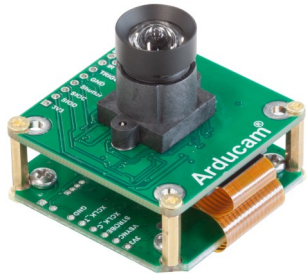




Pivariety Color Global Shutter Camera Module for Raspberry Pi



2. 3MP AR0234 (SKU: B0353)

QUICK START GUIDE

SPECS

Image Sensor	2.3MP AR0234
Max. Resolution	1920Hx1200V
Pixel Size	3um x 3um
Optical Format	1/2.6"
Lens Spec	Default Mount: M12
	Focal length: 3.6mm
	F.NO: 3.0
IR Sensitivity	FOV: 120°(D)/90°(H)/75°(V)
	Integral 650nm IR filter, visible light only
Maximum Frame Rate	1920x1200@60fps, with ISP@30fps; 1920x1080@60fps, with ISP@30fps; 1280x720@120fps, with ISP@60fps
Sensor Output Format	RAW10
ISP Output Format	The output image format of JPG, YUV420, RAW, DNG The output video format of MJPEG, H.264
Interface Type	2-Lane MIPI
Camera Board	38x38mm
Pivariety Adapter Board	40x40mm

INTRODUCTION

• About Arducam

Arducam has been a professional designer and manufacturer of SPI, MIPI, DVP and USB cameras since 2012. We also offer customized turnkey design and manufacturing solution services for customers who want their products to be unique.

• About This Pivariety Camera

Arducam Pivariety is a Raspberry Pi camera solution to take the advantage of using its hardware ISP functions. Pivariety camera modules make users get better performance and a wider variety of camera, lens options. In other words, Pivariety breakthrough the limitations of the closed-source official supported camera driver and camera modules (V1/V2/HQ).

Pivariety camera modules made it possible to be well-tuned ISP with Auto Exposure, Auto White Balance, Auto Gain Control, Lens Shading Correction, etc. This series of cameras use the libcamera framework, they can't be supported by Raspistill, and the way to access the camera is libcamera SDK (for C++)/libcamera-still/libcamera-vid/Gstreamer.

This Pivariety AR0234 Color Global Shutter Camera is migrated Raspberry Pi Cameras, which eliminate rolling shutter artifacts to shoot high-speed moving objects in color sharp images.

SOFTWARE

1. Driver Installation

```
wget -O install_pivariety_pkgs.sh https://github.com/ArduCAM/Arducam-Pivariety-V4L2-Driver/releases/download/install_script/install_pivariety_pkgs.sh
```

```
chmod +x install_pivariety_pkgs.sh
```

```
./install_pivariety_pkgs.sh -p kernel_driver
```

press **y** to reboot

NOTE: The kernel driver installation only supported by the latest version 5.10. For other kernel versions, please go to our Doc page: <https://www.arducam.com/docs/cameras-for-raspberry-pi/pivariety/how-to-install-kernel-driver-for-pivariety-camera/#2-how-to-build-raspberry-pi-kernel-driver-for-arducam-pivariety-camera>

You can also visit this doc page to refer to the hardware connection: <https://www.arducam.com/docs/cameras-for-raspberry-pi/pivariety/pivariety-ar0234-2-3mp-color-global-shutter-camera-module/>

2. Test the Driver and Camera

After you've finished the hardware assembly and driver installation, you can test whether the camera is detected and working.

• View the Status of Driver and Camera

```
dmesg | grep arducam
```

It will display **arducam-pivariety** if driver installed successfully and **firmware version** if the camera can be detected. The display should be **probe failed** if the camera can't be detected, you might have to check the ribbon connection, then reboot the Raspberry Pi.

• View the Video Node

The Pivariety camera modules are emulated as the standard video device under **/dev/video*** node, so you can use the **ls** command for listing the contents in the **/dev** folder.

```
ls /dev/video* -l
```

Since the camera module is V4L2 compliant, you can use the V4L2 controls to list the supported color space, resolutions, and frame rates.

```
v4l2-ctl --list-formats-ext
```

NOTE: Although V4L2 interface is supported, only RAW format images can be obtained, without ISP support.

3. Official Libcamera App Installation

```
./install_pivariety_pkgs.sh -p libcamera_dev
```

```
./install_pivariety_pkgs.sh -p libcamera_apps
```

4. Capture Image and Record Video

• Capture image

For example, preview for **5s** and save the image named **test.jpg**

```
libcamera-still -t 5000 -o test.jpg
```

• Record video

For example, record a **H.264 10s** video with the frame size **1920W x 1080H**

```
libcamera-vid -t 10000 --width 1920 --height 1080 -o test.h264
```

NOTE: H.264 format only supports 1920x1080 and below resolution.

• Plugin gstreamer installation

Install gstreamer

```
sudo apt update
```

```
sudo apt install -y gstreamer1.0-tools
```

Preview

```
gst-launch-1.0 libcamerasrc ! 'video/x-raw,width=1920,height=1080' ! videoconvert ! autovideosink
```

TROUBLESHOOT

1. Cannot Allocate Memory

```
[3:45:35.833744413] [6019] INFO RPI raspberrypi.cpp:611 Sensor: /base/soc/i2c0mux/i2c@1/arducam@0c - Selected mode: 5344x4012-pRAA
[3:45:35.948442507] [6019] ERROR V4L2 v4l2_videodevice.cpp:1126 /dev/video14[17:cap]: Unable to request 4 buffers: Cannot allocate memory
[3:45:35.948551358] [6019] ERROR RPI raspberrypi.cpp:808 Failed to allocate buffers
ERROR: *** failed to start camera ***
```

Edit **/boot/cmdline.txt** and add **cma=400M** at the end
More details: <https://lists.libcamera.org/pipermail/libcamera-devel/2020-December/015838.html>

2. The Image Displays Color Dots

Add code **--denoise cdn_off** at the end of command

```
./libcamera-still -t 5000 -o test.jpg --denoise cdn_off
```

More details: <https://github.com/raspberrypi/libcamera-apps/issues/19>

3. Failed to Install the Driver

Please check the kernel version, we only provide the driver for the latest official kernel version image when this Pivariety camera released.

Note: If you want to compile the kernel driver by yourself, please refer to Doc page: <https://www.arducam.com/docs/cameras-for-raspberry-pi/pivariety/how-to-install-kernel-driver-for-pivariety-camera/>

4. Failed to import fd 18

```
terminate called after throwing an instance of 'std::runtime_error'
what(): failed to import fd 18
Aborted
```

If you find the same error, you may make the wrong selection about the graphics driver. Please follow Arducam Doc page to select the correct graphics driver.

5. Switch to the native camera (raspistill etc.)

Edit the file of **/boot/config.txt**, make **dtoverlay=arducam** change to **#dtoverlay=arducam**
After the modification is completed, you need to reboot the Raspberry Pi.

```
sudo reboot
```

NOTE: This camera module support trigger via an external signal, please refer to the Doc page to get the instruction <https://www.arducam.com/docs/cameras-for-raspberry-pi/pivariety/access-ar0234-2-3mp-color-global-shutter-camera-using-external-trigger-snapshot-mode/>

If you need our help or want to customize other models of Pi cameras, feel free to contact us via support@arducam.com