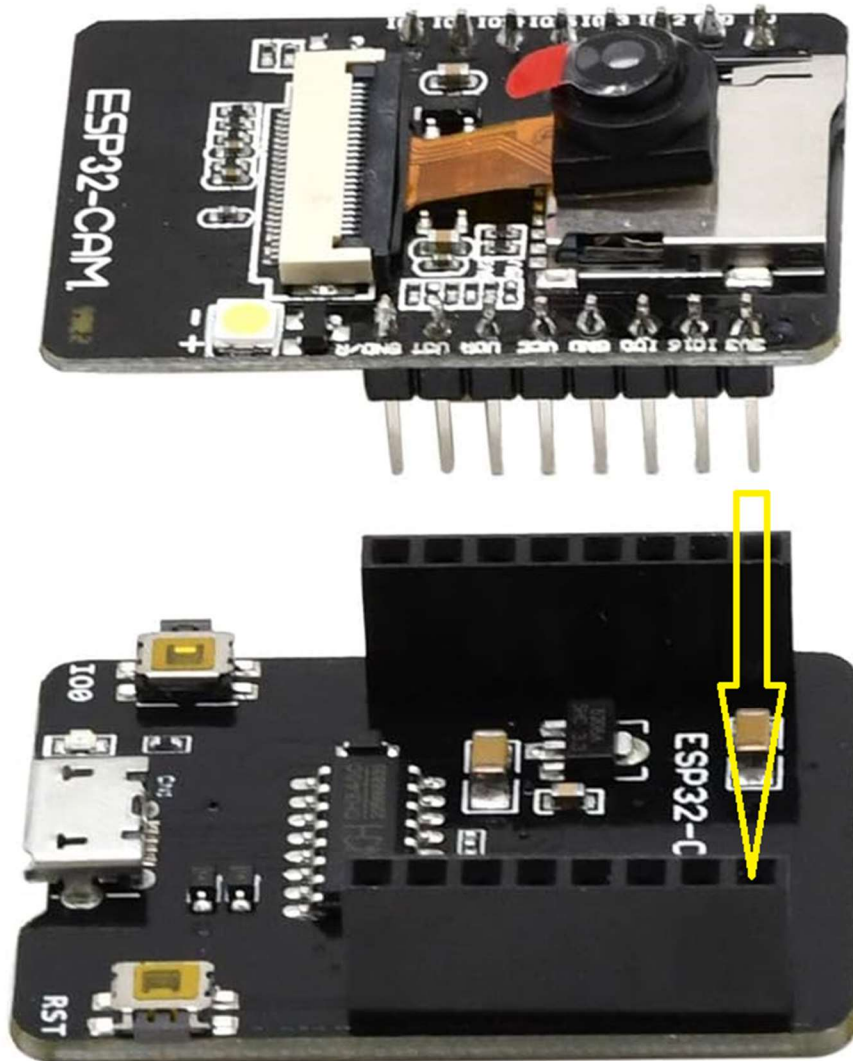


## Programming an ESP32-CAM

The ESP32-CAM board as supplied doesn't have a USB socket so needs an additional circuit adding to enable programming from a PC. This is commonly done via two methods, one is to use the ESP32-CAM-MB board and the other is to use a FTDI convertor board. Both are sometimes supplied when purchasing the ESP32-CAM board, but frequently not. These instructions assume programming from a Windows PC but a version for use with Linux based systems is also available.

### Using an ESP32-CAM-MB board

This is very straight forward and only requires that the ESP32-CAM board is inserted correctly.

