UNIT - 2

COMBINATIONAL CIRCUIT

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Introduction

- Parity
  - A checker bit
  - Single bit error detector code
  - Counts number of 1’s is message

Parity

- Types
  - Even Parity
  - Odd Parity

- Even Parity: Number of 1’s in message is even.
- Odd Parity: Number of 1’s in message is odd.

Parity Generator

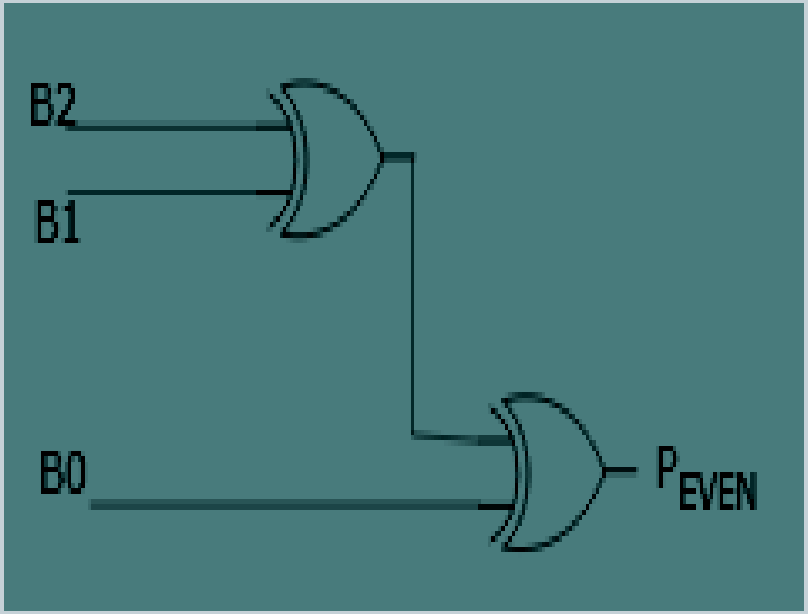
- Parity Bit:
  - An extra bit added along with binary message or data word to enable error checking is Parity bit.

- Parity Generator:
  - A circuit that generates an additional bit which is when appended to a message makes its parity as desired (odd or even).
  - It is used on communication links and is often included in memory systems.

Even Parity Generator

- 3 bit or 4 bit binary message is transmitted through lines along with that extra bit is added.
- If number of 1's is message is even then no error & parity bit is even parity.

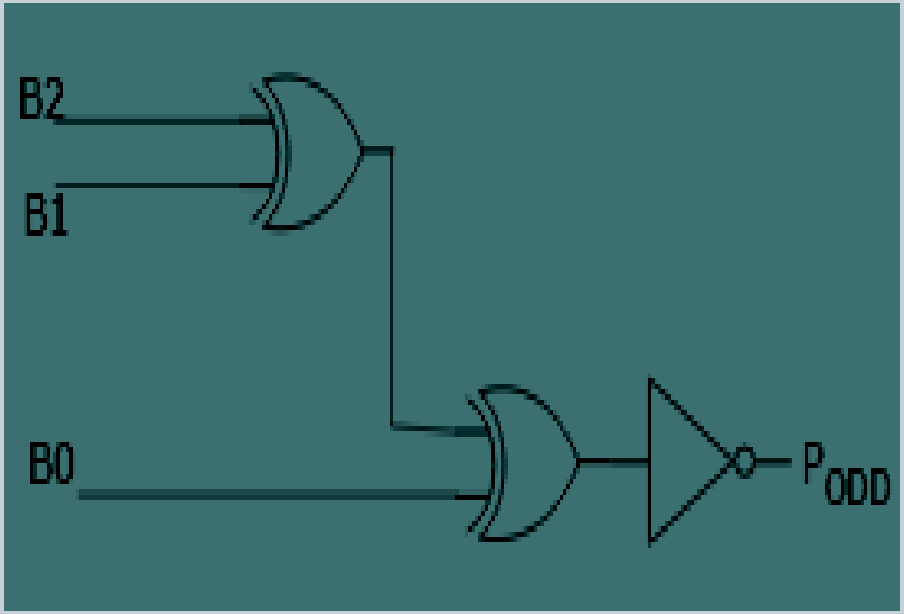
INPUT			OUTPUT
B2	**B1**	**B0**	**P**
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	1



Odd Parity Generator

- 3 bit or 4 bit binary message is transmitted through lines along with that extra bit is added.
- If number of 1's is message is odd then no error & parity bit is odd parity.

