Experiment – 6

Aim of the experiment –

To study the operation of 8×1 multiplier and 1:16 de mux.

Objective –

To verify the truth table of multiplexer and de mux.

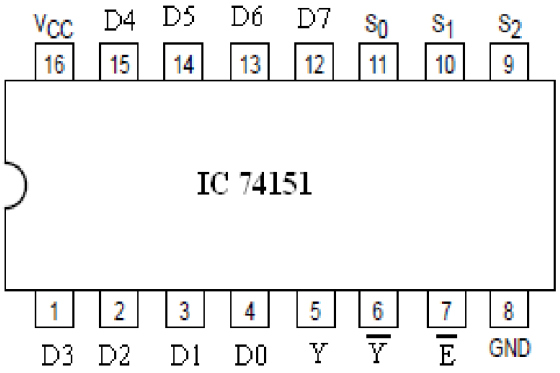
Apparatus required-

Serial No	Items Required	Specifications
1.	Project Board	
2.	IC 74151	8:1 MUX
3.	IC 74154	1:16 complementary DE MUX
4.	Connecting Wires	

Theory -

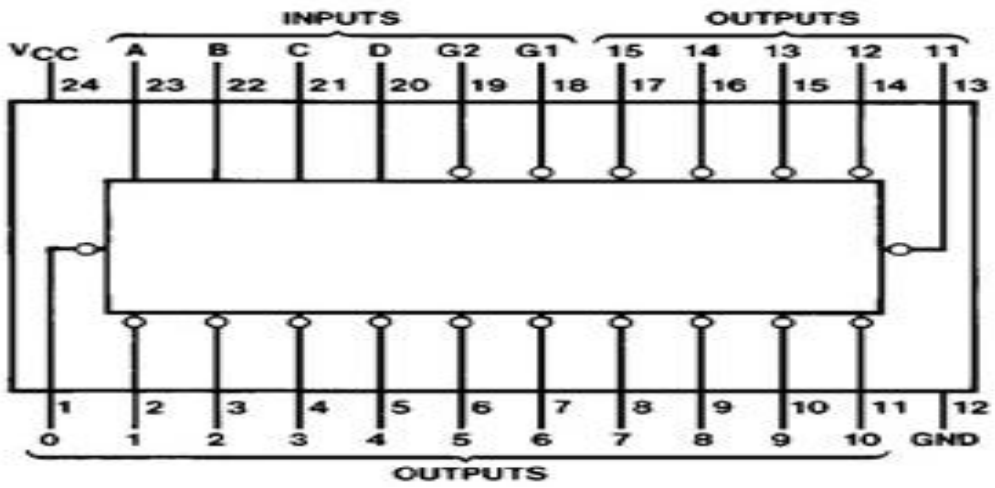
Multiplexer - A multiplexer (mux) is a device that select one of several analog or digital i/p signals and forward the selected I/p into a single output it is having two types of input in the ratio of 2^m = n, where 'n' is no. of data input and 'm' is no. of select input.

8:1 multiplexer :



S2	S1	S0	I	Q
0	0	0	$I_0=0$ $I_0=1$	0,1
0	0	1	$I_1=0$ $I_1=1$	0,1
0	1	0	$I_2=0$ $I_2=1$	0,1
0	1	1	$I_3=0$ $I_3=1$	0,1
1	0	0	$I_4=0$ $I_4=1$	0,1
1	0	1	$I_5=0$ $I_5=1$	0,1
1	1	0	$I_6=0$ I6=1	0,1
1	1	1	$I_7=0$ $I_7=1$	0,1

DE – MUX – It is combination logic having only one input and many no. of output lines along with the select lines.The select lines are used to select one output data at a time the relationship between output lines and the select lines are m = 2s where ‘s’ is the no. of select lines and ‘m’ is the no. of output lines.



$\overline{EN_2}$	$\overline{EN_1}$	S_3	S_2	S_1	S_0	$\overline{Q_{15}}$	$\overline{Q_{14}}$	$\overline{Q_{13}}$	$\overline{Q_{12}}$	$\overline{Q_{11}}$	$\overline{Q_{10}}$	$\overline{Q_9}$	$\overline{Q_8}$	$\overline{Q_7}$	$\overline{Q_6}$	$\overline{Q_5}$	$\overline{Q_4}$	$\overline{Q_3}$	$\overline{Q_2}$	$\overline{Q_1}$	$\overline{Q_0}$
X	1	X	X	X	X	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	X	X	X	X	X	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1
0	0	0	0	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1
0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1
0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1
0	0	0	1	0	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1
0	0	0	1	1	0	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1
0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1
0	0	1	0	0	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1
0	0	1	0	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1
0	0	1	0	1	0	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1
0	0	1	0	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1
0	0	1	1	0	0	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1
0	0	1	1	0	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1
0	0	1	1	1	0	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
0	0	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Tabulation –

Make the table in high and low format.

Table for 1:16 DEMUX-

Table for 8:1 MUX –

Inputs						Outputs															
G1	G2	D	C	B	A	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
L	L	L	L	L	L	L	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
L	L	L	L	L	H	H	L	H	H	H	H	H	H	H	H	H	H	H	H	H	H
L	L	L	L	H	L	H	H	L	H	H	H	H	H	H	H	H	H	H	H	H	H
L	L	L	L	H	H	H	H	H	L	H	H	H	H	H	H	H	H	H	H	H	H
L	L	L	H	L	L	H	H	H	H	L	H	H	H	H	H	H	H	H	H	H	H
L	L	L	H	L	H	H	H	H	H	H	L	H	H	H	H	H	H	H	H	H	H
L	L	L	H	H	L	H	H	H	H	H	H	L	H	H	H	H	H	H	H	H	H
L	L	L	H	H	H	H	H	H	H	H	H	H	L	H	H	H	H	H	H	H	H
L	L	H	L	L	L	H	H	H	H	H	H	H	H	L	H	H	H	H	H	H	H
L	L	H	L	L	H	H	H	H	H	H	H	H	H	H	L	H	H	H	H	H	H
L	L	H	L	H	L	H	H	H	H	H	H	H	H	H	H	L	H	H	H	H	H
L	L	H	L	H	H	H	H	H	H	H	H	H	H	H	H	H	L	H	H	H	H
L	L	H	H	L	L	H	H	H	H	H	H	H	H	H	H	H	H	L	H	H	H
L	L	H	H	L	H	H	H	H	H	H	H	H	H	H	H	H	H	H	L	H	H
L	L	H	H	H	L	H	H	H	H	H	H	H	H	H	H	H	H	H	H	L	H
L	L	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	L
L	H	X	X	X	X	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
H	L	X	X	X	X	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
H	H	X	X	X	X	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H

H = High Level, L = Low Level, X = Don't Care

Conclusion –