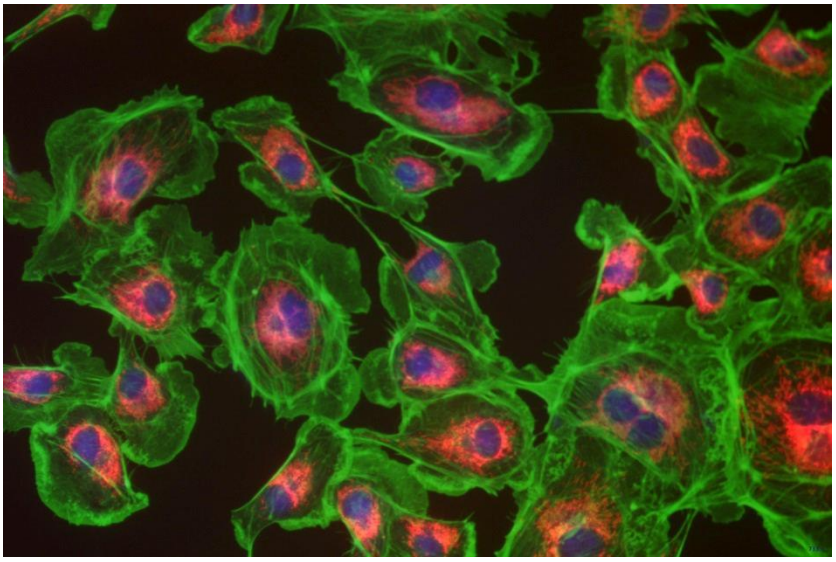
ToupTek Product Catalog-2018

ToupTek Temperature Regulated USB3.0 CCD



Fluorescent Image Captured by ToupCam Camera

Aug. 21, 2018

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Product Catalog

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1 Update History

1.1 03/02/2015

- A totally new product called **ZOPE** digital microscope is available now. This product is partially like Dino-Lite USB microscope but with continuous zoom capability and fixed conjugate distance. The Dino-Lite USB microscope only has 2 magnifications at a conjugate distance. If one wishes to have other magnifications, he has to adjust the object distance and move the lens position. That's very difficult to realize. The optical performance is near the diffraction limit with the help of **12** optical components. The internal 8 LED is embedded in the zoom lens for the refractive illumination. An optional transmissive illumination module is provided also.

1.2 1/11/2015

- New **MTR3CCD** series temperature-regulated USB3.0 CCD camera with 6 models released on Nov. 1,2015
- New **U3CCD** series USB3.0 CCD camera with 4 models released on Nov. 1,2015
- **MG3CMOS** series microscope USB3.0 Sony CMOS Camera with 5 models released on Nov.1,2015
- **E3CMOS** Series USB3.0 Sony Exmor CMOS Camera with 5 models released on Nov.1,2015

1.3 11/11/2015

- A new eyepiece camera series called **SPCMOS** with embedded reduction lens is added, 5 models are included. With different coupled reduction lens, the field of view is greatly enlarged.
- 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.
- A new model called **U3CMOS16000KPA**(TP116000A) is added to ToupTek U3CMOS family. This new model embedded with Panasonic MN34120 sensor with effective pixels approx. 16.37 mega pixels (4660*3512) and 16 Mega output pixels.

1.4 24/10/2016

- Delete the **MG3CMOS** series;
- The integration time for **U3HCCD** is change from 1h to 1000s;
- Added the **ECMOS** series including 4 models into the catalog, which is a new series adopt the Sony Exmor CMOS sensor;
- A new camera called **E3CMOS01200KPA** is added into the **E3CMOS** series;
- **E3CMOS05000KMA** now supports 2 x 2 binning;
- A new camera called **E3CMOS20000KPA** is added into the **E3CMOS** series; The new camera has 20M resolution and 1" sensor size.

1.5 21/12/2016

- Add E3ISPM USB3.0 Sony CMOS Camera with HISPVP in side into the catalog. The Ultra-fine Hardward ISP video pipeline will improve the video speed greatly.

1.6 03/05/2017

- Add U3CMOS10000KMA to the U3CMOS series camera which is a monochromatic sensor with 10M resolution.

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- Add U3ISPM USB3.0 Aptina/Panasonic CMOS Camera with HISPVP in side into the catalog. The Ultra-fine Hardward ISP video pipeline will improve the video speed greatly
- Add the 0.8x(C-Mount) 1.2x(T2-Mount) adapter to the Olympus, Leica, Zeiss, Nikon and Huvitz microscope adapter for the new big size sensors
- Add **SCMOS02000KPB**, **SCMOS00920KPA** to the SCMOS series camera.
- Add **E3ISPM05000KPA**, **E3ISPM03100KPA** to the E3ISPM series camera
- Add **E3ISPM09000KPA** to the E3ISPM series camera
- Add **E3CMOS03100KMC** to the E3COMS series camera
- Add **U3ISPM16000KPB** to the U3ISPM series camera

1.7 10/08/2017

- 2 resolutions are added into **U3CMOS16000KMB**, 36@3840x2160, 43@1980 x 1080. Its smallest integration time changes from 0.06ms to 0.24ms;
- Added 2 models **E3CMOS00400KPA** and **E3CMOS00400KMA** to the **E3CMOS** series. The two models have low resolution but higher frame rate;
- Added 2 models **E3ISPM12300KPA** and **E3ISPM08300KPA** to the **E3ISPM** series. The two models have moderate resolution but high performance for fluorescence applications; **E3ISPM12300KPA** is with Sony Exhmor global shutter sensor
- Added 2 models **ECMOS008300KPA** and **ECMOS06600KPA** to the **ECMOS** series. The two models enrich the ECMOS series and user has more selection.

1.8 11/08/2017

- A new series called **UA** is added into our USB2.0 CMOS camera. This series is an USB2.0 Advance CMOS camera which is more stable and fast than our **UCMOS** series USB2.0 CMOS camera. UA series embedded external dedicated on-board buffer to achieve maximum performance of USB2.0 and is compatible with most of the old and new CPU PC;

1.9 26/09/2017

- Added **U3CCD12000KPA**, **U3CCD12000KMA**, **U3CCD09000KPA**, **U3CCD09000KMA** cameras to the **U3CCD** family. Thus the U3CCD is enriched greatly.
- Change the frame rate or **E3CMOS02300KMC** from 60FPS to 120FPS;
- Added **E3ISPM02000KPA** to the **E3ISPM** series with 125FPS

1.10 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.

1.11 09/12/2017

- Added **E3CMOS01500KMA** to **E3CMOS** series. Sony global shutter monochromatic sensor with high sensitivity and fast frame rate.
- Added **E3ISPM01500KPA** to **E3ISPM** series. Sony global shutter color sensor with high sensitivity and fast frame rate.

1.12 15/12/2017

- Added **MTR3CMOS** to the product catalog. The has 2 modes , they are **MTR3CMOS20000KMA** and **MTR3CMOS20000KMA**. The **MTR3CMOS** series has the two-stage peltier cooling sensor chip to -42 degree below ambient temperature

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1.13 02/01/2018

- Added 4 models camera to the **MTR3CCCD** series , they are **MTR3CCD12000KPA**, **MTR3CCD12000KMA**, **MTR3CCD09000KPA** and **MTR3CCD09000KMA**.

1.14 24/01/2018

- Change the **E3CMOS02300KPB** from **IMX302** to **IMX249**;
- Add **E3CMOS20000KMA** to **E3CMOS** series

1.15 21/03/2018

- Add 1 resolution **30@3360x2526** to **U3ISPM16000KPB**

Change **UCMOS01300KPA** sensor to **SC1235(C)** (the older one is for reference only

UCMOS01300KPA TP601300A	1.3M/MT9M111(C) 1/3“ (4.60x3.70)	3.6x3.6	1.0V/lux-sec 71dB 44dB	15@1280x1024 26@640x512 50@320x256	1x1, 2x2, 4x4	0.14ms~2000ms

1.16 26/04/2018

- Added **E3CMOS12300KMA** to **E3CMOS** series. The sensor size is about 1.1”

1.17 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 monitor application.

1.18 11/07/2018

- Added 3 microscope TE-cooling cameras into the **MTR3CMOS** series, there are **MTR3CMOS16000KPA**, **MTR3CMOS16000KMA** and **MTR3CMOS10300KPA**.

1.19 19/07/2018

- **S3CMOS05000KPC** is added into **S3CMOS** series

1.20 15/08/2018

- Added **SCMOS05000KPB** and **SCMOS03000KPB** into to **SCMOS** series. **SCMOS05000KPB** and **SCMOS03000KPB** have fast speed than **SCMOS05000KPA** and **SCMOS03000KPA**
- Added **ECMOS05000KPA** into **ECMOS** series. We have no such mode before.

1.21 21/08/2018

- A new series called **BigEye** is added. 3 cameras are included
- A new model **XFCAM1080PHB** is added into the microscope auto-focus HDMI CMOS camera

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2 Introduction to ToupCam Cameras

For Microscope, Telescope and Industrial Applications

2.1 Microscope

ToupTek® will work with you to choose and integrate the optimal camera for your microscopy project. Ideal for use in any laboratory setting, ToupTek cameras let you capture high-quality imager with your existing microscope equipment.

For microscope camera, high quality adapter will be the key point to ensure the high quality digital image. ToupTek has designed many different adapters for different microscopes such as Zeiss, Nikon, Leica and Olympus through the straight phototube and other microscopes through the 3rd ocular tube or eyepiece tube.

Our microscopy cameras and associated software are designed to offer consistent, high-quality image acquisition and performance.

2.2 Telescope

ToupTek®'s cameras also support telescopes. It works perfectly with any kind of optical telescope. The images of the observed object can be accurately displayed on a computer screen. With the software ToupView, it is very convenient to preview live images and to capture still pictures. The powerful advanced software ToupView included with the camera ensures simple and convenient operation on the captured images.

How do you mount a ToupTek®' camera for telescope onto a telescope? It is simple and easy. Remove the eyepiece from the telescope's ocular tube. Insert a camera into the ocular tube and secure it by tightening the locking-screw. Plug the camera into the USB2.0 port on your computer. That's all there is to it!

2.3 Machine Vision

ToupTek®'s experience in the machine vision industry will assist you with selecting and integrating the optimal industrial camera best suited to your application. The industry leading ToupTek® Software Developers Kit (SDK) streamlines and simplifies the integration of cameras into your machine vision project with one API for all cameras.

Along with our wide range of standard CMOS and CCD cameras, ToupTek® provides custom design services to alter one of our existing cameras, or creating one for your unique requirements. One of the many advantages of choosing ToupTek® to supply you and your business is the flexibility to opportunities in an ever-changing global market. With all the choices that are available to you, we ensure you get that you're getting the camera that will perform, with a quality that has been designed to last. We at ToupTek® pride ourselves on the quality of our digital cameras, including the after sales support that you receive with your purchase. The opportunity to provide you with an industry leading camera and software solution for your application would be our pleasure.

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2.4 Product Nomenclature

	UHCCD	05100K	P	A	-U	-ET	-S	-C	-SQ	-NA
	1	2	3	4	5	6	7	8	9	10
1	Series Name: SCCCD, U3CCD, U3CMOS, EXCCD, **UHCCD**, UCMOS or SCMOS,HCAM, XCAM, L3CMOS，LCMOS, WCAM, E3CMOS, GCMOS, MG3CMOS , MTR3CCD									
2	Pixel Number: eg. **05100K**: 5.1 Mega pixels									
3	Color Mode, M: Monochromatic; **P**: Polychromatic									
4	Sensor Distinguishing Code, such as **A**, B, C or D…									
5	Data Output Interface Model, **U**: USB; D: DVI; V: VGA; A: Analog									
6	Trigger Type, **ET**: External Trigger; NA: Not Available									
7	Cooled Type, **S**: Semiconductor Cooled; F: Fan Cooled; N: Natural Cooled									
8	Optical-Mechanical Interface Type, **C**: C-mount; M: Microscope; T: Telescope; S: Sporting Scope									
9	Mechanical Shape , CY: Cylinder; **SQ**: Square; CP: Compact									
10	TV System (Analog Cameras Only), PA: PAL; NT: NTSC; **NA**: Not Available									

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2.5 Comparison of ToupCam Cameras

Model	Interface	Characteristic
MTR3CCD	USB3.0	● Temperature-regulated USB3.0 CCD camera with ***Sony*** Super HAD/ExView CCD sensor. Controllable fan is used to achieve high performance heat radiation. Up to 50 degrees temperature drop ensures high quality video or image with lower noise;
SCCCD	USB2.0	● TE-Cooling USB2.0 CCD camera with ***Sony*** Super HAD/ExView CCD sensor. Heap pipe is used to achieve high performance heat radiation to eliminate the vibration. Up to 20 degrees temperature drop ensures high quality video or image with lower noise;
U3CCD	USB3.0	● USB3.0 CCD camera with ***Sony*** Super HAD/ExView CCD sensor. USB3.0 ensures high speed data transfer rate.
EXCCD	USB2.0	● High Speed CCD camera with ***Sony*** ExView HAD CCD sensor. It could be used for dark field applications due to its high sensitivity, such as fluorescence applications;
UHCCD	USB2.0	● High Speed CCD camera with ***Sony*** Super HAD CCD sensor;
MG3CMOS	USB3.0	● With ***Sony*** Exmor, Exmor R and Exmor RS CMOS sensor as the image-picking device and USB3.0 is used as the data transfer interface. High quality fan is used to dissipate the sensor heat and increase the image signal to noise ratio. This technique could lower the sensor noise and upgrade the CMOS sensor to the CCD sensor image quality
E3CMOS	USB3.0	● Super speed USB3.0 camera with ***Sony*** Exmor or Exmor R CMOS Sensor The most cost-effective USB3.0 imaging solution;
L3CMOS	USB3.0	● Super speed USB3.0 camera with on-board memory for ***Aptina*** and ***Sony*** CMOS Sensor; ● High performance cooling structure ensures low image noise;
U3CMOS	USB3.0	● Super speed USB3.0 camera with ***Aptina*** CMOS Sensor The most cost-effective USB3.0 imaging solution;
S3CMOS	USb3.0	● Compact microscope eyepiece camera with 23.2 diameter and ***Aptina*** CMOS sensor and USB3.0 interface;
LCMOS	USB2.0	● High speed USB2.0 camera with on-board memory for ***Aptina*** and ***Sony*** CMOS Sensor; ● On-board memory helps the camera to achieve the bandwidth limitation of USB2.0 and make the camera work stable for different computers with different configuration. High performance cooling structure ensures low image noise;
UCMOS	USB2.0	● High speed USB2.0 camera with ***Aptina*** CMOS Sensor; ● The most cost-effective USB2.0 imaging solution;
SCMOS	USB2.0	● Microscope economic eyepiece camera with 23.2mm diameter. Aptina sensor is used as the image pickup device;
SPCMOS	USB2.0	● Microscope economic eyepiece camera with embedded reduction lens to enlarge the FOV. The 23.2mm diameter ensures is can be directly insert into the eyepiece tube
XCAM	HDMI/VGA	● HDMI & VGA output camera; ● DSP inside ensuring high image quality and versatile functions; ● Including automatic white balance and exposure on/off (AEWB), saving images to SD card (SAVE), video stream and freeze on/off (FREEZE), multiple groups of cross lines and remote image snapshot controller to reduce the vibration blur (REMOTE);
WCAM	WiFi	● WiFi cameras. H.264 or MJPEG compression ensures high quality video; ● WiFi-enabled devices could be used to receive the video, such as smartphones, computers, and tablets with iOS, Android, and Windows operating systems; ● Mulitple users could have access to one camera simultaneously(up to 10); ● Born with ToupView imaging software for quantifying, measuring, and annotating images which is downloadable from app store viewing, capturing, and editing images(Windows OS Only);
WUCAM	WiFi+USB	● Multiple data output method(USB+WiFi) with switch on the cover;
HDMI720P	HDMI	● HDMI camera with720P hardware resolution
XCAM	HDMI+USB;	● With HDMI+USB+SD card output interface. GUI is supported to make the adjustment

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	HDMI+WiFi	at ease ● With HDMI+WiFi+SD card output interface. GUI is supported to make the adjustment at ease
ICMOS	USB2.0	● USB2.0 industrial camera with on-board memory for perfect synchronization and stable performance; ● 8-pin Hirose HR25-7TR-8PA GPIO connector for optical coupler isolation trigger, strobe (Optional); ● Compact industrial standard size (29x29x29 mm)for easy integration;
HCAM	USB2.0	● Handheld USB2.0 microscope with 10X to 1300X magnification;

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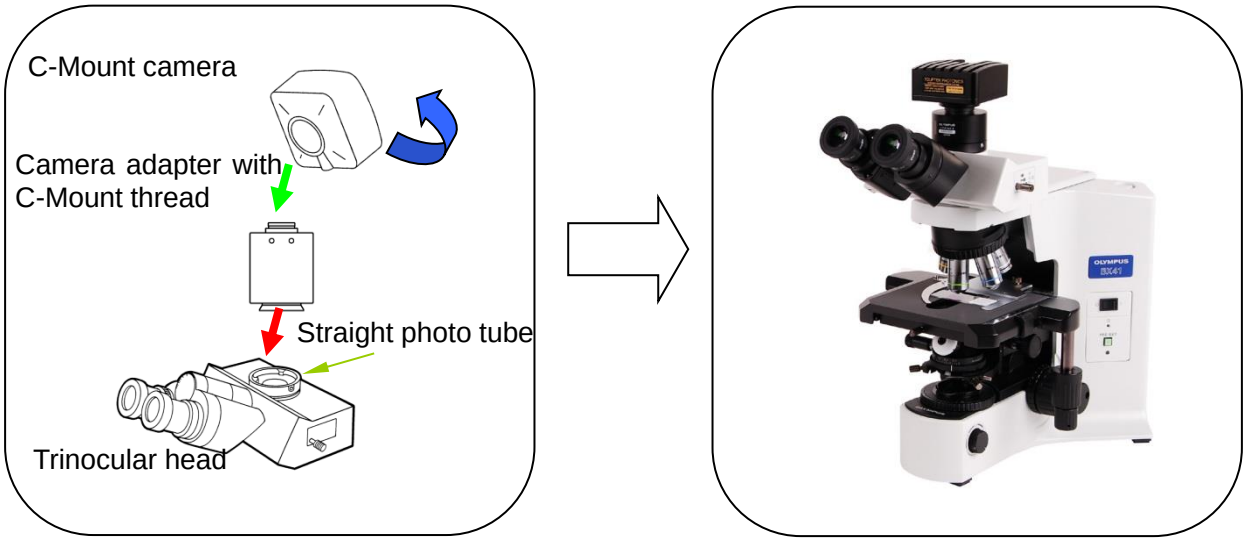
3 ToupCam® Camera & Microscope Configuration

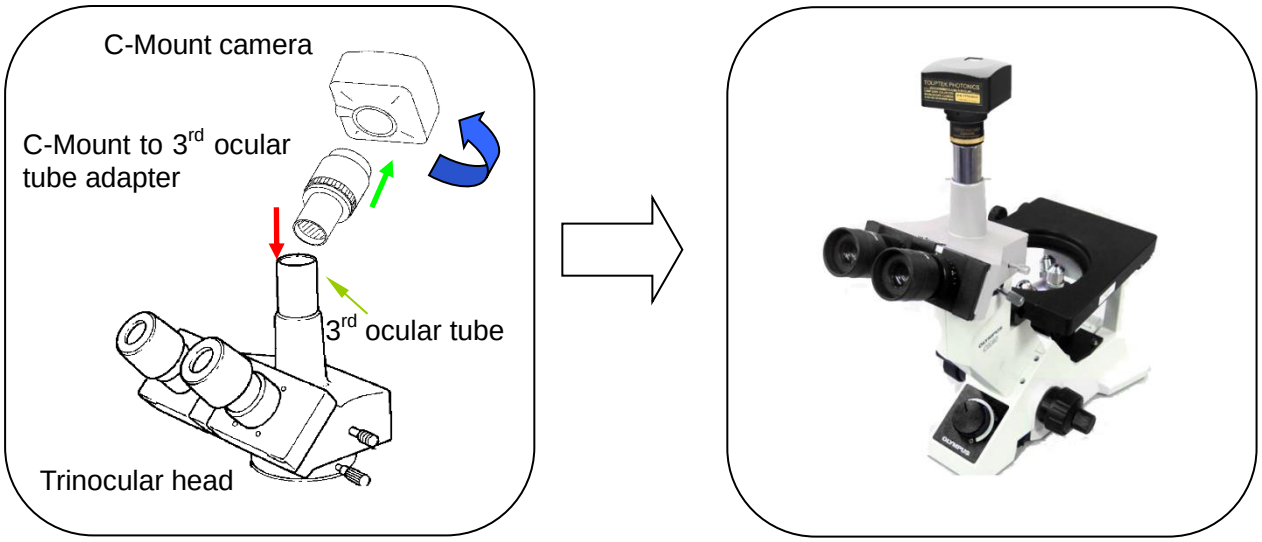
3.1 Trinocular Digital Microscope (1/2)

Attach the C-mount camera and Adapter to the straight photo tube



3.2 Trinocular Digital Microscope (2/2)

Attach the C-Mount camera and Adapter to the 3rd ocular tube or the other 2 eyepiece tubes



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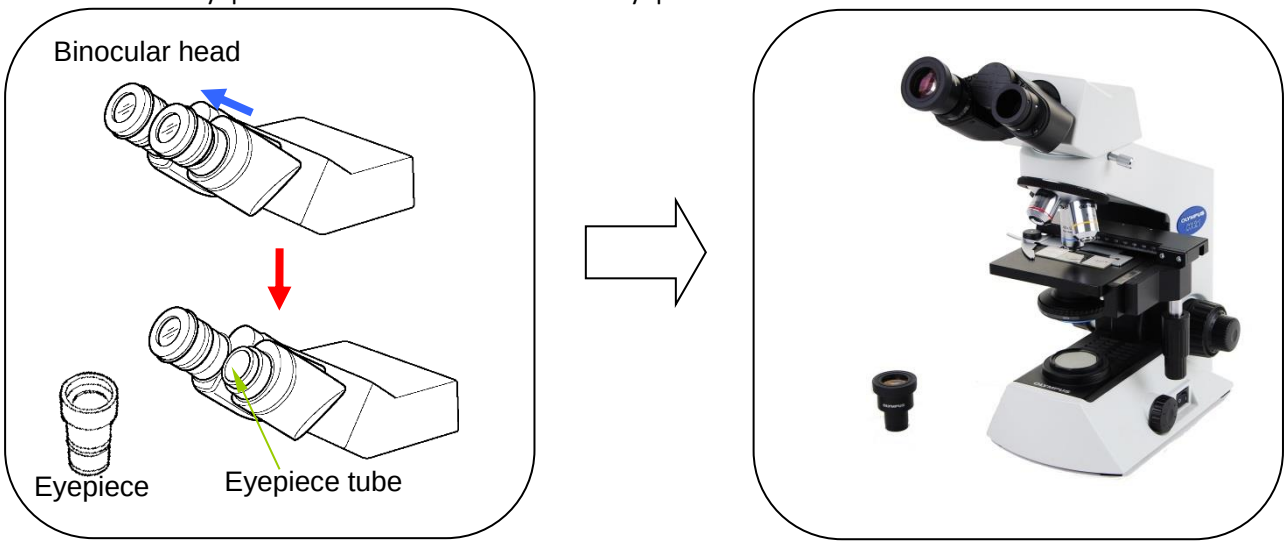
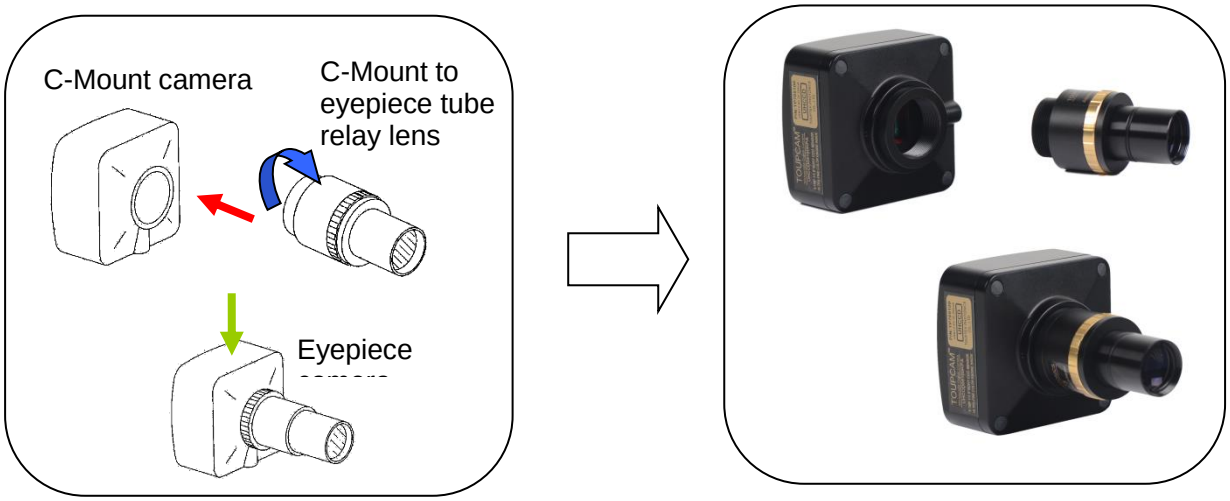
3.3 Binocular Digital Microscope

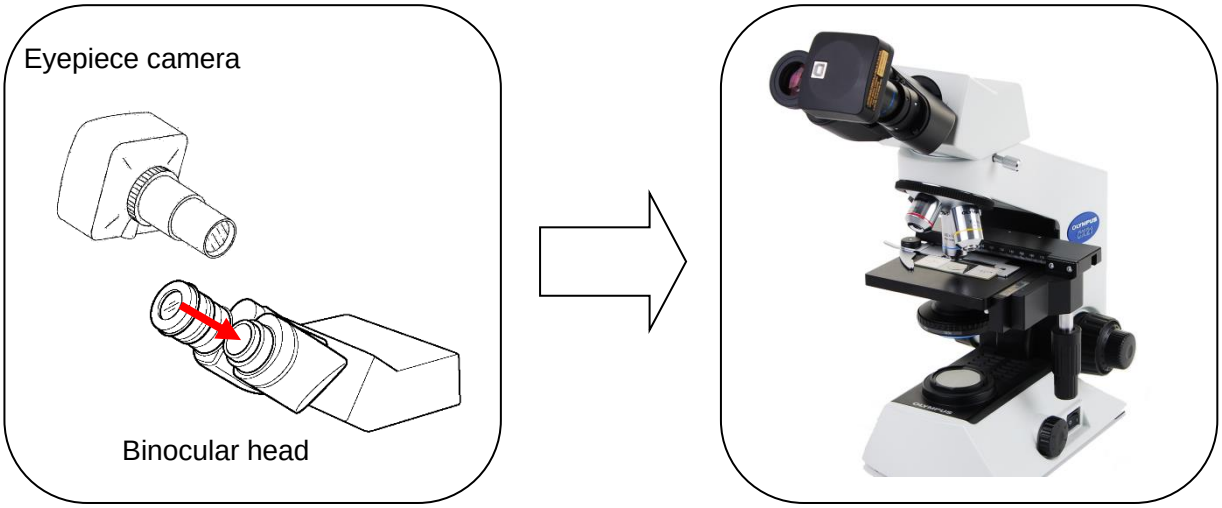
STEP 1: Remove the eyepiece from the ocular tube or the eyepiece tube



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



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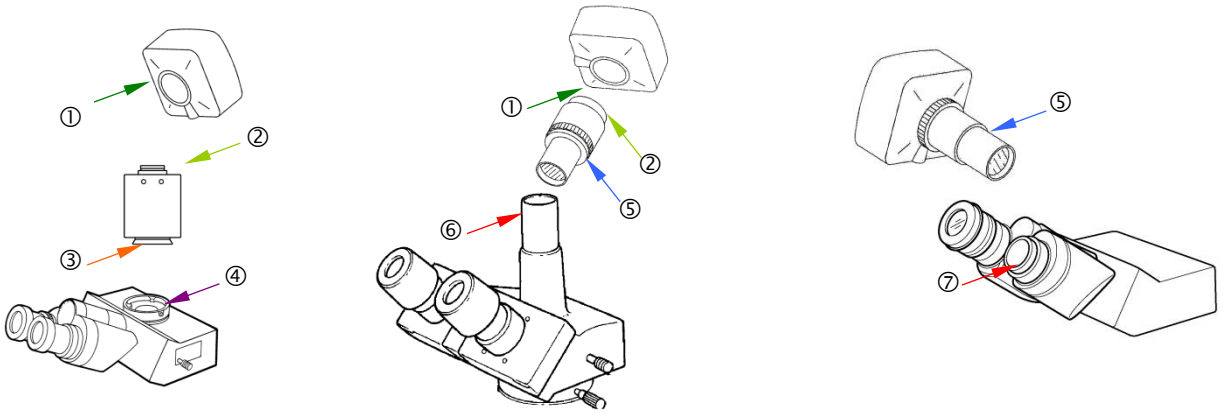
3.4 Size Description of the Connection Parts



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)

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4 Microscope Auto Focus HDMI CMOS Camera

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.

In HDMI output, 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.

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 XFCAM1080PHD's basic characteristic is as follows:

- All in 1(HDMI+WiFi) C-mount camera with Sony high sensitivity CMOS sensor;
- **Auto/Manual focus with the movement of the sensor;**
- For HDMI application, with built-in multiple-language XCamView software. The camera characteristic can be controlled by XCamView through the USB mouse. The other basic processing and control can also be realized by the XCamView;
- 1920 × 1080 (1080P) resolutions to match the current high-definition displayer on the market; Support plug and play application;
- For HDMI application, 2.0M or 5M resolution image(1920*1080 **XFCAM1080PHD**, 2592*1944 **XCAM1080PHB**) can be captured and saved for browsing; For video, 1080P video stream(asf format) can be captured and saved;
- With the USB WiFi adapter, the **XFCAM1080PHB/PHD** can be used as WiFi camera, the ToupView/ToupLite advanced image processing software is used to display the video and capture image. support plug and play application;
- Ultra-Fine Color Engine with perfect color reproduction capability(WiFi);
- 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

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segmentation & count, image stacking, color composite and denoising(USB);

- **XFCAM1080PHB/PHD** can meet various applications and can be widely used in industrial inspection, education and research, materials analysis, precision measurement, medical analyses etc.

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);

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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	60/1920*1080(HDMI) 25/1920x1080(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) 25/1920x1080 (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
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 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
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-FineTM Color Engine (WiFi)
Capture/Control API	Standard SDK for Windows/Linux/Mac(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

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4.3 XFCAM1080PHB/PHD and Microscope

XFCAM1080PHB/PHD and Its Back Panel

Different Views of XFCAM1080PHB/PHD

XFCAM1080PHB/PHD and Microscope

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4.4 Dimension of XFCAM1080PHB/PHD

Dimension of XFCAM1080PHB/PHD

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4.5 Packing Information for XFCAM1080PHB/PHD

Figure 1 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)		

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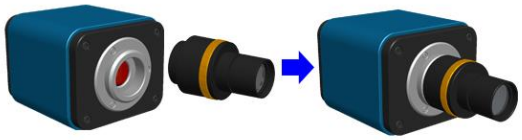
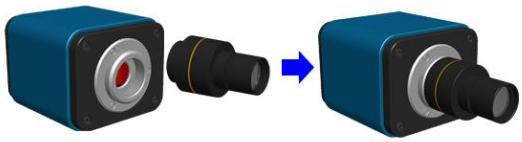
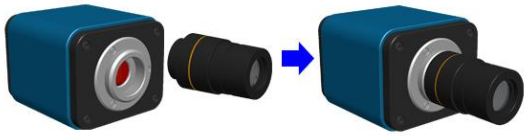
4.6 Extension of XFCAM1080PHB/PHD with Microscope or Telescope Adapter

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)

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5 Microscope HDMI CMOS Camera

5.1 XCAM0720PHA C-mount HDMI CMOS Camera(1) (Stopped)

5.1.1 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.

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5.1.2 XCAM0720PHA Datasheet

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

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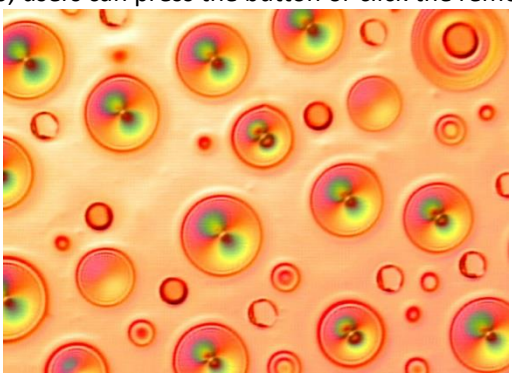
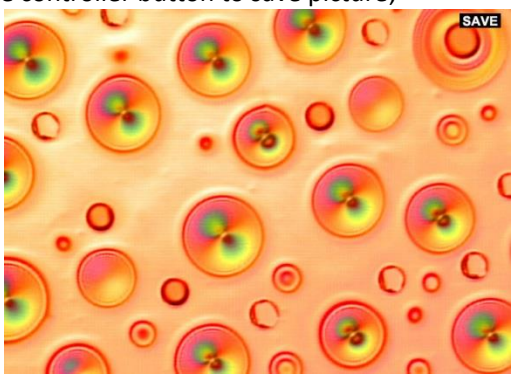
5.1.3 Function Key Description

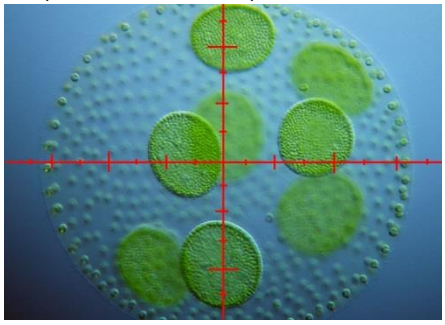
The XCAM0720PHA light indicator flashes about 15s after the power on. Then the XCAM0720PHA will load software, after finish loading, the system begins to work. Auto exposure and white balance are the default state now.

- **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

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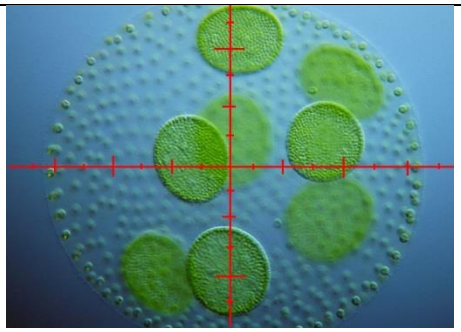
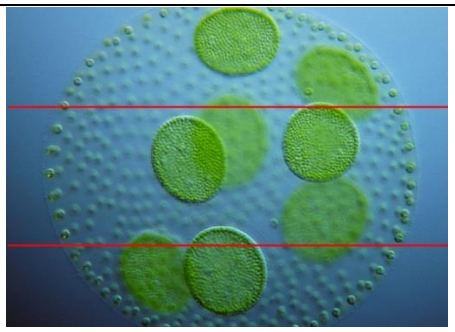
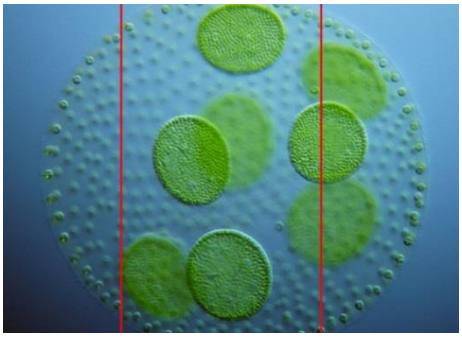


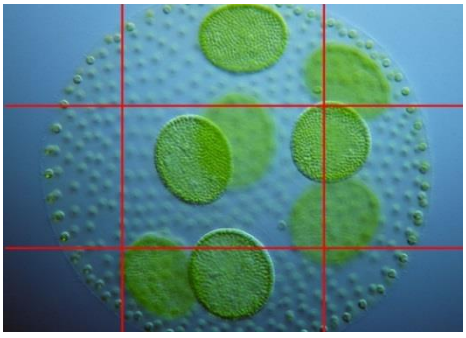
Scale



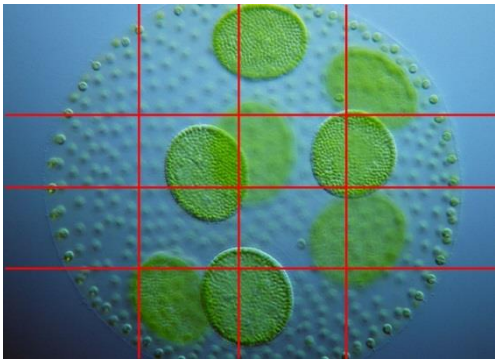
Two horizontal lines



Two horizontal lines



Double cross line



Tri-factor cross line

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5.1.4 Dimension of XCAM0720PHA

Dimension of XCAM720PHA

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5.1.5 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)		

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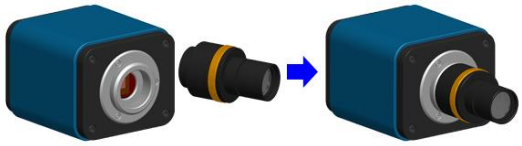
5.1.6 Extension of XCAM0720PHA Camera with Microscope or Telescope Adapter

<table>
<tr><th>Extension</th><th colspan="2">Picture</th></tr>
<tr><td>C-mount Camera</td><td>  </td><td>Machine vision; Medical imaging;
Semiconductor equipment; Test instruments;
Document scanners; 2D barcode readers;
Web camera and security video;
Microscope imaging;</td></tr>
<tr><td>Microscope Camera</td><td colspan="2" rowspan="2"> 
XCAM0720PHA+AMAXXX(23.2mm Adapter)
 
XCAM0720PHA+FMAXXX(23.2mm Adapter)
 
XCAM0720PHA+ATAXXX(31.75mm Adapter)
 
XCAM0720PHA+FTAXXX(31.75mm Adapter)</td></tr>
<tr><td>Telescope Camera:</td></tr>
</table>

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

5.2.1 XCAM0720PHB/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

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5.2.2 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

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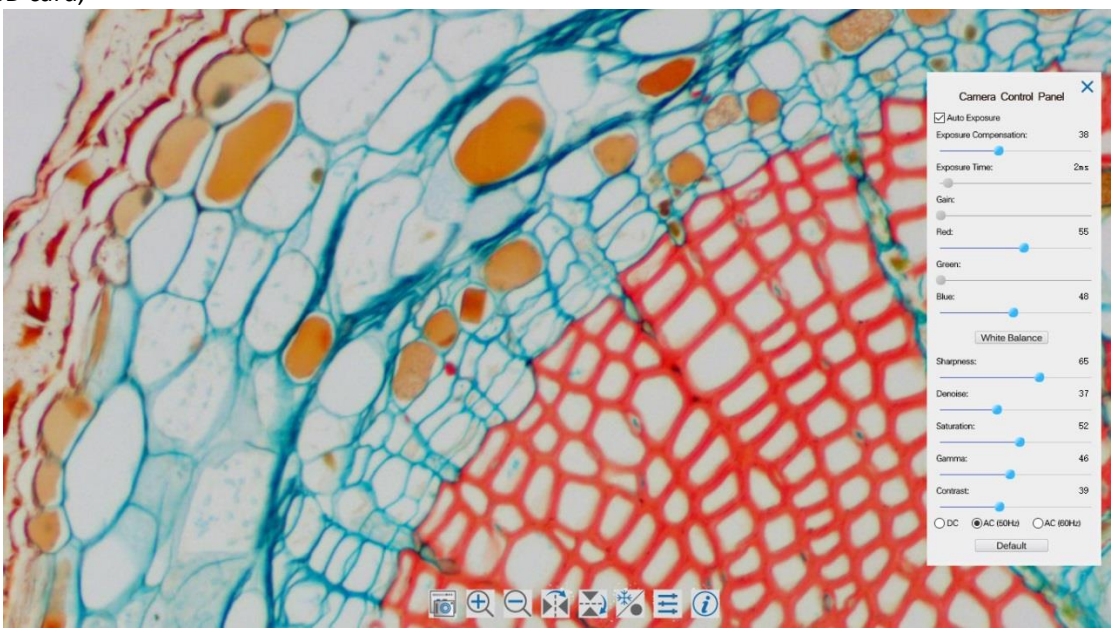
5.2.3 Hardware Interface and XCamView UI Description

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

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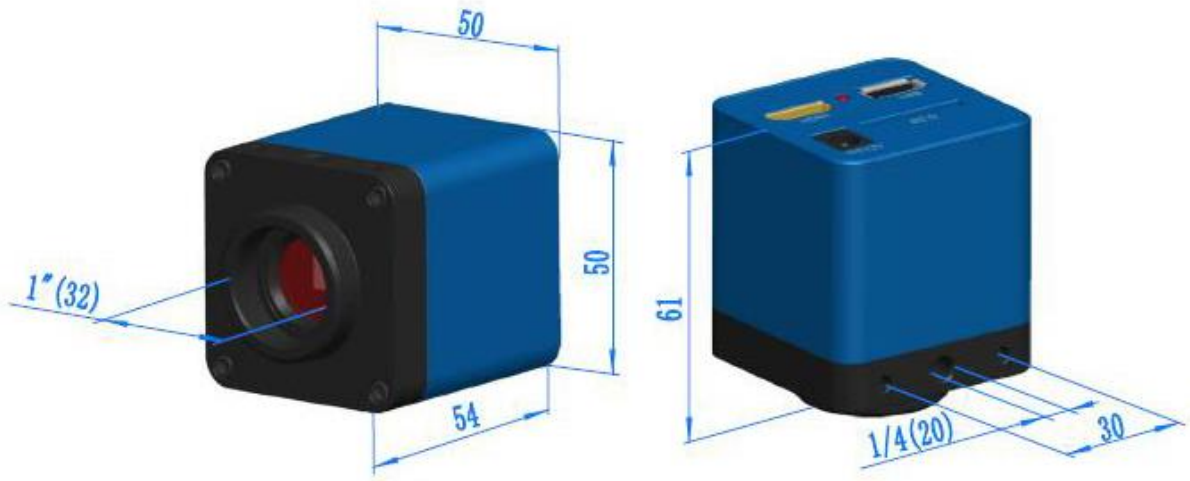
5.2.4 Dimension of XCAM0720PHB/PHC



Dimension of XCAM720PHB/PHC

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5.2.5 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)		

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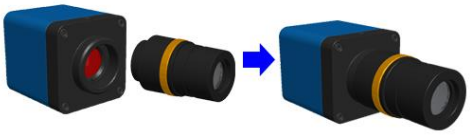
5.2.6 Extension of XCAM0720PHB/PHC with Microscope or Telescope Adapter

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)

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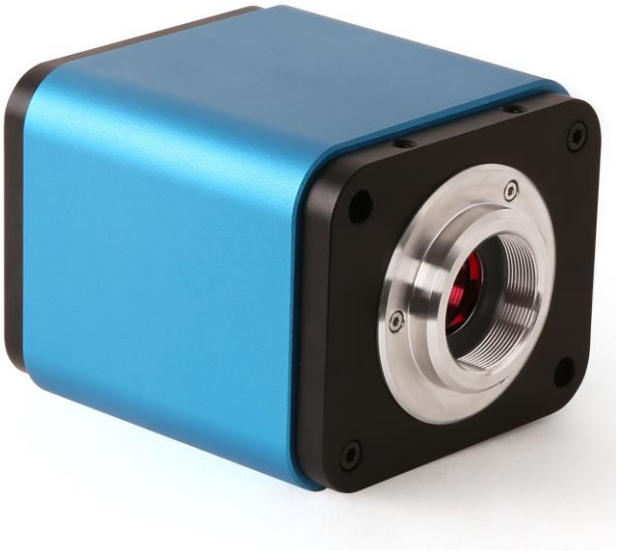
5.3 ALPHA1080 Series C-mount HDMI+USB CMOS Camera(2)



5.3.1 ALPHA1080 Series' Basic Characteristics

ALPHA1080 series is a multiple interfaces (HDMI+USB2.0+SD card) 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 when 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. With ToupView, 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

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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);

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5.3.2 ALPHA1080 Series Datasheet

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	60@1920X1080P (HDMI) 26@1920X1080 (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	60@1920X1080P (HDMI) 26@1920X1080 (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
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 API	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

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5.3.3 ALPHA1080 Series and Microscope

