X8CAM4K Series HDMI/NETWORK/USB Multi-outputs CMOS Camera

Contents

X8CAM4K Series Camera Application



Figure 1 The X8CAM4K Series Camera

The X8CAM4K series cameras have high resolution, high frame rate, and excellent image quality, making them suitable for professional applications that require extremely high levels of detail capture and colour reproduction. The basic characteristic is listed as below:

- Sony large target surface / STARVIS / STARVIS 2 back-illuminated CMOS sensor
- With 10-bit ISP processing, it offers better color reproduction, remarkable sharpening and 3D noise reduction effects, and more accurate ROI white balance
- 4K HDMI/ NETWORK/ USB multiple video synchronous outputs
- 4K/1080P auto switching according to monitor resolution
- Support 4K 60fps low delay HDMI output mode, with an average delay of 50ms (X8CAM4K8MPA and X8CAM4K8MPB)
- Supports customized development based on neural network capabilities, including object recognition, counting, and detection functions.Supports network storage function
- Supports network storage function (images captured or videos recorded by the camera are saved in real time to network storage drives)
- Supports capture and display of JEPG, TIFF, PNG and RAW format images
- Supports external USB 3.0 interface solid-state drive, and supports automatic saving of recorded videos in case of sudden power failure
- Supports USB voice control module, enabling real-time control of the camera through voice commands for taking photos, recording videos, freezing, and other operations
- Provide real-time video EDF function and real-time Stitch function
- Provide two sets of default ISP parameters for biological microscope and stereo microscope
- New UI interface, the browsing interface provids rich file operation functions, image to image comparison, image to real-time video comparison, multi-image EDF function, multi-image Stitch function
- Embedded XCamView for the control of the camera and image processing, supporting automatic edge finding and measurement functions
- ToupView/ToupLite software for PC
- iOS/Android applications for smart phones or tablets

X8CAM4K Series Camera Datasheet and Functions(4)

Order Code	Sensor & Size(mm)	Mount	Pixel(μm)	G Sensitivity Dark Signal	Sensor Output (FPS/Resolution)	Binning	Exposure(us)
X8CAM4K22MPA	IMX571(C) 1.7"(23.46x13.21)	M42*0.75	3.76x3.76	485mv with 1/30s 0.07mv with 1/30s	37@6240*3512	1x1	7~
X8CAM4K16MPA	IMX383(C) 1/1.1"(13.06x7.34)	C	2.4x2.4	470mv with 1/30s 0.21mv with 1/30s	60@5440*3060	1x1	41~
X8CAM4K8MPA	IMX334(C) 1/1.8"(7.68x4.32)	C	2.0x2.0	505mv with 1/30s 0.1mv with 1/30s	60@3840*2160	1x1	37~
X8CAM4K8MPB	IMX585(C) 1/1.2"(11.14x6.26)	C	2.9x2.9	5970mv with 1/30s 0.13mv with 1/30s	90@3840*2160	1x1	59~

Camera Model	Video Saving (Max FPS/Resolution)	Picture	HDMI2.0 (Max FPS/Resolution)	USB3.0 (Max FPS/Resolution)	NETWORK (Max FPS/Resolution)
X8CAM4K22MPA	37@3840*2160	6240*3512	37@3840*2160 37@1920*1080	15@6240*3512 37@2688*1512 37@1920*1080	30@3840*2160 37@1920*1080 37@1280*720
X8CAM4K16MPA	60@3840*2160	5440*3060	60@3840*2160 60@1920*1080	25@5440*3060 45@2688*1512 60@1920*1080	30@3840*2160 60@1920*1080 60@1280*720
X8CAM4K8MPA	60@3840*2160	3840*2160	60@3840*2160 60@1920*1080	30@3840*2160 45@2688*1512 60@1920*1080	30@3840*2160 60@1920*1080 60@1280*720
X8CAM4K8MPB	90@3840*2160	3840*2160	60@3840*2160 60@1920*1080	30@3840*2160 45@2688*1512 60@1920*1080	30@3840*2160 60@1920*1080 60@1280*720



Figure 2 Available Ports on the Back Panel of the Camera Body

Interface or Button	Function Description
USB Mouse	Connect USB mouse for easy operation with embedded XCamView software Connect USB voice control for enable real-time control of camera snap, recording, freezing, and other operations
USB3.0	Connect USB flash drive to save pictures and videos Connect 5G WiFi module to transfer video wirelessly in real time Connect USB microphone to record audio and video Connect USB voice control for enable real-time control of camera snap, recording, freezing, and other operations
USB Video	Connect PC or other host device to realize video image transmission
HDMI	Comply with HDMI2.0 standard. 4K/1080P format video output and supporting automatic switch between 4K and 1080P format according to the connected monitors
LAN	LAN port to connect router and switch to transfer video
SD	SD card slot, comply with SDIO3.0 standard and SD card could be inserted for video and images saving
ON/OFF	Power switch
LED	LED status indicator
DC12V	Power adapter connection (12V/1A)
Video Output Interface	**Function Description**
HDMI Interface	Comply with HDMI2.0 standard; 37fps@4K or 37fps@1080P (X8CAM4K22MPA) 60fps@4K or 60fps@1080P (X8CAM4K16MPA, X8CAM4K8MPA, X8CAM4K8MPB)
LAN Interface	Support real time resolution switching(4K/1080P/720P) H264 encoded video DHCP configuration or manual configuration Unicast/multicast configuration
WiFi Interface	Connecting 5G WiFi adapter (USB3.0 slot) in AP/STA mode
USB Video Interface	Connecting USB Video port of PC for video transfer MJPEG /NV12 format video

Other Function	Function Description
Video Saving	Video format：8M (3840*2160) H264 encoded MP4 file Maximum Video saving frame rate: 37fps(X8CAM4K22MPA);60fps(X8CAM4K16MPA,X8CAM4K8MPA);90fps(X8CAM4K8MPB);
Image Capture	22M (6240*3512, X8CAM4K22MPA) JPEG/TIFF/RAW/PNG image in SD card or USB flash drive 16M (5440*3060, X8CAM4K16MPA) JPEG/TIFF/RAW/PNG image in SD card or USB flash drive 8M (3840*2160, X8CAM4K8MPA, X8CAM4K8MPB) JPEG/TIFF/RAW/PNG image in SD card or USB flash drive (Default SD card priority, priority can be modified in settings)
Measurement Saving	Measurement information saved in different layer with image content Measurement information is saved together with image content in burn in mode
ISP	Exposure(Automatic / Manual Exposure) / Gain, White Balance(Manual / Automatic / ROI Mode), Sharpening, 3D Denoise, Saturation Adjustment, Gamma Adjustment, Contrast Adjustment, Brightness Adjustment, Hue Adjustment, Color to Gray, 50HZ/60HZ Anti-flicker, Dark Enhance, Clarity Enhance, Purple Reduction, Brightness Enhance Function
Image Operation	Zoom In/Zoom Out (Up to 10X), Horizontal/Vertical Flip, Freeze, EDF, Stitch, Grids, Overlay, PIP, Browser (including Picture Browsing, Video Playback, Video Compare, Picture Compare, EDF, Stitch, Image Processing), 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 / Traditional Chinese / Korean / Thailand / French / German / Spanish / Japanese / Italian / Russian / Dutch / Portuguese
Software Environment under Network/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 8 / 8.1 / 10 / 11(32 & 64 bit) OSx(Mac OS X) Linux
PC Requirements	CPU: Equal to Intel i3 12100F or Higher
	Memory: 16GB or More
	USB interface: USB 2.0 interface or higher
	Ethernet Port: RJ45 Ethernet Port
	Display:19” or Larger
	CD-ROM
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 or above Adapter

Dimension of X8CAM4K Series Camera



Figure 3 Dimension of X8CAM4K22MPA



Figure 4 Dimension of X8CAM4K16MPA/X8CAM4K8MPA/X8CAM4K8MPB

X8CAM4K Series Camera Packing Information



Figure 5 X8CAM4K Series Camera Packing Information

	Standard Packing List
A	Gift box : L:25.5cm W:17.0cm H:9.0cm (1pcs, 1.7Kg/ box)
B	X8CAM4K Camera
C	Power Adapter: Input: AC 100~240V 50Hz/60Hz, Output: DC 12V 1A American standard: Model: POWER-U-12V1A(MSA-C1000IC12.0-12W-US): UL/CE/FCC European standard: Model: POWER-E-12V1A(MSA-C10001C12.0-12W-DE): UL/CE/FCC British Standard: Model: POWER-UK-12V1A(NGE12I12-P1J)
D	USB Mouse
E	HDMI2.0 Cable
F	USB3.0 A male to A male gold-plated connectors cable /1.5m
	Optional Accessory
G	Voice Control Module
H	SD Card (32G or above; Speed: class 10)
I	USB flash drive (USB3.0)
J	Ethernet cable
K	USB WiFi adapter (Shape will vary with different models)
L	1.2/1.5X Microscope Adapter (For X8CAM4K22MPA), engineer will help you to determine the right microscope adapter for your application

X8CAM4K Series Camera Configurations

You can use the X8CAM4K series camera in 5 different ways. Each application requires different hardware environment.

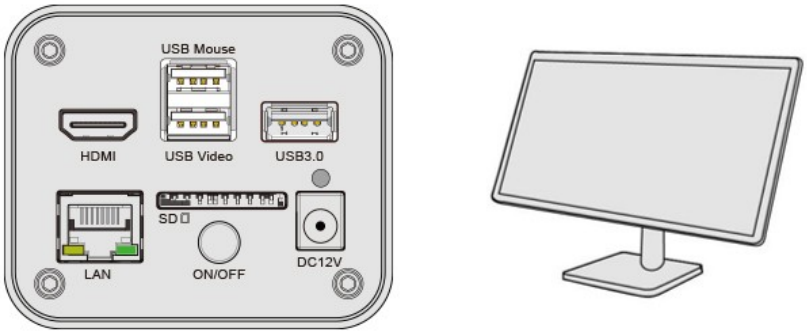
1.1 Camera working standalone with built-in XCamView software

For this application, apart from the microscope, you only need an HDMI monitor, the supplied USB mouse, and the camera embedded XCamView 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:

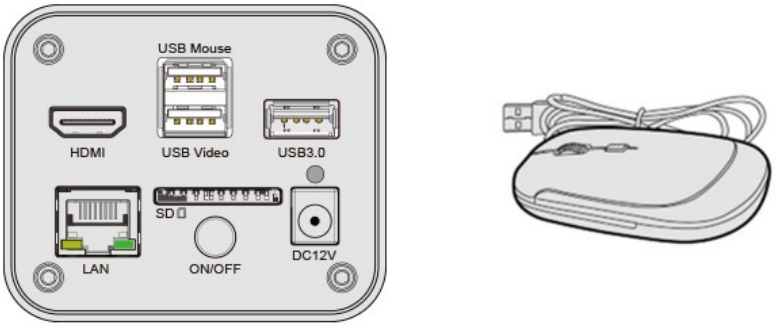


Figure 6 X8CAM4K Series Camera with the HDMI Monitor

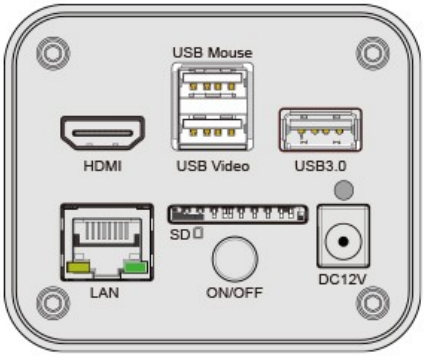
Connect the camera to a HDMI monitor using the HDMI cable;



