oCam-5CRO-U-M™

User Manual





2019. 7.

WITHROBOT Inc.

Revision History

Rev	Date	Description	Author
1.0	2019. 7	1 st Release	PD



Note

This product is for indoor use only. Severe electrostatic stress can damage the product.

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1. INTRODUCTION

Features

oCam-5CRO-U-M is a 5 mega pixel color camera with the following features.

- Interface: USB3.0 SuperSpeed at maximum frame rates of 15 FPS @2592 × 1944, 30 FPS
 @1920 × 1080, 45 FPS @1280 × 960, 60 FPS @1280 × 720, 90 FPS @640 × 480, 120 FPS
 @320 × 240
- Easy Installation: With UVC 1.1 support, no additional driver needs to be installed for Windows and Linux.
- Versatility: Supports wide range of standard M12 lenses with a lens replaceable structure.

External View









USB 3.0 Connector

Additional Technical Information

Further technical information is available at

"https://github.com/withrobot/oCam/tree/master/Products/oCam-5CRO-U-M".

> 0 0 0 0 0 0						
→ C 1	ic. [US] https://github.com/withrobot/o	Cam/tree/master/Pr	oducts/ Q	. ф		
Search or jump to	7 Pull requests Issues Ma	rketplace Explore			 -	+- 🕤
withrobot / oCam		•	Watch • 13	★ Star	34 💡 Fo	ork 29
Code 🕕 Issues 18 👘 Pull r	equests 0 🔳 Projects 0 💷 Wiki 🌒	Security 🛄 Insight	ts			
oCam / Products	s / oCam-5CRO-U-M /		Create new file	Upload files	Find file	History
zeropk Update README.md			L	atest commit 91	bezd9c 22 h	ours ago
) README.md	Update README.md				22 hc	ours ago
README.md						
Model No. oCam-5CF	USB 3.0 Color Came RO-U-M - [sales website]	ra				
Model No. oCam-5CR	USB 3.0 Color Came RO-U-M - [sales website]	ra				
OCam - SIMP Model No. oCam-5CR	USB 3.0 Color Came RO-U-M - [sales website]	ra	ith focal lengthing through the	h of 3.6mm. he CPU. It rec	duces the	

Figure 3. Technical Information Site

2. SPECIFICATIONS

Camera Specifications

ltem	Value
Image Sensor	OmniVision OV5640 CMOS Image Sensor, 1/4 inches
Interface	USB 3.0 SuperSpeed
Resolutions	USB 3.0 2592 (H) x 1944 (V) pixels @15, 7.5, 3.75 fps 1920 (H) x 1080 (V) pixels @30, 15, 7.5 fps 1280 (H) x 960 (V) pixels @45, 30, 15 fps 1280 (H) x 720 (V) pixels @60, 30, 15 fps 640 (H) x 480 (V) pixels @90, 60, 30 fps 320 (H) x 240 (V) pixels @120, 100, 90, 60, 30 fps USB 2.0 2592 (H) x 1944 (V) pixels @3.75 fps 1920 (H) x 1080 (V) pixels @7.5 fps 1280 (H) x 960 (V) pixels @15 fps 1280 (H) x 720 (V) pixels @15 fps 640 (H) x 480 (V) pixels @60, 30 fps 320 (H) x 240 (V) pixels @60, 30 fps 320 (H) x 240 (V) pixels @120, 100, 90, 60, 30 fps
Image Format	YUV Color
Shutter	Rolling Shutter
Camera Control	 Brightness Contrast Hue Saturation Exposure
Lens	• Standard M12, Replaceable
Supported OS	Windows 7 / 10, Linux
Power	• USB Bus Power, DC 5V / 180mA

Operating Temperature	• 0°C ~ + 70°C
Field Of View(FOV)	• 50°(V) x 92.8°(H) x 110°(D) (Default Bundle Lens)
Weight	• Approx. 27grams (including protective case)
PCB Size	• 39mm x 39mm
Case Size	• 49mm x 51mm x 20mm

Table	1	Camera	Sp	ecification	s
Table	۰.	Camera	JP	Centerion	2

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Board Dimensions



Figure 4. Board Size (unit: mm)

Case Dimensions





* 51mm with tripod mounting adapter

3. HOW TO USE ON WINDOWS SYSTEM

Connection to Windows PC

Connect the USB cable to the USB port of the computer. You can use both of the USB 2.0 and USB 3.0 cables for oCam-5CRO-U-M.



