Internal use only

Infonique
iSEB Expansion Board 1200 0012 V1.0

Prepared by	Date	Version
Bing Ran	15/7/2023	1.0

Abstract

This document provides detailed of Infonique iSEB Expansion Board 1200 0012 V1.0 specification.

Document History

Date	Rev	Modifier	Changes
15-July-2023	1.0	Bing Ran	First Draft

Contents

Table of Figures

1 Introduction

This document will discuss the details of the iSEB Expansion Board 1200 0012 V1.0. iSEB Expansion Board 1200 0012 V1.0 is design for a spider robot. It provide 8 rgb leds and 16 pwm output to control the servo motors. The following figure is one of the robot that control with iSEB Expansion Board 1200 0012 V1.0.

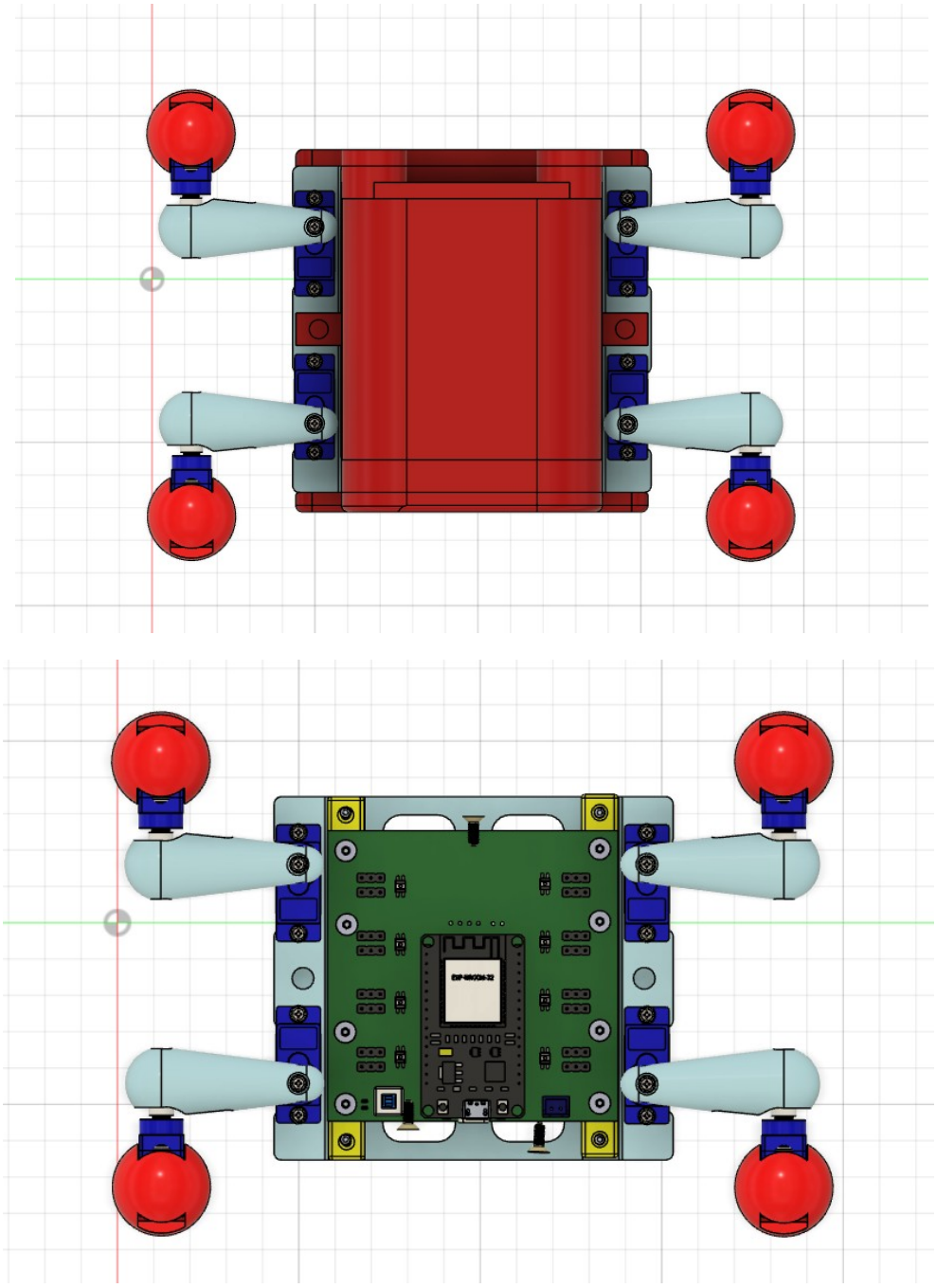


Figure 1: Robot that controlled by iSEB Expansion Board 1200 0012 V1.0.

