

HAM TIPS

from **RCA**



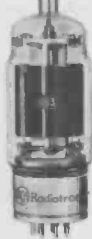
Published by RCA Manufacturing Company, Inc., Camden, N. J., U. S. A.
CAMDEN, N. J.

VOL. 2—No. 1

JAN.—FEB., 1939

RCA-813 CREATES UNUSUAL INTEREST AMONG AMATEURS

Offers circuit simplicity and economy of operation



RCA-813

Not so long ago, the announcement of a new amateur transmitting tube was something of an event—a topic for general discussion. Today, new amateur tubes are announced so frequently that a new type has to be really outstanding to create more than a temporary ripple of interest. Such an outstanding tube is the new high-power beam tetrode, type RCA-813. It is difficult to say if the almost over-night popularity attained by the 813 is due to its amazingly low driving power requirements, its adaptability to band-switching transmitters, its high power output at moderate plate voltages, its operation without need for neutralization, or to its clean-cut, compact mechanical design. In any event, the popularity of this new "r-f factory" in Hamdom is increasing at an unprecedented rate.

Uses Simple Circuits

In general, the circuits recommended for the RCA-813 are basically no different from the circuits commonly used for other beam tetrodes, such as the 807 and 814. Diagram UC-15 shows the circuit for a plate-and-screen-modulated 813, with constants. In this circuit, it will be noted that the plate-circuit by-pass condenser C_6 is connected to ground in series with the screen by-pass, C_5 . This arrangement minimizes the bypassing effect of C_5 at high audio frequencies, and thus greatly improves the modulation of the screen voltage. Because the screen impedance of the 813 is about 20,000 ohms, and the series screen resistor required is 60,000 ohms, the ratio of C_5 to C_6 should be about 3 to 1, as indicated in the legend. For operation at 3.5 Mc. and lower frequencies, it may be desirable to increase the values of C_5 and C_6 , keeping their ratio the same.

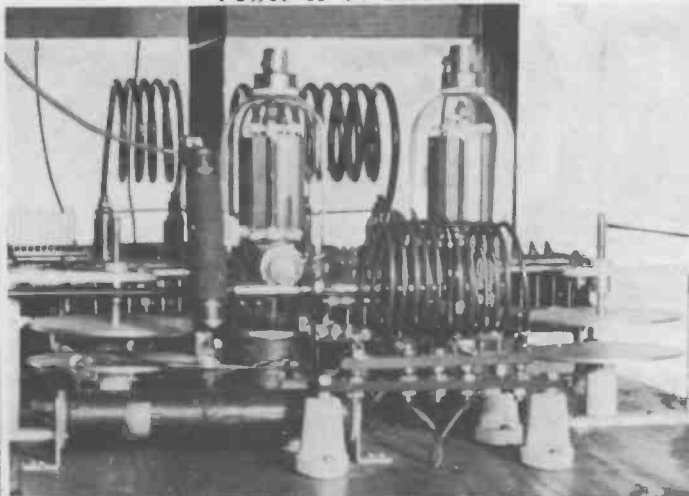
Class C Operation

In class C telegraphy service, where the grid excitation or the cathode circuit of the 813 is to be keyed, it is important that the screen voltage be

(Continued on page 2, column 4)

Copyright 1939, RCA Manufacturing Co., Inc.

Power to Go Places!



W2AMP sent in this photograph of his formidable-looking final, using a pair of the new RCA-810's. He says: "The new bottles replace two 203-A's that I had been using. This change enables me to run up to a kilowatt with ease—and all the way down to ten meters. The only readjustments I had to make in the whole transmitter were those involving reneutralizing and the moving of the plate and grid leads from the socket to the caps on the 810's."

