

RCA-814

Transmitting Beam Power Amplifier

Illustrated on page 84

RCA-814 is a filament type of transmitting tube incorporating new design principles involving the use of directed electron beams. Features resulting from the use of these principles in the 814 are that the screen absorbs little power and that efficient suppressor action is supplied by space-charge effects produced between the screen and the plate. The resultant high power sensitivity makes this tube especially suited for use as an r-f amplifier, frequency multiplier, oscillator, and plate-modulated amplifier. The plate connection is brought out through a separate seal at the top of the bulb to maintain low grid-plate capacitance. The 814 may be operated at maximum ratings in all classes of service at frequencies as high as 30 megacycles. RCA-814 has a ceramic base.

TENTATIVE CHARACTERISTICS AND RATINGS

Filament Volts (a-c or d-c)	10.0	Grid-Plate Capacitance (With	
Filament Amperes	3.25	external shielding)	0.1 max. μf
Transconductance (For plate current		Input Capacitance	13.5 μf
of 39 ma.) Micromhos, approx.....	3300	Output Capacitance	13.5 μf

MAXIMUM RATINGS AND TYPICAL OPERATING CONDITIONS

As R-F Power Amplifier—Class B Telephony

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

D-C PLATE VOLTAGE	1250 max. Volts
D-C SCREEN VOLTAGE (Grid No. 2)	300 max. Volts
D-C PLATE CURRENT	60 max. Milliamperes
PLATE INPUT	75 max. Watts
SCREEN INPUT	6.7 max. Watts
PLATE DISSIPATION	50 max. Watts

TYPICAL OPERATION:

D-C Plate Voltage	1000	1250	Volts
D-C Screen Voltage	200	200	Volts
D-C Grid Voltage (Grid No. 1)*	-28	-28	Volts
Peak R-F Grid Voltage	50	50	Volts
Beam-Forming-Plate Voltage [§]	0	0	Volts
D-C Plate Current	60	60	Milliamperes
D-C Screen Current	1.3	1	Milliamperes
D-C Grid Current (Approx.)	1.8	1.8	Milliamperes
Driving Power (Approx.) [†]	0.65	0.65	Watt
Power Output (Approx.)	20	25	Watts

As Grid-Modulated R-F Power Amplifier—Class C Telephony

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

D-C PLATE VOLTAGE	1250 max. Volts
D-C SCREEN VOLTAGE (Grid No. 2)	300 max. Volts
D-C GRID VOLTAGE (Grid No. 1)	-250 max. Volts
D-C PLATE CURRENT	60 max. Milliamperes
PLATE INPUT	75 max. Watts
SCREEN INPUT	6.7 max. Watts
PLATE DISSIPATION	50 max. Watts

TYPICAL OPERATION:

D-C Plate Voltage	1000	1250	Volts
D-C Screen Voltage	200	200	Volts
D-C Grid Voltage*	-100	-100	Volts
Peak R-F Grid Voltage	129	129	Volts
Peak A-F Grid Voltage	64	64	Volts
Beam-Forming-Plate Voltage [§]	0	0	Volts

* , § , †: see next page.

D-C Plate Current	60	60	Milliamperes
D-C Screen Current	2	1.4	Milliamperes
D-C Grid Current (Approx.)	3	2.8	Milliamperes
Driving Power (Approx.)†	2.5	2.3	Watts
Power Output (Approx.)	25	29	Watts

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

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

D-C PLATE VOLTAGE	1000	max.	Volts
D-C SCREEN VOLTAGE (Grid No. 2)	300	max.	Volts
D-C GRID VOLTAGE (Grid No. 1)	-300	max.	Volts
D-C PLATE CURRENT	120	max.	Milliamperes
D-C GRID CURRENT	10	max.	Milliamperes
PLATE INPUT	120	max.	Watts
SCREEN INPUT	6.7	max.	Watts
PLATE DISSIPATION	34	max.	Watts

TYPICAL OPERATION:

D-C Plate Voltage	900	1000	Volts
D-C Screen Voltage	300	300	Volts
D-C Grid Voltage*	-150	-150	Volts
Peak R-F Grid Voltage	215	222	Volts
Beam-Forming-Plate Voltage‡	0	0	Volts
D-C Plate Current	120	120	Milliamperes
D-C Screen Current	15	17.5	Milliamperes
D-C Grid Current (Approx.)	10	10	Milliamperes
Screen Resistor†	40000	40000	Ohms
Grid Resistor	15000	15000	Ohms
Driving Power (Approx.)	2	2	Watts
Power Output (Approx.)	76	87	Watts

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

Key-down conditions per tube without modulation††

D-C PLATE VOLTAGE	1250	max.	Volts
D-C SCREEN VOLTAGE (Grid No. 2)	300	max.	Volts
D-C GRID VOLTAGE (Grid No. 1)	-300	max.	Volts
D-C PLATE CURRENT	150	max.	Milliamperes
D-C GRID CURRENT	10	max.	Milliamperes
PLATE INPUT	180	max.	Watts
SCREEN INPUT	10	max.	Watts
PLATE DISSIPATION	50	max.	Watts

TYPICAL OPERATION:

D-C Plate Voltage	1000	1250	Volts
D-C Screen Voltage	300	300	Volts
D-C Grid Voltage*	-70	-80	Volts
Peak R-F Grid Voltage	150	165	Volts
Beam-Forming-Plate Voltage‡	0	0	Volts
D-C Plate Current	150	144	Milliamperes
D-C Screen Current	17.5	22.5	Milliamperes
D-C Grid Current (Approx.)	10	10	Milliamperes
Screen Resistor	Not recommended		
Grid Resistor	7000	8000	Ohms
Driving Power (Approx.)	1.35	1.5	Watts
Power Output (Approx.)	100	130	Watts

* Grid voltages are given with respect to the mid-point of filament circuit operated on a.c. If d.c. is used, each stated value of grid voltage should be decreased by 7 volts and the circuit returns made to the negative end of the filament.

‡ Beam-forming plates should be connected to the mid-point of filament circuit operated on a.c. or to the negative end of the filament, when a d-c filament supply is used.

† At crest of audio-frequency cycle with modulation factor of 1.0.

‡ Connected to modulated plate-voltage supply.

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

INSTALLATION AND APPLICATION

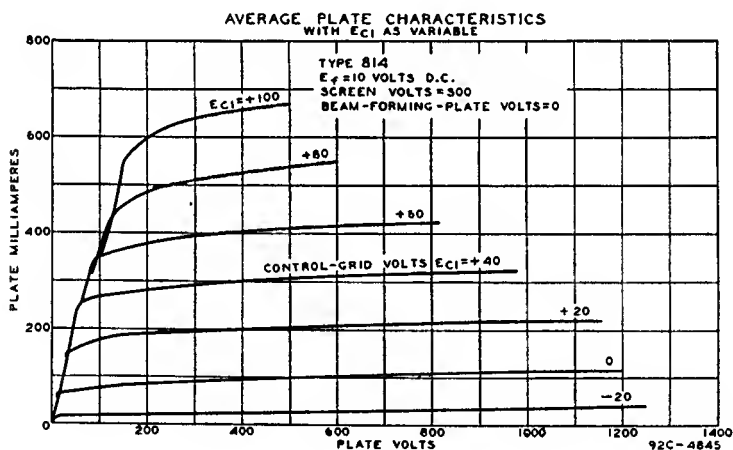
The base pins of the RCA-814 fit the standard 5-contact socket which should be installed to hold the tube in a vertical position with the base down. If it is necessary to place the tube in a horizontal position, the socket should be mounted with the filament-pin openings one vertically above the other so that the filament will be in a vertical plane (on edge).

The beam-forming plates of the 814 are connected to a separate base pin. They should always be operated at zero potential with respect to the filament; never positive. When the filament is operated from an a-c supply, the beam-forming plates should be connected to the mid-point of the filament circuit. When the filament is operated from a d-c supply, they should be connected to the negative end of the filament.

The plate of the 814 shows no color at the maximum plate-dissipation rating for each class of service. The screen should never be allowed to show color.

For high-frequency operation above 30 megacycles, see page 144.

For additional information, see chapters on INSTALLATION and APPLICATION.



Top View of Socket Connections

