DEMULTIPLEXERS

Experiment No. 08

Aim: Implementation of Demultiplexure using gates and TTL ICs

Demultiplexers: The word "demultiplexure" means 'one into many'. Demultiplexing is the process of taking information from one input and transmitting the same over one of several outputs. The demultiplexure (Data-Distributor) has one input signal D, m select signals (S_m, S_{m-1},....., S_1, S_0), and n output signals (Y_0, Y_1, ..., Y_{n-1}, Y_{n-2}). The select inputs determine to which output the data input will be connected. Its block diagram is shown in Fig.1, below.

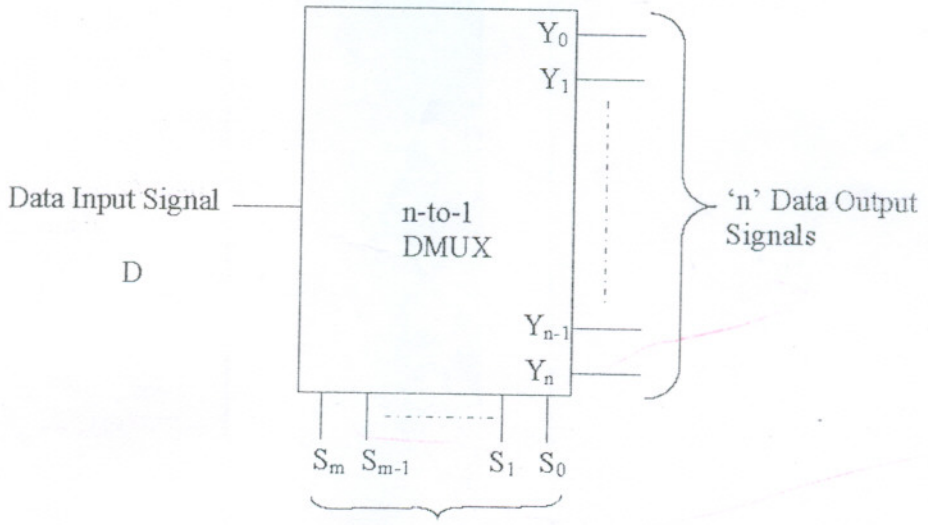

Fig.1. Block Diagram of n-to-1 DMUX.

Activity 1. 1-to-2 line Demultiplexer

A 1-to-2 DMUX has one data input line, one select line, and two output lines. Its logic symbol is shown in Fig.2, below.

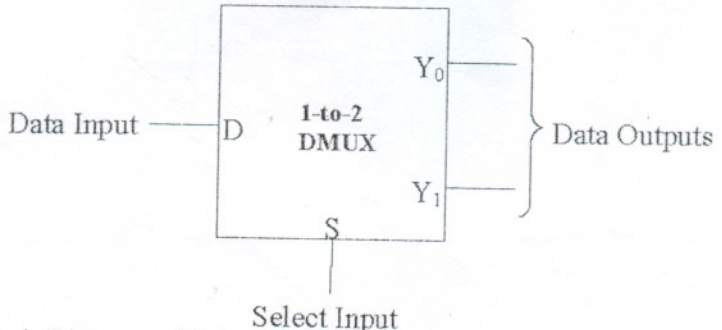

Fig.2. Block Diagram of 1-to-2 DMUX

Logic Diagram:

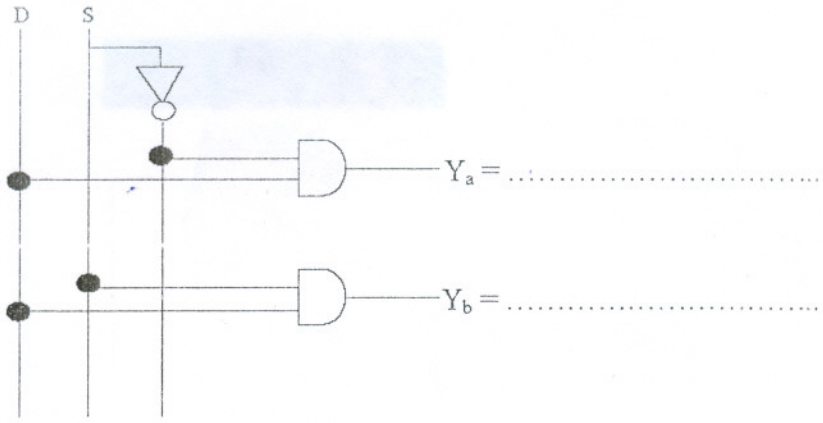

Fig.3. Logic Diagram

Procedure

Step.1. Construct the circuit shown in Fig.3.

Step.2. Apply the data input signal (D), select input signal (S), and record the outputs (Y_0 and Y_1).