ARRL FIELD DAY WON BY W9AIU WITH RCA-802'S IN ALL CW RIGS

RCA-807 used for final amplifier of 'phone transmitter with 15 watts input

The Egyptian Radio Club of Granite City, Illinois, using the club call W9AIU, recently won the A.R.R.L. 1938 Field Day Contest with an all-time high in Field Day scores of 3708 points, leading the contest for the second consecutive year. W9AIU was operated on Chouteau Island, across the Mississippi River from the northern city limits of St. Louis, Mo. Contacts made on 1.75-Mc. 'phone and 3.5-, 7-, and 14-Mc. cw. totaled 317. Of the 317 QSO's, 85 were with other portable stations.

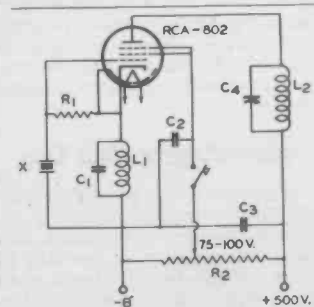


Figure 1—Circuit of portable cw transmitters used at W9AIU-9

- $C_1 = 0.0001 \mu\text{f}$, mica
- $C_2 = 0.01 \mu\text{f}$, mica
- $C_3 = 0.006 \mu\text{f}$, mica
- $C_4 = 1.2 \mu\text{f}$ /meter
- $R_1 = 5000$ ohms, wire-wound
- $R_2 = 25,000$ ohms, 25 watts
- $L_1 = 40$ turns No. 24 D.C.C. on $1\frac{1}{2}$ "-diameter form, close wound
- $L_2 =$ Suitable for frequency desired
- X = Crystal for frequency desired

Each of four cw. transmitters consisted of an RCA-802 in the Reinartz tetrode crystal-oscillator circuit (shown in Fig. 1) with an input of 12 to 18 watts. 'Phone operation started with a 6C5-6L6 combination; this rig was later replaced by a three-stage affair using an RCA-807 final amplifier with 15 watts input. The modulator was a 6N7 in class B. Seven separate receivers were used. Half-wave, end-fed antennas were used for 1.75 and 3.5 Mc. Two 7-Mc. doublets placed at right angles and using EO-1 cable for feeders served for the 40-meter

(Continued on page 2, column 2)

COMPACT DESIGN IS FEATURE OF RCA-921 AND 922

New Double-Ended Phototubes Have Excellent Characteristics



RCA-922

The recent announcement of the RCA-921 and 922 Phototubes have created unusual interest among experimenters. These tubes have low inter-electrode capacitances and high sensitivity. The RCA-921 is a gas-filled tube while the RCA-922 is of the vacuum type. Both are extremely sensitive to red light and infra-red radiation, making them particularly well suited for use with incandescent light sources.

Simple Light-Operated Relay

The RCA-922 is well suited to the simple light-operated relay unit shown in Figure 2. The relay in this circuit opens on an increase in light on the phototube. The change in light which is to actuate the relay can be very small but should last not less than one-tenth of a second. The circuit operates directly on the AC line without necessity of a rectifier.

(Continued on page 2, column 4)

POPULAR-PRICED BEAM POWER TETRODE



The RCA-807 having the low amateur net price of only \$3.50 is an outstanding favorite with amateurs everywhere. Because of its high-power sensitivity, it may be used in a wide variety of amateur applications.

HAM TIPS from RCA

LETTERS TO THE EDITOR

High Perveance!

Dear Sirs:

I am an amateur radio operator, and have a wife and two children who think I am a little touched in the head because of my radio activities. Even though they think I am a little touched they have not bothered me until the last week. Now my wife and children are planning on leaving me and it is all because of my increased enthusiasm in the past week.

It has always been my policy to use RCA Tubes whenever possible. Of course when I decide to buy a new tube I investigate the characteristics of the tube in mind before making the purchase. Approximately a week ago I decided to buy a pair of RCA 810's, and went through the various informations available in order to acquaint myself with the tube. When I came to a phrase which stated that the tube had unusually high PERVEANCE I said to myself, "Son, there is a jug," then spent the next seven days and nights trying to find out what PERVEANCE meant. I have exhausted the patience of the local newspapers, libraries, and universities not to mention my wife and children, in a vain attempt to find out just what kind of a tube it is that has a PERVEANCE.

