Final Report

Jack Hanling

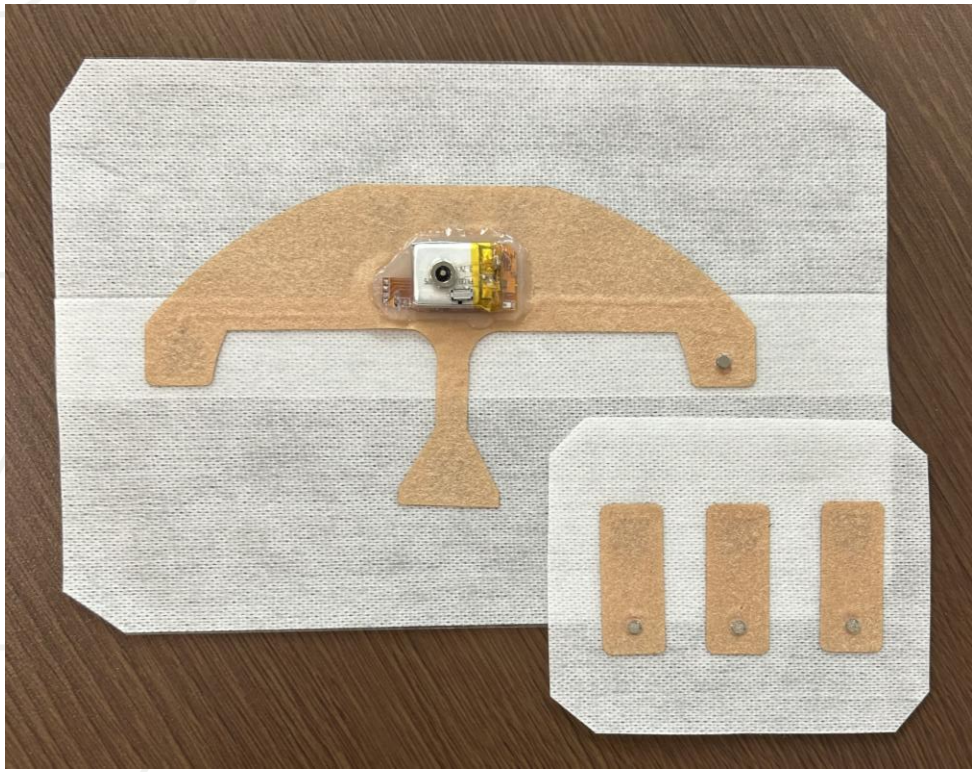
December 2, 2022

Bio-Interfaced Translational Nanoengineering Group

IEN Center for Human-Centric Interfaces and Engineering (CHCIE)

Georgia Tech

Project Overview



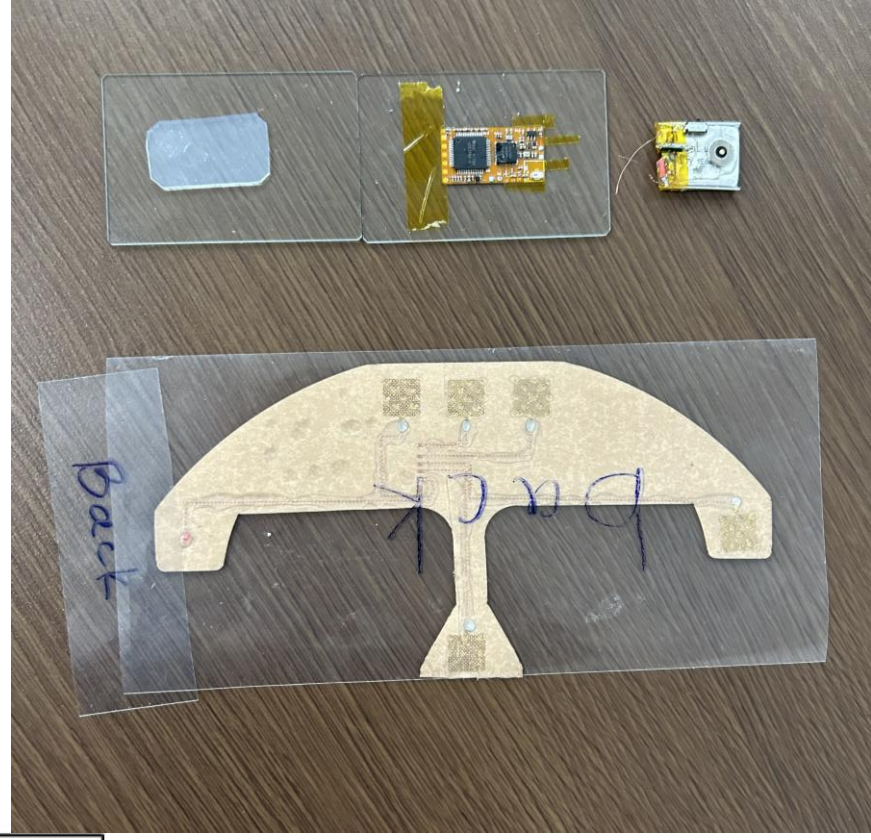
- **Sleep Stage Classifying Device**
  - Device Monitors EEG and Uses CNN to determine sleep stage and abnormalities
- **Semester Goal**
  - Fabricate Sleep Monitoring Device
- **Midterm Overview**
  - Fabricated Batteries
  - Fabricated Sleep Sensor Circuit

