



10-SPECIAL\*

10  
SPECIAL

**POWER AMPLIFIER, OSCILLATOR**

\* For applications critical as to microphonics.

Filament	Thoriated Tungsten		
Voltage	7.5		a-c or d-c volts
Current	1.25		amp.
Amplification Factor	8		
Direct Interelectrode Capacitances:			
Grid to Plate	7		μf
Grid to Filament	4		μf
Plate to Filament	3		μf
Maximum Overall Length			5-5/8"
Maximum Diameter			2-3/16"
Bulb			S-17
Base			Medium 4-Pin Bayonet

A-F POWER AMPLIFIER & MODULATOR - Class A

D-C Plate Voltage		425 max.	volts
Plate Dissipation		12 max.	watts
Typical Operation:			
Filament Voltage	7.5	7.5	7.5 a-c volts
Plate Voltage	250	350	425 volts
Grid Voltage	-22	-31	-39 volts
Peak Grid Swing	18	27	35 volts
Plate Current	10	16	18 ma.
Mutual Conductance	1330	1550	1600 μmhos
Plate Resistance	6000	5150	5000 ohms
Load Resistance	13000	11000	10200 ohms
U.P.O. (5% second harmonic)	0.4	0.9	1.6 watts

A-F POWER AMPLIFIER & MODULATOR - Class B

D-C Plate Voltage		425 max.	volts
D-C Plate Current	Averaged over any		60 max. ma.
Plate Dissipation	audio-frequency cycle		12 max. watts
Typical Operation (2 tubes):			
Filament Voltage	7.5	7.5	7.5 a-c volts
D-C Plate Voltage	250	350	425 volts
Grid Voltage	-28	-40	-50 approx. volts
Zero-Sig. Plate Cur. (per tube)	4	4	4 ma.
Max.-Sig. Plate Cur. (per tube)	55	55	55 ma.
Load Resistance (per tube)	1000	1500	2000 ohms
Effective Load Res. (plate to plate)	4000	6000	8000 ohms
Power Output (2 tubes)	13	20	25 approx. watts

R-F POWER AMPLIFIER - Class B (Telephony)

(Carrier Conditions; for use with a Modulation Factor up to 1.0)

D-C Plate Voltage		450 max.	volts
D-C Plate Current		40 max.	ma.
Plate Dissipation		15 max.	watts
R-F Grid Current		4 max.	amp.
Typical Operation:			
Filament Voltage	7.5	7.5	a-c volts
D-C Plate Voltage	350	450	volts

(continued on next page)

**10  
SPECIAL**



# 10-SPECIAL POWER AMPLIFIER, OSCILLATOR

(continued from preceding page)

Grid Voltage	-40	-53	<u>approx. volts</u>
D-C Plate Current	35	35	ma.
Peak Power Output	12	16	<u>approx. watts</u>
Carrier Power Output	3	4	<u>approx. watts</u>

**PLATE-MODULATED R-F POWER AMPLIFIER - Class C (Telephony)**

*(Carrier Conditions; for use with a Modulation Factor up to 1.0)*

D-C Plate Voltage	350	max.	volts
D-C Plate Current	50	max.	ma.
Plate Dissipation	10	max.	watts
R-F Grid Current	4	max.	amp.
D-C Grid Current	15	max.	ma.

**Typical Operation:**

Filament Voltage	7.5	7.5	a-c volts
D-C Plate Voltage	250	350	volts
Grid Voltage	-95	-135	<u>approx. volts</u>
D-C Plate Current	45	45	ma.
D-C Grid Current*	15	15	ma.
Driving Power*	3	3.5	watts
Power Output	5.5	8	<u>approx. watts</u>

**R-F POWER AMPLIFIER & OSCILLATOR - Class C (Telegraphy)**

*(Key-down Conditions)*

D-C Plate Voltage	450	max.	volts
D-C Plate Current	60	max.	ma.
Plate Dissipation	15	max.	watts
R-F Grid Current	5	max.	amp.
D-C Grid Current	15	max.	ma.

**Typical Operation:**

Filament Voltage	7.5	7.5	a-c volts
D-C Plate Voltage	350	450	volts
Grid Voltage	-90	-115	<u>approx. volts</u>
D-C Plate Current	55	55	ma.
D-C Grid Current*	15	15	ma.
Driving Power*	3	3.3	watts
Power Output	9	13	<u>approx. watts</u>

\* Subject to wide variations depending on the impedance of the load circuit. High impedance load circuits require more grid current and driving power to obtain the desired output. Low impedance circuits need less grid current and driving power, but plate circuit efficiency is sacrificed. The driving stage should have a tank circuit of good regulation and should be capable of delivering considerably more than the required driving power.

OUTLINE DIMENSIONS, TUBE SYMBOL, and  
 SOCKET CONNECTIONS for the 10-Special are the same  
 as for the 841.

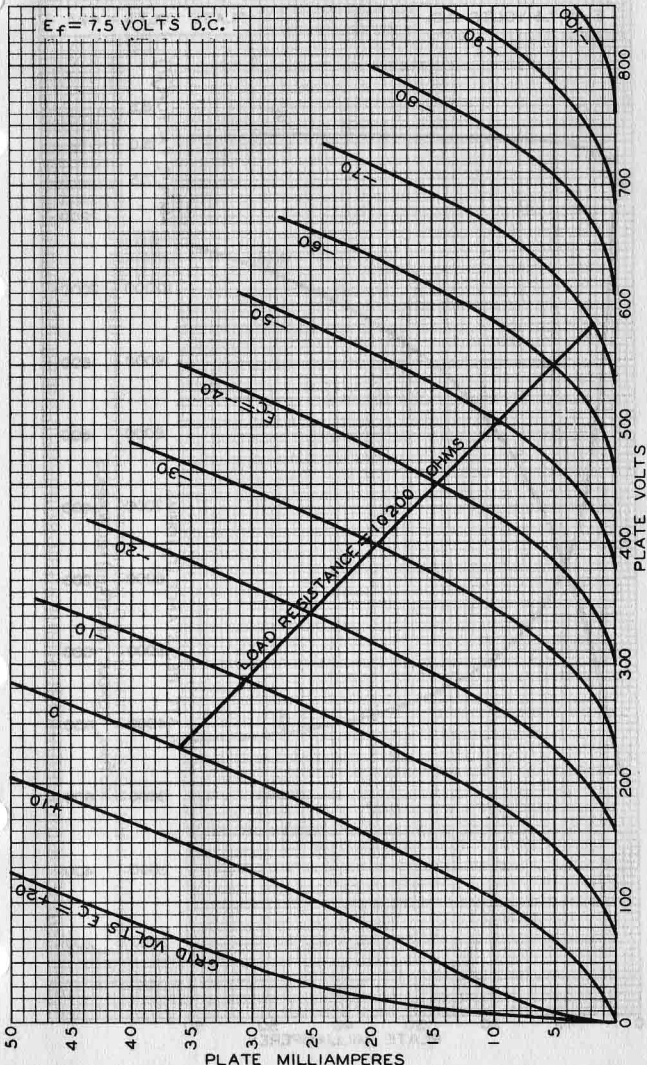


10-SPECIAL

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SPECIAL

### AVERAGE PLATE CHARACTERISTICS

$E_f = 7.5$  VOLTS D.C.



FEB. 10, 1933

PLATE MILLIAMPERES  
RCA RADIOTRON COMPANY, INC.

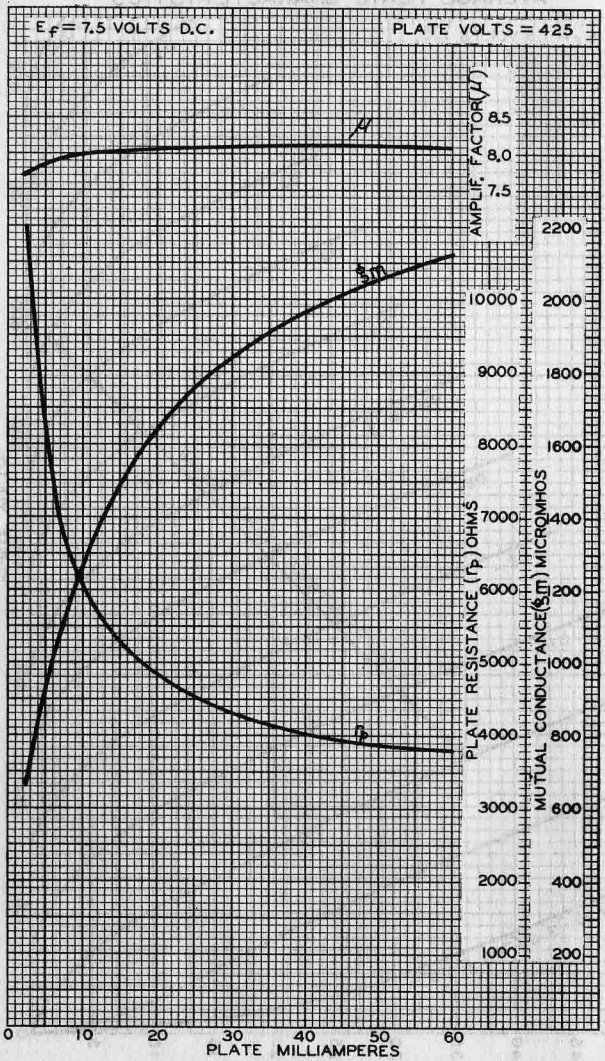
925-509R2

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SPECIAL



10-SPECIAL

AVERAGE CHARACTERISTICS





203-A

203-A

# R-F POWER AMPLIFIER, OSCILLATOR, CLASS B MODULATOR

Filament	Thoriated Tungsten	
Voltage	10	a-c or d-c volts
Current	3.25	amp.
Amplification Factor	25	
Direct Interelectrode Capacitances (approx.):		
Grid to Plate	14.5	$\mu\text{f}$
Grid to Filament	6.5	$\mu\text{f}$
Plate to Filament	5.5	$\mu\text{f}$
Maximum Overall Length		7-7/8"
Maximum Diameter		2-5/16"
Bulb		T-18
Base		Jumbo 4-Large Pin

## MAXIMUM RATINGS and TYPICAL OPERATING CONDITIONS

### A-F POWER AMPLIFIER & MODULATOR - Class B

D-C Plate Voltage	1250 max.	volts
Max-Signal D-C Plate Current *	175 max.	ma.
Max-Signal Plate Input *	220 max.	watts
Plate Dissipation *	100 max.	watts
Typical Operation - 2 tubes:		

*Unless otherwise specified, values are for 2 tubes.*

Filament Voltage	10	10	a-c volts
D-C Plate Voltage	1000	1250	volts
D-C Grid Voltage	-35	-45	volts
Peak A-F Grid-to-Grid Voltage	310	330	volts
Zero-Signal D-C Plate Current	26	26	ma.
Max-Signal D-C Plate Current	320	320	ma.
Load Resistance (per tube)	1725	2250	ohms
Effective Load Res. (plate to plate)	6900	9000	ohms
Max-Signal Driving Power	10	11	approx. watts
Max-Signal Power Output	200	260	approx. watts

\* Averaged over any audio frequency cycle of sine-wave form.

### R-F POWER AMPLIFIER - Class B Telephony

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

D-C Plate Voltage	1250 max.	volts
D-C Plate Current	150 max.	ma.
R-F Grid Current	6 max.	amp.
Plate Input	150 max.	watts
Plate Dissipation	100 max.	watts
Typical Operation:		

Filament Voltage	10	10	a-c volts
D-C Plate Voltage	1000	1250	volts
D-C Grid Voltage	-35	-45	volts
Peak R-F Grid Voltage	95	90	volts
D-C Plate Current	130	106	ma.
D-C Grid Current **	5	3	approx. ma.
Driving Power ** $\circ$	5	3	approx. watts
Power Output	40	42.5	approx. watts

\*\* Subject to wide variations as explained on sheet TRANS. TUBE RATINGS.

$\circ$  At crest of a-f cycle with Modulation Factor of 1.0.

$\leftarrow$  Indicates a change

203-A



203-A

# R-F POWER AMPLIFIER, OSCILLATOR, CLASS B MODULATOR

(continued from preceding page)

## PLATE-MODULATED R-F POWER AMPLIFIER - Class C Telephony

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

D-C Plate Voltage	1000 max.	volts
D-C Grid Voltage	-400 max.	volts
D-C Plate Current	175 max.	ma.
D-C Grid Current	60 max.	ma.
R-F Grid Current	6 max.	amp.
Plate Input	175 max.	watts
Plate Dissipation	67 max.	watts

### Typical Operation:

Filament Voltage	10	10	a-c volts
D-C Plate Voltage	750	1000	volts
D-C Grid Voltage	-100	-135	volts
Peak R-F Grid Voltage	235	275	volts
D-C Plate Current	150	150	ma.
D-C Grid Current**	50	50	approx.ma.
Driving Power**	12	14	approx.watts
Power Output	65	100	approx.watts

## R-F POWER AMPLIFIER & OSCILLATOR - Class C Telegraphy

Key-down conditions per tube without modulation #

D-C Plate Voltage	1250 max.	volts
D-C Grid Voltage	-400 max.	volts
D-C Plate Current	175 max.	ma.
D-C Grid Current	60 max.	ma.
R-F Grid Current	7.5 max.	amp.
Plate Input	220 max.	watts
Plate Dissipation	100 max.	watts

### Typical Operation:

Filament Voltage	10	10	10	a-c volts
D-C Plate Voltage	750	1000	1250	volts
D-C Grid Voltage	-75	-100	-125	volts
Peak R-F Grid Voltage	195	225	255	volts
D-C Plate Current	150	150	150	ma.
D-C Grid Current**	25	25	25	approx.ma.
Driving Power**	5	6	7	approx.watts
Power Output	65	100	130	approx.watts

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

\*\* Subject to wide variations as explained on sheet TRANS. TUBE RATINGS.

For use of the 203-A at the higher frequencies, refer to sheet TRANS. TUBE RATINGS vs FREQUENCY.

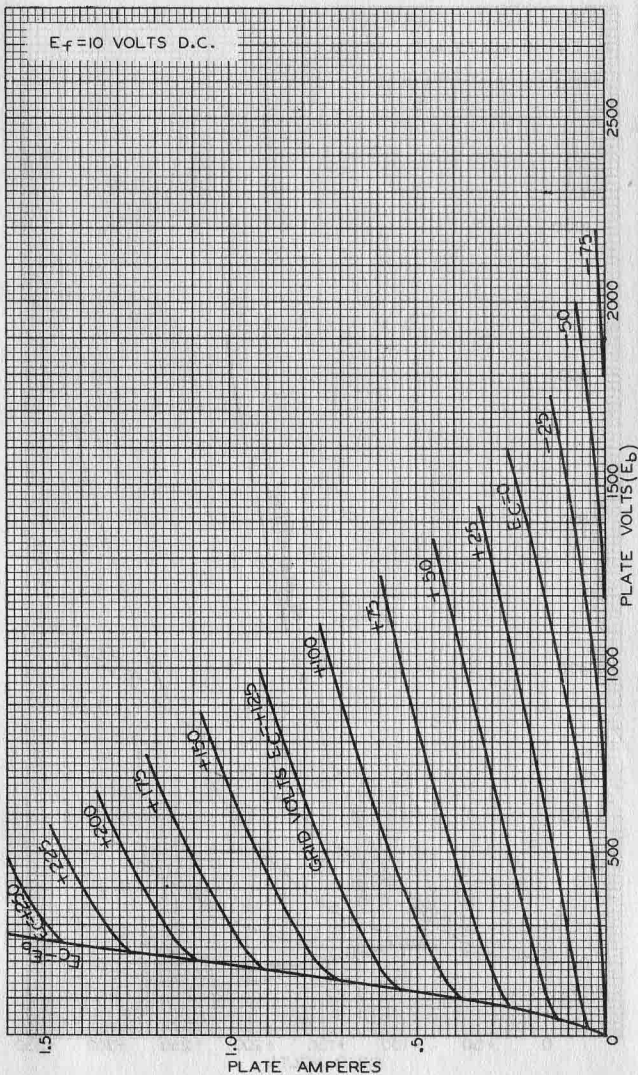
OUTLINE DIMENSIONS, TUBE SYMBOL, and  
SOCKET CONNECTIONS for the 203-A are the same  
as for the 211

← Indicates a change



203-A

# AVERAGE PLATE CHARACTERISTICS



FEB. 27, 1934

RCA RADOTRON DIVISION  
RCA MANUFACTURING COMPANY, INC.

925-5463

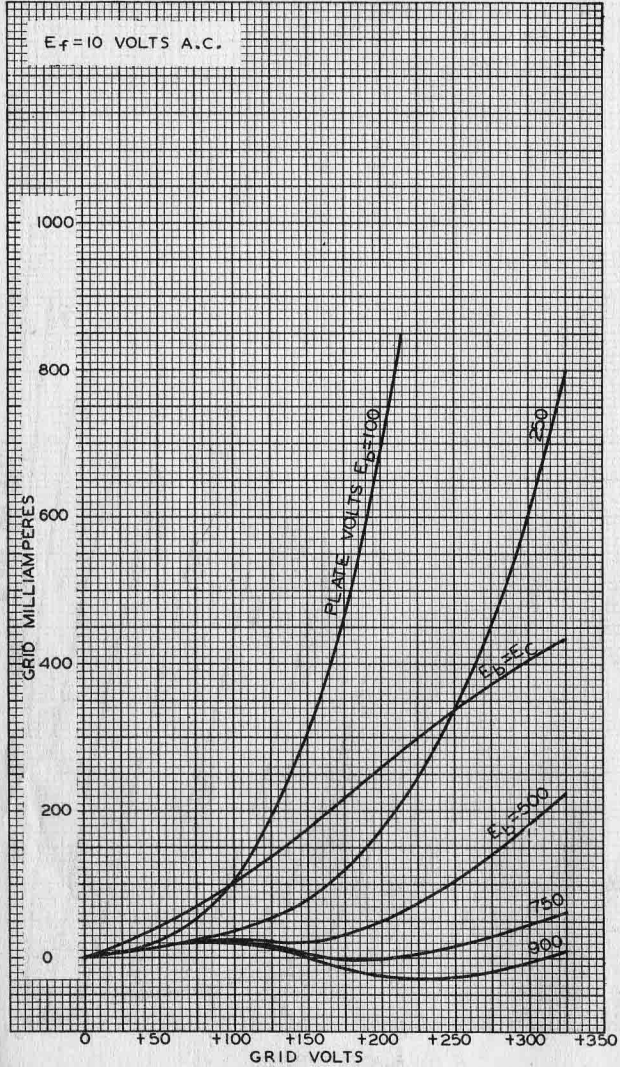
203-A

203-A



203-A

### AVERAGE CHARACTERISTICS





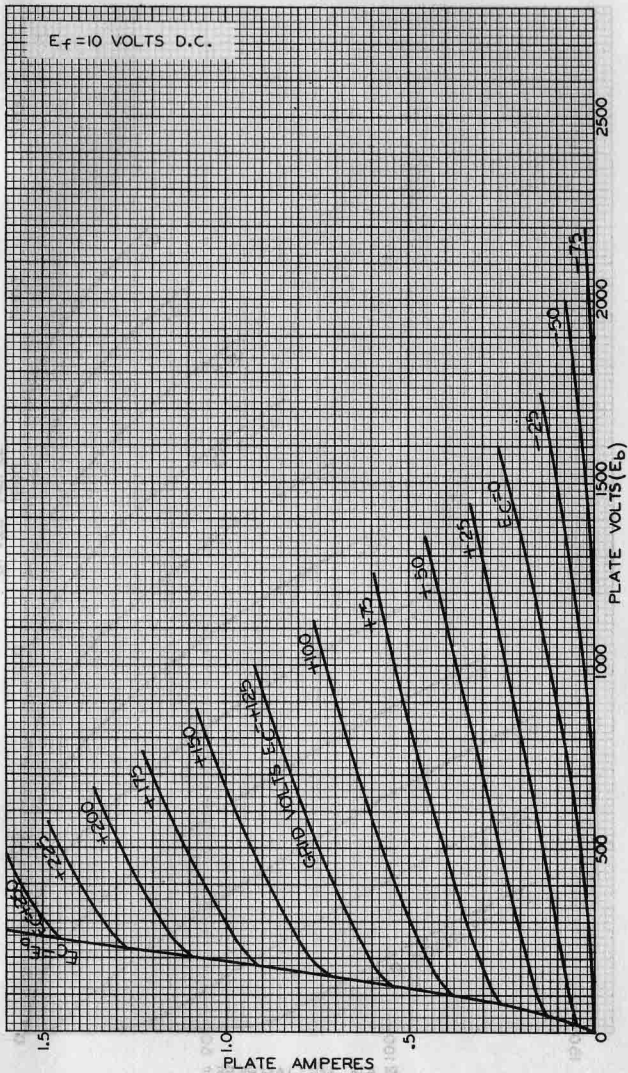


203-A/503-A

203-A

### AVERAGE PLATE CHARACTERISTICS

$E_f = 10$  VOLTS D.C.

