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Team B: Monkey Bots

Teammates: Ian Rosado, Stephanie Chen, Trevor Decker

ILR 09

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Individual Progress

In the last week, I worked on building up our embedded software and hardware. One of the key parts we have not put together yet was the stepper motor control. Although we used the rather simple steppers to do our into lab, we plan on using the ST Microelectronics L6470 driver in our final design. This stepper communicates over SPI bus and handles the micro-control tasks like counting steps to move to a certain position and alerting the controller if the motor skips or is over-torqued. Since we bought bare chips, I had to wire up a small number of external components as seen in figure 1. In this figure, the breadboarded circuit is connected to an arduino generating sample SPI signals and an example stepper motor.

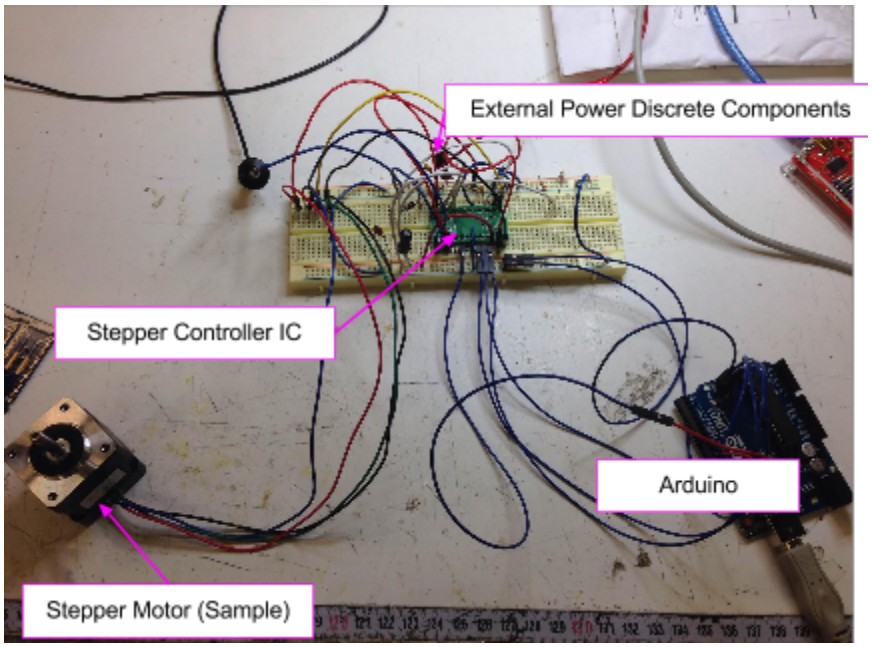

Figure 1: Basic motor power system.

Challenges

My main challenge this week was in determining what kind of SPI data needed to be sent to the stepper controllers. It turns out this controller has a special feature where you can daisy chain multiple controllers to a single bus. However, this results in the chip not responding correctly to the typical SPI data. It took me several hours to find the note in the datasheet that the /CS line must be toggled between each data byte rather than held low during the entire transaction.

As a team, we are still testing different designs for the cleaning unit. We built another prototype of the part of the cleaning unit that slides on our extension arm. This version did not have wheels (delrin slides instead), and did not perform as well as we would have liked.

Teamwork

Ian Rosado, Trevor and Stephanie worked to build a new cleaning unit slide, design the power chain motion mechanism for the cleaning unit, and modify the c-channel gripper to hold on to the side of the window in a stable way. We were able to demo the c-channel gripper and power chain this week. Trevor is still working on tweaking the design of the cleaning unit with Ian's help because we will likely need to bring up a new design that has wheels included. Stephanie would like to tweak the gripper inserts a tad more so that it is more stable.

Plans

Next week, we really need to bring everything together for the first final demo. The largest items on the plate are the cleaning unit and control electronics. I will likely take on the bulk of the control electronics. This should be possible as we have already brought up the individual functions of the ARM board. The high level software and wiring still needs to be done. Trevor, Ian, and Stephanie will all be needed to build a functioning model of the gripper so that we can clean the window on Wednesday.