RCA TUBE
HANDBOOK
HB-3

THYRATRON & IGNITRON SECTION

In this section, data are given for RCA Thyratrons and Ignitrons. Thyratrons are used in relay applications, in grid-controlled rectifier service and in motor-control service. Ignitrons have applications in welder-control service, power rectification, and power conversion.

For further Technical Information, write to Commercial Engineering, Tube Department, Radio Corporation of America, Harrison, N. J.

7-52

THYRATRONS & IGNITRONS

PRICES[□]

OF THYRATRON & IGNITRON TYPES

Schedule U[▲]

Type	Price
2D21	$ 2.00
3C23	12.50
3D22	15.00
105	49.50
172	74.00
502-A	1.85
627	22.00
629♣	13.00
672-A	35.00
676	55.00
677	55.00
884	1.85
885♣	2.00
2050	1.85
5550	50.00
5551	80.50
5552	121.00
5553	265.00
5554	190.00
5555	370.00
5557	8.50
5559	22.00
5560	28.00
5563	47.00
5696	1.90

□ This price list applies only in the United States of America and is subject to change without notice. All prices are exclusive of all Federal, State and local excise, sales, and similar taxes.

▲ Schedule U shows user prices for tube types priced for distribution through other than dealer and service channels.

♣ Not recommended for new equipment design.

INFORMATION ON PURCHASING ABOVE TYPES

Information as to where *RCA Thyratrons & Ignitrons* can be purchased may be obtained from our *regional office* nearest you or from *Tube Department, Radio Corporation of America, Harrison, N.J.*

RCA

THYRATRON & IGNITRON CLASSIFICATION CHART

When choosing tube types, the equipment designer should refer to the RCA PREFERRED TYPES LIST and its companion list - TYPES NOT RECOMMENDED for NEW EQUIPMENT DESIGN - both of which appear in the General section.

THYRATRONS

Maximum Cathode● Amp. Av.	Maximum Cathode● Amp. Peak	Maximum Peak Inverse Anode Volts		Filament (F) or Heater (H) Volts		Filament (F) or Heater (H) Amp.	TUBE TYPE
Triodes							
Mercury-Vapor Types							
0.5	2.0	5000	40–80°C	2.5	F	5.0	5557
0.64	2.5	2500	25–70°	2.5	F	6.0	627
1.5	6.0	1250	−40 to +80°	2.5	F	7.0	3C23
1.6	6.4	20000	25–50°	5.0	F	10.0	5563-A
1.8	10.0	15000	25–55°				
2.5	15.0	1000	40–80°	5.0	H	4.5	5559
2.5	15.0	1000	40–80°	5.0	H	4.5	5728/FG-67
4.0	15.0	10000	30–50°	5.0	H	10.0	677
6.4	40.0	2500	40–80°	5.0	H	10.0	676
2.5▲	77.0▲	750▲	40–90°				
Gas Types							
0.04	0.2	350	−40 to +70°	2.5	H	2.6	629
0.045	35	■	−50 to +90°	6.3	H	2.3	6130/3C45‡
0.075	0.3	300✠	−75 to +90°	6.3	H	0.6	884
0.075	0.3	350⬢	−75 to +90°				
Same as for Type 884				2.5	H	1.5	885
Tetrodes							
Mercury-Vapor Types							
2.5	15.0	1000	40–80°	5.0	H	4.5	5560
3.2	40.0	2500	40–80°	5.0	H	5.0	672-A
6.4	40.0	2000	40–80°	5.0	H	10.0	172†
2.5▲	77.0▲	750▲	30–95°	5.5▲	H	11.0▲	
6.4	40.0	2500	40–80°	5.0	H	10.0	105
4.0*	16.0*	10000*	25–50°				
Gas Types							
0.025	0.1	500	−55 to +90°	6.3	H	0.15	5696□
0.1	0.5	1300	−75 to +90°	6.3	H	0.6	2D21□
0.1	1.0	1300	−55 to +90°	6.3	H	0.6	502-A□
0.1	1.0	1300	−75 to +90°	6.3	H	0.6	2050
0.5	5.0	1300	−75 to +90°	6.3	H	2.6	6012
0.8	8.0	1500	−75 to +90°	6.3	H	2.6	3D22

● In these two columns, values for filament types are for Maximum Anode Amperes.
▲ Welder-Control Service.
■ See Tube Data.
‡ Hydrogen Thyratron.
✠ Relaxation Oscillator (Sweep-Circuit Service).
⬢ Relay & Grid-Controlled Rectifier Service.
† Metal-Shell Type. * Intermittent Service. □ Miniature Type.

THYRATRON & IGNITRON CLASSIFICATION CHART

IGNITRONS

Maximum Ratings For frequencies from 25 to 60 cps						TUBE TYPE
Av. Anode Amp.	Peak Anode Amp.	KVA Demand	Av'g'g Time Sec.	RMS Supply Volts	Peak Inverse or Forward Volts	
AC Welder-Control Service†						
22.4	550	100	22	250	–	5550 Size A
22.4	230	100	9.2	600	–	
12.1	1680	300	22	250	–	
12.1	700	300	9.2	600	–	
56	1130	200	18	250	–	5551 Size B
56	470	200	7.5	600	–	
30.2	3350	600	18	250	–	
30.2	1400	600	7.5	600	–	
113	360	600▲	0.5	2400	–	5554
75	720	1200	1.5	2400	–	
140	2240	400	14	250	–	5552 Size C
140	930	400	5.8	600	–	
75.6	6730	1200	14	250	–	
75.6	2800	1200	5.8	600	–	
207	650	1105▲	0.5	2400	–	5555
135	1400	2400	1.66	2400	–	
355	4500	800	11	250	–	5553 Size D
355	1870	800	4.6	600	–	
192	13500	2400	11	250	–	
192	5600	2400	4.6	600	–	
Frequency-Changer Resistance-Welding Service						
56	336	–	6.25	–	1500	5822
16	1200	–	6.25	–	1500	
70	420	–	6.25	–	1200	
20	1500	–	6.25	–	1200	
Rectifier Service						
200	1800	–	–	–	900	5555
150	1200	–	–	–	2100	
100	900	–	–	–	900	5554
75	600	–	–	–	2100	
Intermittent Rectifier Service						
100	1600	–	6	–	500	5552
40	700	–	6	–	500	5551

† Ratings shown are on a per tube basis with two tubes connected in inverse parallel.

▲ 100% duty.

2D21

2D21

THYRATRON

GAS TETRODE, MINIATURE TYPE

GENERAL DATA

Electrical:

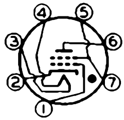
	Min.	Av.	Max.	
Heater, for Unipotential Cathode:				
Voltage (AC or DC)	5.7	6.3	6.9	volts
Current, with heater volts = 6.3	0.54	0.60	0.66	amp
Cathode:				
Heating Time, prior to tube conduction. . .	10	-	-	sec
Direct Interelectrode Capacitances (Approx.):°				
Grid No.1 to Anode.			0.026	μμf
Input			2.4	μμf
Output.			1.6	μμf
Ionization Time (Approx.):				
For conditions: dc anode volts = 100; grid-No.1 square-pulse volts = 50; peak anode amp. during conduction = 0.5			0.5	μsec
Deionization Time (Approx.):				
For conditions: dc anode volts = 125; grid-No.1 volts = -100, grid-No.1 resistor (ohms) = 1000; dc anode amp. = 0.1			35	μsec
For conditions: dc anode volts = 125; grid-No.1 volts = -10; grid-No.1 resistor (ohms) = 1000; dc anode amp. = 0.1			75	μsec
Maximum Critical Grid Current, with ac anode-supply volts (rms) = 460, and average anode amp. = 0.1			0.5	μamp
Anode Voltage Drop (Approx.).			8	volts
Grid-No.1 Control Ratio (Approx.) with grid-No.1 resistor (megohms) = 0; grid-No.2 volts = 0				250
Grid-No.2 Control Ratio (Approx.) with grid-No.1 resistor (megohms) = 0; grid-No.2 resistor (megohms) = 0; grid-No.1 volts = 0				1000

° Without external shield.

Mechanical:

Mounting Position	Any
Maximum Overall Length.	2-1/8"
Maximum Seated Length	1-7/8"
Length, Base Seat to Bulb Top (excluding tip). .	1-1/2" ± 3/32"
Maximum Diameter.	3/4"
Bulb.	T-5-1/2
Base.	Small-Button Miniature 7-Pin
Basing Designation for BOTTOM VIEW.	7BN

Pin 1 - Grid No.1
Pin 2 - Cathode
Pin 3 - Heater
Pin 4 - Heater



Pin 5 - Grid No.2
Pin 6 - Anode
Pin 7 - Grid No.2

← Indicates a change.

2D21

2D21
THYRATRON

RELAY and GRID-CONTROLLED RECTIFIER SERVICE

Maximum Ratings, *Absolute Values*:

PEAK ANODE VOLTAGE:		
Forward	650 max.	volts
Inverse	1300 max.	volts
GRID-No.2 (SHIELD-GRID) VOLTAGE:		
Peak, before anode conduction	-100 max.	volts
→ Average, during anode conduction■	-10 max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Peak, before anode conduction	-100 max.	volts
→ Average, during anode conduction■	-10 max.	volts
CATHODE CURRENT:		
Peak	0.5 max.	amp
Average■	0.1 max.	amp
→ Surge, for duration of 0.1 sec. max.	10 max.	amp
GRID-No.2 CURRENT:		
→ Average■	+0.01 max.	amp
GRID-No.1 CURRENT:		
→ Average■	+0.01 max.	amp
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	100 max.	volts
Heater positive with respect to cathode	25 max.	volts
→ AMBIENT TEMPERATURE RANGE	-75 to +90	°C

→ **Typical Operating Conditions for Relay Service:**

RMS Anode Voltage	117	400	volts
Grid-No.2 Voltage	0	0	volts
RMS Grid-No.1 Bias Voltage□	5	-	volts
DC Grid-No.1 Bias Voltage	-	-6	volts
Peak Grid-No.1 Signal Voltage	5	6	volts
Grid-No.1-Circuit Resistance	1.0	1.0	megohm
Anode-Circuit Resistance#	1200	2000	ohms

Maximum Circuit Values:

Grid-No.1-Circuit Resistance . . . . 10 max. megohms

■ Averaged over any interval of 30 sec. max.
□ Approximately 180° out of phase with the anode voltage.
\# Sufficient resistance, including the tube load, must be used under any conditions of operation to prevent exceeding the current ratings.
→ Indicates a change.

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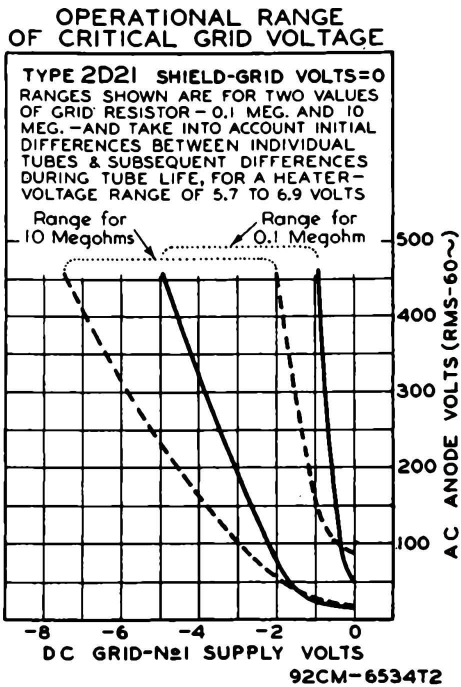
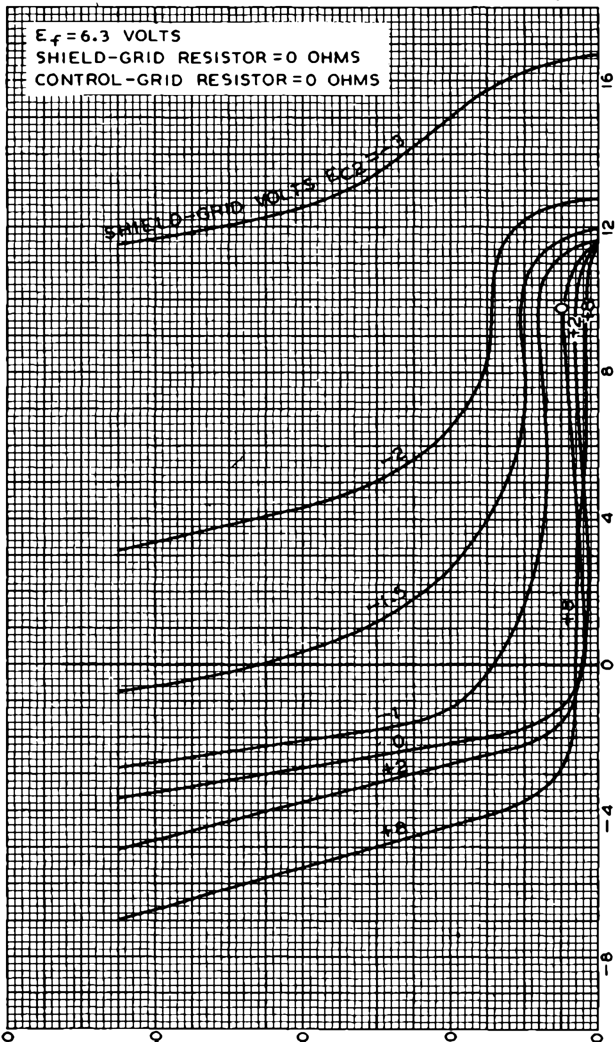
2D21
THYRATRON



2D21

2D21

AVERAGE CONTROL CHARACTERISTICS



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RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

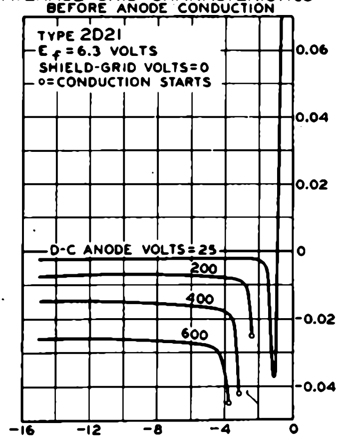
92CM-6531R1

2D21

2D21

THYRATRON

AVERAGE GRID CHARACTERISTICS
BEFORE ANODE CONDUCTION



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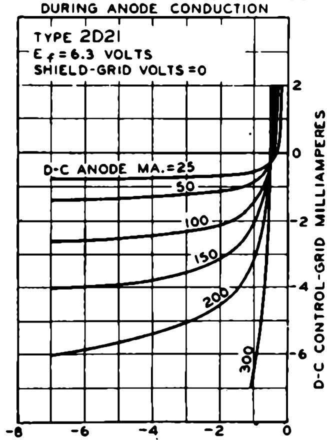
AVERAGE GRID CHARACTERISTICS
DURING ANODE CONDUCTION



92CM-6533T

3C23

GAS-AND-MERCURY-VAPOR THYRATRON

NEGATIVE-CONTROL TRIODE TYPE

GENERAL DATA

Electrical:

Filament, Coated:

Voltage	2.5 ± 5%	ac or dc volts ←
Current at 2.5 volts	7	amp
Minimum heating time prior to tube conduction	15	sec
Direct Interelectrode Capacitance (Approx.):°		
Grid to anode	1.8	μμf
Ionization Time (Approx.): ←		
For conditions: dc anode volts = 100, peak grid volts = +30, and peak anode amperes = 6	3	μsec
Deionization Time (Approx.): ←		
For conditions: dc anode volts = 120, dc grid-supply volts = -20, grid resistor (ohms) = 10000, and dc anode amperes = 1.5	360	μsec
For conditions: dc anode volts = 120, dc grid-supply volts = -500, grid resistor (ohms) = 100000, and dc anode amperes = 1.5	60	μsec
Anode Voltage Drop (Approx.)	15	volts

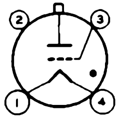
Mechanical:

Mounting Position	Vertical, base down
Maximum Overall Length	6-1/8"
Seated Length	5-1/4" ± 1/4"
Maximum Diameter	2-1/16"
Cooling	Natural circulation of air around tube
Weight (Approx.)	3 oz
Bulb	ST-16
Cap	Medium (JETEC No.C1-5) ←
Base	Medium-Shell Small 4-Pin with Bayonet (JETEC No.A4-10) ←
Basing Designation for BOTTOM VIEW	3G ←

Pin 1 - Filament

Pin 2 - No Connection

Pin 3 - Grid



Pin 4 - Filament

Cap - Anode

CONTROL SERVICE

Maximum Ratings, *Absolute Values: For supply frequency up to 400 cps*

	Operating Condensed-Mercury Temperature Range: -40° to +100°C	-40° to +80°C	
PEAK ANODE VOLTAGE:			
Forward	200 max.	1250 max.	volts
Inverse	200 max.	1250 max.	volts

° Without external shield.

← Indicates a change.

3C23

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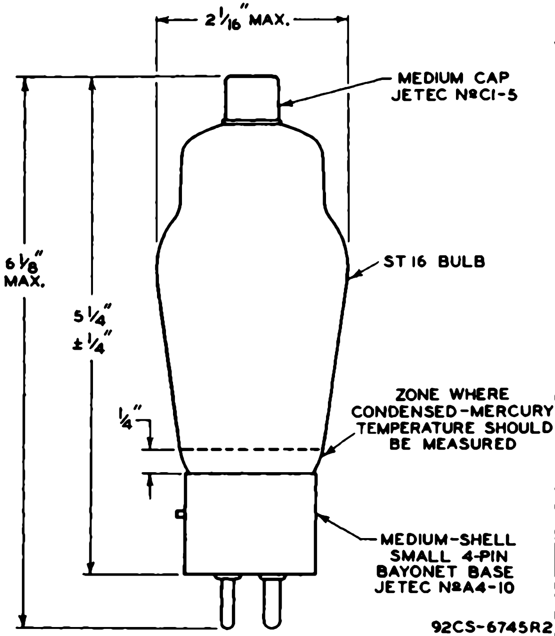
3C23

GAS-AND-MERCURY-VAPOR THYRATRON

	Operating Condensed-Mercury Temperature Range -40° to +100°C	-40° to +80°C	
GRID VOLTAGE:			
Peak or DC, before tube conduction	-500 max.	-500 max.	volts
Average▲, during tube conduction	-10 max.	-10 max.	volts
ANODE CURRENT:			
Peak	6 max.	6 max.	amp
Average●	1.5 max.	1.5 max.	amp
Fault, for duration of 0.1 second max.	120 max.	120 max.	amp
GRID CURRENT:			
Average♦	+0.01 max.	+0.01 max.	amp

▲ Averaged over one conducting period.
● Averaged over any interval of 5 seconds maximum.
♦ Averaged over period of grid conduction.



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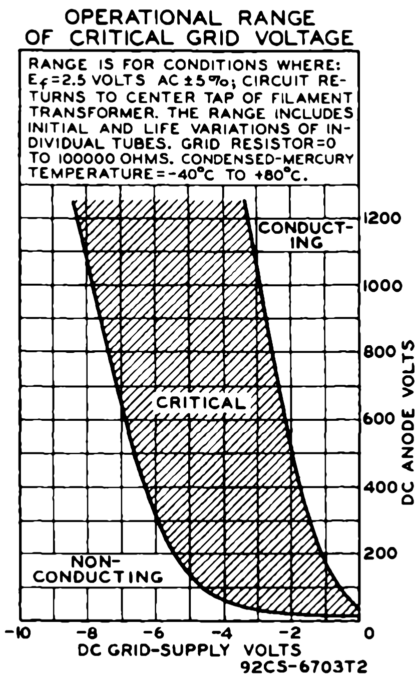
RCA

3C23

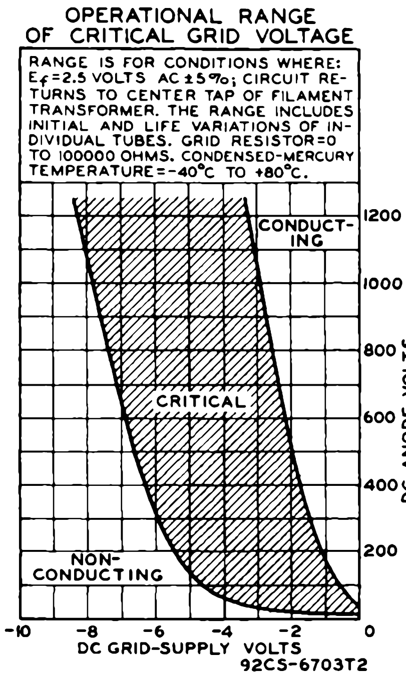
GAS-AND-MERCURY-VAPOR THYRATRON



3C23

3C23

GAS - AND - MERCURY-VAPOR THYRATRON



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3C45

RCA 3C45

HYDROGEN THYRATRON

POSITIVE-CONTROL, TRIODE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage	6.3 $^{+5\%}_{-10\%}$	ac or dc volts
Current at 6.3 volts:		
Minimum	2.0	amp
Average	2.3	amp
Maximum	2.5	amp
Minimum Heating Time	2	minutes

Direct Interelectrode Capacitances (Approx.):

Grid to Anode	3.9	μμf
Grid to Cathode	8.6	μμf
Ionization Time (Approx.)□	0.6	μsec
Deionization Time (Approx.)	25	μsec
Anode-Cathode Voltage Drop (Approx.):		
At middle of pulse duration	150	volts
Maximum Variation in Firing Time (Jitter)	0.06	μsec

Mechanical:

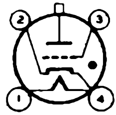
Operating Position	Any
Overall Length	4-3/4" ± 1/4"
Seated Length	4-1/8" ± 1/4"
Maximum Diameter	1-9/16"
Bulb	T-12
Cap	Small (JETEC No.C1-1)
Base	Medium-Shell Small 4-Pin, Micanol (JETEC No.A4-9)

BOTTOM VIEW

Pin 1 - Heater

Pin 2 - Cathode

Pin 3 - Grid



Pin 4 - Heater, Cathode

Cap - Anode

Cooling . . . . Natural

PULSE MODULATOR SERVICE

Maximum and Minimum CCS● Ratings, ***Absolute Values*****:**

DC ANODE-SUPPLY VOLTAGE . . . . 800 min. volts

□ Defined as the time interval between the point on the rising portion of the grid pulse which is 26% of the peak unloaded pulse amplitude and the point on the anode-current pulse which is 26% of its peak amplitude. The anode-current pulse has a time rise of 0.05 microsecond maximum. The grid pulse has a peak amplitude of 130 volts minimum, has a rise time of 0.5 microsecond maximum, and is supplied by a driver having 1500 ohms maximum internal impedance.

● Continuous Commercial Service.

RCA

3C45

HYDROGEN THYRATRON

PEAK ANODE VOLTAGE:			
Forward (E_{bmf})*	3000	max.	volts
Inverse	5% of E_{bmf}	min.	volts
After anode-current pulse:▲			
During first 25 μsec	1500	max.	volts
After first 25 μsec	3000	max.	volts
GRID VOLTAGE:			
Negative (DC or Peak), before conduction	200	max.	volts
Peak Positive Pulse	175	min.	volts
ANODE CURRENT:			
Peak	35	max.	amp
Average°	0.045	max.	amp
Rate of Rise	750	max.	amp/μsec
OPERATION FACTOR†	3×10^8	max.	
PULSE DURATION●	6	max.	μsec
AMBIENT TEMPERATURE	-50 to +90		°C

Typical Operation♦ at 2000 pps in Circuit of Fig.1:

	Pulse Duration of 0.5 μsec	
DC Anode-Supply Voltage	1250	volts
Peak Anode Voltage:		
Forward	3000	volts
Inverse:		
Immediately after anode-current pulse	530	volts
Grid Voltage:		
Negative, before conduction	0	volts
Peak Positive Pulse (Unloaded)	175	volts
Effective Grid-Circuit Resistance	1000	ohms
Anode Current:		
Peak	35	amp
Average°	0.035	amp
Operation Factor†	2.1×10^8	
Peak Power Output to Pulse Transformer (T)	43000	watts

Maximum Circuit Values:

Effective Grid-Circuit Resistance	1500 max.	ohms

* In applications where the anode voltage is applied instantaneously, the power-supply filter should be designed so that the peak forward anode voltage is applied at a rate not to exceed 75000 volts per second.

▲ Exclusive of spike not having more than 0.05 microsecond duration.

♦ Operation with a bulb temperature within the approximate range of 60° to 90°C measured on the bulb directly opposite the anode is recommended for longest life. To attain this temperature under operating conditions involving low ambient temperature, the use of a heat-conserving enclosure for the tube may be necessary.

° Averaged over any cycle.

†,●: See next page.

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

3C45

HYDROGEN THYRATRON

† Defined as *Peak Forward Anode Volts x Pulse Repetition Rate (pps) x Peak Anode Amperes* (excluding spike).

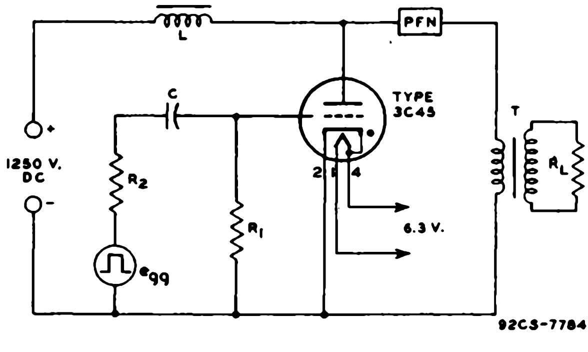
● Pulse duration is defined as the time interval between points on the pulse envelope at which instantaneous amplitudes are equal to 70.7% of the maximum amplitude excluding spike.

OPERATING CONSIDERATIONS

The *ambient-temperature operating range* for the 3C45 extends from -50° to +90°C (-58° to +194°F). Within this range, there is no appreciable effect on the electrical characteristics of the tube. However, for longest life, it is recommended that the tube be operated with a *bulb temperature* within the approximate range of 60° to 90°C (140° to 194°F). Under no circumstances should a stream of cooling air be applied to the glass envelope.

The *Connector* for the anode cap should be of the heat-radiating type and should have ample current-carrying capability for the operating requirements.

Fig. 1 - Typical Pulse-Modulator Circuit Operating at 2000 pps.



C: Blocking Capacitor, 0.001 μf

egg: Pulse Generator supplying peak positive pulse grid voltage of 175 volts (unloaded)

L: Charging Choke, 5 henries

PFN: Pulse-Forming Network with iterative impedance of 50 ohms, and a two-way transmission time of 0.5 microsecond

R_1: Grid Resistor, 30000 ohms

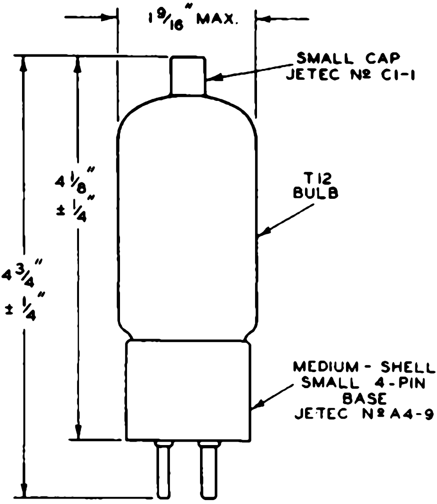
R_2: Effective Resistance of grid circuit, 1000 ohms

R_L: Load Resistance. Value reflected into primary of transformer (T) is 35 ohms.

T: Matching Pulse Transformer

3C45

HYDROGEN THYRATRON



92CS-7757

3D22-A
GAS THYRATRON

NEGATIVE-CONTROL TETRODE TYPE

Supersedes Type 3D22

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

	Min.	Av.	Max.	
Voltage	5.7	6.3	6.9	ac or dc volts
Current at 6.3 volts. . .	-	2.6	2.85	amp

Cathode:		
Minimum heating time prior to tube conduction.	30	sec
Maximum outage time without reheating. .	3	sec
Direct Interelectrode Capacitances (Approx.):°		
Grid No.1 to anode*.	0.1	μμf
Grid No.1 to cathode, grid No.2, base shell, and heater	8.5	μμf
Anode to cathode, grid No.2, base shell, and heater	4.6	μμf
Ionization Time (Approx.):		
For conditions: dc anode volts = 100, grid-No.1 square-pulse volts = +100, and peak anode amperes during conduction = 8	0.5	μsec
Deionization Time (Approx.):		
For conditions: dc anode volts = 125, dc grid-No.1 volts = -200, grid-No.1 resistor (ohms) = 1000, and dc anode amperes = 0.8.	150	μsec
For conditions: dc anode volts = 125, dc grid-No.1 volts = -14.8, grid-No.1 resistor (ohms) = 1000, and dc anode amperes = 0.8.	400	μsec
Maximum Critical Grid-No.1 Current:		
For conditions: ac anode-supply volts = 460 (rms), and average anode amperes = 0.8.	0.8	μamp
Anode Voltage Drop (Approx.)	10	volts
Grid-No.1 Control Ratio (Approx.):		
For conditions: grid-No.1 resistor (megohms) = 0 to 0.1, grid-No.2 resistor (megohms) = 0, and grid-No.2 volts = 0	150	
Grid-No.2 Control Ratio (Approx.):		
For conditions: grid-No.1 resistor (megohms) = 0, grid-No.2 resistor (megohms) = 0 to 0.1, and grid-No.1 volts = -3	650	

° Without external shield.

* With all other electrodes and base shell connected to ground.

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

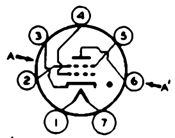
RCA

3D22-A
GAS THYRATRON

Mechanical:

Mounting Position. . . . . .Any
Maximum Overall Length . . . . 4-5/8"
Maximum Seated Length. . . . . 4"
Maximum Diameter . . . . 2-3/8"
Weight (Approx.) . . . . 5 oz
Bulb T-16
Base . . . . Medium-Metal-Shell Giant 7-Pin with Bayonet (JETEC No.A7-17)
Basing Designation for BOTTOM VIEW 7BV

Pin 1 - Heater
Pin 2 - Grid No.2
Pin 3 - Cathode
Pin 4 - Grid No.1



AA'= PLANE OF ELECTRODES

Pin 5 - Grid No.2
Pin 6 - Anode
Pin 7 - Heater

RELAY AND GRID-CONTROLLED RECTIFIER SERVICE

Maximum Ratings, ***Absolute Values:***

PEAK ANODE VOLTAGE:		
Forward.	650 max.	volts
Inverse.	1500 max.	volts
GRID-No.2 (SHIELD-GRID) VOLTAGE:		
Peak, before tube conduction	-100 max.	volts
Average#, during tube conduction	-10 max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Peak or DC, before tube conduction . . .	-200 max.	volts
Average#, during tube conduction	-10 max.	volts
CATHODE CURRENT:		
Peak	8 max.	amp
Average#	0.8 max.	amp
Fault, for duration of 0.1 second max. .	30 max.	amp
AVERAGE GRID-No.2 CURRENT#	+0.1 max.	amp
AVERAGE GRID-No.1 CURRENT#	+0.05 max.	amp
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode.	100 max.	volts
Heater positive with respect to cathode.	25 max.	volts
AMBIENT-TEMPERATURE RANGE.	-75 to +90	°C

Maximum Circuit Values:

Grid-No.1-Circuit Resistance	2 max.	megohms

Averaged over any interval of 30 seconds maximum.

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

3D22-A
GAS THYRATRON

SPECIAL PERFORMANCE TESTS

Made in conformance with indicated sections of MIL-E-1B Specifications dated 2 May 1952

4.9.19.2 (F-66) High-Frequency Vibration:

The tube is rigidly mounted on a table vibrating with simple harmonic motion at a frequency of 50 ± 2 cps with a fixed amplitude of 0.040" ± 0.0025" (total excursion is double the amplitude). Maximum acceleration is 10g. No voltage is applied during vibration. Tube is vibrated for 10 minutes in such manner that table motion is along shortest line between anode and cathode. This test will not cause tube to be inoperative.

4.10.19 (F-64) Thyratron High-Voltage Operation:

	Min.	Max.	
Grid-No.1 Supply Voltage (1)	-4.4	-9.2	volts

This test is made after two light taps with a felt hammer (similar to type used for noise tests) in direction from cathode to anode under the following conditions: heater voltage of 6.3 volts rms, anode supply voltage of 500 volts rms, grid No.2 tied to cathode, load resistance of 2000 ohms, and grid-No.1 circuit-resistance of 2 megohms. Tube conduction is indicated by an oscilloscope connected between anode and cathode and ceases when the grid-No.1 supply voltage is increased negatively within indicated range.

Grid-No.1 Supply Voltage (2)	-4.4	-9.2	volts

This test is made as for Grid-No.1 Supply Voltage (1), except that the taps are made in direction from anode to cathode.

Voltage Difference	-	1	volt

The difference between the value of grid-No.1 supply voltage in the first and second grid-No.1 supply voltage tests will not exceed the specified value.

OPERATING CONSIDERATIONS

Sufficient *anode-circuit resistance*, including the tube load, must be used under any conditions of operation to prevent exceeding the current ratings of the tube.

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

3D22-A

GRID-CONTROLLED RECTIFIER CIRCUITS

DC Voltage Control

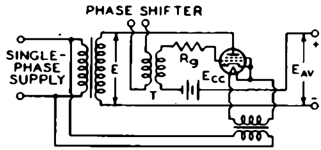


FIG. 1 HALF-WAVE SINGLE-PHASE

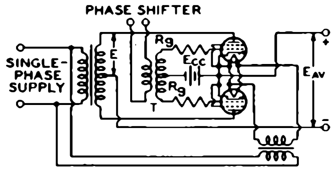


FIG. 2 FULL-WAVE SINGLE-PHASE

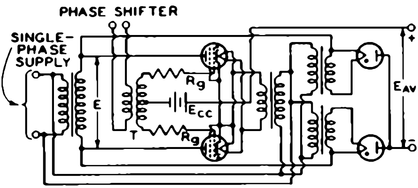


FIG. 3 SERIES SINGLE-PHASE

AC Voltage Control

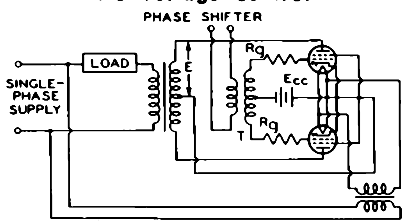


FIG.4 FULL-WAVE SINGLE-PHASE

NOTES

92CL-8596

T = PEAKING TRANSFORMER
IN FIG. 3, THE RECTIFIER TUBES MAY BE 3D22-A's USED AS DIODES. THE 3D22-A IS USED AS A DIODE BY CONNECTING GRIDS No2 AND No1 TO CATHODE (PIN 3)

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

RCA

3D22-A

GRID-CONTROLLED RECTIFIER CIRCUITS

Numerical Relationships Among Electrical Quantities

E = Trans. Sec. Voltage (RMS)
E_{av} = Average DC Output Voltage
E_{bmf} = Peak Forward Anode Voltage
E_{bmi} = Peak Inverse Anode Voltage
E_m = Peak DC Output Voltage
E_r = Major Ripple Voltage (RMS)
f = Supply Frequency
f_r = Major Ripple Frequency
I_{av} = Average DC Output Current
I_b = Average Anode Current
I_p = Anode Current (RMS)
I_{pm} = Peak Anode Current
P_{ac} = Load Volt-Amperes
P_{al} = Line Volt-Amperes
P_{ap} = Trans. Pri. Volt-Amperes
P_{as} = Trans. Sec. Volt-Amperes
P_{dc} = DC Power ($E_{av} \times I_{av}$)

Note: Conditions assumed involve sine-wave supply; zero voltage drop in tubes; no losses in transformer and circuit; no back emf in the load circuit; and no phase-back.

RATIO	Fig. 1	Fig. 2	Fig. 3	Fig. 4
Voltage Ratios				
E/E_{av}	2.22	1.11	1.11	-
E_{bmi}/E	1.41	2.83	1.41	1.41
E_{bmi}/E_{av}	3.14	3.14	1.57	-
E_m/E_{av}	3.14	1.57	1.57	-
E_r/E_{av}	1.11	0.472	0.472	-
E_{bmf}/E:				
Resistive Load	1.41	1.41	1.41	1.41
Inductive Load■	1.41	2.83	1.41	1.41
Frequency Ratio				
f_r/f	1	2	2	-
Current Ratios				
I_p/I_{av}	1.57	0.785	0.785	-
I_b/I_{av}	1	0.5	0.5	-
Resistive Load				
I_{pm}/I_{av}	3.14	1.57	1.57	-
I_{pm}/I_b	3.14	3.14	3.14	3.14
Inductive Load■				
I_{pm}/I_{av}	--	1	1	-
Power Ratios				
P_{ac}/I_bE_{bmf}	--	-	-	1.57
Resistive Load				
P_{as}/P_{dc}	3.49	1.74	1.24	-
P_{ap}/P_{dc}	2.69	1.23	1.24	-
P_{al}/P_{dc}	2.69	1.23	1.24	-

■: See next page.

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

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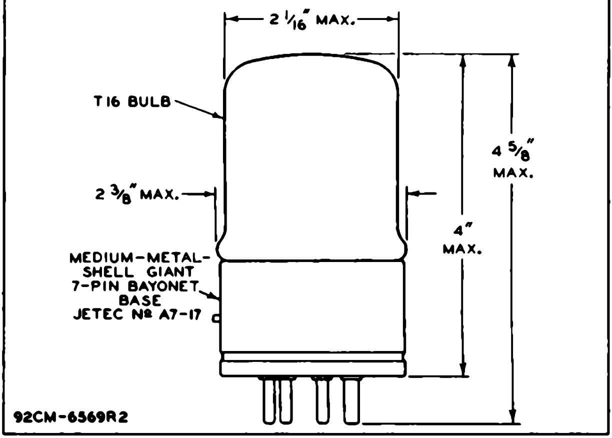
3D22-A
GAS THYRATRON

RATIO	Fig.1	Fig.2	Fig.3	Fig.4
Power Ratios (Cont'd)				
Inductive Load■				
P_{as}/P_{dc}	--	1.57	1.11	-
P_{ap}/P_{dc}	--	1.11	1.11	-
P_{al}/P_{dc}	--	1.11	1.11	-

■ The use of a large filter-input choke is assumed, except for the circuit in Fig.4.

CIRCUIT Single-Phase	MAX. TRANS. SEC. VOLTS (RMS) E	APPROX. DC OUTPUT VOLTS TO FILTER E_{av}	MAX. DC OUTPUT AMPERES I_{av}	MAX. DC OUTPUT WATTS TO FILTER P_{dc}	MAX. AC OUTPUT VOLT-AMPERES P_{ac}
Fig.1 Half-Wave	460	205	0.8	165	-
Fig.2 Full-Wave:					
Resistive Load	460	410	1.6	660	-
Inductive Load	230	205	1.6	330	-
Fig.3 Series	460	410	1.6	660	-
Fig.4 Full-Wave	460	-	-	-	800



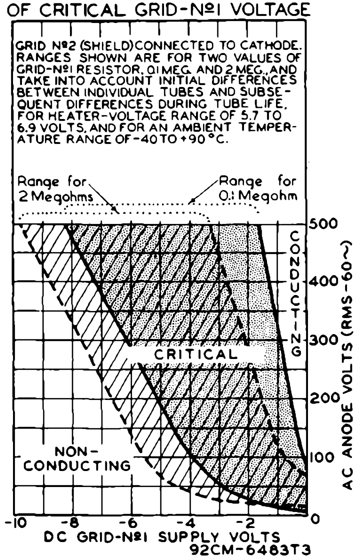
TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

3D22-A

3D22-A

GAS THYRATRON

OPERATIONAL RANGE
OF CRITICAL GRID-№1 VOLTAGE



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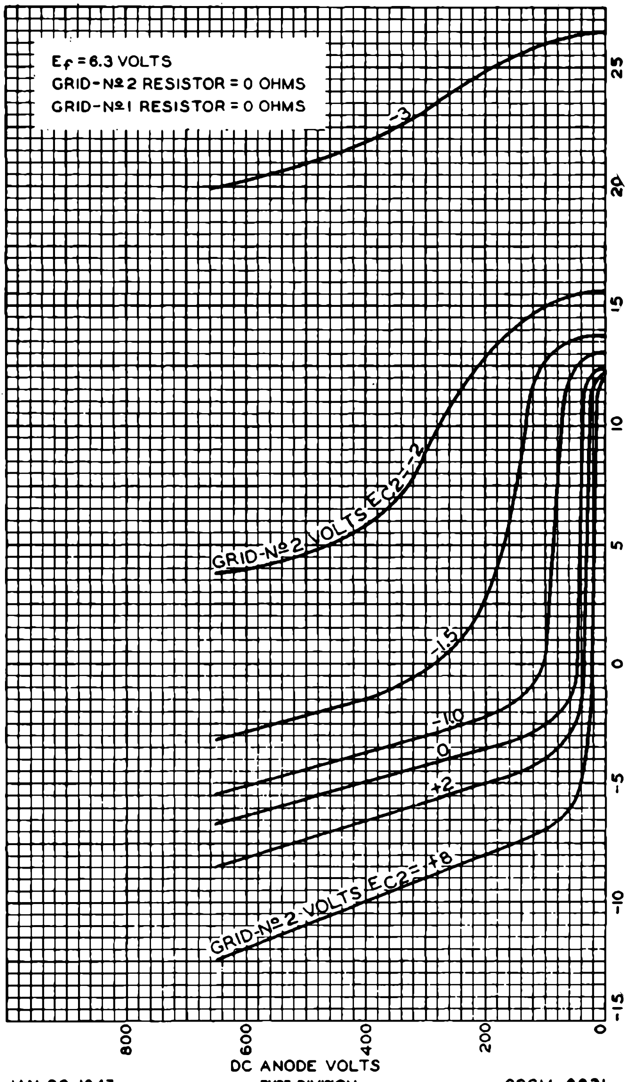
3D22-A

AVERAGE CONTROL CHARACTERISTICS



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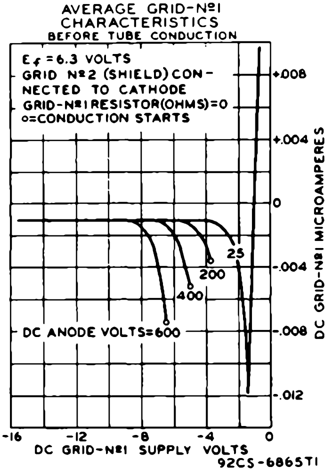
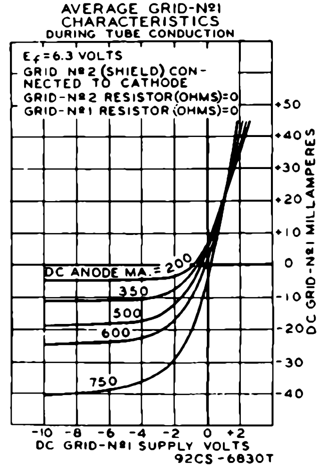
92CM-6831

3D22-A

CHARACTERISTIC CURVES





105

THYRATRON

MERCURY-VAPOR TETRODE

DATA

Electrical:

	Continuous Service		Intermittent Service		
Heater, for Unipotential Cathode:					
Voltage*	5.0	5.0	5.5	5.0	volts
Current.	10.0	10.0	11.0	10.0	amp
Direct Interelectrode Capacitance:					
Grid-No.1 to Anode (Approx.)	0.3	0.3	0.3	0.3	μμf
Peak Voltage Drop (Approx.). .	16	16	16	16	volts
Approx. Control Characteristics:					
Anode Voltage.	100	1000	100	1000	volts
Grid-No.2 Voltage.	0	0	0	0	volts
Grid-No.1 Voltage.	+1	-9	+1	-9	volts
Ionization Time (Approx.). . .	10	10	10	10	μsec.
Deionization Time (Approx.). .	1000	1000	1000	1000	μsec.

Mechanical:

Mounting Position.	Vertical, Base Down
Overall Length	11" ± 1/4"
Seated Length.	10-1/4" ± 1/4"
Greatest Radius.	2-13/16"
Bulb	ST-30
Caps	No. 3917
Base	Super-Jumbo 4-Pin, with Bayonet

Maximum Ratings, Absolute Values:

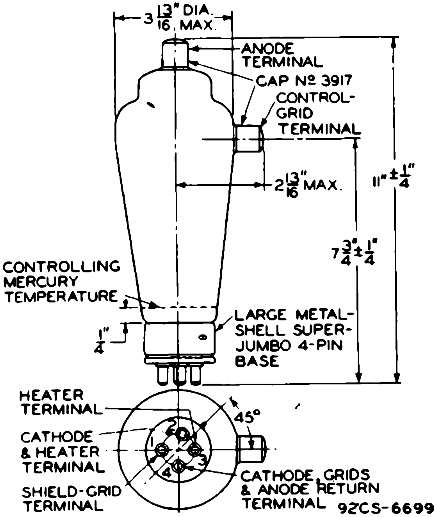
	Continuous Service	Intermittent Service		
PEAK FORWARD ANODE VOLT.	2500	750	10000	max.volts
PEAK INVERSE ANODE VOLT.	2500	750	10000	max.volts
GRID-No.1 (CONT.GRID) VOLT.:				
Before Conduction. . .	-1000	-1000	-1000	max.volts
During Conduction. . .	-10	-10	-10	max.volts
GRID-No.2 (SH'LD GRID) VOLT.:				
Before Conduction. . .	-500	-500	-500	max.volts
During Conduction. . .	-10	-10	-10	max.volts
INSTANTANEOUS ANODE CUR.:				
Below 25 Cycles. . . .	12.8	5.0	8.0	max.amp
25 Cycles and Higher .	40	77	16	max.amp
AVERAGE ANODE CURRENT. .	6.4	2.5	4.0	max.amp
SURGE ANODE CUR., for 0.1 sec., max.	400	400	160	max.amp
INSTANTANEOUS GRID-No.1 CUR.	1.0	1.0	1.0	max.amp
AVERAGE GRID-No.1 CUR. .	0.25	0.25	0.25	max.amp
INSTANTANEOUS GRID-No.2 CUR.	2.0	2.0	2.0	max.amp
AVERAGE GRID-No.2 CUR. .	0.5	0.5	0.5	max.amp
TIME OF AVERAGING CURRENT	15	5	15	max.sec
COND.-MERCURY TEMP. RANGE▲	40-80	30-95	25-50	°C

* Must be applied 5 minutes before anode voltage is applied.

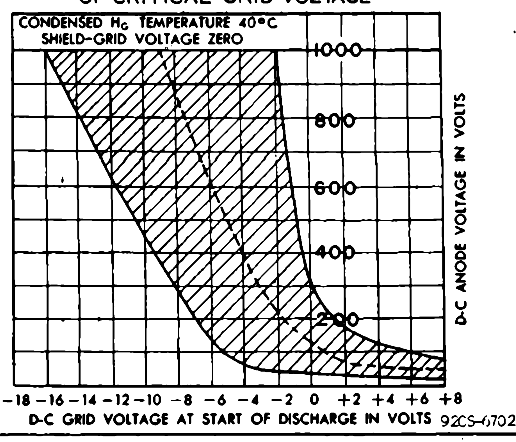
▲ Recommended condensed-mercury temperature = 40°C.

105

THYRATRON



OPERATIONAL REGION OF CRITICAL GRID VOLTAGE



172

172
THYRATRON
METAL MERCURY-VAPOR TETRODE

DATA

Electrical:

	Continuous Service		Welder-Control Service		
Heater, for Unipotential Cathode:					
Voltage*.	5.0	5.0	5.0	5.5	volts
Current	10.0	10.0	10.0	11.0	amp
Direct Interelectrode Capacitance (Approx.):					
Grid No.1 to Anode	0.07	0.07	0.07	0.07	μμf
Peak Voltage Drop . .	16	16	16	16	volts
Approx. Control Characteristics:					
Anode Voltage . . .	100	2000	100	2000	volts
Grid-No.1 Voltage .	+1.0	-14	+1.0	-14	volts
Grid-No.2 Voltage .	0	0	0	0	volts
Ionization Time(Approx.)	10	10	10	10	μsec
Deionization Time (Approx.)	1000	1000	1000	1000	μsec

Mechanical:

Mounting Position . . . . Vertical, Radiator Down
Overall Rigid Length. . . . . 10-11/16" ± 1/16"
Greatest Radius . . . . 2-5/8"
Terminals . . . . See Outline Drawing

Maximum Ratings, Absolute Values:

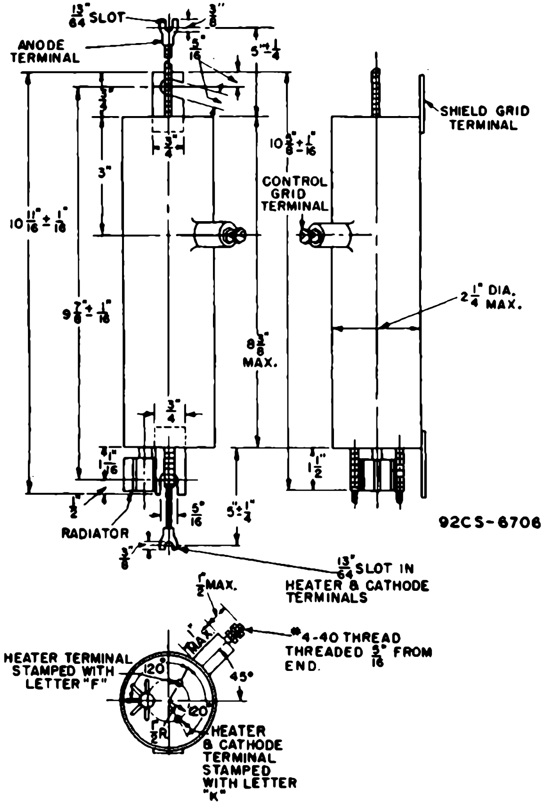
	Continuous Service	Welder-Control Service	
PEAK FORWARD ANODE VOLT. .	2000 max.	750 max.	volts
PEAK INVERSE ANODE VOLT. .	2000 max.	750 max.	volts
GRID-No.1 (CONT. GRID) VOLT.:			
Before Conduction	-1000 max.	-1000 max.	volts
During Conduction	-10 max.	-10 max.	volts
GRID-No.2 (SHL'D GRID) VOLT.:			
Before Conduction	-300 max.	-300 max.	volts
During Conduction	-5.0 max.	-5.0 max.	volts
INSTANTANEOUS ANODE CUR.:			
Below 25 Cycles	13.0 max.	13.0 max.	amp
25 Cycles and Higher. . .	40 max.	77 max.	amp
AVERAGE ANODE CURRENT** . .	6.4 max.	2.5 max.	amp
SURGE ANODE CURRENT for 0.1 sec. max.	400 max.	400 max.	amp
INSTANTANEOUS GRID-No.1 CUR.	1.0 max.	1.0 max.	amp
AVERAGE GRID-No.1 Cur.** .	0.25 max.	0.25 max.	amp
INSTANTANEOUS GRID-No.2 CUR.	2.0 max.	2.0 max.	amp
AVERAGE GRID-No.2 CUR.**. .	0.5 max.	0.5 max.	amp
COND.-MERCURY TEMP. RANGE▲	40 - 80	30 - 95	°C

* Must be applied at least 5 minutes before anode voltage is applied.
** Averaged over any 15-second interval.
▲ Recommended condensed-mercury temperature 40°C.

172

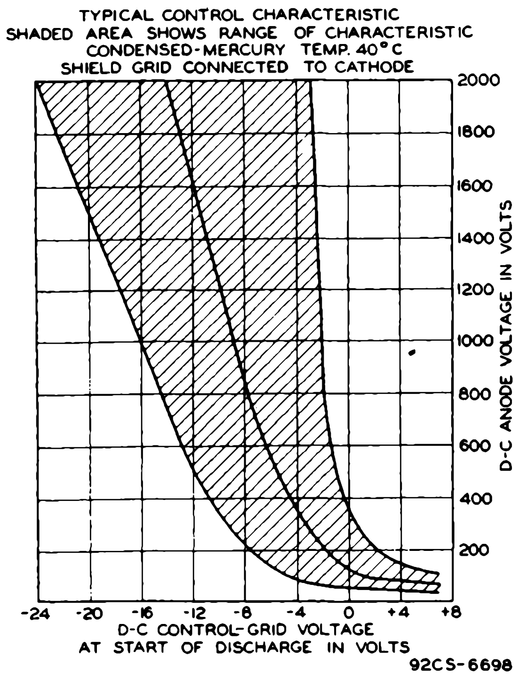
172

THYRATRON



172

THYRATRON



RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

502-A

502-A
GAS THYRATRON

NEGATIVE-CONTROL TETRODE TYPE WITH METAL SHELL

GENERAL DATA

Electrical: ←

Heater, for Unipotential Cathode:

	Min.	*Av.*	*Max.*	
Voltage.	5.7	6.3	7	ac or dc volts
Current at 6.3 volts .	–	0.6	0.66	. . . . . amp

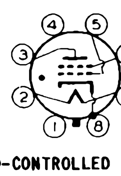
Cathode:		
Minimum heating time prior to tube conduction	10	sec
Direct Interelectrode Capacitances:		
Grid No.1 to anode	0.2	μμf
Grid No.1 to cathode & shell, grid No.2, and heater	2.5	μμf
Ionization Time (Approx.).	0.5	μsec
Deionization Time (Approx.):		
For conditions: dc anode ma = 100, grid-No.1-circuit resistor (ohms) = 1000, and dc grid-No.1 supply volts = -250	10	μsec
For conditions: dc anode ma = 100, grid-No.1-circuit resistor (ohms) = 1000, and dc grid-No.1 supply volts = -15	150	μsec
Maximum Critical Grid-No.1 Current:		
For conditions: anode volts (rms) = 460, and dc grid-No.1 volts adjusted to cutoff	2	μamp
Anode Voltage Drop	8	volts

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-5/8"
Seated Length.	1-31/32" ± 3/32"
Maximum Diameter	1-5/16"
Weight (Approx.)	2 oz
Bulb	Metal Shell MT8G ←
Base	Small-Wafer Octal 8-Pin (JETEC No.B8-21) ←

BOTTOM VIEW

Pin 1 – No Connection
Pin 2 – Heater
Pin 3 – Anode
Pin 4 – No Connection



Pin 5 – Grid No.1
Pin 6 – Grid No.2
Pin 7 – Heater
Pin 8 – Cathode, Shell

RELAY and GRID-CONTROLLED RECTIFIER SERVICE ←

Maximum Ratings, ***Absolute Values*****:**

PEAK ANODE VOLTAGE:			
Forward.	180 max.	650 max.	volts
Inverse.	360 max.	1300 max.	volts

← Indicates a change.

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

502-A

502-A
GAS THYRATRON

GRID-No.2 (SHIELD-GRID) VOLTAGE:			
Peak, before tube conduction	-100 max.	-100 max.	volts
Average■, during tube conduction	-5 max.	-5 max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:			
Peak, before tube conduction	-250 max.	-250 max.	volts
Average■, during tube conduction	-10 max.	-10 max.	volts
CATHODE CURRENT:			
Peak	1.0 max.	1.0 max.	amp
Average●	0.2 max.	0.1 max.	amp
Fault, for duration of 0.1 second max.	10 max.	10 max.	amp
GRID-No.2 CURRENT:			
Average■	+0.01 max.	+0.01 max.	amp
GRID-No.1 CURRENT:			
Average■	+0.01 max.	+0.01 max.	amp
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode . . .	100 max.	100 max.	volts
Heater positive with respect to cathode . . .	25 max.	25 max.	volts
AMBIENT-TEMPERATURE RANGE. .	-55 to +90	-55 to +90	°C

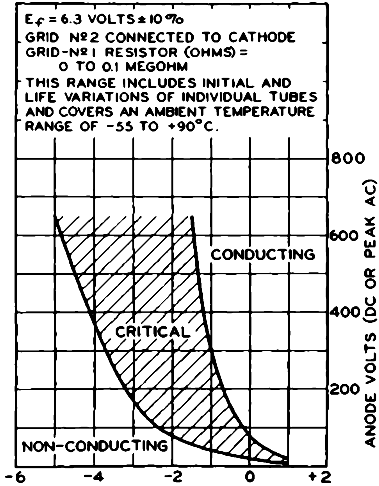
■ Averaged over 1 cycle.
● Averaged over any interval of 30 seconds maximum.

For Dimensional Outline, see GENERAL SECTION

502-A

GAS THYRATRON

OPERATIONAL RANGE
OF CRITICAL GRID-No 1 VOLTAGE



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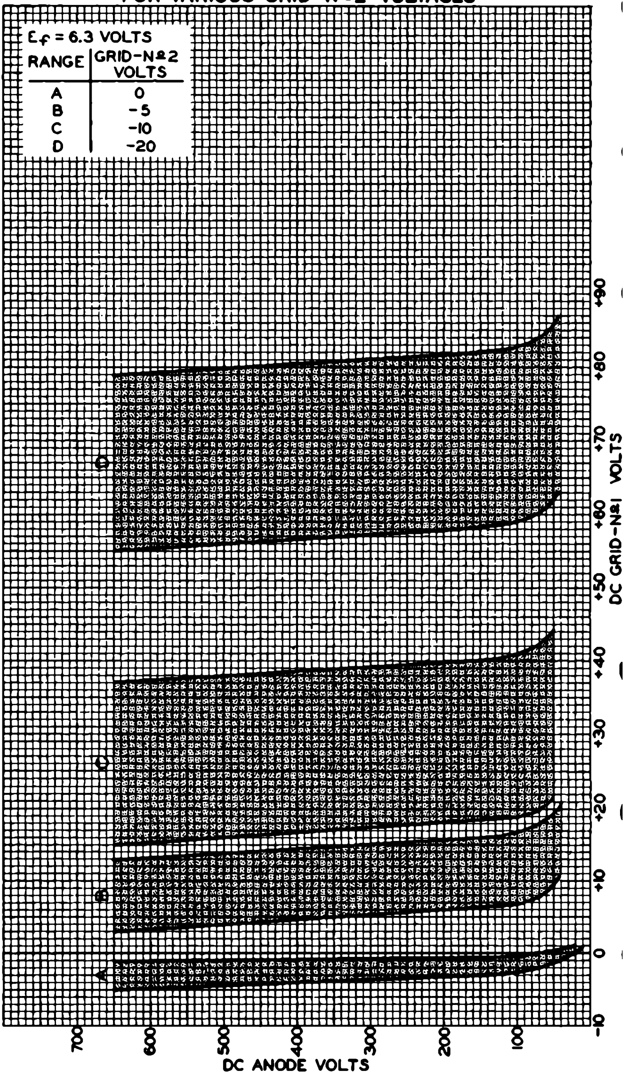
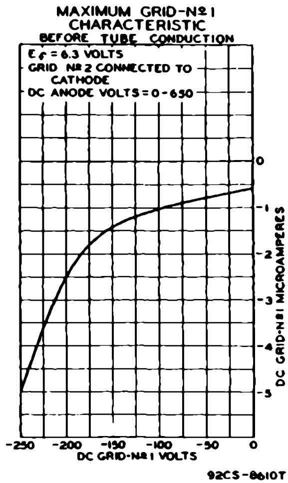
RCA

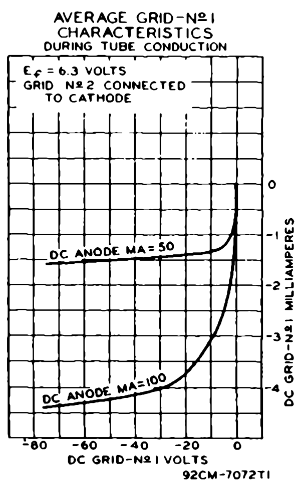
502-A
OPERATIONAL RANGES OF CRITICAL GRID-No.1 VOLTAGE FOR VARIOUS GRID-No.2 VOLTAGES



502-A

CHARACTERISTIC CURVES





629

629
THYRATRON
GAS-TRIODE

DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage*	2.5	volts
Current	2.6	amp

Direct Interelectrode Capacitances (Approx.):

Grid to Anode	3.3	μμf
Grid to Cathode	3.3	μμf
Anode to Cathode	1.8	μμf
Peak Voltage Drop	15	volts
Control Characteristic	Negative	
Ionization Time (Approx.)	10	μseconds
Deionization Time (Approx.)	1000	μseconds

Mechanical:

Mounting Position	Any
Maximum Overall Length	4-1/4"
Maximum Seated Length	3-5/8"
Maximum Diameter	1-9/16"
Bulb	ST-12
Base	Small 5-Pin

Maximum Ratings, Absolute Values:

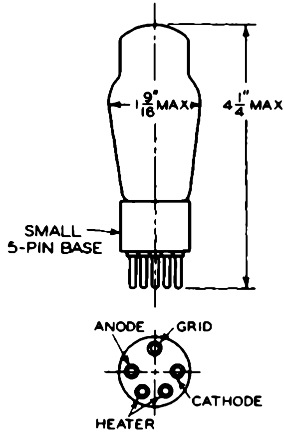
PEAK FORWARD ANODE VOLTAGE	350 max.	volts
PEAK INVERSE ANODE VOLTAGE	350 max.	volts
PEAK GRID VOLTAGE	-90 max.	volts
PEAK ANODE CURRENT	0.2 max.	amp
AVERAGE ANODE CURRENT**	0.04 max.	amp
SURGE ANODE CURRENT for 0.1 sec. max.	2.0 max.	amp
GRID CURRENT, Before Conduction	2.5 max.	μamp
PEAK GRID CURRENT	20 max.	ma.
AVERAGE GRID CURRENT**	0.4 max.	ma.
DC HEATER-CATHODE POTENTIAL RANGE	-45 to +5	volts
AMBIENT TEMPERATURE RANGE	-40 to +70	°C

* Heater voltage must be applied at least 30 seconds before start of tube conduction.

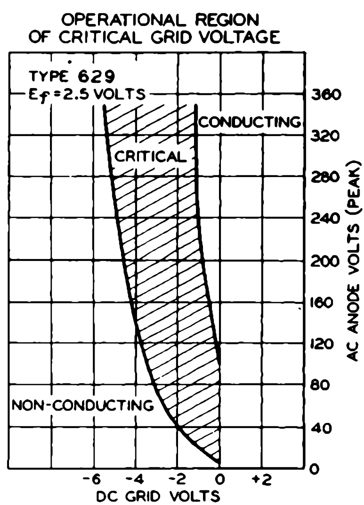
** Averaged over any 10-second interval.

629

THYRATRON



92CS-6737



92CS-6736

672

THYRATRON

MERCURY-VAPOR TETRODE

672

DATA

Electrical:

Heater, for Unipotential Cathode:
  Voltage* . . . . 5.0 . . . . volts
  Current. . . . . 6 . . . . amp
Direct Interelectrode Capacitances (Approx.):
  Grid No.1 to Anode . . . 0.04 . . . . μμf
  Grid No.2 to Anode . . . 3 . . . . μμf
Peak Voltage Drop. . . . . 12 . . . . volts
Control Characteristic . . Negative
Ionization Time (Approx.). 10 . . . . μseconds
Deionization Time (Approx.) 1000 . . . . μseconds

Mechanical:

Mounting Position. . . . . Vertical, Base Down
Overall Length . . . . 8-1/8" ± 1/4"
Maximum Diameter . . . . 2-5/16"
Bulb T-18
Cap. . . . . No. 3995
Base . . . . Large Shell Super-Jumbo 4-Pin

Maximum Ratings, Absolute Values:
For frequencies up to 150 cycles

PEAK FORWARD ANODE VOLTAGE	1500 max.	volts
PEAK INVERSE ANODE VOLTAGE	1500 max.	volts
PEAK GRID-No.1 (CONTROL-GRID) VOLT.:		
Before Conduction.	-1000 max.	volts
PEAK GRID-No.2 (SHIELD-GRID) VOLTAGE:		
Before Conduction.	-300 max.	volts
PEAK ANODE CURRENT	30 max.	amp
AVERAGE ANODE CURRENT**	2.5 max.	amp
SURGE ANODE CURRENT for 0.1 sec., max. .	150 max.	amp
GRID-No.1 CURRENT, Before Conduction (Grid Neg.)	2 max.	μamp
PEAK GRID-No.1 CURRENT	1.0 max.	amp
AVERAGE GRID-No.1 CURRENT**.	0.25 max.	amp
PEAK GRID-No.2 CURRENT	1.0 max.	amp
AVERAGE GRID-No.2 CURRENT**.	0.25 max.	amp
COND.-MERCURY TEMPERATURE RANGE▲	40-80	°C

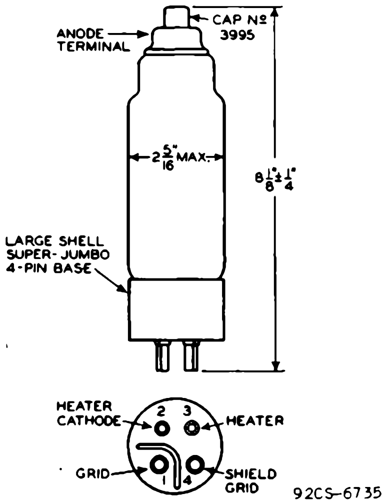
* Heater voltage must be applied at least 5 minutes before anode voltage is applied.

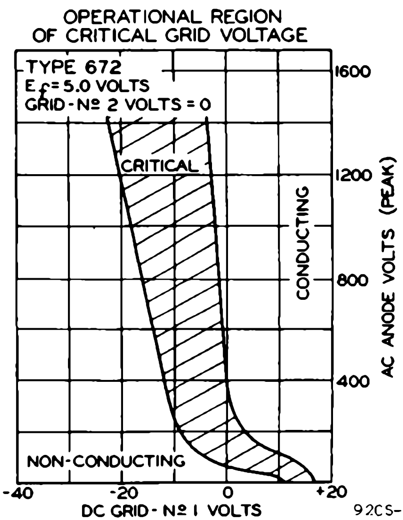
** Averaged over any 15-second interval.

▲ Recommended Condensed-Mercury Temperature 45-50°C.

672

672
THYRATRON





672-A
THYRATRON
MERCURY-VAPOR TETRODE
Supersedes Type 672

GENERAL DATA

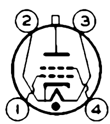
Electrical:

Heater, for Unipotential Cathode:		
Voltage	5	ac or dc volts
Current	5	amp
Cathode:		
Min. Heating Time, prior to tube conduction		5 minutes
Direct Interelectrode Capacitances:		
Grid No.1 to Anode		0.04 $\mu\mu f$
Grid No.2 to Anode		3 $\mu\mu f$
Ionization Time (Approx.)		10 μsec
Deionization Time (Approx.)		1000 μsec
Maximum Critical Grid Current		2 μamp
Anode Voltage Drop (Approx.)		12 volts

Mechanical:

Mounting Position	Vertical, Base Down
Overall Length	7-7/8" ± 1/4"
Seated Length	7-1/8" ± 1/4"
Maximum Diameter	2-5/16"
Bulb	T-18
Cap	Skirted Medium
Base	Large-Shell Super-Jumbo 4-Pin, Bayonet
Basing Designation for BOTTOM VIEW	4CE

Pin 1 - Grid No.1
Pin 2 - Heater, Cathode



Pin 3 - Heater
Pin 4 - Grid No.2
Cap - Anode

GRID-CONTROLLED RECTIFIER SERVICE

For frequencies up to 150 cycles

Maximum Ratings, ***Absolute Values*****:**

PEAK ANODE VOLTAGE:		
Forward	2500 max.	volts
Inverse	2500 max.	volts
GRID-No.2 (SHIELD-GRID) VOLTAGE:		
Peak, before anode conduction	-300 max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Peak, before anode conduction	-1000 max.	volts
CATHODE CURRENT:		
Peak	40 max.	amp
Average■	3.2 max.	amp
Surge, for duration of 0.1 sec. max.	150 max.	amp

■ See next page.

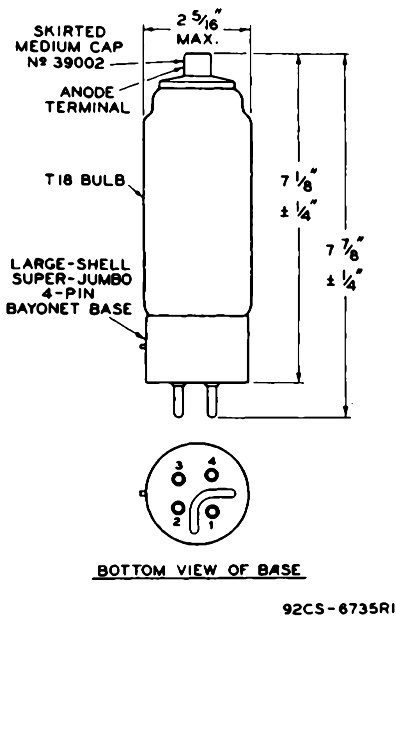
(continued on next page)

672-A
THYRATRON

GRID-No. 2 CURRENT:		
Peak	1 max.	amp
Average■	0.25 max.	amp
GRID-No. 1 CURRENT:		
Peak	1 max.	amp
Average■	0.25 max.	amp
COND.-MERCURY TEMPERATURE RANGE▲	40 to 80	°C

■ Averaged over any interval of 15 sec. max.

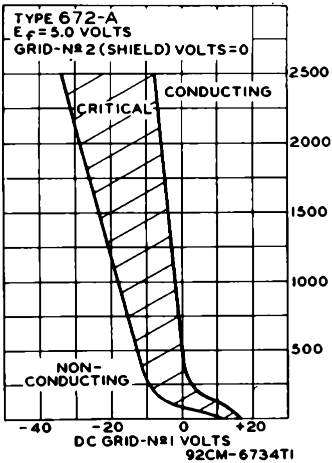
▲ Recommended condensed-mercury temperature is between 45° and 50°C.

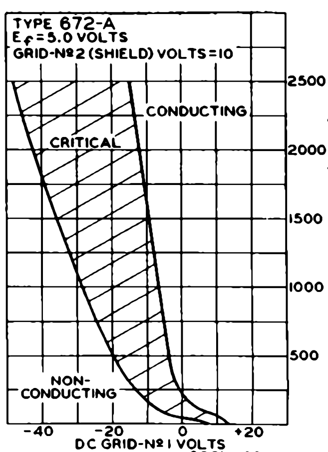


672-A

672-A
THYRATRON

OPERATIONAL RANGES OF CRITICAL GRID-№1 VOLTAGE





676

676

THYRATRON

MERCURY-VAPOR TRIODE

DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage*	5	volts
Current	10	amp
Direct Interelectrode Capacitance:		
Grid to Anode (Approx.)	5	μμf
Peak Voltage Drop	12	volts
Control Characteristic	Negative	
Ionization Time (Approx.)	10	μseconds
Deionization Time (Approx.)	1000	μseconds

Mechanical:

Mounting Position	Vertical, Base Down
Overall Length	11-1/4" ± 1/2"
Maximum Diameter	3-13/16"
Bulb	ST-30
Cap	No. 3985
Base	Large Shell Super-Jumbo 4-Pin

Maximum Ratings, Absolute Values:

For frequencies up to 150 cycles

	Continuous Service	Welder-Control Service	
PEAK FORWARD ANODE VOLTAGE	2500 max.	750 max.	volts
PEAK INVERSE ANODE VOLTAGE	2500 max.	750 max.	volts
PEAK GRID VOLTAGE:			
Before Conduction	-500 max.	-500 max.	volts
PEAK ANODE CURRENT	40 max.	77 max.	amp
AVERAGE ANODE CURRENT	6.4 max.	2.5 max.	amp
SURGE ANODE CURRENT for 0.1 sec. max.	200 max.	200 max.	amp
GRID CURRENT: Before conduction (Grid Negative)	5 max.	5 max.	μamp
PEAK GRID CURRENT	1 max.	1 max.	amp
AVERAGE GRID CURRENT	0.25 max.	0.25 max.	amp
TIME OF AVERAGING CURRENTS	15 max.	5 max.	sec
COND.-MERCURY TEMP. RANGE▲	40 - 80	40 - 90	°C

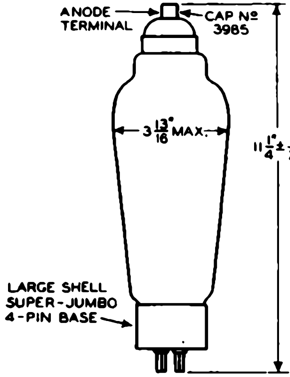
* Heater voltage must be applied for at least 5 minutes before anode voltage is applied.

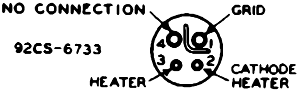
▲ Recommended condensed-mercury temperature range, 45 - 55°C.

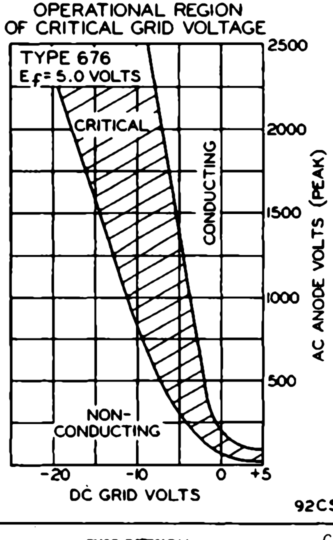
TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

676

676
THYRATRON







92CS-6732

677

677
THYRATRON
MERCURY-VAPOR TRIODE

DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage*	5	volts
Current	10	amp

Direct Interelectrode Capacitance:

Grid to Anode (Approx.)	5	μμf
Peak Voltage Drop	12	volts
Control Characteristic:	Negative	
Ionization Time (Approx.)	10	μseconds
Deionization Time (Approx.)	1000	μseconds

Mechanical:

Mounting Position	Vertical, Base Down
Overall Length	11-1/4" ± 1/2"
Maximum Diameter	3-13/16"
Bulb	ST-30
Cap	No. 3985
Base	Large Shell Super-Jumbo 4-Pin

Maximum Ratings, Absolute Values:

For frequencies up to 150 cycles

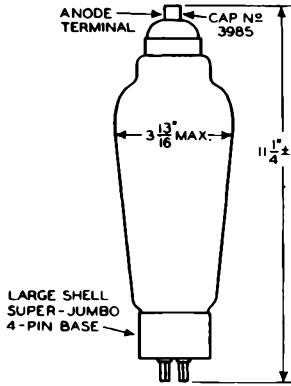
PEAK FORWARD ANODE VOLTAGE	10000 max.	volts
PEAK INVERSE ANODE VOLTAGE	10000 max.	volts
PEAK GRID VOLTAGE:		
Before Conduction	-500 max.	volts
Anode Negative	10 max.	volts
PEAK ANODE CURRENT	15 max.	amp
AVERAGE ANODE CURRENT**	4 max.	amp
SURGE ANODE CURRENT for 0.1 sec., max.	16 max.	amp
GRID CURRENT: Before Conduction (Grid Neg.)	5 max.	μamp
PEAK GRID CURRENT	1 max.	amp
AVERAGE GRID CURRENT**	0.25 max.	amp
COND.-MERCURY TEMPERATURE RANGE▲	30 - 50	°C

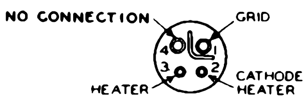
* Heater voltage must be applied for at least 5 minutes before anode voltage is applied.

** Averaged over any 15-second interval.

▲ Recommended condensed-mercury temp. range, 35 - 45°C.

677
THYRATRON





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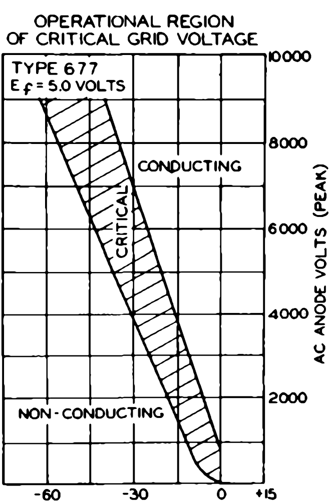


92CS-6730

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

884, 885
THYRATRONS
TRIODE TYPES

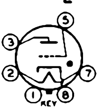
For new equipment design, RCA-884 is recommended.

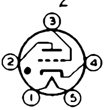
GENERAL DATA

Electrical:	*Type 884*	*Type 885*	
Heater.	Coated Unipotential Cathode		
Voltage	6.3 ± 10%	2.5 ± 10%	a-c or d-c volts
Current	0.6	1.5	. . . . . amp.
Direct Interelectrode Capacitances:			
Grid to Anode . . .	6	6	. . . . . μμf
Grid to Cathode . .	2	2	. . . . . μμf
Anode to Cathode. .	0.6	0.6	. . . . . μμf
Tube Voltage Drop . .	16	16	. .approx.volts

Physical:			
Mounting Position . .	Any	Any	
Maximum Overall Length	4-1/8	4-3/16	. . . . .inches
Maximum Seated Length	3-9/16	3-9/16	. . . . .inches
Maximum Diameter. . .	1-9/16	1-9/16	. . . . .inches
Bulb.	ST-12	ST-12	
Base.	Small Shell Octal 6-Pin	Small 5-Pin	
Basing Designation	G-6Q2	5A2	

Pin 1 - No Connection
Pin 2 - Heater
Pin 3 - Anode
Pin 5 - Grid
Pin 7 - Heater
Pin 8 - Cathode





BOTTOM VIEWS

Pin 1 - Heater
Pin 2 - Anode
Pin 3 - Grid
Pin 4 - Cathode
Pin 5 - Heater

RELAXATION OSCILLATOR — Sweep-Circuit Service△

Maximum Ratings, *Absolute Values*:

PEAK ANODE VOLTAGE.	300 *max.*	volts
PEAK CATHODE CURRENT ●	300 *max.*	ma.
PEAK GRID CURRENT ▲	1 *max.*	ma.
PEAK VOLTAGE BETWEEN ANY TWO ELECTRODES OR BETWEEN ANY ELECTRODE AND HEATER . .	350 *max.*	volts
D-C HEATER-CATHODE POTENTIAL.	-100 to +25	volts
AMBIENT TEMPERATURE RANGE	-75 to +90	°C

△ For best life results, it is desirable to delay tube conduction for about 10 seconds after applying heater voltage in order to allow the cathode to reach normal operating temperature.

● In sweep circuits designed so that the peak cathode current of 300 milliamperes will not be exceeded during condenser discharge, the resultant average cathode current is so small in comparison with the average-current capability of the cathode that a maximum rating for average cathode current is omitted because it has no practical significance.

▲ The resistance of the grid resistor should be not less than 1000 ohms per maximum instantaneous volt applied to the grid. Resistance values in excess of 500000 ohms may cause circuit instability.

←Indicates a change.

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RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

884, 885

THYRATRONS

(continued from preceding page)

RELAY & GRID-CONTROLLED RECTIFIER SERVICE [□]

At Frequencies Below 75 Cycles per Second

Maximum Ratings, ***Absolute Values:***

PEAK ANODE VOLTAGE	350 *max.*	volts
PEAK CATHODE CURRENT	300 *max.*	ma.
AVERAGE CATHODE CURRENT #	75 *max.*	ma.
PEAK VOLTAGE BETWEEN ANY TWO ELECTRODES OR BETWEEN ANY ELECTRODE AND HEATER	350 *max.*	volts
← D-C HEATER-CATHODE POTENTIAL	−100 to +25	volts
← AMBIENT TEMPERATURE RANGE	−75 to +90	°C

□ The heater voltage should be applied for 10 seconds before tube conduction occurs.

For an averaging period of 30 seconds.

← Indicates a change.

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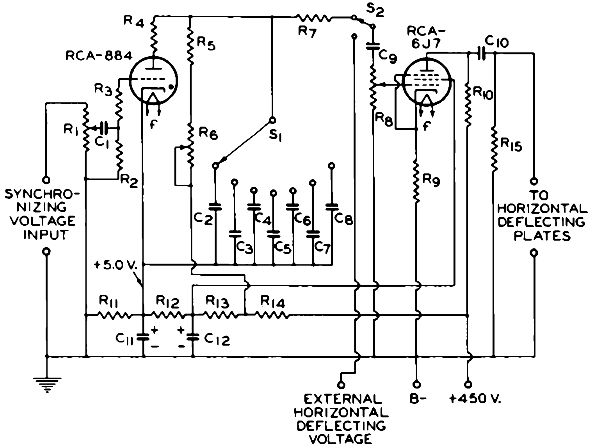
884

884

LINEAR SWEEP-CIRCUIT OSCILLATOR AND AMPLIFIER



C_1 = 0.25 μf OR GREATER
C_2 = 0.25 μf, 500 V.
C_3 = 0.1 μf, 500 V.
C_4 = 0.04 μf, 500 V.
C_5 = 0.015 μf, 500 V.
C_6 = 0.005 μf, 500 V.
C_7 = 0.002 μf, 500 V.
C_8 = 0.0008 μf, 500 V.
C_9 = 0.5 μf, 250 V.
C_{10} = 0.5 μf, 500 V.
C_{11} = 25 μf, 15 V.
C_{12} = 8 μf, 200 V.
R_1 = 5000 OHM (MAX.) POTENTIOMETER
R_2 = NOT GREATER THAN 50000 OHMS
R_3 = 2000-3000 OHMS, 0.5 WATT
R_4 = 350-500 OHMS, 0.5 WATT
R_5 = 0.3-0.5 MEGOHM, 0.5 WATT
R_6 = 1 MEGOHM POTENTIOMETER
R_7 = 1 MEGOHM, 0.5 WATT
R_8 = 0.5 MEGOHM POTENTIOMETER
R_9 = 850 OHMS, 0.5 WATT
R_{10} = 0.1 MEGOHM, 0.5 WATT
R_{11} = 1500 OHMS, 0.5 WATT
R_{12} = 25000 OHMS, 1.0 WATT
R_{13} = 60000 OHMS, 1.0 WATT
R_{14} = 60000 OHMS, 1.0 WATT
R_{15} = 2.0 MEGOHMS, 1.0 WATT
S_1 = 7-CONTACT S.P. SWITCH
S_2 = S.P.D.T. SWITCH

92CM-4875R1

APPROXIMATE FREQUENCY RANGE (CYCLES/SEC.)

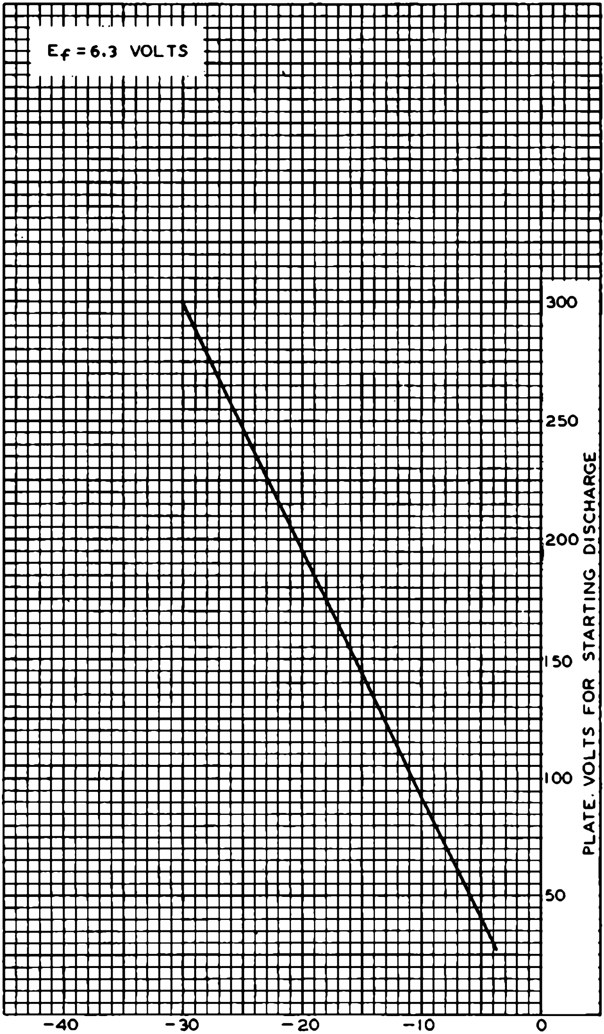
SWITCH (S_1) ON		C_2	C_3	C_4	C_5	C_6	C_7	C_8
R_6 AT	MAX.	20	40	110	280	670	1500	3600
	MIN.	60	130	340	880	2200	4900	11400

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

884

884

AVERAGE CONTROL CHARACTERISTIC



JAN. 4, 1945

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RADIO CORPORATION OF AMERICA HARRISON, NEW JERSEY

92CM-4883R1

2050

THYRATRON

GAS TETRODE

GENERAL DATA

Electrical:

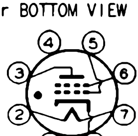
	Min.	Av.	Max.	
Heater, for Unipotential Cathode:				
Voltage (AC or DC)	5.7	6.3	6.9	volts
Current, with heater volts = 6.3	0.54	0.60	0.66	amp
Cathode:				
Heating Time, prior to tube conduction . . .	10	-	-	sec
Direct Interelectrode Capacitances (Approx.):●				
Grid No.1 to Anode			0.26	μμf
Input.			4.2	μμf
Output			3.6	μμf
Ionization Time (Approx.):				
For conditions: dc anode volts = 100; grid-No. 1 square-pulse volts = 50; and peak anode amp. during conduction = 1.0			0.5	μsec
Deionization Time (Approx.):				
For conditions: dc anode volts = 125; grid-No. 1 volts = -250; grid-No. 1 resistor (ohms) = 1000; dc anode amp. = 0.1			50	μsec
For conditions: dc anode volts = 125; grid-No. 1 volts = -10; grid-No. 1 resistor (ohms) = 1000; dc anode amp. = 0.1			100	μsec
Maximum Critical Grid Current, with ac anode-supply volts (rms) = 460, and average anode amp. = 0.1			0.5	μamp
Tube Voltage Drop (Approx.)			8	volts
Grid-No.1 Control Ratio (Approx.) with grid-No. 1 resistor (megohms) = 0; grid-No.2 volts = 0				250
Grid-No.2 Control Ratio (Approx.) with grid-No. 1 resistor (megohms) = 0; grid-No.2 resistor (megohms) = 0; grid-No. 1 volts = 0				800

● Without external shield.

Mechanical:

Mounting Position. Any
Maximum Overall Length . . . . 4-1/8"
Maximum Seated Length. . . . . 3-9/16"
Maximum Diameter . . . . 1-9/16"
Bulb ST-12
Base . . . . Small-Shell Octal 8-Pin
Basing Designation for BOTTOM VIEW 6BS

Pin 1 - No Connection
Pin 2 - Heater
Pin 3 - Anode
Pin 4 - No Connection



Pin 5 - Grid No.1
Pin 6 - Grid No.2
Pin 7 - Heater
Pin 8 - Cathode

← Indicates a change.

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2050

2050
THYRATRON

RELAY and GRID-CONTROLLED RECTIFIER SERVICE

Maximum Ratings, ***Absolute Values:***

PEAK ANODE VOLTAGE:			
Forward.	180 max.	650 max.	volts
Inverse.	360 max.	1300 max.	volts
GRID-No.2 (SHIELD-GRID) VOLTAGE:			
Peak, before anode conduction.	-100 max.	-100 max.	volts
Average, during anode conduction■	-10 max.	-10 max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:			
Peak, before anode conduction.	-250 max.	-250 max.	volts
Average, during anode conduction■	-10 max.	-10 max.	volts
CATHODE CURRENT:			
Peak	1.0 max.	1.0 max.	amp
Average■	0.2 max.	0.1 max.	amp
Surge, for duration of 0.1 sec. max. . . .	10 max.	10 max.	amp
→ GRID-No.2 CURRENT:			
Average■	+0.01 max.	+0.01 max.	amp
→ GRID-No.1 CURRENT:			
Average■	+0.01 max.	+0.01 max.	amp
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode. . .	100 max.	100 max.	volts
Heater positive with respect to cathode. . .	25 max.	25 max.	volts
AMBIENT TEMPERATURE RANGE. .	-75 to +90	-75 to +90	°C

→ **Typical Operating Conditions for Relay Service:**

RMS Anode Voltage.	117 . .	400 . .	volts
Grid-No.2 Voltage.	0 . .	0 . .	volts
RMS Grid-No.1 Bias Voltage . .	5□ . .	- . .	volts
DC Grid-No.1 Bias Voltage. . .	- . .	-6 . .	volts
Peak Grid-No.1 Signal Voltage.	5 . .	6 . .	volts
Grid-No.1-Circuit Resistance .	1.0 . .	1.0 . .	megohm
Anode-Circuit Resistance#. . .	1200 . .	2000 . .	ohms

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:		
For average anode current below 0.1 amp.	10 max.	megohms
For average anode current above 0.1 amp.	2 max.	megohms

■ Averaged over any interval of 30 sec. max.

□ Approximately 180° out of phase with the anode voltage.

\# Sufficient resistance, including the tube load, must be used under any conditions of operation to prevent exceeding the current ratings.

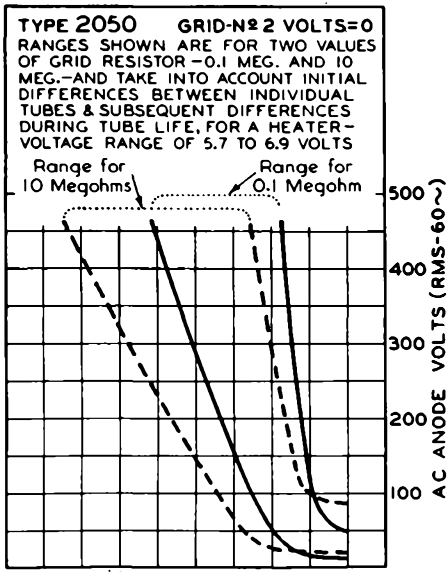
→ Indicates a change.

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

RCA

2050
THYRATRON

OPERATIONAL RANGE OF CRITICAL GRID VOLTAGE



92CM-6540T1

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

2050

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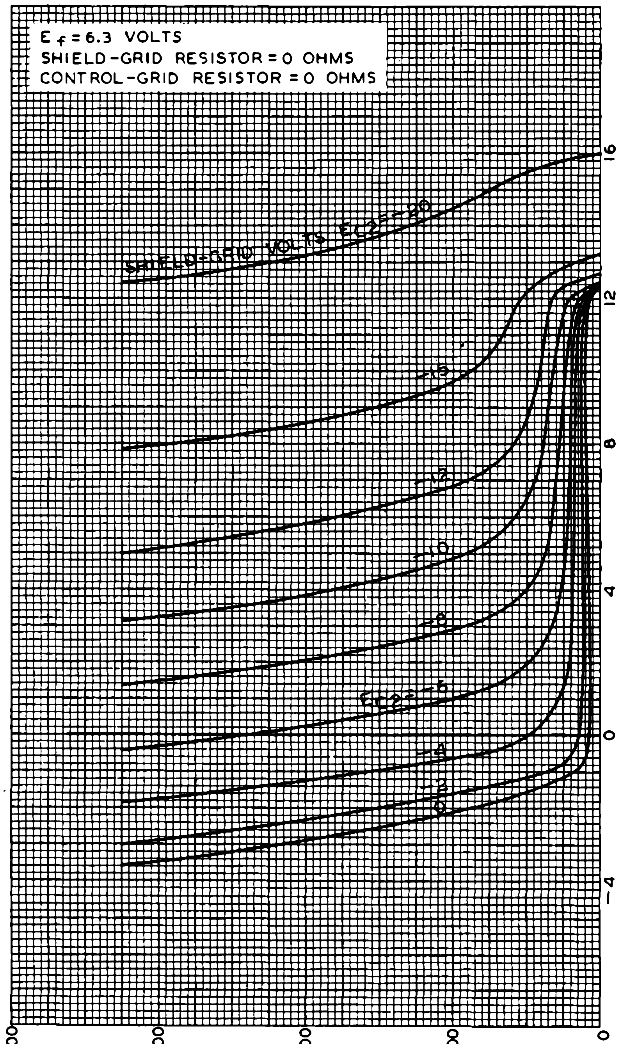
AVERAGE CONTROL CHARACTERISTICS



MAY 3, 1944

RCA VICTOR DIVISION

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6274R1

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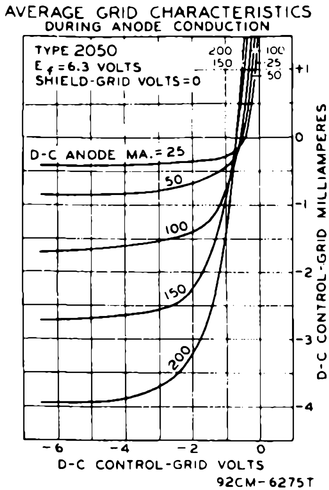
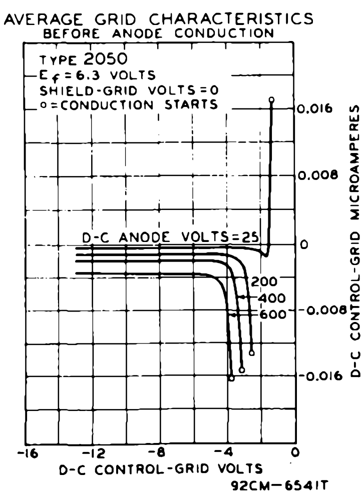
THYRATRON





APRIL 1, 1944

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6275T
92CM-6541T

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IGNITRON
SIZE A

DATA

General:

Peak Voltage Drop (Approx.). . . . . 12 volts
Cooling:
  Type . . . . Air, or Water-Cooled Clamp
  Clamp Width (Approx.). . . . . 1-3/4"
  Clamp Location . . . . See Outline Drawing
Mounting Position. . . . . Vertical, Flexible Lead Up
Max. Rigid Length (Approx.). . . . . 10"
Maximum Diameter . . . . 2-3/4"

AC WELDER-CONTROL SERVICE ⊕

Ratings are for any voltage from 250 to 600 volts rms at frequencies from 25 to 60 cycles

Maximum Ratings, Absolute Values:

	Air Cooled*	Water Cooled	
DEMAND	105 max.	300 max.	kva
CORRESPONDING AVERAGE ANODE CUR.	3 max.	12.1 max.	amp
AVERAGE ANODE CURRENT. . . .	5.6 max.	22.4 max.	amp
CORRESPONDING DEMAND . . .	35 max.	100 max.	kva
TIME OF AVERAGING ANODE CURRENT:			
AT 500 VOLTS RMS	15.5 max.	11 max.	sec
AT 250 VOLTS RMS	31 max.	22 max.	sec
SURGE ANODE CURRENT.	■	■	peak amp
PEAK POSITIVE IGNITOR VOLTAGE§	900 max.	900 max.	volts
	200 min.	200 min.	volts
PEAK NEGATIVE IGNITOR VOLTAGE	5 max.	5 max.	volts
PEAK IGNITOR CURRENT §	100 max.	100 max.	amp
	30 min.	30 min.	amp
AVERAGE IGNITOR CURRENT**. .	1 max.	1 max.	amp
IGNITION TIME§	100 max.	100 max.	µsec
COOLING CLAMP TEMPERATURE. .	75 max.	50 max.	°C

* Mercury condensation in the anode-seal must be prevented by suitable heating devices.

⊕ RMS demand-voltage, -current, and -kva are on the basis of full-cycle conduction (no phase delay) regardless of whether or not phase control is used. Use the 250-volt rating for voltages below 250 volts.

** Averaged over any 5-second interval.

■ Must be limited to 280% of maximum rms demand current.

§ Ignition will occur if either minimum peak positive potential is applied, or minimum peak ignitor current flows, for the rated maximum ignitor ignition time.

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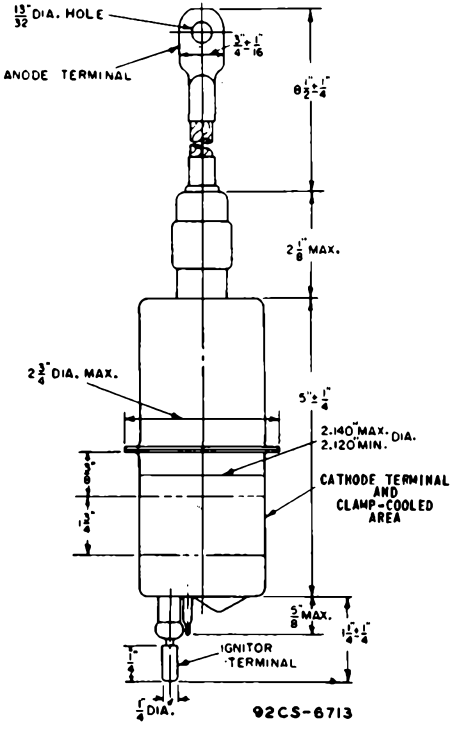
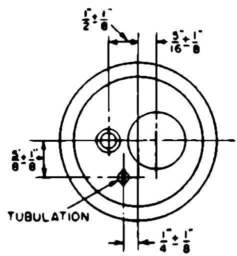
IGNITRON





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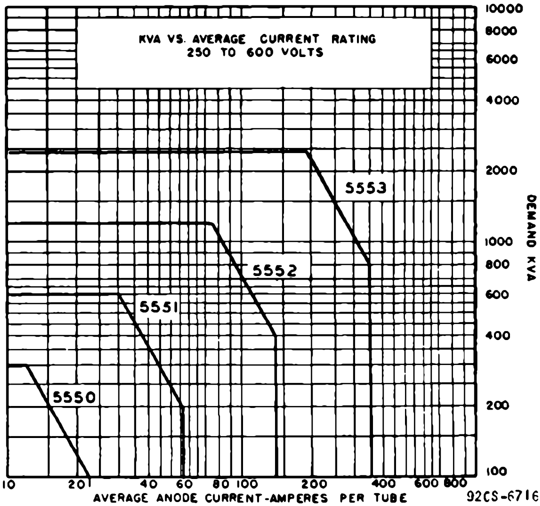
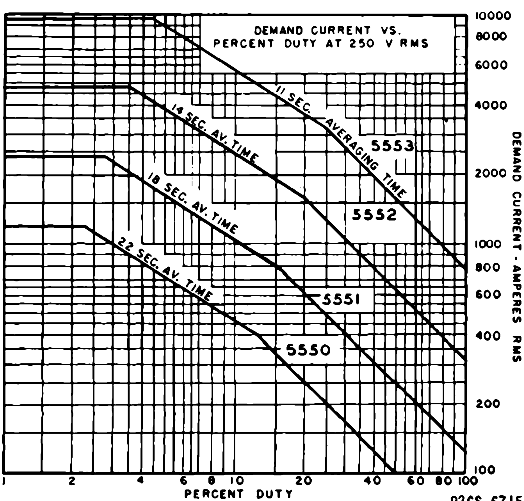
IGNITRON





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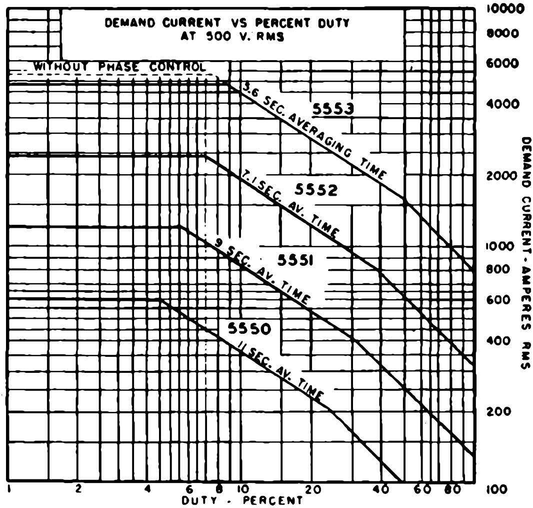
IGNITRON



2 TUBES CONNECTED IN INVERSE PARALLEL

92CS-6714

5551-A
IGNITRON

WATER-COOLED, STEEL-JACKETED, MERCURY-POOL-CATHODE
TYPE HAVING MOUNTING PLATE FOR THERMOSTATIC CONTROL

For resistance-welding control

GENERAL DATA

Electrical:

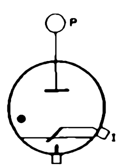
Cathode Excitation		Cyclic
Cathode-Spot Starting		By Ignitor
Minimum Requirements for Cathode Excitation:		
Peak ignitor voltage required to fire	200	volts
Peak ignitor current required to fire	30	amp
Starting time at required voltage or current	100	μsec
Tube Voltage Drop:		
At peak anode current of 3400 amperes	26	volts
At peak anode current of 176 amperes	13	volts

Mechanical:

Operating Position	Vertical, flexible lead up
Maximum Overall Length (Including flexible lead)	23-1/4"
Maximum Radius (Including water connections)	2-7/8"
Weight	3.6 lbs

Terminal Connections *(See Dimensional Outline)*:

P – Anode Terminal (Flexible lead)
K – Cathode Terminal (Bar opposite anode terminal)



I – Ignitor Terminal (Within jacket skirt at cathode end)

Cooling:

Type		Water
Minimum inlet water temperature	10	°C
Maximum outlet water temperature	40	°C
Minimum water flow	1	gpm
Maximum water-temperature rise	4	°C
Maximum pressure drop	2.5	psi

INTERMITTENT RECTIFIER SERVICE and FREQUENCY-CHANGER WELDER SERVICE

Maximum Ratings, *Absolute-Maximum Values:*

For zero phase-control angle and frequencies from 50 to 60 cps

RATING I

PEAK ANODE VOLTAGE:		
Forward	500 max.	volts
Inverse	500 max.	volts

ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5551-A
IGNITRON

ANODE CURRENT:			
Peak		700 max.	amp
Average (Averaged over any interval of 6 seconds maximum).		40 max.	amp
Fault, for duration of 0.15 second maximum.		8750 max.	amp

RATING II

PEAK ANODE VOLTAGE:			
Forward.	1200 max.	1200 max.	volts
Inverse.	1200 max.	1200 max.	volts
ANODE CURRENT:			
Peak	135 max.	600 max.	amp
Average (Averaged over any interval of 10 seconds maximum).	22.5 max.	5 max.	amp
Average (Averaged over any interval of 0.2 second maximum)	22.5 max.	100 max.	amp
Fault, for duration of 0.15 second maximum	7500 max.	7500 max.	amp

RATING III

PEAK ANODE VOLTAGE:			
Forward.	1500 max.	1500 max.	volts
Inverse.	1500 max.	1500 max.	volts
ANODE CURRENT:			
Peak	108 max.	480 max.	amp
Average (Averaged over any interval of 10 seconds maximum).	18 max.	4 max.	amp
Average (Averaged over any interval of 0.2 second maximum)	18 max.	80 max.	amp
Fault, for duration of 0.15 second maximum	6000 max.	6000 max.	amp

RESISTANCE-WELDING-CONTROL SERVICE●

Two Tubes in Inverse-Parallel Circuit

Maximum Ratings, ***Absolute-Maximum Values:***

For frequencies from 25 to 60 cps

Ratings I-A and I-B Apply to Operation Either (1) Without Water-Saving Thermostat, or (2) With Water-Saving Thermostat Shunted by Auxiliary Contactor

RATING I-A

SUPPLY VOLTAGE (RMS)	250 max.	250 max.	volts
DEMAND POWER (During conduction)	200 max.	600 max.	kva

●: See next page.

5551-A

IGNITRON

DUTY▲†	15 max.	2.8 max.	%
ANODE CURRENT (Per tube):			
Peak	1130 max.	3400 max.	amp
Demand (RMS, during conduction)#.	800 max.	2400 max.	amp
Average (Averaged over any interval of 18 seconds maximum)#	56 max.	30.2 max.	amp
Fault, for duration of 0.15 second maximum	6720 max.	6720 max.	amp

RATING I-B

SUPPLY VOLTAGE (RMS)	600 max.	600 max.	volts
DEMAND POWER (During conduction)	200 max.	600 max.	kva
DUTY▲†	37 max.	6.7 max.	%
ANODE CURRENT (Per tube):			
Peak	466 max.	1410 max.	amp
Demand (RMS, during conduction)#.	333 max.	1000 max.	amp
Average (Averaged over any interval of 7.5 seconds maximum)#	56 max.	30.2 max.	amp
Fault, for duration of 0.15 second maximum	2800 max.	2800 max.	amp

Ratings II-A and II-B Apply to Operation with Water-Saving Thermostat Not Shunted by Auxiliary Contactor

RATING II-A

SUPPLY VOLTAGE (RMS)	250 max.	250 max.	volts
DEMAND POWER (During conduction)	200 max.	600 max.	kva
DUTY▲†	9.7 max.	1.9 max.	%
ANODE CURRENT (Per tube):			
Peak	1130 max.	3400 max.	amp
Demand (RMS, during conduction)#.	800 max.	2400 max.	amp
Average (Averaged over any interval of 25.6 seconds maximum)#	36 max.	21 max.	amp
Fault, for duration of 0.15 second maximum	6720 max.	6720 max.	amp

RATING II-B

SUPPLY VOLTAGE (RMS)	600 max.	600 max.	volts
DEMAND POWER (During conduction)	200 max.	600 max.	kva
DUTY▲†	23 max.	4.7 max.	%

●,▲,†,#: See next page.

ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5551-A
IGNITRON

ANODE CURRENT (Per tube):

Peak	466 max.	1410 max.	amp
Demand (RMS, during conduction)#.	333 max.	1000 max.	amp
Average (Averaged over any interval of 10.7 seconds maximum)#	36 max.	21 max.	amp
Fault, for duration of 0.15 second maximum	925 max.	2800 max.	amp

IGNITOR

Maximum Ratings, ***Absolute-Maximum Values:***

PEAK IGNITOR VOLTAGE:

Positive	Equal to anode	volts
Negative	5 max.	volts

IGNITOR CURRENT:

Peak	100 max.	amp
Average (Averaged over any interval of 5 seconds maximum).	1 max.	amp
RMS.	10 max.	amp

● RMS voltage, current, and demand kva are on the basis of full-cycle conduction (no phase delay) regardless of whether or not phase control is used.

▲ Defined as (cycles "on")/(cycles "on" + cycles "off") during the specified averaging time.

† For supply voltages between 250 volts and 600 volts, duty is proportional to supply voltage. For supply voltages lower than 250 volts, the values for 250 volts apply.

For supply voltages between 250 volts and 600 volts, demand anode current and averaging time are each inversely proportional to supply voltage. For supply voltages lower than 250 volts, the values for 250 volts apply.

OPERATING CONSIDERATIONS

The 5551-A is equipped for mounting a thermostatic control with a mounting plate calibrated either for controlling the flow of cooling water through the water jacket, or for protection of the ignitron against overheating.

When the cooling water is circulated successively through the water jackets of two or more ignitrons, the *water-saving thermostat*, if used should be mounted on the ignitron connected directly to the water supply.

The water-saving thermostat, which has normally open contacts, is calibrated to close a circuit energizing a solenoid valve in the water-supply line and thus permit water flow to start when the temperature of the thermostat mounting plate exceeds approximately 35° C. Because of the lag between the heating of the ignitron envelope and the functioning of the water-saving thermostat to start water flow through the water jackets, the ignitron may overheat before the flow of cooling water starts.

5551-A
IGNITRON

Such overheating can be prevented by the use of an auxiliary contactor shunted across the contacts of the water-saving thermostat and actuated by the welding-control switch. The contactor causes the solenoid valve in the water-supply line to open as soon as welding current flows.

If the water-saving thermostat is not shunted by an auxiliary contactor, it will be necessary to use a lower value of maximum average current than that which is specified when the auxiliary contactor is employed. The lower average current value is achieved by increasing the maximum averaging time and decreasing the maximum duty. Although the same maximum conduction time is permitted for both of these operating conditions, the use of the water-saving thermostat alone, without the auxiliary contactor requires a longer interval between successive welds than when the thermostat is shunted by the contactor.

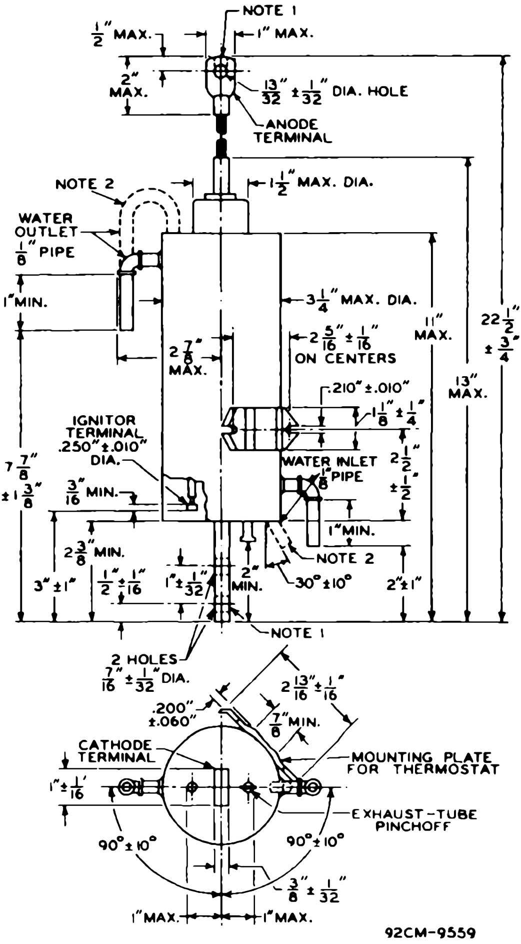
When a *protective thermostat* is used, it should be mounted on an ignitron from which the cooling water discharges into the drain. The protective thermostat is calibrated to open a set of normally closed contacts at a jacket temperature of approximately 52° C. The opening of these contacts causes a protective device to function. This device may be a relay opening the ignitor firing controls, or preferably, a circuit breaker which removes power from the ignitrons.

Care must be taken to insure that the water jacket of each ignitron is completely filled before power is applied. Tube operation with a partially filled water jacket may cause abnormal heating of the tube envelope, with resultant arc-back which impairs tube life. It is also necessary to arrange the cooling system so as to prevent any draining of the water jackets when the flow of water ceases.

RCA

5551-A

IGNITRON



NOTE 1: MAY BE SLOTTED.

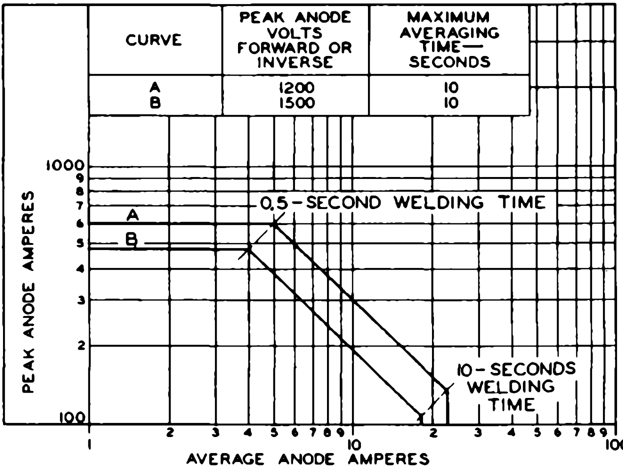
NOTE 2: DASHED POSITION MANUFACTURER'S OPTION.

RCA

5551-A

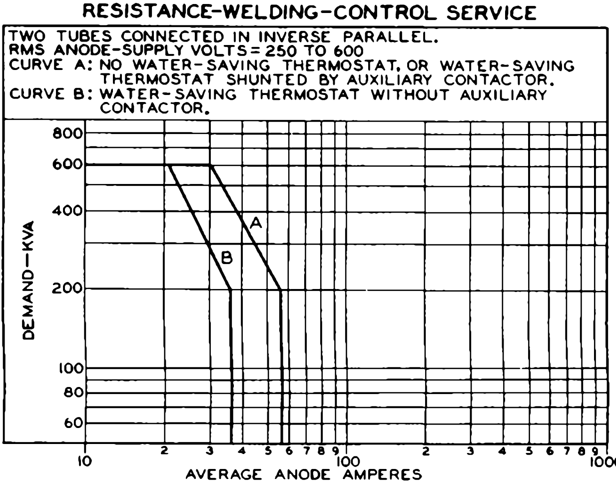
RATING CHARTS

FREQUENCY-CHANGER-WELDER SERVICE



92CS-9695

RESISTANCE-WELDING-CONTROL SERVICE



92CS-9698

5551-A

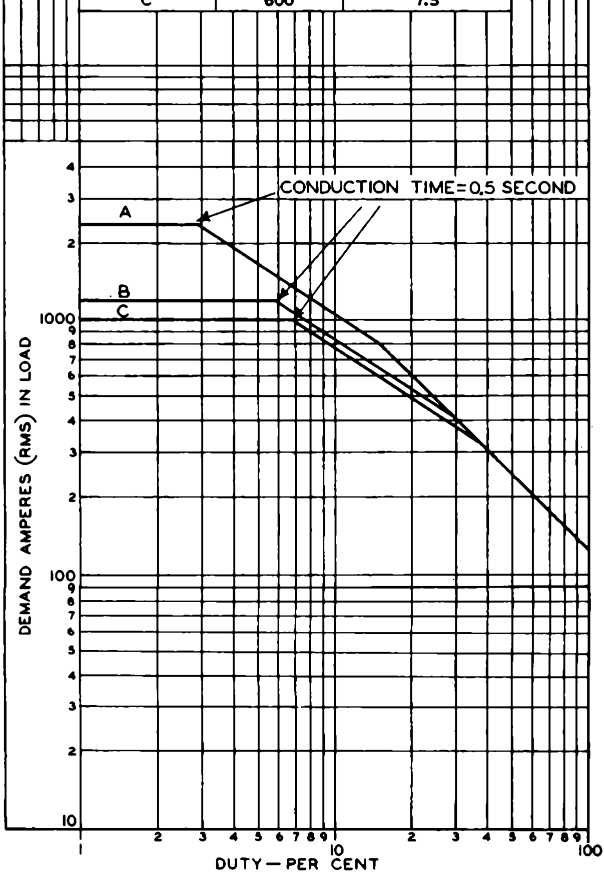
5551-A

RATING CHART

RESISTANCE-WELDING-CONTROL SERVICE

TWO TUBES CONNECTED IN INVERSE PARALLEL.
NO WATER-SAVING THERMOSTAT, OR WATER-SAVING THERMOSTAT SHUNTED BY AUXILIARY CONTACTOR.
PROTECTIVE THERMOSTAT OPTIONAL.

CURVE	RMS ANODE-SUPPLY VOLTS	MAXIMUM AVERAGING TIME—SECONDS
A	250	18
B	500	9
C	600	7.5



ELECTRON TUBE DIVISION 92CM-9696

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

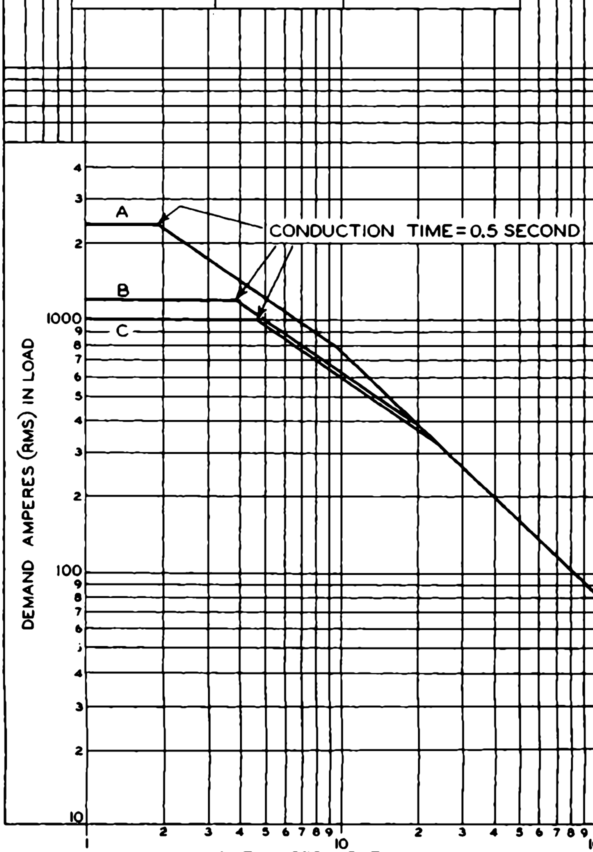
5551-A

RATING CHART

RESISTANCE-WELDING-CONTROL SERVICE

TWO TUBES CONNECTED IN INVERSE PARALLEL.
WATER-SAVING THERMOSTAT WITHOUT AUXILIARY CONTACTOR.
PROTECTIVE THERMOSTAT OPTIONAL.

CURVE	RMS ANODE-SUPPLY VOLTS	MAXIMUM AVERAGING TIME—SECONDS
A	250	25.6
B	500	12.8
C	600	10.7



ELECTRON TUBE DIVISION 92CM-9692

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5552-A

5552-A
IGNITRON

WATER-COOLED, STEEL-JACKETED, MERCURY-POOL-CATHODE TYPE HAVING MOUNTING PLATE FOR THERMOSTATIC CONTROL

For resistance-welding control

GENERAL DATA

Electrical:

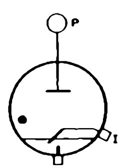
Cathode Excitation . . . . Cyclic
Cathode-Spot Starting. . . . . By Ignitor

Minimum Requirements for Cathode Excitation:		
Peak ignitor voltage required to fire. . .	200	volts
Peak ignitor current required to fire. . .	30	amp
Starting time at required voltage or current	100	µsec
Tube Voltage Drop:		
At peak anode current of 6800 amperes. . .	28	volts
At peak anode current of 440 amperes . . .	14	volts

Mechanical:

Operating Position . . . . Vertical, flexible lead up
Maximum Overall Length (Including flexible lead) . . . . 27-1/4"
Maximum Radius (Including water connections) . . . . . 3-5/8"
Weight . . . . 8 lbs
Terminal Connections *(See Dimensional Outline)*:

P – Anode Terminal (Flexible lead)
K – Cathode Terminal (Bar opposite anode terminal)



I – Ignitor Terminal (Within jacket skirt at cathode end)

Cooling:		
Type		Water
Minimum inlet water temperature.	10	°C
Maximum outlet water temperature	40	°C
Minimum water flow	1.5	gpm
Maximum water-temperature rise	6	°C
Maximum pressure drop.	6	psi

INTERMITTENT RECTIFIER SERVICE

Maximum Ratings, *Absolute-Maximum Values:*

For zero phase-control angle and frequencies from 25 to 60 cps

PEAK ANODE VOLTAGE:		
Forward.	500 max.	volts
Inverse.	500 max.	volts

ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5552-A

IGNITRON

ANODE CURRENT:		
Peak	1600 max.	amp
Average (Averaged over any interval of 6 seconds maximum)	100 max.	amp
Fault, for duration of 0.15 second maximum.	6000 max.	amp

RESISTANCE-WELDING-CONTROL SERVICE●

Two Tubes in Inverse-Parallel Circuit

Maximum Ratings, ***Absolute-Maximum Values:***

For frequencies from 25 to 60 cps

Ratings I-A and I-B Apply to Operation Either (1) Without Water-Saving Thermostat, or (2) With Water-Saving Thermostat Shunted by Auxiliary Contactor

RATING I-A

	Column 1■	Column 2■	
SUPPLY VOLTAGE (RMS)	250 max.	250 max.	volts
DEMAND POWER (During conduction)	400 max.	1200 max.	kva
DUTY▲†	19 max.	3.5 max.	%
ANODE CURRENT (Per tube):			
Peak	2260 max.	6800 max.	amp
Demand (RMS, during conduction)#.	1600 max.	4800 max.	amp
Average (Averaged over any interval of 14 seconds maximum)#	140 max.	75.6 max.	amp
Fault, for duration of 0.15 second maximum. . . .	13450 max.	13450 max.	amp

RATING I-B

	Column 1■	Column 2■	
SUPPLY VOLTAGE (RMS)	600 max.	600 max.	volts
DEMAND POWER (During conduction)	400 max.	1200 max.	kva
DUTY▲†	47 max.	8.5 max.	%
ANODE CURRENT (Per tube):			
Peak	945 max.	2830 max.	amp
Demand (RMS, during conduction)#.	666 max.	2000 max.	amp
Average (Averaged over any interval of 5.8 seconds maximum)#	140 max.	75.6 max.	amp
Fault, for duration of 0.15 second maximum. . . .	5600 max.	5600 max.	amp

●,▲,†,#,■: See next page.

5552-A
IGNITRON

Ratings II-A and II-B Apply to Operation with Water-Saving Thermostat Not Shunted by Auxiliary Contactor

RATING II-A

	Column 1■	*Column 2*■	
SUPPLY VOLTAGE (RMS)	250 max.	250 max.	volts
DEMAND POWER (During conduction)	400 max.	1200 max.	kva
DUTY▲†	11 max.	2 max.	%
ANODE CURRENT (Per tube):			
Peak	2260 max.	6800 max.	amp
Demand (RMS, during conduction)#	1600 max.	4800 max.	amp
Average (Averaged over any interval of 23.5 seconds maximum)#	80 max.	43 max.	amp
Fault, for duration of 0.15 second maximum. . . .	13450 max.	13450 max.	amp

RATING II-B

	Column 1■	*Column 2*■	
SUPPLY VOLTAGE (RMS)	600 max.	600 max.	volts
DEMAND POWER (During conduction)	400 max.	1200 max.	kva
DUTY▲†	26 max.	4.8 max.	%
ANODE CURRENT (Per tube):			
Peak	945 max.	2830 max.	amp
Demand (RMS, during conduction)#	666 max.	2000 max.	amp
Average (Averaged over any interval of 10 seconds maximum)#	80 max.	43 max.	amp
Fault, for duration of 0.15 second maximum. . . .	5600 max.	5600 max.	amp

IGNITOR

Maximum Ratings, ***Absolute-Maximum Values:***

PEAK IGNITOR VOLTAGE:		
Positive	Equal to anode	volts
Negative	5 max.	volts
IGNITOR CURRENT:		
Peak	100 max.	amp
Average (Averaged over any interval of 5 seconds maximum).	1 max.	amp
RMS.	10 max.	amp

●,▲,†,#,■: See next page.

ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5552-A

IGNITRON

● RMS voltage, current, and demand kva are on the basis of full-cycle conduction (no phase delay) regardless of whether or not phase control is used.

▲ Defined as (cycles "on")/(cycles "on" + cycles "off") during the specified averaging time.

† For supply voltages between 250 volts and 600 volts, duty is proportional to supply voltage. For supply voltages lower than 250 volts, the values for 250 volts apply.

For supply voltages between 250 volts and 600 volts, demand anode current and averaging time are each inversely proportional to supply voltage. For supply voltages lower than 250 volts, the values for 250 volts apply.

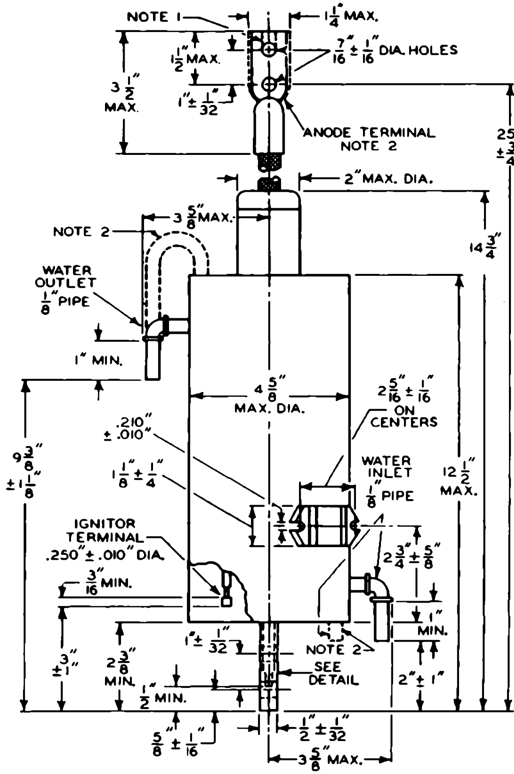
* Column 1 represents operation at maximum average anode current; Column 2 represents operation at maximum demand current.

OPERATING CONSIDERATIONS
for the 5552-A are the same as those shown for Type 5551-A

ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5552-A

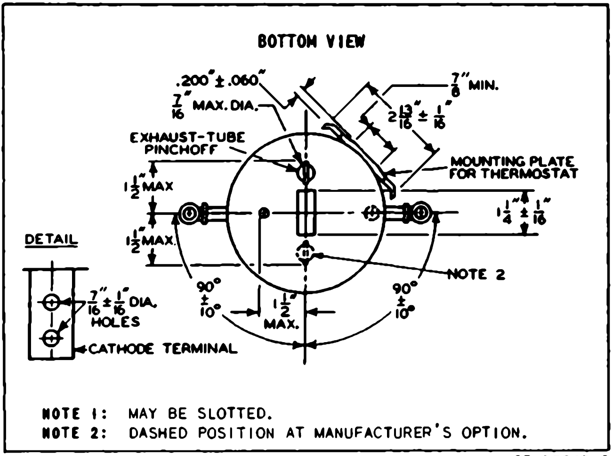
IGNITRON



ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5552-A

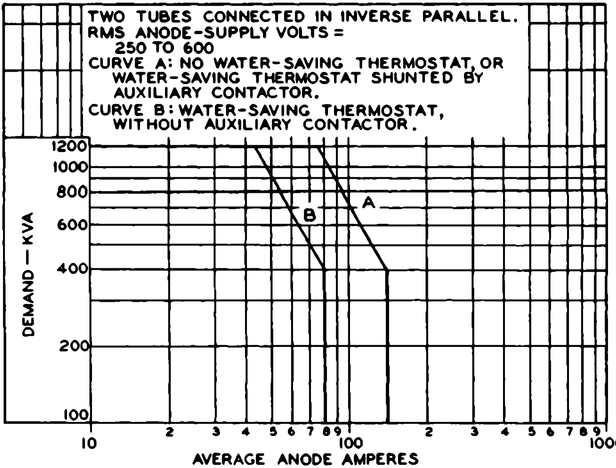
IGNITRON



NOTE 1: MAY BE SLOTTED.
NOTE 2: DASHED POSITION AT MANUFACTURER'S OPTION.

4-59 CE-9772R1B

RATING CHART
RESISTANCE-WELDING-CONTROL SERVICE



92CS-9712

5552-A

RCA

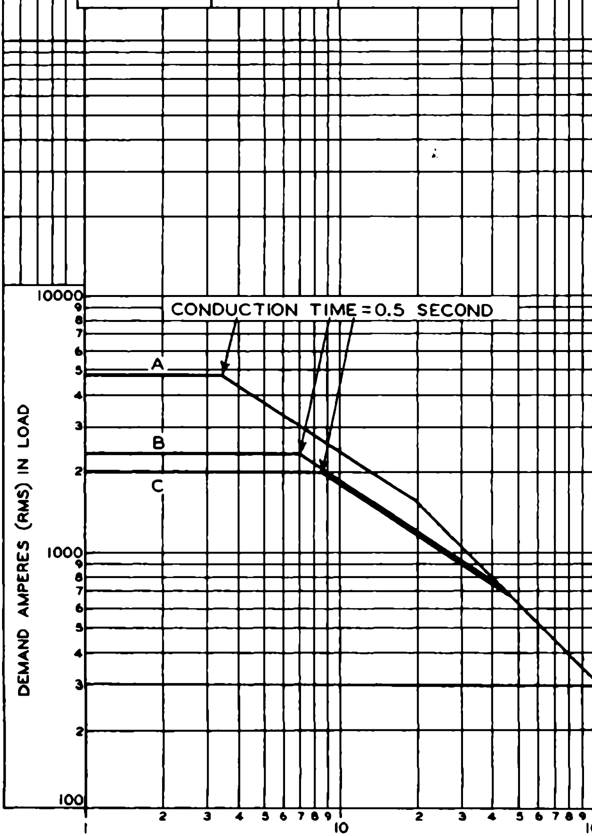
5552-A

RATING CHART

RESISTANCE-WELDING-CONTROL SERVICE

TWO TUBES CONNECTED IN INVERSE PARALLEL.
NO WATER-SAVING THERMOSTAT, OR WATER-SAVING THERMOSTAT SHUNTED BY AUXILIARY CONTACTOR
PROTECTIVE THERMOSTAT OPTIONAL.

CURVE	RMS ANODE-SUPPLY VOLTS	MAXIMUM AVERAGING TIME—SECONDS
A	250	14
B	500	7
C	600	5.8



ELECTRON TUBE DIVISION 92CM-9710

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

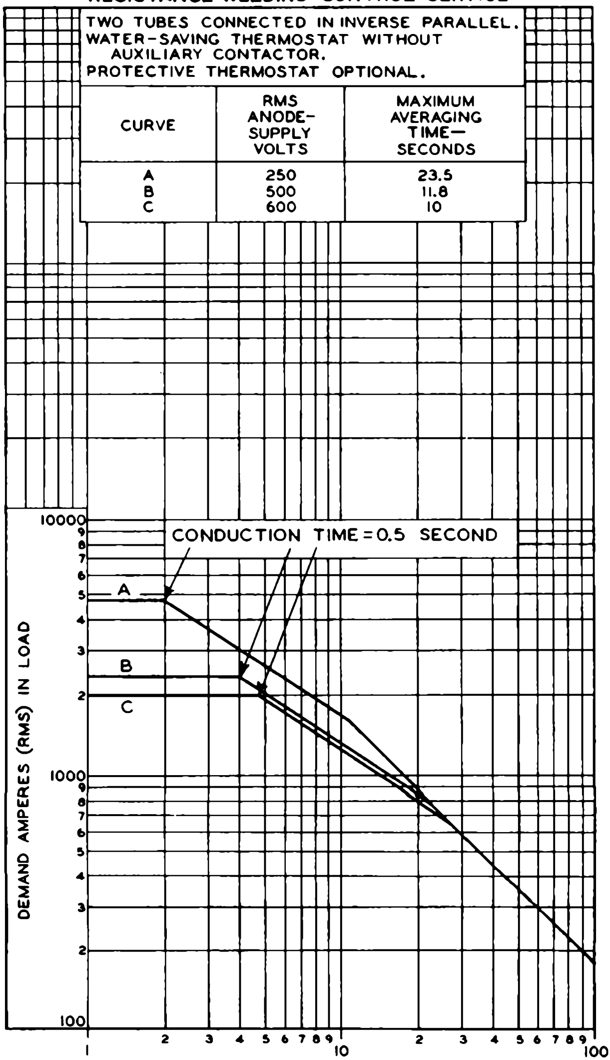
5552-A

RATING CHART

RESISTANCE-WELDING-CONTROL SERVICE

TWO TUBES CONNECTED IN INVERSE PARALLEL.
WATER-SAVING THERMOSTAT WITHOUT AUXILIARY CONTACTOR.
PROTECTIVE THERMOSTAT OPTIONAL.

CURVE	RMS ANODE-SUPPLY VOLTS	MAXIMUM AVERAGING TIME—SECONDS
A	250	23.5
B	500	11.8
C	600	10



ELECTRON TUBE DIVISION

92CM-9711

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5553-B
IGNITRON

WATER-COOLED, STEEL-JACKETED, MERCURY-POOL-CATHODE
TYPE HAVING MOUNTING PLATE FOR THERMOSTATIC CONTROL

For resistance-welding control

GENERAL DATA

Electrical:

Cathode Excitation. . . . . .Cyclic
Cathode-Spot Starting . . . . .By Ignitor
Minimum Requirements for Cathode Excitation:

Peak ignitor voltage required to fire	200	volts
Peak ignitor current required to fire	30	amp
Starting time at required voltage or current.	100	μsec

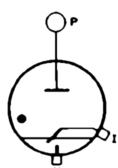
Tube Voltage Drop:

At peak anode current of 13600 amperes. . . .	36	volts
At peak anode current of 1115 amperes	17	volts

Mechanical:

Operating Position. . . . . .Vertical, flexible lead up
Maximum Overall Length (Including flexible lead). . . . . 31-3/8"
Maximum Radius (Including water connections). . . . 4-11/16"
Weight. . . . . 21 lbs
Terminal Connections *(See Dimensional Outline)*:

P - Anode Terminal (Flexible lead)
K - Cathode Terminal (Bar opposite anode terminal)



I - Ignitor Terminal (Within jacket skirt at cathode end)

Cooling:

Type.		Water
Minimum inlet water temperature	10	°C
Maximum outlet water temperature.	40	°C
Minimum water flow.	3	gpm
Maximum water-temperature rise.	9	°C
Maximum pressure drop	5.1	psi

INTERMITTENT RECTIFIER SERVICE
and
FREQUENCY-CHANGER WELDER SERVICE

Maximum Ratings, ***Absolute-Maximum Values:***

For zero phase-control angle and frequencies from 50 to 60 cps

RATING I

PEAK ANODE VOLTAGE:

Forward	600 max.	600 max.	volts
Inverse	600 max.	600 max.	volts

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RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5553-B

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ANODE CURRENT:			
Peak.	1140 max.	4000 max.	amp
Average (Averaged over any interval of 6.25 seconds maximum)	190 max.	54 max.	amp
Average (Averaged over any interval of 0.2 second maximum).	190 max.	666 max.	amp
Fault, for duration of 0.15 second maximum.	50000 max.	50000 max.	amp

RATING II

PEAK ANODE VOLTAGE:			
Forward	1200 max.	1200 max.	volts
Inverse	1200 max.	1200 max.	volts
ANODE CURRENT:			
Peak.	840 max.	3000 max.	amp
Average (Averaged over any interval of 6.25 seconds maximum)	140 max.	40 max.	amp
Average (Averaged over any interval of 0.2 second maximum).	140 max.	500 max.	amp
Fault, for duration of 0.15 second maximum.	37500 max.	37500 max.	amp

RATING III

PEAK ANODE VOLTAGE:			
Forward	1500 max.	1500 max.	volts
Inverse	1500 max.	1500 max.	volts
ANODE CURRENT:			
Peak.	672 max.	2400 max.	amp
Average (Averaged over any interval of 6.25 seconds maximum)	112 max.	32 max.	amp
Average (Averaged over any interval of 0.2 second maximum).	112 max.	400 max.	amp
Fault, for duration of 0.15 second maximum.	30000 max.	30000 max.	amp

RESISTANCE-WELDING-CONTROL SERVICE[●]

Two Tubes in Inverse-Parallel Circuit

Maximum Ratings, ***Absolute-Maximum Values:***

For frequencies from 25 to 60 cps

Ratings I-A and I-B Apply to Operation Either (1) Without Water-Saving Thermostat, or (2) With Water-Saving Thermostat Shunted by Auxiliary Contactor

RATING I-A

	Column 1[●]	*Column 2*[●]	
SUPPLY VOLTAGE (RMS).	250 max.	250 max.	volts

5553-B
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	Column 1*	Column 2*	
DEMAND POWER (During conduction)	800 max.	2400 max.	kva
DUTY●†	24.6 max.	4.4 max.	%
ANODE CURRENT (Per tube):			
Peak	4530 max.	13600 max.	amp
Demand (RMS, during conduction)#	3200 max.	9600 max.	amp
Average (Averaged over any interval of 11 seconds maximum)#	355 max.	192 max.	amp
Fault, for duration of 0.15 second maximum	27000 max.	27000 max.	amp

RATING I-B

	Column 1*	Column 2*	
SUPPLY VOLTAGE (RMS)	600 max.	600 max.	volts
DEMAND POWER (During conduction)	800 max.	2400 max.	kva
DUTY●†	59 max.	10.7 max.	%
ANODE CURRENT (Per tube):			
Peak	1890 max.	5660 max.	amp
Demand (RMS, during conduction)#	1330 max.	4000 max.	amp
Average (Averaged over any interval of 4.6 seconds maximum)#	355 max.	192 max.	amp
Fault, for duration of 0.15 second maximum	11200 max.	11200 max.	amp

Ratings II-A and II-B Apply to Operation with Water-Saving Thermostat Not Shunted by Auxiliary Contactor

RATING II-A

	Column 1*	Column 2*	
SUPPLY VOLTAGE (RMS)	250 max.	250 max.	volts
DEMAND POWER (During conduction)	800 max.	2400 max.	kva
DUTY●†	12.2 max.	2.2 max.	%
ANODE CURRENT (Per tube):			
Peak	4530 max.	13600 max.	amp
Demand (RMS, during conduction)#	3200 max.	9600 max.	amp
Average (Averaged over any interval of 22.4 seconds maximum)#	175 max.	96 max.	amp
Fault, for duration of 0.15 second maximum	27000 max.	27000 max.	amp

⊕,●,†,*,#: See next page.

ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5553-B
IGNITRON

RATING II-B

	Column 1*	Column 2*	
SUPPLY VOLTAGE (RMS)	600 max.	600 max.	volts
DEMAND POWER (During conduction)	800 max.	2400 max.	kva
DUTY●†	29 max.	5.3 max.	%
ANODE CURRENT (Per tube):			
Peak	1890 max.	5660 max.	amp
Demand (RMS, during conduction)#	1330 max.	4000 max.	amp
Average (Averaged over any interval of 9.4 seconds maximum)#	175 max.	96 max.	amp
Fault, for duration of 0.15 second maximum	11200 max.	11200 max.	amp

IGNITOR

Maximum Ratings, ***Absolute-Maximum Values:***

PEAK IGNITOR VOLTAGE:		
Positive	Equal to anode	volts
Negative	5 max.	volts
IGNITOR CURRENT:		
Peak	100 max.	amp
Average (Averaged over any interval of 5 seconds maximum)	1 max.	amp
RMS	10 max.	amp

⊕ RMS voltage, current, and demand kva are on the basis of full-cycle conduction (no phase delay) regardless of whether or not phase control is used.

● Defined as (cycles "on")/(cycles "on" + cycles "off") during the specified averaging time.

† For supply voltages between 250 volts and 600 volts, duty is proportional to supply voltage. For supply voltages lower than 250 volts, the values for 250 volts apply.

* Column 1 represents operation at maximum average anode current; Column 2 represents operation at maximum demand power.

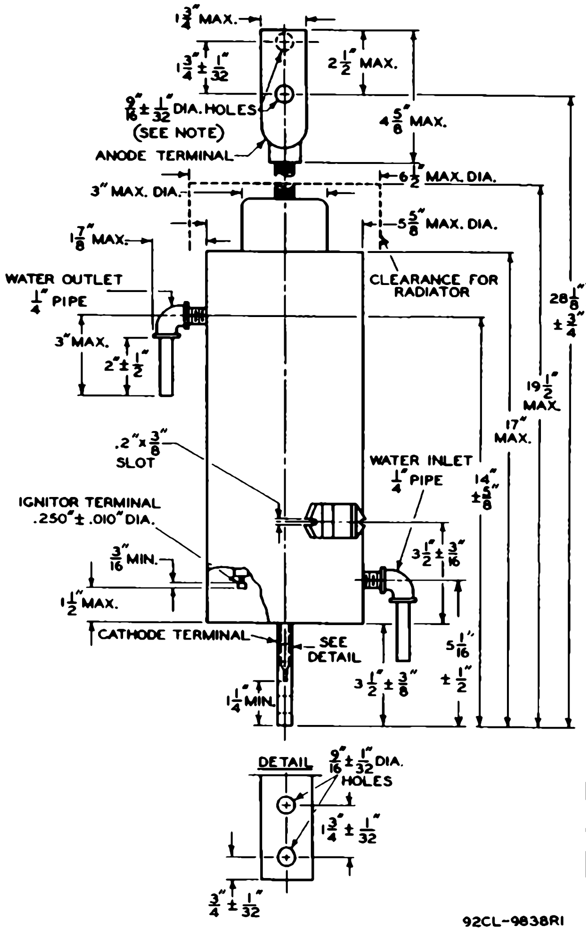
For supply voltages between 250 volts and 600 volts, demand anode current and averaging time are each inversely proportional to supply voltage. For supply voltages lower than 250 volts, the values for 250 volts apply.

OPERATING CONSIDERATIONS
for the 5553-B are the same as those shown for Type 5551-A

RCA

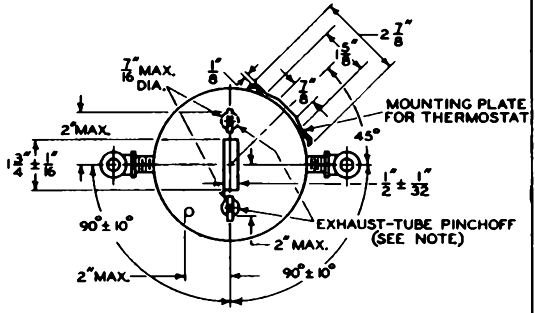
5553-B

IGNITRON



5553-B
IGNITRON

BOTTOM VIEW

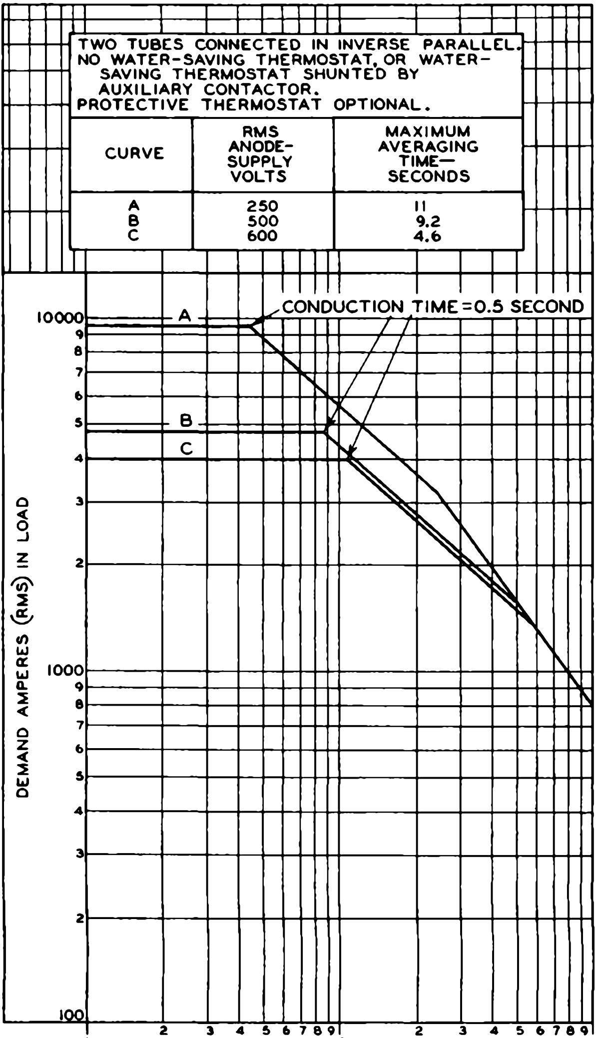


NOTE: DASHED POSITION AT MANUFACTURER'S OPTION.

5553-B
RATING CHART
RESISTANCE-WELDING-CONTROL SERVICE

TWO TUBES CONNECTED IN INVERSE PARALLEL.
NO WATER-SAVING THERMOSTAT, OR WATER-SAVING THERMOSTAT SHUNTED BY AUXILIARY CONTACTOR.
PROTECTIVE THERMOSTAT OPTIONAL.

CURVE	RMS ANODE-SUPPLY VOLTS	MAXIMUM AVERAGING TIME—SECONDS
A	250	11
B	500	9.2
C	600	4.6



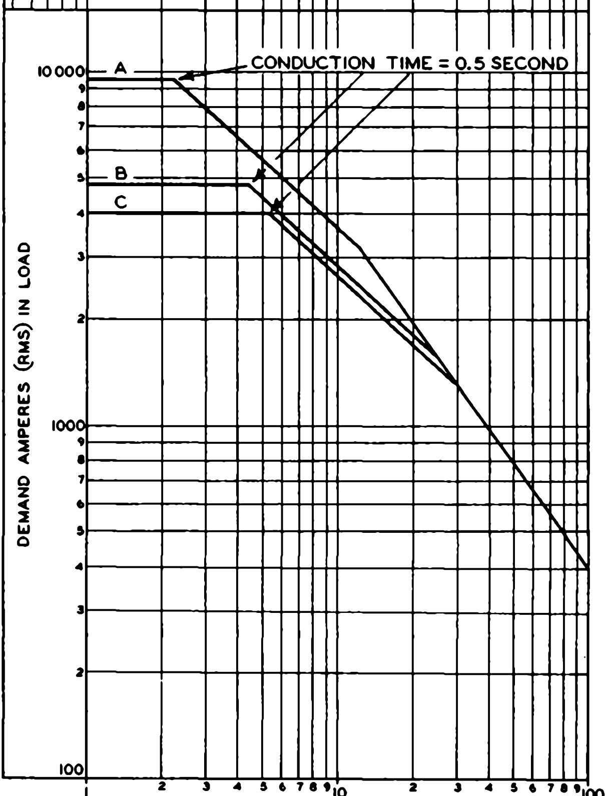
ELECTRON TUBE DIVISION 92CM-9822

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5553-B
RATING CHART
RESISTANCE-WELDING-CONTROL SERVICE

TWO TUBES CONNECTED IN INVERSE PARALLEL.
WATER-SAVING THERMOSTAT WITHOUT AUXILIARY CONTACTOR.
PROTECTIVE THERMOSTAT OPTIONAL.

CURVE	RMS ANODE-SUPPLY VOLTS	MAXIMUM AVERAGING TIME—SECONDS
A	250	22.4
B	500	18.8
C	600	9.4



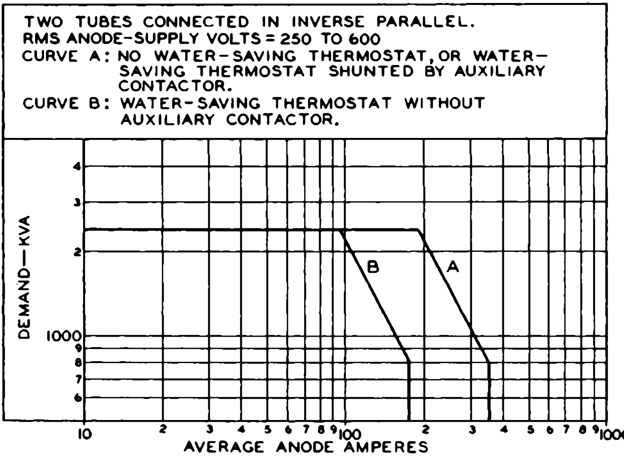
ELECTRON TUBE DIVISION 92CM-9823
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5553-B

5553-B

RATING CHARTS

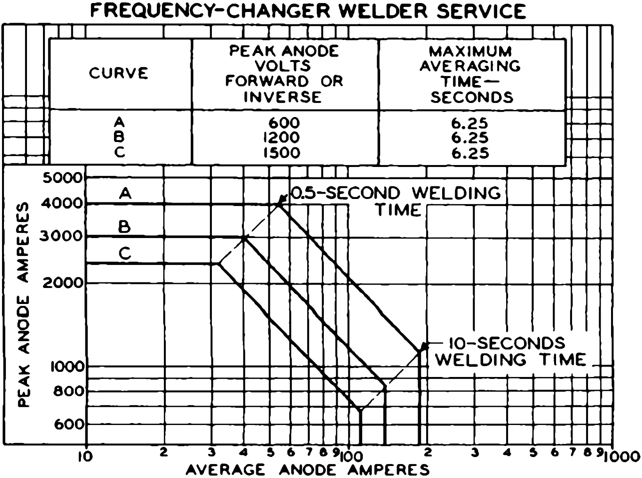
RESISTANCE-WELDING-CONTROL SERVICE



92CS-9825

FREQUENCY-CHANGER WELDER SERVICE

CURVE	PEAK ANODE VOLTS FORWARD OR INVERSE	MAXIMUM AVERAGING TIME— SECONDS
A	600	6.25
B	1200	6.25
C	1500	6.25



92CS-9824

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IGNITRON

DATA

General:

Cathode	Pool Type
Number of Ignitors●	2
Number of Main Anodes	1
Number of Auxiliary Anodes	1
Peak Voltage Drop:	
At 100 Amp. Peak-Anode Current	12.6 volts
At 300 Amp. Peak Anode Current	14.4 volts
At 600 Amp. Peak Anode Current	17.3 volts
Cooling:	
Type	Water
Typical Flow	1.5 to 3 gal./min.
Pressure Drop at Above Flow	2 to 5 lb./sq.in.
Temperature Rise at Lower Rate of Flow (150 Amp per Anode)	6°C
Mounting Position	Vertical, Flexible Lead Up
Maximum Rigid Length (Approx.)	17-1/2"
Diameter, Including Cooling Couplings	7-1/2" ± 1/8"

RECTIFIER SERVICE

For frequencies from 25 to 60 Cycles, Phase Retard = 0

Maximum Ratings, Absolute Values:

PEAK FORWARD ANODE VOLTAGE	900 max.	2100 max.	volts
PEAK INVERSE ANODE VOLTAGE	900 max.	2100 max.	volts
PEAK ANODE CURRENT	900 max.	600 max.	amp
AVERAGE CONTINUOUS ANODE CUR.	100 max.	75 max.	amp
2-HOUR AVERAGE ANODE CURRENT*	150 max.	112.5 max.	amp
1-MINUTE AVERAGE ANODE CUR.**	200 max.	150 max.	amp
SURGE ANODE CURRENT for 0.15 sec. max.	6000 max.	4500 max.	amp
OUTLET WATER TEMPERATURE	60 max.	45 max.	°C
INLET WATER TEMPERATURE	6 min.	6 min.	°C
WATER FLOW, AT CONTINUOUS AVERAGE ANODE CUR. RATING	1.5 min.	1.5 min.	gpm
WATER FLOW, AT NO LOAD#	0.5 min.	0.5 min.	gpm
PEAK INVERSE AUXILIARY ANODE VOLTAGE:			
With Anode Conducting	25 max.	25 max.	volts
With Anode Not Conducting	150 max.	150 max.	volts
AVERAGE AUXILIARY ANODE CUR.	5 max.	5 max.	amp
PEAK POSITIVE IGNITOR VOLTAGE	900 max.	2100 max.	volts
PEAK NEGATIVE IGNITOR VOLTAGE	5 max.	..	volts
PEAK IGNITOR CURRENT	100 max.	..	volts
AVERAGE IGNITOR CURRENT##	2 max.	..	volts
IGNITION TIME	100 max.	..	volts

GENERAL REQUIREMENTS for SELF-EXCITATION and SEPARATE EXCITATION are given on the next page

●, *, **, #, ##: See next page.

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IGNITRON

AC WELDER-CONTROL SERVICE

Ratings for 2400 volts, rms, 25 to 60 cycles

Maximum Ratings, Absolute Values:

DEMAND	1200	max.	kva
CORRESPONDING AVERAGE ANODE CURRENT	75	max.	amp
AVERAGE ANODE CURRENT	113	max.	amp
CORRESPONDING DEMAND	600	max.	kva
TIME OF AVERAGING ANODE CURRENT:			
At 2400 v RMS	1.5	max.	sec
SURGE ANODE CURRENT, for 0.15 sec. max.	3000	max.	amp
WATER FLOW	1.5	min.	gpm
OUTLET WATER TEMPERATURE	30	max.	°C
PEAK INVERSE AUXILIARY ANODE VOLTAGE:			
With Anode Conducting	25	max.	volts
With Anode Not Conducting	150	max.	volts
AVERAGE AUXILIARY ANODE CUR.	5	max.	amp
PEAK POSITIVE IGNITOR VOLTAGE	2400	max.	volts
PEAK NEGATIVE IGNITOR VOLTAGE	5	max.	volts
PEAK IGNITOR CURRENT	100	max.	amp
AVERAGE IGNITOR CURRENT##	2	max.	amp
IGNITION TIME	100	max.	µsec

GENERAL REQUIREMENTS for SELF-EXCITATION and SEPARATE-EXCITATION are given below

SELF-EXCITATION (ANODE FIRING)

See Circuit 92CS-6722

PEAK IGNITOR VOLTAGE	150	min.	volts
PEAK IGNITOR CURRENT	40	min.	amp
Ignitor series resistance for anode firing at anode voltages of:			
600 volts or less	4	. .	ohms
601 to 1000 volts (Approx.)	10	. .	ohms
1001 to 1500 volts (Approx.)	20	. .	ohms
1501 to 2000 volts (Approx.)	35	. .	ohms
2001 to 2400 volts (Approx.)	50	. .	ohms

SEPARATE EXCITATION (CAPACITOR FIRING)

See Circuit 92CS-6722

Minimum volt-ampere requirements are shown on Curve 92CS-6723

- • Use only one ignitor at a time.
- * Averaged over any 2-minute interval.
- ** Averaged over any 1-minute interval.
- \# For systems in which the flow of water is controlled by the load.
- \#\# Averaged over any 10-second interval.

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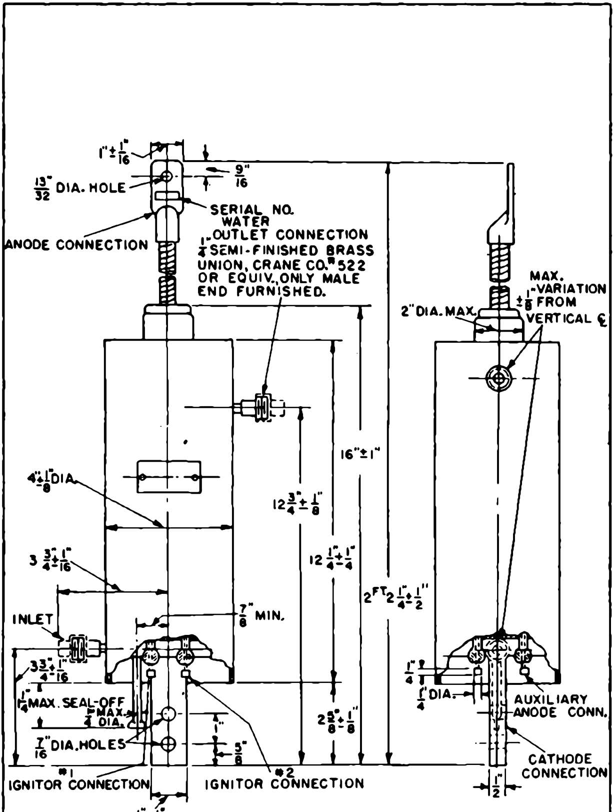
IGNITRON



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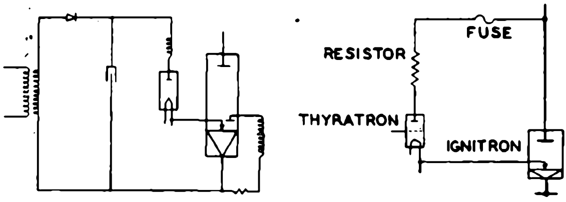
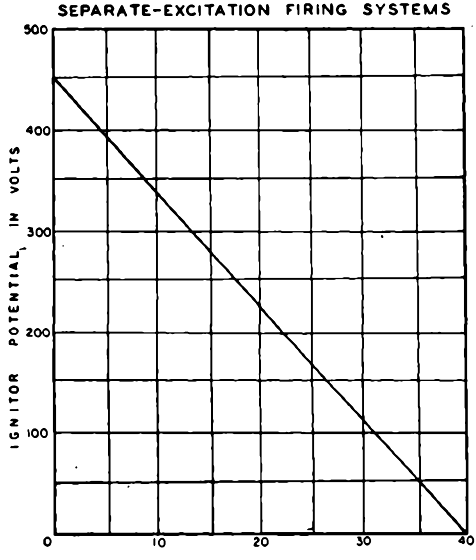


92CS-6722

MINIMUM VOLT-AMPERE REQUIREMENTS FOR SEPARATE-EXCITATION FIRING SYSTEMS



92CS-6723

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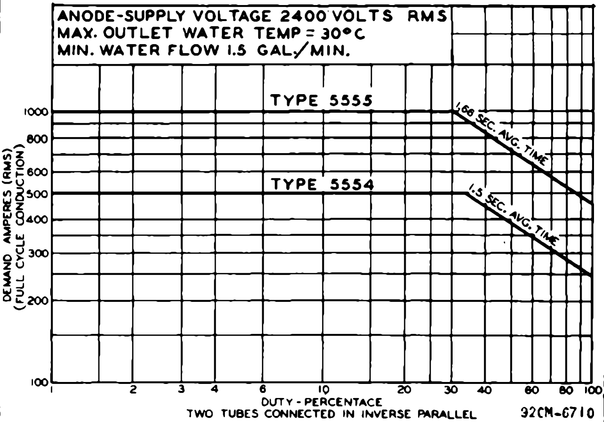
IGNITRON

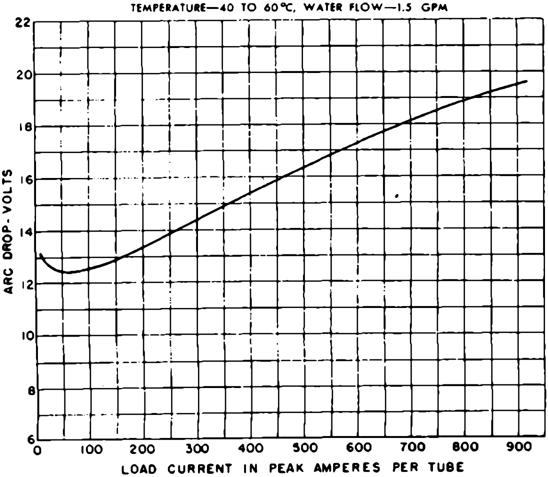
WELDER-CONTROL SERVICE



TWO TUBES CONNECTED IN INVERSE PARALLEL

92CM-6710

ARC DROP, OUTLET WATER TEMPERATURE—40 TO 60°C, WATER FLOW—1.5 GPM



92CS-6746

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IGNITRON

DATA

General:

Cathode	Pool type
Number of Ignitors ●	2
Number of Main Anodes	1
Number of Auxiliary Anodes	1
Peak Voltage Drop:	
At 100 Amp Peak Anode Current	12.6 volts
At 300 Amp Peak Anode Current	14.1 volts
At 600 Amp Peak Anode Current	16.2 volts
At 1200 Amp Peak Anode Current	19.1 volts
Cooling:	
Type	Water
Typical Flow	3 to 5 gal./min.
Pressure Drop at Above Flow	3 to 8 lb./sq.in.
Temp. Rise at Lower Rate of Flow (300 Amp per Anode)	7°C
Mounting Position	Vertical, Flexible Lead Up
Maximum Rigid Length (Approx.)	18-1/2"
Diameter, Including Cooling Couplings	9" ± 1/8"

RECTIFIER SERVICE

For Frequencies from 25 to 60 cycles, Phase Retard = 0

Maximum Ratings, Absolute Values:

PEAK FORWARD ANODE VOLTAGE	900 max.	2100 max.	volts
PEAK INVERSE ANODE VOLTAGE	900 max.	2100 max.	volts
PEAK ANODE CURRENT	1800 max.	1200 max.	amp
AVERAGE CONTINUOUS ANODE CUR.	200 max.	150 max.	amp
2-HOUR AVERAGE ANODE CUR.*	300 max.	225 max.	amp
1-MINUTE AVERAGE ANODE CUR.**	400 max.	300 max.	amp
SURGE ANODE CURRENT for 0.15 sec. max.	12000 max.	9000 max.	amp
OUTLET WATER TEMPERATURE	60 max.	45 max.	°C
INLET WATER TEMPERATURE	6 min.	6 min.	°C
WATER FLOW, AT CONTINUOUS AVERAGE ANODE CUR. RATING	3 min.	3 min.	gpm
WATER FLOW, AT NO LOAD#	1 min.	1 min.	gpm
PEAK INVERSE AUXILIARY ANODE VOLTAGE:			
With anode conducting	25 max.	25 max.	volts
With anode not conducting	150 max.	150 max.	volts
AVERAGE AUXILIARY ANODE CUR.	5 max.	5 max.	amp
PEAK POSITIVE IGNITOR VOLTAGE	900 max.	2100 max.	volts
PEAK NEGATIVE IGNITOR VOLTAGE	5 max.	. .	volts
PEAK IGNITOR CURRENT	100 max.	. .	amp
AVERAGE IGNITOR CURRENT##	2 max.	. .	amp
IGNITION TIME	100 max.	. .	μsec

GENERAL REQUIREMENTS for SELF-EXCITATION and SEPARATE EXCITATION are given on the next page

●, *, **, #, ##: See next page.

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IGNITRON

AC WELDER - CONTROL SERVICE

Ratings for 2400 volts rms, 25 to 60 cycles

Maximum Ratings, Absolute Values:

DEMAND	2400	max.	kva
CORRESPONDING AVERAGE ANODE CURRENT	135	max.	amp
AVERAGE ANODE CURRENT	207	max.	amp
CORRESPONGING DEMAND	1105	max.	kva
TIME OF AVERAGING ANODE CURRENT at 2400 volts rms	1.66	max.	sec
SURGE ANODE CURRENT, for 0.15 sec.max.	6000	max.	amp
WATER FLOW	3	min.	gal./min.
OUTLET WATER TEMPERATURE	30	max.	°C
PEAK INVERSE AUXILIARY ANODE VOLTAGE:			
With anode conducting	25	max.	volts
With anode not conducting	150	max.	volts
AVERAGE AUXILIARY ANODE CURRENT	5	max.	amp
PEAK POSITIVE IGNITOR VOLTAGE	2400	max.	volts
•PEAK NEGATIVE IGNITOR VOLTAGE	5	max.	volts
PEAK IGNITOR CURRENT	100	max.	amp
AVERAGE IGNITOR CURRENT##	2	max.	amp
IGNITION TIME	100	max.	μsec

Demand-ampere requirements are shown on curve 92CM-6710 under type 5554

SELF-EXCITATION (ANODE FIRING)

See Circuit 92CS-6722 under type 5554

PEAK IGNITOR VOLTAGE	150	min.	volts
PEAK IGNITOR CURRENT	40	min.	amp
Ignitor series resistance for anode firing at anode voltages of:			
600 volts or less (Approx.)	4	. .	ohms
601 to 1000 volts (Approx.)	10	. .	ohms
1001 to 1500 volts (Approx.)	20	. .	ohms
1501 to 2000 volts (Approx.)	35	. .	ohms
2001 to 2400 volts (Approx.)	50	. .	ohms

SEPARATE EXCITATION (CAPACITOR FIRING)

See Circuit 92CS-6722 under type 5554

Minimum volt-ampere requirements are shown on curve 92CS-6728 under type 5554

• Use only one ignitor at a time.
* Averaged over any 2-minute interval.
** Averaged over any 1-minute interval.
# For systems in which the flow of water is controlled by the load.
Averaged over any 10-second interval.

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RCA

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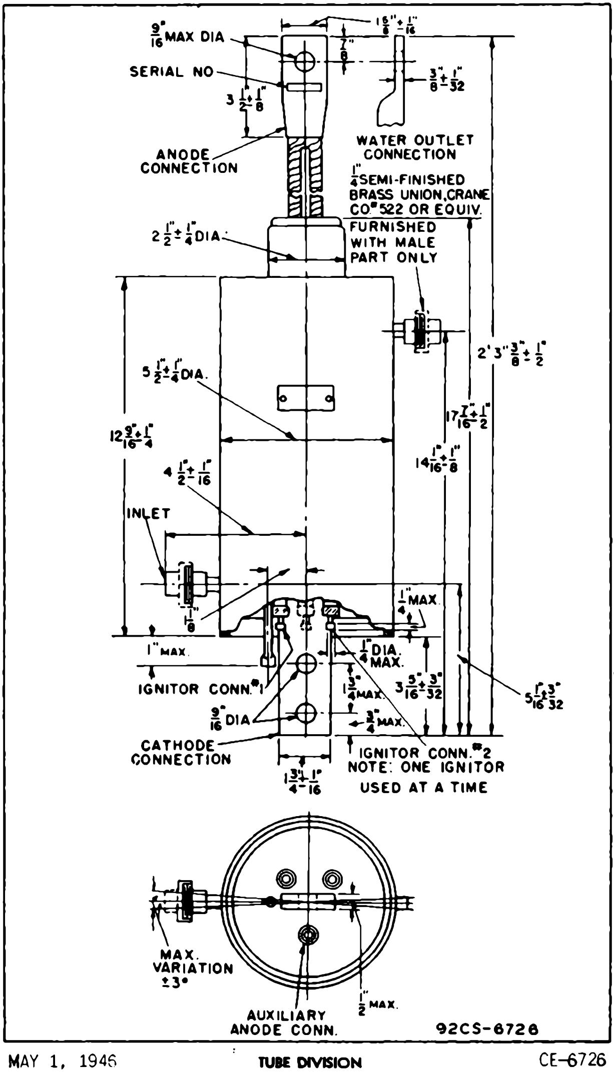
IGNITRON



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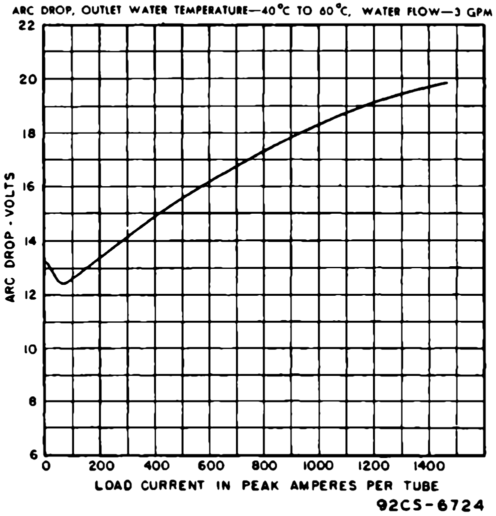
IGNITRON



5557

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THYRATRON
MERCURY-VAPOR TRIODE

DATA

Electrical:

Filament:

Voltage*	2.5				volts
Current	5.0				amp
Direct Interelectrode Capacitance:					
Grid to Anode (Approx.)	4.4				μμf
Peak Voltage Drop (Approx.)	16				volts
Approximate Control Characteristics:					
Anode Voltage	40	100	1000		volts
Grid Voltage	0	-2.25	-6.5		volts
Ionization Time (Approx.)	10				microseconds
Deionization Time (Approx.)	1000				microseconds

Mechanical:

Mounting Position	Vertical, base down
Overall Length	6-3/8" ± 1/4"
Seated Length	5-3/4" ± 1/4"
Maximum Diameter	2-7/16"
Bulb	S-19
Cap	Medium
Base	Medium 4-Pin, Bayonet

Maximum Ratings, Absolute Values:

PEAK FORWARD ANODE VOLTAGE	2500 max.	volts
PEAK INVERSE ANODE VOLTAGE	5000 max.	volts
GRID VOLTAGE:		
Before Conduction	-500 max.	volts
During Conduction	-10 max.	volts
INSTANTANEOUS ANODE CURRENT:		
Below 25 Cycles	1.0 max.	amp
25 Cycles and Higher	2.0 max.	amp
AVERAGE ANODE CURRENT**	0.5 max.	amp
SURGE ANODE CURRENT for 0.1 sec. max.	40 max.	amp
INSTANTANEOUS GRID CURRENT	0.25 max.	amp
AVERAGE GRID CURRENT**	0.05 max.	amp
COND.-MERCURY TEMP. RANGE▲	40 to 80	°C

* Filament voltage must be applied at least 5 seconds before anode voltage is applied.

** Averaged over any 15-second interval.

▲ Recommended condensed-mercury temperature 40°C.

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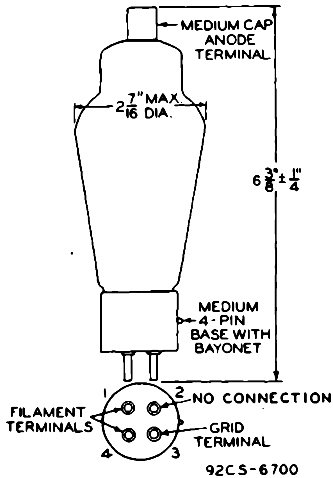
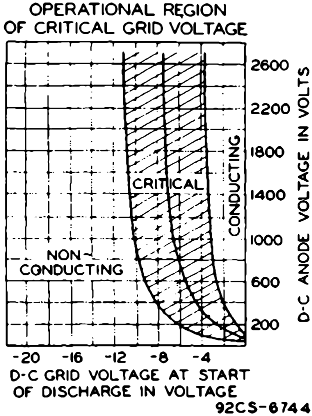
5557

THYRATRON





5559

5559
THYRATRON
MERCURY-VAPOR TRIODE

DATA

Electrical:

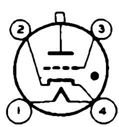
Heater, for Unipotential Cathode:		
Voltage	5.0	volts
Current	4.5	amp
Cathode:		
Minimum Heating Time, prior to tube conduction	5	minutes
Direct Interelectrode Capacitances (Approx.): ←		
Grid to Anode	2.5	$\mu\mu$f
Grid to Cathode	10	$\mu\mu$f
Ionization Time (Approx.)	10	μsec
Deionization Time (Approx.)	1000	μsec
Anode Voltage Drop (Approx.)	16	volts
Grid-No.1 Control Ratio (Approx.) with grid-No.1 resistor (megohms) = 0	220	←

Mechanical:

Mounting Position	Vertical, Base Down
Overall Length	7" ± 1/4"
Seated Length	6-3/8" ± 1/4"
Maximum Diameter	3"
Bulb	ST-23
Cap	Medium
Base	Medium-Shell Small 4-Pin, Bayonet
Basing Designation for BOTTOM VIEW	4BL

Pin 1 - Heater

Pin 2 - Cathode; Circuit Returns



Pin 3 - Grid

Pin 4 - Heater, Cathode

Cap - Anode

Maximum Ratings, ***Absolute Values:***

PEAK ANODE VOLTAGE:		
Forward	1000 max.	volts
Inverse	1000 max.	volts
GRID VOLTAGE:		
Before Conduction	-500 max.	volts
During Conduction	-10 max.	volts
CATHODE CURRENT: ←		
Peak	15 max.	amp
Average**	2.5 max.	amp
Fault, for 0.1 sec. maximum	200 max.	amp
GRID CURRENT:		
Average**	+0.25 max.	amp
COND.-MERCURY TEMPERATURE RANGE▲	+40 to +80	°C
OPERATING FREQUENCY	150 max.	cps ←

** Averaged over any interval of 15 sec. max.

▲ Recommended operating temperature is 40°C.

