Hamming Code
(systematic)

Original data word

7	6	5	4	3	2	1	0	Bit position
0	0	1	0	0	1	1	0	Value 38

AN encoding
(non-systematic)

P_1 = XOR of bits at positions (0, 1, 3, 4, 6)
P_2 = XOR of bits at positions (0, 2, 3, 5, 6)
P_3 = XOR of bits at positions (1, 2, 4, 7)
P_4 = XOR of bits at positions (4, 5, 6, 7)
P_5 = XOR of all bits including P_1 to P_4

Hardening

Multiplication value with a constant A;
e.g., A = 29

38 * 29 = 1102 (hardened value)

Parity Bits					Original Bits							
5	4	3	2	1	7	6	5	4	3	2	1	0
1	1	0	0	1	0	0	1	0	0	1	1	0

Code word

12	11	10	9	8	7	6	5	4	3	2	1	0
0	0	1	0	0	0	1	0	0	1	1	1	0

Code word

Detection

Checking:

C_1 = XOR of bits at positions (P_1, 0, 1, 3, 4, 6) == 0?
C_2 = XOR of bits at positions (P_2, 0, 2, 3, 5, 6) == 0?
C_3 = XOR of bits at positions (P_3, 1, 2, 4, 7) == 0?
C_4 = XOR of bits at positions (P_4, 4, 5, 6, 7) == 0?
C_5 = XOR of all bits including P_1 to P_5 == 0?

No errors if (C_1, C_2, C_3, C_4, C_5) equals (0, 0, 0, 0,0)

Checking:

mod A == 0?

Example:
1102 mod 29 = 0

No errors when result equals zero