

Experiment # 1
Code Converters using MSI Components

1-Objective:

The aim of this experiment is to implement a Boolean Function using MSI components [Decoders, MUX's]

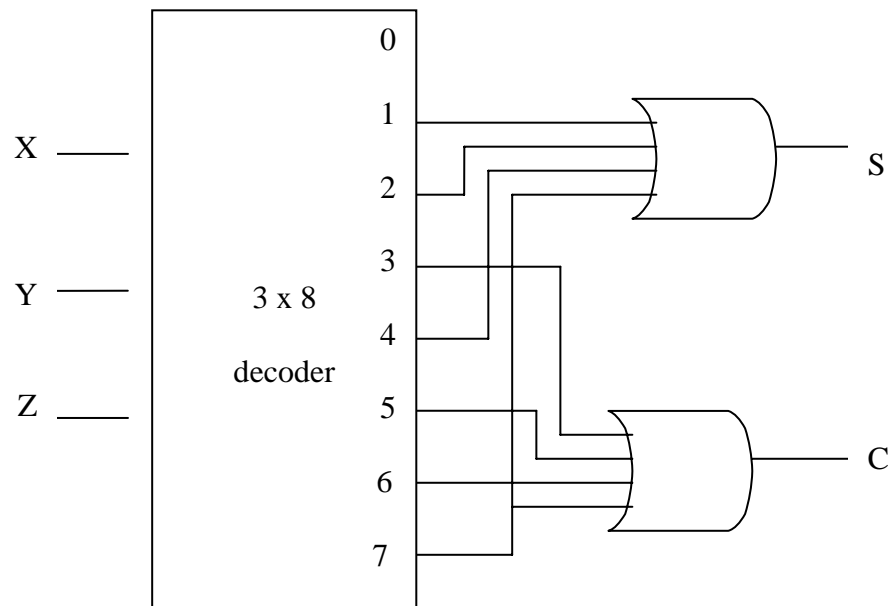
2- Equipment:

| Type of IC | Description |
|------------|-------------|
| 74138 | 3×8 decoder |
| 7432 | OR Gate |
| 74153 | 4×1 MUX |
| 7404 | Inverter |

3- Procedure:

Part A: Implementation of a Full Adder with a decoder:

1- The function diagram is following :



2- Derive the wiring diagram.

3- Connect the circuit given by the function diagram according to the derived wiring diagram.

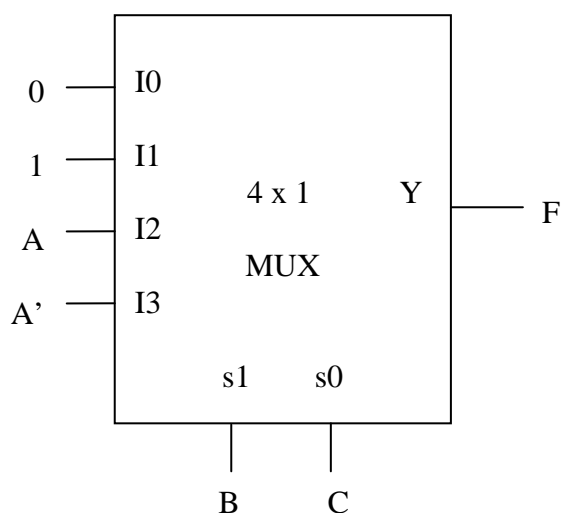
4- Complete the truth table by measuring the outputs S, C.

| x | y | z | c | s |
|---|---|---|---|---|
| 0 | 0 | 0 | | |
| 0 | 0 | 1 | | |
| 0 | 1 | 0 | | |
| 0 | 1 | 1 | | |
| 1 | 0 | 0 | | |
| 1 | 0 | 1 | | |
| 1 | 1 | 0 | | |
| 1 | 1 | 1 | | |

Part B: Implementation of a Boolean function using multiplexers

a- $F(A, B, C) = \sum\{1, 3, 5, 6\}$

1- The function diagram is following :



2- Derive the wiring diagram.

3- Connect the circuit given by the function diagram according to the derived wiring diagram.

4- Complete the table by measuring the output F.

| A | B | C | F |
|---|---|---|---|
| 0 | 0 | 0 | |
| 0 | 0 | 1 | |
| 0 | 1 | 0 | |
| 0 | 1 | 1 | |
| 1 | 0 | 0 | |
| 1 | 0 | 1 | |
| 1 | 1 | 0 | |
| 1 | 1 | 1 | |

b- $F(A, B, C) = \sum\{1, 2, 4, 5\}$

1- Derive the function diagram.

