Exp.No.3

PARITY CHECKER AND CODE CONVERTER

Aim

a) To design & set up a logic circuit using mode control to convert a 3 bit binary to gray code & gray to binary.
b) To design & set up a 3 bit parity generator circuit.
c) To design & set up a parity checker circuit.

Components Required

IC7486(XOR), 7408(AND), 7432(OR), 7404(NOT)

Design

a. Code converter

If the mode control M=0, the circuit will perform conversion from binary to gray & if the mode control M=1, the circuit will perform conversion from gray to binary.

Assume that B_2B_1B_0 is a 3 bit binary no. Then corresponding gray code is G_2G_1G_0.

G_2=B_2
G_1=B_1\oplus B_2
G_0=B_0\oplus B_1

The conversion from gray to binary is

B_2=G_2
B_1=G_2\oplus G_1
B_0=G_2\oplus G_1\oplus G_0

For a general 3 bit no. A_2A_1A_0, the corresponding output is given by

B_2=A_2
B_1=M[A_2\oplus A_0]+M'[A_2\oplus A_0]= A_0\oplus A_2
B_0=M[A_0\oplus A_1]+M'[A_2\oplus A_0\oplus A_0]
b. Parity Generator (Even)

A parity bit is used for error detection. A number is said to have even parity if the total number of ones is even & odd parity if the total number of ones is odd. Parity generator is used to generate even and odd parities.
c. **Parity checker**
   Parity checker detects the parity.

**Circuit Diagram**

```
A2
A1
A0
P
```

**Procedure**

1. Set up the circuit for binary to grey and grey to binary code converter with mode control.
2. Set up the circuit for even parity checker and even parity generator circuit.

**Questions**

1. Design an n-bit gray to binary code converter.
2. Design an n-bit binary to gray code converter.
3. What is the significance of parity checking in communication?
4. Design and verify the truth table of a three bit odd parity generator and checker.