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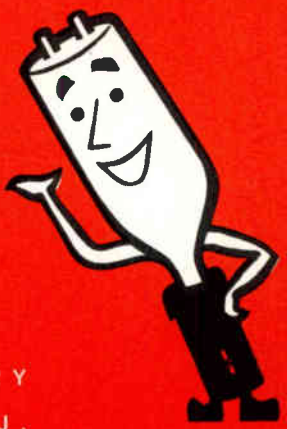
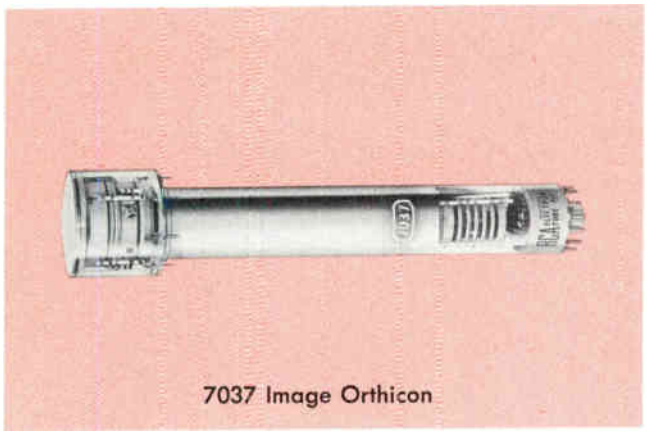
Tube Tips



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

New Color Camera Tube Outperforms All Other Image Orthicons



7037 Image Orthicon

The RCA Electron Tube Division recently announced a new color camera tube which will outperform and outlast any other image orthicon. In addition, this new tube features a new, improved photosurface that has much higher sensitivity and that will retain high sensitivity throughout life.

Identified as commercial type RCA-7037, some of its outstanding features are: higher effective sensitivity to red, green, and blue, permitting a reduction in lighting levels or lens aperture; increased ratio of blue to red sensitivity to provide better balance of effective sensitivity between color channels with incandescent lighting; a new "stabilized" target which greatly reduces any tendency toward an increase in picture "sticking" throughout the life span of the tube and thus makes possible more hours of service and lower camera operating costs; Super-Dynode design to insure freedom from dynode burn; and Micro-Mesh 750-line screen, eliminating mesh pattern and moiré effects without manual defocusing and allowing operation with an aperture-correction circuit to provide 100% response for 350-line information.

When used in a color camera employing the method of simultaneous pickup, the 7037 makes it possible to obtain commercially acceptable color pictures with about 350 foot-candles of incident incandescent illumination on the scene and at a lens stop of f:8 or smaller. In comparison, the type 6474 needs a lens stop of f:5.6. The 7037, therefore, requires only one-half as much light on its photocathode as the 6474.

Since the 7037 has more than twice the sensitivity of the 6474, the new tube can effect lower studio lighting costs because of reduced lighting requirements. In turn, studio air-conditioning costs and requirements will be substantially reduced.

The new 7037 also will give greater freedom in staging techniques with the lower light-level requirement. Greater depth of field can be obtained utilizing the same light levels as those required for the 6474.

In addition to its other features, the spectral response of the 7037 is so closely matched to that of the 6474 that, under most conditions, no change in color filters is required.

Distributor Resale price (optional) of the RCA-7037 image orthicon is $2400.00.

* * *

The new, improved photocathode in the RCA-7037 is only one of the major image orthicon improvements developed by the RCA Electron Tube Division. This outstanding improvement in photocathode sensitivity sets a new high level.

Previous improvements in RCA image orthicons include the addition of Super-Dynode design and 750-line Micro-Mesh, both of which are also utilized in the 7037.

Super-Dynode design, introduced early in 1957, is an important development utilized in today's image orthicon. It had been known for some time that changes in the secondary-emission ratio of the material on the first dynode became objectionable, particularly in color operations. Tubes used in color cameras had to be retired for reasons of "dynode burn" which is a condition contributing to excessive "dark shading."