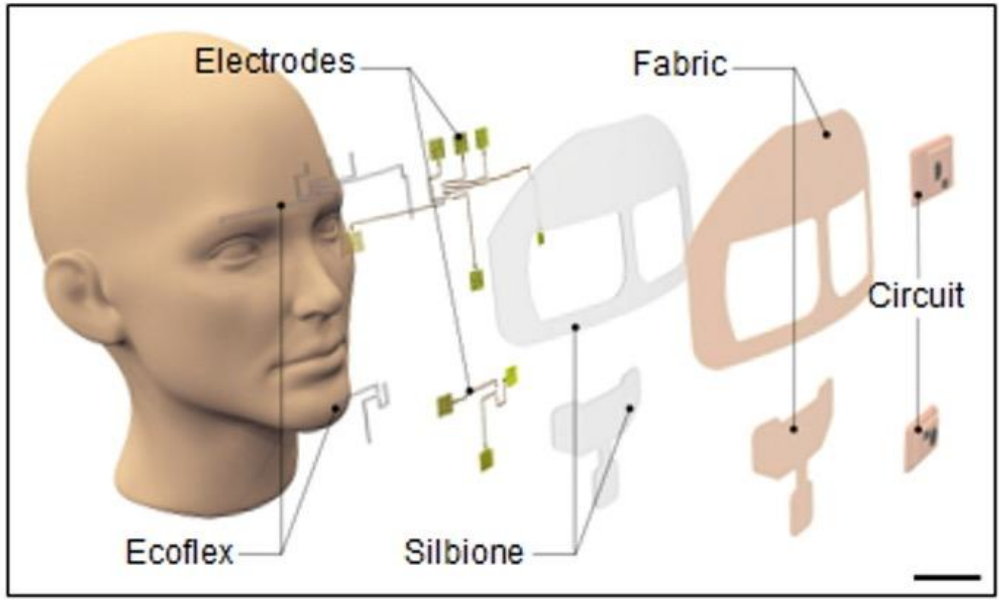
Georgia Tech

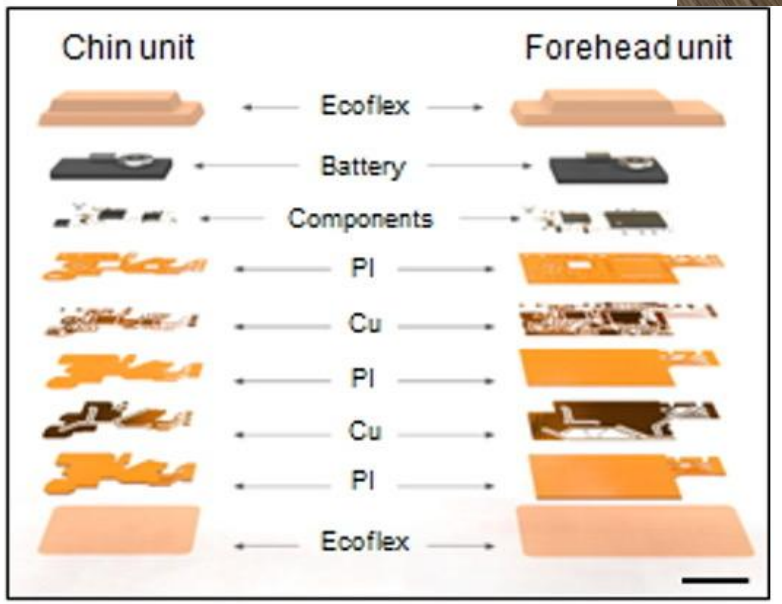
Sleep Device Design

Design Components

- Ecoflex
- Electrodes
- Circuit Component
- Battery







Georgia Tech

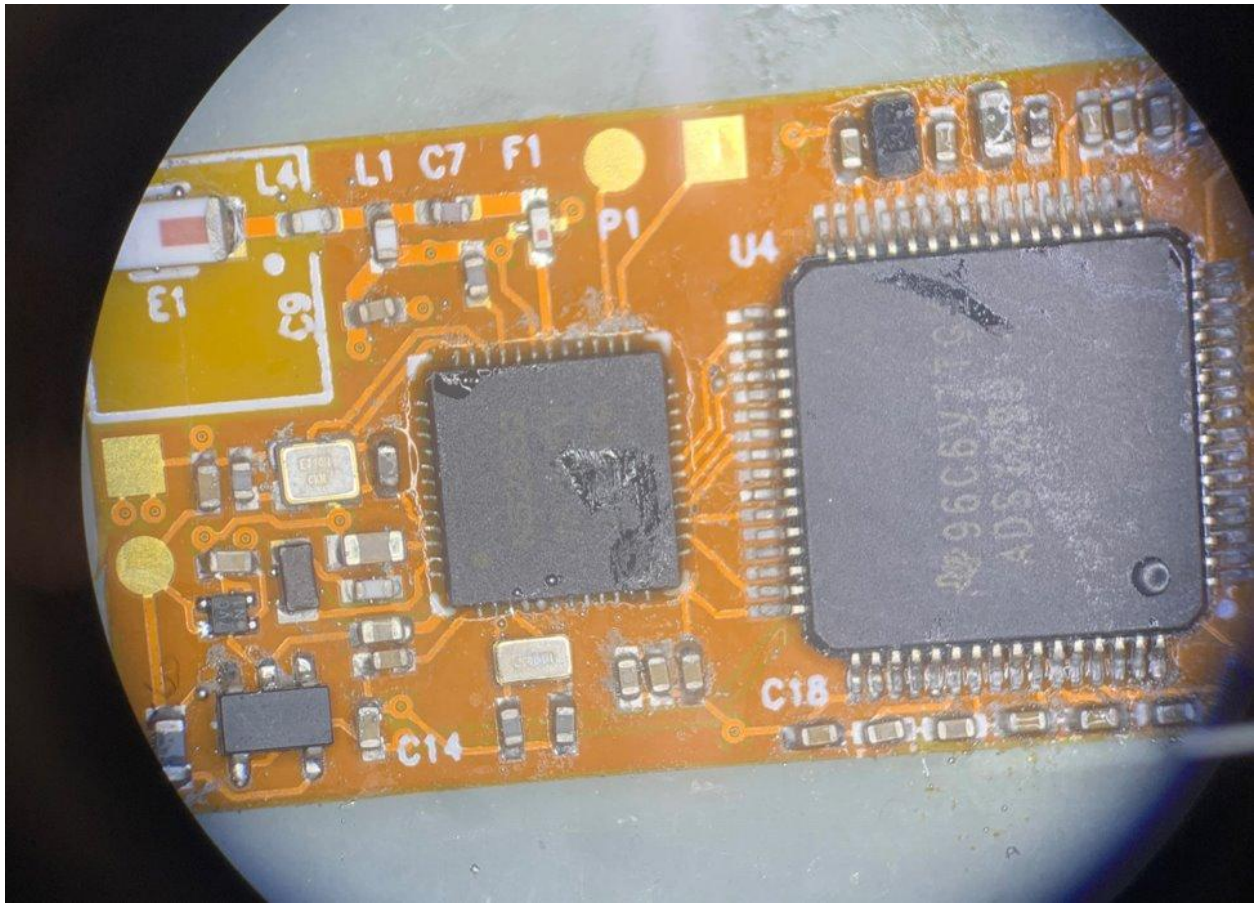
