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

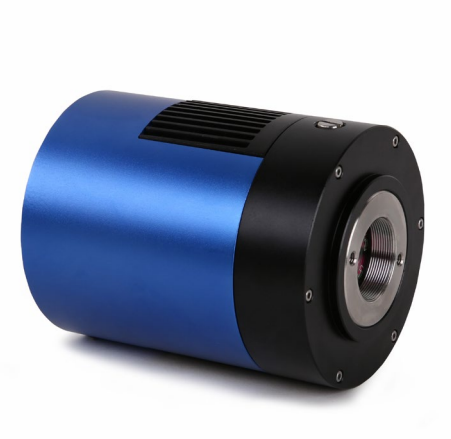
MTR3CMOS camera adopts SONY Exmor CMOS sensor as the image-picking device and USB3.0 is used as the transfer interface to increase the frame rate.

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 1.7M to 45M;
- 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;

9.1.2 MTR3CMOS Datasheet(13)

Order Code	Sensor & Size(mm)	Pixel(μm)	G Sensitivity Dark Signal	FPS/Resolution	Binning	Exposure
MTR3CMOS45000KMA MTRM145000A (New) 20200118	45M/IMX492(M) 4/3 "(17. 47x12. 86)	2.315 x2.315	TBD	8@8192x5556 10@8192x4320 9@7408x5556	1x1 1x1 1x1	0.1ms~3600s
MTR3CMOS26000KPA MTRP126000A 2020年3月份量产	26M/IMX571(C) 1.8 "(23.48x15. 67) APS-C	3.76 x3.76	485mv with 1/30s 0.07mv with 1/30s	14@6224x4168(16bit) 37@3104x2084 110@2064x1388	1x1 2x2 3x3	0.1ms~3600s
MTR3CMOS09000KPA MTRP109000A 2020年3月份量产	9M/IMX533(C) 1 "(11. 28x11. 28)	3.76 x3.76	534mv with 1/30s 0.1mv with 1/30s	42@3000x3000(14bit) 126@1500x1500 188@1000x1000	1x1 2x2 3x3	0.1ms~3600s
MTR3CMOS21000KPA MTRP121000A 20190910	21M/IMX269(C) 4/3 "(17. 4x13. 1)	3.3 x3.3	400mv with 1/30s 0.1mv with 1/30s	5@5280x3956 6@3952x3952 15@2640x1978 50@1760x1318 100@584x440	1x1 1x1 2x2 3x3 9x9	0.1ms~3600s
MTR3CMOS20000KPA MTRP120000A	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	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	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	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	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 8.5 @4096x2160 30@2048x1080 60@1360x720	1x1, 1x1, 2x2, 3x3	0.15ms~3600s
MTR3CMOS07100KPA MTRP107100A	7. 0M/IMX428(C，GS) 1.1 "(14. 4x9. 9)	4. 5 x4. 5	2058mv with 1/30s 0. 15mv with 1/30s	12@3200x2200 33@1600x1100	1x1 1x1	0.1ms~3600s
MTR3CMOS07100KMA MTRM107100A	7. 0M/IMX428(M，GS) 1.1 "(14. 4x9. 9)	4. 5 x4. 5	3354mv with 1/30s 0.15mv with 1/30s	51@3200x2200 133@1600x1100	1x1 2x2	0.1ms~3600s
MTR3CMOS01700KPA MTRP101700A	1.7M/IMX432(C，GS) 1.1 "(14. 4x9. 9)	9.0 x9.0	4910mv with 1/30s 0.3mv with 1/30s	33@1600x1100	1x1	0.1ms~3600s
MTR3CMOS01700KMA MTRM101700A	1.7M/IMX432(M，GS) 1.1 "(14. 4x9. 9)	9.0 x9.0	8100mv with 1/30s 0.3mv with 1/30s	94@1600x1100	1x1	0.1ms~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 SDK	Windows/Linux/macOS/Android Multiple Platform SDK(Native C/C++, C#/VB.NET, Python, Java, DirectShow, Twain, etc)
Recording System	Still Picture and Movie
Cooling System*	Two-stage TE-cooling System -45 °C below Camera Body Temperature