← Indicates a change.

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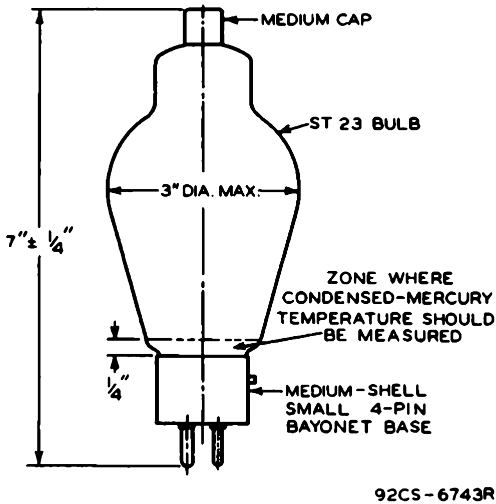
5559
THYRATRON



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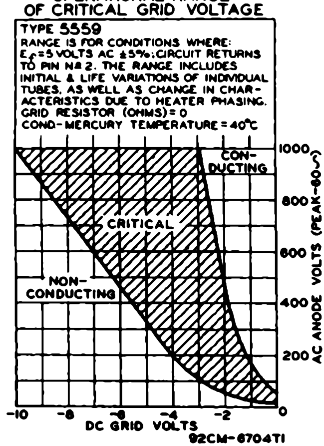
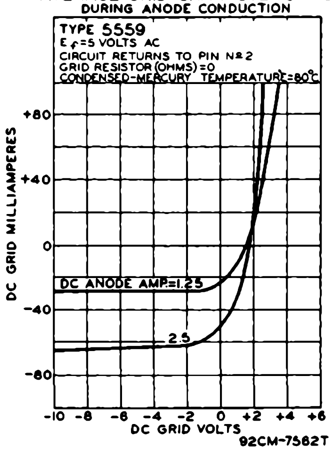
THYRATRON

OPERATIONAL RANGE OF CRITICAL GRID VOLTAGE



AVERAGE GRID CHARACTERISTICS DURING ANODE CONDUCTION



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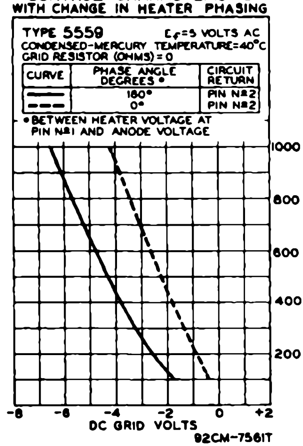
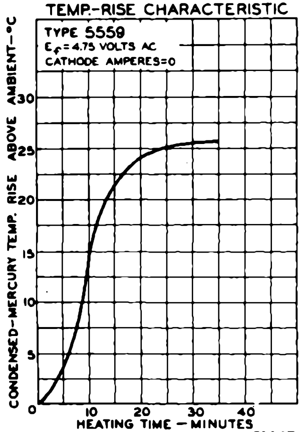
RCA 5559

THYRATRON

SHIFT OF AVERAGE CONTROL CHARACTERISTIC WITH CHANGE IN HEATER PHASING



TEMP.-RISE CHARACTERISTIC



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5560

THYRATRON

MERCURY-VAPOR TETRODE

DATA

Electrical:

Heater, for Unipotential Cathode:			
Voltage	5.5□	5.0	volts
Current	5.0□	4.5	amp
Cathode:			
Minimum Heating Time, prior to tube conduction		5	minutes
Direct Interelectrode Capacitances (Approx.):			
Grid No.1 to Anode		0.2	μμf
Grid No.1 to Cathode		4.4	μμf ←
Ionization Time (Approx.)		10	μsec
Deionization Time (Approx.)		1000	μsec
Anode Voltage Drop (Approx.)		16	volts
Grid-No.1 Control Ratio (Approx.) with grid-No.1 resistor (ohms) = 0; grid-No.1 and grid-No.2 volts = 0			170 ←
Grid-No.2 Control Ratio (Approx.) with grid No.1 resistor (ohms) = 0; grid-No.1 and grid-No.2 volts = 0			300 ←

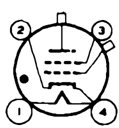
Mechanical:

Mounting Position	Vertical, Base Down
Overall Length	7-11/16" ± 1/4"
Seated Length	7-1/16" ± 1/4" ←
Greatest Radius	2-1/4"
Bulb	ST-23
Caps (Two)	Medium
Base	Medium-Shell Small 4-Pin, Bayonet
Basing Designation for BOTTOM VIEW	4CD

Pin 1 - Heater

Pin 2 - Cathode; Circuit Returns

Pin 3 - Grid No.2



Pin 4 - Heater, Cathode

Top Cap - Anode

Side Cap - Grid No.1

Maximum Ratings, *Absolute Values*:

PEAK ANODE VOLTAGE:			
Forward		1000 max.	volts
Inverse		1000 max.	volts
GRID-No.2 (SHIELD-GRID) VOLTAGE:			
Before Conduction		-300 max.	volts
During Conduction		-5 max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:			
Before Conduction		-1000 max.	volts
During Conduction		-10 max.	volts ←
CATHODE CURRENT:			
Peak	30 max.□	15 max.	amp
Average**	0.5 max.□	2.5 max.	amp
Fault, for 0.1 sec. maximum		200 max.	amp

□ **: See next page.

← Indicates a change.

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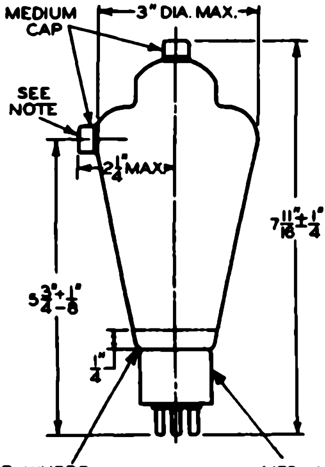
5560
THYRATRON

GRID-No. 2 CURRENT:		
Average**.	0.25 max.	amp
GRID No. 1 CURRENT:		
Average**.	0.25 max.	amp
COND.-MERCURY TEMPERATURE RANGE▲	+40 to +80	°C
OPERATING FREQUENCY.	150 max.	cps

□ Applies when this tube is used for ignitor firing.
** Averaged over any interval of 15 sec. max.
▲ Recommended operating temperature is 40°C.



92CS-6742R1

NOTE: THE PLANE THROUGH TUBE AXIS AND CENTER OF GRID-No1 CAP IS 45° ± 5° FROM THE PLANE THROUGH THE TUBE AXIS AND CENTER OF BAYONET PIN. GRID-No1 CAP IS ON SAME SIDE AS PIN No3.

TEMPERATURE-RISE CHARACTERISTIC of the 5560
is the same as that shown for Type 5559

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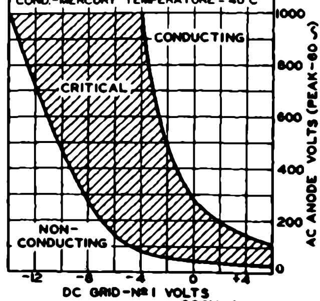
5560

THYRATRON

OPERATIONAL RANGE OF CRITICAL GRID VOLTAGE

TYPE 5560
RANGE IS FOR CONDITIONS WHERE:
E_f = 5 VOLTS AC ±5 %; GRID-№ 2 (SHIELD) VOLTS = 0; CIRCUIT RETURNS TO PIN № 2. THE RANGE INCLUDES INITIAL AND LIFE VARIATIONS OF INDIVIDUAL TUBES, AS WELL AS CHANGE IN CHARACTERISTICS DUE TO HEATER PHASING.
GRID-№ 1 RESISTOR (OHMS) = 0
COND.-MERCURY TEMPERATURE = 40°C



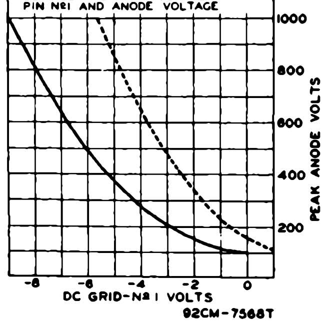
92CM-6705T1

SHIFT OF AVERAGE CONTROL CHARACTERISTIC WITH CHANGE IN HEATER PHASING

TYPE 5560 E_f = 5 VOLTS AC
GRID-№ 2 (SHIELD) VOLTS = 0
CONDENSED-MERCURY TEMPERATURE = 40°C
GRID-№ 1 RESISTOR (OHMS) = 0

CURVE	PHASE ANGLE DEGREES *	CIRCUIT RETURN
———	180°	PIN № 2
- - - -	0°	PIN № 2

*BETWEEN HEATER VOLTAGE AT PIN № 1 AND ANODE VOLTAGE



92CM-7568T

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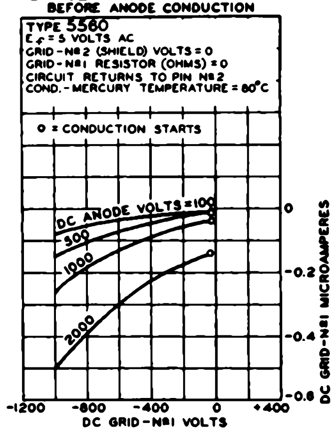
5560

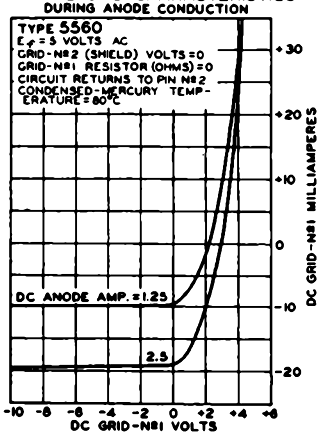
THYRATRON

AVERAGE GRID CHARACTERISTICS
BEFORE ANODE CONDUCTION



92CM-7556T

AVERAGE GRID CHARACTERISTICS
DURING ANODE CONDUCTION



92CM-7570T

5563

RCA

5563

THYRATRON

MERCURY-VAPOR TRIODE

GENERAL DATA

Electrical:

Filament, Coated:

Voltage	5	volts
Current	10	amp

Minimum Heating Time:

At initial installation without anode voltage, for proper distribution of condensed mercury	15	minutes
During subsequent operation and prior to conduction, for bringing condensed-mercury temperature within operating range		Not less than 60 seconds to provide adequate filament heating; longer, if required by low ambient temperatures.

Direct Interelectrode Capacitances:°

Grid to Anode	10 max.	$\mu\mu$f
Grid to Cathode	20 max.	$\mu\mu$f
Ionization Time	10 approx.	μseconds
Deionization Time	1000 approx.	μseconds
Anode Voltage Drop	15 approx.	volts
Grid Control Ratio▲	200 approx.	

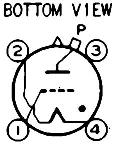
° With no external shield.

Mechanical:

Mounting Position	Vertical, base down
Overall Length	10-1/8" to 11-1/16"
Maximum Diameter	3-7/8"
Cooling	Convection
Bulb	T-24
Cap	Skirted Medium No. 3985
Base	Medium-Metal-Shell Jumbo 4-Pin, Bayonet

BOTTOM VIEW

Pin 1 - Grid
Pin 2 - Filament, Internal Shield



Pin 3 - No Connection
Pin 4 - Filament
Cap - Anode

Maximum Ratings, ***Absolute Values:***

For Anode-Supply Frequencies between 25 and 150 cps

COND. MERCURY TEMP. RANGE□	25 - 55	25 - 50	°C
PEAK ANODE VOLTAGE:			
Forward	10000 max.	15000 max.	volts
Inverse	10000 max.	15000 max.	volts
GRID VOLTAGE:			
Before Anode Conduction (Peak or DC)	-500 max.	-500 max.	volts
During Anode Conduction (Average)●	-10 max.	-10 max.	volts

▲, □, ●: See next page.

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5563
THYRATRON

CATHODE CURRENT:			
Peak	10 max.	6.4 max.	amp
Average	1.8 max.	1.6 max.	amp
Surge, for max. duration of 0.1 second . . .	200 max.	200 max.	amp
Averaging Time	1	1	cycle
GRID CURRENT:			
Peak	+1 max.	+1 max.	amp
Average	+0.1 max.	+0.1 max.	amp
Averaging Time	1	1	cycle

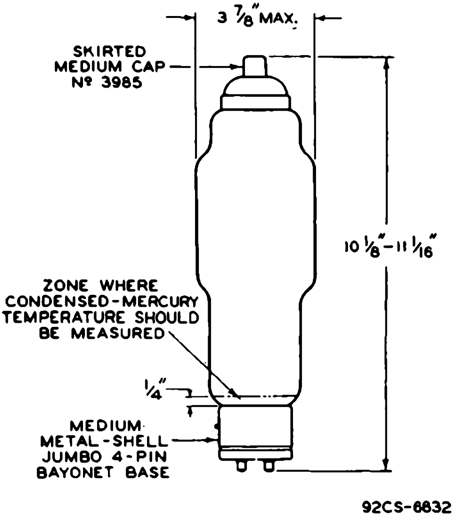
Maximum Circuit Values:

Grid-Circuit Resistance. . .	0.1 max.	0.1 max.	megohm

▲ For conditions with 0.1-megohm grid resistor, circuit returns to pin No.2 as datum of potential, and filament voltage at pin No.4 180° out of phase with the anode voltage.

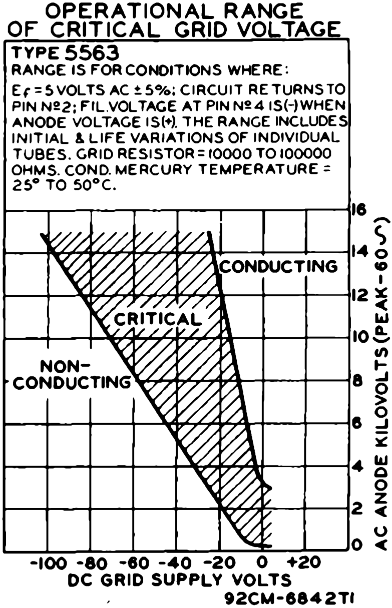
□ Recommended operating value is 40° ± 5°C.

● Averaged over one conducting cycle.



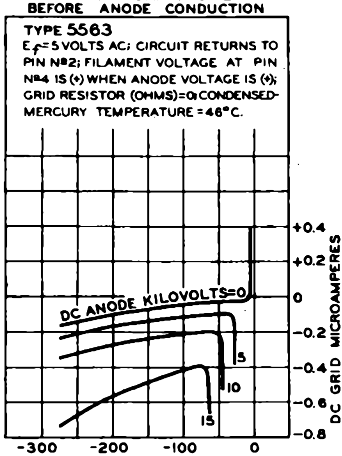
5563

THYRATRON



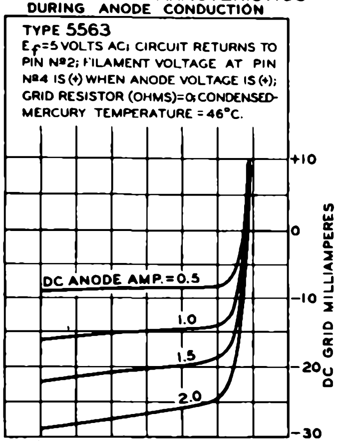
5563
THYRATRON

AVERAGE GRID CHARACTERISTICS
BEFORE ANODE CONDUCTION



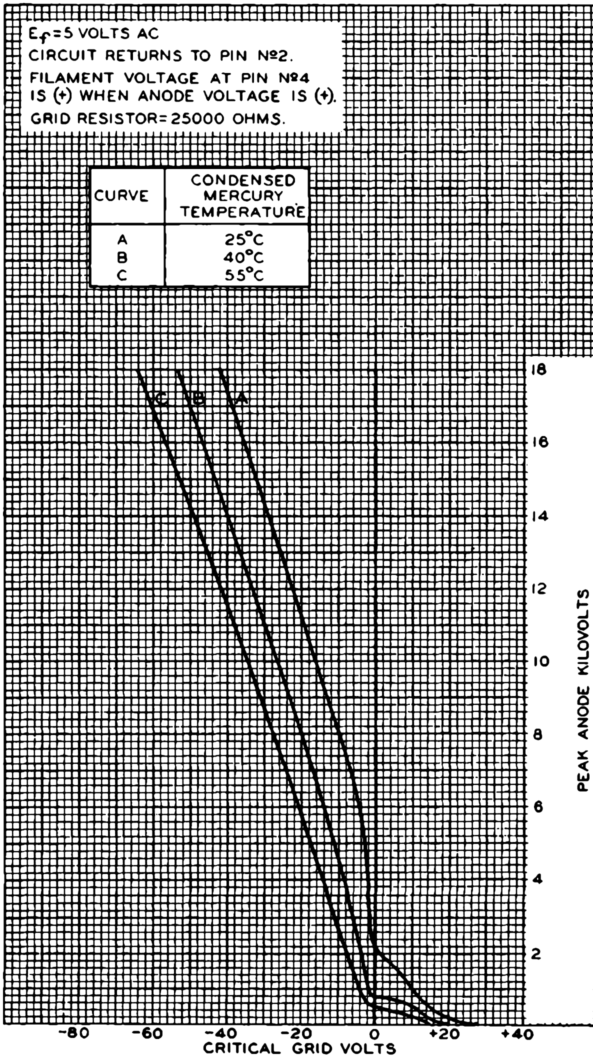
92CM-7208T

AVERAGE GRID CHARACTERISTICS
DURING ANODE CONDUCTION



92CM-7207T

AVERAGE CONTROL CHARACTERISTICS



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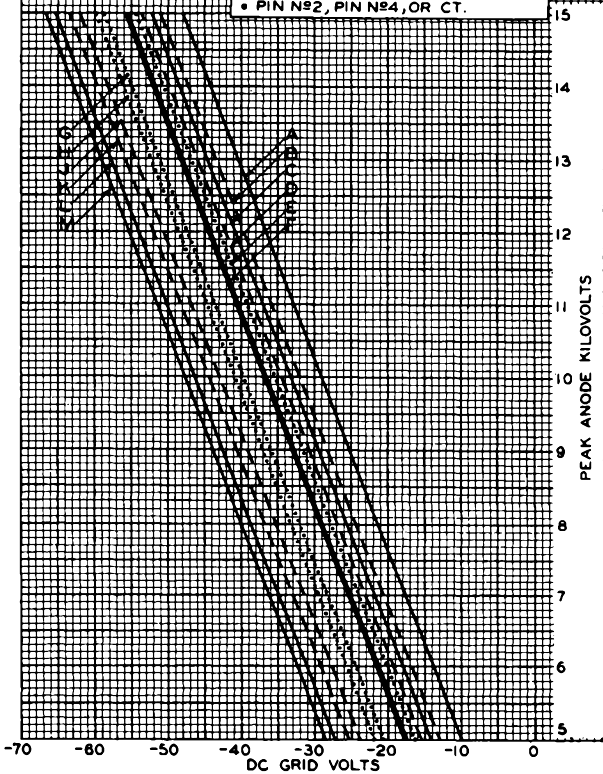
5563

SHIFT OF AVERAGE CONTROL CHARACTERISTICS
WITH CHANGE IN FILAMENT PHASING AND CIRCUIT RETURN

E_f = 5 VOLTS AC

CURVE	PHASE ANGLE DEGREES*	CIRCUIT RETURN	CURVE	PHASE ANGLE DEGREES*	CIRCUIT RETURN
A ———	0	PIN Nº2	G ••••••	135	PIN Nº4
B - - -	0	CT°	H ••••••	180	PIN Nº4
C ———	45	PIN Nº2	J - - -	135	CT°
D - - -	45	CT°	K - - -	180	CT°
E ••••••	0	PIN Nº4	L ———	135	PIN Nº2
F ━━━	90	ANY•	M ———	180	PIN Nº2

* BETWEEN FILAMENT VOLTAGE AT PIN Nº4 AND ANODE VOLTAGE
° CENTER TAP OF FILAMENT TRANSFORMER
• PIN Nº2, PIN Nº4, OR CT.



MAY 17, 1949

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92CM-7285

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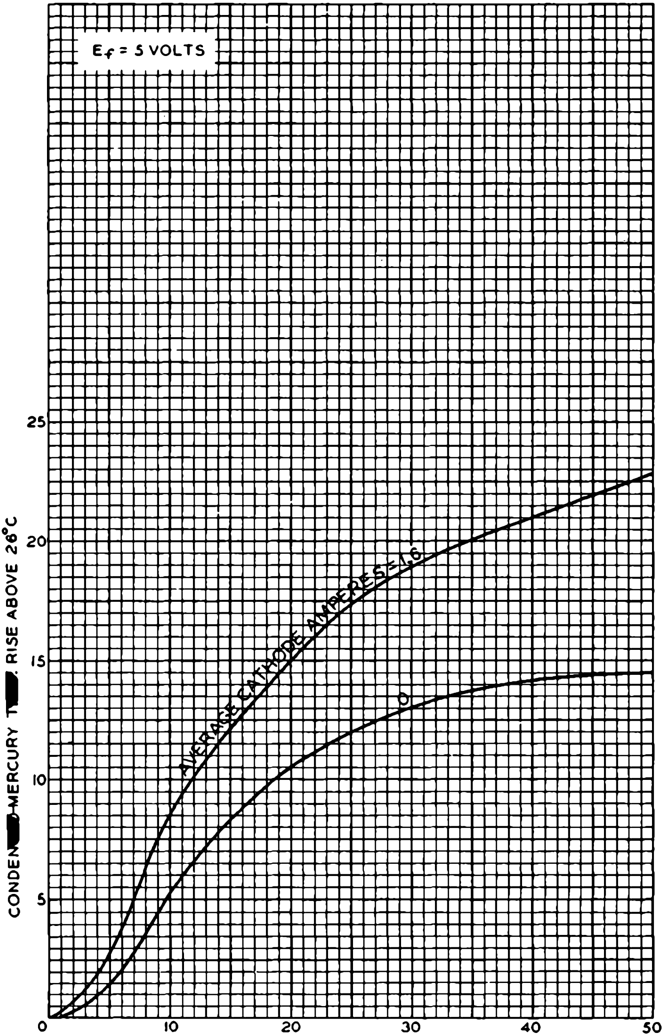
5563

5563

OPERATION CHARACTERISTICS



MAY 4,1949

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RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7267

5563-A

5563-A

MERCURY-VAPOR THYRATRON

NEGATIVE-CONTROL TRIODE TYPF

Supersedes Type 5563

GENERAL DATA

Electrical:

Filamentary Cathode, Coated:

	Min.	*Av.*	*Max.*	
Voltage	4.75	5	5.25	volts
Current at 5 volts	-	10	11	amp

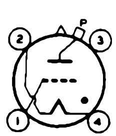
Minimum Heating Time:		
On initial installation, with no voltage on grid or anode, for redistribution of mercury to lower part of tube	15	minutes
During subsequent operation, to allow filament to reach operating temperature prior to tube conduction	1	minute
Direct Interelectrode Capacitances:°		
Grid to anode	4	μμf
Grid to cathode	16	μμf
Ionization Time (Approx.)	10	μsec
Deionization Time (Approx.)	1000	μsec
Maximum Critical Grid Current for instantaneous anode volts = 20000	50	μamp
Anode Voltage Drop (Approx.)	15	volts
Grid Control Ratio (Approx.):		
Under conditions: 10000-ohm grid resistor, circuit returns to pin 2, filament voltage at pin 4 out of phase with anode voltage by 180°, and condensed-mercury temperature of 40°C.	275	

Mechanical:

Operating Position	Vertical, base down
Overall Length	10-3/32" ± 7/16"
Maximum Diameter	2-7/8"
Bulb	T-29
Weight (Approx.)	13 oz
Cap	Medium (JETEC No.C1-5)
Base	Skirted Medium-Metal-Shell Jumbo 4-Pin, with Bayonet (JETEC No.A4-69)

BOTTOM VIEW

Pin 1 - Grid
Pin 2 - Filament Internal Shield, Circuit Returns



Pin 3 - No Connection—Do Not Use
Pin 4 - Filament
Cap - Anode

° Without external shield.

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5563-A

MERCURY-VAPOR THYRATRON

Temperature Control:

Heating--When the ambient temperature is so low that the normal rise of condensed-mercury temperature above the ambient temperature will not bring the condensed-mercury temperature up to the minimum value of the operating range specified under *Maximum Ratings*, some form of heat-conserving enclosure or auxiliary heater will be required.

Cooling--When the operating conditions are such that the maximum value of the operating condensed-mercury temperature for the applicable service rating is exceeded, provision should be made for forced-air cooling sufficient to prevent exceeding the maximum value.

Temperature Rise of Condensed Mercury to Equilibrium Above Ambient Temperature (Approx.):*

No Load	13	°C
Full Load	17	°C

CONTROL SERVICE--In-Phase Operation●

Maximum Ratings, ***Absolute Values:***

For supply frequency of 25 to 60 cps

	Operating Condensed-Mercury Temperature Range		
	25° to 55°C	25° to 50°C	
PEAK ANODE VOLTAGE:			
Forward	15000 max.	20000 max.	volts
Inverse	15000 max.	20000 max.	volts
GRID VOLTAGE:			
Peak or DC, before tube conduction	-500 max.	-500 max.	volts
Average▲, during tube conduction	-10 max.	-10 max.	volts
ANODE CURRENT:			
Peak	10 max.	6.4 max.	amp
Average●●	1.8 max.	1.6 max.	amp
Fault, for duration of 0.1 second maximum	50 max.	50 max.	amp
GRID CURRENT:			
Average positive⊕	100 max.	100 max.	ma
Peak positive with anode negative	5 max.	5 max.	ma

Maximum Circuit Values:

Grid-Circuit Resistance	0.1 max.	0.1 max.	megohm

* With filament voltage = 4.75 volts and no heat-conserving enclosure.

● Filament voltage has a phase angle of either 0° or 180° with respect to the anode voltage.

▲, ●●, ⊕: See next page.

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5563-A
MERCURY-VAPOR THYRATRON

CONTROL SERVICE--Quadrature Operation[oo]

Maximum Ratings, *Absolute Values:*

For supply frequency of 25 to 60 cps

	Operating Condensed-Mercury Temperature Range		
	25° to 55°C	25° to 50°C	
PEAK ANODE VOLTAGE:			
Forward	15000 max.	20000 max.	volts
Inverse	15000 max.	20000 max.	volts
GRID VOLTAGE:			
Peak or DC, before tube conduction	-500 max.	-500 max.	volts
Average▲, during tube conduction	-10 max.	-10 max.	volts
ANODE CURRENT:			
Peak	11.5 max.	11.5 max.	amp
Average●●	2.5 max.	2.5 max.	amp
Fault, for duration of 0.1 second maximum	50 max.	50 max.	amp
GRID CURRENT:			
Average positive⊕	100 max.	100 max.	ma
Peak positive with anode negative	5 max.	5 max.	ma

Maximum Circuit Values:

Grid-Circuit Resistance	0.1 max.	0.1 max.	megohm

▲ Averaged over one conducting period.

●● Averaged over one cycle of power-supply frequency.

⊕ Averaged over period of grid conduction.

oo Filament voltage is 60° to 120° out of phase (leading or lagging) with the anode voltage.

OPERATING CONSIDERATIONS

X-rays are produced when the 5563-A is operated with a peak inverse anode voltage above 16000 volts (absolute value). These rays can constitute a health hazard unless the tube is adequately shielded for X-ray radiation. Although relatively simple shielding should prove adequate, make sure it provides the required protection to the operator.

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5563-A

GRID-CONTROLLED RECTIFIER CIRCUITS

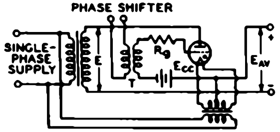

FIG. 1 HALF-WAVE SINGLE-PHASE

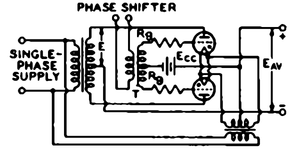

FIG. 2 FULL-WAVE SINGLE-PHASE

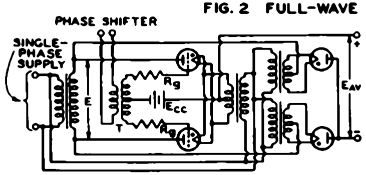

FIG. 3 SERIES SINGLE-PHASE

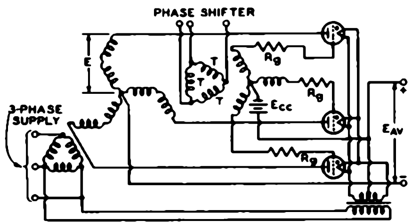

FIG. 4 HALF-WAVE THREE-PHASE

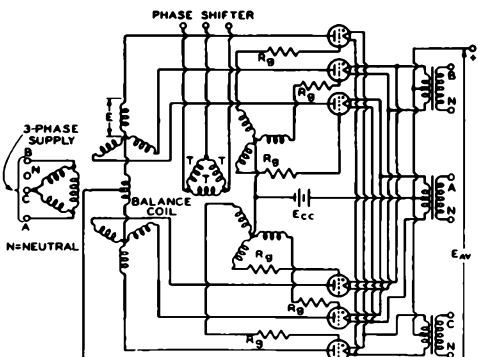

FIG. 5 PARALLEL THREE-PHASE (QUADRATURE OPERATION)

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5563-A

GRID-CONTROLLED RECTIFIER CIRCUITS

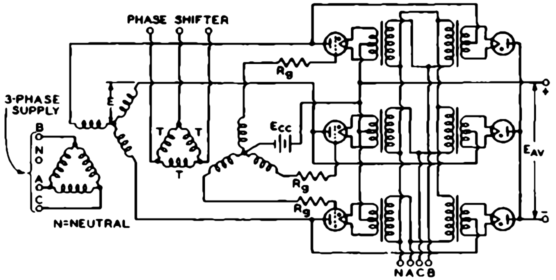

FIG. 6 SERIES THREE-PHASE (QUADRATURE OPERATION)

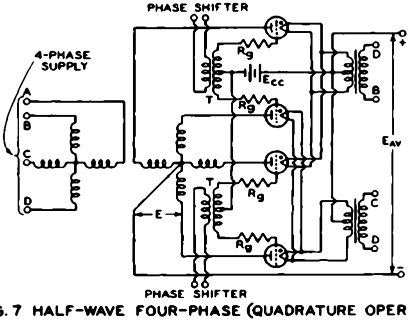

FIG. 7 HALF-WAVE FOUR-PHASE (QUADRATURE OPERATION)

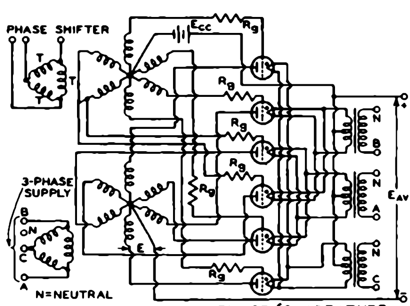

FIG. 8 HALF-WAVE SIX-PHASE (QUADRATURE OPERATION)

NOTES

T = PEAKING TRANSFORMER

IN FIGS. 3 AND 6, THE RECTIFIER TUBES MAY BE EITHER 869-B's OR 5563-A's USED AS DIODES. THE 5563-A IS USED AS A DIODE BY CONNECTING GRID TO PIN 2.

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5563-A

5563-A

GRID-CONTROLLED RECTIFIER CIRCUITS

Numerical Relationships Among Electrical Quantities

E = Trans. Sec. Voltage (RMS)
E_{av} = Average DC Output Voltage
E_{bmi} = Peak Inverse Anode Voltage
E_m = Peak DC Output Voltage
E_r = Major Ripple Voltage (RMS)
f = Supply Frequency
f_r = Major Ripple Frequency
I_{av} = Average DC Output Current
I_b = Average Anode Current
I_p = Anode Current (RMS)
I_{pm} = Peak Anode Current
P_{al} = Line Volt-Amperes
P_{ap} = Trans. Pri. Volt-Amperes
P_{as} = Trans. Sec. Volt-Amperes
P_{dc} = DC Power ($E_{av} \times I_{av}$)

Note: Conditions assumed involve sine-wave supply; zero voltage drop in tubes; no losses in transformer and circuit; no back emf in the load circuit; and no phase-back.

RATIO	Fig. 1	Fig. 2	Fig. 3	Fig. 4	Fig. 5*	Fig. 6	Fig. 7	Fig. 8
Voltage Ratios								
E/E_{av}	2.22	1.11	1.11	0.854	0.854	0.427	0.785	0.74
E_{bmi}/E	1.41	2.83	1.41	2.45	2.45	2.45	2.83	2.83
E_{bmi}/E_{av}	3.14	3.14	1.57	2.09	2.09	1.05	2.22	2.09
E_m/E_{av}	3.14	1.57	1.57	1.21	1.05	1.05	1.11	1.05
E_r/E_{av}	1.11	0.472	0.472	0.177	0.04	0.04	0.106	0.04
Frequency Ratio								
f_r/f	1	2	2	3	6	6	4	6
Current Ratios								
I_p/I_{av}	1.57	0.785	0.785	0.578	0.289	0.578	0.5	0.408
I_b/I_{av}	1	0.5	0.5	0.33	0.167	0.33	0.25	0.167
Resistive Load								
I_{pm}/I_{av}	3.14	1.57	1.57	1.21	0.52	1.05	1.11	1.05
I_{pm}/I_b	3.14	3.14	3.14	3.63	3.14	3.14	4.5	6.3
Inductive Load■								
I_{pm}/I_{av}	—	1	1	1	0.5	1	1	1
Power Ratios								
Resistive Load								
P_{as}/P_{dc}	3.49	1.74	1.24	—	—	—	—	—
P_{ap}/P_{dc}	2.69	1.23	1.24	—	—	—	—	—
P_{al}/P_{dc}	2.69	1.23	1.24	—	—	—	—	—
Inductive Load■								
P_{as}/P_{dc}	—	1.57	1.11	1.71	1.48	1.05	1.57	1.81
P_{ap}/P_{dc}	—	1.11	1.11	1.21	1.05	1.05	1.11	1.29
P_{al}/P_{dc}	—	1.11	1.11	1.21	1.05	1.05	1.11	1.05

* Bleeder current of 2% full-load current will provide exciting current for balance coil and thus avoid poor regulation at light loading.

■ The use of a large filter-input choke is assumed.

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5563-A

MERCURY-VAPOR THYRATRON

<table>
<tr><th rowspan="2">CIRCUIT</th><th rowspan="2">MAX. TRANS. SEC. VOLTS (RMS)
E</th><th rowspan="2">APPROX. DC OUTPUT VOLTS TO FILTER
E_{av}</th><th colspan="2">MAX. DC OUTPUT AMPERES
I_{av}</th><th colspan="2">MAX. DC OUTPUT KW TO FILTER
P_{dc}</th></tr>
<tr><th></th><th></th><th></th><th></th></tr>
<tr><td>**Fig.1**
Half-Wave
Single-Phase
In-Phase Operation</td><td>14000□
10600▲</td><td>6300
4700</td><td colspan="2">1.6
1.8</td><td colspan="2">10
8.5</td></tr>
<tr><td>**Fig.2**
Full-Wave
Single-Phase
In-Phase Operation</td><td>7000□
5300▲</td><td>6300
4700</td><td colspan="2">3.2
3.6</td><td colspan="2">20
17</td></tr>
<tr><td>**Fig.3**
Series
Single-Phase
In-Phase Operation</td><td>14000□
10600▲</td><td>12700
9500</td><td colspan="2">3.2
3.6</td><td colspan="2">40
34</td></tr>
<tr><td>**Fig.4**
Half-Wave
Three-Phase
In-Phase Operation</td><td>8100□
6100▲</td><td>9500
7100</td><td colspan="2">4.8
5.4</td><td colspan="2">45
38</td></tr>
<tr><td>**Fig.5**
Parallel
Three-Phase
Quadrature Operation</td><td>8100□
6100▲</td><td>9500
7100</td><td colspan="2">15.0
15.0</td><td colspan="2">143
106</td></tr>
<tr><td>**Fig.6**
Series
Three-Phase
Quadrature Operation</td><td>8100□
6100▲</td><td>19000
14200</td><td colspan="2">7.5
7.5</td><td colspan="2">143
106</td></tr>
<tr><td>**Fig.7**
Half-Wave
Four-Phase
Quadrature Operation</td><td>7000□
5300</td><td>9000
6700</td><td>*Resis-tive Load*
10.0
10.0</td><td>*Induc-tive Load*
10.0
10.0</td><td>*Resis-tive Load*
90
67</td><td>*Induc-tive Load*
90
67</td></tr>
<tr><td>**Fig.8**
Half-Wave
Six-Phase
Quadrature Operation</td><td>7000□
5300▲</td><td>9500
7100</td><td>*Resis-tive Load*
11.0
11.0</td><td>*Induc-tive Load*
11.5
11.5</td><td>*Resis-tive Load*
105
78</td><td>*Induc-tive Load*
110
81</td></tr>
</table>

□ For maximum peak inverse anode voltage of 20000 volts, and condensed-mercury temperature range of 25° to 50°C.

▲ For maximum peak inverse anode voltage of 15000 volts, and condensed-mercury temperature range of 25° to 55°C.

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5563-A

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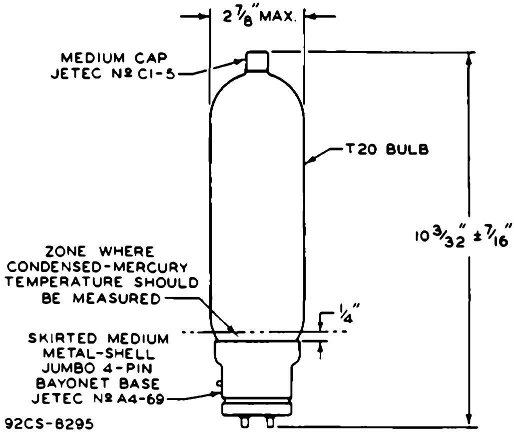
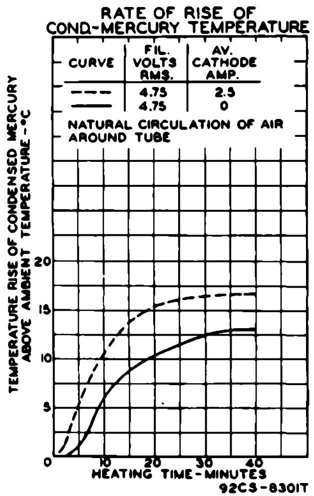
MERCURY-VAPOR THYRATRON





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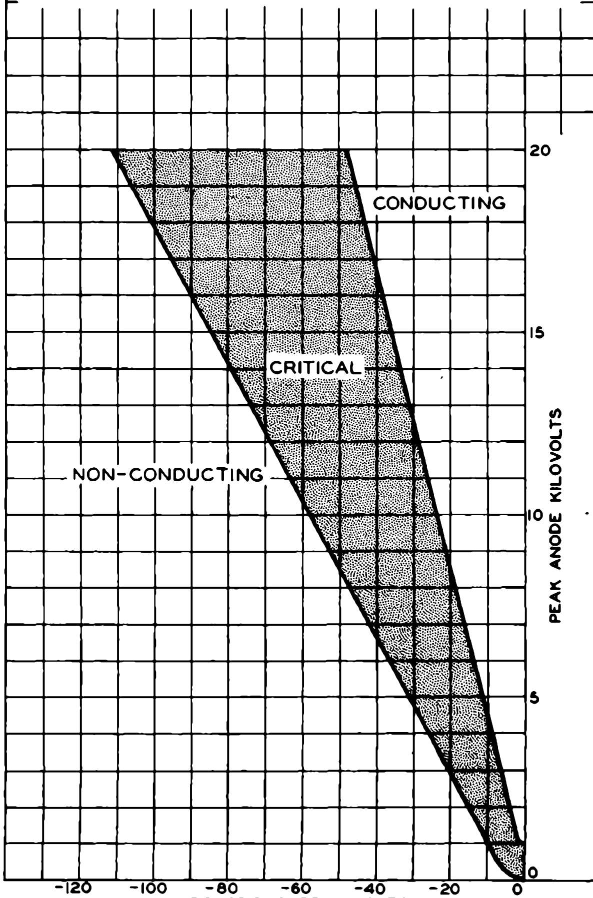
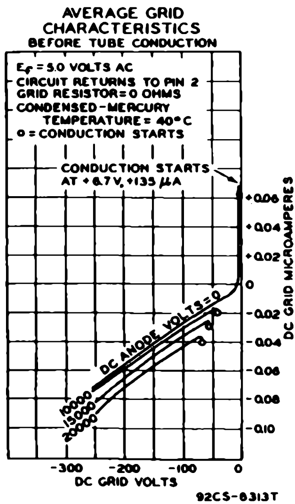
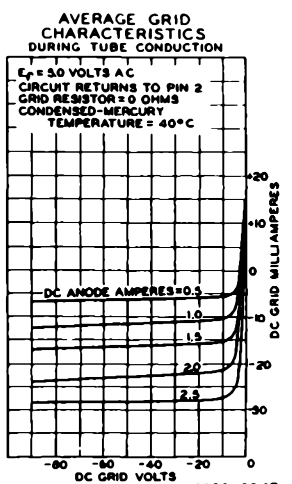
5563-A
OPERATIONAL RANGE OF CRITICAL GRID VOLTAGE

RANGE IS FOR CONDITIONS WHERE:
E_f = 5.0 VOLTS AC ± 5%; CIRCUIT RETURNS TO PIN 2.
FILAMENT VOLTAGE AT PIN 4 IS (-) WHEN ANODE VOLTAGE IS (+).
THE RANGE INCLUDES INITIAL AND LIFE VARIATIONS OF INDIVIDUAL TUBES.
GRID RESISTOR = 10000 TO 100000 OHMS
CONDENSED-MERCURY TEMPERATURE RANGE = 25° TO 55°C



5563-A
CHARACTERISTIC CURVES



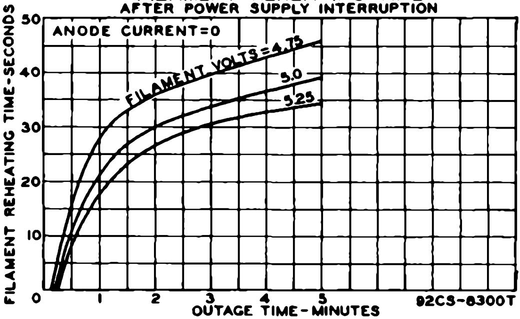


5563-A

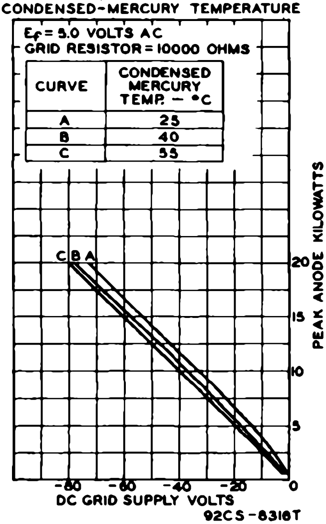
5563-A

CHARACTERISTIC CURVES

FILAMENT REHEATING TIME
AFTER POWER SUPPLY INTERRUPTION



SHIFT OF AVERAGE CONTROL CHARACTERISTIC
WITH CHANGE IN
CONDENSED-MERCURY TEMPERATURE



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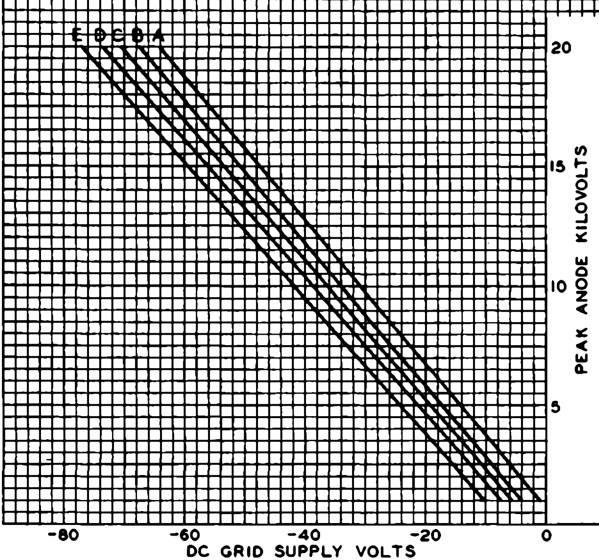
SHIFT OF AVERAGE CONTROL CHARACTERISTICS WITH CHANGE IN FILAMENT PHASING AND CIRCUIT RETURN

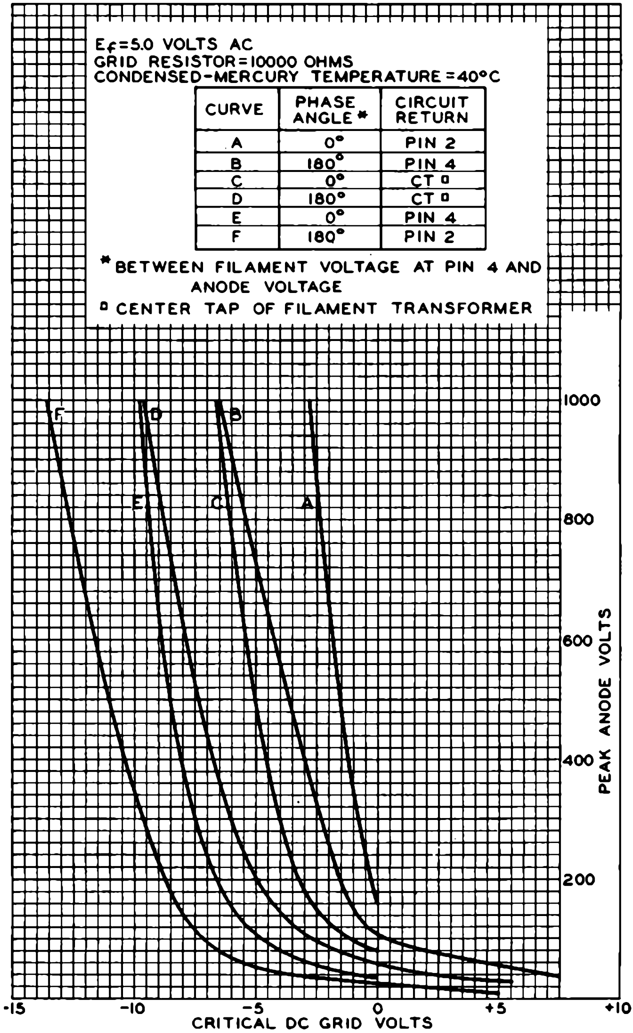
E_f = 5.0 VOLTS AC
GRID RESISTOR = 10000 OHMS
CONDENSED-MERCURY TEMPERATURE = 40°C

CURVE	PHASE ANGLE*	CIRCUIT RETURN
A	0°	PIN 2
B	0°	CT□
C	0°, 180° 90°	PIN 4 ANY •
D	180°	CT□
E	180°	PIN 2

*BETWEEN FILAMENT VOLTAGE AT PIN 4 AND ANODE VOLTAGE
□ CENTER TAP OF FILAMENT TRANSFORMER
• PIN 2, PIN 4, OR CT



5563-A
SHIFT OF AVERAGE CONTROL CHARACTERISTICS WITH CHANGE IN FILAMENT PHASING AND CIRCUIT RETURN AT LOW ANODE VOLTAGES



CURVE	PHASE ANGLE*	CIRCUIT RETURN
A	0°	PIN 2
B	180°	PIN 4
C	0°	CT ▫
D	180°	CT ▫
E	0°	PIN 4
F	180°	PIN 2

* BETWEEN FILAMENT VOLTAGE AT PIN 4 AND ANODE VOLTAGE

▫ CENTER TAP OF FILAMENT TRANSFORMER

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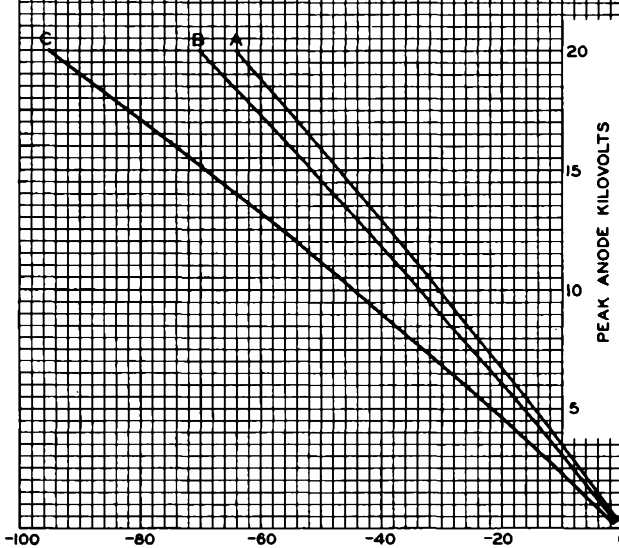
SHIFT OF AVERAGE CONTROL CHARACTERISTICS WITH CHANGE IN GRID-RESISTOR VALUE

E_f = 5.0 VOLTS AC
CONDENSED-MERCURY TEMPERATURE = 40°C

CURVE	GRID RESISTOR MEGOHMS	CIRCUIT RETURN	PHASE ANGLE*
A	0.01	PIN 2	180°
B	0.1	PIN 2	180°
C	1	PIN 2	180°

*BETWEEN FILAMENT VOLTAGE AT PIN 4 AND ANODE VOLTAGE



5696
THYRATRON

GAS-TETRODE, MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage	6.3	ac or dc volts
Current	0.150	amp

Cathode:

Minimum Heating Time, prior to tube conduction	10	sec

Direct Interelectrode Capacitances (Approx.):°

Grid No.1 to Anode	0.03	$\mu\mu$f
Input	1.8	$\mu\mu$f
Output	0.54	$\mu\mu$f

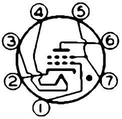
Ionization Time (Approx.):		
For conditions: dc anode volts = 100; grid-No.1 square-pulse volts = +50; peak cathode amperes during conduction = 0.150	0.5	μsec
Deionization Time (Approx.):		
For conditions: dc anode volts = 500; grid-No.1 volts = −100, grid-No.1 resistor (ohms) = 1000; dc cathode amperes = 0.025	25	μsec
For conditions: dc anode volts = 500; grid-No.1 volts = −13; grid-No.1 resistor (ohms) = 1000; dc cathode amperes = 0.025	40	μsec
Maximum Critical Grid-No.1 Current, with ac anode-supply volts (rms) = 350, and average cathode amperes = 0.025	0.5	μamp
Anode Voltage Drop (Approx.)	10	volts
Grid-No.1 Control Ratio (Approx.) with grid-No.1 resistor (megohms) = 0; grid-No.2 volts = 0	250	
Grid-No.2 Control Ratio (Approx.) with grid-No.1 volts = 0, grid-No.2 resistor (ohms) = 0	15	

° Without external shield.

Mechanical:

Mounting Position	Any
Maximum Overall Length	1-3/4"
Maximum Seated Length	1-1/2"
Length, Base Seat to Bulb Top (excluding tip)	1-1/8" ± 3/32"
Maximum Diameter	3/4"
Bulb	T-5-1/2
Base	Small-Button Miniature 7-Pin
Basing Designation for BOTTOM VIEW	7BN

Pin 1 – Grid No.1
Pin 2 – Cathode
Pin 3 – Heater
Pin 4 – Heater



Pin 5 – Grid No.2
Pin 6 – Anode
Pin 7 – Grid No.2

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THYRATRON

RELAY and GRID-CONTROLLED RECTIFIER SERVICE

Maximum Ratings, ***Absolute Values:***

PEAK ANODE VOLTAGE:		
Forward	500 max.	volts
Inverse	500 max.	volts
GRID-No.2 (SHIELD-GRID) VOLTAGE:		
Peak, before anode conduction	-50 max.	volts
Average, during anode conduction■	-10 max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Peak, before anode conduction	-100 max.	volts
Average, during anode conduction■	-10 max.	volts
CATHODE CURRENT:		
Peak	0.1 max.	amp
Average■	0.025 max.	amp
Surge, for duration of 0.1 sec. max.	2 max.	amp
GRID-No.2 CURRENT:		
Average■	+0.005 max.	amp
GRID-No.1 CURRENT:		
Average■	+0.005 max.	amp
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	100 max.	volts
Heater positive with respect to cathode	25 max.	volts
AMBIENT TEMPERATURE RANGE	-55 to +90	°C

Typical Operating Conditions for Relay Service:

RMS Anode Voltage	117	volts
Grid No.2	Connected to cathode at	socket
RMS Grid-No.1 Bias Voltage□	5	volts
Peak Grid-No.1 Signal Voltage	5	volts
Grid-No.1-Circuit Resistance	0.1	megohm
Anode-Circuit Resistance#	5000	ohms

Maximum Circuit Values:

Grid-No.1-Circuit Resistance	10 max.	megohms

■ Averaged over any interval of 30 sec. max.

□ Approximately 180° out of phase with the anode voltage.

Sufficient resistance, including the tube load, must be used under any conditions of operation to prevent exceeding the current ratings.

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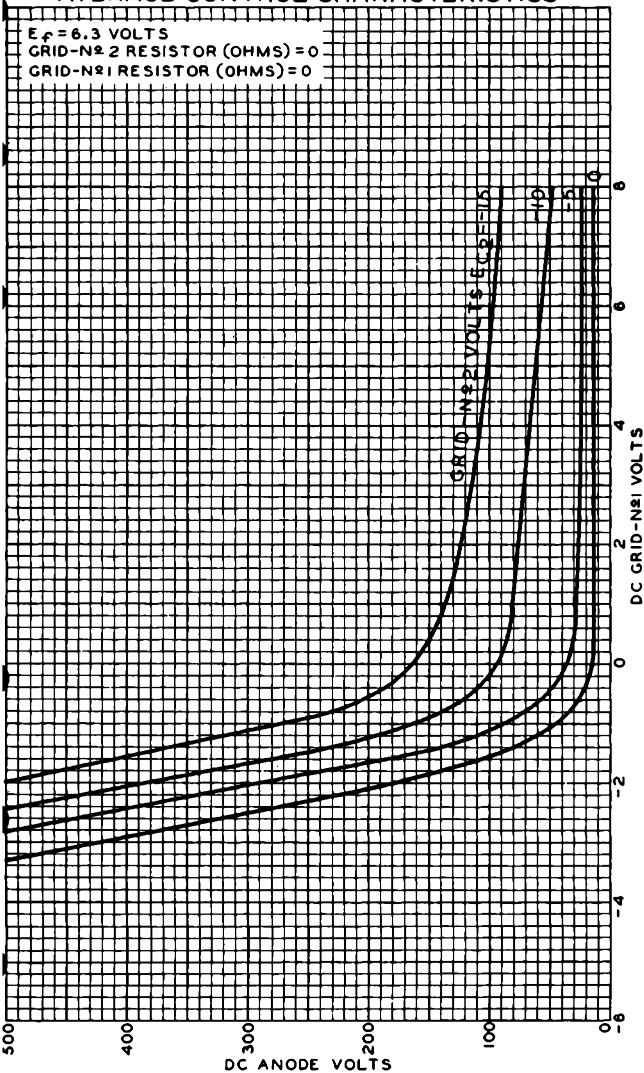
AVERAGE CONTROL CHARACTERISTICS



DC ANODE VOLTS

AUG. 6, 1948

TUBE DEPARTMENT

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92CM-7044

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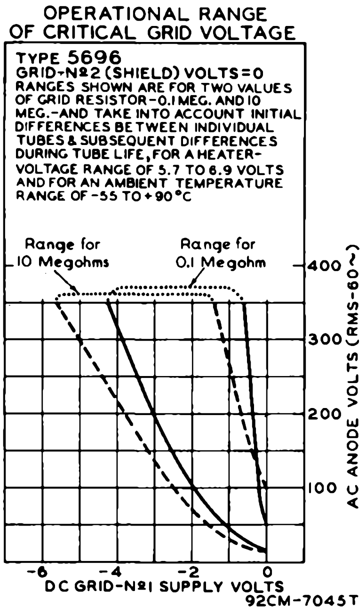
THYRATRON



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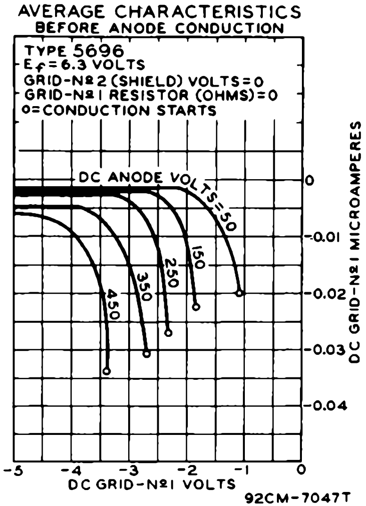

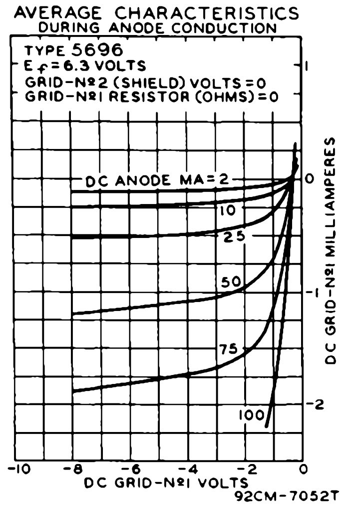

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5728/FG-67

MERCURY-VAPOR THYRATRON

NEGATIVE/POSITIVE-CONTROL TRIODE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

	Min.	*Av.*	*Max.*	
Voltage (AC or DC) . . .	4.75	5.0	5.25	volts
Current at 5.0 volts . .	–	4.5	4.9	amp

Cathode:		
Minimum Heating Time, prior to tube conduction	5	minutes
Maximum Outage Time, without reheating		*See Curves*
Direct Interelectrode Capacitances (Approx., without external shield):		
Grid to Anode	3.25	μμf
Grid to Cathode	8.9	μμf
Maximum Critical Grid Current with ac anode volts (rms) = 220	10	μamp
Anode Voltage Drop (Approx.)	16	volts
Ionization Time (Approx.):		
For conditions: dc anode-supply volts = 100, peak grid volts = +35, and peak anode amperes = 15	15	μsec
Deïonization Time (Approx.):		
For conditions: dc anode volts = 120, dc grid-supply volts = –500, grid resistor (ohms) = 1000, and dc anode amperes = 2.5	5	μsec
For conditions: dc anode volts = 120, dc grid-supply volts = 0, grid resistor (ohms) = 1000, and dc anode amperes = 2.5 .	850	μsec

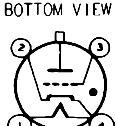
Mechanical:

Mounting Position	Vertical, base down
Maximum Overall Length	7"
Seated Length	6-1/8" ± 1/4"
Maximum Diameter	3"
Bulb	ST-23
Cap	Medium (JETEC No.C1-5)
Base . .	Medium-Shell Small 4-Pin, Bayonet (JETEC No.A4-10)

BOTTOM VIEW

Pin 1: Heater

Pin 2: Cathode (Grid & Anode Return)



Pin 3: Grid

Pin 4: Heater, Cathode

5728/FG-67

MERCURY-VAPOR THYRATRON

Temperature Control:

Heating—When the ambient temperature is so low that the normal rise of condensed-mercury temperature above the ambient temperature will not bring the condensed-mercury temperature up to the minimum value of the operating range specified under *Maximum Ratings*, some form of heat-conserving enclosure or auxiliary heater will be required.

Cooling--When the operating conditions are such that the maximum value of the operating condensed-mercury temperature is exceeded, provision should be made for forced-air cooling sufficient to prevent exceeding the maximum value.

Temperature Rise of Condensed Mercury to Equilibrium Above Ambient Temperature (Approx.):*

No Load	25	°C
Full Load	31	°C

INVERTER SERVICE

Maximum Ratings, *Absolute Values:*

PEAK ANODE VOLTAGE:		
Forward	1000 max.	volts
Inverse	1000 max.	volts
GRID VOLTAGE:		
Peak, before anode conduction	-500 max.	volts
Average●, during anode conduction	-5 max.	volts
CATHODE CURRENT:		
Peak	15 max.	amp
Average●●	2.5 max.	amp
Fault, for duration of 0.1 sec. max.	200 max.	amp
GRID CURRENT:		
Average●	+0.3 max.	amp
CONDENSED-MERCURY TEMPERATURE RANGE	+40 to +80	°C

* With heater voltage = 4.75 volts and no heat-conserving enclosure.

● Averaged over one conducting cycle.

●● Averaged over any interval of 15 seconds maximum.

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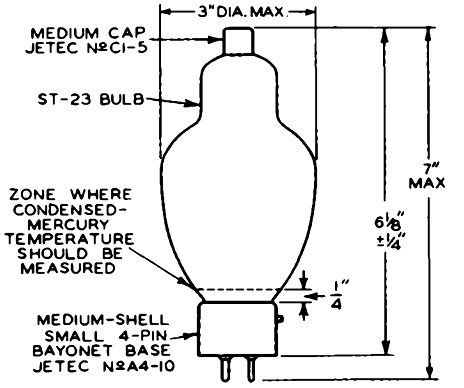
5728/FG-67

MERCURY-VAPOR THYRATRON



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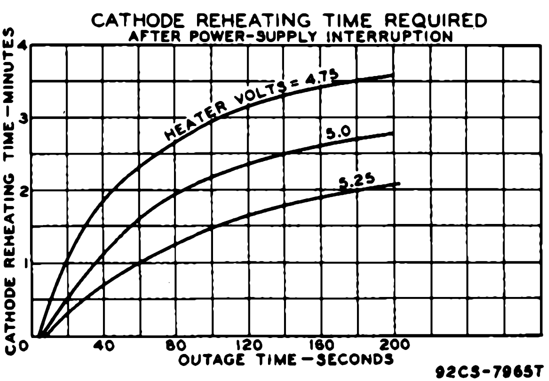

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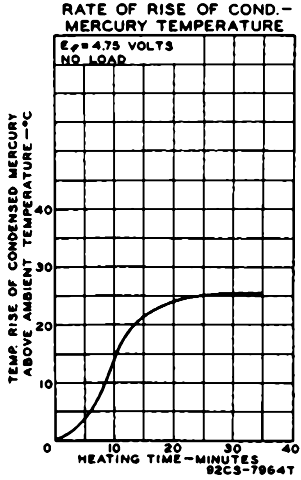
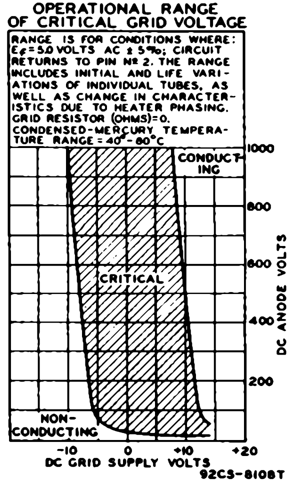
CHARACTERISTIC CURVES





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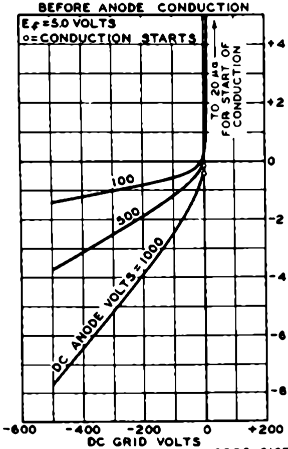
CHARACTERISTIC CURVES

AVERAGE GRID CHARACTERISTICS BEFORE ANODE CONDUCTION



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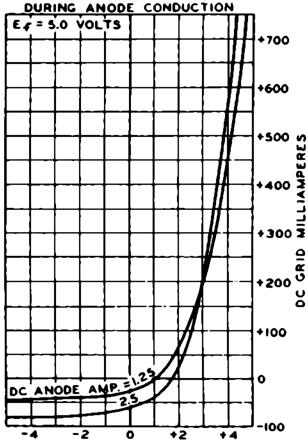
AVERAGE GRID CHARACTERISTICS DURING ANODE CONDUCTION



92CS-8102T

5822-A

5822-A
IGNITRON

WATER-COOLED, STEEL-JACKETED, MERCURY-POOL-CATHODE
TYPE HAVING MOUNTING PLATE FOR THERMOSTATIC CONTROL

For intermittent rectifier and frequency-changer welder service

GENERAL DATA

Electrical:

Cathode Excitation. . . . . .Cyclic
Cathode-Spot Starting . . . . .By Ignitor
Minimum Requirements for Cathode Excitation:

Peak ignitor voltage required to fire	200	volts
Peak ignitor current required to fire	30	amp
Starting time at required voltage or current.	100	μsec

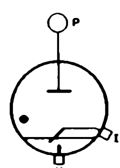
Tube Voltage Drop:

At peak anode current of 1500 amperes	25	volts

Mechanical:

Operating Position. . . . . .Vertical, flexible lead up
Maximum Overall Length (Including flexible lead). . . . . 27-1/4"
Maximum Radius (Including water connections). . . . . 3-5/8"
Weight. . . . . 8.25 lbs
Terminal Connections *(See Dimensional Outline)*:

P - Anode Terminal (Flexible lead)
K - Cathode Terminal (Bar opposite anode terminal)



I - Ignitor Terminal (Within jacket skirt at cathode end)

Cooling:

Type.		Water
Minimum inlet water temperature	10	°C
Maximum outlet water temperature.	35	°C
Minimum water flow.	1.5	gpm
Maximum water-temperature rise.	6	°C
Maximum pressure drop	5	psi

INTERMITTENT RECTIFIER SERVICE
and
FREQUENCY-CHANGER WELDER SERVICE

Maximum Ratings, ***Absolute-Maximum Values:***

For zero phase-control angle and frequencies from 50 to 60 cps

RATING I

PEAK ANODE VOLTAGE:

Forward	1200 max.	1200 max.	volts
Inverse	1200 max.	1200 max.	volts

ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5822-A
IGNITRON

ANODE CURRENT:			
Peak.	420 max.	1500 max.	amp
Average (Averaged over any interval of 6.25 seconds maximum)	70 max.	20 max.	amp
Average (Averaged over any interval of 0.2 second maximum).	70 max.	250 max.	amp
Fault, for duration of 0.15 second maximum.	18750 max.	18750 max.	amp

RATING II

PEAK ANODE VOLTAGE:			
Forward	1500 max.	1500 max.	volts
Inverse	1500 max.	1500 max.	volts
ANODE CURRENT:			
Peak.	336 max.	1200 max.	amp
Average (Averaged over any interval of 6.25 seconds maximum)	56 max.	16 max.	amp
Average (Averaged over any interval of 0.2 second maximum).	56 max.	200 max.	amp
Fault, for duration of 0.15 second maximum.	15000 max.	15000 max.	amp

IGNITOR

Maximum Ratings, ***Absolute-Maximum Values:***

PEAK IGNITOR VOLTAGE:		
Positive.	Equal to anode	volts
Negative.	5 max.	volts
IGNITOR CURRENT:		
Peak.	100 max.	amp
Average (Averaged over any interval of 5 seconds maximum)	1 max.	amp
RMS	10 max.	amp

OPERATING CONSIDERATIONS

The 5822-A is equipped with a mounting plate for mounting a thermostatic control calibrated either for controlling the flow of cooling water through the water jacket, or for protection of the ignitron against overheating.

When the cooling water is circulated successively through the water jackets of two or more ignitrons, the water-saving thermostat, if used, should be mounted on the ignitron connected directly to the water supply.

The water-saving thermostat, which has normally open contacts, is calibrated to close a circuit energizing a solenoid valve in the water-supply line and thus permit water

5822-A
IGNITRON

flow to start when the temperature of the thermostat mounting plate exceeds approximately 35° C. Because of the lag between the heating of the ignitron envelope and the functioning of the water-saving thermostat to start water flow through the water jackets, the ignitron may overheat before the flow of cooling water starts.

Such overheating can be prevented by the use of an auxiliary contactor shunted across the contacts of the water-saving thermostat and actuated by the welding-control switch. The contactor causes the solenoid valve in the water-supply line to open as soon as welding current flows.

When a *protective thermostat* is used, it should be mounted on an ignitron from which the cooling water discharges into the drain. The protective thermostat is calibrated to open a set of normally closed contacts at a jacket temperature of approximately 52° C. The opening of these contacts causes a protective device to function. This device may be a relay opening the ignitor firing controls, or preferably, a circuit breaker which removes power from the ignitrons.

Care must be taken to insure that the water jacket of each ignitron is completely filled before power is applied. Tube operation with a partially filled water jacket may cause abnormal heating of the tube envelope with resultant arc-back which impairs tube life. It is also necessary to arrange the cooling system so as to prevent any draining of the water jackets when the flow of water ceases.

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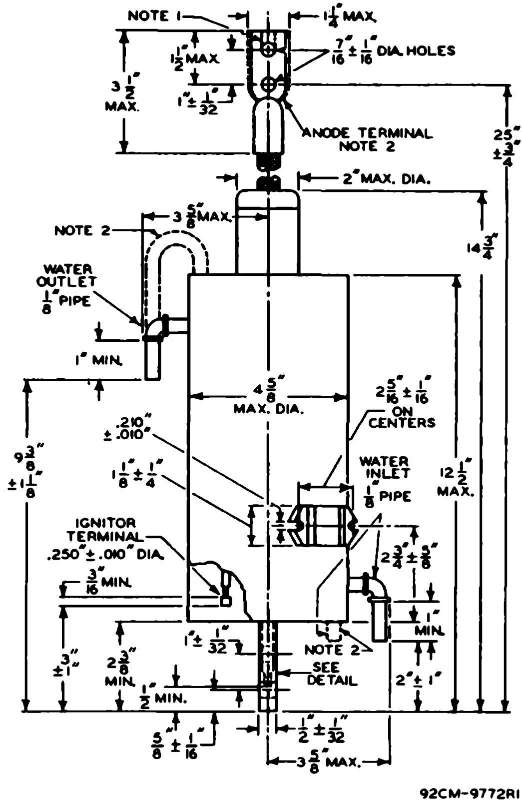
5822-A

5822-A

IGNITRON

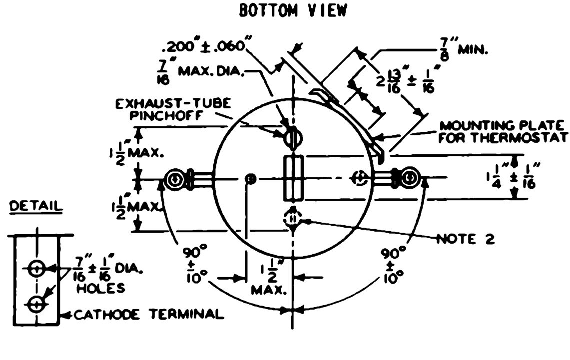


ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5822-A

5822-A

IGNITRON



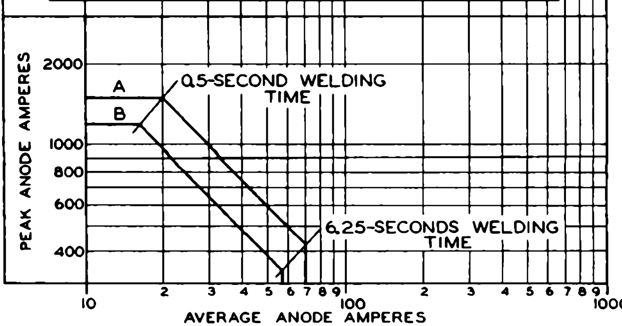
NOTE 1: MAY BE SLOTTED.

NOTE 2: DASHED POSITION AT MANUFACTURER'S OPTION.

4-59 CE-9772R1B

RATING CHART
FREQUENCY-CHANGER WELDER SERVICE

CURVE	PEAK ANODE VOLTS FORWARD OR INVERSE	MAXIMUM AVERAGING TIME—SECONDS
A	1200	6.25
B	1500	6.25



92CS-9821

ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6012

6012
GAS THYRATRON

NEGATIVE-CONTROL TETRODE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

	Min.	*Av.*	*Max.*	
Voltage	5.7	6.3	6.9	ac or dc volts
Current at 6.3 volts	–	2.6	2.85	amp

Cathode:		
Minimum heating time prior to tube conduction	30	sec
Maximum outage time without reheating	5	sec
Direct Interelectrode Capacitances (Approx.):°		
Grid No.1 to anode	0.23	μμf
Grid No.1 to cathode, grid No.2, and heater	5.8	μμf
Anode to cathode, grid No.2, and heater	3.9	μμf
Ionization Time (Approx.): ←		
For conditions: dc anode volts = 100, grid-No.2 volts = 0, grid-No.1 square-pulse volts = +50, and peak anode amperes during conduction = 5	0.5	μsec
Deionization Time (Approx.)		*See Table I* ←
Maximum Critical Grid-No.1 Current:		
For conditions: ac anode-supply volts = 460 (rms), and average anode amperes = 0.5	3	μamp
Anode Voltage Drop (Approx.)	10	volts
Grid-No.1 Control Ratio (Approx.):		
For conditions: grid-No.1 resistor (megohms) = 0, grid-No.2 resistor (megohms) = 0, and grid-No.2 volts = 0	150	
Grid-No.2 Control Ratio (Approx.):		
For conditions: grid-No.1 resistor (megohms) = 0, grid-No.2 resistor (megohms) = 0, and grid-No.1 volts = 0	650	

Mechanical:

Mounting Position	Any
Maximum Overall Length	3-7/8" ←
Maximum Seated Length	3-5/16" ←
Maximum Diameter	1-23/32"
Bulb	T-12
Base	Large-Wafer Octal 6-Pin with External Barriers and Sleeve (JETEC No.B6-100) ←

° Without external shield.

← Indicates a change.

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6012

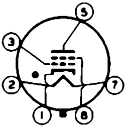
RCA

6012

GAS THYRATRON

Basing Designation for BOTTOM VIEW 6CO

Pin 1 - Cathode
Pin 2 - Heater
Pin 3 - Grid No.1



Pin 5 - Anode
Pin 7 - Heater
Pin 8 - Grid No.2

RELAY AND GRID-CONTROLLED RECTIFIER SERVICE

For anode-supply frequency of 60 cps

Maximum Ratings, *Absolute Values:*

PEAK ANODE VOLTAGE:			
Forward.	650	max.	volts
Inverse.	1300	max.	volts
GRID-No.2 (SHIELD-GRID) VOLTAGE:			
Peak, before tube conduction	-100	max.	volts
Average#, during tube conduction	-10	max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:			
Peak, before tube conduction	-200	max.	volts
Average#, during tube conduction	-10	max.	volts
CATHODE CURRENT:			
Peak	5	max.	amp
Average#	0.5	max.	amp
Fault, for duration of 0.1 second max. .	20	max.	amp
AVERAGE GRID-No.2 CURRENT#	+0.05	max.	amp
AVERAGE GRID-No.1 CURRENT#	+0.05	max.	amp
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode.	100	max.	volts
Heater positive with respect to cathode.	25	max.	volts
AMBIENT-TEMPERATURE RANGE.	-75 to +90		°C

Maximum Circuit Values:

Grid-No.1-Circuit Resistance	2	max.	megohms

Averaged over any interval of 30 seconds maximum.

→ Indicates a change.

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6012

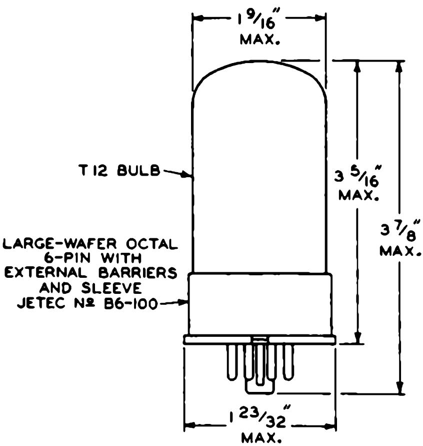
GAS THYRATRON

TABLE I

E_{cc_1} = DC Grid-No.1 Supply Voltage (Volts)
E_{cc_2} = DC Grid-No.2 Supply Voltage (Volts)
R_{g_1} = Grid-No.1 Resistor (Megohms)
R_{g_2} = Grid-No.2 Resistor (Ohms)

DC Anode Volts	125		250		R_{g_1}	E_{cc_1}	R_{g_2}*	E_{cc_2}
DC Anode Amperes	0.5	1.0	0.5	1.0				
DEIONIZATION TIME μsec (Approx.)	175	225	250	275	0.001	-13	1000	0
	350	375	450	475	0.1			
	650	700	1100	1200	2			
	100	125	100	125	0.001	-100	1000	0
	125	150	150	175	0.1			
	250	275	275	300	2			

* Series resistor between grid No.2 and cathode.

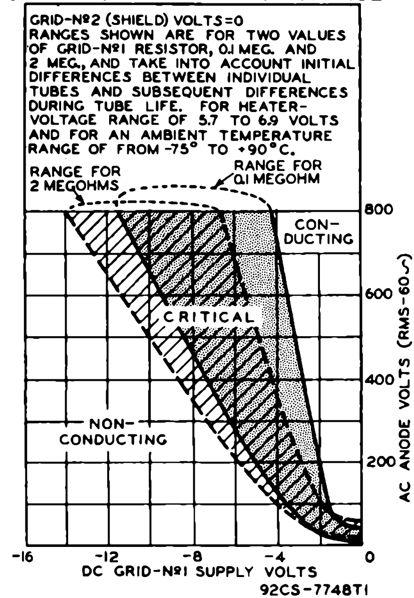


92CS-7635R1

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6012
GAS THYRATRON

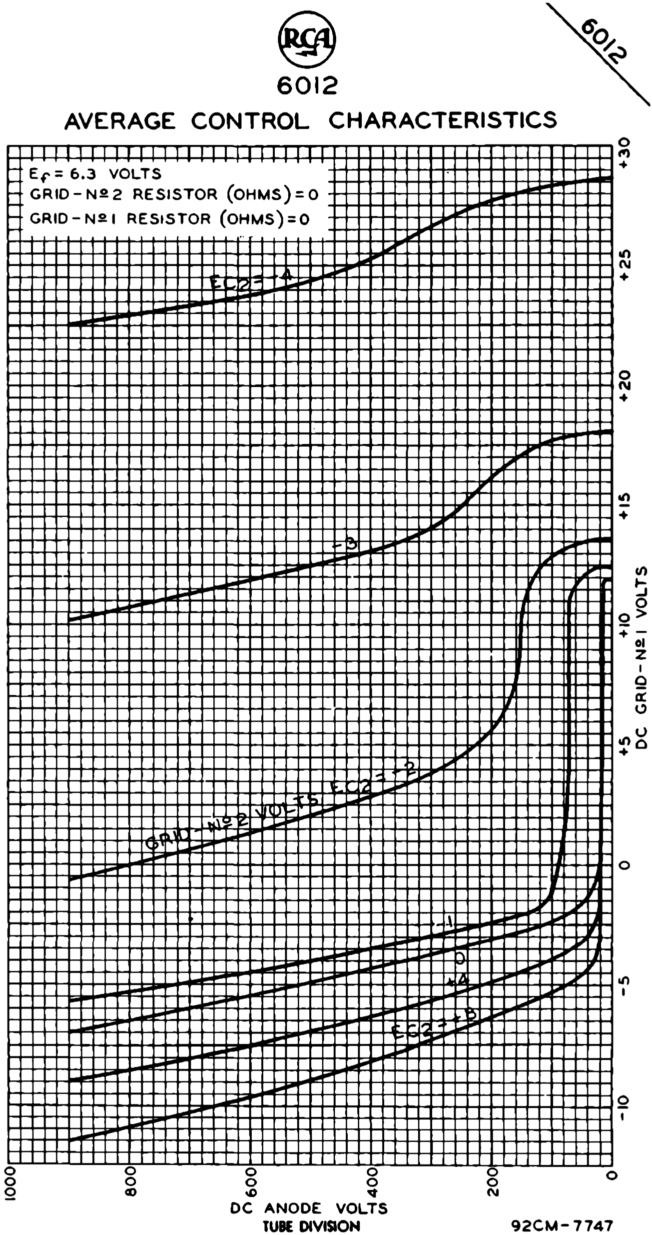
OPERATIONAL RANGE OF CRITICAL GRID-№1 VOLTAGE



TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6012

AVERAGE CONTROL CHARACTERISTICS



TUBE DIVISION

92CM-7747

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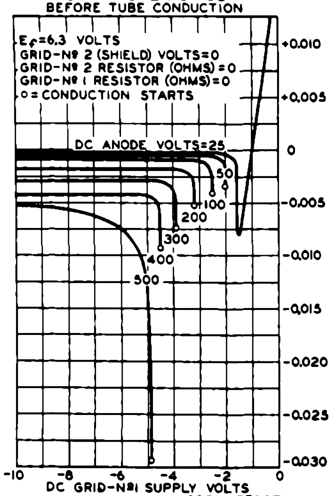
6012

6012

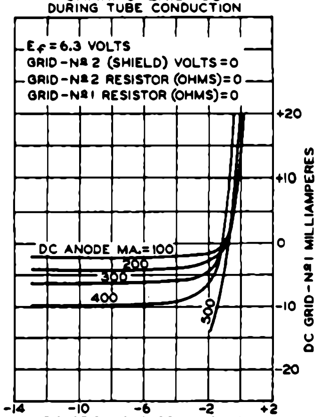
CHARACTERISTIC CURVES

AVERAGE GRID-No.1 CHARACTERISTICS
BEFORE TUBE CONDUCTION



92CM-7763T1

AVERAGE GRID-No.1 CHARACTERISTICS
DURING TUBE CONDUCTION



92CM-7764T1

6130

6130/3C45
HYDROGEN THYRATRON

POSITIVE-CONTROL TRIODE TYPE

GENERAL DATA

Electrical:

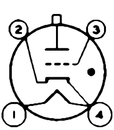
Heater, for Unipotential Cathode:

Voltage	6.3 {+5% / -10%}	. . . ac or dc volts
Current at 6.3 volts:		
Minimum.	2	amp
Average.	2.3	amp
Maximum.	2.5	amp
Minimum heating time	2	minutes
Direct Interelectrode Capacitances (Approx.):		
Grid to anode.	3.9	μμf
Grid to cathode.	8.6	μμf
Ionization Time (Approx.)□	0.6	μsec
Deionization Time (Approx.).	25	μsec
Anode-Cathode Voltage Drop (Approx.) at middle of pulse duration.	150	volts
Maximum Variation in Firing Time (Jitter).	0.06	μsec

Mechanical:

Operating Position . . . . .Any
Maximum Overall Length . . . . 5-3/16"
Seated Length. 4-3/8" ± 3/16"
Maximum Diameter . . . . 1-9/16"
Weight (Approx.) . . . . 3 oz
Cooling. . . . . .Natural
Bulb T12
Cap. . . . . .Small (JEDEC No.C1-1)
Base . . . .Medium-Shell Small 4-Pin, Micanol (JEDEC No.A4-9)
Basing Designation for BOTTOM VIEW 4BL

Pin 1 - Heater
Pin 2 - Cathode, Circuit Returns



Pin 3 - Grid
Pin 4 - Heater, Cathode
Cap - Anode

PULSE-MODULATOR SERVICE

Maximum and Minimum CCS● Ratings, *Absolute Values:*

	For pressures down to 70 mm of Hg#	
DC ANODE-SUPPLY VOLTAGE.	800 min.	volts
PEAK ANODE VOLTAGE:		
Forward (E_{bmf})■.	3000 max.	volts
Inverse.	5% of E_{bmf} min.	volts
After anode-current pulse:▲		
During first 25 μsec . . .	1500 max.	volts
After first 25 μsec. . . .	3000 max.	volts

□,●,#,■,▲: See next page.

6130

6130/3C45

HYDROGEN THYRATRON

	For pressures down to 70 mm of Hg#	
GRID VOLTAGE:		
Negative (DC or Peak), before conduction	200 max.	volts
Peak positive-pulse	175 min.	volts
ANODE CURRENT:		
Peak	35 max.	amp
Average°	0.045 max.	amp
Rate of rise	750 max.	amp/μsec
OPERATION FACTOR†	3×10^8 max.	
PULSE DURATION●	6 max.	μsec
AMBIENT-TEMPERATURE RANGE	-50 to +90	°C

Typical Operation:▲

	At 2000 pps in accompanying circuit with pulse duration of 0.5 μsec	
DC Anode-Supply Voltage	1250	volts
Peak Anode Voltage:		
Forward	3000	volts
Inverse:		
Immediately after anode-current pulse	530	volts
GRID VOLTAGE:		
Negative, before conduction	0	volts
Peak positive-pulse (Unloaded) . .	175	volts
Effective Grid-Circuit Resistance . .	1000	ohms
ANODE CURRENT:		
Peak	35	amp
Average°	0.035	amp
Operation Factor†	2.1×10^8	
Peak Power Output to Pulse Transformer (T)	43000	watts

Maximum Circuit Values:

Effective Grid-Circuit Resistance . .	1500 max.	ohms

□ Defined as the time interval between the point on the rising portion of the grid pulse which is 26 per cent of the peak unloaded-pulse amplitude and the point on the anode-current pulse which is 26 per cent of its peak amplitude. The anode-current pulse has a maximum time rise of 0.05 μsec. The grid pulse has a minimum peak amplitude of 130 volts, a maximum rise time of 0.5 μsec, and is supplied by a driver having a maximum internal impedance of 1500 ohms.

● Continuous Commercial Service.

Corresponds to altitude of about 50,000 feet.

■ In applications where the anode voltage is applied instantaneously, the power-supply filter should be designed so that the peak forward anode voltage is applied at a rate not to exceed 75,000 volts per second.

▲ Exclusive of spike not having more than 0.05 μsec duration.

° Averaged over any cycle.

† Defined as *Peak Forward Anode Volts x Pulse-Repetition Rate (pps) x Peak Anode Amperes* (excluding spike).

●, ▲: See next page.

ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6130/3C45

HYDROGEN THYRATRON

Pulse duration is defined as the time interval between points on the pulse envelope at which instantaneous amplitudes are equal to 70.7 per cent of the maximum amplitude excluding spike.

Operation with a bulb temperature within the approximate range of 60° to 90° C measured on the bulb directly opposite the anode is recommended for longest life. To attain this temperature under operating conditions involving low ambient temperature, the use of a heat-conserving enclosure for the tube may be necessary.

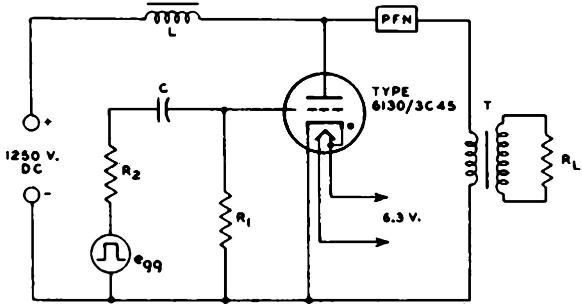
OPERATING CONSIDERATIONS

The *anode* is brought out of the tube to a Small cap. The connector for this cap should be of the heat-radiating type and the connector lead should have ample current-carrying capability for the operating requirements.

Shielding of the 6130/3C45 should be provided if it is operated in the presence of strong electric fields which will ionize the gas within the tube. Any such ionization will cause erratic performance.

Cooling of the 6130/3C45 is accomplished by natural circulation of air around it. Under no circumstances should a stream of cooling air be applied to the glass envelope.

TYPICAL PULSE-MODULATOR CIRCUIT



92CS-7784R2

C: Blocking Capacitor, 0.001 μf

egg: Pulse Generator supplying peak positive-pulse grid voltage of 175 volts (unloaded)

L: Charging Choke, 5 henries

PFN: Pulse-Forming Network with iterative impedance of 50 ohms, and a two-way transmission time of 0.5 μsec

R_1: Grid Resistor, 30,000 ohms

R_2: Effective Resistance of grid circuit, 1000 ohms

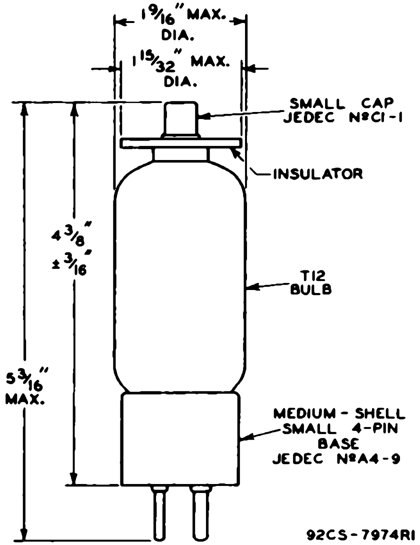
R_L: Load Resistance. Value reflected into primary of transformer (T) is 35 ohms.

T: Matching Pulse Transformer

6130

6130/3C45

HYDROGEN THYRATRON



RCA TUBE
HANDBOOK
HB-3

MISCELLANEOUS TUBE SECTION

In this section, data are given for certain RCA tube types not falling within the scope of the other sections of this Handbook.

For further Technical Information, write to Commercial Engineering, Tube Department, Radio Corporation of America, Harrison, N. J.

RCA

PRICES□
OF MISCELLANEOUS TUBE TYPES

Type	Schedule D⊕	Schedule U▲	Type	Schedule D⊕	Schedule U▲
0A2	$ 2.90	-	1612	-	$ 2.70
0A3*	2.65	-	1620	-	6.25
0A4-G	2.90	-	1621	-	1.95
0B2	3.20	-	1622	-	2.50
0C3*	2.65	-	1629	-	1.40
0D3*	2.65	-	1631	-	3.10
1C21	-	$ 2.85	1632	-	3.25
2A4-G♣	3.20	-	1633	-	1.95
2C21/1642♣	-	1.90	1634♣	-	1.40
2C22♣	-	1.60	1635	-	2.00
2C40	-	24.00	1644	-	3.10
2C43	-	21.50	1654	-	4.55
2J50	-	192.00	1945	-	135.00
2K26	-	78.50	1946	-	10.90
2K56	-	●	1947	-	9.80
2V3-G♣	5.25	-	1949	-	11.30
2X2-A	4.35	-	1950	-	7.80
3A4	-	1.20	5651	-	2.30
3A5	-	1.95	5654	-	4.90
4J52	-	465.00	5675	-	15.20
5R4-GY	-	1.85	5690	-	11.25
6AS6	-	3.65	5691	-	9.50
6F4	-	6.40	5692	-	9.75
6J4	-	8.05	5693	-	7.75
6L4	-	6.60	5718	-	9.35
12A6	2.90	-	5719	-	9.35
12AY7	3.00	-	5726	-	2.00
12L8-GT	-	2.35	5734	-	18.00
12SW7	-	1.20	5751	-	3.80
12SX7-GT	-	1.55	5794	16.50	-
12SY7	-	1.45	5814	-	3.80
26A6	-	3.10	5823	-	1.32
26A7-GT	-	6.55	5825	-	13.00
26C6	-	2.10	5840	-	12.40
26D6	-	2.85	5876	-	15.20
559	-	5.35	5879	-	1.75
579-B	-	15.00	5890	-	26.00
864♣	-	5.00	5893	-	19.40
874♣	-	3.10	5915	-	1.20
878♣	-	12.75	5963	-	1.40
954	-	5.65	5964	-	1.50
955	-	3.60	6026	-	2.95
956	-	7.00	6073	8.00	-
957	-	3.75	6074	8.90	-
958-A	-	6.50	6080	-	6.00
959	-	6.25	6082	-	5.30
991	-	0.75	6101	-	8.00
1609	-	10.25	6173	-	15.80

(notes on next page)

PRICES
OF MISCELLANEOUS TUBE TYPES

Type	*Schedule D*	*Schedule U*	*Type*	*Schedule D*	*Schedule U*
6211..........	-	$ 2.95	9002........	-	$ 2.50
8013-A.......	-	10.30	9003........	-	3.40
8020..........	-	24.00	9004........	-	2.30
9001..........	-	3.40	9005........	-	3.45
			9006........	-	1.60

□ This price list applies only in the United States of America and is subject to change without notice. The price includes Federal Excise Tax, where applicable. All prices are exclusive of any State and local excise, sales and similar taxes.

● Schedule D shows list prices for tube types priced for distribution through dealer and service channels.

▲ Schedule U shows user prices for tube types priced for distribution through other than dealer and service channels.

* For data see OA3/VR75, OC3/VR105, and OD3/VR150, respectively.

♣ Not recommended for new equipment design.

● Discontinued type. Data sheets have been retained in book for reference purposes only.

INFORMATION ON PURCHASING ABOVE TYPES

Information as to where *Miscellaneous Types* of RCA Tubes can be purchased may be obtained from our *regional office* nearest you or from *Tube Department, Radio Corporation of America, Harrison, N.J.*

MAX. D-C HEATER-CATHODE POTENTIALS
OF MISCELLANEOUS TYPES
Based on JAN Specifications as of January 3, 1944

The following Miscellaneous Tubes appear in the JAN Specifications as having an ***absolute maximum*** heater-cathode potential rating as shown below. The corresponding ***design-center maximum*** ratings may be taken as 90 volts and 80 volts, respectively, for the 100- and 90-volt absolute maximum values. Types for which heater-cathode potential ratings are given on their data pages are not included in this list.

Type	*Absolute Max. Volts*
2C21/1642	100
2C22	100
6C4	100
12A6	100
954	90
955	90
956	90
1629	100
1635	100
9001	90
9002	90
9003	90

(Tentative)

OA2

OA2

VOLTAGE REGULATOR

MINIATURE GLOW-DISCHARGE TYPE

GENERAL DATA

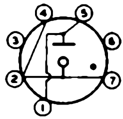
Electrical:

Cathode . . . . Cold

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-5/8"
Maximum Seated Length	2-3/8"
Length, Base Seat to Bulb Top (Excluding tip)	2" ±3/32"
Maximum Diameter	3/4"
Weight (Approx.)	0.3 oz
Bulb	T-5-1/2
Base	Small-Button Miniature 7-Pin (JETEC No. E7-1)
Basing Designation for BOTTOM VIEW	5BO

Pin 1 - Anode
Pin 2 - Cathode
Pin 3 - Internal Connection- Do Not Use
Pin 4 - Cathode



Pin 5 - Anode
Pin 6 - Internal Connection- Do Not Use
Pin 7 - Cathode

Maximum and Minimum Ratings, ***Absolute Values*****:**

AVERAGE STARTING CURRENT♦	75 max.	ma
DC CATHODE CURRENT	30 max.	ma
	5 min.	ma
FREQUENCY	0 max.	cps
AMBIENT-TEMPERATURE RANGF	-55 to +90	°C

Circuit Values:

Shunt Capacitor	0.1 max.	μμf
Series Resistor	*See Operating Considerations*	

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Min.	*Av.*	*Max.*	
DC Anode-Supply Voltage	185■	-	-	volts
Anode Breakdown Voltage	-	156	185*	volts
Anode Voltage Drop	140●	151	168*	volts
Regulation (5 to 30 ma)	-	2	6*	volts

♦ Averaged over starting period not exceeding 10 seconds. This starting period must be followed by a steady-state operating condition of at least 20 minutes, or tube performance will be impaired.

■ Not less than indicated supply voltage should be provided to insure "starting" throughout tube life.

* Maximum individual tube value during useful life.

● Minimum individual tube value during useful life.

← Indicates a change.

OA2

VOLTAGE REGULATOR

OPERATING CONSIDERATIONS

Sufficient resistance must always be used in series with the OA2 to limit the current through the tube. The value for the series resistor is dependent on the maximum anode-supply voltage and the ratio of the current through the load to the operating current of the OA2, and should be chosen to limit the operating current through the tube to 30 milliamperes at all times after the starting period.

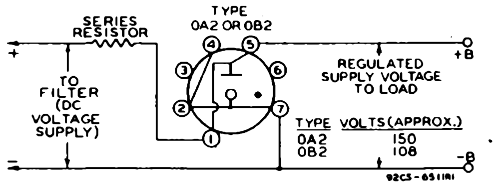
The maximum load current that can be regulated by the OA2 is determined by the minimum and maximum values of the supply voltage. After the value of series resistor for the maximum supply voltage has been calculated as indicated above, it is then in order to determine if this value will permit adequate starting voltage when the supply voltage falls to its minimum value. If adequate starting voltage is not obtained, a new load current of lower value must be used and the calculations repeated. It will be apparent from such calculations that the higher the minimum supply voltage and the smaller the difference between its minimum and maximum values, the higher will be the load current that can be regulated.

When equipment utilizing the OA2 is "turned on", a starting current in excess of the average operating current is permissible as indicated under Maximum Ratings. When the tube is subjected to such high starting currents, the regulated voltage may require up to 20 minutes to drop to its normal operating value. This performance is characteristic of voltage-regulator tubes of the glow-discharge type. Similarly, the regulation is affected by changes in current within the operating current range. For example, the regulation of a tube operated for a protracted period at 5 milliamperes and then changed to 25 milliamperes, may be somewhat different from the value that will be obtained after a long period of operation at 25 milliamperes. Likewise, the regulation may change somewhat after a long idle period.

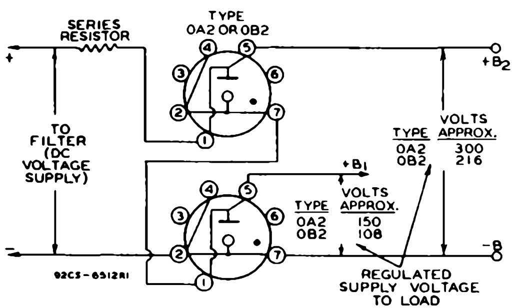
In order to handle more load current, two or more OA2's may be operated in parallel, but such parallel operation requires that a resistance of approximately 100 ohms be used in series with each OA2 in order to equalize division of the current between the paralleled tubes. The disadvantage of this method, of course, is that the use of resistors impairs the regulation which can be obtained.

If the associated circuit has a capacitor in shunt with the OA2, the capacitor should be limited in value to 0.1 μf. A larger value may cause the OA2 to oscillate and thus give unstable regulation performance.

OA2
VOLTAGE REGULATOR



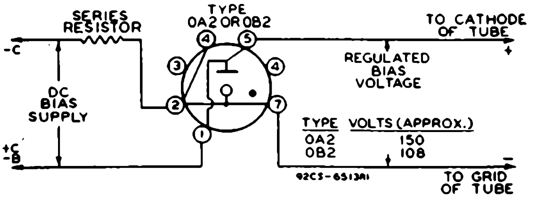
Typical circuit to provide regulated supply voltage of approximately 150 or 108 volts to load. Removal of tube from socket removes voltage from load.



Typical circuit using two OA2's or two OB2's to provide regulated supply voltages of approximately 300 or 216 volts and 150 or 108 volts to load. Socket connections are so made that voltage on load is removed when either tube is taken from its socket.

CIRCUIT FOR BIAS-SUPPLY REGULATION
IS SHOWN ON NEXT PAGE.

OA2
VOLTAGE REGULATOR



Typical circuit for bias-supply regulation. Removal of tube from socket opens B-supply circuit of regulated tubes.

OA3

OA3
VOLTAGE REGULATOR
GLOW-DISCHARGE TYPE

GENERAL DATA

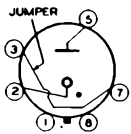
Electrical:

Cathode . . . . .Cold

Mechanical:

Mounting Position . . . . Any
Maximum Overall Length. . . . . 4-1/8"
Seated Length . . . . 3-3/8" ± 3/16" ←
Maximum Diameter. . . . . 1-9/16"
Dimensional Outline . . . . *See General Section*
Weight (Approx.). 1.3 oz ←
Bulb. ST-12
Base. . . . . Small-Shell Octal 6-Pin (JETEC No.B6-3) ←
Basing Designation for BOTTOM VIEW. 4AJ

Pin 1 - No Connection
Pin 2 - Cathode
Pin 3 - Jumper▲



Pin 5 - Anode
Pin 7 - Jumper▲
Pin 8 - No Connection

Maximum and Minimum Ratings, ***Absolute Values:***

AVERAGE STARTING CURRENT♦	100 max.	ma
DC CATHODE CURRENT.	40 max.	ma
	5 min.	ma
FREQUENCY	0 max.	cps ←
AMBIENT-TEMPERATURE RANGE	-55 to +90	°C

Circuit Values: ←

Shunt Capacitor . . . . 0.1 max. µf
Series Resistor . . . . *See Operating Considerations*

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN ←

	Min.	*Av.*	*Max.*	
DC Anode-Supply Voltage	105■	-	-	volts
Anode Breakdown Voltage	-	100	105*	volts
Anode Voltage Drop	68●	75	85*	volts
Regulation (5 to 40 ma)	-	5	6.5*	volts

▲ With suitable socket connections, jumper within base acts as a switch to open power-supply circuit when voltage regulator tube is removed from socket.

♦ Averaged over starting period not exceeding 10 seconds. This starting period must be followed by a steady-state operating condition of at least 20 minutes, or tube performance will be impaired.

■ Not less than indicated supply voltage should be provided to insure "starting" throughout tube life.

* Maximum individual tube value during useful life.

● Minimum individual tube value during useful life.

← indicates a change.

OA3

OA3

VOLTAGE REGULATOR

→

OPERATING CONSIDERATIONS

Sufficient resistance must always be used in series with the OA3 to limit the current through the tube. The value for the series resistor is dependent on the maximum anode-supply voltage and the ratio of the current through the load to the operating current of the OA3, and should be chosen to limit the operating current through the tube to 40 milliamperes at all times after the starting period.

The maximum load current that can be regulated by the OA3 is determined by the minimum and maximum values of the supply voltage. After the value of series resistor for the maximum supply voltage has been calculated as indicated above, it is then in order to determine if this value will permit adequate starting voltage when the supply voltage falls to its minimum value. If adequate starting voltage is not obtained, a new load current of lower value must be used and the calculations repeated. It will be apparent from such calculations that the higher the minimum supply voltage and the smaller the difference between its minimum and maximum values, the higher will be the load current that can be regulated.

When equipment utilizing the OA3 is "turned on", a starting current in excess of the average operating current is permissible as indicated under Maximum Ratings. When the tube is subjected to such high starting currents, the regulated voltage may require up to 20 minutes to drop to its normal operating value. This performance is characteristic of voltage-regulator tubes of the glow-discharge type. Similarly, the regulation is affected by changes in current within the operating-current range. For example, the regulation of a tube operated for a protracted period at 5 milliamperes and then changed to 35 milliamperes, may be somewhat different from the value that will be obtained after a long period of operation at 35 milliamperes. Likewise, the regulation may change somewhat after a long idle period.

In order to handle more load current, two or more OA3's may be operated in parallel, but such parallel operation requires that a resistance of approximately 100 ohms be used in series with each OA3 in order to equalize division of the current between the paralleled tubes. The disadvantage of this method, of course, is that the use of resistors impairs the regulation which can be obtained.

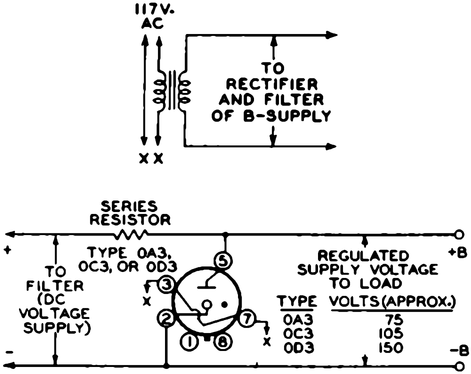
If the associated circuit has a capacitor in shunt with the OA3, the capacitor should be limited in value to 0.1 μf. A larger value may cause the OA3 to oscillate and thus give unstable regulation performance.

→ Indicates a change.

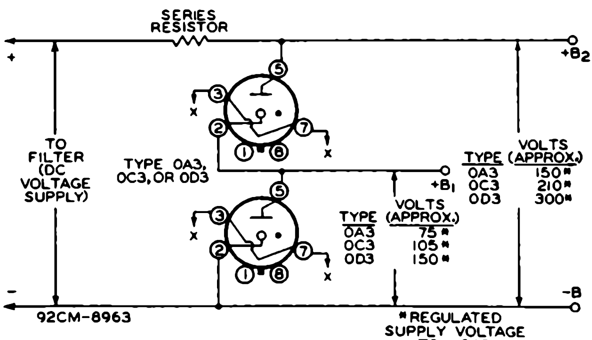
OA3

OA3

VOLTAGE REGULATOR



Typical circuit to provide regulated supply voltage of approximately 75, 105, or 150 volts to load. Removal of tube from socket removes voltage from load.



Typical circuit using two OA3's, two OC3's, or two OD3's to provide regulated supply voltages of approximately 150, 210, or 300 volts and 75, 105, or 150 volts to load. Socket connections are so made that voltage on load is removed when either tube is taken from its socket.

0A4-G

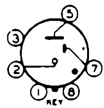
0A4-G

GAS-TRIODE

COLD-CATHODE STARTER-ANODE TYPE

Maximum Overall Length	4-1/8"
Maximum Diameter	1-9/16"
Bulb	ST-12
Base	Small Shell Octal 6-Pin

Pin 1 – No Connection
Pin 2 – Cathode
Pin 3 – No Connection



BOTTOM VIEW

Pin 5 – Anode
Pin 7 – Starter-Anode
Pin 8 – No Connection

CHARACTERISTICS

Peak Anode Breakdown Voltage (Starter anode tied to cathode)	225 min.	volts
Peak Positive Starter-Anode Breakdown Voltage	70 min.	volts
	90 max.	volts
Starter-Anode Current (For transition of discharge to anode at 140 volts peak)	100 max.	μamp.
Starter-Anode Drop	60 approx.	volts
Anode Drop	70 approx.	volts

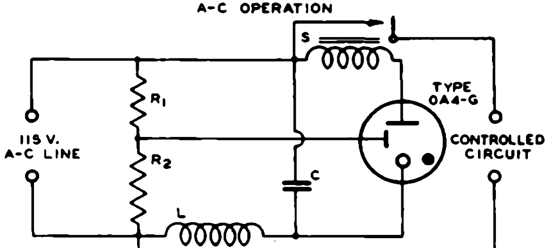
MAXIMUM RATINGS and TYPICAL OPERATING CONDITIONS

Relay Service

Peak Cathode Current	100 max.	ma.
D-C Cathode Current	25 max.	ma.
Typical Operation with A-C Supply:		
Anode-Supply Voltage (RMS)	105 – 130	volts
A-C Starter-Anode Voltage (peak)	70 max.	volts
R-F Starter-Anode Voltage (peak)	55 min.	volts
Sum of A-C and R-F Starter-Anode Voltages (peak)	110 min.	volts

SCHEMATIC RELAY CIRCUIT USING TYPE 0A4-G

A-C OPERATION



C, L } = HIGH-Q TUNED CIRCUIT FOR R-F SIGNAL

R_1 = 15000 OHMS (½ WATT)

R_2 = 10000 OHMS (½ WATT)

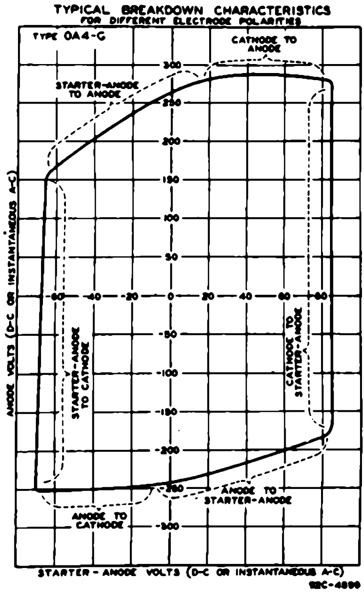
S = RELAY — CHOSEN FOR DESIGN REQUIREMENTS

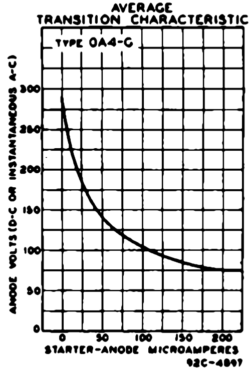
APRIL 20, 1938 TENTATIVE DATA

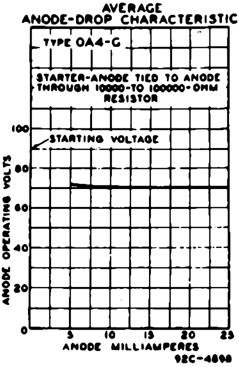
RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

0A4-G

0A4-G
GAS-TRIODE







APRIL 20, 1938

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

92C-4897, 4898, 4899

OB2

OB2

VOLTAGE REGULATOR

MINIATURE GLOW-DISCHARGE TYPE

GENERAL DATA

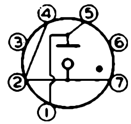
Electrical:

Cathode. . . . . Cold

Mechanical:

Mounting Position. . . . . Any
Maximum Overall Length . . . . 2-5/8"
Maximum Seated Length. . . . . 2-3/8"
Length, Base Seat to Bulb Top (Excluding tip). . . 2" ± 3/32"
Maximum Diameter . . . . 3/4"
Weight (Approx.) . . . . 0.3 oz ←
Bulb T-5-1/2
Base . . . . . . Small-Button Miniature 7-Pin (JETEC No.E7-1) ←
Basing Designation for BOTTOM VIEW 5BO

Pin 1 - Anode
Pin 2 - Cathode
Pin 3 - Internal Connection-Do Not Use
Pin 4 - Cathode



Pin 5 - Anode
Pin 6 - Internal Connection-Do Not Use
Pin 7 - Cathode

Maximum and Minimum Ratings, *Absolute Values:*

AVERAGE STARTING CURRENT♦	75 max.	ma
DC CATHODE CURRENT	30 max.	ma
	5 min.	ma
FREQUENCY.	0 max.	cps ←
AMBIENT-TEMPERATURE RANGE.	-55 to +90	°C

Circuit Values:

Shunt Capacitor.	0.1 max.	μμf
Series Resistor.	*See note below*	

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN ←

	Min.	*Av.*	*Max.*	
DC Anode-Supply Voltage. . . .	133■	-	-	volts
Anode Breakdown Voltage. . . .	-	115	133*	volts
Anode Voltage Drop	101●	108	114*	volts
Regulation (5 to 30 ma.) . . .	-	1	4*	volts

♦ Averaged over starting period not exceeding 10 seconds. This starting period must be followed by a steady-state operating condition of at least 20 minutes, or tube performance will be impaired.

■ Not less than indicated supply voltage should be provided to insure "starting" throughout tube life.

* Maximum individual tube value during useful life.

● Minimum individual tube value during useful life.

The operating considerations and circuit information shown under Type OA2 also apply to Type OB2

← Indicates a change.

RCA

OC3

VOLTAGE REGULATOR

GLOW-DISCHARGE TYPE

GENERAL DATA

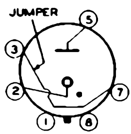
Electrical:

Cathode . . . . .Cold

Mechanical:

Mounting Position . . . . Any
Maximum Overall Length. . . . . 4-1/8"
Seated Length . . . . 3-3/8" ± 3/16" ←
Maximum Diameter. 1-9/16"
Dimensional Outline . . . . *See General Section*
Weight (Approx.). 1.3 oz ←
Bulb. ST-12
Base. . . . . Small-Shell Octal 6-Pin (JETEC No.B6-3) ←
Basing Designation for BOTTOM VIEW. 4AJ

Pin 1 - No Connection
Pin 2 - Cathode
Pin 3 - Jumper▲



Pin 5 - Anode
Pin 7 - Jumper▲
Pin 8 - No Connection

Maximum and Minimum Ratings, *Absolute Values:*

AVERAGE STARTING CURRENT♦	100 max.	ma
DC CATHODE CURRENT.	40 max.	ma
	5 min.	ma
FREQUENCY	0 max.	cps ←
AMBIENT-TEMPERATURE RANGE	-55 to +90	°C

Circuit Values: ←

Shunt Capacitor	0.1 max.	μf
Series Resistor	*See note below*	

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN ←

	Min.	*Av.*	*Max.*	
DC Anode-Supply Voltage	133■	-	-	volts
Anode Breakdown Voltage	-	115	133*	volts
Anode Voltage Drop.	103●	108	116*	volts
Regulation (5 to 40 ma)	-	2	4*	volts

▲ With suitable socket connections, jumper within base acts as a switch to open power-supply circuit when voltage regulator tube is removed from socket.

♦ Averaged over starting period not exceeding 10 seconds. This starting period must be followed by a steady-state operating condition of at least 20 minutes, or tube performance will be impaired.

■ Not less than indicated supply voltage should be provided to insure "starting" throughout tube life.

* Maximum individual tube value during useful life.

● Minimum individual tube value during useful life.

The operating considerations and circuit information shown under Type OA3 also apply to Type OC3

← Indicates a change.

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

OD3

OD3
VOLTAGE REGULATOR

GLOW-DISCHARGE TYPE

GENERAL DATA

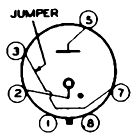
Electrical:

Cathode . . . . Cold

Mechanical:

Mounting Position . . . . Any
Maximum Overall Length. . . . . 4-1/8"
→ Seated Length . . . . 3-3/8" ± 3/16"
Maximum Diameter. . . . . 1-9/16"
Dimensional Outline . . . . *See General Section*
→ Weight (Approx.). 1.3 oz
Bulb ST-12
→ Base . . . . Small-Shell Octal 6-Pin (JETEC No.B6-3)
Basing Designation for BOTTOM VIEW. 4AJ

Pin 1 - No Connection
Pin 2 - Cathode
Pin 3 - Jumper▲



Pin 5 - Anode
Pin 7 - Jumper▲
Pin 8 - No Connection

Maximum and Minimum Ratings, *Absolute Values:*

AVERAGE STARTING CURRENT♦	100 max.	ma
DC CATHODE CURRENT.	40 max.	ma
	5 min.	ma
→ FREQUENCY	0 max.	cps
AMBIENT-TEMPERATURE RANGE	-55 to +90	°C

→ **Circuit Values:**

Shunt Capacitor	0.1 max.	μf
Series Resistor	*See note below*	

→ **CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN**

	Min.	*Av.*	*Max.*	
DC Anode-Supply Voltage	185■	-	-	volts
Anode Breakdown Voltage	-	160	185*	volts
Anode Voltage Drop.	142●	153	165*	volts
Regulation (5 to 40 ma)	-	4	5.5*	volts

▲ With suitable socket connections, jumper within base acts as a switch to open power-supply circuit when voltage regulator tube is removed from socket.

♦ Averaged over starting period not exceeding 10 seconds. This starting period must be followed by a steady state operating condition of at least 20 minutes, or tube performance will be impaired.

■ Not less than indicated supply voltage should be provided to insure "starting" throughout tube life.

* Maximum individual tube value during useful life.

● Minimum individual tube value during useful life.

The operating considerations and circuit information shown under Type 0A3 also apply to Type OD3

→ Indicates a change.

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

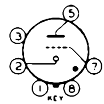
1C21

GAS-TRIODE

COLD-CATHODE GLOW-DISCHARGE TYPE

Maximum Overall Length	2-5/8"
Maximum Seated Height	2-1/16"
Maximum Diameter	1-5/16"
Bulb	T-9
Base	Intermed.Sh.Octal 6-Pin

Pin 1 - No Connection
Pin 2 - Cathode
Pin 3 - No Connection
Pin 5 - Anode



Pin 7 - Grid
Pin 8 - No Connection
● - Gas Tube Type

Mounting Position   BOTTOM VIEW (G-4V)   Any

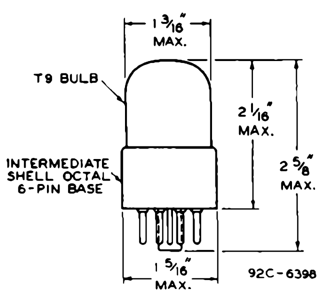
CHARACTERISTICS

Peak Anode Breakdown Voltage (Grid tied to cathode)	180 min.	volts
Peak Positive Grid Breakdown Voltage	66 min.	volts
	80 max.	volts
D-C Anode Extinction Voltage	73 approx.	volts
Grid Current (For transition of discharge to anode at 100 volts peak)	25 av.	μamp.
	50 max.	μamp.
Anode Voltage-Drop	73 approx.	volts
Grid Voltage-Drop	55 approx.	volts

Maximum Ratings Are Design-Center Values

MAXIMUM RATINGS

Peak Cathode Current	100 max.	ma.
D-C Cathode Current	25 max.	ma.
Typical Operation as Relay Tube:		
D-C Anode-Supply Voltage	125 - 145	volts
Peak Positive Grid-Bias Voltage	66 max.	volts
Peak Grid-Signal Voltage	40 min.	volts
Sum of Grid-Bias and Grid-Signal Voltages (Peak)	100 min.	volts
D-C Grid Current	100	μamp.



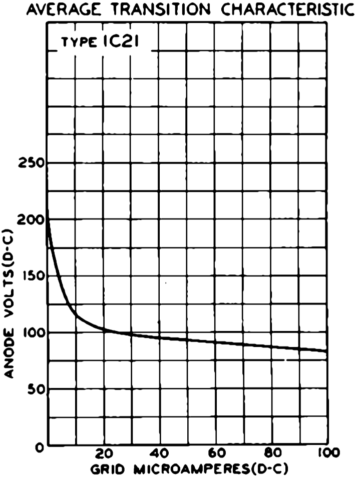
Dec. 1, 1942   TENTATIVE DATA

IC21

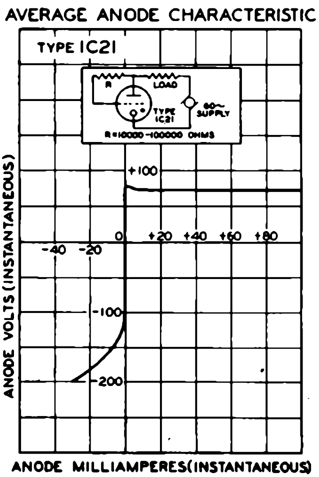
RCA

IC21

GAS-TRIODE



92C-6419R1



92C-6420

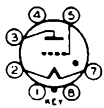
2A4-G

GAS-TRIODE

HOT-CATHODE CONTROL-GRID TYPE

Filament	Coated	
Voltage*	2.5	a-c or d-c volts
Current	2.5	amp.
Maximum Overall Length		4-1/8"
Maximum Seated Height		3-9/16"
Maximum Diameter		1-9/16"
Bulb		ST-12
Base		Small Shell Octal 7-Pin

Pin 1 - No Connection
Pin 2 - Filament +
Pin 3 - Plate
Pin 4 - No Connection
Pin 5 - Grid
Pin 7 - Filament -
Pin 8 - No Connection



BOTTOM VIEW (G-5S_7)

Mounting Position: Any

RELAY SERVICE

Peak Inverse Anode Voltage	200 max.	volts
Peak Forward Anode Voltage	200 max.	volts
Peak Voltage Between Any Two Electrodes	250 max.	volts
Peak Anode Current	1.25 max.	amp.
Average Anode Current (Averaged over Any Period of 45 Seconds)	0.10 max.	amp.
Anode Drop	15	volts

* Filament voltage should be applied for 2 seconds before current is drawn from the anode.

July 1, 1941 TENTATIVE DATA

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

RCA

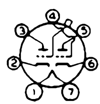
2C21/1642

TWIN-TRIODE AMPLIFIER

Heater■	Coated Unipotential Cathodes		
Voltage	6.3		a-c or d-c volts
Current	0.6		amp.
Direct Interelectrode Capacitances:°			
	Triode Unit T_1	*Triode Unit T_2*	
Grid to Plate	2.4	1.8	μμf
Grid to Cathode	2.6	1.6	μμf
Plate to Cathode	1.4	2.0	μμf

Overall Length	4-9/32" to 4-17/32"
Seated Height	3-21/32" to 3-29/32"
Maximum Diameter	1-9/16"
Bulb	ST-12
Cap	Small Metal
Base	Small 7-Pin, Micanol

Pin 1 - Heater
Pin 2 - Cathode T_2
Pin 3 - Plate T_2
Pin 4 - Grid T_1



Pin 5 - Plate T_1
Pin 6 - Cathode T_1
Pin 7 - Heater
Cap - Grid T_2

RCA Socket: Stock No.9922
Mounting Position: Any

BOTTOM VIEW (7BH)

Maximum Ratings Are Design-Center Values

AMPLIFIER - Each Unit

Plate Voltage	250 max.	volts
Plate Dissipation	2.1 max.	watts
Characteristics - Class A_1 Amplifier:		
Plate Voltage	250	volts
Grid Voltage	-16.5	volts
Amplification Factor	10.4	
Plate Resistance	7600	ohms
Transconductance	1375	μmhos
Plate Current	8.3	ma.

■ In circuits where the cathode is not directly connected to the heater, the potential difference between heater and cathode should be kept as low as possible.

° With no external shield.

Mar. 20, 1943

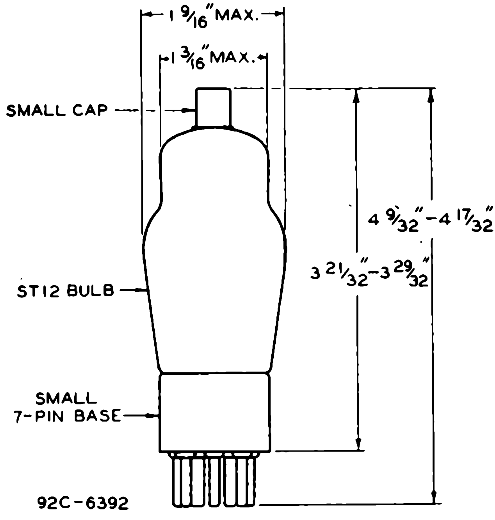
TENTATIVE DATA

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

2C21

2C21

TWIN-TRIODE AMPLIFIER

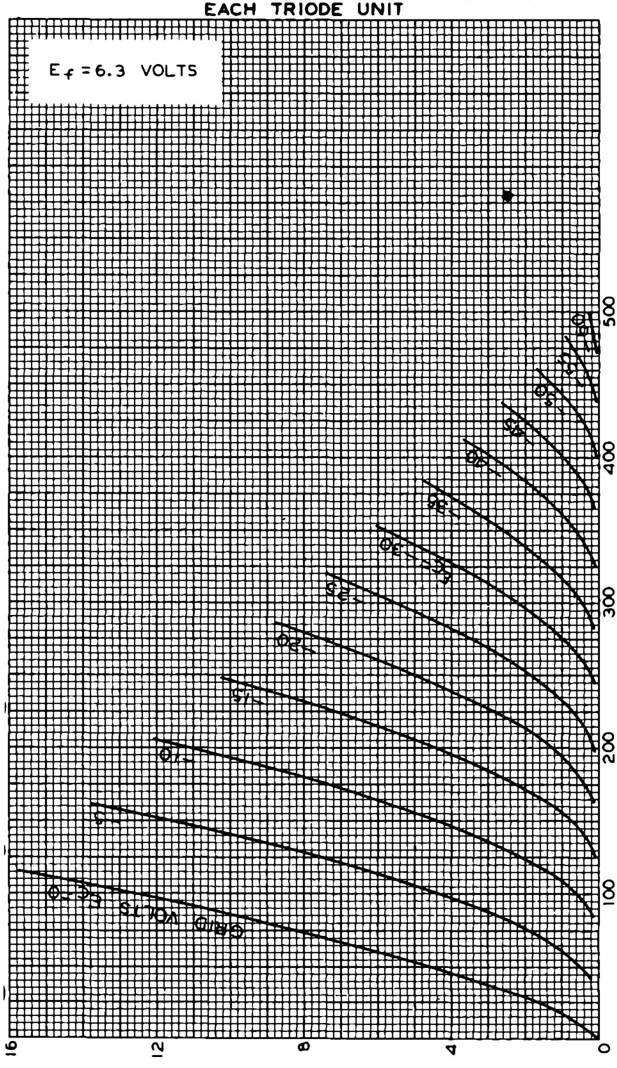


Mar. 20, 1943

TENTATIVE DATA

2C21

2C21
AVERAGE PLATE CHARACTERISTICS
EACH TRIODE UNIT



DEC. 1, 1943

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6385R1

2C22

2C22

AMPLIFIER TRIODE

Heater■	Coated Unipotential Cathode	
Voltage	6.3	a-c or d-c volts
Current	0.3	amp.
Direct Interelectrode Capacitances:°		
Grid to Plate	3.6	μμf
Grid to Cathode	2.2	μμf
Plate to Cathode	0.7	μμf
Overall Length		3-1/8" ± 1/8"
Seated Height		2-9/16" ± 1/8"
Maximum Diameter		1-5/16"
Bulb		T-9
Caps (two RCA No.3947)		Skirted Miniature
Base		Intermediate Shell Octal 8-Pin
Mounting Position		Any

Maximum Ratings Are Design-Center Values

AMPLIFIER

Plate Voltage	300● max.	volts
Plate Dissipation	3.3 max.	watts
Characteristics - Class A_1 Amplifier:		
Plate Voltage	300	volts
Grid Voltage *	-10.5	volts
Amplification Factor	20	
Plate Resistance	6600	ohms
Transconductance	3000	μmhos
Plate Current	11	ma.

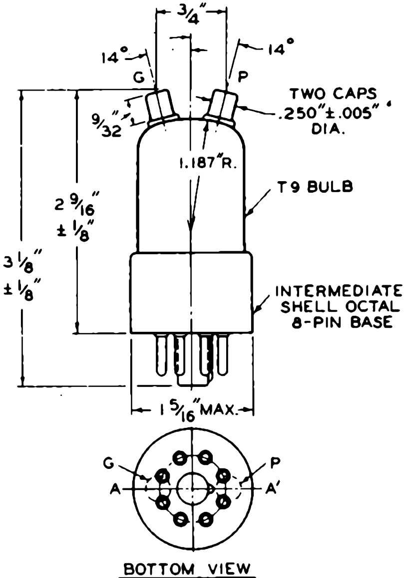
■ In circuits where the cathode is not directly connected to the heater, the potential difference between heater and cathode should be kept as low as possible.
° With no external shield.
● This value is for Continuous Commercial Service (CCS). In intermittent Commercial and Amateur Service (ICAS), the plate voltage may be as high as 500 volts maximum, but the maximum plate dissipation remains unchanged.
* Under maximum rated conditions, the resistance in the grid circuit should not exceed 1.0 megohm.

The approximate resonant frequency of the input (grid-cathode) circuit is 335 megacycles.

2C22

2C22

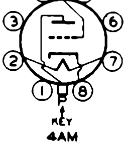
AMPLIFIER TRIODE



NOTE:
THE PLANE PASSING THROUGH THE CENTER OF EITHER CAP, PERPENDICULAR TO AND THROUGH THE CENTER OF THE BOTTOM OF THE BASE, SHALL NOT DEVIATE MORE THAN ± 5° FROM THE LINE A A' THROUGH BASE PLUG AXIS AND KEY CENTER.

92C-6427

BOTTOM VIEW OF SOCKET CONNECTIONS



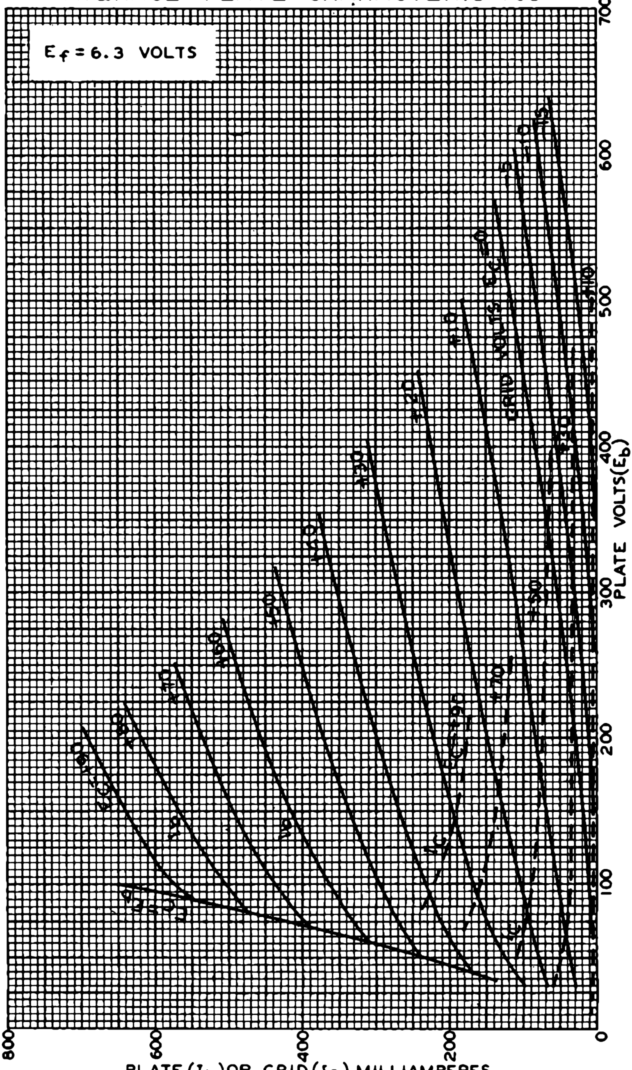
Pin 1 - No Connection
Pin 2 - Heater
Pin 3 - No Connection
Pin 4 - No Connection
Pin 5 - No Connection
Pin 6 - No Connection
Pin 7 - Heater
Pin 8 - Cathode
Cap above Pins 1 & 8 - Plate
Cap above Pins 4 & 5 - Grid

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

2C22

2C22

AVERAGE PLATE CHARACTERISTICS



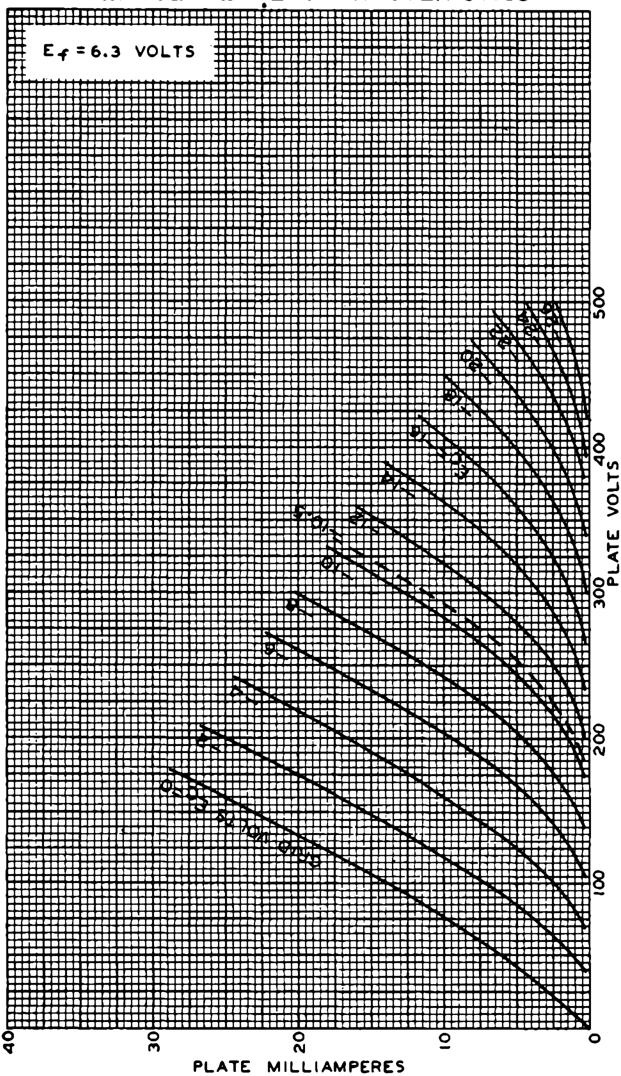
FEB. 23, 1943 RCA VICTOR DIVISION 92C-6437

RADIO CORPORATION OF AMERICA HARRISON, NEW JERSEY

2C22

2C22

AVERAGE PLATE CHARACTERISTICS



FEB. 22, 1943 RCA VICTOR DIVISION 92C-6436

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

2C40

2C40

LIGHTHOUSE TRIODE

Supersedes Types 446-A and 446-B in Military Equipment

GENERAL DATA

Electrical:

Heater for Unipotential Cathode:

Voltage	6.3 ± 5%	ac or dc volts
Current	0.75	amp.

Direct Interelectrode Capacitances:

Grid to Plate*	1.3	μμf
Grid to Cathode*	2.1	μμf
Plate to Cathode*Δ	0.02	μμf
Cathode to Shell	100 approx.	μμf

Characteristics, Class A_1 Amplifier:

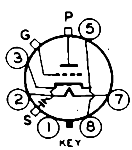
DC Plate Voltage	250	volts
Cathode-Bias Resistor**	200	ohms
Amplification Factor	36	
Plate Resistance	7500	ohms
Transconductance	4800	μmhos
Plate Current	16.5	ma.

Mechanical:

Operating Position	Any
Mounting	Tube should be supported by its metal shell and not by its base or other terminals
Dimensions and Terminals	See Outline Drawing
Base	Small H-Wafer Octal 6-Pin

BOTTOM VIEW

Pin 1 - Internal Con. Do Not Use
Pin 2 - Heater
Pin 3 - Cathode
Pin 5 - Cathode
Pin 7 - Heater
Pin 8 - Cathode



Shell (S) — Cathode RF Terminal
Center Disc (G) — Grid Terminal
Post & End Disc (P) — Plate Terminal

RF AMPLIFIER & OSCILLATOR - Class C Telegraphy

Maximum Ratings, ***Design-Center Values:***

DC PLATE VOLTAGE	450 max.	volts
DC PLATE CURRENT	22 max.	volts
PLATE DISSIPATION	5 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	90 max.	volts
Heater positive with respect to cathode	90 max.	volts
PLATE-SEAL TEMPERATURE#	150 max.	°C

* With cathode connected directly to shell.
** Fixed bias is not recommended.
Δ With shield having diameter of 2-3/8" in plane of grid disc terminal.
\# Under extremely high ambient temperatures, the plate-seal temperature must never exceed 200°C.

2C40

LIGHTHOUSE TRIODE

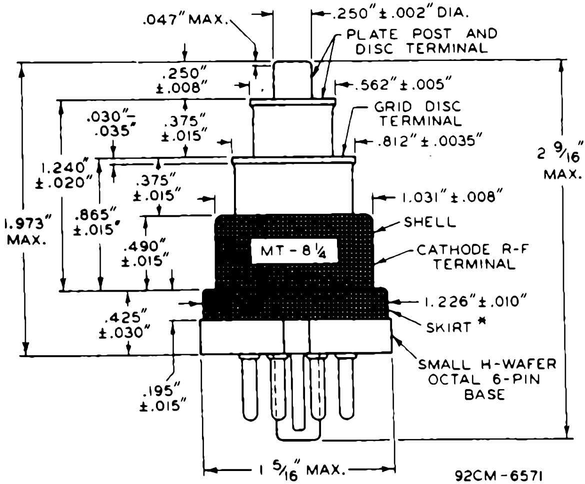


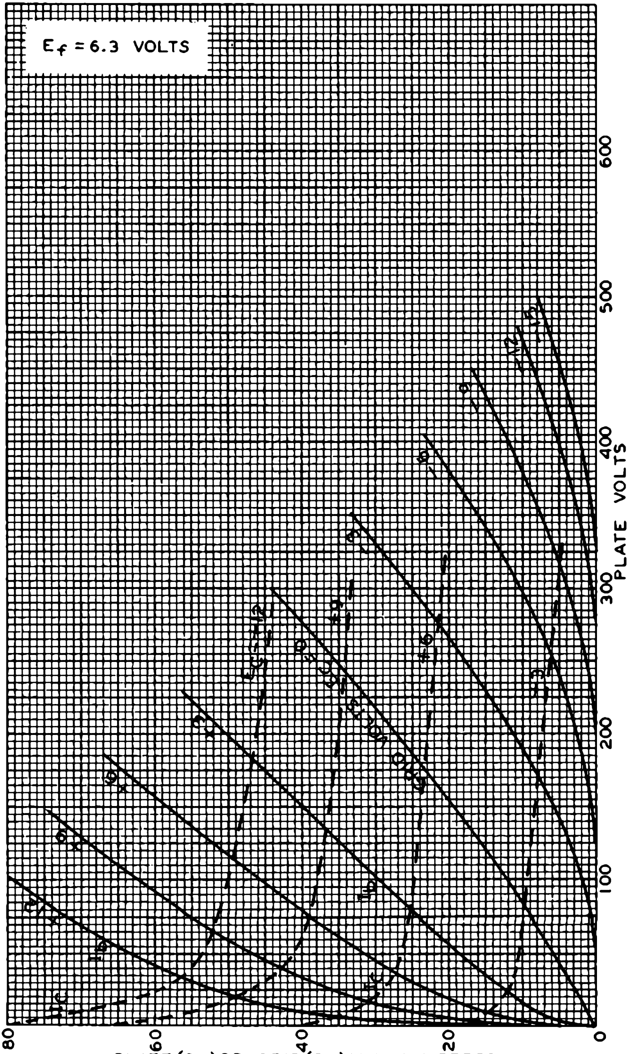
PLATE POST, GRID DISC TERMINAL, AND CATHODE RF TERMINAL ARE CONCENTRIC WITH RESPECT TO EACH OTHER WITHIN 1/64".

* NOT TO BE USED FOR RF CONTACT IN NEW EQUIPMENT DESIGNS.

2C40

2C40

AVERAGE PLATE CHARACTERISTICS



MAR. 3, 1945 — RCA VICTOR DIVISION — 92CM-6507

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

2C43

LIGHTHOUSE TRIODE

2C43

GENERAL DATA

Electrical:

Heater for Unipotential Cathode:

Voltage	6.3 ± 5%	ac or dc volts
Current	0.9	amp.

Direct Interelectrode Capacitances:

Grid to Plate*	1.7	μμf
Grid to Cathode*	2.8	μμf
Plate to Cathode*Δ	0.02	μμf
Cathode to Shell	100 approx.	μμf

Characteristics, Class A_1 Amplifier:

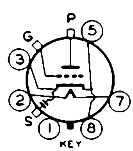
DC Plate Voltage	250	volts
Cathode-Bias Resistor**	100	ohms
Amplification Factor	48	
Plate Resistance	6000	ohms
Transconductance	8000	μmhos
Plate Current	20	ma.

Mechanical:

Operating Position	Any
Mounting	Tube should be supported by its metal shell and not by its base or other terminals
Dimensions and Terminals	See Outline Drawing
Base	Small H-Wafer Octal 6-Pin

BOTTOM VIEW

Pin 1 - Internal Con. Do Not Use
Pin 2 - Heater
Pin 3 - Cathode
Pin 5 - Cathode
Pin 7 - Heater
Pin 8 - Cathode



Shell (S) } Cathode RF Terminal
Center Disc (G) } Grid Terminal
Post & End Disc (P) } Plate Terminal

RF AMPLIFIER & OSCILLATOR - Class C Telegraphy

Maximum Ratings, ***Design-Center Values*****:**

DC PLATE VOLTAGE	450 max.	volts
DC PLATE CURRENT	36 max.	ma.
PLATE DISSIPATION	10 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	90 max.	volts
Heater positive with respect to cathode	90 max.	volts
PLATE-SEAL TEMPERATURE#	150 max.	°C

* With cathode connected directly to shell.
** Fixed bias is not recommended.
Δ With shield having diameter of 2-3/8" in plane of grid disc terminal.
\# Under extremely high ambient temperatures, the plate-seal temperature must never exceed 200°C.

2C43

2C43
LIGHTHOUSE TRIODE

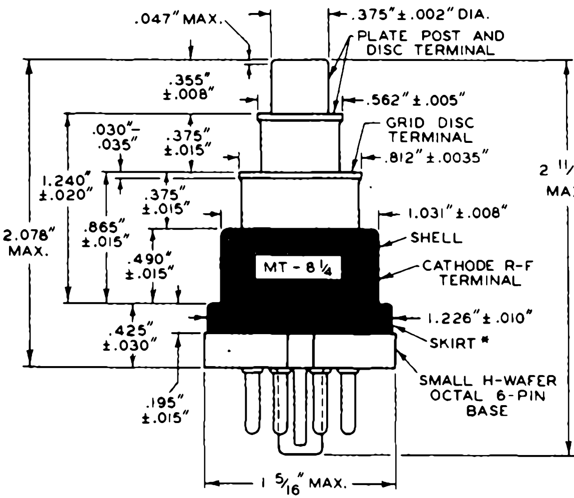


PLATE POST, GRID DISC TERMINAL, AND CATHODE RF TERMINAL ARE CONCENTRIC WITH RESPECT TO EACH OTHER WITHIN 1/64".

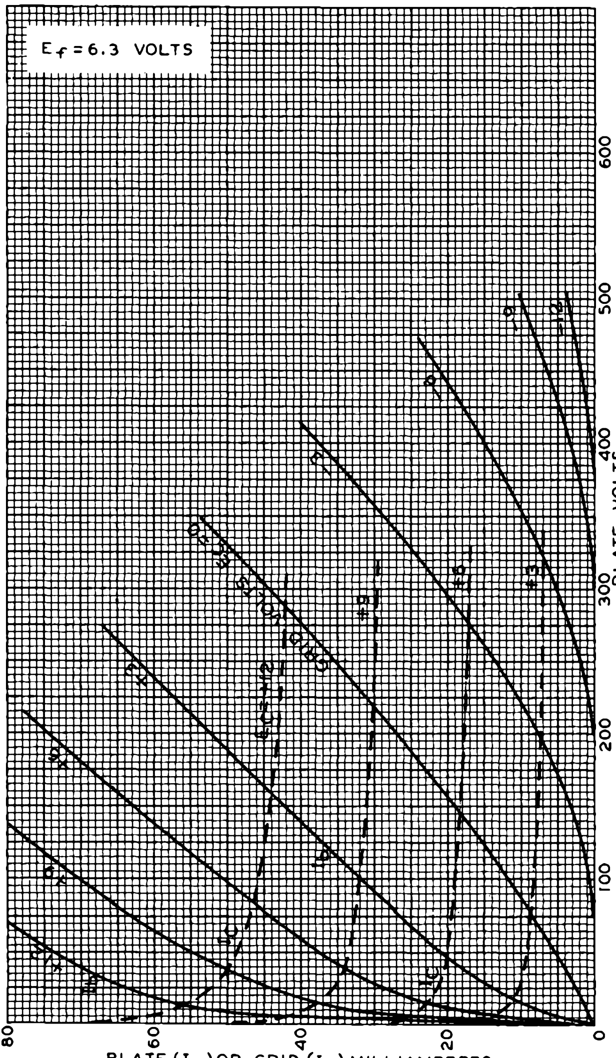
*NOT TO BE USED FOR RF CONTACT IN NEW EQUIPMENT DESIGNS.

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

2C43

2C43

AVERAGE PLATE CHARACTERISTICS



MAR. 5, 1945

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6508

RCA

2J41
MAGNETRON

FREQUENCY-STABILIZED TYPE

Tunable: 9300-9320 Mc

GENERAL DATA

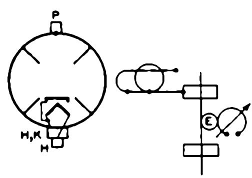
Electrical:

Heater, for Unipotential Cathode:		
Voltage.	5 ± 10%	. . . ac or dc volts
Current.	0.36	. . . . .amp
Minimum Cathode Heating Time	1	minute
Frequency.	9310	Mc
Frequency Range.	9320 max.	Mc
	9300 min.	Mc
Maximum Pulling Frequency:		
At 9300 Mc	2.5	Mc
At 9310 Mc	1.5	Mc
At 9320 Mc	2.5	Mc
Maximum Frequency Change with Anode Stud Temperature Change.	0.025	Mc/°C

Mechanical:

Mounting Position. . . . . .Any
Dimensions . . . . *See Dimensional Outline*
Weight (Approx.) . . . . 7-1/2 lbs
Mating Output RF Connector . . . . MIL Type UG-40/U
Base . . . . Short Skirted Miniature Double Bayonet
Terminal Connections *(See Dimensional Outline)*:

H - Heater
K - Cathode
P - Anode



PULSED OSCILLATOR SERVICE

Maximum and Minimum Ratings, *Absolute Values:*

For Duty Cycle of 0.003 max.

PEAK ANODE VOLTAGE	3000 max.	volts
PEAK ANODE CURRENT	1.2 max.	amp
	0.8 min.	amp
PEAK POWER INPUT	3.6 max.	kw
AVERAGE POWER INPUT.	10.8 max.	watts
PULSE DURATION	0.6 max.	μsec
OPERATION TIME IN ANY 100-MICROSECOND INTERVAL	3 max.	μsec
AMBIENT TEMPERATURE.	85 max.	°C
ABSOLUTE PRESSURE ON WAVEGUIDE WINDOW. . .	30 max.	psi
LOAD VOLTAGE STANDING-WAVE RATIO	1.5 max.	
TIME OF RISE OF VOLTAGE PULSE.	0.2 max.	μsec

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

RCA

2J41

MAGNETRON

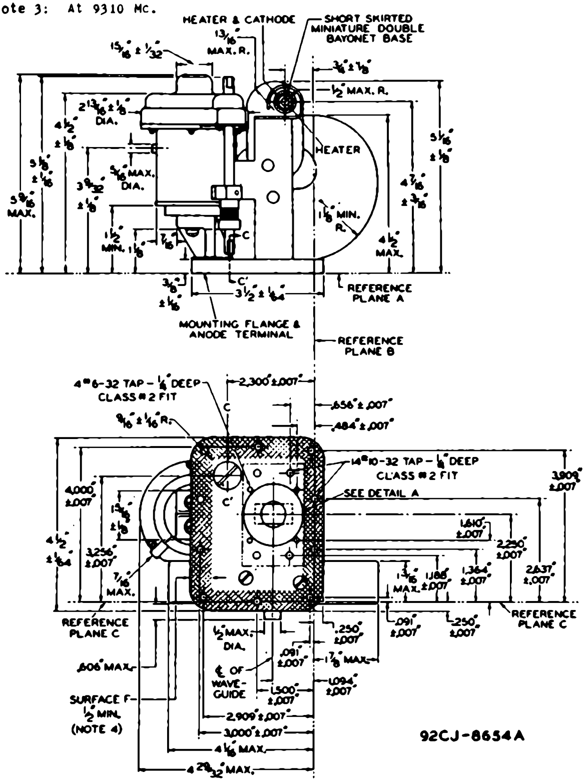
CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Note	Min.	Max.	
Heater Current	1	0.32	0.40	amp
Peak Anode Voltage	1,2,3	2350	2650	volts
Peak Power Output:				
At 9300 Mc	1,2	240	-	watts
At 9310 Mc	1,2	300	-	watts
At 9320 Mc	1,2	240	-	watts

Note 1: With 5 volts ac or dc on heater.

Note 2: With peak anode current of 1 ampere, duty cycle of 0.003, pulse duration of 0.5 μsec ± 10%, load voltage standing-wave ratio, 1.1 max.

Note 3: At 9310 Mc.

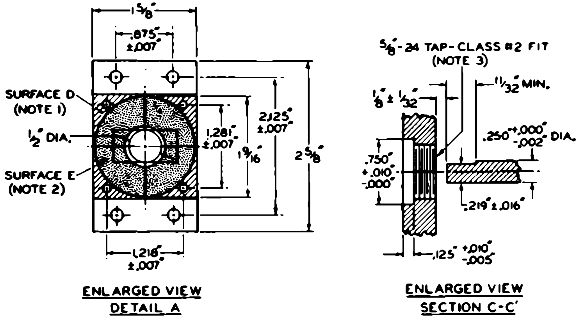


4-56

DATA

2J41

MAGNETRON



Reference plane A is defined as the plane through a plane surface on which the mounting flange rests.

Reference plane B is defined as the plane which is perpendicular to the reference plane A and passes through the exact centers of the indicated mounting flange holes.

Reference plane C is defined as the plane which is mutually perpendicular to the reference planes A and B and passes through the exact center of the indicated mounting flange hole.

NOTE 1: When resting on a plane surface, surface D has a flatness such that a 0.010" thickness gauge, 1/8" wide will not enter between surface D and the plane surface by more than 0.020".

NOTE 2: Surface E recessed not more than 0.035" and not less than 0.010" and parallel to surface D within 0.010".

NOTE 3: Hole and shaft are concentric within 0.020".

NOTE 4: With the mounting flange resting on a plane surface, the flatness of surface F is such that a 0.010" thickness gauge, 1/8" wide will not enter more than 1/4".

92CJ-8654B

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

RCA

2K26
KLYSTRON

SINGLE-RESONATOR, REFLEX TYPE

Frequency: 6250 to 7060 Mc.

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage	6.3 ± 0.5	ac or dc volts
Current	0.44	amp
Frequency Range	6250 to 7060	Mc

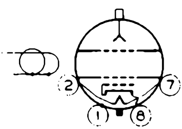
Mechanical:

Mounting Position	Any
Dimensions, Terminal Connections, and Mechanical Tuning Mechanism	See Outline Drawing
Resonant Cavity	Integral Part of Tube
Envelope	Metal
Cap	Miniature with Wafer
Base	Small-Wafer Octal 4-Pin with Pin No.4 replaced by Coaxial Output Line

BOTTOM VIEW

Pin 1 - Shell, Resonator

Pin 2 - Heater



Pin 7 - Heater

Pin 8 - Cathode

Cap - Reflector Terminal

NOTE: COAXIAL OUTPUT LINE PASSES THROUGH VACANT PIN POSITION NO. 4

CW OSCILLATOR - Class C

Maximum Ratings, ***Absolute Values*****:**

DC RESONATOR VOLTAGE	330 max.	volts
DC REFLECTOR VOLTAGE:		
Positive Value	0 max.	volts
Negative Value	350 max.	volts
DC RESONATOR CURRENT	35 max.	ma
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	50 max.	volts
Heater positive with respect to cathode	50 max.	volts
AMBIENT TEMPERATURE OF SHELL	110 max.	°C
TEMPERATURE OF COAXIAL OUTPUT LINE	90 max.	°C

Typical Operation ▫ at 6660 Mc in Mode "A" with 3/4" x 1-1/2" Wave Guide

DC Resonator Voltage	300	volts
DC Reflector Voltage Range▲	-65 to -120	volts
DC Resonator Current	25	ma
DC Reflector Current	less than 7	μa

(continued on next page)

▫, ▲: See next page.

2K26
KLYSTRON

Half-Power Electronic-Tuning Frequency Change■	55	Mc
Power Output	120	mw

▲ Adjusted for maximum power output at the given operating frequency.

■ Change in frequency between the two half-power points when the reflector voltage is varied above and below the point of maximum power output corresponding to the given frequency.

□ The coaxial output line is coupled to the specified wave guide through the wide-band coaxial coupling unit shown on following pages.

INSTALLATION NOTES

A socket for the 2K26 may be obtained by removing the clip from the No.4 pin position of an octal socket and drilling the No.4 opening large enough to admit the coaxial line and the surrounding coupling unit. To guard against excessive strain on the coaxial output line, the tube must be securely fastened by a clamp on the base of the socket mounting. Bumping or continued pressure on the output line will seriously damage the tube. The proper area for clamping on the shoulder of the header skirt is shown on the Outline Drawing.

2K26
KLYSTRON

OPERATING NOTES

All tabulated data and curve information shown for the 2K26 were taken with the specified coupling unit and wave guide. It is important that this coupling unit or its electrical equivalent be used to insure tube interchangeability and satisfactory tuning characteristics. In addition, the standing-wave ratio of the coupler should not exceed 0.8 db. (1.1 voltage-standing-wave ratio).

In most applications the cathode of the 2K26 is operated at a negative potential with respect to ground so that the tube shell, which is integral with the resonator, is at ground potential. In those applications which do not operate with the shell at ground potential, it is essential that the 2K26 be surrounded by a grounded shield and tuned with an insulated tool, in order to protect the user from contact with high voltage. The shield design should permit adequate ventilation to assure that ambient temperature, as measured with a thermometer inserted between the metal tube shell and the shield, will be less than the maximum rated value. Ambient temperature changes will cause the resonator to expand or contract, producing a change in frequency. For best frequency stability, the 2K26 should be operated at nearly constant ambient temperature and with a well-regulated power supply.

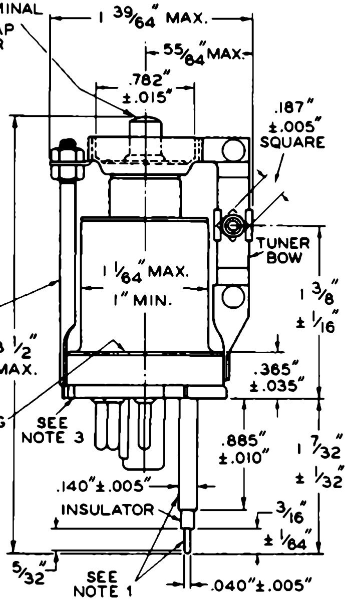
Shielding of the reflector and resonator voltage leads as close to the tube as possible is essential to avoid modulation of the tube output by any external voltages. In addition, the connection to the reflector terminal must be insulated to withstand the total acceleration and reflector voltage. To avoid damage to the tube, the reflector potential must never become positive with respect to the cathode.

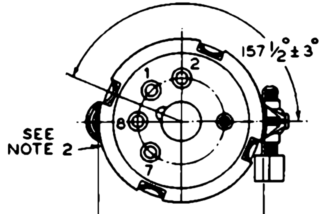
Tuning of the 2K26 is accomplished by mechanical and electronic means. The mechanical tuning system is designed to permit approximate adjustment of frequency, but is not recommended for use where continual or frequent adjustment of frequency is required. Approximately five full turns of the frequency-adjustment screw are sufficient to tune the tube over its rated frequency range. The electronic tuning range is dependent upon reflector voltage, the type of load and the kind of coupling to the load.

Voltage modes are regions within the total range of reflector voltage in which oscillations will occur. The typical operating conditions and curves shown for type 2K26 apply to mode "A", the only mode recommended for this tube.

2K26

2K26
KLYSTRON

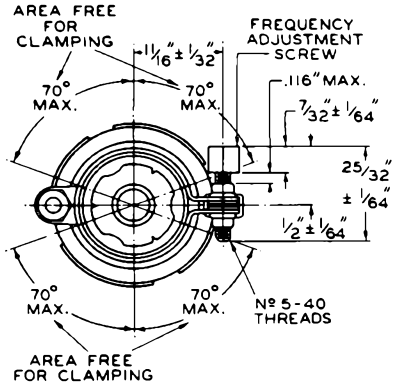




BOTTOM VIEW

2K26

KLYSTRON



TOP VIEW

NOTE 1: THE INNER AND OUTER CONDUCTORS OF THE COAXIAL OUTPUT LINE ARE CONCENTRIC WITHIN 0.010".

NOTE 2: BASE-PIN AND COAXIAL-OUTPUT-LINE POSITIONS ARE HELD TO TOLERANCES SUCH THAT PINS AND OUTPUT LINE WILL FIT FLAT-PLATE GAUGE HAVING (a) THICKNESS OF 1-7/32", (b) 4 HOLES WITH DIAMETER OF 0.1030" ± 0.0005" FROM TOP SURFACE OF GAUGE TO A DEPTH OF 0.25" AND THEN WITH DIAMETER INCREASED BY APPROXIMATELY 1/64" FOR REMAINING DEPTH OF HOLE, SO LOCATED ON A 0.6870" ± 0.0005" DIAMETER CIRCLE THAT THE DISTANCE ALONG THE CHORD BETWEEN ANY TWO ADJACENT HOLE CENTERS IS 0.2630" ± 0.0005", (c) ONE HOLE WITH DIAMETER OF 0.1600" ± 0.0005" TO DEPTH OF 1-7/32" WHOSE CENTER IS LOCATED ON THE SPECIFIED PIN CIRCLE A DISTANCE DETERMINED BY LAYING OFF ON THE TOP SURFACE OF THE GAUGE COUNTERCLOCKWISE FROM THE LAST OF THE FOUR HOLES TWO CONSECUTIVE CHORDS EACH 0.2630" ± 0.0005", AND (d) A CENTER HOLE WITH A MINIMUM DIAMETER OF 0.400" TO CLEAR THE BASE PLUG AND KEY. PIN AND OUTPUT-LINE FIT IN GAUGE SHALL BE SUCH THAT GAUGE TOGETHER WITH SUPPLEMENTARY WEIGHT TOTALING 2 LBS. WILL NOT BE LIFTED WHEN PINS AND COAXIAL OUTPUT LINE ARE WITHDRAWN.

NOTE 3: SMALL-WAFER OCTAL 4-PIN BASE WITH PIN No.4 REPLACED BY COAXIAL OUTPUT LINE.

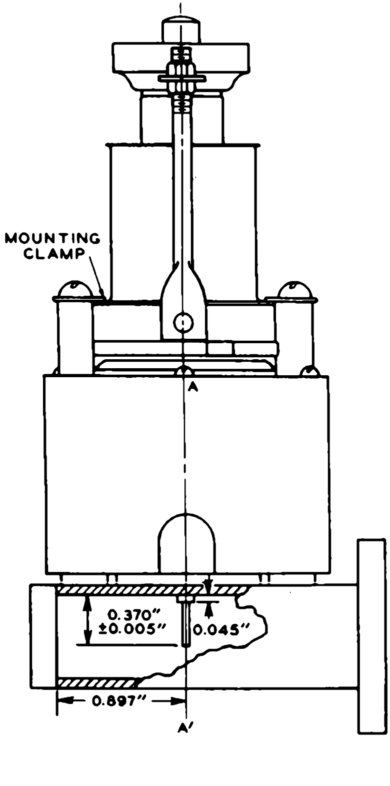
NOTE 4: MINIMUM WIDTH OF SHOULDER IS 0.045".

RCA

2K26
KLYSTRON

COUPLING ARRANGEMENT

RCA-2K26 Coupled to a 3/4" x 1-1/2" Wave Guide Through a Coaxial Transducer Coupling Circuit

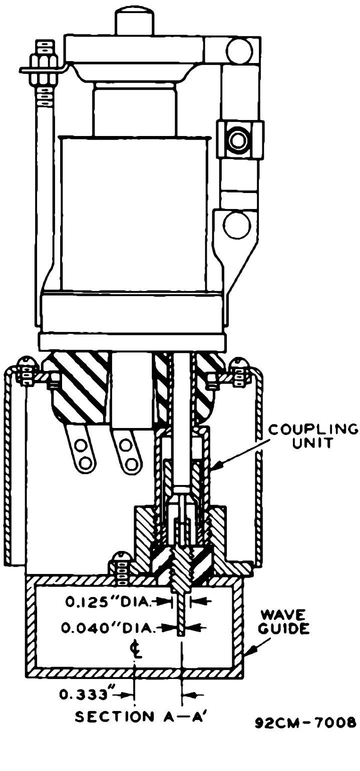


RCA

2K26

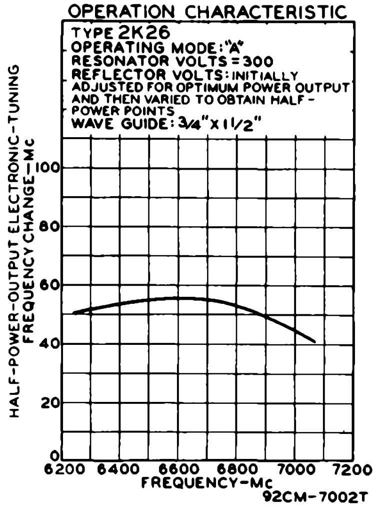
KLYSTRON

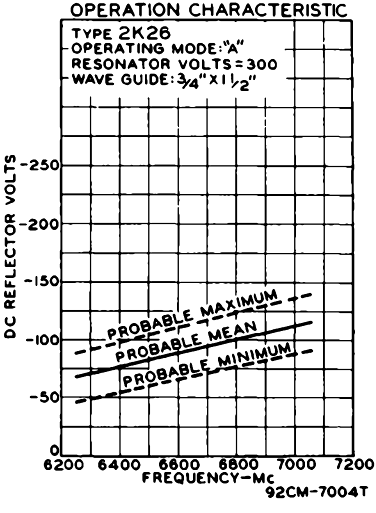
COUPLING ARRANGEMENT (Cont'd)



2K26

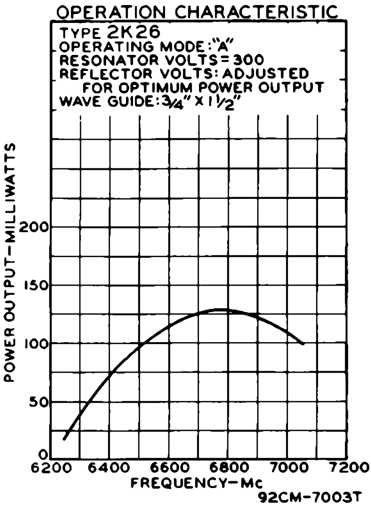
2K26
KLYSTRON





2K26

2K26
KLYSTRON



2K56

Delete

2K56

KLYSTRON

SINGLE-RESONATOR, REFLEX TYPE

Frequency: 3840 to 4460 Mc.

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage	6.3 ± 0.5	ac or dc volts
Current	0.44	amp
Frequency Range	3840 to 4460	Mc

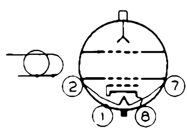
Mechanical:

Mounting Position	Any
Dimensions, Terminal Connections, and Mechanical Tuning Mechanism	See Outline Drawing
Resonant Cavity	Integral Part of Tube
Envelope	Metal
Cap	Miniature with Wafer
Base	Small-Wafer Octal 4-Pin with Pin No.4 replaced by Coaxial Output Line

BOTTOM VIEW

Pin 1 - Shell, Resonator

Pin 2 - Heater



Pin 7 - Heater

Pin 8 - Cathode

Cap - Reflector Terminal

NOTE: COAXIAL OUTPUT LINE PASSES THROUGH VACANT PIN POSITION NO.4

CW OSCILLATOR - Class C

Maximum Ratings, ***Absolute Values*****:**

DC RESONATOR VOLTAGE	330 max.	volts
DC REFLECTOR VOLTAGE:		
Positive Value	0 max.	volts
Negative Value	400 max.	volts
DC RESONATOR CURRENT	37 max.	ma
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode.	50 max.	volts
Heater positive with respect to cathode.	50 max.	volts
AMBIENT TEMPERATURE OF SHELL	110 max.	°C
TEMPERATURE OF COAXIAL OUTPUT LINE	90 max.	°C

Typical Operation □ at 4150 Mc in Mode "A" with 1" x 2" Wave Guide

DC Resonator Voltage	300	volts
DC Reflector Voltage Range▲	-85 to -150	volts
DC Resonator Current	25	ma
DC Reflector Current	less than 7	μa

(continued on next page)

□, ▲: See next page.

2K56

2K56
KLYSTRON

Half-Power Electronic-Tuning Frequency Change■	35	Mc
Power Output	90	mw

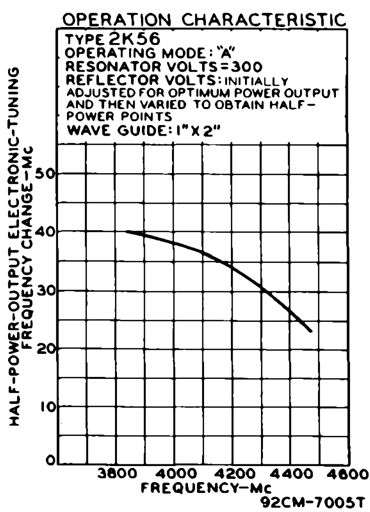
▲ Adjusted for maximum power output at the given operating frequency.

■ Change in frequency between the two half-power points when the reflector voltage is varied above and below the point of maximum power output corresponding to the given frequency.

□ The coaxial output line is coupled to the specified wave guide through the wide-band coaxial coupling unit shown on the following pages.

INSTALLATION and OPERATING NOTES for the 2K56 are the same as those shown for the 2K26, except that consideration should be given to the different coupling unit and wave guide required for the 2K56.

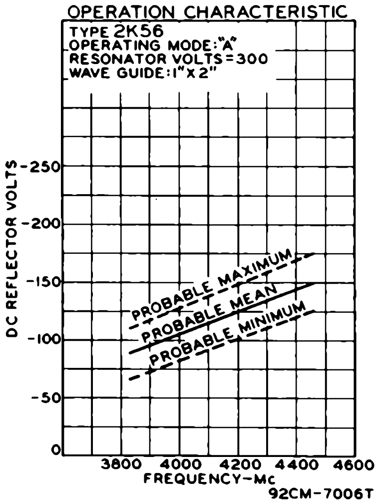
OUTLINE DIMENSIONS for Type 2K56 are the same as those for Type 2K26

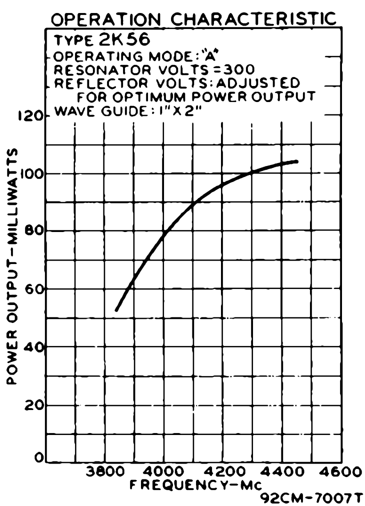


2K56
KLYSTRON

Delete

2K56





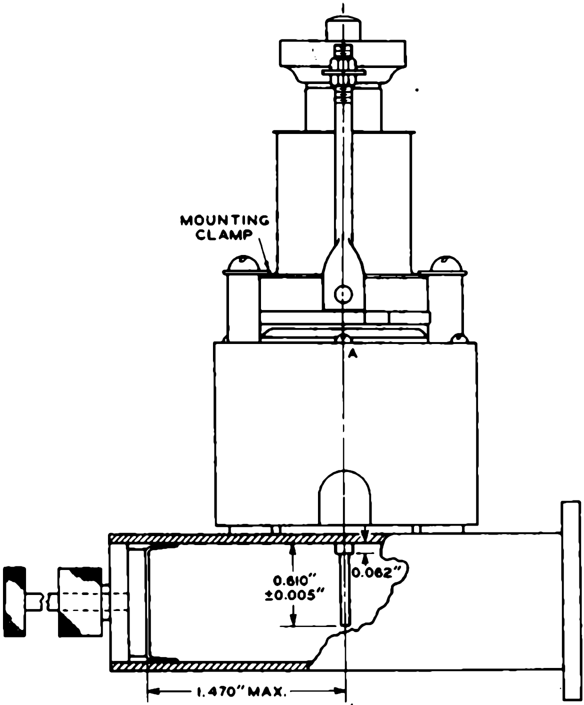
2K56

RCA

2K56
KLYSTRON

COUPLING ARRANGEMENT

RCA-2K56 Coupled to a 1" x 2" Wave Guide Through a Coaxial Transducer Coupling Circuit

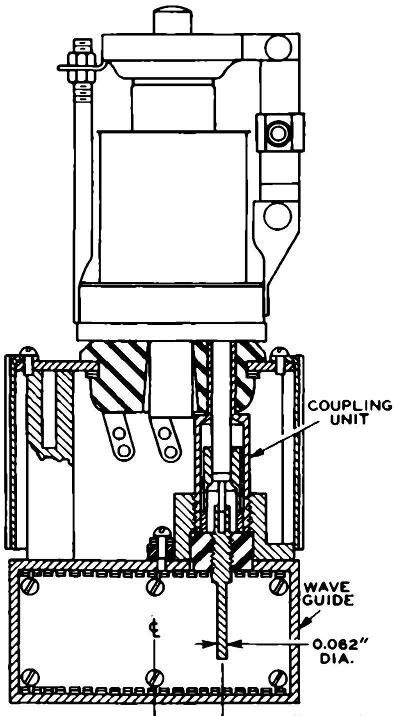


92CM-6988

2K56

KLYSTRON

COUPLING ARRANGEMENT (Cont'd)



SECTION A-A'

2V3-G

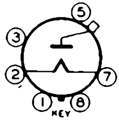
2V3-G

HALF-WAVE HIGH-VACUUM RECTIFIER

FOR USE WITH CATHODE-RAY TUBES

Filament	Tungsten	
Voltage *	2.5	a-c volts
Current	5	amp.
Maximum Overall Length		4-15/32"
Maximum Diameter		1-9/16"
Bulb		ST-12
Cap		Skirted Miniature - Style A
Base		Small Shell Octal 6-Pin

Pin 1 - No Connection
Pin 2 - Filament
Pin 3 - No Connection
Pin 5 - No Connection
Pin 7 - Filament
Pin 8 - No Connection
Cap - Plate



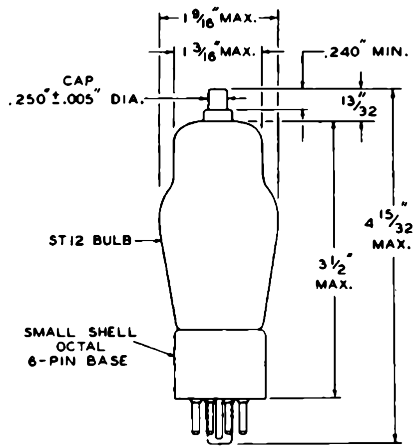
BOTTOM VIEW

Mounting Position: Vertical Only

MAXIMUM RATINGS

Peak Inverse Voltage	16500 max. volts
Peak Plate Current	12 max. ma.
Average Plate Current	2 max. ma.

