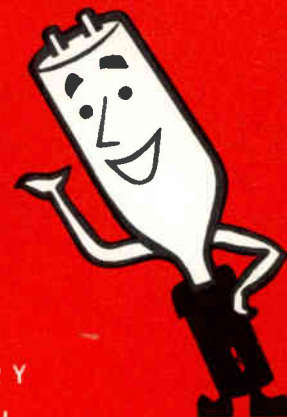




Tube Tips



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

Image Orthicons with Super-Dynode Design Provide Improved Reproduction, Longer Life

An important product design improvement in RCA image orthicon tubes was presented at the recently held NARTB Show and Convention at the Conrad Hilton Hotel, Chicago. This new RCA achievement—called Super-Dynode design—eliminates the tendency toward dynode-burn, inherent in some of the previously manufactured image orthicon tubes.

Super-Dynode design constitutes a major camera tube improvement which provides better picture quality, simplifies camera chain operation, and substantially lengthens effective image orthicon tube life.

Broadcasters at the NARTB Convention learned that not only is this new image orthicon design resistant to dynode-burn, but it also results in a substantial reduction of dynode texture.

In black-and-white TV camera operation, the RCA-5820 Super-Dynode image orthicon provides a marked reduction of dynode texture during "low-key" scenes or "mood" shots. In color TV camera work, the use of RCA-6474 Super-Dynode image orthicons will save much of the time formerly needed for dark-shading adjustments. In addition, color shift in the dark areas is greatly reduced. Super-Dynode design also eliminates the need for reducing the decelerator-grid voltage

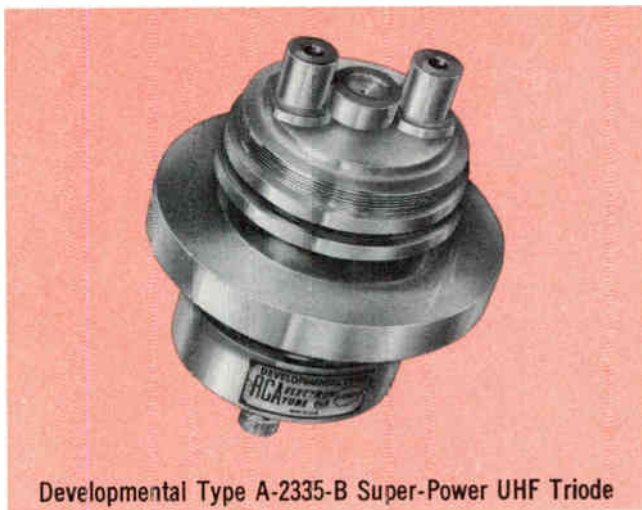
which, in some previous designs, had to be reduced to compensate for dynode-burn. The decelerator-grid voltage can now be set at the optimum value for highlight uniformity throughout the complete useful life of the tube.

Super-Dynode designed RCA-5820's and RCA-6474's are directly interchangeable with all previous RCA-5820's and -6474's. Television broadcasters will also be interested to note that no change in camera circuitry is required. In addition, there is no need for stabilizing runs since no dynode burn-off time is required in the initial operation—or at any time during the life—of these new image orthicon tubes.

The operational features of the 5820 and the 6474 Super-Dynode image orthicons include: a minimum of dark-shading adjustment time; a uniform picture background at all times with a minimum of undesirable background texture in lowlight areas; cleaner color in the dark areas because of minimum color shift; and higher operational performance and longer effective tube life because the decelerator-grid voltage does not need to be reduced from the optimum operating level to compensate for dynode-burn.

RCA-5820 Super-Dynode image orthicons are immediately available at your nearest RCA tube distributor. RCA-6474 Super-Dynode image orthicon camera tubes for color pickup will be available within approximately one month.

Special RCA Power and Camera Tubes Featured at NARTB



Developmental Type A-2335-B Super-Power UHF Triode

Broadcasters at the NARTB Show and Convention also expressed great interest in the RCA radio and television broadcast tubes displayed in the RCA exhibit. Included in this impressive array of RCA engineering accomplishments were: the new developmental type A-2335-B super-power triode, the commercial type 6181 beam power tube, the commercial type 6161 power triode, the developmental type A-2547 beam power tube, and the developmental type C-73456 ½-inch vidicon camera tube.

RCA developmental type A-2335-B is a super-power UHF triode designed for cathode-drive operation in amplifier service at frequencies up to 900 Mc. This tube is adaptable to a wide variety of UHF applications demanding power in the order of 100 kilowatts.

