RCA TUBE TIPS

A NEWSLETTER TO THE BROADCASTING INDUSTRY

RCA TUBE DIVISION HARRISON, N. J.

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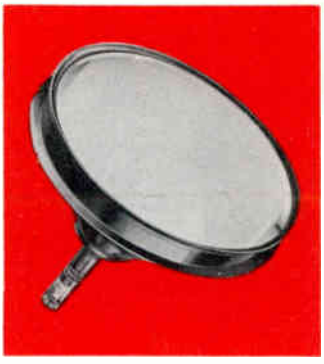
Broadcasters at NARTB Convention See New RCA Commercial Color Picture Tube, Five Developmental Super-Power Transmitting Tubes

The RCA-21AXP22-A, a new color picture tube that is expected to spur manufacture of lower-priced color-TV receivers, was displayed publicly for the first time at the recently held NARTB Convention in Chicago. The new color tube was part of an RCA exhibit including five new developmental super-power transmitting tubes, a commercially available low-noise traveling wave tube, and a very small oscillograph tube.



PICTURE TUBE FOR COLOR TV

Highlight of the display of RCA tubes for color-TV reception, the 21AXP22-A – like the 21AXP22 – is a directly viewed picture tube of the metal-shell type, capable of producing either a full-color or black-and-white picture measuring 19-1/16 inches by 15-1/4 inches with rounded sides and having a projected area of 255 square inches. The new tube has the unique feature of an internal neck coating having high resistance which eliminates the need for an external resistor between the ultor power supply and the tube to protect the tube against damage caused by a momentary internal arc. The resistance of the neck coating also permits use of a tube-insulating boot having an external conductive coating which with the metal envelope of the tube forms a supplementary filter capacitor.

As a result of improved production techniques, this new picture tube has increased light output. Furthermore, a modified procedure for adjusting the lateral-converging magnet on the 21AXP22-A assures more effective convergence adjustment.

SUPER-POWER TRANSMITTING TUBES

A large portion of the RCA exhibit was devoted to the new super-power tubes that are making possible the generation of unprecedented levels of power at higher and higher frequencies. Broadcasters expressed keen interest in super-power tubes, giving particular attention to the five developmental tubes – at present being offered to electronic equipment manufacturers on a sampling basis – that presage things to come in RCA's super-power line. The developmental super-power tubes on display were as follows:

(Continued on next page)

(1) A shielded-grid beam triode capable of delivering a cw power output of approximately 500 Kw at 50 Mc. It is useful at frequencies to at least 75 Mc. This tube has generated over 1,600 Kw at 400 Kc during test. (2) A shielded-grid beam triode intended to generate a useful power output of 300 Kw at 200 Mc in continuous rf service and up to 3,500 Kw in pulse service. This tube is designed for use with double-ended circuitry to give greatly increased power and operating advantages at very-high frequencies. (3) A super-power triode intended 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 Kw. (4) A beam power tube designed especially for use as a grid-driven power amplifier in pulse service. In high-duty, long-pulse service at a frequency of 450 Mc, a peak power output of 250 Kw can be achieved. (5) A beam power tube for generating 1,000 Kw at 425 Mc in short-pulse service, and for switching 5,000 Kw in hard-tube pulse-modulator service. It utilizes an oxide-coated matrix-type cathode to provide a reserve of electron emission together with economy in cathode heating power.

LOW-NOISE TRAVELING WAVE TUBE

Figuring prominently in the RCA display was the Company's type 6861 – the world's first commercially available low-noise traveling-wave tube. Now in production, the 6861 represents a major advance in electron-tube design for microwave receivers. It enables – for the first time – the practical application of low-level rf amplifier stages in receivers for scatter-propagation, radar, and other microwave reception, and of if-amplifier stages in millimeter-wave receivers. An RCA-designed special type of electron gun in the 6861 de-amplifies noise generated in the electron beam, producing an average noise figure of only 6.5 db together with a gain of approximately 25 db over the entire 2,700-3,500 Mc band.

OSCILLOGRAPH TUBE

Newest addition to the company's line of oscillograph tubes, the very small RCA-1EP1 drew favorable comment from many broadcast engineers visiting the RCA exhibit. This tube type employs electrostatic focus and electrostatic deflection and is designed especially for use in small, lightweight equipment in aircraft, or in continuous monitoring service for large electronic equipment.

Design features of this tube include a flat-face bulb, a minimum useful screen diameter of 1-1/16 inches, a maximum overall length of only 4-1/16 inches, and a very sturdy structure.

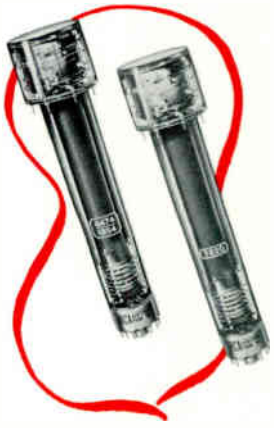
Vacation Time at RCA Tube Division: July 13th to July 30th

Start checking now to be sure that you or your local RCA distributor are stocked up on all the spare tubes you may need during the RCA Tube Division's annual two-week vacation period. All tube-manufacturing operations of the Division will shut down for employee vacations at the close of business Friday, July 13th, and will not re-open until Monday, July 30th. Although the Division's warehouses will operate with reduced staffs to handle orders available from stock, full-scale shipment during this period cannot be guaranteed. Facilities for handling urgent correspondence and inquiries, however, will be maintained as usual.

TUBE TIPS

Design Differences Between RCA Image Orthicon Types Discussed

The question arises occasionally as to the differences between the image-orthicon types RCA-6474/1854 and RCA-5820. Identical in their external appearance, these two types have internal-construction differences that result in dissimilar performance characteristics. These differences are reviewed here to promote a better understanding of the application of these two top-quality camera tubes.



In the 5820, the fine mesh-screen is spaced about 2.5 mils from the glass target, whereas in the 6474/1854, this spacing is about 1 mil. Thus, the two tube types are physically different in their internal construction and are manufactured on two separate production lines.

The wide spacing in the 5820 provides a target capacitance and a transfer characteristic such that careful control of the scene-lighting level is not required to obtain stable performance. Because of its inherent characteristics, the 5820 is especially suited for black-and-white outdoor pickup or in black-and-white studio pickup where the scene lighting is not well controlled.

The close spacing in the 6474/1854 provides a higher target capacitance and, therefore, a longer linear section of the transfer characteristic. This, in turn, results in increased signal-to-noise ratio and extended contrast range. Because of these characteristics, the 6474/1854 was chosen in RCA color cameras. In these cameras, three 6474/1854's are operated in registry with scene highlights carefully controlled to fall on the linear portion of the transfer characteristic. Since the three tubes must track completely in order to retain proper color balance at each point of the picture, it is essential that 6474/1854's be manufactured to especially stringent mechanical tolerances and controls and undergo very severe tests for quality items such as uniformity of landing and shading. These requirements increase manufacturing costs. The 6474/1854 inherently is also the best image orthicon for black-and-white operation when light levels are carefully controlled. Gamma correction and high peaking adjustments are practical due to the high signal-to-noise ratio. Improved gray scale and a generally "crisper" picture can be obtained. For best results, scene highlights should be maintained at a point one stop above the knee of the transfer characteristic.