2 Hardware

2.1 Schematic

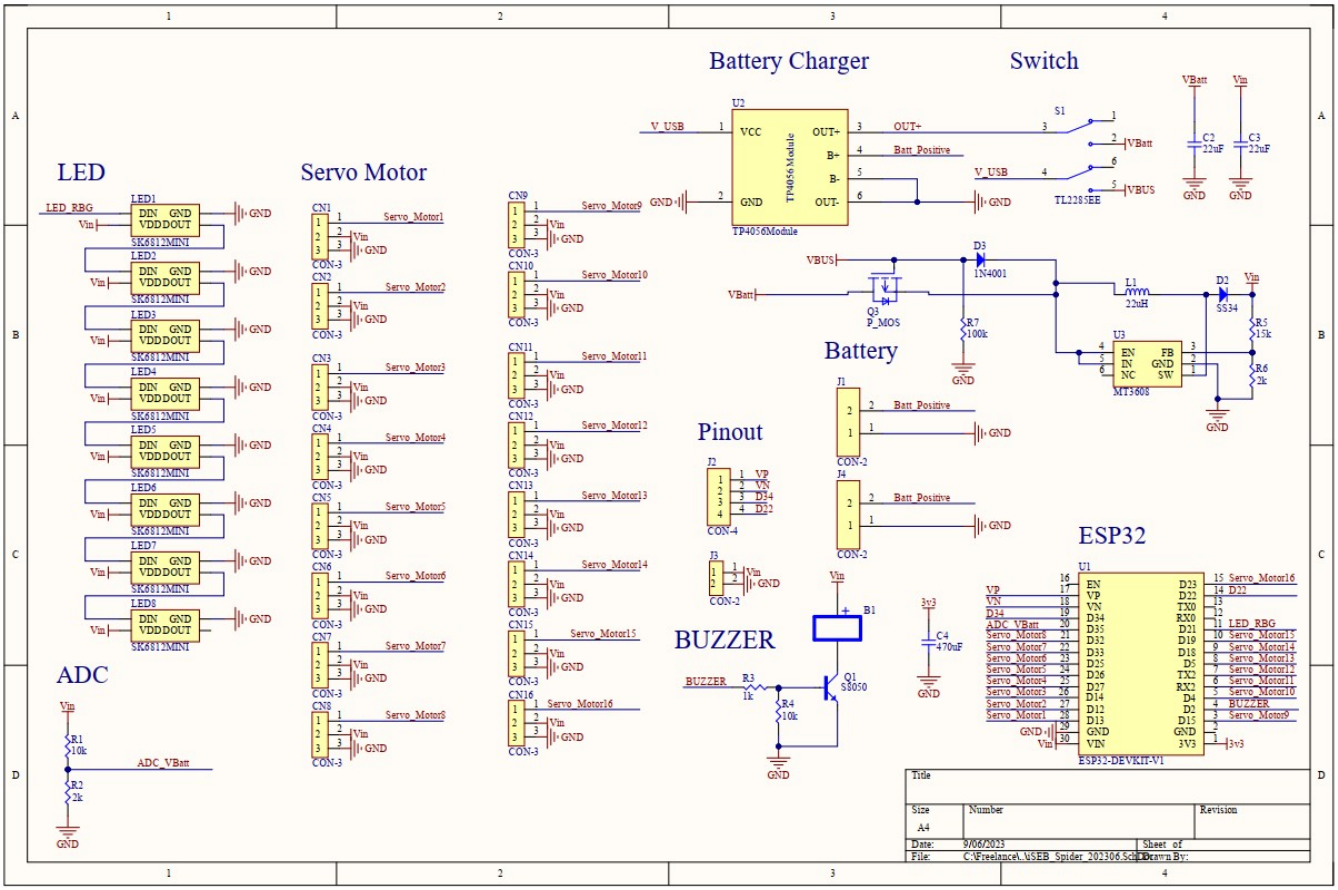


Figure 2: Schemaitc of iSEB Expansion Board 1200 0012 V1.0

2.2 Pinout

Pin	Function	Pin	Function
EN	Enable Pin	D23	PWM16
VP	Unused	D22	Unused
VN	Unused	TX0	TX0
D34	Unused	RX0	RX0
D35	ADC Vbatt	D21	RGB Led
D32	PWM8	D19	PWM15
D33	PWM7	D18	PWM14
D25	PWM6	D05	PWM13
D26	PWM5	D17	PWM12
D27	PWM4	D16	PWM11
D14	PWM3	D04	PWM10
D12	PWM2	D02	Buzzer
D13	PWM1	D15	PWM9

Table 1: Pinout

2.2 PCB Layout

The following is the figure of the iSEB Expansion Board 1200 0012 V1.0

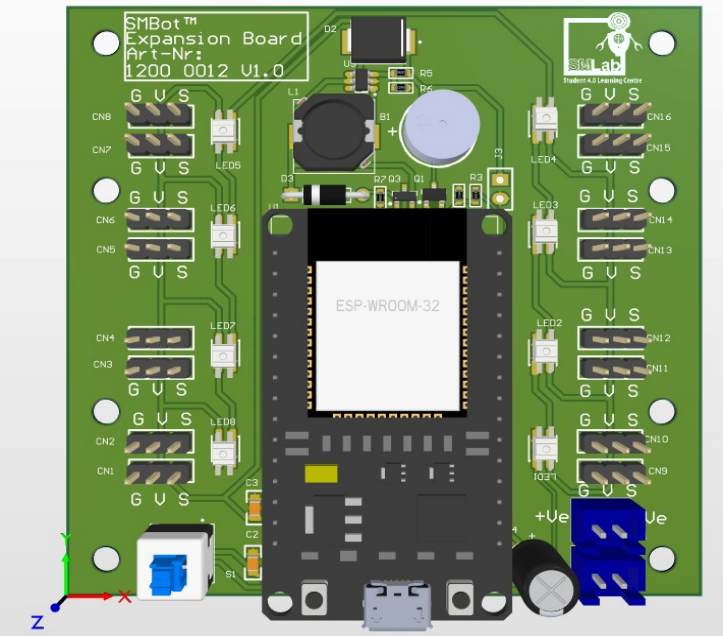


Figure 3: iSEB Expansion Board 1200 0012 V1.0 with ESP32 Module

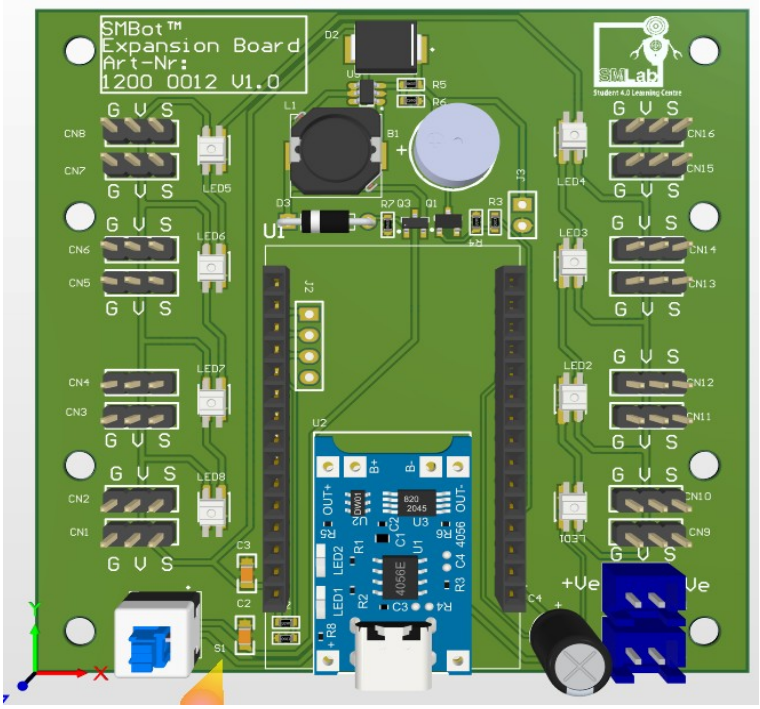
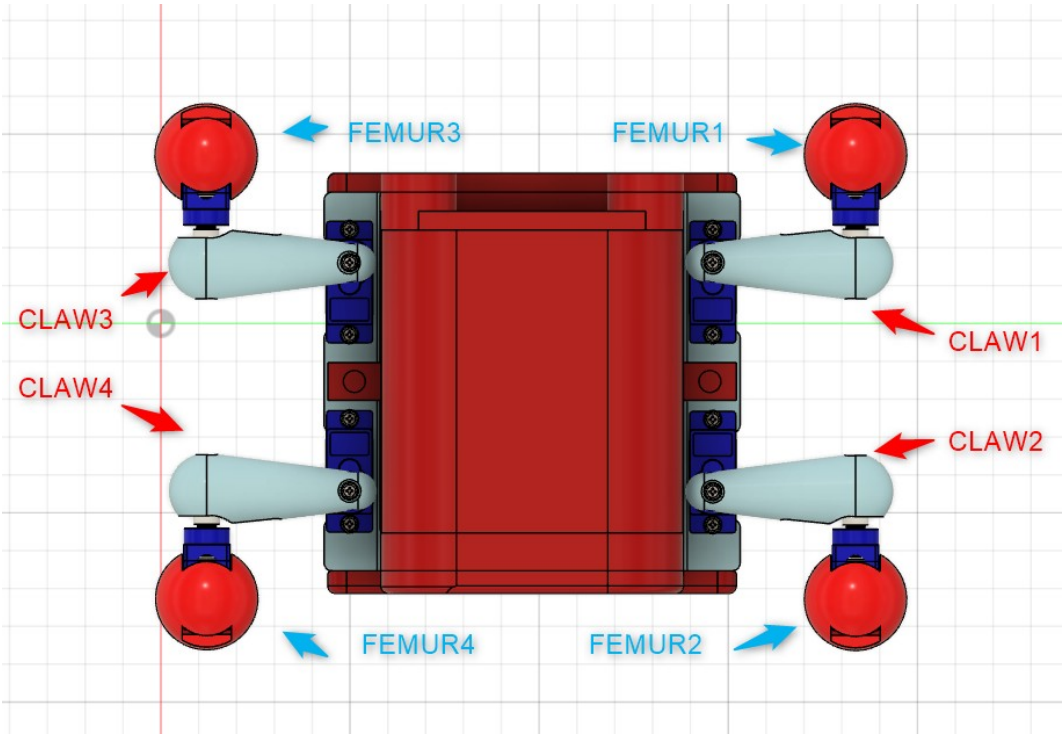


Figure 4: iSEB Expansion Board 1200 0012 V1.0 without ESP32 Module

2.2.1 Label of legs

The following figure is labeling the leg of the robot.



2.2.2 PWM control

There are 16 PWM control port in iSEB Expansion Board 1200 0012 V1.0. The figure below is showing the locaiton of the 16 PWM control port.

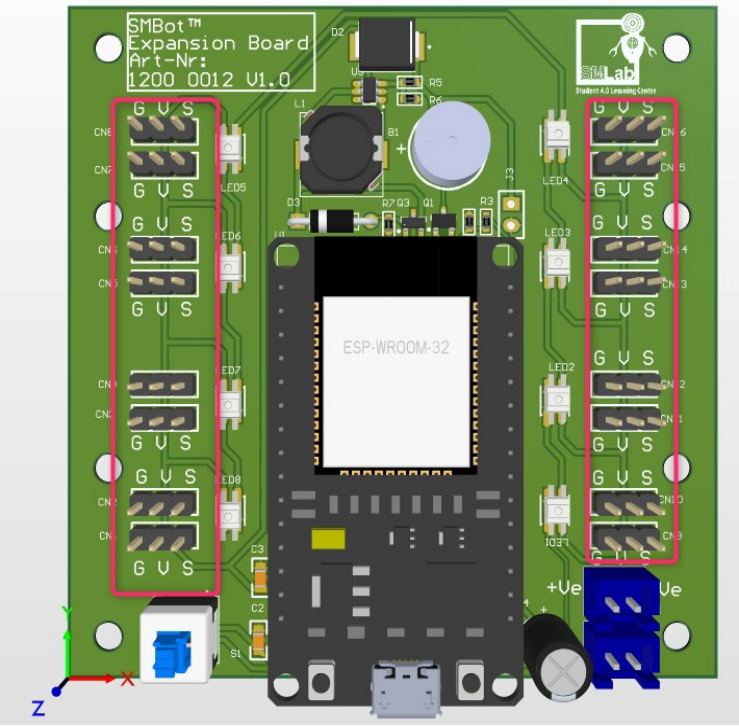
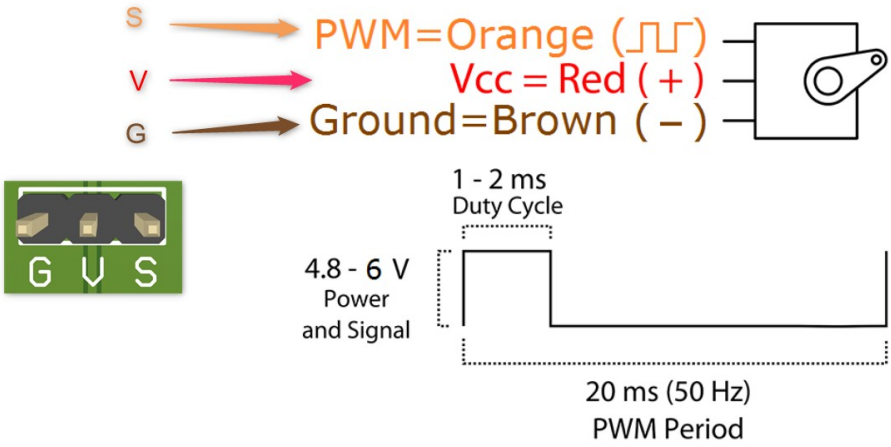


Figure 6: PWM control port

2.2.2.1 PWM Control Servo Motor Connection



Position "0" (1.5 ms pulse) is middle, "90" (~2 ms pulse) is all the way to the right, "-90" (~1 ms pulse) is all the way to the left.

The figure below is specifying the port for each robot's claw.

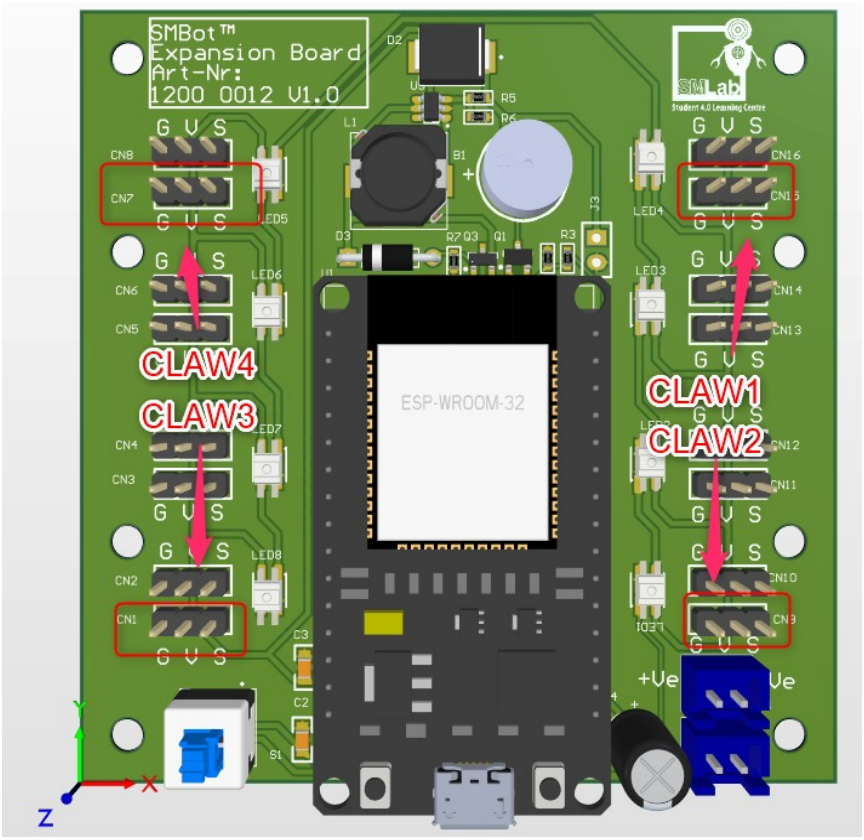
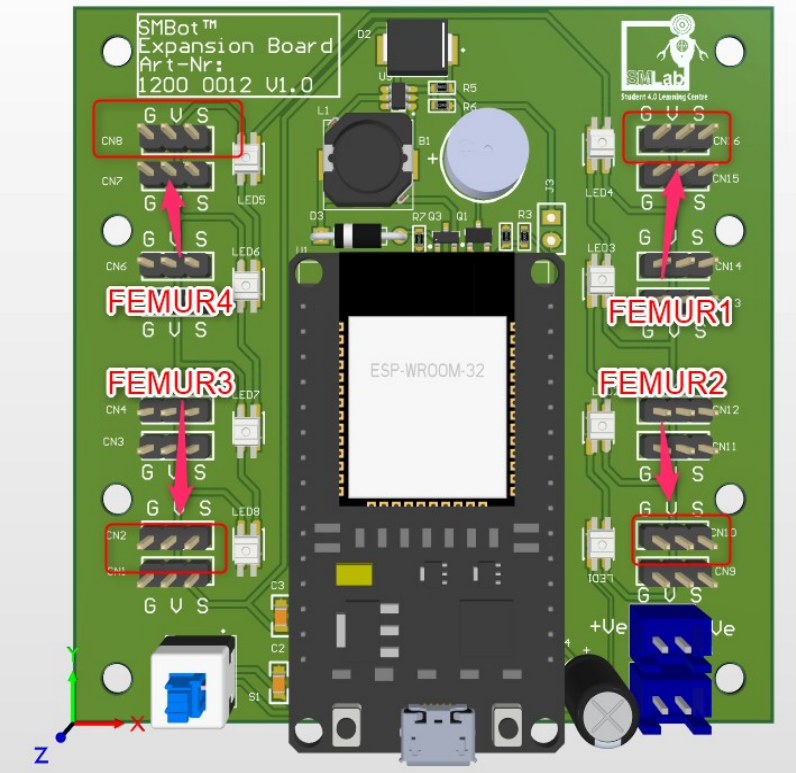


Figure 7: ports for robot's claws

The figure below is specifying the port for each robot's femur.

Figure 8: Ports for robot's femurs



2.2.3 Switch , Battery Connector & RGB Led

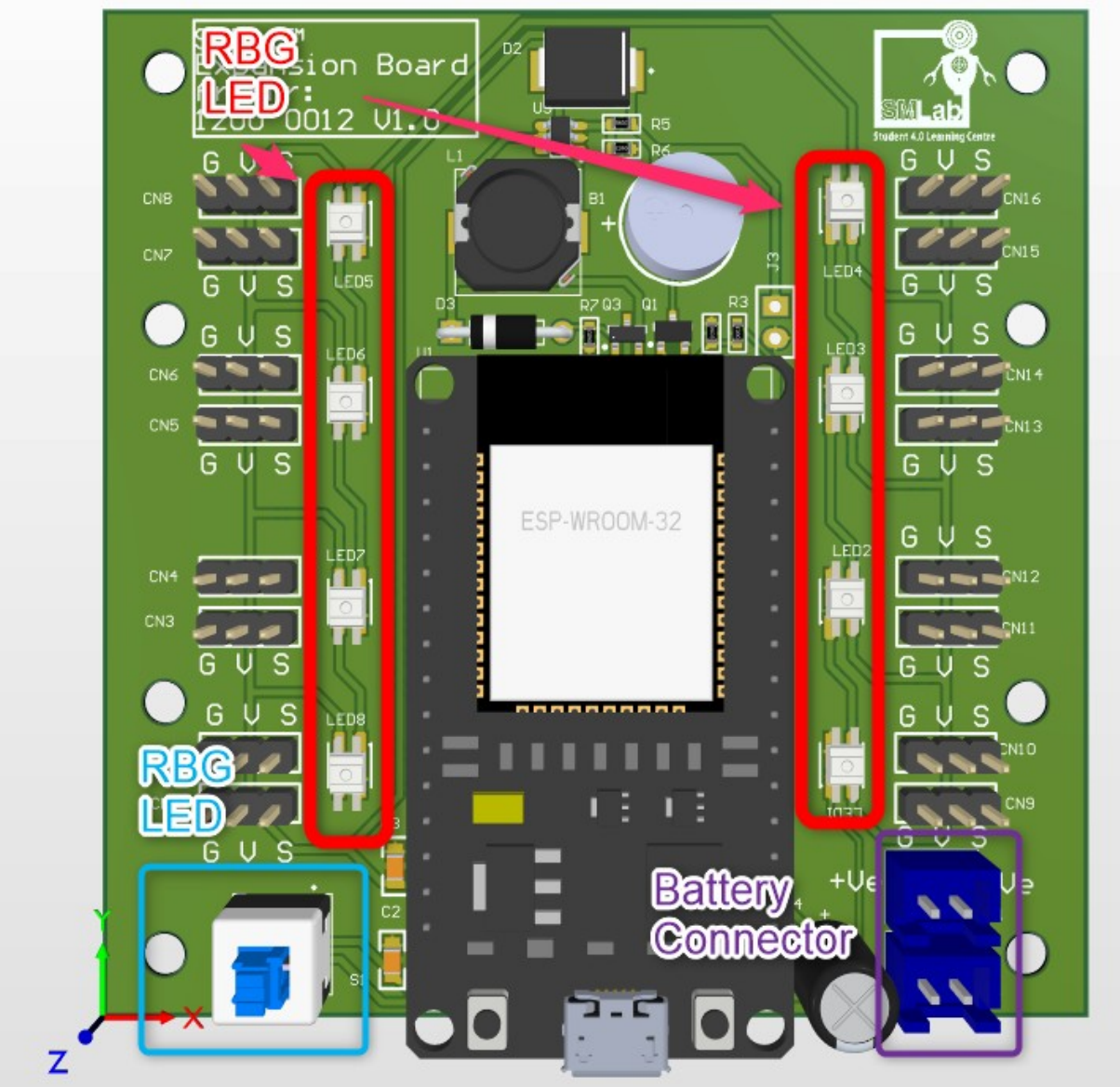


Figure 9: Switch , Battery connector & RGB led

2.3 Bom list

- *iSEB Expansion Board 1200 0012 V1.0 with ESP32 Module x 1*
- *18650 Battery x 2*
- *ESP32-DEVKIT-V1 x 1*
- *Spider chassis set x 1*

3 Firmware

The iSEB Expansion Board 1200 0012 V1.0 is using ESP32 DevKit V1. The figure is showing the pinout of ESP32 DevKit V1.The microcontroller is esp-wroom-32 module.

