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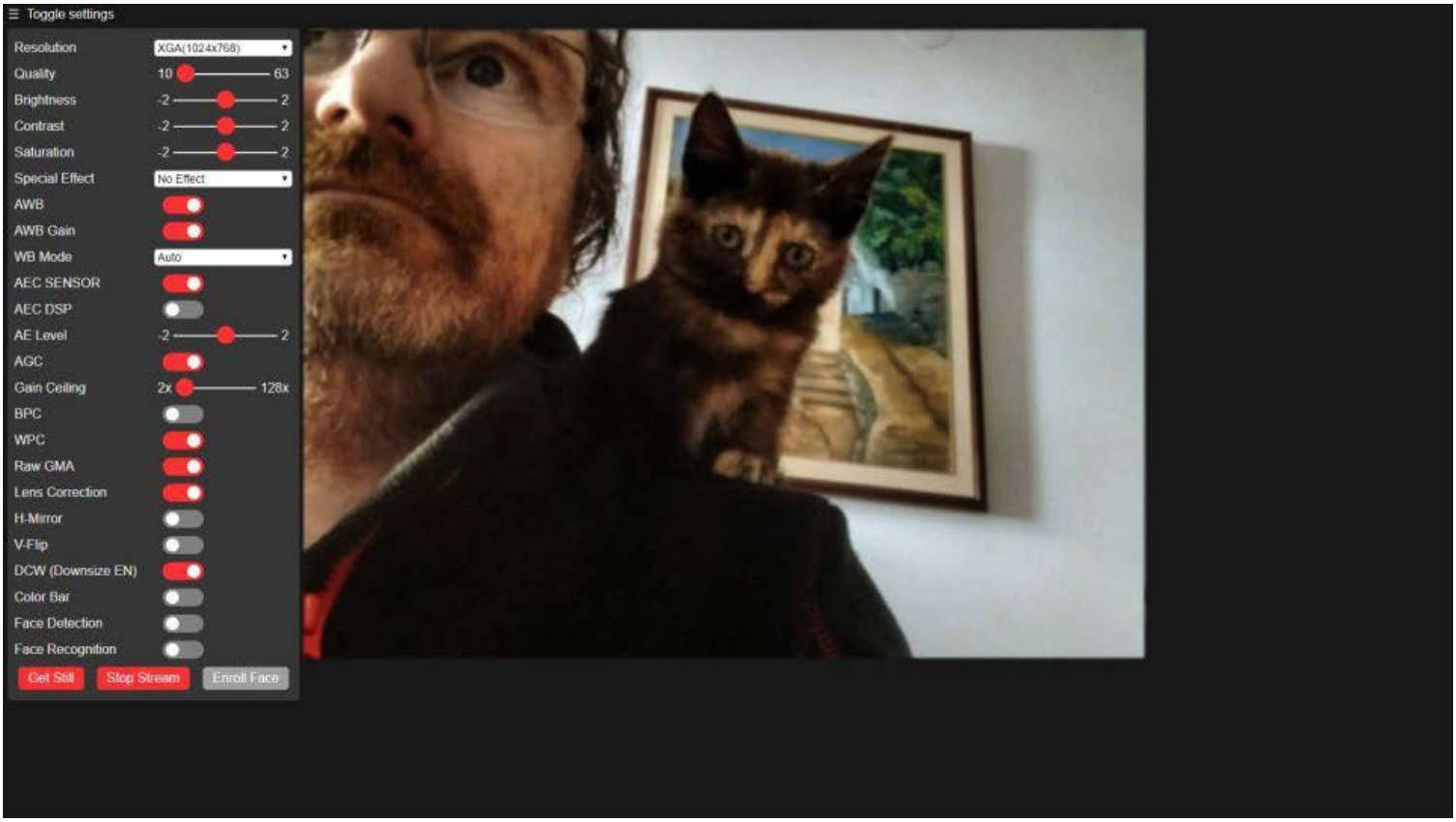
ESP32 Face Recognition

Ai-Thinker ESP32-CAM in the Arduino IDE

January 16, 2019 · Updated: 18:18:41 · WordBot 8200 26



Setting up the Ai-Thinker ESP32-CAM with the Arduino IDE Camera Web Server example.

The AI-Thinker ESP32-CAM module features an ESP32-S chip, an OV2640 camera and a microSD card slot. They have them on AliExpress here. There are other ESP32 based camera modules available that should work if the pins are set in the sketch.

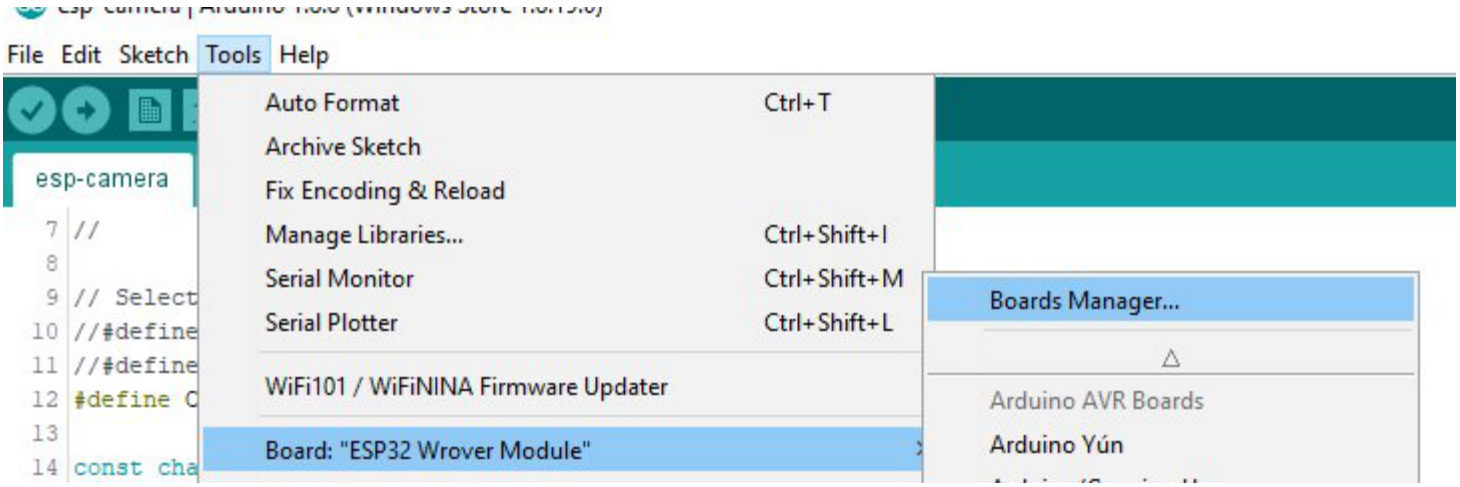
If you prefer to work with your ESP32 in the Espressif IDF there's another guide here: ESP32 Camera Module with Face

Recognition

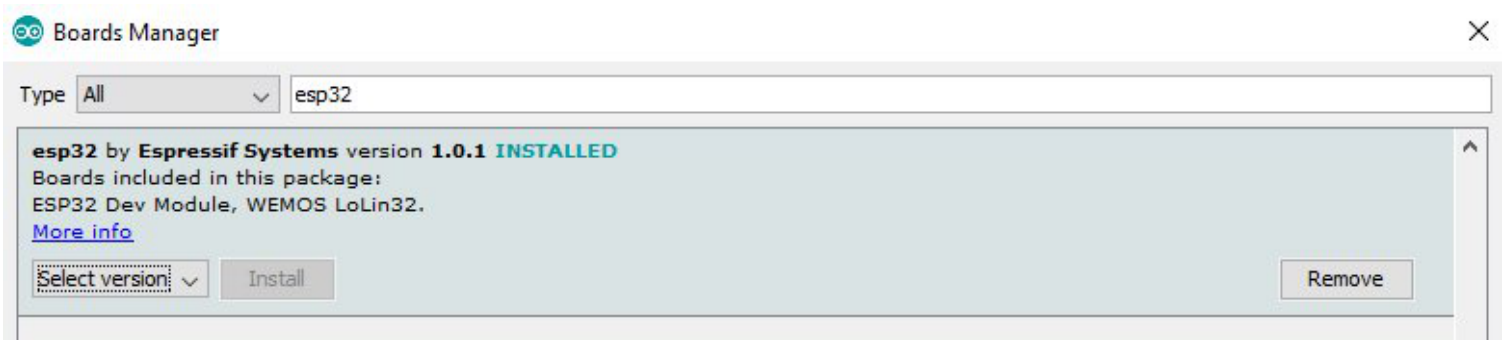
Adding or Updating the ESP32 Range in the Arduino IDE

