oCam-5CRO-U-M™

User Manual

2019. 7.

WITHROBOT Inc.

Revision History

Rev	Date	Description	Author
1.0	2019. 7	1st 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

Figure 1. External View

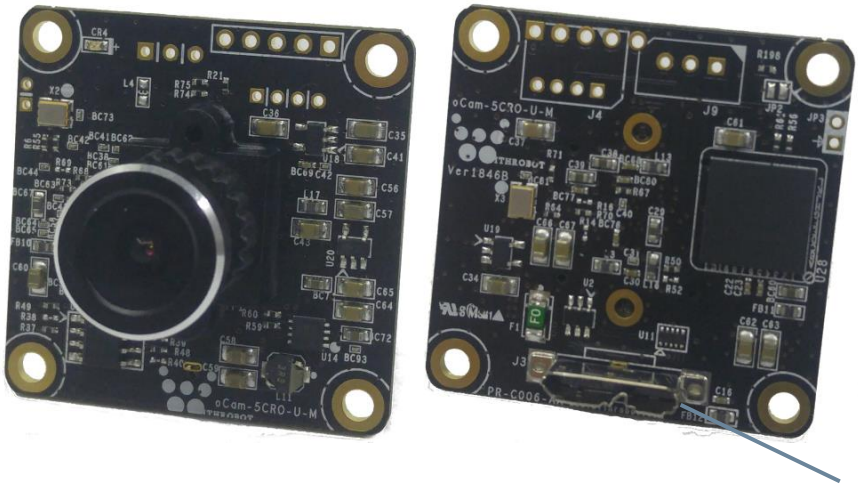

Figure 2. Camera Board

Additional Technical Information

Further technical information is available at

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

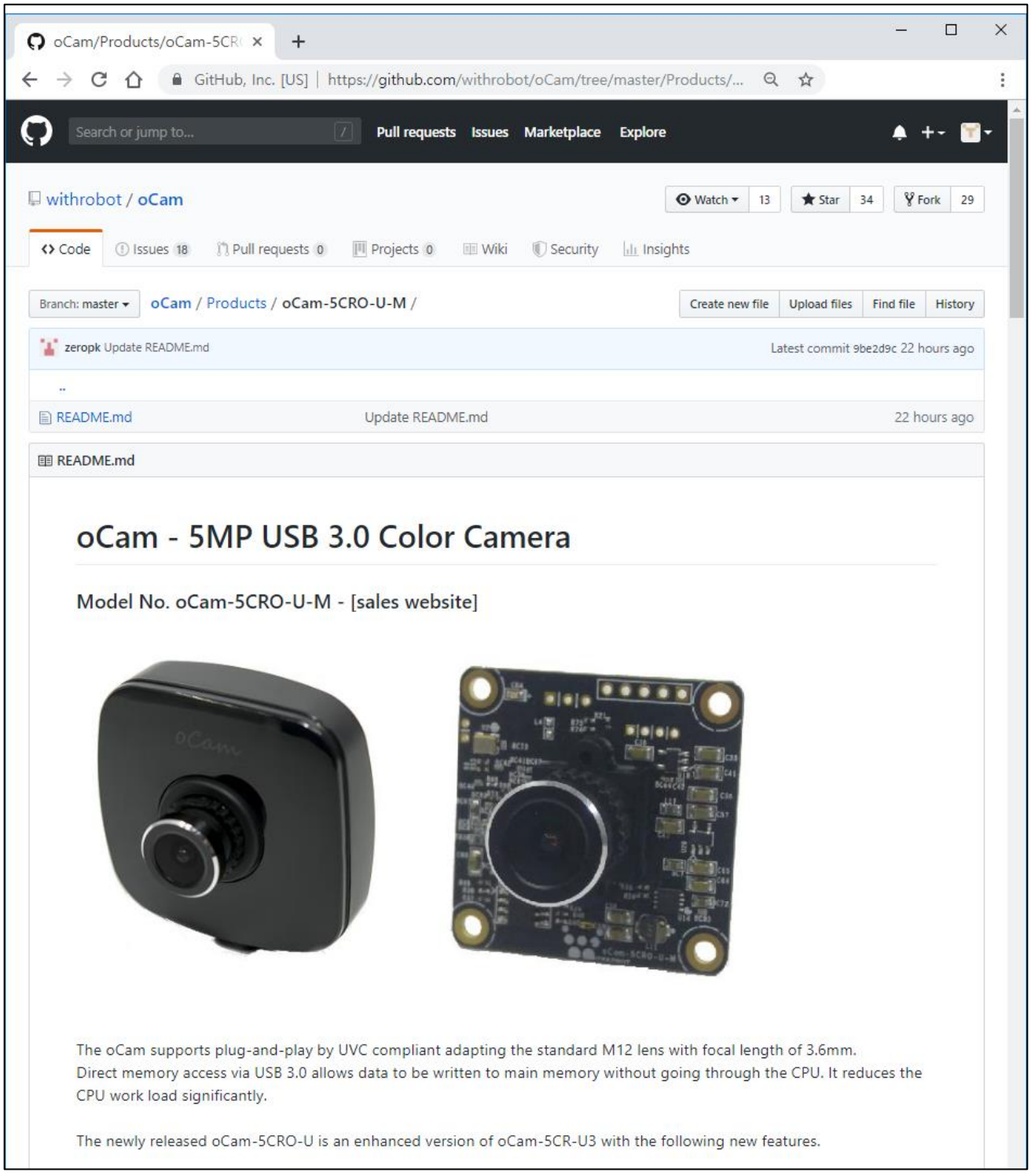

