

ENGINEERING 5

Lecture 12:
Prof. Erik Cheever, Electrical and Biomedical Engineering;
Robot Tag prep

Professor Carr Everbach

Course web page:

<http://www.swarthmore.edu/NatSci/ceverba1/Class/e5/E5Index.html>

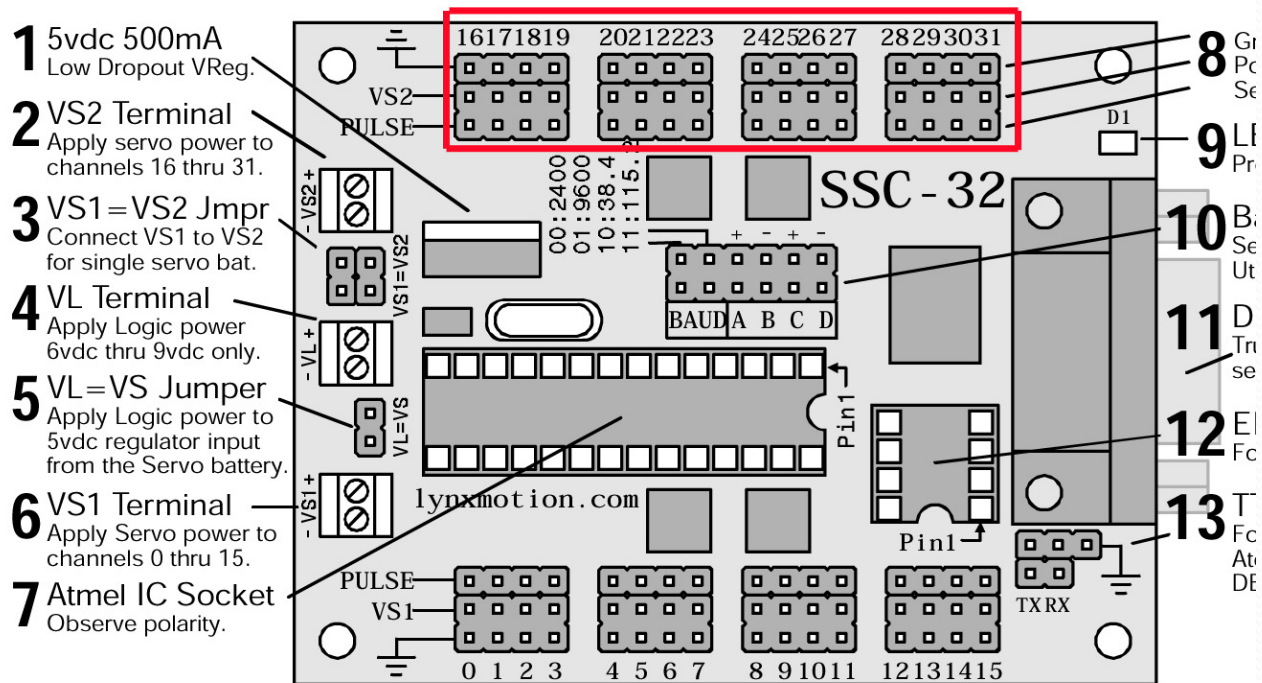


Remember...

- No lab this week: Thanksgiving Break!
- Monday and Wednesday (following break): Wizards available (Hicks 213) from 7:00-10:00 p.m. for robot tag prep.
- *Videos of robot races posted on E5 website. Please add a link to the video of your group's 'bot on your website with a description of what happened and what you learned.*
- Robot tag in class two weeks from today in class. Only scheduled lab is Thursday after break.
- Today: Erik Cheever, Electrical Engineering (E12 prof.)

Robot tag: signaling “it” status

When your robot is “it” it must signal to everyone its status by lighting an LED when it is tagged. This is accomplished by using the Digital Output capability of the Lynxmotion board:



Digital Output commands:

The Lynxmotion board will raise an output from 0V to +5V with the command:

```
# <ch>H<cr>
```

where <ch> is channel number and <cr> is a carriage return.