INPUT			OUTPUT
B_2	B_1	B_0	P
0	0	0	1
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	0



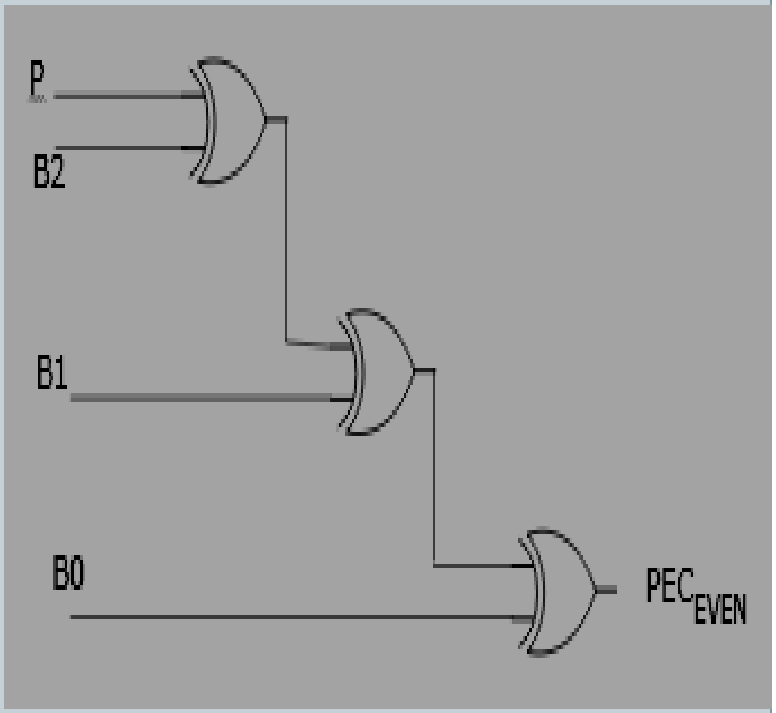
Parity Checker

- At the receiving end a circuit is used to check the parity of received information, and determines whether the error is included in the message or not.
- If single bit change in transmitted message and receiver message, this single bit error can be detected using parity bit.
  - If more than 1 bit changes it is not possible to detect error.
- E.g. Message or word transmitted is 10111 and received message or word is 11111
  - The parity of received word is odd this indicated single bit error is introduced.

Even Parity Checker

- 3 bit or 4 bit binary message is transmitted through lines along with parity bit is added.
- If number of 1's is message + parity bit is even then no error.
- 0 – No Error 1 – Error

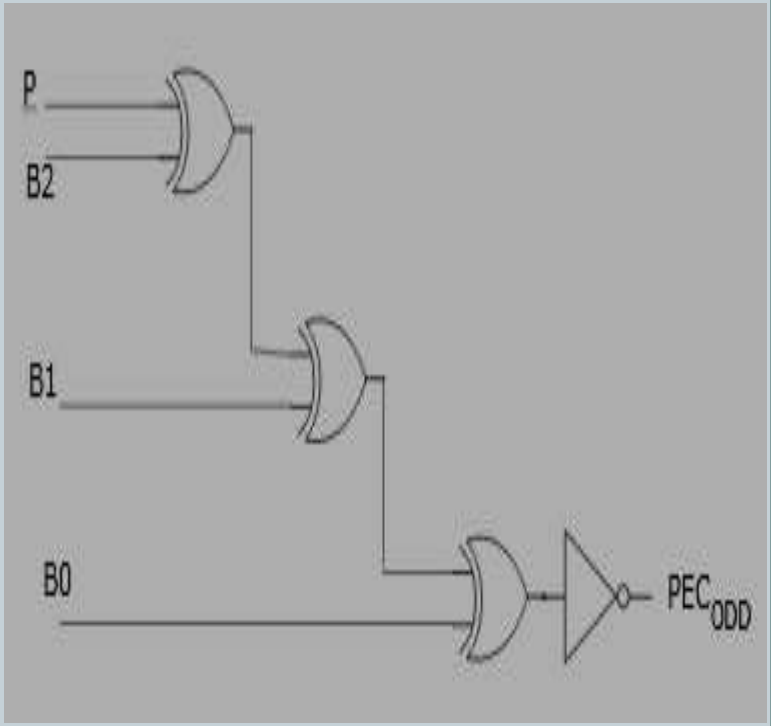
INPUT				OUTPUT
P Parity Bit	B_2	B_1	B_0	PEC
0	0	0	0	0
0	0	0	1	1
0	0	1	0	1
0	0	1	1	0
0	1	0	0	1
0	1	0	1	0
0	1	1	0	0
0	1	1	1	1
1	0	0	0	1
1	0	0	1	0
1	0	1	0	0
1	0	1	1	1
1	1	0	0	0
1	1	0	1	1
1	1	1	0	1
1	1	1	1	0



Odd Parity Checker

- 3 bit or 4 bit binary message is transmitted through lines along with parity bit is added.
- If number of 1's is message + parity bit is odd then no error.
- 0 – No Error 1 – Error

INPUT				OUTPUT
P Parity Bit	B_2	B_1	B_0	PEC
0	0	0	0	1
0	0	0	1	0
0	0	1	0	0
0	0	1	1	1
0	1	0	0	0
0	1	0	1	1
0	1	1	0	1
0	1	1	1	0
1	0	0	0	0
1	0	0	1	1
1	0	1	0	1
1	0	1	1	0
1	1	0	0	1
1	1	0	1	0
1	1	1	0	0
1	1	1	1	1



Thank You