ToupTek HDMI & WiFi Microscope Camera Catalog-2024

HDMI Camera
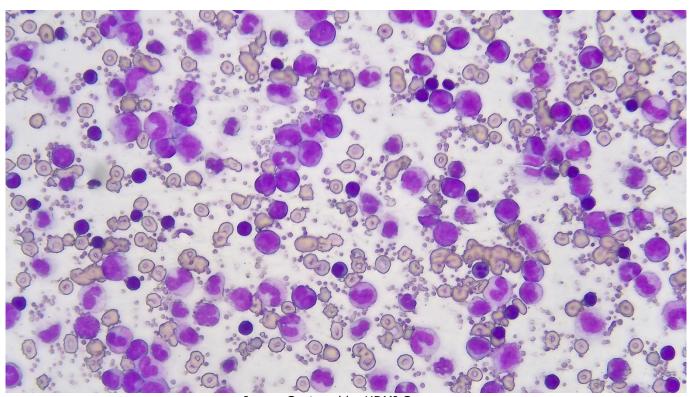

Image Captured by HDMI Camera

08. 01, 2024

Product Catalog

1   Update History

1.1 11/11/2015

- Want USB and WiFi camera integrated together? ToupTek now release its newest model called WUCAM. The WUCAM can be used either as USB2.0 CMOS camera or WiFi CMOS camera with just a switch button on the cover. The WiFi video can be displayed on the current smart phone with APP.

1.2 10/11/2017

- Added ALPHA1080 series to the HDMI family. This new series greatly enriches ToupTek camera products. HDMI and USB outputs could be supported simultaneously. New features are introduced into this camera, video recording, video playback, video measurement, comparison between images and video, on board RTC(real time clock) and so on. Multiple languages are also supported.
- An auto focus camera called XFCAM1080PHD is added into Microscope Auto Focus HDMI CMOS Camera in Sec.3. The camera can be directly insert into the microscope photo-tube. After the calibration, no manual focus operation is needed with this camera.

1.3 11/06/2018

- Added XCAM1080PHE into the HDMI series. XCAM1080PHE adopts large Sony global shutter CMOS sensor which is a best replacement of traditional CCD video camera plus displayer application.

1.4 21/08/2018

- A new model XFCAM1080PHB is added into the microscope auto-focus HDMI CMOS camera

1.5 06/11/2019

- Review of the HDMI camera resolution;
- Add XCAM4K16MPA into the HDMI camera
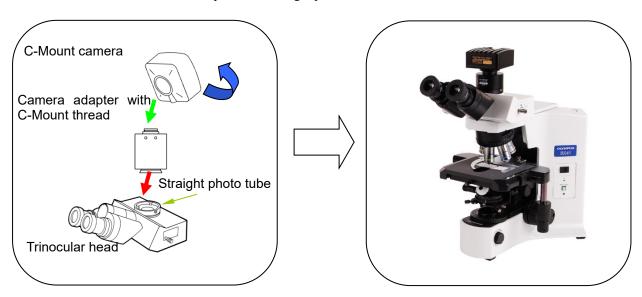
1.6 29/07/2024

- Add X7FCAM4K16MPA_EFL canon EF mount auto focus camera
- Add X5FCAM4K8MPA HDMI+WiFi+USB multi-output auto focus camera
- Add AIOCAM4K series all-in-one camera
- Add X7CAM4K, X5CAM4K, XCAMTOP4K8MPC/D, XCAMLITE4K8MPC/D, OCAM and other series HDMI cameras
- Add WEUCAM series WiFi+USB+Ethernet C interface CMOS camera
- Add TPHD4K133D AM-OLED screen

2   ToupCam® Camera & Microscope Configuration
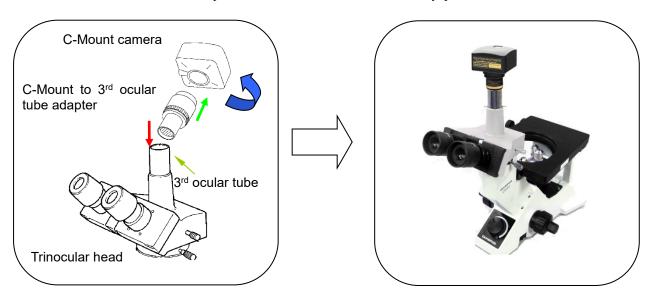
2.1   Trinocular Digital Microscope (1/2)

Attach the C-mount camera and Adapter to the straight photo tube
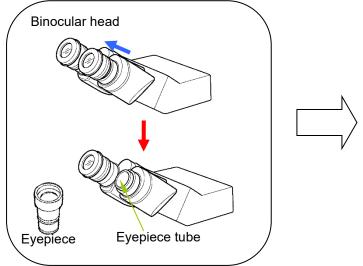
2.2   Trinocular Digital Microscope (2/2)

Attach the C-Mount camera and adapter to the 3rd ocular tube or the other 2 eyepiece tubes
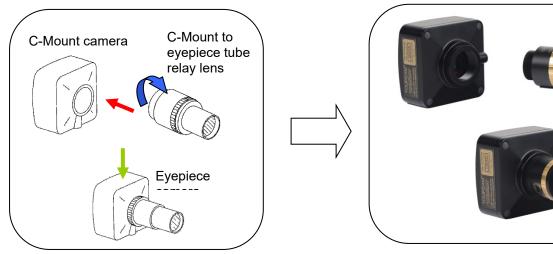
2.3 Binocular Digital Microscope

STEP 1: Remove the eyepiece from the ocular tube or the eyepiece tube
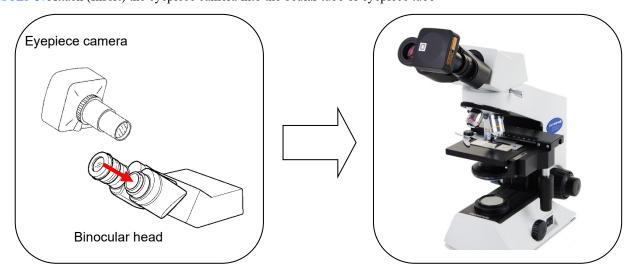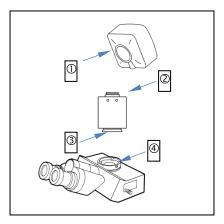
STEP 2: Attach (Screw) the camera Adapter to the C-mount camera
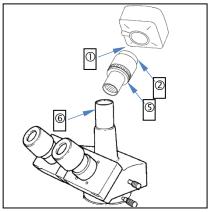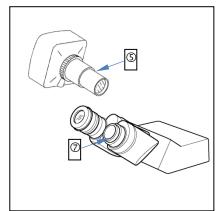
STEP 3: Attach (Insert) the eyepiece camera into the ocular tube or eyepiece tube

2.4 Size Description of the Connection Parts

① Standard C-Mount: Dia.1 inch (25.4mm) female thread
② Standard C-Mount: Dia.1 inch (25.4mm) male thread
③ Camera Adapter connector: size varies between microscope brands
④ Straight photo tube: size varies between microscope brands
⑤ Relay lens: standard eyepiece connector size, Dia.23.2mm (male)
⑥ 3rd ocular tube: standard eyepiece connector size, Dia.23.2mm (female)
⑦ Ocular tube: standard eyepiece connector size, Dia.23.2mm (female)

3   ToupCam HDMI and WiFi Microscope Camera

ToupTek XCAM series microscope cameras are designed specifically for microscopes (biological/metallurgic/continuous zoom monoculars, etc.) users without a computer, directly outputting the microscopic video to the HDMI display;

XCAM series microscope cameras have built-in ultra-high-performance multi-core microprocessor and run LinuxOS-based XCAMView software. When plugging in the mouse, you can easily perform image processing and operation on the HDMI display;

XCAM series microscope cameras also have multiple output functions, which can transfer the video image data of the microscope camera to a computer or mobile devices by USB interface/RJ45 Ethernet interface/WiFi adapter;

XCAM series microscope cameras can be inserted with SD card or USB flash drive to quickly save images or videos for subsequent analysis and research;

XCAM series microscope cameras have high color reproduction ability, what you see is what you get, and the uncompressed raw data or lossless compression technology ensures the authenticity of scientific images; the built-in algorithm can automatically analyze and adjust the image information, regardless of whether the brightfield biological image, polarized light and crystal imaging in dark field, almost no need to manually adjust the parameters, you can get the desired effect.

XCAM series microscope cameras break through the concept of traditional microscope cameras, and improve the quality and technological level of industrial and biological microscopic imaging, making it easier and faster for users to control and use.

There are many types of XCAM series of microscope cameras. In order to facilitate the user to choose, the functions of each model are described as follows:

- X7CAM4K, support HDMI2.0, USB3.0, WiFi, LAN output
- X5CAM4K, support HDMI2.0, USB3.0, WiFi, LAN outpu
- XCAM4K, support HDMI2.0, USB3.0, WiFi, LAN output
- XCAMTOP4K, support HDMI1.4, USB2.0, WiFi, LAN output
- SCAM4K, support HDMI1.4,USB3.0, WiFi output
- XMCALITE4K, support HDMI1.4, USB2.0 output
- TXCAMLITE4K, support HDMI1.4, USB2.0 output, support touch or mouse control
- XCAM1080PX, support HDMI1.4, USB2.0 output
- XCAM1080PHX, support HDMI1.4, WiFi output, some model support USB to LAN output
- XCAMLITE1080P, a simplified version of XCAM1080PX, only supports HDMI1.4 output
- OCAM, only supports HDMI1.4
- ALPHA1080, support HDMI 1080P, USB2.0 output
- XCAM720P, only supports HDMI 720P output

XCAM series of microscope cameras' specific characteristics can be find in the table below:

ToupTek WCAM series microscopic cameras are specially designed for users of microscopes (biological/ metallographic /continuous zoom monoculars, etc.), and directly output microscopic videos to computers or other smart mobile terminals via WiFi with no physical cable.

The WCAM series of microscope cameras have built-in ultra-high-performance multi-core microprocessor, and the camera generates WiFi signals. When the camera is used as an AP hotspot, smartphones, tablets and computers supporting iOS, Android, Windows, and OS X operating systems can connect to the camera, and use ToupView/ToupLite software to obtain microscopic video in real time for image analysis and processing. When the camera is set to WiFi STA mode, it can be connected to the router for network topology, which is convenient for more devices to access the camera.

The WCAM series of microscope cameras not only have WiFi connection function, but also can transfer the video image data of the microscope camera to a computer or other smart mobile terminal through the USB interface/RJ45 Ethernet interface.

WCAM series microscope cameras have high color reproduction ability, what you see is what you get, and high-quality lossless compression technology ensures the authenticity of scientific images; the built-in algorithm can automatically analyze and adjust the image information, regardless of whether it is bright-field biological imaging or dark-field imaging Polarized light, crystal imaging, almost no need to manually adjust the parameters, you can get the desired effect.

The WCAM series of microscope cameras break through the concept of traditional microscope cameras, and improve the quality and technological level of industrial and biological microscope imaging, making it easier and faster for users to control and use.

There are many types of WCAM series microscopic cameras. In order to facilitate the user's choice, the functions of each model are described as follows:

- WCAM: only support WiFi output
- WUCAM: Support WiFi and USB output
- WECAM: Support WiFi and Ethernet (LAN) output

● **WEUCAM**: Support WiFi 、 Ethernet (LAN) and USB output

Type	Camera model	Sensor type	Sensor	Sensor size	Pixel size [μm]	Sensor output (Max)	HDMI	USB video (Max)	WiFi	LAN	WDR	Storage device	Video record	Cap image	Meas	Img view	Video play	Exp time[ms]	3DNR	Low Delay	EDF
X7CAM4K	X7CAM4K16MPA	RS	IMX283	1/1.1"	2.40	30fps/16M	HDMI2.0 30fps/4K 30fps/1080P	USB3.0 20fps/16M 30fps/1080P	WiFi5 AP&STA mode 30fps/4K	1000Mbps ETH 30fps/4K	X	SD card UFD	30fps/4K (MAX) H26X/MP4	16M				0.104~1000		X	Y
	X7CAM4K8MPA		IMX678	1/1.8"	2.00	72fps/4K	HDMI2.0 60fps/4K 60fps/1080P	USB3.0 30fps/4K 60fps/1080P	WiFi5 AP&STA mode 30fps/4K 72fps/720P	1000Mbps ETH 30fps/4K 72fps/720P	Y	SD card UFD	72fps/4K(MAX) H26X/MP4	4K	Y	Y	Y	0.019~1000	Y	Y	Y
	X7CAM4K8MPB		IMX585	1/1.2"	2.90	75fps/4K			WiFi5 AP&STA mode 30fps/4K 75fps/720P	1000Mbps ETH 30fps/4K 75fps/720P			75fps/4K(MAX) H26X/MP4					0.048~1000			
X5CAM4K	X5CAM4K8MPA	RS	IMX678	1/1.8"	2.00	60fps/4K	HDMI2.0 60fps/4K 60fps/1080P	USB3.0 30fps/4K 60fps/1080P	WiFi5 AP&STA mode 30fps/4K 60fps/1080P	1000Mbps ETH 30fps/4K 60fps/1080P	Y	SD card UFD	60fps/4K(MAX) H26X/MP4	4K	Y	Y	Y	0.019~1000	Y	Y	Y
	X5CAM4K8MPB		IMX585	1/1.2"	2.90													0.048~1000			
XCAM4K	XCAM4K16MPA	RS	IMX183	1/1.1"	2.40	30fps/16M	HDMI2.0 30fps/4K 30fps/1080P	USB3.0 15fps/16M	WiFi5 AP&STA mode 30fps/4K	100Mbps ETH 30fps/4K	X	SD card UFD	30fps/4K (MAX) H26X/MP4	16M	Y	Y	Y	0.04~2000	Y	X	X
	XCAM4K8MPA		IMX334	1/1.8"	2.00	60fps/4K	HDMI2.0 60fps/4K 60fps/1080P	USB3.0 30fps/4K		100Mbps ETH 30fps/4K	Y		60fps/4K H26X/MP4	4K							
	XCAM4K8MPB		IMX485	1/1.2"	2.90																
XCAMTOP4K	XCAMTOP4K8MPA	RS	IMX334	1/1.8"	2.00	30fps/4K	HDMI1.4 30fps/4K 30fps/1080P	USB2.0 30fps/4K	WiFi5 AP&STA mode 30fps/4K	100Mbps ETH 30fps/4K	X	SD card UFD	30fps/4K (MAX) H26X/MP4	4K	Y	Y	Y	0.04~1000	Y	X	X
	XCAMTOP4K8MPB		IMX485	1/1.2"	2.90																
	XCAMTOP4K8MPC		IMX678	1/1.8"	2.00																
	XCAMTOP4K8MPD		IMX585	1/1.2"	2.90																
8CAM4K	8CAM4K8MPA	RS	IMX678	1/1.8"	2.00	30fps/4K	HDMI1.4 30fps/4K 30fps/1080P	USB3.0 30fps/4K	WiFi5 AP&STA mode 30fps/1080P 4K Image	X	X	SD card UFD	30fps/4K/MP4 H26X/MP4	4K	Y	Y	Y	0.045~1000	Y	X	X
	8CAM4K8MPB		IMX585	1/1.2"	2.90													0.014~1000			
XCAMLITE4K	XCAMLITE4K8MPA	RS	IMX334	1/1.8"	2.00	30fps/4K	HDMI1.4 30fps/4K 30fps/1080P	USB2.0 20fps/4K	X	X	Y	SD card UFD	30fps/4K H26X/MP4	4K	Y	Y	Y	0.04~1000	Y	X	X
	XCAMLITE4K8MPB		IMX485	1/1.2"	2.90																
	XCAMLITE4K8MPC		IMX678	1/1.8"	2.00																
	XCAMLITE4K8MPD		IMX585	1/1.2"	2.90																
XCAMLITE4K-MINI	XCAMLITE4K8MPA-MINI	RS	IMX334	1/1.8"	2.00	30fps/4K	HDMI1.4 30fps/4K 30fps/1080P	USB2.0 20fps/4K	X	X	Y	UFD	30fps/4K H26X/MP4	4K	Y	Y	Y	0.04~1000	Y	X	X
	XCAMLITE4K8MPB-MINI		IMX485	1/1.2"	2.90																
XCAM1080PX	XCAM1080P2MPA	RS	IMX385	1/2"	3.75	60fps/1080P	HDMI1.4 60fps/1080P	USB2.0 50fps/1080	X	X	X	SD card UFD	60fps/1080P H26X/MP4	1080P	Y	Y	Y	0.04~1000	Y	X	X
	XCAM1080P8MPB		IMX415	1/2.8"	1.45	30fps/4K	HDMI1.4 30fps/1080P	USB2.0 30fps/4K					30fps/1080P H26X/MP4	4K							
XCAM1080PX-MINI	XCAM1080P2MPA-MINI	RS	IMX385	1/2"	3.75	60fps/1080P	HDMI1.4 60fps/1080P	USB2.0 50fps/1080P	X	X	X	UFD	60fps/1080P H26X/MP4	1080P	Y	Y	Y	0.04~1000	Y	X	X
XCAM1080PHX	XCAM1080PHB	RS	IMX178	1/1.8"	2.4	30fps/5M	HDMI1.4 30fps/1080P	X	WiFi4 AP mode 25fps/1080P	X	Y	SD card	25fps/1080P H264,MJPEG/ASF	5M	Y	Y	X	0.03~918	Y	X	X
	XCAM1080PHD		IMX185	1/1.9"	3.75	30fps/1080P				25fps/1080P LAN ADPT				1080P				0.06~918			
	XCAM1080PHE	GS	IMX249	1/1.2"	5.86													0.043~1000			
OCAM	OCAM4K8MPA	RS	IMX678	1/1.8"	2.00	30fps/4K	HDMI1.4 30fps/4K 30fps/1080P	X	X	X	X	UFD	30fps/4K H26X/MP4	4K	Y	Y	Y	0.04~1000	Y	X	X
	OCAM1080P2MPA		IMX385	1/2"	3.75	60fps/1080P	HDMI1.4 60fps/1080P						60fps/1080P H26X/MP4	1080P				0.04~1000			
XCAMLITE1080P	XCAMLITE1080PA	RS	IMX307	1/2.8"	2.9	60fps/1080P	HDMI1.4 60fps/1080P	X	X	X	X	SD card(Old) UFD(New)	60fps/1080P H26X/MP4	1080P	Y	Y	Y	0.01~1000	Y	X	X
XCAM720P	~~XCAM720PHB(S)~~	RS	~~AR0130~~	~~1/3"~~	~~3.75~~	~~6fps/1280*7~~	HDMI1.4 30fps/720P	X	X	X	X	SD card	X	~~720P~~	X	X	X	~~0.2~2000~~	Y	X	X
	XCAM720PHC		IMX322	1/2.8"	2.8	30fps/1080P								1080P				0.06~1900			

Note

1. All cameras are C-Mount
2. All camera are color camera
3. All camerea USB Mouse control UI
4. 1080P:1920*1080
5. 4K: 4K
6. 5M: 2592*1944
7. 16M: 5440*3060
8. WiFi4: 802.11n PROT
9. WiFi5: 802.11ac PROT
10. H26X: H264/H265 ENC
11. ETH: Ethernet
12. ADPT: Adapter
13. PROT: Protocol
14. ENC: Encode
15. UFD: USB flash drive
16. Y: YES
17. X: NO
18: EDF: extend depth of field

	Camera model	Sensor type	Sensor	Sensor size	Pixel size (um)	Sensor output(Max)	USB video	WLAN	LAN	Exp time (ms)
WCAM	WCAM0720PB	RS	MT9P001	1/2.5"	2.2	15fps/720P	X	WiFi4 AP mode 15fps/720P,MJPEG	X	0.1~500
WUCAM	WUCAM0720PA	RS	MT9P001	1/2.5"	2.2	30fps/720P	USB2.0 30fps/720P MJPEG	WiFi4 AP mode 15fps/720P,MJPEG	X	0.1~500
	WUCAM1080PA	RS	IMX307	1/2.8"	2.9	60fps/1080P	USB2.0 50fps/1080P MJPEG	WiFi4 AP mode 50fps/1080P,H264	X	0.01~1000
WECAM	WECAM5MPA	RS	IMX178	1/1.8"	2.4	30fps/5M	X	WiFi5 AP&STA mode 30fps/5M,H264	30fps/5M H264	0.03~918
WEUCAM	WEUCAM4MPA	RS	IMX347	1/1.8"	2.9	30fps/4M	USB2.0 30fps/4M MJPEG,H264	WiFi5 AP&STA mode 30fps/4M,H264	30fps/4M H264	0.021~1000
Note	1.All cameras are C-Mount 2.All camera are color camera 3.720P: 1280*720 4.1080P: 1920*1080 5.4M: 2688*1512 6.5M: 2592*1944 7.WiFi4: 802.11n PROT 8.WiFi5: 802.11ac PROT 9.X: NO									

For all users who want to convert traditional microscopes into digital microscopes, ToupTek will help users select and integrate the best microscope camera.

The mission of ToupTek is to help every user take professional microscopic images, so that everyone can benefit from using ToupTek products.

4 AFDM Series Electric Controlled Continuous Zoom and Autofocus Digital Microscope

4.1 AFDM412 Electric Controlled Continuous Zoom and Autofocus Digital Microscope

4.1.1 Introduction to AFDM Series

AFDM is a series of electric controlled continuous zoom and autofocus all-in-one digital microscope with a large field of view by ToupTek Photonics. It is integrated with HDMI/USB/ETH/WiFi camera, Electric Controlled Continuous Zoom Auto-focus Objective and LED Integrated Illumintaion Light. AFDM is the abbreviation of Auto-focus Digital Microscope. Different products in the AFDM series can be formed with different part to satisfy the applicatuon requirement.

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

AFDM comes with a high-performance SONY CMOS sensor. It also has an embedded ARM core, allowing the camera to be connected directly to the HDMI monitor. The camera has XFCamView software built within it, including Camera Control Panel, Auto Focus Control Panel, Measurement Toolbar, and Synthesis Camera Control Toolbar. Users can directly control the camera and perform various operations through a USB mouse. The images and videos captured by AFDM can be saved on an SD card for on-site analysis and follow-up research.

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

AFDM412 supports HDMI/USB/ETH/WiFi control and video output (ToupView). The frame rate of the output is 4K/30FPS, and the zoom range is 1X~18X. It also supports electric zoom and auto focusing.

Figure 4-1 AFDM's Front and Back View

Figure 4-2 AFDM's Side and Front(with LED light) View

4.1.2 The Module Specifications of AFDM412

4.1.2.1 AFDM Camera Module Datasheet

Order Code	Sensor & Size(mm)	Pixel(μm)	G Sensitivity/Dark Signal	FPS/Resolution	Binning	Exposure(ms)
H4KPA	Sony IMX415LQR-C 1/2.8"(5.57x3.13)	1.45x1.45	300mv/0.13 with 1/30s	30@3840*2160(HDMI) 30@3840*2160(NETWORK) 30@3840*2160(USB)	1x1	0.04~1000

C: Color; M: Monochrome;

4.1.2.2　AFDM Lens Module Datasheet

Order Code	Working Distance(mm)	Zoom Range	MTF(lp/mm)	Distortion	FOV@1X(mm)	FOV@18X(mm)
EMZO-18XA-250	205~255	0.021X~0.39X	160	0.5%	255x145	14.2x8

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

4.1.2.3　AFDM Light Module

Order Code	LED	Power	Inner Dia.(mm)	Out Dia.(mm)		
DRL-5076A-NPC	8 CREE xpes	3V/3A	50	76		

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

AFDM412 can use AALRL-200-7650 as external light for the large FOV illumination

4.1.3 AFDM412 Characteristic And Specification

　　　The AFDM412 comes with H4KPA HDMI camera, EMZO-18XA-250 lens and DRL-5076A-NPC light source(Optional);

4.1.3.1　The Basic Characteristic of AFDM412

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

Figure 4-3 TPS-30A(bracket)+AFDM412+4K Monitor

4.1.4 Specification of AFDM412

Interface & Button Functions	
USB Mouse	USB mouse for XFCamView control
USB2.0	Connect USB flash drive to save pictures and videos Connect 5G WLAN module to transfer video wirelessly in real time with ToupView/ToupLite
HDMI	Comply with HDMI1.4 standard. 4K/1080P format video output and supporting automatic switch between 4K and 1080P format according to the connected monitors
USB Video	Connect PC or other host device to realize video image transmission with ToupView/ToupLite
LAN	LAN port to connect router and switch to transfer video with ToupView/ToupLite
ON/OFF	Power on/off switch
LED	Power LED indicator
SD	Comply with SDIO3.0 standard and SD card could be inserted for video and images saving
DC12V3A	DC12V3A power input
XFCamView Software Funcitons	
UI Operation	With USB mouse to operate on the embedded XFCamView
Image Capture	8M (3840*2160) JPEG/TIFF image in SD card or USB flash drive
Video Record	Video format：8M(3840*2160) H264/H265 encoded MP4 file Video saving frame rate:30fps
Camera Control Panel	Including Exposure, Gain, White Balance, Sharpness, Denoise, Denoise, Saturation, Gamma, Contrast, Brightness, Power Frequency control
Measurement Toolbar	Including Calibration, Measurement, and measurement parameter Export functions
Synthesis Control Toolbar	Including software Zoom, Flip, Freeze, Crosshair, LED Control, Auto-focus, Comparison, Browser , Setting, Version Check function
Auto Focus Control Panel	Including Zoom, Auto Focus, One Push, Manual Focus, Reset, and other functions
Software ToupView/ToupLite Environment under LAN/WLAN/USB Video Output	
White Balance	Auto White Balance
Color Technique	Ultra-Fine Color Engine
Capture/Control SDK	Windows/Linux/macOS/Android Multiple Platform SDK(Native C/C++, C#/VB.NET, Python, Java, DirectShow, Twain, etc)
Recording System	Still Picture or Movie
Operating System	Microsoft® Windows® XP / Vista / 7 / 8 / 8.1 /10(32 & 64 bit)/ToupView OSx(Mac OS X)/ToupLite Linux/ToupLite
PC Requirements	CPU: Equal to Intel Core2 2.8GHz or Higher
	Memory: 4GB or More
	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
Dimension	
Length x Width x Height	80mm x 80mm x 122mm
Shipping Weight	0.75kg

4.1.5 Dimension of AFDM412

Figure 4-4 Dimension of AFDM412

4.1.6 Packing Information of AFDM412

Figure 4-5 Packing Information of AFDM412

	Standard Packing List	
A	Gift box: L:220cm W:220cm H:110cm (1pcs, 2.0kg/box)	
B	AFDM412	
C	Power Adapter: Input: AC 100~240V 50Hz/60Hz, Output: DC 12V 3A	American Standard: Model: HKA03612030-7K : UL/CE/FCC(With American Standard AC Power Cable) European Standard: Model: HKA03612030-7K : UL/CE/FCC(With European Standard AC Power Cable) EMI Standard: FCC Part 15 Subpart B EMS Standard: EN61000-4-2,3,4,5,6
D	USB Mouse	
E	HDMI Cable	
F	USB2.0 A male to A male gold-plated connectors cable /2.0m	
G	CD (Driver & utilities software, Ø12cm)	
	Optional Accessory	
H	Ethernet cable	
I	LED Ring Light(DRL-5076A-NPC)	
J	USB flash drive	

K	USB WLAN adapter	
L	SD card(16G)	
M	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.)

4.1.7 Installation and Operation of AFDM Series Product

Before use, please install the AFDM series product on an adaptive bracket.

1.Plug HDMI cable into the HDMI port to connect AFDM and HDMI monitor;

2.Plug a USB mouse into USB Mouse port, to get control of the AFDM by using built-in software XFCamView;

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

4.Insert SD card into SD card Slot for saving captured images and recorded videos;

5.Press ON/OFF button to start the AFDM, LED Indicator will turn into blue;

6.Move mouse to the left side of the video window, the Camera Control Panel will appear. It includes Manual/Automatic Exposure, White Balance, Sharpness, Denoise, and other functions;

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

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

9.Move mouse to the bottom side of the video window, the Synthesis Camera Control Toolbar will pop up automatically. Click AF button, and Auto Focus Control Panel will show up for autofocus operation, it supports 18X optical zoom, Autofocus, Manual Focus, Reset, and One Push operation.
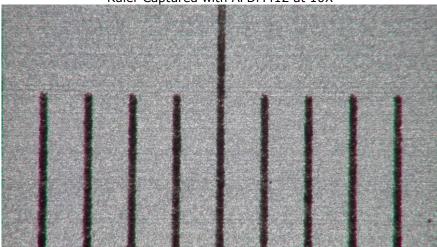
4.1.8 .Images Captured with AFDM412
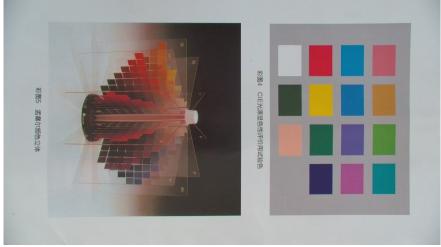
Ruler Captured with AFDM412 at 1X
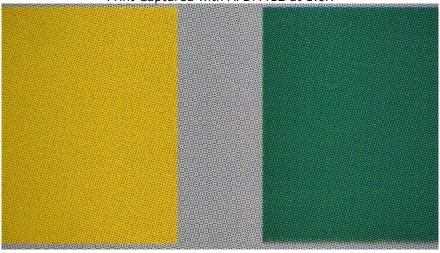
Ruler Captured with AFDM412 at 10X

Ruler Captured with AFDM412 at 18X
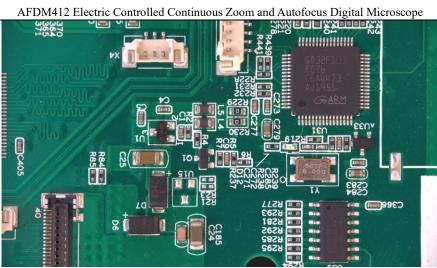
Print Captured with AFDM412 at 1.0X

Print Captured with AFDM412 at 10X
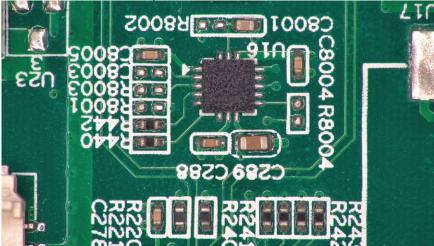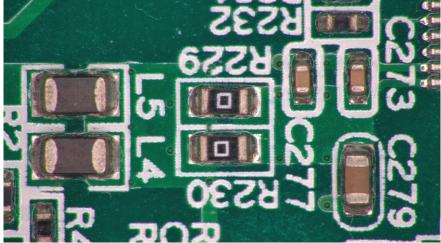
Print Captured with AFDM412 at 18X

PCB Captured with AFDM412 at 4.0X

PCB Captured with AFDM412 at 10X

PCB Captured with AFDM412 at 18X

4.1.9 Software and App

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

Windows: http://www.touptek.com/download/showdownload.php?lang=en&id=33

Linux & macOS: http://www.touptek.com/download/showdownload.php?lang=en&id=28

iOS: https://itunes.apple.com/us/app/toupview/id911644970

Android: https://play.google.com/store/apps/details?id=com.touptek.tpview

For ToupLite and ToupView App, the Auto-focus and LED Brightness Control are not avaiable

4.2   AFDM411 Electric Controlled Continuous Zoom and Autofocus Digital Microscope

4.2.1 Introduction to AFDM411

AFDM is a series of electric controlled continuous zoom and autofocus all-in-one digital microscope with a large field of view by ToupTek Photonics. It is integrated with HDMI camera, Electric Controlled Continuous Zoom Auto-focus Objective and LED Integrated Illumintaion Light. AFDM is the abbreviation of Auto-focus Digital Microscope. Different products in the AFDM series can be formed with different part to satisfy the applicatuon requirement.

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

AFDM comes with a high-performance SONY CMOS sensor. It also has an embedded ARM core, allowing the camera to be connected directly to the HDMI monitor. The camera has XFCamView software built within it, including Camera Control Panel, Auto Focus Control Panel, Measurement Toolbar, and Synthesis Camera Control Toolbar. Users can directly control the camera and perform various operations through a USB mouse. The images and videos captured by AFDM can be saved on an SD card for on-site analysis and follow-up research.

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

AFDM101 supports 1080P60FPS HDMI output.

AFDM411 supports 4K30FPS HDMI output and USB/ ETH/WIFI outputs.

Figure 4-6 AFDM's Front and Back View

Figure 4-7 AFDM's Side and Front(with LED light) View

4.2.2 The Module Specifications of AFDM411

4.2.2.1   AFDM Camera Module Datasheet

Order Code	Sensor & Size(mm)	Pixel(μm)	G Sensitivity/Dark Signal	FPS/Resolution	Binning	Exposure(ms)
H1080PA	Sony IMX462LQR-C 1/2.8"(5.57x3.13)	2.9x2.9	921mv/0.15mv with 1/30s	60/1920*1080(HDMI)	1x1	0.06~918
H4KPA	Sony IMX415LQR-C 1/2.8"(5.57x3.13)	1.45x1.45	300mv/0.13 with 1/30s	30@3840*2160(HDMI) 30@3840*2160(NETWORK) 30@3840*2160(USB)	1x1	0.04~1000

C: Color; M: Monochrome;

4.2.2.2   AFDM Lens Module Datasheet

Order Code	Working Distance(mm)	Zoom Range	MTF(lp/mm)	Distortion	FOV@1X(mm)	FOV@20X(mm)
EMZO-20XA	150~195	0.028X~0.56X	160	0.5%	200x112.5	10x5.6

1X and 20x are defined as the normalized magnification, which is only used to represent the relative relationship between the lowest and highest magnification. Here, the normalized equations are $1x = 0.028/0.028$; $20X=0.56/0.028$;

4.2.2.3   AFDM Light Module

Order Code	LED	Power	Inner Dia.(mm)	Out Dia.(mm)		
DRL-5076A-NPC	8 CREE xpes	3V/3A	50	76		

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

4.2.3 AFDM411 Characteristic And Specification

The AFDM411 comes with H4KPA HDMI camera, EMZO-20XA lens and DRL-5076A-NPC light source(Optional);

4.2.3.1   The Basic Characteristic of AFDM411

- 5 groups 16 elements EMZO with 0.028~0.56X, 20 zoom ratio, supports auto and manual focus
- 192mm standard working distance with 150~195mm depth of field
- At standard working distance, the large field of view 200mm*112.5mm at low magnification, helping users to quickly locate the target object, the small field of view 10mm*5.6mm at higher magnification, helping users to observe microscopically
- Sony 1/2.8" 4K Starvis CMOS with high signal-to-noise ratio
- 4K HDMI/USB/ETH/WiFi multiple video outputs
- 4K/1080P auto switching according to monitor resolution
- SD card/USB flash drive for captured image and video storage, support local preview and playback
- Built-in mouse control software XFCamView, all functions can be realized with USB mouse
- Embedded mouse Camera Control Panel, Measurement Toolbar, Synthesis Control Toolbar, AF Control Panel
- Multi-language support
- Head suction LED ring light, the brightness can be directly controlled by XFCamView
- With the adapter bracket of 76mm diameter, a electric controlled continuous zoom AFDM can be built

Figure 4-8 TPS-30A(bracket)+AFDM411+1080P Monitor

4.2.3.2 Specification of AFDM411

Interface & Button Functions	
USB Mouse	USB mouse for XFCamView control
USB2.0	Connect USB flash drive to save pictures and videos Connect 5G WLAN module to transfer video wirelessly in real time with ToupView/ToupLite
HDMI	Comply with HDMI1.4 standard. 4K/1080P format video output and supporting automatic switch between 4K and 1080P format according to the connected monitors
USB Video	Connect PC or other host device to realize video image transmission with ToupView/ToupLite
LAN	LAN port to connect router and switch to transfer video with ToupView/ToupLite
ON/OFF	Power on/off switch
LED	Power LED indicator
SD	Comply with SDIO3.0 standard and SD card could be inserted for video and images saving
DC12V3A	DC12V3A power input
XFCamView Software Funcitons	
UI Operation	With USB mouse to operate on the embedded XFCamView
Image Capture	8M (3840*2160) JPEG/TIFF image in SD card or USB flash drive
Video Record	Video format：8M(3840*2160) H264/H265 encoded MP4 file Video saving frame rate:30fps
Camera Control Panel	Including Exposure, Gain, White Balance, Sharpness, Denoise, Denoise, Saturation, Gamma, Contrast, Brightness, Power Frequency control
Measurement Toolbar	Including Calibration, Measurement, and measurement parameter Export functions
Synthesis Control Toolbar	Including software Zoom, Flip, Freeze, Crosshair, LED Control, Auto-focus, Comparison, Browser , Setting, Version Check function
Auto Focus Control Panel	Including Zoom, Auto Focus, One Push, Manual Focus, Reset, and other functions
Software ToupView/ToupLite Environment under LAN/WLAN/USB Video Output	
White Balance	Auto White Balance
Color Technique	Ultra-Fine Color Engine
Capture/Control SDK	Windows/Linux/macOS/Android Multiple Platform SDK(Native C/C++, C#/VB.NET, Python, Java, DirectShow, Twain, etc)
Recording System	Still Picture or Movie
Operating System	Microsoft® Windows® XP / Vista / 7 / 8 / 8.1 /10(32 & 64 bit)/ToupView OSx(Mac OS X)/ToupLite Linux/ToupLite
PC Requirements	CPU: Equal to Intel Core2 2.8GHz or Higher
	Memory: 4GB or More
	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
Dimension	
Length x Width x Height	80mm x 80mm x 122mm
Shipping Weight	0.75kg

4.2.4 Dimension of AFDM411

Figure 4-9 Dimension of AFDM411

4.2.5 Packing Information of AFDM411

Figure 4-10 Packing Information of AFDM411

Standard Packing List	
A	Gift box: L:220cm W:220cm H:110cm (1pcs, 2.0kg/box)
B	AFDM411
C	Power Adapter: Input: AC 100~240V 50Hz/60Hz, Output: DC 12V 3A	American Standard: Model: HKA03612030-7K : UL/CE/FCC(With American Standard AC Power Cable) European Standard: Model: HKA03612030-7K : UL/CE/FCC(With European Standard AC Power Cable) EMI Standard: FCC Part 15 Subpart B EMS Standard: EN61000-4-2,3,4,5,6
D	USB Mouse
E	HDMI Cable
F	USB2.0 A male to A male gold-plated connectors cable /2.0m
G	CD (Driver & utilities software, Ø12cm)

	Optional Accessory	
H	Ethernet cable	
I	LED Ring Light(DRL-5076A-NPC)	
J	USB flash drive	
K	USB WLAN adapter	
L	SD card(16G)	
M	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.)

