



# Fish-eye Camera Module (OV2640)

SKU: U037

**M5CameraF** is a development board for image recognition. It features an ESP32(4M Flash + 520K RAM) chip and 2-Megapixel camera(OV2640).**M5CameraF** offers plenty of storage, with an extra 4 Mbyte PSRAM. It also supports image transmission via Wi-Fi and debugging through USB Type-C port.



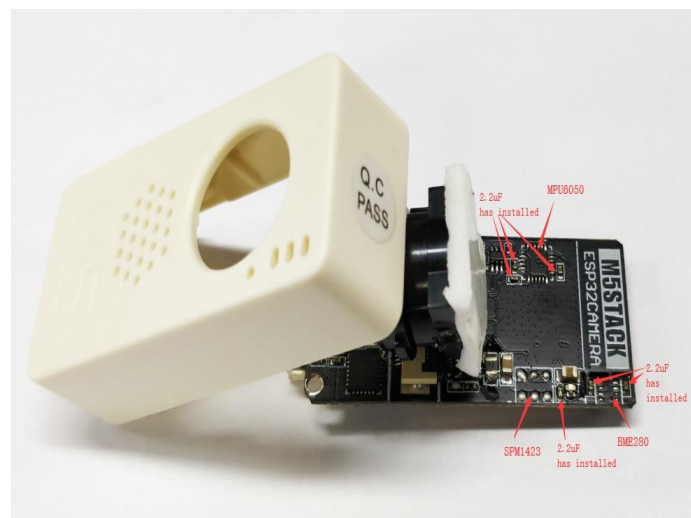
The hardware comes preloaded software, programmed by ESP-IDF. It is an application to run Wi-Fi camera. The output image is size 600\*800, since it's 2-Mega camera, you sure can optimize the software to output the maximum size of photos.

what this software can do?

- Power the board via USB type-C or GROVE
- Use your phone to Wi-Fi scan an AP name start with 'm5stack-' and click to connect this AP.
- Open up web browser on your phone and visit 192.168.4.1
- Then here comes the picture. Video is about 5-6 frames per seconds. not super fast.

The hardware also comes with some reserved weld pad, just in case you want put these chips back on board.

- 9-axis gyroscope (MPU6050)
- pressure sensor (BME280)
- **Digital silicon microphone (SPM1423)**
- Lipo Battery power pins



# Feature

- ESP32 specifications
  - Dual-core Tensilica LX6 microprocessor
  - Up to 240MHz clock frequency
  - **4MB PSRAM**
  - **4MB Flash memory**
  - Integrated 802.11 BGN WiFi transceiver
  - Integrated dual-mode Bluetooth (classic and BLE)
  - Hardware accelerated encryption (AES, SHA2, ECC, RSA-4096)
- CP2104 USB-to-TTL converter
- ESP32-WROVER (PCB Antenna)
- OV2640 sensor
  - Output Formats(8-bit):
    - YUV(422/420)/YCbCr422
    - RGB565/555
    - 8-bit compressed data
    - 8-/10-bit Raw RGB data
  - Maximum Image Transfer Rate according to specific format
    - UXGA/SXGA: 15fps
    - SVGA: 30fps
    - CIF: 60fps
  - Scan Mode: Progressive
- Camera specifications
  - Field of View : **160 degree**
  - Maximum Pixel: 2-Mega
- Sensor best resolution: 1600 \* 1200
- Size : 23.5 × 48 × 23.5mm

# Include

- 1x M5CameraF
- 1x LEGO Adapter
- 1x Wall/1515
- 1x Type-C USB(20cm)



## PinMap

Camera Interface PinMap

<i>Interface</i>	<i>Camera Pin</i>	<i>M5CameraF</i>
SCCB Clock	SIOC	I023
SCCB Data	SIOD	<b>I022</b>
System Clock	XCLK	I027
Vertical Sync	VSYNC	<b>I025</b>

<b><i>Interface</i></b>	<b><i>Camera Pin</i></b>	<b><i>M5CameraF</i></b>
Horizontal Reference	HREF	IO26
Pixel Clock	PCLK	IO21
Pixel Data Bit 0	D2	IO32
Pixel Data Bit 1	D3	IO35
Pixel Data Bit 2	D4	IO34
Pixel Data Bit 3	D5	IO5
Pixel Data Bit 4	D6	IO39
Pixel Data Bit 5	D7	IO18
Pixel Data Bit 6	D8	IO36
Pixel Data Bit 7	D9	IO19
Camera Reset	RESET	IO15
Camera Power Down	PWDN	<i>see Note 1</i>

<i>Interface</i>	<i>Camera Pin</i>	<i>M5CameraF</i>
Power Supply 3.3V	3V3	3V3
Ground	GND	GND

