

Eric Newhall

Team G, Bobs the Builders

Teammates:

Guillermo Cidre, Christian Heaney-Secord, Michael O'Connor

IRL08

4/9/2015

Individual Progress

The first task that I worked on was improving the wire cutter to be more consistent and reliable. The encoders that we were using had a constant offset issue that we discovered. If you rotated the motor then rotate it back to where it began the encoder would not go back to zero. By using a different encoder library in software we were able to resolve this problem. However, the wire cutter also did not close all the way which meant that the wire would often remain uncut. I repositioned the wire cutter and added screws to prevent the string from slipping. Now the wire cutters consistently close all the way. Next, I worked on the slide that would take parts from the hopper to the part flipper and camera. I helped redesign the slide to use a wheel driven by a motor rather than a servo controlling a square to keep parts in the correct facing. Lastly, I worked on reorganizing wiring and adding an LED display to show the correct state the system is in. Wires for the same devices were twisted together and zip tied to the 80/20 frame. Many of the 5 volt power lines were integrated together before being connected to the protoboard.

Challenges

The physical component that needs the most improvements made is the part flipper. The flipper magnet does not hold the pieces very well. We noticed that over time the magnet heats up and becomes weaker. There are several possible solutions we are considering. The magnet could be placed closer to the surface of the flipper.

Alternatively, the magnet could have a heat sink added to it. Finally, it is possible to use another servo to prevent parts from moving so that the magnet would be able to be off most of the time.

Additionally, the weight of the flipper is a problem for the servo controlling it. The acrylic used may need to be made smaller or a smaller electromagnet may need to be used.

Teamwork

Guillermo assisted me with the improvements made to the wire cutter. He helped debug the software problems. He wrote the new code using different libraries. He also helped move and reattached the wire cutters to improve how far they were able to close. Michael worked on the slide to take parts from the hopper to the part flipper. The slide used two wheels attached to a motor to move parts one at a time then an additional motor to straighten the parts out. Christian worked on designing and mounting the part flipper.

Figures

This week we also tested the flux dispenser to see how easy it would be to control. We are considering using a larger motor to move the syringe. However, the flux that we tested with more recently was less viscous so it was easier to dispense. The encoders on the motor proved to be difficult to use with the flux dispenser. By the time the encoder value has changed far too much flux has been dispensed. We plan to use a command to dispense followed by a command to retract in order to get a single small application of flux onto the part.

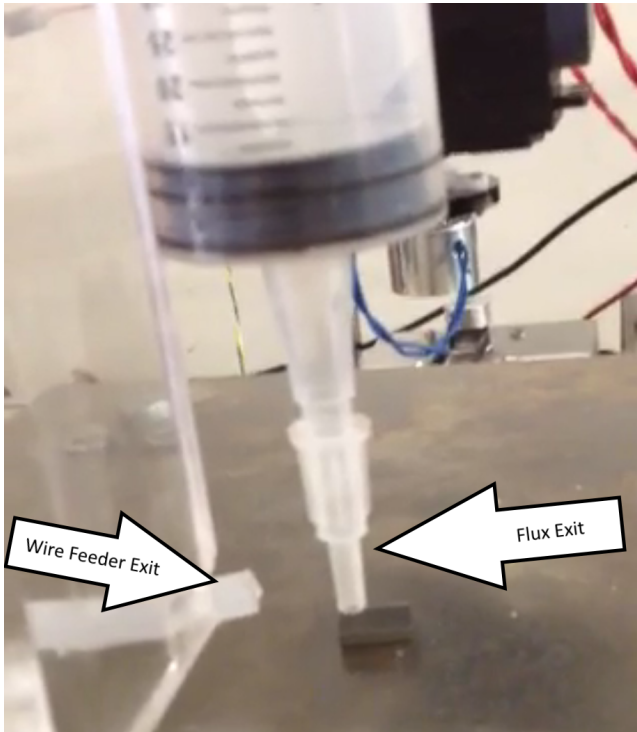


Figure 1. Flux Dispenser

Plans

Next week our group would like to present a full system demonstration for at least one part of the larger size. A large amount of software will be needed since almost all of the previous demonstrations used little to no software. Now that all of the physical systems are completed the process of testing software can begin. The software for next week will be most likely be an unoptimized version of the software for the final system demo. For ease of testing we will be only running a few motors and actuators at a time. In the final many different systems will be functioning at the same time so that the five minute time limit is not exceeded. Also, much of the slide for the hopper and the part flipper will be rebuilt for next week since they were not functioning particularly well and were rushed to completion for this weeks demonstration.

I will be working on the software with Guillermo. We will be integrating the camera code and system demo 5 code with new code to control getting parts to the camera. We will used be continueing to reorganize wires and write code to display system state on LEDs. Christain will be working on a new part flipper that has less weight and improves the magnets ability to hold parts. Also, Christain will be building a stand to place the parts after they have left the flipper. This is where the part placer arm will come to get the parts and bring them to the tray. Michael will be cutting a new slide for the part hopper and orienting it at a slight angle to help the flow of the parts.