

RCA-803

R-F Amplifier Pentode

Illustrated on front cover

RCA-803 is a pentode transmitting tube of the thoriated-tungsten filament type for use as an r-f amplifier, frequency multiplier, oscillator, and suppressor, grid-, or plate-modulated amplifier. The plate connection is brought out through a separate seal at the top of the bulb to insure excellent insulation and low grid-plate capacitance. In adequately shielded circuits, neutralization to prevent feedback is generally unnecessary. The suppressor is connected to its individual base pin. The 803 may be operated at maximum ratings in all classes of service at frequencies as high as 20 megacycles. The maximum rated plate dissipation of the tube is 125 watts. RCA-803 has a ceramic base.

CHARACTERISTICS

Filament Volts (a-c or d-c)	10.0	Grid-Plate Capacitance (With	
Filament Amperes	5	external shielding)	0.15 max. μf
Transconductance (For plate current		Input Capacitance	17.5 μf
of 62.5 ma.) Micromhos	4000	Output Capacitance	29 μf

MAXIMUM RATINGS AND TYPICAL OPERATING CONDITIONS

As R-F Power Amplifier Pentode—Class B Telephony

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

D-C PLATE VOLTAGE	2000 max. Volts
D-C SUPPRESSOR VOLTAGE (Grid No. 3)	500 max. Volts
D-C SCREEN VOLTAGE (Grid No. 2)	600 max. Volts
D-C PLATE CURRENT	160 max. Milliamperes
PLATE INPUT	180 max. Watts
SUPPRESSOR INPUT	10 max. Watts
SCREEN INPUT	20 max. Watts
PLATE DISSIPATION	125 max. Watts

TYPICAL OPERATION:

D-C Plate Voltage	1250	1500	2000	Volts
D-C Suppressor Voltage	40	40	40	Volts
D-C Screen Voltage	500	550	600	Volts
D-C Grid Voltage (Grid No. 1)§	-30	-35	-40	Volts
Peak R-F Grid Voltage	90	70	55	Volts
D-C Plate Current	130	110	80	Milliamperes
D-C Screen Current	33	30	20	Milliamperes
D-C Grid Current (Approx.)	8	5	3	Milliamperes
Driving Power (Approx.)†	4.5	3	1.5	Watts
Power Output (Approx.)	52	53	53	Watts

As Suppressor-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	2000 max. Volts
D-C SCREEN VOLTAGE (Grid No. 2)	600 max. Volts
D-C GRID VOLTAGE (Grid No. 1)	-500 max. Volts
D-C PLATE CURRENT	110 max. Milliamperes
D-C GRID CURRENT	50 max. Milliamperes
PLATE INPUT	180 max. Watts
SCREEN INPUT	30 max. Watts
PLATE DISSIPATION	125 max. Watts

§, †: see end of tabulation.

TYPICAL OPERATION:

D-C Plate Voltage	1250	1500	2000	Volts
D-C Supp. Volt. (Grid No. 3).....	-70	-90	-110	Volts
D-C Grid Voltage§	-110	-100	-100	Volts
Peak R-F Grid Voltage	200	190	170	Volts
Peak A-F Suppressor Voltage	110	130	150	Volts
D-C Plate Current	100	100	80	Milliamperes
D-C Screen Current	70	70	48	Milliamperes
D-C Grid Current (Approx.)	22	20	15	Milliamperes
Screen Resistor	13000	17000	35000	Ohms
Grid Resistor	5000	5000	7000	Ohms
Driving Power (Approx.)	4	3.5	2.5	Watts
Power Output (Approx.)	40	50	53	Watts

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

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

D-C PLATE VOLTAGE	2000 max.	Volts
D-C SUPPRESSOR VOLTAGE (Grid No. 3).....	500 max.	Volts
D-C SCREEN VOLTAGE (Grid No. 2).....	600 max.	Volts
D-C GRID VOLTAGE (Grid No. 1).....	-500 max.	Volts
D-C PLATE CURRENT	160 max.	Milliamperes
PLATE INPUT	180 max.	Watts
SUPPRESSOR INPUT	10 max.	Watts
SCREEN INPUT	20 max.	Watts
PLATE DISSIPATION	125 max.	Watts

TYPICAL OPERATION:

D-C Plate Voltage	1250	1500	2000	Volts
D-C Suppressor Voltage	40	40	40	Volts
D-C Screen Voltage	500	550	600	Volts
D-C Grid Voltage§	-100	-90	-80	Volts
Peak R-F Grid Voltage	160	130	100	Volts
Peak A-F Grid Voltage	75	65	50	Volts
D-C Plate Current	130	110	80	Milliamperes
D-C Screen Current	30	25	20	Milliamperes
D-C Grid Current (Approx.)	8	6	4	Milliamperes
Driving Power (Approx.)†	4	3	2	Watts
Power Output (Approx.)	52	53	53	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

	Pentode Connection	Tetrode Connection	
D-C PLATE VOLTAGE	1600 max.	1600 max.	Volts
D-C SUPP. VOLT. (Grid No 3)	500 max.	—	Volts
D-C SCREEN VOLTAGE***	500 max.	500 max.	Volts
D-C GRID VOLT. (Grid No. 1)	-500 max.	-500 max.	Volts
D-C PLATE CURRENT	160 max.	160 max.	Milliamperes
D-C GRID CURRENT	50 max.	50 max.	Milliamperes
PLATE INPUT	250 max.	250 max.	Watts
SUPPRESSOR INPUT	10 max.	—	Watts
SCREEN INPUT	20 max.	30 max.	Watts
PLATE DISSIPATION	85 max.	85 max.	Watts

TYPICAL OPERATION:

D-C Plate Voltage	1250	1600	1250	1600	Volts
D-C Suppressor Voltage	100	100	—	—	Volts
D-C Screen Voltage	400	500	130	130	Volts
D-C Grid Voltage§	-80	-80	-180	-180	Volts

§, †, ***: see end of tabulation.

Peak R-F Grid Voltage	180	180	305	320	Volts
D-C Plate Current	150	150	150	150	Milliamperes
D-C Screen Current	55	55	75	75	Milliamperes
D-C Grid Current (Approx.)	20	20	45	45	Milliamperes
Screen Resistor	16000‡	20000‡	15000**	20000**	Ohms
Grid Resistor	4000	4000	4000	4000	Ohms
Driving Power (Approx.)	4	4	15	15	Watts
Power Output (Approx.)	125	155	125	155	Watts

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

Key-down conditions per tube without modulation††

	Pentode Connection	Tetrode Connection	
D-C PLATE VOLTAGE	2000 max.	2000 max.	Volts
D-C SUPP. VOLT. (Grid No. 3)	500 max.	—	Volts
D-C SCREEN VOLTAGE***	600 max.	600 max.	Volts
D-C GRID VOLT. (Grid No. 1)	-500 max.	-500 max.	Volts
D-C PLATE CURRENT	175 max.	175 max.	Milliamperes
D-C GRID CURRENT	50 max.	50 max.	Milliamperes
PLATE INPUT	350 max.	350 max.	Watts
SUPPRESSOR INPUT	10 max.	—	Watts
SCREEN INPUT	30 max.	30 max.	Watts
PLATE DISSIPATION	125 max.	125 max.	Watts

TYPICAL OPERATION:

D-C Plate Voltage	1500	2000	1500	2000	Volts
D-C Suppressor Voltage	40	40	—	—	Volts
D-C Screen Voltage	500	500	150	150	Volts
D-C Grid Voltage	-90	-90	-90	-90	Volts
Peak R-F Grid Voltage	175	175	190	190	Volts
D-C Plate Current	160	160	160	160	Milliamperes
D-C Screen Current	45	45	15	15	Milliamperes
D-C Grid Current (Approx.)	12	12	27	26	Milliamperes
Screen Resistor	Not recommended				
Grid Resistor	7500	7500	3500	3500	Ohms
Driving Power (Approx.)	2	2	4.4	4.4	Watts
Power Output (Approx.)	160	210	160	210	Watts

‡ Grid voltages are given with respect to the mid-point of filament 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.

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

*** For pentode connection, Grid No. 2 is screen; for tetrode connection, grids No. 2 and 3 connected together.

‡ Connected to modulated plate supply.

** Connected to unmodulated 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 803 fit the special 5-contact socket which should be mounted to hold the tube in a vertical position with the filament base either up or down. The plate connection is made to the cap at the top of the bulb.

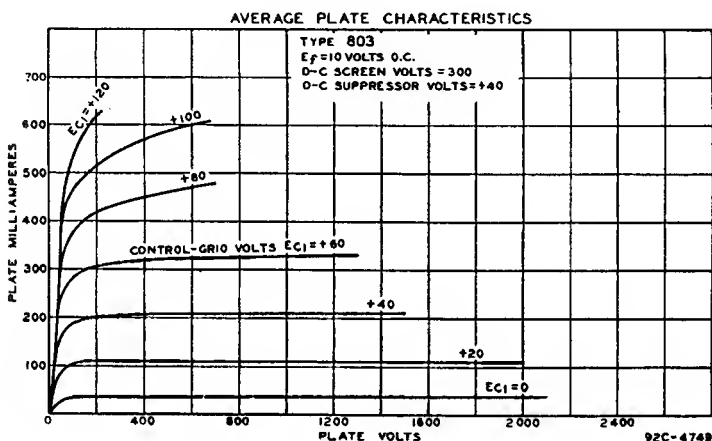
Adequate shielding and isolation of the input circuit and the output circuit are necessary if optimum results are to be obtained. If an external shield is employed with the 803, it should be designed to enclose the base end of the tube and extend up to a position $\frac{1}{4}$ " above the circular shield disc located at the bottom of the plate. Clearance between the glass bulb and external shield should be at least $\frac{1}{16}$ ". The impedance between the screen and filament must be kept as low as

possible by the use of a by-pass condenser. When screen voltage is obtained from a series resistance, the screen by-pass condenser should have a voltage breakdown rating high enough to withstand the full plate voltage of the tube.

The plate of the 803 shows only a barely perceptible red color at the maximum plate-dissipation rating for each class of service. The screen should never be allowed to show more than a dull red color.

For high-frequency operation above 20 megacycles, see page 144.

For additional information, see chapters on INSTALLATION and APPLICATION.



Top View of Socket Connections

