

ECE 376 - Homework #10

Timer1 Capture & Compare - Due Monday, April 14th

Timer1 Capture

Write a C program which

- Uses the ultrasonic range sensor in your lab kit and
- Timer1 Capture interrupts

to measure distance to an object. Some suggestions are:

- Electronic Trombone / Theramin: Output 100Hz to 300Hz when you press RB0 as the distance varies from 10cm to 30cm
- Cat Off the Table: Monitor the presence of cats on the table and display distance on the LCD. If an object gets within 1 meter of the sensor, sound an alarm (play 200Hz on for 100ms, off for 400ms)
- Stepper Motor Control: Measure the distance to an object over the range of 10cm to 2 meters. Display the distance on the LCD display as well as a stepper motor with zero steps = 10cm.. 200 steps = 2 meters.
- Other

1) Requirements: Specify the input, outputs, and how they relate. Also specify which interrupts you'll be using and their functions.

2) C Code & Flow Chart

3) Validation: Collect data to verify

- The range sensor is working
- Interrupts are working
- Your C code is working

4) Demo (video or in-person)

Timer1 Compare

Write a C program which uses Timer1 Compare to output a precise frequency. Some options are:

- Output 200Hz on RC1 and 200.1Hz on RC2. Connect an LED between RC1 and RC2 along with a 200 Ohm resistor to limit current. Explain what you see (LED should vary in brightness)
- Build an 8-key piano where the frequencies are precise notes A3 - A4
- Modify the program for parts 1-4 to use Timer1 Compare to output a precise frequency
- Other

4) Requirements: Specify the input, outputs, and how they relate. Also specify which interrupts you'll be using and their functions.

5) C Code & Flow Chart

6) Validation: Collect data to verify that Timer1 Compare is working correctly

7) Demo (video or in-person)