

Communication Systems

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Chapter 1: Electronic Communication:

- Introduction to communication- meaning and types,
- Block diagram of an electronic communication system.
- Electromagnetic communication spectrum,
- Band designations and usage.
- Channels and base band signals.
- Concepts of bandwidth, gain, attenuation, Channels and base-band signals
- concept of Noise, signal-to-noise (S/N) ratio.

Communication Systems

- Communication is the process of exchanging information.
- A communication system conveys information from its source to a destination.
- **Examples:**
 - Telephone
 - TV
 - Radio
 - Cell phone
 - Satellite

Communication Systems

- A communication system is composed of the following:

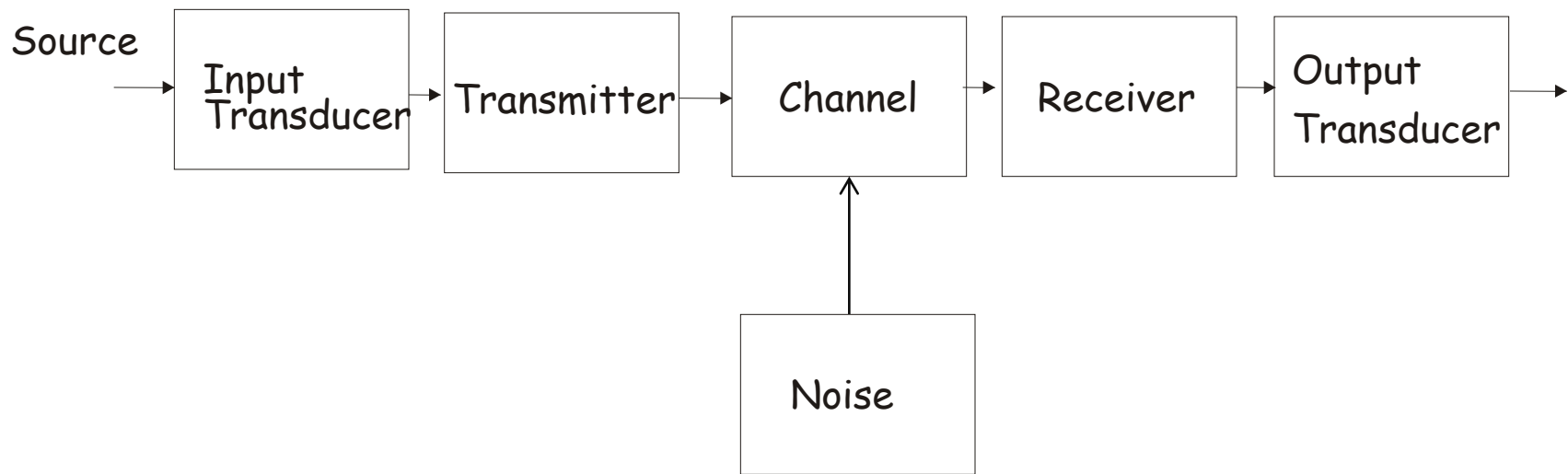
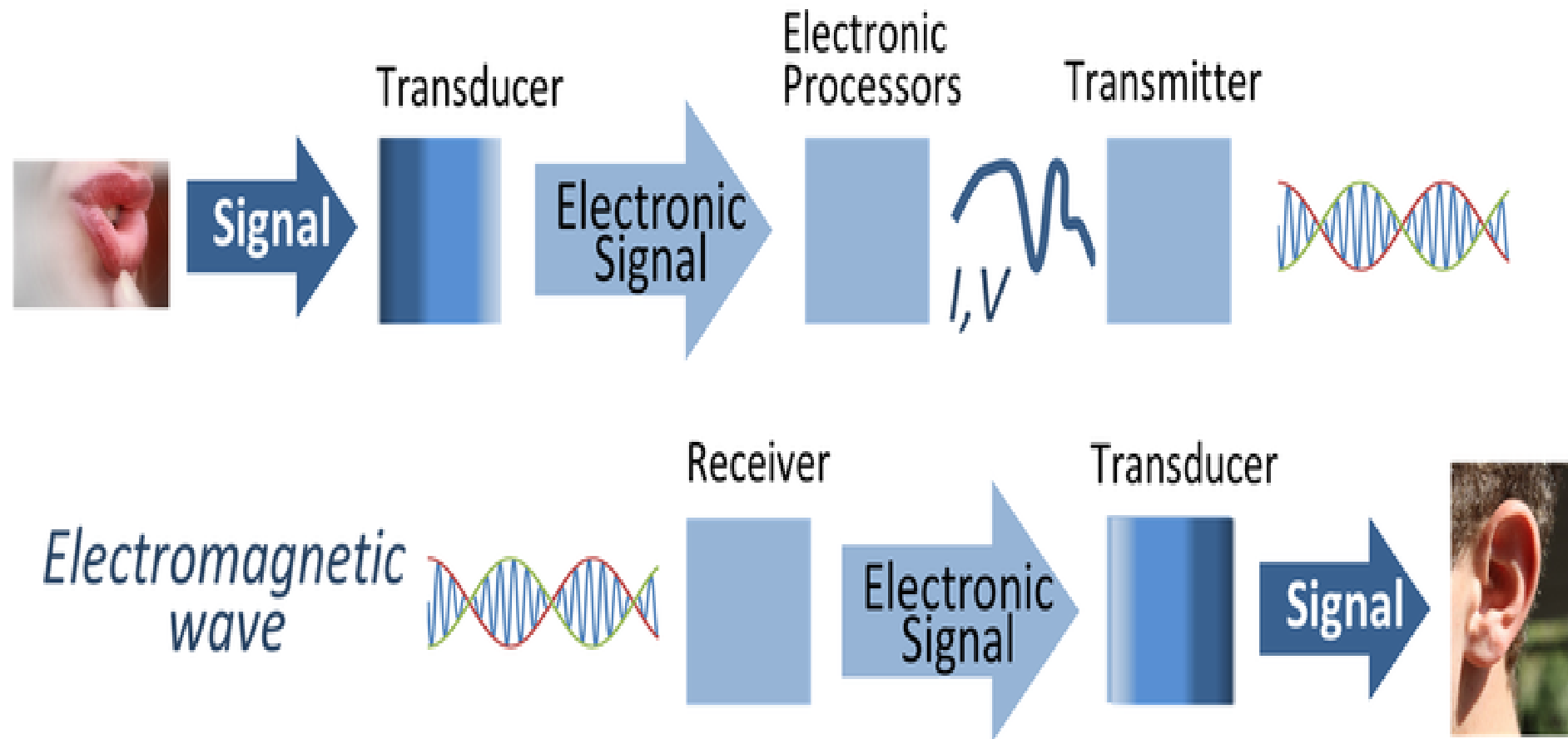