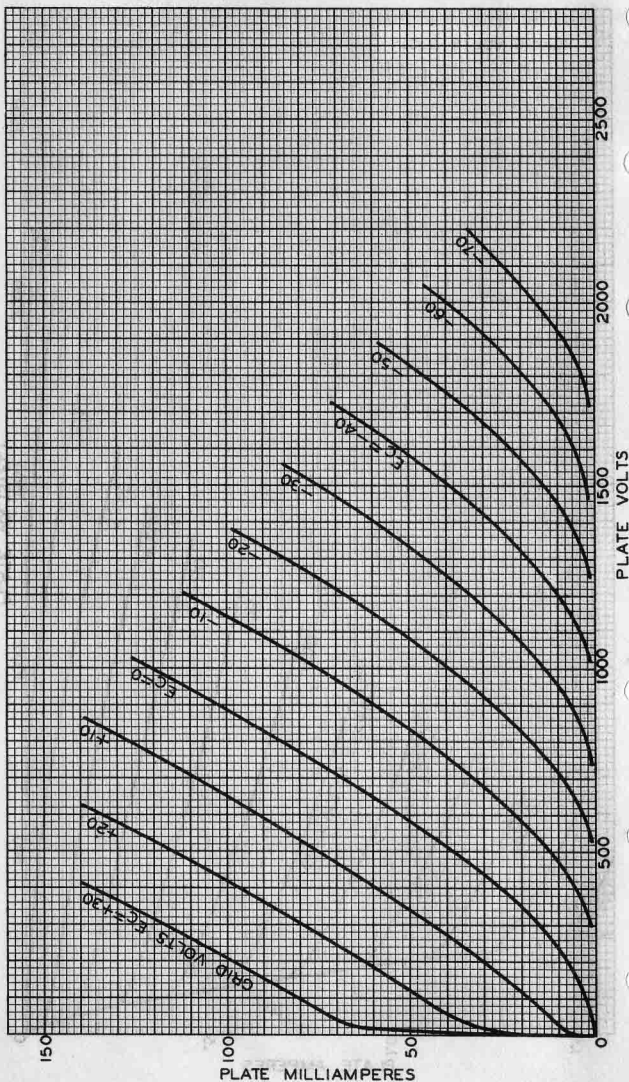


203-A



203-A/503-A

### AVERAGE PLATE CHARACTERISTICS





204-A

204-A

## R-F POWER AMPLIFIER, OSCILLATOR, CLASS B MODULATOR

Filament	Thoriated Tungsten	
Voltage	11	a-c or d-c volts
Current	3.85	amp.
Amplification Factor	23	
Direct Interelectrode Capacitances (approx.):		
Grid to Plate	15	$\mu\text{mf}$
Grid to Filament	12.5	$\mu\text{mf}$
Plate to Filament	2.3	$\mu\text{mf}$
Overall Length	14-1/4" $\pm$ 1/8"	
Maximum Diameter	4-1/16"	
Bulb	T-32	
Cap	No. 1904	
Base	No. 3502	

### MAXIMUM RATINGS and TYPICAL OPERATING CONDITIONS

#### A-F POWER AMPLIFIER & MODULATOR - Class B

D-C Plate Voltage	3000 max.	volts
Max.-Signal D-C Plate Current*	275 max.	ma.
Max.-Signal Plate Input*	600 max.	watts
Plate Dissipation*	250 max.	watts

Typical Operation - 2 tubes:

*Unless otherwise specified, values are for 2 tubes.*

Filament Voltage	11	11	11	a-c volts
D-C Plate Voltage	2000	2500	3000	volts
D-C Grid Voltage	-60	-80	-100	volts
Peak A-F Grid-to-Grid Volt.	500	500	500	volts
Zero-Sig. D-C Plate Cur.	80	80	80	ma.
Max.-Sig. D-C Plate Cur.	500	420	372	ma.
Load Resistance (per tube)	2200	3400	5000	ohms
Effective Load Resistance				
(plate to plate)	8800	13600	20000	ohms
Max.-Signal Driving Power	20	18	18	approx. watts
Max.-Signal Power Output	600	650	700	approx. watts

\* Averaged over any audio-frequency cycle.

#### R-F POWER AMPLIFIER - Class B Telephony

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

D-C Plate Voltage	2500 max.	volts
D-C Plate Current	225 max.	ma.
R-F Grid Current	8 max.	amp.
Plate Input	400 max.	watts
Plate Dissipation	250 max.	watts

Typical Operation:

Filament Voltage	11	11	a-c volts
D-C Plate Voltage	1500	2000	volts
D-C Grid Voltage	-50	-70	volts
Peak R-F Grid Voltage	170	165	volts
D-C Plate Current	200	160	ma.
Driving Power** $\circ$	18	15	approx. watts
Power Output	80	100	approx. watts

\*\*  $\circ$ : See next page.

(continued on next page)

204-A



204-A

# R-F POWER AMPLIFIER, OSCILLATOR, CLASS B MODULATOR

(continued from preceding page)

## PLATE-MODULATED R-F POWER AMPLIFIER - Class C Telephony

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

D-C Plate Voltage		2000 max.	volts
D-C Grid Voltage		-500 max.	volts
D-C Plate Current		275 max.	ma.
D-C Grid Current		80 max.	ma.
R-F Grid Current		8 max.	amp.
Plate Input		550 max.	watts
Plate Dissipation		167 max.	watts
Typical Operation:			
Filament Voltage	11	11	a-c volts
D-C Plate Voltage	1500	2000	volts
D-C Grid Voltage	-200	-250	volts
Peak R-F Grid Voltage	450	500	volts
D-C Plate Current	250	250	ma.
D-C Grid Current**	35	35	approx.ma.
Driving Power**	20	20	approx.watts
Power Output	225	350	approx.watts

## R-F POWER AMPLIFIER & OSCILLATOR - Class C Telephony

Key-down conditions per tube without modulation\*\*

D-C Plate Voltage		2500 max.	volts
D-C Grid Voltage		-500 max.	volts
D-C Plate Current		275 max.	ma.
D-C Grid Current		80 max.	ma.
R-F Grid Current		10 max.	amp.
Plate Input		690 max.	watts
Plate Dissipation		250 max.	watts
Typical Operation:			
Filament Voltage	11	11	11 a-c volts
D-C Plate Voltage	1500	2000	2500 volts
D-C Grid Voltage	-150	-175	-200 volts
Peak R-F Grid Voltage	400	425	440 volts
D-C Plate Current	250	250	250 ma.
D-C Grid Current**	30	30	30 approx.ma.
Driving Power**	15	15	15 approx.watts
Power Output	240	350	450 approx.watts

\*\* Subject to wide variations as explained on sheet TRANS. TUBE RATINGS.

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

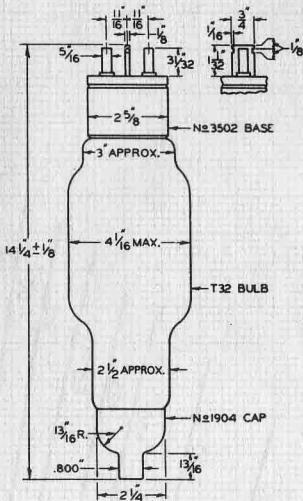
o At crest of audio-frequency cycle with modulation factor of 1.0.

For use of the 204-A at the higher frequencies, refer to sheet TRANS. TUBE RATINGS vs FREQUENCY.

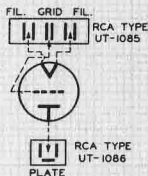


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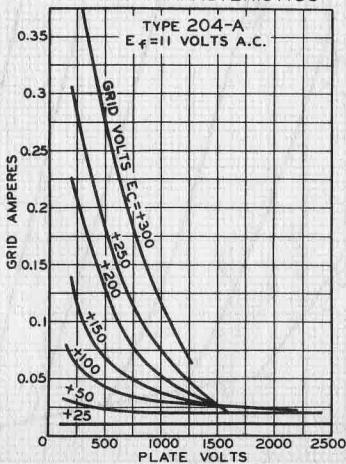
# 204-A R-F POWER AMPLIFIER, OSCILLATOR CLASS B MODULATOR



TUBE SYMBOL & CONNECTIONS  
TO END-MOUNTINGS



## TYPICAL CHARACTERISTICS



92C-4456R1

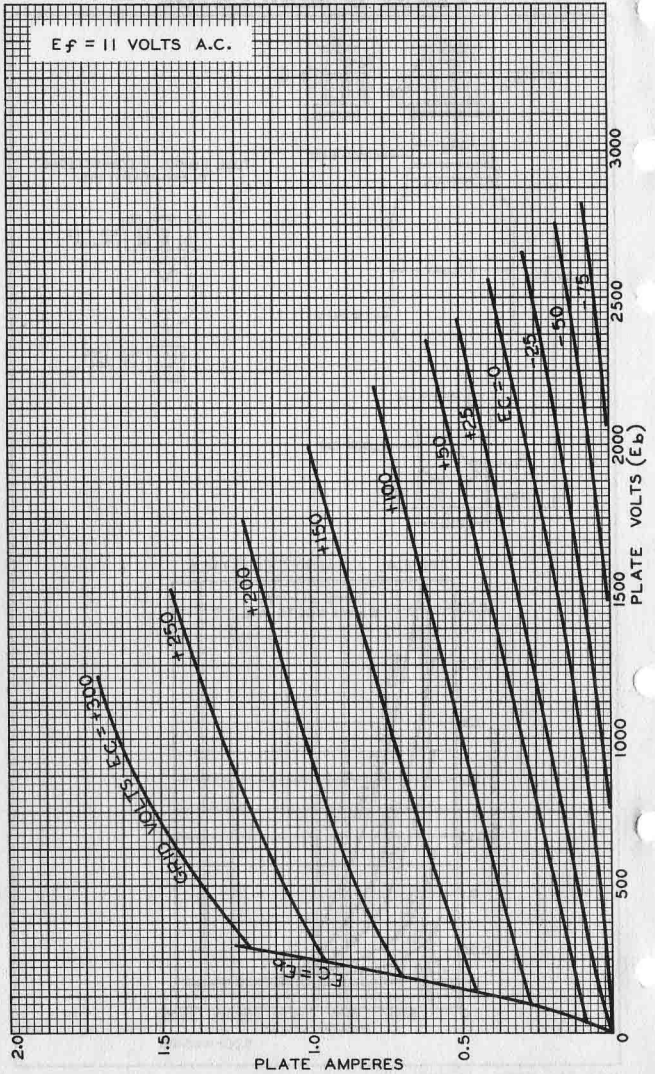
204-A



204-A

### AVERAGE PLATE CHARACTERISTICS

$E_f = 11$  VOLTS A.C.



JUNE 3, 1935

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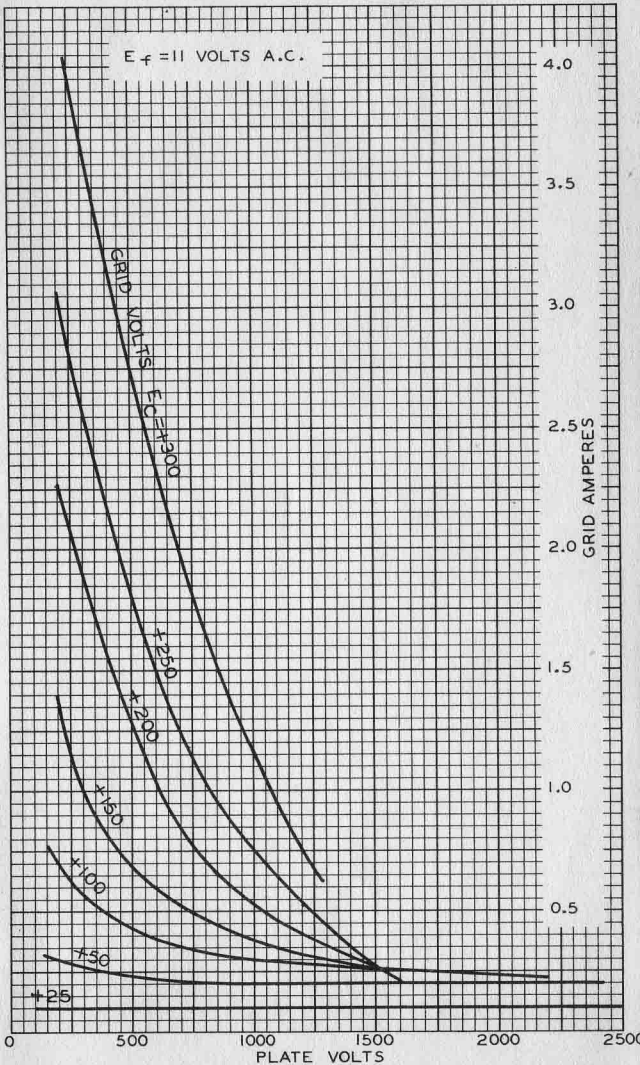
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204-A

204-A

### TYPICAL CHARACTERISTICS



JUNE 3, 1935

RCA RAD'OTRON DIVISION  
RCA MANUFACTURING COMPANY, INC.

92C-4456



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# OSCILLATOR, R-F POWER AMPLIFIER, CLASS B MODULATOR

(WATER COOLED)

Filament	Tungsten	
Voltage	22	a-c or d-c volts
Current	52	amp.
Amplification Factor	20	
Direct Interelectrode Capacitances (approx.):		
Grid to Plate	27	$\mu\text{f}$
Grid to Filament	18	$\mu\text{f}$
Plate to Filament	2	$\mu\text{f}$
Maximum Overall Length		20-1/4"
Maximum Radius		6-1/2"
Base		No. 3906
Water Jacket		UT-1285-A

## MAXIMUM RATINGS and TYPICAL OPERATING CONDITIONS

*This tube can often be operated with reduced filament voltage as explained on sheet TYPES OF CATHODES in front of book.*

### A-F POWER AMPLIFIER & MODULATOR - Class B

D-C Plate Voltage	15000 max.	volts
Max-Signal D-C Plate Current *	2.0 max.	amp.
Max-Signal Plate Input *	20 max.	kw
Plate Dissipation *	7.5 max.	kw

Typical Operation (2 tubes):

*Unless otherwise specified, values are for 2 tubes.*

Filament Voltage	22	22	22	d-c volts
D-C Plate Voltage	6000	10000	12500	volts
D-C Grid Voltage	-210	-410	-575	volts
Peak A-F Grid-to-Grid Volt.	1520	2140	2300	volts
Zero-Signal D-C Plate Cur.	0.5	0.5	0.4	amp.
Max-Signal D-C Plate Cur.	2.5	3.2	2.8	amp.
Load Resistance (per tube)	1050	1600	2500	ohms
Effective Load Resistance (plate to plate)	4200	6400	10000	ohms
Max-Sig. Driving Power	190	380	400	approx. watts
Max-Sig. Power Output	8	20	22.5	approx. kw

\* Averaged over any audio-frequency cycle.

### R-F POWER AMPLIFIER - Class B Telephony

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

D-C Plate Voltage	15000 max.	volts
D-C Plate Current	1.0 max.	amp.
R-F Grid Current	24 max.	amp.
Plate Input	15 max.	kw
Plate Dissipation	10 max.	kw

Typical Operation:

Filament Voltage	22	22	22	d-c volts
D-C Plate Voltage	6000	10000	14000	volts
D-C Grid Voltage	-225	-440	-650	volts
Peak R-F Grid Voltage	400	600	730	volts
D-C Plate Current	0.62	0.93	1.0	amp.

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NOV. 7, 1935 (9-36)

RCA RADIONRON DIVISION  
RCA MANUFACTURING COMPANY, INC.

DATA



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# OSCILLATOR, R-F POWER AMPLIFIER, CLASS B MODULATOR

(continued from preceding page)

Driving Power <sup>0**</sup>	72	16	0 approx.watts
Power Output	1	2.5	4 approx.kw

<sup>0</sup> At crest of a-f cycle with modulation factor of 1.0.

## PLATE-MODULATED R-F POWER AMPLIFIER - Class C Telephony

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

D-C Plate Voltage	10000 max.	volts
D-C Grid Voltage	-3000 max.	volts
D-C Plate Current	1.0 max.	amp.
D-C Grid Current	0.2 max.	amp.
R-F Grid Current	24 max.	amp.
Plate Input	10 max.	kw
Plate Dissipation	6.6 max.	kw

### Typical Operation:

Filament Voltage	22	22	22	a-c volts
D-C Plate Voltage	6000	8000	10000	volts
D-C Grid Voltage	-1200	-1600	-2000	volts
Peak R-F Grid Voltage	1860	2300	2660	volts
D-C Plate Current	0.76	0.78	0.75	amp.
D-C Grid Current **	0.15	0.14	0.07	approx.amp.
Driving Power **	280	325	185	approx.watts
Power Output	3.5	5	6	approx.kw

## R-F POWER AMPLIFIER & OSCILLATOR - Class C Telegraphy

Key-down conditions per tube without modulation\*

D-C Plate Voltage	15000 max.	volts
D-C Grid Voltage	-3000 max.	volts
D-C Plate Current	2.0 max.	amp.
D-C Grid Current	0.2 max.	amp.
R-F Grid Current	30 max.	amp.
Plate Input	30 max.	kw
Plate Dissipation	10 max.	kw

### Typical Operation:

Filament Voltage	22	22	22	a-c volts
D-C Plate Voltage	8000	10000	12000	volts
D-C Grid Voltage	-1000	-1200	-1600	volts
Peak R-F Grid Voltage	1730	2050	2650	volts
D-C Plate Current	1.10	1.33	1.67	amp.
D-C Grid Current **	0.17	0.12	0.09	approx.amp.
Driving Power **	295	245	235	approx.watts
Power Output	6.5	10	15	approx.kw

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

\*\* Subject to wide variations as explained on sheet TRANS. TUBE RATINGS.

For use of the 207 at the higher frequencies, refer to sheet TRANS. TUBE RATINGS vs FREQUENCY.

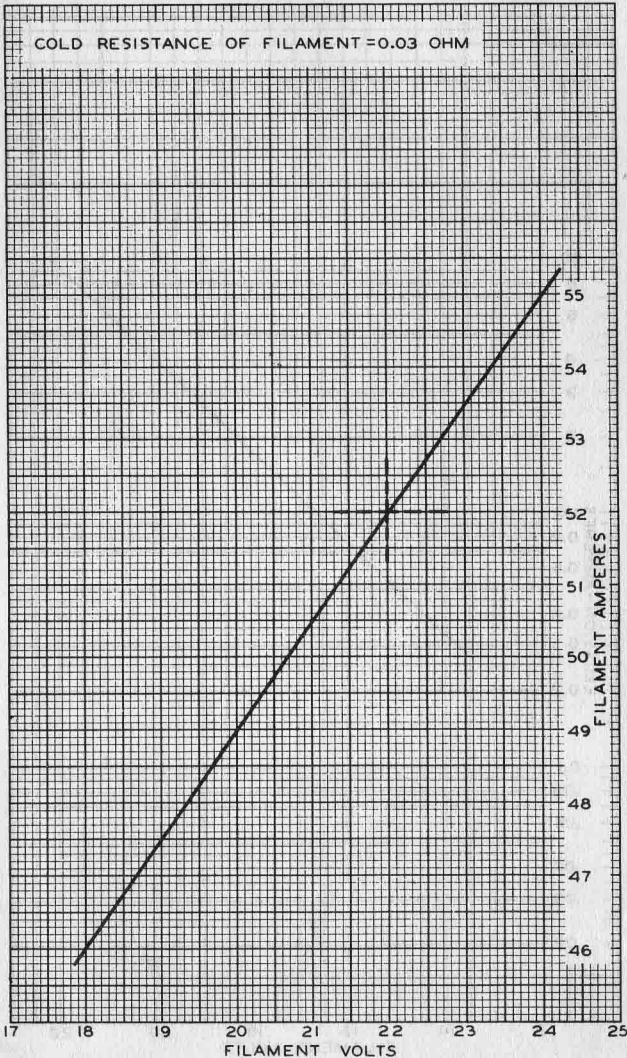


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# AVERAGE FILAMENT CHARACTERISTIC

COLD RESISTANCE OF FILAMENT = 0.03 OHM



JAN. 27, 1936

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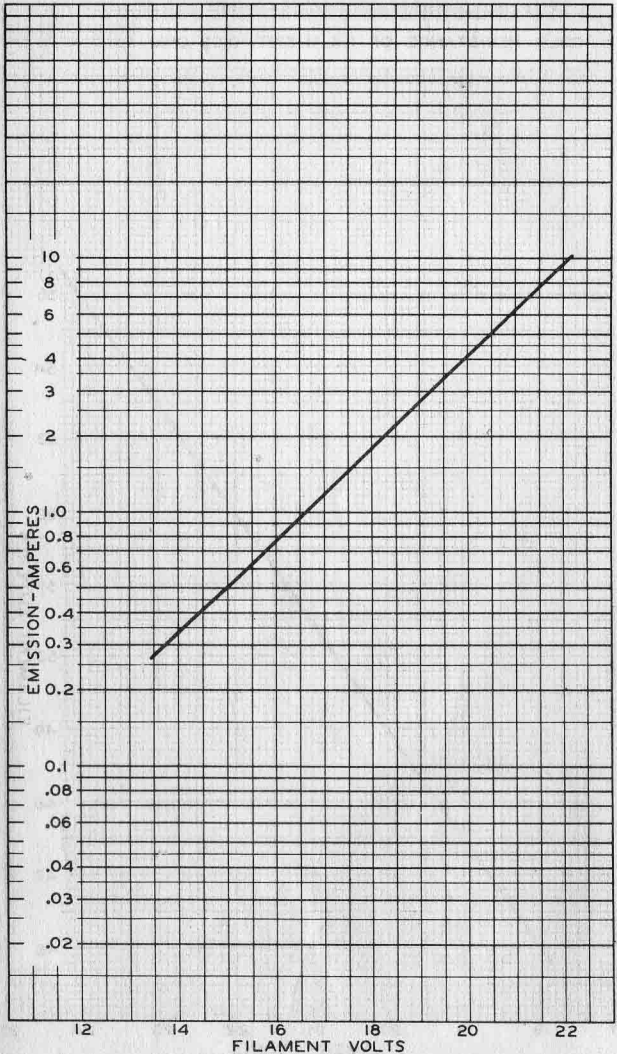
92C-4550

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# AVERAGE FILAMENT-EMISSION CHARACTERISTIC



JAN. 27, 1936

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RCA MANUFACTURING COMPANY, INC.

