SKY TRCKER V1

BEN SALAK'S ME 430 PROJECT

QUICK LINKS

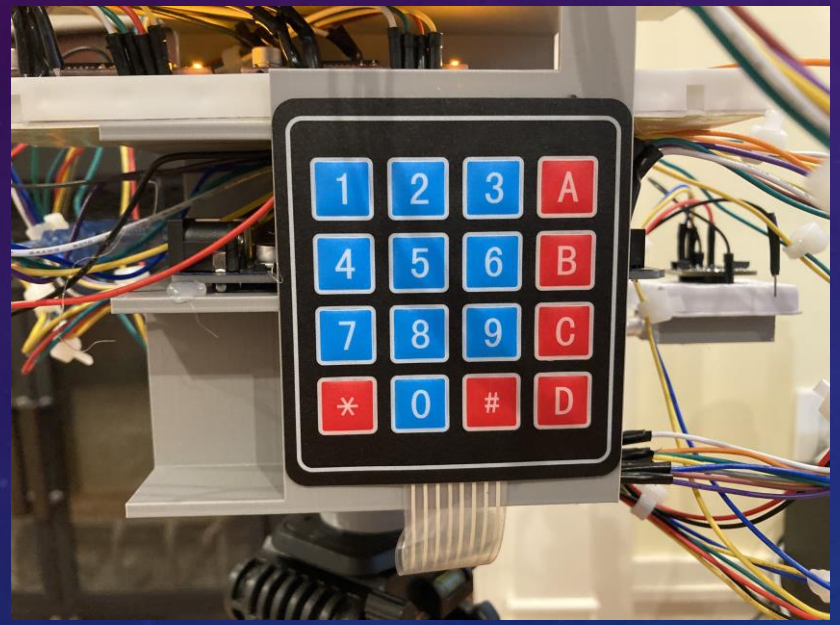
https://github.com/rhit-salakbw/ME430/tree/main/finalProject

OVERALL OBJECTIVE

- Develop a device that will automatically position itself in 3D space to point out location of selected celestial objects
- The purpose is to help align a larger telescope mount with stars as its alignment sequence requires manual alignment with 3 stars.
- The expected result is a decrease in time lost while I try to manually determine if the star I am looking at with my telescope is the correct alignment star.

