Progress Report

Introduction

The Omega Key is a groundbreaking mechanical keyboard that offers users the unprecedented ability to customize the characters of every key. This keyboard breaks the mold of all others, creating an ability to easily write in multiple languages, use technical symbols, and even assign full sentences to a single key.

This report outlines our progress with respect to our schedule and budget. Hardware wise, we have designed the parts and are in the process of manufacturing. For software, we have completed the majority of code but still need to do integration and testing.
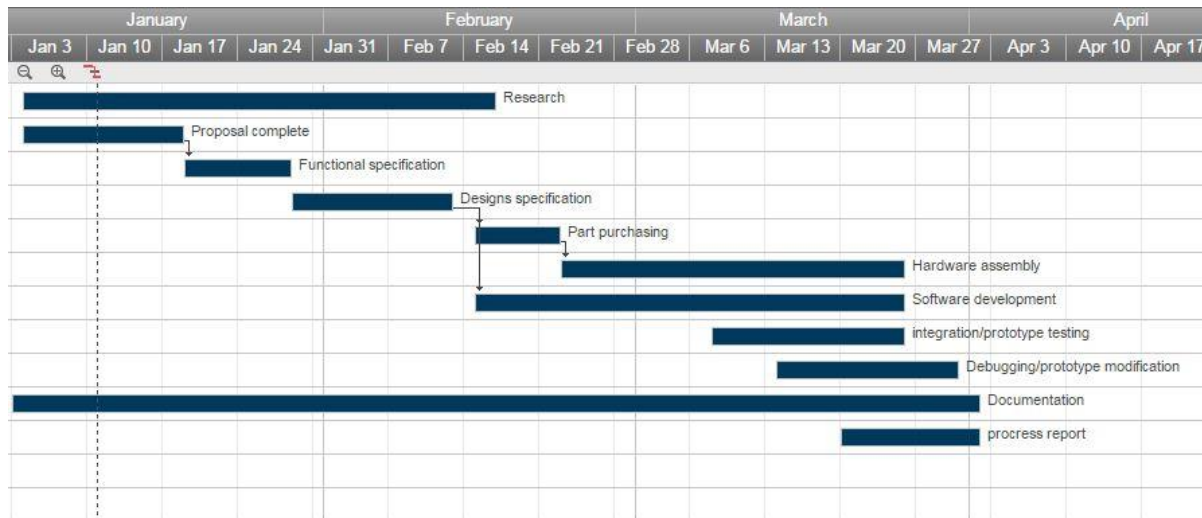
Schedule

Figure 1: OmegaKey development plan

Figure 1 above shows the initial schedule for the development of the Omega Key as detailed in the proposal. The schedule was initially planned to give some leeway so changes can be made in case unexpected difficulty occurred.

The hardware assembly process has been extended due to the initial OLED displays from the design not having an appropriate connector, hence the need to order another batch of displays.

Also, the initial design for the 3D printed keycap did not fit well with the switches and needed some correction as detailed in the Remediation section.

Software development is well underway with some details to be ironed out once the hardware is ready for integration testing.

While slightly behind schedule, with the initial schedule giving a leeway of almost 3 weeks until April 10, we are confident regarding meeting the expected deadline.

Financial

Currently we are within our estimates for the cost of $550 for the Omega Key. We were provided $450 funding from the ENSC 305W/440W course and the Engineering Science Student Society. Currently, we have spent $25 more than the given funding. This stems from the decision to buy new OLED displays to replace the ones we have previously purchased. The old displays were mentioned in our design specification document and details about switching to new displays can be found in the remediation section below. The new OLED display is identical to our test unit hence we only need to purchase 11 more. Fortunately some of the cost can be salvaged by refunding the old OLED displays which can keep us within our budget.

Parts	Cost per Unit (CAD)	Quantity	Total Item Cost (CAD)
Arduino Mega	68.04	1	68.04
Blue Cherry MX Switches	1.25	22	27.20
Test Display	15.99	1	15.99
Old OLED Displays	4.00	22	88.00
New OLED Displays	14.99	11	164.89
Solderable Breadboard (prototype board)	11.99	1	11.99
MCP23017 Chip	1.82	1	1.82
3D Printing	-	-	62.00
Miscellaneous (Shipping, Tax, Overhead, etc.)			35.00
Total Costs			474.93

Table 1: Expenditure

Progress

We have made excellent progress so far on the Omega Key. However, there is still plenty left to do. We have done preliminary tests on all components of the keyboard, including the screens and the mechanical switches. Parts have been designed using CAD software and adjustments are made as tests continue. Once all the parts are 3D printed we will need to do final assembly and wiring of all components.

On the software side, progress is on schedule. For the Leonardo board, which handles key presses and controls messages to the host computer, we have successfully written software that detects

hardware switch activation and messages the computer. This is able to operate without any additional software on the computer. Currently we are able to input regular keys as well as symbols. Further work needs to be done on debouncing, as single key presses are often registered twice.

For the Mega board, which controls the display screens, we have successfully outputted and updated images. An additional software tool has been written to translate multiple image files from PNG format and compile them to a library format that can be loaded onto the board. The software is able to read the library and select images to display. We were able to fit 36 images of 128x64 size onto the onboard flash memory.

Once the hardware is fully assembled, more extensive testing needs to be done on the system level.

Remediation

Our first 3D printed keycap did not allow enough room for the MX Cherry switch to click into so we need to make slight modifications to allow it to fit. Our major remediation was realizing that the first set of OLED screens we purchased had no available connectors to attach to the rest of the keyboard. After discussing our options at length, our group decided to order a different set of OLEDs with breakout boards attached to the back. These screens were much easier to connect, and as an added bonus they have a higher resolution (128x64 compared to 64x32).

Conclusion

Overall, the project is panning out according to plan. We have no team dynamic issues. Most technical aspects of the project are functioning properly. Our only major detour is the need to switch to a new set of OLED displays as the previous set was not able to be implemented. However, we are certain that the new set of OLEDs will function properly and can be integrated into our projects as we have a test unit of that OLED which we tested with.

Although we are approaching our funding limit, we do not have any further cost that is required to complete this project. Furthermore, we are able to refund the old set of OLED displays to gain back some funding. We met some unexpected issues but are on track to complete the project within the scheduled timeframe.