# EECS 388 Laboratory Exercise #5
# Analog-to-Digital Converter

**Demonstrate the week of October 24, 2018**

**Gary J. Minden**

## 1 Introduction

In this lab you will write a task to read the Analog-to-Digital (ADC) and display the results using Putty. You will use the FreeRTOS framework from Lab #04.

When accessing referenced documents, copy the URL and paste into your browser. Some browser PDF plugins cannot handle URLs spanning multiple lines.

### 1.1 Program Modifications

Make a copy of the FreeRTOS project from Lab #04 and rename appropriately, e.g. FreeRTOS_TM4C1294_ADC. You can replicate your LED task from Lab #04 as a starting point. You will add your task to this copy as described below.

### 1.2 ADC Background

The operation of the Analog-to-Digital converter was described in class. The steps to program the ADC and sample the analog input were discussed in class and a sample task was provided. Additional information on the ADC hardware and DriverLib software are at:

http://www.ittc.ku.edu/~gminden/Embedded_Systems/PDFs/TI_TM4C1294_LaunchPad_Eval_B71003.pdf,

http://www.ittc.ku.edu/~gminden/Embedded_Systems/PDFs/TI_TM4C1294NCPDT.pdf, and

http://www.ittc.ku.edu/~gminden/Embedded_Systems/PDFs/TI_TIVA_DriverLib_UG-2.1.0.12573.pdf.

Information on FreeRTOS APIs is at:

http://www.freertos.org

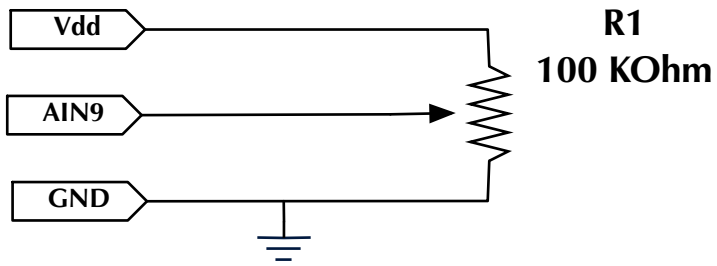
You should read those documents.

### 1.3 Connector Pin-outs

The EECS 388 BoosterPack is connected to the Tiva Evaluation Board.

### 1.4 Off-board Circuit

The initial off-board circuit will be a potentiometer. The circuit is:




Vdd = 3.3 VDC. As you turn the potentiometer your ADC readings should vary between 0 and 4,095.

### 1.5 New Task

Write a new task to sample AIN9 (ADC channel 9) and print your measurement using UARTprintf to Putty. The task steps are:

1. Initialize ADC0, Sequencer 0, to sample ADC channel 9 under processor control (e.g. Processor_Trigger) (See lecture slides.).
2. Insure the Putty is initialized.
3. Sample ADC0/AIN9 once per second.
4. Print the measurement value Putty using the format: "ADC: xxxx" starting at column 0 and an appropriate row.
5. Repeat steps 3 and 4 once per second.