Learning Material - Experiment in ICT 2

Week 12

Goal of week

Student will be known the principles and how to use oscilloscope and function generator. Explore principles of RS Latch, JK Latch, design this flip-flop using IC 74LS00 and IC 74LS32, IC 74LS04.

Content and requirement

1. Analyze principles and structure of RS Latch and JK Latch
2. Design RS latch with CLK, using 74LS00, 74LS32, 74LS04
3. Design JK latch with CLK, using 74LS00, 74LS32, 74LS04

Experimental Equipment

1. Equipment Guideline
2. 5V Power
3. Oscilloscope
4. Function generator
5. Breadboard x1
6. Multimeter x1
7. 74LS00 (2x NAND) x2
8. 74LS04 (6x NOT) x1
9. 74LS32 (4x OR) x2
10. Led (for Q, $\bar{Q}$) x4
11. Resistance x4

Experimental Steps

1. Practice using Function generator and Oscilloscope
2. Draw schematic circuit for RS and JK latch using OR and NAND logic gate
3. Assemble this circuit in breadboard
4. Using function generator and oscilloscope generate input states and test output states

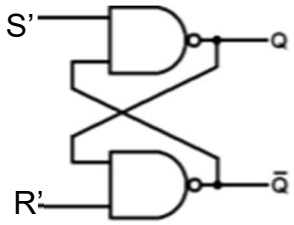
How to test the circuit

1. With RS latch, set signal R to logic 0, S to logic 1 (and vice versa) → how is signal Q, $\bar{Q}$?
2. With JK latch, set signal J to logic 0, K to logic 1 (and vice versa) → how is signal Q, $\bar{Q}$?
3. With JK latch, set signal Preset and Clear, change signals J and K → how is signal Q, $\bar{Q}$?
4. With JK flip-flop, assign signal CLK from *Function generator*, change J, K→how is signal Q,$\bar{Q}$?

Experimental Report

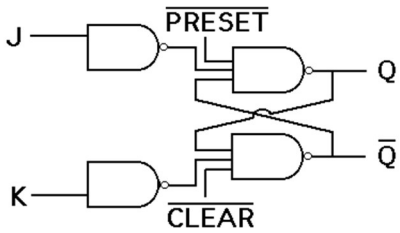
All student must have a report, explain everything you do in this experiment with the content:

- Draw circuit's schematic.
- Inform all result getting from this experiment
- Give some remark



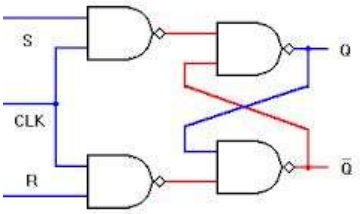
q \ S'R'	00	01	11	10
0	0	0	-	1
1	1	0	-	1

RS Latch

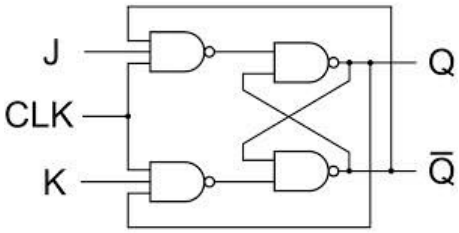


q \ JK	00	01	11	10
0	0	0	1	1
1	1	0	0	1

JK Latch



RS Latch witch CLK



JK Latch witch CLK