CPE 2610, Lab 11, Exploring Analog to Digital Conversion

# Purpose

The purpose of this lab is to explore various aspects of the ADC on the STM board.

# Prerequisites

* The Nucleo-F411RE board had been mounted onto the Computer Engineering Development Board.
* A Digilent Analog Discover 2

# Activities

1. We will be wiring the analog control stick to PortA. (Note: This eliminates the ability to the Keypad unless we remap some pins on the board.)
   1. X -> PC0
   2. Y -> PC1
   3. Click-> PC11

Note: VCC on the control stick should be wired to a 3.3V source to match with that of Vref of the ADC.

1. Used the provided header and sample code (adc\_starter.h and lab11\_starter.c) to implement a main program which will start printing the position of the control stick to the LCD once it has been clicked. The second time it is clicked it will simply hold the last value.
   1. Note: the position should be calibrated, and output should be in the form of percentage right/left or up/down.
   2. For example:

X: Right 75%

Y: Down 25%

1. There are many ways to implement this solution. See table below for possible approaches and their corresponding grades. (Avoid the scanning approach for now, as it would require the use of DMA to retrieve the values of the conversions…)

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| --- | --- | --- | --- |
| Full Name:  (**print**) |  | Section: (Circle One)  111 | 121 | 141 | Due: Friday 4/19 |

# Rubric

|  |  |
| --- | --- |
| ADC Sampling: | Single Sample | Interrupt Driven |
| Push Button Handling | Polled | Interrupts | Uses Deferred Proc. |
| Grade: |  |

# Grading

|  |  |
| --- | --- |
| Grade | Implementation |
| A – Level | Utilizes Continuous ADC Interrupts and Push Button Interrupts |
| B – Level | Single samples taken w/ ADC Interrupts, Push Button Polled |
| C – Level | Polling driven taking single samples |

# Submission

Submit only your documented main file.

* Print Single Sided.
* Staple in the top left.