

Digital Logic Design (EL-1005) LABORATORY MANUAL Spring-2024



LAB 08 Binary Encoder

STUDENT NAME

ROLL NO

SEC

INSTRUCTOR SIGNATURE& DATE

MARKS AWARDED: /10

NATIONAL UNIVERSITY OF COMPUTER AND EMERGING SCIENCES (NUCES), KARACHI

Lab Session 08: Binary Encoder

OBJECTIVES:

- Define basics of encoding mechanism

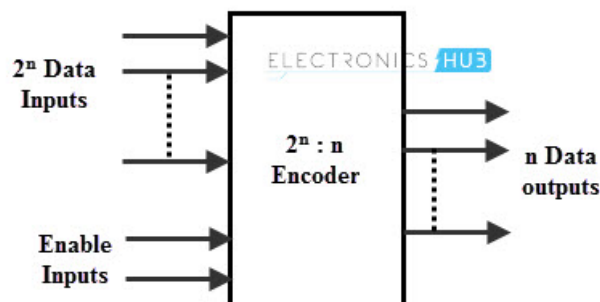
APPARATUS: Logic trainer, Logic probe

COMPONENTS: ICs 74LS148 , 74LS147

THEORY:

- An encoder is a device which converts familiar numbers or characters or symbols into a coded format. It accepts the alphabetic characters and decimal numbers as inputs and produces the outputs as a coded representation of the inputs.
- It encodes the given information into a more compact form. In other words, it is a combinational circuit that performs the opposite function of a decoder.
- These are mainly used to reduce the number of bits needed to represent given information. In digital systems, encoders are used for transmitting the information. Thus, the transmission link uses fewer lines to transmit the encoded information.
- In addition, these encoders are used for encoding the data which is to be stored for later use as it facilitates fewer bits storing over the available space. Let us discuss various types of binary encoders.

A binary encoder has 2^n input lines and n output lines, hence it encodes the information from 2^n inputs into an n -bit code. Depending on the number of input lines, digital or binary encoders produce the output codes in the form of 2 or 3- or 4-bit codes.

