Using Arduino IDE with ESP32-S2-DevKit-USB and ESP32-S2-DevKit-WROVER-USB (Windows 10)

Disclaimer: Espressif hasn't released a stable version of their Arduino package that includes support for ESP32-S2 so installation should be done manually by patching an already install Espressif package.

1. Install the package

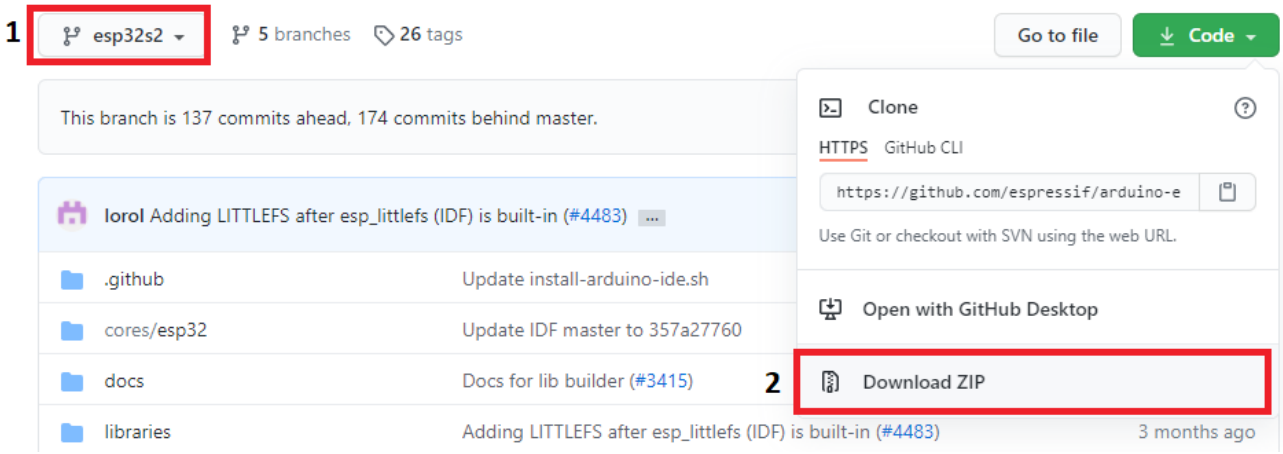
1.1. Install Espressif stable release that will be patched later using board manager (required only if you don't have an already installed package). To do so follow the instructions here:

https://github.com/espressif/arduino-esp32/blob/esp32s2/docs/arduino-ide/boards_manager.md

1.2. Go to Espressif Arduino for ESP32 GitHub page and **select "esp32s2" branch (not "master" branch!)**:

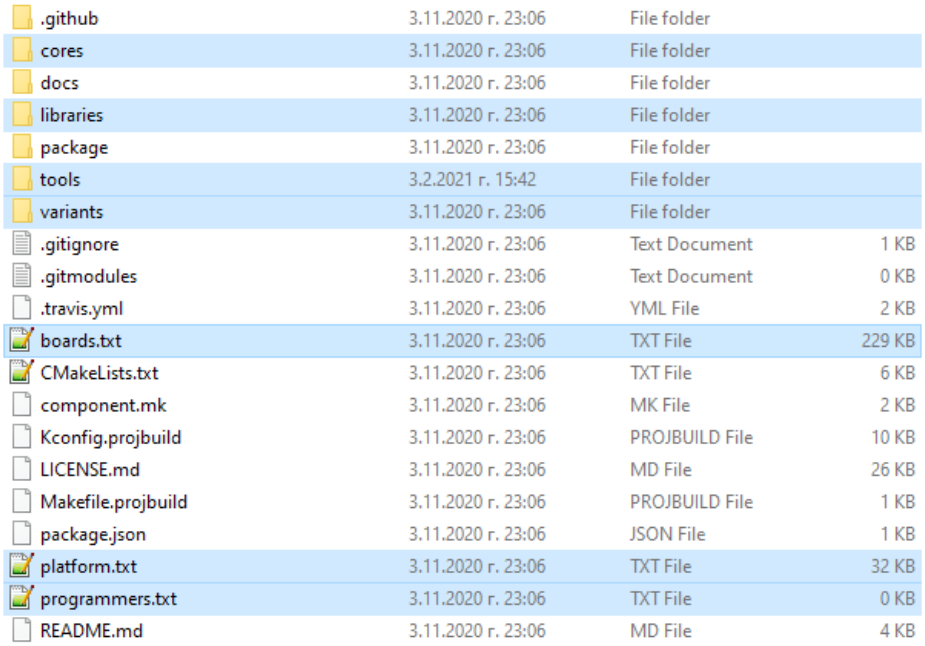
https://github.com/espressif/arduino-esp32/tree/esp32s2

