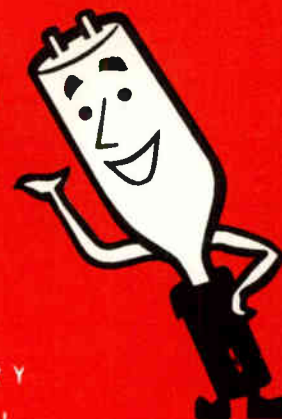




Tmk (s)

Tube Tips



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

RCA Introduces Two 110° Picture Tubes

After two years of research and development, the RCA Tube Division has introduced the first two tubes in a new line of 110°-deflection picture tubes for black-and-white TV reception.

Designated the RCA-21CEP4 and the RCA-17BZP4, the new picture tubes are Silverama super-aluminized types having a viewing area of 262 square inches and 155 square inches, respectively. In overall length, the 21CEP4 is approximately 5½ inches shorter and the 17BZP4 is approximately 3 inches shorter than other types having the same size faceplate and 90° deflection. In addition, the neck diameter of the new picture tube types is only 1⅛ inches. The small neck diameter permits the use of a high-sensitivity deflection yoke which deflects the beam through the wide deflection angle with only slightly more power than that required to scan a tube with a 90° deflection angle.

The overall lengths of the 21CEP4 and the 17BZP4 are 14⅞ inches and 12⅞ inches, respectively. Image sharpness over the entire screen area of both types is maintained by a new "straight" electron gun having improved focus and a unique pre-focus lens system.

Prior to the recent commercial announcements of these two picture tube types, the new RCA 110° picture tubes were released to TV manufacturers on a sampling basis. Each type was offered with the following: an RCA-6CZ5 beam power tube for use as a vertical-deflection amplifier for 110°-deflection picture tubes; an RCA-6DQ6-A high perveance beam power tube for use as a horizontal-deflection amplifier in high-efficiency deflection circuits; a developmental horizontal-deflection-output and high-voltage transformer designed for use with 110° picture tubes; and a developmental deflecting yoke, also designed especially for use with 110° picture tubes.

List prices (optional) are: RCA-21CEP4, \$52.50; RCA-17BZP4, \$45.50.



RCA-6166 Breaks Records at KVAL-TV

William R. Riley, broadcast engineer for KVAL-TV, Eugene, Ore., recently reported on the excellent results of a test the station had conducted on an RCA-6166 power amplifier tube.

During the testing of this particular tube, which was used in the aural amplifier section of KVAL-TV's RCA-TT10AH television transmitter, a check was made and a performance report was written at the end of each 100 hours of continuous operation.

In his letter, Mr. Riley stated, "The tube ran continuously in our RCA-TT10AH transmitter in the aural amplifier socket at full 6 Kw output for a total of 6,157.6 hours. This was phenomenal operation for a power tube in channel 13-transmitter operation where, as you know, maintaining 100% power output can sometimes become quite a problem.

"We would like to congratulate RCA on the development of this new tube design. From our own experience with the 6166, you deserve a hearty 'Well done!'"

The results of this test verify the economies of operation using an RCA-6166 power tetrode. At the Distributor Resale price (optional) of \$1,000.00 for the 6166, the average cost per each hour of operation of this tube type in TV Station KVAL-TV's aural transmitter was 16.2¢.

RCA Invites Radio and TV Broadcasters to IRE-NARTB Exhibits

The RCA Tube Division, in conjunction with other services of the Radio Corporation of America, cordially invites radio and television broadcasters to visit two forthcoming RCA exhibits: one at the IRE Show, March 18-21 in the New York Coliseum; the other at the NARTB Convention, April 7-11 in the Conrad Hilton Hotel, Chicago. On display will be new VHF and UHF power tubes, Vidicon camera tubes, Micro-Mesh black-and-white and color TV camera tubes, and other RCA products of interest to broadcast engineers.



How To Get More Hours from an RCA-6448 Beam Power Tube

Broadcasters can increase the life of their RCA-6448 beam power tubes if they follow these 10 simple procedures:

- Be sure there is no by-passing of cooling water before it gets to tube. Be liberal with plate water flow.
- Water in cooling system must have low-oxygen content. Check oxygen "scavenger bag" in water tank weekly to maintain fresh steel wool.
- Operate filament at lowest voltage practical for adequate emission (not less than 1.25 volts per section). During standbys, reduce filament voltage to 1.08 volts.
- Check electronic protective circuits regularly to make sure they function in accordance with tube manufacturer's recommendations.
- Do not exceed 1,500 amperes filament current during starting operations. Run both filament sections at the same voltage, which should be obtained from a well-regulated power supply.
- Keep all tube surfaces *clean* to avoid leakage and voltage breakdown.
- "Break-in" new tubes in accordance with the procedure outlined in the RCA technical bulletin which is packed with each new tube.
- Blow water from all tube ducts before storing. Store tube in sealed plastic case to prevent foreign matter from entering water connections.
- Avoid stresses at glass and ceramic seals, especially when tightening or removing the water fittings.
- Do not exceed the maximum ratings of the tube.

