

## Deney 4: Combinational Logic Circuit Design using Multiplexers

### 4.0. Objectives

1. To design, draw and implement logic functions using multiplexers.

### 4.1. Introductory Theory

Multiplexing means transmitting a large number of information units over a smaller number of channels or lines. A digital multiplexer is a combinational circuit that selects binary information from one of many input lines and directs it to a single output line. The selection of a particular input line is controlled by a set of selection lines. Normally, there are  $2^n$  input lines and  $n$  selection lines whose bit combinations determine which input is selected.

### 4.2. Implementation of the Experiment

#### Equipment Required

74151 - 8-1 Multiplexer

A combinational circuit has four inputs (ABCD) and one output(Z). The output is equal to 1 when

- I. Both first and second inputs (AB) are equal to 1 or
- II. Both third and fourth inputs(CD) are equal to 1.

Design the circuit described using 8-to-1 Mux following the steps:

1. Obtain the truth table.
2. Use the K-map to realize the logic function using 8-to-1 Mux where (ABC) respectively used as selectors for the Mux.
3. Draw the designed circuit.
4. Construct the logic circuit on the breadboard and test its functionality.

### 4.3. Questions and Results

1. Realize the same function using 2-to-1 multiplexers (show all your work)..
2. Write a report for your experiments and results at the end of construction. Your report should show the truth table and k-maps, expressions, and logic circuits of all your design. (Due to your next lab.)

# 74151 Integrated Circuit

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