The A-2335-B employs a unique, high-strength, low-loss ceramic envelope with ceramic-to-metal compression vacuum seals wherein a tensioned centerbolt provides the requisite forces. "Double-ended" mechanical

and electrical configuration permits the use of quarter-wave mode external output circuitry up to a frequency of 900 Mc. The maximum peak voltage rating of the A-2335-B is 10 Kv and its maximum plate dissipation rating is 100 Kw. As in other RCA super-power tubes, the A-2335-B utilizes a multi-strand thoriated-tungsten filament for long life.

RCA-6181 is a forced-air-cooled beam power tube designed for UHF service in television and cw applications. It can be operated with full plate voltage and plate input at frequencies as high as 900 Mc, and is capable of delivering a synchronizing-level power output of 1200 watts in broadband television service. Featured in the design of the 6181 is a coaxial-electrode structure providing low-inductance, large-area, rf electrode terminals insulated from each other by low-loss ceramic bushings.

The coaxial-electrode structure of the 6181 is designed especially for use with high-power circuits of the coaxial cylinder cavity type. The design provides for easy insertion into the cylinders, and permits effective isolation of the plate from the cathode. The coated unipotential cathode in the 6181 has a "117-volt" heater which is electrically shielded from the rf input and output circuits.

RCA-6161 is a very compact, forced-air-cooled power triode of the integral-radiator type designed for UHF service in television and cw applications. The tube has a maximum plate dissipation of 250 watts in cw and television service and can be operated with full plate voltage and plate input at frequencies as high as 900 Mc, and with reduced ratings up to 2000 Mc. The 6161 features a coaxial-electrode structure designed espe-

cially for use with circuits of the coaxial-cylinder type. This particular design provides low-inductance, large-area, rf electrode terminals for insertion in the cylinders and permits isolation of the plate from the cathode. Isolation of the plate from the cathode makes the 6161 particularly suitable for use in cathode-drive circuits.

RCA developmental type A-2547 is a forced-air-cooled beam power tube intended for use in airborne and SSB service. It features a coaxial-electrode structure with ring-type ceramic-metal seals. The A-2547 has a maximum plate dissipation rating of 1500 watts and can be operated with full input up to 1000 Mc. With reduced input, it is useful up to 2000 Mc.

When used as an rf power amplifier in class C telegraphy service (CCS) with a dc plate voltage of 2000 volts and at frequencies up to 400 Mc, the A-2547 can deliver a useful power output of 1000 watts with low driving power. Only about 60 watts are required from the driver stage. The heater for the unipotential cathode requires 90 volts at 1.5 amperes with a minimum heating time of 2 minutes.

RCA developmental type C-73456 is a 1/2-inch miniature vidicon camera tube intended primarily for use in portable television cameras. This new tube employs a high sensitivity photoconductive layer having a spectral response that covers the entire visible spectrum. The active area of the photoconductive layer has been chosen so as to make use of 8 mm motion picture lenses.

Designed with a heater that takes only about one-fourth of the power required by the heater of a conventional 1-inch vidicon, and having a maximum overall length of only 3 5/8 inches, the C-73456 is especially applicable to transistorized cameras.

RCA Highlights Large and Small Power Tubes at NARTB Exhibition



5762 Power Triode

Among the various large power tube types displayed in the RCA Tube Division's NARTB exhibit was the commercial 5762 forced-air-cooled power triode, which is designed for TV, FM, AM, and industrial services. The 5762 has a maximum plate dissipation of 3 Kw and is rated for operation up to 220 Mc.

Among RCA's small power tubes featured at the exhibition were the developmental type A-2541 beam power tetrode and developmental type A-2514-B VHF power tetrode, as well as the commercial beam power tube types 6816, 6884, 6883, 6417, 5763, and 6893.

RCA developmental type A-2541 beam power tube is a small, compact, forced-air-cooled type designed for use in rf power amplifier or oscillator service at frequencies up to 500 Mc, and in af power amplifier and modulator service. When used as an rf power amplifier in class C FM telephony service or as an rf power amplifier and oscillator in class C telegraphy service under CCS conditions at frequencies up to 150 Mc, the A-2541-A has a maximum plate voltage rating of 200 volts and a maximum plate dissipation rating of 250 watts; at frequencies from 150 to 500 Mc, the maximum plate voltage rating is 1250 volts, and the maximum plate dissipation rating is 150 watts.

RCA developmental type A-2514-B is a high-perveance power tetrode having a maximum plate dissipation rating of 125 watts (ICAS). Under class C telegraphy conditions (ICAS) with 1500 volts on the plate, the A-2514-B delivers 335 watts of useful power output at 60 Mc; with a plate voltage of 1000 volts, the tube delivers 190 watts of useful power output at 175 Mc.

RCA-6816 is a very small forced-air-cooled beam power tube designed for use as a UHF power amplifier, oscillator, and frequency multiplier, as well as an af power amplifier and modulator in compact mobile and fixed station equipment. The tube features a coaxial-electrode structure with ring-type ceramic-metal seals.