then download it as a ZIP, refer to the screenshot below:



1.3. Unzip the archive, go to "<unzip folder>/tools" and run get.exe, wait until required files are downloaded

1.4. Navigate back to the unzip folder and copy the required files and folders: **cores; libraries; tools; variants; boards.txt; platform.txt; programmers.txt** (shown marked in the picture below)

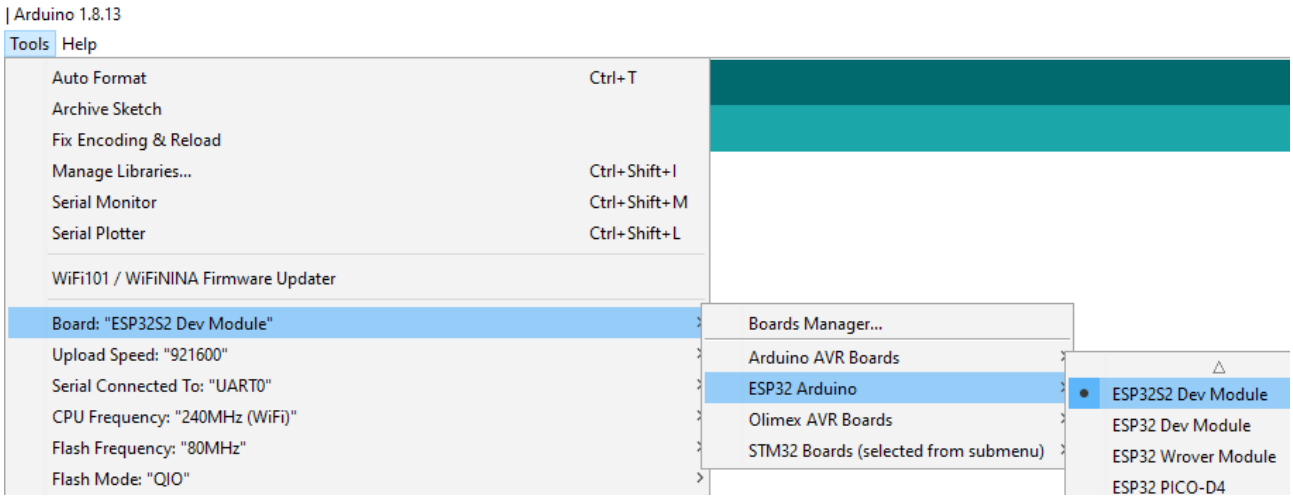


1.5. Go to the package folder. You can easily access it by opening Arduino IDE and from main menu go to File –> Preferences… on the bottom there is a link to the directory where packages are stored.

1.6. (Optional) If you wish you can make a backup of the original packages

1.7. Navigate to: "..\Arduino15\packages\esp32\hardware\esp32\1.0.5-rc4" and paste the copied from 1.4. files and folders. Overwrite the already existing files.

1.8. Restart Arduino IDE and go from Main menu → Tools → Board → ESP32 Arduino. It should be on the top of the list: ESP32S2 Dev Module

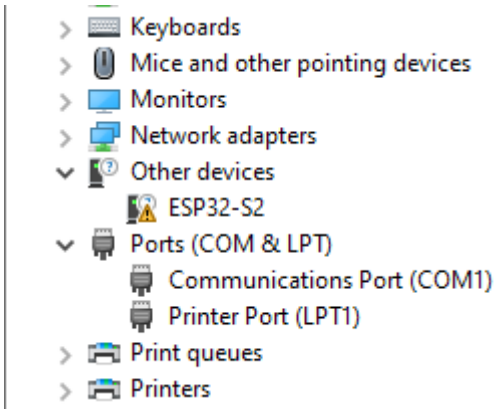


2. (Optional) Install Driver

In order to download code to ESP32-S2 you need to enter bootloader mode first. It is done by pressing and holding button BUT1, resetting the board by pressing RST1 button, then releasing button BUT1. The LED should stop blinking and new device would be visible in “Windows Device Manager”. At this point you can download your code.

