Project Progress Report

Accessible Infusion Pump User-Interface
Week 1
January 29, 2007
Hassam Sultan

Work Completed

During winter break, I have been getting in contact with representatives from National Instruments concerning the embedded applications module with the blackfin microchip processor. Upon the week before school began, Robert Veniventure from National Instruments contacted me with his interest upon assisting us with our biomedical engineering design project. In the conversion, I mentioned our project overview and our projects needs from the blackfin microchip processor. Upon our final presentation last semester, we removed the possibilities of Bluetooth accessibility within our final design, but to my surprise, Mr. Veniventure justified the blackfin was designed for portable, low power devices, which in our regard is the wireless interface. Once completing our conversation, Mr. Veniventure suggested informing his engineers in helping to assist us in designing the appropriate blackfin microchip processor for our project specifically.

On Friday, January 19, 2007, my teammates and I tested the new parts we received from break. The infusion pump we received that day from Baxter Healthcare and we tested its alarm system to confirm all alarms were operable: Open Door, Upstream Occlusion, Air, Downstream Occlusion. Next, we tested and confirmed its operating system by running the primary/secondary flow rate, primary/secondary volume infused, and “Keep Vein Open” (KVO).

We opened the infusion pump and found five wire connectors that relayed information to the stepper motor assembly from the infusion pump interface: CN-1, CN-2, CN-3, CN-4, CN-5. Upon further analysis, we found the door alarm is relayed through CN-2 with a magnetic circuit system found on the door lock. Wire CN-2~2 generates a signal (square wave was found on the oscilloscope) and CN-2~1 receives the signal and completes the circuit to confirm the closed door. Once the circuit is broken by removal of the magnet, the signal is gone and the alarm for the door is displayed on the infusion pump screen.

CN-3 was the largest of the 5 connectors and the information was sent to the stepper motor. Time was further spent throughout the week between Mike and I and investigating the CN-1 and CN-4 wires. Mike managed to find information from running the infusion pump and finding various wave information conveyed through the wires. In my time at the lab, I tried understanding what Mike
performed in the lab and tried to better understand the entire stepper motor setup. Mike further concluded the CN-1 and CN-4 were wires that relayed the alarms for the upstream and downstream occlusions. In addition, the half of the CN-1 wires (1 and 2) were set for setting the air alarm.

Initiation of the LabVIEW® program for our blackfin microprocessor chip was commenced and our current program is shown in Fig. 1.

![Figure 1: Current LabVIEW Program](image)

Testings were further performed on the project joystick (see Fig. 2). The connections relayed within the joystick were investigated and confirmed to be in an I/O operating system.

**Future Work**

Upon receiving an email from Robert Venivisventure, we can hopefully start working on the LabVIEW® program as to interface with the stepper motor. Further information from Mr. Venivisventure should assist us polishing our program and assist in making the interface

![Figure 2: JI-00105 joystick](image)
via embedded applications from the blackfin microprocessor chip. From Mr. Venivventure’s advice via telephone, we should progress with developing our LabVIEW® program and use the advantage of the EZ-KITLite and hopefully have a running LabVIEW program to interface with the stepper motor. However, this can only be accomplished once we completely understand the information and signals conveyed through the five stepper motor assembly wires. Investigation of the encoder wires (CN-5) should be analyzed and understood soon as possible.

Project Review

Currently the basic setup of the LabVIEW® program is being done (i.e. display screens of the flow chart made in our final report). Upon understanding the exact signals that are being generated and passed through the wires in the stepper motor assembly, we can then continue and allow LabVIEW® to generate the same signals with each corresponding wire.

Hours Worked:
10 hours