Group 54

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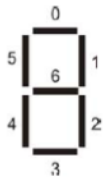
g54_7_segment_decoder - Lab 2

Description

Inputs: 4 bit code[3..0], 1 bit mode
Output: 7 bit segment_out[6..0]

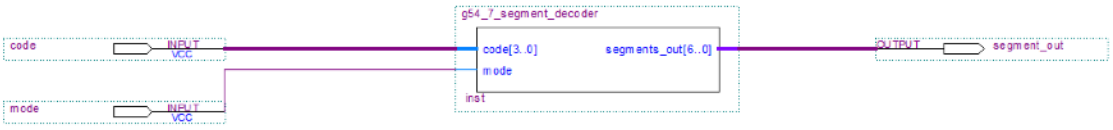
This circuit takes in a 4 bit code that indicates which card value to show up in the 7 segment decoder depending on the mode of the input. Mode set on low (0) maps the code values from 0-15 to the corresponding hexadecimal values. Mode set on high (1) will map 0-12 to the incrementing card face values in a regular deck (A,2,3,4,5,6,7,8,9,10,J,Q,K).

The segment code is to indicate which LEDs turn on to display to appropriate value.
Each bit corresponds to an LED and for each code and mode input we created a switch case where they would link to the appropriate lighting formation. This is driven by an active low signal, meaning the segment is low when the LED segment is on.



numbering of the LED segments (from Altera DE1 board manual)

7 segment decoder: g54_7_segment_decoder



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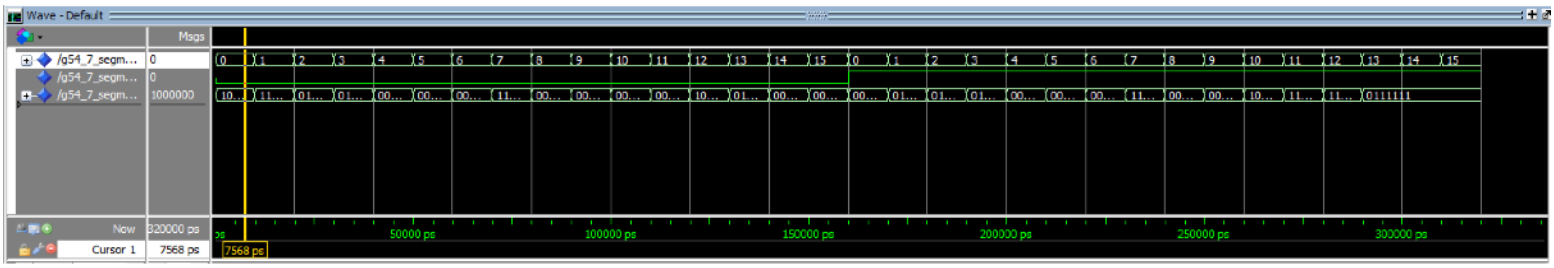
Testing



To test we created a Test Bench file to simulate results. The waveform of the 7 segment decoder shows that for every different code, the value of the 7 segment code changes. We also know that this circuit does what it is meant to do as when mode is switched to 1, we should be getting the same value for the last three code values as there aren't 15 different types of cards, therefore the 7 segment code doesn't change at the end.
Further inspection showed that all the values of the code translated to the correct segment values.