Assume we wish to send the following 16-bit UDP message:

1010

1101

1100

0001

The checksum is calculated by the bitwise XOR summation of the above 4-bit strings and is error-prone (the result is a 4-bit string either).

What is the probability that an error occurred in exactly four bits of the 16-bit original message would lead to silent error (i.e. without being spotted in the receiver)?

(HINT: how should the 4-bit error arrangement be to not to affect the 4-bit XOR summation?)

Each bit is altered in the channel with a probability if p.