2- Derive the wiring diagram.

3- Connect the circuit given by the function diagram according to the wiring diagram.

4- Complete the table by measuring the output F.

| A | B | C | F |
|---|---|---|---|
| 0 | 0 | 0 | |
| 0 | 0 | 1 | |
| 0 | 1 | 0 | |
| 0 | 1 | 1 | |
| 1 | 0 | 0 | |
| 1 | 0 | 1 | |
| 1 | 1 | 0 | |
| 1 | 1 | 1 | |

4- Conclusions & Exercises:

1- Implement the following functions using 3×8 decoder:

$$F1(A, B, C) = \sum(2, 4, 7)$$

$$F2(A, B, C) = \sum(0, 3)$$

$$F3(A, B, C) = \sum(0, 2, 3, 4, 7)$$

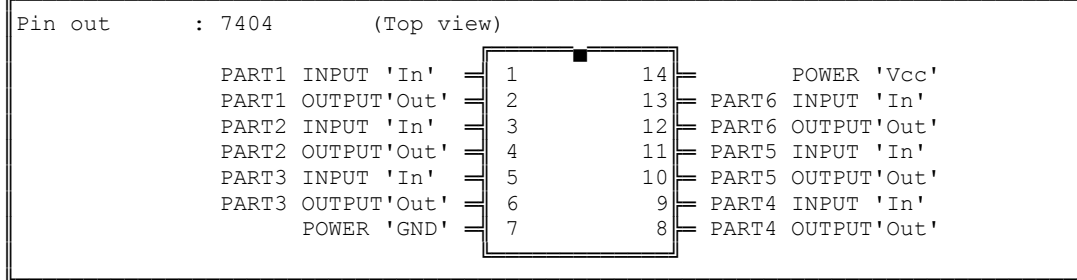
2- Implement the following function using 4×1 MUX:

$$F(A, B, C, D) = \sum (1, 3, 4, 11, 12, 13, 14, 15)$$

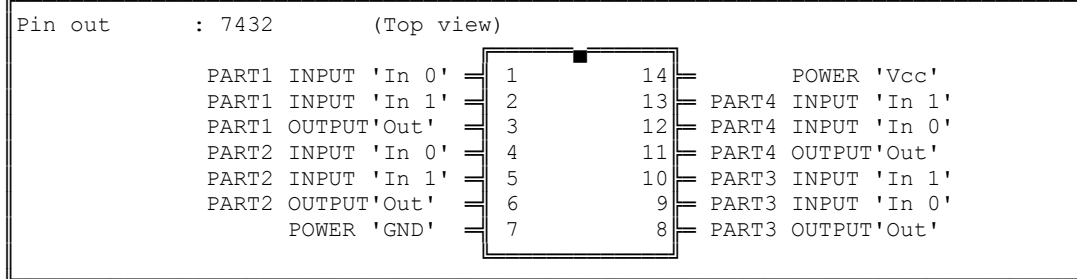
3- Write your conclusion about this experiment.

5 – Pin diagram:

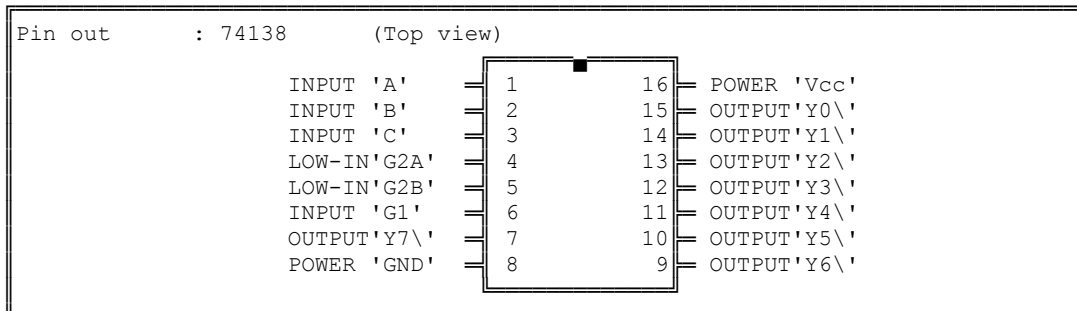
Function: Hex INVERTER



Function: Quad 2-input OR Gate



Function: 3-to-8 lines Decoder



Function: 4x1 MULTIPLEXER