92C-4551

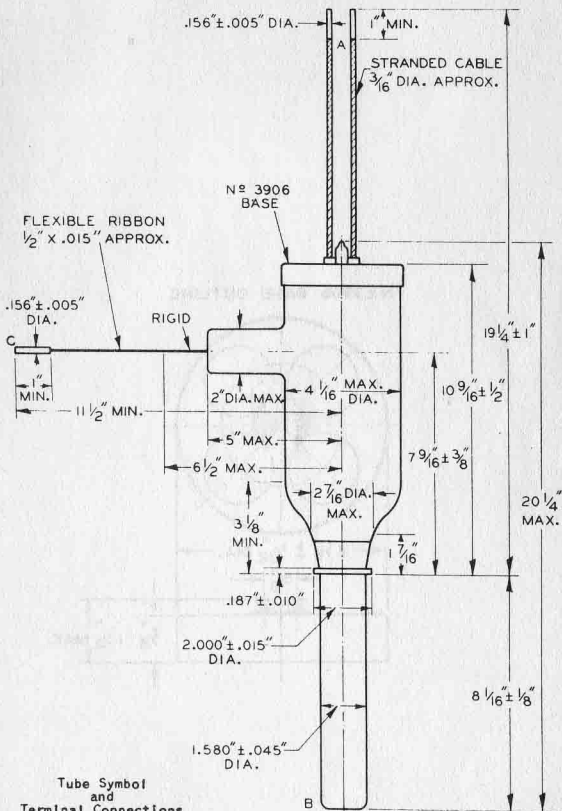


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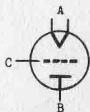
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# OSCILLATOR, R-F POWER AMPLIFIER CLASS B MODULATOR

(continued from preceding page)



Tube Symbol  
and  
Terminal Connections



A - Filament  
B - Plate  
C - Grid

92S-4326 RI

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JAN. 15, 1936

RCA RADIOTRON DIVISION  
RCA MANUFACTURING COMPANY, INC.

DATA 2

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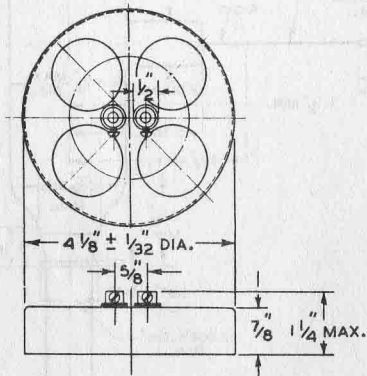


207

# OSCILLATOR, R-F POWER AMPLIFIER, CLASS B MODULATOR

(continued from preceding page)

N<sub>2</sub>3906 BASE OUTLINE



## OSCILLATOR, R-F POWER AMPLIFIER, CLASS B MODULATOR

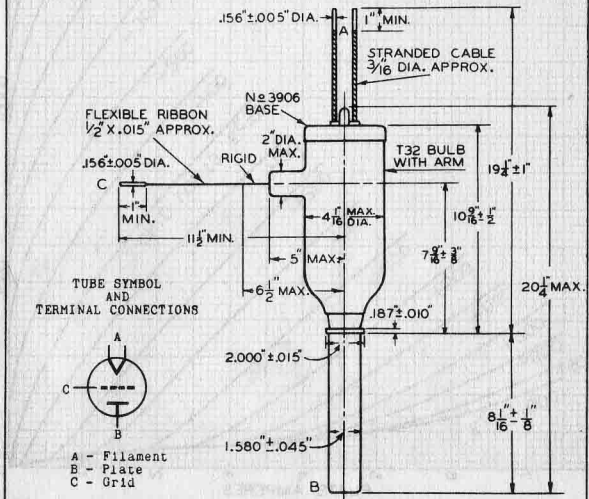
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TABLE II

Carrier Conditions; for use with a Modulation Factor up to 1.0				
FREQUENCY kc	MAX. D-C PLATE VOLTS	APPROX. GRID BIAS VOLTS	TYPICAL VALUES OF	
			D-C PLATE AMPERES	POWER OUTPUT WATTS
1500	10000	-2100	1.0	6600
3200	9000	-2000	1.0	6000
6000	8000	-1800	1.0	5200
9600	7000	-1600	1.0	4500
14400	6000	-1450	0.9	3700
20000	5000	-1300	0.8	3000

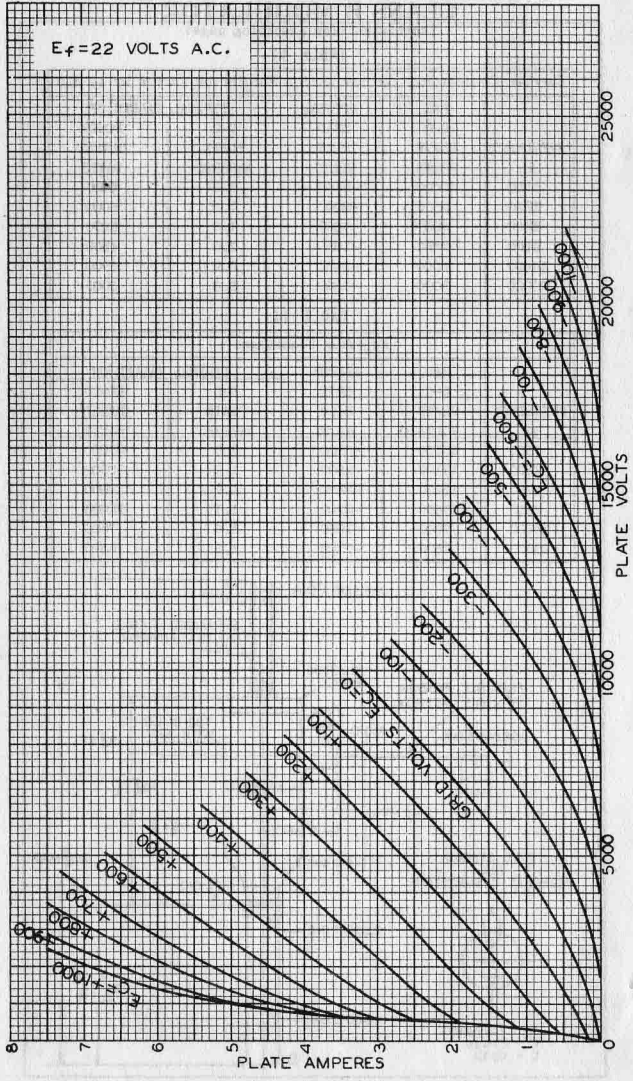
TABLE III

Key-down Conditions				
FREQUENCY kc	MAX. D-C PLATE VOLTS	APPROX. GRID BIAS VOLTS	TYPICAL VALUES OF	
			D-C PLATE AMPERES	POWER OUTPUT WATTS
1500	15000	-3000	2.0	20000
2500	14100	-2800	1.9	18000
3750	13200	-2670	1.8	16000
7500	11400	-2380	1.7	12000
15000	8900	-1950	1.4	7500
20000	7500	-1700	1.3	5500



# AVERAGE PLATE CHARACTERISTICS

$E_f = 22$  VOLTS A.C.



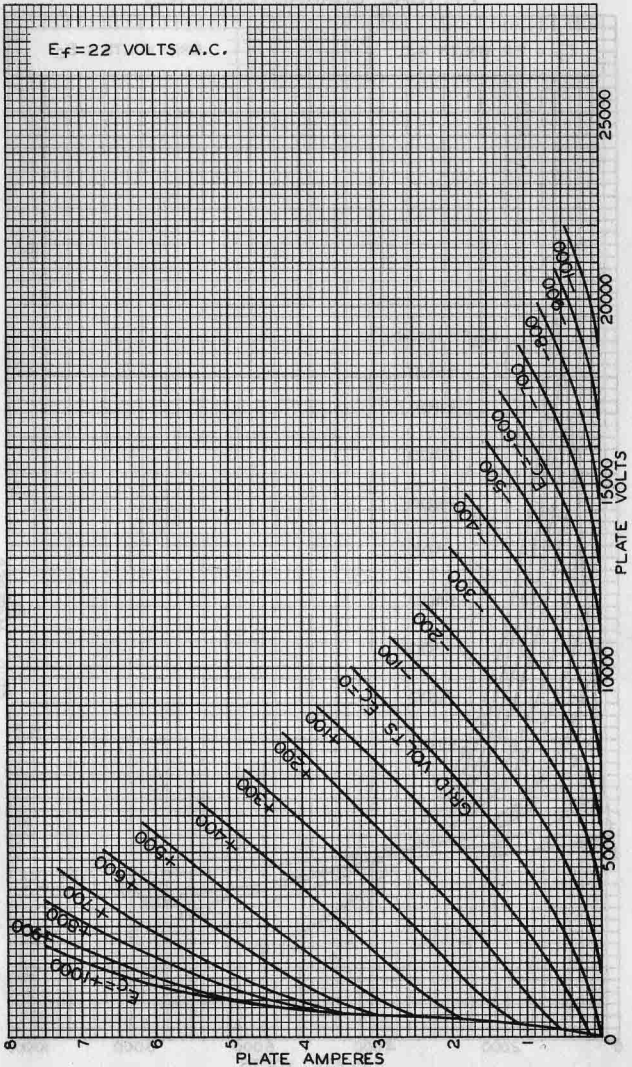


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# AVERAGE PLATE CHARACTERISTICS

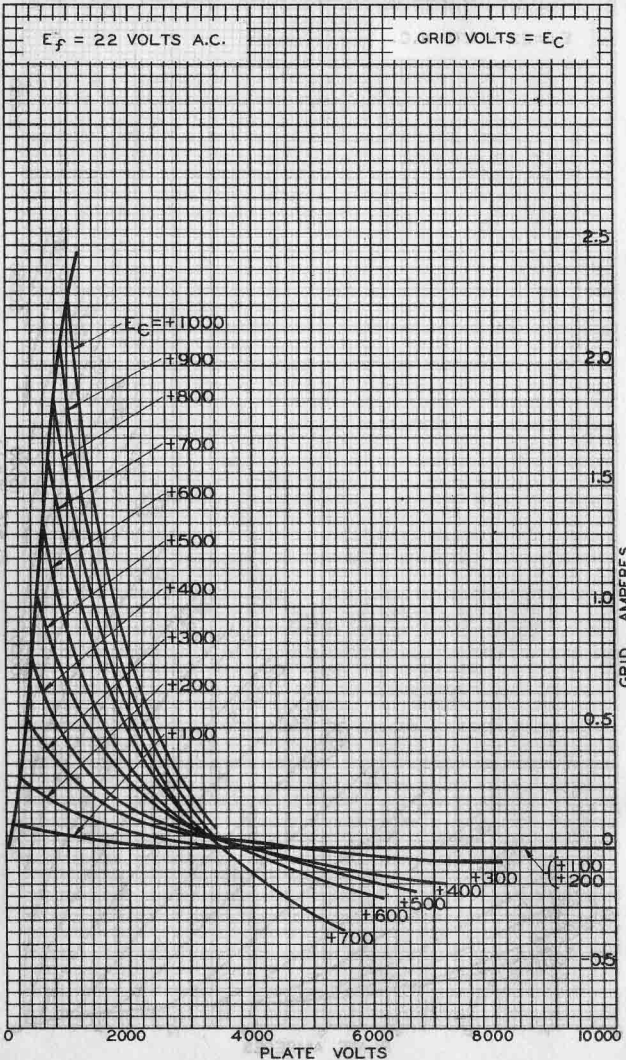
$E_f = 22$  VOLTS A.C.







### TYPICAL CHARACTERISTICS





211

# R-F POWER AMPLIFIER, OSCILLATOR, A-F POWER AMPLIFIER, MODULATOR

Filament	Thoriated Tungsten	
Voltage	10	a-c or d-c volts
Current	3.25	amp.
Amplification Factor	12	
Direct Interelectrode Capacitances:		
Grid to Plate	14.5	$\mu\text{f}$
Grid to Filament	6.0	$\mu\text{f}$
Plate to Filament	5.5	$\mu\text{f}$
Maximum Overall Length		7-7/8"
Maximum Diameter		2-5/16"
Bulb		T-18
Base		Jumbo 4-Large Pin

## MAXIMUM RATINGS and TYPICAL OPERATING CONDITIONS

### A-F POWER AMPLIFIER & MODULATOR - Class A

D-C Plate Voltage	1250 max.	volts
Plate Dissipation	75 max.	watts

#### Typical Operation and Characteristics:

Filament Voltage	10	10	10	a-c volts
D-C Plate Voltage	750	1000	1250	volts
D-C Grid Voltage	-46	-61	-80	volts
Peak A-F Grid Voltage	41	56	75	volts
D-C Plate Current	34	53	60	ma.
Plate Resistance	4400	3800	3600	ohms
Mutual Conductance	2750	3150	3300	$\mu\text{mhos}$
Load Resistance	8800	7600	9200	ohms
U.P.O. (15% second harmonic)	5.6	12	19.7	watts

### A-F POWER AMPLIFIER & MODULATOR - Class B

D-C Plate Voltage	1250 max.	volts
Max-Signal D-C Plate Current *	175 max.	ma.
Max-Signal Plate Input *	220 max.	watts
Plate Dissipation *	100 max.	watts

#### Typical Operation - 2 tubes:

*Unless otherwise specified, values are for 2 tubes.*

Filament Voltage	10	10	a-c volts
D-C Plate Voltage	1000	1250	volts
D-C Grid Voltage	-77	-100	volts
Peak A-F Grid-to-Grid Voltage	380	410	volts
Zero-Sig. D-C Plate Current	20	20	ma.
Max-Sig. D-C Plate Current	320	320	ma.
Load Resistance (per tube)	1725	2250	ohms
Effective Load Res. (plate-to-plate)	6900	9000	ohms
Max-Signal Driving Power	7.5	8	<u>approx.watts</u>
Max-Signal Power Output	200	260	<u>approx.watts</u>

### R-F POWER AMPLIFIER - Class B Telephony

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

D-C Plate Voltage	1250 max.	volts
D-C Plate Current	150 max.	ma.
R-F Grid Current	6 max.	amp.

\* Averaged over any audio-frequency cycle.  
(continued on next page)



# R-F POWER AMPLIFIER, OSCILLATOR, A-F POWER AMPLIFIER, MODULATOR

(continued from preceding page)

Plate Input	150	max.	watts
Plate Dissipation	100	max.	watts
Typical Operation:			
Filament Voltage	10	10	a-c volts
D-C Plate Voltage	1000	1250	volts
D-C Grid Voltage	-77	-100	volts
Peak R-F Grid Voltage	125	125	volts
D-C Plate Current	130	106	ma.
D-C Grid Current**	5	1	approx.ma.
Driving Power <sup>o</sup> **	10	7.5	approx.watts
Power Output	40	42.5	approx.watts

## PLATE-MODULATED R-F POWER AMPLIFIER - Class C Telephony

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

D-C Plate Voltage	1000	max.	volts
D-C Grid Voltage	-400	max.	volts
D-C Plate Current	175	max.	ma.
D-C Grid Current	50	max.	ma.
R-F Grid Current	6	max.	amp.
Plate Input	175	max.	watts
Plate Dissipation	67	max.	watts
Typical Operation:			
Filament Voltage	10	10	a-c volts
D-C Plate Voltage	750	1000	volts
D-C Grid Voltage	-200	-260	volts
Peak R-F Grid Voltage	350	410	volts
D-C Plate Current	150	150	ma.
D-C Grid Current**	35	35	approx.ma.
Driving Power**	12	14	approx.watts
Power Output	65	100	approx.watts

## R-F POWER AMPLIFIER & OSCILLATOR - Class C Telegraphy

*Key-down conditions per tube without modulation\*\**

D-C Plate Voltage	1250	max.	volts	
D-C Grid Voltage	-400	max.	volts	
D-C Plate Current	175	max.	ma.	
D-C Grid Current	50	max.	ma.	
R-F Grid Current	7.5	max.	amp.	
Plate Input	220	max.	watts	
Plate Dissipation	100	max.	watts	
Typical Operation:				
Filament Voltage	10	10	10	a-c volts
D-C Plate Voltage	750	1000	1250	volts
D-C Grid Voltage	-135	-175	-225	volts
Peak R-F Grid Voltage	275	315	375	volts
D-C Plate Current	150	150	150	ma.
D-C Grid Current**	18	18	18	approx.ma.
Driving Power**	5	6	7	approx.watts
Power Output	65	100	130	approx.watts

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

<sup>o</sup>, \*\*: See next page.

(continued on next page)



211

211

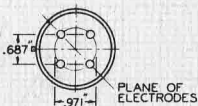
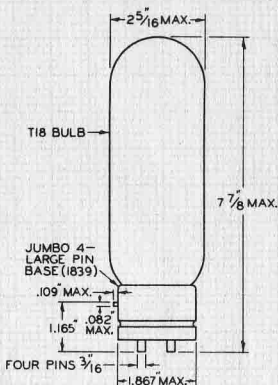
# R-F POWER AMPLIFIER, OSCILLATOR, A-F POWER AMPLIFIER, MODULATOR

(continued from preceding page)

° At crest of a-f cycle with modulation factor of 1.0.

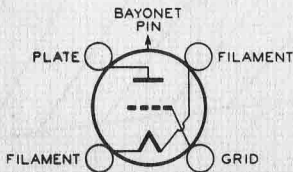
\*\* Subject to wide variations as explained on sheet TRANS, TUBE RATINGS.

For use of the 211 at the higher frequencies, refer to sheet TRANS, TUBE RATINGS vs FREQUENCY.



