

# HALL TIPS

from



VOL. 1—NO. 1

CAMDEN, N. J.

SEPT., 1938

## PAIR RCA 809's PUTS OVER 100 WATTS IN ANTENNA

### RCA 1852 AND 1853 HAVE HIGH GAIN UP TO 60 MEGACYCLES

Ideal for Experimental Amateur and Television Receivers



RCA 1852 and 1853

Announcement of two high gain experimental type receiving tubes by RCA has made it possible for the amateur to obtain good efficiencies at ultra high frequencies, either for experimental or television receivers. The RCA 1852 has the extremely high grid-plate transconductance of 9000 micromhos, while the 1853 has a grid-plate transconductance of 5000 micromhos. The 1853, because of its extended cut-off characteristic, is especially suitable for use in r-f or i-f stages of receivers employing automatic gain control.

The electrode assembly of the 1852 and 1853 has a special shielded lead construction to permit bringing out the control-grid lead to a base pin rather than to a pin cap. With this construction, it has been possible to

(Continued on page 2, col. 4)

### RCA 814 GIVES GOOD OUTPUT WITH LOW DRIVING POWER

130 Watts Realized for Class "C" Telegraphic Conditions



RCA 814

For the amateur radio transmitter owner who desires the utmost in efficiency for medium powered rigs, the RCA 814 will be found to be the logical answer. Utilizing the principle of directed electron beams and featuring low power absorption by the screen, efficient suppressor action is supplied by space charge effects produced between the screen and plate. The resultant high power sensitivity makes this tube especially suited for use as an r-f amplifier, oscillator and frequency multiplier. In class "C" service, it is capable of giving a power output of 130 watts or better, with a driving power of 1.5 watts. The net price is \$17.50.

#### Rating—Class "C" Telegraphy

DC Plate Voltage	1250
DC Screen No. 2 Voltage	300
DC Screen No. 1 Voltage	300
DC Plate Current	150 M. A.
Plate Input	180 Watts Max.
Plate Dissipation	50 Watts Max.

### EXCELLENT ECONOMY OBTAINED THROUGH LOW DRIVING POWER AND TUBE COST

Have 76 Watt Output When Used in Plate-Modulated Telephony Circuit

#### TT-3 Manual



A book that should be in the library of every radio amateur is the new RCA TT-3 Transmitting Tube Handbook. This 192-page manual gives the complete operating data of all RCA Tubes of the air-cooled type which are used for transmitting purposes. Also included are sections on installation requirements, ratings, transmitter design considerations, and many other useful subjects. All RCA Transmitting-Tube Distributors have this book in stock. Be sure and ask for your copy, the largest 25 cents worth you can buy.

#### Legend

- C<sub>1</sub> = 0.001 μf, MICA
- C<sub>2</sub>, C<sub>3</sub>, C<sub>4</sub>, C<sub>5</sub> = 0.01 μf, MICA
- C<sub>6</sub> = 100 μf MIDGET
- C<sub>7</sub> = 1.0 μf/METER†
- C<sub>8</sub> = 25 μf MIDGET
- C<sub>9</sub>, C<sub>10</sub>, C<sub>11</sub>, C<sub>12</sub> = 0.002 μf, MICA
- C<sub>13</sub> = 0.01 μf, MICA
- C<sub>14</sub> = 1.5 μf/METER†
- C<sub>15</sub> = 0.002 μf, 1000 V. MICA
- C<sub>16</sub>, C<sub>17</sub>, C<sub>18</sub> = 0.01 μf, MICA
- C<sub>19</sub> = 1.0 μf/METER/SECTION†
- C<sub>20</sub> = 0.002 μf, 2000 V. MICA
- C<sub>21</sub>, C<sub>22</sub> = 6.7 μf (APPROX.), 4000 V.
- C<sub>23</sub> = 1.5 μf/METER/SECTION†
- R<sub>1</sub> = 75000 OHMS, 1 WATT
- R<sub>2</sub> = 2.0-VOLT, 60-MA. PILOT LAMP
- R<sub>3</sub> = 400 OHMS, 5 WATTS
- R<sub>4</sub> = 10000 OHMS, 1 WATT
- R<sub>5</sub> = 250 OHMS, 5 WATTS
- R<sub>6</sub> = 15000 OHMS, 2 WATTS
- R<sub>7</sub> = 1000 OHMS, 20 WATTS#
- R<sub>8</sub> = 250 OHMS, 20 WATTS
- R<sub>9</sub> = 40 OHMS, C.T., WIRE-WOUND
- XL = CRYSTAL OF FREQUENCY "f"
- L<sub>1</sub> = SEE NOTE\*\*
- L<sub>2</sub> = TUNE FOR f, 2f, or 4f (807)†
- L<sub>3</sub> = TUNE FOR 2f or 4f (6L6, 6L6-G)†
- L<sub>4</sub> = TUNE TO SAME FREQUENCY AS L<sub>2</sub>, C<sub>1</sub>, OR DOUBLE THAT FREQUENCY
- L<sub>5</sub>, L<sub>6</sub> = TUNE TO FREQUENCY OF L<sub>5</sub>, C<sub>11</sub>
- RFC = R-F CHOKE
- S = S.P.S.T. SWITCH#
- X = INSERT KEYING RELAY HERE
- V<sub>1</sub> = TRITET CRYSTAL OSCILLATOR AND HARMONIC GENERATOR\*\*
- V<sub>2</sub> = R-F AMPLIFIER OR DOUBLER
- V<sub>3</sub>, V<sub>4</sub> = R-F POWER AMPLIFIER

