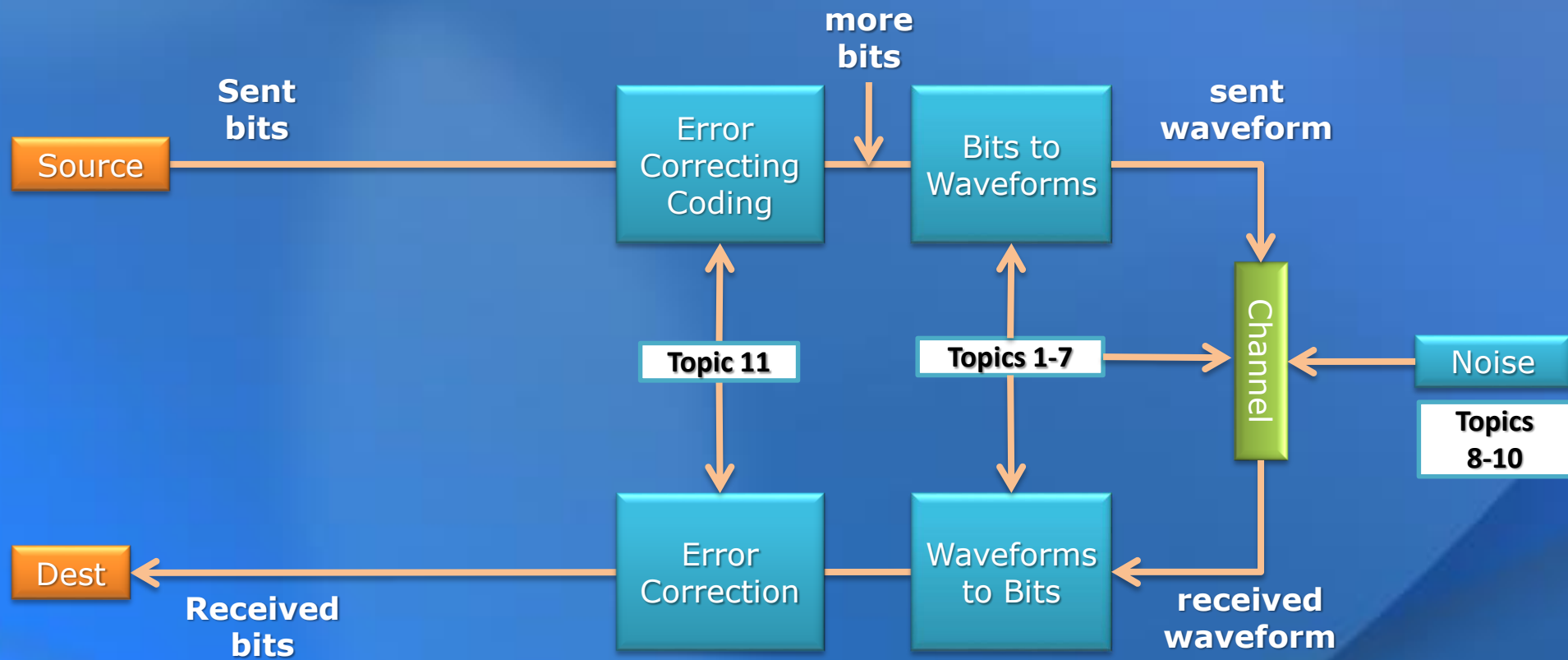


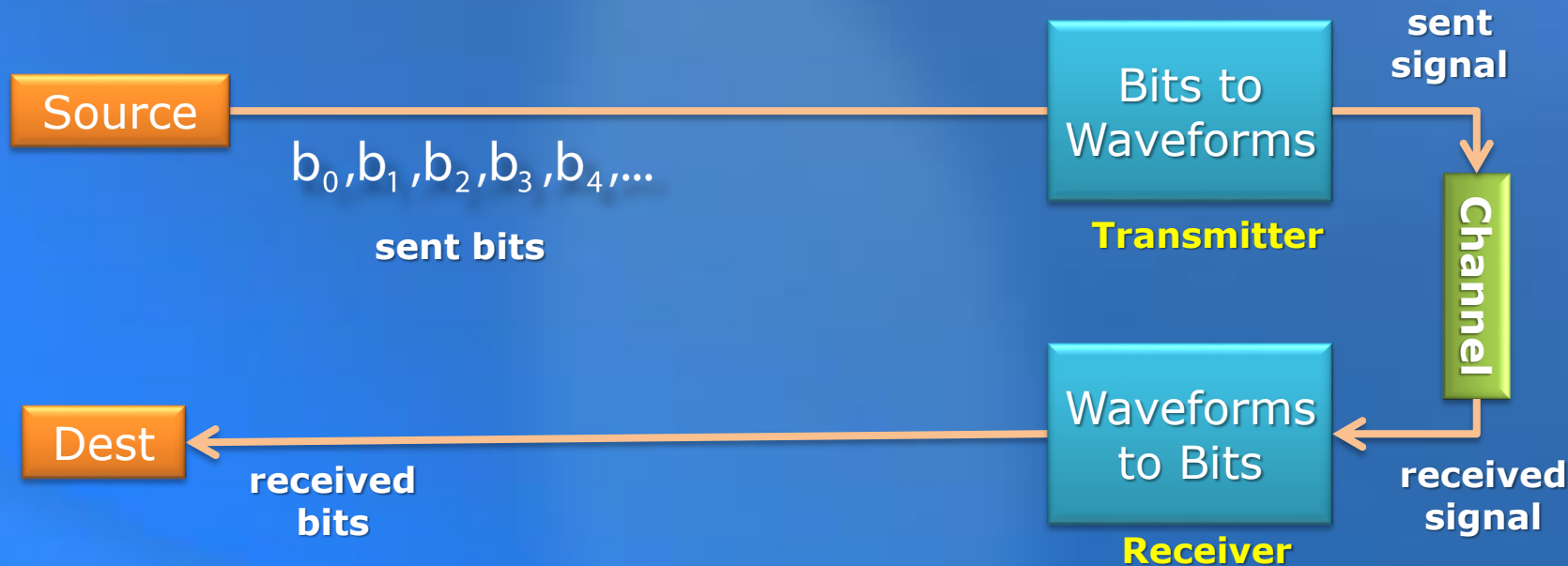
# **Basic Communication System**

# Recap



# Basic Communication System

The **transmitter** takes a sequence of bits (0 or 1) and creates a physical signal or waveform (e.g. time varying voltage or light intensity) that is carried over a channel.



The **channel** (a wire, the air, a fiber optic cable) may modify the signal as it carries it.

The **receiver** tries to figure out what the transmitted bits were from the received signal.