For example:

```
lighton = '#16H';  
fprintf(s, lighton);
```

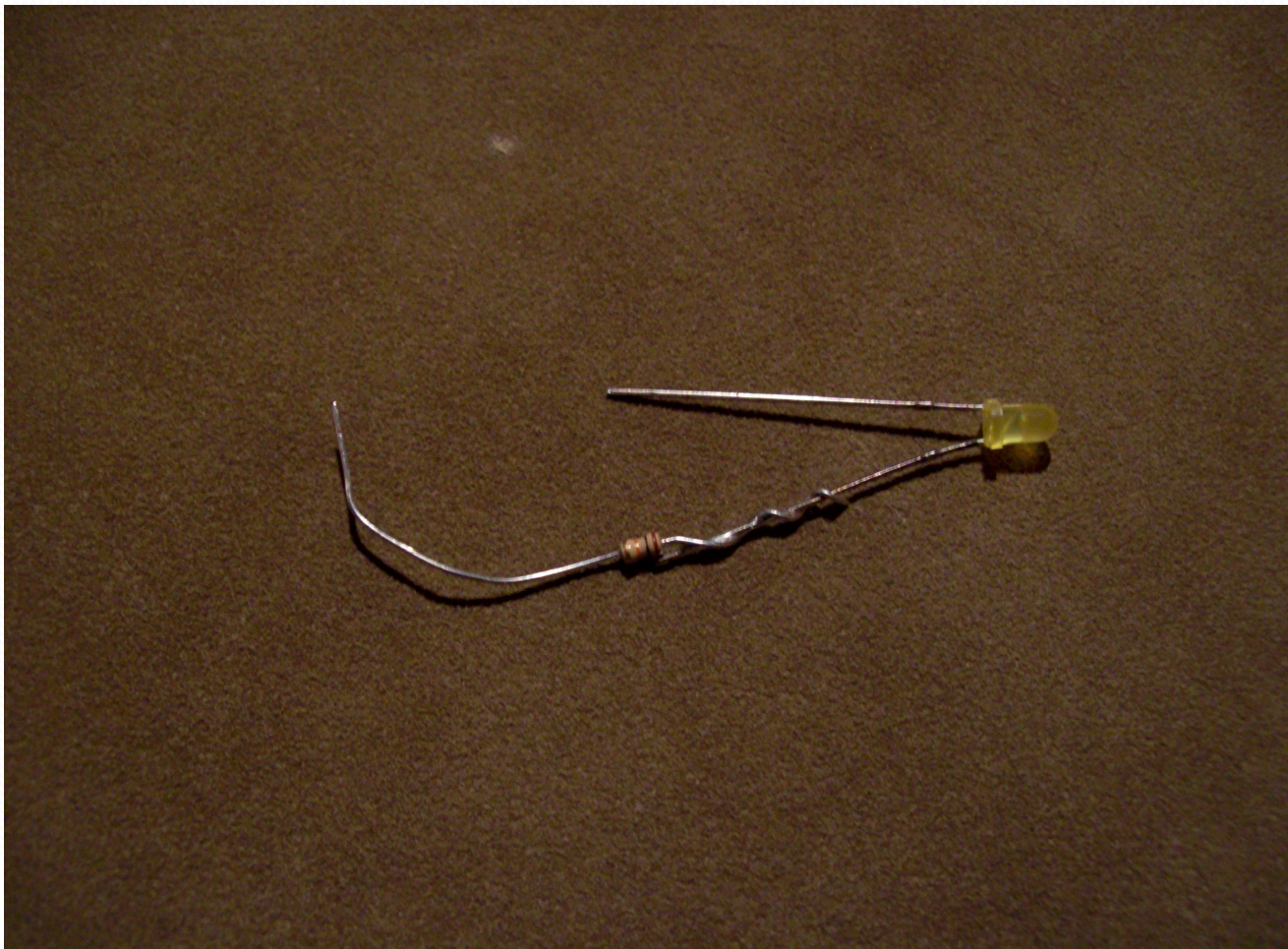
would turn on the LED connected to channel 16. To turn it off,

```
lightoff = '#16L';  
fprintf(s, lightoff);
```

writes 0V to channel 16. Commands such as these can be incorporated into the keystroke-reading part of the virtual joystick program.

The LED-resistor combination:

Light-Emitting Diodes are one-way valves for the flow of electric current. They have very little electrical resistance and can demand more current (at 5V) than the Lynxmotion board can source (250 mA). Therefore a 1000 k Ω resistor must be soldered to the negative leg of the LED (the longer one) and connected to the socket:



Digital Input:

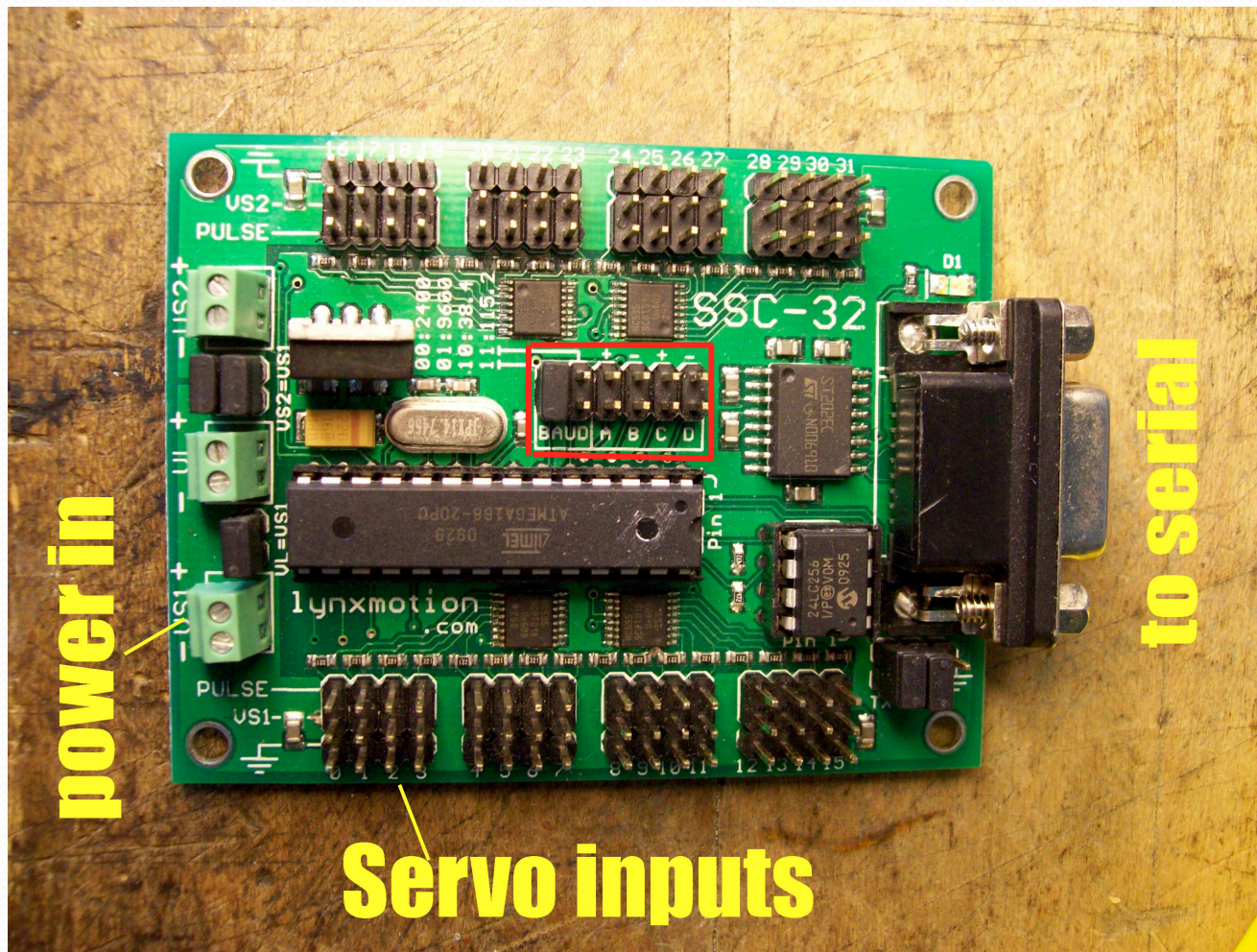
A robot is considered "tagged" when its "tag button" is pressed by the "it" robot. The "tag button" is connected to a digital input that contains an electronic latch to hold the value of the pressed tag button until the program reads the digital input and releases the latch.

To read the latched digital input: AL or BL or CL or DL

```
fprintf(s, 'AL'); % ask for the value of latched digital input A
answer = fscanf(s); % read in the robot's answer as a character '0' or '1'
tagged = str2num(answer); % convert to 0 or 1 for Boolean testing
if (tagged)
    fprintf(s, lighton);
else
    fprintf(s, lightoff);
end
```

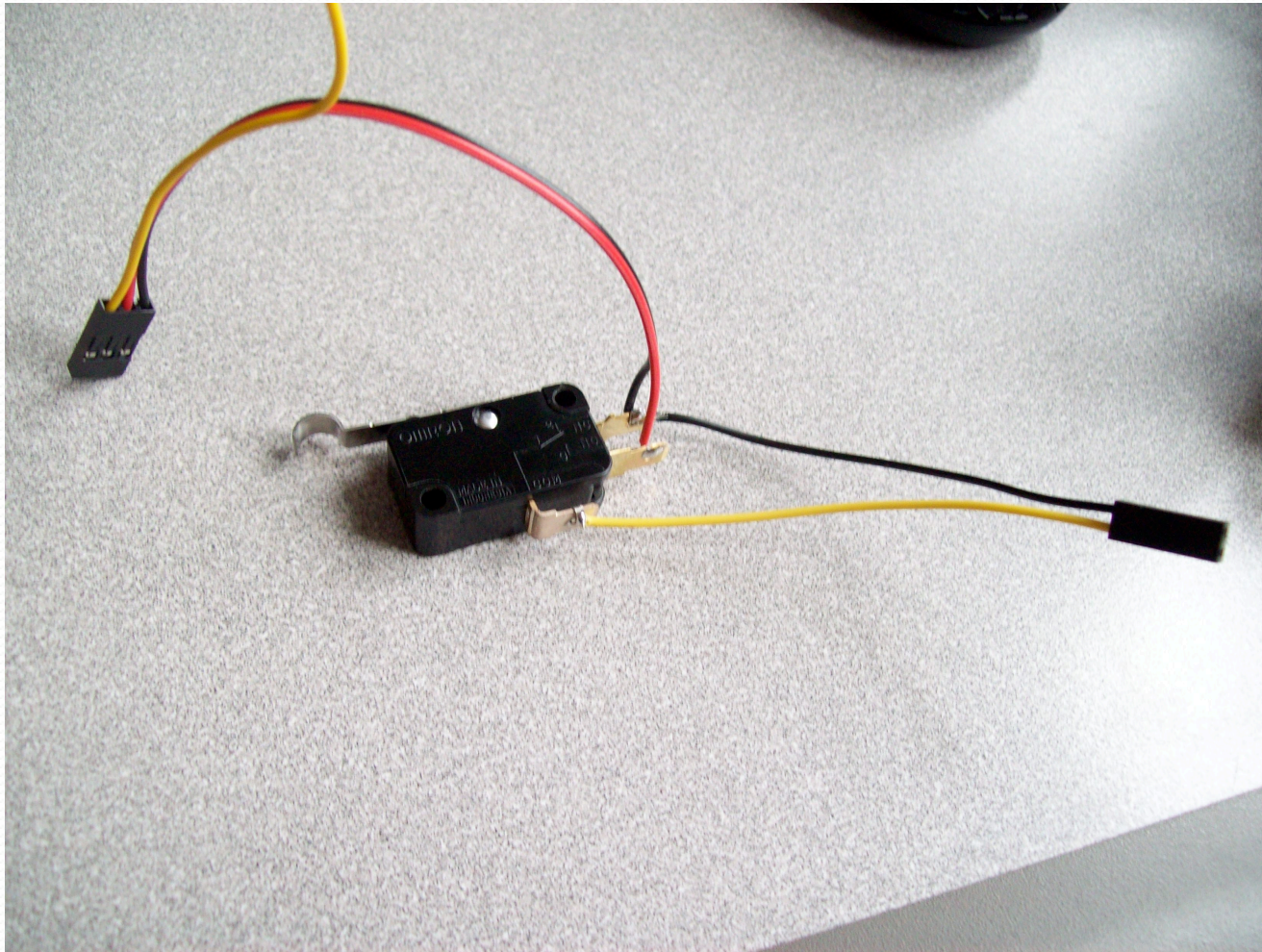
Tag button hardware:

The digital inputs are located here:



Tag button hardware:

The 'tag button':



Tag button hardware:

Connected to board:

