

gPod Accessible Blood Glucose Meter

Week 4
February 12, 2006
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Work Completed

This week I worked on the Winbond text to speech chip most of the week. To start off the 5 MHz and the 24 MHz were delivered. The 24 MHz resonator was added into the speech chip circuit between pins 7 (XTO) and 8 (XTI). This was the resonator that will be needed to run the Winbond speech chip successfully. The 5 MHz resonator was also added to the Winbond speech chip circuit. It is needed to for the data in pin since that pin can only handle 5 MHz at a time not the full 24MHz.

I also soldered single core wires onto the serial port while removing the braided wire that was previously soldered onto it. Then a MAX232 chip was added to the circuit and wired to both the Winbond speech chip and the serial connector. This will allow for the computer to talk to the speech chip for testing of the speech chip circuit. The MAX232 was attached to the serial connector through 3 pins, the R1in, T1out, and Ground. While the MAX232, was attached to the Winbond chip through 2 pins, the TX data and the RX data. Then a reset button was added to the circuit. The button was wired to the reset pin on one side and to ground on the other side. Below is Figure 1, which shows the Winbond speech chip, hooked up to the resonators, MAX232, and button.

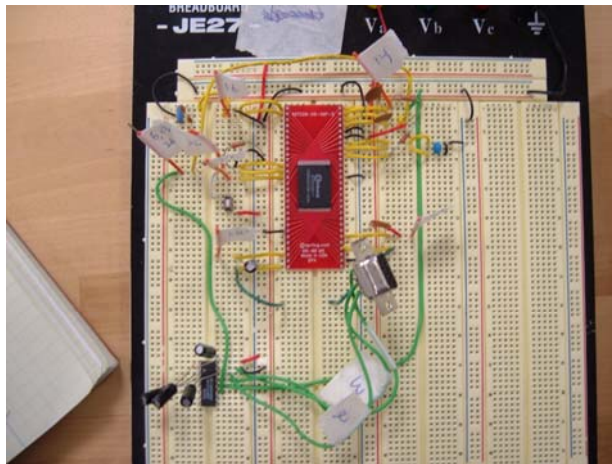


Figure 1: Winbond Speech Chip Circuit Photo

After all the pins on the Winbond speech chip were connected the speech chip was then powered up. Once the chip was powered up there was no response coming from it when it was hooked up to the oscilloscope. The resonators were then checked by use of the oscilloscope and there was no waveform present. This meant that the resonators were not working properly possibly due to being wired up wrong or since the resonators might

need +5 volts not +3.3 volts. All the voltages were then checked to make sure the correct voltages were present at each of the pins on the chip.

An SP03 speech module and serial connector wire was found in the lab and permission was given for us to use it. The SP03 speech module was then hooked up to the computer through the use of the serial adaptor cord and the addition of +5 volts. Then the SP03 testing software was downloaded off the internet and installed. The SP03 speech module correctly worked after a bit of work. At first the module would not complete some full sentences but in the end this was found to be due to the current limiting that was happening. Also the speaker was switched with the one that we purchased. Figure 2 below shows the SP03 speech module, new speaker, and serial connector cable. The speech module seemed to pronounce all words that we tried fairly well except when using the word 'pod' since the speech module pronounced it as 'god'.

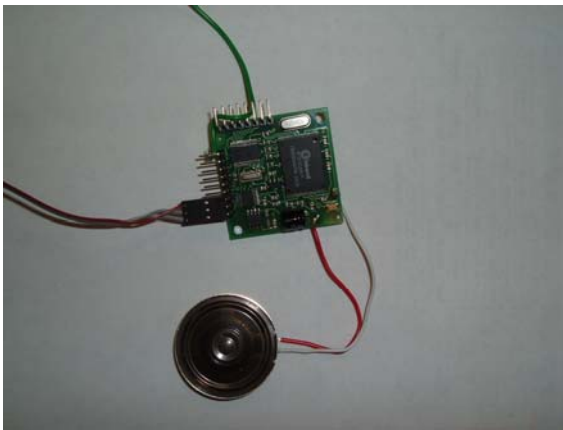


Figure 2: SP03 Speech Module Photo

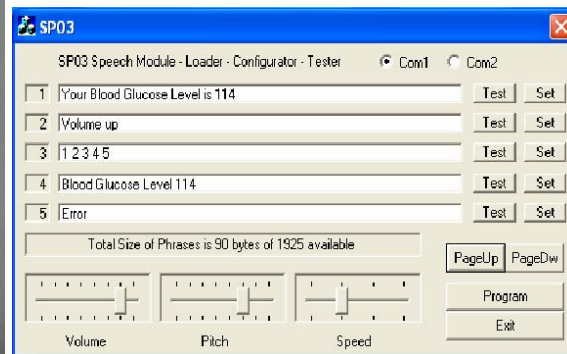


Figure 3: SP03 Test Software

Future Work

This week I will work continue to work on the Winbond speech chip circuit. I will keep working on trying to figure out why the resonators are not operating as they should. I will also keep investigating the SP03 speech module and try to understand how it works. I plan on mapping which pins on the Winbond chip need just +3.3 volts and not +5 volts. This will be done through the use of the Winbond user manual and the SP03 speech module. Once this has been determined a 3.3V voltage regulator will be ordered so that a 5V source can be reduced down to 3.3V for those pins that need it. An amplifying circuit may also be need for the circuit to amplify the speaker so that it can be heard at a higher volume if necessary. I will start with some research to try and identify a circuit that should work for volume amplification. A volume control might also be needed and will be investigated in the same manner.

Dave will continue to work on A/D converter and connecting integrating it with the speech circuit and glucose circuit. He will work on some code to use the SPI or USART port for use with the speech module. He will continue to work with the A/D converter on increasing the acquisition sampling speed to try and resolve the glucose circuit input

problems. Then he should be able to work on the algorithms to convert the voltage level to a glucose concentration.

Mike will continue to work on the glucose circuit. He will keep trying to figure out a correct filter for the glucose signal. Hopefully the high glucose concentration solution will arrive and he can work on the final glucose curve. Mike will also work on the glucose detection circuit which will allow the meter to know when a sample has been applied to the strip.

Project Review

The work on the speech chip has slowed a bit this week though is still progressing nicely. Though, the discovery of the SP03 speech module will be a great help in further understanding how to get the Winbond speech chip to operate correctly. The microprocessor work this week also went well this week. Also, the glucose circuit filtering problem so far has been proved to much more difficult than was expected. Mike will continue to work on the signal noise problem and development of the glucose curve. I will continue to work on the speech chip circuit trying to make it work. Dave will try to get the A/D code working for the glucose circuit, communicate with the speech module, and reduce the noise on the glucose circuit. Total costs to date are \$470.07

Hours Worked

Hours worked on the project: 14 Hours