

# HAM TIPS



A PUBLICATION OF THE RCA TUBE DIVISION

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## RCA PUBLICATIONS FOR HAMS

### New Transmitting Tube Manual Now Available

More and more hams are expressing unprecedented interest in the new 256-page RCA Transmitting Tubes (TT-4) manual. The new manual offers comprehensive and authoritative technical descriptions of 108 types of power tubes having plate-input ratings up to 4 kilowatts and 13 types of associated rectifier tubes. Maximum ratings, operating values, characteristic curves, outline drawings, and socket connection diagrams are also featured.

Covering basic theory of power tubes and their applications and 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. Simple 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 references to a series of five classification charts.

The TT-4 manual contains 16 circuit diagrams showing the use of RCA tubes. These circuits include 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 others.

The manual, RCA Transmitting Tubes (TT-4), can be obtained from your local RCA tube distributor, or by sending \$1.00 to Commercial Engineering, RCA, 415 S. 5th St., Harrison, N. J.

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

\* \* \*

RCA Receiving Tube manual (RC-18) is an up-to-date, 352-page book containing technical data on more than 575 receiving tubes. The book covers electron tube theory and applications, and is written in an easy-to-understand style. Other sections of the book include information on generic tube types, interpretation of tube data, and electron-tube installation. The price of the RC-18 is 75¢.

\* \* \*

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 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 manu-

facturers, arranged in alphabetical-numerical sequence. The listing shows the RCA direct replacement tube type, or the similar tube type, when available. Price: 25¢.

#### Longer Life for Your 6146's and 866-A's

The RCA-6146 beam power tube and the RCA-866-A half-wave mercury-vapor rectifier tube continue to be increasingly popular among hams. A few do's (noted below) should help to considerably increase the already long life of these two types.

#### Do's for the 6146

- Hold heater voltage at 6.3 volts—at tube terminals.
- Provide for adequate ventilation around tube to prevent tube and circuit damage caused by overheating.
- Keep shiny shielding surfaces away from tube to prevent heat reflection back into tube.
- Design circuits around tube to use lowest possible value of resistance in grid circuit and screen circuit.
- In high frequency service, operate tube under load conditions such that maximum rated plate current flows at the plate voltage which will give maximum rated input.
- Have overload protection in plate and screen circuits to protect tube in the event of driver failure.
- See that plate shows no color when operated at full ratings (CCS or ICAS conditions).
- Reduce B+ or insert additional screen resistance when tuning under no-load conditions to prevent exceeding grid-No. 2 input rating.
- Maintain tuning and loading adjustments precisely so that tube will not be subjected to excessive overload. The 6146 is a high-gain, high-perveance tube and can be more easily overloaded through circuit misadjustments than older types not having such features.
- Use adequate grid drive, keeping within maximum grid-current and screen dissipation ratings of tube. Too little grid drive can cause high plate dissipation.
- Make connections to plate with flexible lead to prevent strain on cap seal.
- Operate 6146 within RCA ratings as shown in technical bulletin available on request from RCA Commercial Engineering, Harrison, N. J.

#### Do's for the 866-A

- Hold filament voltage at 2.5 volts—at tube terminals. (Safety note: Do not measure

filament voltage with the high-voltage transformer turned "on.")

- Hold condensed-mercury temperature within minimum and maximum ratings (20° C to 80° C with maximum peak inverse anode voltage of 2.5 Kv; 20° C to 70° C with maximum peak inverse anode voltage of 5 Kv; 20° C to 60° C with maximum peak inverse anode voltage of 10 Kv). Condensed mercury temperature can be measured at the bottom of the glass envelope, close to the base, with a small thermometer attached to the glass with a minimum amount of putty. Recommended operational temperature: 40° ± 5° C.
- Heat filament fully before applying anode voltage (15 seconds under normal conditions).
- After transporting tube, do not apply anode voltage until mercury has been redistributed (by heating filament only for 30 minutes).
- After idle periods, raise anode voltage slowly to the normal operating value.
- Keep rf out of rectifier compartment.
- Operate tube within ratings as shown in the RCA Transmitting Tube Manual TT-4.

