Difference Between Synchronous and Asynchronous Counter

The difference between synchronous and Asynchronous counter is based on the clock signal, speed, etc. The table shows the difference between synchronous and Asynchronous counters.

Synchronous VS Asynchronous Counter	
Synchronous Counter	**Asynchronous Counter**
In the synchronous counter, there are continuous clock input signals with flip-flops used to produce the output.	In Asynchronous counters, different clock signals are used to produce the output.
In the synchronous counter, the operation is faster.	In the Asynchronous counter, the operation is slower.
A synchronous counter is also known as a Parallel counter.	The asynchronous counter is also known as the Serial counter.
A synchronous counter produces less error than the asynchronous counter.	An asynchronous counter produces more errors than a synchronous counter.
The design of the Synchronous counter is complex.	The design of the Asynchronous counter is simple.
Synchronous counters can work with a flexible number of count sequences.	Asynchronous counters can work with a fixed number of count sequences.

What is Synchronous Counter?

A synchronous counter, also known as a parallel counter, is one in which all flip-flops are timed simultaneously with the same clock input. In the synchronous counter, all of the flip-flops in the cascade connection are separately linked to an external clock. This makes it easier to clock all of the flip-flops on the counter simultaneously with the same clock input.

As a result, the standard clock signal causes the state of each individual flip-flop to change at the same time. As a result, this counter has no ripple effect and hence no propagation delay. In synchronous counters, logic gates are employed to regulate the count sequence.

What is Asynchronous Counter?

Before knowing about the Difference Between Synchronous and Asynchronous Counter, let us know about the asynchronous counter. An asynchronous counter is also known as a serial counter because the counter's flip-flops are connected serially, and the input clock pulse is delivered to the first flip-flop in the connection. The clock input ripples across the counter as the output of the first flip flop created by the clock signal is passed on to the next flip-flop in the forward direction.

Similarly, the current output serves as the clock input for the next, and so on. As a result, the timing signal in the asynchronous counter is delayed by some amount as it passes through each flip flop. As a result, there is a propagation delay.