BME328 Lab 1

Timer-Counter-7 Seg Display Project

Due week 3 (15 marks)

Objectives

- To work with standard "off-the-shelve" integrated circuits (ICs).
- To get familiar with bread-boarding and wiring digital circuits.
- To implement simple digital circuits using standard ICs.
- To learn to read schematic diagrams.

Laboratory Pre Lab Instructions

- You need to bring your own breadboard and the bag of discrete components. These items can be purchased from Eng418. Contact Mr. Jim Koch Email **jkoch@ee.ryerson.ca**
- Study and understand the 555 Timer, Up/Down counter with 7-segment display schematic diagram shown in Figure 1.

The 555 Timer produces a square wave (pulse) for the counter to count. Calculate the output frequency as function of RA, RB and Capacitance using 555 Data sheet.

The MC14029B is a 4-bit binary/decade up/down counter consisting of D-type flip-flops with a gating structure to provide toggle flip-flop capability. The counter can be used in either Binary or BCD operation. It also can be used either as a Down-counter (when you

connect pin 10 to ground) or as an Up-counter (when you connect pin 10 to 5V) as shown in Figure 1.

The MC14511B is a BCD-to-seven segment decoder that also has an output drive capability for driving LEDs. It converts a 4-bit binary coded decimal value to drive the appropriate LEDs on the 7-segment display.

Detail logic diagrams of the MC14029B (Binary/Decade Up/Down counter) and MC14511B (BCD-to-Seven segment Latch/Decoder/Driver).

Lab Instructions

- Construct the Circuit of the schematic diagram shown in Figure 1 on your breadboard.
- You may need this circuit in a future lab, so do not disconnect it when you are done.
- Using Scope measure the output frequency from 555 timer Q pin3.
- Using scope probe measure and draw waveforms on outputs QA, QB, QC, QD of 4029 Counter.
- Using scope probe find the values of ABCDEFG for 4511 when it displays 0 to 9.
- Change the value of RA and measure the frequency.
- Change the counter connection to count down.

REFERENCE: http://faculty.ucr.edu/~vladimf/ee120a/Lab_1.pdf

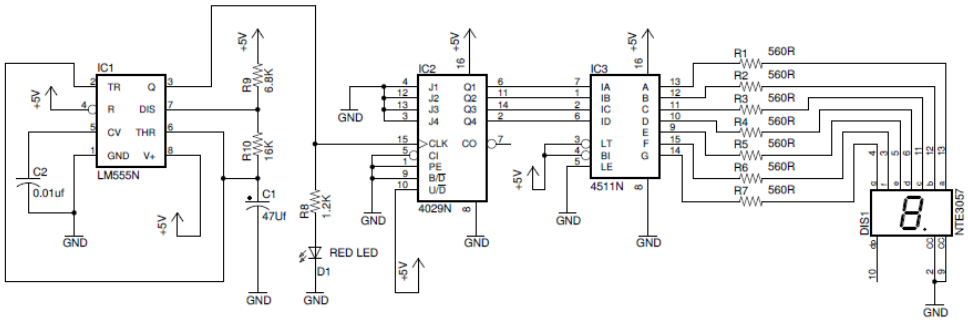

Figure 1

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