Figure 6. USB 2.0 Cable (Left) and USB 3.0 Cable (Right)



Figure 7. USB 2.0 Cable Connected (Left) and USB 3.0 Cable Connected (Right)

After the camera is detected, the computer will show a message that the camera is connected. To check if the camera is connected successfully, open the device manager and check if the oCam-5CRO-U-M appears correctly as shown below.

· · · · · · · · · · · · · · · · · · ·	_	×
파일(F) 동작(A) 보기(V) 도움말(H)		
▼ 1 ● DBI PE > ● Bluetooth > ● IDE ATA/ATAPI 컨트롤러 > ● IDE ATA/ATAPI 컨트롤러 > ● IDE ATA/ATAPI 컨트롤러 > ● US8 커넥터 관리자 > ● US8 커넥터 관리자 > ● US8 커넥터 관리자 > ● IDE ATA/ATAPI 컨트롤러 > ● US8 커넥터 관리자 > ● US8 커넥터 관리자 > ● US8 커넥터 관리자 > ● UAB 프리아이 앤터 > ● UAB 직접 바스 컨트롤러 > ● 방용 직접 바스 컨트롤러 > ● 방용 직접 바스 컨트롤러 > ● 보안 장치 > ● 소프트웨어 장치 > ● 소프트웨어 장치 > ● 소프트웨어 장치 > ● 소프트웨어 장치 > ● ATIV Real HD Camera ● Ccam-SCRO-U-M > ● 컴퓨터 > ● 커미라 ● 전용 직업 > ● 코르섹서 > ● 코르섹서 > ● 프로네서		

Figure 8. Connection Check on Device Manager (This example is for Windows 10)

Viewing the Camera Image

- The oCamViewer is camera image viewing program that support all the oCam cameras from the WITHROBOT Inc.
- Full source code of the oCamViewer is available at the following site:

https://github.com/withrobot/oCam/tree/master/Software

• On starting the oCamViewer, the main window will appear as shown below with "USB3" or "USB2" depending on the type of USB cable connected.

😺 oCamViewer 2	0190613		×
CamO 🗸	Model : oCam-5CRO-U-M	SN_2E8ED001 USB3	
Cam Ctrl	F₩ : Jun_14_2019_15:56	:39 FPS : 0	
W 2592 Play	H 1944 Stop Save	2592 ×1944 3.75fps √ Image Exit]

Figure 9. Main Window of the oCamViewer for Windows(USB 3.0)

😧 oCamViewer 2	_		×		
CamO 🗸	Model : oCam-5	CRO-U-M SN_	2E8ED001	USB2	
Cam Ctrl	F₩ : Jun_14_20	19_15:56:39	FPS	: 0	
₩ 2592	H 1944	2	592 ×1944	3.75fps	~
Play	Stop	Save Image		Exit	

Figure 10. Main Window of the oCamViewer for Windows(USB 2.0)

• Select the resolution and the fps on the dropdown list.

😧 oCamViewer 2	0190613		_		×
CamO 🗸	Model : oCam-5CRO-U-M	SN_2E8E	D001	USB3	
Cam Ctrl	FW : Jun_14_2019_15:56	:39	FPS	: 0	
₩ 2592 Play	H 1944 Stop Save	2592 2592 2592 1920 1920 1920 1280 1280 1280 1280 1280 1280 1280 640 640 640 320 320 320 320	x1944 x1944 x1944 x1080 x1080 x1080 x960 x960 x960 x960 x960 x960 x480 x480 x480 x480 x480 x240 x240 x240 x240 x240	3.75fps 3.75fps 7.50fps 15fps 7.50fps 30fps 30fps 45fps 30fps 30fps 30fps 60fps 30fps 30fps 90fps 30fps 100fps 120fps	



😧 oCamViewer 2	20190613	_		×
CamO 🗸	Model : oCam-5CRO-U-M	SN_2E8ED001	USB2	
Cam Ctrl	F₩ : Jun_14_2019_15:56:	:39 FPS	: 0	
₩ 2592	H 1944	2592 ×1944	3.75fps	~
Play	Stop Save I	1920 ×1944 1920 ×1080 1280 × 960 1280 × 720	3.751ps 7.50fps 15fps 15fps	
		640 × 480 640 × 480 320 × 240 320 × 240	30fps 60fps 30fps 60fps	
		320 × 240 320 × 240 320 × 240 320 × 240	90fps 100fps 120fps	

Figure 12. Resolution Selection on the oCamViewer (USB2.0)

• Click the [Play] button.