Now, gentlemen, here is the situation, you either send me the definition of that word or I absolutely refuse to ever buy a tube that has a PERVEANCE.

Yours very PERVEANCELY,

W9PTI

P.S. My wife's attorney just notified me they were giving me ten days more before filing her suit.

Dear W9PTI:

Far be it from us to do anything that would affect your marital bliss. As a matter of fact, we are married ourselves. So, just to make sure we are right, I have cornered one of our No. 1 engineers (he's married, too) and explained to him how important it was that we find out what "Perveance" means. You see, I didn't know either. Here's what he told me: "RCA Power Tubes are high-perveance tubes, because high perveance saves you money."

"Why?"

"Because it is the important electrical property that is actually a factor of merit or 'goodness' of a tube.

"The perveance of a tube depends upon such things as the area of the cathode surface, the closeness of spacing between electrodes and the pitch and wire size of the grids. For a given set of electrode voltages, the higher the perveance, the higher will be the plate current, transconductance, and power output.

"From your standpoint, it is desirable to use a tube that has as high a perveance as possible. Higher-perveance tubes are more difficult to design, engineer and manufacture, but RCA Tubes are high-perveance tubes! A good example of a tube having high perveance is the new RCA-810. With a plate voltage of

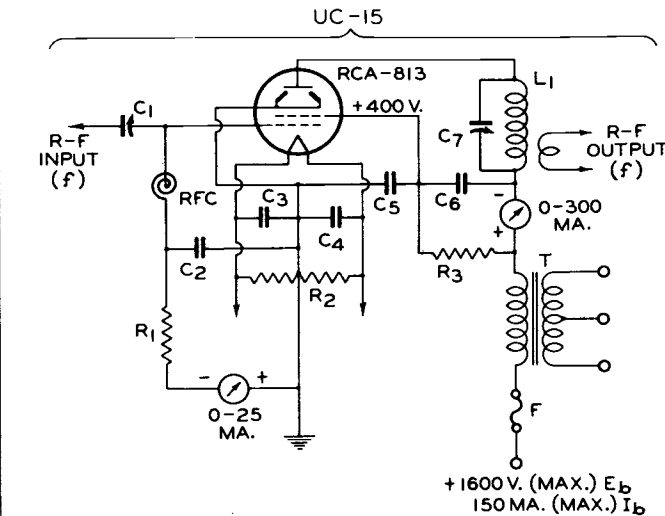


Plate-Modulated Class C R-F Power Amplifier
Power Output 175 Watts*

C₁ = 2 μf/meter*
C₂, C₃, C₄ = 0.002 μf (or larger) mica
C₅ = 0.006 μf (or larger) mica, 2000 V.f
C₆ = 0.002 μf (or larger) mica, 5000 V.f
C₇ = 1.2 μf/meter†
R₁ = 22,000 ohms, 2 watts
R₂ = 50 ohms, c.t., wire-wound
R₃ = 60,000 ohms, 50 watts
L₁ = For frequency "f"

RFC = R-f choke
T = Modulation transformer; secondary Z = 9500 ohms
F = ¼ A. high-voltage fuse
* Approximate.
† Ratio of C₅ to C₆ should be kept approximately 3 to 1.
‡ Capacitance in actual use.

only 2,000 volts, it has a power output of 375 watts and requires only 12 watts of driving power."

Here's hoping the above explanation squares this up for you.

Hopefully,

Your Editor.

Likes 810!

Dear Om's,

I must hand you a big bouquet on the RCA-810 Tube just released. It is superb!

Now, for the first time, I have a really simple one kw. input, always at twice the crystal frequency. The oscillator is an RCA-1610, the doubler uses parallel RCA-1608's and the final push-pull is a pair of RCA-810's. Boy, what a rig! And this is done with only 2000 volts DC, which is relatively simple to insulate compared with the previously used 5000 volts.

Many thanks for a big step forward. 73.

John B. Morgan
W3QP
Blue Bell, Pennsylvania

Field Day Won With CW Rigs Using RCA-802's

(Continued from page 1, column 3)

work. Two similar 14-Mc. doublets took care of 20-meter operation.