* In equipment designed for an average line voltage of 117 volts, the 2V3-G can be operated at line voltages up to 125 volts or as low as 105 volts without serious effect on tube performance and life.



92C-6005R1

APRIL 3, 1939

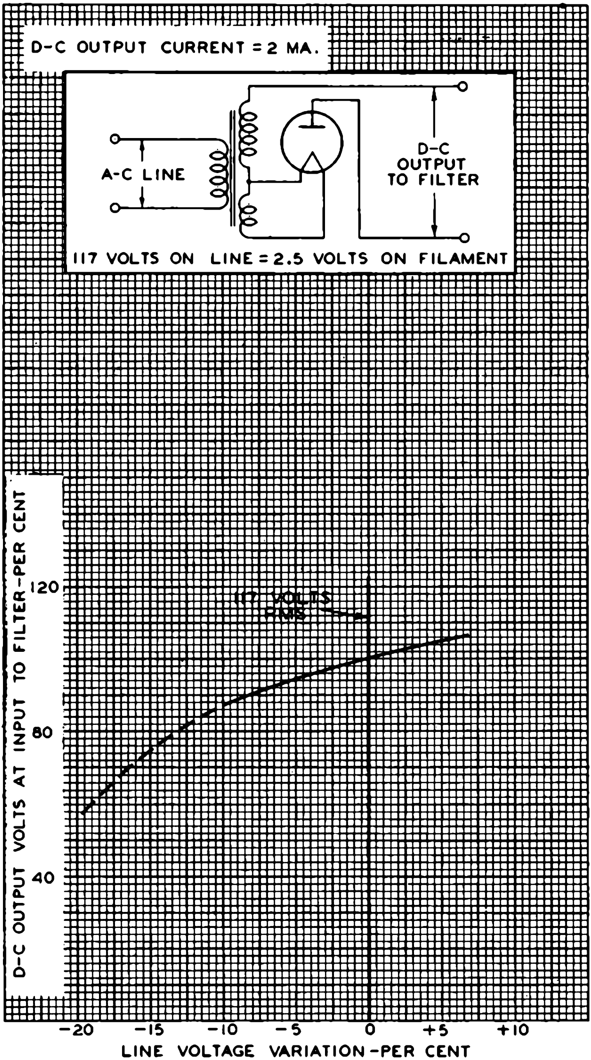
TENTATIVE DATA

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

2V3-G

2V3-G

TYPICAL REGULATION CHARACTERISTIC



RCA

2X2-A

HALF-WAVE VACUUM RECTIFIER

For applications critical as to severe shock and vibration

GENERAL DATA

Electrical:

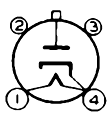
Heater, for Unipotential Cathode:

	Min.	*Av.*	*Max.*	
Voltage.	2.25	2.50	2.75	ac volts
Current at 2.50 volts. . .	1.55	1.75	1.95	amp

Mechanical:

Mounting Position.	Any
Maximum Overall Length	4-17/32"
Seated Length.	3-25/32" ± 1/8"
Maximum Diameter	1-9/16"
Dimensional Outline.	*See General Section*
Weight (Approx.)	1.3 oz
Bulb	ST-12
Cap.	Small (JETEC No.C1-1)
Base	Small-Shell Small 4-Pin (JETEC No.A4-5)
Basing Designation for BOTTOM VIEW	4AB

Pin 1 - Heater
Pin 2 - No Connection
Pin 3 - No Connection



Pin 4 - Heater, Cathode
Cap - Plate

HALF-WAVE RECTIFIER

Maximum Ratings, *Design-Center Values:*

PEAK INVERSE PLATE VOLTAGE	12500 max.	volts
PEAK PLATE CURRENT	60 max.	ma
DC OUTPUT CURRENT.	7.5 max.	ma
HOT-SWITCHING TRANSIENT CURRENT, for duration of 0.2 second max.	100 max.	ma
AMBIENT TEMPERATURE.	70 max.	oC

Typical Operation:

AC Plate-Supply Voltage (RMS).	5500	volts
Total Effective Plate-Supply Impedance . .	0.3	megohm
Filter Input Capacitor	0.1	μf
DC Output Current.	2	ma
DC Output Voltage (At input to filter) . .	4500	volts

SHOCK TEST DATA

Impact Acceleration.	250 max.	g

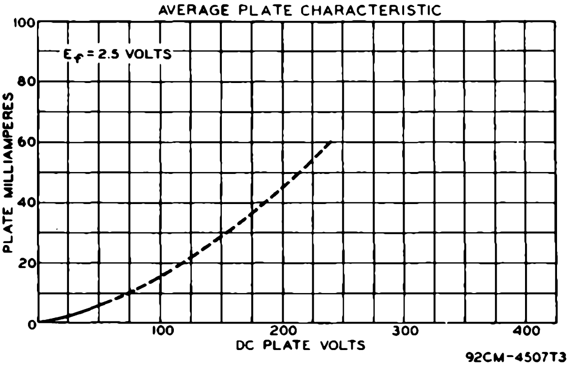
This test is performed on a sample lot of tubes from each production run to determine ability of tube to withstand the specified impact acceleration. The tubes are subjected to a total of 3 blows in each of the 3 primary mutually

← Indicates a change.

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

HALF-WAVE VACUUM RECTIFIER

perpendicular tube planes when tested in the Navy Type, High-Impact (flyweight) Shock Machine. At the end of this test, tubes will not show permanent or temporary shorts or open circuits, and will not be inoperative.



TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

3A4

POWER AMPLIFIER PENTODE

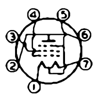
MINIATURE TYPE

Filament	Coated		
Filament Arrangement	*Series* *	*Parallel* **	
Voltage	2.8	1.4	d-c volts
Current	0.1	0.2	amp.

Direct Interelectrode Capacitances:° ←

Grid to Plate	0.34 max.	μμf
Input	4.8	μμf
Output	4.2	μμf
Maximum Overall Length		2-1/8"
Maximum Seated Height		1-7/8"
Maximum Diameter		3/4"
Bulb		T-5-1/2
Base▲		Miniature Button 7-Pin

Pin 1 - Fil. (- series)
Pin 2 - Plate
Pin 3 - Screen
Pin 4 - Grid



Pin 5 {Fil. Mid-Tap (- parallel)
Pin 6 - Plate
Pin 7 - Filament +

RCA Socket — Stock No. 9914
Mounting Position — BOTTOM VIEW (7BB) — Any

Maximum Ratings Are Design-Center Values

A-F POWER AMPLIFIER

Plate Voltage	150 max.	volts
Screen Voltage	90 max.	volts
Plate Dissipation	2.0 max.	watts
Screen Dissipation	0.4 max.	watt
Total Zero-Sig. Cathode Current■	18 max.	ma.

Typical Operation and Characteristics-Class A_1 Amplifier:●

Filament Arrangement	*Parallel* **		
Plate Voltage	135	150	volts
Screen Voltage	90	90	volts
Grid Voltage	-7.5	-8.4	volts
Peak A-F Grid Voltage	7.5	8.4	volts
Zero-Sig. Plate Current	14.8	13.3	ma.
Max.-Sig. Plate Current	14.9	14.1	ma.
Zero-Sig. Screen Current	2.6	2.2	ma.
Max.-Sig. Screen Current	3.5	3.5	ma.
Plate Resistance	90000	100000	ohms
Transconductance	1900	1900	μmhos
Load Resistance	8000	8000	ohms
Total Harmonic Distortion	5	6	%
Max.-Sig. Power Output	600	700	mw

R-F POWER AMPLIFIER

D-C Plate Voltage	150 max.	volts
D-C Screen Voltage	135 max.	volts
D-C Grid Voltage	-30 max.	volts
D-C Plate Current	20 max.	ma.
D-C Grid Current	0.25 max.	ma.
Total D-C Cathode Current ■	25 max.	ma.
Plate Input	3 max.	watts
Screen Input	0.9 max.	watt
Plate Dissipation	2 max.	watts

*, **, °, ▲, ■, ● : See next page.

← Indicates a change.

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

3A4

3A4

POWER AMPLIFIER PENTODE

(continued from preceding page)

➤ *Typical Operation at 10 Mc with Parallel Filament Arrangement:***

D-C Plate Voltage	150	volts
D-C Screen Voltage	135	volts
Grid Resistor	0.2	megohm
D-C Plate Current	18.3	ma.
D-C Screen Current	6.5	ma.
D-C Grid Current	0.13	ma.
Power Output (approx.)	1.2	watts

* Filament voltage applied across the two sections in series between pins No.1 and No.7. Grid voltage is referred to pin No.1.

** Filament voltage applied across the two sections in parallel between pin No.5 and pins No.1 and No.7 connected together. Grid voltage is referred to pin No.5.

○ With no external shield.

■ For series-filament operation. A shunting resistor must be connected across the section between pins No.1 and No.5 to by-pass excess cathode current in this section. The value of the shunting resistor should be adjusted to make the voltage across the shunted section equal to the voltage across the section between pins No.5 and No.7. When other tubes in series-filament arrangement contribute to the filament current of the 3A4, an additional shunting resistor may be required between pins No.1 and No.7.

● Typical operating values for the 3A4 with filament sections in series will be approximately the same as those shown for parallel-filament operation.

▲ *The center hole in sockets designed for this base provides for the possibility that this tube type may be manufactured with the exhaust-tube tip at the base end. For this reason, it is recommended that in equipment employing this tube type, no material be permitted to obstruct the socket hole.*

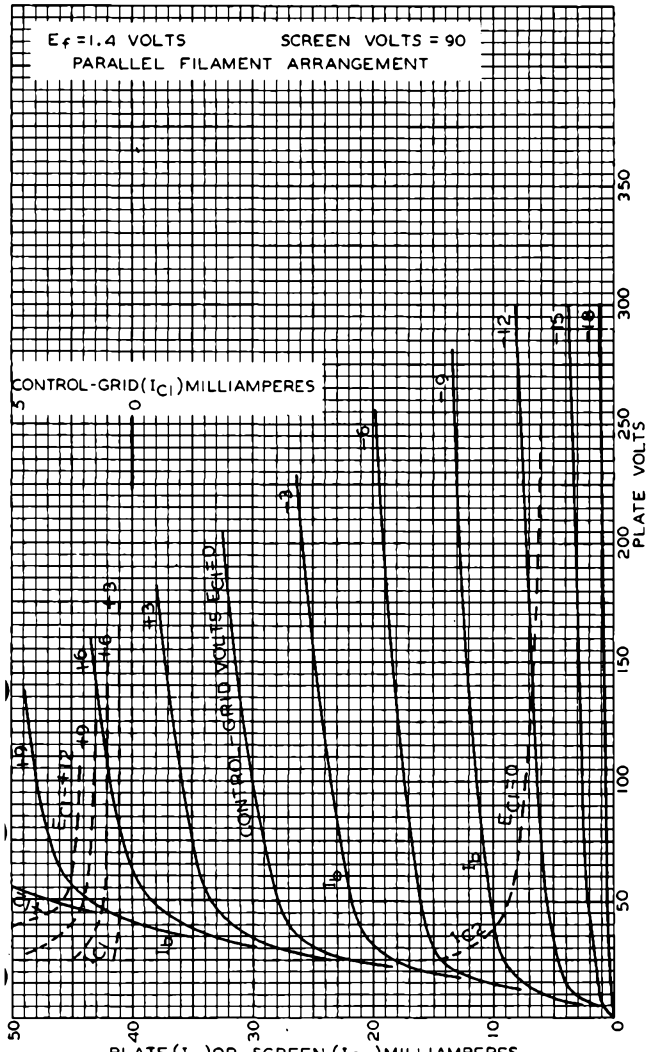
➤ Indicates a change.

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

3A4

3A4

AVERAGE PLATE CHARACTERISTICS



3A5

3A5

H-F TWIN TRIODE
MINIATURE TYPE

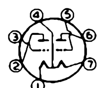
Filament	Coated		
Filament Arrangement	*Series**	*Parallel***	
Voltage	2.8	1.4	d-c volts
Current	0.11	0.22	amp.

Direct Interelectrode Capacitances:°

	Triode Unit T1		*Triode Unit T2*	
Grid to Plate	3.2		3.2	μμf
Grid to Filament	0.9		0.9	μμf
Plate to Filament	1.0		1.0	μμf
Plate to Plate		0.32		μμf

Maximum Overall Length	2-1/8"
Maximum Seated Height	1-7/8"
Maximum Diameter	3/4"
Bulb	T-5-1/2"
Base▲	Miniature Button 7-Pin

Pin 1 - Filament -
Pin 2 - Plate T_2
Pin 3 - Grid T_2
Pin 4 - {Fil. Mid-Tap (+ parallel)



Pin 5 - Grid T_1
Pin 6 - Plate T_1
Pin 7 - Fil.(+ series)

RCA Socket — Stock No.9914

Mounting Position — BOTTOM VIEW (7BC) — Any

For convenience, one triode unit is identified as T_1; the other as T_2.

Maximum Ratings Are Design-Center Values

A-F POWER AMPLIFIER

Plate Voltage	135 max.	volts
Plate Current	5 max.	ma.
Plate Dissipation	0.5 max.	watt
Characteristics - Class A, Amplifier:		
Plate Voltage	90	volts
Grid Voltage	-2.5	volts
Amplification Factor	15	
Plate Resistance	8300	ohms
Transconductance	1800	μmhos
Plate Current	3.7	ma.

R-F POWER AMPLIFIER & OSCILLATOR - Class C Telegraphy

Key-down conditions per tube without modulation

D-C Plate Voltage	135 max.	volts
D-C Grid Voltage	-30 max.	volts
D-C Plate Current (per unit)	15 max.	ma.
D-C Grid Current (per unit)	2.5 max.	ma.
Plate Input (per unit)	2.0 max.	watts
Plate Dissipation (per unit)	1.0 max.	watt
Typical Operation At 40 Mc With Both Units In Push-Pull:		
D-C Plate Voltage	135	volts
D-C Grid Voltage ●	-20	volts
	4000	ohms
	570	ohms
Peak R-F Grid-to-Grid Voltage	90	volts
D-C Plate Current	30	ma.
D-C Grid Current (approx.)	5	ma.
Driving Power (approx.)	0.2	watt
Power Output (approx.)	2	watts

*, **, °, ●, ▲, :see next page.

June 1, 1942 — TENTATIVE DATA

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

3A5

H-F TWIN TRIODE

(continued from preceding page)

* Filament voltage applied across the two sections in series between pins No. 1 and No. 7. Grid voltage is referred to Pin No. 1. For series filament operation, a shunting resistor must be connected across the section between pins No. 1 and No. 4, to by-pass excess cathode current in this section. The value of the shunting resistor should be adjusted to make the voltage across the shunted section equal to the voltage across the section between pins No. 4 and No. 7. When other tubes in series-filament arrangement contribute to the filament current of the 3A5, an additional shunting resistor may be required between pins No. 1 and No. 7.

** Filament voltage applied across the two sections in parallel between pin No. 4 and pins No. 1 and No. 7 connected together. Grid voltage is referred to pins No. 1 and No. 7 tied together.

o With no external shield

● Obtained by grid resistor (4000), cathode resistor (570), or fixed supply.

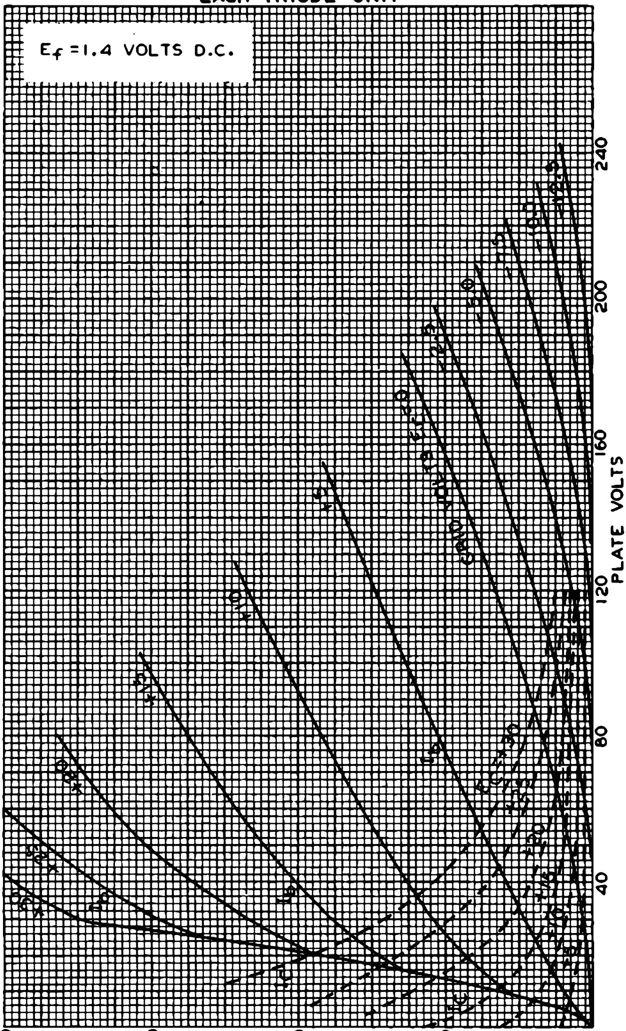
▲ *The center hole in sockets designed for this base provides for the possibility that this tube type may be manufactured with the exhaust-tube tip at the base end. For this reason, it is recommended that in equipment employing this tube type, no material be permitted to obstruct the socket hole.*

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

3A5

3A5

AVERAGE PLATE CHARACTERISTICS
EACH TRIODE UNIT



MARCH 14, 1942

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

92C-6376

4J50

4J50
MAGNETRON

FORCED-AIR COOLED

Fixed Frequency: 9375 ± 30 Mc

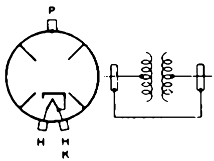
GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:
  Voltage . . . . 13.75 ± 10% . . . . ac or dc volts
  Current . . . . 3.15 . . . . amp
  Starting Current: The maximum instantaneous starting current must never exceed 12 amperes, even momentarily
Minimum Cathode Heating Time . . . . 4 minutes
Frequency . . . . 9375 ± 30 Mc
Maximum Frequency Pulling at VSWR of 1.5/1 15 Mc
Maximum Frequency Change with
  Anode Temperature Change . . . . . 0.25 Mc/°C

Mechanical:

Dimensions and
Terminal Connections:
See *Dimensional Outline*



H – Heater
K – Cathode
P – Anode

Connector (For heater terminal and heater-cathode terminal) . . . Ucinite* No. 115364 with built-in capacitor, or equivalent
Mounting Position . . . . Any
Air Flow:

To Fins -- An air stream should be directed along the cooling fins toward the body of the tube. The stream may be obtained from a rectangular nozzle about 3-1/4" by 3/4" located so that the plane through the 3-1/4" side is parallel with the plane of a cooling fin and so that the nozzle is centered on the body of the tube. Adequate flow should be provided so that the temperature of the anode block does not exceed 150°C.

To Heater-Cathode Terminal -- Adequate flow should be provided to maintain the temperature of the heater-cathode terminal below 165°C.

Weight (Approx.) . . . . 9-1/2 lbs

PULSED OSCILLATOR SERVICE

Maximum and Minimum Ratings, *Absolute Values:*

For Duty Cycle of 0.001 max.

PEAK ANODE VOLTAGE	21 max.	23 max.	kv
PEAK ANODE CURRENT	18 max.	27.5 max.	amp
PEAK POWER INPUT●	380 max.	635 max.	kw
AVERAGE POWER INPUT	0.38 max.	0.635 max.	kw
PULSE DURATION	6.0 max.	1.2 max.	μsec

* Ucinite Div. of United-Carr Fastener Corp., Newtonville 60, Mass.

● For atmospheric pressures greater than 60 centimeters of mercury. Operation at pressures lower than 60 centimeters of mercury may result in arc-over with consequent damage to the tube.

4J50

4J50
MAGNETRON

OPERATION TIME IN ANY 100-MICROSECOND INTERVAL . .	6.0 max.	6.0 max.	μsec
RATE OF RISE OF VOLT. PULSE .	110 max.	110 max.	kv/μsec
	70 min.	70 min.	kv/μsec
ANODE-BLOCK TEMPERATURE . . .	150 max.	150 max.	°C
HEATER-CATHODE TERMINAL TEMPERATURE	165 max.	165 max.	°C

Typical Operation▲ with Load-Voltage Standing-Wave Ratio Equal to or Less than 1.05

With Duty Cycle of	*0.001*	*0.001*	*0.001*	
Heater Voltage	See Operating Considerations			
Magnetic Field	Supplied by permanent magnet integral with tube			
Peak Anode Voltage	20	21.0	21.5	kv
Peak Anode Current	18	23.5	27.5	amp
Pulse Repetition Rate	200	333	1000	cps
Pulse Duration	1	3	5	μsec
Maximum RF Bandwidth	1.0	1.0	3.0	Mc
Peak Power Output	140	185	240	kw

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Note	*Min.*	*Max.*	
Heater Current	1	3.0	3.75	amp
Peak Anode Voltage	-	20	23	kv
Peak Power Output	2	225	-	kw

Note 1: With 13.75 volts ac or dc on heater.

Note 2: With peak anode current = 27.5 amperes corresponding to a peak anode voltage in the order of 21500 volts, anode-block temperature (approx.) = 100°C, pulse duration = 1 microsecond, and maximum load-voltage standing-wave ratio equal to or less than 1.05.

▲ It is essential that the input circuit be designed so that if arcing occurs the energy per pulse delivered to the tube cannot greatly exceed the normal energy per pulse. To satisfy this requirement, it is recommended that pulsers of the discharging-network type be used.

OPERATING CONSIDERATIONS

Rated voltage (13.75 volts) should be applied to the heater for at least 4 minutes to allow the cathode to reach normal operating temperature. When the cathode has reached normal operating temperature, high-voltage pulses, negative with respect to the anode (ground), may be applied to the heater-cathode terminal. As soon as the 4J50 starts to oscillate, the heater voltage (E_f) must be reduced approximately in accordance with the following formula depending on the value of average power input (P_i) to the tube:

P_i up to 100 watts: $E_f = 13.75$ volts

P_i greater than 100 watts: $E_f = 14\ (1-0.000895P_i)$ volts

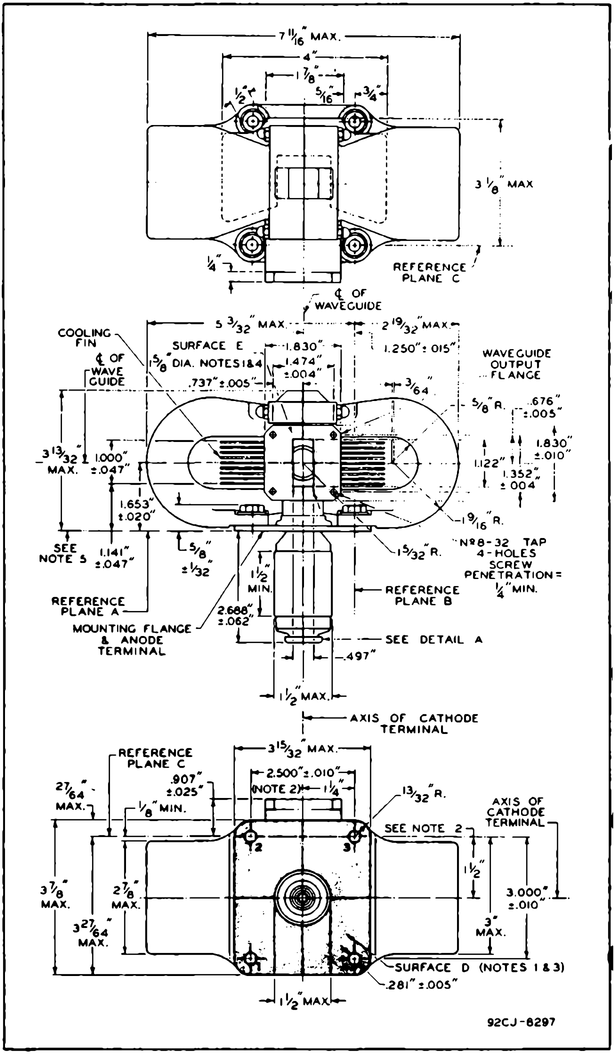
4J50

MAGNETRON

This formula applies to the conditions involving the pulse durations and pulse repetition rates under Typical Operation. If the 4J50 is to be operated with pulse durations and repetition rates different from those shown, write for recommendations as to required reduction in heater voltage to *Commercial Engineering, RCA, Harrison, New Jersey,* giving complete details as to the proposed service. When the tube is oscillating, the cathode is subjected to considerable electron bombardment which raises the temperature of the cathode. The magnitude of such heating is a function of the total dissipation and must be compensated by reduction of the heater voltage in order to prevent overheating of the cathode. Failure to start the tube at rated heater voltage and to reduce the heater voltage as soon as oscillation starts may seriously affect tube life. The heater should be protected against input pulse power by a suitable capacitor connected in shunt with the heater leads as near the input stem as possible in order to limit high transient voltages from developing across the heater.

4J50

4J50
MAGNETRON



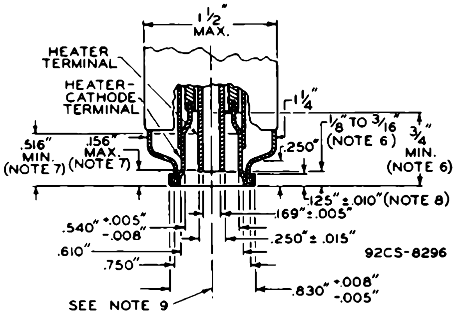
JUNE 14, 1954

RCA

4J50

MAGNETRON

DETAIL A



Reference plane A is defined as the plane through a plane surface on which the mounting flange rests.

Reference plane B is defined as the plane which is perpendicular to plane A and plane C and passes through the exact center of mounting flange holes No.3 and No.4.

Reference plane C is defined as the plane which is perpendicular to plane A and passes through the exact centers of mounting flange holes No.2 and No.3.

NOTE 1: THE WAVEGUIDE OUTPUT FLANGE AND THE MOUNTING FLANGE ARE MADE SO THAT THEY MAY BE USED TO PROVIDE A HERMETIC SEAL AT SURFACE D AND SURFACE E.

NOTE 2: THE AXIS OF THE HEATER-CATHODE TERMINAL WILL BE WITHIN THE CONFINES OF A CYLINDER WHOSE RADIUS IS 3/64" AND WHOSE AXIS IS PERPENDICULAR TO REFERENCE PLANE A AND LOCATED AS DIMENSIONED FROM PLANES B AND C.

NOTE 3: ALL POINTS ON MOUNTING SURFACE D WILL BE WITHIN 0.005" OF MOUNTING PLANE A.

NOTE 4: WHEN RESTING ON A PLANE SURFACE, SURFACE E OF THE WAVEGUIDE OUTPUT FLANGE HAS A FLATNESS SUCH THAT A 0.005" THICKNESS GAUGE 1/8" WIDE WILL NOT ENTER BETWEEN SURFACE E AND THE PLANE SURFACE.

NOTE 5: NO PART OF THE TUBE SUPPORT FASTENED TO THE MOUNTING FLANGE SHOULD EXTEND BEYOND THE SURFACE OF A CYLINDER WHOSE RADIUS IS 3/4" AND WHOSE AXIS IS PERPENDICULAR TO REFERENCE PLANE A AND LOCATED AS DIMENSIONED FROM PLANES B AND C.

NOTE 6: THESE DIMENSIONS DEFINE EXTREMITIES OF THE 0.169" INTERNAL DIAMETER OF THE CYLINDRICAL HEATER TERMINAL.

4J50

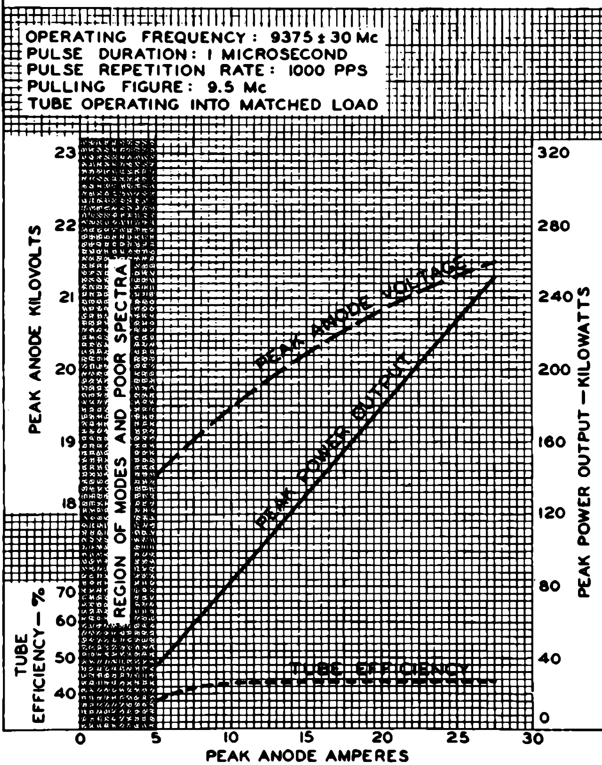
4J50
MAGNETRON

NOTE 7: THESE DIMENSIONS DEFINE EXTREMITIES OF THE 0.540" INTERNAL DIAMETER OF THE CYLINDRICAL HEATER-CATHODE TERMINAL.

NOTE 8: NO PART OF THE CONNECTOR DEVICE FOR THE HEATER AND HEATER-CATHODE TERMINALS SHOULD BEAR AGAINST THE UNDERSIDE OF THIS LIP.

NOTE 9: THE HEATER TERMINAL AND THE HEATER-CATHODE TERMINAL ARE CONCENTRIC WITHIN 0.010".

PERFORMANCE CHART



92CM-8260

JUNE 14, 1954

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

CE-8297B—8260

4B26

4B26/2000

HALF-WAVE GAS RECTIFIER

HOT-CATHODE TYPE

Filament	Thoriated Tungsten	
Voltage	2.2	a-c volts
Current	18	amp.
Overall Length		6-5/8" ± 3/8"
Maximum Diameter		3-1/4"
Bulb		GT-25
End Terminal		*See Outline Drawing*
Base		Mogul Screw
Mounting Position		Any

Maximum Ratings Are Absolute Values

RECTIFIER

Peak Inverse Anode Voltage:		
In Single-Phase, Half-Wave Circuit	375 max.	volts
In Single-Phase, Full-Wave Circuit	250 max.	volts
In Polyphase Circuit	250 max.	volts
Peak Anode Current	36 max.	amp.
D-C Output Current	6 max.	amp.
Characteristics:		
Instantaneous Starting Anode Voltage*	13 approx.	volts
Tube Voltage Drop	8 approx.	volts

* To insure starting throughout tube life, an anode-supply voltage of not less than 20 volts (rms) is recommended. The actual design value above this minimum will depend on the nature of the load on the tube in any particular application.

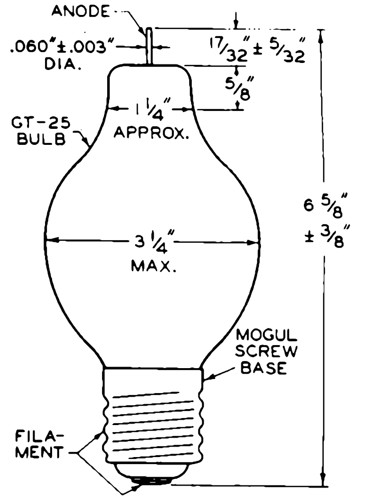
If the output of the 4B26/2000 is filtered, the filter should be of the choke-input type.

Suitable circuits for use with the 4B26/2000 are the same as those shown for Type 872-A/872.

← Indicates a change.

4B26

HALF-WAVE GAS-RECTIFIER



←-Indicates a change.

4J52

4J52[■]

MAGNETRON

FORCED-AIR COOLED

Fixed Frequency: 9375 ± 30 Mc

GENERAL DATA

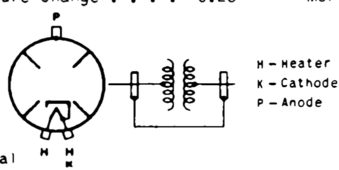
Electrical:

Heater, for Unipotential Cathode:
- Voltage . . . . 12.6 ± 10% . . . . ac or dc volts
- Current . . . . 2.1 . . . . amp
- Starting Current: The maximum instantaneous starting current must never exceed 8 amperes, even momentarily

Minimum Cathode Heating Time . . . . 4 minutes
Frequency . . . . 9375 ± 30 Mc
Maximum Frequency Pulling . . . . 15 Mc
Maximum Frequency Change with Anode Temperature Change . . . . 0.25 Mc/°C

Mechanical:

Dimensions and Terminal Connections: See Outline Drawing



Connector (For heater terminal and heater-cathode terminal) . . . Ucinite* No. 115316 or No. 115402 with built-in capacitor, or equivalent.
Mounting Position . . . . Any
Dimensions . . . . See Outline Drawing
Air Flow to Fins:

An air stream should be directed along the cooling fins toward the body of the tube. The stream may be obtained from a rectangular nozzle 3-1/4" by 3/4" located so that the plane through the 3-1/4" side is parallel with the plane of a cooling fin and so that the nozzle is centered on the body of the tube. Adequate flow should be provided so that the temperature of the anode block does not exceed 150°C.

Weight (Approx.) . . . . 5-1/2 lbs

PULSED OSCILLATOR SERVICE

Maximum Ratings, *Absolute Values:*

	For Duty Cycle of 0.002 max.		
PEAK ANODE VOLTAGE	16 max.	16 max.	kv
PEAK ANODE CURRENT	20 max.	30 max.	amp
PEAK POWER INPUT●	300 max.	450 max.	kw
AVERAGE POWER INPUT	0.3 max.	0.45 max.	kw
PULSE DURATION	5.0 max.	1.2 max.	µsec
OPERATION TIME IN ANY 100-MICROSECOND INTERVAL	6.0 max.	6.0 max.	µsec
ANODE-BLOCK TEMPERATURE	150 max.	150 max.	°C

■ Data shown for this type are in accord with JAN-1A Specification 4J52, 30 January 1952.

* Ucinite Div. of United-Carr Fastener Corp., Newtonville 60, Mass.

● For atmospheric pressures greater than 60 centimeters of mercury. Operation at pressures lower than 60 centimeters of mercury may result in arcover with consequent damage to the tube.

4J52

4J52
MAGNETRON

Typical Operation with Load-Voltage Standing-Wave Ratio Equal to or Less Than 1.05▲:

With Duty Cycle of	*0.0006*	*0.001*	*0.001*	
Heater Voltage	See Operating Considerations			
Magnetic Field	Supplied by permanent magnet integral with tube			
Peak Anode Voltage . . .	15	15	15	kv
Peak Anode Current . . .	15	15	15	amp
Pulse Repetition Rate .	2000	1000	200	cps
Pulse Duration	0.3	1	5	μsec
Maximum RF Bandwidth . .	9	3	1	Mc
Maximum Rate of Rise of Voltage Pulse . .	130	130	100	kv/μsec
Peak Power Output . . .	80	80	80	kw

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Note	*Min.*	*Max.*	
Heater Current	1	1.8	2.4	amp
Peak Anode Voltage	—	14	16	kv
Peak Power Output	2	65	—	kw

Note 1: With 12.6 volts ac or dc on heater.

Note 2: With peak anode current = 15 amperes corresponding to a peak anode voltage in the order of 15000 volts, anode-block temperature (approx.) = 100°C, and maximum load-voltage standing-wave ratio equal to or less than 1.05.

▲ It is essential that the input circuit be designed so that if arcing occurs the energy per pulse delivered to the tube cannot greatly exceed the normal energy per pulse. To satisfy this requirement, it is recommended that pulsers of the discharging-network type be used.

OPERATING CONSIDERATIONS

Rated voltage (12.6 volts) should be applied to the heater for at least 4 minutes to allow the cathode to reach normal operating temperature. When the cathode has reached normal operating temperature, high-voltage pulses, negative with respect to the anode (ground), may be applied to the heater-cathode terminal. As soon as the 4J52 starts to oscillate, the heater voltage (E_f) must be reduced approximately in accordance with the following formula depending on the value of average power input (P_i) to the tube:

P_i up to 130 watts: E_f = 12.6 volts $- 0.04P_i$
P_i from 130 to 450 watts: E_f = 10.5 volts $- 0.02P_i$

where P_i is the average power input to the tube. This formula applies to conditions for pulse durations of 1 microsecond or less and for pulse repetition rates of 1000 pps or more. Normal pulse shape and regulation are assumed; the effect of power supply regulation is not considered. For longer pulse durations and lower pulse

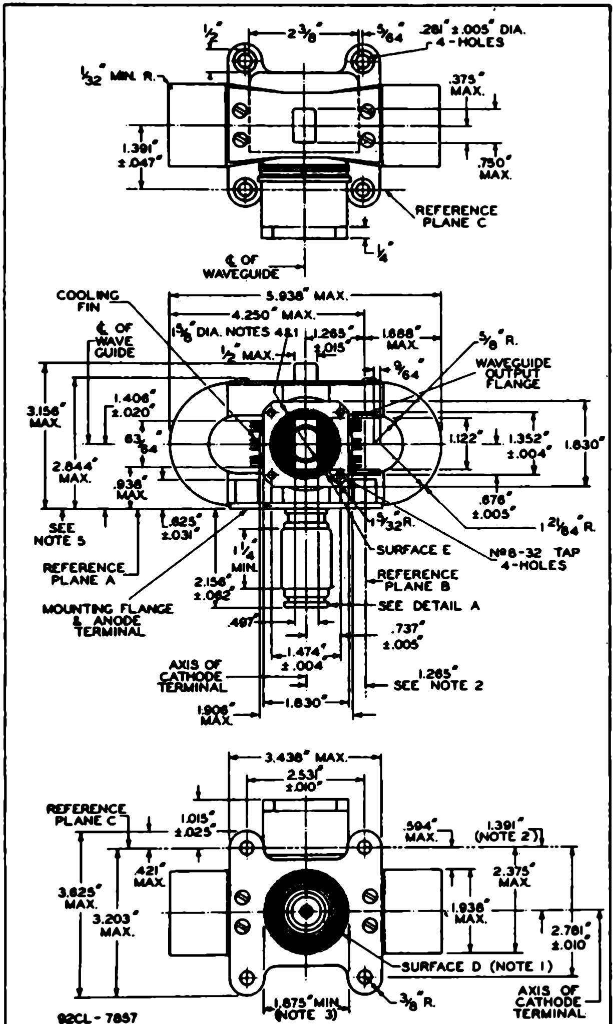
4J52
MAGNETRON

repetition rates, the heater voltage must be increased. The increase in heater voltage is often between 1 and 2 volts depending on the particular application. Rates of rise of the voltage pulse faster than those indicated under Typical Operation are not recommended because they tend to cause unstable operation. A very poor regulation characteristic during the first part of the pulse may indicate, if unstable operation occurs, that an increase in heater voltage is desirable. Increasing the heater voltage under these conditions may, however, decrease the life of the tube. When the tube is oscillating, the cathode is subjected to considerable electron bombardment which raises the temperature of the cathode. The magnitube of the heating is a function of the total dissipation and must be compensated by reduction of the heater voltage in order to prevent overheating of the cathode. Failure to start the tube at rated heater voltage and to reduce the heater voltage as soon as oscillation starts may seriously affect tube life. The heater should be protected against input pulse power by placing a suitable capacitor in shunt with the heater leads as near the input stem as possible in order to limit high transient currents from developing across the heater.

4J52

RCA

4J52
MAGNETRON



OCT. 1, 1953

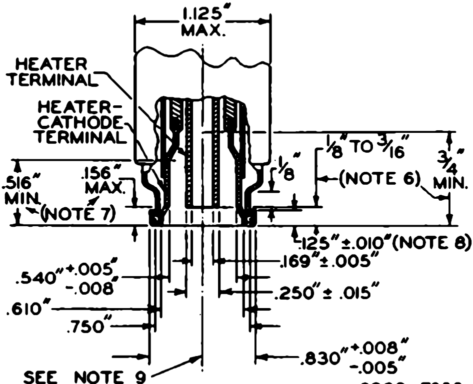
CE-7857A

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

4J52

MAGNETRON

DETAIL A



Reference Plane A is defined as the plane through a plane surface on which the mounting flange rests.

Reference Plane B is defined as the plane which is perpendicular to plane A and plane C and passes through the exact center of mounting flange holes No.3 and No.4.

Reference Plane C is defined as the plane which is perpendicular to plane A and passes through the exact centers of mounting flange holes No.2 and No.3.

NOTE 1: THE WAVEGUIDE OUTPUT FLANGE AND THE MOUNTING FLANGE ARE MADE SO THAT THEY MAY BE USED TO PROVIDE A HERMETIC SEAL AT SURFACE D AND SURFACE E.

NOTE 2: THE AXIS OF THE HEATER-CATHODE TERMINAL WILL BE WITHIN THE CONFINES OF A CYLINDER WHOSE RADIUS IS 3/64" AND WHOSE AXIS IS PERPENDICULAR TO REFERENCE PLANE A AND LOCATED ON THE TRUE CENTER OF THE MOUNTING FLANGE.

NOTE 3: WHEN RESTING ON A PLANE SURFACE (REFERENCE PLANE A), THE SURFACE D HAS A FLATNESS SUCH THAT A 0.010" THICKNESS GAUGE 1/8" WIDE WILL NOT ENTER BETWEEN SURFACE D AND THE PLANE SURFACE. ALSO, THE MOUNTING-FLANGE SURFACE OUTSIDE OF SURFACE D WILL BE WITHIN 0.010" OF THE PLANE SURFACE.

4J52

4J52
MAGNETRON

NOTE 4: WHEN RESTING ON A PLANE SURFACE, SURFACE E OF THE WAVEGUIDE OUTPUT FLANGE HAS A FLATNESS SUCH THAT A 0.005" THICKNESS GAUGE 1/8" WIDE WILL NOT ENTER BETWEEN SURFACE E AND THE PLANE SURFACE.

NOTE 5: NO PART OF THE TUBE SUPPORT FASTENED TO THE MOUNTING FLANGE SHOULD EXTEND BEYOND THE SURFACE OF A CYLINDER WHOSE RADIUS IS 5/8" AND WHOSE AXIS IS PERPENDICULAR TO REFERENCE PLANE A AND LOCATED AT THE TRUE CENTER OF THE MOUNTING FLANGE.

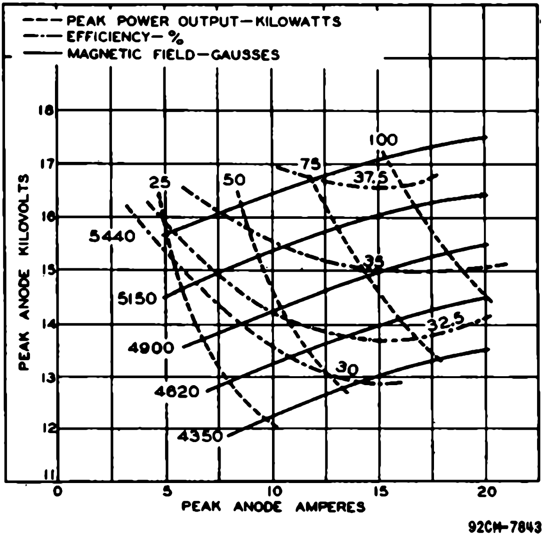
NOTE 6: THESE DIMENSIONS DEFINE EXTREMITIES OF THE 0.169" INTERNAL DIAMETER OF THE CYLINDRICAL HEATER TERMINAL.

NOTE 7: THESE DIMENSIONS DEFINE EXTREMITIES OF THE 0.540" INTERNAL DIAMETER OF THE CYLINDRICAL HEATER-CATHODE TERMINAL.

NOTE 8: NO PART OF THE CONNECTOR DEVICE FOR THE HEATER AND HEATER-CATHODE TERMINALS SHOULD BEAR AGAINST THE UNDERSIDE OF THIS LIP.

NOTE 9: THE HEATER TERMINAL AND THE HEATER-CATHODE TERMINAL ARE CONCENTRIC WITHIN 0.010".

PERFORMANCE CHART



92CM-7843

5R4-GY
FULL-WAVE VACUUM RECTIFIER

GENERAL DATA

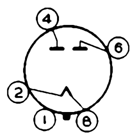
Electrical:

Filament, Coated:#
- Voltage . . . . 5 . . . . ac or dc volts
- Current . . . . 2 . . . . amp

Mechanical:

Mounting Position . . . . . Vertical, or Horizontal with pins 1 and 4 in vertical plane
Maximum Overall Length . . . . 5-5/16"
Maximum Seated Length . . . . 4-3/4"
Maximum Diameter . . . . 2-1/16"
Bulb ST-16
Base . . . . Medium-Shell Octal 5-Pin, Micanol
Basing Designation for BOTTOM VIEW G-5T

Pin 1 - No Connection
Pin 2 - Filament
Pin 4 - Plate No.2



Pin 6 - Plate No.1
Pin 8 - Filament

FULL-WAVE RECTIFIER ←

Maximum Ratings, ***Design-Center Values:***

	For Altitudes up to 40000 ft.		*For Altitudes up to 20000 ft.*	
PEAK INVERSE PLATE VOLT. (No Load)	2100 max.	2400 max.	2800 max.	volts
PEAK PLATE CURRENT PER PLATE . . .	650 max.	650 max.	650 max.	ma
DC OUTPUT CURRENT:				
With capacitor input to filter	250 max.	175 max.	150 max.	ma
With choke input to filter . . .	250 max.	250 max.°	175 max.•	ma

Typical Operation with Capacitor-Input Filter: ←

	For Altitudes up to 40000 ft.		*For Altitudes up to 20000 ft.*	
AC Plate-to-Plate Supply Voltage (RMS):				
Full Load . . .	1400	1500	1800	volts
No Load	1500	1700	2000	volts
Filter Input Capacitor . . .	4	4	4	μf

See curve for conditions necessitating delay in application of plate voltage until filament has reached operating temperature.

°, •: See next page.

← Indicates a change.

SEPT. 30, 1948

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5R4-GY

5R4-GY
FULL-WAVE VACUUM RECTIFIER

	For Altitudes up to 40000 ft.		*For Altitudes up to 20000 ft.*	
Total Effect. Plate-Supply Impedance per Plate▲	125	500	575	ohms
DC Output Current	250	150	150	ma
DC Output Volt. at Input to Filter:				
At Half Load	790•	900•	1060•	volts
At Full Load	700•	810•	950•	volts
Voltage Regulation, Half-Load to Full-Load Current	90•	90•	110•	volts

→ **Typical Operation with Choke-Input Filter:**

	For Altitudes up to 40000 ft.	*For Altitudes up to 20000 ft.*	
AC Plate-to-Plate Supply Voltage (RMS):			
Full Load	1500	1900	volts
No Load	1700	2000	volts
Filter Input Choke	5	10	henries
DC Output Current	250	175	ma
DC Output Voltage at Input to Filter:			
At Half Load	590•	810•	volts
At Full Load	550•	750•	volts
Voltage Regulation, Half-Load to Full-Load Current	40•	60•	volts

O For choke not less than 5 henries.

● For choke not less than 10 henries.

▲ Indicated values for conditions shown will limit peak plate current to max. rated value. When a filter-input capacitor larger than 4 μf is used, it may be necessary to use more plate-supply impedance than the value shown to limit the peak plate current to the rated value.

• Values are approximate.

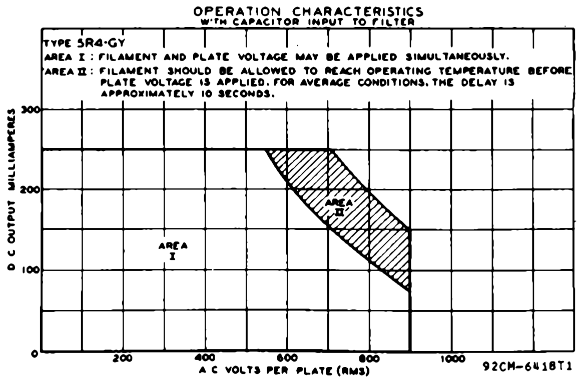
→ Indicates a change.

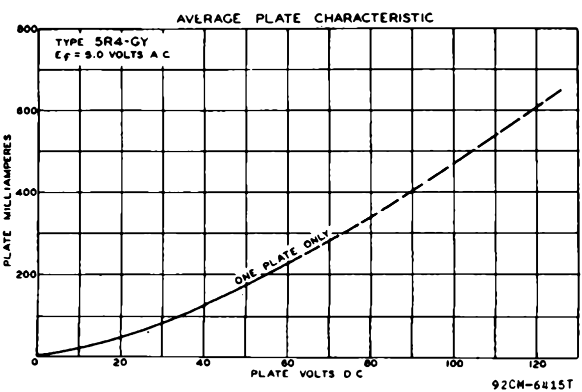
TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

RCA

5R4-GY

FULL-WAVE VACUUM RECTIFIER





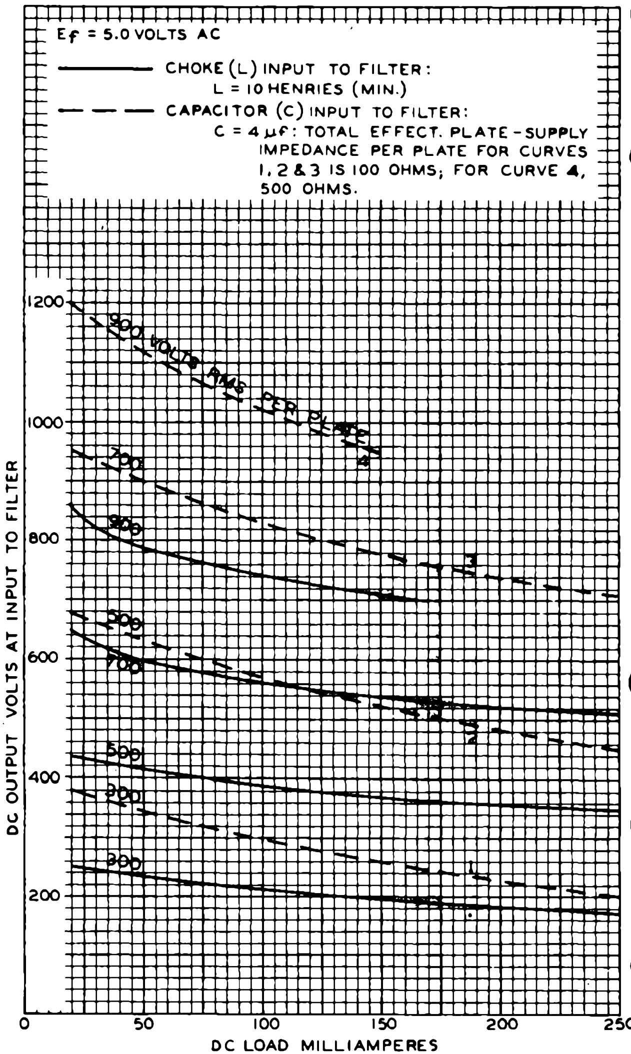
SEPT. 30, 1948 CE-6418T1-6415T

5R4-GY

RCA

5R4-GY

OPERATION CHARACTERISTICS



SEPT. 30, 1948 TUBE DEPARTMENT 92CM-6416R2

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6AS6

SHARP-CUTOFF PENTODE

MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage	6.3	ac or dc volts
Current	0.175	amp

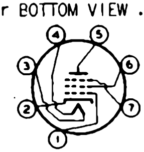
Direct Interelectrode Capacitances:

	Without External Shield	*With External Shield No.316*	
Grid No.1 to Plate . .	0.025 max.	0.02 max.	μμf
Input.	3.9	4.0	μμf
Output	2.2	3.0	μμf
Grid No.1 to Grid No.3. . . .	0.15 max.	0.15 max.	μμf
Grid No.3 to Plate . .	0.7 max.	0.7 max.	μμf
Grid No.3 to All Other Electrodes . .	3.3	3.4	μμf

Mechanical:

Mounting Position. . . . . Any
Maximum Overall Length . . . . 1-3/4"
Maximum Seated Length. . . . . 1-1/2"
Length, Base Seat to Bulb Top (Excluding tip). . 1-1/8" ± 3/32"
Maximum Diameter . . . . 3/4"
Bulb T-5-1/2
Base . . . . Small-Button Miniature 7-Pin
Basing Designation for BOTTOM VIEW . . . . $7CM_1$

Pin 1 - Grid No.1
Pin 2 - Cathode
Pin 3 - Heater
Pin 4 - Heater



Pin 5 - Plate
Pin 6 - Grid No.2
Pin 7 - Grid No.3

AMPLIFIER - Class A_1

Maximum Ratings, ***Design-Center Values*****:**

PLATE VOLTAGE.	180 max.	volts
GRID-No.3 VOLTAGE.	27 max.	volts
GRID-No.2 VOLTAGE.	140 max.	volts
CATHODE CURRENT.	18 max.	ma
PLATE DISSIPATION.	1.7 max.	watts
GRID-No.2 INPUT.	0.75 max.	watt
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode. .	90 max.	volts
Heater positive with respect to cathode. .	90 max.	volts
BULB TEMPERATURE (At hottest point on bulb surface).	120 max.	°C

Characteristics:

Plate Voltage.	120	120	volts

FEB. 1, 1950

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA

6AS6

SHARP-CUTOFF PENTODE

Grid-No.3 Voltage.	-3	0	volts
Grid-No.2 Voltage.	120	120	volts
Grid-No.1 Voltage.	-2	-2	volts
Plate Resistance (Approx.)	-	0.15	megohm
Transconductance, Grid No.1 to Plate. . . .	1850	3200	μmhos
Transconductance, Grid No.3 to Plate. . . .	810	470	μmhos
Plate Current.	3.6	5.2	ma
Max. Plate Current for Grid-No.1 Volts = -10. . . .	-	100	μamp
Max. Plate Current for Grid-No.3 Volts = -15. . . .	-	20	μamp
Grid-No.2 Current.	4.8	3.5	ma

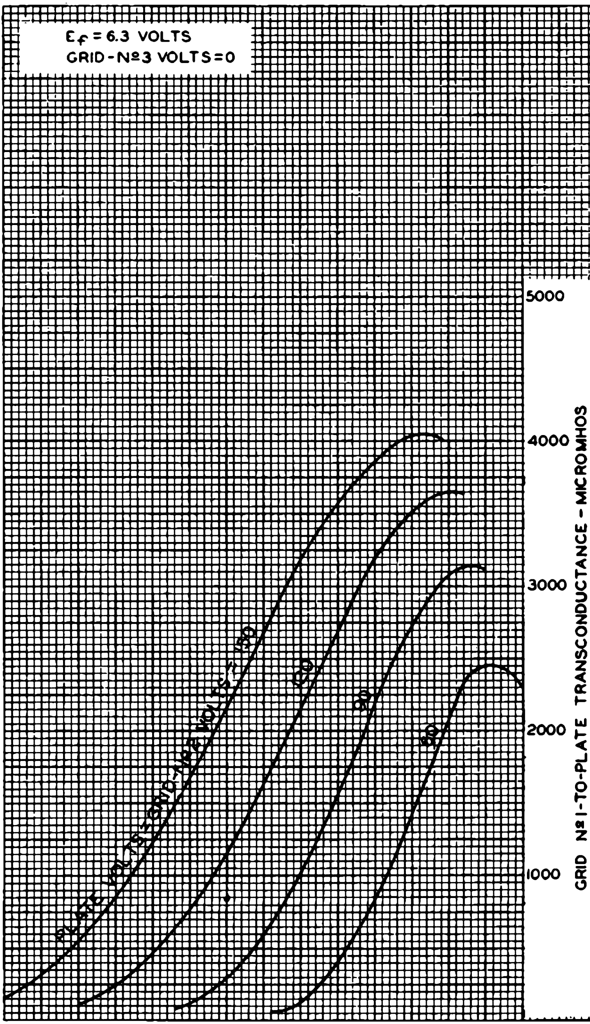
TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6AS6

RCA

6AS6

AVERAGE CHARACTERISTICS



NOV. 4, 1949

TUBE DEPARTMENT

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

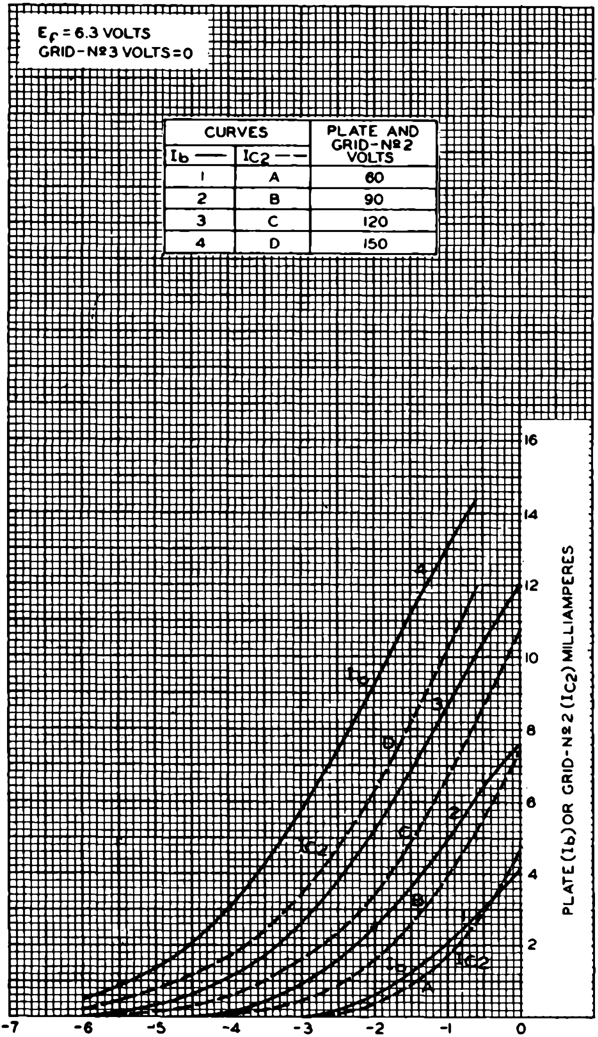
92CM-7401

6AS6

RCA

6AS6

AVERAGE CHARACTERISTICS



NOV. 7, 1949

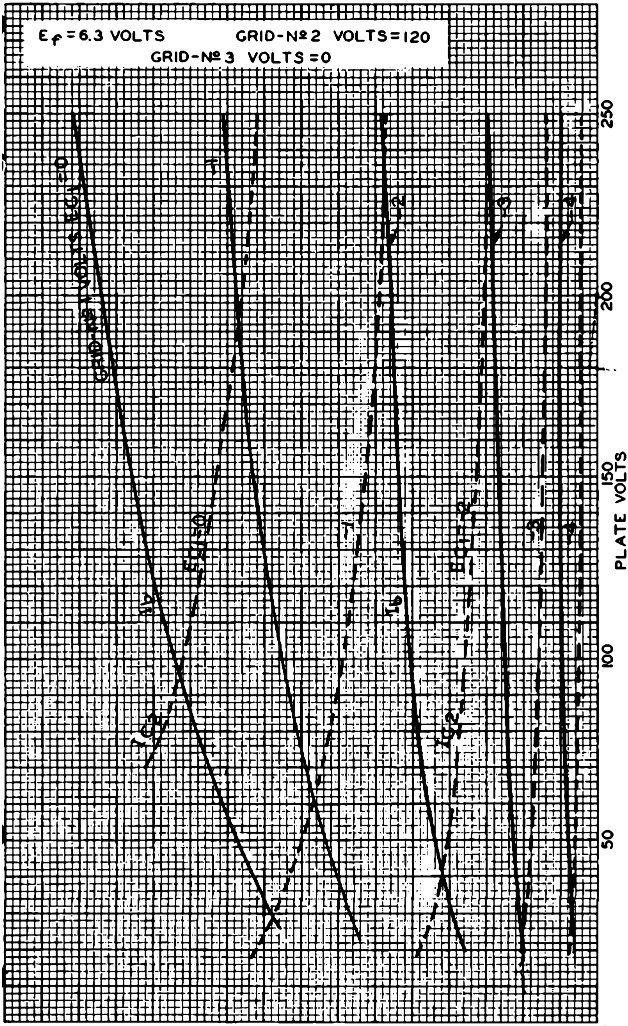
TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7402

6AS6

6AS6

AVERAGE PLATE CHARACTERISTICS



NOV. 4, 1949

TUBE DEPARTMENT

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

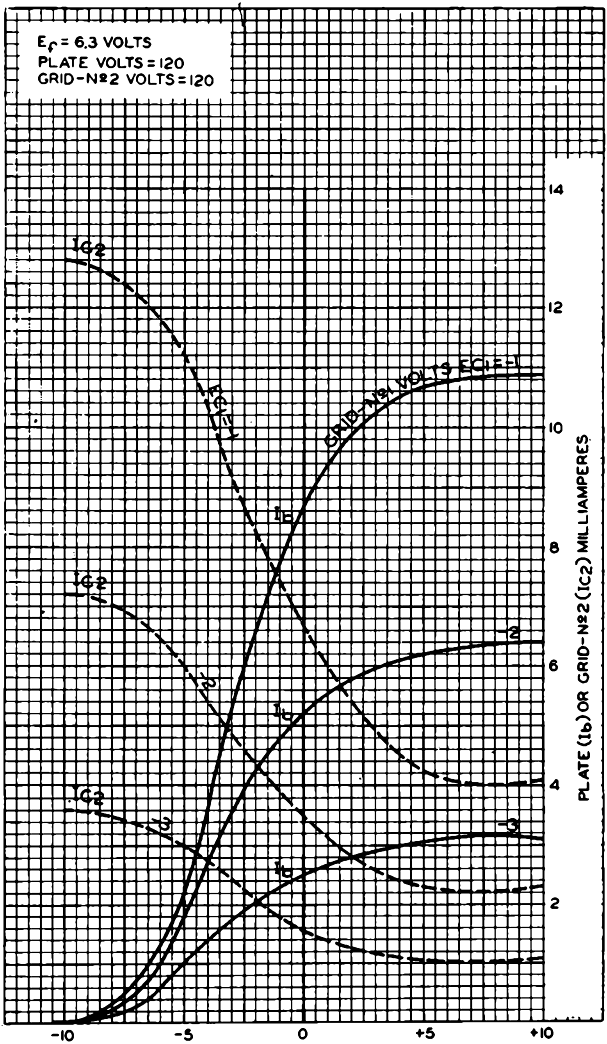
92CM-7408

6AS6

RCA

6AS6

AVERAGE CHARACTERISTICS



NOV. 9, 1949

TUBE DEPARTMENT

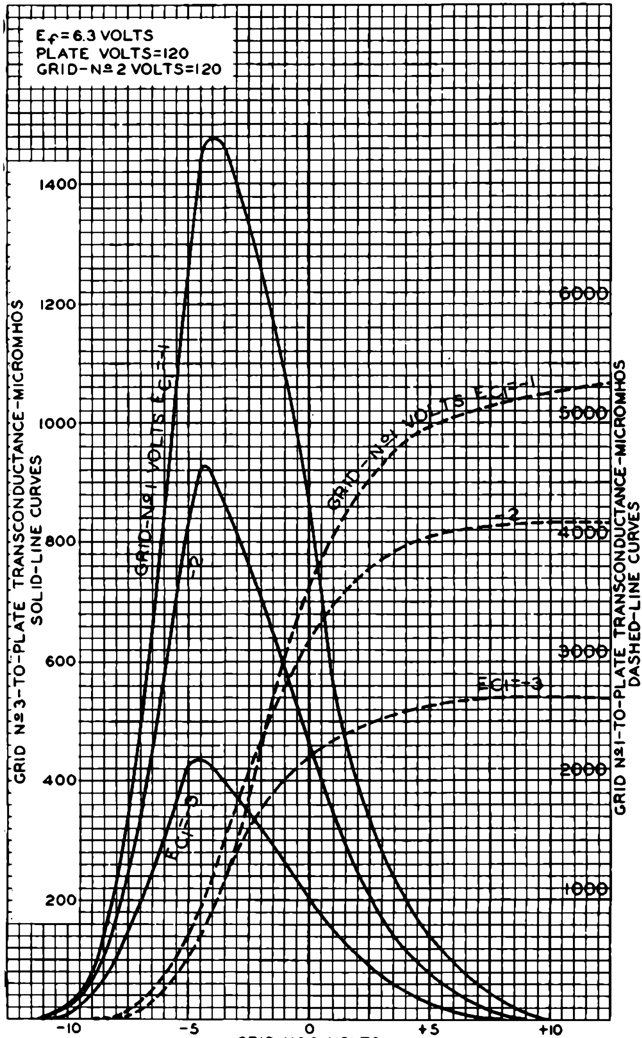
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7403

RCA

6AS6

AVERAGE CHARACTERISTICS



NOV. 10, 1949

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7404

6AS6

6AS7-G

6AS7-G

LOW-MU TWIN POWER TRIODE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:

Voltage	6.3	ac or dc volts
Current	2.5	amp

Direct Interelectrode Capacitances (Approx., each unit):° ←

Grid to plate	10.5	μμf
Grid to heater and cathode	6.8	μμf
Plate to heater and cathode	2.3	μμf
Heater to cathode	11.0	μμf
Grid of unit No.1 to grid of unit No.2	0.70	μμf
Plate of unit No.1 to plate of unit No.2	1.65	μμf

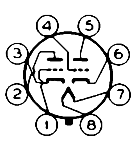
Characteristics, Class A_1 Amplifier (Each unit):

Plate-Supply Voltage	135	volts
Cathode-Bias Resistor■	250	ohms
Amplification Factor	2	
Plate Resistance (Approx.)	280	ohms
Transconductance	7000	μmhos
Plate Current	125	ma

Mechanical:

Mounting Position	Any
Maximum Overall Length	5-5/16"
Maximum Seated Length	4-3/4"
Maximum Diameter	2-1/16"
Bulb	ST-16
Base	Medium-Shell Octal 8-Pin (JETEC No.B8-11) ←
Basing Designation for BOTTOM VIEW	8BD

Pin 1 - Grid of Unit No.2
Pin 2 - Plate of Unit No.2
Pin 3 - Cathode of Unit No.2
Pin 4 - Grid of Unit No.1



Pin 5 - Plate of Unit No.1
Pin 6 - Cathode of Unit No.1
Pin 7 - Heater
Pin 8 - Heater

DC AMPLIFIER

Values for Each Unit

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	250 max.	volts
PLATE CURRENT	125 max.	ma
PLATE DISSIPATION	13 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	300 max.	volts
Heater positive with respect to cathode	300 max.	volts

° Without external shield.
■ Operation with fixed bias is not recommended.

← Indicates a change.

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

RCA

6AS7-G

LOW-MU TWIN POWER TRIODE

Maximum Circuit Values (For maximum rated conditions):

Grid-Circuit Resistance:		
For cathode-bias operation	1.0 max.	megohm
For fixed-bias operation	Not recommended	

BOOSTER SCANNING SERVICE

Values are for Each Unit

Maximum Ratings, *Design-Center Values:*

For operation in a 525-line, 30-frame system□

PEAK NEGATIVE-PULSE PLATE VOLTAGE●	1700 max.	volts
DC PLATE CURRENT	125 max.	ma
PLATE DISSIPATION	13 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	300 max.	volts
Heater positive with respect to cathode	300 max.	volts

Maximum Circuit Values (For maximum rated conditions):

Grid-Circuit Resistance:		
For cathode-bias operation	1.0 max.	megohm
For fixed-bias operation	Not recommended	

□ As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations", Federal Communications Commission.

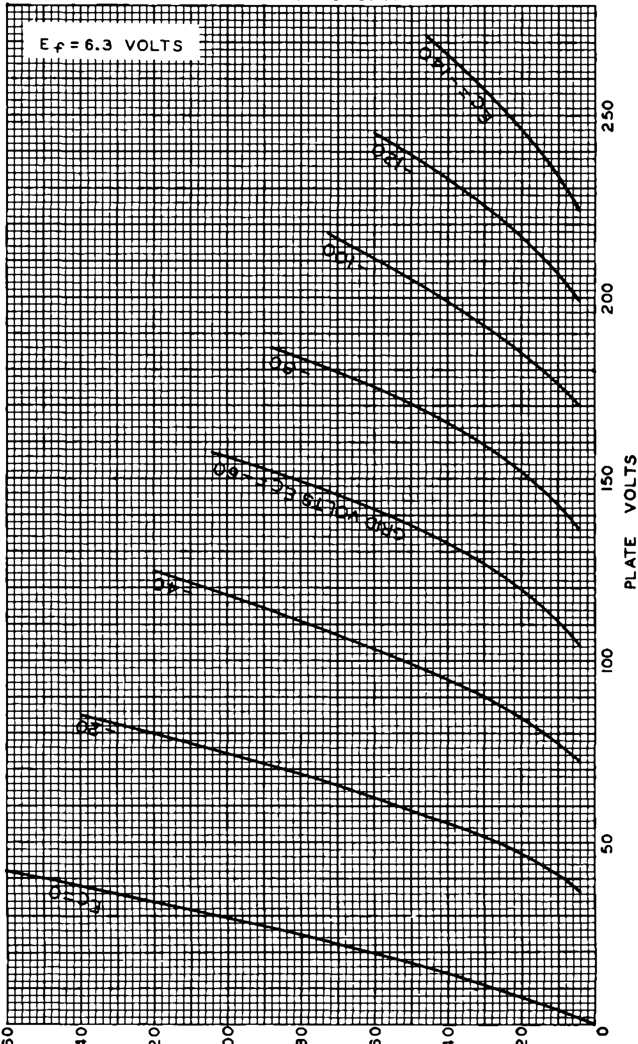
● The duration of the voltage pulse must not exceed 15 per cent of one horizontal scanning cycle. In a 525-line, 30-frame system, 15 per cent of one horizontal scanning cycle is 10 microseconds.

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

RCA

6AS7-G

AVERAGE PLATE CHARACTERISTICS
EACH TRIODE UNIT



NOV. 6, 1945 RCA VICTOR DIVISION 92CM-6618

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

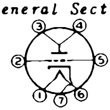
6F4

6F4
OSCILLATOR TRIODE
ACORN TYPE

For use at frequencies up to 1200 Mc approx.

Heater	Coated Unipotential Cathode	
Voltage	6.3	a-c or d-c volts
Current	0.225	amp.
Direct Interelectrode Capacitances:°		
Grid to Plate	1.9	μμf
Grid to Cathode & Heater	2.0	μμf
Plate to Cathode & Heater	0.6	μμf
Overall Length		1-7/32" ± 5/32"
Overall Diameter (including radial pins)		1-3/32" ± 1/16"
Bulb	*See Outline in General Section*	T-4½
Base	*See Outline in General Section*	Small Radial 7-Pin

Pin 1 - Heater
Pin 2 - Grid
Pin 3 - Plate
Pin 4 - Plate



Pin 5 - Grid
Pin 6 - Heater
Pin 7 - Cathode

Mounting Position — Any

BOTTOM VIEW (7BR)

Maximum Ratings Are Design-Center Values

A-F AMPLIFIER

Plate Voltage	150	max.	volts
Plate Supply Voltage	300	max.	volts
Plate Current	15	max.	ma.
Plate Dissipation	2	max.	watts
D-C Heater-Cathode Potential	80	max.	volts
Characteristics - Class A_1 Amplifier:			
Plate Voltage	80		volts
Cathode-Bias Resistor□	150		ohms
Amplification Factor	17		
Plate Resistance	2900		ohms
Transconductance	5800		μmhos
Plate Current	13		ma.

R-F POWER AMPLIFIER & OSCILLATOR - Class C Telegraphy

D-C Plate Voltage	150	max.	volts
D-C Plate Supply Voltage	300	max.	volts
D-C Grid Voltage	-50	max.	volts
D-C Plate Current	20	max.	ma.
D-C Grid Current	8	max.	ma.
Plate Dissipation	2	max.	watts
D-C Heater-Cathode Potential	80	max.	volts
Typical Operation at Moderate Frequencies:●			
D-C Plate Voltage	150		volts
D-C Grid Voltage♦	-15		volts
	550		ohms
	2000		ohms
D-C Plate Current	20		ma.
D-C Grid Current (Approx.)⊙	7.5		ma.
Driving Power (Approx.)⊙	0.2		watt
Power Output (Approx.)	1.8		watts

°, □, ●, ♦, ⊙: see next page.

AUG. 15, 1944 — TENTATIVE DATA

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6F4

OSCILLATOR TRIODE

(continued from preceding page)

○ With no external shield.

□ Fixed-bias operation is not recommended. Under maximum rated conditions, the d-c resistance in the grid circuit should not exceed 0.5 megohm.

● Approximately 45 milliwatts can be obtained when the 6F4 is used at 1200 megacycles as an oscillator with 100 volts on plate, maximum rated plate dissipation, and grid resistor of 2000 ohms.

♦ Obtained from fixed supply, or by cathode resistor (550), grid resistor (2000), or partial self-bias methods.

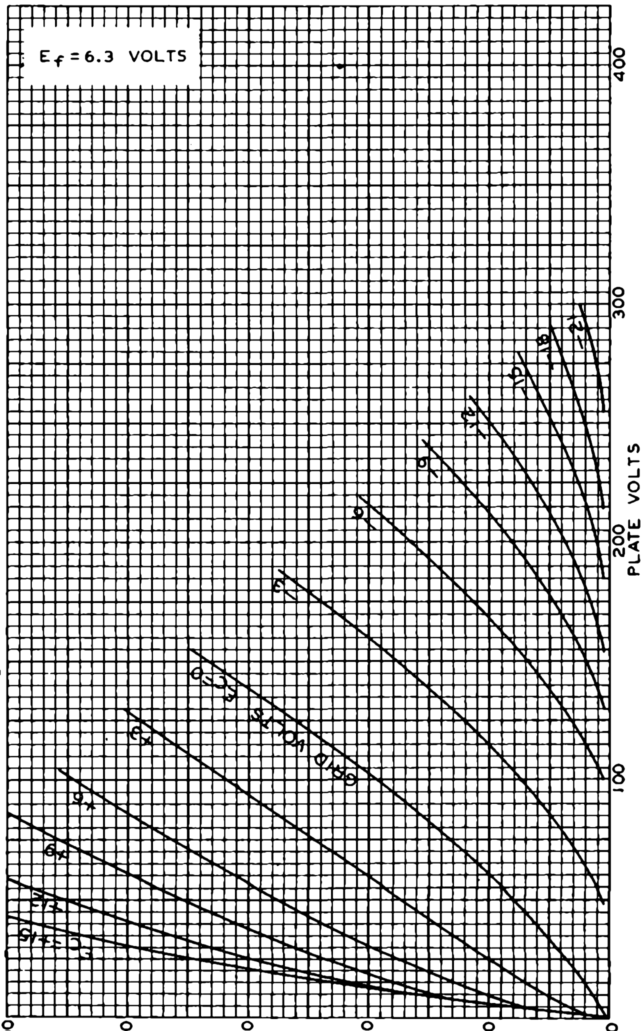
⊙ Subject to wide variations as explained under TUBE RATINGS in General Section.

The *socket* for the 6F4 should be electrically and mechanically compact, and be made with an insulating material having a loss factor not exceeding 0.035 to permit operation of the 6F4 at high frequencies. For most satisfactory performance of the 6F4, it is essential that the inductance of connections between tube and circuit be kept as low as possible.

6F4

6F4

AVERAGE PLATE CHARACTERISTICS

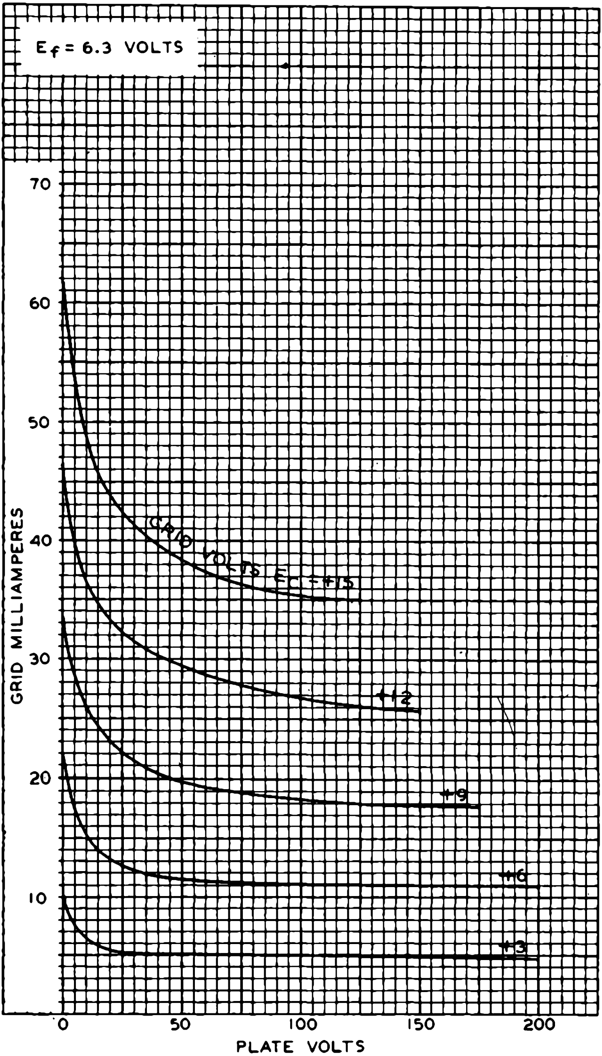


JULY 12, 1944 RCA VICTOR DIVISION 92CM-6567

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6F4

6F4
TYPICAL CHARACTERISTICS



JULY 13, 1944

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6470

6J4

6J4

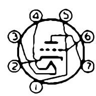
U-H-F AMPLIFIER TRIODE

GROUNDED-GRID, MINIATURE TYPE

For use at frequencies up to 500 Mc. approx.

Heater	Coated Unipotential Cathode	
Voltage	6.3	a-c or d-c volts
Current	0.4	amp.
Direct Interelectrode Capacitances (Approx.):°		
Plate to Cathode & Heater	0.24 max.	μμf
Grid to Cathode & Heater	5.5	μμf
Grid to Plate	4	μμf
Heater to Cathode	2.8	μμf
Maximum Overall Length		2-1/8"
Maximum Seated Height		1-7/8"
Length from Base Seat to Bulb Top (excluding tip)		1-1/2" ± 3/32"
Maximum Diameter		3/4"
Bulb		T-5-1/2"
Base▲		Miniature Button 7-Pin

Pin 1 - Grid
Pin 2 - Cathode
Pin 3 - Heater
Pin 4 - Heater
Pin 5 - Grid
Pin 6 - Grid
Pin 7 - Plate



RCA Socket	Stock No.9914
Mounting Position	Any

BOTTOM VIEW (7BQ)

Maximum Ratings Are Design-Center Values

GROUNDED-GRID AMPLIFIER

Plate Voltage	150 max. volts
Plate Dissipation	2.25 max. watts
Plate Current	20 max. ma.
D-C Heater-Cathode Potential	90 max. volts

Typical Operation and Characteristics - Class A_1 Amplifier:

Plate Voltage	100	150	volts
Cathode-Bias Resistor* (Suitably by-passed)	100	100	ohms
Amplification Factor	55	55	
Plate Resistance	5000	4500	ohms
Transconductance	11000	12000	μmhos
Plate Current	10	15	ma.

° With close-fitting shield connected to grid.

* The 6J4 should always be used with a cathode-bias resistor suitably by-passed. The d-c resistance in the grid circuit under maximum rated conditions should be limited to 0.25 megohm.

▲ *The center hole in sockets designed for this base provides for the possibility that this tube type may be manufactured with the exhaust tube tip at the base end. For this reason, it is recommended that in equipment employing this tube type, no material be permitted to obstruct the socket hole.*

APRIL 1, 1944

TENTATIVE DATA

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6J4

U-H-F AMPLIFIER TRIODE

(continued from preceding page)

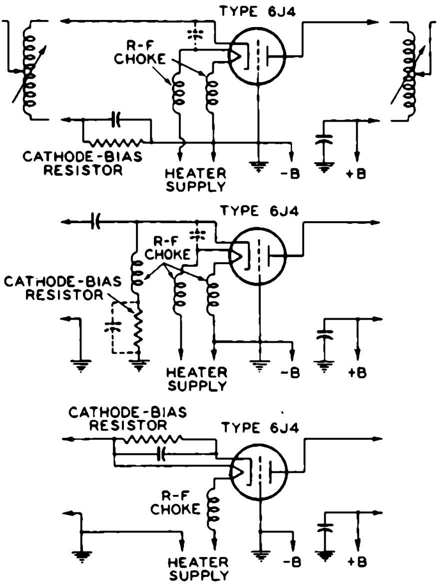
NOTE:

For grounded-grid operation, all three grid terminals should be grounded to minimize the effects of grid-lead inductance on u-h-f performance.

In arranging the circuit for the 6J4 used as a grounded-grid r-f amplifier or mixer, it is preferable to have the heater operate at the same r-f potential as the cathode, so that the cathode-heater capacitance will not be added across the input-circuit capacitance. Placing r-f chokes in series with the heater leads is suggested as a suitable method of operating heater and cathode at the same r-f potential.

TYPICAL GROUNDED-GRID CIRCUITS

Having Heater at R-F Cathode Potential

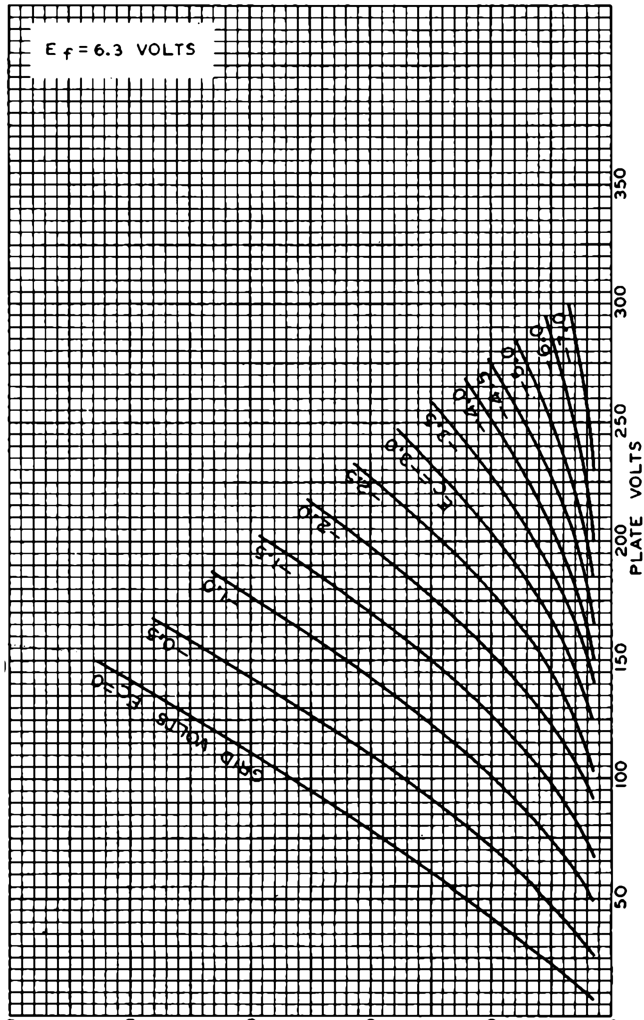


92CM-6550

6J4

6J4

AVERAGE PLATE CHARACTERISTICS



FEB. 19 1944

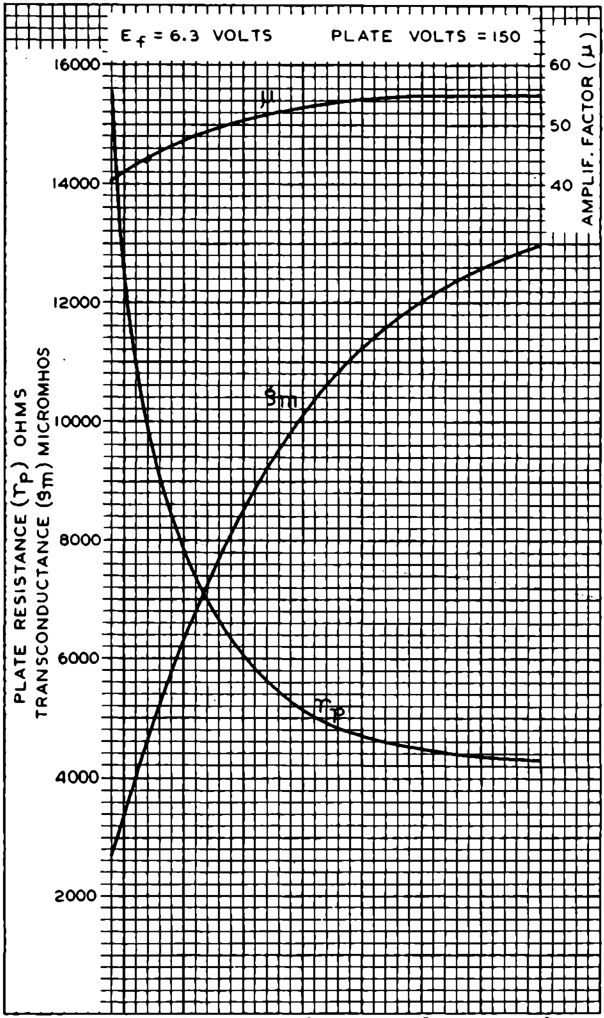
RCA VICTOR DIVISION

RADIO CORPORATION OF AMERICA HARRISON, NEW JERSEY

92CM—6543

6J4

AVERAGE CHARACTERISTICS



MARCH 21, 1944 — RCA VICTOR DIVISION, RADIO CORPORATION OF AMERICA HARRISON, NEW JERSEY — 92CM-6548

6L4

6L4

OSCILLATOR TRIODE

ACORN TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage	6.3	ac or dc volts
Current	0.225	amp

Direct Interelectrode Capacitances:*

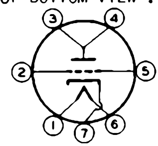
Grid to Plate	1.6	μμf
Grid to Cathode	1.8	μμf
Plate to Cathode	0.5	μμf

* With no external shield.

Mechanical:

Mounting Position	Any
Overall Length	1-7/32" ± 5/32"
Overall Diameter (Including radial pins)	1-3/32" ± 1/16"
Bulb	T-4-1/2
Base	Small Radial 7-Pin
Basing Designation for BOTTOM VIEW	7BR

Pin 1 - Heater
Pin 2 - Grid
Pin 3 - Plate
Pin 4 - Plate



Pin 5 - Grid
Pin 6 - Heater
Pin 7 - Cathode

AMPLIFIER - Class A_1

Maximum Ratings, ***Design-Center Values*:**

PLATE VOLTAGE	500 max.	volts
PLATE DISSIPATION	1.7 max.	watts
PLATE CURRENT	15 max.	ma
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	80 max.	volts
Heater positive with respect to cathode	80 max.	volts

Typical Operation and Characteristics:

Plate Voltage	80	volts
Cathode-Bias Resistor	150	ohms
Amplification Factor	28	
Plate Resistance	4400	ohms
Transconductance	6400	μmhos
Plate Current	9.5	ma

Maximum Circuit Values (for maximum rated conditions):

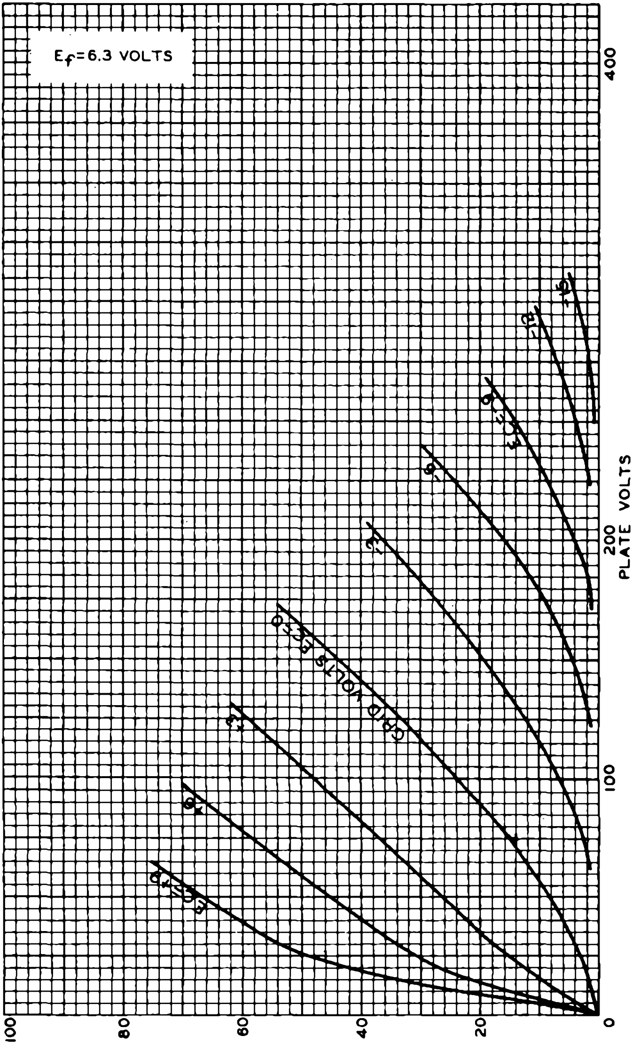
Grid-Circuit Resistance:

For fixed bias	Not Recommended
For cathode bias	0.5 max. megohm

RCA

6L4

AVERAGE PLATE CHARACTERISTICS

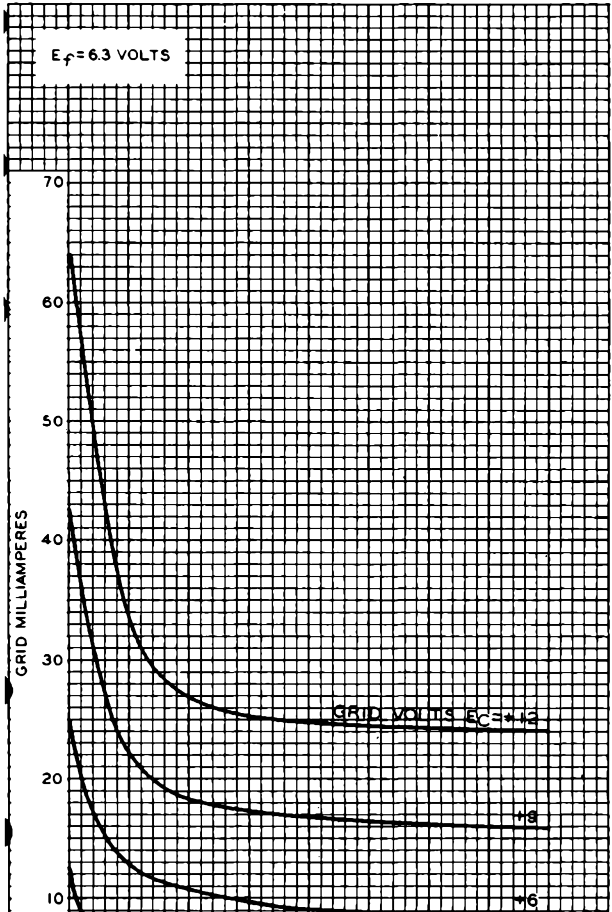


6L4

RCA

6L4

TYPICAL CHARACTERISTICS



MAR. 10, 1949

TUBE DEPARTMENT

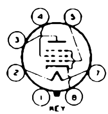
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7202

12A6

BEAM POWER AMPLIFIER

Heater#	Coated Unipotential Cathode	
Voltage	12.6	a-c or d-c volts
Current	0.15	amp.
Direct Interelectrode Capacitances (Approx.):°		
Grid to Plate	0.3	μμf
Input	9.0	μμf
Output	9.0	μμf
Maximum Overall Length		3-1/4"
Maximum Seated Height		2-11/16"
Maximum Diameter		1-5/16"
Bulb		Metal Shell, MT-8
Base		Small Wafer Octal 7-Pin
Pin 1 - Shell		Pin 5 - Grid
Pin 2 - Heater		Pin 7 - Heater
Pin 3 - Plate		Pin 8 - Cathode
Pin 4 - Screen		
Mounting Position		Any



BOTTOM VIEW (7AC)

Maximum Ratings Are Design-Center Values

AMPLIFIER

Plate Voltage	250 max.	volts
Screen Voltage	250 max.	volts
Plate Dissipation	7.5 max.	watts
Screen Dissipation	1.5 max.	watts

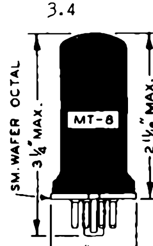
Operating Conditions and Characteristics-Class A_1 Amplifier:

Plate	250	volts
Screen	250	volts
Grid *	-12.5	volts
Peak A-F Grid Voltage	12.5	volts
Zero-Signal Plate Current	30	ma.
Max.-Signal Plate Current	32	ma.
Zero-Signal Screen Current	3.5 approx.	ma.
Max.-Signal Screen Current	5.5 approx.	ma.
Plate Resistance	70000 approx.	ohms
Transconductance	3000	μmhos
Load Resistance	7500	ohms
Total Harmonic Distortion	7	%
Max.-Signal Power Output	3.4	watts

In circuits where the cathode is not directly connected to the heater, the potential difference between heater and cathode should be kept as low as possible.

* The d-c resistance in the grid circuit should not exceed 0.1 megohm when fixed bias is used, or 0.5 megohm when cathode bias is used.

° With shell connected to cathode.



← Indicates a change.

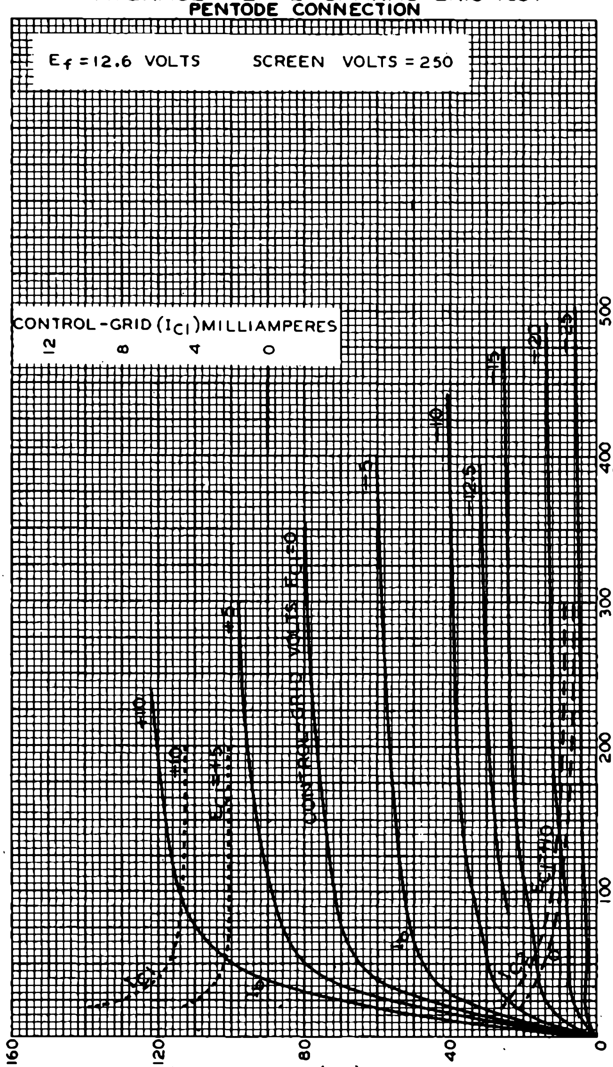
May 1, 1942

TENTATIVE DATA

12A6

12A6

AVERAGE PLATE CHARACTERISTICS
PENTODE CONNECTION



OCT. 14, 1941

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

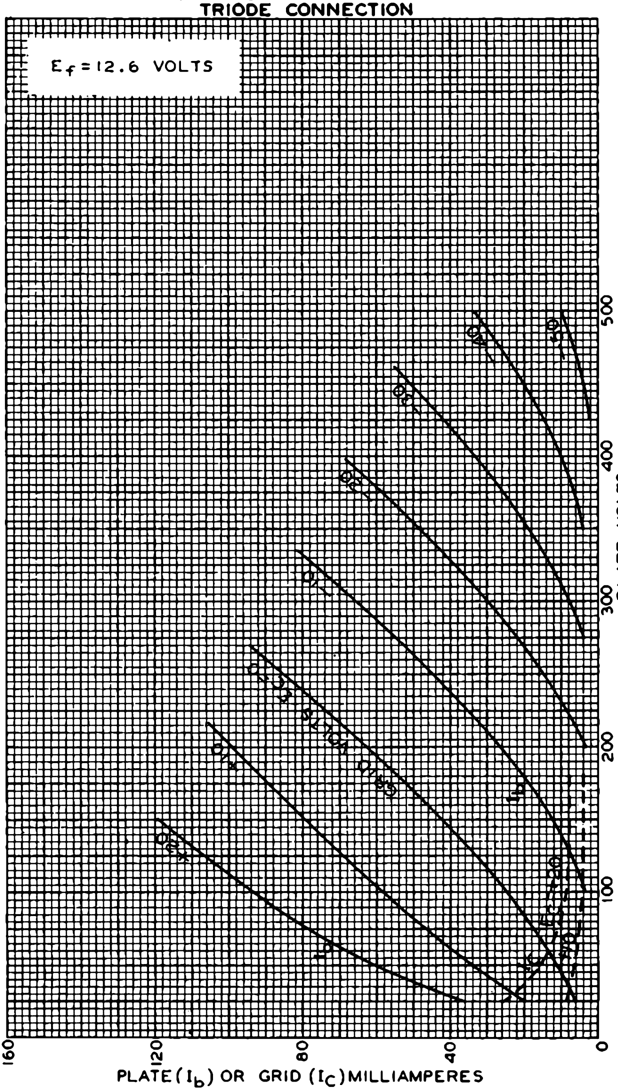
92C-6329

12A6

12A6

AVERAGE PLATE CHARACTERISTICS

TRIODE CONNECTION



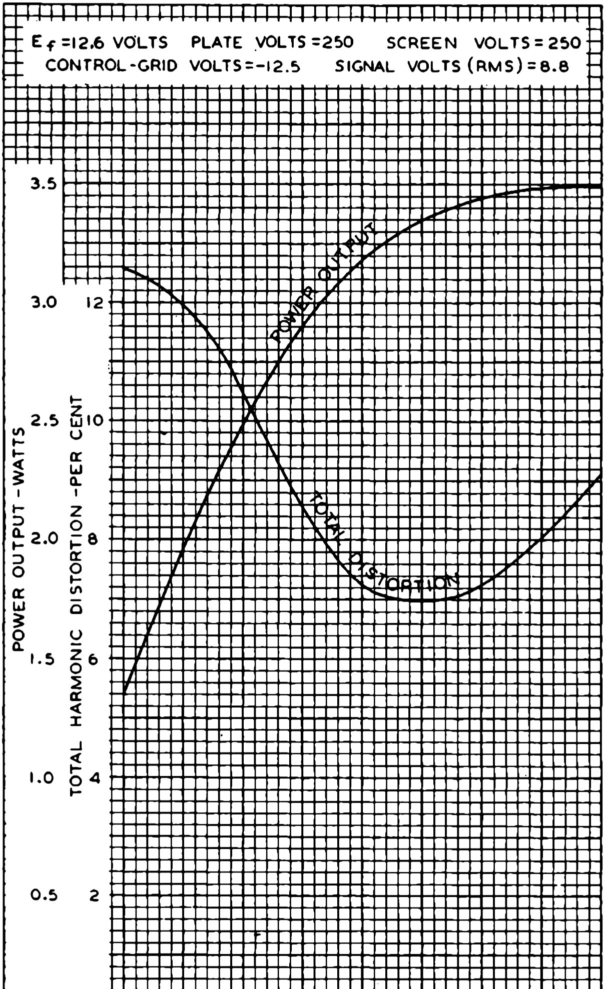
OCT. 13, 1941

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

92C-6327

12A6

OPERATION CHARACTERISTICS



JAN.10,1942

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

92C-6354

RCA

12AY7
MEDIUM-MU TWIN TRIODE

MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:

Heater Arrangement	*Series*	*Parallel*	
Voltage	12.6*	6.3	ac or dc volts
Current	0.15	0.3	amp

Direct Interelectrode Capacitances (Without External Shield)—Each Unit:

Grid to Plate	1.3	$\mu\mu$f
Input	1.3	$\mu\mu$f
Output	0.6	$\mu\mu$f

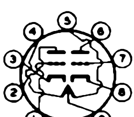
Characteristics, Class A_1 Amplifier (Each Unit):

Plate Voltage	250	volts
Grid Voltage	−4	volts
Amplification Factor	40	
Plate Resistance (Approx.)	22800	ohms
Transconductance	1750	μmhos
Plate Current	3	ma
Grid Voltage (Approx.) for plate current of 10 μamp	−11	volts

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-3/16"
Maximum Seated Length	1-15/16"
Length, Base Seat to Bulb Top (Excluding tip)	1-9/16" ± 3/32"
Maximum Diameter	7/8"
Bulb	T-6-1/2
Base	Small-Button Noval 9-Pin (JETEC No. E9-1)
Basing Designation for BOTTOM VIEW	9A

Pin 1 - Plate of Unit No.2
Pin 2 - Grid of Unit No.2
Pin 3 - Cathode of Unit No.2
Pin 4 - Heater
Pin 5 - Heater



Pin 6 - Plate of Unit No.1
Pin 7 - Grid of Unit No.1
Pin 8 - Cathode of Unit No.1
Pin 9 - Heater Mid-Tap

* Use of the 12.6-volt connection with an ac-heater supply is not recommended for applications involving low hum..

(continued on next page)

12AY7

12AY7

MEDIUM-MU TWIN TRIODE

AMPLIFIER—Class A_1

Values are for each unit

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	300 max.	volts
GRID VOLTAGE:		
Negative bias value	50 max.	volts
Positive bias value	0 max.	volts
PLATE DISSIPATION	1.5 max.	watts
CATHODE CURRENT	10 max.	ma
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	90 max.	volts
Heater positive with respect to cathode	90 max.	volts

Typical Operation as Resistance-Coupled Amplifier:

See RESISTANCE-COUPLED AMPLIFIER CHART No. 28 at front of Receiving Tube Section

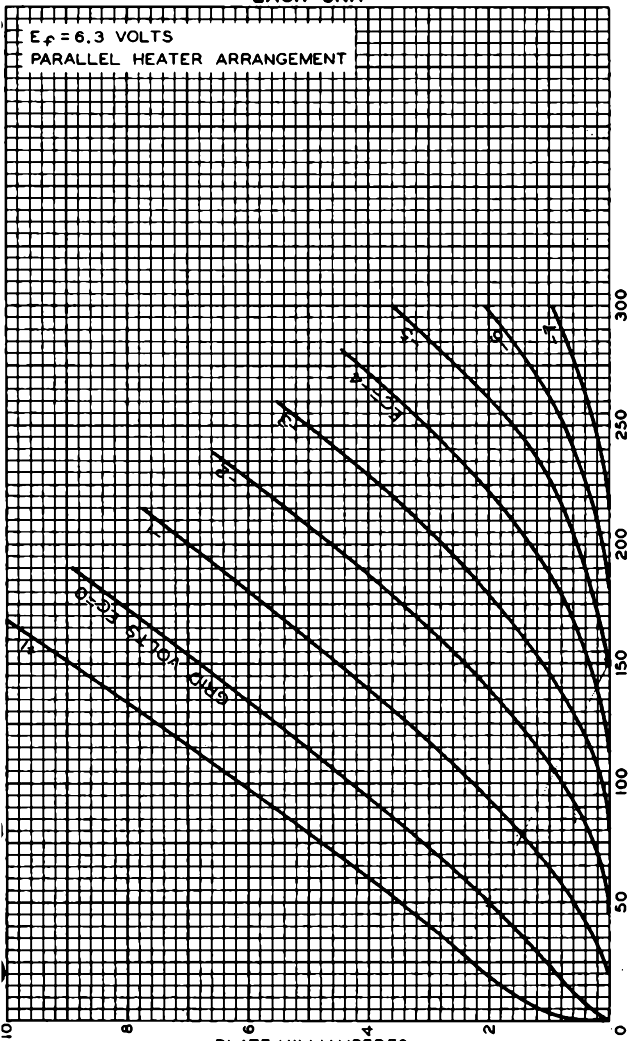
APRIL 1, 1953

TENTATIVE DATA

12AY7

12AY7

AVERAGE PLATE CHARACTERISTICS
EACH UNIT



NOV. 5, 1952

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7861

12L8-GT

12L8-GT

TWIN-PENTODE POWER AMPLIFIER

Heater	Coated Unipotential Cathode	
Voltage	12.6	a-c or d-c volts
Current	0.15	amp.

Direct Interelectrode Capacitances (Approx.):°

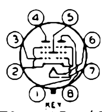
	Pentode Unit P_1	*Pentode Unit P_2*	
Grid to Plate	0.7	0.7	μμf
Input	5.0	5.0	μμf
Output	6.0	6.0	μμf
Grid to Grid	0.08		μμf
Plate to Plate	1.5		μμf
Grid P_1 to Plate P_2	0.2		μμf
Grid P_2 to Plate P_1	0.1		μμf

Maximum Overall Length	3-5/16"
Maximum Seated Height	2-3/4"
Maximum Diameter	1-5/16"
Bulb	T-9
Base	Intermediate Shell Octal 8-Pin

Pin 1 - Grid P_1

Pin 2 - Cathode, Suppressor P_1 & P_2

Pin 3 - Grid P_2



BOTTOM VIEW (8BU)

Pin 4 - Plate P_2

Pin 5 - Screen P_1 & P_2

Pin 6 - Heater

Pin 7 - Heater

Pin 8 - Plate P_1

Mounting Position — Any

For convenience, one pentode unit is identified as P_1; the other as P_2.

Maximum Ratings Are Design-Center Values

AMPLIFIER - Each Unit

Plate Voltage	180 max.	volts
Screen Voltage	180 max.	volts
Plate Dissipation	2.5 max.	watts
Screen Dissipation	1.0 max.	watt
D-C Heater-Cathode Potential	100 max.	volts

Typical Operation and Characteristics - Class A_1 Amplifier:

Plate Voltage	180	volts
Screen Voltage	180	volts
Grid Voltage (Grid No. 1)	-9	volts
Peak A-F Grid Voltage	9	volts
Zero-Sig. Plate Cur.	13	ma.
Max.-Sig. Plate Cur.	13.5	ma.
Zero-Sig. Screen Cur.	2.8	ma.
Max.-Sig. Screen Cur.	4.6	ma.
Plate Resistance	0.16	megohm
Transconductance	2150	μmhos
Load Resistance	10000	ohms
Power Output (Total harmonic dist. 10%)	1.0	watt

° with no external shield.

OCT. 1, 1943

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

DATA

12L8-GT

AVERAGE PLATE CHARACTERISTICS

EACH PENTODE UNIT

12SW7

RCA

12SW7

DUPLEX-DIODE TRIODE

For use with 12-cell storage-battery supply

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage	12.6	ac or dc volts
Current	0.15	amp.

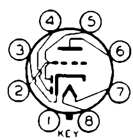
Direct Interelectrode Capacitances—Triode Unit:°

Grid to Plate	2.4	μμf
Grid to Cathode	3.0	μμf
Plate to Cathode	2.8	μμf

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-5/8"
Maximum Seated Length	2-1/16"
Maximum Diameter	1-5/16"
Bulb	Metal Shell, MT8G
Base	Small Wafer Octal 8-Pin
Basing Designation for BOTTOM VIEW	8Q

Pin 1 - Shell
Pin 2 - Triode Grid
Pin 3 - Cathode
Pin 4 - Diode Plate No. 2



Pin 5 - Diode Plate No. 1
Pin 6 - Triode Plate
Pin 7 - Heater
Pin 8 - Heater

CLASS A_1 AMPLIFIER

Maximum Ratings, ***Design-Center Values*:**

PLATE VOLTAGE	250 max.	volts
PLATE DISSIPATION	2.5 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	90 max.	volts
Heater positive with respect to cathode	90 max.	volts

Characteristics:

Plate Voltage	26.5	250	volts
Grid Voltage:			
From a fixed supply of	-	-9	volts
From a grid resistor of	2	-	megohms
Amplification Factor	17	16	
Plate Resistance	15500	8500	ohms
Transconductance	1100	1900	μmhos
Plate Current	1.1	9.5	ma.

Typical Operation with Resistance Coupling:

See RESISTANCE-COUPLED AMPLIFIER CHART, Type 6R7.

° With shell connected to cathode. Values are approximate.

JUNE 20, 1946 TENTATIVE DATA

12SW7

DUPLEX-DIODE TRIODE

DIODE UNITS - Two

The two diode plates are placed around a cathode, the sleeve of which is common to the triode unit. Each diode plate has its own base pin. Diode curves in the front of the RECEIVING TUBE SECTION apply to the 12SW7.

Additional curves applying to the 12SW7 are shown under Types 6R7, and 6SR7

RCA

12SX7-GT
TWIN-TRIODE AMPLIFIER

For use with 12-cell storage-battery supply

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:
- Voltage . . . . 12.6 . . . . . . ac or dc volts
- Current . . . . 0.3 . . . . amp

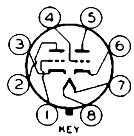
Direct Interelectrode Capacitances (Approx.):°

	Triode Unit No.1	*Triode Unit No.2*	
Grid to Plate	3.6	3.6	μμf
Grid to Cathode	3.0	2.8	μμf
Plate to Cathode	0.8	1.2	μμf

Mechanical:

Mounting Position . . . . Any
Maximum Overall Length . . . . 3-5/16"
Maximum Seated Length . . . . 2-3/4"
Maximum Diameter . . . . 1-5/16"
Bulb T-9
Base . . . . Intermediate Shell Octal 8-Pin
Basing Designation for BOTTOM VIEW 8BD

Pin 1 - Grid of Unit No.2
Pin 2 - Plate of Unit No.2
Pin 3 - Cathode of Unit No.2
Pin 4 - Grid of Unit No.1



Pin 5 - Plate of Unit No.1
Pin 6 - Cathode of Unit No.1
Pin 7 - Heater
Pin 8 - Heater

CLASS A_1 AMPLIFIER

Values are for each unit

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	300 max.	volts
GRID VOLTAGE:		
Negative bias value	50 max.	volts
Positive bias value	0 max.	volts
CATHODE CURRENT	20 max.	ma.
PLATE DISSIPATION	2.5 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	90 max.	volts
Heater positive with respect to cathode	90 max.	volts

Typical Operation and Characteristics:

Plate Voltage	26.5	90	250	volts
Grid Voltage:				
From a fixed supply of	-	0	-8	volts
From a grid resistor of	0.05	-	-	megohm
Amplification Factor	21	20	20	
Plate Resistance	11500	6700	7700	ohms

° With no external shield.

12SX7-GT

TWIN-TRIODE AMPLIFIER

Transconductance	1800	3000	2600	μmhos
Plate Current.	1.8	10	9.0	ma.

Maximum Circuit Values (for maximum rated conditions):

Grid-Circuit Resistance per unit. . . . . 1.0 max. megohm

Typical Operation with Resistance Coupling:

See RESISTANCE-COUPLED AMPLIFIER CHART, Type 6F8-G.

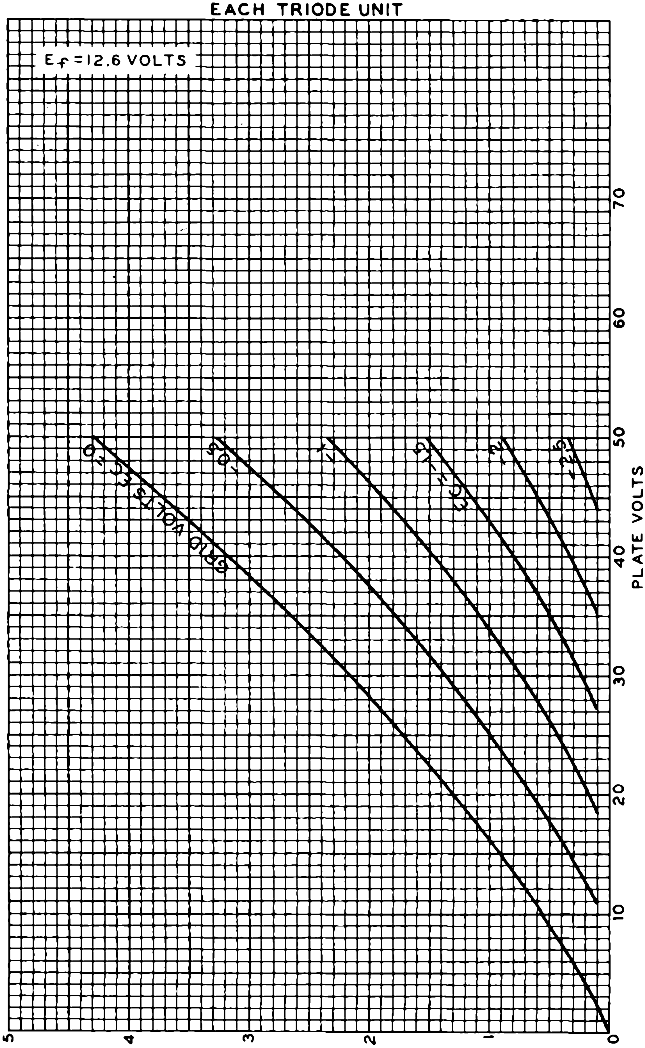
The curves under Types 6J5 and 6SN7-GT also apply to each unit of the 12SX7-GT

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

12SX7-GT

12SX7-GT

AVERAGE PLATE CHARACTERISTICS
EACH TRIODE UNIT



12SY7
PENTAGRID CONVERTER
SINGLE-ENDED METAL TYPE

For use with 12-cell storage-battery supply

GENERAL DATA

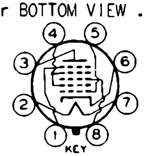
Electrical:

Heater, for Unipotential Cathode:			
Voltage	12.6	. . . . . .	ac or dc volts
Current	0.15	. . . .	amp
Direct Interelectrode Capacitances:			
Grid No.3 to All Other Electrodes (RF Input)	9.5●		μμf
Plate to All Other Electrodes (Mixer Output)	12●		μμf
Grid No.1 to All Other Electrodes (Osc. Input)	7●		μμf
Grid No.3 to Plate	0.13 max.●		μμf
Grid No.1 to Grid No.3	0.15 max.●		μμf
Grid No.1 to Plate	0.06 max.●		μμf
Grid No.1 to Shell, Grid No.5, and All Other Electrodes Except Cathode	4.4		μμf
Grid No.1 to Cathode	2.6		μμf
Cathode to Shell, Grid No.5, and All Other Electrodes Except Cathode	5		μμf

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-5/8"
Maximum Seated Length	2-1/16"
Maximum Diameter	1-5/16"
Bulb	Metal Shell, MT-8G
Base	Small Wafer Octal 8-Pin
Basing Designation for BOTTOM VIEW	8R

Pin 1 - Shell, Grid No.5
Pin 2 - Heater
Pin 3 - Plate
Pin 4 - Grids No.2 & No.4



Pin 5 - Grid No.1
Pin 6 - Cathode
Pin 7 - Heater
Pin 8 - Grid No.3

CONVERTER

Maximum Ratings, ***Design-Center Values:***

PLATE VOLTAGE	300 max.	volts
GRIDS-No.2 and No.4 (SCREEN) VOLTAGE . . .	100 max.	volts
GRIDS-No.2 and No.4 SUPPLY VOLTAGE	300 max.	volts
PLATE DISSIPATION	1.0 max.	watt
GRIDS-No.2 & No.4 DISSIPATION	1.0 max.	watt
TOTAL CATHODE CURRENT	14 max.	ma.
GRID-No.3 (CONTROL GRID) VOLTAGE:		
Negative bias value	50 max.	volts
Positive bias value	0 max.	volts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	90 max.	volts
Heater positive with respect to cathode	90 max.	volts

● With shell connected to cathode.

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

12SY7

12SY7

PENTAGRID CONVERTER

Characteristics - *Separate Excitation:* *

Plate Voltage.	26.5	100	250	volts
Grids-No.2 & No.4 Voltage	26.5	100	100	volts
Grid-No.3 Voltage.	-1	-2	-2	volts
Grid-No.1 (Oscillator Grid) Resistor	20000	20000	20000	ohms
Plate Resistance (Approx.)	-	0.5	1.0	megohm
Conversion Transconductance	250	425	450	µmhos
Conversion Transconductance (Approx.)	8♦	2°	2°	µmhos
Plate Current.	0.45	3.3	3.5	ma.
Grids-No.2 & No.4 Current	1.7	8.5	8.5	ma.
Grid-No.1 Current.	0.1	0.5	0.5	ma.
Total Cathode Current. . .	2.25	12.3	12.5	ma.

NOTE: The transconductance between grid No.1 and grids No.2 and No.4 connected to plate (not oscillating) is approximately 4500 µmhos under the following conditions: grids No.1, No.3, No.5 and shell at 0 volts; grids No.2 and No.4 and plate at 100 volts. Under the same conditions, the plate current is 27 milliamperes, and the amplification factor is 13.

* The characteristics shown with separate excitation correspond very closely with those obtained in a self-excited oscillator circuit operating with zero bias.

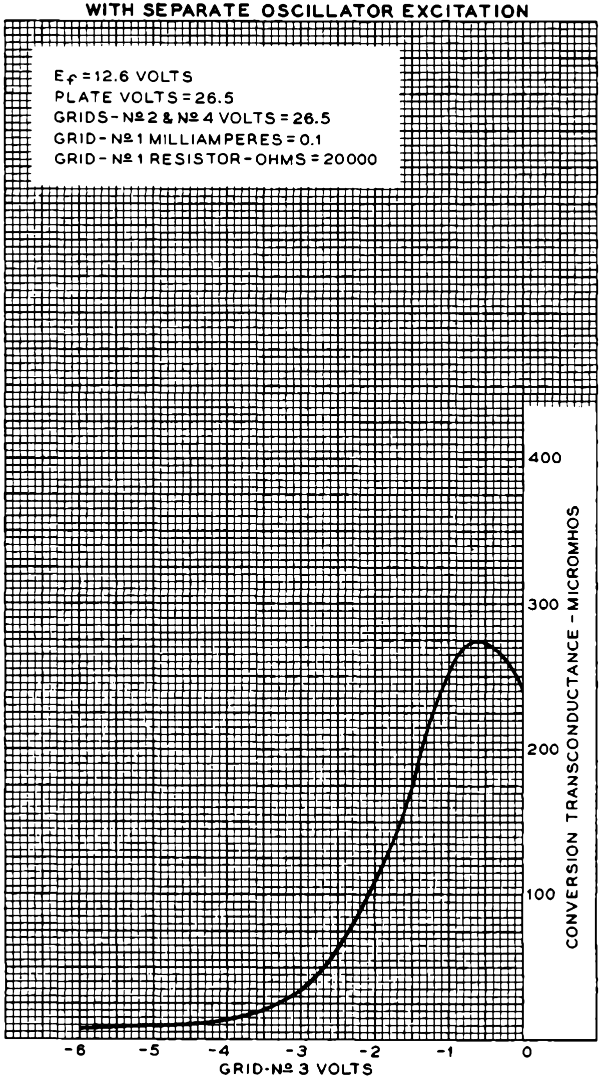
♦ With grid-No.3 bias of -6 volts.

° With grid-No.3 bias of -35 volts.

The curves under Type 6SA7 also apply to the 12SY7.

RCA

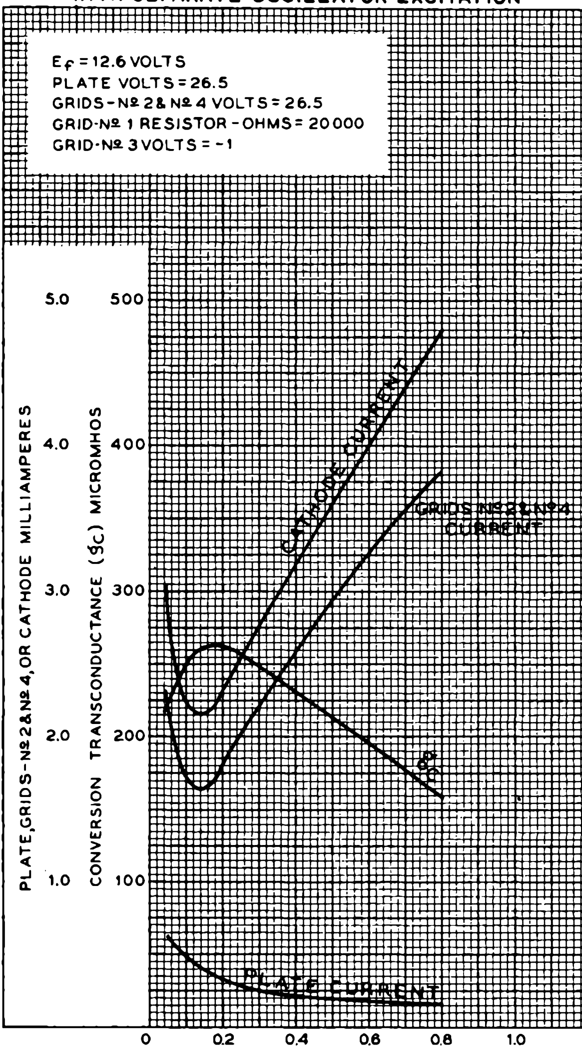
12SY7
OPERATION CHARACTERISTICS
WITH SEPARATE OSCILLATOR EXCITATION



RCA

12SY7

OPERATION CHARACTERISTICS
WITH SEPARATE OSCILLATOR EXCITATION



RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

26A6

R-F AMPLIFIER PENTODE

MINIATURE REMOTE-CUTOFF TYPE

For use with 12-cell storage-battery supply

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage	26.5	ac or dc volts
Current	0.07	amp

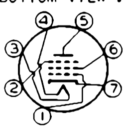
Direct Interelectrode Capacitances:[o]

Grid No.1 to Plate	0.0035 max.	μμf
Input	6.0	μμf
Output	5.0	μμf

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-1/8"
Maximum Seated Length	1-7/8"
Length from Base Seat to Bulb Top (excluding tip)	1-1/2" ± 3/32"
Maximum Diameter	3/4"
Bulb	T-5-1/2
Base	Miniature Button 7-Pin
Basing Designation for BOTTOM VIEW	$7BK_1$

Pin 1 - Grid No.1
Pin 2 - Grid No.3, Internal Shield
Pin 3 - Heater



Pin 4 - Heater
Pin 5 - Plate
Pin 6 - Grid No.2
Pin 7 - Cathode

CLASS A_1 AMPLIFIER

Maximum Ratings, ***Design-Center Values:***

PLATE VOLTAGE	250 max.	volts
GRID-No.2 (SCREEN) VOLTAGE	100 max.	volts
GRID-No.2 SUPPLY VOLTAGE	250 max.	volts
PLATE DISSIPATION	3 max.	watts
GRID-No.2 DISSIPATION	0.4 max.	watt
GRID-No.1 (CONTROL GRID) VOLTAGE:		
Negative bias value	50 max.	volts
Positive bias value	0 max.	volts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	90 max.	volts
Heater positive with respect to cathode	90 max.	volts

Typical Operation and Characteristics:

Plate Voltage	26.5	250	volts
Grid No.3 (Suppressor)	Connected to cathode at socket		
Grid-No.2 Voltage	26.5	100	volts
Grid-No.1 Voltage:			
From a grid-No.1 resistor of	2	-	megohms
From a cathode resistor of	-	125	ohms

[o] with external shield connected to cathode.

26A6

R-F AMPLIFIER PENTODE

Plate Resistance (Approx.). . . .	0.25	1.0	megohms
Transconductance.	2000	4000	µmhos
Grid-No.1 Bias (Approx.) for transconductance of 40 µmhos	-	-25	volts
Grid-No.1 Bias (Approx.) for transconductance of 20 µmhos	-8	-	volts
Plate Current	1.7	10.5	ma.
Grid-No.2 Current	0.7	4.0	ma.

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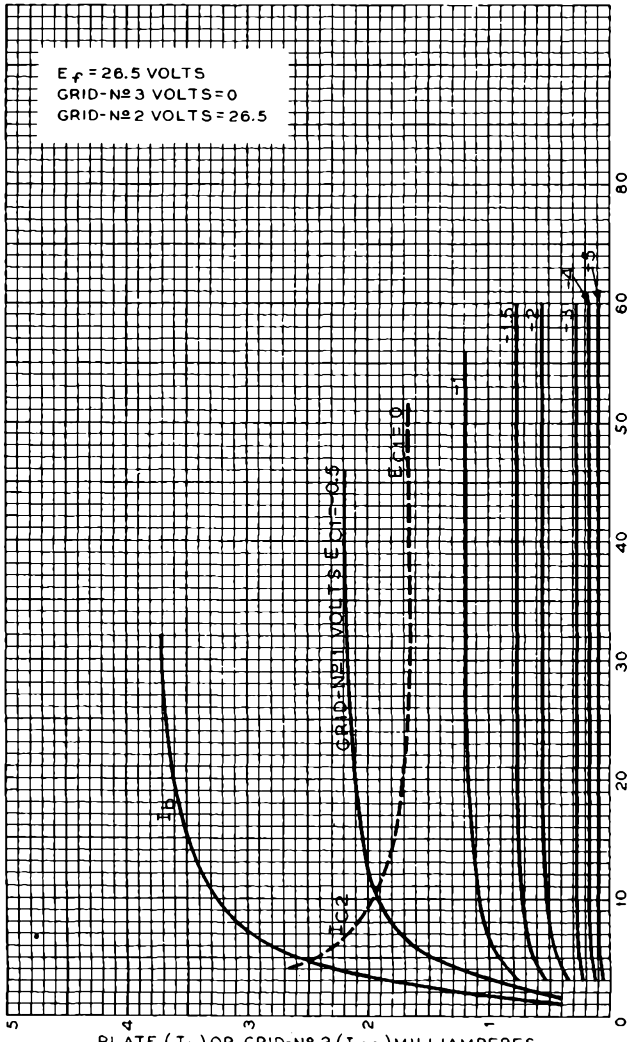
RCA

26A6

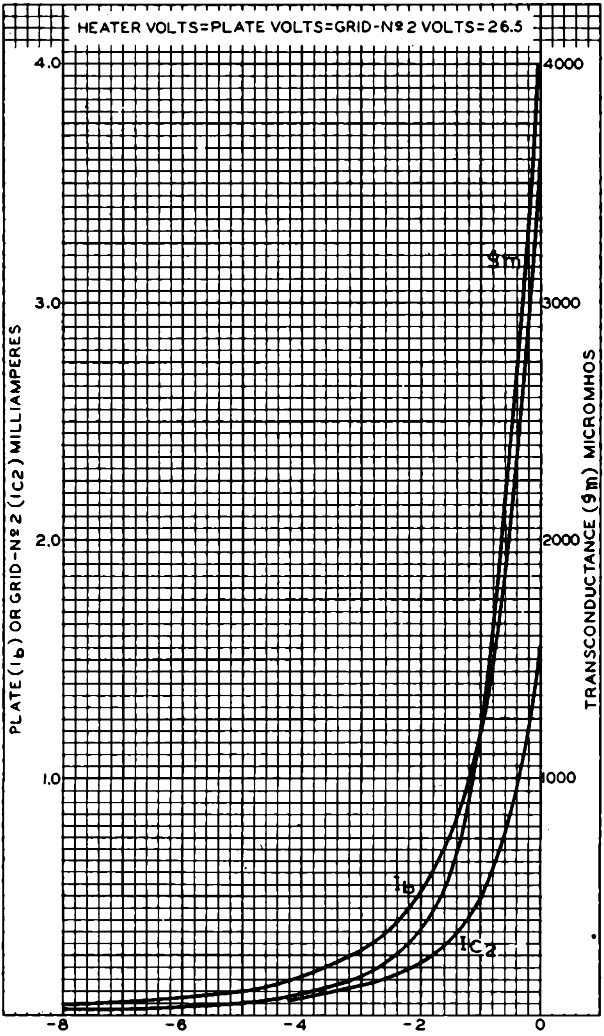
AVERAGE PLATE CHARACTERISTICS



26A6

26A6

AVERAGE CHARACTERISTICS



JUNE 25,1946

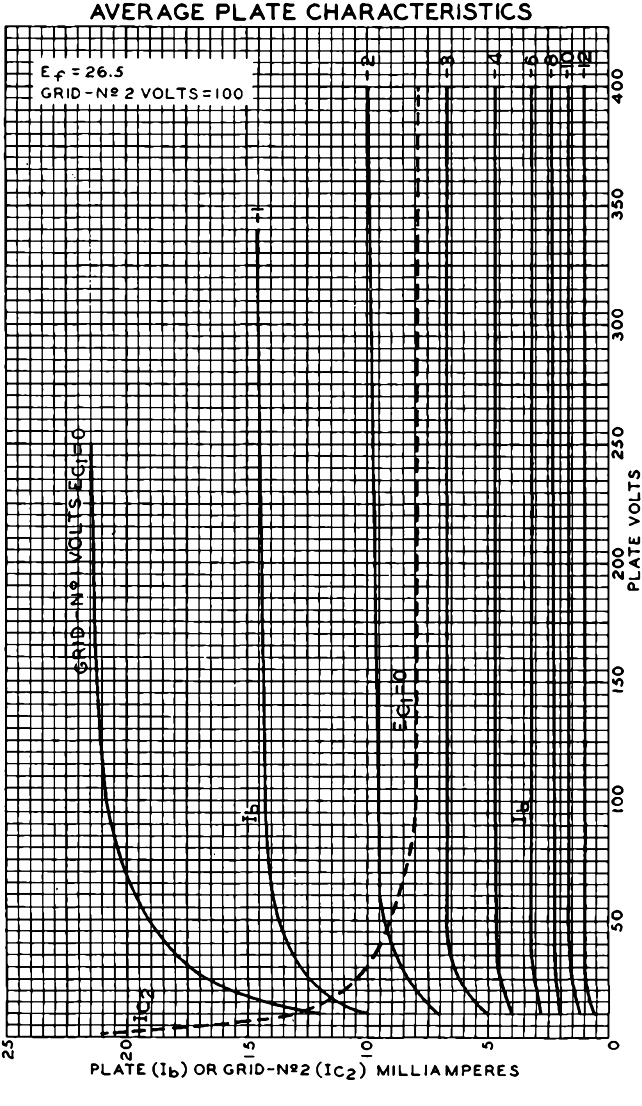
TUBE DIVISION

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6778

26A6

26A6



JULY 18, 1946

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6784

RCA

26A7-GT

TWIN BEAM POWER TUBE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage	26.5	ac or dc volts
Current	0.6	amp

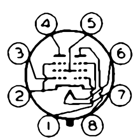
Direct Interelectrode Capacitances (Approx.):°

Grid No.1 to plate▲	1.2	μμf
Grid No.1 to cathode & grid No.3, grid No.2, and heater▲	16	μμf
Plate to cathode & grid No.3, grid No.2, and heater▲	13	μμf
Grid No.1 of unit No.1 to grid No.1 of unit No.2	0.2	μμf
Plate of unit No.1 to plate of unit No.2	0.2	μμf
Grid No.1 of unit No.1 to plate of unit No.2	0.2	μμf
Grid No.1 of unit No.2 to plate of unit No.1	0.2	μμf

Mechanical:

Mounting Position	Any
Maximum Overall Length	3-13/16"
Maximum Seated Length	3-1/4"
Maximum Diameter	1-9/32"
Bulb	T-9
Base	Intermediate-Shell Octal 8-Pin (JETEC No.B8-6), or Short Intermediate-Shell Octal 8-Pin (JETEC No.B8-58)
Basing Designation for BOTTOM VIEW	8BU

Pin 1 - Grid No.1 of Unit No.1
Pin 2 - Cathode, Grid No.3 of Units No.1 & No.2
Pin 3 - Grid No.1 of Unit No.2



Pin 4 - Plate of Unit No.2
Pin 5 - Grid No.2 of Units No.1 & No.2
Pin 6 - Heater
Pin 7 - Heater
Pin 8 - Plate of Unit No.1

AMPLIFIER - Class A_1

Values are for Each Unit

Maximum Ratings, *Design-Center Values*:

PLATE VOLTAGE	50 max.	volts
GRID-No.2 (SCREEN) VOLTAGE	50 max.	volts
PLATE DISSIPATION	2 max.	watts

° Without external shield.
▲ Each unit.

← Indicates a change.

RCA

26A7-GT

TWIN BEAM POWER TUBE

GRID-No.2 INPUT	0.5	max.	watt
→ PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	90	max.	volts
Heater positive with respect to cathode	90	max.	volts

→ **Typical Operation and Characteristics (Each unit):**

Plate Voltage	26.5	volts
Grid-No.2 Voltage	26.5	volts
Grid-No.1 (Control-Grid) Voltage	-4.5	volts
Peak AF Grid-No.1 Voltage	4.5	volts
Zero-Signal Plate Current	20	ma
Max.-Signal Plate Current	20.5	ma
Zero-Signal Grid-No.2 Current	1.9	ma
Max.-Signal Grid-No.2 Current	5.5	ma
Transconductance	5700	μmhos
Load Resistance	1500	ohms
Total Harmonic Distortion	7	%
Max.-Signal Power Output	180	mw

→ **Maximum Circuit Values:**

Grid-No.1-Circuit Resistance:			
For maximum rated conditions:			
With cathode bias	0.5	max.	megohm
With fixed bias	0.1	max.	megohm
For conditions where the maximum design values of plate voltage and grid-No.2 voltage do not exceed 26.5 volts:			
With grid-resistor bias	0.5	max.	megohm

AF POWER AMPLIFIER - Class AB_1

Unless otherwise specified, values are on a Per-Tube Basis

Maximum Ratings, *Design-Center Values*:

PLATE VOLTAGE	50	max.	volts
GRID-No.2 (SCREEN) VOLTAGE	50	max.	volts
PLATE DISSIPATION (Per unit)	2	max.	watts
GRID-No.2 INPUT (Per unit)	0.5	max.	watt
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	90	max.	volts
Heater positive with respect to cathode	90	max.	volts

Typical Push-Pull Operation:

Plate Voltage	26.5	volts
Grid-No.2 Voltage	26.5	volts
Grid-No.1 (Control-Grid) Voltage	-7	volts
Peak AF Grid-No.1-to-Grid No.1 Voltage	14	volts
Zero-Signal Plate Current	19	ma

→ Indicates a change.

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

26A7-GT

TWIN BEAM POWER TUBE

Max.-Signal Plate Current.	30	ma
Zero-Signal Grid-No.2 Current (Approx.). .	2	ma
Max.-Signal Grid-No.2 Current (Approx.). .	8.5	ma
Effective Load Resistance (Plate to plate)	2500	ohms
Total Harmonic Distortion.	5	%
Max.-Signal Power Output	500	mw

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:		
For maximum rated conditions:		
With cathode bias.	0.5 max.	megohm
With fixed bias.	0.1 max.	megohm
For conditions where the maximum design values of plate voltage and grid-No.2 voltage do not exceed 26.5 volts:		
With grid-resistor bias.	0.5 max.	megohm

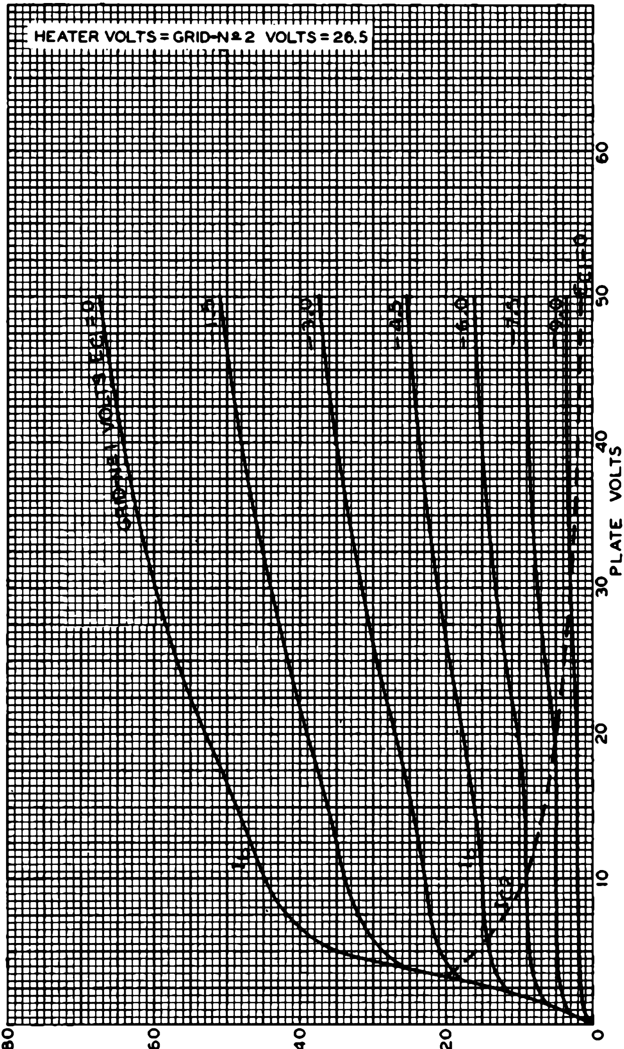
→ Indicates a change.

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

26A7-GT

26A7-GT

AVERAGE PLATE CHARACTERISTICS
EACH UNIT-PENTODE CONNECTION



JAN. 3, 1955

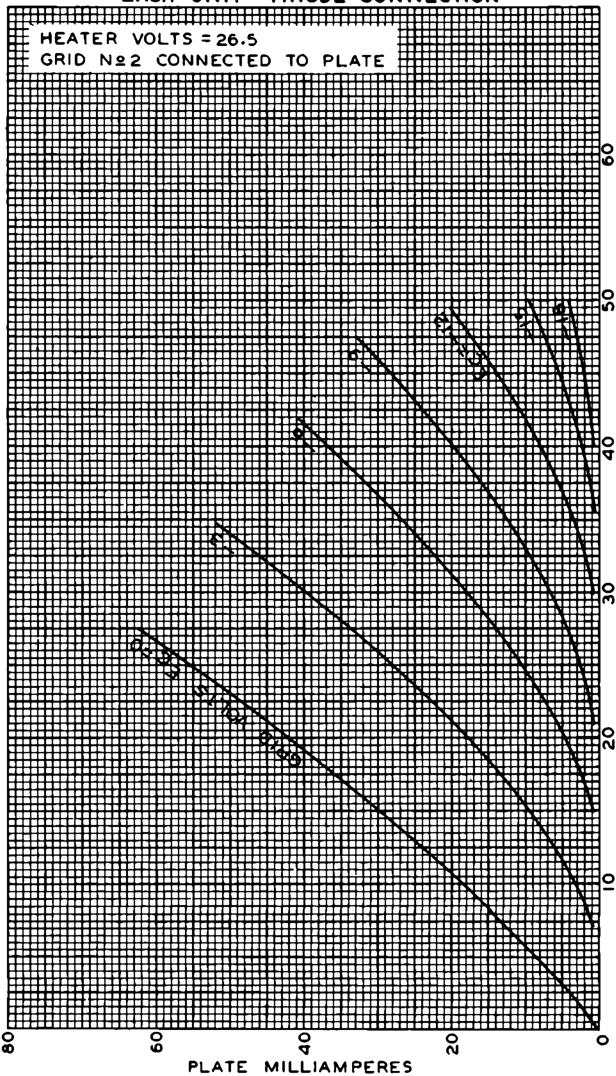
TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6509R1

26A7-GT

26A7-GT

AVERAGE PLATE CHARACTERISTICS
EACH UNIT - TRIODE CONNECTION



MAR. 24, 1945

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

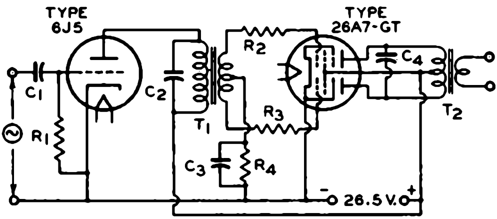
92CM-6510

RCA

26A7-GT

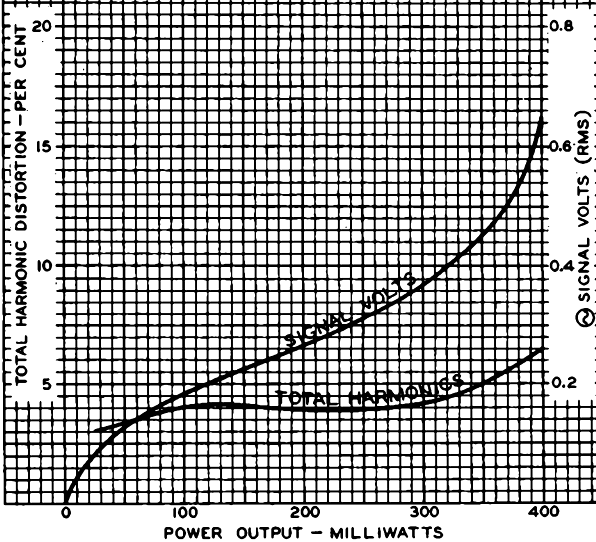
OPERATION CHARACTERISTICS
PUSH-PULL CIRCUIT

HEATER VOLTS = 26.5



C_1, C_4 = 0.01 μf
C_2 = 0.002 μf
C_3 = 1.0 μf
R_1 = 2.2 MEGOHMS
R_2, R_3 = 100 OHMS
R_4 = 0.2 MEGOHM

T_1 = INTERSTAGE COUPLING TRANSFORMER: TURNS RATIO (PRIMARY TO 1/2 SECONDARY) = 3:1
T_2 = OUTPUT TRANSFORMER: PLATE-TO-PLATE LOAD, 2000 OHMS



MAR. 21, 1945 | TUBE DIVISION | 92CM-6579

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

26C6

RCA 26C6

DUPLEX-DIODE TRIODE

MINIATURE TYPE

For use with 12-cell storage-battery supply

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage	26.5	ac or dc volts
Current	0.07	amp

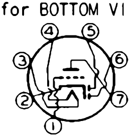
Direct Interelectrode Capacitances:°

Triode Unit:	Grid to Plate	2.0	μμf
	Grid to Cathode & Heater	1.8	μμf
	Plate to Cathode & Heater	1.4	μμf

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-1/8"
Maximum Seated Length	1-7/8"
Length from Base Seat to Bulb Top (excluding tip)	1-1/2" ± 3/32"
Maximum Diameter	3/4"
Bulb	T-5-1/2
Base	Miniature Button 7-Pin
Basing Designation for BOTTOM VIEW	7BT

Pin 1 - Triode Grid
Pin 2 - Cathode
Pin 3 - Heater
Pin 4 - Heater



Pin 5 - Diode Plate No.2
Pin 6 - Diode Plate No.1
Pin 7 - Triode Plate

TRIODE UNIT - Class A_1 AMPLIFIER

Maximum Ratings, ***Design-Center Values:***

PLATE VOLTAGE	250 max.	volts
PLATE DISSIPATION	2.5 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	90 max.	volts
Heater positive with respect to cathode	90 max.	volts

Characteristics:

Plate Voltage	26.5	250	volts
Grid Voltage:			
From a fixed supply of	–	-9	volts
From a grid resistor of	2.0	–	megohms
Amplification Factor	17	16	
Plate Resistance	15500	8500	ohms
Transconductance	1100	1900	μmhos
Plate Current	1.1	9.5	ma.

Typical Operation with Resistance Coupling:

See RESISTANCE-COUPLED AMPLIFIER CHART, Type 6R7.

° With external shield connected to cathode. Values are approximate.

RCA

26C6

DUPLEX-DIODE TRIODE

DIODE UNITS - Two

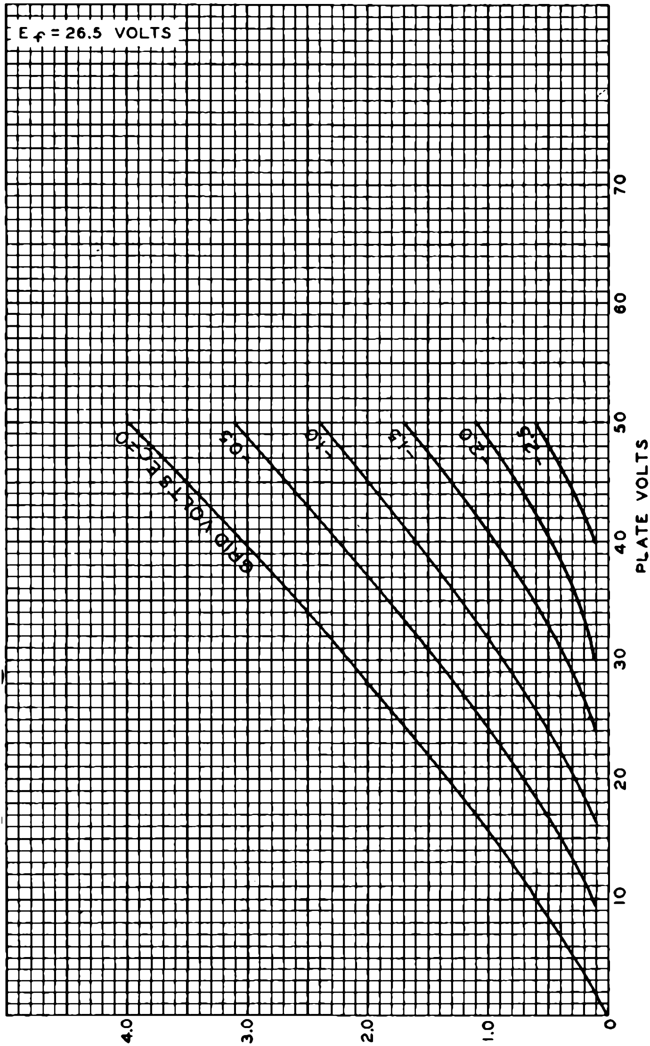
The two diode plates are placed around a cathode, the sleeve of which is common to the triode unit. Each diode plate has its own base pin. Diode curves in the front of the RECEIVING TUBE SECTION apply to the 26C6.

Additional curves applying to the 26C6 are shown under Types 6R7, and 6SR7

26C6

26C6

AVERAGE PLATE CHARACTERISTICS



JUNE 10,1946 | TUBE DEPARTMENT | 92CM-6772

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

RCA

26D6

26D6

PENTAGRID CONVERTER

MINIATURE TYPE

For use with 12-cell storage-battery supply

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage	26.5	ac or dc volts
Current	0.07	amp

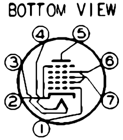
Direct Interelectrode Capacitances:

Grid #3 to All Other Electrodes (RF Input)	7.5●	μμf
Plate to All Other Electrodes (Mixer Output)	14●	μμf
Grid #1 to All Other Electrodes (Osc. Input)	5.8●	μμf
Grid #3 to Plate	0.30 max.●	μμf
Grid #1 to Grid #3	0.15 max.●	μμf
Grid #1 to Plate	0.03 max.●	μμf
Grid #1 to External Shield and All Other Electrodes Except Cathode & Grid No.5	2.9	μμf
Grid #1 to Cathode & Grid #5	2.8▲	μμf
Cathode to External Shield and All Other Electrodes Except Grid #1	15.5	μμf

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-1/8"
Maximum Seated Length	1-7/8"
Length from Base Seat to Bulb Top (excluding tip)	1-1/2" ± 3/32"
Maximum Diameter	3/4"
Bulb	T-5-1/2
Base	Miniature Button 7-Pin
Basing Designation for BOTTOM VIEW	7CH

Pin 1 - Grid No.1
Pin 2 - Cathode, Grid No.5
Pin 3 - Heater
Pin 4 - Heater



Pin 5 - Plate
Pin 6 - Grid No.2, Grid No.4
Pin 7 - Grid No.3

CONVERTER

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	300 max.	volts
GRIDS-No.2 & No.4 (SCREEN) VOLTAGE	100 max.	volts
GRIDS-No.2 & No.4 SUPPLY VOLTAGE	300 max.	volts
PLATE DISSIPATION	1.0 max.	watt
GRIDS-No.2 & No.4 DISSIPATION	1.0 max.	watt
TOTAL CATHODE CURRENT	14 max.	ma.
GRID-No.3 (CONTROL GRID) VOLTAGE:		
Negative bias value	50 max.	volts
Positive bias value	0 max.	volts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	90 max.	volts
Heater positive with respect to cathode	90 max.	volts

● With external shield connected to cathode.
▲ With external shield connected to other electrodes.

26D6

26D6

PENTAGRID CONVERTER

Characteristics - *Separate Excitation:* ◘

Plate Voltage	26.5	100	250	volts
Grids-No.2 & No.4 Voltage	26.5	100	100	volts
Grid-No.3 Voltage	-0.5	-1.5	-1.5	volts
Grid-No.1 (Oscillator-Grid) Resistor	20000	20000	20000	ohms
Plate Resistance (Approx.)	–	0.5	1.0	megohm
Conversion Transconductance	270	455	475	μmhos
Conversion Transconductance (Approx.)*	–	4	4	μmhos
Conversion Transconductance (Approx.)**	8	–	–	μmhos
Plate Current	0.45	2.8	3.0	ma.
Grids-No.2 & No.4 Current	1.6	8.0	7.8	ma.
Grid-No.1 Current	0.1	0.5	0.5	ma.
Total Cathode Current	2.15	11.3	11.3	ma.

Characteristics of Oscillator Section:▲

Plate Voltage	26.5	100	volts
Grids-No.2 & No.4 Voltage	26.5	100	volts
Grid-No.3 Voltage	0	0	volts
Grid-No.1 Voltage	0	0	volts
Amplification Factor	–	22	
Transconductance	4500	7200	μmhos
Plate Current	5.5	27	ma.

◘ The characteristics shown with separate excitation correspond very closely with those obtained in a self-excited oscillator circuit operating with zero bias.

* With grid-No.3 bias of -30 volts.

** With grid-No.3 bias of -6 volts.

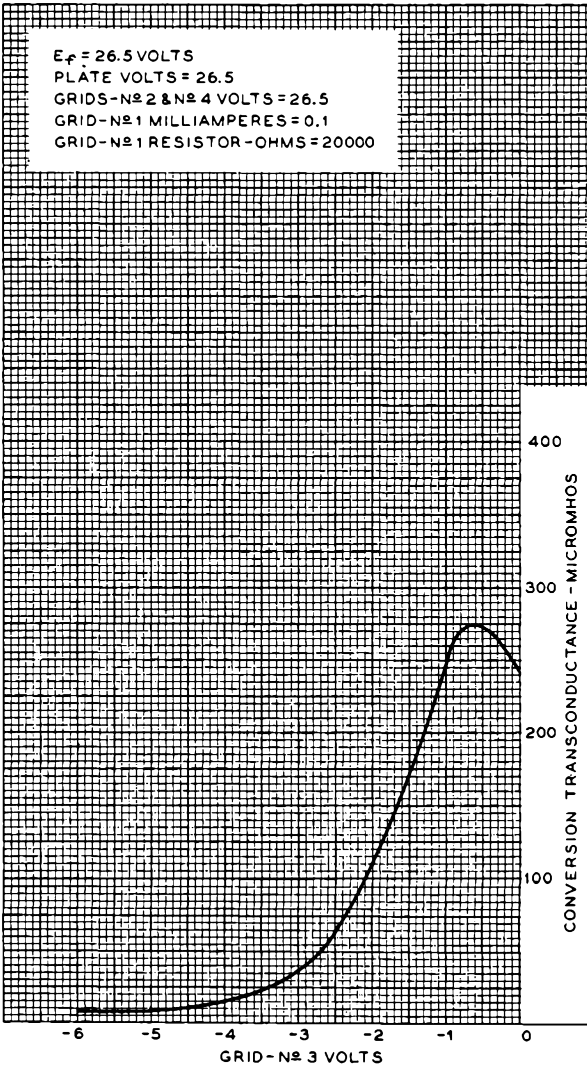
▲ Measured between grid No.1 and grids-No.2 and No.4 connected to plate (not oscillating).

The curves under Type 6BE6 also apply to the 26D6

RCA

26D6

OPERATION CHARACTERISTICS
WITH SEPARATE OSCILLATOR EXCITATION



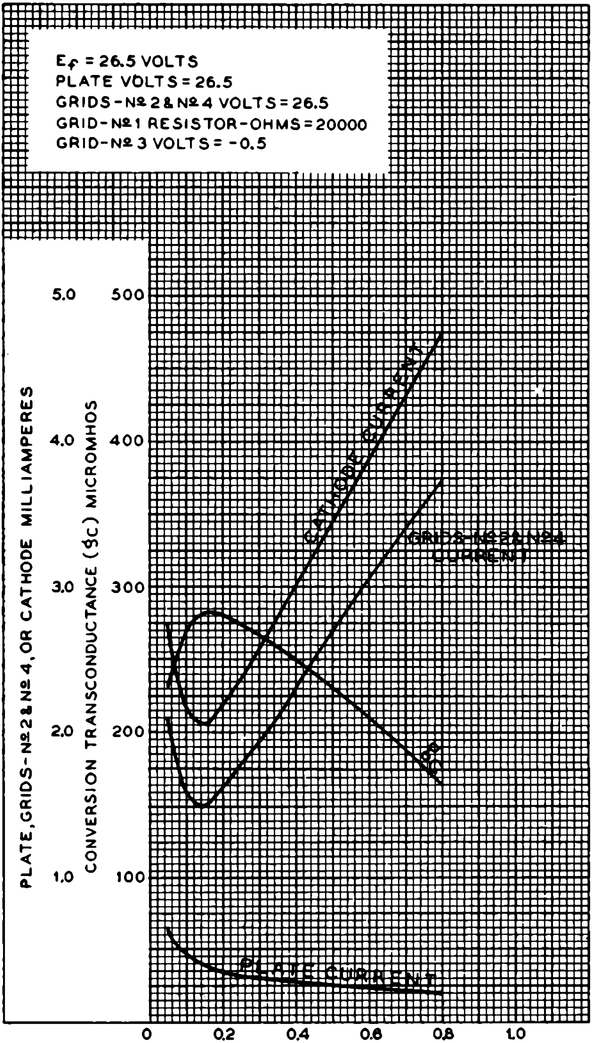
JULY 31, 1946

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6789

26D6

26D6
OPERATION CHARACTERISTICS
WITH SEPARATE OSCILLATOR EXCITATION



RCA

579-B

579-B

HALF-WAVE HIGH-VACUUM RECTIFIER

DATA

Electrical:

Filament, Thoriated Tungsten:

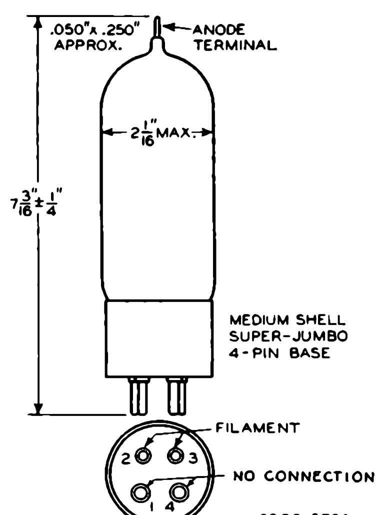
Voltage	2.5 ± 5%	volts
Current	6	amp

Mechanical:

Mounting Position	Vertical
Overall Length	7-3/16" ± 1/4"
Maximum Diameter	2-1/16"
Bulb	T-16
Bulb Terminal	See Outline Drawing
Base	Medium Shell Super-Jumbo 4-Pin

Maximum Ratings, Absolute Values:

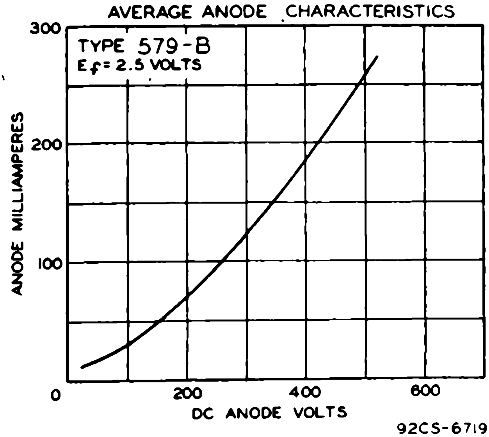
PEAK INVERSE ANODE VOLTAGE	20000 max.	volts
PEAK ANODE CURRENT	270 max.	ma.
AVERAGE ANODE CURRENT	25 max.	ma.
AMBIENT AIR TEMPERATURE	50 max.	°C
BULB TEMPERATURE	75 max.	°C



579-B

579-B

HALF-WAVE HIGH-VACUUM RECTIFIER



864

AMPLIFIER

LOW MICROPHONIC DESIGN

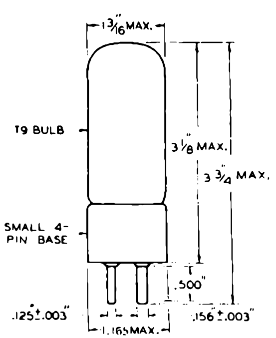
Filament	Coated	
Voltage	1.1	d-c volts
Current	0.25	amp.
Direct Interelectrode Capacitances:		
Grid to Plate	5.3	μμf
Grid to Filament	3.3	μμf
Plate to Filament	2.1	μμf
Maximum Overall Length		3-3/4"
Maximum Diameter		1-3/16"
Bulb		T-9
Base		Small 4-Pin

AMPLIFIER - Class A

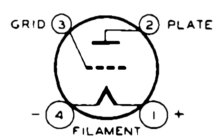
Operating Conditions and Characteristics:

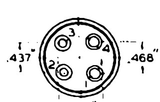
Filament Voltage	1.1	1.1	d-c volts
Plate Voltage	90	135 max.	volts
Grid Voltage	-4.5	-9	volts
Amplification Factor	8.2	8.2	
Plate Resistance	13500	12700	ohms
Mutual Conductance	610	645	μmhos
Plate Current	2.9	3.5	ma.

If a grid-coupling resistor is used, its maximum value should not exceed 2.0 megohms.



TUBE SYMBOL & TOP VIEW OF SOCKET CONNECTIONS





BOTTOM VIEW OF BASE

92C-451R3

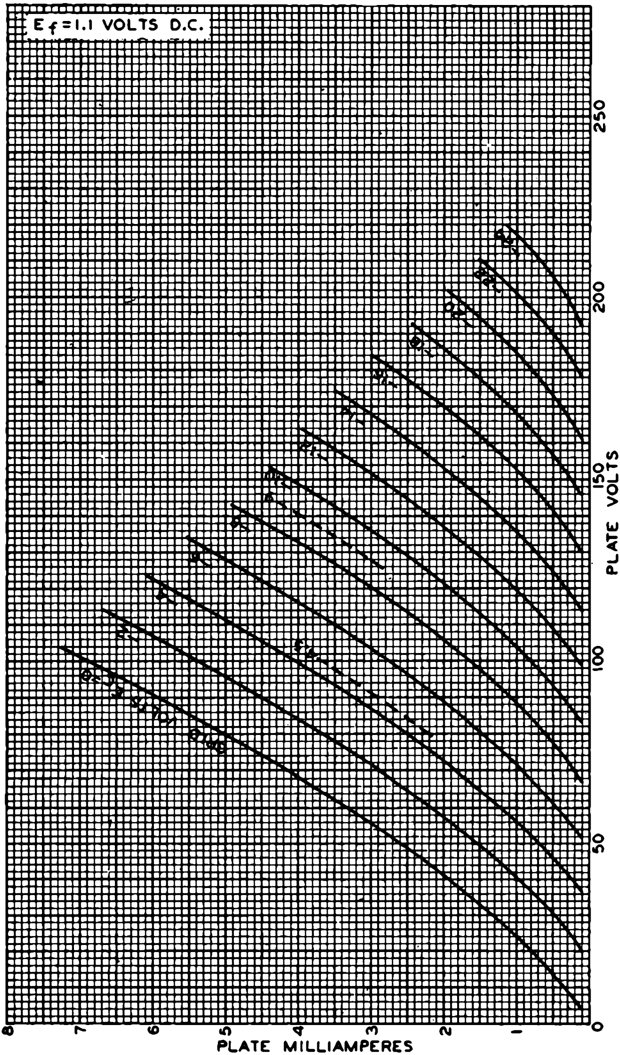
MAR. 20, 1936 DATA

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY INC.

864

864

AVERAGE PLATE CHARACTERISTICS



RCA

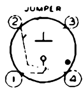
874

874

VOLTAGE REGULATOR

GLOW DISCHARGE

Cathode	Cold
Maximum Overall Length	5-3/8"
Maximum Seated Height	4-3/4"
Maximum Diameter	2-1/16"
Bulb	ST-16
Base	Medium 4-Pin Bayonet
Pin 1 - Cathode	Pin 3 - Anode
Pin 2 - Jumper●	Pin 4 - Jumper●
Mounting Position	Any



BOTTOM VIEW (4S)

Maximum and Minimum Ratings Are Absolute Values

REGULATOR SERVICE

D-C Anode Supply Voltage*	130 min.	volts
D-C Operating Current (Continuous)	50 max.	ma.
	10 min.	ma.
Ambient Temperature Range	-55 to +90	^{o}C
Characteristics:		
D-C Starting Voltage (Approx.)	115	volts
D-C Operating Voltage (Approx.)	90	volts
D-C Operating Current (Continuous)	10 to 50	ma.
Regulation (10 to 50 ma.)	7	volts

● With suitable socket connections, jumper within base acts as switch to open power-supply circuit when voltage regulator tube is removed from socket.

* Not less than indicated supply voltages should be provided to insure "starting" throughout tube life.

Sufficient resistance must always be used in series with this type to limit the current through the tube to 50 milliamperes under continuous (steady state) operating conditions. During the interval of 5 to 10 seconds which may be required for the regulated tubes in associated equipment to warm up and draw plate current, a maximum current of 100 milliamperes is permissible provided each such starting period is followed by a steady-state operating period of at least several minutes. Unless this precaution is observed, tube performance will be impaired.

In voltage-regulator tubes of the glow-discharge type, regulation is somewhat dependent on past operating conditions. For example, the regulation value of a tube operated for a protracted period at 10 milliamperes and then changed to 35 milliamperes, may be somewhat different from the value that will be obtained after a long period of operation at 50 milliamperes. Likewise, the regulation value may change somewhat after a long idle period.

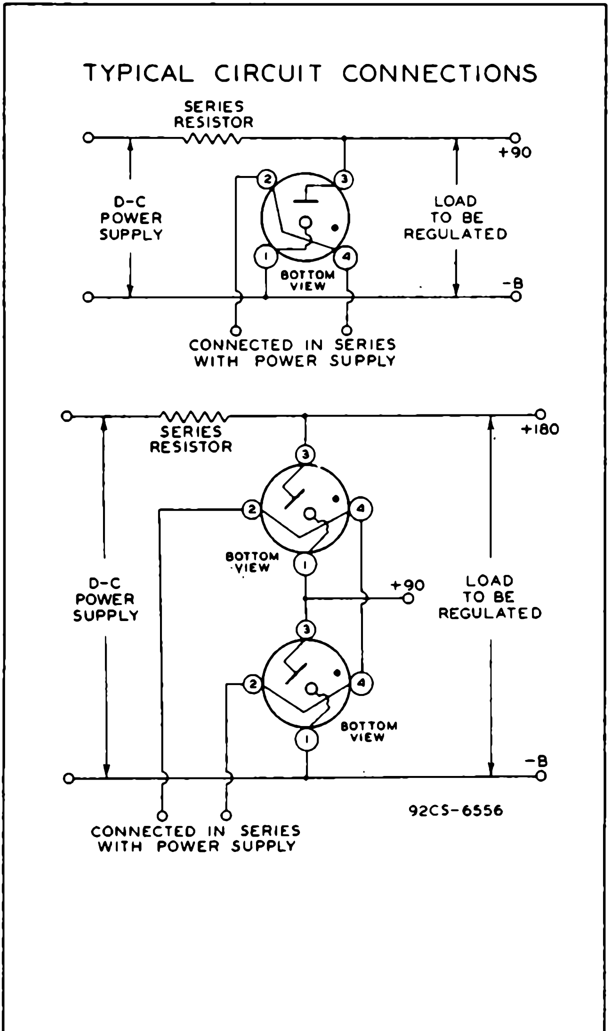
← Indicates a change.

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

874

874

VOLTAGE REGULATOR



878

HALF-WAVE HIGH-VACUUM RECTIFIER

FOR USE WITH CATHODE-RAY TUBES

Filament	Tungsten	
Voltage	2.5	a-c volts
Current	5.0	amp.
Overall Length		7" to 7-5/8"
Maximum Diameter		1-13/16"
Bulb		T-14
Cap		Medium Metal Skirted
Base		Medium 4-Pin

Operating Conditions:

Filament Voltage	2.5	a-c volts
A-C Plate Voltage (RMS)	7100 max.	volts
Peak Inverse Voltage	20000 max.	volts
D-C Output Current (Continuous)	5 max.	ma.

The 878 is for use in suitable rectifying devices to supply the d-c voltage requirements of cathode-ray tubes.

It is important that the filament transformer secondary be insulated to withstand the maximum peak inverse voltage encountered in the installation.

The *maximum peak plate current* of the 878 is limited by the available emission from the filament. In normal operation, the peak current is practically independent of the size of input filter condenser and is approximately 20 milliamperes.

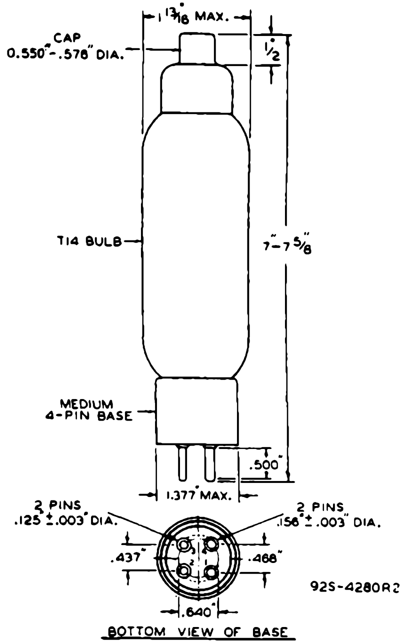
Filter requirements are ordinarily met by the use of a 0.5 to 2.0 µf condenser shunted across the bleeder circuit. The shunt condenser should have a rating sufficient to withstand the instantaneous peak value of the a-c input voltage. If this filtering is inadequate for a definite application, a two-section filter is recommended.

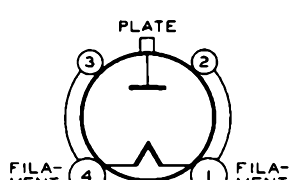
In a *voltage-doubler circuit*, two 878's may be operated to deliver approximately twice the voltage obtainable from a half-wave rectifier circuit for the same a-c input voltage. However, a separate filament-supply winding is required for each tube.