First RCA Power Transistors Announced

RCA recently introduced two new power transistors, designated as types 2N301 and 2N301A. The RCA-2N301 is specifically suited for use in audio output stages of mobile communications equipment, automobile radios, and marine and military equipment. The RCA-2N301A is designed especially for similar applications requiring operation at peak collector voltages as high as 60 volts. When used in a class A circuit, each of the transistor types can deliver a maximum-signal power output of approximately 2.7 watts with a power gain of 32.5 db.

In class B push-pull operation, two 2N301's or 2N301A's can deliver a maximum-signal power output of approximately 12 watts with a power gain of 30 db. The total harmonic distortion at maximum signal power output is less than 10%.

The design of these new transistors utilizes a special mount structure in which the collector is electrically and thermally connected to a mounting flange to insure good electrical contact and excellent thermal conductivity.

High operating stability and electrical uniformity of the 2N301 and the 2N301A are assured with RCA's extremely rigid manufacturing quality controls combined with advanced production techniques and testing procedures.

New TT-4 Manual One of Many RCA Technical Publications Referred to by Broadcasters

Reports from the field indicate that radio and television broadcast engineers are expressing an unprecedented interest in the new 256-page RCA Transmitting Tubes (TT-4) manual. The manual covers basic theory of power tubes and their applications and offers comprehensive and authoritative technical descriptions along with a listing of 108 types of power tubes and 13 types of associated rectifier tubes. The power tube types covered have plate input ratings up to 4 kilowatts. Other information such as maximum ratings, operating values, characteristic curves, outline drawings, and socket-connection diagrams are featured for most types.

Written in an easy-to-understand style, the TT-4 manual contains information on generic tube types; tube parts and materials; tube installation and application; rectifier circuits and filters; interpretation of tube data; and the step-by-step design of af power amplifiers and modulators, rf power amplifiers, frequency multipliers, and oscillators. Calculations are given for determining operating conditions for class C telegraphy service, plate-modulated class C telephony service, frequency multipliers, and class AB and class B af amplifiers.

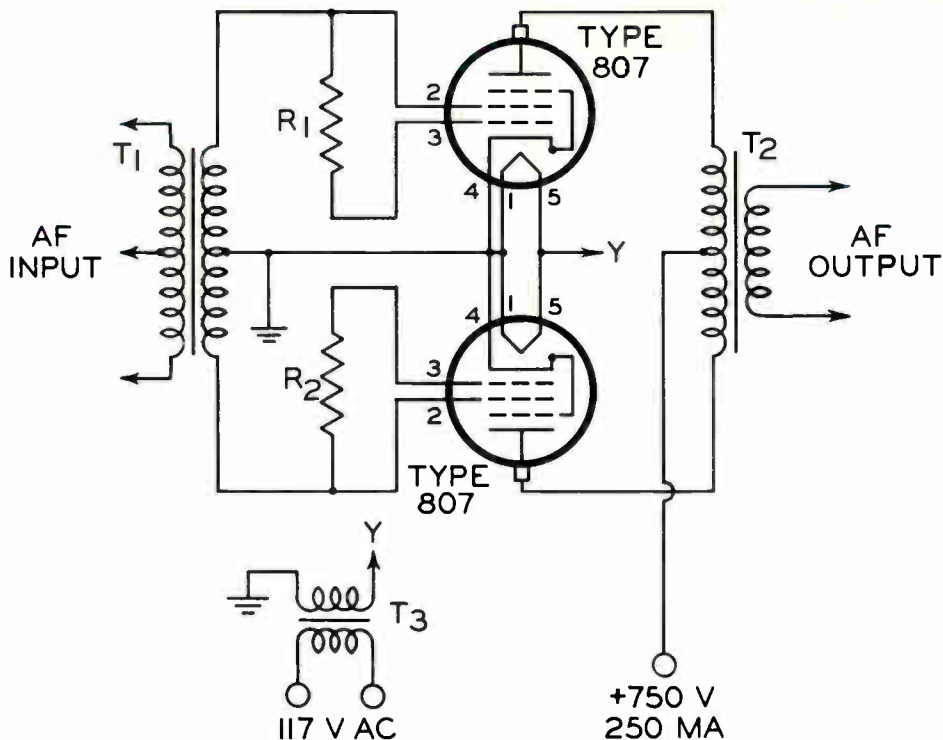
Rapid selection of an RCA power tube or rectifier tube for a specific application is facilitated by reference to a series of five classification charts immediately preceding the tube-data section.

The manual contains 16 circuit diagrams showing the use of RCA tubes in transmitting and industrial applications. Included is a VFO for 3.5-4.0 Mc; crystal oscillators for both fundamental and harmonic output; amplifiers for class C telegraphy service and for class C plate-modulated service; modulators; an electronic bias supply; transmitters for operation at 2 meters, 10 meters, and 462 Mc; and oscillators for dielectric and induction heating.

The RCA Transmitting Tubes manual can be obtained from local RCA tube distributors, or by sending \$1.00 to Commercial Engineering, RCA, 415 S. 5th Street, Harrison, N. J.

* * *

The capsule descriptions below point up the features of other technical publications which radio and television broadcast engineers are finding particularly useful. Copies of these publications also can be obtained from your local RCA tube distributor, or directly from RCA Commercial Engineering.



$R_1, R_2 = 20000$ ohms, 1 watt, carbon

$T_1 =$ Driver transformer, turns ratio of total primary to one-half secondary 1:1.25; Stancor A4761 or equivalent

$T_2 =$ Modulation transformer, audio level 120 watts

(approx.), primary 6650 ohms (approx.), center-tapped; turns ratio depends on modulating impedance of modulated stage

$T_3 =$ Filament transformer, 6.3 volts rms, 1.8 amp.

NOTE: As the driver for this modulator stage, a circuit having a low output impedance and an output of approximately 10 watts is recommended. For this circuit, with the indicated driver transformer T_1 , two 2A3's in push-pull Class AB₁ operating with a plate voltage of 300 volts and a cathode-bias resistor of 780 ohms may be used.

One of several schematic diagrams featured in the new TT-4 manual is this class B modulator or high-power audio circuit. The modulator features type 807's in special triode connection.

RCA Receiving Tube Manual (RC-18) is an up-to-date, 352-page book containing technical data on more than 575 receiving tubes. In addition, over 75 color and black-and-white picture tubes are described. The book covers electron tube applications, information on generic tube types, interpretation of tube data, and electron-tube installation. The price of the RC-18 is 75¢.

* * *

Radiotron Designer's Handbook (4th edition) is an up-to-date, comprehensive reference containing 1,500 pages of technical information and thoroughly covering the design of radio and audio circuits and equipment. Price: \$7.00.

* * *

RCA Receiving Tubes for AM, FM, and Television Broadcast booklet (1275-G) is a 28-page publication containing classification charts, characteristic charts, and base and envelope connection diagrams on more than 600 entertainment receiving tubes and picture tubes. Price: 25¢.

RCA Power Tube Fittings (PTF-1012A) contains 24 pages and lists 39 power-tube fittings designed for supporting and cooling power tubes made by RCA and other manufacturers. The booklet includes exploded-view assembly drawings as well as detail drawings of all fittings. Price: 25¢.

* * *

RCA Interchangeability Directory of Industrial-Type Electron Tubes (ID-1020A) is a 16-page booklet which lists more than 2,000 type designations from 26 different manufacturers arranged in numerical-alphabetical sequence. The listing shows the RCA direct replacement tube type, or the similar tube type, when available. Price: 20¢.

* * *

RCA Photosensitive Devices and Cathode-Ray Tubes (CRPD-105) is a 24-page booklet which provides technical information on 109 RCA tubes, including multiplier phototubes; flying-spot tubes; various kinescope tubes; and storage tubes. Price: 20¢.

RCA TUBE TIPS is eager to learn of instances where RCA tubes are establishing or surpassing operational life records in radio and television broadcast station service. In this issue, KVAL-TV reports the result of a special test covering the continuous operational life of an RCA-6166 power amplifier tube. If you know of any new or unusual operational tube life stories about RCA tubes utilized in radio or television broadcast equipment, please send such information to Harvey Slovik, Editor, RCA TUBE TIPS, 415 S. 5th St., Harrison, N. J.

LONG-TERM POWER DELIVERY

... through
"proved-in"
tube design

17742

Using grid-flange design—an RCA development—this RCA power triode contributed to a new era in VHF operation.

22201



HOW TO GET MORE HOURS FROM AN RCA-5762

- Hold filament voltage at 12.6 volts—right at tube terminals
- Operate each new tube as soon as you receive it
- Keep air-cooling system clean. It helps prevent tube and circuit damage caused by overheating
- Always operate tube within RCA ratings. Follow instructions pocked with tube
- Handle tube carefully—to avoid mechanical damage
- Operate spare tubes periodically

Incorporated within this well-known air-cooled triode are some of the most unique technical advancements in the history of power-tube design. Many of these RCA techniques have evolved from experience gained over years of actual tube operation on the air. All of them contribute substantially to the remarkable endurance of this tube in day-in, day-out transmitter service—over many thousands of hours.

Backed by more than a quarter century of specialized experience in designing and building world-famous high-power tubes, RCA-5762's are paying dividends for broadcasters—continually—in lower tube costs per hour of operation, and in stable performance of the transmitter.

Your RCA Tube Distributor can handle your order for Type 5762's—promptly. Call him.



TUBES FOR BROADCASTING

Radio Corporation of America Harrison, N. J.

World Radio History