

Red Team A

Control System and Assembly Stability
For a Solar Trough

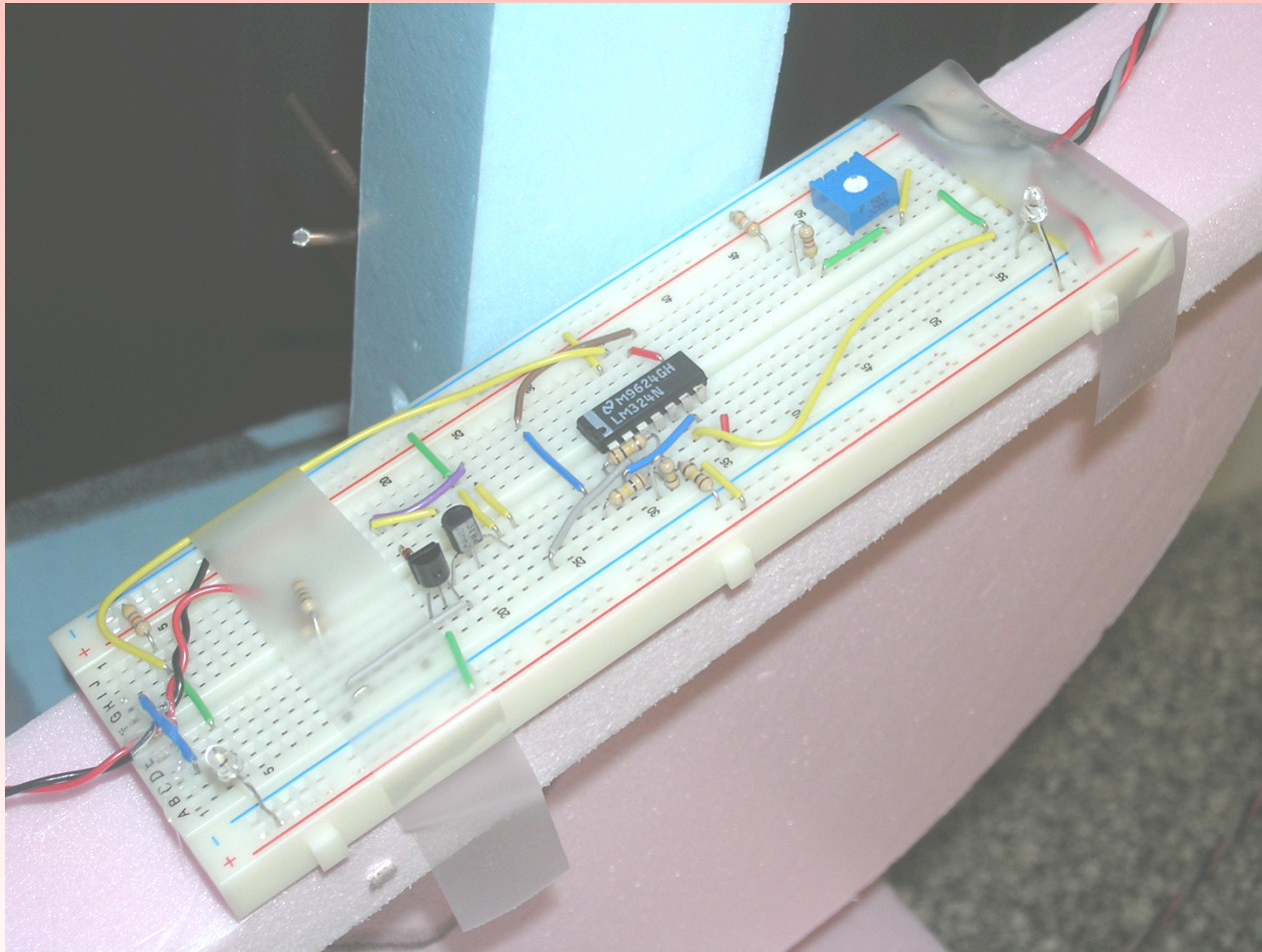
Motivation

- Demonstrate stability of the system
- Demonstrate the ability to track the position of the sun
 - Improve existing prototype by increasing amount of solar energy collection

