g55_7_segment_decoder - Display Input as Hexadecimal or Card Value

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1 Circuit Description

The *g55_7_segment_decoder* circuit takes a 4-bit input called code that stores an unsigned integer, and a 1-bit input called mode that sets if the output should be in hexadecimal (low) or if the number should be displayed as the equivalent card value in a standard deck (high). The output is a 7-bit active-low bus meant to be connected to a 7 segment display. Bit 0 goes to segment 0, bit 1 goes to segment 1, and so forth. Since the values in a deck of cards only goes up to 12 (a king), numbers greater in this will be displayed as a '-' in card mode. Since the number 10 exists in the card display, only the 0 is displayed.

The pinout for the circuit is as follows:

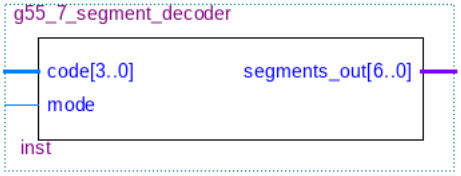

Figure 1: *g55_7_segment_decoder* Pinout

2 Circuit Testing

The *g55_7_segment_decoder* was tested for all possible inputs by combining the code and mode inputs into a signle 5-bit word that was set from 00000_2 to 11111_2. The output was recorded and verified by plotting it in ModelSim. The waveform out is as follows:

Figure 2: *g55_7_segment_decoder* Test Wave