Figure 3. Technical Information Site

2. SPECIFICATIONS

Camera Specifications

Item	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 @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 Specifications

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Board Dimensions

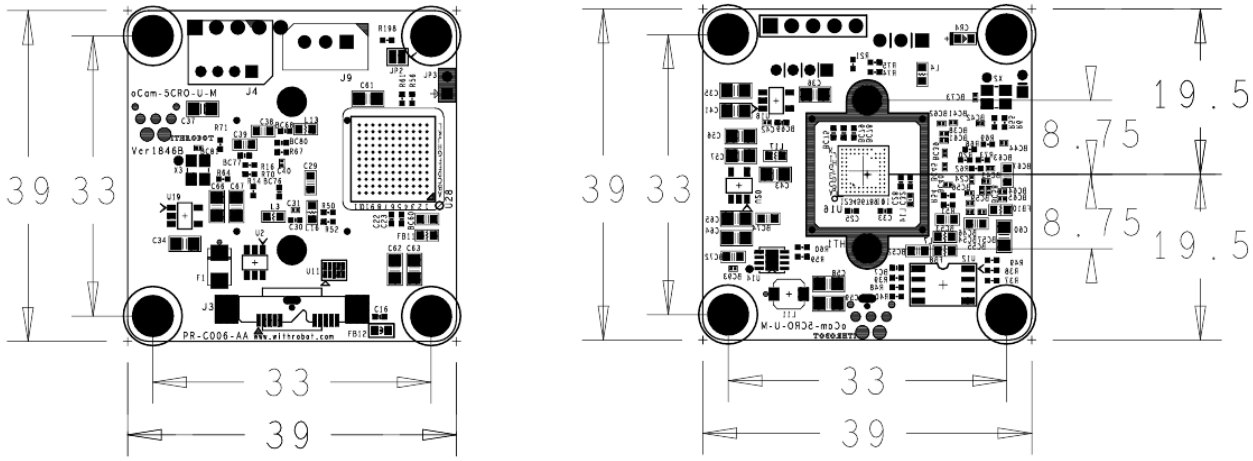


Figure 4. Board Size (unit: mm)

Case Dimensions

Figure 5. Case Size (unit: mm)

* 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.