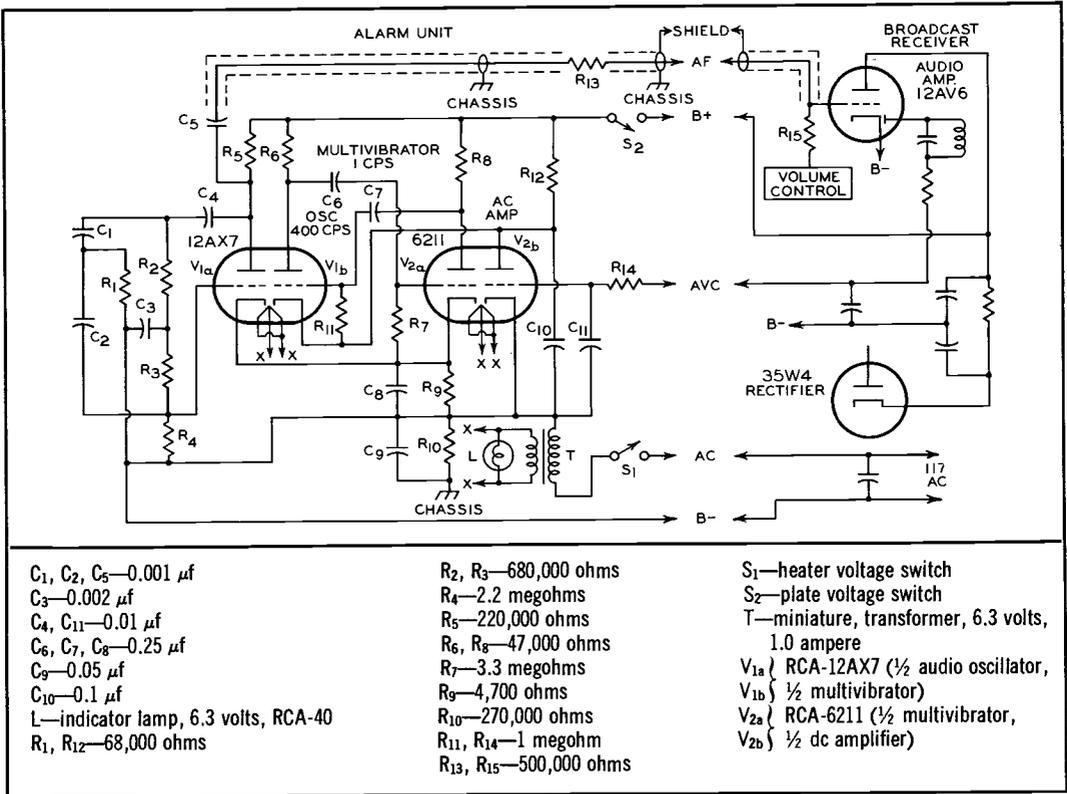
#### Back Issues of HAM TIPS Available

New amateur radio enthusiasts (we mean hams) and some of the oldtimers will be interested to learn that some of those recent back issues of HAM TIPS are still available. If you've missed any of the issues listed below, just drop a note to your technical editor, Bob Leedy, RCA HAM TIPS, 415 S. 5th St., Harrison, N. J., and we'll mail it with the compliments of your local RCA distributor.

Ham Band Charts (Vol. XVI, No. 1, March, 1956) was one of the most popular items ever to appear in this publication. This amateur-band frequency graph, showing useful data on the ham bands from 1.8 to 148 Mc, has been reprinted several times due to the many requests from hams.

Versatile Modulator (Vol. XVI, No. 2, July-August, 1956) by Peter Koustas, W2SGR, gave complete instructions for building a modulator providing any audio power between 25 and 100 watts and, therefore, can modulate 100% any rf input power up to 200 watts.

