NORTH SOUTH UNIVERSITY
Department of ECE
CSE 231: Digital Logic Design

Lab 6: BCD to seven segment decoder.

Objectives

- Familiarize with the analysis of Seven Segment Decoder circuits.
- Learn the implementation of Seven Segment Decoder using Display.
- Verify the Seven Segment Decoder with the logic.

Apparatus

- Trainer Board
- 1 x IC 7447 Decoder
- 1 x Seven segment Display
- 7 x Resistors

Theory

An ABCD to seven segment decoder is a combinational circuit that converts a decimal digit in BCD to an appropriate code for the selection of segments in an indicator used to display decimal digit in a familiar form. The seven outputs of the decoder (a, b, c, d, e, f, g) select the corresponding segments in the display, as shown in figure (a). The numeric display chosen to represent the decimal digit is shown in figure (b).

Each element (a, b, c, d, e, f, g) of the seven segment display is turned on when a logic low is applied to its corresponding input pin.

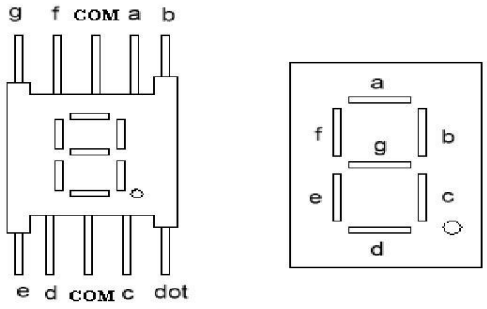


figure (a) Seven-Segment Display

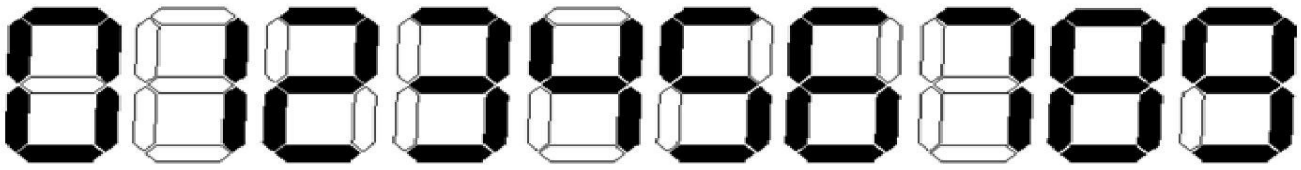
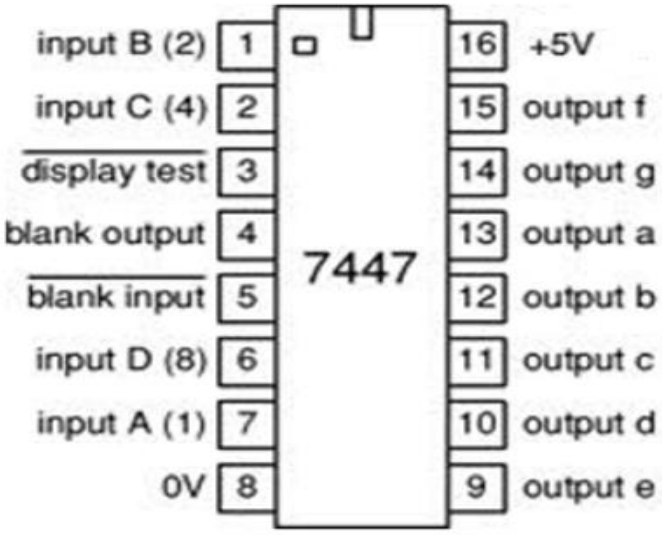
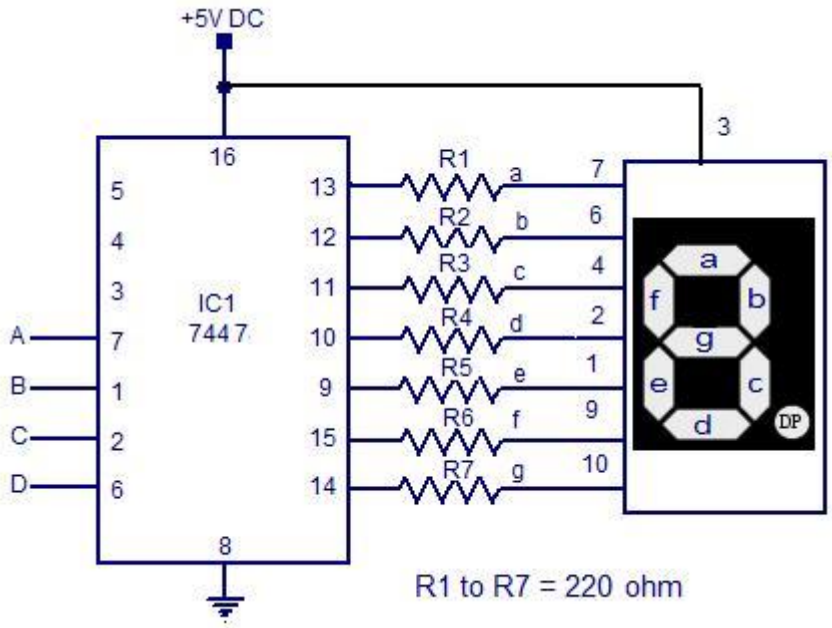


FIGURE (b) Display of decimal digits with a 7-segment device.

Pin Configuration of 7447:



Circuit Diagram:



Truth Table:

Decimal	Inputs				Outputs						
	D	C	B	A	a	b	c	d	e	f	g
0	0	0	0	0							
1	0	0	0	1							
2	0	0	1	0							
3	0	0	1	1							
4	0	1	0	0							
5	0	1	0	1							
6	0	1	1	0							
7	0	1	1	1							
8	1	0	0	0							
9	1	0	0	1							

Assignment

- Draw and simulate the logic diagram for the outputs of truth table and show the k-map simplification.

Simulation

- Simulate the Seven Segment Decoder circuit using Logisim.

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