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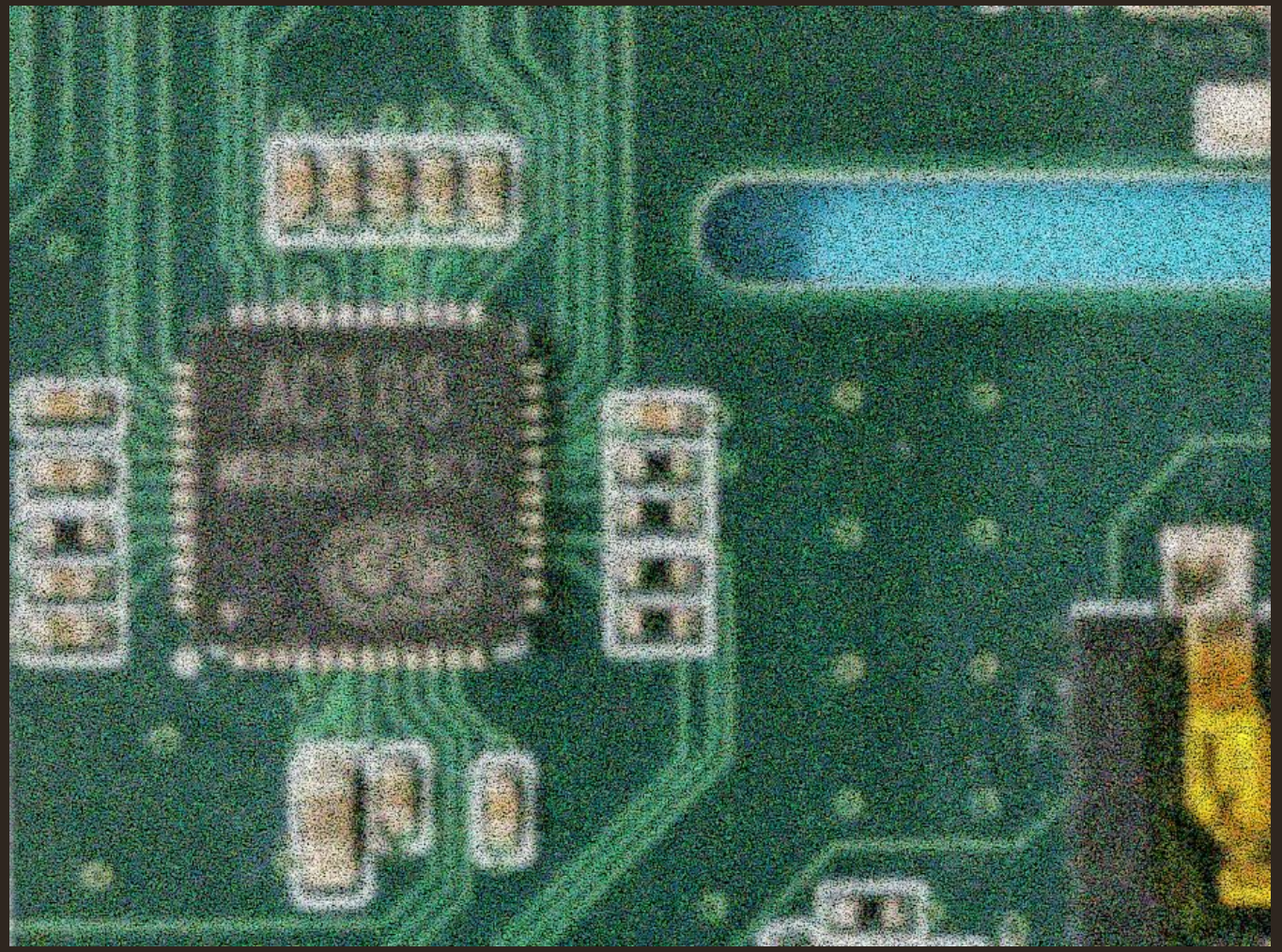
K. Lisa Yang **Center for Conservation Bioacoustics**

