

Communication Systems

Lecture-1

Topic Covered: Types of signals and their representation, 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. Channels, Multiplexing & Demultiplexing.

Essentials of Communication System

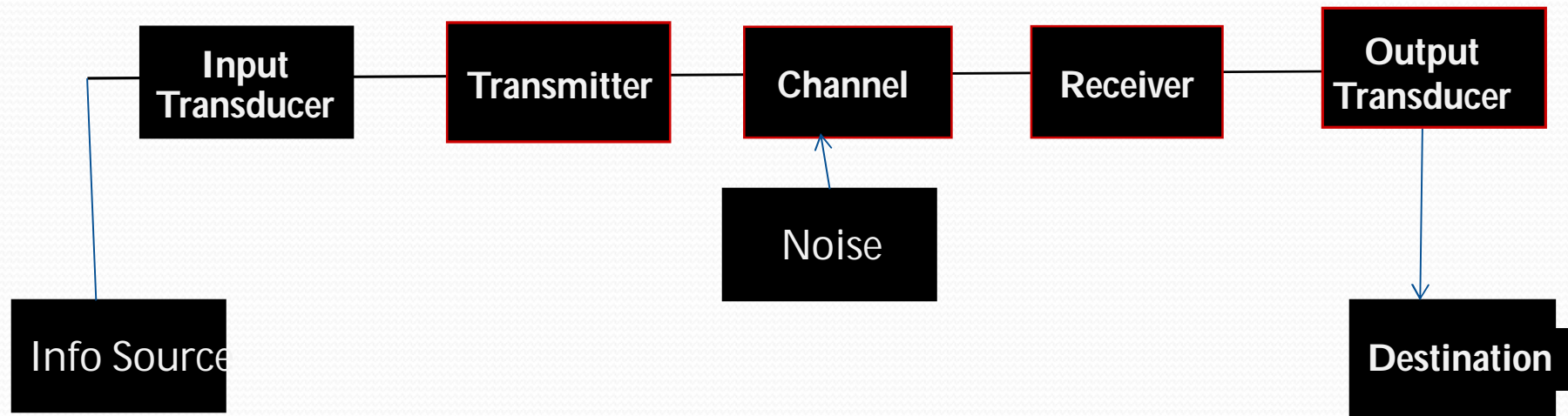


Figure: Block Diagram of Analog Communication System

Essentials of Communication System

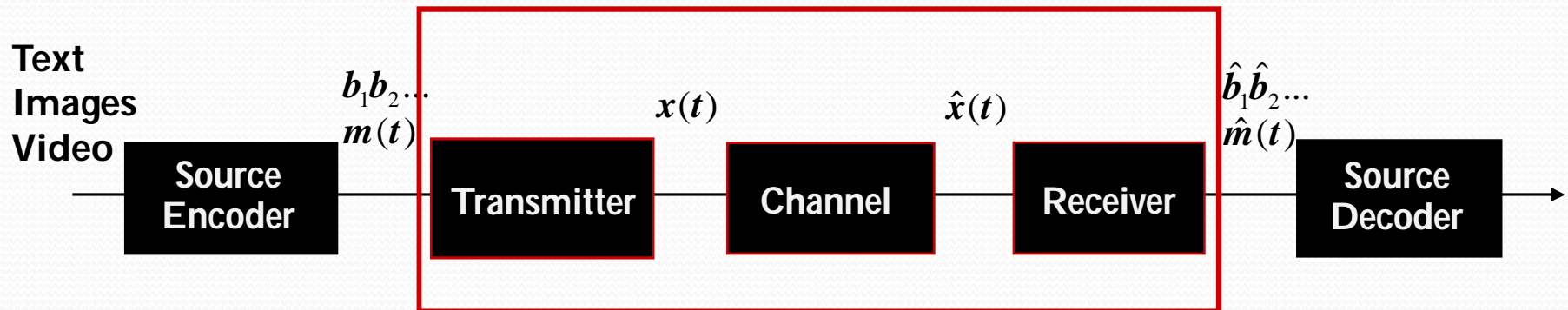
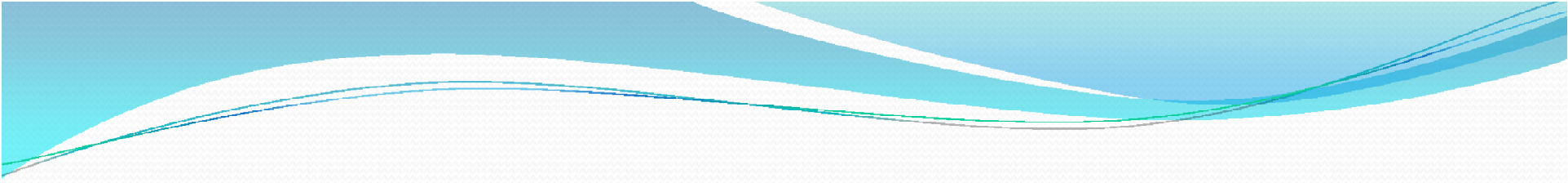
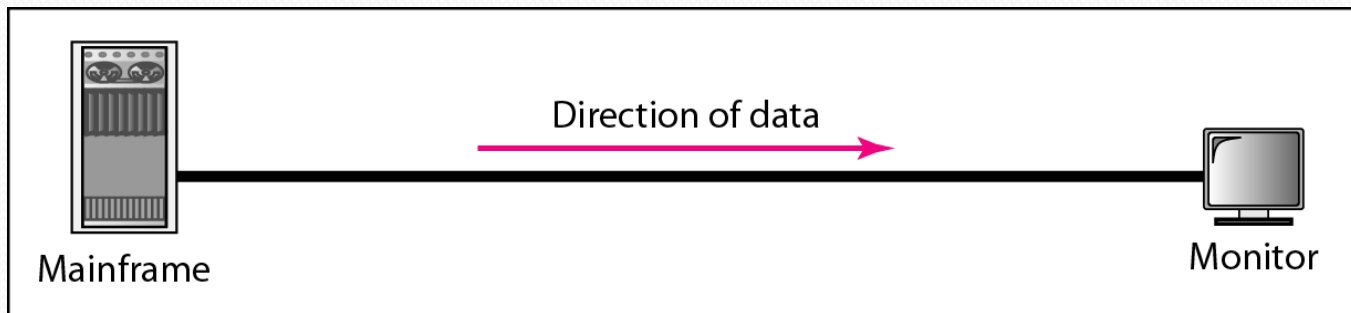


