
Southern Polytechnic College at Kennesaw State University
Electrical Engineering Department
EE 3501 Laboratory Exercise 6: Interrupts and Timers

Name: _____

Date: _____

Learning Objectives:

- How to program an interrupt that uses a GPIO digital input
- How to use a Timer to trigger and interrupt

Prelab

1. Search mbed for documentation related to the Timeout and InterruptIn objects and refer to the usage examples to determine how timer and interrupt resources of the ARM embedded system are used in the mbed environment.
2. Start a new project or clone an existing project. Configure the USER_BUTTON input as an external interrupt. Configure this interrupt to call an Interrupt Service Routine (ISR) on the falling edge of the button (when the button is pressed). Write an ISR that toggles LED1 (PA_5) every time the button is pressed.
3. Compile and test.
4. Demonstrate to the laboratory instructor or take a video to upload to D2L.

Laboratory procedure

1. Modify the prelab code so that it will now respond to two events: when USER_BUTTON is pressed and when USER_BUTTON is released. For each event there should be a corresponding ISR. For the “button press” ISR, turn LED1 (green) on. For the “button release” ISR, turn LED1 (green) off. The default value of LED1 should be defined as OFF at the beginning of the main program.
2. Modify the code in step 1 to turn LED1 off 1 second after the USER_BUTTON has been released. Do this by nesting a Timeout event inside the “button release” ISR and creating an

- ISR to respond to the Timeout event.**
- 3. Demonstrate to the laboratory instructor or take a video to upload to D2L.**

Discussion

Describe the terms interrupt and interrupt service routine (ISR).

Explain the difference between a Timeout and a Ticker object and explain how to configure a Ticker object to issue interrupts at 10 second intervals.

Approved by: _____

Date: _____

Results due: _____