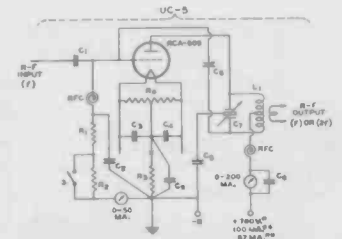


RCA 809

The RCA 809, recently announced to amateurs, is rapidly finding favor because of its outstanding performance and economical net price of \$2.50.

The diagram at the lower left shows a simple, 3-stage transmitter that is capable of operating on any of the amateur bands down to and including 10 meters, by means of 4 or 5 plug-in coils. It is an excellent tube arrangement for the beginner, who can later use stage UC-3 to drive another, more powerful stage. The push-pull 809's are capable of driving push-pull, plate-modulated 806's operating at an input of one kilowatt.

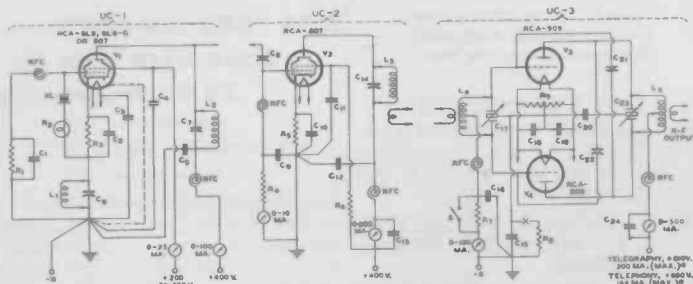
A single 809 makes an excellent final amplifier for a low-power transmitter, as well as a buffer or doubler to drive a larger tube. As an amplifier, the 809 will drive a single, plate-modulated 806, or a push-pull stage using 203-A's, 805's, 838's, or 211's. As a doubler, it will drive a single-ended stage using the 203-A, 211, 805, 808, or 838.



**SINGLE-TUBE R-F AMPLIFIER OR FREQUENCY DOUBLER**  
Amplifier Power Output 55 Watts\*  
Doubler Power Output 25 Watts\*  
UC-5

- C<sub>1</sub> = 0.0005 μf, MICA
- C<sub>2</sub>, C<sub>3</sub>, C<sub>4</sub>, C<sub>8</sub> = 0.002 μf, MICA
- C<sub>5</sub>, C<sub>9</sub> = 0.002 μf, 1000 VOLTS, MICA
- C<sub>6</sub> = 6.7 μf (APPROX.), 2000 VOLTS†

(Continued on page 2, col. 3)



**PUSH-PULL 809 HIGH-FREQUENCY TRANSMITTER**  
Class "C" Plate-Modulated Frequency Power Output 76 Watts\*  
Class "C" Telegraphy Power Output 110 Watts\*

\* Approximate.  
† This high plate-supply voltage should not be used except with cathode bias, as shown. Without cathode bias, the supply voltage should be reduced to 750 volts, for telegraphy, and to 600 volts, for telephony.  
‡ Close switch "S" for telegraph service; open "S" and increase r-f grid excitation to 64 ma. for plate modulated telephone service.

\*\* See QST for April 1937, for data on Tritet oscillator design, as described by J. J. Lamb. With an 80-meter crystal, L<sub>2</sub>C<sub>7</sub> may be tuned to 20 meters and L<sub>5</sub>C<sub>14</sub> to 10 meters.  
† L<sub>2</sub>C<sub>7</sub> may be tuned to the crystal frequency for "straight through" operation if an 807 oscillator is used. The 6L6 and 6L6-G should be tuned to the second or higher harmonic of the crystal.  
‡ Capacitance in actual use.

