

## EXPERIMENT: 6 MULTIPLEXER

**AIM:** To Study multiplexer IC and realization of realization of given logical function using multiplexer IC IC 74151

### LEARNING OBJECTIVE:

- To learn about various applications of multiplexer
- To learn and understand the working of IC 74151
- To learn to realize any function using Multiplexer

**COMPONENTS REQUIRED:** IC 7400, IC 74151, Patch Cords.

### THEORY

Multiplexers are very useful components in digital systems. They transfer a large number of information units over a smaller number of channels, (usually one channel) under the control of selection signals. Multiplexer means many to one. A multiplexer is a circuit with many inputs but only one output. By using control signals (select lines) we can select any input to the output. Multiplexer is also called as data selector because the output bit depends on the input data bit that is selected. The general multiplexer circuit has  $2^n$  input signals,  $n$  control/select signals and 1 output signal.

### 8:1 MUX

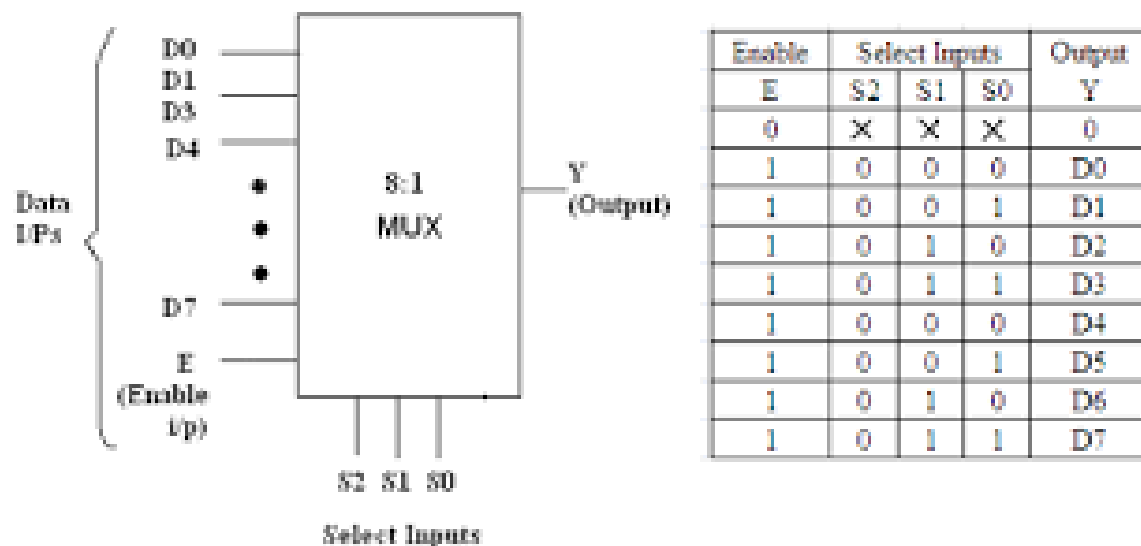
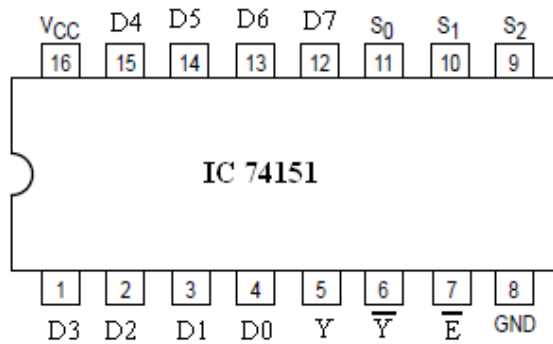


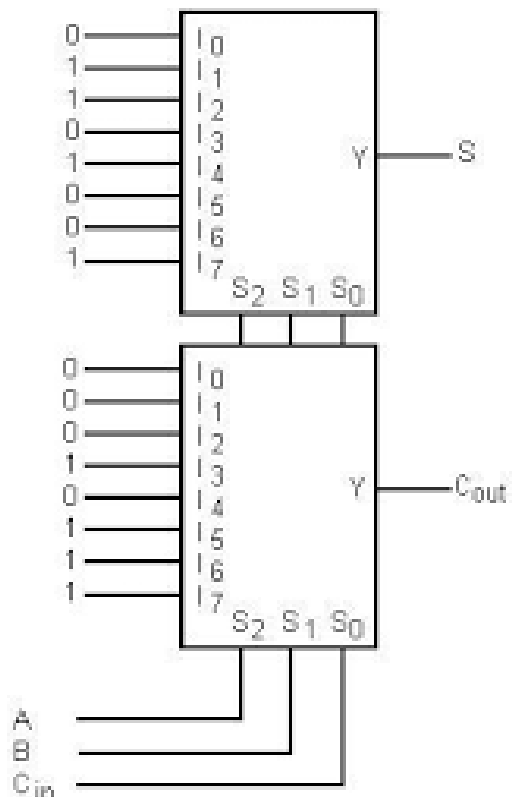
FIGURE: 8:1 MUX

**PIN DIAGRAM IC 74151 (8:1 MUX):****DESIGN OF A FULL ADDER USING 8:1 MUX:****TRUTH TABLE OF FULL ADDER**

Input			Output	
A	B	C <sub>in</sub>	Sum	Carry
0	0	0	0	0
0	0	1	1	0
0	1	0	1	0
0	1	1	0	1
1	0	0	1	0
1	0	1	0	1
1	1	0	0	1
1	1	1	1	1

$$S = m(1,2,4,7) \text{ and}$$

$$C = m(3,5,6,7)$$



LOGIC DIAGRAM OF FULL-ADDER USING 8X1 MUX

**DESIGN** given function using 8:1 Mux and draw logic diagram

**PROCEDURE:**

1. Check all the components for their working.
2. Insert the appropriate IC into the IC base.
3. Make connections as shown in the circuit diagram.
4. Verify the Truth Table and observe the outputs.

**RESULT:** Design and Implementation of given function using 8:1 MUX is successfully done.

**POST LAB QUESTIONS:**

1. Implement the following function using 8:1 MUX and few gates.  
$$F(A,B,C,D) = m(0,3,5,7,9,13,15)$$
2. Design 16:1 MUX using 4:1 MUX.
3. Implement the following expression using one 4:1 MUX and few gates.  
$$F(A,B,C,D) = m(0,1,2,3,6,7,9,10,13,15)$$