

Experiment No - 07

Name of the Experiment: To design and set up the following circuit

1. Designing of 2 to 1 , 4 to 1 line multiplexer
2. Designing a quadruple 2 to 1 line MUX
3. Designing 1 to 4 line de-multiplexer

Objective:

To learn about various applications of multiplexer and de-multiplexer. To learn and understand the working of IC 74153 and IC 74139. To learn to realize any function using Multiplexer

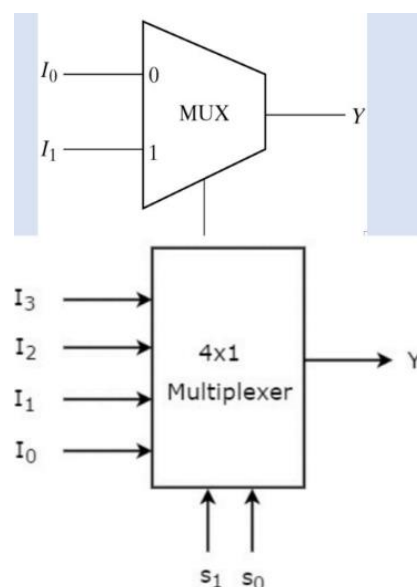
Components Requirements:

- AND gate (7408), OR gate (7432), NOT gate (7404), IC trainer kit, Wires.

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 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. De-multiplexers perform the opposite function of multiplexers. They transfer a small number information units (usually one unit) over a larger number of channels under the control of selection signals. The general de-multiplexer circuit has 1 input signal, n control/select signals and 2^n output signals. De-multiplexer circuit can also be realized using a decoder circuit with enable.

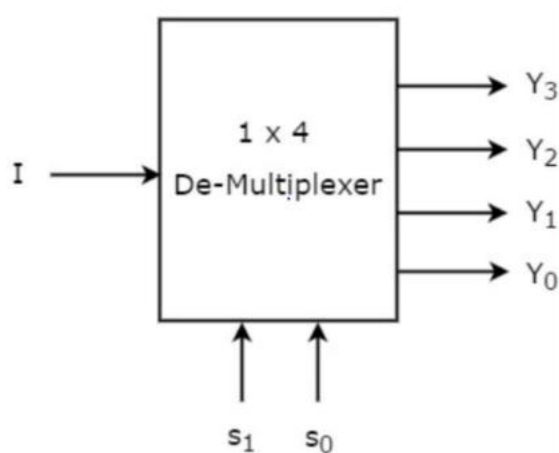
Block Diagram & Truth table:



S	Y
0	I ₀
1	I ₁

S ₁	S ₀	Y
0	0	I ₀
0	1	I ₁
1	0	I ₂
1	1	I ₃

Figure: Block diagram and truth table of 2 to 1 MUX and Block diagram and truth table of 4 to 1 MUX



Selection Inputs		Outputs			
S ₁	S ₀	Y ₃	Y ₂	Y ₁	Y ₀
0	0	0	0	0	I
0	1	0	0	I	0
1	0	0	I	0	0
1	1	I	0	0	0

Figure: Block diagram and truth table of 1 to 4 Demultiplexer

Logic Diagram:

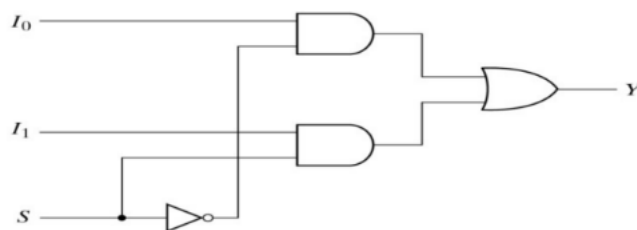


Figure: Logic diagram of 2 to 1 MUX

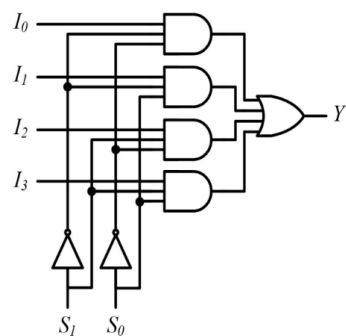


Figure: Logic diagram of 4 to 1 MUX

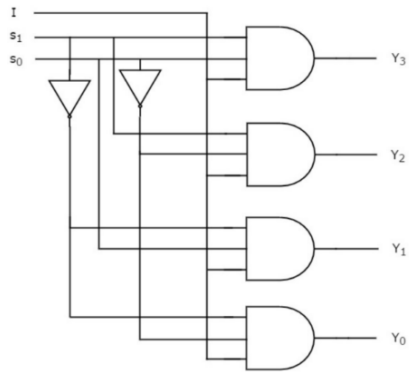
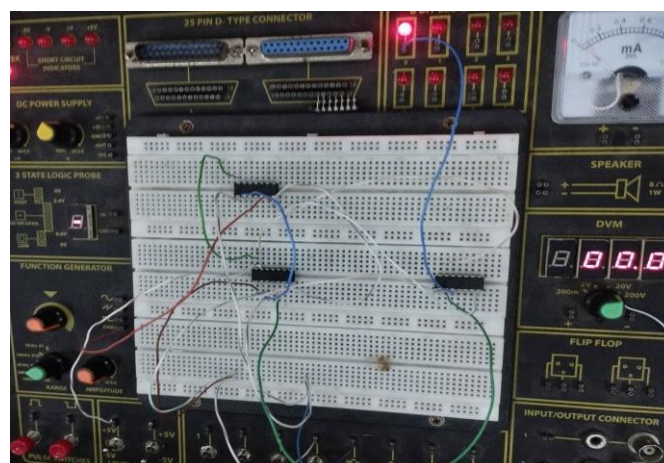
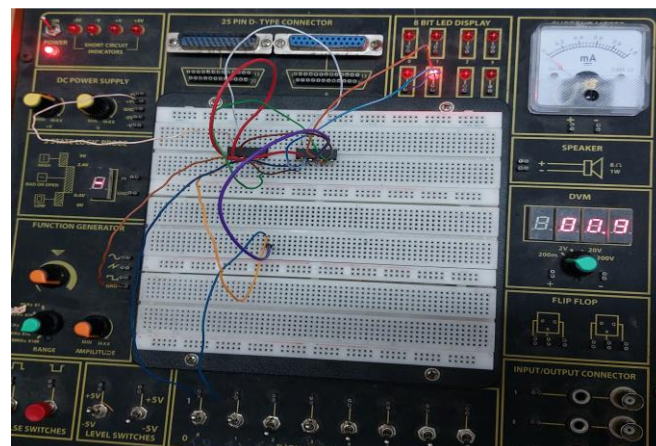


Figure: Logic diagram of 1 to 4 Demux

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.

Diagram:



Discussion:

1. Supply should not exceed 5v.
2. Connections should be tight and easy to inspect.
3. Use L.E.D. with proper sign convention and check it before connecting in circuit.