

Institute of Engineering JIWAJI UNIVERSITY



PRESENTATION ON TV & RADAR

Department of Electronics Engineering
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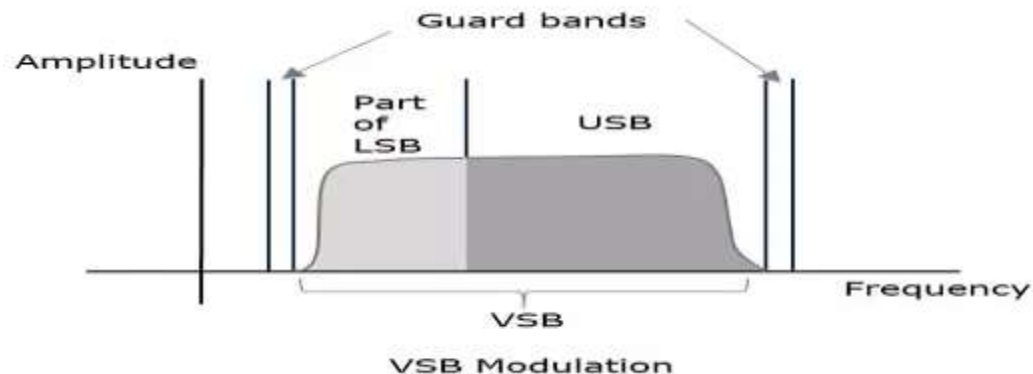
Submitted by:
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COMPARISON OF VARIOUS T.V.SYSTEM

- The CCIR 625-B monochrome system used in most parts of Europe and adopted by India has a video band width of 5MHz
- The British 625 line system has video band width of 5.5 MHz
- In British system .73 has been used as the resolution factor instead of the 0.69 used in our system
- The French T.V . System employs 819 lines with a video band width of 10.4MHz this system therefore has both much improved vertical resolution and better horizontal resolution .