BOTTOM VIEW OF BASE

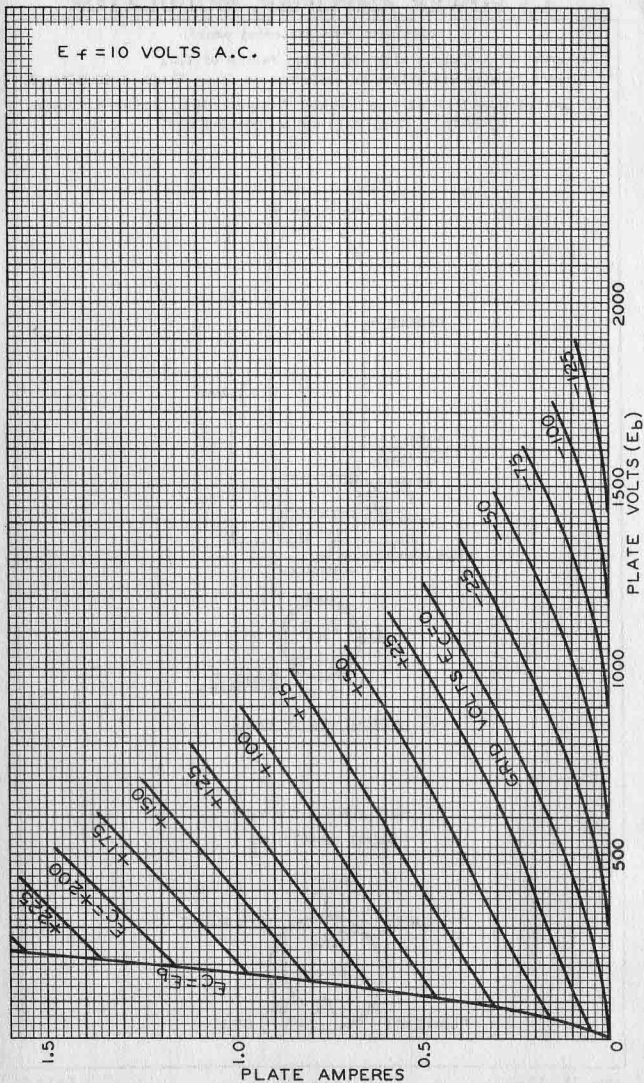
TUBE SYMBOL & TOP VIEW  
OF  
SOCKET CONNECTIONS





## AVERAGE PLATE CHARACTERISTICS

$E_f = 10$  VOLTS A.C.





214

214

# HALF-WAVE RECTIFIER

(WATER COOLED)

Filament*	Tungsten	
Voltage	22	a-c volts
Current	52	amp.
Maximum Overall Length		20-1/4"
Maximum Diameter		4-5/32"
Bulb		T-32
Base#		No. 3911
Water Jacket		WT-1285
Peak Inverse Voltage		50000 max. volts
Peak Plate Current <sup>o</sup>		7.5 max. amp.

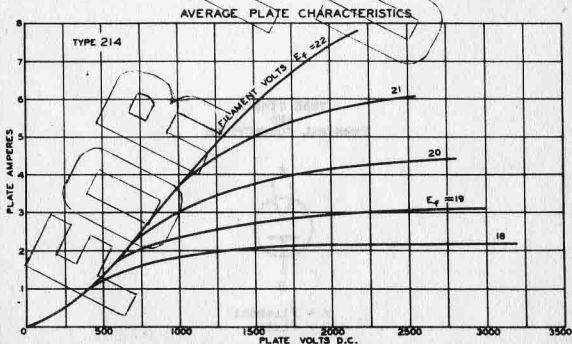
\* The filament of the 214 should be allowed to come up to operating temperature before plate voltage is applied.

\* Base shell is connected within base to one filament lead.

<sup>o</sup> Operation at the maximum peak current rating of 7.5 amperes requires that precautions be taken to maintain exactly the rated filament voltage of 22 volts. When operating conditions are such, however, that the peak current is less than the full rated value, the regulation of the filament voltage need not be so exact. The permissible variation will depend on the magnitude of the peak current and will increase with decreased values of peak current. Table I shows the maximum operating range of filament voltage for several maximum values of peak plate current.

TABLE I

MAXIMUM PEAK PLATE CURRENT Amperes	MAXIMUM RANGE OF FILAMENT VOLTAGE Volts
7.5	22.0 exact
6.0	22.0 - 21.5
5.0	22.0 ± 21.0
4.0	22.0 - 20.5

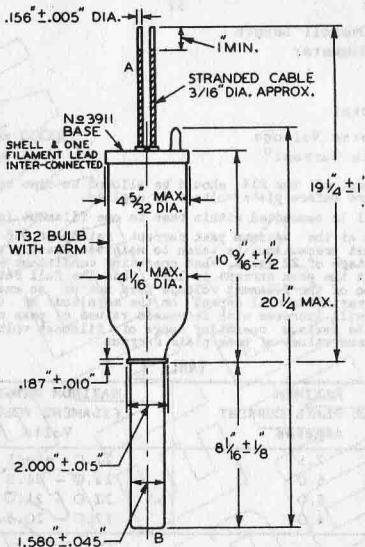


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# HALF-WAVE RECTIFIER

(continued from preceding page)



TUBE SYMBOL  
AND  
TERMINAL CONNECTIONS



A - Filament  
B - Plate



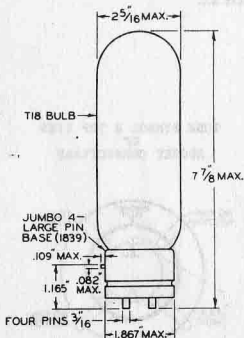
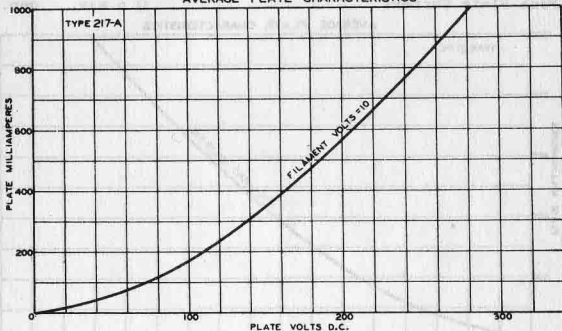
217-A

217A

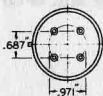
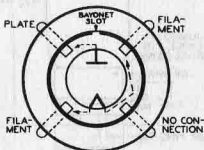
# HALF-WAVE RECTIFIER

Filament	Thoriated Tungsten	
Voltage	10.0	a-c volts
Current	3.25	amp.
Maximum Overall Length		7-7/8"
Maximum Diameter		2-5/16"
Bulb		T-18
Base		Jumbo 4-Large Pin
Peak Inverse Voltage	3500 max.	volts
Peak Plate Current	0.6 max.	amp.

AVERAGE PLATE CHARACTERISTICS



TUBE SYMBOL & TOP VIEW OF SOCKET CONNECTIONS



BOTTOM VIEW OF BASE

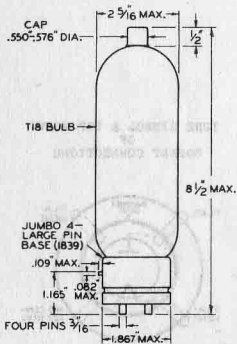
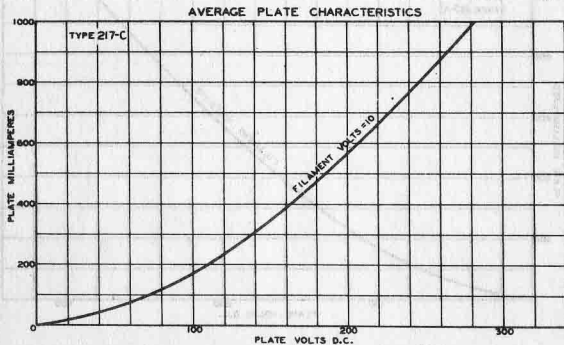


217-C

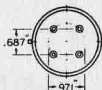
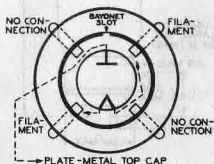

  
217-C

# HALF-WAVE RECTIFIER

Filament	Thoriated Tungsten	
Voltage	10.0	a-c volts
Current	3.25	amp.
Maximum Overall Length		8-1/2"
Maximum Diameter		2-5/16"
Bulb		T-18
Cap		Medium Metal
Base		Jumbo 4-Large Pin
Peak Inverse Voltage		7500 max. volts
Peak Plate Current		0.6 max. amp.



TUBE SYMBOL & TOP VIEW OF SOCKET CONNECTIONS



BOTTOM VIEW OF BASE



218

218

# HALF-WAVE RECTIFIER

Filament*	Tungsten	
Voltage	11.0	a-c volts
Current	14.75	amp.
Overall Length		15-3/8" ± 1/8"
Maximum Diameter		5-1/16"
Bulb		GT-40
Cap		No. 1904
Base*		No. 3505
Peak Inverse Voltage		50000 max. volts
Peak Plate Current <sup>o</sup>		0.75 max. amp.

\* The filament of the 218 should be allowed to come up to operating temperature before plate voltage is applied.

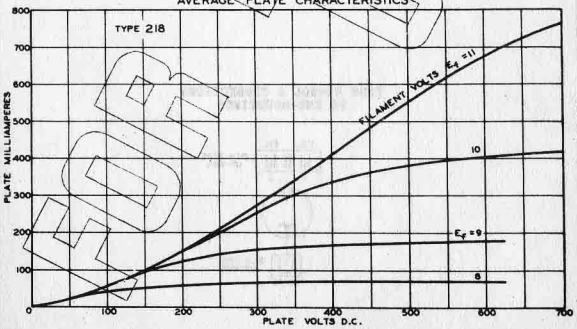
\* Base shell is connected within base to one filament lead.

<sup>o</sup> Operation at the maximum peak current rating of 0.75 ampere requires that precautions be taken to maintain exactly the filament voltage of 11 volts. When operating conditions are such, however, that the peak current is less than the full rated value, the regulation of the filament voltage need not be so exact. The permissible variation will depend on the magnitude of the peak current, and will increase with decreased values of peak current. Table I shows the maximum operating range of filament voltage for several maximum values of peak plate current.

TABLE I

MAXIMUM PEAK PLATE CURRENT Amperes	MAXIMUM RANGE OF FILAMENT VOLTAGE Volts
0.75	11.0 exact
0.60	11.0 - 10.75
0.50	11.0 - 10.5
0.40	11.0 - 10.25

AVERAGE PLATE CHARACTERISTICS

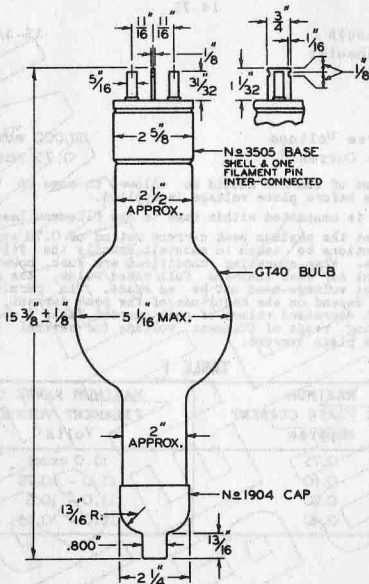


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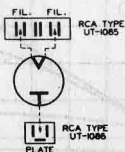


# HALF-WAVE RECTIFIER

(continued from preceding page)



## TUBE SYMBOL & CONNECTIONS TO END-MOUNTINGS





219

219

# HALF-WAVE RECTIFIER

Filament*	Tungsten	
Voltage	22.0	a-c volts
Current	24.5	amp.
Overall Length		22-3/8" ± 3/16"
Maximum Diameter		6-1/8"
Bulb		T-48
Cap		No. 3902
Base#		No. 3505
Peak Inverse Voltage		50000 max. volts
Peak Plate Current <sup>o</sup>		2.5 max. amp.

\* The filament of the 219 should be allowed to come up to operating temperature before plate voltage is applied.

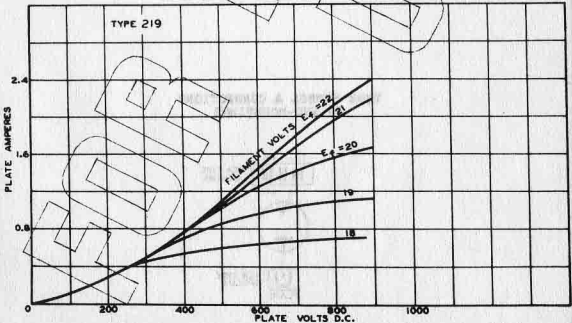
# Base shell is connected within base to one filament lead.

o Operation at the maximum peak current rating of 2.5 amperes requires that precautions be taken to maintain exactly the filament voltage of 22 volts. When operating conditions are such, however, that the peak current is less than the full rated value, the regulation of the filament voltage need not be so exact. The permissible variation will depend on the magnitude of the peak current, and will increase with decreased values of peak current. Table I shows the maximum operating range of filament voltage for several maximum values of peak plate current.

TABLE I

MAXIMUM PEAK PLATE CURRENT Amperes	MAXIMUM RANGE OF FILAMENT VOLTAGE Volts
2.5	22.0 exact
2.0	22.0 - 21.5
1.7	22.0 - 21.0
1.4	22.0 - 20.5

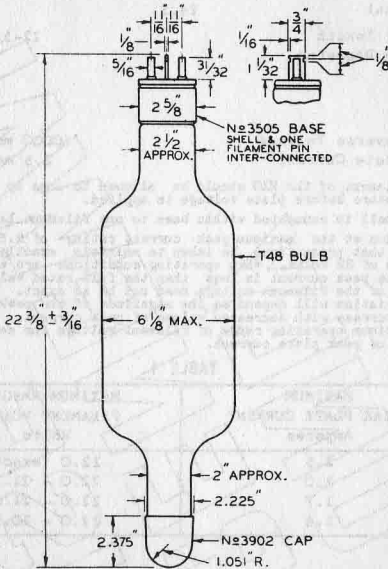
AVERAGE PLATE CHARACTERISTICS



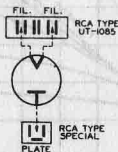
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# HALF-WAVE RECTIFIER

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## TUBE SYMBOL & CONNECTIONS TO END-MOUNTINGS





520-B

520-B

## R-F POWER AMPLIFIER, OSCILLATOR (WATER COOLED)

Filament	Tungsten	
Voltage	22	a-c or d-c volts
Current	34	amp.
Amplification Factor	17	
Direct Interelectrode Capacitances (approx.):		
Grid to Plate	27	$\mu\text{f}$
Grid to Filament	18	$\mu\text{f}$
Plate to Filament	2	$\mu\text{f}$
Maximum Overall Length		16"
Maximum Radius		3"
Cap		Special
Water Jacket		Special

### MAXIMUM RATINGS and TYPICAL OPERATING CONDITIONS

*This tube can often be operated with reduced filament voltage as explained on sheet TYPES OF CATHODES in front of book.*

#### R-F POWER AMPLIFIER - Class B Telephony

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

D-C Plate Voltage	10000 max.	volts
D-C Plate Current	0.6 max.	amp.
R-F Grid Current	4 max.	amp.
Plate Input	6 max.	kw
Plate Dissipation	5 max.	kw
Typical Operation:		
Filament Voltage	22	d-c volts
D-C Plate Voltage	7500	volts
D-C Plate Current	0.4	amp.
Power Output	1 approx.	kw

#### PLATE-MODULATED R-F POWER AMPLIFIER - Class C Telephony

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

D-C Plate Voltage	7500 max.	volts
D-C Grid Voltage	-1500 max.	volts
D-C Plate Current	0.6 max.	amp.
D-C Grid Current	0.15 max.	amp.
R-F Grid Current	4 max.	amp.
Plate Input	4.5 max.	kw
Plate Dissipation	3.3 max.	kw
Typical Operation:		
Filament Voltage	22	a-c volts
D-C Plate Voltage	6000	volts
D-C Plate Current	0.5	amp.
Power Output	2 approx.	kw

#### R-F POWER AMPLIFIER & OSCILLATOR - Class C Telegraphy

*Key-down conditions per tube without modulation \**

D-C Plate Voltage	10000 max.	volts
D-C Grid Voltage	-1500 max.	volts

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JAN. 15, 1936

DATA

520-B



520-B

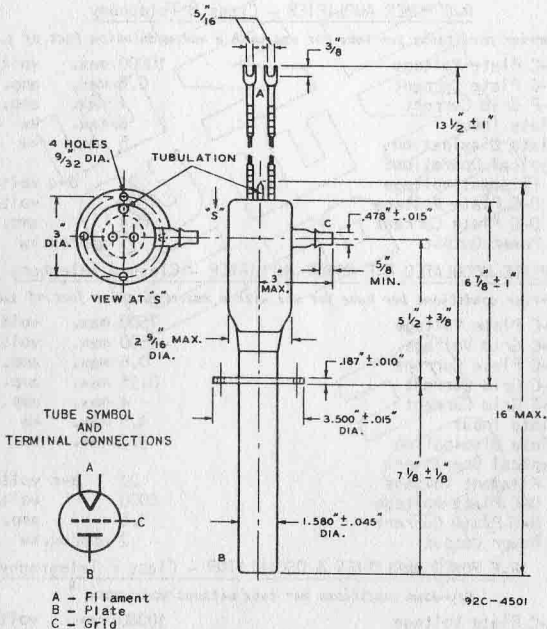
# R-F POWER AMPLIFIER, OSCILLATOR

(continued from preceding page)

D-C Plate Current	1.2 max.	amp.
D-C Grid Current	0.15 max.	amp.
R-F Grid Current	5 max.	amp.
Plate Input	12 max.	kw
Plate Dissipation	5 max.	kw
Typical Operation:		
Filament Voltage	22	a-c volts
D-C Plate Voltage	7500	volts
D-C Plate Current	1	amp.
Power Output	5 approx.	kw

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

For use of the 520-B at the higher frequencies, refer to sheet TRANS. TUBE RATINGS vs FREQUENCY.



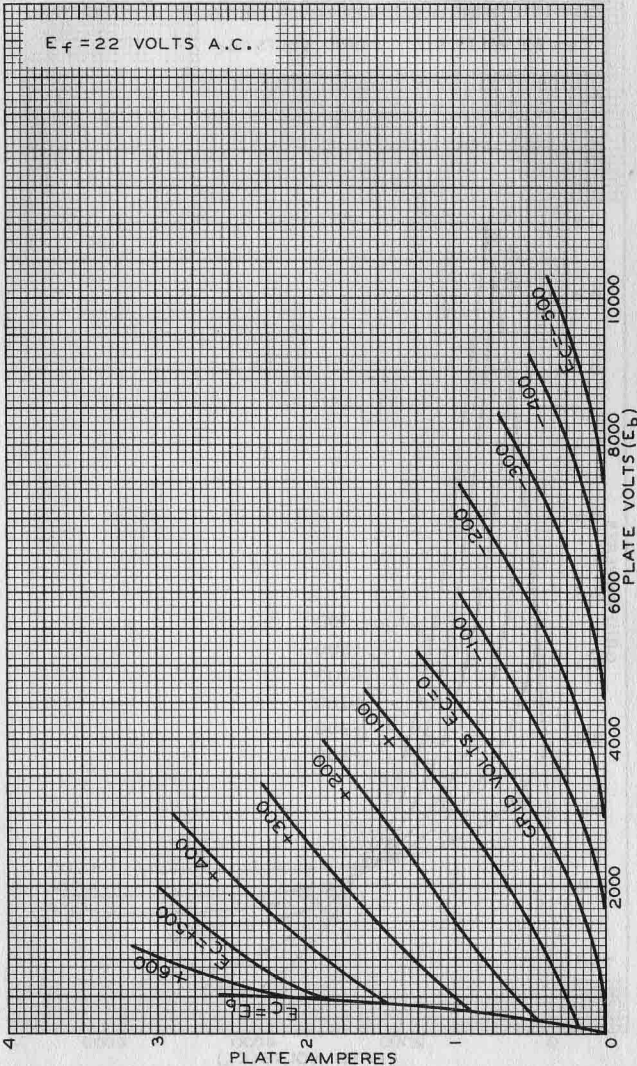


520-B

520-B

### AVERAGE PLATE CHARACTERISTICS

$E_f = 22$  VOLTS A.C.





