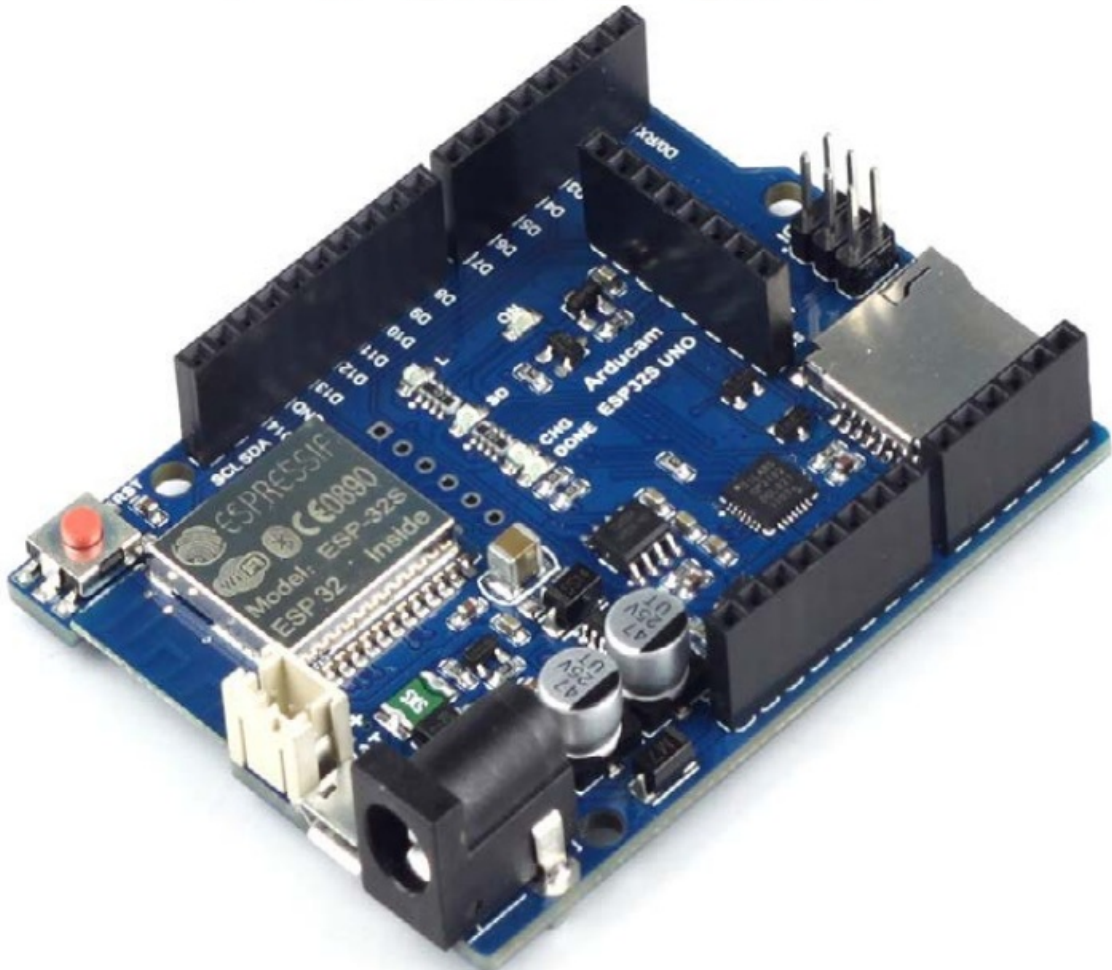


ArduCam ESP32 UNO R3 Development Board User Guide

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ArduCam



lonelybinary.com

ArduCam ESP32 UNO board
User Guide
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Introduction

Arducam now released a ESP32 based Arduino board for Arducam mini camera modules while keeping the same form of factors and pinout as the standard Arduino UNO R3 board. The high light this ESP32 board is that it well mates with Arducam mini 2MP and 5MP camera modules, supports Lithium battery power supply and recharging and with build in SD card slot. It can be an ideal solution for home security and IoT camera applications.



Figure 1 Arducam ESP32 UNO Kit

Features

- Build in ESP-32S Module
- 26 digital input/output pins, IO ports are 3.3V tolerant
- Arducam Mini 2MP/5MP camera interface
- Lithium battery recharging 3.7V/500mA max
- Building in SD/TF card socket
- 7-12V power jack input

