Experiment No. 4 & 5

DESIGN AND TESTING OF SEVEN SEGMENT DISPLAY

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**Abstract:**

The experiments to be discussed will be over the conceptualization, parts, design, and implementation of a seven segment decoder, similar to the number display of a digital clock. This experiment is to be approached cautiously, as it can cause some confusion. Before even starting the laboratory, you will need to create simplified logic expressions for each segment of the display module. With these designs in hand, prepare to draw a schematic on a circuit design program (In this report, we shall be using Altera Quartus II). After debugging is complete, we will model the circuit in Altera ModelSim to observe how the design will react given a real world implementation and inputs. We will do this by observing the waveform and comparing inputs to expected outputs. The next laboratory experiment deals with taking the aforementioned design and implementing it onto a breadboard. Results can be verified by correct operation of the circuit.

**Introduction:**

The seven segment display is a fundamental of the digital world. It is an excellent tool for relaying information, whether it is the time on a clock or output from a calculator, to name a few examples. However, it is important that the display correctly displays information. In order for the display to be useful, it has to function as expected when the correct inputs are given. This is a 2 sided problem. Firstly, the display will need to show the right output given a certain input. Thus, it must work theoretically. Secondly, given a correct design, it must be physically implementable and practical. Thusly, the design must be able to work in a circuit and then connected to other electronics in order to work together to perform some task. As such, it is a good idea to know how to wire up a design and then have it display some sort of output.

**Background and Theory:**

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