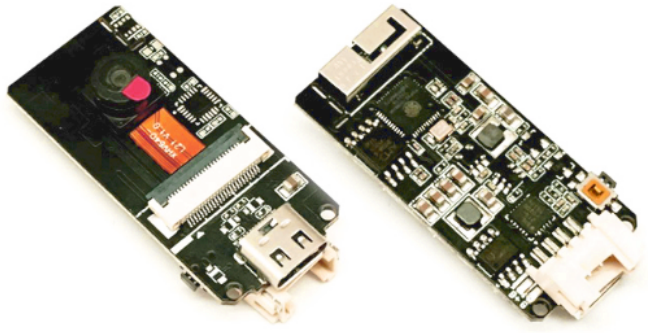
ESP32CAM



Description

ESP32CAM is a development board for image recognition. It features an ESP32(4M Flash + 520K RAM) chip and 2-Megapixel carmera(OV2640). It also supports image transmission via Wi-Fi and debuging rough USB Type-C port.

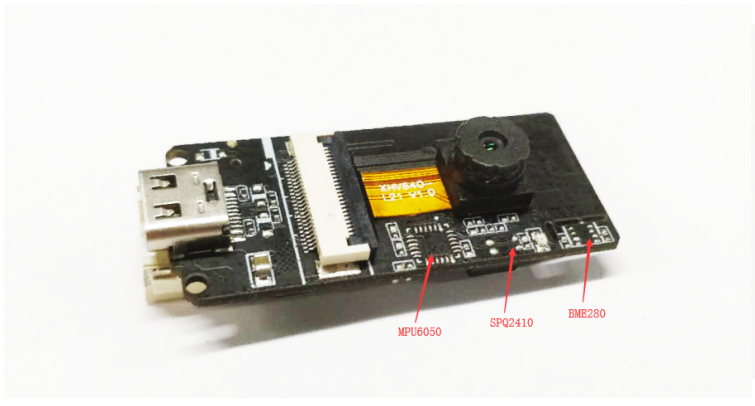
The hardware comes preloaded software, programmed by ESP-IDF. It is an application to run Wi-Fi camera. The output image is size 600*800, since it's 2-Maga camera, you sure can optimize the software to output the maximum size of photos.

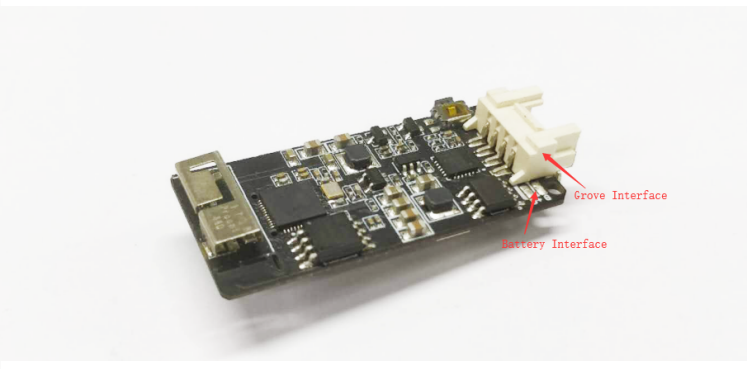
what this software can do?

- 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 senconds. 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





Product Features

- ESP32 specifications
  - Dual-core Tensilica LX6 microprocessor
  - Up to 240MHz clock frequency
  - **520KB internal RAM**
  - **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 TTL
- ESP32 chip set + 3D 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
    - UXGA/SXGA: 15fps
    - SVGA: 30fps
    - CIF: 60fps
  - Scan Mode: Progressive
- Camera specifications
  - Field of View : **65 degree**
  - Maxmium Pixel: 2M
- Size: 20.5 × 46.5 × 11.5mm
- Product Size：46.5mm x 19.5mm x 11.7mm
- Product weight：6.3g

Include

- 1x ESP32CAM

EasyLoader

1.EasyLoader is a simple and fast program burner. Every product page in EasyLoader provides a product-related case program. It can be burned to the master through simple steps, and a series of function verification can be performed. .

2. After downloading the software, double-click to run the application, connect the M5 device to the computer through the data cable, select the port parameters, click **"Burn"** to start burning. (**For M5StickC burning, please Set the baud rate to 750000 or 115200**)

3. Currently EasyLoader is only suitable for Windows operating system, compatible with M5 system adopts ESP32 as the control core host. Before installing for M5Core, you need to install CP210X driver (you do not need to install with M5StickC as controller)

PinMap

Camera Interface PinMap

Interface	*OV2640 Pin*	*ESP32Cam*
SCCB Clock	SIOC	IO23
SCCB Data	SIOD	IO25
System Clock	XCLK	IO27
Vertical Sync	VSYNC	IO22
Horizontal Reference	HREF	IO26
Pixel Clock	PCLK	IO21
Pixel Data Bit 0	D2	IO17
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	*see Note 1*
Power Supply 3.3V	3V3	3V3
Ground	GND	GND

GROVE Interface

Grove	*ESP32Cam*
SCL	IO4
SDA	IO13
5V	5V
GND	GND

LED Interface

LED	*ESP32Cam*

	ESP32Cam
LED_Pin	IO16

reserved chip interfaces

BME280 Interface

I2C address 0x76.

BME280	*ESP32Cam*
SCL	IO4
SDA	IO13

I2C address is 0x68.

MPU6050 Interface

MPU6050	*ESP32Cam*
SCL	IO4
SDA	IO13

MIC(SPQ2410) Interface

SPQ2410	*ESP32Cam*
OUT	IO32

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 differece

Device	Chip	RAM | FLASH	Interface	ImageSensor	Lens Type	PM IC	Include
	ESP32-D0WD	520KB RAM 4MB Flash	Port (I2C/UART/GPIO) ×1	OV2640	Normal type Field of View:65 Degree	IP5306	ESP32 CAM x 1
	ESP32-D0WD	520KB RAM 4MB PSRAM 4MB Flash	Port (I2C/UART/GPIO) ×1	OV2640	Normal type Field of View:65 Degree	TP4057	M5Camera x 1 LEGO Accessories x 1 · Type-C USB Cable x 1 User Manual Wall/1515 x1
	ESP32-D0WD	520KB RAM 4MB Flash 4MB Flash	Port (I2C/UART/GPIO) ×1	OV2640	Fish Eye Field of View:160 Degree	TP4057	M5CameraF x 1 LEGO Accessories x 1 · Type-C USB Cable x 1 Wall/1515 x1
	ESP32-D0WD	520KB RAM 4MB PSRAM 4MB Flash	Port (I2C/UART/GPIO) ×1	OV2640	Normal type Field of View:65 Degree	TP4057	M5CameraX x 1 LEGO Accessories x 1 · Type-C USB Cable x 1 Wall/1515 x1
	Kendryte K210	8M RAM 16MB Flash	Port (I2C/UART/GPIO) ×1	OV7740	Normal type Field of View:65 Degree	AXP192	M5StickV x 1 Type-C USB Cable x1

Related Link

- **Offical Video**
- **Forum**
- **Datasheet** - ESP32 - OV2640

Example

Firmware

- **ESP32CAM Firmware**

Code

- **Serial communication-ESP32CAM**
- **Serial communication-M5Core**（The serial communication routine is the communication between the camera and the M5Core.）