- To change the resolution/fps, click the [Stop] button first and then select one on the dropdown list, and then click the [Play] button.
- To check or change the camera parameters, click the [Cam Ctrl] button while the camera is being displayed to open the control window. Use the slide bar to change a parameter.

CamCtrl			×
Brightness	0		
Contrast	4		
Hue	6		
Saturation	4		
Exposure	-11=0.5ms		
Gain	0	I	
₩B Blue	0		
₩B Red	0		
-Color corre	ection (oCa	m-1CGN, oCam-18CRN only)	
Set de	fault	Reset Color c	orrection
₩DR On (oCam-2WRS-c	only) IR On (oCam-4	RO-only)

Figure 13. Control Window of the oCamViewer for Windows

- To stop viewing the camera image, click the [Stop] button on the main window.
- To terminate the oCamViewer, click the [Exit] button on the main window.

4. HOW TO USE ON LINUX SYSTEM

Connection to Linux PC

Checking the Connection

Connect the USB cable to the USB port of the computer. You can use both of the USB 2.0 and USB 3.0 cables for oCam-5CRO-U-M.

To check the connection, use the following command. With USB3.0 connection, ID value of 04b4:00f9 should appear and with USB2.0 connection, ID value of 00f8 should appear.

\$ 1susb Bus 004 Device 026: ID 04b4:00f9 Cypress Semiconductor Corp.

Viewing the Camera Image

(1) Viewing the Camera Image with the oCamViewer

- The oCamViewer is camera image viewing program that support all the oCam cameras from the WITHROBOT Inc.
- Full source code of the oCamViewer is available at the following site:

https://github.com/withrobot/oCam/tree/master/Software

• On starting the oCamViewer, the main window will appear as shown below.

😣 🖨 💿 oCam Viewer	
Device [/dev/video0[oCam-5CRO-U-M(SN_2E8ED001)] ‡ Refresh Connect	Formats Controls Miscellaneous

Figure 14. Main Window of the oCamViewer for Linux

• Select the oCam-5CRO-U-M in the "Device" list. On clicking the [Connect] button, the camera image will appear.

	oCam-5CRO-U-M 1920 x 1080 (YUYV) 30 fps
Device	Formats Controls Miscellaneous
ev/video0 [oCam-5CRO-U-M (SN_2E8ED001)] 🛟 Refresh	
Disconnect	

Figure 15. Main Window of the oCamViewer for Linux (Camera Connected)

• To change the resolution/fps, select "Format" on the right panel and select one on the dropdown list, and then click the [Apply] button at the bottom.

Device //dev/video0[oCam-SCRO-U-M (SN_2EBED001)] : Refresh Disconnect //dev/video0[oCam-SCRO-U-M (SN_2EBED001)] : Refresh //dev/video0[oCam-SCRO-U-M (SN_2EBED001]] : Refresh	😣 🖻 💷 oCam Viewer	0Cam-5CDO-LLM 1280 v 720 (VLVVI) 61 for
/dev/video0[oCam-SCRO-U-M (SN_2E8ED001)] : Refresh Disconnect (YUYV 4:2:2) 1280 x 720 15 fps 1280 x 720 30 fps 1280 x 960 30 fps 1280 x 960 30 fps 1280 x 960 30 fps 1280 x 1080 15 fps 1920 x 1080 15 fps 2592 x 1944 7.5 fps 2592 x 1944 7.5 fps 320 x 240 100 fps 320 x 240 0 fps 640 x 480 30 fps 640 x 480 90 fps 640 x 480 90 fps<!--</th--><th>Device</th><th>Formats Controls Miscellaneous</th>	Device	Formats Controls Miscellaneous
Disconnect • OGam-5CRO-U-M 1280 x 720 (YUYV) • VUYV 4:2:2 1280 x 720 30 fps 1280 x 720 30 fps 1280 x 720 60 fps 1280 x 720 15 fps 1280 x 720 30 fps 1280 x 720 30 fps 1280 x 720 40 fps 1280 x 720 15 fps 1280 x 720 40 fps 1280 x 720 1080 7.5 fps 1292 x 1080 15 fps	/dev/video0 [oCam-5CRO-U-M (SN_2E8ED001)] 🔅 Refresh	
▼ YUYV 4:2:2 1280 x 720 15 fps 1280 x 720 60 fps 1280 x 720 60 fps 1280 x 960 15 fps 1280 x 960 30 fps 1280 x 960 15 fps 1280 x 960 30 fps 1280 x 960 30 fps 1280 x 960 15 fps 1280 x 240 120 fps	Disconnect	oCam-5CRO-U-M 1280 x 720 (YUYV)
1280 x 720 15 fps 1280 x 720 30 fps 1280 x 960 15 fps 1280 x 960 30 fps 1280 x 960 30 fps 1280 x 960 45 fps 1280 x 960 65 fps 1280 x 960 fps 1280 x 960 fps		▼ YUYV 4:2:2
(Apply		1280 x 720 15 fps 1280 x 720 30 fps 1280 x 720 30 fps 1280 x 960 15 fps 1280 x 960 30 fps 1280 x 960 30 fps 1280 x 960 45 fps 1920 x 1080 30 fps 1920 x 1080 7.5 fps 2592 x 1944 15 fps 2592 x 1944 7.5 fps 2592 x 1944 7.5 fps 320 x 240 100 fps 320 x 240 100 fps 320 x 240 30 fps 320 x 240 30 fps 320 x 240 90 fps 640 x 480 30 fps 640 x 480 90 fps
		Apply