MAARU Sound Recorder Hardware Reverse Engineering

Will Fritz



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Background

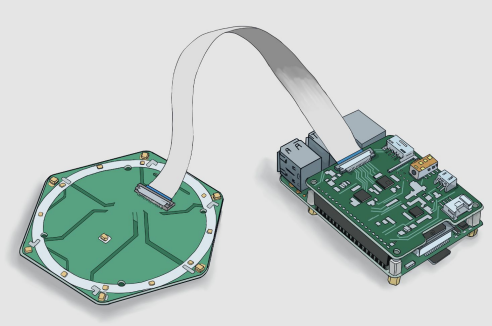


Image Credit: Becky Heath

- Working in collaboration with Neel at Imperial College
- MAARU (Multichannel Acoustic Autonomous Recording Unit) is designed for spatial ecosystem monitoring
- Omnidirectional
- Originally a 6 channel recorder
- Manufacturer no longer makes the audio recording hardware.
- Needs to be 4 channel

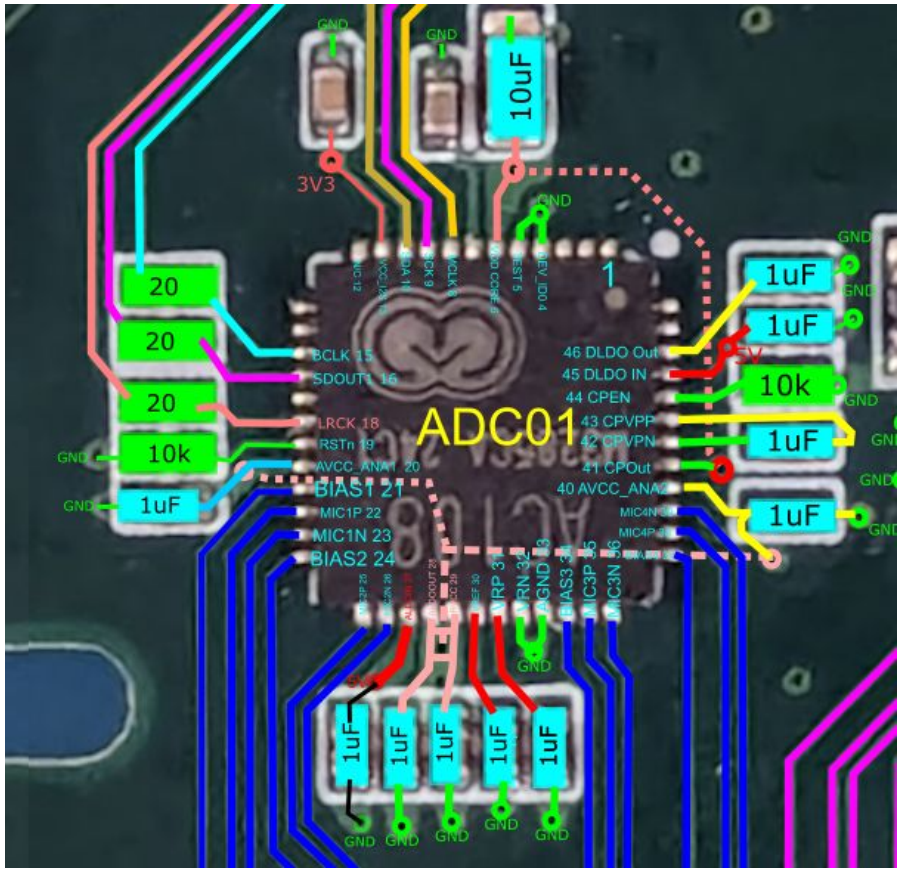
Goals

- Recreate the audio recording hardware without firmware and software modification
- Remove unnecessary components to reduce cost
- Make hardware open-sourced
- Make assembly possible for human or resource-restricted manufacturer
- Allow manufacturing locally for users near the deployment locations

