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| **Course Name:** | **Analogue Digital Systems** | **Semester:** | **IV** |
| **Date of Performance:** | **12 / 03 / 2024** | **Batch no.:** | **A - 2** |
| **Faculty Name:** | **Prof. Amrita Naiksatam** | **Roll no.:** | **16014022050** |
| **Faculty Sign & Date:** |  | **Grade / Marks:** | **\_\_\_ / 25** |

**Experiment No.: 7**

**Title: To generate and study Digital Modulation technique Binary Amplitude Shift Keying (BASK) using LABVIEW/HARDWARE**

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| **Aim and Objective of the Experiment:** |
| * To understand the working of BASK. * To visualize the BASK output and make appropriate conclusions. |

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| **COs to be achieved:** |
| CO2: To understand Pulse Shaping techniques for optimum transmission of signal and Band-pass digital modulation and demodulation. |

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| **Theory:** |
| The simplest way of achieving BASK is by switching ON the carrier whenever data bit is ‘1’ and switching OFF whenever data bit is ‘0’. The BASK waveform is generated by a balanced modulator circuit i.e. Linear multiplier. One of the inputs is AC coupled carrier wave and other input is information signal to be transmitted, is DC coupled. The methods to demodulate BASK waveform is to rectify it, pass it through the filter and square up the resulting waveform. The output is the original data stream. |

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| **Step-Wise Procedure:** |
| 1. Assemble the circuit as shown in circuit diagram. 2. Apply modulating signal as square wave of 10Vp-p& 200Hz to pin no. 11 and carrier signal as Sine wave of 2.5Vp-p& 1 KHz to pin no.13. 3. Observe the BASK output at pin no 3. 4. Draw the waveforms of modulating, carrier and BASK signal. |

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| **Circuit Diagram:** |
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| **Observation Table:** |
| **Modulating Signal:**  Amplitude – 70V and Frequency – 250kHz  **Carrier Signal:**  Amplitude – 18V and Frequency – 1.44Mhz |

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| **Post Lab Subjective / Objective type Questions:** |
| 1. **State the basic parameters to design a digital communication system.**   Bandwidth: The range of frequencies required for transmission.  Data Rate: The rate at which data is transmitted, usually measured in bits per second (bps).  Modulation Technique: The method used to encode digital data onto an analog carrier signal (e.g., ASK, PSK, FSK).  Channel Characteristics: Understanding the properties of the transmission medium, including noise, attenuation, and distortion.  Error Correction and Detection: Techniques used to ensure the accuracy of transmitted data, such as error-correcting codes.  Synchronization: Ensuring that the transmitter and receiver are synchronized in terms of timing and frequency.  Multiplexing: Techniques used to allow multiple signals to share the same transmission medium (e.g., time-division multiplexing, frequency-division multiplexing).   1. **Draw and explain Receiver of BASK.**   The receiver for BASK typically consists of a series of stages:     1. Signal Reception: The received signal is passed through a bandpass filter to remove noise and unwanted signals. 2. Demodulation: In BASK, demodulation involves detecting changes in the amplitude of the received signal to extract the transmitted binary data. 3. Threshold Detection: The demodulated signal is compared to a threshold value to determine whether it corresponds to a '1' or a '0'. If the signal is above the threshold, it is interpreted as a '1', and if it is below the threshold, it is interpreted as a '0'. 4. Decoding: Finally, the sequence of '1's and '0's is processed to recover the original digital data. 5. **Draw signal Constellation Diagram for BASK & hence determine its Euclidean Distance.**     In BASK, the signal constellation diagram represents the possible signal states in the complex plane. Since BASK is a type of amplitude modulation, the signal states are represented along the amplitude axis.   1. Signal Constellation Diagram: In BASK, there are two possible signal states: one corresponding to the carrier amplitude when transmitting a '1' and the other corresponding to zero amplitude when transmitting a '0'. So, the constellation diagram would have two points, typically represented as (A, 0) and (-A, 0), where A is the amplitude of the carrier signal. 2. Euclidean Distance: The Euclidean distance between two points in the constellation diagram is calculated using the distance formula from Euclidean geometry. For BASK, it is simply twice the amplitude of the carrier signal (2A). This distance represents the minimum distance between two signal points, which affects the system's resilience to noise and interference. |

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| **Conclusion:** |
| The experiment enabled us to generate and examine Binary Amplitude Shift Keying (BASK) modulation. By understanding BASK's operation and visualizing its output, we gained valuable insights into digital modulation techniques, enhancing our comprehension of communication systems and their real-world applications. |

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| **Signature of faculty in-charge with date:** |