Cool Shades

ELET4308/4108-Spring 2005

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Team 10

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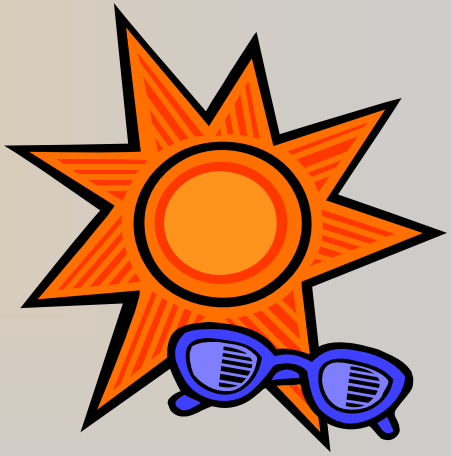
University of Houston - T 102E

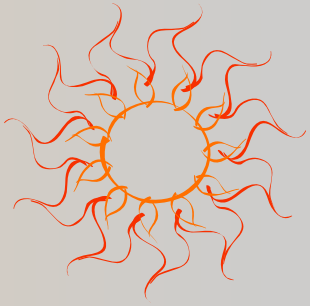


COLLEGE OF TECHNOLOGY
University of Houston

Presentation Outline

- Introduction/Overview – Alex
- Hardware – Andy
- Software – Joanne
- Cost Analysis – Kevin
- FAQ – Alex

Introduction



- Is the summer heat too hot for you?
- Does the electric bill keep rising in the summer time?
- Do you want a sun solar rejection shade?
- Do you also want it to be automated?
- Then, automatic COOL SHADE system would be the solution.

Product Objectives

To design an automated window shade control system that is

- micro-controlled and light sensitive
- highly user friendly

Motivation

- reduce energy consumption
- cost-efficient
- lower utility bills

Product Purposes

Cool Shades is used to

- provide high sun solar rejection rate
- prevent sunlight from generating intense heat, glare and protection from UV rays
- softly filter sunlight
- eliminate crumpling commonly associated with draperies and blinds
- provide privacy

