



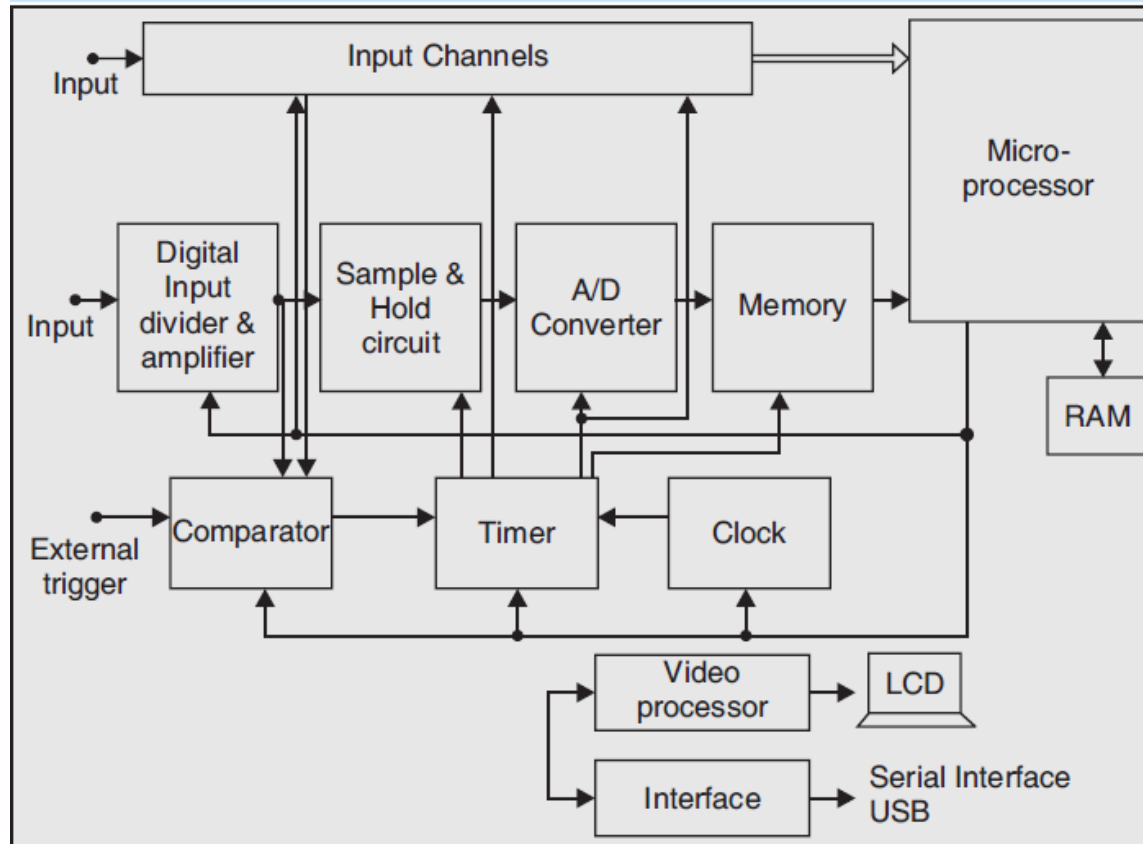
UNIT - 2

SIGNAL RECORDERS

Digital Storage Oscilloscope (DSO)

Digital Storage Oscilloscope (DSO)

- The digital storage oscilloscope just like a normal oscilloscope is a “test and measurement” equipment.
- It makes use of A/D and D/A converters internally to take advantage of processing of signals in digital form



- The DSO operation is controlled and operated by a comparator block in the microprocessor.
- The data acquisition system contains a sample-and-hold circuit and an A/D converter that takes the samples and digitizes the input signal at a rate determined by the clock.
- This digitized data will be stored in the memory. If the memory becomes full, the first stored data will be overwritten by the latest data.
- This data acquisition and storage process will happen till the external trigger receives at the comparator circuit.
- Once the trigger occurs, the data acquisition will be stopped and will not acquire any new data. At this point of time the saved data will be shown in the LCD.

Modes of Operation

The digital storage oscilloscope has the following mode of operation:

- 1. Roll Mode: This is used to observe the fast varying signal.
- 2. Store Mode: It is called refresh mode and is most commonly used.
- 3. Hold or Save Mode: This mode is also the commonly used mode.

Advantages

The digital storage oscilloscope(DSO) has many advantages than that of normal oscilloscope.

Some of the advantages are as listed below:

- 1. Since the DSO uses digital memory, it can store the waveforms for longer time. But in the normal CRO this cannot happen.**
- 2. In the DSO, we can store and view the part or full waveforms before the actual trigger happens. But this is not possible in the conventional CRO.**
- 3. In the DSO, the stored waveform can be positioned anywhere in the screen. We can actually adjust the vertical and horizontal scales of the waveform. This is not possible in the normal CRO.**

Nowadays most of the DSOs can store as many waveforms in the memory and if needed we can take the printouts of the waveforms by connecting a normal standard printer to the DSO.

Disadvantages

- The digital storage oscilloscope (DSO) has the following disadvantages:
 - **1. DSOs are costly as compared to other oscilloscopes.**
 - **2. Slower compared to conventional oscilloscopes.**

Applications of DSO

- **Observation of single-pulse events:** There are many phenomena which occur only once. Like occurrence of spike in any signal in a time due to some external effects, is only for the small instant of time. This can be easily recorded in the storage oscilloscope and analyzed when it required.
- **Observation of portion of waveform:** The waveform recorded by storage oscilloscope is analyzed with greater detail.
- **Enlargement of waveform:** Very small variation in the amplitude and frequency of the waveform is analyzed with this oscilloscope.
- **Mathematical operations:** Waveform addition, subtraction, multiplication, integration, differentiation and feature comparison are possible with DSO.
- **As a measuring device:** It can be used as multimeter, voltmeter, ammeter, ohmmeter, temperature meter etc.