Raspberry Pi Camera Module

1/4-Inch 5-Megapixel Module Datasheet

Rev 1.0, Sept 2013

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1 Introduction

In order to meet the increasing need of Raspberry Pi compatible camera modules. The ArduCAM team now released a add-on camera module for Raspberry Pi which is fully compatible with official one. It attaches to Raspberry Pi by way of one of the two small sockets on the board upper surface. This interface uses the dedicated CSI interface, which was designed especially for interfacing to cameras. The CSI bus is capable of extremely high data rates, and it exclusively carries pixel data. The camera is supported in the latest version of Raspbian, Raspberry Pi's preferred operating system

The board itself is tiny, at around 36mm x 36mm. The highlight of our module is that the Lens is replaceable compared to official one, making it perfect for mobile or other applications where size and image quality are important. It connects to Raspberry Pi by way of a short ribbon cable. The camera is connected to the BCM2835 processor on the Pi via the CSI bus, a higher bandwidth link which carries pixel data from the camera back to the processor. This bus travels along the ribbon cable that attaches the camera board to the Pi.

The sensor itself has a native resolution of 5 megapixel, and has a fixed focus lens onboard. In terms of still images, the camera is capable of 2592 x 1944 pixel static images, and also supports 1080p30, 720p60 and 640x480p60/90 video.

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2 Features

- High-Definition video camera for Raspberry Pi Model A or B
- Omnivision 5647 sensor in a fixed-focus module with replaceable Lens
- Lens holder: M12x0.5 or CS Mount
- 5MPixel sensor
- Integral IR filter
- Still picture resolution: 2592 x 1944
- Max video resolution: 1080p
- Max frame rate: 30fps
- Size: 36 x 36 mm
- Connection by flat ribbon cable to 15-pin MIPI Camera Serial Interface (CSI) connector S5 on Raspberry Pi computer board

3 Key Specifications

- **active array size:** 2592 x 1944
- **power supply:**
  core: 1.5V ± 5% (with embedded 1.5V regulator)
  analog: 2.6 ~ 3.0V (2.8V typical)
  I/O: 1.7V ~ 3.0V
- **power requirements:**
  active: TBD
  standby: TBD
- **temperature range:**
  operating: -30°C to 70°C (see table 8-2)
  stable image: 0°C to 50°C (see table 8-2)
- **output formats:** 8-/10-bit RGB RAW output
- **lens size:** 1/4"
- **lens chief ray angle:** 24° (see figure 10-2)
- **input clock frequency:** 6~27 MHz
- **S/N ratio:** TBD
- **dynamic range:** TBD
- **maximum image transfer rate:**
  QSXGA (2592 x 1944): 15 fps
  1080p: 30 fps
  960p: 45 fps
  720p: 60 fps
  VGA (640 x 480): 90 fps
  QVGA (320 x 240): 120 fps
- **sensitivity:** TBD
- **shutter:** rolling shutter / global shutter
- **maximum exposure interval:** 1968 x t_{ROW}
- **pixel size:** 1.4 µm x 1.4 µm
- **well capacity:** TBD
- **dark current:** TBD
- **fixed pattern noise (FPN):** TBD
- **image area:** 3673.6 µm x 2738.4 µm
- **die dimensions:** 5520 µm x 4700 µm

