CSE260

LAB Experiment-07

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Name of the experiment: Design a circuit that outputs 2's complement of a 3 bit number using encoder & decoder

Objective:

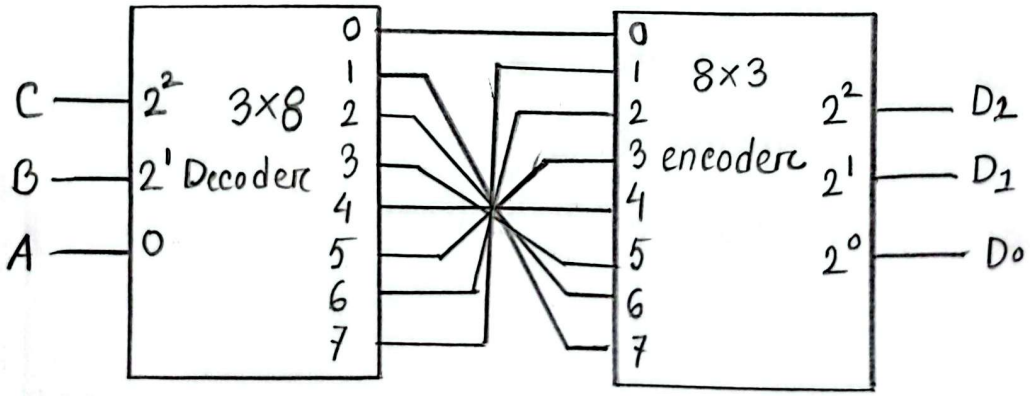
→ understand the hardware system to calculate 2's complement ~~of~~ of a 3 bit number.

→ Obtain ideas about encoders and decoders.

Required Components and Equipments:

→ IC 74ls 138 [decoder]
→ IC 74LS 148 [encoder]
→ Jumper wires
→ Breadboard.

Experimental setup:



Truth Table for 2's complement output :

Inputs				Outputs				Active low output			Output line connection	
Minterm	C	B	A	Minterm	D_2	D_1	D_0	D_2	D_1	D_0	Decoder	Encoder
0	0	0	0	0	0	0	0	1	1	1	0	0
1	0	0	1	1	0	0	1	1	1	0	1	7
2	0	1	0	2	0	1	0	1	0	1	2	6
3	0	1	1	3	0	1	1	1	0	0	3	5
4	1	0	0	4	1	0	0	0	1	1	4	4
5	1	0	1	5	1	0	1	0	1	0	5	3
6	1	1	0	6	1	1	0	0	0	1	6	2
7	1	1	1	7	1	1	1	0	0	0	7	1

Results and Discussions:

(a)

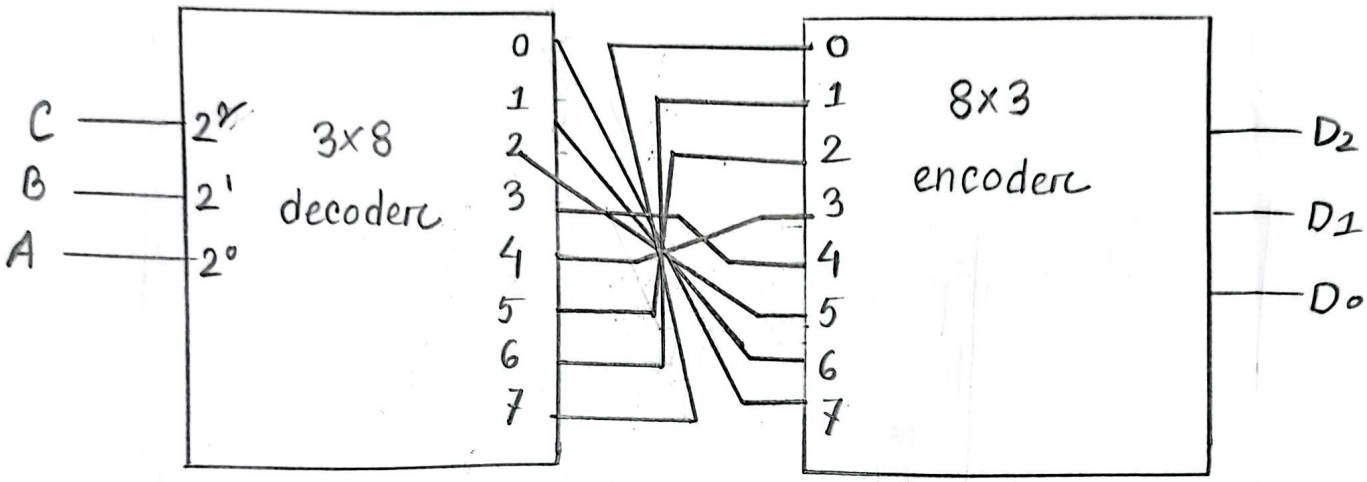


Figure: circuit diagram with encoder and decoder that will output the 1's complement of 3 bit number.

(b) Yes, we can implement a code converter with encoder and decoder.

For example, '3' is given in the input of 3×8 decoder (011) and the 3rd line in the output actives. The 3rd line in the output of the 3×8 decoder needs to be connected with the 6th line of the input of the 8×3 encoder.

Thus, BCD is connected to excess 3 using 3×8 decoder and 8×3 encoder.