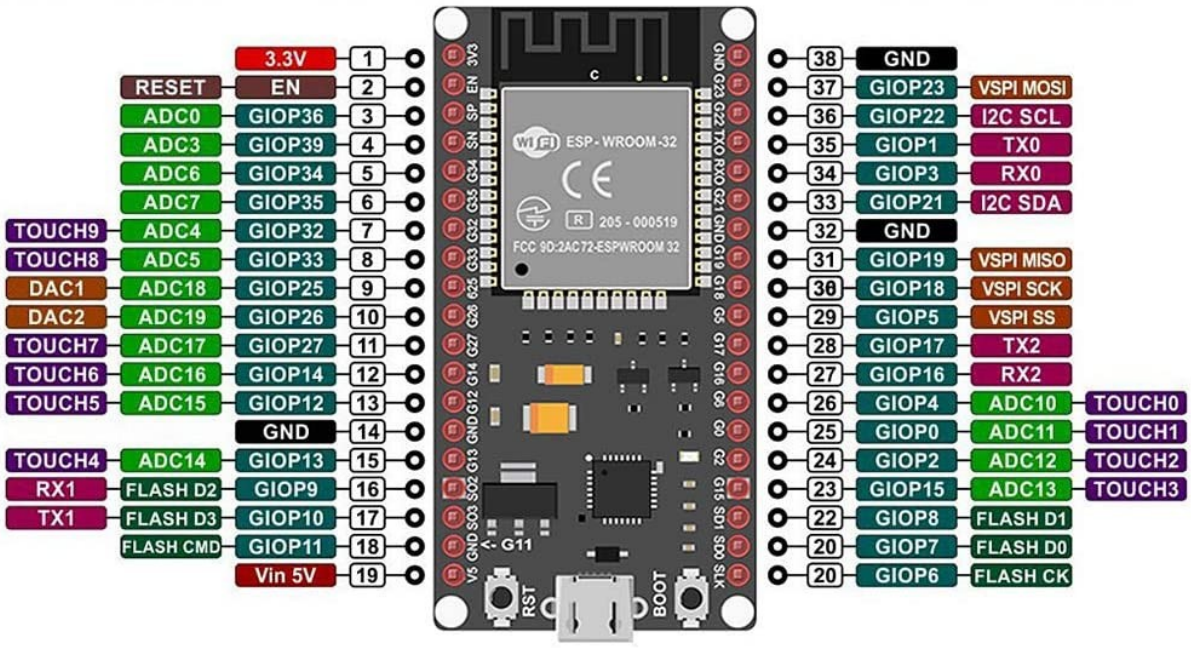


Figure 10: Pinout of ESP32 DevKit V1

3.1 Specification of the ESP32 DevKit V1

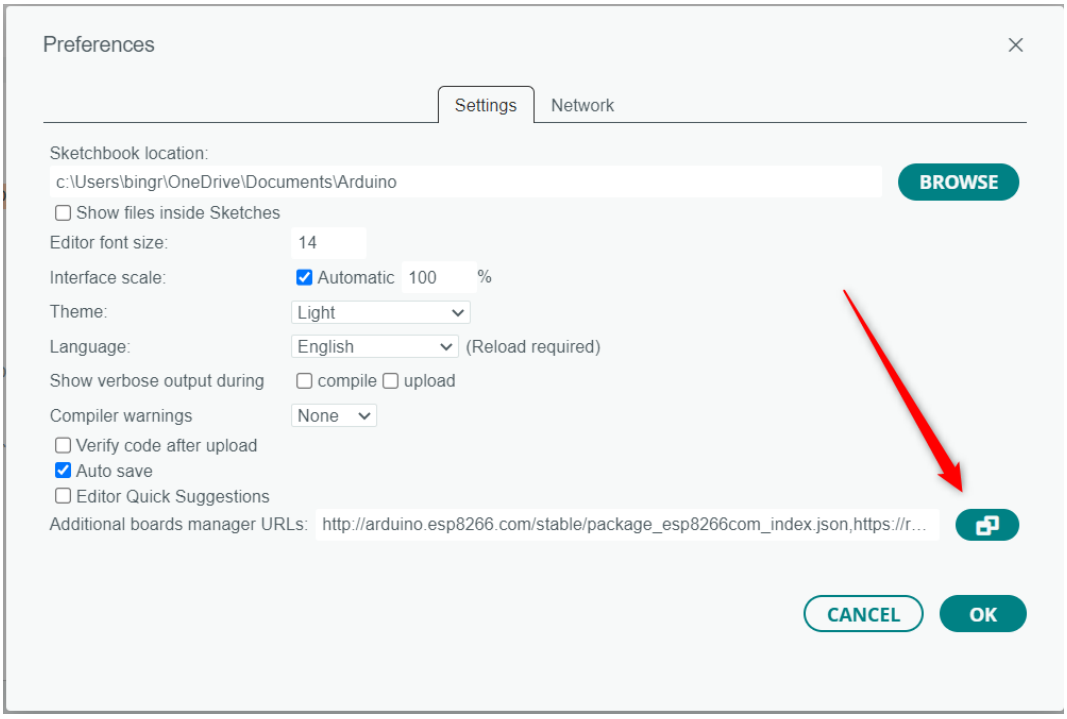
Microcontroller: Tensilica 32-bit Single-/Dual-core CPU Xtensa LX6

- Operating Voltage: 3.3V
- Input Voltage: 7-12V
- Digital I/O Pins (DIO): 25
- Analog Input Pins (ADC): 6
- Analog Outputs Pins (DAC): 2
- UARTs: 3
- SPIs: 2
- I2Cs: 3
- Flash Memory: 4 MB
- SRAM: 520 KB
- Clock Speed: 240 Mhz
- Wi-Fi: IEEE 802.11 b/g/n/e/i:
    - Integrated TR switch, balun, LNA, power amplifier and matching network
    - WEP or WPA/WPA2 authentication, or open networks
- Dimensions: 51.5x29x5mm

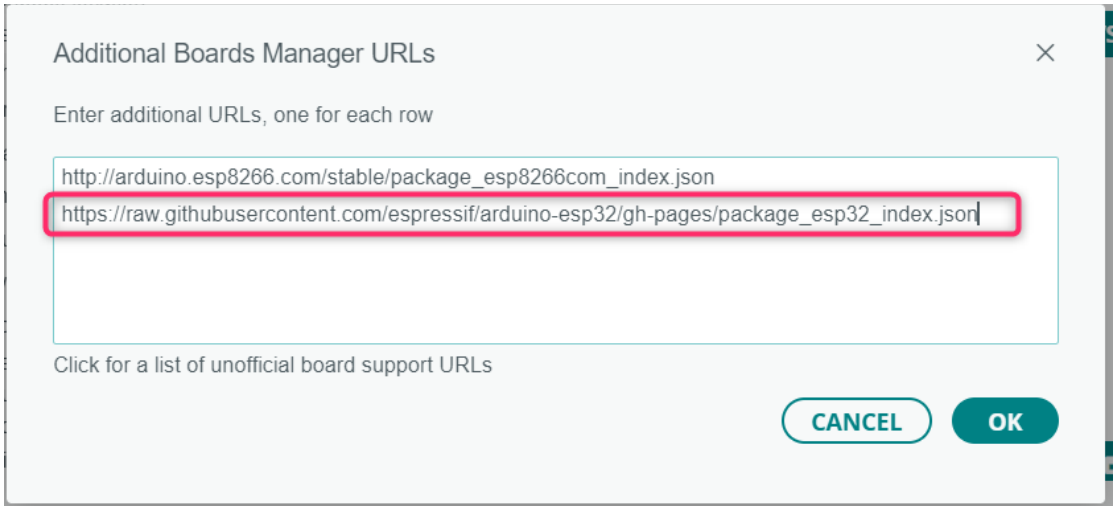
3.2 Environment set up

We need to set up the environment to flash the binary to ESP32 DevKit V1.

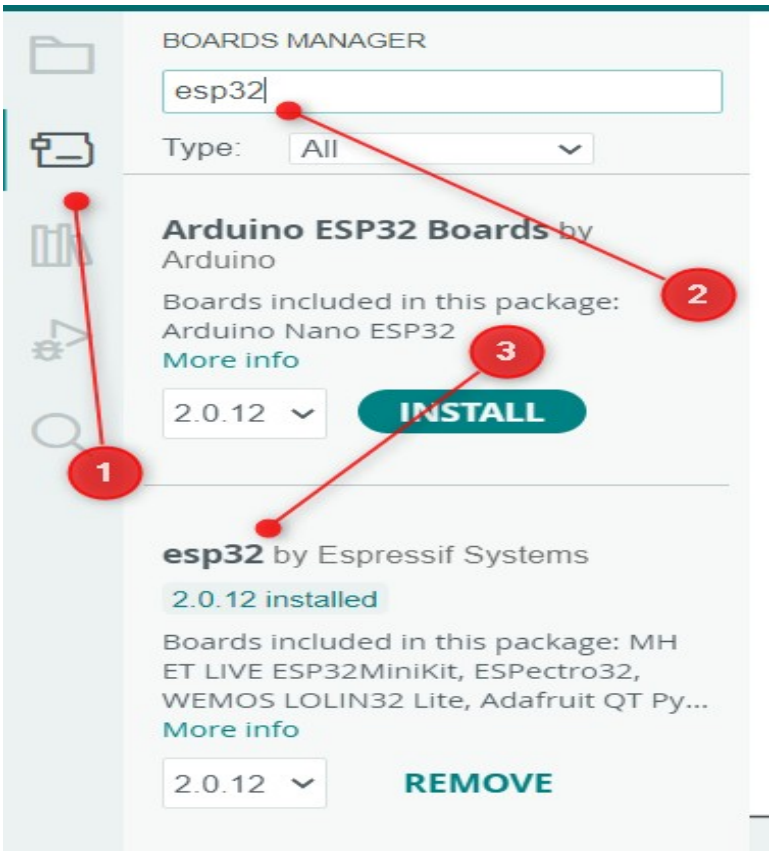
- Install Arduino IDE is requried to install. (Snapshot is base on Arduino IDE 2.2.0)
- Add https://raw.githubusercontent.com/espressif/arduino-esp32/gh-pages/package_esp32_index.json to Board Managers and install ESP32 libary.
    - Select Files-> Preferences and click on the icon