RCA-6884 beam power tube is identical with the 6816 except for its heater rating of 26.5 volts, 0.52 ampere, as compared with 6.3 volts, 2.1 amperes for the 6816.

RCA-6883 is a small beam power tube designed for use as an rf power amplifier and oscillator as well as an af power amplifier and modulator in mobile equipment.

RCA-6417 is a general-purpose transmitting beam power tube of the heater cathode type intended for use in compact, low-power mobile and portable transmitters and in emergency equipment.

RCA-5763 is identical with the 6417 except for its heater ratings of 6 volts, 0.75 ampere, as compared with 12.6 volts, 0.375 ampere for the 6417.

RCA-6893 is a small beam power tube for use as an rf power amplifier and oscillator, as well as af power amplifier and modulator in mobile equipment. The 6893 is intended primarily for operation in communications equipment powered by a 12-volt storage battery.

Low-Light Camera Tube Shown

Also on display in the RCA booth was the RCA-6849, a television camera tube designed especially for use in industrial and scientific-research television applications involving extremely low light levels. It may also be of use to broadcasters in producing special effects.

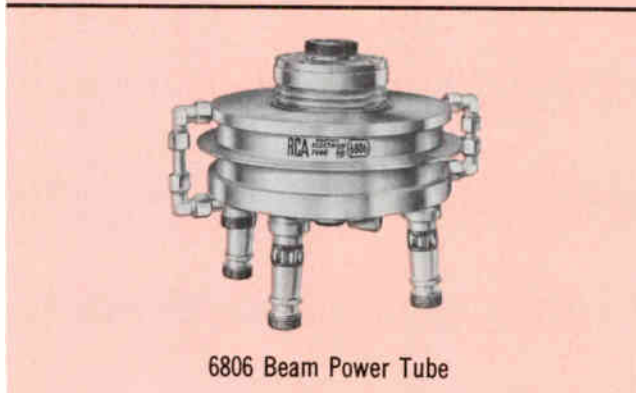
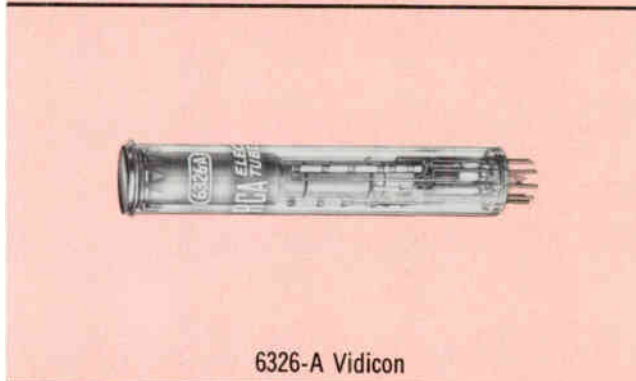
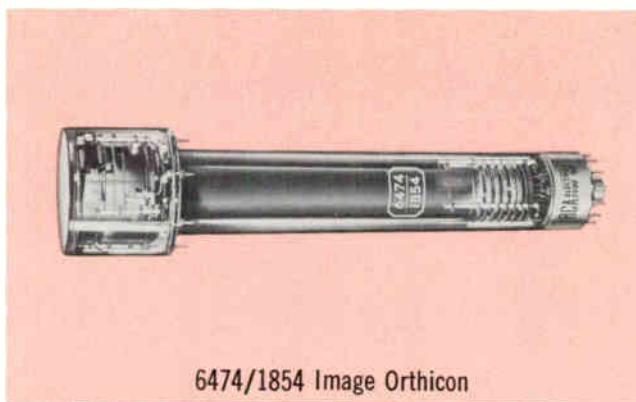
Because of its extremely high sensitivity combined with a spectral response approaching that of the human eye, the 6849 is capable of extending the range of human vision by amplifying low-intensity light images so that the eye can see details in the amplified images when they are brightly displayed on a television picture tube. When used in a standard television system and with proper low-noise amplifiers, the 6849 can produce signal information with illumination on the photo-cathode as low as 0.00001 foot-candle.

Tubes for Color Displayed by RCA

In addition to the types mentioned above, the following commercial tubes exhibited by RCA at the 1957 NARTB show are primarily intended for use in color-television applications: the 6474/1854 image orthicon, with the new Super-Dynode, for simultaneous color pickup; the 6326-A vidicon without side-tip for simultaneous color pickup; and the 6806 UHF beam power tube for color or black-and-white television transmitter applications.

RCA-6474/1854 image orthicon is a television camera tube intended for use in color cameras utilizing the method of simultaneous pickup of the studio or outdoor scene to be televised. This method employs three 6474's to produce the information necessary for the formation of a color-TV image.