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

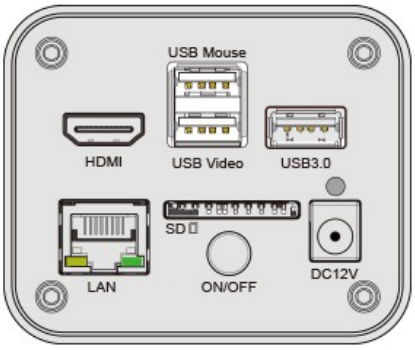


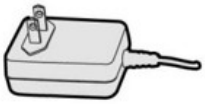
Insert the supplied SD card/USB flash drive into the X8CAM4K series camera SD card slot/USB3.0 slot;





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





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

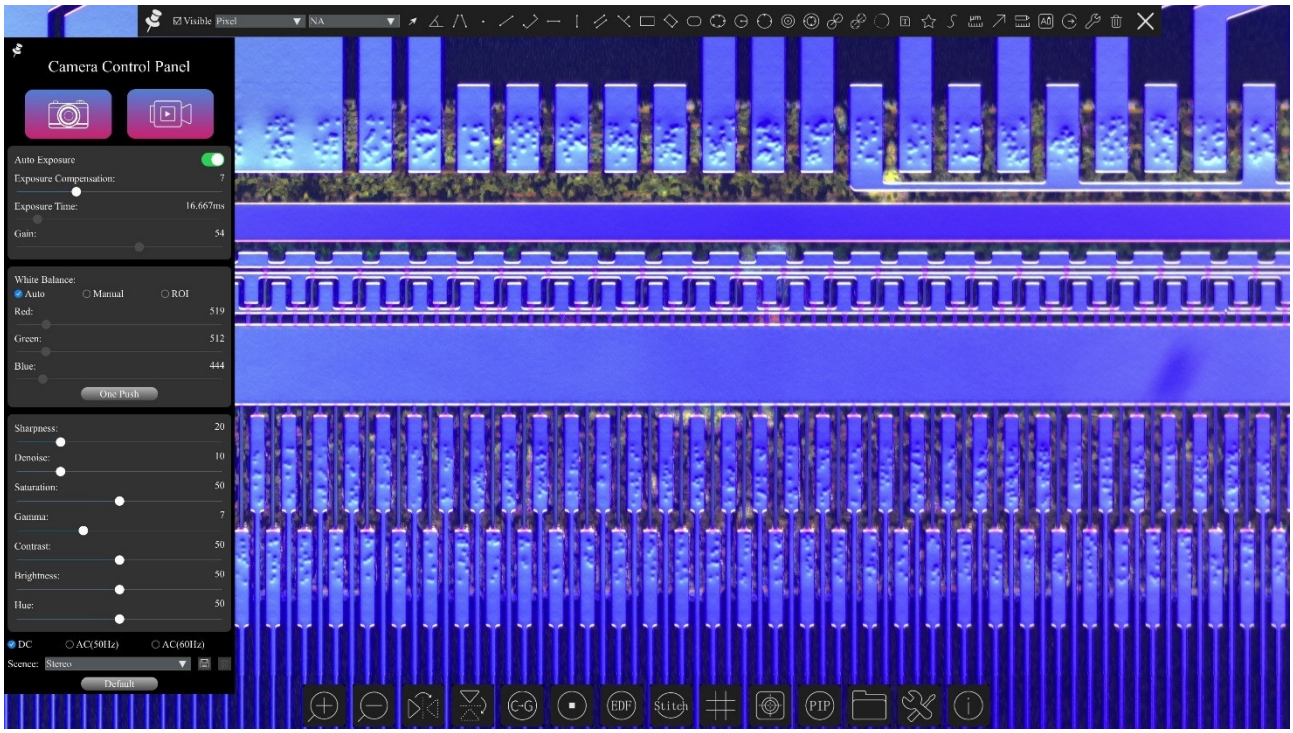


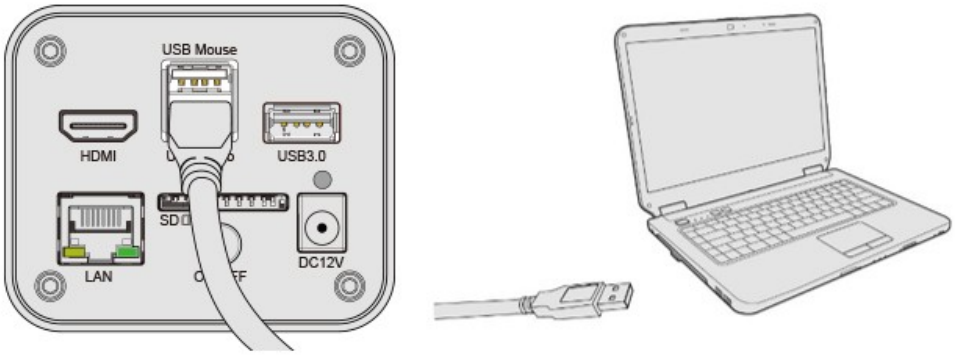
Figure 7 XCamView and X8CAM4K Series Camera in HDMI Mode

1.2 Connecting camera to computers with USB3.0 port

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

For macOS and Linux user (macOS 10.10 or above or Linux distributions with kernel 2.6.27 or higher), please use ToupLite. The steps to start the camera are listed below:

Start the camera according to Sec. 1.1. After the camera is running, connect camera to computer with USB cable. Please use “USB Video” slot, The upper left corner of the HDMI graphics interface displays “USB3.0 Mode” or “USB2.0 Mode”, indicating that a connection has been established with the PC.



Install ToupView/ToupLite on your PC or install ToupView App on the mobile device; Run the software ToupView/ToupLite, clicking the camera name in the Camera List group to start the live video as shown in Figure 8.

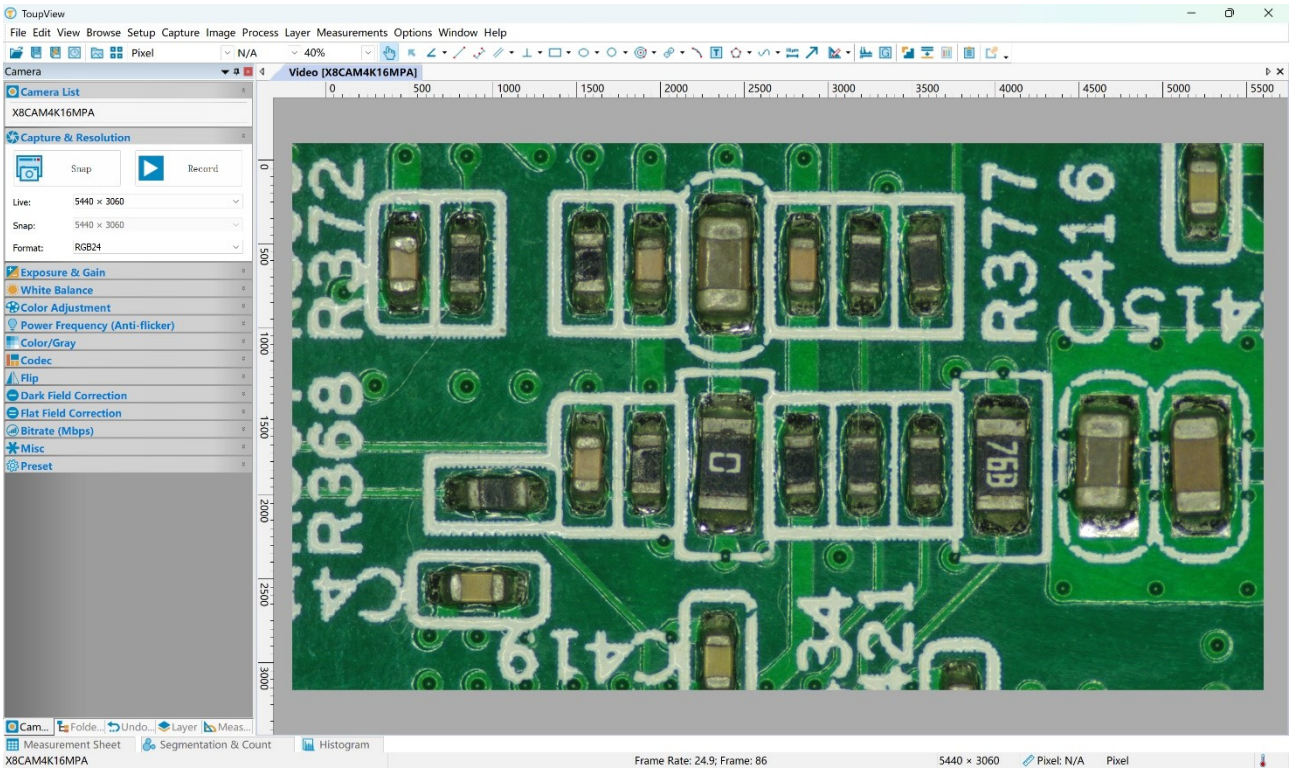


Figure 8 ToupView and X8CAM4K Series Camera in USB Mode

1.3 Camera working in WiFi mode (AP mode)

Please make sure your PC is WiFi enabled.



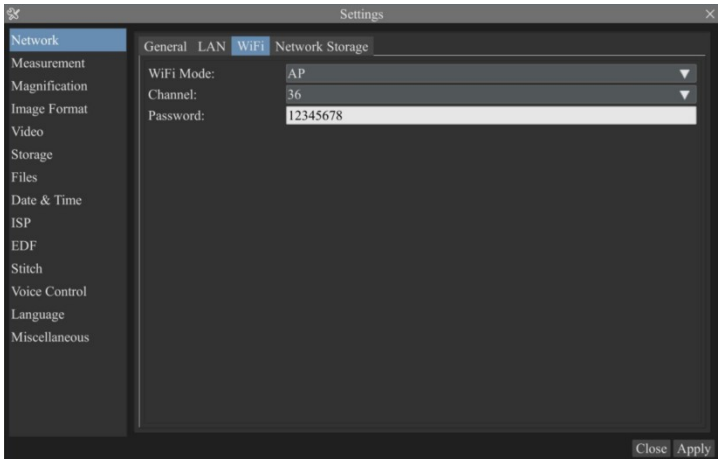
Figure 9 The PC or Mobile Device Connect to the Camera through WiFi

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

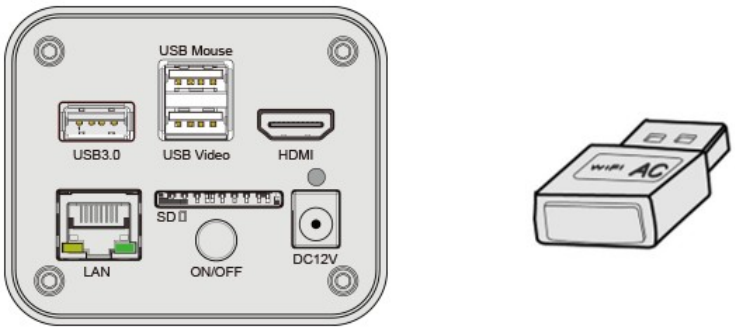
For macOS and Linux user (macOS 10.10 or above or Linux distributions with kernel 2.6.27 or higher), please use ToupLite. When connecting the camera with a mobile device, the free ToupView App is required. Just make sure that the mobile device uses iOS 11 or higher/Android 5.1 or higher operating systems.

The steps to start the camera are listed below:

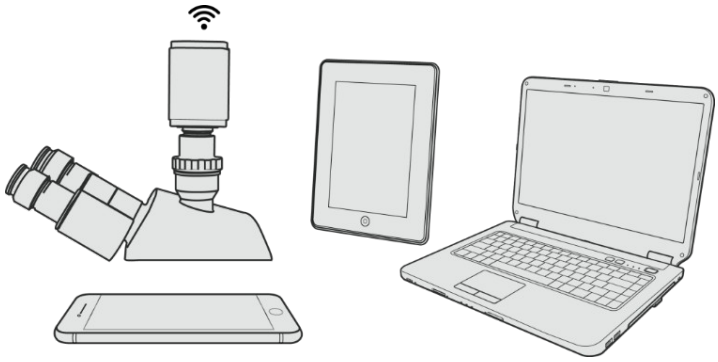
Start the camera according to Sec. 1.1. After the camera is running, move the mouse to the bottom of the GUI and clicking the button on the Synthesis Camera Control Toolbar at the bottom of the video window, a small window called Settings will pop up as shown below. Click Network> WiFi property page and choose the AP in the WiFi Mode edit box(The factory default configuration is AP mode).



Plug the USB WiFi adapter into the camera's USB3.0 port, the upper left corner of the HDMI graphics interface will display "AP mode";



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



Start ToupView/ToupLite software or ToupView App and check the configuration. Normally, the active X8CAM4K series cameras will be automatically recognized. The live image of each camera is shown in Figure 10. For the display, the Camera List group is used in ToupView/ToupLite software, and the Camera Thumbnail is used in ToupView App.

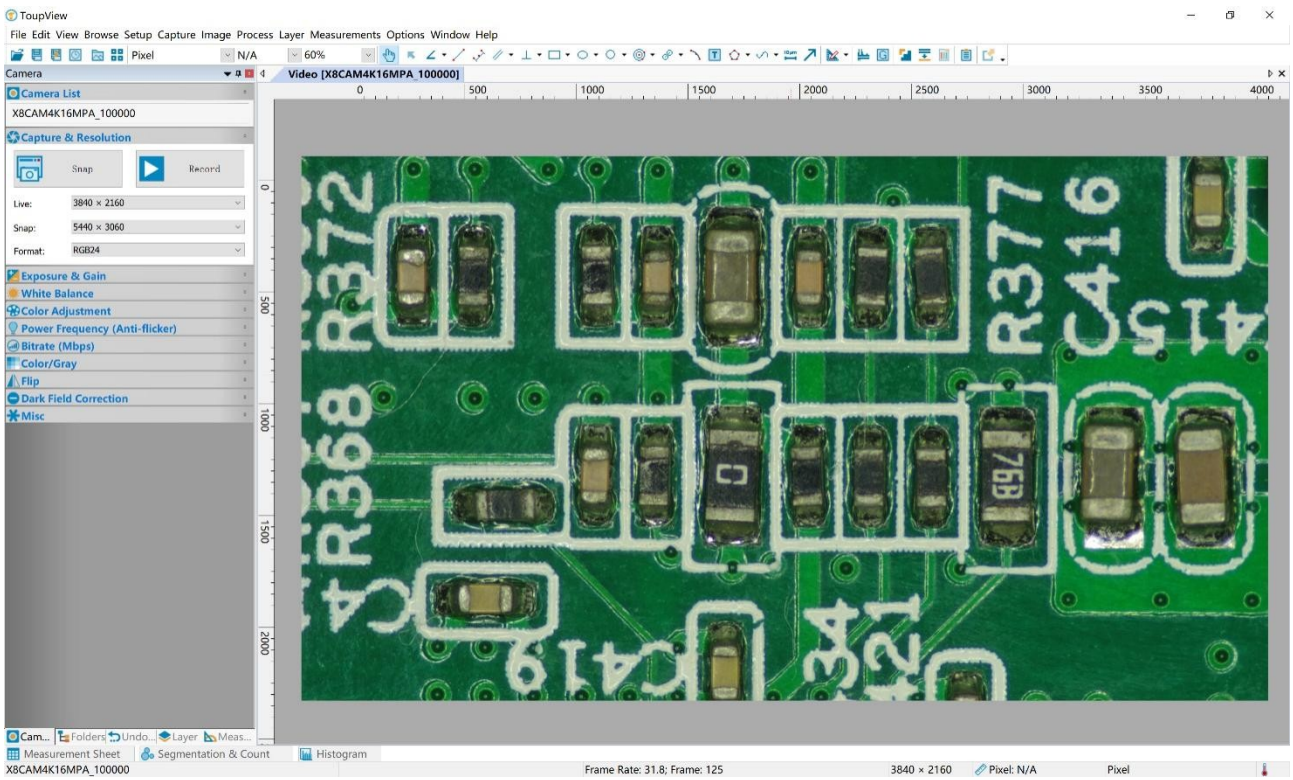


Figure 10 ToupView and X8CAM4K Series Camera in WiFi AP Mode

1.4 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 in the same net. The subnet mask and gateway of the camera and PC must be the same.

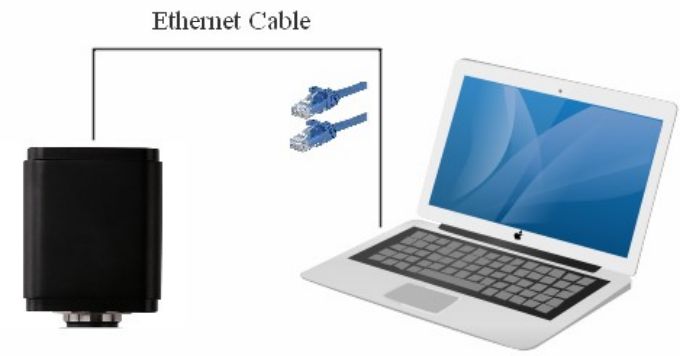


Figure 11 Connecting theX8CAM4K Series Camera with Ethernet Cable to the PC

Start the camera according to Sec. 1.1 after the camera is running, clicking button on the Synthesis Camera Control Toolbar at the bottom of the video window(See Figure 7), 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.

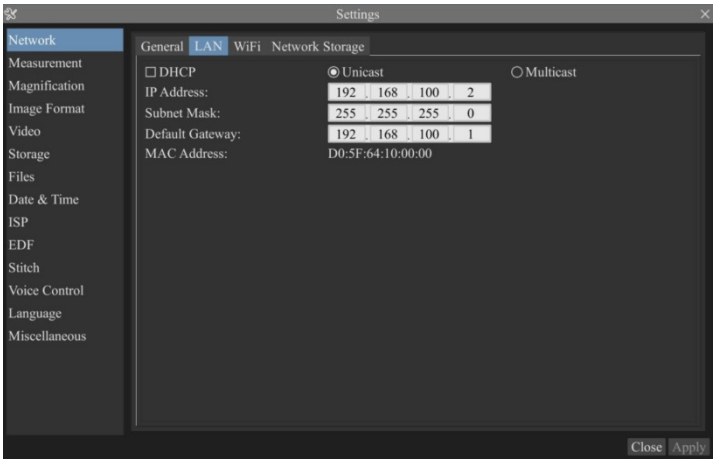


Figure 12 Configure theX8CAM4K Series Camera IP

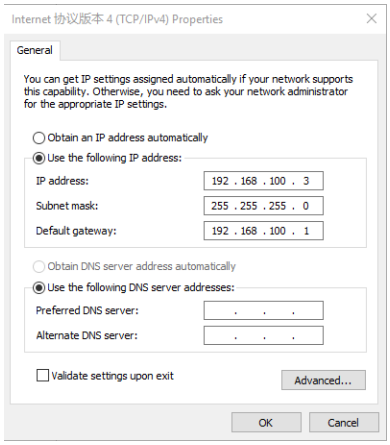
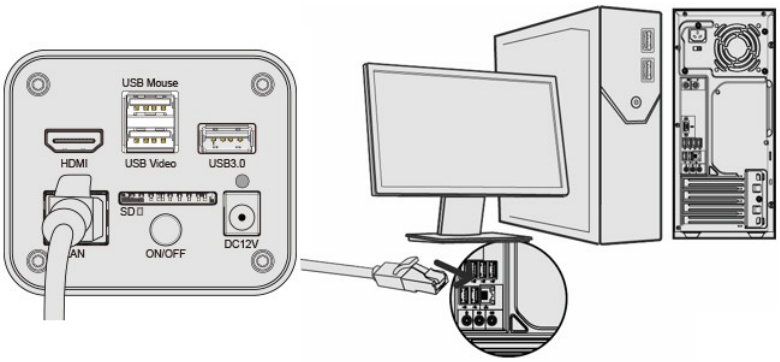


Figure 13 Configure the PC's IP

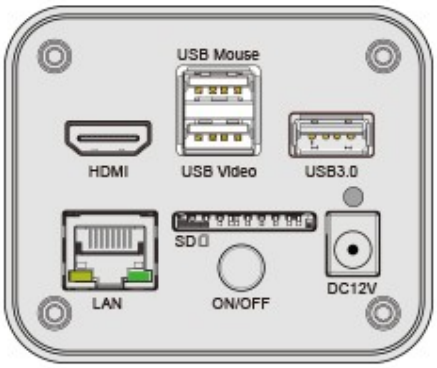
After the above configurations are finished, user can connect the X8CAM4K series camera to the computer through the Ethernet cable as shown below:

Connect the LAN port with the Ethernet cable to the PC's network port, the upper left corner of the HDMI graphics interface will display IP address;



Insert the supplied SD card/USB flash drive into the X8CAM4K series camera's SD card slot/USB3.0 slot;





Install ToupView/ToupLite on your PC or install ToupView App on the mobile device; Run the software ToupView/ToupLite, clicking the camera name in the camera list starts the live video as shown in Figure 10.

