

IOWA STATE UNIVERSITY

Senior Design Weekly Report

Weekly Report 6

Group: May-06

Group member: Chongli Cai, Qiaoya Cui, David Hoffman, Andrew Kom, Ailing Mei

Client: Garmin International

Advisor: Dr. Colin Christy

Period: 10/1/2012-10/6/2012

Date: 10/6/2012

Goals to Meet

The goals we wanted to meet for this week were to build a schematic of the Current and Voltage measuring circuits using Cadence Virtuoso. We also wanted to start the process of getting a basic program to run on the evaluation board. This process would include learning the programming environment that would be used with the PIC chip.

Weekly Progress

We made a significant change to our design. We opted to change the MCU we are going to use from the PIC chip to a TI MSP430 microprocessor. This change was made for a number of reasons. First, we changed it because we didn't need as many of the features the PIC chip would offer. Our design will only utilize the UART serial communication, and an ADC. The TI controller has both of these needs, and is much smaller, and cheaper. Second, the power consumption on the TI chip is lower than that of the PIC chip. This means that the device will not need as big of a battery to run a continuous process. Finally, the interface to program the TI chip is much easier, given that we have a TI Launchpad board that has the programmer on the board. This means that we do not have to fight other teams to borrow the programmer for the PIC chip, and also means that programming it will be very quick and easy. It also has a socket for the MCU, so programming multiple chips to see the differences if parts of the code are changed would be easier to accomplish. For all these reasons, we found it to be a good choice to try this MCU instead.

This week we were also able to build the schematic for the current and voltage sensing circuit. We still need to have some details about the MCU to run simulations, but as soon as we do that, we will have a simulation of the Current and Voltage measuring circuits that we can feed into the MCU's ADC to get data converted.

Future Planning

One big drawback of changing MCU is that our software engineer now must research the other chip, the MSP430. This will be something important to accomplish this week. The simulation of the Voltage and Current circuits will also be run and tested for accuracy. We also have decided to start with a small resistance sense resistor to get the current value, and have designed the circuit to be able to change that sense resistor to a hall-effect sensor at any point we would like to.

Another drawback has been getting a way to interface with an SD card, as the old MCU had this already built on the evaluation board. We have located a document that specifies how to set them up for communication between one another. Designing and fabricating this communication circuit will be a high priority as well for the coming week(s).

Pending Issues

The change to a new MCU could bring about many new issues, such as the integration of the SD card, as explained above. Many of these should be fixed given that we accomplish the above goals.

Individual Contributions

Andrew:

Wrote the Weekly Progress Report 6

Located SD card to MSP430 document

Started design on the SD card board for MCU interface

Chongli:

Worked to develop the Voltage and Current measuring circuits
Developed the simulation schematic for the above circuits

Ailing:

Worked to develop the Voltage and Current measuring circuits
Developed the simulation schematic for the above circuits

Qiaoya:

Worked to develop the Voltage and Current measuring circuits
Developed the simulation schematic for the above circuits

David:

Procured the datasheet for the MSP430
Began familiarization with the TI programming environment