

# BAssist

(Banjo Assist Robot)

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# Motivation

- People who have play music as a hobby should not be stopped by physical disability
- Might be the unique project in the class to attract attention of general public
- Group members are all music lovers

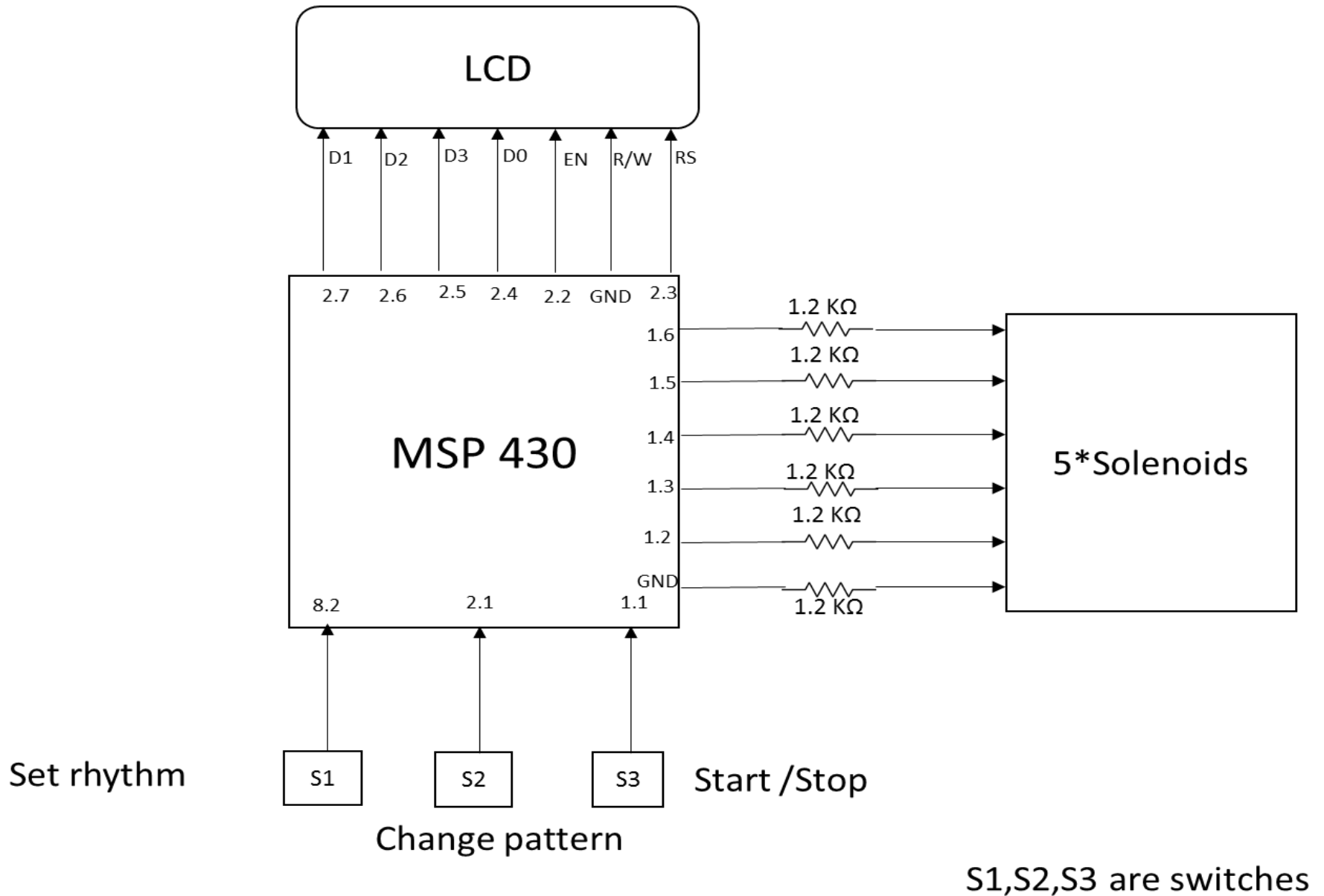
# Overview

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!