878

878

HALF-WAVE HIGH-VACUUM RECTIFIER





JAN. 15, 1936

DATA

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

954

DETECTOR AMPLIFIER PENTODE

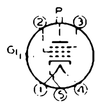
ACORN TYPE

Especially for wavelengths as short as 0.7 meter

Heater	Coated Unipotential Cathode	
Voltage	6.3	a-c or d-c volts
Current	0.15	amp.
Direct Interelectrode Capacitances:		
Grid to Plate●	0.007 max.	μμf
Input	3.4	μμf
Output	3.0	μμf
Overall Length		1-11/16" ± 3/16"
Overall Diameter		1-3/32" ± 1/16"
Bulb	*See Outline in GENERAL SECTION*	T-4½
End Terminals		Two
Base		Small Radial 5-Pin

Pin 1 - Heater
Pin 2 - Grid No.2
Pin 3 - Grid No.3
Pin 4 - Heater
Pin 5 - Cathode
P - Plate
G_1 - Grid No.1

RCA Socket	Stock No.9925
RCA Grid & Plate Clips	Stock No.9939
Mounting Position	Any



P is on Long Part of Bulb: Top
G_1 is on Short Part of Bulb: Bottom
BOTTOM VIEW (5BB)

Maximum and Minimum Ratings Are Design-Center Values

A-F AMPLIFIER

D-C Plate Voltage	250 max.	volts
D-C Screen (Grid No.2) Voltage	100 max.	volts
D-C Grid (No.1) Voltage	-3 min.	volts
Plate Dissipation	0.5 max.	watt
Screen Dissipation	0.1 max.	watt
D-C Heater-Cathode Potential	80 max.	volts

Characteristics— Class A_1 Amplifier:

D-C Plate Voltage	90	250	volts
Suppressor (Grid No.3)	Connected to cathode at socket		
D-C Screen Voltage	90	100	volts
D-C Grid Voltage■	-3	-3	volts
Plate Resistance	1.0	Greater than 1.0	megohm
Transconductance	1100	1400	μmhos
D-C Plate Current	1.2	2.0	ma.
D-C Screen Current	0.5	0.7	ma.

Typical Operation with Resistance-Coupling:

Plate-Supply Voltage○	250	volts
Suppressor	Connected to cathode at socket	
D-C Screen Voltage	50	volts
D-C Grid Voltage■	-2.1	volts
Load Resistance	0.25	megohm
D-C Plate Current	0.5	ma.
Second Harmonic Distortion	5	%
Voltage Output	40 to 50 RMS	volts
Voltage Gain	100 approx.	

●, ■, ○: See next page.

← Indicates a change.

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

DETECTOR AMPLIFIER PENTODE

(continued from preceding page)

DETECTOR

D-C Plate Voltage	250 max.	volts
D-C Screen (Grid No. 2) Voltage	100 max.	volts
→ D-C Heater-Cathode Potential	80 max.	volts
Typical Operation — Biased Detector:		
Plate-Supply Voltage°	250	volts
Suppressor (Grid No. 3)	Connected to cathode at socket	
D-C Screen Voltage	100	volts
D-C Grid (No. 1) Voltage	-6 approx.	volts
Load Resistance	0.25	megohm
D-C Plate Current	Adjusted to 0.1 ma. with no input signal	
Cathode Resistor	20000 to 50000	ohms

● With shield baffle.

■ Under maximum rated conditions, the resistance in the grid circuit should not exceed 0.5 megohm with fixed bias, or 1.0 megohm with cathode bias.

° This is a plate-supply voltage value. The voltage effective at the plate will be plate-supply voltage minus the voltage drop in load caused by the plate current.

R-f grounding by means of condensers placed close to the tube terminals is required if the full capabilities of the 954 for ultra-high-frequency uses are to be obtained. It is important in the cases of the plate and control-grid circuits that separate r-f grounding returns be made to a common point in order to avoid r-f inter-action through common return circuits. It may also be advisable in some applications to supplement the action of the by-pass condensers by r-f chokes placed close to the condensers in the return or supply lead for the grid, the screen, the suppressor, the plate, and the heater.

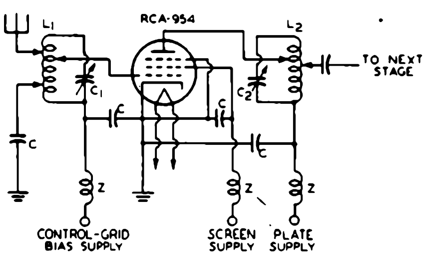
TYPICAL R-F AMPLIFIER CIRCUIT

For ultra-high frequencies, coils L1 and L2 may be tapped at suitable points determined by test to reduce effect of tube loading on circuit impedances.

Because electronic plate loading is not serious in a pentode, the use of coil L2 with tapped plate connection may not be necessary to give satisfactory results.

The condensers should all be of high quality and be designed for ultra-high frequency operation.

The license extended to the purchaser of tubes appears in the License Notice accompanying them. Information contained herein is furnished without assuming any obligations.



WAVE-LENGTH RANGE		2.75 TO 5.3 METERS APPROX.	1 TO 3 METERS APPROX.	0.8 METER APPROX.
L1, L2	TURNS	10	4	5
	WIRE	No 16 B.C.*	No 16 B.C.*	No 30 B.C.*
	OUTSIDE DIA.	3/8"	3/8"	1/8"
	LENGTH	3/4"	5/16"	1/8"
C1, C2 (VARIABLE)		3 TO 25 μμf	3 TO 25 μμf	3 TO 4 μμf
C		100 TO 500 μμf	100 TO 500 μμf	100 TO 500 μμf
Z	TURNS	15	15	15
	WIRE	No 30	No 30	No 30
	OUTSIDE DIA.	1/4"	1/4"	1/4"
	WINDING	S.L.°	S.L.°	S.L.°

92CM-4386R2

*B.C. = BARE COPPER °S.L. = SINGLE LAYER

→ Indicates a change. NOTE: THE ABOVE DATA ARE NECESSARILY APPROXIMATE

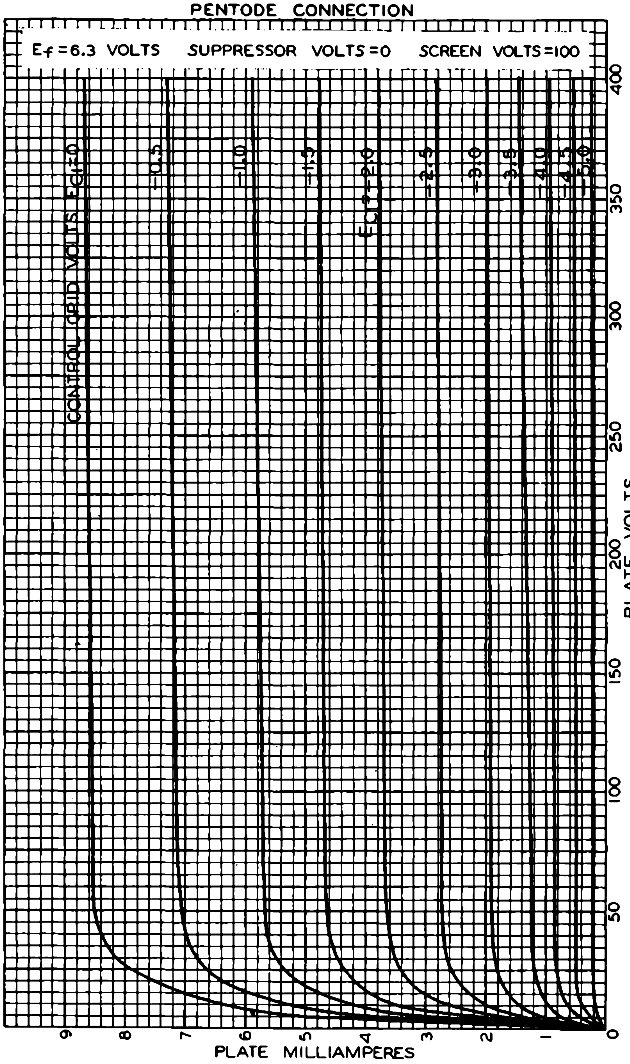
RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

954

RCA

954

AVERAGE PLATE CHARACTERISTICS
PENTODE CONNECTION



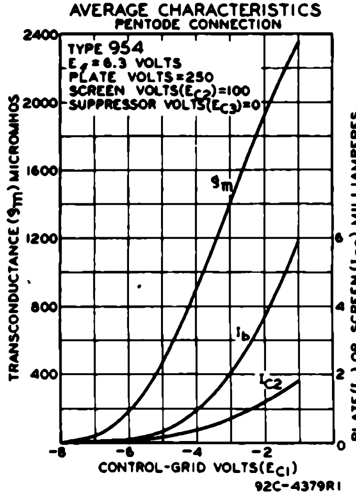
MAR. 11, 1935

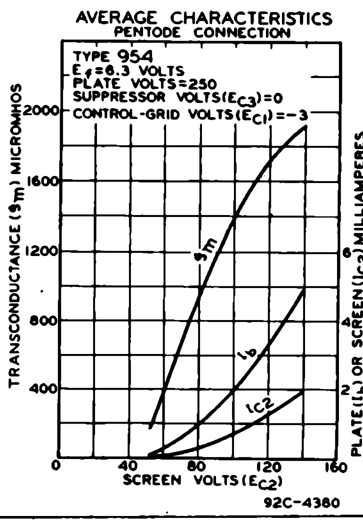
RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

92C-4378

954

CHARACTERISTICS CURVES





July 1, 1941

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

92C-4379R1
92C-4380

955

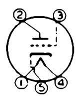
DETECTOR, AMPLIFIER, OSCILLATOR

ACORN TYPE

Especially for wavelengths between 0.5 meter and 5 meters

Heater	Coated Unipotential Cathode	
Voltage	6.3	a-c or d-c volts
Current	0.15	amp.
Direct Interelectrode Capacitances:●		
Grid to Plate	1.4	μμf
Grid to Cathode	1.0	μμf
Plate to Cathode	0.6	μμf
Overall Length		1-7/32" ± 5/32"
Overall Diameter		1-3/32" ± 1/16"
Bulb	*See Outline in GENERAL SECTION*	T-4½
Base	*See Outline in GENERAL SECTION*	Small Radial 5-Pin ←

Pin 1 - Heater
Pin 2 - Plate
Pin 3 - Grid
Pin 4 - Heater
Pin 5 - Cathode



RCA Socket — Stock No.9925
Mounting Position — Any

Short Part of Bulb: Bottom
BOTTOM VIEW (5BC)

Maximum Ratings Are Design-Center Values

A-F AMPLIFIER

D-C Plate Voltage	250 max.	volts
Plate Dissipation	1.6 max.	watts
D-C Heater-Cathode Potential	80 max.	volts ←

Typical Operation and Characteristics— Class A_1 Amplifier:

D-C Plate Voltage	90	135	180	250	volts
D-C Grid Voltage*	-2.5	-3.75	-5	-7	volts
Amplification Factor	25	25	25	25	
Plate Resistance	14700	13200	12500	11400	ohms
Transconductance	1700	1900	2000	2200	μmhos
D-C Plate Current	2.5	3.5	4.5	6.3	ma.
Load Resistance	-	-	20000	-	ohms
Second Harmonic Dist.	-	-	5	-	%
Power Output	-	-	135	-	mw

Typical Operation with Resistance-Coupling:

Plate-Supply Voltage°	180	volts
D-C Grid Voltage*	-3.5	volts
Load Resistance	250000	ohms
Plate Current	0.42	ma.
Second Harmonic Distortion	5	%
Voltage Output	45 RMS	volts
Voltage Gain	20 approx.	

R-F POWER AMPLIFIER & OSCILLATOR - Class C

Plate Modulated or C.W.

D-C Plate Voltage	180 max.	volts
D-C Plate Current	8 max.	ma.
D-C Grid Current	2 max.	ma.
D-C Heater-Cathode Potential	80 max.	volts ←

Typical Operation:

D-C Plate Voltage	180	volts
D-C Grid Voltage	-35 approx.	volts
D-C Plate Current	7	ma.

●, *, °: See next page.

← Indicates a change.

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

DETECTOR, AMPLIFIER, OSCILLATOR

(continued from preceding page)

D-C Grid Current	1.5 approx. ma.
Power Output**	0.5 approx. watt

DETECTOR

Typical Operation:	Biased	Grid-Leak	
Plate-Supply Voltage°	180	45	volts
Grid Voltage	-7 approx.	Grid Return to Cathode	volts
Load Resistance	0.25	-	megohm
Plate Current	Adjusted to 0.2 ma. approx. with no input signal.	-	ma.
Cathode Resistor	50000 approx.	-	ohms
Grid Leak	-	1 to 5	megohms
Grid Condenser	-	0.00025	μf

● With no external shield.

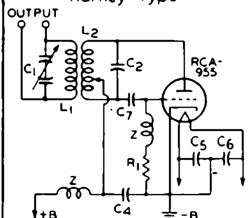
* Under maximum rated conditions, the resistance in the grid circuit should not exceed 0.1 megohm with fixed bias, or 0.5 megohm with cathode bias.

° This is a plate-supply voltage value. The voltage effective at plate will be plate-supply voltage minus the voltage drop in load caused by plate current.

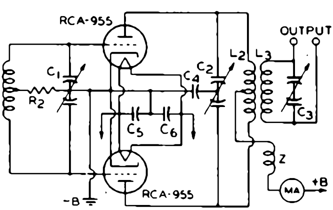
** At 5 meters. Only moderate reduction in this value will be found for wavelengths as low as 1 meter. Below 1 meter, the power output decreases as the wavelength is decreased.

R-F grounding by means of condensers placed close to the tube pins is required if the full capabilities of the 955 for ultra-high-frequency uses are to be obtained.

U-H-F OSCILLATOR
Hartley Type



PUSH-PULL U-H-F OSCILLATOR
Tuned-Plate Tuned-Grid Type



L_1C_1, L_2C_2, L_3C_3 = DEPEND ON FREQUENCY RANGE DESIRED 92CM-6558

$C_4, C_5, C_6 = 100 \mu\mu f$

$C_7 = 50 \mu\mu f$

R_1 = 20000 TO 25000 OHMS, 1/2 WATT

R_2 = 10000 TO 12500 OHMS, 1/2 WATT

Z = R-F CHOKE

 ← Indicates a change.

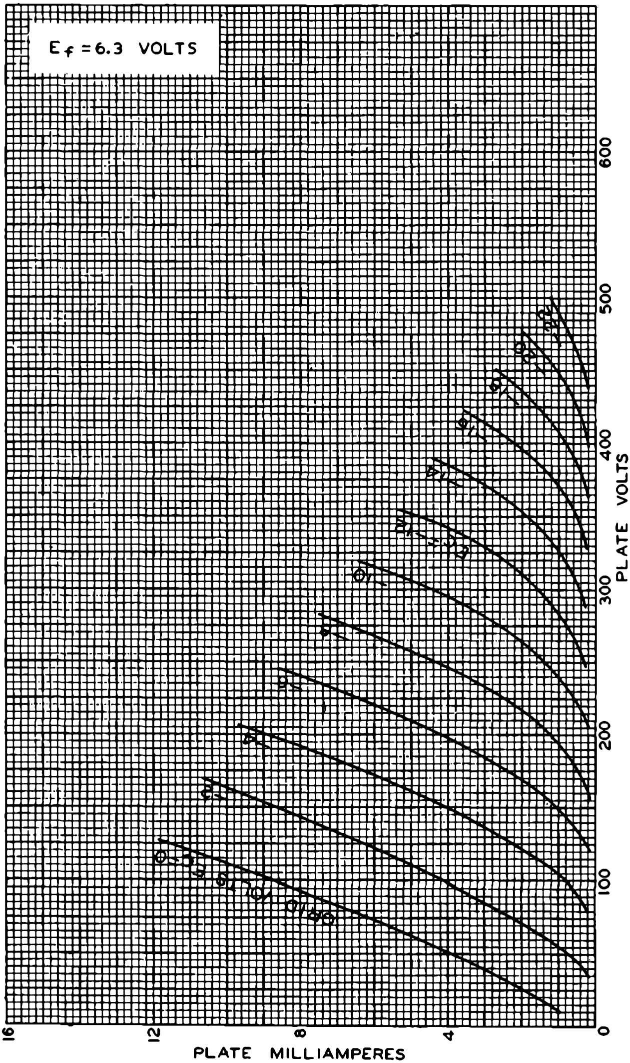
RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

955.

RCA

955

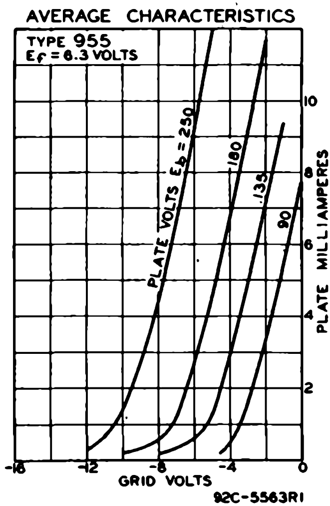
AVERAGE PLATE CHARACTERISTICS

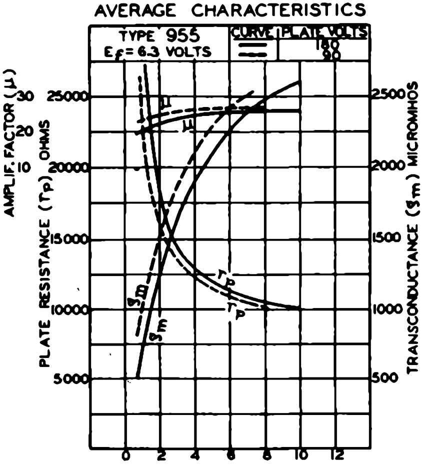


RCA

955

CHARACTERISTICS CURVES





July 1, 1941

92C-5563R1
92S-5564

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

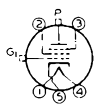
956

956
SUPER-CONTROL R-F AMPLIFIER PENTODE
ACORN TYPE

Especially for wavelengths as short as 0.7 meter

Heater	Coated Unipotential Cathode	
Voltage	6.3	a-c or d-c volts
Current	0.15	amp.
Direct Interelectrode Capacitances:		
Grid to Plate●	0.007 max.	μμf
Input	3.4	μμf
Output	3.0	μμf
Overall Length		1-11/16" ± 3/16"
Overall Diameter		1-3/32" ± 1/16"
Bulb	*See Outline in GENERAL SECTION*	T-4½
End Terminals		Two
Base		Small Radial 5-Pin

Pin 1 - Heater
Pin 2 - Grid No.2
Pin 3 - Grid No.3
Pin 4 - Heater
Pin 5 - Cathode
P - Plate
G_1 - Grid No.1



RCA Socket	Stock No.9925
RCA Grid & Plate Clips	Stock No.9939
Mounting Position	Any

P is on Long Part of Bulb: Top
G_1 is on Short Part of Bulb: Bottom
BOTTOM VIEW (5BB)

Maximum and Minimum Ratings Are Design-Center Values

AMPLIFIER

D-C Plate Voltage	250 max.	volts
D-C Screen (Grid No.2) Voltage	100 max.	volts
Grid (No.1) Voltage	-3 min.	volts
Plate Dissipation	1.7 max.	watts
Screen Dissipation	0.3 max.	watt
D-C Heater-Cathode Potential	80 max.	volts

Characteristics— Class A_1 Amplifier:

D-C Plate Voltage	250	volts
Suppressor (Grid No.3)	Connected to cathode at socket	
D-C Screen Voltage	100	volts
D-C Grid (No.1) Voltage*	-3	volts
Plate Resistance	0.7 approx.	megohm
Transconductance	1800	μmhos
Grid Bias for Transcond. of approx. 2 μmhos	-45	volts
D-C Plate Current	6.7	ma.
D-C Screen Current	2.7	ma.

MIXER— In Superheterodyne Circuit

D-C Plate Voltage		250 max.	volts
D-C Screen Voltage		100 max.	volts
D-C Heater-Cathode Potential		80 max.	volts
Typical Operation:			
D-C Plate Voltage	100	250	volts
Suppressor	Connected to cathode at socket		
D-C Screen Voltage	100	100	volts
D-C Grid Voltage	-10	-10 approx.	volts

The grid bias shown is minimum for an oscillator peak voltage of 9 volts. These values are optimum.

●,* :See next page.   ← Indicates a change.

JUNE 30, 1944   DATA

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

956

SUPER-CONTROL R-F AMPLIFIER PENTODE

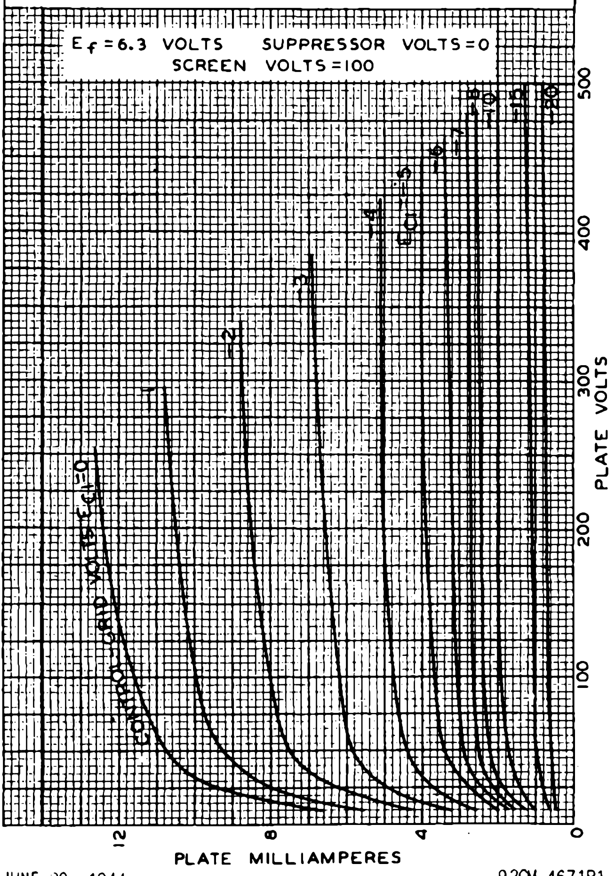
(continued from preceding page)

● With shield baffle.

* Under maximum rated conditions, the resistance in the grid circuit should not exceed 0.5 megohm with fixed bias, or 1.0 megohm with cathode bias.

Typical R-F Amplifier Circuit for the 956 is the same as that for Type 954.

AVERAGE PLATE CHARACTERISTICS



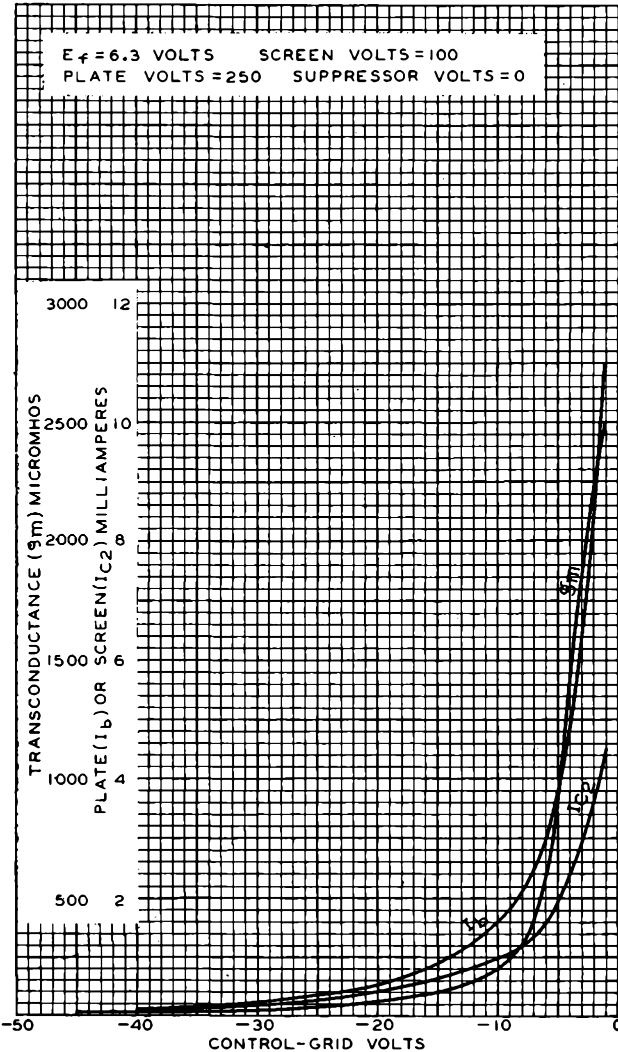
JUNE 30, 1944

92CM-4671R1

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

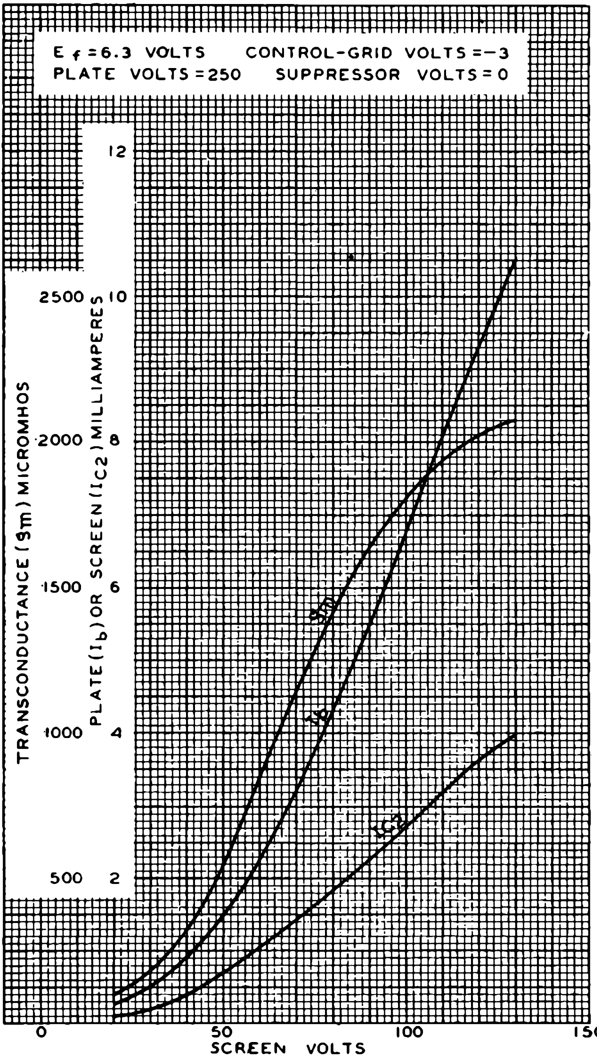
956

AVERAGE CHARACTERISTICS



956

AVERAGE CHARACTERISTICS



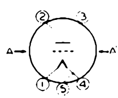
MAY 13, 1941 RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC. 92C-4673R1

957

DETECTOR, AMPLIFIER, OSCILLATOR

ACORN TYPE

Filament	Coated	
Voltage	1.25	d-c volts
Current	0.05	amp.
Direct Interelectrode Capacitances:°		
Grid to Plate	1.2	μμf
Grid to Filament	0.3	μμf
Plate to Filament	0.7	μμf
Overall Length		1-7/32" ± 5/32"
Overall Diameter		1-3/32" ± 1/16"
Bulb	*See Outline in GENERAL SECTION*	T-4½
Base		Small Radial 5-Pin ←
Pin 1 - Filament		Pin 5 - Filament -
Pin 2 - Plate		AA' - Plane of Electrodes
Pin 3 - Grid		
Pin 4 - Filament -		
RCA Socket		Stock No. 9925
Mounting Position		Vertical◊



Short Part of Bulb: Bottom

BOTTOM VIEW (5BD)

Maximum Ratings Are Design-Center Values

AMPLIFIER

D-C Plate Voltage	135 max.	volts
Characteristics — Class A_1 Amplifier:		
D-C Plate Voltage	135	volts
D-C Grid Voltage*	-5	volts
Amplification Factor	13.5	
Plate Resistance	20800 approx.	ohms
Transconductance	650	μmhos
D-C Plate Current	2	ma.

° With no external shield.

◊ Horizontal operation permitted if plane of electrodes is vertical (plate on edge).

* Under maximum rated conditions, the resistance in the grid circuit should not exceed 0.1 megohm with fixed bias, or 0.5 megohm with cathode bias.

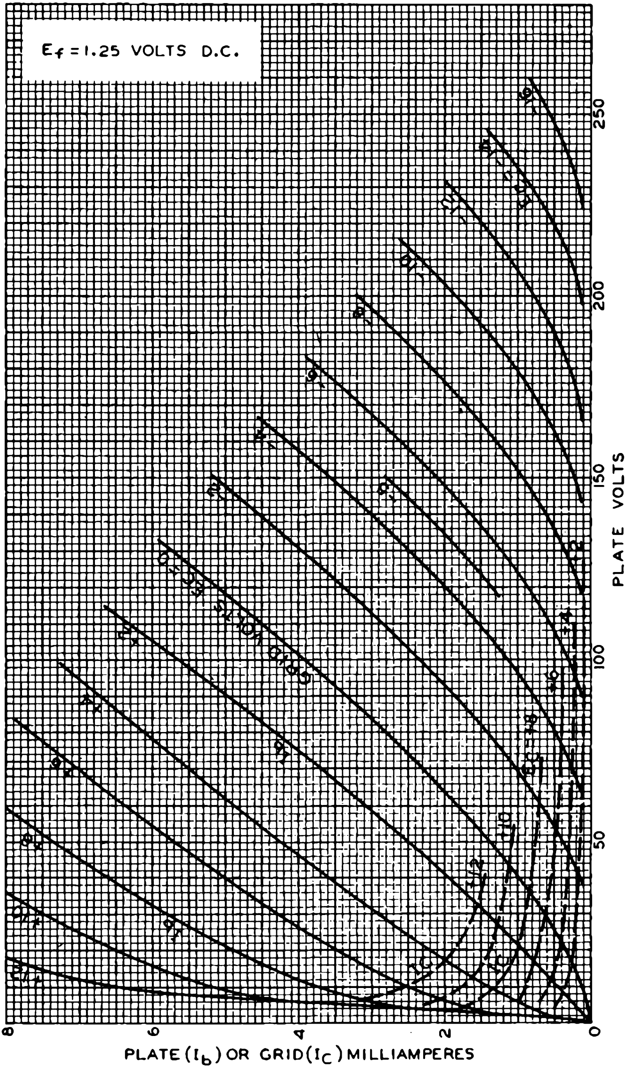
R-F grounding by means of condensers placed close to the tube pins is required if the full capabilities of the 957 for ultra-high-frequency uses are to be obtained.

← Indicates a change.

957

957

AVERAGE PLATE CHARACTERISTICS



JUNE 15, 1944

RCA VICTOR DIVISION

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6338R1

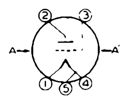
958-A

958-A

AMPLIFIER TRIODE
ACORN TYPE

Filament	Coated	
Voltage	1.25	d-c volts
Current	0.10	amp.
Direct Interelectrode Capacitances:°		
Grid to Plate	2.6	μμf
Grid to Filament	0.6	μμf
Plate to Filament	0.8	μμf
Overall Length		1-7/32" ± 5/32"
Overall Diameter		1-3/32" ± 1/16"
Bulb	*See Outline in GENERAL SECTION*	T-4½
Base		Small Radial 5-Pin

Pin 1 - Filament +
Pin 2 - Plate
Pin 3 - Grid
Pin 4 - Filament -
Pin 5 - Filament -
AA' - Plane of Electrodes



Short Part of Bulb: Bottom
BOTTOM VIEW (5BD)

RCA Socket	Stock No. 9925
Mounting Position	Vertical◊

Maximum Ratings Are Design-Center Values

A-F AMPLIFIER

D-C Plate Voltage	135 max.	volts
D-C Plate Current	5 max.	ma.
Plate Dissipation	600 max.	mw
Characteristics — Class A_1 Amplifier:		
D-C Plate Voltage	135	volts
D-C Grid Voltage*	-7.5	volts
Amplification Factor	12	
Plate Resistance	10000	ohms
Transconductance	1200	μmhos
D-C Plate Current	3	ma.

R-F POWER AMPLIFIER & OSCILLATOR - Class C Telegraphy

Key-down conditions per tube without modulation#

D-C Plate Voltage	135 max.	volts
D-C Grid Voltage	-30 max.	volts
D-C Plate Current	7 max.	ma.
D-C Grid Current	1 max.	ma.
D-C Plate Input	950 max.	mw
Plate Dissipation	600 max.	mw
Typical Operation at Moderate Frequencies:		
D-C Plate Voltage	135	volts
D-C Grid Voltage●	-20	volts
	20000	ohms
	2500	ohms
Peak R-F Grid Voltage	40	volts
D-C Plate Current	7	ma.
D-C Grid Current**	1 approx.	ma.
Driving Power**	35 approx.	mw
Power Output	600	mw

°, #, ◊, *, **, ●: See next page.

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

958-A

AMPLIFIER TRIODE

(continued from preceding page)

° With no external shield.

◊ Horizontal operation permitted if plane of electrodes is vertical (plate on edge).

* Under maximum rated conditions, the resistance in the grid circuit should not exceed 0.1 megohm with fixed bias, or 0.5 megohm with cathode bias.

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

● Obtained by a grid resistor (20000), cathode resistor (2500), or fixed supply.

** Subject to wide variation as explained under Tube Ratings in General Section.

NOTE: The 958-A is capable of producing a useful power output at frequencies up to approx. 350 megacycles.

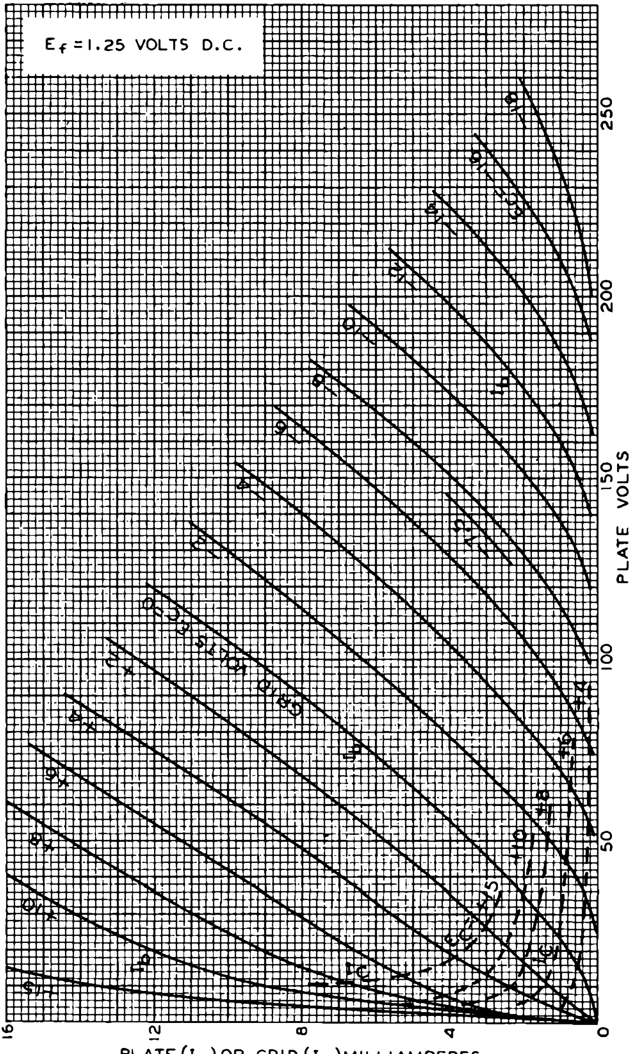
R-F grounding by means of condensers placed close to the tube pins is required if the full capabilities of the 958-A for ultra-high-frequency uses are to be obtained.

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

958-A

958-A

AVERAGE PLATE CHARACTERISTICS



JUNE 15, 1944

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

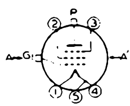
92CM-6334R1

959

RCA

959
DETECTOR AMPLIFIER PENTODE
ACORN TYPE

Filament	Coated	
Voltage	1.25	d-c volts
Current	0.05	amp.
Direct Interelectrode Capacitances:		
Grid to Plate°	0.015 max.	μμf
Input	1.8	μμf
Output	2.5	μμf
Overall Length		1-11/16" ± 3/16"
Overall Diameter		1-3/32" ± 1/16"
Bulb	*See Outline in GENERAL SECTION*	T-4½
End Terminals		Two
Base		Small Radial 5-Pin ←
Pin 1 - Filament		P - Plate
Pin 2 - Grid No.2		G_1 - Grid No.1
Pin 3 - Grid No.3		AA' - Plane of Electrodes
Pin 4 - Filament -		
Pin 5 - Filament -		
RCA Socket		Stock No. 9925
RCA Grid & Plate Clips		Stock No. 9939
Mounting Position		Vertical◊



P is on Long Part of Bulb: Top
G_1 is on Short Part of Bulb: Bottom
BOTTOM VIEW (5BE)

Maximum Ratings are Design-Center Values

AMPLIFIER ←

D-C Plate Voltage	145 max.	volts
D-C Screen (Grid No.2) Voltage	67.5 max.	volts
Characteristics — Class A_1 Amplifier:		
D-C Plate Voltage	135	volts
Suppressor (Grid No.3)	Connected to filament(-) at socket	
D-C Screen Voltage	67.5	volts
D-C Grid (No.1) Voltage #	-3	volts
Plate Resistance	0.8 approx.	megohm
Transconductance	600	μmhos
D-C Plate Current	1.7	ma.
D-C Screen Current	0.4	ma.

° With shield baffle.

◊ Horizontal operation permitted if plane of electrodes is vertical (plate on edge).

Under maximum rated conditions, the resistance in the grid circuit should not exceed 0.1 megohm with fixed bias, or 0.5 megohm with cathode bias.

R-f grounding by means of condensers placed close to the tube terminals is required if the full capabilities of the 959 for ultra-high-frequency uses are to be obtained. It is important in the cases of the plate and control-grid circuits that separate r-f grounding returns be made to a common point in order to avoid r-f inter-action through common return circuits. It may also be advisable in some applications to supplement the action of the by-pass condensers by r-f chokes placed close to the condensers in the return or supply lead for the grid, the screen, the suppressor, the plate, and the filament.

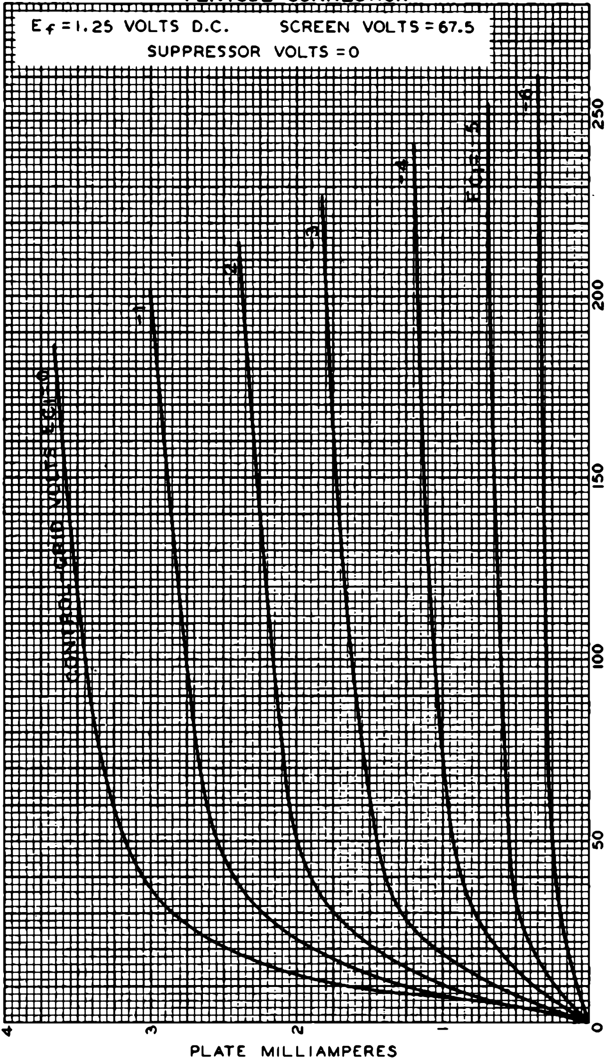
← Indicates a change.

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

959

959

AVERAGE PLATE CHARACTERISTICS
PENTODE CONNECTION



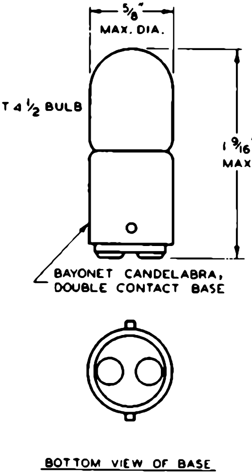
991

VOLTAGE REGULATOR

Type	Glow Discharge
Maximum Overall Length	1-9/16"
Maximum Diameter	5/8"
Bulb	T-4-1/2
Base	Bayonet Candelabra, Double Contact
Operating Conditions:	
Starting-Supply Voltage (D.C.)	87 min. volts
Peak Current *	3 max. ma.
Continuous Current (D.C.) **	2 max. ma.
Operating Voltage △	67 max. volts 48 min. volts

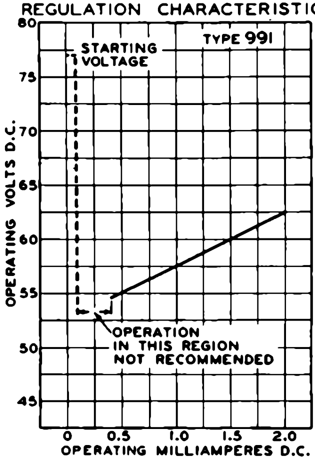
* If the 991 is used with a pulsating or alternating supply voltage, the peak current should be limited to 3 ma.
** Sufficient resistance must always be used in series with this tube to limit its d-c current to 2 ma.
△ For d-c operating current between 0.4 and 2 ma.

TUBE MOUNTING POSITION
VERTICAL OR HORIZONTAL



92C-4614

REGULATION CHARACTERISTIC



92C-4615

1603

TRIPLE-GRID DETECTOR AMPLIFIER

For applications critical as to microphonics, noise, and hum

Heater■	Coated Unipotential Cathode	
Voltage	6.3	a-c or d-c volts
Current	0.3	amp.
Direct Interelectrode Capacitances:▲		
Triode Connection (Approx.) - Grids #2 & #3 tied to plate		
Grid to Plate	2.0	μμf
Grid to Cathode	3.0	μμf
Plate to Cathode	10.5	μμf
Pentode Connection		
Grid to Plate	0.007 max.°	μμf
Input	4.6	μμf
Output	6.5	μμf
Overall Length		4-11/16" to 4-15/16"
Seated Height		4-1/16" to 4-5/16"
Maximum Diameter		1-9/16"
Bulb		ST-12
Cap		Small Metal
Base		Small 6-Pin

BOTTOM VIEW

Pin 1 - Heater
Pin 2 - Plate
Pin 3 - Screen
Pin 4 - Suppressor
Pin 5 - Cathode
Pin 6 - Heater
Cap - Grid

Mounting Position: Any

SINGLE-TUBE AMPLIFIER

Plate Voltage	250 max.	volts
Screen Voltage	180 max.	volts

Typical Operation and Characteristics - Class A_1 Amplifier:

	Pentode Connection			*Triode Connection*		
Plate	100	250	250	180	250	volts
Screen	100	100	180	-	-	volts
Grid	-3	-3	-3	-5.3	-8	volts
Suppressor	Tied to cath. at socket					
Amp. Fact.	-	-	-	20●	20●	
Plate Res.	1.0	□	0.9	0.011	0.0105	megohm
Transcond.	1185	1225	2000	1800	1900	μmhos
Grid Bias #	-7	-7	-	-	-	volts
Plate Cur.	2	2	8.3	5.3	6.5	ma.
Screen Cur.	0.5	0.5	2.1	-	-	ma.

□ Greater than 1.5. ● Approx. # Approx., for cath. cur. cut-off.

PUSH-PULL AMPLIFIER - Triode Connection

Typical Operation - Class A_1 Amplifier:
Unless otherwise specified, values are for 2 tubes

Plate	90	volts
Grid	-2.5	volts
Cathode Resistor	625	ohms
Plate Current	4.0	ma.
Load Res. (plate to plate)	100000	ohms
Power Output	40	mw.

DETECTOR

Typical Operation as Biased Detector:

Plate Supply◊	100	100	250	250	volts
Screen	12	30	50	100	volts
Grid	-1.16	-1.83	-1.95	-4.3	volts
Cathode Res.	18000	10000	3000	10000	ohms
Suppressor	Connected to cathode at socket				
Cath. Cur. (no sig.)	0.063	0.183	0.65	0.43	ma.
Plate Resistor	1.00	0.25	0.25	0.50	megohm
Blocking Condenser	0.01	0.01	0.03	0.03	μf
Grid Resistor *	1.00	0.50	0.25	0.25	megohm
R-F Signal (RMS)**	1.05	1.60	1.18	1.37	volts

■ In circuits where the cathode is not directly connected to the heater, the potential difference between heater and cathode should be kept as low as possible.
▲ The internal shield in the dome of the 1603 is connected to the cathode within the tube.
° With close-fitting shield connected to cathode.
◊ Voltage at plate will be "Plate Supply" voltage minus voltage drop in plate resistor caused by plate current.
* For the following amplifier tube.
** See next page.

← Indicates a change.

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC

RCA

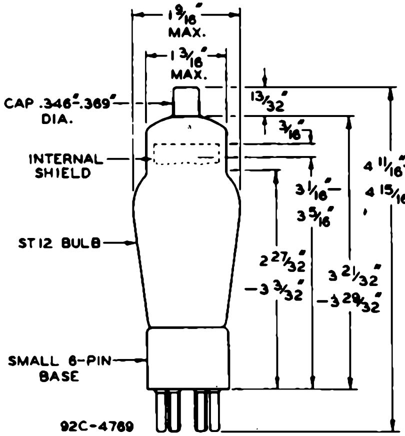
1603

TRIPLE-GRID DETECTOR AMPLIFIER

(continued from preceding page)

** With these signal values modulated 20%, the voltage output under each set of conditions is 17 peak volts at the grid of the following amplifier. This value is sufficient to insure full audio output from a 42 (for 6.3-volt operation) or a 2A5 (for 2.5-volt operation) under 250-volt plate conditions.

For Curves, refer to Types 6J7 and 57. For additional Data, refer to RESISTANCE-COUPLED AMPLIFIER CHART.



1609

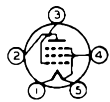
1609

AMPLIFIER PENTODE

For applications critical as to microphonics

Filament	Coated	
Voltage	1.1	d-c volts
Current	0.25	amp.
Direct Interelectrode Capacitances:°		
Grid to Plate	1.0	μμf
Input	7	μμf
Output	7	μμf
Maximum Overall Length		4-3/16"
Maximum Seated Height		3-9/16"
Maximum Diameter		1-9/16"
Bulb		ST-12
Base		Small 5-Pin

Pin 1 - Filament +
Pin 2 - Plate
Pin 3 - Grid
Pin 4 - Screen
Pin 5 - Filament -



BOTTOM VIEW

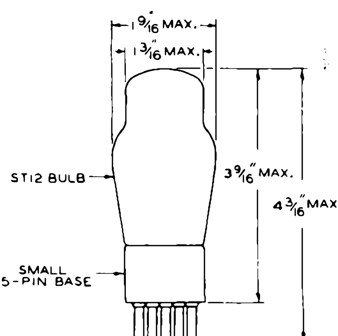
Mounting Position — Any

Maximum Ratings Are Absolute Values

A-F AMPLIFIER

Plate Voltage	135 max.	volts
Screen Voltage	67.5 max.	volts
Typical Operation and Characteristics - Class A_1 Amplifier:		
Plate	135	volts
Screen	67.5	volts
Grid *	-1.5	volts
Plate Res.	0.4 approx.	megohm
Transcond.	725	μmhos
Plate Cur.	2.5	ma.
Screen Cur.	0.65	ma.

° Without shield.
* The d-c resistance in the grid circuit of the 1609 should not exceed 0.5 megohm for fixed-bias conditions.



← Indicates a change.

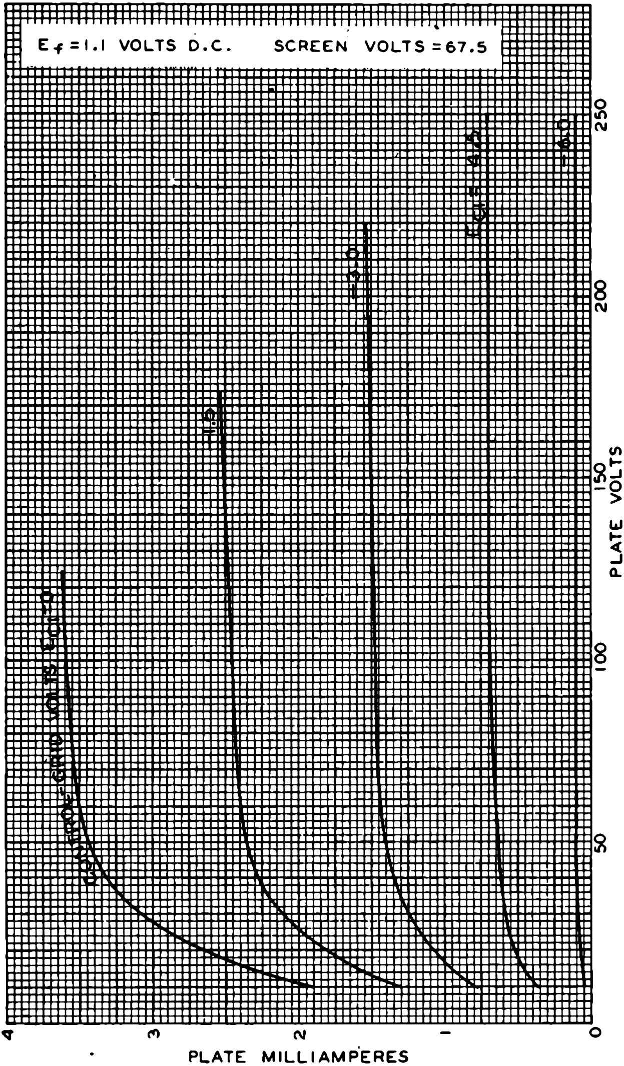
Jan. 1, 1943 DATA

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

1609

1609

AVERAGE PLATE CHARACTERISTICS



JAN. 26, 1937

RCA VICTOR DIVISION

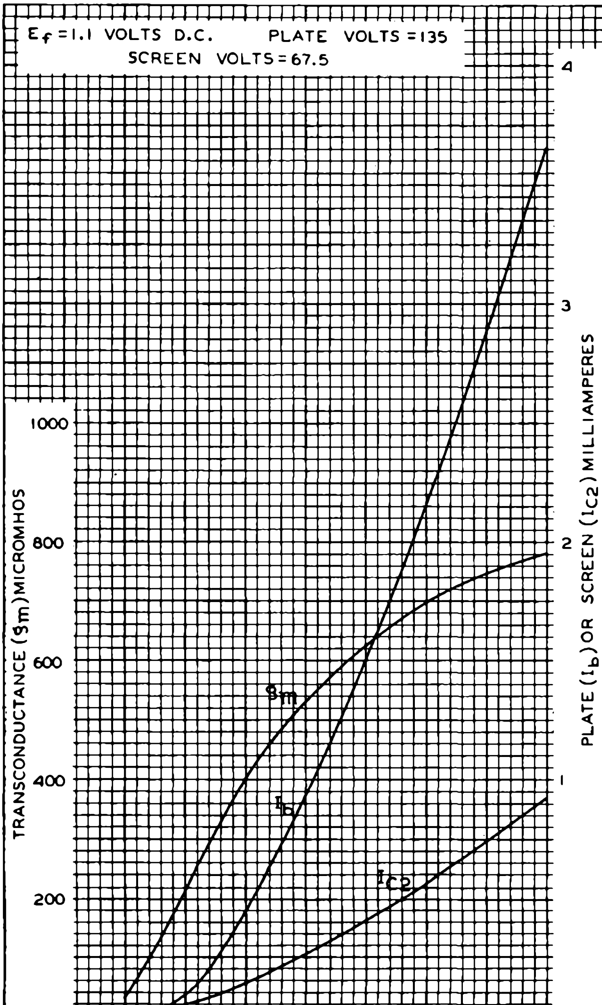
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92C-4721

1609

1609

AVERAGE CHARACTERISTICS



JAN. 12, 1942 RCA VICTOR DIVISION 92C-6355

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

1611

1611

POWER AMPLIFIER PENTODE

The 1611 is a power pentode intended for use as a relay tube in equipment on ships for automatically announçing SOS signals. To meet the special requirements of such service, the 1611 features an i_p-e_g characteristic having suitable slope and minimized variation between tubes. Physical characteristics of the 1611 are the same as those of Type 6F6.

RCA-1611 is available only through Radiomarine Corporation of America, 75 Varick Street, New York, N. Y.

1612

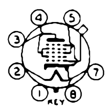
1612

PENTAGRID AMPLIFIER

For applications critical as to microphonics

Heater ■	Coated Unipotential Cathode	
Voltage	6.3	a-c or d-c volts
Current	0.3	amp.
Direct Interelectrode Capacitances:°		
Grid #1 to Grid #3	0.20 max.	μμf
Grid #1 to Plate	0.001 max.	μμf
Grid #3 to Plate	0.10 max.	μμf
Grid #1 to All Other Electrodes	7.5	μμf
Grid #3 to All Other Electrodes	10	μμf
Plate to All Other Electrodes	11	μμf
Maximum Overall Length		3-1/8"
Maximum Seated Height		2-9/16"
Maximum Diameter		1-5/16"
Bulb		Metal Shell, MT-8
Cap		Miniature
Base		Small Wafer Octal 7-Pin

Pin 1 - Shell
Pin 2 - Heater
Pin 3 - Plate
Pin 4 - Grids #2 & #4



BOTTOM VIEW

Pin 5 - Grid #3
Pin 7 - Heater
Pin 8 - Cathode
Cap - Grid #1

Mounting Position — Any

Maximum Ratings Are Design-Center Values

AMPLIFIER

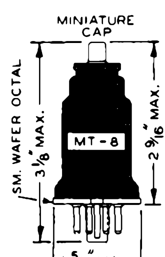
Plate Voltage	250 max.	volts
Screen Voltage	100 max.	volts
Plate Dissipation	1.5 max.	watts
Screen Dissipation	1.0 max.	watt

Typical Operation and Characteristics - Class A_1 Amplifier:

Plate	250	volts
Screen (Grids #2 & #4)	100	volts
Control Grid (Grid #1)	-3	volts
Control Grid (Grid #3)	-3	volts
Plate Res.	0.6	megohm
Transcond. (Grid #1 - Plate)	1100	μmhos
Transcond. (Grid #1 - Plate)*	5 approx.	μmhos
Plate Cur.	5.3	ma.
Screen Cur.	6.5	ma.

■ In circuits where the cathode is not directly connected to the heater, the potential difference between heater and cathode should be kept as low as possible.
° With shell connected to cathode.
* With Grid #1 bias = -15 volts; Grid #3 bias = -15 volts.

Curves under Type 6L7 also apply to the 1612.



← indicates a change.

Jan. 1, 1943 — DATA

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

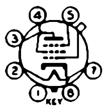
1620

1620

TRIPLE-GRID DETECTOR AMPLIFIER

For applications critical as to microphonics

Heater■	Coated Unipotential Cathode	
Voltage	6.3	a-c or d-c volts
Current	0.3	amp.
Direct Interelectrode Capacitances:°		
Pentode Connection		
Grid to Plate	0.005 max.	μμf
Input	7.0	μμf
Output	12.0	μμf
Maximum Overall Length		3-1/8"
Maximum Seated Height		2-9/16"
Maximum Diameter		1-5/16"
Bulb		Metal Shell, MT-8
Cap		Miniature
Base		Small Wafer Octal 7-Pin



Pin 1 - Shell
Pin 2 - Heater
Pin 3 - Plate
Pin 4 - Screen
Pin 5 - Suppressor
Pin 7 - Heater
Pin 8 - Cathode
Cap - Grid

BOTTOM VIEW

Mounting Position: Any

Maximum Ratings Are Design-Center Values

AMPLIFIER - Pentode Connection

Plate Voltage	250 max.	volts
Screen Voltage	100 max.	volts

Typical Operation and Characteristics - Class A_1 Amplifier:

Plate	100	250	volts
Screen	100	100	volts
Grid #	-3	-3	volts
Suppressor	Connected to cathode at socket		
Plate Res.	1.0	▲	megohm
Transcond.	1185	1225	μmhos
Grid Bias for cathode current cut-off	-7	-7	volts
Plate Cur.	2.0	2.0	ma.
Screen Cur.	0.5	0.5	ma.

AMPLIFIER - Triode Connection°°

Plate Voltage	250 max.	volts

Typical Operation and Characteristics - Class A_1 Amplifier:

Plate	180	250	volts
Grid #	-5.3	-8	volts
Amp. Fact.	20	20	
Plate Res.	11000	10500	ohms
Transcond.	1800	1900	μmhos
Plate Cur.	5.3	6.5	ma.

■ For cathode-bias operation of the 1620 a minimum cathode-resistor by-pass condenser of 25 μf is recommended to minimize hum, particularly in circuits where the 1620 is followed by high-gain stages. When a 25 μf condenser or larger is used, the voltage difference between heater and cathode is not critical, but it should be kept as low as possible. If less than a 25 μf condenser is used, positive or negative biasing of the heater with respect to the cathode is required, but the bias value chosen for minimum hum should be within the range of +5 to +50 volts or -5 to -50 volts.

° With shell connected to cathode.

\# Under maximum rated conditions, the d-c resistance in the grid circuit should not exceed 1.0 megohm.

▲ Greater than 1.0 megohm.

°° Screen and suppressor tied to plate.

← Indicates a change.

OUTLINE DIMENSIONS for the 1620 are the same as for 1612.

Curves under Type 6J7 also apply to the 1620.

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

1621

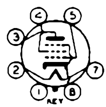
1621

POWER AMPLIFIER PENTODE

For applications requiring continuity of service

Heater■	Coated Unipotential Cathode	
Voltage	6.3	a-c or d-c volts
Current	0.7	amp.
Direct Interelectrode Capacitances (Approx.):°		
Grid to Plate	0.20	μμf
Input	7.5	μμf
Output	11.5	μμf
Maximum Overall Length		3-1/4"
Maximum Seated Height		2-11/16"
Maximum Diameter		1-5/16"
Bulb		Metal Shell, MT-8
Base		Small Wafer Octal 7-Pin

Pin 1 - Shell
Pin 2 - Heater
Pin 3 - Plate
Pin 4 - Screen
Pin 5 - Grid
Pin 7 - Heater
Pin 8 - Cathode


BOTTOM VIEW

Mounting Position: Any

Maximum Ratings Are Design-Center Values

PUSH-PULL AMPLIFIER - Triode Connection†

Recommended with Cathode-Bias Operation only.

Plate Voltage	300 max.	volts
Plate Dissipation	8.3 max.	watts

Typical Operation - Class A_1 Amplifier:
Unless otherwise specified, values are for 2 tubes

Plate Supply *	327.5	volts
Cathode Resistor ▲	500	ohms
Peak A-F Grid-to-Grid Voltage	54	volts
Zero-Sig. Plate Current	55	ma.
Max.-Sig. Plate Current	59	ma.
Load Resistance (plate-to-plate)	5000	ohms
Total Harmonic Distortion	1	%
Power Output	2	watts

* Actual voltage between cathode and plate will be plate-supply voltage minus drop in cathode resistor.

▲ Type of input coupling used should not introduce too much resistance in the grid circuit. Transformer- or impedance-coupling devices are recommended. The grid circuit may have a resistance as high as, but not greater than, 0.5 megohm provided the heater voltage is not allowed to rise more than 10% above rated value under any condition of operation.

PUSH-PULL AMPLIFIER - Pentode Connection

Plate Voltage	300 max.	volts
Screen Voltage	300 max.	volts
Plate Dissipation	7.9 max.	watts
Screen Input	1.9 max.	watts

Typical Operation - Class A_1 Amplifier:

Unless otherwise specified, values are for 2 tubes

Plate	300	volts
Screen	300	volts
D-C Grid Voltage #	-30	volts
Peak A-F Grid-to-Grid Voltage	60	volts
Zero-Sig. Plate Current	38	ma.
Max.-Sig. Plate Current	69	ma.

■, †, #, °: See next page.

← Indicates a change.

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

RCA

1621

POWER AMPLIFIER PENTODE

(continued from preceding page)

Zero-Sig. Screen Current	6.5	ma.
Max.-Sig. Screen Current	13	ma.
Load Resistance* (plate-to-plate)	4000	ohms
Total Harmonic Distortion	3	%
Power Output	5	watts

■ In circuits where the cathode is not directly connected to the heater, the potential difference between heater and cathode should be kept as low as possible.
o With shell connected to cathode.
† Screen connected to plate.
* Type of input coupling used should not introduce too much resistance in the grid circuit. Transformer- or impedance-coupling devices are recommended. When the grid circuit has a resistance not higher than 0.05 megohm, fixed bias may be used; for higher values, cathode bias is required. With cathode bias, the grid circuit may have a resistance as high as, but not greater than, 0.5 megohm provided the heater voltage is not allowed to rise more than 10% above rated value under any conditions of operation.

OUTLINE DIMENSIONS for the 1621 are the same as those for Type 1246.

Curves under Type 6F6 also apply to the 1621.

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

RCA

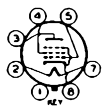
1622

BEAM POWER AMPLIFIER

For applications requiring continuity of service

Heater■	Coated Unipotential Cathode	
Voltage	6.3	a-c or d-c volts
Current	0.9	amp.
Direct Interelectrode Capacitances (approx.):°		
Grid to Plate	0.4	μμf
Input	10	μμf
Output	12	μμf
Maximum Overall Length		4-5/16"
Maximum Seated Height		3-3/4"
Maximum Diameter		1-9/16" ± 1/16" ←
Bulb		Metal Shell, MT-10
Base		Small Wafer Octal 7-Pin

Pin 1 - Shell
Pin 2 - Heater
Pin 3 - Plate
Pin 4 - Screen



Pin 5 - Grid
Pin 7 - Heater
Pin 8 - Cathode

Mounting Position — BOTTOM VIEW (7AC) — Any

Maximum Ratings Are Design-Center Values

PUSH-PULL AMPLIFIER

Plate Voltage	300 max. volts
Screen Voltage	250 max. volts
Plate Dissipation	13.8 max. watts
Screen Dissipation	1.4 max. watts

Typical Operation - Class A_1 Amplifier:
Unless otherwise specified, values are for 2 tubes

Plate Voltage	300	volts
Screen Voltage	250	volts
D-C Grid Voltage #	-20	volts
Peak A-F Grid-to-Grid Voltage	40	volts
Zero-Sig. Plate Current	86	ma.
Max.-Sig. Plate Current	125	ma.
Zero-Sig. Screen Current	4	ma.
Max.-Sig. Screen Current	10.5	ma.
Load Resistance (plate to plate)	4000	ohms
Total Harmonic Distortion	1	%
Power Output	10	watts

■ The heater voltage should never fluctuate so that it exceeds 7 volts. The potential difference between heater and cathode should be kept as low as possible.

\# The type of input coupling used should not introduce too much resistance in the grid circuit. Transformer- or impedance-coupling devices are recommended. When the grid circuit has a resistance not higher than 0.1 megohm, fixed bias may be used; for higher values, cathode bias is required. With cathode bias, the grid circuit may have a resistance not to exceed 0.5 megohm, provided the heater voltage is not allowed to rise more than 10% above the rated value under any condition of operation.

° With shell connected to cathode.

Curves under Type 6L6 also apply to the 1622 within the limitations of its maximum ratings.

←- Indicates a change.

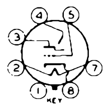
1629

ELECTRON-RAY TUBE

INDICATOR TYPE WITH TRIODE UNIT

Heater	Coated Unipotential Cathode	
Voltage	12.6	a-c or d-c volts
Current	0.15	amp.
Overall Length		3-15/16" ± 3/16"
Seated Height		3-3/8" ± 3/16" ←
Maximum Diameter		1-3/16"
Bulb		T-9
Base		Small Shell Octal 7-Pin

Pin 1 - No Connection
Pin 2 - Heater
Pin 3 - Plate
Pin 4 - Target
Pin 5 - Grid
Pin 7 - Heater
Pin 8 - Cathode



BOTTOM VIEW (7AL)

Mounting Position: Any▲ ←

Maximum and Minimum Ratings Are Design-Center Values

INDICATOR SERVICE

Plate-Supply Voltage		250 max.	volts
Target Voltage		250 max.	volts
		125 min.	volts ←
D-C Heater-Cathode Potential		90 max.	volts ←
Typical Operation: ←			
Plate and Target Supply Voltage	200	250	volts
Series Triode Plate Resistor□	1	1	megohm
Target Current † ◇	3	4	ma.
Triode-Plate Current◇	0.19	0.24	ma.
Triode-Grid Voltage (Approx.)			
For shadow angle of 0°	-6.5	-8.0	volts
For shadow angle of 90°	0	0	volts

□ Designated as R in the circuit diagram under Type 6E5, in the Receiving Tube Section.

† Subject to wide variation.

◇ For triode-grid bias of 0 volts.

▲ The plane of the ray-control electrode passes through the tube axis and base key.

Curves for Type 1629 are the same as for the 6E5 in the Receiving-Tube Section.

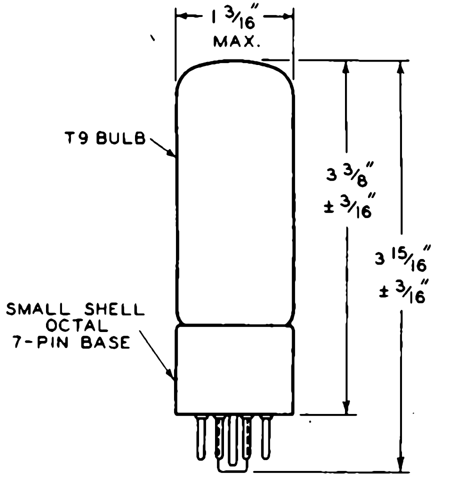
← Indicates a change.

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

1629

1629

ELECTRON-RAY TUBE



92CM-6554

1631

BEAM POWER AMPLIFIER

For applications critical as to uniformity of characteristics

Heater	Coated Unipotential Cathode	
Voltage	12.6	a-c or d-c volts
Current	0.45	amp.
Plate Dissipation		16 max. watts

Other ratings, characteristics, dimensions, and socket connections for the 1631 are the same as those for Type 6L6. Typical operating data for the 6L6 also apply to the 1631 within the limitation of the maximum plate-dissipation rating.

1632

BEAM POWER AMPLIFIER

For applications critical as to uniformity of characteristics

Heater	Coated Unipotential Cathode	
Voltage	12.6	a-c or d-c volts
Current	0.6	amp.
Plate Voltage		117 max. volts
Screen Voltage		117 max. volts
Plate Dissipation		5.5 max. watts

Dimensions and socket connections for the 1632 are the same as for Type 25L6. Typical operating data for the 1632 are the same within its plate voltage and dissipation limitations as for the 25L6.

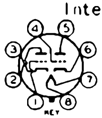
1633

TWIN-TRIODE AMPLIFIER

For applications critical as to matching of the two triode units

Heater	Coated Unipotential Cathode		
Voltage	25		a-c or d-c volts
Current	0.15		amp.
Direct Interelectrode Capacitances (Approx.):°			
	Triode Unit T_1	*Triode Unit T_2*	
Grid to Plate	3.6	3.6	μμf
Grid to Cathode	3.0	2.8	μμf
Plate to Cathode	0.8	1.2	μμf
Maximum Overall Length			3-5/16"
Maximum Seated Height			2-3/4"
Maximum Diameter			1-5/16"
Bulb			T-9
Base			Intermediate Shell Octal 8-Pin

Pin 1 - Grid T_2
Pin 2 - Plate T_2
Pin 3 - Cathode T_2
Pin 4 - Grid T_1



BOTTOM VIEW (8BD)

Pin 5 - Plate T_1
Pin 6 - Cathode T_1
Pin 7 - Heater
Pin 8 - Heater

Mounting Position: Any

For convenience, one triode unit is identified as T_1; the other as T_2.

° See next page.

Nov. 15, 1945 DATA

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

1633

TWIN-TRIODE AMPLIFIER

(continued from preceding page)

Maximum And Minimum Ratings Are Design-Center Values

AMPLIFIER - Each Unit

Plate Voltage	300 max.	volts
Grid Voltage	0 min.	volts
Cathode Current	20 max.	ma.
Plate Dissipation	2.5 max.	watts
D-C Heater-Cathode Potential	90 max.	volts
Characteristics - Class A_1 Amplifier:		
Plate Voltage	250	volts
Grid Voltage#	-8	volts
Amplification Factor	18	
Plate Resistance	6900	ohms
Transconductance	2600	μmhos
Plate Current	11.5	ma.

o With no external shield.

The d-c resistance in the grid circuit should not exceed 1.0 megohm under maximum rated conditions per unit.

Curves for Type 1633 are the same as for the 6J5, and 6SN7-GT.

1634

TWIN-TRIODE AMPLIFIER

For applications critical as to matching of the two triode units

Maximum ratings, characteristics, dimensions, and socket connections for the 1634 are the same as for Type 12SC7.

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

1635

HIGH-MU TWIN POWER TRIODE

GENERAL DATA

Electrical:

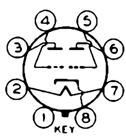
Heater, for Unipotential Cathode:

Voltage	6.3	ac or dc volts
Current	0.6	amp

Mechanical:

Mounting Position	Any
Maximum Overall Length	3-5/16"
Maximum Seated Length	2-3/4"
Maximum Diameter	1-5/16"
Bulb	T-9
Base	Intermediate-Shell Octal 8-Pin
Basing Designation for BOTTOM VIEW	G-8B

Pin 1 - No Connection
Pin 2 - Heater
Pin 3 - Plate of Unit No. 2
Pin 4 - Grid of Unit No. 2



Pin 5 - Grid of Unit No. 1
Pin 6 - Plate of Unit No. 1
Pin 7 - Heater
Pin 8 - Cathode

AF POWER AMPLIFIER - Class B

Maximum Ratings, ***Design-Center Values:*** ←

DC PLATE VOLTAGE	300 max.	volts
PEAK PLATE CURRENT (per plate)	90 max.	ma.
PLATE DISSIPATION (per plate)	3 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	90 max.	volts
Heater positive with respect to cathode	90 max.	volts

Typical Operation: ←

Values are for 2 units unless otherwise specified

DC Plate Voltage	300	300	volts
DC Grid Voltage	0	0	volts
Peak AF Grid-to-Grid Voltage	70	108●	volts
Zero-Signal DC Plate Current	6.6	6.6	ma.
Max.-Signal DC Plate Current	54	54	ma.
Peak Grid Current (per unit)	38	39	ma.
Plate-Supply Impedance	0	1000*	ohms
Effective Load Resistance (plate-to-plate)	12000	12000	ohms
Effective Grid-Circuit Impedance (per unit)	0	516**	ohms
Total Harmonic Distortion	4	5	%
Max.-Signal Power Output	10.4	10.4	watts

●,*,**: See next page. ← Indicates a change.

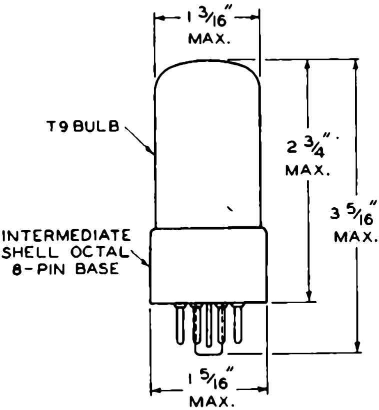
1635

HIGH-MU TWIN POWER TRIODE

● Includes peak voltage drop through the grid-circuit impedance.

* Practical design value.

** At 400 cycles for class B stage in which the effective resistance per grid circuit is 500 ohms, and the leakage reactance of the coupling transformer is 50 millihenrys. The driver stage should be capable of supplying the grids of the class B stage with the specified values at low distortion.



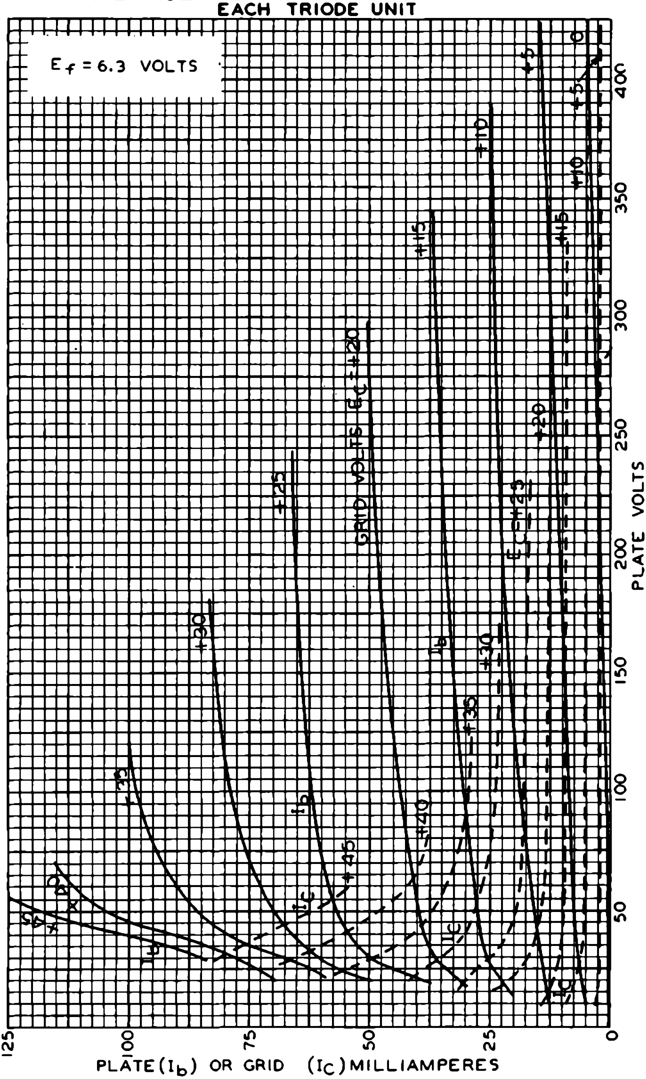
92C-6393

1635

1635

AVERAGE PLATE CHARACTERISTICS

EACH TRIODE UNIT



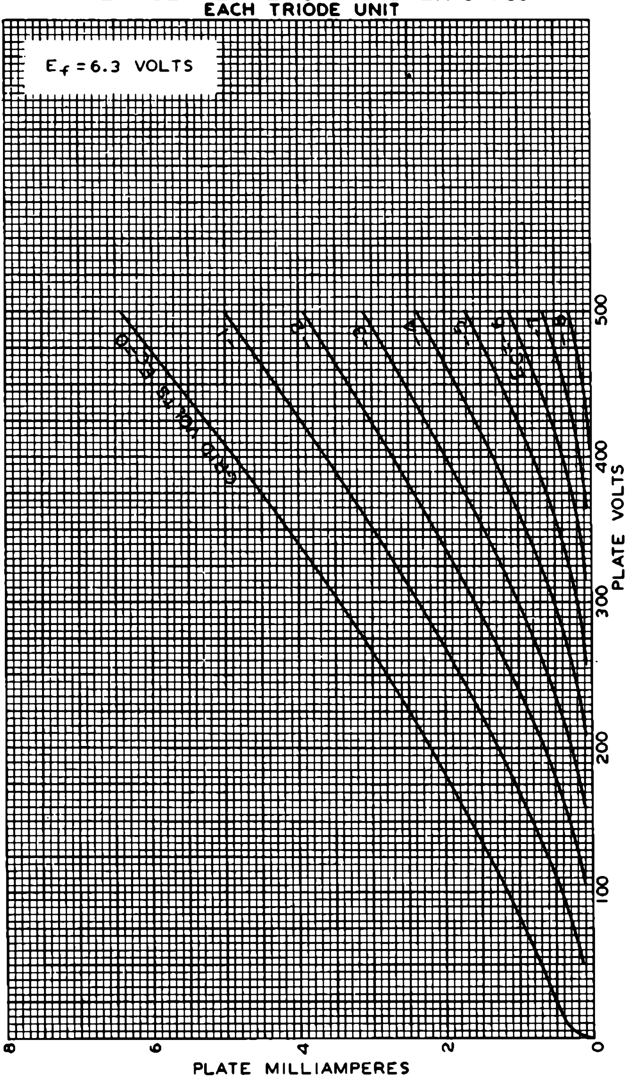
FEB. 26, 1942

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

92C-6358

1635

1635
AVERAGE PLATE CHARACTERISTICS
EACH TRIODE UNIT



FEB. 27, 1942

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

92C-6369

1654

1654
HALF-WAVE VACUUM RECTIFIER

MINIATURE TYPE

GENERAL DATA

Electrical:

Filament, Coated:

Voltage	1.4	ac or dc volts
Current	0.05	amp

Direct Interelectrode Capacitance (Approx.):°

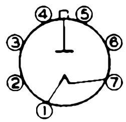
Plate to Filament	1.4	$\mu\mu$f

° With no external shield.

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-7/16"
Maximum Seated Length	2-3/16"
Maximum Diameter	3/4"
Bulb	T-5-1/2
Base	Small-Button Miniature 7-Pin
Basing Designation for BOTTOM VIEW	2Z

Pin 1 - Filament -
Pin 2 - Internal Con. Do Not Use
Pin 3 - Internal Con. Do Not Use
Pin 4 - No Connection
Pin 5 - No Connection



Pin 6 - Internal Con. Do Not Use
Pin 7 - Filament +
Bulb Terminal } Plate

HALF-WAVE RECTIFIER

Maximum Ratings, ***Design-Center Values:***●

PEAK INVERSE PLATE VOLTAGE	4300 max.	volts	←
PEAK PLATE CURRENT■	6 max.	ma	
AVERAGE PLATE CURRENT	1 max.	ma	

Typical Operation:

AC Plate-Supply Voltage	1500	volts	←
Filter-Input Capacitor	0.025	μf	
Total Effective Plate-Supply Impedance	150000	ohms	←
DC Output Current	1	ma	
DC Output Voltage (At Input to Filter)*	1230	volts	←

Circuit Values: ←

A plate-supply impedance of 150000 ohms is required in order that the "hot-switching" current will not exceed the permissible value of 15 ma. under conditions of normal line-voltage fluctuation. For plate-supply voltages lower than 1500 volts, the plate-supply impedance may be decreased provided the resultant peak-current rating of 6 ma. and the "hot-switching" current of 15 ma. are not exceeded.

●,■,*: See next page.

← Indicates a change.

RCA

1654
HALF-WAVE VACUUM RECTIFIER

● These ratings apply to the 1654 when it is operated from a power supply having a frequency up to 500 cycles per second. If a contemplated application involves higher supply frequencies, please write, stating the proposed operating frequency, to Commercial Engineering, RCA, Harrison, N. J., as to the required reduction in ratings.

→ ■ A peak value of 15 ma. for 0.1 second is permitted under conditions of "hot-switching", i.e., switching the plate circuit "on" while the filament is hot.

* Values are approximate.

→ Indicates a change.

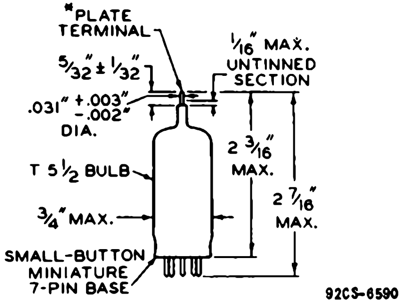
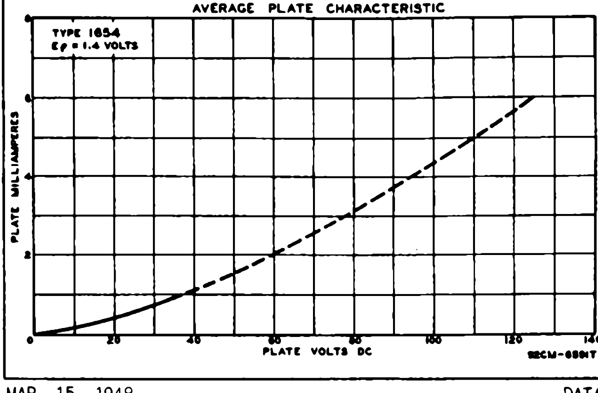


*PLATE TERMINAL AT TIP MAY BE ECCENTRIC WITH RESPECT TO BASE AXIS BY 1/8" MAX.

AVERAGE PLATE CHARACTERISTIC



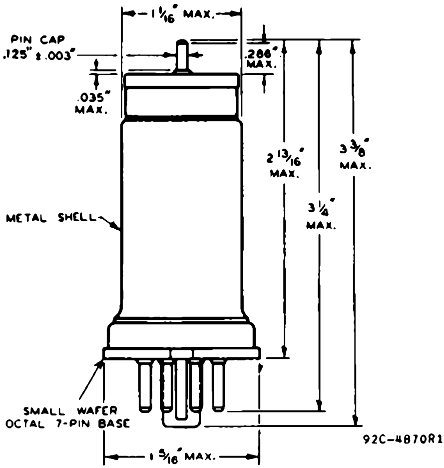
1851

TELEVISION AMPLIFIER PENTODE

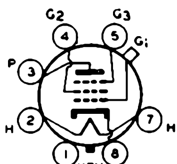
Heater ▲	Coated Unipotential Cathode	
Voltage	6.3	a-c or d-c volts
Current	0.45	amp.
Direct Interelectrode Capacitances:°		
Grid to Plate	0.02 max.	μμf
Input	11.5	μμf
Output	5.2	μμf
Maximum Overall Length		3-3/8"
Maximum Diameter		1-5/16"
Bulb		Metal Shell, MT-8
Cap		Pin Cap
Base		Small Wafer Octal 7-Pin

° With shell connected to cathode.

For additional data and curves, refer to Type 1852. The 1851 and 1852 are identical electrically except for capacitances.



BOTTOM VIEW OF SOCKET CONNECTIONS



G_1 = GRID
G_2 = SCREEN
G_3 = SUPPRESSOR
H = HEATER
K = CATHODE
P = PLATE
S = SHELL

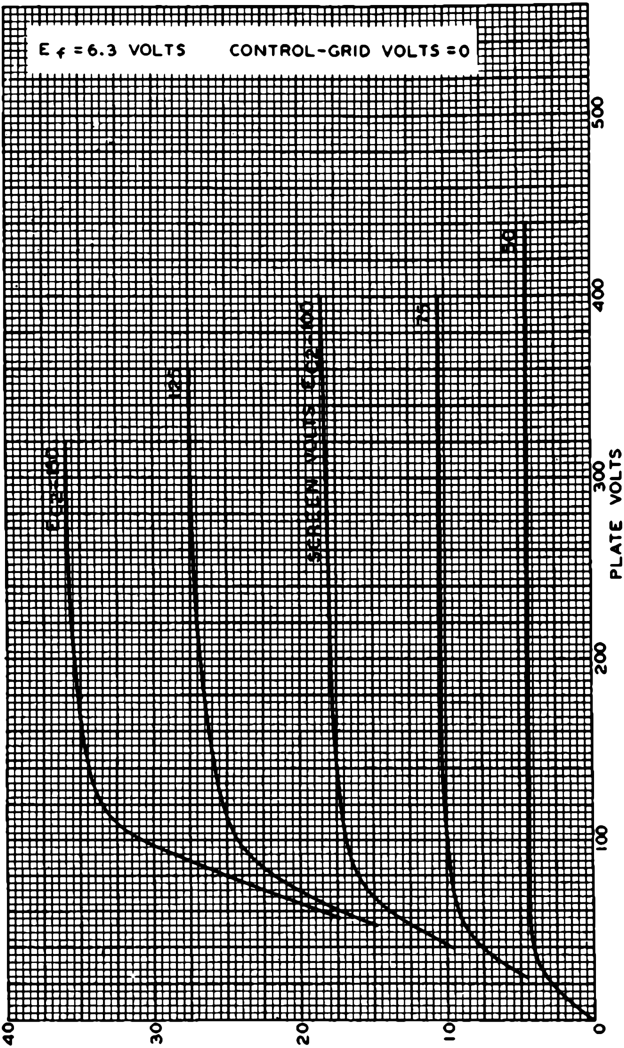
MOUNTING POSITION

VERTICAL: Base up or down.
HORIZONTAL: Permissible with Pins #2 & #7 in vertical plane.

1851

1851

AVERAGE PLATE CHARACTERISTICS



FEB. 14, 1938 RCA RADIOTRON DIVISION RCA MANUFACTURING COMPANY, INC. 92C-4877

1945

1945
VACUUM-GAUGE TUBE

HYDROGEN-SENSITIVE, IONIZATION TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

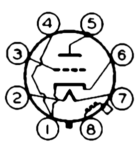
Voltage	6.3 ± *10%*	ac or dc volts
Current	0.75	amp

Mechanical:

Mounting Position*	Any
Maximum Overall Length	6-3/8"
Maximum Diameter	1-5/16"
Tubulation	See Outline Drawing
Bulb	Metal Shell MT8G
Base	Small-Wafer Octal 8-Pin

BOTTOM VIEW

Pin 1 - Cathode
Pin 2 - Heater
Pin 3 - Ion Collector
Pin 4 - Cathode
Pin 5 - Plate, Shell DO NOT USE FOR GETTER CONNECTION



Pin 6 - Cathode
Pin 7 - Heater
Pin 8 - Getter

Shell - Plate, Getter Connection to Hexagonal Section of Tubulation

LEAK DETECTOR

Maximum Ratings, ***Absolute Values*:**

PLATE VOLTAGE	300	max.	volts
ION-COLLECTOR VOLTAGE	-30	max.	volts
	-15	min.	volts
PLATE CURRENT	50	max.	ma.
PLATE DISSIPATION	7	max.	watts
PEAK HEATER-CATHODE VOLTAGE	0	max.	volts

Typical Operation:

Plate Voltage	185	volts
Minimum Plate-Supply Voltage	250	volts
Ion-Collector Voltage	-22.5	volts
Plate Current	32	ma.
Ion-Collector Current	Less than 0.5*	μamp
Plate Dissipation	6	watts

* With no hydrogen in the gauge. When hydrogen from minute leaks enters the gauge tube, the ion-collector current may increase by less than 1%. In order to obtain a definite reading of such small changes in ion-collector current, it is necessary to use an amplifier capable of amplifying dc currents of the order of 0.005 μamp.

The metal shell of the 1945 contains an indirectly-heated cathode, an ion-collector and a plate made of palladium. The palladium plate located across the inner end of the tubulation serves, when cold, as a vacuum-tight barrier to the vacuum system. This construction permits the metal enclosure to be exhausted to a much better vacuum than

1945

VACUUM-GAUGE TUBE

(continued from preceding page)

normally exists in a vacuum system. However, when heated, the palladium plate serves as a permeable membrane which permits any hydrogen in the vacuum system to which the 1945 is connected to flow into the tube.

Practical application of the 1945 to locating a leak consists simply of connecting it to the vacuum system and of probing the system with a jet of gas containing a high percentage of hydrogen. If a leak is present, hydrogen enters the vacuum system at the point of leakage, passes through the hot palladium plate, and produces an increase in current to the ion-collector.

Because of its high vacuum, the 1945 can detect far smaller leaks than are detectable using conventional ionization gauges operating at the same pressure as the vacuum system. Actually, an increase in hydrogen pressure of less than 10^{-7} mm of mercury (10^{-4} microns) can be detected by the 1945.

The 1945 can be connected to a hard-glass, soft-glass, or metal vacuum system.

Connection to a hard-glass system may readily be made by breaking off the tip of the glass tubulation (see Outline Drawing), and sealing the (Corning Code 772 Nonex) tubulation to the glass system.

Connection to a soft-glass system requires a graded seal between the hard-glass tubulation of the 1945 and the soft glass of the system.

Connection to a metal system requires that the glass tubulation first be removed by pinching the glass with pliers at a point close to the Kovar seal. Then, the 1945 can be connected to a metal system by a straight pipe coupling which is necessary for clearance of the metal exhaust tubulation. Always apply the wrench to the hexagonal section and never to the metal shell. After the coupling has been tightened, it should be coated with Glyptal to insure that the joint is vacuum tight.

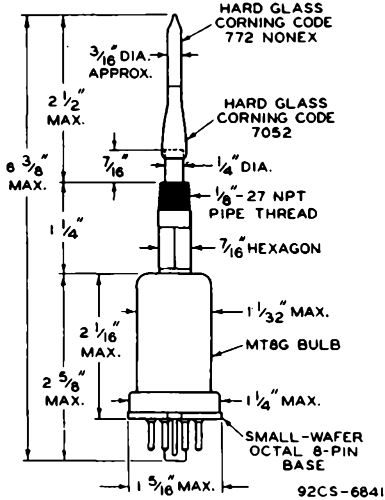
Suitable support should be provided for the 1945. In a glass system, it should be supported by a suitable clamp encircling the metal shell. The clamp should be lined with an asbestos pad so that the clamp does not place a strain on the welds. In a metal system, the 1945 can usually be supported by the pipe coupling.

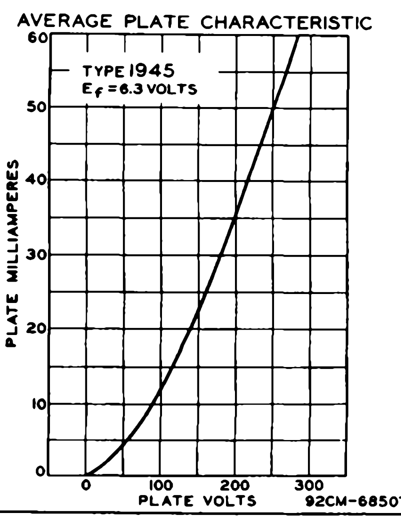
For safety reasons, it is advisable to have the metal shell of the 1945 at ground potential (positive polarity).

RCA

1945

VACUUM-GAUGE TUBE





1946

1946
VACUUM-GAUGE TUBE

THERMOCOUPLE TYPE

DATA

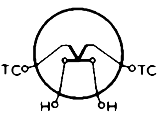
General:

Heater, for Thermocouple:		
Voltage (Approx.)	1	ac or dc volts
Current	0.070	amp
Resistance of Thermocouple	5 approx.	ohms
Maximum Overall Length (with tubulation)		6-1/4"
Maximum Diameter		1-11/16"
Bulb		T-12
Tubulation		3/8" Diameter Hard Glass, Corning Code 772 Nonex
Mounting Position		Any
Terminal Arrangement		See Outline Drawing

Terminal Connections:

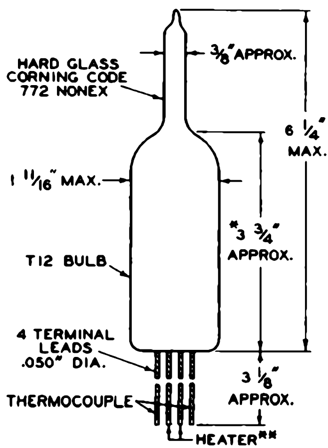
H - Heater

TC - Thermocouple



Calibration:

See next page.



*MEASURED FROM BULB END TO BULB-TOP LINE AS DETERMINED BY RING GAUGE OF 1/2" I.D.

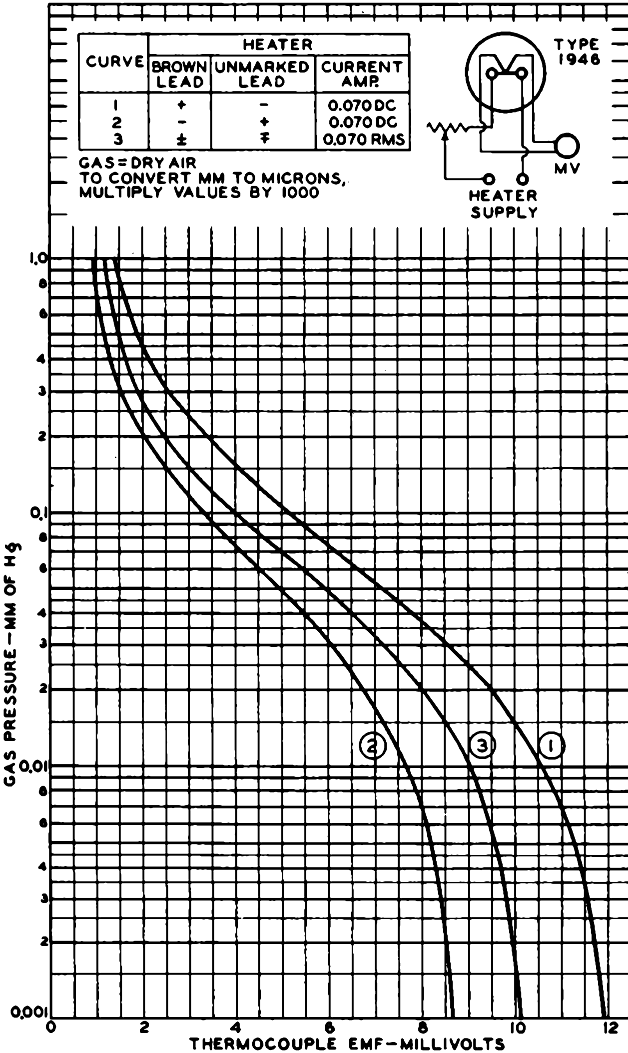
**BROWN HEATER LEAD SHOULD BE CONNECTED TO POSITIVE TERMINAL OF DC HEATER SUPPLY. 92CS-6815

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

1946

1946

CALIBRATION CURVES



CURVE	HEATER BROWN LEAD	HEATER UNMARKED LEAD	HEATER CURRENT AMP.
1	+	-	0.070 DC
2	-	+	0.070 DC
3	±	∓	0.070 RMS

MAR. 11, 1947 | TUBE DEPARTMENT | 92CM-6852

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

1947

1947
VACUUM-GAUGE TUBE

PIRANI TYPE

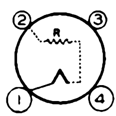
DATA

General:

Filament, Platinum Iridium:		
Voltage (Approx.). . . .	10	dc volts
Current (Varies with Gas Pressure). . .	70 - 100	ma.
Resistance between base pins No.1 & No.2 under vacuum better than 3 x 10-5 mm of mercury	135.8	ohms
Maximum Overall Length (including tubulation). . . .		7-9/16"
Maximum Diameter		1-3/16"
Bulb		T-9
Tubulation		7/32" Diameter Soft Glass, Corning Code 001 Lead
Mounting Position.		Any
Base		Small-Shell Small 4-Pin

BOTTOM VIEW

Pin 1 - Filament
Pin 2 - Filament
Pin 3 - No Connection
Pin 4 - Internal Connection - Do Not Use



R - Series Filament-Calibrating Resistor in base of tube

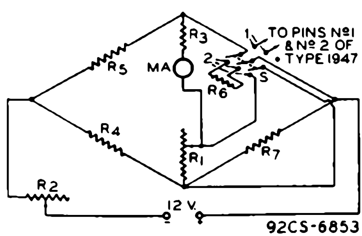
Maximum Ratings, *Absolute Values*:

FILAMENT VOLTAGE . . . . 16 max. volts

Calibration for 1947 in Accompanying Circuit:

See curve on following sheet.

PIRANI GAUGE BRIDGE CIRCUIT



92CS-6853

R1: 50 Ohms	R3 + METER: 15 Ohms	R6: 120.7 Ohms
R2: 25 Ohms	R4 R5: 10 Ohms each	R7: 135.8 Ohms

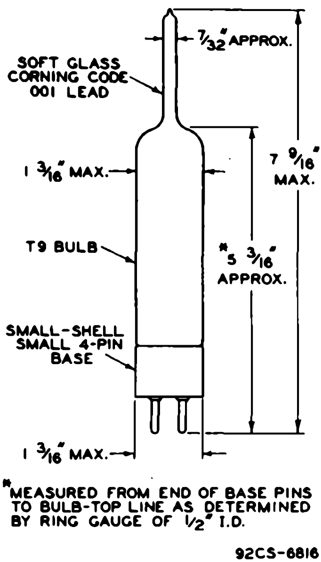
STEP 1: With switch S in position 2, adjust R2 so that meter reads 2.5 milliamperes.

STEP 2: With switch S in position 1, and with dry air at atmospheric pressure in the 1947, adjust R1 so that meter reads 5.0 milliamperes.

STEP 3: With no further adjustments and with switch S in position 1, proceed to use gauge.

1947

1947
VACUUM-GAUGE TUBE

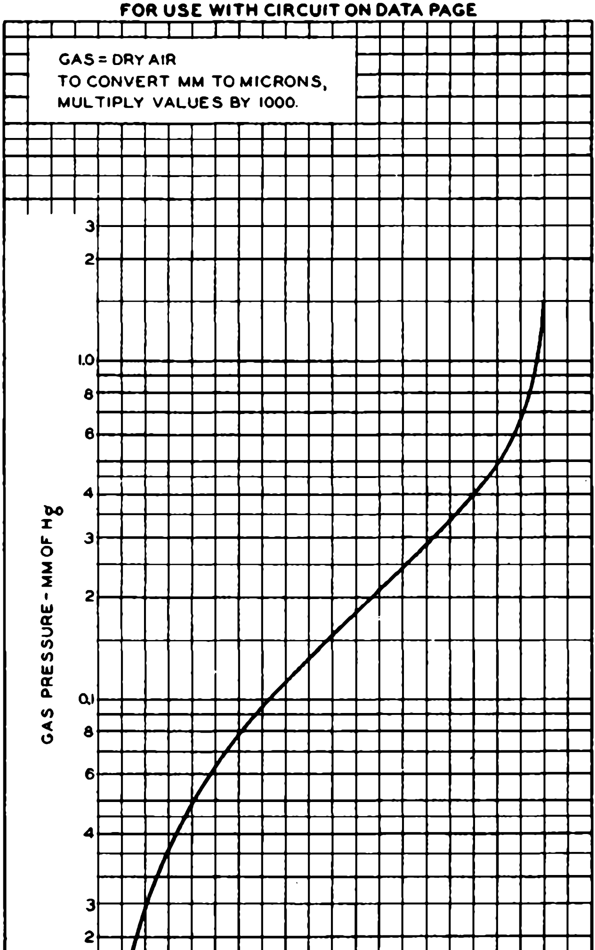


RCA

1947

CALIBRATION CURVE

FOR USE WITH CIRCUIT ON DATA PAGE



MARCH 10, 1947

TUBE DEPARTMENT

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6849

1949
VACUUM-GAUGE TUBE

HARD-GLASS BULB, IONIZATION TYPE

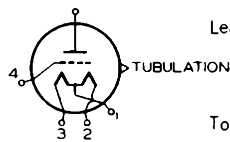
DATA

General:

Filament, Tungsten:*		
Voltage (Approx.)	5	ac or dc volts
Current (Approx.)	3.5	amp
Maximum Tube Length (Including tubulation)		11-1/2"
Maximum Tube Radius		2-3/16"
Maximum Bulb Length		5-1/8"
Maximum Bulb Diameter		2-1/16"
Bulb		T-16
Tubulation		1/2" Diameter Hard Glass, Corning Code 772 Nonex
Operating Position		Vertical with tubulation up or down; Horizontal, with stem press in vertical plane
Terminal Arrangement		See Outline Drawing

Terminal Lead Connections:

Lead 1 - Common Lead to Filaments
Lead 2 - Filament
Lead 3 - Filament (Spare)



Lead 4 - Grid
Top Lead - Plate

Maximum Ratings, *Absolute Values:*

FILAMENT VOLTAGE	6.5 max.	volts
DC PLATE VOLTAGE DURING OPERATION	-100 max.	volts
DC GRID VOLTAGE DURING OPERATION	+200 max.	volts
VOLTAGE ON GRID & PLATE TIED TOGETHER DURING DEGASSING (DC OR PEAK AC)	650 max.	volts
GRID & PLATE DISSIPATION (TOTAL) DURING DEGASSING	150 max.	watts
AMBIENT TEMPERATURE DURING OPERATION.	100 max.	°C
GAS PRESSURE	0.001 max.	mm of Hg

Typical Degassing Conditions:

Grid Connected to Plate

Filament Voltage (AC or DC)	6	6	volts
Grid & Plate Voltage	350 rms	500 dc	volts
Grid & Plate Current (Average)	100	150	ma

Typical Operation:

DC Plate Voltage	-22.5	-22.5	-22.5	volts

* The 1949 contains two filaments, one of which is a spare. Values shown are for either filament operated alone. The filament voltage should be kept as low as possible during degassing because use of a low filament voltage materially increases filament life.

← Indicates a change

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

1949

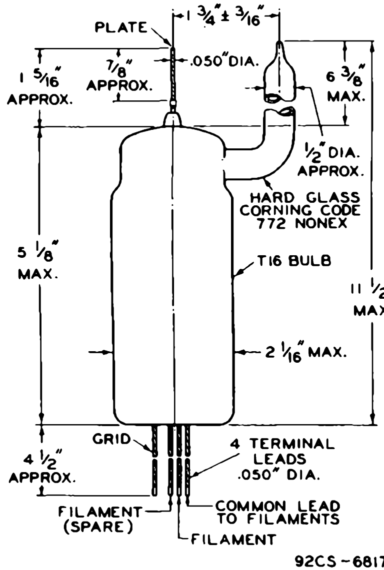
VACUUM-GAUGE TUBE

DC Grid Voltage	+80	+110	+160	volts
Grid Current	10	10	10	ma
Sensitivity	80	110	140	μa/micron▲

Calibration:

See curve on following sheet.

▲ 1 micron = 0.001 mm of mercury.



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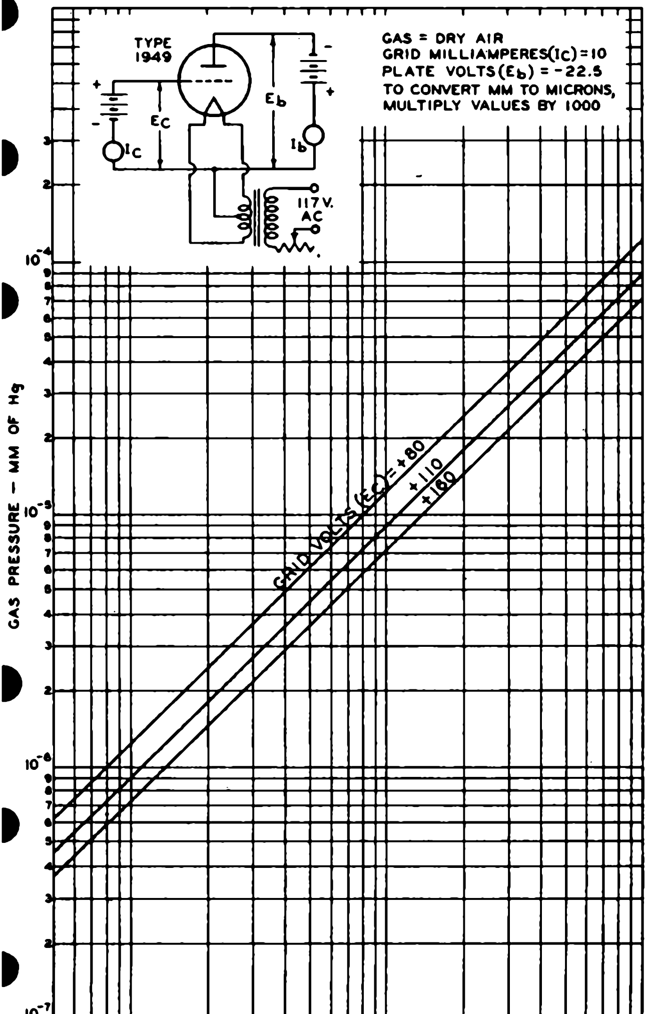
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

RCA

1949

CALIBRATION CURVES



MAR. 11, 1947

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6851

RCA

1950

VACUUM-GAUGE TUBE

SOFT-GLASS BULB, IONIZATION TYPE

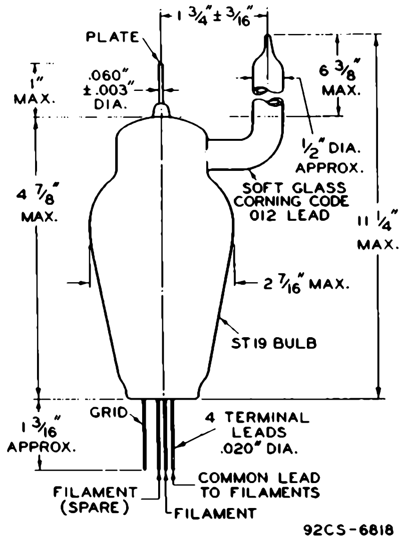
DATA

General:

Filament, Tungsten:*
  Voltage (Approx.) . . . . 5 . . . . . . ac or dc volts
  Current (Approx.) . . . . 3.5 . . . . amp
Maximum Tube Length (Including tubulation) . . . . 11-1/4"
Maximum Tube Radius . . . . 2-3/16"
Maximum Bulb Length . . . . 4-7/8"
Maximum Bulb Diameter . . . . 2-7/16"
Bulb ST-19
Tubulation . . . . 1/2" Diameter Soft Glass, Corning Code 012 Lead
Operating Position . . . . . Vertical, with tubulation up or down; Horizontal with stem press in vertical plane
Terminal Arrangement . . . . See Outline Drawing

* The 1950 contains two filaments, one of which is a spare. Values shown are for either filament operated alone. The filament voltage should be kept as low as possible during degassing because use of a low filament voltage materially increases filament life.

Maximum Ratings, Typical Degassing Conditions, Typical Operation, Calibration and Terminal Lead Connections for the 1950 are the same as for the 1949.



TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

RCA

5642

HALF-WAVE VACUUM RECTIFIER

SUBMINIATURE TYPE

For compact, portable high-voltage-rectifier applications

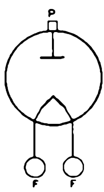
GENERAL DATA

Electrical:

Filament, Coated:		
Voltage	1.25	ac or dc volts
Current	0.2	amp
Direct Interelectrode Capacitance (Approx.):°		
Plate to filament	0.6	$\mu\mu$f

Mechanical:

Operating Position	Any
Maximum Length (Excluding flexible leads)	2.380"
Length, Base Seat to Bulb Top (Excluding tip)	1.700" ± 0.060"
Diameter	0.366" to 0.400"
Bulb	T3
Plate Terminal:	
Minimum length	0.250"
Leads, Flexible, Tinned	2
Minimum length	1.5"
Orientation and diameter	*See Dimensional Outline*
Maximum untinned distance from base seat	0.050"
Base	Special 2-Lead



P - Plate Terminal

F - Filament Lead

PULSED-RECTIFIER SERVICE

Maximum and Minimum Ratings, *Design-Center Values:*

For operation in a 525-line, 30-frame system□

PEAK INVERSE PLATE VOLTAGE	10000	max.	volts
PEAK PLATE CURRENT	5	max.	ma
DC PLATE CURRENT	0.25	max.	ma
FREQUENCY OF SUPPLY VOLTAGE	5	min.	kc

Typical Operation:

Peak-Pulse Plate Voltage⊕	8000	volts
DC Output Voltage (2 tubes)	12000	volts
DC Output Current	0.15	ma

Characteristics:

Plate Current for plate volts = 30	4	ma

°, □, ⊕: *See next page.*

ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5642

5642

HALF-WAVE VACUUM RECTIFIER

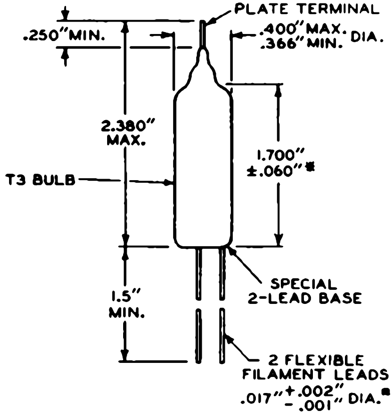
○ Without external shield.

□ As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations," Federal Communications Commission.

● The duration of the voltage pulse must not exceed 15 per cent of one horizontal scanning cycle. In a 525-line, 30-frame system, 15 per cent of one horizontal scanning cycle is 10 microseconds.

OPERATING CONSIDERATIONS

The *flexible leads* of the 5642 are usually soldered to the circuit elements. Soldering of the connections should be made as far as possible from the glass button and the glass tip. If this precaution is not followed, the heat of the soldering operation will crack the glass seals of the leads and damage the tube.



92CS-9713

* Measured from base seat to bulb-top line as determined by a ring gauge of 0.210" ± 0.001" inside diameter.

■ The specified lead diameter applies only in the zone between 0.050" and 0.250" from the base seat. Between 0.250" and 1.500", a maximum diameter of 0.021" is held. Outside of these zones, the lead diameter is not controlled.

5651

5651

VOLTAGE-REFERENCE TUBE

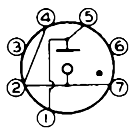
MINIATURE GLOW-DISCHARGE TYPE

DATA

General:

Cathode	Cold
Maximum Overall Length	2-1/8"
Maximum Seated Length	1-7/8"
Length from Base Seat to Bulb Top (excluding tip)	1-1/2" ± 3/32"
Maximum Diameter	3/4"
Bulb	T-5-1/2
Mounting Position	Any
Base	Small-Button Miniature 7-Pin
Basing Designation for BOTTOM VIEW	5BO

Pin 1 - Anode
Pin 2 - Cathode
Pin 3 - Internal Connection -Do Not Use
Pin 4 - Cathode



Pin 5 - Anode
Pin 6 - Internal Connection -Do Not Use
Pin 7 - Cathode

Maximum Ratings, ***Absolute Values*****:**

DC OPERATING CURRENT (Continuous)	3.5 max.	ma
AMBIENT TEMPERATURE RANGE	-55 to +90	°C

Characteristics and Operation Range Values:

	Min.	*Av.*	*Max.*	
DC Starting Voltage	-	107	115*	volts
DC Operating Voltage	82	87	92	volts
DC Operating Current	1.5	-	3.5	ma
Regulation (1.5 ma. to 3.5 ma.)	-	-	3	volts
Stability□	-	-	0.1	volt

Circuit Values:

Shunt Capacitor	-	-	0.02	μf
Series Resistor	See NOTE Below			

* A supply voltage of not less than this value should be provided to insure "starting" throughout tube life.

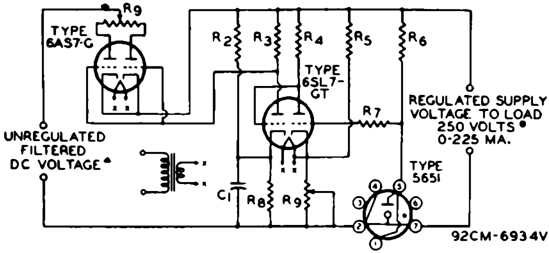
□ Defined as the maximum voltage fluctuation at any current level within the operating current range.

NOTE: A series resistor must always be used with the 5651. The resistance value must be chosen so that (1) the maximum current rating of 3.5 ma. is not exceeded at the highest anode-supply voltage employed, and (2) the minimum current rating of 1.5 ma. is always exceeded when the anode-supply voltage is at its lowest value.

5651

5651
VOLTAGE-REFERENCE TUBE

SERIES TYPE OF STABILIZED VOLTAGE SUPPLY USING
RCA-5651 AS VOLTAGE-REFERENCE TUBE



C_1 = 0.1 µf, 400 volts
R_1 = Plate current balancing potentiometer, 160 ohms, 10 watts
R_2 = 12000 ohms, 2 watts
R_3 = 470000 ohms, 0.5 watt
R_4 = 470000 ohms, 0.5 watt
R_5 = 12000 ohms, 2 watts
R_6 = 68000 ohms, 1 watt
R_7 = 1 megohm, 0.5 watt
R_8 = 15000 ohms, 2 watts
R_9 = output voltage control potentiometer, 10000 ohms

▲ 375 volts approx. at zero load current; 325 volts approx. at 225 milliamperes load current.

● The voltage regulation of this supply operated at a fixed line voltage of 117 volts and an output voltage of 250 volts is less than 0.2 volt over the current range of 0 to 225 milliamperes. At full current, the regulation for a variation of ± 10 per cent in line voltage is less than 0.1 volt. Socket connections for the 5651 are made so that removal of the 5651 from its socket opens the load.

5654

SHARP-CUTOFF PENTODE

MINIATURE TYPE

Intended for RF and IF Broad-Band Applications where dependable performance under shock and vibration are paramount. The 5654 is a "premium" version of the 6AK5.

5654 PREMIUM TYPE

GENERAL DATA

Electrical:

Heater, Pure Tungsten, for Unipotential Cathode:

Voltage	6.3 ± 10%	ac or dc volts
Current	0.175	amp

Direct Interelectrode Capacitances:▲

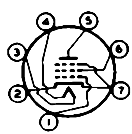
Grid No.1 to Plate	0.020 max.	μμf
Input	4.0	μμf
Output	2.85	μμf

Mechanical:

Mounting Position	Any
Maximum Overall Length	1-3/4"
Maximum Seated Length	1-1/2"
Length from Base Seat to Bulb Top (Excluding tip)	1-1/8" ± 3/32"
Maximum Diameter	3/4"
Bulb	T-5-1/2
Base	Small-Button Miniature 7-Pin (JETEC No.E7-1)

BOTTOM VIEW

Pin 1 - Grid No.1
Pin 2 - Cathode, Grid No.3, Int. Shield
Pin 3 - Heater
Pin 4 - Heater



Pin 5 - Plate
Pin 6 - Grid No.2
Pin 7 - Cathode, Grid No.3, Int. Shield

AMPLIFIER - Class A_1

Maximum Ratings, ***Absolute Values*****:**

PLATE VOLTAGE	200 max.	volts
GRID-No.2 (SCREEN) VOLTAGE	155 max.	volts
PLATE DISSIPATION	1.85 max.	watts
GRID-No.2 INPUT	0.55 max.	watt
CATHODE CURRENT	20 max.	ma
PEAK HEATER-CATHODE VOLTAGE:		
Heater positive with respect to cathode	100 max.	volts
Heater negative with respect to cathode	100 max.	volts

Typical Operation and Characteristics:

Plate Voltage	120	180	volts
Grid-No.2 Voltage	120	120	volts

▲ According to RTMA Standard ET-109A with external shield No.316.

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5654

5654

SHARP-CUTOFF PENTODE

Cathode-Bias Resistor	180	180	ohms
Plate Resistance (Approx.) . . .	0.30	0.50	megohm
Transconductance	5000	5100	μmhos
Plate Current	7.5	7.7	ma
Grid-No.2 Current	2.5	2.4	ma
Grid-No.1 Voltage (Approx.) for plate current of 10 μamp .	-8.5	-8.5	volts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance . . . . . . 0.5 max. megohm

SPECIAL RATINGS & PERFORMANCE DATA

Shock Rating:

Impact Acceleration . . . . 500 max. g

Tubes are held rigid in three different positions in a Navy Type, High Impact (flyweight) Shock Machine and are subjected to 500 g impact acceleration.

Fatigue Rating:

Vibrational Acceleration . . . . 2.5 max. g

Tubes are rigidly mounted and subjected in each of three positions to 2.5 g vibrational acceleration at 60 cycles per second for 32 hours.

Heater Cycling Life Performance:

Cycles of Intermittent Operation . . . 2000 min. cycles

Under the following conditions: With heater voltage of 7.5 volts cycled 1 minute on and 1 minute off, heater positive with respect to cathode by +100 volts dc, and plate, grid-No.2, and grid-No.1 voltage = 0 volts.

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Note	*Min.*	*Max.*	
Heater Current	1	0.160	0.190	amp
Grid-No.1-to-Plate Capacitance	-	-	0.020	μμf
Input Capacitance	-	3.4	4.6	μμf
Output Capacitance	-	2.45	3.25	μμf
Plate Current	1,2	3.0	12.0	ma
Transconductance	1,2	3500	6500	μmhos
Reverse Grid Current	1,3	-	0.1	μamp

Note 1: With 6.3 volts ac on heater.

Note 2: With plate voltage of 120 volts, grid-No.2 voltage of 120 volts, and grid-No.1 voltage of -2 volts.

Note 3: With plate voltage of 120 volts, grid-No.2 voltage of 120 volts, grid-No.1 voltage of -2 volts, and grid-No.1 resistor of 0.1 megohm.

CURVES
are the same as shown for Type 6AK5
in the Receiving Tube Section

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5675

UHF MEDIUM-MU TRIODE

"PENCIL TYPE" FOR GROUNDED-GRID SERVICE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage	6.3	ac or dc volts
Current	0.135	amp
Direct Interelectrode Capacitances:		
Grid to Plate	1.3	μμf
Grid to Cathode	2.3	μμf
Plate to Cathode	0.09 max.	μμf

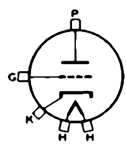
Characteristics, Class A_1 Amplifier:

Plate Voltage	135	volts
Cathode-Bias Resistor	68	ohms
Amplification Factor	20	
Plate Resistance	3225	ohms
Transconductance	6200	μmhos
Plate Current	24	ma

Mechanical:

Terminal Connections:

H - Heater
K - Cathode



G - Grid
P - Plate

Mounting Position	Any
Dimensions	See Outline Drawing

RF POWER AMPLIFIER & OSCILLATOR - Class C

Maximum Ratings, *Absolute Values*:

DC PLATE VOLTAGE	165 max.	volts
DC GRID VOLTAGE	-90 max.	volts
DC CATHODE CURRENT	30 max.	ma
DC GRID CURRENT	8 max.	ma
PLATE INPUT	5 max.	watts
PLATE DISSIPATION●	5 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	90 max.	volts
Heater positive with respect to cathode	90 max.	volts
PLATE-SEAL TEMPERATURE	175 max.	°C

Typical Operation as Grounded-Grid Oscillator at 1700 Mc:*

DC Plate Voltage	120	volts
DC Grid Voltage	-8	volts
From a grid resistor of	2000	ohms

● In applications where the plate dissipation exceeds 2.5 watts, it is important that a large area of contact be provided between the plate cylinder and its lead connector to provide adequate heat conduction.

* At 3000 Mc, and with full ratings, a useful output of approximately 50 milliwatts may be obtained.

5675

5675

UHF MEDIUM-MU TRIODE

DC Plate Current	25	ma
DC Grid Current (Approx.).	4	ma
Power Output (Approx.)	475	mw

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Note	*Min.*	*Max.*	
Heater Current	1	0.125	0.145	amp
Grid-to-Plate Capacitance. .	-	1.1	1.5	μμf
Grid-to-Cathode Capacitance.	-	2.0	2.6	μμf
Plate-to-Cathode Capacitance	-	-	0.09	μμf

Note 1: With 6.3 volts ac or dc on heater.

INSTALLATION NOTES

Connections to the cathode cylinder, grid disk, and plate cylinder should be made by flexible spring contacts only. The connectors must make firm, large-surface contact, yet must be sufficiently flexible so that no part of the tube is subjected to strain. Unless this recommendation is observed, the glass-to-metal seals may be damaged.

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RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

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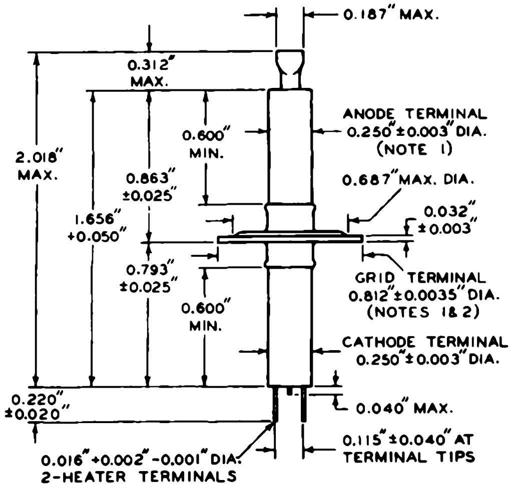
5675
UHF MEDIUM-MU TRIODE



92CS-7340R1

NOTE 1: MAX. ECCENTRICITY OF ℄ (AXIS) OF ANODE TERMINAL OR GRID-TERMINAL FLANGE WITH RESPECT TO THE ℄ (AXIS) OF THE CATHODE TERMINAL IS 0.008".

NOTE 2: TILT OF GRID-TERMINAL FLANGE WITH RESPECT TO ROTATIONAL AXIS OF CATHODE TERMINAL IS DETERMINED BY CHUCKING THE CATHODE TERMINAL, ROTATING THE TUBE, AND GAUGING THE TOTAL TRAVEL DISTANCE OF THE GRID-TERMINAL FLANGE PARALLEL TO THE AXIS AT A POINT APPROXIMATELY 0.020" INWARD FROM ITS EDGE FOR ONE COMPLETE ROTATION. THE TOTAL TRAVEL DISTANCE WILL NOT EXCEED 0.020".

5675

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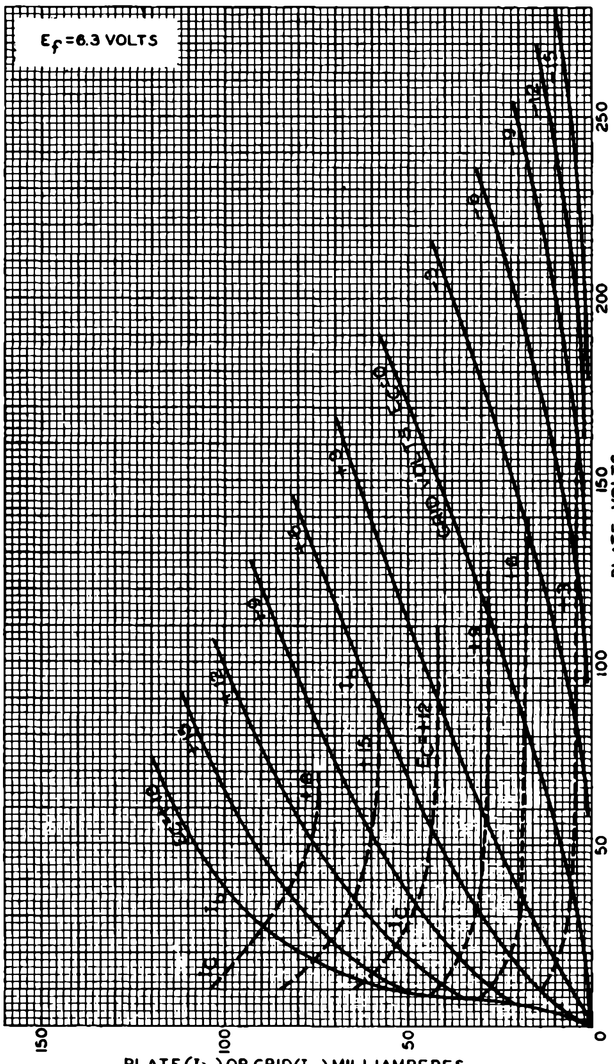
AVERAGE PLATE CHARACTERISTICS



AUG. 23, 1949 TUBE DEPARTMENT 92CM-7343

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

RCA

PREMIUM TYPE 5686

5686
BEAM POWER TUBE

9-PIN MINIATURE TYPE

For af or rf power-amplifier applications at frequencies up to 160 Mc

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage	6.3	ac or dc volts
Current	0.35	amp

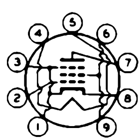
Direct Interelectrode Capacitances:

	Without External Shield	*With External Shield*°	
Grid No.1 to plate	0.11 max.	0.08 max.	μμf
Grid No.1 to cathode & grid No.3, grid No.2, and heater	6.4	6.5	μμf
Plate to cathode & grid No.3, grid No.2, and heater	4	8.5	μμf

Mechanical:

Operating Position	Any
Maximum Overall Length	2-3/16"
Maximum Seated Length	1-15/16"
Length, Base Seat to Bulb Top (Excluding tip)	1-9/16" ± 3/32"
Diameter	0.750" to 0.875"
Dimensional Outline	*See General Section*
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)
Basing Designation for BOTTOM VIEW	9G

Pin 1 - Cathode, Grid No.3
Pin 2 - Grid No.1
Pin 3 - Cathode, Grid No.3
Pin 4 - Heater



Pin 5 - Heater
Pin 6 - Grid No.2
Pin 7 - Plate
Pin 8 - Cathode, Grid No.3
Pin 9 - Grid No.2

AUDIO-FREQUENCY POWER AMPLIFIER — Class A_1

Maximum Ratings, *Absolute Values:*

PLATE VOLTAGE	275 max.	volts
GRID-No.2 (SCREEN-GRID) VOLTAGE	275 max.	volts
GRID-No.2 INPUT	3.3 max.	watts
PLATE DISSIPATION	8.25 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	100 max.	volts
Heater positive with respect to cathode	100 max.	volts

Typical Operation and Characteristics:

Plate Voltage	250	volts
Grid-No.2 Voltage	250	volts

°: See next page.

ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

RCA

5686

BEAM POWER TUBE

Grid-No.1 (Control-Grid) Voltage.	-12.5	volts
Peak AF Grid-No.1 Voltage	12.5	volts
Zero-Signal Plate Current	27	ma
Zero-Signal Grid-No.2 Current	3	ma
Plate Resistance (Approx.).	45000	ohms
Transconductance.	3100	µmhos
Load Resistance	9000	ohms
Max.-Signal Power Output.	2.7	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:		
For fixed-bias operation.	0.1 max.	megohm
For cathode-bias operation.	0.5 max.	megohm

RADIO-FREQUENCY POWER AMPLIFIER — Class C

Maximum Ratings, *Absolute Values:*

PLATE VOLTAGE	275 max.	volts
GRID-No.2 (SCREEN-GRID) VOLTAGE	275 max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE.	-165 max.	volts
PLATE CURRENT	44 max.	ma
GRID-No.2 CURRENT	16.5 max.	ma
GRID-No.1 CURRENT	3.3 max.	ma
PLATE INPUT	11 max.	watts
GRID-No.2 INPUT	3.3 max.	watts
PLATE DISSIPATION	8.25 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode.	100 max.	volts
Heater positive with respect to cathode.	100 max.	volts

Typical Operation:

	At frequencies up to 160 Mc		
Plate Voltage	250	250	volts
Grid-No.2 Voltage	180	250	volts
Grid-No.1 Voltage	-30	-50	volts
From grid-No.1 resistor of. . .	15000	25000	ohms
Peak RF Grid-No.1 Voltage	50	75	volts
Plate Current	30	40	ma
Grid-No.2 Current (Approx.) . . .	6.5	10.5	ma
Grid-No.1 Current (Approx.) . . .	2	2	ma
RF Grid-No.1 Driving Power (Approx.)	0.1	0.15	watt
Power Output (Approx.).	5	6.5	watts
Useful Power Output at 125 Mc . .	–	5.25	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance. . .	50000 max.	ohms

° With external shield JEDEC No.315 connected to cathode & grid No.3.

5686

BEAM POWER TUBE

SPECIAL RATINGS & PERFORMANCE DATA

Shock Rating:

This test is performed on a sample lot of tubes from each production run. Tubes are held rigid and are subjected in four different positions to an impact acceleration of 450 g.

Fatigue Rating:

This test is performed on a sample lot of tubes from each production run. Tubes are rigidly mounted and subjected to 2.5 g vibrational acceleration at a fixed frequency of 25 cycles per second for 100 hours in each of three positions.

Heater-Cycling Life Performance:

This test is performed on a sample lot of tubes from each production run. Tubes will withstand a minimum of 2000 cycles of intermittent operation under the following conditions: heater volts = 7.5 cycled one minute on and one minute off, heater 100 volts positive with respect to cathode, and all other elements connected to ground.

5687

5687

MEDIUM-MU TWIN TRIODE

9-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:

Heater arrangement	*Series*	*Parallel*	
Voltage	12.6	6.3	ac or dc volts
Current	0.45	0.9	amp

Direct Interelectrode Capacitances (Approx.):°

Grid to plate (Each unit)	4	$\mu\mu f$
Grid to cathode and heater (Each unit)	4	$\mu\mu f$
Plate to cathode and heater:		
Unit No.1	0.6	$\mu\mu f$
Unit No.2	0.5	$\mu\mu f$
Heater to cathode (Each unit)	7	$\mu\mu f$
Grid to grid	0.025	$\mu\mu f$
Plate to plate	0.75	$\mu\mu f$

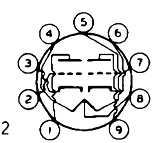
Characteristics, Class A_1 Amplifier (Each Unit):

Plate Voltage	120	180	250	volts
Grid Voltage	−2	−7	−12.5	volts
Amplification Factor	18	17	16	
Plate Resistance (Approx.)	1560	2000	3000	ohms
Transconductance	11500	8500	5400	μmhos
Plate Current	36	23	12	ma
Grid Voltage (Approx.) for plate μa = 100	−9	−14	−19	volts

Mechanical:

Operating Position	Any
Maximum Overall Length	2-3/16"
Maximum Seated Length	1-15/16"
Length, Base Seat to Bulb Top (Excluding tip)	1-9/16" ± 3/32"
Diameter	0.750" to 0.875"
Dimensional Outline	*See General Section*
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)
Basing Designation for BOTTOM VIEW	9H

Pin 1 – Plate of Unit No.2
Pin 2 – Grid of Unit No.2
Pin 3 – Cathode of Unit No.2
Pins 4 & 8 – Heater of Unit No.2
Pins 5 & 8 – Heater of Unit No.1



Pin 6 – Cathode of Unit No.1
Pin 7 – Grid of Unit No.1
Pin 8 – Heater Mid-Tap
Pin 9 – Plate of Unit No.1

°: See next page.

5687

MEDIUM-MU TWIN TRIODE

AMPLIFIER — Class A_1

Values are for Each Unit

Maximum Ratings, *Absolute Values:*

PLATE VOLTAGE.	330 max.	volts
GRID CURRENT	6.6 max.	ma
PLATE DISSIPATION:		
Either plate	4.2 max.	watts
Both plates (Both units operating) . . .	7.5 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode.	100 max.	volts
Heater positive with respect to cathode.	100 max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)°	220 max.	°C

Maximum Circuit Values:

Grid-Circuit Resistance.	1 max.	megohm

° Without external shield.

ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5690

FULL-WAVE VACUUM RECTIFIER

Intended for critical industrial and aircraft applications where 10,000-hour life, extreme uniformity, rigid construction, and exceptional stability are paramount.

SPECIAL RED TUBE 5690

GENERAL DATA

Electrical:

Heaters, Pure Tungsten, for Unipotential Cathodes:

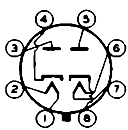
Of Units 1 & 2 connected in	*Series*	*Parallel*	
Voltage	12.6 ± 5%*	6.3 ± 5%*	volts
Current	1.2	2.4	amp

Mechanical:

Mounting Position	Any
Maximum Overall Length	4-1/4"
Maximum Seated Length	3-11/16"
Maximum Diameter	1-23/32"
Bulb	T-12
Base	Short Jumbo-Shell Octal 8-Pin, Non Hygroscopic (JETEC No.B8-71)

BOTTOM VIEW

Pin 1: Heater of Unit No.2
Pin 2: Heater of Unit No.2
Pin 3: Plate of Unit No.2
Pin 4: Cathode of Unit No.2



Pin 5: Plate of Unit No.1
Pin 6: Heater of Unit No.1
Pin 7: Heater of Unit No.1
Pin 8: Cathode of Unit No.1

RECTIFIER

Maximum Ratings, *Absolute Values: For supply frequency of 60 cps*

	For Altitudes up to 40000 Feet	
PEAK INVERSE PLATE VOLTAGE.	1120 max.	volts
PEAK VOLTAGE BETWEEN PLATE OF UNIT No.1 AND PLATE OF UNIT No.2 . . .	1120 max.	volts
PEAK PLATE CURRENT PER PLATE	375 max.	ma
AC PLATE SUPPLY VOLTAGE (RMS) PER PLATE .	*See Rating Chart I*	
DC OUTPUT CURRENT PER PLATE	*See Rating Chart I*	

HOT-SWITCHING CURRENT:

Even occasional hot-switching with capacitor-input circuits permits the flow of plate currents having magnitudes which can adversely affect the life and reliability of tubes designed for life values in the order of 10000 hours. If capacitor-input circuits are to be used, protect the circuits against the possibility of hot-switching and do not exceed a maximum peak current value per plate of 3 amperes during the initial cycles of the hot-switching transient. If hot-switching is required in operation, the use of choke-input circuits is recommended for maximum reliability and for long life. Such circuits limit the hot-switching current to a value no higher than that of the peak plate current.

* May deviate ± 10 per cent from rated value provided such deviation occurs for less than 2 per cent of operating time.

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5690

5690

FULL-WAVE VACUUM RECTIFIER

PEAK HEATER-CATHODE VOLTAGE:●

Heater negative with respect to cathode	400 max.	volts
Heater positive with respect to cathode	400 max.	volts
BULB TEMPERATURE	200 max.	°C

Typical Operation as Full-Wave Rectifier with Capacitor-Input Filter:

AC Plate-to-Plate Supply Voltage (RMS)	700	volts
Filter-Input Capacitor▲	10	μf
Effective Plate-Supply Resistance per Plate	350	ohms
DC Output Voltage at Input to Filter (Approx.):		
At half-load current of 55 ma	415	volts
At full-load current of 110 ma	355	volts
Voltage Regulation (Approx.):		
Half-load to full-load current	60	volts

Typical Operation as Full-Wave Rectifier with Choke-Input Filter:

AC Plate-to-Plate Supply Voltage (RMS)	700	volts
Filter Input Choke	10	henries
DC Output Voltage at Input to Filter (Approx.):		
At half-load current of 67.5 ma	305	volts
At full-load current of 135 ma	300	volts
Voltage Regulation (Approx.):		
Half-load to full-load current	5	volts

SPECIAL RATINGS & PERFORMANCE DATA

Shock Rating:

Impact Acceleration . . . . 500 max. g

Tubes are held rigid in three different positions in a Navy Type, High Impact (flyweight) Shock Machine and are subjected to 500 g impact acceleration.

Fatigue Rating:

Vibrational Acceleration . . . . 2.5 max. g

Tubes are rigidly mounted and subjected in each of three positions to 2.5 g vibrational acceleration at 25 cycles per second for 32 hours.

CHARACTERISTICS RANGE RALUES FOR EQUIPMENT DESIGN

	Note	*Min.*	*Max.*	
Heater Current	1	2.30	2.50	amp

● For maximum reliability, it is recommended that the cathode of each unit be connected directly to the mid-point or one side of the heater winding.

▲ Higher values of capacitance than indicated may be used but the effective plate-supply resistance should be increased to prevent exceeding the maximum rating for peak plate current. *See Rating Chart II.*

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

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5690

FULL-WAVE VACUUM RECTIFIER

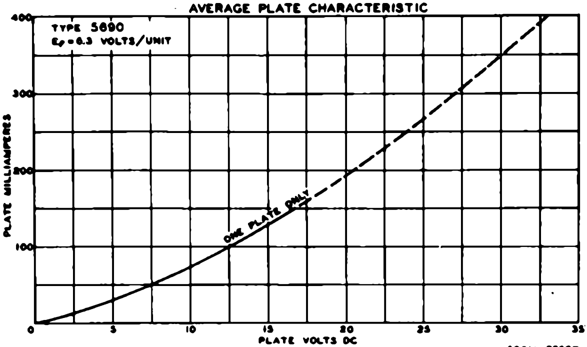
	Note	*Min.*	*Max.*	
Heater–Cathode Current:				
Heater negative with respect to cathode . . .	1,2	–	30	µamp
Heater positive with respect to cathode . . .	1,2	–	30	µamp
Tube Voltage Drop	1,3	15	19	volts

Note 1: With 6.3 volts on heater of unit No.1 connected in parallel with heater of unit No.2.

Note 2: With 300 volts between heater and cathode.

Note 3: With dc voltage per plate adjusted to give dc plate current of 150 ma. per unit.

AVERAGE PLATE CHARACTERISTIC



92CM-7702T

RATING CHARTS and OPERATION CHARACTERISTICS

Rating Chart I represents graphically the relationships between absolute maximum ac voltage input and absolute maximum dc output current derived from the fundamental ratings for conditions of capacitor-input and choke-input filters. This graphical presentation gives the equipment designer considerable latitude in choice of operating conditions.

Rating Chart II represents graphically the relationships between maximum rectification efficiency and absolute maximum dc output current per plate for conditions of capacitor input to filter.

Rating Chart III represents graphically the relationships between minimum plate-supply resistance per plate and absolute maximum ac plate-supply voltage per plate under no-load conditions for conditions of capacitor input to filter when occasional hot-switching is employed.

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

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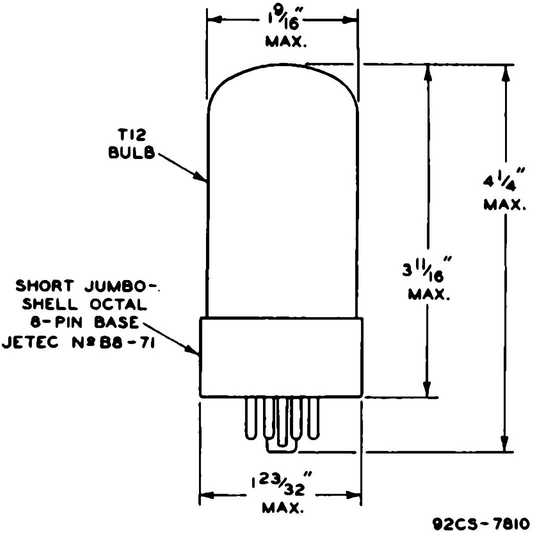
5690

FULL-WAVE VACUUM RECTIFIER

The *Operation Characteristics for the 5690 in Full-Wave Circuit with 4µf, 10µf, and 20µf-Capacitor Input to Filter* show not only typical operating curves for different plate-supply voltages and different effective plate-supply resistances, but also by means of boundary line "AED" the limiting current and voltage relationships presented on *Rating Chart I*.

The *Operation Characteristics for the 5690 in Full-Wave Circuit with Choke Input to Filter* show not only typical operating curves for different plate-supply voltages but also by means of boundary line "ABC" the limiting current and voltage relationships presented on *Rating Chart I*. These curves also give information as to the effect of various sizes of chokes on regulation. The solid-line curves show the dc voltage outputs which would be obtained if the filter chokes had infinite inductance. The long-dash lines radiating from the zero position are boundary lines for various sizes of chokes as indicated. The intersection of one of these lines with a solid-line curve indicates the point on the curve at which the choke no longer behaves as though it had infinite inductance. To the left of the choke boundary line, the regulation curves depart from the solid-line curves as shown by the representative short-dash regulation curves.



92CS-7810

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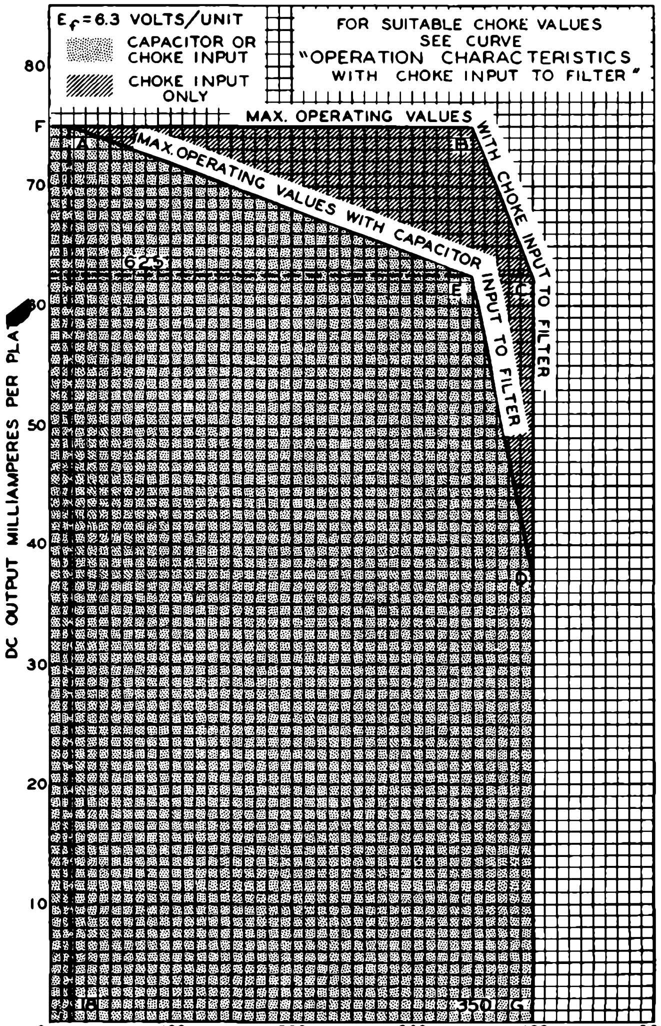
5690

5690

RATING CHART I



JULY 1,1952

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RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7797

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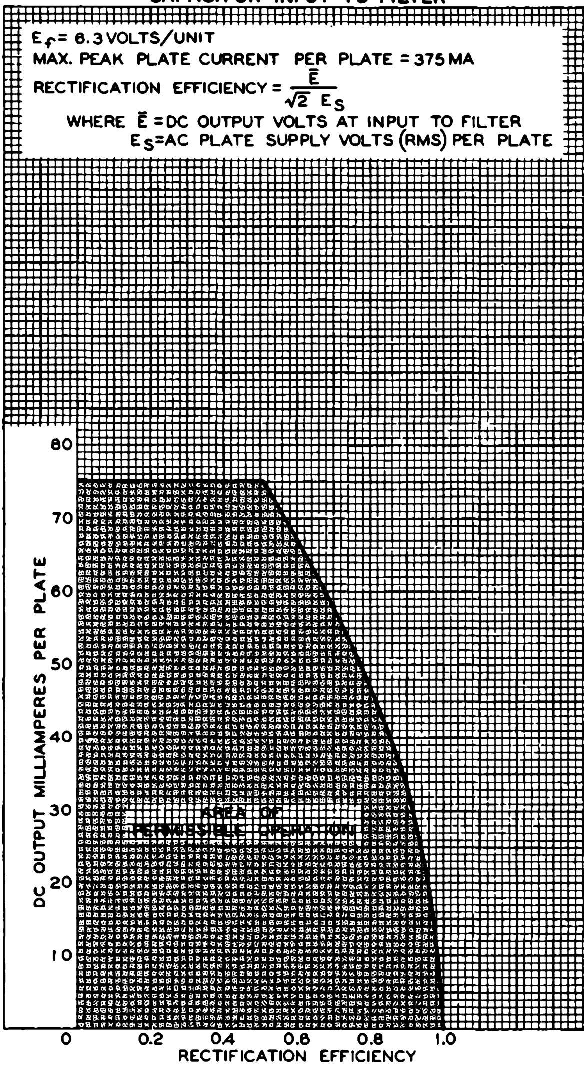
5690

RATING CHART II
CAPACITOR INPUT TO FILTER



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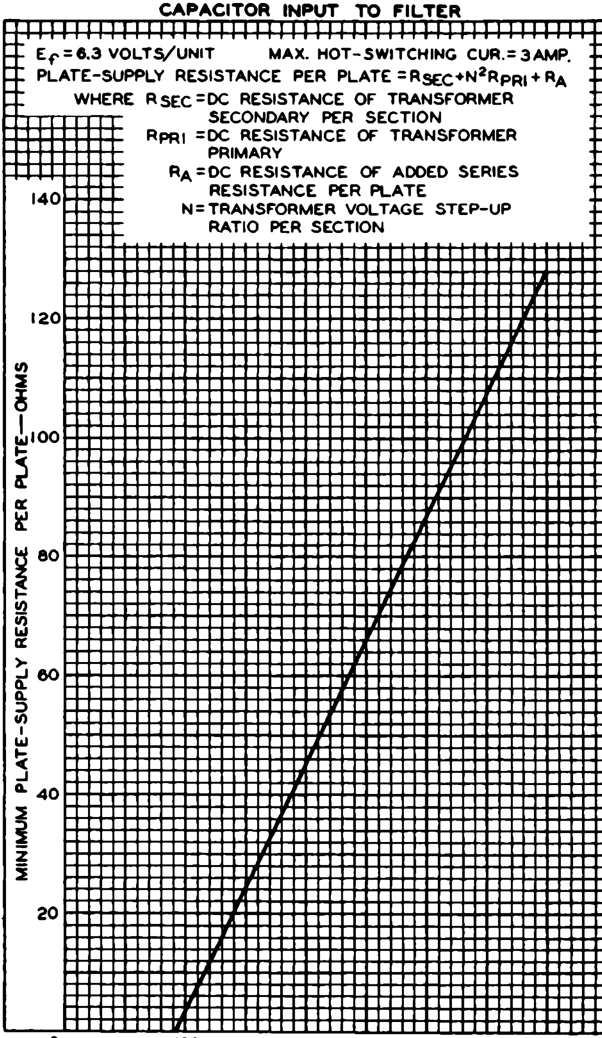
5690

5690

RATING CHART III

CAPACITOR INPUT TO FILTER



JAN. 9, 1953

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

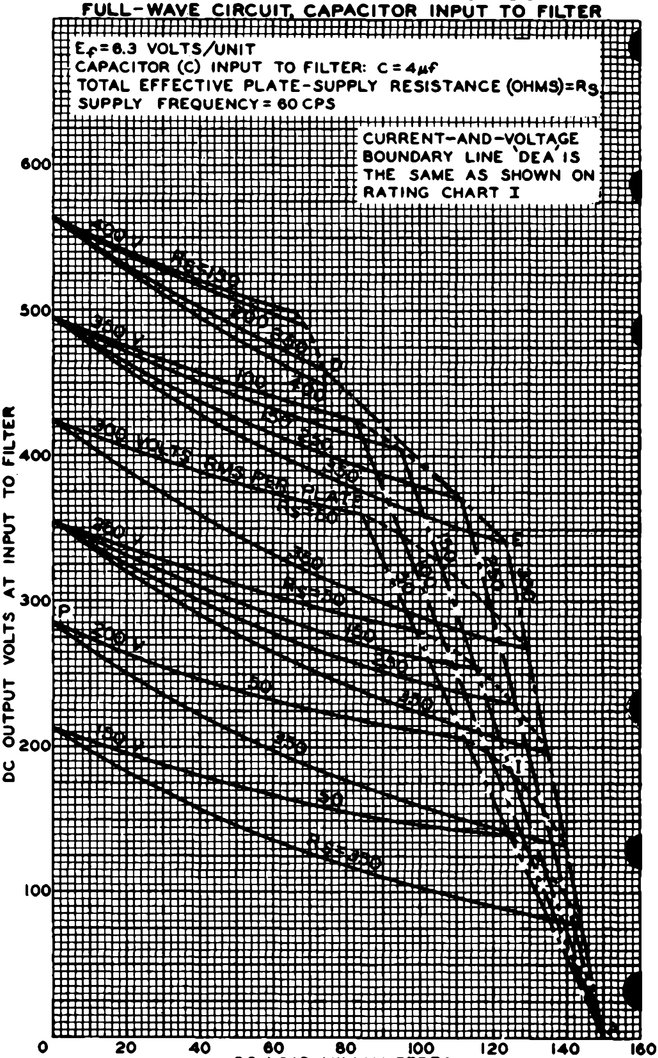
92CM-7895

RCA

5690

OPERATION CHARACTERISTICS

FULL-WAVE CIRCUIT, CAPACITOR INPUT TO FILTER



MAY 9, 1952 — TUBE DEPARTMENT — 92CM-7794

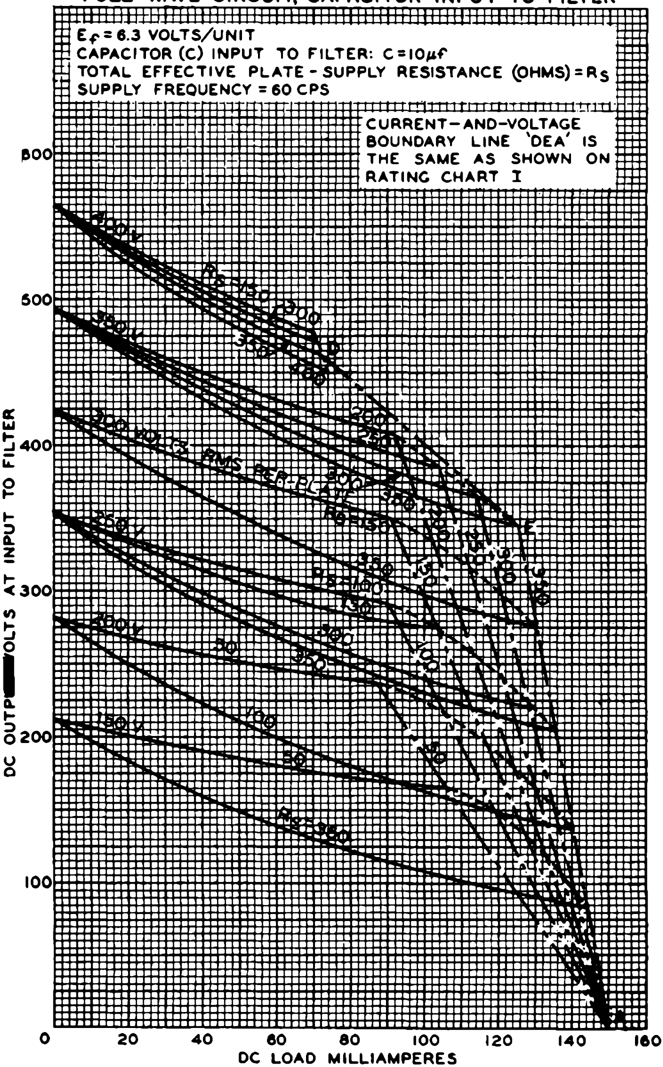
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

RCA

5690

OPERATION CHARACTERISTICS

FULL-WAVE CIRCUIT, CAPACITOR INPUT TO FILTER



MAY 12, 1952

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

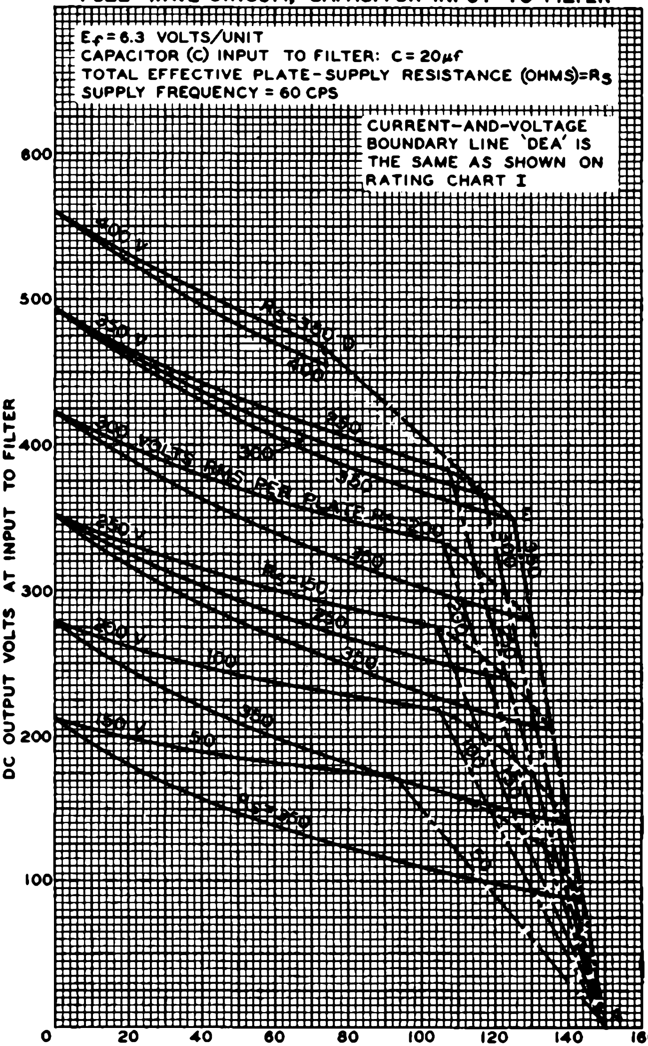
92CM-7795

5690

5690

OPERATION CHARACTERISTICS

FULL-WAVE CIRCUIT, CAPACITOR INPUT TO FILTER



MAY 7, 1952

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

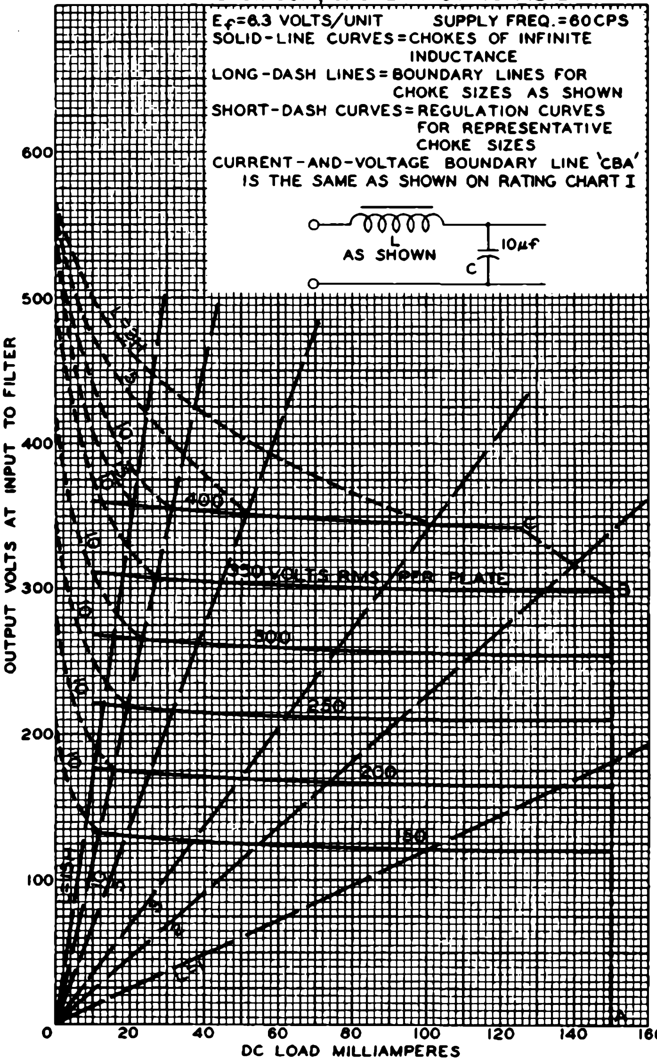
92CM-7793

RCA

5690

OPERATION CHARACTERISTICS

FULL-WAVE CIRCUIT, CHOKE INPUT TO FILTER



MAY 15, 1952

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7796

5691 SPECIAL RED TUBE

5691
HIGH-MU TWIN TRIODE

Intended for critical industrial applications where 10,000-hour life, extreme uniformity, rigid construction, and exceptional stability are paramount. Within its ratings, the 5691 may be used to replace its receiving-tube counterpart, type 6SL7-GT, where heater transformer will carry increased current.

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:
- Voltage . . . . 6.3 ± 5%* . . . ac or dc volts
- Current . . . . 0.6 . . . . amp

Direct Interelectrode Capacitances:°

	Min.	Av.	Max.	
Triode No.1:				
Grid to Plate	3.1	3.6	4.1	μμf
Grid to Cathode	1.9	2.4	2.9	μμf
Plate to Cathode	1.8	2.3	2.8	μμf
Triode No.2:				
Grid to Plate	3.1	3.6	4.1	μμf
Grid to Cathode	2.2	2.7	3.2	μμf
Plate to Cathode	2.1	2.6	3.1	μμf
Plate of Triode No.1 to Plate of Triode No.2	0.27	0.32	0.37	μμf

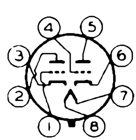
* May deviate ±10% from rated value provided such deviation occurs for less than 2% of the operating time.

° With no external shield.

Mechanical:

Mounting Position . . . . Any
Maximum Overall Length . . . . 2-7/8"
Maximum Seated Length . . . . 2-5/16"
Maximum Diameter . . . . 1-9/32"
Bulb T-9
Base . . . . Short Intermediate-Shell Octal 8-Pin, Non-Hygroscopic
Basing Designation for BOTTOM VIEW 8BD

Pin 1 - Grid of Triode No.2
Pin 2 - Plate of Triode No.2
Pin 3 - Cathode of Triode No.2
Pin 4 - Grid of Triode No.1



Pin 5 - Plate of Triode No.1
Pin 6 - Cathode of Triode No.1
Pin 7 - Heater
Pin 8 - Heater

(continued on next page)

5691

5691
HIGH-MU TWIN TRIODE

INDUSTRIAL SERVICE

Includes applications such as dc and audio amplifiers

Values are for each unit

Maximum Ratings, *Absolute Values:*

DC PLATE VOLTAGE	275 max.	volts
DC PLATE-SUPPLY VOLTAGE	330 max.	volts
GRID VOLTAGE:		
Negative bias range	1● min. to 100 max.	volts
Negative peak value	200 max.	volts
DC GRID CURRENT	2 max.	ma
DC CATHODE CURRENT	10 max.	ma
PLATE DISSIPATION	1 max.	watt
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	100 max.	volts
Heater positive with respect to cathode	100 max.	volts
AMBIENT TEMPERATURE RANGE	-55 to +90	°C

● For resistance-coupled amplifier applications, the negative bias may be as low as 0.5 volt.

Maximum Circuit Value (for any operating condition):

Grid-Circuit Resistance . . . . 2 max. megohms

Characteristics and Range Values:

Heater Volts, 6.3; Plate Volts, 250; Grid Volts, -2

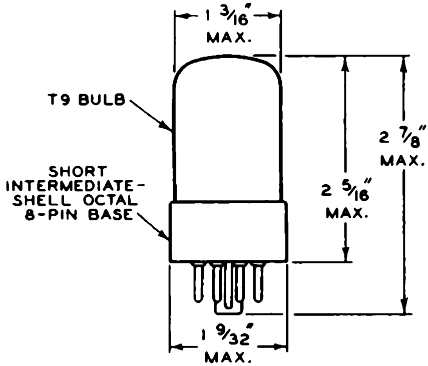
	Min.	*Av.*	*Max.*	
Heater Current	0.55	0.6	0.65	amp
Heater-Cathode Current with heater-cathode voltage of ± 100 volts	-	-	5	μamp
Plate Current	1.7	2.3	2.9	ma
Difference in Plate Current between triode units	-	-	0.9	ma
Plate Current for grid voltage of -5.5 volts	-	-	15	μamp
Reverse Grid Current	-	-	0.2	μamp
Amplification Factor	60	70	80	
Plate Resistance	-	44000	-	ohms
Transconductance	1300	1600	1900	μmhos

Typical Operation as Resistance-Coupled Amplifier (Each Unit)

See RESISTANCE-COUPLED AMPLIFIER CHART No. 7 at front of Receiving Tube Section.

5691

HIGH-MU TWIN TRIODE

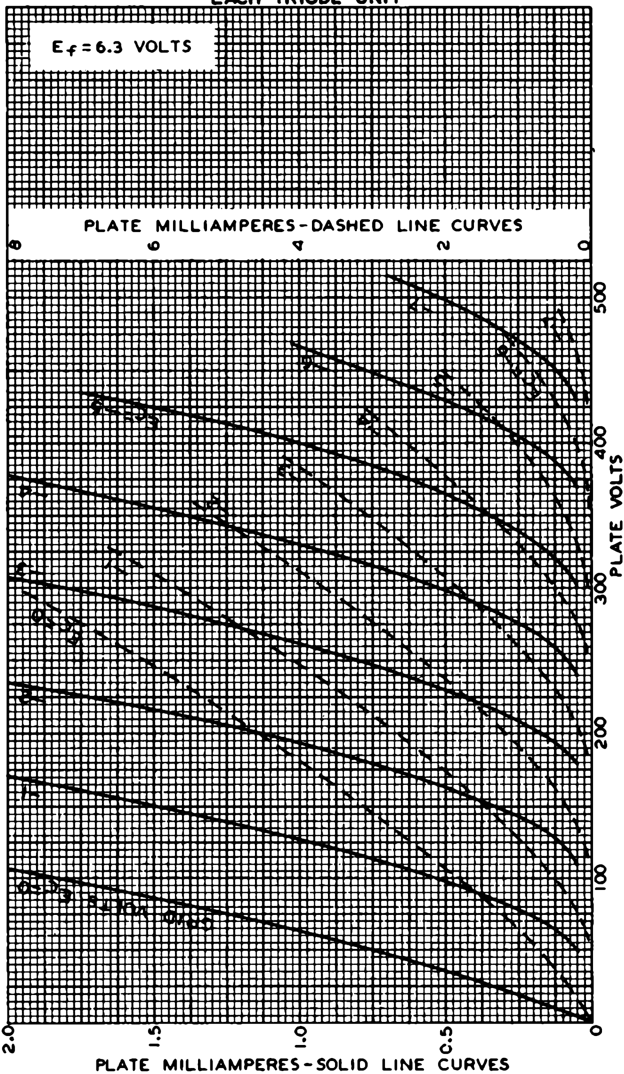


5691

RCA

5691

AVERAGE PLATE CHARACTERISTICS
EACH TRIODE UNIT



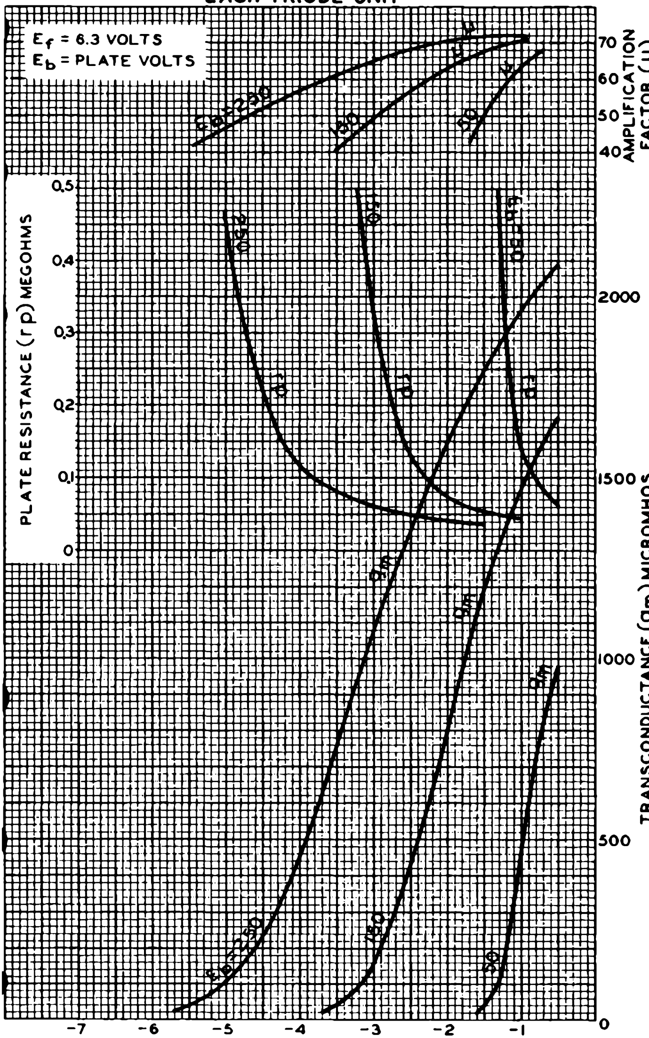
JUNE 16, 1941 TUBE DEPARTMENT 92C-6298

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5691

5691

AVERAGE CHARACTERISTICS
EACH TRIODE UNIT



NOV. 21, 1947

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6913

5692
SPECIAL RED TUBE 5692

5692

MEDIUM-MU TWIN TRIODE

Intended for critical industrial applications where 10,000-hour life, extreme uniformity, rigid construction, and exceptional stability are paramount. Within its ratings, the 5692 may be used to replace its receiving-tube counterpart, type 6SN7-GT.

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:
Voltage. . . . . 6.3 ± 5%* . . . ac or dc volts
Current. . . . . 0.6 . . . . amp

Direct Interelectrode Capacitances:°

	Min.	Av.	Max.	
Triode No.1:				
Grid to Plate	3.0	3.5	4.0	μμf
Grid to Cathode	1.8	2.3	2.8	μμf
Plate to Cathode	2.0	2.5	3.0	μμf
Triode No.2:				
Grid to Plate	2.8	3.3	3.8	μμf
Grid to Cathode	2.1	2.6	3.1	μμf
Plate to Cathode	2.2	2.7	3.2	μμf
Plate of Triode No.1 to Plate of Triode No.2	0.27	0.32	0.37	μμf

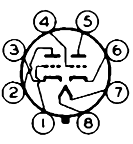
* Heater voltage may deviate ± 10% from rated value, provided such deviation occurs for less than 2% of the operating time.

° With no external shield.

Mechanical:

Mounting Position. . . . . Any
Maximum Overall Length . . . . 2-7/8"
Maximum Seated Length. . . . . 2-5/16"
Maximum Diameter . . . . 1-9/32"
Bulb T-9
Base . . . . Short Intermediate-Shell Octal 8-Pin, Non-Hygroscopic
Basing Designation for BOTTOM VIEW 8BD

Pin 1 - Grid of Triode No.2
Pin 2 - Plate of Triode No.2
Pin 3 - Cathode of Triode No.2
Pin 4 - Grid of Triode No.1



Pin 5 - Plate of Triode No.1
Pin 6 - Cathode of Triode No.1
Pin 7 - Heater
Pin 8 - Heater

(continued on next page)

5692

5692
MEDIUM-MU TWIN TRIODE

INDUSTRIAL SERVICE

Including applications such as dc amplifiers, audio amplifiers, and relaxation oscillators.

Values are for each unit

Maximum Ratings, *Absolute Values*:

DC PLATE VOLTAGE	275 max.	volts
DC PLATE-SUPPLY VOLTAGE.	330 max.	volts
GRID VOLTAGE:		
Negative bias range.	1● min. to 100 max.	volts
Negative peak value.	200 max.	volts
DC GRID CURRENT.	2 max.	ma
DC CATHODE CURRENT	15 max.	ma
PLATE DISSIPATION.	1.75 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode. .	100 max.	volts
Heater positive with respect to cathode. .	100 max.	volts
AMBIENT TEMPERATURE RANGE.	-55 to +90	°C

● For resistance-coupled amplifier applications, the negative bias may be as low as 0.5 volt.

Maximum Circuit Value (for any operating condition):

Grid-Circuit Resistance. . . . . 2 max. megohms

Characteristics and Range Values:

Heater Volts, 6.3; Plate Volts, 250; Grid Volts, -9

	Min.	Av.	Max.	
Heater Current	0.55	0.6	0.65	amp
Heater-Cathode Current with heater-cathode voltage of ± 100 volts.	-	-	5	μamp
Plate Current.	4.8	6.5	8.2	ma
Difference in Plate Current between triode units	-	-	2.0	ma
Plate Current for grid voltage of -24 volts	-	-	15	μamp
Reverse Grid Current	-	-	0.2	μamp
Amplification Factor	18	20	22	
Plate Resistance	-	9100	-	ohms
Transconductance	1825	2200	2575	μmhos

Typical Operation as Resistance-Coupled Amplifier (Each Unit)

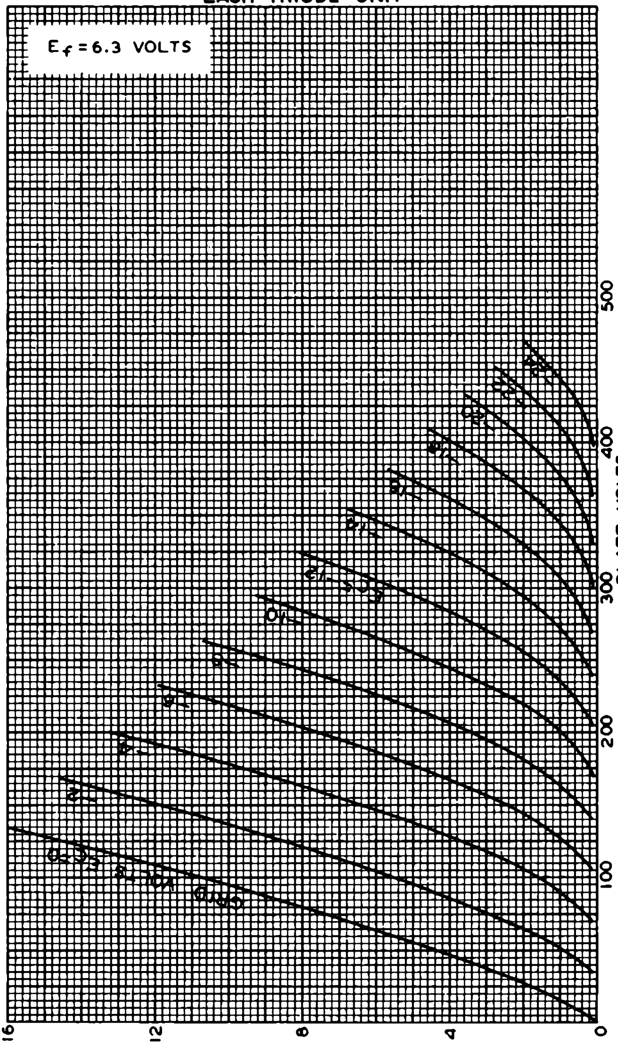
See RESISTANCE-COUPLED AMPLIFIER CHART No. 13 at front of Receiving Tube Section.