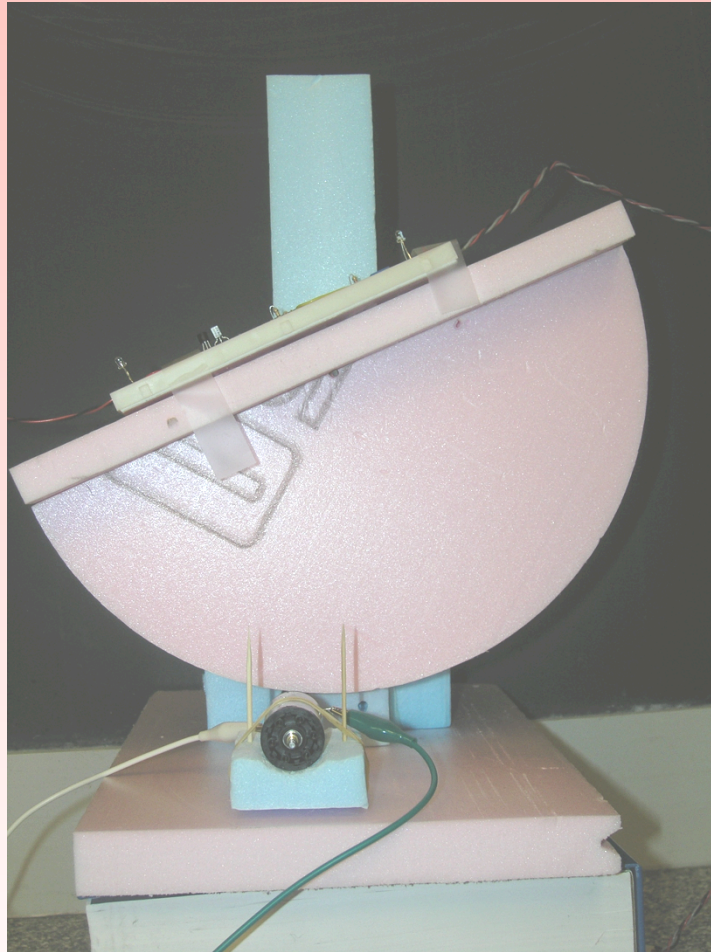
Sun Tracking

- Sun is directly over trough for just 15 minutes without sun tracking
- Control system is implemented to measure changes in sun intensity
- Responds by moving trough towards direction of maximum intensity

