

## UNIT IV SATELLITE ACCESS

### 4.1 Modulation and Multiplexing: Voice, Data, Video

Communications satellites are used to carry telephone, video, and data signals, and can use both analog and digital modulation techniques.

#### **Modulation:**

Modification of a carrier's parameters (amplitude, frequency, phase or a combination of them) in dependence on the symbol to be sent.

Modulation is the process of transforming a carrier signal so that it can carry the information of a message signal. It superimposes the contents of the message signal over a high-frequency carrier signal, which is then transmitted over communication channels.

Modulation can be of two types –

- Analog Modulation
- Digital Modulation

#### **Analog Modulation**

Here, the analog information signal is transformed to the analog carrier signal so that it can travel large distances without substantial loss.

Analog modulation can be of three types –

- Amplitude Modulation
- Frequency Modulation
- Phase Modulation

#### **Digital Modulation**

Digital modulation is the process of converting a digital bit stream into an analog carrier wave for transmission via a communication channel.

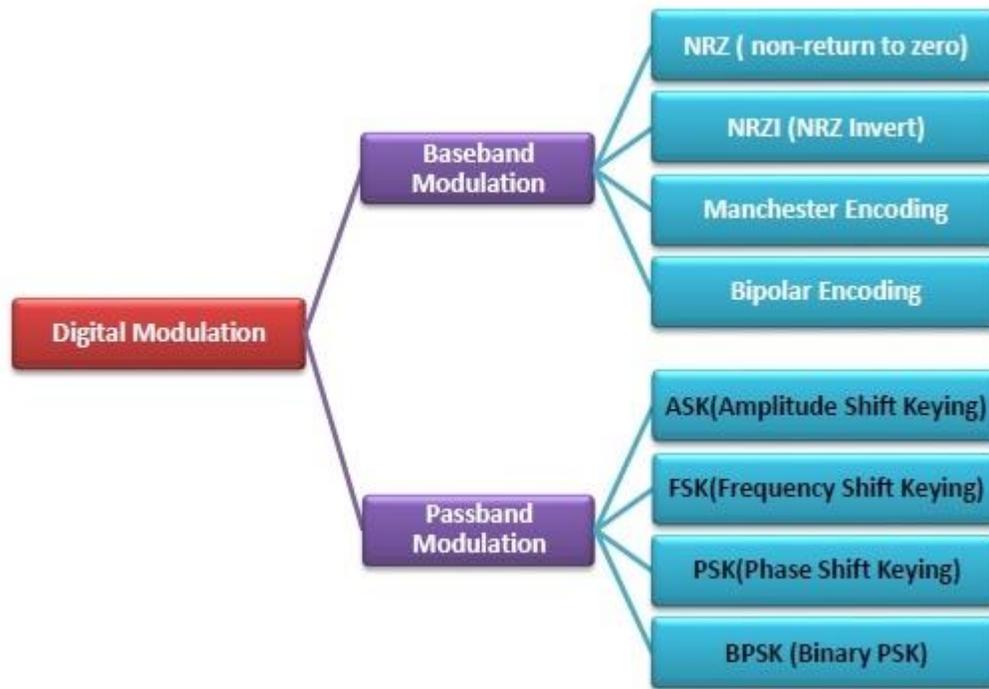
Digital modulation is broadly divided into two categories –

- **Bandpass Modulation as in baseband transmission:**

Here, the bits are converted directly into signals.

- **Passband Modulation as in passband transmission:**

Here, the amplitude, phase or frequency of the carrier signal is regulated to transmit the bits.

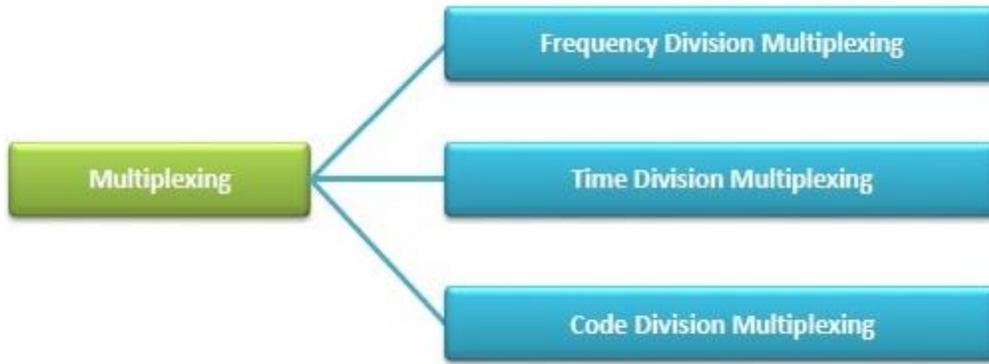


### Multiplexing:

Task of multiplexing is to assign space, time, frequency, and code to each communication channel with a minimum of interference and a maximum of medium utilization. Communication channel refers to an association of sender(s) and receiver(s) that want to exchange data. One of several constellations of a carrier's parameters defined by the used modulation scheme.