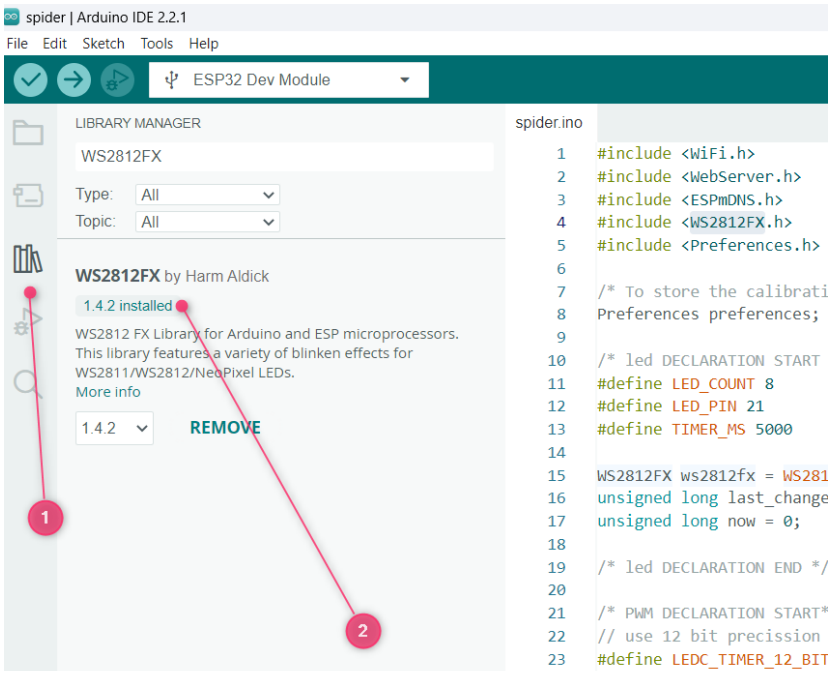
- Add Boards Manager URLs



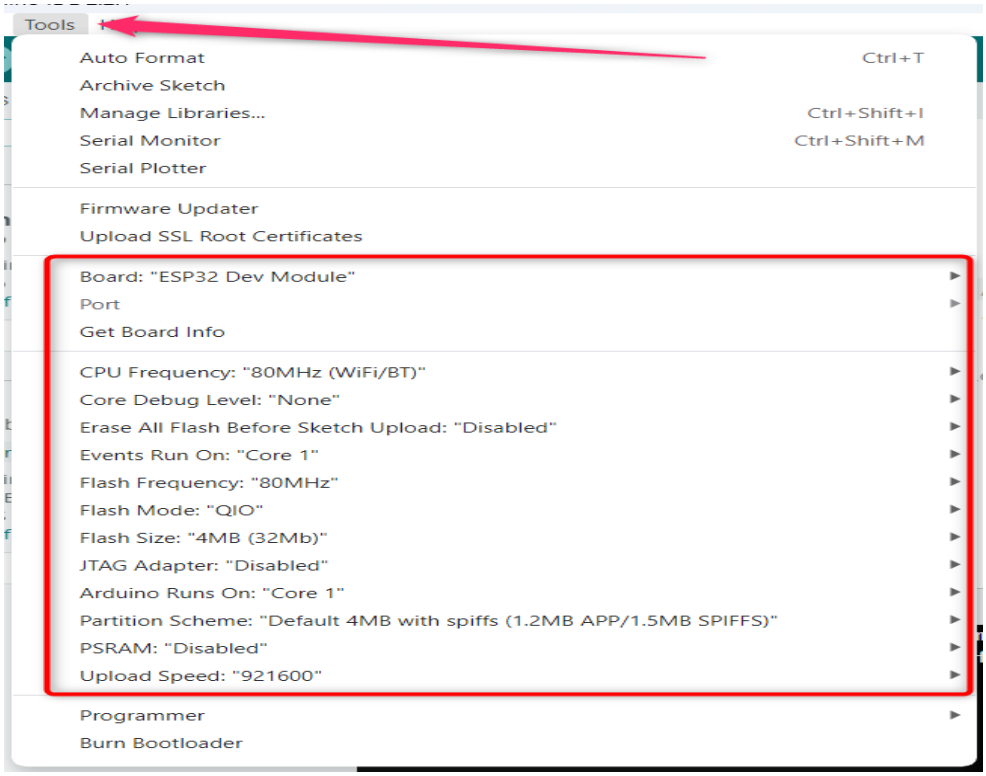
- Install ESP32 by Espressif Systems at Board Manager.



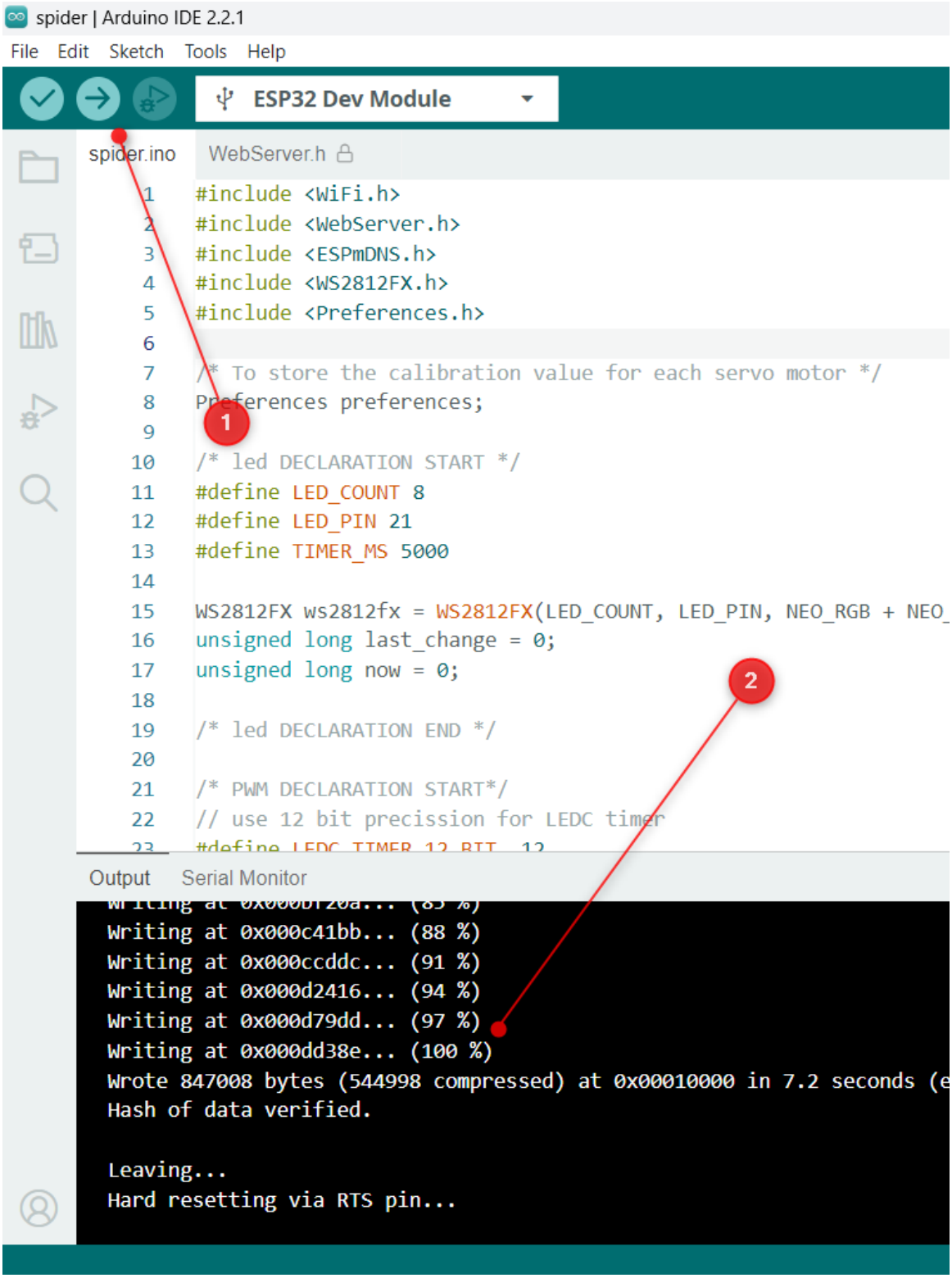
- Install WS2812FX by Harm Aldick (version 1.4.2) library.
  - Snapshot of install libary



