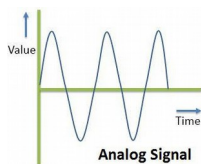


# Digital electronics

**Introduction:-** digital electronics is the foundation of digital computers and most of automated control systems. Digital electronics is have a great impact on modern society. Nowadays, we are using calculators, computers, watches, communication system etc.

**Analog signal:-** analogue signal is defined as “voltage or current whose size is proportional to the quantity is represents”. It is a continuous signal and has infinite set of possible values.



the example of analogue signals are sound, temperature, pressure, velocity, Sinoidal wave form etc

**Digital signal:-** digital signals are discrete in nature. A digital signals can have fixed number of values. Mostly digital signals have only two value that is 1 and 0. A value 1 represents a high Signals and a value 0 represents a low signals.



A digital signal represent a  
Logic 1 = high level

Logic 0 = low level

**Analog system:-** the system which processes and analog signal is known as analogue system. In an analog system, the physical quantities can vary over a continuous range of value. these example of analog systems are telephone system and Magnetic tape recording etc.

**Digital system:-** the system which processes a digital signal is known as digital system. the digital signals can represent in discrete value. the example of digital systems are digital watches, calculators, computers, counters etc.

**Difference between analog and digital signals:-**

**Analog signal.**

1. analog signals are continuous in nature and can have infinite number of values.
2. Basic analog signal is represented by sine wave.
3. Analog signals are stored in the form of wave signals.
4. Analog signal transmission requires less bandwidth.
5. Processing and transmission of analogue signals is more prone to noise.

**Digital signal:-**

1. Digital signals are discrete in nature and can have fixed number of value.
2. Basic digital signal is represented by square wave.
3. Digital signals are stored in the form of binary bits.
4. Digital signal transmission requires large bandwidth.
5. processing and transmission of digital signals is less prone to noise.

### **advantages of digital system over analogue systems:-**

- 1. Flexibility:** digital system hardware are very flexible as compared to analog system hardware.
- 2. Effect of noise:** In digital systems, effect of noise is very less as compared to in analog system.
- 3. Reliability:** digital system are more reliable as compared to analog system.
- 4. Storage:** it is very easy, reliable and compact to store information in digital form as compared to in analog form.
- 5. Observational error:** Analog instruments are prone to observational error while digital instruments are free from observational error like parallax and approximation error.

**6. Design:** with the advancement of digital technology and availability of large variety IC's, it is very easy to design a complex logic in digital system as compared to in analog system.

**6.Easy to use:** The digital systems are easier to use because they directly display data in alpha-numeric form on the screen.

### **Disadvantages of digital system over analog system:-**

**1. Bandwidth:** Digital systems required large bandwidth as compared to analog systems.

**2. Quantization noise:** Quantization noise is available in digital systems which is not present in analog systems.

**3.Complexity:** Digital systems are more complex as compared to analog systems.

### **Applications of digital systems:**

digital systems are widely used almost every sphere of life. some of the application are:

1. Data base management system used banks, offices, institutes, shop etc using computers.

2. process monitoring and control system in industries using computers, PLC's robots.

3. Digital Signal Processing and digital communication.

4. Entertainment appliance like CD/DVD players, LED TVs, digital cameras.
5. appliances like photostat machine, fax machine, EPBAX machines, microwaves ovens.
6. medical instruments like digital x-ray machines, ultrasound machines, ECG machines.
7. Combustion control in modern vehicles.