Phototransistor Control System

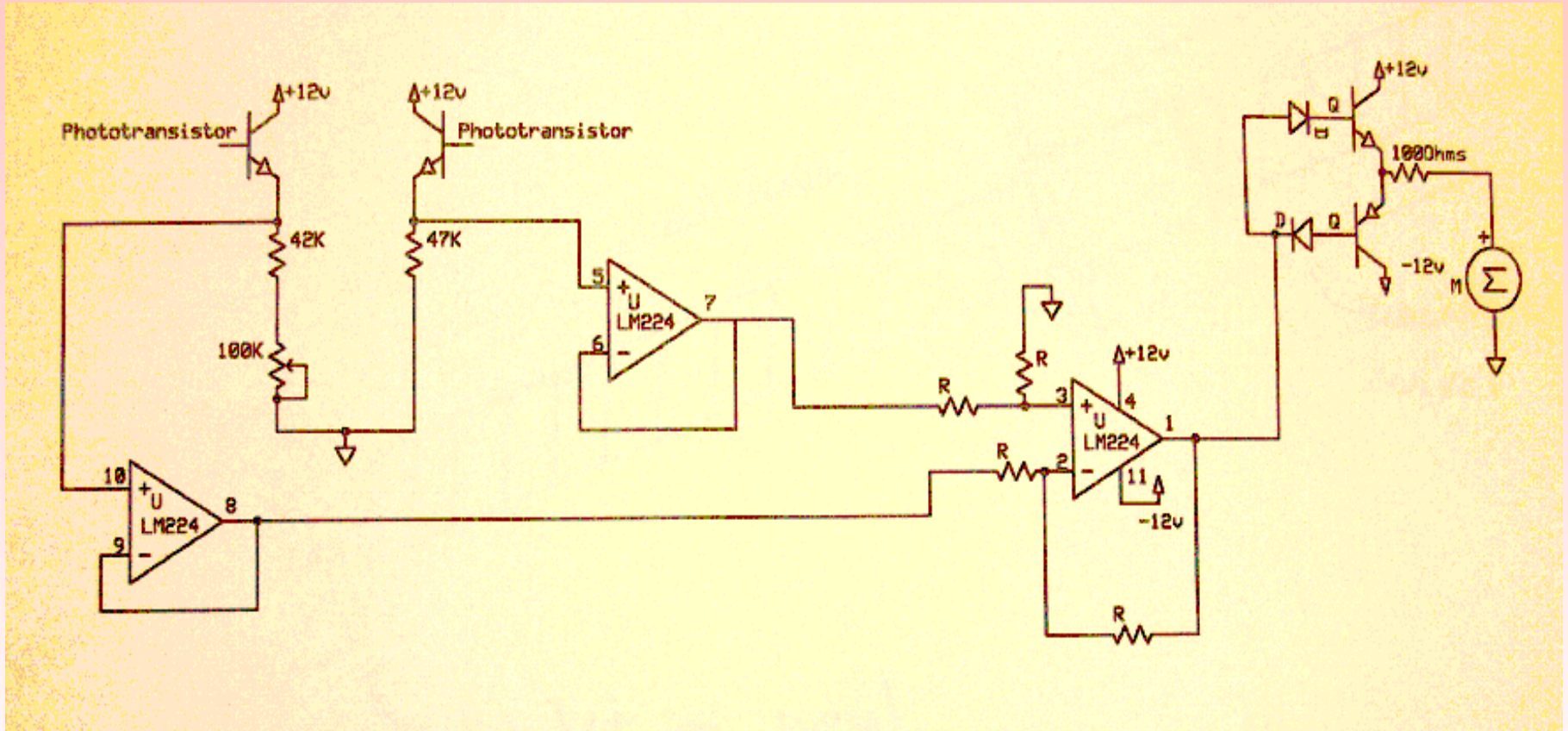


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Control Circuit



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Issues to Consider

- **Calibrate sensitivity to changes in light**
- **Preventing unnecessary motion due to passing shadows**
- **Modifying system parameters (overshoot, response time) by changing circuit elements**

LED Control System

- **LEDs generate 1.65-1.75V in sunlight**
 - **Acts as power supply to circuit**
- **Brings panel back to east just after sunrise**
- **Source: www.redrok.com/electron.htm#led3**

Critical Issues

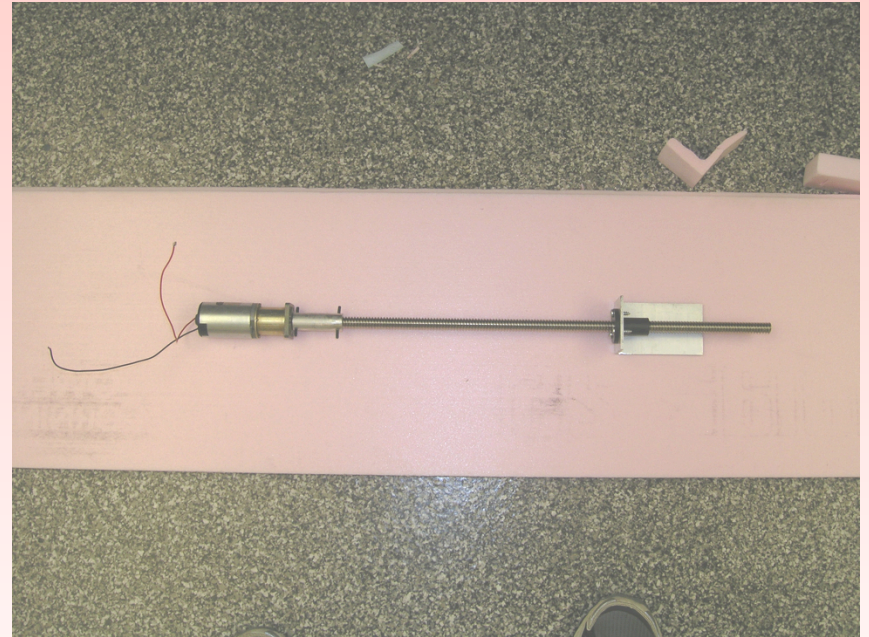
Need	Design Attribute
Affordable	LED system - \$2.24 for all parts
	Inexpensive circuit elements in other designs
Simplicity	Pre-fabricated boards with final circuit design for easy repair
	Assembly can be easily built from diagrams
	Simple shapes and materials
Durability	Weather cover for electronics
Stability	Lead screw assembly for motion control