ALPHA1080 Series and Its Back Panel

Different Views of ALPHA1080 Series

ALPHA1080 Series and Microscope

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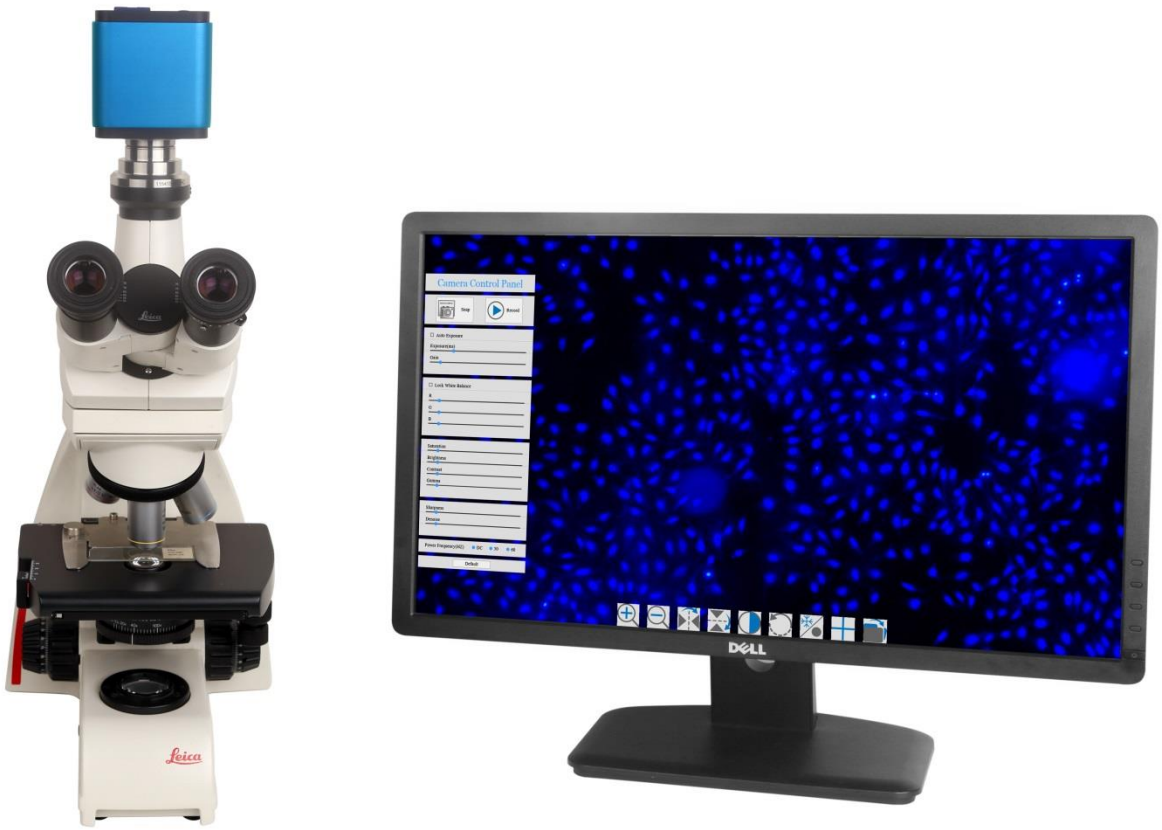
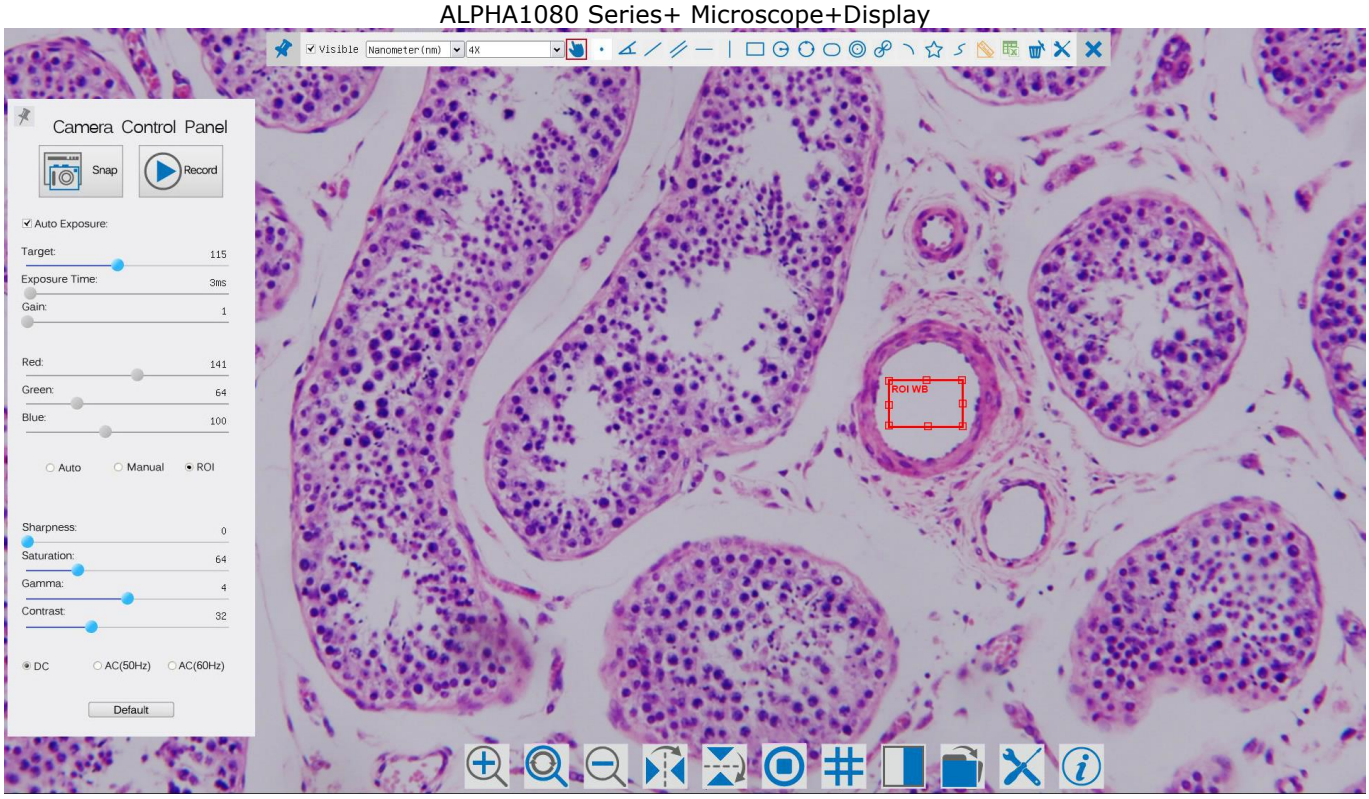


ALPHA1080 Series+ Microscope+Display



ALPHA1080 XCamView UI for Mouse Control

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5.3.4 Dimension of ALPHA1080 Series

Dimension of ALPHA1080 Series

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5.3.5 Packing Information for ALPHA1080 Series

Packing Information of ALPHA1080

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)		

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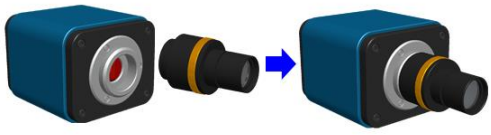
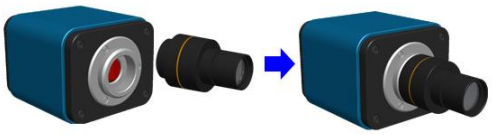
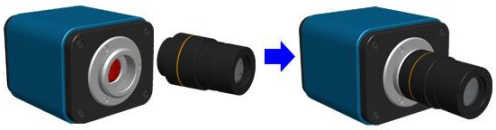
5.3.6 Extension of ALPHA1080 with Microscope or Telescope Adapter

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)

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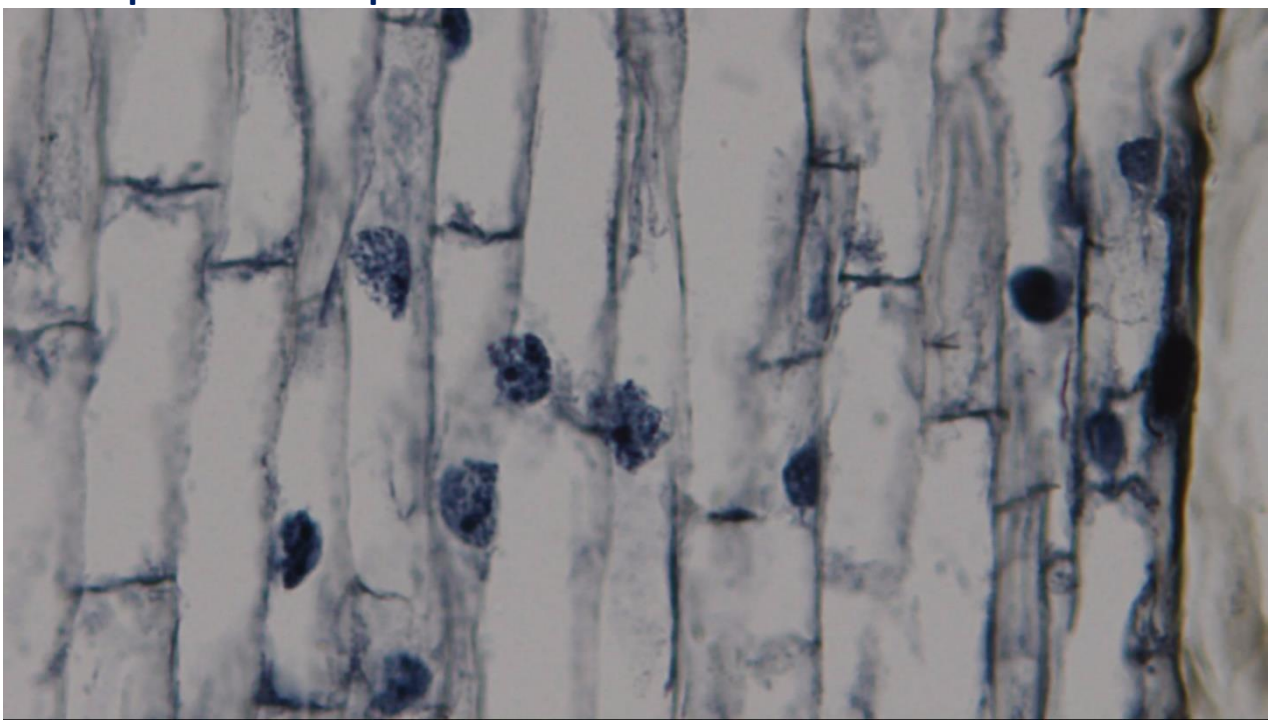
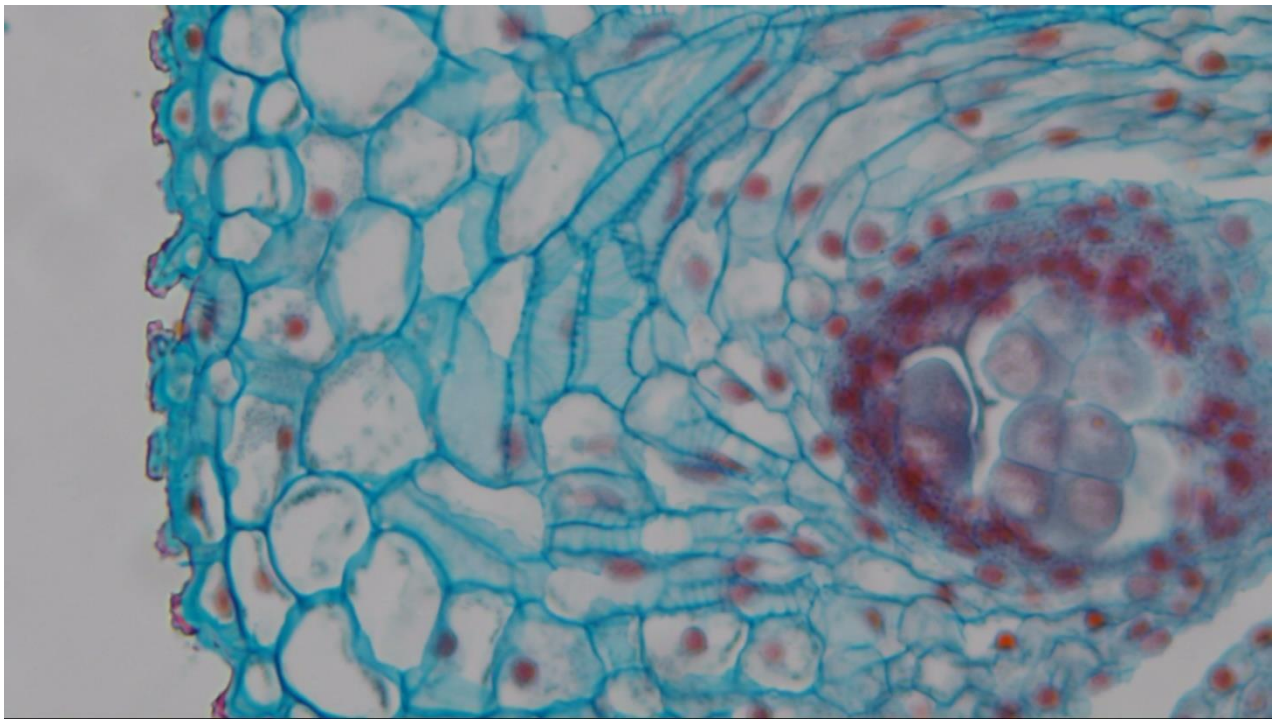
5.3.7 Sample Photos Captured with ALPHA1080A





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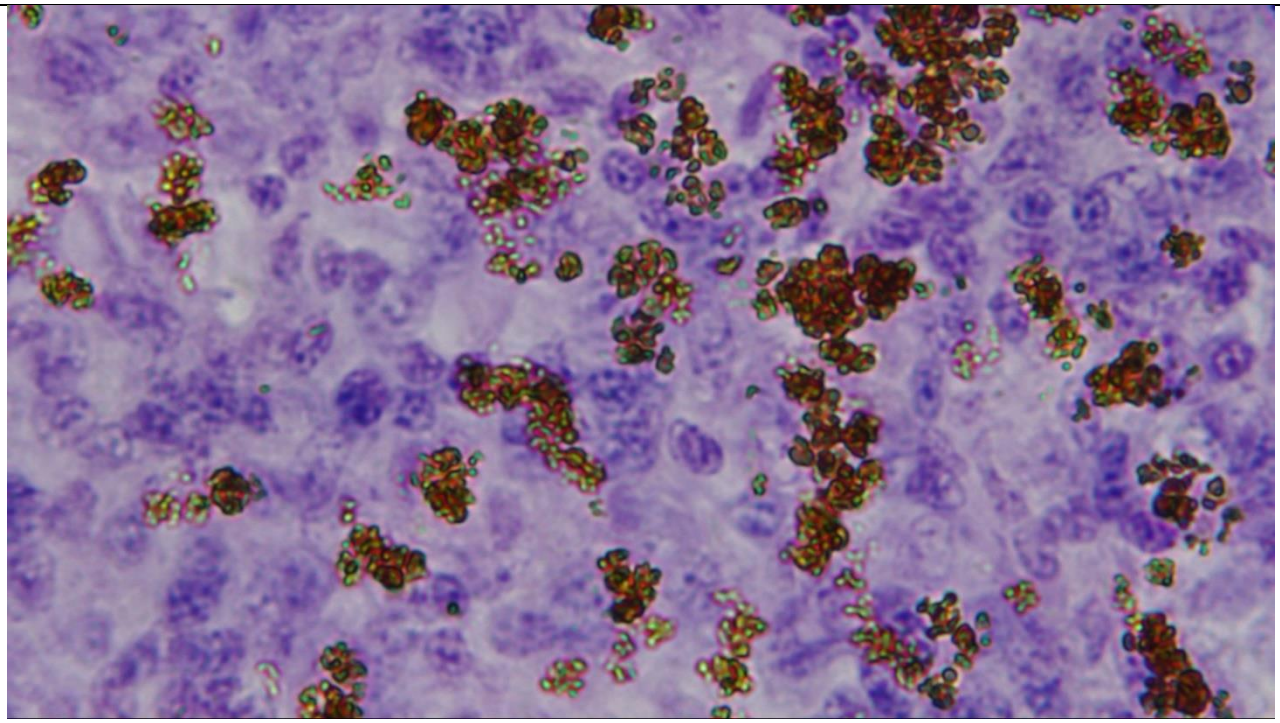

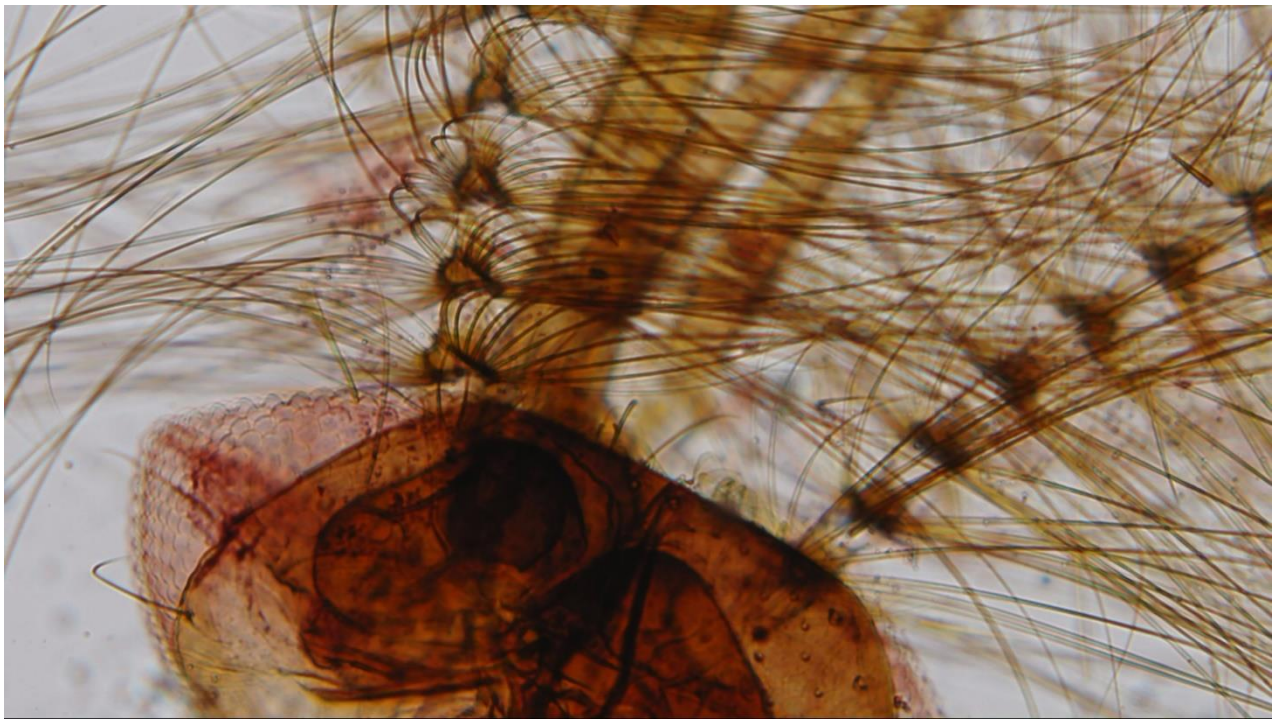

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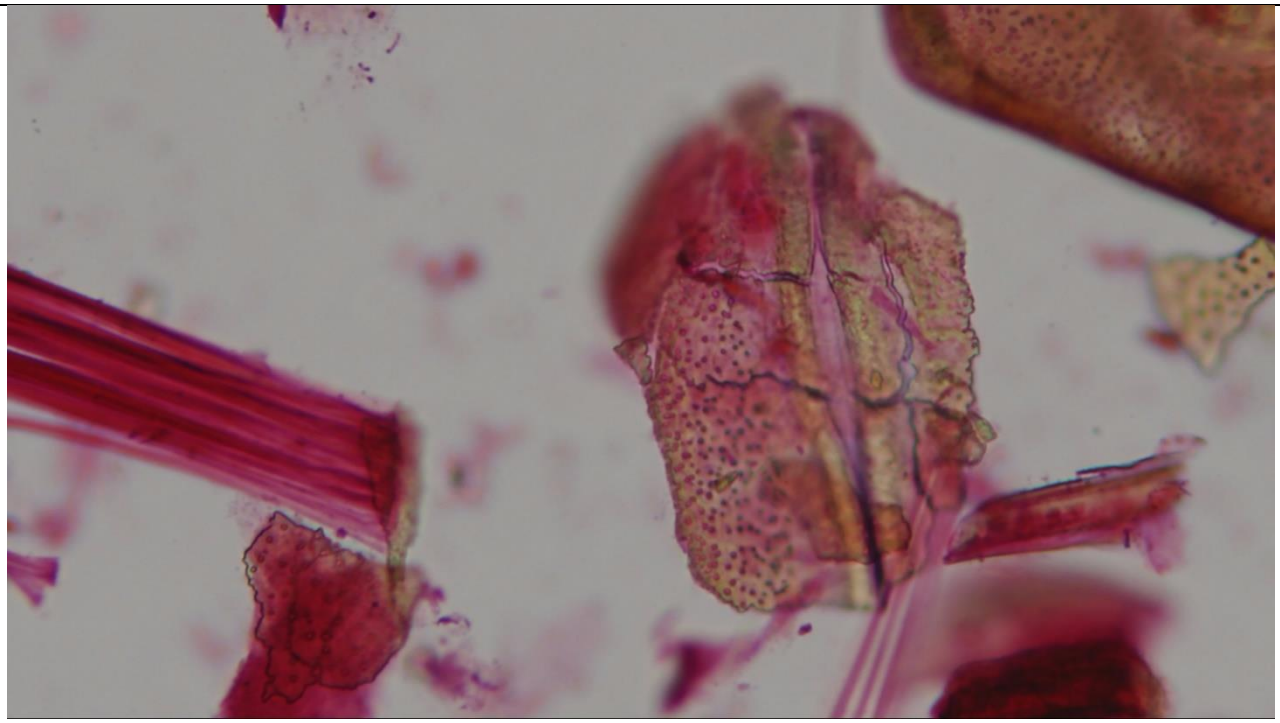

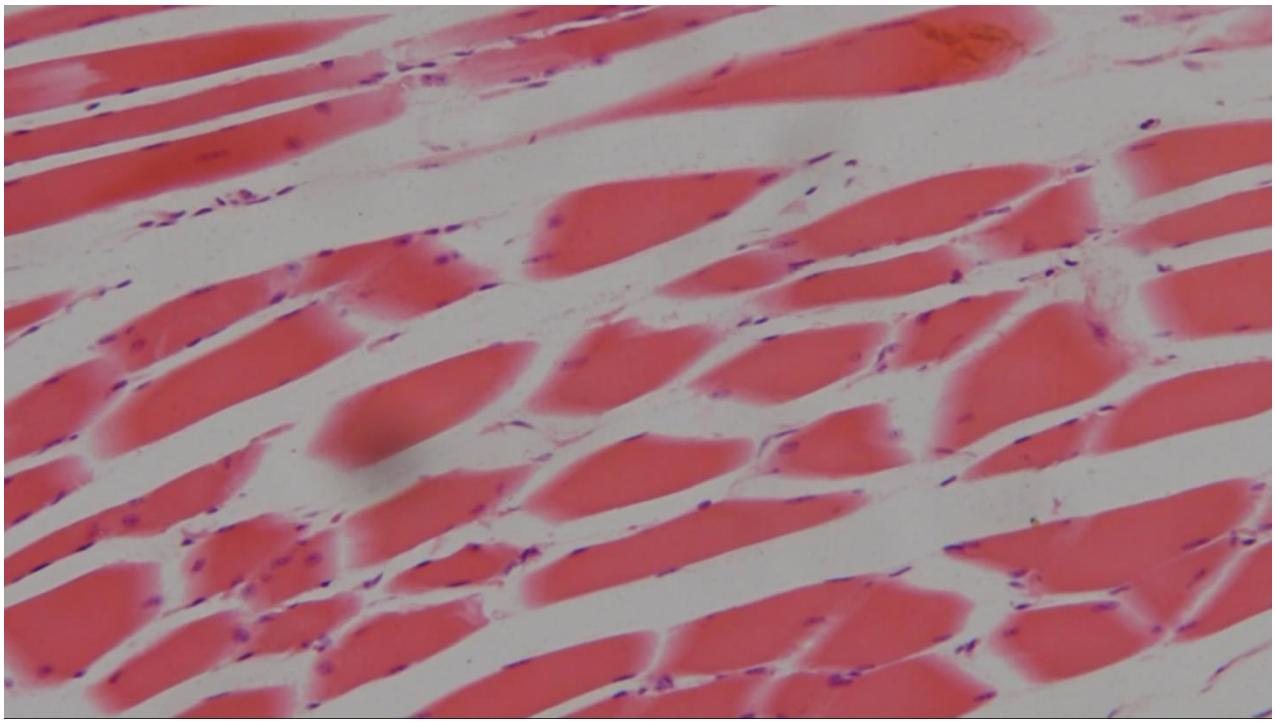

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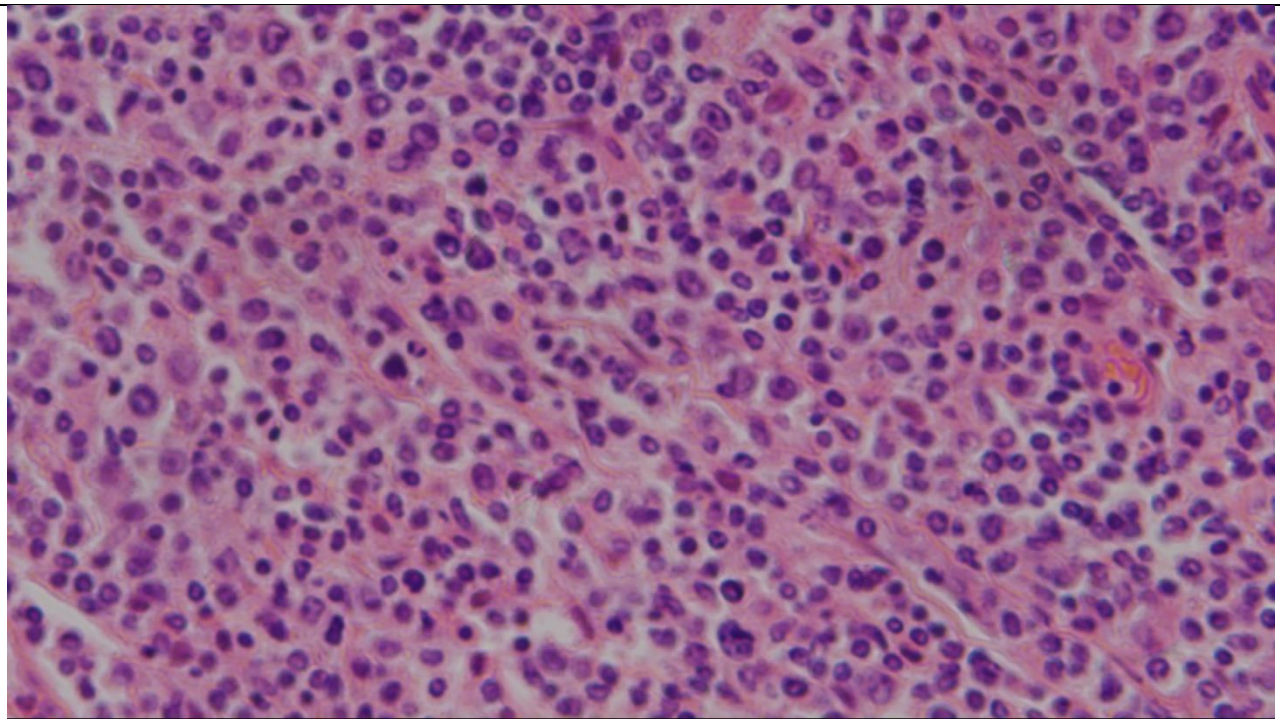

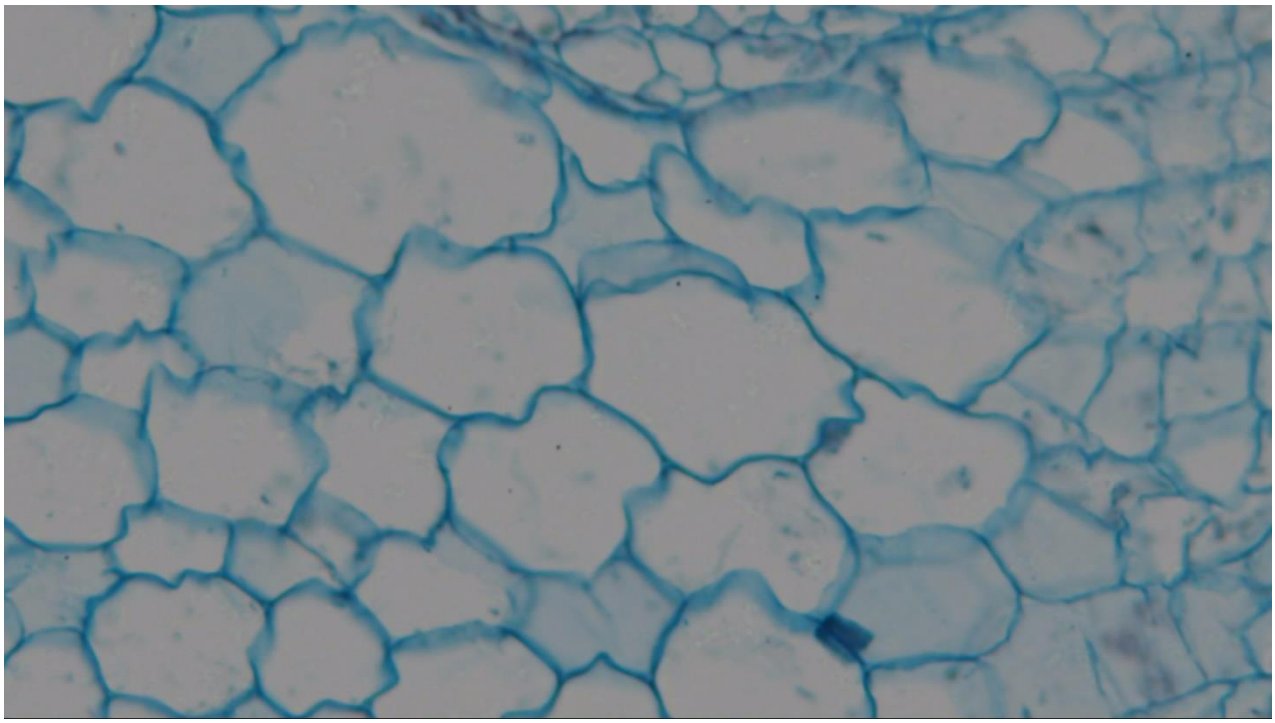

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5.4 XCAM1080PHA C-mount HDMI+USB CMOS Camera(1)

5.4.1 XCAM1080PHA's Basic Characteristic

XCAM1080PHA 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 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 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. With ToupView, you can control the camera, process the image as ToupTek's other USB series camera.

The XCAM1080PHA'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);
- Support standard UVC for Windows/Linux/Mac(USB);

The possible applications of XCAM1080PHA are as follows:

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- 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);

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5.4.2 XCAM1080PHA Datasheet

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	60@1920X1080P (HDMI) 30@1920X1080 (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	High Speed in SD Card(8G)
Video Record	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

Other Specification for USB Output

White Balance	Auto White Balance
Color Technique	Ultra-Fine™ Color Engine (USB)
Capture/Control API	Standard UVC for Windows/Linux/Mac(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

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5.4.3 XCAM1080PHA and Microscope

XCAM1080PHA and Its Back Panel

Different Views of XCAM1080PHA

XCAM1080PHA and Microscope

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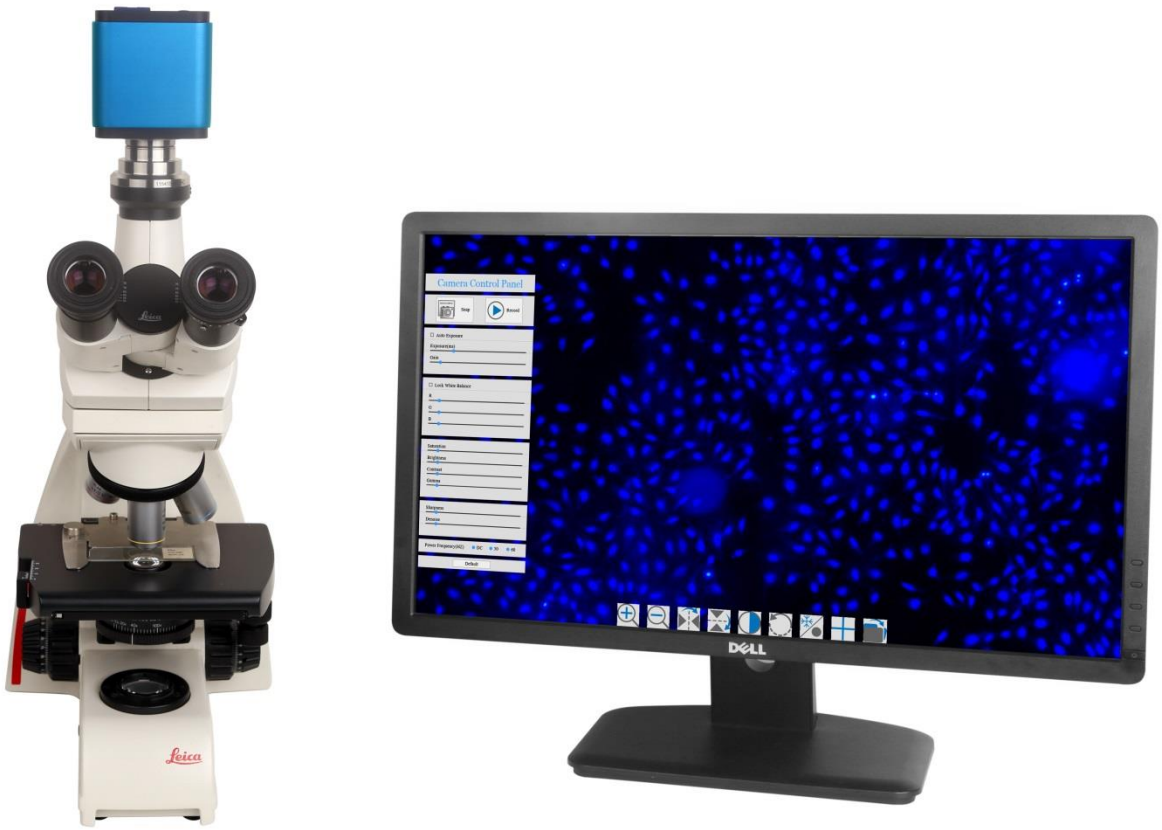
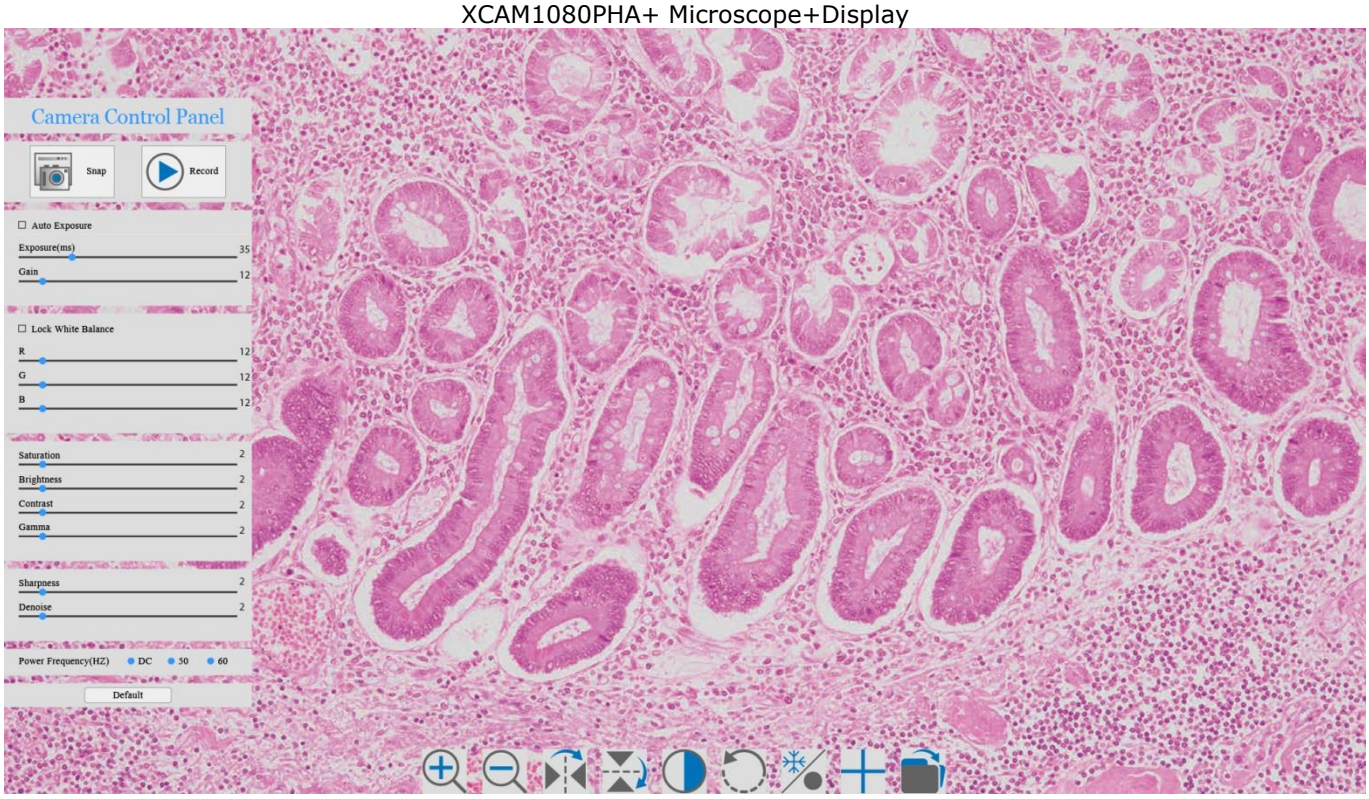


XCAM1080PHA+ Microscope+Display



XCamView UI for Mouse Control

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5.4.4 Dimension of XCAM1080PHA

Dimension of XCAM1080PHA

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5.4.5 Packing Information for XCAM1080PHA

Packing Information of XCAM1080PHA

Standard Packing List			
A	Gift box : L:25.5cm W:17.0cm H:19.0cm (1pcs, 1.55kg/ box)		
B	XCAM1080PHA 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	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)		

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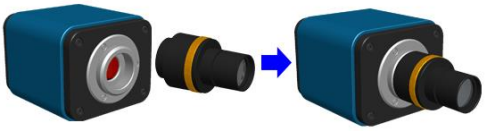
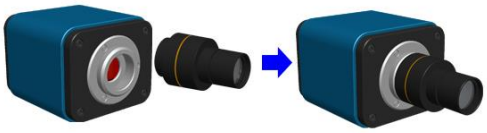
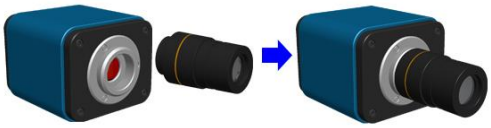
5.4.6 Extension of XCAM1080PHA with Microscope or Telescope Adapter

<table>
<tr><th>Extension</th><th colspan="2">Picture</th></tr>
<tr><td>C-mount Camera</td><td>  </td><td>Machine vision; Medical imaging;
Semiconductor equipment; Test instruments;
Document scanners; 2D barcode readers;
Web camera and security video;
Microscope imaging;</td></tr>
<tr><td>Microscope Camera</td><td colspan="2"> 
XCAM1080PHA+AMAXXX(23.2mm Adapter)
 
XCAM1080PHA+FMAXXX(23.2mm Adapter)</td></tr>
<tr><td>Telescope Camera:</td><td colspan="2"> 
XCAM1080PHA+ATAXXX(31.75mm Adapter)
 
XCAM1080PHA+FTAXXX(31.75mm Adapter)</td></tr>
</table>

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5.5 XCAM1080PHB/PHD/PHE C-mount HDMI+WiFi CMOS Camera

5.5.1 XCAM1080PHB/PHD/PHE's Basic Characteristic

XCAM1080PHB/PHD/PHE 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 XCAM1080PHB/PHD/PHE's basic characteristic is as follows:

- All in 1(HDMI+WiFi) C-mount camera with Sony high sensitivity CMOS sensor;
- For HDMI application, with built-in multiple-language XCamView software. The camera characteristic can be controlled by XCamView through the USB mouse. The other basic processing and choosing can also be realized by the XCamView;
- 1920 × 1080 (1080P) resolutions to match the current high-definition displayer on the market; Support plug and play application;
- For HDMI application, 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;
- With the USB WiFi adapter, the ***XCAM1080PHB/PHD/PHE*** can be used as WiFi camera, the ToupView/ToupLite advanced image processing software is used to display the video and capture image. support plug and play application;
- Ultra-Fine Color Engine with perfect color reproduction capability(WiFi);
- 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);
- ***XCAM1080PHB/PHD/PHE*** can meet various applications and can be widely used in industrial inspection, education and research, materials analysis, precision measurement, medical analyses etc.

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The possible applications of ***XCAM1080PHB/PHD/PHE*** 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);

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5.5.2 XCAM1080PHB/PHD/PHE Datasheet(2)

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	60/1920*1080(HDMI) 25/1920x1080(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	60/1920*1080(HDMI) 25/1920x1080(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	60/1920*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 API	Standard SDK for Windows/Linux/Mac(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

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5.5.3 XCAM1080PHB/PHD/PHE and Microscope

XCAM1080PHB/PHD/PHE and Its Back Panel

Different Views of XCAM1080PHB/PHD/PHE

XCAM1080PHB/PHD/PHE and Microscope

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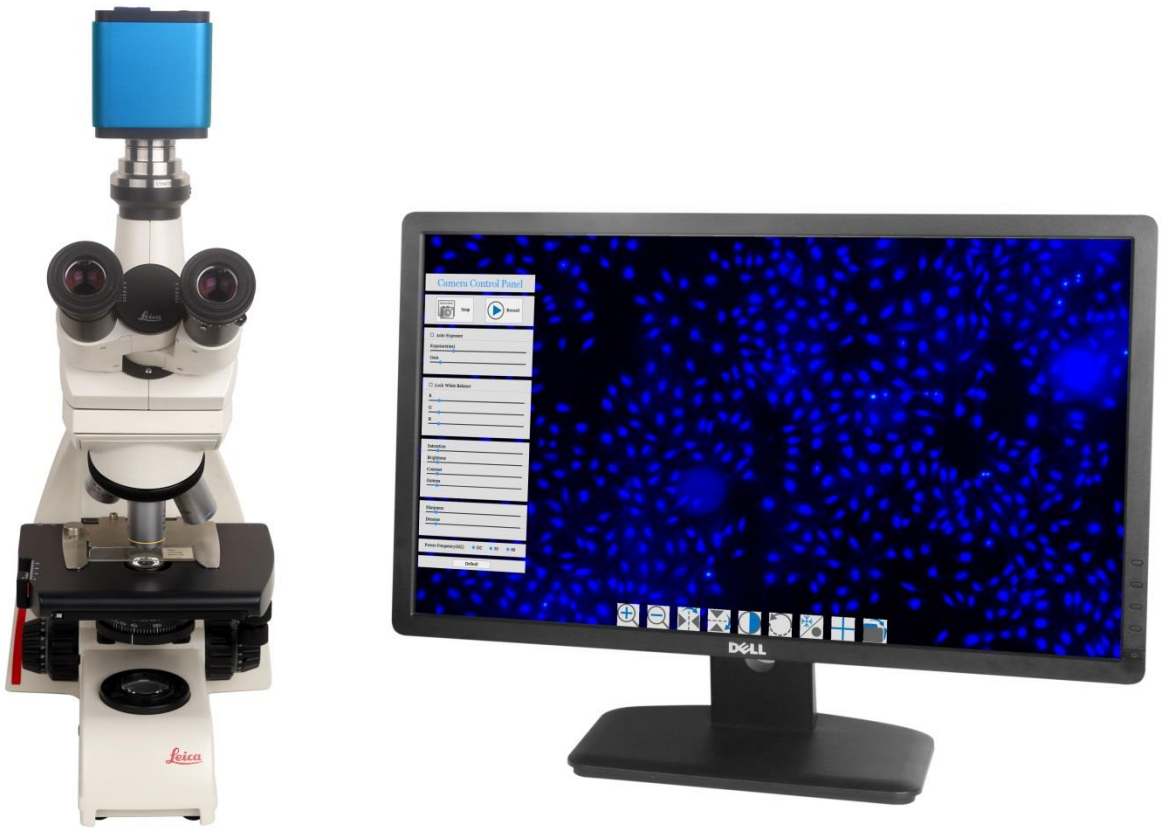
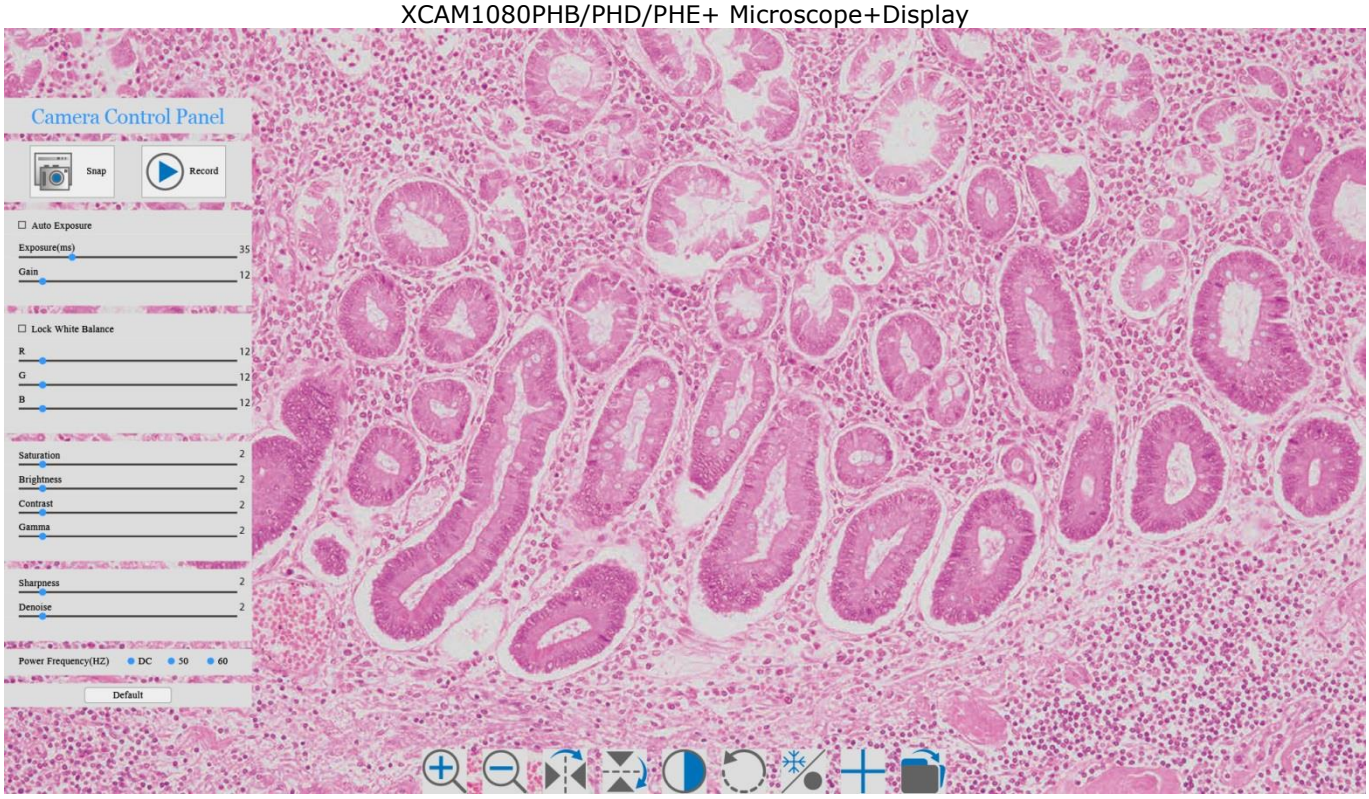


XCAM1080PHB/PHD/PHE+ Microscope+Display



XCamView UI for Mouse Control

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5.5.4 Dimension of XCAM1080PHB/PHD/PHE

Dimension of XCAM1080PHB/PHD/PHE

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5.5.5 Packing Information for XCAM1080PHB/PHD/PHE

Packing information of XCAM1080PHB/PHD/PHE

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		
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)		

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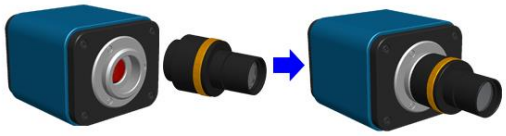
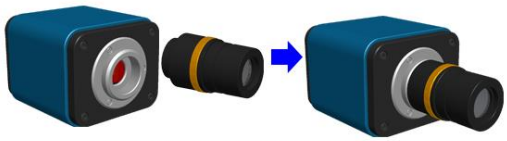
5.5.6 Extension of XCAM1080PHB/PHD/PHE with Microscope or Telescope Adapter

<table>
<tr><th>Extension</th><th colspan="2">Picture</th></tr>
<tr><td>C-mount Camera</td><td>  </td><td>Machine vision; Medical imaging;
Semiconductor equipment; Test instruments;
Document scanners; 2D barcode readers;
Web camera and security video;
Microscope imaging;</td></tr>
<tr><td>Microscope Camera</td><td colspan="2" rowspan="2"> 
XCAM1080PHB+AMAXXX(23.2mm Adapter)
 
XCAM1080PHB+FMAXXX(23.2mm Adapter)</td></tr>
<tr><td>Telescope Camera:</td></tr>
<tr><td></td><td colspan="2"> 
XCAM1080PHB+ATAXXX(31.75mm Adapter)
 
XCAM1080PHB+FTAXXX(31.75mm Adapter)</td></tr>
</table>

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6 Microscope TE-Cooling USB2.0 and 3.0 CCD Camera

6.1 MTR3CCD Series TE-Cooling C-mount USB3.0 CCD Camera

6.1.1 The Basic Characteristic of MTR3CCD

MTR3CCD camera adopts Sony Exview HAD CCD II sensor as the image-picking device with two-stage peltier cooling sensor chip to -50 degree below ambient temperature. This will greatly increase the signal to noise ratio and decrease the image noise. Smart structure is designed to assure the heat radiation efficiency and avoid the moisture problem. Electric fan is used to increase the heat radiation speed.

USB3.0 is used as the data transfer interface to increase the frame rate.

MTR3CCD comes with advanced video & image processing application ToupView; Providing Windows/Linux/OSX multiple platform SDK; Native C/C++, C#/VB.NET, DirectShow, Twain Control API;

The **MTR3CCD** can be widely used in low light environment and microscope fluorescence image capture and analysis, as well as the astronomy deep sky application.

The basic characteristic of MTR3CCD can be summarized as follows:

- Standard C-Mount camera with SONY ExView HAD CCD II sensors from 1.4M to 12M;
- Two-stage TE-cooling with controllable electric fan;
- Sensor chip cooling up to 50°C below ambient temperature;
- Working temperature can be regulated to specified temperature in 5 minutes;
- Smart structure to assure the heat radiation efficiency and avoid the moisture problem;
- IR-CUT/AR coated windows;
- Up to 1 hour long time exposure;
- USB3.0 5Gbit/second interface ensuring high speed data transmission;
- Ultra-Fine^{TM} color engine with perfect color reproduction capability;
- With advanced video & image processing application ToupView;
- Support both video and trigger modes;
- Providing Windows/Linux/Mac OS multiple platforms SDK;
- Native C/C++, C#/VB.NET, DirectShow, Twain control API;

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6.1.2 MTR3CCD Datasheet(12)

Order Code	Sensor & Size(mm)	Pixel(μm)	G Sensitivity Dark Signal	FPS/Resolution	Binning	Exposure
MTR3CCD12000KPA MP112000A(New)	12M/ICX834AQG(C) 1“ (13.15x8.77)	3.1x3.1	420mv with 1/30s 15.2mv with 1/30s	3.6@4248x2836 3.6@2124x1418	1x1, 2x2	0.06ms~1h
MTR3CCD12000KMA MM112000A(New)	12M/ICX834ALG(M) 1“ (13.15x8.77)	3.1x3.1	420mv with 1/30s 12mv with 1/30s (F8.0)	3.6@4248x2836 3.6@2124x1418	1x1, 2x2	0.06ms~1h
MTR3CCD09000KPA MP109000A(New)	9.0M/ICX814AQG(C) 1“ (12.47x9.98)	3.69x3.69	580mv with 1/30s 12mv with 1/30s	4.4@3388x2712 4.4@1694x1356	1x1, 2x2	0.06ms~1h
MTR3CCD09000KMA MM109000A(New)	9.0M/ICX814ALG(M) 1“ (12.47x9.98)	3.69x3.69	660mv with 1/30s 12mv with 1/30s (F8.0)	4.4@3388x2712 4.4@1694x1356	1x1, 2x2	0.06ms~1h
MTR3CCD06000KPA MP106000A	6.0M/ICX694AQG(C) 1“ (12.48x9.99)	4.54x4.54	880mv with 1/30s 8mv with 1/30s	7.5@2748x2200 14@2748x1092	1x1	0.06ms~1h
MTR3CCD06000KMA MM106000A	6.0M/ICX694ALG(M) 1“ (12.48x9.99)	4.54x4.54	1000mv with 1/30s 8mv with 1/30s	7.5@2748x2200 14@2748x1092	1x1	0.06ms~1h
MTR3CCD02800KPA MP102800A(New)	2.8M/ICX674AQG(C) 2/3“ (8.81x6.63)	4.54x4.54	800mv with 1/30s 4mv with 1/30s	15@1938x1460 17@1610x1212 18@1930x1092	1x1	0.05ms~1h
MTR3CCD02800KMA MM102800A(New)	2.8M/ICX674ALG(M) 2/3“ (8.81x6.63)	4.54x4.54	950mv with 1/30s 4mv with 1/30s	15@1938x1460 17@1610x1212 18@1930x1092	1x1	0.05ms~1h
MTR3CCD01400KPA MP101400A	1.4M/ICX285AQ(C) 2/3“ (8.88x6.70)	6.45x6.45	1240mv with 1/30s 10mv with 1/30s	15@1360x1024	1x1	0.07ms~1h
MTR3CCD01400KMA MM101400A	1.4M/ICX285AL(M) 2/3“ (8.88x6.70)	6.45x6.45	1300mv with 1/30s 11mv with 1/30s	15@1360x1024	1x1	0.07ms~1h
MTR3CCD01400KPB MP101400B(New)	1.4M/ICX825AQA(C) 2/3“ (8.88x6.70)	6.45x6.45	2000mv with 1/30s 4.8mv with 1/30s	25@1376x1040	1x1	0.07ms~1h
MTR3CCD01400KMB MM101400B(New)	1.4M/ICX825ALA(M) 2/3“ (8.88x6.70)	6.45x6.45	2000mv with 1/30s 4.8mv with 1/30s	25@1376x1040	1x1	0.07ms~1h

C:Color; M:Monochrome;

Other Specification for MTR3CCD Cameras	
Spectral Range	380-650nm (with IR-cut Filter)
White Balance	ROI White Balance/ Manual Temp Tint Adjustment/NA for Monochromatic Sensor
Color Technique	Ultra-Fine™ Color Engine/NA for Monochromatic Sensor
Capture/Control API	Native C/C++, C#/VB.NET, DirectShow, Twain and Labview
Recording System	Still Picture and Movie
Cooling System*	Two-stage TE-cooling System -45 ℃ below Camera Body Temperature
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 over PC USB Port External Power Adapter for Cooling System, DC12V, 3A
Software Environment	
Operating System	Microsoft® Windows® XP / Vista / 7 / 8 /10 (32 & 64 bit) OSx(Mac OS X) Linux
PC Requirements	CPU: Equal to Intel Core2 2.8GHz or Higher
	Memory:2GB or More
	USB Port:USB2.0 High-speed Port
	Display:17” or Larger
	CD-ROM

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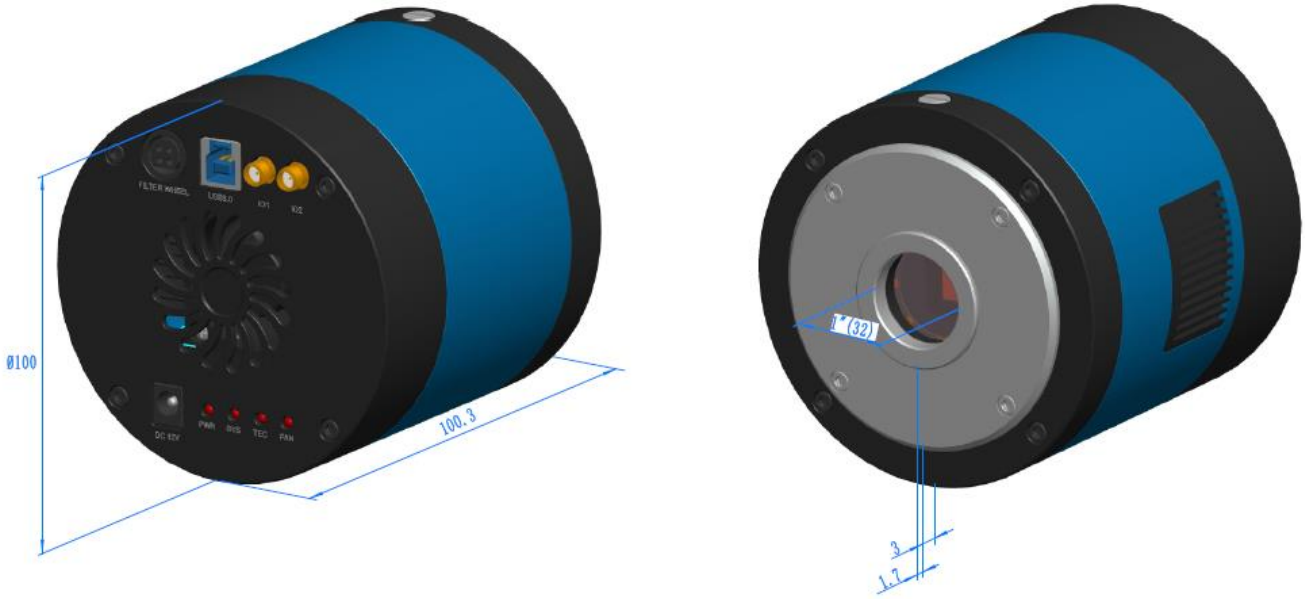
6.1.3 MTR3CCD Dimension

The MTR3CCD body, made from tough, alloy with CNC technique, ensures a heavy duty, workhorse solution. The camera is designed with a high quality IR-CUT or AR to block the IR light or protect the camera sensor. The fan‘s vibration is minimized to the low level to eliminate the vibration caused imaging blur. This design ensures a rugged, robust solution with an increased lifespan when compared to the other industrial camera solutions.



Dimension of MTR3CCD

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6.1.4 Packing Information for MTR3CCD Camera

Packing Information of MTR3CCD Camera

Standard Package			
A	Carton L:50cm W:30cm H:30cm (20pcs, 12~17Kg/ carton), not shown in the photo		
B	3-A safety equipment case: L:28cm W:23cm H:15cm (1pcs, 2.8Kg/ box); Carton size:L:28.2cm W:25.2cm H:16.7cm		
C	MTR3CCD camera(C-mount)		
D	Power adapter: input: AC 100~240V 50Hz/60Hz, output: DC12 V 3A		
E	High-Speed USB3.0 A male to B male gold-plated connectors cable /2.0m		
F	CD (Driver & utilities software, Ø12cm)		
Optional Accessory			
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 108004/AMA100
		C-Mount to Dia.31.75mm eyepiece tube (Please choose 1 of them for your telescope)	108008/ATA037 108009/ATA050 108010/ATA075 108011/ATA100
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 108008/FMA100
		C-mount to Dia.31.75mm eyepiece tube (Please choose 1 of them for your telescope)	108011/FTA037 108012/FTA050 108013/FTA075 108014/FTA100
	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	External trigger control line		
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.)	

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6.2 SCCCD Series TE-Cooling C-mount USB2.0 CCD Camera suspended

6.2.1 The Basic Characteristic of SCCCD

SCCCD adopts semiconductor cooling peltier chip technique to keep Sony ExView HAD or HAD CCD sensor (The image-picking device) at low temperature. This will greatly increase the signal to noise ratio and decrease the image noise. Besides, integrated heat pipe-heat sink technique is used to transfer the heat to the camera housing fins. No fan is needed to keep the camera from vibration.

USB2.0 is used as the data transfer interface to keep the moderate frame rate.

SCCCD comes with advanced video & image processing application ToupView; Providing Windows/Linux/OSX multiple platform SDK; Native C/C++, C#/VB.NET, DirectShow, Twain Control API;

The SCCCD can be widely used in low light environment and microscope fluorescence image capture and analysis.

The basic characteristic of SCCCD is summarized as follows:

- Standard C-Mount camera with SONY ExView or Super HAD CCD 1.4~5.2M sensor;
- Well-designed high-performance TE-cooling with heat pipe heat sink structure;
- Up to 20 degrees temperature drop ensures high quality image with lower noise;
- C-mount camera;
- Supporting up to 4 miniutes long time exposure;
- USB2.0 interface ensuring high speed data transmission;
- Ultra-Fine^{TM} color engine with perfect color reproduction capability;
- With advanced video & image processing application ToupView;
- Providing Windows/Linux/Mac OS multiple platforms SDK;
- Native C/C++, C#/VB.NET, DirectShow, Twain Control API;

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6.2.2 SCCCD Datasheet(5)

Order Code	Sensor & Size(mm)	Pixel(μm)	G Sensitivity Dark Signal	FPS/Resolution	Binning	Exposure
SCCCD05200KPA TP905200A	5.2M/ICX655AQ(C) 2/3“ (8.44x7.07)	3.45x3.45	420mv with 1/30s 4mv with 1/30s	4.3@2448x2050 10.5@960x720	1x1	0.22ms~60s
SCCCD01400KPA TP901400A	1.4M/ICX285AQ(C) 2/3“ (8.77x6.60)	6.45x6.45	1240mv with 1/30s 10mv with 1/30s	15@1360x1024	1x1	0.12ms~240s
SCCCD01400KMA TM901400A	1.4M/ICX285AL(M) 2/3“ (8.77x6.60)	6.45x6.45	1300mv with 1/30s 11mv with 1/30s	15@1360x1024	1x1	0.12ms~240s
SCCCD01400KPB TP901400B	1.4M/ICX205AK(C) 1/2“ (6.32x4.76)	4.65x4.65	400mv with 1/30s 16mv with 1/30s	15@1360x1024	1x1	0.12ms~240s
SCCCD01400KMB TM901400B	1.4M/ICX205AL(M) 1/2“ (6.32x4.76)	4.65x4.65	450mv with 1/30s 16mv with 1/30s	15@1360x1024	1x1	0.12ms~240s

C:Color; M:Monochrome;

Other Specification for SCCCD Cameras	
Spectral Range	380-650nm (with IR-cut Filter)
White Balance	ROI White Balance/ Manual Temp Tint Adjustment/NA for Monochromatic Sensor
Color Technique	Ultra-Fine™ Color Engine/NA for Monochromatic Sensor
Capture/Control API	Native C/C++, C#/VB.NET, DirectShow, Twain
Recording System	Still Picture and Movie
Cooling System*	TE-cooling System -20 ℃ below Ambient Temperature
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 over PC USB Port External Power Adapter for Cooling System, DC 3V, 5A
Software Environment	
Operating System	Microsoft® Windows® XP / Vista / 7 / 8 /10 (32 & 64 bit) OSx(Mac OS X) Linux
PC Requirements	CPU: Equal to Intel Core2 2.8GHz or Higher
	Memory:2GB or More
	USB Port:USB2.0 High-speed Port
	Display:17” or Larger
	CD-ROM

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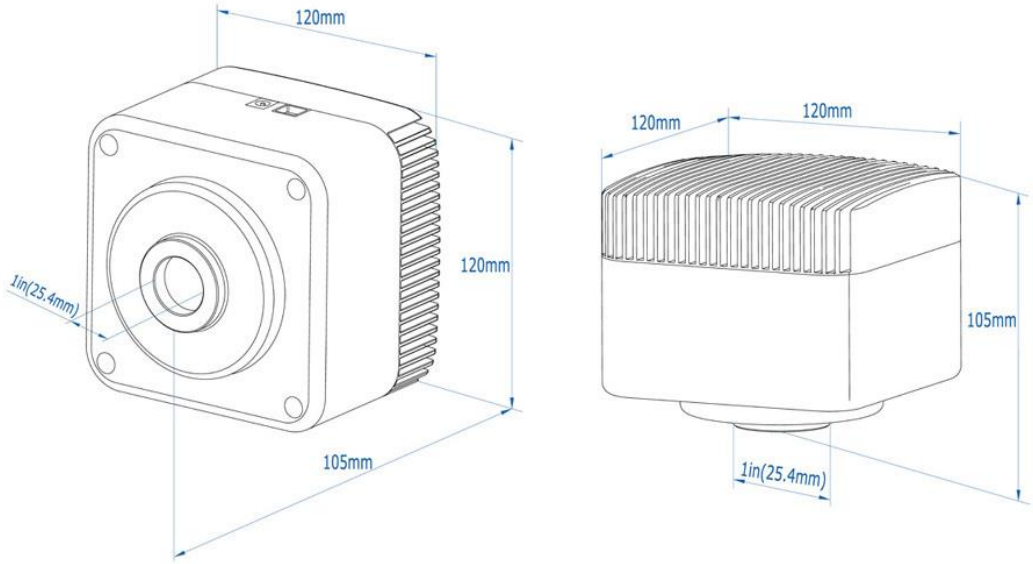
6.2.3 Dimension of SCCCD

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



Dimension of SCCCD

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6.2.4 Packing Information for SCCCD

Packing Information of SCCCD

Standard Package		
A	3-A safety equipment case: L:28cm W:23cm H:15cm (1pcs, 3.7Kg/ box); carton size:L:28.2cm W:25.5cm H:16.7cm	
B	SCCCD(C-mount)	
C	CD (Driver & utilities software, Ø12cm)	
D	High-Speed USB2.0 A male to B male gold-plated connectors cable /2.0m	
E	Power Adapter: input: AC 100~240V 50Hz/60Hz, output: DC 3V 5A	
F	Power cord	
Optional Accessories		
G	Calibration kit:	TS-M1(X=0.01mm/100Div.); TS-M2(X,Y=0.01mm/100Div.); TS-M7 (X=0.01mm/100Div., 0.10mm/100Div.)

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7 Microscope USB3.0 CCD Camera

7.1 U3CCD Series C-mount USB3.0 CCD Camera

7.1.1 U3CCD Basic Characteristic

ToupTek U3CCD is an ExView HAD CCD series camera. It adopts Sony ExView HAD CCD sensor as the image-picking device. Sony ExView HAD CCD is a CCD that drastically improves light efficiency by including near infrared light region as a basic structure of HAD (Hole-Accumulation-Diode) sensor. ToupTek uses EXCCD for simplicity. USB3.0 is used as the data transfer interface.

U3CCD hardware resolutions range from 1.4M to 6M and come with the integrated CNC aluminum alloy compact housing.

U3CCD comes with advanced video & image processing application ToupView; Providing Windows/Linux/ OSX multiple platforms SDK; Native C/C++, C#/VB.NET, DirectShow, Twain Control API;

The U3CCD can be widely used in bright field light environment and microscope image capture and analysis with higher frame rate.

The U3CCD characteristic is as follows:

- Standard C-Mount camera with SONY ExView HAD CCD II sensors from 1.4M ~ 6M;
- IR-CUT Coated Windows
- Up to 1000s long time exposure;
- USB3.0 5Gbit/second interface ensuring high speed data transmission;
- Ultra-Fine^{TM} color engine with perfect color reproduction capability;
- With advanced video & image processing application ToupView;
- Providing Windows/Linux/Mac OS multiple platforms SDK;
- Native C/C++, C#/VB.NET, DirectShow, Twain Control API;

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7.1.2 U3CCD Datasheet (10)

Order Code	Sensor & Size(mm)	Pixel(μm)	G Sensitivity Dark Signal	FPS/Resolution	Binning	Exposure
U3CCD12000KPA NP112000A(New)	12M/ICX834AQG(C) 1“ (13.15x8.77)	3.1x3.1	420mv with 1/30s 15.2mv with 1/30s	3.6@4248x2836 3.6@2124x1418	1x1, 2x2	0.06ms~1000s
U3CCD12000KMA NM112000A(New)	12M/ICX834ALG(M) 1“ (13.15x8.77)	3.1x3.1	420mv with 1/30s 12mv with 1/30s (F8.0)	3.6@4248x2836 3.6@2124x1418	1x1, 2x2	0.06ms~1000s
U3CCD09000KPA NP109000A(New)	9.0M/ICX814AQG(C) 1“ (12.47x9.98)	3.69x3.69	580mv with 1/30s 12mv with 1/30s	4.4@3388x2712 4.4@1694x1356	1x1, 2x2	0.06ms~1000s
U3CCD09000KMA NM109000A(New)	9.0M/ICX814ALG(M) 1“ (12.47x9.98)	3.69x3.69	660mv with 1/30s 12mv with 1/30s (F8.0)	4.4@3388x2712 4.4@1694x1356	1x1, 2x2	0.06ms~1000s
U3CCD06000KPA NP106000A	6.0M/ICX694AQG(C) 1“ (12.48x9.99)	4.54x4.54	880mv with 1/30s 8mv with 1/30s	7.5@2748x2200 14@2748x1092	1x1	0.06ms~1000s
U3CCD06000KMA NM106000A	6.0M/ICX694ALG(M) 1“ (12.48x9.99)	4.54x4.54	1000mv with 1/30s 8mv with 1/30s	7.5@2748x2200 14@2748x1092	1x1	0.06ms~1000s
U3CCD02800KPA NP102800A	2.8M/ICX674AQG(C) 2/3“ (8.81x6.63)	4.54x4.54	800mv with 1/30s 4mv with 1/30s	15@1938x1460 17@1610x1212 18@1930x1092	1x1	0.05ms~1000s
U3CCD02800KMA NM102800A	2.8M/ICX674ALG(M) 2/3“ (8.81x6.63)	4.54x4.54	950mv with 1/30s 4mv with 1/30s	15@1938x1460 17@1610x1212 18@1930x1092	1x1	0.05ms~1000s
U3CCD01400KPB NP101400B(New)	1.4M/ICX825AQA(C) 2/3“ (8.88x6.70)	6.45x6.45	2000mv with 1/30s 4.8mv with 1/30s	25@1376x1040	1x1	0.07ms~1000s
U3CCD01400KMB NM101400B(New)	1.4M/ICX825ALA(M) 2/3“ (8.88x6.70)	6.45x6.45	2000mv with 1/30s 4.8mv with 1/30s	25@1376x1040	1x1	0.07ms~1000s

C: Color; M: Monochrome;

Other Specification for U3CCD Camera	
Spectral Range	380-650nm (with IR-cut Filter)
White Balance	ROI White Balance/ Manual Temp Tint Adjustment/NA for Monochromatic Sensor
Color Technique	Ultra-Fine™ Color Engine/NA for Monochromatic Sensor
Capture/Control API	Native C/C++, C# /VB.Net,, DirectShow, Twain
Recording System	Still Picture and Movie
Cooling System*	Natural
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 over PC USB Port
Software Environment	
Operating System	Microsoft® Windows® XP / Vista / 7 / 8 /10 (32 & 64 bit) OSx(Mac OS X) Linux
PC Requirements	CPU: Equal to Intel Core2 2.8GHz or Higher
	Memory: 2GB or More
	USB Port: USB3.0 High-speed Port
	Display: 17” or Larger
	CD-ROM

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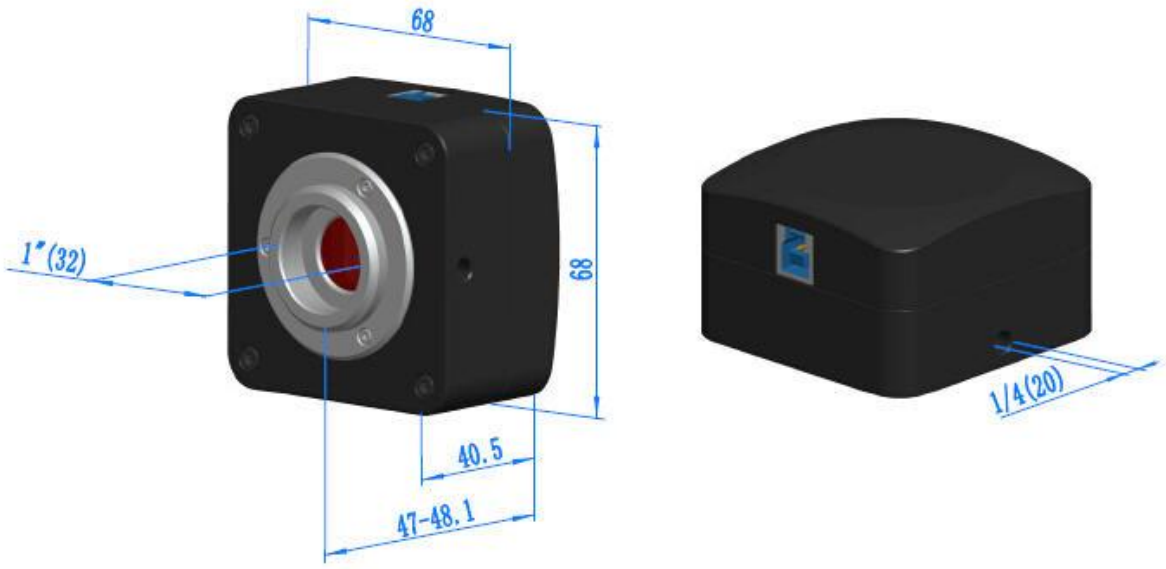
7.1.3 Dimension of U3CCD

The U3CCD body, made from tough, CNC aluminum alloy, ensures a heavy duty, workhorse solution. The camera is designed with a high quality IR-CUT to protect the camera sensor. No moving parts included. This design ensures a rugged, robust solution with an increased lifespan when compared to other industrial camera solutions.



Dimension of U3CCD Series Camera

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7.1.4 Packing Information for U3CCD Series Camera

Packing Information of U3CCD Series Camera

Standard Camera Packing List			
A	Carton L:52cm W:32cm H:33cm (20pcs, 12~17Kg/ carton), not shown in the photo		
B	Gift box L:15cm W:15cm H:10cm (0.7~0.75Kg/ box)		
C	U3CCD series USB3.0 C-mount CMOS camera		
D	High-speed USB3.0 A male to B male gold-plated connectors cable /2.0m		
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 108004/AMA100
		C-mount to Dia.31.75mm eyepiece tube (Please choose 1 of them for your telescope)	108008/ATA037 108009/ATA050 108010/ATA075 108011/ATA100
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 108008/FMA100
		C-Mount to Dia.31.75mm Eyepiece Tube (Please choose 1 of them for your telescope)	108011/FTA037 108012/FTA050 108013/FTA075 108014/FTA100
	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.)	

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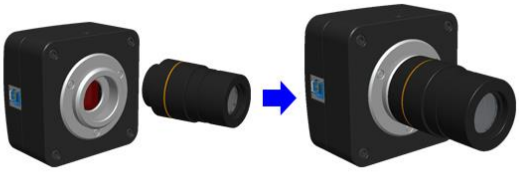
7.1.5 Extension of U3CCD with Microscope or Telescope Adapter

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	 U3CCD+AMAXXX(23.2mm Adapter)	 U3CCD+FMAXXX(23.2mm Adapter)
Telescope Camera	 U3CCD+ATAXXX(31.75mm Adapter)	 U3CCD+FTAXXX(31.75mm Adapter)

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8 Microscope USB2.0 CCD Camera

8.1 EXCCD Series C-mount USB2.0 CCD Camera

8.1.1 EXCCD Basic Characteristic

ToupTek EXCCD is an ExView HAD CCD camera and it adopts Sony ExView HAD CCD sensor as the image-picking device. Sony ExView HAD CCD is a CCD that drastically improves light efficiency by including near infrared light region as a basic structure of HAD (Hole-Accumulation-Diode) sensor. ToupTek uses EXCCD for simplicity. USB2.0 is used as the data transfer interface.

EXCCD comes with advanced video & image processing application ToupView; Providing Windows/Linux/OSX multiple platform SDK; Native C/C++, C#/VB.NET, DirectShow, Twain Control API;

The EXCCD can be widely used in low light environment and microscope fluorescence image capture and analysis.

The EXCCD's basic characteristic is as follows:

- Standard C-Mount camera with SONY ExView 0.3M~1.4M sensors;
- USB2.0 interface ensuring high speed data transmission;
- Ultra-Fine color engine with perfect color reproduction capability;
- With advanced video & image processing application ToupView;
- Providing Windows/Linux/Mac OS multiple platforms SDK;
- Native C/C++, C#/VB.NET, DirectShow, Twain Control API;

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8.1.2 EXCCD Datasheet(4)

Order Code	Sensor & Size(mm)	Pixel(μm)	G Sensitivity Dark Signal	FPS/Resolution	Binning	Exposure
EXCCD01400KPA TP801400A	1.4M/ICX285AQ(C) 2/3“ (8.77x6.60)	6.45x6.45	1240mv with 1/30s 10mv with 1/30s	15@1360x1024	1x1	0.12ms~240s
EXCCD01400KMA TM801400A	1.4M/ICX285AL(M) 2/3“ (8.77x6.60)	6.45x6.45	1300mv with 1/30s 11mv with 1/30s	15@1360x1024	1x1	0.12ms~240s
EXCCD00440KMA TM800440A	0.44M/ICX829AL(M) 1/2"(6.43x4.80)	8.6X8.3	2800mv with 1/30s 2mv with 1/30s	46@748X578	1X1	0.20ms~3600s
EXCCD00300KMA TM800300A	0.3M ICX618AL(M) 1/4“ (3.58x2.69)	5.6x5.6	1200mv with 1/30s 4mv with 1/30s	72@640x480	1x1	0.06ms~40s,

C: Color; M: Monochrome;

Other Specification for EXCCD Cameras	
Spectral Range	380-650nm (with IR-cut Filter)
White Balance	ROI White Balance/ Manual Temp Tint Adjustment /NA for Monochromatic Sensor
Color Technique	Ultra-Fine™ Color Engine /NA for Monochromatic Sensor
Capture/Control API	Native C/C++, C#/VB.NET, DirectShow, Twain and Labview
Recording System	Still Picture and Movie
Cooling System*	Natural
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 over PC USB Port
Software Environment	
Operating System	Microsoft® Windows® XP / Vista / 7 / 8 /10 (32 & 64 bit) OSx(Mac OS X) Linux
PC Requirements	CPU: Equal to Intel Core2 2.8GHz or Higher
	Memory:2GB or More
	USB Port:USB2.0 High-speed Port
	Display:17” or Larger
	CD-ROM

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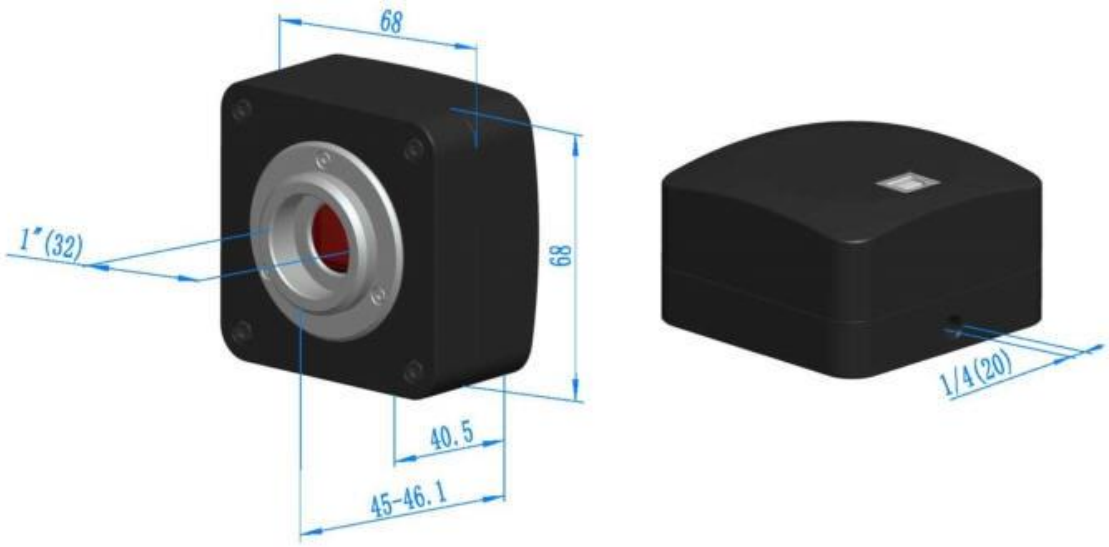
8.1.3 Dimension of EXCCD

The EXCCD body, made from tough, zinc 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 EXCCD

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8.1.4 Packing Information of EXCCD

Packing Information of EXCCD

Standard Camera Packing List			
A	Carton L:52cm W:32cm H:33cm (20pcs, 12~17Kg/ carton), not shown in the photo		
B	Gift box L:15cm W:15cm H:10cm (0.67~0.80Kg/ box)		
C	EXCCD series USB2.0 C-Mount camera		
D	High-speed USB2.0 A male to B male gold-plated connectors cable /2.0m		
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.)	

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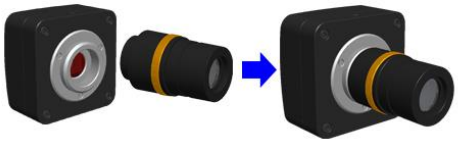
8.1.5 Extension of EXCCD with Microscope or Telescope Adapter

Application	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	 EXCCD+AMAXXX(23.2mm Adapter)	 EXCCD+FMAXXX(23.2mm Adapter)
Telescope Camera	 EXCCD+ATAXXX(31.75mm Adapter)	 EXCCD+FTAXXX(31.75mm Adapter)

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8.2 UHCCD Series C-mount USB2.0 CCD Camera

8.2.1 UHCCD Basic Characteristic

ToupTek UHCCD is an ultra-high performance Super HAD CCD camera. The camera adopts Sony Super HAD CCD sensor as the image-picking device; The Super HAD CCD is a version of Sony's high performance CCD HAD (Hole-Accumulation Diode) sensor with sharply improved sensitivity by the incorporation of a new semiconductor technology developed by Sony Corporation. USB2.0 is used as the data transfer interface.

UHCCD comes with advanced video & image processing application ToupView; Providing Windows/Linux/OSX multiple platform SDK; Native C/C++, C#/VB.NET, DirectShow, Twain Control API;

The UHCCD can be widely used in bright field light environment and microscope image capture and analysis.

The UHCCD's basic characteristic is as follows:

- Standard C-Mount camera with SONY Super HAD CCD 0.8~5.2M sensor;
- USB2.0 interface ensuring high speed data transmission;
- Ultra-Fine color engine with perfect color reproduction capability;
- With advanced video & image processing application ToupView;
- Providing Windows/Linux/Mac OS multiple platforms SDK;
- Native C/C++, C#/VB.NET, DirectShow, Twain Control API;

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8.2.2 UHCCD Datasheet(9)

Order Code	Sensor & Size(mm)	Pixel(μm)	G Sensitivity Dark Signal	FPS/Resolution	Binning	Exposure
UHCCD05200KPA TP705200A	5.2M/ICX655AQ(C) 2/3“ (8.44x7.07)	3.45x3.45	420mv with 1/30s 4mv with 1/30s	4.3@2448x2050 10.5@960x720	1x1	0.22ms~60s
UHCCD05100KPA TP705100A	5.1M/ICX452AQ(C) 1/1.8“ (7.19x5.39)	2.775x2.775	260mv with 1/30s 16mv with 1/30s	4@2592x1944 35@560x420	1x1, 2x2	0.212ms~77ms
UHCCD05000KPA TP705000A	5.0M/ICX282AQ(C) 2/3“ (8.70x6.53)	3.40x3.40	280mv with 1/30s 16mv with 1/30s	4.5@2560x1920 9@1280x960	1x1, 2x2	0.203ms~60s
UHCCD03100KPB TP703100B	3.1M/ICX252AQ(C) 1/1.8“ (7.06x5.30)	3.45x3.45	270mv with 1/30s 12mv with 1/30s	6@2048x1536 41@640x480	1x1,2x2	0.178ms~77ms,
UHCCD02000KPA TP702000A	2.0M/ICX274AQ(C) 1/1.8“ (7.04x5.28)	4.40x4.40	420mv with 1/30s 8mv with 1/30s	10@1600x1200	1x1	0.135ms~60s
UHCCD01400KPA TP701400A	1.4M/ICX205AK(C) 1/2“ (6.32x4.76)	4.65x4.65	400mv with 1/30s 16mv with 1/30s	8@1360x1024	1x1	0.227ms~60s
UHCCD01400KPB TP701400B	1.4M/ICX205AK(C) 1/2“ (6.32x4.76)	4.65x4.65	400mv with 1/30s 16mv with 1/30s	15@1360x1024	1x1	0.127ms~60s
UHCCD01400KMB TM701400B	1.4M/ICX205AL(M) 1/2“ (6.32x4.76)	4.65x4.65	450mv with 1/30s 16mv with 1/30s	15@1360x1024	1x1	0.127ms~60s
UHCCD00800KPA TP700800A	0.8M/ICX204AK(C) 1/3“ (4.76x3.57)	4.65x4.65	400mv with 1/30s 6mv with 1/30s	16@1024x768	1x1	0.16ms~60s

C:Color; M:Monochrome;

Other Specification for UHCCD	
Spectral Range	380-650nm (with IR-cut Filter)
White Balance	ROI White Balance/ Manual Temp Tint Adjustment/NA for Monochromatic Sensor
Color Technique	Ultra-Fine™ Color Engine/NA for Monochromatic Sensor
Capture/Control API	Native C/C++, C#/VB.NET, DirectShow, Twain and Labview
Recording System	Still Picture and Movie
Cooling System*	Natural
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 over PC USB Port
Software Environment	
Operating System	Microsoft® Windows® XP / Vista / 7 / 8 /10 (32 & 64 bit) OSx(Mac OS X) Linux
PC Requirements	CPU: Equal to Intel Core2 2.8GHz or Higher
	Memory:2GB or More
	USB Port:USB2.0 High-speed Port
	Display:17” or Larger
	CD-ROM

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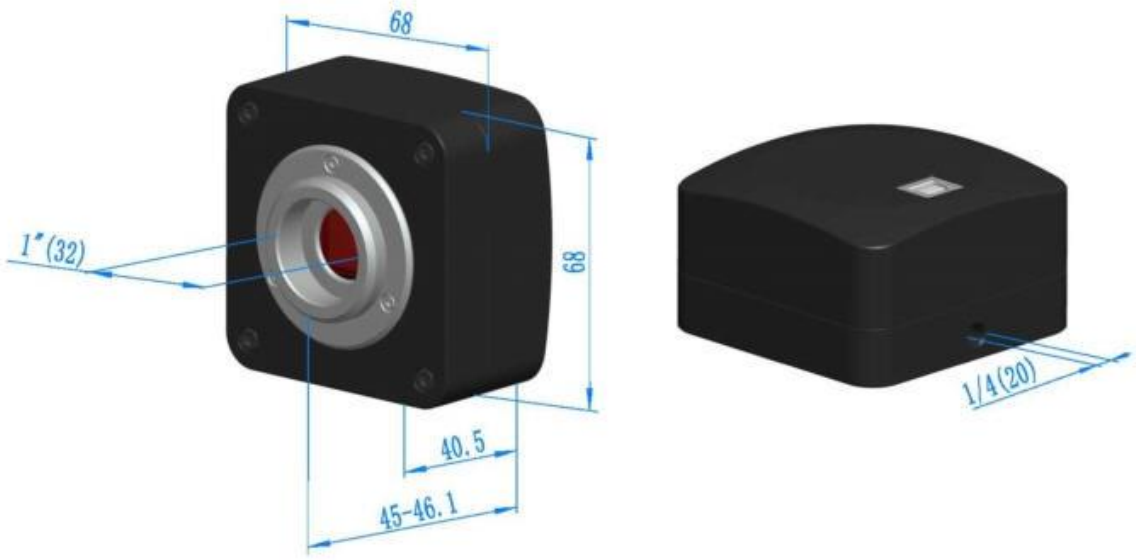
8.2.3 Dimension of UHCCD

The UHCCD body, made from tough, zinc 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 UHCCD

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8.2.4 Packing Information of UHCCD

Packing Information of UHCCD

Standard Camera Packing List			
A	Carton L:52cm W:32cm H:33cm (20pcs, 12~17Kg/ carton), not shown in the photo		
B	Gift box L:15cm W:15cm H:10cm (0.67~0.8Kg/ box)		
C	UHCCD series camera		
D	High-speed USB2.0 A male to B male gold-plated connectors cable /2.0m		
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.)	

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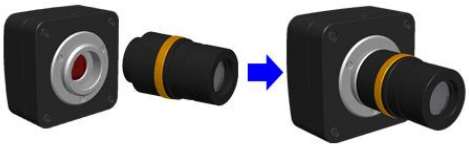
8.2.5 Extension of UHCCD with Microscope or Telescope Adapter

<table>
<tr><th>Extension</th><th colspan="2">Picture</th></tr>
<tr><td>C-mount Camera</td><td>  </td><td>Machine vision; Medical imaging;
Semiconductor equipment; Test instruments;
Document scanners; 2D barcode readers;
Web camera and security video;
Microscope imaging;</td></tr>
<tr><td>Microscope Camera</td><td> 
UHCCD+AMAXXX(23.2mm Adapter)</td><td> 
UHCCD+FMAXXX(23.2mm Adapter)</td></tr>
<tr><td>Telescope Camera</td><td> 
UHCCD+ATAXXX(31.75mm Adapter)</td><td> 
UHCCD+FTAXXX(31.75mm Adapter)</td></tr>
</table>

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9 Microscope USB3.0 CMOS Camera

9.1 MTR3CMOS Series TE-Cooling C-mount USB3.0 CMOS Camera

9.1.1 The Basic Characteristic of MTR3CMOS

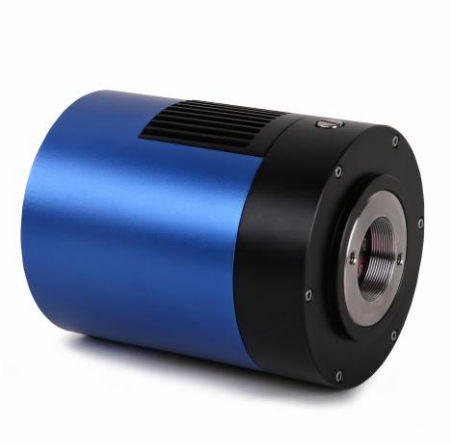
MTR3CMOS camera adopts SONY Exmor CMOS sensor as the image-picking device and USB3.0 is used as the transfer interface to increase the frame rate.

With the two-stage peltier cooling sensor chip to -42 degree below ambient temperature. This will greatly increase the signal to noise ratio and decrease the image noise. Smart structure is designed to assure the heat radiation efficiency and avoid the moisture problem. Electric fan is used to increase the heat radiation speed.

USB3.0 is used as the data transfer interface to increase the frame rate.

MTR3CMOS comes with advanced video & image processing application ToupView; Providing Windows/Linux/OSX multiple platform SDK; Native C/C++, C#/VB.NET, DirectShow, Twain Control API;

The **MTR3CMOS** can be widely used in low light environment and microscope fluorescence image capture and analysis, as well as the astronomy deep sky application.



The basic characteristic of MTR3CMOS can be summarized as follows:

- Standard C-Mount camera with SONY Exmor CMOS sensors from 10M to 20M;
- Two-stage TE-cooling with controllable electric fan;
- Sensor chip cooling up to 42°C below ambient temperature;
- Working temperature can be regulated to specified temperature in 5 minutes;
- Smart structure to assure the heat radiation efficiency and avoid the moisture problem;
- IR-CUT/AR coated windows;
- Up to 1 hour long time exposure;
- USB3.0 5Gbit/second interface ensuring high speed data transmission;
- Ultra-Fine^{TM} color engine with perfect color reproduction capability;
- With advanced video & image processing application ToupView;
- Support both video and trigger modes;
- Providing Windows/Linux/Mac OS multiple platforms SDK;
- Native C/C++, C#/VB.NET, DirectShow, Twain control API;

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9.1.2 MTR3CMOS Datasheet(5)

Order Code	Sensor & Size(mm)	Pixel(μm)	G Sensitivity Dark Signal	FPS/Resolution	Binning	Exposure
MTR3CMOS20000KPA MTRP120000A (New)	20M/IMX183(C) 1 "(13.056x8.755)	2.4 x2.4	462mv with 1/30s 0.21mv with 1/30s	5@5440x3648 10@4096x2160 15@2736x1824 30@1824x1216	1x1, 1x1, 2x2, 3x3	0.1ms~3600s
MTR3CMOS20000KMA MTRM120000A (New)	20M/IMX183(M) 1 "(13.056x8.755)	2.4 x2.4	388mv with 1/30s 0.21mv with 1/30s (F8.0)	17.8@5440x3648 41@4096x2160 51@2736x1824 64@1824x1216	1x1, 1x1, 2x2, 3x3	0.1ms~3600s
MTR3CMOS16000KPA MTRP116000A (New)	16M/MN34230PLJ(C) 4/3" (17.6x13.3)	3.8x3.8	2413LSB 89.1LSB (Gain = 0dB)	6@4640x3506 20@2304x1750 48@1536x1160	1x1 2x2 3x3	0.15ms~3600s
MTR3CMOS16000KMA MTRM116000A (New)	16M/MN34230ALJ(M) 4/3" (17.6x13.3)	3.8x3.8	2650LSB 89.1LSB (Gain = 0dB)	22.5@4648x3506 43.0@2304x1750 48.0@1536x1168	1x1 2x2 3x3	0.15ms~3600s
MTR3CMOS10300KPA MTRP110300A (New)	10.3M/IMX294(C) 4/3 "(17.47x12.86)	4.63 x4.63	419mv with 1/30s 0.12mv with 1/30s	7.5@3704x2778 10 @4096x2160 60 @2048x1080 96@1360x720	1x1, 1x1, 2x2, 3x3	0.15ms~3600s

C:Color; M:Monochrome;

Other Specification for MTR3CMOS Cameras	
Spectral Range	380-650nm (with IR-cut Filter)
White Balance	ROI White Balance/ Manual Temp Tint Adjustment/NA for Monochromatic Sensor
Color Technique	Ultra-Fine™ Color Engine/NA for Monochromatic Sensor
Capture/Control API	Native C/C++, C#/VB.NET, DirectShow, Twain and Labview
Recording System	Still Picture and Movie
Cooling System*	Two-stage TE-cooling System -45 ℃ below Camera Body Temperature
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 over PC USB Port External Power Adapter for Cooling System, DC12V, 3A
Software Environment	
Operating System	Microsoft® Windows® XP / Vista / 7 / 8 /10 (32 & 64 bit) OSx(Mac OS X) Linux
PC Requirements	CPU: Equal to Intel Core2 2.8GHz or Higher
	Memory:2GB or More
	USB Port:USB3.0 High-speed Port
	Display:17" or Larger
	CD-ROM

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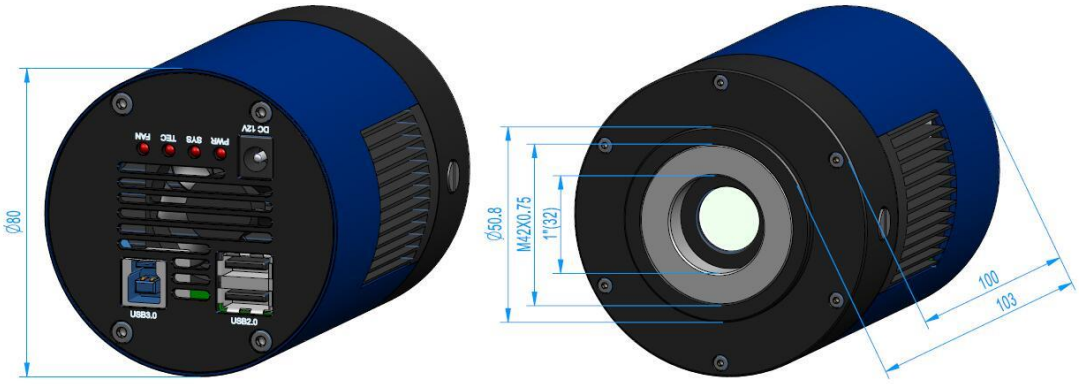
9.1.3 MTR3CMOS Dimension

The MTR3CMOS body, made from tough, alloy with CNC technique, ensures a heavy duty, workhorse solution. The camera is designed with a high quality IR-CUT or AR to block the IR light or protect the camera sensor. The fan's vibration is minimized to the low level to eliminate the vibration caused imaging blur. This design ensures a rugged, robust solution with an increased lifespan when compared to the other industrial camera solutions.



Dimension of MTR3CMOS

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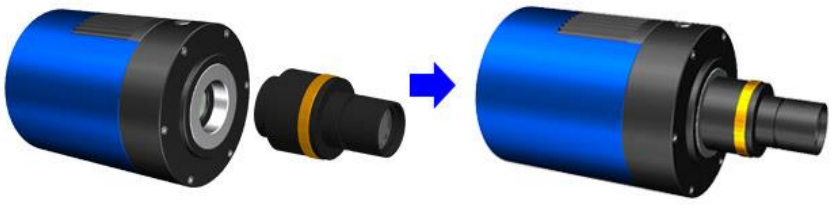
9.1.4 Packing Information for MTR3CMOS Camera

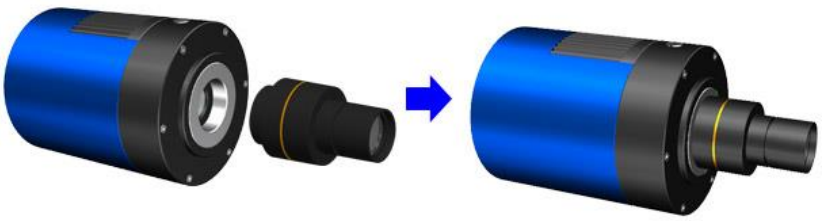
Packing Information of MTR3CMOS Camera

Standard Package			
A	Carton L:50cm W:30cm H:30cm (20pcs, 12~17Kg/ carton), not shown in the photo(TBD)		
B	3-A safety equipment case: L:28cm W:23cm H:15cm (1pcs, 2.8Kg/ box); Carton size:L:28.2cm W:25.2cm H:16.7cm(TBD)		
C	MTR3CMOS camera(C-mount)		
D	Drying tube and desiccant		
E	Power adapter: input: AC 100~240V 50Hz/60Hz, output: DC12 V 3A		
F	High-Speed USB3.0 A male to B male gold-plated connectors cable /1.5m		
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 108004/AMA100
		C-Mount to Dia.31.75mm eyepiece tube (Please choose 1 of them for your telescope)	108008/ATA037 108009/ATA050 108010/ATA075 108011/ATA100
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 108008/FMA100
		C-mount to Dia.31.75mm eyepiece tube (Please choose 1 of them for your telescope)	108011/FTA037 108012/FTA050 108013/FTA075 108014/FTA100
	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.)	

9.1.5 Extension of MTR3CMOS with Microscope Adapter



MTR3CMOS+AMAXXX(23.2mm Adapter)



MTR3CMOS+FMAXXX(23.2mm Adapter)

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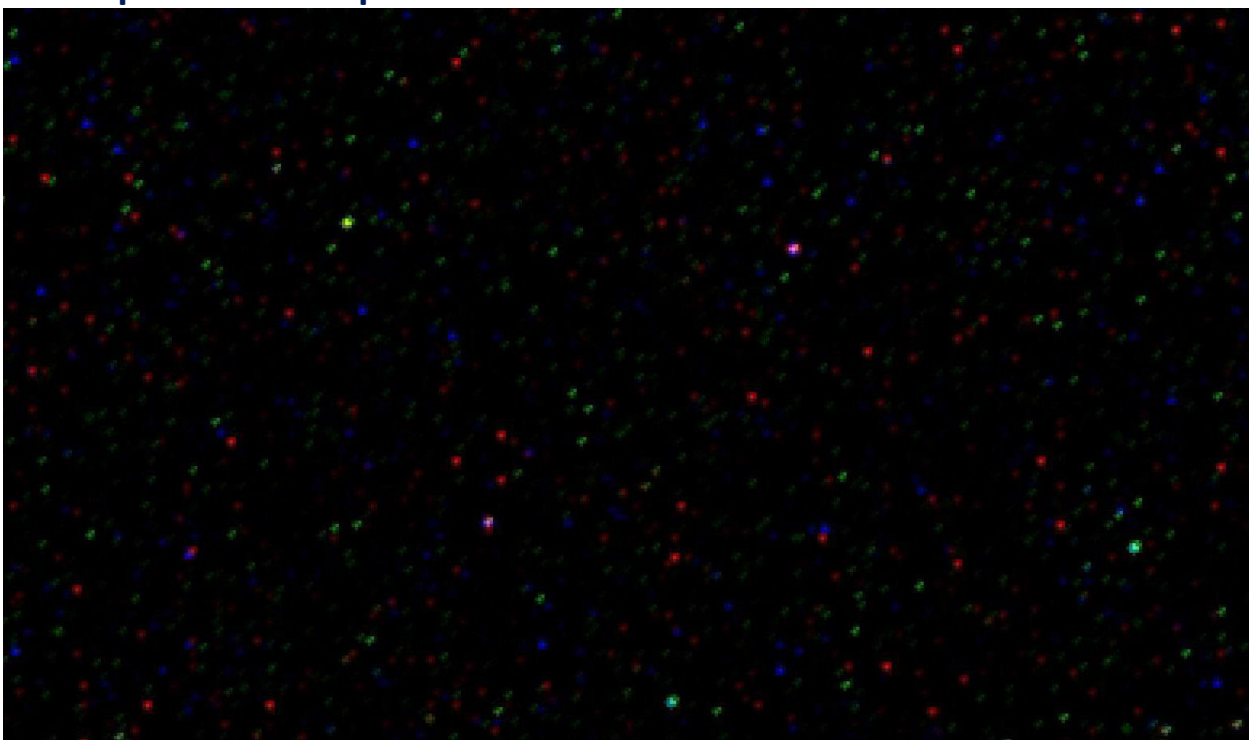
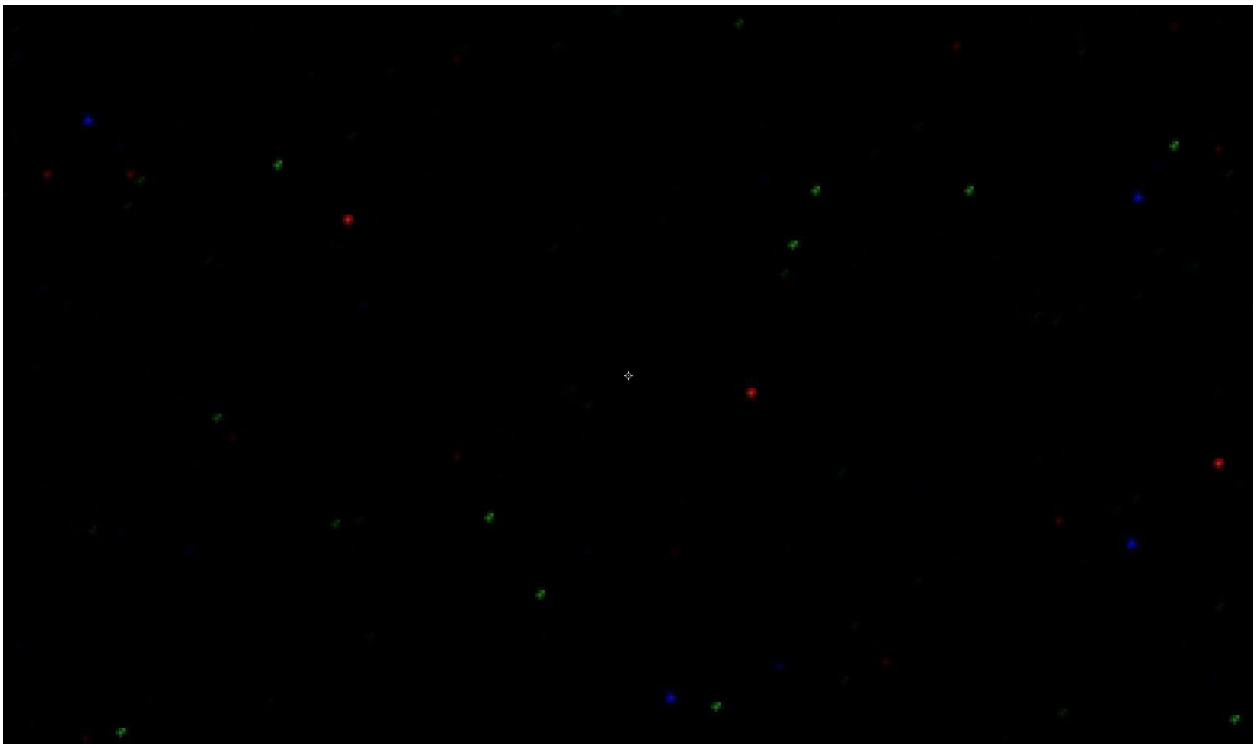
9.1.6 Sample Photos Captured with MTR3CMOS Camera



Hot noise for the MTR3CMOS at Gain 20 , 600 second, 15 Centidegree



Hot noise for the MTR3CMOS Gain 20 , 600 second, minus 15 Centidegree

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9.2 BigEye Series M42 and M42 to C or F Mount USB3.0 CMOS Camera

9.2.1 Characteristic

- Large scientific CMOS sensor (SONY Exmor, Exmor R(Back-illuminated), Exmor RS CMOS sensor;
- Wide spectrum range, some models even have high response in the ultra-violet to infrared wavelength;
- Real-time 8/12bit depth switch(depending on sensor);
- Ultra-fine^{TM} HISP VP and USB3.0 5 Gbps interface ensuring high frame rates(Up to 30 frames for 10M resolution);
- Ultra low noise and low power dissipation by using column-parallel A/D conversion;
- With hardware resolution from 4.2M to 10.3M;
- Rolling Shutter or Global Shutter;
- Standard M42 mount and M42 to C-mount or F-mount;
- CNC aluminum alloy housing;
- With advanced video & image processing application ToupView;
- Providing Windows/Linux/Mac OS multiple platforms SDK;
- Native C/C++, C#/VB.Net, DirectShow, Twain;

BigEye's different views

BigEye+F-mount BigEye + F-mount+Lens

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BigEye with F-mount+Lens

BigEye with F-mount and Lens

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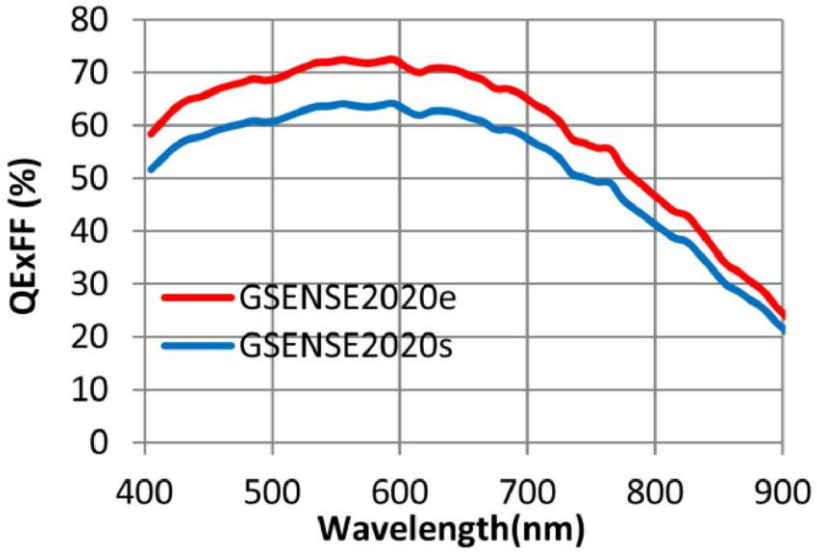
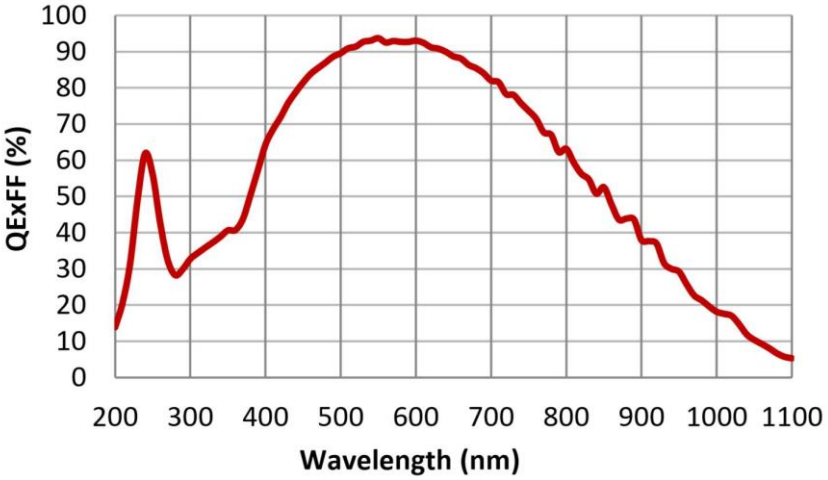
9.2.2 BigEye Datasheet (3)

Order Code	Sensor & Size(mm)	Pixel(μm)	G Sensitivity Dark Signal	FPS/Resolution	Binning	Exposure
BigEye10000KPA BP910000A (New)	10.3M/IMX294(C) 4/3 "(17.47x12.86)	4.63 x4.63	419mv with 1/30s 0.12mv with 1/30s	30@3704x2778 34.5@4096x2160 39.5@2760x2072 62@2048x1080 86@1360x720	1x1, 1x1, 1x1, 2x2, 3x3	0.1ms~15s
BigEye4200KMA BM94200A (New)	4.2M/GSENSE2020S(M,RS or GS) 1.2"(13.31x13.31)	6.5x 6.5	$8.1x10^7$ (e-/((W/m2).s)) Peak QE 64.2% @595nm DS	45@2048x2046 45@1024 x 1023	1x1 2x2	0.01ms~1000s
BigEye4200KMB BM94200B (New)	4.2M/GSENSE2020BSI(M,UV, RS GS) 1.2"(13.31x13.31)	6.5 x 6.5	$1.1x10^8$ (e-/((W/m2).s)) Peak QE 93.7% @595nm	43@2048 x2046 42@1024 x1023	1x1 2x2	0.01ms~1000s

C: Color; M: Monochrome; GS: Global Shutter, UV: Good UV response



Spectral response of GSENSE2020e and GSENSE2020s



Spectral Response of GSENSE2020BSI

Other Specification for BigEye Camera

Spectral Range	200-1100nm (UV without IR-cut Filter) or 400-900nm
White Balance	ROI White Balance/ Manual Temp Tint Adjustment/NA for Monochromatic Sensor
Color Technique	Ultra-fine™ HISPVP /NA for Monochromatic Sensor
Capture/Control API	Native C/C++, C# /VB.Net,, DirectShow, Twain and Labview
Recording System	Still Picture and Movie
Cooling System*	Natural

Operating Environment

Operating Temperature(in Centidegree)	-10~ 50

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Storage Temperature(in Centidegree)	-20~ 60
Operating Humidity	30~80%RH
Storage Humidity	10~60%RH
Power Supply	DC 5V over PC USB Port
Software Environment	
Operating System	Microsoft® Windows® XP / Vista / 7 / 8 /10 (32 & 64 bit) OSx(Mac OS X) Linux
PC Requirements	CPU: Equal to Intel Core2 2.8GHz or Higher
	Memory: 2GB or More
	USB Port: USB3.0 High-speed Port
	Display: 17” or Larger
	CD-ROM

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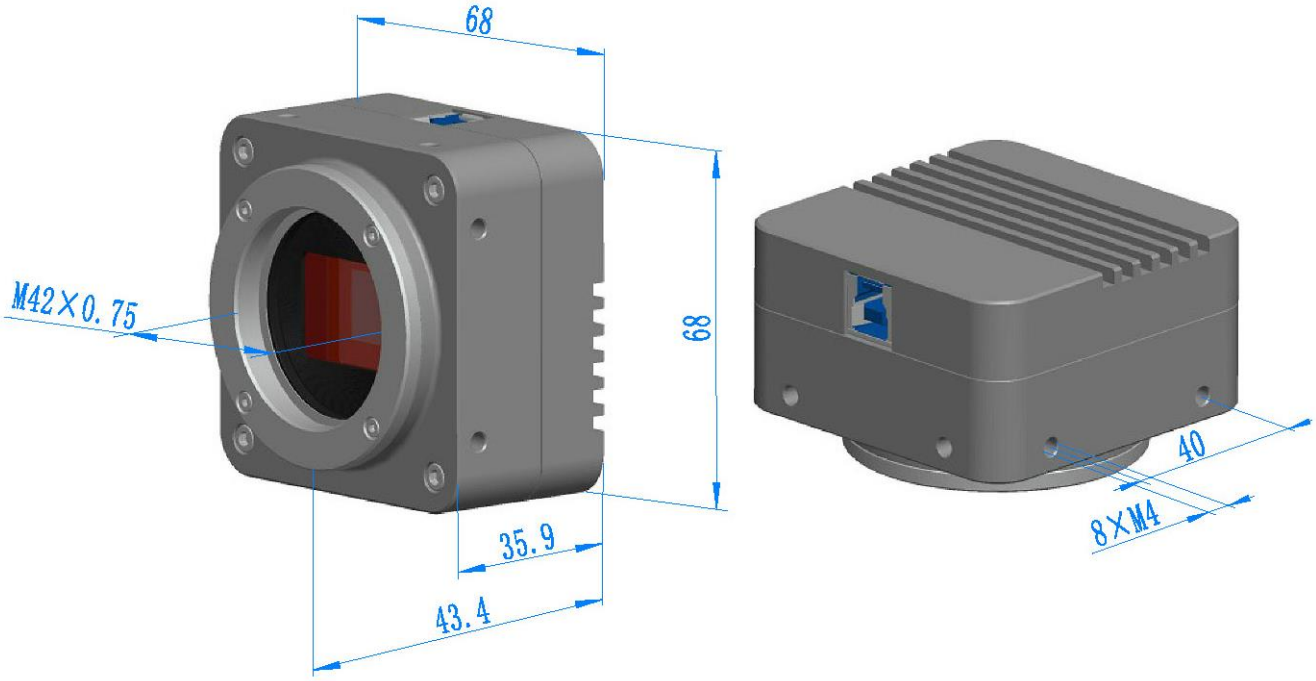
9.2.3 Dimension of BigEye

The BigEye body, made from tough, CNC aluminum alloy, ensures a heavy duty, workhorse solution. The camera is designed with a high quality IR-CUT or AR glass 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 BigEye with M42x0.75 or F-mount Interface

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9.2.4 Packing Information for BigEye

Packing Information of BigEye Series camera

Standard Camera Packing List		
A	Carton L:52cm W:32cm H:33cm (20pcs, 12~17Kg/ carton), not shown in the photo	
B	Gift box L:15cm W:15cm H:10cm (0.58~0.6Kg/ box)	
C	BigEye series USB3.0 C-mount CMOS camera	
D	High-speed USB3.0 A male to B male gold-plated connectors cable /2.0m	
E	CD (Driver & utilities software, Ø12cm)	
Optional Accessory		
F	M42x0.75mm-mount to C-mount converter (If C-mount adapter is used)	
G	M42x0.75mm-mount to F-mount converter (If F-mount lens is used)	
H	Phototube to M42x0.75 mount adapter (U-TV1.2XT2) for Olympus microscope	
I	Phototube to M42x0.75 mount adapter (MQD42120 MBB42120) for Nikon microscope	
J	Phototube to M42x0.75 mount adapter (P95-T2 4/ P95-C 1" 1.0 x 3" 1.2x) for Zeiss Primo Star series , Zeiss Primo vert series microscope	
K	Phototube to M42x0.75 mount adapter (11541510-120 HT2-1.2X) for Leica microscope	
L	Phototube to M42x0.75 mount adapter (60N-T2 4/3" 1.2x) for Zeiss Axio series microscope	
	Note: For 4/3" sensor, 1.2X adapter with M42x0.75 mount should be chosen, for the 1.2" sensor, 1.0X adapter with C-mount could be used to get the better FOV;	
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.)

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9.3 E3ISPM Series C-mount USB3.0 CMOS Camera with Hardware ISP and Video Pipeline

9.3.1 E3ISPM Basic Characteristic

E3ISPM adopt SONY Exmor CMOS sensor as the image-picking device and USB3.0 is used as the transfer interface.

E3ISPM hardware resolutions range from 3.1M to 20M and come with the integrated CNC aluminum alloy compact housing.

E3ISPM integrated with 12 bit Ultra-fine™ Hardware Image Signal Processor Video Pipeline(Ultra-fine™ HISP VP) for Demosaic, Adjustments, Automatic Exposition, Gain Adjustment, One Push White Balance, Chrominance Adjustment, Saturation Adjustment, Gamma Correction, Luminance Adjustment, Contrast Adjustment, Bayer and finally form RAW data for 8/12 bit output. This will move the heavier burden of the processing from the PC to the Ultra-fine™ HISP VP and greatly accelerating the processing speed.

E3ISPM comes with advanced video & image processing application ToupView; Providing Windows/Linux/ OSX multiple platforms SDK; Native C/C++, C#/VB.NET, DirectShow, Twain Control API;

The E3ISPM can be widely used in bright field light environment and microscope image capture and analysis with higher frame rate.

The basic characteristic of E3ISPM cameras are as follows:

- SONY Exmor, Exmor R(Back-illuminated), Exmor RS CMOS sensor with USB3.0 interface;
- Real-time 8/12bit depth switch(depending on sensor);
- Ultra-fineTM HISP VP and USB3.0 5 Gbps interface ensuring high frame rates(Up to 15 frames for 20M Resolution);
- Super high sensitivity up to 1120mV(IMX264);
- Ultra low noise and low power dissipation by using column-parallel A/D conversion;
- With hardware resolution among 3.1M to 20M;
- Rolling Shutter or Global Shutter;
- Standard C-Mount camera;
- CNC aluminum alloy housing;
- With advanced video & image processing application ToupView;
- Providing Windows/Linux/Mac OS multiple platforms SDK;
- Native C/C++, C#/VB.Net, DirectShow, Twain, LabView

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9.3.2 E3ISPM Datasheet (11)

Order Code	Sensor & Size(mm)	Pixel(μm)	G Sensitivity Dark Signal	FPS/Resolution	Binning	Exposure
E3ISPM20000KPA IP120000A	20M/IMX183(C) 1 "(13.06x8.76)	2.4 x2.4	462mv with 1/30s 0.21mv with 1/30s	15@5440x3648 50@2736x1824 60@1824x1216	1x1 2x2 3x3	0.1ms~15s
E3ISPM12300KPA IP112300A(New)	12.3M/IMX304(C, GS) 1.1"(14.13x10.35)	3.45x3.45	1146mv with 1/30s 0.1mv with 1/30s	23.4@4096x3000 46.3@2048x1500	1x1 1x1	0.244ms~15s
E3ISPM12000KPA IP112000A	12M/IMX226(C) 1/1.7"(7.40x5.55)	1.85x1.85	280mv with 1/30s 0.1mv with 1/30s	25@4000x3000 50@2048x1080	1x1 2x2	0.1ms~15s
E3ISPM09000KPA IP109000A(New)	9.0M/IMX305(C, GS) 1" (14.13x7.45)	3.45x3.45	1146mv with 1/30s 0.15mv with 1/30s	34@4096x2160 60@2048x1080	1x1 1x1	0.1ms~15s
E3ISPM08300KPA IP108300A(New)	8.3M/IMX274(C) 1/2.5"(6.22x3.50)	1.62x1.62	236mv with 1/30s 0.1mv with 1/30s	32@3840x2160 65@1920x1080	1x1 2x2	0.244ms~15s
E3ISPM06300KPA IP106300A	6.3M/IMX178(C) 1/1.8" (7.37x4.92)	2.4x2.4	425mv with 1/30s 0.15mv with 1/30s	30@3072 x2048 38@1536x 1024	1x1 2x2	0.1ms~15s
E3ISPM05000KPA IP105000A(New)	5.0M/IMX264(C, GS) 2/3" (8.45x7.07)	3.45x3.45	1146mv with 1/30s 0.15mv with 1/30s	35@2448x2048 50@1224x1024	1x1 1x1	0.1ms~15s
E3ISPM03100KPA IP103100A(New)	3.1M/IMX265(C, GS) 1/1.8" (7.07x5.30)	3.45x3.45	1146mv with 1/30s 0.15mv with 1/30s	53@2048x1536 85@1024x768	1x1 1x1	0.1ms~15s
E3ISPM03100KPB IP103100B	3.1M/IMX123(C) 1/2.8" (5.12x3.84)	2.5x2.5	600mv with 1/30s 0.15mv with 1/30s	50@2048x1536 50@1920x1080	1x1 1x1	0.1ms~15s
E3ISPM02000KPA IP102000A(New)	2M/IMX385(C) 1/2" (7.2x4.05)	3.75x3.75	2350mv with 1/30s 0.15mv with 1/30s	125@1920x1080	1x1	0.1ms~15s
E3ISPM01500KPA IP101500A(New)	1.5M/IMX273(C, GS) 1/2.9" (4.968x3.726)	3.45x3.45	1146mv with 1/30s 0.15mv with 1/30s	164@1440x1080 320@720x540	1x1 2x2	0.1ms~15s

C: Color; M: Monochrome; GS: Global Shutter

Other Specification for E3ISPM Camera

Spectral Range	380-650nm (with IR-cut Filter)
White Balance	ROI White Balance/ Manual Temp Tint Adjustment/NA for Monochromatic Sensor
Color Technique	Ultra-fine™ HISPVP /NA for Monochromatic Sensor
Capture/Control API	Native C/C++, C# /VB.Net,, DirectShow, Twain and Labview
Recording System	Still Picture and Movie
Cooling System*	Natural
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 over PC USB Port
Software Environment	
Operating System	Microsoft® Windows® XP / Vista / 7 / 8 /10 (32 & 64 bit) OSx(Mac OS X) Linux
PC Requirements	CPU: Equal to Intel Core2 2.8GHz or Higher
	Memory: 2GB or More
	USB Port: USB3.0 High-speed Port
	Display: 17" or Larger
	CD-ROM

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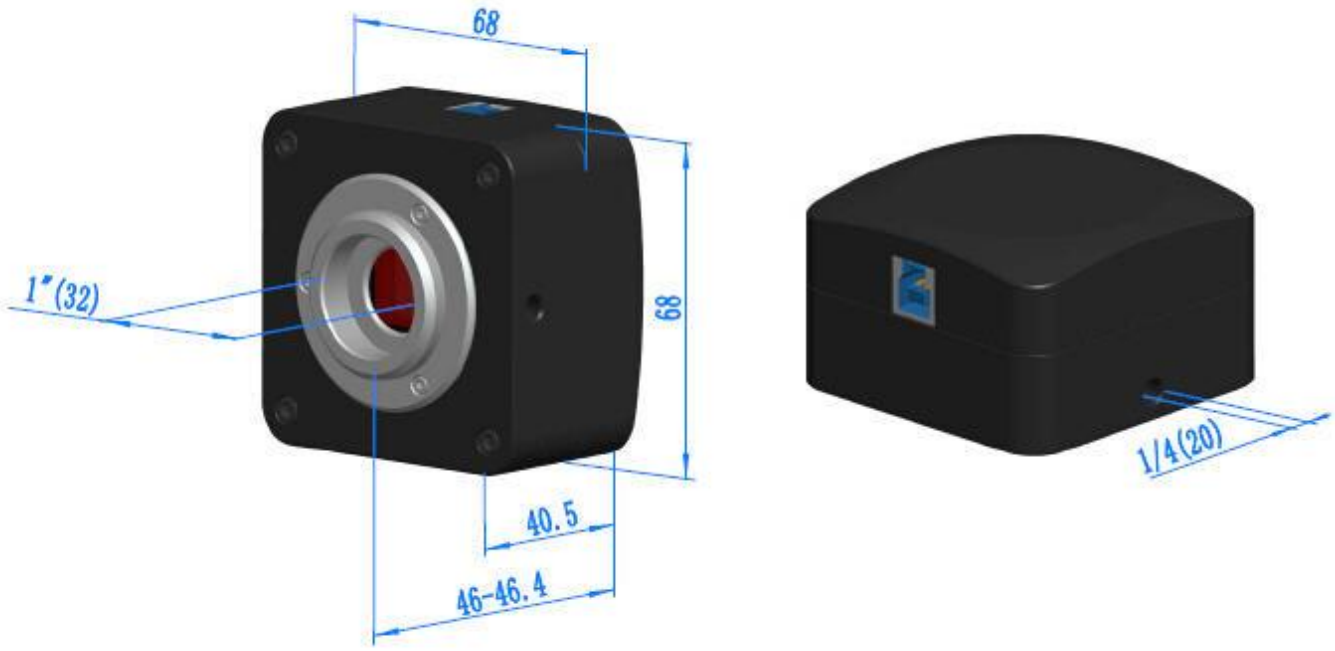
9.3.3 Dimension of E3ISPM

The E3ISPM body, made from tough, CNC aluminum alloy, ensures a heavy duty, workhorse solution. The camera is designed with a high quality IR-CUT to protect the camera sensor. No moving parts included. This design ensures a rugged, robust solution with an increased lifespan when compared to other industrial camera solutions.



Dimension of E3ISPM

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9.3.4 Packing Information for E3ISPM

Packing Information of E3ISPM

Standard Camera Packing List			
A	Carton L:52cm W:32cm H:33cm (20pcs, 12~17Kg/ carton), not shown in the photo		
B	Gift box L:15cm W:15cm H:10cm (0.58~0.6Kg/ box)		
C	E3ISPM series USB3.0 C-mount CMOS camera		
D	High-speed USB3.0 A male to B male gold-plated connectors cable /2.0m		
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 108004/AMA100
		C-mount to Dia.31.75mm eyepiece tube (Please choose 1 of them for your telescope)	108008/ATA037 108009/ATA050 108010/ATA075 108011/ATA100
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 108008/FMA100
		C-Mount to Dia.31.75mm Eyepiece Tube (Please choose 1 of them for your telescope)	108011/FTA037 108012/FTA050 108013/FTA075 108014/FTA100
	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.)	

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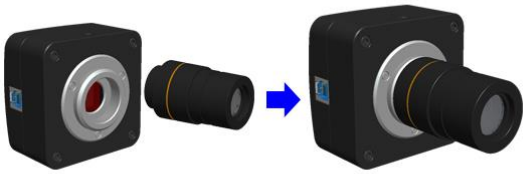
9.3.5 Extension of E3ISPM with Microscope or Telescope Adapter

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	 E3ISPM+AMAXXX(23.2mm Adapter)	 E3ISPM+FMAXXX(23.2mm Adapter)
Telescope Camera	 E3ISPM+ATAXXX(31.75mm Adapter)	 E3ISPM+FTAXXX(31.75mm Adapter)

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9.4 E3CMOS Series C-mount USB3.0 CMOS Camera

9.4.1 E3CMOS Basic Characteristic

E3CMOS adopt SONY Exmor CMOS sensor as the image-picking device and USB3.0 is used as the data transfer interface.

E3CMOS hardware resolutions range from 2.3M to 20M and come with the integrated CNC aluminum alloy compact housing.

E3CMOS comes with advanced video & image processing application ToupView; Providing Windows/Linux/ OSX multiple platforms SDK; Native C/C++, C#/VB.NET, DirectShow, Twain Control API;

The E3CMOS can be widely used in bright field light environment and microscope image capture and analysis with higher frame rate.

The basic characteristic of E3CMOS cameras are as follows:

- SONY Exmor, Exmor R(Back-illuminated), Exmor RS CMOS sensor with USB3.0 interface;
- Real-time 8/12/14/16bit depth switch(depending on sensor);
- Super high sensitivity up to 1120mV(IMX185);
- Ultra low noise and low power dissipation by using column-parallel A/D conversion;
- With hardware resolution among 2.3M to 20M;
- Rolling Shutter or Global Shutter;
- Standard C-Mount camera;
- CNC aluminum alloy housing;
- USB3.0 5 Gbps interface ensuring high frame rates;
- With advanced video & image processing application ToupView;
- Providing Windows/Linux/Mac OS multiple platforms SDK;
- Native C/C++, C#/VB.Net, DirectShow, Twain, LabView

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9.4.2 E3CMOS Datasheet(18)

Order Code	Sensor & Size(mm)	Pixel(μm)	G Sensitivity Dark Signal	FPS/Resolution	Binning	Exposure
E3CMOS20000KPA EP120000A (Suspended)	20M/IMX183(C) 1 "(13.06x8.76)	2.4 x2.4	462mv with 1/30s 0.21mv with 1/30s	5.5@5440x3648 16@2736x1824 21@1824x1216	1x1, 2x2, 3x3	0.1ms~15s
E3CMOS20000KMA EM120000A (New)	20M/IMX183(M) 1 "(13.06x8.76)	2.4 x2.4	776mv with 1/30s 0.21mv with 1/30s	17.5@5440x3648 40@4080x2160 48@2736x1824 60@1824x1216	1x1, 1x1, 2x2, 3x3	0.1ms~60s
E3CMOS12000KPA EP112000A	12M/IMX226(C) 1/1.7"(7.40x5.55)	1.85x1.85	280mv with 1/30s 0.1mv with 1/30s	7.1@4000x3000 30@2048x1080	1x1, 2x2	0.244ms~2000ms
E3CMOS12300KMA EM112300A (New)	12.3M/IMX304(M) 1.1 "(14.13x10.35)	3.45 x3.45	1146mv with 1/30s 0.1mv with 1/30s	23.4@4096x3000 46.3@2048x1500	1x1, 1x1,	0.244ms~15s
E3CMOS06300KPA EP106300A	6.3M/IMX178(C) 1/1.8" (7.37x4.92)	2.4x2.4	425mv with 1/30s 0.15mv with 1/30s	15@3072 x2048 26@1536x 1024	1x1, 2x2	0.244ms~2000ms
E3CMOS06300KMA EM106300A	6.3M/IMX178(M) 1/1.8" (7.37x4.92)	2.4x2.4	425mv with 1/30s 0.15mv with 1/30s	30@3072 x2048 50@1536x 1024	1x1, 2x2	0.244ms~2000ms
E3CMOS05000KPA EP105000A (Suspended)	5.0M/IMX264(C, GS) 2/3" (8.45x7.07)	3.45x3.45	1146mv with 1/30s 0.15mv with 1/30s	15@2448x2048 51@1224x1024	1x1	0.1ms~60s
E3CMOS05000KMA EM105000A	5.0M/IMX264(M, GS) 2/3" (8.45x7.07)	3.45x3.45	915mv with 1/30s 0.15mv with 1/30s	35@2448x2048 60@1224x1024	1x1, 2x2	0.1ms~60s
E3CMOS03100KPA EP103100A (Suspended)	3.1M/IMX036(C) 1/2.8" ((5.12x3.84)	2.5x2.5	200mv with 1/30s 0.5mv with 1/30s	28@2048x1536 28@1024x768	1x1, 2x2	0.244ms ~2000ms
E3CMOS03100KPB EP103100B	3.1M/IMX123(C) 1/2.8" (5.12x3.84)	2.5x2.5	600mv with 1/30s 0.15mv with 1/30s	25@2048x1536 30@1920x1080	1x1	0.244ms~2000ms
E3CMOS03100KMC EM103100C (New)	3.1M/IMX265(M, GS) 1/1.8" (7.07x5.30)	3.45x3.45	1146mv with 1/30s 0.15mv with 1/30s	53@2048x1536 85@1024x768	1x1 1x1	0.1ms~15s
E3CMOS02300KPA EP102300A	2.3M/IMX185(C) 1/1.9" (7.20x4.50)	3.75x3.75	1120mv with 1/30s 0.15mv with 1/30s	38@1920x1200 66@960x600	1x1, 2x2	0.244ms ~2000ms
E3CMOS02300KPB EP102300B	2.3M/IMX249(C,GS) 1/1.2" (11.25x7.03)	5.86x5.86	1016mv with 1/30s 0.15mv with 1/30s	30@1920x1200	1x1	0.244ms~2000ms
E3CMOS02300KMC EM102300C	2.3M/IMX174(M, GS) 1/1.2" (11.25x7.03)	5.86x5.86	1016mv with 1/30s 0.15mv with 1/30s	120@1920x1200	1x1	0.244ms~2000ms
E3CMOS01500KMA EM101500A (New)	1.5M/IMX273(M, GS) 1/2.9" (4.968x3.726)	3.45x3.45	1830mv with 1/30s 0.15mv with 1/30s	228@1440x1080 530@720x540	1x1 2x2	0.1ms~60s
E3CMOS01200KPA EP101200A	1.2M/IMX224(C) 1/3"(4.80x3.60)	3.75 x3.75	2040mv with 1/30s 0.15mv with 1/30s	60@1280x960 120@640x480	1x1, 2x2	0.105ms~15s
E3CMOS00400KPA EP100400A (New)	0.4M/IMX287(C, GS) 1/2.9"(4.97x3.73)	6.9x6.9	4584mv with 1/30s 0.15mv with 1/30s	520@720x540	1x1	0.244ms~15s
E3CMOS00400KMA EM100400A (New)	0.4M/IMX287(M,GS) 1/2.9"(4.97x3.73)	6.9x6.9	7469mv with 1/30s 0.15mv with 1/30s	520@720x540	1x1	0.244ms~15s

C: Color; M: Monochrome; GS: Global Shutter

For the suspended models, customer can choose the corresponding models from E3ISPM series with faster frame rate.