Circuit Component

Fabrication

1. Integrated Circuit Component
2. Surface Mount Soldering

Details

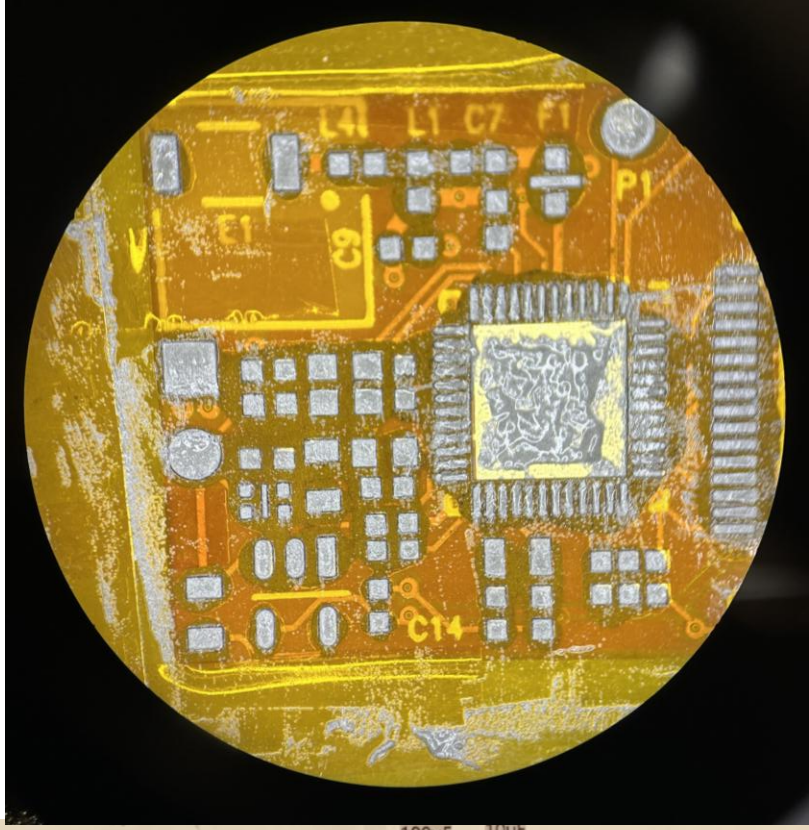
1. This is the Central Hardware Component of Device
2. Built Three of These Circuits