Reverse Engineering Tools

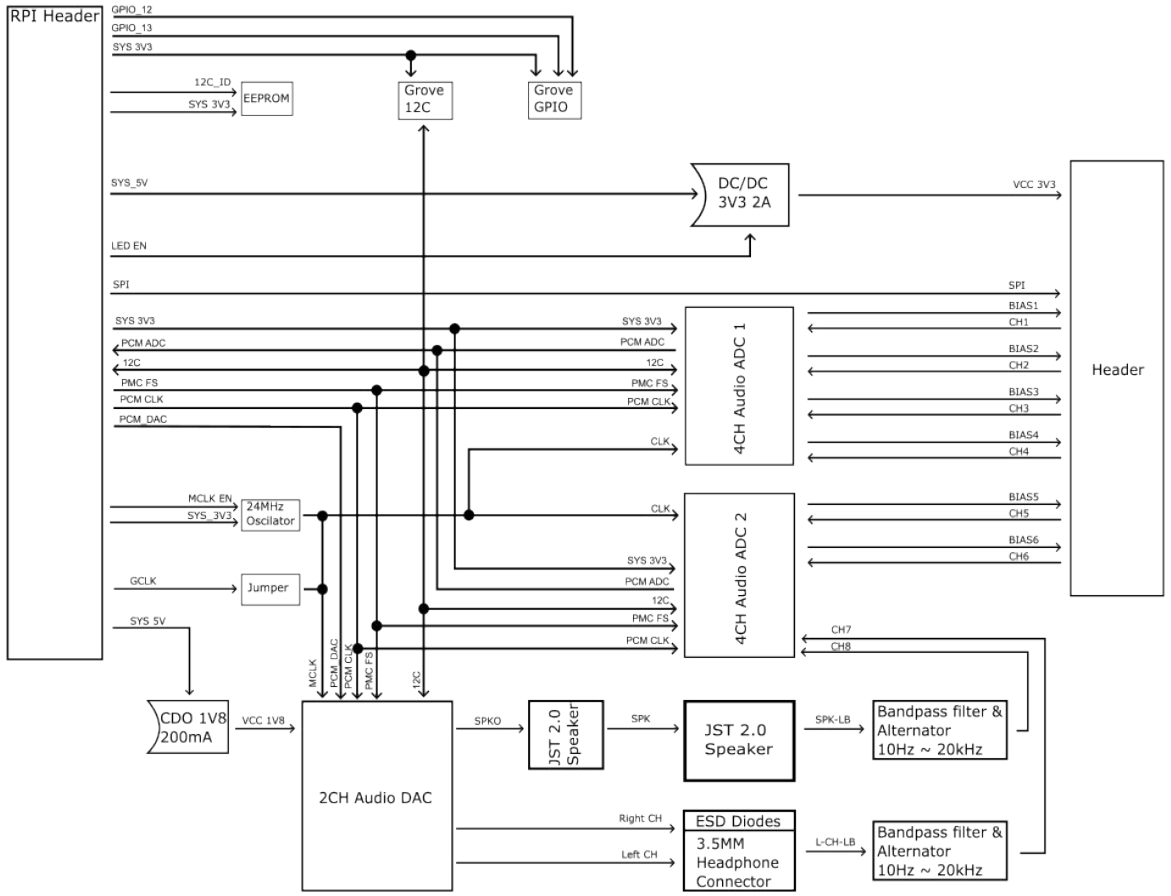
KiCad

INKSCAPE

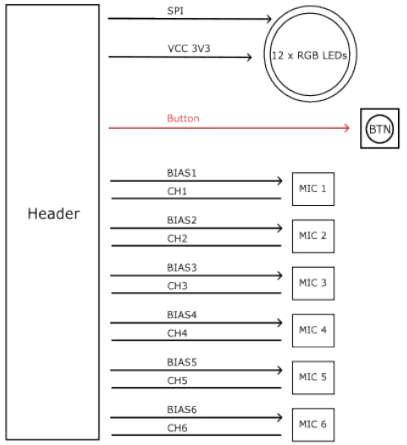


Schematic Analysis