4.2.6 Installation and Operation of AFDM Series Product

Before use, please install the AFDM series product on an adaptive bracket.

1.Plug HDMI cable into the HDMI port to connect AFDM and HDMI monitor;

2.Plug a USB mouse into USB Mouse port, to get control of the AFDM by using built-in software XFCamView;

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

4.Insert SD card into SD card Slot for saving captured images and recorded videos;

5.Press ON/OFF button to start the AFDM, LED Indicator will turn into blue;

6.Move mouse to the left side of the video window, the Camera Control Panel will appear. It includes Manual/Automatic Exposure, White Balance, Sharpness, Denoise, and other functions;

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

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

9.Move mouse to the bottom side of the video window, the Synthesis Camera Control Toolbar will pop up automatically. Click AF button, and Auto Focus Control Panel will show up for autofocus operation, it supports 20X optical zoom, Autofocus, Manual Focus, Reset, and One Push operation.

4.2.7 Images Captured with AFDM411

Ruler Captured with AFDM411 at 1X

Ruler Captured with AFDM411 at 10X
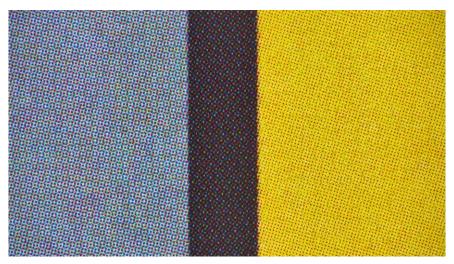
Ruler Captured with AFDM411 at 20X

Print Captured with AFDM411 at 1.0X

Print Captured with AFDM411 at 10X

Print Captured with AFDM411 at 20X
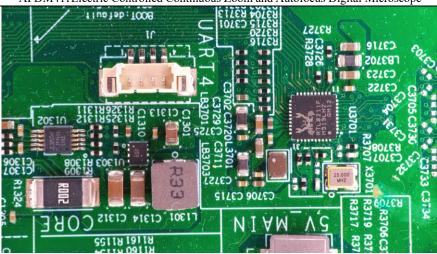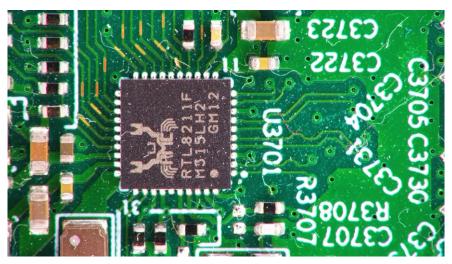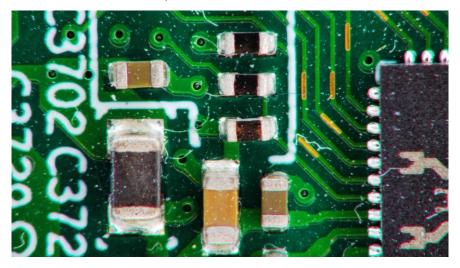
PCB Captured with AFDM411 at 4.0X

PCB Captured with AFDM411 at 10X

PCB Captured with AFDM411 at 20X

4.2.8 Software and App

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

Windows: http://www.touptek.com/download/showdownload.php?lang=en&id=33

Linux & macOS: http://www.touptek.com/download/showdownload.php?lang=en&id=28

iOS: https://itunes.apple.com/us/app/toupview/id911644970

Android: https://play.google.com/store/apps/details?id=com.touptek.tpview

For ToupLite and ToupView App, the Auto-focus and LED Brightness Control are not avaiable

4.3 AFDM101 Electric Controlled Continuous Zoom and Autofocus Digital Microscope

4.3.1 Introduction to AFDM101

AFDM is the abbreviation of Auto-focus Digital Microscope. Different products in the AFDM series can be formed with different part to satisfy the applicatuon requirement. AFDM is a series of electric controlled continuous zoom and autofocus all-in-one digital microscope with a large field of view by ToupTek Photonics. It is integrated with HDMI camera, Electric Controlled Continuous Zoom Auto-focus Objective and LED Integrated Illumintaion Light.

AFM101 comes with H1080PA HDMI camera, EMZO-20XA lens and DRL-5076A-NPC light source(Optional); The camera use an embedded ARM core, allowing the camera to be connected directly to the HDMI monitor. The camera has XFCamView software built within it, including Camera Control Panel, Auto Focus Control Panel, Measurement Toolbar, and Synthesis Camera Control Toolbar. Users can directly control the camera and perform various operations through a USB mouse. The images and videos captured by AFDM101 can be saved on an SD card for on-site analysis and follow-up research.

AFDM101 can be widely used in industrial inspection, medical observation, teaching and scientific research, automation system, and other fields.

Figure 4-11 AFDM101's front and back view

Figure 4-12 AFDM101's side and front(with LED light) view

4.3.2 The Module Specifications of AFDM101

4.3.2.1 AFDM Camera Module Datasheet

Order Code	Sensor & Size(mm)	Pixel(µm)	G SensitivityDark Signal	FPS/Resolution	Binning	Exposure(ms)
H1080PA	Sony IMX462LQR-C 1/2.8"(5.57x3.13)	2.9x2.9	921/0.15mv with 1/30s	60/1920*1080 (HDMI)	1x1	0.06~918
H4KPA	Sony IMX415LQR-C 1/2.8"(5.57x3.13)	1.45x1.45	300/0.13mv with 1/30s	30@3840*2160(HDMI) 30@3840*2160(NW) 30@3840*2160(USB)	1x1	0.04~1000

C: Color; M: Monochrome;

4.3.2.2 AFDM Lens Module Datasheet

Order Code	Working Distance(mm)	Zoom Range	MTF(lp/mm)	Distortion	FOV@1X(mm)	FOV@20X(mm)
EMZO-20XA	150~195	0.028X~0.56X	160	0.5%	200x112.5	10x5.6

1X and 20x are defined as the normalized magnification, which is only used to represent the relative relationship between the lowest and highest magnification. Here, the normalized equation 1x = 0.028/0.028; 20X=0.56/0.028;

4.3.2.3 AFDM Light Module

Order Code	LED	Power	Inner Dia.(mm)	Out Dia.(mm)		
DRL-5076A-NPC	8 CREE xpes	3V/3A	50	76		

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

4.3.3 AFDM101 Characteristic and Specification

The AFM101 comes with H1080PA HDMI camera, EMZO-20XA lens and DRL-5076A-NPC light source(Optional);

4.3.3.1 The Basic Characteristic of AFDM101

- 5 groups 16 elements EMZO with 0.028~0.56X, 20 zoom ratio, supports auto and manual focus;
- 195mm standard working distance with 150~195mm depth of field;
- At standard working distance, the large field of view 200mm*112.5mm at low magnification, helping users to quickly locate the target object, the small field of view 10mm*5.6mm at higher magnification, helping users to observe microscopically.
- Sony 1/2.8" 1080P CMOS with high signal-to-noise ratio;
- Connect to HDMI monitor with 1080P@60FPS video format;
- SD card storage supports 1080P pictures and video streams(asf format);
- Built-in mouse control software XFCamView, all functions can be realized with USB mouse;
- Embedded mouse Camera Control Panel, Measurement Toolbar, Synthesis Control Toolbar, AF Control Panel;
- Multi-language support;
- Head suction LED ring light, the brightness can be directly controlled by XFCamView;
- With the adapter bracket of 76mm diameter, a electric controlled continuous zoom AFDM can be built.

Figure 4-13 TPS-30A(bracket)+AFDM101

Figure 4-14 TPS-30A(bracket)+AFDM101+1080P monitor

4.3.3.2 Specification of AFDM101

Interface & Button Functions	
USB Mouse	USB mouse for XFCamView control
USB2.0	USB keyboard or other USB control device
HDMI	HDMI output
ON/OFF	Power on/off switch
LED	Power LED indicator
SD	SD card slot
DC12V3A	DC12V3A power input
Software Funcitons	
UI Operation	With USB mouse to operate on the embedded XFCamView
Image Capture	JPEG format with 2M Resolution in SD card
Video Record	ASF format 1080P 30fps in SD card
Camera Control Panel	Including Exposure, Gain, White Balance, Color Adjustment, Sharpness and Denoising control
Measurement Toolbar	Including Calibration, Measurement, and measurement parameter Export functions
Synthesis Control Toolbar	Including software Zoom, Flip, Freeze, Crosshair, LED Control, Auto-focus, Comparison, Browser , Setting, Version Check function
Auto Focus Control Panel	Including Zoom, Auto Focus, One Push, Manual Focus, Reset, and other functions
Operating Environment	
Operating Temperature(in Centidegree)	-10~ 50
Storage Temperature(in Centidegree)	-20~ 60
Operating Humidity	30~80%RH
Storage Humidity	10~60%RH
Dimension	
Length x Width x Height	80mm x 80mm x 122mm
Shipping Weight	0.75kg

4.3.4 Dimension of AFDM101

Figure 4-15 Dimension of AFDM101

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4.3.5 Packing Information of AFDM101

Figure 4-16 Packing information of AFDM101

	Standard Packing List	
A	Gift box: L:220cm W:220cm H:110cm (1pcs, 2.0kg/box)	
B	AFDM101	
C	USB Mouse	
D	HDMI Cable	
E	Power Adapter: Input: AC 100~240V 50Hz/60Hz, Output: DC 12V 3A	American Standard: Model: HKA03612030-7K : UL/CE/FCC(With American Standard AC Power Cable) European Standard: Model: HKA03612030-7K : UL/CE/FCC(With European Standard AC Power Cable) EMI Standard: FCC Part 15 Subpart B EMS Standard: EN61000-4-2,3,4,5,6
	Optional Accessory	
F	LED Ring Light(DRL-5076A-NPC)	
G	SD card(16G)	
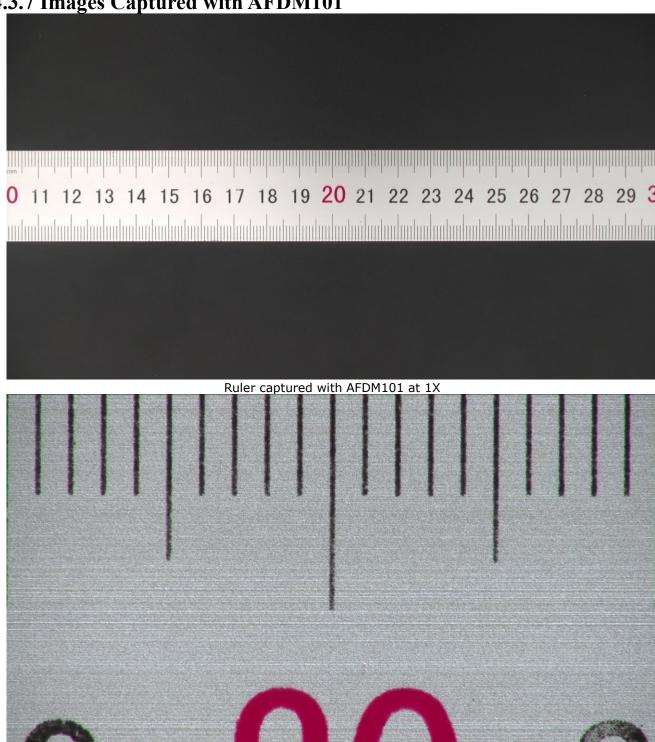
4.3.6 Installation and Operation of AFDM101

Before use, please install the AFDM series product on an adaptive bracket.

1. Plug HDMI cable into the HDMI port to connect AFDM and HDMI monitor;
2. Plug a USB mouse into USB Mouse port, to get control of the AFDM by using built-in software XFCamView;
3. Plug DC12V3A power adapter into DC12V3A port, to supply power for the AFDM, the LED Indicator will turn into red;
4. Insert SD card into SD card Slot for saving captured images and recorded videos;
5. Press ON/OFF button to start the AFDM, LED Indicator will turn into blue;
6. Move mouse to the left side of the video window, the Camera Control Panel will appear. It includes Manual/Automatic Exposure, White Balance, Sharpness, Denoise, and other functions;
7. Move mouse to the upper side of the video window, the Measurement Toolbar will appear. It includes calibration, measurement of lines, angles, rectangles, circles, etc, and supports data export(*.CSV format);
8. Move mouse to the bottom side of the video window, the Synthesis Camera Control Toolbar will appear. Operations like Zoom In, Zoom Out, Flip, Freeze, Crossline, LED brightness control, Autofocus, SD card contents browsing, Settings, and Camera Version can be executed;
9. Move mouse to the bottom side of the video window, the Synthesis Camera Control Toolbar will pop up

automatically. Click AF button, and Auto Focus Control Panel will show up for autofocus operation, it supports 20X optical zoom, Autofocus, Manual Focus, Reset, and One Push operation.

4.3.7 Images Captured with AFDM101
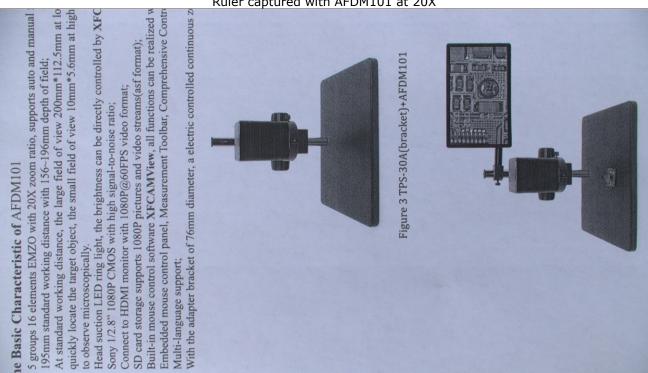
Ruler captured with AFDM101 at 1X
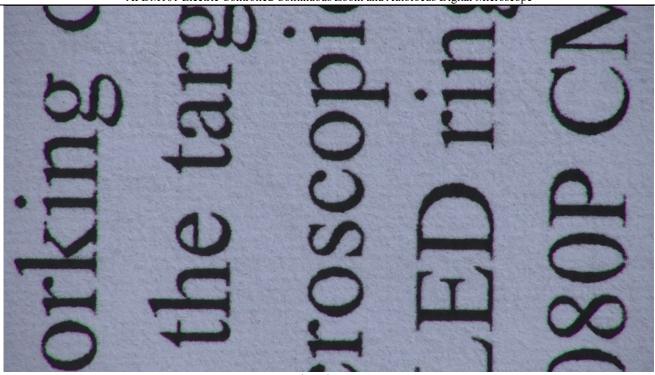
Ruler captured with AFDM101 at 10X
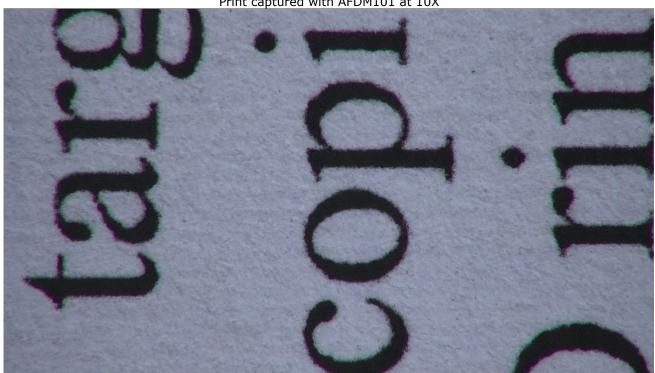
Ruler captured with AFDM101 at 20X

Print captured with AFDM101 at 1.0X

Print captured with AFDM101 at 10X
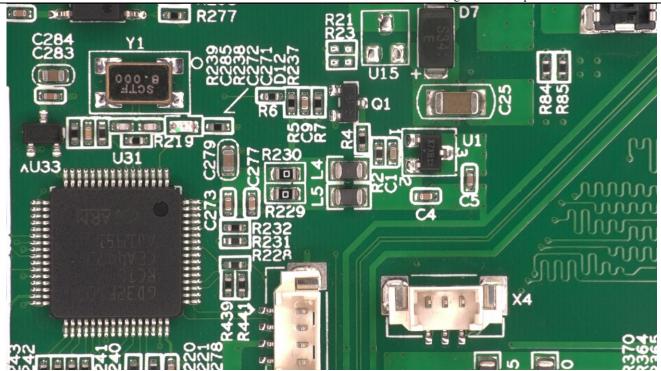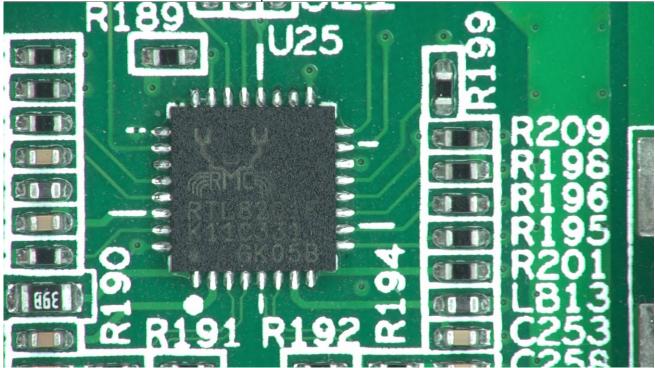
Print captured with AFDM101 at 20X
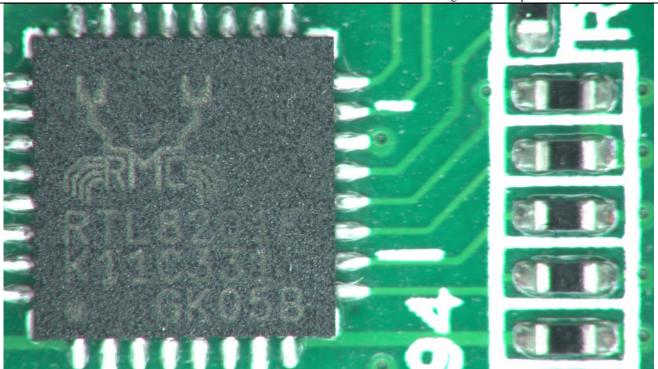
PCB captured with AFDM101 at 4.0X

PCB captured with AFDM101 at 10X

PCB captured with AFDM101 at 20X

5 HDMI Canon EF Mount Auto-focus Camera

5.1 X7FCAM4K16MPA_EFL HDMI+NETWORK+USB Multi-outputs Canon EF Mount Auto Focus CMOS Camera

The X7FCAM4K16MPA_EFL is a camera designed by ToupTek that includes multiple modes of output (HDMI/NETWORK/USB), where X in 'X7FCAM4K16MPA_EFL means multiple interfaces, the 7 series represents the AI high-end platform of Touptek, F means auto focus, 4K represents HDMI output of 4K, 16MP represents maximum camera output of 16MP images, A represents sensor type A, and EFL stands for Canon Electro-Focus Lens, also known as EF mount lens. It uses large-size, high-resolution and ultra-high-performance CMOS sensor. The camera can be directly connected to an HDMI display, or it can be connected to a computer via NETWORK or USB, and the image and video can be saved in an SD card /USB flash drive for on-site analysis and subsequent research.

The X7FCAM4K16MPA_EFL camera outputs real-time images through the HDMI interface, and can operate the graphical interface through a USB mouse to perform image display adjustment, processing, measurement and other functions.

The X7FCAM4K16MPA_EFL camera's most important feature is that it can be used with any supported EF-mount Lens, and after correctly installing the lens, you can get the focal length, aperture and focus of the lens in real time on the HDMI display interface, and you can control the aperture and focus section of the EF lens.

The camera can be used for inspection in medical fields, such as ophthalmology and dentistry; it can also be used for ultra-high-definition industrial inspection. It can be adapted to EF mount Lenses of various focal lengths according to customer needs.

The basic characteristic is listed as below:

- Large size, high-resolution, and high-performance Sony back-illuminated CMOS sensor
- Compatible for Canon EF mount Lenses, achieving electric control of lens aperture, manual/auto focusing
- Based on lens focusing control, achieve the depth of field synthesis function of the focused images
- Provide lens distortion correction function
- 4K HDMI/ NETWORK / USB multiple video synchronous outputs
- SD card/USB flash drive for captured image and video storage, support local preview and playback
- New file management system, providing rich file operation functions, image to image comparison (2 or 4 sheets), image to real-time video comparison, multi-image EDF and other functions
- Excellent ISP with local tone mapping,3D denoising and ROI white balance ensures great quality of video image.
- Embedded XCamView for the control of the camera and image processing, supporting automatic edge finding and other measurement functions
- ToupView/ToupLite software for PC
- iOS/Android applications for smart phones or tablets

Figure 5-1 TPS-600 bracket+X7FCAM4K16MPA_EFL+Canon EF-S 18-55mm f/4-5.6 IS STM

Figure 5-2 TPS-600 bracket+X7FCAM4K16MPA_EFL+Canon EF-S 18-55mm f/4-5.6 IS STM

Figure 5-3 TPS-600 bracket+X7FCAM4K16MPA_EFL+Canon EF-S 18-55mm f/4-5.6 IS STM+HDMI 4K monitor

5.1.1 X7FCAM4K16MPA_EFL Datasheet(1)

The main parameters of the X7FCAM4K16MPA_EFL camera sensor are shown in the table below:

Order Code	Sensor & Size(mm)	Pixel(μm)	G Sensitivity/Dark Signal	FPS/Resolution	Binning	Exposure(ms)
X7FCAM4K16MPA_EFL	IMX283(C) 1/1.1"(13.06x7.34)	2.4x2.4	1847mv with 1/30s 0.84mv with 1/30s	30@5440*3060	1x1	0.104~1000

The video output parameters for the different interfaces of the X7FCAM4K16MPA_EFL camera are shown in the following table：

Camera Model	Video Saving(FPS/Resolution)	HDMI2.0(FPS/Resolution)	USB3.0(FPS/Resolution)	NETWORK(FPS/Resolution)
X7FCAM4K16MPA_EFL	30@3840*2160 30@1920*1080	30@3840*2160 30@1920*1080	20@5440*3060 30@2688*1512 30@1920*1080	30@3840*2160 30@1920*1080 30@1280*720

5.1.2 X7FCAM4K16MPA_EFL Interface and Other Function

Interface or Button	Function Description
USB Mouse	Connect USB mouse for easy operation with embedded XCamView software

USB3.0	Connect USB flash drive to save pictures and videos Connect 5G Wi-Fi module to transfer video wirelessly at real time Connect USB microphone for audio and video recording
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/2A)

Video Output Interface	**Function Description**
HDMI Interface	Comply with HDMI2.0 standard; 30fps@4K or 30fps@1080P
LAN Interface	Support real time resolution switching(4K/1080P/720P) H264 encoded video DHCP configuration or manual configuration Unicast/multicast configuration
Wi-Fi Interface	Connecting 5G Wi-Fi adapter (USB3.0 slot) in AP/STA mode
USB Video Interface	Connecting USB Video port of PC for video transfer H264/MJPEG format video

Other Function	**Function Description**
Video Saving	Video format：16M (3840*2160) H264/H265 encoded MP4 file Video saving frame rate: 30fps
Image Capture	16M (5440*3060) JPEG/TIFF 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 / R OI Mode)，Sharpening，3D Denoise，Saturation Adjustment，Gamma Adjustment，Contrast Adjustment，Brightness Adjustment，Hue Adjustment，50HZ/60HZ Anti-flicker, Color to Gray Function
Image Operation	Zoom In/Zoom Out (Up to 10X), Mirror/Flip, Freeze, EDF, Cross Line, Overlay, PIP, Auto Focus, Browser (including Picture Browsing, Video Playback, Video Compare, Picture Compare, EDF, Image Processing), Measurement Function
Embedded RTC(Optional)	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 video
Operating System	Microsoft® Windows® 8 / 8.1 / 10 / 11(32 & 64 bit) OSx (Mac OS X) Linux
PC Requirements	CPU: Equal to Intel Core2 2.8GHz or higher
	Memory: 4GB or more
	USB interface: USB2.0 interface or higher
	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/2A adapter

5.1.3 X7FCAM4K16MPA_EFL Camera Lens Supported

The X7FCAM4K16MPA_EFL camera can be used with any supported Canon EF mount lens. After correctly installing the lens, it can read information such as lens focal length, aperture, and focus position, and can also electrically control the lens aperture and focus position. The X7FCAM4K16MPA_EFL camera theoretically supports any Canon/Tamron/Sigma brand EF mount lens, but not all lenses have been tested. Using lenses from manufacturers other than Canon/Tamron/Sigma may result in uncontrollable and incompatible situations.

The verified compatible EF mount lens models are listed below:

LENS	Closest Focusing Distance	Focal Length Display	Aperture Control	Focus Control	Fixed Distance Focus
Canon EF-S 10-18mm f/4.5-5.6 IS STM	About 0.22 meters	Support	Support	Support	/
Canon EF-S 18-55mm f/3.5-5.6 IS STM	About 0.25 meters	Support	Support	Support	Support
Canon EF-S 18-55mm f/4-5.6 IS STM	About 0.25 meters	Support	Support	Support	/
Canon EF-S 15-85mm f/3.5-5.6 IS USM	About 0.35 meters	Support	Support	Support	/
Canon EF-S 18-135mm f/3.5-5.6 IS USM	About 0.39 meters	Support	Support	Support	Support
Canon EF-S 18-200mm f/3.5-5.6 IS	About 0.45 meters	Support	Support	Support	/
Canon EF 24mm f/1.4L II USM	About 0.25 meters	Support	Support	Support	/
Canon EF 24mm f/2.8 IS USM	About 0.2 meters	Support	Support	Support	/
Canon EF 35mm f/1.4L II USM	About 0.28 meters	Support	Support	Support	/
Canon EF 50mm f/1.2L USM	About 0.45 meters	Support	Support	Support	Support
Canon EF 50mm f/1.4 USM	About 0.45 meters	Support	Support	Support	/
Canon EF 85mm f/1.2L II USM	About 0.95 meters	Support	Support	Support	/
Canon EF 16-35mm f/2.8L III USM	About 0.28 meters	Support	Support	Support	/
Canon EF 16-35mm f/4L IS USM	About 0.28 meters	Support	Support	Support	/
Canon EF 24-70mm f/2.8L II USM	About 0.38 meters (Macro mode is about 0.2 meters)	Support	Support	Support	/
Canon EF 24-70mm f/4L IS USM	About 0.38 meters (Macro mode is about 0.2 meters)	Support	Support	Support	/
Canon EF 24-105mm f/4L IS USM	About 0.45 meters	Support	Support	Support	/
Canon EF 100-400mm f/4.5-5.6L IS II USM	About 0.98 meters	Support	Support	Support	/
Sigma 150-600mm f/5-6.3 DG OS HSM|S	About 2.6 meters	Support	Support	Support	/

Figure 5-4 The Canon EF lens currently supported by X7FCAM4K16MPA_EFL camera

5.1.4 Dimension of X7FCAM4K16MPA_EFL

Figure 5-5 Dimension of X7FCAM4K16MPA_EFL camera

5.1.5 Packing Information for X7FCAM4K16MPA_EFL
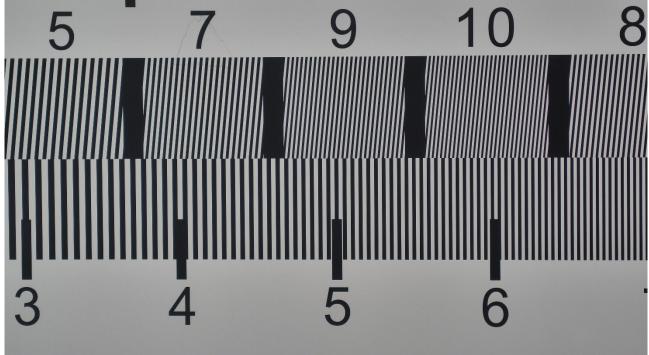
Figure 5-6 X7FCAM4K16MPA_EFL Camera Packing Information

	Standard Packing List
A	Gift box: L:25.5cm W:17.0cm H:9.0cm (1pcs, 1.7Kg/ box)
B	X7FCAM4K16MPA_EFL Camera
C	**Power Adapter:** Input: AC 100~240V 50Hz/60Hz, Output: DC 12V 2A **American standard:** Model: POWER-12V2A(MX24Z1-1202000) + American standard plug **European standard:** Model: POWER-12V2A(MX24Z1-1202000) + European standard plug
D	USB Mouse
E	HDMI Cable
F	USB3.0 A male to a male gold-plated connectors cable /1.5m
G	CD (Driver & utilities software, Ø12cm)
	Optional Accessory
H	SD Card (16G or above; Speed: class 10)
I	USB flash drive
J	USB Wi-Fi adapter
K	Ethernet cable
L	Canon/Tamron/Sigma EF mount lens

5.1.6 Images Captured by X7FCAM4K16MPA_EFL Camera

Short focus shooting resolution board
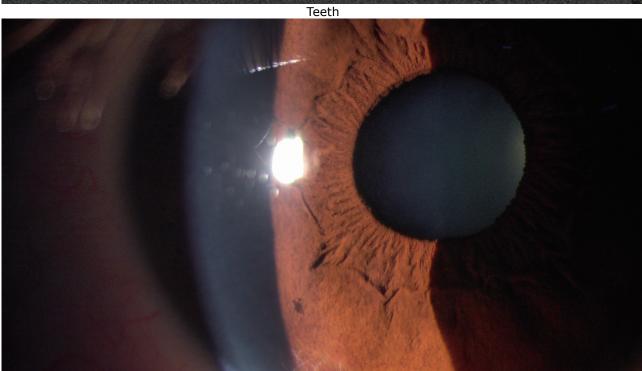
Telephoto shooting resolution board

Moth

Insect

Teeth

Eye

6   HDMI Auto-focus Camera

6.1   X5FCAM4K8MPA HDMI+WiFi+USB Multi-outputs Auto Focus C-mount CMOS Camera

The X5FCAM4K8MPA is a camera designed by ToupTek that includes multiple modes of output (HDMI/WiFi/USB), where X in 'X5FCAM' means a CMOS camera with multiple interfaces, and F means auto focus. It uses ultra-high-performance CMOS sensor. The camera can be directly connected to an HDMI display, or it can be connected to a computer via WiFi or USB, and the image and video can be saved in an SD card /USB flash drive for on-site analysis and subsequent research.

Enhanced with an embedded ARM core, this camera integrates various functions inside. With the help of a USB mouse and well-designed UI on the HDMI monitor, all functions could be easily controlled.

The X5FCAM4K8MPA camera comes with the built-in Auto Focus system, which can realize Auto Focus on specific areas of the sample.

By inserting a WiFi module or connecting to a computer via a USB cable, the user can directly control the camera's hardware with the software ToupView or ToupLite. The X5FCAM4K8MPA camera can be used for tool field inspection, microscope observation, etc.

The basic characteristic is listed as below:

- Sony STARVIS 2 back-illuminated CMOS sensor
- 4K HDMI/ WiFi / 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 40ms
- SD card/USB flash drive for captured image and video storage, support local preview and playback
- New browsing function, providing rich file operation functions, image to image comparison, image to real-time video comparison, multi-image EDF and other functions
- Provide multiple focusing methods, and the size of the focusing area can be modified; Provide AF+EDF, facilitating the synthesis of high depth of field images in multiple focus areas at high magnification
- Excellent ISP with local tone mapping and 3D denoising
- Provide real-time video EDF function and real-time video WDR output function
- Provide two sets of default ISP parameters for biological microscope and stereo microscope
- 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

6.1.1 X5FCAM4K8MPA Datasheet (1)

The main parameters of the X5FCAM4K8MPA camera sensor are shown in the table below:

Order Code	Sensor & Size(mm)	Pixel(μm)	G Sensitivity/Dark Signal	FPS/Resolution	Binning	Exposure(ms)
X5FCAM4K8MPA	Sony IMX678(C) 1/1.8"(7.68x4.32)	2.0x2.0	3541mv with 1/30s 0.15mv with 1/30s	60@3840*2160	1x1	0.019~1000

The output parameters of the different interfaces of the X5FCAM4K8MPA camera are shown in the following table:

Camera Model	Video Saving(FPS/Resolution)	HDMI2.0(FPS/Resolution)	USB3.0(FPS/Resolution)	WiFi(FPS/Resolution)
X5FCAM4K8MPA	60@3840*2160 60@1920*1080	60@3840*2160 60@1920*1080	30@3840*2160 45@2688*1512 60@1920*1080	30@3840*2160 60@1920*1080 60@1280*720

6.1.2 X5FCAM4K8MPA Interface and Other Function

Interface or Button	Function Description
USB Mouse	Connect USB mouse for easy operation with embedded XCamView software
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 for audio and video recording
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
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;60fps@4K or 60fps@1080P
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 H264/MJPEG format video
Other Function	**Function Description**
Video Saving	Video format：8M(3840*2160) H264/H265 encoded MP4 file Video saving frame rate: 60fps in Low Delay mode; 30fps in WDR mode
Image Capture	8M (3840*2160) JPEG/TIFF 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 Function
Image Operation	Zoom In/Zoom Out(Up to 10X), Mirror/Flip, Freeze, EDF, Cross Line, Overlay, PIP , Auto Focus , Browser(including Picture Browsing , Video Playback , Video Compare , Picture Compare , EDF , 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 WiFi/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 Core2 2.8GHz or Higher
	Memory: 4GB or More
	USB interface: USB2.0 interface or higher

	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 Adapter

6.1.3 Dimension of X5FCAM4K8MPA

Figure 6-1 Dimension of X5FCAM4K8MPA

6.1.4 Packing Information for X5FCAM4K8MPA

Figure 6-2 X5FCAM4K8MPA Camera Packing Information

	Standard Packing List
A	Gift box : L:25.5cm W:17.0cm H:9.0cm (1pcs, 1.7Kg/ box)
B	X5FCAM4K8MPA 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 EMI standard: FCC Part 15 Subpart B EMS standard: EN61000-4-2,3,4,5,6		
D	USB Mouse		
E	HDMI Cable		
F	USB3.0 A male to A male gold-plated connectors cable /2.0m		
G	CD (Driver & utilities software, Ø12cm)		
	Optional Accessory		
H	SD Card(16G or above; Speed: class 10)		
I	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
J	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 **I** and **J** 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;		
K	108015(Dia.23.2mm to 30.0mm Ring)/Adapter rings for 30mm eyepiece tube		
L	108016(Dia.23.2mm to 30.5mm Ring)/ Adapter rings for 30.5mm eyepiece tube		
M	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.)
N	USB flash drive		
O	USB WiFi adapter		

6.1.5 Extension of X5FCAM4K8MPA with Microscope or Telescope Adapter

Extension	Picture
C-mount Camera	Machine vision; Medical imaging; Semiconductor equipment; Test instruments; Document scanners; 2D barcode readers; Web camera and security video; Microscope imaging;
Microscope Camera	X5FCAM4K HDMI+AMAXXX(23.2mm Adapter) X5FCAM4K HDMI+FMAXXX(23.2mm Adapter)
Telescope Camera	X5FCAM4K HDMI+ATAXXX(31.75mm Adapter) X5FCAM4K HDMI+FTAXXX(31.75mm Adapter)

6.2 XFCAM4K8MPA HDMI+WiFi+USB Multi-outputs Auto Focus C-mount CMOS Camera

XFCAM4K8MPA camera is a camera designed by ToupTek that includes multiple modes of output (HDMI+Wi-Fi+USB), where X in 'XFCAM' means a CMOS camera with multiple interfaces, and F means auto focus. It uses ultra-high-performance CMOS sensor. The camera can be directly connected to an HDMI display, or it can be connected to a computer via Wi-Fi or USB, and the image and video can be saved in an SD card for on-site analysis and subsequent research.

Enhanced with an embedded ARM core, this camera integrates various functions inside. With the help of a USB mouse and well-designed UI on the HDMI displayer, all functions could be easily controlled.

The XFCAM4K8MPA camera comes with the built-in auto focus system, which can realize auto focus on specific areas of the scene.

By inserting a Wi-Fi module or connecting with a computer via a USB cable, the user can directly control the camera's hardware with the software ToupView or ToupLite. XFCAM4K8MPA camera can be used for tool field inspection, microscope observation, etc.

