ArduCAM-M-2MP ESP8266 Evaluation Kit User Guide

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1 Introduction

The evaluation kit is designed for low cost WIFI IoT camera based on ArduCAM-Mini-2MP-V2 and ArduCAM-ESP8266-Nano modules. User can implement a 2MP WIFI camera using HTTP or Websocket protocol on ESP8266, and the camera can be acted as an AP and mobile phone/PC can connect to the camera directly or acted as a Station which connected to the home router. The kit can take 2MP full resolution JPEG still image, but streaming low resolution low frame rate video due to the limitation of ESP8266. The kit can be USB powered or battery powered with buildin charging circuits. The kit can also be used separately, it is identical to an ArduCAM-Mini-2MP camera and a ESP8266 module.

2 Kit Content

- ArduCAM-Mini-2MP-V2  x1
- ArduCAM-ESP8266-Nano  x1
- Battery power cable  x1

Note: not battery is included, need to buy from local.

3 Features

- 2MP image sensor OV2640, support JPEG
- Standard FOV 60° stock lens
- I2C interface for the sensor configuration
- SPI interface for camera commands and data stream
- Onboard ES8266-12F module
- Build in Lithium battery recharging 3.7V/500mA max
- Build in SD/TF card socket
- Build in micro USB-Serial (CH340g) convertor
- Compatible with Arduino IDE
- Small form of factor

Figure 1 ArduCAM-Mini-2MP-V2 and ESP8266-Nano
4 Pin Definition

There are two connectors on ArduCAM-Mini-2MP camera module, the 8 pin connector on the down side is standard ArduCAM connector. The other dual line 16 pin connector is dedicate connector for ArduCAM-ESP8266-Nano module, it can be well mated with ESP8266 Nano module directly.

Table 1 ArduCAM-M-2MP Standard Connector Pin Definition

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>PIN NAME</th>
<th>TYPE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CS</td>
<td>Input</td>
<td>SPI slave chip select input</td>
</tr>
<tr>
<td>2</td>
<td>MOSI</td>
<td>Input</td>
<td>SPI master output slave input</td>
</tr>
<tr>
<td>3</td>
<td>MISO</td>
<td>Output</td>
<td>SPI master input slave output</td>
</tr>
<tr>
<td>4</td>
<td>SCLK</td>
<td>Input</td>
<td>SPI serial clock</td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
<td>Ground</td>
<td>Power ground</td>
</tr>
<tr>
<td>6</td>
<td>VCC</td>
<td>POWER</td>
<td>3.3V~5V Power supply</td>
</tr>
<tr>
<td>7</td>
<td>SDA</td>
<td>Bi-directional</td>
<td>Two-Wire Serial Interface Data I/O</td>
</tr>
<tr>
<td>8</td>
<td>SCL</td>
<td>Input</td>
<td>Two-Wire Serial Interface Clock</td>
</tr>
</tbody>
</table>

Table 2 ArduCAM-ESP8266-Nano Pin Definition

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>PIN NAME</th>
<th>TYPE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RST</td>
<td>Input</td>
<td>ESP8266 reset input</td>
</tr>
<tr>
<td>2</td>
<td>A0</td>
<td>Input</td>
<td>Analog input</td>
</tr>
<tr>
<td>3</td>
<td>GND</td>
<td>Ground</td>
<td>Power ground</td>
</tr>
<tr>
<td>4</td>
<td>D0/GPIO16</td>
<td>Input</td>
<td>Chip select for camera</td>
</tr>
<tr>
<td>5</td>
<td>D5/SCK</td>
<td>Ground</td>
<td>Hardware SPI SCLK</td>
</tr>
<tr>
<td>6</td>
<td>D6/MISO</td>
<td>Input</td>
<td>Hardware SPI MOSI</td>
</tr>
<tr>
<td>7</td>
<td>D7/MOSI</td>
<td>Output</td>
<td>Hardware SPI MOSI</td>
</tr>
<tr>
<td>8</td>
<td>3.3V</td>
<td>POWER</td>
<td>3.3V Power supply</td>
</tr>
<tr>
<td>9</td>
<td>GND</td>
<td>Ground</td>
<td>Power ground</td>
</tr>
<tr>
<td>10</td>
<td>D8/GPIO15</td>
<td>INOUT</td>
<td>GPIO</td>
</tr>
<tr>
<td>11</td>
<td>D4/GPIO2</td>
<td>INOUT</td>
<td>GPIO</td>
</tr>
<tr>
<td>12</td>
<td>D3/GPIO0</td>
<td>INOUT</td>
<td>Chip select for SD card</td>
</tr>
<tr>
<td>13</td>
<td>SDA/GPIO04</td>
<td>Bi-directional</td>
<td>Two-Wire Serial Interface Data I/O</td>
</tr>
<tr>
<td>14</td>
<td>SCL/GPIO05</td>
<td>Output</td>
<td>Two-Wire Serial Interface Clock</td>
</tr>
<tr>
<td>15</td>
<td>Rx/GPIO03</td>
<td>Input</td>
<td>Hardware UARTRX</td>
</tr>
<tr>
<td>16</td>
<td>Tx/GPIO01</td>
<td>Output</td>
<td>Hardware UARTTX</td>
</tr>
</tbody>
</table>
5 Wiring Diagram

