

Experiment -5

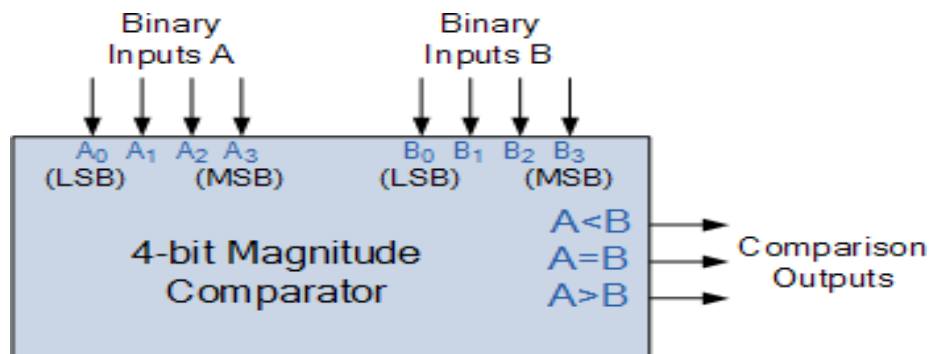
Aim : To Design A Comparator Circuit & Verify Its Truth Table

Equipments and Components Required:

Sl. No	Description	Specification	Quantity
1	Trainer kit	Microtech kit	1
2	Hook Wire	-	-
3	IC 7485	Comapartor ICs	1

Theory: THEORY: Comparators can be designed for comparing multibit numbers. Figure shows the n- bit comparator. It receives two n- bit comparator A and B as input and the outputs are $A > B$, $A = B$, $A < B$. Depending upon the relative magnitude of the two numbers, one of the outputs will be HIGH. The reader is advised to simplify the expression for $A > B$, $A = B$ and $A < B$ output using K map and design the circuit using gates however 4-bit comparators are available in MSI (7485) which can compare words of greater length without external gates. The $A > B$, $A = B$ and $A < B$ output of a stage handling less significant bits are connected to the corresponding $A > B$, $A = B$ and $A < B$ cascading input of the next stage handling more significant bits . the stage handling the list significant bits must have $A = B$ input connected to logic 1 level and $A > B$ and $A < B$ input connected to logic 0 or 1 level .

CIRCUIT DIAGRAM: block diagram of 4-bit comparator



Procedure:

1. Connect the circuit as shown in circuit DIA. Using ICS.
2. Make connection with source (5v) for high level i/p & for low level i/p.
3. For different i/p condition observe the o/p level & form observation table.
4. Compare observation table with the standard truth table

Calculations:

Truth table of Comparator ckt:

1 Bit Comaparator Ckt:

Inputs		Outputs		
B	A	A > B	A = B	A < B
0	0	0	1	0
0	1	1	0	0
1	0	0	0	1
1	1	0	1	0

4 Bit Comaparator Ckt:

Inputs				Outputs			Inputs				Outputs		
X		Y		X>Y	X=Y	X<Y	X		Y		X>Y	X=Y	X<Y
0	0	0	0	0	1	0	1	0	0	0	1	0	0
0	0	0	1	0	0	1	1	0	0	1	1	0	0
0	0	1	0	0	0	1	1	0	1	0	0	1	0
0	0	1	1	0	0	1	1	0	1	1	0	0	1
0	1	0	0	1	0	0	1	1	0	0	1	0	0
0	1	0	1	0	1	0	1	1	0	1	1	0	0
0	1	1	0	0	0	1	1	1	1	0	1	0	0
0	1	1	1	0	0	1	1	1	1	1	0	1	0