DIGITAL COMMUNICATION LAB THIRD STAGE

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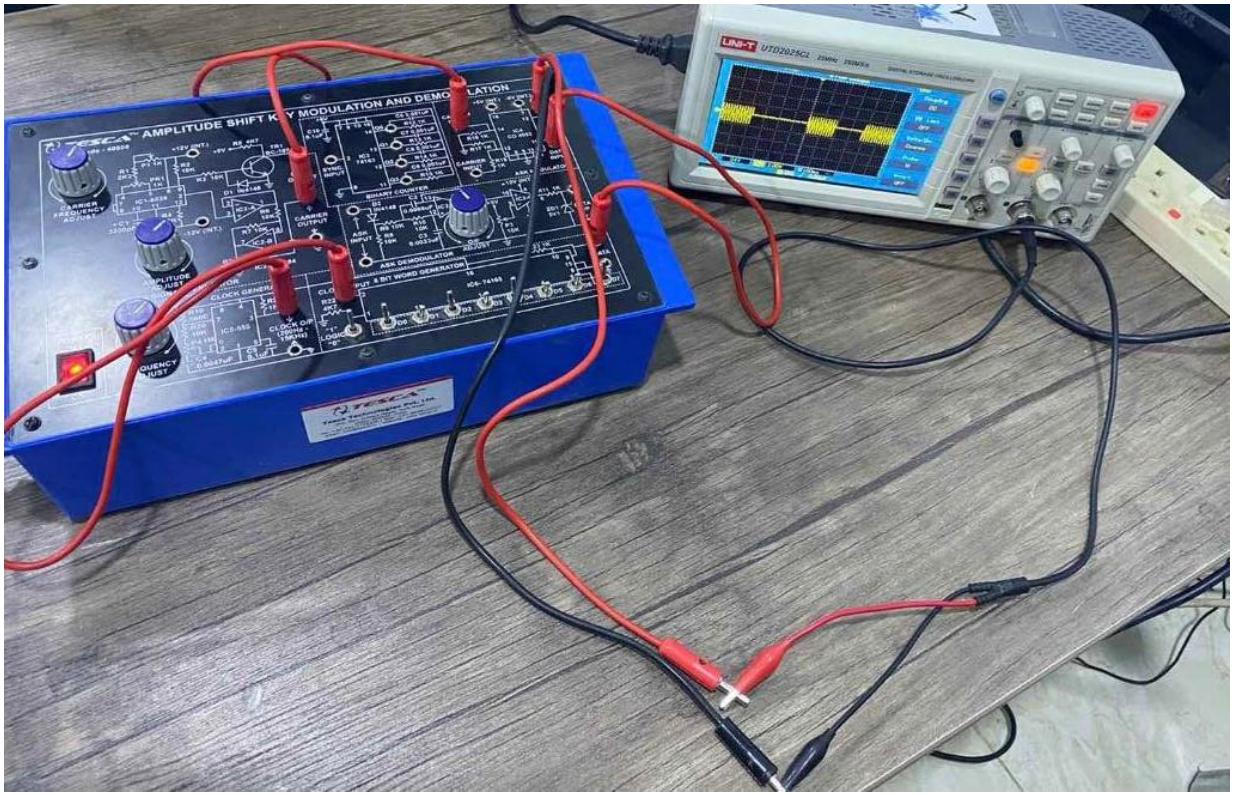
Experiment:4

Amplitude Shift Key Modulation & Demodulation (ASK)



Object:

In this lab, you will learn how to perform the modulation and demodulation and to calculate the modulation index for various modulating voltages.