OUTLINE DIMENSIONS for the 5692 are the same as those shown for type 5691

5692

5692

AVERAGE PLATE CHARACTERISTICS
EACH TRIODE UNIT



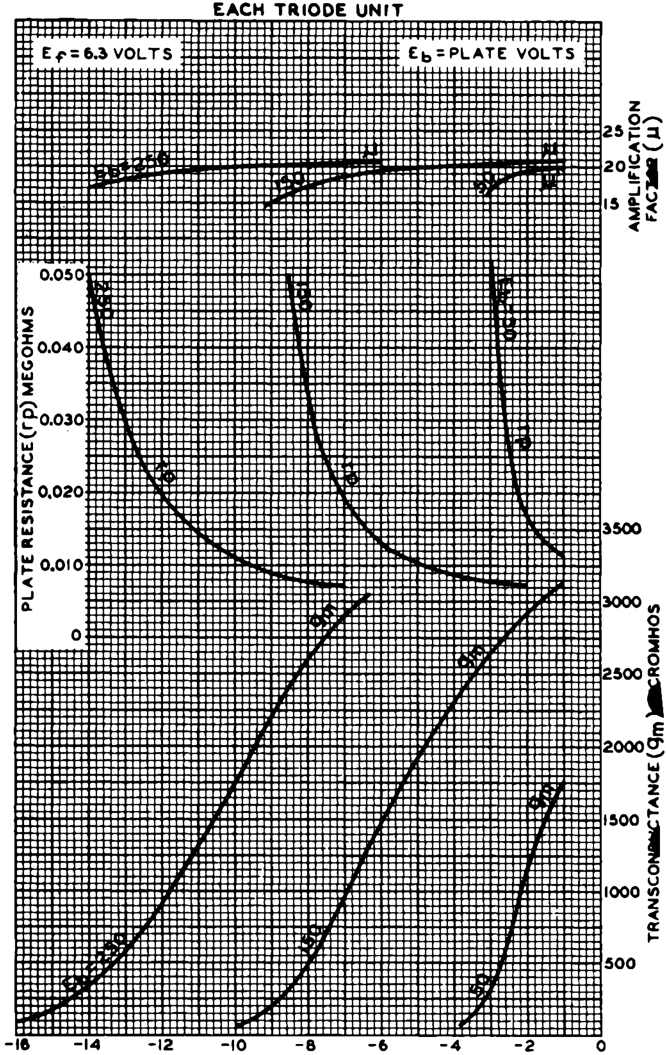
FEB. 21, 1941 — TUBE DEPARTMENT — 92CM-6257

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5692

5692

AVERAGE CHARACTERISTICS
EACH TRIODE UNIT



NOV. 10, 1947

TUBE DEPARTMENT

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6914

SPECIAL RED TUBE 5693

5693

SHARP-CUTOFF PENTODE

Intended for critical industrial applications where 10,000-hour life, extreme uniformity, rigid construction, and exceptional stability are paramount. Within its ratings, the 5693 may be used to replace its receiving-tube counterpart, type 6SJ7.

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage	6.3 ± 5%*	ac or dc volts
Current	0.3	amp

Direct Interelectrode Capacitances:°

	Min.	*Av.*	*Max.*	
Grid to Plate	-	-	0.005	μμf
Input	4.8	5.3	5.8	μμf
Output	5.6	6.2	6.8	μμf

* May deviate ± 10% from rated value provided such deviation occurs for less than 2% of the operating time.

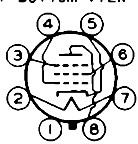
° With shell connected to cathode.

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-5/8"
Seated Length	1-31/32" ± 3/32"
Maximum Diameter	1-5/16"
Bulb	Metal Shell MT-8
Base	Small-Wafer Octal 8-Pin, Non-Hygroscopic

Basing Designation for BOTTOM VIEW 8N

Pin 1 - Shell
Pin 2 - Heater
Pin 3 - Grid No.3
Pin 4 - Grid No.1



Pin 5 - Cathode
Pin 6 - Grid No.2
Pin 7 - Heater
Pin 8 - Plate

INDUSTRIAL SERVICE

Includes applications such as dc and resistance-coupled amplifiers

Maximum Ratings, ***Absolute Values:***

DC PLATE VOLTAGE	300 max.	volts
DC PLATE-SUPPLY VOLTAGE	330 max.	volts
DC GRID-No.3 (SUPPRESSOR) VOLTAGE:		
Negative bias value	0 min.	volts
	-100 max.	volts
DC GRID-No.2 (SCREEN) VOLTAGE▲	125 max.	volts
DC GRID-No.2-SUPPLY VOLTAGE	330 max.	volts

▲: See next page.

5693

5693
SHARP-CUTOFF PENTODE

GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Negative bias range.	-1■ min. to -50 max.	volts
Negative peak value.	-50 max.	volts
DC CATHODE CURRENT	10 max.	ma
PLATE DISSIPATION.	2 max.	watts
GRID-No.2 DISSIPATION.	0.3 max.	watt
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode.	100 max.	volts
Heater positive with respect to cathode.	100 max.	volts
AMBIENT TEMPERATURE RANGE.	-55 to +90	°C

Maximum Circuit Value:

See curve on a following page giving maximum values of the grid-No.1 resistor.

Characteristics and Range Values:

Heater volts, 6.3; Plate Volts, 250; Grid-No.3 Volts, 0; Grid-No.2 Volts, 100; Grid-No.1 Volts, -3.

	Min.	Av.	Max.	
Heater Current	0.275	0.300	0.325	amp
Heater-Cathode Current with heater-cathode voltage of ± 100 volts	-	-	5	μamp
Plate Current.	2.3	3.0	3.7	ma
Plate Current for grid-No.1 voltage of -7.5 volts. . .	2	30	80	μamp
Plate Current for grid-No.3 voltage of -70 volts . . .	150	450	750	μamp
Grid-No.2 Current.	0.60	0.85	1.10	ma
Reverse Grid-No.1 Current. .	-	-	0.1	μamp
Plate Resistance	1.0	-	-	megohm
Transconductance	1400	1650	1900	μmhos

Typical Operation as Resistance-Coupled Amplifier:

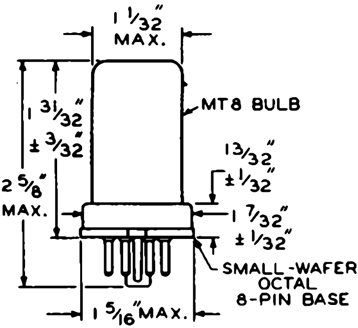
See RESISTANCE-COUPLED AMPLIFIER CHART No.20 at front of Receiving Tube Section.

▲ The 5693 may be operated at a grid-No.2 voltage as high as the rated grid-No.2 supply voltage when the grid-No.2 dissipation rating is not exceeded for any signal condition and when a resistor is used in series with grid-No.2 and its supply voltage.

■ For resistance-coupled amplifier applications, the grid-No.1 negative bias may be as low as -0.5 volt.

RCA

5693
SHARP-CUTOFF PENTODE



5693

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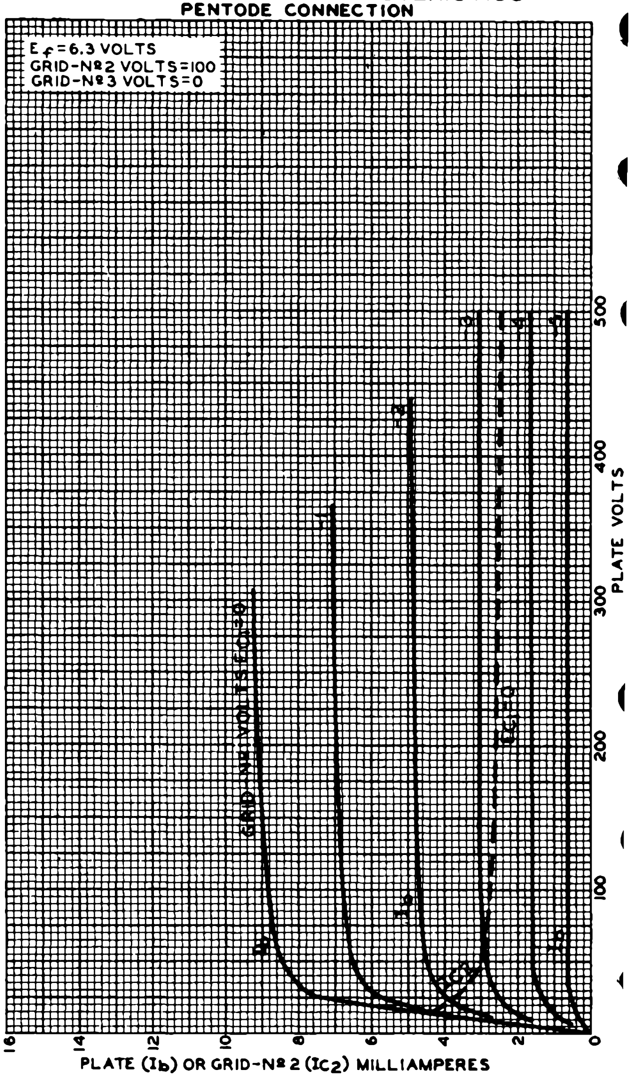
AVERAGE PLATE CHARACTERISTICS

PENTODE CONNECTION



OCT. 16, 1947 TUBE DEPARTMENT 92CM-4939R1

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5693

OPERATION CHARACTERISTICS

E_f = 6.3 VOLTS PLATE VOLTS = 300 GRID-No 3 VOLTS = 0

CURVE	GRID-No 2 RESISTOR	GRID-No 2 SUPPLY VOLTS
1	0 MEG.	100
2	0.25 MEG.	300
3	0.5 MEG.	300
4	0.75 MEG.	300

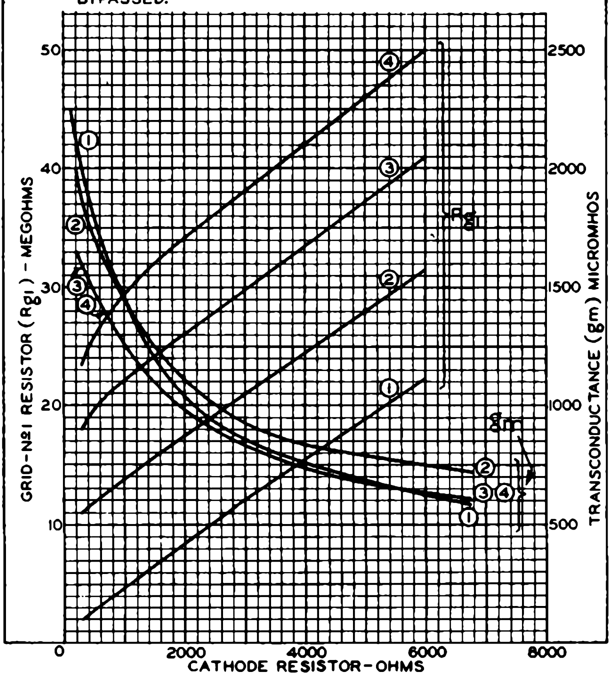
THESE CURVES ARE BASED ON THE FOLLOWING VALUES: $\Delta I_K = 300\mu AMP$, $\Delta I_{g_1} = 0.1\mu AMP$

EXPRESSING THESE VALUES AS A RATIO, WE HAVE:

$$\frac{\Delta I_K}{\Delta I_{g_1}} = \frac{300}{0.1} \text{ OR } 3000$$

FOR THOSE APPLICATIONS PERMITTING OTHER VALUES OF ΔI_K, A NEW RATIO OF $\Delta I_K/\Delta I_{g_1}$ CAN BE CALCULATED. THE VALUES OF R_{g_1} AS READ FROM THE CURVE MUST BE MULTIPLIED BY A FACTOR WHICH IS THE QUOTIENT OF THE NEW RATIO DIVIDED BY THE OLD RATIO. FOR EXAMPLE, IF THE NEW RATIO IS 6000 THE MULTIPLYING FACTOR IS 6000/3000, OR 2, AND VALUES OF R_{g_1} AS READ FROM THE CURVE ARE THEREFORE MULTIPLIED BY 2.

NOTE: TRANSCONDUCTANCE CURVES WERE OBTAINED WITH GRID-No 2 RESISTOR AND CATHODE RESISTOR SUITABLY BYPASSED.

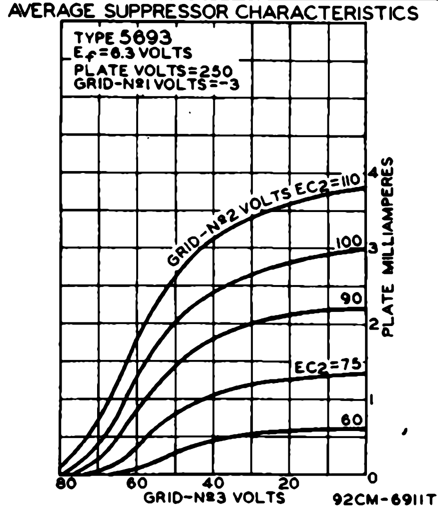


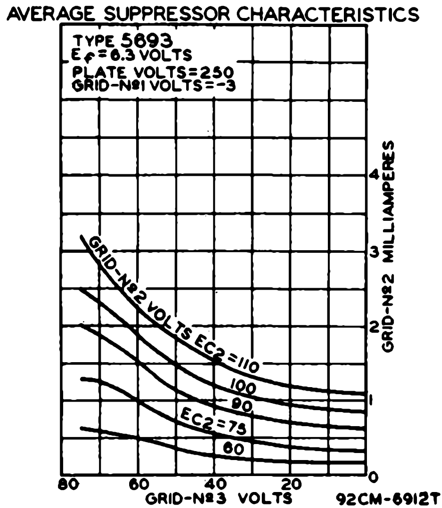
JAN. 6, 1948 TUBE DEPARTMENT 92CM-6920R1

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

RCA

5693
SHARP-CUTOFF PENTODE

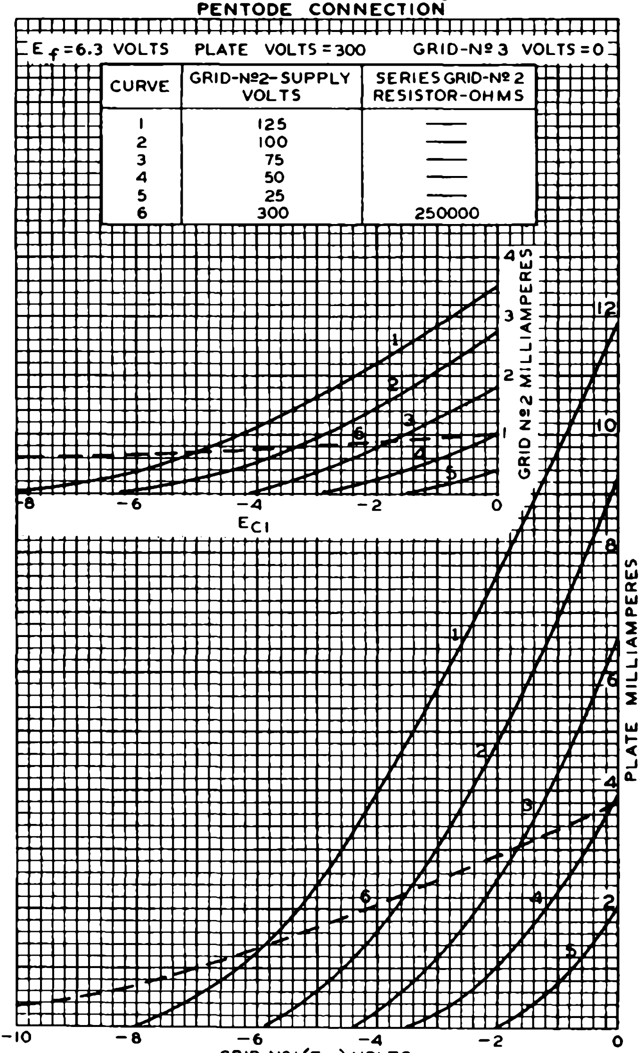




RCA

5693

AVERAGE CHARACTERISTICS
PENTODE CONNECTION



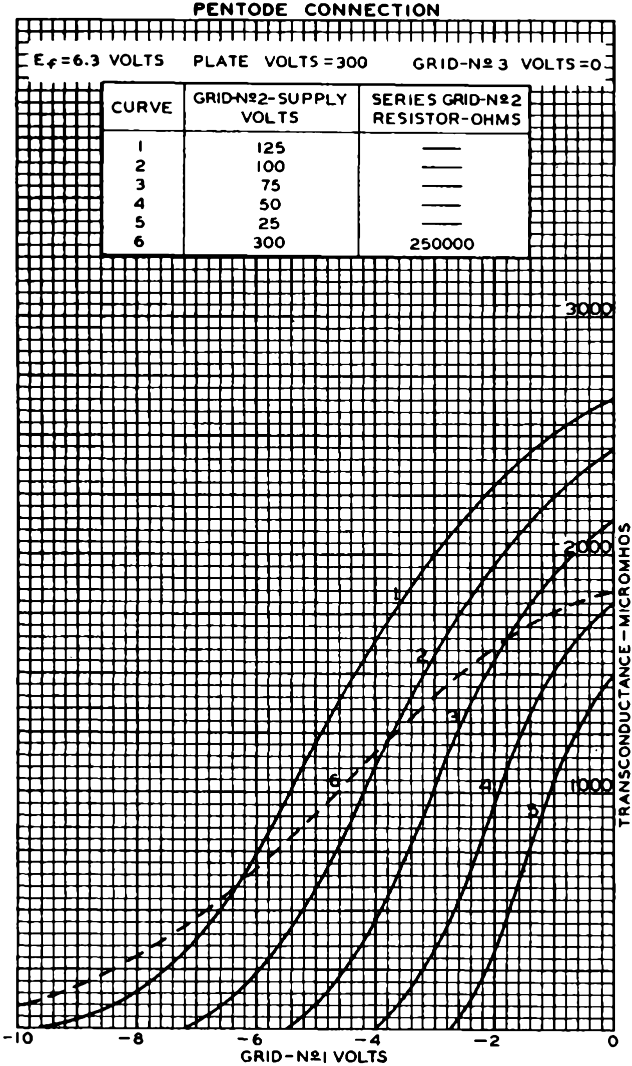
5693

5693

AVERAGE CHARACTERISTICS
PENTODE CONNECTION

E_f = 6.3 VOLTS   PLATE VOLTS = 300   GRID-№ 3 VOLTS = 0

CURVE	GRID-№2-SUPPLY VOLTS	SERIES GRID-№2 RESISTOR-OHMS
1	125	—
2	100	—
3	75	—
4	50	—
5	25	—
6	300	250000



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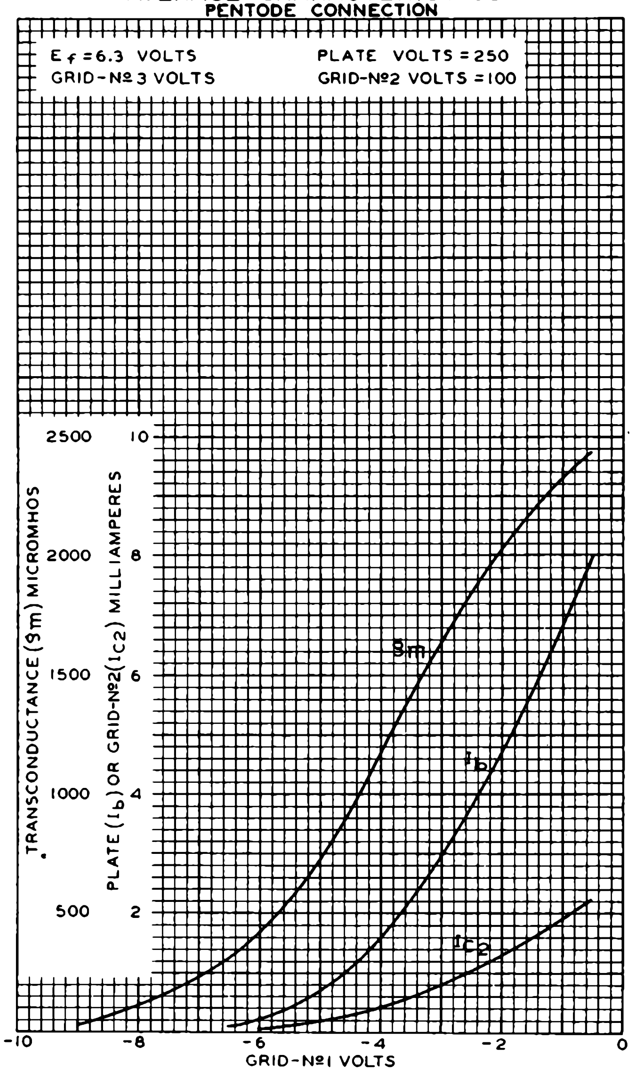
AVERAGE CHARACTERISTICS
PENTODE CONNECTION



MARCH 5,1948

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-4937R1

5718 PREMIUM TYPE

RCA

5718
MEDIUM-MU TRIODE

SUBMINIATURE TYPE

Intended for applications where dependable performance under shock and vibration is paramount.

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage	6.3 ± 5%	ac or dc volts
Current	0.150	amp

Direct Interelectrode Capacitances:

	With External Shield°	*Without External Shield*	
Grid to Plate	1.3	1.4	μμf
Input	2.4	2.2	μμf
Output	2.4	0.7	μμf

° Having inside diameter of 0.405" and connected to lead No.5.

Characteristics, Class A_1 Amplifier:

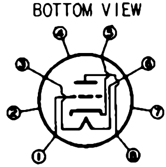
Plate Supply Voltage	100	150	volts
Cathode Resistor	150	180	ohms
Amplification Factor	27	27	
Plate Resistance	4650	4150	ohms
Transconductance	5800	6500	μmhos
Plate Current	8.5	13.0	ma
Grid Volts (Approx.) for plate current of 10 μamp	-7	-11	volts

Mechanical:

Operating Position	Any
Maximum Bulb Length	1-3/8"
Length from Button Seal to Bulb Top (Excluding tip)	1.075" ± 0.060"
Diameter	0.383" ± 0.017"
Bulb	T-3
Leads, Flexible	8
Length	1-1/2" to 1-3/4"
Orientation and Diameter	See Dimensional Outline

BOTTOM VIEW

Lead No.1 - Grid
Lead No.2 - No Conn.
Lead No.3 - Heater
Lead No.4 - No Conn.



Lead No.5 - Cathode
Lead No.6 - Heater
Lead No.7 - No Conn.
Lead No.8 - Anode

AMPLIFIER - Class A_1

Maximum Ratings, ***Absolute Values*****:**

DC PLATE VOLTAGE . . . . 165 max. volts

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5718

5718

MEDIUM-MU TRIODE

PLATE DISSIPATION	3.3	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200	max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)	250	max.	^{o}C

Typical Operation as Resistance-Coupled Amplifier:

See RESISTANCE-COUPLED AMPLIFIER CHART at end of tabulated data for this type

Maximum Circuit Values:

Grid-Circuit Resistance:
- For cathode-bias operation . . . . . . 1.2 max. megohms
- For fixed-bias operation . . . . Not recommended

Cathode-Bias Resistance - An adequate value of cathode-bias resistor should be used to protect the tube in event of temporary failure of excitation and resultant loss in developed bias.

RF AMPLIFIER and OSCILLATOR - Class C

Operation with full input is permissible up to 1000 Mc.

Maximum Ratings, ***Absolute Values*****:**

DC PLATE VOLTAGE	165	max.	volts
DC GRID VOLTAGE	-55	max.	volts
DC PLATE CURRENT	22	max.	ma
DC GRID CURRENT	5.5	max.	ma
PLATE DISSIPATION	3.3	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200	max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)	250	max.	^{o}C

Maximum Circuit Values:

Grid-Circuit Resistance:
- For cathode-bias operation . . . . . . 1.2 max. megohms
- For fixed-bias operation . . . . Not recommended

Cathode-Bias Resistance - An adequate value of cathode-bias resistor should be used to protect the tube in event of temporary failure of excitation and resultant loss in developed bias.

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

RCA

5718

MEDIUM-MU TRIODE

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN*

	Note	Min.	Max.	
Heater Current	1	0.138	0.162	amp
Grid-to-Plate Capacitance . .	2	1.1	1.8	μμf
Input Capacitance	2	1.6	2.8	μμf
Output Capacitance	2	0.5	0.9	μμf
Amplification Factor	1,3	23	31	
Plate Current	1,3	6.0	11.0	ma
Plate Current	1,4	-	100	μamp
Transconductance	1,3	4800	6800	μmhos
Transconductance	5,3	4500	-	μmhos
Grid Current	1,6	-	±0.4	μamp
Heater-Cathode Leakage Current:				
Heater negative with respect to cathode	1,7	-	7.0	μamp
Heater positive with respect to cathode	1,7	-	7.0	μamp
Leakage Resistance:				
Between Grid and All Other Electrodes Tied . .	1,8	100	-	megohms
Between Plate and All Other Electrodes Tied . .	1,9	100	-	megohms
Useful Power Output	1,10	600	-	mw

* Each tube is stabilized before characteristics testing by continuous operation for at least 45 hours at room temperature and with dissipation values equivalent to life test conditions.

Note 1: With 6.3 volts ac or dc on heater.

Note 2: With external shield.

Note 3: With dc plate supply voltage of 100 volts, cathode resistor of 150 ohms, and cathode bypass capacitor of 1000 microfarads.

Note 4: With dc plate voltage of 100 volts, and dc grid voltage of -7 volts.

Note 5: With 5.5 volts ac or dc on heater.

Note 6: With dc plate supply voltage of 100 volts, cathode resistor of 150 ohms, and grid resistor of 0.5 megohm.

Note 7: With 100 volts dc between heater and cathode.

Note 8: With grid 100 volts negative with respect to all other electrodes tied together.

Note 9: With plate 300 volts negative with respect to all other electrodes tied together.

Note 10: In self-excited oscillator with dc plate voltage of 150 volts, grid resistor and feedback optimized to give useful power output at a plate current of 20 ma. and frequency of 500 Mc.

SPECIAL RATINGS & PERFORMANCE DATA

Shock Rating:

Impact Acceleration . . . . 450 max. g

Tubes are held rigid in three different positions in a Navy Type, High Impact (flyweight) Shock Machine and are subjected to 450 g impact acceleration.

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

RCA

5718

MEDIUM-MU TRIODE

Fatigue Rating:

Vibrational Acceleration . . . . . . 2.5 max. g

Tubes are rigidly mounted and subjected in each of three positions to 2.5 g vibrational acceleration at 25 cycles per second for 32 hours.

Uniform Acceleration Rating . . . . . 1000 max. g

Tubes are subjected in each of three positions to a gradually applied uniform acceleration up to 1000 g.

High-Frequency Vibration Performance:

RMS Output Voltage . . . . 60 max. mv

Under the following conditions: A 100-volt plate and grid-No.2 voltage supply having an impedance not exceeding that of a 40-μf capacitor, plate load resistance of 10000 ohms, grid-No.1 resistor of 0.1 megohm, cathode resistor of 150 ohms, cathode bypass capacitor of 1000 μf, and vibrational acceleration of 15 g at 40 cps.

Heater-Cycling Life Performance:

Cycles of Intermittent Operation . . 2500 max. cycles

Under the following conditions: With heater voltage of 7.0 volts cycled 1 minute on and 4 minutes off, heater-cathode voltage of 140 volts (rms), and plate, grid-No.2, and grid-No.1 voltage = 0 volts.

Average Life Performance:

The average life performance based on a 500-hour test at 175°C ambient temperature is not less than 450 hours. This life test is made on sample lot of tubes with heater voltage of 6.3 volts; plate supply voltage of 100 volts; grid-No.2 supply voltage of 100 volts; dc heater-cathode voltage (heater positive with respect to cathode) of 200 volts; cathode resistor of 150 ohms; and grid-No.1 resistor of 1 megohm.

The 500-hour end-point limits for the 5840 with heater voltage of 6.3 volts, plate supply voltage of 100 volts, grid-No.2 supply voltage of 100 volts, cathode resistor of 150 ohms bypassed by capacitor having a maximum reactance of 3 ohms, and dc heater-cathode voltage of 100 volts with heater either positive or negative with respect to cathode are: transconductance, 3250 micromhos minimum; heater-cathode leakage current, 20 microamperes maximum; and grid-No.1 current, +0.9 microampere maximum or -0.9 microampere maximum.

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

RCA

5718

MEDIUM-MU TRIODE

OPERATING CONDITIONS AS RESISTANCE-COUPLED AMPLIFIER

Plate-Supply Voltage	100						volts
Plate Load Resistor	0.047		0.10		0.27		meg
Grid-No.1 Resistor°	0.10	0.27	0.27	0.47	0.27	0.47	meg
Cathode Resistor	1000	1200	2200	2700	6800	8200	ohms
Sig. Input Volt. (rms)	0.5	0.5	0.5	0.5	0.5	0.5	volt
Output Voltage (rms)	8.2	8.5	8.2	8.2	7.3	7.4	volts
Voltage Gain▲	16.4	17.0	16.4	16.4	14.6	14.8	
Distortion	3.9	3.2	3.0	2.71	3.4	2.8	%
Sig. Input Volt. (rms)*	0.59	0.70	0.67	0.81	0.75	0.86	volt
Output Voltage (rms)	9.7	11.75	11.0	13.1	11.0	12.7	volts
Voltage Gain▲	16.4	16.8	16.4	16.2	14.6	14.8	
Distortion	4.5	4.7	4.1	4.6	5.0	5.0	%

Plate-Supply Voltage	200						volts
Plate Load Resistor	0.047		0.10		0.27		meg
Grid-No.1 Resistor°	0.10	0.27	0.27	0.47	0.27	0.47	meg
Cathode Resistor	820	1000	1800	2200	4700	5600	ohms
Sig. Input Volt. (rms)	1.0	1.0	1.0	1.0	1.0	1.0	volt
Output Voltage (rms)	19.0	19.5	18.6	18.1	16.2	16.2	volts
Voltage Gain▲	19.0	19.5	18.6	18.1	16.2	16.2	
Distortion	4.0	3.3	3.2	3.1	3.8	3.2	%
Sig. Input Volt. (rms)*	1.23	1.45	1.43	1.56	1.34	1.58	volts
Output Voltage (rms)	23.4	28.0	26.0	28.2	21.6	25.0	volts
Voltage Gain▲	19.0	19.3	18.2	18.1	16.1	15.8	
Distortion	5.0	5.0	4.9	5.0	5.1	5.1	%

° of following stage.

▲ Ratio of signal output to signal input.

* Maximum value to swing the grid of resistance-coupled amplifier tube to the point where its grid No.1 starts to draw current.

Note: Coupling capacitors should be selected to give desired frequency response. Cathode resistors should be adequately bypassed.

5718

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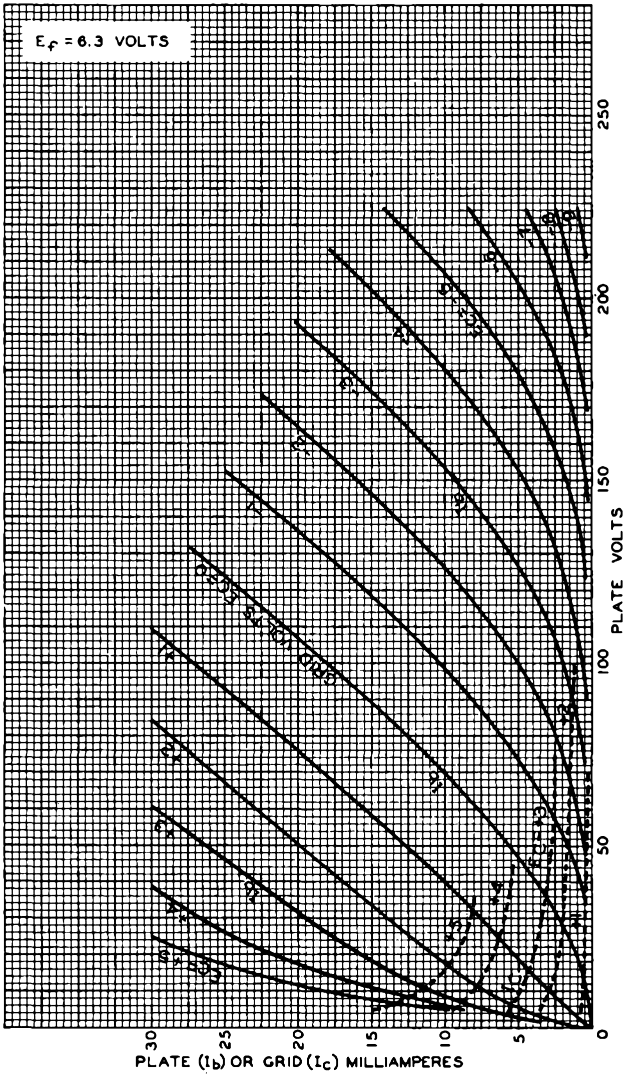
5718

AVERAGE PLATE CHARACTERISTICS



5718

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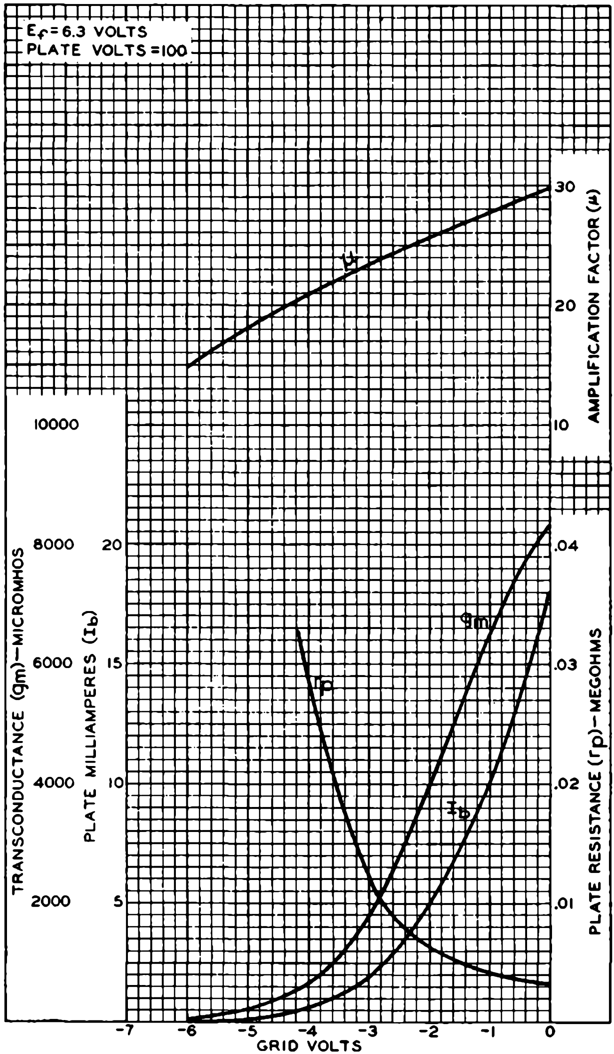
5718

AVERAGE CHARACTERISTICS



SEPT. 25, 1952

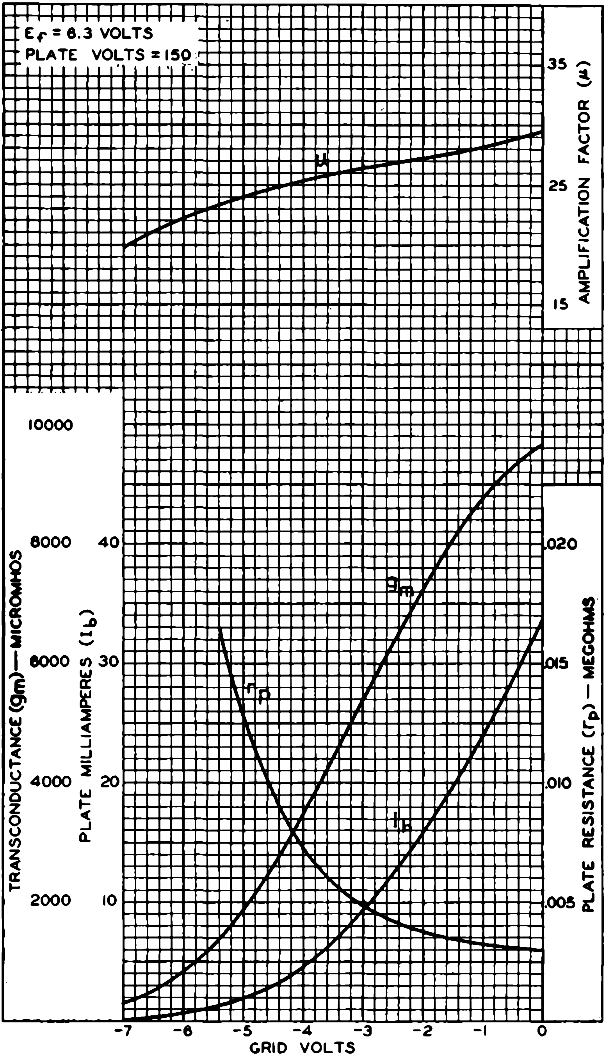
TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7850

RCA

5718

AVERAGE CHARACTERISTICS



APRIL 22, 1955

TUBE DIVISION

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7851R1

PREMIUM TYPE 5719

RCA

5719

HIGH-MU TRIODE

SUBMINIATURE TYPE

Intended for applications where dependable performance under shock and vibration is paramount.

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage	6.3 ± 5%	. . . ac or dc volts
Current	0.150	. . . . amp

Direct Interelectrode Capacitances:

	With External Shield°	*Without External Shield*	
Grid to Plate	0.8	0.8	μμf
Input	1.9	1.7	μμf
Output	2.2	0.6	μμf

° Having inside diameter of 0.405" and connected to cathode.

Characteristics, Class A_1 Amplifier:

Plate Supply Voltage . .	100	150	volts
Cathode Resistor	1500	680	ohms
Amplification Factor . .	70	70	
Plate Resistance	41000	30500	ohms
Transconductance	1700	2300	μmhos
Plate Current	0.73	1.85	ma
Grid volts (Approx.) for plate current of 10 μamp	-2.5	-3.8	volts

Mechanical:

Operating Position	Any
Maximum Bulb Length	1-3/8"
Length from Button Seal to Bulb Top (Excluding tip).	1.075" ± 0.060"
Diameter	0.383" ± 0.017"
Bulb	T-3
Leads, Flexible	8
Length	1-1/2" to 1-3/4"
Orientation and Diameter	See Dimensional Outline in GENERAL SECTION

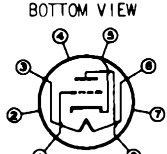
BOTTOM VIEW

Lead No.1 - Grid

Lead No.2 - No Conn.

Lead No.3 - Heater

Lead No.4 - No Conn.



Lead No.5 - Cathode

Lead No.6 - Heater

Lead No.7 - No Conn.

Lead No.8 - Plate

AMPLIFIER - Class A_1

Maximum Ratings, *Absolute Values:*

PLATE VOLTAGE	165 max.	volts

TUBE DEPARTMENT

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5719

5719

HIGH-MU TRIODE

GRID VOLTAGE	-55	max.	volts
PLATE CURRENT	3.3	max.	ma
PLATE DISSIPATION	0.55	max.	watt
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200	max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)	250	max.	°C

Typical Operation as Resistance-Coupled Amplifier:

See RESISTANCE-COUPLED AMPLIFIER CHART at end of tabulated data for this type

Maximum Circuit Values:

Grid-Circuit Resistance:		
For cathode-bias operation	1.2 max.	megohms
For fixed-bias operation	Not recommended	

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN*

	Note	*Min.*	*Max.*	
Heater Current	1	0.138	0.162	amp
Grid-to-Plate Capacitance	2	0.6	1.0	μμf
Input Capacitance	2	1.2	2.2	μμf
Output Capacitance	2	0.4	0.8	μμf
Amplification Factor	1,3	60	80	
Plate Current	1,3	0.5	0.9	ma
Plate Current	1,4	-	50	μamp
Transconductance	1,3	1400	2000	μmhos
Transconductance	5,3	1300	-	μmhos
Grid Current	1,6	-	±0.3	μamp
Heater-Cathode Leakage Current:				
Heater negative with respect to cathode	1,7	-	7.0	μamp
Heater positive with respect to cathode	1,7	-	7.0	μamp
Leakage Resistance:				
Between Grid and All Other Electrodes Tied Together	1,8	100	-	megohms
Between Plate and All Other Electrodes Tied Together	1,9	100	-	megohms

* Each tube is stabilized before characteristics testing by continuous operation for at least 45 hours at room temperature and with dissipation values equivalent to life test conditions.

Note 1: With 6.3 volts ac or dc on heater.

Note 2: Without external shield.

Note 3: With plate supply voltage of 100 volts, cathode resistor of 150 ohms, and cathode bypass capacitor of 1000 microfarads.

5719

HIGH-MU TRIODE

Note 4: With dc plate voltage of 100 volts, and dc grid voltage of -2.5 volts.

Note 5: With 5.7 volts ac or dc on heater.

Note 6: With plate supply voltage of 100 volts, cathode resistor of 1500 ohms, cathode bypass capacitor of 1000 microfarads and grid resistor of 0.1 megohm.

Note 7: With 100 volts dc between heater and cathode.

Note 8: With grid 100 volts negative with respect to all other electrodes tied together.

Note 9: With plate 300 volts negative with respect to all other electrodes tied together.

SPECIAL RATINGS & PERFORMANCE DATA

Shock Rating:

Impact Acceleration . . . . 450 max. g

Tubes are held rigid in three different positions in a Navy Type, High Impact (flyweight) Shock Machine and are subjected to 450 g impact acceleration.

Fatigue Rating:

Vibrational Acceleration . . . . 2.5 max. g

Tubes are rigidly mounted and subjected in each of three positions to 2.5 g vibrational acceleration at 25 cycles per second for 32 hours.

Uniform Acceleration Rating: . . . . 1000 max. g

Tubes are subjected in each of three positions to a gradually applied uniform acceleration up to 1000 g.

Low-Frequency Vibration Performance:

RMS Output Voltage . . . . 25 max. mv

Under the following conditions: A 150-volt plate voltage supply having an impedance not exceeding that of a 40 μf capacitor, plate load resistance of 10000 ohms, grid resistor of 0.1 megohm, cathode resistor of 1500 ohms, cathode bypass capacitor of 1000 μf, and vibrational acceleration of 15 g at 40 cps.

Heater-Cycling Life Performance:

Cycles of Intermittent Operation . . . . 2500 min. cycles

Under the following conditions: With heater voltage of 7.0 volts cycled 1 minute on and 4 minutes off, heater-cathode voltage of 140 volts (rms), and plate and grid voltage = 0 volts.

Average Life Performance:

The average life performance based on a 500-hour test at 175°C ambient temperature is not less than 450 hours. This life test is made on sample lot of tubes with heater voltage of 6.3 volts; plate supply voltage of 100 volts; dc heater-cathode voltage (heater positive with respect to cathode) of 200 volts; cathode resistor of 1500 ohms; and grid resistor of 1 megohm.

The 500-hour end-point limits for the 5719 with heater voltage of 6.3 volts, plate supply voltage of 100 volts, cathode resistor of 680 ohms bypassed by capacitor having a maximum reactance of 3 ohms, and dc heater-cathode voltage of 100 volts with heater either positive or negative with respect to cathode are: transconductance, 1000 micromhos minimum; heater-cathode leakage current, 20 microamperes maximum; and grid current, +0.9 microampere maximum or -0.9 microampere maximum.

5719

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5719

HIGH-MU TRIODE

OPERATING CONDITIONS AS RE-

Cathode-Bias

Plate Supply Voltage	100				
Plate Load Resistor	0.1	0.1	0.27	0.27	0.47
Grid Resistor°	0.27	0.47	0.47	1.0	0.47
Cathode Resistor	2700	2700	5600	6800	10000
Signal Input Volts (rms)	0.1	0.1	0.1	0.1	0.1
Output Volts (rms)	3.7	3.9	4.1	4.2	3.95
Gain▲	37	39	41	42	39.5
Distortion	2.4	2.1	2.1	1.8	2.4
Signal Input Volts (rms)*	0.20	0.20	0.20	0.26	0.20
Output Volts (rms)	7.3	7.7	8.1	10.7	7.8
Gain▲	36.5	38.5	40.5	41.2	39
Distortion	5.0	4.5	4.3	4.9	5.0

Zero-Bias

Plate-Supply Voltage	100				
Plate Load Resistor	0.1	0.1	0.27	0.27	0.47
Grid Resistor°	0.27	0.47	0.47	1.0	0.47
Signal Input Volts (rms)	0.1	0.1	0.1	0.1	0.1
Output Volts (rms)	3.8	4.0	4.3	4.55	4.2
Gain▲	38	40	43	45.5	42
Distortion	2.2	2.0	1.9	1.6	2.1
Signal Input Volts (rms)*	0.2	0.21	0.22	0.26	0.2
Output Volts (rms)	7.25	7.9	8.95	11	7.9
Gain▲	36.2	37.6	40.6	42.4	39.5
Distortion	5.0	4.8	4.9	4.8	4.8

Note 1: Coupling capacitors should be selected to give desired frequency response. Cathode resistor should be adequately bypassed.

° Of following stage.

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5719

HIGH-MU TRIODE

SISTANCE-COUPLED AMPLIFIER·

Operation

			200				volts
0.47	0.1	0.1	0.27	0.27	0.47	0.47	megohm
1.0	0.27	0.47	0.47	1.0	0.47	1.0	megohm
10000	1500	1800	3300	3900	5600	6800	ohms
0.1	0.1	0.1	0.1	0.1	0.1	0.1	volt
4.3	4.4	4.6	4.9	5.0	4.8	5.0	volts
43	44	46	49	50	48	50	
1.7	0.7	0.7	0.9	0.7	0.9	0.7	per cent
0.25	0.51	0.61	0.50	0.59	0.49	0.64	volt
10.7	22	27	24.2	29	23.2	31.6	volts
42.8	43.1	44.3	48.4	49.2	47.3	49.4	
4.5	3.9	5.0	4.5	4.5	5.0	5.0	per cent

Operation

			200				volts
0.47	0.1	0.1	0.27	0.27	0.47	0.47	megohm
1.0	0.27	0.47	0.47	1.0	0.47	1.0	megohm
0.1	0.1	0.1	0.1	0.1	0.1	0.1	volt
4.55	4.7	4.9	5.35	5.4	5.2	5.4	volts
45.5	47	49	53.5	54	52	54	
1.6	0.4	0.4	0.8	0.7	0.9	0.7	per cent
0.27	0.59	0.63	0.54	0.65	0.5	0.63	volt
11.3	25	27.7	25.8	31.5	23.5	30.5	volts
41.8	42.4	43.9	47.7	48.5	47	48.4	
5.0	4.9	5.0	4.9	5.0	5.0	4.8	per cent

* Maximum value to swing the grid of resistance-coupled amplifier tube to the point where its grid starts to draw current.

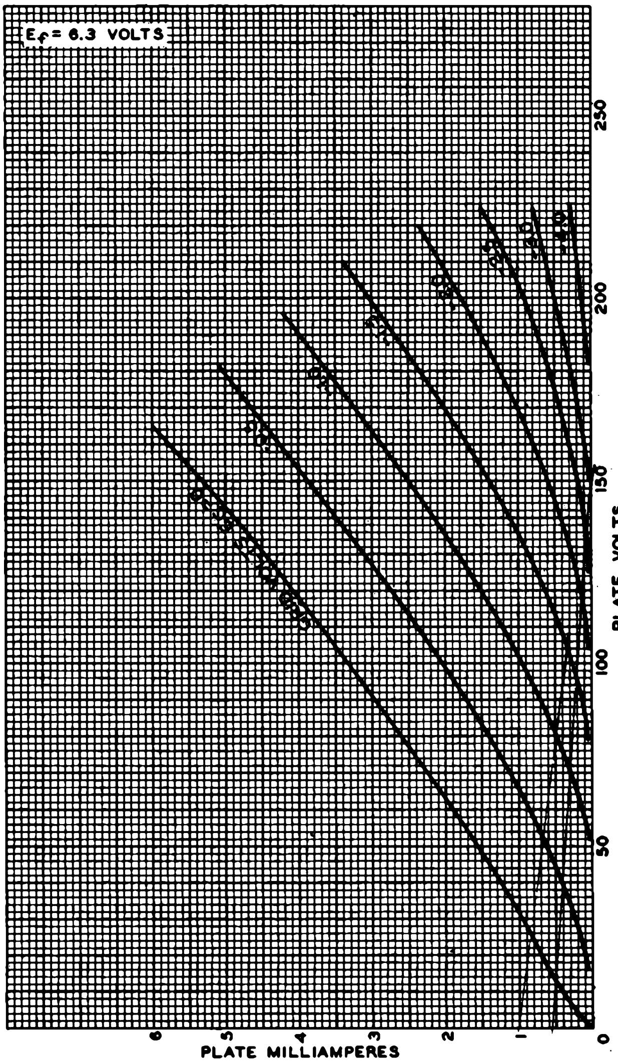
▲ Ratio of signal output to signal input.

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5719

5719

AVERAGE PLATE CHARACTERISTICS



FEB.16,1953

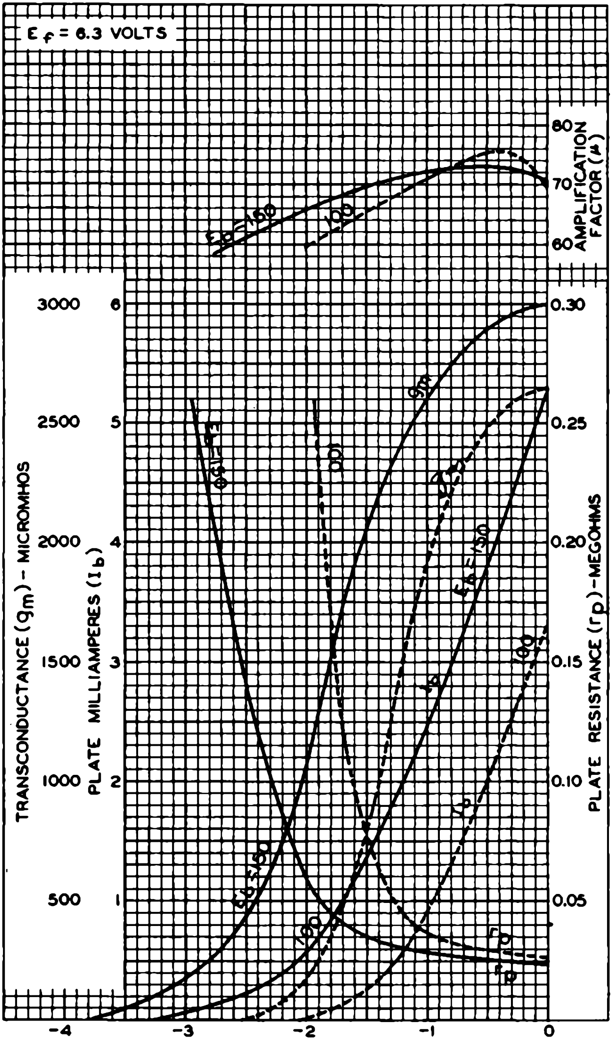
TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7925

5719

5719

AVERAGE CHARACTERISTICS



FEB. 16, 1953 TUBE DEPARTMENT 92CM-7926

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5726

PREMIUM TYPE 5726

TWIN DIODE

MINIATURE TYPE

Intended for applications where dependable performance under shock and vibration is paramount. The 5726 is a "premium" version of the 6AL5W.

GENERAL DATA

Electrical:

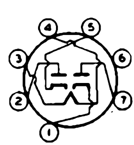
Heater, for Unipotential Cathodes:			
Voltage	6.3 ± 10%		ac or dc volts
Current	0.3		amp
Resonant Frequency (Each unit, approx.)	700		Mc
Direct Interelectrode Capacitances (With external shield JETEC No.316):			
Unit No.1:			
Plate to Cathode + External Shield, Heater, and Internal Shield	3.2		μμf
Cathode to Plate + External Shield, Heater, and Internal Shield	3.9		μμf
Unit No.2:			
Plate to Cathode + External Shield, Heater, and Internal Shield	3.2		μμf
Cathode to Plate + External Shield, Heater, and Internal Shield	3.9		μμf
Plate of Unit No.1 to Plate of Unit No.2●	0.026	max.	μμf

Mechanical:

Mounting Position	Any
Maximum Overall Length	1-3/4"
Maximum Seated Length	1-1/2"
Length, Base Seat to Bulb Top (Excluding tip)	1-1/8" ± 3/32"
Maximum Diameter	3/4"
Bulb	T-5-1/2
Base	Small-Button Miniature 7-Pin (JETEC No.E7-1)

BOTTOM VIEW

Pin 1 - Cathode of Diode Unit No.1
Pin 2 - Plate of Diode Unit No.2
Pin 3 - Heater
Pin 4 - Heater



Pin 5 - Cathode of Diode Unit No.2
Pin 6 - Internal Shield
Pin 7 - Plate of Diode Unit No.1

HALF-WAVE RECTIFIER

Maximum Ratings, ***Absolute Values:***

PEAK INVERSE PLATE VOLTAGE	360	max.	volts
PEAK PLATE CURRENT PER PLATE	60	max.	ma

● With external and internal shield connected to ground.

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5726

5726

TWIN DIODE

HOT-SWITCHING TRANSIENT PLATE CURRENT		
For duration of 0.2 second maximum . . .	350 max.	ma
DC OUTPUT CURRENT PER PLATE	10 max.	ma
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	360 max.	volts
Heater positive with respect to cathode	360 max.	volts

Typical Operation:

The two units may be used separately or in parallel

AC Plate-Supply Voltage Per Plate (RMS)	117	volts
Minimum Total Effective Plate-Supply Impedance Per Plate	300	ohms
DC Output Current Per Plate	9	ma

Shock and Vibration Tests:

These tests are made as indicated in the JAN Specifications: JAN 1-A for Electron Tubes, May 1946 under the section as follows:

Section F6b (9e) Shock Test:		
Instantaneous Impact Acceleration . .	700 max.	g
Section F6b (9f) Vibration Test:		
Vibrational Acceleration	2.5 max.	g

Heater Cycling Life Test:

This test is made as indicated in the JAN Specifications JAN 1-A for Electron Tubes for type 5726/6AL5W.

Cycles of Intermittent Operation:		
At a heater voltage of 7.5 volts . . .	2000 min.	cycles

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Note	*Min.*	*Max.*	
Heater Current	1	0.275	0.325	amp
Direct Interelectrode Capacitances (With external shield JETEC No.316):				
Unit No.1:				
Plate to Cathode + External Shield, Heater, and Internal Shield	-	2.4	4.0	μμf
Cathode to Plate + External Shield, Heater, and Internal Shield	-	2.8	4.4	μμf
Unit No.2:				
Plate to Cathode + External Shield, Heater, and Internal Shield	-	2.4	4.0	μμf
Cathode to Plate + External Shield, Heater, and Internal Shield	-	2.8	4.4	μμf

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

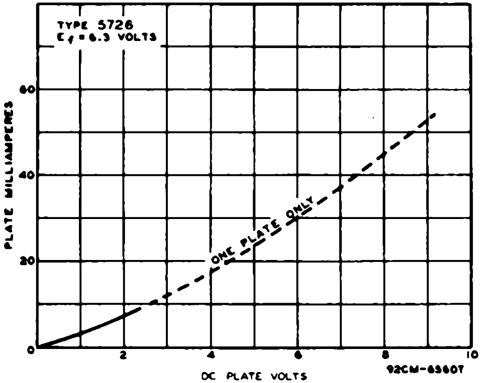
5726

TWIN DIODE

	Note	Min.	Max.	
Plate of Unit No.1 to Plate of Unit No.2	2	-	0.026	μμf
Plate Current (Per Plate) . . .	1,3	40	-	ma

Note 1: With 6.3 volts ac on heater.
Note 2: With external and internal shield connected to ground.
Note 3: With dc plate voltage = 10 volts. Each unit tested separately with electrodes of opposite unit grounded.

AVERAGE PLATE CHARACTERISTIC

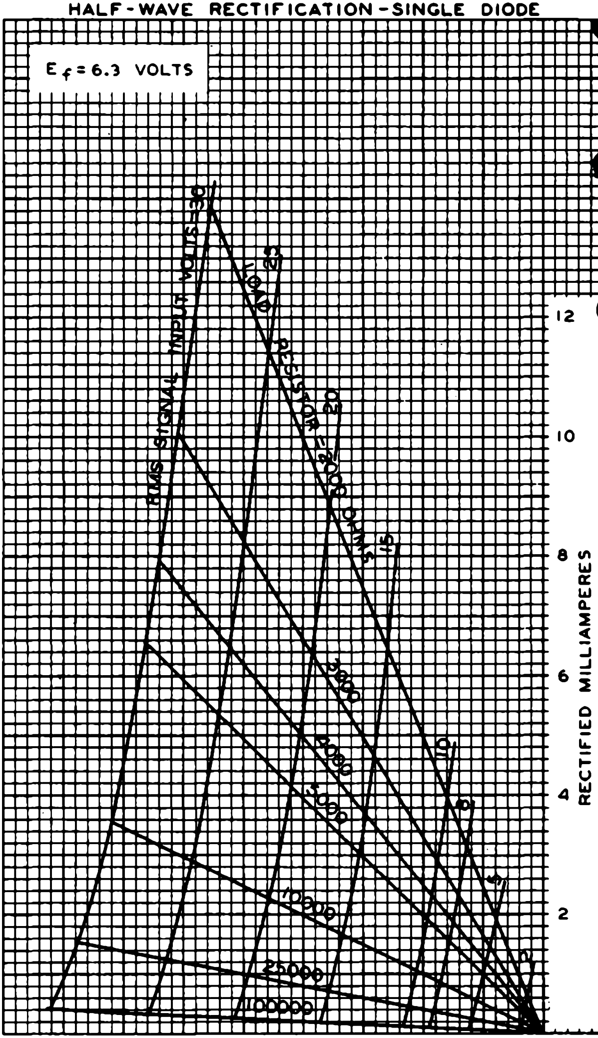


5726

RCA

5726

AVERAGE CHARACTERISTICS
HALF-WAVE RECTIFICATION - SINGLE DIODE



JUNE 7, 1944

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6561

5734

RCA
5734
MECHANO-ELECTRONIC TRANSDUCER

TRIODE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage	6.3	ac or dc volts
Current	0.15	amp

Mechanical:

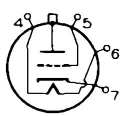
Mounting Position	Any
Maximum Angular Deflection of Plate Shaft	±0.5 degree
Maximum Overall Length (Excluding flexible leads)	1.300"
Maximum Diameter	0.328"
Envelope	Metal Shell MT-2-1/4

Terminal Connections, BOTTOM VIEW

Lead 4 – Heater

Lead 5 – Grid

Lead 6 – Heater



Lead 7 – Cathode, Internal Shield

Shell – Plate

Maximum Ratings, ***Design-Center Values*****:**

DC PLATE-SUPPLY VOLTAGE	300 max.	volts
DC PLATE CURRENT	5 max.	ma
PLATE DISSIPATION	0.4 max.	watt
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	90 max.	volts
Heater positive with respect to cathode	90 max.	volts

Typical Operation:

DC Plate-Supply Voltage	300	volts
DC Grid Voltage	0	volts
Amplification Factor▲	20	
Plate Resistance▲	72000	ohms
Transconductance▲	275	micromhos
DC Plate Current▲	1.5	ma
Load Resistance	75000	ohms
Deflection Sensitivity♦	40	volts/degree
	2300	volts/radian
Moment of Inertia of Plate●	3.4	milligram cm^2
Rotational Compliance of Diaphragm●	0.0013×10^{-3}	radian/dyne cm
	0.075	degree/gram cm

▲ For plate shaft in undeflected position.

♦ Average change in voltage across 75000-ohm plate-load resistor when the plate shaft is deflected from -0.5 to +0.5 degree. The plane of deflection of the plate shaft must coincide with the plane through terminal No.5 and the axis of the tube.

● Based on external plate-shaft length of 1/8" and the center of the diaphragm as pivot.

NOV. 15, 1948 — TUBE DEPARTMENT — TENTATIVE DATA

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5734

RCA

5734

MECHANO-ELECTRONIC TRANSDUCER

OPERATING PRINCIPLES

The plate shaft extends through the center of a thin metal diaphragm. Angular displacement of the plate shaft changes the distance between the fixed grid and the plate and results in a change in the plate current. The plane of deflection of the plate shaft coincides with the plane through terminal No. 5 and the axis of the tube.

The part of the plate shaft within the tube has a minimum free cantilever resonance of 12000 cycles per second permitting, with suitable mechanical coupling to the external end of the plate shaft, measurements of vibration up to 12000 cycles per second.

OPERATING NOTES

The 5734 may be mounted by means of a supporting clamp which should firmly grip the metal shell of the tube within the designated clamping space indicated on the Outline Drawing. It is essential, however, that the pressure exerted on the shell by the clamp be held to a minimum to prevent possible fracture of the seals.

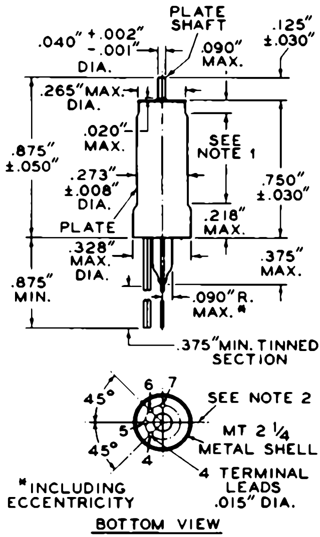
Under no circumstances should the plate shaft be displaced from its normal position by more than 0.5 degree. A larger displacement of the plate shaft will distort the flexible diaphragm and may damage the tube electrodes.

A non-corrosive flux must be used in soldering the actuating stylus to the plate shaft. Unless this precaution is observed, the plate shaft and the diaphragm will be damaged.

RCA

5734

MECHANO-ELECTRONIC TRANSDUCER



NOTE 1: TUBE SUPPORTING CLAMP ON METAL SHELL MUST BE WITHIN THIS SPACE, AND SHOULD BE FASTENED ONLY TIGHT ENOUGH TO INSURE GOOD CONTACT FOR THE PLATE CONNECTION.

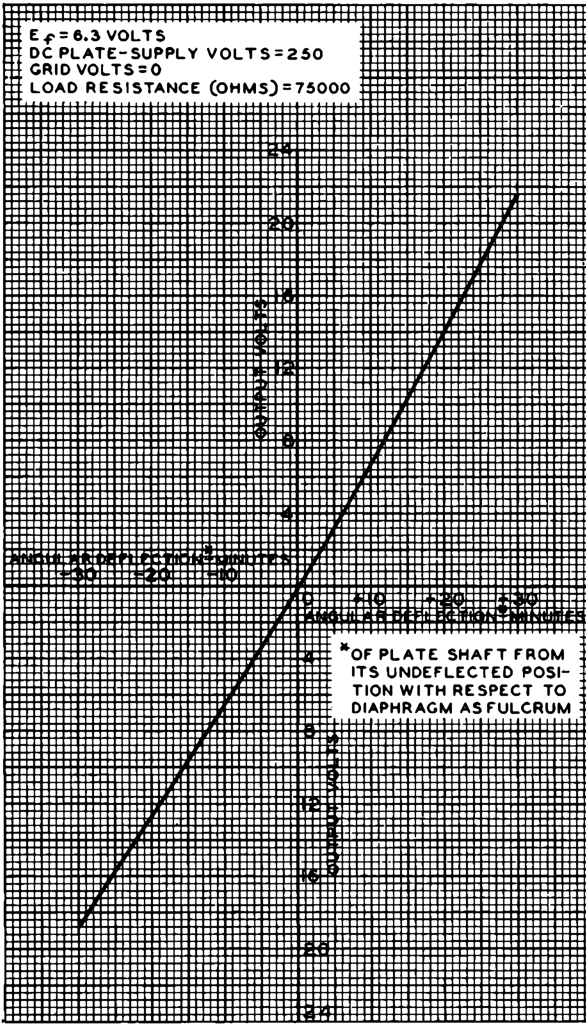
NOTE 2: THE PLANE OF DEFLECTION OF THE PLATE SHAFT WILL COINCIDE WITH THE PLANE THROUGH TERMINAL LEAD No. 5 AND THE AXIS OF THE TUBE.

92CS-7036

5734

5734

AVERAGE CHARACTERISTIC

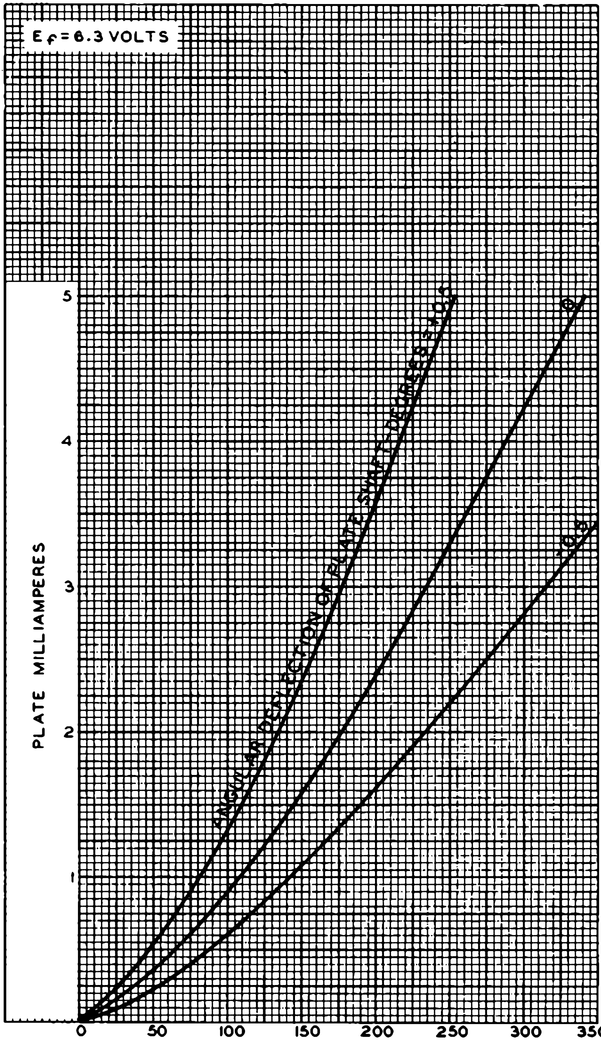


RCA

5734

5734

AVERAGE CHARACTERISTICS

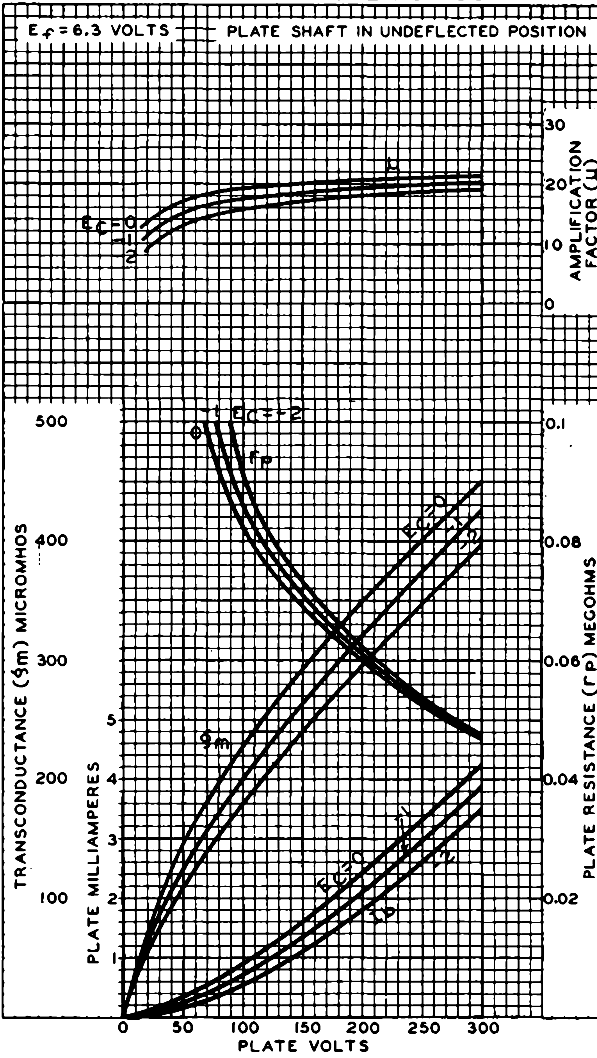


RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5734

5734

AVERAGE CHARACTERISTICS



AUG. 17, 1948

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7057

PREMIUM TYPE 5750

5750
PENTAGRID CONVERTER

7-PIN MINIATURE TYPE

For use as a combined mixer and oscillator tube particularly in mobile and aircraft communications receivers in which dependability is paramount. This "premium" type is similar to the 6BE6.

GENERAL DATA

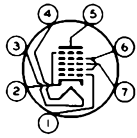
Electrical:

Heater, for Unipotential Cathode:			
Voltage	6.3		ac or dc volts
Current	0.3		amp
Direct Interelectrode Capacitances:[o]			
Grid No.3 to all other electrodes (RF input)	7.1		μμf
Plate to all other electrodes (Mixer input)	7.6		μμf
Grid No.1 to all other electrodes (Oscillator input)	5.5		μμf
Grid No.3 to plate	0.3	max.	μμf
Grid No.3 to grid No.1	0.15	max.	μμf
Grid No.1 to cathode & grid No.5	3		μμf
Cathode & grid No.5 to all other electrodes except grid No.1	15		μμf

Mechanical:

Operating Position	Any
Maximum Overall Length	2-1/8"
Maximum Seated Length	1-7/8"
Length, Base Seat to Bulb Top (Excluding tip)	1-1/2" ± 3/32"
Diameter	0.650" to 0.750"
Dimensional Outline	*See General Section*
Bulb	T5-1/2
Base	Small-Button Miniature 7-Pin (JEDEC No.E7-1)
Basing Designation for BOTTOM VIEW	7CH

Pin 1 - Grid No.1
Pin 2 - Cathode, Grid No.5
Pin 3 - Heater
Pin 4 - Heater



Pin 5 - Plate
Pin 6 - Grid No.2, Grid No.4
Pin 7 - Grid No.3

CONVERTER

Maximum Ratings, *Absolute Values:*

PLATE VOLTAGE	330	max.	volts
GRID-No.3 (CONTROL-GRID) VOLTAGE:			
Negative-bias value	55	max.	volts
Positive-bias value	0	max.	volts
GRIDS-No.2 & No.4 (SCREEN-GRID) SUPPLY VOLTAGE	330	max.	volts

[o]: See next page.

ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5750

5750

PENTAGRID CONVERTER

GRIDS—No.2 & No.4 VOLTAGE	110 max.	volts
TOTAL CATHODE CURRENT	15.5 max.	ma
GRIDS—No.2 & No.4 INPUT	1.1 max.	watts
PLATE DISSIPATION	1.1 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	100 max.	volts
Heater positive with respect to cathode	100 max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)	165 max.	°C

Characteristics:

*With Separate Excitation**

Plate Voltage	100	250	volts
Grids—No.2 & No.4 Voltage	100	100	volts
Grid-No.3 Voltage	-1.5	-1.5	volts
RMS Grid-No.1 (Oscillator-grid) Voltage	10	10	volts
Grid-No.1 Resistor	20000	20000	ohms
Plate Resistance (Approx.)	0.4	1	megohm
Conversion Transconductance	455	475	μmhos
Plate Current	2.6	2.6	ma
Grids—No.2 & No.4 Current	7.5	7.5	ma
Grid-No.1 Current	0.5	0.5	ma
Total Cathode Current	10.6	10.6	ma
Grid-No.3 Voltage (Approx.) for conversion transconductance of:			
10 μmhos	-30	-30	volts
100 μmhos	-6	-6	volts

Oscillator Characteristics (Not Oscillating):■

Plate & Grids—No.2 & No.4 Voltage	100	volts
Grid-No.3 Voltage	0	volts
Grid-No.1 Voltage	0	volts
Amplification Factor§	22.5	
Oscillator Transconductance§	7800	μmhos
Cathode Current	25	ma
Grid-No.1 Voltage (Approx.) for plate μa. = 10	-11	volts

o Without external shield.

* The characteristics shown with separate excitation correspond very closely with those obtained in a self-excited oscillator circuit operating with zero bias.

■ With grids No.2 & No.4 connected to plate.

§ Between grid No.1 and grids No.2 & No.4 connected to plate.

SPECIAL RATINGS & PERFORMANCE DATA

Shock Rating:

Impact Acceleration	450 max.	g

This test is performed in a Navy-Type, High-Impact (fly-

ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5750
PENTAGRID CONVERTER

weight) Shock Machine.

Fatigue Rating:

Vibrational Acceleration . . . . 2.5 max. g
This test is performed for a period of 100 hours minimum at a frequency of 25 cycles per second.

Heater-Cycling Life Performance:

Cycles of Intermittent Operation . . . . . 2000 min. cycles
Under the following conditions: heater volts = 7.5 cycled one minute on and one minute off, heater 135 volts positive with respect to cathode, and all other elements connected to ground.

CURVES
shown under Type 6BE6 in the Receiving-Tube Section also apply to the 5750

ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

RCA

PREMIUM TYPE 5751

5751

HIGH-MU TWIN TRIODE

9-PIN MINIATURE TYPE

Intended for applications where dependable performance under shock and vibration is paramount

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:

Heater Arrangement	*Series*	*Parallel*	
Voltage (AC or DC)	12.6 ± 10%	6.3 ± 10%	volts
Current	0.175	0.35	amp

Characteristics, Class A_1 Amplifier:

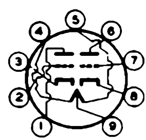
Plate Voltage	100	250	volts
Grid Voltage	−1	−3	volts
Amplification Factor	70	70	
Plate Resistance	58000	58000	ohms
Transconductance	1200	1200	μmhos
Plate Current	0.9	1.0	ma

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-3/16"
Maximum Seated Length	1-15/16"
Length, Base Seat to Bulb Top (Excluding tip).	1-9/16" ±3/32"
Maximum Diameter	7/8"
Bulb	T-6-1/2
Base	Small-Button Noval 9-Pin (JETEC No.E9-1)

BOTTOM VIEW

Pin 1 – Plate of Unit No.2
Pin 2 – Grid of Unit No.2
Pin 3 – Cathode of Unit No.2
Pin 4 – Heater
Pin 5 – Heater



Pin 6 – Plate of Unit No.1
Pin 7 – Grid of Unit No.1
Pin 8 – Cathode of Unit No.1
Pin 9 – Heater Mid-Tap

AMPLIFIER – Class A_1

Values are for each unit

Maximum Ratings, *Absolute Values:*

PLATE VOLTAGE	330 max.	volts
GRID VOLTAGE:		
Negative bias value	55 max.	volts
Positive bias value	0 max.	volts
PLATE DISSIPATION	0.8 max.	watt
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	100 max.	volts
Heater positive with respect to cathode	100 max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)	165 max.	°C

5751

5751

HIGH-MU TWIN TRIODE

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN*

	Note	*Min.*	*Max.*	
Heater Current	1	0.160	0.190	amp
Amplification Factor	1,2	55	85	
Plate Current	1,2	0.4	1.8	ma
Plate Current	1,3	-	10.5	μamp
Transconductance	1,2	900	1600	μmhos
Reverse Grid Current	1,4	-	0.4	μamp
Heater-Cathode Leakage Current:				
Heater negative with respect to cathode	1,5	-	10	μamp
Heater positive with respect to cathode	1,5	-	10	μamp
Leakage Resistance:				
Between Grid and All Other Electrodes Tied Together	1,6	500	-	megohms
Between Plate and All Other Electrodes Tied Together	1,7	500	-	megohms

* Each tube is stabilized before characteristics testing by continuous operation for at least 45 hours at room temperature and with dissipation values equivalent to life test conditions.

Note 1: With 12.6 volts ac or dc on heater (series connected).

Note 2: With dc plate voltage of 250 volts and dc grid voltage of -3 volts. Each unit is tested separately. Electrodes of unit not under test are grounded.

Note 3: With dc plate voltage of 250 volts, plate load resistance of 0.1 megohm, and dc grid voltage of -10.5 volts. Each unit is tested separately. Electrodes of unit not under test are grounded.

Note 4: With dc plate voltage of 250 volts, grid resistor of 1.0 megohm, and dc grid voltage of -3 volts. Each unit is tested separately. Electrodes of unit not under test are grounded.

Note 5: With 100 volts dc between heater and cathode, and units connected in parallel.

Note 6: With grid 100 volts negative with respect to all other electrodes tied together.

Note 7: With plate 300 volts negative with respect to all other electrodes tied together.

SPECIAL RATINGS & PERFORMANCE DATA

Shock Rating:

Impact Acceleration . . . . 600 max. g

Tubes are held rigid in three different positions in a Navy Type, High Impact (flyweight) Shock Machine and are subjected to 600 g impact acceleration.

Fatigue Rating:

Vibrational Acceleration . . . . 2.5 max. g

Tubes are rigidly mounted and subjected in each of three positions to 2.5 g vibrational acceleration at 25 cycles per second for 32 hours.

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5751

HIGH-MU TWIN TRIODE

Low-Frequency Vibration Performance:

RMS Output Voltage . . . . 100 max. mv

Under the following conditions and with units connected in parallel; heater voltage of 12.6 volts (series connected), dc plate voltage of 250 volts, dc grid voltage of -3 volts, plate load resistance of 2000 ohms, and vibrational acceleration of 2.5 g at 25 cycles per second.

Heater-Cycling Life Performance:

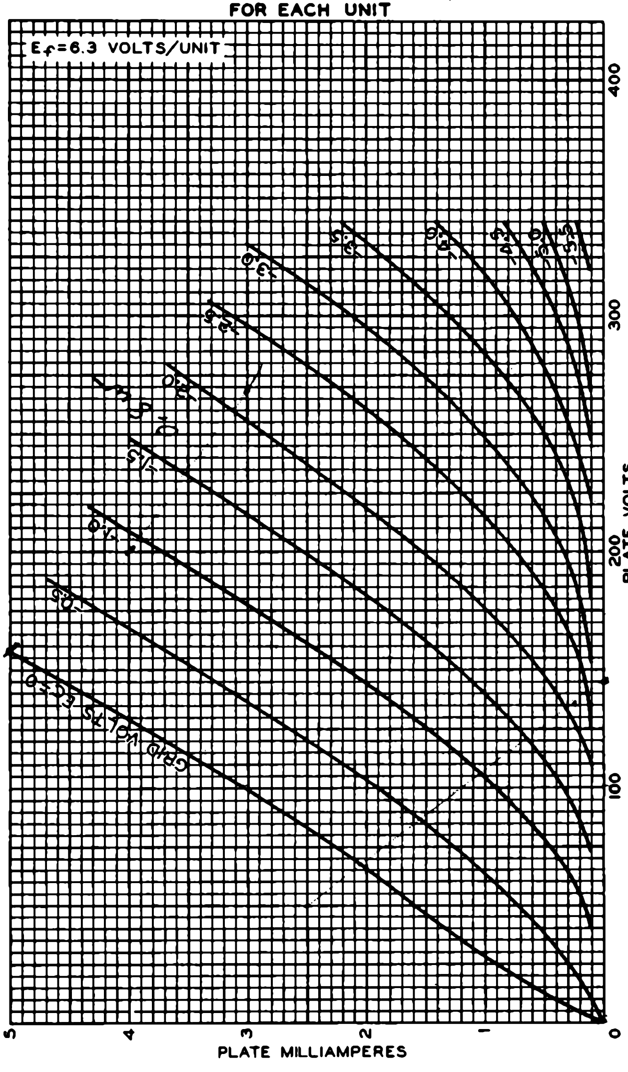
Cycles of Intermittent Operation . . . . . 2000 min. cycles

Under the following conditions and with parallel heater arrangement: heater voltage of 7.5 volts cycled one minute on and one minute off, heater 100 volts positive with respect to cathode, and plate and grid voltage = 0 volts.

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5751

5751
AVERAGE PLATE CHARACTERISTICS
FOR EACH UNIT



MAR.13,1953 TUBE DEPARTMENT 92CM-7948

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

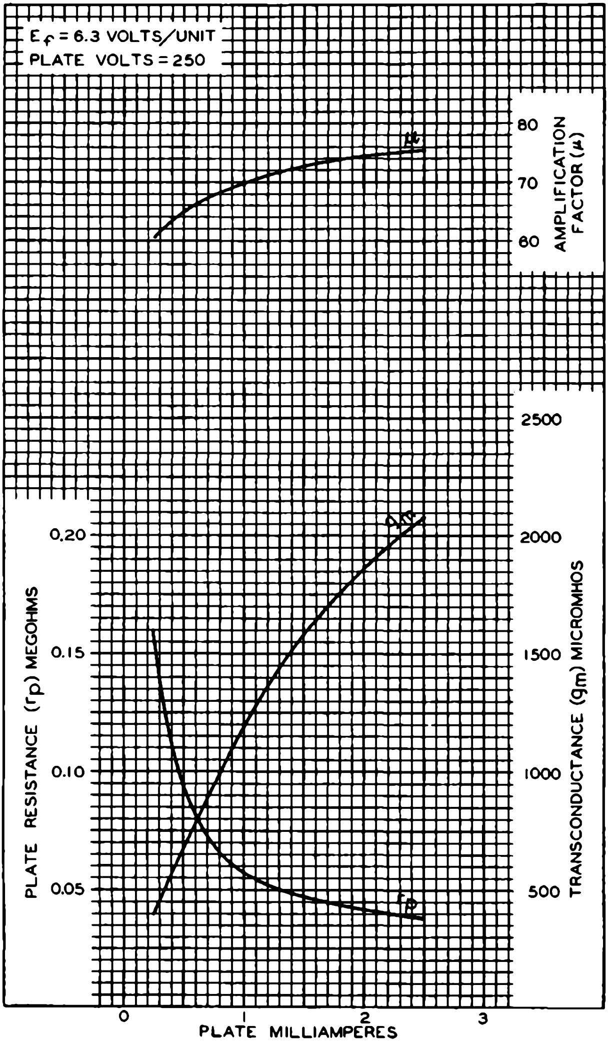
5751

RCA

5751

AVERAGE CHARACTERISTICS

FOR EACH UNIT



MAR. 12, 1953

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7947

5794

FIXED-TUNED OSCILLATOR TRIODE

"PENCIL TYPE" WITH INTEGRAL RESONATORS

For radiosonde service at 1680 Mc

The 5794 is the same as the 6562 except for the following items:

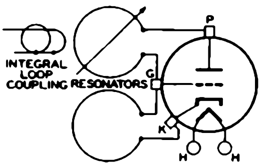
Mechanical:

Dimensions . . . . *See Dimensional Outline*

Terminal Connections *(See Dimensional Outline)*:

H - Heater

K - Cathode



G - Grid

P - Plate

OPERATING CONSIDERATIONS

The *flexible heater leads* of the 5794 are usually soldered to the circuit elements. Soldering of these connections should not be made closer than 3/4" from the end of the tube. If this precaution is not followed, the heat of the soldering operation may crack the glass seals of the leads and damage the tube. Under no circumstances should any of the electrodes be soldered to the circuit elements. Connections to the electrodes should be made by spring contact only.

The 5794 should be supported by a suitable clamp around the metal shell either above or below the frequency-adjustment screw. It is essential, however, that the pressure exerted on the shell by the clamp be held to a minimum because excessive pressure can distort the reasonators and result in a change of frequency.

The *plate and cathode connections* should have flexible leads which will accommodate variations in the relative positions of the plate and cathode terminals in individual tubes.

The 5794 may be mechanically tuned by adjustment of the frequency-adjustment screw located on the metal shell of the tube. A clockwise rotation of the frequency-adjustment screw will decrease the frequency, while a counterclockwise rotation will increase the frequency. The range of adjustment provided by the screw is ±12 megacycles.

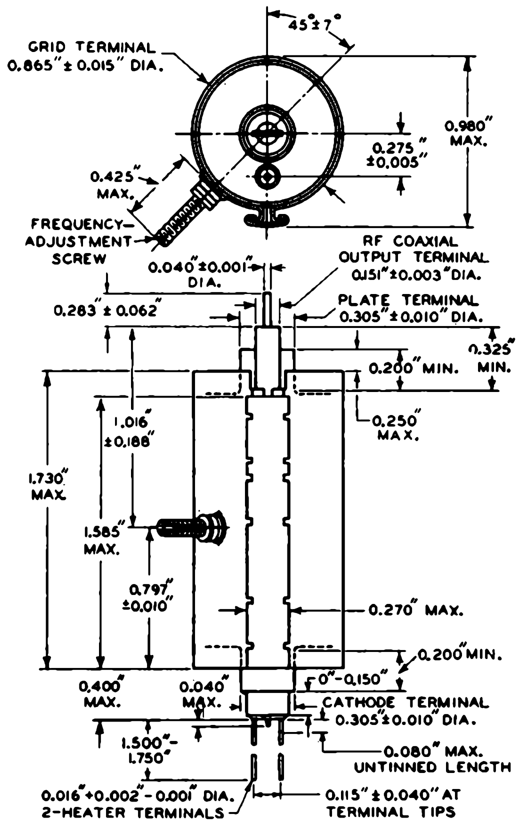
← Indicates a change.

5794

RCA

5794

FIXED-TUNED OSCILLATOR TRIODE



92CM-7140R4

5814

PREMIUM TYPE 5814

MEDIUM-MU TWIN TRIODE

MINIATURE TYPE

Intended for applications where dependable performance under shock and vibration is paramount

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:

Heater Arrangement	*Series*	*Parallel*	
Voltage (AC or DC) . . .	12.6 ± 10%	6.3 ± 10%	volts
Current	0.175	0.35	amp

Direct Interelectrode Capacitances (No external shield):

	Unit No.1	*Unit No.2*	
Grid to Plate	1.5	1.5	μμf
Input	1.6	1.6	μμf
Output	0.50	0.35	μμf

Characteristics, Class A_1 Amplifier:

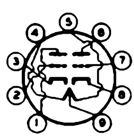
Plate Voltage	100	250	volts
Grid Voltage	0	-8.5	volts
Amplification Factor . . .	19.5	17	
Plate Resistance	6250	7770	ohms
Transconductance	3100	2200	μmhos
Plate Current	11.8	10.5	ma

Mechanical:

Mounting Position . . . . Any
Maximum Overall Length . . . . 2-3/16"
Maximum Seated Length . . . . 1-15/16"
Length from Base Seat to Bulb Top (Excluding Tip). . . . 1-9/16" ± 3/32"
Maximum Diameter . . . . 7/8"
Bulb T-6-1/2
Base . . . . Small-Button Noval 9-Pin (JETEC No.E9-1)

BOTTOM VIEW

Pin 1 - Plate of Unit No.2
Pin 2 - Grid of Unit No.2
Pin 3 - Cathode of Unit No.2
Pin 4 - Heater
Pin 5 - Heater



Pin 6 - Plate of Unit No.1
Pin 7 - Grid of Unit No.1
Pin 8 - Cathode of Unit No.1
Pin 9 - Heater Mid-Tap

AMPLIFIER - Class A_1

Values are for each unit

Maximum Ratings, ***Absolute Values:***

PLATE VOLTAGE.	330 max.	volts
PLATE DISSIPATION	3 max.	watts
CATHODE CURRENT	22 max.	ma

5814

5814

MEDIUM-MU TWIN TRIODE

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode .	100 max.	volts
Heater positive with respect to cathode .	100 max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)	180 max.	°C

Maximum Circuit Values (For maximum rated conditions):

Grid-Circuit Resistance:

For cathode-bias operation	1.0 max.	megohm
For fixed-bias operation	0.25 max.	megohm

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN*

	Note	*Min.*	*Max.*	
Heater Current	1	0.160	0.190	amp
Amplification Factor . . .	1,2	15.5	18.5	
Plate Current	1,2	6.5	14.5	ma
Plate Current	1,3	-	20	µamp
Transconductance	1,2	1750	2650	µmhos
Transconductance	1,4	2500	3700	µmhos
Reverse Grid Current . . .	5,6	-	1.5	µamp
Heater-Cathode Leakage Current:				
Heater negative with respect to cathode. .	1,7	-	10	µamp
Heater positive with respect to cathode. .	1,8	-	10	µamp
Leakage Resistance:				
Between Grid and All Other Electrodes Tied Together . .	1,9	500	-	megohms
Between Plate and All Other Electrodes Tied Together . .	1,10	500	-	megohms

* Each tube is stabilized before characteristics testing by continuous operation for at least 45 hours at room temperature and with dissipation values equivalent to life test conditions.

Note 1: With 12.6 volts ac or dc on heater (series connection).

Note 2: With dc plate voltage of 250 volts and dc grid voltage of -8.5 volts. Each unit is tested separately. Electrodes of units not under test are grounded.

Note 3: With dc plate voltage of 250 volts, plate load resistance of 0.5 megohm, and dc grid voltage of -30 volts. Each unit is tested separately. Electrodes of unit not under test are grounded.

Note 4: With dc plate voltage of 100 volts and dc grid voltage of 0 volts. Each unit is tested separately. Electrodes of unit not under test are grounded.

Note 5: With 15 volts ac or dc on heater (series connection).

Note 6: With dc plate voltage of 250 volts, grid resistor of 0.5 megohm, and dc grid voltage of -30 volts. Each unit is tested separately. Electrodes of unit not under test are grounded.

Note 7: With -100 volts dc between heater and cathode, and units connected in parallel.

Note 8: With +100 volts dc between heater and cathode, and units connected in parallel.

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5814

MEDIUM-MU TWIN TRIODE

Note 9: With grid 100 volts negative with respect to all other electrodes tied together.

Note 10: With plate 300 volts negative with respect to all other electrodes tied together.

SPECIAL RATINGS and PERFORMANCE DATA

Shock Rating:

Impact Acceleration . . . . 600 max. g

Tubes are held rigid in three different positions in a Navy Type, High Impact (flyweight) Shock Machine and are subjected to 600 g impact acceleration.

Fatigue Rating:

Vibrational Acceleration . . . . . 2.5 max. g

Tubes are rigidly mounted and subjected in each of three positions to 2.5 g vibrational acceleration at 25 cycles per second for 32 hours.

Low-Frequency Vibration Performance:

RMS Output Voltage . . . . 100 max. mv

Under the following conditions and with units connected in parallel: Heater voltage of 12.6 volts, plate voltage supply of 250 volts, dc grid voltage of -8.5 volts, plate load resistance of 2000 ohms, and vibrational acceleration of 2.5 g at 25 cycles per second.

Heater-Cycling Life Performance:

Cycles of Intermittent Operation. . 2000 min. cycles

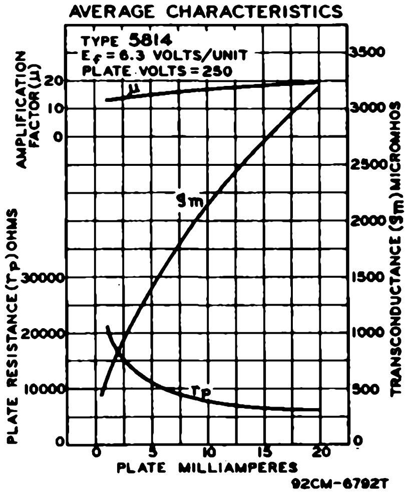
Under the following conditions and with heaters of unit No.1 and unit No.2 connected in parallel: Heater voltage of 7.5 volts cycled one minute on and one minute off, heater 100 volts positive with respect to cathode, and plate and grid voltage = 0 volts.

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5814

5814

MEDIUM-MU TWIN TRIODE

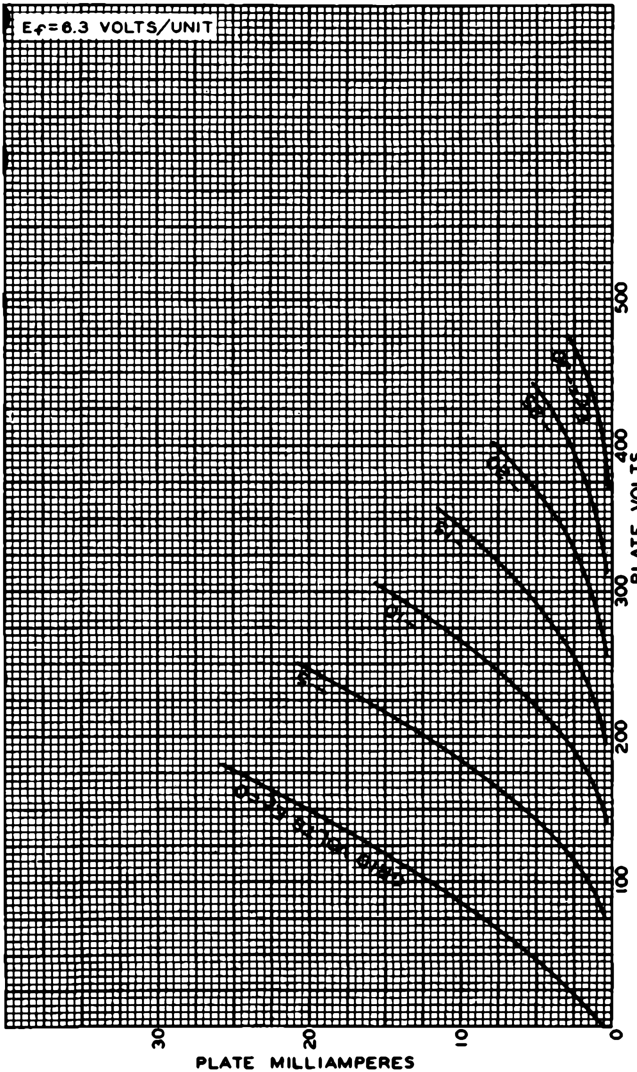


JUNE 1, 1953

CE-6792T

5814

AVERAGE PLATE CHARACTERISTICS
FOR EACH UNIT



FEB.26,1953

TUBE DEPARTMENT

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

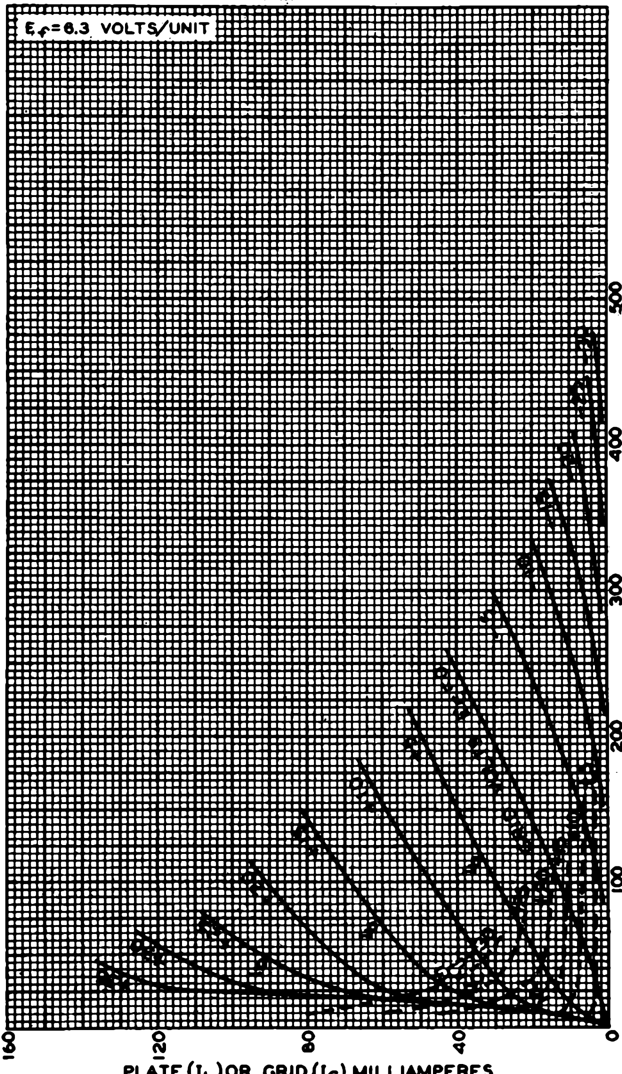
92CM-7939

5814

RCA

5814

AVERAGE PLATE CHARACTERISTICS
FOR EACH UNIT



FEB.26,1953 TUBE DEPARTMENT 92CM-7938

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5823

5823

GLOW-DISCHARGE TRIODE

COLD-CATHODE, MINIATURE TYPE

GENERAL DATA

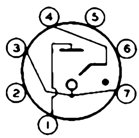
Electrical:

Cathode		Cold
Ionization Time (Approx.):		
For conditions: Instantaneous anode volts = 185; peak positive starter-electrode pre-firing volts = 70; peak positive starter-electrode triggering volts = 50; anode-circuit series resistor (ohms) = 820; starter-electrode series resistor (ohms) = 100000	20	μsec
Deionization Time (Approx.):		
For conditions: (Same as for *Ionization Time*)	500	μsec
Anode Voltage Drop.	62	volts
Starter-Electrode Voltage Drop.	61	volts
Anode Breakdown Voltage	290	volts
Starter-Electrode Breakdown Voltage	80	volts
Required Transfer Current (DC or Instantaneous AC) for transition of discharge to anode at 140 volts peak	50	μamp

Mechanical:

Mounting Position	Any
Maximum Overall Length.	2-1/8"
Maximum Seated Length	1-7/8"
Length, Base Seat to Bulb Top (excluding tip) .	1-1/2" ±3/32"
Maximum Diameter.	3/4"
Bulb.	T-5-1/2
Base.	Small-Button Miniature 7-Pin
Basing Designation for BOTTOM VIEW	4CK

Pin 1 – Anode
Pin 2 – Internal Connection– Do Not Use
Pin 3 – Cathode
Pin 4 – Starter Electrode



Pin 5 – Internal Connection– Do Not Use
Pin 6 – Internal Connection– Do Not Use
Pin 7 – Cathode

Maximum Ratings▲, *Absolute Values:*

For First-Quadrant Operation Only

PEAK ANODE AND STARTER-ELECTRODE VOLTAGE:		
Inverse	200 max.	volts
Forward	200 max.	volts

▲ These ratings apply to the 5823 when it is operated from a power supply having a frequency of 60 cycles per second. If a contemplated application involves higher supply frequencies, please write, stating the proposed operating frequency, to the attention of Commercial Engineering, RCA, Harrison, New Jersey for information as to required changes in maximum ratings and characteristics.

RCA

5823
GLOW-DISCHARGE TRIODE

CATHODE CURRENT:		
Peak	100 max.	ma
Average*	25 max.	ma
PEAK STARTER-ELECTRODE CURRENT:		
With starter-electrode voltage positive	100 max.	ma
AMBIENT TEMPERATURE	-60 to +75	°C

Typical Operating Conditions:

For Relay Service with 60-Cycle AC Supply

AC Anode Supply Voltage (RMS)	117	volts
AC Starter-Electrode Voltage:		
Max. Peak Positive Pre-Firing Voltage	70	volts
Min. Peak Positive Triggering Voltage	35	volts
Min. Firing Voltage (Sum of In-Phase Instantaneous Pre-Firing Voltage and Instantaneous Triggering Voltage)	105	volts

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

For First-Quadrant Operation Only

	Note	Min.	Max.	
Anode Breakdown Voltage	1	200	-	volts
Starter-Electrode Breakdown Voltage	2	73	105□	volts
Required Transfer Current (DC or Instantaneous AC) for transition of discharge to anode at 140 volts peak	3	-	400□	μamp
Anode Voltage Drop	4	-	85□	volts
Starter-Electrode Voltage Drop	5	-	75□	volts

Note 1: With a variable dc anode voltage, dc starter-electrode voltage of 0 volts, anode-circuit series resistance of 3000 ohms, and starter-electrode series resistance of 50000 ohms.

Note 2: With dc anode voltage of 0 volts, variable dc starter-electrode voltage, anode-circuit series resistance of 3000 ohms, and starter-electrode series resistance of 50000 ohms.

Note 3: With a variable dc starter-electrode voltage, anode-circuit series resistance of 3000 ohms, and starter-electrode series resistance of 2 megohms.

Note 4: With dc anode voltage of 230 volts, dc starter-electrode voltage of 91 volts, dc cathode current of 50 milliamperes, anode-circuit series resistance of 3000 ohms, and starter-electrode series resistance of 50000 ohms.

Note 5: With dc anode voltage of 0 volts, variable dc starter-electrode voltage, dc starter-electrode current of 10 milliamperes, and starter-electrode series resistance of 3000 ohms.

* Averaged over any interval of 15 seconds maximum.

□ Maximum individual tube values during life.

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5823

GLOW-DISCHARGE TRIODE

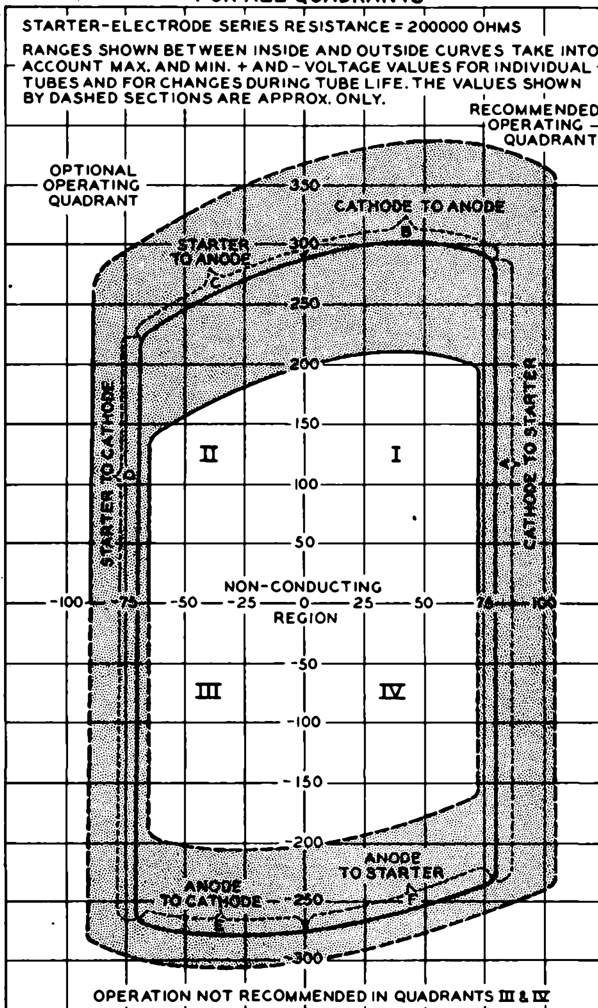
OPERATING NOTES

RCA-5823 is recommended for operation only in that part of the breakdown characteristic designated by Quadrant I. Operation in Quadrant II is satisfactory but changes in tube ratings are necessary. Operation in Quadrants III and IV is not recommended, because the anode and starter electrode are not designed for efficient cathode operation; their use in this manner will result in unstable operation and shorter tube life. The information given for Quadrants III and IV is of value to the equipment designer in that it indicates the need for precautions to be taken in order that the peak inverse voltage rating is not exceeded.

Because of the asymmetrical shape of its anode characteristic the 5823 can be used as a rectifier. When so used (with starter electrode connected through 50000-ohm resistor to anode), the 5823 has a maximum peak inverse anode voltage rating of 200 volts, a maximum peak cathode current of 100 milliamperes, and a maximum dc cathode current of 25 milliamperes. Operation at values of dc cathode current less than 8 milliamperes is not recommended because of resulting instability.

5823

5823
BREAKDOWN CHARACTERISTICS
FOR ALL QUADRANTS



MAY 16,1949

TUBE DEPARTMENT
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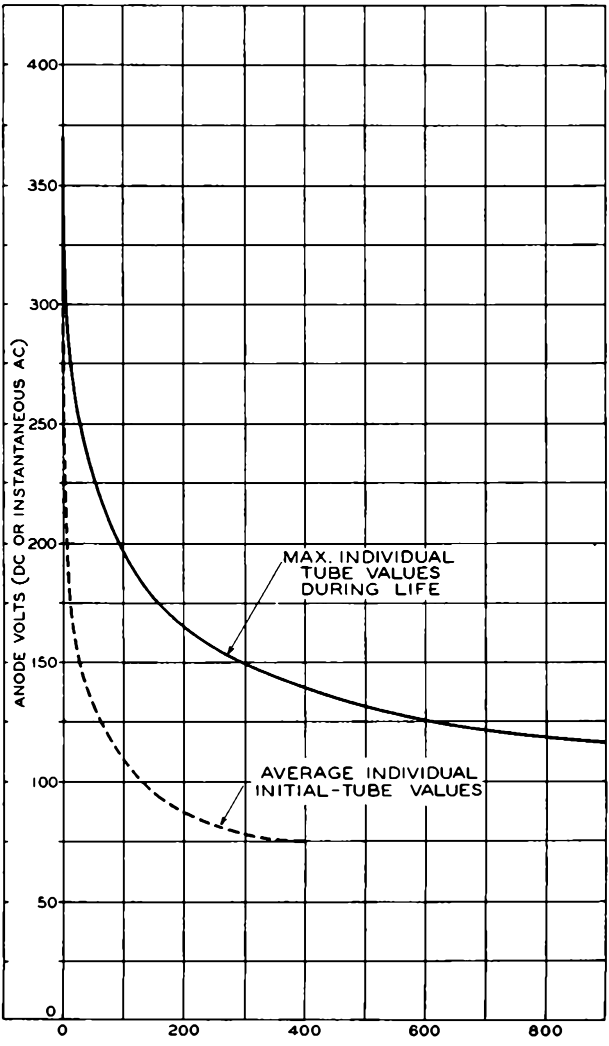
92CM-7283

5823

RCA

5823

TRANSITION CHARACTERISTIC



MAY 16,1949 TUBE DEPARTMENT 92CM-7282

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5823

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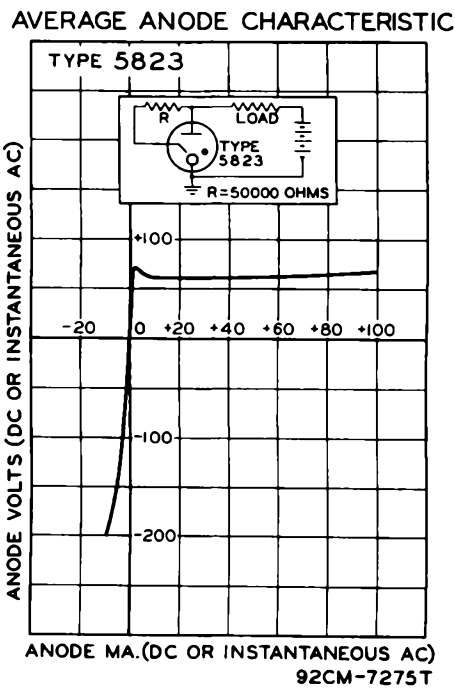
5823
GLOW-DISCHARGE TRIODE



5825

5825

HALF-WAVE VACUUM RECTIFIER

GENERAL DATA

Electrical:

Filament, Thoriated Tungsten:

Voltage	1.6	ac volts
Current	1.25	amp

Direct Interelectrode Capacitance:°

Plate to Filament	2.2	μμf

Tube Voltage Drop at maximum

peak plate current	1750	volts

° *with no external shield.*

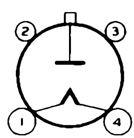
Mechanical:

Mounting Position	Any
Overall Length	5-11/16" ± 5/32"
Seated Length	5-1/6" ± 5/32"
Maximum Diameter	2-1/16"
Bulb	ST-16
Cap	Medium
Base	Medium-Shell Small 4-Pin
Basing Designation for BOTTOM VIEW	4P

Pin 1 – Filament

Pin 2 – No Connection

Pin 3 – No Connection



Pin 4 – Filament, Internal Shield

Cap – Plate

HALF-WAVE RECTIFIER

Maximum Ratings, ***Absolute Values:***

For supply frequencies up to 250 kc

PEAK INVERSE PLATE VOLTAGE	60000 max.	volts
PEAK PLATE CURRENT	40 max.	ma
AVERAGE PLATE CURRENT	2 max.	ma
HOT-SWITCHING TRANSIENT CURRENT for duration of 0.1 sec. max.	100 max.	ma
PLATE DISSIPATION	3.5 max.	watts
BULB TEMPERATURE	80 max.	°C

Typical Operation at 70 kc in Half-Wave Circuit with Capacitor-Input to Filter:

AC Plate-Supply Voltage (RMS)	21200	volts
Filter-Input Capacitor	350	μμf
Effective Plate-Supply Impedance	120000	ohms
DC Output Current	2	ma
DC Output Voltage at Input to Filter (Approx.):		
At half-load current (1 ma)	28000	volts
At full-load current (2 ma)	26700	volts
Voltage Regulation (Approx.):		
Half-load to full-load current	1300	volts

SEPT. 15, 1949 TENTATIVE DATA

5825

5825

HALF-WAVE VACUUM RECTIFIER

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Note	Min.	Max.	
Filament Current	1	1.15	1.35	amp
Plate-Filament Capacitance	-	2.14	2.26	μμf

Note: With 1.6 volts dc on filament.

OPERATING NOTES

When the filament is supplied from an rf power source which is at a high dc potential above ground, adjustment of the filament voltage by direct measurement is usually impractical. However, a simple method utilizing visual comparison of filament temperatures can be used for adjustment of filament power. The color temperature of the filament operating from an rf power source may be checked visually by observing in a darkened room the reflection of the incandescent filament upon the surface of the internal shield. A visual comparison of this color temperature with that obtained when the filament of another 5825 is operated from a dc or low-frequency ac supply of 1.6 volts, provides a convenient means for adjusting the amount of rf excitation to produce 1.6 volts (rms) at the filament terminals.

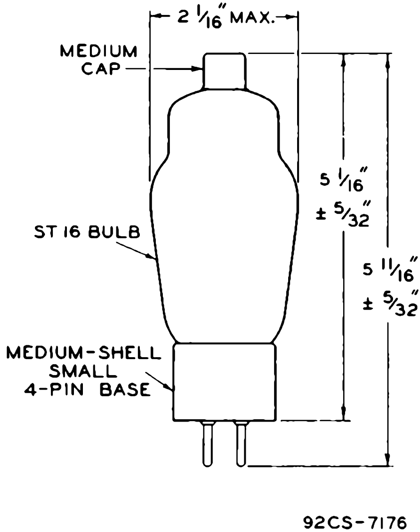
The filament must never under any condition of operation be allowed to reach a temperature higher than that caused by operating the filament on dc or low-frequency ac at a voltage of 1.68 volts. Operation at higher temperatures will cause impaired performance of the tube. During circuit adjustment, however, it is permissible to allow the filament voltage to rise to 2 volts for the brief interval required to make the adjustment.

Soft x-rays are produced when the 5825 is operated at a plate voltage above approximately 20000 volts. These rays can constitute a health hazard unless the tube is adequately shielded. Relatively simple shielding should prove adequate, but the need for this precaution should be considered in equipment design.

5825

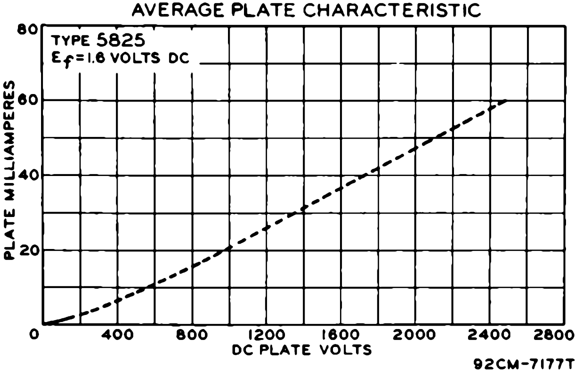
5825

HALF-WAVE VACUUM RECTIFIER



5825

HALF-WAVE VACUUM RECTIFIER



5840
SHARP-CUTOFF PENTODE
SUBMINIATURE TYPE

Intended for applications where dependable performance under shock and vibration is paramount.

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage	6.3 ± 5%	ac or dc volts
Current	0.150	amp

Direct Interelectrode Capacitances:

	With External Shield°	*Without External Shield*	
Grid No.1 to Plate	0.015 max.	0.03 max.	μμf
Input	4.2	4.0	μμf
Output	3.4	1.9	μμf

° Having inside diameter of 0.405" and connected to cathode.

Characteristics, Class A_1 Amplifier:

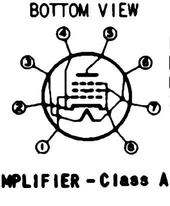
Plate Supply Voltage	100	volts
Grid-No.2 Supply Voltage	100	volts
Cathode Resistor	150	ohms
Plate Resistance	260000	ohms
Transconductance	5000	μmhos
Plate Current	7.5	ma
Grid-No.2 Current	2.4	ma
Grid-No.1 Volts (Approx.) for plate current of 10 μamp	-9	volts

Mechanical:

Operating Position	Any
Maximum Bulb Length	1-3/8"
Length from Button Seal to Bulb Top (Excluding tip)	1.075" ± 0.060"
Diameter	0.383" ± 0.017"
Bulb	T-3
Leads, Flexible	8
Length	1-1/2" to 1-3/4"
Orientation and Diameter	See Dimensional Outline in GENERAL SECTION

BOTTOM VIEW

Lead No.1 - Grid No.1
Lead No.2 - Cathode, Grid No.3
Lead No.3 - Heater
Lead No.4 - Cathode, Grid No.3



Lead No.5 - Plate
Lead No.6 - Heater
Lead No.7 - Grid No.2
Lead No.8 - Cathode, Grid No.3

AMPLIFIER - Class A_1

Maximum Ratings, ***Absolute Values*****:**

DC PLATE VOLTAGE	165 max.	volts
GRID-No.2 (SCREEN) VOLTAGE	155 max.	volts

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5840

5840

SHARP-CUTOFF PENTODE

GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Negative bias value	55 max.	volts
PLATE DISSIPATION	1.1 max.	watts
GRID-No.2 INPUT	0.55 max.	watt
DC CATHODE CURRENT	16.5 max.	ma
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200 max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)	250 max.	^{o}C

Typical Operation as Resistance-Coupled Amplifier:

See RESISTANCE-COUPLED AMPLIFIER CHART at end of tabulated data for this type

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:		
For cathode-bias operation	1.2 max.	megohms
For fixed-bias operation	Not recommended	

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN*

	Note	*Min.*	*Max.*	
Heater Current	1	0.138	0.162	amp
Grid-No.1-to-Plate Capacitance	2	-	0.015	μμf
Input Capacitance	2	3.5	4.9	μμf
Output Capacitance	2	2.9	3.9	μμf
Plate Current	1,3	5.5	9.5	ma
Plate Current	1,4	-	50	μamp
Transconductance	1,3	4100	5900	μmhos
Transconductance	5,3	3750	-	μmhos
Grid-No.1 Current	1,6	-	±0.3	μamp
Grid-No.2 Current	1,3	0.5	3.5	ma
Plate Resistance	1,7	0.175	-	megohm
Heater-Cathode Leakage Current:				
Heater negative with respect to cathode	1,8	-	7.0	μamp
Heater positive with respect to cathode	1,8	-	7.0	μamp
Leakage Resistance:				
Between Grid No.1 and All Other Electrodes Tied Together	1,9	100	-	megohms
Between Plate and All Other Electrodes Tied Together	1,10	100	-	megohms

* See next page.

5840

5840

SHARP-CUTOFF PENTODE

Note 1: With 6.3 volts ac or dc on heater.

Note 2: With external shield having inside diameter of 0.405" and connected to cathode.

Note 3: With plate supply voltage of 100 volts, grid-No.2 supply voltage of 100 volts, cathode resistor of 150 ohms, and cathode bypass capacitor of 1000 microfarads.

Note 4: With dc plate voltage of 100 volts, dc grid-No.2 voltage of 100 volts, and dc grid-No.1 voltage of -9 volts.

Note 5: With 5.7 volts ac or dc on heater.

Note 6: With plate supply voltage of 100 volts, grid-No.2 supply voltage of 100 volts, cathode resistor of 150 ohms, cathode bypass capacitor of 1000 microfarads, and grid-No.1 resistor of 0.1 megohm.

Note 7: With plate supply voltage of 100 volts, grid-No.2 supply voltage of 100 volts, cathode resistor of 150 ohms bypassed by capacitor having a maximum reactance of 3 ohms.

Note 8: With 100 volts dc between heater and cathode.

Note 9: With grid No.1 100 volts negative with respect to all other electrodes tied together.

Note 10: With plate 300 volts negative with respect to all other electrodes tied together.

* Each tube is stabilized before characteristics testing by continuous operation for at least 45 hours at room temperature and with dissipation values equivalent to life test conditions.

SPECIAL RATINGS & PERFORMANCE DATA

Shock Rating:

Impact Acceleration . . . . 450 max. g

Tubes are held rigid in three different positions in a Navy Type, High Impact (flyweight) Shock Machine and are subjected to 450 g impact acceleration.

Fatigue Rating:

Vibrational Acceleration . . . . . 2.5 max. g

Tubes are rigidly mounted and subjected in each of three positions to 2.5 g vibrational acceleration at 25 cycles per second for 32 hours.

Uniform Acceleration Rating . . . . . 1000 max. g

Tubes are subjected in each of three positions to a gradually applied uniform acceleration up to 1000 g.

Low-Frequency Vibration Performance:

RMS Output Voltage . . . . 60 max. mv

Under the following conditions: A 100-volt plate and grid-No.2 voltage supply having an impedance not exceeding that of a 40-μf capacitor, plate load resistance of 10000 ohms, grid-No.1 resistor of 0.1 megohm, cathode resistor of 150 ohms, cathode bypass capacitor of 1000 μf, and vibrational acceleration of 15 g at 40 cps.

RCA

5840

SHARP-CUTOFF PENTODE

Heater-Cycling Life Performance:

Cycles of Intermittent Operation . . 2500 min. cycles
Under the following conditions: With heater voltage of 7.0 volts cycled 1 minute on and 4 minutes off, heater-cathode voltage of 140 volts (rms), and plate, grid-No.2, and grid-No.1 voltage = 0 volts.

Average Life Performance:

The average life performance based on a 500-hour test at 175°C ambient temperature is not less than 450 hours. This life test is made on sample lot of tubes with heater voltage of 6.3 volts; plate supply voltage of 100 volts; grid-No.2 supply voltage of 100 volts; dc heater-cathode voltage (heater positive with respect to cathode) of 200 volts; cathode resistor of 150 ohms; and grid-No.1 resistor of 1 megohm.

The 500-hour end-point limits for the 5840 with heater voltage of 6.3 volts, plate supply voltage of 100 volts, grid-No.2 supply voltage of 100 volts, cathode resistor of 150 ohms bypassed by capacitor having a maximum reactance of 3 ohms, and dc heater-cathode voltage of 100 volts with heater either positive or negative with respect to cathode are: transconductance, 3250 micromhos minimum; heater-cathode leakage current, 20 microamperes maximum; and grid-No.1 current, +0.9 microampere maximum or −0.9 microampere maximum.

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5840

5840

SHARP-CUTOFF PENTODE

OPERATING CONDITIONS AS RESISTANCE-COUPLED AMPLIFIER

Plate-Supply Voltage	100						volts
Plate Load Resistor	0.10	0.10	0.27	0.27	0.47	0.47	meg
Grid-No.2 Resistor	0.22	0.22	0.68	0.68	1.2	1.2	meg
Grid-No.1 Resistor°	0.27	0.47	0.47	1.0	0.47	1.0	meg
Cathode Resistor	820	820	2200	2200	3300	3300	ohms
Sig. Input Volt. (rms)	0.1	0.1	0.1	0.1	0.1	0.1	volt
Output Voltage (rms)	8.2	9.0	9.5	11.8	9.2	11.7	volts
Voltage Gain▲	82	90	95	118	92	117	
Distortion	2.8	3.8	2.5	3.0	3.1	2.3	%
Sig. Input Volt. (rms)*	0.23	0.22	0.15	0.16	0.12	0.14	volt
Output Voltage (rms)	17.7	18.6	13.6	17	11	16	volts
Voltage Gain▲	77	85	91	106	92	114	
Distortion	4.9	4.8	4.7	4.4	4.8	5.0	%

Plate-Supply Voltage	150						volts
Plate Load Resistor	0.10	0.10	0.27	0.27	0.47	0.47	meg
Grid-No.2 Resistor	0.27	0.27	0.82	0.82	1.5	1.5	meg
Grid-No.1 Resistor°	0.27	0.47	0.47	1.0	0.47	1.0	meg
Cathode Resistor	560	560	1500	1500	2200	2200	ohms
Sig. Input Volts. (rms)	0.1	0.1	0.1	0.1	0.1	0.1	volt
Output Voltage (rms)	11.5	12.5	13.2	15.5	13	16.7	volts
Voltage Gain▲	115	125	132	155	130	167	
Distortion	1.5	2.2	2.4	2.4	3.7	3.0	%
Sig. Input Volt. (rms)*	0.20	0.18	0.16	0.16	0.11	0.14	volt
Output Voltage (rms)	21.7	21.7	20.5	24	14	22.2	volts
Voltage Gain▲	109	120	128	150	127	159	
Distortion	4.8	5.0	4.9	4.8	4.2	4.8	%

° Of following stage.

▲ Ratio of signal output to signal input.

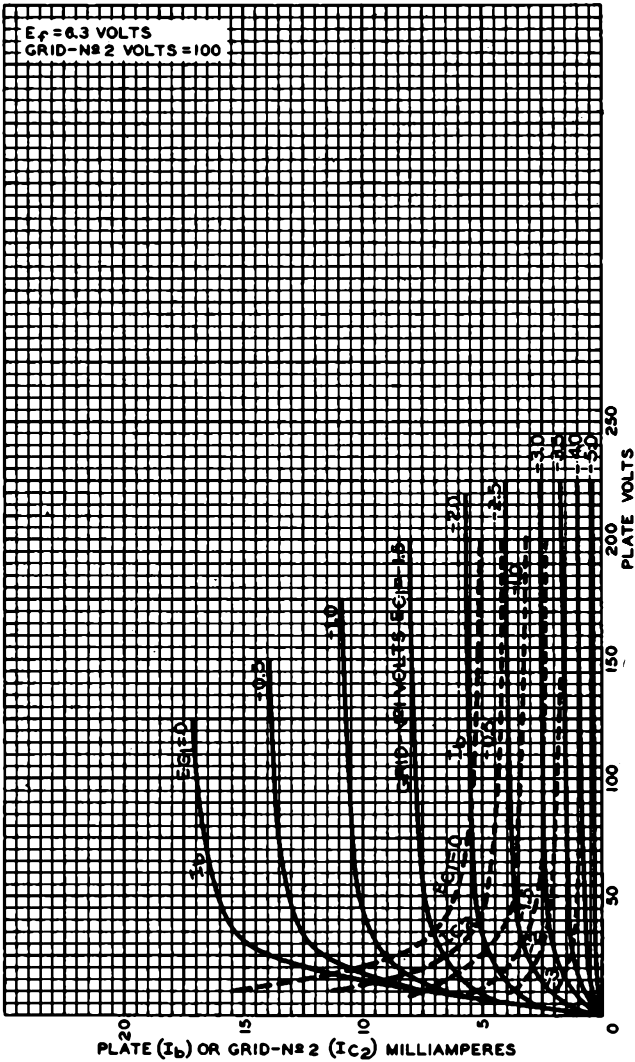
* Maximum value to swing the grid of resistance-coupled amplifier tube to the point where its grid No.1 starts to draw current.

Note: Coupling capacitors should be selected to give desired frequency response. Cathode resistors should be adequately bypassed.

5840

5840

AVERAGE PLATE CHARACTERISTICS



JAN. 8, 1953

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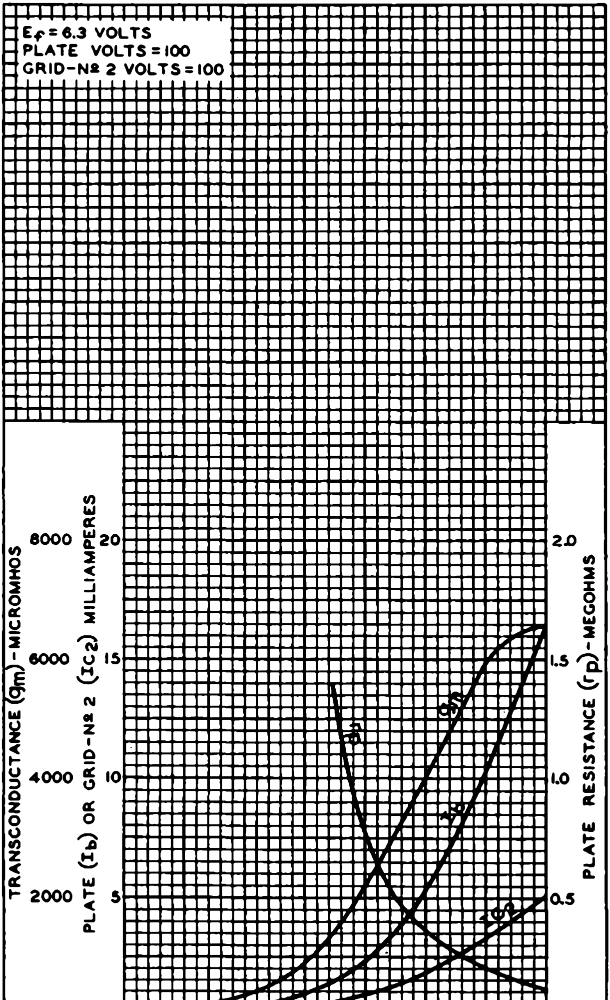
92CM-7893

RCA

5840

AVERAGE CHARACTERISTICS



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5876

5876

UHF HIGH-MU TRIODE

"PENCIL TYPE" FOR GROUNDED-GRID SERVICE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage	6.3	ac or dc volts
Current	0.135	amp

Direct Interelectrode Capacitances:

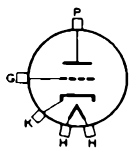
Grid to Plate	1.4	$\mu\mu$f
Grid to Cathode	2.5	$\mu\mu$f
Plate to Cathode	0.035 max.	$\mu\mu$f

Mechanical:

Terminal Connections:

H – Heater

K – Cathode



G – Grid

P – Plate

Mounting Position	Any
Dimensions	See Outline Drawing

AMPLIFIER – Class A_1

Maximum Ratings, ***Absolute Values*****:**

DC PLATE VOLTAGE	300 max.	volts
DC GRID VOLTAGE	-100 max.	volts
DC PLATE CURRENT	25 max.	ma
PLATE DISSIPATION◇	6.25 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode.	90 max.	volts
Heater positive with respect to cathode.	90 max.	volts
PLATE-SEAL TEMPERATURE	175 max.	°C

Characteristics:

Plate Voltage	250	volts
Cathode-Bias Resistor	75	ohms
Amplification Factor	56	
Plate Resistance	8625	ohms
Transconductance	6500	μmhos
Plate Current	18	ma

Maximum Circuit Values:

Grid-Circuit Resistance	0.5 max.	megohm

PLATE-MODULATED RF POWER AMPLIFIER – Class C Telephony

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

Maximum CCS° Ratings, ***Absolute Values*****:**

DC PLATE VOLTAGE	275 max.	volts

◇, °: See next page.

5876

5876

UHF HIGH-MU TRIODE

DC GRID VOLTAGE	-100	max.	volts
DC PLATE CURRENT	22	max.	ma
DC GRID CURRENT	8	max.	ma
PLATE INPUT	6.0	max.	watts
PLATE DISSIPATION◇	4.25	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	90	max.	volts
Heater positive with respect to cathode	90	max.	volts
PLATE-SEAL TEMPERATURE	175	max.	°C

Maximum Circuit Values:

Grid-Circuit Resistance	0.1	max.	megohm

RF POWER AMPLIFIER & OSCILLATOR- Class C Telegraphy

Key-down conditions per tube without amplitude modulation●

Maximum CCS○ Ratings, *Absolute Values*:

DC PLATE VOLTAGE	360	max.	volts
DC GRID VOLTAGE	-100	max.	volts
DC PLATE CURRENT	25	max.	ma
DC GRID CURRENT	8	max.	ma
PLATE INPUT	9	max.	watts
PLATE DISSIPATION◇	6.25	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	90	max.	volts
Heater positive with respect to cathode	90	max.	volts
PLATE-SEAL TEMPERATURE	175	max.	°C

Typical Operation as Oscillator in Grounded-Grid Circuit:

	500 Mc	*1700 Mc*	
DC Plate Voltage	250	250	volts
DC Grid Voltage♠	-12	-2	volts
DC Plate Current	23	23	ma
DC Grid Current (Approx.)□	6	3	ma
Useful Power Output (Approx.)	3	0.75	watts

Typical Operation as RF Power Amplifier in Grounded-Grid Circuit:

	500 Mc	
DC Plate Voltage	275	volts
DC Grid Voltage♠	-51	volts
DC Plate Current	23	ma
DC Grid Current (Approx.)□	7	ma
Driver Power Output (Approx.)□*	2	watts
Useful Power Output (Approx.)	3	watts

Maximum Circuit Values:

Grid-Circuit Resistance	0.1	max.	megohm

◇, ●, ○, ♠, □, *: See next page.

5876

UHF HIGH-MU TRIODE

FREQUENCY MULTIPLIER

Maximum CCS° Ratings, *Absolute Values*:

DC PLATE VOLTAGE	330 max.	volts
DC GRID VOLTAGE	-100 max.	volts
DC PLATE CURRENT	22 max.	ma
DC GRID CURRENT	8 max.	ma
PLATE INPUT	7.5 max.	watts
PLATE DISSIPATION◇	6.25 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	90 max.	volts
Heater positive with respect to cathode	90 max.	volts
PLATE-SEAL TEMPERATURE	175 max.	°C

Typical Operation in Grounded-Grid Circuit:

	Tripler to 480 Mc	*Doubler to 960 Mc*	
DC Plate Voltage	300	300	volts
DC Grid Voltage♠	-90	-70	volts
DC Plate Current	18	17.3	ma
DC Grid Current (Approx.)□	6	7	ma
Driver Power Output (Approx.)□*	2.1	2	watts
Useful Power Output (Approx.)	2.1	2	watts

Maximum Circuit Values:

Grid-Circuit Resistance	0.1 max.	megohm

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Note	*Min.*	*Max.*	
Heater Current	1	0.125	0.145	amp
Grid-to Plate Capacitance	-	1.2	1.6	μμf
Grid-to Cathode Capacitance	-	2.2	2.8	μμf
Plate-to Cathode Capacitance	-	-	0.035	μμf

Note 1: With 6.3 volts ac or dc on heater.

◇ In applications where the plate dissipation exceeds 2.5 watts, it is important that a large area of contact be provided between the plate cylinder and the terminal to provide adequate heat conduction.

° Continuous Commercial Service.

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

♠ Obtained from grid resistor.

* In grounded-grid circuits the grid-driving voltage and the developed rf plate voltage act in series to supply the load circuit. As a result, the required driving power is increased over that needed for grounded-cathode circuits. The increased driving power is not lost because it appears as output from the grounded-grid stage. If the driving voltage and grid current are increased, the output will always increase.

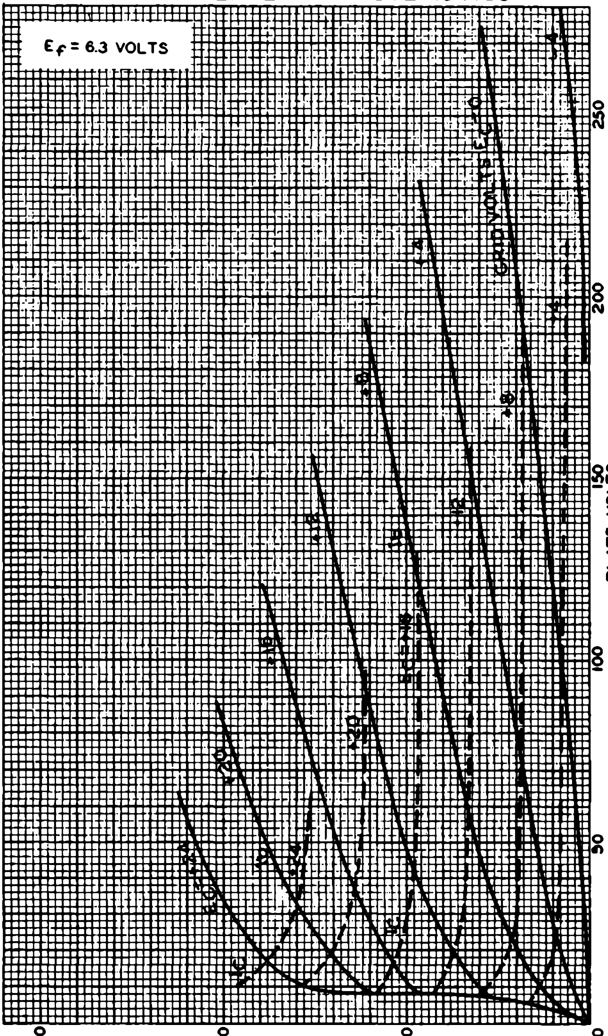
□ For effect of load resistance on grid current and driving power, refer to TUBE RATINGS—*Grid Current and Driving Power* in General Section.

OUTLINE DIMENSIONS and INSTALLATION NOTES for the 5876 are the same as those shown for Type 5675.

5876

5876

AVERAGE PLATE CHARACTERISTICS



JAN. 6, 1950

TUBE DEPARTMENT

92CM-7426

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

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5879

SHARP-CUTOFF PENTODE

9-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:

Voltage	6.3	ac or dc volts
Current	0.15	amp

Direct Interelectrode Capacitances:°

Pentode Connection:

Grid No.1 to Plate	0.15 max.	μμf ←
Input	2.7	μμf
Output	2.4	μμf

Triode Connection (Grids No.2 & No.3 connected to plate):

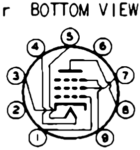
Grid No.1 to Plate	1.4	μμf
Grid No.1 to Cathode & Heater	1.4	μμf
Plate to Cathode & Heater	0.85	μμf

° With no external shield.

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-3/16"
Maximum Seated Length	1-15/16"
Length, Base Seat to Bulb Top (Excluding tip)	1-9/16" ±3/32"
Maximum Diameter	7/8"
Bulb	T-6-1/2
Base	Small-Button Noval 9-Pin (JETEC No.E9-1)
Basing Designation for BOTTOM VIEW	9AD

Pin 1 – Grid No.1
Pin 2 – No Connection
Pin 3 – Cathode
Pin 4 – Heater
Pin 5 – Heater



Pin 6 – No Connection
Pin 7 – Grid No.2
Pin 8 – Plate
Pin 9 – Grid No.3

AMPLIFIER – Class A_1

Pentode Connection

Maximum Rating, ***Design-Center Values:***

PLATE VOLTAGE	300 max.	volts
GRID-No.2 (SCREEN) VOLTAGE	150 max.	volts
GRID-No.2 SUPPLY VOLTAGE	300 max.	volts
GRID-No.2 INPUT	0.25 max.	watt
PLATE DISSIPATION	1.25 max.	watts
GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Negative Bias Value	50 max.	volts
Positive Bias Value	0 max.	volts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	90 max.	volts
Heater positive with respect to cathode	90 max.	volts

← Indicates a change

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5879

5879

SHARP-CUTOFF PENTODE

Characteristics:

Plate Voltage	250	volts
Grid No.3 (Suppressor)	Connected to cathode at socket	
Grid-No.2 Voltage	100	volts
Grid-No.1 Voltage	-3	volts
Plate Resistance (Approx.)	2	megohms
Transconductance	1000	μmhos
Grid-No.1 Bias (Approx.) for plate current of 10 μamp	-8	volts
→ Plate Current	1.8	ma
Grid-No.2 Current	0.4	ma

Maximum Circuit Values:

Grid-No.1-Circuit Resistance	2.2 max.	megohms

AMPLIFIER - Class A_1

Triode Connection - Grids No.2 & No.3 Connected to Plate

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	250 max.	volts
TOTAL PLATE DISSIPATION	1.5 max.	watts
GRID-No.1 VOLTAGE		
Negative Bias Value	50 max.	volts
Positive Bias Value	0 max.	volts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	90 max.	volts
Heater positive with respect to cathode	90 max.	volts

Characteristics:

Plate Voltage	100	250	volts
Grid-No.1 Voltage	-3	-8	volts
Amplification Factor	21	21	
Plate Resistance (Approx.)	17000	13700	ohms
Transconductance	1240	1530	μmhos
Total Plate Current	2.2	5.5	ma

Maximum Circuit Values:

Grid-No.1-Circuit Resistance	2.2 max.	megohms

Typical Operation as Resistance-Coupled Amplifier:

See RESISTANCE-COUPLED AMPLIFIER CHARTS at front of Receiving Tube Section.

→ Indicates a change

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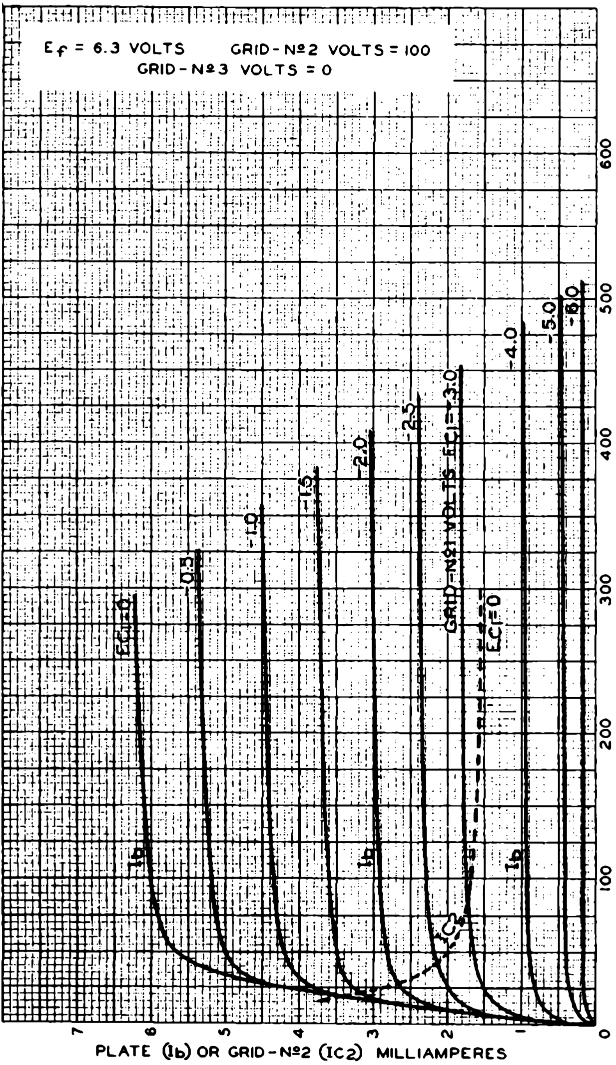
AVERAGE PLATE CHARACTERISTICS



FEB. 1, 1950

TUBE DEPARTMENT

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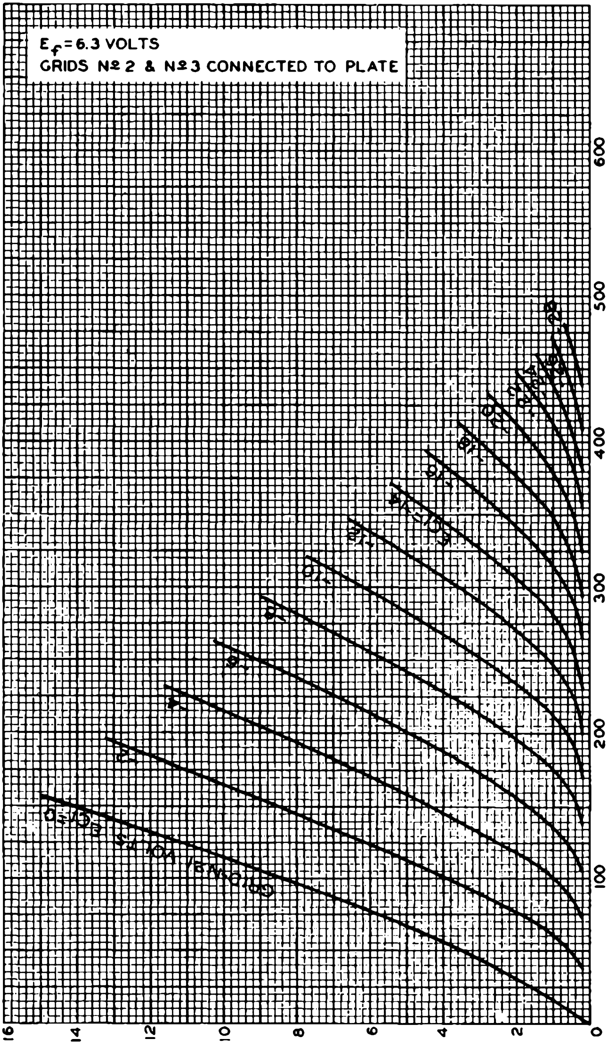
92CM-7439

5879

5879

AVERAGE PLATE CHARACTERISTICS

TRIODE CONNECTION



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92CM-7448

5879

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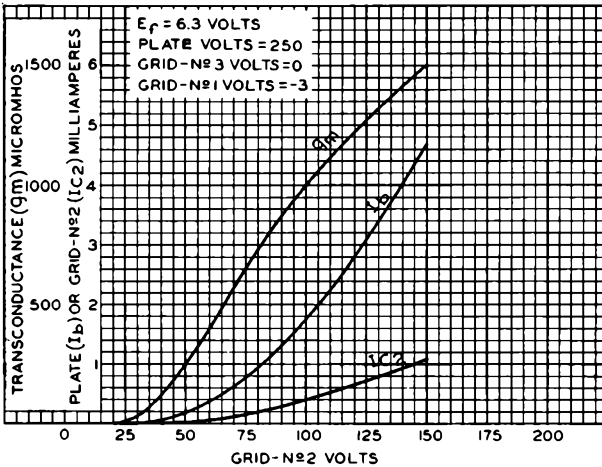
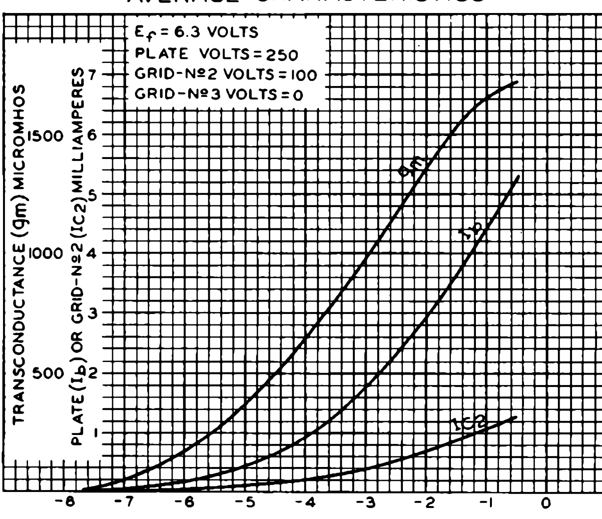
5879

AVERAGE CHARACTERISTICS



AVERAGE CHARACTERISTICS



5890

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5890

REMOTE-CUTOFF BEAM PENTODE

GENERAL DATA

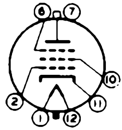
Electrical:

Heater, for Unipotential Cathode:			
Voltage	6.3	ac or dc	volts
Current	0.6		amp
Mu-Factor, Grid No.2 to Grid No.1	5		
Direct Interelectrode Capacitances:			
Grid No.1 to Plate	0.018		$\mu\mu$f
Input	7.5		$\mu\mu$f
Output	1.6		$\mu\mu$f

Mechanical:

Mounting Position	Any
Overall Length	6-1/2" ± 1/4"
Seated Length	6" ± 1/4"
Maximum Diameter	1-1/2"
Cap	Small
Base	Small-Shell Duodecal 7-Pin
Basing Designation for BOTTOM VIEW	12J

Pin 1 - Heater
Pin 2 - Grid No.1
Pin 6 - Grid No.3
Pin 7 - Internal Con.- Do Not Use



Pin 10 - Grid No.2
Pin 11 - Cathode
Pin 12 - Heater
Cap - Plate

Bulb Temperature	220 max.	°C

VOLTAGE-CONTROL SERVICE

Maximum CCS● Ratings, ***Absolute Values*:**

DC PLATE VOLTAGE	30000 max.	volts
DC GRID-No.3 VOLTAGE	6600 max.	volts
DC GRID-No.2 VOLTAGE	450 max.	volts
DC GRID-No.1 VOLTAGE:		
Negative bias value	-200 max.	volts
Positive bias value	0 max.	volts
Positive peak value	2 max.	volts
MAX.-SIGNAL DC PLATE VOLTAGE	500 max.	volts
MAX.-SIGNAL GRID-No.3 INPUT	1 max.	watt
MAX.-SIGNAL GRID-No.2 INPUT	0.1 max.	watt
PLATE DISSIPATION	10 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode:		
During equipment warm-up period not exceeding 15 seconds	450 max.	volts
After equipment warm-up period	165 max.	volts
Heater positive with respect to cathode	165 max.	volts

●: See next page.

5890

REMOTE-CUTOFF BEAM PENTODE

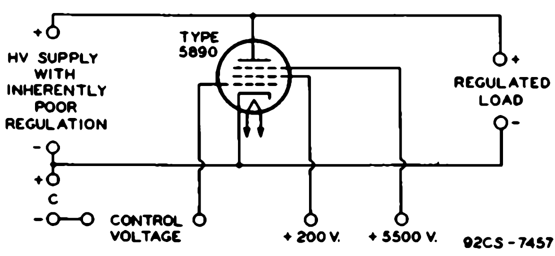
Typical Operation as Shunt Voltage-Regulator Tube in Accompanying Circuit			
DC Plate Voltage	20000	30000	volts
DC Grid-No.3 Voltage	5500	5500	volts
DC Grid-No.2 Voltage*	200	200	volts
DC Grid-No.1 Voltage**	-60	-60	volts
Peak Grid-No.1 Voltage	45	20	volts
Zero-Sig. DC Plate Cur.	0	0	μamp
Max.-Sig. DC Plate Cur.	500	60	μamp
Zero-Sig. DC Grid-No.3 Cur.	0	0	μamp
Max.-Sig. DC Grid-No.3 Cur.	0	0	μamp
Zero-Sig. DC Grid-No.2 Cur.	0	0	μamp
Max.-Sig. DC Grid-No.2 Cur.	0	0	μamp
Grid-No.1 Bias (Approx.) for plate current of 10 μamp.	-52	-52	volts
Grid-No.1—Plate Transconductance	11	3	μmhos

● Continuous Commercial Service.

* Subject to variation of ± 40% if grid-No.1 voltage is desired at indicated value.

** Subject to variation of ± 40% if grid-No.2 voltage is desired at indicated value.

Shunt Voltage-Regulator Circuit



NOTE: THE CONTROL VOLTAGE MAY BE TAKEN FROM THE LOAD CIRCUIT OR FROM A CIRCUIT SUPPLYING SIGNAL TO THE LOAD CIRCUIT, DEPENDING ON THE TYPE OF LOAD INVOLVED.

OPERATING NOTES

Operation of the 5890 with a plate voltage above approximately 16000 volts results in the production of soft x-rays which can constitute a health hazard on prolonged exposure unless the tube is adequately shielded. Relatively simple shielding should prove adequate, but the need for this precaution should be considered in equipment design.

5890

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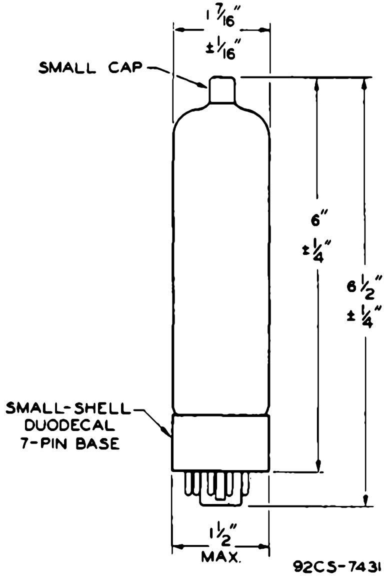
5890

REMOTE-CUTOFF BEAM PENTODE



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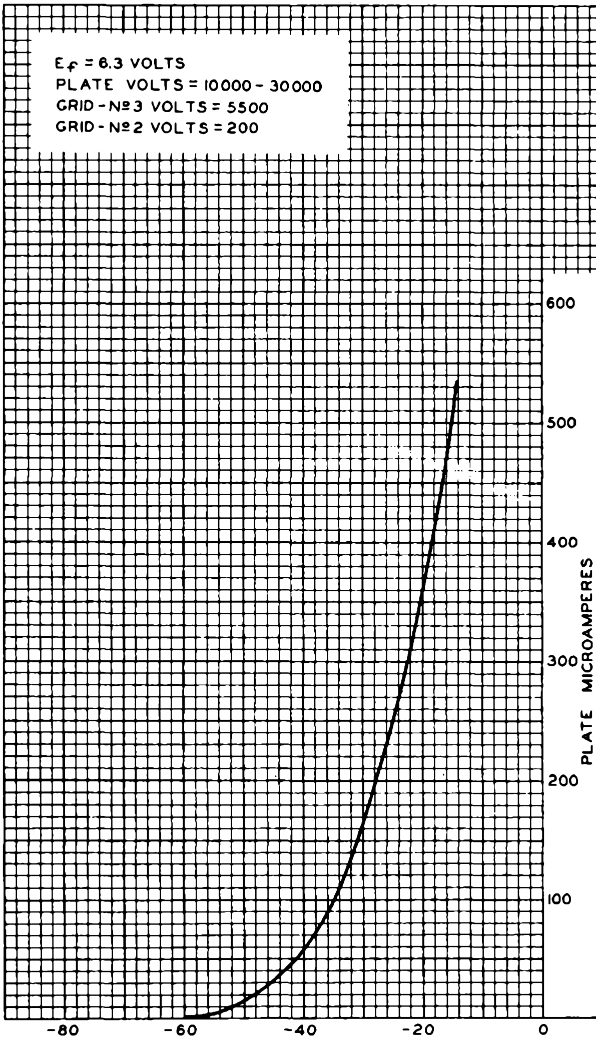
5890

AVERAGE CHARACTERISTIC



5893

5893

UHF MEDIUM-MU TRIODE

"PENCIL TYPE" FOR GROUNDED-GRID SERVICE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage (AC or DC):		
Under Transmitting Conditions.	6.0 ± 10%	volts
Under Standby Conditions	6.3 max.	volts
Current.	0.330	amp
Direct Interelectrode Capacitances (Approx.):		
Grid to Plate.	1.75	μμf
Grid to Cathode.	2.5	μμf
Plate to Cathode	0.07 max.	μμf

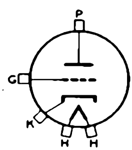
Characteristics, Class A_1 Amplifier:

Plate Voltage.	200	volts
Cathode-Bias Resistor.	100	ohms
Amplification Factor	27	
Plate Resistance	4500	ohms
Transconductance	6000	μmhos
Plate Current.	25	ma

Mechanical:

Terminal Connections:

H - Heater Lead
K - Cathode Cylinder (Adjacent to Heater Leads)



G - Grid Flange
P - Plate Cylinder (Adjacent to pinch-off)

Mounting Position.	Any	
Dimensions	See Outline Drawing	
Plate Seal Temperature	175 max.	°C

PLATE-PULSED OSCILLATOR▲ - Class C

Maximum Ratings, ***Absolute Values:***

For a maximum "on" time♠ of 5 microseconds

PEAK POSITIVE-PULSE PLATE-SUPPLY VOLTAGE♦	1750 max.	volts
PEAK NEGATIVE-PULSE GRID-BIAS VOLTAGE. .	150 max.	volts
PEAK PLATE CURRENT FROM PULSE SUPPLY . .	3 max.	amp

▲ In this class of service, the heater should be allowed to warm up for a minimum of 60 seconds before plate voltage is applied.

♠ "On" time for this tube is the sum of the durations of all the individual pulses which occur during any 5000-microsecond interval. Pulse duration is defined as the time interval between the two points on the pulse at which the instantaneous value is 70% of the peak value. The peak value is defined as the maximum value of a smooth curve through the average of the fluctuations over the top portion of the pulse.

♦: See next page.

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5893

UHF MEDIUM-MU TRIODE

PEAK RECTIFIED GRID CURRENT.	1.3	max.	amp
DC PLATE CURRENT	0.003	max.	amp
DC GRID CURRENT.	0.0013	max.	amp
PLATE DISSIPATION⊕	6	max.	watts
PULSE DURATION	1.5	max.	μsec

Typical Operation with Rectangular Wave Shape in Grounded-Grid Circuit at 3300 Mc:

With duty factor⊕ of 0.001

Peak Positive-Pulse Plate Supply Voltage♦	1750	volts
Peak Negative-Pulse Grid-Bias Voltage. . .	110	volts
From Grid Resistor of.	100	ohms
Peak Plate Current from Pulse Supply . . .	3.0	amp
Peak Rectified Grid Current.	1.1	amp
DC Plate Current	0.003	amp
DC Grid Current.	0.0011	amp
Useful Power Output at Peak of Pulse§ (Approx.)	1200	watts
Pulse Duration	1.0	μsec
Pulse Repetition Rate.	1000	pps

PLATE-MODULATED RF POWER AMPLIFIER - Class C Telephony

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

Maximum Ratings, *Absolute Values*:

	CCS●	*ICAS*●●	
DC PLATE VOLTAGE	260 max.	320 max.	volts
DC GRID VOLTAGE.	-100 max.	-100 max.	volts
DC PLATE CURRENT	33 max.	33 max.	ma
DC GRID CURRENT.	15 max.	15 max.	ma
PLATE INPUT.	8.5 max.	10.5 max.	watts
PLATE DISSIPATION⊕	5 max.	5.5 max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode . . .	90 max.	90 max.	volts
Heater positive with respect to cathode . . .	90 max.	90 max.	volts

♦ The magnitude of any spike on the plate voltage pulse should not exceed a value of 2000 volts with respect to cathode and its duration should not exceed 0.01 microsecond measured at the peak-pulse-value level.

⊕ Duty factor is the product of pulse duration and repetition rate. For variable pulse durations and pulse repetition rates, the duty factor is defined as the ratio of time "on" to total elapsed time in any 5000-microsecond interval.

§ The power output at peak of pulse is obtained from the average power output using the duty factor of the peak pulse. This procedure is necessary since the power output pulse duty factor may be less than the applied voltage pulse duty factor because of a delay in the start of rf power output.

⊕, ●, ●●: See next page.

5893

5893

UHF MEDIUM-MU TRIODE

Typical Operation in Grounded-Grid Circuit at 500 Mc:

	CCS●	ICAS●●	
DC Plate Voltage	250	300	volts
DC Grid Voltage†	-36	-45	volts
DC Plate Current	30	30	ma
DC Grid Current (Approx.)	11	12	ma
Driver Power Output (Approx.)	1.8	2.0	watts
Useful Power Output (Approx.)	5.5	6.5	watts

Maximum Circuit Value:

Grid-Circuit Resistance	0.1 max.	0.1 max.	megohm

RF POWER AMPLIFIER AND OSCILLATOR--Class C Telegraphy

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

Maximum Ratings, *Absolute Values*:

	CCS●	ICAS●●	
DC PLATE VOLTAGE	320 max.	400 max.	volts
DC GRID VOLTAGE	-100 max.	-100 max.	volts
DC PLATE CURRENT	35 max.	40 max.	ma
DC GRID CURRENT	15 max.	15 max.	ma
PLATE INPUT	11 max.	16 max.	watts
PLATE DISSIPATION●	7 max.	8 max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	90 max.	90 max.	volts
Heater positive with respect to cathode	90 max.	90 max.	volts

Typical Operation as RF Power Amplifier in Grounded-Grid Circuit at 500 Mc:

DC Plate Voltage	300	350	volts
DC Grid Voltage†	-47	-51	volts
DC Plate Current	33	35	ma
DC Grid Current (Approx.)	13	13	ma
Driver Power Output (Approx.)	2	2.5	watts
Useful Power Output (Approx.)	7.5	8.5	watts

Typical Operation as RF Power Amplifier in Grounded-Grid Circuit at 1000 Mc:

DC Plate Voltage	300	350	volts
DC Grid Voltage†	-30	-33	volts

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

●, ●, ●●, †, : See next page.

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5893

UHF MEDIUM-MU TRIODE

	CCS●	ICAS●●	
DC Plate Current	33	35	ma
DC Grid Current (Approx.). . .	12	13	ma
Driver Power Output (Approx.).	1.9	2.4	watts
Useful Power Output (Approx.).	5.5	6.5	watts

Typical Operation as Oscillator in Grounded-Grid Circuit at 500 Mc:

DC Plate Voltage	300	350	volts
DC Grid Voltage†	-47	-51	volts
DC Plate Current	33	35	ma
DC Grid Current (Approx.). . .	13	13	ma
Useful Power Output (Approx.).	5	6	watts

Maximum Circuit Value:

Grid-Circuit Resistance. . . .	0.1 max.	0.1 max.	megohm

FREQUENCY DOUBLER

Maximum Ratings, *Absolute Values*:

	CCS●	ICAS●●	
DC PLATE VOLTAGE	260 max.	320 max.	volts
DC GRID VOLTAGE.	-100 max.	-100 max.	volts
DC PLATE CURRENT	33 max.	33 max.	ma
DC GRID CURRENT.	12 max.	12 max.	ma
PLATE INPUT.	8.5 max.	10.5 max.	watts
PLATE DISSIPATION❀	6 max.	7.5 max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	90 max.	90 max.	volts
Heater positive with respect to cathode	90 max.	90 max.	volts

Typical Operation as Doubler to 1000 Mc. in Grounded-Grid Circuit:

DC Plate Voltage	250	300	volts
DC Grid Voltage†	-40	-50	volts
DC Plate Current	33	33	ma
DC Grid Current (Approx.). . .	7	8	ma

❀ In applications where the plate dissipation exceeds 2.5 watts, it is important that a large area of contact be provided between the plate cylinder and the connector in order to provide adequate heat conduction.

● Continuous Commercial Service.

●● Intermittent Commercial and Amateur Service.

† Obtained from grid resistor.

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5893

UHF MEDIUM-MU TRIODE

	CCS●	ICAS●●	
Driver Power Output (Approx.)	3.2	3.5	watts
Useful Power Output (Approx.)	2.75	3.0	watts
Maximum Circuit Value:			
Grid-Circuit Resistance	0.1 max.	0.1 max.	megohm

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Note	*Min.*	*Max.*	
Heater Current	1	0.3	0.36	amp
Grid-to-Plate Capacitance	-	1.45	2.05	$\mu\mu f$
Grid-to-Cathode Capacitance	-	2.05	2.95	$\mu\mu f$
Plate-to-Cathode Capacitance	-	-	0.07	$\mu\mu f$
Plate Current	1,2	16	34	ma
Useful Power Output at Peak of Pulse	1,3	750	-	watts

Note 1: With 6.0 volts ac or dc on heater.

Note 2: With dc plate voltage of 200 volts and cathode resistor of 100 ± 1% ohms.

Note 3: With peak positive-pulse plate-supply voltage of 1750 volts, grid resistor varied to give dc plate current of 3 ma, dc grid current of approximately 1.1 ma, duty factor of 0.001, and frequency of 3300 Mc.

INSTALLATION NOTES

Connections to the cathode cylinder, grid flange, and plate cylinder should be made by flexible spring contacts only. The connectors must make firm, large-surface contact, yet must be sufficiently flexible so that no part of the tube is subjected to strain. Unless this recommendation is observed, the glass-to-metal seals may be damaged.

The *heater* leads of the 5893 fit the Cinch socket No. 54A11953. They should not be soldered to circuit elements. The heat of the soldering operation may crack the glass seals of the heater leads and damage the tube.

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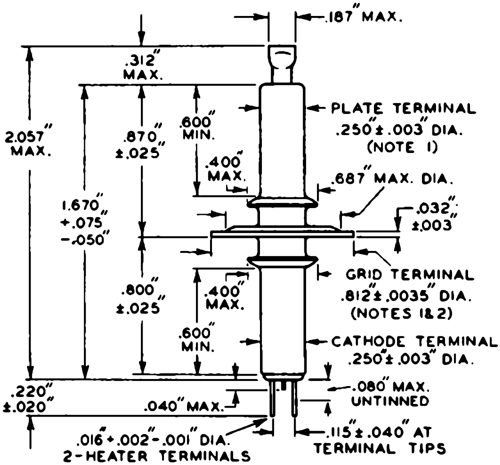
5893

5893

UHF MEDIUM-MU TRIODE



NOTE 1: MAX. ECCENTRICITY OF ℄ (AXIS) OF PLATE TERMINAL OR GRID-TERMINAL FLANGE WITH RESPECT TO THE ℄ (AXIS) OF THE CATHODE TERMINAL IS 0.008".

NOTE 2: TILT OF GRID-TERMINAL FLANGE WITH RESPECT TO ROTATIONAL AXIS OF CATHODE TERMINAL IS DETERMINED BY CHUCKING THE CATHODE TERMINAL, ROTATING THE TUBE, AND GAUGING THE TOTAL TRAVEL DISTANCE OF THE GRID-TERMINAL FLANGE PARALLEL TO THE AXIS AT A POINT APPROXIMATELY 0.020" INWARD FROM ITS EDGE FOR ONE COMPLETE ROTATION. THE TOTAL TRAVEL DISTANCE WILL NOT EXCEED 0.020".

92CS-7419R1

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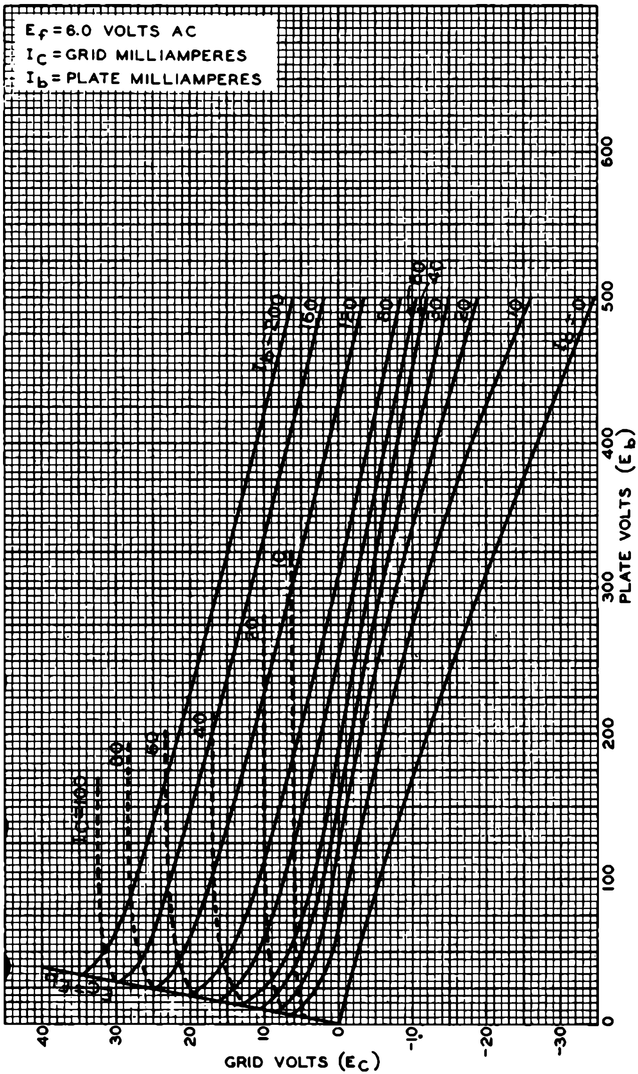
AVERAGE CONSTANT-CURRENT CHARACTERISTICS



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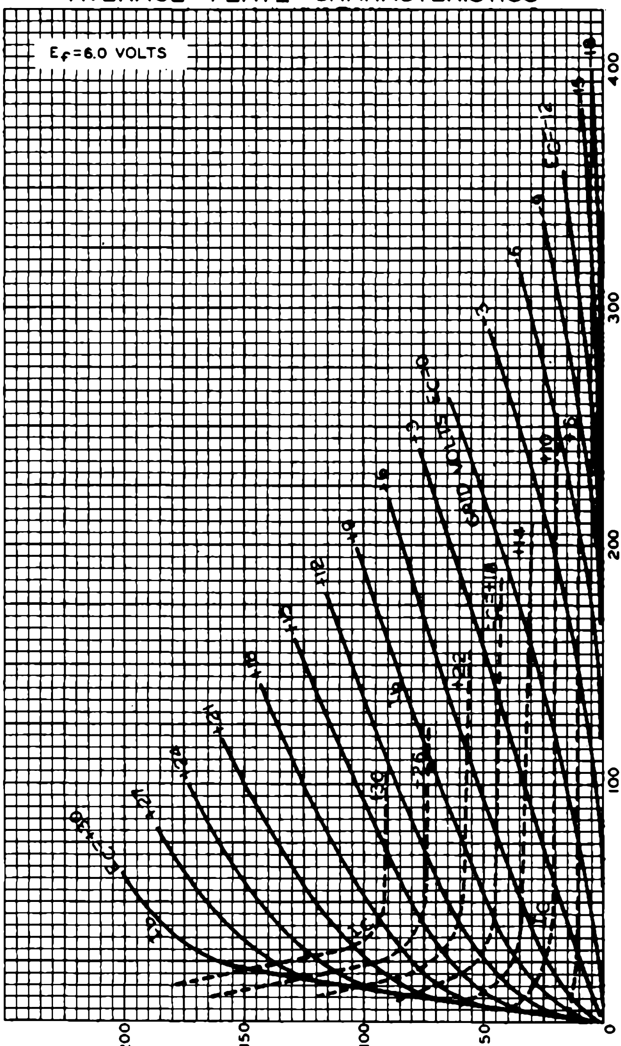
AVERAGE PLATE CHARACTERISTICS



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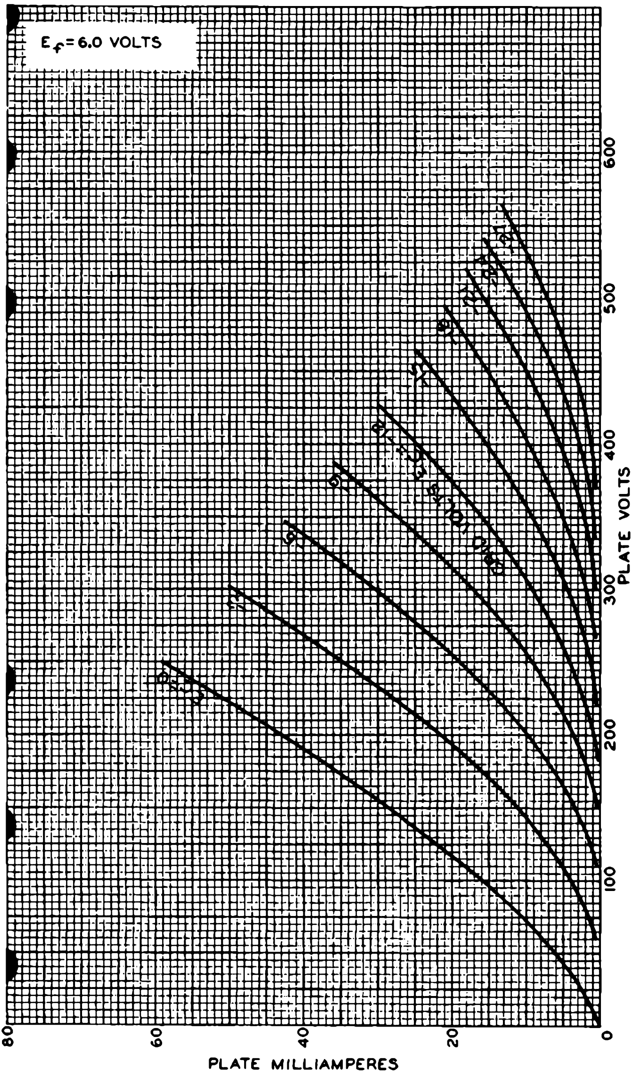
AVERAGE PLATE CHARACTERISTICS



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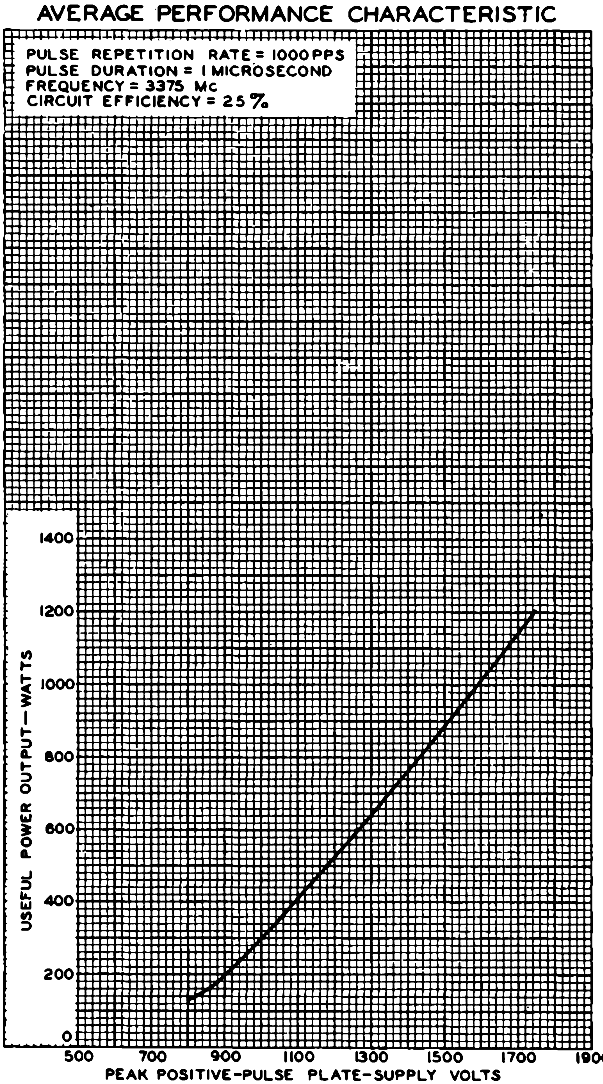
AVERAGE PERFORMANCE CHARACTERISTIC
PULSE REPETITION RATE = 1000 PPS
PULSE DURATION = 1 MICROSECOND
FREQUENCY = 3375 Mc
CIRCUIT EFFICIENCY = 25 %
USEFUL POWER OUTPUT—WATTS
0
200
400
600
800
1000
1200
1400
500
700
900
1100
1300
1500
1700
1900
PEAK POSITIVE-PULSE PLATE-SUPPLY VOLTS

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5915

PENTAGRID AMPLIFIER

FOR "ON-OFF" CONTROL APPLICATIONS INVOLVING LONG PERIODS OF OPERATION UNDER CUTOFF CONDITIONS

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage	6.3 ± 10%	ac or dc volts
Current	0.3	amp
Microphonism		Not Tested
Direct Interelectrode Capacitances (Approx.):°		
Grid No.1 to Plate	0.08 max.	μμf
Grid No.3 to Plate	0.35 max.	μμf
Grid No.1 to Grid No.3	0.15 max.	μμf
Grid No.1 to All Other Electrodes and Heater	5.4	μμf
Grid No.3 to All Other Electrodes and Heater	6.9	μμf
Plate to All Other Electrodes and Heater	7.6	μμf

° with no external shield.

