**Project #2**

**Introduction:**

The goal of this project was to make use of the peripherals available to us on the STM32F207ZG microcontroller. This project in particular made use of the onboard voltage pot and the LCD display.

**Project Description:**

In this project our group was tasked with first initializing, and then reading real time values from the onboard voltage pot. These values were then to be output to the LCD display as a decimal value ranging from zero to four thousand and ninety-five. The value on the display would change as the voltage pot altered.

**Design/Development:**

Our group was quite fortunate in regards to this particular project as much of the work was generously provided to us by a group of classmates who had taken the course previously. The assembly to initialize and read from the onboard pot was provided to all groups in what was the original lab for the class. Some minor changes had to be made to this code to allow it to function in the manner we needed it to. This consisted of a small tweak in how we received data back from the peripheral wherein we had to place the value in a register before branching back to our main procedure.

Where our classmates code helped immensely however was when attempting to initialize and display data to the LCD. As there is very little documentation in regards to how to go about this our group was originally going to recompile one of the example projects provided by the IAR workbench that used the LCD. We would then take the resulting object file and using an ARM toolkit decompile the code and view the resulting ARM assembly essentially reverse engineering the process to see how it works. We were thankfully able to avoid this though as the aforementioned code provided to us well documented processes that allowed working with the LCD to become extremely simple.

Once we overcame the hurdle of declaring a variable in memory, which is quite unintuitive, we were able to complete the implementation of the project rather quickly. Making use of the glyphs, again provided by classmates, we used a simple loop that would constantly fill the variable with the correct voltage read, and we then used a procedure from the provided code to write the string, having converted it to its ASCII value, to the screen.

**Conclusion:**

Our groups implementation worked as intended and was able to display the entire range of possible values the voltage pot could output. Though portions of the project were frustrating due to the lack of documentation on IAR’s part we had a lot of fun with this project and learned a great deal in just what it takes to display something as simple as a character to the LCD screen. If we were to make any suggestions for future iterations of this project we would certainly include some documentation on how to correctly declare a variable as it is quite unconventional, and despite much searching we were only able to get it functioning properly with some assistance.

**Contributions:**

Zac compiled the initial lab report. While both Brandon and Andrew proofread and added their opinions to the report. All three members contributed to the implementation of the project on the board.