Other Specification for E3CMOS Camera	
Spectral Range	380-650nm (with IR-cut Filter)
White Balance	ROI White Balance/ Manual Temp Tint Adjustment/NA for Monochromatic Sensor
Color Technique	Ultra-Fine™ Color Engine/NA for Monochromatic Sensor
Capture/Control API	Native C/C++, C# /VB.Net,, DirectShow, Twain and Labview
Recording System	Still Picture and Movie
Cooling System*	Natural
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 over PC USB Port
Software Environment	
Operating System	Microsoft® Windows® XP / Vista / 7 / 8 /10 (32 & 64 bit) OSx(Mac OS X)

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	Linux
PC Requirements	CPU: Equal to Intel Core2 2.8GHz or Higher
	Memory: 2GB or More
	USB Port: USB3.0 High-speed Port
	Display: 17” or Larger
	CD-ROM

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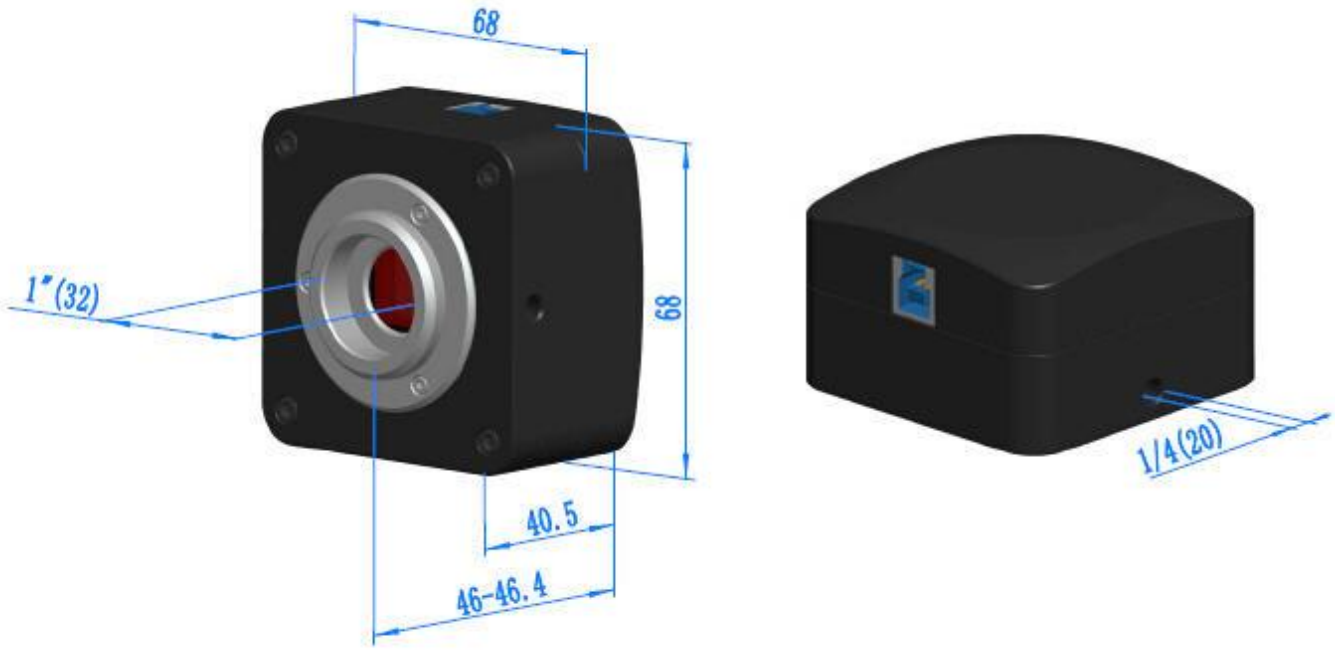
9.4.3 Dimension of E3CMOS

The E3CMOS body, made from tough, CNC aluminum alloy, ensures a heavy duty, workhorse solution. The camera is designed with a high quality IR-CUT to protect the camera sensor. No moving parts included. This design ensures a rugged, robust solution with an increased lifespan when compared to other industrial camera solutions.



Dimension of E3CMOS

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9.4.4 Packing Information for E3CMOS

Packing Information of E3CMOS

Standard Camera Packing List			
A	Carton L:52cm W:32cm H:33cm (20pcs, 12~17Kg/ carton), not shown in the photo		
B	Gift box L:15cm W:15cm H:10cm (0.58~0.6Kg/ box)		
C	E3CMOS series USB3.0 C-mount CMOS camera		
D	High-speed USB3.0 A male to B male gold-plated connectors cable /2.0m		
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 108004/AMA100
		C-mount to Dia.31.75mm eyepiece tube (Please choose 1 of them for your telescope)	108008/ATA037 108009/ATA050 108010/ATA075 108011/ATA100
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 108008/FMA100
		C-Mount to Dia.31.75mm Eyepiece Tube (Please choose 1 of them for your telescope)	108011/FTA037 108012/FTA050 108013/FTA075 108014/FTA100
	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.)	

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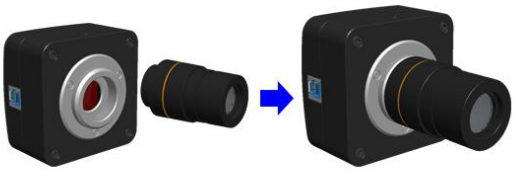
9.4.5 Extension of E3CMOS with Microscope or Telescope Adapter

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	 E3CMOS+AMAXXX(23.2mm Adapter)	 E3CMOS+FMAXXX(23.2mm Adapter)
Telescope Camera	 E3CMOS+ATAXXX(31.75mm Adapter)	 E3CMOS+FTAXXX(31.75mm Adapter)

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9.5 U3ISPM Series C-mount USB3.0 CMOS Camera with Hardware ISP and Video Pipeline Inside

9.5.1 U3ISPM Basic Characteristic

U3ISPM is an ultra-high performance USB3.0 CMOS camera and it adopts ultra-high performance CMOS sensor as the image-picking device and USB3.0 is used as the data transfer interface.

U3ISPM integrated with 12 bit Ultra-fine™ Hardware Image Signal Processor Video Pipeline(Ultra-fine™ HISP VP) for Demosaic, Adjustments, Automatic Exposition, Gain Adjustment, One Push White Balance, Chrominance Adjustment, Saturation Adjustment, Gamma Correction, Luminance Adjustment, Contrast Adjustment, Bayer and finally form RAW data for 8/12 bit output. This will move the heavier burden of the processing from the PC to the Ultra-fine™ HISP VP and greatly accelerating the processing speed.

U3ISPM comes with advanced video & image processing application ToupView; Providing Windows/Linux/ OSX multiple platforms SDK; Native C/C++, C#/VB.NET, DirectShow, Twain Control API;

The U3ISPM can be widely used in bright field light environment and microscope image capture and analysis with higher frame rate.

The basic characteristic of the U3ISPM cameras are as follows:

- Standard C-Mount camera with Aptina or Panasonic CMOS sensor;
- With hardware resolution among 16M to 18M;
- Ultra-fine™ HISP VP and USB3.0 5 Gbps interface ensuring high frame rates(Up to 13 frames for 18M Resolution);
- CNC aluminum alloy housing;
- USB3.0 5 Gbps interface ensuring high frame rate;
- With advanced video & image processing application ToupView;
- Providing Windows/Linux/Mac OS multiple platforms SDK;
- Native C/C++, C#/VB.NET, DirectShow, Twain Control API;

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9.5.2 U3ISPM Datasheet(3)

Order Code	Sensor & Size	Pixel(μm)	G Responsivity Dynamic range SNRmax	FPS/Resolution	Binning	Exposure
U3ISPM18000KPA IP118000A(New)	18M/AR1820(C) 1/2.3"(6.14x4.61)	1.25x1.25	0.62 V/lux-sec 65.8dB 36.3	13.1@4912x3684 34.3@2456x1842 54.4@1228x922	1x1, 2x2, 4x4	0.1ms~2s
U3ISPM16000KPA IP116000A(New)	16M/MN34120(C) 1/2.33"(6.18x4.67)	1.335x1.335	R: 2453LSB Gr: 2444LSB Gb: 1054LSB B: 996LSB	16@4632x3488 30@2320x1740 27@1536x1160	1x1, 2x2, 3x3	0.2ms~2s
U3ISPM16000KPB IP116000B(New)	16M/MN34230(C) 4/3"(17.60x13.30)	3.8x3.8	R: 1315LSB Gr: 2413LSB Gb: 2413LSB B: 1042LSB (Gain = 0dB)	22@4640x3506 30@3360x2526 43@2304x1750 49@1536x1168	1x1, 2x2, 3x3	0.2ms~15s

C: Color; M: Monochrome;

Other Specification for U3ISPM Camera

Spectral Range	380-650nm (with IR-cut Filter)
White Balance	ROI White Balance/ Manual Temp Tint Adjustment/NA for Monochromatic Sensor
Color Technique	Ultra-fine™ HISP VP /NA for Monochromatic Sensor
Capture/Control API	Native C/C++, C#/VB.NET, DirectShow, Twain and Labview
Recording System	Still Picture and Movie
Cooling System*	Natural
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 over PC USB Port
Software Environment	
Operating System	Microsoft® Windows® XP / Vista / 7 / 8 /10 (32 & 64 bit) OSx(Mac OS X) Linux
PC Requirements	CPU: Equal to Intel Core2 2.8GHz or Higher
	Memory:2GB or More
	USB Port:USB3..0 High-speed Port
	Display:17" or Larger
	CD-ROM

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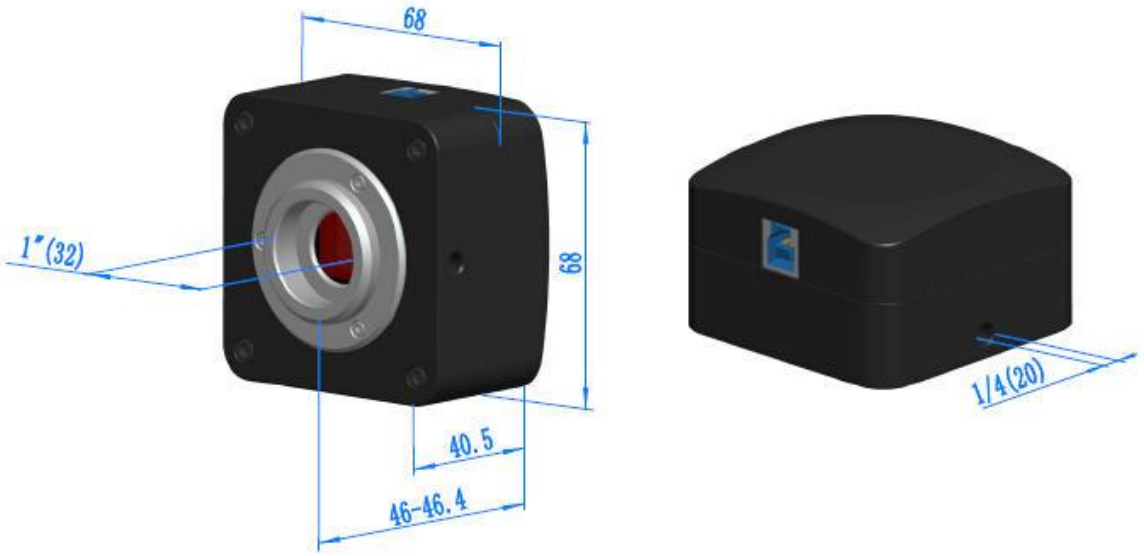
9.5.3 Dimension of U3ISPM

The U3ISPM body, made from tough, zinc 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 U3ISPM

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9.5.4 Packing Information for U3ISPM

Packing Information of U3ISPM

Standard Camera Packing List			
A	Carton L:52cm W:32cm H:33cm (20pcs, 12~17Kg/ carton), not shown in the photo		
B	Gift box L:15cm W:15cm H:10cm (0.67~0.7Kg/ box)		
C	U3ISPM series USB3.0 C-mount CMOS camera		
D	High-speed USB3.0 A male to B male gold-plated connectors cable /2.0m		
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.)	

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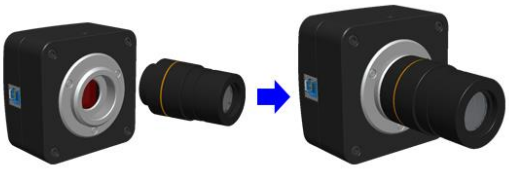
9.5.5 Extension of U3ISPM with Microscope or Telescope Adapter

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	 U3ISPM+AMAXXX(23.2mm Adapter)	 U3ISPM+FMAXXX(23.2mm Adapter)
Telescope Camera	 U3ISPM+ATAXXX(31.75mm Adapter)	 U3ISPM+FTAXXX(31.75mm Adapter)

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9.6 L3CMOS Series C-mount USB3.0 CMOS Camera

9.6.1 L3CMOS Basic Characteristic

L3CMOS is Luxurious USB3.0 CMOS camera with frame buffers and it adopts ultra-high performance CMOS sensor as the image-picking device, and USB3.0 is used as the data transfer interface.

L3CMOS comes with advanced video & image processing application ToupView; Providing Windows/Linux/ OSX multiple platforms SDK; Native C/C++, C#/VB.NET, DirectShow, Twain Control API;

The L3CMOS can be widely used in bright field light environment and microscope image capture and analysis.

The basic characteristic of L3COMS 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;
- With hardware resolution among 1.2M to 14M;
- On-board memory for perfect synchronization，higher frame rate and stable performance;
- High performance cooling structure, ensures low image noise;
- USB3.0 5 Gbps interface ensuring high frame rate;
- Ultra-Fine^{TM} color engine with perfect color reproduction capability;
- With advanced video & image processing application ToupView;
- Providing Windows/Linux/Mac OS multiple platforms SDK;
- Native C/C++, C#/VB.NET, DirectShow, Twain Control API;

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9.6.2 L3CMOS Datasheet(5)

Order Code	Sensor & Size(mm)	Pixel(μm)	G Sensitivity Dynamic Range SN Ratio	FPS/Resolution	Binning	Exposure
L3CMOS14000KPA LP114000A	14M/MT9F002(C) 1/2.3"(5.73x4.60)	1.4x1.4	0.724v/lux-sec 65.3dB 35.5dB	6.2@4096x3286 20.8@2048x1644 53.3@1024x822	1x1,2x2,4x4	0.1ms~2000ms
L3CMOS10000KPA LP110000A	10M/MT9J003(C) 1/2.3" (5.98x4.58)	1.67x1.67	0.31v/lux-sec 65.2dB 34dB	7.2@3584x2746 24.5@1792x1372	1x1,2x2,4x4	0.1ms~2000ms
L3CMOS08500KPA LP108500A	8.5M/Special(C) 1/2.4"(5.56x4.26)	1.67x1.67	0.31v/lux-sec 65.2dB 34dB	8.3@3328x2548 26.2@1664x1272	1x1,2x2,4x4	0.1ms~2000ms
L3CMOS05100KPA LP105100A	5.1M/MT9P006(C) 1/2.5" (5.63x4.23)	2.2x2.2	1.76v/lux-sec 67.74dB 38.5dB	14.2@2560x1922 38.3@1280x960 101.2@640x480	1x1,2x2,4x4	0.05ms~2000ms
L3CMOS03100KPA LP103100A	3.1M/AR0330(C) 1/3" (4.51x3.37)	2.2x2.2	1.9v/lux-sec 100dB 39dB	27.3@2048x1534 53.3@1024x770	1x1, 2x2	0.1ms~2000ms

C: Color; M: Monochrome;

Other Specification for L3CMOS Camera	
Spectral Range	380-650nm (with IR-cut Filter)
White Balance	ROI White Balance/ Manual Temp Tint Adjustment/NA for Monochromatic Sensor
Color Technique	Ultra-Fine™ Color Engine/NA for Monochromatic Sensor
Capture/Control API	Native C/C++, C#/VB.NET, DirectShow, Twain and Labview
Recording System	Still Picture and Movie
Cooling System*	Natural with High Performance Cooling Structure
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 over PC USB Port
Software Environment	
Operating System	Microsoft® Windows® XP / Vista / 7 / 8 /10 (32 & 64 bit) OSx(Mac OS X) Linux
PC Requirements	CPU: Equal to Intel Core2 2.8GHz or Higher
	Memory:2GB or More
	USB Port:USB3.0 High-speed Port
	Display:17" or Larger
	CD-ROM

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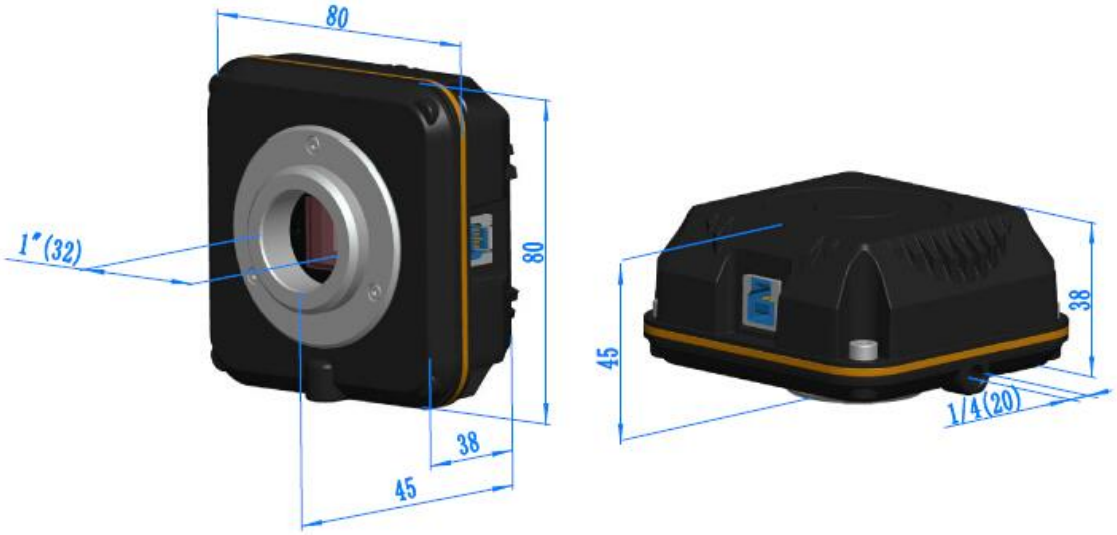
9.6.3 Dimension of L3CMOS

The L3CMOS 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 L3CMOS

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9.6.4 Packing Information of L3CMOS

Packing Information of L3CMOS

Standard Camera Packing List			
A	Carton L:40cm W:36cm H:36cm (16pcs, 12~17Kg/ carton), not shown in the photo		
B	Gift box L:16.4cm W:16.4cm H:9.6cm (0.72~0.8Kg/ box)		
C	L3CMOS series USB3.0 C-mount CMOS camera		
D	High-speed USB3.0 A male to B male gold-plated connectors cable /2.0m		
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.)	

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9.6.5 Extension of L3CMOS with Microscope or Telescope Adapter

<table>
<tr><th>Extension</th><th colspan="2">Picture</th></tr>
<tr><td>C-mount Camera</td><td>  </td><td>Machine vision; Medical imaging;
Semiconductor equipment; Test instruments;
Document scanners; 2D barcode readers;
Web camera and security video;
Microscope imaging;</td></tr>
<tr><td>Microscope Camera</td><td colspan="2" rowspan="2"> 
L3CMOS+AMAXXX(23.2mm Adapter)
 
L3CMOS+FMAXXX(23.2mm Adapter)
 
L3CMOS+ATAXXX(31.75mm Adapter)
 
L3CMOS+FTAXXX(31.75mm Adapter)</td></tr>
<tr><td>Telescope Camera</td></tr>
</table>

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9.7 U3CMOS Series C-mount USB3.0 CMOS Camera

9.7.1 U3CMOS Basic Characteristic

U3CMOS is an ultra-high performance USB3.0 CMOS camera and it adopts ultra-high performance CMOS sensor as the image-picking device and USB3.0 is used as the data transfer interface.

U3CMOS hardware resolutions range from 3.0M to 14M and come with the integrated zinc aluminum alloy compact housing.

U3CMOS comes with advanced video & image processing application ToupView; Providing Windows/Linux/ OSX multiple platforms SDK; Native C/C++, C#/VB.NET, DirectShow, Twain Control API;

The U3CMOS can be widely used in bright field light environment and microscope image capture and analysis with higher frame rate.

The basic characteristic of the U3CMOS cameras are as follows:

- Standard C-Mount camera with Aptina CMOS sensor;
- With hardware resolution among 3.0M to 18M;
- Integrated zinc aluminum alloy housing;
- USB3.0 5 Gbps interface ensuring high frame rate;
- With advanced video & image processing application ToupView;
- Providing Windows/Linux/Mac OS multiple platforms SDK;
- Native C/C++, C#/VB.NET, DirectShow, Twain Control API;

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9.7.2 U3CMOS Datasheet(10)

Order Code	Sensor & Size	Pixel(μm)	G Responsivity Dynamic range SNRmax	FPS/Resolution	Binning	Exposure
U3CMOS18000KPA TP118000A (New)	18M/AR1820(C) 1/2.3"(6.14x4.61)	1.25x1.25	0.62 V/lux-sec 65.8dB 36.3	5.6@4912x3684 18.1@2456x1842 32.2@1228x922	1x1,2x2,4x4	0.1ms~2000ms
U3CMOS16000KPA TP116000A (New)	16M/MN34120(C) 1/2.33"(6.18x4.66)	1.335x1.335	R: 2453LSB Gr: 2444LSB Gb: 1054LSB B: 996LSB	6.0@4632x3488 15.0@2320x1740 26.0@1536x1160	1x1, 2x2,3x3	0.2ms~2000ms
U3CMOS16000KPB TP116000B (New)	16M/MN34230PLJ(C) 4/3" (17.60x13.30)	3.8x3.8	R: 1315LSB Gr: 2413LSB Gb: 2413LSB B: 1042LSB (Gain = 0dB)	6.0@4648x3506 15.0@2304x1750 30.0@1536x1168	1x1,2x2,3x3	0.06ms~15s
U3CMOS16000KMB TM116000B (New)	16M/MN34230ALJ(M) 4/3" (17.60x13.30)	3.8x3.8	A: 2650LSB B: 2650LSB C: 2650LSB D: 2650LSB (Gain = 0dB)	22@4640x3506 36@3840x2160 43@2304x1750 43@1920x1080 49@1536x1168	1x1, 1x1, 2x2, 2x2, 3x3	0.224ms~15s
U3CMOS14000KPA TP114000A	14M/MT9F002(C) 1/2.3"(5.73x4.60)	1.4x1.4	0.724v/lux-sec 65.3dB 35.5dB	6.2@4096x3286 20.8@2048x1644 53.3@1024x822	1x1, 2x2,	0.224ms~2000ms
U3CMOS10000KPA TP110000A	10M/MT9J003(C) 1/2.3" (5.98x4.58)	1.67x1.67	0.31v/lux-sec 65.2dB 34dB	7.2@3584x2746 24.5@1792x1372	1x1,2x2,4x4	0.4ms~2000ms
U3CMOS10000KMA TM110000A	10M/MT9J003(M) 1/2.3"(5.98x4.58)	1.67x1.67	0.4v/lux-sec 65.2dB 34dB	7.2@3584x2746 24.5@1792x1372	1x1,2x2,4x4	0.4ms~2000ms
U3CMOS08500KPA TP108500A	8.5M/Special(C) 1/2.4"(5.56x4.26)	1.67x1.67	0.31v/lux-sec 65.2dB 34dB	8.3@3328x2548 26.2@1664x1272	1x1,2x2,4x4	0.1ms~2000ms
U3CMOS05100KPA TP105100A	5.1M/MT9P006(C) 1/2.5" (5.70x4.28)	2.2x2.2	1.76v/lux-sec 67.74dB 38.5dB	14.2@2560x1922 38.3@1280x960 101.2@640x480	1x1,2x2,4x4	0.1ms~2000ms
U3CMOS03100KPA TP103100A	3.1M/AR0330(C) 1/3" (4.51x3.38)	2.2x2.2	1.9v/lux-sec 100dB 39dB	27.3@2048x1534 53.3@1024x770	1x1, 2x2	0.1ms~2000ms

C: Color; M: Monochrome;

Other Specification for U3CMOS Camera	
Spectral Range	380-650nm (with IR-cut Filter)
White Balance	ROI White Balance/ Manual Temp Tint Adjustment/NA for Monochromatic Sensor
Color Technique	Ultra-Fine™ Color Engine/NA for Monochromatic Sensor
Capture/Control API	Native C/C++, C#/VB.NET, DirectShow, Twain and Labview
Recording System	Still Picture and Movie
Cooling System*	Natural
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 over PC USB Port
Software Environment	
Operating System	Microsoft® Windows® XP / Vista / 7 / 8 /10 (32 & 64 bit) OSx(Mac OS X) Linux
PC Requirements	CPU: Equal to Intel Core2 2.8GHz or Higher
	Memory:2GB or More
	USB Port:USB3..0 High-speed Port
	Display:17" or Larger
	CD-ROM

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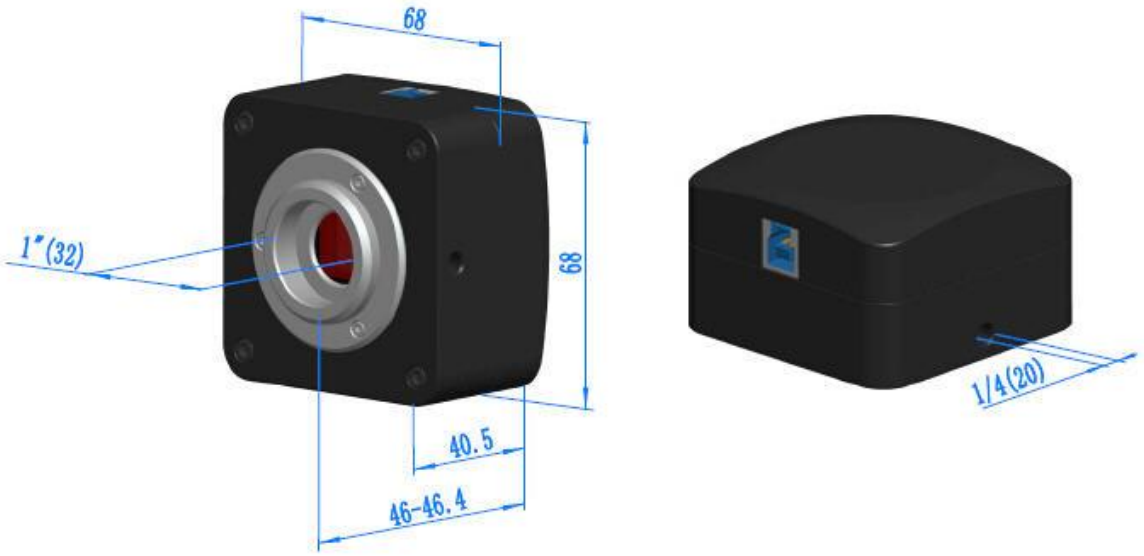
9.7.3 Dimension of U3CMOS

The U3CMOS body, made from tough, zinc 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 U3CMOS

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9.7.4 Packing Information for U3CMOS

Packing Information of U3CMOS

Standard Camera Packing List			
A	Carton L:52cm W:32cm H:33cm (20pcs, 12~17Kg/ carton), not shown in the photo		
B	Gift box L:15cm W:15cm H:10cm (0.67~0.7Kg/ box)		
C	U3CMOS series USB3.0 C-mount CMOS camera		
D	High-speed USB3.0 A male to B male gold-plated connectors cable /2.0m		
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.)	

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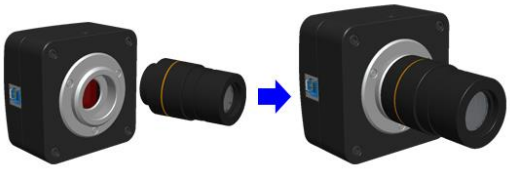
9.7.5 Extension of U3CMOS with Microscope or Telescope Adapter

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	 U3CMOS+AMAXXX(23.2mm Adapter)	 U3CMOS+FMAXXX(23.2mm Adapter)
Telescope Camera	 U3CMOS+ATAXXX(31.75mm Adapter)	 U3CMOS+FTAXXX(31.75mm Adapter)

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9.8 S3CMOS Series USB3.0 Eyepiece Camera

9.8.1 S3CMOS Characteristic

S3CMOS is an economic version with simple and compact structure USB3.0 CMOS eyepiece camera. So here, the S means simple and compact. USB3.0 is used as the data transfer interface.

Microscope eyepiece camera with 23.2 diameter and compact size;

The S3CMOS comes with high-speed USB3.0 interface and high frame rate video display keep the screen smooth without interruption;

Also the S3CMOS comes with advanced video & image processing application ToupView;

The S3CMOS can be widely used to transfer the mono or binocular student microscopes to digital microscope.

With 23.2 to 30mm or 23.2 to 30.75 convert ring, the S3CMOS camera can also change the stereo microscope to digital stereo microscope.

The basic characteristic of S3CMOS cameras are as follows:

- Microscope eyepiece camera with 23.2 diameter and compact size;
- Easy to extend to C or CS- Mount camera with high quality lens(optional);
- High-quality camera with Aptina CMOS sensor;
- Auto white balance and auto-exposure; Brightness, contrast, chroma, and saturation can be adjusted;
- High-speed USB3.0 interface and high frame rate video display keep the screen smooth without interruption;
- With advanced video & image processing application ToupView;
- Providing Windows/Linux/Mac OS multiple platforms SDK;
- Native C/C++, C#/VB.NET, DirectShow, Twain Control API;

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9.8.2 S3CMOS Datasheet(2)

Order Code	Sensor & Size	Pixel(μm)	G Responsivity Dynamic range SNRmax	FPS/Resolution	Binning	Exposure
S3CMOS05000KPA TP305000A	5.0M/MT9P001(C) 1/2.5"(5.70x4.28)	2.2x2.2	0.53 V/lux-sec 66.5dB 40.5dB	15@2560x1920 15@2048x1536 30@1920x1080	1x1,2x2	Auto
S3CMOS05000KPC TP305000C(New)	5.0M/SC5033(C) 1/2.7"(5.18x3.89)	2.0x2.0	2 V/lux-sec 64dB 35dB	15@2560x1920 20@2048x1536 20@1600x1200 30@800x600	1x1,2x2	Auto

C: Color; M: Monochrome;

Other Specification for S3CMOS Camera	
Spectral Range	380-650nm (with IR-cut Filter)
White Balance	Auto White Balance
Color Technique	N/A
Capture/Control API	Native C/C++, C#/VB.NET, DirectShow, Twain and Labview
Recording System	Still Picture and Movie
Cooling System*	Natural
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 over PC USB3.0 Port
Software Environment	
Operating System	Microsoft® Windows® XP / Vista / 7 / 8 /10 (32 & 64 bit) OSx(Mac OS X) Linux
PC Requirements	CPU: Equal to Intel Core2 2.8GHz or Higher
	Memory:2GB or More
	USB Port:USB3.0 High-speed Port
	Display:17" or Larger
	CD-ROM

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9.8.3 Dimension of S3CMOS

The S3CMOS body, made from aluminum alloy blackening, ocular housing: Dia.32 X 56mm ensures a heavy duty, workhorse solution. The camera is designed with a high quality IR-CUT filter to filter the infrared light and 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 S3CMOS

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9.8.4 Packing Information for S3CMOS

Packing Information of S3CMOS

Standard Camera Packing List		
A	Carton L:52cm W:32cm H:33cm (20pcs, 12~17Kg/ carton), not shown in the photo	
B	Gift box L:15cm W:15cm H:10cm (0.25~0.35Kg/ box)	
C	S3CMOS series camera	
D	High-Speed USB3.0 USB315-ATA | USB 3.0 A Male to A Male Cable,1.5m	
E	CD (Driver & utilities software, Ø8cm)	
Optional Accessory		
F	C-Mount Adapter Housing:108027(HS502)	
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	108017(Dia.23.2mm to 31.75mm Ring)/ Adapter rings for 31.75mm 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.)

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10 Microscope USB2.0 CMOS Camera

10.1 ECMOS Series C-mount USB2.0 CMOS Camera

10.1.1 ECMOS Basic Characteristic

ECMOS adopt SONY Exmor CMOS sensor as the image-picking device and USB2.0 is used as the data transfer interface.

ECMOS hardware resolutions range from 1.2M to 5.3M and come with the integrated CNC aluminum alloy compact housing.

ECMOS comes with advanced video & image processing application ToupView; Providing Windows/Linux/ OSX multiple platforms SDK; Native C/C++, C#/VB.NET, DirectShow, Twain Control API;

The ECMOS can be widely used in bright field light environment and microscope image capture and analysis with higher frame rate.

The basic characteristic of ECMOS cameras are as follows:

- SONY Exmor, Exmor R(Back-illuminated), Exmor RS CMOS sensor with USB2.0 interface;
- Real-time 8/12/14/16bit depth switch(depending on sensor);
- Super high sensitivity up to 2040mV(IMX224);
- Ultra low noise and low power dissipation by using column-parallel A/D conversion;
- With hardware resolution among 1.2M to 5.3M;
- Rolling Shutter;
- Standard C-Mount camera;
- CNC aluminum alloy housing;
- USB2.0 interface ensuring high speed data transmission;
- With advanced video & image processing application ToupView;
- Providing Windows/Linux/Mac OS multiple platforms SDK;
- Native C/C++, C#/VB.Net, DirectShow, Twain;

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10.1.2 ECMOS Datasheet (7)

Order Code	Sensor & Size(mm)	Pixel(μm)	G Sensitivity Dark Signal	FPS/Resolution	Binning	Exposure
ECMOS08300KPA EP608300A(New)	8.3M/IMX274(C) 1/2.5"(6.22x3.50)	1.62x1.62	236mv with 1/30s 0.1mv with 1/30s	4@3840x2160 16@1920x1080	1x1 2x2	0.244ms~15s
ECMOS06600KPA EP606600A(New)	6.6M/IMX326(C) 1/2.9"(4.98x3.50)	1.62x1.62	236mv with 1/30s 0.1mv with 1/30s	5@3072x2160 6@2592x1944 6@3072x1728 7@2160x2160	1x1 1x1 1x1 1x1	0.244ms~15s
ECMOS05300KPA EP605300A	5.3M/IMX178(C) 1/1.9" (7.37x4.15)	2.4x2.4	425mv with 1/30s 0.15mv with 1/30s	5.5@3072 x1728 35@1280x720	1x1, 2x2	0.105ms~15s
ECMOS05000KPA EP605000A(New)	5.0M/IMX335(C) 1/2.8" (5.18x3.89)	2.0x2.0	505mv with 1/30s 0.13mv with 1/30s	6.4@2592 x1944 26.7@1296x972	1x1, 2x2	0.1ms~15s
ECMOS03100KPA EP603100A	3.1M/IMX123(C) 1/2.8" (5.12x3.84)	2.5x2.5	600mv with 1/30s 0.15mv with 1/30s	10.5@2048x1536 15@1920x1080	1x1	0.105ms~15s
ECMOS02000KPA EP602000A	2.0M/IMX290(C) 1/2.8"(5.56x3.13)	2.9 x2.9	1300mv with 1/30s 0.15mv with 1/30s	17@1920x1080	1x1	0.105ms~15s
ECMOS01200KPA EP601200A	1.2M/IMX224(C) 1/3"(4.80x3.60)	3.75 x3.75	2040mv with 1/30s 0.15mv with 1/30s	27@1280x960 54@640x480	1x1, 2x2	0.105ms~15s

C: Color; M: Monochrome;

Other Specification for ECMOS Camera

Spectral Range	380-650nm (with IR-cut Filter)
White Balance	ROI White Balance/ Manual Temp Tint Adjustment/NA for Monochromatic Sensor
Color Technique	Ultra-Fine™ Color Engine/NA for Monochromatic Sensor
Capture/Control API	Native C/C++, C# /VB.Net, DirectShow, Twain
Recording System	Still Picture and Movie
Cooling System*	Natural
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 over PC USB Port
Software Environment	
Operating System	Microsoft® Windows® XP / Vista / 7 / 8 /10 (32 & 64 bit) OSx(Mac OS X) Linux
PC Requirements	CPU: Equal to Intel Core2 2.8GHz or Higher
	Memory: 2GB or More
	USB Port: USB2.0 Port
	Display: 17" or Larger
	CD-ROM

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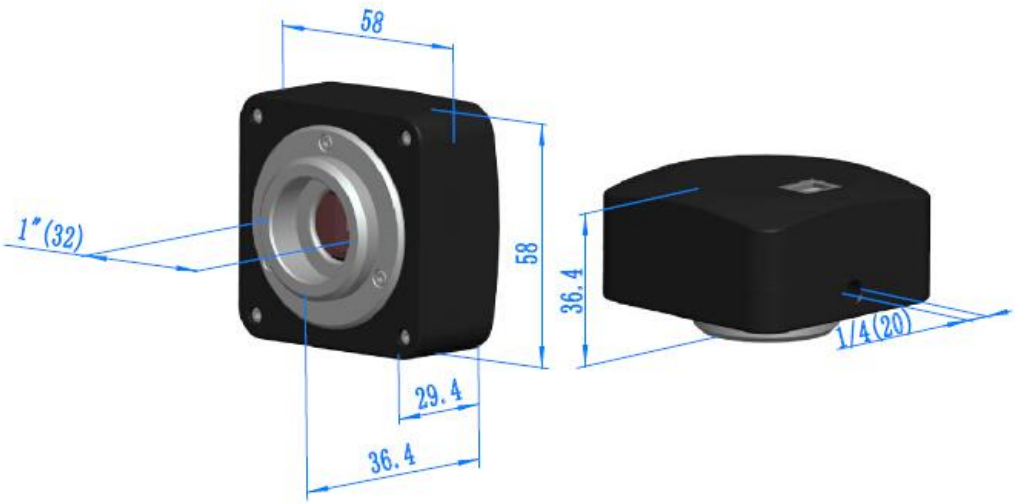
10.1.3 Dimension of ECMOS

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



Dimension of ECMOS

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10.1.4 Packing Information for ECMOS

Packing Information of ECMOS

Standard Camera Packing List			
A	Carton L:52cm W:32cm H:33cm (20pcs, 12~17Kg/ carton), not shown in the photo		
B	Gift box L:15cm W:15cm H:10cm (0.5~0.55Kg/ box)		
C	ECMOS series USB2.0 C-mount CMOS camera		
D	High-speed USB2.0 A male to B male gold-plated connectors cable /2.0m		
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.)	

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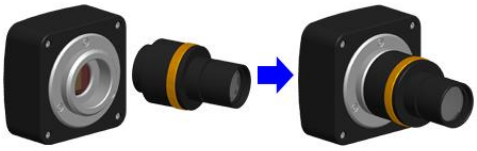
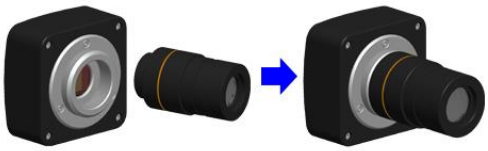
10.1.5 Extension of ECMOS with Microscope or Telescope Adapter

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	 ECMOS+AMAXXX(23.2mm Adapter)	 ECMOS+FMAXXX(23.2mm Adapter)
Telescope Camera	 ECMOS+ATAXXX(31.75mm Adapter)	 ECMOS+FTAXXX(31.75mm Adapter)

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10.2 LCMOS Series C-mount USB2.0 CMOS Camera

10.2.1 LCMOS Characteristic

LCMOS is luxurious USB2.0 CMOS camera with frame buffers and it adopts ultra-high performance CMOS sensor as the image-picking device, and USB2.0 is used as the data transfer interface.

LCMOS comes with advanced video & image processing application ToupView; Providing Windows/Linux/OSX multiple platform SDK; Native C/C++, C#/VB.NET, DirectShow, Twain Control API;

The LCMOS can be widely used in bright field environment and microscope image capture and analysis with moderate speed.