Audio Drive Board



Mic Array Board



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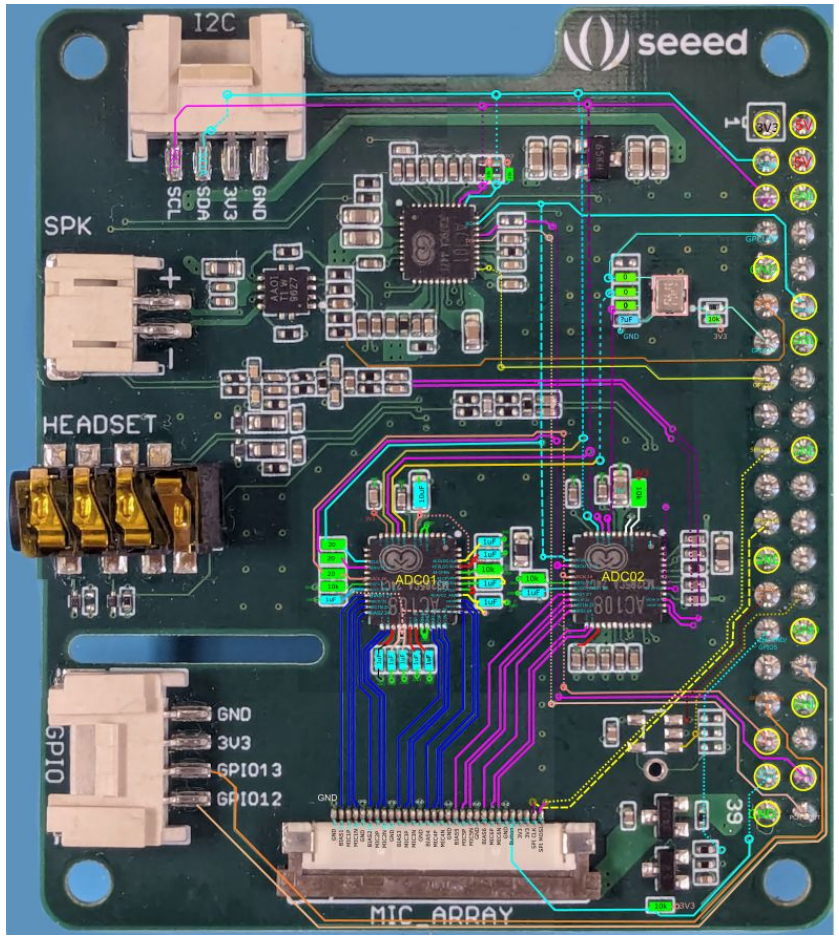