To prevent "dynode burn," RCA incorporated a new material which eliminated the problem. Tubes now utilizing the Super-Dynode design require a minimum of dark-shading adjustment time, give a more uniform picture background at all times with a minimum of undesirable background texture in lowlight areas and, for color operation, give cleaner colors in the dark areas because of minimum color shift. In addition, and of great importance, is the fact that the decelerator-grid voltage can be set at the best value for highlight uniformity throughout the useful life of the tube, thus eliminating the interdependence of dark shading and highlight uniformity.

The RCA Electron Tube Division also perfected a ruling engine which would allow the production of especially fine mesh-masters for the screens of image orthicons and vidicons. This extremely delicate mesh structure, with 750 spaces in each linear inch, permits

improved picture detail contrast by the use of aperture correction circuitry. In the use of this fine-mesh screen —called Micro-Mesh—100% aperture response can be obtained for 350-line information, whereas, only 60% was obtainable for the same information with the older 500-mesh screen. If the full correction now possible is attempted with 500-mesh type tubes, beat pattern problems and moiré effects become very pronounced.

The developmental work at RCA, recently culminating in the outstanding features of the RCA-7037, has been and continues to be concerned with improving performance and quality of the image orthicon and vidicon types.

Two New 'Ham' Tubes Under Development

Ever since the popular RCA-6146—originally designed for "ham" radio use—found its way into commercial broadcast service, broadcasters have become increasingly interested in RCA "ham type" tubes. It is for this reason that TUBE TIPS now reports that two new RCA "ham type" beam power tubes are currently under development. They are the RCA developmental types A-2514-D and the A-2540-B.

The A-2514-D is a high-perveance, high-gain type especially suited for use as a linear rf power amplifier in single sideband suppressed-carrier service. In such service, the A-2514-D has the following tentative ICAS maximum ratings at frequencies up to 60 Mc: dc plate voltage, 2000 v; maximum-signal plate input, 400 w; and plate dissipation, 125 w. Under these conditions, the A-2514-D will give a useful maximum-signal power output of 250 w at 60 Mc.

Under ICAS conditions in class C telegraphy service with 1500 v on the plate, the A-2514-D will deliver 340 w of useful power output at 60 Mc; and with 1000 v on the plate, the new tube will deliver 215 w of useful power output at 175 Mc.

When operated at maximum ratings, this new type requires some forced-air cooling provided by a small fan or blower to prevent exceeding the maximum bulb-temperature rating of 250° C.

The A-2514-D utilizes a unipotential cathode; a heater rated at 6.3 v, 3.2 amp; and a septar 7-pin base. Maximum overall length is 5 inches; maximum diameter is $2\frac{9}{16}$ inches.

The A-2540-B is similar to the A-2514-D, but is somewhat smaller in size and does not have as much power output. As a linear rf power amplifier in single sideband suppressed carrier service, the A-2540-B has the following tentative ICAS maximum ratings at frequencies up to 60 Mc: dc plate voltage, 1250 v; maximum-signal plate input, 250 w; and plate dissipation, 80 w. Under these conditions, the A-2540-B will give a useful power output of 170 w at 60 Mc.

Under ICAS conditions in class C telegraphy service with 1250 v on the plate, the A-2540-B will deliver 215 w of useful power output at 60 Mc; and with 850 v on the plate, the A-2540-B will deliver 135 w of useful power output at 175 Mc.

When operated at maximum ratings, this new type requires some forced-air cooling provided by a small fan or blower to prevent exceeding the maximum bulb-temperature rating of 250° C.

Maximum overall length is 5 inches; maximum diameter is $2\frac{1}{16}$ inches.

At present, these two developmental tubes are available only to electronic equipment manufacturers on a sampling basis. TUBE TIPS will keep you alerted on the commercial announcements which will be forthcoming in the near future.

