

EXPERIMENT- 8

Objective: To study the 8:1 multiplexer & 1:8 demultiplexer.

Resources Required: 8:1 multiplexer & 1:8 demultiplexer trainer kit

Theory:

Multiplexer

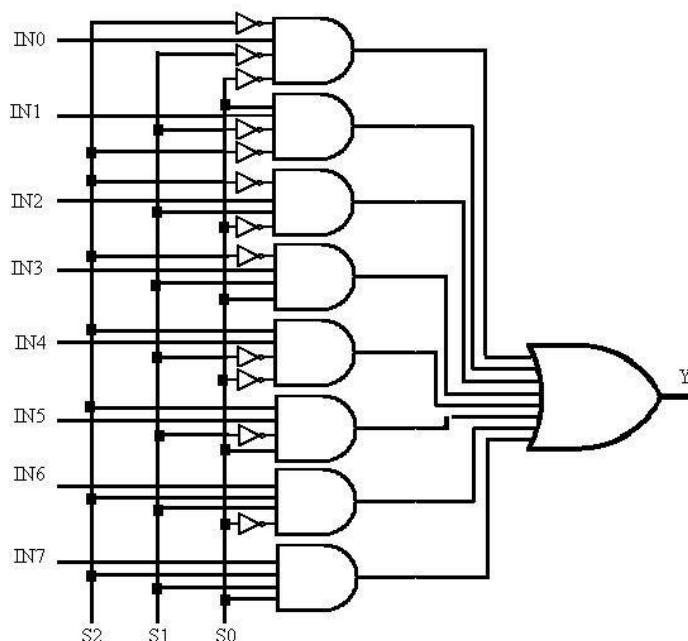
In electronics, a multiplexer or mux is a device that selects one of several analog or digital input signals and forwards the selected input into a single line. A multiplexer of 2^n inputs has n select lines, which are used to select which input line to send to the output. An electronic multiplexer can be considered as a multiple-input, single-output switch i.e. digitally controlled multi-position switch. The digital code applied at the select inputs determines which data inputs will be switched to output.

A common example of multiplexing or sharing occurs when several peripheral devices share a single transmission line or bus to communicate with computer. Each device in succession is allocated a brief time to send and receive data. At any given time, one and only one device is using the line. This is an example of time multiplexing since each device is given a specific time interval to use the line. In frequency multiplexing, several devices share a common line by transmitting at different frequencies.

Truth Table of 8:1 MUX

S2	S1	S0	Y
0	0	0	D0
0	0	1	D1
0	1	0	D2
0	1	1	D3
1	0	0	D4
1	0	1	D5
1	1	0	D6
1	1	1	D7

Logic Diagram of 8:1 MUX



Demultiplexer

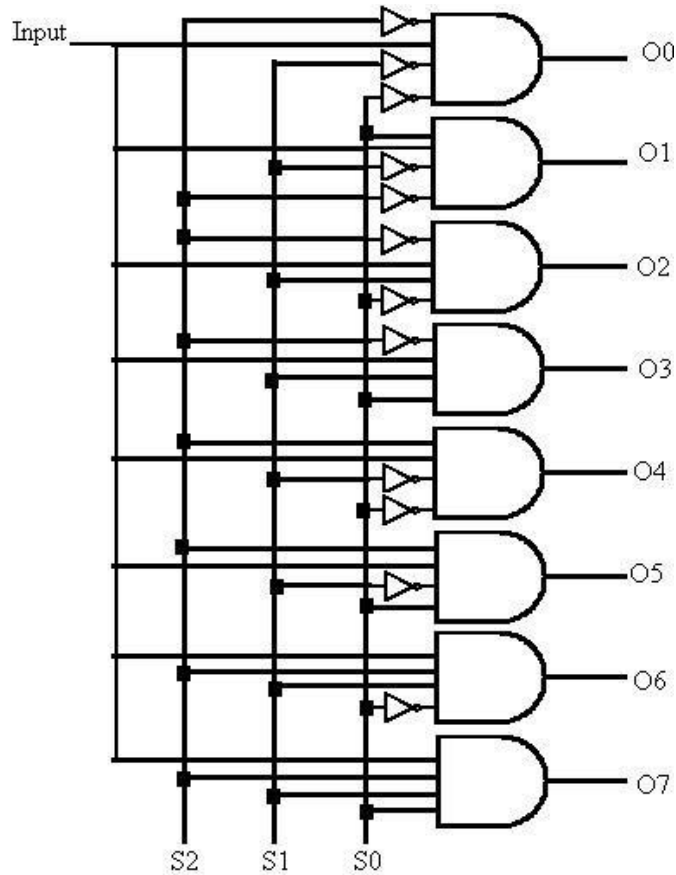
A demultiplexer (or demux) is a device taking a single input signal and selecting one of many data-output-lines, which is connected to the single input. A multiplexer is often used with a complementary demultiplexer on the receiving end. A demultiplexer is a single-input, multiple-output switch. Demultiplexers take one data input and a number of selection inputs, and they have several outputs. They forward the data input to one of the outputs depending on the values of the selection inputs.

Demultiplexers are sometimes convenient for designing general purpose logic, because if the demultiplexer's input is always true, the demultiplexer acts as a decoder. This means that any function of the selection bits can be constructed by logically OR-ing the correct set of outputs. Demultiplexer is called as a 'distributro', since it transmits the same data to different destinations.

Truth Table of 1:8 DEMUX

S2	S1	S0	O7	O6	O5	O4	O3	O2	O1	O0
0	0	0	0	0	0	0	0	0	0	1
0	0	1	0	0	0	0	0	0	1	0
0	1	0	0	0	0	0	0	1	0	0
0	1	1	0	0	0	0	1	0	0	0
1	0	0	0	0	0	1	0	0	0	0
1	0	1	0	0	1	0	0	0	0	0
1	1	0	0	1	0	0	0	0	0	0
1	1	1	1	0	0	0	0	0	0	0

Logic Diagram of 1:8 DEMUX



Procedure:

1. Select appropriate combinational logic circuit from the tab menu.
2. Select run button in the top to execute the operation.
3. Observe the output on the output LEDs and observe digital waveforms on digital display.
4. Repeat the procedure and observe the corresponding outputs of multiplexer and demultiplexer.

Result: 8:1 multiplexer & 1:8 demultiplexer have been studied and verified.