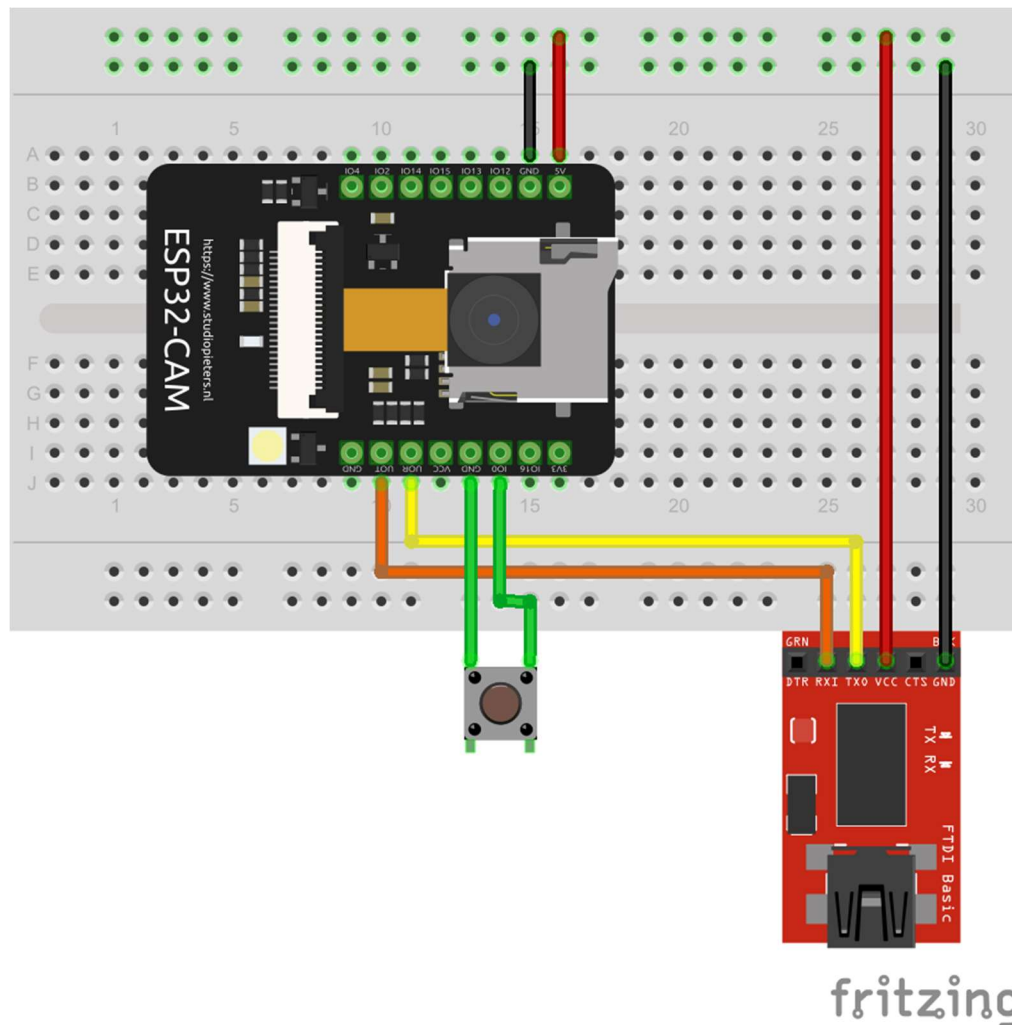


Check that the two boards line up and that the 3V3 pin lines up with the socket indicated in the picture.

To program the ESP32-CAM, connect the usb socket to a PC and then press the two buttons indicated by IO0 and RST on the board, releasing IO0 a second or so after releasing RST, the board should go into programming mode. This operation varies between boards and some only accept the reset button on the actual ESP32 board so some dexterity may be required to press them at the same time. Similarly, once programmed, some boards are automatically reset by the PC software, some aren't and require a manual reset by pressing one or other of the reset buttons. This can only be found out by trial and error with the boards in use.