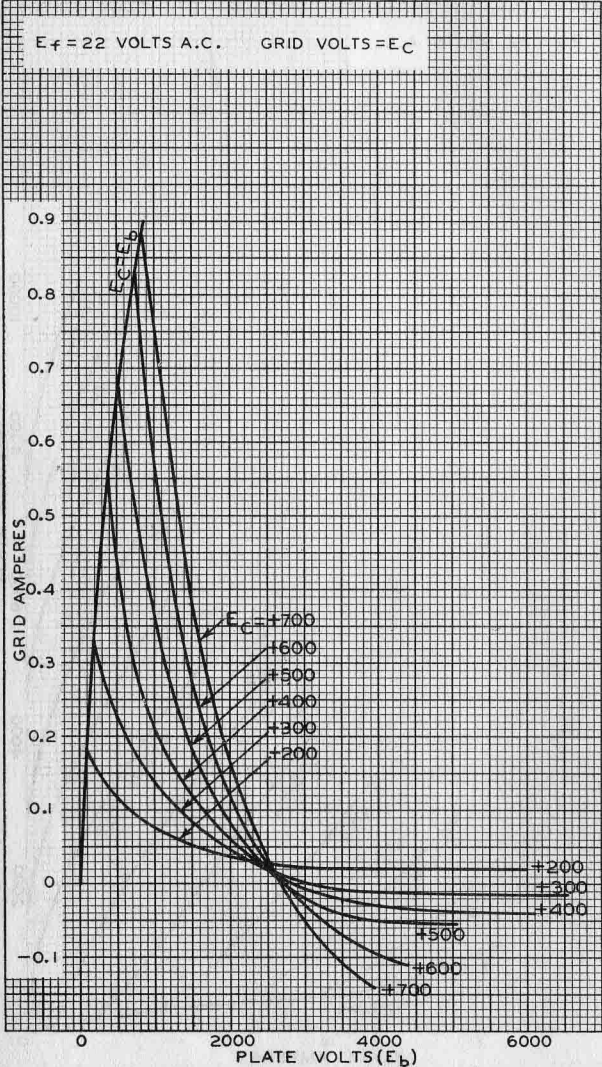
520-B



520-B

### TYPICAL CHARACTERISTICS

$E_f = 22$  VOLTS A.C.    GRID VOLTS =  $E_c$





800

800

## R-F POWER AMPLIFIER, OSCILLATOR, CLASS B MODULATOR

Filament	Thoriated Tungsten	
Voltage	7.5	a-c or d-c volts
Current	3.25	amp.
Amplification Factor	15	
Direct Interelectrode Capacitances:		
Grid to Plate	2.5	$\mu\text{f}$
Grid to Filament	2.75	$\mu\text{f}$
Plate to Filament	2.75	$\mu\text{f}$
Maximum Overall Length		6-3/8"
Maximum Diameter		2-11/16"
Bulb		S-21
Caps (two)		Small Metal
Base		Medium 4-Pin Bayonet

### MAXIMUM RATINGS and TYPICAL OPERATING CONDITIONS

#### A-F POWER AMPLIFIER & MODULATOR - Class B

D-C Plate Voltage	1250 max.	volts
Max-Signal D-C Plate Current *	115 max.	ma.
Max-Signal Plate Input *	.85 max.	watts
Plate Dissipation *	35 max.	watts

Typical Operation - 2 tubes:

*Unless otherwise specified, values are for 2 tubes.*

Filament Voltage	7.5	7.5	7.5	a-c volts
D-C Plate Voltage	750	1000	1250	volts
D-C Grid Voltage	-40	-55	-70	volts
Peak A-F Grid-to-Grid Volt.	320	300	300	volts
Zero-Sig. D-C Plate Cur.	26	28	30	ma.
Max-Sig. D-C Plate Cur.	210	160	130	ma.
Load Resistance (per tube)	1600	3125	5250	ohms
Effective Load Resistance (plate to plate)	6400	12500	21000	ohms
Max-Signal Driving Power	6.0	4.4	3.4	approx.watts
Max-Signal Power Output	90	100	106	approx.watts

#### R-F POWER AMPLIFIER - Class B Telephony

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

D-C Plate Voltage	1250 max.	volts
D-C Plate Current	45 max.	ma.
Plate Input	50 max.	watts
Plate Dissipation	35 max.	watts

Typical Operation:

Filament Voltage	7.5	7.5	a-c volts
D-C Plate Voltage	750	1000	volts
D-C Grid Voltage	-40	-55	volts
Peak R-F Grid Voltage	160	170	volts
D-C Plate Current	45	42	ma.
D-C Grid Current **	2	2	approx.ma.
Driving Power <sup>o</sup> **	3.6	3.3	approx.watts
Power Output	10	14	approx.watts

\* , <sup>o</sup> , \*\* See next page.



800

## R-F POWER AMPLIFIER, OSCILLATOR, CLASS B MODULATOR

(continued from preceding page)

### PLATE-MODULATED R-F POWER AMPLIFIER - Class C Telephony

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

D-C Plate Voltage	1000 max.	volts
→ D-C Grid Voltage	-400 max.	volts
D-C Plate Current	80 max.	ma.
D-C Grid Current	25 max.	ma.
Plate Input	80 max.	watts
Plate Dissipation	23 max.	watts

Typical Operation:

Filament Voltage	7.5	7.5	a-c volts
D-C Plate Voltage	750	1000	volts
→ D-C Grid Voltage	-150 <sup>□</sup>	-200 <sup>□</sup>	volts
Peak R-F Grid Voltage	275	325	volts
D-C Plate Current	70	70	ma.
D-C Grid Current**	15	15	approx.ma.
Driving Power**	3	4	approx.watts
Power Output	35	50	approx.watts

### R-F POWER AMPLIFIER & OSCILLATOR - Class C Telephony

*Key-down conditions per tube without modulation \**

D-C Plate Voltage	1250 max.	volts
→ D-C Grid Voltage	-400 max.	volts
D-C Plate Current	80 max.	ma.
D-C Grid Current	25 max.	ma.
Plate Input	100 max.	watts
Plate Dissipation	35 max.	watts

Typical Operation:

Filament Voltage	7.5	7.5	7.5	a-c volts
D-C Plate Voltage	750	1000	1250	volts
D-C Grid Voltage	-100	-135	-175	volts
Peak R-F Grid Voltage	225	260	300	volts
D-C Plate Current	70	70	70	ma.
D-C Grid Current**	15	15	15	approx.ma.
Driving Power**	2	3	4	approx.watts
Power Output	35	50	65	approx.watts

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

→ \* Averaged over any audio frequency cycle of sine-wave form.

□ At crest of a-f cycle with modulation factor of 1.0.

\*\* Subject to wide variations as explained on sheet TRANS. TUBE RATINGS.

→ □ Preferably obtained by means of a combination of grid leak and either fixed- or self-bias.

For use of the 800 at the higher frequencies, refer to sheet TRANS. TUBE RATINGS vs FREQUENCY.

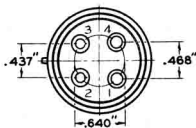
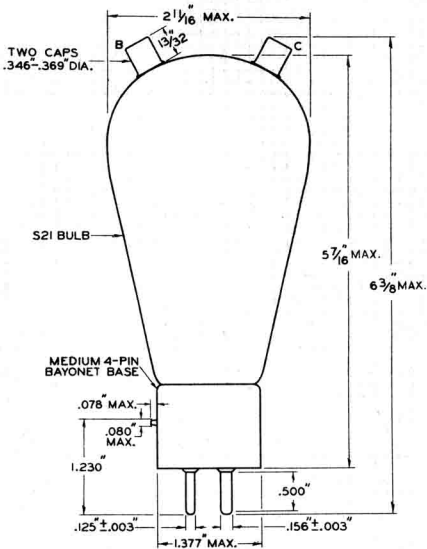
← Indicates a change



800

800

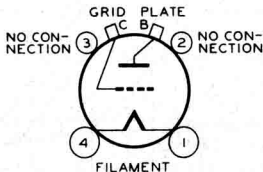
# R-F POWER AMPLIFIER, OSCILLATOR, CLASS B MODULATOR



BOTTOM VIEW OF BASE

92S-4281R 2

TUBE SYMBOL & TOP VIEW  
OF  
SOCKET CONNECTIONS



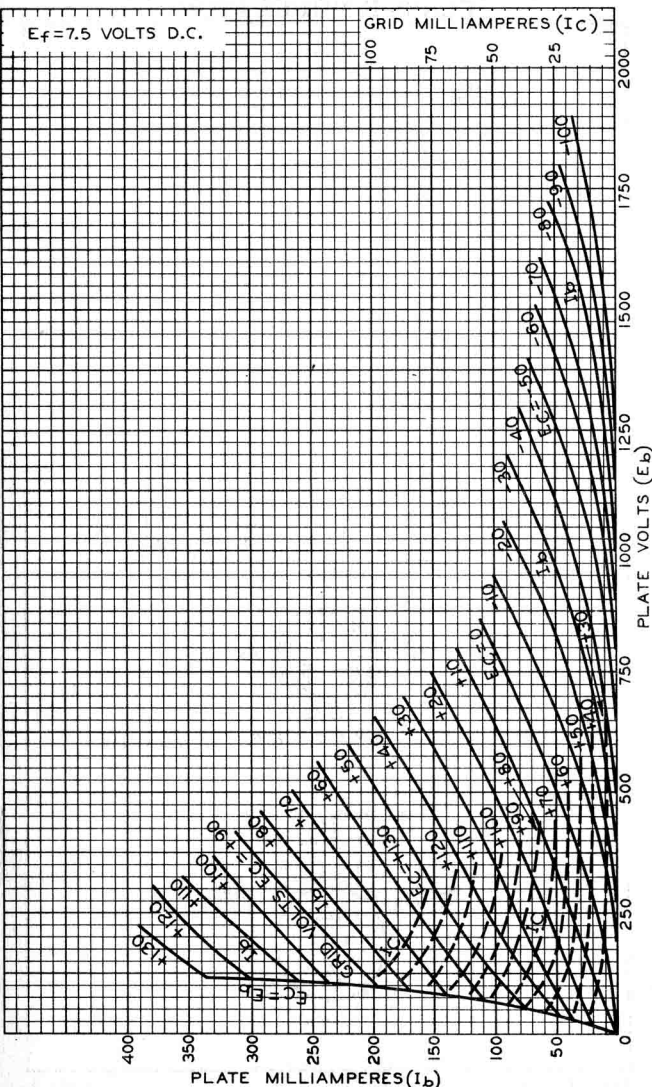
800



# AVERAGE PLATE CHARACTERISTICS

$E_f = 7.5$  VOLTS D.C.

GRID MILLIAMPERES ( $I_c$ )



SEPT. 11, 1933

PLATE MILLIAMPERES ( $I_b$ )

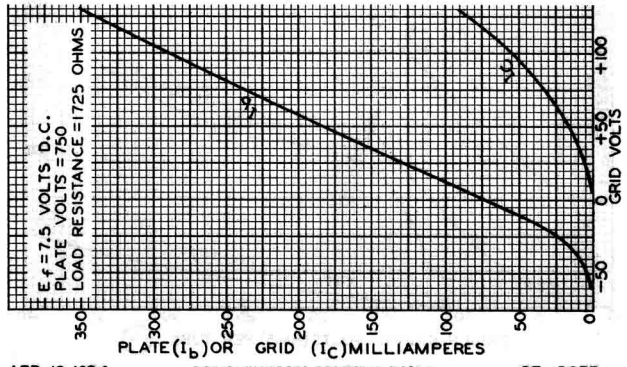
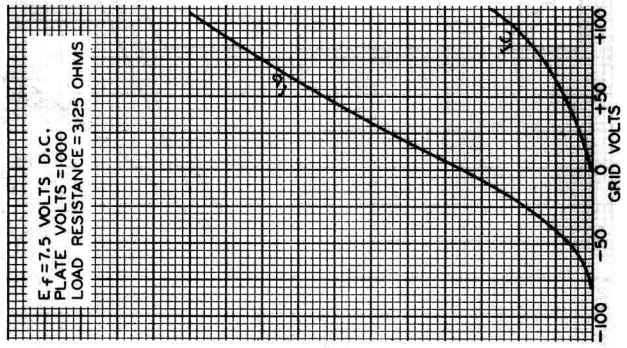
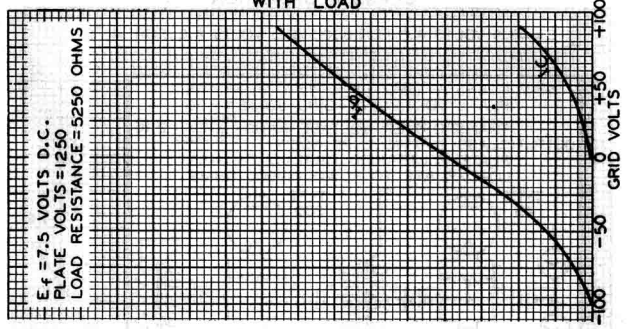
RCA RADIOTRON DIVISION  
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925-5368



800

### AVERAGE TRANSFER CHARACTERISTICS WITH LOAD

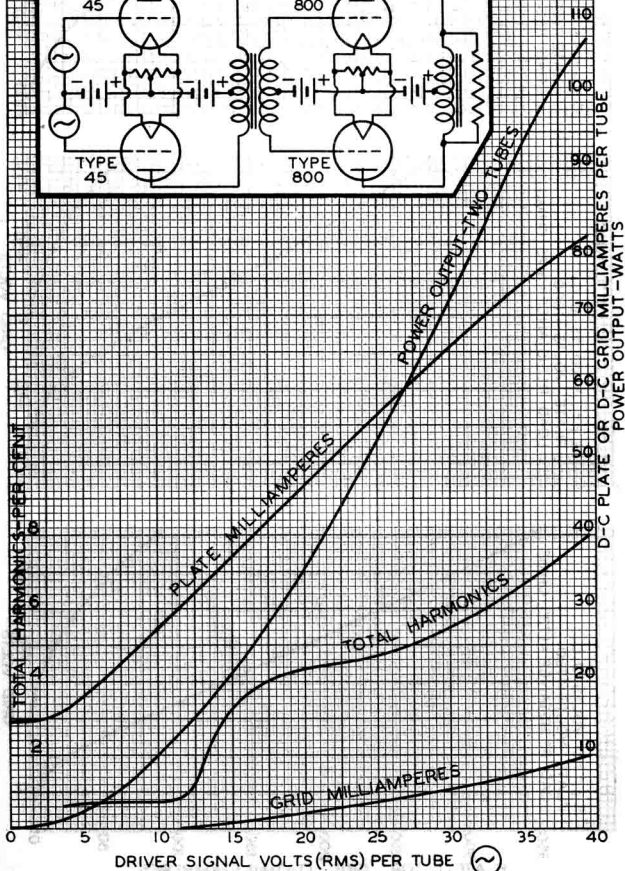
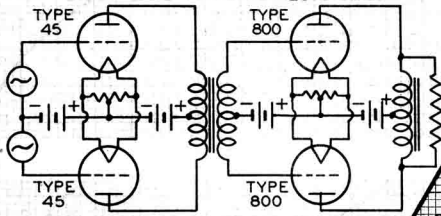




## OPERATION CHARACTERISTICS CLASS B OPERATION

$E_f = 7.5$  VOLTS A.C. FOR 800'S, 2.5 VOLTS A.C. FOR 45'S

INPUT: CLASS A—TWO TYPE 45'S PUSH PULL  
 PLATE VOLTS = 275, GRID VOLTS = -56  
 TRANSFORMER VOLTAGE RATIO  $\frac{\text{PRIM.}}{1/2 \text{ SEC.}} = 2.16$   
 OUTPUT: CLASS B—TWO TYPE 800'S  
 PLATE VOLTS = 1000, GRID VOLTS = -55  
 LOAD, PLATE TO PLATE = 12500 OHMS





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801

# OSCILLATOR, R-F POWER AMPLIFIER, A-F POWER AMPLIFIER, MODULATOR

Filament	Thoriated Tungsten	
Voltage	7.5	a-c or d-c volts
Current	1.25	amp.
Amplification Factor	8	
Direct Interelectrode Capacitances:		
Grid to Plate	6.0	$\mu\text{f}$
Grid to Filament	4.5	$\mu\text{f}$
Filament to Plate	1.5	$\mu\text{f}$
Maximum Overall Length		5-3/8"
Maximum Diameter		2-1/16"
Bulb		ST-16
Base	Medium 4-Pin Ceramic, Bayonet	

## MAXIMUM RATINGS and TYPICAL OPERATING CONDITIONS

### A-F POWER AMPLIFIER & MODULATOR—Class A

D-C Plate Voltage		600 max.	volts
Plate Dissipation		20 max.	watts
Typical Operation:			
Filament Voltage	7.5	7.5	7.5 a-c volts
D-C Plate Voltage	425	500	600 volts
D-C Grid Voltage	-40	-45	-55 volts
Peak A-F Grid Voltage	35	40	50 volts
D-C Plate Current	18	24	30 ma.
Plate Resistance	5000	4600	4300 ohms
Mutual Conductance	1600	1725	1840 $\mu\text{mhos}$
Load Resistance	10200	8000	7800 ohms
U. P. O. (5% second harm.)	1.6	2.3	3.8 watts

### A-F POWER AMPLIFIER & MODULATOR - Class B

D-C Plate Voltage		600 max.	volts
Max-Signal D-C Plate Current*		70 max.	ma.
Max-Signal Plate Input*		42 max.	watts
Plate Dissipation*		20 max.	watts

Typical Operation - 2 tubes:

*Unless otherwise specified, values are for 2 tubes.*

Filament Voltage	7.5	7.5	7.5	a-c volts
D-C Plate Voltage	400	500	600	volts
D-C Grid Voltage	-50	-60	-75	volts
Peak A-F Grid-to-Grid Voltage	270	290	320	volts
Zero-Signal D-C Plate Cur.	8	8	8	ma.
Max-Signal D-C Plate Cur.	130	130	130	ma.
Load Resistance (per tube)	1500	2000	2500	ohms
Effective Load Res. (plate to plate)	6000	8000	10000	ohms
Max-Signal Driving Power	3	3	3	approx. watts
Max-Signal Power Output	27	36	45	approx. watts

\* Averaged over any audio frequency cycle of sine-wave form.

← Indicates a change

APRIL 5, 1937

RCA RADIOTRON DIVISION  
RCA MANUFACTURING COMPANY, INC.

DATA





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# OSCILLATOR, R-F POWER AMPLIFIER, A-F POWER AMPLIFIER, MODULATOR

(continued from preceding page)

## R-F POWER AMPLIFIER - Class B Telephony

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

D-C Plate Voltage	600 max.	volts
D-C Plate Current	50 max.	ma.
R-F Grid Current	4 max.	amp.
Plate Input	30 max.	watts
Plate Dissipation	20 max.	watts

### Typical Operation:

Filament Voltage	7.5	7.5	a-c volts
D-C Plate Voltage	500	600	volts
D-C Grid Voltage	-60	-75	volts
Peak R-F Grid Voltage	85	90	volts
D-C Plate Current	45	45	ma.
D-C Grid Current**	0.2	0.2	approx. ma.
Driving Power***	2.2	2.3	approx. watts
Power Output	6	7.5	approx. watts

\* At crest of a-f cycle with modulation factor of 1.0

## PLATE-MODULATED R-F POWER AMPLIFIER - Class C Telephony

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

D-C Plate Voltage	500 max.	volts
D-C Grid Voltage	-200 max.	volts
D-C Plate Current	60 max.	ma.
D-C Grid Current	15 max.	ma.
R-F Grid Current	4 max.	amp.
Plate Input	30 max.	watts
Plate Dissipation	13.5 max.	watts

### Typical Operation:

Filament Voltage	7.5	7.5	a-c volts
D-C Plate Voltage	400	500	volts
D-C Grid Voltage	-150	-190	volts
Peak R-F Grid Voltage	260	300	volts
D-C Plate Current	55	55	ma.
D-C Grid Current**	15	15	approx. ma.
Driving Power**	4	4.5	approx. watts
Power Output	14	18	approx. watts

## R-F POWER AMPLIFIER & OSCILLATOR - Class C Telegraphy

Key-down conditions per tube without modulation †

D-C Plate Voltage	600 max.	volts
D-C Grid Voltage	-200 max.	volts
D-C Plate Current	70 max.	ma.
D-C Grid Current	15 max.	ma.
R-F Grid Current	5 max.	amp.
Plate Input	42 max.	watts
Plate Dissipation	20 max.	watts

### Typical Operation:

Filament Voltage	7.5	7.5	a-c volts
D-C Plate Voltage	500	600	volts
D-C Grid Voltage	-125	-150	volts
Peak R-F Grid Voltage	235	260	volts
D-C Plate Current	65	65	ma.

\*\* † See next page

← Indicates a change



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801

# OSCILLATOR, R-F POWER AMPLIFIER, A-F POWER AMPLIFIER, MODULATOR

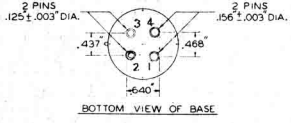
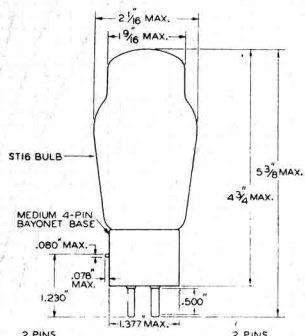
(continued from preceding page)

D-C Grid Current**	15	15 <u>approx.ma.</u>
Driving Power**	3.5	4 <u>approx.watts</u>
Power Output	20	25 <u>approx.watts</u>

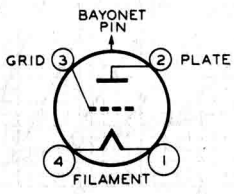
\* Modulation essentially negative may be used if the positive peak of the audio-frequency envelope does not exceed 115% of the carrier conditions.

