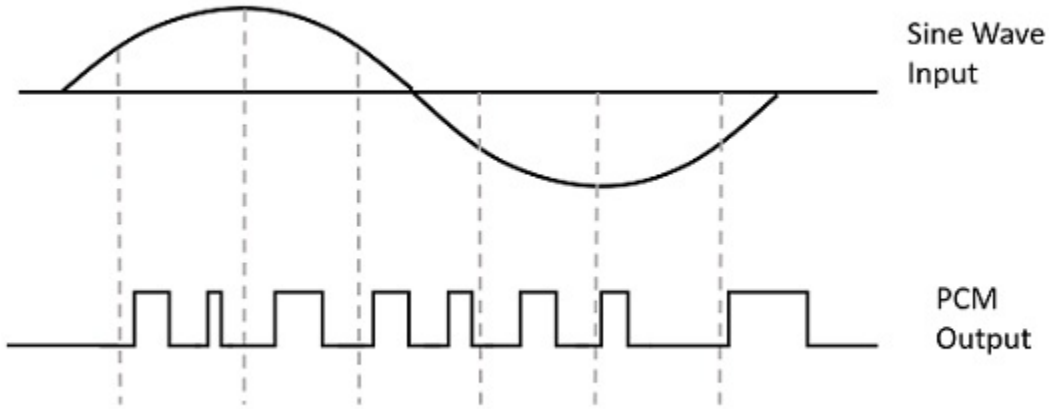
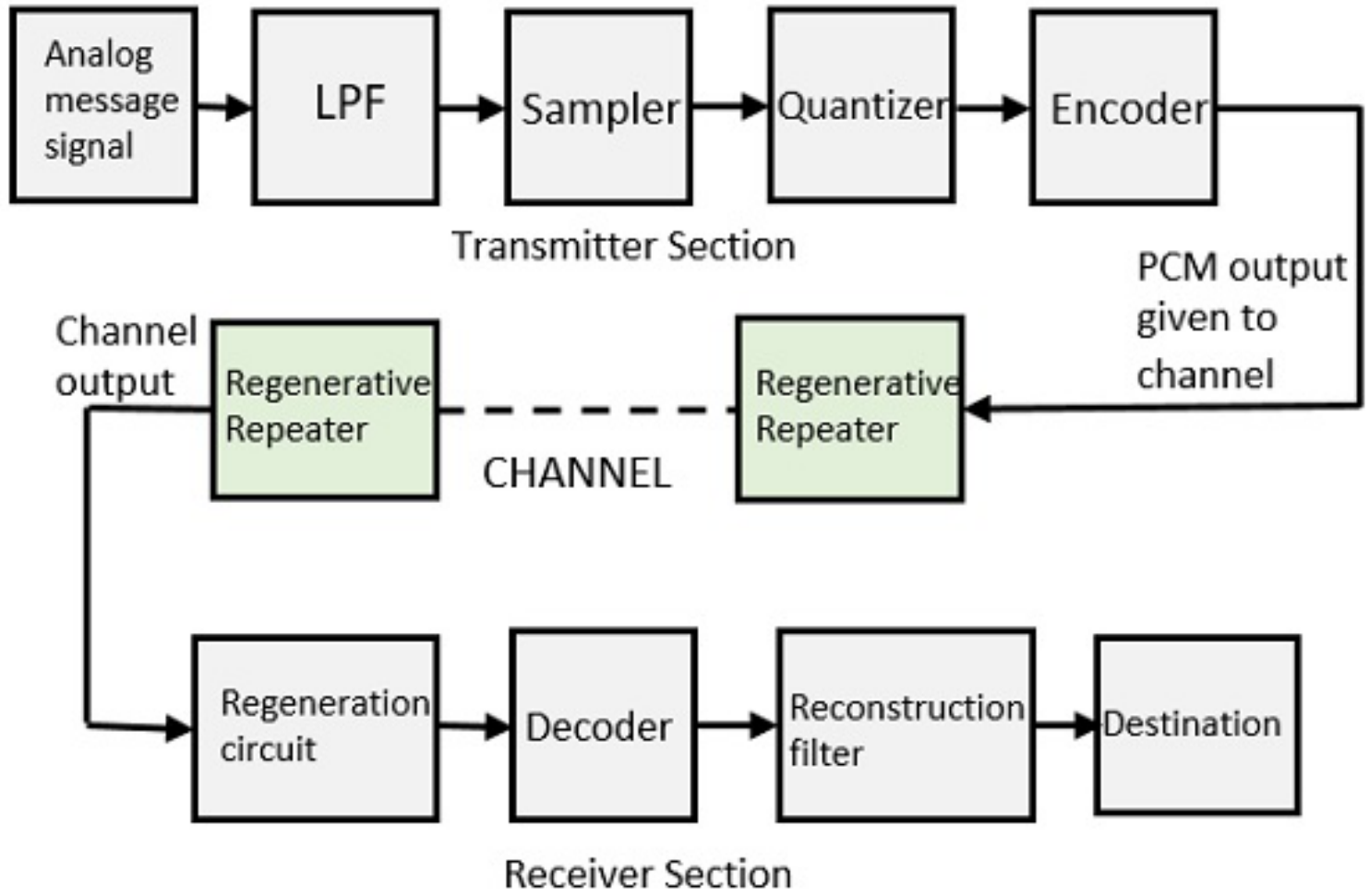
Pulse Code Modulation

- Modulation is the process of varying a carrier signal's properties, such as amplitude, frequency, or phase, to transmit information.
- There are many modulation techniques, which are classified according to the type of modulation employed. the digital modulation technique used is Pulse Code Modulation PCM.



Basic Elements of PCM and its block diagram



Basic Elements of PCM

1. **PCM (Pulse Code Modulation)**: A digital modulation technique that converts analog signals into a series of discrete, binary values.
2. **Low Pass Filter**: A filter used in PCM to remove high-frequency components from the analog signal before sampling, preventing aliasing.
3. **Sampler**: A component that periodically measures and digitizes the amplitude of the filtered analog signal at a specific sampling rate.
4. **Quantizer**: The part of PCM that assigns each sampled value to a discrete binary code, effectively quantizing the continuous signal.
5. **Encoder**: Converts the quantized sample values into a binary bitstream for transmission or storage.
6. **Regenerative Repeater**: A device used in long-distance PCM transmission systems to regenerate and amplify the digital signal to maintain signal integrity.
7. **Decoder**: Reverses the encoding process by converting the received binary bitstream back into quantized sample values.
8. **Reconstruction Filter**: Filters the decoded signal to smooth out the digital steps and reconstruct the original analog waveform.