#### **GROVE Interface**

<i>Grove</i>	<i>M5CameraF</i>
SCL	<b>IO13</b>
SDA	<b>IO4</b>
5V	5V
GND	GND

#### **LED Interface**

<i>LED</i>	<i>M5CameraF</i>
LED_Pin	IO14

**The following tables are Reserved Chip Interfaces**

**BME280 Interface**

*It's IIC address is 0x76.*

<b><i>BME280</i></b>	<b><i>M5CameraF</i></b>
SCL	IO23
SDA	IO22

**MPU6050 Interface**

*It's IIC address is 0x68.*





<b><i>MPU6050</i></b>	<b><i>M5CameraF</i></b>
SCL	IO23
SDA	IO22

**MIC(SPM1423) Interface**

<b><i>MIC(SPM1423)</i></b>	<b><i>M5CameraF</i></b>
CLK	IO4
DATA	IO2

**NOTE:**

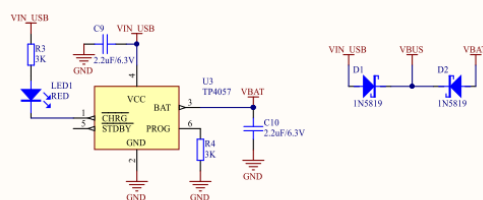
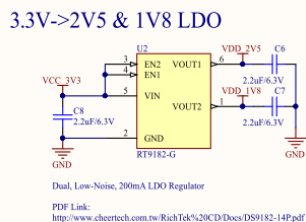
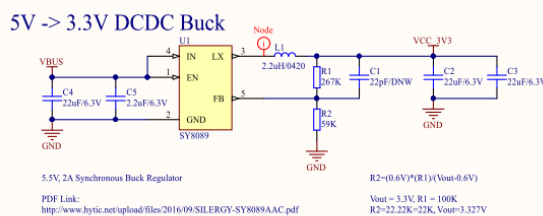
1. **Camera Power Down** pin does not need to be connected to ESP32 GPIO. Instead it may be pulled down to ground with 10 kOhm resistor.
2. We have several patterns of camera board, the following figures shows the main difference  
**view click [here](#).**

Picture	Features	ESP32	RAM	Flash	Input Voltage	Series Interface	Image Sens or CMOS	Lens type	Max Image Size	Frame rate	Hardware difference	Charger IC	Operating Temperature	Size	Package Include	reserved solder pad for additional hardware component
	Programming Support - ESP-IDF - Arduino	240MHz dual core, 600 DMIPS, 520KB SRAM, Wi-Fi, dual mode Bluetooth	520KB	4MB	5VDC	I2C+I/O +UART	OV2640	Normal type (Field of View: 65 Degree)	800 * 600 JPEG	10fps (800 * 600 JPEG)	ESP32 chip set + 3D Antenna	IP5306	0 to 40 °C	20.5 × 46.5 × 11.5mm	1x ESP32CAM	MPU6050, Microphone, BME280 Sensor, Battery
	Programming Support - ESP-IDF - Arduino - LEGO Compatible	240MHz dual core, 600 DMIPS, 520KB SRAM, Wi-Fi, dual mode Bluetooth	520KB + 4MB PSRAM	4MB	5VDC	I2C+I/O +UART	OV2640	Normal type (Field of View: 65 Degree)	1600 * 1200 JPEG	10fps (800 * 600 JPEG)	ESP32-WROVER module(PCB Antenna)	TP4057	0 to 40 °C	40 × 49 × 13mm	1x M5Camera 1x LEGO Accessories Type-C USB Cable User Manual	MPU6050, Microphone, BME280 Sensor, Battery
	Programming Support - ESP-IDF - Arduino - LEGO Compatible	240MHz dual core, 600 DMIPS, 520KB SRAM, Wi-Fi, dual mode Bluetooth	520KB + 4MB PSRAM	4MB	5VDC	I2C+I/O +UART	OV2640	Normal type (Field of View: 65 Degree)	1600 * 1200 JPEG	10fps (800 * 600 JPEG)	ESP32-WROVER module(PCB Antenna)	TP4057	0 to 40 °C	23.5 × 48 × 13mm	1x M5Camera 1x LEGO Adapter 1x Wall/1515 1x Type-C USB Cable	MPU6050, Microphone, BME280 Sensor, Battery
	Programming Support - ESP-IDF - Arduino - LEGO Compatible	240MHz dual core, 600 DMIPS, 520KB SRAM, Wi-Fi, dual mode Bluetooth	520KB + 4MB PSRAM	4MB	5VDC	I2C+I/O +UART	OV2640	Fish Eye (Field of View: 160 Degree)	1600 * 1200 JPEG	10fps (800 * 600 JPEG)	ESP32-WROVER module(PCB Antenna)	TP4057	0 to 40 °C	23.5 × 48 × 23.5mm	1x M5Camera 1x LEGO Adapter 1x Wall/1515 1x Type-C USB Cable	MPU6050, Microphone, BME280 Sensor, Battery

