oCam-2WRS-U™

User Manual

2019. 4.

WITHROBOT Inc.

Revision History

Rev	Date	Description	Author
1.0	2019. 4	1st Release	PD

Note

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

CONTENST

1. INTRODUCTION

Features

oCam-2WRS-U is a Full HD color camera using IMX290 image sensor from Sony with the following features.

- WDR(Wide Dynamic Range): It provides clear image for a scene with wide dynamic range where exist very bright parts and very dark parts at the same time.
- Dedicated ISP(Image Signal Processor): It provides excellent color quality and high sensitivity under low light condition.
- Interface: USB3.0 SuperSpeed
- 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.

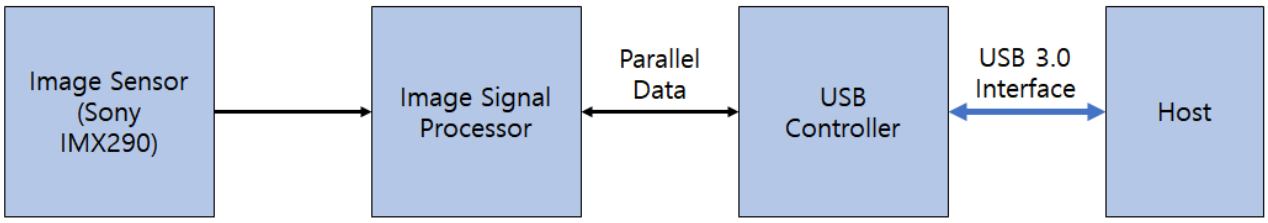


Figure 1. Internal Structure

External View

Figure 2. External View – Front and Back

Figure 3. External View – Bottom View

Additional Technical Information

Further technical information including the latest firmware and example source codes are available at "https://github.com/withrobot/oCam/tree/master/Products/oCam-2WRS-U".

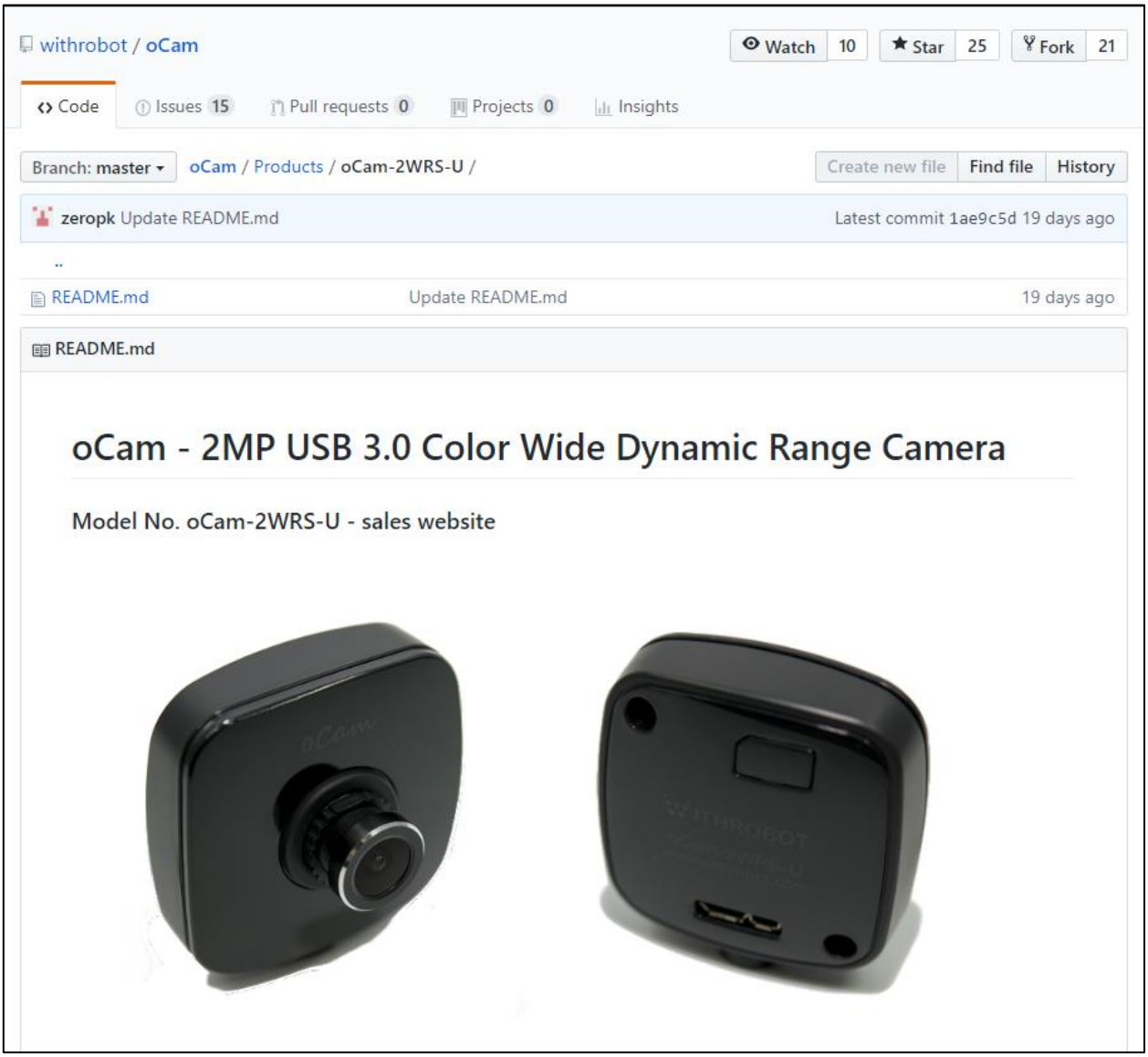


Figure 4. Technical Information Site

2. SPECIFICATIONS

Camera Specifications

Item	Value
Image Sensor	• Sony IMX290 CMOS Image Sensor, 1/2.8 inches
Interface	• USB 3.0 SuperSpeed
Resolutions	• 30 fps @1920 x 1080 • 15 fps @1920 x 1080
Shutter	• Rolling Shutter
Camera Control	• WDR On/Off • Brightness • Auto Exposure On/Off
Lens	• Standard M12, Replaceable
Supported OS	• Windows 10 (64 bit), Linux
Power	• USB Bus Power, DC 5V / 250mA
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

