

Laboratory work: Construct encoder and decoder circuit

Components Required:

- ☐ IC 7432
- ☐ IC 7408
- ☐ IC 7404
- ☐ Breadboard
- ☐ Light Emitting Diode (LED)
- ☐ Resistor (1 K Ω)

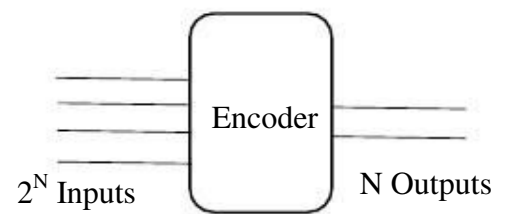
THEORY:

Encoder:

- ☐ It is a combinational logic function that has 2^N input lines and N output lines.
- ☐ The N output lines generate the binary code for the possible 2^N input lines.
- ☐ When a bit comes in an input wire, the encoder outputs the physical address of that wire. It performs the inverse operation of a decoder.

Truth Table:

I0	I1	I2	I3	O1	O2
1	0	0	0	0	0
0	1	0	0	0	1
0	0	1	0	1	0
0	0	0	1	1	1



Octal Encoder:

- ☐ Eight inputs and three outputs

Truth Table:

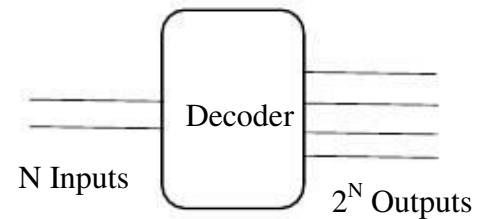
A	B	C	D	E	F	G	H	X	Y	Z
1	0	0	0	0	0	0	0	0	0	0
0	1	0	0	0	0	0	0	0	0	1
0	0	1	0	0	0	0	0	0	1	0
0	0	0	1	0	0	0	0	0	1	1
0	0	0	0	1	0	0	0	1	0	0
0	0	0	0	0	1	0	0	1	0	1
0	0	0	0	0	0	1	0	1	1	0
0	0	0	0	0	0	0	1	1	1	1

Decoder:

- ☐ It is a combinational logic function that has N input lines and 2^N output lines.
- ☐ N input lines generate 2^N min terms
- ☐ It performs the inverse operation of an encoder.

Truth Table:

I0	I1	O1	O2	O3	O4
0	0	1	0	0	0
0	1	0	1	0	0
1	0	0	0	1	0
1	1	0	1	0	1



Octal Decoder:

- ☐ Three inputs and eight outputs

Truth Table:

X	Y	Z	A	B	C	D	E	F	G	H
0	0	0	1	0	0	0	0	0	0	0
0	0	1	0	1	0	0	0	0	0	0
0	1	0	0	0	1	0	0	0	0	0
0	1	1	0	0	0	1	0	0	0	0
1	0	0	0	0	0	0	1	0	0	0
1	0	1	0	0	0	0	0	1	0	0
1	1	0	0	0	0	0	0	0	1	0
1	1	1	0	0	0	0	0	0	0	1

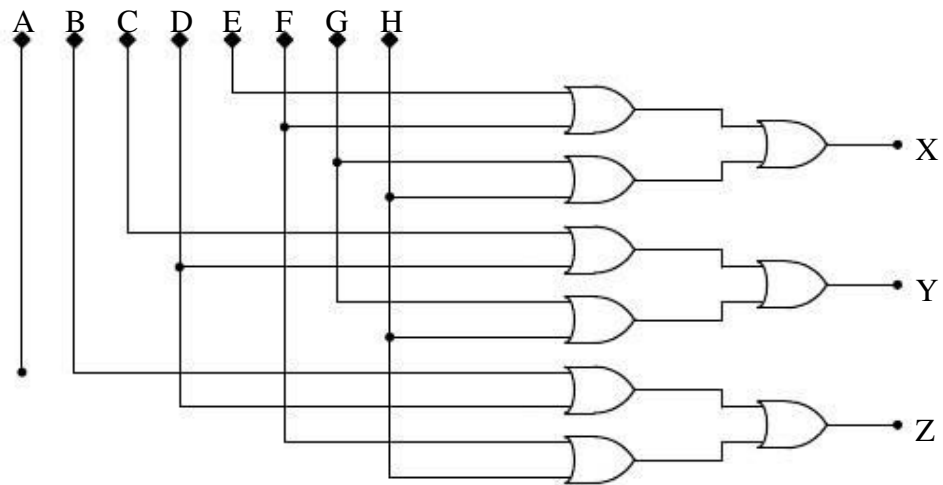


Fig: Logic Diagram of 3 output Encoder

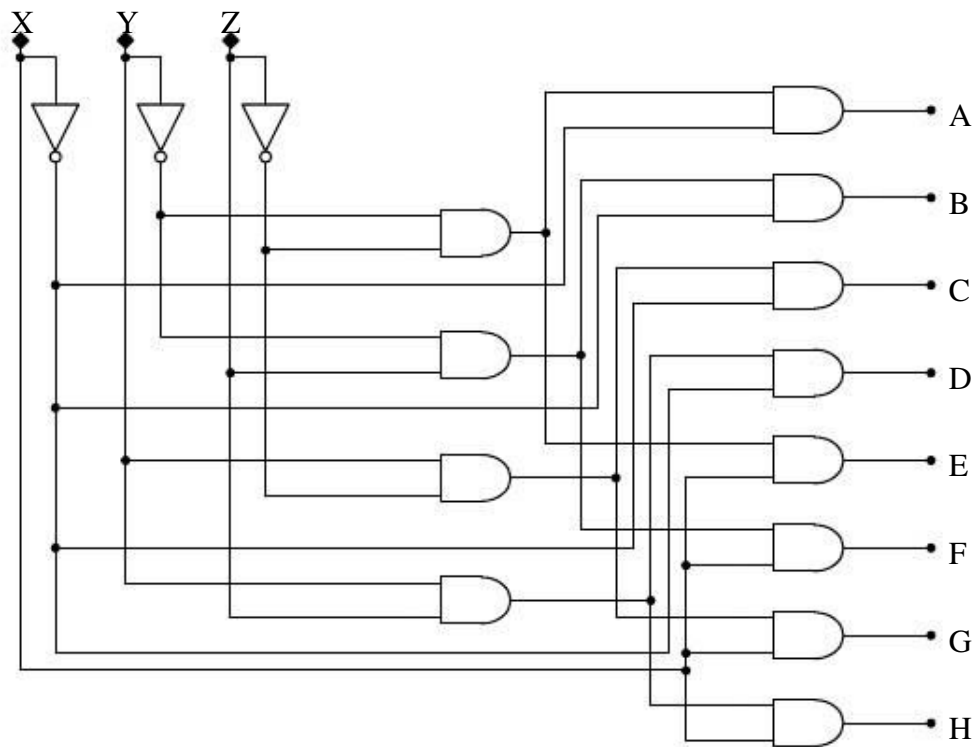


Fig: Logic Diagram of 3 input Decoder