1.5 Connecting multi-cameras to the router through the LAN port/ WiFi STA mode for the network application

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

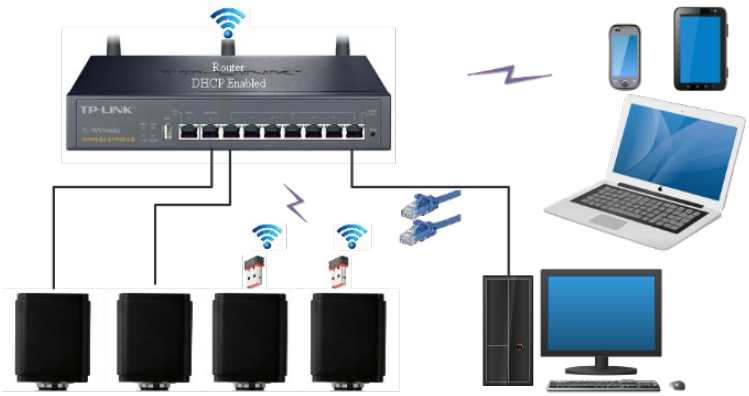
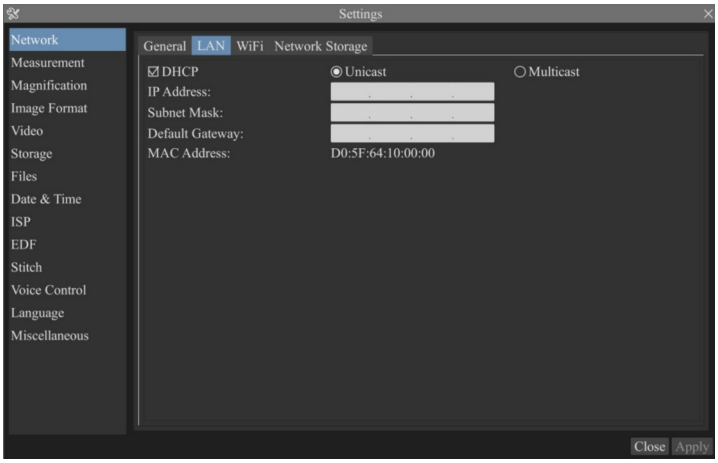


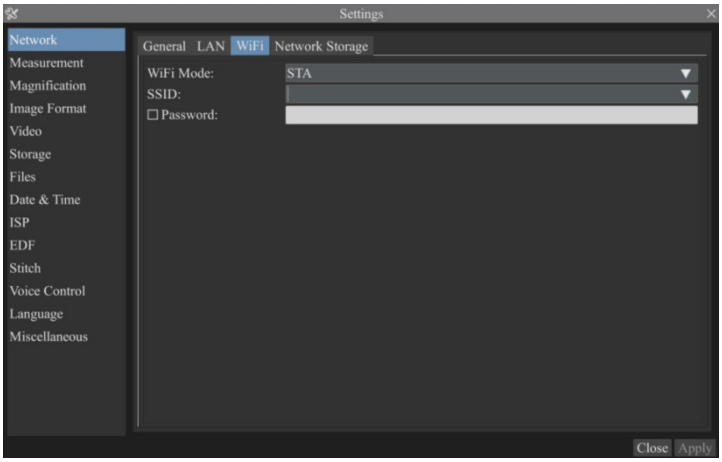
Figure 14 Multi X8CAM4K Series Cameras Connecting to the Router through the LAN Port/ WiFi Style

The connection and configuration are just the same as in Sec.1.1 or Sec. 1.4. 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 guarantee that the broadcasting function is enabled in the network.

Active X8CAM4K series 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 10.



Or start the camera according to Sec. 1.1. After the camera is running, move the mouse to the bottom of the video window and clicking the button on the Synthesis Camera Control Toolbar at the bottom of the video window, a small window called Settings will pop up as shown below. Clicking Network> WiFi property page and choosing the STA in the WiFi Mode edit box (The factory default configuration is AP mode). Choice or input the to be connected router's SSID and Password as shown below:

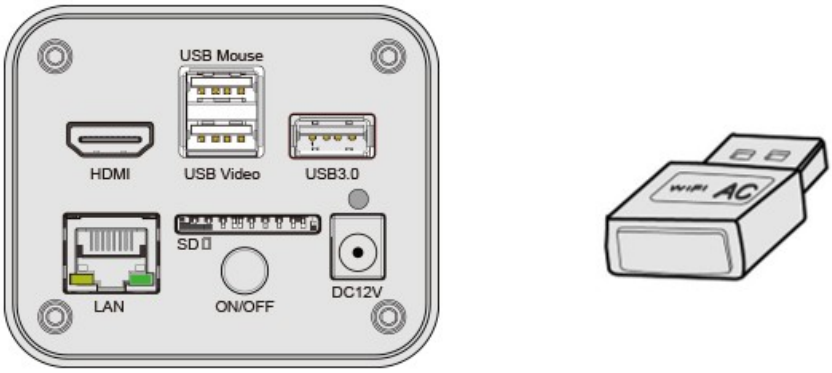


Install ToupView /ToupLite software on your PC. Alternatively, install the free ToupView App on the mobile device;

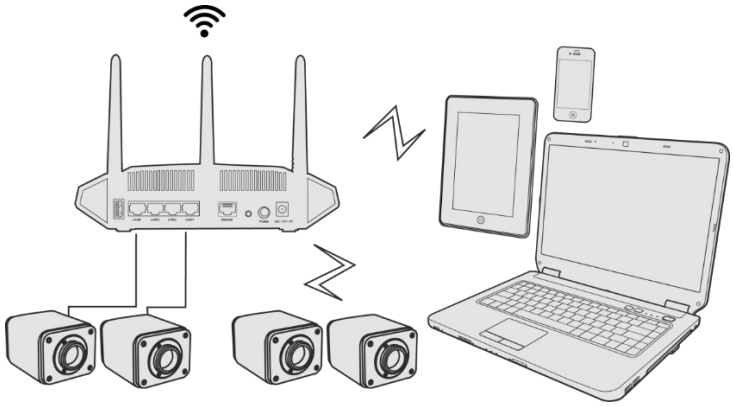
Plug the Ethernet cable into the camera's LAN port and the other end to the PC (for those connected to router with LAN Port), the upper left corner of the HDMI graphics interface will display IP address;



Or plug the USB WiFi adapter into the camera's USB3.0 port(for those connected to router with WiFi STA mode), the upper left corner of the HDMI graphics interface will display"STA Mode";



Finally, as shown below, 2 X8CAM4K series cameras are connected to the router with LAN cable and 2 X8CAM4K series cameras are connected to the same router with WiFi STA mode (The number of the cameras, the connection mode (LAN or WiFi STA) connected to the router are determined by the router performance).



Make sure that your PC or your mobile device is connected to the LAN or WiFi of the router; Start ToupView/ToupLite software or ToupView App and check the configuration. Normally, active X8CAM4K series cameras are automatically recognized. The live image of each camera is displayed. For the display, Camera List group is used in ToupView/ToupLite software, and Camera Thumbnail is used in ToupView App; Select theX8CAM4K series camera you are interested in. To do so, double click the camera's name in Camera List tool window if you use ToupView /ToupLite software; If you use ToupView App, tap the camera's thumbnail in Camera List page(See Figure 15)

About the routers/switches

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

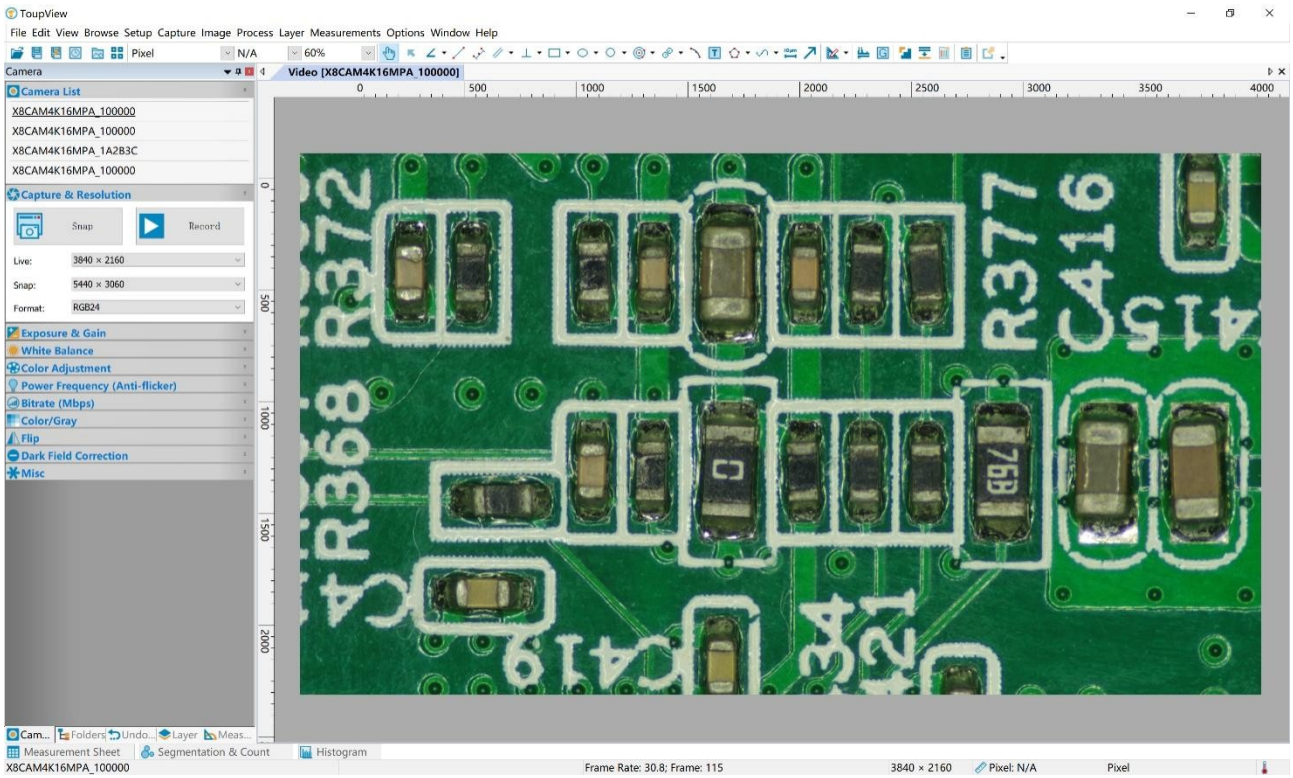


Figure 15 ToupView and X8CAM4K Series Camera in LAN port/ WiFi STA mode

2 Instructions for Using X8CAM4K Series Cameras with Different Microscopes

2.1 X8CAM4K22MPA camera for use with biomicroscope via M42 microscope adapter



Figure 16 Biomicroscope + M42 Micro Adaptor +X8CAM4K22MPA

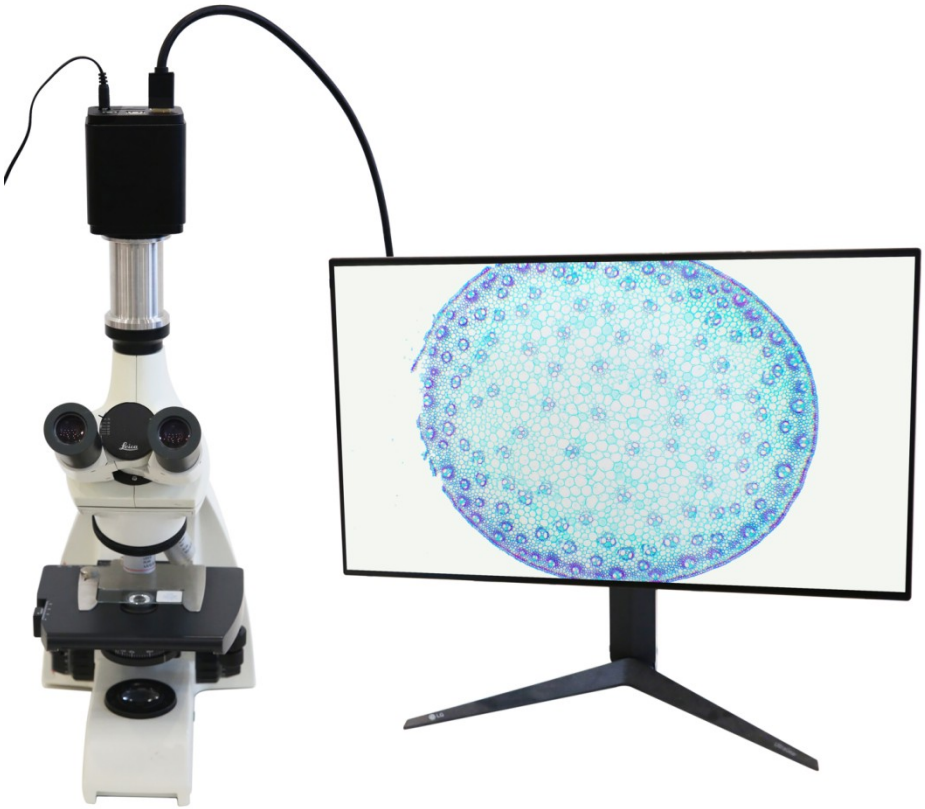


Figure 17 X8CAM4K22MPA Camera for Use with Biomicroscope Via M42 Microscope Adapter