Board Dimensions

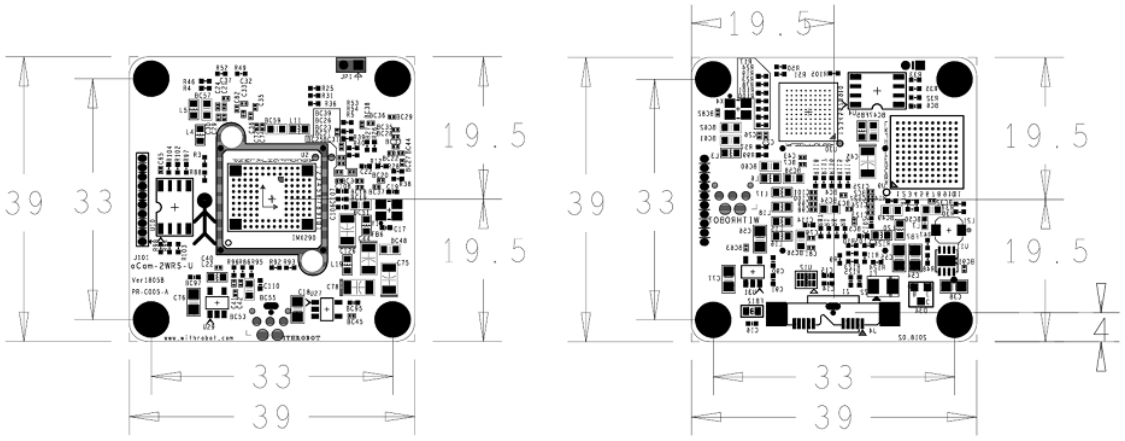


Figure 5. Board Size (unit: mm)

Case Dimensions

Figure 6. 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. 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-2WRS-U appears correctly as shown below.

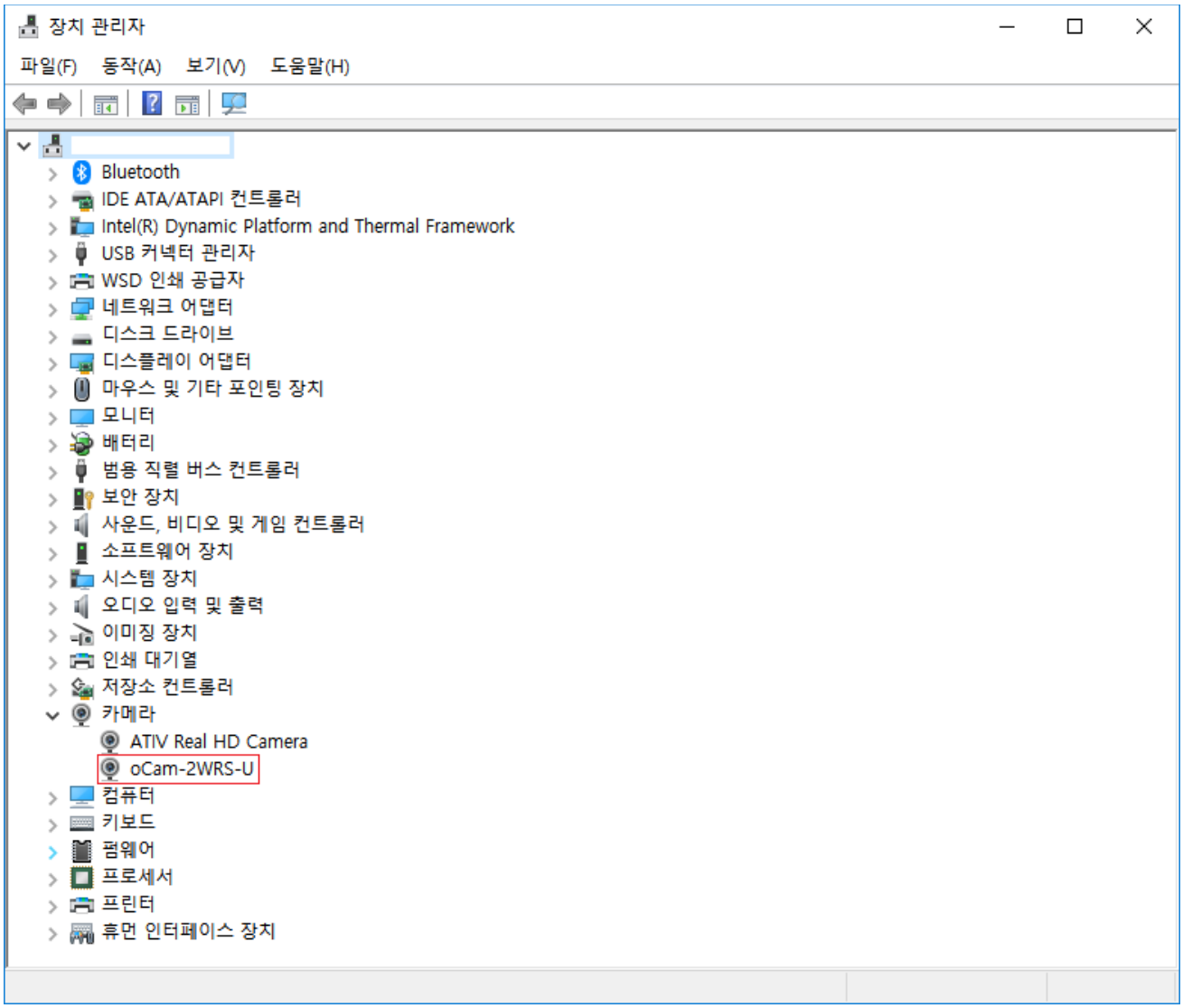


Figure 7. Connection Check on Device Manager (This example is fo Windows 10)

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.