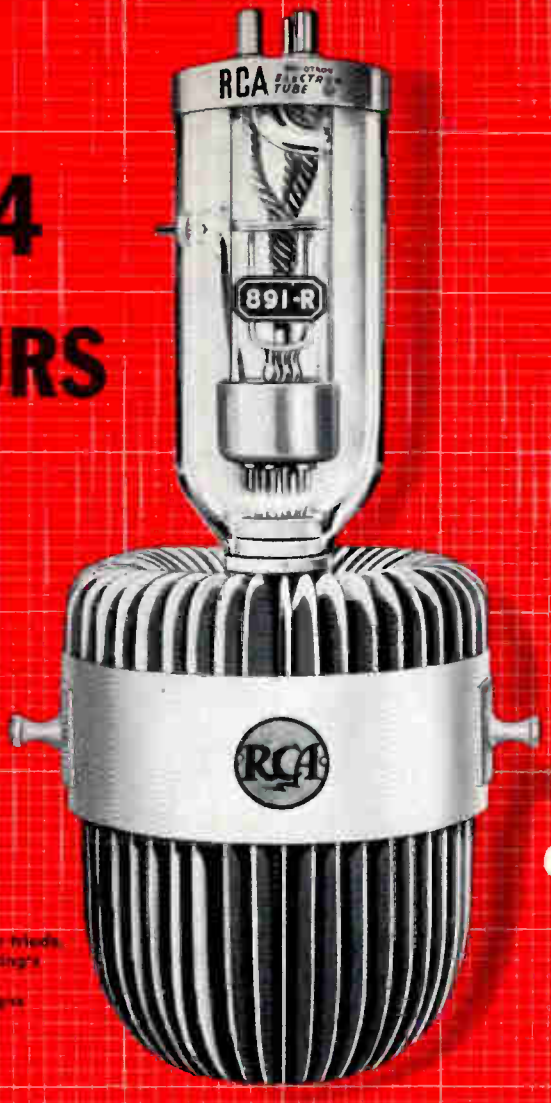
RCA Announces New High-Fidelity Speaker

A new, inexpensive speaker – well suited to the requirements of top-quality broadcast monitoring or control-room use – was recently added to the RCA line of high-fidelity equipment. Designated the 501S1 Biaxial Speaker, this unit combines a 12-inch low-frequency "woofer," a specially designed 3-inch high-frequency "tweeter," and a capacitive crossover network. The tweeter unit is mounted off-axis to provide smooth acoustical cross-over. The 501S1 has exceptionally good transient response over its entire range because of its inherently good damping.

The 501S1 is capable of handling 12 watts continuous duty and has substantially uniform response over the range of frequencies from 40 to 18,000 cycles per second. The "woofer" has an 8-ohm voice-coil and features a 14.5-ounce Alnico V magnet.

RCA Time-proved Tube Designs...for longer service

48,044 HOURS ON-AIR



...in 11 years of operation

RCA-891-R power triode... one of broadcasting's first forced-air cooled tubes that goes ...still a favorite

The remarkable endurance of RCA Power Tubes is due in great measure to *"proved-in"* designs—that have withstood and passed the "shake-down" tests of practical transmitter operation for years and years. Take RCA's famous forced-air-cooled designs—like the RCA-891-R at WOI.
Says WOI's Chief Engineer, Keith K. Ketcham:

"In April of 1952 we removed from our RCA 5DX 5-kw transmitter, an RCA-891-R modulator tube...which was purchased by WOI in September 1939...
The total number of hours in use chalked up by this tube amounted to 48,044.6—which amounts to approximately 11½ YEARS OF SERVICE IN OUR TRANSMITTER."

RCA application-proved power-tube designs are paying off for broadcast stations like WOI every day—in assuring greater reliability of equipment operation—in reducing tube cost per hour of operation! Your RCA Tube Distributor is ready to handle your call for RCA Tubes of all types promptly—for virtually every need and operation in a broadcast station.

HOW TO GET MORE HOURS FROM AN RCA-891-R

- Reduce filament voltage to the minimum to give required output at acceptable distortion level—then increase by the amount required to compensate for line-voltage regulation.
- Keep air-cooling system clean—to prevent tube and circuit damage from overheating.
- When handling tube, lift it by the handles to avoid mechanical damage: Don't bump glass envelope or grid arm.
- Operate spare tubes periodically.
- Operate RCA-891-R within RCA ratings. Always follow the instructions packed with each tube.

RCA ®

TUBES FOR BROADCASTING

RADIO CORPORATION OF AMERICA • HARRISON, N. J.