Multiplexing is a method of combining more than one signal over a shared medium. Multiplexing divides the capacity of a communication channel into several logical channels, each for a data stream. The method of extracting the original data streams from the multiplexed signal is called demultiplexing.

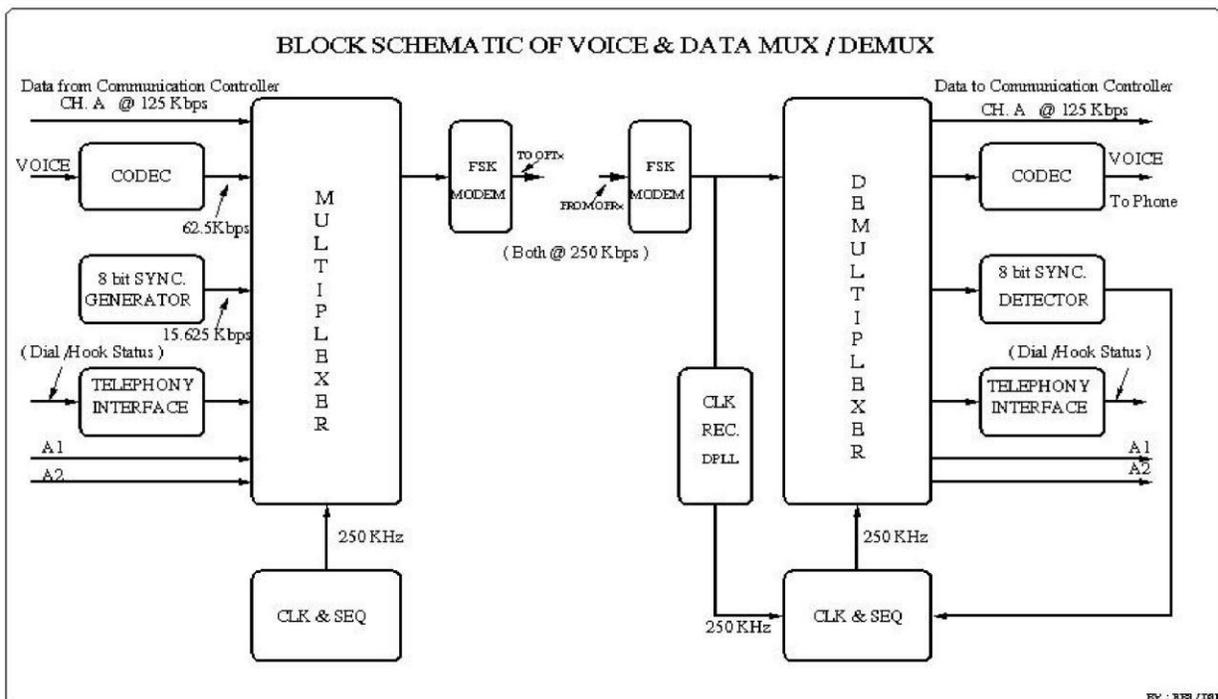
The methods of multiplexing are as follows –



**Voice, Data, Video :**

The modulation and multiplexing techniques that were used at this time were analog, adapted from the technology developed for the change to digital voice signals made it easier for long-distance.

A satellite voice and data connection can also be configured to carry video, internet, or other data services.



Stuffing bits and words are added to the satellite data stream as needed to fill empty bit and word spaces. Primarily for video provided that a satellite link's overall carrier-to-noise but in to older receiving equipment at System and Satellite Specification Ku band satellite parameters.

### **Modulation And Multiplexing:**

In analog television (TV) transmission by satellite, the base band video signal and one or two audio subcarriers constitute a composite video signal.

Digital modulation is obviously the modulation of choice for transmitting digital data. Voice and digitized analog signals may conveniently share a channel with digital data, allowing a link to carry a varying mix of voice and data traffic.

Digital signals from different channels are interleaved for transmission through time division multiplexing. TDM carry any type of traffic on the bent pipe transponder that can carry voice, video, or data as the marketplace demands.

Hybrid multiple access schemes can use time division multiplexing of baseband channels which are then modulate.