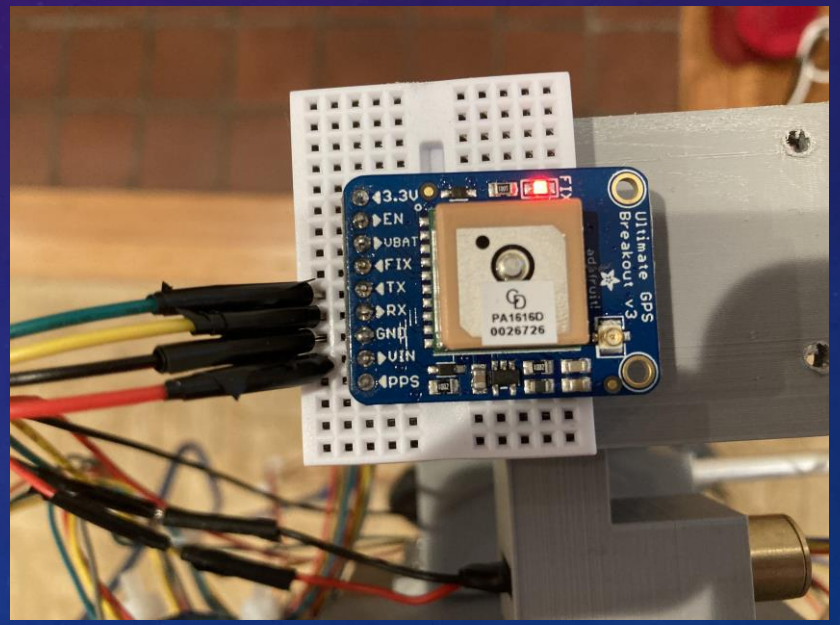
INPUTS

16-Button Keypad



Used keypad in kit – if more than 8 buttons needed, this is a great product

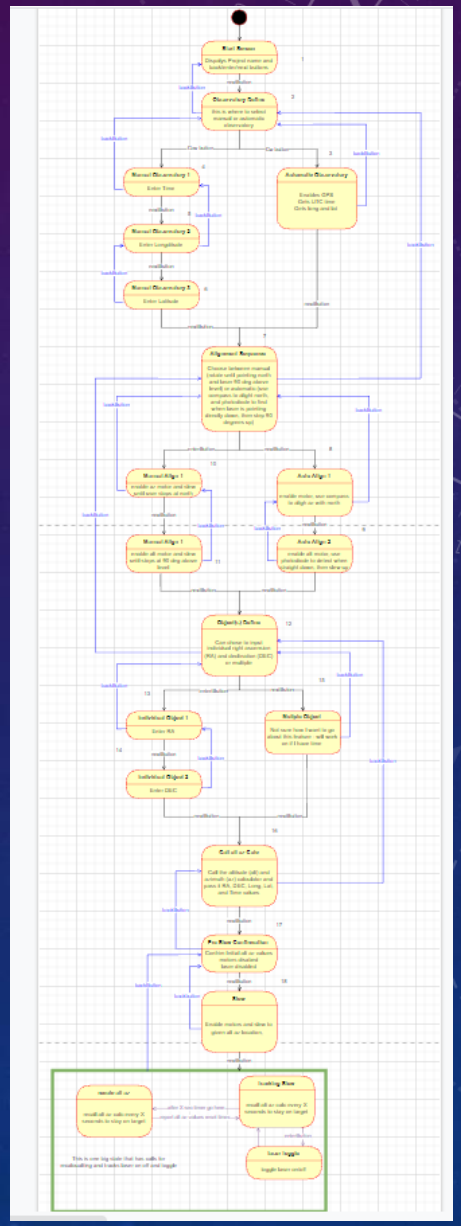
GPS Sensor



Used Adafruit GPS module – if using near building, should also get antenna

CODE – STATE FLOW DESIGN

- Since the code for this project is very sequential, a state flow design was used.
- 17 switch cases were used to model all states; backward and forward movement through the menus is included.



CODE – LIBRARY USE

#include <Key.h> and #include <Keypad.h>: for keypad

#include <LiquidCrystal.h>: for LCD control

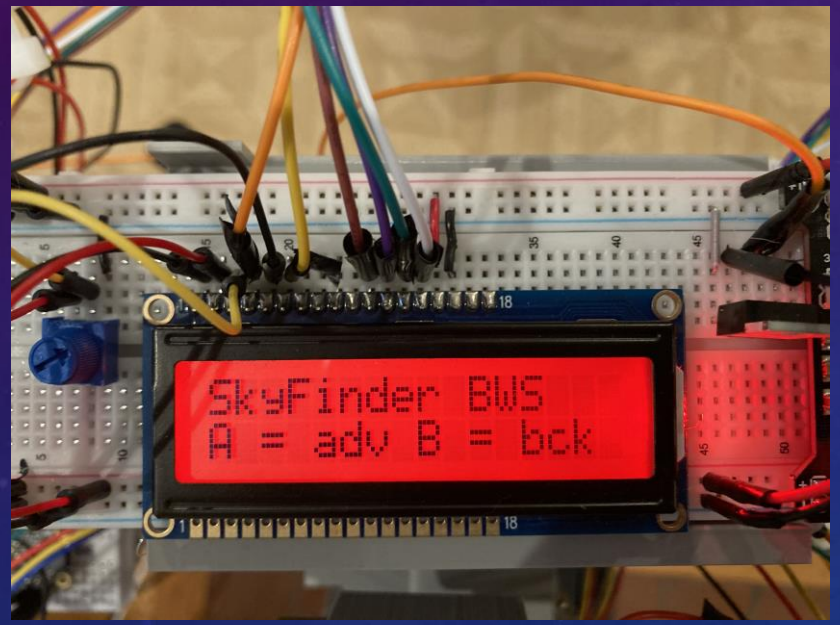
#include <AccelStepper.h> and #include <MultiStepper.h>: for motor control (fine control of acceleration profiles and motor movement at same time)

#include <Adafruit_GPS.h>: library for reading in and parsing GPS

```
//library inclusion
    #include <Key.h>
    #include <Keypad.h>
    #include <LiquidCrystal.h>
    #include <AccelStepper.h>
    #include <MultiStepper.h>
    #include <Adafruit_GPS.h>
```

