

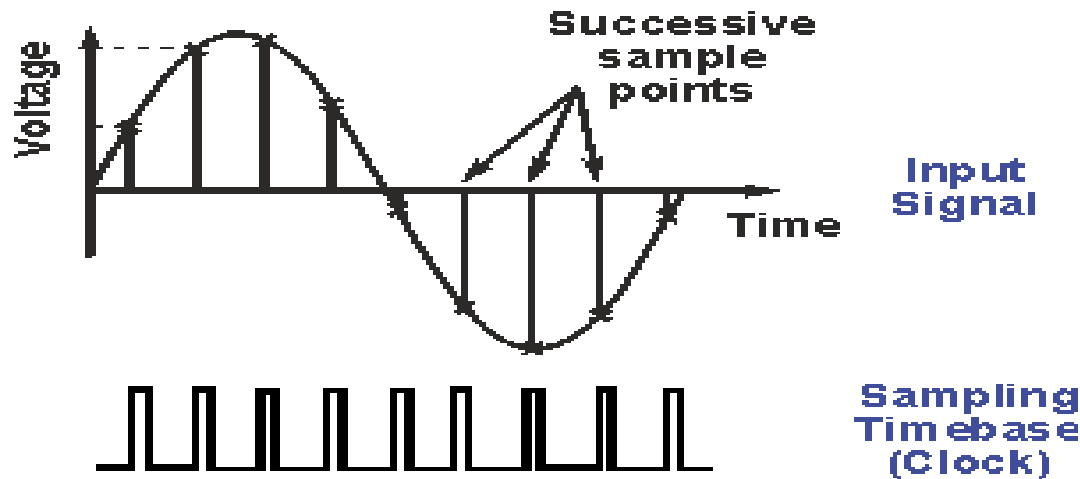
EIPC (NEE-403)

Unit-4

Display Devices &
Recorders

Digital Storage Oscilloscope

- A **digital storage oscilloscope** is an oscilloscope which stores and analyses the signal **digitally** rather than using analogue techniques.
- The input analogue signal is **sampled** and then converted into a **digital record** of the amplitude of the signal at each sample time.



Digital oscilloscope sampling

Digital Storage Oscilloscope

- **Basic advantage of digital operation is the storage capacity, stored information can be repeatedly read out, processing capability and analysis of the output.**
- **Furthermore, voltage and time scales can be easily changed after the waveform has been recorded, which allows expansion of the selected portions.**

Digital Storage Oscilloscope

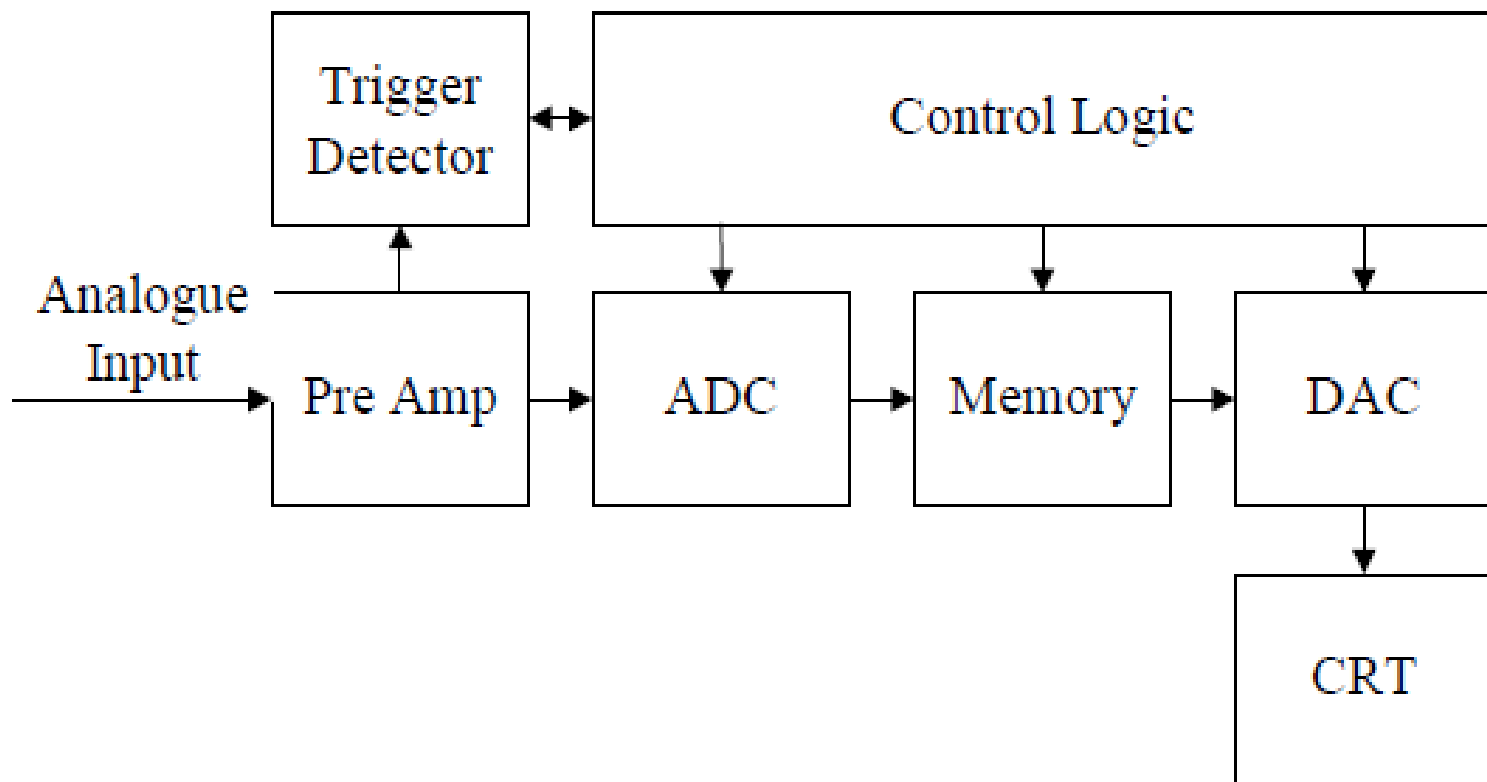
- Also cursor can be positioned at any desired point on the waveform and time & voltage values are displayed digitally on the screen
- Split screen capabilities enables easy comparison of the two signals.