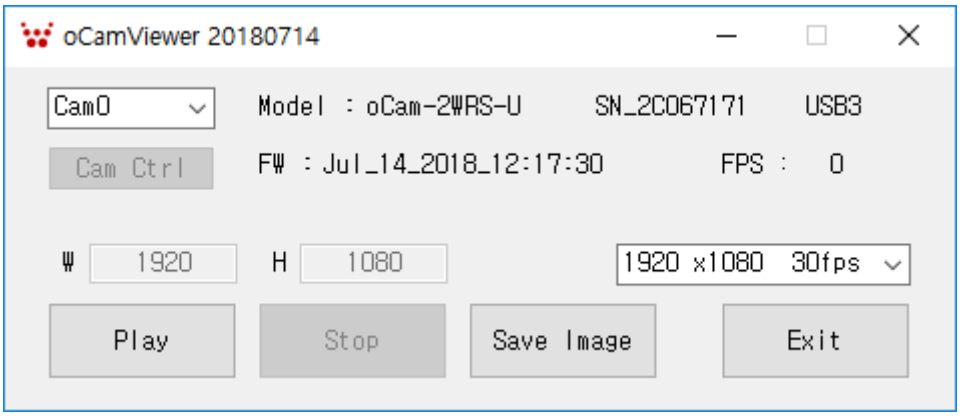


Figure 8. Main Window of the oCamViewer for Windows

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

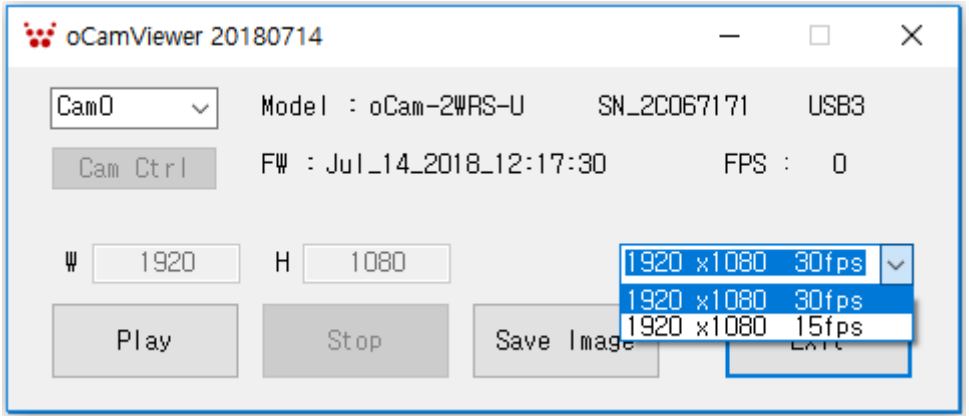


Figure 9. Resolution Selection on the oCamViewer

- 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.