Features **& procedure** :

The board consists of the following built-in parts:

1. ±12V D.C. at 50mA, IC regulated Power Supply internally connected
2. . ±5V D.C. at 50mA, IC regulated Power Supply internally connected
3. clock generator 200HZ to 15HZ.
4. 8 Bit word Generator.
5. Logic selection switches for high/low (9Nos).
6. Binary counter (Divided by 16 counter).
7. Corrier signal Generator 4 to 10KHz.
8. .Amplitude Shift Key (ASK)Modulator.
9. Amplitude Shift Key (ASK)Demodulator.
10. Mains ON/OFF switch, Fuse and Jewel light

* The unit is operative on 230V ±10% at 50Hz A.C. Mains
* Adequate no. of patch cords stackable 4mm spring loaded plug length ½ meter
* Good Quality, reliable terminal/sockets are provided at appropriate places on panel for connections/ observation of waveforms

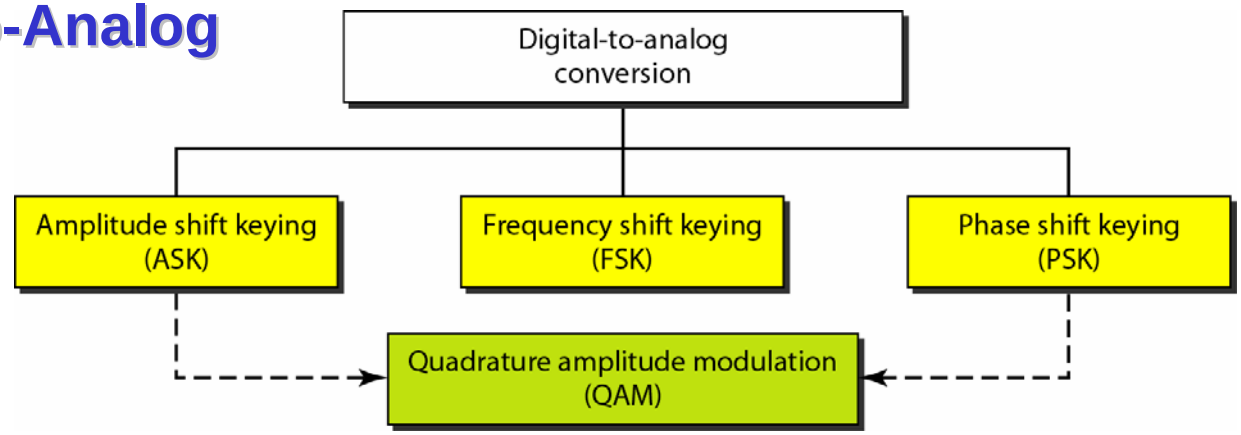
* Strongly supported by detailed Operating Instructions, giving details of Object, Theory, Design procedures, Report Suggestions and Book References

Amplitude Shift Key

Digital-to-Analog Modulation – **process of changing one of the characteristic of an analog signal (typically a sinewave) based on the information in a digital signal**

- **sinewave is defined by 3 characteristics (amplitude, frequency, and phase) ⇒ digital data (binary 0 & 1) can be represented by varying any of the three**
- **application: transmission of digital data over telephone wire (modem)**

Types of Digital-to-Analog Modulation



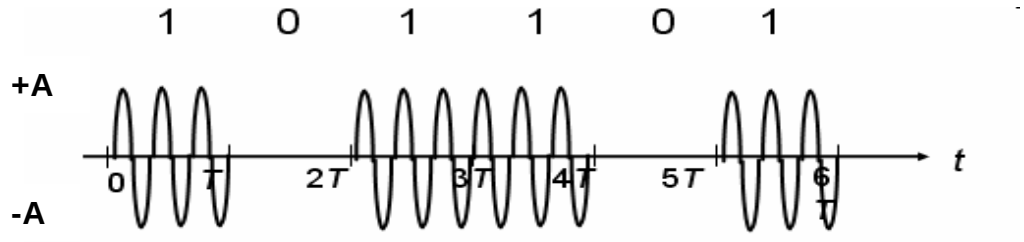
Modulation of Digital Data: ASK

ASK – strength of carrier signal is varied to represent binary 1 or 0

- **both frequency & phase remain constant while amplitude changes**
- **commonly, one of the amplitudes is zero**

