

Communication Systems

EE-206-F

**Dronacharya College of Engineering,
Gurgaon**

L T P
3 1 0Class Work marks : 50
Theory marks : 100
Total marks : 150
Duration of Exam : 3 hr

NOTE: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

SECTION-A**INTRODUCTION TO COMMUNICATION SYSTEMS:**

The essentials of a Communication system, modes and media's of Communication, Classification of signals and systems , Fourier Analysis of signals. Analog Communication & Digital Communication. Basic concepts of Modulation, Demodulators, Channels, Multiplexing & Demultiplexing.

SECTION-B**AMPLITUDE MODULATION:**

Amplitude modulation, Generation of AM waves, Demodulation of AM waves, DSBSC, Generation of DSBSC waves, Coherent detection of DSBSC waves, single side band modulation, generation of SSB waves, demodulation of SSB waves, vestigial sideband modulation (VSB).

ANGLE MODULATION :

Basic definitions: Phase modulation (PM) & frequency modulation(FM), narrow band frequency modulation, wideband frequency modulation, generation of FM waves, Demodulation of FM waves.

SECTION C

PULSE ANALOG MODULATION: Sampling theory, sampling and hold circuits. Time division (TDM) and frequency division (FDM) multiplexing, pulse amplitude modulation (PAM), pulse time modulation.

PULSE DIGITAL MODULATION : Coding & Decoding techniques, Elements of pulse code modulation, noise in PCM systems, Measure of information, channel capacity, channel capacity of a PCM system, differential pulse code modulation (DPCM). Delta modulation (DM)

SECTION D

DIGITAL MODULATION TECHNIQUES: ASK, FSK, BPSK, QPSK, M-ary PSK.

PC-PC data Communication

INTRODUCTION TO NOISE: External noise, Internal noise, S/N ratio, noise figure.

TEXT BOOKS:

1. Communication systems (4th edn.): Simon Haykins; John wiley & sons.
2. Communication systems: Singh & Sapre; TMH.

REFERENCE BOOKS :

1. Electronic Communication systems : Kennedy; TMH.
2. Communication Electronics : Frenzel; TMH.
3. Communication system : Taub & Schilling; TMH.

