Project Identity

Freely Adjustable and Accessible Keyboard for Client with Cerebral Palsy

Work Completed

The week got off to a good start when our parts orders came in for the female head receptacle and the correct switches. The switches that arrived are capable of being mounted onto a printed circuit board, which will make it much easier to connect all of them to the control board. After some simple testing was done using a protoboard to make sure the switches function correctly, I used calipers to measure all the dimensions of the switches. Then I measured the distance between the points that will be mounted on the PCB, and compared it to the specifications given on Cherry Corp.'s website. The distances matched what was specified. Given below in Fig.1 is an image of the bottom of a switch, with all distances given (inches).

Figure 1. Cherry MX Switch PCB Points
Nolan was able to use this information in the design of the printed circuit board that he is making using PCB Express. This week we were able to build a preliminary model of the PCB, excluding the LEDs, where all the switches are connected and then sent to the control board. Figure 2 below shows the current design of the PCB that will be used for the keyboard.

![Keyboard PCB](image)

As can be seen in Fig. 2, the switches are connected both in rows and columns, and everything is wired into the control board at the bottom left. Unfortunately, we will not be able to divide this PCB into two like we were originally planning so we could save money.

Also this week I contacted Miriam and we talked briefly about the design of the keyboard and its functionality. Sadly, last Wednesday Sam’s team was not able to meet, because of inclement weather. They will also not be able to meet this week, because Hampton Elementary has this week off from school. So without his team reviewing the design, we were not able to get confirmation on anything. However, she said she believes that the rubber bottom will probably provide enough friction for Sam, and the vacuum suction devices will not be needed. The keyboard will need to tilt, and this can be done using a locking mechanism illustrated on the next page in Fig. 3.
Having a locking mechanism like this would allow for variable changes in the tilt of the keyboard, so Sam will be able to choose which angle he likes the best.

Along with other things going on, Nolan and I have been learning more about the control board and how to program the switches for them to act as a primary keyboard on Sam’s laptop.

**Future Work**

Within the next couple of weeks Nolan and I hope to complete the design of the printed circuit board. To accomplish this we must also incorporate the LED design, so first we must create a scale model on a protoboard, and test it using the same type of voltage source we will be using (probably two 9V batteries). We plan on ordering or acquiring from Mansfield Supply the parts required for the keyboard stant (hinges and metal pieces), and the rubber base. A better grip for Sam is also required, and finding the best material is necessary.

**Project Review**

After four weeks the PCB design is nearing completion, and the finalized model of the keyboard and stand is simply waiting for approval from Sam’s team. After many changes, the design finally seems solid and it is not believed that the staff at Hampton Elementary will require any more last minute changes. The software for the control board is not too complicated, and Nolan and I have been learning it fairly easily. With a finished PCB, it will not be long before we can start soldering the switches and testing the whole keyboard.

**Hours Worked:**

~11