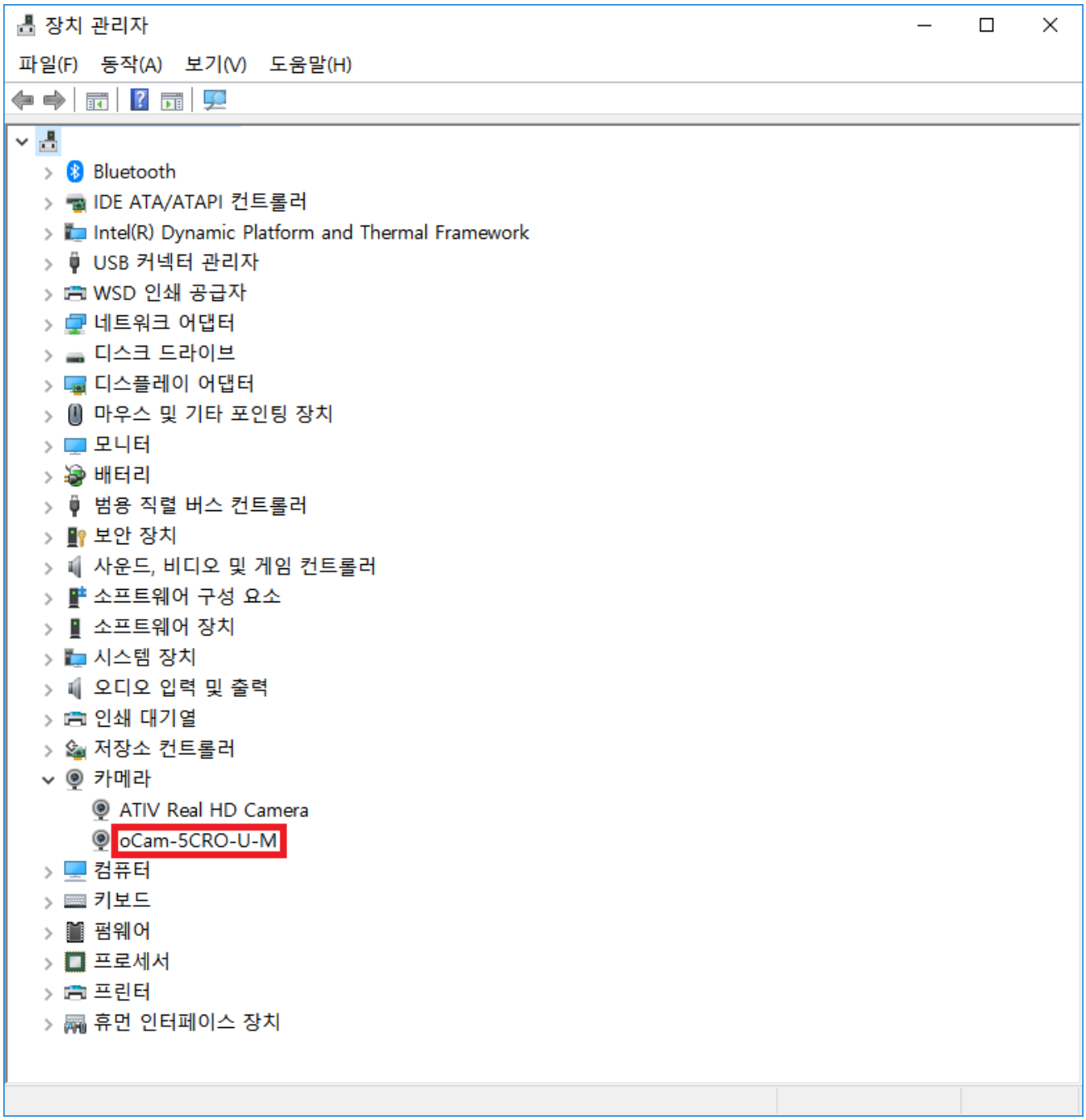


Figure 8. Connection Check on Device Manager (This example is for Windows 10)

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.

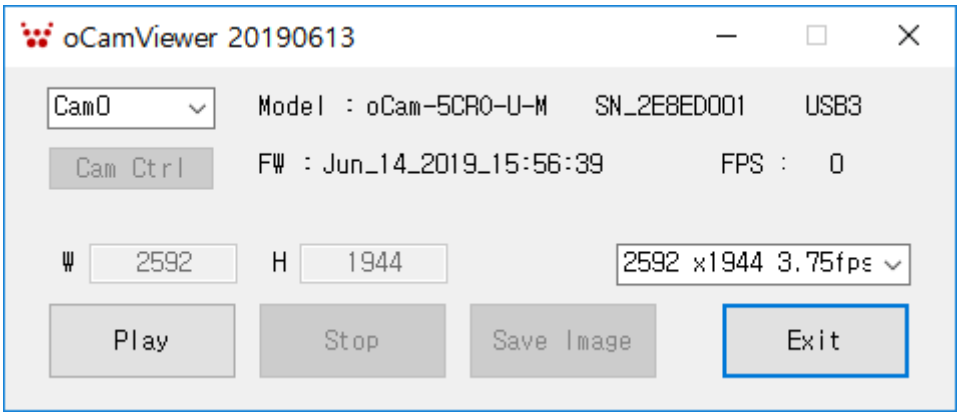


Figure 9. Main Window of the oCamViewer for Windows(USB 3.0)