- Auto/Manual focus with the movement of the sensor
- Sony Exmor/STARVIS back-illuminated CMOS sensor
- 4K HDMI/USB/Wi-Fi multiple video outputs
- 4K/1080P auto switching according to displayer resolution
- SD card/USB flash drive for captured image and video storage, support local preview and playback
- Embedded XCamView for the control of the camera and image processing
- Excellent ISP with local tone mapping and 3D denoising
- ToupView/ToupLite software for PC
- iOS/Android applications for smart phones or tablets

6.2.1 XFCAM4K8MPA Datasheet(1)

Order Code	Sensor & Size(mm)	Pixel(μm)	G Sensitivity/Dark Signal	FPS/Resolution	Binning	Exposure(ms)
XFCAM4K8MPA	Sony IMX334(C) 1/1.8"(7.68x4.32)	2.0x2.0	505mv with 1/30s 0.1mv with 1/30s	60@3840*2160(HDMI) 30@3840*2160(WiFi) 30@3840*2160(USB)	1x1	0.04~2000

6.2.2 XFCAM4K8MPA Interface and Other Function

Interface & Button Functions	
ON/OFF	Power switch
SD	Comply with SDIO3.0 standard and SD card could be inserted for video and images saving
LED	LED status indicator
DC12V	Power adapter connection (12V/1A)
USB Mouse	USB Mouse for control of XCamView software
USB3.0	Connect USB flash drive to save picture and video(Host Mode) Connect 5G WiFi module to transfer video wirelessly in real time(AP/STA, Host Mode) Connect the computer to transfer video image(Device Mode)
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

Other Specification for HDMI Output	
UI Operation	With USB Mouse to operate on the embedded XCamView
Image Capture	JPEG Format with 8M(3840*2160) Resolution in SD Card
Video Record	Video format: 8M (3840*2160) video file encoded by MP4 and H264 Storage frame rate: 50~60fps (related to SD card speed grade and image resolution)
Camera Control Panel	Including focus, exposure, gain, white balance (automatic, manual, ROI), color adjustment, sharpness and 3D noise reduction control
Toolbar	Including Zoom, Mirror, Comparison, Freeze, Cross, Browser Function, Multi-language and XCamView Version Information
Other Specification for Wi-Fi /USB3.0 Output	
UI Operation	ToupView or ToupLite on Windows/Linux/OSX/Android Platform
Wi-Fi Performance	Frequency：2.4G Bandwidth：20M Protocol：802.11n Highest rate：150Mbps RF Power 20dBm(Maximum)
	Frequency：5G Bandwidth：40M Protocol：802.11ac Highest rate：400Mbps RF Power 20dBm(Maximum)
USB3.0 Performance	5Gbps
Maximum Connected Devices	WiFi:1~3 (According to the Environment and Connection Distance)/USB: 1
White Balance	Automatic/manual/ROI
Recording System	Still Picture or Movie
Software Environment	
PC Operating System	Microsoft® Windows® XP /Vista /7/8/8.1(32 & 64 bit) OSx(Mac OS X) Linux
PC Requirements	CPU: Equal to Intel Core2 2.8GHz or Higher
	Memory:4GB or More
	USB Port:USB2.0 High-speed Port
	Display:19" or Larger
	CD-ROM
Operating Environment	
Operating Temperature(Celsius)	-10~ 50
Storage Temperature(Celsius)	-20~ 60
Operating Humidity	30~80%RH
Storage Humidity	10~60%RH
Power Supply	DC 12V/1A Adapter
Size	
Length x Width x Height	78 mm (3.07") x 65 mm (2.76") x 94.5mm (3.62")
Weight	0.47 kg (1.0lbs)

6.2.3 Dimension of XFCAM4K8MPA

Figure 6-3 Dimension of XFCAM4K8MPA

6.2.4 Packing Information for XFCAM4K8MPA

Figure 6-4 Packing Information of XFCAM4K8MPA

	Standard Packing List		
A	Gift box : L:25.5cm W:17.0cm H:9.0cm (1pcs, 1.43Kg/ box)		
B	XFCAM4K8MPA		
C	Power Adapter Input: AC 100~240V 50/60Hz Output: DC 12V 1A	American standard: Model: GS12U12-P1I 12W/12V/1A: UL/CUL/BSMI/CB/FCC EMI Standard: EN55022, EN61204-3, EN61000-3-2-3, FCC Part 152 class B, BSMI CNS14338 EMS Standard:EN61000-4-2,3,4,5,6,8,11,EN61204-3,Class A Light Industry Standard	
		European standard: Model:GS12E12-P1I 12W/12V/1A; TUV(GS)/CB/CE/ROHS EMI Standard: EN55022, EN61204-3, EN61000-3-2-3, FCC Part 152 class B, BSMI CNS14338 EMS Standard:EN61000-4-2,3,4,5,6,8,11,EN61204-3,Class A Light Industry Standard	
D	USB Mouse		
E	HDMI Cable		
F	Wireless network adapter with USB interface		
G	CD (Driver & utilities software, Ø12cm)		
	Optional Accessory		
H	SD card(More than 16G, the speed class is class 10)		
I	USB WiFi adapter		
J	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
		C-Mount to Dia.31.75mm eyepiece tube (Please choose 1 of them for your telescope)	108008/ATA037 108009/ATA050 108010/ATA075
K	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
		C-Mount to Dia.31.75mm eyepiece tube (Please choose 1 of them for your telescope)	108011/FTA037 108012/FTA050 108013/FTA075
	Note: For J and K 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;		
L	108015(Dia.23.2mm to 30.0mm ring)/Adapter rings for 30mm eyepiece tube		
M	108016(Dia.23.2mm to 30.5mm ring)/ Adapter rings for 30.5mm eyepiece tube		
N	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.)	

6.2.5 Extension of XFCAM4K8MPA with Microscope or Telescope Adapter

Extension	Picture
C-mount Camera	Machine vision; Medical imaging; Semiconductor equipment; Test instruments; Document scanners; 2D barcode readers; Web camera and security video; Microscope imaging;
Microscope Camera	XFCAM4K HDMI+AMAXXX(23.2mm Adapter) XFCAM4K HDMI+FMAXXX(23.2mm Adapter)
Telescope Camera	XFCAM4K HDMI+ATAXXX(31.75mm Adapter) XFCAM4K HDMI+FTAXXX(31.75mm Adapter)

6.3   XFCAMTOP4K Series HDMI+WiFi+USB Multi-outputs Auto Focus C-mount CMOS Camera

XFCAMTOP4K series camera is a camera designed by ToupTek that includes multiple modes of output (HDMI/WiFi/USB), where X in 'XFCAM' means a CMOS camera with multiple interfaces, and F means auto focus. It uses ultra-high-performance CMOS sensor. The camera can be directly connected to an HDMI display, or it can be connected to a computer via WiFi or USB, and the image and video can be saved in an SD card for on-site analysis and subsequent research.

Enhanced with an embedded ARM core, this camera integrates various functions inside. With the help of a USB mouse and well-designed UI on the HDMI display, all functions could be easily controlled.

The XFCAMTOP4K series camera comes with the built-in auto focus system, which can realize auto focus on the specific areas of the sample.

By inserting a WiFi module or connecting with a computer via a USB cable, the user can directly control the camera's hardware with the software ToupView or ToupLite. XFCAMTOP4K series camera can be used for tool field inspection, microscope observation, etc.

- Sony Exmor/STARVIS back-illuminated CMOS sensor
- 4K HDMI/ WiFi/ USB multiple video outputs C-mount camera
- 4K/1080P auto switching according to monitor resolution
- SD card/USB flash drive for captured image and video storage, support local preview and playback
- Auto/Manual focus with the movement of the sensor
- Embedded XCamView for the control of the camera and image processing
- Excellent ISP with local tone mapping and 3D denoising
- ToupView/ToupLite software for PC
- iOS/Android applications for smart phones or tablets

6.3.1 XFCAMTOP4K Series Camera's Datasheet(2)

Order Code	Sensor & Size(mm)	Pixel(µm)	G Sensitivity	FPS/Resolution	Binning	Exposure(ms)
XFCAMTOP4K8MPA	Sony IMX334(C) 1/1.8"(7.68x4.32)	2.0x2.0	505mv with 1/30s 0.1mv with 1/30s	30@3840*2160(HDMI) 30@3840*2160(WiFi) 30@3840*2160(USB)	1x1	0.04~1000
XFCAMTOP4K8MPC	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) 30@3840*2160(WiFi) 30@3840*2160(USB)	1x1	0.04~1000

6.3.2 XFCAMTOP4K Series Camera's Interface and Other Function

Interface & Button Functions	
ON/OFF	Power switch
SD	Comply with SDIO3.0 standard and SD card could be inserted for video and images saving
LED	LED status indicator
DC12V	Power adapter connection (12V/1A)
USB Mouse	USB Mouse for control of XCamView software
USB2.0	Connect USB flash drive to save picture and video(Host Mode) Connect 5G WiFi module to transfer video wirelessly in real time(AP/STA, Host Mode
USB Video	Connect the computer to transfer video image(Device Mode)
HDMI	Comply with HDMI 1.4 standard. 4K/1080P format video output and supporting automatic switch between 4K and 1080P format according to the connected monitors
Video Output Interface	Function Description
HDMI Interface	Comply with HDMI 1.4 standard, 30fps@4K or 30fps@1080P
WiFi Interface	Connecting 5G WiFi adapter (USB2.0 slot) in AP/STA mode

USB Video Interface	Connecting USB Video port of PC for video transfer in MJPEG format
Other Function	**Function Description**
Video Saving	Video format：8M(3840*2160) H264/H265 encoded MP4 file Video saving frame rate：30fps in SD card or USB flash drive
Image Capture	8M (3840*2160) JPEG/TIFF image in SD card or USB flash drive
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， Contrast Adjustment， Brightness Adjustment，Gamma Adjustment， Color to Gray， 50HZ/60HZ Anti-flicker Function
Video /Image Operation	Zoom In/Zoom Out(Up to 10X), Mirror/Flip, Color/Gray, Freeze, Cross Line, Overlay , Auto Focus, Compare(Comparison between real time video and images in SD card/ USB flash drive), Embedded Files Browser, Video Playback, 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 / Japanese / Italian / Russian
Software Environment under WiFi/USB Video Output	
White Balance	Automatic/Manual/ROI
Color Technique	Ultra-Fine Color Engine
Capture/Control SDK	Windows/Linux/macOS/Android Multiple Platform SDK(Native C/C++, C#/VB.NET, Python, Java, DirectShow, Twain, etc)
Recording System	Still Picture or Movie
Operating System	Microsoft® Windows® XP / Vista / 7 / 8 / 8.1 /10(32 & 64 bit) OSx(Mac OS X) Linux
PC Requirements	CPU: Equal to Intel Core2 2.8GHz or Higher
	Memory: 4GB or More
	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

6.3.3 Dimension of XFCAMTOP4K Series Camera

Figure 6-5 Dimension of XFCAMTOP4K Series Camera

6.3.4 Packing Information for XFCAMTOP4K Series Camera

Figure 6-6 Packing Information of XFCAMTOP4K Series Camera

	Standard Packing List		
A	Gift box : L:25.5cm W:17.0cm H:9.0cm (1pcs, 1.48Kg/ box)		
B	XFCAMTOP4K8MPA 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 EMI standard: FCC Part 15 Subpart B EMS standard: EN61000-4-2,3,4,5,6		
D	USB Mouse		
E	HDMI Cable		
F	USB2.0 A male to A male gold-plated connectors cable /2.0m		
G	CD (Driver & utilities software, Ø12cm)		
	Optional Accessory		
H	SD Card(16G or above; Speed: class 10)		
I	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
J	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 **I** and **J** 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;		
K	108015(Dia.23.2mm to 30.0mm Ring)/Adapter rings for 30mm eyepiece tube		
L	108016(Dia.23.2mm to 30.5mm Ring)/ Adapter rings for 30.5mm eyepiece tube		
M	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.)
N	USB flash drive		
O	USB WiFi adapter (In WiFi mode, a USB WiFi adapter is required to operate the camera), different models have different shapes		

6.3.5 Extension of XFCAMTOP4K Series Camera with Microscope Adapter

Extension	Picture
C-mount Camera	Machine vision; Medical imaging; Semiconductor equipment; Test instruments; Document scanners; 2D barcode readers; Web camera and security video; Microscope imaging;
Microscope Camera	XFCAMTOP4K HDMI+AMAXXX(23.2mm Adapter) XFCAMTOP4K HDMI+FMAXXX(23.2mm Adapter)

6.4 XFCAM1080PHB/PHD HDMI+WiFi Multi-outputs Auto Focus C-mount CMOS Camera

6.4.1 XFCAM1080PHB/PHD Auto Focus HDMI's Characteristic

XFCAM1080PHB/PHD is a multiple interfaces (HDMI+WiFi+SD card, so X here means multiple interfaces) CMOS camera with autofocus function (F means autofocus) and it adopts ultra-high performance Sony CMOS sensor as the image-picking device. HDMI+WiFi are used as the data transfer interface to HDMI display or computer.

For HDMI output, The XCamView will be loaded and a camera control panel and toolbar are overlaid on the HDMI screen, in this case, the USB mouse can be used to set the camera, browse and compare the captured image, play the video ital.

For WiFi output, unplug the mouse and plug in the USB WiFi adapter, connect the computer WiFi to the camera, then the video stream can be transfer to computer with the advanced software ToupView. With ToupView, you can control the camera, process the image as ToupTek's other USB series camera.

In HDMI and WiFi outputs, the camera embedded Auto/Manual Focus function can obtain the clear image at ease. No hand rotation of the microscope Coarse/Fine knob is needed.

The XFCAM1080PHB/PHD's basic characteristic is as follows:

- All in 1(HDMI+WiFi) C-mount camera with Sony high sensitivity CMOS sensor;
- 1920 × 1080 (1080P) video resolution;
- Record 1080P video(ASF format) into SD card;
- 5~2M resolution captured image(XFCAM1080PHB/PHD);
- HDMI/WiFi output simultaneously;
- Auto/Manual focus with the movement of the sensor;
- For HDMI output, XCamView is used to control the camera;
- For WiFi output, ToupView/ToupLite is used to control the camera;
- Ultra-Fine Color Engine with perfect color reproduction capability(WiFi);
- With advanced video & image processing application ToupView/ToupLite;
- Windows/Linux/macOS/Android multi-platform SDK;
- CNC Camera housing;

The possible applications of XFCAM1080PHB/PHD are as follows:

- Scientific research, education (teaching, demonstration and academic exchanges);
- Digital laboratory, medical research;
- Industrial visual (PCB examination, IC quality control);
- Medical treatment (pathological observation);
- Food (microbial colony observation and counting);
- Aerospace, military (high sophisticated weapons);

6.4.2 XFCAM1080PHB/PHD Datasheet(2)

Order Code	Sensor & Size(mm)	Pixel(μm)	G Sensitivity Dark Signal	FPS/Resolution	Binning	Exposure
XFCAM1080PHB XF1080B	1080P/5M/Sony IMX178(C) 1/1.8"(6.22x4.67)	2.4x2.4	425mv with 1/30s 0.15mv with 1/30s	30@1920*1080(HDMI) 25@1920*1080(WiFi)	1x1	0.03ms~918ms
XFCAM1080PHD XF1080D	1080P/2M/Sony IMX185(C) 1/1.9"(7.20x4.05)	3.75x3.75	1120mv with 1/30s 0.15mv with 1/30s	60@1920*1080(HDMI) 25@1920*1080(WiFi)	1x1	0.06ms~918ms

C: Color; M: Monochrome;

Interface & Button Functions	
USB	USB Mouse/USB WiFi Adapter
HDMI	HDMI Output
DC12V	12V/1A Power in
SD	SD Card Slot
LED	Power Indicator Power
ON/OFF	On/off Switch
Other Specification for HDMI Output	
UI Operation	With USB Mouse to operate on the embedded XCamView
Image Capture	JPEG Format with 5M or 2M Resolution in SD Card (XFCAM1080PHB/PHD)
Video Record	ASF Format 1080P 30fps in SD Card(8G)
Camera Control Panel	Including Exposure, Gain, White Balance, Color Adjustment, Sharpness and Denoising Control
Auto-focus Control Panel	Including Auto-focus, Manual Focus, One Push AF and Conjugate Correction Functions
Toolbar	Including Zoom, Mirror, Comparison, Freeze, Cross, WDR, Auto-focus, Browser Function, Setting, Muti-language and XCamView Version Information
Other Specification for WiFi Output	
UI Operation	ToupView or ToupLite on Windows/Linux/OSX/Android Platform
WiFi Performance	802.11n 150Mbps; RF Power 20dBm(Maximum)
Maximum Connected Devices	3~6(According to the Environment and Connection Distance)
White Balance	Auto White Balance
Color Technique	Ultra-Fine Color Engine (WiFi)
Capture/Control SDK	Windows/Linux/macOS/Android Multiple Platform SDK(Native C/C++, C#/VB.NET, Python, Java, DirectShow, Twain, etc.)(WiFi)
Recording System	Still Picture or Movie (WiFi)
Software Environment (for USB2.0 Connection)	

Operating System	Microsoft® Windows® XP / Vista / 7 / 8 / 8.1/10(32 & 64 bit) OSx(Mac OS X) Linux
PC Requirements	CPU: Equal to Intel Core2 2.8GHz or Higher
	Memory:4GB or More
	USB Port:USB2.0 High-speed Port(As Power Only, not as the USB Data Transfer)
	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 Adapter

6.4.3 XFCAM1080PHB/PHD and Microscope

XFCAM1080PHB/PHD and Its Back Panel

Different Views of XFCAM1080PHB/PHD

XFCAM1080PHB/PHD and Microscope

6.4.4 Dimension of XFCAM1080PHB/PHD Series Camera

Dimension of XFCAM1080PHB/PHD Series Camera

6.4.5 Packing Information for XFCAM1080PHB/PHD

Figure 6-7 Packing Information of XFCAM1080PHB/PHD

	Standard Packing List		
A	Gift box : L:25.5cm W:17.0cm H:9.0cm (1pcs, 1.43Kg/ box)		
B	XFCAM1080PHB/PHD		
C	Power Adapter: Input: AC 100~240V 50Hz/60Hz, Output: DC 12V 1A American standard: Model: GS12U12-P1I 12W/12V/1A: UL/CUL/BSMI/CB/FCC EMI Standard:EN55022,EN61204-3, EN61000-3-2,-3, FCC Part 152 class B, BSMI CNS14338 EMS Standard:EN61000-4-2,3,4,5,6,8,11,EN61204-3,Class A Light Industry Standard European standard:Model:GS12E12-P1I 12W/12V/1A; TUV(GS)/CB/CE/ROHS EMI Standard:EN55022,EN61204-3, EN61000-3-2,-3, FCC Part 152 class B, BSMI CNS14338 EMS Standard:EN61000-4-2,3,4,5,6,8,11,EN61204-3,Class A Light Industry Standard		
D	HDMI Cable		
E	USB Mouse		
F	Wireless network adapter with USB interface		
G	CD (Driver & utilities software, Ø12cm)		
	Optional Accessory		
H	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
		C-Mount to Dia.31.75mm eyepiece tube (Please choose 1 of them for your telescope)	108008/ATA037 108009/ATA050 108010/ATA075
I	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
		C-Mount to Dia.31.75mm eyepiece tube (Please choose 1 of them for your telescope)	108011/FTA037 108012/FTA050 108013/FTA075
	Note: For H and I 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;		
J	108015(Dia.23.2mm to 30.0mm ring)/Adapter rings for 30mm eyepiece tube		
K	108016(Dia.23.2mm to 30.5mm ring)/ Adapter rings for 30.5mm eyepiece tube		
L	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.)	
M	SD card(4G or 8G)		

6.4.6 Extension of XFCAM1080PHB/PHD with Microscope or Telescope Adapter

Extension	Picture	
C-mount Camera		Machine vision; Medical imaging; Semiconductor equipment; Test instruments; Document scanners; 2D barcode readers; Web camera and security video; Microscope imaging;
Microscope Camera	 XFCAM1080PHD+AMAXXX(23.2mm Adapter)	 XFCAM1080PHD+FMAXXX(23.2mm Adapter)
Telescope Camera:	 XFCAM1080PHD+ATAXXX(31.75mm Adapter)	 XFCAM1080PHD+FTAXXX(31.75mm Adapter)

7   AIOCAM Series All-in-One Camera

7.1 AIOCAM4K Series All-in-One Camera

7.1.1 AIOCAM4K Series Camera's Basic Characteristic

The AIOCAM4K is a multifunctional all-in-one camera that integrates a 4K image acquisition and processing system and a 13.3-inch display screen for capturing digital images of stereo microscopes, biological microscopes, or online interactive teaching. The basic characteristic is listed as below:

- The camera and display screen are integrated together, eliminating wiring and facilitating installation
- Sony STARVIS 2 back-illuminated CMOS sensor
- The average delay of display screen output is 40ms
- Support HDMI2.0 interface connection to external displays for synchronous output, 4K/1080P auto switching according to monitor resolution
- Support USB 3.0 interface for synchronous output of real-time video
- Provide real-time video WDR output function
- Provide real-time video EDF function
- USB flash drive for captured image and video storage, support local preview and playback
- Excellent ISP with local tone mapping and 3D denoising
- Provide two sets of default ISP parameters for biological microscope and stereo microscope
- Embedded XCamView for the control of the camera and image processing, supporting automatic edge finding and measurement functions
- New browsing function, providing rich file operation functions, image to image comparison, image to real-time video comparison, multi-image EDF and other functions
- ToupView/ToupLite software for PC
- iOS/Android applications for smart phones or tablets

Figure 7-1 AIOCAM4K Series All-in-One Camera

Figure 7-2 AIOCAM4K Series All-in-One Camera with Leica Microscope

7.1.2 AIOCAM4K Series Camera's Datasheet and Functions(1)

The main parameters of the AIOCAM4K series all-in-one camera with different sensors are shown in the table below:

Order Code	Sensor & Size(mm)	Pixel(μm)	G Sensitivity/Dark Signal	FPS/Resolution	Binning	Exposure(ms)
AIOCAM4K8MPA	Sony IMX678(C) 1/1.8"(7.68x4.32)	2.0x2.0	3541mv with 1/30s 0.15mv with 1/30s	60@3840*2160	1x1	0.019~1000

The output parameters of different interfaces of AIOCAM4K series all-in-one cameras are shown in the following table:

Camera Model	Video Saving(FPS/Resolution)	HDMI2.0(FPS/Resolution)	USB3.0(FPS/Resolution)	WiFi(FPS/Resolution)
AIOCAM4K8MPA	60@3840*2160 60@1920*1080	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 7-3 Available Ports on the Panel of the Camera Body

Interface or Button	Function Description
USB 2.0	Connect USB mouse for easy operation with embedded XCamView software
USB Video	Connect PC or other host device to realize video image transmission
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 for audio and video recording
ON/OFF	Power switch (Short press to turn on, long press to turn off)
HDMI OUT	Comply with HDMI2.0 standard. Used to extend 4K/1080P format video output and supporting automatic switch between 4K and 1080P format according to the connected monitors
LED	LED status indicator
+/-	Display brightness adjustment button
MENU	Display menu key
DC 12V2A	Power adapter connection (12V/2A)

Video Output Interface	Function Description
HDMI Interface	Synchronize video output through HDMI OUT interface, comply with HDMI2.0 standard; 60fps@4K Or 60fps@1080P
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 H264/MJPEG format video

Other Function	Function Description
Video Saving	Video format：8M (3840*2160) H264/H265 encoded MP4 file Video saving frame rate: 60fps in Low Delay mode; 30fps in WDR mode
Image Capture	8M (3840*2160) JPEG/TIFF image in USB flash drive
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， Contrast Adjustment， Brightness Adjustment， Gamma Adjustment, Hue Adjustment, Color to Gray， 50HZ/60HZ Anti-flicker Function
Image Operation	Zoom In/Zoom Out (Up to 10X), Mirror/Flip, Freeze, Video EDF, Cross Line, Overlay, PIP, Browser (including Picture Browsing, Video Playback, Video Compare, Picture Compare, Picture EDF, 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 WiFi/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 Core2 2.8GHz or Higher
	Memory: 4GB or More
	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/2A Adapter

7.1.3 Dimension of XCAM4K Series Camera
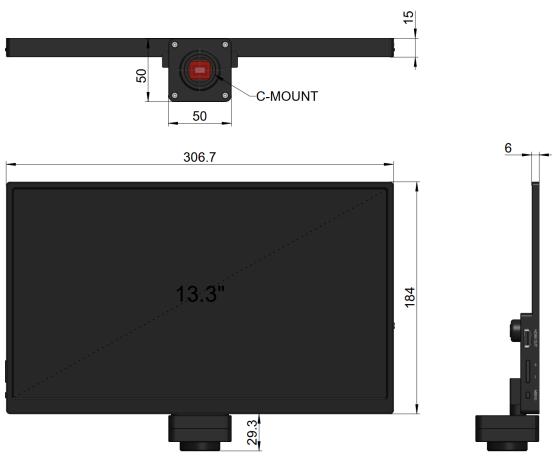
Figure 7-4 Dimension of AIOCAM4K Series All-in-One Camera

7.1.4 Packing Information of AIOCAM4K Series All-in-One Camera

Figure 7-5 AIOCAM4K Series All-in-One Camera Packing Information

Standard Packing List	
A	Gift box: L:35.6cm W:24.9cm H:7.5cm (1pcs, 1.68Kg/ box)
B	AIOCAM4K Series All-in-One Camera
C	Power Adapter: Input: AC 100~240V 50Hz/60Hz, Output: DC 12V 2A American standard: Model: POWER-12V2A(MX24Z1-1202000) + American standard plug European standard: Model: POWER-12V2A(MX24Z1-1202000) + European standard plug
D	USB wireless mouse
E	USB3.0 A male to A male gold-plated connectors cable /2.0m
F	CD (Driver & utilities software, Ø12cm)
Optional Accessory	
G	HDMI Cable
H	USB flash drive
I	USB WiFi adapter

J	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
K	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 **J** and **K** 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;		
L	108015(Dia.23.2mm to 30.0mm Ring)/Adapter rings for 30mm eyepiece tube		
M	108016(Dia.23.2mm to 30.5mm Ring)/ Adapter rings for 30.5mm eyepiece tube		
N	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.)

8   Microscope HDMI CMOS Camera

8.1 X7CAM4K Series HDMI/NETWORK /USB Multi-outputs C-mount CMOS Camera

8.1.1 X7CAM4K Series Camera's Basic Characteristic

The X7CAM4K series camera is intended for acquisition of digital images from stereo microscopes, biological microscopes, or online interactive teaching. The basic characteristic is listed as below:

- Sony STARVIS 2 back-illuminated CMOS sensor
- 4K HDMI/ NETWORK/ USB multiple video synchronous outputs
- 4K/1080P auto switching according to monitor resolution
- High frame rate output, supporting up to 4K 75fps
- Support 4K 60fps low delay HDMI output mode, with an average delay of 40ms
- SD card/USB flash drive for captured image and video storage, support local preview and playback
- Supports USB voice control module, enabling real-time control of the camera through voice commands for taking photos, recording videos, freezing, and other operations
- New browsing function, providing rich file operation functions, image to image comparison, image to real-time video comparison, multi-image EDF and other functions
- Excellent ISP with local tone mapping and 3D denoising
- Provide real-time video EDF function and real-time video WDR output function
- Provide two sets of default ISP parameters for biological microscope and stereo microscope
- 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

8.1.2 X7CAM4K Series Camera's Datasheet and Functions(3)

The main parameters of X7CAM4K series cameras with different sensors are shown in the table below:

Order Code	Sensor & Size(mm)	Pixel(μm)	G Sensitivity/Dark Signal	FPS/Resolution	Binning	Exposure(ms)
X7CAM4K8MPA	Sony IMX678(C) 1/1.8"(7.68x4.32)	2.0x2.0	3541mv with 1/30s 0.15mv with 1/30s	72@3840*2160	1x1	0.019~1000
X7CAM4K8MPB	Sony IMX585(C) 1/1.2"(11.14x6.26)	2.9x2.9	5970mv with 1/30s 0.13mv with 1/30s	75@3840*2160	1x1	0.048~1000
X7CAM4K16MPA	Sony IMX283(C) 1/1.1"(13.06x7.34)	2.4x2.4	1847mv with 1/30s 0.84mv with 1/30s	30@5440*3060	1x1	0.104~1000

The output parameters of different interfaces of X7CAM4K series cameras are shown in the following table:

Camera Model	Video Saving(FPS/Resolution)	HDMI2.0(FPS/Resolution)	USB3.0(FPS/Resolution)	NETWORK(FPS/Resolution)
X7CAM4K8MPA	72@3840*2160 72@1920*1080	60@3840*2160 60@1920*1080	30@3840*2160 45@2688*1512 60@1920*1080	30@3840*2160 60@1920*1080 72@1280*720
X7CAM4K8MPB	75@3840*2160 75@1920*1080	60@3840*2160 60@1920*1080	30@3840*2160 45@2688*1512 60@1920*1080	30@3840*2160 60@1920*1080 75@1280*720
X7CAM4K16MPA	30@3840*2160 30@1920*1080	30@3840*2160 30@1920*1080	20@5440*3060 30@2688*1512 30@1920*1080	30@3840*2160 30@1920*1080 30@1280*720

Interface or Button	Function Description
USB Mouse	Connect USB mouse for easy operation with embedded XCamView software (Flat shape without labelling) 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;60fps@4K or 60fps@1080P (X7CAM4K8MPA, X7CAM4K8MPB) 30fps@4K or 30fps@1080P(X7CAM4K16MPA)
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 H264/MJPEG format video

Other Function	Function Description
Video Saving	Video format：8M(3840*2160) H264/H265 encoded MP4 file Video saving frame rate:72fps(X7CAM4K8MPA); 75fps(X7CAM4K8MPB); 60fps in Low Delay Mode(X7CAM4K8MPA, X7CAM4K8MPB); 30fps in WDR Mode(X7CAM4K8MPA, X7CAM4K8MPB); 30fps(X7CAM4K16MPA)
Image Capture	8M (3840*2160, X7CAM4K8MPA, X7CAM4K8MPB) JPEG/TIFF image in SD card or USB flash drive 16M (5440*3060, X7CAM4K16MPA) JPEG/TIFF 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, Contrast Adjustment, Brightness Adjustment, Gamma Adjustment, Hue Adjustment, Color to Gray, 50HZ/60HZ Anti-flicker Function
Image Operation	Zoom In/Zoom Out(Up to 10X), Mirror/Flip, Freeze, EDF, Cross Line, Overlay, PIP , Browser(including Picture Browsing , Video Playback , Video Compare , Picture Compare , EDF , 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® XP / Vista / 7 / 8 / 8.1 / 10 / 11(32 & 64 bit) OSx(Mac OS X) Linux
PC Requirements	CPU: Equal to Intel Core2 2.8GHz or Higher
	Memory: 4GB or More
	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 Adapter

8.1.3 Dimension of X7CAM4K Series Camera

Figure 8-1 Dimension of X7CAM4K Series (Cubic and Flat Shape)

8.1.4 Extension of X7CAM4K Series Camera with Microscope or Telescope Adapter

Extension	Picture	
C-mount Camera		Scientific research, digital teaching (teaching, demonstration and academic discussing); Digital laboratory, medical research; Machine vision (PCB detection, IC quality control); Medical treatment (pathological observation); Food (microbial colony observation and counting); Aviation and military;
Microscope Camera	 4K HDMI+AMAXXX(23.2mm Adapter) 4K HDMI+FMAXXX(23.2mm Adapter) 4K HDMI+ATAXXX(31.75mm Adapter) 4K HDMI+FTAXXX(31.75mm Adapter)	

Figure 8-2 X7CAM4K Series Camera and HDMI Displayer
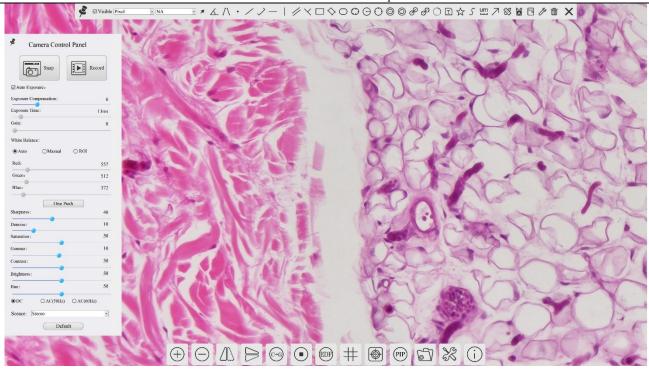
Figure 8-3 The X7CAM4K Series Camera's Control GUI

Figure 8-4 X7CAM4K Series Camera and Leica Microscope

Figure 8-5 X7CAM4K Series Camera and Zeiss Microscope

8.1.5 Packing Information of X7CAM4K Series Camera
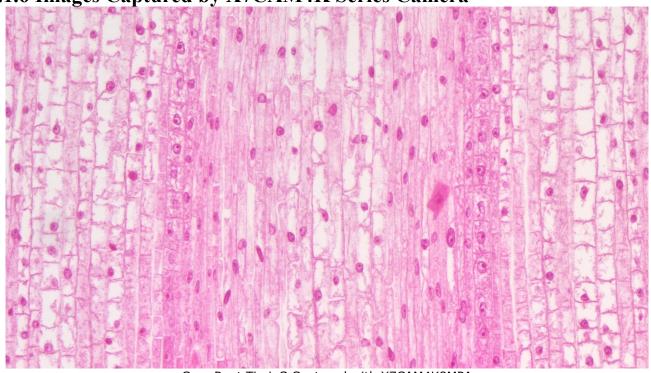
Figure 8-6 X7CAM4K Series Camera Packing Information (Cubic and Flat Shape)

	Standard Packing List
A	Gift box : L:25.5cm W:17.0cm H:9.0cm (1pcs, 1.7Kg/ box)
B	X7CAM4K Camera (One of the two different shapes)
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 EMI standard: FCC Part 15 Subpart B EMS standard: EN61000-4-2,3,4,5,6
D	USB Mouse
E	HDMI Cable
F	USB3.0 A male to A male gold-plated connectors cable /2.0m
G	CD (Driver & utilities software, Ø12cm)
	Optional Accessory
H	SD Card(16G or above; Speed: class 10)
I	USB flash drive

J	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
K	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 J and K 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;		
L	108015(Dia.23.2mm to 30.0mm Ring)/Adapter rings for 30mm eyepiece tube		
M	108016(Dia.23.2mm to 30.5mm Ring)/ Adapter rings for 30.5mm eyepiece tube		
N	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.)	
O	USB WiFi adapter		
P	Ethernet cable		

8.1.6 Images Captured by X7CAM4K Series Camera

Corn Root Tip.L.S Captured with X7CAM4K8MPA
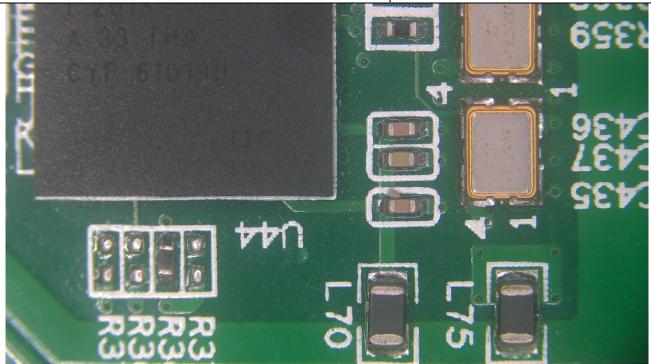
Three Year Tilia Stem.C.S Captured with X7CAM4K8MPA

Corn Leaf Captured with X7CAM4K8MPA

Circuit Board Captured with X7CAM4K8MPA

8.2 X5CAM4K Series HDMI/NETWORK /USB Multi-outputs C-mount CMOS Camera

8.2.1 X5CAM4K Series Camera's Basic Characteristic

The X5CAM4K series camera is intended for acquisition of digital images from stereo microscopes, biological microscopes, or online interactive teaching. The basic characteristic is listed as below:

- Sony STARVIS 2 back-illuminated CMOS sensor
- 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 40ms
- SD card/USB flash drive for captured image and video storage, support local preview and playback
- New browsing function, providing rich file operation functions, image to image comparison, image to real-time video comparison, multi-image EDF and other functions
- Excellent ISP with local tone mapping and 3D denoising
- Provide real-time video EDF function and real-time video WDR output function
- Provide two sets of default ISP parameters for biological microscope and stereo microscope
- 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

8.2.2 X5CAM4K Series Camera's Datasheet and Functions(2)

The main parameters of X5CAM4K series cameras with different sensors are shown in the table below:

Order Code	Sensor & Size(mm)	Pixel(μm)	G Sensitivity/Dark Signal	FPS/Resolution	Binning	Exposure(ms)
X5CAM4K8MPA	Sony IMX678(C) 1/1.8"(7.68x4.32)	2.0x2.0	3541mv with 1/30s 0.15mv with 1/30s	60@3840*2160	1x1	0.019~1000
X5CAM4K8MPB	Sony IMX585(C) 1/1.2"(11.14x6.26)	2.9x2.9	5970mv with 1/30s 0.13mv with 1/30s	60@3840*2160	1x1	0.048~1000

The output parameters of different interfaces of X5CAM4K series cameras are shown in the following table:

Camera Model	Video Saving(FPS/Resolution)	HDMI2.0(FPS/Resolution)	USB3.0(FPS/Resolution)	NETWORK(FPS/Resolution)
X5CAM4K8MPA	60@3840*2160 60@1920*1080	60@3840*2160 60@1920*1080	30@3840*2160 45@2688*1512 60@1920*1080	30@3840*2160 60@1920*1080 60@1280*720
X5CAM4K8MPB	60@3840*2160 60@1920*1080	60@3840*2160 60@1920*1080	30@3840*2160 45@2688*1512 60@1920*1080	30@3840*2160 60@1920*1080 60@1280*720

X5CAM4K Series HDMI/NETWORK /USB Multi-outputs C-mount CMOS Camera

Interface or Button	Function Description
USB Mouse	Connect USB mouse for easy operation with embedded XCamView software(Flat shape without labelling)
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 for audio and video recording
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;60fps@4K or 60fps@1080P
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 H264/MJPEG format video

