Difference between Synchronous and Asynchronous Sequential Circuits

Sr. No.	Key	Synchronous Sequential Circuits	Asynchronous Sequential Circuits
1	Definition	Synchronous sequential circuits are digital sequential circuits in which the feedback to the input for next output generation is governed by clock signals.	On other hand Asynchronous sequential circuits are digital sequential circuits in which the feedback to the input for next output generation is not governed by clock signals.
2	Memory Unit	In Synchronous sequential circuits, the memory unit which is being get used for governance is clocked flip flop.	On other hand unclocked flip flop or time delay is used as memory element in case of Asynchronous sequential circuits.
3	State	The states of Synchronous sequential circuits are always predictable and thus reliable.	On other hand there are chances for the Asynchronous circuits to enter into a wrong state because of the time difference between the arrivals of inputs. This is called as race condition.
4	Complexity	It is easy to design Synchronous sequential circuits	However on other hand the presence of feedback among logic gates causes instability issues making the design of Asynchronous sequential circuits difficult.
5	Performance	Due to the propagation delay of clock signal in reaching all elements of the circuit the Synchronous sequential circuits are slower in its operation speed	Since there is no clock signal delay, these are fast compared to the Synchronous Sequential Circuits
6	Example	Synchronous circuits are used in counters, shift registers, memory units.	On other hand Asynchronous circuits are used in low power and high speed operations such as simple microprocessors, digital signal processing units and in communication systems for email applications, internet access and networking.