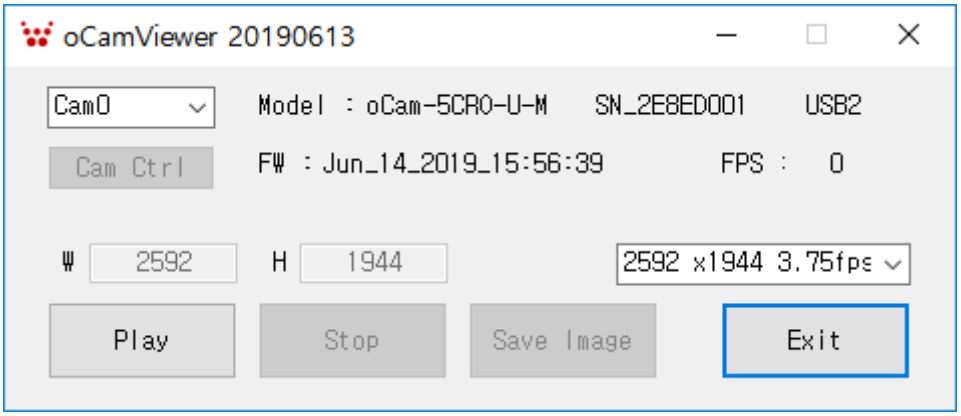


Figure 10. Main Window of the oCamViewer for Windows(USB 2.0)

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

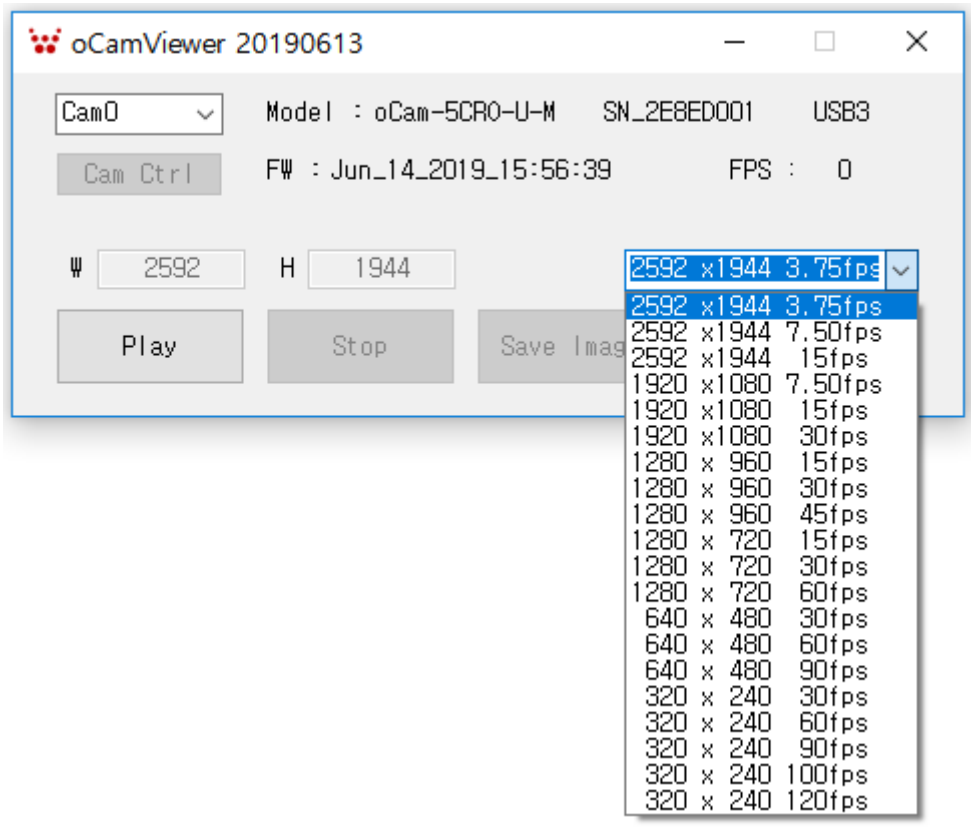


Figure 11. Resolution Selection on the oCamViewer (USB3.0)