Figure 2 shows the wiring diagram between the ArduCAM mini 2MP and ESP8266 Nano module.

![Wiring Diagram](image)

6 Getting Started ESP8266 with Arduino IDE

This chapter shows you how to develop an application for ArduCAM ESP8266 Nano board using Arduino IDE.

6.1 Installing with Boards Manager

Starting with 1.6.4, Arduino allows installation of third-party platform packages using Boards Manager. We have packages available for Windows, Mac OS, and Linux (32 and 64 bit).

- Install Arduino 1.6.8 from the Arduino website.
- Start Arduino and open Preferences window.
- Enter the following link into Additional Board Manager URLs field. You can add multiple URLs, separating them with commas.

  http://www.arduino.com/downloads/ESP8266_UNO/package_ArduCAM_index.json

- Open Boards Manager from Tools -> Board menu and install ArduCAM_ESP8266_UNO addon package.

Note that the installed package source file is located in the C:\Users\Your name\AppData\Local\Arduino15\ folder, here is C:\Users\zk109\AppData\Local\Arduino15\ for example.
6.2 Using Arduino IDE

After installation of ArduCAM ESP8266 Nano board add-on package, you can select this board from the Tool->Board menu. And there several ready to use examples from the File->Examples->ArduCAM. You can use these examples directly or as a starting point to develop your own code.

- Select ArduCAM_ESP8266_UNO board from Tool->Board menu.
➢ Select the example from File->Examples->ArduCAM.

![Figure 4 Example Selection](image1)

➢ Configure the camera setting

You need to modify the `memorysaver.h` file in order to enable OV2640 camera for ArduCAM Mini 2MP camera modules. Only one camera can be enabled at a time. The `memorysaver.h` file is located at `C:\Users\Your computer name\AppData\Local\Arduino15\packages\ArduCAM_ESP8266_UNO\hardware\ArduCAM_ESP8266_UNO\2.1.0\libraries\ArduCAM`.

![Figure 5 Camera Configuration](image2)

➢ Compile and uploading
Change the SSID and password if needed with your own network environment before compile the example. Click uploading the example will automatically flashed into the board.

6.3 Examples

There are 3 examples for both 2MP ArduCAM mini camera modules.

- **ArduCAM_Mini_OV2640_Capture**

  This example uses HTTP protocol to capture still or video over home wifi network from ArduCAM mini 2MP and display on the web browser.

  Using this example the ssid and password should be modifies before uploading.

![Example Code](image)

**Figure 6 Wifi Camera Example**

After uploading, the board IP address is obtained via DHCP protocol. You can figure out the IP address through the serial monitor as Figure 7 shown. The default serial monitor baudrate setting is 115200bps.
Finally, open the index.html or video.html, input the IP address obtained from the serial monitor then take pictures or videos. The html files are located at

c:\Users\Your computer name\Local\Arduino15\packages\ArduCAM_ESP8266_UNO\hardware\ArduCAM_ESP8266_UNO\2.1.0\libraries\ArduCAM\examples\ESP8266\ArduCAM_Mini_OV2640_Capture\html

Figure 8 Example Html page

- ArduCAM_Mini_OV2640_Capture2SD
This example takes time elapse still photos using ArduCAM mini 2MP and then stored on the TF/SD card. The LED indicates when the TF/SD card is writing.

- ArduCAM_Mini_OV2640_Video2SD

This example takes motion JPEG video clips using ArduCAM mini 2MP and then stored on the TF/SD card as AVI format, about 4 minutes to complete.