

## EXPERIMENT #10

### Forward Error Correction Code: Hamming Code

#### INTRODUCTION

In data transmission, the ability of a receiving station to correct errors in the received data is called forward error correction (FEC) and can improve the performance on a data link when there is a lot of noise present. Hamming code is a set of error-correction codes that can be used to detect and correct bit errors that can occur when computer data is moved or stored.

Hamming codes make FEC less expensive to implement through the use of a block mechanism.

#### Laboratory Procedure

- Set up a basic communication system (Figure 1) using 8-PSK modulation. Find the error rate over an
- Add a channel code to the system (Figure 2) such as a Hamming code. Evaluate the error performance of the system in case of
  - o A code word length of 7bits
  - o A code word length of 15bits.

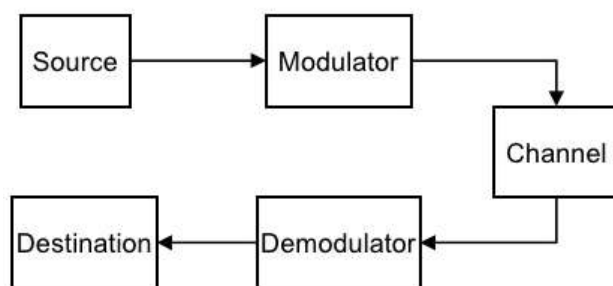


Figure 1: Block diagram of a basic communication system.

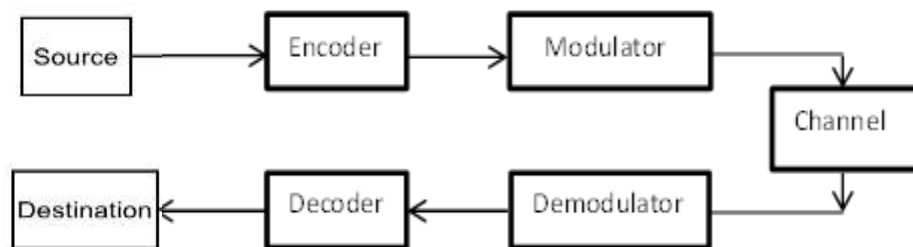


Figure 2: Block diagram of a basic communication system with a channel encoder.

#### Report:

1. Plot the results and find the code gain at  $BER=10^{-3}$ .
2. Discuss the results.
3. Find the detection and correction capability for the code used in both cases.
4. What is the advantage and disadvantage of the channel code.