# What are Bits?

- A bit is the basic unit of information used in modern computers and communication systems.
- A bit is a variable that can assume only two possible values or “states”, commonly denoted by 0 or 1.
- Intuitively, the bit can be thought of as the answer to a yes/no question.
- More complicated information can be sent with sequences of bits.

# Representing Bits

Physically, bits can be represented as two distinct states of a physical variable.

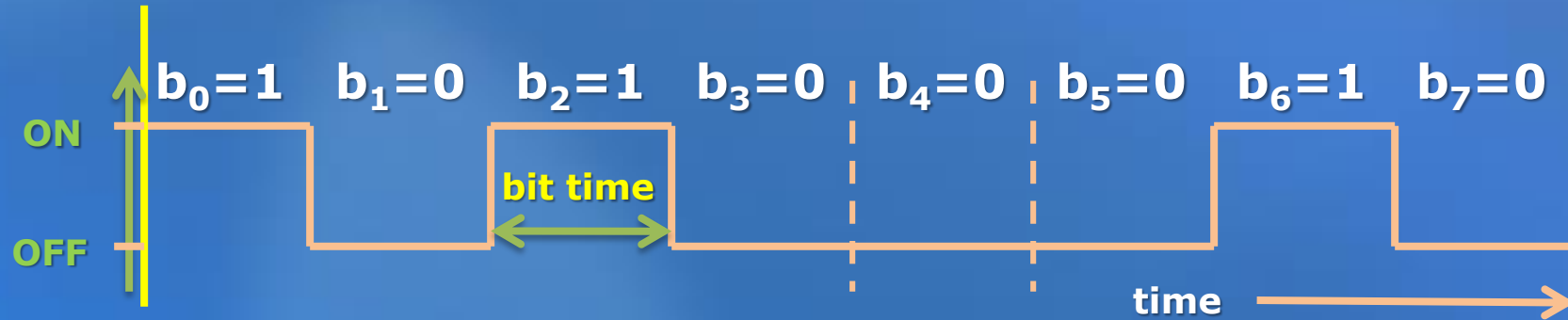
Examples:

- voltage (1 = high / 0 = low)
- current (1 = positive / 0 = negative)
- light (1 = on / 0 = off)

