

PRELAB!

Design and draw the characters 0 to 9 (decimal digits) (or if you like the characters 0 to F to represent hexadecimal digits) using a the seven-segment display when the segment E is (a) stuck at OFF; and when (b) stuck at ON. Off means there is no illumination and ON means segment E is always illuminated.

1.0 Objectives

The main objective of this lab is to gain more experience in programming the Altera DE2 board and carry out an independent activity. We will design a circuit to control a broken 7-segment displays that will display an input value based on the position of a group of toggle switches.

2.0 Setup

Begin by creating a new folder `/home/username/CPRE281/mProj`. You will be saving your work for this lab in these directories. Information about the DE2 board, such as hardware device pin assignments, can be found in the user's manual provided with the Lab05 files. A picture of the DE2 board has also been provided with the Lab05 files.

3.0 The 7-segment Display (lab5step0)

Start a new project and name it `broken_seven_seg_decoder`. As you have done in previous labs, ensure that you assign the proper Cyclone II device `EP2C35F672C6`.

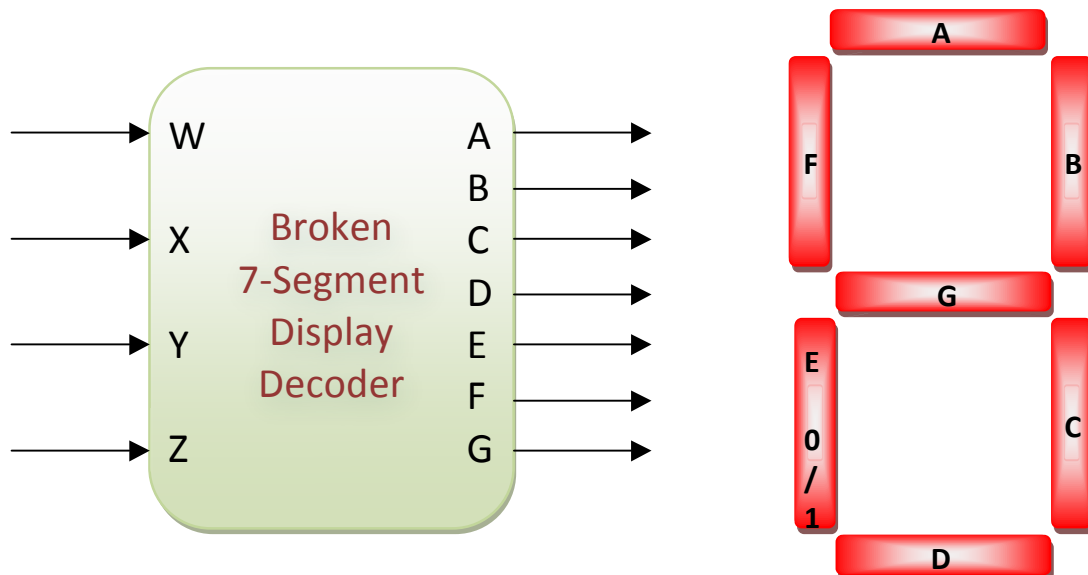


Figure 1: Broken 7-Segment Display Decoder

A 7-segment display is shown in **Figure 1**. The decoder provides the outputs A-G needed to light the proper segments of the 7-segment display based on a 4-bit input except that segment E is now stuck at 0 (SA0). That means it is always off. Note that the LED's of the 7-segment display are lit when there is a logic 0 instead of a logic 1 connected to them.

Create two decoders. Your inputs {Z, Y, X, W} represent a hexadecimal value (W is the LSB). Your outputs are {A, B, C, D, E, F, G}. Review previous lab instructions if needed for Verilog code. You will need to name your module **broken0_seven_seg_decoder** and **broken1_seven_seg_decoder**. The choice of method to implement is left to you.

Compile your code and fix any errors. Then assign toggle switches SW3, SW2, SW1, and SW0 as your input devices. Assign HEX4 as your output device. Program the DE2 board with your design and demonstrate it to your TA for all values from 0 to F on the 7-segment display.

Verify your circuit on the DE2 board and show your results to the TA.

5.0 Complete

You are done with this lab. Ensure that all lab files are closed, exit Quartus II, log off the computer, and hand in your answer sheet. **Don't forget to write down your name, student ID, and your lab section number.**