- Build in micro USB-Serial interface
- Compatible with Arduino IDE

Pin Definition

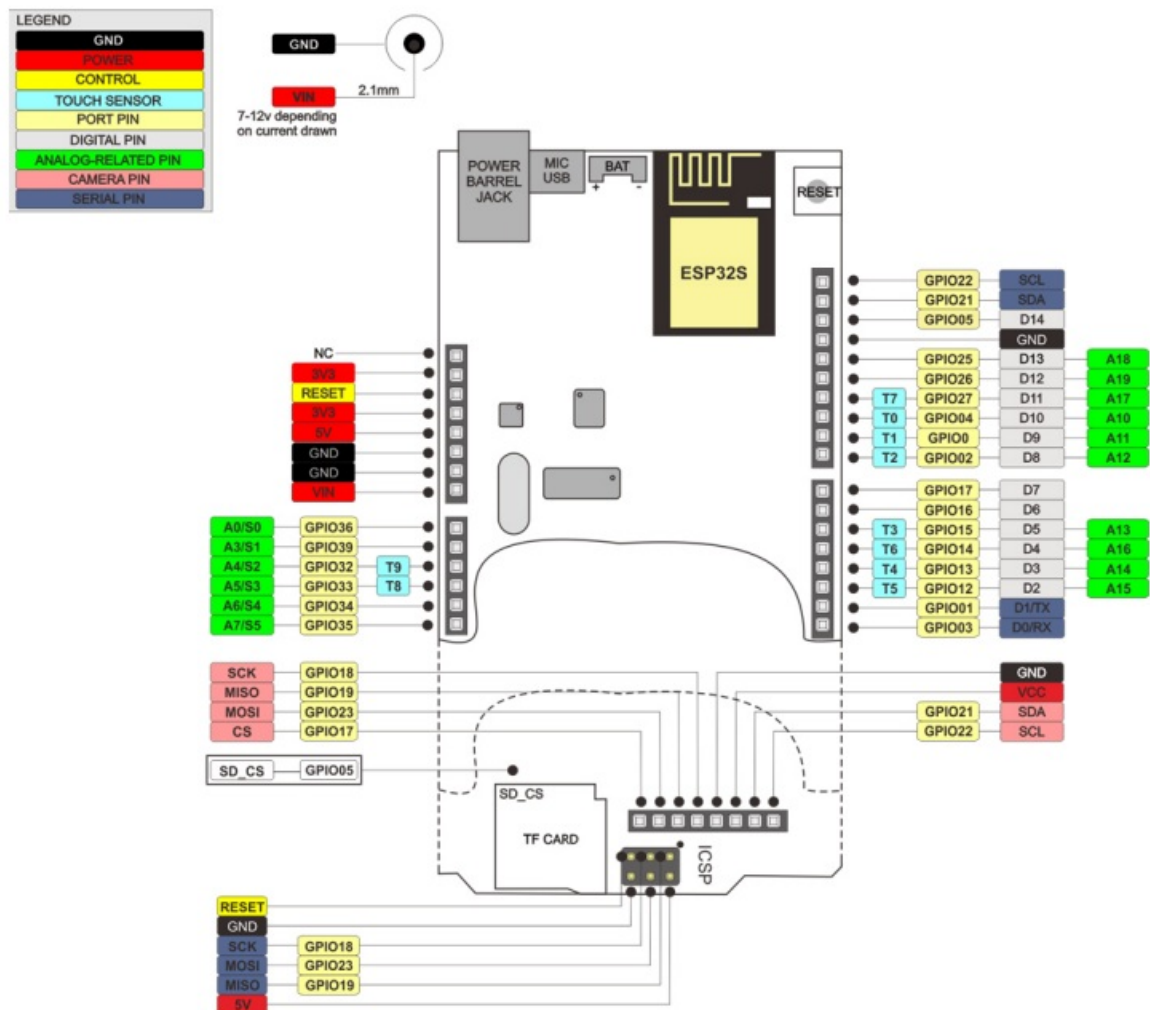
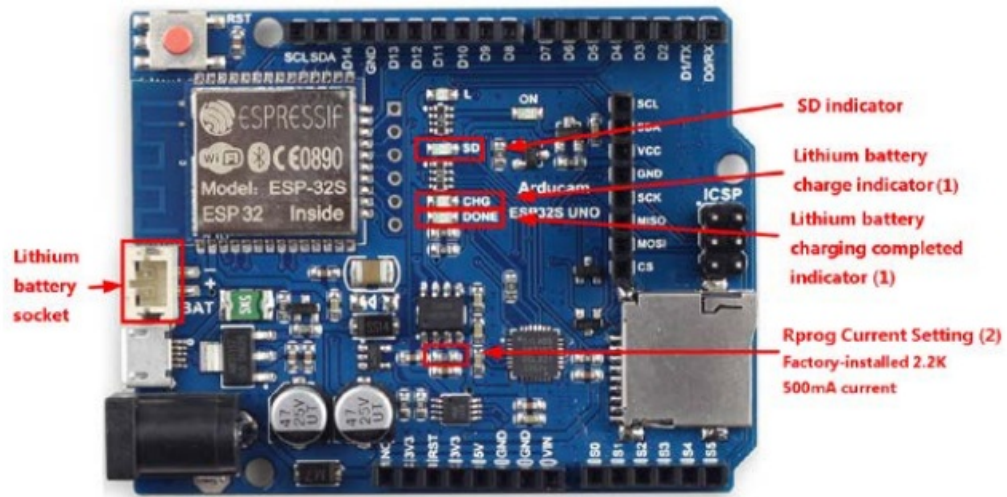


Figure 2 Arducam ESP32 UNO Pin Out

The board has build in Lithium battery charger, which accepts default 3.7V/500mA Lithium battery. The charging indicator and charging current setting can be found from the Figure 3.



