# JOYSTICK PCB CALIBRATION & TESTING ver. 19_Mar_2025

## A) Initial Calibration of the Joystick PCB:

⚠️ **Power Supply (in place of Battery)**: For initial testing of the PCB for its functionality, you may use the Keithley DC Power Supply instead of the Battery. Set CH1 of the Keithley DC Power Supply, voltage to 8V and current limit to 1A. Solder two wires to the battery points on the PCB and connect the power supply. Take extreme care to follow right polarity.

⚠️ **Select DOIT ESP32 DEVKIT V1 Board** for joystick and IDE should have the following boards and libraries installed.

ESP32 Board
ESP-NOW library
ESP-WiFi library
ESP-Servo library
ESP-ADC driver library
WiFi library
Adafruit BUS IO Library
Adafruit GFX Library
Adafruit SSD1306 Library
EEPROM Library

⚠️ **POWER and ARM switches:** Solder wires to these two switches so that the PCB can be tested for its proper functionality. Follow Fig 1. For the position of the switches.

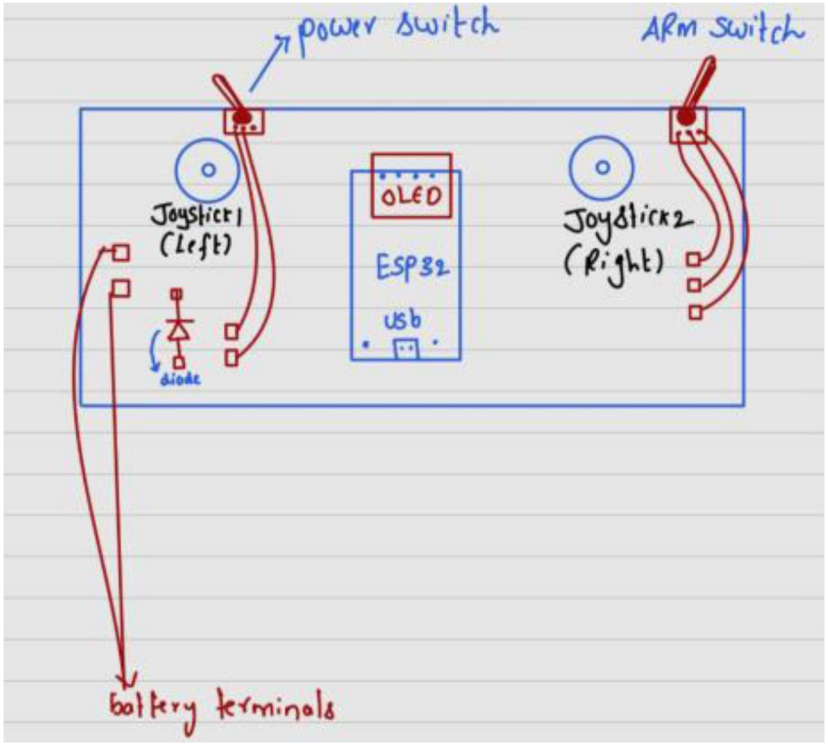


Fig 1. Top view of joystick

**Calibration Procedure**

1. Upload the code in the folder **Joystick Flight Control Code - Joystick DO IT ESP32** to the esp32 in the joystick.

2. Turn **ON** your **Power Switch** (located on the left-side) and keep **ARM Switch** (located on the right-side) **OFF**. You should be able to see **ARM** status on OLED display. **ARM** status should be "0" while calibrating.

3. Now press the **Calibrate button** on **Right Joystick** (this is the button inside the Right Joystick - at the centre). Once the **Calibrate button** is pressed, the OLED will show the message "**Starting calibration...**".

4. Calibration progress as well as instructions to be followed will be displayed on the OLED display. Position the **Right Joystick** and **Left Joystick** in accordance with the provided instructions.

5. Refer to the diagrams below for the correct positioning of the Joysticks. Here, **Left Joystick** is referred as **Joystick 1** and **Right Joystick** as **Joystick 2.**

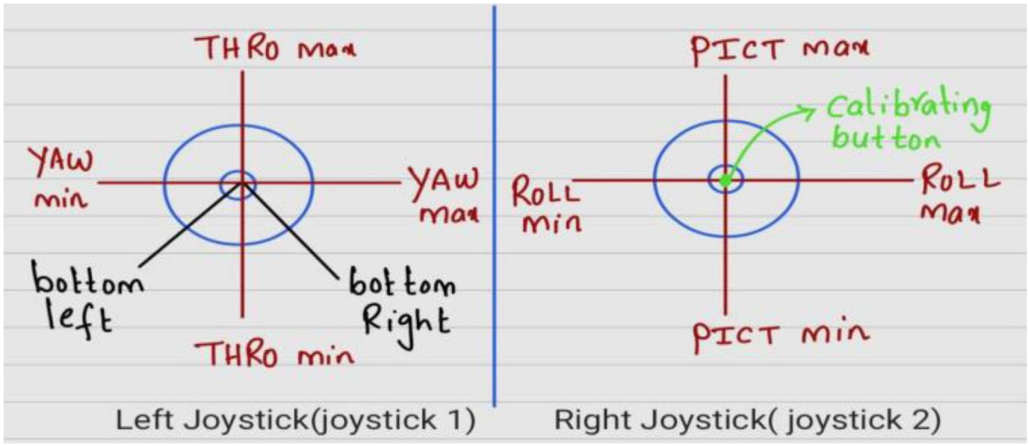


Fig.2 Joystick 1 and Joystick 2

6. After calibrating all positions, you will see the message "**Calibration done"** on OLED display.

**B) Testing of the Joystick PCB:**

⚠️ **Demo Drone**: MS101 Lab RAs/Engineers will provide you a DEMO propeller-less Drone and batteries to check your joystick's functionality.

1. Attach battery case with joystick case while replacing the initially connected Keithley Power supply with supply from battery (battery case).

2. After turning your joystick ON, (make sure **ARM** status is "0") you have to recalibrate your joystick again.

3. Completing calibration, **ARM** your joystick and then you will be able to see **“Connected”** on the OLED Screen.

4. Now, take your Left joystick to Bottom-Left position to start the arming sequence, then take it to Bottom-Centre position, eventually you will see the drone motors rotating.

5. Now you are set to test your group’s joystick with the **MS101 LAB DEMO DRONE** under supervision of TAs/RAs.

**Abbreviations used:**

THRO: Throttle; YAW: Yaw; PICT: Pitch; ROLL: Roll