

Error Detection and Correction

XOR - equal to 1 for an odd number of 1's at its binary input and a 0 for an even number of bits

$$P0 = D0 \text{ xor } D1 \text{ xor } D3$$

$$P1 = D0 \text{ xor } D1 \text{ xor } D2$$

$$P2 = D1 \text{ xor } D2 \text{ xor } D3$$

Syndrome Word - bitwise XOR of the before and after parity bits, represents a binary representation of the bits that flipped

Syndrome word contains positions of the parity bits

To determine a double bit error, use a global parity bit

A double bit error must be flagged as an unrecoverable error

K = number of parity

M = number of data bits

1 = no error possibility

$$K + M + 1 \leq 2^K \text{ patterns of syndrome words}$$