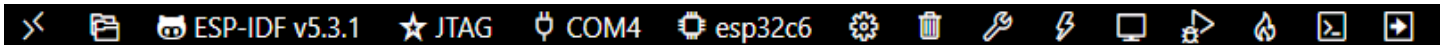
ESP-IDF Setup:

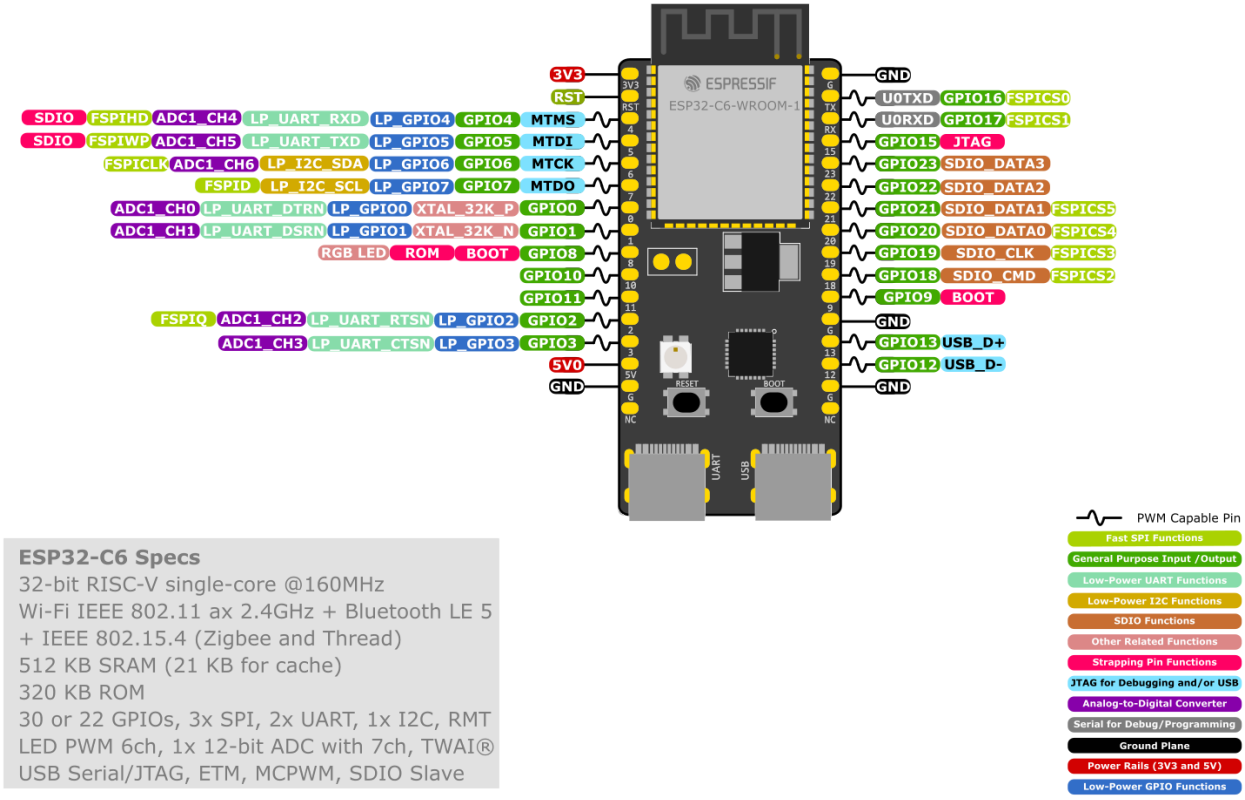
1. To begin, ensure you have Visual Studio Code installed on your computer. The most recent version is acceptable.
2. Install the ESP-IDF extension through the VS Code library and follow the setup instructions.
3. Right-click on the downloaded ZIP file from GitHub and install the code to your desktop, we will move it soon.
4. Once installed, use the example “sample project” as a baseline for the project. Next, paste the files for the FAM embedded code into the main directory of the newly created project.
5. At the bottom of the screen, you will see a series of icons. Shown below:



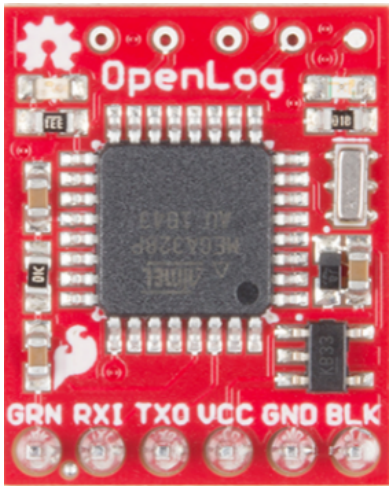
6. First, click the **plug** icon and select the COM port corresponding to the ESP32 connected to your PC. Next, select the **chip** icon and select the esp32c6 board with USB-JTAG as the loader.
7. Next, click on the **wrench** icon to build the project in your environment. This may take a moment.