Essentials of Communication System

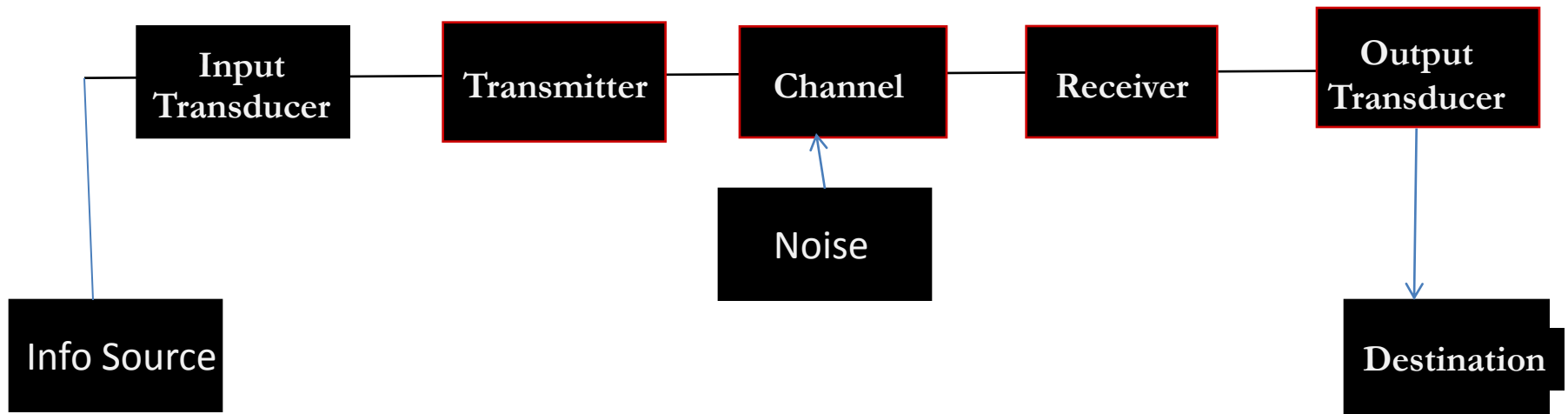


Figure: Block Diagram of Analog Communication System

Essentials of Communication System

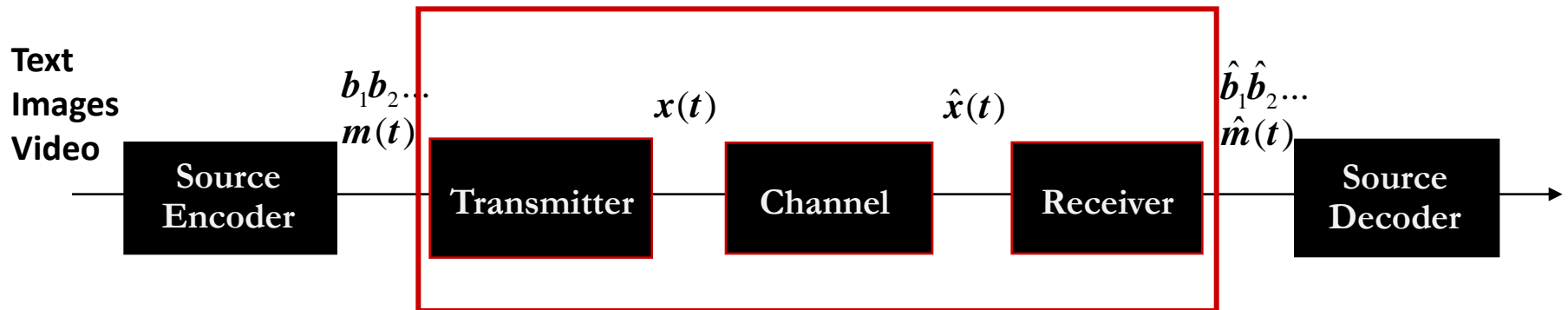
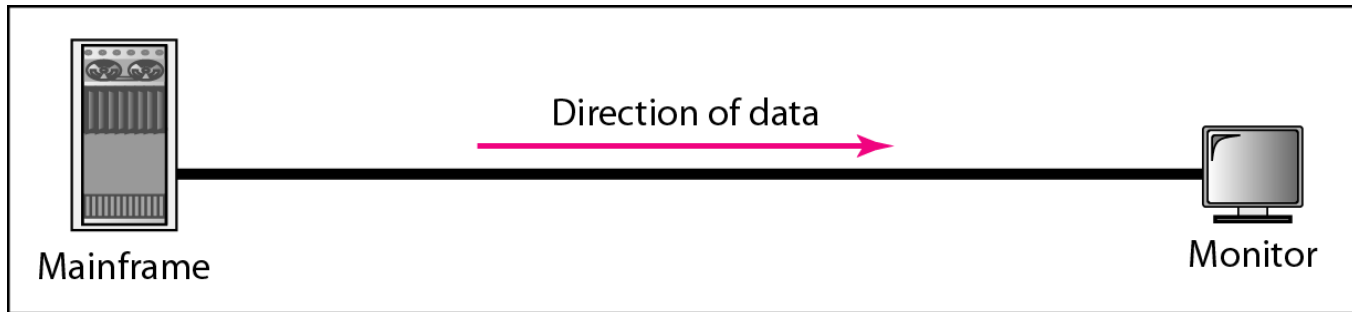


Figure: Block Diagram of Digital Communication System

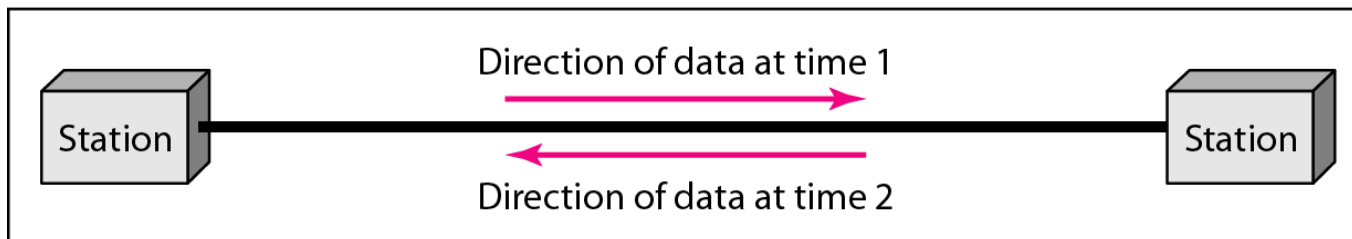
- Source encoder converts message into message signal or bits.
- Transmitter converts message signal or bits into format appropriate for channel transmission (analog/digital signal).
- Channel introduces distortion, noise, and interference.
- Receiver decodes received signal back to message signal.
- Source decoder decodes message signal back into original message.

- Communication systems send information electronically over communication channels.
- Many different types of systems which convey many different types of information.
- Design challenges include hardware, system, and network issues.
- Communication systems recreate transmitted information at receiver with high fidelity.

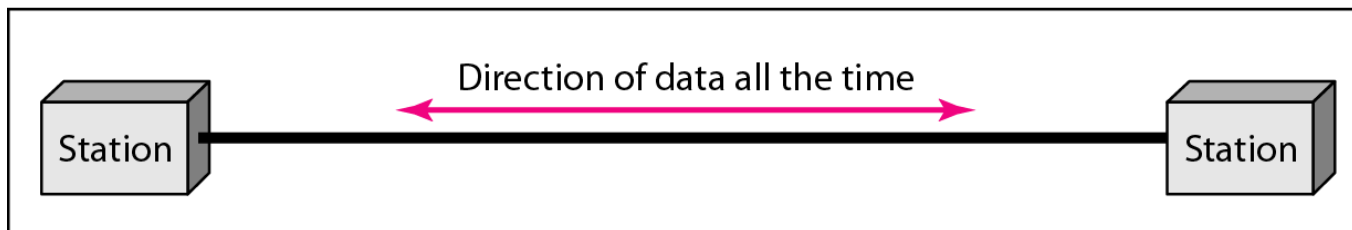
Modes of Communication: *Simplex, Half-Duplex and Full-Duplex*)



a. Simplex



b. Half-duplex



c. Full-duplex

- **Simplex (SX)** – one direction only, e.g. TV
- **Half Duplex (HDX)** – both directions but not at the same time, e.g. CB radio
- **Full Duplex (FDX)** – transmit and receive simultaneously between two stations, e.g. standard telephone system
- **Full/Full Duplex (F/FDX)** - transmit and receive simultaneously but not necessarily just between two stations, e.g. data communications circuits

Medias for Communication

- Telephone Channel
- Mobile Radio Channel
- Optical Fiber Cable
- Satellite Channel