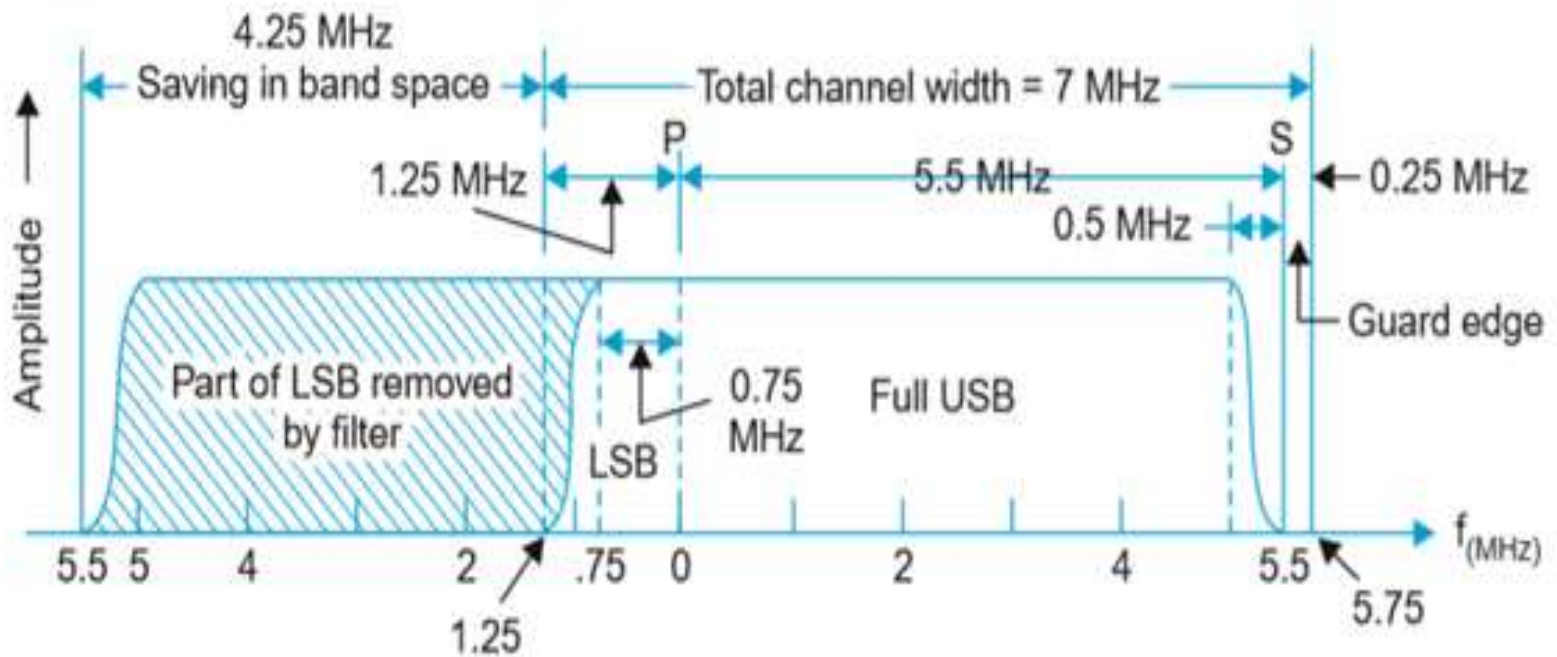
VESTIGIAL SIDEBAND TRANSMISSION

- Vestigial Sideband Modulation or VSB Modulation is the process where a part of the signal called as vestige is modulated, along with one sideband.
- Along with the upper sideband, a part of the lower sideband is also being transmitted in this technique. A guard band of very small width is laid on either side of VSB in order to avoid the interferences. This VSB modulation is mostly used in television transmissions
- The transmission bandwidth of VSB modulated wave will be the total of message bandwidth and the width of vestigial sideband. Two guard bands are laid on both the sides of this VSB signal so as to avoid the interference of signals.



- This pattern of transmission of the modulated signal is known as vestigial sideband. In the 625 line system, frequencies up to 0.75 MHz in the lower sideband are fully radiated.
- The picture signal is seen to occupy a bandwidth of 6.75 MHz instead to 11 MHz.

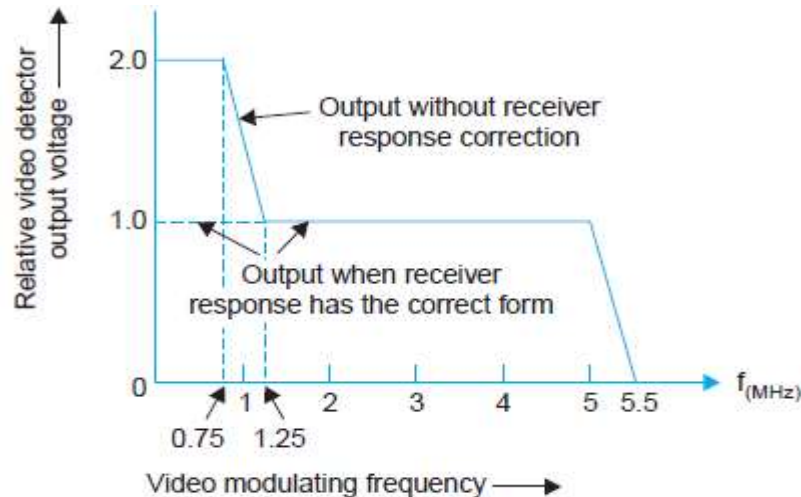
Bandwidth Diagram:



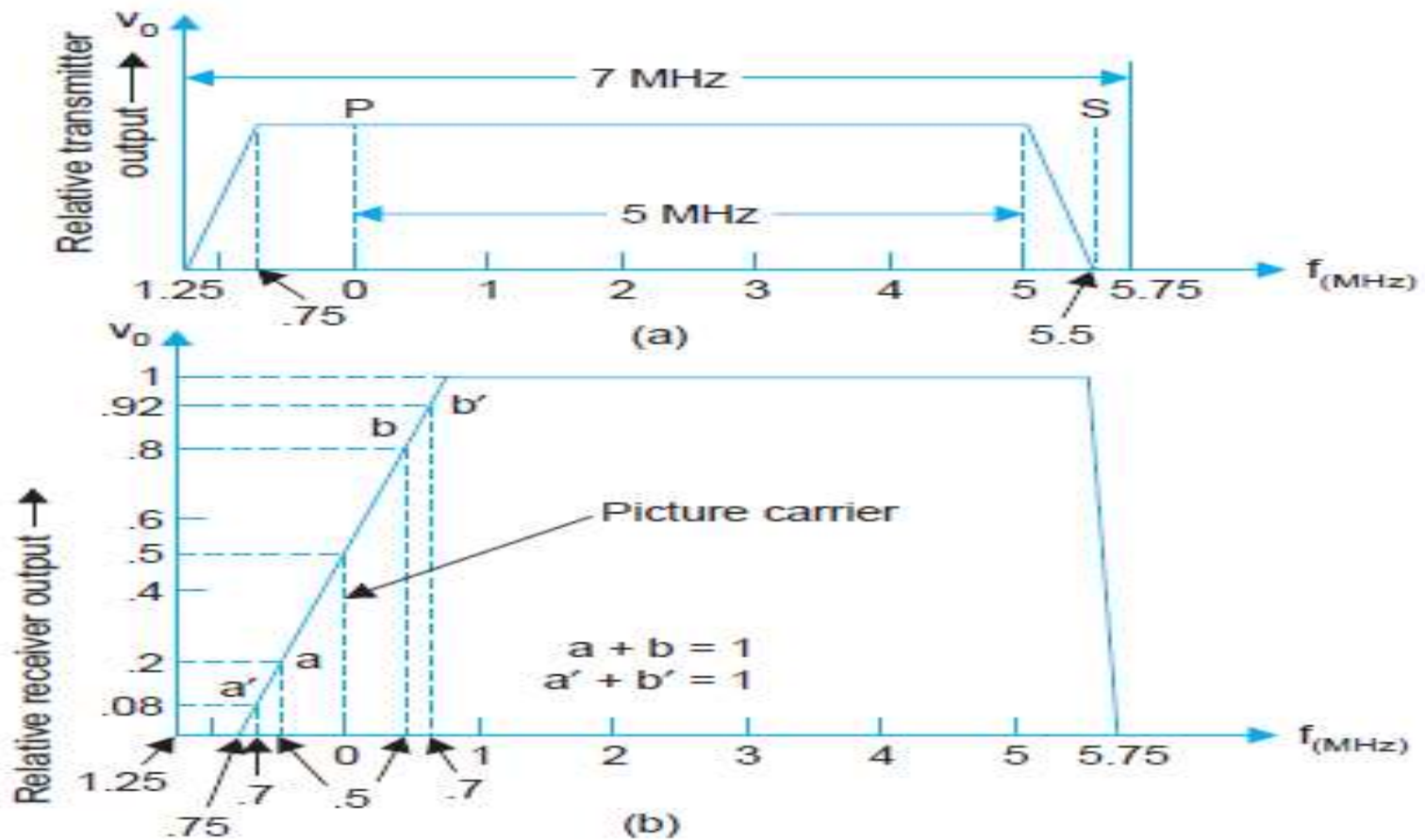
RECEPTION OF VESTIGIAL SIDE BAND SIGNAL

The normal practice in television receivers. With vestigial sideband however, the relative amplitude of the frequencies for which both sidebands exist is double that of the true SSB component at the envelope detector output.

the low frequency content of the picture signal, and in effect, amounts to distortion in terms of relative amplitudes for different frequencies and needs correction at the receiver.



Receiver video detector output vs modulating frequency characteristics illustrating the need for specially shaped receiver IF response curves.



Ideal characteristics of a TV transmitter and receiver. (a) transmitter output characteristics for vestigial sideband signals. (b) desired receiver characteristics for correct reproduction of video signals. Note that the picture carrier is positioned halfway down the response curve.

PICTURE TUBES

- The picture tube that serves as the screen for a television receiver is a specialized form of cathode-ray tube.
- It consists of an evacuated glass bulb or envelope, inside the neck of which is rigidly supported an electron gun that supplies the electron beam.
- A luminescent phosphor coating provided on the inner surface of its face plate produces light when hit by the electrons of the fast moving beam.
- The size of picture tube in general denotes the diagonal length. The size of the picture tube ranges from about 2.5 cm to 30” 76 cm or more.

MONOCHROME PICTURE TUBE SPECIFICATION

Modern monochrome picture tubes employ electrostatic focussing and electromagnetic deflection. A typical black and white picture tube is shown. The commonly used picture tubes manufacture in India and marketed by Bharat Electronics Ltd.

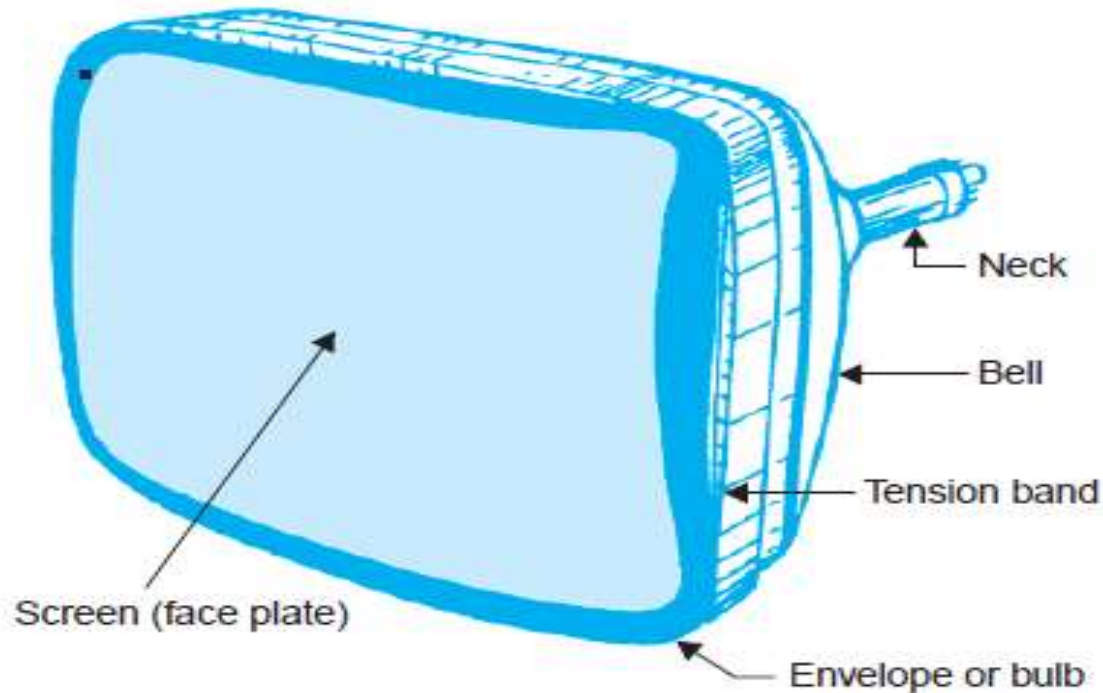


Fig. A rectangular picture tube.

CONSTRUCTION AND WORKING PRINCIPLE OF MONOCHROME PICTURE TUBES

The picture tube is used to convert the video signal into optical signals

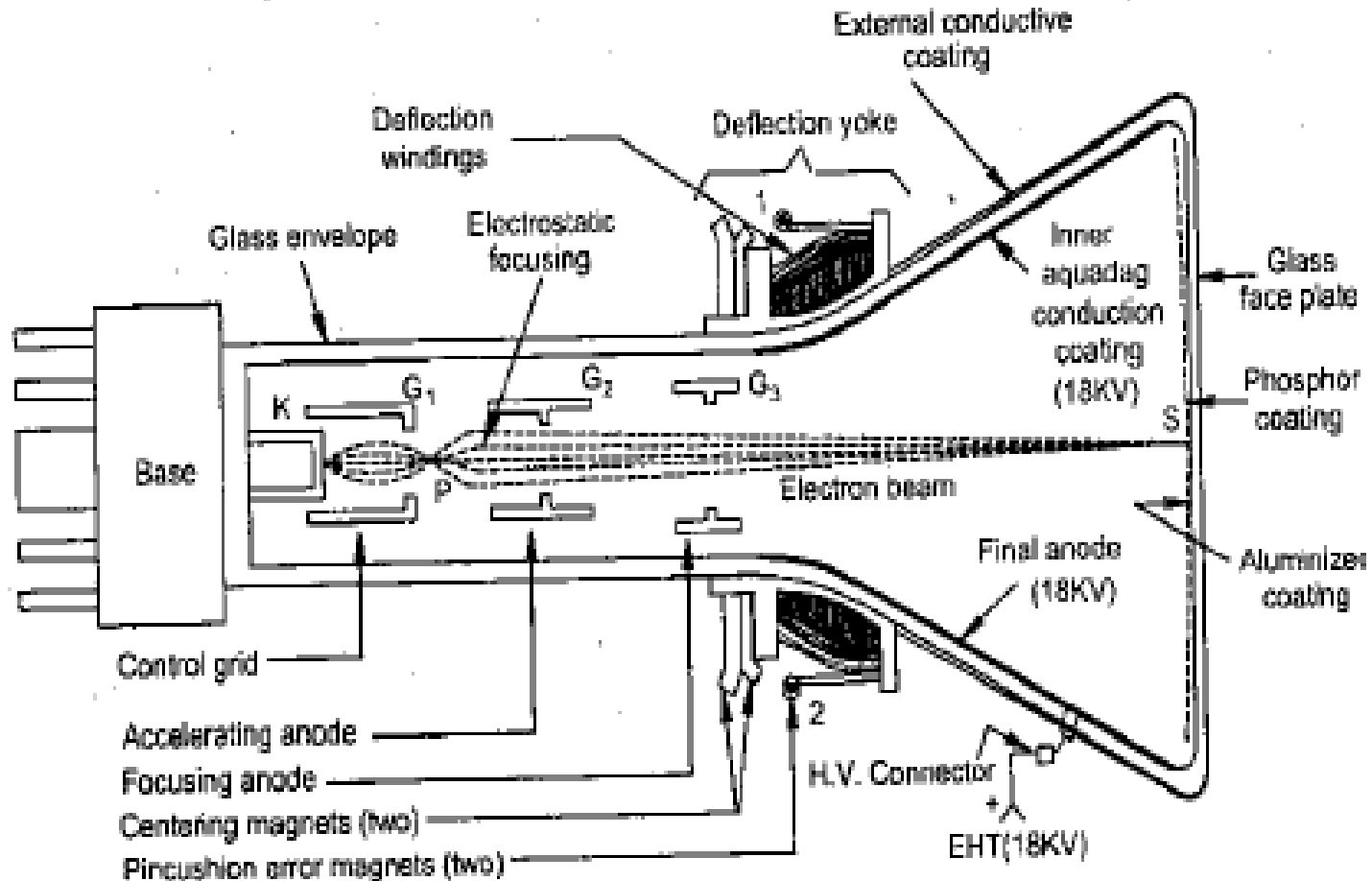


Fig. Elements of a picture tube employing low voltage electrostatic focusing and magnetic deflection.

