

# **gPod Accessible Blood Glucose Meter**

Week 1

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## **Work Completed**

The first thing that was done was to inspect and check on what parts have arrived. All parts that were ordered had arrived though not all were correct. The LCD screen from Crystalfontz was too small. We think though that we can use it for development if a development board can be purchased. Due to the connectors are too small for soldering for our experience and with the development board the screen will just snap in and then will not have to be moved again. This will cut down on our chances of breaking the screen during development. The bar code scanner currently does not read the bar code on the empty insulin vial that we have which means that it most likely will have to be returned for a bar code scanner that will work with our vial. This could be caused by the bar code since it runs with the curve of the bottle and not the length of the bottle.

Another Winbond speech chip and DIP adapter had to be ordered since trouble was encountered during soldering of the first set. This happened since the correct tip Dave needed was not present and he plans on soldering the second set at his work where he will have the correct tools. Also, additional memory was ordered and the USB chip that will be needed for our gPod and a computer to talk to each other.

Dave and I spent a large amount of time in the lab working on the glucose circuit and managed to get a signal from it that was very close to being correct. At first we were having trouble getting a signal from the One Touch Ultra glucose meter it just kept showing error conditions when wired to ground. A number of setups were tried to grab the data from the One Touch Ultra meter and they all failed since the meter just kept going into an error state. So, then we just removed the strip reader with the electrodes and built our own glucose circuit. The measurements were read through the use of an oscilloscope. Figure 1, shows the glucose circuit that was assembled this week. A voltage of 400mV had to be applied to the Reference, Working 1, and Working 2 electrodes. A sample of solution of ~114mg/dL was applied to the test strip and the results were recorded with the oscilloscope, Figure 2. Channel 1, in orange, shows the data from the Working electrode 1 and channel 2, in blue, shows the data from the Working electrode 2. The data recorded is exactly what we had researched last semester though it is inverted. The problem with the data being inverted is that the slope is positive instead of negative like the research which will cause there to be negative voltages. The voltages have to be kept above 0 for the A/D converter on the microprocessor to work. Finally there was more data analysis done using Labview.

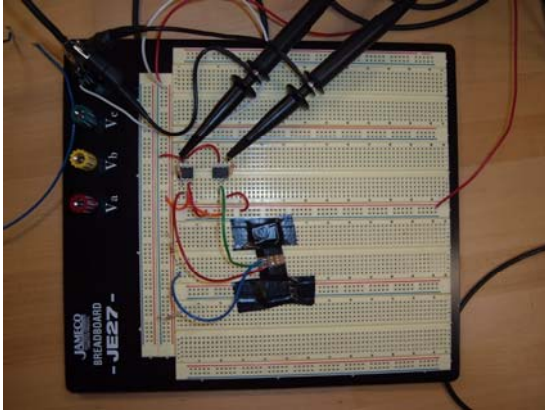


Figure 1: Picture of the Glucose Circuit

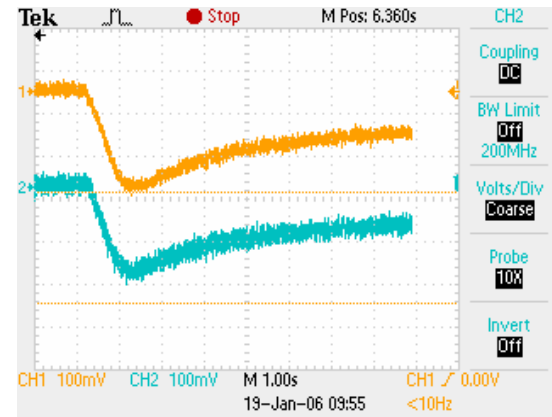


Figure 2: Glucose Measurements

## Future Work

Work on the glucose circuit will continue with measurements and attempting to solve when the signal is being inverted. The glucose circuit will be adjusted so that the signal is in the positive range so that the microprocessors A/D converters will be able to work with it. Then a series tests will be run using different concentrations of the glucose solution so a voltage/current to glucose curve can be determined. Once the curve has been acquired work can begin on moving the data to the microprocessor.

New materials should also be arriving which had been ordered the previous week such as the new Winbond text to speech chip and its DIP adapter. Once Dave successfully solders the Winbond chip to the DIP adapter I will begin to prototype the chip circuitry. I also plan on further research on how to talk/program to the Winbond chip. Hopefully the LCD development board will arrive, if approved, so that work may begin on the LCD prototyping and user interface.

## Project Review

The project so far has been progressing in a positive direction with the success of the glucose circuit portion so far. Though the LCD and speech chip have had set backs they should be back on track fairly soon once the parts arrive. The glucose circuit though is about 2 weeks ahead of schedule. Also, by the end of the next week we hope to have an accurate glucose curve and to be writing code for obtaining data from the microprocessor. The project is well under budget right now at \$324.42 and it will be only up to about \$500 after the orders from week 1 come in. There are no more major purchases foreseeable until it is time to order the printed circuit boards.

## Hours Worked

Hours worked on the project: 15 Hours