Fig. Block diagram of Electronics Communication System

Communication Systems



Input Transducer

- *Source: Analog or digital*
- *Example: Speech, music, written text*
- **Input Transducer:** Converts the message produced by a source to a form suitable for the communication system.
- **Example:**
Speech waves → Microphone → Voltage

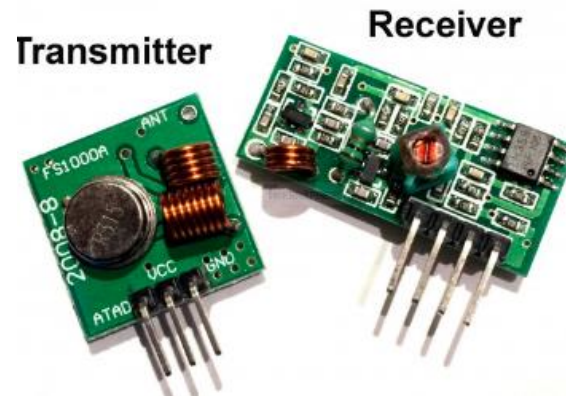
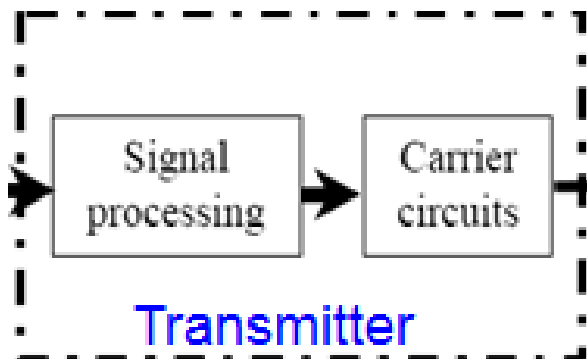


Transmitter

-The **transmitter** is a collection of electronic components and circuits that converts the electrical signal into a signal suitable for transmission over a given medium.