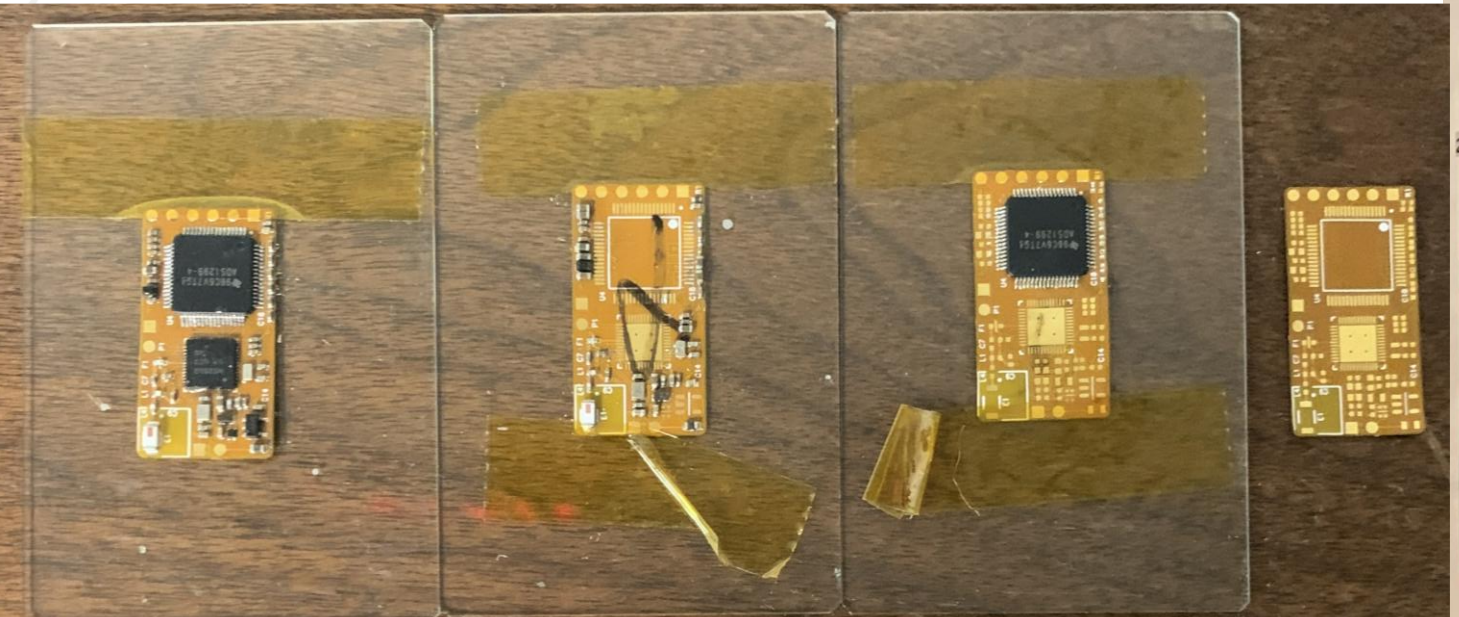


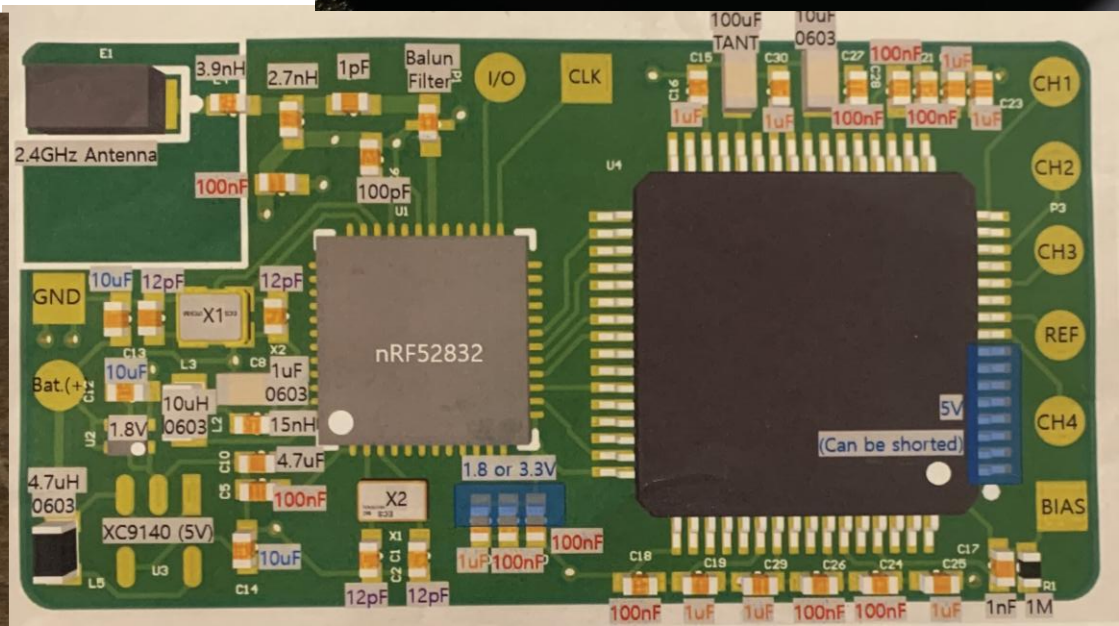
Circuit Component

Final Product

- Development Stages at Bottom
- New Soldering Method to the Right



