Experiment 7: Simulation of Logic Circuits

In-Lab Procedure and Report (30 points)

After meeting with your instructor in the regular lab room (Broun 266) for a preliminary lecture and quiz, you will be given further instructions for accessing the necessary software and performing the experiment in a "self-paced" mode. You will move to Broun 308 and/or you will be informed of times when your instructor or assistants will be available to help you in the lab. Your instructor will tell you when your report is due.

This experiment will be performed on a computer using LogicWorks software. The PC lab in Broun 308 is available for your use except when reserved for other classes. LogicWorks is installed on each of the 12 machines in this lab. Alternatively, you may choose to purchase LogicWorks (e.g., at the AU Bookstore) and install it on your own PC.

The LogicWorks tutorial is designed to be self-explanatory, and regardless of the availability of your instructor, you should complete this experiment on your own time in Broun 308. ***Report computer and network problems in 308 to Mr. Les Simonton in Broun 321, email *simonton.eng.auburn.edu* Please also cc to *troppel@eng.auburn.edu***

 (1) Complete the LogicWorks "5-minute Tutorial."

The LogicWorks "5-minute tutorial" is on pages 48 - 83 of the LogicWorks manual. Copies of this tutorial have been prepared and placed in Broun 308. There is only one copy per workstation in 308. Work through the tutorial to learn how to use LogicWorks.

(2) Draw and Simulate the 4-bit binary counter circuit shown in Figure 1.

Draw and simulate the test circuit shown in Figure 1, which is based on the 74163 binary counter. The 74163 is very similar to the 74169 we used in Expt. 6, except it does not have the option to count down. Also, the P and T enable inputs are not complemented on the 74163, so they must be connected HIGH for the chip to work.
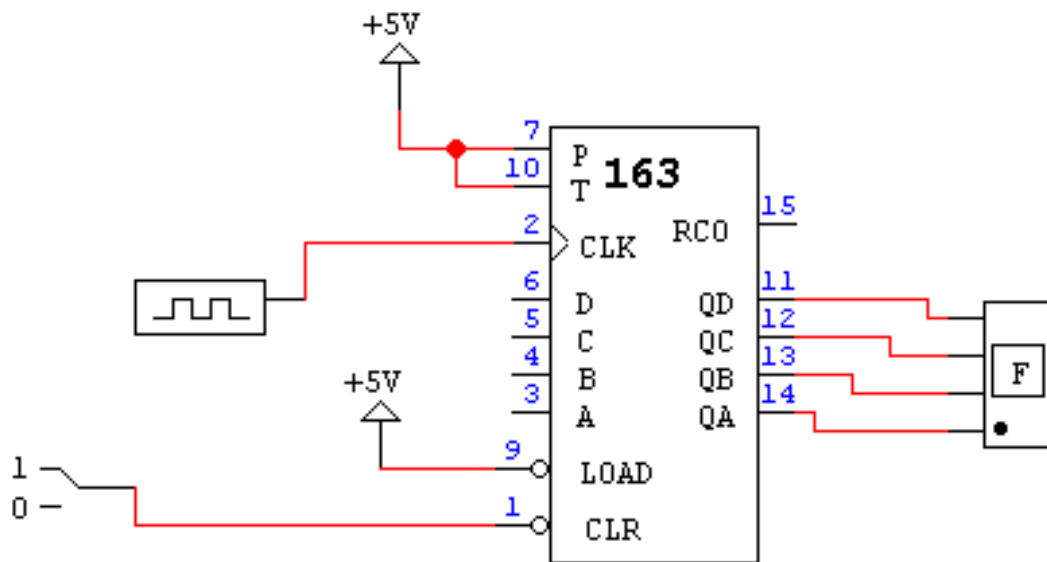
Your counter must perform as follows:

(1) When the CLR input is 0, the output should reset to 0.
(2) When the CLR input is set back to 1, the output should count up. (I recommend setting the simulation speed to somewhere around "walk" so you can actually see the count changing. Also, the timing diagram shown in Figure 2 should be generated.

(3) Email your circuit to your instructor - this is your lab report.

When your circuit is working properly, use the text tool to put your name and the date on the diagram. Then save your circuit on your H: drive and/or on a diskette.

Then email your circuit (.CCT) to your GTA as an attachment. The subject line in your email should read "2010 Expt 7 Circuit from *yourname*." This counts as your lab report submission. Your GTA's email address is on the course web page.

The exercise of submitting results electronically is part of the learning objective for this experiment. Therefore, you are required to submit electronically.

FIGURE 1. Test Circuit for Expt. 7

FIGURE 2. Test Circuit Output