2.2 X8CAM4K16MPA camera with trinocular stereo microscope

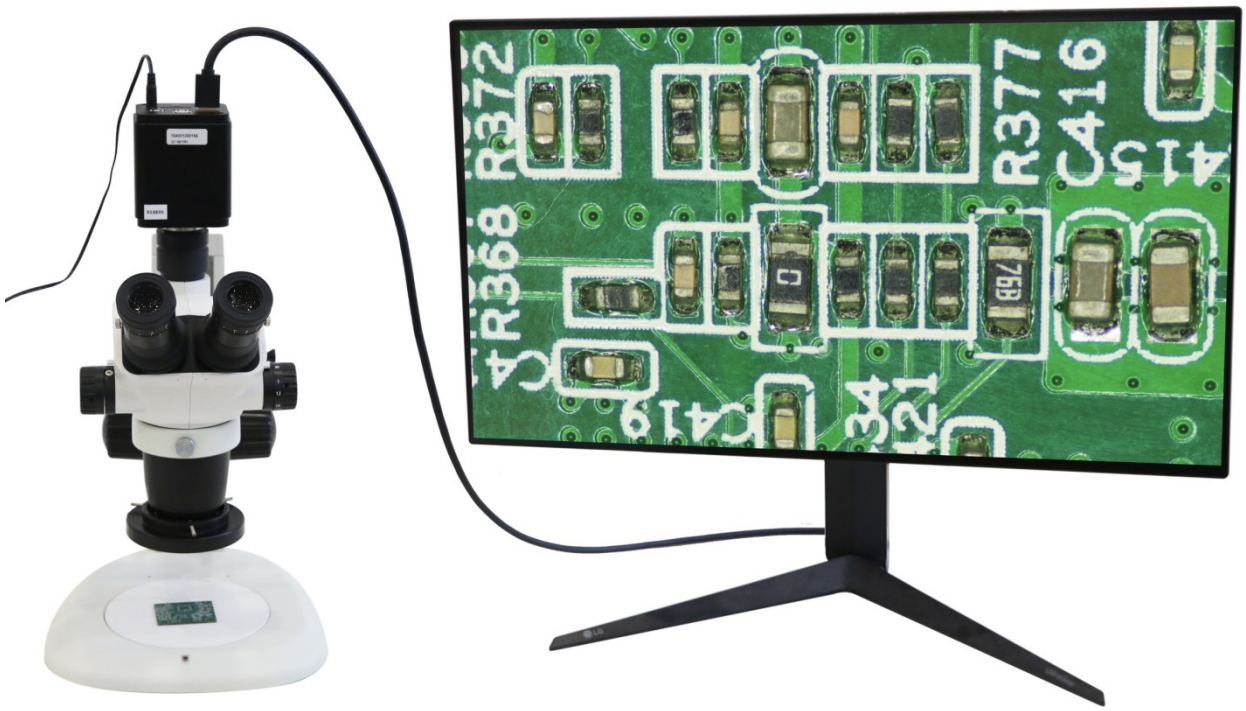


Figure 18 X8CAM4K16MPA Camera with Trinocular Stereo Microscope

2.3 X8CAM4K16MPA camera with metallographic microscope

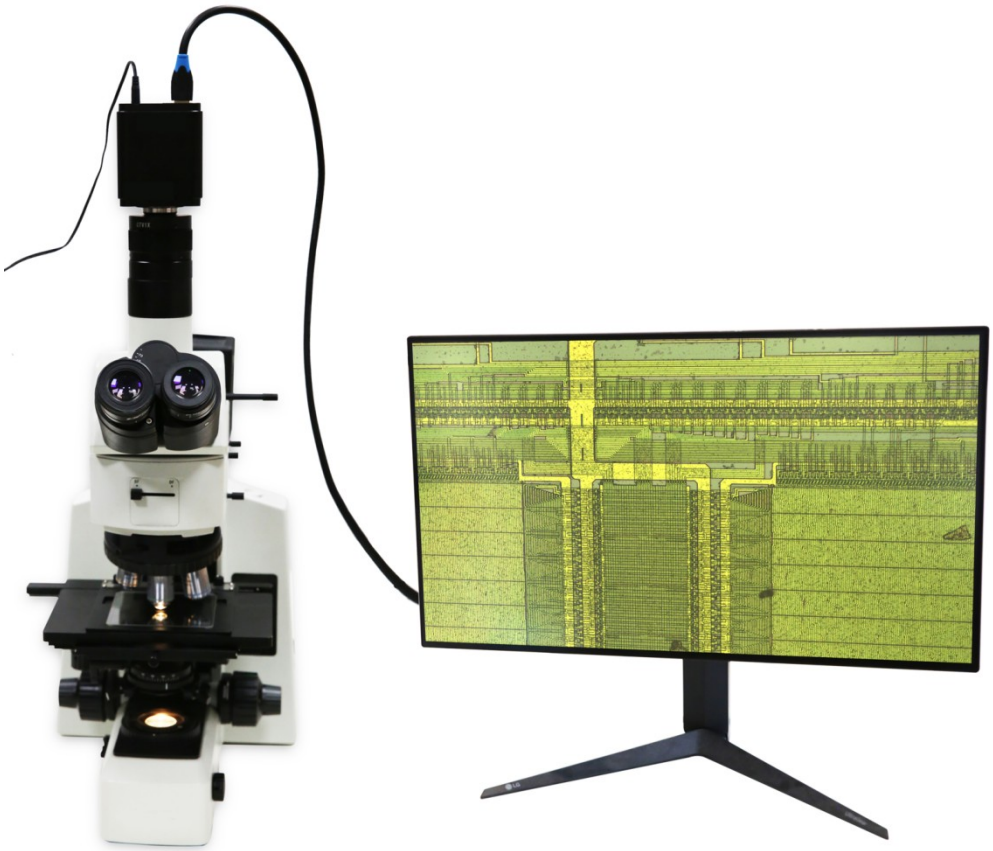


Figure 19 X8CAM4K16MPA Camera with Metallographic Microscope

2.4 X8CAM4K22MPA with Canon lenses via M42 to EF mount adapter

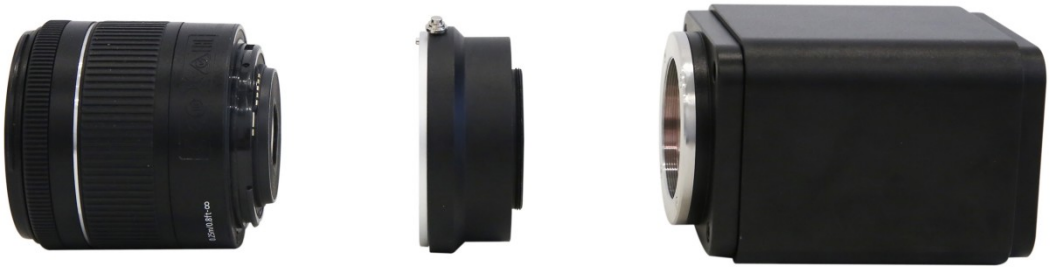


Figure 20 X8CAM4K22MPA with Canon lenses via M42 to EF mount adapter



Figure 21 X8CAM4K22MPA with Canon Lenses Via M42 to EF Mount Adapter

Sample Photos Captured with X8CAM4K Series Camera

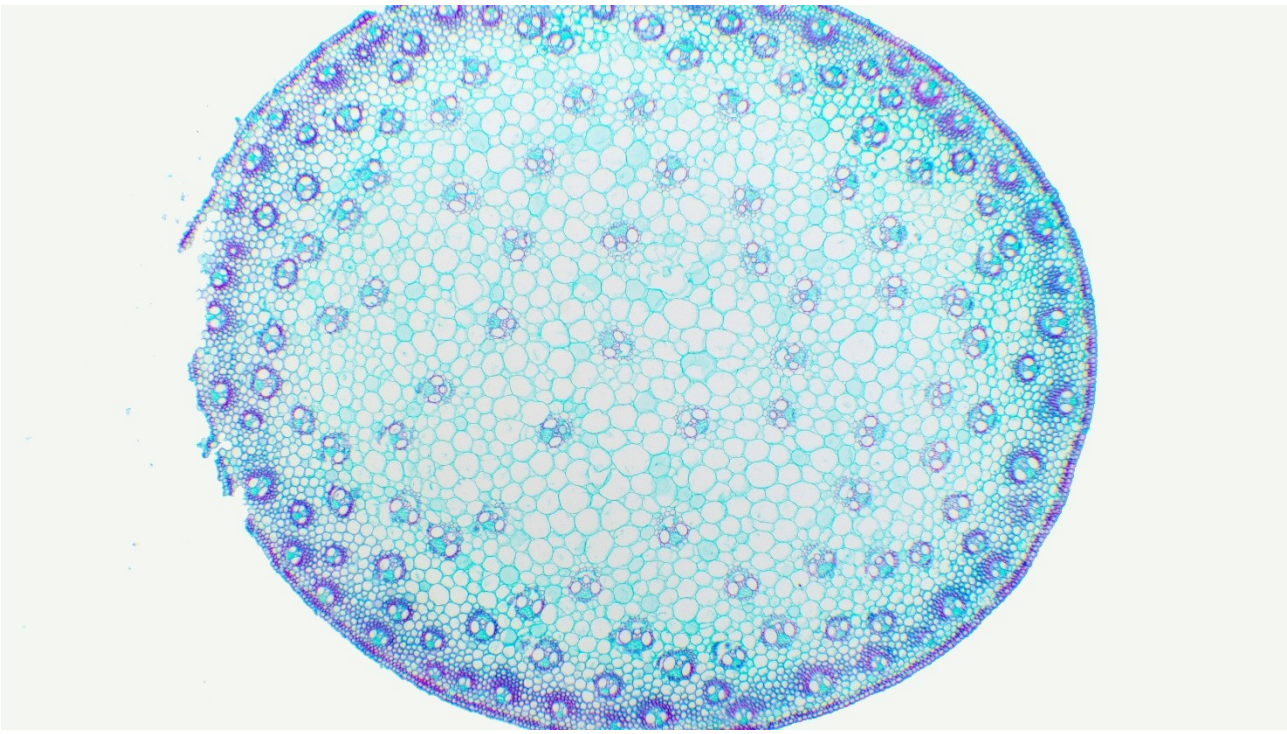


Figure 22 Corn Stem.C.S Captured with X8CAM4K22MPA

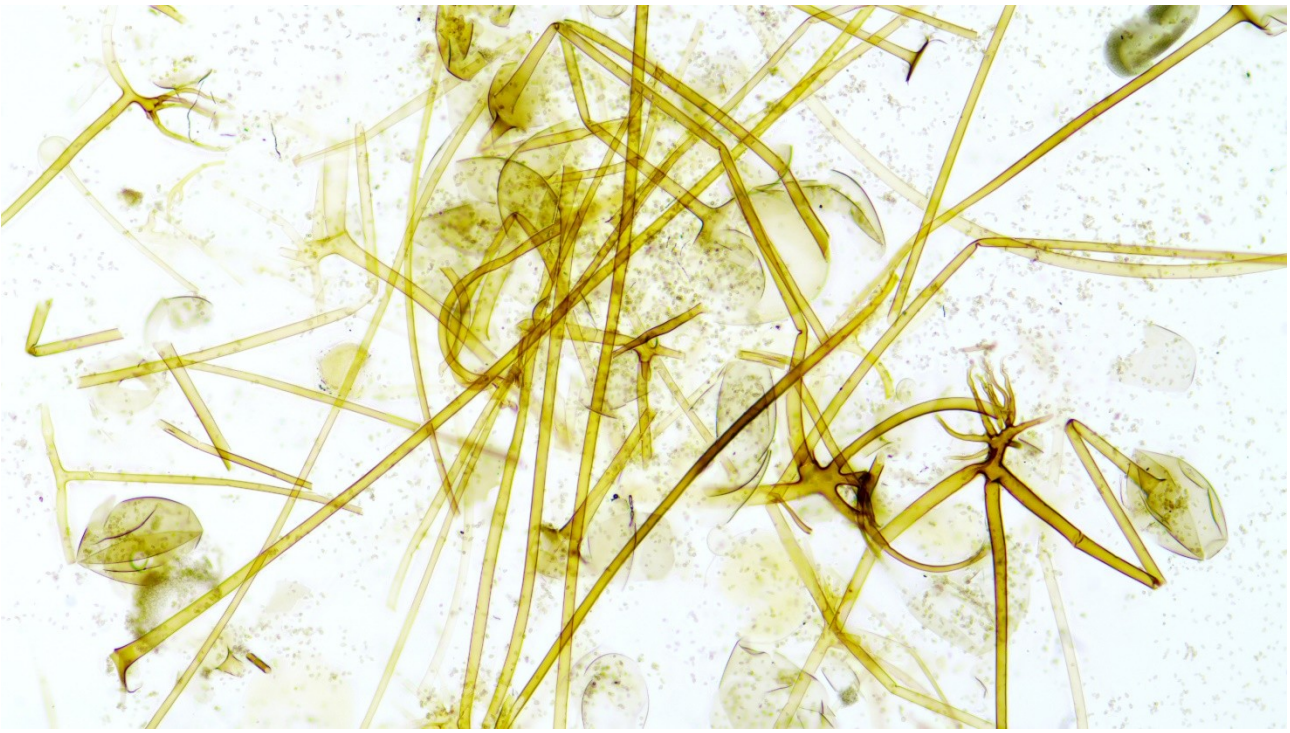


