High frequency crt or travelling wave type crt

- When the signal to be displayed is of a very high frequency ,the electron beam does not get sufficient time to pick up the instantaneous level of the signal.
- Also at high frequencies the numbers of electrons striking the screen in a given time and the intensity of the beam is reduced.
- Instead of one set of deflection plates,a series of vertical deflection plates are used.
- The plates are so shaped and spaced that an electron travelling along the CRT receives from each set of plates an additional deflecting force in proper time sequence.

High frequency crt or travelling wave type crt

- This synchronisation is achieved by making the signal travel from one plate to the next at the same speed as the transit time of the electrons.
- The signal is applied to each pair of plates,and as the electron beam travels the signal also travels through the delay lines.
- The time delays are so arranged that the same electrons are deflected by the input signal.

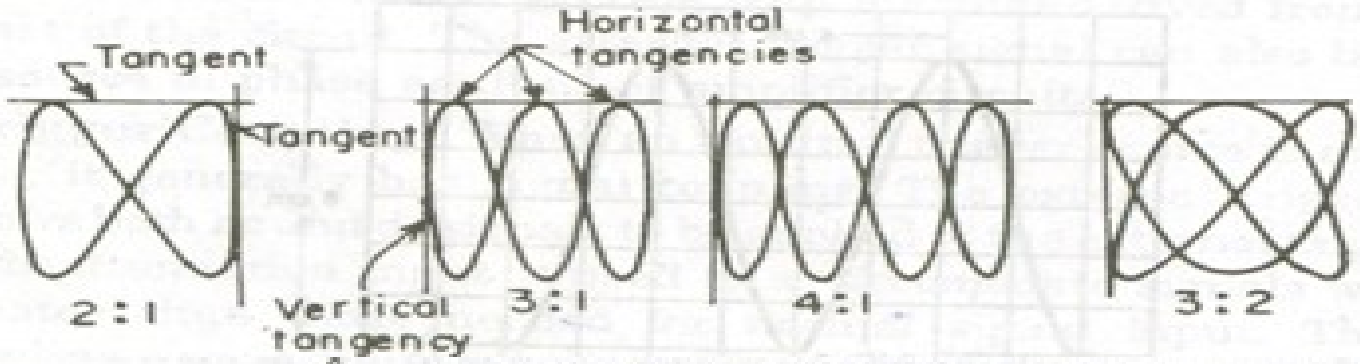
Characteristics of a HF cRO(HF improvement in a cro)

1. The vertical amplifier must be designed both for high B.W. and high sensitivity or gain.Making the vertical amplifier a fixed gain amplifier simplifies the design.The input to the amplifier is brought to the required level by means of an attenuator circuit.the final stages is the push-pull stage.
2. The LF CRT is replaced by an HF CRT.
3. A probe is used to connect the signals,e.g. a high Z passive probe acts like a compensated attenuator.
4. By using a triggered sweep,for fast rising signals,and by the use of delay lines between the vertical plates,for improvement of HF characteristics.

LISSAJOUS PATTERN

- Lissajous patterns may be used for accurate measurement of frequency..
- The signal whose frequency is to be measured is applied to the Y-plate.An accurately calibrated standard variable frequency source is used to supply voltage to the X-plates with the internal sweep generator switched off.

LISSAJOUS PATTERN



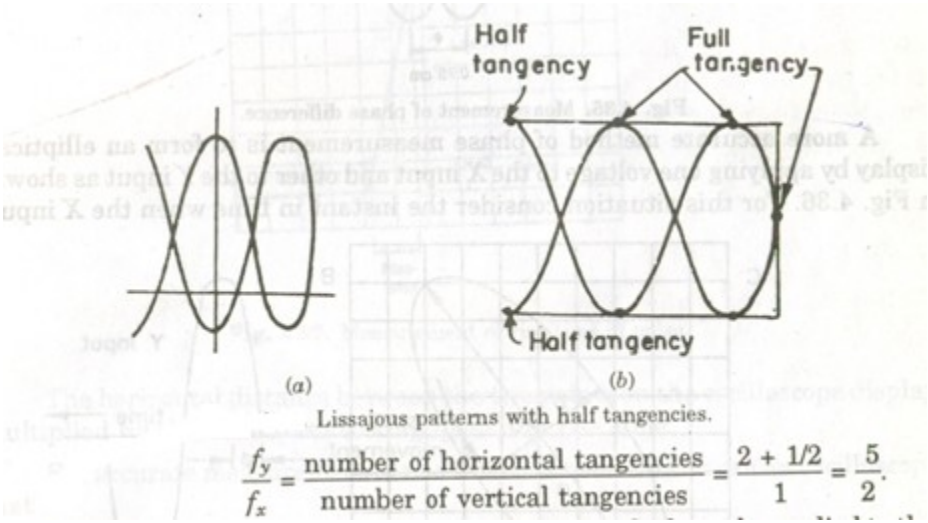
$$\frac{f_y}{f_x} = \frac{\text{number of times tangent touches top or bottom}}{\text{number of times tangent touches either side}}$$

$$= \frac{\text{number of horizontal tangencies}}{\text{number of vertical tangencies}}$$

where f_y = frequency of signal applied to Y plates,

and f_x = frequency of signal applied to X plates.

LISSAJOUS PATTERN



Lissajous patterns with half tangencies.

$$\frac{f_y}{f_x} = \frac{\text{number of horizontal tangencies}}{\text{number of vertical tangencies}} = \frac{2 + 1/2}{1} = \frac{5}{2}.$$