What is a Signal?

Signal is an electromagnetic wave that carries information through physical medium. Here the data is converted into electromagnetic signal either as analog or digital and sent from sender to receiver.

Electronic signals in general can be classified into two. They are analog signals and digital signals. These signals vary in properties. They both are used to convey signals. The major difference between the two signals is that analog signals are continuous signals and whereas digital signals are discrete signals.

Analog Signals vs. Digital Signals

1. Signal which are Continuous as time varying in nature are **analog signals**

2. Signal which are discrete are called **digital signals**.

Volts(V)

Analog Signal

5V

Amplitude
10 V$_{p-p}$

0

Time (t)

-5V

Volts(V)

Digital Signal

5V

0V

Time (t)
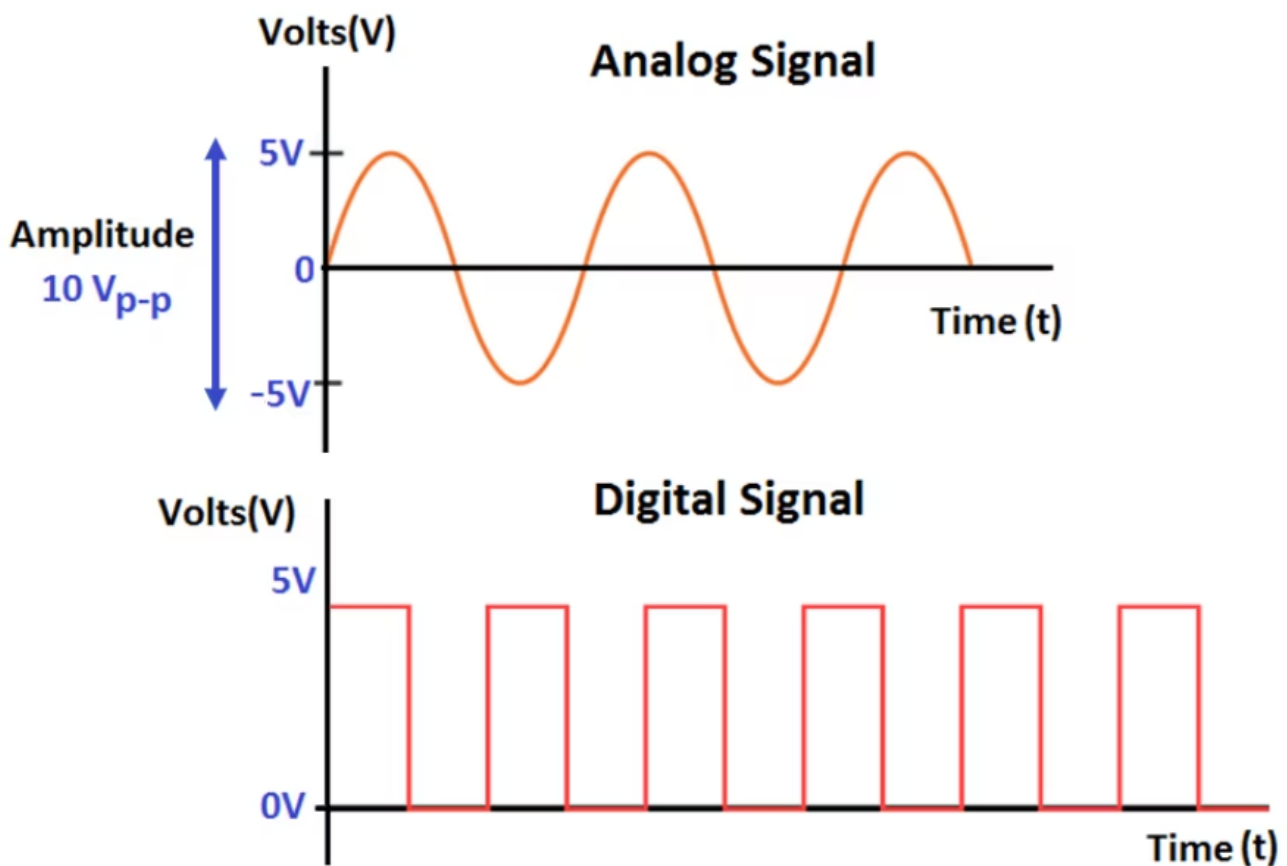
Analog signal	Digital signal
Analog signals are continuous signals.	Digital signals are not continuous, they are discrete signals.
We can represent analog signals in the form of sign waves.	We can represent digital signals in the form of square waves.
The values of voltage will be in a continuous range	The values of voltage will be discontinuous.

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Records the information as it is.	Converts the information into binary form.
These signals are used in analog devices.	Digital electronic devices like computers, smartphones, smartwatches, etc. use these signals
Examples: Any natural sound, human voice, data read by analog	Electronic signals, computer signals, data read by digital devices.

Note:

Compared to digital signals analog signals lack perfection and efficiency. They can be subjected to distortions. The main disadvantage of analog signals is that they are not resilient to noise. Noises are unwanted signals that destroy the perfection of signals. This will affect the quality of transmission. This problem is not faced by digital signals.

Parallel Transmission
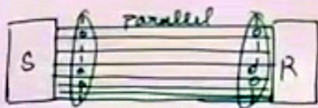
→ Each bit has its own path &
Total message is transmitted at
the same time.
→ n-bit must be transmitted through
n-separate wires
→ Faster but requires many wires
→ Used for short distance where
speed is important
Eg: CPU & Memory (Bus)

CPU & Printer

Serial Transmission
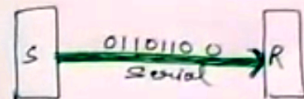
→ Each bit in the message is sent in
sequence one at a time.
→ n-bit is transmitted through one wire.
→ Slower but less expensive since
requires only pair of wire.
→ Used for long distance
Eg: CPU & I/O devices
Computer to Computer

2 Types
ⓐ Synchronous