## Using an FTDI programmer

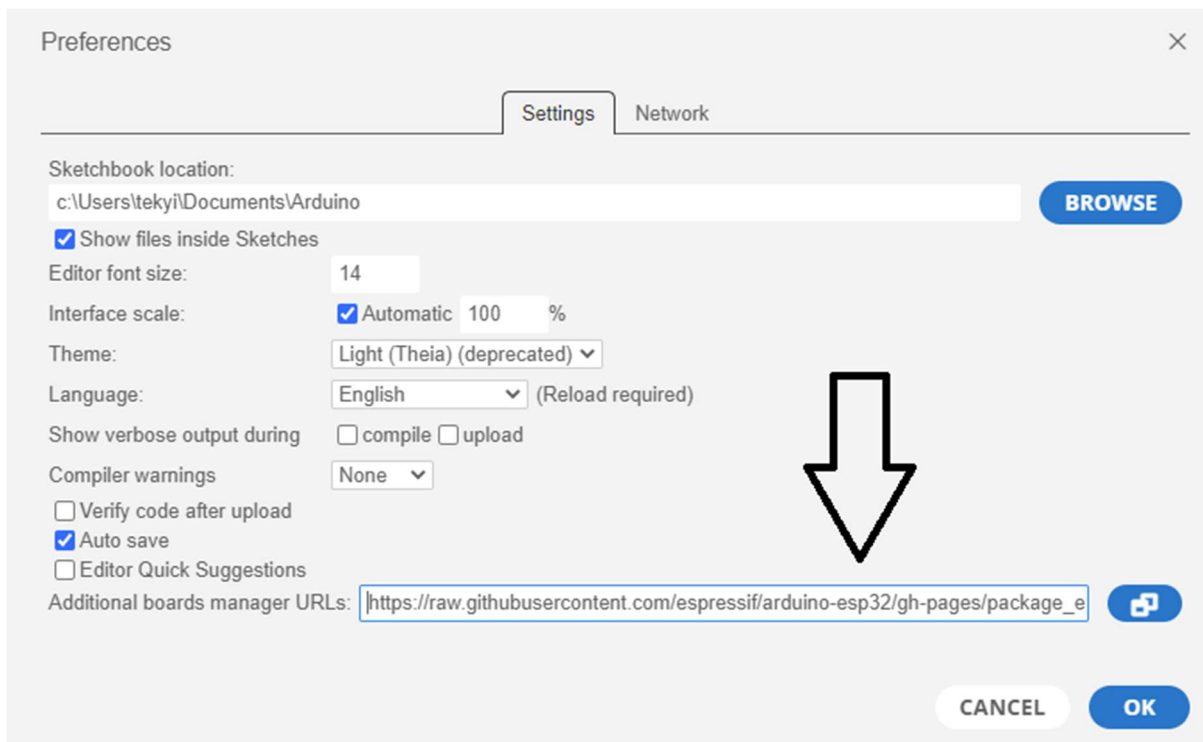
This is just a USB to serial interface which connects to the ESP32-CAM serial ports and can supply power to the board as well. Connect up the two boards as shown in the diagram following.



To program the ESP32-CAM, connect the usb socket on the FTDI board to a PC while holding closed the switch. Release the switch once the ESP32-CAM has powered up. Once programming is complete, press the reset button if it is available, otherwise, temporarily disconnect the red power lead. If a switch isn't available, a flying lead could be used to jumper the IO0 pin to GND as required.

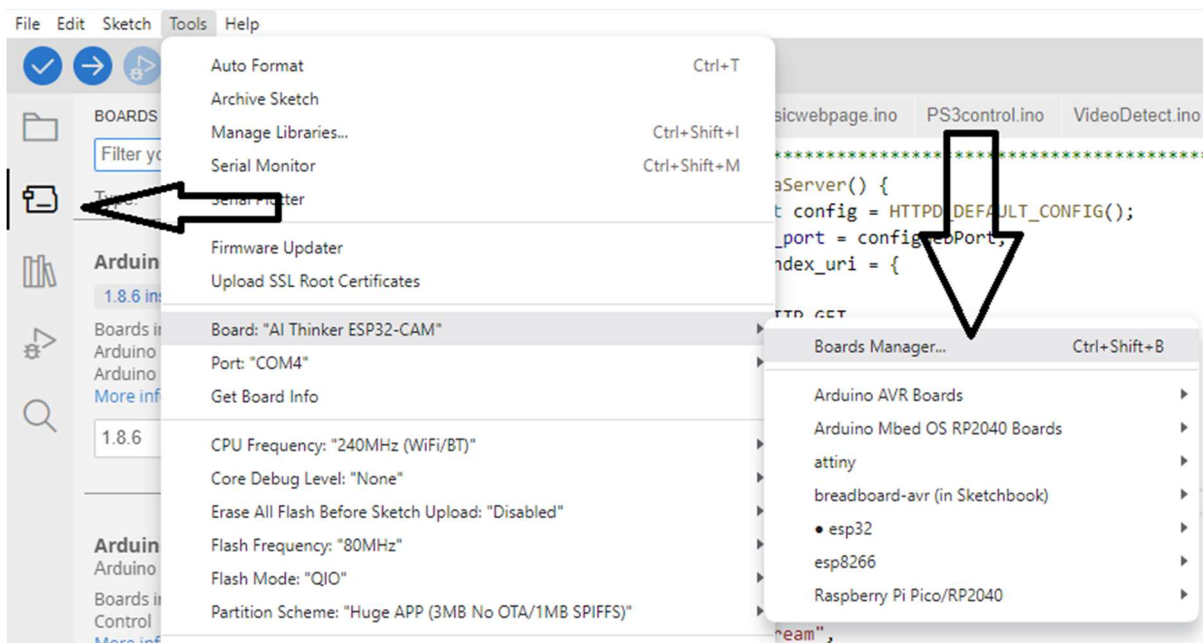
## Programming the ESP32-CAM from an Arduino 2.0 IDE