(1) indicator light state

| Charge state | Yellow LED $\overline{\text{CHRG}}$ | Green LED $\overline{\text{STDBY}}$ |
|---|---|--|
| charging | bright | extinguish |
| Charge Termination | extinguish | bright |
| Vin too low; Temperature of battery too low or too high; no battery | extinguish | extinguish |
| BAT PIN Connect 10u Capacitance; No battery | Green LED bright, Yellow LED Coruscate T=1-4 S | |

(2) Rprog Current Setting

| RPROG (k) | I_{BAT} (mA) |
|--------------|--------------------------|
| 10 | 130 |
| 5 | 250 |
| 4 | 300 |
| 3 | 400 |
| 2 | 580 |
| 1.66 | 690 |
| 1.5 | 780 |
| 1.33 | 900 |
| 1.2 | 1000 |

Figure 3 Battery Charging Indicator and Current Settings

Getting Started ESP32 with Arduino IDE

This chapter shows you how to develop an application for Arducam ESP32 UNO board using Arduino IDE. (Tested on 32 and 64 bit Windows 10 machines)

4.1 Steps to install Arducam ESP32 support on Windows

- Starting Download and install the latest Arduino IDE Windows Installer from arduino.cc
- Download and install Git from git-scm.com
- Start Git GUI and run through the following steps:
Select Clone Existing Repository:

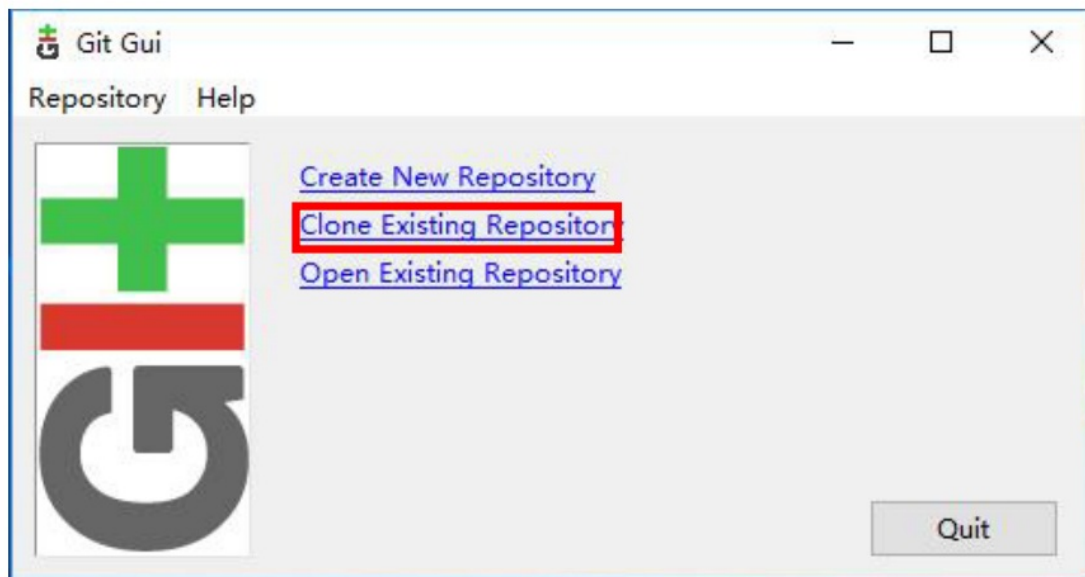


Figure 4 Select Clone Existing Repository

Select source and destination:

Source Location: https://github.com/ArduCAM/ArduCAM_ESP32S_UNO.git

Target Directory:

C:/Users/[YOUR_USER_NAME]/Documents/Arduino/hardware/ArduCAM/ArduCAM_ESP32S_UNO

Click Clone to start cloning the repository:

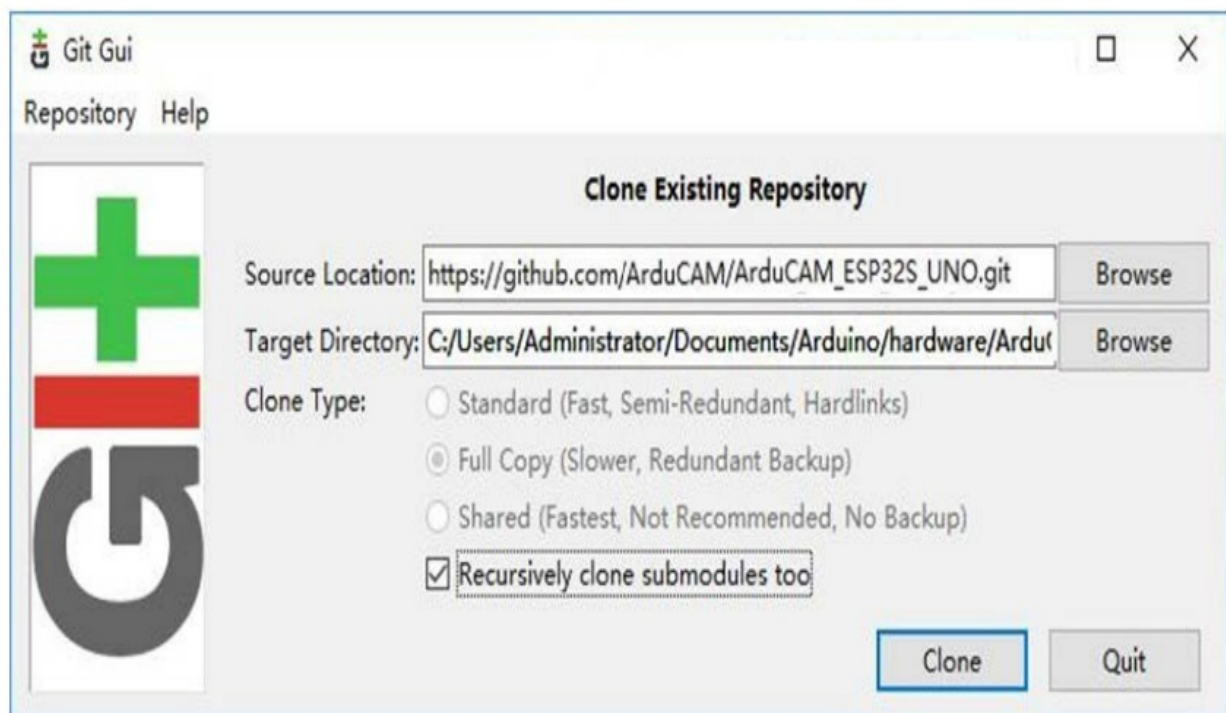


Figure 5 Clone the Repository

Open C:/Users/[YOUR_USER_NAME]/Documents/Arduino/hardware/ ArduCAM/esp32/tools and double-click get.exe