Open Issues

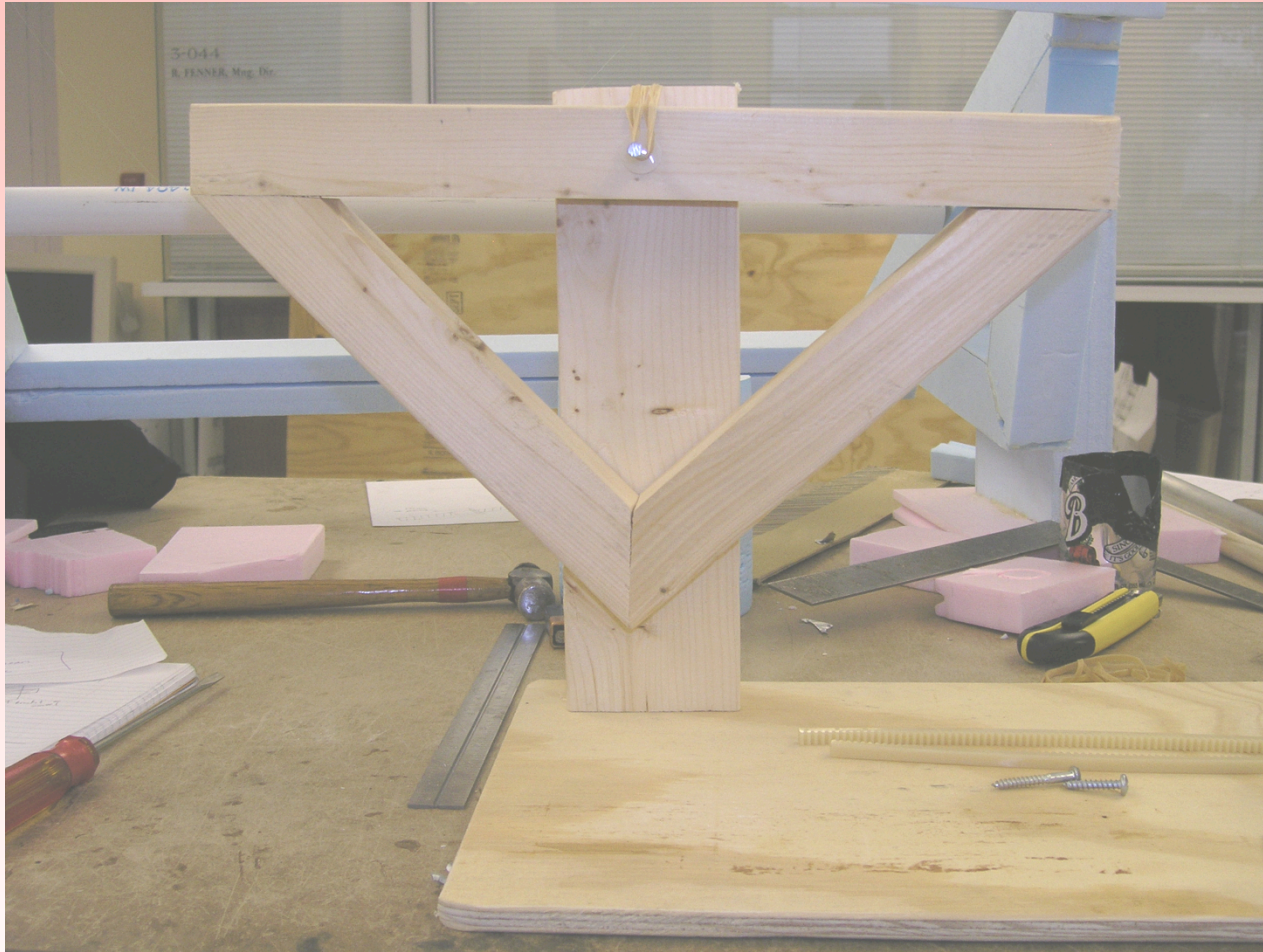
- **Supplying power for motor**
 - Solar power source?
 - External battery?
 - Low torque requirements due to slow motion of trough