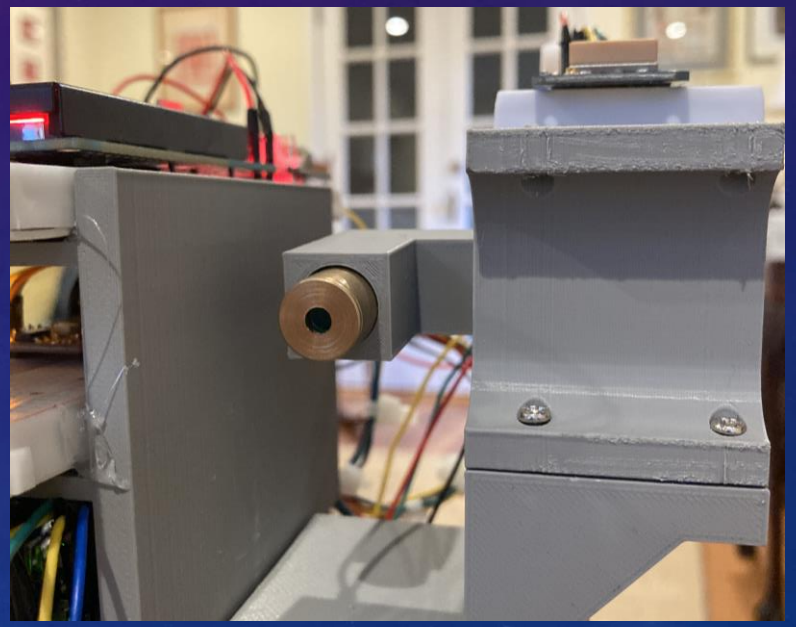
OUTPUTS

LCD Screen



Used Adafruit RGB LCD

Laser



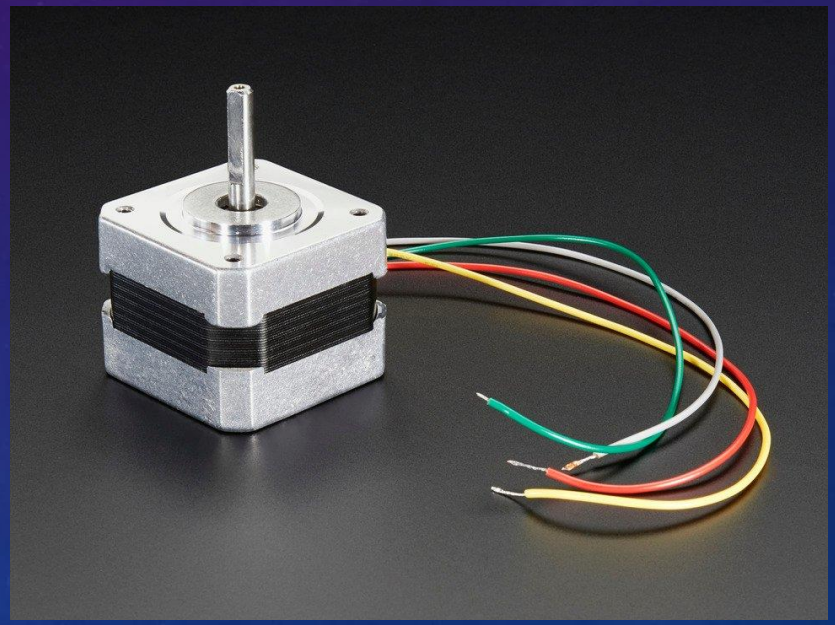
Used generic 5 mW green Amazon laser

OUTPUTS

Motor Controllers

Used EasyDriver motor drivers from Sparkfun – great product!

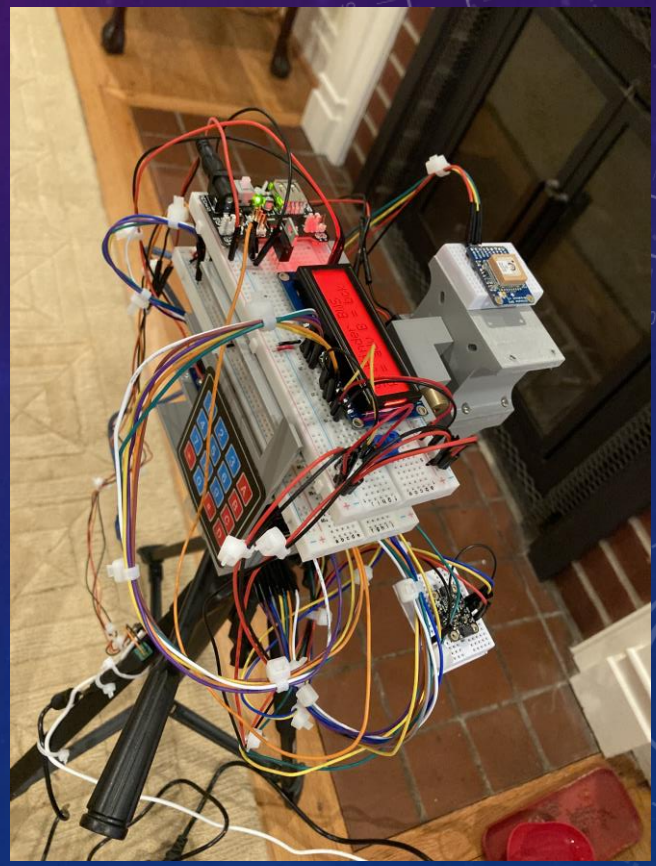
Motor Choice



Used Adafruit NEMA 17 stepper motors

RESULTS

- The device can successfully move and find its longitude, latitude, time, and date.
- The device can move with precision due to 1/8th micro stepping stepper motors.
- The device cannot level or find north. The magnetometer feature was not implemented.



ADVICE

- Pick a project you are genuinely interested in.
- Try and avoid magnetometers.
- Do some basic math while sizing motors to make sure the current and max torque fit your power supply and device weight.
- Make a good CAD model to ensure everything fits together, and build in modularity so parts can be easily iterated and replaced.