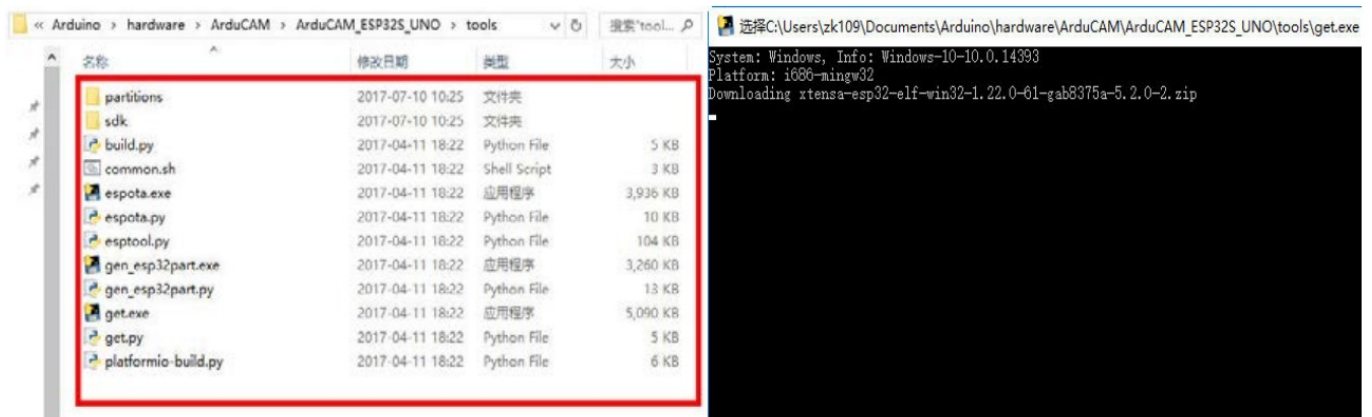


Figure 6 Install ESP32 board

When get.exe finishes, you should see the following files in the directory

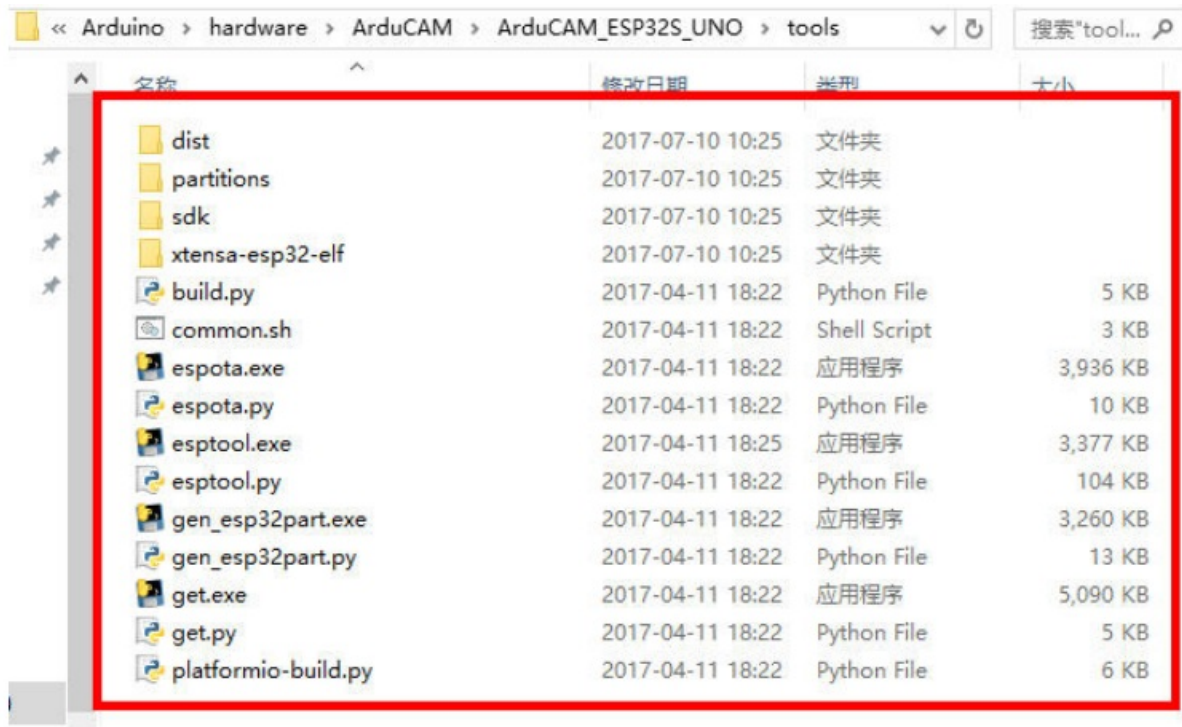


Figure 7 ESP32 board directory

Plug your ESP32 board and wait for the drivers to install (or install manually any that might be required)

4.2 Using Arduino IDE

After installation of Arducam ESP32UNO board, 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.