# HAM TIPS FROM RCA

## ELECTRIC CHARACTERISTICS OF THE RCA 809

RCA 809 is a three-electrode, high-mu, transmitting tube of the thoriated-tungsten filament type for use as a radio-frequency amplifier, oscillator, frequency multiplier, or class B modulator. Because of its high perveance, the 809 can be operated at high plate efficiency with low driving power. The plate connection is brought out through a separate seal at the top of the bulb to provide good insulation. The internal structure of the 809 permits operation at maximum ratings at frequencies as high as 60 megacycles. The maximum plate dissipation rating is 25 watts for class C telegraph and class B services. The 809 has a ceramic base.

### CHARACTERISTICS AND RATINGS

Filament Volts (AC or DC)	6.3	Grid-Plate Capacitance	6.7 $\mu\mu\text{f}$
Filament Amperes	2.5	Grid-Filament Capacitance	5.7 $\mu\mu\text{f}$
Amplification Factor	50	Plate-Filament Capacitance	0.9 $\mu\mu\text{f}$

### MAXIMUM RATING AND TYPICAL OPERATING CONDITIONS

#### As Plate-Modulated R-F Power Amplifier—Class "C" Telephony

Carrier conditions per tube for use with a max. modulation factor of 1.0

DC Plate Voltage	600 max. Volts
DC Grid Voltage	-200 max. Volts
DC Plate Current	83 max. Milliamperes
DC Grid Current	35 max. Milliamperes
Plate Input	50 max. Watts
Plate Dissipation	17.5 max. Watts

#### TYPICAL OPERATION:

DC Plate Voltage	500	600	Volts
DC Grid Voltage	-160	-160	Volts
Peak R-F Grid Voltage	250	250	Volts
DC Plate Current	83	83	Milliamperes
DC Grid Current (Approx.)	32	32	Milliamperes
Grid Resistor	5000	5000	Ohms
Driving Power (Approx.)	7.2	7.2	Watts
Power Output (Approx.)	30	38	Watts

Grid voltages are given with respect to the mid-point of filament operated on AC. If DC is used, each stated value of grid voltage should be decreased by 4.5 volts and the circuit returns made to the negative end of the filament.

#### As R-F Power Amplifier and Oscillator—Class "C" Telegraphy

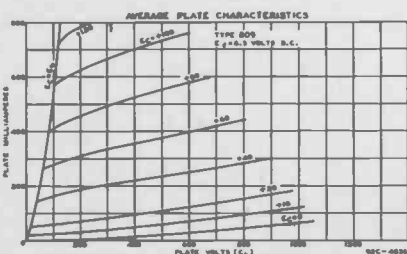
Key-down conditions per special tube without modulation††

DC Plate Voltage	750 max. Volts
DC Grid Voltage	-200 max. Volts
DC Plate Current	100 max. Milliamperes
DC Grid Current	35 max. Milliamperes
Plate Input	75 max. Watts
Plate Dissipation	25 max. Watts

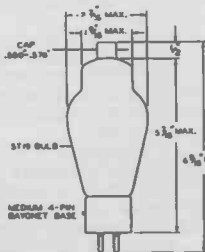
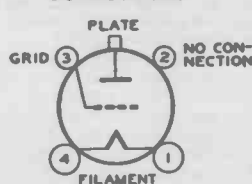
#### TYPICAL OPERATION:

DC Plate Voltage	500	750	Volts
DC Grid Voltage	-50	-60	Volts
Peak R-F Grid Voltage	135	140	Volts
DC Plate Current	100	100	Milliamperes
DC Grid Current (Approx.)	20	20	Milliamperes
Grid Resistor	2500	3000	Ohms
Driving Power (Approx.)	2.5	2.5	Watts
Power Output (Approx.)	35	55	Watts

†† Modulation essentially negative may be used if the positive peak of the audio-frequency envelope does not exceed 115% of the carrier conditions.



### Top View of Socket Connections



## INSTALLATION AND APPLICATION

The base pins of the RCA-809 fit the standard 4-contact socket, such as the RCA type UR-542A. The socket should be installed so that the tube will operate in a vertical position with the base down. If it is necessary to place the tube in a horizontal position, the socket should be mounted with the filament-pin openings one vertically above the other so that the plate will be in a vertical plane (on edge).