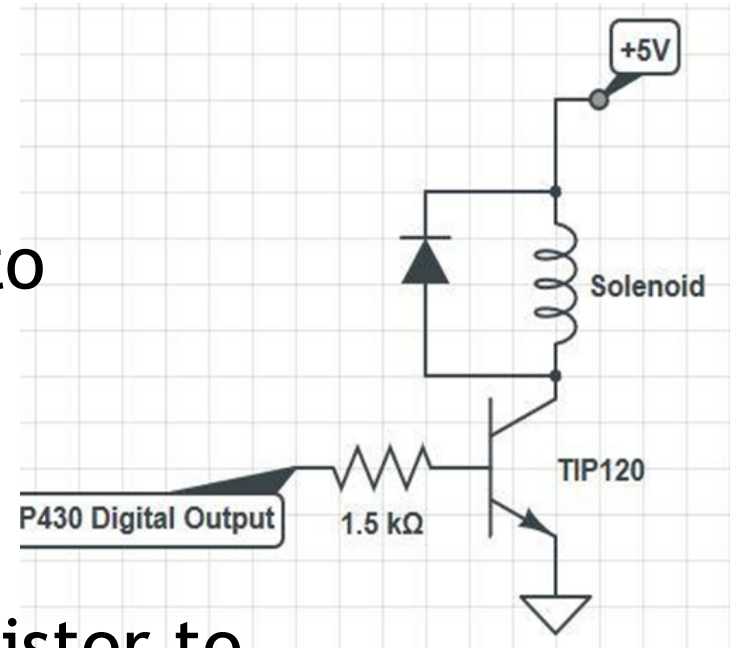
# Block Diagram



# Hardware Interface

## MSP with Solenoids

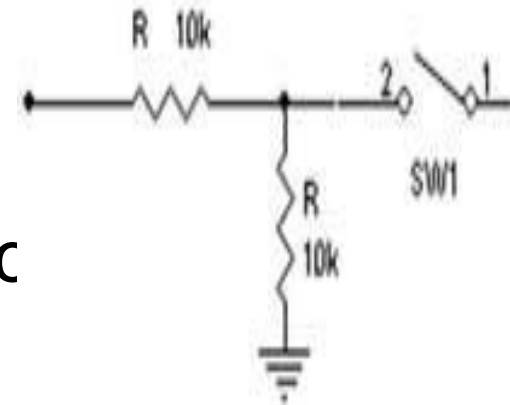
- Solenoid actuators connected to GPIO pins of MSP 430 through TIP120 Darlington
- 1.5 kOhm resistor is placed in series with the base of the transistor to limit current between the MSP's output pin and the transistor as shown in figure



# Hardware Interface

## MSP with Switches

- Each switch is connected to a GPIO on the MSP
- Another end is grounded through limiting resistor to prevent short circuit of MSP as shown in figure.



Make Switch Close – Low  
Make Switch Open – High

# Hardware Interface

## MSP with LCD

- Each of the data and control lines of MSP were shared through Logic level converters to the LCD character display
- Due to individual connection of LCD and MSP 430 , additional supply voltage of ~1.3 V is needed for character contrast which was done by voltage divider consisting of 3KOhm and 1 Kohm resistor and supplied voltage of 5 V.

# Software Interface

## MSP with solenoids

- 5 GPIO pins were configured as an output pins each were connected to five solenoids

## MSP with switches

- GPIO pins were configured as inputs and given interrupt routines. Had to implement debouncing to prevent multiple triggers.



# Software Interface

## MSP with LCD

- 4 data lines and 2 control lines were connected to the character display
- Managed via GPIO
- Datasheet delays satisfied via 1kHz timer and active waiting

# Results

- All components worked individually, but there were some integration troubles in hardware
  - LCD screen had a lot of lines and would not fit on the BAssist fixture