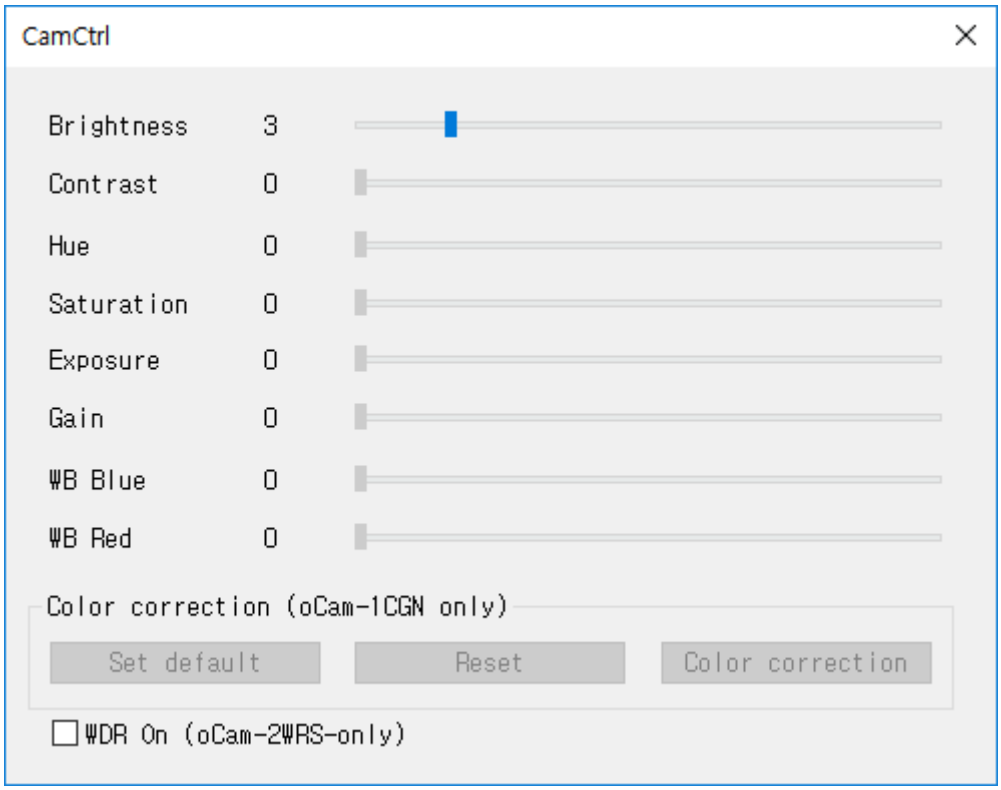


Figure 10. Control Window of the oCamViewer for Windows

- Brightness can be changed in the 1 ~ 19 range by controlling the camera exposure time. Therefor, higher brightness can cause more blurring on the image.
- Auto Exposure is turned on by setting the brightness to be 0.
- Auto Exposure is turned off when the brightness is higher than 0.
- WDR (Wide Dynamic Range) is turned on and off by checking the [Cam Ctrl] button in the Control Window while the camera image is being displayed (refer the "WDR Sample Image" in the appendix)
  - With WDR turned on, brightness control is disabled.
  - On turning off the WDR, the previous brightness is restored.
  - On starting the oCamViewer, the previous WDR setting is restored. If WDR was on, WDR will be automatically turned on when the oCamViewer starts.

- On power resetting the camera, either by disconnect-reconnect the camera or power resetting the computer, the WDR setting is restored to the default value of "Off".

- 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

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.

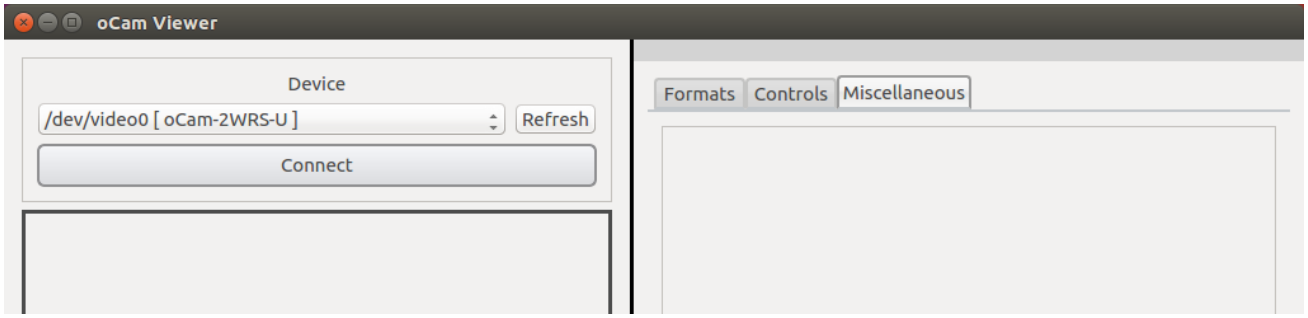


Figure 11. Main Window of the oCamViewer for Linux

- Select the oCam-2WRS-U in the "Device" list. On clicking the [Connect] button, the camera image will appear.

- 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.

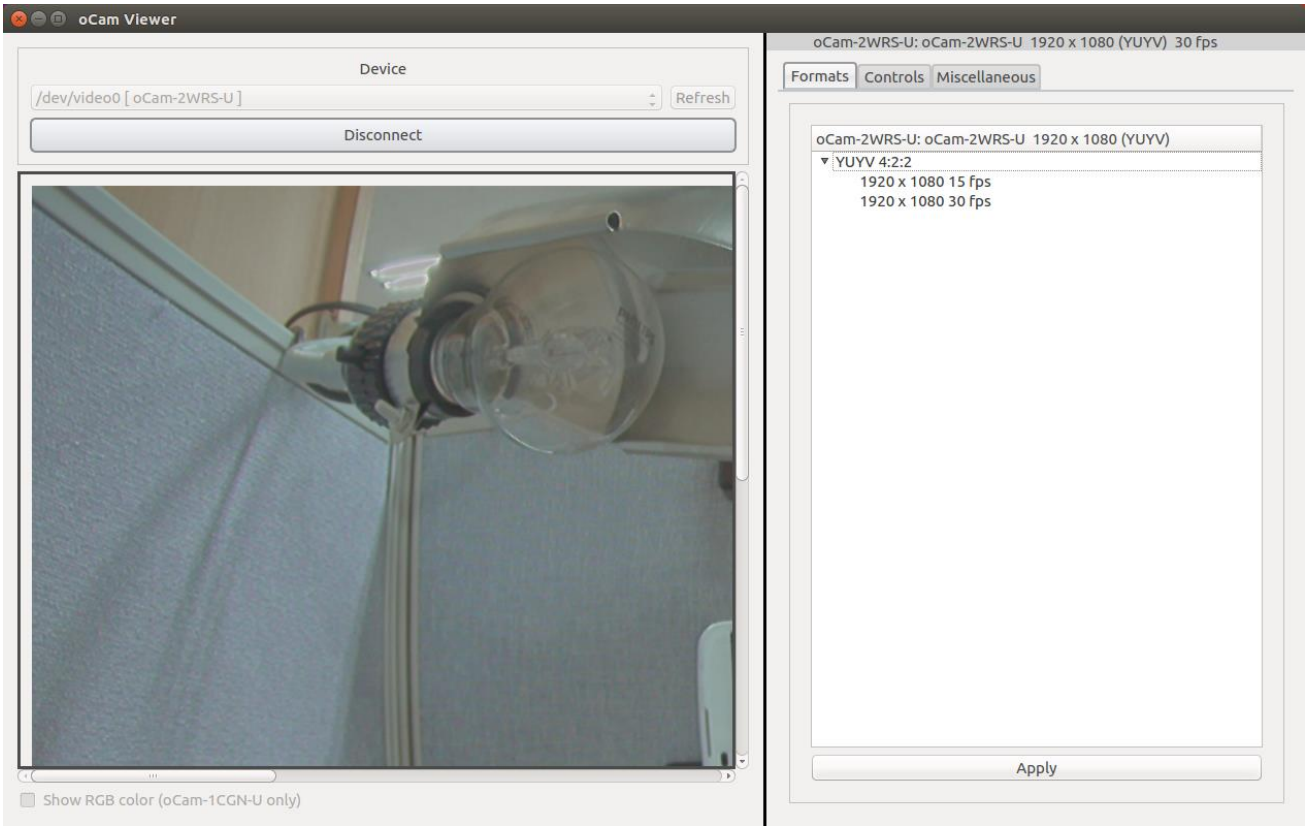


Figure 12. Resolution Selection on the oCamViewer

- To turn on and off the WDR (Wide Dynamic Range), select “0” (WDR Off) or “1”(WDR On) under the “Backlight Compensation” in the “Controls” panel.