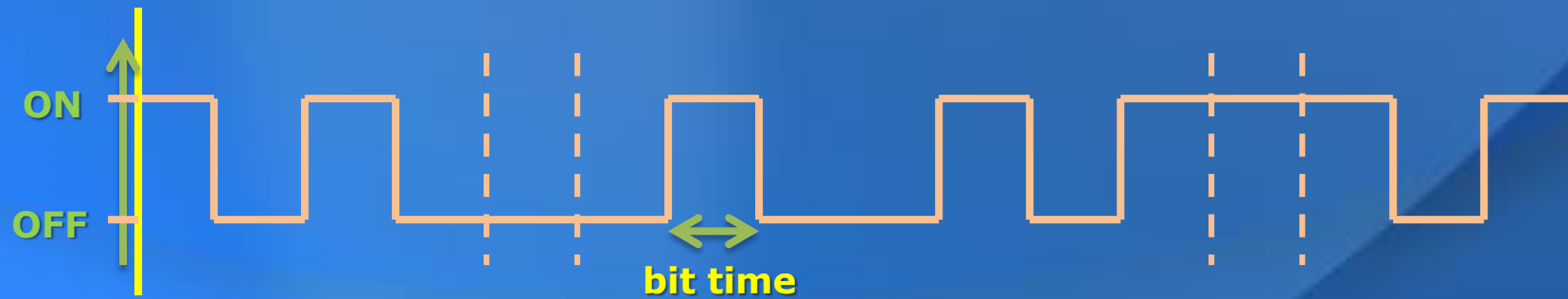


# Representing Bit Sequences as Waveforms

light intensity



light intensity

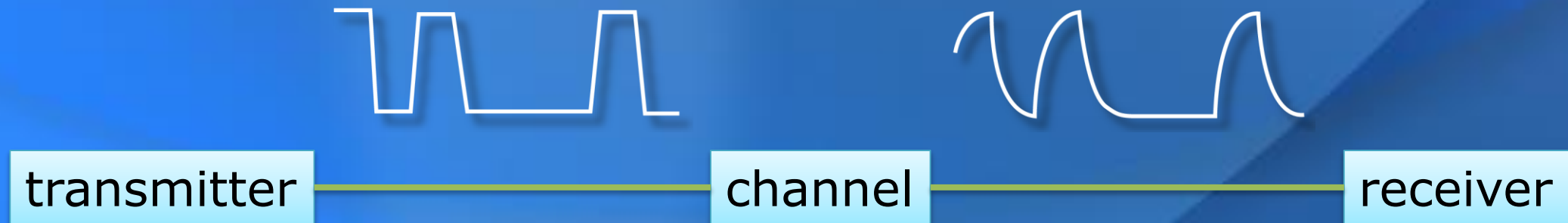


# Channel

**The transmitter sends the waveform representing the bit sequence to the receiver over a channel.**

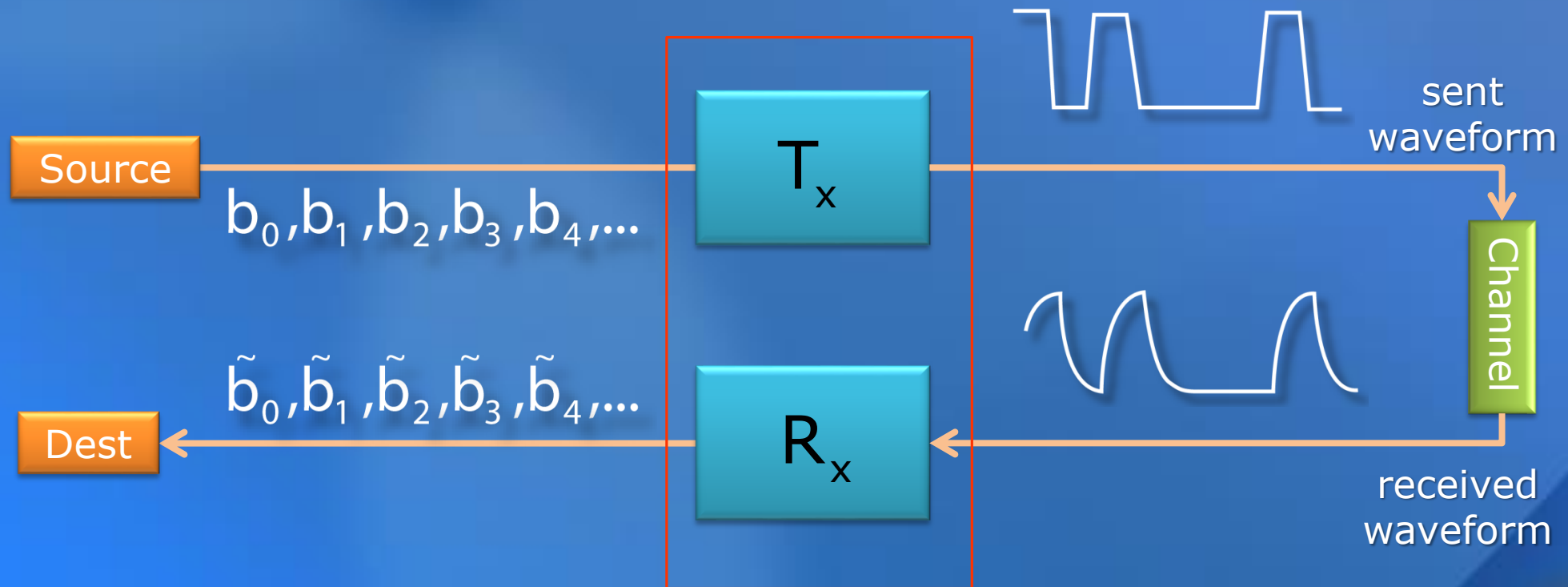
## **Examples:**

- A voltage or current waveform might be sent over a wire
- A light waveform might be sent over a fiber optic link (Internet) or over plain air (TV remote)





# Receiver



## Common abbreviations:

$T_x$  = Transmitter  
 $R_x$  = Receiver