The basic characteristic of L3CMOS cameras are as follows:

- Stand C-Mount camera with Aptina CMOS sensor;
- With hardware resolution among 1.2M to 14M;
- On-board memory for perfect synchronization，higher frame rate and stable performance;
- High performance cooling structure, ensures low image noise;
- USB2.0 interface ensuring high speed data transmission;
- Ultra-Fine^{TM} color engine with perfect color reproduction capability;
- With advanced video & image processing application ToupView;
- Providing Windows/Linux/Mac OS multiple platforms SDK;
- Native C/C++, C#/VB.NET, DirectShow, Twain Control API;

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10.2.2 LCMOS Datasheet (10)

Order Code	Sensor & Size(mm)	Pixel(μm)	G Responsivity Dynamic range SNRmax	FPS/Resolution	Binning	Exposure
LCMOS14000KPA LP614000A	14M/MT9F002(C) 1/2.3"(5.73x4.60)	1.4x1.4	0.724v/lux-sec 65.3dB 35.5dB	2.7@4096x3288 10@2048x1644 35@1024 x822	1x1, 2x2, 4x4	0.4ms~2000ms
LCMOS10000KPA LP610000A	10M/MT9J003(C) 1/2.3" (5.98x4.59)	1.67x1.67	0.31v/lux-sec 65.2dB 34dB	3.7@3584x2748 13@1792x1374 35@896 x684	1x1, 2x2, 4x4	0.4ms~2000ms
LCMOS09000KPB LP609000B	9M/Special(C) 1/2.4"(5.83x4.37)	1.67x1.67	0.31v/lux-sec 65.2dB 34dB	3.9@3488x2616 15@1744x1308 47@872 x654	1x1, 2x2, 4x4	0.4ms~2000ms
LCMOS08000KPB LP608000B	8M/Special(C) 1/2.5"(5.45x4.09)	1.67x1.67	0.31v/lux-sec 65.2dB 34dB	4.4@3264x2448 17@1600x1200 55@800x600	1x1, 2x2, 4x4	0.4ms~2000ms
LCMOS05100KPA LP605100A	5.1M/MT9P001(C) 1/2.5"(5.70x4.28)	2.2x2.2	0.53 V/lux-sec 66.5dB 40.5dB	6.8@2592x1944 18@1280x960 55@640x480	1x1, 2x2, 4x4	0.294ms~2000ms
LCMOS03100KPA LP603100A	3.1M/MT9T001(C) 1/2"(6.55x4.92)	3.2x3.2	1.0 V/lux-sec 61dB 43dB	11.5@2048x1536 32@1024x768 45@680x510	1x1, 2x2, 3x3	0.244ms~2000ms
LCMOS03100KPB LP603100B	3.1M/IMX036(C) 1/2.8"(5.12x3.84)	2.5x2.5	200mv with 1/30s 0.5mv with 1/30s	12@2048x1536 48@1024x768 48@680x510	1x1,2x2,3x3	0.244ms~2000ms
LCMOS02000KPB LP602000B	2.0M/Special(C) 1/2.6"(5.12x3.84)	3.2x3.2	1.0 V/lux-sec 61dB 43dB	16@1600x1200 40@800x600	1x1, 2x2	0.244ms~2000ms
LCMOS01300KPA LP601300A	1.3M/MT9M111(C) 1/3"(4.60x3.70)	3.6x3.6	2.1V/lux-sec 68.2dB 45dB	15@1280x1024 26@640x512 48@320x256	1x1, 2x2, 4x4	0.14ms~2000ms
LCMOS01200KPB LP601200B	1.2M/AR0130(C) 1/3"(4.80x3.60)	3.75 x3.75	5.5v/lux-sec 85.3dB 44dB	28@1280x960 30@640x480	1x1, 2x2	0.4ms~2000ms

C: Color; M: Monochrome;

Other Specification for LCMOS Cameras

Spectral Range	380-650nm (with IR-cut Filter)
White Balance	ROI White Balance/ Manual Temp Tint Adjustment/NA for Monochromatic Sensor
Color Technique	Ultra-Fine™ Color Engine/NA for Monochromatic Sensor
Capture/Control API	Native C/C++, C#/VB.NET, DirectShow, Twain and Labview
Recording System	Still Picture and Movie
Cooling System*	Natural with High Performance Cooling Structure
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 over PC USB Port
Software Environment	
Operating System	Microsoft® Windows® XP / Vista / 7 / 8 /10 (32 & 64 bit)，OSx(Mac OS X),Linux
PC Requirements	CPU: Equal to Intel Core2 2.8GHz or Higher
	Memory:2GB or More
	USB Port:USB2.0 High-speed Port
	Display:17" or Larger
	CD-ROM

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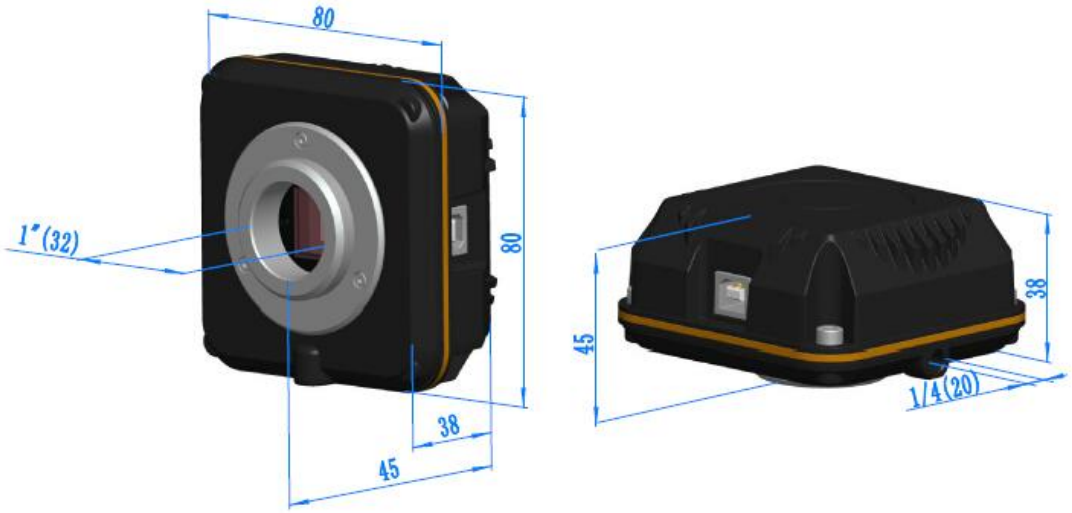
10.2.3 Dimension of LCMOS

The LCMOS 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 LCMOS

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10.2.4 Packing Information of LCMOS

Packing Information of LCMOS

Standard Camera Packing List			
A	Carton L:40cm W:36cm H:36cm (16pcs, 12~17Kg/ carton), not shown in the photo		
B	Gift box L:16.4cm W:16.4cm H:9.6cm (0.7~0.8Kg/ box)		
C	LCMOS series USB2.0 C-mount CMOS camera		
D	High-speed USB2.0 A male to B male gold-plated connectors cable /2.0m		
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.)	

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10.2.5 Extension of LCMOS 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	 LCMOS+AMAXXX(23.2mm Adapter)	 LCMOS+FMAXXX(23.2mm Adapter)
Telescope Camera	 LCMOS+ATAXXX(31.75mm Adapter)	 LCMOS+FTAXXX(31.75mm Adapter)

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10.3 UA Series C-mount USB2.0 CMOS Camera

10.3.1 UA's Basic Characteristic

UA is an Advanced USB2.0 CMOS camera. It adopts ultra-high performance CMOS sensor as the image-picking up device. USB2.0 is used as the data transfer interface.

UA hardware resolutions ranges from 3.1M to 16M installed in the aluminum alloy CNC compact housing. UA comes with advanced video & image processing application ToupView; Providing Windows/Linux/OSX multiple platform SDK; Native C/C++, C#/VB.NET, DirectShow, Twain Control API; The UA can be widely used in bright field light environment and microscope image capture and analysis with moderate frame rate.

The basic characteristic of UA cameras are as follows:

- Standard C-Mount with Aptina/Panasonic CMOS sensor;
- With hardware resolution among 3.1M to 16M;
- USB2.0 interface ensuring high speed data transmission;
- Ultra-Fine^{TM} color engine with perfect color reproduction capability;
- With advanced video & image processing application ToupView;
- Providing Windows/Linux/Mac OS multiple platforms SDK;
- Native C/C++, C#/VB.NET, DirectShow, Twain Control API;
- External dedicated on-board buffer to achieve maximum performance of USB2.0
- Compatible with most of the old and new CPU PC;
- Aluminum alloy CNC housing which is the same as that of UCMOS series.

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10.3.2 UA Datasheet(4)

Order Code	Sensor & Size(mm)	Pixel(μm)	G Responsivity Dynamic range SNRmax	FPS/Resolution	Binning	Exposure
UA1600CA (New) UP901600A	16M/MN34120(C) 1/2.33“(6.18x4.66)	1.335x1.335	R: 2453LSB Gr: 2444LSB Gb: 1054LSB B: 996LSB	2@4632x3488 8@2320x1740 11@1536x1160	1x1 2x2 3x3	0.2ms~2000ms
UA1000CA (New) UP901000A	10M/MT9J003(C) 1/2.3“ (5.98x4.59)	1.67x1.67	0.31v/lux-sec 65.2dB 34dB	3.3@3584x2748 11@1792x1374 38@896x684	1x1 2x2 4x4	0.4ms~2000ms
UA510CA (New) UP900510A	5.1M/MT9P006(C) 1/2.5“ (5.70x4.28)	2.2x2.2	0.53 V/lux-sec 66.5dB 40.5dB	7@2592x1944 27@1280x960 90@640x480	1x1 2x2 4x4	0.294ms~2000ms
UA310CA (New) UP900310A	3.1M/MT9T001(C) 1/2“ (6.55x4.92)	3.2x3.2	1.0 V/lux-sec 61dB 43dB	12@2048x1536 32@1024x768 45@680x510	1x1 2x2 3x3	0.244ms~2000ms

C: Color; M: Monochrome;

Other Specification for UA Camera	
Spectral Range	380-650nm (with IR-cut Filter)
White Balance	ROI White Balance/ Manual Temp Tint Adjustment/NA for Monochromatic Sensor
Color Technique	Ultra-Fine™ Color Engine/NA for Monochromatic Sensor
Capture/Control API	Native C/C++, C#/VB.NET, DirectShow, Twain and Labview
Recording System	Still Picture and Movie
Cooling System*	Natural
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 over PC USB Port
Software Environment	
Operating System	Microsoft® Windows® XP / Vista / 7 / 8 /10 (32 & 64 bit) OSx(Mac OS X) Linux
PC Requirements	CPU: Equal to Intel Core2 2.8GHz or Higher
	Memory:2GB or More
	USB Port:USB2.0 High-speed Port
	Display:17” or Larger
	CD-ROM

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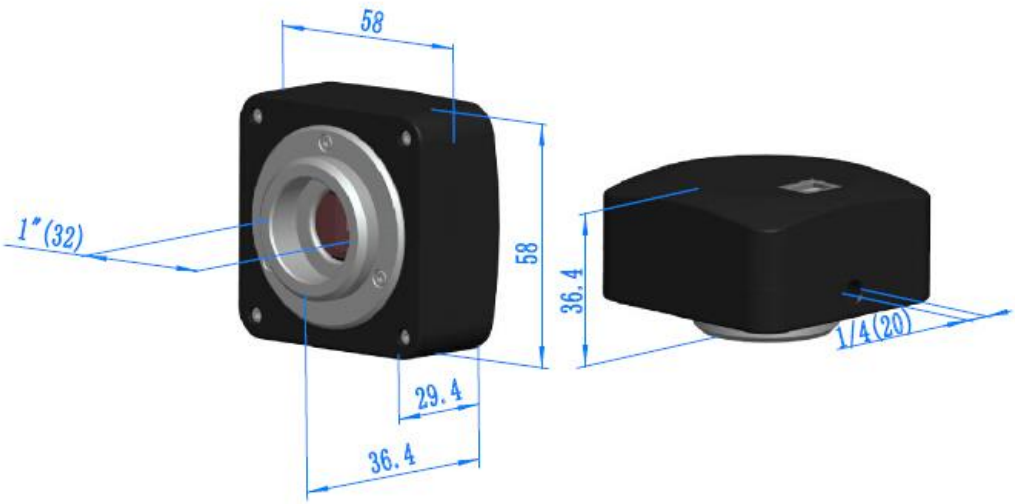
10.3.3 Dimension of UA

The UA body, made from CNC 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 UA

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10.3.4 Packing Information for UA

Packing Information of UA

Standard Camera Packing List			
A	Carton L:52cm W:32cm H:33cm (20pcs, 12~17Kg/ carton), not shown in the photo		
B	Gift box L:15cm W:15cm H:10cm (0.5~0.55Kg/ box)		
C	UA series USB2.0 C-mount CMOS camera		
D	High-speed USB2.0 A male to B male gold-plated connectors cable /2.0m		
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.)	

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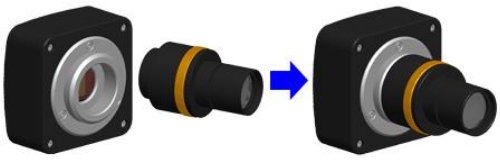
10.3.5 Extension of UA with Microscope or Telescope Adapter

<table>
<tr><th>Extension</th><th colspan="2">Picture</th></tr>
<tr><td>C-mount Camera</td><td>  </td><td>Machine vision; Medical imaging;
Semiconductor equipment; Test instruments;
Document scanners; 2D barcode readers;
Web camera and security video;
Microscope imaging;</td></tr>
<tr><td>Microscope Camera</td><td colspan="2"> 
UA+AMAXXX(23.2mm Adapter)
 
UA+FMAXXX(23.2mm Adapter)</td></tr>
<tr><td>Telescope Camera:</td><td colspan="2"> 
UA+ATAXXX(31.75mm Adapter)
 
UA+FTAXXX(31.75mm Adapter)</td></tr>
</table>

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10.4 UCMOS Series C-mount USB2.0 CMOS Camera

10.4.1 UCMOS Basic Characteristic

UCMOS is an ultra-high performance CMOS camera and it adopts ultra-high performance CMOS sensor as the image-picking device. USB2.0 is used as the data transfer interface.

UCMOS hardware resolutions ranges from 0.35M to 14M and comes with the Integrated zinc aluminum alloy compact housing. UCMOS comes with advanced video & image processing application ToupView; Providing Windows/Linux/OSX multiple platform SDK; Native C/C++, C#/VB.NET, DirectShow, Twain Control API; The UCMOS can be widely used in bright field light environment and microscope image capture and analysis with moderate frame rate.

The basic characteristic of UCMOS cameras are as follows:

- Standard C-Mount with Aptina CMOS sensor;
- With hardware resolution among 0.35M to 14M;
- Integrated zinc aluminum alloy housing;
- USB2.0 interface ensuring high speed data transmission;
- Ultra-Fine^{TM} color engine with perfect color reproduction capability;
- With advanced video & image processing application ToupView;
- Providing Windows/Linux/Mac OS multiple platforms SDK;
- Native C/C++, C#/VB.NET, DirectShow, Twain Control API;

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10.4.2 UCMOS Datasheet(10)

Order Code	Sensor & Size(mm)	Pixel(μm)	G Responsivity Dynamic range SNRmax	FPS/Resolution	Binning	Exposure
UCMOS14000KPA TP614000A	14M/MT9F002(C) 1/2.3“(5.73x4.60)	1.4x1.4	0.724v/lux-sec 65.3dB 35.5dB	1.8@4096x3288 10@2048x1644 27@1024x822	1x1, 2x2, 4x4	0.4ms~2000ms
UCMOS10000KPA TP610000A	10M/MT9J003(C) 1/2.3“ (5.98x4.59)	1.67x1.67	0.31v/lux-sec 65.2dB 34dB	1.9@3584x2748 8@1792x1374 27@896x684	1x1, 2x2, 4x4	0.4ms~2000ms
UCMOS09000KPB TP609000B	9M/Special(C) 1/2.4“(5.83x4.37)	1.67x1.67	0.31v/lux-sec 65.2dB 34dB	1.9@3488x2616 8@1744x1308 27@872x654	1x1, 2x2, 4x4	0.4ms~2000ms
UCMOS08000KPB TP608000B	8M/Special(C) 1/2.5“(5.45x4.09)	1.67x1.67	0.31v/lux-sec 65.2dB 34dB	1.9@3264x2448 8@1600x1200 27@800x600	1x1, 2x2, 4x4	0.4ms~2000ms
UCMOS05100KPA TP605100A	5.1M/MT9P006(C) 1/2.5“ (5.70x4.28)	2.2x2.2	0.53 V/lux-sec 66.5dB 40.5dB	5@2592x1944 18@1280x960 60@640x480	1x1, 2x2, 4x4	0.294ms~2000ms
UCMOS03100KPA TP603100A	3.1M/MT9T001(C) 1/2“ (6.55x4.92)	3.2x3.2	1.0 V/lux-sec 61dB 43dB	8@2048x1536 22@1024x768 43@680x510	1x1, 2x2, 3x3	0.244ms~2000ms
UCMOS02000KPB TP602000B	2.0M/Special(C) 1/2.6“(5.12x3.84)	3.2x3.2	1.0 V/lux-sec 61dB 43dB	16@1600x1200 50@800x600	1x1, 2x2	0.128ms~2000ms
UCMOS01300KPA TP601300A	1.23M/SC1235(C) 1/3“ (4.80x3.60)	3.75x3.75	4.5V/lux-sec 74dB 38dB	15@1280x960 15@1280x720	1x1, 1x1	0.14ms~2000ms
UCMOS01300KMA TM601300A	1.3M/MT9M001(M) 1/2“ (6.66x5.32)	5.2x5.2	2.1 V/lux-sec 68.2dB 45dB	20@1280x1024	1x1	0.14ms~500ms
UCMOS00350KPA TP600350A	0.35M/MT9V011(C) 1/4“ (3.58x2.69)	5.6x5.6	1.9V/lux-sec 60dB 45dB	30@640x480 80@320x240	1x1, 2x2	0.111ms~192ms

C: Color; M: Monochrome;

Other Specification for UCMOS Camera

Spectral Range	380-650nm (with IR-cut Filter)
White Balance	ROI White Balance/ Manual Temp Tint Adjustment/NA for Monochromatic Sensor
Color Technique	Ultra-Fine™ Color Engine/NA for Monochromatic Sensor
Capture/Control API	Native C/C++, C#/VB.NET, DirectShow, Twain and Labview
Recording System	Still Picture and Movie
Cooling System*	Natural
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 over PC USB Port
Software Environment	
Operating System	Microsoft® Windows® XP / Vista / 7 / 8 /10 (32 & 64 bit) OSx(Mac OS X) Linux
PC Requirements	CPU: Equal to Intel Core2 2.8GHz or Higher
	Memory:2GB or More
	USB Port:USB2.0 High-speed Port
	Display:17” or Larger
	CD-ROM

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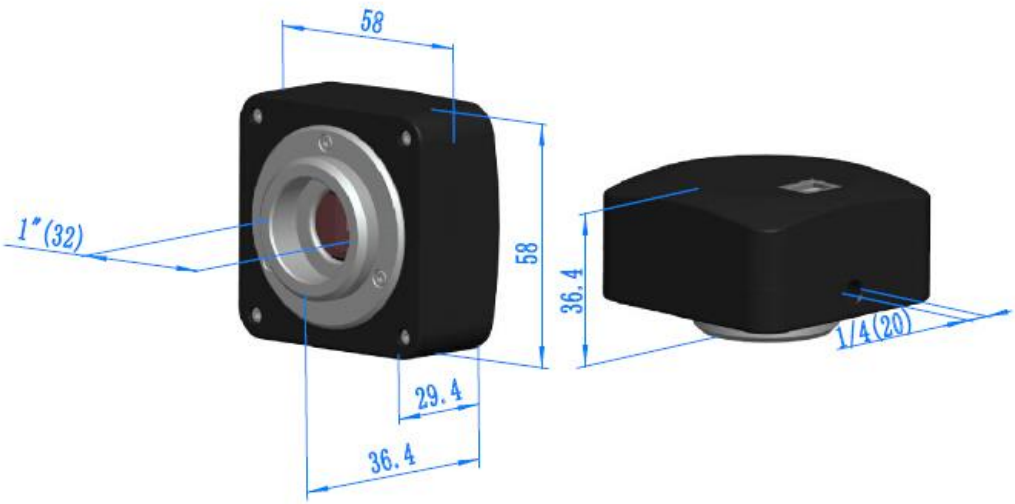
10.4.3 Dimension of UCMOS

The UCMOS body, made from tough, zinc 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 UCMOS

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10.4.4 Packing Information for UCMOS

Packing Information of UCMOS

Standard Camera Packing List			
A	Carton L:52cm W:32cm H:33cm (20pcs, 12~17Kg/ carton), not shown in the photo		
B	Gift box L:15cm W:15cm H:10cm (0.5~0.55Kg/ box)		
C	UCMOS series USB2.0 C-mount CMOS camera		
D	High-speed USB2.0 A male to B male gold-plated connectors cable /2.0m		
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.)	

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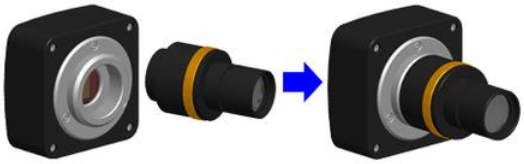
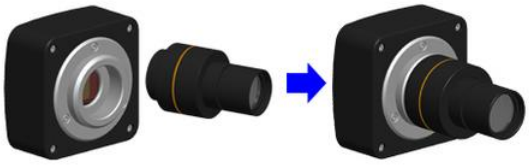
10.4.5 Extension of UCMOS with Microscope or Telescope Adapter

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	 UCMOS+AMAXXX(23.2mm Adapter)	 UCMOS+FMAXXX(23.2mm Adapter)
Telescope Camera:	 UCMOS+ATAXXX(31.75mm Adapter)	 UCMOS+FTAXXX(31.75mm Adapter)

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10.5 SPCMOS Series USB2.0 CMOS Eyepiece Camera with Reduction Lens

10.5.1 SPCMOS Basic Characteristic

ToupTek SPCMOS is an extension of ToupTek's SCMOS camera with fixed reduction lens to increase the field of view from the microscope eyepiece tube. The SPCMOS is still an economic version with simple and compact structure CMOS eyepiece camera. So here, the S means simple and compact, P means plus. USB2.0 is used as the data transfer interface.

The SPCMOS comes with high-speed USB2.0 interface and high frame rate video display keep the screen smooth without interruption;

Also the SPCMOS comes with advanced video & image processing application ToupView;

The SPCMOS can be widely used to transfer the mono or binocular student microscopes to digital microscope.

With 23.2 to 30mm or 23.2 to 30.75 convert ring, the SPCMOS camera can also change the stereo microscope to digital stereo microscope.

The basic characteristic of SPCMOS cameras are as follows:

- Microscope eyepiece camera with 23.2 diameter and compact size;
- An extension of ToupTek's SCMOS camera with fixed reduction lens to ensure the full field of view of the microscope from the eyepiece can be imaged to the CMOS sensor;
- High-quality camera with Aptina CMOS sensor;
- Auto white balance and auto-exposure; Brightness, contrast, chroma, and saturation can be adjusted;
- High-speed USB2.0 interface and high frame rate video display keep the screen smooth without interruption;
- With advanced video & image processing application ToupView;
- Providing Windows/Linux/Mac OS multiple platforms SDK;
- Native C/C++, C#/VB.NET, DirectShow, Twain Control API;

SPCMOS Eyepiece Camera

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10.5.2 SPCMOS Datasheet(5)

Order Code	Sensor & Size(mm)	Pixel(μm)	G Responsivity Dynamic range SNRmax	FPS/Resolution	Binning	Exposure
SPCMOS05000KPA SP505000A	5.0M/Aptina(C) 1/2.5“ (5.70x4.28)	2.2x2.2	NA	2@2592x1944 3@2048x1536 5@1600x1200 7.5@1280x1024	N/A	Auto
SPCMOS03000KPA SP503000A	3.0M/Aptina(C) 1/2.7“ (4.51x3.38)	2.2x2.2	NA	3@2048x1536 5@1600x1200 7.5@1280x1024	N/A	Auto
SPCMOS02000KPA SP502000A	2.0M/Aptina(C) 1/3.2“ (4.48x3.36)	2.8x2.8	NA	5@1600x1200 7.5@1280x1024 7.5@1280x960 20@800x600	N/A	Auto
SPCMOS01300KPA SP501300A	1.3M/Aptina(C) 1/3“ (4.60x3.70)	3.6x3.6	NA	7.5@1280x1024 12.5@1024x768 12.5@800x600	N/A	Auto
SPCMOS00350KPA SP500350A	0.35M/Aptina(C) 1/4“ (3.58x2.69)	5.6x5.6	NA	30@640x480	N/A	Auto

C: Color; M: Monochrome;

Other Specification for SPCMOS Camera	
Spectral Range	380-650nm (with IR-cut Filter)
White Balance	Auto White Balance
Color Technique	N/A
Capture/Control API	Native C/C++, C#/VB.NET, DirectShow, Twain and Labview
Recording System	Still Picture and Movie
Cooling System*	Natural
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 over PC USB Port
Software Environment	
Operating System	Microsoft® Windows® XP / Vista / 7 / 8 /10 (32 & 64 bit) OSx(Mac OS X) Linux
PC Requirements	CPU: Equal to Intel Core2 2.8GHz or Higher
	Memory:2GB or More
	USB Port:USB2.0 High-speed Port
	Display:17” or Larger
	CD-ROM

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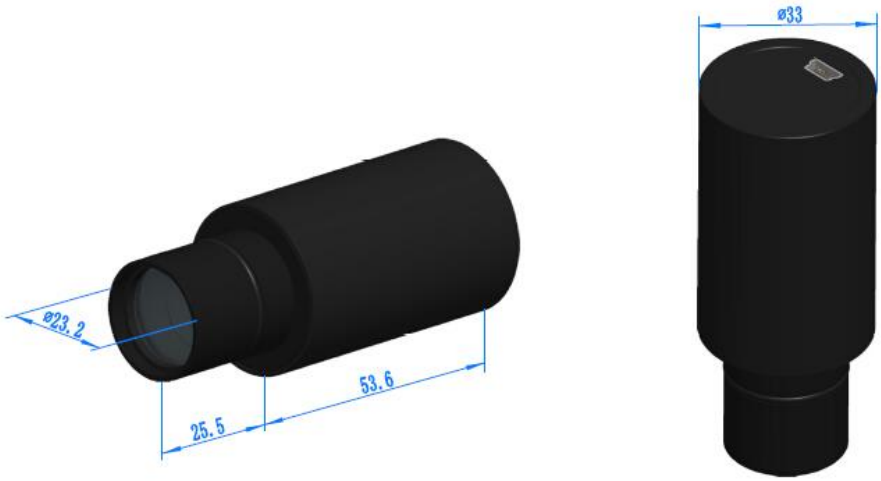
10.5.3 Dimension of SPCMOS

The SPCMOS body, made from aluminum alloy blackening, ocular housing: Dia.33 X 79.1mm ensures a heavy duty, workhorse solution. The camera is designed with a high quality IR-CUT filter to filter the infrared light and 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 SPCMOS

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10.5.4 Packing Information for SPCMOS

Packing Information of SPCMOS

Standard Camera Packing List		
A	Carton L:52cm W:32cm H:33cm (20pcs, 12~17Kg/ carton), not shown in the photo	
B	Gift box L:15cm W:15cm H:10cm (0.25~0.26Kg/ box)	
C	SPCMOS series eyepiece camera	
D	High-Speed USB2.0 A male to mini B 5-pin male gold-plated connectors cable /1.5m	
E	CD (Driver & utilities software, Ø8cm)	
Optional Accessory		
F	108015(Dia.23.2mm to 30.0mm Ring)/Adapter rings for 30mm eyepiece tube	
G	108016(Dia.23.2mm to 30.5mm Ring)/ Adapter rings for 30.5mm eyepiece tube	
H	108017(Dia.23.2mm to 31.75mm Ring)/ Adapter rings for 31.75mm 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.)

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10.6 SCMOS Series USB2.0 CMOS Eyepiece Camera

10.6.1 SCMOS Characteristic

ToupTek SCMOS is an economic version with simple and compact structure CMOS eyepiece camera. So here, the S means simple and compact. USB2.0 is used as the data transfer interface.

The SCMOS comes with high-speed USB2.0 interface and high frame rate video display keep the screen smooth without interruption;

Also the SCMOS comes with advanced video & image processing application ToupView;

The SCMOS can be widely used to transfer the mono or binocular student microscopes to digital microscope.

With 23.2 to 30mm or 23.2 to 30.75 convert ring, the SCMOS camera can also change the stereo microscope to digital stereo microscope.

- Microscope eyepiece camera with 23.2 diameter and compact size;
- Easy to extend to C or CS- Mount camera with high quality lens(optional);
- High-quality camera with Aptina CMOS sensor;
- Auto white balance and auto-exposure; Brightness, contrast, chroma, and saturation can be adjusted;
- High-speed USB2.0 interface and high frame rate video display keep the screen smooth without interruption;
- With advanced video & image processing application ToupView;
- Providing Windows/Linux/Mac OS multiple platforms SDK;
- Native C/C++, C#/VB.NET, DirectShow, Twain Control API;

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10.6.2 SCMOS Datasheet (9)

Order Code	Sensor & Size(mm)	Pixel(μm)	G Responsivity Dynamic range SNRmax	FPS/Resolution	Binning	Exposure
SCMOS05000KPA TP505000A	5.0M/Aptina(C) 1/2.5“ (5.70x4.28)	2.2x2.2	NA	2@2592x1944 3@2048x1536 5@1600x1200 7.5@1280x1024	N/A	Auto
SCMOS05000KPB TP505000B(NEW)	5.0M/SC5033(C) 1/2.7“ (5.18x3.89)	2.0x2.0	2.0V/lux-sec 64dB 35dB	20@2592x1944 20@2048x1536 20@1600x1200 30@800x600	N/A	Auto
SCMOS03000KPA TP503000A	3.0M/Aptina(C) 1/2.7“ (4.51x3.38)	2.2x2.2	NA	3@2048x1536 5@1600x1200 7.5@1280x1024	N/A	Auto
SCMOS03000KPB TP503000B(NEW)	3.0M/SmartSens(C) 1/3“ (4.10x3.07)	2.0x2.0	2.0V/lux-sec 64dB 35dB	20@2048x1536 20@1600x1200 30@800x600	N/A	Auto
SCMOS02000KPA TP502000A	2.0M/Aptina(C) 1/3.2“ (4.48x3.36)	2.8x2.8	NA	5@1600x1200 7.5@1280x1024 20@800x600 22@640x480	N/A	Auto
SCMOS02000KPB TP502000B(NEW)	2.0M/OV2710(C) 1/2.7”(5.76x3.24)	3x3	3.3V/ Lux-sec 69dB 39dB	25@1920x1080 30@1280x1024 30@1280x720	N/A	Auto
SCMOS01300KPA TP501300A	1.3M/Aptina(C) 1/3“ (4.60x3.70)	3.6x3.6	NA	7.5@1280x1024 12.5@1024x768 12.5@800x600	N/A	Auto
SCMOS00920KPA TP500A(NEW)	0.92M/BG0703(C) 1/2.7” (5.80x3.28)	4.5x4.5	5.8V/ Lux-sec 65dB 43dB	25@1280x720 25@640x480	N/A	Auto
SCMOS00350KPA TP500350A	0.35M/Aptina(C) 1/4“ (3.58x2.69)	5.6x5.6	NA	30@640x480	N/A	Auto

SCMOS05000KPB and SCMOS03000KPB have fast speed than SCMOS05000KPA and SCMOS03000KPA

C: Color; M: Monochrome;

Other Specification for SCMOS Camera

Spectral Range	380-650nm (with IR-cut Filter)
White Balance	Auto White Balance
Color Technique	N/A
Capture/Control API	Native C/C++, C#/VB.NET, DirectShow, Twain and Labview
Recording System	Still Picture and Movie
Cooling System*	Natural
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 over PC USB Port
Software Environment	
Operating System	Microsoft® Windows® XP / Vista / 7 / 8 /10 (32 & 64 bit) OSx(Mac OS X) Linux
PC Requirements	CPU: Equal to Intel Core2 2.8GHz or Higher
	Memory:2GB or More
	USB Port:USB2.0 High-speed Port
	Display:17” or Larger
	CD-ROM

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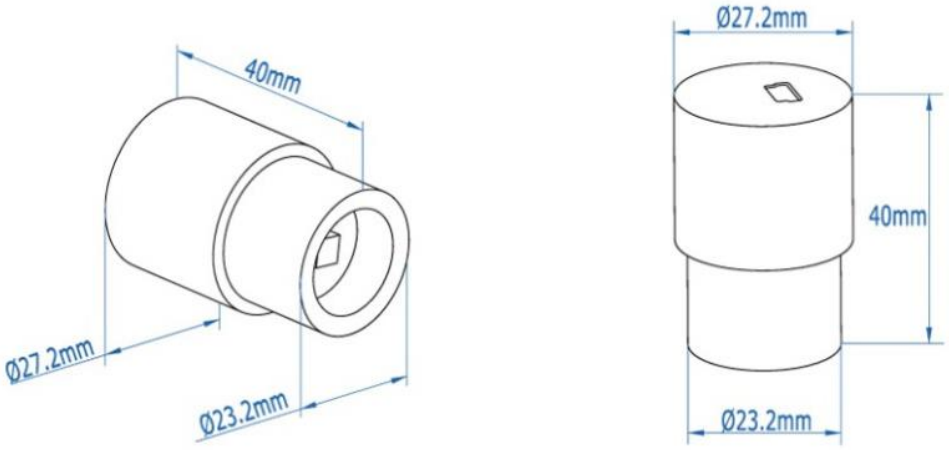
10.6.3 Dimension of SCMOS

The SCMOS body, made from aluminum alloy blackening, ocular housing: Dia.27.2 X 40mm ensures a heavy duty, workhorse solution. The camera is designed with a high quality IR-CUT filter to filter the infrared light and 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 SCMOS

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10.6.4 Packing Information for SCMOS

Packing Information of SCMOS

Standard Camera Packing List		
A	Carton L:52cm W:32cm H:33cm (50pcs, 12~17Kg/ carton), not shown in the photo	
B	Gift box L:14.5cm W:9.5cm H:6.0cm (0.15~0.16Kg/ box)	
C	SCMOS series USB2.0 eyepiece camera	
D	High-Speed USB2.0 A male to mini B 5-pin male gold-plated connectors cable /1.5m	
E	CD (Driver & utilities software, Ø8cm)	
Optional Accessory		
F	C-Mount Adapter Housing:108027(HS502)	
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	108017(Dia.23.2mm to 31.75mm Ring)/ Adapter rings for 31.75mm 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.)

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11 Microscope WiFi CMOS Camera

11.1 WCAM Series C-mount WiFi CMOS Camera

11.1.1 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;
- Integrated zinc aluminum alloy housing;
- Ultra-Fine^{TM} 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);

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11.1.2 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 API	Native C/C++, C#/VB.NET, DirectShow, Twain and Labview
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**

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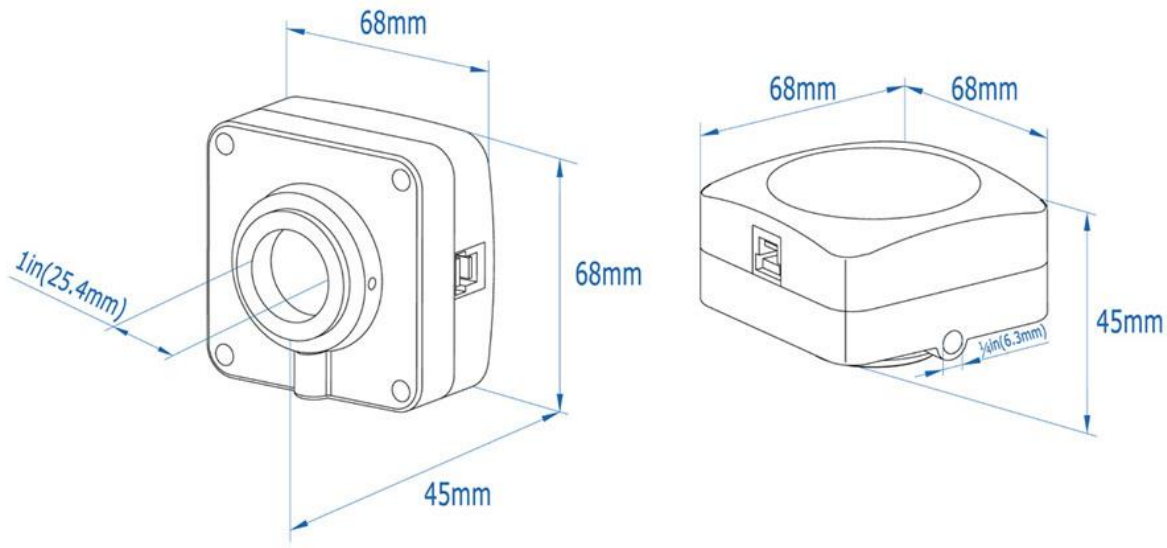
11.1.3 Dimension of WCAM

The WCAM body, made from tough, zinc 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

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11.1.4 Packing Information of WCAM

Packing Information of WCAM

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.)	

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11.1.5 Extension of WCAM with Microscope or Telescope Adapter

<table>
<tr><th>Extension</th><th colspan="2">Picture</th></tr>
<tr><td>C-mount Camera</td><td>  </td><td>Machine vision; Medical imaging;
Semiconductor equipment; Test instruments;
Document scanners; 2D barcode readers;
Web camera and security video;
Microscope imaging;</td></tr>
<tr><td>Microscope Camera</td><td colspan="2" rowspan="2"> 
WCAM+AMAXXX(23.2mm Adapter)
 
WCAM+FMAXXX(23.2mm Adapter)
 
WCAM+ATAXXX(31.75mm Adapter)
 
WCAM+FTAXXX(31.75mm Adapter)</td></tr>
<tr><td>Telescope Camera</td></tr>
</table>

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12 Microscope WiFi+USB CMOS Camera

12.1 WUCAM Series C-mount WiFi+USB CMOS Camera

12.1.1 WUCAM's Basic Characteristic

ToupTek WUCAM 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. 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 WUCAM 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 USB+WiFi data intaface;
- 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 protocal;
- 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);

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12.1.2 WUCAM Datasheet (1)

Order Code	Sensor Size(mm)	Pixel(μm)	G Responsivity Dynamic range SNRmax	FPS/Resolution	Binning	Exposure(ms)
WUCAM0720PA 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 API	Native C/C++, C#/VB.NET, DirectShow, Twain for WiFi/UVC Standard for USB
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**

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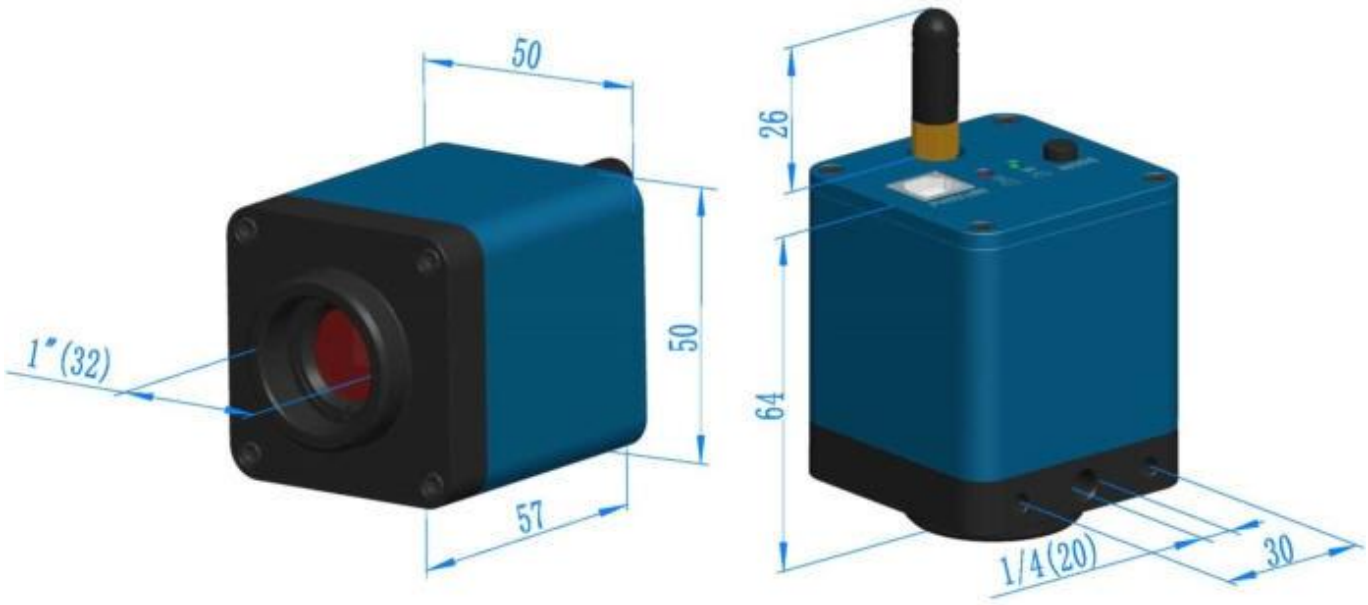
12.1.3 Dimension of WUCAM



Dimension of WUCAM

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12.1.4 Packing Information of WUCAM

Packing Information of WUCAM

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	WUCAM 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.)	

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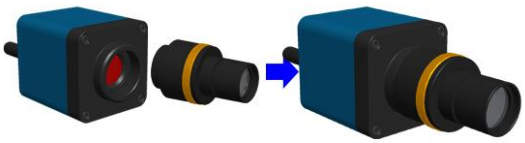
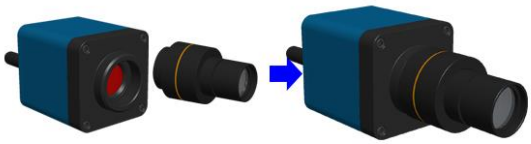
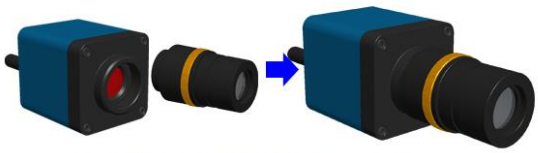
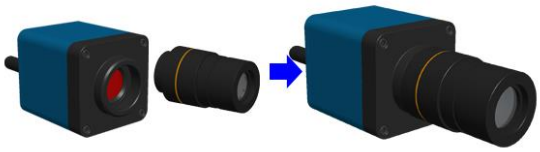
12.1.5 Extension of WUCAM with Microscope or Telescope Adapter

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)

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13 Industrial USB2.0 CMOS Camera

13.1 ICMOS Series C-mount USB2.0 CMOS Camera

13.1.1 ICMOS Basic Characteristic

ICMOS is an industrial CMOS camera and it adopts ultra-high performance CMOS sensor as the image-picking device. USB2.0 is used as the data transfer interface. Dimensions: 29x29x29 mm excluding lens holder, without optics (metal case) is realized to obey the industrial camera standard.

A 8-pin Hirose HR25-7TR-8PA GPIO connector for trigger, strobe (Optional);

Further, the ICMOS comes with advanced video & image processing application ToupView and providing Windows/Linux/OSX multiple platforms SDK;

Also, native C/C++, C#/VB.NET, DirectShow, Twain Control API are provided.

The ICMOS can be widely used in machine vision and on-line inspection.

The basic characteristic of ICMOS cameras are as follows:

- C-Mount camera with Aptina or OnSemi CMOS sensor;
- Dimensions: 29x29x29 mm excluding lens holder, without optics (metal case);
- 8-pin Hirose HR25-7TR-8PA GPIO connector for trigger, strobe (Optional);
- USB 2.0 interface with screw locks for camera control, data, and power;
- With advanced video & image processing application ToupView;
- Providing Windows/Linux/Mac OS multiple platforms SDK;
- Native C/C++, C#/VB.NET, DirectShow, Twain Control API;

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13.1.2 ICMOS Datasheet(4)

Order Code	Sensor & Size(mm)	Pixel(μm)	G Responsivity Dynamic range SNRmax	FPS/Resolution	Binning	Exposure(ms)
ICMOS14000KPA IP614000A	14M/MT9F002(C) 1/2.3"(5.73x4.60)	1.4x1.4	0.724v/lux-sec 65.3dB 35.5dB	2.7@4096x3288 10@2048x1644 35@1024 x822	1x1, 2x2, 4x4	0.4ms~2000ms
ICMOS10000KPA IP610000A	10M/MT9J003(C) 1/2.3" (5.98x4.59)	1.67x1.67	0.31v/lux-sec 65.2dB 34dB	3.7@3584x2748 13@1792x1374 35@896 x684	1x1, 2x2, 4x4	0.4ms~2000ms
ICMOS03100KPA IP603100A	3.1M/MT9T001(C) 1/2" (6.55x4.92)	3.2x3.2	1.0 V/lux-sec 61dB 43dB	12@2048x1536 43@1024x768 83@680x510	1x1	0.128ms~2000ms
ICMOS01300KMA IM601300A	1.3M/MT9M001(M) 1/2" (6.66x5.32)	5.2x5.2	2.1 V/lux-sec 68.2dB 45dB	30@1280x1024	1x1	0.64ms~1035.62ms

C: Color; M: Monochrome;

Other Specification for ICMOS Camera	
Spectral Range	380-650nm (with IR-cut Filter)
White Balance	ROI White Balance/ Manual Temp Tint Adjustment/NA for Monochromatic Sensor
Color Technique	Ultra-Fine™ Color Engine/NA for Monochromatic Sensor
Capture/Control API	Native C/C++, C#/VB.NET, DirectShow, Twain and Labview
Recording System	Still Picture and Movie
Cooling System*	Natural
Cable Connection	**Include Locking Screws**
User IO	**IO with Optocoupler Isolation(Trigger and Flash)**
Operating Modes	
Continuous Capture Mode	Video Mode
Single Capture Mode	**Hard Trigger or Soft Trigger**
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 over PC USB Port
Software Environment	
Operating System	Microsoft® Windows® XP / Vista / 7 / 8 /10 (32 & 64 bit) OSx(Mac OS X) Linux
PC Requirements	CPU: Equal to Intel Core2 2.8GHz or Higher
	Memory:2GB or More
	USB Port:USB2.0 High-speed Port
	Display:17" or Larger
	CD-ROM

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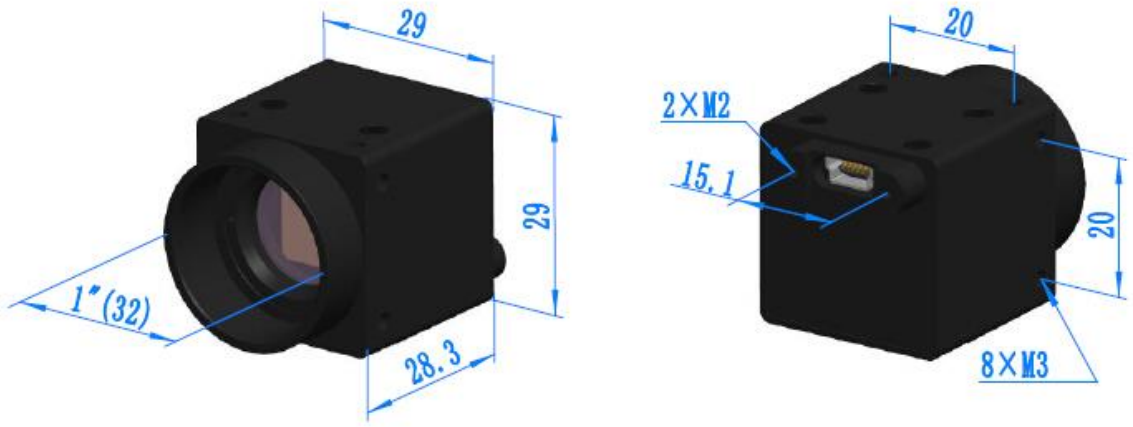
13.1.3 Dimension of ICMOS

The ICMOS 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 ICMOS

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13.1.4 Packing Information for ICMOS Camera

Packing Information ICMOS

Standard Camera Packing List			
A	Carton L:52cm W:32cm H:33cm (50pcs, 12~17Kg/ carton), not shown in the photo		
B	Gift box L:14cm W:9.7cm H:6cm (0.17~0.18Kg/ box)		
C	ICMOS series USB2.0 C-mount camera		
D	High-speed USB2.0 A male to B male gold-plated connectors cable /2.0m		
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.)	