The 6474 has exceptional sensitivity combined with a spectral response approaching that of the human eye, and good resolution capability. With a suitably designed optical system utilizing efficient color filters, commercially acceptable color pictures can be obtained with about 350 foot-candles of incident incandescent illumination on the scene and a lens stop of f:5.6. When



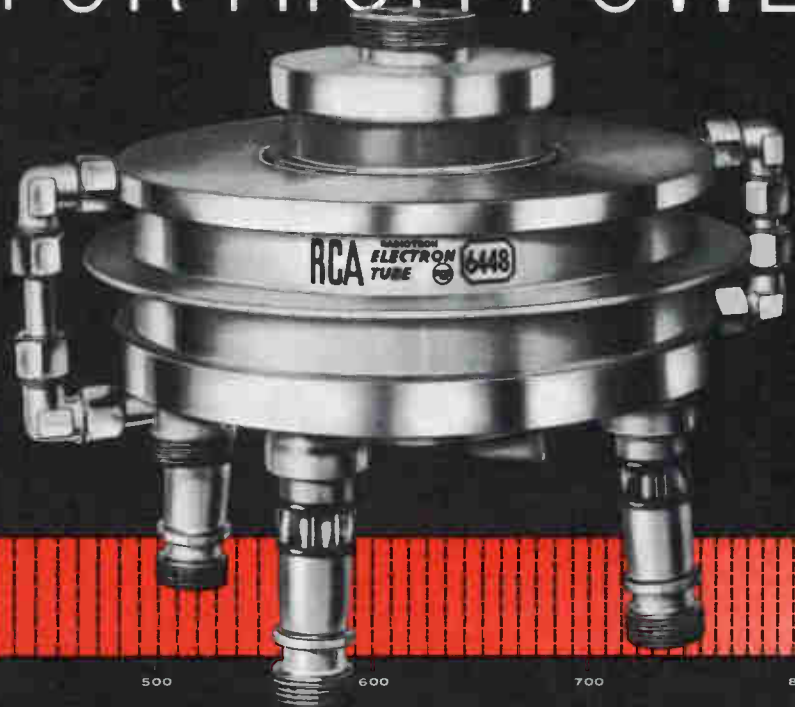
operated in the proper optical system and camera equipment, the tube will accurately translate the colors of a particular scene.

RCA-6326-A Vidicon is a small camera tube intended primarily for use in compact color-television cameras utilizing the method of simultaneous pickup of the film or live subjects to be televised. The tube is also useful in black-and-white pickup applications for either film or live pickup. In either color or black-and-white service, the 6326-A can provide a picture of high quality for broadcasting or industrial-television applications. Its resolution capability is approximately 600 television lines.

RCA-6806 is a beam power tube intended for operation as a grid-driven power amplifier at frequencies up to 150 Mc and from 220 to 1000 Mc. The tube is useful in color or black-and-white television service, as a cw amplifier in Class C telegraphy service, as a class AB power amplifier, and it is also well-suited for use in single-sideband service. The various features of the 6806 make possible the practical operation of the tube as a grid-driven UHF power amplifier which provides high gain without the need for neutralization.

"POWER-HOUSE"
RELIABILITY

FOR HIGH-POWER UHF



RCA-6448, the "new tube look" in high power. One type meets the frequency requirement for any channel in UHF-TV

You are looking at the beam power tube that has made high-power UHF a practical reality. It has met and passed the strenuous "shake-down" test of commercial UHF station operation over a period of 2 years in daily service!

Already proved-in for long life and low cost per hour of operation, RCA-6448 is the forerunner of a sweeping technological advancement in power-tube design that will open a new era in rf power levels—above and beyond previous tube capabilities.

Your RCA Tube Distributor handles RCA Tubes for virtually every application. For prompt tube delivery, call him.

RCA Tubes — for Long-Term Power Delivery



TUBES FOR TELECASTING

RADIO CORPORATION OF AMERICA · HARRISON, N. J.

HOW TO GET MORE HOURS FROM AN RCA-6448

- Avoid by-passing of cooling water before it gets to tube. Be liberal with plate water-flow.
- Operate filament at lowest voltage practical for adequate emission (not less than 1.25v per section). During long standbys, reduce normal value to 80%.
- Check electronic protective circuits for correct sensitivity.
- Raise filament voltage gradually (prevents high initial surge current). Run both filament sections at same voltage—obtained from well-regulated supply.
- Keep all tube surfaces **CLEAN**—to avoid leakage and voltage breakdown.
- "Break-in" new tube in accordance with RCA technical bulletin (packed with each tube).
- Operate spare tubes periodically. Blow water from all ducts before storing or transporting.
- Avoid stresses at glass and ceramic seals—especially when tightening or removing water fittings.
- Do not exceed the maximum rating of the tube—even momentarily.

World Radio History

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