Figure 23 Rhizopus.W.M Captured with X8CAM4K22MPA

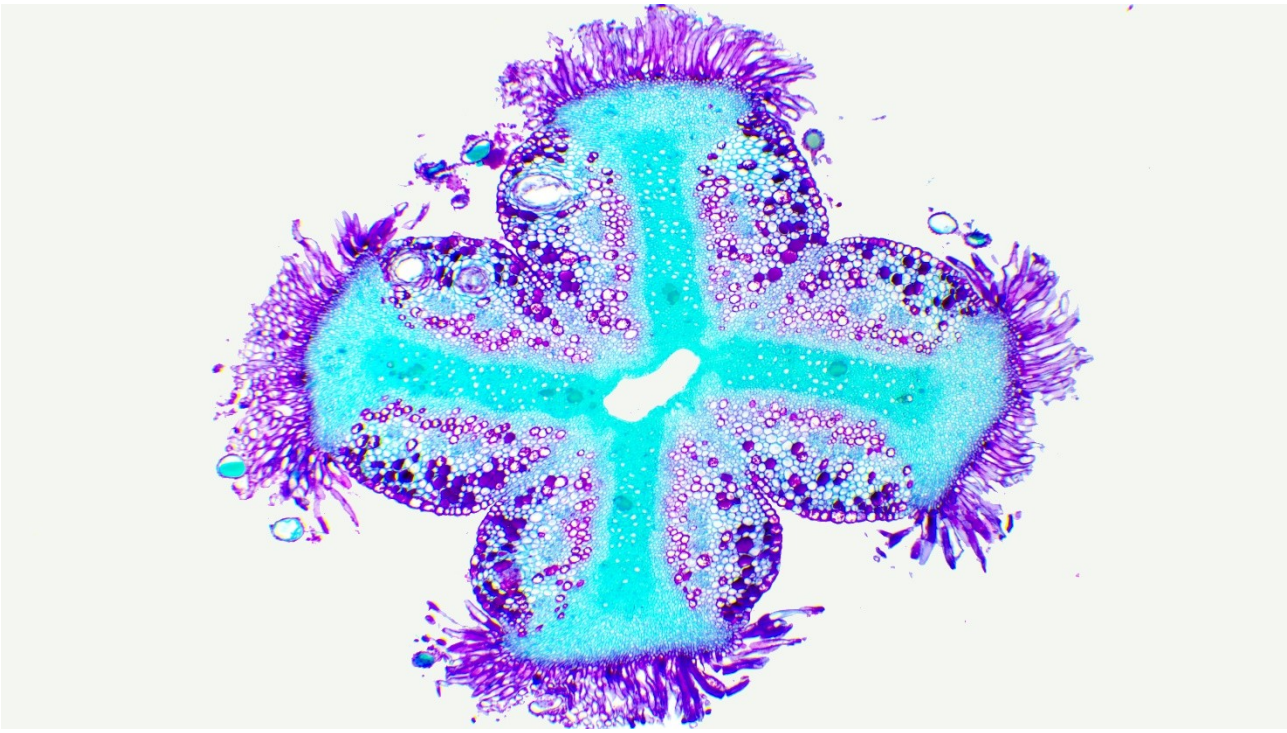


Figure 24 Cross Section of Cotton Stigma Captured with X8CAM4K22MPA

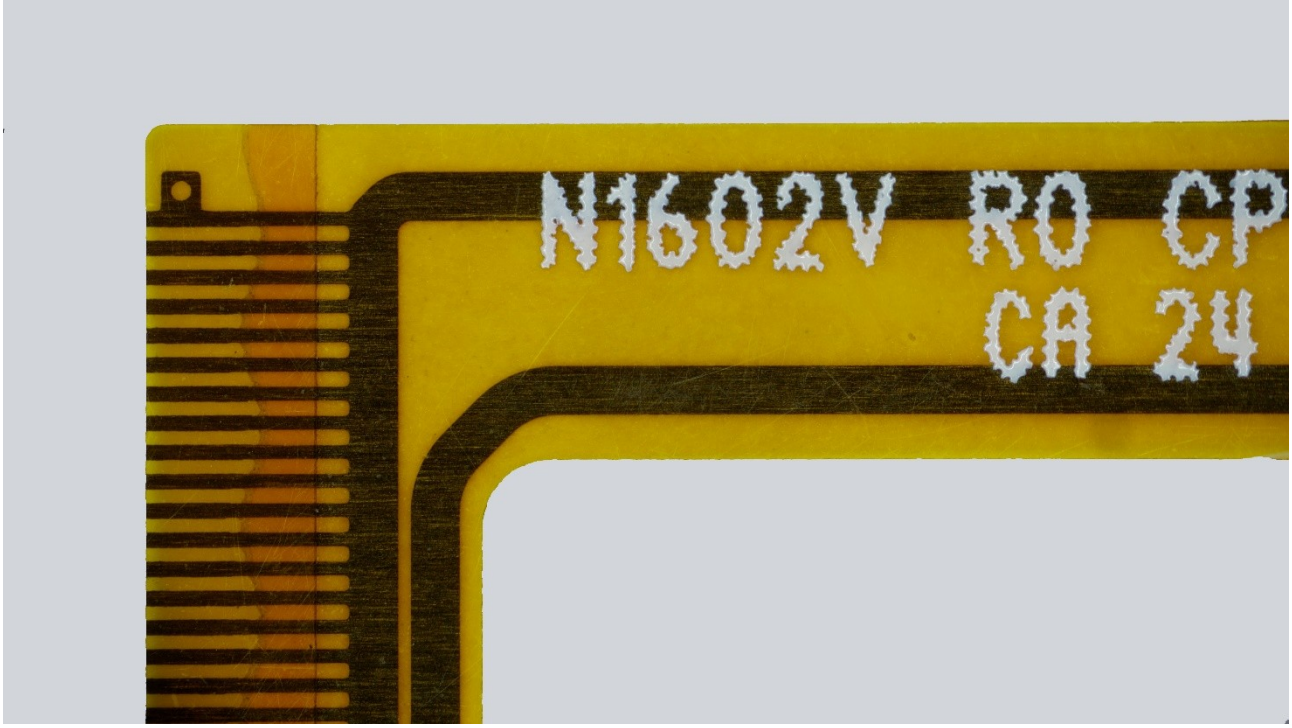


Figure 25 FPC Captured with X8CAM4K16MPA

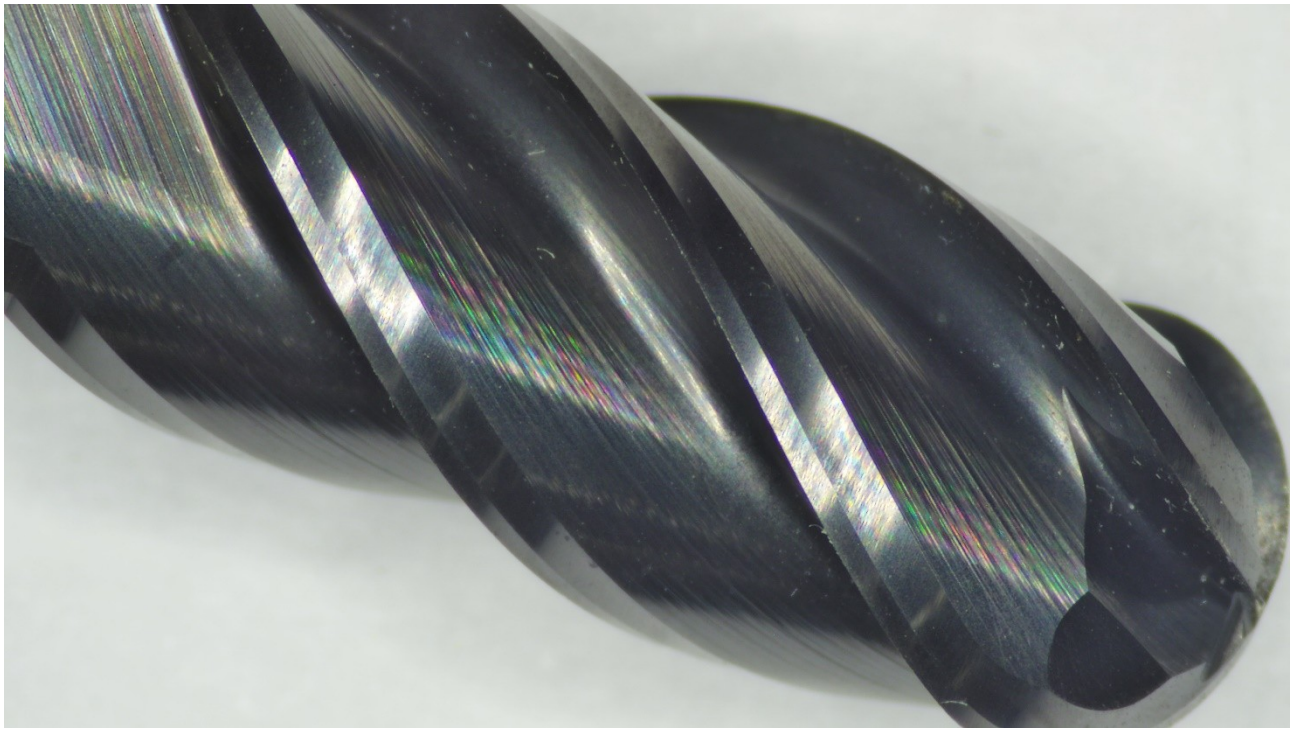


Figure 26 Carbide Tip Captured with X8CAM4K16MPA

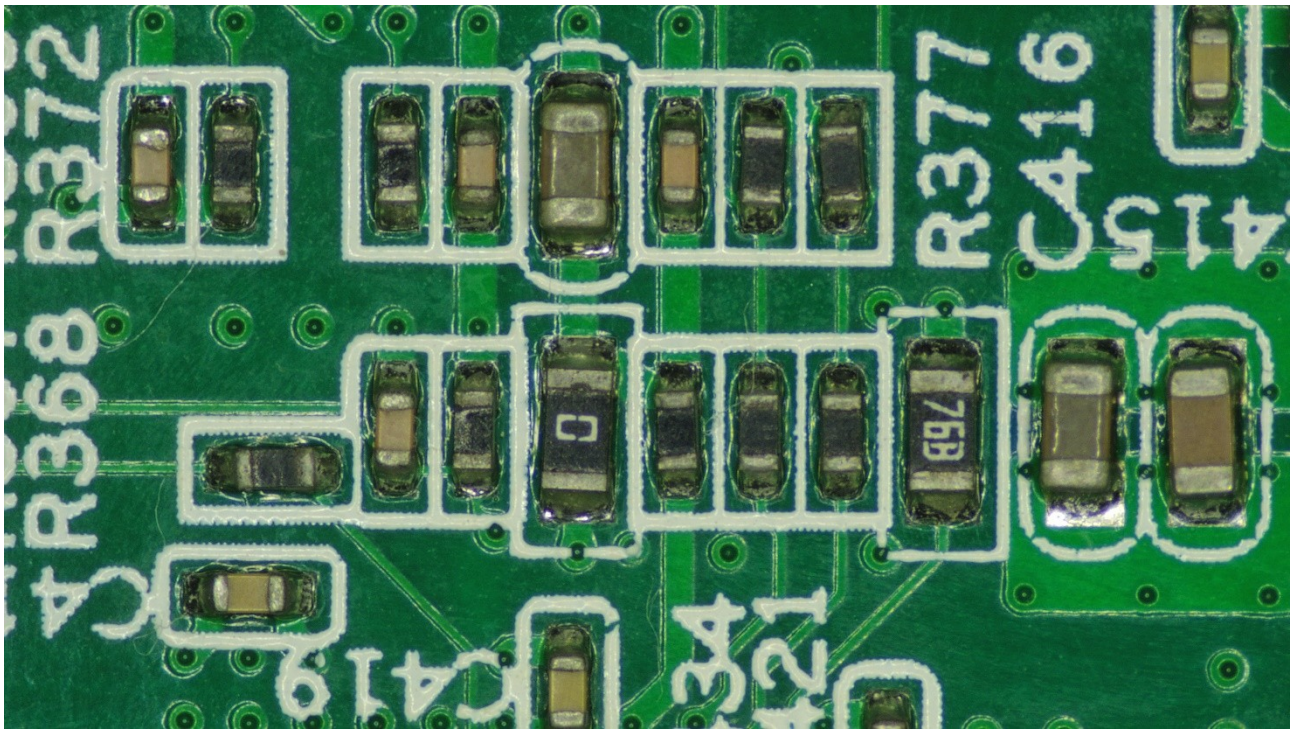


Figure 27 Circuit Board Captured with X8CAM4K16MPA

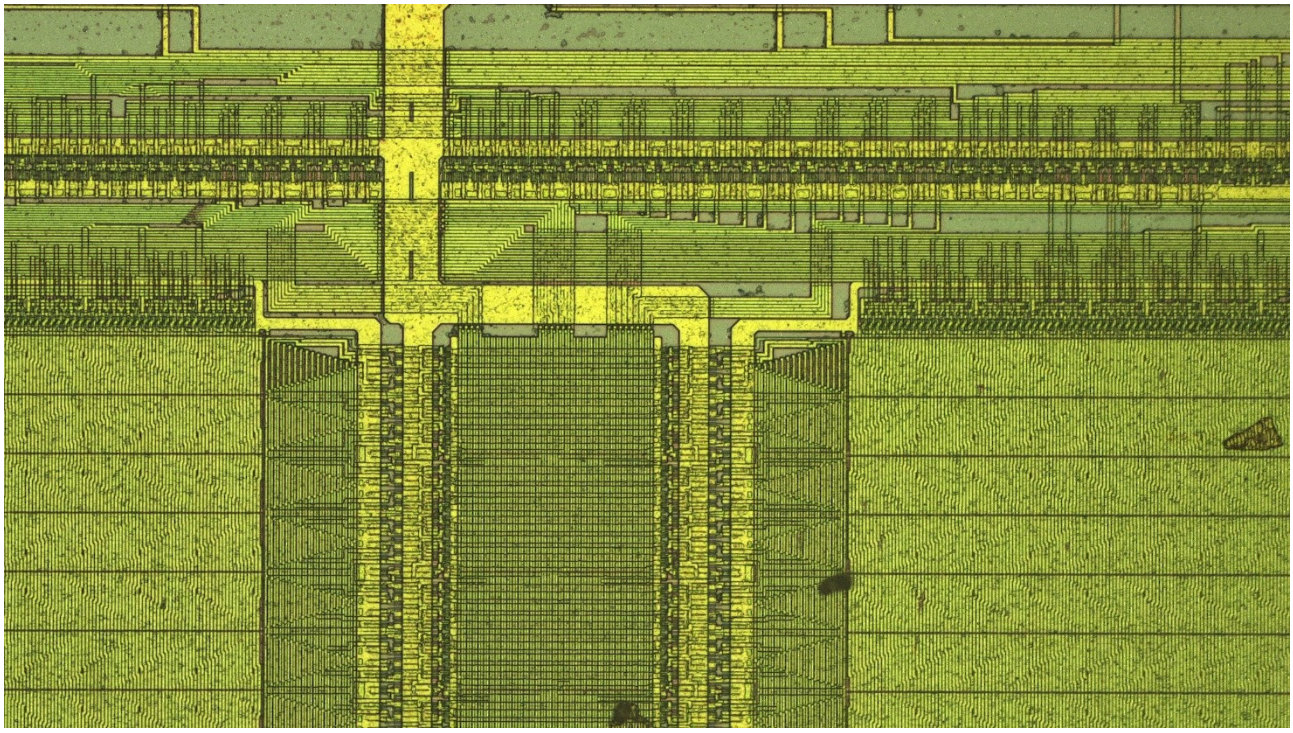


Figure 28 Samples Photographed by the SOPTOP RX50M Metallographic Microscopy System Captured with X8CAM4K16MPA

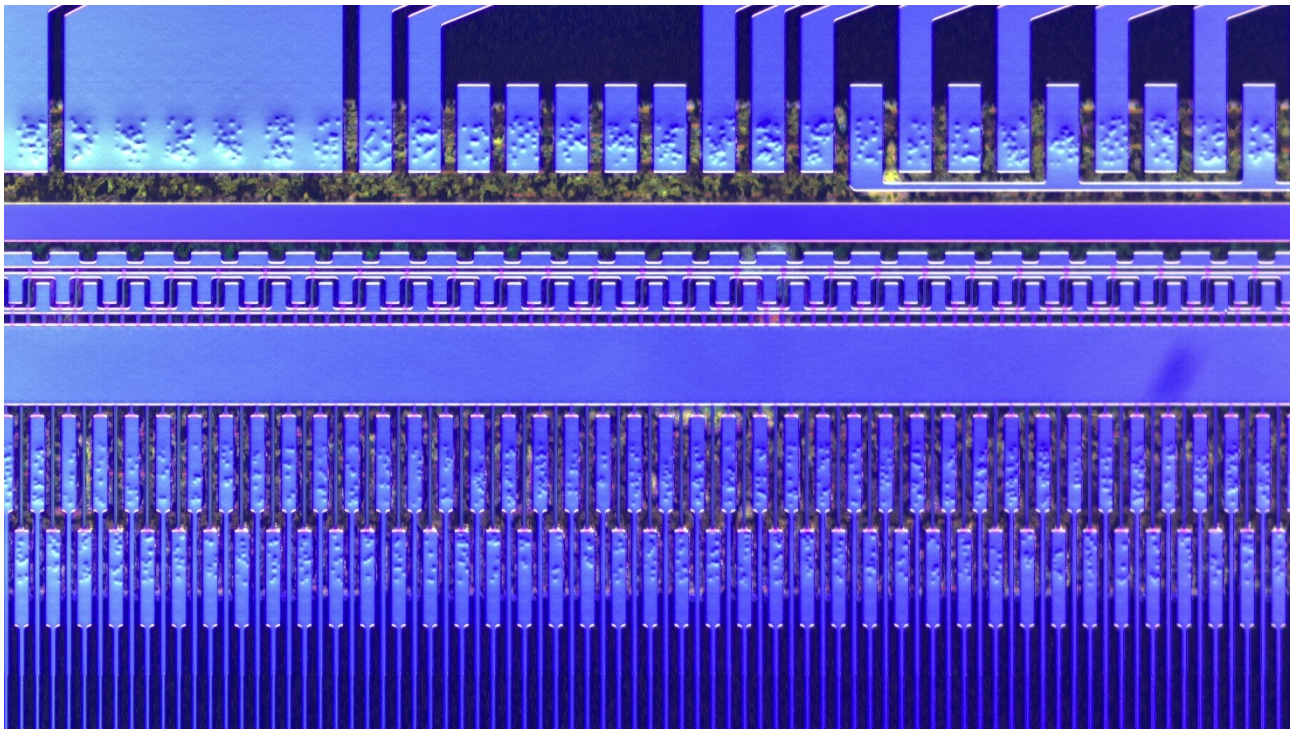


Figure 29 Conductive Particles of the Liquid Crystal Screen Photographed by the DIC-100WVA Differential Interference Contrast (DIC) Microscopy System Captured with X8CAM4K16MPA