If you've **never used** an ESP32 board in the Arduino IDE you need to follow the first part of this tutorial: ESP32 Built-in OLED Heltec WiFi Kit 32

If you **already have** the ESP32 boards available in your IDE then you just need to update to the latest version of the board libraries. To do this, open the Arduino IDE and in the menu: Tools > Board:xxxxx > Boards Manager:



Search for ESP32:

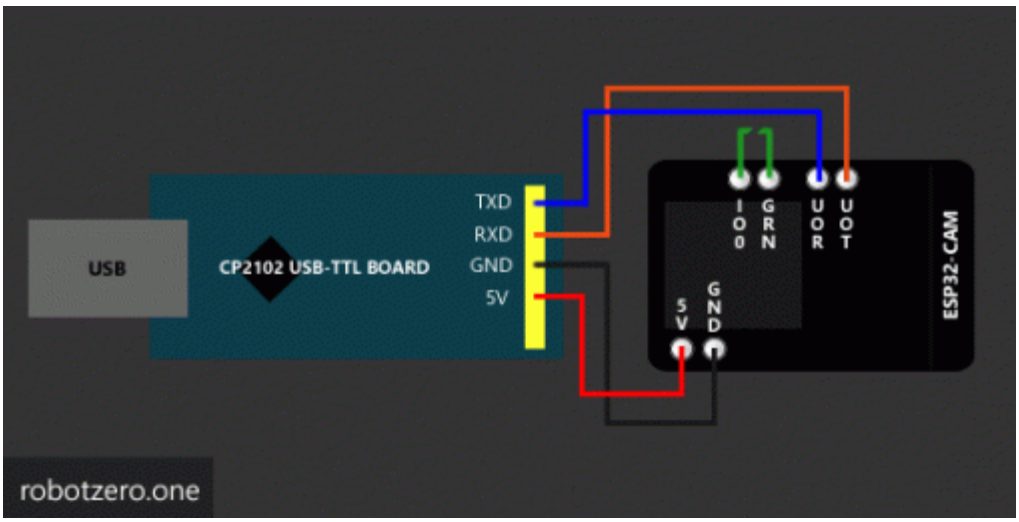


Update this to the latest version.

Connections

The ESP32-CAM doesn't come with a USB connector so you need either a CP2102 or a FT232RL USB to TTL Serial Converter to connect it to your PC. When using WiFi the ESP32 can use more current than is supplied via USB through these devices resulting in the module crashing and rebooting. I found the top device worked fine (I bought it here) but the FT232RL wouldn't work without a separate supply to the 5V pin.

