Project Identity

Freely Adjustable and Accessible Keyboard for Client with Cerebral Palsy

Work Completed

This week Nolan and I completed a lot of work towards finishing the keyboard. I started off the week by working on the PCB. I contacted PCB express and met with Bill to totally understand building the PCB. I fixed up the switch mounts, and created the input for the LEDs. Before completing the PCB, we must wait to see if the key layout is accepted, and decide on how we are going to power the LEDs. We must also figure out the input for the control board, and get the measurements on the diode and horizontal keys that were ordered. (mentioned later) Figure 1 below shows what the PCB looks like now.

![Figure 1. PCB](image1.png)

It must be decided on how we are going to connect the PCB to the control board, and Bill suggested using ribbon cable. Given below in Fig. 2 is the layout of the control board connectors. The shaded in circles are the ones that must be connected to the PCB.

![Figure 2. Control Board Inputs](image2.png)
This week we tested to see if the LEDs lit up when a large number of them were used, instead of just five. (we couldn’t use all fifty because at this moment we do not have enough resistors) With approximately 30 LEDs mounted on a protoboard, we turned on the voltage and all lit up with good brightness. This means that we do not have to alter the power source we will be using (9V). Below in Figure 3 is an image of the LEDs lighting up.

![LED Circuit Image](image)

**Figure 3. LED circuit**

After testing the LEDs, Nolan worked on programming the controller while I tried to create designs for the keyboard. One idea I have is to use the base from an apple keyboard and mount the switches inside of it. Figure’s four and five on the next page show top and side views of how this would look, and try to give us a feel of if this is plausible or not.
After this was completed, Nolan and I went to solder one of the switches onto the control board, and then he tested his program to see if it worked. It was a success! When the switch was compressed, it moved the mouse pointer across the screen, which he had programmed it to do. Then he tried to make it act as a “double click”, and this worked as well.

The potentiometer we will be using, along with horizontal keycaps were ordered this week. Once these arrive, we can take measurements and finish the design of the PCB.

**Future Work**

This week Nolan and I plan to test the power source from the USB CPU connection to see if this could work to power the LEDs. This would remove the need for a replaceable or rechargeable battery, and would make operation of the keyboard easier.

Once the parts we ordered come in, and when we get approval from Miriam and Sam’s team, we can finish the design of the PCB and place our order. The design of the keyboard case and stand will also be adjusted, so we can start to assemble it in the near future.
Project Review

This week was probably our most successful yet. Now that we know the control board works and how to program it, a huge weight has been lifted off of our shoulders. The PCB is near completion, and once we make some minor adjustments we will place our order. The stand design needs to be decided upon, but once we have all the correct measurements, it will be easy to complete.

Hours Worked:

~12