Start Arduino IDE, Select your board in Tools > Board menu>

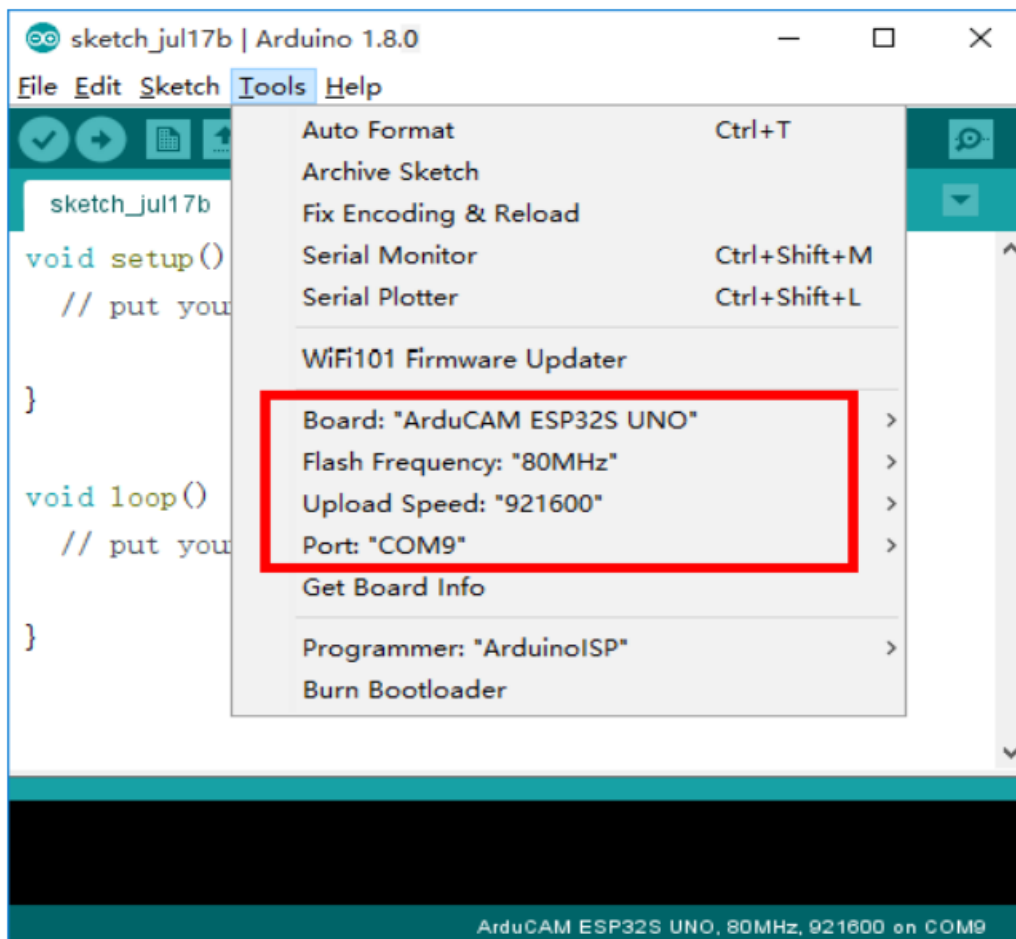


Figure 8 Board Selection

Select the example from File->Examples->ArduCAM

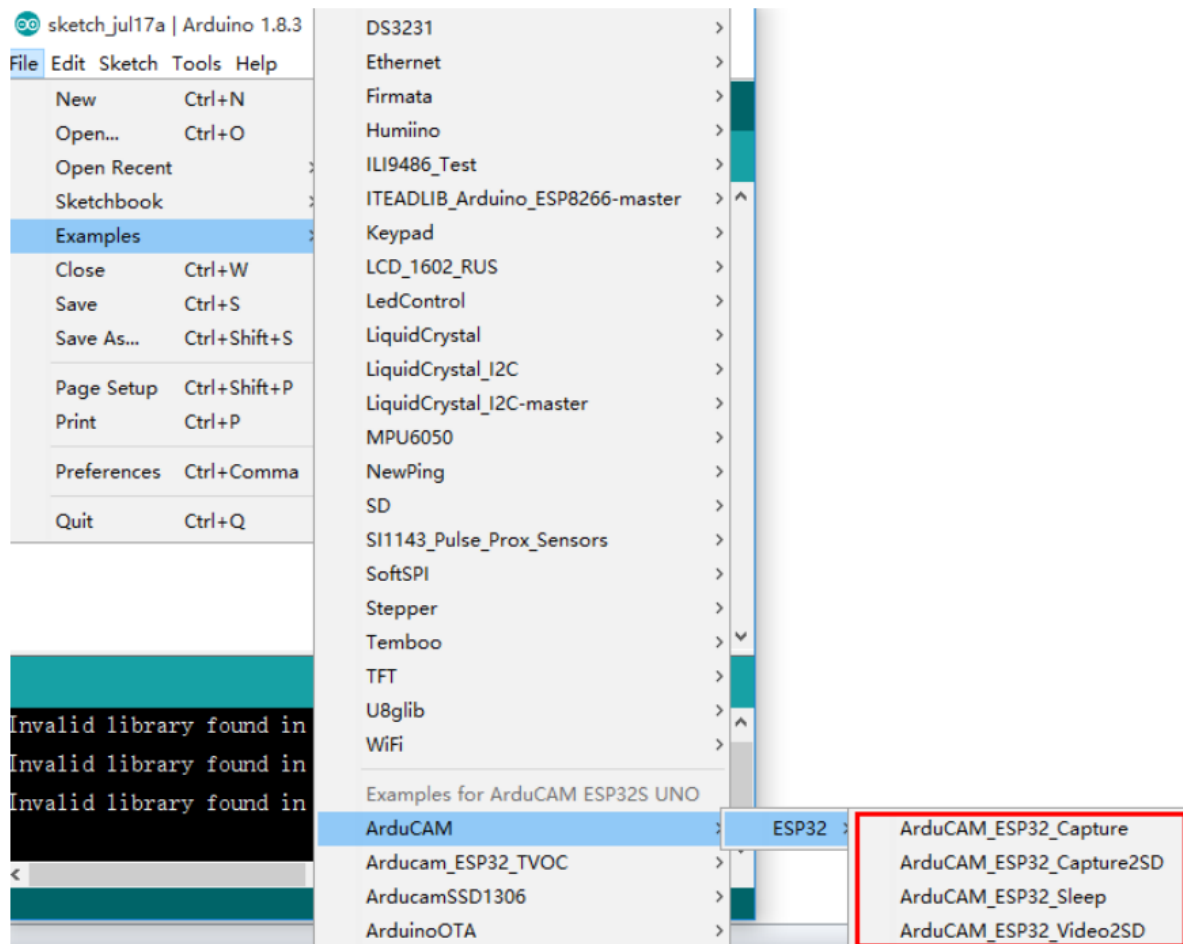


Figure 6 Example Selection

Configure the camera setting

You need to modify the memorysaver.h file in order to enable OV2640 or OV5642 camera for ArduCAM Mini 2MP or 5MP camera modules. Only one camera can be enabled at a time. The memorysaver.h file is located at C:\Users\Your computer\Documents\Arduino\hardware\ArduCAM\ArduCAM_ESP32S_UNO\libraries\ArduCAM

```
//Step 1: select the hardware platform, only one at a time
#define OV2640 MINI_2MP
//#define OV5642_MINI_5MP
//#define OV5642_MINI_5MP_BIT_ROTATION_FIXED
//#define OV5642_MINI_5MP_PLUS
//#define OV5640_MINI_5MP_PLUS

//#define ARDUCAM_SHIELD_REVC
//#define ARDUCAM_SHIELD_V2
```

Figure 7 Camera Configuration

Compile and uploading

