

Transmission Simulation

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This document has the goal of illustrating the functioning of a telecommunication system transmission from the beginning to the end. The full schematic - containing every step - of a transmission system is presented in figure 1. Before exploring the mathematical background hidden between the steps, it is crucial to understand what every phase of the system means.

- ◇ *Source:*
- ◇ *Formatting Device:*
- ◇ *Source Coding:*
- ◇ *Channel Coding:*

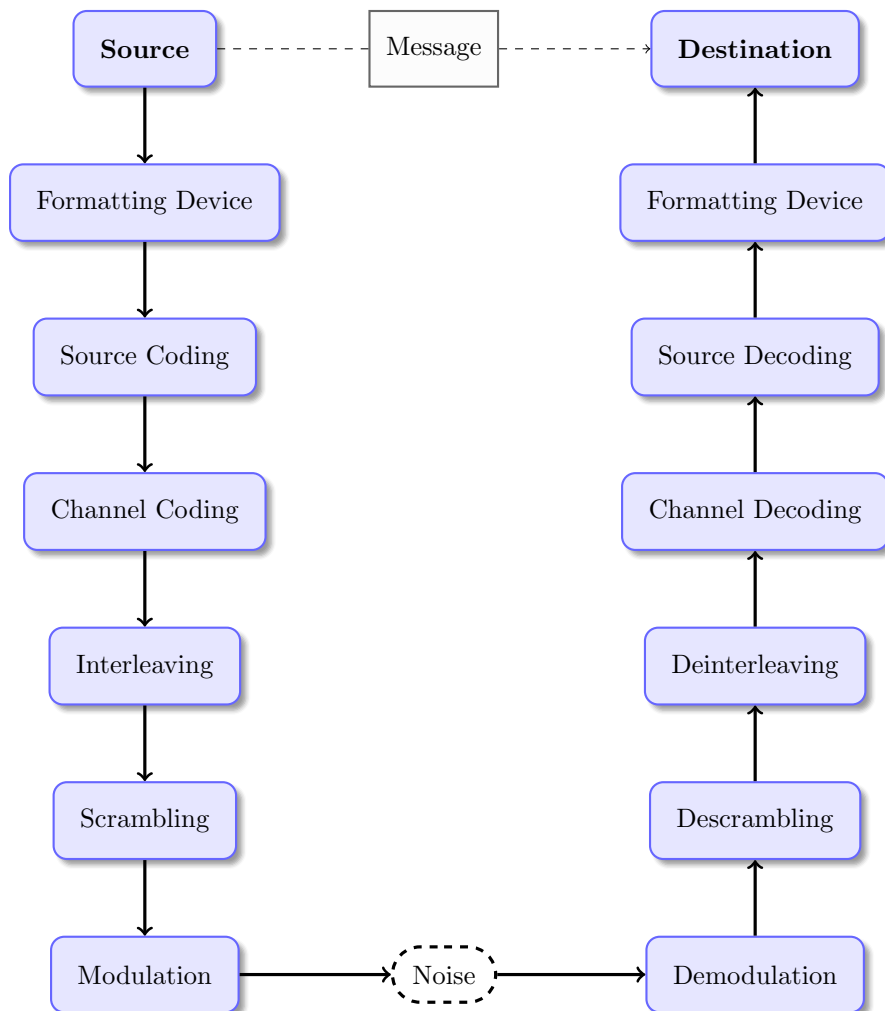


Figure 1: The diagram of the digital information transmission system.

- ◇ *Interleaving*:
- ◇ *Scrambling*:
- ◇ *Modulation*: the modulation process' goal is to match the spectrum of the transmitted signal with the transmission channel bandwidth making the signal more noise-immune and increasing the data-transfer rate; these operations are performed by the *modulator*.
- ◇ *Noise*: the noise is a crucial obstacle to cross to have a successful transmission; the noise is the main reason for a wrongly transmitted symbol. There are different types of noise, some of them are generated by other transmissions, others are due to the physical medium and others are caused by the intermediate devices between the transmission. Nevertheless, in every transmission, there will be the *Gaussian White Noise* which is a thermal noise caused by the Big Bang.
- ◇ *Demodulation*:
- ◇ *Descrambling*:
- ◇ *Deinterleaving*:
- ◇ *Channel Decoding*:
- ◇ *Source Decoding*:
- ◇ *Formatting Device*:
- ◇ *Destination*: