

gPod Accessible Blood Glucose Meter

Week 7

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Work Completed

This week was spent working towards integration of the LCD screen and the speech module to the microprocessor. We also did some work looking for enclosures for the meter and also started to work with the barcode scanner. Mike worked with the glucose circuit to develop a sample detection routine required for accurate timing.

Dave worked with the microprocessor to integrate the LCD screen and the speech module. He used some sample code included with the compiler and also some code found from the internet. Initially the code was missing the proper initialization routine to start the LCD screen. Other problems were encountered with the digital outputs on the microprocessor and were resolved by changing the port the output was located on. Figure 1 shows the LCD displaying “hello world” commanded by the microprocessor.



Figure 1, LCD screen displaying “hello world” as commanded by the microprocessor.

Dave also spent time trying to interface the speech module with the microprocessor. He wrote a simple LabView routine to emulate the SP03 software provided by the vendor of the speech module. The LabView program works correctly and in the coming week will be translated to the microprocessor. Table 1 shows the command sequence to speak the word “Hello” by the speech module.

Command Sent	Response Read	Comment
80	01	Start of command sequence
00	00	Volume (Full)
04	04	Speech Pitch (4)
02	02	Speech Speed (2)
48	H	Text string follows until 1A command received by the module. Note: The text buffer is 85 bytes in size so the text string is limited to 81 characters long.
65	e	
6C	l	
6F	o	
1A	1A	Ends text string
00	00	Speak the text

Table 1, Command sequence required for speech module.

Matt started to find enclosures for the meter, researched the necessary surface mount parts required, and started investigating the barcode scanner.

He started by opening up the POS-X Xi 1000 barcode scanner to examine the circuit boards size, as can be seen by Figure 2 below. There were 2 major parts and one minor. There was a circuit board for the sensor and one for the microprocessor. The minor board was just for the button. He took a few quick measurements for finding a suitable casing. Matt also tried to get the scanner to read barcodes using LabView but could not find a VI specifically designed to read from a USB device. More work will be done this week with the barcode scanner.



Figure 2: POS-X Xi 1000 Scanner Circuitry

Matt also spent some time on the idea of casing and casing options. Through internet searches a few different enclosure sites were identified such as Pac-Tek and OKW. Both have good options though it was found that OKW will give up to one hundred dollars of free samples. Figure 3, below shows a sample enclosure for the glucose meter. While Figure 4, below shows a sample enclosure for the vial scanner. These are possible enclosures that could be used for our project. There are options for different battery sizes and options to hide the screws.



Figure 3: Sample Glucose Enclosure



Figure 4: Sample Vial Scanner Enclosure

Finally, Matt researched the components required for a surface mounted circuit. These parts included the op amps, resistors, capacitors, microprocessors, and a new LCD screen. There was also a problem with the speech module we currently had so Matt placed an order for a new module.

Mike worked with the glucose circuit to develop a sample detection routine. Sample detection is required for the timing to take a glucose measurement. Using a voltage comparator circuit will provide a system of sample detection. Once the voltage level is above 0.2 V the comparator output voltage is 5 V. This 5V output will be used by the microprocessor to start the timer to take the voltage reading 2 seconds after the sample is applied. Figure 5 shows the comparator output and signal voltage.

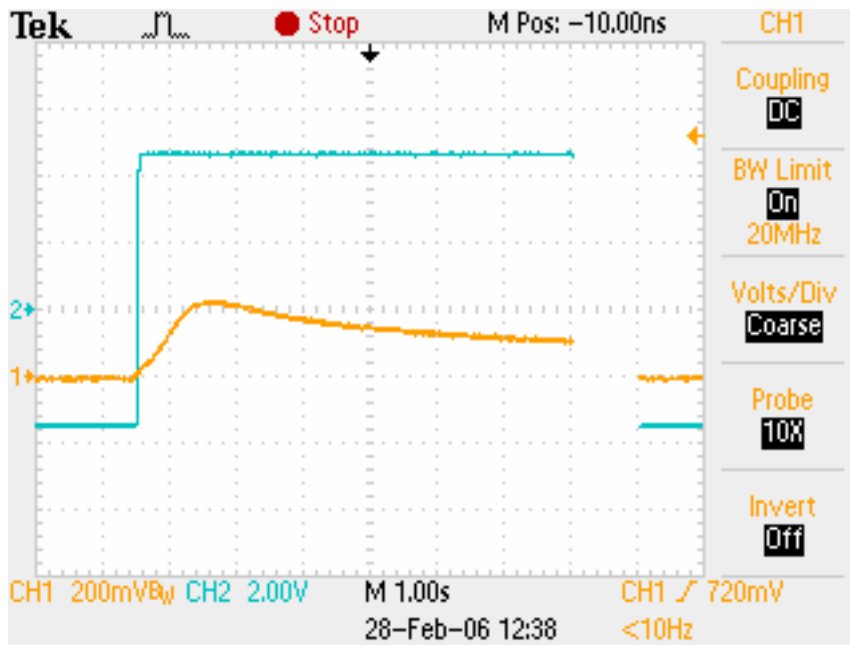


Figure 5, Comparator output (blue) and input voltage (orange).

There was some concern about the comparator voltage being negative. We learned that the microprocessor has an onboard comparator module so that will be used to fix this problem.