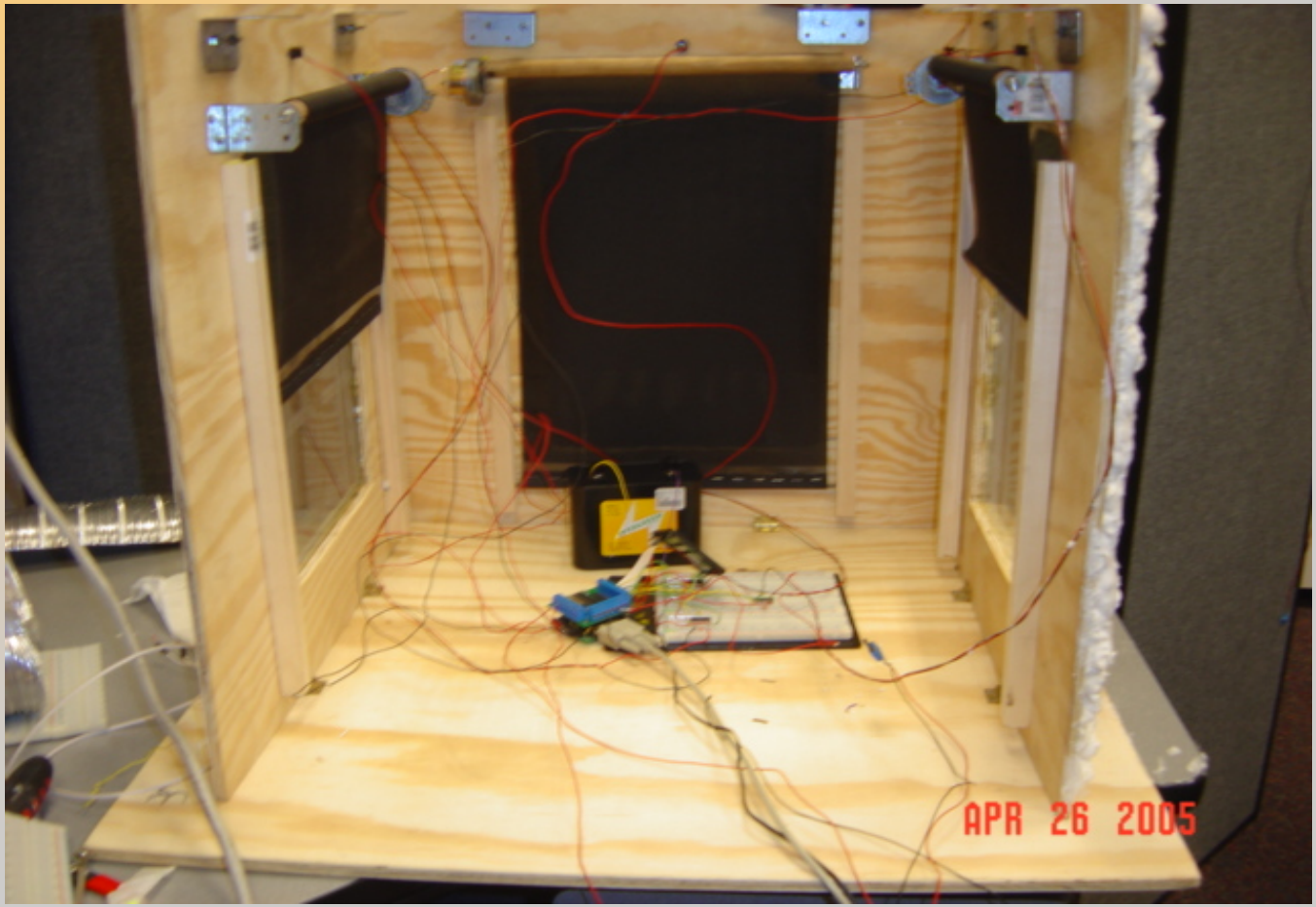
Cool Shades model

Design Specifications

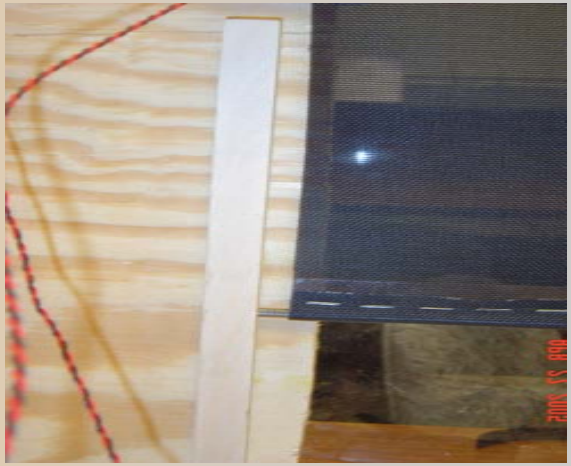
The Prototype consists of

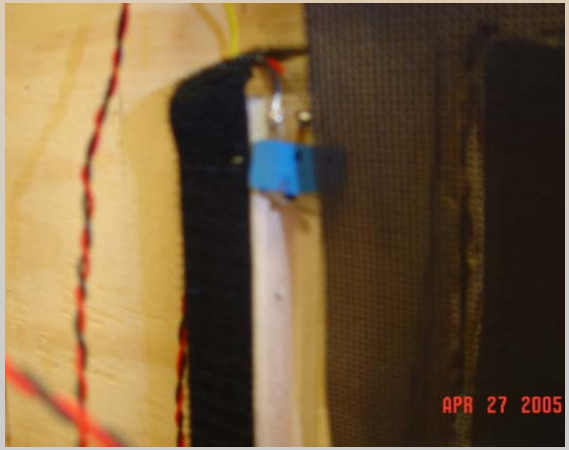
- Three windows (just as a shape of a building)
- Three DC gear motors (12V, 21 RPM)
- Three S8369 Hamamatsu sunlight sensor
- Snap-Action toggle switch
- Mini-Max/51-C2 microcontroller

