Learning Material - Experiment in ICT 2

Week 14

Goal of week

Student will be known about sequential circuit, principles, structure and how to implement sequential circuit. Practice implement sequential circuit by design synchronous counter using JK flip-flop and show up the value with 7 segment display decoder. The counter only count in the range of 0 to 9.

Content and requirement

Analyze principles, structure and activity of sequential circuit
Explore how to design a sequential circuit with specific function.
Implement synchronous counter using JK flip-flop.
Implement 7 segment display decoder
Implement reset logic circuit at the value 9 to 0.

Experimental Equipment

1. IC 74LS76 (JK-FF)
2. IC 74LS08 (AND)
3. IC 74LS247 (Decoder)
4. Function generator
5. Resistors
6. Breadboard
7. 5VDC Power
8. Voltmeter
9. Conductors
10. Oscilloscope
11. 7 segment display

Experimental Steps

Analyze principles and structure of 7segment display using JK flip-flop

- Define input, output variable, state
- Building truth table
- Building excitation equations table
- Assign state table
- Define state diagram
- Draw schematic circuit and assemble in breadboard

Experimental Report

All students 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

A four-bit synchronous "up" counter