\*\* Subject to wide variations as explained on sheet TRANS. TUBE RATINGS.

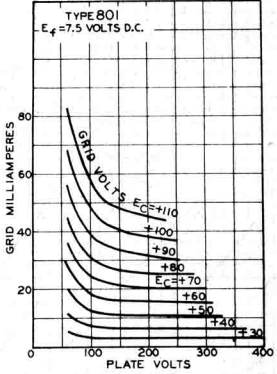
For use of the 801 at the higher frequencies, refer to sheet TRANS. TUBE RATINGS vs FREQUENCY.



TUBE SYMBOL & TOP VIEW OF SOCKET CONNECTIONS



AVERAGE CHARACTERISTICS

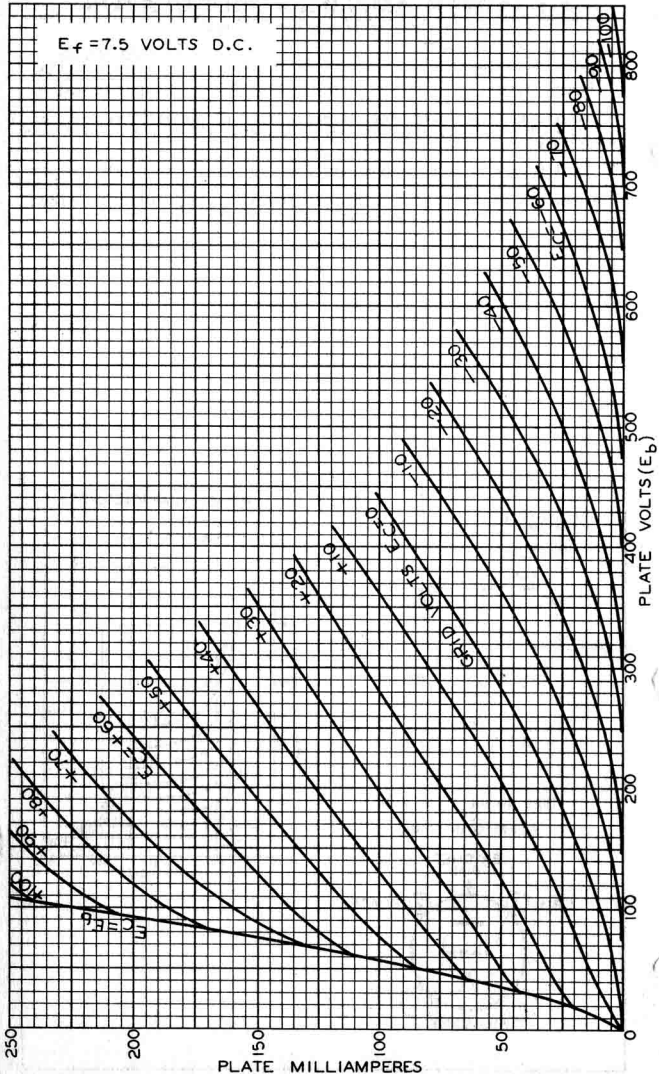


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# AVERAGE PLATE CHARACTERISTICS

$E_f = 7.5$  VOLTS D.C.



JULY 18, 1934

RCA RADOTRON DIVISION  
RCA MANUFACTURING COMPANY, INC.

925-5538



802

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**R-F POWER AMPLIFIER PENTODE**

Heater <sup>⊙</sup>	Coated Unipotential Cathode		
Voltage	6.3	a-c or d-c volts	
Current	0.9	amp.	
Transconductance for plate current of 20 ma.	2250	approx. $\mu$ mhos	
Direct Interelectrode Capacitances:			
Grid to Plate (with external shielding)	0.15 max.	$\mu$ f	
Input	12	$\mu$ f	
Output	8.5	$\mu$ f	
Maximum Overall Length	5-3/4"		
Maximum Diameter	2-1/16"		
Bulb	ST-16		
Cap	Small Metal		
Base	Medium 7-Pin Bayonet		

**MAXIMUM RATINGS and TYPICAL OPERATING CONDITIONS****A-F POWER AMPLIFIER & MODULATOR - Class A**

D-C Plate Voltage	500 max.				volts
D-C Screen Voltage (Grid #2)	250 max.				volts
Plate & Screen Input	15 max.				watts
Screen Input	3 max.				watts
Typical Operation:					
Heater Voltage	6.3	6.3	6.3	6.3	volts
D-C Plate Voltage	400	400	500	500	volts
Suppressor (Grid #3)	Connected to cathode at socket				
D-C Screen Voltage	200	250	175	225	volts
D-C Grid Voltage (Grid #1) <sup>⊠</sup>	-10	-18	-10	-17	volts
Peak A-F Grid Voltage	10	18	10	17	volts
Internal Shield	Connected to cathode at socket				
D-C Plate Current	30	30	25	25	ma.
D-C Screen Current	9	10	6	7	ma.
Load Resistance	10000	10000	18000	16000	ohms
Cathode-Bias Res.	255	450	325	530	ohms
Total Har. Dist.	4	8	4	10	%
Power Output	3	5.5	4	6.5	watts

<sup>⊠</sup> The d-c resistance in the grid circuit should not exceed 10000 ohms with fixed bias, or 500000 ohms with self-bias.

**R-F POWER AMPLIFIER - Class B Telephony**

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

D-C Plate Voltage	500 max.	volts
D-C Suppressor Voltage (Grid #3)	200 max.	volts
D-C Screen Voltage (Grid #2)	250 max.	volts
D-C Plate Current	30 max.	ma.
Plate Input	15 max.	watts
Suppressor Input	2 max.	watts
Screen Input	4 max.	watts
Plate Dissipation	10 max.	watts

<sup>⊙</sup> In circuits where the cathode is not directly connected to the heater, the potential difference between them should not exceed 100 volts.

(continued on next page)



## R-F POWER AMPLIFIER PENTODE

(continued from preceding page)

### Typical Operation:

Heater Voltage	6.3	6.3	volts
D-C Plate Voltage	400	500	volts
Suppressor *	Connected to cathode at socket		
D-C Screen Voltage	150	200	volts
D-C Grid Voltage (Grid #1)	-22	-28	volts
Peak R-F Grid Voltage	35	32	volts
Internal Shield	Connected to cathode at socket		
D-C Plate Current	25	25	ma.
D-C Screen Current	6.5	7	ma.
D-C Grid Current	1	0	approx.ma.
Driving Power °	0.5	0.18	approx.watt
Power Output	2.75	3.5	approx.watts

### SUPPRESSOR-MODULATED R-F POWER AMPLIFIER - Class C Telephony

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

D-C Plate Voltage	500 max.	volts
D-C Screen Voltage (Grid #2)	200 max.	volts
D-C Grid Voltage (Grid #1)	-200 max.	volts
D-C Plate Current	30 max.	ma.
D-C Grid Current	7.5 max.	ma.
Plate Input	15 max.	watts
Screen Input	6 max.	watts
Plate Dissipation	10 max.	watts

### Typical Operation:

Heater Voltage	6.3	6.3	6.3	volts
D-C Plate Voltage	400	500	500	volts
D-C Suppressor Voltage (Grid #3)	-40	-53	-45	volts
D-C Screen Voltage	••	•••	•••	volts
D-C Grid Voltage	-85◊	-90◊◊	-90◊◊◊	volts
Peak A-F Suppressor Voltage	40	53	65	volts
Peak R-F Grid Voltage	125	125	125	volts
Internal Shield	Connected to cathode at socket			
D-C Plate Current	18	20	22	ma.
D-C Screen Current	28	28	28	ma.
D-C Grid Current	7.5	4	4.5	approx.ma.
Driving Power	0.9	0.6	0.5	approx.watt
Power Output	2	3	3.5	approx.watts

•• Voltage taken from unmodulated plate-voltage supply through 9000-ohm resistor.

••• Voltage taken from unmodulated plate-voltage supply through 10700-ohm resistor.

◊ Bias may also be obtained with 11300-ohm grid resistor.

◊◊ Bias may also be obtained with 18000-ohm grid resistor.

◊◊◊ Bias may also be obtained with 20000-ohm grid resistor.

### GRID-MODULATED R-F POWER AMPLIFIER - Class C Telephony

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

D-C Plate Voltage	500 max.	volts
D-C Suppressor Voltage (Grid #3)	200 max.	volts

\* ° : See next page. (continued on next page)



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**R-F POWER AMPLIFIER PENTODE**

(continued from preceding page)

D-C Screen Voltage (Grid #2)	250 max.	volts
D-C Grid Voltage (Grid #1)	-200 max.	volts
D-C Plate Current	30 max.	ma.
Plate Input	15 max.	watts
Suppressor Input	2 max.	watts
Screen Input	4 max.	watts
Plate Dissipation	10 max.	watts
Typical Operation:		
Heater Voltage	6.3	6.3 volts
D-C Plate Voltage	400	500 volts
Suppressor *	Connected to cathode at socket	
D-C Screen Voltage	150	200 volts
D-C Grid Voltage	-105	-130 volts
Peak A-F Grid Voltage	40	50 volts
Peak R-F Grid Voltage	125	145 volts
Internal Shield	Connected to cathode at socket	
D-C Plate Current	25	25 ma.
D-C Screen Current	7.5	8 ma.
D-C Grid Current	2	1 approx.ma.
Driving Power <sup>o</sup>	1	0.8 approx.watt
Power Output	3	4 approx.watts

**PLATE-MODULATED R-F POWER AMPLIFIER—Class C Telephony***Pentode Connection.**Carrier conditions per tube for use with a max. modulation fact. of 1.0*

D-C Plate Voltage	400 max.	volts
D-C Suppressor Voltage (Grid #3)	200 max.	volts
D-C Screen Voltage (Grid #2)	200 max.	volts
D-C Grid Voltage (Grid #1)	-200 max.	volts
D-C Plate Current	40 max.	ma.
D-C Grid Current	7.5 max.	ma.
Plate Input	16 max.	watts
Suppressor Input	2 max.	watts
Screen Input	4 max.	watts
Plate Dissipation	6.7 max.	watts
Typical Operation:		
Heater Voltage	6.3	volts
D-C Plate Voltage	400	volts
D-C Suppressor Voltage	40	volts
D-C Screen Voltage	195 **	volts
D-C Grid Voltage	-40 <sup>Δ</sup>	volts
Peak R-F Grid Voltage	55	volts
Internal Shield	Connected to cathode at socket	
D-C Plate Current	35	ma.
D-C Screen Current	17	approx.ma.
D-C Grid Current	1.5	approx.ma.

\* Applying a positive voltage of not more than 40 volts to the suppressor gives slightly increased output.

<sup>o</sup> At crest of a-f cycle with modulation factor of 1.0.

\*\* Voltage may also be taken from modulated plate-voltage supply through 12000-ohm resistor.

<sup>Δ</sup> Bias may also be obtained with 26700-ohm grid resistor.

(continued on next page)

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## R-F POWER AMPLIFIER PENTODE

(continued from preceding page)

Driving Power	0.1 approx.watt
Power Output	8 approx.watts

### PLATE-MODULATED R-F POWER AMPLIFIER - Class C Telephony

*Tetrode Connection - Grids #2 & #3 tied together*

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

D-C Plate Voltage	400 max.	volts
D-C Screen Voltage (Grids #2 & #3)	200 max.	volts
D-C Grid Voltage (Grid #1)	-200 max.	volts
D-C Plate Current	40 max.	ma.
D-C Grid Current	7.5 max.	ma.
Plate Input	16 max.	watts
Screen Input	6 max.	watts
Plate Dissipation	6.7 max.	watts
Typical Operation:		
Heater Voltage	6.3	volts
D-C Plate Voltage	400	volts
D-C Screen Voltage	85 #	volts
D-C Grid Voltage	-120 ⊕	volts
Peak R-F Grid Voltage	160	volts
Internal Shield	Connected to cathode at socket	
D-C Plate Current	35	ma.
D-C Screen Current	21	ma.
D-C Grid Current	6 approx.ma.	
Driving Power	0.9 approx.watt	
Power Output	8 approx.watts	

# Voltage may also be taken from unmodulated plate-voltage supply through 15000-ohm resistor.

⊕ Bias may also be obtained with 20000-ohm grid resistor.

### R-F POWER AMPLIFIER & OSCILLATOR - Class C Telephony

*Pentode Connection*

*Key-down conditions per tube without modulation #*

D-C Plate Voltage	500 max.	volts		
D-C Suppressor Voltage (Grid #3)	200 max.	volts		
D-C Screen Voltage (Grid #2)	250 max.	volts		
D-C Grid Voltage (Grid #1)	-200 max.	volts		
D-C Plate Current	60 max.	ma.		
D-C Grid Current	7.5 max.	ma.		
Plate Input	25 max.	watts		
Suppressor Input	2 max.	watts		
Screen Input	6 max.	watts		
Plate Dissipation	10 max.	watts		
Typical Operation:				
Heater Voltage	6.3	6.3	6.3	volts
D-C Plate Voltage	400	500	500	volts
D-C Suppressor Voltage	0	0	40	volts
D-C Screen Voltage	200 <sup>⊕</sup>	200 <sup>⊕</sup>	250 <sup>⊕</sup>	volts
D-C Grid Voltage	-100 <sup>⊕</sup>	-100 <sup>⊕</sup>	-100 <sup>⊕</sup>	volts

#, ∞, ∞∞, ⊕, ⊕, ⊕, ⊕. See next page.

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**R-F POWER AMPLIFIER PENTODE**

(continued from preceding page)

Peak R-F Grid Voltage	155	155	155	volts
Internal Shield	Connected to cathode at socket			
D-C Plate Current	45	45	45	ma.
D-C Screen Current	25	22	12	ma.
D-C Grid Current	7	6	2	<u>approx.ma.</u>
Driving Power	1.1	0.9	0.25	<u>approx.watts</u>
Power Output	10	14	16	<u>approx.watts</u>

∞∞ Voltage may also be obtained from plate-supply voltage through 8000-ohm resistor.

∞∞∞ Voltage may also be obtained from plate-supply voltage through 13600-ohm resistor.

⊕ Voltage may also be obtained from plate-supply voltage through 20800-ohm resistor.

⊙ Bias may also be obtained with 14200-ohm grid resistor.

⊕ Bias may also be obtained with 16200-ohm grid resistor.

⊕⊕ Bias may also be obtained with 50000-ohm grid resistor.

**R-F POWER AMPLIFIER & OSCILLATOR - Class C Telegraphy***Tetrode Connection - Grids #2 & #3 tied together**Key-down conditions per tube without modulation #*

D-C Plate Voltage	500 max.	volts
D-C Screen Voltage (Grids #2 & #3)	200 max.	volts
D-C Grid Voltage (Grid #1)	-200 max.	volts
D-C Plate Current	60 max.	ma.
D-C Grid Current	7.5 max.	ma.
Plate Input	25 max.	watts
Screen Input	6 max.	watts
Plate Dissipation	10 max.	watts

**Typical Operation:**

Heater Voltage	6.3	6.3	volts
D-C Plate Voltage	400	500	volts
D-C Screen Voltage	100§	100§§	volts
D-C Grid Voltage	-60△△	-60△△△	volts
Peak R-F Grid Voltage	90	90	volts
Internal Shield	Connected to cathode at socket		
D-C Plate Current	45	45	ma.
D-C Screen Current	15	15	ma.
D-C Grid Current	7	6	<u>approx.ma.</u>
Driving Power	0.7	0.5	<u>approx.watt</u>
Power Output	10	12	<u>approx.watts</u>

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

§ Voltage may be taken from plate-voltage supply through 20000-ohm resistor.

§§ Voltage may be taken from plate-voltage supply through 27000-ohm resistor.

△△ Bias may also be obtained with 8600-ohm grid resistor.

△△△ Bias may also be obtained with 10000-ohm grid resistor.

For use of the 802 at the higher frequencies, refer to sheet  
TRANS. TUBE RATINGS vs FREQUENCY.

JAN. 15, 1937

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DATA 3

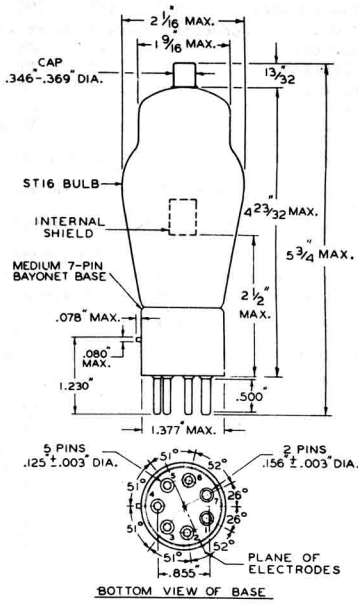


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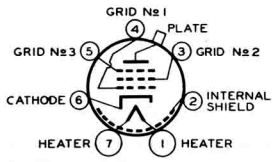
802

# R-F POWER AMPLIFIER PENTODE



92C-4364 R4

## TUBE SYMBOL & TOP VIEW OF SOCKET CONNECTIONS





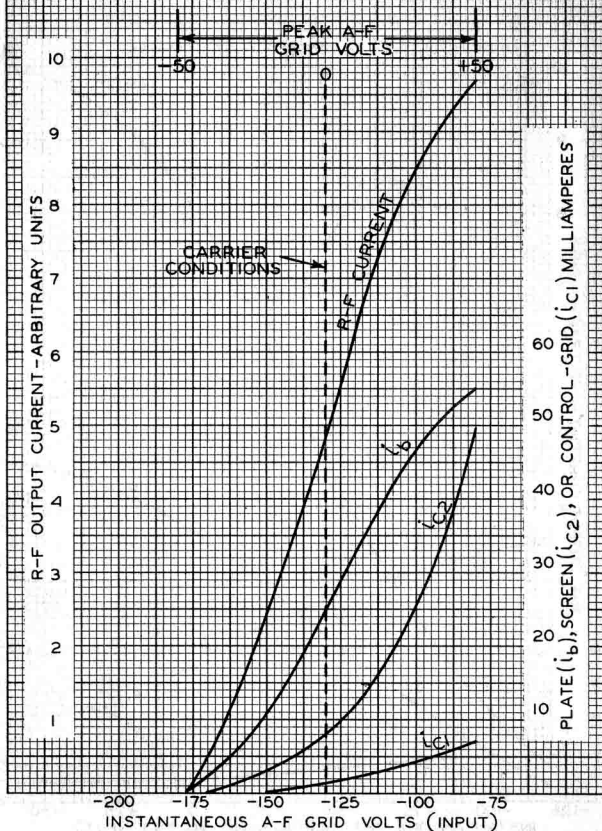
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## CONTROL-GRID MODULATION CHARACTERISTICS

$E_f = 6.3$  VOLTS  
 D-C PLATE VOLTS = 500  
 D-C SCREEN VOLTS = 200  
 D-C SUPPRESSOR VOLTS = 0  
 D-C GRID BIAS VOLTS = -130  
 PEAK R-F GRID VOLTS = 145  
 INTERNAL SHIELD CONNECTED TO CATHODE

NOTE: INSTANTANEOUS VALUES IGNORE INSTANTANEOUS R-F COMPONENTS



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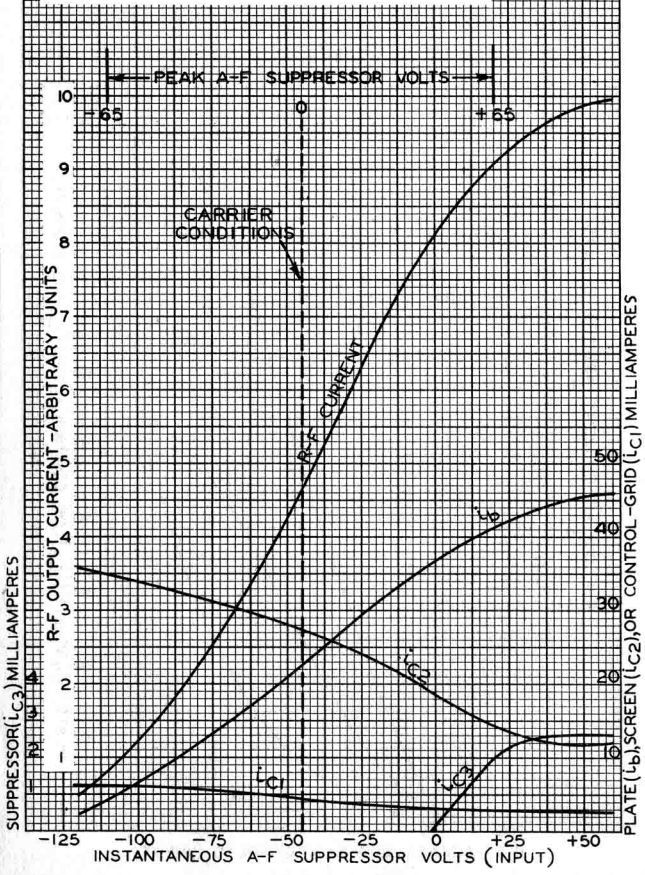


