ESP32 survival guide

Working with ESP32 WROVER (camera enabled)

I decided to try an alternative to ESP32 cam boards which are limited in functionality due to all pins except 13 being reserved for the camera. The ESP2 WROVER boards, although less popular, offers certain advantages:

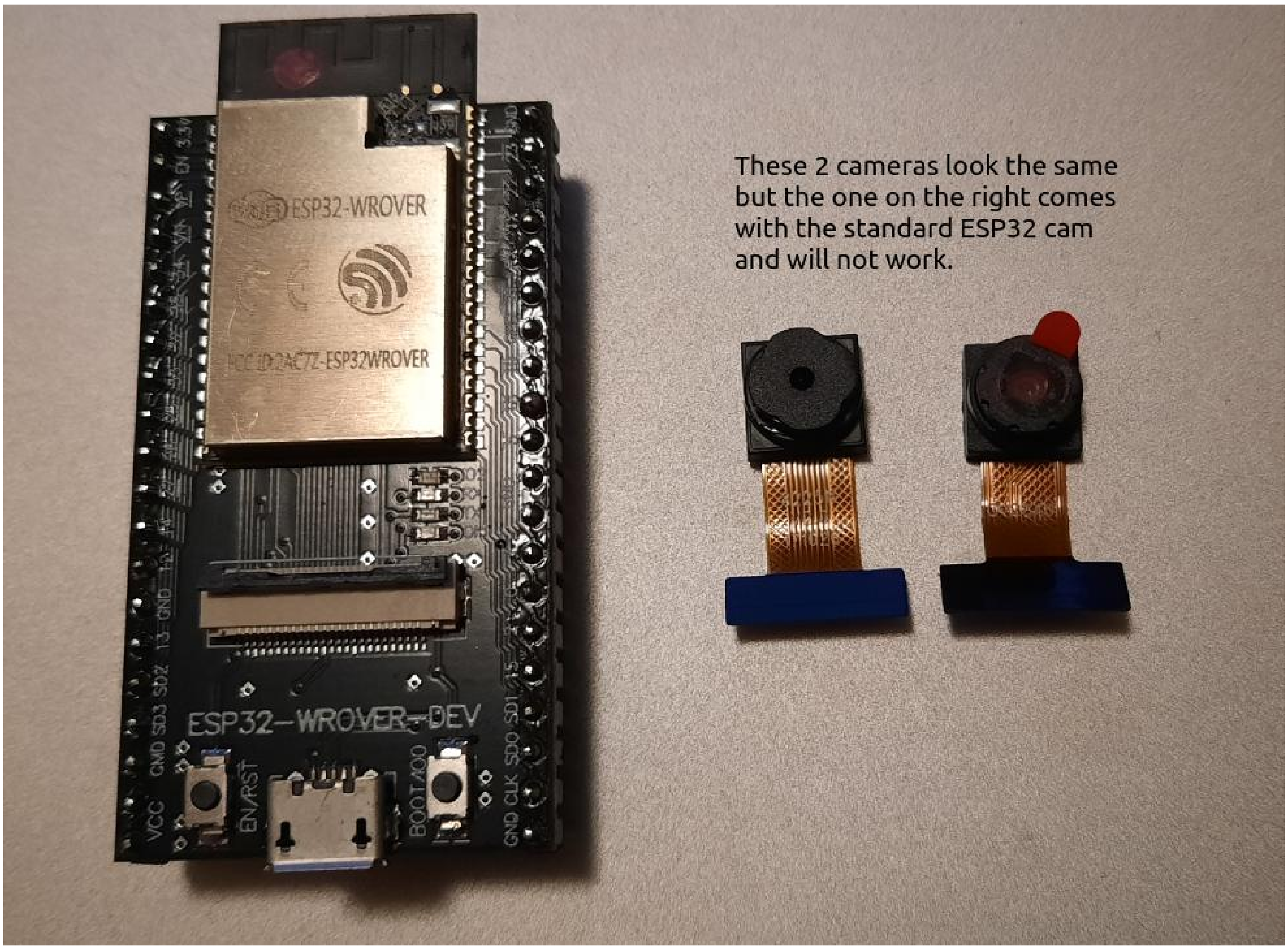
- no need for an interface board or UART upload board
- many more pins to use for motion sensors or other similar triggers
- can be used as a standard ESP32 controller for other projects if needed
- can be used with a slightly modified but otherwise standard ESP32 case

disadvantages:

- lack of a flash LED (could add your own and possibly much brighter)
- no memory card slot
- no ability to add an external antenna

It took some time to solve a couple of issues I ran into. At first I assumed I had received bad hardware, but it turned out the setting in my Arduino IDE were simply wrong. Also I had the wrong camera type selected.

First of all, the cameras that ship with ESP32 Wrover boards are NOT the same ones we get with ESP32 cam boards. Although both are technically OV2640 cameras, I was not able to get those shipped with ESP32 cameras to work with my ESP32 WROOM.