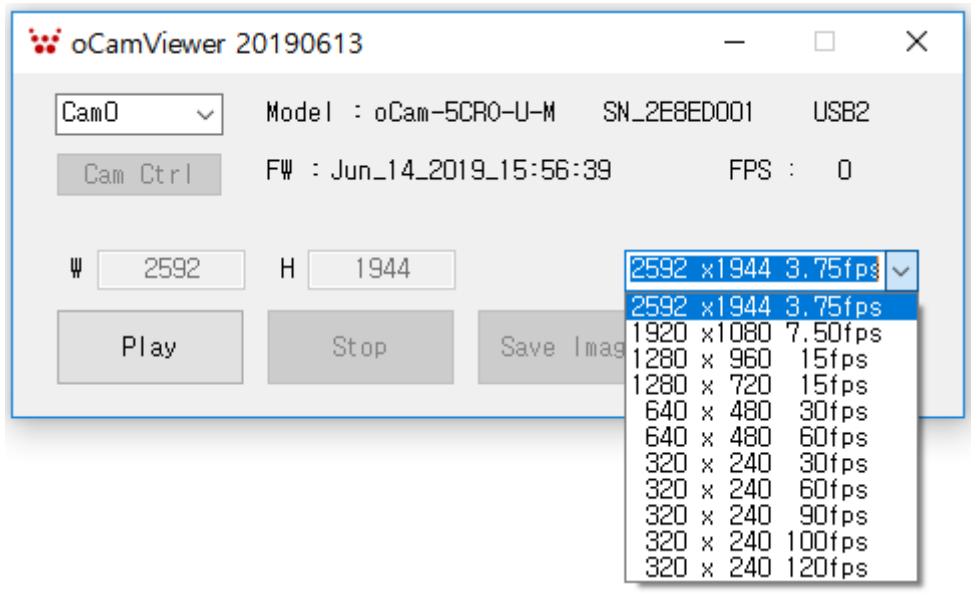


Figure 12. Resolution Selection on the oCamViewer (USB2.0)

- 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.