Click uploading the example will automatically flashed into the board.

4.3 Examples

There are 4 examples for both 2MP and 5MP ArduCAM mini camera modules.

ArduCAM_ESP32_Capture

This example uses HTTP protocol to capture still or video over home wifi network from ArduCAM mini 2MP/5MP and display on the web browser.

The default is AP mode, after uploading the demo, you can search the 'arducam_esp32' and connect it without password.


```

ArduCAM_ESP32_Capture

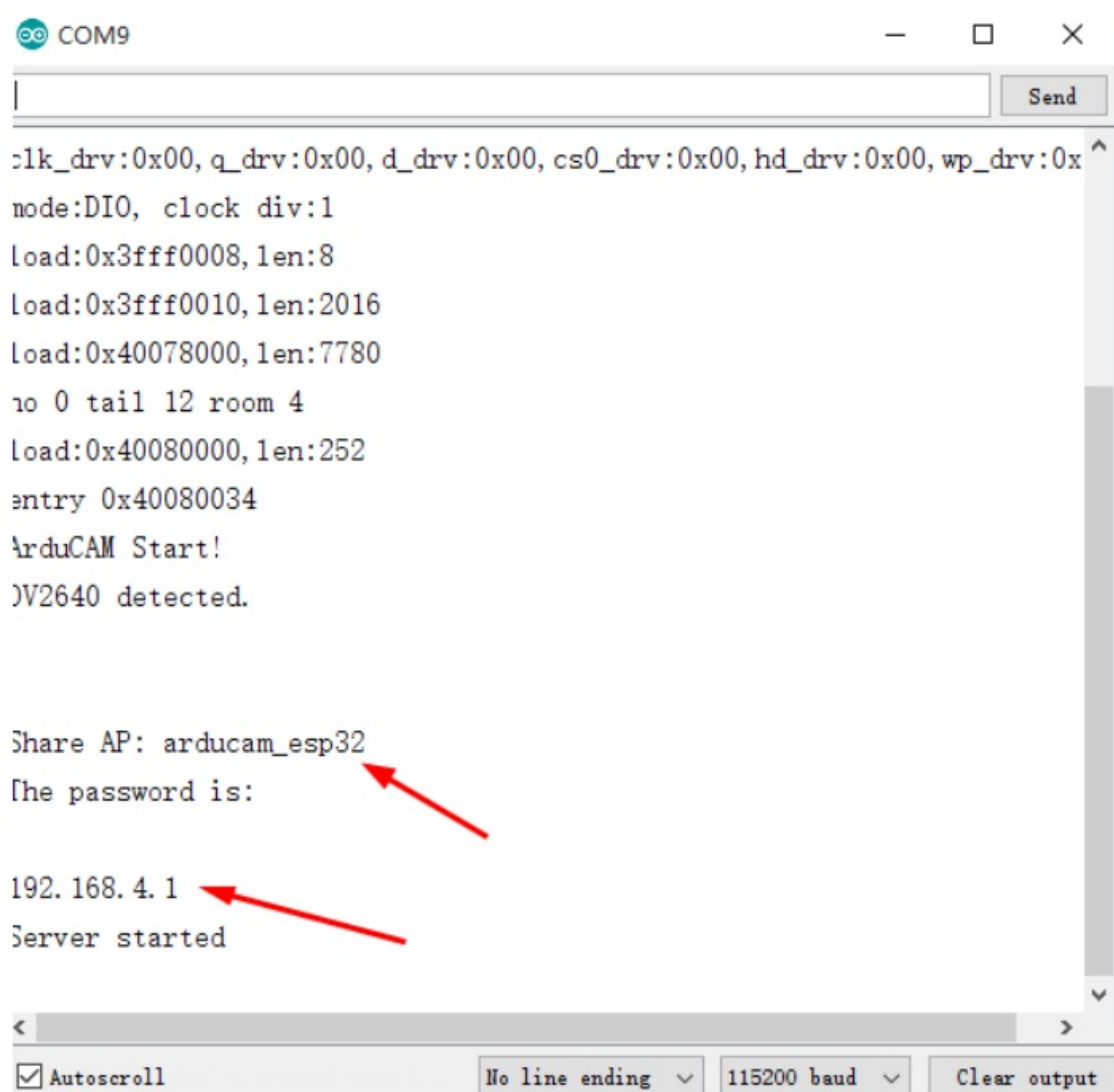
//Default is AP mode.
int wifiType = 1; // 0:Station 1:AP

//AP mode configuration
//Default is arducam_esp8266.If you want,you can change the AP_aaid to your f
const char *AP_ssid = "arducam_esp32";
//Default is no password.If you want to set password,put your password here
const char *AP_password = NULL;

//Station mode you should put your ssid and password
const char *ssid = "SSID"; // Put your SSID here
const char *password = "PASSWORD"; // Put your PASSWORD here

