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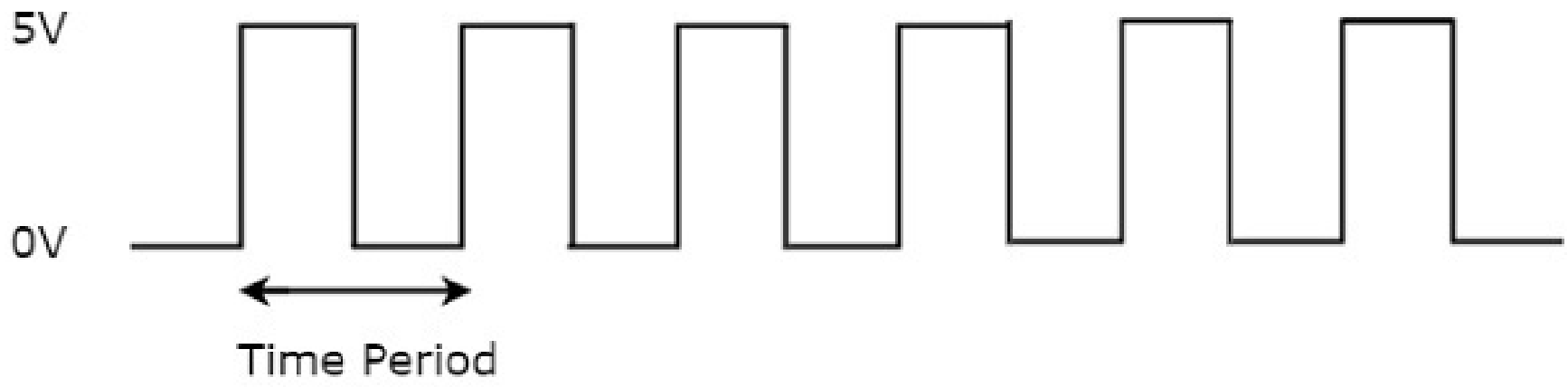
Day - 8

Embedded Systems Programming

CLOCK SIGNAL



A **clock signal** is a timing signal used in digital circuits to synchronize the operations of different components. It provides a steady pulse at regular intervals, acting like a **rhythm keeper** for electronic devices. The ON time and OFF time of clock signal **need not be the same.**

In the above figure, square wave is considered as clock signal. This signal stays at **logic High (5V)** for some time and stays at **logic Low (0V)** for **equal amount of time**. This pattern repeats with some time period. In this case, the time period will be equal to either **twice of ON time or twice of OFF time.**

KEY CHARACTERISTICS

- **Frequency:** The rate at which the clock ticks (measured in Hertz, Hz). For example, a 1 MHz clock signal ticks one million times per second.

- **Duty Cycle:** The percentage of one cycle in which the signal is high (active). A 50% duty cycle means the signal is high for half the time and low for the other half.

- **Waveform:** Clock signals typically take the form of a square wave, characterized by a rapid rise and fall between high and low states.

IMPORTANCE OF CLOCK SIGNALS

Clock signals are crucial for:

💡 **Synchronization:** Ensuring all parts of a digital system operate in unison.

💡 **Data Transfer:** Dictating when data is valid and can be read or written.

💡 **Timing Control:** Managing the sequence of operations in circuits, like adders, counters, and registers.

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