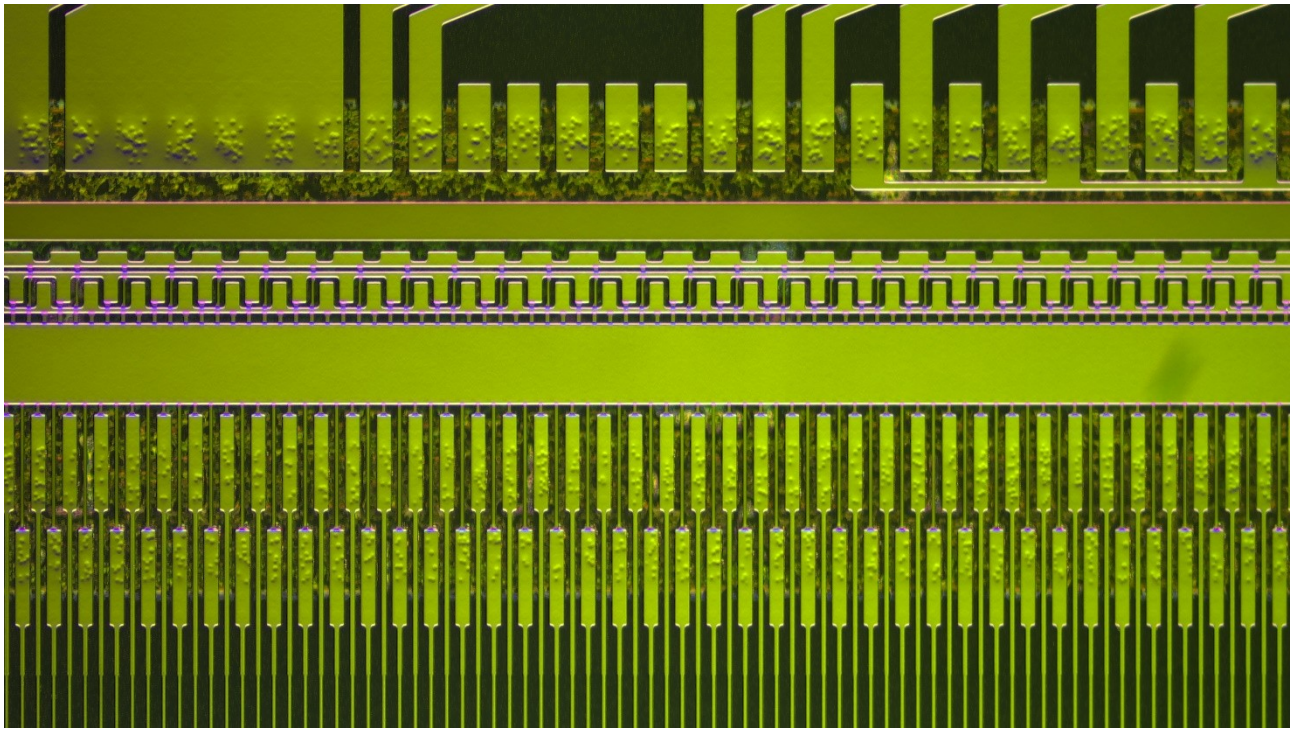


Figure 30 Conductive Particles of the Liquid Crystal Screen Photographed by the DIC-100WVA Differential Interference Contrast (DIC) Microscopy System Captured with X8CAM4K16MPA

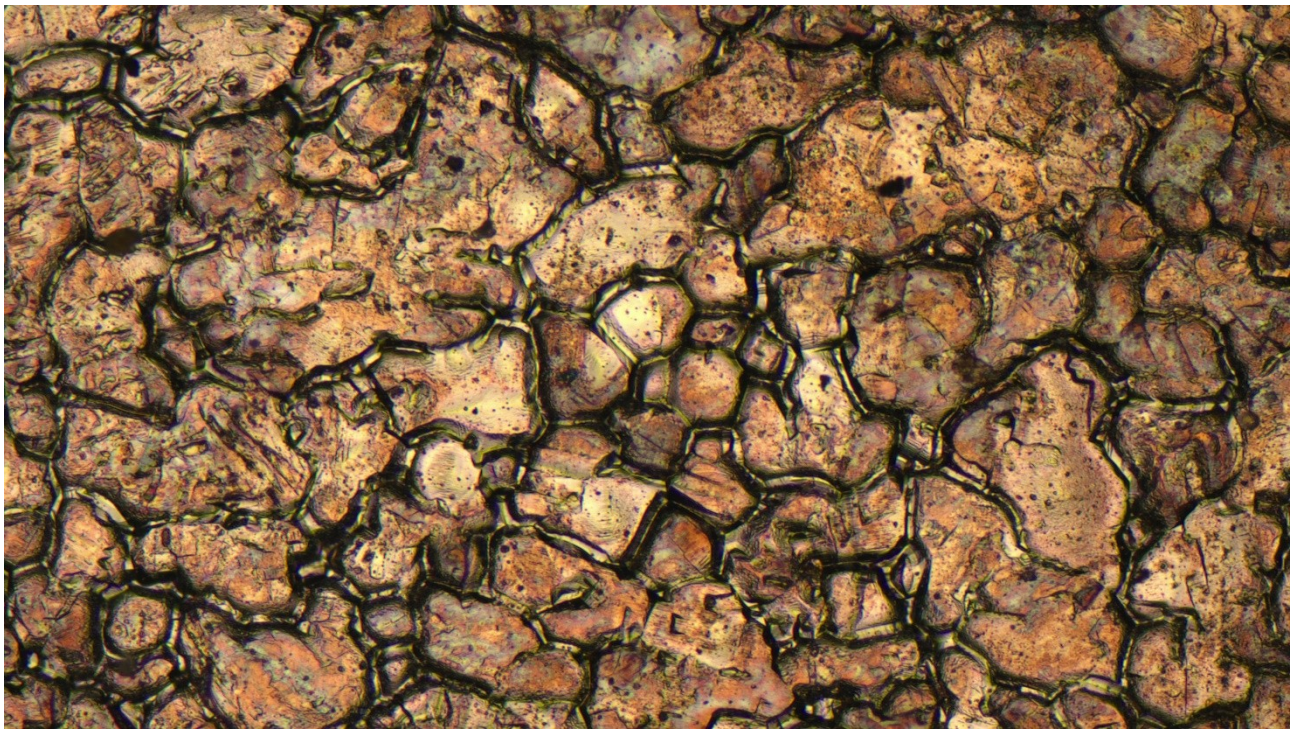


Figure 31 Metal Samples Photographed by the OUMIT CX43M Metallographic Microscopy System Captured with X8CAM4K16MPA

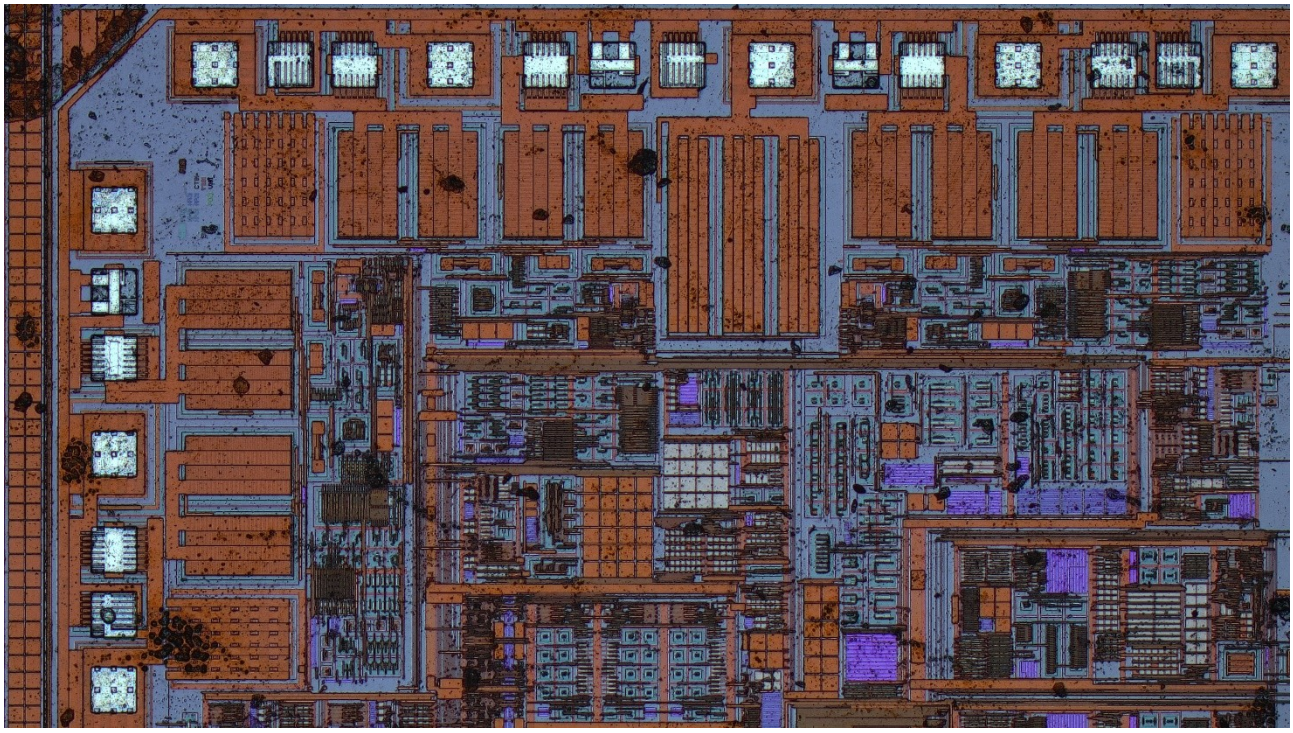


Figure 32 Semiconductor Samples Photographed by the OUMIT CX43M Metallographic Microscopy System Captured with X8CAM4K16MPA