- Update the upload setting



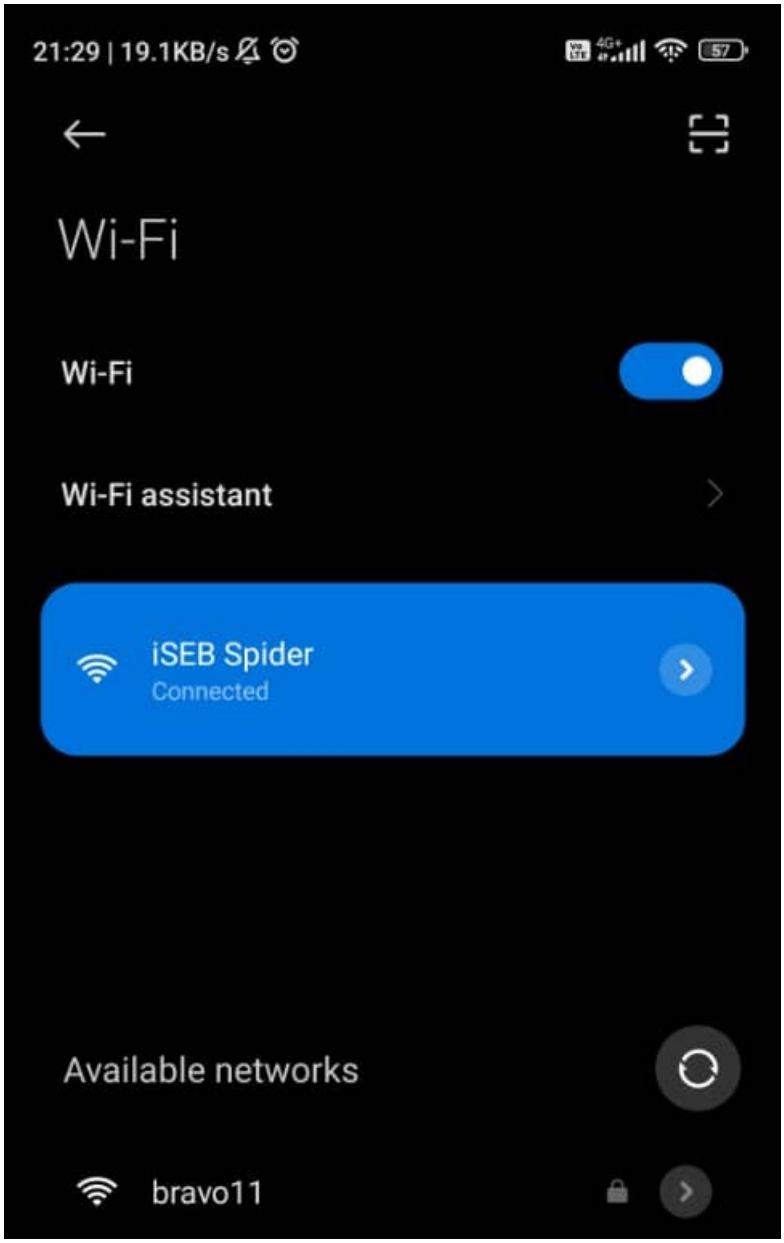
- Click upload button and the firmware will be flashed successfully if the snapshot below is seen.



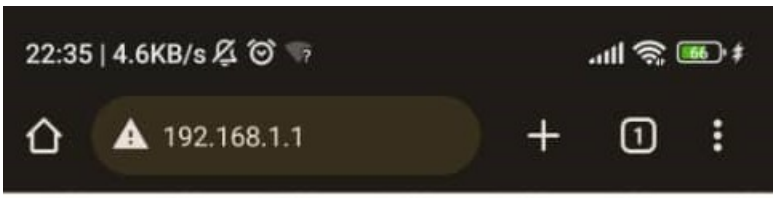
- The environment set up is done if the binary able to flash to ESP32 DevKit V1..

3.3 WiFi server and control

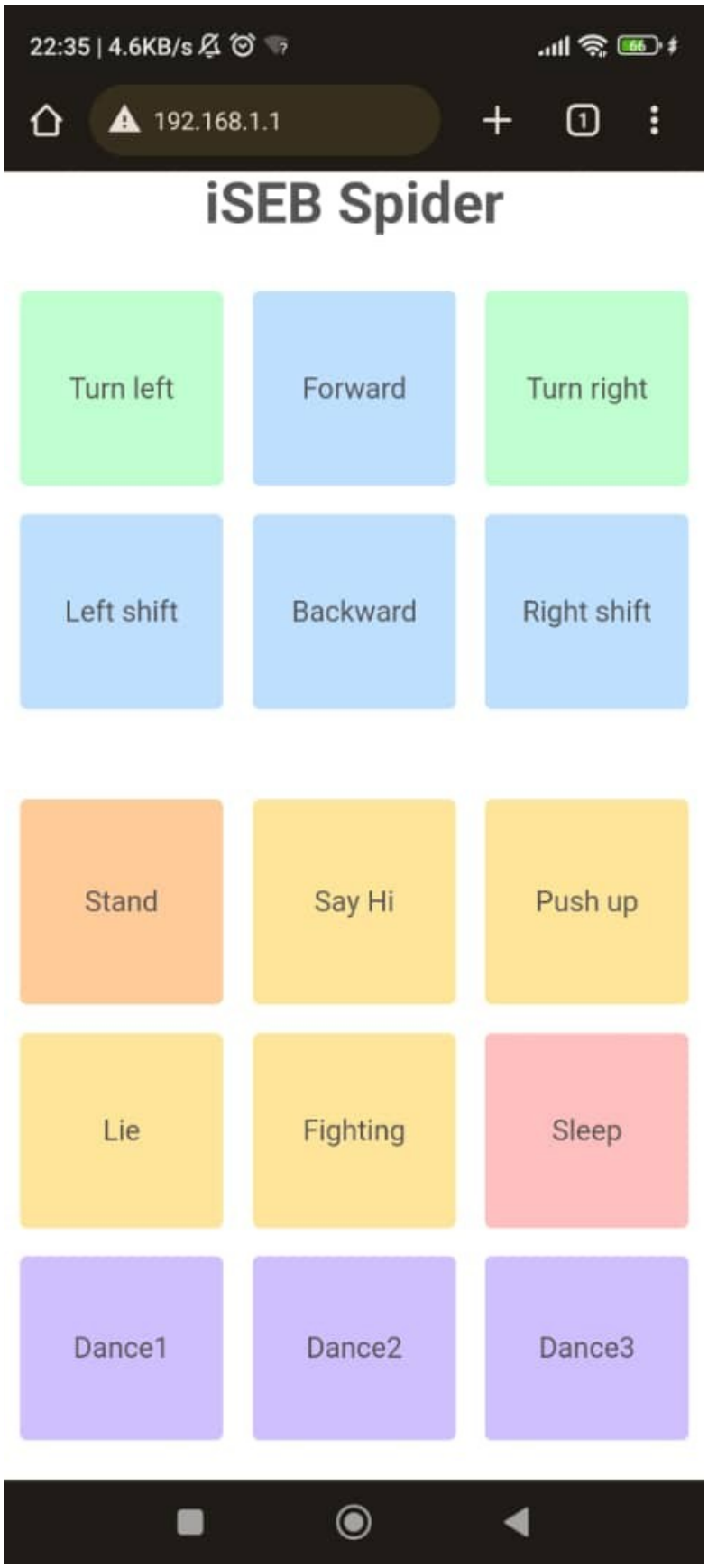
- After flash succesfully, the iSEB Spider should be appear in the WiFi list. The figure below is showing the iSEB spider is appeared in the WiFi list.



