ECE-3120
Fall 2008

LAB 7 – Temperature Conversion

The purpose of this lab is to reinforce your basic programming skills with the 68HCS12 using Subroutines and D-Bug12 Functions.

PRE-LAB:

Prepare pseudocode and the first draft of the program and calculate the expected results by hand (both decimal and hex). This must be completed before coming to the lab and shown to the lab instructor at the start of the lab session. Note: The Pre-Lab must be typed into a proper *.ASM source file, following our standard Program Format requirements.

Approved: Lab TA _____ *Date* _____

PROGRAMMING ASSIGNMENT:

Write a subroutine that will convert the temperature in Fahrenheit to Celsius accurate to one decimal digit. Write a main program (**Temperature.asm**) that will:

- Prompt the user to enter a temperature in Fahrenheit by displaying the following message:
  - "Please enter a temperature in Fahrenheit"
- Call the GetCmdLine() function to read in the temperature
- Call a subroutine to convert the input string (representing a decimal number) into binary number
- Call the temperature conversion subroutine to convert it to Celsius
- Output the current temperature to the screen in the following format:
  - xxxx°F yyyy.y°C
- Output the next message
  - "Want to continue(y/n)"
- Call the getchar() function to read in one character. If the character entered by the user is **y,** then repeat the process. Otherwise, return to the D-Bug12 monitor by executing the swi instruction.
- The code must start at $1000.

Procedure: First, use D-Bug12 to fill memory locations $1000 through $3BFF with zeros. Then assemble, download, and debug/execute the program as follows.

a. Download the program, run it at full speed until it stops, and verify that the final values are still correct.
b. When finished debugging and executing, copy the entire terminal window output and paste it into a Notepad or Word document for inclusion in the report. You should edit out mistakes and unnecessary repetitions before submission.

Approved: Lab TA _____ *Date* _____

Things to turn in as your Lab Report, attached in this order:

1. This assignment sheet, with your name at the top, signed by the TA where shown.

2. Your uncorrected pre-lab document (commented source code).

3. A printout of the final **Temperature.asm** and **Temperature.lst** files. You'll need to print the listing file in landscape mode to make it fit. Use Notepad to print them.

4. A printout from the terminal screen (method: highlight text, type ctrl+c, and paste into a Notepad or Word document, using Courier New as the font) that includes everything done. Add brief hand-written comments and highlight important values at each step in the procedure, showing the relevant memory contents and register contents.

5. Answer the following questions, in your document:

a) What Parameter Passing method and Result Returning method are you using in the two subroutines you have written?
b) Draw the stack frame for both the subroutines