Figure: Block Diagram of Digital Communication System

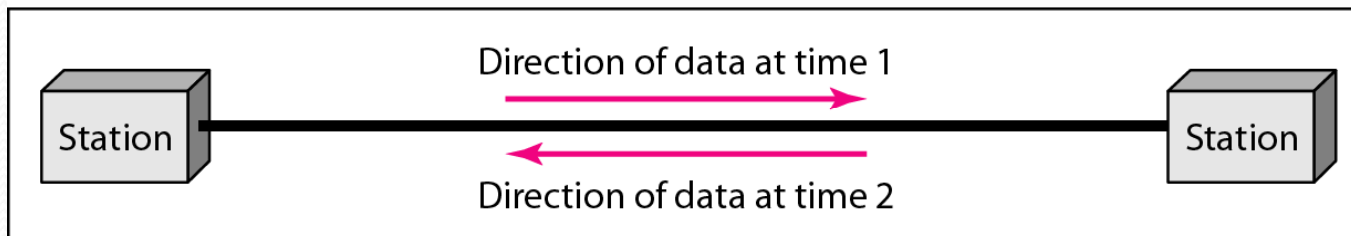
- Source encoder converts message into message signal or bits.
- Transmitter converts message signal or bits into format appropriate for channel transmission (analog/digital signal).
- Channel introduces distortion, noise, and interference.
- Receiver decodes received signal back to message signal.
-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

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- 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.

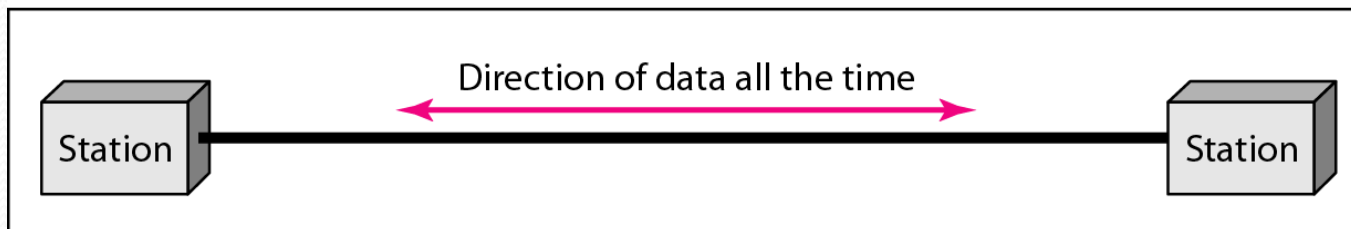
Modes of Communication: *Simplex, Half-Duplex and Full-Duplex*)



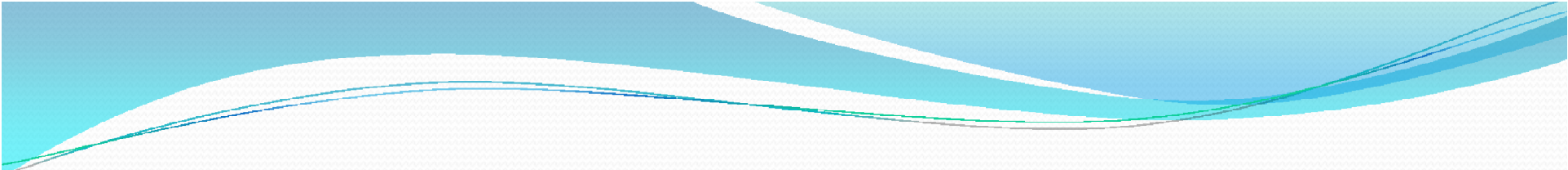
a. Simplex



b. Half-duplex



c. Full-duplex

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- **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