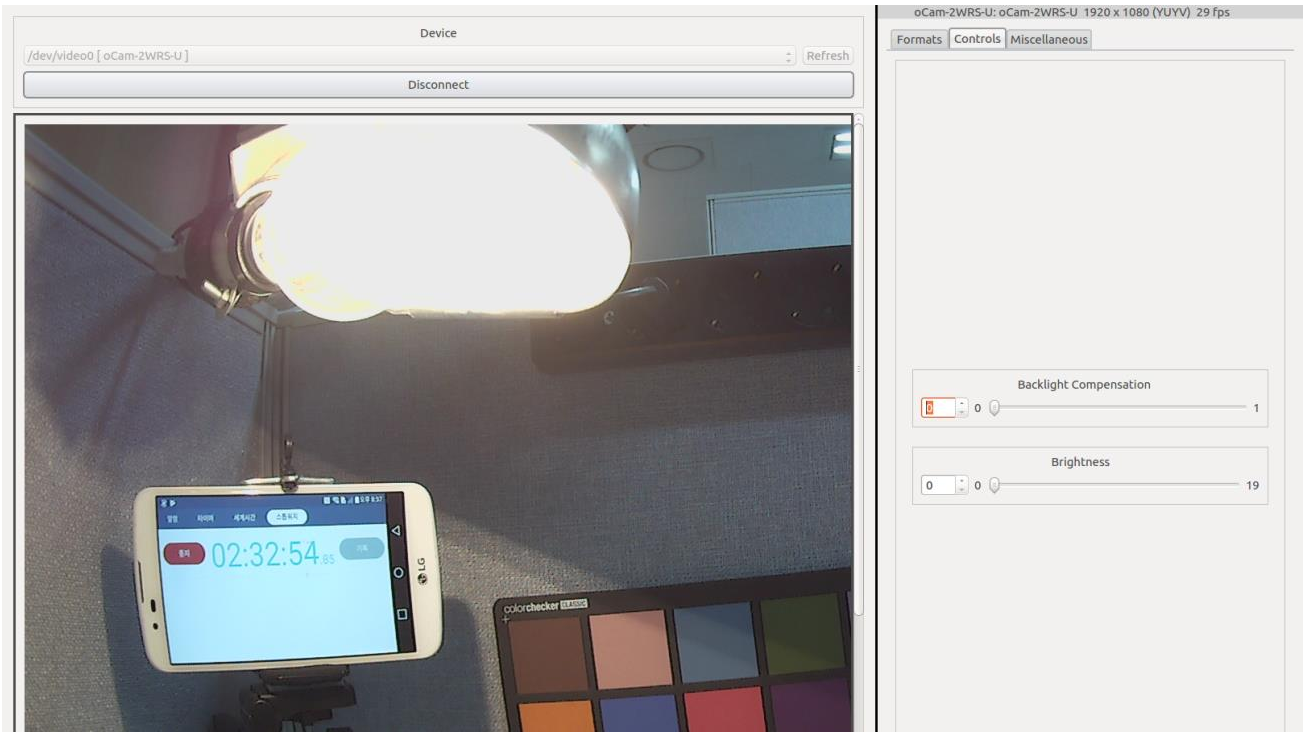


Figure 13. Turning Off the WDR: Backlight Compensation = “0”

