Solar Maximum

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Hardware Testing Diagrams

28BYJ-48 5v Stepper Motor Testing
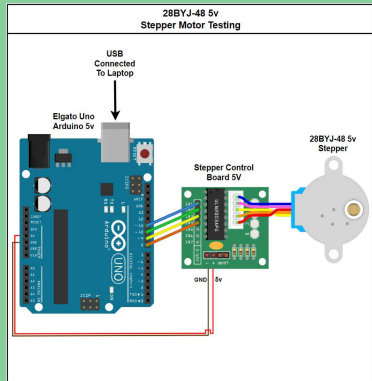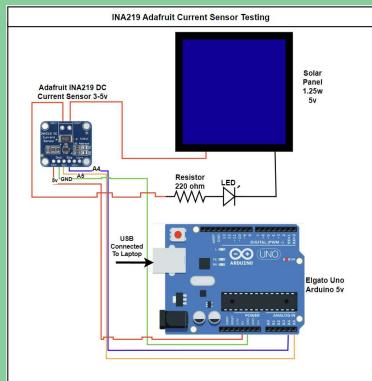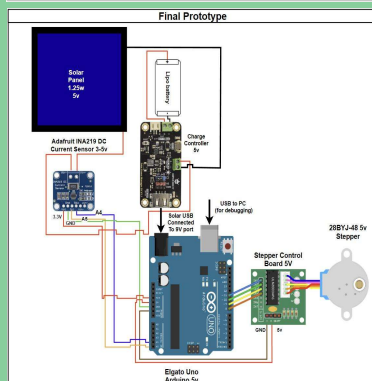
Stepper Testing: Testing the motor and initial positioning algorithm as well as determining how different steps correspond to the angle of rotation.

INA219 Adafruit Current Sensor Testing

Current Testing: Testing the Current Reader Adafruit INA219 5v and insuring it is sensitive enough to detect changes in current.

Final Prototype

Final Diagram: Testing the charge controller and power without a pc hookup

Project Overview

Our senior design project focuses on enhancing solar energy efficiency through a sun tracking system controlled by Arduino. By continuously adjusting solar panel orientation to follow the sun's path, our project aims to optimize energy output. We will develop an Arduino based control system that calculates the sun's position, while a mechanical system with sensors ensures accurate alignment. We will also implement energy monitoring and data logging to assess system performance. This project seeks to make solar power more efficient, contributing to sustainable energy solutions.

Purpose and Goals

- Enhance Solar Energy Efficiency
  - This project aims to increase and optimize the efficiency of Solar Energy devices to produce the most amount of energy possible without depleting resources back into the machine
- Automation and Integration
  - The nature of this project is a hybrid integrated software/hardware device to automate Solar Array positioning for increased operation efficiency
- Sustainable Energy
  - This project will be able to benefit the greater good by potentially optimizing the energy produced by solar cell systems to provide better pathways for future energy production.
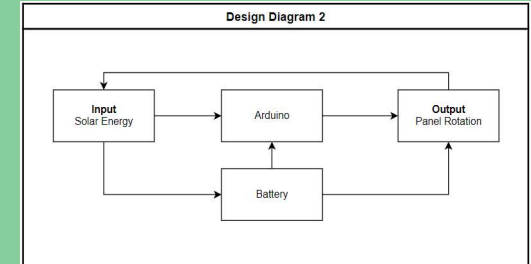
Software and Electrical Design Diagrams

The following designs outline the computation and algorithm inputs and outputs, energy storage and management, and how the feedback loop operates.

System Loop

Design Diagram 1
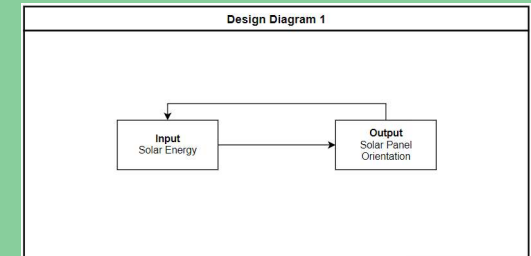
Computation and Energy Storage Integration

Design Diagram 2

Full System Algorithm

Design Diagram 3