Figure 16. Resolution Selection on the oCamViewer

• To change the camera parameters, change each parameter by moving the slide bar in the "Controls" panel.

😣 🖨 💷 oCam Viewer	
	oCam-5CRO-U-M 1280 x 720 (YUYV) 59 fps
Device	Formats Controls Miscellaneous
/dev/video0 [oCam-5CRO-U-M (SN_2E8ED001)] 🛟 Refresh	
Disconnect	
	Brightness
	þ 🕽 -4 🗕 4
	Contrast
	Exposure (Absolute)
THE OWNER WATER OF TAXABLE PARTY.	Hue
	6 0 11
	Saturation
Contraction of the second seco	4 0 8
Show RGB color (oCam-1CGN-U only)	
and the color (ocall redit o only)	

Figure 17. Brightness Control

• To disconnect the camera, click [Disconnect] button on the left panel.

🛞 🖨 💷 oCam Viewer	
	oCam-5CRO-U-M 1280 x 720 (YUYV) 56 fps
Device	Formats Controls Miscellaneous
/dev/video0 [oCam-5CRO-U-M (SN_2E8ED001)] 🛟 Refresh	
Disconnect	oCam-5CRO-U-M 1280 x 720 (YUYV)
	▶ YUYV 4:2:2

Figure 18. Camera Disconnection.

5. NOTES

- With the oCam-5CRO-U-M, you can adjust the focus by rotating the lens by hand.
 Therefore, in a vibrating environment, the lens can be loosened by being rotated by itself.
 To prevent this, it is recommended to lock the lens by using the supplied lens lock ring after you finish adjusting the focus.
- To change the lens, you need to loosen the lock ring first before you take out the lens from the holder.
- Excessive exposure will reduce the frame rate as it extends the frame interval time.

APPENDIX

Specifications of the Bundle M12Lens



Specifications

USE : The lens is intended for use in 1/2.9", 1/2.7" C-MOS camera.

Focal Length	3.6mm ±5%
Relative Aperture	2.0
Image Size	1/2.9" 1/2.7"
	1/2.9" : 50°(V) X 92.8°(H) X 110°(D)
Angle Of View	1/2.7" : 59°(V) X 103°(H) X 125°(D)
Back Focal Length	6.17mm ±5%
Flange Back Length	5.4mm ±0.2mm
Lens Length	15.6mm ±0.3mm
TTL	21.0mm ±0.4mm
MTF on-axis(at 50 lp/mm)	87.5%
0.7F (at 50 lp/mm)	86.2%(R), 78.4%(T)
Relative Illumination	44.5%(Full image circle)
Flange Type	M12 * P0.5
Head Size	¢ 15.0
Operating Temperature Range	-20°C ~ +70°C , Under RH 90%
Storage Temperature Range	-25°C ~ +85°C , Under RH 99%
Lens Construction	4G [All Glass]
	With Ir Cut Filter(650nm)

Specifications of the Onboard M12 Lens Holder



How to Update the Camera Firmware

• The latest camera firmware is available at the following site.

https://github.com/withrobot/oCam/tree/master/Firmware

• The firmware update software (UpdateFW.exe) is available at the following site.

https://github.com/withrobot/oCam/tree/master/Firmware/Update FW

• The instruction to use the UpdateFW.exe is available at the following site.

https://github.com/withrobot/oCamS/tree/master/Firmware

• The oCamViewer source code is available at the following site.

https://github.com/withrobot/oCam/tree/master/Software

Technical Support

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