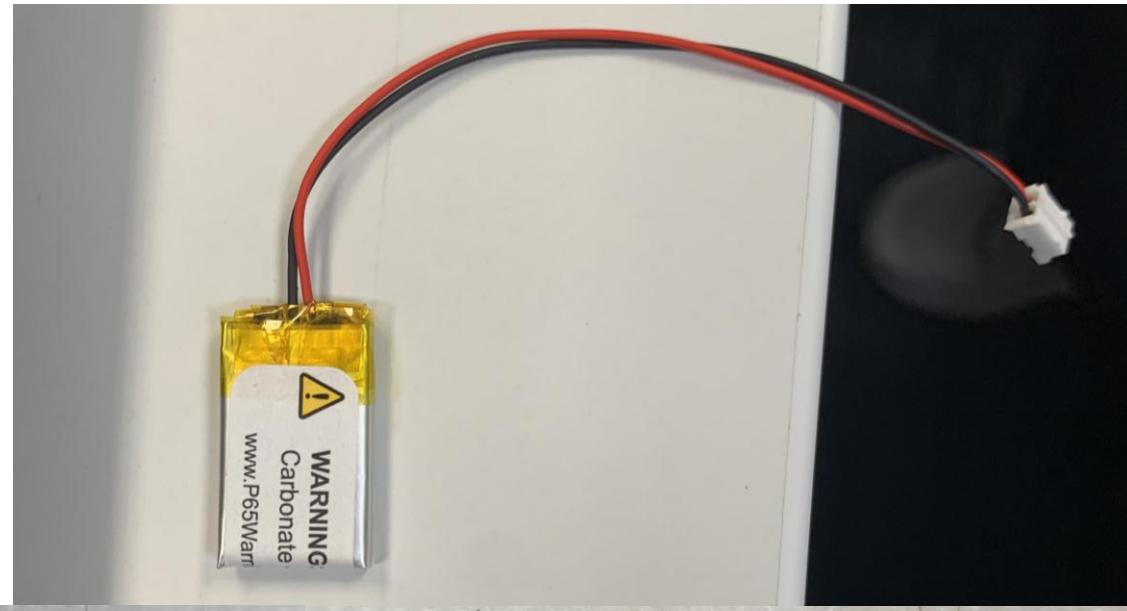


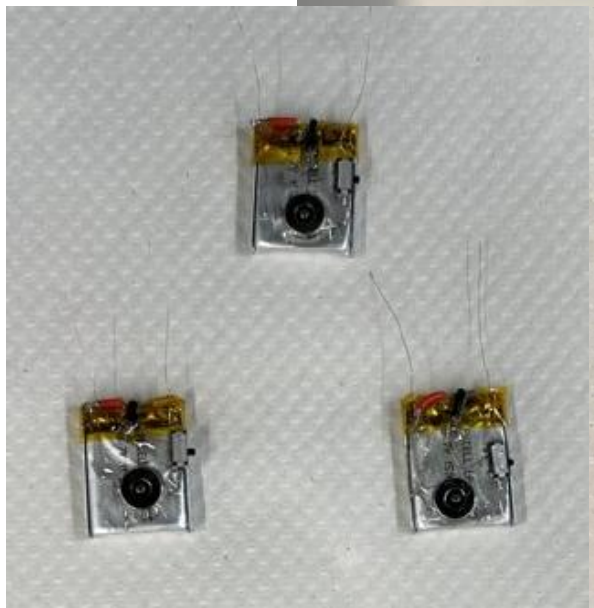


Battery Component

Battery Components
- Battery
- Re-charging Magnet
- Switch
- Copper Wire
- Epoxy Cover

