



Dr. SNS RAJALAKSHMI COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS)

Accredited by NAAC (Cycle- III) with 'A+' Grade



DEPARTMENT OF B.SC CS (GCD)

**21UCU407 – COMPUTER NETWORKS AND DATA COMMUNICATIONS
UNIT- II
DATA TRANSMISSION: CONCEPT AND TERMINOLOGY**

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Transmission Terminology

- ❑ data transmission occurs between a transmitter & receiver via some medium
- ❑ guided medium
 - eg. twisted pair, coaxial cable, optical fiber
- ❑ unguided / wireless medium
 - eg. air, water, vacuum

Transmission Terminology

- ❑ direct link
 - no intermediate devices
- ❑ point-to-point
 - direct link
 - only 2 devices share link
- ❑ multi-point
 - more than two devices share the link

Transmission Terminology

❑ Simplex transmission

- one direction
 - eg. television

❑ Half-duplex transmission

- either direction, but only one way at a time
 - eg. police radio (walkie-talkie: push-to-talk and release-to-listen)

❑ Full-duplex transmission

- both directions at the same time
 - eg. telephone

Time domain concepts of signals

□ time domain concepts

➤ analog signal

- varies in a smooth way over time

➤ digital signal

- maintains a constant level then changes to another constant level

➤ periodic signal

- pattern repeated over time

➤ aperiodic signal

- pattern not repeated over time

Analog and digital data transmission

- ❑ data
 - entities that convey meaning
- ❑ signals & signalling
 - electric or electromagnetic representations of data, physically propagates along medium
- ❑ transmission
 - communication of data by propagation and processing of signals

Audio Signals

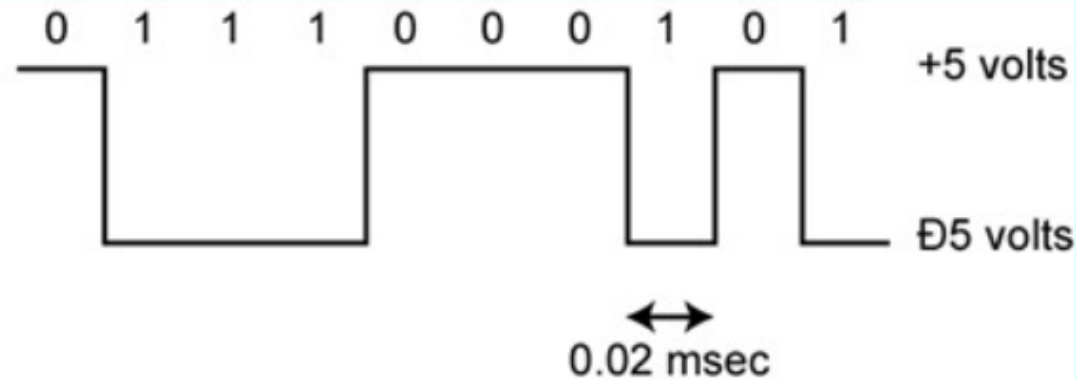
- ❑ freq range 20Hz-20kHz (speech 100Hz-7kHz)
- ❑ easily converted into electromagnetic signals
- ❑ varying volume converted to varying voltage
- ❑ can limit frequency range for voice channel to 300-3400Hz



In this graph of a typical analog signal, the variations in amplitude and frequency convey the gradations of loudness and pitch in speech or music. Similar signals are used to transmit television pictures, but at much higher frequencies.

Digital Data

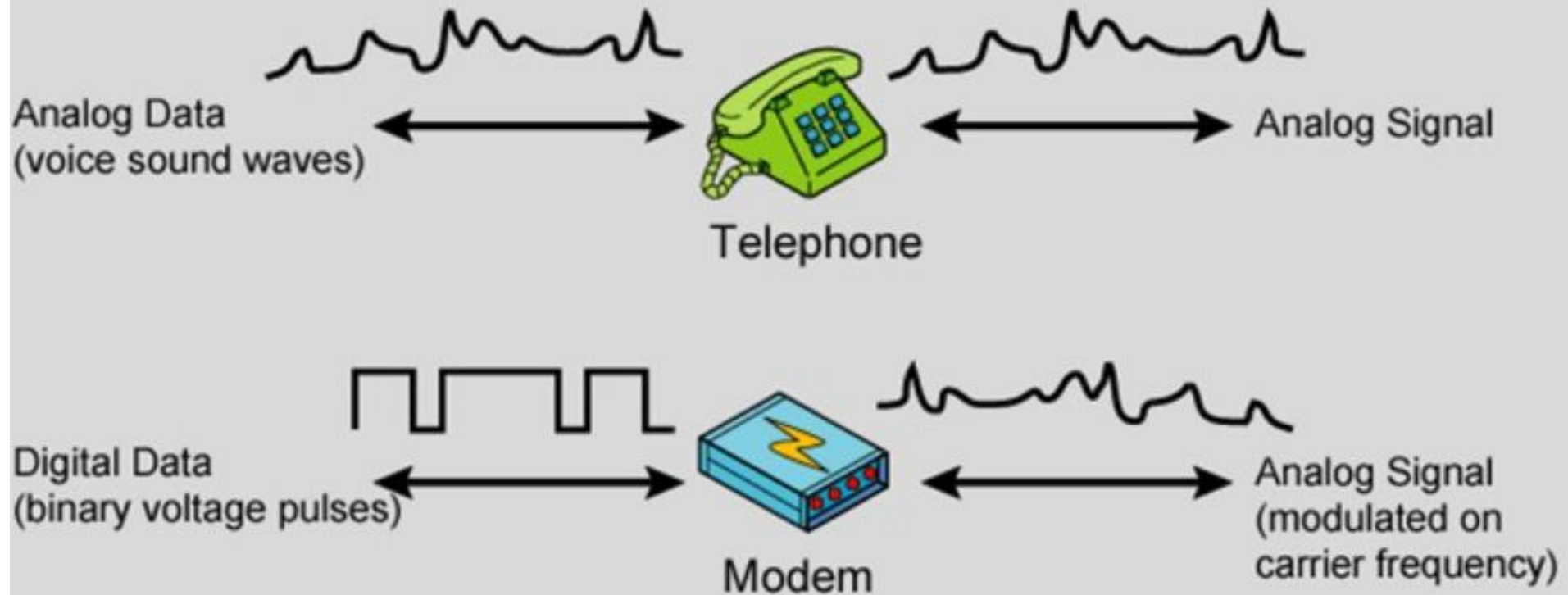
- ❑ as generated by computers etc.
- ❑ has two dc components
- ❑ bandwidth depends on data rate