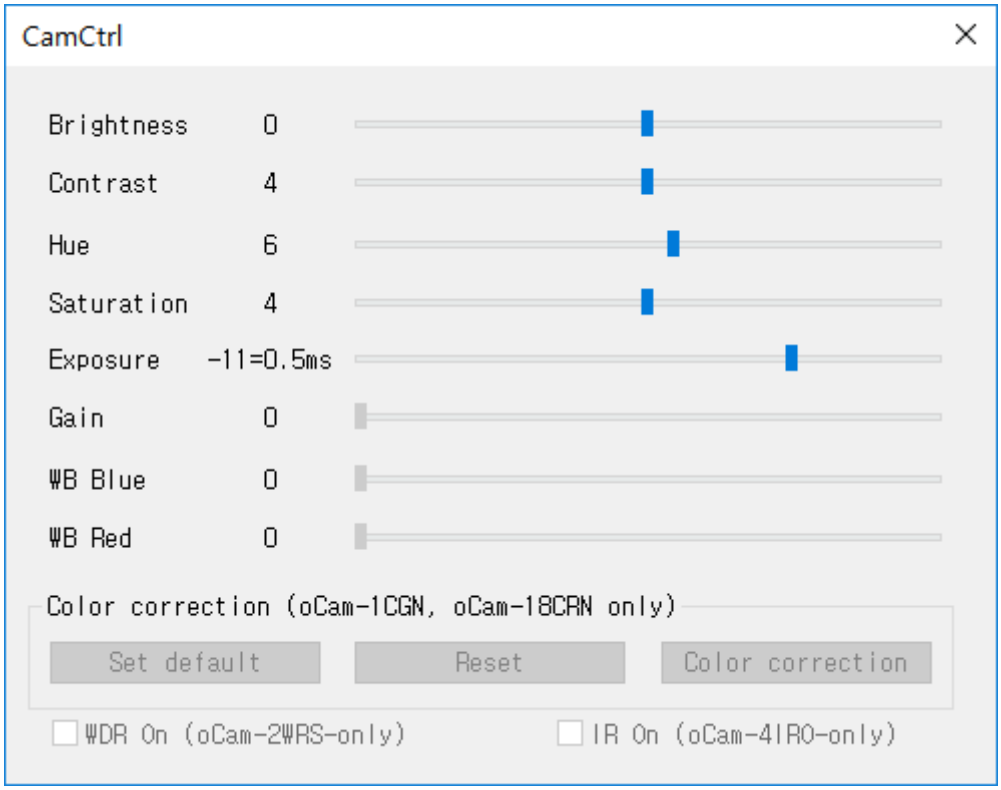


Figure 13. Control Window of the oCamViewer for Windows

- 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.

```
$ lsusb
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.

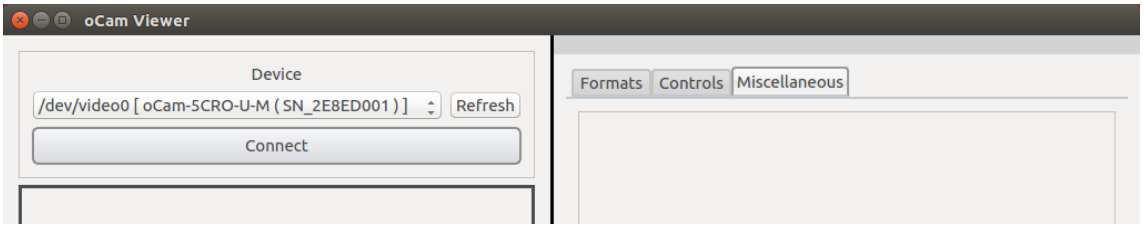


Figure 14. Main Window of the oCamViewer for Linux

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

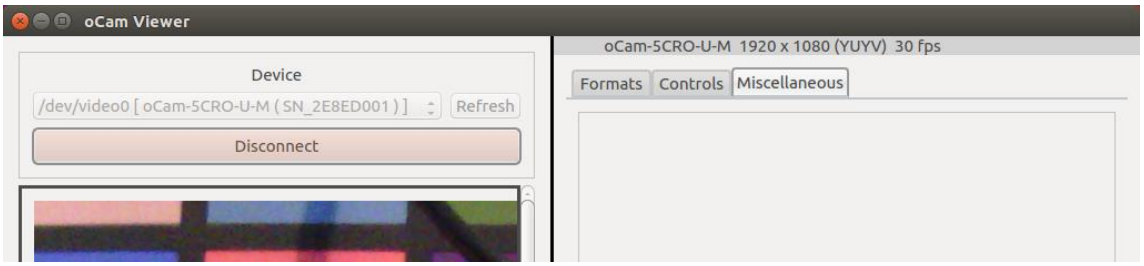