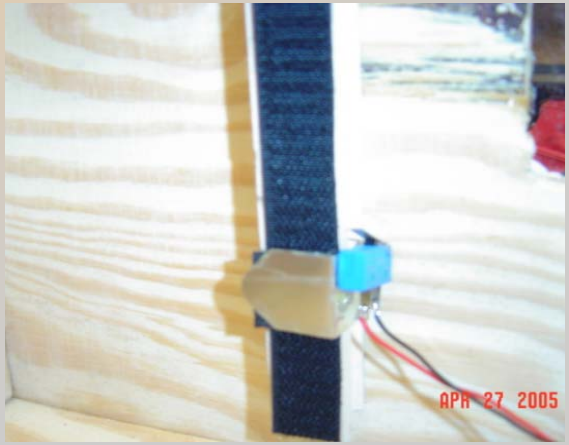
Cool Shade Prototype



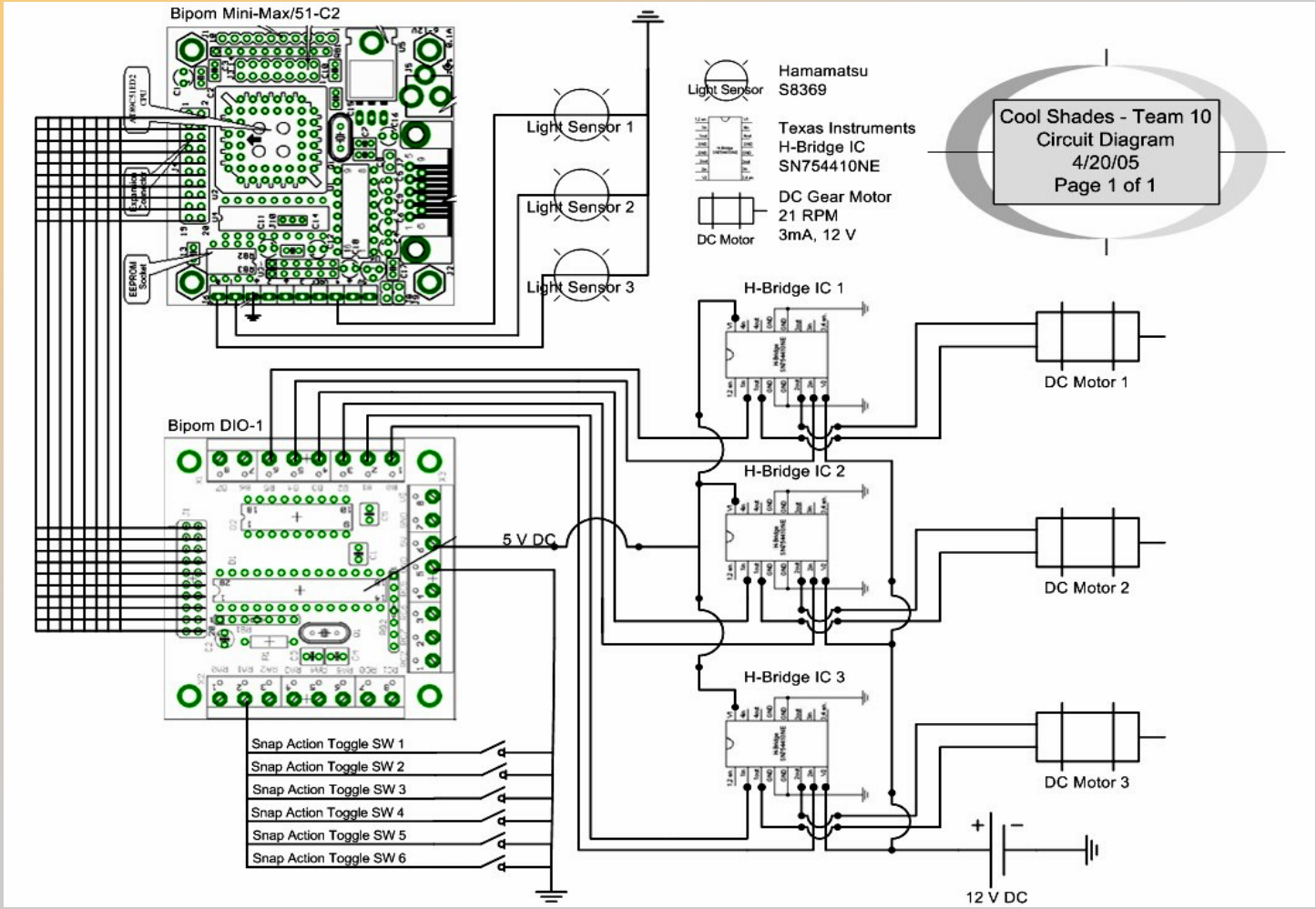
Cool Shade Prototype







Hardware Design



Hardware Design

Hamamatsu S8369 Sunlight Sensor *

Operating Values:

Output 0 - 0.5V

Complete Darkness to Direct Sunlight

*Reference # 1

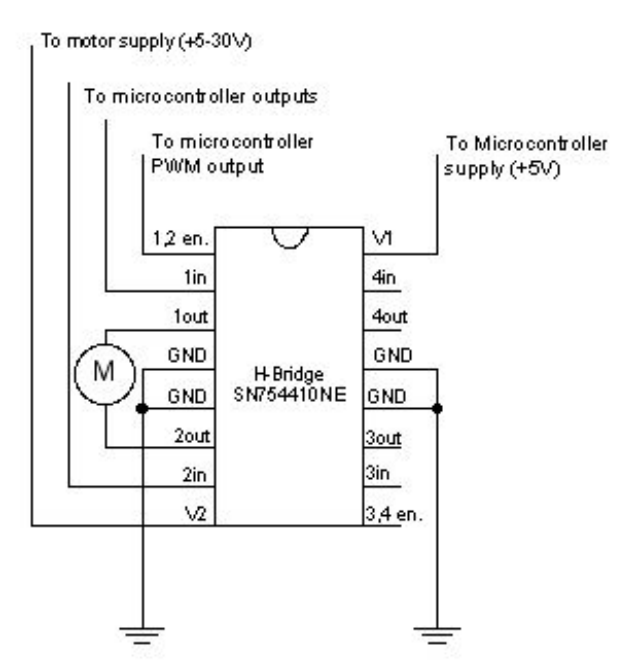
Hardware Design

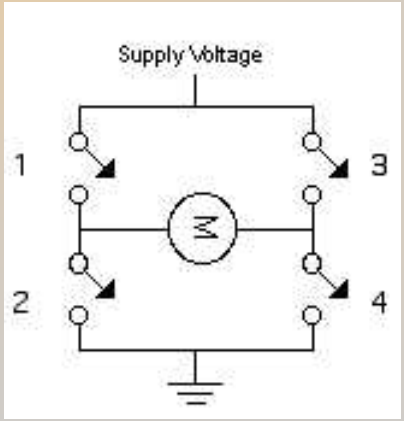
Output current when active:

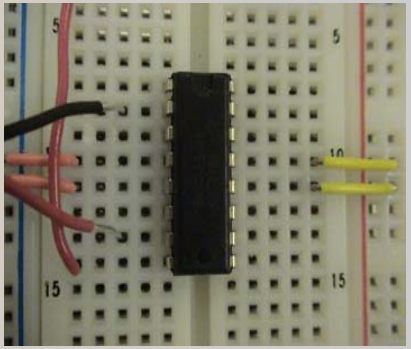
1.55 mA to 0.8 mA

*Can be bridged

Texas Instruments
SN754410
H-Bridge

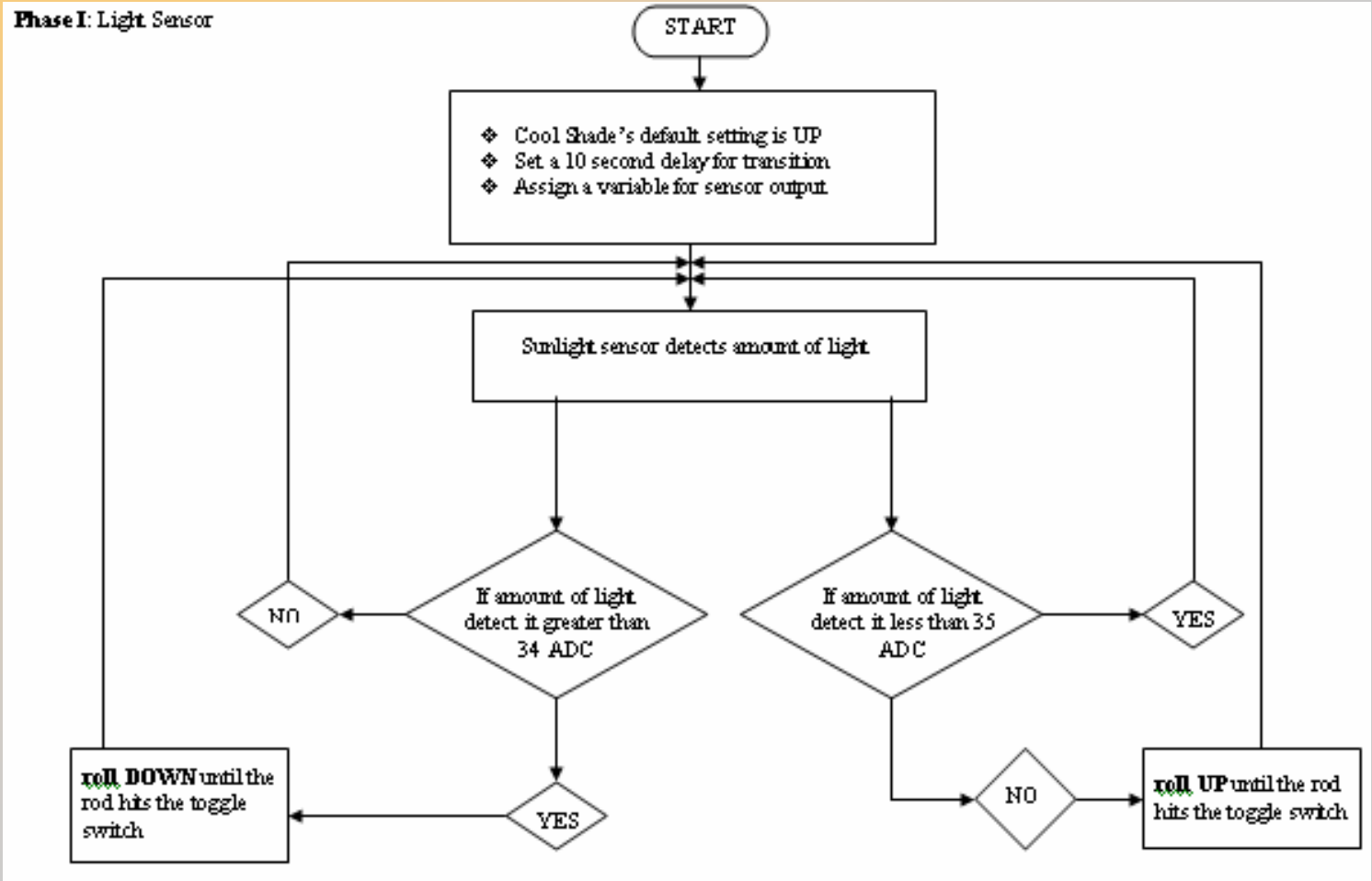




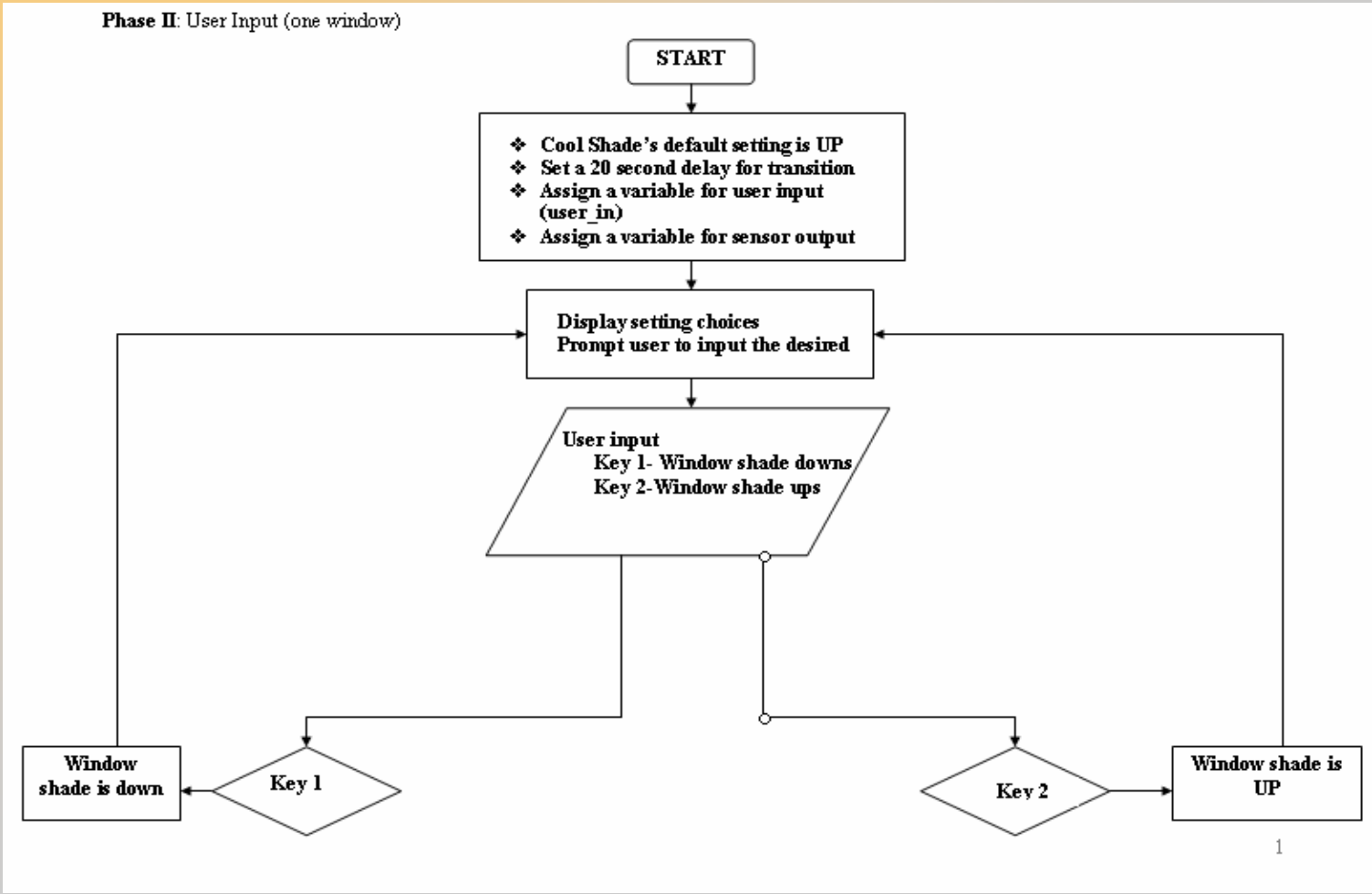


*Reference # 3-5

Software Design

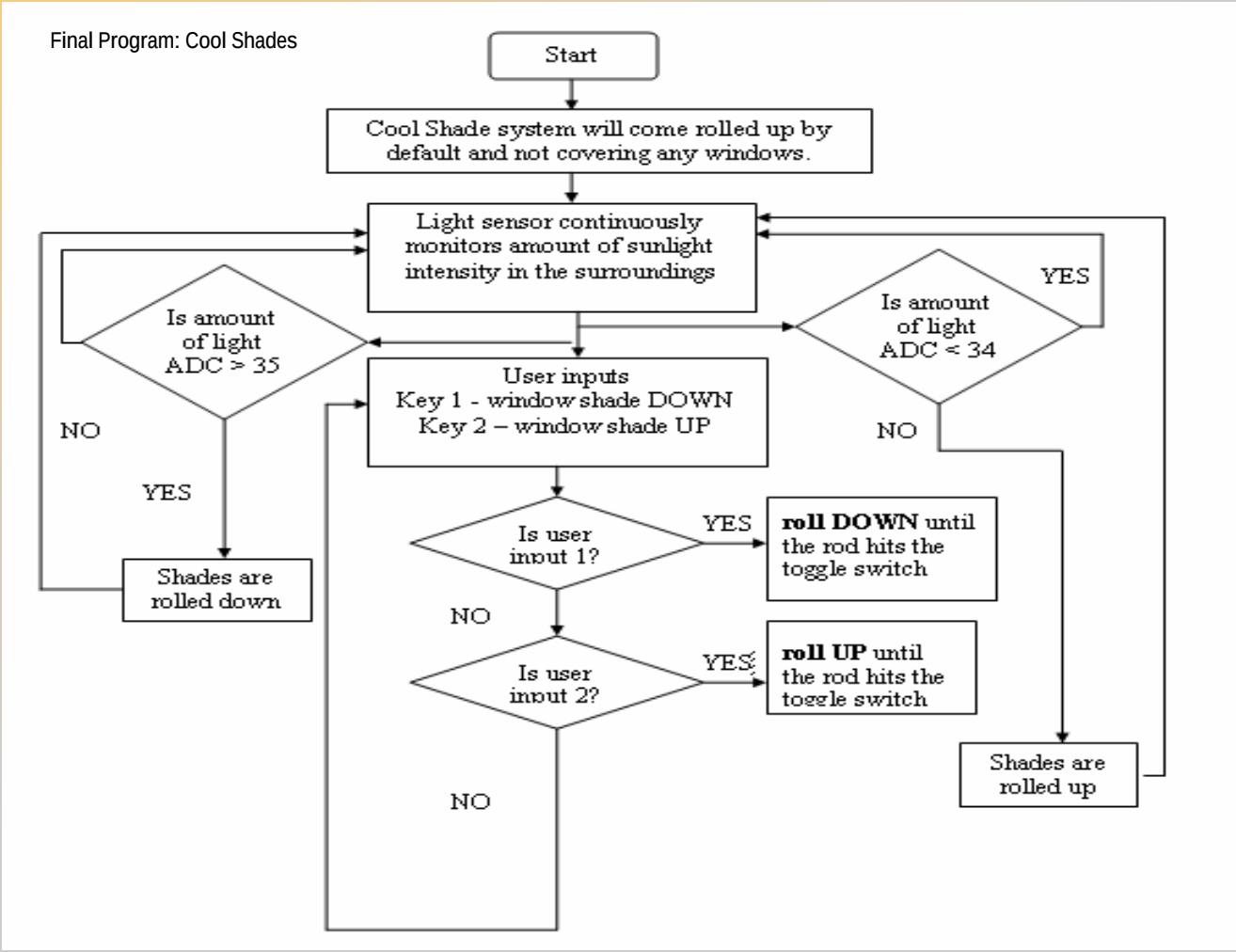


Software Design



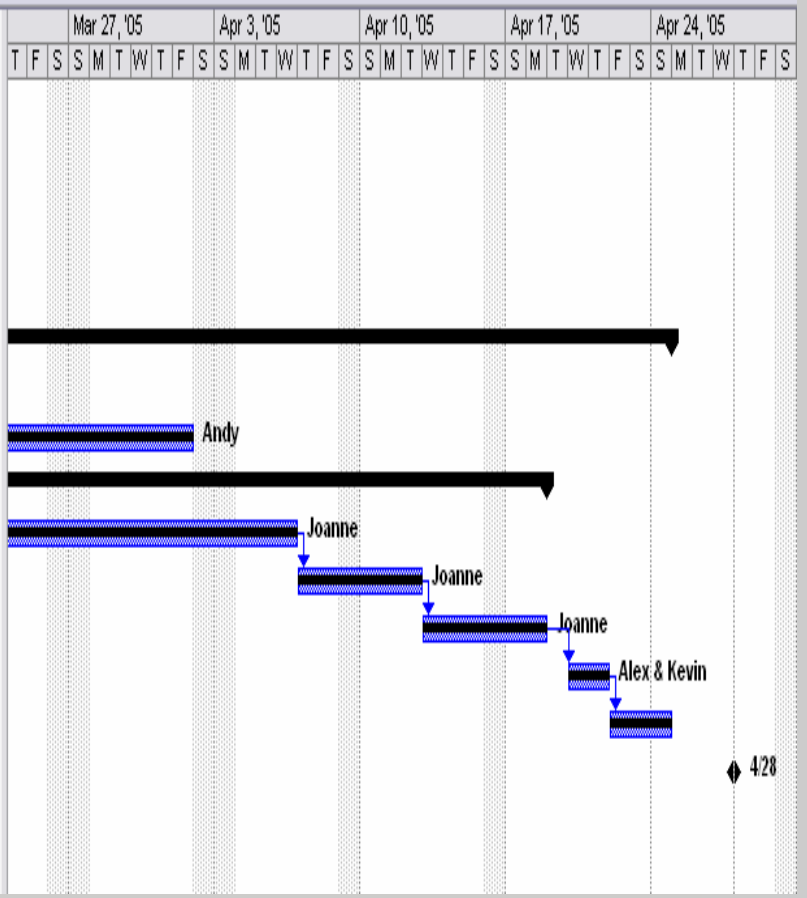
Software Design

Final Program: Cool Shades



Project Schedule

	Task Name	Duration	Start	Finish
1	+ Formation of Team	3.5 days	Thu 1/20/05	Tue 1/25/05
5	+ Team Meetings Scheduling	0.13 days	Tue 1/25/05	Tue 1/25/05
7	+ Project Planning	3 days	Tue 2/1/05	Thu 2/3/05
10	+ Project Design Research	5.75 days	Tue 2/8/05	Tue 2/15/05
15	Project Proposal Presentation	0 days	Thu 2/17/05	Thu 2/17/05
16	- Project Construction	44 days	Mon 2/21/05	Sun 4/24/05
17	Mechanical Work	2.5 wks	Mon 2/21/05	Wed 3/9/05
18	Electrical Work	2 wks	Mon 3/21/05	Fri 4/1/05
19	- Programming Work	25 days	Thu 3/10/05	Mon 4/18/05
20	Phase I: Light Sensor (one window)	3 wks	Thu 3/10/05	Wed 4/6/05
21	Phase II: User Input (one window)	1 wk	Thu 4/7/05	Tue 4/12/05
22	Phase III: User Input (three input simultaneous	1 wk	Wed 4/13/05	Mon 4/18/05
23	Final Design Work	2 days	Wed 4/20/05	Thu 4/21/05
24	Final Project Testing	3 days	Fri 4/22/05	Sun 4/24/05
25	Deadline	0 days	Thu 4/28/05	Thu 4/28/05



Cost Analysis

Parts

Item	*Qty*	*Cost*
8051Microcontroller	1	$95.00
Sunlight Sensor	3	$36.00
DC Motors	3	$38.85
Switches	3	School Inventory
Prototype bases	1	$17.00
Mesh	3 ft.	Donated
Metal bar	2	$12.00
Wooden Rod	3	$8.00
TOTAL	13	$206.85

Lab Equipments

Item	*Qty*	*Cost*
DC Dual Power Supply	1	$899.00
2-Channel Oscilloscope	1	$2995.00
Function Generator	1	$375.05
Soldering Kit	1	$25.00
TOTAL	5	$4294.05

Cost Analysis

Item	*Cost*
Travel Expenses	**$200**
Shop Cost	**Free**
Total	**$200**

Processes	*Est. Hours*	*Act. Hours*	*Price per Hour*	*Total*
Project Design	**100**	**50**	**$25**	**$3,125**
Mechanical	**45**	**24**	**$30**	**$1,800**
Electrical	**80**	**70**	**$30**	**$5,250**
Programming	**150**	**160**	**$30**	**$12,000**
Testing	**50**	**62**	**$25**	**$3,875**
Total	**425**	**381**	**N/A**	**$26,050**

Grand Total	**$26,663.70**

References

1) http://sales.hamamatsu.com/assets/pdf/parts_S/S8369.pdf - Sunlight Sensor Specification Sheet
2) http://www.bipom.com/support/mm51cTest_BASCOM51.zip - ADC Code
3) http://www.acroname.com/robotics/parts/R8-754410-3.html - H-Bridge
4) http://www.acroname.com/robotics/parts/R6-754410.pdf - H-Bridge Specification Sheet
5) http://stage.itp.nyu.edu/~tigoe/pcomp/labs/lab-motors.shtml - H-Bridge Tutorial

Questions???

Thank You