```

Figure 8 Mode Configure



```

COM9

clk_drv:0x00,q_drv:0x00,d_drv:0x00,cs0_drv:0x00,hd_drv:0x00,wp_drv:0x
mode:DIO, clock div:1
load:0x3fff0008,len:8
load:0x3fff0010,len:2016
load:0x40078000,len:7780
no 0 tail 12 room 4
load:0x40080000,len:252
entry 0x40080034
ArduCAM Start!
OV2640 detected.

Share AP: arducam_esp32
The password is:

192.168.4.1
Server started

```

Autoscroll No line ending 115200 baud Clear output

Figure9 Identifying IP address

If you want to use STA mode, you should change 'int wifiType = 1' to 'int wifiType = 0'. The ssid and password should be modified before uploading.



```
ArduCAM_ESP32_Capture | Arduino 1.8.3
File Edit Sketch Tools Help

#endif

//you can change the value of wifiType to select Station or AP mode.
//Default is AP mode.
int wifiType = 0; // 0:Station 1:AP

//AP mode configuration
//Default is arducam_esp8266. If you want, you can change the AP_name to
const char *AP_ssid = "arducam_esp32";
//Default is no password. If you want to set password, put your password here
const char *AP_password = NULL;

//Station mode you should put your ssid and password
const char *ssid = "SSID"; // Put your SSID here
const char *password = "PASSWORD"; // Put your PASSWORD here
```

Figure10 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 9 shown. The default serial monitor baudrate setting is 115200bps.

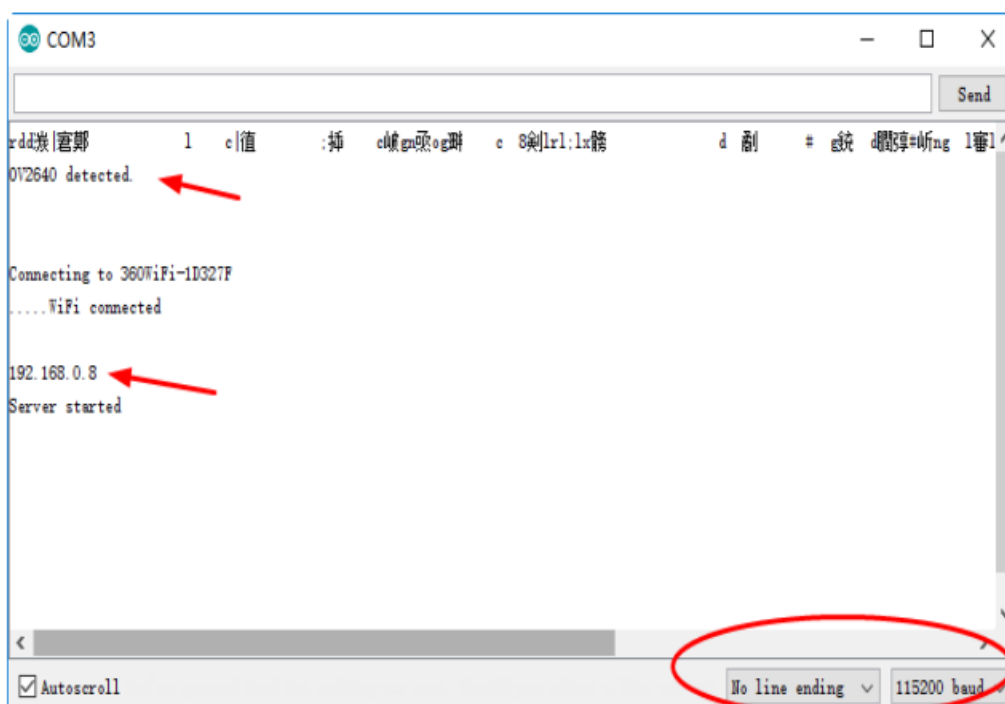



Figure 10 Identifying IP address

Finally, open the index.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\Documents\Arduino\hardware\ArduCAM\ArduCAM_ESP32S_UNO\libraries\ArduCAM\examples\ESP32\ArduCAM_ESP32_Capture\html

