

# COMPARATORS

Aim: - To verify the truth table of one bit and two bit comparators using logic gates.

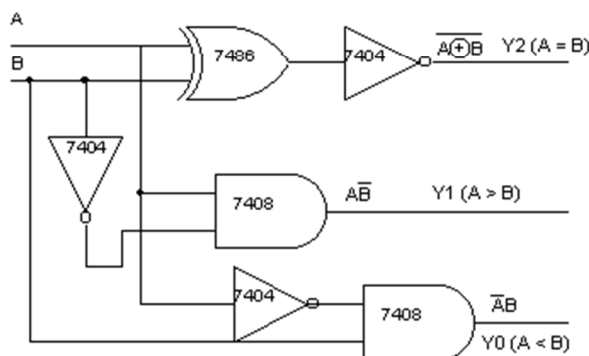
Apparatus Required: -

IC 7486, IC 7404, IC 7408, etc.

Procedure: -

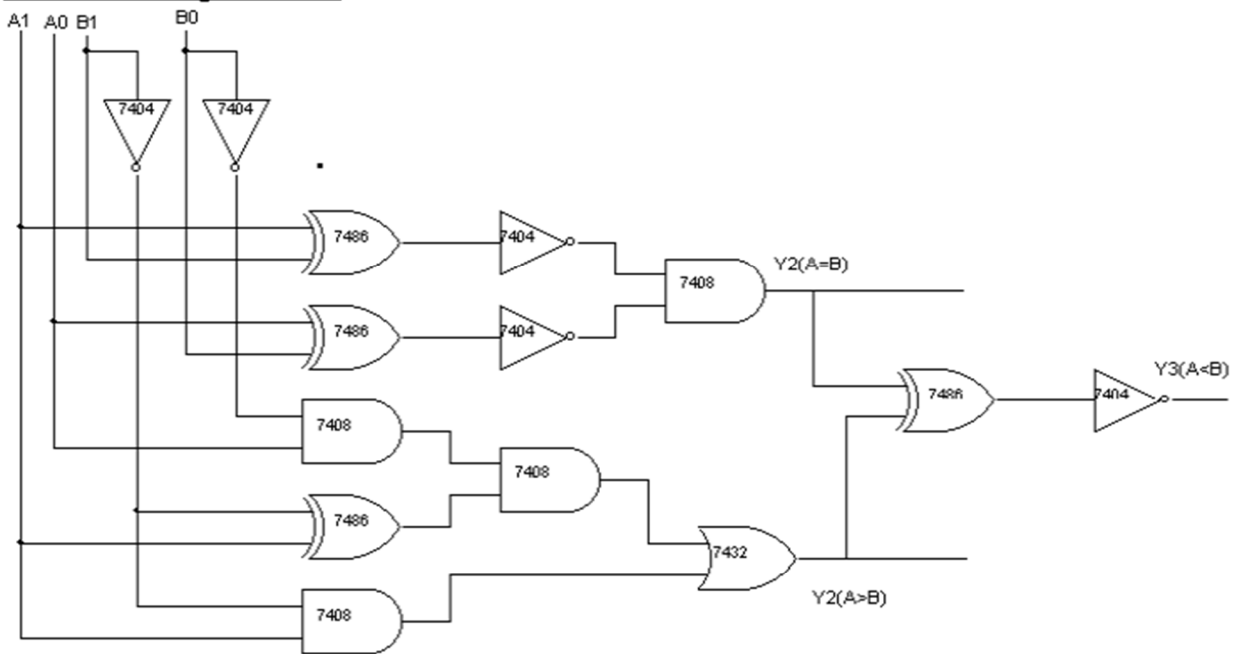
1. Verify the gates.
2. Make the connections as per the circuit diagram.
3. Switch on Vcc.
4. Applying i/p and Check for the outputs.
5. The voltmeter readings of outputs are taken and tabulated in tabular column.
6. The o/p are verified.