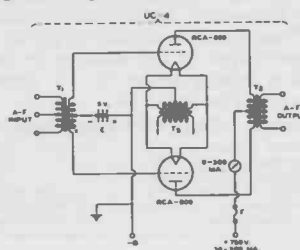
## Pair RCA 809's Puts Over 100 Watts in Antenna

(Continued from page 1, col. 4)

- $C_7 = 0.75 \mu\mu\text{f}$ /METER/SECTION †
- $R_1 = 1500 \text{ OHMS}$ , 2 WATTS
- $R_2 = 2500 \text{ OHMS}$ , 2 WATTS
- $R_3 = 250 \text{ OHMS}$ , 10 WATTS
- $R_4 = 40 \text{ OHMS}$ , C.T., WIRE-WOUND
- RFC = R-F CHOKE
- $L_1 = \text{TUNE TO FREQ. "f" or } 2f$
- X = INSERT KEYING RELAY HERE

- S = S.P.S.T. SWITCH ††
- \* Approximate.
- † The extra 30 volts is for the cathode bias developed across  $R_2$ ; reduce to 630 V. for plate-modulated service.
- †† Maximum for unmodulated class C r-f amplifier service; reduce to 83 ma. for plate-modulated service.
- \*\* Maximum for class C r-f doubler service.
- †  $C_6$  is not required for frequency doubling.
- ‡ Capacitance in actual use.
- ¶ When tube is used as an unmodulated r-f amplifier, close switch "S"; as a frequency doubler and as a plate-modulated r-f amplifier, open "S" and increase r-f excitation to obtain rated d-c grid current.

Two 809's in class B audio service are capable of plate modulating 100% an r-f stage having a d-c plate input up to 200 watts (approx.). Four 809's in push-pull-parallel will deliver 200 watts of audio power and will modulate a transmitter operating with about 400 watts input. Class B 809's are the logical amateur choice for high audio power at low cost.



CLASS "B" MODULATOR OR A-F POWER AMPLIFIER  
A-F Power Output 100 Watts\*  
UC-4

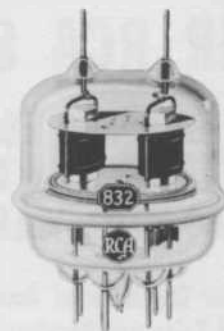
- $T_1$  = INPUT TRANSFORMER
- $T_2$  = OUTPUT TRANSFORMER; PRIMARY IMPEDANCE 8400 OHMS, PLATE-TO-PLATE
- $T_3$  = 6.3-VOLT, 5.0-AMPERE, C.T., FILAMENT TRANSFORMER
- F = 1/4 A. HIGH-VOLTAGE FUSE
- \* Approximate.

NOTE: When the plate supply is 500 volts, the power output is 60 watts, the plate-to-plate load impedance is 5200 ohms, and "E" should be omitted. Zero-bias operation is recommended only where the plate-supply voltage does not exceed 500 volts. Push-pull 2AS's, self-biased, are suitable for the driver stage.

## 832 IDEAL FOR LINE-OF-SIGHT TRANSMITTERS

Operate at good efficiency up to 300 megacycles

A new "double" beam power transmitting tube, designed for ultra-high frequency work is now available to experimenters through RCA Tube Distributors. This new tube contains two



RCA-832

beam power units in one envelope. It is designed primarily for use as a push-pull u-h-f power amplifier with maximum ratings at wave-lengths as short as two meters. With reduced ratings it may be operated at wave-lengths down to one meter.

The excellent performance of the RCA 832 results from its compact, balanced structure and close electrode spacing. Its internal shielding eliminates the need for neutralization in properly designed circuits. Short internal leads minimize internal lead inductance. The terminal arrangement provides excellent insulation and facilitates symmetry of circuit layout.

For use in Class C telegraph service, the RCA 832 has a maximum d-c plate-voltage rating of 400 volts, a maximum total plate input of 36 watts, and a maximum total plate dissipation of 15 watts. The heaters are arranged for operation from either a 6.3- or 12.6-volt supply. The amateur net price is \$28.75.

## RCA 1852 and 1853 Have High Gain Up To 60 Megacycles

(Continued from page 1, col. 1)

keep the grid-plate capacitance as low as that of a similar tube with capped construction. From a circuit standpoint, the proximity of grid pin to cathode pin simplifies wiring and decreases the size of the inductance loop connecting the input circuit to the tube. These are features important at high frequencies because they provide decreased feedback and improved circuit stability.

Both of these tubes use the small 8-pin octal base and have 6.3-volt, 0.45-ampere heater ratings. The amateur net price is only \$1.85 for either tube.