Details
- Power Source of the Device
- Made 7 amount of these

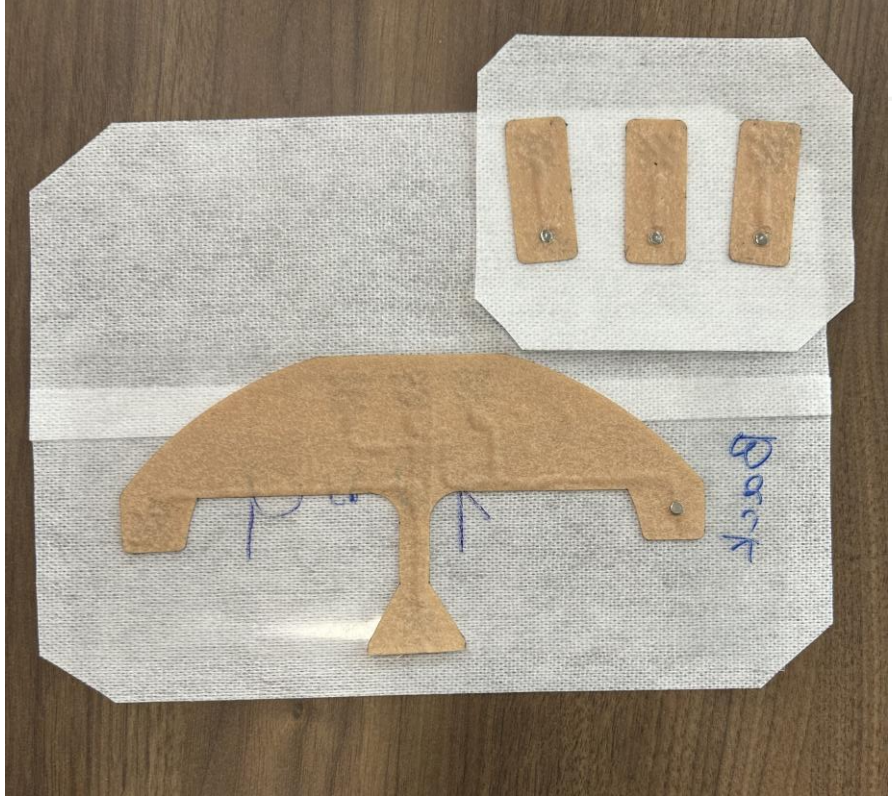


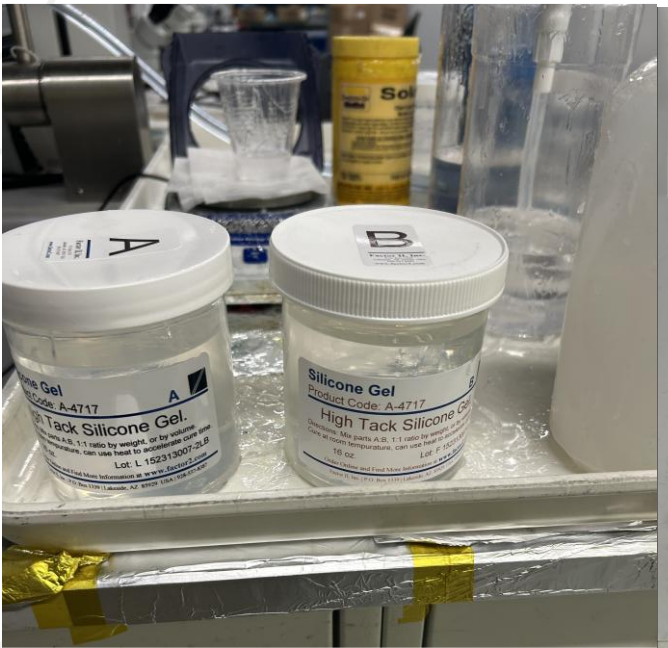


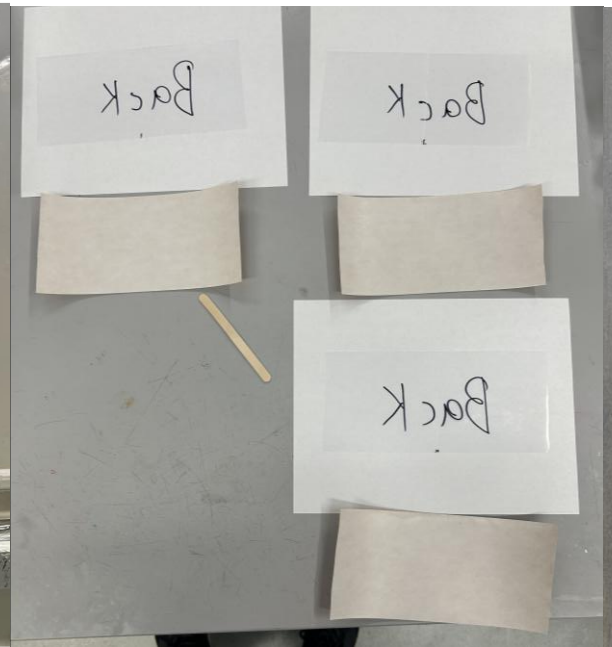
Fabric Pad Component

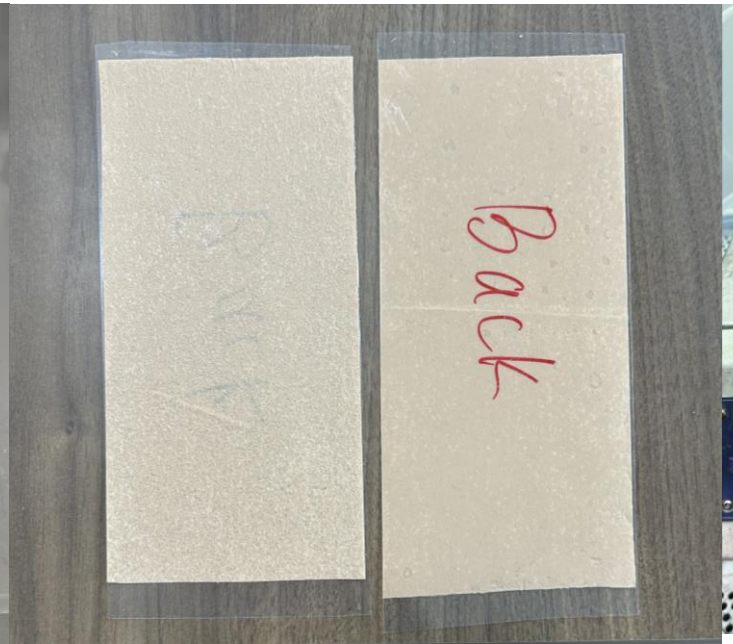