Other Function	Function Description
Video Saving	Video format：8M(3840*2160) H264/H265 encoded MP4 file Video saving frame rate:60fps
Image Capture	8M (3840*2160) JPEG/TIFF 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 Function
Image Operation	Zoom In/Zoom Out(Up to 10X), Mirror/Flip, Freeze, EDF, Cross Line, Overlay, PIP，Browser(including Picture Browsing , Video Playback , Video Compare , Picture Compare , EDF , 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® XP / Vista / 7 / 8 / 8.1 / 10 / 11(32 & 64 bit) OSx(Mac OS X) Linux
PC Requirements	CPU: Equal to Intel Core2 2.8GHz or Higher
	Memory: 4GB or More
	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 Adapter

8.2.3 Dimension of X5CAM4K Series Camera

Figure 8-7 Dimension of X5CAM4K Series(Cubic and Flat Shape)

8.2.4 Extension of X5CAM4K Series Camera with Microscope or Telescope Adapter

Extension	Picture	
C-mount Camera		Scientific research, digital teaching (teaching, demonstration and academic discussing); Digital laboratory, medical research; Machine vision (PCB detection, IC quality control); Medical treatment (pathological observation); Food (microbial colony observation and counting); Aviation and military;
Microscope Camera	 4K HDMI+AMAXXX(23.2mm Adapter) 4K HDMI+FMAXXX(23.2mm Adapter) 4K HDMI+ATAXXX(31.75mm Adapter) 4K HDMI+FTAXXX(31.75mm Adapter)	

Figure 8-8 X5CAM4K Series Camera and HDMI Displayer
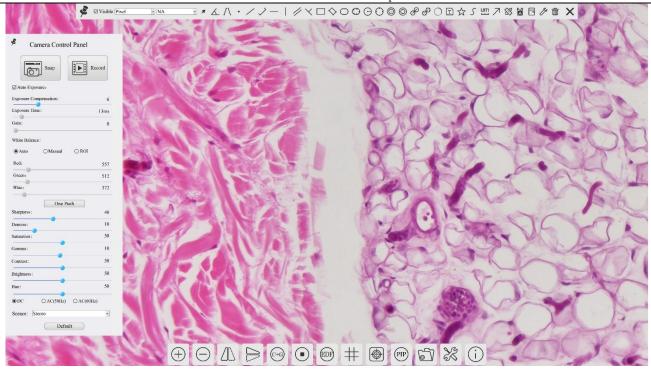
Figure 8-9 The X5CAM4K Series Camera's Control GUI

Figure 8-10 X5CAM4K Series Camera and Leica Microscope

Figure 8-11 X5CAM4K Series Camera and Zeiss Microscope

8.2.5 Packing Information of X5CAM4K Series Camera
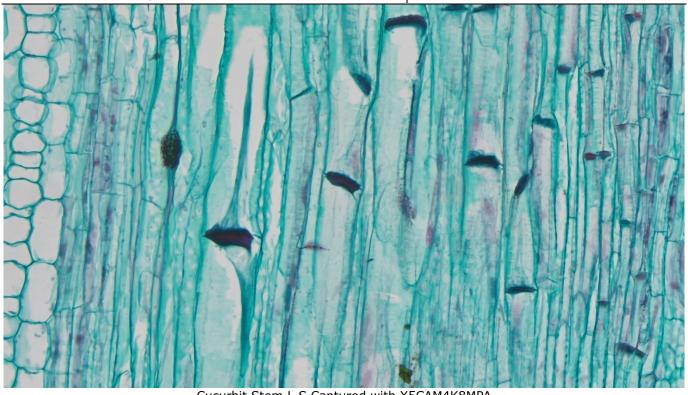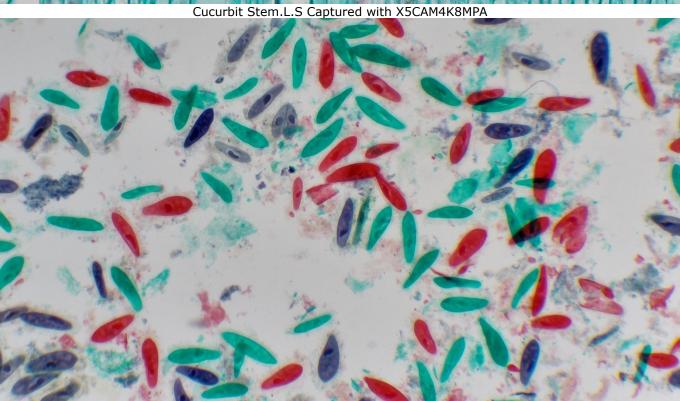
Figure 8-12 X5CAM4K Series Camera Packing Information(Cubic and Flat Shape)

	Standard Packing List
A	Gift box : L:25.5cm W:17.0cm H:9.0cm (1pcs, 1.7Kg/ box)
B	X5CAM4K Camera(One of the two different shapes)
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 EMI standard: FCC Part 15 Subpart B EMS standard: EN61000-4-2,3,4,5,6
D	USB Mouse
E	HDMI Cable
F	USB3.0 A male to A male gold-plated connectors cable /2.0m
G	CD (Driver & utilities software, Ø12cm)
	Optional Accessory
H	SD Card(16G or above; Speed: class 10)
I	USB flash drive
J	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
K	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 J and K 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;
L	108015(Dia.23.2mm to 30.0mm Ring)/Adapter rings for 30mm eyepiece tube
M	108016(Dia.23.2mm to 30.5mm Ring)/ Adapter rings for 30.5mm eyepiece tube
N	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.)
O	USB WiFi adapter
P	Ethernet cable

8.2.6 Images Captured by X5CAM4K Series Camera
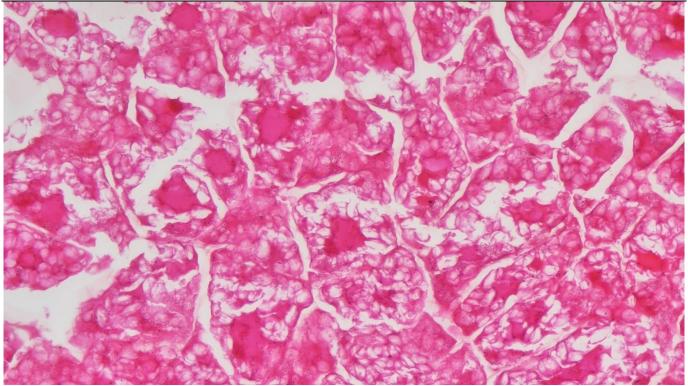
Cucurbit Stem.L.S Captured with X5CAM4K8MPA

Paramecium.W.M Captured with X5CAM4K8MPA

Fluorescent Sectioning of WheatSeeds Captured with X5CAM4K8MPA

8.3   XCAM4K Series HDMI/NETWORK /USB Multi-outputs C-mount CMOS Camera

8.3.1 XCAM4K Series Camera's Basic Characteristic

The XCAM4K series camera is the next-generation live-view imaging-system with 4K resolution at 60/30 FPS.

XCAM4K series camera comes with Sony Exmor CMOS sensor with high sensitivity, low dark current and no smear achieved through the adoption of R, G and B primary color mosaic filters.

The camera uses a standard C-mount interface for maximum compatibility with various microscopy-systems. It can be used as a stand-alone recorder when used with an HDMI displayer or television, or live-streamed to a PC via NETWORK /USB for image-capture and video-recording.

Hardware 3D denoising, sharpness and local tone mapping control functions greatly improve the image and video quality.

The included Windows software ToupView offers image-development and measurement tools, as well as advanced compositing features such as image-stitching and extended-depth-of-focus. With the ability to calibrate scales at multiple magnifications, the software can be used for multi-level inspection.

For Mac and Linux, there is a lite version of the software ToupLite which can capture video and still images, and includes limited processing features.

The XCAM4K series camera is intended to be used for the acquisition of digital images from the stereo microscope, biological microscope or online interactive teaching. The basic characteristics are listed as below:

- Sony Exmor/Starvis back-illuminated CMOS sensor
- 4K HDMI/ NETWORK / USB multiple video outputs
- 4K/1080P auto switching according to displayer resolution, FPS at 4K is 30/60 fps
- SD card/USB flash drive for captured image and video storage, support local preview and playback
- Embedded XCamView for the control of the camera and image processing
- Excellent ISP with local tone mapping and 3D denoising
- ToupView/ToupLite software for PC
- iOS/Android applications for smart phones or tablets

8.3.2 XCAM4K Series Camera's Datasheet and Functions(3)

Order Code	Sensor & Size(mm)	Pixel(μm)	G Sensitivity Dark Signal	FPS/Resolution	Binning	Exposure(ms)
XCAM4K8MPA XP4K8MA	4K/Sony IMX334(C) 1/1.8"(7.68x4.32)	2.0x2.0	505mv with 1/30s 0.13mv with 1/30s	60@3840*2160(HDMI) 30@3840*2160(NETWORK) 30@3840*2160(USB)	1x1	0.04~2000
XCAM4K8MPB XP4K8MB	Sony IMX485(C) 1/1.2"(11.14x6.26)	2.9x2.9	2188mv with 1/30s 0.39mv with 1/30s	60@3840*2160(HDMI) 30@3840*2160(NETWORK) 30@3840*2160(USB)	1x1	0.04~2000
XCAM4K16MPA XP4K16MA	Sony IMX183(C) 1/1.06"(13.06x7.34)	2.4x2.4	461mv with 1/30s 0.21mv with 1/30s	30@3840*2160(HDMI) 30@3840*2160(NETWORK) 15@5440*3060(USB)	1x1	0.04~2000

C: Color; M: Monochrome;
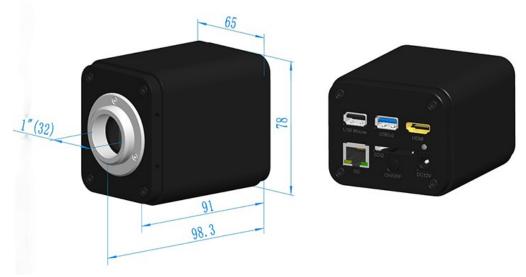
Interface or Button	Function Description
USB Mouse	Connect USB mouse for easy operation with embedded **XCamView** software.
USB3.0	Connect USB flash drive to save pictures and videos (**Host Mode**). Connect 5G WiFi module to transfer video wirelessly in real time(**AP/STA**, **Host Mode**); Connect computer with USB connection to transfer video in real time(Device Mode)；
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	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; 60fps@4K or 60fps@1080P(**XCAM4K8MPA**, **XCAM4K8MPB**); 30fps@4K or 60fps@1080P(**XCAM4K16MPA**);
LAN Interface	30ps@4K resolution, support real time resolution switching; H264/H265 encoded video; Bandwidth adjustment in real time; DHCP configuration or manual configuration; Unicast/multicast configuration;
WiFi Interface	Connecting 5G WiFi adapter (USB3.0 slot) in AP/STA mode (**Host Mode**);
USB3.0 Slot	Connecting USB3.0 port of PC for video transfer (**Device Mode**); MJPEG format video;

Other Function	Function Description
Video Saving	Video format：8M(3840*2160) H264 encoded MP4 file; Video saving frame rate：50~60fps(**XCAM4K8MPA**, **XCAM4K8MPB**) (related with SD card and video resolution); 26~30fps(**XCAM4K16MPA**) (related with SD card and video resolution);
Image Capture	8M (3840*2160, **XCAM4K8MPA**, **XCAM4K8MPB**) JPEG/TIFF image in SD card or USB flash drive; 16M (3840*2160, **XCAM4K16MPA**) JPEG/TIFF image in SD card or USB flash drive.
Measurement Saving	Measurement information saved in different layer with image content; Measurement information is saved together with image content in burn in mode.
ISP Function	Exposure(Automatic / Manual Exposure) / Gain，White Balance(Manual / Automatic / ROI Mode)，Sharpening，3D Denoise，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, PIP (Picture in Picture), Compare(Comparison between real time video and images in SD card or USB flash drive), Embedded Files Browser, Video Playback, 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 / Thai / French / German / Japanese / Italian

Software Environment under NEWWORK/WiFi/USB Video Output	
White Balance	Auto White Balance
Color Technique	Ultra-Fine Color Engine
Capture/Control SDK	Windows/Linux/macOS/Android Multiple Platform SDK(Native C/C++, C#/VB.NET, Python, Java, DirectShow, Twain, etc)
Recording System	Still Picture or Movie
Operating System	Microsoft® Windows® XP / Vista / 7 / 8 / 8.1 /10(32 & 64 bit) OSx(Mac OS X) Linux
PC Requirements	CPU: Equal to Intel Core2 2.8GHz or Higher
	Memory: 4GB or More
	Ethernet Port: RJ45 Ethernet Port
	Displayer: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 Adapter

8.3.3 Dimension of XCAM4K Series Camera

Dimension of XCAM4K Series Camera

8.3.4 Extension of XCAM4K Series Camera with Microscope or Telescope Adapter

Extension	Picture	
C-mount Camera		Scientific research, digital teaching (teaching, demonstration and academic discussing); Digital laboratory, medical research; Machine vision (PCB detection, IC quality control); Medical treatment (pathological observation); Food (microbial colony observation and counting); Aviation and military;
Microscope Camera	4K HDMI+AMAXXX(23.2mm Adapter)	4K HDMI+FMAXXX(23.2mm Adapter)
Telescope Camera	4K HDMI+ATAXXX(31.75mm Adapter)	4K HDMI+FTAXXX(31.75mm Adapter)

Figure 8-13 XCAM4K Series Camera and HDMI Displayer
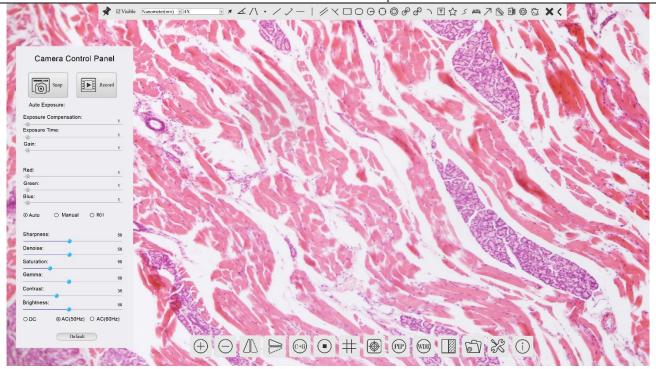
Figure 8-14 The XCAM4K Series Camera's Control GUI

Figure 8-15 XCAM4K Series Camera and Leica Microscope

Figure 8-16 XCAM4K Series Camera and Zeiss Microscope

8.3.5 Packing Information of XCAM4K Series Camera

Packing Information of XCAM4K Series Camera(Square and Flatened)
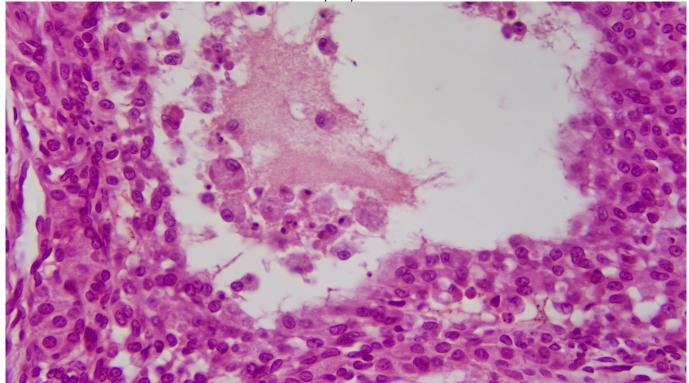
Standard Packing List	
A	Gift box : L:25.5cm W:17.0cm H:9.0cm (1pcs, 1.57Kg/ box)
B	XCAM4K series camera(Square or flatened)
C	Power Adapter: Input: AC 100~240V 50Hz/60Hz, Output: DC 12V 1A **American standard**: Model: GS12U12-P1I 12W/12V/1A: UL/CUL/BSMI/CB/FCC **European standard**: Model:GS12E12-P1I 12W/12V/1A; TUV(GS)/CB/CE/ROHS
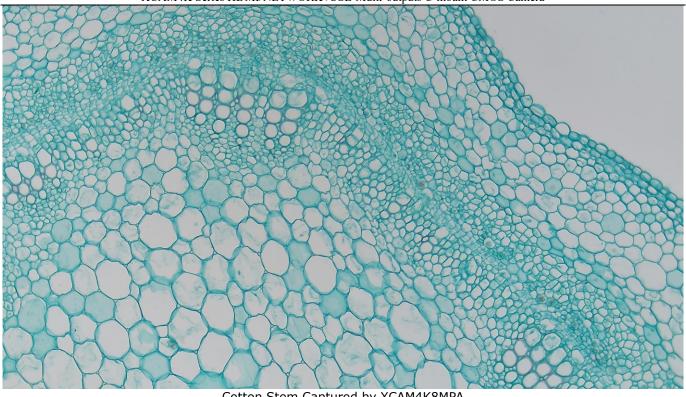
	EMI Standard: EN55022, EN61204-3, EN61000-3-2,-3, FCC Part 152 class B, BSMI CNS14338 EMS Standard: EN61000-4-2,3,4,5,6,8,11, EN61204-3, Class A Light Industry Standard
D	USB Mouse
E	HDMI 2.0 Cable(Support 3840x2160, 60FPS)
F	High-speed USB3.0 A male to A male gold-plated connectors cable /2.0m
G	CD (Driver & utilities software, Ø12cm)

<div align="center">**Optional Accessory**</div>

H	SD Card (16G or above; Speed: Class 10)		
I	USB WiFi adapter		
J	Ethernet cable		
K	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
L	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 K and L 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 applications;		
M	108015(Dia.23.2mm to 30.0mm ring)/Adapter rings for 30mm eyepiece tube		
N	108016(Dia.23.2mm to 30.5mm ring)/ Adapter rings for 30.5mm eyepiece tube		
O	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.)	
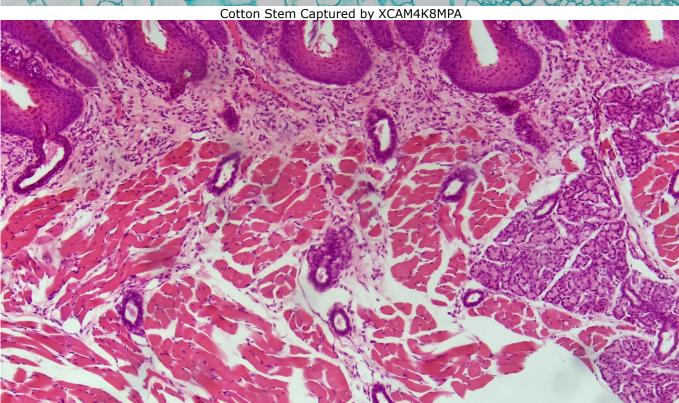
8.3.6 Images Captured by XCAM4K Series Camera

Rabbit Emdryo by XCAM4K8MPA

Ovary Captured by XCAM4K8MPA
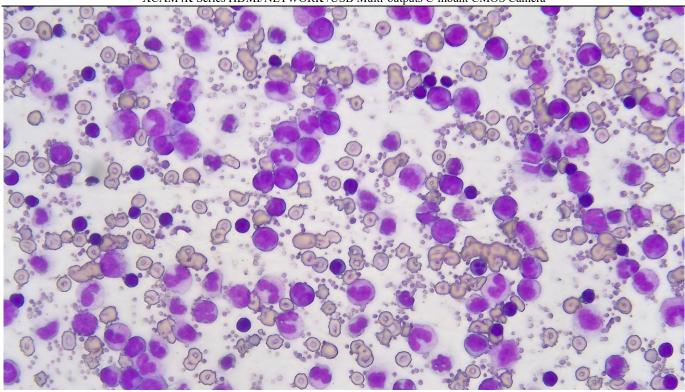
Cotton Stem Captured by XCAM4K8MPA
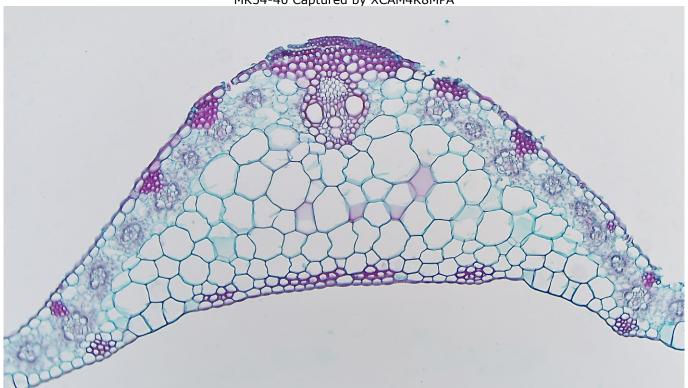
Taste Bad Captured by XCAM4K8MPA

MK54-40 Captured by XCAM4K8MPA

Corn Leaf Captured by XCAM4K8MPA

8.4   XCAMTOP4K Series HDMI/NETWORK/USB Multi-outputs C-mount CMOS Camera

8.4.1 XCAMTOP4K Series Camera's Basic Characteristic

The XCAMTOP4K series camera is intended to be used for the acquisition of digital images from the stereo microscope, biological microscope or online interactive teaching. The basic characteristics are listed as below:

- Sony Exmor/STARVIS back-illuminated 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 XCAMView for the control of the camera and image processing
- Excellent ISP with local tone mapping and 3D denoising
- ToupView/ToupLite software for PC
- iOS/Android applications for smart phones or tablets

8.4.2 XCAMTOP4K Series Camera's Datasheet and Functions(4)

Order Code	Sensor & Size(mm)	Pixel(µm)	G Sensitivity Dark Signal	FPS/Resolution	Binning	Exposure(ms)
XCAMTOP4K8MPA	Sony IMX334(C) 1/1.8"(7.68x4.32)	2.0x2.0	505mv with 1/30s 0.1mv with 1/30s	30@3840*2160(HDMI) 30@3840*2160(NETWORK) 30@3840*2160(USB)	1x1	0.04~1000
XCAMTOP4K8MPB (Suspended)	Sony IMX485(C) 1/1.2"(11.14x6.26)	2.9x2.9	2188mv with 1/30s 0.39mv with 1/30s	30@3840*2160(HDMI) 30@3840*2160(NETWORK) 30@3840*2160(USB)	1x1	0.04~1000
XCAMTOP4K8MPC	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) 30@3840*2160(NETWORK) 30@3840*2160(USB)	1x1	0.04~1000
XCAMTOP4K8MPD	Sony IMX585(C) 1/1.2"(11.14x6.26)	2.9x2.9	1028mv with 1/30s 0.13mv with 1/30s	30@3840*2160(HDMI) 30@3840*2160(NETWORK) 30@3840*2160(USB)	1x1	0.04~1000

C: Color; M: Monochrome;

Interface or Button	Function Description

USB Mouse	Connect USB mouse for easy operation with embedded XCAMView software
USB2.0	Connect USB flash drive to save pictures and videos Connect 5G WLAN module to transfer video wirelessly in real time
USB Video	Connect PC or other host device to realize video image transmission
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
LAN	LAN port to connect router and switch to transfer video
SD	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 HDMI1.4 standard 30fps@4K or 30fps@1080P
LAN Interface	support real time resolution switching(4K/1080P/720P) H264 encoded video DHCP configuration or manual configuration Unicast/multicast configuration
WLAN Interface	Connecting 5G WLAN adapter (USB2.0 slot) in AP/STA mode
USB Video Interface	Connecting USB Video port of PC for video transfer MJPEG format video
Other Function	Function Description
Video Saving	Video format：8M(3840*2160) H264/H265 encoded MP4 file Video saving frame rate：30fps
Image Capture	8M (3840*2160) JPEG/TIFF image in SD card or USB flash drive
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， 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 between real time video and images in SD card or USB flash drive), Embedded Files Browser, Video Playback, 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 / Japanese / Italian / Russian
Software ToupView/ToupLite Environment under LAN/WLAN/USB Video Output	
White Balance	Auto White Balance
Color Technique	Ultra-Fine Color Engine
Capture/Control SDK	Windows/Linux/macOS/Android Multiple Platform SDK(Native C/C++, C#/VB.NET, Python, Java, DirectShow, Twain, etc)
Recording System	Still Picture or Movie
Operating System	Microsoft® Windows® XP / Vista / 7 / 8 / 8.1 /10(32 & 64 bit) OSx(Mac OS X) Linux
PC Requirements	CPU: Equal to Intel Core2 2.8GHz or Higher
	Memory: 4GB or More
	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 Adapter

8.4.3 Dimension of XCAMTOP4K Series Camera

Dimension of XCAMTOP4K Series Camera

8.4.4 Extension of XCAMTOP4K Series Camera with Microscope or Telescope Adapter

Extension	Picture	
C-mount Camera		Scientific research, digital teaching (teaching, demonstration and academic discussing); Digital laboratory, medical research; Machine vision (PCB detection, IC quality control); Medical treatment (pathological observation); Food (microbial colony observation and counting); Aviation and military;
Microscope Camera	 4K HDMI+AMAXXX(23.2mm Adapter)	 4K HDMI+FMAXXX(23.2mm Adapter)
Telescope Camera	 4K HDMI+ATAXXX(31.75mm Adapter)	 4K HDMI+FTAXXX(31.75mm Adapter)

Figure 8-17 XCAMTOP4K Series Camera and HDMI Displayer

Figure 8-18 The XCAMTOP4K Series Camera's Control GUI

Figure 8-19 XCAMTOP4K Series Camera and Leica Microscope

Figure 8-20 XCAMTOP4K Series Camera and Zeiss Microscope
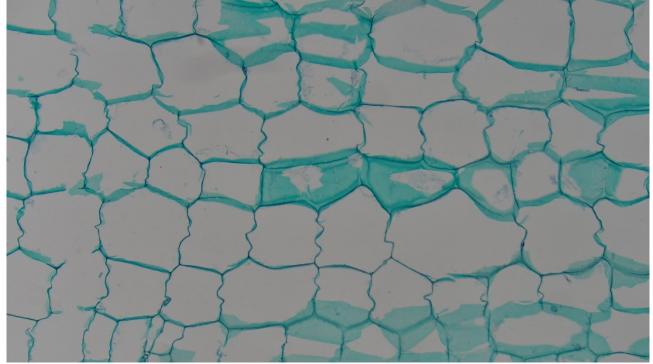
8.4.5 Packing Information of XCAMTOP4K Series Camera
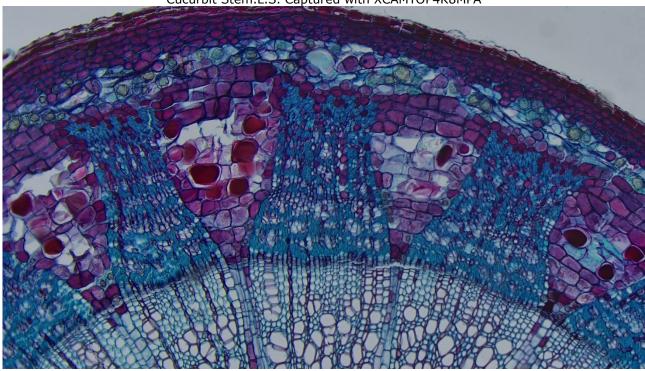
Packing Information of XCAMTOP4K Series Camera

Standard Packing List	
A	Gift box : L:25.5cm W:17.0cm H:9.0cm (1pcs, 1.57Kg/ box)
B	XCAMTOP4K 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 EMI standard: FCC Part 15 Subpart B EMS standard: EN61000-4-2,3,4,5,6
D	USB Mouse
E	HDMI Cable
F	USB2.0 A male to A male gold-plated connectors cable /2.0m
G	CD (Driver & utilities software, Ø12cm)
Optional Accessory	
H	SD Card(16G or above; Speed: class 10)
I	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

8.4.6 Images Captured by XCAMTOP4K Series Camera

Cucurbit Stem.L.S. Captured with XCAMTOP4K8MPA

Two Year Tilia Stem.C.S. Captured with XCAMTOP4K8MPA

Simple Cuboidal Epithelium.Sec. Captured with XCAMTOP4K8MPA

Circuit Board Captured with XCAMTOP4K8MPA

8.5   SCAM4K Series HDMI/WiFi /USB3.0 Multi-outputs C-mount CMOS Camera

Figure 8-21 The SCAM4K Series Camera

The SCAM4K series camera is intended for acquisition of digital images from stereo microscopes, biological microscopes, or online interactive teaching. The basic characteristic is listed as below:

- Sony Exmor/STARVIS back-illuminated CMOS sensor
- 4K HDMI/ WiFi/ USB3.0 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 XCamView for the control of the camera and image processing
- Excellent ISP with local tone mapping and 3D denoising
- ToupView/ToupLite software for PC
- iOS/Android applications for smart phones or tablets

8.5.1 SCAM4K Series Camera Datasheet and Functions（2）

Order Code	Sensor & Size(mm)	Pixel(µm)	G Sensitivity/Dark Signal	FPS/Resolution	Binning	Exposure(ms)
SCAM4K8MPA	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) 30@1920*1080(WiFi) 30@3840*2160(USB3.0)	1x1	0.045~1000
SCAM4K8MPB	Sony IMX585(C) 1/1.2"(11.14x6.26)	2.9x2.9	1028mv with 1/30s 0.13mv with 1/30s	30@3840*2160(HDMI) 30@1920*1080(WiFi) 30@3840*2160(USB3.0)	1x1	0.014~1000

Figure 8-22 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
USB2.0	Connect USB flash drive to save pictures and videos Connect 5G WiFi module to transfer video wirelessly in real time
USB Video	Connect PC or other host device to realize video image transmission
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

SD	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 HDMI1.4 standard 30fps@4K or 30fps@1080P
WiFi Interface	Connecting 5G WiFi adapter (USB2.0 slot) in AP/STA mode 1080P H264 format video, 8M (3840*2160) image
USB Video Interface	Connecting USB3.0 Video port of PC for video transfer H264/NV12/MJPEG format video
Other Function	**Function Description**
Video Saving	Video format：8M(3840*2160) H264/H265 encoded MP4 file Video saving frame rate：30fps
Image Capture	8M (3840*2160) JPEG/TIFF image in SD card or USB flash drive
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， 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 between real time video and images in SD card or USB flash drive), Embedded Files Browser, Video Playback, 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 / Japanese / Italian / Russian
Software Environment under WiFi/USB Video Output	
White Balance	Auto White Balance
Color Technique	Ultra-Fine Color Engine
Capture/Control SDK	Windows/Linux/macOS/Android Multiple Platform SDK(Native C/C++, C#/VB.NET, Python, Java, DirectShow, Twain, etc)
Recording System	Still Picture or Movie
Operating System	Microsoft® Windows® XP / Vista / 7 / 8 / 8.1 /10(32 & 64 bit) OSx(Mac OS X) Linux
PC Requirements	CPU: Equal to Intel Core2 2.8GHz or Higher
	Memory: 4GB or More
	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 Adapter

8.5.2 Dimension of SCAM4K Series Camera

Figure 8-23 Dimension of SCAM4K Series Camera

8.5.3 SCAM4K Series Camera Packing Information

Figure 8-24 SCAM4K Series Camera Packing Information

	Standard Packing List		
A	Gift box : L:25.5cm W:17.0cm H:9.0cm (1pcs, 1.57Kg/ box)		
B	SCAM4K Camera(One of the two different shapes)		
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 EMI standard: FCC Part 15 Subpart B EMS standard: EN61000-4-2,3,4,5,6		
D	USB Mouse		
E	HDMI Cable		
F	USB3.0 A male to A male gold-plated connectors cable /2.0m		
G	CD (Driver & utilities software, Ø12cm)		
	Optional Accessory		
H	SD Card(16G or above; Speed: class 10)		

I	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
J	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 **K** and **L** 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;		
K	108015(Dia.23.2mm to 30.0mm Ring)/Adapter rings for 30mm eyepiece tube		
L	108016(Dia.23.2mm to 30.5mm Ring)/ Adapter rings for 30.5mm eyepiece tube		
M	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.)
N	USB flash drive		
O	USB WiFi adapter		

8.5.4 Software and App

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

Windows: http://www.touptek.com/download/showdownload.php?lang=en&id=33

Linux & macOS: http://www.touptek.com/download/showdownload.php?lang=en&id=28

iOS: https://itunes.apple.com/us/app/toupview/id911644970

Android: https://play.google.com/store/apps/details?id=com.touptek.tpview

8.5.5 Sample Photos Captured with SCAM4K Series Camera
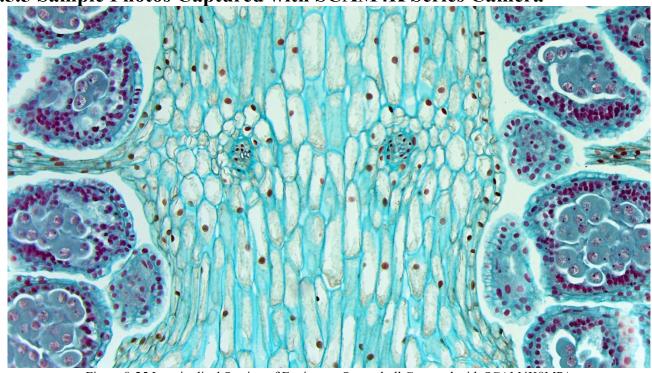
Figure 8-25 Longitudinal Section of Equisetum Sporophyll Captured with SCAM4K8MPA
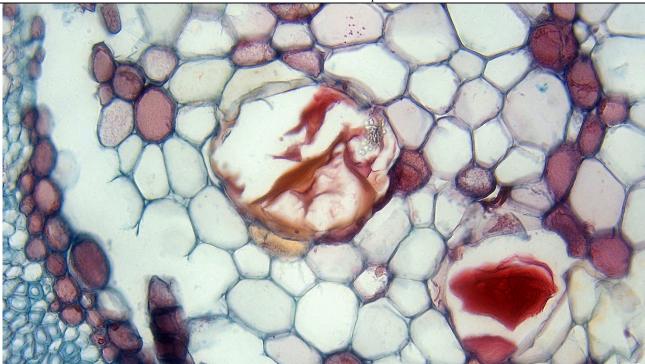
Figure 8-26 Lime Wood Stem CS Captured with SCAM4K8MPA
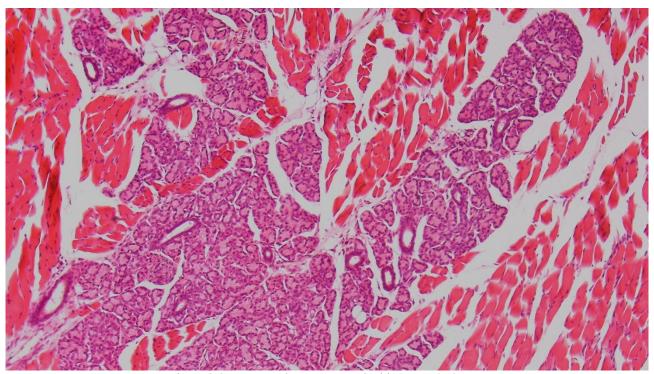
Figure 8-27 Taste Bud.Sec. Captured with SCAM4K8MPA
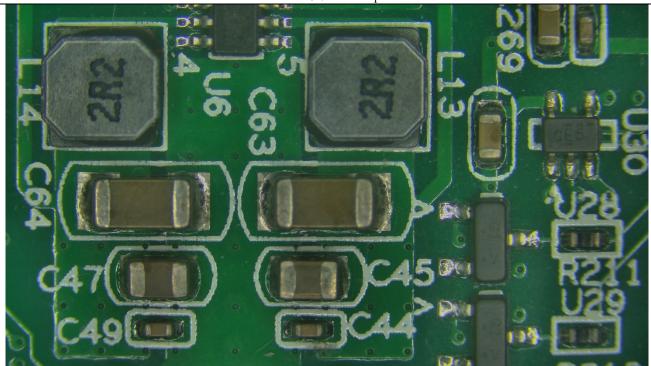
Figure 8-28 Circuit Board Captured with SCAM4K8MPA

8.6   XCAMLITE4K Series HDMI/USB Multi-outputs C-mount CMOS Camera

8.6.1 XCAMLITE4K Series Camera's Basic Characteristic

Figure 8-29 XCAMLITE4K Series Camera(Square)

For details of the camera operations, please check XCAMLITE4K_en.docx or XCAMLITE4K_en.pdf file.

The XCAMLITE4K series camera is the lite version live-view imaging-system with 4K resolution at 30 FPS.

The XCAMLITE4K series camera comes with Sony Exmor CMOS sensor with high sensitivity, low dark current and no smear achieved through the adoption of R, G and B primary color mosaic filters.

The camera uses a standard C-mount interface for maximum compatibility with various microscopy-systems. It can be used as a stand-alone recorder when used with an HDMI displayer or television, or live-streamed to a PC via USB for image-capture and video-recording.

Hardware 3D denoising, sharpness and local tone mapping control functions greatly improve the image and video quality.

The included Windows software ToupView offers image-development and measurement tools, as well as advanced compositing features such as image-stitching and extended-depth-of-focus. With the ability to calibrate scales at multiple magnifications, the software can be used for multi-level inspection.

For Mac and Linux, there is a lite version of the software ToupLite which can capture video and still images, and includes limited processing features.

