Experiment No: 14

Name: Synchronous counter.

Aim:- construct and test synchronous counter

Objectives: to study, design, construct and the working of various counters.

Theory:

Construct a synchronous 3-bit binary counter and check its operation.

However, with the synchronous counter, the external clock signal is connected to the clock input of every individual flip-flop within the counter so that all of the flip-flop are clocked together simultaneously (in parallel) at the same time giving a fixed time relationship. In other words changes in the output occurs in synchronisation with the clock signal. The result of this synchronisation is that all the individual output bits changing state at exactly the same time in response to the common clock signal with no ripple effect and therefore no propagation delay.

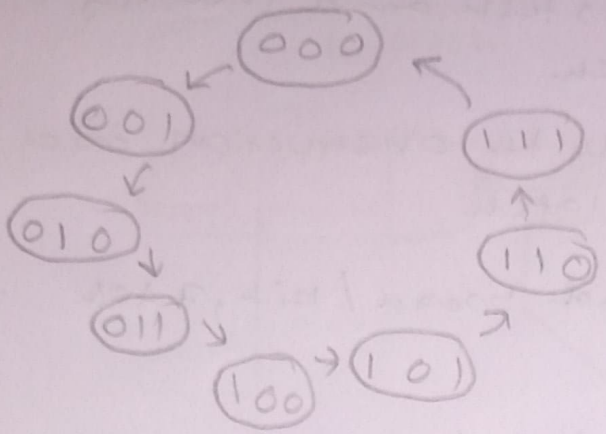
Procedure:

1. Connections are made as per the circuit diagram.
2. Switch the power supply on
3. observe the output compare it with the truth table

Result

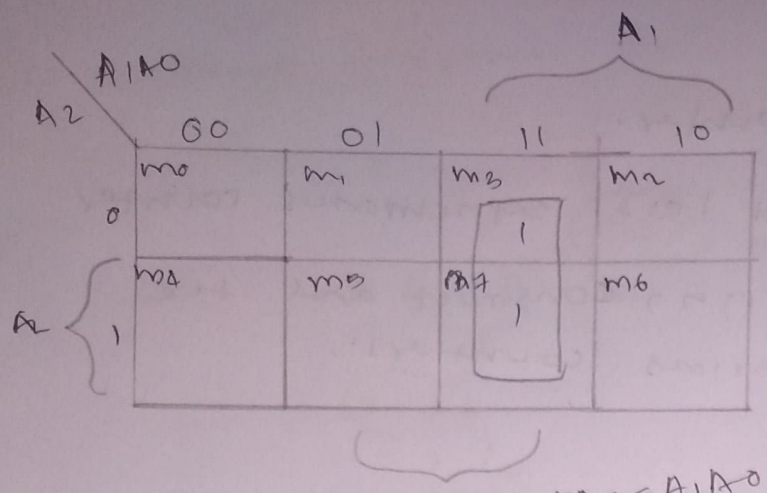
Synchronous circuit are constructed and their truth tables are verified.

State diagram

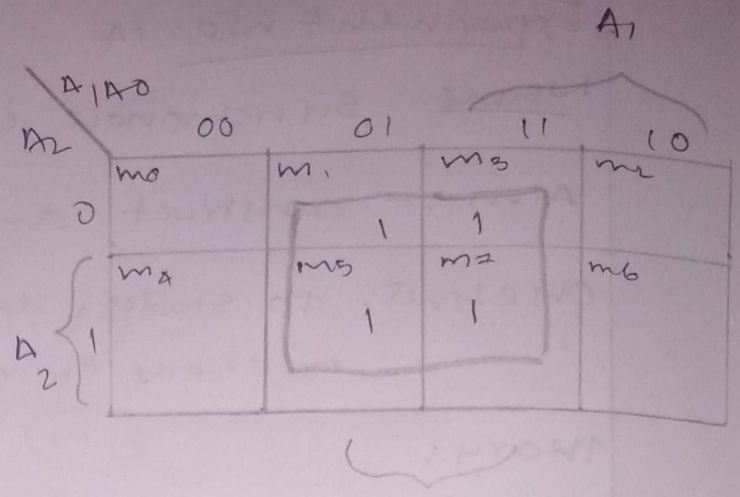


truth table

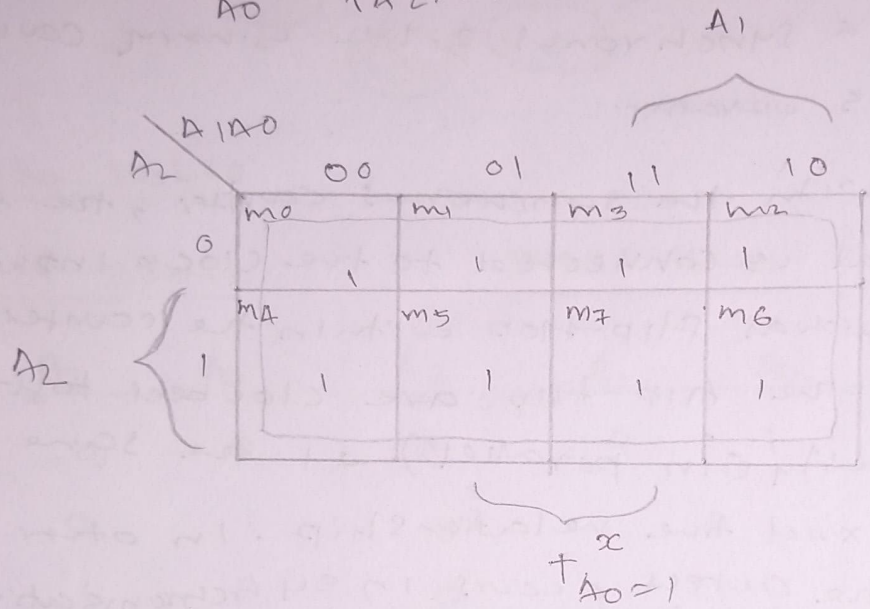
present state			next state			flip-flop inputs		
A_2	A_1	A_0	A_2	A_1	A_0	T_{A_2}	T_{A_1}	T_{A_0}
0	0	0	0	0	1	0	0	1
0	0	1	0	1	0	0	1	1
0	1	0	0	1	1	0	0	1
0	1	1	1	0	0	1	1	1
1	0	0	1	0	1	0	0	1
1	0	1	1	1	0	0	1	1
1	1	0	1	1	1	0	0	1
1	1	1	0	0	0	1	1	1



$TA_2 = A_1A_0$



$TA_1 = A_0$



$TA_0 = 1$