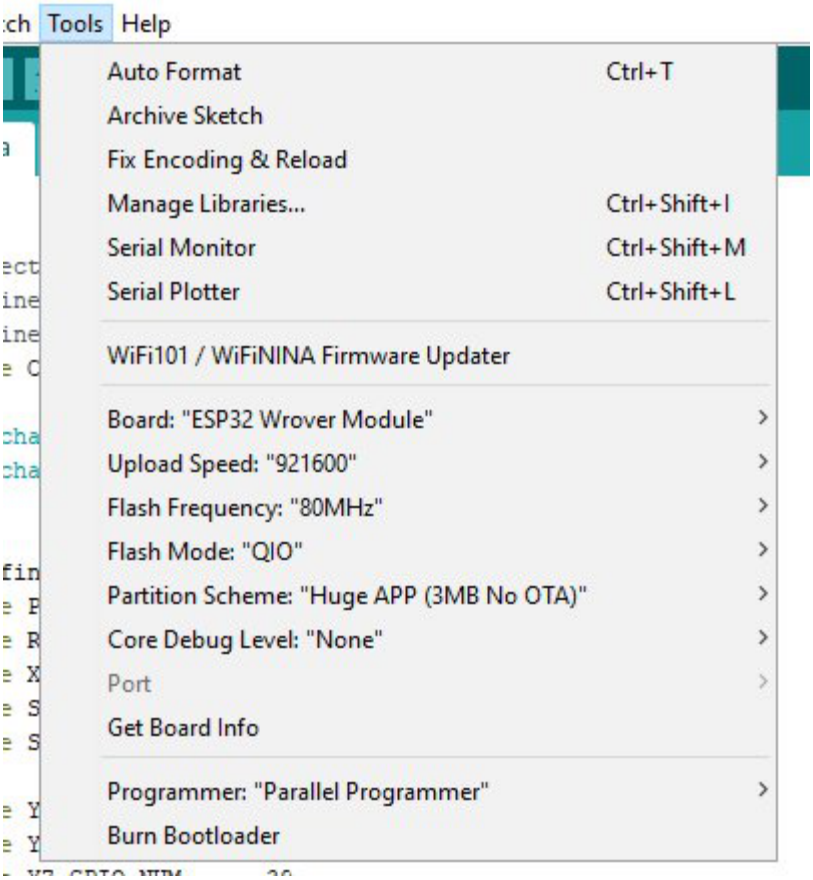
USB to Serial TTL Above FT232RL Below



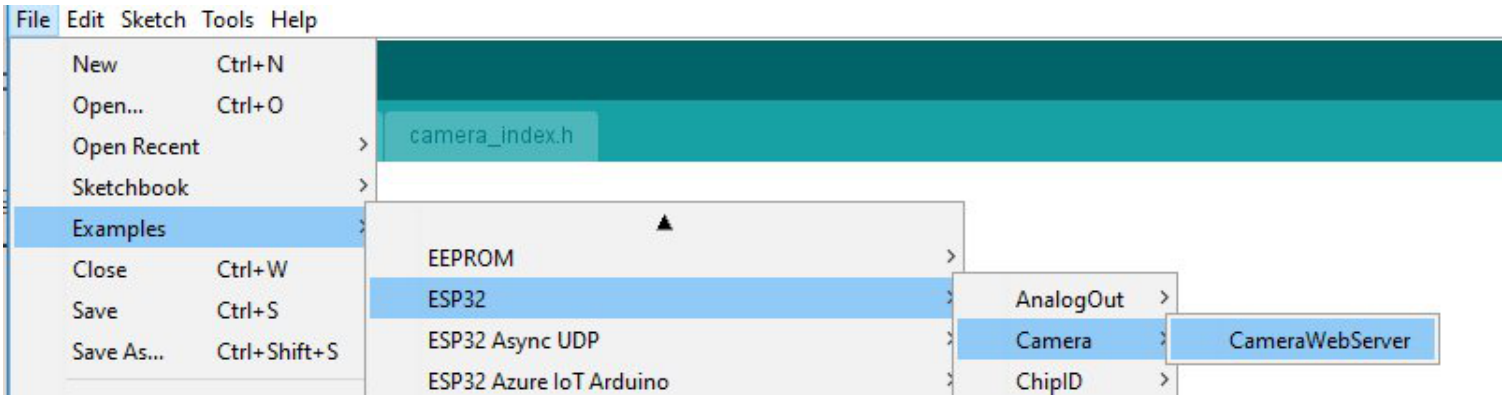
Wire the module according to the diagram above. The green connection should be connected when flashing the module and disconnected when running.

Running the Camera Web Server Example

Plug in your module and change the board settings to these:



Open the Sketch by navigating File > Examples > ESP32 > Camera > CameraWebServer:



Edit the Sketch defines to look like this (assuming you are using the Ai-Thinker module):

```
// Select camera model
//#define CAMERA_MODEL_WROVER_KIT
//#define CAMERA_MODEL_M5STACK_PSRAM
#define CAMERA_MODEL_AI_THINKER
```

Change the following two lines to match your WiFi connection details:

```
const char* ssid = "NSA";
const char* password = "orange";
```

Click Upload to build and flash the Sketch to your device.

If you get an error that the device fails to connect. Check that the IO0 pin (green in the diagram) is connected to GND and press the reset button under the module and try again.

When the device has completed flashing, unplug IO0 from GND.

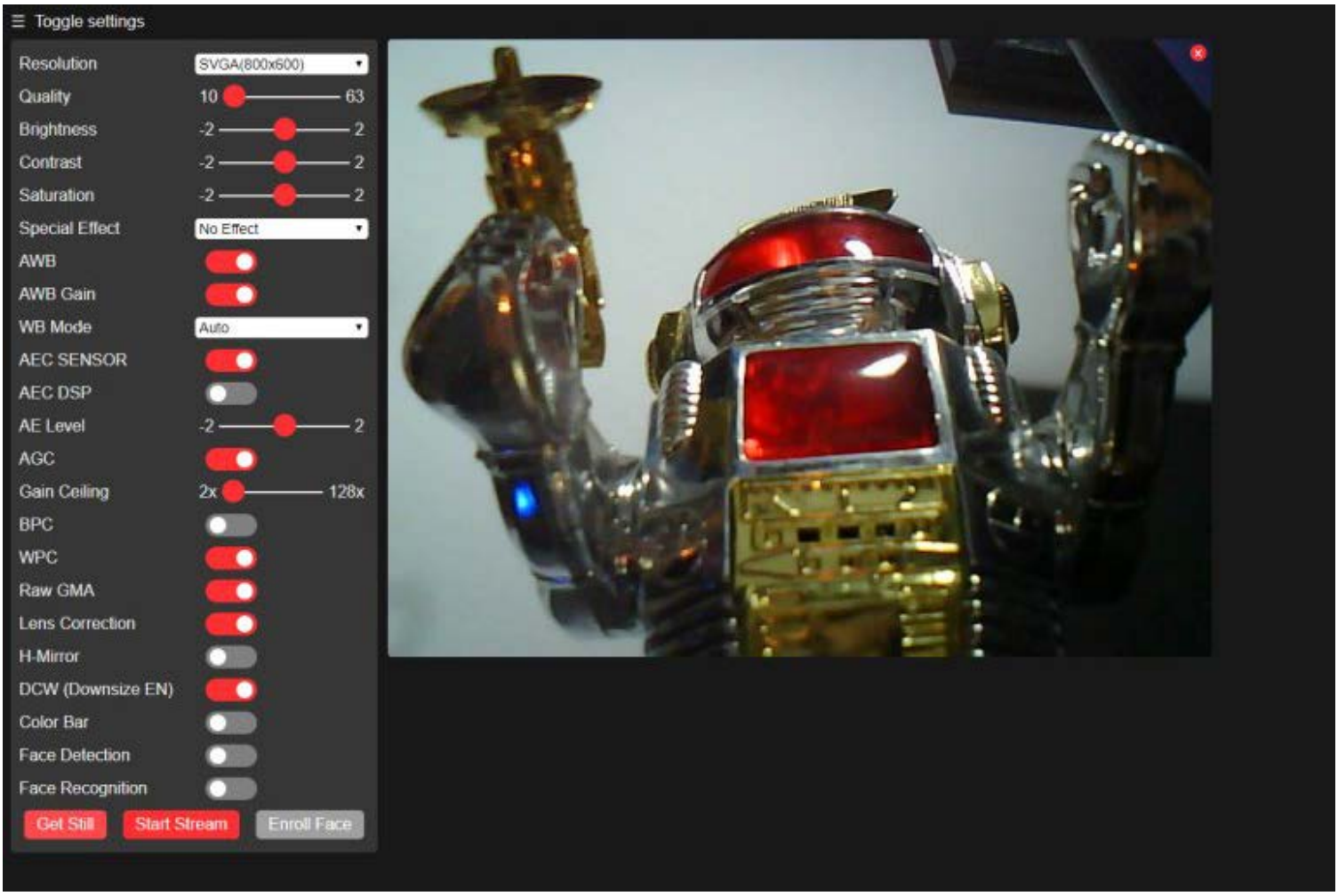
Open the serial monitor via Tools > Serial Monitor.