System Stability

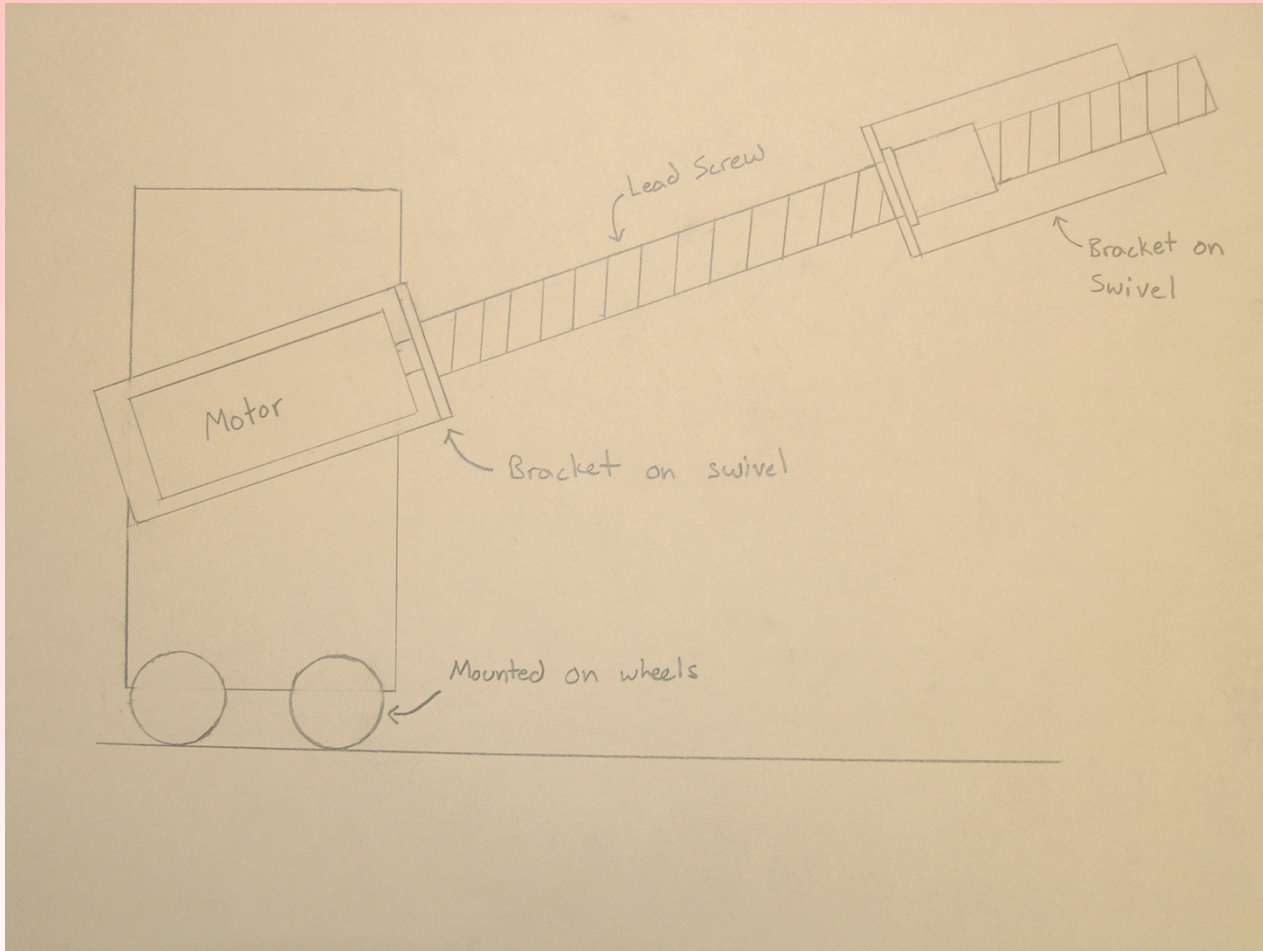
- Lead screw prevents wind or other interferences from disturbing the system



Our Linkage in Action



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