Details

- Attaches Electrodes to Head
- Made 7 Fabric Pads



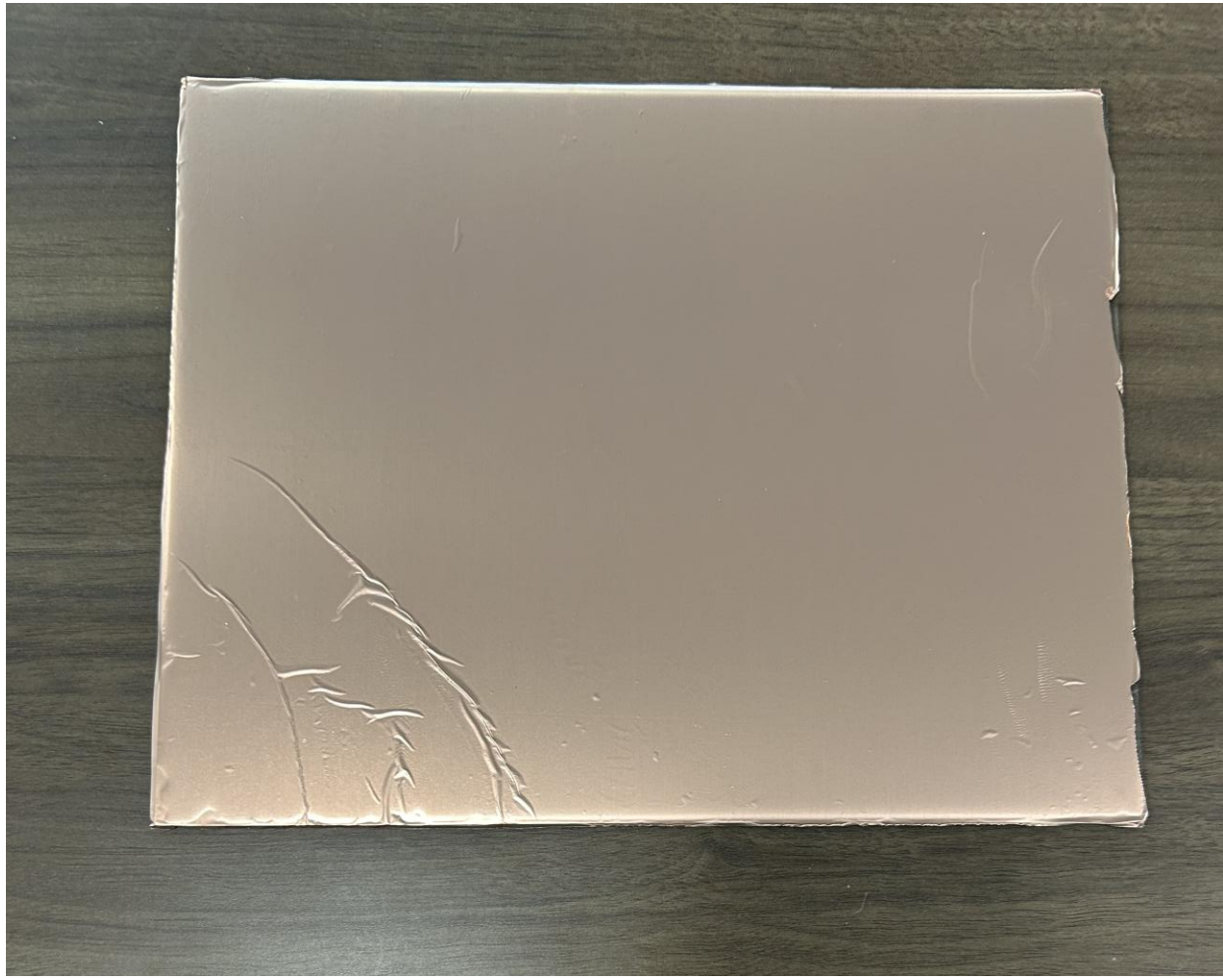






Copper Plate Lamination

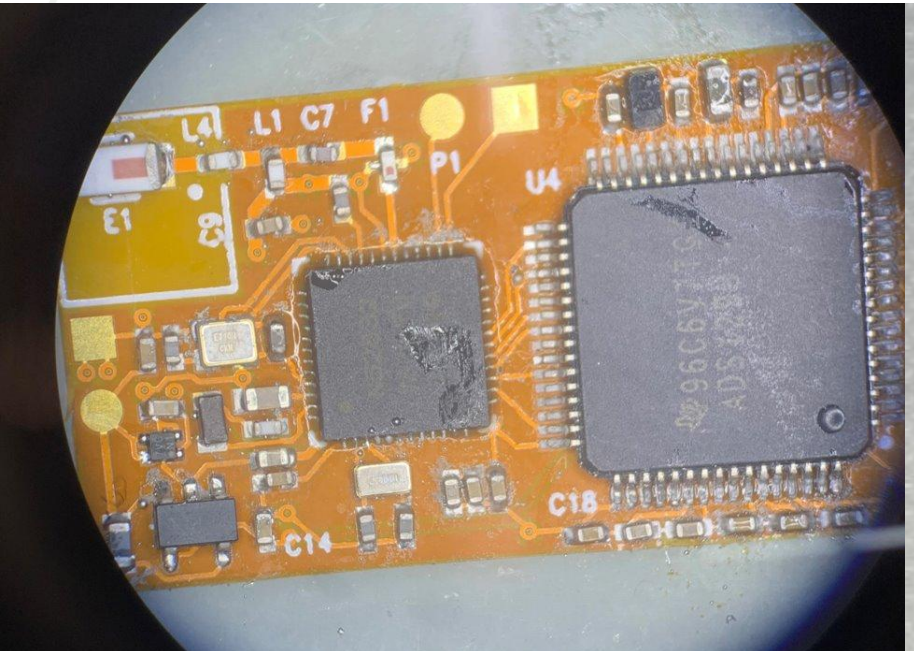
Details:
1. Method of Developing the Copper Wiring/Electrodes for the Patch

