

gPod Accessible Blood Glucose Meter

Week 2

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Work Completed

This week the development board and LCD screen from Crystalfontz was approved and ordered. The DIP adapter was received though; our order from Digi-key has yet to arrive. This order is holding up the speech module portion of the design.

Why the signal was being inverted has been solved through use of the op amps. The signal is now in the positive range and the orientation that was expected is there. A LM358 op amp was used instead of the LM741 to try and eliminate the need for both +5V and -5V sources. The LM358 is a dual op amp so only one would be needed through the use of just one source has become more complicated. Also, with the signal now in the positive range it will be able to be used with the microprocessors A/D converter for data analysis.

This past week the main focus of our efforts was to correct the gain problem within our glucose circuit. The issue was with the electrodes where the voltage signal from working electrode 1 was half that of the voltage signal from working electrode 2. Most of the week was spent trying to figure out that problem. Figure 1 shows a glucose measurement where the signal from working electrode 1, in orange, has half the voltage of the signal from working electrode 2, in blue. The circuit was debugged while trying to fix the problem where the wires were checked for correct placement. When that was not the issue the electrical components were replaced with new ones, a different oscilloscope was tried, and different probes were tried. Then the proto board placement of the circuit was changed and then a different proto board was tried while still did not result in the resolution of the gain issue. We then tried reverting back to the original configuration with the LM741 op amp as opposed to the LM358. The LM358 was used to try and eliminate the need for use of +5/-5 voltages to be used and instead use +5/0 voltages. The same problems persisted with the original set up.

Then we started to suspect that the electrodes themselves might be the issues with all the use they had been receiving in a short time. Mike went and constructed new electrodes out of some foam tape, wires, and part of a plastic ruler as the base. These new electrodes had the exact same result as the electrodes that were pulled from the meter.

Dr. Northrop was consulted on this issue of the glucose circuits gain issue. He offered no advice though since he could not think of a way that we had not checked already.

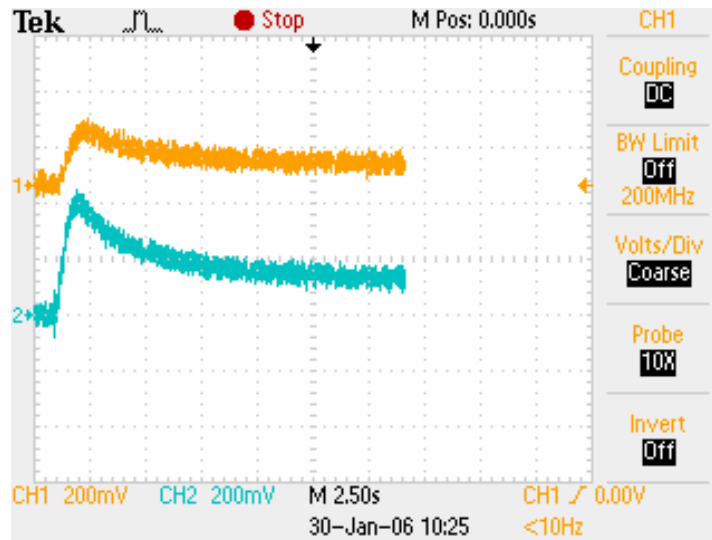


Figure 1: Glucose Measurements with Gain Problem

Future Work

Mike and I will continue to work on the glucose circuit to solve where the gain issue is happening and to develop an accurate glucose curve. For development of the curve different dilution of the control solution will be used. This will allow for different concentrations of glucose to be achieved and therefore a glucose curve to be developed.

Dave will begin to work with the microprocessor and its A/D converter. He will start programming the microprocessor and once the glucose curve is done start moving it to the microprocessor. Dave will also solder the Winbond text to speech chip to the DIP adapter once the Winbond chip arrives.

I will work with mike on the glucose circuit for most of the week in the development of the glucose curve. I will also be working on prototyping the Winbond speech chips circuitry once it has arrived and has been soldered.

Project Review

The project has seemed too stalled this week due to the glucose circuit trouble and the waiting for parts to have come in. Though, once the glucose circuit has been fixed forward progress should start up again real soon. The LCD and speech modules are still not progressing since the parts are being shipped, but once they have arrived progress will pick up. By the end of the week there should be progress on the speech module, microprocessor, and we should have an accurate glucose curve. We are well under budget with only about \$500 spent so far and no major purchases seen in the near future.

Hours Worked

Hours worked on the project: 14.5 Hours