Digital Storage Oscilloscope

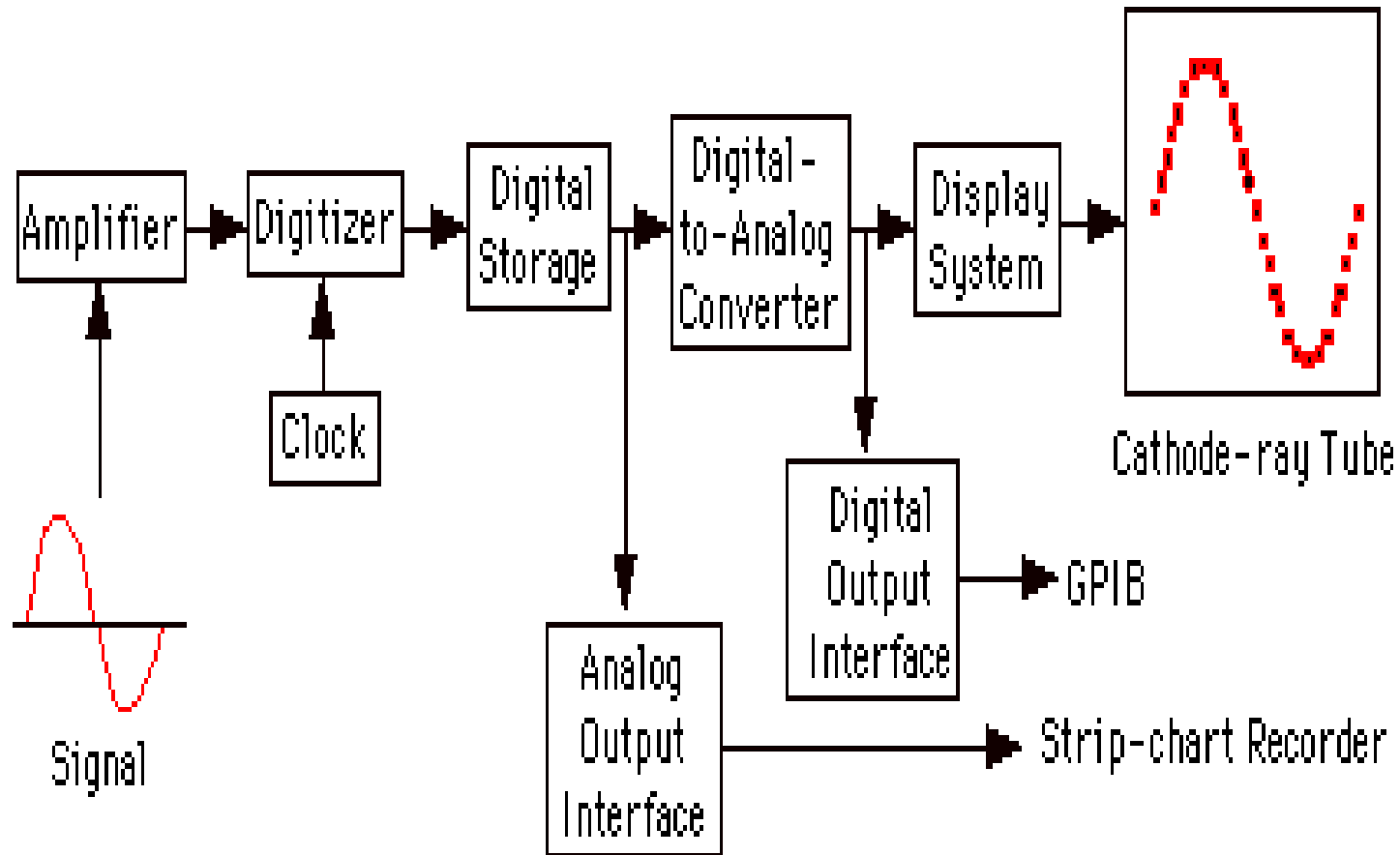
- **Pretrigger capability is also significant advantage. Slow read out of data is possible for producing hardcopy with external plotters.**
- **When more memory is needed, magnetic memory expansion is possible.**
- **Analog input voltage can be sampled at adjustable rates.**
- **But limited in bandwidth by the speed of the A/D Converters**