ArduCAM_OV2640_Video



Camera IP Address

192.168.4.1

If no response, please check the Camera IP Address above

160X120

176X144

320X240

352X288

640X480

800X600

1024X768

1280X1024

1600X1200

Change Mode

Figure 11 Example Html page

ArduCAM_ESP32_Capture2SD

This example takes time elapse still photos using ArduCAM mini 2MP/5MP and then stored on the TF/SD card.
The LED indicates when the TF/SD card is writing.

```
load:0x3fff0008,len:8
load:0x3fff0010,len:2016
load:0x40078000,len:7780
ho 0 tail 12 room 4
load:0x40080000,len:252
entry 0x40080034
ArduCAM Start!
SD Card detected!
SD Card Type: SDHC
SD Card Size: 7580MB
OV2640 detected.
Star Capture
Capture Done.
The fifo length is :6148
Image save OK.
Star Capture
Capture Done.
The fifo length is :6148
```

The screenshot shows a serial monitor window with a 'Send' button at the top right. The output text is as follows: 'load:0x3fff0008,len:8', 'load:0x3fff0010,len:2016', 'load:0x40078000,len:7780', 'ho 0 tail 12 room 4', 'load:0x40080000,len:252', 'entry 0x40080034', 'ArduCAM Start!', 'SD Card detected!', 'SD Card Type: SDHC', 'SD Card Size: 7580MB', 'OV2640 detected.', 'Star Capture', 'Capture Done.', 'The fifo length is :6148', 'Image save OK.', 'Star Capture', 'Capture Done.', and 'The fifo length is :6148'. A red arrow points to the line 'SD Card Size: 7580MB'. At the bottom, there are controls for 'Autoscroll' (checked), 'No line ending' (dropdown), '115200 baud' (dropdown), and a 'Clear output' button.

Figure 12 Example ArduCAM_ESP32_Capture2SD

ArduCAM_ESP32_Video2SD

This example takes motion JPEG video clips using ArduCAM mini 2MP/5MP and then stored on the TF/SD card as AVI format.


```
COM9
|
| Send
|
| configsip: 0, SPIWP:0x00
| clk_drv:0x00, q_drv:0x00, d_drv:0x00, cs0_drv:0x00, hd_drv:0x00, wp_drv:0x
| mode:DIO, clock div:1
| load:0x3fff0008, len:8
| load:0x3fff0010, len:2016
| load:0x40078000, len:7780
| ho 0 tail 12 room 4
| load:0x40080000, len:252
| entry 0x40080034
| ArduCAM Start!
| SD Card detected!
| OV2640 detected.
| SD Card Type: SDHC
| SD Card Size: 7580MB
| Recording video, please wait...
| Record video OK
| Recording video, please wait...
|
| < >
| ☒ Autoscroll No line ending 115200 baud Clear output
```

Figure 13 Example ArduCAM_ESP32_Video2SD

ArduCAM_ESP32_Sleep

To reduce power consumption, calling the interface function immediately goes into the Deep – sleep mode. In this mode, the chip will disconnect all wi-fi connections and data connections and enter the sleep mode. Only the RTC module will still work and be responsible for the timing of the chip. This demo is suitable for battery power.



Figure 14 Normal mode




Figure 15 DeepSleep mode

```
SD Card detected!  
SD Card Type: SDHC  
SD Card Size: 7580MB  
OV2640 detected.  
Star Capture  
Capture Done.  
The fifo length is :7172  
Image save OK.  
ets Jun  8 2016 00:22:57  
  
rst:0x5 (DEEPSLEEP_RESET),boot:0x13 (SPI_FAST_FLASH_BOOT)  
config: 0, SPIWP:0x00  
clk_drv:0x00, q_drv:0x00, d_drv:0x00, cs0_drv:0x00, hd_drv:0x00, wp_drv:0x00  
mode:DIO, clock div:1  
load:0x3fff0008,len:8  
load:0x3fff0010,len:2016  
load:0x40078000,len:7780  
ho 0 tail 12 room 4
```

Figure 16 Example ArduCAM_ESP32_Sleep

Documents / Resources

| | |
|---|---|
|  | <p>ArduCam ESP32 UNO R3 Development Board [pdf] User Guide</p> <p>ESP32 UNO R3 Development Board, ESP32, UNO R3 Development Board, R3 Development Board, Development Board, Board</p> |
|---|---|

References

- [Arduino - Home](#)
- [Git](#)
- [Lonely Binary](#)
- [Simplifying embedded vision for all. - Arducam](#)
- [GitHub - ArduCAM/ArduCAM_ESP32S_UNO: ArduCAM ESP32 Series Development Boards](#)
- [GitHub - esp8266/Arduino: ESP8266 core for Arduino](#)
- [User Manual](#)

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