Deney 3: Combinational Logic Circuit Design the BCD Digit

3.0. Objectives

1. Design the minimum logic circuit using Karnaugh maps to simplify logic.
2. To detect a BCD digit when it is ≥ 5.

3.1. Introductory Theory

See lecture notes.

3.2. Implementation of the Experiment

Equipment Required

7400 - 2-input NAND gate

7410 - 3-input NAND gate

The procedure involves the following steps:

1- The problem is stated.
2- The number of available input variables and required output variables are determined.
3- The input and output variables are assigned letter symbols.
4- The truth table that defines the required relationship between inputs and outputs is derived.
5- The simplified Boolean function for each output is obtained.
6- The logic diagram is drawn.

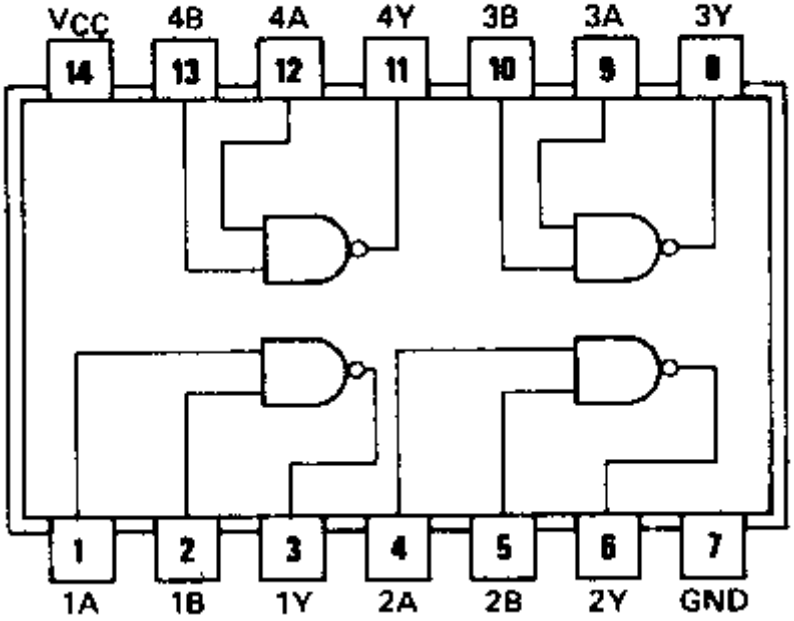
1. Design and implement the 2-level NAND-NAND logic circuit which will detect cases of 8421 BCD ≥ 5:
    a. Obtain the truth table.
    b. Use K-map to simplify the logic functions of all segments.
    c. Find the simplified output function in sum of products.
    d. Draw the logic circuit; write pin numbers of ICs which are used.
    e. Construct the logic circuit on the breadboard and test its functionality.

3.3. Sorular ve Sonuçlar

1. 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.)

Integrated Circuits

7400



7410