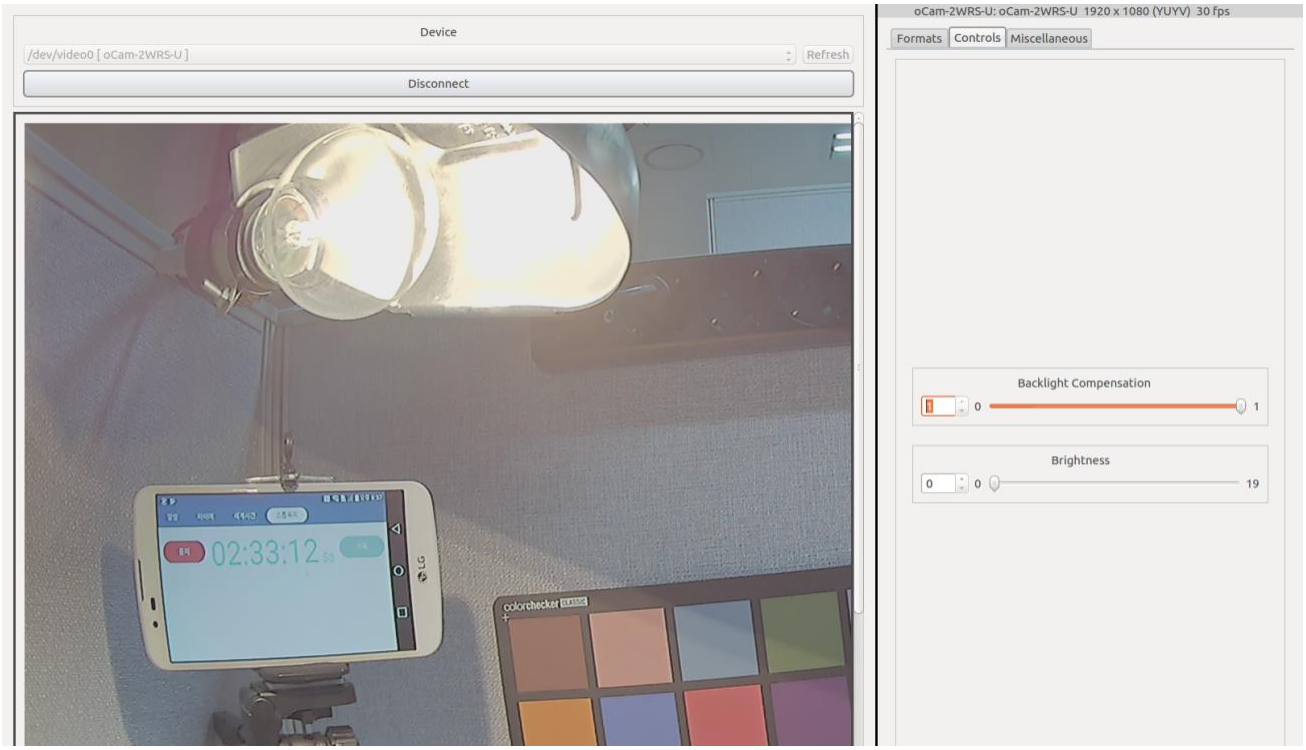


Figure 14. Turning On the WDR: Backlight Compensation = “1”

- To change the brightness, move the "Brightness" slide bar in the "Controls" panel.

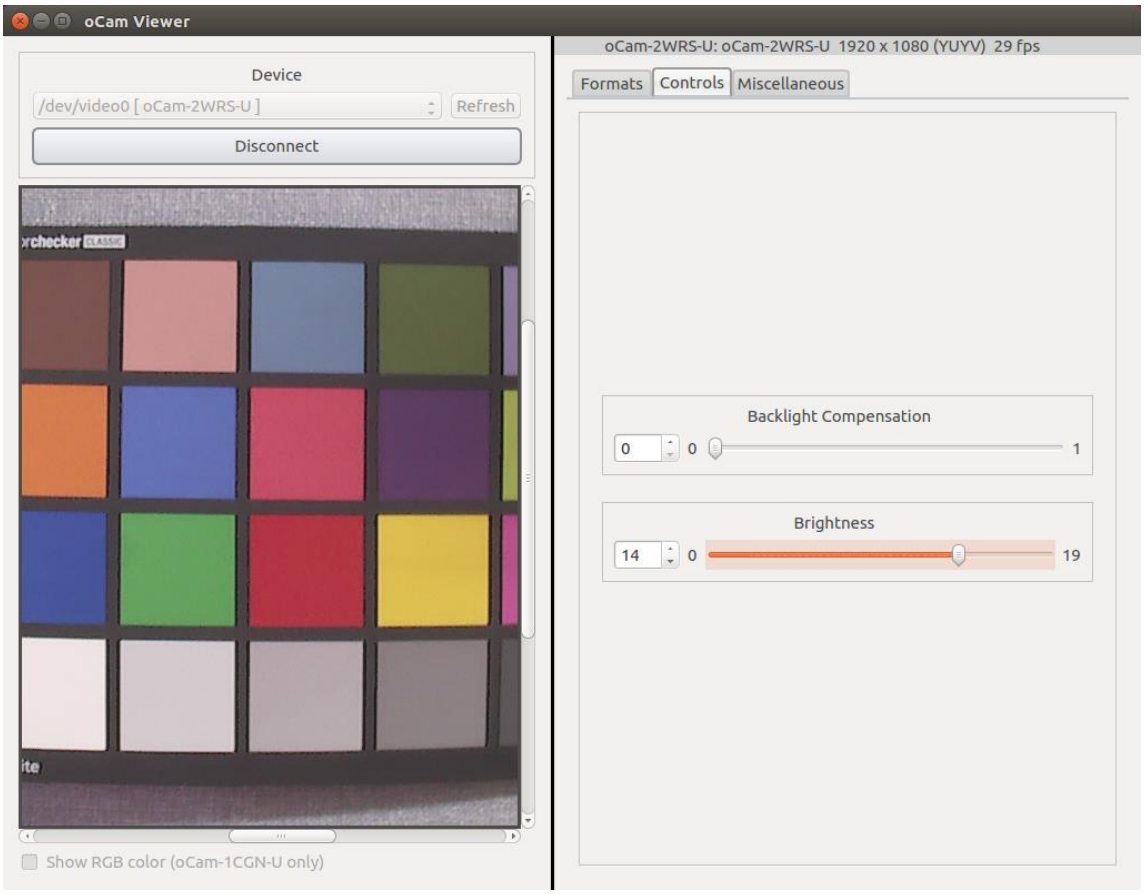


Figure 15. Brightness Control

(2) Viewing the Camera Image with the Guvcview

- Start the Guvcview by entering the "guvcview" command on the terminal window.

