

BAssist

(Banjo Assist Robot)

Team Members:

Fatemeh Gholizadeh

David Hatch

Shiva Khanal

Gavin Philips

Overview

A robotic assistant for
Scruggs-style banjo plucking.

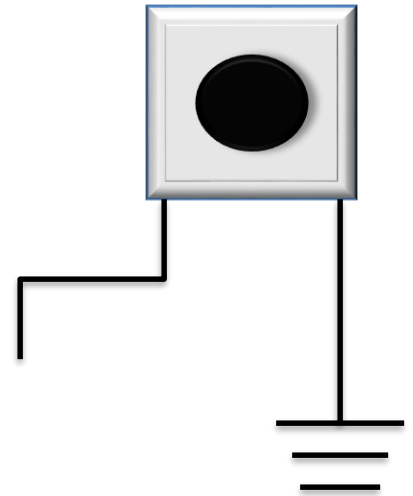
The BAssist will pluck the banjo strings in
a desired pattern, leaving you free to
focus on fretting the desired chords!



Components

Switches

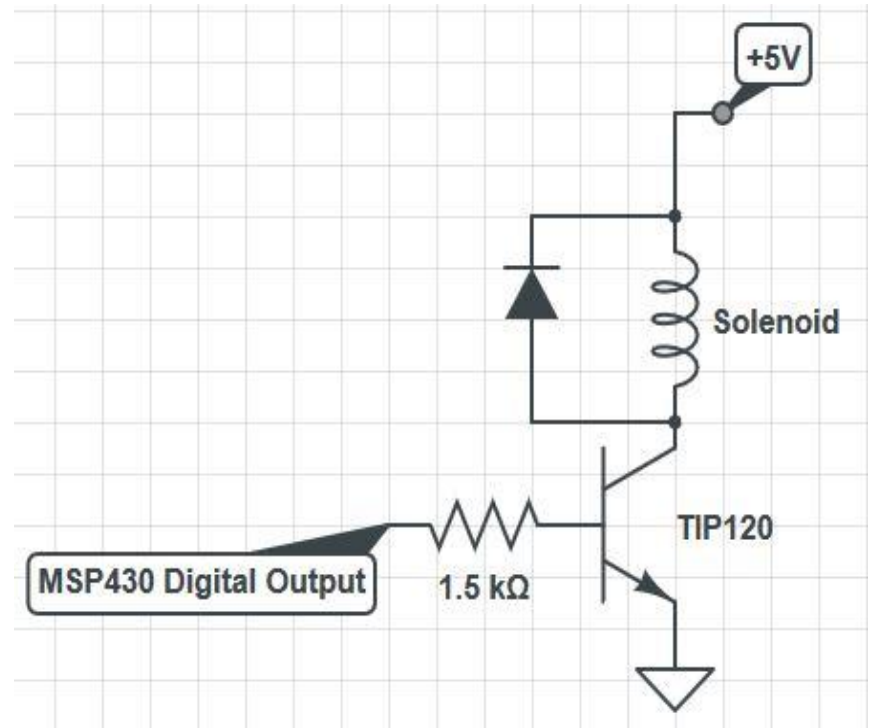
- P1.1 – Start/Stop
- P2.1 – Cycle through pattern
- P8.2 – Set rhythm
- Hardware interface: one GPIO line per switch
- Software handling: pins set up to trigger interrupt on falling edge
- Progress: completed, integrated with solenoid driving code





Solenoid Actuator

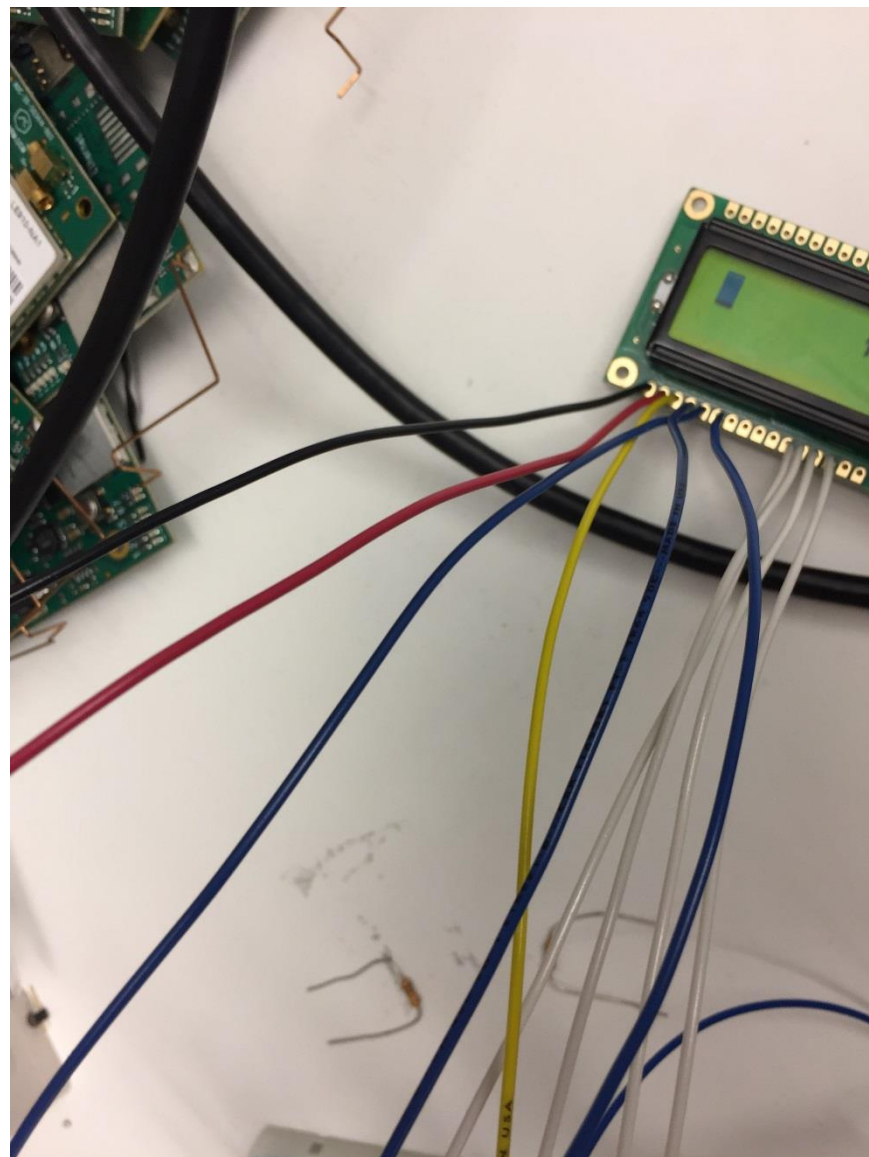
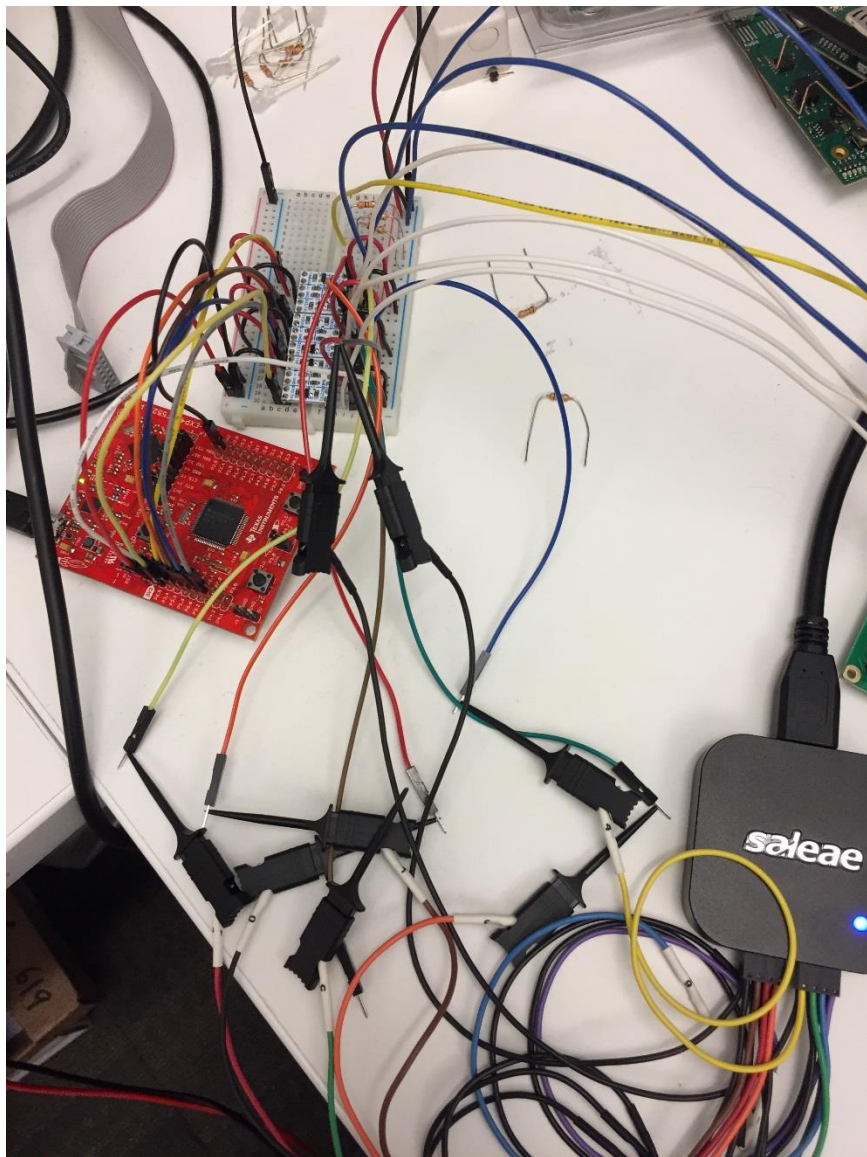
- 5x - 5V mini push-pull solenoid
- Hardware interface: Solenoid actuators connected to GPIO pins through TIP120 Darlington power transistors.
- Software handling: GPIO manipulation
- Progress: completed



LCD

- 2x16 character LCD module
- Hardware interface: 4 data lines, 3 control lines
- Software handling: LCD addressed via custom drivers that manipulate digital GPIO lines
- Progress: drivers implemented, interfacing hardware tested, successfully writing chars





Project Status

Task Division

- LCD and User Notifications
 - Fatemeh Gholizadeh, Gavin Philips
- Rhythm Control System
 - Shiva Khanal
- Solenoids and Mechanical Design
 - David Hatch

Hardware

- Accomplishments
 - 3d printed prototype stabilizing housing for solenoids
 - Tested and confirmed transistor functionality
 - Tested and confirmed solenoid functionality
 - Tested and confirmed LCD functionality
- Opportunities/issues
 - Heat dissipation in solenoids

Software

- Accomplishments
 - Designed and implemented basic architecture
 - Implemented and tested timer peripheral @ 1kHz
 - Implemented and tested interrupts for switches
 - Implemented and tested logic that translates the plucking pattern to solenoid actuation
- Opportunities/Issues
 - LCD driver blocks rest of application by using active wait