Digital Storage Oscilloscope

Conventional DSO Block Diagram



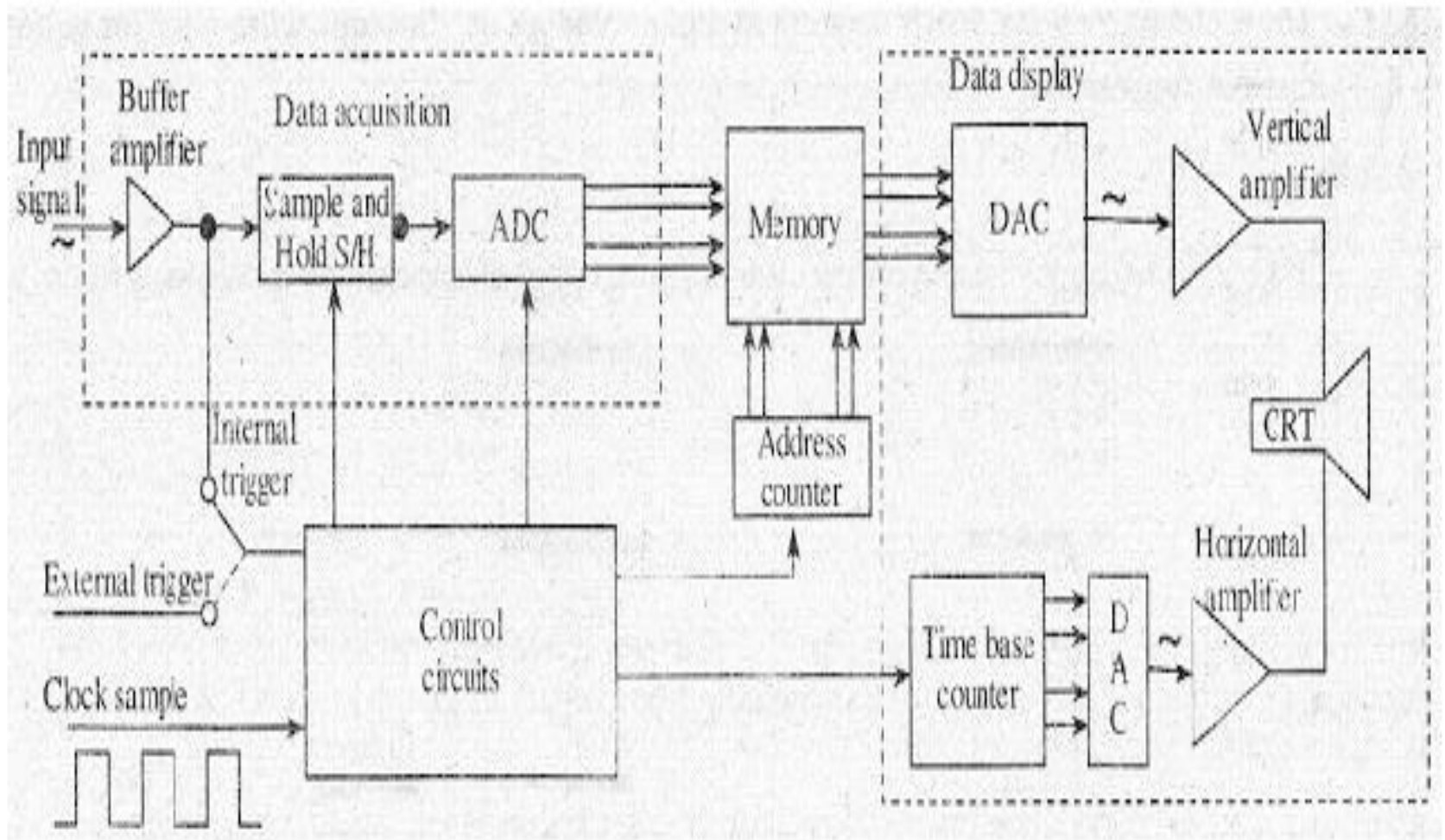
Digital Storage Oscilloscope



Digital Storage Oscilloscope

- Initially the input signal is attenuated and it is then applied to the vertical amplifier.
- The input, is then digitized by an analog to digital converter to create a data set that is stored in the memory .it can be available in the digital form also.
- The stored digital data can be converted to analog signal and can be applied to CRO for displaying it.
- The digital storage oscilloscope has three modes of operation:
 - 1. Roll mode ii) Store mode iii) Hold or save mode
- Roll mode is used to display very fast varying signals, clearly on the screen. The fast varying signal is displayed as if it is changing slowly, on the screen

Digital Storage Oscilloscope



Block diagram DSO

Digital Recording

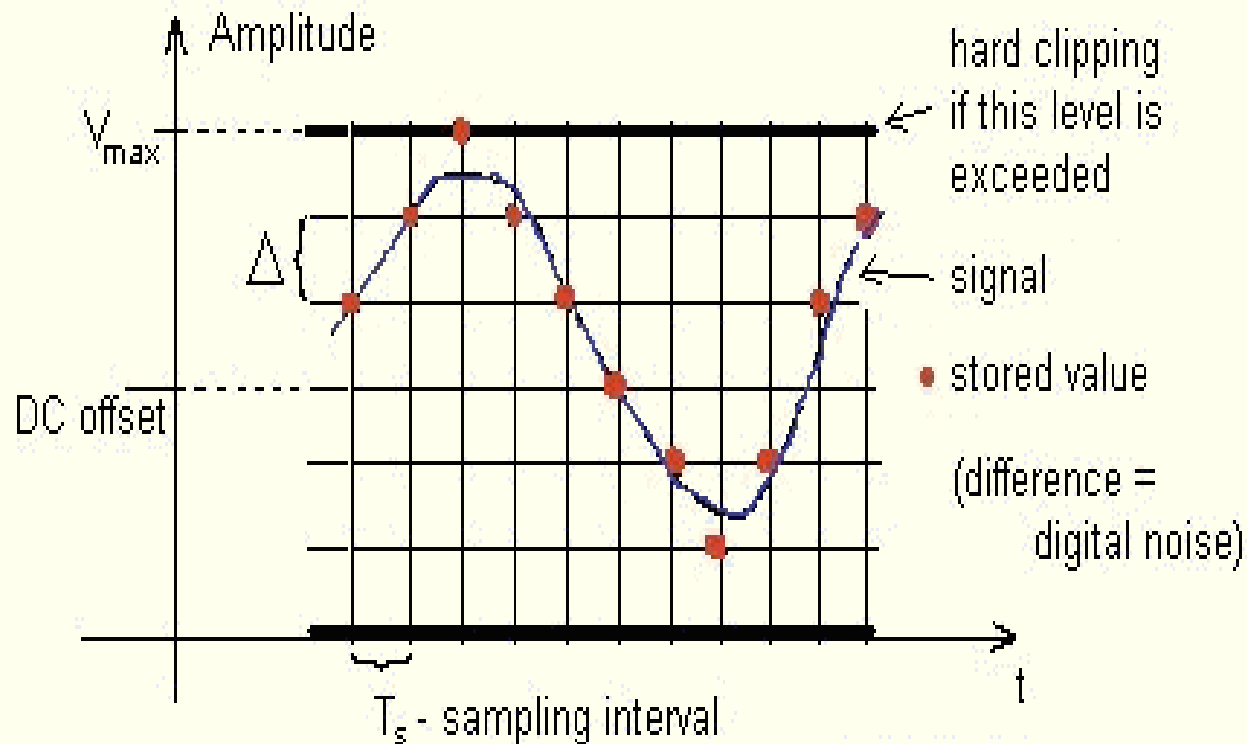
- **An analog signal is converted to digital** by an analog-to-digital converter, which measures the amplitude of an analog signal at regular intervals, which are specified by the sample rate, and then **stores these sampled & quantized numerical value in computer hardware such as compact disc or hard` disk.**
- **Digital recordings are very accurate,** the accuracy determined only by the quality of the D/A and A/D converters.

Digital Recording

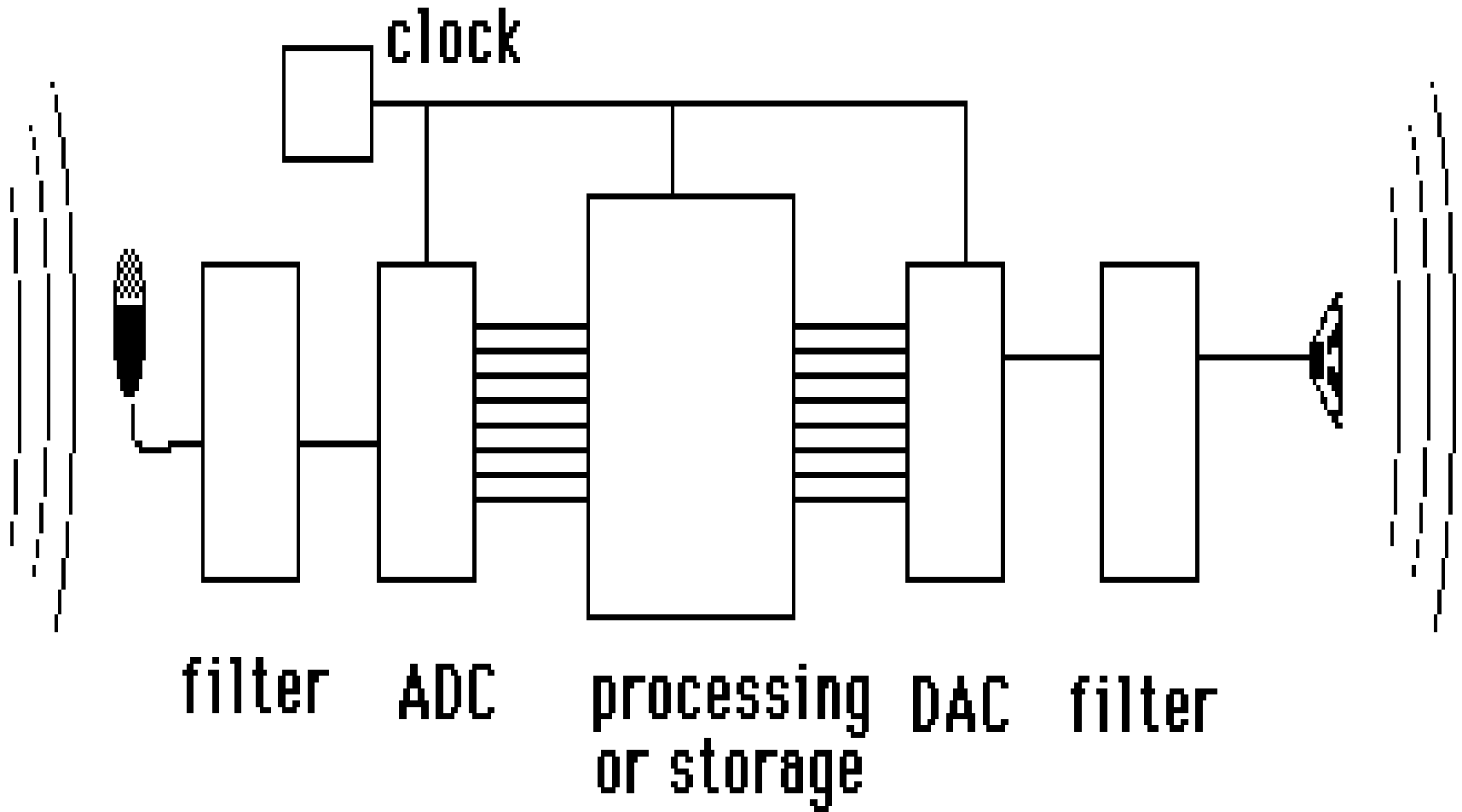
- For **optical disc recording technologies** such as **CDs** or **DVDs**, a laser is used to burn microscopic holes into the dye layer of the medium.
- **A weaker laser is used to read these signals.**
- This works because the **metallic substrate of the disc is reflective**, and **the unburned dye prevents reflection while the holes in the dye permit it**, allowing digital data to be represented.

Digital Recording

- During digital recording of the analog signal, analog to digital (A/D) conversion takes place from continuous time-amplitude coordinates to discrete time-amplitude coordinates



Digital Recording



Thank You