Mainparts :

- Electron gun
- Focusing anode
- Deflection Coils
- Final anode.
- Phosphor screen
- External conductive Coating

ELECTRON GUN

The electron gun unit consists of Cathode, control grid and accelerating anode. It is indirectly heated by a filament Thoriatedm Tungsten or borium and strontium oxides are having low work function and so release a sufficient number electrons of when heated. The control grid is used to control the flow of electrons from the cathode. It is also in the form of cylinder, end for flow of electrons. Screen grid is maintained at 400V and focusing grid is maintained at 600V. Through this base pin only the heated voltage for different grids are supplied.

FOCUSSING ANODE

Electro static method is used to focus the electrons beam. The positive potential at the accelerating anode is extended. This is considered as first lens action. Screen grid and focus grid forms the second lens system. The focus anode is larger in diameter and also its potential is higher than the first anode. The voltages given to the grid are so selected that the second convergence point is on the screen picture tube.

DEFLECTION COILS

Electromagnetic system is used to deflect electrons beam in horizontal and vertical direction. The picture tube produces horizontal deflection and another pair of coil placed left and right produces vertical deflection. The two pair of coils are collectively called as deflection yoke. In deflection yoke, centering magnet and pin cushion magnet are also provided for centering electrons beam. At the movement of electrons beam at corners

FINAL ANODE.

To provide sufficient velocity and energy for electrons beam a final anode is included in the tube.

EXTERNAL CONDUCTIVE COATING

Aquadag is also coated on the outer surface of the glass bell. A spring clip used to connect this coating with the chassis ground. A.C. ripples in high voltage and provide a perfect higher voltage.

PHOSPHOR SCREEN:

The phosphor chemicals are light metal such as zinc and cadmium in the form of sulphate. The kinetic energy of the moving electrons in the beam are transformed to the atoms in the phosphor coating. External conductive coating is also outer the surface of the glass bell. Decay time of phosphors used in picture tubes is approximately 5 ms in monochrome picture tube.

ALUMINIZED SCREEN:

A very thin coating of aluminium is provided on the back surface of the screen phosphor on all modern picture tubes. The aluminium coating is connected to high voltage anode coating. Aluminium coating reflects light from the screen

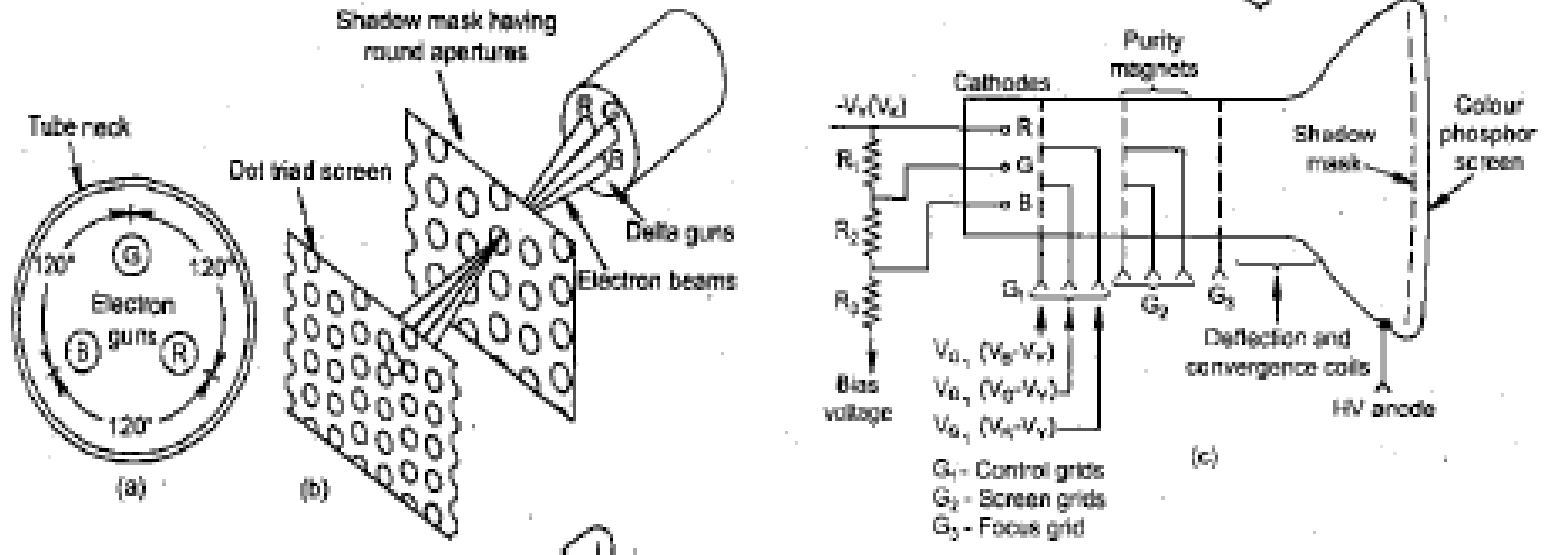
TYPES OF COLOUR PICTURE TUBES:

The screen of colour picture tube is coated with three different colour phosphor. However the three colour phosphor are separated from each other physically.

Three types of picture tubes are

1. Delta – gun picture tube.
2. Precision – In – Line or Gun – In – Line picture tube.
3. Trinitron picture tube.

CONSTRUCTION AND WORKING PRINCIPLE OF DELTA GUN PICTURE TUBES



DELTA GUN

Radio Corporation of America developed this tube. Arranges in delta shape.

MAIN SECTION

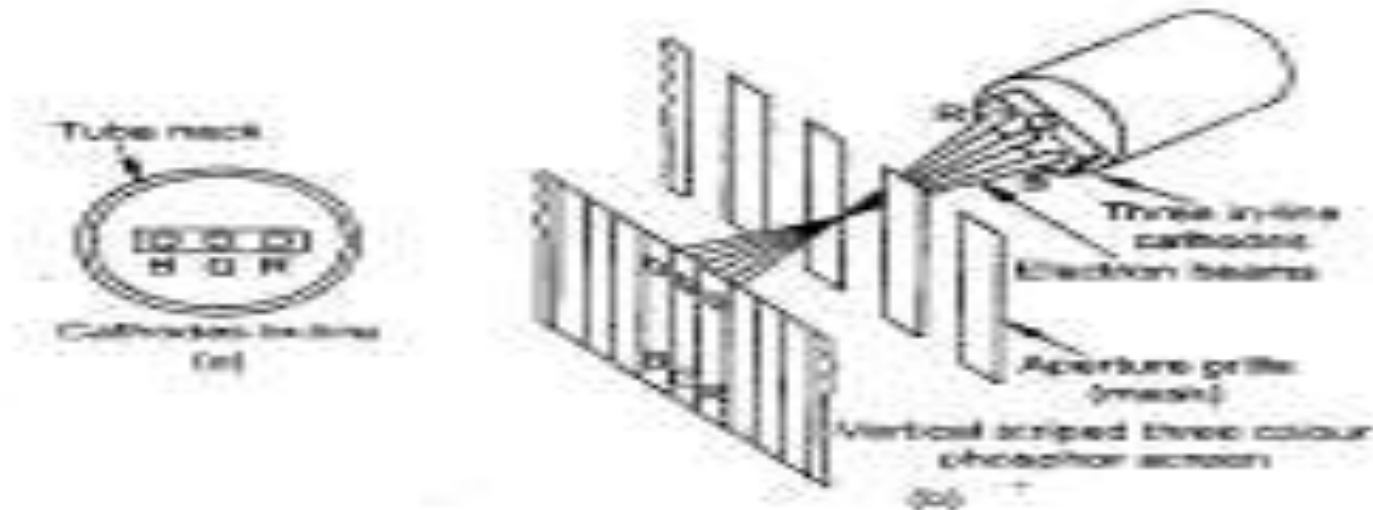
Electron gun consists of three electron guns spaced equally at 120 Screen and shadow mark section.

WORKING PRINCIPLE

The video signals corresponding to each primary colour are given to the three electrons gun. The axis of even electrons beam are adjusted by the purity magnet. And during this time other triode are by the mask. The overall colour depends upon the phosphor which are being energised and the intensity of each beam. Red and green beams are 'ON', screen become yellow.

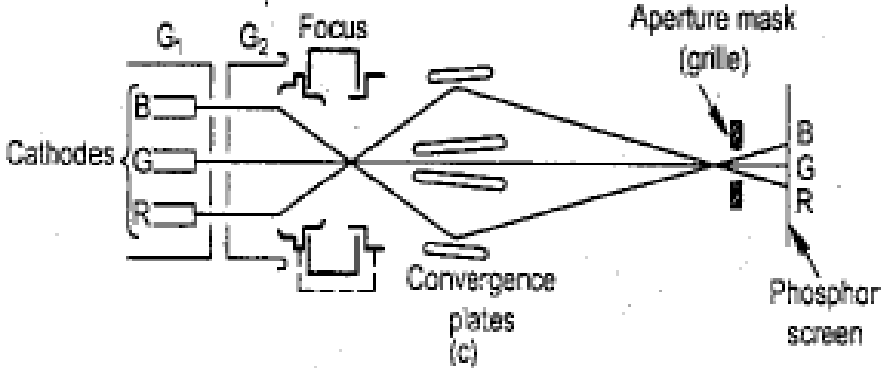
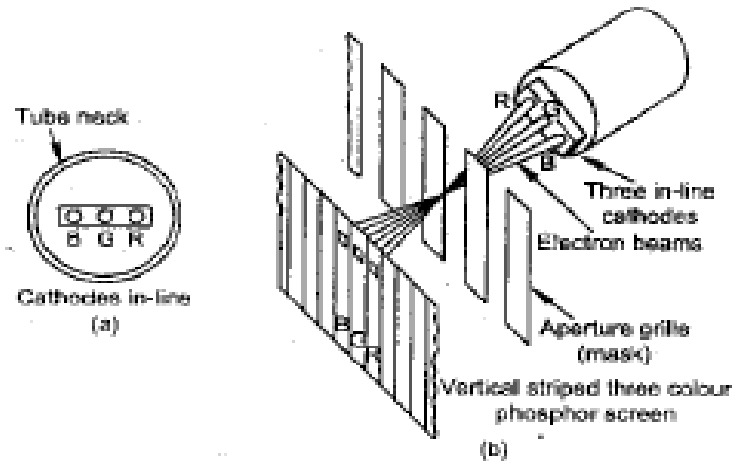
PRECISION – IN – LINE OR GUN – IN – LINE PICTURE TUBE

This tube as the name suggests has three guns which are aligned precisely in a horizontal line. The electron beams are deflected by the mask.



TRINITRON COLOUR PICTURE TUBE:

This type of tube was developed by Sony corporation of Japan. These tubes are having a single gun with three in-line cathodes.



ELECTRON GUN SECTION:

Here there is only one electron gun, but with three cathodes for each primary colour, screen and mask construction. The outer plates are supplied with above 450V less than the final anode voltage. Four convergence plates are used. Since green beam is in centre, it passes through the centre plate. But red and blue beams pass between other plates. Since centre plate is connected internally to final anode, zero potential is found between these plates. So green beam is not affected by convergence voltage. Due to voltage difference, an electronic force is developed and converging action takes place. So convergence is done for red and blue beams.

THANK YOU