Power Supplied By Gasoline-Driven Alternator

Power was supplied by a 1500-watt, 220-volt, three-phase, gasoline-engine-driven alternator. Step-down transformers on each phase provided 110-volt, 60-cycle AC. This alternator

was placed 200 feet from the receivers in order to reduce noise. An advantage of this type of power supply was that it could be used for lights, soldering irons, etc., as well as for station operation. A staff of 19 operators participated at W9AIU-9.

The following comments received from the E.R.C. explain their preference for the RCA-802 for use in their portable cw. transmitters:

"Several years ago Mr. Reinartz visited St. Louis demonstrating his crystal osc. circuit using the 802 tube, and to say that the thing was a hit with the gang here is putting it mildly. Since then, the Egyptian Radio Club has built and maintained several of these oscillators for emergency use and, of course, they get a real work during the A.R.R.L. Field Day contest each year. We have found that the RCA-802 used in this circuit is by far the most reliable and flexible portable transmitter it is possible to build. Changing bands is simplicity itself by merely placing the proper crystal and coil in their holders and tuning with the aid of the meter or an r-f indicating device. With the use of keying filters and antennas properly placed it was possible for us to operate four of these transmitters simultaneously, one in the 20-meter cw. band, two on 40 and one in the 80-meter cw. band.

Band-changing Made Easy

"...Twenty-, forty-, and eighty-meter crystals are used for efficiency and quick band-change adjustment. Keying is accomplished by breaking the screen voltage from the bleeder on the power supply. No trouble of any kind was had with these transmitters despite the fact that two of the RCA-802's had seen service in two previous Field Day Contests with plenty of station operation in between."

RCA-813 Creates Unusual Interest Among Amateurs

(Continued from page 1, column 1)

obtained from a separate, low-voltage source, or from a tap on a bleeder circuit across the plate supply. It should not be obtained through a series resistor as shown in the plate-modulated-telephony circuit, UC-15. With the series-resistor method, the DC screen voltage will rise to the plate potential when the space current is reduced to zero. This voltage, of course, greatly exceeds the maximum screen-voltage rating. When the DC screen voltage is limited to approximately 400 volts under key-up conditions, a fixed grid bias of 45 or 50 volts is adequate to reduce the plate current to a safe value; partial fixed bias is recommended, therefore, in cw. transmitters where the oscillator stage is to be keyed for break-in operation. The remainder of the required grid bias can be conveniently obtained from a grid leak.

Because of its extremely low driving-power requirements—less than one watt in most types of service—the RCA-813 greatly simplifies the design of an exciter unit for a quick-band-change transmitter.

Compact Design is Feature of RCA-921 and 922

(Continued from page 1, column 4)

To adjust the circuit for a maximum sensitivity, first short-circuit C₁ and set R₀ so that plate current of the 25A6 is slightly larger than the value which closes the relay. Then remove the shorting connection from C₁, adjust the illumination on the phototube to the highest value at which it is desired that the relay stay closed, and move the pointer on R₀ toward the cathode of the 75 until the relay is on the verge of opening. The adjustment is then complete. With this adjustment, the relay will

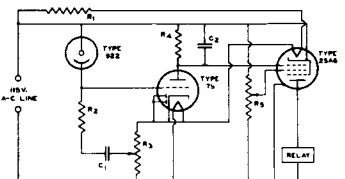


Figure 2—Simple light-operated relay circuit

NOTE: IF RELAY IS A MAGNETIC TYPE, IT MAY BE NECESSARY TO CONNECT A 10-15 OHM RESISTOR IN PARALLEL WITH THE RELAY-COIL TO PREVENT CHATTERING BY THE RELAY.

open on a very small increase in light on the phototube.

Editor's Note: The above circuit and description is one of several shown in the RCA Technical Bulletin on the RCA-922 Phototube. These bulletins are available from your RCA Power Tube Distributor on practically all types of RCA Power and Special Purpose Tubes. Ask for a free copy pertaining to tube types in which you are interested.