Embedded Prototype Setup/Wiring Guide:

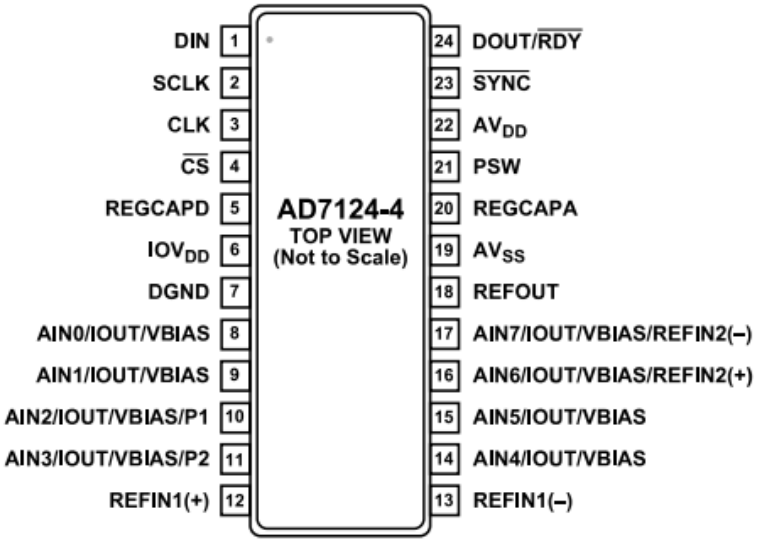
1. Ensure the jumper pins are properly connected to ESP32, Openlog, and AD7124 adapter. If not, follow the following sub-steps:
    a. Plug all three components into the breadboard relatively close to one another.
    b. For the ESP32, connect jumpers to GPIOs 10, TX, RX, 18, 19, 20, and 21. A layout of the ESP32 C6 can be seen below. Leave all other pins floating.



c. Next, we'll do the Openlog wiring. Connect the jumper from GPIO 10 on the ESP32 to the Openlogs GRN pin. Next, connect the TX pin on the ESP32 to the RXI pin on the Openlog, and RX on the ESP to the TX0 on Openlog. Then, place a jumper on VCC pin and connect it to a power rail on your breadboard. Finally, connect GND and BLK to the GRN rail on your breadboard. A Picture of the Openlog is shown below:



d. Finally, we will wire the AD7124 Adapter board. The diagram shown here:



e. First, wire jumpers connected to GPIOs 18-21 from the ESP32 to the following number locations on the adapter board:

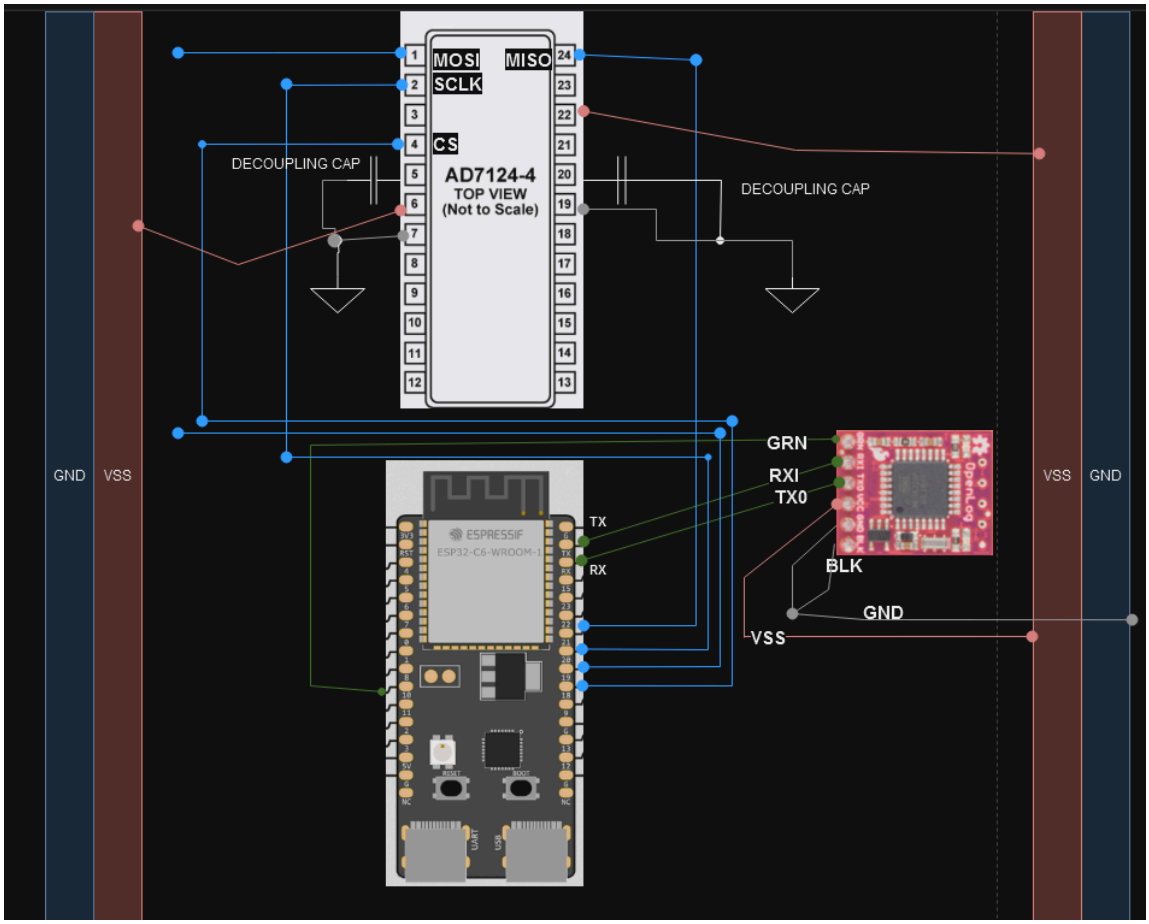
18 > ADC pin 4 **(CS)**
19 > ADC pin 1 **(MOSI)**
20 > ADC pin 24 **(MISO)**
21 > ADC pin 2 **(SCLK)**