Press the reset button on the ESP32-CAM and watch the start up sequence in the serial monitor:

```
.........
WiFi connected
Starting web server on port: '80'
Starting stream server on port: '81'
Camera Ready! Use 'http://192.168.1.103' to connect
```

Look for the IP address that the ESP32 has been given on your network.

Type that IP address into your browser. You should be able to see a GUI on the left where you can control elements of the camera, set face detection and face recognition. Click **Get Still** to take a photo. Click **Start Stream** to see a video stream from the camera.



Resources

Here's a list of resources that I used to get this working

https://github.com/espressif/arduino-esp32/tree/master/libraries/ESP32/examples/Camera/CameraWebServer – Arduino Camera Web Server example

https://github.com/espressif/esp-who – Homepage for the face recognition library

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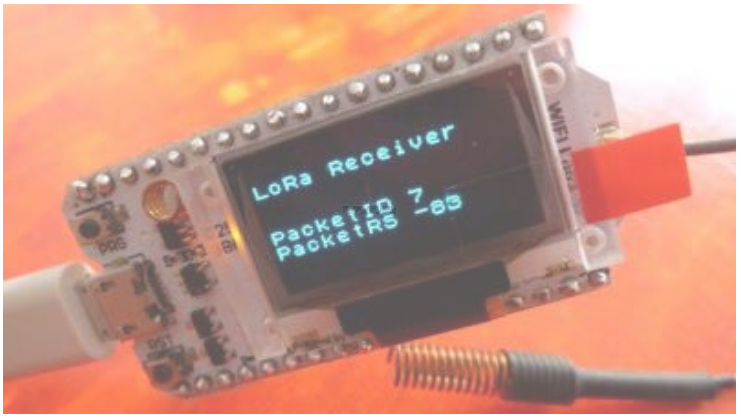

Heltec WiFi LoRa 32 – ESP32 with OLED and SX1278

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26 Replies to “Ai-Thinker ESP32-CAM in the Arduino IDE”

Chris Lidyard
January 17, 2019 at 9:07 pm

Thanks for the article. Sorted me out and have donated. Keep posting, I'm interested in your adventures with the MAIX board.

REPLY

WordBot
January 18, 2019 at 2:30 pm

That's great thanks! The MAIX is very interesting but they have a way to go to get to where the Espressif boards are with libraries etc.

REPLY

who_took_my_nick
January 22, 2019 at 2:33 pm

Brownout detector was triggered

ets Jun 8 2016 00:22:57

rst:0xc (SW_CPU_RESET),boot:0x1b (SPI_FAST_FLASH_BOOT)
configsip: 0, SPIWP:0xee
clk_drv:0x00,q_drv:0x00,d_drv:0x00,cs0_drv:0x00,hd_drv:0x00,wp_drv:0x00
mode:DIO, clock div:1
load:0x3fff0018,len:4
load:0x3fff001c,len:1100
load:0x40078000,len:10088
load:0x40080400,len:6380
entry 0x400806a4

It is power issue, as i can see from the forums. I power it as you suggested. From the same TTL adapter i use 5V and GND and connect it to 5V and GND on the ESP32 cam board. ESP module is little bit hot. Not sure is it ok. Any idea?

REPLY

WordBot
January 22, 2019 at 3:26 pm

I found that with the FT232RL connected with a USB cable that when the wifi started up it would crash with the brown out error. The other connector I plugged straight into my PC (no cable) and this was fine. It could be your adaptor or the USB cable that

can’t carry the current needed. You can connect your own supply of 5v to the board (without the 5v and ground of the connector being connected) to see if that works.

REPLY

_rp_
January 27, 2019 at 5:56 pm

Thanks for this…

Any ideas on how to activate the flash light?

rp

REPLY

WordBot
January 27, 2019 at 8:05 pm

Not yet. I’ll write a note if I find out.

REPLY

Piebe
February 3, 2019 at 4:29 pm

GPIO4 is the Flash

REPLY

_rp_
February 4, 2019 at 2:31 pm

Thanks.
That thing is bright…

REPLY

victor
February 8, 2019 at 7:05 pm

Do you have an example of how to save a photo to the card?

