Experiment No.: 3

Title: Experimental study of FSK modulation and demodulation.

Roll No.: _____ Batch: _____
Date of Performance: _____
Date of Assessment: _____

Particulars	Marks
Attendance (05)	
Journal (05)	
Performance (05)	
Understanding (05)	
Total (20)	
Signature of Staff Member	

Experiment No: 3

Title: Experimental study of FSK modulation and demodulation.

Aim: To study and implement Frequency Shift Keying (FSK) modulation and demodulation technique.

Prerequisites:

- Basic understanding of digital communication systems.
- Knowledge of Frequency Shift Keying (FSK), how carrier frequency changes with digital data (0s and 1s).
- Familiarity with carrier and message signals (frequency, amplitude, and logic levels).
- Understanding of binary data representation and waveform patterns.
- Basic electronics knowledge, components like resistors, capacitors, transistors, and ICs.
- Ability to use lab instruments such as function generator, CRO/DSO, and power supply.
- Familiarity with FSK trainer kit.
- Skill to observe and interpret FSK waveforms (modulated and demodulated).

Objectives:

1. To understand the working of FSK modulation and demodulation.
2. To generate FSK signals using a balanced modulator and digital input.
3. To observe demodulated output and verify recovery of original data.
4. To analyze the frequency variations representing binary data.

Theory:

Frequency Shift Keying (FSK) is a digital modulation technique in which the frequency of the carrier signal is shifted between two values based on the binary data input:

- Binary '1' is represented by a high frequency (e.g., 640 kHz)
- Binary '0' is represented by a low frequency (e.g., 320 kHz)

The modulated waveform thus consists of alternating carrier frequencies depending on the input bit stream. Demodulation is typically achieved using a **PLL (Phase-Locked Loop)** detector that locks onto the carrier frequencies and converts them back into binary form.

The FSK Modulation and Demodulation with noise consist of following sections.

1. Digital Data Generator section
2. ASK modulator using Balanced Modulator.
3. Carrier Generator.
4. Adder section.

5. Gaussian Noise Generator Section.
6. Noise Adder section
7. FSK demodulator using PLL detector
8. Integrated & Dump Filter (Matched Filter)
9. Comparator Section
10. Power supply section

Procedure:

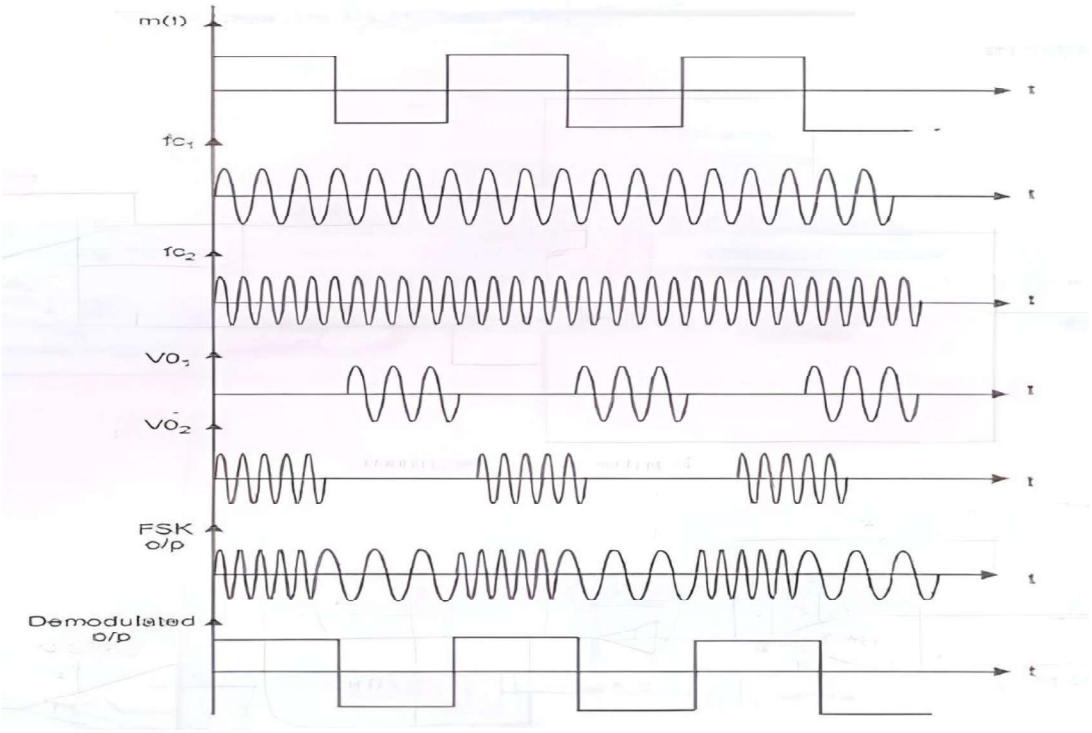
A. FSK Modulation

1. Switch ON the kit (Power Supply section).
2. Set a digital data pattern using the Data Generator switches.
3. Connect the data output to both Balanced Modulator 1 and 2.
4. Connect two different carrier frequencies from the Carrier Generator to each modulator.
5. The modulators generate ASK1 and ASK2 signals.
6. Feed ASK1 and ASK2 into the Adder section to get the FSK output.
7. Observe the FSK waveform on CRO/DSO from the Adder output.

B. FSK Demodulation

1. Connect FSK output to the Noise Adder input to simulate channel noise.
2. Feed the noisy FSK signal to the Demodulator input.
3. Observe the Comparator output and the Raw Data output after filtering.
4. Compare this output with the original input to verify successful demodulation.

Waveforms:



Conclusion:

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