f. Connect jumpers to ADC pins 6, 7, 19, and 22. These pins will go to the following locations:

Pin 6 **(IOVdd)** > Positive Supply Rail (3.3V)
Pin 7 **(DGND)** > Ground Rail
Pin 19 **(AVss)** > Ground Rail
Pin 22 **(AVdd)** > Positive Supply Rail (3.3V)

g. Next, you will need two 0.1µF capacitors. These will be Decoupled to the ground plane on ADC pins 5 and 20. For pin 5, ensure that the capacitor is decoupled alongside DGND. For pin 20, ensure that it is decoupled to the same ground that AVss is on.

2. With hardware components connected and wired up, your system should look something like this:



3. Next, we are going to connect the DC Power Supply to the system. First, find 5 plugs for the PSU and connect them to channel 1, channel 2, and the GND plug. The ground plug will go into the top ground plane on the breadboard, negative supply from channels 1 and 2 will also be connected here. Channel 1 positive supply rail will go to the jumper connected to ADC pin 8 (AIN+). Channel 2 positive supply, will go to the positive supply rail to send to your components.
4. Now that connections are made, turn the knobs on channel 1 to get 1.5V. On channel 2, turn the voltage knob to get 3.3V. This will be our input voltage and supply voltage respectively.
5. Depress the output button on the DC power supply to send power to the system.
6. Finally, plug in your USB cable from the proper COM port on the PC to ESP32 C6's "USB" port. MAKE SURE NOT TO PLUG INTO THE UART PORT ON THE LEFT SIDE.

ESP-IDF Code Execution:

1. In ESP-IDF, press the **fire** icon on the bottom taskbar to "build, flash, and monitor" the program. This may take a moment.
2. If you encounter an issue where the output window gives a repeated polling error, restart ESP-IDF and try step 1 again.

3. Once the code flashes and executes, you will see the output in the terminal window showing data read in from the ADC, and the value being sent to the MQTT broker and SD card.
4. NOTE: if the broker has not been run yet, it will print a corresponding output statement.

Server Setup:

1. Plug in usb-c power and monitor to raspberry pi
2. Navigate to Desktop/Fam_Server/python/instruction.txt
3. Paste code from the instruction.txt into terminal and press enter

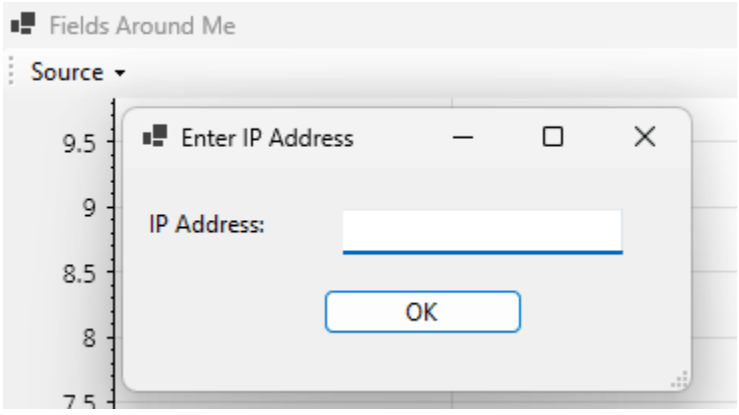
Desktop App Setup:

1. Download Visual Studio 2022
2. Right click on downloaded Zip from github and go to properties
3. Under Security, click unblock and apply
4. Unzip Git files
5. Open FAMApp.sln
6. Click Run FAM Application

Desktop App Usage

A. CSV File Viewing
   1. Select “Source” drop down menu
   2. Select “Load from Micro SD”
   3. Select .CSV in file explorer window

B. Wifi Live Data Graphing
   1. Select “Source” drop down menu
   2. Select “Wifi”
   3. Enter Server IP address into box and click continue(IP Address is shown on server boot up)
   4. Plot will display archived data from the day and continue live plotting data



C. API Access
   1. Select “Source” drop down menu
   2. Hover over APIs
   3. Select Desired API
   4. Enter Server IP address into box and click continue(IP Address is shown on server boot up)

5. API is take a few seconds to load and appear in a pop up