Freely Adjustable and Accessible Keyboard and Arrow Pad for Client with Cerebral Palsy

Project Identity

During the week Steve met up with Bill to discuss the PCB express layout and make some changes. The circuitry was altered to meet our needs, however we must determine the configuration for the LED circuit before it can be incorporated into our design. Also before finishing the PCB, our keyboard design still needs to be approved by the client contact. An up to date diagram of our PCB layout is shown below in Fig. 1.

Figure 1: PCB Express work completed

In order to complete the PCB design, the LED circuit was worked on. Again a 9 voltage source was used to power up roughly 30 LEDs. This gave us a better idea of how the LEDs will be powered within the keyboard, by battery or by USB if applicable. A diagram of the resistors and diodes used can be seen below in Fig. 2.
Furthermore, the PCB needs to be able to connect to the female header receptacle on the control board. Wiring was determined to be too "tacky" and unstable. Bill has suggested we use ribbon cable. An appropriate ribbon cable will need to accommodate the 30 pin female header.

While Steve worked on finishing the design for the keyboard, I began programming a key switch. This enabled a better understanding on how the program works, and when the architecture is complete, the final programming will be quick and simple. First, I soldered the switch to its respective pins on the female header receptacle. Using the software, I was able to program the switch to perform all the necessary functions needed for the keyboard. Some of these included all the functions of a mouse (move left, right, up, down, left click, right click, and double click). These can be performed at specific sensitivity increments for fine or course movement. Also the switch was programmed to function as a character, enter key, tab key, and caps lock. A video of the switch being able to control the mouse can be seen on the website.

Steve’s was interested in incorporating the unique design of the apple keyboard into our design. The keyboard is clear and angled and measurements
were taken and drawn in Visio to test for plausibility. Near final layouts of the design were agreed upon and can be seen below.

![Keyboard Diagram](image)

**Figure 4. Top View of Keyboard**

**Figure 5. Side View of Keyboard**

**Future Work**

The next week will be dedicated towards seeing if the USB cable can support the LED circuit. This will eliminate the need for batteries or an external power supply. With the USB being the power source for the LEDs, there will be less maintenance required. Also, we will be expecting a potentiometer to arrive, that can enable our dimming settings. Its dimensions are necessary for the completion of the PCB.

Once our design is approved by Miriam and Sam’s team, the PCB can be completed and ordered. Also final measurements on the external structure of the keyboard can be determined, and if the apple keyboard design fits.
Project Review

Much work was accomplished this week. The PCB layout only has a little bit more tweaking before its completion, which is a plus. Also it was a nice head start using the programming software so the process is quick and simple later on when the pieces are being put together. Once we receive a reply from the contacts we can further our progress. Overall a very successful week.

Hours Works:
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