Pinch Valve Update

Update Summary

Hardware Features

- Inserted buttons
  - manually adjusts valve position (i.e. opens/closes)
- Motor components
  - chopper driver and stepper motor
- Control system
  - responds to button tips

Software Features

- Control System
  - Flow rate estimate: time differential from last tip
  - Moves toward optimal position
  - Responds with regularity
  - Initial testing confirms it works well
- Target tip times from two constants
  - optimal flow rate (L/hr) and bucket volume
- Reset feature
  - Position will not move below fully closed and fully open (0-5 mm)

Hardware

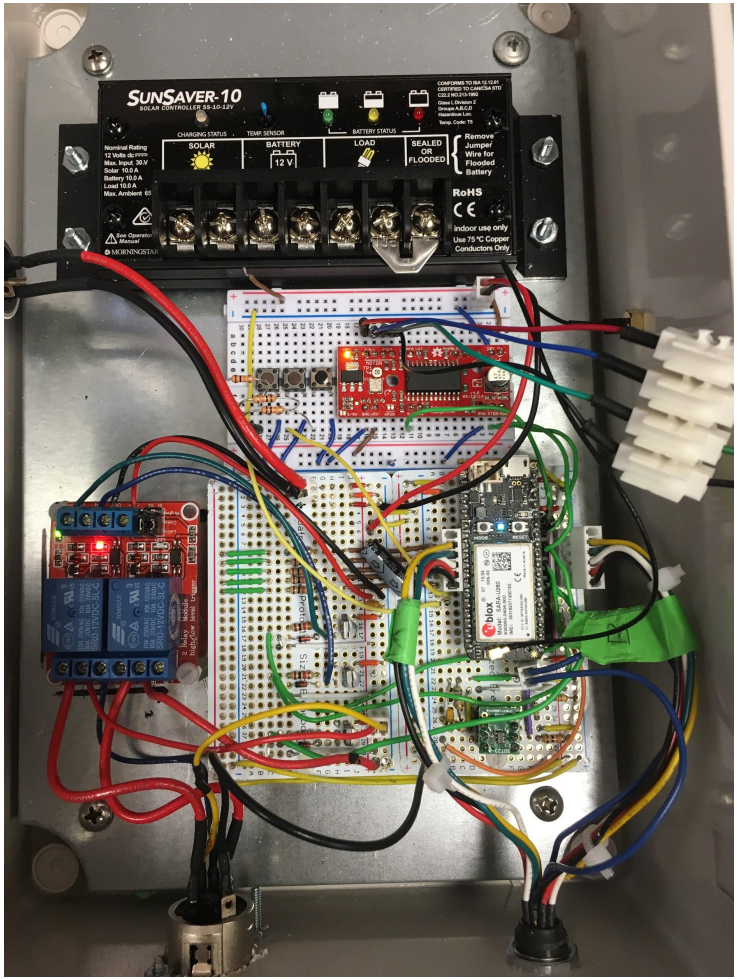
Components

- Easy Driver Stepper Board
- Linear Step Motor
- Three push buttons

Sleep function enabled a significant reduction of heat

Confirms it meets the following for proper safety of motors

- I Supply is >> I Load
- Driver I Rat. is > 1.4X maximal I Rat. of the motor*
- V Rat. of Motor < V of Power Supply