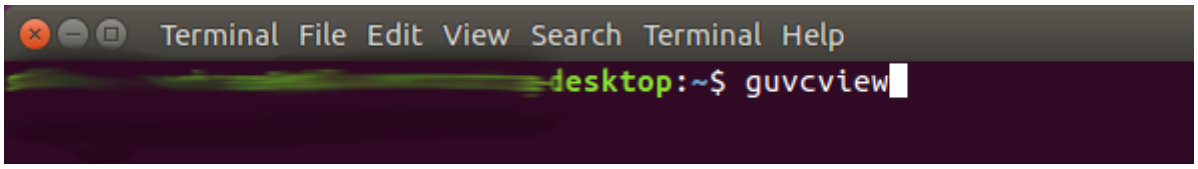


Figure 16. Starting the Guvcview

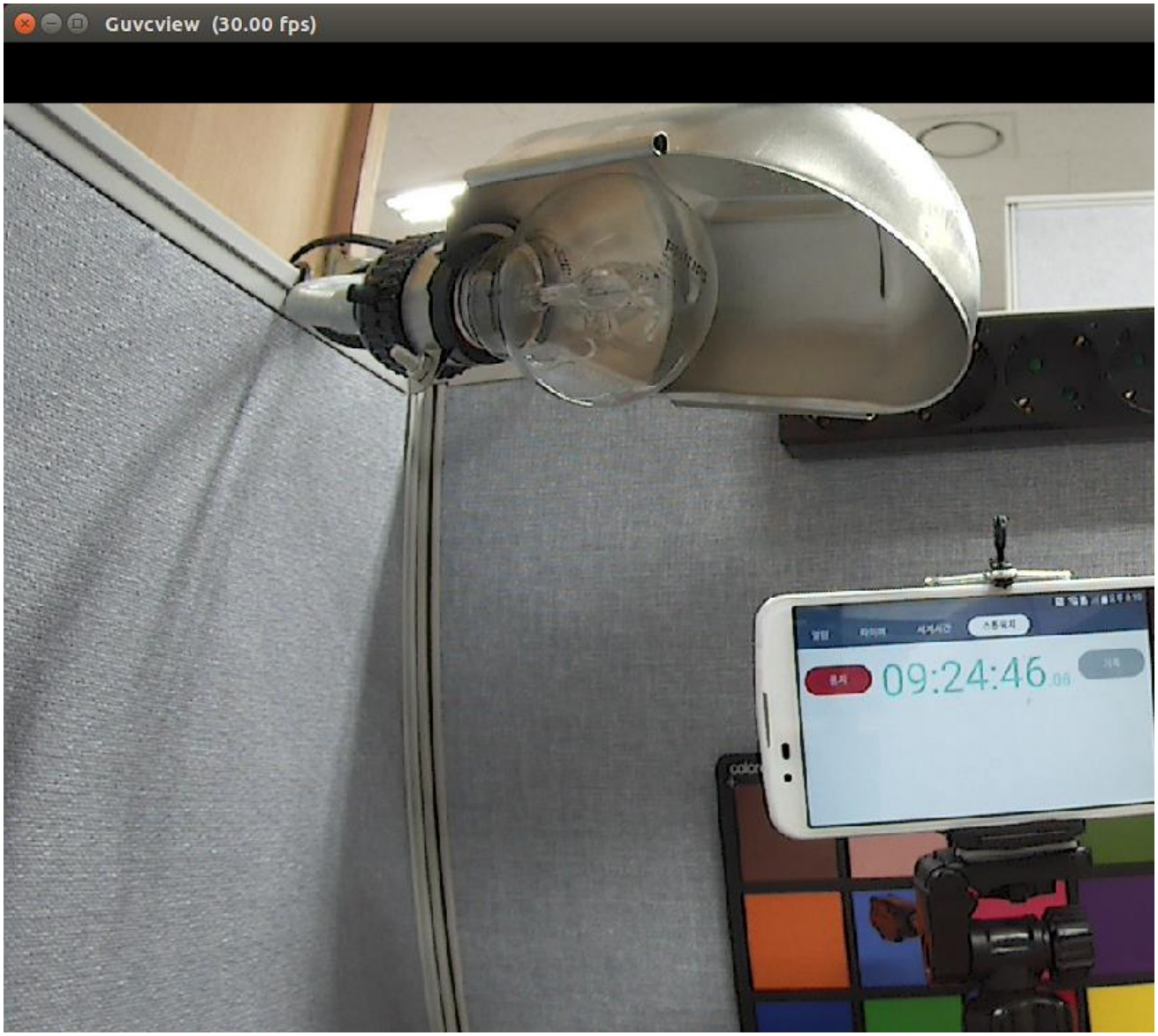


Figure 17. Guvcview Image Window

- On the Guvcview camera image window, the current frame rate is shown on the top bar.

5. NOTES

On the oCam-2WRS-U, 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.

