Work Completed:

This week I first reviewed the contents of the electronics orders received last week from Allied Electronics and Digikey. All of the parts ordered were properly shipped; however there were a couple of minor problems with the components. In order to connect the switching supply to the final circuit, a female connector is required. However, the ordered power connector was male. Eventually I will need to order the proper connector, but since the rest of the electronics have not been completed, I have decided to delay the order for as long as possible to ensure that I will get all of the parts required. Also, I didn’t realize that the part number for the current direction limiting diodes were for a 6 amp diode. It was a remnant from when we thought the load cells we were using might be drawing approximately an amp of current each. Now that I suspect we will only be using only AC power for the base and only DC for the wireless display, I don’t think the diodes are necessary. They would only be needed if both types of power had to be accommodated in a single device. Other than these issues, I believe that building and programming the electronic circuits can proceed as scheduled.

I built a test circuit for the LCD characters using a single character, a driver chip and a DIP switch to simulate the output of the microcontroller. The circuit setup is diagramed in the schematic below.

The datasheet of the driver chip states that a square wave should be applied to the phase input as well as the backplane of the LCD, however it does not give any other specification for frequency or duty cycle. Therefore a 50 Hz wave was applied for testing purposes. The final circuit did not work as expected, but further testing revealed an intermittent connection somewhere in the circuit because it alternated between displaying the desired digit and not displaying anything. Further trouble with the protoboard leads me to believe that there is a short somewhere on the board.

Examination of the keypad and the datasheet revealed that some of the pins on the device were not labeled and the datasheet did not describe the pinout on the matrix device. I created a diagram of my own detailing which pins were connected for each button. Also, my original design called for the use of pull-up resistors to allow for
multiplexing the lines, but I have found a method of multiplexing the lines without the need of any extra resistors.

Current Status:

The test circuit from the LCD must be moved to a different protoboard and once a single digit is working the other three digits will be connected. I built the power regulator circuit for the display device, and found that it maintained a five volt supply with the input over 7.5 volts. I received an e-mail today that the microcontroller and op-amps that I sampled from Microchip’s website have finally shipped. I should get them by the end of next week. The picture below shows the current LCD test circuit.

Future Work:

Next week the four LCD characters should be connected to the Qik-Start board along with the keypad matrix. Unfortunately since the PIC16F737 microcontrollers we will use in the final product are not in, we need to use the 874 for the time being. As long as the ports used on the 874 are also available on the 737, there should not be any significant change in the code used on the two devices. The appropriate ports of the Qik Start board need to be soldered in order to interface it with a protoboard. I will start programming the PIC to decode a key press on the keypad as well as display the proper number on the LCD display. For the keypad I already have a program that decoded twelve keys, it simply needs to be expanded for sixteen keys and modified to use the
proper I/O ports. A table will need to be created for the LCD display in order to convert a binary number into the proper BCD input for the series of LCD characters.

Project Review:

I am currently on schedule with my established timeline. The only major issue is that I am unable to create a test circuit for the platform power systems because of the missing connector. Once I get to the load cell systems this problem will have to be corrected because the power supply noise may have a significant affect on the accuracy on the load cell A/D conversion. Also, we need to know if the power supply will work or if the noise is too great. For the time being, this is not a problem while I am working on the display systems.

Hours worked:

8 hours