# Difference Between Synchronous and Asynchronous Transmission

## Synchronous Transmission

### Asynchronous Transmission

In

the previous article, we have discussed Serial and Parallel Transmission. As we know in Serial Transmission data is sent bit by bit, in such a way that each bit follows another. It is of two types namely, **Synchronous and Asynchronous Transmission**.

One of the major differences is that in Synchronous Transmission, the sender and receiver should have synchronized clocks before data transmission. Whereas Asynchronous Transmission does not require a clock, but it adds a parity bit to the data before transmission.

Furthermore, the synchronous transmission uses synchronization characters while asynchronous method employs start/stop bits, in order to alert the modem when data are being sent and when are these transmissions are completed are known as message characters.

### Content: Synchronous Vs Asynchronous Transmission

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#### **Comparison Chart**

BASIS FOR	SYNCHRONOUS	ASYNCHRONOUS
COMPARISON	TRANSMISSION	TRANSMISSION
Meaning	Transmission starts with the	It uses start bit and stop bit
	block header which holds a	preceding and following a

BASIS FOR	SYNCHRONOUS	ASYNCHRONOUS
COMPARISON	TRANSMISSION	TRANSMISSION
	sequence of bits.	character respectively.
Transmission	Sends data in the form of	Sends 1 byte or character at a
manner	blocks or frames	time
Synchronization	Present with the same clock pulse.	Absent
Transmission Speed	Fast	Slow
Gap between the data	Does not exist	Exist
Cost	Expensive	Economical
Time Interval	Constant	Random
Implemented by	Hardware and software	Hardware only
Examples	Chat Rooms, Video Conferencing, Telephonic	Letters, emails, forums, etcetera.

BASIS FOR	SYNCHRONOUS	ASYNCHRONOUS
COMPARISON	TRANSMISSION	TRANSMISSION
	Conversations, etcetera.	

#### Definition of Synchronous Transmission

In **Synchronous Transmission**, data flows in a full-duplex mode in the form of blocks or frames. Synchronization between the sender and receiver is necessary so that the sender knows where the new byte starts (since there is no gap between the data). Therefore, each block of characters is labelled with the synchronization characters and the receiving device acquires the data until a special ending character is identified.



Synchronous Transmission is efficient, reliable and is used for transferring a large amount of data. It provides real-time communication between connected devices. Chat Rooms, Video Conferencing, telephonic conversations, as well as face to face interactions, are some of the examples of Synchronous Transmission.

The voice-band and broad-band channels are usually used in the synchronous transmission modes as it provides a faster speed up to 1200 bps and serves the purpose of high data transfer speed.

#### Definition of Asynchronous Transmission

In **Asynchronous Transmission** data flows in a half-duplex mode, 1 byte or a character at a time. It transmits the data in a continuous stream of bytes. In general, the size of a character sent is 8 bits to which a parity bit is added, i.e. a start and a stop bit that gives the total of 10 bits.

<u>It does not require a clock for synchronization; rather it uses the parity bits to tell the</u> <u>receiver how to interpret the data. These parity bits are known as start and stop bits which</u> <u>control the transfer of data.</u>



uses character-based synchronization so that the receiving terminal could synchronize itself with the receipt of data on a character. It is simple, fast, economical and does not require a 2-way communication. Letters, emails, forums, televisions and radios are some of the examples of Asynchronous Transmission.

The voice-band channels that are of a narrow type and operates on a slower speed are utilized in the asynchronous transfer. Here, the transmitting device works manually or intermittently.

#### Key Differences Between Synchronous and Asynchronous Transmission

- 1. In Synchronous Transmission, data is transferred in the form of frames. On the other hand, in Asynchronous Transmission data is transmitted 1 byte at a time.
- 2. Synchronous Transmission requires a clock signal between the sender and receiver so as to inform the receiver about the new byte. In contrast, in Asynchronous Transmission sender and receiver does not require a clock signal as the data sent here has a parity bit attached to it which indicates the start of the new byte.
- 3. Data transfer rate of Asynchronous Transmission is slower than that of Synchronous Transmission.
- 4. Asynchronous Transmission is simple and economical, whereas Synchronous Transmission is complicated and expensive.
- 5. Synchronous Transmission is efficient and has lower overhead as compared to the Asynchronous Transmission.
- 6. In asynchronous data transfer, the line is kept at a stable value (logic 1) if no data is transmitted through the line. As against, in synchronous transfer, the end of the data is indicated by the sync character(s). Further than the sync characters, the line can be either high or low.

#### **Conclusion**

Both Synchronous and Asynchronous Transmission have their advantages and disadvantages. Asynchronous is simple, economical and used for transmitting a small amount of data.

<u>Conversely, Synchronous Transmission is used for transferring the bulk of data as it is</u> <u>efficient and has less overhead. Hence, we conclude that both Synchronous and</u> <u>Asynchronous Transmission are necessary for data transmission.</u>