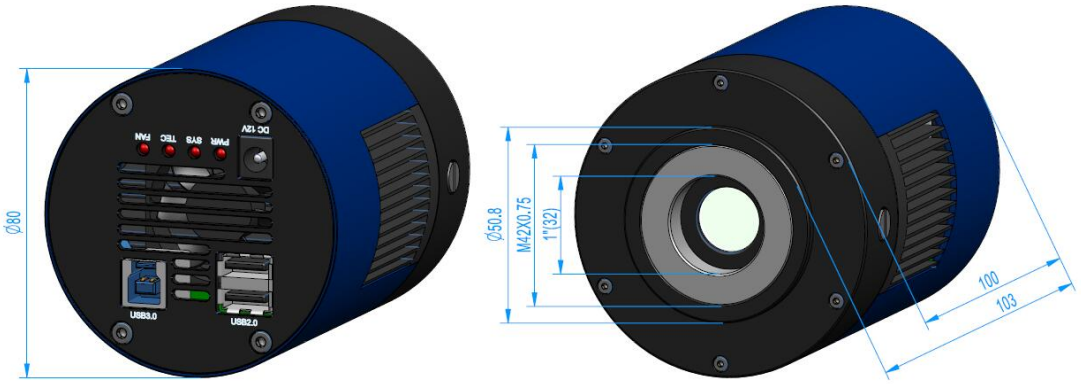
Operating Environment

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

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.



