Earlier this past week, Mike and I went to the gym to use the free weights on the scale to determine a linear relationship between the voltage from the load cells on the scale and weight. This was unsuccessful as any weight put on the scale (25 pounds, 50 pounds), gave a voltage of .1V. However, we did find that the scale’s calibration is off by .5 pounds. A 25 pound dumbbell weighed as 25.5 pounds and a 50 pound dumbbell weighed as 50.5 pounds.

To deal with this, I cut the connection from the PCB to the LCD screen in the scale (Fig. 1).

After studying the board, I think that we need to process the signal ourselves before we can try to determine the relationship between voltage and weight. I plan to amplify the signals coming from the load cells and then add them using a differential amplifier. This is the processing that we couldn’t access from the board (because we don’t have a schematic), and I hope that it will solve our problem of not being able to get a meaningful voltage-weight relationship.

I also figured out how we are going to take the signal from the pulse oximeter. By mapping the connections that lead to and from the LED and photodiode, I was able to find the output from the photodiode (Fig. 2).
Pins 1 and 5 connect across the battery, providing power to the LED and photodiode. Pins 2 and 3 connect across the photodiode itself. By soldering leads to these pins and connecting them to an oscilloscope, the waveform that is sent to the pulse oximeter’s microprocessor can be seen (Fig. 3).
For a blood oxygen saturation of about 98% (mine, as measured by the oximeter), the steady state voltage that is reached is about 250mV. Because we cannot calibrate the pulse oximeter, we’ll set a threshold voltage and anything above it will be considered 98% blood oxygen saturation. This will be done with a comparator, and the digital signal will be sent to the microprocessor.

**Future Work**

I started to complete the respiratory rate probe by soldering a thermocouple to the retractable cable. The work is a little messy, so I plan to clean it up. Also, I need to add the comparator to the pulse oximeter circuit and finish work on the scale. If things go well with the microprocessor in the next few days, it might be worth it to ditch the comparators and use the microprocessor to set the thresholds. I also really need to work on the blood pressure device. I keep pushing it back to work on other things. Finally, we need to begin seriously thinking about the website, Bluetooth (ordered), casing, buttons, and PCB design.

**Project Review**

I was able to help Rob power up the LCD screen this week. Now we just need to figure out how to use it to display. Mike has yet to give me any hard data on the battery (part number, price), which we need to order. We’re moving along, but these next four weeks are going to require a lot of man hours to get everything we need to do finished.

**Hours Worked**

Hours spent by working on the project, Week 8 (3/21/07-3/27/07): 15 hours