Video camera tube

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In older video cameras, before the mid to late 1980s, a **video camera tube** or **pickup tube** was used instead of a charge-coupled device (CCD) for converting a video image into an electrical signal. Several types were in use from the 1930s to the 1980s. The most commercially successful of these tubes were various types of cathode ray tubes or "CRTs".

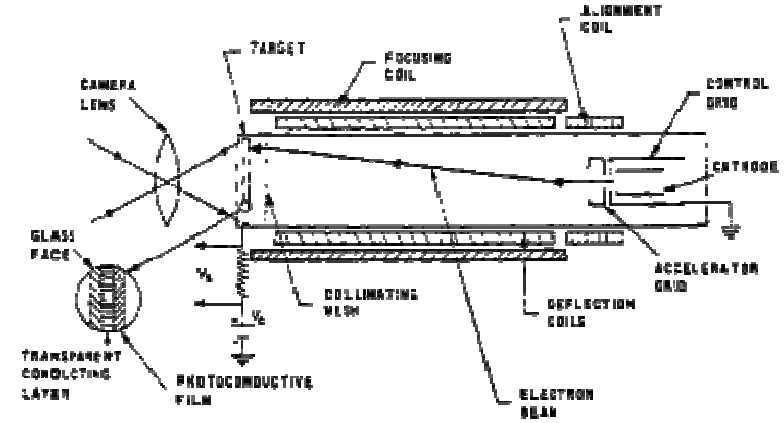
vidicon tube (2/3 inch in diameter)

Any vacuum tube which operates using a focused beam of electrons ("cathode rays") is known as a cathode ray tube. However, in the popular lexicon "CRT" usually refers to the "picture tube" in a television or computer monitor. The proper term for this type of display tube is kinescope, only one of many types of cathode ray tubes. Others include the tubes used in oscilloscopes, radar displays, and the camera pickup tubes described in this article.[1] (The word "kinescope" has also become the popular name for a film recording made by focusing a motion picture camera onto the face of a kinescope cathode ray tube, a common practice before the advent of video tape recording.[2])

Video camera tubes typically had a certain maximum brightness tolerance. If that limit were exceeded, such as by pointing the camera at the sun, sun-reflecting shiny surfaces, or extremely bright point light sources, the tube detecting surface would instantly "burn out" and be rendered insensitive on part or all of the screen. The only remedy was replacing the video tube.[*citation needed*]

Vidicon

A vidicon tube is a video camera tube design in which the target material is a photoconductor. The Vidicon was developed in the 1950s at RCA by P. K. Weimer, S. V. Forgue and R. R. Goodrich as a simple alternative to the structurally and electrically complex Image Orthicon.[*citation needed*] While the initial photoconductor used was selenium, other targets–including silicon diode arrays–have been used.[*citation needed*]



Schematic of vidicon tube.

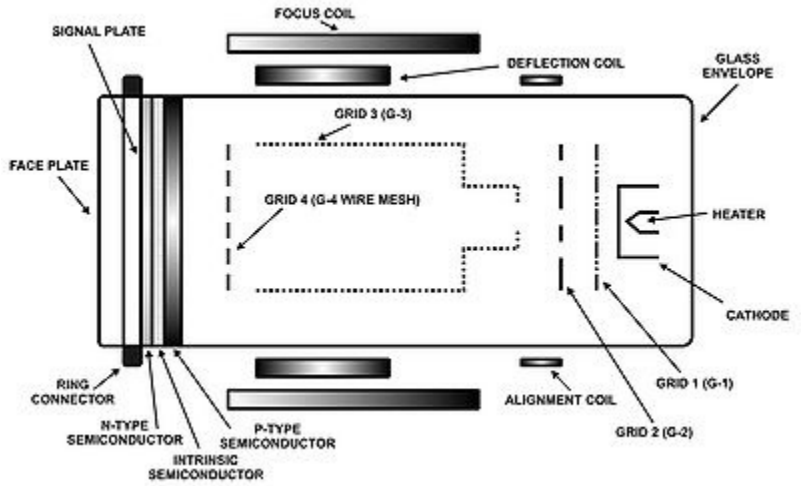
The vidicon is a storage-type camera tube in which a charge-density pattern is formed by the imaged scene radiation on a photoconductive surface which is then scanned by a beam of low-velocity electrons. The fluctuating voltage coupled out to a video amplifier can be used to reproduce the scene being imaged. The electrical charge produced by an image will remain in the face plate until it is scanned or until the charge dissipates. Pyroelectric photocathodes can be used to produce a vidicon sensitive over a broad portion of the infrared spectrum.[*citation needed*]

Prior to the design and construction of the Galileo probe to Jupiter in the late 70s to early 80s, NASA used Vidicon cameras on most of their unmanned deep space probes equipped with the remote sensing ability.[*citation needed*]

Vidicon tubes are notable for a particular type of interference they suffered from, known as vidicon microphony. Since the sensing surface is quite thin, it is possible to bend it with loud noises. The artifact is characterized by a series of many horizontal bars evident in any footage (mostly pre 1990) in an environment where loud noise was present at the time of recording or broadcast. A studio where a loud rock band was performing or even gunshots or explosions would create this artifact.[*citation needed*]

[edit] Plumbicon

Plumbicon is a registered trademark of Philips for its Lead Oxide (PbO) target vidicons. Used frequently in broadcast camera applications, these tubes have low output, but a high signal-to-noise ratio. They had excellent resolution compared to Image Orthicons, but lacked the artificially sharp edges of IO tubes, which caused some of the viewing audience to perceive them as softer. CBS Labs invented the first outboard edge enhancement circuits to sharpen the edges of Plumbicon generated images.[83] [84] [85]



Schematic of a Plumbicon tube. (This image is schematic, not to scale; a Plumbicon has the same shape as a vidicon.)

Compared to Saticons, Plumbicons had much higher resistance to burn in, and comet and trailing artifacts from bright lights in the shot. Saticons though, usually had slightly higher resolution. After 1980, and the introduction of the diode gun plumbicon tube, the resolution of both types was so high, compared to the maximum limits of the broadcasting standard, that the Saticon's resolution advantage became moot. While broadcast cameras migrated to solid state Charged Coupled Devices, plumbicon tubes remain a staple imaging device in the medical field.[83][84][85]

Narragansett Imaging is the only company now making Plumbicons, and it does so from the factories Philips built for that purpose in Rhode Island, USA. While still a part of the Philips empire, the company purchased EEV's (English Electric Valve) lead oxide camera tube business, and gained a monopoly in lead oxide tube production.[83][84][85]

The mighty Plumbicon tube! Better than the image orthicon and Vidicon, Plumbicons produced a clearer picture with brighter colors. Eventually, all broadcast color cameras switched to Plumbicons (or tubes similar in design). The Plumbicon served the broadcast industry from 1965 until the early 1990's, when CCDs and chips replaced camera tubes.