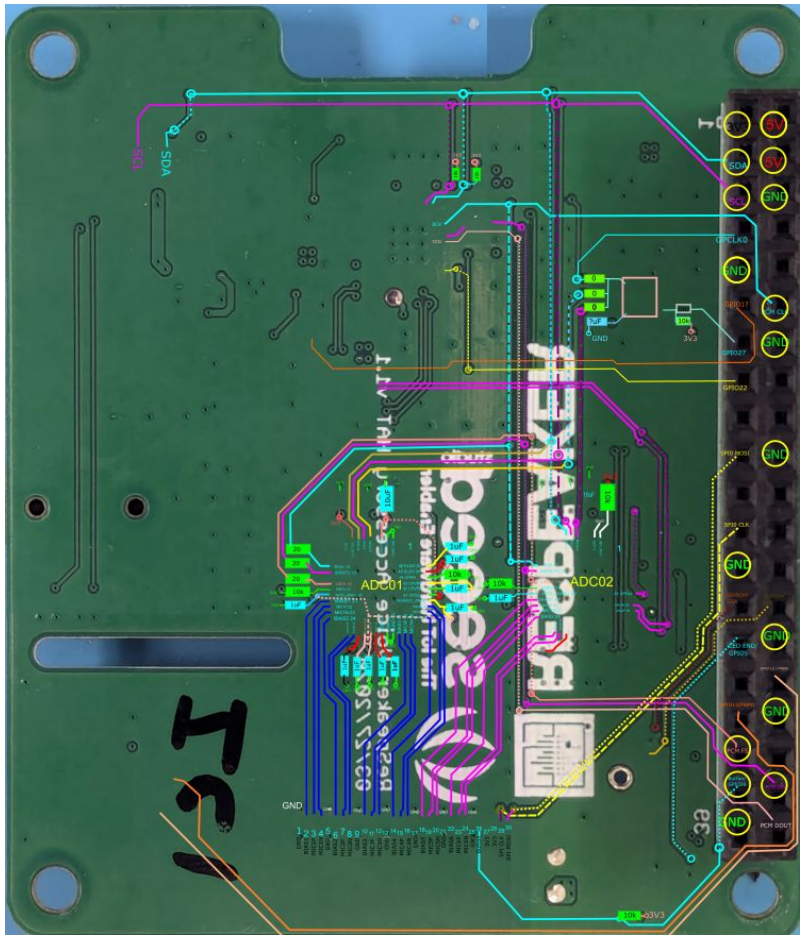
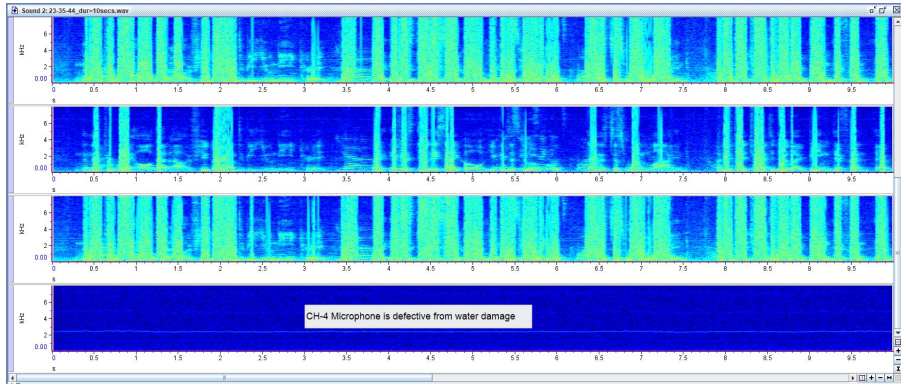
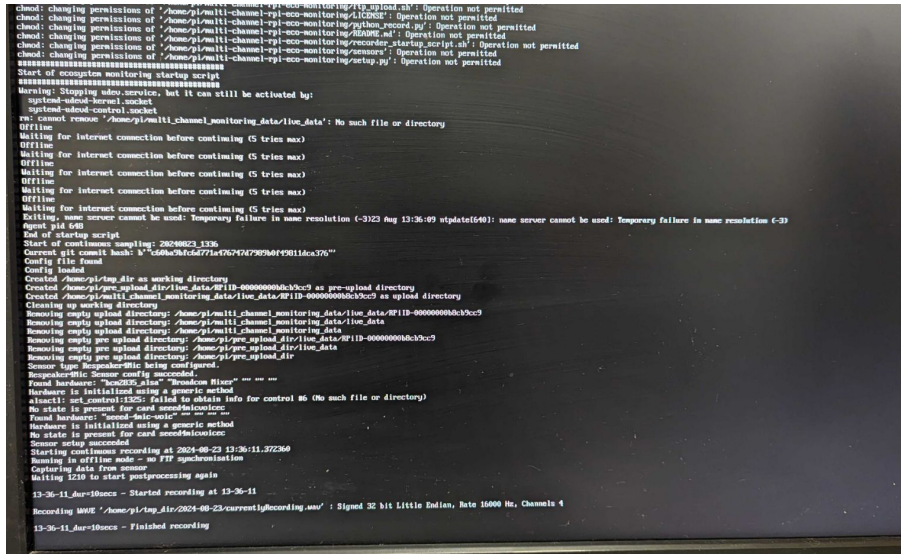
PCB Analysis





