Noah Corona

ECE 153B

Feb. 15, 2021

Final project proposal

Project Overview

The goal is to build a solar tracking system to charge a power bank of 18650 cells. The idea is that we can optimize power generation by tilting the panel in the direction of the sun. The project uses photoresistors to determine the strength of the light perpendicular to the solar panels, and uses servos to adjust the angle of the panel to maximize this value.

Peripherals

The first peripheral used will be a light sensor, which uses a photoresistor to determine the intensity of the incoming light. The sensor is on a breakout board, which has power and I2C connections to the STM32.
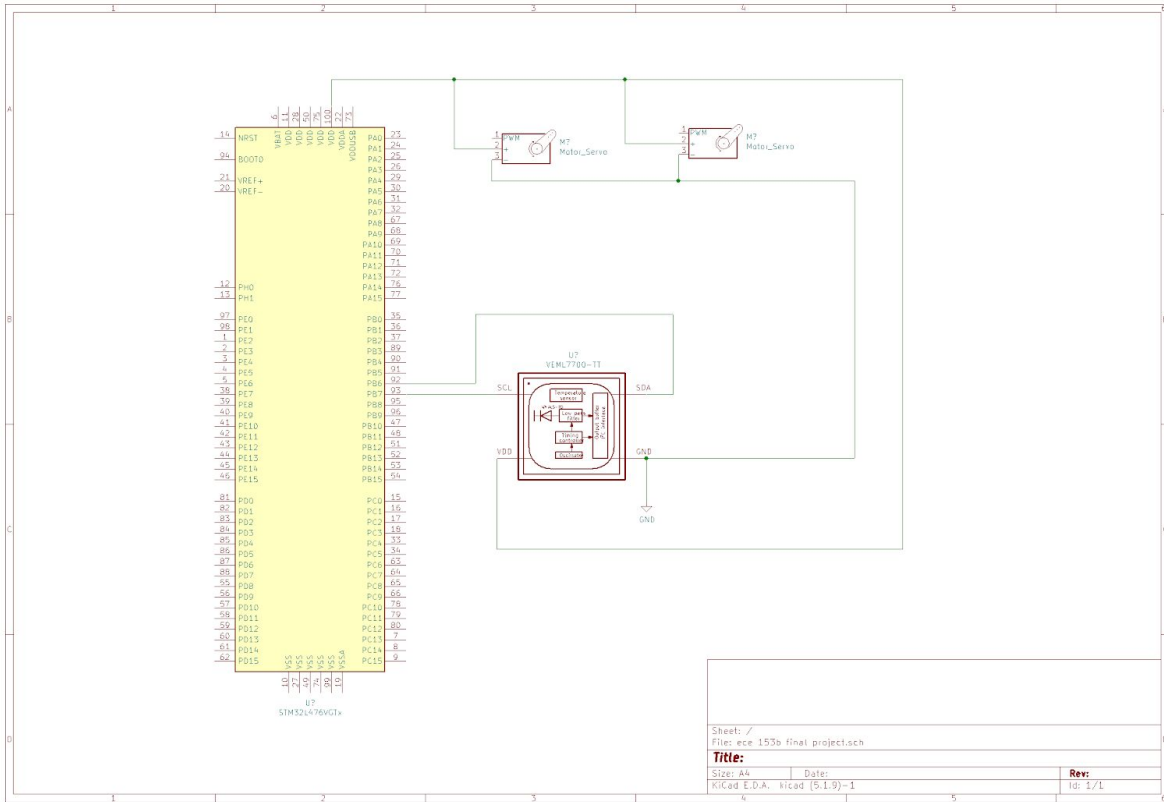
The second peripheral is a pair of servo motors for 2-axis "pan-and-tilt" rotation. The servos control two brackets that allow 360-degree rotation and 180-degree rotation. The brackets are also used to mount the solar panel on.

Serial Interface Protocols

The light sensor uses I2C to communicate with the STM32. The value received by the STM32 represents the intensity of the light measured by the sensor in units of lux.

The servo motors are controlled using pulse-width modulation. To implement PWM, we use a pin of the STM32 configured as a timer in PWM mode. The duty cycle is changed to modify the width of the pulse, which in turn changes the angle the servo is currently at.

Circuit Diagram

Project Website

https://sites.google.com/view/ece153b-final-noah-corona/home