Self-Sustaining, Solar Power Robot

Bi-Weekly Report

Accomplishments

During the weeks following the critical design review, we were able to accomplish a number of goals which we considered important.

1. Feasible design for solar panel structure
   - Step structure put aside
   - Raising arm suggested but abandoned
   - Flat surface
     - Perf board
     - Slits or use existing holes for wires to pass
2. Mounting method for panel structure
   - Original hanger setup abandoned
   - Observed other group with raised bolts
   - Stumbled across parts in team member's stash
     - Long screws through holes in robot frame
       - 3 long bolts for tripod stand
     - Nuts and washers to secure it to frame
       - 12 washers
       - 12 nuts

   - Perf board set on board
     - Measured and drilled holes
     - Leveled and placed board securing with nuts/washers
3. Battery monitoring circuit
   - Design not using IC made
   - Obtained parts for circuit
     - 330 ohm resistor
     - 33 kohm resistor
     - 330 nF capacitor
     - .1 uF capacitor
     - 555 timer
4. Battery monitoring tasks
   - Checked TI for board ready part – unsuccessful
   - Found surface mount adapter
     - Om-Adapt DIL16
5. Servos provided with constant power source
   - Voltage regulated servo input
     - Source from onboard voltage regulator
     - Tested for overload
   - Prevents fluctuations of direct link to battery/solar cells
   - Simplifies overall design of charge/power supplying circuitry
6. Servo calibration completed

Issues

There were also a number of issues that we encountered which must be resolved to make further progress.

1. Unexpected IC controller physical characteristics
   o Surface mount
   o No one in town will mount
2. Problem with servo voltage control
   o Using regulated board voltage works
   o Further testing may be needed to check
3. Solar cell outputs vary greatly in different lighting
   o Might be fixed by voltage regulator
   o Need further testing
4. Difficult to mount cells on perf board
   o Cells fragile
   o Want to modify while testing
   o Glue, tape, etc?
5. Problems with reading taken from 555 charge monitoring circuit
   o Numbers fluctuating

Goals

A number of goals will help to direct our foreword movement in the project. Since goals are not separated from the issues, a few of the following are obvious.

1. Obtain surface mount adapter for IC
2. Debug and finalize battery monitoring circuitry
3. Ensure voltage regulator on servos works correctly
4. Obtain light source for consistent lighting
5. Determine way to mount cells onto perf board
6. Wire solar cells
7. Obtain batteries
8. Program light seeking algorithm
9. Program interesting behavior