PCB Development

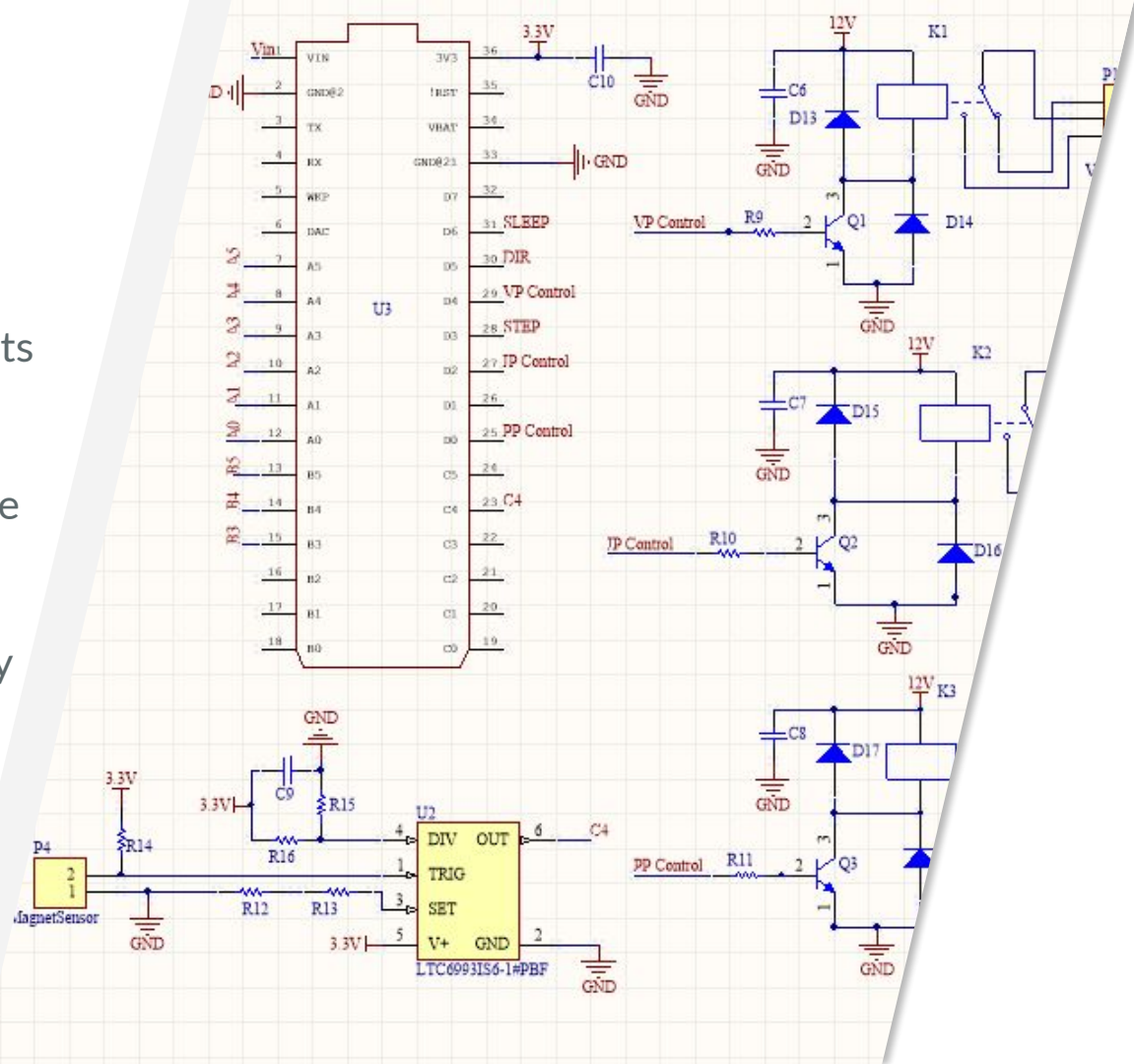
Matching components with available parts from manufacturers

Selecting surface mount and through hole pieces

Cleaning up a schematic for a high quality finish.

Ready to initiate PCB design

- Have constructed several boards



Software

Pinch Valve Class and Bucket Class Development

- Several methods, shift up, shift down, update Flow
- Constructor with pins (direction, step, sleep, up, down, reset)
- Attach interrupt scheme to sense buttons, bucket tips
- Position variable to monitor where the position is, ensures the motor doesn't go too high in case of a clog.
- Programmable to do different size turns (e.g. ½ turn, etc.)

Envision adding prevention of clog functionality, adjustment for extremely high rates of flow that happen suddenly (~10 sec)