These 2 cameras look the same but the one on the right comes with the standard ESP32 cam and will not work.
ESP32-WROVER
ESP32-WROVER-DEV

In my code I had to switch from:

```
#define CAMERA_MODEL_AI_THINKER
```

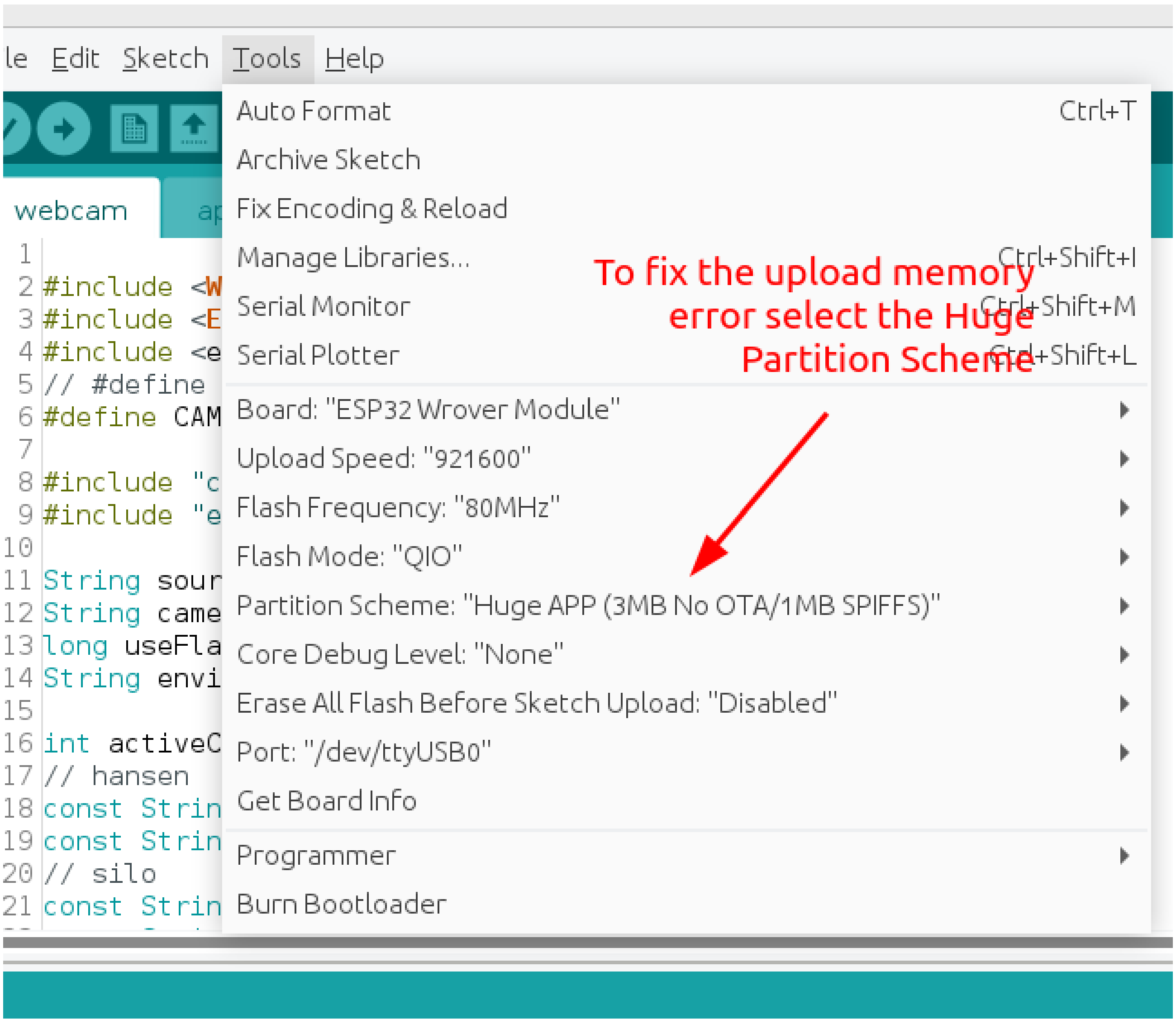
to:

```
#define CAMERA_MODEL_WROVER_KIT // Has PSRAM
```

Additionally, when uploading using the ESP32 WROVER Module, I was getting this error:

```
esp32 Sketch uses 1509765 bytes (115%) of program storage space. Maximum is 1310720 bytes.
```

This was fixed by setting the Partition Scheme in the arduino IDE to "huge" (see screen below)



```
1
2 #include <W
3 #include <E
4 #include <e
5 // #define
6 #define CAM
7
8 #include "c
9 #include "e
10
11 String sour
12 String came
13 long useFla
14 String envi
15
16 int activeC
17 // hansen
18 const Strin
19 const Strin
20 // silo
21 const Strin
```

Board: "ESP32 Wrover Module"
Upload Speed: "921600"
Flash Frequency: "80MHz"
Flash Mode: "QIO"
Partition Scheme: "Huge APP (3MB No OTA/1MB SPIFFS)"
Core Debug Level: "None"
Erase All Flash Before Sketch Upload: "Disabled"
Port: "/dev/ttyUSB0"

To fix the upload memory error select the Huge Partition Scheme

le Edit Sketch Tools Help
webcam
Auto Format Ctrl+T
Archive Sketch
Fix Encoding & Reload
Manage Libraries... Ctrl+Shift+I
Serial Monitor Ctrl+Shift+M
Serial Plotter Ctrl+Shift+L
Get Board Info
Programmer
Burn Bootloader

With these changes I was able to get the ESP32 WROVER and camera to work propery.

See also: https://randomnerdtutorials.com/getting-started-freenove-esp32-wrover-cam/

creating graphics for monochrome lcd displays

See: https://homelab.impressto.ca/image2hex.php

Remotely control an esp32 with a built-in web server and clourflare

```
cloudflared tunnel  create tunnel-name

cloudflared tunnel route dns tunnel-name tunnel.example.com

cloudflared tunnel run --url http://localhost:5467  tunnel-name
```

Update /etc/cloudflared/config.yml and add an entry:

```
  - hostname: leds.impressto.ca
    service: http://192.168.0.192:80
```