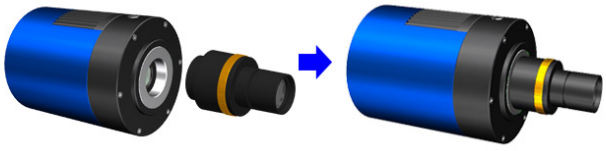
Dimension of MTR3CMOS

9.1.4 Packing Information for MTR3CMOS Camera

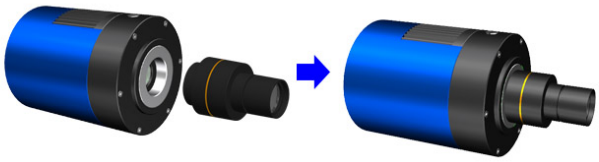
Packing Information of MTR3CMOS Camera

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

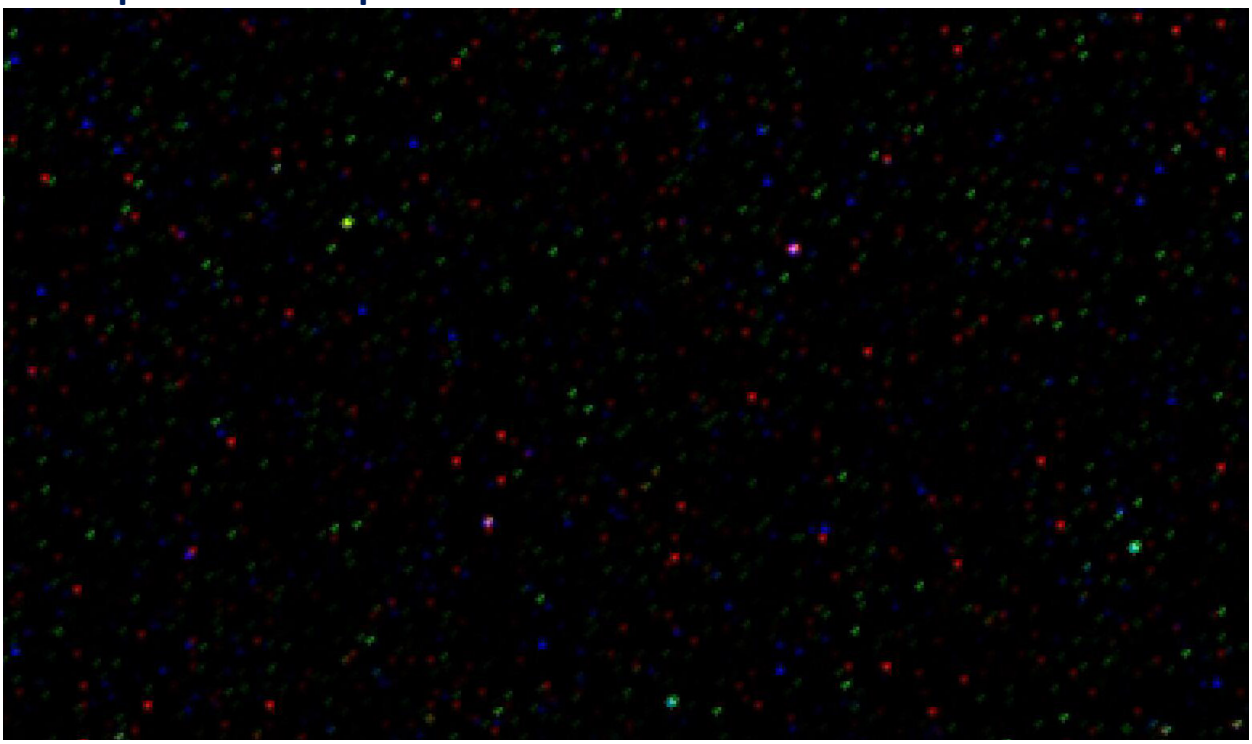


MTR3CMOS+AMAXXX(23.2mm Adapter)

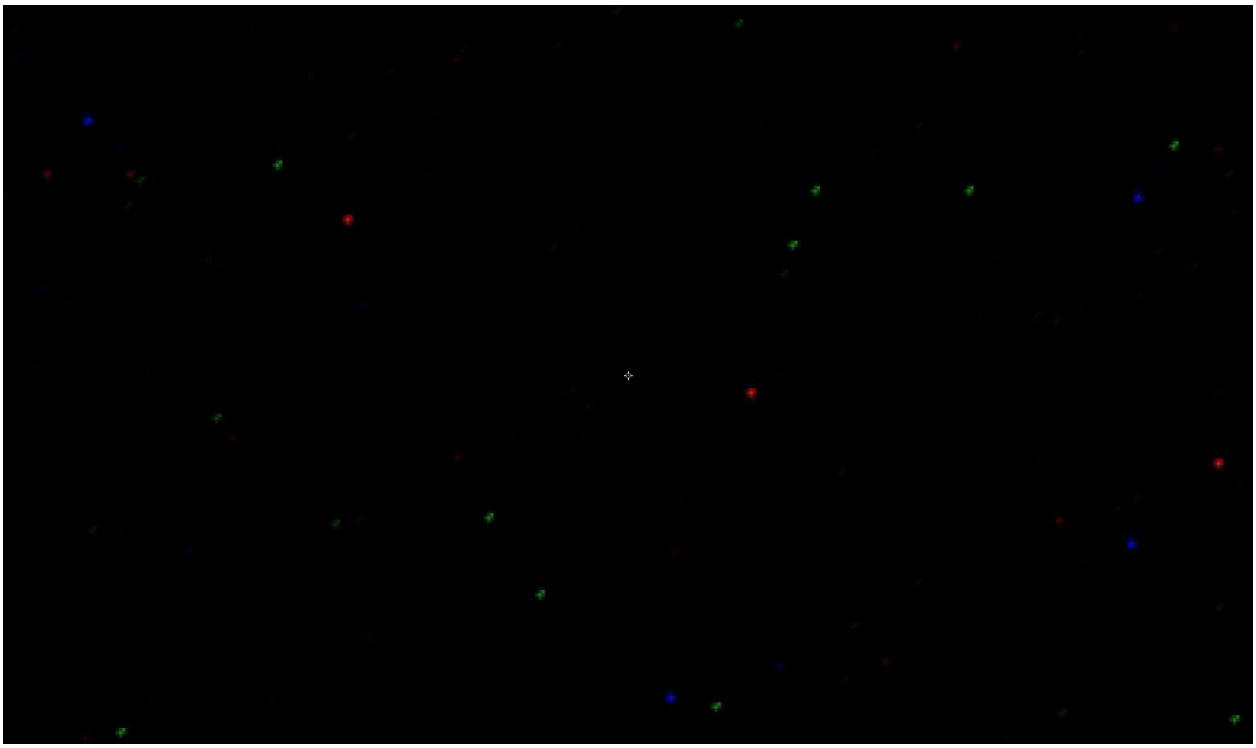


MTR3CMOS+FMAXXX(23.2mm Adapter)

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