Accessible Home Vital Signs Monitor

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Week3
02/14/07

Work Completed:

Last week I began working on the code which be used to convert our analog signals to digital data, which would then be compatible with the LCD screen and speech module. This week, I dedicated my time to researching displaying text onto the LCD screen. Using the microprocessor, we are going to send and receive data needed for communication with the speech module and screen. The LCD screen that we are going to use requires 3 control lines, as well as either 4 or 8 I/O lines for the data bus. In our case an 8-bit data bus will be used (for a total of 11 lines), and the lines are referred to as DB0, DB1, DB2, DB3, DB4, DB5, DB6, and DB7. To communicate with our microchip, these data lines will need to be connected to the corresponding pins on the microprocessor, which are denoted as RD0, RD1, RD2, RD3, RD4, RD5, RD6, and RD7 located in PORTD.

To control the operation of the LCD, 3 control lines, EN, RS, and RW will be used. The EN line is called "Enable", and it is used to tell the LCD that we are sending it data. To send data to the LCD, our program will make sure this line is low (0) and then set the other two control lines and/or put data on the data bus. When the other lines are completely ready, EN is brought high, and then the minimum amount of time required by the LCD datasheet is waited. After this required time has passed, EN is brought low (0) again which allows the data to be read to the screen. The RS line is the "Register Select" line. When RS is low (0), the data is to be treated as a command or special instruction (such as clear screen, position cursor, etc.). When RS is high (1), the data being sent is text data which should be displayed on the screen. The RW line is the "Read/Write" control line. When RW is low (0), the information on the data bus is being written to the
LCD. When RW is high (1), the program is effectively reading the LCD. Below is a block diagram of the pins/ports we plan to use on the microprocessor and the corresponding pins they connect to. It can be seen how 11 pins are used to control the LCD screen, while 3 others will be analog inputs to the microchip for the thermocouple, blood pressure cuff, and thermometer.

**Figure 1: Block Diagram of Pin Layout**
Future Work:

Next week I would like to begin processing the thermocouple data and display the resting voltage on the LCD screen. Before this happens, we need to alter the amplifier/filter to produce a voltage of -0.3V to 0.3V which is the required input voltage for the microprocessor. As of this afternoon, Jenna was working on the thermocouple circuit, and I anticipate she will resolve any problems in the near future. Once we can correctly process and display a real bio signal, we will have to alter/add more code to allow for simultaneous inputs. Since this could be a complicated part of the design, I would like to get started as soon as possible.

Project Review:

So far I feel the design is progressing at a fairly steady rate. My ultimate goal for the coming weeks is to display the thermocouple voltage on the LCD screen. Once we do this, we will be able to add each vital sign as they are completed. As we continue to work on each vital sign, we will be able to incorporate it into the thermocouple code and keep building from there.

Total Hours Worked: 15