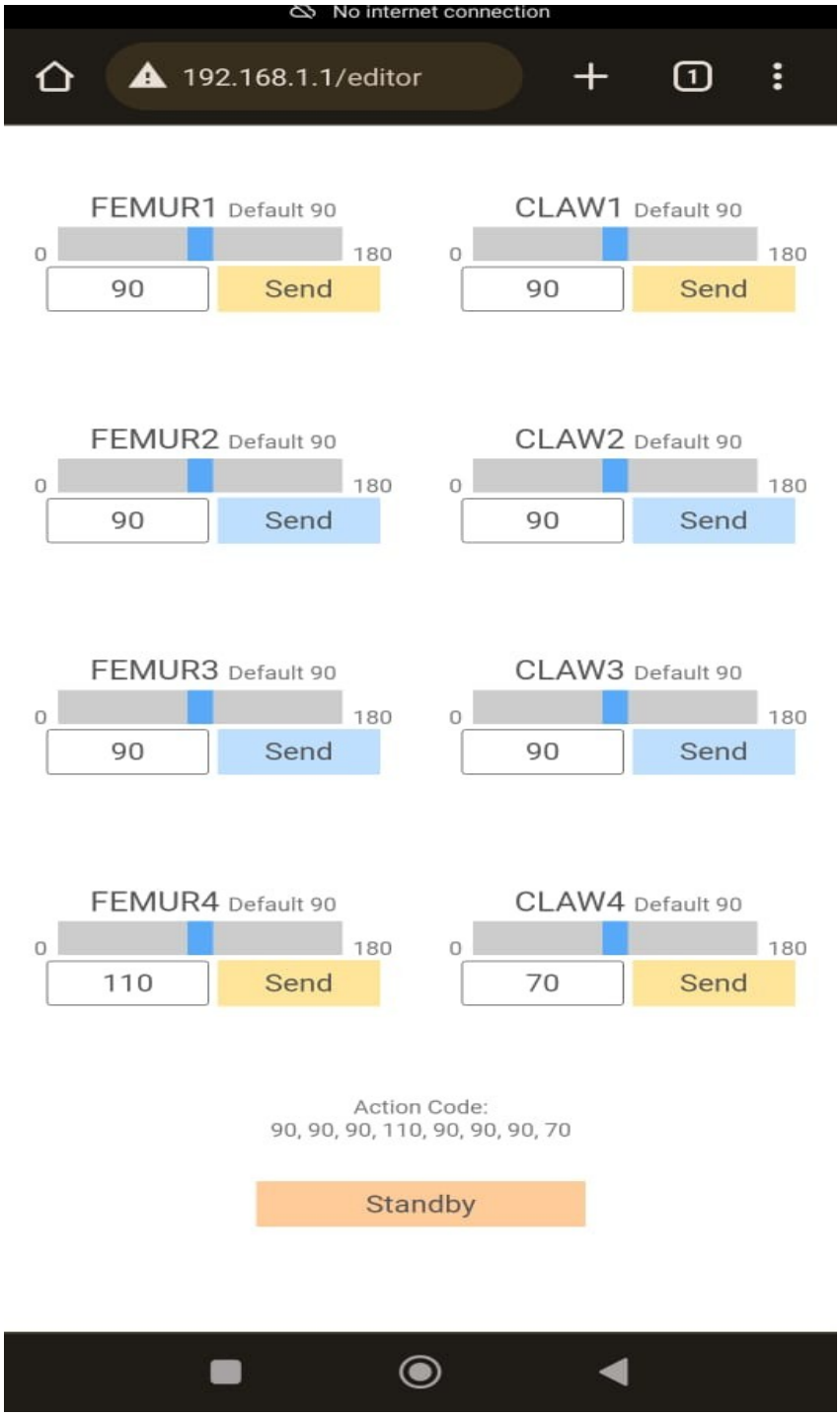
- Connect to the ISEB Spider and access 192.168.1.1



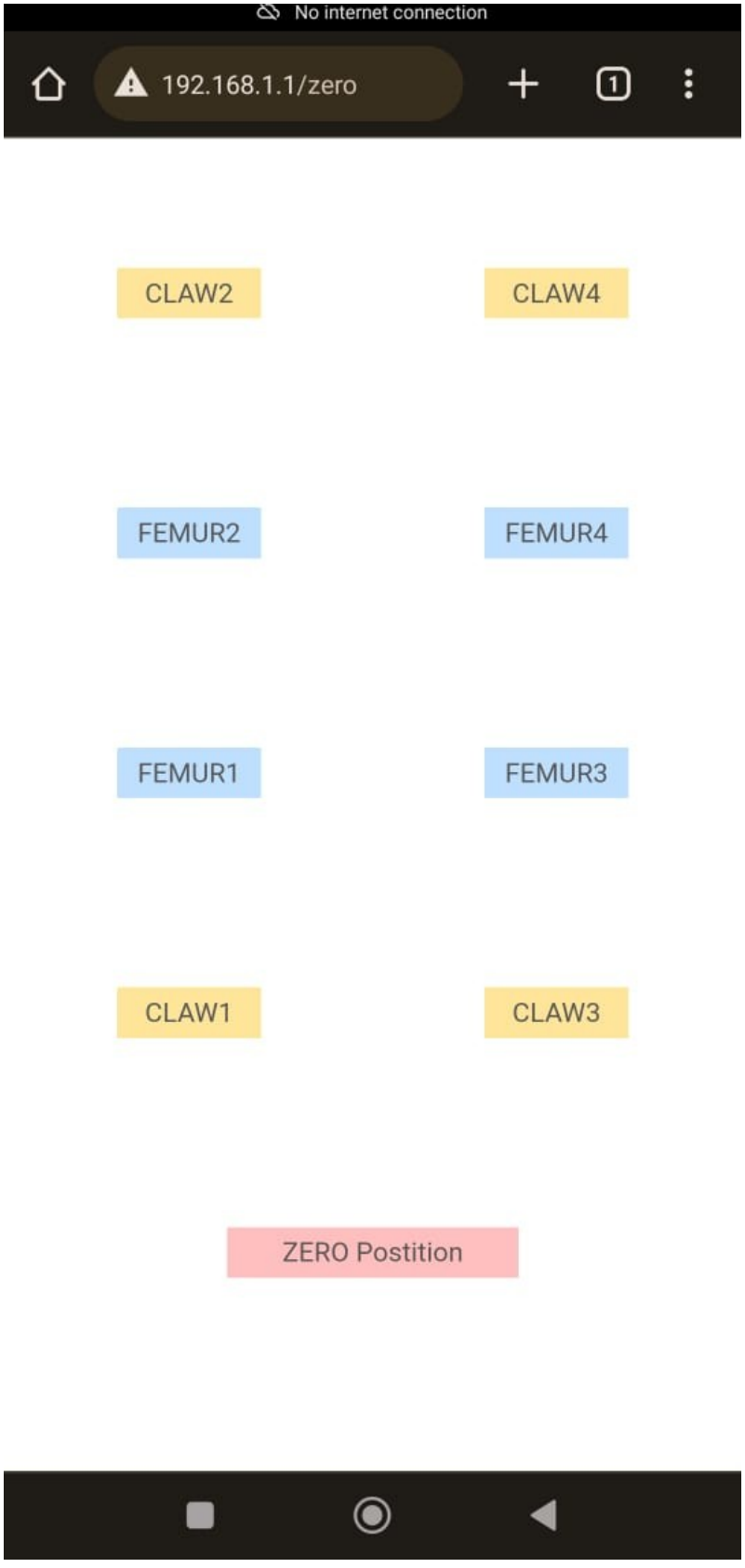
- The control page will be show as below



- The Motion Editor Page



- The Zero Page



- The Setting page