**EET 4250 Lab 5**

**Using Systick Interrupts for Audio Output on the TM4C/LM4F**

**Functional Description**

In this lab you will output a digital wave from the TM4C by using Systick Interrupts to output a number from 0 to 15 over four pins on an output port. This wave will then be converted to analog using a simple resistor pattern acting as a digital to analog converter. Finally, the wave will be sent to a headphone speaker so that it can be heard audibly. Because much of the software has already been provided, please find a sequence of at least 5 notes to play over the speaker. There will also be two input switches: a play/pause button and a stop button. Two LEDs will give a visual indicator of status: one will indicate a musical beat, the other will shine while a note is being played.

**Instructions**

1. Use the Lab 5 starter project and make the necessary modifications to complete the software.
   1. Modify music\_songs.h to play a different song than Mary Had a Little Lamb.
   2. Modify main.c to complete the implementation of the software. Follow the comments for hints on what needs changed.
2. Show the instructor when completed. Use the functional description above and the example from class as a measure of completeness. Use the deliverables below to know what to turn in.

**Deliverables**

Turn in a professional report which includes the following information:

* Cover sheet with name(s), course number, lab number, and project title.
* Description of what the program aims to accomplish.
* How the program works or ideas on why it doesn’t work. Include any limitations of the algorithm, implementation, or other related hardware/software limitations.
* Choose one of the following options to display a general overview of execution flow.
  + Flowchart
  + Data flow graph
  + Circuit diagram
* A summary or thoughts on experiences while doing the lab. Suggestions for the future are welcomed.

**Lab Submission**

1. In the labs section of Blackboard, click on the title of this lab, and you will be taken to a submission form.
2. Attach lab report and submit.