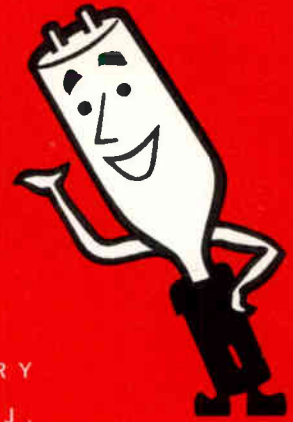




# Tube Tips



A NEWSLETTER TO THE BROADCASTING INDUSTRY  
RCA ELECTRON TUBE DIVISION, HARRISON, N. J.

## RCA-5762A Provides Full-Power Performance In Wide Range of Applications

RCA's recently announced 5762A power triode for VHF service in television and cw applications combines the rugged dependability of the 5762/7C24 with important improvements.

Unilaterally interchangeable with the 5762/7C24, the new forced-air-cooled power triode features an entirely new grid design and grid characteristics which make it ideal for both TV and FM. Intended for use as an rf power amplifier and oscillator at frequencies up to 220 Mc, the 5762A can provide optimum, full-power performance in a wide range of transmitting equipment that includes the popular 5-, 10-, 25-, and 35-Kw types. Maximum plate dissipation of the 5762A is 4 Kw, and its full ratings apply to all VHF televising channels. In broadband television service at 216 Mc, the tube can deliver a synchronizing-level power output of 6.35 Kw when supplied by a driving power of less than 1 Kw.

The new power triode retains the highly efficient radiator of its predecessor for low blower requirements, as well as the thoriated-tungsten filament for high emission, long cathode life, and economical power consumption. It also retains the complete shielding between filament leads and plate; the low grid-to-plate capacitance; and the high perveance for use in grounded-grid circuits.

In addition to increased maximum plate dissipation



and improved qualities for FM applications, the 5762A has increased maximum plate input for class B television service to 9 Kw. Further contributing to the superior performance of the new power triode at very high frequencies are effective rf isolation between filament and plate circuits and elimination of neutralizing circuits.

Distributor Resale price (optional) of the RCA-5762A is \$250. For additional information, contact your local RCA electron tube distributor.

## New RCA Power-Line Monitor and Phase Checker Make Useful Additions to Station Test Equipment

Broadcast engineers and technicians looking for short cuts in routine assignments will find it to their advantage to consider control-room and other station applications for the WV-120A Power-Line Monitor and the WG-360A Phase Checker—brand-new additions to RCA's famous line of electronic test instruments.

Monitoring of ac power-line voltages in the 100- to 140-volt range becomes an easy chore for any technician using the WV-120A. Quick readings at distances of 10 feet or more are obtainable through an expanded scale having large numerals and pointer. The moving-vane-type meter furnishes true RMS readings even when line voltage is not a pure sine wave, and responds quickly to line-voltage fluctuations and "bounce."

The unusually low price of the WV-120A—\$14.95 User price (optional)—offers the potential purchaser real value. A precise test instrument of high accuracy ( $\pm 2\%$  at 120 volts;  $\pm 3\%$  at 100 and 140 volts), the

new Power-Line Monitor features a wide frequency range (25 to 400 cps) and comes in a handsome case that is slotted for convenient mounting on wall or other vertical surface.

The second of RCA's newest electronic instruments is the WG-360A Phase Checker, also priced at a User price (optional) of \$14.95. Here is an innovation in test equipment that keeps pace with new needs arising from the rapid growth and anticipated expansion of stereo FM broadcasting.

Stereo-speaker cones facing in the same general direction should move forward and backward together, or "in phase," when the speakers are driven from the same monaural source. The WG-360A provides a simple, fast, and reliable method for checking the phasing of either low-frequency or mid-range speaker assemblies in left- and right-hand channels in stereo systems. Equally useful for hi-fi or PA systems, this overall

dynamic check on phasing includes everything from input source to speaker sound-wave output.

The WG-360A is sound-powered and operates without tubes, transistors, or batteries. Power is provided directly by voice-, music-, or audio-tone acoustic energy coming from the speakers. Designed for use with an



The WV-120A Power-Line Monitor provides a continuous and highly accurate indication of line voltage. Large meter scale is clearly readable at distances of 10 feet or more.

external indicator, such as a vacuum-tube voltmeter or a cathode-ray oscilloscope, the new Phase Checker may be used with any model of RCA volt ohmmeter, oscilloscope, or *VoltOhmyst*.®

The WG-360A consists of two separate receptor units, each of which contains a 4-inch high-sensitivity, high-impedance (approximately 50-ohm), permanent-magnet speaker. Effective frequency range of these speakers, or "receptors," is approximately 40 to 4000 cycles. Resonant frequency is approximately 180 cps.

One receptor unit is provided with a 15-foot, double-conductor lead terminating in an RCA-type phono plug. This plug fits a corresponding jack on the rear grille of the other receptor unit. The second unit, in addition to a 4-inch speaker, also contains a DPDT (double-pole, double-throw) slide switch, a special audio-frequency step-up transformer, a crystal diode, a jack for the interconnecting cable, and a three-terminal board for connecting an external VOM, VTVM, or CRO.

Each receptor unit is housed in a smooth, fabric-covered wooden case with recessed metal grilles both front and rear.



Operation of RCA's new WG-360A Phase Checker is simplicity itself and takes all the guesswork out of stereo phasing. The broadcast technician merely places one receptor unit in front of the left-hand speaker, the other receptor unit in front of the right-hand speaker, and feeds monaural music or audio tone into the system. He then moves the receptor switch to "in-phase" and "out-of-phase" positions. Correct phasing is indicated by a higher indicator reading at the "in-phase" position.

## Recent Camera Tube Developments Highlighted In New Brochure and Four Technical Papers

In recent years, there has been an increasing demand for TV-camera equipment for low-light-level studio and outdoor applications. This demand has prompted RCA to develop new and improved image-orthicon camera tubes.

These image-orthicon tubes are featured in a recently published RCA brochure available upon request from local RCA tube distributors. "New Frontiers in TV Camera Tubes" describes and compares RCA image orthicons and points up their versatility. Basic tube operating characteristics are also provided. Of equal interest to the broadcast station manager, engineer, or technician, the new brochure serves as a ready reference to the latest RCA image orthicons which contribute to improved TV-camera performance in varied broadcast assignments.

Also of considerable interest to broadcasters are four new technical papers prepared by design and application engineers of the RCA Electron Tube Division for the *JOURNAL OF THE SOCIETY OF MOTION PICTURE AND TELEVISION ENGINEERS*.

"Picture Characteristics of Image Orthicons and Vidicons," by R. G. Neuhauser, appears in the September, 1961, issue. In the October, 1961, issue is another article by the same author titled, "Vidicon Light-Transfer Characteristics and Film Reproduction."

An article by G. A. Robinson in the April, 1961, issue discusses "Operation of Vidicons in Unusual Environmental Conditions."

Camera tube noise factors are treated by B. H. Vine in the article, "Analysis of Noise in the Image Orthicon," which appears in the June, 1961, issue.

Reprints of these four papers are available on request from the Commercial Engineering Department, RCA Electron Tube Division, Harrison, N. J.

## RCA Extends Warranties on Three Camera Tubes

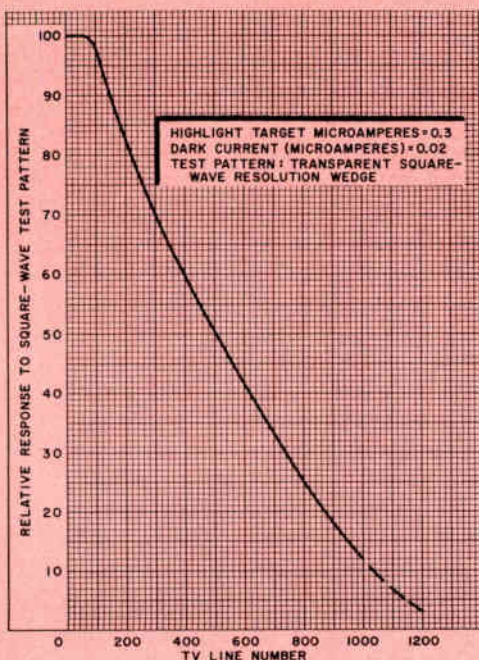
Users of the RCA-7513 image orthicon and the RCA-4415 and -4416 set of matched image orthicons may realize significant reductions in "tube-operating costs per hour" as a result of recent warranty changes affecting these types.

Under RCA's new policy, the warranty time for these types is increased from 350 hours to 500 hours, thus providing customers with a wider time-spread over which to amortize tube purchase price.

Since their introduction, these three image-orthicon types have gained wide acceptance in color television broadcast applications.

Announced in 1959, the RCA-7513 has helped to achieve improved registration in color cameras and a more uniform signal output and background. It has also been widely used for high-quality black-and-white studio pickup. The improved registration results from three features: precision construction; the absence of magnetic parts in critical portions of the tube; and use of a field mesh.

The recently announced RCA-4415 and -4416—available as a set of three tubes having matched characteristics for color pickup—also utilize precision construction and field-mesh design. These two types permit operation of color cameras in studios equipped for normal black-and-white scene lighting levels (150 to 250 footcandles).



Curve in illustration shows uncompensated horizontal response of the RCA-8051 vidicon camera tube to a square-wave test pattern. The 8051 is specifically intended for new equipment designs utilizing 35-mm optical systems.

### New RCA-8051 Vidicon Camera Tube Features 1200-TV-Line Resolution

The first commercial vidicon-type camera tube having a limiting resolution capability of 1200 television lines has been announced by the RCA Electron Tube Division.

Intended especially for new equipment design utilizing 35-mm film camera optics, the RCA-8051 provides extremely fine detail in picture reproduction. It is designed for black-and-white film pickup as well as for high-definition closed-circuit TV involving remote reading of documents or instruments and for color pickup in three-vidicon cameras. The design features of the 1½-inch-diameter 8051 assure good registration in color pickup and simplify set-up and operation procedures.

High resolution is attained without sacrifice of sensitivity or increase in lag. In addition to its outstanding limiting resolution capability, the new tube features precision construction and a mesh electrode having separate external connection.

Distributor Resale price (optional) of the RCA-8051 is \$575.

### Broadcasters Advised to Safeguard Vidicon Tubes Against Excessive Illumination

Direct exposure of vidicon camera-tube faceplates to the sun or to other intense illumination can result in serious damage or complete loss of tube usefulness through "image burn." The danger is especially increased when the source of illumination is intensified through a lens system.

This reminder is posted by RCA Electron Tube Division application engineers, who further point out that the damage can occur with no voltages applied to the tube. They recommend that cameramen and other technicians or maintenance people keep mindful of maximum faceplate illumination ratings found in the technical bulletins for vidicons and follow the precaution of capping the lens whenever the camera is not being used, particularly when a camera is being transported out-of-doors.

### Failure to Allow for RF Heating of Cathode Limits Power Tube Life at High Frequencies

Internal rf heating that accompanies operation of power tubes at high frequencies can lead to overheated cathodes and result in shorter tube life, according to RCA Electron Tube Division Engineers Harold C. Vance, Sr., and Arthur P. Sweet. Mr. Vance is Manager of Sales Engineering for the Distributor Products Department and Mr. Sweet is Engineering Group Leader in Small Power Tube Applications.

When tubes operate at UHF—or sometimes even at (high-band) VHF—it is advisable to carefully determine the actual filament or heater voltage required to obtain full power output after the tube has reached operating temperature.

This may be desirable in order to conserve emission because operation at these high frequencies is accompanied by internal rf heating of the cathode, often referred to as "back bombardment."

"The cathode doesn't care where its heat comes from," they explain. "The hotter it gets, the more it emits within certain limits." Normal heater supply voltage ratings may be based upon developing the required number of degrees Kelvin at a relatively low frequency. If the operating frequency and power are high enough, the additional rf heating may heat the cathode hotter than is required for normal emission and consequently result in shorter tube life. Thus, the same tube may deliver full power output at some filament voltage below its maximum filament rating when operated at some higher frequency.

Mr. Vance reports past experiences where some 8D21 tubes, for example, would deliver full output at filament voltages as low as 2.3 volts; other tubes requiring full 3.2 volts in some cases for 50 to 100 hours and then apparently increasing emission to a point where an intermediate value such as 2.4 volts was sufficient. He points out that this condition only occurred when operating on the "high band" of TV. Full power output could not be obtained at reduced filament voltages on the "low band."

For station engineers interested in maximizing service-life of power tubes at high frequencies, they offer the following recommendation:

"The tube should always be put into operation at rated heater voltage. The proper operating value may then be found by reducing the heater voltage, with normal modulation applied to the transmitter, until a reduction in rf output is observed. The heater voltage should then be increased by an amount equivalent to the maximum percentage regulation of the heater-voltage supply. Some circuit readjustment may be necessary during this procedure."

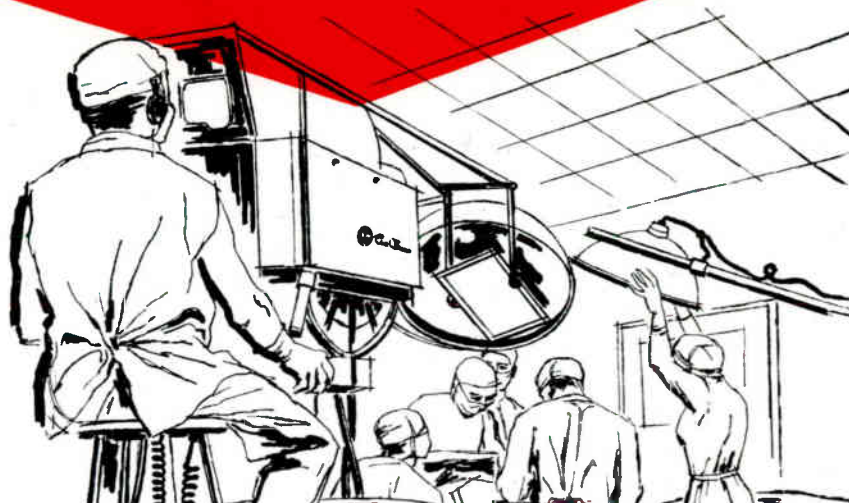
### Two Price Changes Announced

Broadcasters will achieve even lower "tube-operating costs per hour" with the RCA-7513 image orthicon as the result of a recent price reduction affecting this popular camera tube. Effective with the extended warranty period (see story opposite page), RCA has announced a decrease in the Distributor Resale price (optional) from \$1810 to \$1320.

A price reduction has also been announced for the RCA-6166 (glass) power triode, which has been receiving considerable industry attention as the result of continuing improvement in product quality. Effective October 1, the Distributor Resale price (optional) is \$850.

# TRUE COLOR REPRODUCTION

where the smallest detail is important!



## RCA IMAGE ORTHICONS telecast latest surgical techniques to thousands of doctors at Chicago convention

A set of three RCA-4415 image-orthicon camera tubes was used by Smith Kline & French Laboratories for closed-circuit color telecasts at the 47th Annual Meeting of the American College of Surgeons held in Chicago October 2-6.

During the five-day conference, the Philadelphia pharmaceutical firm employed the RCA camera tubes for 21 hours of special surgical programs in color. Demonstrations included operations ranging from a common caesarean section to treatment of advanced cancer.

The tubes were installed in color cameras at the University of Chicago Clinics where actual operations were performed. The daily telecasts were viewed on 9-by-12-foot screens by thousands of doctors assembled at the Pick-Congress Hotel.

Introduced in April of this year, this new type is primarily used in a set of three tubes for color telecasting which consists of two 4415's for the red and green channels and one RCA-4416 for the blue channel. The use of type 4416 produces a significant increase in the effective sensitivity of the set. A special optical system designed by Smith Kline & French television engineers, however, permitted the firm to utilize under these demonstration conditions three 4415's instead. The company has been televising surgical operations in color, as a service to the medical profession, since 1949.

RCA's set of 4415-4416 image orthicons is especially useful for color pickup in studios having lighting and ventilating facilities ordinarily considered adequate for only black-and-white telecasts. The high quality of color reproduction is achieved by closely matching the characteristics of the tubes in each set and by use of precision construction and a field mesh.

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**Joseph Geiger,**  
Chief Engineer of  
SK&F's color televi-  
sion unit, says:

"We regard the RCA-4415 tubes as the finest set of image orthicons we have ever used. The closely matched characteristics of the set of tubes provide true color reproduction over the entire picture area. Picture quality of this type is a prime requirement in presenting medical colorcasts where each detail must be accurately reproduced."

FORM 3547 REQUESTED