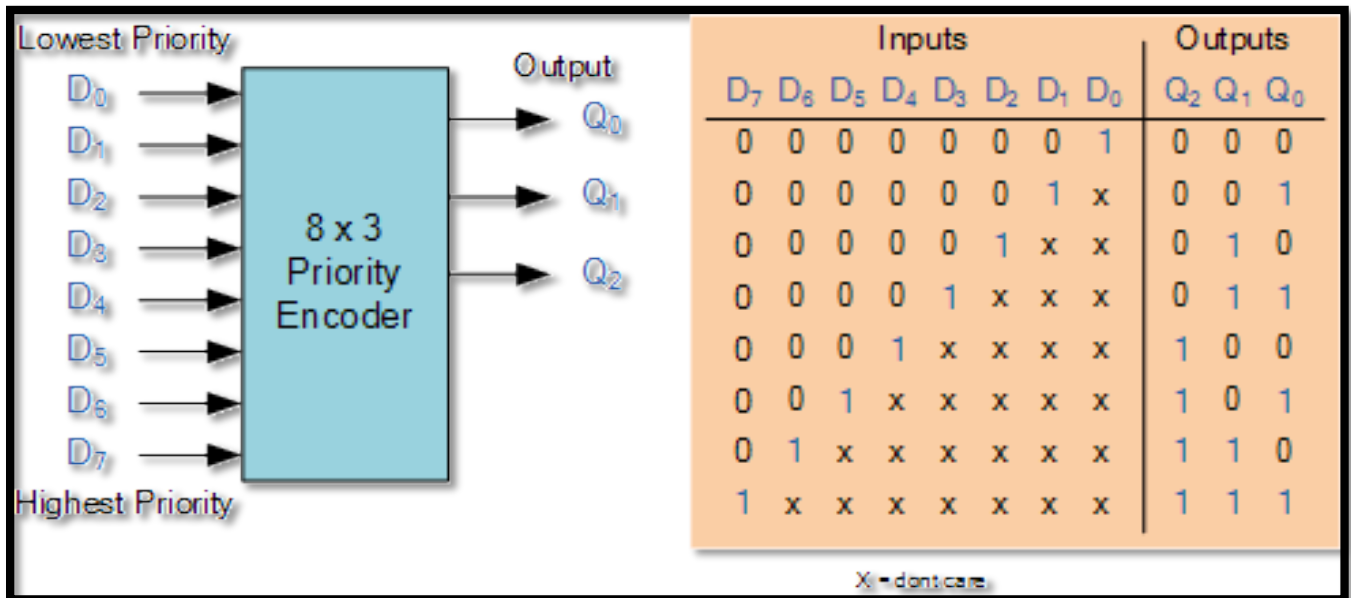


Priority Encoder

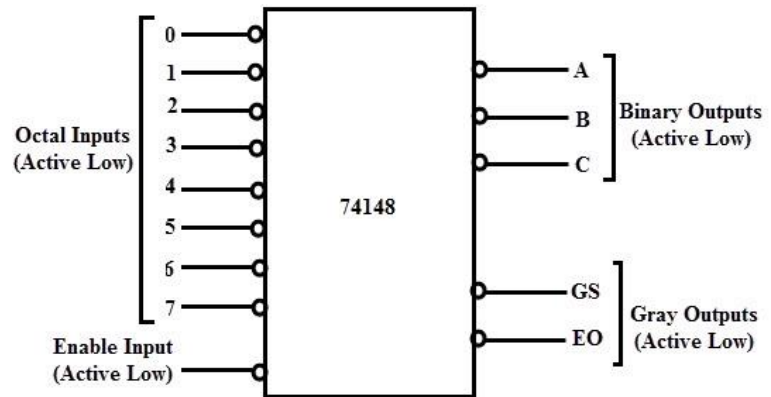
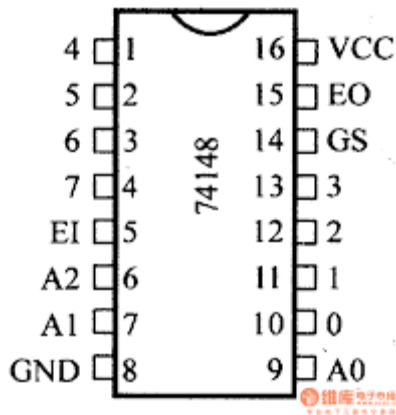
A priority encoder is a circuit or algorithm that compresses multiple binary inputs into a smaller number of outputs. The output of a priority encoder is the binary representation of the original number starting from zero of the most significant input bits. If two or more inputs are given at the same time, the input having the highest priority will take precedence.

Octal to Binary (8x3) Encoder (74148)

An octal to binary encoder consists of eight input lines and three output lines. Each input line corresponds to each octal digit and three outputs generate corresponding binary code.

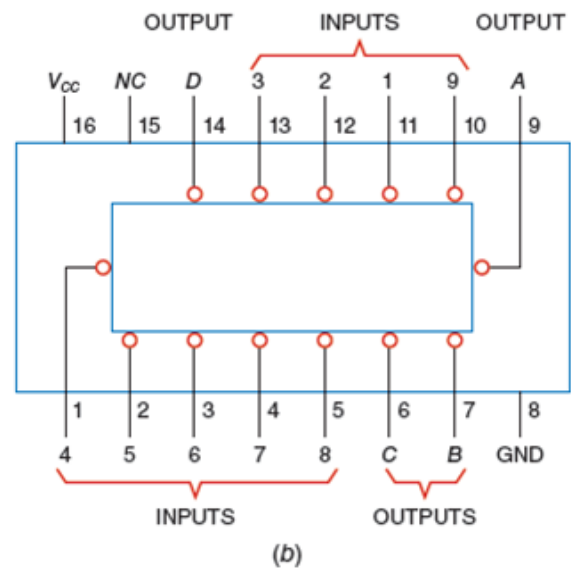
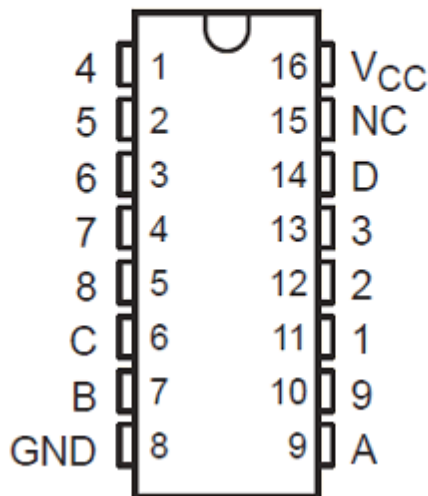