Other New RCA Tube Types

RCA-6816 and -6884 are very small, forced-air-cooled beam power tubes designed for use as UHF power amplifiers, oscillators, and frequency multipliers as well as af power amplifiers and modulators in compact mobile and fixed equipment.

These types have a maximum plate dissipation rating of 115 w in modulator service and cw service. In the latter service, they can be operated with full ratings to 1200 Mc and with reduced ratings to 2000 Mc.

The design of these tubes utilizes a coaxial electrode structure with each electrode, its support, and its gold-plated external contact surface formed in one piece. This type of construction facilitates accurate assembly of the electrodes and provides low-inductance, high-conductivity paths to the electrodes themselves. The respective electrode contact surfaces are insulated from each other by low-loss ceramic bushings which permit tube operation with seal temperatures as high as 250° C.

The 6884 is identical with the 6816 except for its heater rating of 26.5 v, 0.52 amp, as compared with 6.3 v, 2.1 amp for the 6816.

* * *

RCA-6155/4-125A is a forced-air-cooled beam power tube of the thoriated-tungsten filament type intended for use as an amplifier, modulator, and oscillator. It has a maximum plate dissipation rating of 125 w. The 6155 can be operated with full ratings at frequencies up to 120 Mc and with reduced ratings up to 200 Mc.

* * *

RCA-6156/4-250A is a forced-air-cooled beam power tube of the thoriated tungsten filament type intended for use as an amplifier, modulator, and oscillator. It has a maximum plate dissipation rating of 250 w. The 6156 can be operated with full ratings at frequencies up to 75 Mc and with reduced ratings up to 120 Mc.

* * *

Distributor Resale prices (optional) for the new tube types mentioned above are as follows: RCA-6816, $60.00; RCA-6884, $60.00; RCA-6155/4-125A, $27.50; RCA-6156/4-250A, $37.50.

6816 Beam Power Tube

RCA Holds Color Seminar For Television Broadcasters

Television broadcasters throughout the United States recently attended a two-day color television seminar held by RCA at its Camden, N. J., manufacturing plant. The seminar was held to acquaint the nation's TV broadcasters with the latest developments in color TV broadcast equipment and operating techniques.

This was the 17th color television equipment meeting sponsored by RCA for broadcast station personnel since the advent of commercial color broadcasting.

This seminar's format was developed to provide maximum practical details on the installation, operation, and maintenance of color television broadcasting equipment.

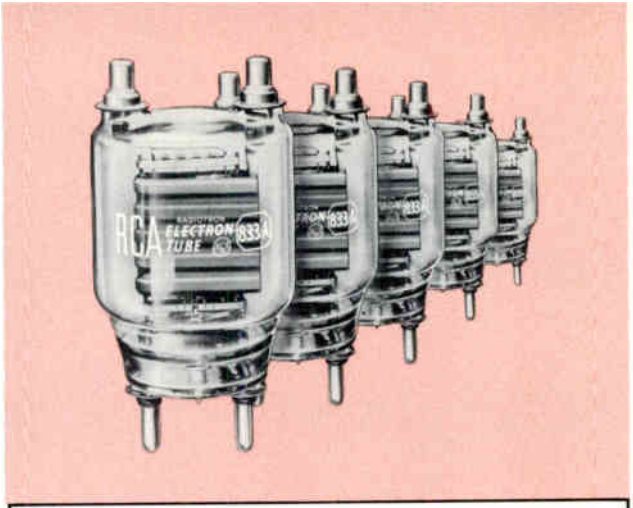
RCA-892-R Still Going Strong at WTOC After 51,520 Hours of Service

In a recent report to TUBE TIPS, Gordon L. Hester, radio engineering supervisor for WTOC, Savannah, Ga., pointed up the extremely long service records of two RCA-892-R power triodes.

One of these tubes was just retired after being in service for a total of 51,317 hours in the station's RCA-BTA-5F AM transmitter. The other 892-R, which was paired with the retired tube, "is still operating normally, and to date has 51,520 hours of operation," according to Mr. Hester.