REPLY

WordBot
February 8, 2019 at 7:57 pm

Here's a start – https://github.com/raphaelbs/esp32-cam-ai-thinker/tree/master/examples/sd_jpg but this is for the Espressif IDF. I've not tried it myself.

REPLY

Richard Luckman
February 18, 2019 at 8:43 pm

Just in case anyone has the same problem that I had whereby the module worked fine plugged directly into the PC but as soon as I moved it to photograph the bird table just outside the window I lost connection. On my module the jumper next to the IPEX connector was set to use the IPEX connector and not the circuit board antenna. Pictures I have seen on the web show it jumpered the other way. As it happened my eventual plan was to use it with an external antenna so it saved me having to alter the jumper

REPLY

Tony Yeung
March 26, 2019 at 11:26 pm

Can you provide details of how the jumper is supposed to be configured? I can't find the information of how to set it to IPEX versus PCB antenna.

REPLY

Ian Muir
February 19, 2019 at 7:03 pm

After booting and watching the serial monitor mine just shows dots going across the screen and nothing else.
I am running off a seperate 5v power supply.
any Ideas?

REPLY

WordBot
February 19, 2019 at 7:17 pm

The dots are shown while it's trying to connect to the your wifi network. Double check your wifi settings and maybe move closer to the router.

Also – see this comment: https://robotzero.one/esp32-cam-arduino-ide/#comment-2703

REPLY

Ian Muir
February 21, 2019 at 7:20 pm

Thanks.
It now connects and I can log on to it with a web browser.
There is no camera picture, the controls show but the camera picture is just black.

REPLY

WordBot
February 21, 2019 at 8:07 pm

Press f12 in the browser to open the console. Go to the network tab and then click Get Still or Start Stream on the controls do you see an error in the network tab?

REPLY

Ian Muir
February 23, 2019 at 10:08 am

No errors, it just records a black screen. Tried 2 units both with the same results.

REPLY

WordBot
February 25, 2019 at 10:03 am

I have another tutorial to finish this week that uses the camera in a different way. We can see if it works with this.

REPLY

Leszek Niedziela
February 23, 2019 at 12:03 am

Thank you for the detailed explanation! Have a coffee!

REPLY

WordBot
February 23, 2019 at 9:03 am

Appreciated! Thanks.

REPLY

Clavier pierre
March 6, 2019 at 2:56 pm

Merci pour ce tuto il fonctionne parfaitement. J'ai passé des jours à fouiller internet sans jamais réussir à faire fonctionner esp32cam encore un grand merci. Serait-il possible de connecter le module directement sur un écran tft lcd?

REPLY

WordBot
March 6, 2019 at 3:48 pm

It's going to be difficult to connect a screen to the Ai-thinker board because nearly all the pins are used by the camera or SD-card reader http://wiki.aithinker.com/esp32-cam (scroll down).

REPLY

Mike
March 15, 2019 at 7:49 am

Thank you very much for this, three ESP32-Cams are now working smooth within my HomeAssistant / MotionEye – wonderful
After each reconnect of the ESP32-Cam to power, i have to press this little reset button once, for connecting to the WLAN – is there a pin layout to solder a bigger button to the Cam?
So again, thank you very much for this!!!

REPLY

WordBot
March 16, 2019 at 12:30 pm

I just tried with mine and reconnecting power (at least via USB) causes it to reconnect to the WiFi.

REPLY

day tripper
March 18, 2019 at 3:18 am

Thanks very much for this publication, I received a pair of the esp32-cam modules yesterday and had them both running by this afternoon.

The one question I have is if anyone has integrated control of the hella bright LED into this kit? It doesn't appear to be "wired" into the code (though I did notice it tends to have a weak glow).

fwiw, I strongly recommend fitting some kind of heat sink to the SOC shield (and hope there's some thermal compound under it) as it runs pretty toasty while streaming.

Cheers!

REPLY

WordBot
March 18, 2019 at 2:59 pm

LED is on pin 04 – https://robotzero.one/esp32-cam-arduino-ide/#comment-2381

REPLY

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