

What is Time Division Multiplexing – TDM: A Basic Guide

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Multiplexing is the process of combining multiple signals into one signal, over a shared medium. If analog signals are multiplexed, it is Analog Multiplexing and if digital signals are multiplexed, that process is Digital Multiplexing. There are several multiplexing techniques among which Time-division multiplexing found its most common application in digital telephony. In this article, we will discuss what Time Division Multiplexing – TDM is. keep on reading this new blog in Linqip to find out more.

A comprehensive look at multiplexing can be found on the Linqip website, which is one of the best sources of information on the topic. Dedicated electrical components experts are ready to answer any questions you might have regarding time division multiplexing. Please take a few minutes to read Linqip’s article “**What Is An Electrical Component?**” before proceeding further.

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What is Time Division Multiplexing – TDM?

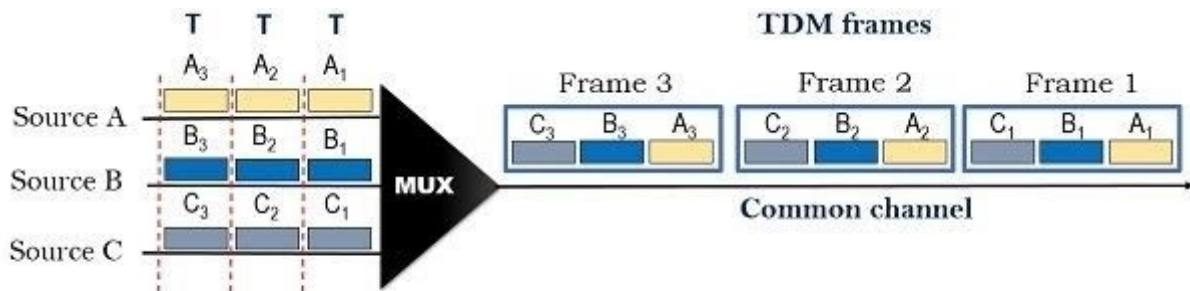
Time-division multiplexing (TDM) is a communications process that transmits two or more streaming digital signals over a common channel. In TDM, incoming signals are divided into equal fixed-length time slots. After multiplexing, these signals are transmitted over a shared medium and reassembled into their original format after de-multiplexing. Both multiplexer and de-multiplexer are synchronized by a common clock to receive data following the transmit sequence.

Time Division Multiplexing Working Principle

As we can see in the figure below, source A, B and C wants to transmit data through a common medium. Thus, the signal from the 3 sources, is divided into multiple frames each having its fixed time slot. Here, 3 units from each source are taken into consideration, that jointly forms the actual signal.

A frame is transmitted at a time that is composed of one unit of each source. As these units are entirely different from each other, the chances of unnecessary signal mixing can be eliminated.

When a frame gets transmitted over a particular time slot, the next frame uses the same channel to get transmitted and the process is further repeated until the completion of the transmission.



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Time Division Multiplexing Types

- Synchronous TDM
- Asynchronous TDM

TDM comprises two major categories that are described below.

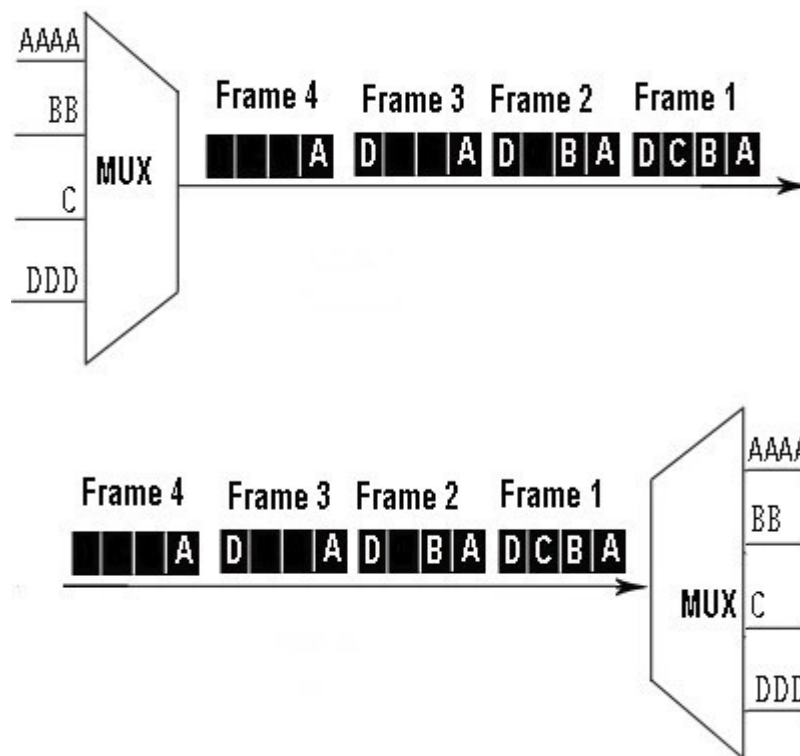
Synchronous TDM

Synchronous TDM is primarily known as synchronous because each time slot is preauthorized to a continuing source. Synchronous TDM is a data transfer approach during which there may be a continuous flow of data signals followed by timing signals. It helps to support that the send and therefore the receiver are synchronized with one another.