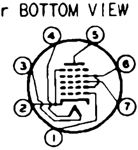
Characteristics, Class A Amplifier:

Plate Voltage	67.5	67.5	volts
Grids-No.2 and No.4 Voltage	67.5	67.5	volts
Grid-No.3 Voltage	0	-4	volts
Grid-No.1 Voltage	0	0	volts
Grid-No.1-to-Plate Transconductance	2000	-	μmhos
Grid-No.3-to-Plate Transconductance	-	1100	μmhos

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-1/8"
Maximum Seated Length	1-7/8"
Length, Base Seat to Bulb Top (Excluding tip)	1-1/2" ± 3/32"
Maximum Diameter	3/4"
Bulb	T-5-1/2
Base	Small-Button Miniature 7-Pin
Basing Designation for BOTTOM VIEW	7CH

Pin 1 - Grid No.1
Pin 2 - Cathode, Grid No.5
Pin 3 - Heater
Pin 4 - Heater



Pin 5 - Plate
Pin 6 - Grid No.2, Grid No.4
Pin 7 - Grid No.3

GATED AMPLIFIER IN COMPUTER SERVICE & "ON-OFF" CONTROL SERVICE

Maximum Ratings, ***Absolute Values*****:**

PLATE VOLTAGE	250 max.	volts

5915

5915
PENTAGRID AMPLIFIER

GRIDS–No.2 and No.4 VOLTAGE.	See Curve	
GRIDS–No.2 and No.4 SUPPLY VOLTAGE	250 max.	volts
GRID–No.3 SUPPLY VOLTAGE:		
Negative bias value.	100 max.	volts
Positive bias value.	0 max.	volts
Peak negative value.	200 max.	volts
Peak positive value.	90 max.	volts
GRID–No.1 SUPPLY VOLTAGE:		
Negative bias value.	100 max.	volts
Positive bias value.	0 max.	volts
Peak negative value.	200 max.	volts
Peak positive value: Limited in any application by the peak cathode current and the grid-No.1 input		
PLATE DISSIPATION.	1 max.	watt
GRID–No.3 INPUT.	0.5 max.	watt
GRIDS–No.2 and No.4 INPUT.	1 max.	watt
GRID–No.1 INPUT.	0.5 max.	watt
DC CATHODE CURRENT	20 max.	ma
PEAK CATHODE CURRENT	70 max.	ma
PEAK HEATER–CATHODE VOLTAGE:		
Heater negative with respect to cathode. .	90 max.	volts
Heater positive with respect to cathode. .	90 max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)...	120 max.	^{o}C

Typical Operation:

	CUTOFF CONDITION Grid-No.1 Control	*CUTOFF CONDITION* Grid-No.3 Control	*ZERO-BIAS CONDITION*	
Plate-Supply Voltage.	150	150	150	volts
Grid-No.3 Supply Voltage.	0	−10	0	volts
Grids-No.2 & No.4 Supply Voltage . . .	75	75	75	volts
Grid-No.1 Supply Voltage.	−10	0	0	volts
Plate-Circuit Resistance . . .	20000	20000	20000	ohms
Grid-No.3-Circuit Resistance . . .	47000	47000	47000	ohms
Grids-No.2 & No.4 Series Resistor. . .	470	470	470	ohms
Grid-No.1-Circuit Resistance . . .	47000	47000	47000	ohms
Plate Current.	0	0	5.8	ma
Grids-No.2 & No.4 Current.	0	14	9	ma

5915

PENTAGRID AMPLIFIER

Maximum Circuit Values:

Grid-No.1 or Grid-No.3-Circuit Resistance:

For fixed-bias operation . . . . 0.5 max. megohm

For cathode-bias operation . . . . 1.0 max. megohm

RANGE VALUES FOR EQUIPMENT DESIGN

	Note	*Min.*	*Max.*	
Cutoff Condition				
Plate Current. . . .	1a and 1b	–	0.2	ma
Zero-Bias Condition				
Plate Current. . . .	2	5.0	6.5	ma

Note 1a: For conditions with grid No.1 as control electrode: 6.3 volts on heater, plate-supply volts = 150, grid-No.3 supply volts = 0, grids-No.2 & No.4 supply volts = 75, grid-No.1 supply volts = -10, plate-circuit resistance (ohms) = 20000, grid-No.3 circuit resistance (ohms) = 47000, grids-No.2 & No.4 series resistor (ohms) = 470, and grid No.1-circuit resistance (ohms) = 47000.

Note 1b: For conditions with grid No.3 as control electrode: values are same as for Note 1a except that grid-No.3 supply volts = -10 and grid-No.1 supply volts = 0.

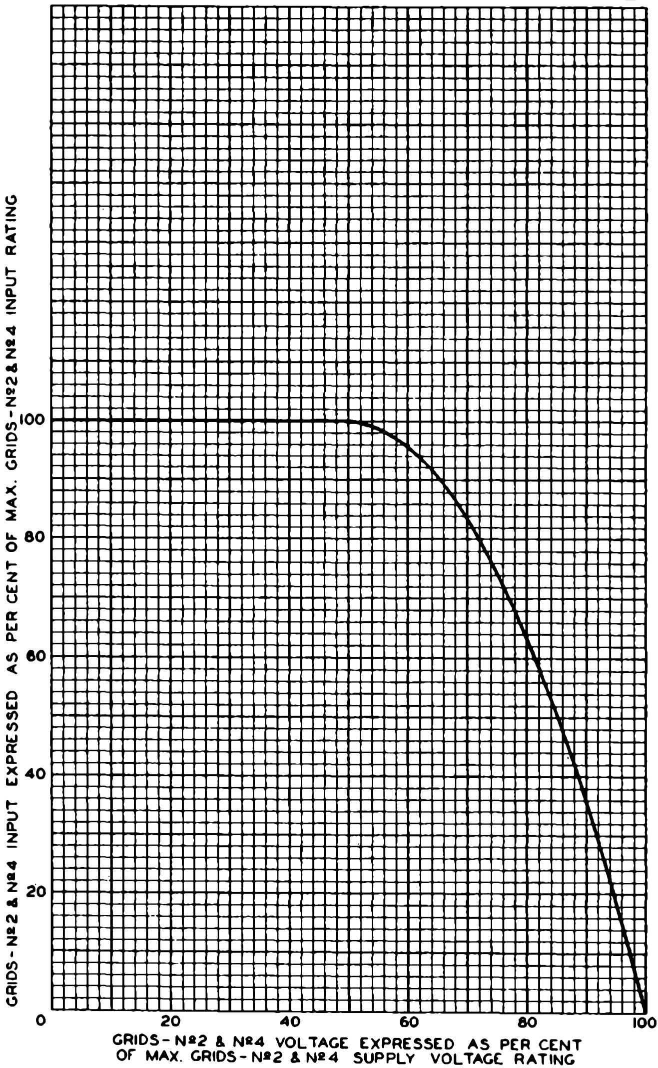
Note 2: For conditions with 6.3 volts on heater, plate-supply volts = 150, grids-No.2 and No.4 supply volts = 75, grid-No.3 supply volts = 0, grid No.1 supply volts = 0, plate-circuit resistance (ohms) = 20000, grid-No.3-circuit resistance (ohms) = 47000, grids-No.2 and No.4 series resistor (ohms) = 470, and grid-No.1-circuit resistance (ohms) = 47000.

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5915

5915

GRIDS-№ 2 & № 4 INPUT RATING CURVE



JUNE 8, 1950

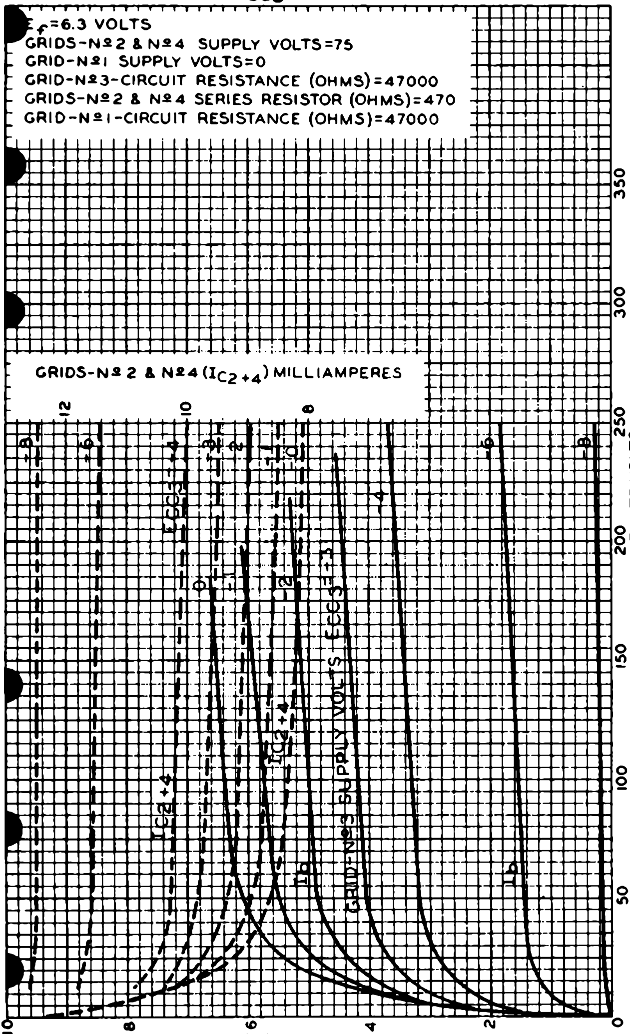
TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7500

RCA

5915

AVERAGE OPERATION CHARACTERISTICS
WITH E_{C3} AS VARIABLE



JUNE 8,1950 | TUBE DEPARTMENT | 92CM-7499

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5915

RCA

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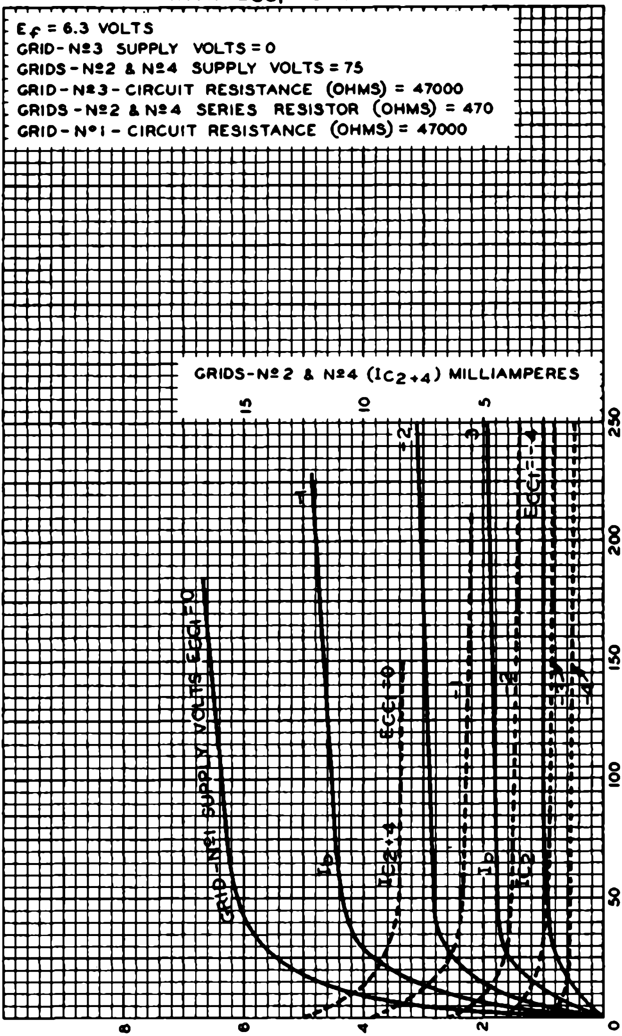
AVERAGE OPERATION CHARACTERISTICS
WITH E_{CC1} AS VARIABLE



5963

5963

MEDIUM-MU TWIN TRIODE

9-PIN MINIATURE TYPE

For "on-off" control applications involving long periods of operation under cutoff conditions

GENERAL DATA

Electrical:

Heater, Pure Tungsten, for Unipotential Cathodes:

Heater arrangment	*Series*	*Parallel*	
Voltage	12.6 ± 10%	6.3 ± 10%	ac or dc volts
Current	0.15	0.3	amp

Microphonism. Not Tested

Direct Interelectrode Capacitances (Approx.):°

	Unit No.1	*Unit No.2*	
Grid to plate	1.5	1.5	μμf
Grid to cathode and heater. .	1.9	1.9	μμf
Plate to cathode and heater .	0.5	0.35	μμf
Grid of unit No.1 to grid of unit No.2	0.1 max.		μμf

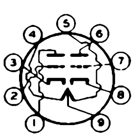
Characteristics, Class A_1 Amplifier (Each Unit):

Plate Voltage	67.5	volts
Grid Voltage.	0	volts
Amplification Factor.	21	
Plate Resistance (Approx.).	6600	ohms
Transconductance.	3200	μmhos
Plate Current	8.5	ma

Mechanical:

Mounting Position . . . . Any
Maximum Overall Length. . . . . 2-3/16"
Maximum Seated Length . . . . 1-5/16"
Length, Base Seat to Bulb Top (Excluding tip) 1-9/16" ± 3/32"
Maximum Diameter. . . . . 7/8"
Dimensional Outline . . . . *See General Section*
Bulb. T-6-1/2
Base. . . . . Small-Button Noval 9-Pin (JETEC No.E9-1)
Basing Designation for BOTTOM VIEW. 9A

Pin 1 - Plate of Unit No.2
Pin 2 - Grid of Unit No.2
Pin 3 - Cathode of Unit No.2
Pins 4 & 9 - Heater of Unit No.2
Pins 5 & 9 - Heater of Unit No.1



Pin 6 - Plate of Unit No.1
Pin 7 - Grid of Unit No.1
Pin 8 - Cathode of Unit No.1
Pin 9 - Heater Mid-Tap

° without external shield.

← Indicates a change.

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5963

5963

MEDIUM-MU TWIN TRIODE

FREQUENCY DIVIDER IN COMPUTER SERVICE and "ON-OFF" CONTROL SERVICE

Values are for Each Unit

Maximum Ratings, *Absolute Values:*

PLATE VOLTAGE	250 max.	volts
GRID VOLTAGE:		
Negative bias value	100 max.	volts
Positive bias value	0 max.	volts
Peak negative value	200 max.	volts
PLATE DISSIPATION	2.5 max.	watts
GRID INPUT	0.5 max.	watt
CATHODE CURRENT:		
Peak	100 max.	ma
DC	20 max.	ma
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	90 max.	volts
Heater positive with respect to cathode	90 max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)	120 max.	°C

Typical Operation as Frequency Halfer:

	Cutoff Condition	*Zero-Bias Condition*	
Plate-Supply Voltage	150	150	volts
Grid Voltage	-15	0	volts
Plate-Circuit Resistance	20000	20000	ohms
Grid-Circuit Resistance	47000	47000	ohms
Plate Current	0	5.1	ma

Maximum Circuit Values:

Grid-Circuit Resistance:		
For fixed-bias operation	0.5 max.	megohm
For cathode-bias operation	1.0 max.	megohm

→ **CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN**

	Note	*Min.*	*Max.*	
Cutoff Condition				
Plate Current	1	-	50	μamp
Difference in Plate Current Between Units	-	-	50	μamp
Zero-Bias Condition				
Plate Current	2	4.6	5.4	ma
Difference in Plate Current Between Units	-	-	0.8	ma

Note 1: For conditions with 12.6 volts on heater, plate-supply volts = 150, grid-supply volts = -15, plate-circuit resistance (ohms) = 20000, and grid-circuit resistance (ohms) = 47000.

Note 2: Conditions are same as for Note 1 except that grid-supply volts = 0.

→ Indicates a change.

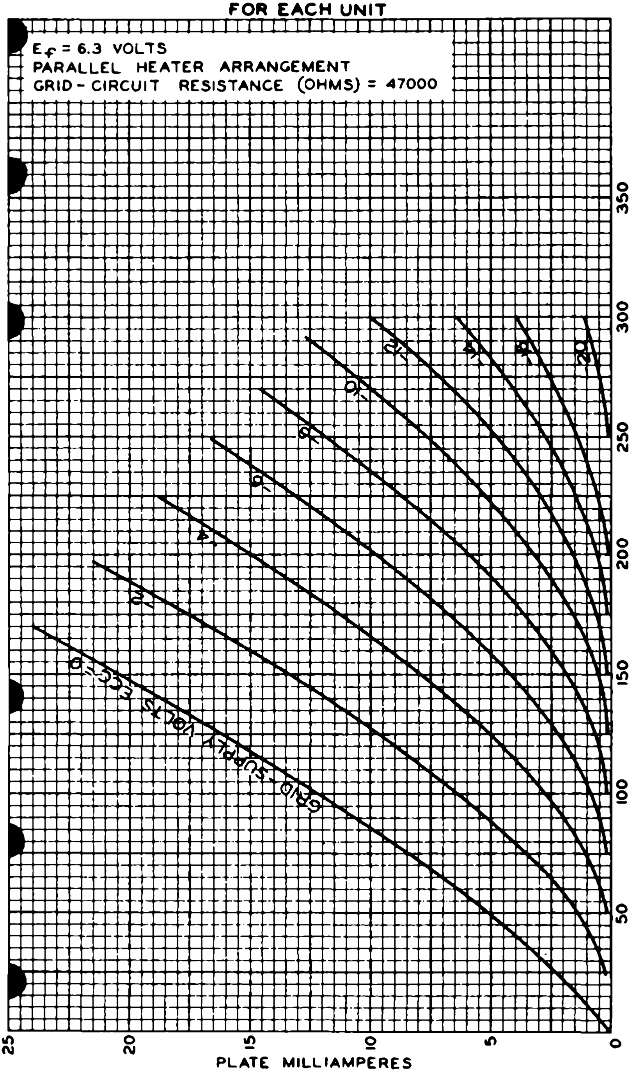
SEPT. 1, 1955 DATA

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5963

5963

AVERAGE OPERATION CHARACTERISTICS
FOR EACH UNIT



MAY 19, 1950

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7493

5964

5964

MEDIUM-MU TWIN TRIODE

FOR "ON-OFF" CONTROL APPLICATIONS INVOLVING
LONG PERIODS OF OPERATION UNDER CUTOFF CONDITIONS

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage	6.3 ± 10%	ac or dc volts
Current	0.45	amp
Microphonism		Not Tested
Direct Interelectrode Capacitances (Approx.):°		
Each Unit:		
Grid to Plate	1.3	μμf
Grid to Cathode and Heater	2.1	μμf
Plate to Cathode and Heater	0.4	μμf
Grid of Unit No.1 to Grid of Unit No.2	0.4 max.	μμf

° With no external shielding.

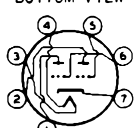
Characteristics, Class A Amplifier (Each Unit, with both units operating):

Plate Voltage	100	volts
Cathode-Bias Resistor●	50	ohms
Amplification Factor	39	
Plate Resistance	6500	ohms
Transconductance	6000	μmhos
Plate Current	9.5	ma

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-1/8"
Maximum Seated Length	1-7/8"
Length, Base Seat to Bulb Top (Excluding tip)	1-1/2" ± 3/32"
Maximum Diameter	3/4"
Bulb	T-5-1/2
Base	Small-Button Miniature 7-Pin
Basing Designation for BOTTOM VIEW	7BF

Pin 1 - Plate of Triode No.2
Pin 2 - Plate of Triode No.1
Pin 3 - Heater
Pin 4 - Heater



Pin 5 - Grid of Triode No.1
Pin 6 - Grid of Triode No.2
Pin 7 - Cathode

FREQUENCY DIVIDER IN COMPUTER SERVICE & "ON-OFF" CONTROL SERVICE

Values are for each unit

Maximum Ratings, *Absolute Values*:

PLATE VOLTAGE	250 max.	volts

● Common to both units.

5964

5964

MEDIUM-MU TWIN TRIODE

GRID VOLTAGE:		
Negative bias value	100 max.	volts
Positive bias value	0 max.	volts
Peak negative value	200 max.	volts
PLATE DISSIPATION	1.5 max.	watts
GRID INPUT	0.1 max.	watt
DC CATHODE CURRENT*	15 max.	ma
PEAK CATHODE CURRENT*	75 max.	ma
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	90 max.	volts
Heater positive with respect to cathode	90 max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)	150 max.	^{o}C

Typical Operation as Frequency Halfer (Each Unit):

	Cutoff Condition	*Zero-Bias Condition*	
Plate-Supply Voltage	150	150	volts
Plate-Circuit Resistance	20000	20000	ohms
Grid-Supply Voltage	−10	0	volts
Grid-Circuit Resistance	47000	47000	ohms
Plate Current	0	5	ma

Maximum Circuit Values:

Grid-Circuit Resistance:		
For fixed-bias operation	0.5 max.	megohm
For cathode-bias operation	1.0 max.	megohm

RANGE VALUES FOR EQUIPMENT DESIGN

	Note	*Min.*	*Max.*	
Cutoff Condition				
Plate Current (Each Unit)	1	-	0.2	ma
Difference in Plate Current Between Units	-	-	0.2	ma
Zero-Bias Condition				
Plate Current (Each Unit)	2	4.3	5.7	ma
Difference in Plate Current Between Units	-	-	1.4	ma

Note 1: For conditions with 6.3 volts on heater, plate-supply volts = 150, plate-circuit resistance (ohms) = 20000, grid-supply volts = -10, and grid-circuit resistance (ohms) = 47000.

Note 2: Conditions are same as for Note 1 except that grid-supply volts = 0.

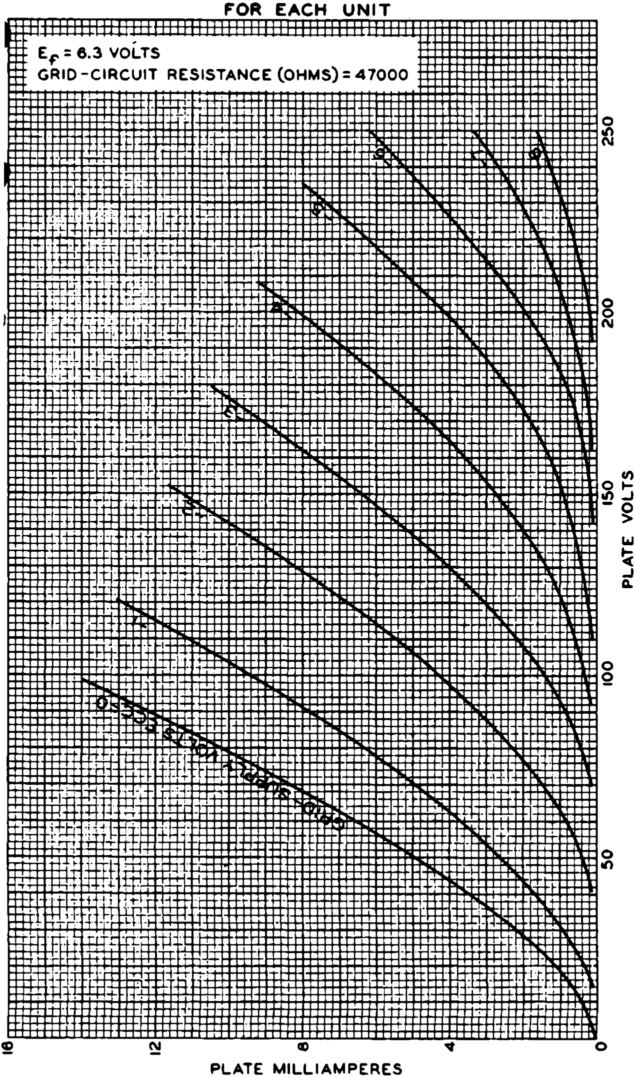
* With both units operating, the dc cathode current should not exceed 30 milliamperes, and the peak cathode current should not exceed 150 milliamperes.

SEPT. 1, 1950 TENTATIVE DATA

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5964

AVERAGE OPERATION CHARACTERISTICS
FOR EACH UNIT



MAY 31, 1950

TUBE DEPARTMENT

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7495

RCA

5965

MEDIUM-MU TWIN TRIODE

9-PIN MINIATURE TYPE

For "on-off" control applications involving long periods of operation under cutoff conditions.

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:

	Series	*Parallel*	
Heater arrangement			
Voltage (AC or DC)	12.6 ± 5%	6.3 ± 5%	volts
Current.	0.225	0.45	amp

Direct Interelectrode Capacitances (Approx.):*

Grid to plate (Each unit)	3.0	$\mu\mu$f
Grid to cathode and heater (Each unit) .	3.8	$\mu\mu$f
Plate to cathode and heater (Unit No.1).	0.5	$\mu\mu$f
Plate to cathode and heater (Unit No.2).	0.38	$\mu\mu$f
Plate of unit No.1 to plate of unit No.2	0.5	$\mu\mu$f

Characteristics, Class A_1 Amplifier (Each Unit):

Plate Supply Voltage	150	volts
Cathode-Bias Resistor	220	ohms
Amplification Factor	47	
Plate Resistance	7250	ohms
Transconductance	6500	μmhos
Plate Current	8.2	ma
Grid Voltage (Approx.) for plate current of 150 μamp	−5.5	volts

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-3/16"
Maximum Seated Length	1-15/16"
Length from Base Seat to Bulb Top (Excluding tip)	1-9/16" ± 3/32"
Maximum Diameter	7/8"
Bulb	T-6-1/2
Base	Small-Button Noval 9-Pin (JETEC No.E9-1)
Basing Designation for BOTTOM VIEW	9A

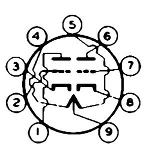
Pin 1 – Plate of Unit No.2

Pin 2 – Grid of Unit No.2

Pin 3 – Cathode of Unit No.2

Pin 4,9 – Heater of Unit No.2

Pin 5,9 – Heater of Unit No.1



Pin 6 – Plate of Unit No.1

Pin 7 – Grid of Unit No.1

Pin 8 – Cathode of Unit No.1

Pin 9 – Heater Mid-Tap

* Without external shield.

5965

RCA

5965

MEDIUM-MU TWIN TRIODE

FREQUENCY DIVIDER IN COMPUTER SERVICE and "ON-OFF" CONTROL SERVICE

Values are for Each Unit

Maximum Ratings, *Absolute Values*:

PLATE VOLTAGE	330 max.	volts
GRID VOLTAGE:		
Negative bias value	150 max.	volts
PLATE DISSIPATION	2.4 max.	watts
Total for both units	4.4 max.	watts
DC CATHODE CURRENT	16.5 max.	ma
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode .	200# max.	volts
Heater positive with respect to cathode .	200# max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)	165 max.	°C

Typical Operation in Computer Service:

	Cutoff Condition	*Conduction Condition*	
Plate Supply Voltage	150	150	volts
Plate Load Resistor	7200	7200	ohms
Plate Current	-	10.5	ma
Grid Voltage (Approx.) for grid current of 140 μamp . .	-	less than 1 volt	
Grid Voltage (Approx.) for plate current of 150 μamp . .	-5.5	-	volts
Difference in Grid Voltage Between Units (For plate current of 150 μamp per unit)	1.5	-	volts

Maximum Circuit Values:

Grid-Circuit Resistance:		
For fixed-bias operation	0.1 max.	megohm
For cathode-bias operation	0.5 max.	megohm

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Note	*Min.*	*Max.*	
Heater Current	1	0.207	0.243	amp
Amplification Factor (Each Unit)	1,2	39	55	
Grid Voltage for plate current of 150 μamp (Each Unit) . . .	1,3	-	-7.5	volts
Difference in Grid Voltage Between Units (For plate current of 150 μamp per unit)	-	-	1.5	volts
Plate Current 1 (Each Unit) . .	1,2	6	10.4	ma

The dc component must not exceed 100 volts.

5965

MEDIUM-MU TWIN TRIODE

	Note	Min.	Max.	
Plate Current 2 (Each Unit) . .	1,4	9.75	-	ma
Reverse Grid Current (Each Unit)	1,5	-	1	μamp
Heater-Cathode Leakage Current:				
Heater negative with respect to cathode	1,6	-	20	μamp
Heater positive with respect to cathode	1,6	-	20	μamp
Transconductance	1,2	5100	7900	μmhos

Note 1: With 12.6 volts ac or dc on heater (series connected).

Note 2: With plate supply voltage of 150 volts and cathode resistor for each cathode of 220 ohms adequately bypassed for a signal frequency of 60 cps. Each unit tested separately. Unit not under test biased to cutoff.

Note 3: With plate supply voltage of 150 volts, grid supply voltage adjusted to give dc plate current of 150 microamperes, and plate load resistor of 7200 ohms. Each unit tested separately. Unit not under test biased to cutoff.

Note 4: With plate supply voltage of 150 volts, grid supply voltage adjusted to give dc grid current of 140 microamperes, and plate load resistor of 7200 ohms. Each unit tested separately. Unit not under test biased to cutoff.

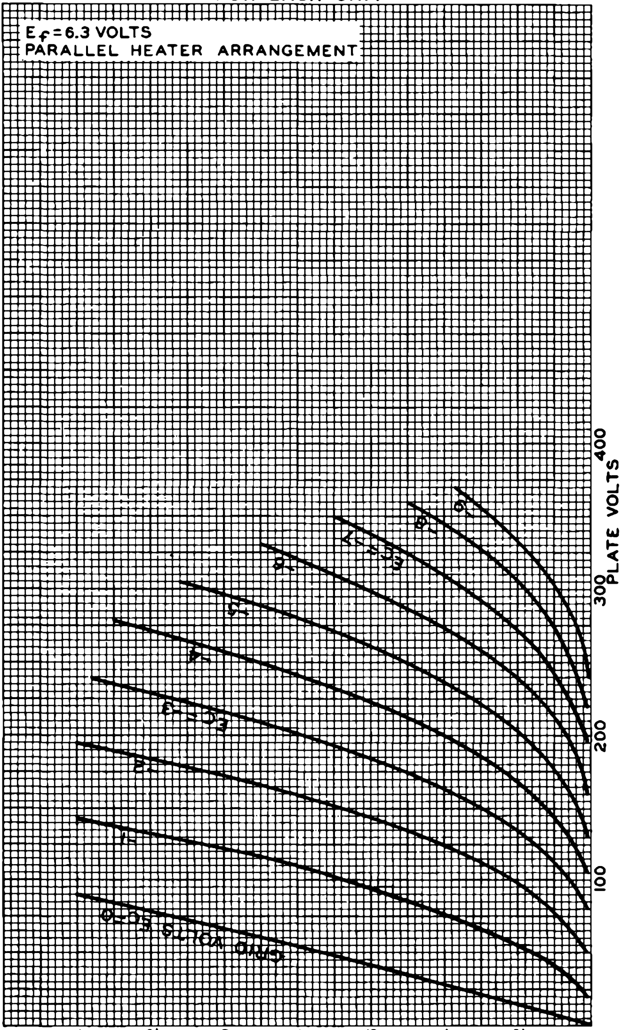
Note 5: With plate supply voltage of 150 volts, cathode resistor for each cathode of 220 ohms, and grid-circuit resistance of 0.5 megohm. Each unit tested separately. Unit not under test biased to cutoff.

Note 6: With 100 volts dc between heater and cathode and units connected in parallel.

5965

5965

AVERAGE PLATE CHARACTERISTICS
FOR EACH UNIT



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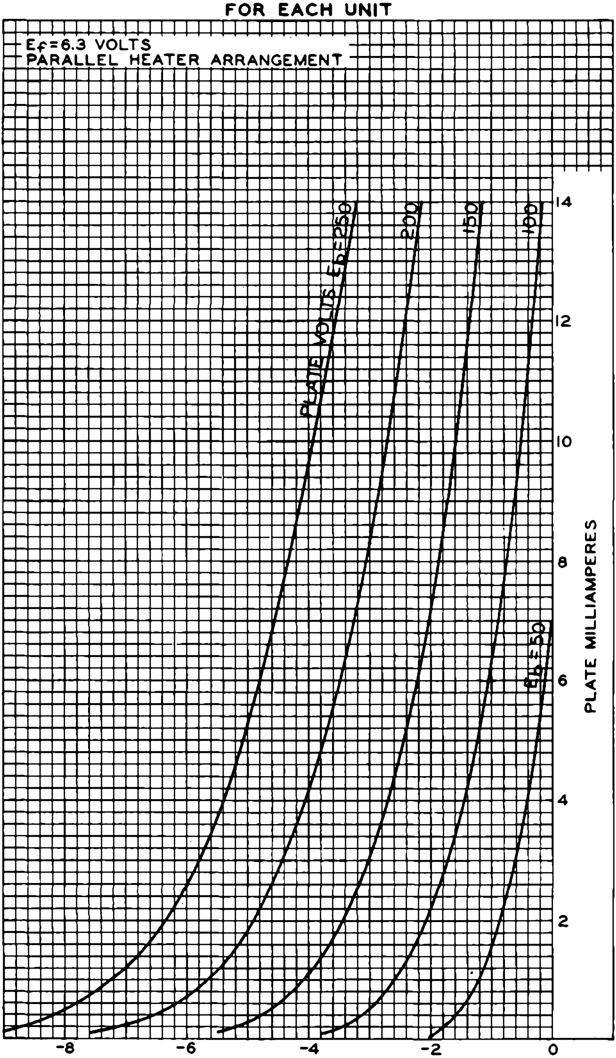
AVERAGE CHARACTERISTICS
FOR EACH UNIT



MAR.5,1954

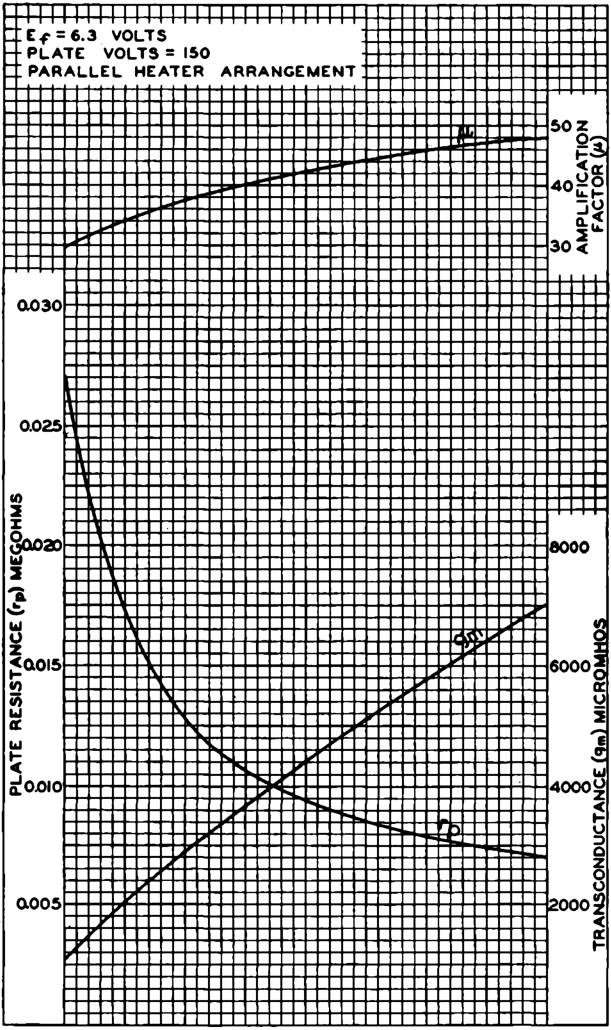
TUBE DIVISION

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-8262

5965

AVERAGE CHARACTERISTICS
FOR EACH UNIT



MAR. 8, 1954

TUBE DIVISION

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-8265

6073 PREMIUM TYPE

RCA

6073

VOLTAGE REGULATOR

MINIATURE GLOW-DISCHARGE TYPE

Intended for applications where very stable characteristics and dependable performance under shock and vibration are paramount. The 6073 is a "premium" version of the OA2.

DATA

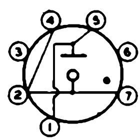
General:

Cathode . . . . Cold

Mechanical:

Mounting Position	Any
Maximum Overall Length.	2-5/8"
Maximum Seated Length	2-3/8"
Length, Base Seat to Bulb Top (Excluding tip) . . .	2" ± 3/32"
Maximum Diameter.	3/4"
Bulb.	T-5-1/2
Base. . . . . . Small-Button Miniature 7-Pin (JETEC No. E7-1)	
Basing Designation for BOTTOM VIEW	5BQ

Pin 1 - Anode
Pin 2 - Cathode
Pin 3 - Internal Connection- Do Not Use
Pin 4 - Cathode



Pin 5 - Anode
Pin 6 - Internal Connection- Do Not Use
Pin 7 - Cathode

Maximum Ratings, ***Absolute Values:***

AVERAGE STARTING CURRENT (See note below) .	75 max.	ma
DC CATHODE CURRENT	30 max.	ma
	5 min.	ma
AMBIENT TEMPERATURE RANGE	-55 to +90	°C
FREQUENCY.	0 max.	cps

Characteristics Range Values for Equipment Design:

	Min.	*Av.*	*Max.*	
DC Anode-Supply Voltage	185▲	-	-	volts
Anode Breakdown Voltage	-	156	185●	volts
Anode Voltage Drop.	140☗	151	168●	volts
Regulation (5 to 30 ma)	-	2	6●	volts

Circuit Values:

Shunt Capacitor	-	-	0.1	µf
Series Resistor			See note below	

NOTE: The notes and circuit information shown under Type OA2 are also applicable to the 6073.

▲,●,☗: See next page.

MAY 1, 1952 TENTATIVE DATA

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6073
VOLTAGE REGULATOR

Shock and Vibration Tests:

These tests are made as indicated in the JAN Specifications JAN 1-A for Electron Tubes, May, 1946 under the sections as follows:

Section F-6b (9e) Shock Test:
Instantaneous Impact Acceleration . . . . 900 max. g

Section F-6b (9f) Vibration Test:
Vibrational Acceleration. . . . . 2.5 max. g

▲ Not less than indicated supply voltage should be provided to insure "starting" throughout tube life.

● Maximum individual tube value during life.

♠ Minimum individual tube value during life.

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6074 PREMIUM TYPE

RCA

6074
VOLTAGE REGULATOR

MINIATURE GLOW-DISCHARGE TYPE

Intended for applications where very stable characteristics and dependable performance under shock and vibration are paramount. The 6074 is a "premium" version of the 0B2.

DATA

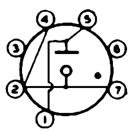
General:

Cathode. . . . . Cold

Mechanical:

Mounting Position. . . . . Any
Maximum Overall Length . . . . 2-5/8"
Maximum Seated Length. . . . . 2-3/8"
Length, Base Seat to Bulb Top (Excluding tip). . . 2" ± 3/32"
Maximum Diameter . . . . 3/4"
Bulb T-5-1/2
Base . . . . . . Small-Button Miniature 7-Pin (JETEC No.E7-1)
Basing Designation for BOTTOM VIEW 5BQ

Pin 1 - Anode
Pin 2 - Cathode
Pin 3 - Internal Connection- Do Not Use
Pin 4 - Cathode



Pin 5 - Anode
Pin 6 - Internal Connection- Do Not Use
Pin 7 - Cathode

Maximum Ratings, *Absolute Values*:

AVERAGE STARTING CURRENT (See note below)	75 max.	ma
DC CATHODE CURRENT	30 max.	ma
	5 min.	ma
AMBIENT TEMPERATURE RANGE.	-55 to +90	°C
FREQUENCY.	0 max.	cps

Characteristics Range Values for Equipment Design:

	Min.	*Av.*	*Max.*	
DC Anode-Supply Voltage. . . .	133▲	-	-	volts
Anode Breakdown Voltage. . . .	-	115	133●	volts
Anode Voltage Drop	101★	108	114●	volts
Regulation (5 to 30 ma). . . .	-	1	4●	volts

Circuit Values:

Shunt Capacitor.	-	-	0.1	μf
Series Resistor.			See note below	

NOTE: The notes and circuit information shown under Type OA2 are also applicable to the 6074.

▲,●,★: See next page.

RCA

6074
VOLTAGE REGULATOR

Shock and Vibration Tests:

These tests are made as indicated in the JAN Specifications JAN 1-A for Electron Tubes, May, 1946 under the sections as follows:

Section F-6b (9e) Shock Test:
Instantaneous Impact Acceleration . . . . 900 max. g

Section F-6b (9f) Vibration Test:
Vibrational Acceleration. . . . . 2.5 max. g

▲ Not less than indicated supply voltage should be provided to insure "starting" throughout tube life.

● Maximum individual tube value during life.

★ Minimum individual tube value during life.

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6080

6080

LOW-MU TWIN POWER TRIODE

GENERAL DATA

Heater, for Unipotential Cathodes:

Voltage	6.3 ± 10%	ac or dc volts
Current	2.5	amp

Direct Interelectrode Capacitances (Approx.): ←
(Each Unit, without external shield)

Grid to Plate	8	μμf
Input	6	μμf
Output	2.2	μμf
Heater to Cathode:		
Triode Unit No.1	6.5	μμf
Triode Unit No.2	6	μμf
Grid of Unit No.1 to Grid of Unit No.2	0.5	μμf
Plate of Unit No.1 to Plate of Unit No.2	2	μμf

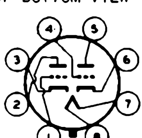
Characteristics, Amplifier Class A_1 (Each Unit):

Plate-Supply Voltage	135	volts
Cathode-Bias Resistor	250	ohms
Amplification Factor	2	
Plate Resistance	280	ohms
Transconductance	7000	μmhos
Plate Current	125	ma

Mechanical:

Mounting Position	Any
Maximum Overall Length	4-1/16" ←
Maximum Seated Length	3-1/2" ←
Maximum Diameter	1-23/32"
Bulb	T-12
Base	Large-Wafer Octal 8-Pin with Sleeve and External Barriers (JETEC No.B8-98) ←
Basing Designation for BOTTOM VIEW	8BD

Pin 1 - Grid of Unit No.2
Pin 2 - Plate of Unit No.2
Pin 3 - Cathode of Unit No.2
Pin 4 - Grid of Unit No.1



Pin 5 - Plate of Unit No.1
Pin 6 - Cathode of Unit No.1
Pin 7 - Heater
Pin 8 - Heater

DC AMPLIFIER

Values are for Each Unit

Maximum Ratings, *Absolute Values:*

PLATE VOLTAGE	250 max.	volts
PLATE CURRENT	125 max.	ma
PLATE DISSIPATION	13 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	300 max.	volts
Heater positive with respect to cathode	300 max.	volts

← indicates a change

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6080

6080

LOW-MU TWIN POWER TRIODE

BULB TEMPERATURE●	200 max.	°C

Maximum Circuit Values:

Grid-Circuit Resistance:		
For cathode-bias operation	1.0 max.	megohm
For fixed-bias operation□	0.1 max.	megohm
For combined fixed and cathode-bias operation*	0.1 max.	megohm

BOOSTER SCANNING SERVICE

Values are for Each Unit

Maximum Ratings, ***Absolute Values:***

For operation in a 525-line, 30-frame system▲

PEAK NEGATIVE-PULSE PLATE VOLTAGE●	3000 max.	volts
PEAK NEGATIVE-PULSE GRID VOLTAGE	2300 max.	volts
DC PLATE CURRENT	125 max.	ma
PLATE DISSIPATION	13 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode●	300 max.	volts
Heater positive with respect to cathode	300 max.	volts
BULB TEMPERATURE●	200 max.	°C

Maximum Circuit Values (For maximum rated conditions):

Grid-Circuit Resistance:		
For cathode-bias operation	1.0 max.	megohm
For fixed-bias operation	not recommended	

→ **CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN**

	Note	*Min.*	*Max.*	
Heater Current	1	2.26	2.74	amp
Amplification Factor (Each Unit)	1,2	1.4	2.6	
Plate Current (Each Unit)	1,2	100	150	ma
Transconductance (Each Unit)	1,2	5800	8200	μmhos
Reverse Grid Current (Units in Parallel)	1,3	-	4	μamp

Note 1: With 6.3 volts ac or dc on heater.

Note 2: With plate-supply voltage of 135 volts, and cathode-bias resistor of 250 ohms in each cathode (both triode units operating).

Note 3: With plate-supply voltage of 135 volts, grid resistor of 1 megohm in each grid and cathode-bias resistor of 250 ohms in each cathode (both triode units operating).

● At hottest point on bulb surface.

□ When fixed bias is used, the plate circuit should contain a protective resistance to provide a minimum drop of 15 volts dc at the normal operating conditions.

*,▲,●,●: See next page.

→ Indicates a change

RCA

6080

LOW-MU TWIN POWER TRIODE

★ When combined fixed- and cathode-bias is used, the cathode-bias portion should have a minimum value of 7.5 volts dc at the normal operating conditions.

▲ As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations", Federal Communications Commission.

● The duration of the voltage pulse must not exceed 15 per cent of one horizontal scanning cycle. In a 525-line, 30-frame system, 15 per cent of one horizontal scanning cycle is 10 microseconds.

● Operation of this tube is not recommended with a damper pulse between heater and cathode.

SPECIAL RATINGS & PERFORMANCE DATA ←

Shock Rating:

Impact Acceleration . . . . 450 max. g

Tubes are held rigid in four different positions in a Navy Type, High Impact (flyweight) Shock Machine and are subjected to 450 g impact acceleration.

Fatigue Rating:

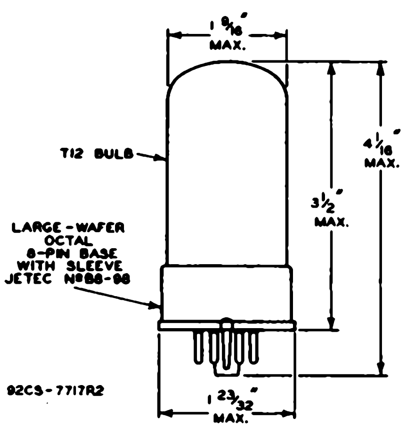
Vibrational Acceleration . . . . 2.5 max. g

Tubes are rigidly mounted and subjected in each of three positions to 2.5 g vibrational acceleration at 25 cycles per second for 32 hours.

Low-Frequency Vibration Performance:

RMS Output Voltage . . . . 200 max. mv

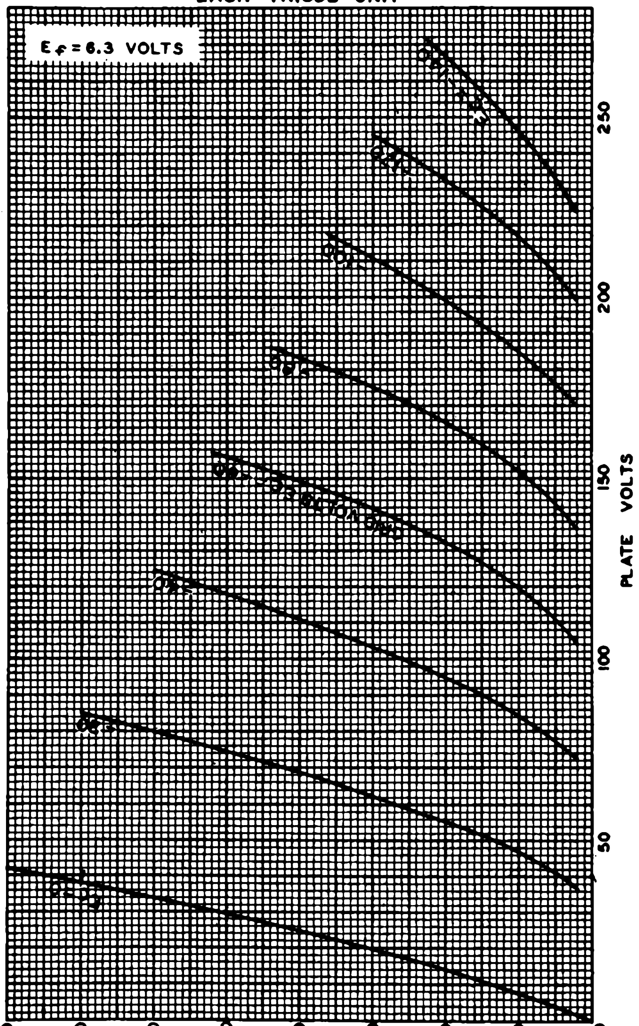
Under the following conditions and with units connected in parallel: Heater voltage of 6.3 volts, plate voltage supply of 135 volts, dc grid voltage of -7 volts, plate load resistance of 2000 ohms, and vibrational acceleration of 2.5 g at 25 cycles per second.



← Indicates a change

6080

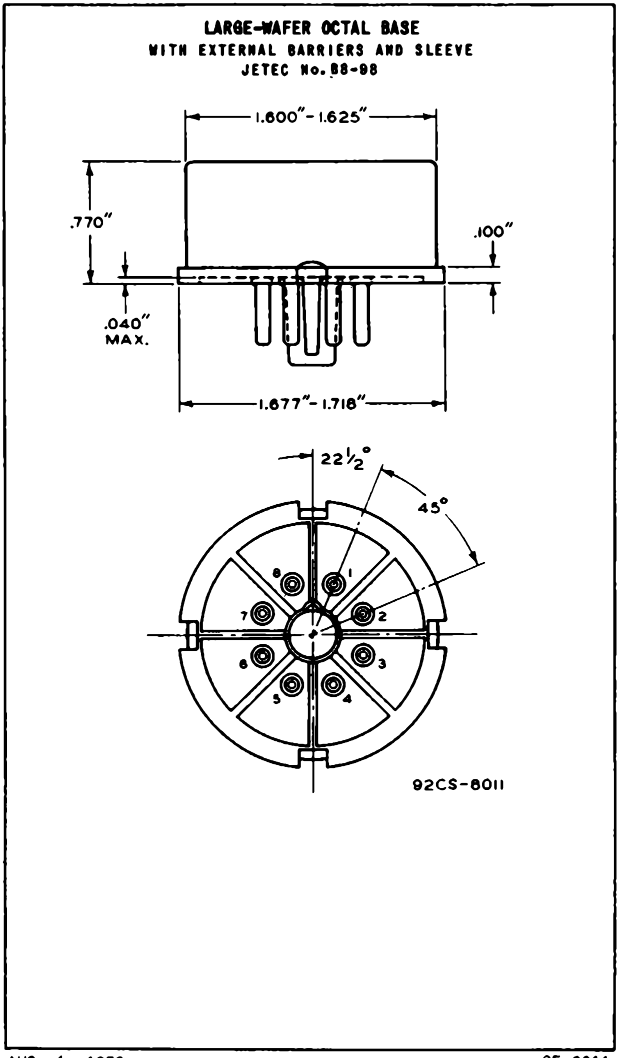
6080
AVERAGE PLATE CHARACTERISTICS
EACH TRIODE UNIT



RCA

6080

LOW-MU TWIN POWER TRIODE



RCA

6082

LOW-MU TWIN POWER TRIODE

GENERAL DATA

Heater, for Unipotential Cathodes:

Voltage	26.5 ± 10%	ac or dc volts
Current	0.6	amp

Direct Interelectrode Capacitances (Approx.): ←
(Each Unit, without external shield)

Grid to Plate	8	μμf
Input	6	μμf
Output	2.2	μμf
Heater to Cathode:		
Triode Unit No.1	13	μμf
Triode Unit No.2	13	μμf
Grid of Unit No.1 to Grid of Unit No.2	0.5	μμf
Plate of Unit No.1 to Plate of Unit No.2	2	μμf

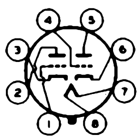
Characteristics, Amplifier Class A_1 (Each Unit):

Plate-Supply Voltage	135	volts
Cathode-Bias Resistor	250	ohms
Amplification Factor	2	
Plate Resistance	280	ohms
Transconductance	7000	μmhos
Plate Current	125	ma

Mechanical:

Mounting Position	Any
Maximum Overall Length	4-1/16" ←
Maximum Seated Length	3-1/2" ←
Maximum Diameter	1-23/32"
Bulb	T-12
Base	Large-Wafer Octal 8-Pin with Sleeve and External Barriers (JETEC No.B8-98) ←
Basing Designation for BOTTOM VIEW	8BD

Pin 1 - Grid of Unit No.2
Pin 2 - Plate of Unit No.2
Pin 3 - Cathode of Unit No.2
Pin 4 - Grid of Unit No.1



Pin 5 - Plate Unit No.1
Pin 6 - Cathode of Unit No.1
Pin 7 - Heater
Pin 8 - Heater

DC AMPLIFIER

Values are for Each Unit

Maximum Ratings, *Absolute Values:*

PLATE VOLTAGE	250 max.	volts
PLATE CURRENT	125 max.	ma
PLATE DISSIPATION	13 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	300 max.	volts
Heater positive with respect to cathode	300 max.	volts

← Indicates a change

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6082

6082

LOW-MU TWIN POWER TRIODE

BULB TEMPERATURE●	200 max.	°C
Maximum Circuit Values:		
Grid-Circuit Resistance:		
For cathode-bias operation	1.0 max.	megohm
For fixed-bias operation□	0.1 max.	megohm
For combined fixed- and cathode-bias operation♠	0.1 max.	megohm

→ **CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN**

	Note	*Min.*	*Max.*	
Heater Current	1	0.55	0.65	amp
Amplification Factor (Each Unit)	1,2	1.4	2.6	
Plate Current (Each Unit) . . .	1,2	100	150	ma
Transconductance (Each Unit)	1,2	5800	8200	μmhos
Reverse Grid Current (Units in Parallel).	1,3	-	4	μamp

Note 1: With 26.5 volts ac or dc on heater.

Note 2: With plate-supply voltage of 135 volts, and cathode-bias resistor of 250 ohms in each cathode (both triode units operating).

Note 3: With plate-supply voltage of 135 volts, grid resistor of 1 megohm in each grid and cathode-bias resistor of 250 ohms in each cathode (both triode units operating).

● At hottest point on bulb surface.

□ When fixed bias is used, the plate circuit should contain a protective resistance to provide a minimum drop of 15 volts dc at the normal operating conditions.

♠ When combined fixed- and cathode-bias is used, the cathode-bias portion should have a minimum value of 7.5 volts dc at the normal operating conditions.

→ **SPECIAL RATINGS & PERFORMANCE DATA**

Shock Rating:

Impact Acceleration . . . . 450 max. g

Tubes are held rigid in four different positions in a Navy Type, High Impact (flyweight) Shock Machine and are subjected to 450 g impact acceleration.

Fatigue Rating:

Vibrational Acceleration . . . . 2.5 max. g

Tubes are rigidly mounted and subjected in each of three positions to 2.5 g vibrational acceleration at 25 cycles per second for 32 hours.

Low-Frequency Vibration Performance:

RMS Output Voltage . . . . 200 max. mv

Under the following conditions and with units connected in parallel: Heater voltage of 26.5 volts, plate voltage

→ indicates a change

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6082

LOW-MU TWIN POWER TRIODE

supply of 135 volts, dc grid voltage of -7 volts, plate load resistance of 2000 ohms, and vibrational acceleration of 2.5 g at 25 cycles per second.

Outline Drawing and
Average Plate Characteristics Curve
for the 6082 are the same as
shown for Type 6080

PREMIUM TYPE 6101

6101

MEDIUM-MU TWIN TRIODE

MINIATURE TYPE

Intended for applications at altitudes up to 55000 feet and where dependable performance under shock and vibration is paramount.

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage	6.3 ± 10%	ac or dc volts
Current	0.45	amp

Direct Interelectrode Capacitances (Each Unit, approx.)*:

Grid to Plate	1.5	μμf
Input	2.0	μμf
Output	0.4	μμf
Heater to Cathode	6.0	μμf

Characteristics, Class A_1 Amplifier:

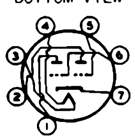
Plate Supply Voltage	100	volts
Cathode-Bias Resistor	50#	ohms
Amplification Factor	38	
Plate Resistance	6300	ohms
Transconductance	6000	μmhos
Plate Current	8.5	ma

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-1/8"
Maximum Seated Length	1-7/8"
Length, Base Seat to Bulb Top (Excluding tip)	1-1/2" ± 3/32"
Maximum Diameter	3/4"
Bulb	T-5-1/2
Base	Small-Button Miniature 7-Pin (JETEC No.E7-1)

BOTTOM VIEW

Pin 1 - Plate of Unit No.2
Pin 2 - Plate of Unit No.1
Pin 3 - Heater
Pin 4 - Heater



Pin 5 - Grid of Unit No.1
Pin 6 - Grid of Unit No.2
Pin 7 - Cathode

AMPLIFIER - Class A_1

Values are for each unit

Maximum Ratings, *Absolute Values:*

	*For Pressures Down to 55 ± 5 mm of Hg***	
PLATE VOLTAGE	330 max.	volts

* With no external shield.
** Corresponds to altitude of about 55000 feet.
\# Value is common to both units operating at the specified conditions.

6101

RCA

6101

MEDIUM-MU TWIN TRIODE

PLATE DISSIPATION	0.85 max.	watt
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode .	180 max.	volts
Heater positive with respect to cathode .	180 max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)	165 max.	°C

Maximum Circuit Values (For maximum rated conditions):

Grid-Circuit Resistance:		
For fixed-bias operation	Not recommended	
For cathode-bias operation	0.5 max.	megohm

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Note	*Min.*	*Max.*	
Heater Current	1	0.420	0.480	amp
Grid-to-Plate Capacitance (Each Unit).	2	1.2	1.8	μμf
Grid-to-Cathode Capacitance (Each Unit).	2	1.4	2.8	μμf
Plate-to-Cathode Capacitance (Unit No.1).	2	0.25	0.65	μμf
Plate-to-Cathode Capacitance (Unit No.2).	2	0.25	0.55	μμf
Heater-to-Cathode Capacitance .	2	4.0	8.0	μμf
Amplification Factor	1,3	28	48	
Plate Current (1)	1,4	6.5	11.5	ma
Plate Current (2)	1,5	-	200	μamp
Plate Current (3)	1,7	5	-	μamp
Transconductance (1).	1,4	4500	7500	μmhos
Transconductance (2).	6,4	▲	-	μmhos
Reverse Grid Current (1). . . .	1,8	-	0.5	μamp
Reverse Grid Current (2). . . .	9,10	-	1.0	μamp
Heater-Cathode Leakage Current:				
Heater negative with respect to cathode . . .	1,11	-	10	μamp
Heater positive with respect to cathode . . .	1,11	-	10	μamp
Leakage Resistance Per Unit:				
Between Grid and All Other Electrodes Tied Together	1,12	100	-	megohms
Between Plate and All Other Electrodes Tied Together	1,13	100	-	megohms

Note 1: With 6.3 volts ac or dc on heater.

Note 2: With no external shield.

Note 3: With plate supply voltage of 100 volts, cathode-bias resistor of 50 ohms common to both units, and a cathode bypass capacitor of 1000 μf. Each unit tested separately and with both units operating.

Note 4: With plate supply voltage of 100 volts and cathode-bias resistor of 50 ohms common to both units. Each unit tested separately and with both units operating.

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

RCA

6101

MEDIUM-MU TWIN TRIODE

Note 5: With dc plate voltage of 250 volts, and dc grid voltage of −14.5 volts. Each unit tested separately and with both units operating.

Note 6: With 5.7 volts ac or dc on heater.

Note 7: With plate supply voltage of 250 volts and dc grid voltage of −10.5 volts. Each unit tested separately and with both units operating.

Note 8: With plate supply voltage of 250 volts, grid-circuit resistance of 1.0 megohm common to both units, and cathode-bias resistor of 500 ohms common to both units. Plate of unit No.1 tied to plate of unit No.2; grid of unit No.1 tied to grid of unit No.2.

Note 9: With 7.0 volts ac or dc on heater.

Note 10: With plate supply voltage of 100 volts, grid-circuit resistance of 1 megohm common to both units and cathode-bias resistor of 50 ohms common to both units. Plate of unit No.1 tied to plate of unit No.2; grid of unit No.1 tied to grid of unit No.2.

Note 11: With 100 volts dc between heater and cathode.

Note 12: With grid 100 volts negative with respect to all other electrodes tied together.

Note 13: With plate 300 volts negative with respect to all other electrodes tied together.

SPECIAL RATINGS & PERFORMANCE DATA

Shock Rating:

Impact Acceleration . . . . 500 max. g

This test is performed on a sample lot of tubes from each production run to determine ability of tube to withstand the specified impact acceleration. Tubes are held rigid in four different positions in a Navy Type, High-Impact (flyweight) Shock Machine and are subjected to 20 blows at a hammer angle of 30° (equivalent to the specified maximum impact acceleration). At the end of this test, tubes will not show permanent or temporary shorts or open circuits, and are required to meet established limits for vibration, heater-cathode leakage current, and transconductance.

Fatigue Rating:

Vibrational Acceleration . . . . 2.5 max. g

This test is performed on a sample lot of tubes from each production run to determine ability of tube to withstand the specified vibrational acceleration. Tubes are rigidly mounted and subjected in each of three positions to 2.5 g vibrational acceleration at 60 cycles per second for 32 hours. At the end of this test, tubes will not show permanent or temporary shorts or open circuits, and are required to meet established limits for fatigue, heater-cathode leakage current, and transconductance.

Low-Frequency Vibration Performance:

RMS Output Voltage . . . . 25 max. millivolts

This test is performed on a sample lot of tubes from each production run to determine ability of tube to withstand low-frequency vibration of its elements with consequent

6101

MEDIUM-MU TWIN TRIODE

generation of audio noise as determined by the measured rms output voltage. Plate of unit No.1 tied to plate of unit No.2 and grid of unit No.1 tied to grid of unit No.2; dc plate voltage of 250 volts, dc grid voltage of -8 volts, plate load resistance of 20000 ohms, and vibrational acceleration of 2.5 g at 25 cps.

Audio-Frequency Noise and Microphonic Performance:

RMS Output Voltage . . . . 70 max. millivolts

This test is performed on a sample lot of tubes from each production run to determine susceptibility of tube to movement of its elements when tapped and consequent generation of audio noise as determined by the measured rms output voltage. Plate of unit No.1 tied to plate of unit No.2, grid of unit No.1 tied to grid of unit No.2, plate supply voltage of 100 volts, grid-circuit resistance of 0.1 megohm common to both units, cathode-bias resistor of 50 ohms common to both units, and plate load resistance of 10000 ohms.

Glass Strain Test:

This test is performed on a sample lot of tubes from each production run to check for tubes which may have been improperly processed. Tubes are completely submerged in boiling water (97°C to 100°C) for a period of 15 seconds and then immediately submerged in ice water (0°C to 3°C). Tubes will withstand this treatment without loss of vacuum.

Shorts and Continuity Test:

This test is performed on a sample lot of tubes from each production run. In this test a tube is considered inoperative if it shows a permanent or temporary short or open circuit, or a value of reverse grid current in excess of 1.0 microampere under the conditions specified in the CHARACTERISTICS RANGE VALUES for reverse grid current (1).

1-Hour Stability Life Performance:

This test is performed on a sample lot of tubes from each production run to insure that the tubes have been properly stabilized. With both units operating, each unit is checked for variation in transconductance under conditions of maximum rated plate dissipation. At the end of 1 hour, the value of transconductance of each unit is read. The variation in transconductance from the 0-hour reading will not exceed 12 per cent.

100-Hour Life Performance:

This test is performed on a sample lot of tubes from each production run under conditions of maximum rated plate dissipation to insure a low percentage of early inopera-

6101

MEDIUM-MU TWIN TRIODE

tives. At the end of 100 hours, a tube is considered inoperative if it shows a permanent or temporary short or open circuit, or a value of reverse grid current in excess of 1.0 microampere under the conditions specified in CHARACTERISTICS RANGE VALUES for reverse grid current (1).

500-Hour Average Life Performance:

This 500-hour test is made on a sample lot of tubes from each production run to insure high quality of the individual tube and to guard against epidemic failures of any of the characteristics indicated below. With both units operating, each unit is life tested separately at room temperature under the following conditions: heater voltage of 6.3 volts ac or dc, plate supply voltage of 100 volts, dc heater-cathode voltage (heater positive with respect to cathode) of 180 volts, and cathode bias resistor (common to both units) of 50 ohms. At the end of 500 hours, the tubes will not show permanent shorts or open circuits and will be criticized for the total number of defects in the sample lot and for the number of tubes failing to pass the established limits of heater current, transconductance with 6.3 volts ac or dc on heater, transconductance with 5.7 volts ac or dc on heater, plate current (1), reverse grid current (2), heater-cathode leakage current, and leakage resistance per unit.

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6101

RCA

6101

AVERAGE PLATE CHARACTERISTICS
FOR EACH UNIT

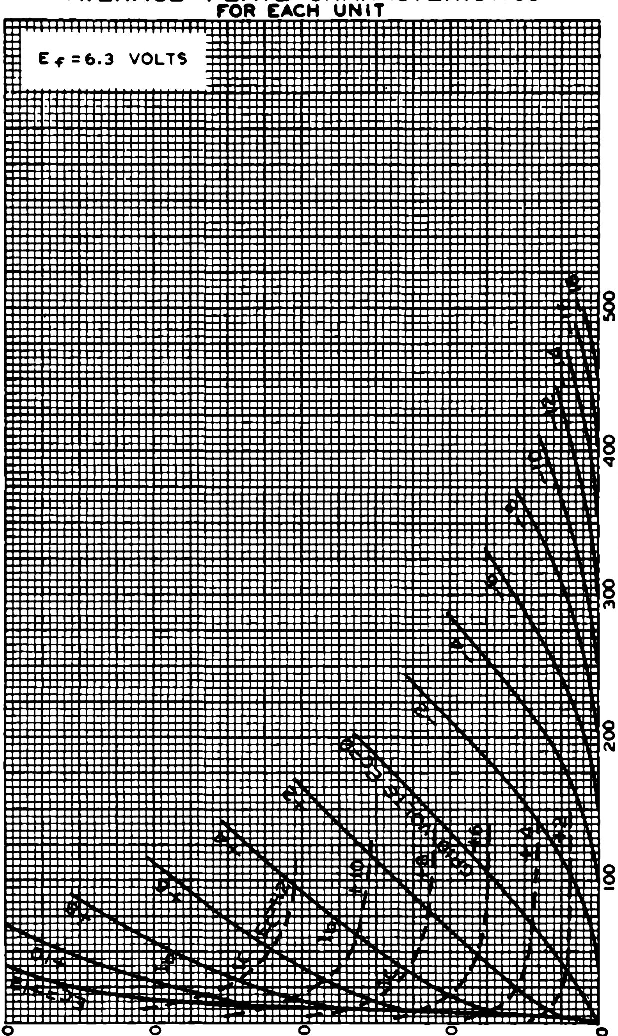


PLATE (I_b) OR GRID (I_c) MILLIAMPERES

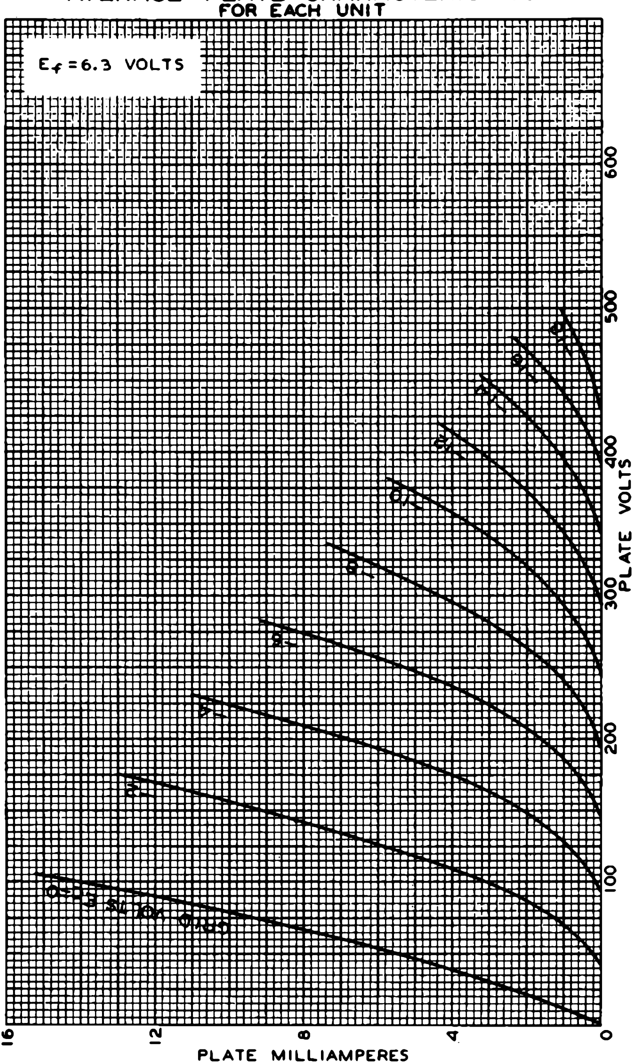
JULY 13, 1953 TUBE DEPARTMENT 92CM-8034

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6101

RCA 6101

AVERAGE PLATE CHARACTERISTICS
FOR EACH UNIT



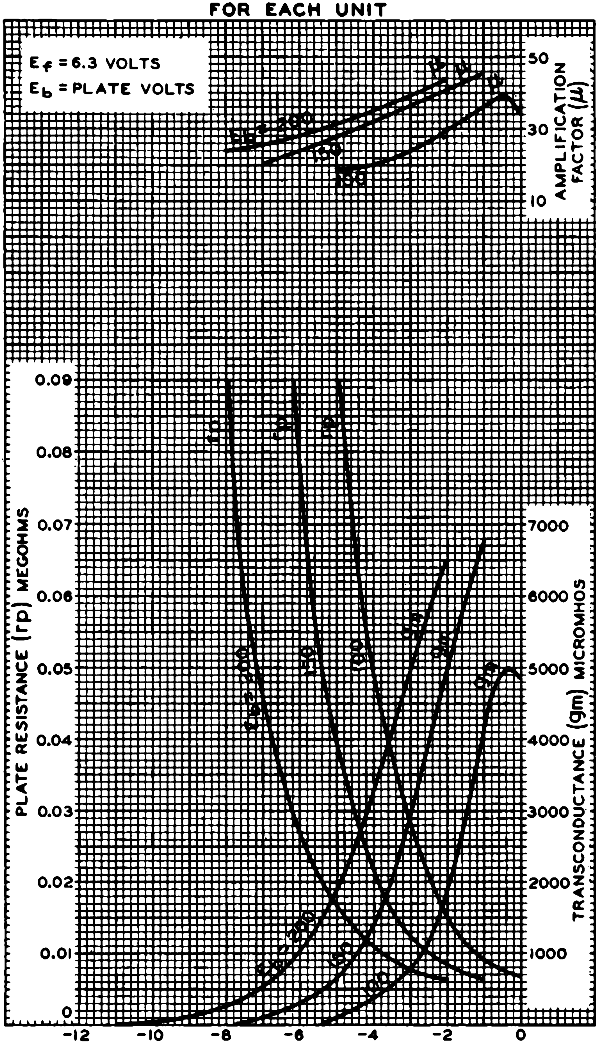
JULY 13, 1953

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-8033

6101

6101
AVERAGE CHARACTERISTICS
FOR EACH UNIT



6173

6173

UHF DIODE

"PENCIL TYPE" FOR PULSE-DETECTION SERVICE

GENERAL DATA

Electrical:

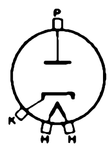
Heater, for Unipotential Cathode:		
Voltage	6.3 ± 10% . . .	ac or dc volts
Current	0.135	amp
Resonant Freq. (Approx.) .	1600	Mc
Direct Interelectrode Capacitance (Approx.):		
Plate to Cathode . . .	1.1	μμf

Mechanical:

Terminal Connections:

H - Heater Leads

P - Plate Cylinder (Adjacent to Pinch-off)



K - Cathode Cylinder (Adjacent to Heater Leads)

Mounting Position . . . . Any

Dimensions . . . . See Outline Drawing

PULSE-DETECTION AND PULSE-POWER-MEASURING SERVICE▲

Maximum Ratings, ***Absolute Values:***

PEAK INVERSE PLATE VOLTAGE	1000 max.	volts
PEAK PULSE PLATE VOLTAGE	150 max.	volts
PEAK PULSE PLATE CURRENT	1.0 max.	amp
AVERAGE PLATE CURRENT	1 max.	ma.
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode .	90 max.	volts
Heater positive with respect to cathode .	90 max.	volts
SEAL TEMPERATURE (Plate or Cathode)	175 max.	°C

HALF-WAVE RECTIFIER

Maximum Ratings, ***Absolute Values:***

PEAK INVERSE PLATE VOLTAGE	375 max.	volts
PEAK PLATE CURRENT	50 max.	ma
HOT-SWITCHING TRANSIENT PLATE CURRENT●		
For duration of 0.2 second maximum . . .	250 max.	ma
DC OUTPUT CURRENT	5.5 max.	ma

(continued on next page)

▲ In this class of service, the heater should be allowed to warm up for a minimum of 60 seconds before plate voltage is applied in order to allow the cathode to reach normal operating temperature and to be able to supply the high peak plate currents encountered in this class of service.

● A minimum plate-load impedance (including the source impedance) of 300 ohms is required to limit the hot-switching transient plate current and thereby prevent damage to the tube when the plate voltage is applied.

6173

RCA 6173

UHF DIODE

PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode . .	90 max.	volts	
Heater positive with respect to cathode . .	90 max.	volts	
SEAL TEMPERATURE (Plate or Cathode).	175 max.	°C	

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Note	*Min.*	*Max.*	
Heater Current	1	0.123	0.143	amp
Plate-to-Cathode Capacitance	-	0.8	1.4	$\mu\mu$f
Tube Voltage Drop.	1,2	-	15	volts

Note 1: With 6.3 volts ac or dc on heater.

Note 2: With peak plate current of 50 milliamperes provided by an applied dc voltage. Tube drop is measured by a voltmeter connected between plate and cathode.

INSTALLATION CONSIDERATIONS

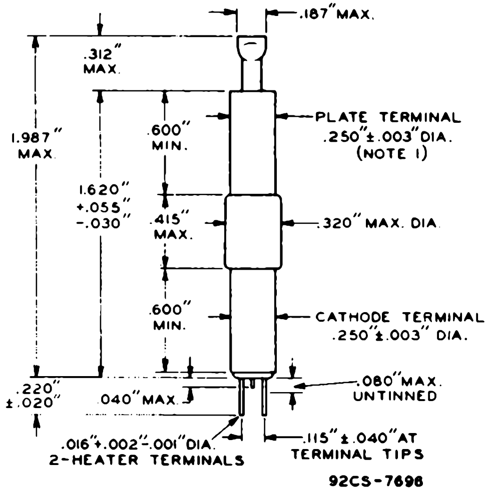
Connections to the cathode cylinder and plate cylinder should be made by flexible spring contacts only. The connectors must make firm, large-surface contact, yet must be sufficiently flexible so that no part of the tube is subjected to strain. Unless this recommendation is observed, the glass-to-metal seals may be damaged.

The *heater* leads of the 6173 fit the Cinch Socket No.54A16325. They should not be soldered to circuit elements. The heat of the soldering operation may crack the glass seals of the heater leads and damage the tube.

6173

6173

UHF DIODE



NOTE 1: ECCENTRICITY OF ℄ (AXIS) OF PLATE TERMINAL WITH RESPECT TO THE ℄ (AXIS) OF THE CATHODE TERMINAL IS 0.008".

6173

UHF DIODE

OPERATING CONSIDERATIONS

The *Pulse Rating Chart* shown on the facing page represents graphically the relationships between pulse duration, pulse repetition rate, and peak pulse plate current. This Chart gives the equipment designer a wide choice of operating parameters within the tube's ratings.

Dotted boundary line "ABC" is the locus of the maximum peak pulse plate current values for various pulse durations. In most applications, two of the three parameters shown in the Pulse Rating Chart are known. Knowing any two parameters, the equipment designer can select from the Chart the maximum allowable value of the third parameter. For example, if an application requires a 1.0-microsecond pulse and a pulse repetition rate of 1000 per second, the maximum allowable peak pulse plate current is 1.0 ampere. Since the pulse repetition rate of 1000 is a maximum value for a pulse duration of 1.0 microsecond, it follows that any pulse repetition rate up to 1000 may be used under these conditions. If a longer pulse duration is required, e.g., 1.5 microseconds, and the same pulse repetition rate of 1000 is required, the maximum allowable peak pulse plate current is 0.67 ampere.

In applications where groups of pulses are employed, the equipment designer can total the pulse duration of the individual pulses in any one group and then treat the pulse duration of the group as a single wide pulse.

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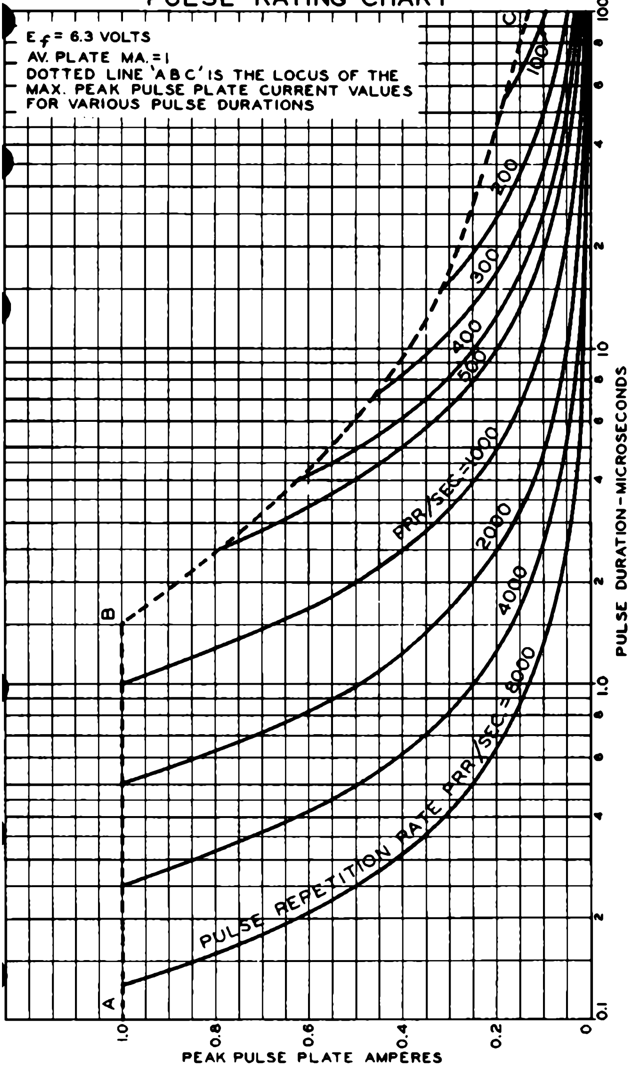
6173

PULSE RATING CHART



JAN. 4, 1952

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92CM-7727

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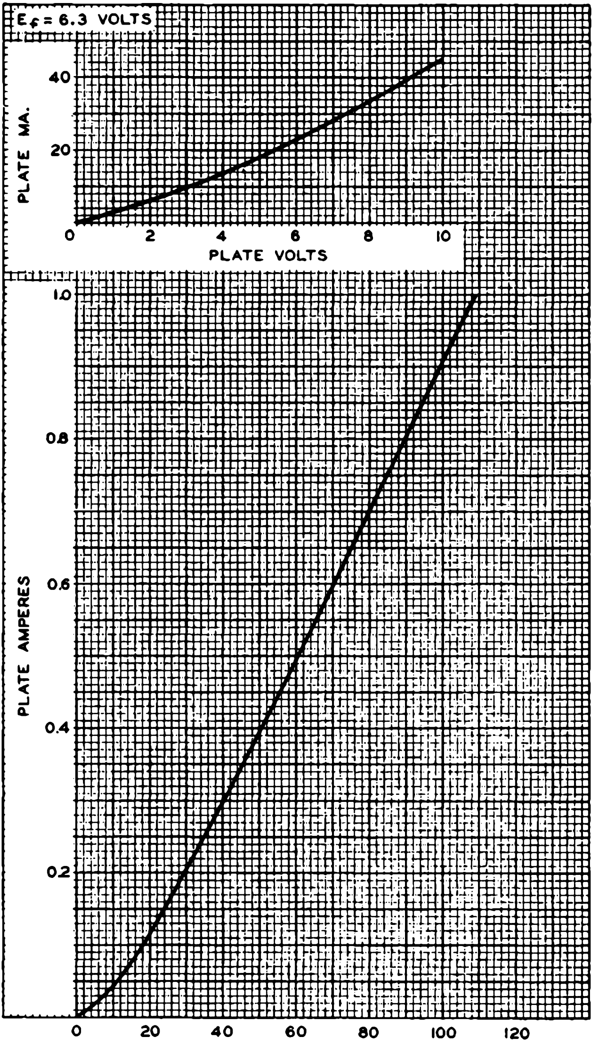
6173

AVERAGE PLATE CHARACTERISTICS



JAN. 4, 1952

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7726

6197

6197

POWER PENTODE

FOR "ON-OFF" CONTROL APPLICATIONS INVOLVING
LONG PERIODS OF OPERATION UNDER CUTOFF CONDITIONS

GENERAL DATA

Electrical:

Heater, Pure Tungsten, for Unipotential Cathode:

Voltage	6.3 ± 5%	ac or dc volts
Current at 6.3 volts	0.65	amp

Direct Interelectrode Capacitances (Approx. with no external shield):

Grid No.1 to Plate	0.125	μμf
Grid No.1 to Cathode and Heater	11.5	μμf
Plate to Cathode and Heater	5.0	μμf
Heater to Cathode	8.5	μμf

Characteristics, Class A_1 Amplifier:

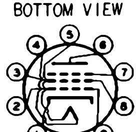
Heater Voltage	6.3	volts
Plate Voltage	250	volts
Grid No.3	Connected to Cathode at Socket	
Grid-No.2 Voltage	150	volts
Grid-No.1 Voltage	-3	volts
Mu-Factor, Grid No.2 to Grid No.1	22	
Plate Resistance	90000	ohms
Transconductance	11000	μmhos
Plate Current	30	ma
Grid-No.2 Current	7	ma
Maximum Plate Current for grid-No.1 voltage of -12 volts	100	μamp

Mechanical:

Mounting Position	Vertical; Horizontal operation permitted if pins No.3 and No.8 are in a vertical plane
Maximum Overall Length	2-5/8"
Maximum Seated Length	2-3/8"
Length, Base Seat to Bulb Top (Excluding tip)	2" ± 3/32"
Maximum Diameter	7/8"
Bulb	T-6-1/2
Base	Small-Button Noval 9-Pin (JETEC No.E9-1)

BOTTOM VIEW

Pin 1: Cathode
Pin 2: Grid No.1
Pin 3: Grid No.2
Pin 4: Heater
Pin 5: Heater



Pin 6: Plate
Pin 7: Grid No.3, Int. Shield
Pin 8: Grid No.2
Pin 9: Grid No.1

FREQUENCY DIVIDER IN COMPUTER SERVICE and "ON-OFF" CONTROL SERVICE

Maximum Ratings, *Absolute Values:*

PLATE VOLTAGE	300 max.	volts
GRID-No.3 (SUPPRESSOR) VOLTAGE	0 max.	volts

6197

POWER PENTODE

GRID-No.2 (SCREEN) VOLTAGE	250 max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE	-50 max.	volts
PLATE DISSIPATION	7.5 max.	watts
GRID-No.2 INPUT	2.5 max.	watts
CATHODE CURRENT	50 max.	ma
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	180● max.	volts
Heater positive with respect to cathode	180● max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)	200 max.	°C

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:		
For fixed-bias operation	0.1 max.	megohm
For cathode-bias operation	0.5 max.	megohm

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Note	*Min.*	*Max.*	
Heater Current	1	0.61	0.69	amp
Mu-Factor, Grid No.2 to Grid No.1	1,2	19	25	
Plate Current (1)	1,3	26	46	ma
Plate Current (2)	1,4	20	40	ma
Plate Current (3)	1,5	-	100	μamp
Grid-No.2 Current	1,4	5	9	ma
Reverse Grid-No.1 Current	1,6	-	2	μamp
Heater-Cathode Leakage Current:				
Heater negative with respect to cathode	●1,7	-	40	μamp
Heater positive with respect to cathode	1,7	-	40	μamp
Transconductance	1,4	9000	13000	μmhos

Note 1: With 6.3 volts ac or dc on heater.

Note 2: With grid No.3 tied to cathode, grid No.2 tied to plate, plate voltage of 150 volts, grid-No.2 voltage of 150 volts, and grid-No.1 voltage of -3 volts.

Note 3: With plate voltage of 50 volts, grid No.3 tied to cathode, grid No.2 voltage of 100 volts, and grid-No.1 voltage of 0 volts.

Note 4: With plate voltage of 250 volts, grid No.3 connected to cathode, grid-No.2 voltage of 150 volts, and grid-No.1 voltage of -3 volts.

Note 5: With plate voltage of 250 volts, grid No.3 connected to cathode, grid-No.2 voltage of 150 volts, and grid-No.1 voltage of -12 volts.

Note 6: With plate voltage of 250 volts, grid No.3 connected to cathode, grid-No.2 voltage of 150 volts, grid-No.1 supply voltage of -3 volts, and grid-No.1 resistor of 0.25 megohm.

Note 7: With 90 volts dc between heater and cathode.

● DC component must not exceed 90 volts.

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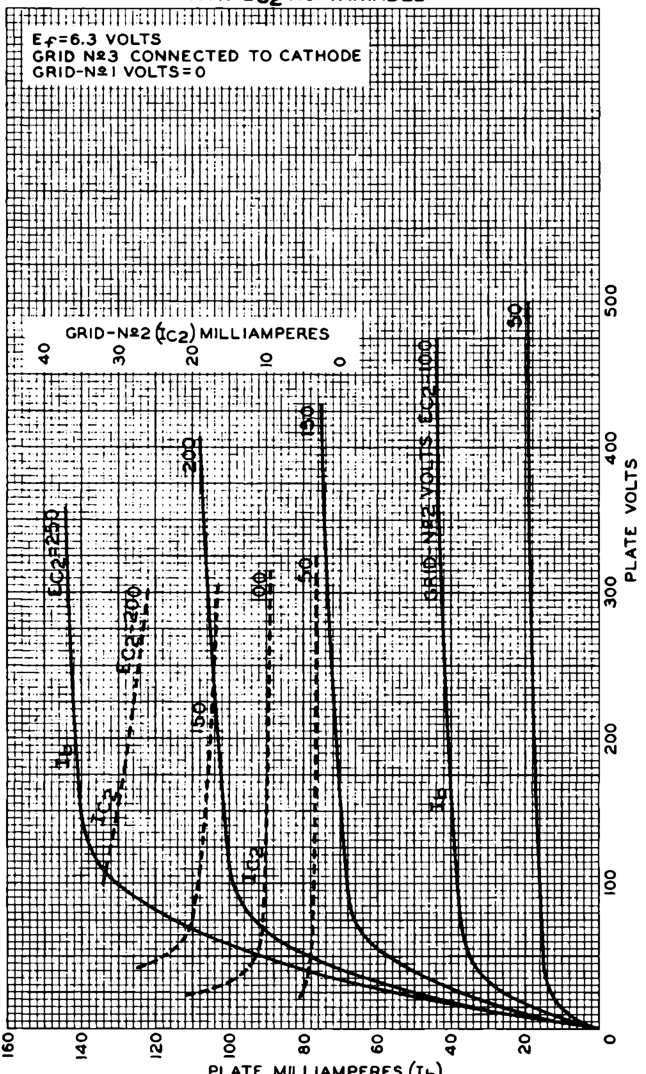
6197

6197

AVERAGE PLATE CHARACTERISTICS
WITH E_{C2} AS VARIABLE



DEC. 8, 1953

TUBE DEPARTMENT

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92CM-8150

6197

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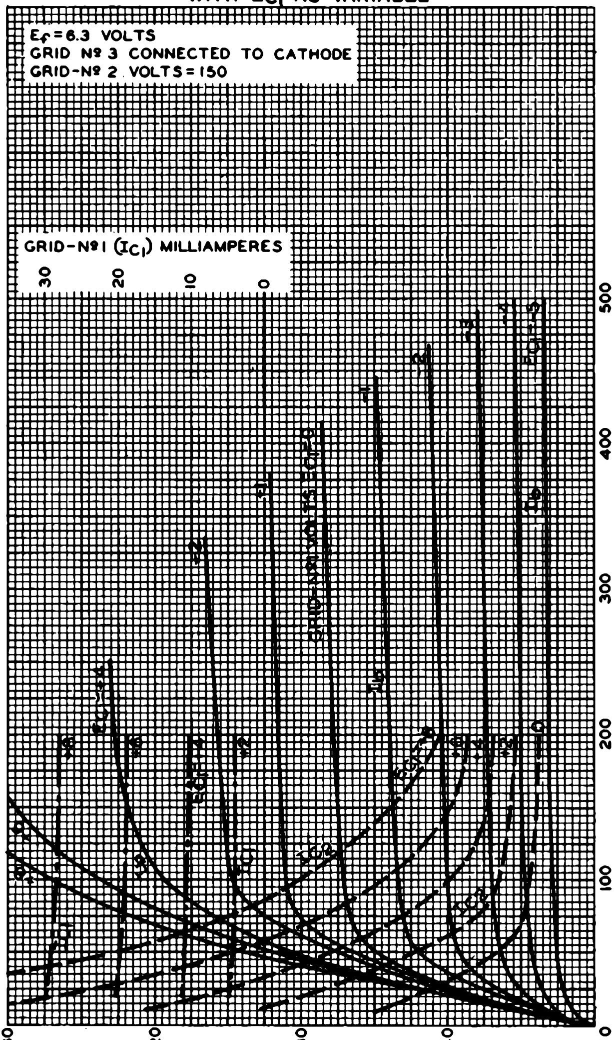
6197

AVERAGE PLATE CHARACTERISTICS
WITH E_{C_1} AS VARIABLE



DEC. 4, 1953 TUBE DEPARTMENT 92CM-8285

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6197

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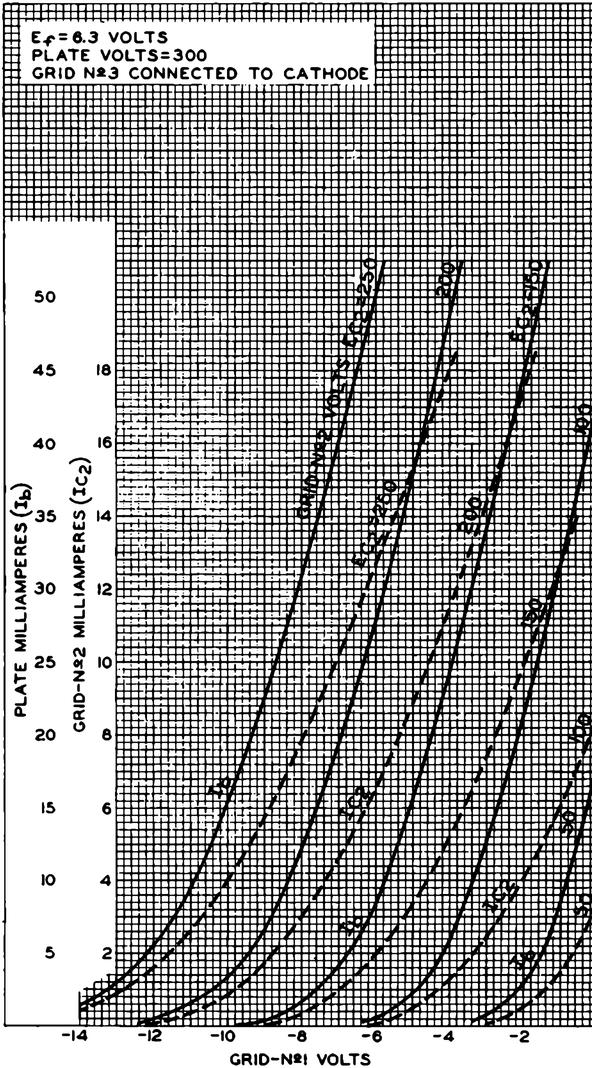
AVERAGE CHARACTERISTICS



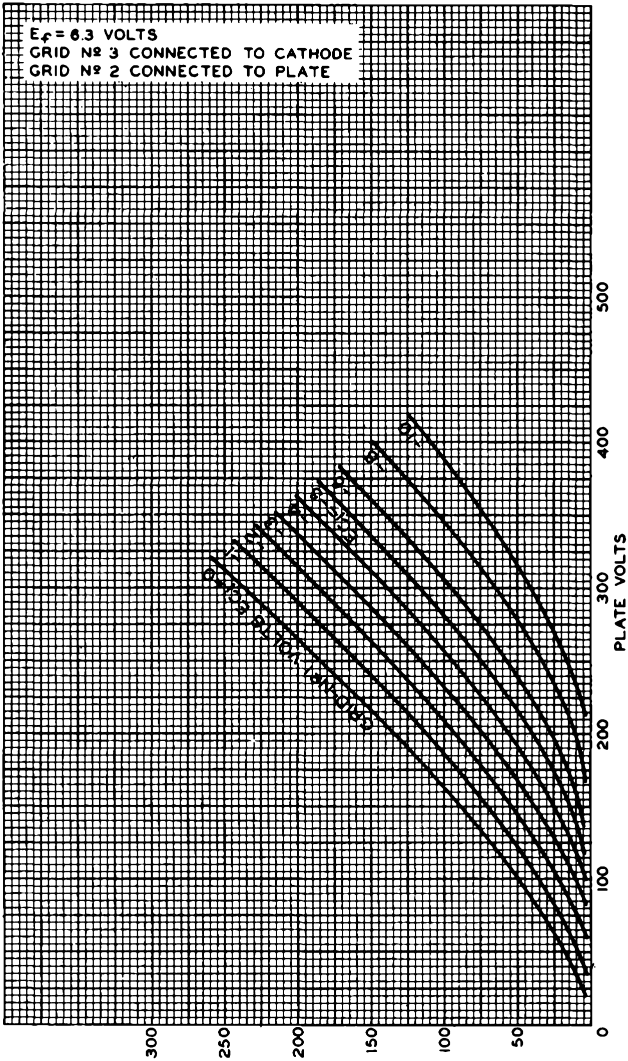
DEC.4,1953

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-8149

6197

AVERAGE PLATE CHARACTERISTICS
TRIODE CONNECTION



DEC. 4, 1953
TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY
92CM-8286

6201

6201

HIGH-MU TWIN TRIODE

9-PIN MINIATURE TYPE

Intended for applications where dependable performance under shock and vibration is paramount, and for "on-off" control applications involving long periods of operation under cutoff conditions. The 6201, a "premium" version of the 12AT7, may be used at frequencies up to 300 Mc.

GENERAL DATA

Electrical:

Heater, Pure Tungsten, for Unipotential Cathodes:

Heater arrangement	*Series*	*Parallel*	
Voltage.	12.6 ± 10%	6.3 ± 10%	ac or dc volts
Current.	0.15	0.3	amp

Direct Interelectrode Capacitances (Approx.):

Grid-Drive Operation:	*Without External Shield*	*With External Shield**	
Grid to plate (Each unit). .	1.6	1.6	μμf
Grid to cathode and heater (Each unit)	2.5	2.5	μμf
Plate to cathode and heater (Unit No.1)	0.45	1.2	μμf
Plate to cathode and heater (Unit No.2)	0.38	1.3	μμf
Heater to cathode (Each unit).	2.8	2.8	μμf
Plate to plate	0.24	-	μμf

Cathode-Drive Operation:	*Without External Shield*	*With External Shield*●	
Plate to cathode (Unit No.1).	0.2	0.18	μμf
Plate to cathode (Unit No.2).	0.24	0.2	μμf
Cathode to grid and heater (Each unit)	5	5	μμf
Plate to grid and heater (Unit No.1).	1.9	2.7	μμf
Plate to grid and heater (Unit No.2).	1.8	2.7	μμf

Characteristics, Class A_1 Amplifier (Each Unit):

Plate-Supply Voltage	100	250	volts
Cathode Resistor	270	200	ohms
Amplification Factor	57	60	
Plate Resistance (Approx.) . . .	14300	10900	ohms
Transconductance	4000	5500	μmhos
Plate Current.	3.3	10	ma
Grid Voltage (Approx.) for plate current of 10 μamp . . .	-5	-12	volts

*,●: See next page.

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6201

RCA

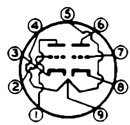
6201

HIGH-MU TWIN TRIODE

Mechanical:

Mounting Position . . . . Any
Maximum Overall Length. . . . . 2-3/16"
Maximum Seated Length . . . . 1-15/16"
Length, Base Seat to Bulb Top (Excluding tip) 1-9/16" ± 3/32"
Maximum Diameter. . . . . 7/8"
Dimensional Outline . . . . *See General Section*
Bulb. T-6-1/2
Base. . . . . .Small-Button Noval 9-Pin (JETEC No.E9-1)
Basing Designation for BOTTOM VIEW. 9A

Pin 1 - Plate of Unit No.2
Pin 2 - Grid of Unit No.2
Pin 3 - Cathode of Unit No.2
Pins 4 & 9 - Heater of Unit No.2
Pins 5 & 9 - Heater of Unit No.1



Pin 6 - Plate of Unit No.1
Pin 7 - Grid of Unit No.1
Pin 8 - Cathode of Unit No.1
Pin 9 - Heater Mid-Tap

AMPLIFIER - Class A_1

Values are for Each Unit

Maximum Ratings, *Absolute Values:*

PLATE VOLTAGE	330 max.	volts
GRID VOLTAGE:		
Negative bias value	55 max.	volts
Positive bias value	0 max.	volts
PLATE DISSIPATION	2.75 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode .	100 max.	volts
Heater positive with respect to cathode .	100 max.	volts
BULB TEMPERATURE (At hottest point on bulb surface).	180 max.	°C

Maximum Circuit Values:

Grid-Circuit Resistance:		
For fixed-bias operation.	0.25 max.	megohm
For cathode-bias operation.	1.0 max.	megohm

Typical Operation as Resistance-Coupled Amplifier:

See RESISTANCE-COUPLED AMPLIFIER CHART at end of tabulated data for this type

* With external shield JETEC No.315 connected to cathode of unit under test.

● With external shield JETEC No.315 connected to grid of unit under test.

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RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6201

6201

HIGH-MU TWIN TRIODE

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN●

Values Are For Each Unit and are Initial, Unless Otherwise Specified

	Note	Min.	Max.	
Heater Current	1	0.138	0.162	amp
Direct Interelectrode Capacitances:				
Grid to plate.	2	1.3	1.9	μμf
Grid to cathode and heater	2	2	3	μμf
Plate to cathode and heater (Unit No.1) . .	2	0.2	0.7	μμf
Plate to cathode and heater (Unit No.2) . .	2	0.16	0.6	μμf
Heater to cathode. . . .	2	2.1	3.5	μμf
Plate to plate	3	0.15	0.33	μμf
Amplification Factor . . .	1,4	50	70	
Plate Current (1).	1,4	7	14	ma
Plate-Current Difference Between Units.	1,4	-	3.2	ma
Plate Current (2).	1,5	-	100	μamp
Transconductance (1) . . .	1,4	4500	6500	μmhos
Transconductance (1) at 500 Hours.	1,4	3800	6500	μmhos
Transconductance (2) . . .	3,6	4100	-	μmhos
Transconductance Change: Difference between average transconductance (1) initially, and average after 500 hours, expressed as a percentage of the initial average	1,4	-	15	%
Reverse Grid Current. . . .	1,7	-	0.7	μamp
Grid Emission Current . . .	8,9	-	1.5	μamp
Heater-Cathode Leakage Current:				
Heater negative with respect to cathode. . .	1,10	-	10	μamp
Heater positive with respect to cathode. . .	1,10	-	10	μamp
Leakage Resistance:				
Between grid and all other electrodes tied together	1,11	100	-	megohms

● Each tube is stabilized before characteristics testing by continous operation for at least 45 hours at room temperature and with dissipation values equivalent to life test conditions.

Notes 1 to 11: See next page.

6201

HIGH-MU TWIN TRIODE

	Note	Min.	Max.	
Leakage Resistance:				
Between plate and all other electrodes tied together.	1,12	100	-	megohms
Leakage Resistance at 500 Hours:				
Between grid and all other electrodes tied together.	1,11	50	-	megohms
Between plate and all other electrodes tied together.	1,12	50	-	megohms

Note 1: With 12.6 volts ac or dc on heater (series connection).

Note 2: Without external shield and with unit not under test connected to ground.

Note 3: Without external shield.

Note 4: With dc plate-supply volts = 250, cathode resistor (ohms) = 200, and cathode bypass capacitor of 1000 μf. Each unit tested separately. Unit not under test connected to ground.

Note 5: With dc plate-supply volts = 250, plate load resistance (megohms) = 0.1, and dc grid volts = -20. Each unit tested separately. Unit not under test connected to ground.

Note 6: With 11.0 volts ac or dc on heater (series connection).

Note 7: With dc plate-supply volts = 250, grid-circuit resistance (megohms) = 0.5, cathode resistor (ohms) = 200, and cathode bypass capacitor of 1000 μf. Each unit tested separately. Unit not under test connected to ground.

Note 8: With 15.0 volts ac or dc on heater (series connection).

Note 9: With dc plate volts = 250, grid-circuit resistance (megohms) = 0.5, and dc grid volts = -20. Each unit tested separately.

Note 10: With 100 volts dc between heater and cathode and units connected in parallel.

Note 11: With grid 100 volts negative with respect to all other electrodes tied together.

Note 12: With plate 300 volts negative with respect to all other electrodes tied together.

SPECIAL RATINGS & PERFORMANCE DATA

Shock Rating:

Impact Acceleration. . . . . 600 max. g

This test is performed on a sample lot of tubes from each production run in a Navy Type, High-Impact (flyweight) Shock Machine. Tubes are held rigid in four different positions and are subjected to 20 blows at the specified maximum impact acceleration. At the end of this test, tubes will not show permanent or temporary shorts or open circuits, and are required to meet established limits for vibrational acceleration, heater-cathode leakage current, and transconductance.

Fatigue Rating:

Vibrational Acceleration . . . . 2.5 max. g

This test is performed on a sample lot of tubes from each

6201

HIGH-MU TWIN TRIODE

production run. Tubes are rigidly mounted and subjected in each of three positions to 2.5 g vibrational acceleration at 25 cycles per second for 32 hours. At the end of this test, tubes will not show permanent or temporary shorts or open circuits, and are required to meet established limits for impact acceleration, heater-cathode leakage current, and transconductance.

Low-Frequency Vibration Performance:

RMS Output Voltage. . . . . 100 max. mv

This test is performed on a sample lot of tubes from each production run under the following conditions: plate of unit No.1 tied to plate of unit No.2, grid of unit No. 1 tied to grid of unit No.2, heater volts = 12.6, dc plate volts = 250, dc grid volts = -3, plate load resistance (ohms) = 2000, and vibrational acceleration of 2.5 g at 25 cycles per second.

Heater-Cycling Life Performance:

Cycles of Intermittent Operation. . . . . 2000 min. cycles

Under the following conditions and with the heaters of unit No.1 and unit No.2 connected in parallel: heater volts = 7.5 cycled one minute on and one minute off, heater 135 volts positive with respect to cathode, and plate and grid volts = 0.

Audio-Frequency Noise and Microphonic Performance:

RMS Output Voltage. . . . . 100 max. mv

This test is performed on a sample lot of tubes from each production run under the following conditions: plate of unit No.1 tied to plate of unit No.2, grid of unit No.1 tied to grid of unit No.2, dc heater volts = 12.6, plate-supply volts = 300, cathode resistor (ohms) = 200 common to both units, and plate load resistance (ohms) = 10,000.

Shorts and Continuity Test:

This test is performed on a sample lot of tubes from each production run. In this test, a tube is considered inoperative if it shows a permanent or temporary short or open circuit, or a value of reverse grid current in excess of 1.4 microamperes under the conditions specified in the CHARACTERISTICS RANGE VALUES for reverse grid current.

1-Hour Stability Life Performance:

This test is performed on a sample lot of tubes from each production run to insure that the tubes have been properly stabilized. With both units operating, each unit is checked for variation in transconductance under conditions of maximum rated plate dissipation. At the end of 1 hour, the value of transconductance is read. The variation in transconductance from the 0-hour reading will not exceed 10 per cent.

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6201

HIGH-MU TWIN TRIODE

100-Hour Life Performance:

This test is performed on a sample lot of tubes from each production run under the conditions of maximum rated plate dissipation to insure a low percentage of early inoperatives. At the end of 100 hours, a tube is considered inoperative if it shows a permanent or temporary short or open circuit, or a value of reverse grid current in excess of 1.4 microamperes under the conditions specified in CHARACTERISTICS RANGE VALUES for reverse grid current.

500-Hour Average Life Performance:

This 500-hour test is made on a sample lot of tubes from each production run to insure high quality of the individual tube and to guard against epidemic failures of any of the characteristics indicated below. With both units operating, each unit is life tested separately at room temperature under the following conditions: heater volts = 12.6 ac or dc (series connection), plate-supply volts = 250, cathode resistor (ohms) = 200, grid-circuit resistance (megohms) = 0.5, heater 135 volts positive with respect to cathode, and bulb temperature (^{o}C) = 180. At the end of 500 hours, tube will not show permanent shorts or open circuits and will be criticized for the total number of defects in the sample lot and for the number of tubes failing to pass the established initial limits for heater current, reverse grid current, heater-cathode leakage current, and 500-hour limits for transconductance (I), transconductance change, and leakage resistance as shown under CHARACTERISTICS RANGE VALUES.

6201

HIGH-MU TWIN TRIODE

6201

OPERATING CONSIDERATIONS AS RESISTANCE-COUPLED AMPLIFIER
(Each Unit)

Plate-Supply Voltage	90			volts
Plate Load Resistor	0.1	0.24	0.51	megohm
Grid Resistor (Of following stage)	0.24	0.51	1	megohm
Cathode Resistor	2400	5300	11000	ohms
Peak Output Voltage	13	15	16	volts
Voltage Gain▲	27	28	28	
Plate-Supply Voltage	180			volts
Plate Load Resistor	0.1	0.24	0.51	megohm
Grid Resistor (Of following stage)	0.24	0.51	1	megohm
Cathode Resistor	1400	3600	7100	ohms
Peak Output Voltage	28	31	33	volts
Voltage Gain▲	33	33	32	
Plate-Supply Voltage	300			volts
Plate Load Resistor	0.1	0.24	0.51	megohm
Grid Resistor (Of following stage)	0.24	0.51	1	megohm
Cathode Resistor	1200	2900	6400	ohms
Peak Output Voltage	47	52	55	volts
Voltage Gain▲	33	34	34	

▲ At 2 volts (rms) output.

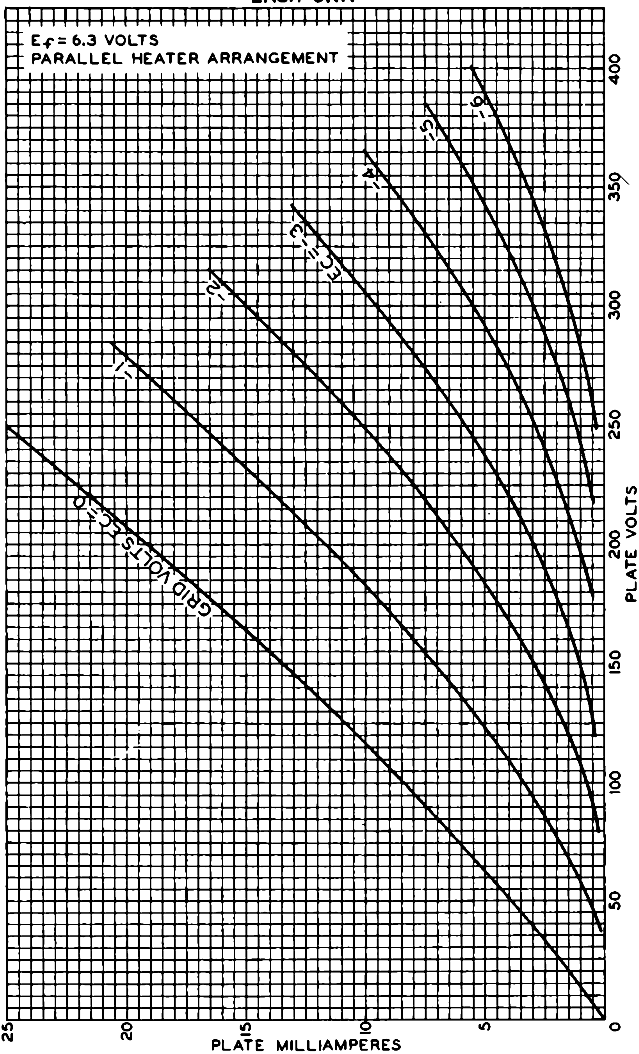
Note: Coupling capacitors should be selected to give desired frequency response. Cathode resistors should be adequately bypassed.

6201

6201

AVERAGE PLATE CHARACTERISTICS

EACH UNIT



TUBE DIVISION

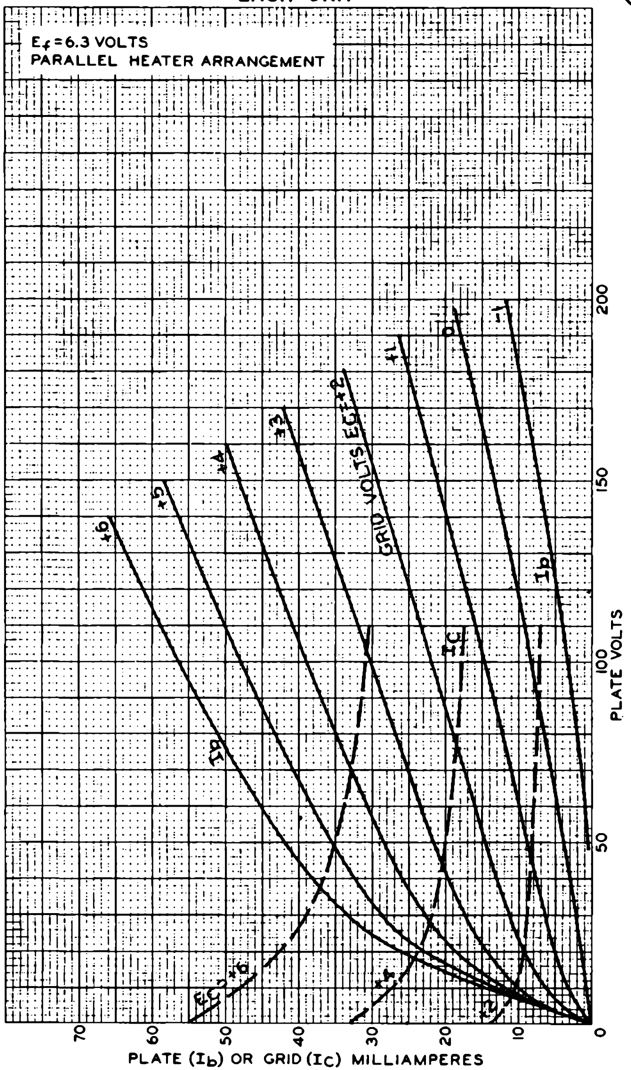
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-9020

RCA

6201

AVERAGE CHARACTERISTICS
EACH UNIT



TUBE DIVISION

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

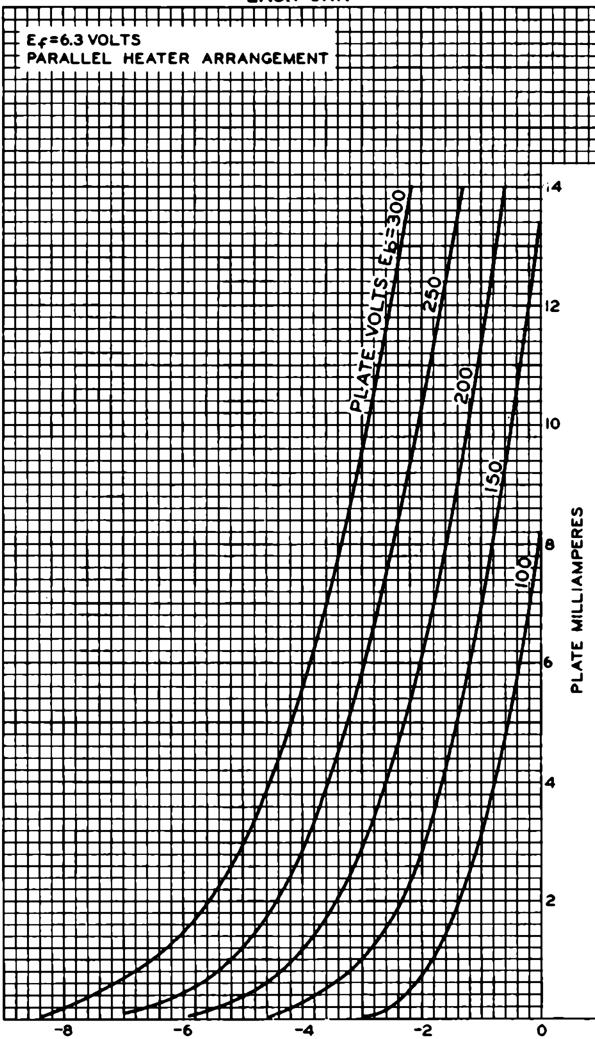
92CM-9021

6201

6201

6201

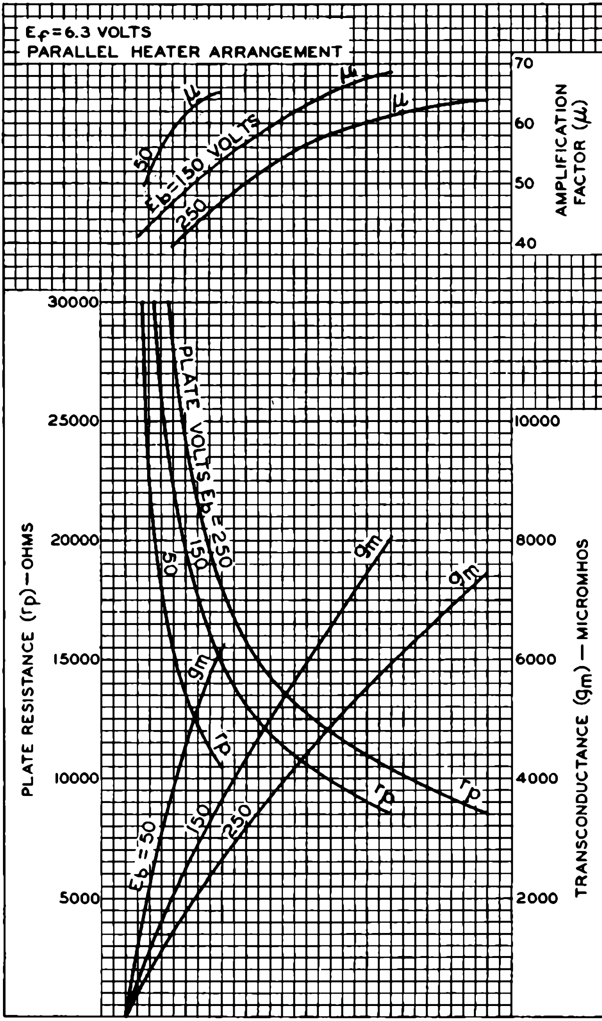
AVERAGE CHARACTERISTICS
EACH UNIT



TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-9023

6201
AVERAGE CHARACTERISTICS
EACH UNIT



6211

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MEDIUM-MU TWIN TRIODE

9-PIN MINIATURE TYPE

For "on-off" control applications involving long periods of operation under cutoff conditions

GENERAL DATA

Electrical:

Heater, Pure Tungsten, for Unipotential Cathodes:

Heater arrangement	*Series*	*Parallel*	
Voltage	12.6 ± 5%	6.3 ± 5%	ac or dc volts
Current	0.15	0.3	amp

Direct Interelectrode Capacitances:°

	Unit No.1	*Unit No.2*	
Grid to plate	2.22	2.22	μμf
Grid to cathode and heater	2.90	2.90	μμf
Plate to cathode and heater	0.54	0.46	μμf
Heater to cathode	3.25	3.25	μμf ←
Plate of unit No.1 to plate of unit No.2	0.56		μμf
Grid of unit No.1 to grid of unit No.2	0.06 max.		μμf

Characteristics, Class A$_1$ Amplifier (Each Unit):

Plate-Supply Voltage	100	volts
Cathode Resistor	470	ohms
Amplification Factor	27	
Plate Resistance (Approx.)	7500	ohms
Transconductance	3600	μmhos
Plate Current	4.6	ma
Grid Voltage (Approx.) for plate voltage of 150 volts and plate current of 100 μamp	-8	volts ←

Mechanical:

Mounting Position . . . . Vertical, base up or down, or Horizontal with pins 1 and 5 in vertical plane ←

Maximum Overall Length . . . . 2-3/16"

Maximum Seated Length . . . . 1-5/16"

Length, Base Seat to Bulb Top (Excluding tip) . 1-9/16" ± 3/32"

Maximum Diameter . . . . 7/8"

Dimensional Outline . . . . *See General Section*

Bulb T-6-1/2

Base . . . . Small-Button Noval 9-Pin (JETEC No.E9-1)

Basing Designation for BOTTOM VIEW 9A

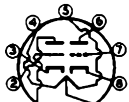
Pin 1 - Plate of Unit No.2

Pin 2 - Grid Unit No.2

Pin 3 - Cathode of Unit No.2

Pins 4 & 9 - Heater of Unit No.2

Pins 5 & 9 - Heater of Unit No.1



Pin 6 - Plate of Unit No.1

Pin 7 - Grid of Unit No.1

Pin 8 - Cathode of Unit No.1

Pin 9 - Heater Mid-Tap

° Without external shield.

← Indicates a change.

6211

6211

MEDIUM-MU TWIN TRIODE

FREQUENCY DIVIDER IN COMPUTER SERVICE and "ON-OFF" CONTROL SERVICE

Values are for Each Unit

Maximum Ratings, *Absolute Values:*

PLATE VOLTAGE	200 max.	volts
GRID VOLTAGE:		
Negative bias value	100 max.	volts
→ Positive bias value	1 max.	volt
→ DC POSITIVE GRID CURRENT	2 max.	ma
→ DC CATHODE CURRENT	16 max.	ma
PLATE DISSIPATION	1 max.	watt
→ PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	180 max.	volts
Heater positive with respect to cathode	180▲ max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)	120 max.	°C

Maximum Circuit Values:

Grid-Circuit Resistance:		
For fixed-bias operation	0.1 max.	megohm
For cathode-bias operation	0.5 max.	megohm

→ **CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN**

	Note	*Min.*	*Max.*	
Heater Current	1	0.138	0.162	amp
Plate Current (Each unit)	1,2	4.8	5.5	ma
Plate Current (Each unit)	1,3	3.6	5.6	ma
Plate Current (Each unit)	1,2,4	-	100	µamp
Transconductance	1,2,3	2700	4500	µmhos
Reverse Grid Current (Units in parallel)	1,5	-	1	µamp
Leakage Resistance (Each unit):				
Between grid and all other electrodes	1,6	100	-	megohms
Between plate and all other electrodes	1,7	100	-	megohms
Heater-Cathode Leakage Current:				
Heater negative with respect to cathode	1,8	-	20	µamp
Heater positive with respect to cathode	1,8	-	20	µamp
Difference in Grid Voltage Between Units	1,2,9	-	1	volt
Contact Potential	1,10	-	1	volt
Amplification Factor (Each unit)	1,2	23	31	

Note 1: With 12.6 volts ac or dc on heater (series arrangement).

▲ The dc component must not exceed 90 volts.

→ Indicates a change.

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6211

MEDIUM-MU TWIN TRIODE

Note 2: With plate-supply volts = 150, plate-circuit resistance (ohms) = 20,000, and grid-circuit resistance (ohms) = 47,000. Each unit tested separately. Unit not under test connected to ground.

Note 3: With plate-supply volts = 100, cathode resistor (ohms) = 470, and cathode bypass capacitor of 1000 µf. Each unit tested separately. Unit not under test connected to ground.

Note 4: With grid volts = -10.

Note 5: With plate-supply volts = 150, cathode resistor (ohms) = 470, and grid-circuit resistance (megohm) = 0.5.

Note 6: With grid 100 volts negative with respect to all other electrodes tied together.

Note 7: With plate 300 volts negative with respect to all other electrodes tied together.

Note 8: With 100 volts dc between heater and cathode and units connected in parallel.

Note 9: With grid voltage adjusted for plate current of 100 µamp.

Note 10: With plate volts = 100, grid current (µamp) = 0.1, and grid-circuit resistance (megohm) = 0.1. Each unit tested separately. Unit not under test connected to ground.

SPECIAL RATINGS & PERFORMANCE DATA

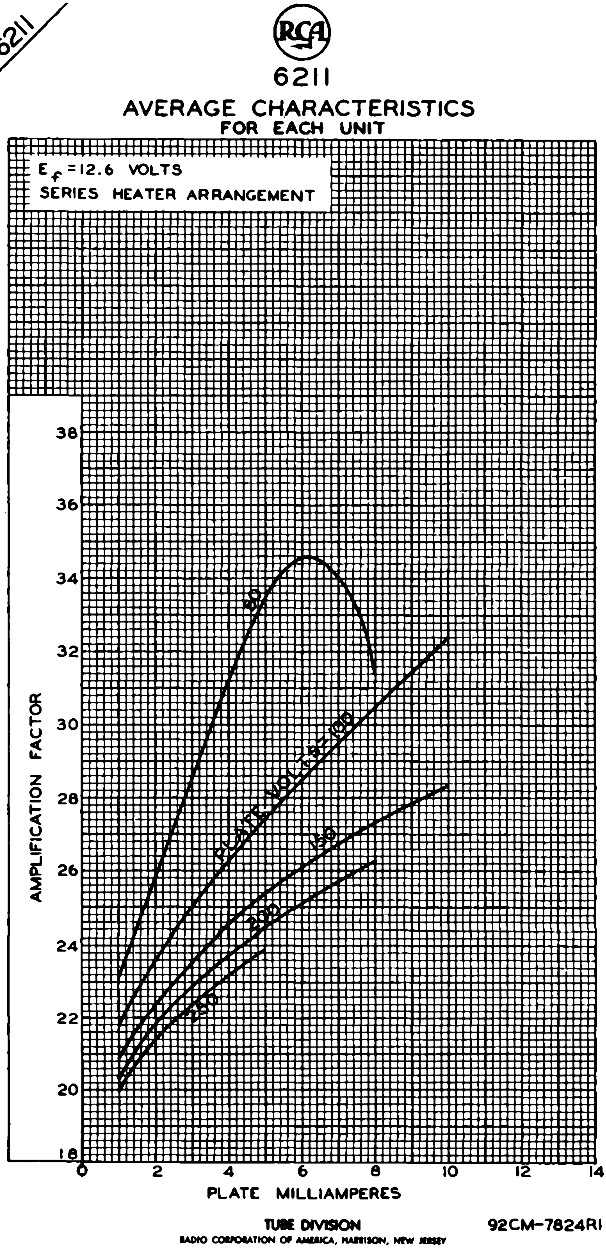
Heater-Cycling Life Performance:

Cycles of Intermittent Operation. . . . . 2000 min. cycles

For conditions: Series heater arrangement, heater volts = 17, cycled 1 minute on and 4 minutes off, heater positive with respect to cathode by +100 volts dc, plate volts = 0, and grid volts = 0.

← Indicates a change.

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY


RCA
6211
AVERAGE CHARACTERISTICS
FOR EACH UNIT
Ef = 12.6 VOLTS
SERIES HEATER ARRANGEMENT
AMPLIFICATION FACTOR
PLATE MILLIAMPERES
PLATE VOLTS = 100
50
150
200
250
18
20
22
24
26
28
30
32
34
36
38
0
2
4
6
8
10
12
14
TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY
92CM-7824R1

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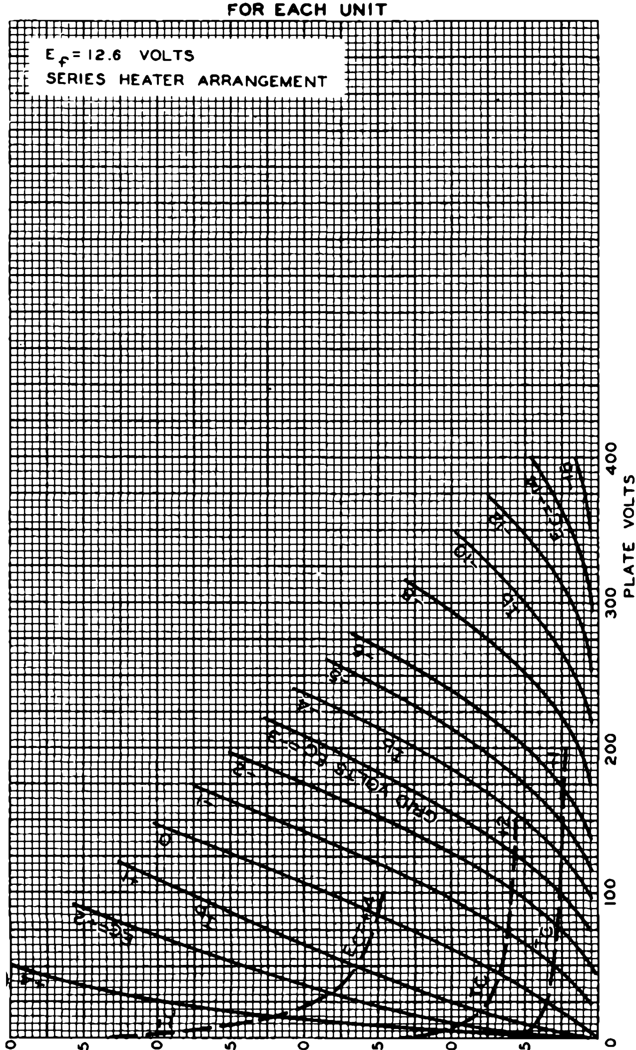
6211

AVERAGE PLATE CHARACTERISTICS
FOR EACH UNIT



JULY 9,1952 TUBE DEPARTMENT 92CM-7822

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

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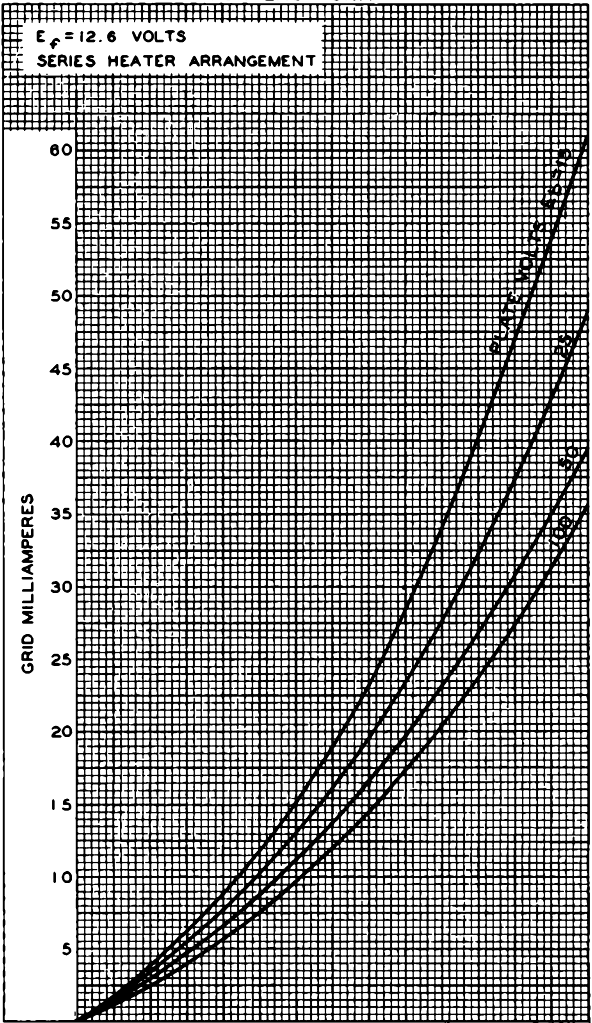
AVERAGE CHARACTERISTICS
FOR EACH UNIT



RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6263

6263

UHF MEDIUM-MU TRIODE

"PENCIL TYPE" WITH EXTERNAL PLATE RADIATOR

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage (AC or DC):			
Under Transmitting Conditions	6.0 ± 10%		volts
Under Standby Conditions	6.3 max.		volts
Current at 6.0 Volts	0.280		amp
Amplification Factor	27		
Transconductance, for dc plate current of 27 milliamperes and dc plate voltage of 200 volts	7000		μmhos

Direct Interelectrode Capacitances:

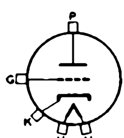
	With External Shield▲	*Without External Shield*	
Grid to Plate	1.5	1.7	μμf
Grid to Cathode	-	2.9	μμf
Plate to Cathode	-	0.08 max.	μμf

Mechanical:

Terminal Connections:

H: Heater

K: Cathode Cylinder (Adjacent to heater lead terminals)



G: Grid Flange (Between glass sections)

P: Plate Cylinder (With integral radiator)

Mounting Position . . . . Any

Dimensions and Terminal Connections . . . . See Dimensional Outline

Radiator . . . . Integral part of tube

Cooling:

In many applications, the 6263 does not require forced-air cooling. The radiator in combination with a connector having adequate heat conduction capability will generally provide adequate cooling under conditions of free circulation of air. The cooling must be sufficient to limit the plate-seal temperature to 175°C. When conditions do not provide adequate circulation of air, provision should be made to direct a blast of cooling air from a small blower through the radiator fins. The quantity of air should be sufficient to limit the plate-seal temperature to 175°C. See curves.

Incoming Air Temperature	40 max.	°C
Plate-Seal Temperature (Measured on Plate Seal).	175 max.	°C
Weight (Approx.).	24 grams (0.85 oz)	
Socket for Heater Leads . .	Cinch No.54A16325, or equivalent	

▲ A flat plate shield 1-1/4" diameter located parallel to the plane of the grid flange and midway between the grid flange and the radiator plate terminal. The shield is tied to the cathode.

6263

6263

UHF MEDIUM-MU TRIODE

RF POWER AMPLIFIER & OSCILLATOR - Class C Telegraphy

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

	CCS#	ICAS##	
Maximum Ratings, *Absolute Values:*			
*For Pressures down to 46 mm of Hg***			
DC PLATE VOLTAGE	330 max.	400 max.	volts
DC GRID VOLTAGE	-100 max.	-100 max.	volts
DC PLATE CURRENT	40 max.	55 max.	ma
DC GRID CURRENT	25 max.	25 max.	ma
DC CATHODE CURRENT	55 max.	70 max.	ma
PLATE INPUT	13 max.	22 max.	watts
PLATE DISSIPATION	8 max.	13 max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	90 max.	90 max.	volts
Heater positive with respect to cathode	90 max.	90 max.	volts
Typical Operation as Oscillator in Cathode-Drive Circuit at 500 Mc:			
DC Plate Voltage	300	350	volts
DC Grid Voltage□	-30	-35	volts
DC Plate Current	35	40	ma
DC Grid Current (Approx.)	11	14	ma
Useful Power Output (Approx.)	5●	7●	watts
Typical Operation as RF Power Amplifier in Cathode-Drive Circuit at 500 Mc:			
DC Plate Voltage	300	350	volts
DC Grid Voltage□	-48	-58	volts
DC Plate Current	35	40	ma
DC Grid Current (Approx.)	13	15	ma
Driver Power Output (Approx.)	2.2	3	watts
Useful Power Output (Approx.)	7●	10●	watts

Maximum Circuit Values (CCS or ICAS Conditions):

Grid-Circuit Resistance . . . . 0.1 max. megohm

PLATE-MODULATED RF POWER AMPLIFIER - Class C Telephony

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

	CCS#	ICAS##	
Maximum Ratings, *Absolute Values:*			
*For Pressures down to 46 mm of Hg***			
DC PLATE VOLTAGE	275 max.	300 max.	volts

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

#,##,**,□,●: See next page.

6263

UHF MEDIUM-MU TRIODE

DC GRID VOLTAGE	-100 max.	-100 max.	volts
DC PLATE CURRENT	33 max.	46 max.	ma
DC GRID CURRENT	25 max.	25 max.	ma
DC CATHODE CURRENT	50 max.	60 max.	ma
PLATE INPUT	9 max.	15 max.	watts
PLATE DISSIPATION	5.5 max.	9 max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	90 max.	90 max.	volts
Heater positive with respect to cathode	90 max.	90 max.	volts

Typical Operation in Cathode-Drive Circuit at 500 Mc:

DC Plate Voltage	275	320	volts
DC Grid Voltage□	-42	-52	volts
DC Plate Current	35	35	ma
DC Grid Current (Approx.). . . .	13	12	ma
Driver Power Output (Approx.). .	2	2.4	watts
Useful Power Output (Approx.). .	6.7●	8●	watts

Maximum Circuit Values (CCS or ICAS Conditions):

Grid-Circuit Resistance . . . . 0.1 max. megohm

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Note	*Min.*	*Max.*	
Heater Current	1	0.260	0.300	amp
Grid-to-Plate Capacitance .	-	1.45	1.95	μμf
Grid-to-Cathode Capacitance	-	2.45	3.35	μμf
Plate-to-Cathode Capacitance	-	-	0.08	μμf
Plate Current	1,2	18	36	ma
Transconductance	1,2	5600	8400	μmhos
Useful Power Output	3,4	6.5	-	watts

Note 1: With 6.0 volts ac or dc on heater.

Note 2: With dc plate voltage of 200 volts, cathode resistor of 100 ± 1% ohms, and cathode bypass capacitor of 1000 μf.

Note 3: With 5.4 volts ac or dc on heater.

Note 4: With dc plate voltage of 350 volts, grid resistor adjusted to give a dc plate current of 50 milliamperes in a cavity-type oscillator operating at 500 megacycles per second and having an efficiency of about 75 per cent.

** Corresponds to altitude of about 60000 feet.

Continuous Commercial Service.

Intermittent Commercial and Amateur Service.

□ From a grid resistor, or from a suitable combination of grid resistor and fixed supply or grid resistor and cathode resistor.

● This value of useful power is measured at load of output circuit having an efficiency of about 75 per cent.

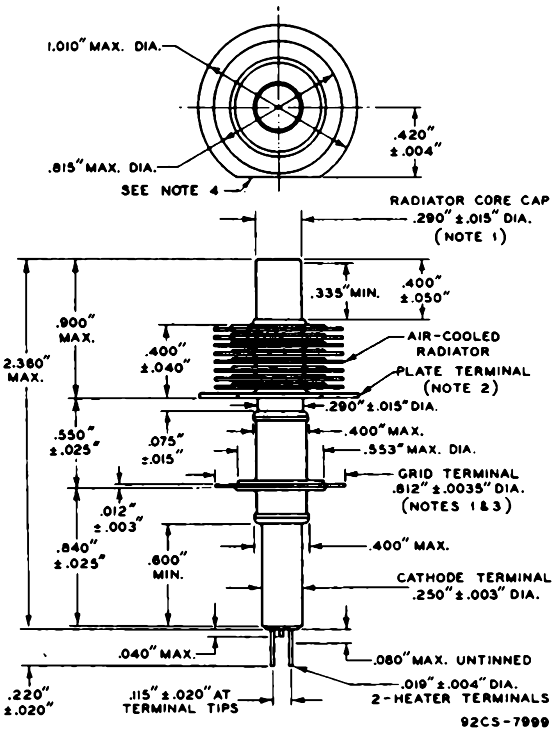
6263

6263

UHF MEDIUM-MU TRIODE

OPERATING FREQUENCY

The 6263 can be operated as an rf power amplifier and oscillator with full ratings at frequencies up to 500 megacycles per second and with reduced ratings at frequencies as high as 1700 megacycles per second.



NOTE 1: MAX. ECCENTRICITY OF ℄ (AXIS) OF RADIATOR-CORE CAP OR GRID-TERMINAL FLANGE WITH RESPECT TO THE ℄ (AXIS) OF THE CATHODE TERMINAL IS 0.015".

6263

UHF MEDIUM-MU TRIODE

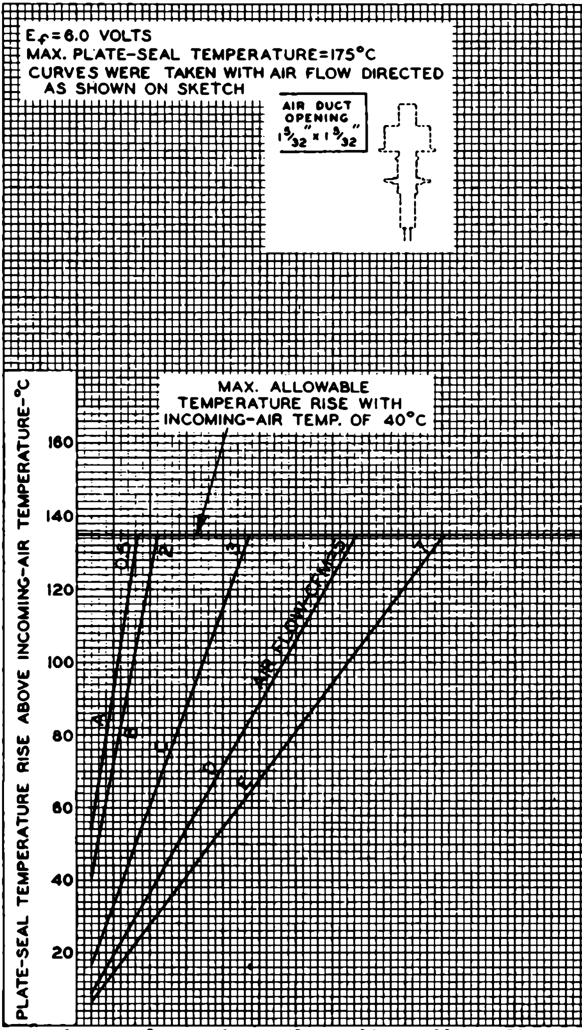
NOTE 2: TILT OF PLATE-TERMINAL FIN OF RADIATOR WITH RESPECT TO ROTATIONAL AXIS OF CATHODE CYLINDER IS DETERMINED BY CHUCKING THE CATHODE TERMINAL, ROTATING THE TUBE, AND GAUGING THE TOTAL TRAVEL DISTANCE OF THE PLATE-TERMINAL FIN PARALLEL TO THE AXIS AT A POINT APPROXIMATELY 0.020" INWARD FROM THE STRAIGHT EDGE OF THE PLATE-TERMINAL FIN FOR ONE COMPLETE ROTATION. THE TOTAL TRAVEL DISTANCE WILL NOT EXCEED 0.035".

NOTE 3: TILT OF GRID-TERMINAL FLANGE WITH RESPECT TO ROTATIONAL AXIS OF CATHODE TERMINAL IS DETERMINED BY CHUCKING THE CATHODE TERMINAL, ROTATING THE TUBE, AND GAUGING THE TOTAL TRAVEL DISTANCE OF THE GRID-TERMINAL FLANGE PARALLEL TO THE AXIS AT A POINT APPROXIMATELY 0.020" INWARD FROM ITS EDGE FOR ONE COMPLETE ROTATION. THE TOTAL TRAVEL DISTANCE WILL NOT EXCEED 0.025".

NOTE 4: THE STRAIGHT EDGE ON THE PERIMETER OF THE LARGE FIN (PLATE TERMINAL) IS PARALLEL TO A PLANE THROUGH THE CENTERS OF THE HEATER LEADS AT THEIR SEALS WITHIN 15°.

6263

COOLING REQUIREMENTS



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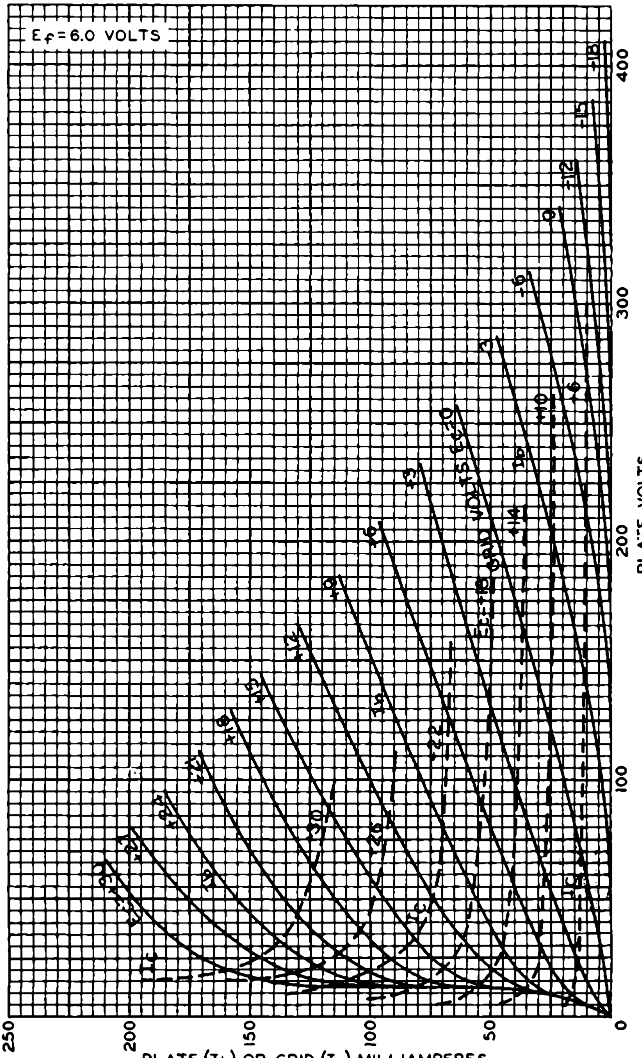
AVERAGE PLATE CHARACTERISTICS



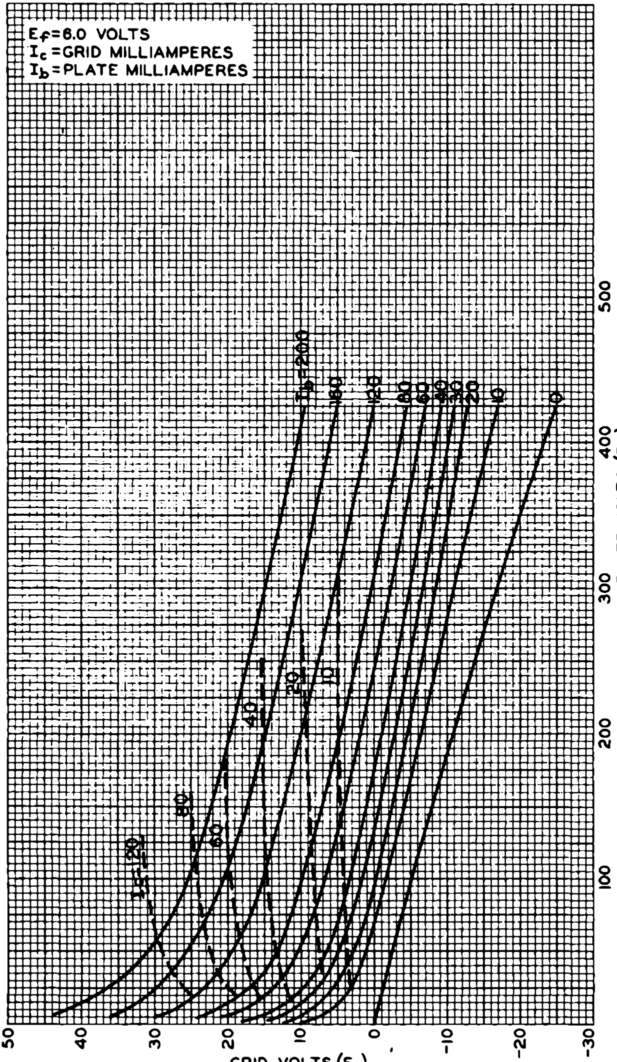
OCT.7,1953 TUBE DEPARTMENT 92CM-8103

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6263

6263

AVERAGE CONSTANT-CURRENT CHARACTERISTICS



OCT.7,1953 TUBE DEPARTMENT 92CM-8104

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6264

UHF MEDIUM-MU TRIODE

"PENCIL TYPE" WITH EXTERNAL PLATE RADIATOR

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage (AC or DC):		
Under Transmitting Conditions	6.0 ± 10%	volts
Under Standby Conditions	6.3 max.	volts
Current at 6.0 volts	0.280	amp
Amplification Factor	40	
Transconductance, for dc plate current of 18.5 milliamperes and dc plate voltage of 200 volts	6800	μmhos

Direct Interelectrode Capacitances:

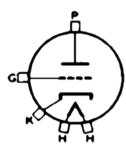
	With External Shield▲	*Without External Shield*	
Grid to Plate	1.5	1.75	μμf
Grid to Cathode	-	2.95	μμf
Plate to Cathode	-	0.07 max.	μμf

Mechanical:

Terminal Connections:

H: Heater

K: Cathode Cylinder (Adjacent to heater-lead terminals)



G: Grid Flange (Between glass sections)

P: Plate Cylinder (With integral radiator)

Mounting Position . . . . Any

Dimensions and Terminal Connections . . . . See Dimensional Outline

Radiator . . . . Integral part of tube

Cooling:

In many applications, the 6264 does not require forced-air cooling. The radiator in combination with a connector having adequate heat conduction capability will generally provide adequate cooling under conditions of free circulation of air. The cooling must be sufficient to limit the plate-seal temperature to 175°C. When conditions do not provide adequate circulation of air, provision should be made to direct a blast of cooling air from a small blower through the radiator fins. The quantity of air should be sufficient to limit the plate-seal temperature to 175°C. See curves.

Incoming Air Temperature	40 max.	°C
Plate-Seal Temperature (Measured on Plate Seal)	175 max.	°C
Weight (Approx.)	24 grams (0.85 oz)	
Socket for Heater Leads . .	Cinch No.54A16325, or equivalent	

▲ A flat plate shield 1-1/4" diameter located parallel to the plane of the grid flange and midway between the grid flange and the radiator plate terminal. The shield is tied to the cathode.

6264

6264

UHF MEDIUM-MU TRIODE

RF POWER AMPLIFIER AND OSCILLATOR--Class C Telegraphy

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

	CCS#	ICAS##	
Maximum Ratings, *Absolute Values:*			
*For Pressures Down to 46 mm of Hg***			
DC PLATE VOLTAGE	330 max.	400 max.	volts
DC GRID VOLTAGE	-100 max.	-100 max.	volts
DC PLATE CURRENT	40 max.	50 max.	ma
DC GRID CURRENT	25 max.	25 max.	ma
DC CATHODE CURRENT	55 max.	70 max.	ma
PLATE INPUT	13 max.	22 max.	watts
PLATE DISSIPATION	8 max.	13 max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	90 max.	90 max.	volts
Heater positive with respect to cathode	90 max.	90 max.	volts

Typical Operation as Oscillator in Cathode-Drive Circuit at 500 Mc:

	CCS	ICAS	
DC Plate Voltage	300	350	volts
DC Grid Voltage†	-25	-30	volts
DC Plate Current	35	35	ma
DC Grid Current (Approx.)	11	13	ma
Useful Power Output (Approx.)	5●	6●	watts

Typical Operation as RF Power Amplifier in Cathode-Drive Circuit at 500 Mc:

	CCS	ICAS	
DC Plate Voltage	300	350	volts
DC Grid Voltage†	-42	-45	volts
DC Plate Current	35	40	ma
DC Grid Current (Approx.)	13	15	ma
Driver Power Output (Approx.)	2.4	3	watts
Useful Power Output (Approx.)	7.5●	10●	watts

Maximum Circuit Values (CCS or ICAS Conditions):

Grid-Circuit Resistance . . . . 0.1 max. megohm

FREQUENCY MULTIPLIER

	CCS#	ICAS##	
Maximum Ratings, *Absolute Values:*			
*For Pressures Down to 46 mm of Hg***			
DC PLATE VOLTAGE	300 max.	350 max.	volts

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

#,##,**,†,●: See next page.

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6264

6264

UHF MEDIUM-MU TRIODE

DC GRID VOLTAGE	-125 max.	-140 max.	volts
DC PLATE CURRENT	33 max.	45 max.	ma
DC GRID CURRENT	15 max.	15 max.	ma
DC CATHODE CURRENT	45 max.	55 max.	ma
PLATE INPUT	9.9 max.	15.8 max.	watts
PLATE DISSIPATION	6 max.	9.5 max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode . . .	90 max.	90 max.	volts
Heater positive with respect to cathode . . .	90 max.	90 max.	volts

Typical Operation as Tripler to 510 Mc in Cathode-Drive Circuit:

DC Plate Voltage	300	350	volts
DC Grid Voltage†	-110	-122	volts
DC Plate Current	26	36.5	ma
DC Grid Current (Approx.) . . .	4.1	5.8	ma
Driver Power Output (Approx.) .	2.75	4.5	watts
Useful Power Output (Approx.) .	2.1●	3.4●	watts

Maximum Circuit Values (CCS or ICAS Conditions):

Grid-Circuit Resistance . . . . 0.1 max. megohm

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Note	*Min.*	*Max.*	
Heater Current	1	0.260	0.300	ma
Grid-to-Plate Capacitance . .	-	1.50	2.0	$\mu\mu$f
Grid-to-Cathode Capacitance .	-	2.50	3.40	$\mu\mu$f
Plate-to-Cathode Capacitance	-	-	0.07	$\mu\mu$f
Plate Current	1,2	13	24	ma
Transconductance	1,2	5400	8200	μmhos
Useful Power Output	3,4	6.5	-	watts

Note 1: With 6.0 volts ac or dc on heater.

Note 2: With dc plate voltage of 200 volts, cathode resistor of 100 ± 1% ohms, and cathode bypass capacitor of 1000 μf.

Note 3: With 5.4 volts ac or dc on heater.

Note 4: With plate voltage of 350 volts, grid resistor adjusted to give a dc plate current of 50 milliamperes in a cavity-type oscillator operating at 500 megacycles per second and having an efficiency of about 75 per cent.

* Corresponds to altitude of about 60000 feet.

\# Continuous Commercial Service.

\## Intermittent Commercial and Amateur Service.

● This value of useful power is measured at load of output circuit having an efficiency of about 75 per cent.

† From a grid resistor, or from a suitable combination of grid resistor and fixed supply or grid resistor and cathode resistor.

6264

UHF MEDIUM-MU TRIODE

Outline Drawing and
Cooling-Requirement Curves for the 6264
are the same as shown for Type 6263

OPERATING FREQUENCY

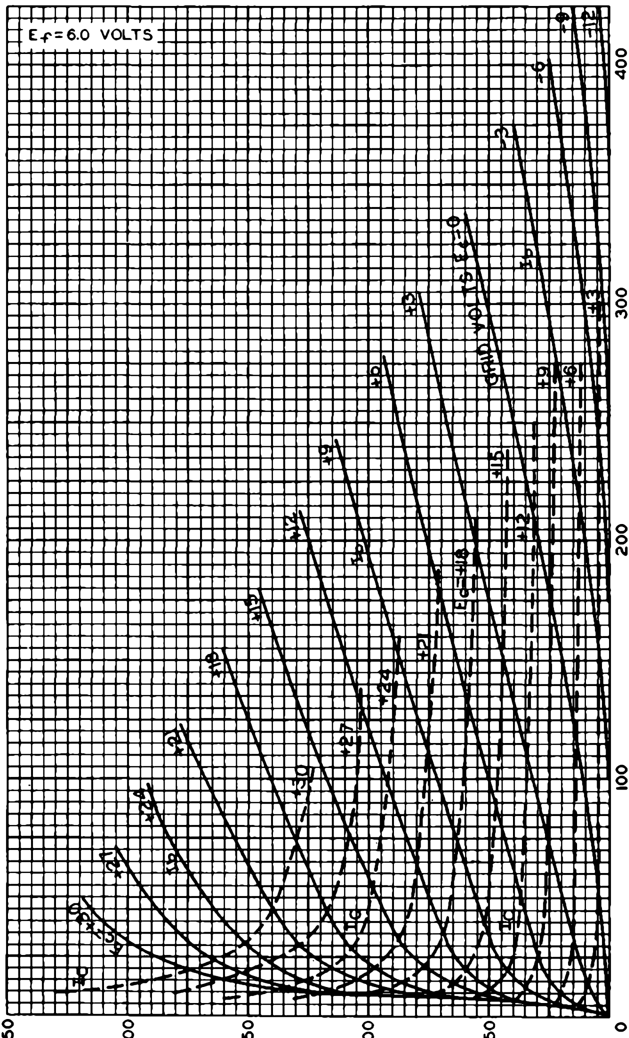
The 6264 can be operated as a frequency multiplier and as an rf power amplifier and oscillator with full ratings at frequencies up to 500 megacycles per second and with reduced ratings at frequencies as high as 1700 megacycles per second.

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6264

6264

AVERAGE PLATE CHARACTERISTICS



OCT. 8, 1953

TUBE DEPARTMENT

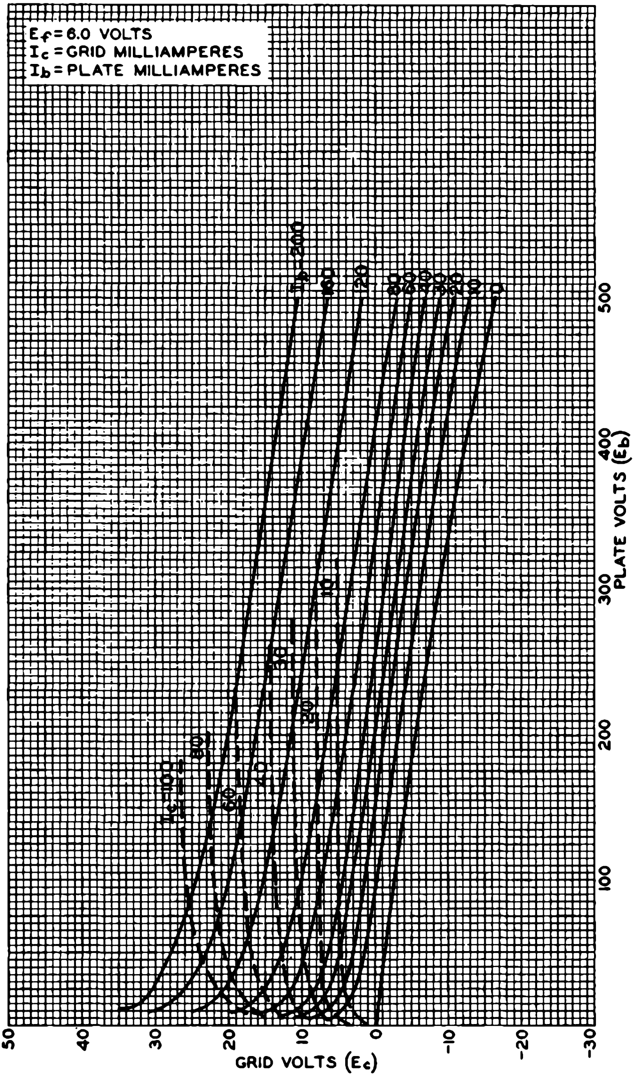
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-8105

6264

6264

AVERAGE CONSTANT-CURRENT CHARACTERISTICS



OCT. 8, 1953

TUBE DEPARTMENT

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-8106

6521
MAGNETRON

FORCED-AIR COOLED

Fixed Frequency: 5400 ± 20 Mc

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

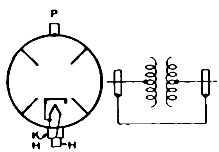
Voltage	10 ± 10%	. . . ac or dc volts
Current	3.2	. . . . amp

Starting current: The maximum instantaneous starting current must never exceed 12 amperes, even momentarily.

Minimum Cathode Heating Time	5	minutes
Frequency	5400 ± 20	Mc
Maximum Frequency Pulling at VSWR of 1.5/1	10	Mc
Maximum Frequency Change with Anode Temperature Change (After warmup)	0.15	Mc/°C

Mechanical:

Dimensions and Terminal Connections: *See Dimensional Outline*



H – Heater
K – Cathode
P – Anode

Connector (For heater terminal and heater-cathode terminal) . . . Ucinite* No. 115364 with built-in capacitor, or equivalent

Mounting Position . . . . Any

Air Flow:

To Pins—An air stream should be directed along the cooling fins toward the body of the tube. The stream may be obtained from a rectangular nozzle about 3" x 1-1/2" located so that the plane through the 3" side is parallel with the plane of a cooling fin and so that the nozzle is centered on the body of the tube. Adequate flow should be provided so that the temperature of the anode block does not exceed 150°C.

To Heater-Cathode Terminal—Adequate flow should be provided to maintain the temperature of the heater-cathode terminal below 165°C.

Weight (Approx.) . . . . 11-1/2 lbs

PULSED OSCILLATOR SERVICE

Maximum and Minimum Ratings, ***Absolute Values:***

For Duty Cycle of 0.001 max.

PEAK ANODE VOLTAGE	16 max.	kv
PEAK ANODE CURRENT	16 max.	amp
	10 min.	amp
PEAK POWER INPUT●	256 max.	kw

* Manufactured by Ucinite Division of United-Carr Fastener Corporation, Newtonville 60, Massachusetts.

● For atmospheric pressures greater than 40 centimeters of mercury at 25°C. Operation at pressures lower than 40 centimeters of mercury (altitudes higher than 16000 feet) may result in arcover with consequent damage to the tube.

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6521

6521
MAGNETRON

AVERAGE POWER INPUT	0.256	max.	kw
PULSE DURATION	2.2	max.	μsec
OPERATION TIME IN ANY 100-MICROSECOND INTERVAL	5	max.	μsec
RATE OF RISE OF VOLTAGE PULSE	120	max.	kv/μsec
	80	min.	kv/μsec
ANODE BLOCK TEMPERATURE	150	max.	°C
HEATER-CATHODE TERMINAL TEMPERATURE	165	max.	°C
LOAD VOLTAGE STANDING-WAVE RATIO	1.5	max.	

Typical Operation▲ with Load Voltage Standing-Wave Ratio Equal To or Less Than 1.05

With Duty Cycle of 0.0008

Heater Voltage	*See Operating Considerations*	
Magnetic Field	Supplied by permanent magnet integral with tube	
Peak Anode Voltage (Approx.)	15	kv
Peak Anode Current	13.5	amp
Pulse Repetition Rate	400	cps
Pulse Duration	2	μsec
Maximum RF Bandwidth	1.5	Mc
Peak Power Output	85	kw

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Note	*Min.*	*Max.*	
Heater Current	1	2.8	3.6	amp
Peak Anode Voltage	2	14	16	kv
Peak Power Output	2,3	75	-	kw
Pulses Missing From Total	2,4	-	0.25	%

Note 1: With 10.0 volts ac on heater.

Note 2: With peak anode current of 13.5 amperes, and heater voltage reduced to 9.1 volts.

Note 3: With peak anode voltage of approximately 15 kilovolts, anode block temperature of approximately 100°C, and maximum VSWR equal to or less than 1.05.

Note 4: Pulses are considered to be missing if the energy level at the operating frequency is less than 70 per cent of the normal value at a VSWR of 1.5, and with VSWR phase adjusted to produce maximum instability.

OPERATING CONSIDERATIONS

The *waveguide output flange* is designed for use with a standard 1" x 2" rectangular waveguide such as that designated by RETMA as WR 187, or that having the JAN designation RG-49/U, and mates with flanges such as Airtron■ No.B54626 or equivalent.

▲ It is essential that the input circuit be designed so that if arcing occurs the energy per pulse delivered to the tube cannot greatly exceed the normal energy per pulse. To satisfy this requirement, it is recommended that pulsers of the discharging-network type be used.

■ Manufactured by Airtron, Inc., Linden, N. J.

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6521

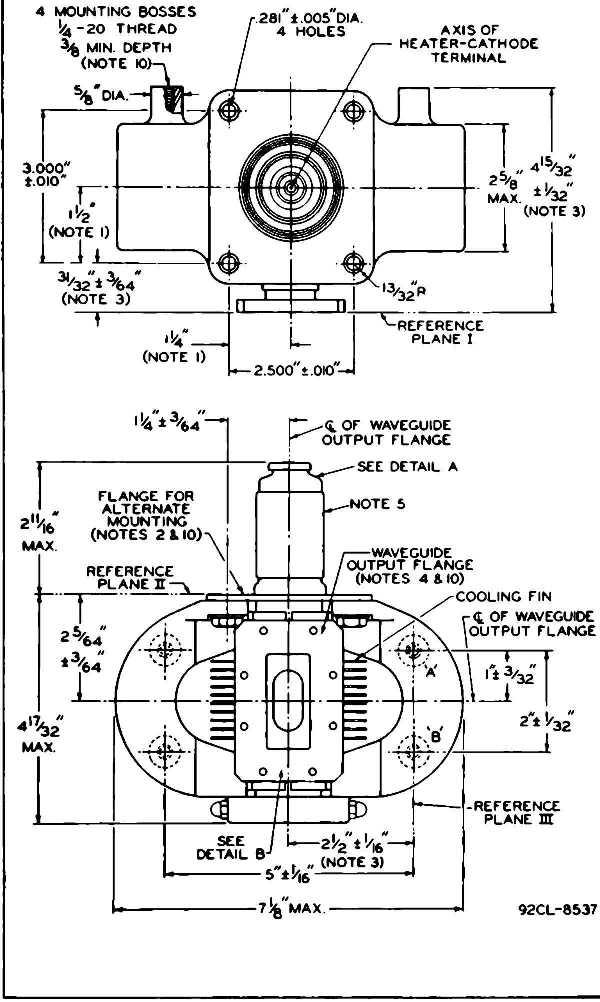
MAGNETRON

As soon as the 6521 begins to oscillate, the *heater voltage* should be reduced to 9.1 volts when it is operated under the typical operating conditions shown in the tabulated data. For other operating conditions, the heater voltage (E_f) should be reduced depending on the average power input (P_i) to the tube as follows:

P_i (watts)	E_f (volts)
up to 90	10.0
90 to 130	9.9
130 to 180	9.5
180 to 220	9.1
220 to 256	8.9

RCA

6521
MAGNETRON



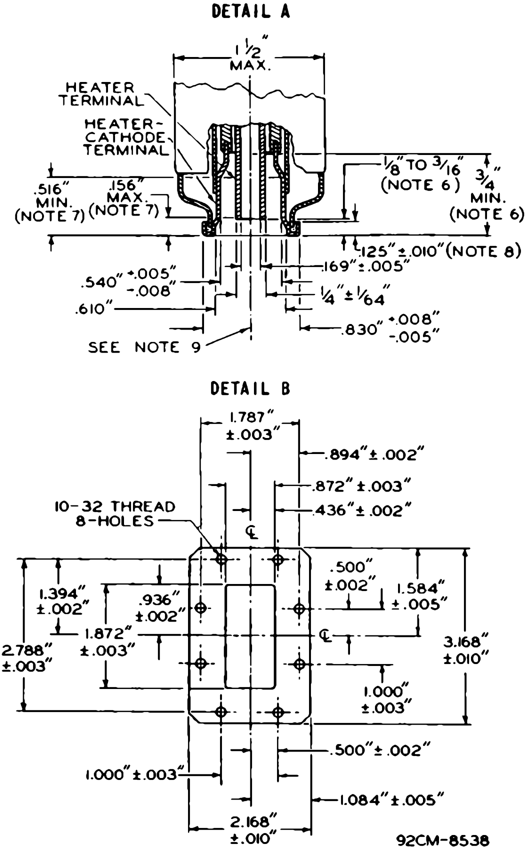
MAY 1, 1955 CE-8537A

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6521

6521

MAGNETRON



Reference plane *I* is defined as that plane against which the waveguide output flange abuts.

Reference plane *II* is defined as that plane perpendicular to reference plane *I* and touching the surface of the flange for alternate mounting.

Reference plane *III* is defined as that plane perpendicular to reference plane *I* and passing through the exact centers of holes 'A' and 'B'.

6521

MAGNETRON

NOTE 1: The axis of the heater-cathode terminal will be within the confines of a cylinder whose radius is 3/64" and whose axis is perpendicular to reference plane *II* at the specified location.

NOTE 2: When resting on a smooth surface, this flange surface shall have a flatness such that a 0.050" thickness gauge 1/8" wide shall not enter between the two surfaces, and it shall be perpendicular to reference plane *I* within $\pm 2^{o}$.

NOTE 3: The tolerances include angular as well as lateral deviations.

NOTE 4: With the waveguide output flange resting on a plane surface, a 0.005" thickness gauge 1/8" wide shall not enter between the two surfaces.

NOTE 5: No part of the tube support fastened to the flange for alternate mounting should extend within the surface of a cylinder whose radius is 3/4" and whose axis is perpendicular to reference plane *II* at the specified location.

NOTE 6: These dimensions define extremities of the 0.169" internal diameter of the cylindrical heater terminal.

NOTE 7: These dimensions define extremities of the 0.540" internal diameter of the cylindrical heater-cathode terminal.

NOTE 8: No part of the connector device for the heater and heater-cathode terminals should bear against the underside of this lip.