Usually a driver installation is not required, despite that the unit gets marked with exclamation mark. If you however experience problems in “3. Upload a sketch”, follow the next steps.

2.1. In order to start bootloader mode reset the board while holding BUT1. Your device will most likely be on “Other devices” tab

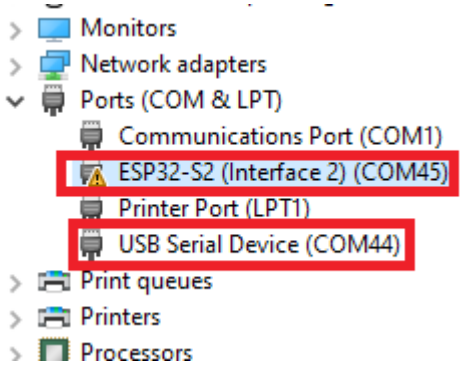


2.2. Go to https://zadig.akeo.ie/ and download Zadig software and run it

2.3. If there are multiple devices in the dropdown menu choose “ESP-32-S2 (Interface 2)” option and from the menu below select “USB Serial (CDC)” driver.

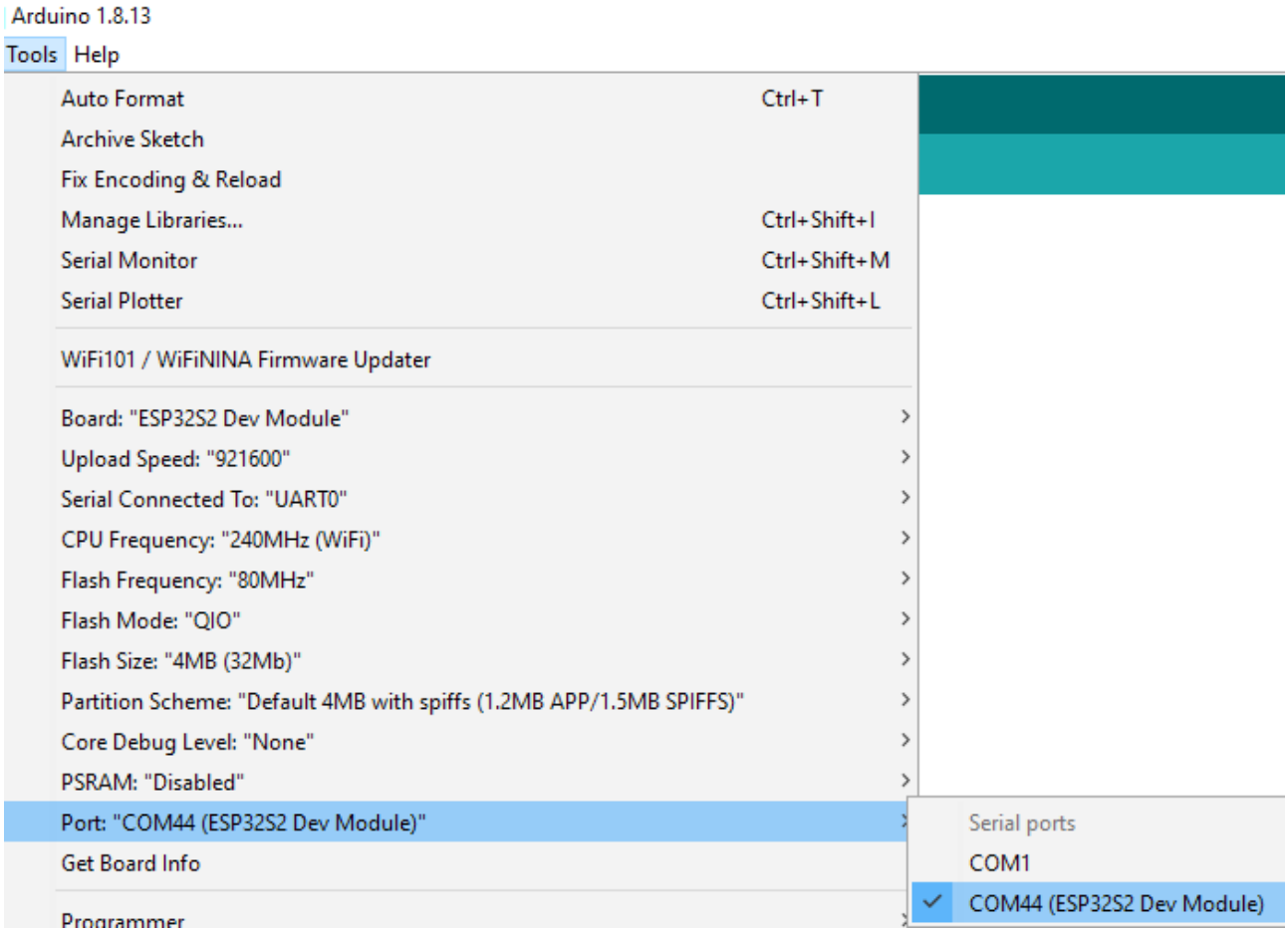
2.4. Install Driver and wait a little bit (it takes about a minute)