The time slots are broadcasted regardless of whether the sources have any information to transmit or not. Thus, for the benefit of the integrity of execution, the channel space is wasted.

In Synchronous TDM, a frame consists of one complete cycle of time slots. Thus, the number of slots in a frame is equal to the number of inputs.

The figures below indicate how the Synchronous TDM works.



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Asynchronous TDM

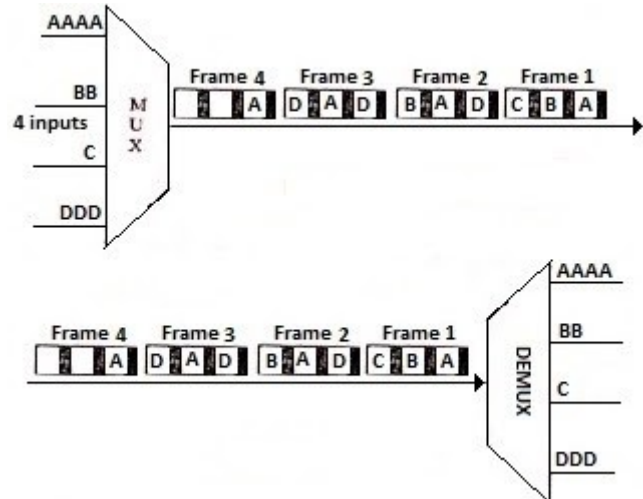
Asynchronous TDM is called statistical division multiplexing. It is a method in which time slots are not permanent as in Synchronous TDM. Time slots are assigned to only those machines which have the information to send the data.

This transmission approach transmits one character or 8 bits at a time. In this approach, before the transmission process begins, each character transfers the beginning bit. After sending the character, it also sends the end bit. With the character bits and begin and stop

bits, the entire number of bits is 10 bits.

In Asynchronous TDM, a frame contains a fixed number of time slots. Each slot has an index of which device to receive.

The figures below indicate how the Asynchronous TDM works.



Time-Division Multiplexing Applications

TDM is mainly useful for analog and digital signals (but its processing technique allows the multiplexing of digital signals conveniently rather than analog ones) in which several channels with low speed are multiplexed into high-speed channels used for transmission. It finds its application mainly in a digital communication system, in cellular radio and satellite communication system.

The major applications of time-division multiplexing are given below.

- It is used in ISDN (Integrated Services Digital Network) telephone lines.
- It is used in PSTN (public switched telephone network).
- It is used for some telephone systems.
- It is used in wireline telephone lines.

Time-Division Multiplexing Advantages

The main advantages of TDM are as follows.

- Simple circuit design.
- It uses the entire channel bandwidth for the transmission of the signal.
- The problem of Intermodulation distortion is not present in TDM.
- Pulse overlapping can sometimes cause crosstalk but it can be reduced by utilizing guard time. Thus, is not much serious.
- Time-division multiplexing systems are more flexible than frequency division multiplexing.
- Time-division multiplexing circuitry is not complex.

- Full available channel bandwidth can be utilized for each channel.



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Time-Division Multiplexing Disadvantages

The major disadvantages of TDM are as follows.

- The transmitting and receiving sections must be properly synchronized to have proper signal transmission and reception.
- It is Complex to implement.
- Due to slow narrowband fading, all the TDM channels may get wiped out.

So, now you know the answer to the question “what is Time Division Multiplexing – TDM?”. If you enjoy this article in Linqip, let us know what you think by leaving a reply in the comment section. We will be more than glad to have your viewpoint on the article. Is there any question we can help you through? Feel free to [sign up](#) on our website where our experts are prepared to provide you with the most professional advice.

What Are the Advantages of TDM Over FDM?

TDM uses the entire available bandwidth on a time-share basis, whereas FDM divides the band into multiple channels separated by guard bands, resulting in ineffective frequency utilization.

What Is an Example of TDM?

TDM can be seen in television broadcasts. Typically, a television serial runs for 10 minutes and is followed by a 5-minute advertisement. There is a dedicated frequency for the serial at the time it is being broadcasted.