-Transmitters are made up of oscillators, amplifiers, tuned circuits and filters, modulators, frequency mixers, frequency synthesizers, and other circuits.

- Examples: TV station, radio station, web server.

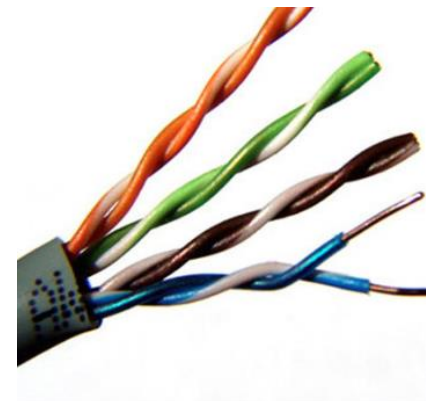


Source of image:

<https://www.deltakit.net/product/rf-transmitter-receiver-module-315mhz-wireless-link-kit-for-arduino/>

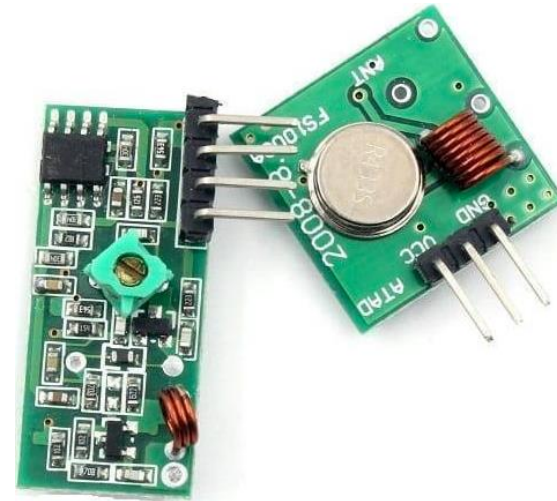
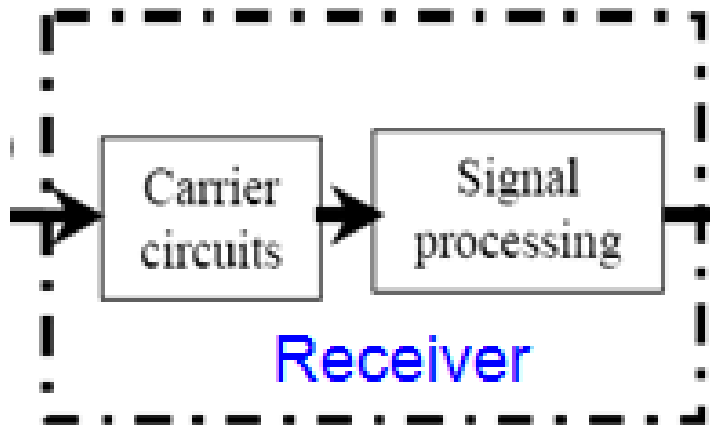
Communication Channel

- The **communication channel** is the medium by which the electronic signal is sent from one place to another.
- Types of media include
 - Electrical conductors (wires, coaxial cable,)
 - Optical media (laser beam, fiber optic cable)
 - Free space
 - System-specific media (e.g., water is the medium for sonar).



Receiver

- Extracts message from the received signal
- Operations: Amplification, Demodulation, Filtering
- Goal: The receiver output is a scaled, possibly delayed version of the message signal (ideal transmission)
- Examples: TV set, radio, web client



Source of image: <https://hallroad.org/fs1000a-433mhz-rf-transmitter-receiver-module-male-pin-in-pakistan.html>

Output Transducer

- Converts electrical signal into the form desired by the system
- Examples: Loudspeakers, PC



Plotter



Noise

- Noise is random, undesirable electronic energy that enters the communication system via the communicating medium and interferes with the transmitted message.
- Types of Noise:
 - Internal and External Noise
- Internal Noise: Generated by components within a communication system (thermal noise)
- External Noise:
 - Atmospheric noise (electrical discharges)
 - Man-made noise (ignition noise)

Thank You