The XCAMLITE4K series camera is intended to be used for the acquisition of digital images from the stereo microscope, biological microscope or online interactive teaching. The basic characteristics are listed as below:

- Sony Exmor/Starvis back-illuminated CMOS sensor
- 4K HDMI/USB multiple video outputs
- 4K/1080P auto switching according to the displayer resolution
- SD card for the captured image and video storage
- Embedded XCamView for the control of the camera
- With strong ISP and other related processing functions
- ToupView/ToupLite software for PC
- ToupLite software for MAC

8.6.2 XCAMLITE4K Series Camera's Datasheet and Functions(4)

Order Code	Sensor & Size(mm)	Pixel(μm)	G Sensitivity	FPS/Resolution	Binning	Exposure(ms)
XCAMLITE4K8MPA	Sony IMX334(C) 1/1.8"(7.68x4.32)	2.0x2.0	505mv with 1/30s 0.1mv with 1/30s	30@3840*2160(HDMI) 20@3840*2160(USB)	1x1	0.04~1000
XCAMLITE4K8MPB	Sony IMX485(C) 1/1.2"(11.14x6.26)	2.9x2.9	2188mv with 1/30s 0.39mv with 1/30s	30@3840*2160(HDMI) 20@3840*2160(USB)	1x1	0.04~1000
XCAMLITE4K8MPC	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) 20@3840*2160(USB)	1x1	0.04~1000
XCAMLITE4K8MPD	Sony IMX585(C) 1/1.2"(11.14x6.26)	2.9x2.9	1028mv with 1/30s 0.13mv with 1/30s	30@3840*2160(HDMI) 20@3840*2160(USB)	1x1	0.04~1000

C: Color; M: Monochrome;

Figure 8-30 Available Ports on the Back Panel of the Camera Body

Interface	Function Description
USB Mouse	Connect USB mouse for easy operation with embedded XCamView software;
USB Video	Connect PC or other host device to realize video image transmission;
HDMI	Comply with HDMI1.4 standard. 4K or 1080P format video output for standard displyer;
DC12V	Power adapter connection (12V/1A);
SD	Comply with SDIO3.0 standard and SD card could be inserted for video and images storage;
USB	Connect USB flash drive for capturing video and image storage
LED	LED status indicator;
ON/OFF	Power switch;
Video Output Interface	**Function Description**
HDMI Interface	Comply with HDMI1.4 standard; 30fps@4K or 30fps@1080P;
USB Video Interface	Connecting USB port of　PC for video transfer ; MJPEG format video;
Other Function	**Function Description**
Video Saving	Video format：8M(3840*2160) H264/H265 encoded MP4 file; Video saving frame rate：30fps;
Image Capture	8M (3840*2160) JPEG/TIFF image in SD card ;
Measurement Saving	Measurement information saved in layer mode with image content; Measurement information is saved together with image content in burn in mode.
ISP Function	Exposure(Automatic / Manual Exposure) / Gain，　White Balance(Manual / Automatic / ROI Mode)，Sharpening，3D Denoise，Saturation Adjustment，Contrast Adjustment，Brightness Adjustment，Gamma Adjustment，Color to Gray，50HZ/60HZ Anti-flicker Function
Image Operations	Zoom In/Zoom Out, Mirror/Flip, Freeze, Cross Line, Overlay, Embedded Files Browser, Video Playback, 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 / Thai / French / German / Japanese / Italian / Russian
Software Function and Environment under USB Video Output	
White Balance	Auto White Balance
Color Technique	Ultra-Fine Color Engine
Capture/Control SDK	Windows/Linux/macOS/Android Multiple Platform SDK(Native C/C++, C#/VB.NET, Python, Java, DirectShow, Twain, etc)
Recording System	Still Picture or Movie
Operating System	Microsoft® Windows® XP / Vista / 7 / 8 / 8.1 /10(32 & 64 bit) OSx(Mac OS X) Linux
PC Requirements	CPU: Equal to Intel Core2 2.8GHz or Higher
	Memory: 4GB or More
	Ethernet Port: RJ45 Ethernet Port

	Displayer: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 Adapter

8.6.3 XCAMLITE4K Series Camera's Dimension

XCAMLITE4K Series Camera's Dimension

8.6.4 XCAMLITE4K Series Camera Packing Information

Figure 8-31 XCAMLITE4K Series Camera Packing Information

	Standard Packing List
A	Gift box : L:25.5cm W:17.0cm H:9.0cm (1pcs,1.48kg/ box)
B	XCAMLITE4K series camera

C	Power Adapter: Input: AC 100~240V 50Hz/60Hz, Output: DC 12V 1A **American standard**: Model: GS12U12-P1I 12W/12V/1A: UL/CUL/BSMI/CB/FCC **European standard**: Model:GS12E12-P1I 12W/12V/1A; TUV(GS)/CB/CE/ROHS EMI Standard: EN55022,EN61204-3, EN61000-3-2,-3, FCC Part 152 class B, BSMI CNS14338 EMS Standard: EN61000-4-2,3,4,5,6,8,11,EN61204-3,Class A Light Industry Standard		
D	USB mouse		
E	HDMI cable		
F	USB2.0 A male to A male gold-plated connectors cable/2.0m		
G	CD (Driver & utilities software, Ø12cm)		
	Optional Accessory		
H	SD card(16G or above; speed: class 10)		
I	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
J	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 I and J 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;		
K	108015(Dia.23.2mm to 30.0mm ring)/Adapter rings for 30mm eyepiece tube		
L	108016(Dia.23.2mm to 30.5mm ring)/ Adapter rings for 30.5mm eyepiece tube		
M	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.)	

8.6.5 Extension of XCAMLITE4K Series Camera with Microscope Adapter

Extension	Picture	
C-mount Camera		Machine vision; Medical imaging; Semiconductor equipment; Test instruments; Document scanners; 2D barcode readers; Web camera and security video; Microscope imaging;
Microscope Camera	XCAMLITE4K+AMAXXX(23.2mm Adapter) XCAMLITE4K+FMAXXX(23.2mm Adapter)	

8.6.6 Camera Working Standalone with Built-in XCamView Software

For this application, apart from the microscope, the user only needs an XCAMLITE4K series camera, an HDMI displayer, an HDMI cable, an SD card, a USB mouse and a power adapter that come with the camera. The steps to start the camera are listed as below:

- Connect the camera to a HDMI displayer using the HDMI cable;
- Insert the supplied USB mouse to the camera's USB mouse port;
- Insert the supplied SD card into the XCAMLITE4K series camera SD card slot;
- Connect power adapter to the camera the and switch it on;
- Switch on the displayer 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 UI will pop up and users could operate with the mouse at ease.

Figure 8-32 XCAMLITE4K Series Camera with HDMI Displayer

Figure 8-33 XCAMLIT4K Series Camera's UI on the HDMI Displayer

8.6.7 Connecting Camera to the PC with USB Video Port

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

For macOS or 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:

- Install the ToupView/ToupLite on your PC;
- Connect power adapter to the camera the and switch it on. After starting the camera, plug one end of the USB cable into the USB 2.0 Video port of the XCAMLITE4K series camera, and plug the other end into the USB port of the PC;
- Open ToupView/ToupLite software. The XCAMLITE4K series camera will be recognized automatically by software. In ToupView/ToupLite software, select the corresponding XCAMLITE4K series camera by clicking the camera name in the camera list.

Note:

When the USB cable and the mouse are plugged into the camera at the same time, the USB cable is preferred and the mouse is not available; when the USB cable is unplugged, the mouse can be used normally.

8.6.8 Sample Photos Captured with XCAMLITE4K Series Camera
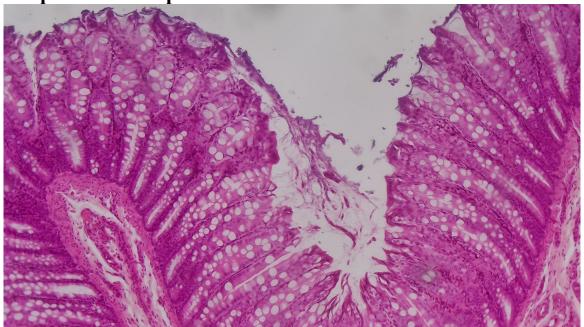
Figure 8-34 Alfalfa Stem Captured with XCAMLITE4KA8MPA
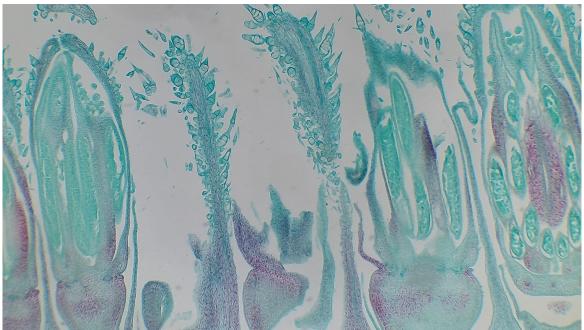
Figure 8-35 Top Bud. Captured with XCAMLITE4K8MPA

8.7 XCAMLITE4K-MINI Series HDMI/USB Multi-outputs C-mount CMOS Camera

8.7.1 XCAMLITE4K-MINI Series Camera's Basic Characteristic

Figure 8-36 XCAMLITE4K-MINI Series Camera(Square)

For details of the camera operations, please check XCAMLITE4K-MINI_en.docx or XCAMLITE4K-MINI_en.pdf file.

The XCAMLITE4K-MINI series camera is the lite version live-view imaging-system with 4K resolution at 30 FPS.

The XCAMLITE4K-MINI series camera comes with Sony Exmor CMOS sensor with high sensitivity, low dark current and no smear achieved through the adoption of R, G and B primary color mosaic filters.

The camera uses a standard C-mount interface for maximum compatibility with various microscopy-systems. It can be used as a stand-alone recorder when used with an HDMI displayer or television, or live-streamed to a PC via USB for image-capture and video-recording. USB flash drive is used for the captured image and video storage

Hardware 3D denoising, sharpness and local tone mapping control functions greatly improve the image and video quality.

The included Windows software ToupView offers image-development and measurement tools, as well as advanced compositing features such as image-stitching and extended-depth-of-focus. With the ability to calibrate scales at multiple magnifications, the software can be used for multi-level inspection.

For Mac and Linux, there is a lite version of the software ToupLite which can capture video and still images, and includes limited processing features.

The XCAMLITE4K-MINI series camera is intended to be used for the acquisition of digital images from the stereo microscope, biological microscope or online interactive teaching. The basic characteristics are listed as below:

- Sony Exmor/Starvis back-illuminated CMOS sensor
- 4K HDMI/USB multiple video outputs
- 4K/1080P auto switching according to the displayer resolution
- USB flash drive for the captured image and video storage
- Embedded XCamView for the control of the camera
- With strong ISP and other related processing functions
- ToupView/ToupLite software for PC
- ToupLite software for MAC

8.7.2 XCAMLITE4K-MINI Series Camera's Datasheet and Functions(2)

Order Code	Sensor & Size(mm)	Pixel(μm)	G Sensitivity	FPS/Resolution	Binning	Exposure(ms)
XCAMLITE4K8MPA-MINI	Sony IMX334(C) 1/1.8"(7.68x4.32)	2.0x2.0	505mv with 1/30s 0.1mv with 1/30s	30@3840*2160(HDMI) 20@3840*2160(USB)	1x1	0.04~1000
XCAMLITE4K8MPB-MINI	Sony IMX485(C) 1/1.2"(11.14x6.26)	2.9x2.9	2188mv with 1/30s 0.39mv with 1/30s	30@3840*2160(HDMI) 20@3840*2160(USB)	1x1	0.04~1000

C: Color; M: Monochrome;

Figure 8-37 Available Ports on the Back Panel of the Camera Body

Interface	Function Description
HDMI	Comply with HDMI1.4 standard. 4K or 1080P format video output for standard monitor
LED	LED status indicator
USB Mouse	Connect USB mouse for easy operation with embedded **XCamView** software
DC12V	Power adapter connection (12V/1A)
USB Video	Connect PC or other host device to realize video image transmission
USB2.0	Connect USB flash disk for capturing video and image storage
Video Output Interface	**Function Description**
HDMI Interface	Comply with HDMI1.4 standard; 30fps@4K or 30fps@1080P;
USB Video Interface	Connecting USB port of PC for video transfer ; MJPEG format video;
Other Function	**Function Description**
Video Saving	Video format：8M(3840*2160) H264/H265 encoded MP4 file; Video saving frame rate：30fps;
Image Capture	8M (3840*2160) JPEG/TIFF image in USB flash drive
Measurement Saving	Measurement information saved in layer mode with image content; Measurement information is saved together with image content in burn in mode.
ISP Function	Exposure(Automatic / Manual Exposure) / Gain，White Balance(Manual / Automatic / ROI Mode)，Sharpening，3D Denoise，Saturation Adjustment，Contrast Adjustment，Brightness Adjustment，Gamma Adjustment，Color to Gray，50HZ/60HZ Anti-flicker Function
Image Operations	Zoom In/Zoom Out, Mirror/Flip, Freeze, Cross Line, Overlay, Embedded Files Browser, Video Playback, 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 / Thai / French / German / Japanese / Italian / Russian
Software Function and Environment under USB Video Output	
White Balance	Auto White Balance
Color Technique	Ultra-Fine Color Engine
Capture/Control SDK	Windows/Linux/macOS/Android Multiple Platform SDK(Native C/C++, C#/VB.NET, Python, Java, DirectShow, Twain, etc)
Recording System	Still Picture or Movie
Operating System	Microsoft® Windows® XP / Vista / 7 / 8 / 8.1 /10(32 & 64 bit) OSx(Mac OS X) Linux
PC Requirements	CPU: Equal to Intel Core2 2.8GHz or Higher
	Memory: 4GB or More
	Ethernet Port: RJ45 Ethernet Port
	Displayer: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 Adapter

8.7.3 XCAMLITE4K-MINI Series Camera's Dimension

XCAMLITE4K-MINI Series Camera's Dimension

8.7.4 XCAMLITE4K-MINI Series Camera Packing Information

Figure 8-38 XCAMLITE4K-MINI Series Camera Packing Information

	Standard Packing List		
A	Gift box : L:25.5cm W:17.0cm H:9.0cm (1pcs,1.48kg/ box)		
B	XCAMLITE4K-MINI series camera		
C	**Power Adapter:** Input: AC 100~240V 50Hz/60Hz, Output: DC 12V 1A **American standard**: Model: POWER-U-12V1A(MSA-C1000IC12.0-12H-US) **European standard:**Model: POWER-E-12V1A(MSA-C10001C12.0-12H-DE)		
D	USB mouse		
E	HDMI cable		
F	USB2.0 A male to A male gold-plated connectors cable/2.0m		
G	CD (Driver & utilities software, Ø12cm)		
	Optional Accessory		
H	USB flash drive		
I	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
J	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 I and J 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;		
K	108015(Dia.23.2mm to 30.0mm ring)/Adapter rings for 30mm eyepiece tube		
L	108016(Dia.23.2mm to 30.5mm ring)/ Adapter rings for 30.5mm eyepiece tube		
M	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.)	

8.7.5 Extension of XCAMLITE4K-MINI Series Camera with Microscope Adapter

Extension	Picture	
C-mount Camera		Machine vision; Medical imaging; Semiconductor equipment; Test instruments; Document scanners; 2D barcode readers; Web camera and security video; Microscope imaging;
Microscope Camera	 XCAMLITE4K-MIN+AMAXXX(23.2mm Adapter) XCAMLITE4K-MIN+FMAXXX(23.2mm Adapter)	

8.7.6 Camera Working Standalone with Built-in XCamView Software

Figure 8-39 XCAMLITE4K-MINI Series Camera with the HDMI Displayer

For this application, apart from the microscope, the user only needs an XCAMLITE4K-MINI series camera, an HDMI display, an HDMI cable, an USB flash drive, a USB mouse and a power adapter that come with the camera. The steps to start the camera are listed as below:

- Connect the camera to a HDMI display using the HDMI cable;
- Insert the supplied USB mouse to the camera's USB port;
- Insert the supplied USB flash drive into the XCAMLITE4K-MINI series camera USB2.0 port;
- Connect power adapter to the camera;
- Switch on the display 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 UI will pop up and users could operate with the mouse at ease.

8.7.7 Connecting Camera to the PC with USB Port

For Windows user (Windows XP (32bit), Windows 7/8/10 (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:

- Install the ToupView/ToupLite on your PC;
- Connect power adapter to the camera the and switch it on. After starting the camera, plug one end of the Micro USB cable into the USB 2.0 port of the XCAMLITE4K-MINI series camera, and plug the other end into the USB port of the PC;
- Open ToupView/ToupLite software. The XCAMLITE4K-MINI series camera will be recognized automatically by software. In ToupView/ToupLite software, select the corresponding XCAMLITE4K-MINI series camera by clicking the camera name in the camera list.

Note:

When the Micro USB cable and the mouse are plugged into the camera at the same time, the Micro USB cable is preferred and the mouse is not available; when the Micro USB cable is unplugged, the mouse can be used normally.

8.7.8 Sample Photos Captured with XCAMLITE4K-MINI Series Camera
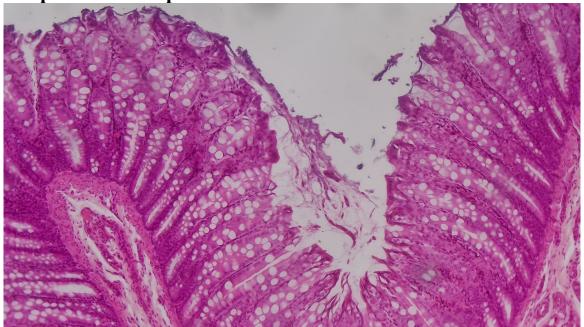
Figure 8-40 Alfalfa Stem Captured with XCAMLITE4K8MPA-MINI
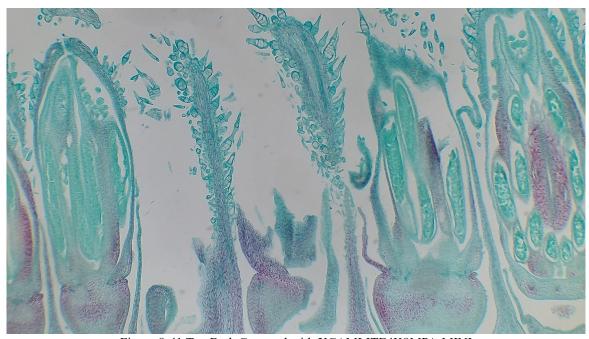
Figure 8-41 Top Bud. Captured with XCAMLITE4K8MPA-MINI

8.8 TXCAMLITE4K Series HDMI/USB Multi-outputs C-mount CMOS Camera with Touch Function(2)

8.8.1 TXCAMLITE4K Series Camera's Basic Characteristic

Figure 8-42 TXCAMLITE4K Series Camera(Square)

For details of the camera operations, please check TXCAMLITE4K_en.docx or TXCAMLITE4K_en.pdf file.

The TXCAMLITE4K series camera is the lite version live-view imaging-system with 4K resolution at 30 FPS with touch function

The TXCAMLITE4K series camera comes with Sony Exmor CMOS sensor with high sensitivity, low dark current and no smear achieved through the adoption of R, G and B primary color mosaic filters.

The camera uses a standard C-mount interface for maximum compatibility with various microscopy-systems. It can be used as a stand-alone recorder when used with an HDMI displayer, it is embedded XCamView for the contorls of the camera with touch screen or mouse. It can be also live-streamed to a PC via USB for image-capture and video-recording.

Hardware 3D denoising, sharpness and local tone mapping control functions greatly improve the image and video quality.

The included Windows software ToupView offers image-development and measurement tools, as well as advanced compositing features such as image-stitching and extended-depth-of-focus. With the ability to calibrate scales at multiple magnifications, the software can be used for multi-level inspection.

For Mac and Linux, there is a lite version of the software ToupLite which can capture video and still images, and includes limited processing features.

The TXCAMLITE4K series camera is intended to be used for the acquisition of digital images from the stereo microscope, biological microscope or online interactive teaching. The basic characteristics are listed as below:

- Sony Exmor/STARVIS back illuminated CMOS sensor
- 4K HDMI/USB multiple video outputs
- 4K/1080P auto switching according to the display resolution
- SD card/USB flash drive for the captured image and video storage, support local preview and playback
- Embedded XCamView for the contorls of the camera with touch screen or mouse
- The touch or mouse control mode can be switched
- With strong ISP and other related processing functions
- ToupView/ToupLite software for PC

8.8.2 TXCAMLITE4K Series Camera's Datasheet and Functions(2)

Order Code	Sensor & Size(mm)	Pixel(μm)	G Sensitivity	FPS/Resolution	Binning	Exposure(ms)
TXCAMLITE4K8MPA	Sony IMX334(C) 1/1.8"(7.68x4.32)	2.0x2.0	505mv with 1/30s 0.1mv with 1/30s	30@3840*2160(HDMI) 20@3840*2160(USB)	1x1	0.04~1000
TXCAMLITE4K8MPB	Sony IMX485(C) 1/1.2"(11.14x6.26)	2.9x2.9	2188mv with 1/30s 0.39mv with 1/30s	30@3840*2160(HDMI) 20@3840*2160(USB)	1x1	0.04~1000

C: Color; M: Monochrome;

Figure 8-43 Available Ports on the Back Panel of the Camera Body

Interface	Function Description
USB Mouse	If the touch function is used, this interface does not need to be connected, and the XCamView software is directly controlled by touching; If the interface is switched to the mouse operation mode, the USB mouse interface can be connected for the control of the built-in XCamView software
USB Video	Connect PC or other host device to realize video image transmission
HDMI	Comply with HDMI1.4 standard. 4K or 1080P format video output for standard monitor
DC12V	Power adapter connection (12V/1A or 12V/2A)
SD	Comply with SDIO3.0 standard and SD card could be inserted for video and images storage
USB	In touch mode, using USB Type-A to Type-C cable to connect with touch screen ; In mouse mode, USB Flash Drive can be inserted.
LED	LED status indicator
ON/OFF	Power switch
Video Output Interface	**Function Description**
HDMI Interface	Comply with HDMI1.4 standard 30fps@4K or 30fps@1080P
USB Video Interface	Connecting USB port of PC for video transfer MJPEG format video
Other Function	**Function Description**
Video Saving	Video format：8M(3840*2160) H264/H265 encoded MP4 file Video saving frame rate：30fps
Image Capture	8M (3840*2160) JPEG/TIFF image in SD card or USB flash drive
Measurement Saving	Measurement information saved in layer mode with image content Measurement information is saved together with image content in burn in mode
ISP Function	Exposure(Automatic / Manual Exposure) / Gain， White Balance(Manual / Automatic / ROI Mode)，Sharpening， 3D Denoise， Saturation Adjustment， Contrast Adjustment， Brightness Adjustment， Gamma Adjustment， 50HZ/60HZ Anti-flicker Function
Image Operations	Zoom In/Zoom Out, Mirror/Flip, Freeze, Embedded Files Browser, Video Playback, 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 / Thai / French / German / Japanese / Italian / Russian
Software Function and Environment under USB Video Output	
White Balance	Auto White Balance
Color Technique	Ultra-Fine^{TM} Color Engine
Capture/Control SDK	Windows/Linux/macOS/Android Multiple Platform SDK(Native C/C++, C#/VB.NET, Python, Java, DirectShow, Twain, etc)
Recording System	Still Picture or Movie
Operating System	Microsoft® Windows® XP / Vista / 7 / 8 / 8.1 /10 /11(32 & 64 bit) OSx(Mac OS X) Linux
PC Requirements	CPU: Equal to Intel Core2 2.8GHz or Higher
	Memory: 4GB or More
	Ethernet Port: RJ45 Ethernet Port

	Displayer: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 Adapter or DC 12V/2A Adapter

8.8.3 TXCAMLITE4K Series Camera's Dimension

TXCAMLITE4K Series Camera's Dimension

8.8.4 TXCAMLITE4K Series Camera Packing Information

Figure 8-44 TXCAMLITE4K Series Camera Packing Information

	Standard Packing List
A	Gift box : L:33cm W:21.5cm H:6.8cm
B	4K or 1080P touch screen
C	TXCAMLITE4K series camera
D	**Power Adapter:** Input: AC 100~240V 50Hz/60Hz, Output: DC 12V 1A **American standard**: Model: POWER-U-12V1A(MSA-C1000IC12.0-12H-US) **European standard:**Model: POWER-E-12V1A(MSA-C10001C12.0-12H-DE) OR **Power Adapter:** Input: AC 100~240V 50Hz/60Hz, Output: DC 12V 2A **American standard**: Model: POWER-12V2A(MX24Z1-1202000) + American standard plug **European standard:**Model: POWER-12V2A(MX24Z1-1202000) + European standard plug
E	USB2.0 Type A to Type C data cable /0.5M (Adapt to the situation that the screen is relatively close to the camera)
F	USB2.0 Type A to Type C data cable/1.5M (Adapt to the situation that the screen is far away from the camera)
G	HDMI data cable/0.5M (Adapt to the situation that the screen is relatively close to the camera)
H	HDMI data cable /1.5M (Adapt to the situation that the screen is far away from the camera)
I	USB2.0 A male to A male data cable /2.0M
J	USB Mouse
K	CD (Driver & utilities software, Ø12cm)
	Optional Accessory
L	SD card(16G or above; speed: class 10)
M	USB 3.0 Flash Drive(32G or above)
N	Adjustable lens adapter(Not shown)	C-Mount to Dia.23.2mm eyepiece tube (Please choose 1 of them for your microscope)	108001/AMA037 108002/AMA050 108003/AMA075
O	Fixed lens adapter(Not shown)	C-Mount to Dia.23.2mm eyepiece tube (Please choose 1 of them for your microscope)	108005/FMA037 108006/FMA050 108007/FMA075
	Note: For N and O 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;		
P	108015(Dia.23.2mm to 30.0mm ring)/Adapter rings for 30mm eyepiece tube (Not shown)
Q	108016(Dia.23.2mm to 30.5mm ring)/ Adapter rings for 30.5mm eyepiece tube(Not shown)
R	Calibration kit(Not shown)	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.)

8.8.5 Extension of TXCAMLITE4K Series Camera with Microscope Adapter

Extension	Picture	
C-mount Camera		Machine vision; Medical imaging; Semiconductor equipment; Test instruments; Document scanners; 2D barcode readers; Web camera and security video; Microscope imaging;
Microscope Camera	 TXCAMLITE4K+AMAXXX(23.2mm Adapter) TXCAMLITE4K+FMAXXX(23.2mm Adapter)	

8.8.6 Connection Modes of TXCAMLITE4K Series Camera

TPS-210A50(Stand) + TZM0480(0.4X~8X Monocular Zoom Objective) + TXCMLITE4K(HDMI/USB Output CMOS Camera with Touch Function) + Touch Screen, the Touch Screen Can Be Tilted on the Table Through Its Own Stand (Long HDMI Cable and USB Type A To Type C Data Cable Are Required To Connect the Camera and Touch Screen)

TPS-210A50(Stand)+TZM0480（0.4x-8.0x Monocular Zoom Objective）+TXCAMLITE4K Camera(HDMI/USB Output CMOS Camera with Touch Function)+Touch Screen, the Touch Screen Is Fixed on the Fixing Block at the Front of the Camera through the Mounting Hole on the Built-in Bracket (Front View, Short HDMI Cable and USB Type A to Type C Data Cable Can Be Used to Connect the Camera and Touch Screen)

TPS-210A50(Stand)+TZM0480（0.4x-8.0x Monocular Zoom Objective）+TXCAMLITE4K Camera(HDMI/USB Output CMOS Camera with Touch Function)+Touch Screen, the Touch Screen Is Fixed on the Fixing Block at the Front of the Camera through the Mounting Hole on the Built-in Bracket (Left side View, Short HDMI Cable and USB Type A to Type C Data Cable Can Be Used to Connect the Camera and Touch Screen)

TPS-210A50-G(Stand)+TZM0480（0.4x-8.0x Monocular Zoom Objective）+TXCAMLITE4K Camera(HDMI/USB Output CMOS Camera with Touch Function)+Touch Screen, the Touch Screen Is Fixed on the Cross Bar of Stand through the Mounting Hole on the Built-in Bracket (Front View, Short HDMI Cable and USB Type A to Type C Data Cable Can Be Used to Connect the Camera and Touch Screen)

8.8.7 Sample Photos Captured with TXCAMLITE4K Series Camera
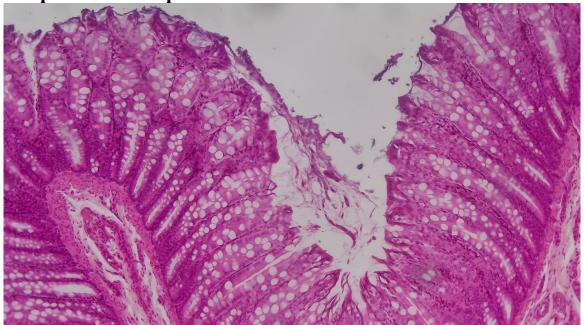
Figure 8-45 Alfalfa Stem Captured with TXCAMLITE4KA8MPA
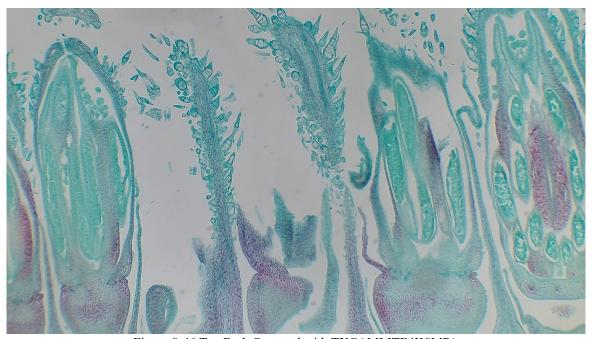
Figure 8-46 Top Bud. Captured with TXCAMLITE4K8MPA

8.9   XCAM1080PX Series C-mount HDMI+USB Output CMOS Camera(3)

8.9.1 XCAM1080PX Series Camera's Basic Characteristic

XCAM1080PX series camera is a multiple interfaces (HDMI+USB2.0+SD card, so X here means multiple interfaces) CMOS camera and it adopts ultra-high performance Sony IMX385 or 415 CMOS sensor as the image-picking device. HDMI+USB2.0 are used as the data transfer interface to HDMI display or computer.

For HDMI output, The XCamView will be loaded and a camera control panel and toolbar are overlaid on the HDMI dsiplayer, in this case, the USB mouse can be used to set the camera, browse and compare the captured image, play the video ital.

For USB2.0 output, unplug the mouse and plug in the USB2.0 cable to the camera and computer, then the video stream can be transfer to computer with the advanced software ToupView/ToupLite.

The included Windows software ToupView offers image-development and measurement tools, as well as advanced compositing features such as image-stitching and extended-depth-of-focus. With the ability to calibrate scales at multiple magnifications, the software can be used for multi-level inspection. Its lite version is ToupLite.

For Mac and Linux, there is a lite version of the software ToupLite which can capture video and still images, and includes limited processing features.

The XCAM1080PX series camera's basic characteristic is as follows:

- All in 1(HDMI+USB+SD card) C-mount camera with Sony high sensitivity CMOS sensor;
- Simultaneous HDMI & USB output;
- Built-in mouse control;
- Built-in image capture & video record to SD card;
- Built-in camera control panel, including exposure(manual/auto)/gain, white balance(lockable), color adjustment, sharpness and denoising control;
- Built-in toolbar including zoom, mirror, comparison, freeze, cross, browser functions;
- Built-in image & video browsing, display & play;
- Ultra-Fine color engine with perfect color reproduction capability(USB2.0);
- Support standard UVC for Windows/Linux/Mac(USB);
- With advanced video & image processing application ToupView, which including professional image processing such as 2D measurement, HDR, image stitching, EDF(Extended Depth of Focus), image segmentation & count, image stacking, color composite and denoising(USB). ToupLite for the control of the camera and simple image processing and video playback;
- With ToupLite to control the camera and capture video or still images, which includes limited processing features;
- CNC precision machining shell;

The possible applications of XCAM1080PX series camera are as follows:

- Scientific research, education (teaching, demonstration and academic exchanges);
- Digital laboratory, medical research;
- Industrial visual (PCB examination, IC quality control);
- Medical treatment (pathological observation);
- Food (microbial colony observation and counting);
- Aerospace, military (high sophisticated weapons);

8.9.2 XCAM1080PX series camera Datasheet(3)

Order Code	Sensor & Size(mm)	Pixel(μm)	G Sensitivity Dark Signal	FPS/Resolution	Binning	Exposure
XCAM1080P2MPA	Sony IMX385(C) 1/2"(7.2x4.05)	3.75x3.75	1175mv with 1/30s 0.15mv with 1/30s	60@1920*1080(HDMI) 50@1920*1080(USB)	1x1	0.04~1000
~~XCAM1080P8MPA~~ ~~(Suspended)~~	~~Sony IMX334(C)~~ ~~1/1.8"(7.68x4.32)~~	~~2.0x2.0~~	~~505mv with 1/30s~~ ~~0.1mv with 1/30s~~	~~60@1920*1080(HDMI)~~ ~~30@3840*2160(USB)~~	~~1x1~~	~~0.04~1000~~
XCAM1080P8MPB	Sony IMX415(C) 1/2.8"(5.57x3.13)	1.45x1.45	300mv with 1/30s 0.13mv with 1/30s	30@1920*1080(HDMI) 30@3840*2160(USB)	1x1	0.04~1000

C: Color; M: Monochrome;

Interface	Function Description
USB Mouse	Connect USB mouse for easy operation with embedded XCamView software;
USB Video	Connect PC or other host device to realize video image transmission;
HDMI	Comply with HDMI1.4 standard. 1080P format video output for standard displayer;
USB	Connect USB flash drive for capturing video and image storage;
SD	Comply with SDIO3.0 standard and SD card could be inserted for video and images storage;
LED	LED status indicator;
DC12V	Power adapter connection (12V/1A);
ON/OFF	Power switch;

Video Output Interface	Function Description
HDMI Interface	Comply with HDMI1.4 standard; 60fps@1080P;
USB Video Interface	Connecting USB port of PC for video transfer ; MJPEG format video;

Function Name	Function Description
Video Saving	Video format：1920*1080 H264/H265 encoded MP4 file; Video saving frame rate：60fps(XCAM1080P2MPA/XCAM1080P8MPA(Suspended)); 30fps(XCAM1080P8MPB)
Image Capture	2M (1920*2160, XCAM1080P2MPA) JPEG/TIFF image in SD card ; 8M (3840*2160, XCAM1080P8MPA/XCAM1080P8MPB) JPEG/TIFF image in SD card ;
Measurement Saving	Measurement information saved in layer mode with image content; Measurement information is saved together with image content in burn in mode.
ISP Function	Exposure(Automatic / Manual Exposure) / Gain， White Balance(Manual / Automatic / ROI Mode)， Sharpening， 3D Denoise， Saturation Adjustment， Contrast Adjustment， Brightness Adjustment， Gamma Adjustment， Color to Gray， 50HZ/60HZ Anti-flicker Function
Image Operations	Zoom In/Zoom Out, Mirror/Flip, Freeze, Cross Line, Overlay, Embedded Files Browser, Video Playback, 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 / Thai / French / German / Japanese / Italian / Russian

Software Environment under USB Video Output	
White Balance	Auto White Balance
Color Technique	Ultra-Fine Color Engine
Capture/Control SDK	Windows/Linux/macOS/Android Multiple Platform SDK(Native C/C++, C#/VB.NET, Python, Java, DirectShow, Twain, etc)

Recording System	Still Picture or Movie
Operating System	Microsoft® Windows® XP / Vista / 7 / 8 / 8.1 /10(32 & 64 bit) OSx(Mac OS X) Linux
PC Requirements	CPU: Equal to Intel Core2 2.8GHz or Higher
	Memory: 4GB or More
	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 Adapter

8.9.3 Dimension of XCAM1080PX Series Camera

Dimension of XCAM1080PX Series Camera

8.9.4 Packing Information for XCAM1080PX Series Camera

Packing Information of XCAM1080PX Series Camera

	Standard Packing List		
A	Gift box: L:25.5cm W:17.0cm H:9.0cm (1pcs,1.47kg/ box)		
B	One XCAM1080PX series camera		
C	Power Adapter: Input: AC 100~240V 50Hz/60Hz, Output: DC 12V 1A **European standard**: Model:GS12E12-P1I 12W/12V/1A; TUV(GS)/CB/CE/ROHS **American standard**: Model: GS12U12-P1I 12W/12V/1A: UL/CUL/BSMI/CB/FCC EMI Standard:EN55022,EN61204-3, EN61000-3-2,-3, FCC Part 152 class B, BSMI CNS14338 EMS Standard:EN61000-4-2,3,4,5,6,8,11,EN61204-3,Class A Light Industry Standard		
D	USB Mouse		
E	HDMI cable		
F	USB2.0 A male to A male gold-plated connectors cable /2.0m		
G	CD (Driver & utilities software, Ø12cm)		
	Optional Accessory		
H	SD card(16G or above; Speed: class 10)		
I	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
J	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 K and L 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;		
K	108015(Dia.23.2mm to 30.0mm ring)/Adapter rings for 30mm eyepiece tube		
L	108016(Dia.23.2mm to 30.5mm ring)/ Adapter rings for 30.5mm eyepiece tube		
M	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.)	

8.9.5 Extension of XCAM1080PX Series Camera with Microscope

Extension	Picture
C-mount Camera	 Machine vision; Medical imaging; Semiconductor equipment; Test instruments; Document scanners; 2D barcode readers; Web camera and security video; Microscope imaging;
Microscope Camera	 XCAM1080PX+AMAXXX(23.2mm Adapter) XCAM1080PX+FMAXXX(23.2mm Adapter)

8.10 XCAM1080PHX C-mount HDMI+WiFi Output CMOS Camera

8.10.1 XCAM1080PHX's Basic Characteristic

XCAM1080PHX is a multiple interfaces (HDMI+WiFi+SD card, X here means multiple interfaces) CMOS camera and it adopts ultra-high performance Sony CMOS sensor as the image-picking device. HDMI+WiFi are used as the data transfer interface to HDMI display or computer.

For HDMI output, The XCamView will be loaded and a camera control panel and toolbar are overlaid on the HDMI screen, in this case, the USB mouse can be used to set the camera, browse and compare the captured image, play the video ital.

For WiFi output, unplug the mouse and plug in the USB WiFi adapter, connect the computer WiFi to the camera, then the video stream can be transfer to computer with the advanced software ToupView. With ToupView, you can control the camera, process the image as ToupTek's other USB series camera.

The XCAM1080PHX's basic characteristic is as follows:

- C-mount CMOS camera with Sony high sensitivity sensor
- HDMI+WiFi outputs at the same time
- HDMI output can be controlled by XCamView through the USB mouse
- WiFi output can be enabled with wireless network USB adapter，and can be controlled with ToupView/ToupLite application
- Ultra-Fine Color Engine with perfect color reproduction capability(WiFi)
- 5.04M resolution image(2592*1944 XCAM1080PHB) or 2.0M resolution image(1920*1080 XCAM1080PHD/PHE(Global Shutter for PHE)) can be captured and saved for browsing; For video, 1080P video stream(asf format) can be captured and saved
- Windows/Linux/OSX multiple platform SDK
- CNC housing
- Can be used for industrial inspection, education and research, materials analysis, precision measurement, medical analyses etc.

The possible applications of XCAM1080PHX are as follows:

- Scientific research, education (teaching, demonstration and academic exchanges);
- Digital laboratory, medical research;
- Industrial visual (PCB examination, IC quality control);
- Medical treatment (pathological observation);
- Food (microbial colony observation and counting);
- Aerospace;

8.10.2 XCAM1080PHX Datasheet(3)

Order Code	Sensor & Size(mm)	Pixel(μm)	G Sensitivity Dark Signal	FPS/Resolution	Binning	Exposure
XCAM1080PHB **XP1080B**	1080P/5M/Sony IMX178(C) 1/1.8"(6.22x4.67)	2.4x2.4	425mv with 1/30s 0.15mv with 1/30s	30@1920*1080(HDMI) 25@1920*1080(WiFi)	1x1	0.03ms~918ms
XCAM1080PHD **XP1080D**	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@1920*1080(WiFi)	1x1	0.06ms~918ms
XCAM1080PHE **XP1080E**	Sony IMX249(C,**GS**) 1/1.2"(11.25x6.33)	5.86*5.86	1016mv with 1/30s 0.15mv with 1/30s	30@1920*1080(HDMI) 25@1920*1080(WiFi)	1x1	0.043ms~1000ms

C: Color; M: Monochrome;

XCAM1080PHE adopt large Sony global shutter CMOS sensor which is a best replacement of traditional CCD video camera

Interface & Button Functions	
USB	USB Mouse/USB WiFi Adapter
HDMI	HDMI Output
DC12V	12V Power in
SD	SD Card Slot
ON/OFF	Power On/off Switch
LED	Power Indicator
Other Specification for HDMI Output	
UI Operation	With USB Mouse to Operate on the Embedded XCamView
Image Capture	JPEG Format with 5M Resolution (2592*1944) in SD Card(8G) (**XAM1080PHB**) JPEG Format with 2M Resolution in SD Card (**XCAM1080PHD/PHE**(**Global Shutter for PHE**))
Video Record	ASF Format 1080P 30fps in SD Card(8G)
Camera Control Panel	Including Exposure, Gain, White Balance, Color Adjustment, Sharpness and Denoising Control
Toolbar	Including Zoom, Mirror, Comparison, Freeze, Cross, Browser Function, Muti-language and XCamView Version Information
Other Specification for WiFi Output	
UI Operation	ToupView or ToupLite on Windows/Linux/OSX/Android Platform
WiFi Performance	802.11n 150Mbps; RF Power 20dBm(Maximum)
Maximum Connected Devices	3~6(According to the Environment and Connection Distance)
White Balance	Auto White Balance
Color Technique	Ultra-Fine Color Engine (WiFi)
Capture/Control SDK	Windows/Linux/macOS/Android Multiple Platform SDK(Native C/C++, C#/VB.NET, Python, Java, DirectShow, Twain, etc) (WiFi)
Recording System	Still Picture or Movie (WiFi)
Software Environment (for USB2.0 Connection)	
Operating System	Microsoft® Windows® XP / Vista / 7 / 8 / 8.1/10(32 & 64 bit) OSx(Mac OS X) Linux
PC Requirements	CPU: Equal to Intel Core2 2.8GHz or Higher
	Memory:4GB or More

	USB Port:USB2.0 High-speed Port(As Power Only, not as the USB Data Transfer)
	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 Adapter

8.10.3 XCAM1080PHX and Microscope
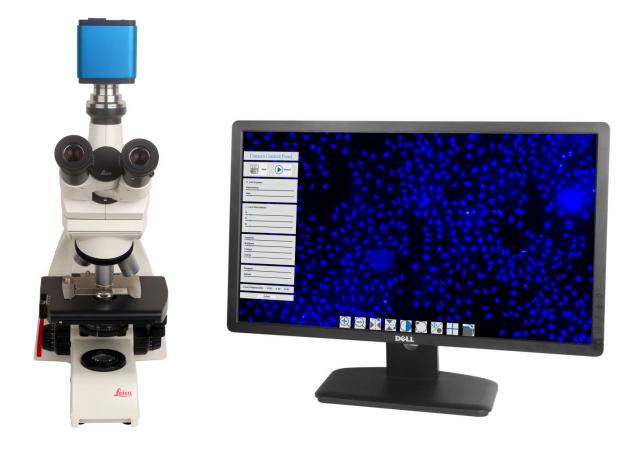
XCAM1080PHX and Its Back Panel

Different Views of XCAM1080PHX

XCAM1080PHX and Microscope

XCAM1080PHX+ Microscope+Display

XCamView UI for Mouse Control

8.10.4 Dimension of XCAM1080PHX Series Camera

Dimension of XCAM1080PHX Series Camera

8.10.5 Packing Information for XCAM1080PHX Series Camera

Packing information of XCAM1080PHX Series Camera

	Standard Packing List			
A	Gift box : L:25.5cm W:17.0cm H:9.0cm (1pcs, 1.43Kg/ box)			
B	XCAM1080PHB or XCAM1080PHD or XCAM1080PHE camera			
C	Power Adapter: Input: AC 100~240V 50Hz/60Hz, Output: DC 12V 1A **American standard:** Model: GS12U12-P1I 12W/12V/1A: UL/CUL/BSMI/CB/FCC EMI Standard:EN55022,EN61204-3, EN61000-3-2,-3, FCC Part 152 class B, BSMI CNS14338 EMS Standard:EN61000-4-2,3,4,5,6,8,11,EN61204-3,Class A Light Industry Standard **European standard:**Model:GS12E12-P1I 12W/12V/1A; TUV(GS)/CB/CE/ROHS EMI Standard:EN55022,EN61204-3, EN61000-3-2,-3, FCC Part 152 class B, BSMI CNS14338 EMS Standard:EN61000-4-2,3,4,5,6,8,11,EN61204-3,Class A Light Industry Standard			
D	HDMI cable			
E	USB mouse			
F	Wireless network adapter with USB interface			
G	CD (Driver & utilities software, Ø12cm)			
	Optional Accessory			
H	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	
		C-Mount to Dia.31.75mm eyepiece tube (Please choose 1 of them for your telescope)	108008/ATA037 108009/ATA050 108010/ATA075	
I	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	
		C-Mount to Dia.31.75mm eyepiece tube (Please choose 1 of them for your telescope)	108011/FTA037 108012/FTA050 108013/FTA075	
	Note: For H and I 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;			
J	108015(Dia.23.2mm to 30.0mm ring)/Adapter rings for 30mm eyepiece tube			
K	108016(Dia.23.2mm to 30.5mm ring)/ Adapter rings for 30.5mm eyepiece tube			
L	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.)		
M	SD card(4G or 8G)			

8.10.6 Extension of XCAM1080PHX with Microscope or Telescope Adapter

Extension	Picture
C-mount Camera	Machine vision; Medical imaging; Semiconductor equipment; Test instruments; Document scanners; 2D barcode readers; Web camera and security video; Microscope imaging;
Microscope Camera	XCAM1080PHX+AMAXXX(23.2mm Adapter) XCAM1080PHX+FMAXXX(23.2mm Adapter)
Telescope Camera	XCAM1080PHX+ATAXXX(31.75mm Adapter) XCAM1080PHX+FTAXXX(31.75mm Adapter)

8.11 OCAM Series HDMI C-mount CMOS Camera

8.11.1 OCAM Series Camera's Basic Characteristic

Figure 8-47 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

8.11.2 OCAM Series Camera's 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 8-48 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

8.11.3 Dimension of OCAM Series Camera
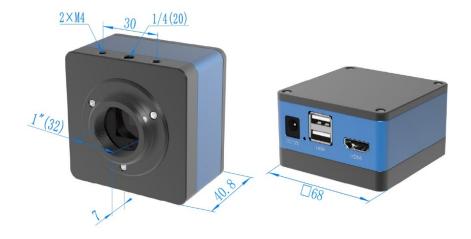
Figure 8-49 Dimension of OCAM Series
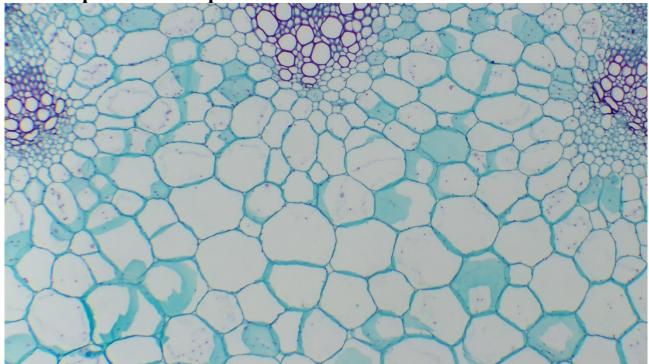
8.11.4 Packing Information for OCAM Series Camera
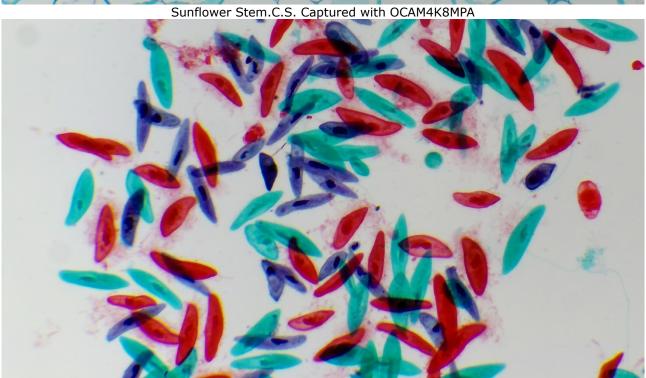
Figure 8-50 OCAM Series HDMI Camera Packing Information
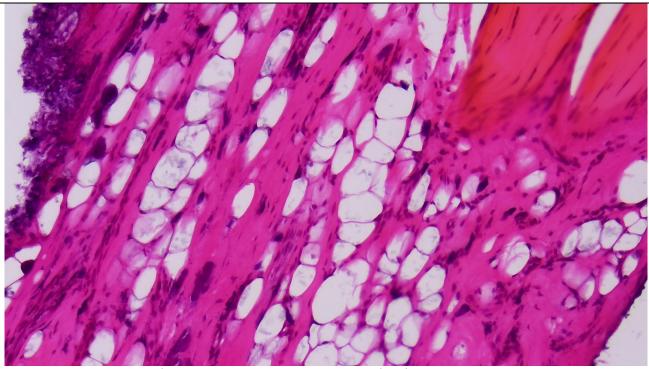
	Standard Packing List
A	Gift box: L:18.4cm W:17.8cm H:8.1cm
B	OCAM Camera (pls specify which model you want)
C	Power Adapter: Input: AC 100~240V 50Hz/60Hz, Output: DC 12V 1A **American standard**: Model: POWER-U-12V1A(MSA-C1000IC12.0-12W-US) **European standard**: Model: POWER-E-12V1A(MSA-C10001C12.0-12W-DE)
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.)

8.11.5 Sample Photos Captured with OCAM Series Camera

Sunflower Stem.C.S. Captured with OCAM4K8MPA
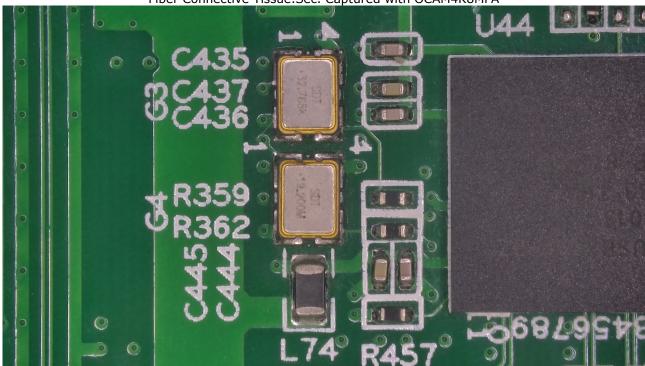
Paramecium.WM. Captured with OCAM4K8MPA

Fiber Connective Tissue.Sec. Captured with OCAM4K8MPA

Circuit Board Captured with OCAM4K8MPA

8.12 XCAMLITE1080P Series HDMI C-mount CMOS Camera

8.12.1 XCAMLITE1080P Series Camera's Basic Characteristic

Figure 8-51 XCAMLITE1080P Series Camera

For details of the camera operations, please check XCAMLITE1080P_en.pdf or XCAMLITE1080P_en.pdf file.

The XCAMLITE1080P series camera is intended to be used for the acquisition of digital images from the stereo microscope, biological microscope or online interactive teaching. The basic characteristic is listed as below:

- Sony Starvis back illuminated CMOS sensor
- 1080P HDMI video outputs
- SD card for the captured image and video storage
- Embedded XCamView for the control of the camera
- With strong ISP and other related processing functions

8.12.2 XCAMLITE1080P Series Camera's Datasheet and Functions(1)

Order Code	Sensor & Size(mm)	Pixel(μm)	G Sensitivity	FPS/Resolution	Binning	Exposure(ms)
XCAMLITE1080PA XPLITE1080PA	Sony IMX307(C) 1/2.8"(5.57x3.13)	2.9x2.9	1300mv with 1/30s	60@1920*1080(HDMI)	1x1	0.01~1000

C: Color; M: Monochrome;
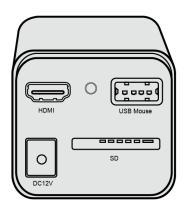
Figure 8-52 Available Ports on the Back Panel of the Camera Body

Interface and Button	Function Description
HDMI	Comply with HDMI1.4 standard. 1080P format video output for standard FHD displayer
LED	LED status indicator
USB Mouse	Connect USB mouse for easy operation with embedded XCamView software
DC12V	Power adapter connection (12V/1A)
SD	Comply with SDIO3.0 standard and SD card could be inserted for video and images storage
Video Output Interface	Function Description
HDMI Interface	Comply with HDMI1.4 standard; 60fps@1080P
Other Function	Function Description

Video Saving	Video format：2M(1920*1080) H264 encoded MP4 file； Video saving frame rate：50~60fps (related with SD card performance);
Image Capture	2M (1920*1080) JPEG image in SD card
Measurement Saving	Measurement information saved in different layer with image content; Measurement information is saved together with image content in burn in mode.
ISP Function	Exposure(Automatic / Manual Exposure) / Gain，White Balance(Manual / Automatic / ROI Mode)，Sharpening，3D Denoise，Saturation Adjustment，Contrast Adjustment，Brightness Adjustment，Gamma Adjustment，Color to Gray，50HZ/60HZ Anti-flicker Function
Image Operations	Zoom In/Zoom Out, Mirror/Flip, Freeze, Cross Line, Overlay, Embedded Files Browser, Video Playback, 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 / Thai / French / German / Japanese / Italian / Russian
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
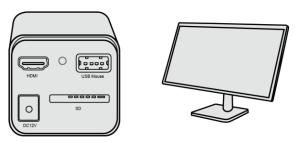
8.12.3 XCAMLITE1080P Series Camera's Application Configurations

For HDMI application, apart from the microscope, user only need an HDMI displayer, the supplied USB mouse and the camera embedded XCamView software. The steps to start the camera are listed as below:

Figure 8-53 XCAMLITE1080P Series Camera with HDMI Displayer

● Connect the camera to a HDMI displayer using HDMI cable;

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

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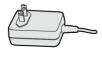
- Insert the supplied SD card into HDMI camera SD card slot;

- Connect the camera to the DC 12V power adapter and switch it on;

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

8.12.4 XCAMLITE1080P Series Camera's Packing Information

Figure 8-54 XCAMLITE1080P Series Camera's Packing Information(Square and Cylinder-shaped)

	Standard Packing List		
A	Gift box : L:17.4cm W:17.4cm H:7.6cm (1pcs,0.54kg/ box)		
B	A XCAMLITE1080P series camera		
C	**Power Adapter**: Input: AC 100~240V 50Hz/60Hz, Output: DC 12V 1A **American standard**: Model: GS12U12-P1I 12W/12V/1A: UL/CUL/BSMI/CB/FCC **European standard**:Model:GS12E12-P1I 12W/12V/1A; TUV(GS)/CB/CE/ROHS EMI standard:EN55022,EN61204-3, EN61000-3-2,-3, FCC Part 152 class B, BSMI CNS14338 EMS standard:EN61000-4-2,3,4,5,6,8,11,EN61204-3, class A light industry standard		
D	HDMI cable		
E	USB mouse/USB wireless mouse		
	Optional Accessory		
F	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
G	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 F and G 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;		

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H	108015(Dia.23.2mm to 30.0mm ring)/Adapter rings for 30mm eyepiece tube	
I	108016(Dia.23.2mm to 30.5mm ring)/ Adapter rings for 30.5mm eyepiece tube	
J	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.)
K	SD card	

8.12.5 Sample Photos Captured with XCAMLITE1080P Series Camera
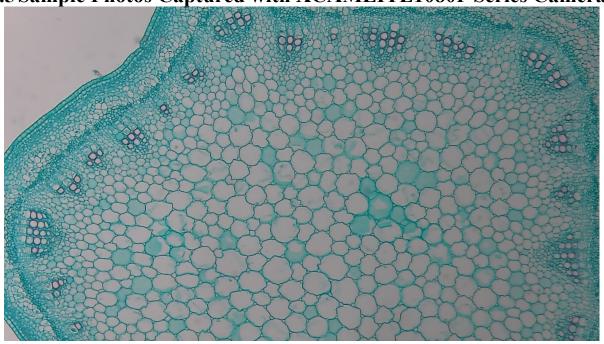
Figure 8-55 Alfalfa Stem Captured with XCAMLITE1080PA

Figure 8-56 Top Bud. Captured with XCAMLITE1080PA

8.13 XCAM1080PHA Series C-mount HDMI+USB Output CMOS Camera (1) (Discontinued)

8.13.1 XCAM1080PHA Series Camera's Basic Characteristic

XCAM1080PHA series camera is a multiple interfaces (HDMI+USB2.0+SD card, so X here means multiple interfaces) CMOS camera and it adopts ultra-high performance Sony IMX236 CMOS sensor as the image-picking device. HDMI+USB2.0 are used as the data transfer interface to HDMI displayer or computer.

For HDMI output, The XCamView will be loaded and a camera control panel and toolbar are overlaid on the HDMI screen, in this case, the USB mouse can be used to set the camera, browse and compare the captured image, play the video ital.

For USB2.0 output, unplug the mouse and plug in the USB2.0 cable to the camera and computer, then the video stream can be transfer to computer with the advanced software ToupView/ToupLite.

The included Windows software ToupView offers image-development and measurement tools, as well as advanced compositing features such as image-stitching and extended-depth-of-focus. With the ability to calibrate scales at multiple magnifications, the software can be used for multi-level inspection. Its lite version is ToupLite.

For Mac and Linux, there is a lite version of the software ToupLite which can capture video and still images, and includes limited processing features.

The XCAM1080PHA series camera's basic characteristic is as follows:

- All in 1(HDMI+USB+SD card) C-mount camera with Sony high sensitivity CMOS sensor;
- Simultaneous HDMI & USB output;
- CNC precision machining shell;
- Built-in mouse control;
- Built-in image capture & video record to SD card;
- Built-in camera control panel, including exposure(manual/auto)/gain, white balance(lockable), color adjustment, sharpness and denoising control;
- Built-in toolbar including zoom, mirror, comparison, freeze, cross, browser functions;
- Built-in image & video browsing, display & play;
- Ultra-Fine color engine with perfect color reproduction capability(USB);
- With advanced video & image processing application ToupView, which including professional image processing such as 2D measurement, HDR, image stitching, EDF(Extended Depth of Focus), image segmentation & count, image stacking, color composite and denoising(USB). ToupLite for the control of the camera and simple image processing and video playback;
- With ToupLite to control the camera and capture video or still images, which includes limited processing features;
- CNC precision machining shell;

The possible applications of XCAM1080PHA series camera are as follows:

- Scientific research, education (teaching, demonstration and academic exchanges);
- Digital laboratory, medical research;
- Industrial visual (PCB examination, IC quality control);
- Medical treatment (pathological observation);
- Food (microbial colony observation and counting);
- Aerospace, military (high sophisticated weapons);

8.13.2 XCAM1080PHA Series Camera's Datasheet(1)

Order Code	Sensor & Size(mm)	Pixel(μm)	G Sensitivity Dark Signal	FPS/Resolution	Binning	Exposure
XCAM1080PHA XP1080A	1080P/Sony IMX236 1/2.8"(5.38x3.02)	2.8x2.8	510 mv with 1/30s 0.15 mv with 1/30s	30@1920*1080P(HDMI) 30@1920*1080(USB)	1x1	0.1ms~999ms

C: Color; M: Monochrome;

Interface & Button Functions		
	USB	USB Camera or USB Mouse
	HDMI	HDMI Output
	DC12V	12V Power in
	SD	SD Card Slot
	ON/OFF	Power On/off Switch

Other Specification for HDMI Output		
UI Operation		With USB Mouse
Image Capture	HDMI	1080P/8M/15M Resolution, JPEG or TIFF Format in SD Card(8G or above)
	USB	1080P/8M/15M Resolution in Computer
Video Record	HDMI	30fps@1080P (avi) in SD Card(8G)
	USB	30fps@1080P (avi) in Computer
Camera Control Panel		Including Exposure, Gain, White Balance, Color Adjustment, Sharpness and Denoising Control
Toolbar		Including Zoom, Mirror, Comparison, Freeze, Cross, Browser Function

Other Specification for USB Output	
White Balance	Auto White Balance
Color Technique	Ultra-Fine Color Engine (USB)
Capture/Control SDK	Standard UVC for Windows/Linux/macOS(USB)
Recording System	Still Picture or Movie (USB)

Software Environment (for USB2.0 Connection)	
Operating System	Microsoft® Windows® XP / Vista / 7 / 8 / 8.1 /10(32 & 64 bit) OSx(Mac OS X) Linux
PC Requirements	CPU: Equal to Intel Core2 2.8GHz or Higher
	Memory:4GB or More
	USB Port:USB2.0 High-speed 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 Adapter

8.13.3 XCAM1080PHA Series Camera's and Microscope
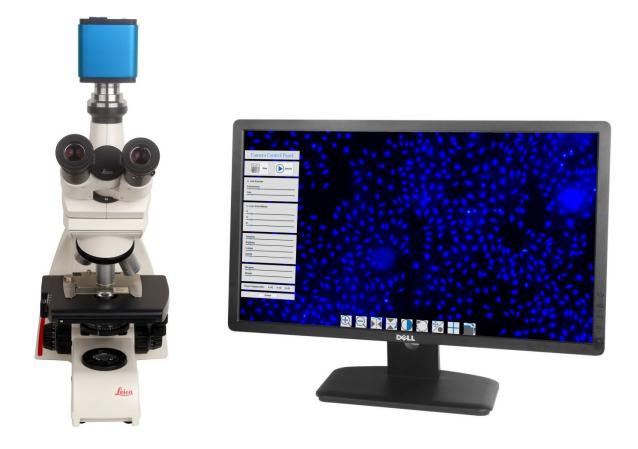
XCAM1080PHA Series Camera and Its Back Panel
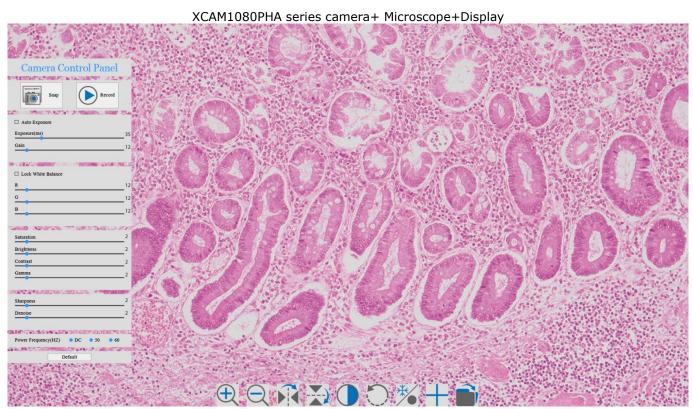
Different Views of XCAM1080PHA Series Camera

XCAM1080PHA Series Camera and Microscope

XCAM1080PHA series camera+ Microscope+Display

XCamView UI for Mouse Control

8.13.4 Dimension of XCAM1080PA Series Camera

Dimension of XCAM1080PHA Series Camera

8.13.5 Packing Information for XCAM1080PHA Series Camera

Packing Information of XCAM1080PHA Series Camera

Standard Packing List	
A	Gift box : L:25.5cm W:17.0cm H:19.0cm (1pcs, 1.55kg/ box)
B	One XCAM1080PHA series camera
C	Power Adapter: Input: AC 100~240V 50Hz/60Hz, Output: DC 12V 1A **American standard:** Model: GS12U12-P1I 12W/12V/1A: UL/CUL/BSMI/CB/FCC **European standard:** Model:GS12E12-P1I 12W/12V/1A; TUV(GS)/CB/CE/ROHS EMI Standard:EN55022,EN61204-3, EN61000-3-2,-3, FCC Part 152 class B, BSMI CNS14338 EMS Standard:EN61000-4-2,3,4,5,6,8,11,EN61204-3,Class A Light Industry Standard
D	HDMI cable
E	USB mouse
F	High-speed USB2.0 A male to A male gold-plated connectors cable /2.0m
G	CD (Driver & utilities software, Ø12cm)

Optional Accessory			
H	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
		C-Mount to Dia.31.75mm eyepiece tube (Please choose 1 of them for your telescope)	108008/ATA037 108009/ATA050 108010/ATA075
I	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
		C-Mount to Dia.31.75mm eyepiece tube (Please choose 1 of them for your telescope)	108011/FTA037 108012/FTA050 108013/FTA075
Note: For H and I 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;			
J	108015(Dia.23.2mm to 30.0mm ring)/Adapter rings for 30mm eyepiece tube		
K	108016(Dia.23.2mm to 30.5mm ring)/ Adapter rings for 30.5mm eyepiece tube		
L	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.)	
M	SD card(4G or 8G)		

8.13.6 Extension of XCAM1080PHA Series Camera with Microscope

Extension	Picture
C-mount Camera	Machine vision; Medical imaging; Semiconductor equipment; Test instruments; Document scanners; 2D barcode readers; Web camera and security video; Microscope imaging;
Microscope Camera	XCAM1080P HA/8MPA/15MPA +AMAXXX(23.2mm Adapter)　　XCAM1080P HA/8MPA/15MPA +FMAXXX(23.2mm Adapter)
Telescope Camera:	XCAM1080P HA/8MPA/15MPA +ATAXXX(31.75mm Adapter)　　XCAM1080P HA/8MPA/15MPA +FTAXXX(31.75mm Adapter)

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8.14 XCAM0720PHB(Discontinued)/PHC C-mount HDMI CMOS Camera (2)

8.14.1 XCAM0720PHB(Discontinued)/PHC 's Basic Characteristic

- Through standard HDMI interface to stream the video to displayer or HDTV;
- Aptina CMOS sensor;
- Easy connecting to other equipment on the production line with the C-mount optical interface;
- High-resolution and high frame rate, perfect color reproduction, highly integrated and compact, low failure rate and stable performance;
- 1280 × 720 (720P) resolutions to match the current high-definition displayer on the market;
- XCAM720PHB/PHC embedded XCamView based on the Qt platform. The camera characteristic can be controlled by XCamView through the mouse. The other basic processing and choosing can also be realized by the XCamView;
- XCAM0720PHB/PHC can meet various applications and can be widely used in industrial inspection, education and research, materials analysis, precision measurement, medical analyses etc.

Photos of XCAM0720PHB/PHC

8.14.2 XCAM0720PHB/PHC Datasheet(2)

Order Code	Sensor & Size(mm)	Pixel(μm)	G Responsivity Dynamic range SNRmax	FPS/Resolution	Binning	Exposure(ms)
~~XCAM0720PHB~~ ~~XP0720B~~	~~720P/1.2M/AR0130(C)~~ ~~1/3"(4.80x2.70)~~	~~3.75 x3.75~~	~~6.5v/lux-sec~~ ~~85.3dB~~ ~~44dB~~	~~30@1280x720~~	~~1x1~~	~~0.2ms~2000ms~~
XCAM0720PHC XP0720C	720P/2M/IMX322(C) 1/2. 8"(5.78x3.02)	2.8 x2.8	510mv with 1/30s (G Sensitivity) 0.15mv with 1/30s (Dark Signal)	30@1280x720 (HDMI) 1920x1080 (Capture)	1x1	0.06ms~1900ms

Interface & Button Functions	
Photos of XCAM0720PHB/PHC	

Camera Interface	
HDMI	HDMI Output Port
USB	USB Mouse for XCamView Control
DC12V	Power Input Slot
SD	SD Card Slot

Overall Dimensions	
Width x Depth x Height	50 mm (1.97") x 50 mm (1.97") x 61mm (2.4")
Shipping Weight	0.47kg (0.55 lbs)

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 5V/1A Adapter

Optional Accessories	
Lens	C-mount Lens
Cable	HDMI Cable
Memory Card	SD Card
Mouse	USB mouse/USB Wireless Mouse
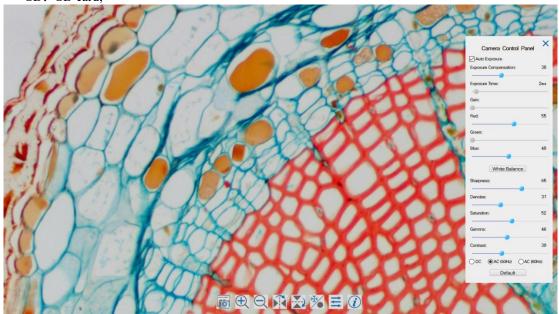
8.14.3 Hardware Interface and XCamView UI Description

The XCAM0720PHB/PHC light indicator flashes about 15s after the power on. The camera will load XCamView, and then the system begins to work. Auto exposure and white balance are the default state now.

- HDMI：The HDMI cable connected to the HDMI diaplayer;
- USB：USB mouse;
- DC 12V：Power in 12V/1A；
- LED: The blue LED indicator;
- SD：SD card;

The GUI of the embeded camera control panel of XCamView in XCAM720PHB
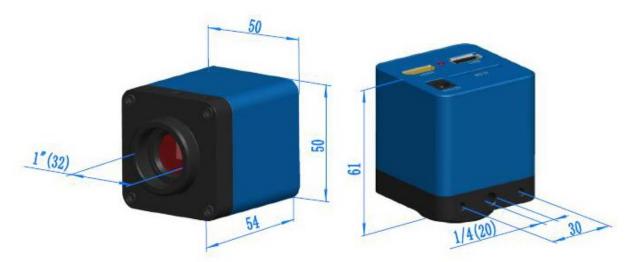
XCamView toolbar for XCAM0720PHB/PHC

Move mouse to the bottom of the HDMI displayer, the bottom toolbar will be available. The function of each toolbar buttons are described as follows:

1：Image Capture
2：Digital Zoom In
3：Digital Zoom Out
4：Horizontal Flip
5：Vertical Flip
6：Video Freez /Cancel Video Freeze
7：Display/Hide the Camera Control Panel
8：Display the XCamView Version Information

8.14.4 Dimension of XCAM0720PHB/PHC

Dimension of XCAM720PHB/PHC Series Camera

8.14.5 Packing Information for XCAM0720PHB/PHC

Packing Information for XCAM0720PHB/PHC

	Standard Packing List		
A	Gift box : L:17.5cm W:17.5cm H:8.5cm (1pcs, 0.85kg/ box)		
B	XCAM0720PHB or XCAM0720PHC		
C	Power Adapter: Input: AC 100~240V 50Hz/60Hz, Output: DC 12V 1A **American standard:** Model: GS12U12-P1I 12W/12V/1A: UL/CUL/BSMI/CB/FCC EMI Standard:EN55022,EN61204-3, EN61000-3-2,-3, FCC Part 152 class B, BSMI CNS14338 EMS Standard:EN61000-4-2,3,4,5,6,8,11,EN61204-3,Class A Light Industry Standard		
	European standard: Model:GS12E12-P1I 12W/12V/1A; TUV(GS)/CB/CE/ROHS EMI Standard:EN55022,EN61204-3, EN61000-3-2,-3, FCC Part 152 class B, BSMI CNS14338 EMS Standard:EN61000-4-2,3,4,5,6,8,11,EN61204-3,Class A Light Industry Standard		
D	HDMI Cable		
E	USB mouse/USB Wireless Mouse		
	Optional Accessory		
F	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
		C-Mount to Dia.31.75mm eyepiece tube (Please choose 1 of them for your telescope)	108008/ATA037 108009/ATA050 108010/ATA075
G	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
		C-Mount to Dia.31.75mm eyepiece tube (Please choose 1 of them for your telescope)	108011/FTA037 108012/FTA050 108013/FTA075
	Note: For F and G 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;		
H	108015(Dia.23.2mm to 30.0mm ring)/Adapter rings for 30mm eyepiece tube		
I	108016(Dia.23.2mm to 30.5mm ring)/ Adapter rings for 30.5mm eyepiece tube		
J	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.)	
K	SD card(4G or 8G)		

8.14.6 Extension of XCAM0720PHB/PHC with Microscope or Telescope Adapter

Extension	Picture	
C-mount Camera		Machine vision; Medical imaging; Semiconductor equipment; Test instruments; Document scanners; 2D barcode readers; Web camera and security video; Microscope imaging;
Microscope Camera	XCAM720PHB+AMAXXX(23.2mm Adapter)	XCAM720PHB+FMAXXX(23.2mm Adapter)
Telescope Camera:	XCAM720PHB+ATAXXX(31.75mm Adapter)	XCAM720PHB+FTAXXX(31.75mm Adapter)

8.15 ALPHA1080 Series HDMI+USB Outputs C-mount CMOS Camera(2) (Discontinued)

8.15.1 ALPHA1080 Series' Basic Characteristics

ALPHA1080 series is a multiple outputs (HDMI+USB2.0+SD card) C-mount CMOS camera and it adopts ultra-high performance Sony CMOS sensor as the image-picking device. HDMI+USB2.0 are used as the data transfer interface to HDMI display or computer.

For HDMI camera mode, The XCamView will be loaded and the Camera Control Panel+ Measurement Toolbar and Synthesis Camera Control Toolbar are overlaid on the HDMI screen with the mouse move to the related region, in this case, the USB mouse can be used to set the camera, browse and compare the captured image, play the video and perform the measurement ital.

For USB Video camera mode, plug in the micro USB host cable to the camera's USB Video port and computer USB port, then the video stream can be transfer to computer with the advanced software ToupView/ToupLite. With ToupView/ToupLite, you can control the camera, process the video and image as ToupTek's other USB series camera.