Pin Configuration



Decimal to BCD Priority Encoder (74147)

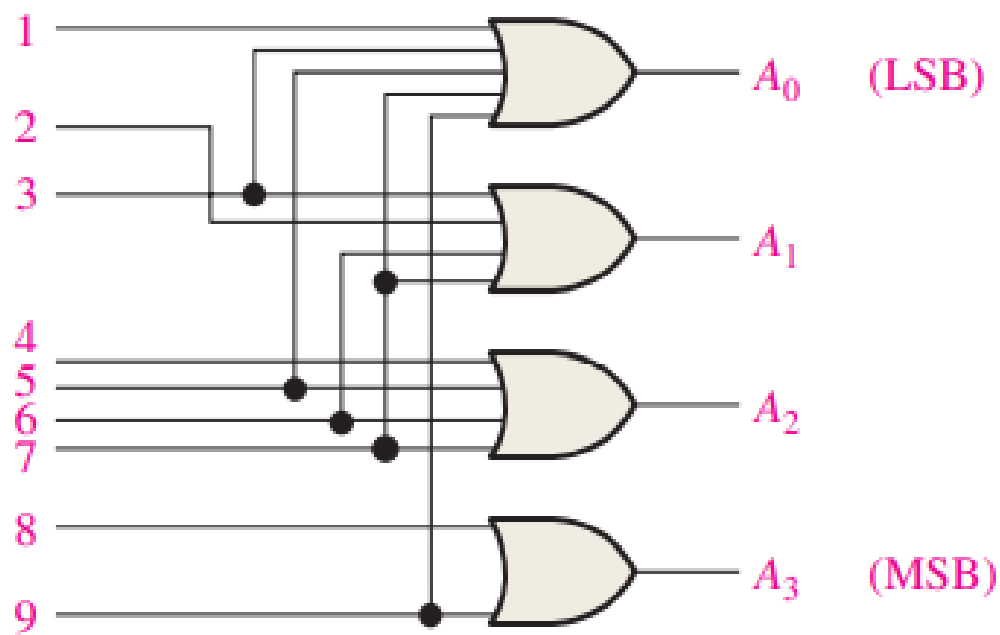
74147



$$A_3 = 8 + 9 \quad A_1 = 2 + 3 + 6 + 7$$

$$A_2 = 4 + 5 + 6 + 7 \quad A_0 = 1 + 3 + 5 + 7 + 9$$

Decimal Digit	BCD Code			
	A_3	A_2	A_1	A_0
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





Lab Session 08 Report Section BSE-2A

Student_ ID _____ Date 11th March 2024

TASK # 01

Design and Implement Octal to Binary Priority Encoder on Bread Board using 74148 IC.

TASK # 02

Design and Implement Decimal to BCD Priority Encoder on Bread Board using 74147 IC.

TASK # 03

Design 2*2 Bit Binary Multiplier Circuit on Bread Board.

TASK # 04

Design a combinational circuit on Bread Board that compares two 1-bit numbers and generates the comparison result. The result consists of three outputs let us say L, E, G, so that

$$L = 1 \text{ if } A < B$$

$$E = 1 \text{ if } A = B$$

$$G = 1 \text{ if } A > B$$



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