**Types Of Serial Communication**

1. Serial Communication is of two types :-
2. Synchronous
3. Asynchronous

**<a> Synchronous**

In Synchronous transmission, data flows in a full-duplex mode in the form of blocks or frames and it require external clock for synchronization. It uses a clock signal between the sender and the receiver so as to inform the receiver about the new bytes. Synchronous transmission is faster but it is costly. In synchronous transmission there is no gap present between data. It needs precisely synchronized clocks for the information of new bytes. Efficient use of transmission line is done in synchronous transmission and it is used for high speed of transmission. A master and slave configuration is required to implement synchronous data transfer.

Ex- I2C, SPI, CAN, LIN.

* **I2C-** It is a synchronous protocol which uses two wires SDA (Serial Data) and SCL (Serial Clock) for the communication. Here, multiple master and multiple slaves can be interfaced together. Devices sends and receives data using one wire which is SDA and SCL maintains sync between devices through common clock which is provided by active master. Each slave has its own unique 7 to 10 bit address which master uses to identify them.
* **SPI-** It is a synchronous protocol where a single master is connected to multiple slaves. It consist of two data lines (MOSI and MISO), one clock line (SCK) and a slave select line (SS). Here, entire communication is handled by Master, no slave can send data on its own will. It is faster form of serial communication.

**<b> Asynchronous**

In asynchronous transmission, data flows in a half-duplex mode, 1 byte or a character at a time. It does not require a clock for synchronization, rather it uses the parity bits to tell the receiver how to interpret the data. These parity bits are known as start and stop bits which control the transfer of data. In asynchronous transmission, sender and the receiver does not require a clock signal as the data here has a parity bit attached to it which indicates the start of the new byte. Here, internal clock is used and its transmission is slow. In asynchronous, time interval of transmission is not constant and there is gap present between the data and also transmission line remains empty during gap in character transmission. It is used for low speed of transmission.

Ex- RS-232, RS-422, RS-485, UART.

* **UART-** It comes under asynchronous which uses one to one scenarios. It uses full-duplex mode. It consist of only 3 pins, Tx , Rx and gnd. Availability of various baud rates makes it suitable for wide applications and devices.
* **RS-232, RS-422 and Rs-485-** These are some of the serial communication standard that use UART. These standards often use more wires than Tx and Rx. These standards define the wiring and electrical properties of the signals such as voltage levels, speeds, pinout, termination resistors and a lot of other things.

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