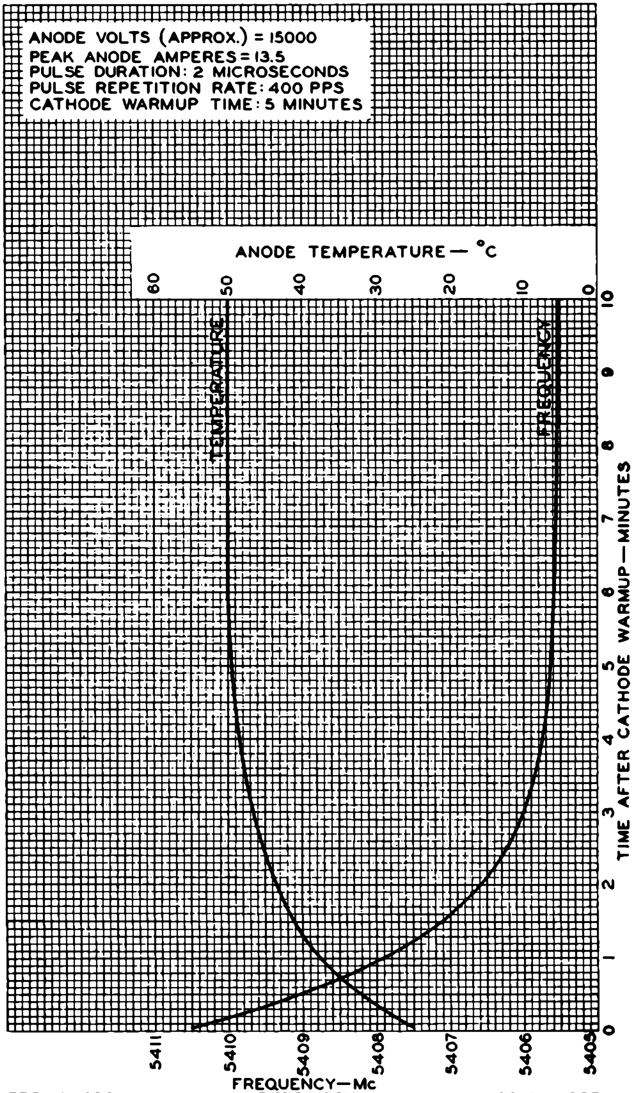
NOTE 9: The heater terminal and heater-cathode terminal are concentric within 0.010".

NOTE 10: Connection to the anode may be made through the mounting bosses, the flange for alternate mounting, or the waveguide output flange.

6521

6521

TYPICAL STABILIZATION CHARACTERISTICS



FEB. 4, 1955

TUBE DIVISION

92CM-8527

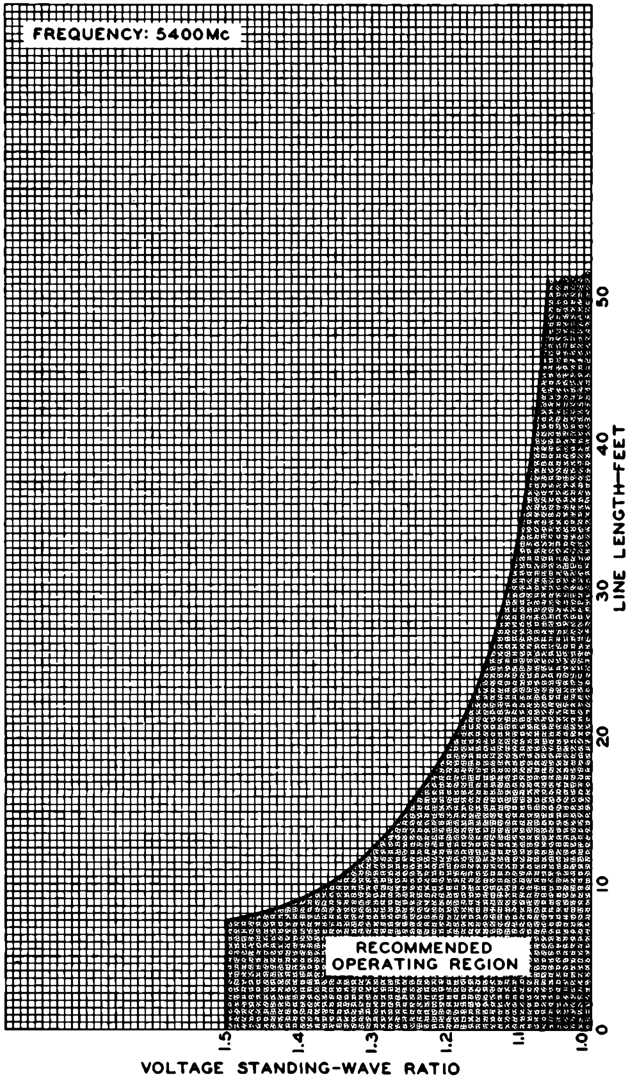
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6521

RCA

6521

OPERATING REGION



FEB. 4, 1955

TUBE DIVISION

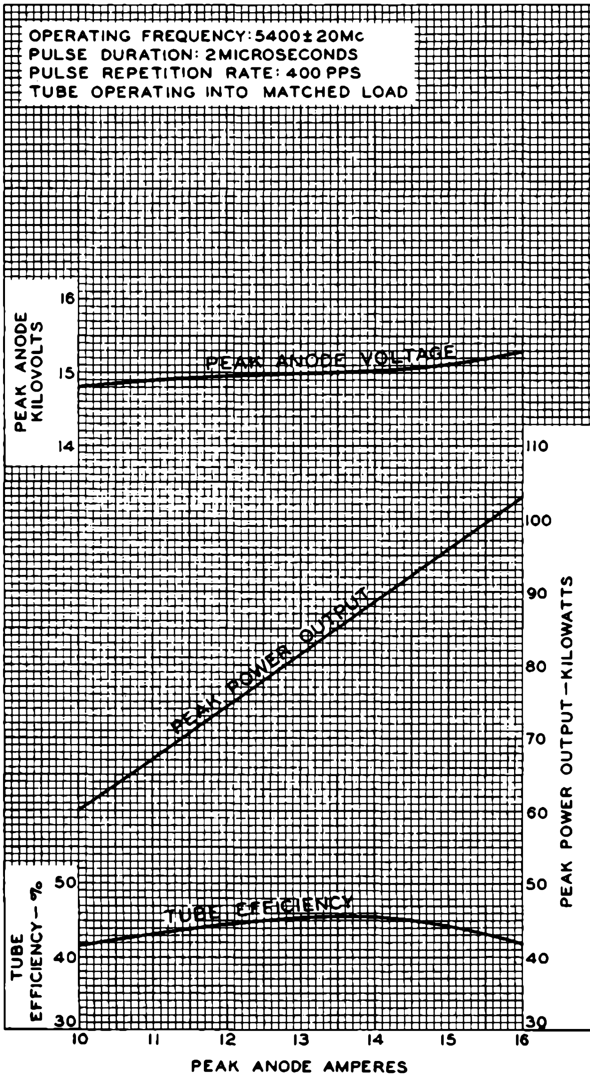
92CM-8528

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6521

6521

PERFORMANCE CHART



FEB. 8, 1955

TUBE DIVISION

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-8533

6562

FIXED-TUNED OSCILLATOR TRIODE

"PENCIL TYPE" WITH INTEGRAL RESONATORS

For radiosonde service at 1680 Mc

GENERAL DATA

Electrical:

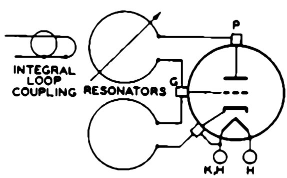
Heater, for Unipotential Cathode:		
Voltage range*	5.2 to 6.6	ac or dc volts
Current at 6.0 volts	0.160	amp
Frequency (Approx.)	1680	Mc
Frequency Adjustment Range	±12▲	Mc
RF Coaxial Output Terminal:		
Characteristic impedance (Approx.)	50	ohms

Mechanical:

Mounting Position	Any
Dimensions	*See Dimensional Outline*
Resonators (Two)	Integral Part of Tube

Terminal Connections *(See Dimensional Outline)*:

H - Heater
K - Cathode



G - Grid
P - Plate

FIXED-TUNED OSCILLATOR SERVICE

Maximum Ratings, *Absolute Values:*

DC PLATE VOLTAGE	120 max.	volts
DC PLATE CURRENT	34 max.	ma
DC GRID CURRENT	8 max.	ma
PLATE INPUT	4 max.	watts
PLATE DISSIPATION	3.6 max.	watts
PEAK HEATER-CATHODE VOLTAGE	0 max.	volts
AMBIENT-TEMPERATURE RANGE	-55 to +75	°C

Operating Frequency Drift:

Maximum Frequency Drift:		
For heater voltage range of 5.2 to 6.6 volts, plate voltage range of 95 to 117 volts, and ambient-temperature range of +22° to -40°C	+4 to -1	Mc

* This range of heater voltage is for radiosonde applications in which the heater is supplied from batteries and in which the equipment design requirements of minimum size, light weight, and high efficiency are the primary considerations even though the average life expectancy of the 6562 in such service is only a few hours.

▲ As supplied, tubes are adjusted to 1680 ± 4 megacycles.

6562

6562

FIXED-TUNED OSCILLATOR TRIODE

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Note	*Min.*	*Av.*	*Max.*	
Heater Current.	1	0.135	0.148	0.157	amp
Power Output.	2,4	-	600	-	mw
Power Output.	3,4	300	-	-	mw

Note 1: With 5.2 volts ac on heater.

Note 2: With ac heater voltage of 6.6 volts, dc plate voltage of 117 volts, frequency of 1680 megacycles per second and grid resistor chosen within the range of 1300 to 1800 ohms. The choice of grid resistor should be such that for any individual tube, the dc plate current must not exceed 34 milliamperes, and when this value of grid resistor is used in the test of Note 3, a minimum power output of 300 milliwatts is obtained.

Note 3: With ac heater voltage of 5.2 volts, dc plate voltage of 95 volts, frequency of 1680 megacycles per second, and grid resistor chosen within the range of 1300 to 1800 ohms. The choice of grid resistor to give a minimum power output of 300 milliwatts for any individual tube must be such that when this same resistor value is used in the test of Note 2 the dc plate current will not exceed 34 milliamperes.

Note 4: Measured with a coaxial-type load having an impedance of approximately 50 ohms and adjusted for a maximum voltage standing-wave ratio of 1.1.

OPERATING CONSIDERATIONS

The *flexible heater leads* of the 6562 are usually soldered to the circuit elements. Soldering of these connections should not be made closer than 3/4" from the end of the tube (excluding cathode tab). If this precaution is not followed, the heat of the soldering operation may crack the glass seals of the leads and damage the tube. Under no circumstances should any of the electrodes be soldered to the circuit elements. Connections to the electrodes should be made by spring contact only.

The 6562 should be supported by a suitable clamp around the metal shell either above or below the frequency-adjustment screw. It is essential, however, that the pressure exerted on the shell by the clamp be held to a minimum because excessive pressure can distort the resonators and result in a change of frequency.

The *plate connection* should have a flexible lead which will accomodate variations in the relative position of the plate terminal in individual tubes.

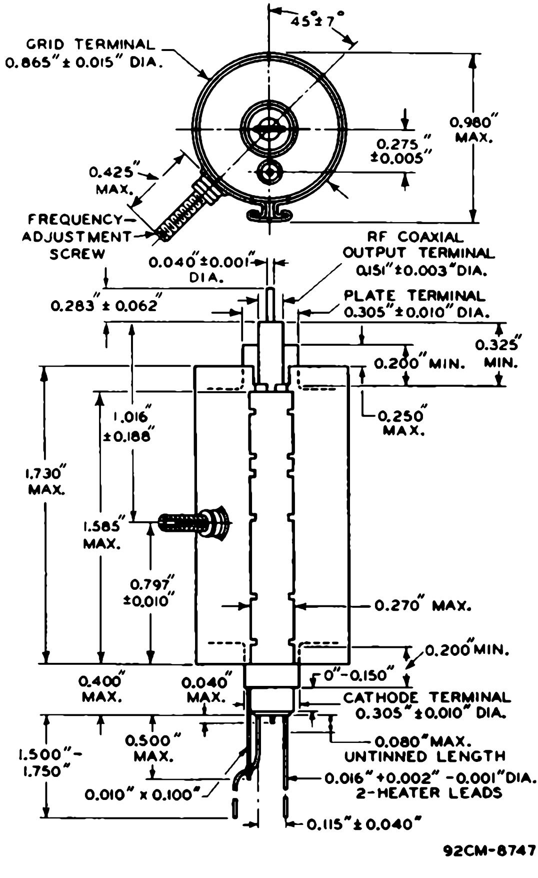
The 6562 may be mechanically tuned by adjustment of the frequency-adjustment screw located on the metal shell of the tube. A clockwise rotation of the frequency-adjustment screw will decrease the frequency, while a counterclockwise rotation will increase the frequency. The range of adjustment provided by the screw is ±12 megacycles.

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

RCA

6562

FIXED-TUNED OSCILLATOR TRIODE



TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

RCA

6861

TRAVELING-WAVE TUBE

LOW-NOISE AMPLIFIER TYPE

Useful over frequency range of 2700 to 3500 Mc

6861

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage	5	ac or dc volts
Current at 5 volts	0.65	amp

Starting current: The maximum instantaneous starting current must never exceed 4 amperes, even momentarily.

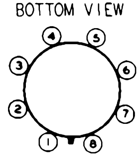
Minimum Cathode Heating Time	1	minute
Frequency Range	2700 to 3500	Mc
Cold Insertion Loss	80	db

Mechanical:

Mounting Position	Any
Maximum Overall Length	19-3/8"
Metal-Shell Diameter	1.375" ± 0.005"
Weight (Approx.)	1-1/2 lbs
Collector-Terminal Connector	Birnbach No.406 Banana Jack
RF Connectors:	
Input terminal	Type N UG-18/U Plug
Output terminal	Type N UG-18/U Plug
Base	Octal 8-Pin

BOTTOM VIEW

Pin 1 - Grid No.1
Pin 2 - No Connection
Pin 3 - Helix
Pin 4 - Grid No.4



Pin 5 - Grid No.3
Pin 6 - Grid No.2
Pin 7 - Heater
Pin 8 - Heater, Cathode

Maximum and Minimum Ratings, *Absolute Values:*

DC COLLECTOR VOLTAGE	500 max.	volts
DC HELIX VOLTAGE	500 max.	volts
DC GRID-No.4 VOLTAGE	500 max.	volts
DC GRID-No.3 VOLTAGE	300 max.	volts
DC GRID-No.2 VOLTAGE	75 max.	volts
DC GRID-No.1 VOLTAGE	20 max.	volts
DC COLLECTOR CURRENT	1000 max.	µamp
DC HELIX CURRENT	10 max.▲	µamp
MAGNETIC FIELD STRENGTH	400 min.●	gausses
PEAK RF POWER INPUT	250 max.	watts
AVERAGE RF POWER INPUT	1 max.	watt
METAL-SHELL TEMPERATURE (At hottest point)	175 max.	°C

▲ During alignment of the tube in the magnetic-focusing field, the helix current may exceed this value for short periods, but should never exceed 50 µamp.

● This value of field strength will focus the electron beam, but noise figure will not be optimum.

RCA

6861

TRAVELING-WAVE TUBE

Typical Operation at 3100 Mc:

DC Collector Voltage	400	volts
DC Helix Voltage	375	volts
DC Grid-No.4 Voltage	200	volts
DC Grid-No.3 Voltage	40	volts
DC Grid-No.2 Voltage (Approx.)	20	volts
DC Grid-No.1 Voltage	0	volts
DC Collector Current	150	μamp
DC Helix Current	0.5	μamp
DC Grid-No.4 Current, DC Grid-No.3 Current, DC Grid-No.2 Current, DC Grid-No.1 Current	each less than 1	μamp
Magnetic Field Strength†	525 ± 5%	gausses
Gain (Low level)	25	db
Power Output (Saturated)	1.0	mw
Noise Figure	6.5	db

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Note	*Min.*	*Max.*	
Heater Current	1	0.45	0.85	amp
Input VSWR (Non-operating)	2	-	1.7	
Output VSWR (Non-operating)	2	-	2.0	
DC Helix Voltage	3	350	390	volts
DC Grid-No.4 Voltage	3	160	250	volts
DC Grid-No.3 Voltage	3	30	50	volts
Saturated Power Output	3	0.25	-	mw
Gain	3	20	-	db
Noise Figure	3	-	7.0	db

Note 1: With heater voltage of 5.0 volts.

Note 2: Measured at specified connector over the frequency range of 2700 to 3500 Mc.

Note 3: Adjusted for optimum noise figure with a magnetic field of 525 gausses, signal frequency of 3100 Mc, and heater voltage of 5 volts.

OPERATING CONSIDERATIONS

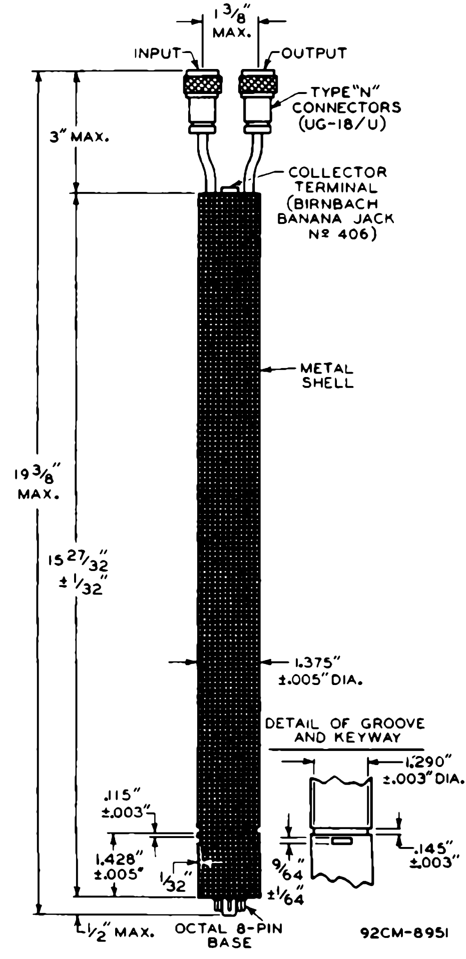
The *magnetic field* required for focusing the electron beam of the 6861 may be obtained from a solenoid or permanent magnet capable of providing a uniform field of 525 gausses over the length of the tube axis starting 2 inches from the groove near the base end of the metal shell and continuing for at least 9 inches along the tube axis.

† For RCA Solenoid, Developmental No. J-2006.

6861

6861

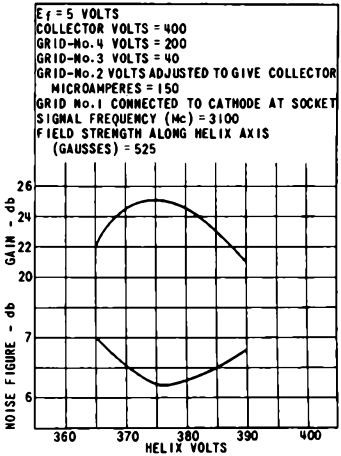
TRAVELING-WAVE TUBE



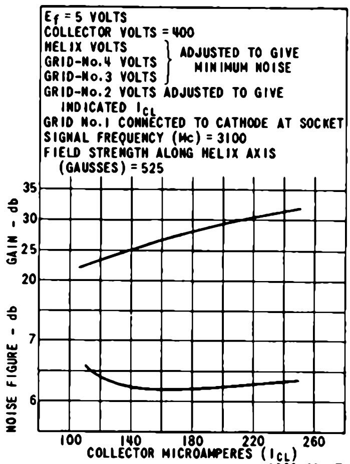
TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6861

NOISE-FIGURE CHARACTERISTICS



92CS-8965T



92CS-8968T

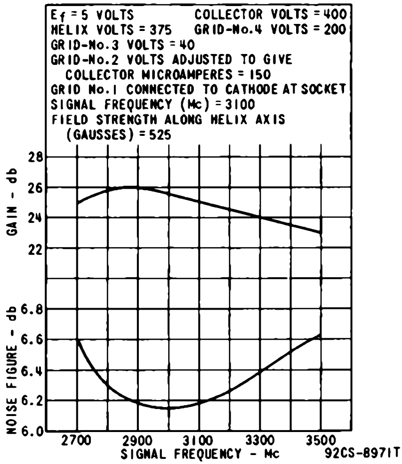
RCA

6861

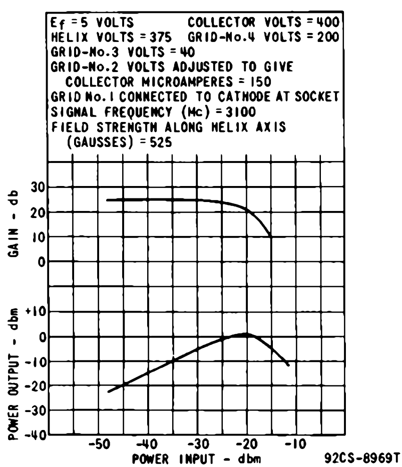
6861

TRAVELING-WAVE TUBE

NOISE-FIGURE CHARACTERISTICS



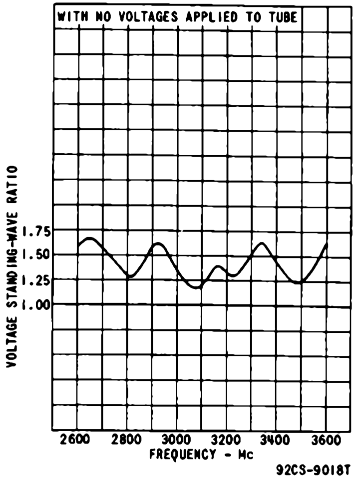
SATURATION CHARACTERISTICS



6861

6861

INPUT-MATCHING CHARACTERISTIC



TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

8013-A

HALF-WAVE VACUUM RECTIFIER

GENERAL DATA

Electrical:

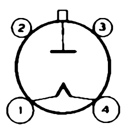
Filament, Thoriated Tungsten:

	Min.	*Av.*	*Max.*	
Voltage	2.37	2.50	2.63	ac volts
Current at 2.50 volts . . .	4.7	5.0	5.3	amp

Mechanical:

Mounting Position . . Any, preferably vertical with base down
Maximum Overall Length. . . . . 6-1/16"
Seated Length . . . . 5-9/32" ± 5/32"
Maximum Diameter. . . . . 2-1/16"
Weight (Approx.). . . . . 2.9 oz
Bulb. ST-16
Cap . . . . Skirted Medium with Rolled Edge (JETEC No. C1-19)
Base. . . . . Medium-Shell Small 4-Pin (JETEC No. A4-9)
Basing Designation for BOTTOM VIEW. 4P

Pin 1 - Filament
Pin 2 - No Connection
Pin 3 - No Connection



Pin 4 - Filament
Cap - Plate

HALF-WAVE RECTIFIER

Maximum Ratings, *Absolute Values:*

PEAK PLATE VOLTAGE:			
Forward	40000▲	max.	volts
Inverse	40000▲	max.	volts
PLATE CURRENT:			
Peak.	150	max.	ma
Average	20	max.	ma
Fault	500	max.	ma
PLATE DISSIPATION	12	max.	watts

OPERATING CONSIDERATIONS

Filament and *plate voltage* may be applied simultaneously to the 8013-A.

The *bulb* of the 8013-A should be cleaned regularly. Accumulation of dust or other foreign matter on the bulb will cause leakage and, as a result, probably tube failure.

X-rays are produced during normal operation of the 8013-A. These rays can constitute a health hazard unless the tube is adequately shielded for X-ray radiation. Although relatively simple shielding should prove adequate, make sure it provides the required protection to the operator.

▲This value may be increased to 55000 volts when the 8013-A is immersed in oil.

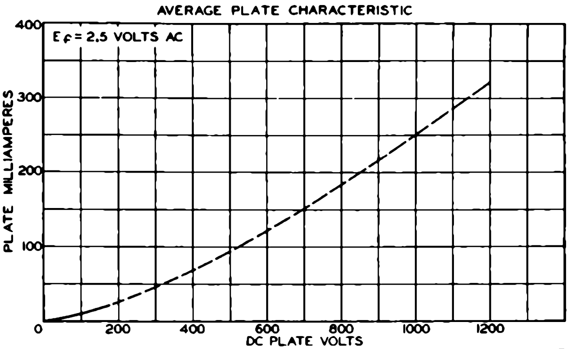
← Indicates a change.

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

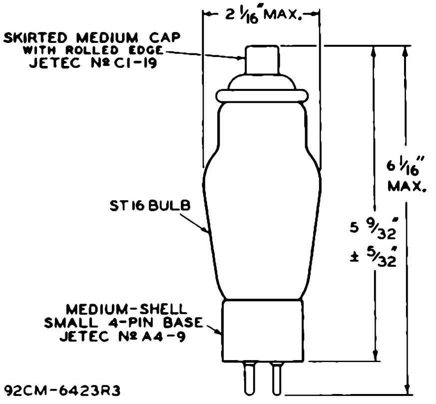
RCA

8013-A

HALF-WAVE VACUUM RECTIFIER



92CM-6344T



92CM-6423R3

8020

8020

HALF-WAVE HIGH-VACUUM RECTIFIER

DATA

Electrical:

Filament, Thoriated Tungsten:

Voltage	5	volts
Current	5.5 - 6.5	amp

Direct Interelectrode Capacitance:

Anode to Filament	1.4	μμf
Tube Voltage Drop at 100 ma.	200	volts

Mechanical:

Mounting Position	Vertical, Base Down
Overall Length	7-1/2" ± 1/2"
Maximum Diameter	2-5/16"
Bulb	T-18
Cap	Medium
Base	Medium 4-Pin, Bayonet

RECTIFIER SERVICE

Maximum Ratings, Absolute Values:

PEAK INVERSE ANODE VOLTAGE	40000 max.	volts
PEAK ANODE CURRENT	750 max.	ma.
AVERAGE ANODE CURRENT	100 max.	ma.

SURGE - LIMITING DIODE SERVICE

Maximum Ratings, Absolute Values:

FILAMENT VOLTAGE	5.8 max.	volts
PEAK FORWARD ANODE VOLTAGE	12500 max.	volts
AVERAGE ANODE DISSIPATION	75 max.	watts

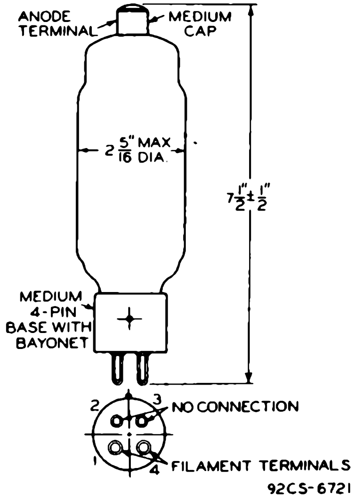
Typical Operation:

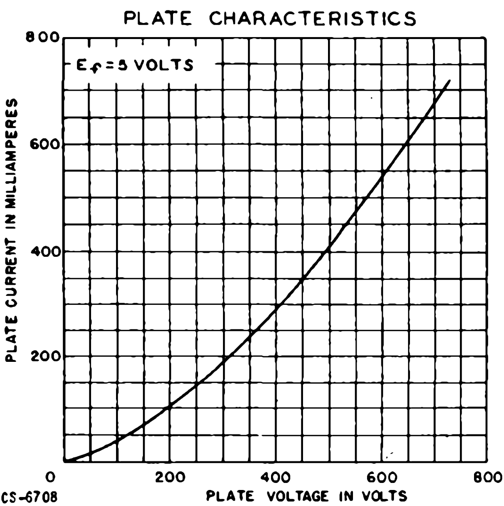
Filament Voltage	5.5	volts
Peak Forward Anode Voltage	10000	volts
Minimum Peak Anode Current	2	amp

8020

8020

HALF-WAVE HIGH-VACUUM RECTIFIER





9001

RCA

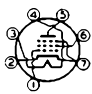
9001

DETECTOR AMPLIFIER PENTODE

MIDGET TYPE

Heater ■	Coated Unipotential Cathode	
Voltage	6.3	a-c or d-c volts
Current	0.15	amp.
Direct Interelectrode Capacitances:		
Grid to Plate	0.01 max.	μμf
Input	3.6	μμf
Output	3.0	μμf
Maximum Overall Length		1-13/16"
Maximum Seated Height		1-9/16"
Length from Base Seat to Bulb Top (excluding tip)		1-3/16" ± 3/32"* ←
Maximum Diameter		3/4"
Bulb		T-5-1/2
Base▲		Miniature Button 7-Pin

Pin 1 - Grid
Pin 2 - Cathode
Pin 3 - Heater
Pin 4 - Heater



Pin 5 - Plate
Pin 6 - Screen
Pin 7 - Cathode, Grid No. 3, Internal Shield

BOTTOM VIEW

RCA Socket	Stock No. 9914 ←
Mounting Position	Any

Maximum and Minimum Ratings Are Design-Center Values

AMPLIFIER

Plate Voltage	250 max.	volts
Screen Voltage	100 max.	volts
Grid Voltage	-3 min.	volts
Plate Dissipation	0.5	watt ←
Screen Dissipation	0.1	watt ←

Typical Operation and Characteristics - Class A_1 Amplifier:

Plate Voltage	90	250	volts
Screen Voltage	90	100	volts
Grid Voltage	-3	-3	volts
Plate Resistance	1.0	●	approx. megohm
Transconductance	1100	1400	μmhos
Plate Current	1.2	2.0	ma.
Screen Current	0.5	0.7	ma.

Typical Operation as Mixer in Superheterodyne Circuit:

Plate Voltage	100	250	volts
Screen Voltage	100	100	volts
Grid Voltage #	-5	-5	approx. volts
Conversion Transconductance	-	550	approx. μmhos

Shielding and *r-f by-passing* of each r-f amplifier stage may be required in order to prevent interstage coupling and to provide the shortest possible circuit returns when the tube is operated at the ultra-high frequencies. R-f by-passing can be accomplished by the use of small condensers having short leads placed close to the tube terminals. It may also be advisable in some applications to supplement the action of the by-pass condensers by r-f chokes close to the condensers in the return or supply leads for the grid, screen,

■, ▲, ●, #: See next page.

*Temporary minimum length = 1-1/16".

← Indicates a change.

OCT. 1, 1943 DATA

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

9001

DETECTOR AMPLIFIER PENTODE

(continued from preceding page)

plate and heater. The 9001 has two cathode leads in order that the plate and screen r-f circuits may be completed with a minimum of circuit inductance in common with the grid circuit. The grid return may be connected to one cathode terminal and the plate and screen returns may be connected to the other cathode terminal.

■ The cathode of the 9001, when operated from a transformer, should preferably be connected to the heater circuit. In the case of d-c operation of the heater from a storage battery, the cathode circuit is tied in either directly or through bias resistors to the negative battery terminal. In circuits where the cathode is not directly connected to the heater, the potential difference between heater and cathode should be kept as low as possible.

● Greater than 1.0 megohm.

The grid bias is minimum for an oscillator peak voltage of 4 volts. These values are optimum.

▲ *The center hole in sockets designed for this base provides for the possibility that this tube type may be manufactured with the exhaust-tube tip at the base end. For this reason, it is recommended that in equipment employing this tube type, no material be permitted to obstruct the socket hole..*

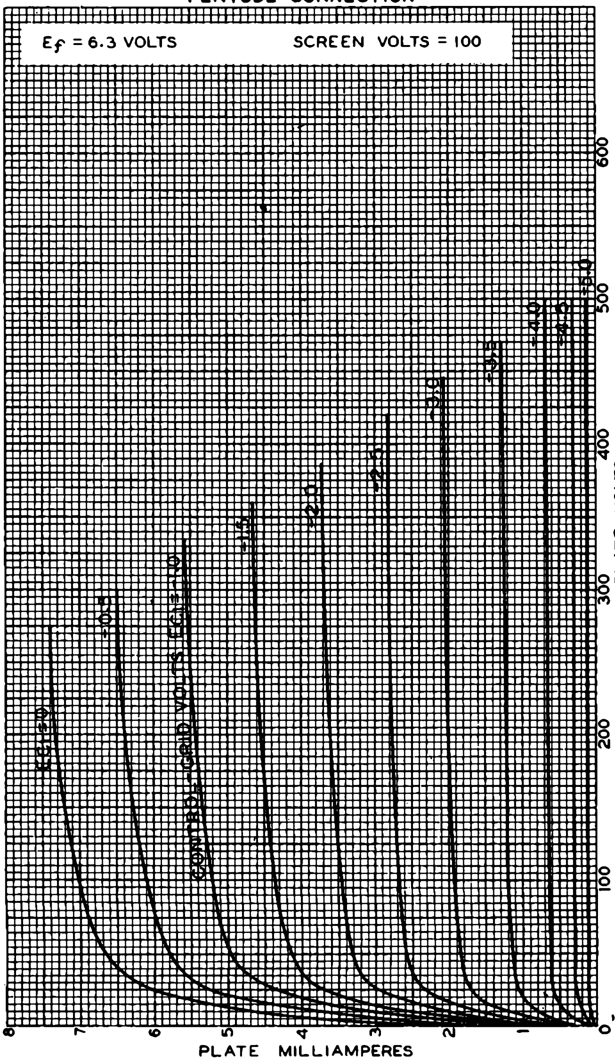
RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

9001

RCA

9001

AVERAGE PLATE CHARACTERISTICS
PENTODE CONNECTION



MAY 22, 1941

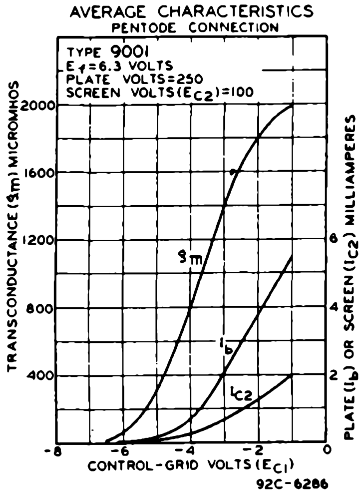
RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

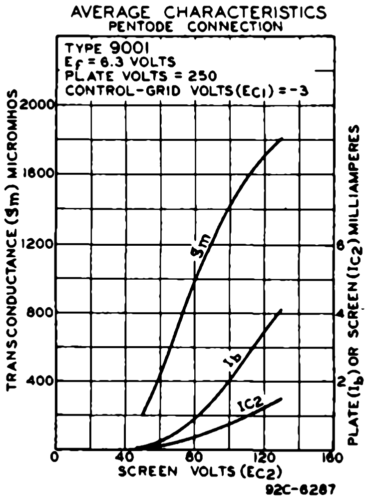
92C-6291

9001

9001

DETECTOR AMPLIFIER PENTODE





July 1, 1941

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

92C-6286
92C-6287

9002

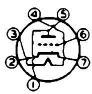
9002

DETECTOR, AMPLIFIER, OSCILLATOR

MIDGET TYPE

Heater ■	Coated Unipotential Cathode	●
Voltage	6.3	a-c or d-c volts
Current	0.15	amp.
Direct Interelectrode Capacitances:		
Grid to Plate	1.4	μμf
Grid to Cathode	1.2	μμf
Plate to Cathode	1.1	μμf
Maximum Overall Length		1-13/16"
Maximum Seated Height		1-9/16"
Length from Base Seat to Bulb Top (excluding tip)		1-3/16" ± 3/32"*
Maximum Diameter		3/4"
Bulb		T-5-1/2
Base ▲		Miniature Button 7-Pin

Pin 1 - Plate
Pin 2 - Cathode
Pin 3 - Heater
Pin 4 - Heater



Pin 5 - Plate
Pin 6 - Grid
Pin 7 - Cathode

RCA Socket		Stock No. 9914
Mounting Position	BOTTOM VIEW	Any

Maximum Ratings Are Design-Center Values

AMPLIFIER

Plate Voltage	250 max. volts
Plate Dissipation	1.6 max. watts

Typical Operation and Characteristics - Class A_1 Amplifier:

Plate	90	135	180	250	volts
Grid	-2.5	-3.75	-5	-7	volts
Amp. Fact.	25	25	25	25	
Plate Res.	14700	13200	12500	11400	ohms
Transcond.	1700	1900	2000	2200	μmhos
Plate Cur.	2.5	3.5	4.5	6.3	ma.

■ The cathode of the 9002, when operated from a transformer, should preferably be connected to the heater circuit. In the case of d-c operation of the heater from a storage battery, the cathode circuit is tied in either directly or through bias resistors to the negative battery terminal. In circuits where the cathode is not directly connected to the heater, the potential difference between heater and cathode should be kept as low as possible.

▲ *The center hole in sockets designed for this base provides for the possibility that this tube type may be manufactured with the exhaust-tube tip at the base end. For this reason, it is recommended that in equipment employing this tube type, no material be permitted to obstruct the socket hole.*

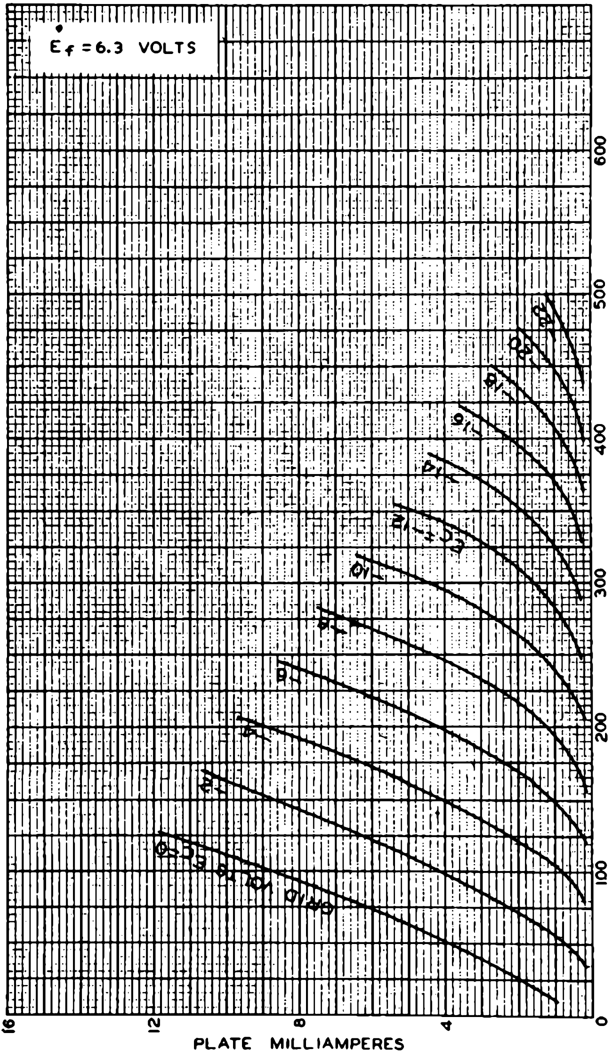
*Temporary minimum length = 1-1/16".

← Indicates a change.

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

9002

AVERAGE PLATE CHARACTERISTICS



SEPT. 17, 1943

RCA VICTOR DIVISION

RADIO CORPORATION OF AMERICA HARRISON, NEW JERSEY

92C-6284

9003

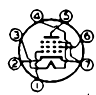
9003

SUPER-CONTROL R-F AMPLIFIER PENTODE

MIDGET TYPE

Heater	Coated Unipotential Cathode	
Voltage	6.3	a-c or d-c volts
Current	0.15	amp.
Direct Interelectrode Capacitances:		
Grid to Plate	0.01 max.	μμf
Input	3.4	μμf
Output	3.0	μμf
Maximum Overall Length		1-13/16"
Maximum Seated Height		1-9/16"
Length from Base Seat to Bulb Top (excluding tip)		1-3/16" ± 3/32"* ←
Maximum Diameter		3/4"
Bulb		T-5-1/2
Base▲		Miniature Button 7-Pin

Pin 1 - Grid
Pin 2 - Cathode
Pin 3 - Heater
Pin 4 - Heater



BOTTOM VIEW

Pin 5 - Plate
Pin 6 - Screen
Pin 7 - Cathode, Grid No. 3, Internal Shield

RCA Socket		Stock No. 9914 ←
Mounting Position		Any

Maximum and Minimum Ratings Are Design-Center Values

AMPLIFIER

Plate Voltage	250 max.	volts
Screen Voltage	100 max.	volts
Grid Voltage	-3 min.	volts
Plate Dissipation	1.7 max.	watts ←
Screen Dissipation	0.3 max.	watt ←

Typical Operation and Characteristics - Class A_1 Amplifier:

Plate Voltage	250	volts
Screen Voltage	100	volts
Grid Voltage	-3	volts
Plate Resistance	0.7 approx.	megohm
Transconductance	1800	μmhos
Grid Bias for Transcond. of 15 μmhos	-35	volts
Grid Bias for Transcond. of 2 μmhos	-45	volts
Plate Current	6.7	ma.
Screen Current	2.7	ma.

Typical Operation as Mixer in Superheterodyne Circuit:

Plate Voltage	100	250	volts
Screen Voltage	100	100	volts
Grid Voltage #	-10	-10 approx.	volts
Conversion Transconductance	-	600 approx.	μmhos

The grid bias is minimum for an oscillator peak voltage of 9 volts. These values are optimum.

▲ *The center hole in sockets designed for this base provides for the possibility that this tube type may be manufactured with the exhaust-tube tip at the base end. For this reason, it is recommended that in equipment employing this tube type, no material be permitted to obstruct the socket hole.*

Shielding Considerations & Heater-Cathode Connections for the 9003 are the same as for Type 9001.

← Indicates a change.

*Temporary minimum length = 1-1/16".

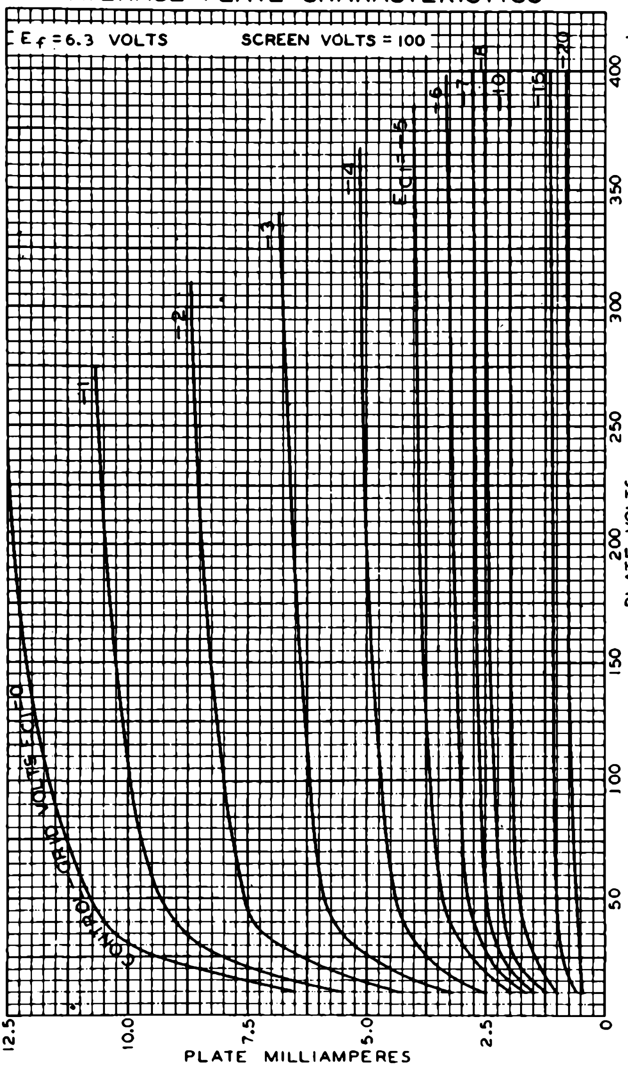
RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

9003

RCA

9003

AVERAGE PLATE CHARACTERISTICS



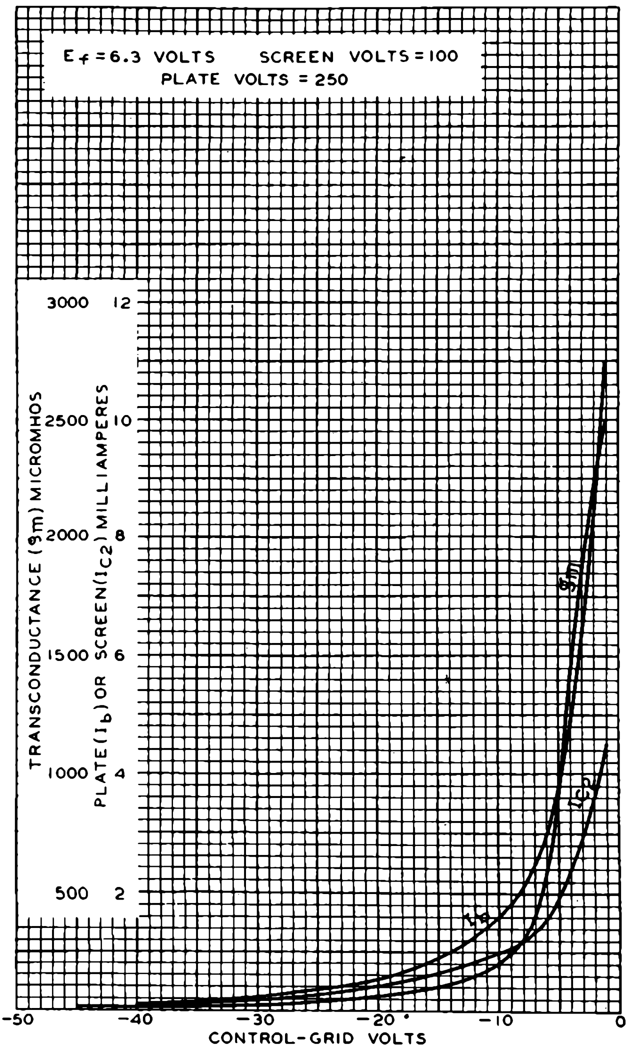
SEPT. 17, 1943 — RCA VICTOR DIVISION — 92C-6288

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

RCA

9003

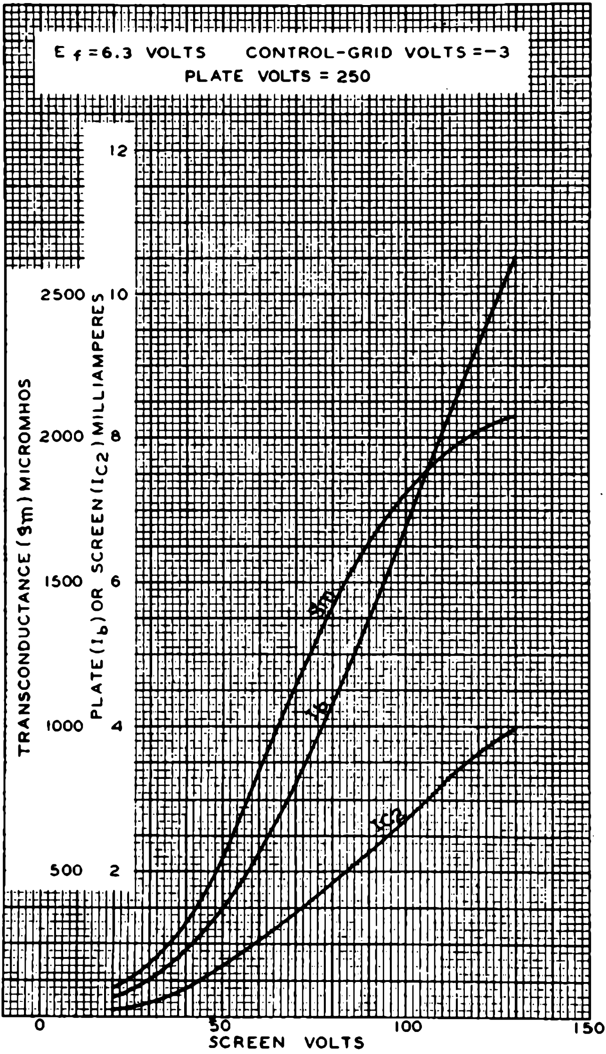
AVERAGE CHARACTERISTICS



9003

9003

AVERAGE CHARACTERISTICS



MAY 29, 1941

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

92C-6290

9004

9004

U-H-F DIODE

ACORN TYPE

Heater	Coated Unipotential Cathode	
Voltage	6.3	a-c or d-c volts
Current	0.15	amp.
Direct Interelectrode Capacitances:°		
Plate to Cathode	1.3	μμf
Plate to Heater	0.3 approx.	μμf
Heater to Cathode	2.2 approx.	μμf
Overall Length		1-7/32" ± 5/32"
Overall Diameter		1-3/32" ± 1/16"
Bulb		T-4½
RCA Socket		Stock No.9925
Mounting Position		Any

Maximum Ratings Are Design-Center Values

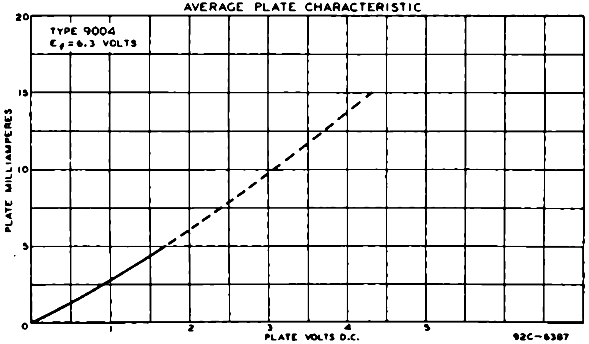
RECTIFIER

A-C Plate Voltage (RMS)	117 max. volts
D-C Output Current	5 max. ma.

The resonant frequency of the 9004 is approximately 850 Mc

°With no external shield.

AVERAGE PLATE CHARACTERISTIC



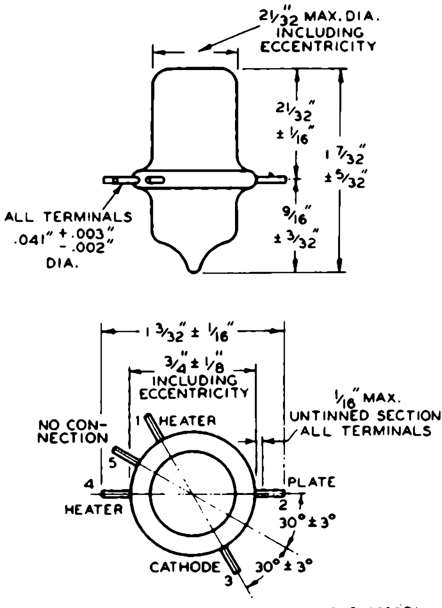
Dec. 1, 1942

TENTATIVE DATA

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

9004

U-H-F DIODE



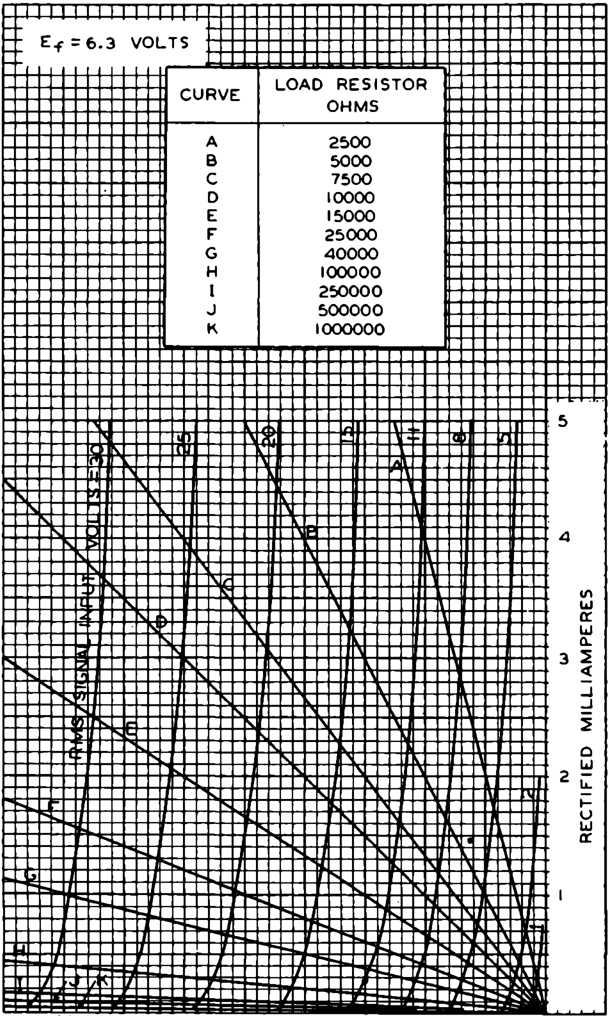
BOTTOM VIEW

→ Indicates a change.

9004

9004

AVERAGE CHARACTERISTICS



CURVE	LOAD RESISTOR OHMS
A	2500
B	5000
C	7500
D	10000
E	15000
F	25000
G	40000
H	100000
I	250000
J	500000
K	1000000

D-C VOLTS DEVELOPED BY DIODE

9005

9005

U-H-F DIODE

ACORN TYPE

Heater	Coated Unipotential Cathode	
Voltage	3.6	a-c or d-c volts
Current	0.165	amp.
Direct Interelectrode Capacitances:°		
Plate to Cathode	0.8	μμf
Plate to Heater	0.2 approx.	μμf
Heater to Cathode	1.1 approx.	μμf
Overall Length		1-7/32" ±5/32"
Overall Diameter		1-3/32" ±1/16"
Bulb		T-4½
RCA Socket		Stock No.9925
Mounting Position		Any

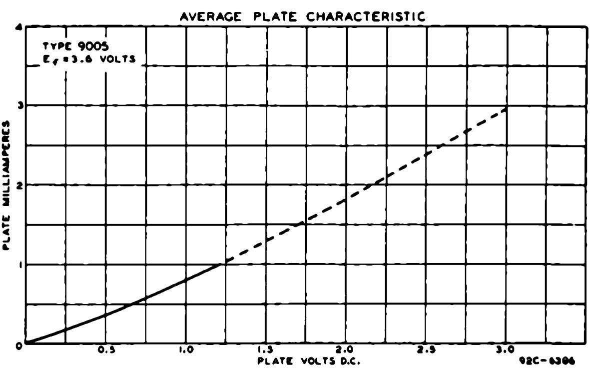
Maximum Ratings are Design-Center Values

RECTIFIER

A-C Plate Voltage (RMS)	117 max. volts
D-C Output Current	1.0 max. ma.

The resonant frequency of the 9005 is approximately 1500 Mc.

°With no external shield.



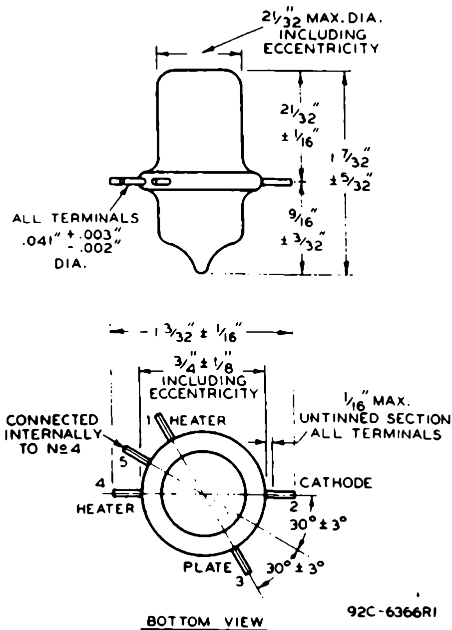
Dec. 1, 1942

TENTATIVE DATA

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

9005

U-H-F DIODE

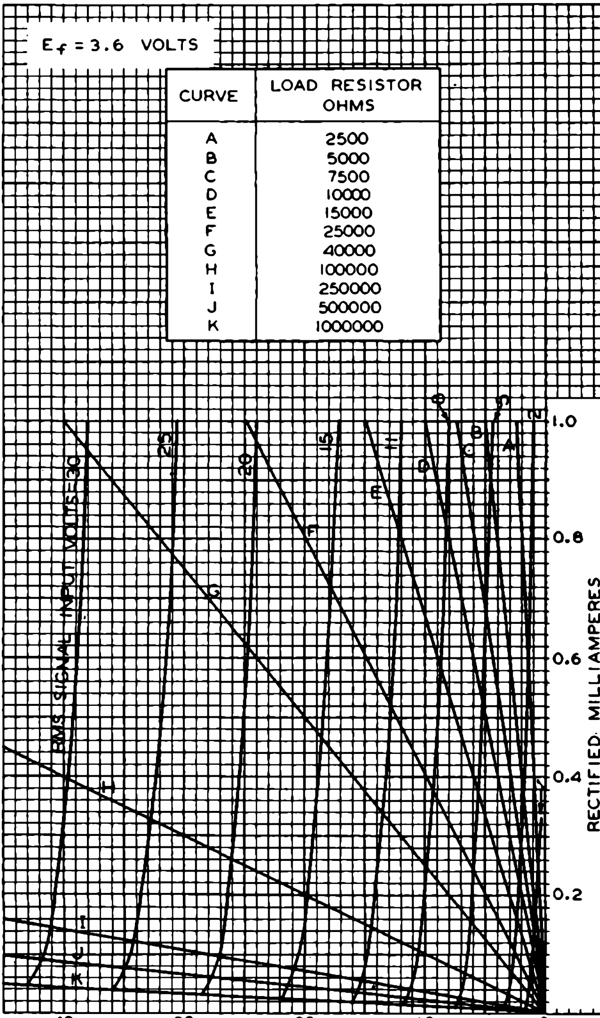


→ Indicates a change.

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

9005

AVERAGE CHARACTERISTICS



CURVE	LOAD RESISTOR OHMS
A	2500
B	5000
C	7500
D	10000
E	15000
F	25000
G	40000
H	100000
I	250000
J	500000
K	1000000

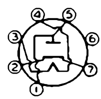
9006

U-H-F DIODE

MIDGET TYPE

Heater	Unipotential Cathode	
Voltage	6.3	a-c or d-c volts
Current	0.15	amp.
Direct Interelectrode Capacitances:●		
Plate to Cathode	1.4	μμf
Plate to Heater	0.2	μμf
Cathode to Heater	2.2	μμf
Maximum Overall Length		1-13/16"
Maximum Seated Height		1-9/16"
Length from Base Seat to Bulb Top (excluding tip)		1-3/16 ± 3/32"*
Maximum Diameter		3/4"
Bulb		T-5-1/2
Base▲		Miniature Button 7-Pin

Pin 1 - Plate
Pin 2 - Cathode
Pin 3 - Heater
Pin 4 - Heater



BOTTOM VIEW (6BH)

Pin 5 - Plate
Pin 6 - No Connection
Pin 7 - Cathode

RCA Socket	Stock No. 9914
Mounting Position	Any

Maximum Ratings Are Design-Center Values

RECTIFIER

Peak Inverse Plate Voltage	750 max.	volts
Peak Plate Current	15 max.	ma.
D-C Output Current	5 max.	ma.
D-C Heater-Cathode Potential	100 max.	volts
Typical Operation as Rectifier:		
A-C Plate Supply Voltage (RMS)	270	volts
Min. Total Effective Plate-Supply Impedance	100	ohms
D-C Output Current	5	ma.

● With no external shield.

The resonant frequency of the 9006 is 700 megacycles (approx).

▲ *The center hole in sockets designed for this base provides for the possibility that this tube type may be manufactured with the exhaust-tube tip at the base end. For this reason, it is recommended that in equipment employing this tube type, no material be permitted to obstruct the socket hole.*

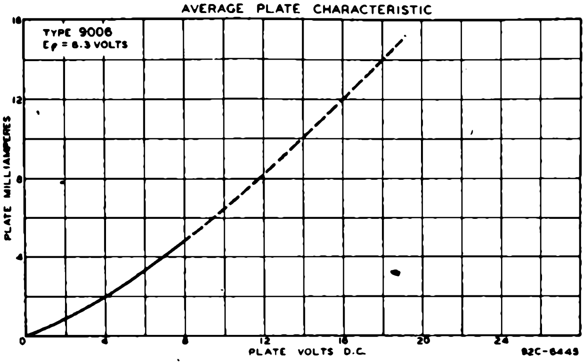
*Temporary minimum length = 1-1/16".

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

RCA

9006

U-H-F DIODE



RCA TUBE
HANDBOOK
HB-3

RECEIVING TUBE SECTION—Part 1

Up to Type 6A3

In this section, data are given for those types of RCA tubes employed primarily in broadcast and home-television receivers. These types are also used in many other applications.

For further Technical Information, write to Commercial Engineering, Tube Department, Radio Corporation of America, Harrison, N. J.

7-52

RECEIVING TUBES—PART 1

RCA

PRICES□
OF RECEIVING TUBE TYPES

Schedule D⊕

Type	Price	Type	Price	Type	Price
OY4........$	●	1N5-GT†....$	2.40	6AB5/6N5♣..$	3.15
OZ4........	1.65	1P5-GT.....	●	6AB7†♣.....	3.60
OZ4-G......	1.65	1Q5-GT♣†...	3.05	6AC5-GT†♣..	3.00
1A3........	2.50	1R5........	2.35	6AC7†......	3.35
1A4-P......	●	1S4........	2.45	6AD7-G.....	3.90
1A5-GT†♣...	2.05	1S5........	2.05	6AF4.......	4.05
1A6........	●	1T4........	2.25	6AF6-G♣....	3.15
1A7-GT†....	2.45	1T5-GT♣....	2.80	6AG5.......	2.25
1AC5.......	3.00	1T6........	3.00	6AG7.......	3.75
1AD5.......	3.00	1U4........	2.25	6AH4-GT....	2.35
1B3-GT†....	2.65	1U5........	2.00	6AH6.......	3.90
1B4-P......	●	1-V........	2.55	6AK5.......	4.35
1B5/25S....	●	1V2........	1.70	6AK6.......	2.55
1C5-GT†....	2.60	1X2-A......	2.65	6AL5.......	1.75
1C6........	●	2A3........	4.15	6AL7-GT....	2.90
1C7-G......	●	2A5........	●	6AQ5.......	2.10
1D5-GP.....	●	2A6........	●	6AQ6.......	1.85
1D5-GT.....	●	2A7........	●	6AQ7-GT....	2.65
1D7-G......	●	2B7........	●	6AR5.......	1.65
1D8-GT♣....	4.05	2E5........	●	6AS5.......	2.10
1E5-GP.....	●	3A8-GT.....	●	6AS7-G.....	7.10
1E7-GT.....	●	3LF4.......	2.80	6AT6.......	1.65
1E8........	3.00	3Q4........	2.25	6AU5-GT....	3.20
1F4........	●	3Q5-GT†....	2.80	6AU6.......	1.85
1F5-G......	●	3S4........	2.20	6AV5-GT....	2.65
1F6........	●	3V4........	2.20	6AV6.......	1.65
1F7-G......	●	5AZ4.......	1.55	6AX4-GT....	2.55
1G4-GT†....	●	5T4♣.......	5.00	6AX5-GT....	2.00
1G5-G......	●	5U4-G......	1.75	6B4-G......	3.20
1G6-GT†♣...	3.00	5V4-G......	2.80	6B5........	●
1H4-G......	●	5W4........	●	6B6-G......	●
1H5-GT†....	1.95	5W4-GT†♣...	1.75	6B7........	●
1H6-G......	●	5X4-G♣.....	2.00	6B8♣.......	3.35
1J6-GT.....	●	5Y3-G♣.....	1.35	6B8-G......	●
1L4........	2.25	5Y3-GT.....	1.35	6BA6.......	1.95
1L6........	2.75	5Y4-G♣.....	1.70	6BA7.......	2.50
1LA4♣......	2.65	5Z3♣.......	2.00	6BC5.......	2.00
1LA6.......	2.65	5Z4........	3.30	6BD6.......	2.00
1LB4.......	2.65	6A3♣.......	3.35	6BE6.......	2.05
1LC5.......	2.65	6A6........	●	6BF5.......	2.35
1LC6.......	2.65	6A7♣.......	2.75	6BF6.......	1.75
1LD5.......	2.65	6A7S.......	●	6BG6-G.....	5.25
1LE3.......	2.65	6A8♣.......	2.70	6BH6.......	2.30
1LG5.......	2.65	6A8-G♣.....	2.75	6BJ6.......	2.10
1LH4.......	2.65	6A8-GT♣....	2.75	6BL7-GT....	2.90
1LN5.......	2.65	6AB4.......	2.00	6BQ6-GT....	3.80

For Footnotes, see end of list.

(Continued on next page)

PRICES
OF RECEIVING TUBE TYPES
Schedule D®

Type	Price	Type	Price	Type	Price
6BQ7.......$	●	6Q7♣.......$	2.40	7A4.......$	2.00
6BQ7-A.....	3.50	6Q7-G......	●	7A5.......	2.35
6C4........	1.65	6Q7-GT♣....	2.10	7A6.......	2.10
6C5........	1.95	6R7♣.......	2.80	7A7.......	2.00
6C5-GT† ...	1.65	6R7-GT†....	●	7A8.......	1.90
6C6♣.......	2.50	6S4........	1.90	7AD7......	4.60
6C8-G......	3.90	6S7♣.......	3.25	7AF7......	1.80
6CB6.......	2.10	6S7-G......	●	7AG7......	2.45
6CD6-G.....	5.90	6S8-GT.....	2.65	7AH7......	2.45
6CF6.......	2.50	6SA7.......	2.10	7B4.......	1.80
6CL6.......	3.35	6SA7-GT†♣..	2.10	7B5.......	1.85
6D6♣.......	2.50	6SB7-Y♣....	2.90	7B6.......	2.00
6D8-G......	●	6SC7.......	2.35	7B7.......	2.00
6E5........	2.55	6SF5.......	1.95	7B8.......	2.05
6F5♣.......	1.90	6SF5-GT....	1.80	7C5.......	2.00
6F5-GT♣....	1.85	6SF7♣......	2.30	7C6.......	1.85
6F6........	2.45	6SG7.......	2.30	7C7.......	2.05
6F6-G♣.....	2.00	6SH7.......	2.50	7E6.......	2.90
6F7♣.......	3.90	6SJ7.......	2.00	7E7♣......	3.20
6F8-G......	3.90	6SJ7-GT....	1.65	7F7.......	2.45
6G6-G♣.....	2.75	6SK7.......	2.00	7F8.......	2.90
6H6........	2.00	6SK7-GT†♣..	2.00	7G7.......	2.75
6H6-GT♣†...	2.10	6SL7-GT....	2.65	7H7.......	2.20
6J5........	1.70	6SN7-GT....	2.35	7J7.......	3.25
6J5-GT.....	1.80	6SQ7.......	1.75	7K7.......	2.75
6J6........	2.50	6SQ7-GT†♣..	1.75	7L7.......	2.75
6J7........	2.50	6SR7.......	1.85	7N7.......	2.20
6J7-G......	●	6SS7♣......	2.40	7Q7.......	2.40
6J7-GT♣....	2.55	6ST7♣......	2.70	7R7.......	3.35
6J8-G♣. ...	3.20	6SZ7♣......	2.45	7S7.......	●
6K5-GT†....	●	6T7-G......	●	7V7.......	3.35
6K6-GT†....	1.80	6T8........	2.90	7W7.......	3.35
6K7♣.......	2.10	6U5°♣......	2.25	7X7.......	2.65
6K7-G♣.....	2.40	6U7-G♣.....	2.40	7Y4.......	1.80
6K7-GT♣....	2.35	6U8........	2.90	7Z4.......	1.80
6K8........	3.05	6V6........	3.40	10........	§
6K8-G......	●	6V6-GT.....	2.00	12A7......	●
6K8-GT.....	●	6W4-GT.....	1.90	12A8-GT†♣.	2.75
6L5-G......	●	6W6-GT.....	2.45	12AH7-GT♣.	3.05
6L6........	4.60	6W7-G......	●	12AL5.....	1.80
6L6-G......	3.35	6X4........	1.50	12AQ5.....	2.10
6L7........	2.90	6X5♣.......	3.10	12AT6.....	1.65
6L7-G......	●	6X5-GT†....	1.55	12AT7.....	2.90
6N6-G......	●	6X8........	2.95	12AU6.....	1.85
6N7♣.......	2.95	6Y6-G......	2.55	12AU7.....	2.40
6N7-GT†....	2.85	6Z7-G......	●	12AV6.....	1.65
6P5-GT†....	●	6ZY5-G.....	●	12AW6.....	2.65

For Footnotes, see end of list.

(continued on next page)

RCA

PRICES
OF RECEIVING TUBE TYPES

Schedule D⊕

Type	Price	Type	Price	Type	Price
12AX4-GT...$	2.65	14E6.......$	•	36........$	•
12AX7	2.50	14E7	•	37	•
12BA6	1.95	14F7	2.45	38	•
12BA7	2.50	14F8	3.20	39/44	•
12BD6	2.00	14H7♣	2.40	41♣	1.90
12BE6	2.05	14J7	•	42♣	1.90
12BF6	1.75	14N7	•	43♣	2.05
12BH7	2.75	14Q7	2.40	45	2.10
12C8	3.90	14R7	3.35	45Z3	•
12F5-GT	•	19	•	45Z5-GT	•
12H6	2.00	19BG6-G	6.00	46	•
12J5-GT♣	1.80	19J6	2.65	47♣	2.90
12J7-GT♣	2.55	19T8	2.90	49	•
12K7-GT♣	2.35	19X8	3.10	50	•
12K8	3.15	24-A♣	2.70	50A5	2.20
12Q7-GT♣	2.10	25A6♣	3.40	50B5	2.10
12S8-GT	•	25A6-GT/G	•	50C5	2.05
12SA7	2.10	25AC5-GT†	•	50C6-G	2.90
12SA7-GT	2.10	25B5	•	50L6-GT	1.95
12SC7	2.50	25BQ6-GT	3.90	50X6	2.20
12SF5	2.10	25C6-G	•	50Y6-GT	2.15
12SF5-GT	•	25L6	3.90	50Y7-GT	2.10
12SF7	2.40	25L6-GT	1.95	50Z7-G	•
12SG7	2.35	25W4-GT♣	2.05	53	•
12SH7	2.50	25Z5♣	1.80	55	•
12SJ7	2.00	25Z6♣	2.60	56♣	1.85
12SJ7-GT	•	25Z6-GT†	1.80	57♣	2.10
12SK7	2.00	26♣	2.05	58♣	2.10
12SK7-GT♣	2.00	27♣	1.75	59	•
12SL7-GT	2.65	30	•	70L7-GT♣	3.90
12SN7-GT	2.30	31	•	71-A♣	2.35
12SQ7	1.75	32	•	75♣	2.00
12SQ7-GT	1.75	32L7-GT	•	76♣	1.70
12SR7	2.00	33	•	77♣	2.15
12V6-GT	2.10	34	•	78♣	2.15
12X4	1.50	35	•	79	•
12Z3	•	35A5	2.05	80♣	1.55
14A4	•	35B5	2.10	81	•
14A5	•	35C5	2.05	82	•
14A7	2.20	35L6-GT	1.95	83	2.85
14AF7	2.40	35W4	1.35	83-V♣	3.40
14B6	2.20	35Y4	1.80	84/6Z4♣	1.80
14B8♣	2.20	35Z3	1.80	85	•
14C5♣	2.75	35Z4-GT♣	1.45	89	•
14C7	2.40	35Z5-GT†	1.40	117L7-GT/ 117M7-GT.	3.90

For Footnotes, see end of list.

(continued on next page)

PRICES
OF RECEIVING TUBE TYPES

Schedule D●

Type	Price	Type	Price	Type	Price
117N7-GT♣..$	4.80	117Z4-GT...$	●	876........	●
117P7-GT♣..	4.80	117Z6-GT†♣	2.95	886........	●
117Z3......	1.80				

□ This price list applies only in the United States of America and is subject to change without notice. The price includes Federal Excise Tax, where applicable. All prices are exclusive of any state and local excise, sales and similar taxes.

● Schedule D shows list prices for tube types priced for distribution through dealer and service channels.

* See 1F7-GV for data.

† For data, refer to corresponding type with -GT/G suffix or to double-branded type having -GT and -G suffix.

● Discontinued type. Data sheets have been retained in book for reference purposes only.

♣ Not recommended for new equipment design.

○ See 6U5/6G5 for data.

§ Discontinued type. Replace by Type 10-Y.

INFORMATION ON PURCHASING ABOVE TYPES

Information as to where *RCA Receiving Tubes* can be purchased may be obtained from our *regional office* nearest you or from *Tube Department, Radio Corporation of America, Harrison, New Jersey.*

RECEIVING TUBE CLASSIFICATION CHART

This chart is designed to help tube users in identifying type designations and characteristics of RCA Receiving Tubes—tubes which are used primarily in AM, FM, and television broadcast receivers. It is so arranged as to permit quick determination of the type designations of RCA receiving tubes according to their functions and cathode voltages. Types having simi-liar characteristics and the same filament or heater voltage are bracketed.

RCA

RECEIVING TUBE

Types having similar characteristics and

Filament or Heater Volts			1.25—1.4		
			Sub-miniature	*Miniature*	*Other*
RECTIFIERS *(For rectifiers with amplifier units, see POWER AMPLIFIERS).*					
Half-Wave	vacuum	Peak Inverse Volts: Below 1500			
		Above 1500		1V2 (1X2-A, 1X2-B)	1B3-GT
Full-Wave	vacuum	Peak Inverse Volts: Below 1500			
		Above 1500			
	mercury-vapor	Above 1500			
	gas	Below 1500			
Doubler	vacuum	Peak Inverse Volts: Below 1500			
DIODE DETECTORS *(For diode detectors with amplifier units, see VOLT-*					
One Diode				1A3	
Two Diodes					
Three Diodes					
POWER AMPLIFIERS with and without Rectifiers, Diode Detectors, and					
Triodes	low-mu	single unit			
	high-mu	single unit			
		twin unit			

CLASSIFICATION CHART

the same filament or heater voltage are bracketed.

2.0—5.0		6.3—117.0		
Octal	*Other*	*Miniature*	*Octal*	*Other*
		35W4 117Z3	6AX4-GT 6W4-GT 12AX4-GT 25W4-GT (35Z4-GT 35Z5-GT)	1-v 35Y4 35Z3
3A3	3A2		6AU4-GT	
(5Y3-G, 5Z4 5Y3-GT, 5Y4-G (5V4-G, 5W4-GT	5AZ4) 80 83-v)	(6X4 12X4	6X5, 6X5-GT) 6AX5-GT	7Y4 7Z4 84/6Z4
(5T4, 5U4-G 5X4-G	5Z3)			
	83			
Cold-Cathode Types 0Z4, 0Z4-G				
			(25Z6, 25Z6-GT (50Y6-GT 50Y7-GT) 117Z6-GT	25Z5) 50X6
AGE AMPLIFIERS and also POWER AMPLIFIERS).				
		6AL5 12AL5	(6H6, 6H6-GT) 12H6	7A6
		6BC7		
Voltage Amplifiers.				
	2A3 45 71-A		6B4-G	
		6BC4	6AC5-GT	
			6AQ7-GT,(6N7, 6N7-GT)	

When choosing tube types, the equipment designer should refer to the RCA PREFERRED TYPES LIST and its companion list - TYPES NOT RECOMMENDED for NEW EQUIPMENT DESIGN - both of which appear in the General Section.

RCA

RECEIVING TUBE

Types having similar characteristics and

Filament or Heater Volts		1.25—1.4		
		Sub-miniature	Miniature	Other
POWER AMPLIFIERS with and without Rectifiers, Diode Detectors, and				
Beam Tubes	**single unit**			1Q5-GT, 3Q5-GT*, 3LF4*
	with rectifier			
Pentodes	**single unit**	1AC5	1S4, 3S4*, 3Q4*, 3V4*	1A5-GT, 1C5-GT, 1LB4
	with medium-mu triode			
	with diode and triode			1D8-GT
GATED AMPLIFIERS				
Pentagrid Amplifier				
SHUNT VOLTAGE REGULATORS				
Beam Triode				

* Filament arranged for either 1.4 or 2.8-volt operation.

CLASSIFICATION CHART

the same filament or heater voltage are bracketed.

2.0—5.0		6.3—117.0		
Octal	*Other*	*Miniature*	*Octal*	*Other*
Voltage Amplifiers. (Continued)				
		6AS5 6BF5 6AQ5 12AQ5 (35B5, 35C5) (50B5, 50C5)	6AU5-GT 6BG6-G (6L6 6BQ6-GT 6CD6-G 6L6-G) (6V6 6V6-GT) 6AV5-GT 12V6-GT 6Y6-G (25L6 19BG6-G 6W6-GT 25L6-GT) 25BQ6-GT 50C6-G 50L6-GT 35L6-GT	7A5 7C5 14C5 35A5 50A5
			(117L7/M7-GT 117P7-GT) 70L7-GT 117N7-GT	
	47	6CL6 (6AK6 6AR5	6AG7 6G6-G) (6F6, 6F6-G, 6F6-GT (6K6-GT (25A6	7B5 7AD7 42) 41) 43)
			6AD7-G	
		6BY6		
			6BD4-A	

When choosing tube types, the equipment designer should refer to the RCA PREFERRED TYPES LIST and its companion list - TYPES NOT RECOMMENDED for NEW EQUIPMENT DESIGN - both of which appear in the General Section.

RCA

RECEIVING TUBE

Types having similar characteristics and

Filament or Heater Volts			1.25—1.4		
			Sub-miniature	Miniature	Other
VOLTAGE AMPLIFIERS with and without Diode Detectors; TRIODE, TETRODE, AND PENTODE DETECTORS; OSCILLATORS.					
Triodes	medium-mu	single unit			1LE3
		with rf pentode			
		with power pentode			
		with pentode and diode			1D8-GT
		with two diodes			
		twin unit			
	high-mu	single unit			
		with diode			1H5-GT 1LH4
		with two diodes			
		with three diodes			
		twin unit			
Tetrodes	sharp-cutoff				

CLASSIFICATION CHART

the same filament or heater voltage are bracketed.

2.0—5.0		6.3—117.0		
Octal	Other	Miniature	Octal	Other
	27	6AF4 6C4 6S4	(6C5, 6C5-GT) (6J5, 6J5-GT) 12J5-GT 6AH4-GT	7A4
			6F7	
			6AD7-G	
		(6BF6 12BF6	6R7 6SR7 6ST7) 12SR7	
		(6BK7-A) 6J6 12AU7▲ 6BQ7-A 19J6 12AV7▲ 6BZ7) 12BH7▲	(6F8-G, 6SN7-GT, 6SN7-GTA) 6C8-G 12AH7-GT 6BL7-GT 12SN7-GT	7AF7 14AF7 7F8 14F8 7N7
		6AB4	(6F5, 6F5-GT) (6SF5, 6SF5-GT) 12SF5	7B4
		12AT6 (6AT6 6AQ6 12AV6 6AV6	6Q7) 12Q7-GT 6Q7-GT, 6SZ7 (12SQ7 6SQ7, 6SQ7-GT) 12SQ7-GT)	7B6 14B6 7C6 7S 7K7 7X7
		6T8 19T8	6S8-GT	
		12AT7▲ 12AX7▲	6SC7, 12SC7 6SL7-GT 12SL7-GT	7F7 14F7
	24-A			

▲ Heater arranged for either 6.3 or 12.6-volt operation.

When choosing tube types, the equipment designer should refer to the RCA PREFERRED TYPES LIST and its companion list - TYPES NOT RECOMMENDED for NEW EQUIPMENT DESIGN - both of which appear in the General Section.

RECEIVING TUBE

Filament or Heater Volts			1.25—1.4		
			Sub-miniature	*Miniature*	*Other*
VOLTAGE AMPLIFIERS with and without Diode Detectors, TRIODE, TETRODE, AND PENTODE DETECTORS, OSCILLATORS.					
Pentodes	remote-cutoff	single unit		1T4	1LG5
		with triode			
		with diode			
		with two diodes			
	semiremote-cutoff	single unit			
	sharp-cutoff	single unit	1AD5	1L4 1U4	1LC5 1LN5 1N5-GT
		with triode			
		with diode	1T6	1S5 1U5	1LD5
CONVERTERS & MIXERS *(For other types used as Mixers, see VOLT-*					
Converters	pentagrid		1E8	1L6 1R5	1A7-GT 1LA6 1LC6
	triode-pentode				
	triode-hexode				
	triode-heptode				
	octode				
Mixers	pentagrid				
ELECTRON-RAY TUBES					
Single	with remote-cutoff triode				
	with sharp-cutoff triode				
Twin	without triode				
Triple	without triode				

CLASSIFICATION CHART

2.0—5.0		6.3—117.0		
ctal	Other	Miniature	Octal	Other
		6BJ6 (6BD6 (12BD6 (6BA6 (12BA6	6SK7, 6SK7-GT) (6K7, 6K7-G 12SK7, 12SK7-GT) 6K7-GT 6SG7) 6AB7 12K7-GT 12SG7) 6SS7 6S7	78) 7A7 14A7) 6D6 7H7 14H7 7AH7 7B7
				6F7
			6SF7 12SF7	
			12C8 6B8	7E7 7R7 14R7
		6DC6		
		(6AG5 6AK5) (6BC5 6CB6) 6CF6 6AH6 6BH6 12AW6 (6AU6 12BY7▲ (12AU6	(6SJ7) (6SJ7-GT) 12SJ7 6AC7 12J7-GT 6SH7) 12SH7) (6J7, 6J7-GT 6W7-G	7AG7 7G7 7C7 14C7 7L7 7V7 6C6) 77) 7W7
		6AN8		
		6AS8		
AGE AMPLIFIERS).				
		(6BE6 (12BE6 12BA7 (6BA7	6SA7 6SA7-GT) (6A8, 6A8-G 6A8-GT 12SA7 12SA7-GT) 6SB7-Y) 12A8-GT	6A7) 7B8 14B8 7Q7 14Q7
		(6X8) 19X8 (6U8 6AT8)		
			6K8, 12K8	
			6J8-G	7J7
				7A8
			6L7	
				6AB5 6N5 6U5
				6E5
			6AF6-G	
			6AL7-GT	

▲ Heater arranged for either 6.3 or 12.6-volt operation.

DIODE CONSIDERATIONS
DIODE-TRIODE AND DIODE-PENTODE TUBES

Certain multi-unit tubes contain one or more diode plates, each having its own base pin, in addition to a triode or pentode unit. Such types may employ either a unipotential cathode or a filamentary cathode.

In unipotential-cathode tubes the cathode is common to the triode or pentode unit and the diode(s). In filamentary-cathode tubes the filament is likewise common to the triode or pentode unit and the diode(s). However, in filament types, diode operation is affected by the position of the diode plate(s) with respect to the filament, and, therefore, the position of the diode plate(s) is specified on the individual tube data sheets.

The rectifying action of the diode is commonly used for the following purposes:

Detection: Detection may be accomplished by using either a half-wave or full-wave circuit arrangement to supply signal voltage to the triode or pentode unit of the tube or to another amplifier tube. The half-wave circuit will provide approximately twice the rectified voltage obtainable from a full-wave circuit for the same applied signal voltage. Since the amplitude variation of the envelope of the rectified voltage is usually of greater importance than rectifier power, the half-wave circuit is more commonly used in practice.

AVC: Regulation of amplifier gain, generally called Automatic Volume Control, may be accomplished by using the output of a diode rectifier in a number of ways. The diode output may be applied to the control grids of the preceding amplifier tubes, or it may be applied, in the case of rf pentodes, to their suppressors, plates and/or screens.

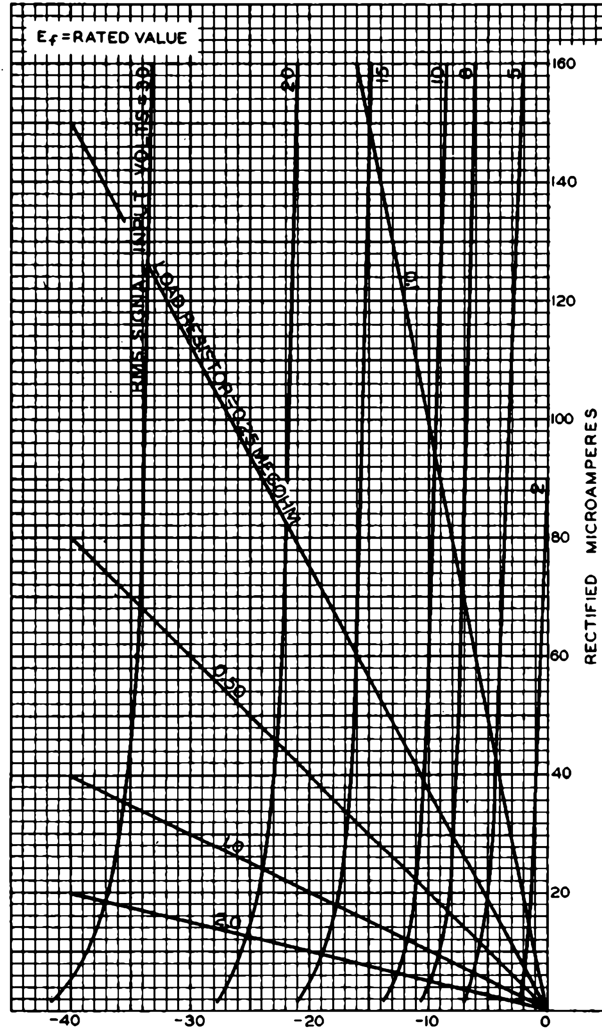
The above functions can be performed simultaneously by using a single diode, two diodes in parallel, or by two diodes operating independently. A number of typical circuit arrangements are shown on the following pages.

Average Characteristic Curves for diodes in diode-triode and diode-pentode tubes are shown on the next page.

AVERAGE DIODE CHARACTERISTICS

HALF-WAVE RECTIFICATION-SINGLE DIODE UNIT

SEE PRECEDING PAGE

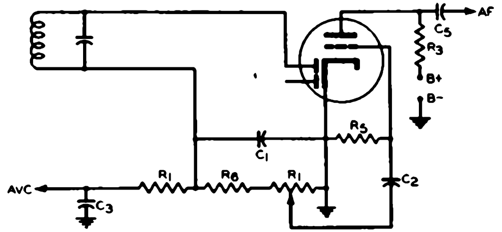


RCA

DIODE CONSIDERATIONS

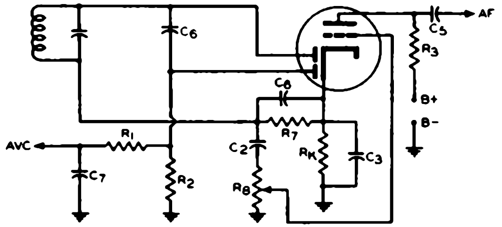
TYPICAL DIODE-TRIODE CIRCUITS

HALF-WAVE DETECTOR, AVC, ZERO-BIAS AMPLIFIER



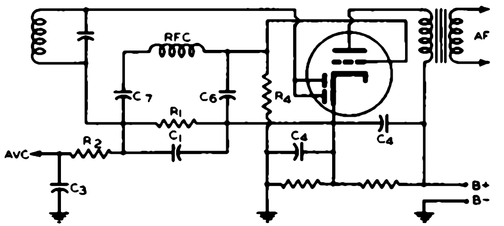
92CS-6677

HALF-WAVE DETECTOR AND DELAYED AVC, CATHODE-BIAS AMPLIFIER



92CS-6679

HALF-WAVE DETECTOR, AVC, FIXED-BIAS AMPLIFIER



92CS-6678R1

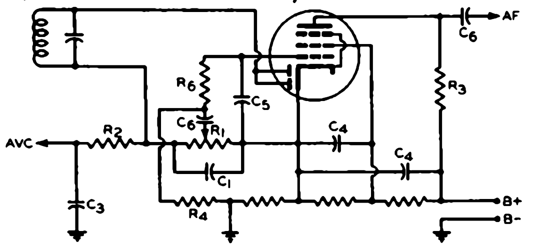
TYPICAL VALUES

C1: 150 μμf for 450-1600 kc
C2: 0.01 μf
C3: 0.1 μf
C4: 0.5 μf or larger
C5: 0.01 to 0.1 μf or larger
C6: 100 μμf
C7: 0.01 to 0.05 μf
R1: 0.5 Megohm
R2: 1.0 Megohm
R3: 0.1 Megohm
R4: 0.05 to 1.0 Megohm
R5: 10 Megohms
R6: 22000 Ohms
R7: 0.25 Megohm
R8: 1 to 2 Megohm

DIODE CONSIDERATIONS

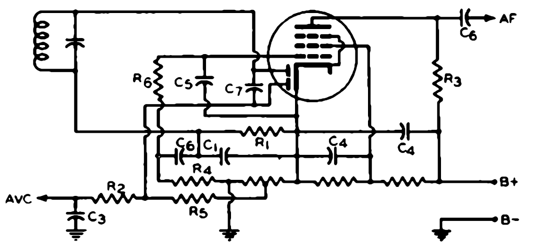
TYPICAL DIODE-PENTODE CIRCUITS

HALF-WAVE DETECTOR AND AVC, FIXED-BIAS AMPLIFIER



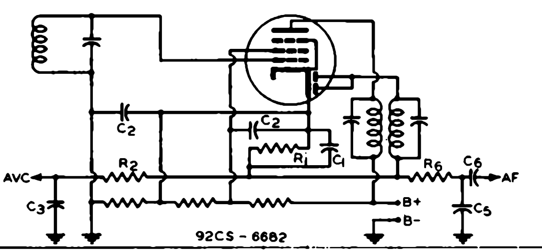
92CS-6681

HALF-WAVE DETECTOR, SEPARATE AVC, FIXED-BIAS AMPLIFIER



92CS-6680

HALF-WAVE DETECTOR, AVC, FIXED-BIAS H-F AMPLIFIER



TYPICAL VALUES

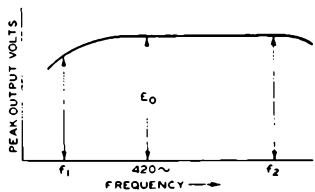
C1: 150 μμf for 450-1600 kc
C2, C3: 0.1 μf
C4: 0.5 μf or larger
C5: 100 μμf or smaller
C6: 0.01 to 0.1 μf
C7: 500 to 1000 μμf

R1: 0.5 to 1.0 Megohm
R2: 1.0 to 1.5 Megohms
R3: 0.1 to 0.2 Megohm
R4: 0.5 to 1.0 Megohm
R5: 1.0 Megohm
R6: 0.1 to 0.2 Megohm

RESISTANCE-COUPLED AMPLIFIERS

Symbols used in the following text and charts are explained at the end of the text.

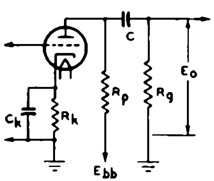
GENERAL CIRCUIT CONSIDERATIONS



92CS-6883

In the discussions which follow, the frequency (f_2) is that value at which the high-frequency response begins to fall off. The frequency (f_1) is that value at which the low-frequency response drops below a satisfactory value, as discussed below. Decoupling filters are not necessary for two stages or less. A variation of 10 per cent in values of resistors and capacitors has only slight effect on performance. One-half-watt resistors are usually suitable for R_{g2}, R_g, R_p, and R_k resistors. Capacitors C and C_{g2} should have a working voltage equal to or greater than E_{bb}. Capacitor C_k may have a low working voltage in the order of 10 to 25 volts. Peak Input Voltage is equal to the Peak Output Voltage divided by the Voltage Gain.

Triode (Heater-Cathode Type) Amplifier



92CS-6886

Diagram No.1

Capacitors C and C_k have been chosen to give an output voltage equal to 0.8 E_o for a frequency (f_1) of 100 cycles. For any other values of (f_1), multiply values of C and C_k by $100/f_1$. In the case of capacitor C_k, the values shown in the charts are for an amplifier with dc heater excitation; when ac is used, depending on the character of the associated circuit, the gain, and the value of f_1, it may be necessary to increase the value of C_k to minimize hum disturbances. It may be desirable to operate the heater at a positive voltage of from 15 to 40 volts with respect to the cathode. The voltage output at f_1, of "n" like stage equals $(0.8)^n E_o$ where E_o is the peak output voltage of the final stage. For an amplifier of typical construction, the value of f_2 is well above the audio-frequency range for any value of R_p.

Pentode (Filament-Type) Amplifier

Capacitors C and C_{g2} have been chosen to give an output voltage equal to $0.8E_o$ for a frequency (f_1) of 100 cycles. For any other value of f_1, multiply values of C and C_{g2} by $100/f_1$. The voltage output at f_1 for "n" like stages equals $(0.8)^n E_o$

RESISTANCE-COUPLED AMPLIFIERS

(continued from preceding page)

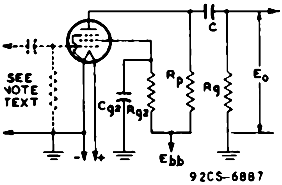


Diagram No.2

where E_o is the peak output voltage of the final stage. For an amplifier of typical construction, and for R_p values of 0.1, 0.25, and 0.5 megohm, approximate values of f_2 are 20000, 10000, and 5000 cps, respectively.

Note: The values of input coupling capacitor in microfarads and of grid resistor in megohms should be such that their product lies between 0.02 and 0.1. Values commonly used are 0.005 μf and 10 megohms.

Pentode (Heater-Cathode Type) Amplifier

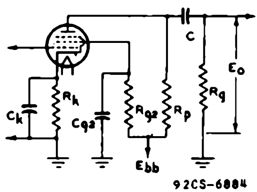


Diagram No.3

Capacitors C, C_k, and C_{g2} have been chosen to give an output voltage equal to 0.7 E_o for a frequency (f_1) of 100 cycles. For any other value of f_1, multiply values of C, C_k, and C_{g2} by $100/f_1$. In the case of capacitor C_k, the values shown in the charts are for an amplifier with dc heater excitation; when ac is used, depending on the character of the associated circuits, the voltage gain, and the value of f_1, it may be necessary to increase the value of C_k to minimize hum disturbances. It may be desirable to operate the heater at a positive voltage of from 15 to 40 volts with respect to the cathode. The voltage output at f_1 for "n" like stages equals $(0.7)^n E_o$ where E_o is the peak output voltage of the final stage. For an amplifier of typical construction, and for R_p values of 0.1, 0.25, and 0.5 megohm, approximate values of f_2 are 20000, 10000, and 5000 cps, respectively.

Phase Inverters

Information given for triode amplifiers, in general, applies to this case. Capacitors C have been chosen to give an output voltage equal to 0.9 E_o for a frequency (f_1) of 100 cycles. For any other value of f_1, multiply values of C by $100/f_1$. The signal input is applied to the grid of triode unit A. The grid of triode unit B obtains its signal from a tap (P) on the grid resistor (R_g) in the output circuit of unit A. The tap is chosen so as to make the voltage output of unit B equal to that of unit A. Its location is determined by the voltage gain values given in the charts. For

RESISTANCE-COUPLED AMPLIFIERS

(continued from preceding page)

example, if V.G. is 20 (from the charts), P is chosen so as to supply 1/20 of the voltage across R_g to the grid of unit B. For phase-inverter service, the cathode resistor may be left unbypassed unless a bypass capacitor is necessary to minimize hum; omission of the bypass capacitor assists in balancing the output stages. The value of R_k is specified on the basis that both units are operating simultaneously at the same values of plate load and plate voltage.

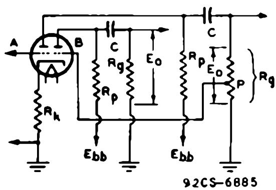


Diagram No.4

SYMBOLS USED IN RESISTANCE-COUPLED AMPLIFIER CHARTS

C = Blocking Capacitor (μf).

C_k = Cathode Bypass Capacitor (μf).

C_{g2} = Screen Bypass Capacitor (μf).

E_{bb} = Plate-Supply Voltage (volts). Voltage at plate equals plate-supply voltage minus drop in R_p and R_k. See Note 1, below.

R_k = Cathode Resistor (ohms).

R_{g2} = Screen Resistor (megohms).

R_g = Grid Resistor (megohms). for following stage.

R_p = Plate Resistor (megohms).

V.G. = Voltage Gain. At 5 volts (RMS) output, unless otherwise specified.

E_o = Peak Output Voltage (volts). This voltage is obtained across R_g (for following stage) at any frequency within the flat region of the output vs frequency curve, and is for the condition where the signal level is adequate to swing the resistance-coupled amplifier tube to the point where its grid starts to draw current.

Note 1: For other supply voltages differing by as much as 50 per cent from those listed, the values of resistors, capacitors, and voltage gain are approximately correct. The value of voltage output, however, for any of these other supply voltages, equals the listed voltage output multiplied by the new plate-supply voltage divided by the plate-supply voltage corresponding to the listed voltage output.

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KEY TO RESISTANCE-COUPLED AMPLIFIER CHARTS

Tube Type	Chart No.
1L4	1
1S5	2
1U4	3
1U5	2
2B7	5
6A6 #	6
6AQ6	7
6AQ7-GT	7
6AT6	7
6AU6	8
6AV6	25
6B7	5
6B8	5
6BF6	9
6C4	10
6C5	11
6C5-GT	11
6C6 t.	11
6C6 p.	14
6C8-G ##	12
6F5	18
6F5-GT	18
6F8-G ##	13
6J5	13
6J5-GT	13
6J7, 6J7-G, 6J7-GT t	11
6J7, 6J7-G, 6J7-GT p	14
6N7 #	6
6N7-GT #	6
6Q7	7

Tube Type	Chart No.
6Q7-G	7
6Q7-GT	7
6R7	9
6R7-GT	9
6S7	16
6S7-G	16
6S8-GT	4
6SC7 #	17
6SF5	18
6SF5-GT	18
6SF7	19
6SH7	8
6SJ7	20
6SJ7-GT	20
6SL7-GT ##	7
6SN7-GT ##	13
6SN7-GTA ##	29
6SQ7	4
6SQ7-GT	4
6SR7	9
6ST7	9
6SZ7	7
6T8	7
6W7-G t	11
6W7-G p	14
12AT6	7
12AU6	8
12AV6	25
12AU7 ##	10
12AX7 ##	25

Tube Type	Chart No.
12AY7 ##	28
12C8	5
12F5-GT	18
12J5-GT	13
12J7-GT t.	11
12J7-GT p.	14
12Q7-GT	7
12S8-GT	4
12SC7 #	17
12SF5	18
12SF7	19
12SH7	8
12SJ7	20
12SJ7-GT	20
12SL7-GT ##	7
12SN7-GT ##	13
12SQ7	4
12SQ7-GT	4
12SR7	9
19T8	7
53 #	6
55	22
56	23
57 t	11
57 p	14
75	4
76	23
85	22
5879 t	27
5879 p	26

The cathodes of the two units have a common terminal.

Chart values are for one triode unit. The cathodes of each unit have separate terminals.

t – Triode Connection

p – Pentode Connection

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RESISTANCE-COUPLED AMPLIFIER CHARTS

See Circuit Diagram 2

1

Ebb	Rp	Rg	Rg2	Rk	Cg2	Ck	C	Eo	V.G.
45	0.22	0.22	0.24	-	0.071	-	0.011	12	16*
		0.47	0.32	-	0.06	-	0.006	14	23
		1.0	0.39	-	0.056	-	0.0035	18	30
	0.47	0.47	0.57	-	0.049	-	0.0052	14	22
		1.0	0.64	-	0.047	-	0.0035	17	30
		2.2	0.74	-	0.044	-	0.0018	19	33
	1.0	1.0	1.1	-	0.036	-	0.0028	14	28
		2.2	1.25	-	0.035	-	0.0018	16	32
		3.3	1.45	-	0.032	-	0.0015	18	38
90	0.22	0.22	0.4	-	0.089	-	0.011	26	28
		0.47	0.46	-	0.081	-	0.0055	36	36
		1.0	0.47	-	0.08	-	0.0035	42	41
	0.47	0.47	0.84	-	0.07	-	0.0055	30	34
		1.0	0.9	-	0.069	-	0.003	38	42
		2.2	1.0	-	0.062	-	0.0018	40	50
	1.0	1.0	2.0	-	0.045	-	0.0028	30	45
		2.2	2.1	-	0.045	-	0.0018	35	55
		3.3	2.2	-	0.044	-	0.0012	40	61
135	0.22	0.22	0.5	-	0.09	-	0.011	42	34
		0.47	0.63	-	0.074	-	0.0055	54	51
		1.0	0.67	-	0.072	-	0.0035	57	60
	0.47	0.47	1.1	-	0.071	-	0.005	47	49
		1.0	1.4	-	0.06	-	0.0028	54	68
		2.2	1.5	-	0.051	-	0.0018	60	87
	1.0	1.0	2.1	-	0.059	-	0.0025	45	53
		2.2	2.4	-	0.054	-	0.0018	57	88
		3.3	2.7	-	0.049	-	0.0012	61	91

* At 4 volts (RMS) output.

RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

2

See Circuit Diagram 2

E_{bb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o	V.G.
		0.22	0.26	-	0.042	-	0.013	14	17
	0.22	0.47	0.36	-	0.035	-	0.006	17	24
		1.0	0.4	-	0.034	-	0.004	18	28
		0.47	0.82	-	0.025	-	0.0055	14	25
45	0.47	1.0	1.0	-	0.023	-	0.003	17	33
		2.2	1.1	-	0.022	-	0.002	18	38
		1.0	1.9	-	0.019	-	0.003	14	31
	1.0	2.2	2.0	-	0.019	-	0.002	17	38
		3.3	2.2	-	0.018	-	0.0015	18	43
		0.22	0.5	-	0.05	-	0.011	31	25
	0.22	0.47	0.59	-	0.05	-	0.006	37	34
		1.0	0.67	-	0.042	-	0.003	40	41
		0.47	1.2	-	0.035	-	0.005	31	37
90	0.47	1.0	1.4	-	0.034	-	0.003	36	47
		2.2	1.6	-	0.031	-	0.002	40	57
		1.0	2.5	-	0.026	-	0.003	31	45
	1.0	2.2	2.9	-	0.025	-	0.002	36	58
		3.3	3.1	-	0.024	-	0.0012	38	66
		0.22	0.66	-	0.052	-	0.011	45	31
	0.22	0.47	0.71	-	0.051	-	0.006	56	41
		1.0	0.86	-	0.039	-	0.003	60	54
		0.47	1.45	-	0.042	-	0.005	46	44
135	0.47	1.0	1.8	-	0.034	-	0.003	54	62
		2.2	1.9	-	0.033	-	0.002	60	71
		1.0	3.1	-	0.03	-	0.003	45	56
	1.0	2.2	3.7	-	0.029	-	0.0015	53	76
		3.3	4.3	-	0.026	-	0.0014	56	88

RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

See Circuit Diagram 2

3

E_{bb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o	V.G.
45	0.22	0.22	0.06	-	0.046	-	0.011	11	23
		0.47	0.07	-	0.045	-	0.006	15	33
		1.0	0.011	-	0.04	-	0.003	17	39
	0.47	0.47	0.34	-	0.025	-	0.005	13	34
		1.0	0.44	-	0.022	-	0.003	16	46
		2.2	0.5	-	0.022	-	0.002	18	55
	1.0	1.0	1.0	-	0.016	-	0.003	14	43
		2.2	1.0	-	0.016	-	0.002	17	51
		3.3	1.1	-	0.015	-	0.001	17	60
90	0.22	0.22	0.3	-	0.046	-	0.01	27	37
		0.47	0.36	-	0.04	-	0.006	36	54
		1.0	0.4	-	0.038	-	0.003	39	63
	0.47	0.47	0.9	-	0.027	-	0.0045	29	61
		1.0	1.0	-	0.023	-	0.003	35	82
		2.2	1.1	-	0.022	-	0.002	38	96
	1.0	1.0	1.9	-	0.02	-	0.0025	30	77
		2.2	2.0	-	0.02	-	0.002	35	98
		3.3	2.2	-	0.018	-	0.001	37	114
135	0.22	0.22	0.4	-	0.052	-	0.011	44	46
		0.47	0.49	-	0.037	-	0.005	55	71
		1.0	0.52	-	0.034	-	0.003	60	83
	0.47	0.47	1.1	-	0.029	-	0.0045	45	77
		1.0	1.3	-	0.023	-	0.003	53	106
		2.2	1.4	-	0.022	-	0.002	59	123
	1.0	1.0	2.3	-	0.021	-	0.0025	45	104
		2.2	2.5	-	0.019	-	0.0015	53	136
		3.3	2.9	-	0.016	-	0.001	56	163

RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

4

See Circuit Diagram 1

E_{bb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o	V.G.
90	0.1	0.1	-	6300	-	2.2	0.02	3	23☛
		0.25	-	6600	-	1.7	0.01	5	29■
		0.5	-	6700	-	1.7	0.006	6	31★
	0.25	0.25	-	10000	-	1.24	0.01	5	34■
		0.5	-	11000	-	1.07	0.006	7	40★
		1.0	-	11500	-	0.9	0.003	10	40
	0.5	0.5	-	16200	-	0.75	0.005	7	39
		1.0	-	16600	-	0.7	0.003	10	44
		2.0	-	17400	-	0.65	0.0015	13	48
180	0.1	0.1	-	2600	-	3.3	0.025	16	29
		0.25	-	2900	-	2.9	0.015	22	36
		0.5	-	3000	-	2.7	0.007	23	37
	0.25	0.25	-	4300	-	2.1	0.015	21	43
		0.5	-	4800	-	1.8	0.007	28	50
		1.0	-	5300	-	1.5	0.004	33	53
	0.5	0.5	-	7000	-	1.3	0.007	25	52
		1.0	-	8000	-	1.1	0.004	33	57
		2.0	-	8800	-	0.9	0.002	38	58
300	0.1	0.1	-	1900	-	4.0	0.03	31	31
		0.25	-	2200	-	3.5	0.015	41	39
		0.5	-	2300	-	3.0	0.007	45	42
	0.25	0.25	-	3300	-	2.7	0.015	42	48
		0.5	-	3900	-	2.0	0.007	51	53
		1.0	-	4200	-	1.8	0.004	60	56
	0.5	0.5	-	5300	-	1.6	0.007	47	58
		1.0	-	6100	-	1.3	0.004	62	60
		2.0	-	7000	-	1.2	0.002	67	63

☛ At 2 volts (RMS) output. ■ At 3 volts (RMS) output. ★ At 4 volts (RMS) output

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RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

See Circuit Diagram 3

5

E_{bb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o	V.G.
90	0.1	0.1	0.37	2000	0.07	3.0	0.02	19	24
		0.25	0.5	2200	0.07	3.0	0.01	28	33
		0.5	0.6	2000	0.06	2.8	0.006	29	37
	0.25	0.25	1.18	3500	0.04	1.9	0.008	26	43
		0.5	1.1	3500	0.04	2.1	0.007	33	55
		1.0	1.35	3500	0.04	1.9	0.003	32	65
	0.5	0.5	2.6	5000	0.04	1.5	0.004	22	63
		1.0	2.8	6000	0.04	1.55	0.003	29	85
		2.0	2.9	6200	0.04	1.5	0.003	27	100
180	0.1	0.1	0.44	1000	0.08	4.4	0.02	30	30
		0.25	0.5	1200	0.08	4.4	0.015	52	41
		0.5	0.6	1200	0.07	4.0	0.008	53	46
	0.25	0.25	1.18	1900	0.05	2.7	0.01	39	55
		0.5	1.2	2100	0.06	3.2	0.007	55	69
		1.0	1.5	2200	0.05	3.0	0.003	53	83
	0.5	0.5	2.6	3300	0.04	2.1	0.005	47	81
		1.0	2.8	3500	0.04	2.0	0.003	55	115
		2.0	3.0	3500	0.04	2.2	0.002	53	116
300	0.1	0.1	0.5	950	0.09	4.6	0.025	60	36
		0.25	0.55	1100	0.09	5.0	0.015	89	47
		0.5	0.6	900	0.08	4.8	0.009	86	54
	0.25	0.25	1.2	1500	0.06	3.2	0.015	70	64
		0.5	1.2	1600	0.06	3.5	0.008	100	79
		1.0	1.5	1800	0.08	4.0	0.004	95	100
	0.5	0.5	2.7	2400	0.05	2.5	0.006	80	96
		1.0	2.9	2500	0.05	2.3	0.003	120	150
		2.0	3.4	2800	0.05	2.8	0.0025	90	145

RCA

RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

6

See Circuit Diagram 4

E_{bb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o	V.G.
90	0.1	0.1	-	1900*	-	-	0.025	13	16
		0.25	-	2250*	-	-	0.01	19	19
		0.5	-	2500*	-	-	0.006	20	20
	0.25	0.25	-	4050*	-	-	0.01	16	20
		0.5	-	4950*	-	-	0.006	20	22
		1.0	-	5400*	-	-	0.003	24	23
	0.5	0.5	-	7000*	-	-	0.006	18	22
		1.0	-	8500*	-	-	0.003	23	23
		2.0	-	9650*	-	-	0.0015	26	23
180	0.1	0.1	-	1300*	-	-	0.03	35	19
		0.25	-	1700*	-	-	0.015	46	21
		0.5	-	1950*	-	-	0.007	50	22
	0.25	0.25	-	2950*	-	-	0.015	40	23
		0.5	-	3800*	-	-	0.007	50	24
		1.0	-	4300*	-	-	0.0035	57	24
	0.5	0.5	-	5250*	-	-	0.007	44	24
		1.0	-	6600*	-	-	0.0035	54	25
		2.0	-	7650*	-	-	0.002	61	25
300	0.1	0.1	-	1150*	-	-	0.03	60	20
		0.25	-	1500*	-	-	0.015	83	22
		0.5	-	1750*	-	-	0.007	86	23
	0.25	0.25	-	2650*	-	-	0.015	75	23
		0.5	-	3400*	-	-	0.0055	87	24
		1.0	-	4000*	-	-	0.003	100	24
	0.5	0.5	-	4850*	-	-	0.0055	76	23
		1.0	-	6100*	-	-	0.003	94	24
		2.0	-	7150*	-	-	0.0015	104	24

*Values shown are for phase-inverter service.

RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

See Circuit Diagram 1

7

Ebb	Rp	Rg	Rg2	Rk	Cg2	Ck	C	Eo	V.G.
90	0.1	0.1	-	4200	-	2.5	0.025	5.4	22●
		0.22	-	4600	-	2.2	0.014	7.5	27●
		0.47	-	4800	-	2.0	0.0065	9.1	30●
	0.22	0.22	-	7000	-	1.5	0.013	7.3	30●
		0.47	-	7800	-	1.3	0.007	10	34■
		1.0	-	8100	-	1.1	0.0035	12	37★
	0.47	0.47	-	12000	-	0.83	0.006	10	36■
		1.0	-	14000	-	0.7	0.0035	14	39★
		2.2	-	15000	-	0.6	0.002	16	41★
180	0.1	0.1	-	1900	-	3.6	0.027	19	30★
		0.22	-	2200	-	3.1	0.014	25	35
		0.47	-	2500	-	2.8	0.0065	32	37
	0.22	0.22	-	3400	-	2.2	0.014	24	38
		0.47	-	4100	-	1.7	0.0065	34	42
		1.0	-	4600	-	1.5	0.0035	38	44
	0.47	0.47	-	6600	-	1.1	0.0065	29	44
		1.0	-	8100	-	0.9	0.0035	38	46
		2.2	-	9100	-	0.8	0.002	43	47
300	0.1	0.1	-	1500	-	4.4	0.027	40	34
		0.22	-	1800	-	3.6	0.014	54	38
		0.47	-	2100	-	3.0	0.0065	63	41
	0.22	0.22	-	2600	-	2.5	0.013	51	42
		0.47	-	3200	-	1.9	0.0065	65	46
		0.1	-	3700	-	1.6	0.0035	77	48
	0.47	0.47	-	5200	-	1.2	0.006	61	48
		1.0	-	6300	-	1.0	0.0035	74	50
		2.2	-	7200	-	0.9	0.002	85	51

● At 2 volts (RMS) output. ■ At 3 volts (RMS) output. ★ At 4 volts (RMS) output

![RCA]

RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

8

See Circuit Diagram 3

E_{bb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o	V.G.
90	0.1	0.1	0.07	1800	0.11	9.0	0.021	25	52
		0.22	0.09	2100	0.1	8.2	0.012	32	72
		0.47	0.096	2100	0.1	8.0	0.0065	37	88
	0.22	0.22	0.25	3100	0.08	6.2	0.009	25	72
		0.47	0.26	3200	0.078	5.8	0.0055	32	99
		1.0	0.35	3700	0.085	5.1	0.003	34	125
	0.47	0.47	0.75	6300	0.042	3.4	0.0035	27	102
		1.0	0.75	6500	0.042	3.3	0.0027	32	126
		2.2	0.8	6700	0.04	3.2	0.0018	36	152
180	0.1	0.1	0.12	800	0.15	14.1	0.021	57	74
		0.22	0.15	900	0.126	14.0	0.012	82	116
		0.47	0.19	1000	0.1	12.5	0.006	81	141
	0.22	0.22	0.38	1500	0.09	9.6	0.009	59	130
		0.47	0.43	1700	0.08	8.7	0.005	67	171
		1.0	0.6	1900	0.066	8.1	0.003	71	200
	0.47	0.47	0.9	3100	0.06	5.7	0.0045	54	172
		1.0	1.0	3400	0.05	5.4	0.0028	65	232
		2.2	1.1	3600	0.04	3.6	0.0019	74	272
300	0.1	0.1	0.2	500	0.13	18.0	0.019	76	109
		0.22	0.24	600	0.11	16.4	0.011	103	145
		0.47	0.26	700	0.11	15.3	0.006	129	168
	0.22	0.22	0.42	1000	0.1	12.4	0.009	92	164
		0.47	0.5	1000	0.098	12.0	0.007	108	230
		1.0	0.55	1100	0.09	11.0	0.003	122	262
	0.47	0.47	1.0	1800	0.075	8.0	0.0045	94	248
		1.0	1.1	1900	0.065	7.6	0.0028	105	318
		2.2	1.2	2100	0.06	7.3	0.0018	122	371

RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

See Circuit Diagram 1

9

E_{bb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o	V.G.
		0.047	-	2200	-	2.5	0.063	14	9
	0.047	0.1	-	2800	-	2.0	0.033	18	10
		0.22	-	3200	-	1.7	0.015	20	10
		0.1	-	4100	-	1.4	0.032	13	10
90	0.1	0.22	-	5400	-	1.0	0.013	20	11
		0.47	-	6400	-	0.9	0.007	24	11
		0.22	-	8500	-	0.67	0.015	18	11
	0.22	0.47	-	12000	-	0.5	0.0065	23	11
		1.0	-	14000	-	0.43	0.0035	27	11
		0.047	-	2000	-	2.9	0.062	32	10
	0.047	0.1	-	2500	-	2.2	0.033	42	10
		0.22	-	3000	-	1.9	0.016	47	11
		0.1	-	3800	-	1.5	0.033	36	11
180	0.1	0.22	-	5100	-	1.1	0.015	47	11
		0.47	-	6200	-	0.9	0.007	55	12
		0.22	-	8000	-	0.73	0.015	41	12
	0.22	0.47	-	11000	-	0.5	0.007	54	12
		1.0	-	13000	-	0.4	0.0035	69	12
		0.047	-	1800	-	3.0	0.063	58	10
	0.047	0.1	-	2400	-	2.4	0.033	74	11
		0.22	-	2900	-	2.0	0.016	85	11
		0.1	-	3600	-	1.6	0.033	65	12
300	0.1	0.22	-	5000	-	1.2	0.015	85	12
		0.47	-	6200	-	0.95	0.007	96	12
		0.22	-	7800	-	0.73	0.015	74	12
	0.22	0.47	-	11000	-	0.5	0.007	95	12
		1.0	-	13000	-	0.43	0.0035	106	12

RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

10 — See Circuit Diagram 1

E_{bb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o	V.G.
90	0.047	0.047	-	1600	-	3.2	0.061	9	10■
		0.1	-	1800	-	2.5	0.033	11	11★
		0.22	-	2000	-	2.0	0.015	14	11
	0.1	0.1	-	3000	-	1.6	0.032	10	11★
		0.22	-	3800	-	1.1	0.015	15	11
		0.47	-	4500	-	1.0	0.007	18	11
	0.22	0.22	-	6800	-	0.7	0.015	14	11
		0.47	-	9500	-	0.5	0.0065	20	11
		1.0	-	11500	-	0.43	0.0035	24	11
180	0.047	0.047	-	920	-	3.9	0.062	20	11
		0.1	-	1200	-	2.9	0.037	26	12
		0.22	-	1400	-	2.5	0.016	29	12
	0.1	0.1	-	2000	-	1.9	0.032	24	12
		0.22	-	2800	-	1.4	0.016	33	12
		0.47	-	3600	-	1.1	0.007	40	12
	0.22	0.22	-	5300	-	0.8	0.015	31	12
		0.47	-	8300	-	0.56	0.007	44	12
		1.0	-	10000	-	0.48	0.0035	54	12
300	0.047	0.047	-	870	-	4.1	0.065	38	12
		0.1	-	1200	-	3.0	0.034	52	12
		0.22	-	1500	-	2.4	0.016	68	12
	0.1	0.1	-	1900	-	1.9	0.032	44	12
		0.22	-	3000	-	1.3	0.016	68	12
		0.47	-	4000	-	1.1	0.007	80	12
	0.22	0.22	-	5300	-	0.9	0.015	57	12
		0.47	-	8800	-	0.52	0.007	82	12
		1.0	-	11000	-	0.46	0.0035	92	12

■ At 3 volts (RMS) output. ★ At 4 volts (RMS) output.

RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

See Circuit Diagram 1 — **11**

E_{bb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o	V.G.
90	0.05	0.05	-	2800	-	2.0	0.05	14	9
		0.1	-	3400	-	1.62	0.025	17	9
		0.25	-	3800	-	1.3	0.01	20	10
	0.1	0.1	-	4800	-	1.12	0.025	16	10
		0.25	-	6400	-	0.84	0.01	22	11
		0.5	-	7500	-	0.66	0.005	23	12
	0.25	0.25	-	11400	-	0.52	0.01	18	12
		0.5	-	14500	-	0.4	0.006	23	12
		1.0	-	17300	-	0.33	0.004	26	13
180	0.05	0.05	-	2200	-	2.2	0.055	34	10
		0.1	-	2700	-	2.1	0.03	45	11
		0.25	-	3100	-	1.85	0.015	54	11
	0.1	0.1	-	3900	-	1.7	0.035	41	12
		0.25	-	5300	-	1.25	0.015	54	12
		0.5	-	6200	-	1.2	0.008	55	13
	0.25	0.25	-	9500	-	0.74	0.015	44	13
		0.5	-	12300	-	0.55	0.008	52	13
		1.0	-	14700	-	0.47	0.004	59	13
300	0.05	0.05	-	2100	-	3.16	0.075	57	11
		0.1	-	2600	-	2.3	0.04	70	11
		0.25	-	3100	-	2.2	0.015	83	12
	0.1	0.1	-	3800	-	1.7	0.035	65	12
		0.25	-	5300	-	1.3	0.015	84	13
		0.5	-	6000	-	1.17	0.008	88	13
	0.25	0.25	-	9600	-	0.9	0.015	73	13
		0.5	-	12300	-	0.59	0.008	85	14
		1.0	-	14000	-	0.37	0.003	97	14

RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

12

See Circuit Diagram 1

Ebb	Rp	Rg	Rg2	Rk	Cg2	Ck	C	Eo	V.G.
90	0.1	0.1	-	3040	-	2.34	0.028	13	18
		0.25	-	3700	-	1.48	0.0115	17	20
		0.5	-	4520	-	1.29	0.006	19	21
	0.25	0.25	-	6770	-	0.95	0.011	15	21
		0.5	-	7870	-	0.81	0.0065	19	23
		1.0	-	8830	-	0.69	0.0035	21	23
	0.5	0.5	-	12400	-	0.51	0.006	16	22
		1.0	-	15000	-	0.43	0.0035	20	24
		2.0	-	16500	-	0.38	0.0015	25	24
180	0.1	0.1	-	2420	-	2.34	0.028	30	20
		0.25	-	3080	-	1.84	0.012	40	22
		0.5	-	3560	-	1.6	0.0065	45	23
	0.25	0.25	-	5170	-	1.25	0.012	35	24
		0.5	-	6560	-	0.95	0.007	45	25
		1.0	-	7550	-	0.85	0.0035	50	26
	0.5	0.5	-	9840	-	0.66	0.007	38	25
		1.0	-	12500	-	0.5	0.004	44	26
		2.0	-	15600	-	0.44	0.0015	51	26
300	0.1	0.1	-	2120	-	3.93	0.037	55	22
		0.25	-	2840	-	2.01	0.013	73	23
		0.5	-	3250	-	1.79	0.007	80	25
	0.25	0.25	-	4750	-	1.29	0.013	64	25
		0.5	-	6100	-	0.96	0.0065	80	26
		1.0	-	7100	-	0.77	0.004	90	27
	0.5	0.5	-	9000	-	0.67	0.007	67	27
		1.0	-	11500	-	0.48	0.004	83	27
		2.0	-	14500	-	0.37	0.002	96	28

RCA

RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

See Circuit Diagram 1

13

E_{bb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o	V.G.
90	0.05	0.05	-	1650	-	2.80	0.06	11	11
		0.1	-	2070	-	2.66	0.029	14	12
		0.25	-	2380	-	1.95	0.012	17	13
	0.1	0.1	-	3470	-	1.85	0.035	12	13
		0.25	-	3940	-	1.29	0.012	17	13
		0.5	-	4420	-	1.0	0.007	19	13
	0.25	0.25	-	7860	-	0.73	0.0135	14	13
		0.5	-	9760	-	0.55	0.007	18	13
		1.0	-	10690	-	0.47	0.004	20	13
180	0.05	0.05	-	1190	-	3.27	0.06	24	13
		0.1	-	1490	-	2.86	0.032	30	13
		0.25	-	1740	-	2.06	0.0115	36	13
	0.1	0.1	-	2330	-	2.19	0.038	26	14
		0.25	-	2830	-	1.35	0.012	34	14
		0.5	-	3230	-	1.15	0.006	38	14
	0.25	0.25	-	5560	-	0.81	0.013	28	14
		0.5	-	7000	-	0.62	0.007	36	14
		1.0	-	8110	-	0.5	0.004	40	14
300	0.05	0.05	-	1020	-	3.56	0.06	41	13
		0.1	-	1270	-	2.96	0.034	51	14
		0.25	-	1500	-	2.15	0.012	60	14
	0.1	0.1	-	1900	-	2.31	0.035	43	14
		0.25	-	2440	-	1.42	0.0125	56	14
		0.5	-	2700	-	1.2	0.0065	64	14
	0.25	0.25	-	4590	-	0.87	0.013	46	14
		0.5	-	5770	-	0.64	0.0075	57	14
		1.0	-	6950	-	0.54	0.004	64	14

RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

14 — See Circuit Diagram 3

E_{bb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o	V.G.
90	0.1	0.1	0.37	1200	0.05	5.2	0.02	17	41
		0.25	0.44	1100	0.05	5.3	0.01	22	55
		0.5	0.44	1300	0.05	4.8	0.006	33	66
	0.25	0.25	1.1	2400	0.03	3.7	0.008	23	70
		0.5	1.18	2600	0.03	3.2	0.005	32	85
		1.0	1.4	3600	0.025	2.5	0.003	33	92
	0.5	0.5	2.18	4700	0.02	2.3	0.005	28	93
		1.0	2.6	5500	0.05	2.0	0.0025	29	120
		2.0	2.7	5500	0.02	2.0	0.0015	27	140
180	0.1	0.1	0.44	1000	0.05	6.5	0.02	42	51
		0.25	0.5	750	0.05	6.7	0.01	52	69
		0.5	0.5	800	0.05	6.7	0.006	59	83
	0.25	0.25	1.1	1200	0.04	5.2	0.008	41	93
		0.5	1.18	1600	0.04	4.3	0.005	60	118
		1.0	1.4	2000	0.04	3.8	0.0035	60	140
	0.5	0.5	2.45	2600	0.03	3.2	0.005	45	135
		1.0	2.9	3100	0.025	2.5	0.0025	56	165
		2.0	2.7	3500	0.02	2.8	0.0015	60	165
300	0.1	0.1	0.44	500	0.07	8.5	0.02	55	61
		0.25	0.5	450	0.07	8.3	0.01	81	82
		0.5	0.53	600	0.06	8.0	0.006	96	94
	0.25	0.25	1.18	1100	0.04	5.5	0.008	81	104
		0.5	1.18	1200	0.04	5.4	0.005	104	140
		1.0	1.45	1300	0.05	5.8	0.005	110	185
	0.5	0.5	2.45	1700	0.04	4.2	0.005	75	161
		1.0	2.9	2200	0.04	4.1	0.003	97	200
		2.0	2.95	2300	0.04	4.0	0.0025	100	230

RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

See Circuit Diagram 1

15

E_{bb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o	V.G.★
90	0.05	0.05	-	2120	-	2.3	0.05	14	9.3
		0.1	-	2500	-	1.86	0.03	18	10
		0.25	-	2900	-	1.65	0.014	21	11
	0.1	0.1	-	3510	-	1.36	0.03	16	11
		0.25	-	4620	-	1.08	0.015	22	12
		0.5	-	5200	-	1.0	0.0085	23	12
	0.25	0.25	-	8050	-	0.61	0.0125	18	12
		0.5	-	10300	-	0.49	0.0085	22	12
		1.0	-	12100	-	0.42	0.0055	24	12
180	0.05	0.05	-	1810	-	2.9	0.06	32	10
		0.1	-	2240	-	2.2	0.03	41	11
		0.25	-	2660	-	1.8	0.014	46	12
	0.1	0.1	-	3180	-	1.46	0.03	36	12
		0.25	-	4200	-	1.1	0.0145	46	12
		0.5	-	4790	-	1.0	0.009	50	12
	0.25	0.25	-	7100	-	0.7	0.014	38	12
		0.5	-	9290	-	0.54	0.009	46	12
		1.0	-	10950	-	0.46	0.0055	52	13
300	0.05	0.05	-	1740	-	2.91	0.06	56	11
		0.1	-	2160	-	2.18	0.032	68	12
		0.25	-	2600	-	1.82	0.015	79	12
	0.1	0.1	-	3070	-	1.64	0.032	60	12
		0.25	-	4140	-	1.1	0.014	79	13
		0.5	-	4700	-	0.81	0.0075	89	13
	0.25	0.25	-	6900	-	0.57	0.013	64	13
		0.5	-	9100	-	0.46	0.0075	80	13
		1.0	-	10750	-	0.4	0.005	88	13

★ At 4 volts (RMS) output.

RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

16

See Circuit Diagram 3

E_{bb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o	V.G.
90	0.1	0.1	0.59	870	0.065	5.1	0.018	16	33
		0.25	0.65	900	0.061	5.0	0.01	21	47
		0.5	0.7	910	0.057	4.58	0.007	23	54
	0.25	0.25	1.5	1440	0.044	3.38	0.007	14	56
		0.5	1.6	1520	0.044	3.23	0.0055	18	66
		1.0	1.7	1560	0.043	3.22	0.004	19	77
	0.5	0.5	3.2	2620	0.029	2.04	0.004	12	70
		1.0	3.5	2800	0.03	1.95	0.0026	15	84
		2.0	3.7	3000	0.031	1.92	0.0024	16	94
180	0.1	0.1	0.58	530	0.073	7.2	0.017	33	47
		0.25	0.68	540	0.07	6.9	0.01	43	66
		0.5	0.71	540	0.065	6.6	0.0063	48	75
	0.25	0.25	1.6	850	0.05	4.6	0.0071	33	79
		0.5	1.8	890	0.044	4.7	0.005	40	104
		1.0	1.9	950	0.046	4.4	0.0037	44	118
	0.5	0.5	3.3	1410	0.041	3.5	0.0041	30	109
		1.0	3.6	1520	0.037	3.0	0.003	38	134
		2.0	3.8	1600	0.031	2.9	0.0024	42	147
300	0.1	0.1	0.59	430	0.007	8.5	0.0167	57	57
		0.25	0.67	440	0.071	8.0	0.01	75	78
		0.5	0.71	440	0.071	8.0	0.0066	82	89
	0.25	0.25	1.7	620	0.058	6.0	0.0071	54	98
		0.5	1.95	650	0.057	5.8	0.005	66	122
		1.0	2.1	700	0.055	5.2	0.0036	76	136
	0.5	0.5	3.6	1000	0.04	4.1	0.0037	52	136
		1.0	3.9	1080	0.041	3.9	0.0029	66	162
		2.0	4.1	1120	0.043	3.8	0.0023	73	174

RCA

RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

See Circuit Diagram 4

17

E_{bb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o	V.G.
90	0.1	0.1	-	1850*	-	-	0.028	4.1	13●
		0.25	-	1960*	-	-	0.012	5.9	23■
		0.5	-	2050*	-	-	0.0065	6.9	25★
	0.25	0.25	-	3400*	-	-	0.011	6.2	26★
		0.5	-	3750*	-	-	0.006	8.6	30
		1.0	-	3900*	-	-	0.003	10	33
	0.5	0.5	-	5500*	-	-	0.005	7.4	31
		1.0	-	6300*	-	-	0.003	10	33
		2.0	-	7450*	-	-	0.0015	12	36
180	0.1	0.1	-	960*	-	-	0.031	17	25
		0.25	-	1070*	-	-	0.012	24	29
		0.5	-	1220*	-	-	0.0065	27	33
	0.25	0.25	-	1850*	-	-	0.011	21	35
		0.5	-	2150*	-	-	0.006	28	39
		1.0	-	2400*	-	-	0.003	32	41
	0.5	0.5	-	3050*	-	-	0.006	24	40
		1.0	-	3420*	-	-	0.003	32	43
		2.0	-	3890*	-	-	0.002	36	45
300	0.1	0.1	-	750*	-	-	0.033	35	29
		0.25	-	930*	-	-	0.014	50	34
		0.25	-	1040*	-	-	0.007	54	36
	0.25	0.25	-	1400*	-	-	0.012	45	39
		0.5	-	1680*	-	-	0.006	55	42
		1.0	-	1840*	-	-	0.003	64	45
	0.5	0.5	-	2330*	-	-	0.006	50	45
		1.0	-	2980*	-	-	0.003	62	48
		2.0	-	3280*	-	-	0.002	72	49

● At 2 volts (RMS) output. ■ At 3 volts (RMS) output. ★ At 4 volts (RMS) output.
*Values are for phase-inverter service.

RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

18

See Circuit Diagram 1

E_{bb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o	V.G.
90	0.1	0.1	-	4400	-	2.5	0.02	4	28●
		0.25	-	4800	-	2.1	0.01	5	34■
		0.5	-	5000	-	1.8	0.005	6	35★
	0.25	0.25	-	8000	-	1.33	0.01	6	39■
		0.5	-	8800	-	1.18	0.005	7	43★
		1.0	-	9000	-	0.9	0.003	10	44
	0.5	0.5	-	12200	-	0.76	0.005	8	43
		1.0	-	13500	-	0.67	0.003	10	46
		2.0	-	14700	-	0.58	0.0015	12	48
180	0.1	0.1	-	1800	-	4.4	0.025	16	37
		0.25	-	2000	-	3.3	0.015	23	44
		0.5	-	2200	-	2.9	0.006	25	46
	0.25	0.25	-	3500	-	2.3	0.01	21	48
		0.5	-	4100	-	1.8	0.006	26	53
		1.0	-	4500	-	1.7	0.004	32	57
	0.5	0.5	-	6100	-	1.3	0.006	24	53
		1.0	-	6900	-	0.9	0.003	33	63
		2.0	-	7700	-	0.83	0.0015	37	66
300	0.1	0.1	-	1300	-	5.0	0.025	33	42
		0.25	-	1600	-	3.7	0.01	43	49
		0.5	-	1700	-	3.2	0.006	48	52
	0.25	0.25	-	2600	-	2.5	0.01	41	56
		0.5	-	3200	-	2.1	0.007	54	63
		1.0	-	3500	-	2.0	0.004	63	67
	0.5	0.5	-	4500	-	1.5	0.006	50	65
		1.0	-	5400	-	1.2	0.004	62	70
		2.0	-	6100	-	0.93	0.002	70	70

●At 2 volts (RMS) output. ■ At 3 volts (RMS) output. ★ At 4 volts (RMS) output

RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

See Circuit Diagram 3

19

E_{bb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o	V.G.
90	0.1	0.1	0.26	1500	0.11	4.8	0.02	21	21
		0.22	0.3	1600	0.1	4.4	0.012	26	29
		0.47	0.35	1900	0.09	4.2	0.006	28	37
	0.22	0.22	0.64	2400	0.09	3.4	0.009	21	33
		0.47	0.7	2500	0.09	3.2	0.0055	26	40
		1.0	0.84	2600	0.084	3.0	0.0035	29	52
	0.47	0.47	1.5	4200	0.06	2.1	0.0045	21	50
		1.0	1.6	4400	0.06	1.9	0.003	26	59
		2.2	1.7	4800	0.058	1.6	0.002	29	64
180	0.1	0.1	0.33	1000	0.13	6.7	0.02	32	33
		0.22	0.5	1200	0.12	5.8	0.011	37	45
		0.47	0.6	1300	0.11	5.5	0.006	43	52
	0.22	0.22	0.76	1700	0.11	4.5	0.0095	37	47
		0.47	0.9	1700	0.1	4.5	0.0055	44	68
		1.0	1.0	1800	0.1	4.2	0.003	47	82
	0.47	0.47	1.8	3300	0.09	2.9	0.0045	38	70
		1.0	2.0	3800	0.08	2.4	0.003	50	85
		2.2	2.1	4000	0.07	2.3	0.002	57	98
300	0.1	0.1	0.32	750	0.19	8.0	0.021	62	39
		0.22	0.36	850	0.18	7.7	0.012	80	46
		0.47	0.37	900	0.18	7.7	0.006	93	57
	0.22	0.22	0.8	1150	0.13	6	0.01	63	62
		0.47	0.94	1300	0.12	5.7	0.0055	78	88
		1.0	0.98	1500	0.11	5.0	0.0035	99	97
	0.47	0.47	1.7	2300	0.1	3.5	0.0045	71	82
		1.0	1.9	2500	0.1	3.5	0.003	89	109
		2.2	2.0	2800	0.09	3.1	0.002	105	125

RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

20

See Circuit Diagram 3

E_{bb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o	V.G.
90	0.1	0.1	0.29	820	0.09	8.8	0.02	18	41
		0.25	0.29	880	0.085	7.4	0.016	23	68
		0.5	0.31	1000	0.075	6.6	0.007	28	70
	0.25	0.25	0.69	1680	0.06	5.0	0.012	16	75
		0.5	0.92	1700	0.045	4.5	0.005	18	93
		1.0	0.82	1800	0.04	4.0	0.003	22	104
	0.5	0.5	1.5	3600	0.045	2.4	0.003	18	91
		1.0	1.7	3800	0.03	2.4	0.002	22	119
		2.0	1.9	4050	0.028	2.35	0.0015	24	139
180	0.1	0.1	0.29	760	0.10	9.1	0.019	49	55
		0.25	0.31	800	0.09	8.0	0.015	60	82
		0.5	0.37	860	0.09	7.8	0.007	62	91
	0.25	0.25	0.83	1050	0.06	6.8	0.001	38	109
		0.5	0.94	1060	0.06	6.6	0.004	47	131
		1.0	0.94	1100	0.07	6.1	0.003	54	161
	0.5	0.5	1.85	2000	0.05	4.0	0.003	37	151
		1.0	2.2	2180	0.04	3.8	0.002	44	192
		2.0	2.4	2410	0.035	3.6	0.0015	54	208
300	0.1	0.1	0.35	500	0.10	11.6	0.019	72	67
		0.25	0.37	530	0.09	10.9	0.016	96	98
		0.5	0.47	590	0.09	9.9	0.007	101	104
	0.25	0.25	0.89	850	0.07	8.5	0.011	79	139
		0.5	1.10	860	0.06	7.4	0.004	88	167
		1.0	1.18	910	0.06	6.9	0.003	98	185
	0.5	0.5	2.0	1300	0.06	6.0	0.004	64	200
		1.0	2.2	1410	0.05	5.8	0.002	79	238
		2.0	2.5	1530	0.04	5.2	0.0015	89	263

RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

See Circuit Diagram 4

21

E_{bb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o	V.G.
90	0.1	0.1	-	1480*	-	2.65	0.025	8	21★
		0.25	-	1760*	-	2.02	0.0115	11	25
		0.5	-	1930*	-	1.7	0.0065	14	26
	0.25	0.25	-	3000*	-	1.36	0.01	12	28
		0.5	-	3390*	-	1.1	0.006	15	30
		1.0	-	3670*	-	0.8	0.0035	18	33
	0.5	0.5	-	5300*	-	0.65	0.0055	14	31
		1.0	-	6050*	-	0.61	0.003	18	33
		2.0	-	6700*	-	0.45	0.0015	20	35
180	0.1	0.1	-	930*	-	3.4	0.028	18	26
		0.25	-	1100*	-	2.6	0.0115	28	31
		0.5	-	1210*	-	2.32	0.007	33	32
	0.25	0.25	-	1820*	-	1.71	0.012	28	35
		0.5	-	2110*	-	1.38	0.007	34	38
		1.0	-	2400*	-	1.1	0.0035	41	39
	0.5	0.5	-	3240*	-	0.9	0.006	32	39
		1.0	-	3890*	-	0.703	0.0035	38	40
		2.0	-	4360*	-	0.553	0.002	44	41
300	0.1	0.1	-	670*	-	3.81	0.028	38	31
		0.25	-	950*	-	2.63	0.012	52	34
		0.5	-	1050*	-	2.34	0.007	60	36
	0.25	0.25	-	1430*	-	1.87	0.012	50	38
		0.5	-	1680*	-	1.46	0.006	59	40
		1.0	-	1930*	-	1.19	0.0035	66	43
	0.5	0.5	-	2540*	-	0.97	0.006	55	42
		1.0	-	3110*	-	0.72	0.0035	70	44
		2.0	-	3560*	-	0.56	0.002	75	45

★ At 4 volts (RMS) output. *Values are for phase-inverter service.

RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

22 — See Circuit Diagram 1

E_{bb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o	V.G.
90	0.05	0.05	-	3800	-	1.4	0.06	16	4.5
		0.1	-	4600	-	1.1	0.03	19	4.9
		0.25	-	5400	-	0.86	0.015	23	5.1
	0.1	0.1	-	6620	-	0.7	0.04	17	5.1
		0.25	-	9000	-	0.55	0.015	22	5.4
		0.5	-	10300	-	0.5	0.007	25	5.5
	0.25	0.25	-	15100	-	0.31	0.015	18	5.3
		0.5	-	20500	-	0.25	0.007	23	5.5
		1.0	-	24400	-	0.2	0.004	26	5.6
180	0.05	0.05	-	3200	-	1.8	0.06	33	4.9
		0.1	-	4100	-	1.6	0.045	44	5.2
		0.25	-	5000	-	1.2	0.02	49	5.3
	0.1	0.1	-	6200	-	0.9	0.04	37	5.3
		0.25	-	8700	-	0.7	0.015	47	5.5
		0.5	-	10000	-	0.57	0.008	50	5.5
	0.25	0.25	-	14500	-	0.43	0.015	40	5.6
		0.5	-	20000	-	0.29	0.008	48	5.7
		0.1	-	24000	-	0.24	0.004	53	5.7
300	0.05	0.05	-	3200	-	1.9	0.08	50	5.2
		0.1	-	4100	-	1.5	0.045	74	5.5
		0.25	-	5100	-	1.2	0.015	85	5.6
	0.1	0.1	-	5900	-	0.8	0.03	64	5.5
		0.25	-	8300	-	0.54	0.015	82	5.7
		0.5	-	9600	-	0.43	0.006	88	5.8
	0.25	0.25	-	14300	-	0.3	0.01	71	5.7
		0.5	-	19400	-	0.22	0.006	84	5.7
		1.0	-	23600	-	0.2	0.003	94	5.8

RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

See Circuit Diagram 1

23

E_{bb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o	V.G.
90	0.05	0.05	-	2500	-	2.0	0.06	16	7.0
		0.1	-	3200	-	1.6	0.03	21	7.7
		0.25	-	3800	-	1.25	0.015	23	8.1
	0.1	0.1	-	4500	-	1.05	0.03	19	8.1
		0.25	-	6500	-	0.82	0.015	23	8.9
		0.5	-	7500	-	0.68	0.007	25	9.3
	0.25	0.25	-	11100	-	0.48	0.015	21	9.4
		0.5	-	15100	-	0.36	0.007	24	9.7
		1.0	-	18300	-	0.32	0.0035	28	9.8
180	0.05	0.05	-	2400	-	2.5	0.06	36	7.7
		0.1	-	3000	-	1.9	0.035	48	8.2
		0.25	-	3700	-	1.65	0.015	55	9.0
	0.1	0.1	-	4500	-	1.45	0.035	45	9.3
		0.25	-	6500	-	0.97	0.015	55	9.5
		0.5	-	7600	-	0.8	0.008	57	9.8
	0.25	0.25	-	10700	-	0.6	0.015	49	9.7
		0.5	-	14700	-	0.45	0.007	59	10
		1.0	-	17700	-	0.4	0.0045	64	10
300	0.05	0.05	-	2400	-	2.8	0.08	65	8.3
		0.1	-	3100	-	2.2	0.045	80	8.9
		0.25	-	3800	-	1.8	0.02	95	9.4
	0.1	0.1	-	4500	-	1.6	0.04	74	9.5
		0.25	-	6400	-	1.2	0.02	95	10
		0.5	-	7500	-	0.98	0.009	104	10
	0.25	0.25	-	11100	-	0.69	0.02	82	10
		0.5	-	15200	-	0.5	0.009	96	10
		1.0	-	18300	-	0.4	0.005	108	10

RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

24 — See Circuit Diagram 4

E_{bb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o	V.G.
90	0.1	0.1	-	2050*	-	-	0.04	5.8	23■
		0.25	-	2200*	-	-	0.015	8.4	29★
		0.5	-	2350*	-	-	0.009	9.5	29
	0.25	0.25	-	4000*	-	-	0.015	7.1	31★
		0.5	-	4250*	-	-	0.006	9.7	33
		1.0	-	4650*	-	-	0.004	12	35
	0.5	0.5	-	6150*	-	-	0.006	8.8	34
		1.0	-	6850*	-	-	0.004	12	38
		2.0	-	7500*	-	-	0.002	15	40
180	0.1	0.1	-	1050*	-	-	0.04	21	27
		0.25	-	1250*	-	-	0.02	27	31
		0.5	-	1350*	-	-	0.009	31	34
	0.25	0.25	-	2050*	-	-	0.02	26	37
		0.5	-	2450*	-	-	0.01	34	41
		1.0	-	2750*	-	-	0.005	40	42
	0.5	0.5	-	3450*	-	-	0.009	30	42
		1.0	-	4100*	-	-	0.0035	39	44
		2.0	-	4650*	-	-	0.002	44	45
300	0.1	0.1	-	800*	-	-	0.025	40	29
		0.25	-	1000*	-	-	0.01	57	34
		0.5	-	1100*	-	-	0.006	60	36
	0.25	0.25	-	1650*	-	-	0.01	56	39
		0.5	-	2050*	-	-	0.0055	66	42
		1.0	-	2350*	-	-	0.003	77	43
	0.5	0.5	-	2850*	-	-	0.0055	61	44
		1.0	-	3600*	-	-	0.003	75	46
		2.0	-	4450*	-	-	0.0015	82	46

■ At 3 volts (RMS) output. ★ At 4 volts (RMS) output.
*Values are for phase-inverter service.

RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

See Circuit Diagram 1

25

E_{bb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o	V.G.
		0.1	-	4400	-	2.7	0.023	5	29●
	0.1	0.22	-	4700	-	2.4	0.013	6	35●
		0.47	-	4800	-	2.3	0.007	8	41●
		0.22	-	7000	-	1.6	0.001	6	39●
90	0.22	0.47	-	7400	-	1.4	0.006	9	45■
		1.0	-	7600	-	1.3	0.003	11	48★
		0.47	-	12000	-	0.9	0.006	9	48■
	0.47	1.0	-	13000	-	0.8	0.003	11	52★
		2.2	-	14000	-	0.7	0.002	13	55★
		0.1	-	1800	-	4.0	0.025	18	40
	0.1	0.22	-	2000	-	3.5	0.013	25	47
		0.47	-	2200	-	3.1	0.006	32	52
		0.22	-	3000	-	2.4	0.012	24	53
180	0.22	0.47	-	3500	-	2.1	0.006	34	59
		1.0	-	3900	-	1.8	0.003	39	63
		0.47	-	5800	-	1.3	0.006	30	62
	0.47	1.0	-	6700	-	1.1	0.003	39	66
		2.2	-	7400	-	1.0	0.002	45	68
		0.1	-	1300	-	4.6	0.027	43	45
	0.1	0.22	-	1500	-	4.0	0.013	57	52
		0.47	-	1700	-	3.6	0.006	66	57
		0.22	-	2200	-	3.0	0.013	54	59
300	0.22	0.47	-	2800	-	2.3	0.006	69	65
		1.0	-	3100	-	2.1	0.003	79	68
		0.47	-	4300	-	1.6	0.006	62	69
	0.47	1.0	-	5200	-	1.3	0.003	77	73
		2.2	-	5900	-	1.1	0.002	92	75

● At 2 volts (RMS) output. ■ At 3 volts (RMS) output. ★ At 4 volts (RMS) output

RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

26 — See Circuit Diagram 3

E_{bb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o	V.G.*
90	0.1	0.1 0.22 0.47	0.35	1700	0.044 0.046 0.047	4.6 4.5 4.4	0.020 0.012 0.006	13 17 20	29 39 47
	0.22	0.22 0.47 1.0	0.80	3000	0.034 0.035 0.036	3.2 3.1 3.0	0.010 0.005 0.003	15 21 24	43 59 67
	0.47	0.47 1.0 2.2	1.9	7000	0.021 0.022 0.023	1.8 1.7 1.7	0.005 0.003 0.002	21 25 28	59 75 87
180	0.1	0.1 0.22 0.47	0.35	700	0.060 0.062 0.064	7.4 7.3 7.2	0.020 0.012 0.006	24 28 33	39 56 65
	0.22	0.22 0.47 1.0	0.80	1200	0.045 0.046 0.048	5.5 5.3 5.2	0.010 0.005 0.003	24 31 34	65 87 101
	0.47	0.47 1.0 2.2	1.9	2500	0.033 0.034 0.035	3.5 3.4 3.3	0.005 0.003 0.002	27 32 37	98 122 140
300	0.1	0.1 0.22 0.47	0.35	300	0.075 0.077 0.080	10.8 10.6 10.5	0.020 0.012 0.006	25 32 35	51 68 83
	0.22	0.22 0.47 1.0	0.80	600	0.056 0.057 0.058	7.9 7.5 7.4	0.010 0.005 0.003	28 37 41	81 109 123
	0.47	0.47 1.0 2.2	1.3	1200	0.044 0.046 0.047	5.3 5.2 5.1	0.005 0.003 0.002	35 42 48	125 152 174

* At an output voltage of 1 volt RMS and Grid No. 1 bias of 1 volt.

CHART FOR MAXIMUM VOLTAGE OUTPUT

E_{bb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o	V.G.
90	0.1	0.1 0.22 0.47	0.12 0.15 0.17	2000 2200 2400	0.09 0.08 0.07	4.8 4.4 4.0	0.027 0.013 0.007	22 28 31	23 32 39
	0.22	0.22 0.47 1.0	0.35 0.40 0.44	3500 3800 4100	0.06 0.065 0.06	3.3 3.2 3.0	0.011 0.006 0.003	24 30 32	33 44 50
	0.47	0.47 1.0 2.2	0.90 1.0 1.1	6800 7400 8000	0.04 0.04 0.04	2.0 2.0 2.0	0.005 0.003 0.002	25 30 32	47 57 64

(Continued on next page)

RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

See Circuit Diagram 3 — Cont'd **26**

E_{bb}	R_p	R_g	R_{g1}	R_k	C_{g1}	C_k	C	E_o	V.G.
180	0.1	0.1	0.19	1300	0.08	6.0	0.021	48	33
		0.22	0.20	1400	0.08	5.85	0.013	59	46
		0.47	0.22	1500	0.07	5.45	0.007	68	57
	0.22	0.22	0.44	2000	0.09	4.85	0.011	48	41
		0.47	0.53	2300	0.07	4.45	0.006	62	62
		1.0	0.55	2400	0.065	4.25	0.004	68	72
	0.47	0.47	1.0	3500	0.07	3.5	0.005	51	54
		1.0	1.1	3700	0.07	3.5	0.003	59	66
		2.2	1.2	4000	0.07	3.3	0.002	66	81
300	0.1	0.1	0.18	1000	0.1	7.0	0.022	85	38
		0.22	0.2	1100	0.1	6.8	0.013	110	53
		0.47	0.23	1200	0.075	6.4	0.007	124	66
	0.22	0.22	0.47	1400	0.1	5.75	0.012	88	44
		0.47	0.52	1600	0.1	5.45	0.006	113	64
		1.0	0.58	1700	0.075	5.0	0.004	124	86
	0.47	0.47	1.1	2300	0.1	4.6	0.006	90	58
		1.0	1.2	2500	0.1	4.3	0.004	110	76
		2.2	1.3	2800	0.1	4.2	0.002	121	99

RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

27 — See Circuit Diagram 1

E_{bb}	R_p	R_g	R_k	C_k	C	E_o	V.G.
90	0.047	0.047	1800	2.9	0.060	9	10#
		0.1	2100	2.4	0.033	12	11§
		0.22	2200	2.3	0.016	14	21*
	0.1	0.1	3200	1.8	0.027	10	12§
		0.22	3900	1.3	0.015	13	13*
		0.47	4300	1.0	0.007	16	13
	0.22	0.22	6200	0.87	0.015	12	13§
		0.47	8100	0.53	0.006	16	13
		1.0	9000	0.49	0.003	19	14
180	0.047	0.047	1200	3.5	0.063	21	12
		0.1	1600	2.6	0.033	29	13
		0.22	1800	2.4	0.016	35	13
	0.1	0.1	2200	1.9	0.031	26	13
		0.22	2900	1.35	0.015	33	14
		0.47	3400	1.1	0.007	40	14
	0.22	0.22	4500	0.92	0.015	28	14
		0.47	6400	0.61	0.006	39	14
		1.0	8200	0.52	0.003	47	14
300	0.047	0.047	1100	3.9	0.063	42	13
		0.1	1500	2.8	0.033	65	13
		0.22	1700	2.5	0.016	71	14
	0.1	0.1	2000	2.1	0.032	45	15
		0.22	3400	1.4	0.015	74	15
		0.47	3700	1.1	0.007	83	15
	0.22	0.22	4300	0.97	0.015	50	15
		0.47	7200	0.63	0.007	88	15
		1.0	7400	0.63	0.003	94	15

At 2 volts (RMS) output. § At 3 volts (RMS) output.

* At 4 volts (RMS) output.

RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

See Circuit Diagram 1

28

E_{bb}	R_p	R_g	R_k	C_k°	C°	E_o	V.G.*
90	0.1 0.24 0.51	0.24 0.51 1.0	1800 3700 7800	— — —	— — —	13 14 16	24 26 27
180	0.1 0.24 0.51	0.24 0.51 1.0	1300 2800 5700	— — —	— — —	31 33 33	27 29 30
300	0.1 0.24 0.51	0.24 0.51 1.0	1200 2300 4800	— — —	— — —	58 30 56	28 30 31

* At 2 volts (RMS) output.

° Coupling capacitors should be selected to give desired frequency response. Cathode resistors should be adequately bypassed.

RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

29 — See Circuit Diagram 1

E_{bb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o	V.G.
90	0.047	0.047 0.1 0.22	- - -	1870 2230 2500	- - -	3.1 2.5 2.1	0.063 0.031 0.016	14 18 20	13 14 14
	0.1	0.1 0.22 0.47	- - -	3370 4100 4800	- - -	1.8 1.3 1.1	0.034 0.015 0.006	15 20 23	14 14 15
	0.22	0.22 0.47 1.00	- - -	7000 9100 10500	- - -	0.80 0.65 0.60	0.013 0.007 0.004	16 22 25	14 14 15
180	0.047	0.047 0.1 0.22	- - -	1500 1860 2160	- - -	3.6 2.9 2.2	0.066 0.055 0.015	33 41 47	14 14 15
	0.1	0.1 0.22 0.47	- - -	2750 3550 4140	- - -	1.8 1.4 1.3	0.028 0.015 0.007	35 45 51	15 15 16
	0.22	0.22 0.47 1.00	- - -	5150 7000 7800	- - -	1.0 0.71 0.61	0.016 0.007 0.004	36 45 51	16 16 16
300	0.047	0.047 0.1 0.22	- - -	1300 1580 1800	- - -	3.6 3.0 2.5	0.061 0.032 0.015	59 73 83	14 15 16
	0.1	0.1 0.22 0.47	- - -	2500 3130 3900	- - -	1.9 1.4 1.2	0.031 0.014 0.0065	68 82 96	16 16 16
	0.22	0.22 0.47 1.00	- - -	4800 6500 7800	- - -	0.95 0.69 0.58	0.015 0.0065 0.0035	68 85 96	16 16 16

MAX. D-C HEATER-CATHODE POTENTIALS
OF RECEIVING TYPES
Based on JAN Specifications as of January 3, 1944

The following Receiving Tubes appear in the JAN Specifications as having an *absolute maximum* heater-cathode potential rating of 100 volts. The corresponding *design-center maximum* rating may be taken as 90 volts, the value which should be used in connection with the respective data sheets in this Section except as noted below. Receiving types for which heater-cathode potential ratings are given on their data pages are not included in this list.

2A5	6K8-G	12SF7
2B7	*6L5-G	12SG7
6A6	6L7	12SH7
6A7	6L7-G	12SJ7
6A8-G	6N7	12SK7
6A8-GT	6N7-GT/G	12SK7-GT/G
6AB7	6Q7	12SL7-GT
6AC7	6Q7-G	12SN7-GT
6AG7	6Q7-GT	12SR7
6B7	6SA7	*24-A
6B8	6SA7-GT/G	25L6
6B8-G	6SC7	25L6-GT/G
6C5	6SF5	*27
6C6	6SG7	*35
6C8-G	6SH7	35L6-GT
6D6	6SJ7	36
6E5	6SK7	*37
6F5	6SK7-GT/G	*38
6F5-GT/G	6SL7-GT	39/44
6F6	6SN7-GT	41
6F6-G	6SR7	42
6F7	6SS7	50L6-GT
6F8-G	6ST7	53
6G6-G	6U5/6G5	56
6J5	6V6	57
6J5-GT/G	6V6-GT/G	58
6J7	12AH7-GT	*59
6J7-G	12C8	75
6J7-GT	12J5-GT	76
6K6-GT/G	12K7-GT/G	77
6K7	12Q7-GT/G	78
6K7-G	12SA7	*79
6K7-GT	12SA7-GT/G	*85
6K8	12SC7	

* Data sheet for this type is on an *absolute rating* basis.

(Tentative)

GRID-No. 2 INPUT RATING CHART

The Grid-No.2 Input Rating Chart shown on the back of this page presents graphically the relationship between the grid-No.2 voltage and the maximum grid-No.2 input for certain multi-electrode tube types.

The chart shows that full rated grid-No.2 input is permissible at grid-No.2 voltages up to 50 per cent of the maximum rated grid-No.2 supply voltage. From the 50 per cent point to the full rated value of supply voltage, the grid-No.2 input must be decreased. The decrease in allowable grid-No.2 input follows a curve of the parabolic form.

This chart is useful for applications utilizing either a fixed grid-No.2 voltage, or a series grid-No.2 voltage-dropping resistor.

Where a fixed grid-No.2 voltage is used, it is necessary only to determine that the grid-No.2 input is within the boundary of the operating area on the chart at the selected value of grid-No.2 voltage to be used.

Where a grid-No.2 voltage-dropping resistor is used, the minimum value of resistor that will assure tube operation within the boundary of the curve can be determined from the following relation:

$$R_{g2} \geqq \frac{E_{c2}\ (E_{cc2} - E_{c2})}{P_{c2}}$$

where:

R_{g2} = minimum value for grid-No.2 voltage-dropping resistor in ohms.

E_{c2} = selected value of grid-No.2 voltage in volts.

E_{cc2} = grid-No.2 supply voltage in volts.

P_{c2} = grid-No.2 input in watts corresponding to E_{c2}.

EXAMPLES

Example 1 - *Use of a Fixed Grid-No.2 Supply Voltage:*

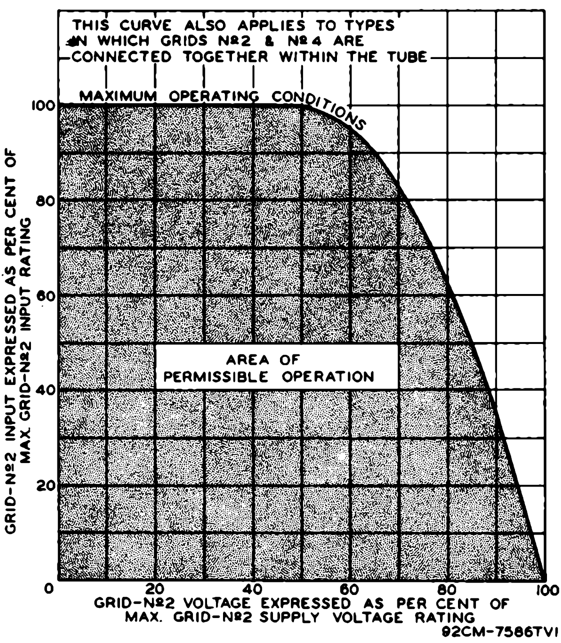
The tube data for a certain tube stipulates a maximum grid-No.2 supply voltage rating of 300 volts, and a maximum grid-No.2 input rating of 1 watt. It is desired to operate the tube with a fixed voltage of 200 volts between grid No.2 and cathode. This value is 66-2/3% of the maximum grid-No.2 supply voltage rating. From the chart, the maximum grid-No.2 input, therefore, must be limited to 88% of the maximum grid-No.2 input rating or 0.88 watt.

GRID-No. 2 INPUT RATING CHART

Example 2 - *Use of a Grid-No. 2 Voltage-Dropping Resistor:*

The tube data for a certain tube stipulates a maximum grid-No.2 supply voltage rating of 300 volts, and a maximum grid-No.2 input rating of 1 watt. It is desired to operate the tube with a grid-No.2-to-cathode voltage of 250 volts, obtained through a dropping resistor from a 300-volt power supply. Because 250 volts is 83% of 300 volts, the maximum grid-No.2 input must be limited, as shown on the chart, to 56% of the maximum grid-No.2 input rating, or 0.56 watt. Then, the minimum value required for the grid-No.2 voltage-dropping resistor will be:

$$R_{g2} = \frac{250\ (300 - 250)}{0.56} = 22,320 \text{ ohms}$$

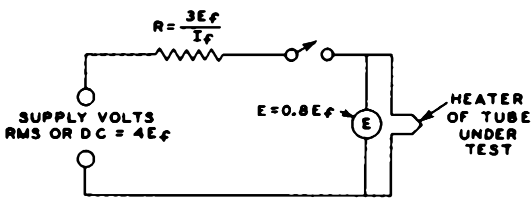


92CM-7586TVI

HEATER WARM-UP TIME MEASUREMENT
FOR TUBE TYPES INTENDED FOR USE IN SERIES HEATER-STRING ARRANGEMENT

Heater warm-up time is measured in the circuit shown below as follows: The heater is placed in series with a resistance having a value 3 times the heater operating resistance. A voltage having a value 4 times the rated heater voltage is then applied. Heater warm-up time is then defined as the time required for the voltage across the heater to reach 80 per cent of its rated value.

TEST CIRCUIT FOR DETERMINING HEATER WARM-UP TIME



E_f = RATED HEATER VOLTAGE OF TUBE UNDER TEST.
I_f = RATED HEATER CURRENT OF TUBE UNDER TEST.

92CS-8503

0Z4, 0Z4-G

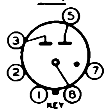
FULL-WAVE GAS RECTIFIER

COLD CATHODE TYPE

	0Z4	0Z4-G
Maximum Overall Length	2-5/8"	2-5/8"
Maximum Diameter	1-5/16"	1-1/16"
Bulb	Metal Shell, MT-8	T-7
Base	Small Wafer Octal 6-Pin	Dwarf Shell Octal 5-Pin

0Z4

Pin 1 - Shell
Pin 2 - No Connection
Pin 3 - Plate #2

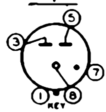


Pin 5 - Plate #1
Pin 7 - No Connection
Pin 8 - Cathode

BOTTOM VIEW

0Z4-G

Pin 1 - No Connection
Pin 3 - Plate #2
Pin 5 - Plate #1



Pin 7 - No Connection
Pin 8 - Cathode

BOTTOM VIEW

MAXIMUM RATINGS

Starting-Supply Voltage per Plate	300 min. peak	volts
Peak Plate-to-Plate Voltage	1000 max.	volts
Peak Plate Current	200 max.	ma.
D-C Output Current	75 max.	ma.
	30 min.	ma.
D-C Output Voltage	300 max.	volts
Average Dynamic Tube Voltage Drop	24	volts

SEPT. 1, 1938 — TENTATIVE DATA

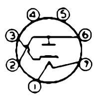
1A3

H-F DIODE

MINIATURE TYPE

Heater	Coated Unipotential Cathode	
Voltage	1.4	a-c or d-c volts
Current	0.15	amp.
Direct Interelectrode Capacitances (Approx.):°		←
Plate to Cathode	0.4	μμf
Plate to Heater	0.8	μμf
Heater to Cathode	0.6	μμf
Maximum Overall Length		2-1/8"
Maximum Seated Height		1-7/8"
Length from Base Seat to Bulb Top (excluding tip)		1-1/2" ± 3/32" ←
Maximum Diameter		3/4"
Bulb		T-5-1/2
Base▲		Miniature Button 7-Pin

Pin 1-Heater
Pin 2-Plate
Pin 3-Cathode
Pin 4-No Connection
Pin 5 {Internal Con. Do Not Use ←
Pin 6-Plate
Pin 7-Heater



BOTTOM VIEW ($5AP_2$)

RCA Socket	Stock No. 9914
Mounting Position	Any

Maximum Ratings Are Design-Center Values

RECTIFIER

Peak Inverse Plate Voltage	330 max.	volts	←
Peak Plate Current	5 max.	ma.	←
D-C Output Current	0.5 max.	ma.	
D-C Heater-Cathode Potential	140 max.	volts	←

Typical Operation with Condenser-Input Filter: ←

A-C Plate Supply Voltage (RMS)	117	volts
Filter Input Condenser	2	μf
Min. Total Effective Plate-Supply Impedance	0	ohms

° The resonant frequency of the 1A3 is approximately 1000 Mc. with no external shield.

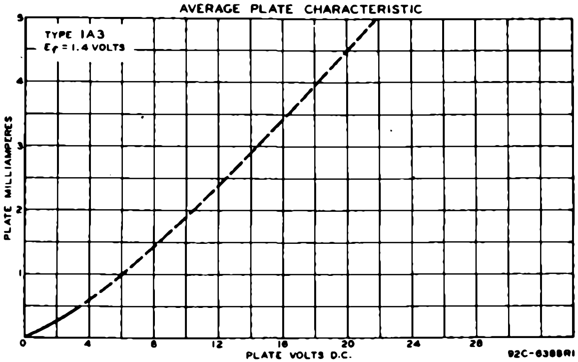
▲ *The center hole in sockets designed for this base provides for the possibility that this tube type may be manufactured with the exhaust-tube tip at the base end. For this reason, it is recommended that in equipment employing this tube type, no material be permitted to obstruct the socket hole.*

← Indicates a change

1A3

1A3

H-F DIODE



1A4-P

1A4-P

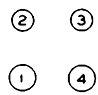
SUPER-CONTROL R-F AMPLIFIER PENTODE

Filament	Coated	
Voltage	2.0	d-c volts
Current	0.060	amp.

Direct Interelectrode Capacitances:		
Grid to Plate (with shield-can)	0.007 max.	μμf
Input	5	μμf
Output	11	μμf

Overall Length	4-9/32" to 4-17/32"
Maximum Diameter	1-9/16"
Bulb	ST-12
Cap	Small Metal
Base	Small 4-Pin

Pin 1-Filament +
Pin 2-Plate
Pin 3-Screen



BOTTOM VIEW

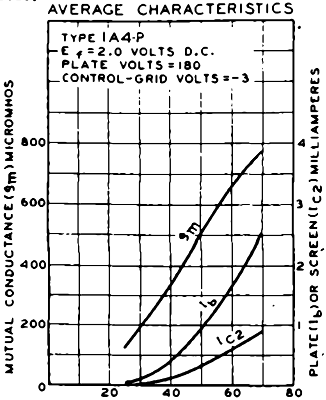
Pin 4-Filament -
Cap -Grid

AMPLIFIER - Class A

Operating Conditions and Characteristics:			
Filament	2.0	2.0	d-c volts
Plate	90	180 max.	volts
Screen	67.5	67.5 max.	volts
Grid	-3	-3	min. volts
Amp. Fact.	425	750	
Plate Res.	0.6	1.0	approx. megohm
Mut. Cond.	720	750	μmhos
Mut. Cond. *	15	15	μmhos
Plate Cur.	2.2	2.3	ma.
Screen Cur.	0.9	0.8	ma.

* At -15 volts bias.

AVERAGE CHARACTERISTICS



92C-4655

SEPT. 30, 1936

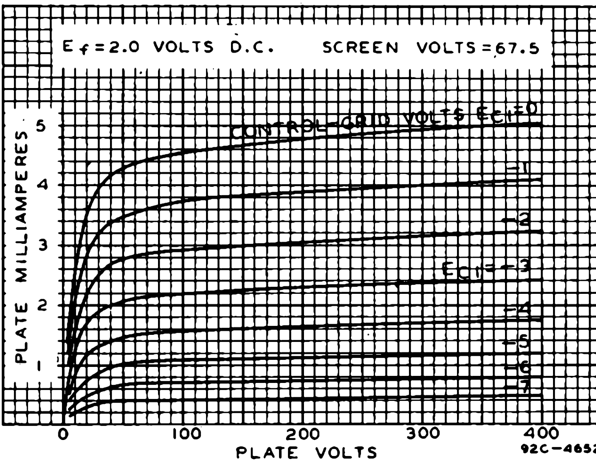
TENTATIVE DATA

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

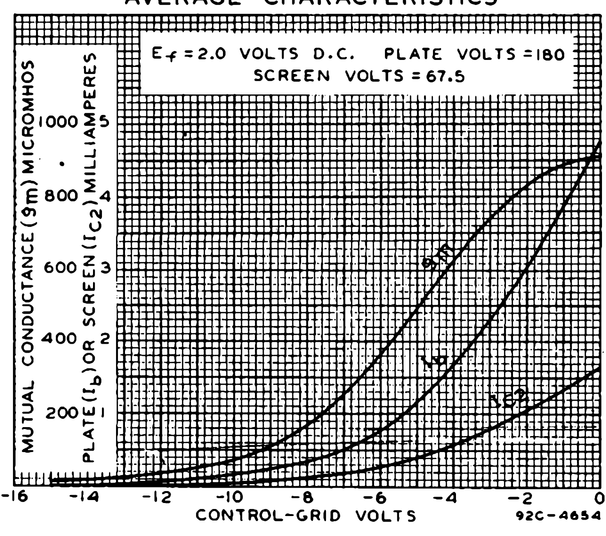
RCA

1A4-P

AVERAGE PLATE CHARACTERISTICS



AVERAGE CHARACTERISTICS

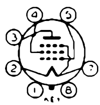


1A5-GT/1A5-G

POWER AMPLIFIER PENTODE

Filament	Coated	
Voltage	1.4	d-c volts
Current	0.05	amp.
Maximum Overall Length		3-5/16"
Maximum Seated Height		2-3/4"
Maximum Diameter		1-5/16"
Bulb		T-9
Base		Intermediate Shell Octal 7-Pin

Pin 1 - No Connection
Pin 2 - Filament +
Pin 3 - Plate
Pin 4 - Screen



Pin 5 - Grid
Pin 7 - Filament -
Pin 8 - No Connection

Mounting Position: Any

BOTTOM VIEW (G-6X)

AMPLIFIER

Plate Voltage	110 max.	volts
Screen Voltage	110 max.	volts
Total Zero-Sig. Cathode Current	6 max.	ma.