The Make-Your-Own Microphone (Vol. XVI, No. 3, September, 1956) by G. D. Hanchett, W2YM, describes a very popular transistorized microphone which has all the features desirable for mobile operation: good audio quality, fairly high signal output, insensitivity to unwanted electrical pickup, rugged construction and low price.



Schematic and parts list for automatic Conelrad unit.

**Let's Face It!**

**Correction please:** In the Automatic Conelrad Alarm article\* which appeared in the February issue of HAM TIPS (Vol. XVII, No. 1), capacitor C<sub>4</sub> was included in the parts list, but was inadvertently omitted from the circuit schematic. The schematic should have shown the capacitor connected between the plate of V<sub>1a</sub> and the junction of capacitor C<sub>1</sub> and resistor R<sub>2</sub>. The corrected schematic is shown above.

The position of R<sub>4</sub> in the schematic was incorrect and has been changed as shown above. R<sub>4</sub> now connects to the grid of V<sub>1a</sub> and to B-. The ground shown between C<sub>5</sub> and R<sub>13</sub> on the af-output line is also in error. The output lead from C<sub>5</sub>, through R<sub>13</sub> and to the grid of the audio amplifier in the receiver, should be a shielded cable with the shield connected to the chassis of the alarm unit.

The 0.05-μf capacitor (C<sub>9</sub>) and the 270,000-ohm resistor (R<sub>10</sub>) should be shown connected between the B- and the metal chassis, not ground. In the text of the original article, capacitor C<sub>9</sub> was erroneously referred to as

C<sub>5</sub>. When a transformer-type radio receiver is used, C<sub>9</sub> and R<sub>10</sub> can be omitted and the B- connected directly to the metal chassis.

**Description:** For the information of those readers who may not have acquired copies of the original article, the Conelrad Alarm unit can be used with any 5-tube ac-dc broadcast receiver producing at least 4 volts avc.

As shown in the diagram above, wires from the grid of the first audio amplifier, its shield, B+, avc, ac, and B- of the receiver are connected to the alarm unit. The "B" voltage can range from 120 volts minimum to 250 volts maximum. The author used the popular RCA model 6X5-series broadcast receiver and connected the Conelrad alarm unit to the receiver as shown in the right-hand portion of the schematic diagram. The only modification of the receiver required is the addition of a 500,000-ohm resistor (R<sub>15</sub>) inserted between the grid lead of the receiver's first audio amplifier (12AV6) and the volume control.

When the Conelrad "alert" is in effect, or when the broadcast station's carrier leaves the air, the output of the alarm's audio oscillator will cause the receiver to emit a series of 400-cycle "beeps" at 1-second intervals.

\*Automatic Conelrad Alarm by G. D. Hanchett, W2YM  
 RCA Tube Division, Harrison, N. J.



From your local  
RCA distributor,  
headquarters for  
RCA receiving  
and power tubes.

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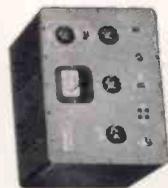
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The popular Allied Knight-Kit S-255 transmitter for 80, 40, 20, 15, and 11-10 meters.



RCA-807 Beam Power Tube—worldamous in r.f. amplifier, frequency-multiplier, and modulator service.

Close-up view of the RCA-807 final amplifier in the S-255.



## LEADING AMATEUR DESIGNS ...use RCA Tubes

Compact, versatile, and capable of delivering a hefty CW signal on any band from 10 to 80, Allied's Knight-Kit S-255 transmitter pictured here is making friends with novices and seasoned amateurs alike for its outstanding on-the-air performance. The rig is designed around an RCA-807 beam power final!

And there's good reason why RCA-807 is specified in so many amateur and commercial designs. The tube has an excellent watts-per-dollar

factor. Performance is noteworthy—even at low plate voltage. And, of course, an RCA-807 is easy to excite (a single 6AG7 can drive it to full plate input; a pair of 807's can modulate it).

RCA-807—as well as the complete line of RCA beam power tubes, triodes, and rectifier tubes—is available through your RCA Tube Distributor. For technical data on RCA-807 write RCA, Commercial Engineering, Section, Harrison, N.J.



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