APPENDIX

WDR (Wide Dynamic Range) Sample Images

Figure 18. Sample Image: WDR Off, Light Off

Figure 19. Sample Image: WDR Off, Light On

Figure 20. Sample Image: WDR On, Light Off

Figure 21. Sample Image: WDR On, Light On

Figure 22. Sample Image: Image Captured by a Camera without WDR

Figure 23. Sample Image: Image Captured by the oCam-2WRS-U with WDR On

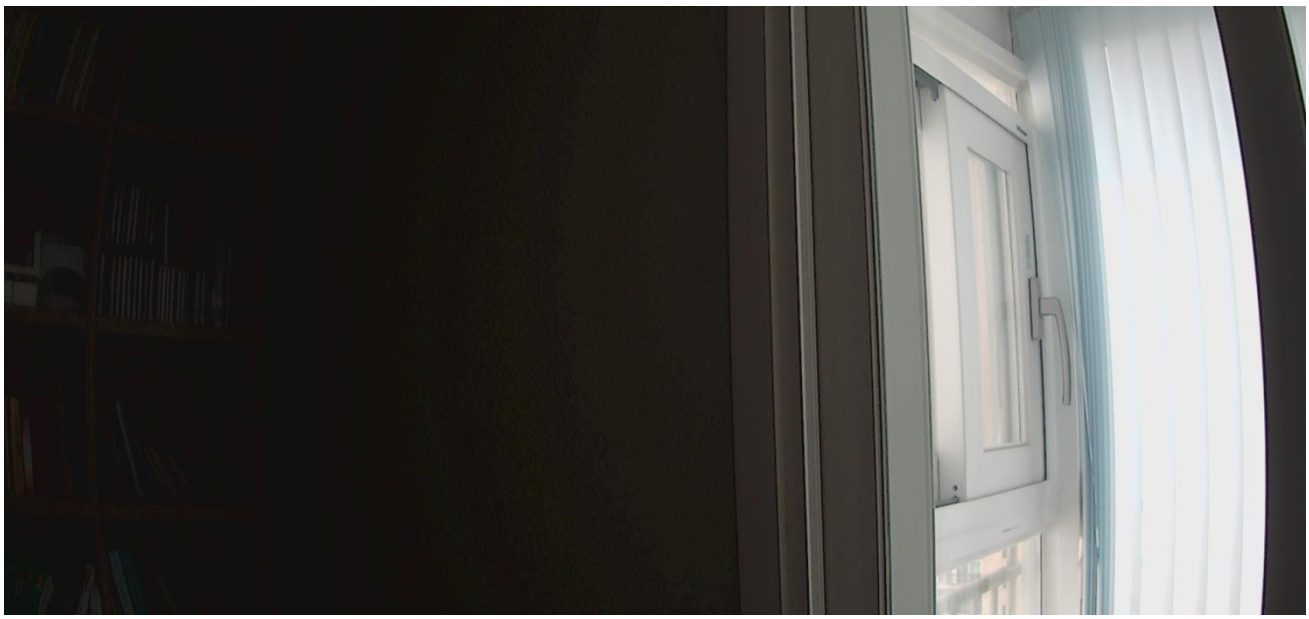
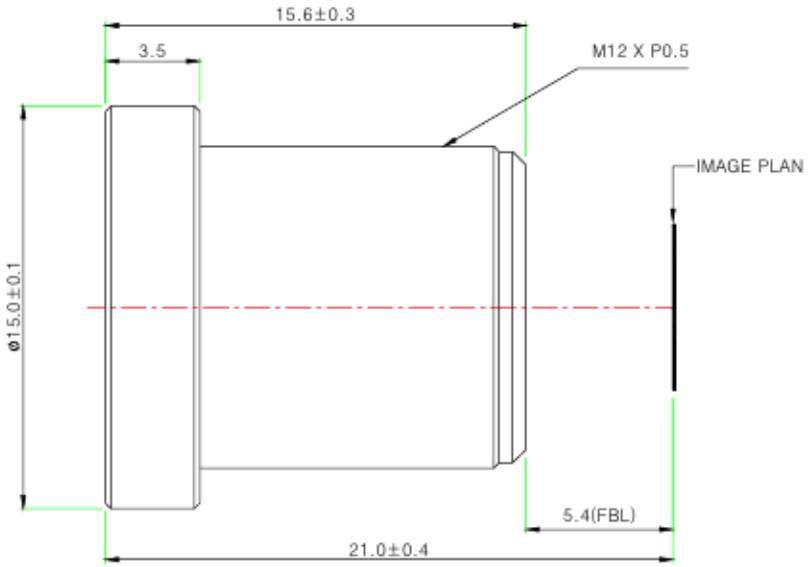


Figure 24. Sample Image: High Contrast Image Captured by the oCam-2WRS-U with WDR Off

Figure 25. Sample Image: High Contrast Image Captured by the oCam-2WRS-U with WDR On

Specifications of the Bundle M12Lens

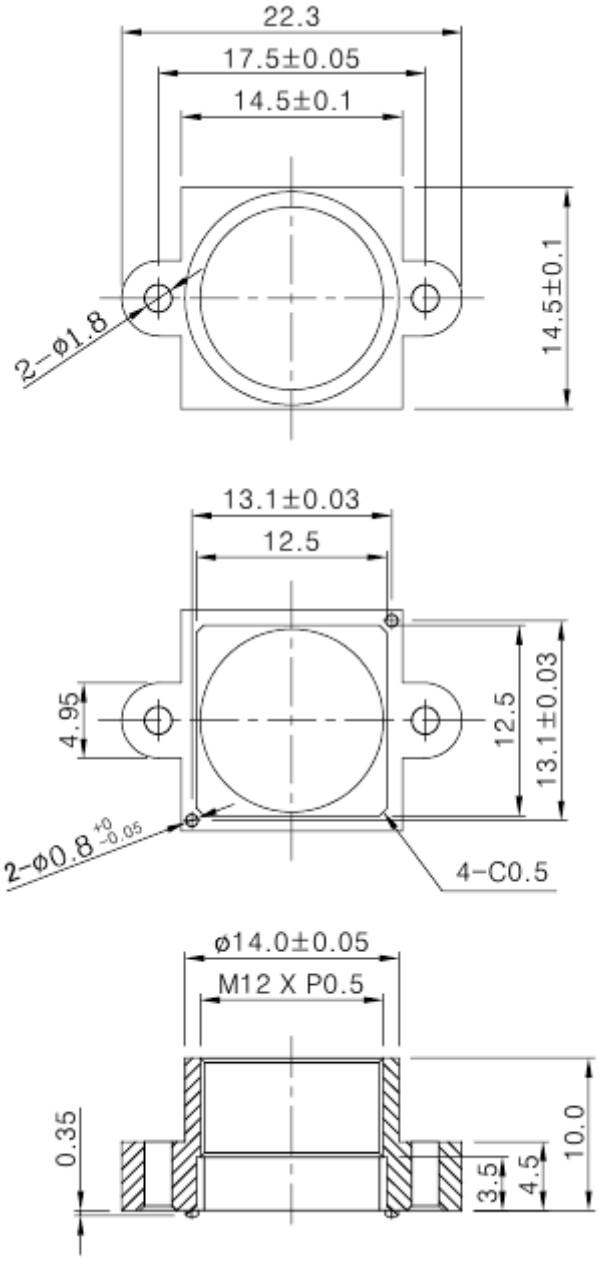


Specifications

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"
Angle Of View	1/2.9'' : 50°(V) X 92.8°(H) X 110°(D) 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

- E-Mail: withrobot@withrobot.com

www.withrobot.com