Observations: *Truth-Table*

Select Inputs	Data Input	Outputs	
S	D(0/1)	Y_0	Y_1
0	D(0/1)		
0	D(0/1)		
1	D(0/1)		
1	D(0/1)		

Activity 2. Implementation of 1-to-2 line DMUX with Enable / Disable input

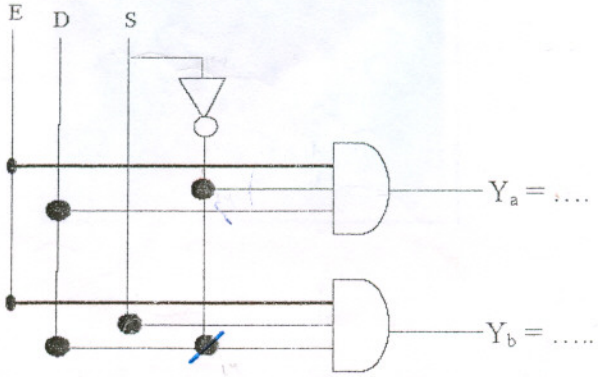

Fig.4.Logic Diagram of 1-to-2 line DMUX with enable/disable input

Connect an extra Enable signal 'E' to the 1-to-2 DMUX, as shown in Fig.4.

Observations: *Truth-Table*

Enable Input	Select Inputs	Data Input	Outputs	
E	S	D(0/1)	Y_0	Y_1
1	0	D(0/1)		
0	0	D(0/1)		
1	1	D(0/1)		
0	1	D(0/1)		

Write:

1. When Enable Input is HIGH, the Output of the DMUX is.....(Enabled / Disabled).

2. When Enable Input is LOW, the Output of the DMUX is ..... (Enabled/Disabled).

Activity 3. *1-to-4 Demultiplexer*

A 1-to-4 DMUX has a single data input (D), two select inputs (S1 and S2), and four outputs (Y_0, Y_1, Y_2, Y_3). Its logic symbol is shown in Fig.4, below.

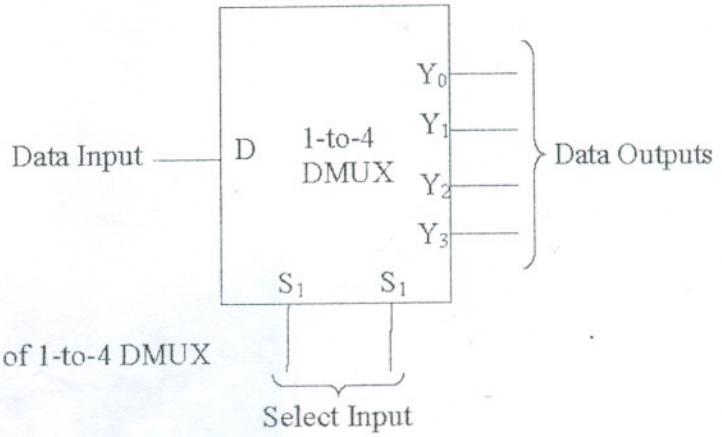

Fig.5. Block Diagram of 1-to-4 DMUX

1-to-4 Demultiplexer Using IC 74139

The logic symbol of IC 74139 (Dual 1-to-4 Decoder / Demultiplexer) is shown in Fig.6, below.

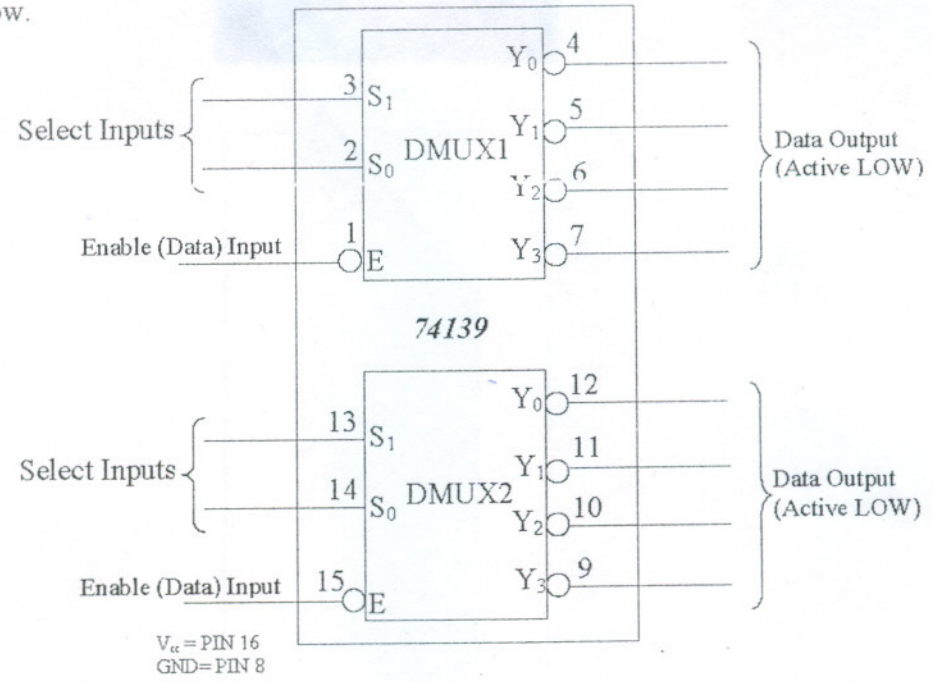

Fig.6.

Procedure:

Step.1. Choose any DMUX (say DMUX1) to perform the experiment.

Step.2. Make the proper connections of the Data Input, Select Input, and Outputs.

Step.3. Apply the Data Signal, and Select Signals.

Step.4. Observe and record the outputs.

Observations: *Truth-Table*

Data Input	Select Inputs		Outputs			
D	S_1	S_0	Y_0	Y_1	Y_2	Y_3
D(0/1)	0	0				
D(0/1)	0	1				
D(0/1)	1	0				
D(0/1)	1	0				