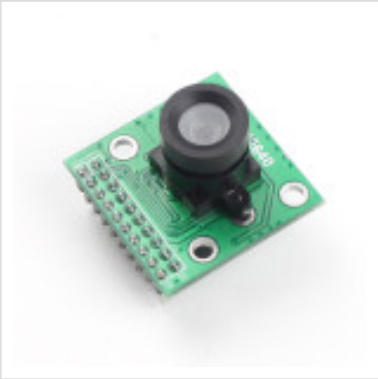
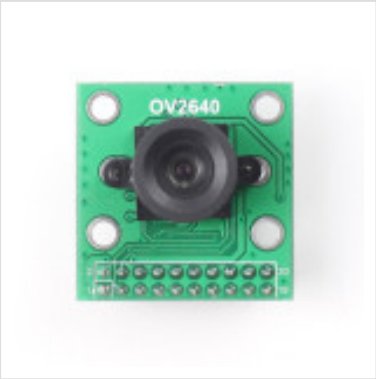
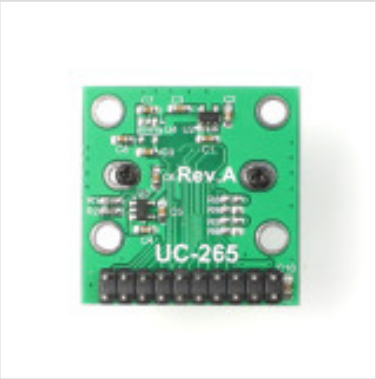
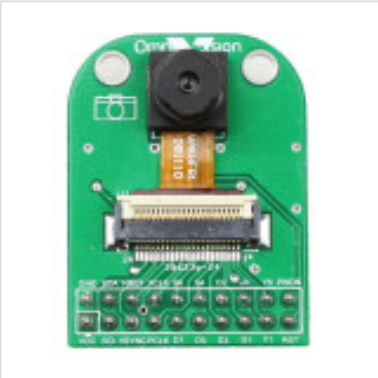
# 2MP: OV2640





- **Features**
- Flex type module or M12 mount lens holder with more lens options module
- 1/4” sensor size
- High sensitivity for low-light operation
- Standard SCCB interface
- Output support for Raw RGB, RGB (RGB565/555), GRB422, YUV (422/420) and YCbCr (4:2:2) formats, JPEG compression formats
- Supports image sizes: UXGA, SXGA, SVGA, and any size scaling down from SXGA to 40×30
- Automatic image control functions including Automatic Exposure Control (AEC), Automatic Gain Control (AGC), Automatic White Balance (AWB), Automatic Band Filter (ABF), and Automatic Black-Level Calibration (ABLC)
- Image quality controls including color saturation, gamma, sharpness (edge enhancement), lens correction, white pixel canceling, noise canceling, and 50/60 Hz luminance detection
- Low operating voltage for embedded portable apps

- **Key Specifications**

| | | |
|---|---|---|
| Array Size | UXGA | 1600 x 1200 |
| Power Supply | Core | 1.3VDC + 5% |
| | Analog | 2.5 ~ 3.0VDC |
| | I/O | 1.7V to 3.3V |
| Power Requirements | Active | 125 mW (for 15 fps, UXGA YUV mode) |
| | | 140 mW (for 15 fps, UXGA compressed mode) |
| | Standby | 900 µA |
| Temperature Range | Stable Image | 0°C to 50°C |
| Output Formats (8-bit) | | • YUV(422/420)/YCbCr422<br>• RGB565/555<br>• 8-bit compressed data<br>• 8-/10-bit Raw RGB data |
| Lens Size | | 1/4" |
| Chief Ray Angle | | 25° non-linear |
| Maximum Image Transfer Rate | UXGA/SXGA | 15 fps |
| | SVGA | 30 fps |
| | CIF | 60 fps |
| Sensitivity | | 0.6 V/Lux-sec |
| S/N Ratio | | 40 dB |
| Dynamic Range | | 50 dB |
| Scan Mode | | Progressive |
| Maximum Exposure Interval | | 1247 x $t_{ROW}$ |
| Gamma Correction | | Programmable |
| Pixel Size | | 2.2 µm x 2.2 µm |
| Dark Current | | 15 mV/s at 60°C |
| Well Capacity | | 12 Ke |
| Fixed Pattern Noise | | <1% of $V_{PEAK-TO-PEAK}$ |
| Image Area | | 3590 µm x 2684 µm |
| Package Dimensions | | 5725 µm x 6285 µm |