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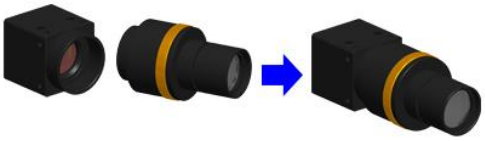
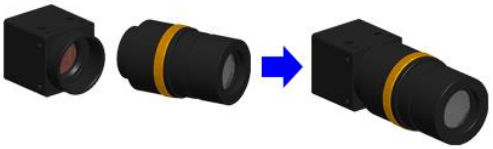
13.1.5 Extension of ICMOS with Microscope or Telescope Adapter

<table>
<tr><th>Extension</th><th colspan="2">Picture</th></tr>
<tr><td>C-mount Camera</td><td>  </td><td>Machine vision; Medical imaging;
Semiconductor equipment; Test instruments;
Document scanners; 2D barcode readers;
Web camera and security video;
Microscope imaging;</td></tr>
<tr><td>Microscope Camera</td><td colspan="2" rowspan="2"> 
ICMOS+AMAXXX(23.2mm Adapter)
 
ICMOS+FMAXXX(23.2mm Adapter)
 
ICMOS+ATAXXX(31.75mm Adapter)
 
ICMOS+FTAXXX(31.75mm Adapter)</td></tr>
<tr><td>Telescope Camera</td></tr>
</table>

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14 ZOPE Series Continuous Zoom Digital Microscope

14.1 Basic Characteristic of ZOPE

- The ZOPE stays in focus when magnification/focal length is changed;
- True continuous zoom that most of the handheld USB microscopes do not have;
- Digital microscope with USB2.0 to computer or HDMI interface to HDMI display;
- Compact and professional optical performance;
- With compact inner 8 high power LEDS for the reflective illumination and uniform LED transmission illumination with battery as the power;
- Long and fixed working distance up to 70mm for all zoom positions;
- CNC mechanical body ensure smooth zooming operation;
- Wide range of resolutions from 1.2M~5M;
- Ultra-Fine^{TM} color engine with perfect color reproduction capability;
- With advanced video & image processing application ToupView;
- Providing Windows/Linux/Mac OS multiple platforms SDK;
- Native C/C++, C#/VB.NET, DirectShow, Twain Control API;
- USB Power, no extra source required;

With transmission illumination

With EPI illumination On

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14.2 ZOPE Series Digital Microscope Module List

The ZOPE series digital microscope is a combination of Zoom Lens and USB Camera. Customers can choose their interested parts and ToupTek engineers will install them into a ZOPE digital microscope.

Order Code	Zoom Lens	Camera Module
ZOPEA05100KPA **ZPA605100A**	ZLA 0.25X~1.6X (continues and parfocal)	X05100KPA(5M pixels CMOS camera)
ZOPEA01200KPA **ZPA601200A**	ZLA 0.25X~1.6X (continues and parfocal)	X01200KPA(1.2M pixels CMOS camera)
ZOPEB05100KPA **ZPB605100A**	ZLB 0.7X~5.6X(continues and parfocal)	X05100KPA(5M pixels CMOS camera)
ZOPEB01200KPA **ZPB601200A**	ZLB 0.7X~5.6X(continues and parfocal)	X01200KPA(1.2M pixels CMOS camera)

ZLA: A type zoom lens with 0.25X~1.6X magnification;
ZLB: B type zoom lens with 0.7X~5.6X magnification;

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14.3 Zoom Lens for ZOPE Series Digital Microscope

Currently ToupTek has 2 kinds of zoom lens for option, they are ZLA and ZLB. Customer can choose the right one according to their applications.

Model / Specification	ZLA	ZLB
Zoom Lens	0.25X~1.6X (continues and parfocal)	0.7X~5.6X(continues and parfocal)
Working Distance	67.85mm(From lens to object surface)	31.73(from lens to object suface)
MTF	Diffraction limited	Diffraction limited
Field	Φ28.8~4.5mm	Φ10.85~1.36mm
Reflection illumination(USB power supply)	8 LEDs embedded illumination(adjustable)	8 LEDs embedded illumination(adjustable)
Transmission Illumination (Battery power, Optional)	Uniform illumination(3 levels switchable)	Uniform illumination(3 levels switchable)

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14.4 Camera Modules for ZOPE Series Digital Microscope

Currently ToupTek has 2 kinds of camera modules for the Zoom Lens, they are X05100KPA and X01200KPA. ToupTek will continue to enrich the camera modules according to the requirements.

Order Code	Sensor & Size(mm)	Pixel(μm)	G Responsivity Dynamic range SNRmax	FPS/Resolution	Binning	Exposure(ms)
X05100KPA	5.1M/MT9P001(C) 1/2.5“ (5.7x4.28)	2.2x2.2	0.53 V/lux-sec 66.5dB 40.5dB	5@2592x1944 18@1280x960 60@640x480	1x1, 2x2, 4x4	0.294ms~2000ms
X01200KPA	1.2M/AR0130(M) 1/3“(4.8x3.6)	3.75 x3.75	6.5v/lux-sec 85.3dB 44dB	28@1280x960 30@640x480	1x1, 2x2	0.4ms~2000ms

C: Color; M: Monochrome;

Other Specification for UCMOS Camera	
Spectral Range	380-650nm (with IR-cut Filter)
White Balance	ROI White Balance/ Manual Temp Tint Adjustment/NA for Monochromatic Sensor
Color Technique	Ultra-Fine™ Color Engine/NA for Monochromatic Sensor
Capture/Control API	Native C/C++, C#/VB.NET, DirectShow, Twain and Labview
Recording System	Still Picture and Movie
Cooling System*	Natural
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 over PC USB Port
Software Environment	
Operating System	Microsoft® Windows® XP / Vista / 7 / 8 /10 (32 & 64 bit) OSx(Mac OS X) Linux
PC Requirements	CPU: Equal to Intel Core2 2.8GHz or Higher
	Memory:2GB or More
	USB Port:USB2.0 High-speed Port
	Display:17” or Larger
	CD-ROM

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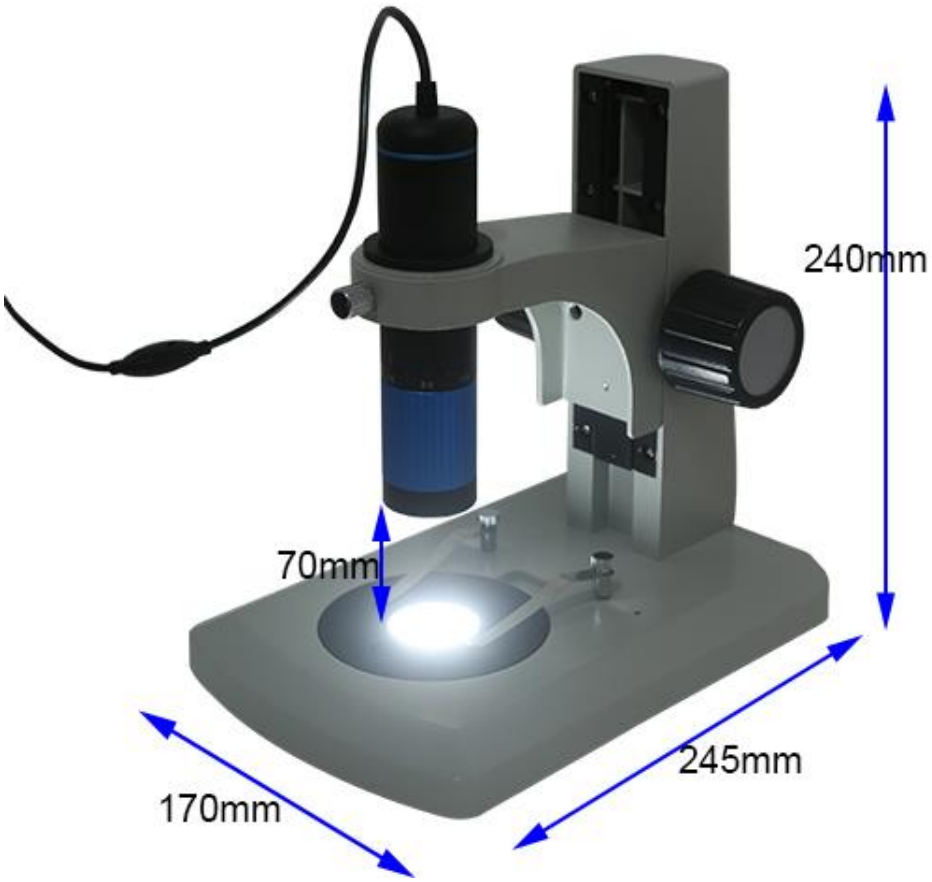
14.5 Dimension of ZOPE



Dimension of ZOPE

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14.6 Packing Information for ZOPE Series Digital Microscope

Standard Packing List		
A	Carton L:51cm W:31.5cm H:18cm (1pcs, 2.8Kg/ carton, 0.029m^3), not shown in the photo	
B	ZOPE series digital microscope	
C	Solid stand	
D	Hexwrench to install the stand	
E	CD (Driver & utilities software, Ø12cm)	
Optional Accessory		
F	Uniform transmissive illumination kit(3 Battery power supply, 3 levels switchable)	
G	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.)

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15 Handheld CMOS USB 2.0 Microscope Camera

15.1 HCAM SeriesUSB2.0 CMOS Camera

15.1.1 HCAM Basic Characteristic

The intermediate-level ToupTek Handheld Digital Microscope is an easy to use, low power microscope. With powers of 10x to 200x, it's ideal for viewing stamps, coins, bugs, plants, rocks, skin, gems, circuit boards, and more. With the higher power magnifications, you can even view traditional microscope slides.

Best of all, you can capture your discoveries using the built-in 0.35MP，1.3MP or 2.0 MP camera. Press the shutter to save images and high resolution video directly to your PC. The LED illuminator ensures your specimens are clear and bright. An included metal stand allows for steady shots and comes in handy when viewing at higher powers, minimizing shaking and keeping your specimen in sharp focus.

For teens and adults alike, the ToupTek Handheld Digital Microscope is a fun, educational tool. It's well suited for hobbyists, quality control inspectors, medical professionals, and scientific researchers.

The basic characteristic of HCAM is :

- USB-powered handheld digital microscope with 10x to 200x magnification;
- Built-in 0.35MP, 1.3MP or 2MP digital camera for capturing images and videos;
- 8 LED ring illuminator;
- Use the included Windows software to capture images and video of your discoveries. Measure your specimens with built-in measurement tool;
- Computer requirements: CD/DVD drive and USB 2.0 port. UVC plug-and-play with Windows 7/8, Vista, and XP (32/64 bit).

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15.1.2 HCAM Hardware Characteristic

Order Code	Sensor	Size(mm)	Pixel(μm)	FPS/Resolution	Binning	Exposure
HCAM02000KPA HC502000A	MI2010(C)	1/3.2“	2.8x2.8	28 @ 1920 x1080 28@1280x 720 30@640x 480	1x1	0.5ms~30ms
HCAM01300KPA HC501300A	MT9M112(C)	1/4“	2.8x2.8	15@1280x1024 30@640x512	1x1	0.5ms~30ms
HCAM00350KPA HC500350A	GC0308(C)	1/6.5“	3.4x3.4	30@640x480	1x1	0.5ms~30ms

C: Color; M: Monochrome;

Other Specification for HCAM Camera	
Spectral Range	380-650nm (with IR-cut Filter)
White Balance	Auto White Balance
Color Technique	N/A
Capture/Control API	Native C/C++, C#/VB.NET, DirectShow, Twain and Labview
Recording System	Still Picture and Movie
Cooling System*	Natural
Illumination	LED Illumination
Holding Frame	Optional(M-SD-HM1, M-SD-HM2,M-SD-HM3)
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 over PC USB Port
Software Environment	
Operating System	Microsoft® Windows® XP / Vista / 7 / 8 /10 (32 & 64 bit) OSx(Mac OS X) Linux
PC Requirements	CPU: Equal to Intel Core2 2.8GHz or Higher
	Memory:2GB or More
	USB Port:USB2.0 High-speed Port
	Display:17” or Larger
	CD-ROM

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15.1.3 M-SD-HM1 Hand Held USB Microscope Stand

Pole stand (Metal) for handheld microscope with focus mount has the following basic characteristic

- Oxidized silver aluminum alloy;
- Stable to ensure capturing the clear video and image;
- Overall dimensions：150mmX80mmX147mm;
- Plate dimensions: 150mmX80mm;
- Pole coaxial focus with 51mm range;

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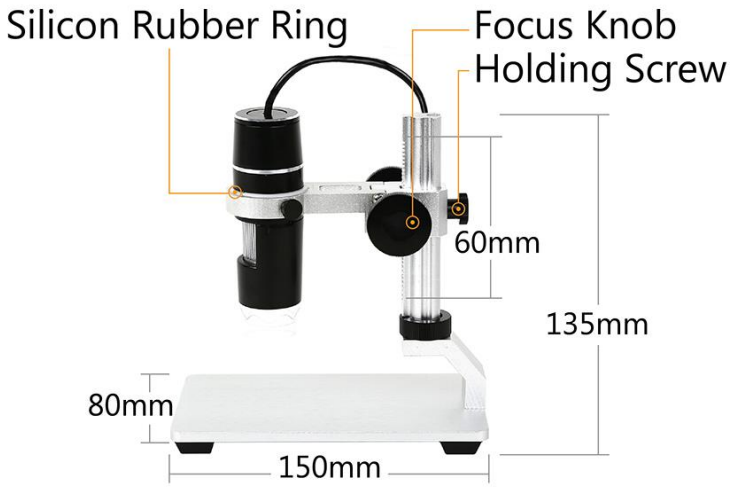
15.1.4M-SD-HM2 Hand Held USB Microscope Stand

The track stand (Metal) for handheld microscope with focus mount has the following basic characteristic

- Oxidized silver aluminum alloy;
- Focus knob inherited from the traditional microscope to focus at ease;
- Silicon rubber ring to protect the handheld microscope;
- Holding screw to hold the microscope;
- Stable to ensure capturing the clear video and image;
- Overall dimensions：150mmX80mmX135mm;
- Plate dimensions: 150mmX80mm;
- Rack focus with 60mm range;



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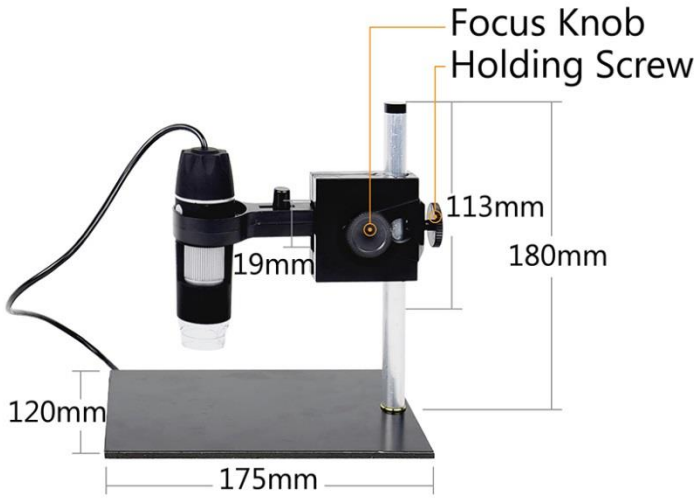
15.1.5 M-SD-HM3 Hand Held USB Microscope Stand

Plastic stand (Plastic) for handheld microscope with focus mount has the following basic characteristic

- Plastic plate with aluminum alloy pole ;
- Focus knob inherited from the traditional microscope allow for precise focus;
- Bayonet mount to install the handheld microscope at ease;
- Holding screw to hold the microscope;
- Stable to ensure capturing video and image;
- Overall dimensions：175mmX120mmX180mm;
- Plate dimensions: 175mmX120mm;
- Focus range: 113mm;
- Fine focus range 19mm



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16 ToupTek HDMI Displayer for XCAM Series Camera

16.1 TPHD1080PA HDMI Displayer

16.1.1 TPHD1080PA's basic characteristic

TPHD1080PA 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 could make the imaging & display solution simple, flexible and intuitive. Outstanding performance of TPHD1080PA helps XCAM HDMI camera reach fast frame rate and excellent color.

The TPHD1080PA's basic characteristic is as follows

- HDMI monitor;
- 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;

16.1.2 TPHD1080PA Datasheet

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

TPHD1080PA 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	

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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

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16.1.3 TPHD1080PA and XCAM0720PHB/PHC Camera

Front View of TPHD1080PA

Back View of TPHD1080PA+XCAM Series Camera

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Side view of TPHD1080PA+XCAM Series Camera

Front View of Leica Microscope+XCAMSeries Camera and TPHD1080PA

Side View of Leica Microscope+XCAMSeries Camera and TPHD1080PA

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Front View of Nikon Microscope+XCAMSeries Camera and TPHD1080PA

Side View of Nikon Microscope+XCAMSeries Camera and TPHD1080PA

Front View of Olympus Microscope+XCAMSeries Camera and TPHD1080PA

Side View of Olympus Microscope+XCAMSeries Camera and TPHD1080PA

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Front View of Zeiss Microscope+XCAMSeries Camera and TPHD1080PA

Side View of Zeiss Microscope+XCAMSeries Camera and TPHD1080PA

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16.1.4 TPHD1080PA and XCAM1080PHA,XCAM1080PHB/PHD Camera

Front View of TPHD1080PA

Back View of TPHD1080PA+XCAM Series Camera

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Side view of TPHD1080PA+XCAM Series Camera

Front View of Leica Microscope+XCAMSeries Camera and TPHD1080PA

Side View of Leica Microscope+XCAMSeries Camera and TPHD1080PA

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Front View of Nikon Microscope+XCAMSeries Camera and TPHD1080PA

Side View of Nikon Microscope+XCAMSeries Camera and TPHD1080PA

Front View of Olympus Microscope+XCAMSeries Camera and TPHD1080PA

Side View of Olympus Microscope+XCAMSeries Camera and TPHD1080PA

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Front View of Zeiss Microscope+XCAMSeries Camera and TPHD1080PA

Side View of Zeiss Microscope+XCAMSeries Camera and TPHD1080PA

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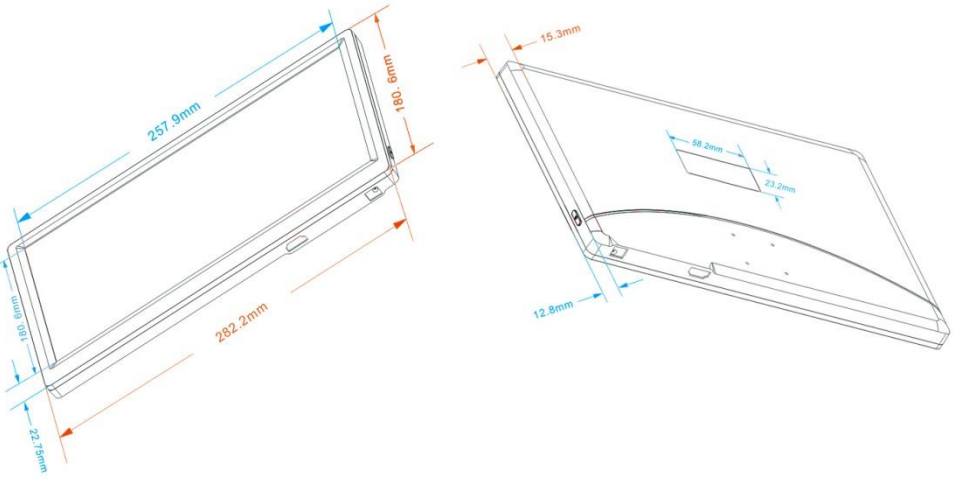
16.1.5 Dimension of TPHD1080PA



Dimension of TPHD1080PA

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17 Eyepiece Tube to C-Mount Adapter

17.1 23.2mm Eyepiece to C-mount Adjustable Microscope Eyepiece Adapter

AMA Specifications

Article Code	Picture	Model	Description	Bar Code
108001		AMA037	1.Available Size for 18 mm Field 18X0.37mm 2.Fit to 1/4”~1/3” Size Sensor 3.0.37X Magnification 4.Manually Focusable 5.Parfocal with the Eyepiece 6.Dia.23.2mm Eyepiece Tube to C-Mount	108001
108002		AMA050	1.Available Size for 18 mm Field 18X0.50mm 2.Fit to 1/2”~2/3” Size Sensor 3.0.50X Magnification 4.Manually Focusable 5.Parfocal with the Eyepiece 6.Dia.23.2mm Eyepiece Tube to C-Mount	108002
108003		AMA075	1.Available Size for 18 mm Field 18X0.75mm 2.Fit to 1/1.8”~1” Size Sensor 3.0.75X Magnification 4.Manually Focusable 5.Parfocal with the Eyepiece 6.Dia.23.2mm Eyepiece Tube to C-Mount	108003
108004		AMA100		

*To cover the field, the sensor size should be smaller than the available size. ToupTek’s experts will help you to select the correct Adapter for your ordered microscope camera. What you need to do is to select the right camera model.

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17.2 23.2mm Eyepiece to C-mount Fixed Microscope Eyepiece Adapter

FMA Specifications

Article Code	Picture	Model	Description	Bar Code
108005		FMA037	1.Available Size for 18 mm Field 18X0.37mm 2.Fit to 1/4”~1/3” Size Sensor 3.0.37X Magnification 4.Dia.23.2mm Eyepiece Tube to C-Mount	108005
108006		FMA050	1.Available Size for 18 mm Field 18X0.50mm 2.Fit to 1/2”~2/3” Size Sensor 3.0.50X Magnification 4.Dia.23.2mm Eyepiece Tube to C-Mount	108006
108007		FMA075	1.Available Size for 18 mm Field 18X0.75mm 2.Fit to 1/1.8”~1” Size Sensor 3.0.75X Magnification 4.Dia.23.2mm Eyepiece Tube to C-Mount	108007

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17.3 31.75mm Eyepiece to C-mount Adjustable Telescope Eyepiece Adapter

ATA Specifications

Article Code	Picture	Model	Description	Bar Code
108008		ATA037	1.Fit to 1/4” ~ 1/3” Size Sensor 2.0.37X Magnification 3.Manually Focusable 4.Parfocal with the Eyepiece 5.C-Mount to Dia.31.75mm Eyepiece Tube	108008
108009		ATA050	1.Fit to 1/2” ~ 2/3” Size Sensor 2.0.50X Magnification 3.Manually Focusable 4.Parfocal with the Eyepiece 5.C-Mount to Dia.31.75mm Eyepiece Tube	108009
108010		ATA075	1.Fit to 1/1.8” ~ 1” Size Sensor 2.0.75X Magnification 3.Manually Focusable 4.Parfocal with the Eyepiece 5.C-Mount to Dia.31.75mm Eyepiece Tube	108010

*To cover the field, the sensor size should be smaller than the available size. ToupTek’s experts will help you to select the correct Adapter for your ordered microscope camera. What you need to do is to select the right camera model.

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17.4 31.75mm Eyepiece to C-mount Fixed Telescope Eyepiece Adapter

FTA Specifications

Article Code	Picture	Model	Description	Bar Code
108011		FTA037	1.Fit to 1/4" ~ 1/3" Size Sensor 2.0.37X Magnification 3.C-Mount to Dia.31.75mm Eyepiece Tube	108011
108012		FTA050	1.Fit to 1/2" ~ 2/3" Size Sensor 2.0.50X Magnification 3.C-Mount to Dia.31.75mm Eyepiece Tube	108012
108013		FTA075	1.Fit to 1/1.8" ~ 1" Size Sensor 2.0.75X Magnification 3.C-Mount to Dia.31.75mm Eyepiece Tube	108013

*To cover the field, the sensor size should be smaller than the available size. ToupTek's experts will help you to select the correct Adapter for your ordered telescope camera. What you need to do is to select the right camera model.

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18 Microscope 23.2 to 30, 30.5, 30.75 Eyepiece Converter

18.1 The Basic Characteristic of the Eyepiece Converter

- The Eyepiece converter can make the 23.2 mm camera Adapter to different size microscope and telescope eyepiece holder. The ToupTek's FMA and AMA end size is 23.2mm and can be directly inserted into the 23.2mm microscope eyepiece holder;
- For 23.2 eyepiece holder, no extra converter is needed for the microscope;
- The 23.2mm to 30.0mm converter is needed to connecting the 23.2mm camera Adapter to the 30 mm eyepiece holder microscope;
- The 23.2mm to 30.5mm converter is needed to connecting the 23.2mm camera Adapter to the 30.5 mm eyepiece holder microscope;
- The 23.2mm to 31.75mm converter is needed to connecting the 23.2mm camera Adapter to the 31.75 mm eyepiece holder microscope;
- For 31.75 mm eyepiece holder, user can directly use ToupTek's 31.75mm FMA and AMA for their C-mount Camera.

18.2 Specification of the Eyepiece Converter

Order Code	Picture	Model	Characteristic
108015		MET2323000	Dia.23.2mm to 30.0mm Converter
108016		MET2323050	Dia.23.2mm to 30.5mm Converter
108017		MET2323175	Dia.23.2mm to 31.75mm Converter

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19 Olympus,Leica,Nikon, Zeiss Phototube to C-Mount Adapter

19.1 Olympus TV Adapter

19.1.1 Characteristic

- Convert the Olympus trinocular microscope phototube/head/port (have standard 35 mm outer diameter for the insertion end to phototube) to traditional C-Mount type(25.4 mm or 1 inch diameter with 32 threads per inch);
- With different built-in reduction lens (1.2X,1X, 0.8X,0.63X, 0.5X, 0.35X) for achieving better field of view from microscope trinocular head(suitable for 4/3" 1", 2/3", 1/1.8", 1/2", 1/2.5", 1/3" or 1/4" inch CCD or CMOS sensor chips);
- Can be installed in UIS trinocular tube such as : BX series, BX2 series, CX series, CX2 series, MX series;
- Build of material: anodized aluminum;
- Telecentric optics with low light deficiency;
- Parfocal with different microscope objective lenses;
- Diffraction limited MTF;
- Aperture totally coupled with UIS microscope objective's exit pupil;

19.1.2 Specifications

Model	Photo	Magnification	Sensor Size	Mount Type
U-TV1.2XT2(NEW)		1.2X	4/3",1"	T2-Mount
U-TV1X-2/U-CAMD3		1.0X	1", 2/3"	C-Mount
U-TV0.80XC(New)		0.80X	1",2/3"	C-Mount

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U-TV0.63XC		0.63X	2/3”,1/1.8”,1/2”	C-Mount
U-TV0.5XC-3		0.50X	1/1.8”,1/2”,1/2.5”	C-Mount
U-TV0.40XC		0.40X	1/2.5”,1/3”,1/4”	C-Mount
U-TV0.35XC-2		0.35X	1/3”,1/4”， 1/5”	C-Mount
Supported Microscope	Specially designed for Olympus CX， BX， MX， STM， SZX， IX， GX(GX41) series microscopes			

19.2 Zeiss TV Adapter

19.2.1 P95 Series Zeiss Characteristic

- Convert the Zeiss trinocular microscope phototube/head/port (have standard ISO 30 mm(1.18 inch) outer diameter for the insertion end to phototube) to traditional C-Mount type(25.4 mm or 1 inch diameter with 32 threads per inch);
- With different built-in reduction lens (1.2X,1X, 0.8X, 0.65X, 0.5X, 0.35X) for achieving better field of view from microscope trinocular head(suitable for 4/3" 1", 2/3", 1/1.8", 1/2", 1/2.5", 1/3" or 1/4" inch CCD or CMOS sensor chips);
- Can be installed in Zeiss UIS trinocular tube such as:

  Zeiss PrimoStar series and Zeiss Primo vert series
- Build of material: anodized aluminum;
- Telecentric optics with low light deficiency;
- Parfocal with different microscope objective lenses;
- Diffraction limited MTF;
- Aperture totally coupled with UIS microscope objective's exit pupil;

19.2.2 Specifications for the P95 series adapter

Model	Photo	Magnification	Sensor Size	Mount Type
P95-T2 4/ P95-C 1" 1.0 x 3" 1.2x(New)		1.2X	1", 4/3"	T2-Mount
P95-C 1" 1.0x		1X	1", 2/3"	C-Mount
P95-C 1" 0.8x(New)		0.8X	1",2/3"	C-Mount
P95-C 2/3" 0.65x		0.65X	2/3",1/1.8",1/2"	C-Mount

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P95-C 1/2" 0.50x		0.5X	1/1.8",1/2",1/2.5"	C-Mount
P95-C 1/3" 0.35x		0.35X	1/3",1/4"， 1/5"	C-Mount
Supported Microscope	Specially designed for Zeiss Primo Star series , Zeiss Primo vert series			

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19.2.3 60N-C, 60N-T2 Series TV Adapter Characteristic for Zeiss Microscope

- Convert the Zeiss trinocular microscope phototube/head/port (have standard ISO 30 mm(1.18 inch) outer diameter for the insertion end to phototube) to traditional C-Mount type(25.4 mm or 1 inch diameter with 32 threads per inch);
- With different built-in reduction lens (1.2X,1X, 0.8X, 0.65X, 0.5X, 0.35X) for achieving better field of view from microscope trinocular head(suitable for 4/3" 1", 2/3", 1/1.8", 1/2", 1/2.5", 1/3" or 1/4" inch CCD or CMOS sensor chips);
- Can be installed in Zeiss UIS trinocular tube such as Axio series microscope;
- Build of material: anodized aluminum;
- Telecentric optics with low light deficiency;
- Parfocal with different microscope objective lenses;
- Diffraction limited MTF;
- Aperture totally coupled with UIS microscope objective's exit pupil;

19.2.4 Specifications for the 60N-C or 60N-T2 series adapter

Model	Photo	Magnification	Sensor Size	Mount Type
60N-T2 4/3" 1.2x(New)		1.20X	1", 4/3"	T2-Mount
60N-C 1" 1.0x		1.0X	1", 2/3"	C-Mount
60N-C 1"0.8x(New)		0.80X	1",2/3"	C-Mount
60N-C 2/3" 0.63x(New)		0.63X	2/3",1/1.8",1/2"	C-Mount
60N-C 1/2" 0.5x		0.50X	1/1.8",1/2",1/2.5"	C-Mount
Supported Microscope	Axio Examiner.A1; Axio Examiner.D1; Axio Examiner.Z1; Axio Imager Vario; Axio Imager.A1; Axio Imager.A1m; Axio Imager.A2; Axio Imager.A2m; Axio Imager.D1; Axio Imager.D1 for epi-fluorescence with ApoTome equipment; Axio Imager.D1m;			

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	Axio Imager.D2; Axio Imager.D2m; Axio Imager.M1 (Axio Imager.M1 for KS ELISPOT); Axio Imager.M1m; Axio **Imager**.M2; Axio Imager.M2m; Axio Imager.Z1; Axio Imager.Z1 + ApoTome; Axio Imager.Z1m; Axio Imager.Z2; Axio Imager.Z2m; Axio Lab.A1; Axio Lab.A1 FL-LED; Axio Lab.A1 MAT; Axio Lab.A1 Pol; Axio Observer.A1; Axio Observer.A1 Entry; Axio Observer.D1; Axio Observer.D1 Entry; Axio Observer.D1 Mid Range; Axio Observer.Z1; Axio Observer.Z1 High End; Axio Scope.A1; Axio Scope.A1 Pol; Axio Scope.A1 Vario; Axio Vert.A1; Axio Vert.A1 FL; Axio Vert.A1 FL-LED; Axio Vert.A1 MAT; Axio Zoom.V16; PALM CombiSystem Rel. 4.2; PALM MicroBeam; PALM MicroBeam Rel.4.2; PALM MicroTweezers Rel.4.2; Stemi 508 doc; Stemi 508 trino; SteREO Discovery.V12; SteREO Discovery.V8; SteREO Lumar.V12;

The Primo Star and ToupCam Camera

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19.3 LEICA TV Adapter

19.3.1 Characteristic

- Convert the LEICA trinocular microscope phototube/head/port (have standard 35 mm outer diameter for the insertion end to phototube) to traditional C-Mount type(25.4 mm or 1 inch diameter with 32 threads per inch);
- With different built-in reduction lens (1.2X,1X, 0.8X, 0.7X, 0.55X, 0.35X) for achieving better field of view from microscope trinocular head(suitable for 4/3" 1", 2/3", 1/1.8", 1/2", 1/2.5", 1/3" or 1/4" inch CCD or CMOS sensor chips);
- Can be installed in UIS trinocular tube such as: specially designed for LEICA DM series biology microscopes and industrial microscopes;
- Build of material: stainless steel material;
- Telecentric optics with low light deficiency;
- Parfocal with different microscope objective lenses;
- Diffraction limited MTF;
- Aperture totally coupled with LEICA UIS microscope objective's exit pupil;

19.3.2 Specifications

Model	Photo	Magnification	Sensor Size	Mount Type
11541510-120 HT2-1.2X(New)		1.2X	4/3", 1"	T2 Mount
11541510 HC-1.0X		1.0X	1", 2/3"	C-Mount
11541510-080 HC-0.80X(New)		0.8X	1", 2/3"	C-Mount
11541543 HC 0.70X		0.7X	2/3",1/1.8",1/2"	C-Mount
11541544 HC-0.55X		0.55X	1/1.8",1/2",1/2.5"	C-Mount
11541512 HC-0.35X		0.35X	1/2.5",1/3",1/4"	C-Mount
Supported Microscope	Specially designed for LEICA DM series biology microscopes and industrial microscopes			

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19.4 NIKON TV Adapter

19.4.1 Characteristic

- Convert the NIKON trinocular microscope phototube/head/port (have standard 38 mm(1.50 inch) outer diameter for the insertion end to phototube) to traditional C-Mount type(25.4 mm or 1 inch diameter with 32 threads per inch);
- With different built-in reduction lens (1.2X,1X, 0.8X, 0.70X, 0.55X, 0.35X) for achieving better field of view from microscope trinocular head(suitable for 4/3" 1", 2/3", 1/1.8", 1/2", 1/2.5", 1/3" or 1/4" inch CCD or CMOS sensor chips);
- Can be installed in UIS trinocular tube such as : NIKON E100, E200, 50i, 55i, 80i, 90i, Ni series, Ti Series, SMZ800, SMZ1000, SMZ15000 biology microscopes and industrial microscopes;
- Build of material: stainless steel material for the C-Mount end and spray-painted aluminum for the phototube end ;
- Telecentric optics with low light deficiency;
- Parfocal with different microscope objective lenses;
- Diffraction limited MTF;
- Aperture totally coupled with UIS microscope objective's exit pupil;

The Adapter works for the following microscope series: NIKON microscopes UPRIGHT: Alphaphot-2, Eclipse series (requires YT-tube 92306), Labophot-2, Optiphot-2 Optiphot 100S, 150, 200, 300 Stereo: SMZ-10A, SMZ-U, SMZ-1000, SMZ-1500 METALLURGICAL: EPIPHOT 300/200 MEASURING: MM-40, MM-60 INVERTED: Diaphot 300/200 TS100-F TE2000

19.4.2 Specification

Model	Photo	Magnification	Sensor Size	Mount Type
MQD42120(New) **MBB42120**		1.2X	4/3",1"	T2-Mount
MQD42000 **MBB42000**		1.0X	1", 2/3"	C-Mount
MQD42080(New) **MBB42080**		0.8X	1",2/3"	C-Mount

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MQD42070 **MBB42070**		0.7X	2/3”,1/1.8”,1/2”	C-Mount
MQD42055 **MBB42055**		0.55X	1/1.8”,1/2”,1/2.5”	C-Mount
MQD42035 **MBB42035**		0.35X	1/2.5”,1/3”,1/4”	C-Mount
Supported Microscope	Specially designed for NIKON E100,E200,50i,55i,80i,90i, Ni series, Ti Series, SMZ800,SMZ1000, SMZ15000 biology microscopes and industrial microscopes			

19.5 HUVITZ TV Adapter

19.5.1 Characteristic

- Convert the HUVITZ trinocular microscope phototube/head/port (have standard 35 mm outer diameter for the insertion end to phototube) to traditional C-Mount type(25.4 mm or 1 inch diameter with 32 threads per inch);
- With different built-in reduction lens (1.2X,1X, 0.8X, 0.63X, 0.5X, 0.35X) for achieving better field of view from microscope trinocular head(suitable for 4/3" 1", 2/3", 1/1.8", 1/2", 1/2.5", 1/3" or 1/4" inch CCD or CMOS sensor chips);
- Can be installed in UIS trinocular tube such as : HRM series, HSZ series microscope;
- Build of material: anodized aluminum;
- Telecentric optics with low light deficiency;
- Parfocal with different microscope objective lenses;
- Diffraction limited MTF;
- Aperture totally coupled with UIS microscope objective's exit pupil;

19.5.2 Specifications

Model	Photo	Magnification	Sensor Size	Mount Type
HSZ-T2P1.2 (NEW)		1.2X	4/3",1"	T2-Mount
HSZ-CP1X		1X	1", 2/3"	C-Mount
HSZ-CP0.80X (New)		0.80X	1",2/3"	C-Mount
HSZ-CP0.63X		0.63X	2/3",1/1.8",1/2"	C-Mount
HSZ-CP0.5X		0.5X	1/1.8",1/2",1/2.5"	C-Mount

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HSZ-CP0.35X		0.35X	1/3”,1/4”，1/5”	C-Mount
Supported Microscope	Specially designed for HUVITZ HRM series, HSZ series microscopes			

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19.6 Labomed TV Adapter

19.6.1 Characteristic

- Convert the Labomed trinocular microscope phototube/head/port (have standard 35 mm outer diameter for the insertion end to phototube) to traditional C-Mount type(25.4 mm or 1 inch diameter with 32 threads per inch);
- With different built-in reduction lens (1X, 0.63X, 0.5X, 0.35X) for achieving better field of view from microscope trinocular head(suitable for 1”, 2/3”, 1/1.8”, 1/2”, 1/2.5”, 1/3” or 1/4” inch CCD or CMOS sensor chips);
- Can be installed in UIS trinocular tube such as : LB series microscope;
- Build of material: anodized aluminum;
- Telecentric optics with low light deficiency;
- Parfocal with different microscope objective lenses;
- Diffraction limited MTF;
- Aperture totally coupled with UIS microscope objective’s exit pupil;

19.6.2 Specifications

Model	Photo	Magnification	Sensor Size	Mount Type
LB1.0X		1X	1”, 2/3”	C-Mount
LB0.75X		0.75X	2/3”,1/1.8”,1/2”	C-Mount
LB0.65X		0.65X	1/1.8”,1/2”,1/2.5”	C-Mount

LB0.50X		0.5X	1/2.3,1/2.5”,1/3”	C-Mount
LB0.35X		0.35X	1/2.5”,1/3”,1/4”	C-Mount
Supported Microscope	Specially designed for Labomed LB series microscopes			

20 ToupTek Lens for Machine Vision

20.1 TP-1632ZL5M (16mm~32mm, 1” Format)

20.1.1 Specification

Resolution:	150lp/mm
Format :	1 "
Mount :	C
Focal Length :	16 ~ 32mm
F/No:	F1.8~F16
Iris Type :	Manual Iris
Horizontal of view :	53.2 °~ 27.5 °
Distortion :	±1%
Focusing range :	∞ ~ 0.3m
Coating Range:	400nm~950nm
Filter Thread:	M62 x 0.75mm
Dimension:	∅66 x 113.35mm
Weight:	619g

20.1.2 Drawing and Optical Performance

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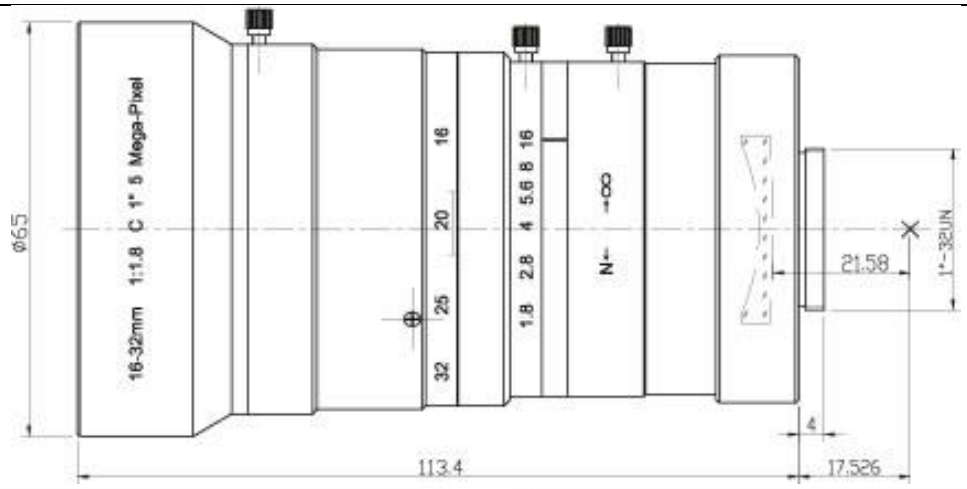

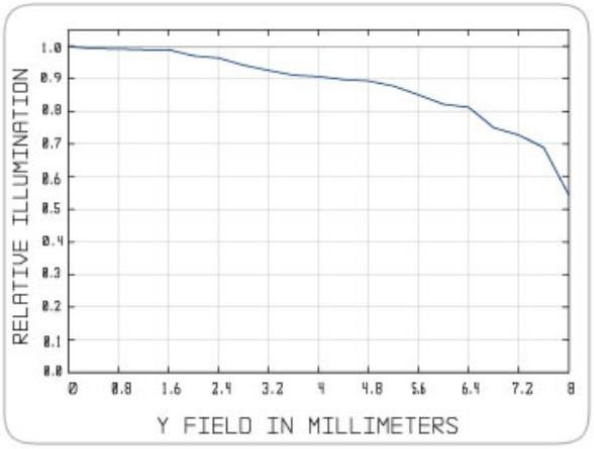

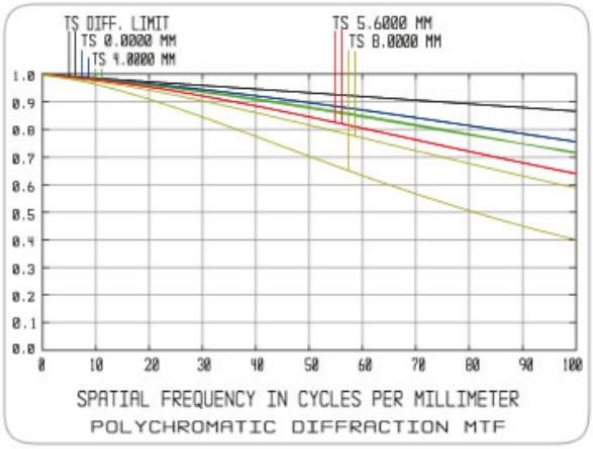

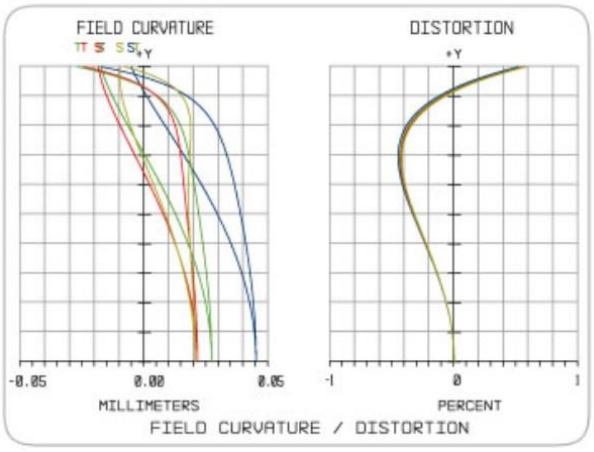

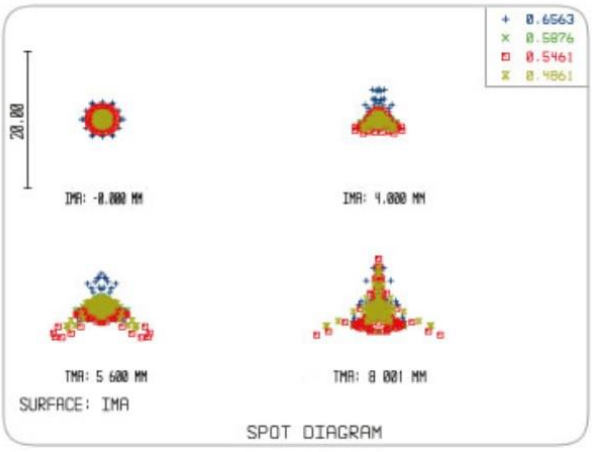

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20.2 TPWA Series Lens with CS-mount