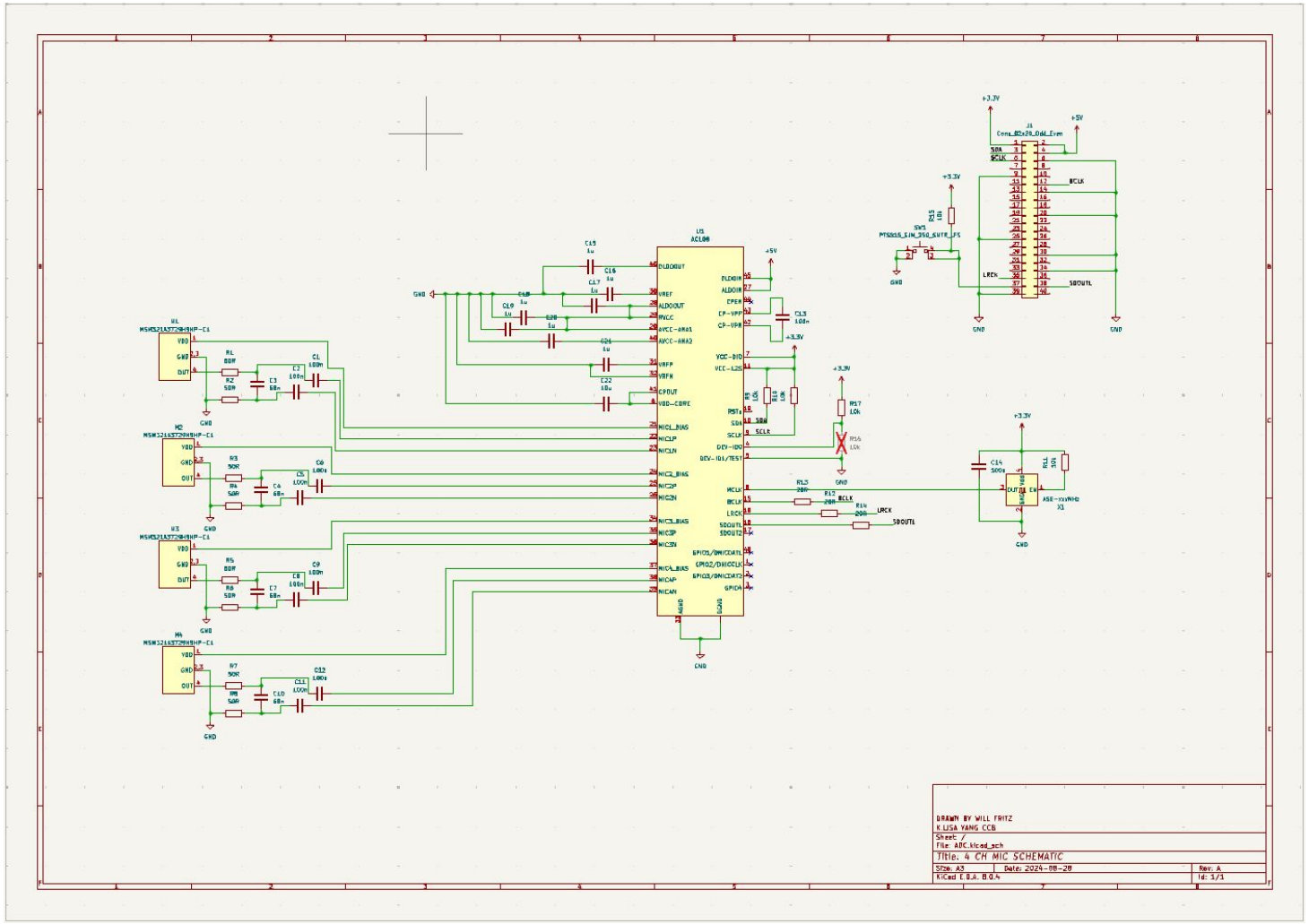
Prototyping





Functioning modified 4-CH recorder running on a RPi 2B v.1.2 using driver and software from the MAARU project

Schematic Capture



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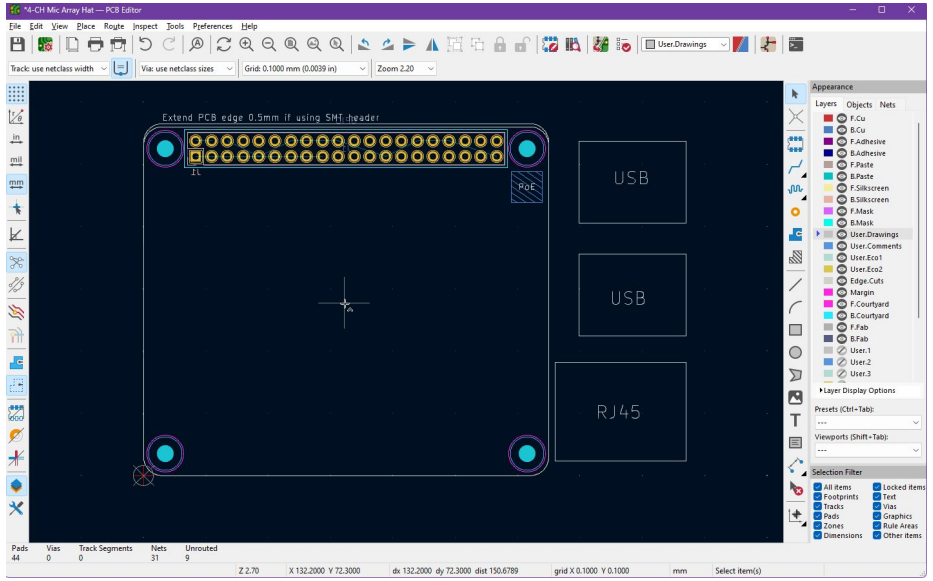
Next Steps

- Create board layout
- Prototype board
- Test board
- Make recreatable



Takeaways

- Circuits require a lot of drawing
- Learned how to make footprints and schematics in KiCad
- Learned how to reverse engineer a board using Inkscape and datasheets
- Found out how engineering teams operate

Questions

Contact info:

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