Experiment No. 4
Study of flip flop IC
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Date of Performance:
Date of Submission:

Aim - Study of flip flop IC

Objective –
The basic function of flip flop is to store data. They can be used to keep a record or what value of variable (input, output or intermediate). Flip flop are also used to exercise control over the functionality of a digital circuit i.e. change the operation of a circuit depending on the state of one or more flip flops.

Components required –

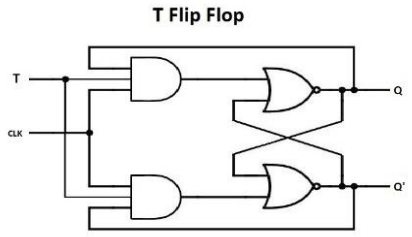
1. IC MC74HC73A (Dual JK flip-flop) – 1No.
2. LM7805 – 1No.
3. Tactile Switch – 4No.
4. 9V battery – 1No.
5. LED (Green – 1; Red – 1)
6. Resistors (1kΩ - 4; 220kΩ -2)
7. Breadboard
8. Connecting wires

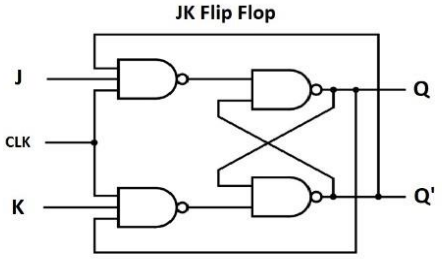
Theory –
Flip-flop is a circuit that maintains a state until directed by input to change the state. A basic flip-flop can be constructed using four-NAND or four-NOR gates. Flip flop is popularly known as the basic digital memory circuit. It has its two states as logic 1(High) and logic 0(low) states. A flip flop is a sequential circuit which consist of single binary state of information or data. The digital circuit is a flip flop which has two outputs and are of opposite states. It is also known as a Bistable Multivibrator.
Types of flip-flops:

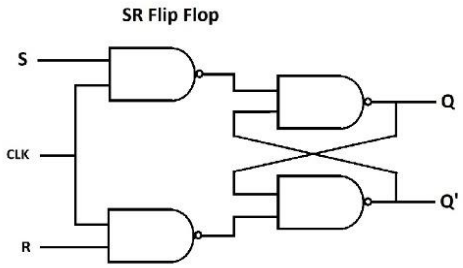
1. SR Flip Flop
2. JK Flip Flop
3. D Flip Flop
4. T Flip Flop

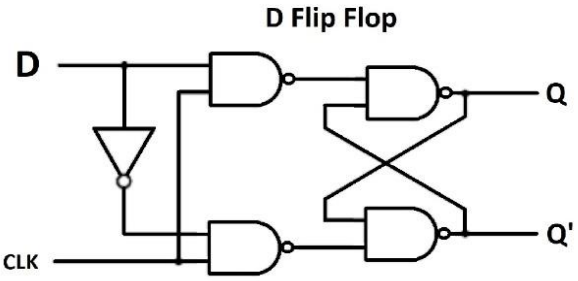
Logic diagrams and truth tables of the different types of flip-flops are as follows: S-R Flip Flop : In the flip flop, with the help of preset and clear when the power is switched ON, the states of the circuit keeps on changing, that is it is uncertain. It may come to set(Q=1) or reset(Q'=0) state. In many applications, it is desired to initially set or reset the flip flop that is the initial state of the flip flop that needs to be assigned. This thing is accomplished by the preset(PR) and the clear(CLR).
In JK flip flops, the diagram over here represents the basic structure of the flip flop which consists of Clock (CLK), Clear (CLR), Preset (PR).

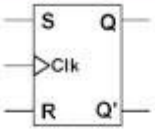
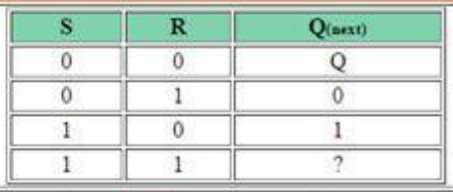
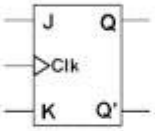
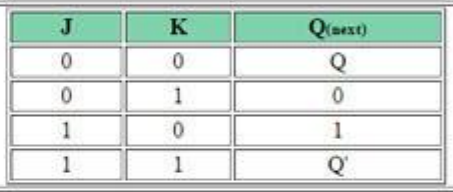
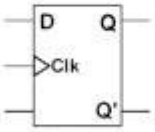
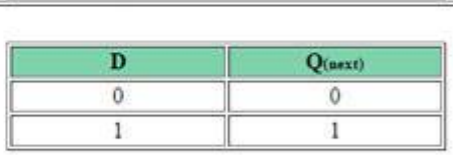
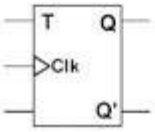
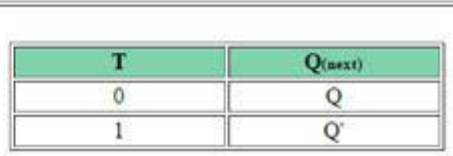
Output –









FLIP-FLOP NAME	FLIP-FLOP SYMBOL	CHARACTERISTIC TABLE
SR		
JK		
D		
T		

S	R	Q(next)
0	0	Q
0	1	0
1	0	1
1	1	?

J	K	Q(next)
0	0	Q
0	1	0
1	0	1
1	1	Q'

D	Q(next)
0	0
1	1

T	Q(next)
0	Q
1	Q'

Conclusion -

Flip-flop ICs are essential in digital circuit design, enabling the storage and manipulation of binary information. Their various types cater to different needs in memory storage, state retention, and timing applications. Understanding flip-flops is crucial for designing reliable and efficient digital systems, including registers, counters, and state machines.