Model No.	Focal Length	Aperture	Mount	Format	FOV	Dimensions	M.O.D(m)	Weight(g)	Remarks
TPF-F02116	2.1mm	2.0	CS	1/3″	151 °	Φ30*16.7mm	0.2	45	
TPF-F02516	2.5mm	2.0	CS	1/3″	140 °	Φ30*19mm	0.2	45	
TPF-F02816	2.8mm	2.0	CS	1/3″	138 °x104 °x74 °	Φ30*17.7mm	0.2	38	

20.3 TP3MP Series Lens with CS-mount

Model No.	Focal Length	Aperture	Mount	Format	FOV	Dimensions	M.O.D(m)	Weight(g)	Remarks
TPF-F02512IR3MP	2.5mm	1.2	CS	1/2.5″	115°x109°x90°	Φ28*23.6mm	0.2	32.6	全金属
TPF-F02812IR3MP	2.8mm	1.2	CS	1/2.5″	110°x104°x90°	Φ28*23.6mm	0.2	32.6	全金属
TPF-F0412IR3MP	4.0mm	1.2	CS	1/2.5″	76°	Φ28*30.0mm	0.2	44.6	全金属
TPF-F0612IR3MP	6.0mm	1.2	CS	1/2.5″	49.8°	Φ30*32.5mm	0.2	49.2	全金属
TPF-F0812IR3MP	8.0mm	1.2	CS	1/2.5″	35°	Φ30*32.5mm	0.2	49.2	全金属
TPF-F2512IR3MP	25mm	1.2	CS	1/2.5″	16.7°	Φ30*32.2mm	0.2	54	全金属

20.4 TP2MP Series Lens with CS-mount

Model No.	Focal Length	Aperture	Mount	Format	FOV	Dimensions	M.O.D(m)	Weight(g)	Remarks
TPF-F0411IR2MP	4mm	F1.2	CS	1/2.″	80 °	Φ30*30.0mm	0.2	49.5	全金属
TPF-F4080HD	4mm	F1.2	CS	1/2.7″	82.6 °	Φ28*31.5mm	0.2m	48	
TPF-F0611IR2MP	6mm	1.2	CS	1/2.″	54 °	Φ30*30.0mm	0.2	50.5	
TPF-F6080HD	6mm	F1.2	CS	1/2.7″	54 °	Φ28*31.5mm	0.2m	50.5	
TPF-F0811IR2MP	8mm	1.2	CS	1/2.″	40 °	Φ30*30.0mm	0.2	48.4	全金属
TPF-F1211IR2MP	12mm	1.2	CS	1/2.″	28°5′	Φ30*30.0mm	0.2	49.5	全金属
TPF-F1611IR2MP	16mm	1.2	CS	1/2.″	23 °	Φ30*30.0mm	0.2	33.0	全金属

20.5 TP1MP Series Lens with CS-mount

Model No.	Focal Length	Aperture	Mount	Format	FOV	Dimensions	M.O.D(m)	Weight(g)	Remarks
TPF-F0412IR	4.0mm	1.2	CS	1/3″	63.8 °	Φ30*35mm	0.2	49.5	全金属
TPF-F0612IR	6.0mm	1.2	CS	1/3″	45.3 °	Φ30*33mm	0.2	45.5	全金属
TPF-F0812IR	8.0mm	1.2	CS	1/3″	34 °12’	Φ30*34mm	0.2	48.4	全金属
TPF-F1212IR	12mm	1.2	CS	1/3″	17 °42’	Φ30*32mm	0.2	33	全金属
TPF-F1612IR	16mm	1.2	CS	1/3″	17 °42’	Φ30*32mm	0.2	33	全金属
TPF-F0814IR	8mm	1.4	CS	1/3″	34 °42’	Φ30*26.5mm	0.2	33.5	全金属
TPF-F2514IR	25mm	1.4	CS	1/3″	13 °7’	Φ30*36mm	0.2	47	全金属
TPF-F1214IR	12mm	1.4	CS	1/3″	23°30’	Φ28*25.2mm	0.2	27.6	全金属
TPF-F0414IR	4.0mm	1.4	CS	1/3″	63.8 °	Φ30*30.15mm	0.2	38.5	全金属
TPF-F0614IR	6.0mm	1.4	CS	1/3″	44.5 °	Φ30*32mm	0.2	36	全金属
TPF-F1614IR	16mm	1.4	CS	1/3″	17 °1’	Φ30*32mm	0.3	36.5	全金属
TPF-F2514IR-C	25mm	1.4	C	1/2″	63.8 °	Φ30*31mm	0.2	47	全金属

21 ToupTek Machine Vision Lens

21.1 FA-A Series Machine Vision Lens (1/1.9” 6M Resolution)

21.1.1 Characteristic

- Compatible with 6M resolutions sensor
- The minimum F# is 2.8，support the maximum 1/1.9” sensor
- Super low distortion and high relative illumination
- Optimized for machine vision illumination light and sensor
- Smart structure, high seismic resistance, high and low temperature work stability
- Multilayer broadband coating ensures high transmittance and low stray light of visible and near infrared light
- Support ultra-short work distance, the different working distances are optimized to ensure the lens's optimal performance

21.1.2 Specifications (7)

Model	EFFL（mm）	F# Number	Optical Distortion	FOV			Minimum Working Distance(m)	Filter Thread	Interface
				D	H	V			
FA-A0628M-6MP	6	F2.8-F16	-1.50%	73.5 °	62.8 °	44.5 °	0.035	~	C
FA-A0828M-6MP	8	F2.8-F16	-0.96%	58.5 °	49.3 °	34.0 °	0.04	M27*0.5	C
FA-A1228M-6MP	12	F2.8-F16	-0.38%	41.2 °	34.4 °	23.4 °	0.06	M27*0.5	C
FA-A1628M-6MP	16	F2.8-F16	-0.08%	31.0 °	25.7 °	17.5 °	0.07	M27*0.5	C
FA-A2528M-6MP	25	F2.8-F16	-0.02%	19.8 °	16.3 °	10.9 °	0.15	M25.5*0.5	C
FA-A3528M-6MP	35	F2.8-F16	-0.02%	13.8 °	11.3 °	7.6 °	0.18	M27*0.5	C
FA-A5028M-6MP	50	F2.8-F16	0.11%	9.7 °	8.0 °	5.4 °	0.30	M25.5*0.5	C

21.1.3 Lens Layout

21.2 FA-B Series Machine Vision lens (2/3” 6M Resolution)

21.2.1 Lens Characteristic

- Compatible with 6M resolutions sensor
- The minimum F# is 2.0 , support the maximum 2/3” sensor
- Super low distortion to ensure high measurement accuracy
- Compact structure, can be integrated to compact apparatus
- High performance price ratio

21.2.2 Specifications (6)

Model	EFFL(mm)	F# Number	Optical Distortion	FOV			Minimum Working Distance(m)	Filter Thread	Interface
				D	H	V			
FA-B0824M-5MP	8	F2.4-F16	-2.06%	70.2 °	58.1 °	44.5 °	0.03	~	C
FA-B1220M-5MP	12	F2.0-F16	-1.01%	48.8 °	40.2 °	30.6 °	0.08	~	C
FA-B1620M-5MP	16	F2.0-F16	-0.28%	37.8 °	30.8 °	23.5 °	0.10	M27*0.5	C
FA-B2520M-5MP	25	F2.0-F16	-0.88%	23.5 °	18.8 °	14.2 °	0.15	M27*0.5	C
FA-B3520M-5MP	35	F2.0-F16	-0.09%	17.8 °	14.3 °	10.8 °	0.20	M27*0.5	C
FA-B5028M-5MP	50	F2.8-F16	0.04%	12.5 °	10.1 °	7.5 °	0.35	M27*0.5	C

21.2.3 Lens Layout

21.3 FA-C Series Machine Vision Lens(1” 10M Resolution)

21.3.1 Lens Characteristic

- Compatible with 10M resolutions sensor
- The minimum F# is 2.8 , support the maximum 1” sensor
- Super low distortion and high relative illumination
- Optimized for machine vision illumination light and sensor
- Smart structure, high seismic resistance, high and low temperature work stability
- Multilayer broadband coating ensures high transmittance and low stray light of visible and near infrared light
- Support ultra-short work distance, the different working distances are optimized to ensure the lens's optimal performance

21.3.2 Specifications(5)

Model	EFFL(mm)	F# Number	Optical Distortion	FOV			Minimum Working Distance(m)	Filter Thread	Interface
				D	H	V			
FA-C1228M-12MP	12	F2.8-F16	-1.79%	70.5 °	59.8 °	46.2 °	0.10	~	C
FA-C1628M-12MP	16	F2.8-F16	-1.30%	54.8 °	44.9 °	33.9 °	0.08	M35.5*0.5	C
FA-C2528M-12MP	25	F2.8-F16	0.40%	36.7 °	29.6 °	22.1 °	0.12	M35.5*0.5	C
FA-C3528M-12MP	35	F2.8-F16	-0.21%	26.7 °	21.4 °	15.9 °	0.18	M35.5*0.5	C
FA-C5028M-12MP	50	F2.8-F16	-0.05%	18.9 °	15.1 °	11.2 °	0.28	M35.5*0.5	C

21.3.3 Lens Layout

21.4 FA-D and FA-E Series Telecentric Lens

21.4.1 Lens Characteristic

- FA-D is compatible with 2/3” sensor， FA-E is compatible with 1/2“ sensor
- Object space telecentric design
- High resolution, high contrast and high relative illumination
- Ultra low distortion and suite for high accuracy measurement and alignment
- Standard C-mount interface

21.4.2 Specifications (18)

Model	Magnification	WD (mm)	Sensor Size	DOF (mm)	Resolution (um)	Optical Distortion	Telecentricity	F#	TTL（mm）	Max Diameter (mm)	Coaxial Illumination
FA-D-05-110	0.5	110	2/3"	2.98	12	≤0.05%	≤0.1°	9.3	120.5	35	√
FA-D-08-65	0.8	65	2/3"	1.25	8.3	≤0.10%	≤0.1°	10	89.7	26	
FA-D-08-130	0.8	130	2/3"	1.4	9.4	≤0.10%	≤0.1°	11.2	117.1	28	√
FA-D-1-65	1	65	2/3"	0.8	7.5	≤0.10%	≤0.1°	11	79.9	26	√
FA-D-1-110	1	110	2/3"	0.88	7.4	≤0.05%	≤0.1°	11	128.4	30	√
FA-D-2-65	2	65	2/3"	0.2	4.5	≤0.10%	≤0.1°	13.2	80.0	26	√
FA-D-2-110	2	110	2/3"	0.27	4.5	≤0.05%	≤0.1°	13.6	130.4	30	√
FA-D-4-110	4	110	2/3"	0.11	3.7	≤0.05%	≤0.1°	22	110.2	30	
FA-E-05-110	0.5	110	1/2"	2.9	25.4	≤0.50%	≤0.1°	18.8	46.2	16	
FA-E-05-65	0.5	65	1/2"	2	8.5	≤0.10%	≤0.1°	6.5	68.0	16	
FA-E-08-65	0.8	65	1/2"	2.9	20	≤0.10%	≤0.1°	23.9	76.0	16	√
FA-E-08-130	0.8	130	1/2"	2.9	20	≤0.10%	≤0.1°	23.5	97.1	18	√
FA-E-1-65	1	65	1/2"	1.1	10	≤0.20%	≤0.1°	14.9	80.0	16	√
FA-E-1-110	1	110	1/2"	1.5	13.2	≤0.10%	≤0.1°	19.7	109.8	18	√
FA-E-2-65	2	65	1/2"	0.33	5.6	≤0.10%	≤0.1°	16.7	80.1	16	
FA-E-2-110	2	110	1/2"	0.7	12.9	≤0.20%	≤0.1°	31.7	73.8	16	
FA-E-3-110	3	110	1/2"	0.3	7.65	≤0.10%	≤0.1°	34.2	117.1	16	√
FA-E-4-110	4	110	1/2"	0.18	6.1	≤0.10%	≤0.1°	36.3	132.5	16	√

FA-D is compatible with 2/3” sensor， FA-E is compatible with 1/2“ sensor

21.4.3 Lens Layout

TOUPTEK PHOTONICS
WE KNOW IMAGES, WE MAKE CAMERAS

COFEMO SAS
220 Traverse du Chemin de Fer
13119 St-Savournin
France
www.cofemo.fr

22 LHCCD Series Linear CCD Camera

22.1 Basic Characteristic

- Linear USB2.0 CCD camera with C-mount, f-mount, and M72x0.75 photography standards;
- 2048~3648 pixel silicon linear CCD array;
- 16-Bit A/D converter for high intensity resolution;
- External trigger capability;
- Optical integration time adjustable from 2 to 4000ms;
- Board-level camera, ideal for OEM applications;
- No external power supply required;
- High scan rate (up to 120 scans/second);
- SDK for user applications;
- Demo graphical user interface;
- Compatible to Windows XP, Vista and 7/8(32 or 64 bit);

22.2 Datasheet

Order Code	Sensor	Size(mm)	Pixel(μm)	FPS/Resolution	Binning	Exposure(ms)
LHCCD00511	ILX511 (M)	28mm	14x200	475@2048	NA	2ms~4000ms,
LHCCD00554	ILX554 (M)	28mm	14x56	475@2048	NA	2ms~4000ms
LHCCD01304	TCD1304 (M)	29.184mm	8x200	125@3648	NA	3.8ms~4000ms

OTHER HARDWARE CONFIGURATION	
Capture/Control API	SDK and Example Code
Capture Mode	Single Camera Multiple Instance and Multiple Cameras Supported
Lens Mount(Optional)	M42
Host Interface	USB2.0
SOFTWARE ENVIRONMENT	
Operating System	Microsoft® Windows® XP / Vista / 7 /8 (32 & 64 Bit)
PC Requirements	CPU: Equal to Intel Core 2 2.8GHz or Higher
	Memory:2GB or More
	USB Port:USB2.0 High-speed Port
OPERATING ENVIRONMENT	
Operating Temperature	-30~70
Storage Temperature	-40~85
Operating Humidity	30~80%RH
Storage Humidity	10~60%RH
Power Supply	DC 5V Over USB Port

23 Micro-spectrometer

ToupTek's spectrometer is applicable for spectral detection within the wavelength range between 200nm and 1100nm.

Due to their high stability and performance, these portable instruments can greatly satisfy the increasing need for their use in scientific research, industrial manufacture, and online detections and so on. The ToupSpm is capable of measuring:

- Spectral power distribution
- Absorbance, transmission
- Reflection
- Relative irradiance
- Chromaticity coordinates
- Color temperature
- Color rendering index
- Color tolerance
- Color difference
- Color purity
- Main wavelength
- Luminous flux
- Luminance
- Irradiance power
- Luminous efficiency

etc. for various kinds of samples, light sources and display devices. In addition, they can be utilized to achieve the photochromic analysis of:

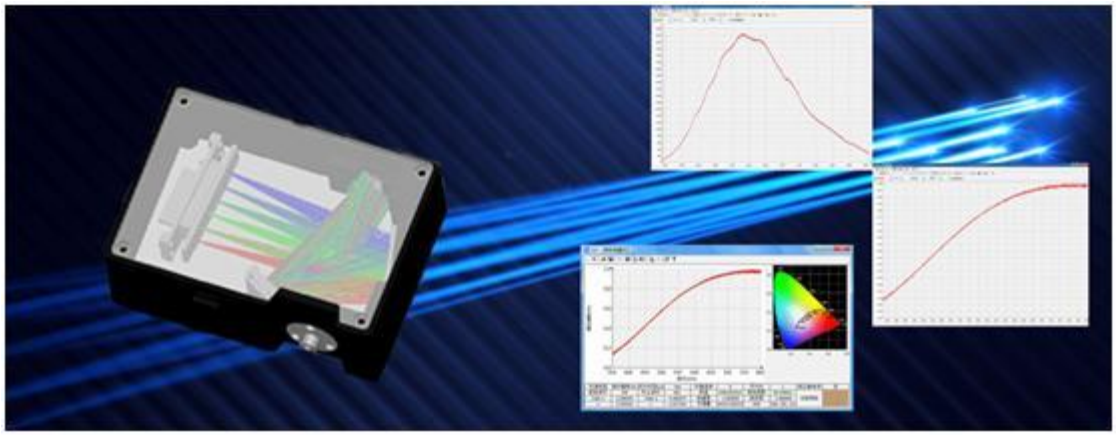
Florescence lamps

High pressure gas discharge light sources

Halogen-tungsten lamps, medical light sources

Semi-conductor lighting devices

Display devices such as CRT, LCD, PDP, ELD, and VFD



ToupSpm can offer the best solutions for spectral detections. With different system configurations and sampling accessories, ToupSpm can achieve high spectral resolution up to 0.2nm, stable wide and narrow line spectrums with different optical interfaces. Furthermore, with the easy-to-use basic operating software and high efficient SDK, users can easily produce various kinds of spectral detection systems customized to meet their own goals.

23.1 USB2000A-ILX511(P/N: TS300511)

Mechanical Parameters

Dimension(mm)	95x68.5x36
Weight (g)	210

Detector Specifications

Detector	Sony ILX511 2048 linear CCD array
Wavelength Response Range(nm)	330-1100
Active Pixels	2048
Pixel Size(um)	14x200
Saturation Exposure(lx.s)	0.004
Saturation Output Voltage	0.8V
A/D Resolution	16bit
Dark Signal Voltage(mv)	3
Sensitivity Non-uniformity	1%
Sensitivity(V/lx.s)	200

Optical Bench

Optical System	f/4, asymmetrical crossed Czerny-Turner
Focal Length(mm)	45(Input); 70(Output)
Entrance Aperture(um)	5,10,15,20,50 etc. width slits or fiber(customizable)
Grating	Various kind of scoring grating or holographic grating with different grating constants and flare wavelength(customizable)
Cylindrical Lens	Optional
Optical Filter	Band pass or long pass filters to eliminate secondary spectrum
Fiber and Fiber Connection	NA 0.22,SMA905(customizable)

Spectroscopic

Wavelength Range	Depends on optical grating
Optical Resolution (nm)	0.2-10 FWHM (Depends on grating constant, width of slit and detector model)
SNR	300:1 (Full signal)
Wavelength Tolerance (nm)	About ±0.2
Dark noise (RMS counts)	50
Integration Time	2ms-4s
Dynamic Range	267
Stray light	<0.05% at 550nm

Electronics

Power Consumption	300 mAx5 V DC
Data Transfer Speed	Full spectrum into memory every 2.4 ms at USB 2.0

Computer

Operating System	Windows / XP / Vista/7 /8 (32 and 64)
Interface	USB 2.0 (480Mbps), compatible with USB 1.1

Pre-defined System Components

Name	Customizable Parts	Remark
Slit	Width (um)	10, 20, 50, 100 .etc
Grating	Lines Per Unit (L/mm)	300, 600, 1200, 1800
	Wavelength Range(nm)	200-1100 (User defined, about 650 range with 600 lines/mm grating)
Fiber	Core Diameter (um)	9, 50, 200, 400, 600 .etc
	Wavelength Range(nm)	200-1100
	Outer Protection Layer	Normal or enhanced jacketing
	Interface Type	SMA 905 (standard) or FC, ST .etc

Detector	Model	Sony ILX511
Cylindrical Lens	Optional	Enhance system's light gathering ability

Optional Components

Name	Remark
Light Source	Used for wide range spectral measurements or wavelength calibration: for example halogen tungsten, xenon or argon light sources
Integration Sphere	Used to acquire uniform light
Reflection Measurement Accessory	Components used for reflection spectrum measurements: for example standard reflection board or specialized clamp
Transmission Measurement Accessory	Components used for transmission spectrum measurement: for example sample holder and various kinds of cuvettes

Packing List

Name	Amount
ToupTek Microspectrometer	USB2000A
Fiber with SMA 905 Interface	1
Mini USB Data Transfer Wire	1
CD of Software and SDK	1

23.2 USB2000B-ILX554(P/N: TS300554)

Mechanical Parameters

Dimensions (mm)	95×68.5×36
Weight (g)	210

Detector Specification

Detector	Sony ILX554 2048 linear CCD array
Wavelength Response Range (nm)	330-1000
Active Pixels	2048
Pixel size (μm)	14×56
Saturation Exposure(lx s)	0.004
Saturation Output Voltage	1V
A/D Resolution	16 bit
Dark Signal Voltage(mv)	3
Sensitivity Non-uniformity	1%
Sensitivity (V/lx.s)	240

Optical Bench

Optical System	f/4, asymmetrical crossed Czerny-Turner
Focal length (mm)	45 (Input); 70 (Output)
Entrance Aperture (μm)	5, 10, 15, 20, 50 etc. width slits or fiber (customizable)
Grating	Various kinds of scoring grating or holographic grating with different grating constants and flare wavelengths (customizable)
Cylindrical Lens	optional
Optical Filter	Band pass or long pass filters to eliminate secondary spectrum
Fiber and Fiber Connection	NA 0.22, SMA905 (customizable)

Spectroscopic

Wavelength Range	Depends on optical grating
Optical Resolution (nm)	0.2-10 FWHM (Depends on grating constant, width of slit and detector model)
SNR	300:1 (Full signal)
Wavelength Tolerance (nm)	About ±0.2
Dark noise (RMS counts)	50
Integration Time	2ms-4s
Dynamic Range	333
Stray Light	<0.05% at 550nm

Electronics

Power Consumption	300 mA×5 V DC
Data Transfer Speed	Full spectrum into memory every 2.4 ms at USB 2.0

Computer

Operating System	Windows /XP/Vista/7 /8(32 and 64)
Interface	USB 2.0 (480Mbps), compatible with USB 1.1

Pre-defined System Components

Name	Customizable Parts	Remark
Slit	Width (μm)	10, 20, 50, 100 .etc
Grating	Lines Per Unit (L/mm)	300, 600, 1200, 1800
	Wavelength Range(nm)	200-1100 (User defined, about 650 range with 600 lines/mm grating)
Fiber	Core Diameter (μm)	9, 50, 200, 400, 600 .etc
	Wavelength Range(nm)	200-1100
	Outer Protection Layer	Normal or enhanced jacketing
	Interface Type	SMA 905 (standard) or FC, ST .etc

Detector	Model	Sony ILX554
Cylindrical Lens	Optional	Enhance system's light gathering ability

Optional Components

Name	Remark
Light Source	Used for wide range spectral measurements or wavelength calibration: for example halogen tungsten, xenon or argon light sources
Integration Sphere	Used to acquire uniform light
Reflection Measurement Accessory	Components used for reflection spectrum measurements: for example standard reflection board or specialized clamp
Transmission Measurement Accessory	Components used for transmission spectrum measurement: for example sample holder and various kinds of cuvettes

Packing List

Name	Amount
ToupTek Micro-spectrometer	USB2000B
Fiber with SMA 905 Interface	1
Mini USB Data Transfer Wire	1
CD of Software and SDK	1

23.3 USB4000A-TCD1304(P/N: TS301304)

Mechanical Parameters

Dimensions (mm)	95×68.5×36
Weight (g)	210

Detector Specification

Detector	TCD1304AP linear CCD array
Wavelength Response Range (nm)	330-1100
Active Pixels	3648
Pixel size (μm)	8×200
Saturation Exposure（lx s）	0.004
Saturation Output Voltage	600mv
A/D Resolution	16 bit
Dark Signal Voltage（mv）	2
Photo Response non-uniformity	1%(MAX)
Sensitivity (V/lx s)	160

Optical Bench

Optical System	F/4, asymmetrical crossed Czerny-Turner
Focal length (mm)	50 (Input); 65 (Output)
Entrance Aperture (μm)	5, 10, 15, 20, 50 .etc width slits or fiber (customizable)
Grating	Various kinds of scoring grating or holographic grating with different grating constants and flare wavelengths (customizable)
Cylindrical Lens	optional
Optical Filter	Band pass or long pass filters to eliminate secondary spectrum
Fiber and Fiber Connection	NA 0.22, SMA905 (customizable)

Spectroscopic

Wavelength Range	Depends on optical grating
Optical Resolution (nm)	0.2-10 FWHM (Depends on grating constant, width of slit and detector model)
SNR	300:1 (Full signal)
Wavelength Tolerance (nm)	About ±0.2
Dark noise (RMS counts)	50
Integration Time	3.8ms-4s
Dynamic Range	300
Stray light	<0.05% at 550nm

Electronics

Power Consumption	300 mA×5 V DC
Data Transfer Speed	Full spectrum into memory every 3.6ms at USB 2.0

Computer

Operating System	Windows /XP/Vista/7 /8(32 and 64)
Interface	USB 2.0 (480Mbps), compatible with USB 1.1

Pre-defined System Components

Name	Customizable Parts	Remark
Slit	Width (μm)	10, 20, 50, 100 .etc
Grating	Lines Per Unit (L/mm)	300, 600, 1200, 1800
	Wavelength Range(nm)	200-1100 (User defined, about 650 range with 600 lines/mm grating)
Fiber	Core Diameter (μm)	9, 50, 200, 400, 600 .etc
	Wavelength Range(nm)	200-1100
	Outer Protection Layer	Normal or enhanced jacketing
	Interface Type	SMA 905 (standard) or FC, ST .etc

Detector	Model	Toshiba TCD1304
Cylindrical Lens	Optional	Enhance system's light gathering ability

Optional Components

Name	Remark
Light Source	Used for wide range spectral measurements or wavelength calibration: for example halogen tungsten, xenon or argon light sources
Integration Sphere	Used to acquire uniform light
Reflection Measurement Accessory	Components used for reflection spectrum measurements: for example standard reflection board or specialized clamp
Transmission Measurement Accessory	Components used for transmission spectrum measurement: for example sample holder and various kinds of cuvettes

Packing List

Name	Amount
ToupTek Micro-spectrometer	USB4000A
Fiber with SMA 905 Interface	1
Mini USB Data Transfer Wire	1
CD of Software and SDK	1

23.4 MAYA2000A-HAMAMATSU S9840(P/N: TS309840)

Mechanical Parameters

Dimensions (mm)	160×110×60
Weight (g)	900

Detector Specification

Detector	HAMAMATSU S9840
Wavelength Response Range (nm)	200-1100
Active Pixels	2048x14
Pixel size (μm)	14x14
Pixel well Capacity (ke-)	130
Read Out Noise (e- rms)	25
A/D Resolution	16 bit
Dark Current (pA/cm2)	40 (MAX 120)
Photo Response Non-uniformity	±3%
Sensitivity (uV/e-)	4.0

Optical Bench

Optical System	F/4, symmetrical crossed Czerny-Turner
Focal Length (mm)	98.5 (input); 98.5 (output)
Entrance Aperture (μm)	5, 10, 15, 20, 50 .etc width slits or fiber (customizable)
Grating	Various kinds of scoring grating or holographic grating with different grating constants and flare wavelengths (customizable)
Cylindrical Lens	optional
Optical Filter	Band pass or long pass filters to eliminate secondary spectrum
Fiber and Fiber Connection	NA 0.22, SMA905 (customizable)

Spectroscopic

Wavelength Range	Depends on optical grating
Optical Resolution (nm)	0.14-10 FWHM (Depends on grating constant, width of slit and detector model)
SNR	450:1 (Full signal)
Wavelength Tolerance (nm)	About ±0.2
Dark noise (RMS counts)	50
Integration Time	10μs-7.8s
Dynamic Range	2.0×108(system); 5200:1 (single acquisition)
Stray light	<0.05% at 550nm

Electronics

Power Consumption	400 mA×5 V DC
Data Transfer Speed	Full spectrum into memory every 5 ms at USB 2.0

Computer

Operating System	Windows /XP/Vista/7 /8(32 and 64 bit)
Interface	USB 2.0 (480Mbps), compatible with USB 1.1

Pre-defined System Components

Name	Customizable Parts	Remark
Slit	Width (μm)	10, 20, 50, 100 .etc
Grating	Lines Per Unit (L/mm)	300, 600, 1200, 1800
	Wavelength Range(nm)	200-1100 (User defined, about 650 range with 600 lines/mm grating)
Fiber	Core Diameter (μm)	9, 50, 200, 400, 600 .etc
	Wavelength Range(nm)	200-1100
	Outer Protection Layer	Normal or enhanced jacketing
	Interface Type	SMA 905 (standard) or FC, ST .etc

Detector	Model	HAMAMATSU S9840
Cylindrical Lens	Optional	Enhance system's light gathering ability

Optional Components

Name	Remark
Light Source	Used for wide range spectral measurements or wavelength calibration: for example halogen tungsten, xenon or argon light sources
Integration Sphere	Used to acquire uniform light
Reflection Measurement Accessory	Components used for reflection spectrum measurements: for example standard reflection board or specialized clamp
Transmission Measurement Accessory	Components used for transmission spectrum measurement: for example sample holder and various kinds of cuvettes

Packing List

Name	Amount
ToupTek Microspectrometer	MAYA2000A
Fiber with SMA 905 Interface	1
Mini USB Data Transfer Wire	1
CD of Software and SDK	1

23.5 DH-2000

The **DH-2000 Deuterium Tungsten Halogen Light Source** combines the continuous spectrum of deuterium and tungsten halogen light sources in a single optical path.

The combined-spectrum light source produces a powerful, stable output from 215-2500 nm. In addition, deep-UV versions of the light source are available, providing a 190-2500 nm wavelength range.

Options and Accessories

Integrated shutters are also available with the DH-2000 and can be driven either by a switch or by a TTL signal. Another option is to include a filter holder with the system, which accepts filters up to 4 mm in thickness and as large as 25-mm square or 20-mm round in diameter. All versions of the DH-2000 have an SMA 905 Connector for easy coupling to our spectrometers and accessories via optical fiber, and a safety shutter for blocking the light when the fiber is not attached.

Adjustable Power

All versions of the DH-2000 have a potentiometer on the back of the light source to balance the light level between the deuterium and tungsten halogen light sources. This potentiometer allows you to adjust the optical power of the tungsten halogen light from 10-100%.

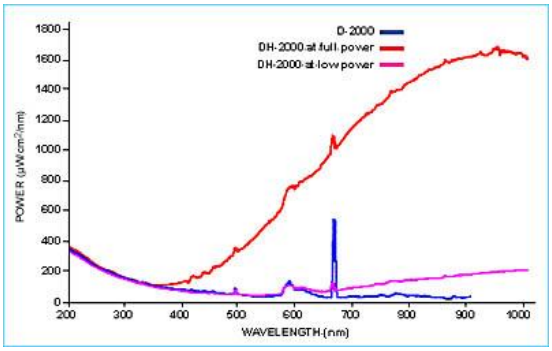
Optical Fibers

We recommend using our solarization-resistant optical fibers with all versions of the DH-2000.

DH-2000 Spectral Output

We recommend using our solarization-resistant optical fibers with all versions of the DH-2000.

This spectral output graph shows the output of the DH-2000 (red) at full power and the DH-2000 with the tungsten halogen at low power (pink), D-2000 (blue). The height of the deuterium atomic emission line depends on the optical resolution of the spectrometer.



DH-2000 Deuterium Light Source Specifications

Dimensions:	150 mm x 135 mm x 319 mm
Weight:	3.5 kg
Power Consumption:	25 W (deuterium); 20 W (tungsten halogen)
Wavelength Range:	190-2500 nm (deep-UV deuterium and tungsten halogen bulbs) 215-2500 nm (standard deuterium and tungsten halogen bulbs)
Humidity:	5-95% without condensation at 40 ℃
Lamp Current:	Operating 85 V/0.3A
Lamp Lifetime:	1,000 hours
Lamp Voltage:	Ignition 580 V @20 ℃
Current Voltage Drift:	<0.01% per hour
Current Voltage Stability:	<5 x 10-6 peak-to-peak (0.1-10.0 Hz)
Operating Temperature:	5 ℃ - 35 ℃
Power Requirements:	85-264 V 50/60 Hz
Radiation Characteristic:	Aperture 0.5 mm, numerical aperture 26 °(13 °); focused Total power: 100 W
Power Consumption:	Approximately 78VA
Warm-up Time:	40 minutes (deuterium); 20 minutes (tungsten halogen)
Markings:	CE; VDI/VDE 0160; EN 61010

23.6 LS-1-CAL-INT

Calibrated for use with integrating sphere.

The LS-1-CAL-INT is designed for calibrating the absolute spectral response of your system when using the Fiber Optic Integrating Sphere as your sampling optic. The LS-1-CAL-INT comes with a PTFE diffuser plug that fits snugly into the sample port of the Integrating Sphere to measure absolute spectral intensities of LEDs and other emission sources.

Basic Specification

Spectral Range (calibrated):	300-1050 nm (calibrated)
Power Consumption:	800 mA @ 12 VDC
Power Output:	4.85 watts
Bulb Life:	10000 hours (recommend recalibration after 50 hours of use)
Recalibration:	Required after ~50 hours of operation
Bulb Color Temperature:	2800 K
Output Regulation:	0.2% voltage
Time to Stabilized Output:	~30 minutes
Connector:	SMA 905 for fiber; 6.35-mm barrel for cosine corrector; PTFE plug for integrating sphere

24 ToupView for ToupCam Cameras

ToupView is professional software integrated with camera control, image capture & process, image browse, image measurement and analysis. ToupView is born with the following features:

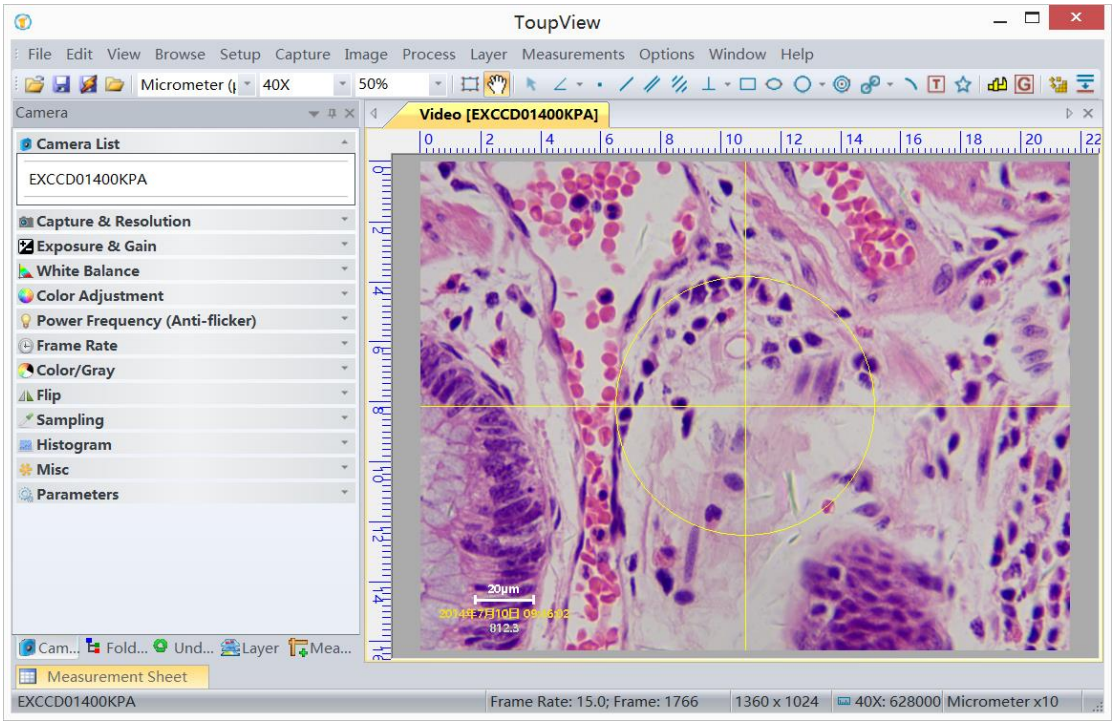
24.1 User-friendly UI design

Well-arranged menus and toolbars ensure quick operating;

The unique design of 5 sidebars -- Camera, Folders, Undo/Redo, Layer, Measurement are orderly classified;

Convenient operating method (Double click or right-click context menu) as much as possible;

Detailed help manual;



24.2 Professional Camera Control Panel

Exposure & Gain	Auto exposure (exposure target preset) and manual exposure (exposure time can be inputted manually); Up to 5 times gain;
White Balance	Advanced single-click intelligent white balance setting, temperature and tint can be manually adjusted;
Color Adjustment	Hue, saturation, brightness, contrast, gamma initialization adjustment;
Frame Rate Control	Adjustment of frame rate available for different computer configurations;
Power Frequency Setting(Anti-filcker)	Natural light/DC, AC 50 HZ, AC60 HZ switch function thoroughly eliminates video flicker;
Flip	Check the “horizontal” or “vertical” option to correct the sample direction;
Skip and bin sampling	Bin mode can obtain low noise video stream; Skip mode obtains sharper and smoother video stream. Support video stream histogram extension, Negative and positive switching, Gray calibration, Clarity factor for focusing etc.
Parameters	Load, save, overwrite, import, export self-defined parameters of camera control panel (including calibration information, exposure and color setting information);

24.3 Practical functions with good results

Video functions	Various professional functions : Video broadcast; Time lapse capture; Video record; Video watermark; Move watermark; Rotate watermark; Video stream grid; Video measurement; Video calibration, Gray calibration; Video EDF; Image stitch; Video scale bar, date and etc.;

Image Processing and Enhancement	Control and adjust image by contrast, denoise, all kinds of filtering algorithm and mathematical morphology algorithm; image rotate, image scale, image print;
2D Measurement	Easy video or image calibration. Various video and image measurement methods like area, perimeter, angle etc.. Measurement results can be hierarchical controlled according to characteristics or preferences;
Image Stitching	Image stitching can automatically combine a sequence of relevant images into a perfect larger one. No requirement on the image order； Support video window, image window, browse window image stitching operation.
EDF(Extended Depth of Focus)	Aimed at generating a clearer image by combining a sequence of previously captured multi-focus images; Support video window, image window, browse window EDF operation. Provided with maximum contrast, weighted average, FFDSSD algorithms to meet with most applications. Consider image shift, rotation and scale in the EDF process to guarantee EDF accuracy & speed；
Professional Segmentation & Count function	Integrate the advanced 6 image segmentation and particle counting algorithm (Watershed (W), OTSU Dark, OTSU Bright, RGB Histogram, HSV Histogram and Color Cube). Manual segmentation function (Split objects) ensures the success of a complete segmentation. The count result can be exported to Microsoft Excel for further analysis;
Image Stacking	Image stacking adopts advanced image matching technology. With the recorded video, regardless of shifting, rotation, scaling, the high fidelity image can be stacked to decrease the image noise.
Color Composite	Color composite adds appropriate pseudo color to monochrome fluorescence images. Fluorescence probe and color can be chosen from the pre-defined database. Dye database can also be easily created for special fluorescence probe.

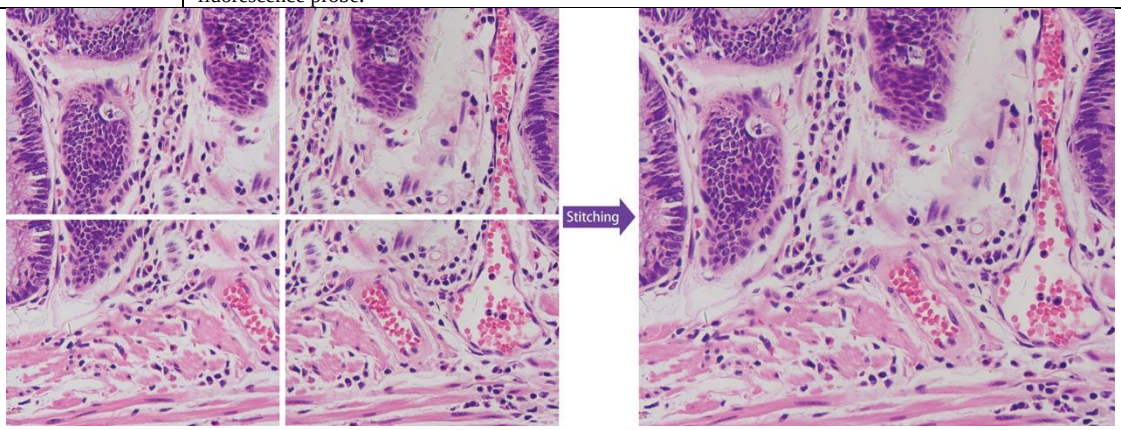


Image Stitching

EDF(Extended Depth of Focus)

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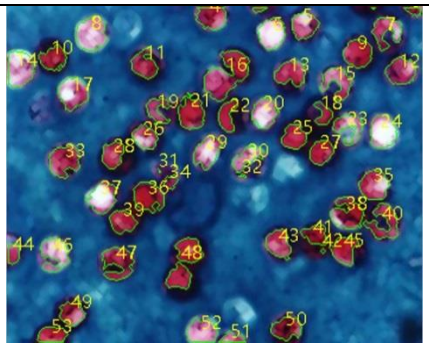


Image Segmentation & Count

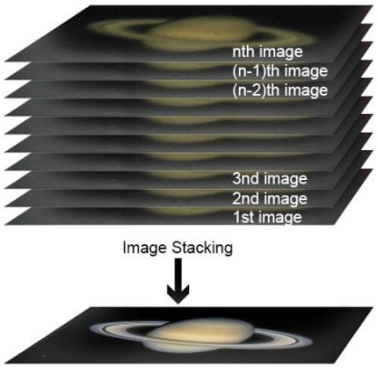
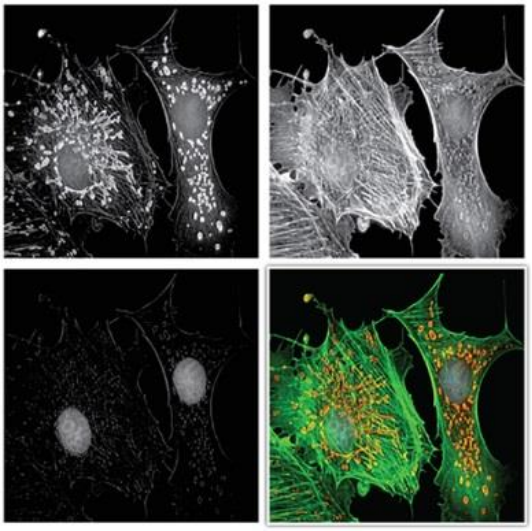


Image Stacking



Fluorescence image Color Composite

24.4 Powerful compatibility

Video Interface	Support Twain, DirectShow, Labview, SDK Package（Native C++、C#）
Operating System	Compatible with Microsoft® Windows® XP / Vista / 7 / 8 /10 (32 & 64 bit), Mac OSX, Linux
Language Support	Unlimited language support, currently available in Simplified Chinese, Traditional Chinese, English, Russian, German, French, Polish and Turkish

24.5 Hardware Requirement

PC Requirements	CPU: Intel Core 2 2.8GHz or Higher
	Memory:2GB or more
	USB port:USB2.0 or USB3.0 port
	Display:17” or Larger
	CD-ROM