One Bit Comparator: -



A	B	Y1 (A > B)	Y2 (A = B)	Y3 (A < B)
0	0	0	1	0
0	1	0	0	1
1	0	1	0	0
1	1	0	1	0

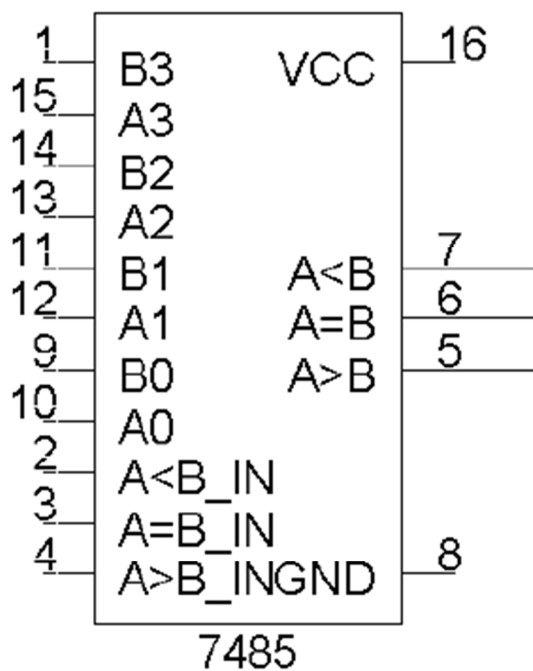
### Two Bit Comparator: -



### Two-Bit Comparator: -

A1	A0	B1	B0	Y1 (A > B)	Y2 (A = B)	Y3 (A < B)
0	0	0	0	0	1	0
0	0	0	1	0	0	1
0	0	1	0	0	0	1
0	0	1	1	0	0	1
0	1	0	0	1	0	0
0	1	0	1	0	1	0
0	1	1	0	0	0	1
0	1	1	1	0	0	1
1	0	0	0	1	0	0
1	0	0	1	1	0	0
1	0	1	0	0	1	0
1	0	1	1	0	0	1
1	1	0	0	1	0	0
1	1	0	1	1	0	0
1	1	1	0	1	0	0
1	1	1	1	0	1	0

### 4-bit Comparator



Tabular Coloumn For<sup>4</sup> Bit Comparator: -

A <sub>3</sub> B <sub>3</sub>	A <sub>2</sub> B <sub>2</sub>	A <sub>1</sub> B <sub>1</sub>	A <sub>0</sub> B <sub>0</sub>	A>B	A=B	A<B	A>B	A=B	A<B
A <sub>3</sub> >B <sub>3</sub>	X	X	X	X	X	X			
A <sub>3</sub> <B <sub>3</sub>	X	X	X	X	X	X			
A <sub>3</sub> =B <sub>3</sub>	A <sub>2</sub> >B <sub>2</sub>	X	X	X	X	X			
A <sub>3</sub> =B <sub>3</sub>	A <sub>2</sub> <B <sub>2</sub>	X	X	X	X	X			
A <sub>3</sub> =B <sub>3</sub>	A <sub>2</sub> =B <sub>2</sub>	A <sub>1</sub> >B <sub>1</sub>	X	X	X	X			
A <sub>3</sub> =B <sub>3</sub>	A <sub>2</sub> =B <sub>2</sub>	A <sub>1</sub> <B <sub>1</sub>	X	X	X	X			
A <sub>3</sub> =B <sub>3</sub>	A <sub>2</sub> =B <sub>2</sub>	A <sub>1</sub> =B <sub>1</sub>	A <sub>0</sub> >B <sub>0</sub>	X	X	X			
A <sub>3</sub> =B <sub>3</sub>	A <sub>2</sub> =B <sub>2</sub>	A <sub>1</sub> =B <sub>1</sub>	A <sub>0</sub> <B <sub>0</sub>	X	X	X			
A <sub>3</sub> =B <sub>3</sub>	A <sub>2</sub> =B <sub>2</sub>	A <sub>1</sub> =B <sub>1</sub>	A <sub>0</sub> =B <sub>0</sub>	1	0	0			
A <sub>3</sub> =B <sub>3</sub>	A <sub>2</sub> =B <sub>2</sub>	A <sub>1</sub> =B <sub>1</sub>	A <sub>0</sub> =B <sub>0</sub>	0	1	0			
A <sub>3</sub> =B <sub>3</sub>	A <sub>2</sub> =B <sub>2</sub>	A <sub>1</sub> =B <sub>1</sub>	A <sub>0</sub> =B <sub>0</sub>	0	0	1			