2.5 Now on Device manager you should be seeing 2 new devices. The one we need is USB Serial Device



3. Upload a sketch

3.1. After you enter the bootloader mode as mentioned above, navigate to Main Menu → Tools → Port… select the COM of your device.



3.2. Compile and upload your sketch – there is an example provided for the RGB LED at the end of this document

3.3. If everything is alright the demo would be uploaded successfully, and error message that the board can't be reset would be thrown. You can disable reset after upload to not see the error. This is normal and expected:

```
Wrote 3072 bytes (128 compressed) at 0x00008000 in 0.0 seconds (effective 1638.4 kbit/s)...
Hash of data verified.

Leaving...
Hard resetting via RTS pin...
ERROR: ESP32-S2 chip was placed into download mode using GPIO0.
esptool.py can not exit the download mode over USB. To run the app, reset the chip manually.
To suppress this error, set --after option to 'no_reset'.
To suppress this error, set --after option to 'no_reset'.
```

3.4. Reset the board without BUT1 being pressed to switch from bootloader mode to execution mode – this will make the board run the uploaded sketch.

4. RGB LED demo

The demo is based on Adafruit demo. It requires to also install the Adafruit NeoPixel library from Main Menu --> Sketch --> Include Library --> Manage libraries... search for Adafruit NeoPixel and install it.

```
/*
  Board: ESP32-S2-DevKit-USB
  Requires Adafruit NeoPixel library
 */

#include <Adafruit_NeoPixel.h>
#define PIN 18
#define NUMPIXELS 1
#define PERIOD 10  //ms

Adafruit_NeoPixel pixels(NUMPIXELS, PIN, NEO_GRB + NEO_KHZ800);

int R=255, G=0, B=0;

void setup()
{
  pixels.begin();
}

void loop ()
{
  for (G=0; G<255; G++)
  {
    pixels.setPixelColor(0, pixels.Color(R, G, B));
    pixels.show();
    delay (PERIOD);
  }

  for (R=255; R>0; R--)
  {
    pixels.setPixelColor(0, pixels.Color(R, G, B));
    pixels.show();
    delay (PERIOD);
  }

  for (B=0; B<255; B++)
  {
    pixels.setPixelColor(0, pixels.Color(R, G, B));
    pixels.show();
    delay (PERIOD);
  }

  for (G=255; G>0; G--)
  {
    pixels.setPixelColor(0, pixels.Color(R, G, B));
    pixels.show();
    delay (PERIOD);
  }

  for (R=0; R<255; R++)
  {
```

```
    pixels.setPixelColor(0, pixels.Color(R, G, B));
    pixels.show();
    delay (PERIOD);
   }

   for (B=255; B>0; B--)
   {
    pixels.setPixelColor(0, pixels.Color(R, G, B));
    pixels.show();
    delay (PERIOD);
   }
}
```