Figure 15. Main Window of the oCamViewer for Linux (Camera Connected)

- 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.

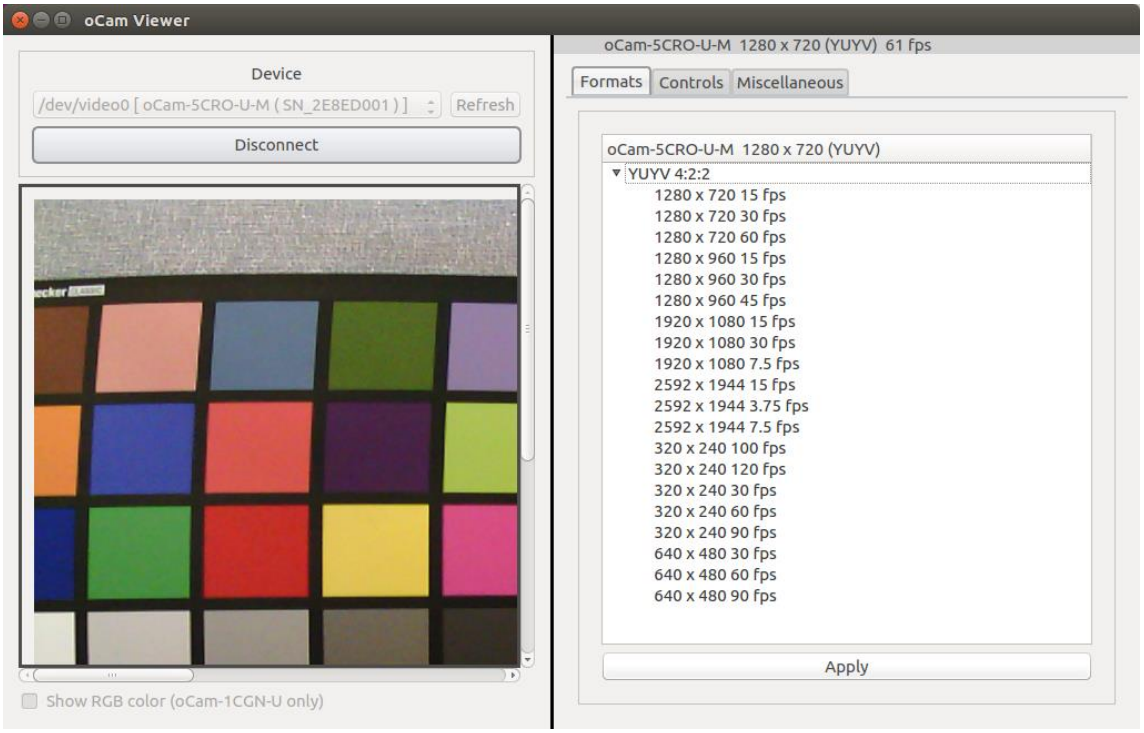


Figure 16. Resolution Selection on the oCamViewer

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

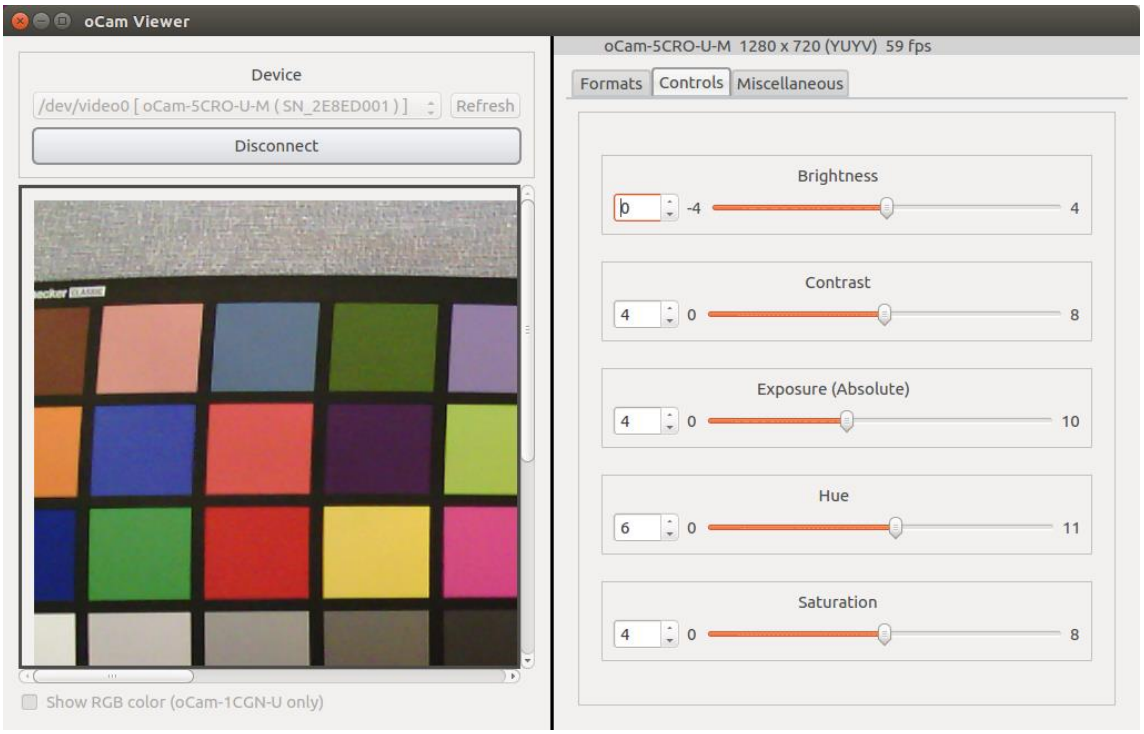


Figure 17. Brightness Control

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

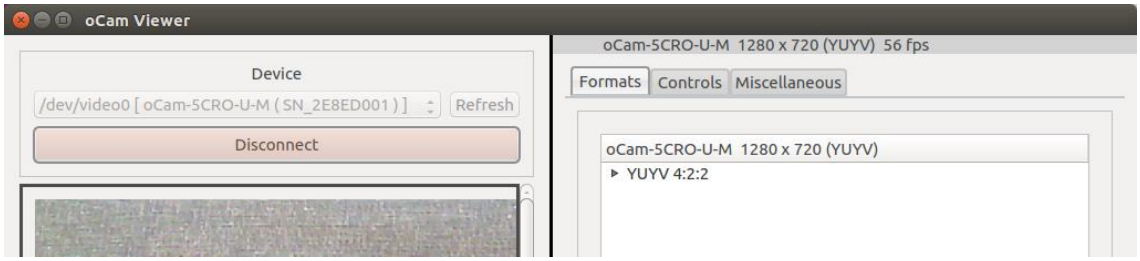


