Lab 1
Hardware Bread-Boarding

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.
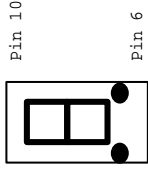
- To learn to read schematic diagrams.

Laboratory Instructions

- You need to bring your own breadboard and the bag of discrete components. These items can be purchased from the Bookstore. The hookup wires and ICs will be provided to you.

- Study and understand the 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.

- 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).
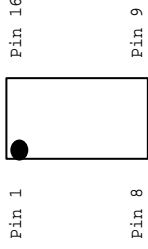
Design Problem

- Follow the schematic diagram shown in Figure 1 to wire up the Up/Down counter on your breadboard.

- You may need this circuit in a future lab, so do not disconnect it when you are done.
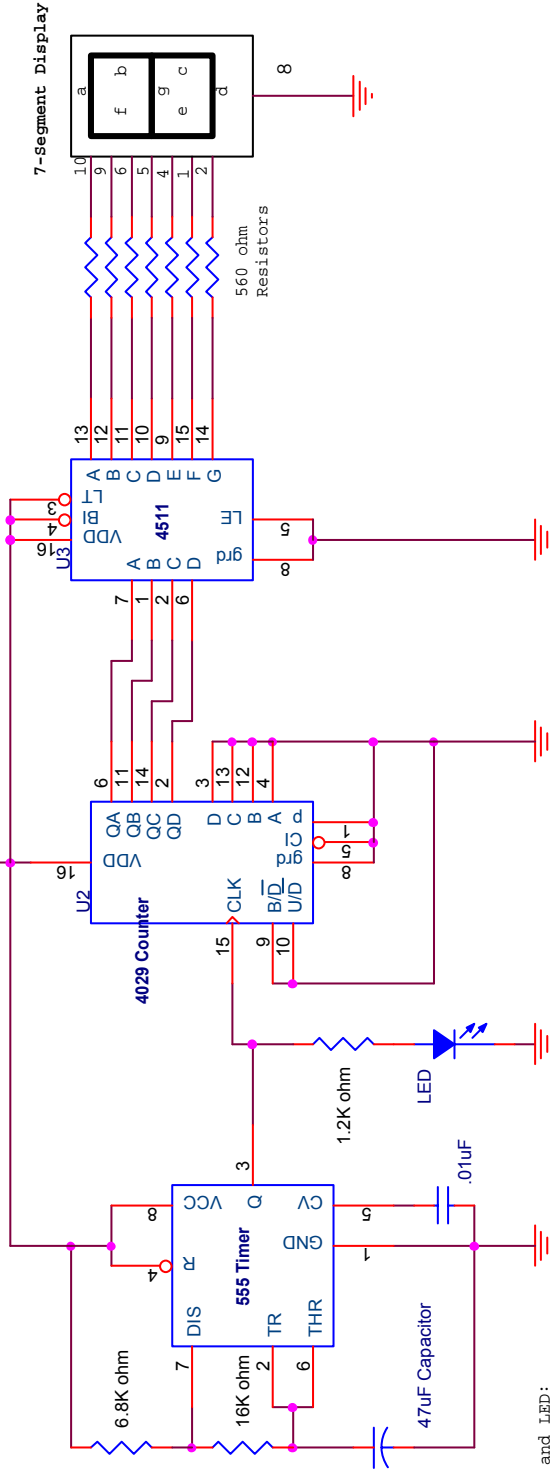
Top view of 7-segment display

Pin 1   Pin 10

Pin 5   Pin 6

Top view of IC

Pin 16   Pin 9

Pin 1   Pin 8

7-Segment Display

560 ohm
Resistors

4511

U3

4029 Counter

U2

+9vdc

555 Timer

6.8K ohm

16K ohm

47uF Capacitor

.01uF

1.2K ohm

LED

For Capacitor and LED:
Long lead is the positive side of component.