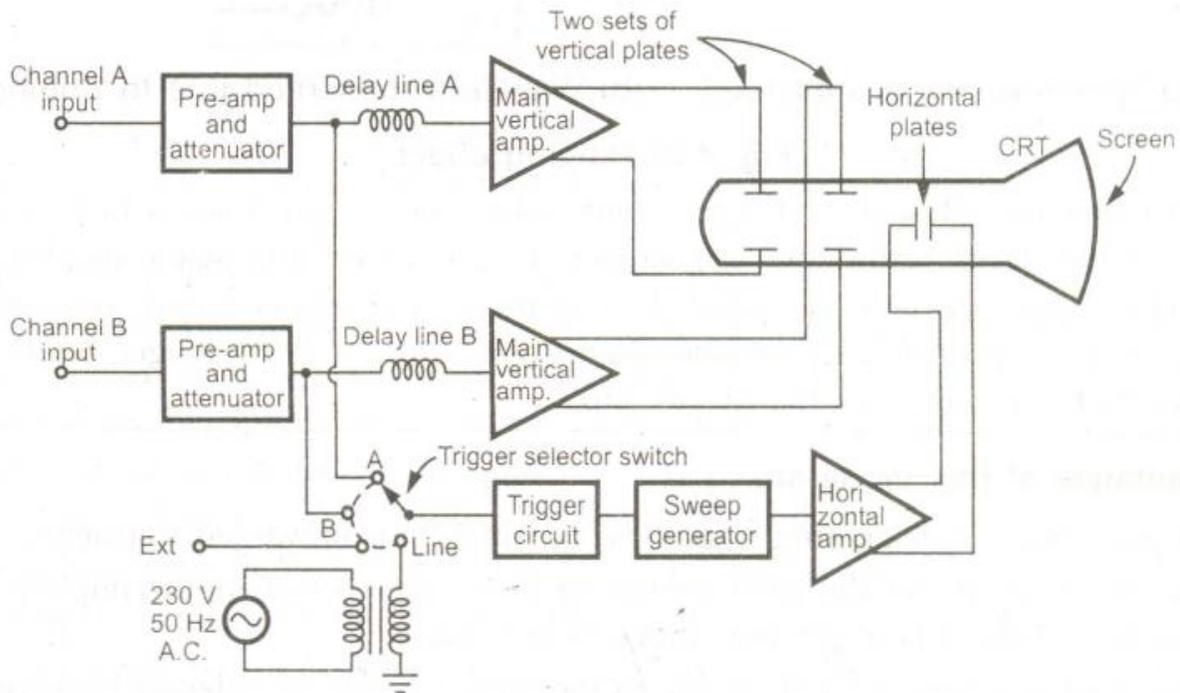


## DUAL AND MULTIPLE BEAM OSCILLOSCOPES

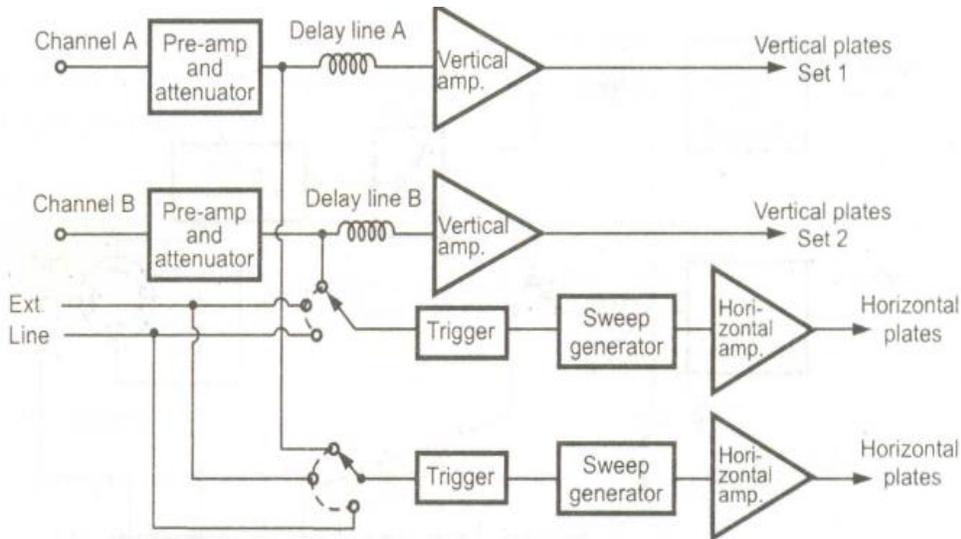
### Dual Beam Oscilloscope

Another method of studying two voltages simultaneously on the screen is to use a special cathode ray tube having two separate electron guns generating two separate beams. Each electron beam has its own vertical deflection plates.

But the two beams are deflected horizontally by the common set of horizontal plates. The time base circuit may be same or different. Such an oscilloscope is called **Dual Beam Oscilloscope**.



The oscilloscope has two vertical deflection plates and two separate channels A and B for the two separate input signals. Each channel consists of a preamplifier and an attenuator. A delay line, main vertical amplifier and a set of vertical deflection plates together forms a single channel. There is a single set of horizontal plates and single time base circuit. The sweep generator drives the horizontal amplifier which in turn drives the plates. The horizontal plates sweep both the beams across the screen at the same rate. The sweep generator can be triggered internally by the channel A signal or channel B signal. Similarly it can also be triggered from an external signal or line frequency signal. This is possible with the help of trigger selector switch, a front panel control. Such an oscilloscope may have separate timebase circuit for separate channel. This allows different sweep rates for the two channels but increases the size and weight of the oscilloscope.



### Dual beam CRO with separate time bases

Multiple beam oscilloscope has a single tube but several beam producing systems inside. Each system has separate vertical deflecting pair of plates and generally (1 common time base system).

The triggering can be done internally using either of the multiple inputs or externally by an external signal or line voltages.

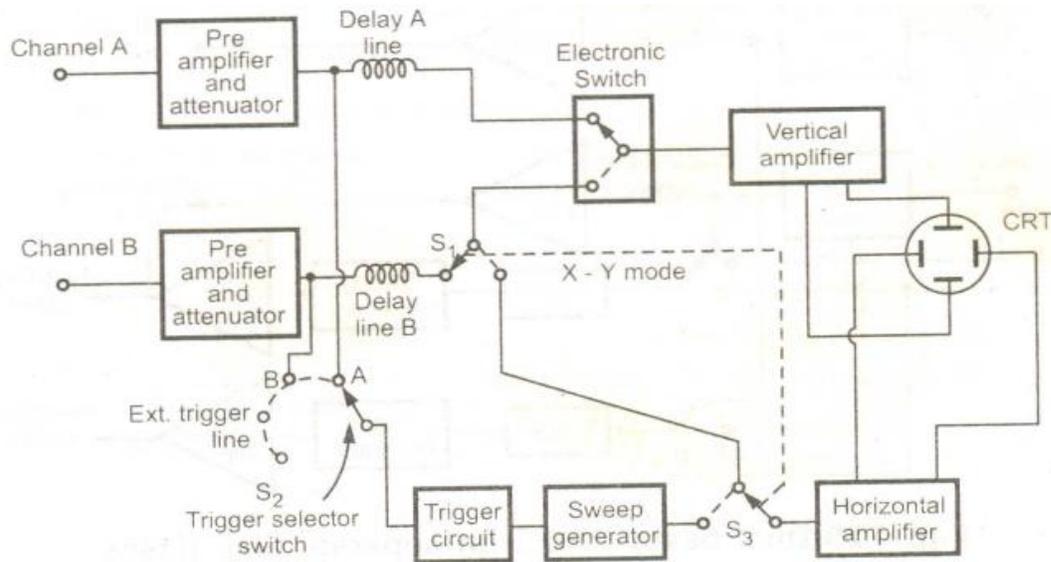
#### Dual trace oscilloscope:

The comparison of two or more voltages is very much necessary in the analysis and study of many electronic circuits and systems. This is possible by using more than one oscilloscope but in such a case it is difficult to trigger the sweep of each oscilloscope precisely at the same time. A common and less costly method to solve this problem is to use dual trace or multitrace oscilloscopes. In this method, the same electron beam is used to generate two traces which can be deflected from two independent vertical sources. The methods are used to generate two independent traces which the alternate sweep method and other is chop method.

The block diagram of dual trace oscilloscope is shown in the Fig

There are two separate vertical input channels A and B. A separate preamplifier and - attenuator stage exists for each channel. Hence amplitude of each input can be individually controlled. After preamplifier stage, both the signals are fed to an electronic switch. The switch

has an ability to pass one channel at a time via delay line to the vertical amplifier. The time base circuit uses a trigger selector switch 52 which allows the circuit to be triggered on either A or B channel, on line frequency or on an external signal. The horizontal amplifier is fed from the sweep generator or the B channel via switch 51 and 51. The X-Y mode means, the oscilloscope operates from channel A as the vertical signal and the channel B as the horizontal signal. Thus in this mode very accurate X-Y measurements can be done.



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