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### SUPPRESSOR MODULATION CHARACTERISTICS

$E_f = 6.3$  VOLTS  
 D-C PLATE VOLTS = 500  
 D-C SCREEN VOLTS = 200  
 D-C SUPPRESSOR VOLTS = -45  
 D-C GRID BIAS VOLTS = -90  
 PEAK R-F GRID VOLTS = 125  
 INTERNAL SHIELD CONNECTED TO CATHODE

NOTE: INSTANTANEOUS VALUES IGNORE  
 INSTANTANEOUS R-F COMPONENTS

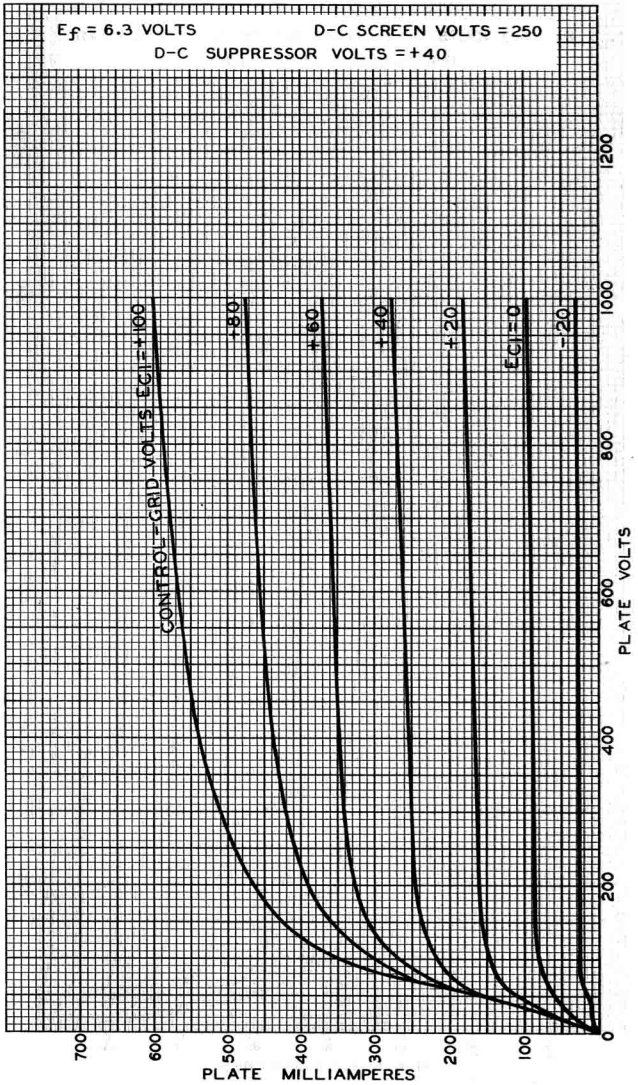




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# AVERAGE PLATE CHARACTERISTICS



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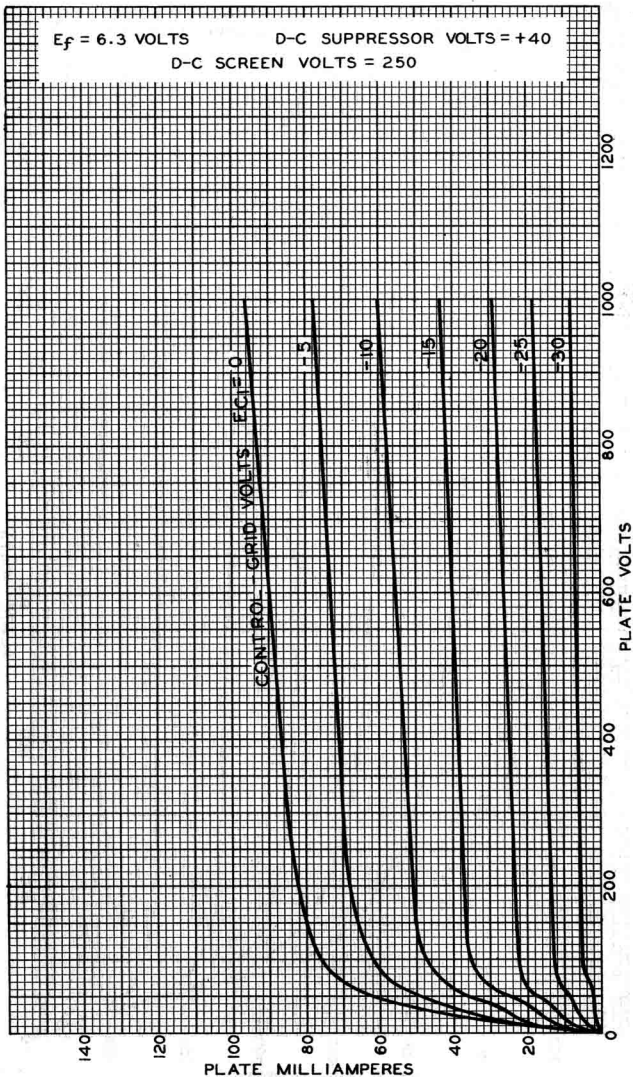
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# AVERAGE PLATE CHARACTERISTICS

$E_f = 6.3$  VOLTS

D-C SUPPRESSOR VOLTS = +40

D-C SCREEN VOLTS = 250



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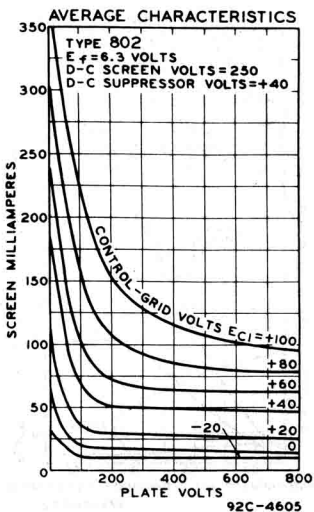
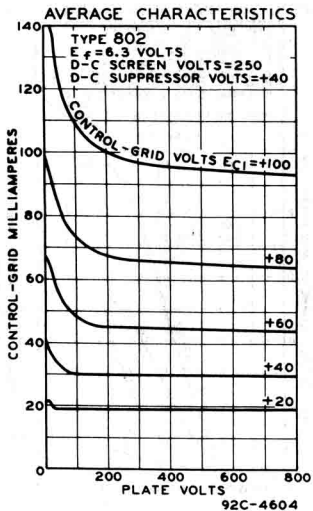
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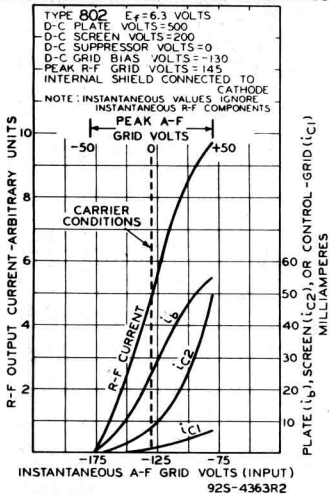
### CHARACTERISTICS CURVES



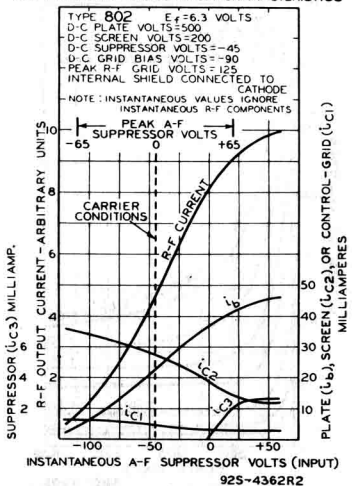


CHARACTERISTICS CURVES

CONTROL-GRID MODULATION CHARACTERISTICS



SUPPRESSOR MODULATION CHARACTERISTICS





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**R-F POWER AMPLIFIER PENTODE**

Filament	Thoriated Tungsten		
Voltage	10	a-c or d-c	volts
Current	5		amp.
Transconductance for plate current of 62.5 ma.	4000		μmhos
Direct Interelectrode Capacitances:			
Grid to Plate (with external shielding)	0.15 max.		μμf
Input	17.5		μμf
Output	29		μμf
Maximum Overall Length			9-3/8"
Maximum Diameter			2-9/16"
Bulb			T-20
Cap			Medium Metal
Base			Giant 5-Pin Ceramic, Bayonet

**MAXIMUM RATINGS and TYPICAL OPERATING CONDITIONS****R-F POWER AMPLIFIER - Class B Telephony***Carrier conditions per tube for use with a max. modulation fact. of 1.0*

D-C Plate Voltage	2000 max.	volts
D-C Suppressor Voltage (Grid #3)	500 max.	volts
D-C Screen Voltage (Grid #2)	600 max.	volts
D-C Plate Current	160 max.	ma.
Plate Input	180 max.	watts
Suppressor Input	10 max.	watts
Screen Input	20 max.	watts
Plate Dissipation	125 max.	watts

**Typical Operation:**

Filament Voltage	10	10	10	a-c	volts
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 #1)	-30	-35	-40		volts
Peak R-F Grid Voltage	90	70	55		volts
D-C Plate Current	130	110	80		ma.
D-C Screen Current	33	30	20		ma.
D-C Grid Current	8	5	3	approx.	ma.
Driving Power *	4.5	3.0	1.5	approx.	watts
Power Output	52	53	53	approx.	watts

\* At crest of a-f cycle with modulation factor of 1.0.

**SUPPRESSOR-MODULATED R-F POWER AMPLIFIER - Class C Telephony***Carrier conditions per tube for use with a max. modulation fact. of 1.0*

D-C Plate Voltage	2000 max.	volts
D-C Screen Voltage (Grid #2)	600 max.	volts
D-C Grid Voltage (Grid #1)	-500 max.	volts
D-C Plate Current	110 max.	ma.
D-C Grid Current	50 max.	ma.
Plate Input	180 max.	watts
Screen Input	30 max.	watts
Plate Dissipation	125 max.	watts

(continued on next page)

JAN. 15, 1937

RCA RADOTRON DIVISION  
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TENTATIVE DATA





## R-F POWER AMPLIFIER PENTODE

(continued from preceding page)

### Typical Operation:

Filament Voltage	10	10	10	a-c volts
D-C Plate Voltage	1250	1500	2000	volts
D-C Suppressor Voltage	-70	-90	-110	volts
D-C Screen Voltage	#	##	###	volts
D-C Grid Voltage	-110 <sup>o</sup>	-100 <sup>o</sup>	-100 <sup>oo</sup>	volts
Peak A-F Suppressor Volt.	110	130	150	volts
Peak R-F Grid Voltage	200	190	170	volts
D-C Plate Current	100	100	80	ma.
D-C Screen Current	70	70	48	ma.
D-C Grid Current	22	20	15	approx.ma.
Driving Power	4.0	3.5	2.5	approx.watts
Power Output	40	50	53	approx.watts

\* Voltage taken from unmodulated plate-voltage supply through 13000-ohm resistor.

\*\* Voltage taken from unmodulated plate-voltage supply through 17000-ohm resistor.

\*\*\* Voltage taken from unmodulated plate-voltage supply through 35000-ohm resistor.

<sup>o</sup> Bias may also be obtained with 5000-ohm grid resistor.

<sup>oo</sup> Bias may also be obtained with 7000-ohm grid resistor.

### GRID-MODULATED R-F POWER AMPLIFIER - Class C Telephony

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

D-C Plate Voltage	2000 max.	volts
D-C Suppressor Voltage (Grid #3)	500 max.	volts
D-C Screen Voltage (Grid #2)	600 max.	volts
D-C Grid Voltage (Grid #1)	-500 max.	volts
D-C Plate Current	160 max.	ma.
Plate Input	180 max.	watts
Suppressor Input	10 max.	watts
Screen Input	20 max.	watts
Plate Dissipation	125 max.	watts

### Typical Operation:

Filament Voltage	10	10	10	a-c volts
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	ma.
D-C Screen Current	30	25	20	ma.
D-C Grid Current	8	6	4	approx.ma.
Driving Power *	4	3	2	a approx.watts
Power Output	52	53	53	approx.watts

\* At crest of a-f cycle with modulation factor of 1.0.

### PLATE-MODULATED R-F POWER AMPLIFIER - Class C Telephony

#### Pentode Connection

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

D-C Plate Voltage	1600 max.	volts
D-C Suppressor Voltage (Grid #3)	500 max.	volts
D-C Screen Voltage (Grid #2)	500 max.	volts

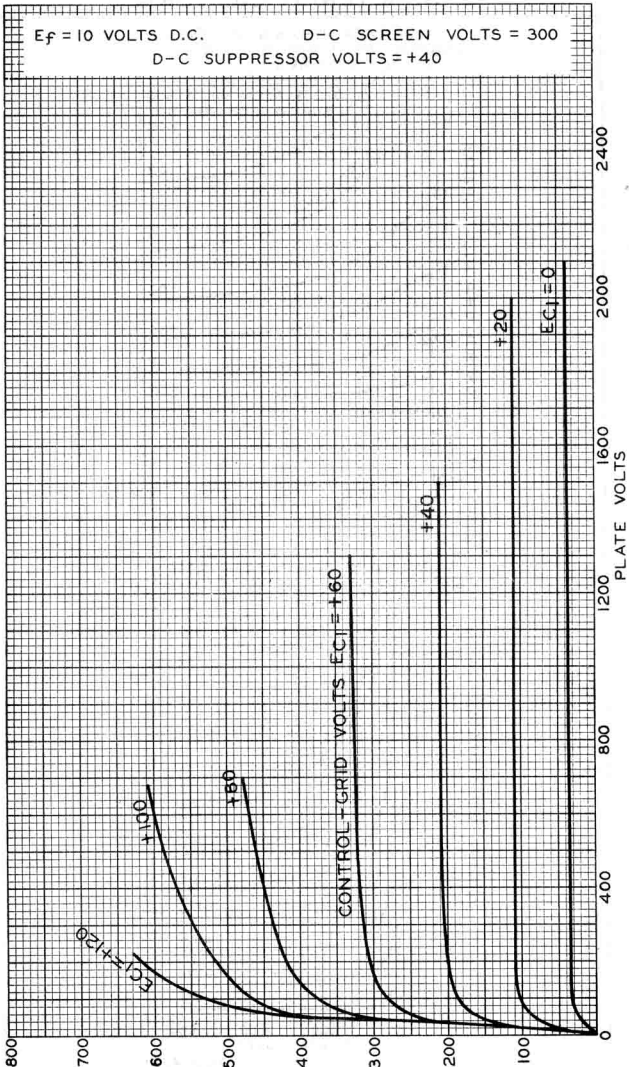
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# AVERAGE PLATE CHARACTERISTICS



MAR. 8, 1937

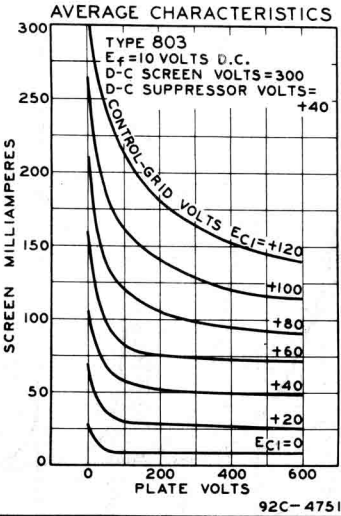
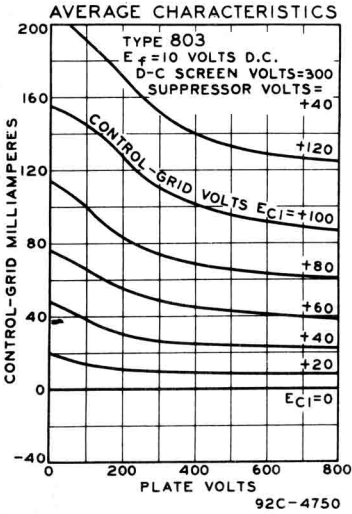
PLATE MILLIAMPERES

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92C-4749



CHARACTERISTICS CURVES





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**R-F POWER AMPLIFIER PENTODE**

(continued from preceding page)

D-C Grid Voltage (Grid #1)		-500 max.	volts
D-C Plate Current		160 max.	ma.
D-C Grid Current		50 max.	ma.
Plate Input		250 max.	watts
Suppressor Input		10 max.	watts
Screen Input		20 max.	watts
Plate Dissipation		85 max.	watts
Typical Operation:			
Filament Voltage	10	10	a-c volts
D-C Plate Voltage	1250	1600	volts
D-C Suppressor Voltage	100	100	volts
D-C Screen Voltage	◆	◆◆	volts
D-C Grid Voltage	⊕	⊕	volts
Peak R-F Grid Voltage	180	180	volts
D-C Plate Current	150	150	ma.
D-C Screen Current	55	55	ma.
D-C Grid Current	20	20	approx.ma.
Driving Power	4	4	approx.watts
Power Output	125	155	approx.watts

◆ Voltage taken from modulated plate-voltage supply through 16000-ohm resistor or from modulated fixed supply of 400 volts.

◆◆ Voltage taken from modulated plate-voltage supply through 20000-ohm resistor or from modulated fixed supply of 500 volts.

⊕ Bias obtained with 4000-ohm grid resistor.

**PLATE-MODULATED R-F POWER AMPLIFIER - Class C Telephony***Tetrode Connection - Grids #2 & #3 tied together**Carrier conditions per. tube for use with a max. modulation fact. of 1.0*

D-C Plate Voltage		1600 max.	volts
D-C Screen Voltage (Grids #2 & #3)		500 max.	volts
D-C Grid Voltage (Grid #1)		-500 max.	volts
D-C Plate Current		160 max.	ma.
D-C Grid Current		50 max.	ma.
Plate Input		250 max.	watts
Screen Input		30 max.	watts
Plate Dissipation		85 max.	watts
Typical Operation:			
Filament Voltage	10	10	a-c volts
D-C Plate Voltage	1250	1600	volts
D-C Screen Voltage	□	□□	volts
D-C Grid Voltage	⊕	⊕	volts
Peak R-F Grid Voltage	305	320	volts
D-C Plate Current	150	150	ma.
D-C Screen Current	75	75	ma.
D-C Grid Current	45	45	approx.ma.
Driving Power	15	15	approx.watts
Power Output	125	155	approx.watts

□ Voltage taken from unmodulated plate-voltage supply through 15000-ohm resistor or from unmodulated fixed supply of 130 volts.

□□ Voltage taken from unmodulated plate-voltage supply through 20000-ohm resistor or from unmodulated fixed supply of 130 volts.

⊕ Bias obtained with 4000-ohm grid resistor.

(continued on next page)

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TENTATIVE DATA 2



# R-F POWER AMPLIFIER PENTODE

(continued from preceding page)

## R-F POWER AMPLIFIER & OSCILLATOR - Class C Telegraphy

### Pentode Connection

Key-down conditions per tube without modulation§

D-C Plate Voltage	2000 max.	volts
D-C Suppressor Voltage (Grid #3)	500 max.	volts
D-C Screen Voltage (Grid #2)	600 max.	volts
D-C Grid Voltage (Grid #1)	-500 max.	volts
D-C Plate Current	175 max.	ma.
D-C Grid Current	50 max.	ma.
Plate Input	350 max.	watts
Suppressor Input	10 max.	watts
Screen Input	30 max.	watts
Plate Dissipation	125 max.	watts

### Typical Operation:

Filament Voltage	10	10	10	a-c volts
D-C Plate Voltage	1250	1500	2000	volts
D-C Suppressor Voltage	40	40	40	volts
D-C Screen Voltage	500	500	500	volts
D-C Grid Voltage	†	†	†	volts
Peak R-F Grid Voltage	175	175	175	volts
D-C Plate Current	160	160	160	ma.
D-C Screen Current	45	45	45	ma.
D-C Grid Current	12	12	12	approx.ma.
Driving Power	2	2	2	approx.watts
Power Output	130	160	210	approx.watts

## R-F POWER AMPLIFIER & OSCILLATOR - Class C Telegraphy

### Tetrode Connection - Grids #2 & #3 tied together

Key-down conditions per tube without modulation§

D-C Plate Voltage	2000 max.	volts
D-C Screen Voltage (Grids #2 & #3)	600 max.	volts
D-C Grid Voltage (Grid #1)	-500 max.	volts
D-C Plate Current	175 max.	ma.
D-C Grid Current	50 max.	ma.
Plate Input	350 max.	watts
Screen Input	30 max.	watts
Plate Dissipation	125 max.	watts

### Typical Operation:

Filament Voltage	10	10	10	a-c volts
D-C Plate Voltage	1250	1500	2000	volts
D-C Screen Voltage	150	150	150	volts
D-C Grid Voltage	†††	†††	†††	volts
Peak R-F Grid Voltage	190	190	190	volts
D-C Plate Current	160	160	160	ma.
D-C Screen Current	15	15	15	ma.
D-C Grid Current	28	27	26	approx.ma.
Driving Power	4.6	4.4	4.4	approx.watts
Power Output	130	160	210	approx.watts

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

† Bias obtained with 7500-ohm resistor.  
 †† Bias obtained with 3500-ohm resistor.

