Timothy Barber

Final Project Report

Electrical Engineering 2

1. Project Purpose and Overview
   1. Purpose – To display more text than is possible on a static 6x7-segment display or simply to give a message a moving element that attracts the eye.
   2. Overview
      1. This project displays the text “Scroll ” on 6x7-segmented displays and frequently updates which displays the letters are on, giving it the appearance of movement. Two switches control movement speed and direction. A button will reset the position.
2. Theory of Operation
   1. When turned on, the text “Scroll ” will cycle horizontally through the displays.
   2. Switching SW9 up will set the direction to up.
   3. Switching SW9 back down will reset the direction to left.
   4. Switching SW8 up will more than double the speed at which the displays update.
   5. Switching SW8 back down will reset to the original speed.
   6. Pressing KEY3 will reset the text to the original position until the next update.
3. Explanation of code
   1. A register variable holds 28 values, which allows for 20 million different combinations, or about ½ of a second’s worth of clock cycles. When this register reaches 20 million (or 9 million if fastmode is on) then the next update cycle occurs. The update cycle is just a very large case statement that holds all possible variations, assigning constants that hold the binary sequences for letters to the segmented displays. For vertical scrolling I put in some manual sequences because it wouldn’t make sense to have constants for one use.
4. Truth Table for all Boolean Functions
   1. See II. and III.A.
5. Descriptions of Test Cases and Results
   1. Bug: Occasionally, when SW8 is toggled, the movement ceases for ~5 seconds, after which it will continue or be preemptively restarted by pressing KEY3
   2. For user input see II.
6. Conclusions
   1. This project was fun to work on, I enjoyed adding more functionality after I had implemented simple horizontal scrolling. I believe the code could be simplified significantly, vertical scrolling could likely be achieved with separate modules instead of hard-coding, but I could not get it to work this way.