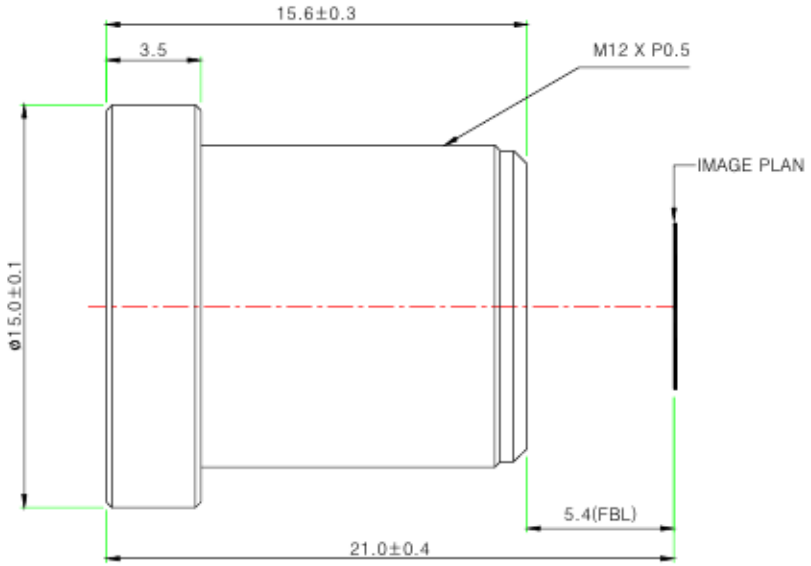
Figure 18. Camera Disconnection.

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

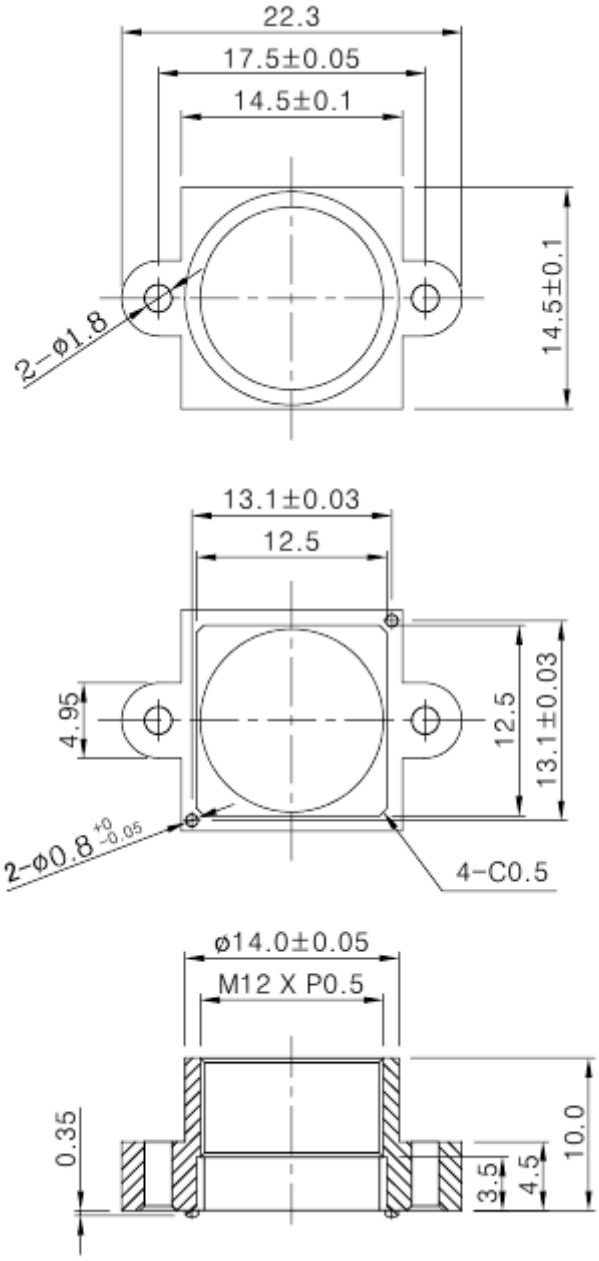


Specifications

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℃ ~ +70℃ , Under RH 90%
Storage Temperature Range	-25℃ ~ +85℃ , 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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