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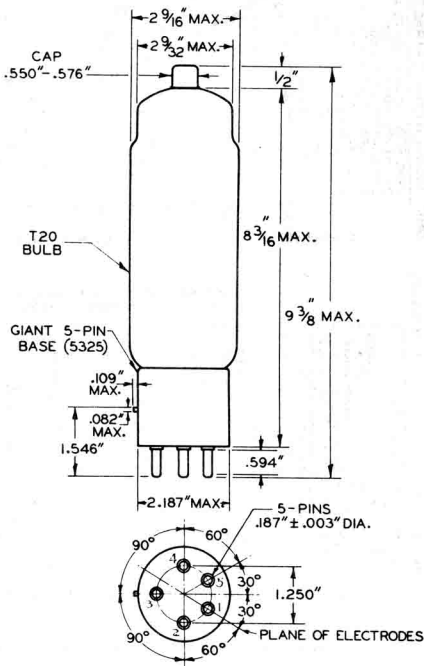
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# R-F POWER AMPLIFIER PENTODE

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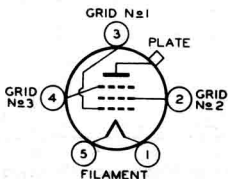
For use of the 803 at the higher frequencies, refer to sheet  
TRANS. TUBE RATINGS vs FREQUENCY.



BOTTOM VIEW OF BASE

92C-4424R1

TUBE SYMBOL & TOP VIEW  
OF  
SOCKET CONNECTIONS



SEPT. 30, 1936

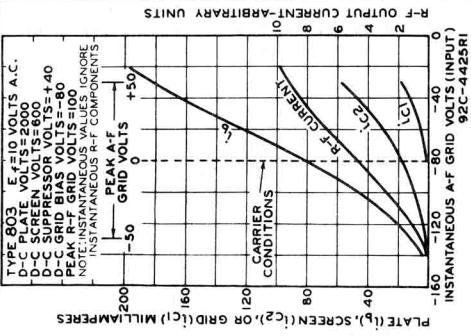
RCA RADOTRON DIVISION  
RCA MANUFACTURING COMPANY, INC.

TENTATIVE DATA 3

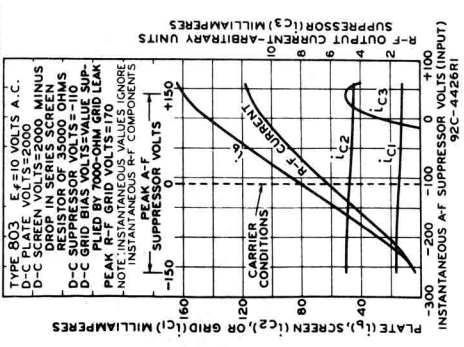


# R-F POWER AMPLIFIER PENTODE

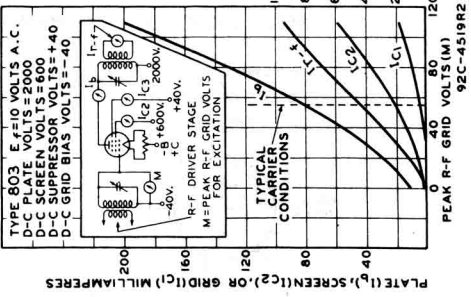
GRID MODULATION CHARACTERISTICS



SUPPRESSOR MODULATION CHARACTERISTICS



OPERATION CHARACTERISTICS CLASS B R-F AMPLIFIER





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**R-F POWER AMPLIFIER PENTODE**

Filament	Thoriated Tungsten	
Voltage	7.5	a-c or d-c volts
Current	3.0	amp.
Mutual Conductance for plate current of 32 ma.	3250	μmhos.
Direct Interelectrode Capacitances:		
Grid to Plate (with external shielding)	0.01 max.	μf
Input	16	μf
Output	14.5	μf
Maximum Overall Length		8-3/4"
Maximum Diameter		2-1/16"
Bulb		T-16
Cap		Small Metal
Base		Medium 5-Pin Ceramic

**MAXIMUM RATINGS and TYPICAL OPERATING CONDITIONS****R-F POWER AMPLIFIER - Class B Telephony***Carrier conditions per tube for use with a max. modulation fact. of 1.0*

D-C Plate Voltage	1250 max.	volts
D-C Suppressor Voltage (Grid #3)	200 max.	volts
D-C Screen Voltage (Grid #2)	300 max.	volts
D-C Plate Current	50 max.	ma.
Plate Input	60 max.	watts
Suppressor Input	5 max.	watts
Screen Input	10 max.	watts
Plate Dissipation	40 max.	watts

**Typical Operation:**

Filament Voltage	7.5	7.5	7.5	a-c volts
D-C Plate Voltage	1000	1000	1250	volts
D-C Suppressor Voltage	0	45	45	volts
D-C Screen Voltage	300	300	300	volts
D-C Grid Voltage (Grid #1)	-20	-20	-20	volts
Peak R-F Grid Voltage	30	30	27	volts
D-C Plate Current	45	45	45	ma.
D-C Screen Current	12	11.5	11	ma.
D-C Grid Current	1	1	1	<u>approx.ma.</u>
Driving Power *	0.35	0.3	0.25	<u>approx.watt</u>
Power Output	11	12	16	<u>approx.watts</u>

\* At crest of a-f cycle with modulation factor of 1.0.

**SUPPRESSOR-MODULATED R-F POWER AMPLIFIER - Class C Telephony***Carrier conditions per tube for use with a max. modulation fact. of 1.0*

D-C Plate Voltage	1250 max.	volts
D-C Screen Voltage (Grid #2)	300 max.	volts
D-C Grid Voltage (Grid #1)	-300 max.	volts
D-C Plate Current	50 max.	ma.
D-C Grid Current	15 max.	ma.
Plate Input	60 max.	watts
Screen Input	15 max.	watts
Plate Dissipation	40 max.	watts

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SEPT. 30, 1936

RCA RADOTRON DIVISION  
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TENTATIVE DATA





# R-F POWER AMPLIFIER PENTODE

(continued from preceding page)

**Typical Operation:**

Filament Voltage	7.5	7.5	a-c volts
D-C Plate Voltage	1000	1250	volts
D-C Suppressor Voltage (Grid #3)	-35	-50	volts
D-C Screen Voltage	**	***	volts
D-C Grid Voltage	-100♦	-100♦♦	volts
Peak R-F Grid Voltage	140	140	volts
Peak A-F Suppressor Voltage	60	70	volts
D-C Plate Current	45	48	ma.
D-C Screen Current	33.5	35.5	ma.
D-C Grid Current	5.5	7	approx.ma.
Driving Power	0.7	0.85	approx.watt
Power Output	16	21	approx.watts

- \*\* Voltage taken from unmodulated plate-voltage supply through 21000-ohm resistor.
- \*\*\* Voltage taken from unmodulated plate-voltage supply through 27000-ohm resistor.
- ♦ Bias may also be obtained with 18000-ohm grid resistor.
- ♦♦ Bias may also be obtained with 15000-ohm grid resistor.

## GRID-MODULATED R-F POWER AMPLIFIER - Class C Telephony

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

D-C Plate Voltage	1250 max.	volts
D-C Suppressor Voltage (Grid #3)	200 max.	volts
D-C Screen Voltage (Grid #2)	300 max.	volts
D-C Grid Voltage (Grid #1)	-250 max.	volts
D-C Plate Current	50 max.	ma.
Plate Input	60 max.	watts
Suppressor Input	5 max.	watts
Screen Input	10 max.	watts
Plate Dissipation	40 max.	watts

**Typical Operation:**

Filament Voltage	7.5	7.5	7.5	a-c volts
D-C Plate Voltage	1000	1000	1250	volts
D-C Suppressor Voltage	0	45	45	volts
D-C Screen Voltage	300	300	300	volts
D-C Grid Voltage	-115	-115	-115	volts
Peak R-F Grid Voltage	140	135	135	volts
Peak A-F Grid Voltage	35	35	35	volts
D-C Plate Current	45	45	45	ma.
D-C Screen Current	15	11	11	ma.
D-C Grid Current	2	2	2	approx.ma.
Driving Power *	1.1	0.85	0.85	approx.watts
Power Output	14	16	21	approx.watts

\* At crest of a-f cycle with modulation factor of 1.0.

## PLATE-MODULATED R-F POWER AMPLIFIER - Class C Telephony

### Pentode Connection

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

D-C Plate Voltage	1000 max.	volts
D-C Suppressor Voltage (Grid #3)	200 max.	volts
D-C Screen Voltage (Grid #2)	300 max.	volts

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**R-F POWER AMPLIFIER PENTODE**

(continued from preceding page)

D-C Grid Voltage (Grid #1)	-300	max.	volts
D-C Plate Current	80	max.	ma.
D-C Grid Current	15	max.	ma.
Plate Input	80	max.	watts
Suppressor Input	5	max.	watts
Screen Input	10	max.	watts
Plate Dissipation	27	max.	watts
Typical Operation:			
Filament Voltage	7.5	a-c	volts
D-C Plate Voltage	1000		volts
D-C Suppressor Voltage	50		volts
D-C Screen Voltage	#		volts
D-C Grid Voltage	⊕		volts
Peak R-F Grid Voltage	130		volts
D-C Plate Current	75		ma.
D-C Screen Current	21		ma.
D-C Grid Current	6	approx.	ma.
Driving Power	0.65	approx.	watt
Power Output	50	approx.	watts

⊕ Bias obtained with 15000-ohm resistor.

# Voltage taken from modulated plate-voltage supply through 37000-ohm resistor or from modulated fixed supply of 220 volts.

**PLATE-MODULATED R-F POWER AMPLIFIER - Class C Telephony***Tetrode Connection - Grids #2 & #3 tied together**Carrier conditions per tube for use with a max. modulation fact. of 1.0*

D-C Plate Voltage	1000	max.	volts
D-C Screen Voltage (Grids #2 & #3)	200	max.	volts
D-C Grid Voltage (Grid #1)	-300	max.	volts
D-C Plate Current	80	max.	ma.
D-C Grid Current	15	max.	ma.
Plate Input	80	max.	watts
Screen Input	10	max.	watts
Plate Dissipation	27	max.	watts
Typical Operation:			
Filament Voltage	7.5	a-c	volts
D-C Plate Voltage	1000		volts
D-C Screen Voltage	#		volts
D-C Grid Voltage	⊕⊕		volts
Peak R-F Grid Voltage	145		volts
D-C Plate Current	75		ma.
D-C Screen Current	28		ma.
D-C Grid Current	8	approx.	ma.
Driving Power	1.1	approx.	watts
Power Output	50	approx.	watts

# Voltage taken from unmodulated plate-voltage supply through 30000-ohm resistor or from modulated fixed supply of 155 volts.

⊕⊕ Bias obtained with 10000-ohm grid resistor.

(continued on next page)

SEPT. 30, 1936

RCA RADIOTRON DIVISION  
RCA MANUFACTURING COMPANY, INC.

TENTATIVE DATA 2



## R-F POWER AMPLIFIER PENTODE

(continued from preceding page)

### R-F POWER AMPLIFIER & OSCILLATOR - Class C Telegraphy

#### Pentode Connection

Key-down conditions per tube without modulation <sup>oo</sup>

D-C Plate Voltage	1250 max.	volts
D-C Suppressor Voltage (Grid #3)	200 max.	volts
D-C Screen Voltage (Grid #2)	300 max.	volts
D-C Grid Voltage (Grid #1)	-300 max.	volts
D-C Plate Current	95 max.	ma.
D-C Grid Current	15 max.	ma.
Plate Input	120 max.	watts
Suppressor Input	5 max.	watts
Screen Input	15 max.	watts
Plate Dissipation	40 max.	watts

#### Typical Operation:

Filament Voltage	7.5	7.5	7.5	7.5	a-c	volts
D-C Plate Voltage	750	1000	1250	1250		volts
D-C Suppressor Voltage	45	45	0	45		volts
D-C Screen Voltage	300	300	300	300		volts
D-C Grid Voltage	-100	-100	-100	-100		volts
Peak R-F Grid Voltage	150	150	145	150		volts
D-C Plate Current	92	92	80	92		ma.
D-C Screen Current	29	29	33	27		ma.
D-C Grid Current	7	7	7	7	approx.	ma.
Driving Power	0.95	0.95	0.9	0.95	approx.	watt
Power Output	45	60	64	80	approx.	watts

### R-F POWER AMPLIFIER & OSCILLATOR - Class C Telegraphy

#### Tetrode Connection - Grids #2 & #3 tied together

Key-down conditions per tube without modulation <sup>oo</sup>

D-C Plate Voltage	1250 max.	volts
D-C Screen Voltage (Grids #2 & #3)	200 max.	volts
D-C Grid Voltage (Grid #1)	-300 max.	volts
D-C Plate Current	95 max.	ma.
D-C Grid Current	15 max.	ma.
Plate Input	120 max.	watts
Screen Input	15 max.	watts
Plate Dissipation	40 max.	watts

#### Typical Operation:

Filament Voltage	7.5	a-c	volts
D-C Plate Voltage	1250		volts
D-C Screen Voltage	180		volts
D-C Grid Voltage	-100		volts
Peak R-F Grid Voltage	160		volts
D-C Plate Current	92		ma.
D-C Screen Current	23		ma.
D-C Grid Current	8	approx.	ma.
Driving Power	1.2	approx.	watts
Power Output	80	approx.	watts

<sup>oo</sup> See next page.

(continued on next page)



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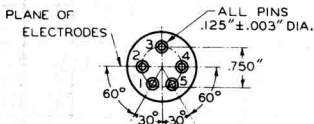
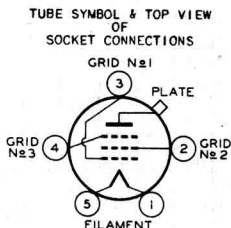
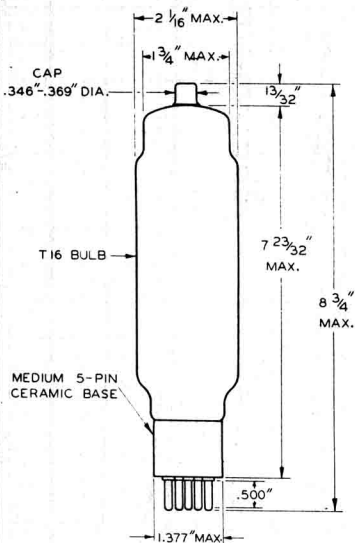
# R-F POWER AMPLIFIER PENTODE

(continued from preceding page)

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

For the 804 as a crystal-controlled oscillator, typical operating conditions are: d-c plate voltage, 1250 volts; d-c suppressor voltage, 0 volts; d-c screen voltage, 300 volts; grid leak resistor, 30000 ohms; d-c plate current, 42 ma.; d-c screen current, 24 ma.

For operation of the 804 at the higher frequencies, refer to TRANS. TUBE RATINGS vs FREQUENCY.



BOTTOM VIEW OF BASE

92C-4547

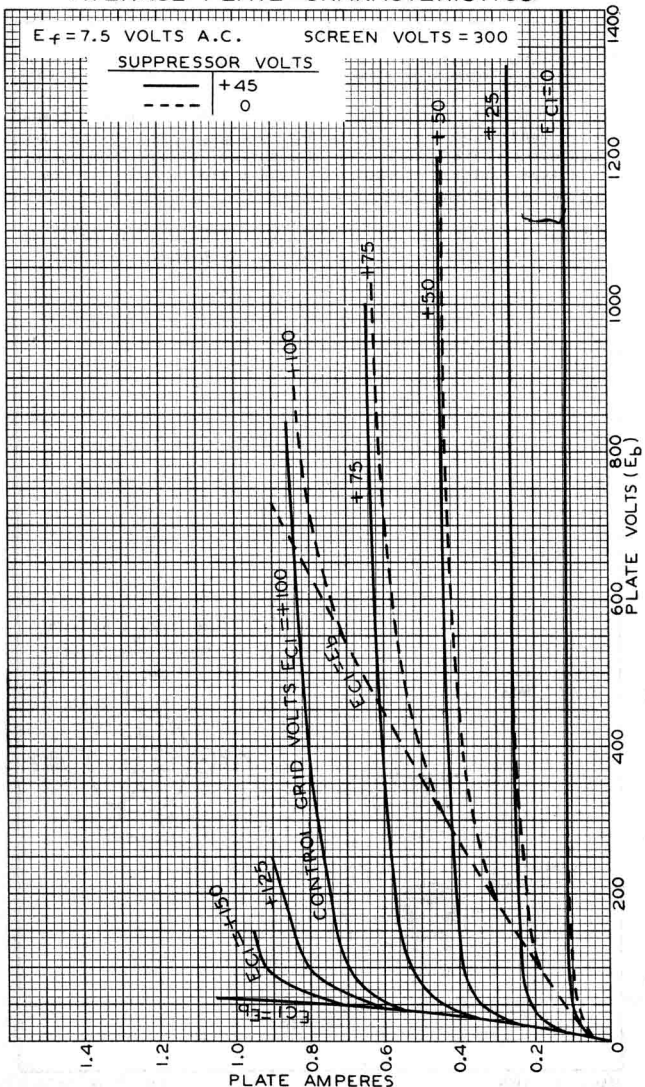


# AVERAGE PLATE CHARACTERISTICS

$E_f = 7.5$  VOLTS A.C.      SCREEN VOLTS = 300

SUPPRESSOR VOLTS

—	+45
- - -	0



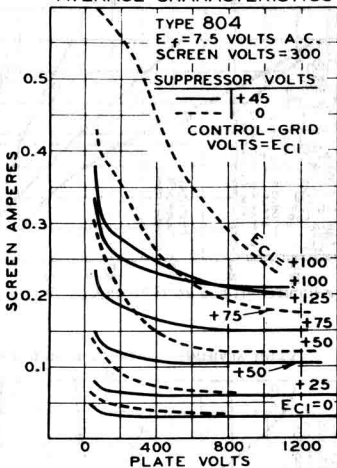


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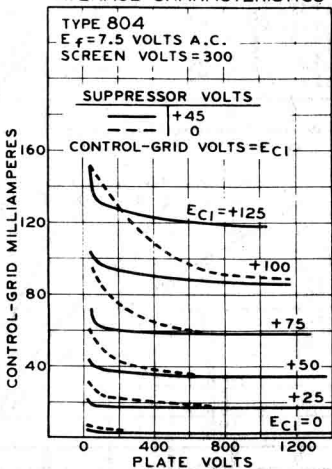
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## R-F POWER AMPLIFIER PENTODE

AVERAGE CHARACTERISTICS



AVERAGE CHARACTERISTICS



MAR. 20, 1936

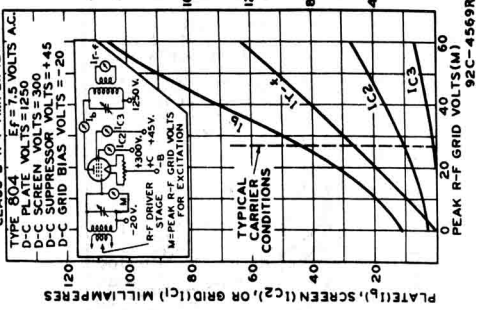
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92C-4564 &amp; 4565

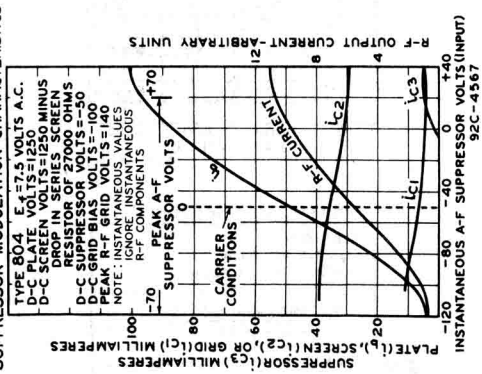


# R-F POWER AMPLIFIER PENTODE

## OPERATION CHARACTERISTICS CLASS B R-F AMPLIFIER



## SUPPRESSOR MODULATION CHARACTERISTICS



## GRID MODULATION CHARACTERISTICS

