

Lab #3 – Design of Combinational Logic Circuit

This lab is an introduction to logic circuit design and requires you to analyze a problem statement, derive a truth table, design a custom circuit, and test/verify that circuit physically.

Problem Statement

Design a circuit that will light the same number of LEDs as there are active switches. You will utilize three switches as input. The LEDs should be lit as a bar-magnitude display. The output pattern should look as follows:

0 - 0 - 0 (no switches active)

1 - 0 - 0 (any 1 switch active)

1 - 1 - 0 (any 2 switches active)

1 - 1 - 1 (all 3 switches active)

First implement the design using Electronic Workbench. Verify its functionality. Once you are satisfied, implement it on a breadboard and test it.

Prior to the lab, draw a truth table and derive Boolean expressions for all output variables. Come to the lab prepared to build and/or demonstrate your design.