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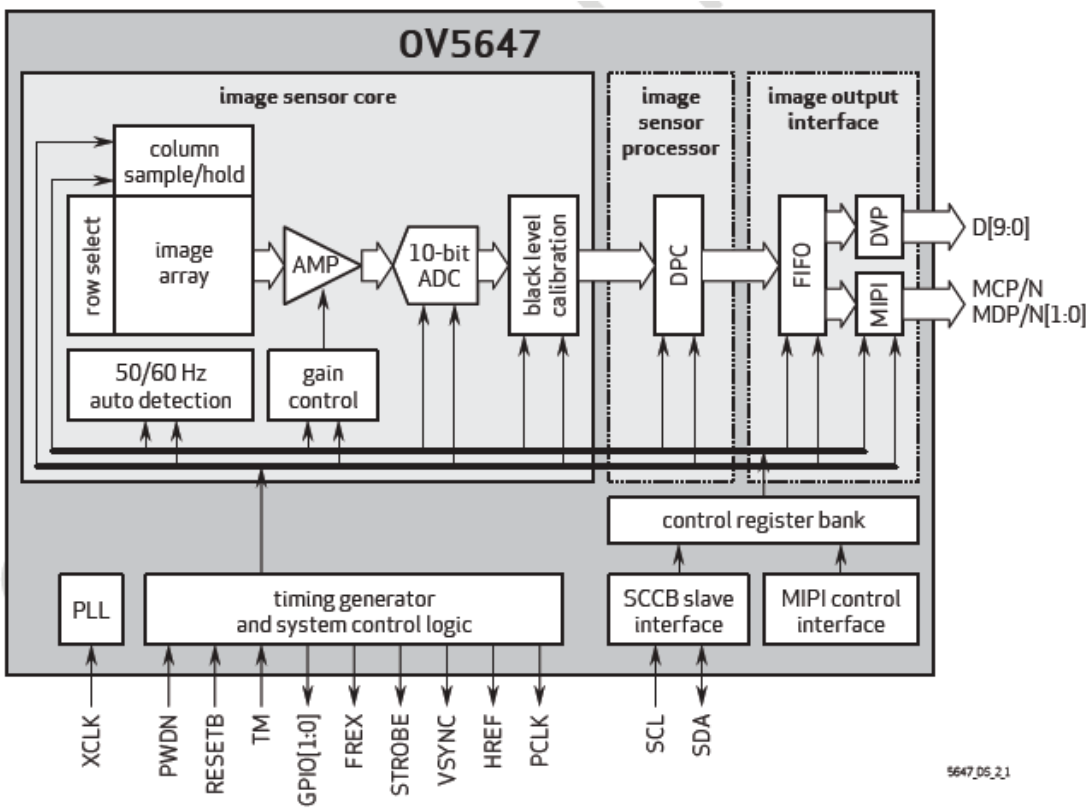
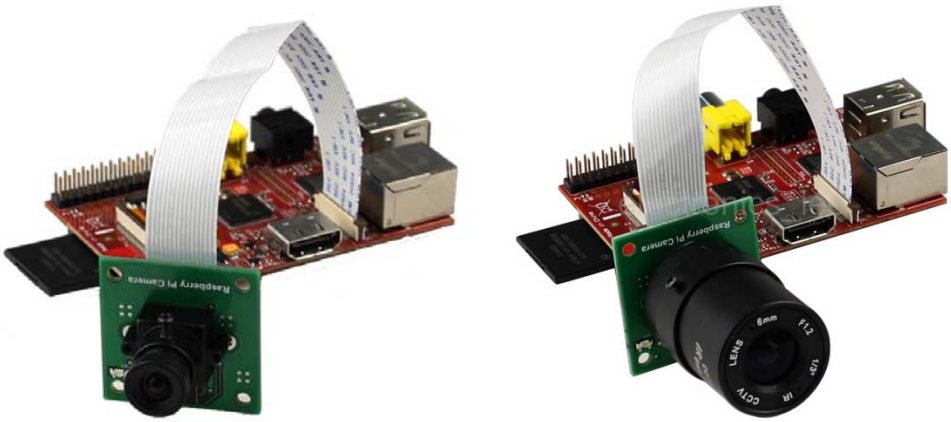
4 Block Diagram



Note: Raspberry Pi camera module only support MIPI interface, it doesn't support DVP interface.

5 Application

- Cellular phones
- PDAs
- Toys
- Other battery-powered products
- Can be used in Raspberry Pi, ARM, DSP, FPGA platforms



6 Pin Definition

Pin No.	PIN NAME	TYPE	DESCRIPTION
1	DGND	Ground	Power ground
2	CAM_D0_N	Output	MIPI data lane0 negative output
3	CAM_D0_P	Output	MIPI data lane0 positive output
4	DGND	Ground	Power ground
5	CAM_D1_N	Output	MIPI data lane1 negative output
6	CAM_D1_P	Output	MIPI data lane1 positive output
7	DGND	Ground	Power ground
8	CAM_C_N	Output	MIPI clock negative output
9	CAM_C_P	Output	MIPI clock positive output
10	DGND	Ground	Power ground
11	POWER_EN	Input	Camera module power enable active high
12	LED_EN	Input	Reserved
13	SCL	Input	Two-Wire Serial Interface Clock
14	SDA	Bi-directional	Two-Wire Serial Interface Data I/O
15	+3.3V	POWER	3.3v Power supply

7 Lens Options

The Raspberry Pi camera shipped with default LS-40136 (M12x0.5 mount) and LS-6018 (CS mount), Lenses specification list as follows. Please contact us admin@arducam.com for more lens options.

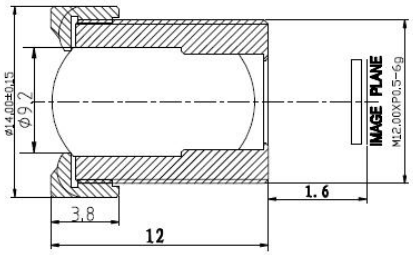
LS-40136 Lens Specification

A. Specification: **LS-40136**

1. sensor size: 1/4″
2. focal length(EFL): **3.2** mm
3. F/NO(infinition): **2.0**
4. back focal length: **1.6** mm

6. Field of view:
   - Diagonal, **85°**;
   - Horzongtal, **63.7°**;
   - Vertical, **70°**;
7. Thread size: **M12*P0.5**
8. Element: **5E+IR**

B. Layout



LS-6018 Lens Specification

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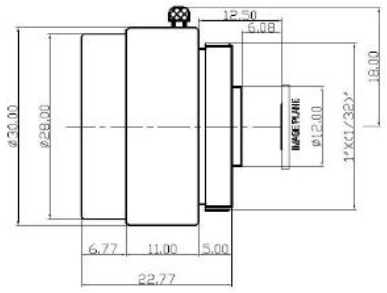
Technical parameters

型号 Model No.	LS-6018CS	视 场 角 Field of View	68°
焦距 Focal Length	6.0MM	外型尺寸 Dimensions	Φ28*24.2mm
通光口径 Aperture(F)	1.4	近摄距离 M.O.D(m)	0.1
接口 Mount	CS	净 重 Weight(g)	29.0
靶面尺寸 Format	1/2.7″	备 注 Remarks	Metal



8 Mechanical Dimension