- [Official Video](#)
- [Forum](#)
- [Datasheet - ESP32 - OV2640](#)
- [Serial communication-M5CameraF](#)
- [Serial communication-M5Core](#) (The serial communication routine is the communication between the camera and the M5Core.)
- [QRcode](#)
- [MPU6050](#) (Gyro Example after soldering MPU6050)

# Schematic

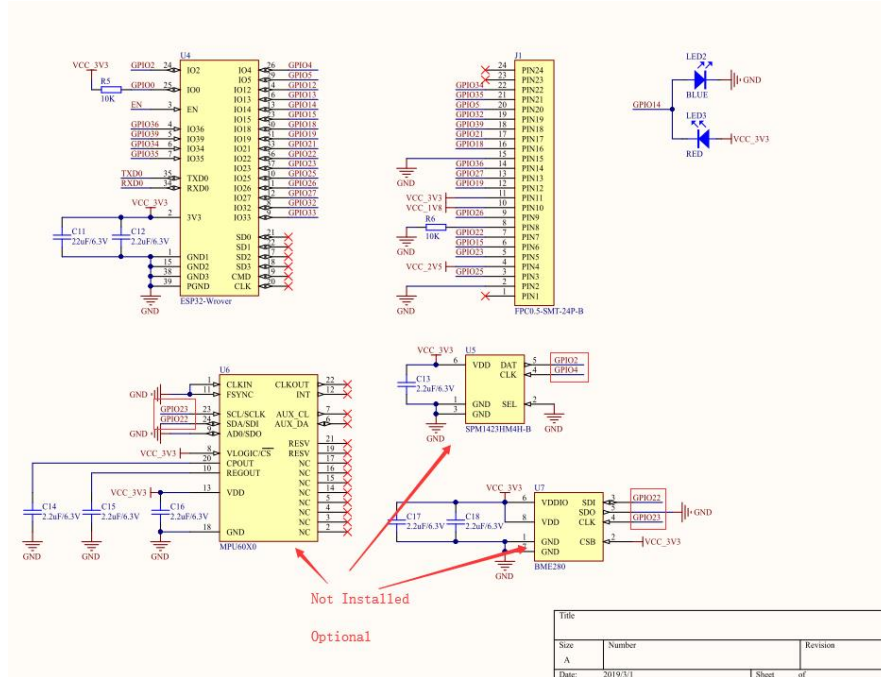
## Power circuit



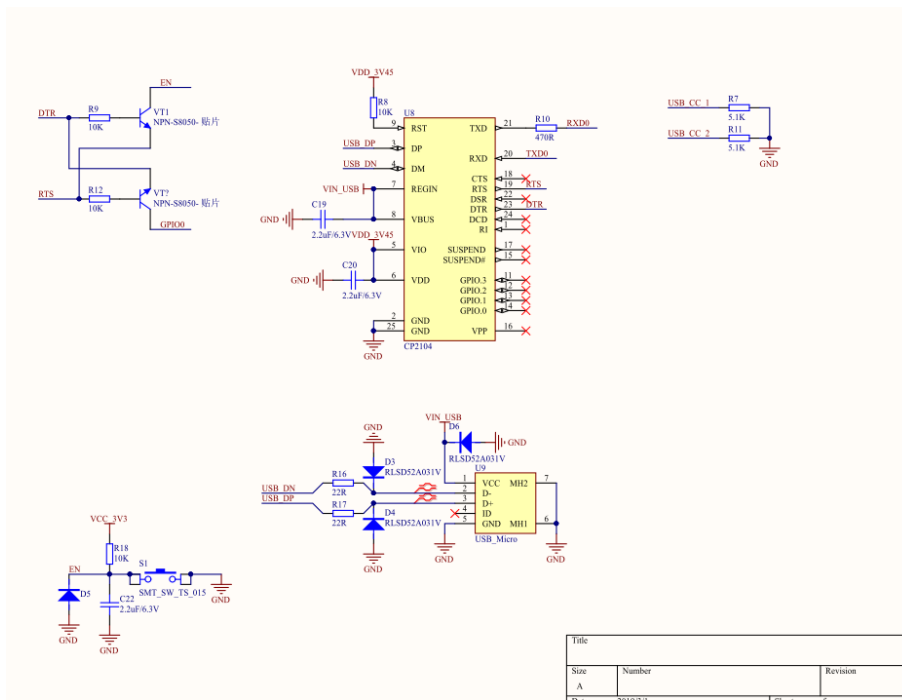
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# Chip peripheral circuit



# USB to serial port part of the circuit





<https://m5stack.com/collections/m5-unit/products/fish-eye-camera-module-ov2640/12-99-19>