- **Application**
- Cellular phones
- PDAs
- Toys
- Other battery-powered products
- Can be used in Arduino, Maple, ChipKit, STM32, ARM, DSP, FPGA platforms

- **Pin Definition**

| Pin No. | PIN NAME | TYPE | DESCRIPTION |
|---|---|---|---|
| 1 | VCC | POWER | 3.3v Power supply |
| 2 | GND | Ground | Power ground |

| | | | |
|---|---|---|---|
| 3 | SCL | Input | Two-Wire Serial Interface Clock |
| 4 | SDATA | Bi-directional | Two-Wire Serial Interface Data I/O |
| 5 | VSYNC | Output | Active High: Frame Valid; indicates active frame |
| 6 | HREF | Output | Active High: Line/Data Valid; indicates active pixels |
| 7 | PCLK | Output | Pixel Clock output from sensor |
| 8 | XCLK | Input | Master Clock into Sensor |
| 9 | DOUT9 | Output | Pixel Data Output 9 (MSB) |
| 10 | DOUT8 | Output | Pixel Data Output 8 |
| 11 | DOUT7 | Output | Pixel Data Output 7 |
| 12 | DOUT6 | Output | Pixel Data Output 6 |
| 13 | DOUT5 | Output | Pixel Data Output 5 |
| 14 | DOUT4 | Output | Pixel Data Output 4 |
| 15 | DOUT3 | Output | Pixel Data Output 3 |
| 16 | DOUT2 | Output | Pixel Data Output 2 (LSB) |
| 17 | DOUT1 | Output | Pixel Data Output 1(10bit mode) |
| 18 | DOUT0 | Output | Pixel Data Output 0 (10bit mode) |
| 19 | RST | Input | Camera reset, active low |
| 20 | PWDN | Input | Camera power down, active high |

- **Demonstration**

ArduCAM provides a full demonstration for OV2640 camera module on Arduino platform. Please download the examples from github.

Example ArduCAM_OV2640_Camera_Playback.ino

It will turn the ArduCAM into a real digital camera with capture and playback functions.
1. Preview the live video on LCD Screen.
2. Capture and buffer the image to FIFO when shutter pressed quickly.
3. Store the image to Micro SD/TF card with BMP format.
4. Playback the capture photos one by one when shutter button hold on for 3 seconds.
This program requires the latest ArduCAM library and Rev.C or Rev.C+ ArduCAM shield and use Arduino IDE 1.5.2 compiler or above.

Example ArduCAM_OV2640_Digital_Camera.ino

It will run the ArduCAM as a real 2MP digital camera, provide both preview and JPEG capture.
The demo sketch will do the following tasks:
1. Set the sensor to BMP preview output mode.
2. Switch to JPEG mode when shutter buttom pressed.
3. Capture and buffer the image to FIFO.
4. Store the image to Micro SD/TF card with JPEG format.
5. Resolution can be changed by myCAM.OV2640_set_JPEG_size() function.
This program requires the latest ArduCAM library and Rev.C or Rev.C+ ArduCAM shield and use Arduino IDE 1.5.2 compiler or above.

Example ArduCAM_SPI_OV2640_FIFO_UART.ino

The demo sketch will do the following tasks:
1. Set the sensor to JPEG output mode.
2. Capture and buffer the image to FIFO.
3. Transfer the captured JPEG image back to host via Arduino board USB port.
4. Resolution can be changed by myCAM.OV2640_set_JPEG_size() function.
This program requires the latest ArduCAM library and Rev.C or Rev.C+ ArduCAM shield and use Arduino IDE 1.5.2 compiler or above.
5. Use ArduCAM host application to capture, view and save pictures.

- **Sample Pictures Taken by OV2640**

OV2640 Landscape

OV2640 night vision with 940 IR light

OV2640 Protrait