

Arducam

OV5647 Camera Module with Built-in Motorized IR-CUT Filter & Two Infrared LEDs for Raspberry Pi

Rev 1.0, Mar 2018

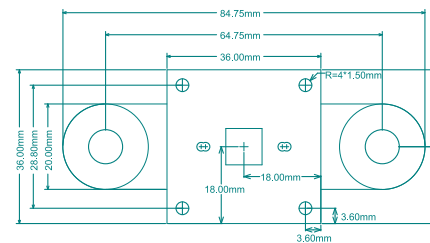
Introduction

- In order to meet the increasing need of both daylight and night vision photography for Raspberry Pi, the Arducam team now released camera module with motorized IR-Cut filter and two Infrared LEDs illuminator boards for Raspberry Pi boards. The motorized (switchable) IR-CUT filter can be controlled by software code to be ON/OFF in order to block or pass the infrared light. Two Infrared LEDs are automatically turned ON/OFF according to the light environment. It can be widely used in wild life photography, agriculture NDVI applications etc.
- This camera works as the regular Raspberry Pi camera board by connecting to the BCM2835/BCM2836/BCM2837 processor on the Pi via the CSI bus. And also fully compatible with the software package like raspistill and raspivid commands. The sensor itself has a native resolution of 5 megapixels and a fixed focus lens onboard which is capable of taking 2592 x 1944pixel still images, and record 1080p30, 720p60 and 640x480p60/90 video.
- Two types of flex ribbon cable are provided for connecting the Raspberry Pi board, one regular cable connects to the Raspberry Pi series board (15cm/5.9inch flex ribbon cable 15pin 1.0mm pitch to 15pin 1.0mm pitch), another cable is specific for connecting Raspberry Pi Zero (15cm/5.9inch flat ribbon cable 15pin 1.0mm pitch to 22pin 0.5mm pitch). So one camera for all Raspberry pi boards.
- This camera is a combination of the regular camera and NOIR camera. During the daylight user can switch on the IR-CUT filter to filter out strong infrared light to take the good images as the human eyes see. During the night user can switch off the IR-CUT filter to let infrared light pass through from two infrared LEDs and takes black and white images.

Features

- High-Definition video camera for Raspberry Pi Model A/B/B+, Raspberry Pi 2/3 and Raspberry Pi Zero
- 5MPixel sensor with Omni Vision OV5647 sensor in a fixed-focus M12 mount swappable lens
- Two infrared illuminator LEDs with two heat sinks
- Built-in Motorized IR-CUT filter
- CMOS size: 1/4inch
- Pixel Size: 1.4 x 1.4 um
- Lens: f=2.25 mm
- Field of View: horizontal 85 degree
- Fixed Focus: 30cm to infinity
- Still picture resolution: 2592 x 1944
- Video resolution: 1080p at 30 fps, up to 90fps Video at VGA
- Max frame rate: 30fps
- Provides 3.3V power output for infrared LEDs
- Size: 36 x 36mm
- 4 screw mounting holes

Mechanical Dimension



Connecting the camera

- The camera is pre-assembled. All user need do is to connect the camera module with Raspberry Pi by a flex cable. Insert the flex cable into the connector situated between the Ethernet and HDMI ports, with the silver connectors facing the HDMI port. The flex cable connector should be opened by pulling the tabs on the top of the connector upwards then towards the Ethernet port. The flex cable should be inserted firmly into the connector, to make sure the flex cable not bend into a sharp angle. The top part of the connector should then be pushed towards the HDMI connector and down, while the flex cable is held in place.
- Watch the following picture to see a demonstration of the camera being connected: (as shown in figure 1)

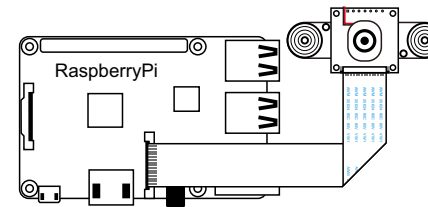


Figure 1 Connecting the camera

- When camera works at night, the infrared LEDs might generate heat, so 2 optional heat sinks are provided. Paste the heat sinks under the LEDs illuminator board with double faced adhesive tapes if necessary.

Enable the camera with IR-CUT filter

Enable the camera:

Open the `raspi-config` tool from the Terminal:

```
$ sudo raspi-config
```

Select **Enable camera** and hit **Enter**, then go to **Finish** and you'll be prompted to reboot.

Enable IR-CUT filter:

- Prerequisites

Disable the automatic management of camera led in `/boot/config.txt`:

```
$ sudo echo "disable_camera_led=1" >> /boot/config.txt
```

```
$ sudo reboot
```

If permission denied you can do:

```
$ sudo nano /boot/config.txt
```

add `"disable_camera_led=1"` at the file end. Then save the file and reboot.

```
$ sudo reboot
```

- Installation

```
$ wget https://raw.githubusercontent.com/arducam/RPI_Motorized_IRCut_Control/master/CameraLED.py
```

```
$ sudo chmod 755 CameraLED.py
```

- Usage

You need to be root (or at least be able to use sudo). Standalone: You can use the library as a standalone command:

```
$ sudo ./CameraLED.py
```

```
Usage: ./CameraLED.py [state|toggle|on|off]
```

```
$ sudo ./CameraLED.py state
```

```
State: 0
```

```
$ sudo ./CameraLED.py toggle
```

```
State: 1
```

```
$ sudo ./CameraLED.py toggle
```

```
State: 0
```

```
$ sudo ./CameraLED.py on
```

```
State: 1
```

```
$ sudo ./CameraLED.py off
```

```
State: 0
```

Trouble shooting

If the camera module isn't working correctly, there are number of things to try:

- Check if the infrared LEDs work, cover the light sensor on the LEDs board then the infrared LEDs can be turned on, but the light from infrared LEDs is invisible to the naked eyes, you can only see very dim red dot, but using NOIR camera you can see very bright infrared light.
- You could use the output of `vcgencmd get_camera command` to check if the camera is connected, the output should be `supported=1 detected=1 if camera is connected, or else is detected = 0`.
- Is the ribbon cable attached to the Camera Serial Interface (CSI), not the Display Serial Interface (DSI)? The ribbon connector will fit into either port. The Camera port is located near the HDMI connector.
- Are the ribbon connectors all firmly seated, and are they the right way rounded? They must be straight in their sockets.
- Have `sudo apt-get update` and `sudo apt-get upgrade` been run?
- Has `raspi-config` been run and the Camera Module enabled?
- Is your power supply sufficient? The Camera Module adds about 200-250mA to the power requirements of your Raspberry Pi.
- If you get with mmal error shown below: `mmal: No data received from sensor`. Please check all connections, including the Sunny one on the camera board, this error usually appears because of a faulty connection with the camera, or the camera might be defective, please contact the seller for further help by mail: admin@arducam.com.

Using the camera

Libraries for using the camera are available in:

- Shell (Linux command line):
<https://www.raspberrypi.org/documentation/usage/camera/raspicam/README.md>
- Python:
<https://www.raspberrypi.org/documentation/usage/camera/python/README.md>
- Motorized IR Cut Control Python Script:
https://github.com/ArduCAM/RPI_Motorized_IRCut_Control.git.

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