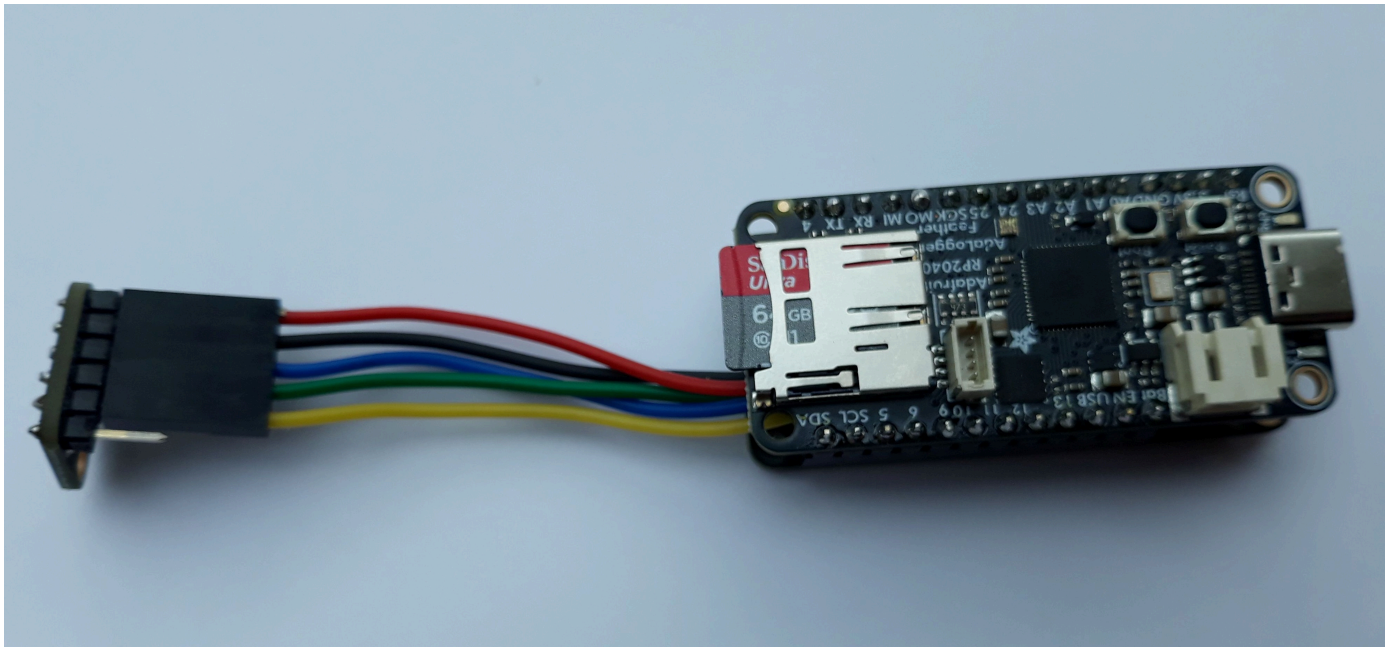
microPAM

Overview

This is a Passive Acoustic Monitor (PAM) using Adafruit PR2040 Adalogger and ICS43434 I2S MEMS microphones.



It uses CircuitPython as basic firmware and a small python script **microPAM.py**. The I2S microphone is accessed via a custom PIO module **I2S.py** that controls the I2S bus and fetches the MEMS audio data.

I2S Microphone

The ICS43434 I2S microphone has a special timing as shown here

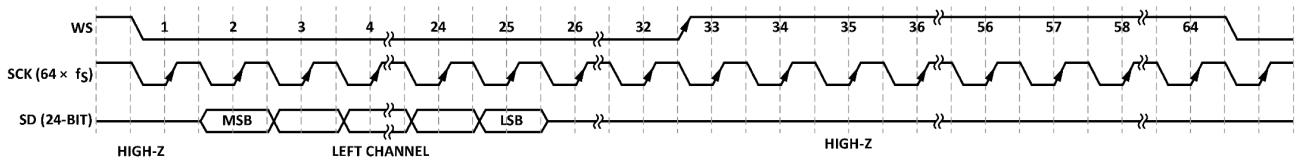


Figure 10. Mono Output I²S Format Left Channel (LR = 0)

that needs a special PIO script.

Main Loop

The mean code of the microPAM logger is a simple loop:

```
while True:
    ch=menu()
    if ch==1:
        status=CLOSED
    elif ch==-1:
        status=MUST_STOP

    buffer = i2s.last_read
    if len(buffer) > 0:
        if status != STOPPED:
            led.value = True
            logger(buffer)
            led.value = False
            data_count += 1
            if (data_count%100==0): gc.collect()
    loop_count += 1
```

A simple User Interface (UI) allows to flag the acquisition to start or to stop. To keep system as simple as possible, no more user interaction is implemented. After checking if there are new data available and if the acquisition is not stopped, data are saved to disk.

While writing to disk, the LED light up to indicate disk activity. Also, the garbage collector is run regularly.

Logger function

The **logger(buffer)** function handles all disk related operation, like file name creation, file opening, writing and closing.