

## EXPERIMENT#12

### TO DESIGN QPSK/4-QAM MODULATION SYSTEM

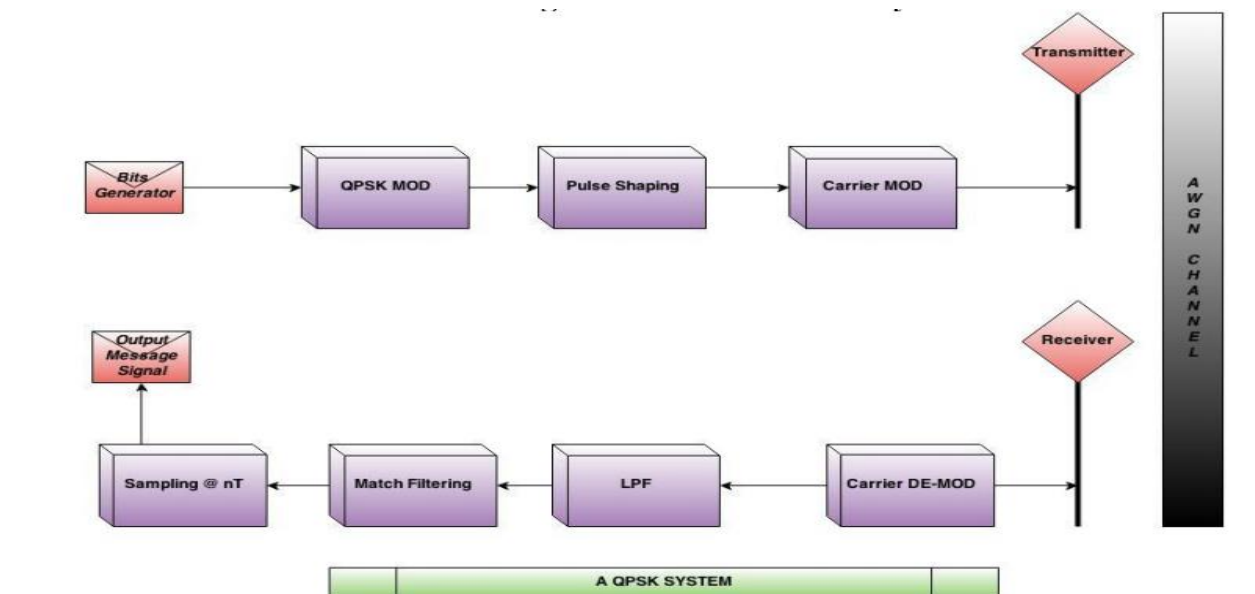
#### OBJECTIVE:

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#### THEORY:



#### BITS GENERATOR:

This module of the digital communication system generates the message (signal) in bits. All the data here is in bits which are the input bits.

#### QPSK MOD:

In Quadrature Phase Shift Keying Modulation module, the modulator converts 1's into +1 and 0's into -1 given that it translates bits into complex bits pair which are then superimposed onto four different phases (0,90,180,270) degrees.

#### PULSE SHAPING:

In this module, the modulated data is super imposed on a pulse (e.g. Manchester pulse, Raised Cosine, Gaussian pulse etc.) for channel synchronization.

#### CARRIER MOD:

This is where the carrier modulation takes place i.e. the signal is multiplied with a sinus and cosine carrier wave and then added up together. The frequency of the carrier wave is

at least ten times the frequency of baseband (message) signal.

**TRANSMITTER:**

This module transmits the data in the form of electromagnetic waves.

**RECEIVER:**

This modules receives the transmitted data and processes as designed.

**CARRIER DE-MOD:**

In this section, the received signal is simultaneously multiplied with sinus and cosinus waves again to translate the original message signal followed by the following processes.

**LPF:**

The received signal is then low pass filtered for band limiting purposes and removing high frequency components and noise.

**MATCHED FILTER:**

This module increase the strength of the signal so that the overall SNR (Signal to Noise Ratio) can be improved significantly.

**SAMPLING @  $nT$  :**

This demodulator samples the matched filter output at the rate  $nT$ .It records the peaks of the matched filter output and converts them into bits which are the output bits.

**SOFTWARE USED:**

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**Lab Task :**

*Design QPSK Transmitter in MATLAB, generate its pdf and attach the output.*

**CONCLUSION:**

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## Post Lab Questions

a) Define QPSK Modulation.

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b) What are advantages of QPSK?

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c) What is the difference between QPSK and BPSK?

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