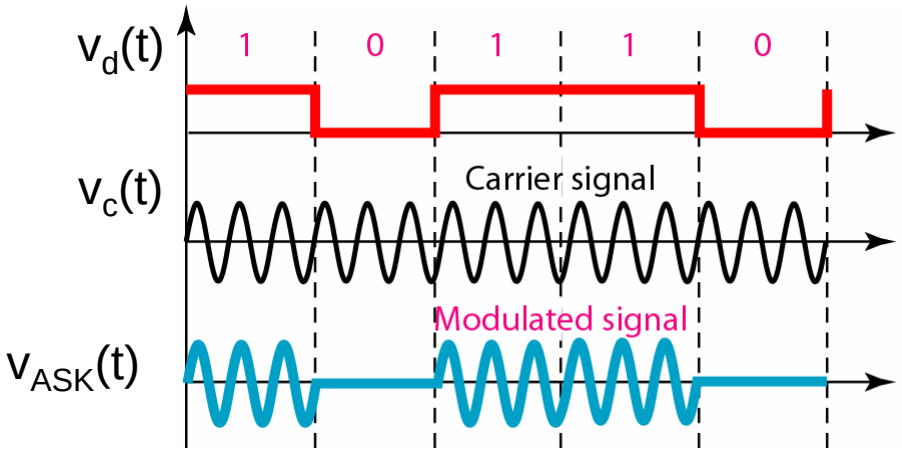
$$s(t) = \begin{cases} A_0 \cos(2\pi f_c t), & \text{binary 0} \\ A_1 \cos(2\pi f_c t), & \text{binary 1} \end{cases} = \begin{cases} 0, & \text{binary 0} \\ A\cos(2\pi f_c t), & \text{binary 1} \end{cases}$$

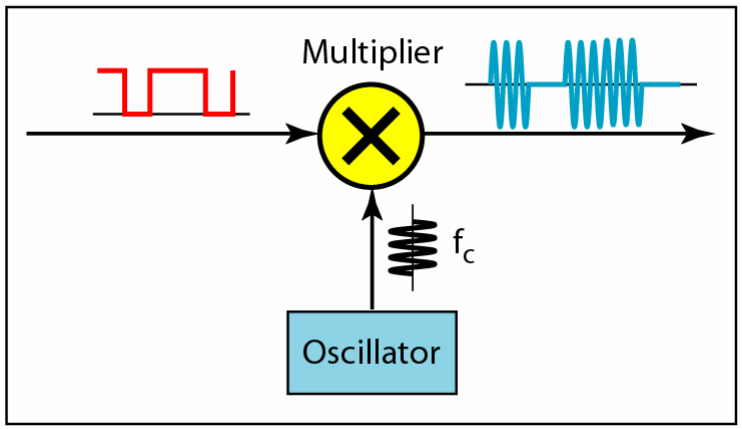
Is this picture, from the textbook, entirely correct?!

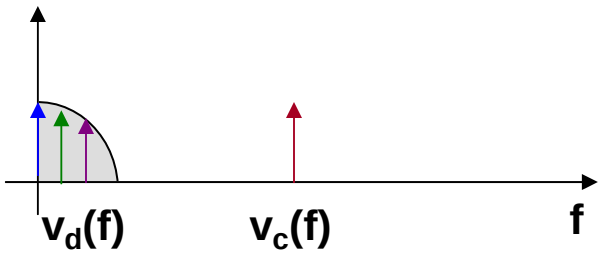


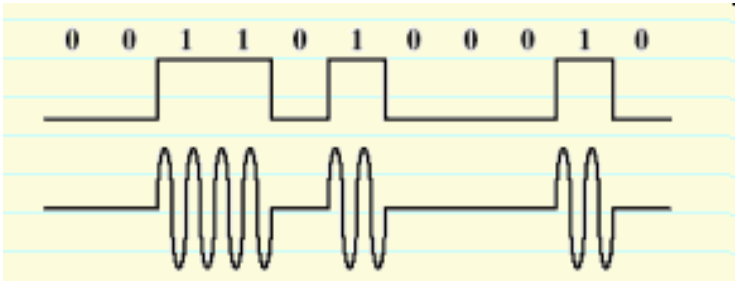
- **advantage: simplicity**
- **disadvantage: ASK is very susceptible to noise interference – noise usually (only) affects the amplitude, therefore ASK is the modulation technique most affected by noise**
- **application: ASK is used to transmit digital data over optical fiber**

Example [ASK]









Digital-to-analog modulation.

- **demodulation**: **only the presence or absence of a sinusoid in a given time interval needs to be determined**