SUNO - The Self-Oriented Solar Mirror

An EPS@ISEP 2017 project

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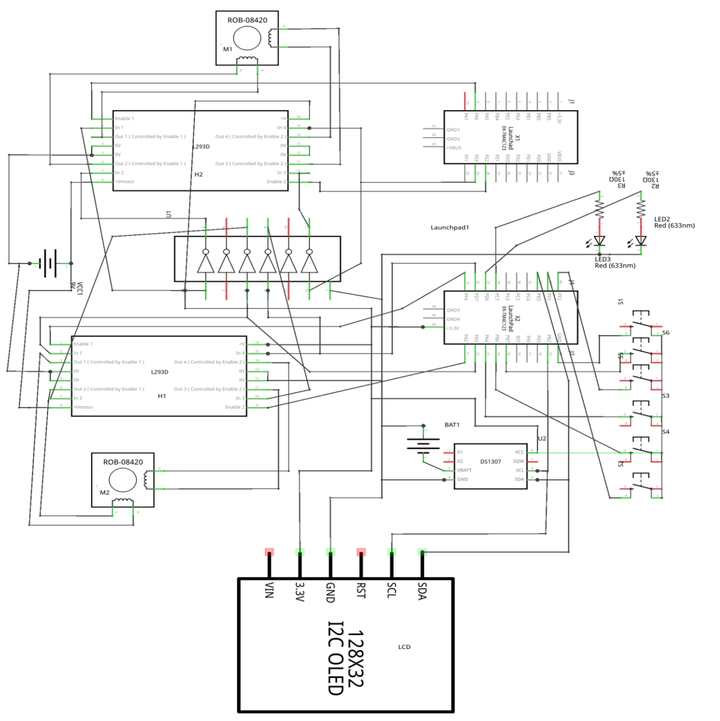
What is a solar mirror?

A solar mirror is a simple way to harness solar energy and to transform it into energy that can be used daily. Raw materials are overused and new sources of energy are needed.

Goal

- Design and construct a self-oriented solar mirror
- The mirror must track the movement of the Sun
- The Mirror must reflect sunlight onto a pre-defined area
- Make the product customer friendly

Schematics

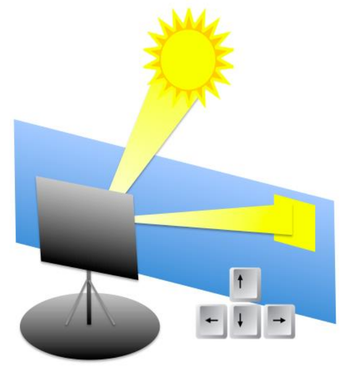


Manual

1. Place the mirror in a sunny place facing the south

2. Turn the mirror on

3. Position the reflected light using the buttons



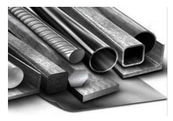
SUNO

Materials

Polyvinyl Chloride (PVC) [2]

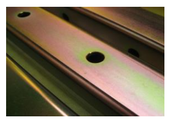
Medium Density Fibreboard (MDF) [3]

Pine Tree [4]



Steel [5]

Aluminum [6]



Zinc Plated Metal [7]

Components

Bipolar Stepper Motor [8]

- Good resolution allows precise movement and easy control
- High torque and a holding torque without power supply

Power Supply

Solar Panel (Final Product) [9]

- The product is designed to work only during the day and changes its position towards the Sun.
- The system will hibernate when the Sun is out of range, which will minimize the power consumption.

An external power supply (Prototype)

- Ideal because two different voltages are needed
- Supplies 12 volts for the motor and 5 volts for the Tiva C board

LCD Display (Final Product) [10]

- Has to support SPI or I2C protocol to minimize number of pins used

RTC

- To keep track of time - to know the position of the sun - the exact time has to be known
- It has to have its own battery and it has to support the I2C protocol.

Tiva C [11]

- Inexpensive, self-contained, single-board microcontroller

Others

- Buttons for user control
- Pull down resistors for the buttons
- Capacitors for Debounce
- Switches to detect end of range and turn device on/off

The team

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References

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