The ALPHA1080 series' basic characteristics are as follows:

For HDMI output:

- All in 1(HDMI+USB+SD card) C-mount camera with Sony high sensitivity CMOS sensor;
- Simultaneous HDMI & USB output;
- Built-in mouse control;
- Built-in image capture & video record to SD card;
- Built-in camera control panel, including exposure(manual/auto)/gain, white balance(lockable), color adjustment, sharpness control;
- Built-in video and image measurement;
- Built-in toolbar including zoom, mirror, comparison, freeze, cross, browser functions;
- Built-in image & video browsing, display & play;
- Real time clock(RTC)

For USB Video mode:

- Ultra-Fine color engine with perfect color reproduction capability(USB);
- With advanced video & image processing application ToupView, which including professional image processing such as 2D measurement, HDR, image stitching, EDF(Extended Depth of Focus), image segmentation & count, image stacking, color composite and denoising(USB);
- Support standard UVC protocol for Windows/Linux/Mac(USB);
- CNC precision machining shell;

The possible applications of ALPHA1080 series are as follows:

- Scientific research, education (teaching, demonstration and academic exchanges);
- Digital laboratory, medical research;
- Industrial visual (PCB examination, IC quality control, mechanical part measurement);
- Medical treatment (pathological observation);
- Food (microbial colony observation and counting);
- Aerospace, military (high sophisticated weapons);

8.15.2 ALPHA1080 Series Datasheet(2)

Order Code	Sensor & Size(mm)	Pixel(μm)	G Sensitivity Dark Signal	FPS/Resolution	Binning	Exposure
~~ALPHA1080A~~ ~~AL1080A~~	~~1080P/Sony IMX290 1/2.8"(5.57x4.13)~~	~~2.9x2.9~~	~~1300mv with 1/30s~~ ~~0.15 mv with 1/30s~~	~~26@1920*1080P(HDMI)~~ ~~26@1920*1080(USB)~~	~~1x1~~	~~0.036ms~8s~~
~~ALPHA1080B~~ ~~AL1080B~~	~~1080P/Sony IMX185 1/1.9"(7.20x4.50)~~	~~3.75x3.75~~	~~1120mv with 1/30s~~ ~~0.15 mv with 1/30s~~	~~26@1920*1080P(HDMI)~~ ~~26@1920*1080(USB)~~	~~1x1~~	~~0.34ms~4s~~

C: Color; M: Monochrome;

Interface & Button Functions		
	HDMI	HDMI Output
	USB Mouse	USB Mouse for the Control of the HDMI Mode
	USB Video	USB Video for the PC
	LED	Camera Status Indicate
	SD	SD Card Slot
	DC12V	12V/1A Power in
	ON/OFF	Power ON/OFF Switch

Other Specification for HDMI Output	
UI Operation	With USB Mouse for HDMI Mode
Image Capture	High Speed in SD Card(8G)
Video Record	1080P 26fps in SD Card(8G)(AVI Format in SD Card)
Camera Control Panel	Including Exposure, Gain, White Balance, Color Adjustment and Sharpness Control
Toolbar	Including Zoom, Mirror, Comparison, Freeze, Cross, Browser Function

Other Specification for USB Output	
White Balance	Auto White Balance, Manual White Balance, ROI White Balance(👍)
Color Technique	Ultra-Fine Color Engine (USB2.0)
Capture/Control SDK	Standard UVC for Windows(USB2.0)
Recording System	Still Picture or Movie (HDMI or USB)

Software Environment (for USB2.0 Connection)	
Operating System	Microsoft® Windows® XP / Vista / 7 / 8 / 8.1 /10(32 & 64 bit) OSx(Mac OS X) Linux
PC Requirements	CPU: Equal to Intel Core2 2.8GHz or Higher
	Memory:4GB or More
	USB Port:USB2.0 High-speed 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 Adapter

8.15.3 ALPHA1080 Series and Microscope

ALPHA1080 Series and Its Back Panel
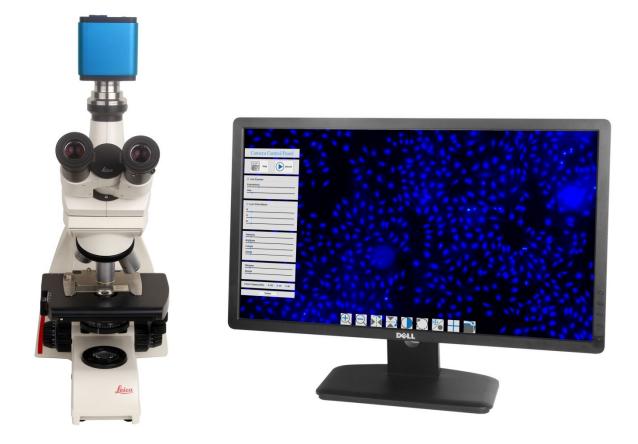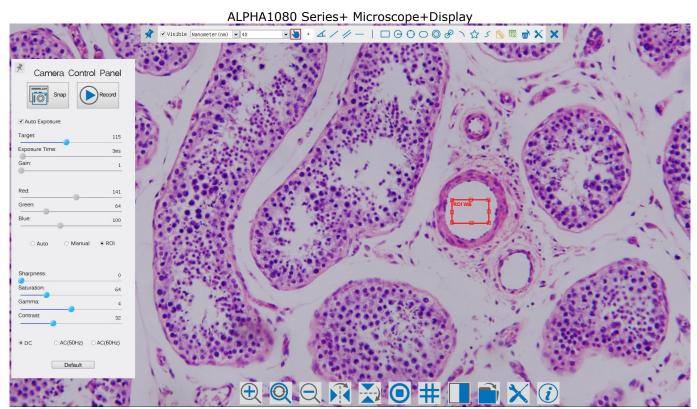
Different Views of ALPHA1080 Series

ALPHA1080 Series and Microscope

ALPHA1080 Series+ Microscope+Display
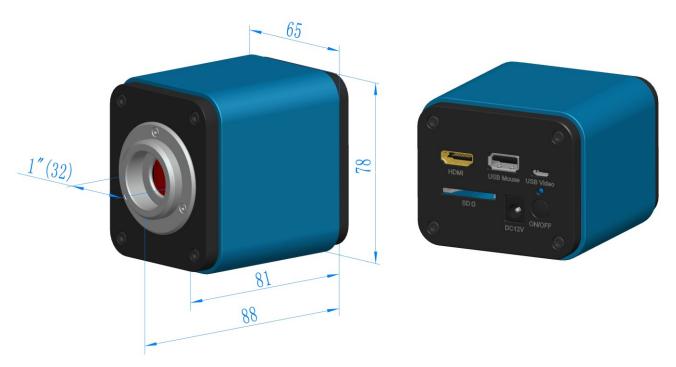
ALPHA1080 XCamView UI for Mouse Control

8.15.4 Dimension of ALPHA1080 Series

Dimension of ALPHA1080 Series Camera

8.15.5 Packing Information for ALPHA1080 Series
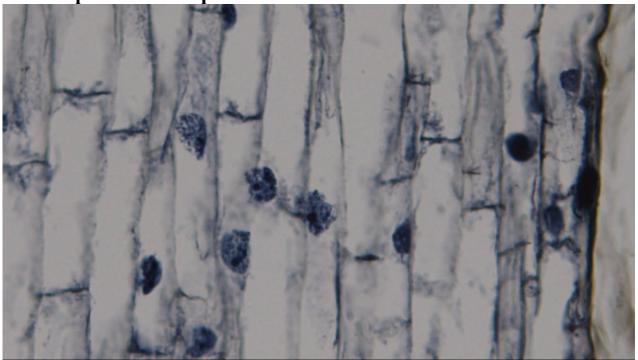
Packing Information of ALPHA1080 Series Camera

	Standard Packing List
A	Gift box : L:25.5cm W:17.0cm H:19.0cm (1pcs, 1.55kg/ box)
B	ALPHA1080 Series camera
C	Power Adapter: Input: AC 100~240V 50Hz/60Hz, Output: DC 12V 1A **American standard:** Model: GS12U12-P1I 12W/12V/1A: UL/CUL/BSMI/CB/FCC EMI Standard:EN55022,EN61204-3, EN61000-3-2,-3, FCC Part 152 class B, BSMI CNS14338 EMS Standard:EN61000-4-2,3,4,5,6,8,11,EN61204-3,Class A Light Industry Standard **European standard:** Model:GS12E12-P1I 12W/12V/1A; TUV(GS)/CB/CE/ROHS EMI Standard:EN55022,EN61204-3, EN61000-3-2,-3, FCC Part 152 class B, BSMI CNS14338 EMS Standard:EN61000-4-2,3,4,5,6,8,11,EN61204-3,Class A Light Industry Standard
D	HDMI Cable
E	USB Mouse
F	Micro USB2.0 cable /2.0m
G	CD (Driver & utilities software, Ø12cm)
	Optional Accessory
H	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
		C-Mount to Dia.31.75mm eyepiece tube (Please choose 1 of them for your telescope)	108008/ATA037 108009/ATA050 108010/ATA075
I	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
		C-Mount to Dia.31.75mm eyepiece tube (Please choose 1 of them for your telescope)	108011/FTA037 108012/FTA050 108013/FTA075
	Note: For H and I 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;
J	108015(Dia.23.2mm to 30.0mm ring)/Adapter rings for 30mm eyepiece tube
K	108016(Dia.23.2mm to 30.5mm ring)/ Adapter rings for 30.5mm eyepiece tube
L	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.)
M	SD Card(4G,8G,16G)

8.15.6 Extension of ALPHA1080 with Microscope or Telescope Adapter

Extension	Picture
C-mount camera	Machine vision; Medical imaging; Semiconductor equipment; Test instruments; Document scanners; 2D barcode readers; Microscope imaging;
Microscope Camera	 ALPHA1080+AMAXXX(23.2mm Adapter) ALPHA1080+FMAXXX(23.2mm Adapter)
Telescope Camera	 ALPHA1080+ATAXXX(31.75mm Adapter) ALPHA1080+FTAXXX(31.75mm Adapter)
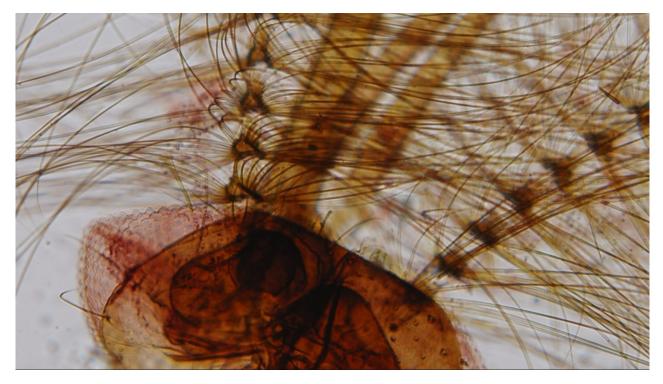
8.15.7 Sample Photos Captured with ALPHA1080A
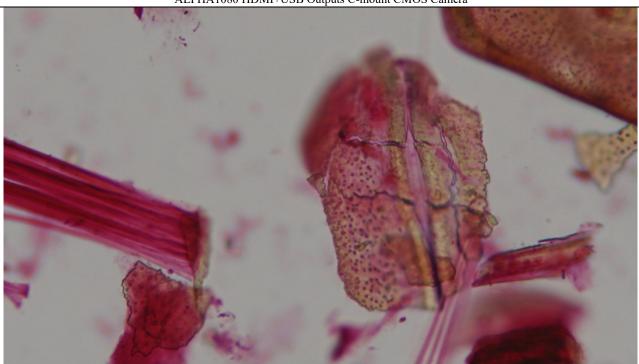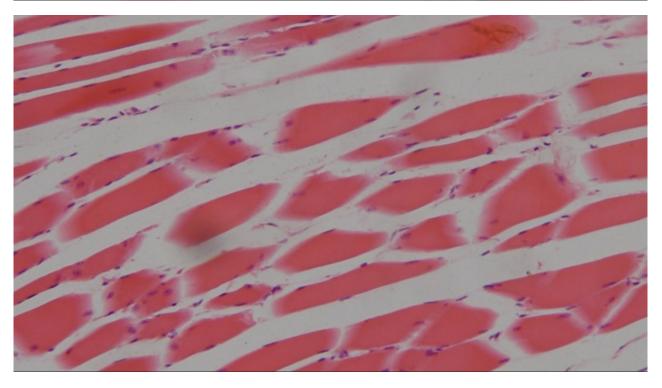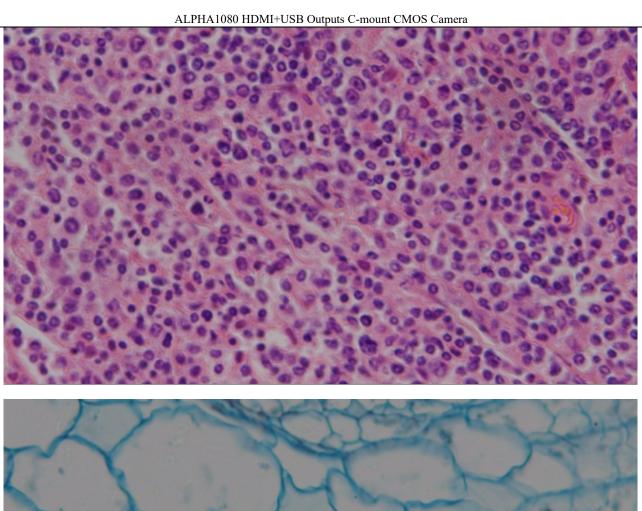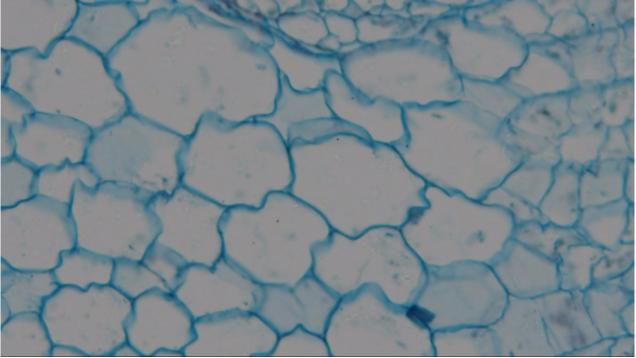
8.16 XCAM0720PHA C-mount HDMI CMOS Camera(1) (Discontinuted)

8.16.1 XCAM0720PHA's Basic Characteristic

- Through standard HDMI interface to stream the video to displayer or HDTV.
- Aptina CMOS sensor;
- Easy connecting to other equipment on the production line with the C-mount interface.
- High-resolution and high frame rate, perfect color reproduction, highly integrated and compact, low failure rate and stable performance.
- 1280 × 720 (720P) resolutions to match the current high-definition displayer on the market.
- Supporting various OSD cursors which can be toggled On/off (functions shift as users press the button). The OSDs including: scale, double horizontal line, double vertical line, double cross line, Tri-cross line.
- Function buttons including automatic white balance and exposure on/off (AEWB), saving images to SD card (SAVE), video stream and freeze on/off (FREEZE), remote image snapshot controller to reduce the vibration blur (REMOTE).
- Meet various applications and can be widely used in industrial inspection, education and research, materials analysis, precision measurement, medical analyses etc.

8.16.2 XCAM0720PHA Datasheet(1)

Order Code	Sensor & Size(mm)	Pixel(μm)	G Responsivity Dynamic range SNRmax	FPS/Resolution	Binning	Exposure(ms)
XCAM0720PHA XP0720A(Suspended)	720P/MT9P031 (C) 1/2.5"(5.70x4.28)	2.2x2.2	1.4 V/lux-sec 70.1dB 38.1dB	30@1280x720	1x1	0.21ms~33ms
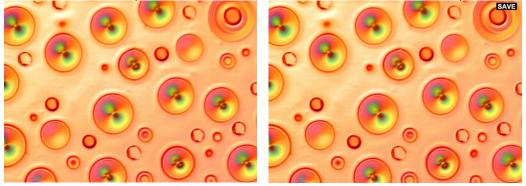
Interface & Button Functions	
	Button 1 — Video Stream/Freeze Button 2 — AEWB ON/OFF Button 3 — Save Image to SD Card Button 4 — Cursor ON/OFF 1X HDMI Output Port 1X SD Card Slot 1X Power Input Slot 1X Remote Switch Slot

Overall Dimensions	
Width X Depth X Height	68 mm (2.67") X 68 mm (2.67") X 92mm (3.62")
Shipping Weight	0.25 kg (0.55 lbs)

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 5V/1A Adapter

Optional Accessories	
Lens	C-mount Lens
Cable	HDMI Cable
Memory Card	SD Card
Remote Image Save Switch	2.5mm Headphone Jack Remote Image Save Switch

8.16.3 Function Key Description
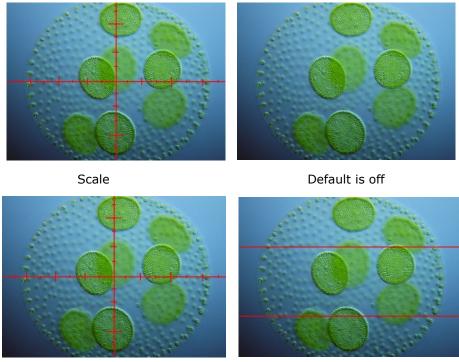
The XCAM0720PHA light indicator flashes about 15s after the power on. Then the XCAM0720PHA will load software, after finish loading, the system begins to work. Auto exposure and white balance are the default state now.

- FREEZE button：Toggle between the video stream mode/freeze mode(Default is video stream);
- AEWB button：Toggle auto exposure and white balance on/off (Default is on);
- SAVE button：Saving the current screen to the image SD card, the compression format is JPEG with a resolution of 1280x720, users can press the button or click the remote controller button to save picture;
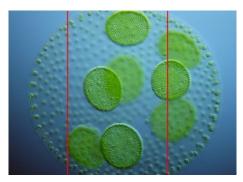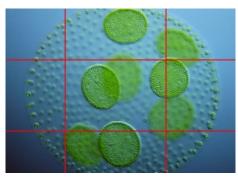
- CURSOR button：Toggle the OSD cursor on/off (default is off).Crosshair style including: scale, double horizontal line, double vertical line, double cross line, Tri-factor cross line. Functions shift as user press the button.

| Scale | Default is off |
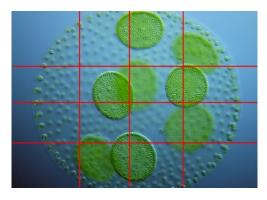
Scale   Two horizontal lines

Two horizontal lines   Double cross line

Tri-factor cross line

8.16.4 Dimension of XCAM0720PHA Series Camera

Dimension of XCAM720PHA Series Camera

8.16.5 Packing Information for XCAM720PHA

Packing Information of XCAM0720PHA

	Standard Packing List		
A	Gift box : L:25.5cm W:17.0cm H:19.0cm (1pcs, 1.43Kg/ box)		
B	XCAM0720PHA		
C	Power Adapter: Input: AC 100~240V 50Hz/60Hz, Output: DC 12V 1A **American standard:** Model: GS12U12-P1I 12W/12V/1A: UL/CUL/BSMI/CB/FCC EMI Standard:EN55022,EN61204-3, EN61000-3-2,-3, FCC Part 152 class B, BSMI CNS14338 EMS Standard:EN61000-4-2,3,4,5,6,8,11,EN61204-3,Class A Light Industry Standard **European standard:** Model:GS12E12-P1I 12W/12V/1A; TUV(GS)/CB/CE/ROHS EMI Standard:EN55022,EN61204-3, EN61000-3-2,-3, FCC Part 152 class B, BSMI CNS14338 EMS Standard:EN61000-4-2,3,4,5,6,8,11,EN61204-3,Class A Light Industry Standard		
D	HDMI Cable		
E	2.5mm Headphone Jack Remote Image Save Switch		
	Optional Accessory		
F	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
		C-Mount to Dia.31.75mm eyepiece tube (Please choose 1 of them for your telescope)	108008/ATA037 108009/ATA050 108010/ATA075
G	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
		C-Mount to Dia.31.75mm eyepiece tube (Please choose 1 of them for your telescope)	108011/FTA037 108012/FTA050 108013/FTA075
	Note: For F and G 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;		
H	108015(Dia.23.2mm to 30.0mm ring)/Adapter rings for 30mm eyepiece tube		
I	108016(Dia.23.2mm to 30.5mm ring)/ Adapter rings for 30.5mm eyepiece tube		
J	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.)	
K	SD card(4G or 8G)		

8.16.6 Extension of XCAM0720PHA Camera with Microscope or Telescope Adapter

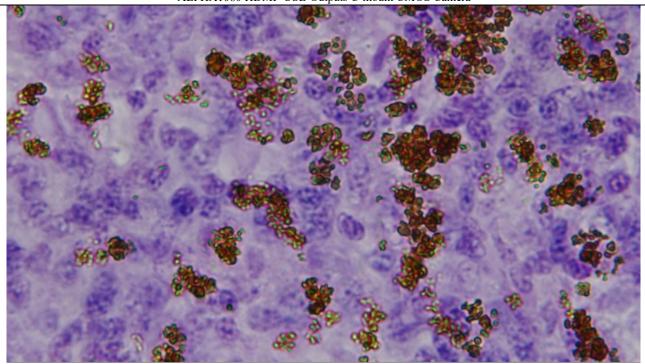| Extension	Picture
C-mount Camera	Machine vision; Medical imaging; Semiconductor equipment; Test instruments; Document scanners; 2D barcode readers; Web camera and security video; Microscope imaging;
Microscope Camera	XCAM0720PHA+AMAXXX(23.2mm Adapter) XCAM0720PHA+FMAXXX(23.2mm Adapter)
Telescope Camera:	XCAM0720PHA+ATAXXX(31.75mm Adapter) XCAM0720PHA+FTAXXX(31.75mm Adapter)

9 Microscope WiFi CMOS Camera

9.1 WCAM Series C-mount WiFi CMOS Camera

9.1.1 WCAM Basic Characteristic

ToupTek WCAM is WiFi camera and it adopts ultra-high performance CMOS sensor as the image-picking device. WiFi is used as the data transfer interface.

When the WCAM is attached to the eyepiece of a microscope and started, it will and generates a WiFi signal for sending high-resolution images from a microscope to WiFi-enabled devices such as smartphones, tablets, and computers with iOS, Android, OS X, Linux and Windows operating systems, streaming images to up to six devices simultaneously.

The camera includes ToupView images software for quantifying, measuring, and annotating images and for using with an interactive white board. It also works with the free, downloadable Toupviewt app for viewing, capturing, and editing images.

The basic characteristic of WCAM cameras are as follows:

- C-Mount camera has 25.4 mm or 1-inch diameter with 32 threads per inch;
- Scientific research grade camera with Aptina CMOS sensor;
- Sends H.264 encodec high-resolution images from a microscope to WiFi-enabled smartphones, computers, and tablets with iOS, Android, and Windows operating systems;
- Streams images to several devices simultaneously;
- CNC aluminum alloy housing;
- Ultra-Fine color engine with perfect color reproduction capability;
- With advanced video & image processing application ToupView(only support simple video viewing capturing for IOS/ android system);
- Custom programmable with SDK provided(Windows/Linux/OS);

9.1.2 WCAM Datasheet (4)
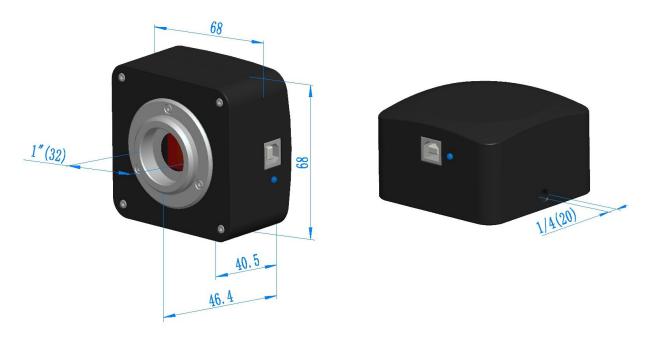
Order Code	Sensor Size(mm)	Pixel(μm)	G Responsivity Dynamic range SNRmax	FPS/Resolution	Binning	Exposure(ms)
WCAM1080PA WP601080A	1080P/IMX222 (C) 1/2.8" (5.38x3.02)	2.8x2.8	510mV with 1/30s 0.15mv with 1/30s	25@1920x1080	1x1	0.059ms~1941ms
WCAM0720PA WP600720A(Suspended)	720P/MT9P001 (C) 1/2.5" (5.63x3.17)	2.2x2.2	1.0 V/lux-sec 61dB 43dB	30@1280x720	2x2	0.21ms~200ms
WCAM0720PB WP600720B	720P/MT9P001 (C) 1/2.5" (5.63x3.17))	2.2x2.2	1.0 V/lux-sec 61dB 43dB	10@1280x720	2x2	Auto Exposure
WCAM0300KPA WP600300KA	0.3M/MT9V011 (C) 1/4" (3.58 x 2.69)	5.6x5.6	1.9V/lux-sec 60dB 45dB	25@640x480	1x1	Auto Exposure

C: Color; M: Monochrome;

Other Specification for WCAM Camera	
Spectral Range	380-650nm (with IR-cut Filter)
White Balance	Whole Area White Balance/ Manual Temp Tint Adjustment/NA for Monochromatic Sensor
Color Technique	Ultra-Fine Color Engine/NA for Monochromatic Sensor
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 and Movie
Cooling System*	Natural
Maximum Connected Devices	<=3
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	USB Charger, Not Recommend PC USB Port
Software Environment	
Operating System	Microsoft® Windows® XP / Vista / 7 / 8 /10 (32 & 64 bit) IOS IPAD or IPhone, Android PAD and Phone
PC Requirements	CPU: Equal to Intel Core2 2.8GHz or Higher
	Memory:2GB or More
	WiFi Adapter with DHCP Enabled
	Display:17" or Larger
	CD-ROM
PAD	IPAD or PAD with Android System
Mobile Phone	IPhone or Smart Phone with Android System

9.1.3 Dimension of WCAM Series Camera

The WCAM body, made from tough, 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.

Dimension of WCAM Series Camera

9.1.4 Packing Information of WCAM Series Camera

Packing Information of WCAM Series Camera

	Standard Camera Packing List		
A	Carton L:52cm W:32cm H:33cm (20pcs, 11.4~14Kg/ carton), not shown in the photo		
B	Gift box L:15cm W:15cm H:10cm (0.57~0.58Kg/ box)		
C	WCAM series USB2.0 C-mount CMOS camera		
D	High-speed USB2.0 A male to B male gold-plated connectors cable /2.0m(for PC power only) or with USB charger		
E	CD (Driver & utilities software, Ø12cm)		
	Optional Accessory		
F	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
		C-mount to Dia.31.75mm eyepiece tube (Please choose 1 of them for your telescope)	108008/ATA037 108009/ATA050 108010/ATA075
G	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
		C-mount to Dia.31.75mm eyepiece Tube (Please choose 1 of them for your telescope)	108011/FTA037 108012/FTA050 108013/FTA075
	Note: For F and G 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;		
H	108015(Dia.23.2mm to 30.0mm ring)/Adapter rings for 30mm eyepiece tube		
I	108016(Dia.23.2mm to 30.5mm ring)/ Adapter rings for 30.5mm eyepiece tube		
J	108017(Dia.23.2mm to 31.75mm Ring)/ Adapter rings for 31.75mm 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.)	

9.1.5 Extension of WCAM with Microscope or Telescope Adapter

Extension	Picture
C-mount Camera	Machine vision; Medical imaging; Semiconductor equipment; Test instruments; Document scanners; 2D barcode readers; Web camera and security video; Microscope imaging;
Microscope Camera	WCAM+AMAXXX(23.2mm Adapter) WCAM+FMAXXX(23.2mm Adapter)
Telescope Camera	WCAM+ATAXXX(31.75mm Adapter) WCAM+FTAXXX(31.75mm Adapter)

9.2   WUCAM1080PA Series C-mount WiFi+USB CMOS Camera

9.2.1 WUCAM1080PA's Basic Characteristic

ToupTek WUCAM1080PA is a camera that has the WiFi output and USB output. An on-camera switch is used to switch between the WiFi output and USB output.

When WiFi output is available, this camera is used as a WiFi camera and could be connected to mobile devices, such as smart phones, pads and computers. It could work with ToupView app on iOS, Android and windows platform with H264 format.

When USB output is available, this camera is used as a USB camera and could support UVC standard. The camera could be used with ToupView or other 3rd part software which could support UVC camera.

The basic characteristic of WUCAM1080PA series camera is as follows:

- Sony Starvis back illuminated CMOS sensor
- USB,WiFi(AP mode) multiple video outputs
- With strong ISP and other related processing functions
- ToupView/ToupLite software for PC
- iOS/Android app for smart phones or tablets
-

9.2.2 WUCAM1080PA Datasheet (1)

Order Code	Sensor & Size(mm)	Pixel(μm)	G Sensitivity	FPS/Resolution	Binning	Exposure(ms)
WUCAM1080PA	Sony IMX307(C) 1/2.8"(5.57x3.13)	2.9x2.9	1300mv with 1/30s	50@1920*1080(USB) 50@1920*1080(WiFi)	1x1	0.01~1000

C: Color; M: Monochrome;

Other Specification for WCAM Camera	
Output Interface	USB or WiFi(on Camera Switch)
Spectral Range	380-650nm (with IR-cut Filter)
White Balance	Whole Area White Balance/ Manual Temp Tint Adjustment/NA for Monochromatic Sensor
Color Technique	Ultra-Fine Color Engine/NA for Monochromatic Sensor
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 and Movie
Cooling System*	Natural
Maximum Connected Device	6~10
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	USB Charger USB port from PC
Software Environment	

Operating System	Microsoft® Windows® XP / Vista / 7 / 8 /10 (32 & 64 bit) **IOS IPAD or IPhone, Android PAD and Phone**
PC Requirements	CPU: Equal to Intel Core2 2.8GHz or Higher
	Memory:2GB or More
	WiFi Adapter with DHCP Enabled
	Display:17" or Larger
	CD-ROM
PAD	**IPAD or PAD with Android System**
Mobile Phone	**IPhone or Smart Phone with Android System**

Interface and Indicator	Function Description
Micro USB	Connect to 5V power supply with Micro USB cable, Camera provides WiFi AP connection mode; Connecting to PC with Micro USB cable, Camera provides UVC function.
WiFi LED	WiFi function indicator
PWR LED	Power indicator
Video Output Interface	**Function Description**
USB Video Interface	Connecting USB port of PC for video transfer; MJPEG format video, supported 50fps@1080P;
WiFi Interface	Support 802.11b/g/n protocols in AP mode; 50fps@1920*1080 H264 encoded video and Jpeg image capture; support up to 3 clients, 1 client connection is the best.
Other Function	**Function Description**
Color Technique	Ultra-Fine Color Engine;
ISP Function	Exposure(Automatic / Manual Exposure) , Gain， White Balance(Automatic / Manual / ROI Mode)， Sharpening， 3D Denoise， Saturation Adjustment， Contrast Adjustment， Brightness Adjustment， Gamma Adjustment， Color to Gray， 50HZ/60HZ Anti-flicker Function, Anti-flicker， Mirror/Flip
Capture/Control SDK	Windows/Linux/macOS/Android Multiple Platform SDK;
Recording System	Still Picture or Movie
PC Requirements	CPU: Equal to Intel Core2 2.8GHz or Higher
	Memory: 4GB or More
	WiFi Adaptor: Support 802.11 b/g/n
	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	USB DC 5V/1A Adapter

9.2.3 Dimension of WUCAM1080PA Series Camera

The WUCAM1080PA body, made from tough, CNC aluminum alloy, ensures a heavy duty, workhorse solution. The camera is designed with a high-quality IR-CUT filter 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.

Dimension of WUCAM1080PA Series Camera

9.2.4 Packing Information of WUCAM1080PA Series Camera

Packing Information of WUCAM1080PA Camera

	Standard Packing List		
A	Gift box : L:17.4cm W:17.4cm H:7.6cm (1pcs, 0.54kg/ box)		
B	WUCAM1080PA		
C	Power Adapter: Input: AC 100~240V 50Hz/60Hz, Output: DC 5V 1A **American standard**: Model: POWER-U-5V1A(SK12G-0500100U): UL/CE/FCC **European standard**: Model: POWER-E-5V1A(SK12G-0500100V): UL/CE/FCC		
D	Micro USB data cable 1.5m		
	Optional Accessory		
E	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
F	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 **E** and **F** 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;		
G	108015(Dia.23.2mm to 30.0mm Ring)/Adapter rings for 30mm eyepiece tube		
H	108016(Dia.23.2mm to 30.5mm Ring)/ Adapter rings for 30.5mm eyepiece tube		
I	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.)	

9.2.5 Extension of WUCAM1080PA with Microscope or Telescope Adapter

Extension	Picture
C-mount Camera	 Machine vision; Medical imaging; Semiconductor equipment; Test instruments; Document scanners; 2D barcode readers; Web camera and security video; Microscope imaging;
Microscope Camera	 WUCAM+AMAXXX(23.2mm Adapter) WUCAM+FMAXXX(23.2mm Adapter)
Telescope Camera	 WUCAM+ATAXXX(31.75mm Adapter) WUCAM+FTAXXX(31.75mm Adapter)

9.3   WUCAM0720PA0720PA WiFi+USB C-mount CMOS Camera

9.3.1 WUCAM0720PA's Basic Characteristic

ToupTek WUCAM0720PA is a camera that has the WiFi output and USB output. An on-camera switch is used to switch between the WiFi

and USB output.

When WiFi output is available, this camera is used as a WiFi camera and could be connected to mobile devices, such as smart phones, pads and computers. It could work with ToupView app on iOS, Android and windows platform. More than 6 users could connect the camera simultaneously by WiFi connection.

When USB output is available, this camera is used as a USB camera and could support UVC standard. The camera could be used with ToupView or other 3rd part software which could support UVC camera.

The basic characteristic of WUCAM0720PA series camera is as follows:

- C-Mount camera has 25.4 mm or 1-inch diameter with 32 threads per inch;
- Scientific research grade camera with Aptina CMOS sensor;
- Switchable WiFi+USB data interface;
- Send MJPEG encodec high-resolution images from camera to WiFi-enabled smartphones, computers, and tablets with iOS, Android, and Windows operating systems;
- Streams images to several devices simultaneously;
- Send MJPEG encodec high-resolution images from camera to USB-enabled computer with UVC standard protocol;
- Ultra-Fine color engine with perfect color reproduction capability;
- With advanced video & image processing application ToupView(only support simple video viewing capturing for IOS/ android system);
- Custom programmable with SDK provided(Windows/Linux/OS)(WiFi);

9.3.2 WUCAM0720PA Datasheet (1)

Order Code	Sensor Size(mm)	Pixel(μm)	G Responsivity Dynamic range SNRmax	FPS/Resolution	Binning	Exposure(ms)
WUCAM0720PA0720PA WU600720A	720P/MT9P001 (C) 1/2.5" (5.63x3.17)	2.2x2.2	0.53 V/lux-sec 66.5dB 40dB	30@1280x720	2x2	Auto/Manual Exposure

C: Color; M: Monochrome;

Other Specification for WCAM Camera	
Output Interface	USB or WiFi(on Camera Switch)
Spectral Range	380-650nm (with IR-cut Filter)
White Balance	Whole Area White Balance/ Manual Temp Tint Adjustment/NA for Monochromatic Sensor
Color Technique	Ultra-Fine Color Engine/NA for Monochromatic Sensor
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 and Movie

Cooling System*	Natural
Maximum Connected Device	6~10
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	USB Charger USB port from PC
Software Environment	
Operating System	Microsoft®Windows®XP / Vista / 7 / 8 /10 (32 & 64 bit) IOS IPAD or IPhone, Android PAD and Phone
PC Requirements	CPU: Equal to Intel Core2 2.8GHz or Higher
	Memory:2GB or More
	WiFi Adapter with DHCP Enabled
	Display:17" or Larger
	CD-ROM
PAD	IPAD or PAD with Android System
Mobile Phone	IPhone or Smart Phone with Android System

9.3.3 Dimension of WUCAM0720PA Series Camera

The WUCAM0720PA body, made from tough, CNC aluminum alloy, ensures a heavy duty, workhorse solution. The camera is designed with a high-quality IR-CUT filter 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.

Dimension of WUCAM0720PA Series Camera

9.3.4 Packing Information of WUCAM0720PA Series Camera

Packing Information of WUCAM0720PA Camera

	Standard Camera Packing List		
A	Carton L:52cm W:32cm H:33cm (20pcs, 11.4~14Kg/ carton, 0.045m3), not shown in the photo		
B	Gift box L:15cm W:15cm H:10cm (0.46~0.47Kg/ box)		
C	WUCAM0720PA series WiFi+USB2.0 C-mount CMOS camera		
D	High-speed USB2.0 A male to B male gold-plated connectors cable /2.0m(for PC power only) or with USB charger		
E	CD (Driver & utilities software, Ø12cm)		
	Optional Accessory		
F	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
		C-mount to Dia.31.75mm eyepiece tube (Please choose 1 of them for your telescope)	108008/ATA037 108009/ATA050 108010/ATA075
G	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
		C-mount to Dia.31.75mm eyepiece Tube (Please choose 1 of them for your telescope)	108011/FTA037 108012/FTA050 108013/FTA075
	Note: For F and G 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;		
H	108015(Dia.23.2mm to 30.0mm ring)/Adapter rings for 30mm eyepiece tube		
I	108016(Dia.23.2mm to 30.5mm ring)/ Adapter rings for 30.5mm eyepiece tube		
J	108017(Dia.23.2mm to 31.75mm Ring)/ Adapter rings for 31.75mm 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.)	