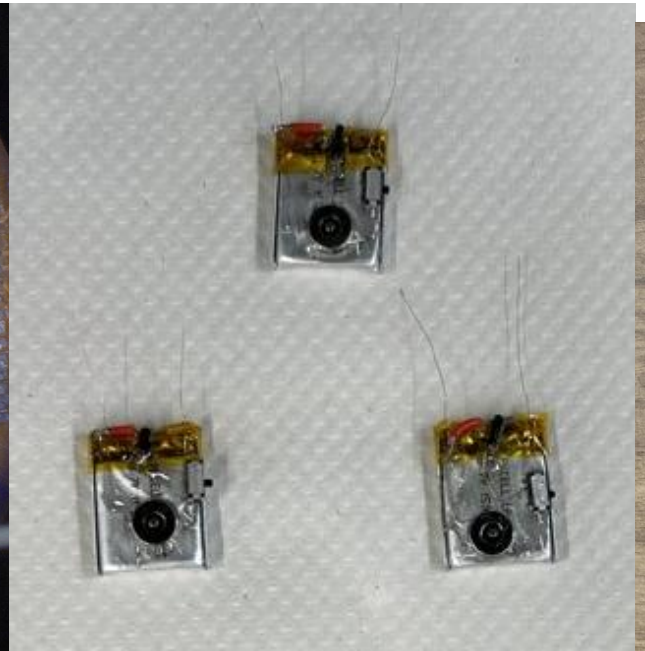


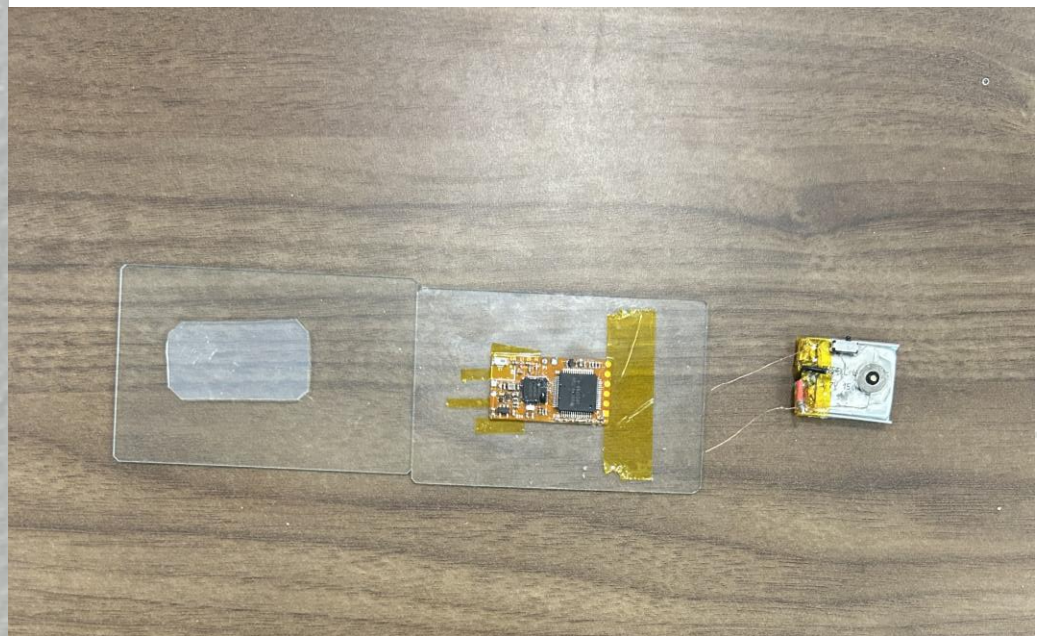
Final Reflections

Components Made

- Circuit Component x3
- Battery Component x7
- Fabric Patches x7







Next Steps Discussion