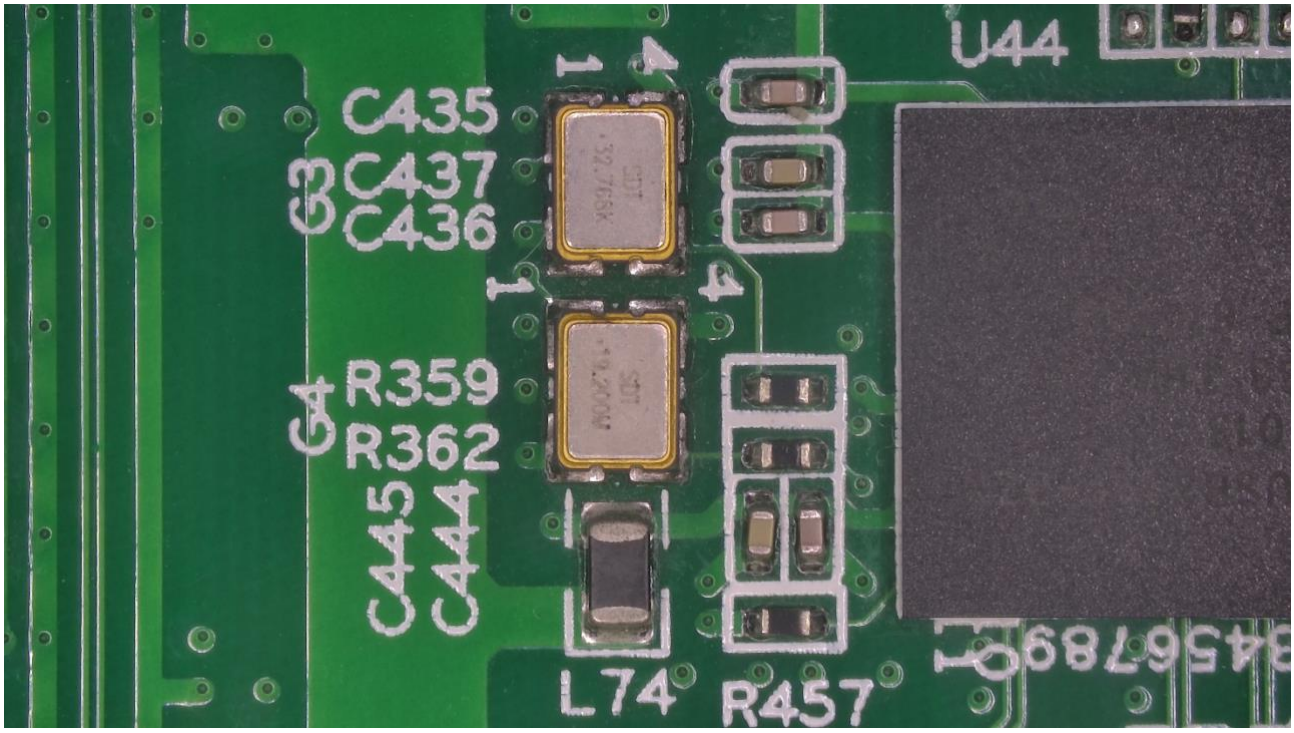


Figure 15 Circuit Board Captured with OCAM4K8MPA

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