User input at a PC is converted into a stream of binary digits (1s and 0s). In this graph of a typical digital signal, binary one is represented by -5 volts and binary zero is represented by +5 volts. The signal for each bit has a duration of 0.02 msec, giving a data rate of 50,000 bits per second (50 kbps).

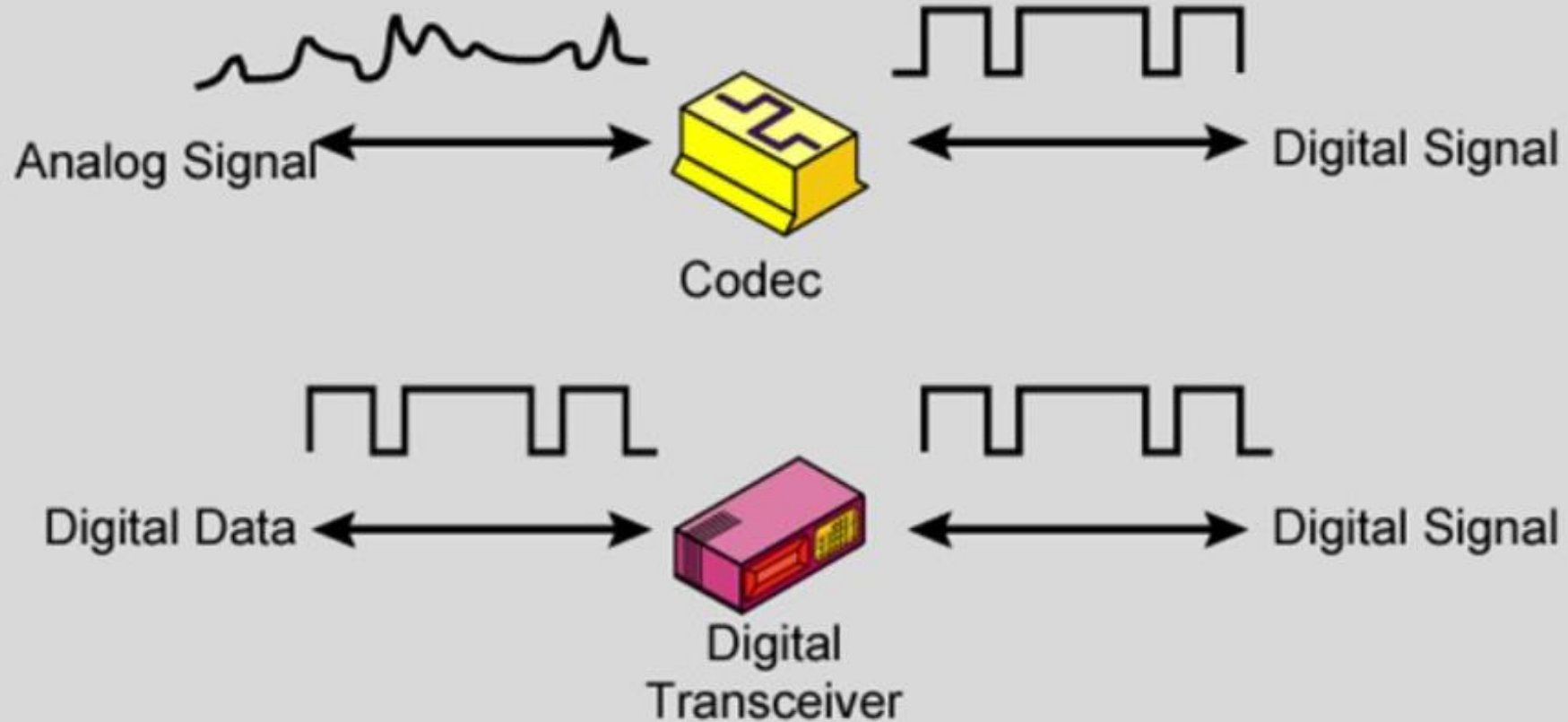
Analog Signals

Analog Signals: Represent data with continuously varying electromagnetic wave



Digital signals

Digital Signals: Represent data with sequence of voltage pulses



Advantages and disadvantages of digital signals

- ❑ cheaper
- ❑ less susceptible to noise
- ❑ but greater attenuation
- ❑ digital now preferred choice