"Even with this great number of hours," Mr. Hester wrote, "the tube (in operation) still has good noise and distortion measurements as borne out by our noise, distortion, and frequency response measurements that we make daily here at WTOC.

"Needless to say, we are very pleased with the service records of both RCA-892-R's."

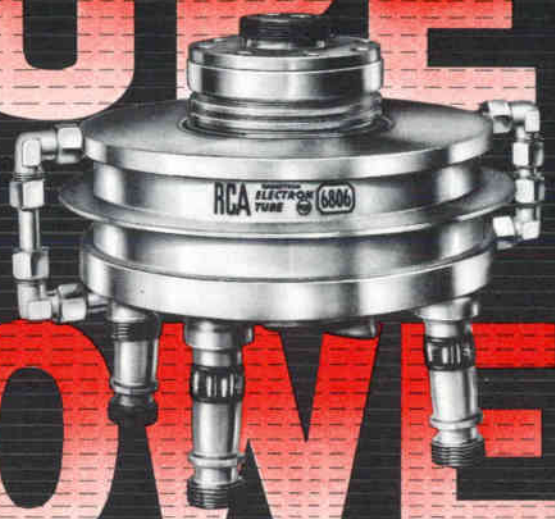


How to Get More Hours from an RCA-833-A Power Triode

The life of an RCA-833-A power triode can be increased if these 10 simple recommendations are followed:

- Clean glass bulb regularly—especially in the area between the plate and grid posts.
- With forced-air cooling, keep blower in proper working order (40 cfm from 2-inch diameter nozzle directed vertically onto bulb between grid and plate seals). Maximum bulb temperature between the plate and the grid seals should not exceed 145° C.
- At full plate load, hold the filament voltage at 10 v. At reduced load, filament voltage can be reduced as much as 5% for longer life. Reduce filament voltage to 80% of normal during standby periods of less than 15 minutes; remove filament voltage when longer standby periods are anticipated.
- Watch line-voltage fluctuation; compensate for line voltage variations to avoid exceeding maximum ratings.
- Operate new tube for 50-100 hours before storing it. Operate spare tubes periodically.
- Allow filament to reach normal operating temperature before applying other voltages to the elements of the tube.
- When a dc filament supply is used, reverse the polarity of the filament leads every 500 hours of operation.
- Be sure that overload protection is working properly in the plate circuit to prevent overheating due to improper circuit adjustment, overloading, or loss of grid bias. Overheating may decrease filament emission; however, filament activity can sometimes be restored by operating the filament at rated voltage for 10 minutes or more with no voltage on the grid or plate. This process may be accelerated by raising the filament voltage to 12 v (not higher) for a few minutes.
- Make sure that the connector for each post terminal is clean, in good repair, and fastened tightly. The flexible leads to the connectors should have adequate slack so that they place no strain on the glass at the seals.
- Operate 833-A within RCA ratings as shown in the technical bulletin available on request from RCA Commercial Engineering, Harrison, N. J.

SUPER POWER



RCA-6806

Megacycles 500 600 700 800 900

...extends the UHF Horizon... Again, RCA engineering sets the pace in UHF television...with a beam power tube for color and black-and-white TV transmitters. High power gain is achieved through unique tube geometry and a symmetrical array of unit electron-optical systems. A multi-strand, thoriated-tungsten type filament—featuring individual strand suspension—provides high emission, affords economical operation. Compact, simplified construction results in a high-power tube weighing only 28 pounds—a boon to station men when rotating and maintaining tubes.

Already on the air in leading super-power UHF stations like WBRE-TV, WBUF-TV, WHP-TV, and WTPA, RCA-6806 is another instance of RCA leadership in power-tube advancements for broadcast applications.

Service on RCA tubes is always available quickly—from your RCA Industrial Tube Distributor.

Compact, lightweight, and easy to handle, RCA-6806 delivers 28 kw TV output at 550 Mc.

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