9.3.5 Extension of WUCAM0720PA with Microscope or Telescope Adapter

Extension	Picture	
C-mount Camera		Machine vision; Medical imaging; Semiconductor equipment; Test instruments; Document scanners; 2D barcode readers; Web camera and security video; Microscope imaging;
Microscope Camera	WUCAM+AMAXXX(23.2mm Adapter)	WUCAM+FMAXXX(23.2mm Adapter)
Telescope Camera	WUCAM+ATAXXX(31.75mm Adapter)	WUCAM+FTAXXX(31.75mm Adapter)

9.4　WECAM Series +WiFi +Ethernet CMOS Camera

9.4.1 The Characteristic of WECAM Series Camera

The WECAM series camera is intended to be used for the acquisition of digital images from the stereo microscope, biological microscope or online interactive teaching. The basic characteristics are listed as below:

- Sony Exmor back illuminated CMOS sensor
- LAN, WiFi(AP/STA mode) multiple video outputs
- Powerful ISP functions
- ToupView/ToupLite software for PC
- iOS/Android app for smart phones or tablets

9.4.2 WECAM Series Camera Datasheet and Functions

Order Code	Sensor & Size(mm)	Pixel(μm)	G Sensitivity Dark Signal	FPS/Resolution	Binning	Exposure (ms)
WECAM5MPA	5M/Sony IMX178(C) 1/1.8"(6.22x4.67)	2.4x2.4	425mv with 1/30s 0.15mv with 1/30s	30@2592*1944	1x1	0.03ms~918ms

Figure 9-1 Available Ports on the Back Panel of the Camera Body

Interface	Function Description
WiFi Antenna	Antenna for the WiFi signal
LED	LED status indicator When the power adapter is inserted into the power slot, the LED light will be on and the starting process will last about 8 seconds; WiFi AP mode: the LED flashes fast; WiFi STA mode: the LED flashes slowly; LAN mode: the Ethernet indicator and the LED light will be on;
DC12V	Power jack (12V/1A).
AP/STA Switch Button	Press to switch between AP and STA mode;
LAN	100M Ethernet port to connect to the router or computer to transfer video.　Video can be transmitted via LAN or WiFi. LAN and WiFi cannot be used at the same time. The priority of LAN connection is higher than WiFi;
Video Output Interface	Function Description
LAN Interface	30fps@2592*1944 H264 encoded video and Jpeg image capture
WiFi Interface	Support 802.11ac protocols in AP/STA mode; 30fps@2592*1944 H264 encoded video and Jpeg image capture
Other Function	Function Description
Software Environment　under　LAN/WiFi/Output	
White Balance	Auto White Balance
Color Technique	Ultra-Fine Color Engine
ISP	Exposure(Automatic/Manual Exposure)/ Gain，　White Balance(Manual / One Push), Sharpening，3D Denoise，　Saturation Adjustment，Contrast Adjustment，Brightness Adjustment，Gamma Adjustment，50HZ/60HZ Anti-flicker，Mirror/Flip，Network Bandwidth Adjustment
Capture/Control SDK	Windows/Linux/macOS/Android Multiple Platform SDK(Native C/C++, C#/VB.NET, Python, Java, DirectShow, Twain, etc)
Recording System	Still Picture or Movie
Operating System	Microsoft®Windows®XP / Vista / 7 / 8 / 8.1 /10(32 & 64 bit) OSx(Mac OS X) Linux
PC Requirements	CPU: Equal to Intel Core2 2.8GHz or Higher

WECAM Series WiFi +Ethernet CMOS Camera

	Memory: 4GB or More
	Ethernet: RJ45 Interface, 100M bps or more
	WiFi Adaptor: Support 802.11 b/g/n/ac
	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 Adapter

9.4.3 Dimension of WECAM Series Camera

Dimension of WECAM Series Camera

9.4.4 Packing Information for WECAM Series Camera

Packing Information for WECAM Series Camera

	Standard Packing List		
A	Gift box : L:15cm W:15cm H:10cm (1pcs, 0.46kg/ box)		
B	One WECAM series camera		
C	Power Adapter: Input: AC 100~240V 50Hz/60Hz, Output: DC 12V 1A **American standard:** Model: GS12U12-P1I 12W/12V/1A: UL/CUL/BSMI/CB/FCC **European standard:** Model:GS12E12-P1I 12W/12V/1A; TUV(GS)/CB/CE/ROHS EMI Standard:EN55022,EN61204-3, EN61000-3-2,-3, FCC Part 152 class B, BSMI CNS14338 EMS Standard:EN61000-4-2,3,4,5,6,8,11,EN61204-3,Class A Light Industry Standard		
D	CD (Driver & utilities software, Ø12cm)		
	Optional Accessory		
E	Ethernet cable		
F	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
G	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 F and G 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;		
H	108015(Dia.23.2mm to 30.0mm ring)/Adapter rings for 30mm eyepiece tube		
I	108016(Dia.23.2mm to 30.5mm ring)/ Adapter rings for 30.5mm eyepiece tube		
J	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.)	

9.5　WEUCAM Series +WiFi +Ethernet + USB CMOS Camera

9.5.1 The Characteristic of WEUCAM Series Camera

The WEUCAM series cameras can be connected to smart devices and computers through the network or directly connected to a computer via USB. It can be used for video and image acquisition of stereo microscope or biomicroscope, and can also be used for interactive microscope teaching system, which is convenient for teachers to teach and students to learn. The main features are as follows:

- Sony Exmor back illuminated large-sized CMOS sensor with lower noise and better photosensitive characteristics
- USB/LAN/WiFi multiple video outputs, WiFi adopts 802.11AC chip, with higher transmission bandwidth
- Powerful ISP functions, real-time video transmission can reach up to 30fps/4M
- ToupView/ToupLite software for PC, fully applicable for biological and stereological observations
- iOS/Android app for smart phones or tablets

9.5.2 WEUCAM Series Camera Datasheet and Functions

Order Code	Sensor & Size(mm)	Pixel(μm)	G Sensitivity/Dark Signal	FPS/Resolution	Binning	Exposure (ms)
WEUCAM4MPA	4M/Sony IMX347(C) 1/1.8"(7.8x4.38)	2.9x2.9	921mv with 1/30s 0.15mv with 1/30s	30@2688*1512(USB) 30@2688*1512(NETWORK)	1x1	0.021ms~1000ms

Figure 9-2 Available Ports on the Back Panel of the Camera Body

Interface	Function Description
LAN	100M Ethernet port to connect to the router or computer to transfer video. Video can be transmitted via LAN or WiFi. LAN and WiFi cannot be used at the same time. The priority of LAN connection is higher than WiFi.
USB	Connect the Micro USB 5V/1A power supply to power the camera, at this time the camera provides LAN or WiFi connection mode. Connect the Micro USB cable to the USB port of the computer to achieve video image output.
AP/STA Switch Button	Press to switch between AP and STA mode. Connecting 2~3 clients for a single camera is recommended

Video Output Interface	Function Description
LAN Interface	30fps@2688*1512 H264 encoded video and Jpeg image capture.
USB Interface	Connect to PC via Micro USB cable to transfer MJPEG/H264 real-time images, support 30fps@2688*1512 and 30fps@1920*1080.
WiFi Interface	Support 802.11ac protocols in AP/STA mode; 30fps@2688*1512 H264 encoded video and Jpeg image capture.

Software Environment　under　LAN/WLAN/Output	
White Balance	Auto, Manual and ROI White Balance
Color Technique	Ultra-Fine Color Engine
ISP	Exposure(Automatic/Manual Exposure)/ Gain, White Balance(Auto, Manual and ROI White Balance), Sharpening, 3D Denoise, Saturation Adjustment，Contrast Adjustment，Brightness Adjustment，Gamma Adjustment，50HZ/60HZ Anti-flicker，Mirror/Flip，color to grey, Network Bandwidth Adjustment
Capture/Control SDK	Windows/Linux/macOS/Android Multiple Platform SDK(Native C/C++, C#/VB.NET, Python, Java, DirectShow, Twain, etc)
Recording System	Still Picture or Movie
Operating System	Microsoft® Windows® XP / Vista / 7 / 8 / 8.1 / 10 / 11(32 & 64 bit) OSx(Mac OS X) Linux
PC Requirements	CPU: Equal to Intel Core2 2.8GHz or Higher
	Memory: 4GB or More

	Ethernet RJ45 Interface: 100M bps or more
	WiFi Adaptor: Support 802.11 b/g/n/ac
	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	Micro USB DC 5V/1A Adapter
Camera Size	
Length x Width x Height	50 mm x 50mm x 112mm
Shipping Weight	0.19 kg

9.5.3 Dimension of WEUCAM Series Camera

Dimension of WEUCAM Series Camera

9.5.4 Packing Information for WEUCAM Series Camera

Packing Information for WEUCAM Series Camera

	Standard Packing List		
A	Gift box : L:15cm W:15cm H:10cm (1pcs, 0.5kg/ box)		
B	One WEUCAM series camera		
C	Power Adapter: Input: AC 100~240V 50Hz/60Hz, Output: DC 5V 1A **American standard**: Model: POWER-U-5V1A(SK12G-0500100U): UL/CE/FCC **European standard**: Model: POWER-E-5V1A(SK12G-0500100V): UL/CE/FCC		
D	Micro USB cable 1.5 metres		
E	CD (Driver & utilities software, Ø12cm)		
	Optional Accessory		
F	Ethernet cable		
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.)	

10   ToupTek HDMI Displayer for XCAM Series Camera

10.1 TPHD4K133D HDMI OLED Displayer

10.1.1 TPHD4K133D's Basic Characteristic

TPHD4K133D is born with ToupTek's HDMI camera and can be used for 4K resolution display screen. TP2HD4K133D adopts AM-OLED panel to guarantee the wide view angle(approaching 178 degrees) and high contrast.

TPHD4K133D is a regular mouse screen that can be paired with an HDMI camera to create an integrated imaging and display system, which is flexible and intuitive. At the same time, the high-quality display characteristics of TPHD4K133D can fully utilize the features of an HDMI camera.

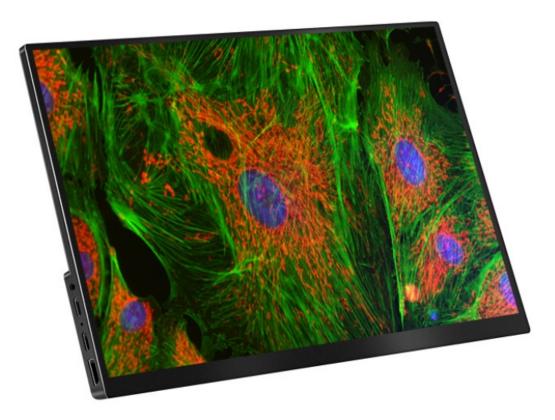The TPHD4K133D's basic characteristic is as follows

- True 4K HDMI displayer, meet the needs of most applications
- 13.3 inch active area
- In-Plane Switching, 178 degree wide viewing angle
- HDR dynamic image enhancement
- 100% DCI-P3 gamut
- 400cd/m2 display brightness, high contrast ratio up to 1000:1
- 4mm narrow frame design on three sides, with 81.5% of the screen area, great visual experience
- No delay is felt with 3ms response, and dynamic definition is optimized to keep the picture stable and clear without residual shadow
- Standard HDMI interface
- Connect computer to realize screen projection, splitting and expansion
- Integrated invisible folding support, easy viewing angle adjustment
- Easy to connect with HDMI camera

10.1.2 TPHD4K133D's Datasheet(1)
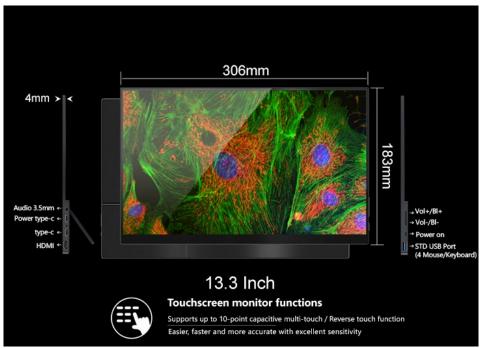
Order Code	Active Area(Inch)	Video Fomat	Resolution	Contrast	Color Gamut	View Angle
TPHD4K133D	13.3	HDMI	4K	100000:1	100% DCI-P3	IPS Full View(178°)

TPHD4K133D Datasheet

Basic Performance	
LCD Panel	AM-OLED
Input Video Format	HDMI
Native Resolution	3840 x 2160
Display Type	16:9 Ratio 13.3 Inch Active Matrix Super TFT LCD
Typical Contrast Ratio	100000:1
Colors	10.7 Million
Viewing Angle(L/R/U/D)	IPS Full View(178°)
Active Display Area	295mm(W) × 165mm(H)
Pixel Pitch	0.154(W) X 0.154(H) mm
Refresh Rate	60Hz
Brightness	400cd/m^2
Backlight	OLED Self Luminous
Outline Parameter	
Color	Black
Dimension	306(L)*183(H)*8(T) mm
Weight	560g
Operating Environment	
Operating Temperature	-15 Degree~55 Degree
Humidity Non Condensing	Operating:10%-90%, Storage: 5%-90%
Synchronization Range	30-80 KHz Horizontal, 55-75 Hz Vertical
Power Supply	AC110V-220V /DC5~12V(1A) (Type C)
Power Consumption	Max 12W
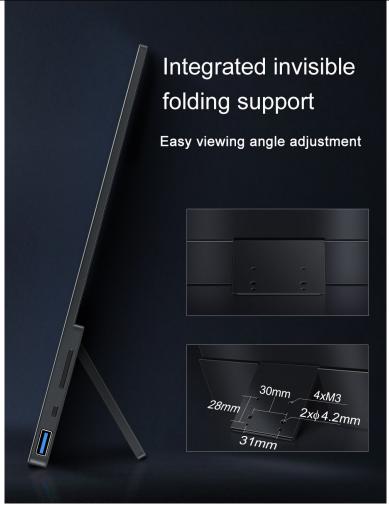
10.1.3 TPHD4K133D and XCAM Series HDMI Camera

Front View of TPHD4K133D Displayer

Dimension, Interface and Control Button of TPHD4K133D Displayer

Integrated Invisible Folding Support of TPHD4K133D Displayer

Right Side View of TPHD4K133D Displayer and XCAM Series HDMI Camera's Connection

Back View of TPHD4K133D Displayer and XCAM Series HDMI Camera's Connection

TPS300A Stand, Monocular Zoom Objective (TZM0480), XCAM Series HDMI Camera and TPHD4K133D Displayer

10.2 TP2HD4K133B Touchscreen HDMI LCD Displayer

10.2.1 TP2HD4K133B's Basic Characteristic

TP2HD4K133B is born with ToupTek's XCAM series HDMI camera and can be used for high definition display. It adopts IPS LCD panel(Super TFT) to guarantee the wide view angle and high contrast. Together with XCAM HDMI camera, TP2HD4K133B could make the imaging & display solution simple, flexible and intuitive. Outstanding performance of TP2HD4K133B helps XCAM HDMI camera reach fast frame rate and excellent color. The HDMI camera with touch function is connected with TP2HD4K133B touchscreen monitor, can easily realize touch operation of camera function.

The TP2HD4K133B's basic characteristic is as follows

- TP2HD4K133B(Touchscreen model)
- True 4K HDMI displayer
- 13.3 inch active area
- IPS LCD panel, 178 degree wide viewing angle
- HDR dynamic image enhancement
- 100% SRGB primary gamut
- 400cd/m^2 display brightness, high contrast ratio up to 1000:1
- 4mm narrow frame design on three sides, with 90% of the screen area, great visual experience
- No delay is felt with 3ms response, and dynamic definition is optimized to keep the picture stable and clear without residual shadow
- Standard HDMI interface
- Connect computer to realize screen projection, splitting and expansion
- Integrated invisible folding support, easy viewing angle adjustment
- Easy to connect with HDMI camera

10.2.2 TP2HD4K133B Datasheet(1)
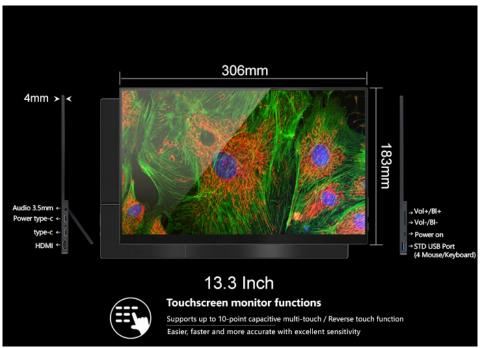
Order Code	Active Area(Inch)	Video Fomat	Resolution	Contrast	Color Gamut	View Angle
TP2HD4K133B	13.3	HDMI	4K	1000:1	100%	IPS Full View(178°)

TP2HD4K133B Datasheet

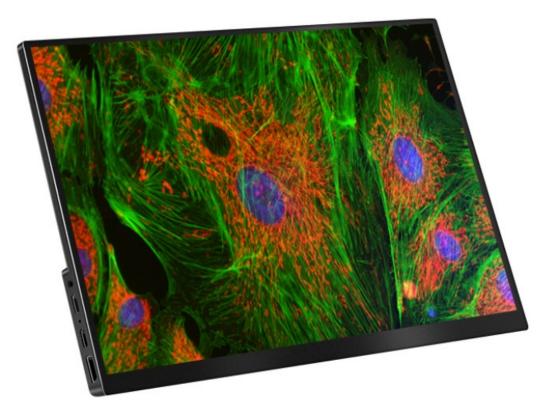| Basic Performance	
LCD Panel	IPS LCD Screen(Super TFT)
Input Video Format	HDMI
Native Resolution	3840 x 2160
Display Type	16:9 Ratio 13.3 Inch Active Matrix Super TFT LCD
Typical Contrast Ratio	1000:1
Colors	16.7 Million
Viewing Angle(L/R/U/D)	IPS Full View(178°)
Active Display Area	295mm(W) × 165mm(H)
Pixel Pitch	0.154(W) X 0.154(H) mm
Refresh Rate	60Hz
Brightness	400cd/m^2
Backlight	LED Backlight， 50000 hours
Outline Parameter	
Color	Black
Dimension	306(L)*183(H)*8(T) mm
Weight	560g
Operating Environment	
Operating Temperature	-15 Degree~55 Degree
Humidity Non Condensing	Operating:10%-90%, Storage: 5%-90%
Synchronization Range	30-80 KHz Horizontal, 55-75 Hz Vertical
Power Supply	AC110V-220V /DC5~12V(1A) (Type C)
Power Consumption	Max 15W

10.2.3 TP2HD4K133B and XCAM Series HDMI Camera

Front View of TP2HD4K133B Displayer

Dimension, Interface and Control Button of TP2HD4K133B Displayer

Integrated Invisible Folding Support of TP2HD4K133B Displayer

Right Side View of TP2HD4K133B Displayer and XCAM Series HDMI Camera's Connection

Back View of TP2HD4K133B Displayer and XCAM Series HDMI Camera's Connection

TPS300A Stand, Monocular Zoom Objective (TZM0480), XCAM Series HDMI Camera and TP2HD4K133B Displayer

10.3 TPHD1080PD/TP2HD1080PD HDMI Displayer

10.3.1 TPHD1080PD/TP2HD1080PD's Basic Characteristic

TPHD1080PD/TP2HD1080PD is born with ToupTek's XCAM series HDMI camera and can be used for high definition display. It adopts IPS LCD panel(Super TFT) to guarantee the wide view angle and high contrast. Together with XCAM HDMI camera, TPHD1080PD/TP2HD1080PD could make the imaging & display solution simple, flexible and intuitive. Outstanding performance of TPHD1080PD/TP2HD1080PD helps XCAM HDMI camera reach fast frame rate and excellent color. The HDMI camera with touch function is connected with TP2HD1080PD touchscreen monitor, can easily realize touch operation of camera function.

The TPHD1080PD/TP2HD1080PD's basic characteristic is as follows

- TPHD1080PD(General model)/TP2HD1080PD(Touchscreen model)
- True 1080P HDMI displayer
- 13.3 inch active area
- IPS LCD panel, 178 degree wide viewing angle
- HDR dynamic image enhancement
- 72% SRGB primary gamut
- 400cd/m^2 display brightness, high contrast ratio up to 1000:1
- 4mm narrow frame design on three sides, with 90% of the screen area, great visual experience
- No delay is felt with 3ms response, and dynamic definition is optimized to keep the picture stable and clear without residual shadow
- Standard HDMI interface
- Connect computer to realize screen projection, splitting and expansion
- Integrated invisible folding support, easy viewing angle adjustment
- Easy to connect with HDMI camera
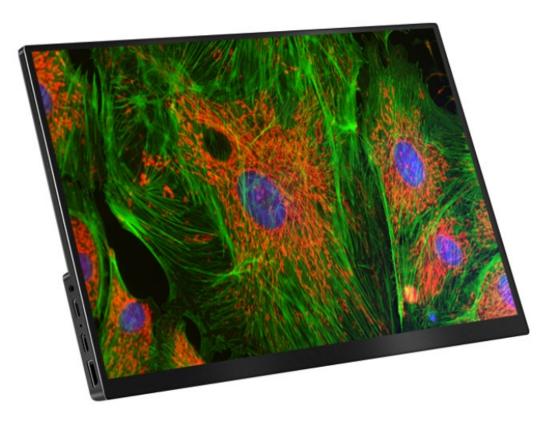
10.3.2 TPHD1080PD/TP2HD1080PD Datasheet(2)

Order Code	Active Area(Inch)	Video Fomat	Resolution	Contrast	Color Gamut	View Angle	Touch Function
TPHD1080PD	13.3	HDMI	1080P	1000:1	72%	IPS Full View(178°)	NA
TP2HD1080PD	13.3	HDMI	1080P	1000:1	72%	IPS Full View(178°)	Available

TPHD1080PD/TP2HD1080PD Datasheet
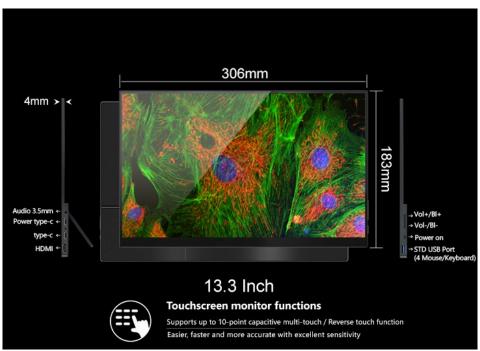
Basic Performance	
TPHD1080PD/TP2HD1080PD	Common/touch, 2 means square
LCD Panel	IPS LCD Screen(Super TFT)
Input Video Format	HDMI
Native Resolution	1920 x 1080
Display Type	16:9 Ratio 13.3 Inch Active Matrix Super TFT LCD
Typical Contrast Ratio	1000:1
Colors	16.7 Million
Viewing Angle(L/R/U/D)	IPS Full View(178°)
Active Display Area	295mm(W) × 165mm(H)
Pixel Pitch	0.154(W) X 0.154(H) mm
Refresh Rate	60Hz
Brightness	400cd/m^2
Backlight	LED Backlight， 50000 hours
Outline Parameter	
Color	Black
Dimension	306(L)*183(H)*8(T) mm
Weight	450g
Operating Environment	
Operating Temperature	-15 Degree~55 Degree
Humidity Non Condensing	Operating:10%-90%, Storage: 5%-90%
Synchronization Range	30-80 KHz Horizontal, 55-75 Hz Vertical
Power Supply	AC110V-220V /DC5~12V(1A) (Type C)

Power Consumption	Max 12W
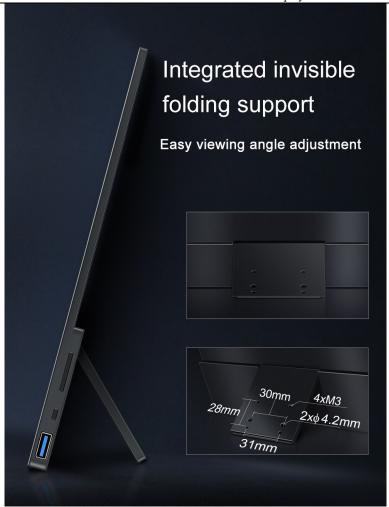
10.3.3 TPHD1080PD/TP2HD1080PD and XCAM Series HDMI Camera

Front View of TPHD1080PD/TP2HD1080PD Displayer

Dimension, Interface and Control Button of TPHD1080PHD Displayer

Integrated Invisible Folding Support of TPHD1080PHD Displayer

Right Side View of TPHD1080PHD/ TP2HD1080PHD Displayer and XCAM Series HDMI Camera's Connection

Back View of TPHD1080PD/TP2HD1080PD Displayer and XCAM Series HDMI Camera's Connection
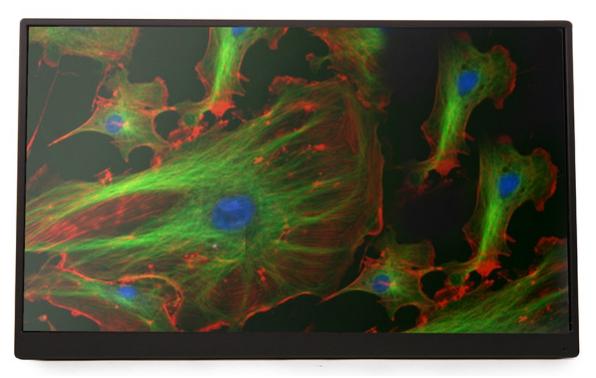

TPS300A Stand, Monocular Zoom Objective (TZM0480), XCAM Series HDMI Camera and
TPHD1080PD/TP2HD1080PD Displayer

10.4 TPHD4K133A 4K HDMI Displayer(Not available)

10.4.1 TPHD4K133A's Basic Characteristic

TPHD4K133A is specially designed for ToupTek XCAM series 4K HDMI cameras, which can stream live 4K videos. The TPHD4K133A screen uses an IPS LCD screen (also known as a super TFT display) with a full viewing angle (close to 180 degrees) and high contrast characteristics.

Combining TPHD4K133A with XCAM series 4K HDMI cameras can build an integrated imaging and display system, which is flexible and intuitive. At the same time, TPHD4K133A's high-quality display features helps fully demonstrate the characteristics of XCAM series 4K HDMI cameras.

The TPHD4K133A's basic characteristic is as follows:

- 4K HDMI input display;
- IPS LCD screen;
- Hardware resolution 3840 x2160;
- Contrast ratio up to 1500:1;
- LED backlight, lifespan up to 50000 hours;
- Two HDMI ports
- Button to switch HDMI1 and HDMI2 signal input or display at the same time
- The power switch is used as a backlight control button
- The effective display size is 13.3 inches;

10.4.2 TPHD4K133A Datasheet(1)

Order Code	Active Area(Inch)	Video Fomat	Resolution	Contrast	Color(Million)	View Angle
TPHD4K133A	13.6	HDMI 2.0	4K	1500:1	16. 7	IPS Full View

Basic Performance	
LCD Panel	Panasonic IPS LCD Screen(Super TFT)
Input Video Format	HDMI2.0/ HDMI1.4
Native Resolution	3840 x 2160
Display Type	13.3 Inch Active Matrix Super TFT LCD
Colors	16.7 Million
Viewing Angle(L/R/U/D)	IPS Full View

Active Display Area	293.76±0.1mm(W) × 165.24±0.1mm (H)
Pixel Pitch	0.0765(W) X 0.0765(H) mm
Brightness	Above 300Cd/m2
Color gamut	72% NTSC sRGB 100%
Response time	15/14（Trp.）(Tr+TD)(MS)
Typical Contrast Ratio	1500:1
Backlight	LED Backlight， 50000 hours
Outline Parameter	
Color	Black
Dimension	303.8(L)*185(H)*10.5(W) mm
Weight	0.55Kg
Operating Environment	
Operating Temperature	-15 Degree~55 Degree
Humidity Non Condensing	Operating:10%-90%, Storage: 5%-90%
Synchronization Range	30-80 KHz Horizontal, 55-75 Hz Vertical
Power Supply	AC110V-220V /DC12V(1A)
Power Consumption	Max 12W

10.4.3 TPHD4K133A Control

1. Provide Two HDMI HD interfaces
2. After the power is connected, the product will automatically turn on, and the LED will change from red to blue.
3. The back button switches display among HDMI1 signal, HDMI2 signal or display both at the same time
4. The power switch is used as a backlight control button

10.4.4 TPHD4K133A, HDMI Camera and Microscope

TPHD4K133A and HDMI 4K Camera

Leica Microscope and HDMI 4K Camera with TPHD4K133A

Zeiss Microscope and HDMI 4K Camera with TPHD4K133A

Olympus Microscope and HDMI 4K Camera with TPHD4K133A

10.5 TPHD4K133B HDMI LCD Monitor(Not available)

10.5.1 TPHD4K133B Basic Characteristic

TPHD4K133B is born with ToupTek's XCAM series HDMI camera and can be used for high definition display. It adopts IPS LCD panel(Super TFT) to guarantee the wide view angle and high contrast. Together with XCAM HDMI camera, TPHD4K133B could make the imaging & display solution simple, flexible and intuitive. Outstanding performance of TPHD4K133B helps XCAM HDMI camera reach fast frame rate and excellent color.
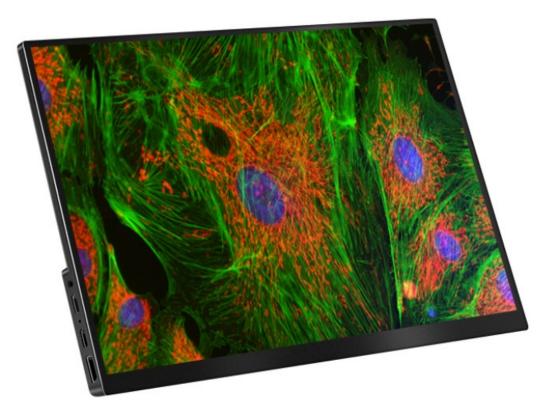
The TPHD4K133B's basic characteristic is as follows

- True 4K HDMI displayer
- 13.3 inch active area
- IPS LCD panel, 178 degree wide viewing angle
- HDR dynamic image enhancement
- 100% SRGB primary gamut
- 400cd/m^2 display brightness, high contrast ratio up to 1000:1
- 4mm narrow frame design on three sides, with 90% of the screen area, great visual experience
- No delay is felt with 3ms response, and dynamic definition is optimized to keep the picture stable and clear without residual shadow
- Standard HDMI interface
- Connect computer to realize screen projection, splitting and expansion
- Integrated invisible folding support, easy viewing angle adjustment
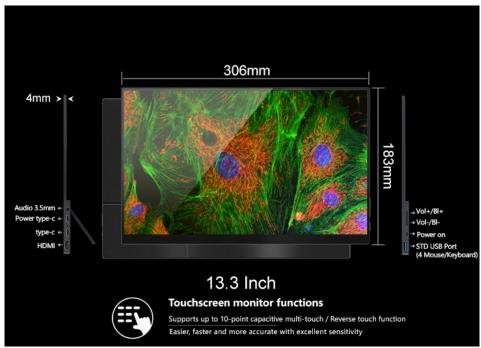- Easy to connect with HDMI camera

10.5.2 TPHD4K133B Datasheet(1)

Order Code	Active Area(Inch)	Video Fomat	Resolution	Contrast	Color Gamut	View Angle	Touch Function
TPHD4K133B	13.3	HDMI	4K	1000:1	100%	IPS Full View(178°)	NA

TPHD4K133B/TP2HD4K133B Datasheet

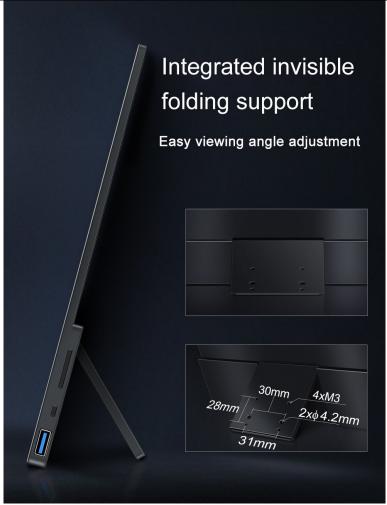| Basic Performance	
LCD Panel	IPS LCD Screen(Super TFT)
Input Video Format	HDMI
Native Resolution	3840 x 2160
Display Type	16:9 Ratio 13.3 Inch Active Matrix Super TFT LCD
Typical Contrast Ratio	1000:1
Colors	16.7 Million
Viewing Angle(L/R/U/D)	IPS Full View(178°)
Active Display Area	295mm(W) × 165mm(H)
Pixel Pitch	0.154(W) X 0.154(H) mm
Refresh Rate	60Hz
Brightness	400cd/m^2
Backlight	LED Backlight， 50000 hours
Outline Parameter	
Color	Black
Dimension	306(L)*183(H)*8(T) mm
Weight	560g
Operating Environment	
Operating Temperature	-15 Degree~55 Degree
Humidity Non Condensing	Operating:10%-90%, Storage: 5%-90%
Synchronization Range	30-80 KHz Horizontal, 55-75 Hz Vertical
Power Supply	AC110V-220V /DC5~12V(1A) (Type C)
Power Consumption	Max 12W

10.5.3 TPHD4K133B and XCAM Series HDMI Camera

Front View of TPHD4K133B Displayer

Dimension, Interface and Control Button of TPHD4K133B Displayer

Integrated Invisible Folding Support of TPHD4K133B Displayer

Right Side View of TPHD4K133B Displayer and XCAM Series HDMI Camera's Connection

Back View of TPHD4K133B Displayer and XCAM Series HDMI Camera's Connection

TPS300A Stand, Monocular Zoom Objective (TZM0480), XCAM Series HDMI Camera and TPHD4K133B Displayer

10.6 TPHD1080PA/B HDMI Displayer(Not available)

10.6.1 TPHD1080PA/B's Basic Characteristic

TPHD1080PA/B is born with ToupTek's XCAM series HDMI camera and can be used for high definition display. It adopts Panasonic IPS LCD panel(Super TFT) to guarantee the wide view angle and high contrast. Together with XCAM HDMI camera, TPHD1080PA/B could make the imaging & display solution simple, flexible and intuitive. Outstanding performance of TPHD1080PA/B helps XCAM HDMI camera reach fast frame rate and excellent color.

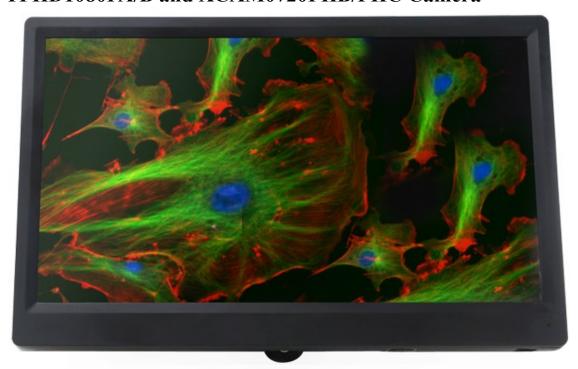The TPHD1080PA/B's basic characteristic is as follows

- HDMI displayer;
- Panasonic IPS LCD panel;
- True 1080P;
- High contrast ratio up to 1000:1;
- LED backlight with 50000 hours long life time;
- 11.6 inch active area;

10.6.2 TPHD1080PA/B Datasheet(1)

Order Code	Active Area(Inch)	Video Fomat	Resolution	Contrast	Color(Million)	View Angle
TPHD1080PA/B HD1080A	11.6	HDMI	1080P	1000:1	16.7	IPS Full View

TPHD1080PA/B Datasheet

Basic Performance	
LCD Panel	Panasonic IPS LCD Screen(Super TFT)
Input Video Format	HDMI
Native Resolution	1920 x 1080
Display Type	16:9 Ratio 11.6 Inch Active Matrix Super TFT LCD
Typical Contrast Ratio	1000:1
Colors	16.7 Million
Viewing Angle(L/R/U/D)	IPS Full Vew
Active Display Area	258mm(W) × 145mm(H)
Pixel Pitch	0.134(W) X 0.134(H) mm
Brightness	350 cd/ sq.m ;400cd sq.m / Optional
Backlight	LED Backlight， 50000 hours
Outline Parameter	
Color	Black
Dimension	281(L)*179(H)*15.6(W) mm
Weight	400g
Operating Environment	
Operating Temperature	-15 Degree~55 Degree
Humidity Non Condensing	Operating:10%-90%, Storage: 5%-90%
Synchronization Range	30-80 KHz Horizontal, 55-75 Hz Vertical
Power Supply	AC110V-220V /DC12V(1A)
Power Consumption	Max 12W

10.6.3 TPHD1080PA/B and XCAM0720PHB/PHC Camera

Front View of TPHD1080PA/B

Back View of TPHD1080PA/B+XCAM Series Camera

Side view of TPHD1080PA/B+XCAM Series Camera

Front View of Leica Microscope+XCAMSeries Camera and TPHD1080PA/B

Side View of Leica Microscope+XCAMSeries Camera and TPHD1080PA/B

Front View of Nikon Microscope+XCAMSeries Camera and TPHD1080PA/B

Side View of Nikon Microscope+XCAMSeries Camera and TPHD1080PA/B

Front View of Olympus Microscope+XCAMSeries Camera and TPHD1080PA/B

Side View of Olympus Microscope+XCAMSeries Camera and TPHD1080PA/B

Front View of Zeiss Microscope+XCAMSeries Camera and TPHD1080PA/B

Side View of Zeiss Microscope+XCAMSeries Camera and TPHD1080PA/B

10.6.4 TPHD1080PA/B and XCAM1080PHA Series Camera, XCAM1080PHB/ PHD Camera

Front View of TPHD1080PA/B

Back View of TPHD1080PA/B+XCAM Series Camera

Side view of TPHD1080PA/B+XCAM Series Camera

Front View of Leica Microscope+XCAMSeries Camera and TPHD1080PA/B

Side View of Leica Microscope+XCAMSeries Camera and TPHD1080PA/B

Front View of Nikon Microscope+XCAMSeries Camera and TPHD1080PA/B

Side View of Nikon Microscope+XCAMSeries Camera and TPHD1080PA/B

Front View of Olympus Microscope+XCAMSeries Camera and TPHD1080PA/B

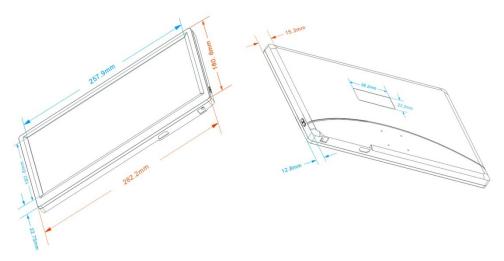Side View of Olympus Microscope+XCAMSeries Camera and TPHD1080PA/B

Front View of Zeiss Microscope+XCAMSeries Camera and TPHD1080PA/B

Side View of Zeiss Microscope+XCAMSeries Camera and TPHD1080PA/B

10.6.5 Dimension of TPHD1080PA/B

Dimension of TPHD1080PA/B

11   ToupTek®-- Contact Information

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12 ToupTek Web

12.1 Microscopic Web

Chinese: https://www.touptekphotonics.com.cn
English: https://www.touptek.com
English: https://www.touptekphotonics.com

12.2 Astronomy Web

Chinese: https://www.touptek-astro.com.cn
Chinese: https://www.touptek-astro.cn
English: https://www.touptek-astro.com

12.3 Astronomy independent station/shop

English: https://www.touptekastro.com