Startup the Arduino IDE and if it hasn't been done before, add the link to the ESP32 repository to the Additional Boards entry on the preferences screen, accessed via the File menu. The link at the time of writing is '[https://raw.githubusercontent.com/espressif/arduino-esp32/gh-pages/package\\_esp32\\_index.json](https://raw.githubusercontent.com/espressif/arduino-esp32/gh-pages/package_esp32_index.json)'. If there are other entries, add this to the end separated by a comma.

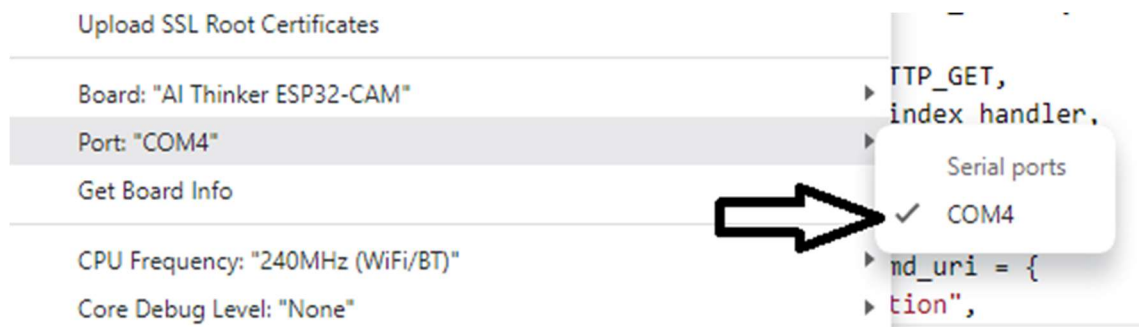


Stop and restart the IDE and the interface will start to download the repository. Stop and restart the interface again once this is complete.

From the Tools menu, Select Board and then Board Manager to select the version of the board you will use. This can also be accessed via the Boards Manager icon on the side bar.



Connect the board to the PC if it isn't already and then from the Tools menu, Select Port and the port that will be used. If a port isn't displayed, check that the USB socket hasn't been allocated to another program and that the drivers for the ESP32-CAM-MB board or the FTDI programmer have been installed. This usually happens automatically on recent operating systems.



Start the serial monitor either from the Tools menu or via the icon in the top right hand corner of the IDE.



When the ESP32-CAM has been put into programming mode, the serial monitor screen will display the message 'waiting for download'.

```
16:08:19.959 -> Command = H{"name":"Mary"}
16:08:19.965 -> Command = LPAUSE5000 2
16:08:19.965 -> Pausing for 5000 millisec
16:08:24.874 -> ets Jun 8 2016 00:22:57
16:08:24.874 ->
16:08:24.874 -> rst:ex1 (POWERON_RESET),bc
16:08:24.874 -> waiting for download
```