Typical Operation and Characteristics - Class A_1 Amplifier:

Plate	85	90	volts
Screen	85	90	volts
Grid *	-4.5	-4.5	volts
Peak A-F Grid Volt.	4.5	4.5	volts
Zero-Sig. Plate Cur.	3.5	4.0	ma.
Max.-Sig. Plate Cur.	3.5	4.0	ma.
Zero-Sig. Screen Cur.	0.7	0.8	ma.
Max.-Sig. Screen Cur.	1.0	1.1	ma.
Plate Res.	0.3	0.3	approx. ohms
Transcond.	800	850	μmhos
Load Res.	25000	25000	ohms
Total Harmonic Dist.	10	7	%
Max.-Sig. Power Output	100	115	mw

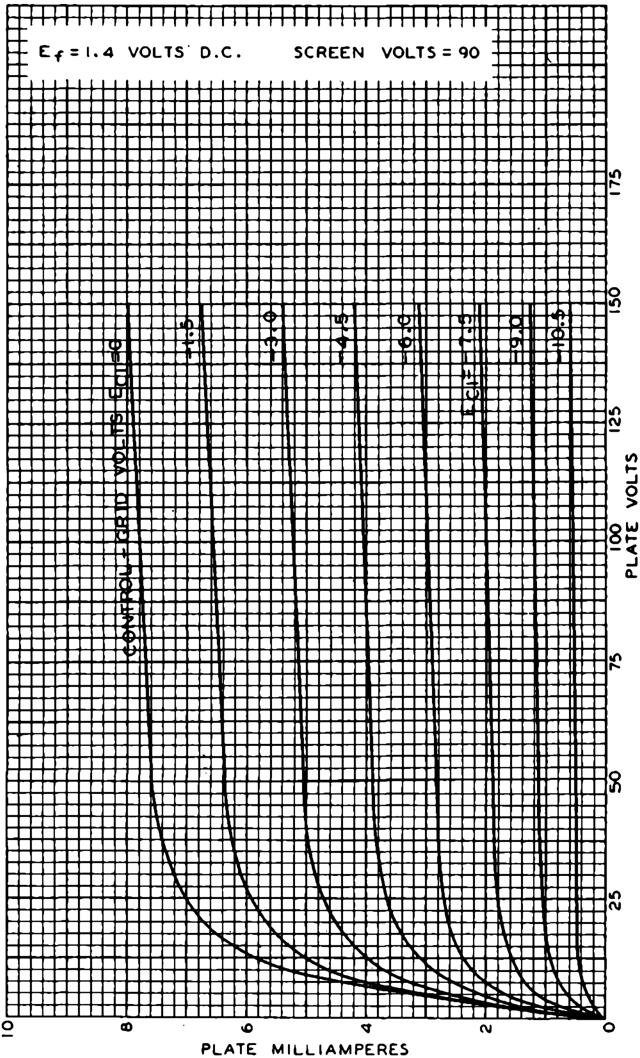
* Self-bias is recommended so that grid bias will be proportionately less as the B-supply voltage falls off during battery life.

1A5-GT

RCA

1A5-GT

AVERAGE PLATE CHARACTERISTICS



NOV. 10, 1938

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

92C-4998

Cunningham Radiotron

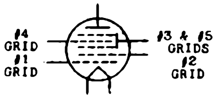
RCA-1A6

1A6

PENTAGRID CONVERTER

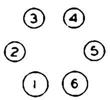
Filament	Coated	
Voltage	2.0	d-c volts
Current	0.060	amp.

Direct Interelectrode Capacitances (approx.):



C_{g_4p}	0.25[©]	μμf
$C_{g_4g_2}$	0.2[©]	μμf
$C_{g_4g_1}$	0.1[©]	μμf
$C_{g_1g_2}$	0.8	μμf
$C_{g_4(k+g_1+g_2+g_3+g_5+p)}$ = R-F Input	10.5	μμf
$C_{g_2(k+g_1+g_3+g_4+g_5+p)}$ = Osc. Output	6	μμf
$C_{g_1(k+g_2+g_3+g_4+g_5+p)}$ = Osc. Input	5	μμf
$C_{p(k+g_1+g_2+g_3+g_4+g_5)}$ = Mixer Output	9	μμf

Overall Length	4-9/32" to 4-17/32"
Maximum Diameter	1-9/16"
Bulb	ST-12
Cap	Small Metal
Base	Small 6-Pin



BOTTOM VIEW

Pin 1-Filament+
Pin 2-Plate
Pin 3-Grid #2
Pin 4-Grid #1
Pin 5-Grids #3 & #5
Pin 6-Filament-
Cap -Grid #4

CONVERTER SERVICE

Plate Voltage	180 max.	volts
Screen (Grids #3 & #5) Voltage	67.5 max.	volts
Anode-Grid (Grid #2) Voltage	135 max.	volts
Anode-Grid Voltage Supply*	180 max.	volts
Control-Grid (Grid #4) Voltage	-3 min.	volts
Total Cathode Current	9 max.	ma.

Typical Operation:

Filament	2.0	2.0	d-c volts
Plate	135	180	volts
Screen	67.5	67.5	volts
Anode-Grid	135	135	volts
Anode-Grid Supply	135	180*	volts
Control-Grid	-3	-3	volts
Oscillator-Grid (Grid #1) Res.	50000	50000	ohms
Plate Resistance	0.4	0.5	megohm
Conversion Cond.	275	300	μmhos
Conversion Cond. at -22.5 volts on Grid #4	4	4	μmhos
Plate Current	1.2	1.3	ma.
Screen Current	2.5	2.4	ma.
Anode-Grid Current	2.3	2.3	ma.
Oscillator-Grid Cur.	0.2	0.2	ma.
Total Cathode Current	6.2	6.2	ma.

*Applied through a 20000-ohm voltage-dropping resistor, by-passed by 0.1 μf condenser ←

The mutual conductance of the oscillator portion (not oscillating) of the 1A6 is 425 micromhos under the following conditions: plate voltage, 135 to 180 volts; screen voltage, 67.5 volts; anode-grid voltage (no voltage-dropping resistor), 135 volts; and oscillator-grid voltage, 0 volts. Under these same conditions, the anode-grid current is 2.3 milliamperes.

© With shield-can.

← Indicates a change

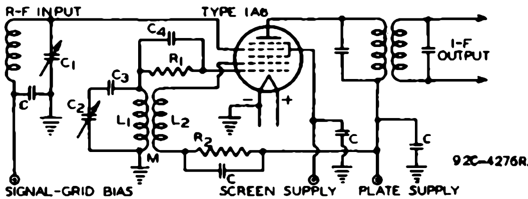
1A6

Cunningham Radiotron

RCA-1A6

PENTAGRID CONVERTER

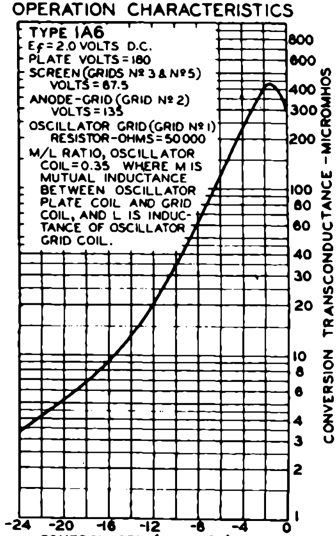
TYPICAL PENTAGRID CONVERTER CIRCUIT



C = 0.1 µf
C_1 = } GANGED VARIABLE CONDENSERS
C_2 =
C_3 = PADDING CONDENSER
C_4 = GRID CONDENSER OF 200 µµf
L_1 = OSCILLATOR GRID INDUCTANCE } COUPLED
L_2 = OSCILLATOR PLATE INDUCTANCE

M = MUTUAL INDUCTANCE OF L_1 AND L_2
R_1 = OSCILLATOR GRID LEAK
R_2 = VOLTAGE DROPPING RESISTOR OF 20000 OHMS
GRID #2 VOLTS SHOULD BE HIGHER THAN SCREEN VOLTS

OPERATION CHARACTERISTICS



92C-5343

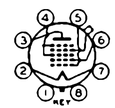
1A7-GT/G

PENTAGRID CONVERTER

Filament	Coated	
Voltage	1.4	d-c volts
Current	0.05	amp.
Direct Interelectrode Capacitances:°		
Grid #4 to Plate	0.5 max.	μμf
Grid #4 to Grid #2	0.4 max.	μμf
Grid #4 to Grid #1	0.2 max.	μμf
Grid #1 to Grid #2	0.9	μμf
Grid #4 to All Other Electrodes (R-F Input)	7.0	μμf
Grid #2 to All Other Electrodes Except Grid #1 (Osc. Output)	4.4	μμf
Grid #1 to All Other Electrodes Except Grid #2 (Osc. Input)	3.4	μμf
Plate to All Other Electrodes (Mixer Output)	10	μμf
Maximum Overall Length		3-5/16"
Maximum Seated Height		2-3/4"
Maximum Diameter		1-5/16"
Bulb		T-9
Cap		Skirted Miniature
Base		Small Wafer Octal 8-Pin, Sleeve

Pin 1 - Base Sleeve
Pin 2 - Filament +
Pin 3 - Plate
Pin 4 - Grids #3 & #5
Pin 5 - Grid #1
Pin 6 - Grid #2
Pin 7 - Filament −
Pin 8 - No Connection
Cap - Grid #4

Mounting Position — Any



BOTTOM VIEW (GT-7Z)

Maximum Ratings Are Design-Center Values

CONVERTER SERVICE

Plate Voltage	110 max.	volts
Screen (Grids #3 & #5) Voltage	60 max.	volts
Screen Supply Voltage	110 max.	volts
Anode-Grid (Grid #2) Voltage	110 max.	volts
Total Zero-Sig. Cathode Current	4 max.	ma.
Typical Operation:		
Plate	90	volts
Screen **	45	volts
Anode-Grid	90	volts
Control-Grid (Grid #4)*	0	volts
Oscillator-Grid (Grid #1) Resistor	200000	ohms
Plate Res.	0.6	megohm
Conversion Transcond.	250	μmhos
Conversion Transcond. with Grid #4 bias of -3 volts	5 approx.	μmhos ←
Plate Cur.	0.6	ma.
Screen Cur.	0.7	ma.
Anode-Grid Cur.	1.2	ma.
Oscillator-Grid Cur.	0.035	ma.
Total Cathode Cur.	2.5	ma.

NOTE: The transconductance of the oscillator portion (not oscillating) is 550 micromhos under the following conditions: plate volts, 90; screen volts, 45; control-grid volts, 0; anode-grid volts, 90; and oscillator-grid volts, 0.

° With external shield connected to negative filament terminal.
** Obtained preferably by using a properly by-passed 45000- to 75000-ohm voltage-dropping resistor in series with the 90-volt supply.
* A resistance of at least 1.0 megohm should be in the grid return to negative filament pin.

← Indicates a change.

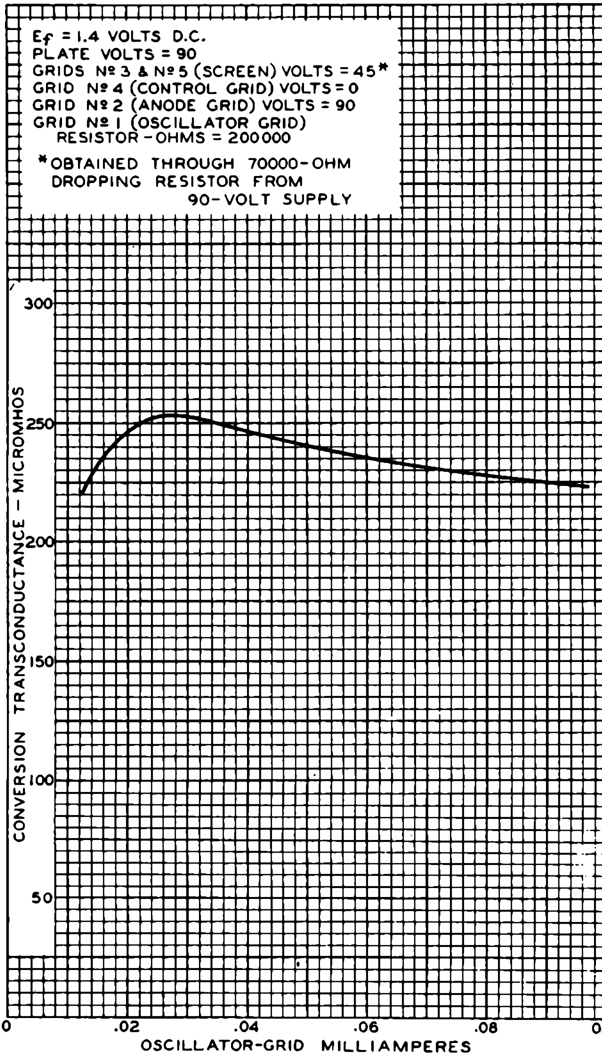
Typical Pentagrid Converter Circuit is shown under Type 1A6.

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

1A7-GT/G

1A7-GT/G

OPERATION CHARACTERISTIC



OCT. 23, 1939

RCA VICTOR DIVISION

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92C-6091

1AC5

POWER PENTODE

SUBMINIATURE TYPE

GENERAL DATA

Electrical:

Filament, Coated:

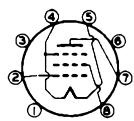
Voltage	1.25	dc volts
Current	0.04	amp

Mechanical:

Mounting Position	Any
Maximum Overall Length	1-3/4"
Maximum Seated Length	1-1/2"
Length, Base Seat to Bulb Top (excluding tip)	1.200" ±0.060"
Maximum Diameter	0.4"
Bulb	T-3
Base	Small-Button Sub-minar 8-Pin

BOTTOM VIEW

Pin 1 - No Connection
Pin 2 - Grid No.1
Pin 3 - No Connection
Pin 4 - Filament (-), Grid No.3



Pin 5 - Filament (+)
Pin 6 - No Connection
Pin 7 - Plate
Pin 8 - Grid No.2

AMPLIFIER - Class A_1

Maximum Ratings, ***Design-Center Values*****:**

PLATE VOLTAGE	67.5 max.	volts
GRID-No. 2 (SCREEN) VOLTAGE	67.5 max.	volts
TOTAL CATHODE CURRENT	4.0 max.	ma

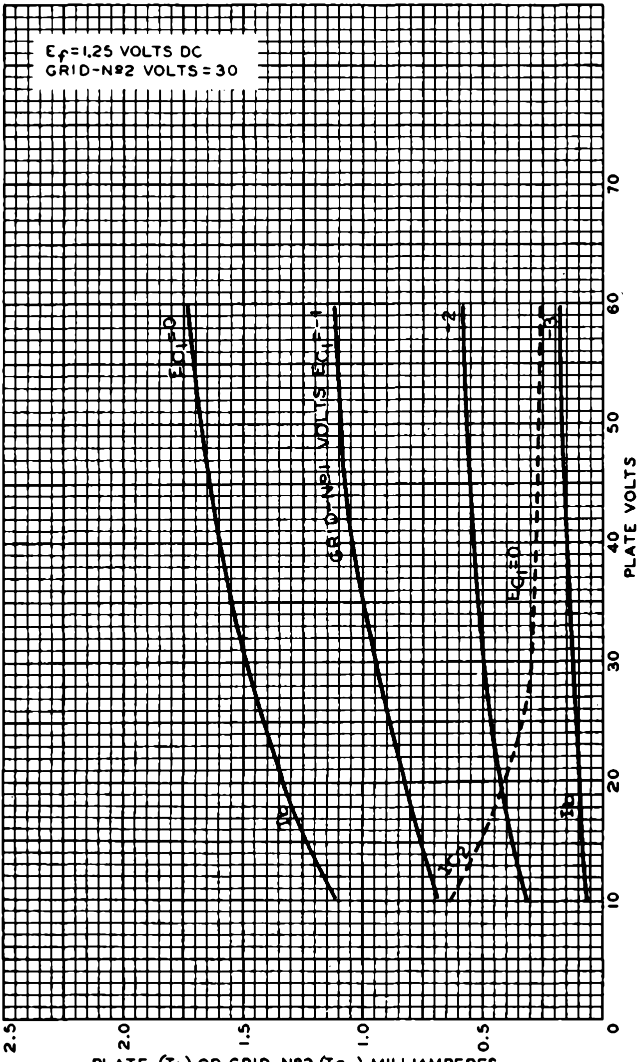
Typical Operation and Characteristics:

Plate Voltage	30	45	67.5	volts
Grid-No.2 Voltage	30	45	67.5	volts
Grid-No.1 (Control-Grid) Voltage	-2	-3	-4.5	volts
Peak AF Grid-No.1 Voltage	2	3	4.5	volts
Zero-Signal Plate Current	0.5	1.0	2.0	ma
Zero-Signal Grid-No.2 Current	0.1	0.2	0.4	ma
Plate Resistance	0.2	0.17	0.15	megohm
Transconductance	450	600	750	μmhos
Load Resistance	50000	40000	25000	ohms
Total Harmonic Distortion	10	10	10	%
Max.-Signal Power Output	5	15	50	mw

1AC5

1AC5

AVERAGE PLATE CHARACTERISTICS



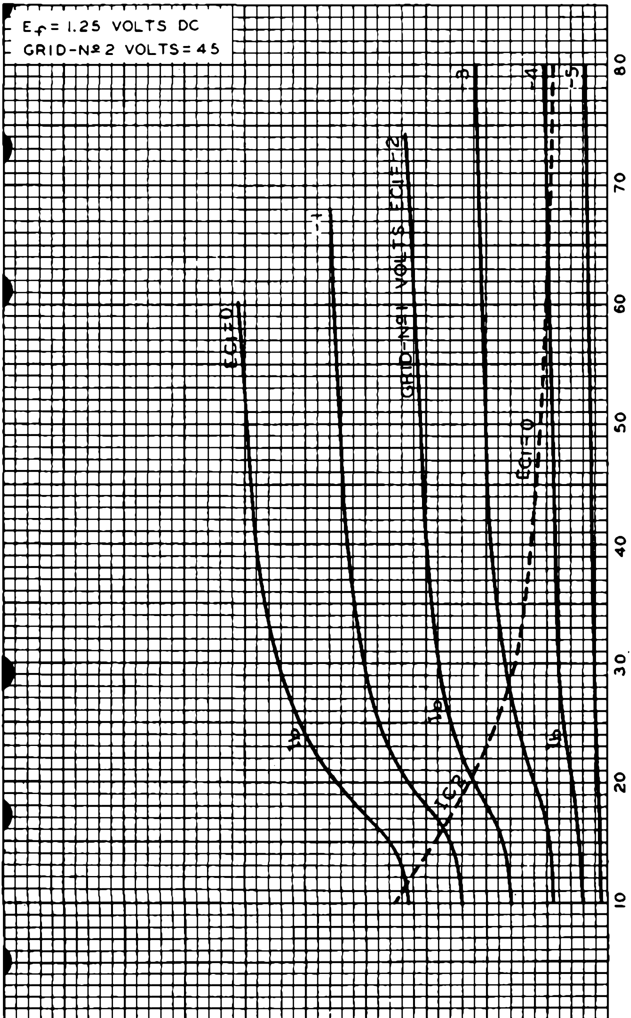
APRIL 12, 1949 — TUBE DEPARTMENT — 92CM-7245

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

1AC5

1AC5

AVERAGE PLATE CHARACTERISTICS



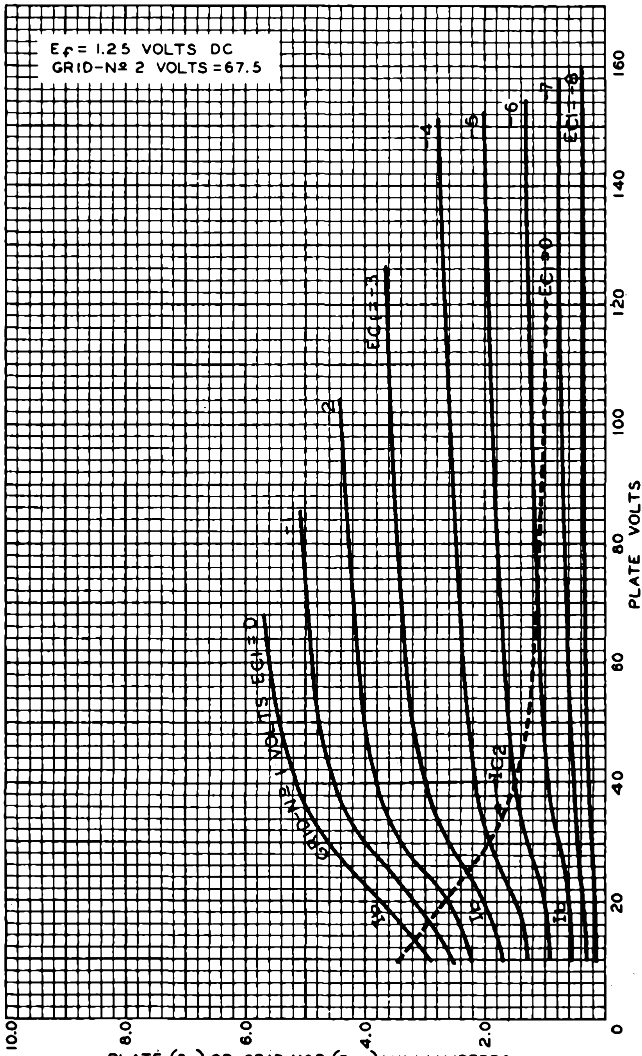
APRIL 26, 1949 — TUBE DEPARTMENT — 92CM-7261

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

IAC5

1AC5

AVERAGE PLATE CHARACTERISTICS



APRIL 13, 1949

TUBE DEPARTMENT

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7247

1AD5

1AD5
SHARP-CUTOFF PENTODE
SUBMINIATURE TYPE

GENERAL DATA

Electrical:

Filament, Coated:

Voltage	1.25	dc volts
Current	0.04	amp

Direct Interelectrode Capacitances:[o]

Grid No.1 to Plate	0.010 max.	$\mu\mu$f
Input	1.8	$\mu\mu$f
Output	2.8	$\mu\mu$f

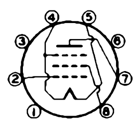
[o] With no external shield.

Mechanical:

Mounting Position	Any
Maximum Overall Length	1-3/4"
Maximum Seated Length	1-1/2"
Length, Base Seat to Bulb Top (excluding tip)	1.200 ± 0.060"
Maximum Diameter	0.4"
Bulb	T-3
Base	Small-Button Sub-minar 8-Pin

BOTTOM VIEW

Pin 1 - No Connection
Pin 2 - Grid No.1
Pin 3 - No Connection
Pin 4 - Filament (-), Grid No.3



Pin 5 - Filament (+)
Pin 6 - No Connection
Pin 7 - Plate
Pin 8 - Grid No.2

AMPLIFIER - Class A_1

Maximum Ratings, ***Design-Center Values:***

PLATE VOLTAGE	67.5 max.	volts
GRID-No.2 (SCREEN) VOLTAGE	67.5 max.	volts
TOTAL CATHODE CURRENT	4.0 max.	ma

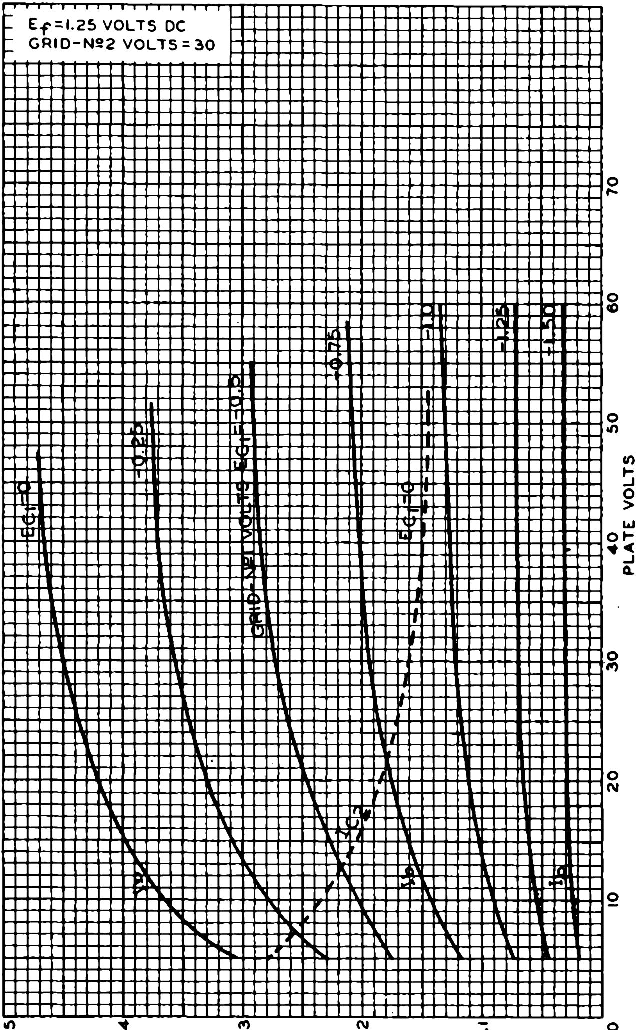
Typical Operation and Characteristics:

Plate Voltage	30	45	67.5	volts
Grid-No.2 Voltage	30	45	67.5	volts
Grid-No.1 (Control-Grid) Voltage	0	0	0	volts
Plate Resistance (Approx.)	0.7	0.7	0.7	megohm
Transconductance	430	580	735	μmhos
Grid-No.1 Bias (Approx.) for plate current of 10 μamp	-3	-4	-6	volts
Plate Current	0.45	0.9	1.85	ma
Grid-No.2 Current	0.16	0.35	0.75	ma

RCA

1AD5

AVERAGE PLATE CHARACTERISTICS

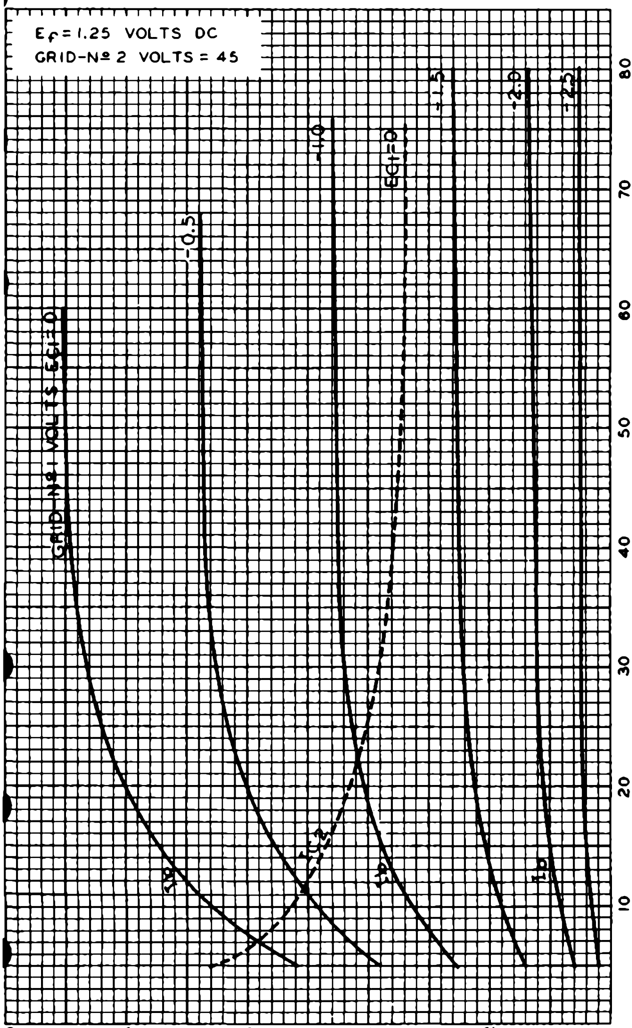


APRIL 19, 1949 — TUBE DEPARTMENT — 92CM-7253

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

1AD5

AVERAGE PLATE CHARACTERISTICS

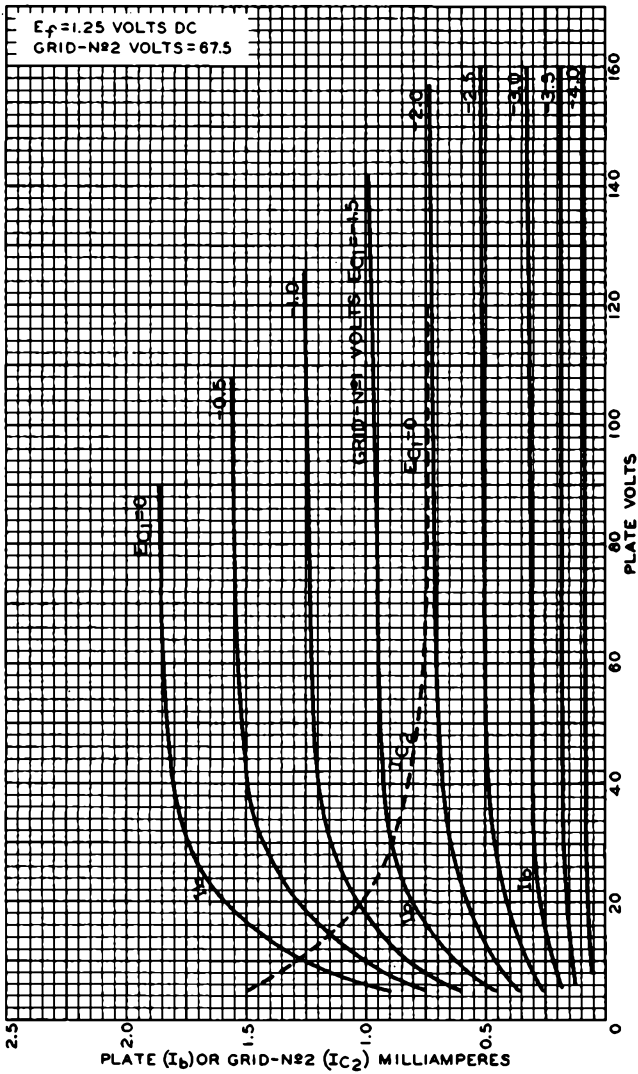


APRIL 19, 1949 TUBE DEPARTMENT 92CM-7251

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

1AD5

AVERAGE PLATE CHARACTERISTICS



1AD5

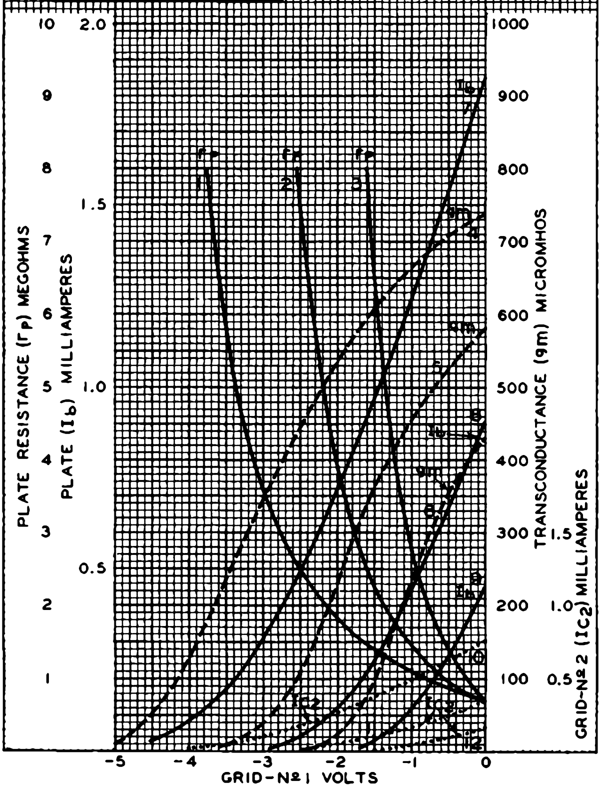
RCA

1AD5

AVERAGE CHARACTERISTICS

E_f = 1.25 VOLTS DC

CURVE		PLATE VOLTS	GRID-No 2 VOLTS
1	r_p	67.5	67.5
2	r_p	45	45
3	r_p	30	30
4	g_m	67.5	67.5
5	g_m	45	45
6	g_m	30	30
7	I_b	67.5	67.5
8	I_b	45	45
9	I_b	30	30
10	I_{c2}	67.5	67.5
11	I_{c2}	45	45
12	I_{c2}	30	30



RCA

1AX2
HALF-WAVE VACUUM RECTIFIER

9-PIN MINIATURE TYPE

GENERAL DATA

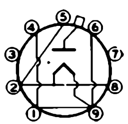
Electrical:

Filament, Coated:		
Voltage	1.4	ac volts
Current	0.65	amp
Direct Interelectrode Capacitance:°		
Plate to filament	0.7 max.	μμf

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-27/32"
Seated Length	2-7/16" ± 1/8"
Maximum Diameter	7/8"
Dimensional Outline	*See General Section*
Bulb	T-6-1/2
Cap	Skirted Miniature (JETEC No.C1-2 or C1-33)
Base	Small-Button Noval 9-Pin (JETEC No.E9-1)
Basing Designation for BOTTOM VIEW	9Y

Pin 1 - Filament, Internal Shield
Pin 2 - Filament
Pin 3 - No Connection♦
Pin 4 - Same as Pin 1



Pin 5 - Same as Pin 2
Pin 6 - Same as Pin 1
Pin 7 - Same as Pin 3
Pin 8 - Same as Pin 2
Pin 9 - Same as Pin 1
Cap - Plate

PULSED-RECTIFIER SERVICE

Maximum Ratings, *Design-Center Values Except as Noted:*

For operation in a 525-line, 30-frame system□

PEAK INVERSE PLATE VOLTAGE (Absolute maximum)	25000■	max.	volts
PEAK PLATE CURRENT	11	max.	ma
AVERAGE PLATE CURRENT	1	max.	ma

Typical Operation:

Peak Plate Supply Voltage:		
Positive pulse value	20000	volts
Negative pulse value	5000	volts
DC Output Voltage (Approx.)	20000	volts
DC Output Current (Approx.)	300	μamp

° Without external shield.

♦ May be connected to one side of filament, or used as a tie point for filament dropping resistor; otherwise do not use.

□ As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations", Federal Communications Commission.

■ Under no circumstances should this absolute value be exceeded.

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

1AX2

HALF-WAVE VACUUM RECTIFIER

OPERATING CONSIDERATIONS

Filament Voltage Adjustment. When the filament is supplied from an rf source and is at a high dc potential above ground, adjustment of the filament voltage by direct measurement is impractical. To insure that the rated voltage is applied to the filament, a simple method utilizing a visual color match of two incandescent filaments in a darkened room may be used. In this method, the rf filament voltage, obtained from a pulse-power source, is adjusted until the color of this filament matches that of the filament of another 1AX2 operated from a dc or low-frequency ac supply of 1.4 volts.

X-rays. The voltages employed in some television receivers and other high-voltage equipment are sufficiently high that high-voltage rectifier tubes may produce X-rays which can constitute a health hazard unless such tubes are adequately shielded. Relatively simple shielding should prove adequate, but the need for this precaution should be considered in equipment design.

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

RCA

1B3-GT/8016

HALF-WAVE VACUUM RECTIFIER

Supersedes Type 8016

GENERAL DATA

Electrical:

Filament, Coated:

Voltage	1.25*	ac volts
Current	0.2	amp
Direct Interelectrode Capacitance (Approx.):●		
Plate to Filament	1.5	μμf

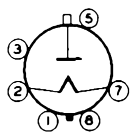
* The filament voltage must never exceed 1.5 volts, even momentarily.

● With no external shield.

Mechanical:

Mounting Position	Any
Overall Length	3-7/8" ± 3/16"
Seated Length	3-5/16" ± 3/16"
Maximum Diameter	1-9/32" ←
Bulb	T-9
Cap	Small
Base	Intermediate-Shell Octal 6-Pin ←
Basing Designation for BOTTOM VIEW	3C

Pin 1 - See NOTE
Pin 2 - Filament
Pin 3 - Same as Pin 1
Pin 5 - Same as Pin 1



Pin 7 - Filament, Internal Shield
Pin 8 - Same as Pin 1
Cap - Plate

NOTE: May be connected to pin 7; otherwise, do not use.

HALF-WAVE RECTIFIER

Maximum Ratings, ***Design-Center Values*:**

PEAK INVERSE PLATE VOLTAGE	30000 max.	volts ←
PEAK PLATE CURRENT	17 max.	ma
AVERAGE PLATE CURRENT	2 max.	ma
FREQUENCY OF SUPPLY VOLTAGE	300 max.	kc

OPERATING NOTES

When the *filament* is to be operated on rf, it is recommended that the filament be connected first to a dc or low-frequency ac supply of 1.25 volts. The color temperature of the filament corresponding to this voltage may then be checked visually by observing in a darkened room the reflection of the incandescent filament upon the upper surface of the internal shield. A visual comparison of this color temperature with that obtained with the filament operated from an rf voltage provides a convenient means for adjusting the amount of rf excitation to produce 1.25 volts (RMS) at the filament terminals.

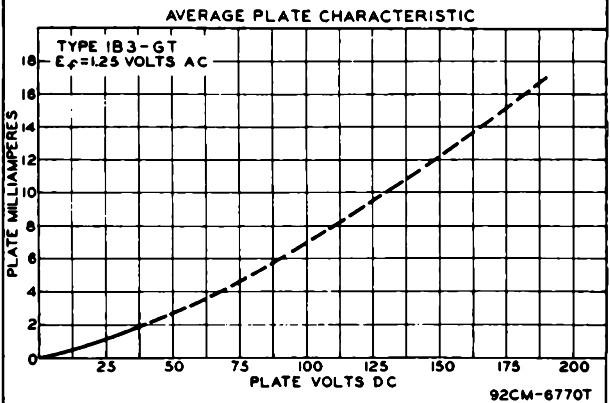
The *voltages* employed in some television receivers and other high-voltage equipment are sufficiently high that high-voltage rectifier tubes may produce soft x-rays which can constitute a health hazard, unless such tubes are adequately shielded. Relatively simple shielding should prove adequate, but the need for this precaution should be considered in equipment design.

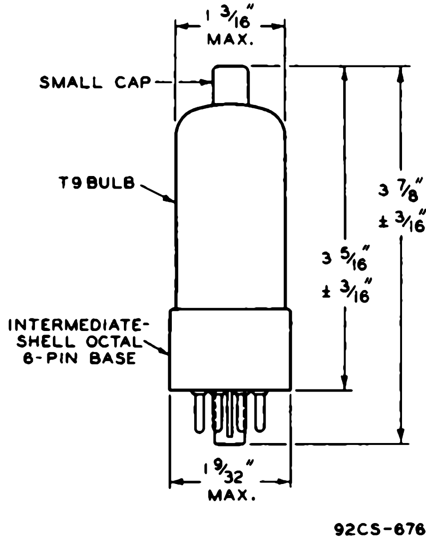
← Indicates a change.

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

1B3-GT

1B3-GT
HALF-WAVE VACUUM RECTIFIER





NOV. 15, 1949 TUBE DEPARTMENT CE-6770T-6760R1

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

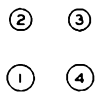
1B4-P

1B4-P

R-F AMPLIFIER PENTODE

Filament	Coated	
Voltage	2.0	d-c volts
Current	0.060	amp.
Direct Interelectrode Capacitances:		
Grid to Plate (with shield-can)		0.007 max. μμf
Input		5 μμf
Output		11 μμf
Overall Length		4-9/32" to 4-17/32"
Maximum Diameter		1-9/16"
Bulb		ST-12
Cap		Small Metal
Base		Small 4-Pin

Pin 1-Filament +
Pin 2-Plate
Pin 3-Screen



Pin 4-Filament -
Cap -Grid

BOTTOM VIEW

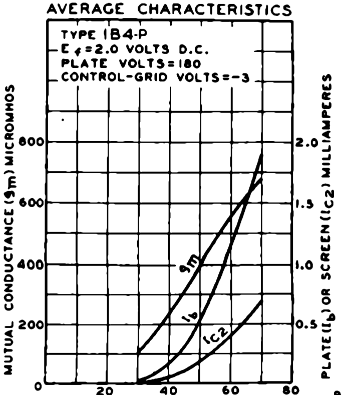
AMPLIFIER - Class A

Operating Conditions and Characteristics:

Filament	2.0	2.0	d-c volts
Plate	90	180 max.	volts
Screen	67.5	67.5 max.	volts
Grid	-3	-3	volts
Amp. Fact.	550	1000	
Plate Res.	1.0	1.5	megohms
Mut. Cond.	600	650	μmhos
Grid Bias†	-8	-8	volts
Plate Cur.	1.6	1.7	ma.
Screen Cur.	0.7	0.6	ma.

† For plate current cut-off.

AVERAGE CHARACTERISTICS



92C-4659

SEPT. 30, 1936

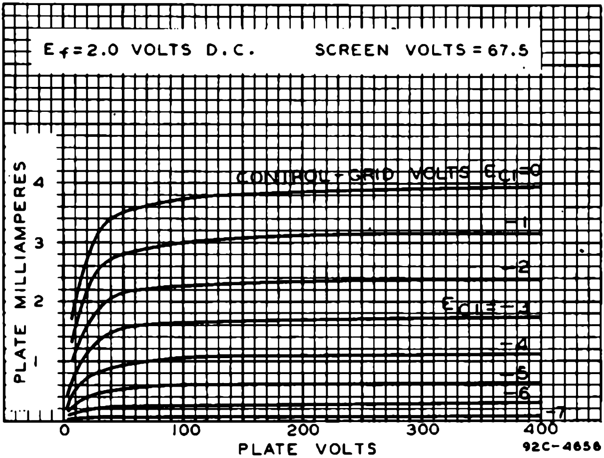
TENTATIVE DATA

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

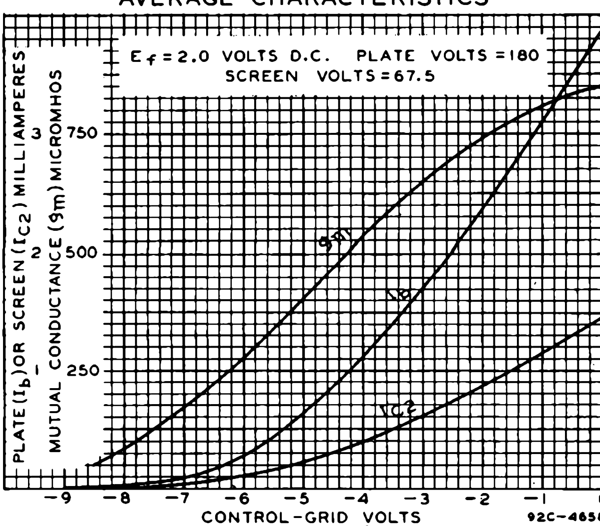
1B4-P

1B4-P

AVERAGE PLATE CHARACTERISTICS



AVERAGE CHARACTERISTICS



AUG. 31, 1936

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

92C-4670

RCA

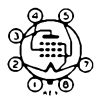
1C5-GT/1C5-G

POWER AMPLIFIER PENTODE

Filament	Coated	
Voltage	1.4	d-c volts
Current	0.10	amp.
Maximum Overall Length		3-5/16"
Maximum Seated Height		2-3/4"
Maximum Diameter		1-5/16"
Bulb		T-9
Base		Intermediate Shell Octal 7-Pin

Pin 1 - No Connection
Pin 2 - Filament +
Pin 3 - Plate
Pin 4 - Screen
Pin 5 - Grid
Pin 7 - Filament -
Pin 8 - No Connection

Mounting Position: Any



BOTTOM VIEW (G-6X)

AMPLIFIER

Plate Voltage	110 max.	volts
Screen Voltage	110 max.	volts
Total Zero-Sig. Cathode Current	12 max.	ma.

Typical Operation and Characteristics - Class A_1 Amplifier:

Plate	83	90	volts
Screen	83	90	volts
Grid *	-7.0	-7.5	volts
Peak A-F Grid Volt.	7.0	7.5	volts
Zero-Sig. Plate Cur.	7.0	7.5	ma.
Max.-Sig. Plate Cur.	7.3	7.8	ma.
Zero-Sig. Screen Cur.	1.6	1.6	ma.
Max.-Sig. Screen Cur.	3.5	3.5	ma.
Plate Res.	110000	115000	approx. ohms
Transcond.	1500	1550	µmhos
Load Res.	9000	8000	ohms
Total Harmonic Dist.	10	10	%
Max.-Sig. Power Output	200	240	mw

* Self-bias is recommended so that grid bias will be proportionately less as the B-supply voltage falls off during battery life.

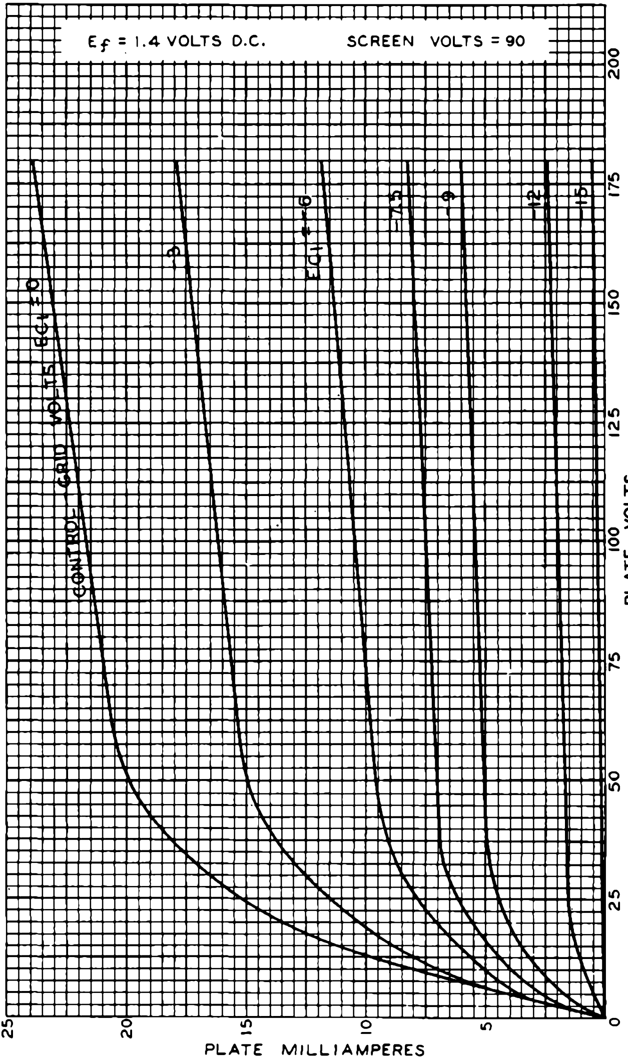
May 1, 1941 TENTATIVE DATA

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

1C5-GT

1C5-GT

AVERAGE PLATE CHARACTERISTICS



NOV. 10, 1938

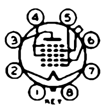
RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC

92C-4997

1C7-G
PENTAGRID CONVERTER

Filament	Coated	
Voltage	2.0	d-c volts
Current	0.120	amp.
Direct Interelectrode Capacitances:°		
Grid #4 to Plate	0.26	μμf
Grid #4 to Grid #2	0.32	μμf
Grid #4 to Grid #1	0.11	μμf
Grid #1 to Grid #2	1.2	μμf
Grid #4 to All Other Electrodes (R-F Input)	10	μμf
Grid #2 to All Other Electrodes Except Grid #1 (Osc. Output)	5.5	μμf
Grid #1 to All Other Electrodes Except Grid #2 (Osc. Input)	4.8	μμf
Plate to All Other Electrodes (Mixer Output)	14	μμf
Overall Length		4-7/32" to 4-15/32"
Seated Height		3-21/32" to 3-29/32" ←
Maximum Diameter		1-9/16"
Bulb		ST-12
Cap		Skirted Miniature
Base		Small Shell Octal 8-Pin

Pin 1 - No Connection
Pin 2 - Filament +
Pin 3 - Plate
Pin 4 - Grids #3 & #5
Pin 5 - Grid #1



BOTTOM VIEW (G-7Z)

Pin 6 - Grid #2
Pin 7 - Filament -
Pin 8 - No Connection
Cap - Grid #4

Mounting Position: Vertical, Base Down◇

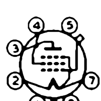
◇ Horizontal operation permitted if pins 2 and 7 are in vertical plane.
° With close-fitting shield connected to negative filament terminal.
← Indicates a change.

Maximum Ratings, Typical Operating Conditions and Curve for Type 1C7-G are the same as for Type 1C6.

1D5-GP
SUPER-CONTROL R-F AMPLIFIER PENTODE

Filament	Coated	
Voltage	2.0	d-c volts
Current	0.060	amp.
Overall Length		4-7/32" to 4-15/32"
Seated Height		3-21/32" to 3-29/32" ←
Maximum Diameter		1-9/16"
Bulb		ST-12
Cap		Skirted Miniature
Base		Small Shell Octal 7-Pin

Pin 1 - No Connection
Pin 2 - Filament +
Pin 3 - Plate
Pin 4 - Screen



BOTTOM VIEW (G-5Y)

Pin 5 - No Connection
Pin 7 - Filament -
Pin 8 - No Connection
Cap - Grid

Mounting Position: Vertical, Base Down◇

◇ Horizontal operation permitted if pins 2 and 7 are in vertical plane.
← Indicates a change.

Operating Conditions and Curves for Type 1D5-GP are the same as for Type 1A4-P.

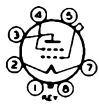
RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

1D5-GT

SUPER-CONTROL R-F AMPLIFIER TETRODE

Filament	Coated	
Voltage	2.0	d-c volts
Current	0.060	amp.
Overall Length		4-7/32" to 4-15/32"
Seated Height		3-21/32" to 3-29/32"
Maximum Diameter		1-9/16"
Bulb		ST-12
Cap		Skirted Miniature
Base		Small Shell Octal 7-Pin

Pin 1 - No Connection
Pin 2 - Filament +
Pin 3 - Plate
Pin 4 - Screen



Pin 5 - No Connection
Pin 7 - Filament -
Pin 8 - No Connection
Cap - Grid

Mounting Position: Vertical◊

BOTTOM VIEW (G-5R)

AMPLIFIER

Typical Operation and Characteristics - Class A_1 Amplifier:

Plate	135	180	volts
Screen	67.5	67.5	volts
Grid	-3	-3	volts
Plate Res.	0.35	0.6	approx. megohm
Transcond.	625	650	μmhos
Grid Bias for Transcond. = 15 μmhos	-15	-15	volts
Plate Cur.	2.2	2.2	ma.
Screen Cur.	0.7	0.7	ma.

◊ Horizontal operation permitted if pins 2 and 7 are in vertical plane.

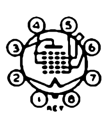
★

1D7-G

PENTAGRID CONVERTER

Filament	Coated	
Voltage	2.0	d-c volts
Current	0.060	amp.
Overall Length		4-7/32" to 4-15/32"
Seated Height		3-21/32" to 3-29/32" ←
Maximum Diameter		1-9/16"
Bulb		ST-12
Cap		Skirted Miniature
Base		Small Shell Octal 8-Pin

Pin 1 - No Connection
Pin 2 - Filament +
Pin 3 - Plate
Pin 4 - Grids #3 & #5
Pin 5 - Grid #1



Pin 6 - Grid #2
Pin 7 - Filament -
Pin 8 - No Connection
Cap - Grid #4

Mounting Position: Vertical, Base Down◊

BOTTOM VIEW (G-7Z)

For curve and additional data, refer to Type 1A6. The 1D7-G and the 1A6 are identical electrically.

◊ Horizontal operation permitted if pins 2 and 7 are in vertical plane.

← Indicates a change.

May 1, 1941

TENTATIVE DATA

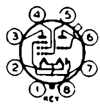
RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

1D8-GT

DIODE-TRIODE-POWER AMPLIFIER PENTODE

Filament	Coated	
Voltage	1.4	d-c volts
Current	0.1	amp.
Maximum Overall Length		3-5/16"
Maximum Seated Height		2-3/4" ←
Maximum Diameter		1-5/16"
Bulb		T-9
Cap		Skirted Miniature - Style C
Base		Intermediate Shell Octal 8-Pin

Pin 1 - No Connection
Pin 2 - Filament +
Pin 3 - Pentode Plate
Pin 4 - Pentode Screen
Pin 5 - Pentode Grid



Pin 6 - Triode Plate
Pin 7 - Filament -
Pin 8 - Diode Plate
Cap - Triode Grid

Mounting Position: Any

BOTTOM VIEW (G-8AJ)

TRIODE UNIT ←

Plate Voltage: 110 max. volts

Typical Operation and Characteristics - Class A_1 Amplifier:

Plate Voltage	45	67.5	90	volts
Grid Voltage	0	0	0	volts
Amplification Factor	25	25	25	
Plate Resistance	77000	55500	43500	approx. ohms
Transconductance	325	450	575	μmhos
Plate Current	0.3	0.6	1.1	ma.

PENTODE UNIT ←

Plate Voltage	110 max.	volts
Screen Voltage	110 max.	volts
Total Zero-Sig. Cathode Current	6 max.	ma.

Typical Operation and Characteristics - Class A_1 Amplifier:

Plate Voltage	45	62.5	67.5	90	volts
Screen Voltage	45	62.5	67.5	90	volts
Grid Voltage	-4.5	-5	-6	-9	volts
Peak A-F Grid Volt.	4.5	5	6	9	volts
Plate Current	1.6	3.8	3.8	5	ma.
Screen Current	0.3	0.8	0.8	1.0	ma.
Plate Resistance	0.3	0.2	0.2	0.2	approx. megohm
Transconductance	650	875	875	925	μmhos
Load Resistance	20000	16000	16000	12000	ohms
Total Harmonic Dist.	10	10	10	10	%
Power Output	35	90	100	200	mw.

DIODE UNIT

The diode is located at the negative end of the filament, and is independent of the triode unit and of the pentode unit except for the common filament.

← Indicates a change.

Sept. 2, 1941 DATA

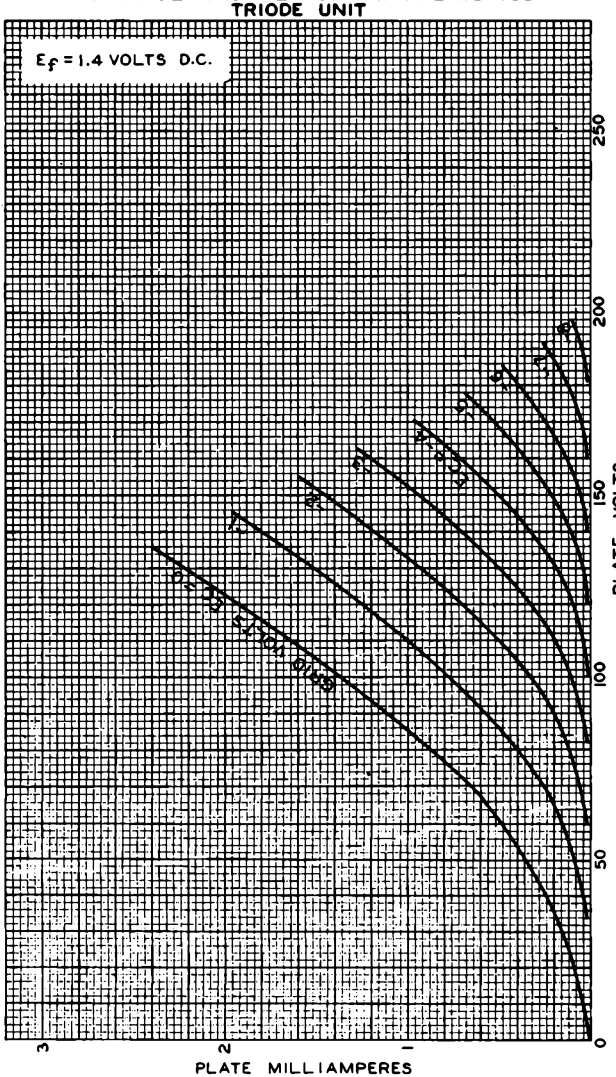
RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

1D8-GT

RCA

1D8-GT

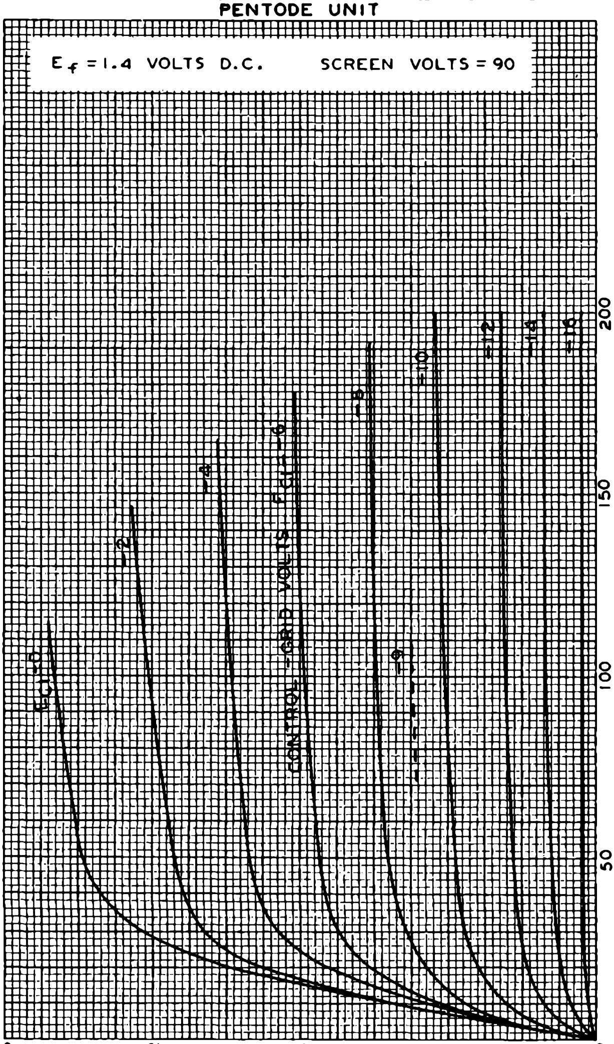
AVERAGE PLATE CHARACTERISTICS
TRIODE UNIT



1D8-GT

RCA

1D8-GT
AVERAGE PLATE CHARACTERISTICS
PENTODE UNIT



JUNE 9, 1939

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

92C-6059

1E8

1E8

PENTAGRID CONVERTER

SUBMINIATURE TYPE

GENERAL DATA

Electrical:

Filament, Coated:

Voltage	1.25	dc volts
Current	0.04	amp

Direct Interelectrode Capacitances:°

Grid No.3 to All Other Electrodes (RF Input)	6	μμf
Plate to All Other Electrodes (Mixer Input)	5	μμf
Grid No.1 to All Other Electrodes (Osc. Input)	2.4	μμf
Grid No.3 to Plate	0.4 max.	μμf
Grid No.3 to Grid No.1	0.2 max.	μμf

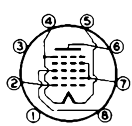
° With no external shield.

Mechanical:

Mounting Position	Any
Maximum Overall Length	1-3/4"
Maximum Seated Length	1-1/2"
Length, Base Seat to Bulb Top (excluding tip)	1.200" ± 0.060"
Maximum Diameter	0.4"
Bulb	T-3
Base	Small-Button Sub-minar 8-Pin

BOTTOM VIEW

Pin 1 - Internal Connection- Do Not Use
Pin 2 - Grid No.1
Pin 3 - No Connection



Pin 4 - Filament (-), Grid No.5
Pin 5 - Filament (+)
Pin 6 - Plate
Pin 7 - Grid No.2, Grid No.4
Pin 8 - Grid No.3

CONVERTER

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	67.5 max.	volts
GRIDS-No.2 & No.4 (SCREEN) VOLTAGE	45 max.	volts
GRIDS-No.2 & No.4 SUPPLY VOLTAGE	67.5 max.	volts
TOTAL CATHODE CURRENT	4.0 max.	ma

Characteristics — *Separate Excitation:*#

Plate Voltage	30	45	67.5	volts
Grids-No.2 & No.4 Supply Voltage	30	45	67.5	volts
Grids-No.2 & No.4 Resistor	10000	15000	20000	ohms

The characteristics shown under separate excitation approximate those obtained in a self-excited oscillator operating with zero bias.

1E8

1E8

PENTAGRID CONVERTER

Grid-No.3 (Control-Grid) Voltage	0	0	0	volts
Grid-No.1 (Oscillator-Grid) Resistor	0.1	0.1	0.1	megohm
Plate Resistance (Approx.)	0.3	0.4	0.4	megohm
Conversion Transconductance	115	140	150	μmhos
Grid-No.3 Voltage (Approx.) for conversion transconductance of 5 μmhos	-7	-8	-9	volts
Plate Current	0.3	0.6	1.0	ma
Grids-No.2 & No.4 Current	0.8	1.1	1.5	ma
Grid-No.1 Current	30	50	70	μamp
Total Cathode Current	1.1	1.7	2.5	ma

NOTE: The transconductance between grid No.1 and grids No.2 & No.4 connected to plate (not oscillating) is approximately 730 micromhos under the following conditions: Signal applied to grid No.1 at zero bias; grids No.2 & No.4 and plate at 30 volts; and grid No.3 grounded. Under the same conditions, the total cathode current is 3 milliamperes and the amplification factor is 3.9.

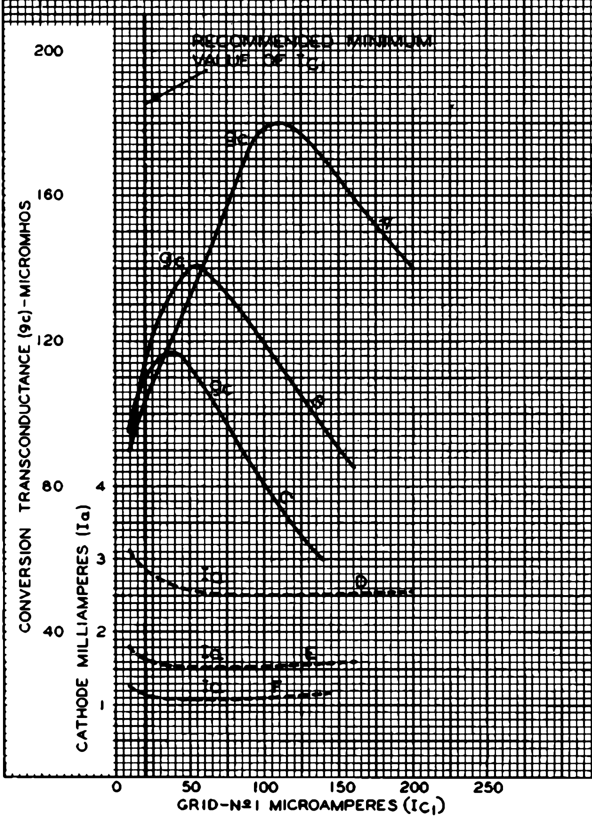
1E8

OPERATION CHARACTERISTICS WITH SEPARATE OSCILLATOR EXCITATION

E_f = 1.25 VOLTS DC

CURVE	PLATE VOLTS	GRIDS No 2 & No 4 SUPPLY VOLTS[□]	GRIDS No 2 & No 4 SERIES RESISTOR OHMS	GRID-No 1 RESISTOR MEGOHMS
A, D	67.5	67.5	20000	0.1
B, E	45	45	15000	0.1
C, F	30	30	10000	0.1

□ APPLIED THROUGH SERIES RESISTOR OF VALUE INDICATED



JAN. 24, 1949

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7165

1E8

1E8

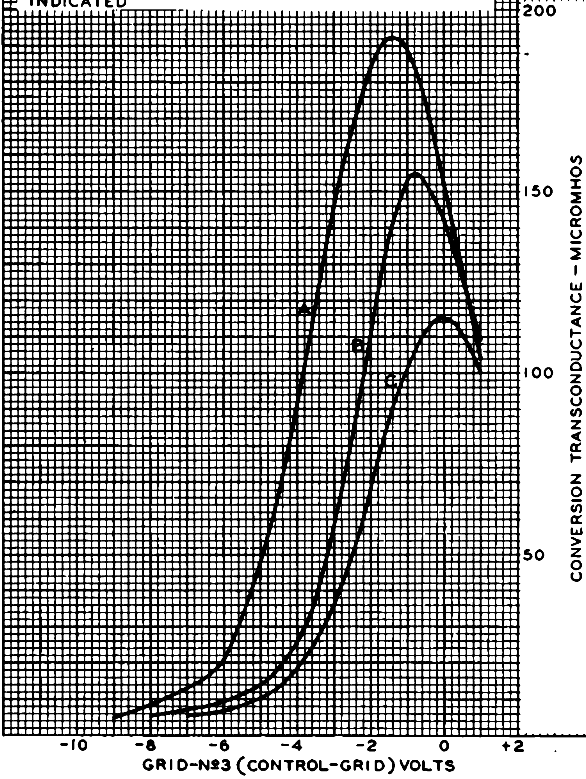
OPERATION CHARACTERISTICS
WITH SEPARATE OSCILLATOR EXCITATION

E_f=1.25 VOLTS DC

CURVE	PLATE VOLTS	GRIDS №2 & №4 SUPPLY VOLTS[o]	GRIDS №2 & №4 SERIES RESISTOR OHMS	GRID-№1 RESISTOR MEGOHMS	GRID-№1 CURRENT μAMP*
A	30	30	10000	0.1	30
B	45	45	15000	0.1	50
C	67.5	67.5	20000	0.1	70

*OBTAINED BY ADJUSTMENT OF OSCILLATOR GRID VOLTAGE TO GIVE INDICATED VALUES

[o]APPLIED THROUGH SERIES RESISTOR OF VALUE INDICATED



JAN. 25,1949

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7166

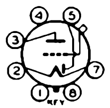
1H5-GT/G

1H5-GT/G

DIODE HIGH-MU TRIODE

Filament	Coated	
Voltage	1.4	a-c or d-c volts
Current	0.05	amp.
Direct Interelectrode Capacitances (Approx.):°		
Triode Unit		
Grid to Plate	1.0	μμf
Grid to Filament	1.1	μμf
Plate to Filament	4.6	μμf
Maximum Overall Length		3-5/16"
Maximum Seated Height		2-3/4"
Maximum Diameter		1-5/16"
Bulb		T-9
Cap		Skirted Miniature
Base		Sm.Wafer Octal 7-Pin,Sleeve

Pin 1 - Base Sleeve
Pin 2 - Filament +
Pin 3 - Triode Plate
Pin 4 - No Connection
Pin 5 - Diode Plate



Pin 7 - Filament -, Diode Shield
Pin 8 - No Connection
Cap - Triode Grid

Mounting Position: Any

BOTTOM VIEW (GT-5Z)

Maximum Ratings Are Design-Center Values

TRIODE UNIT

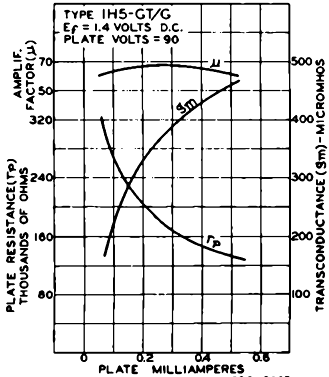
Plate Voltage	110 max.	volts
Characteristics — Class A_1 Amplifier:		
Plate	90	volts
Grid	0	volts
Amp. Fact.	65	
Plate Res.	240000	ohms
Transcond.	275	μmhos
Plate Cur.	0.15	ma.

DIODE UNIT

The diode is located at the negative end of the filament, and is independent of the triode unit except for the common filament.

° With external shield connected to negative filament terminal.

AVERAGE CHARACTERISTICS



← Indicates a change.

Jan. 1, 1943

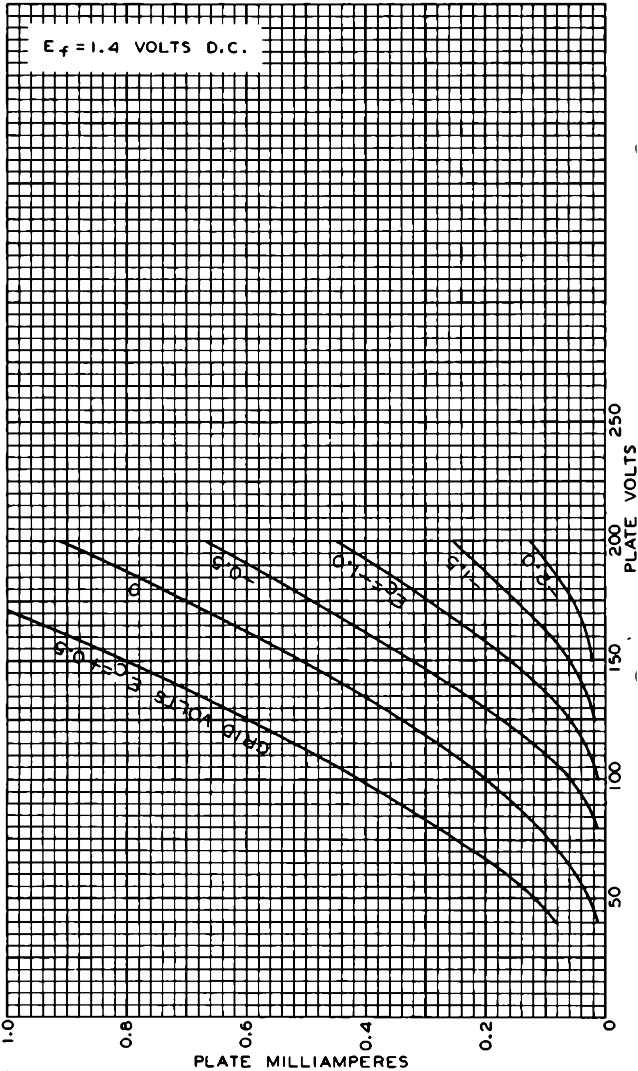
DATA

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

1H5-GT/G

1H5-GT/G

AVERAGE PLATE CHARACTERISTICS



DEC. 28, 1942

RCA VICTOR DIVISION

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92C-6001R1

1K3

HALF-WAVE VACUUM RECTIFIER

GENERAL DATA

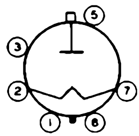
Electrical:

Filament, Coated:
Voltage* . . . . 1.25 . . . . .ac volts
Current . . . . 0.2 . . . . amp
Direct Interelectrode Capacitance (Approx.):o
Plate to filament and internal shield . . . 1.6 $\mu\mu$f

Mechanical:

Operating Position. . . . . Any
Maximum Overall Length. . . . . 3-9/16"
Seated Length . . . . 2-13/16" ± 3/16"
Maximum Diameter. . . . . 1-9/32"
Bulb. T9
Cap . . . . Small with Tubular Support (JEDEC No.C1-34)
Base. . . . . Intermediate-Shell Octal 6-Pin,
Arrangement 1 (JEDEC No.B6-8), or
Short Intermediate-Shell Octal 6-Pin
with External Barriers, Arrangement 1 (JEDEC No.B6-60)
Basing Designation for BOTTOM VIEW. 3C

Pin 1 - Internal Connection— Do Not Use■
Pin 2 - Filament
Pin 3 - Same as Pin 1
Pin 5 - Same as Pin 1



Pin 7 - Filament, Internal Shield
Pin 8 - Same as Pin 1
Cap - Plate

PULSED-RECTIFIER SERVICE

Maximum Ratings, ***Design-Maximum Values:***

For operation in a 525-line, 30-frame system□

INVERSE PLATE VOLTAGE:		
Total dc and peak●	26000 max.	volts
DC.	22000 max.	volts
PEAK PLATE CURRENT.	50 max.	ma
DC PLATE CURRENT.	0.5 max.	ma

Characteristics:

DC Plate Voltage.	225	volts
DC Plate Current.	7	ma

* Under no circumstances should the filament voltage be less than 1.05 volts or more than 1.45 volts.

o Without external shield.

■ *See Operating Considerations.*

□ As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations," Federal Communications Commission.

● The duration of the voltage pulse must not exceed 15 per cent of one horizontal scanning cycle. In a 525-line, 30-frame system, 15 per cent of one horizontal scanning cycle is 10 microseconds.

ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

1K3

HALF-WAVE VACUUM RECTIFIER

OPERATING CONSIDERATIONS

Socket Connections. Socket terminals Nos. 1, 3, 4, 5, 6, and 8 may be connected to socket terminal No.7 or to a corona shield which is connected to socket terminal No.7. Socket terminals Nos.4 and 6 may be used as tie points for components at or near filament potential.

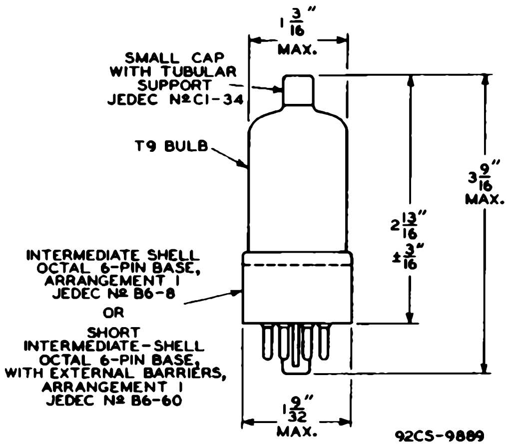
Measurement of Filament Voltage. To measure the filament voltage when the filament is at a high dc potential with respect to ground, it is recommended that a simple method utilizing visual comparison of the filament temperature be used. The color temperature of the filament, operating from a pulse- or rf-power source, may be checked by observing in a darkened room the reflection of the incandescent filament upon the surface of the internal shield. A visual comparison of this color temperature with that obtained when the filament of another 1K3 is operated from a dc or low-frequency ac supply of 1.25 volts, provides a convenient means for adjusting the amount of excitation to produce 1.25 volts (rms) at the filament terminals.

The high voltages at which the 1K3 is operated are very dangerous. Great care should be taken in the design of apparatus to prevent the operator from coming in contact with these high voltages. Particular care against fatal shock should be taken in the measurement of filament voltage. Under all circumstances, circuit parts which may be at high potentials should be enclosed or adequately insulated.

X rays. The voltages employed in some television receivers and other high-voltage equipment are sufficiently high that high-voltage rectifier tubes may produce *X rays* which can constitute a health hazard unless such tubes are adequately shielded. Relatively simple shielding should prove adequate, but the need for this precaution should be considered in equipment design.

1K3

HALF-WAVE VACUUM RECTIFIER



ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

1L4

1L4

R-F AMPLIFIER PENTODE

MINIATURE TYPE

Filament	Coated	
Voltage	1.4	d-c volts
Current	0.05	amp.
Direct Interelectrode Capacitances:°		
Grid to Plate	0.008 max.	μμf
Input	3.6	μμf
Output	7.5	μμf
Maximum Overall Length		2-1/8"
Maximum Seated Height		1-7/8"
Maximum Diameter		3/4"
Bulb		T-5-1/2
Base ▲		Miniature Button 7-Pin

Pin 1 {Filament -, Internal Shield

Pin 2 - Plate

Pin 3 - Screen

Pin 4 - No Connection

Pin 5 {Filament -, Internal Shield

Pin 6 - Grid

Pin 7 - Filament +

BOTTOM VIEW (6AR)

RCA Socket — Stock No. 9914

Mounting Position — Any

Maximum And Minimum Ratings Are Design-Center Values

AMPLIFIER

Plate Voltage	110 max.	volts
Screen Voltage	90 max.	volts
Screen Supply Voltage	110 max.	volts
Grid Voltage	0 min.	volts
Total Cathode Current	6.5 max.	ma.

Typical Operation and Characteristics - Class A_1 Amplifier

Plate Voltage	90	90	volts
Screen Voltage	67.5	90	volts
Grid Voltage	0	0	volts
Plate Resistance	0.6	0.35	megohm
Transconductance	925	1025	μmhos
Grid Bias for Plate Current = 10 μamp.	-6	-8	volts
Plate Current	2.9	4.5	ma.
Screen Current	1.2	2.0	ma.

o With no external shield.

▲ *The center hole in sockets designed for this base provides for the possibility that this tube type may be manufactured with the exhaust-tube tip at the base end. For this reason, it is recommended that in equipment employing this tube type, no material be permitted to obstruct the socket hole.*

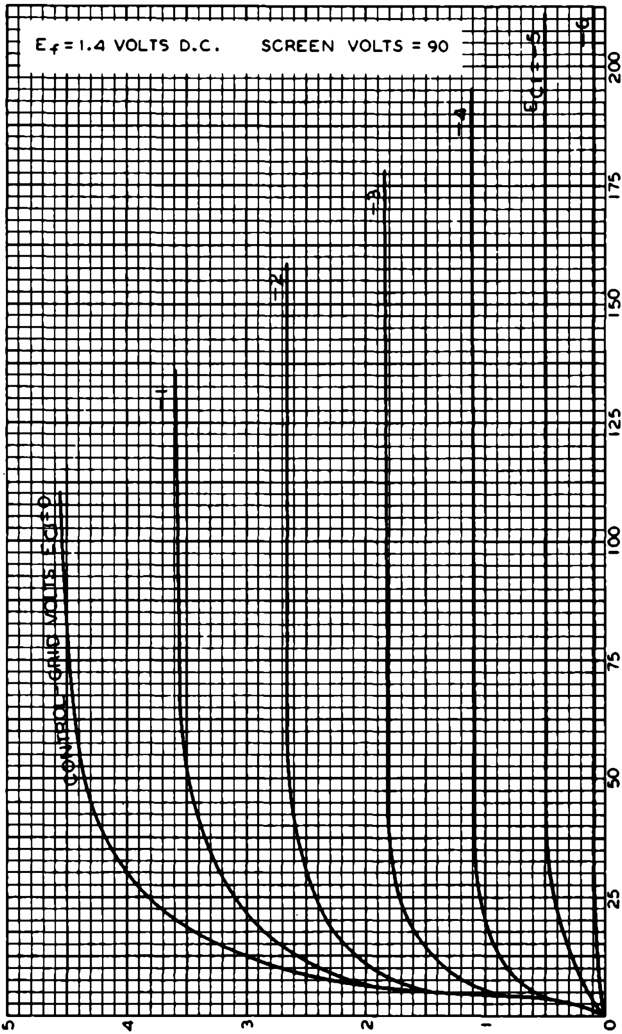
June 1, 1942 — TENTATIVE DATA

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

1L4

1L4

AVERAGE PLATE CHARACTERISTICS



MARCH 18, 1942

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

92C-6382

IL6

IL6
PENTAGRID CONVERTER

MINIATURE TYPE

GENERAL DATA

Electrical:

Filament, Coated:

Voltage	1.4	. . . .	dc volts
Current	0.050	. . . .	amp

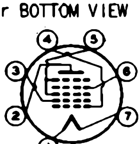
Direct Interelectrode Capacitances:

	With External Shield▲	*Without External Shield*	
Grid No.4 to All Other Electrodes (RF Input) . . .	7.5	7.5	$\mu\mu$f
Plate to All Other Electrodes (Mixer Output) .	12	7	$\mu\mu$f
Grid No.1 to All Other Electrodes Except Grid No.2 (Osc. Input)	2.2	2.2	$\mu\mu$f
Grid No.2 to All Other Electrodes Except Grid No.1 (Osc. Output).	2.6	2.6	$\mu\mu$f
Grid No.4 to Plate	0.36 max.	0.46 max.	$\mu\mu$f
Grid No.4 to Grid No.2 . . .	0.24	0.24	$\mu\mu$f
Grid No.4 to Grid No.1 . . .	0.19	0.19	$\mu\mu$f
Grid No.2 to Grid No.1 . . .	0.80	0.80	$\mu\mu$f
Grid No.1 to Plate	0.10 max.	0.15 max.	$\mu\mu$f

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-1/8"
Maximum Seated Length	1-7/8"
Length from Base Seat to Bulb Top (excluding tip)	1-1/2" ± 3/32"
Maximum Diameter	3/4"
Bulb	T-5-1/2
Base . . . . . . Small-Button Miniature 7-Pin (JETEC No.E7-1)	
Basing Designation for BOTTOM VIEW	7DC

Pin 1 - Filament (-)
Pin 2 - Plate
Pin 3 - Grid No.2
Pin 4 - Grid No.1



Pin 5 - Grid No.3, Grid No.5
Pin 6 - Grid No.4
Pin 7 - Filament (+)

CONVERTER

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	110 max.	volts
GRIDS-No.3 & No.5 (SCREEN) VOLTAGE	65 max.	volts

▲ External shield #316 connected to pin 1.

AUG. 1, 1953 TENTATIVE DATA

1L6

PENTAGRID CONVERTER

GRIDS—No.3 & No.5 SUPPLY VOLTAGE	110 max.	volts
GRID—No.2 (OSCILLATOR-PLATE) VOLTAGE . . .	110 max.	volts
TOTAL CATHODE CURRENT	4 max.	ma

Characteristics - *Separate Excitation:*#

Plate Voltage	90	volts
Grids-No.3-and-No.5 Voltage	45	volts
Grid-No.2 (Oscillator-Plate) Voltage . . .	90	volts
Grid-No.4 (Mixer-Grid) Voltage	0	volts
Grid-No.1 (Oscillator-Grid) Resistor . . .	0.2	megohm
Plate Resistance (Approx.)	0.65	megohm
Conversion Transconductance	300	µmhos
Grid-No.4 Voltage for Conversion Transconductance of 10 µmhos . . .	-3.5	volts
Grid-No.4 Voltage for Conversion Transconductance of 100 µmhos . .	-1.3	volts
Plate Current	0.5	ma
Grids-No.3-and-No.5 Current	0.6	ma
Grid-No.2 Current	1.2	ma
Grid-No.1 Current	0.035	ma
Total Cathode Current	2.35	ma

Maximum Circuit Values:

Grid-No.4-Circuit Resistance	1.0 max.	megohm

NOTE: The transconductance between grid No.1 and grid No.2 connected to plate (not oscillating) is approximately 550 µmhos under the following conditions: signal applied to grid No.1 at zero bias; grid No.2 and plate at 90 volts; grids No.3 and No.5 at 45 volts; grid No.4 grounded. Under the same conditions, the total cathode current is 5 milliamperes, and the amplification factor is 40.

The characteristics shown under separate excitation approximate those obtained in a self-excited oscillator operating with zero bias.

AUG. 1, 1953 — TENTATIVE DATA

1LB4
POWER PENTODE

GENERAL DATA

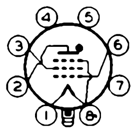
Electrical:

Filament, Coated:
- Voltage . . . . 1.4 . . . . dc volts
- Current . . . . 0.05 . . . . amp

Mechanical:

Mounting Position . . . . Any
Maximum Overall Length . . . . 2-25/32"
Maximum Seated Length . . . . 2-1/4"
Maximum Diameter . . . . 1-3/16"
Bulb T-9
Base . . . . Lock-in 8-Pin
Basing Designation for BOTTOM VIEW 5AD2

Pin 1 - Filament (+)
Pin 2 - Plate
Pin 3 - Grid No.2
Pin 4 - Internal Connection —Do Not Use



Pin 5 - No Connection
Pin 6 - Grid No.1
Pin 7 - No Connection
Pin 8 - Filament (-), Grid No.3
Plug - Base Shell

Maximum Ratings and Typical Operating Conditions for the 1LB4 are the same as for the Pentode Unit of Type 1D8-GT.

1LC5

1LC5

SHARP-CUTOFF PENTODE

GENERAL DATA

Electrical:

Filament, Coated:

Voltage	1.4	dc volts
Current	0.05	amp

Direct Interelectrode Capacitances:°

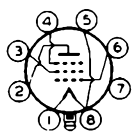
Grid No.1 to Plate	0.007 max.	μμf
Input	3.2	μμf
Output	7.0	μμf

° With external shield connected to negative filament terminal.

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-25/32"
Maximum Seated Length	2-1/4"
Maximum Diameter	1-3/16"
Bulb	T-9
Base	Lock-in 8-Pin
Basing Designation for BOTTOM VIEW	7AO

Pin 1 - Filament (+)
Pin 2 - Plate
Pin 3 - Grid No.2
Pin 4 - Grid No.3
Pin 5 - Filament (-), Internal Shield



Pin 6 - Grid No.1
Pin 7 - No Connection
Pin 8 - Filament (-), Internal Shield
Plug - Base Shell

AMPLIFIER - Class A_1

Maximum Ratings, ***Design-Center Values:***

PLATE VOLTAGE	110 max.	volts
GRID-No.2 (SCREEN) VOLTAGE	45 max.	volts

Typical Operation and Characteristics:

Plate Voltage	45	90	volts
Grid No.3	Connected to negative filament terminal at socket		
Grid-No.2 Voltage	45	45	volts
Grid-No.1 (Control-Grid) Supply Voltage	0	0	volts
Min. Grid-No.1 Resistor	1	1	megohm
Plate Resistance (Approx.)	0.7	1.5	megohms
Transconductance	750	775	μmhos
Plate Current	1.1	1.15	ma
Grid-No.2 Current	0.35	0.30	ma

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

RCA

1LC6
PENTAGRID CONVERTER

GENERAL DATA

Electrical:

Filament, Coated:

Voltage	1.4	dc volts
Current	0.05	amp

Direct Interelectrode Capacitances:°

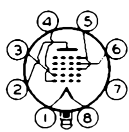
Grid No.4 to Plate	0.28	μμf
Mixer Input	9.0	μμf
Mixer Output	5.5	μμf
Oscillator Input	2.4	μμf
Oscillator Output	4.8	μμf

° With external shield connected to negative filament terminal.

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-25/32"
Maximum Seated Length	2-1/4"
Maximum Diameter	1-3/16"
Bulb	T-9
Base	Lock-in 8-Pin
Basing Designation for BOTTOM VIEW	7AK

Pin 1 - Filament (+)
Pin 2 - Plate
Pin 3 - Grid No.2
Pin 4 - Grid No.1
Pin 5 - Grid No.3, Grid No.5



Pin 6 - Grid No.4
Pin 7 - No Connection
Pin 8 - Filament (-)
Plug - Base Shell

CONVERTER

Maximum Ratings, ***Design-Center Values*****:**

PLATE VOLTAGE	110 max.	volts
GRIDS-No.3 & No.5 (SCREEN) VOLTAGE	45 max.	volts
GRIDS-No.3 & No.5 SUPPLY VOLTAGE	110 max.	volts
GRID-No.2 (ANODE-GRID) VOLTAGE	50 max.	volts
GRID-No.2 SUPPLY VOLTAGE	110 max.	volts
TOTAL CATHODE CURRENT	3.0 max.	ma

Typical Operation:

Plate Voltage	45	90	volts
Grids-No.3 & No.5 Voltage□	35	35	volts
Grid-No.2 Voltage	45	45	volts
Grid-No.4 (Control-Grid) Supply Voltage	0	0	volts
Min. Grid-No.4 Resistor	1	1	megohm
Grid-No.1 (Oscillator-Grid) Resistor	0.2	0.2	megohm
Plate Resistance	0.3	0.65	megohm
Conversion Transconductance	250	275	μmhos
Conversion Transconductance (Approx.)#	5	5	μmhos

□,#: See next page.

ILC6
PENTAGRID CONVERTER

Plate Current.	0.70	0.75	ma
Grids-No.3 & No.5 Current.	0.75	0.70	ma
Grid-No.2 Current.	1.4	1.4	ma
Grid-No.1 Current.	0.035	0.035	ma
Total Cathode Current.	2.9	2.9	ma

° Obtained preferably by using a properly bypassed voltage-dropping resistor in series with the plate voltage supply. To avoid oscillation difficulties, the voltage of grids No.3 & No.5 must be at least 10 volts lower than the grid-No.2 voltage.

For grid-No.4 bias of -3 volts.

NOTE: The characteristics of the oscillator section (not oscillating) are: transconductance = approx. 550 μmhos; μ = 14; and grid-No.2 current = 2.7 ma. under the following conditions: plate volts = 90; grids No.3 & No.5 volts = 45; grid-No.4 volts = 0; grid-No.2 volts = 90; grid-No.1 volts = 0.

1LD5

1LD5

DIODE—SHARP-CUTOFF PENTODE

GENERAL DATA

Electrical:

Filament, Coated:

Voltage	1.4	dc volts
Current	0.05	amp

Direct Interelectrode Capacitances:°

Pentode Unit:

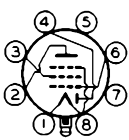
Grid No.1 to Plate	0.18	$\mu\mu$f
Input	3.2	$\mu\mu$f
Output	6.0	$\mu\mu$f

° With external shield connected to negative filament terminal.

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-25/32"
Maximum Seated Length	2-1/4"
Maximum Diameter	1-3/16"
Bulb	T-9
Base	Lock-in 8-Pin
Basing Designation for BOTTOM VIEW	6AX

Pin 1 - Filament (+)
Pin 2 - Pentode Plate
Pin 3 - Pentode Grid No.2
Pin 4 - Diode Plate
Pin 5 - No Connection



Pin 6 - Pentode Grid No.1
Pin 7 - No Connection
Pin 8 - Filament (-), Pentode Grid No.3
Plug - Base Shell

PENTODE UNIT
AMPLIFIER - Class A_1

Maximum Ratings, ***Design-Center Values:***

PLATE VOLTAGE	110 max.	volts
GRID-No.2 (SCREEN) VOLTAGE	50 max.	volts

Typical Operation and Characteristics:

Plate Voltage	45	90	volts
Grid-No.2 Voltage	45	45	volts
Grid-No.1 Voltage	0	0	volts
Plate Resistance (Approx.)	0.9	0.75	megohm
Transconductance	550	575	μmhos
Plate Current	0.55	0.6	ma
Grid-No.2 Current	0.12	0.1	ma

DIODE UNIT

The diode is located at the negative end of the filament and is independent of the pentode unit except for the common filament.

1LE3

1LE3
MEDIUM-MU TRIODE

GENERAL DATA

Electrical:

Filament, Coated:

Voltage	1.4	dc volts
Current	0.05	amp

Direct Interelectrode Capacitances - Triode Unit:*

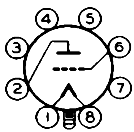
Grid to Plate	1.7	μμf
Grid to Cathode	1.7	μμf
Plate to Cathode	3.0	μμf

* With external shield connected to negative filament terminal.

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-25/32"
Maximum Seated Length	2-1/4"
Maximum Diameter	1-3/16"
Bulb	T-9
Base	Lock-in 8-Pin
Basing Designation for BOTTOM VIEW	4AA

Pin 1 - Filament (+)
Pin 2 - Plate
Pin 3 - No Connection
Pin 4 - No Connection
Pin 5 - Internal Connection - Do Not Use



Pin 6 - Grid
Pin 7 - No Connection
Pin 8 - Filament (-)
Plug - Base Shell

AMPLIFIER - Class A_1

Maximum Ratings, ***Design-Center Values*****:**

PLATE VOLTAGE	110 max.	volts

Typical Operation and Characteristics:

Plate Voltage	90	90	volts
Grid Voltage	0	-3	volts
Amplification Factor	14.5	14.5	
Plate Resistance	11200	19000	ohms
Transconductance	1300	760	μmhos
Plate Current	4.5	1.4	ma

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

1LG5

REMOTE-CUTOFF PENTODE

GENERAL DATA

Electrical:

Filament, Coated:

Voltage	1.4	dc volts
Current	0.05	amp

Direct Interelectrode Capacitances:[o]

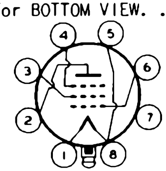
Grid No.1 to Plate	0.007 max.	μμf
Input	3.2	μμf
Output	7.0	μμf

[o] With external shield connected to negative filament terminal.

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-25/32"
Maximum Seated Length	2-1/4"
Maximum Diameter	1-3/16"
Bulb	T-9
Base	Lock-in 8-Pin
Basing Designation for BOTTOM VIEW	7AO

Pin 1 - Filament (+)
Pin 2 - Plate
Pin 3 - Grid No.2
Pin 4 - Grid No.3
Pin 5 - Filament (-) Internal Shield



Pin 6 - Grid No.1
Pin 7 - No Connection
Pin 8 - Filament (-) Internal Shield
Plug - Base Shell

AMPLIFIER - Class A_1

Maximum Ratings, ***Design-Center Values:***

PLATE VOLTAGE	110 max.	volts
GRID-No.2 (SCREEN) VOLTAGE	110 max.	volts

Typical Operation and Characteristics:

Plate Voltage	90	90	volts
Grid No.3 (Suppressor)	Connected to negative filament terminal at socket		
Grid-No.2 Voltage	45	90	volts
Grid-No.1 (Control-Grid) Voltage	0	-1.5	volts
Plate Resistance (Approx.)	1.0	0.5	megohm
Transconductance	800	1150	μmhos
Grid-No.1 Bias (Approx.) for transconductance of 10 μmhos	-10	-19	volts
Plate Current	1.7	3.7	ma
Grid-No.2 Current	0.4	0.9	ma

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

1LH4

DIODE – HIGH-MU TRIODE

GENERAL DATA

Electrical:

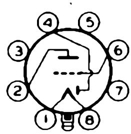
Filament, Coated:

Voltage	1.4	dc volts
Current	0.05	amp

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-25/32"
Maximum Seated Length	2-1/4"
Maximum Diameter	1-3/16"
Bulb	T-9
Base	Lock-in 8-Pin
Basing Designation for BOTTOM VIEW	5AG

Pin 1 - Filament (+)
Pin 2 - Triode Plate
Pin 3 - No Connection
Pin 4 - Diode Plate
Pin 5 - No Connection



Pin 6 - Triode Grid
Pin 7 - No Connection
Pin 8 - Filament (-)
Plug - Base Shell

Maximum Ratings and Characteristics for Type 1LH4 are the same as those shown for the 1H5-GT.

ILN5

ILN5
SHARP-CUTOFF PENTODE

GENERAL DATA

Electrical:

Filament, Coated:

Voltage	1.4	dc volts
Current	0.05	amp

Direct Interelectrode Capacitances:[o]

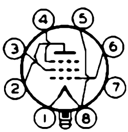
Grid No.1 to Plate	0.007 max.	$\mu\mu f$
Input	3.0	$\mu\mu f$
Output	8.0	$\mu\mu f$

[o] With external shield connected to negative filament terminal.

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-25/32"
Maximum Seated Length	2-1/4"
Maximum Diameter	1-3/16"
Bulb	T-9
Base	Lock-in 8-Pin
Basing Designation for BOTTOM VIEW	7AO

Pin 1 - Filament (+)
Pin 2 - Plate
Pin 3 - Grid No.2
Pin 4 - Grid No.3
Pin 5 - Filament (-)



Pin 6 - Grid No.1
Pin 7 - No Connection
Pin 8 - Filament (-)
Plug - Base Shell

AMPLIFIER - Class A_1

Maximum Ratings, ***Design-Center Values:***

PLATE VOLTAGE	110 max.	volts
GRID-No.2 (SCREEN) VOLTAGE	110 max.	volts

Typical Operation and Characteristics:

Plate Voltage	90	volts
Grid-No.3 (Suppressor)	Connected to cathode at socket	
Grid-No.2 Voltage	90	volts
Grid-No.1 (Control-Grid) Voltage	0	volts
Plate Resistance (Approx.)	1.1	megohms
Transconductance	800	μmhos
Grid-No.1 Bias (Approx.) for transconductance of 10 μmhos	-4.5	volts
Plate Current	1.6	ma
Grid-No.2 Current	0.35	ma

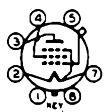
1N5-GT/G

1N5-GT/G

R-F AMPLIFIER PENTODE

Filament	Coated	
Voltage	1.4	d-c volts
Current	0.05	amp.
Direct Interelectrode Capacitances:°		
Grid to Plate	0.007 max.	μμf
Input	3	μμf
Output	10	μμf
Maximum Overall Length		3-5/16"
Maximum Seated Height		2-3/4"
Maximum Diameter		1-5/16"
Bulb		T-9
Cap		Skirted Miniature
Base		Small Wafer Octal 7-Pin, Sleeve

Pin 1 - Base Sleeve
Pin 2 - Filament +
Pin 3 - Plate
Pin 4 - Screen



Pin 5 - No Connection
Pin 7 - Filament -
Pin 8 - No Connection
Cap - Grid

Mounting Position: Any

BOTTOM VIEW (GT-5Y)

Maximum Ratings Are Design-Center Values

AMPLIFIER

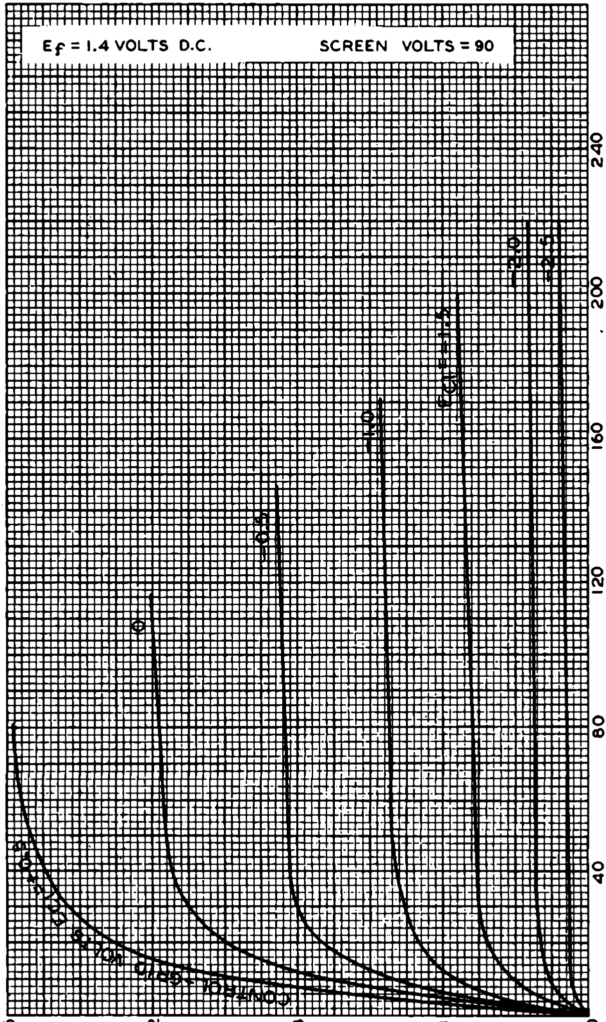
Plate Voltage	110 max.	volts
Screen Voltage	110 max.	volts
Typical Operation and Characteristics - Class A_1 Amplifier:		
Plate	90	volts
Screen	90	volts
Grid	0	volts
Plate Res.	1.5 approx.	megohms
Transcond.	750	μmhos
Grid Bias for Transcond. of approx. 5 μmhos	-4	volts
Plate Cur.	1.2	ma.
Screen Cur.	0.3	ma.

° With shield connected to negative filament terminal.

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

1N5-GT/G

1N5-GT/G
AVERAGE PLATE CHARACTERISTICS



DEC. 29, 1942 | RCA VICTOR DIVISION | 92C-6000R1

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

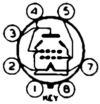
1Q5-GT/1Q5-G

1Q5-GT ★

BEAM POWER AMPLIFIER

Filament	Coated	
Voltage	1.4	d-c volts
Current	0.1	amp.
Maximum Overall Length		3-5/16"
Maximum Seated Height		2-3/4"
Maximum Diameter		1-5/16"
Bulb		T-9
Base		Intermediate Shell Octal 7-Pin

Pin 1 - No Connection
Pin 2 - Filament +
Pin 3 - Plate
Pin 4 - Screen
Pin 5 - Grid
Pin 7 - Filament -
Pin 8 - No Connection



Mounting Position: Any

BOTTOM VIEW (G-6AF)

AMPLIFIER

Plate Voltage	110 max.	volts
Screen Voltage	110 max.	volts
Zero-Signal Cathode Current	12 max.	ma.

Typical Operation and Characteristics - Class A_1 Amplifier:

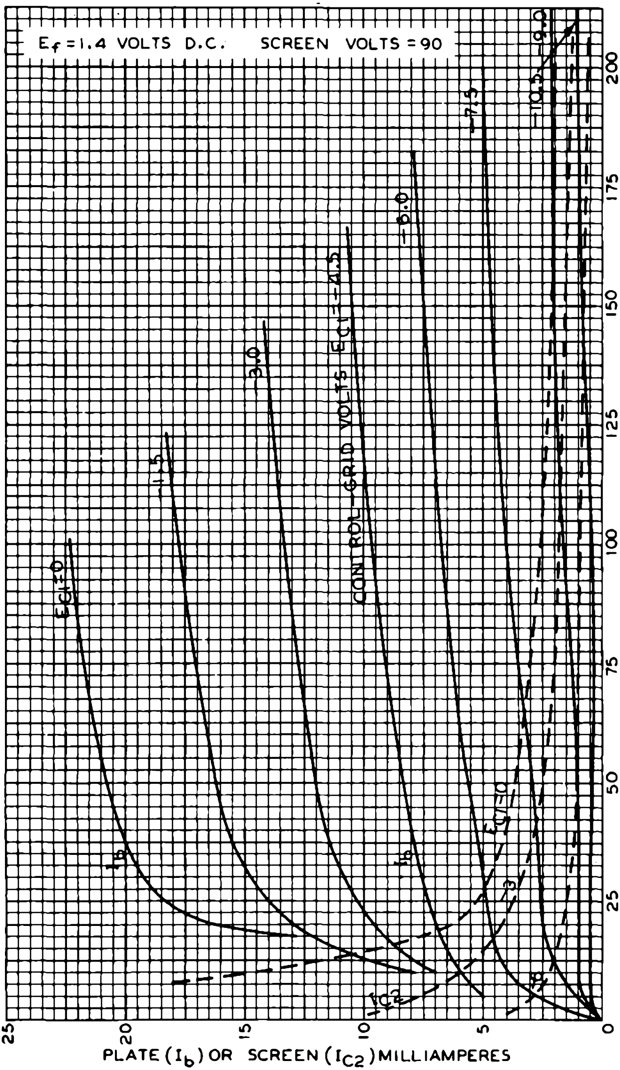
Plate	85	90	volts
Screen	85	90	volts
Grid	-5	-4.5	volts
Peak A-F Grid Voltage	5	4.5	volts
Zero-Sig. Plate Cur.	7.0	9.5	ma.
Zero-Sig. Screen Cur.	0.8	1.3	approx. ma.
Plate Resistance	70000	75000	approx. ohms
Transconductance	1950	2200	µmhos
Load Resistance	9000	8000	ohms
Total Harmonic Dist.	5.5	6.0	%
Max.-Sig. Power Output	250	270	mw.

← Indicates a change.

1Q5-GT

1Q5-GT

AVERAGE PLATE CHARACTERISTICS



JUNE 3, 1941

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

92C-6293

1R5

1R5

PENTAGRID CONVERTER

MINIATURE TYPE

Filament	Coated	
Voltage	1.4	d-c volts
Current	0.05	amp.
Direct Interelectrode Capacitances:°		
Grid #3 to All Other Electrodes (R-F Input)	7.0	μμf
Plate to All Other Electrodes (Mixer Output)	7.5	μμf
Grid #1 to All Other Electrodes (Osc. Input)	3.8	μμf
Grid #3 to Plate	0.4 max.	μμf
Grid #3 to Grid #1	0.2 max.	μμf
Grid #1 to Plate	0.1 max.	μμf
Maximum Overall Length	2-1/8"	
Maximum Seated Height	1-7/8"	
Maximum Diameter	3/4"	
Bulb	T-5-1/2	
Base▲	Miniature Button 7-Pin	

Pin 1 - Filament -
Pin 2 - Plate
Pin 3 - Grids #2 & #4
Pin 4 - Grid #1

Pin 5 - Filament -
Pin 6 - Grid #3
Pin 7 - Filament +

Mounting Position — BOTTOM VIEW (7AT) — Any

Maximum and Minimum Ratings Are Design-Center Values

CONVERTER SERVICE

Plate Voltage	90 max.	volts
Grids #2 & #4 Voltage	67.5 max.	volts
Grids #2 & #4 Supply Voltage	90 max.	volts
Grid #3 Voltage	0 min.	volts
Total Zero-Sig. Cathode Current	5.5 max.	ma.

Typical Operation and Characteristics:

Plate Voltage	45	67.5	90	90	volts
Grids #2 & #4 Voltage	45	67.5	45	67.5	volts
Grid #3 Voltage	0	0	0	0	volts
Grid #1 Resistor	0.1	0.1	0.1	0.1	megohm
Plate Resistance	0.6	0.5	0.8	0.6	approx. megohm
Conversion Transcond.	235	280	250	300	μmhos
Grid #3 Bias for Conver. Transcond. of approx. 5 μmhos	-9	-14	-9	-14	volts
Plate Current	0.7	1.4	0.8	1.6	ma.
Grids #2 & #4 Current	1.9	3.2	1.9	3.2	ma.
Grid #1 Current	0.15	0.25	0.15	0.25	ma.
Total Cathode Current	2.75	5	2.75	5	ma.

NOTE: The transconductance between Grid #1 and Grids #2 & #4 tied to plate (not oscillating) is approximately 1400 μmhos under the following conditions: Grid #1 & #3 at 0 volts; Grids #2 & #4 and plate at 67.5 volts.

° With no external shield.

▲ The center hole in sockets designed for this base provides for the possibility that this tube type may be manufactured with the exhaust-tube tip at the base end. For this reason, it is recommended that in equipment employing this tube type, no material be permitted to obstruct the socket hole.

← Indicates a change.

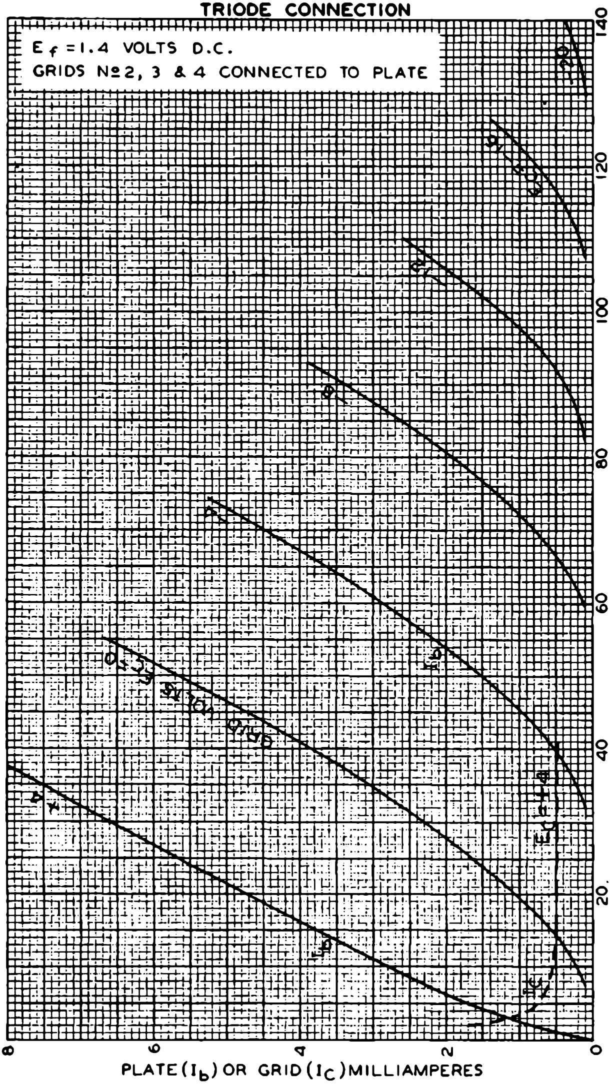
RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

1R5

RCA

1R5

AVERAGE PLATE CHARACTERISTICS
TRIODE CONNECTION



MAY 4, 1942

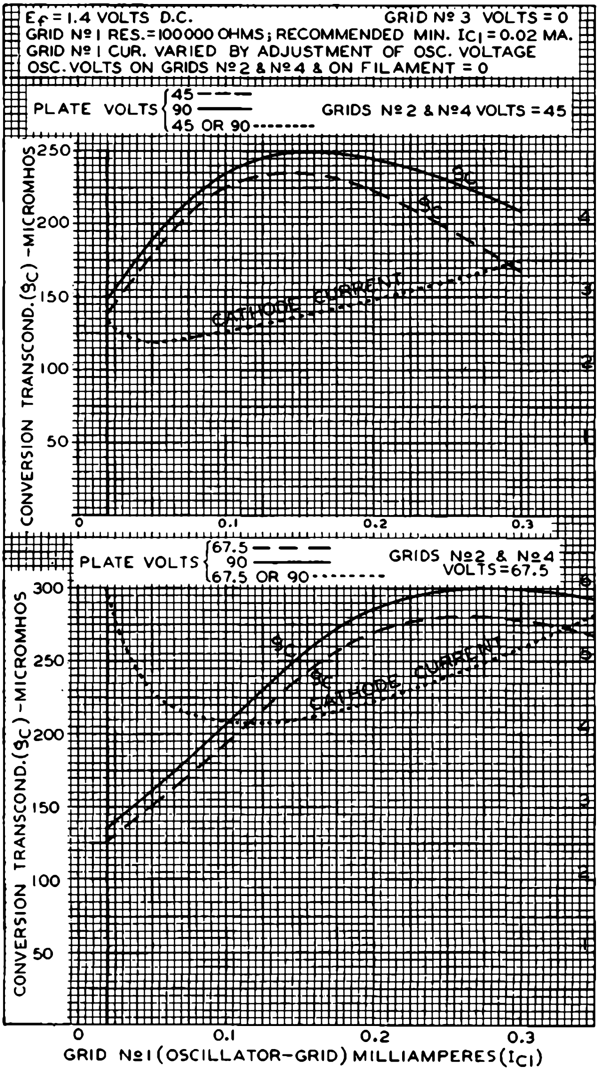
RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

92C-6350R1

RCA

1R5

OPERATION CHARACTERISTICS



1R5

1R5

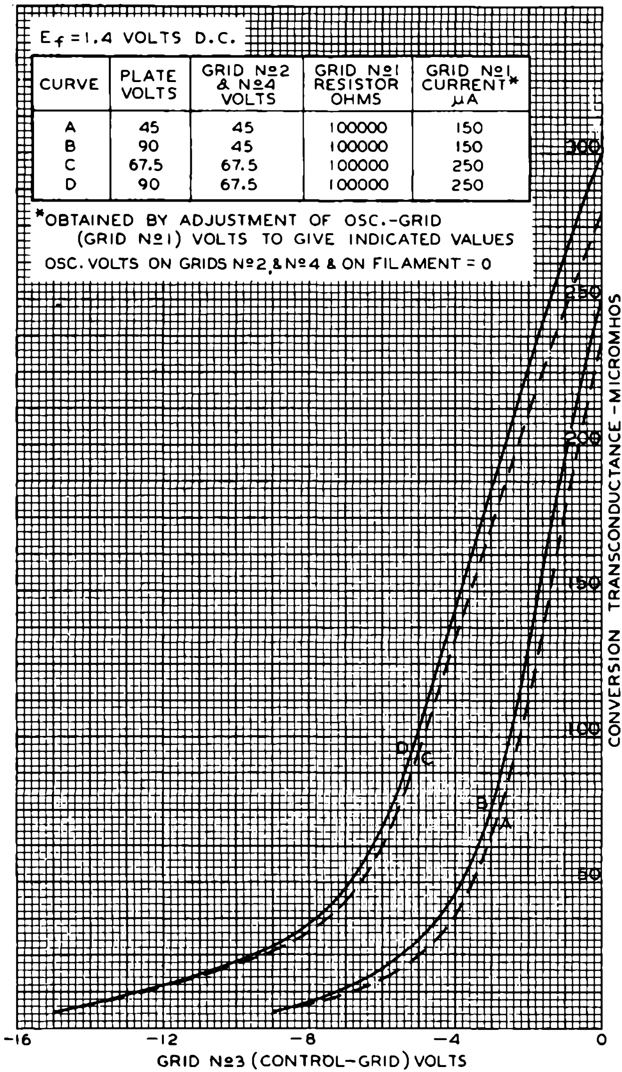
OPERATION CHARACTERISTICS

E_f = 1.4 VOLTS D.C.

CURVE	PLATE VOLTS	GRID №2 & №4 VOLTS	GRID №1 RESISTOR OHMS	GRID №1 CURRENT* μA
A	45	45	100000	150
B	90	45	100000	150
C	67.5	67.5	100000	250
D	90	67.5	100000	250

*OBTAINED BY ADJUSTMENT OF OSC.-GRID (GRID №1) VOLTS TO GIVE INDICATED VALUES

OSC. VOLTS ON GRIDS №2 & №4 & ON FILAMENT = 0



1S4

★ 1S4

POWER AMPLIFIER PENTODE

MINIATURE TYPE

Filament	Coated	
Voltage	1.4	d-c volts
Current	0.1	amp.
Maximum Overall Length		2-1/8"
Maximum Seated Height		1-7/8"
Maximum Diameter		3/4"
Bulb		T-5-1/2
Base[△]		Miniature Button 7-Pin
Pin 1 - Filament -		Pin 5 - Filament -
Pin 2 - Plate		Pin 6 - Plate
Pin 3 - Grid		Pin 7 - Filament +
Pin 4 - Screen		
Mounting Position		Any

BOTTOM VIEW (7AV)

AMPLIFIER

Plate Voltage	90 max. volts
Screen Voltage	67.5 max. volts
Total Max.-Signal Cathode Current	11 max. ma.
Total Zero-Signal Cathode Current	9 max. ma.

Typical Operation and Characteristics - Class A_1 Amplifier:

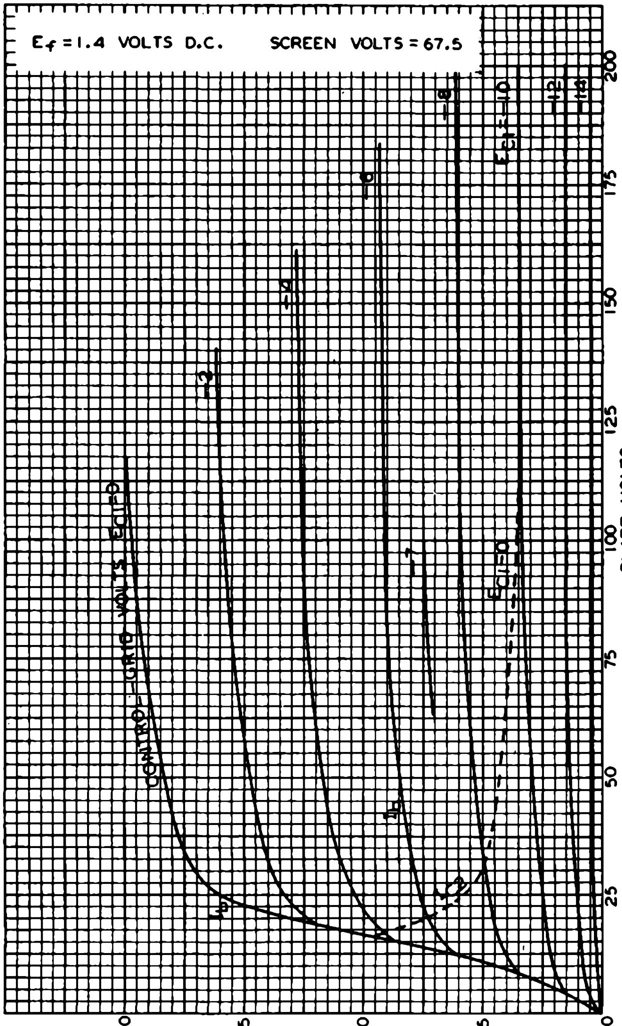
Filament	1.4	1.4	1.4	d-c volts
Plate	45	67.5	90	volts
Screen	45	67.5	67.5	volts
Grid	-4.5	-7	-7	volts
Peak A-F Grid Voltage	4.5	7	7	volts
Zero-Signal Plate Cur.	3.8	7.2	7.4	ma.
Zero-Signal Screen Cur.	0.8	1.5	1.4	ma.
Plate Res. (Approx.)	0.1	0.1	0.1	megohm
Transcond.	1250	1550	1575	µmhos
Load Res.	8000	5000	8000	ohms
Total Harmonic Distortion	12	10	12	%
Max.-Sig. Power Output	65	180	270	mw

△ *The center hole in sockets designed for this base provides for the possibility that this tube type may be manufactured with the exhaust-tube tip at the base end. For this reason, it is recommended that in equipment employing this tube type, no material be permitted to obstruct the socket hole.*

1S4

1S4

AVERAGE PLATE CHARACTERISTICS



JAN. 26, 1942

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

92C-6157R1

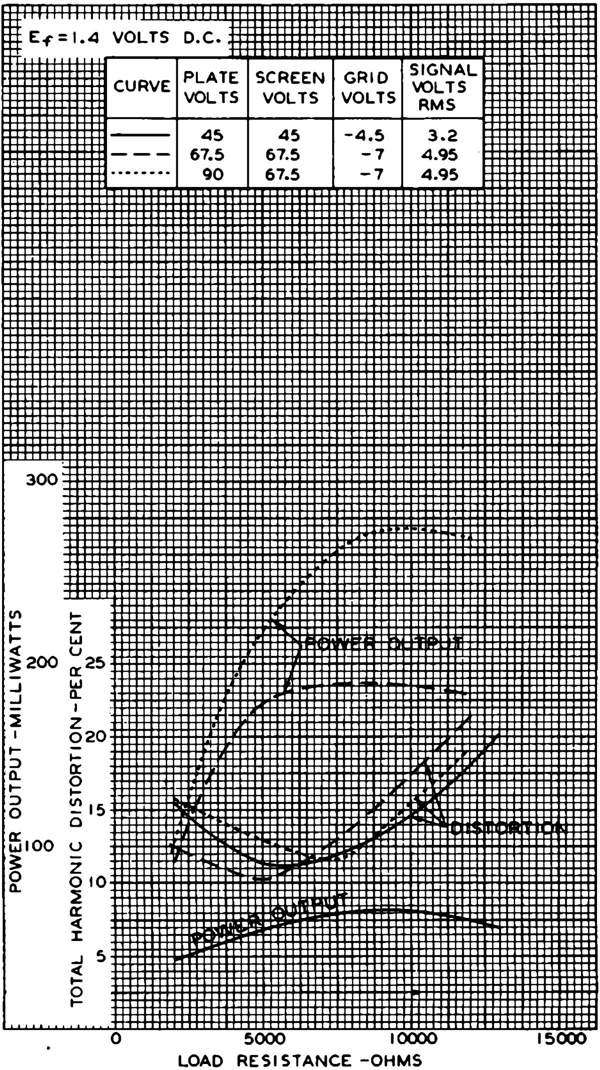
1S4

1S4

OPERATION CHARACTERISTICS

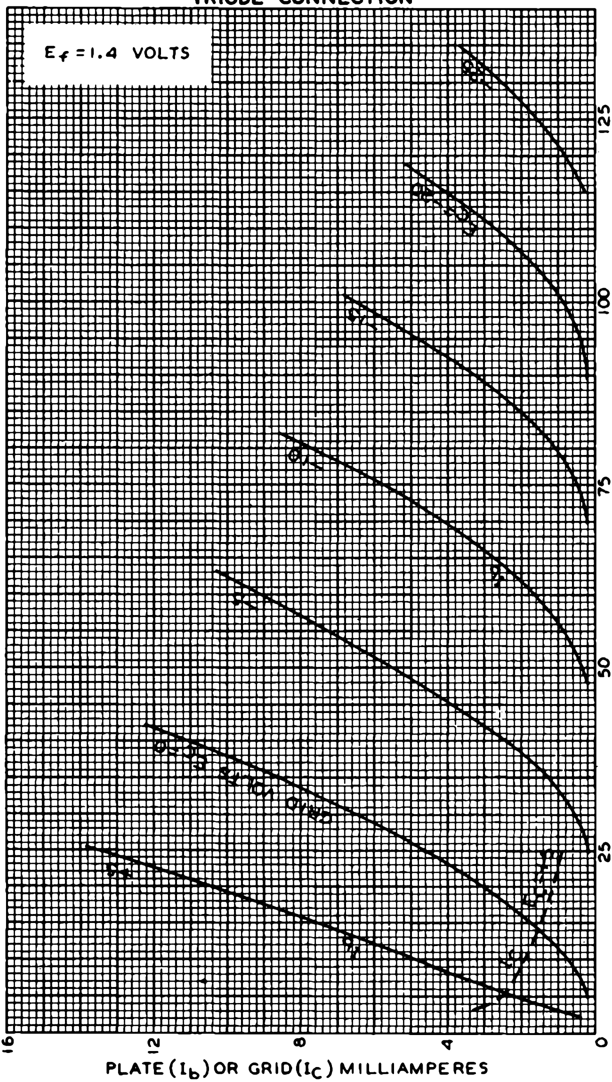
E_f = 1.4 VOLTS D.C.

CURVE	PLATE VOLTS	SCREEN VOLTS	GRID VOLTS	SIGNAL VOLTS RMS
———	45	45	-4.5	3.2
— — —	67.5	67.5	-7	4.95
········	90	67.5	-7	4.95



1S4

1S4
AVERAGE PLATE CHARACTERISTICS
TRIODE CONNECTION



DEC. 26, 1941

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

92C-6348

1S5
DIODE-PENTODE
MINIATURE TYPE

GENERAL DATA

Electrical:

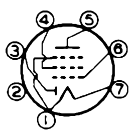
Filament, Coated:

Voltage	1.4	dc volts
Current	0.05	amp

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-1/8"
Maximum Seated Length	1-7/8"
Length, Base Seat to Bulb Top (excluding tip)	1-1/2" ± 3/32"
Maximum Diameter	3/4"
Bulb	T-5-1/2
Base	Small-Button Miniature 7-Pin
Basing Designation for BOTTOM VIEW	6AU

Pin 1 - Filament (-), Grid No.3
Pin 2 - No Connection
Pin 3 - Diode Plate



Pin 4 - Pentode Grid No.2
Pin 5 - Pentode Plate
Pin 6 - Pentode Grid No.1
Pin 7 - Filament (+)

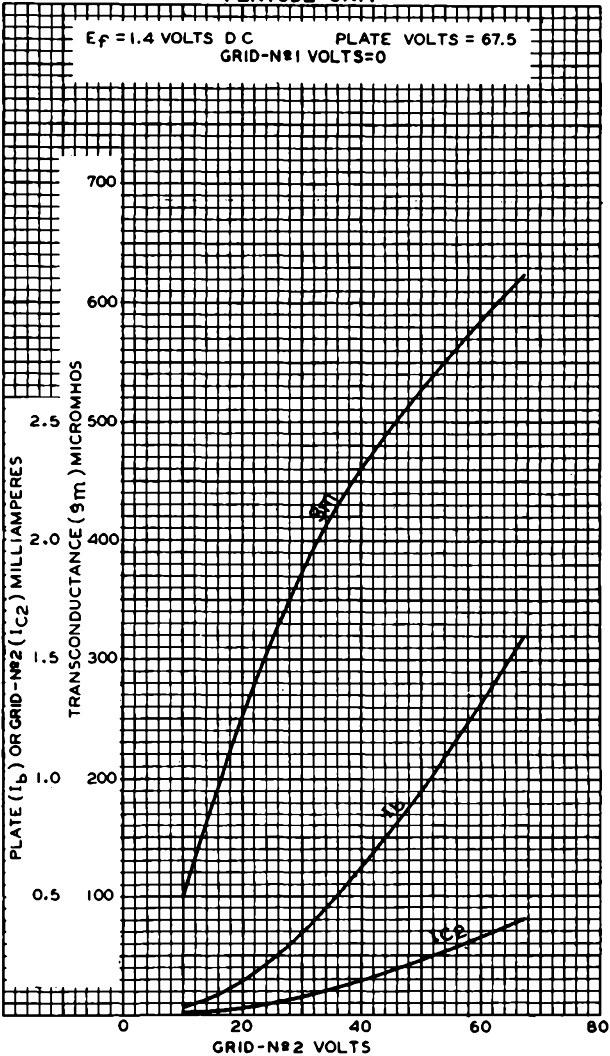
Maximum Ratings, Characteristics, and Typical Operating Conditions for Type 1S5 are the same as those shown for the 1U5.

Curves shown under Type 1U5 also apply to the 1S5.

1S5

1S5

AVERAGE CHARACTERISTICS
PENTODE UNIT



JUNE 12, 1941

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6297

1T4

REMOTE-CUTOFF PENTODE

MINIATURE TYPE

GENERAL DATA

Electrical:

Filament, Coated:

Voltage	1.4	dc volts
Current	0.05	amp

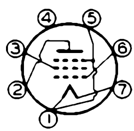
Direct Interelectrode Capacitances:°

Grid No.1 to plate	0.01	μμf
Grid No.1 to filament (-) & grid No.3 & internal shield, and grid No.2	3.6	μμf
Plate to filament (-) & grid No.3 & internal shield, and grid No.2	7.5	μμf

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-1/8"
Maximum Seated Length	1-7/8"
Length, Base Seat to Bulb Top (Excluding tip)	2" ± 3/32"
Maximum Diameter	3/4"
Bulb	T-5-1/2
Base	Small-Button Miniature 7-Pin (JETEC No. E7-1)
Basing Designation for BOTTOM VIEW	6AR

Pin 1 - Filament (-), Grid No.3, Int. Shield
Pin 2 - Plate
Pin 3 - Grid No.2
Pin 4 - No Connection-Do Not Use



Pin 5 - Filament (-), Grid No.3, Int. Shield
Pin 6 - Grid No.1
Pin 7 - Filament (+)

AMPLIFIER - Class A_1

Maximum Ratings, ***Design-Center Values:***

PLATE VOLTAGE	90 max.	volts
GRID-No.2 (SCREEN) SUPPLY VOLTAGE	90 max.	volts
GRID-No.2 VOLTAGE	67.5 max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Positive bias value	0 max.	volts
TOTAL CATHODE CURRENT	5.5 max.	ma

Typical Operation and Characteristics:

Plate Voltage	45	67.5	90	90	volts
Grid-No.2 Voltage	45	67.5	45	67.5	volts
Grid-No.1 Voltage	0	0	0	0	volts
Plate Resistance (Approx.)	0.35	0.25	0.8	0.5	megohm
Transconductance	700	875	750	900	μmhos
Plate Current	1.7	3.4	1.8	3.5	ma
Grid-No.2 Current	0.7	1.5	0.65	1.4	ma
Grid-No.1 Voltage for transconductance of 10 μmhos	-10	-16	-10	-16	volts

°With or without external shield JETEC No.316 connected to pin No.1.

← Indicates a change.

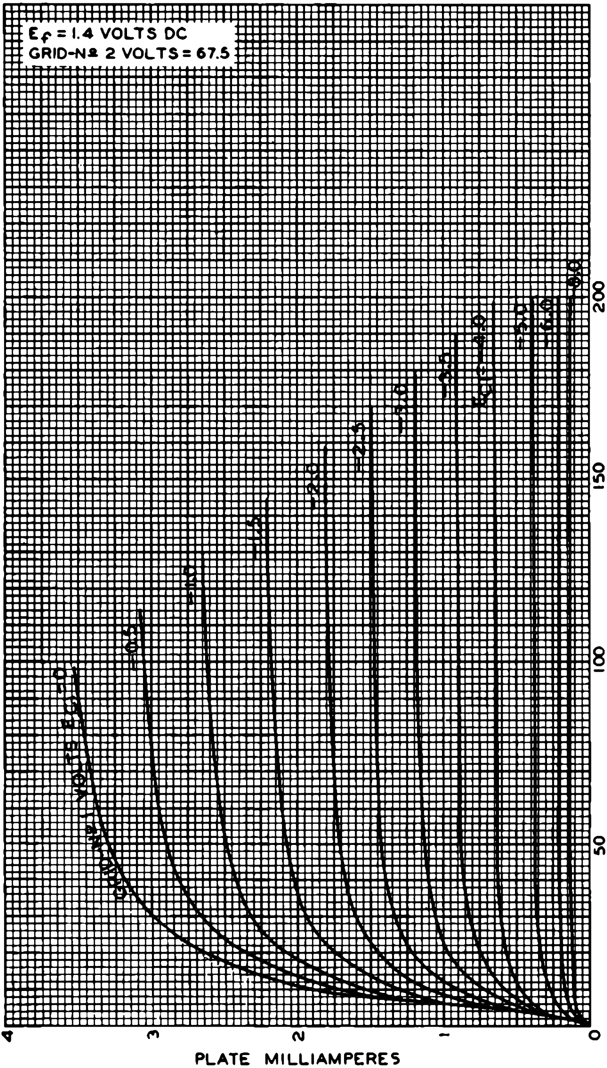
TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

1T4

RCA

1T4

AVERAGE PLATE CHARACTERISTICS



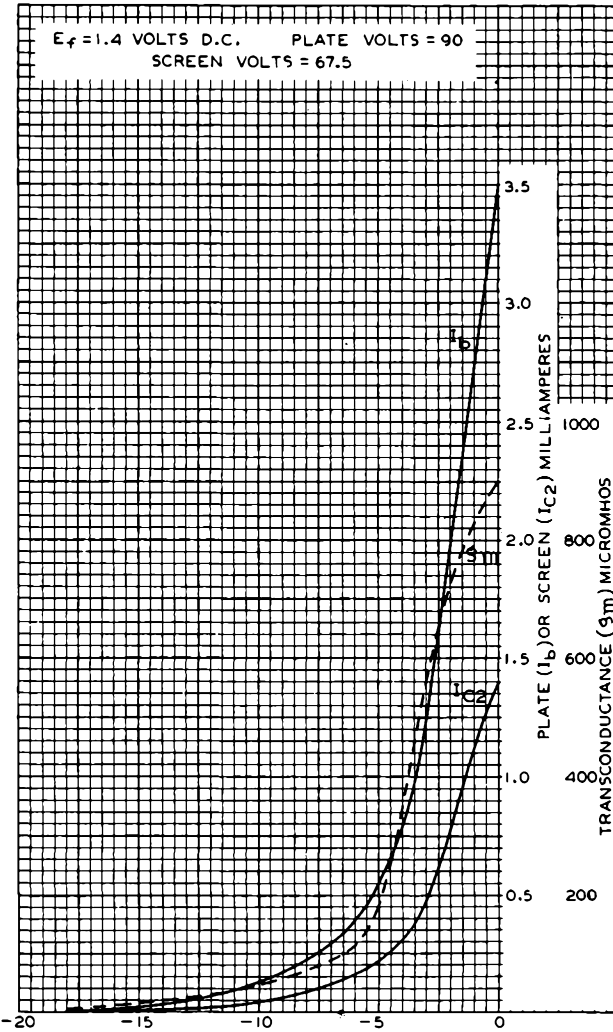
DEC. 27, 1954 TUBE DIVISION 92CM-6101R2

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

1T4

1T4

AVERAGE CHARACTERISTICS



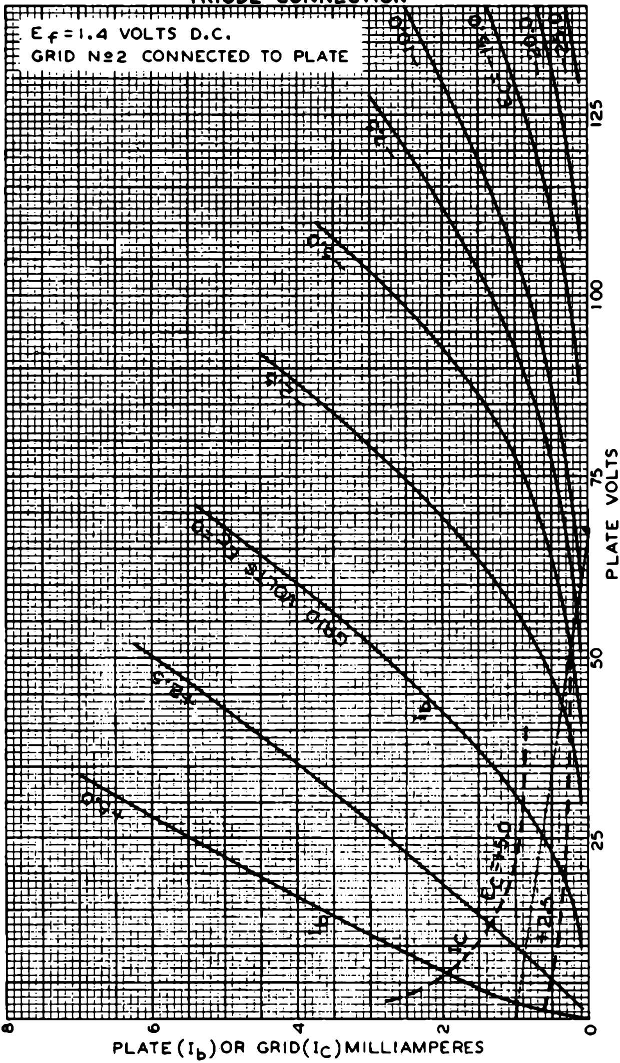
JAN. 24, 1942

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92C-6357

1T4

1T4
AVERAGE PLATE CHARACTERISTICS
TRIODE CONNECTION



FEB. 16, 1943

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92C-6352R1

1T6

DIODE—SHARP-CUTOFF PENTODE

SUBMINIATURE TYPE

GENERAL DATA

Electrical:

Filament, Coated:

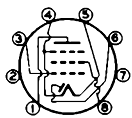
Voltage	1.25	dc volts
Current	0.04	amp

Mechanical:

Mounting Position	Any
Maximum Overall Length	1-3/4"
Maximum Seated Length	1-1/2"
Length, Base Seat to Bulb Top (excluding tip)	1.200 ± 0.060"
Maximum Diameter	0.4"
Bulb	T-3
Base	Small-Button Sub-minar 8-Pin

BOTTOM VIEW

Pin 1 – Pentode Plate
Pin 2 – No Connection
Pin 3 – Grid No.1
Pin 4 – Filament (–), Grid No.3



Pin 5 – Filament (+)
Pin 6 – Diode Plate
Pin 7 – No Connection
Pin 8 – Grid No.2

PENTODE UNIT
AMPLIFIER – Class A_1

Maximum Ratings, ***Design-Center Values:***

PLATE VOLTAGE	67.5 max.	volts
GRID-No.2 (SCREEN) VOLTAGE	67.5 max.	volts
TOTAL CATHODE CURRENT	2.0 max.	ma

Typical Operation and Characteristics:

Plate Voltage	30	45	67.5	volts
Grid-No.2 Voltage	30	45	67.5	volts
Grid-No.1 (Control-Grid) Voltage	0	0	0	volts
Plate Resistance (Approx.)	0.5	0.5	0.4	megohm
Transconductance	330	475	600	µmhos
Plate Current	0.33	0.75	1.6	ma
Grid-No.2 Current	0.10	0.21	0.4	ma

DIODE UNIT

Maximum Ratings, ***Design-Center Values:***

PLATE CURRENT	0.25 max.	ma

Diode Considerations:

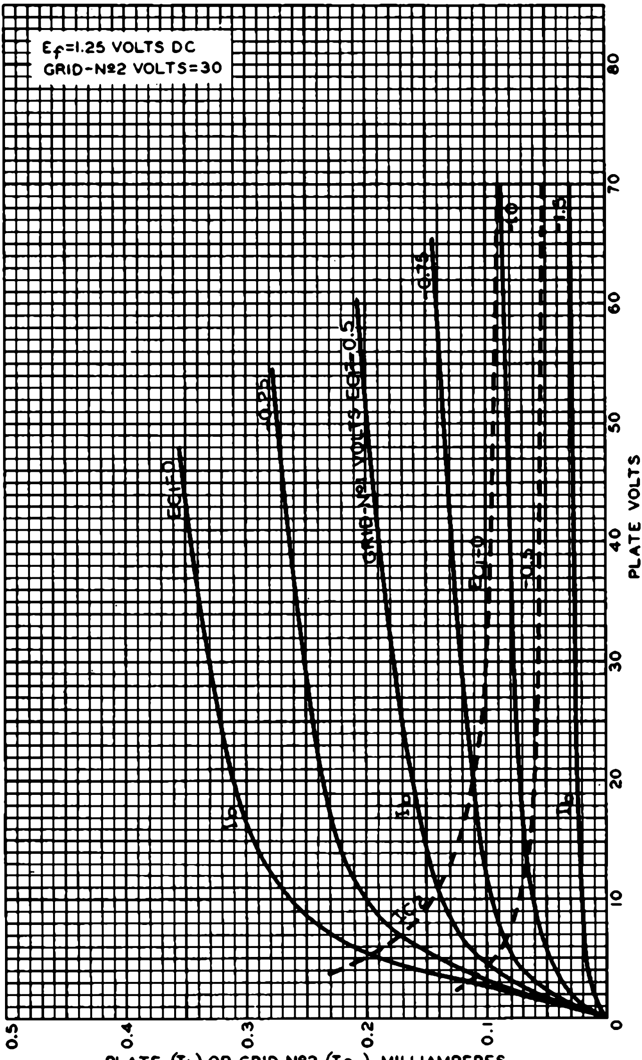
The diode is located at the negative end of the filament and is independent of the pentode unit except for the common filament.

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

RCA

1T6

AVERAGE PLATE CHARACTERISTICS



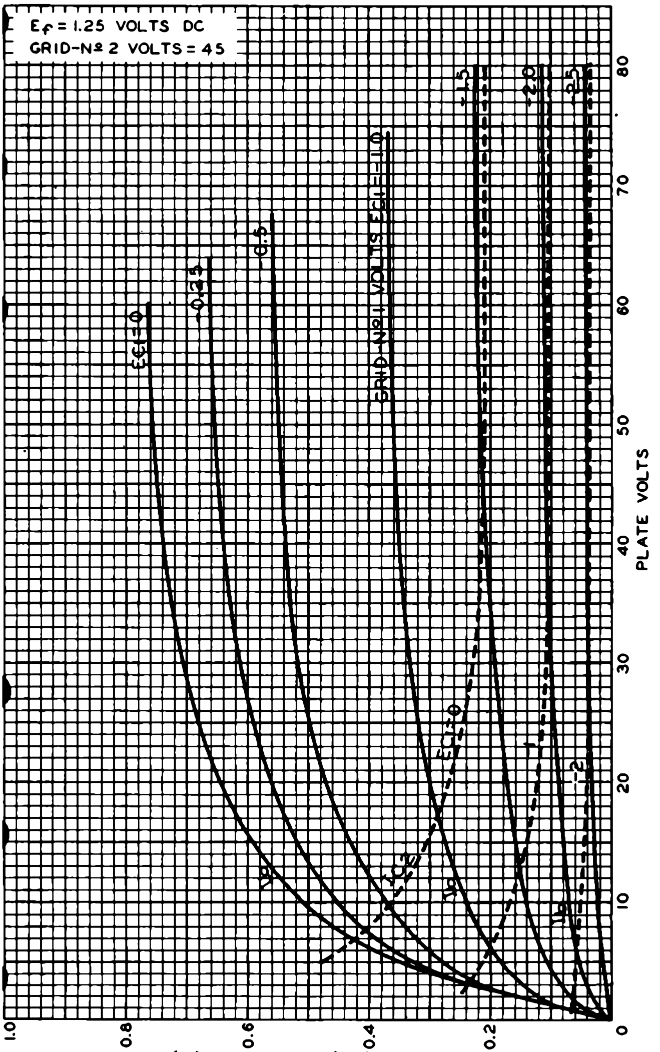
APRIL 26,1949 — 92CM-7260

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

RCA

1T6

AVERAGE PLATE CHARACTERISTICS



APRIL 21, 1949

TUBE DEPARTMENT

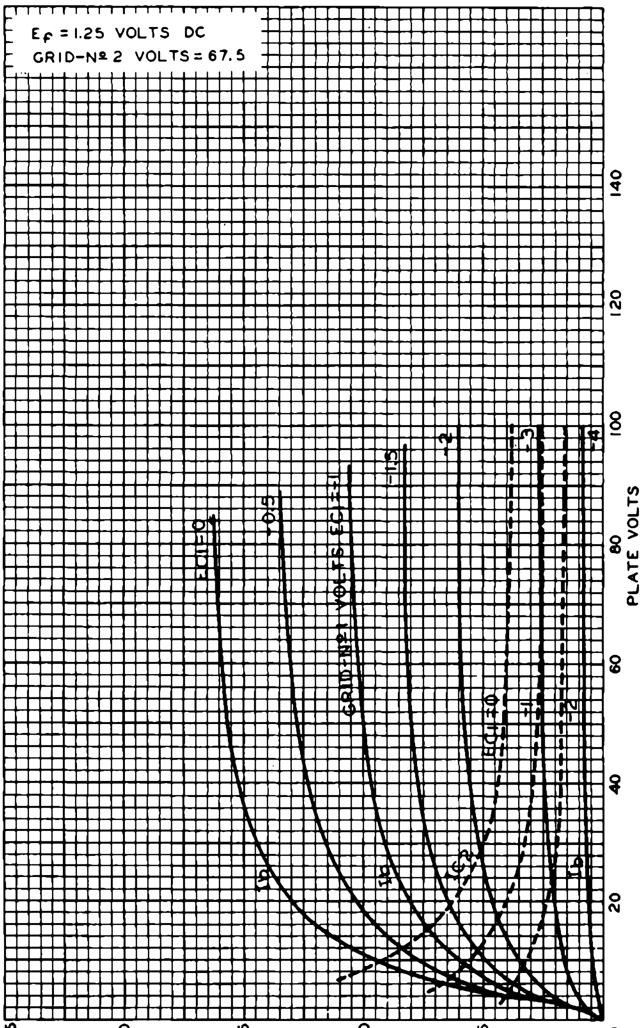
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7257

IT6

IT6

AVERAGE PLATE CHARACTERISTICS



APRIL 20, 1949 TUBE DEPARTMENT 92CM-7256

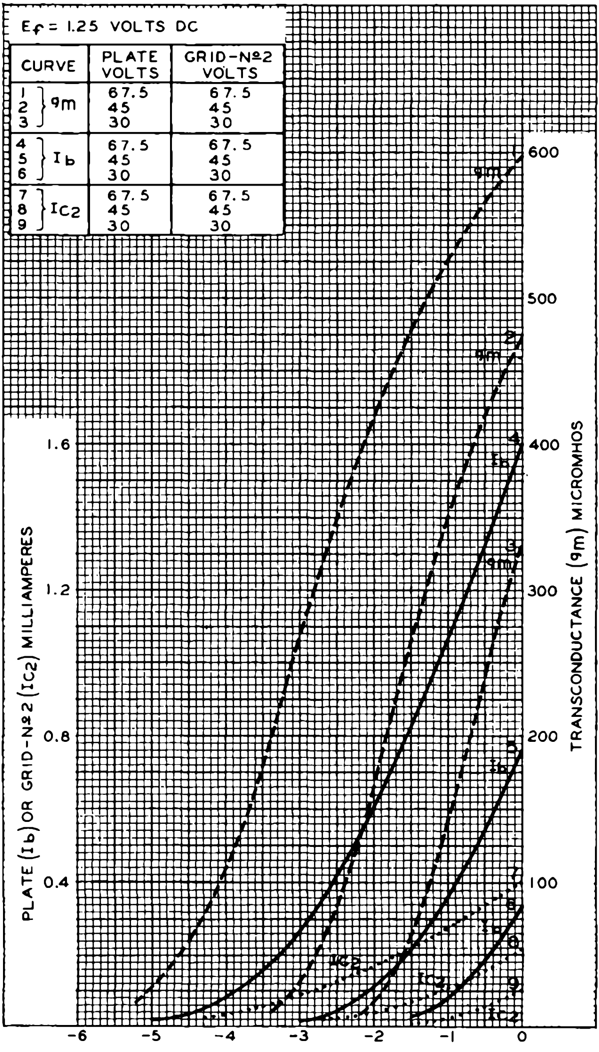
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

1T6

RCA

1T6

AVERAGE CHARACTERISTICS



APRIL 25, 1949 | **TUBE DEPARTMENT** | 92CM-7259

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

1U4

SHARP-CUTOFF PENTODE

MINIATURE TYPE

GENERAL DATA

Electrical:

Filament, Coated:

Voltage	1.4	dc volts
Current	0.05	amp

Direct Interelectrode Capacitances:

Grid No.1 to plate°	0.01 max.	$\mu\mu$f
Grid No.1 to filament (-) & grid No.3 & internal shield, and grid No.2•	3.6	$\mu\mu$f
Plate to filament (-) & grid No.3 & internal shield, and grid No.2•	7.5	$\mu\mu$f

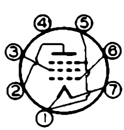
Characteristics, Class A_1 Amplifier:

Plate Voltage	90	volts
Grid-No.2 Voltage	90	volts
Grid-No.1 Voltage	0	volts
Plate Resistance (Approx.)	1	megohm
Transconductance	900	μmhos
Plate Current	1	ma
Grid-No.2 Current	0.5	ma
Grid-No.1 Voltage (Approx.) for transconductance of 10 μmhos	-4	volts

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-1/8"
Maximum Seated Length	1-7/8"
Length, Base Seat to Bulb Top (Excluding tip)	1-1/2" ± 3/32"
Maximum Diameter	3/4"
Bulb	T-5-1/2
Base	Small-Button Miniature 7-Pin (JETEC No.E7-1)
Basing Designation for BOTTOM VIEW	6AR

Pin 1 - Filament (-), Grid No.3, Internal Shield
Pin 2 - Plate
Pin 3 - Grid No.2
Pin 4 - No Connection



Pin 5 - Filament (-), Grid No.3, Internal Shield
Pin 6 - Grid No.1
Pin 7 - Filament (+)

AMPLIFIER - Class A_1

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	110 max.	volts
GRID-No.2 (SCREEN) VOLTAGE	110 max.	volts

° Without external shield.

• With external shield JETEC No.316 connected to pin No.1 or pin No.5.

→ Indicates a change.

1U4

SHARP-CUTOFF PENTODE

GRID-No.1 (CONTROL-GRID) VOLTAGE:

Positive bias value	0 max.	volts
→ TOTAL CATHODE CURRENT	6 max.	ma

Typical Operation as Resistance-Coupled Amplifier:

See RESISTANCE-COUPLED AMPLIFIER CHART No. 3 at front of this Section

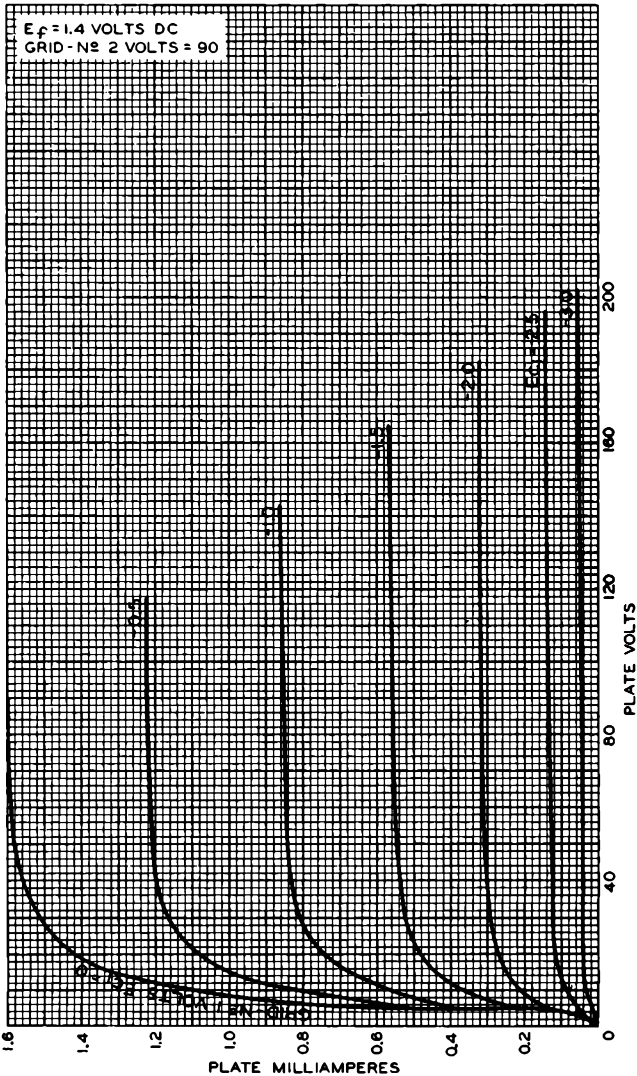
→ Indicates a change.

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

RCA

1U4

AVERAGE PLATE CHARACTERISTICS



FEB. 6, 1946

TUBE DIVISION

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

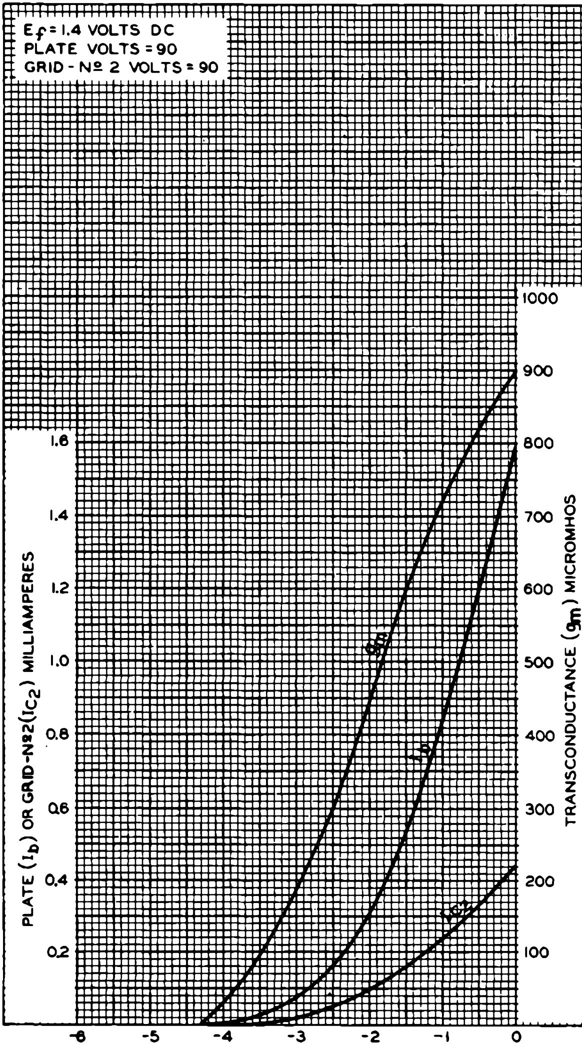
92CM-6669R1

1U4

RCA

1U4

AVERAGE CHARACTERISTICS



FEB. 6, 1948

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6688R1

1U5

1U5
DIODE–PENTODE

MINIATURE TYPE

GENERAL DATA

Electrical:

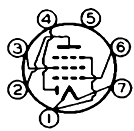
Filament, Coated:

Voltage	1.4	dc volts
Current	0.05	amp

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-1/8"
Maximum Seated Length	1-7/8"
Length, Base Seat to Bulb Top (excluding tip)	1-1/2" ± 3/32"
Maximum Diameter	3/4"
Bulb	T-5-1/2
Base	Small-Button Miniature 7-Pin
Basing Designation for BOTTOM VIEW	6BW

Pin 1 – Filament (–), Pentode Grid No.3
Pin 2 – Pentode Plate
Pin 3 – Pentode Grid No.2



Pin 4 – Diode Plate
Pin 5 – No Connection
Pin 6 – Pentode Grid No.1
Pin 7 – Filament (+)

PENTODE UNIT

AMPLIFIER – Class A_1

Maximum Ratings, ***Design-Center Values:***

PLATE VOLTAGE	90 max.	volts
GRID-No.2 (SCREEN) VOLTAGE	90 max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Negative bias value	50 max.	volts
Positive bias value	0 max.	volts
TOTAL MAX.-SIGNAL CATHODE CURRENT	3 max.	ma.

Characteristics:

Plate Voltage	67.5	volts
Grid-No.2 Voltage	67.5	volts
Grid-No.1 Voltage	0	volts
Plate Resistance (Approx.)	0.6	megohm
Transconductance	625	µmhos
Plate Current	1.6	ma.
Grid-No.2 Current	0.4	ma.

Typical Operation as Resistance-Coupled Amplifier:

See RESISTANCE-COUPLED AMPLIFIER CHART at front of this Section.

DIODE UNIT

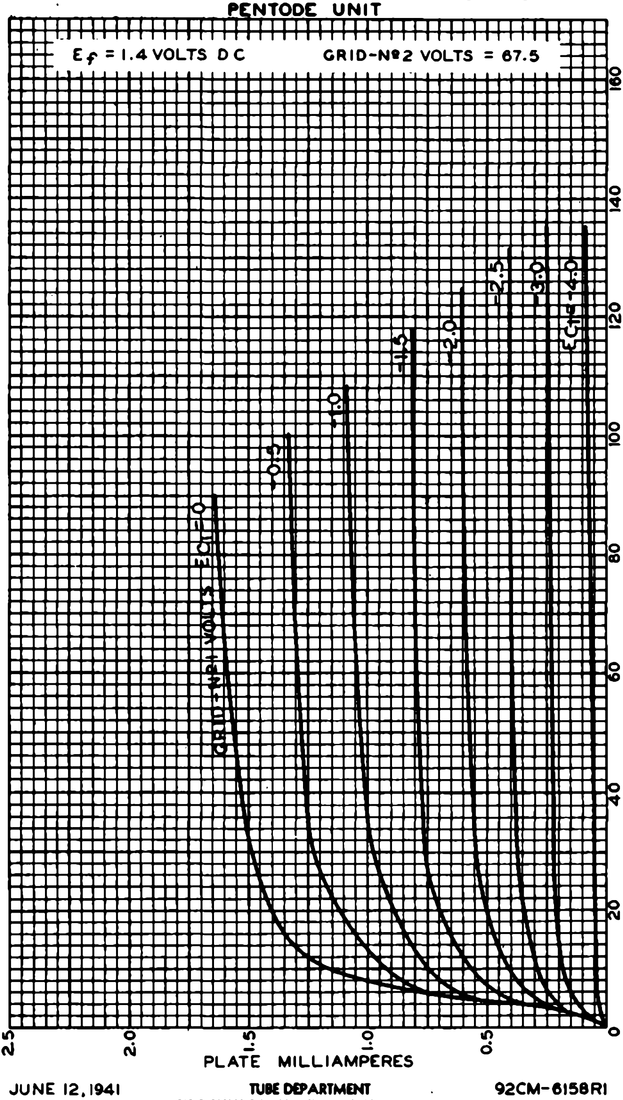
The diode is located at the negative end of the filament and is independent of the pentode unit except for the common filament.

Curve shown under Type 1S5 also applies to the 1U5.

1U5

RCA

1U5
AVERAGE PLATE CHARACTERISTICS
PENTODE UNIT



JUNE 12, 1941

TUBE DEPARTMENT

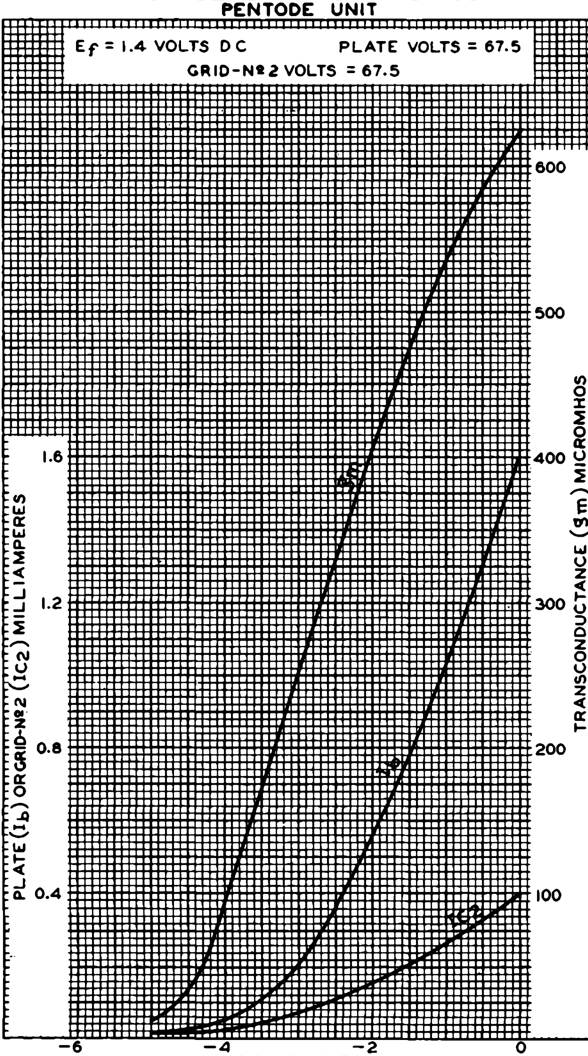
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6158R1

1U5

1U5

AVERAGE CHARACTERISTICS
PENTODE UNIT



JUNE 12, 1941

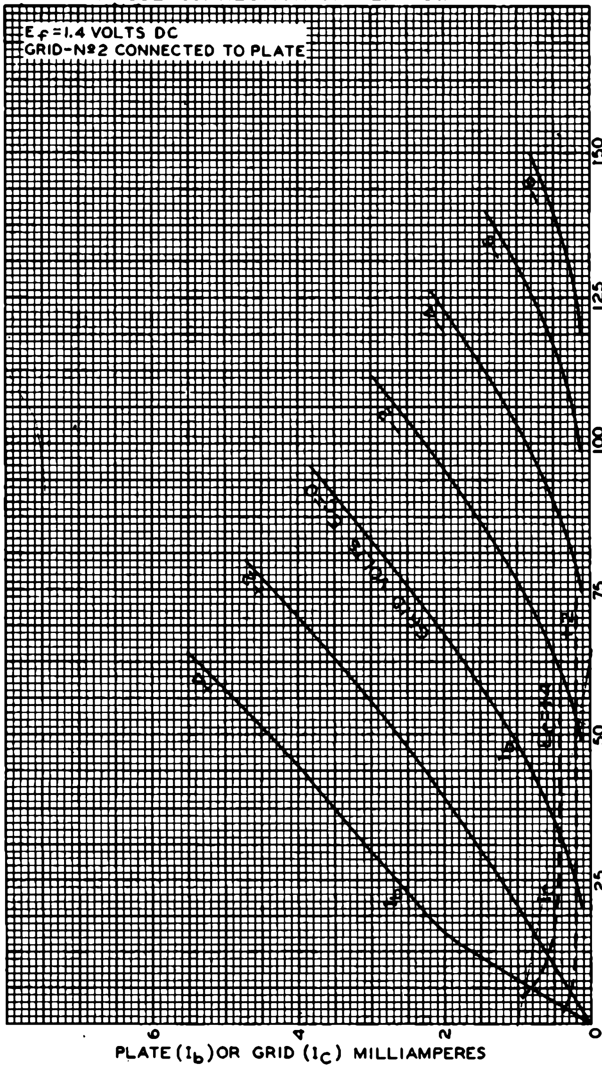
TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6172R1

IU5

RCA

IU5
AVERAGE PLATE CHARACTERISTICS
TRIODE CONNECTION OF PENTODE UNIT



JAN. 2, 1942 TUBE DEPARTMENT 92CM-6351R1
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

1-V

HALF-WAVE HIGH-VACUUM RECTIFIER

The 1-v supersedes the mercury-vapor type 1 and is interchangeable with it.

Heater	Coated Unipotential Cathode	
Voltage	6.3	a-c or d-c volts
Current	0.3	amp.
Maximum Overall Length		4-3/16"
Maximum Diameter		1-9/16"
Bulb		ST-12
Base		Small 4-Pin
Pin 1-Heater		Pin 3-Cathode
Pin 2-Plate		Pin 4-Heater
Mounting Position	BOTTOM VIEW (4G)	Any

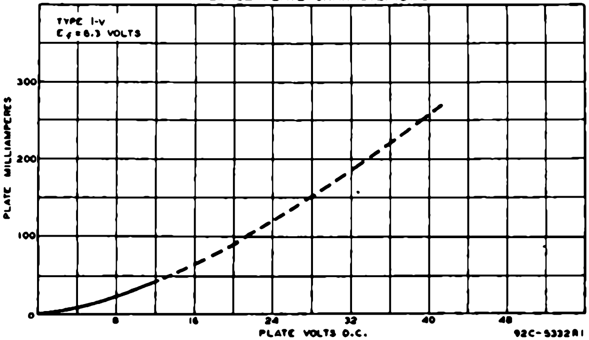
HALF-WAVE RECTIFIER

Peak Inverse Voltage			1000 max. volts
Peak Plate Current			270 max. ma.
D-C Heater-Cathode Potential			500 max. volts
Typical Operation with Condenser-Input Filter:			
A-C Plate Voltage (RMS)	117	150	325 max. volts
Total Effective Plate-Supply Impedance ▲	0 min.	30 min.	75 min. ohms
D-C Output Current	45 max.	45 max.	45 max. ma.

■ Under no condition of operation should the normal operating heater voltage of 6.3 volts ever fluctuate to exceed a maximum of 7.5 volts.

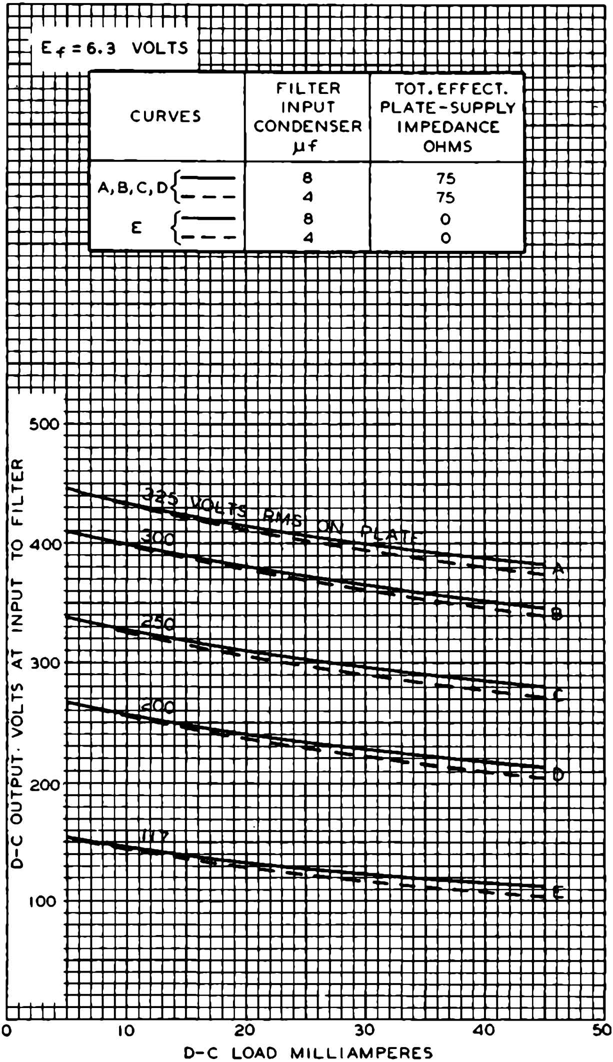
▲ When a filter-input condenser larger than 40 μf is used, it may be necessary to use more plate-supply impedance than the minimum value shown to limit the peak plate current to the rated value.

AVERAGE PLATE CHARACTERISTIC



FEB. 2, 1940 DATA

OPERATION CHARACTERISTICS



1V2

HALF-WAVE VACUUM RECTIFIER

MINIATURE TYPE

GENERAL DATA

Electrical:

Filament, Coated:

▲Voltage	0.625	ac volt
Current	0.3	amp

Direct Interelectrode Capacitance (Approx.):°

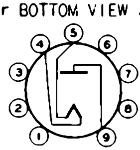
Plate to Filament	0.8	μμf

° With no external shield.

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-3/16"
Maximum Seated Length	1-15/16"
Length, Base Seat to Bulb Top (Excluding tip)	1-9/16" ± 3/32"
Maximum Diameter	7/8"
Bulb	T-6-1/2
Base	Small-Button Noval 9-Pin
Basing Designation for BOTTOM VIEW	9U

Pin 1 - Internal Connection- Do Not Use
Pin 2 - Same as pin 1
Pin 3 - Same as pin 1
Pin 4 - Filament



Pin 5 - Filament
Pin 6 - Same as pin 1
Pin 7 - Same as pin 1
Pin 8 - Same as pin 1
Pin 9 - Plate

HALF-WAVE RECTIFIER

*Pulsed-Rectifier Service**

Maximum Ratings, ***Design-Center Values:***

PEAK INVERSE PLATE VOLTAGE	7500 max.	volts
PEAK PLATE CURRENT	10 max.	ma
AVERAGE PLATE CURRENT	0.5 max.	ma

* The duration of the voltage pulse must not exceed 15% of one horizontal scanning cycle in a 525-line, 30-frame system as described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations", Federal Communications Commission. In such a system, 15% of one scanning cycle is 10 microseconds.

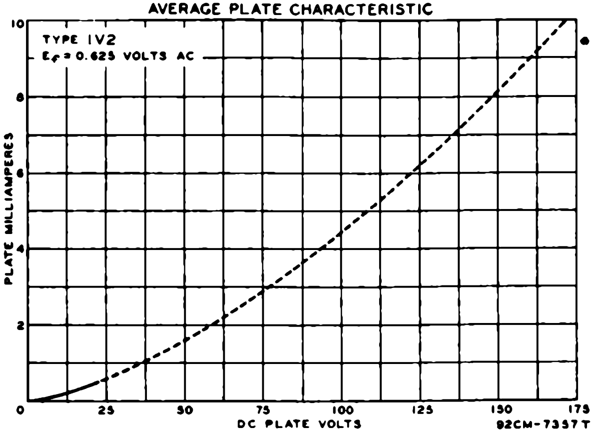
OPERATING NOTES

When the filament voltage is measured, it is recommended that a thermal rms voltmeter be used. The meter and its leads must be insulated to withstand 15000 volts and the stray capacitances to ground should be minimized.

1V2

1V2

HALF-WAVE VACUUM RECTIFIER



NOV. 15, 1949

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

CE-7357T

1X2-A
HALF-WAVE VACUUM RECTIFIER

9-PIN MINIATURE TYPE

Supersedes Type 1X2

GENERAL DATA

Electrical:

Filament, Coated:

Voltage	1.25	ac volts
Current	0.2	amp

Direct Interelectrode Capacitance (Approx.):°

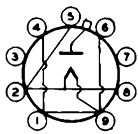
Plate to Filament	1	μμf

° With no external shield.

Mechanical:

Mounting Position	Any
Overall Length	2-11/16 ± 1/8"
Maximum Diameter	7/8"
Bulb	T-6-1/2
Cap	Skirted Miniature, JETEC C1-33
Base	Small-Button Noval 9-Pin
Basing Designation for BOTTOM VIEW	9Y

Pin 1 - Filament, Internal Shield
Pin 2 - Filament
Pin 3 - See NOTE
Pin 4 - Same as Pin 1



Pin 5 - Same as Pin 2
Pin 6 - Same as Pin 1
Pin 7 - Same as Pin 3
Pin 8 - Same as Pin 2
Pin 9 - Same as Pin 1
Cap - Plate

NOTE: May be connected to filament; otherwise, do not use.

PULSED-RECTIFIER SERVICE

Maximum Ratings, *Design-Center Values*:

For operation in a 525-line, 30-frame system°

PEAK INVERSE PLATE VOLTAGE	18000 max.	volts
DC OUTPUT VOLTAGE	16000 max.	volts
PEAK PLATE CURRENT	10 max.	ma
AVERAGE PLATE CURRENT	1 max.	ma

Typical Operation:

Peak Positive-Pulse Plate Supply Voltage*	14000	volts
Peak Negative-Pulse Plate Supply Voltage*	3500	volts
Peak Inverse Plate Voltage	17500	volts
DC Output Voltage	14000	volts
DC Output Current	175	μa

° As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations", Federal Communications Commission.

* The duration of the voltage pulse must not exceed 15% of one horizontal scanning cycle. In a 525-line, 30-frame system, 15% of one horizontal scanning cycle is 10 microseconds.

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

RCA

1X2-A

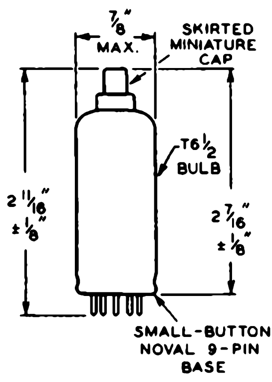
HALF-WAVE VACUUM RECTIFIER

OPERATING NOTES

When the filament is supplied from an rf power source which is at a high dc potential above ground, adjustment of the filament voltage by direct measurement is usually impractical. However, a simple method utilizing visual comparison of filament temperatures can be used for adjustment of filament power. The color temperature of the filament operating from an rf power source may be checked visually by observing in a darkened room the reflection of the incandescent filament upon the surface of the internal shield. A visual comparison of this color temperature with that obtained when the filament of another 1X2-A is operated from a dc or low-frequency ac supply of 1.25 volts, provides a convenient means for adjusting the amount of rf excitation to produce 1.25 volts (rms) at the filament terminals.

The voltages employed in some television receivers and other high-voltage equipment are sufficiently high that high-voltage rectifier tubes may produce x-rays which can constitute a health hazard, unless such tubes are adequately shielded. Relatively simple shielding should prove adequate, but the need for this precaution should be considered in equipment design.

The AVERAGE PLATE CHARACTERISTIC curve shown for type 1B3-GT also applies to the 1X2-A within ratings



TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

RCA

1X2-B

HALF-WAVE VACUUM RECTIFIER

9-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

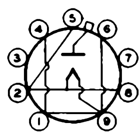
Filament, Coated:
Voltage . . . . 1.25 . . . . ac volts
Current . . . . 0.2 . . . . amp
Direct Interelectrode Capacitance (Approx.):°
Plate to Filament . . . . 1 . . . . $\mu\mu$f

Mechanical:

Mounting Position . . . . Any
Maximum Overall Length . . . . 2-27/32"
Seated Length . . . . 2-7/16" ± 1/8"
Maximum Diameter . . . . 7/8"
Bulb T-6-1/2
Cap . . . . Skirted Miniature (JETEC No.C1-2 or C1-33)
Base . . . . Small-Button Noval 9-Pin (JETEC No.E9-1)

BOTTOM VIEW

Pin 1 - Filament, Int. Shield
Pin 2 - Filament
Pin 3 - No. Conn.- Do Not Use
Pin 4 - Filament, Int. Shield
Pin 5 - Filament



Pin 6 - Filament, Int. Shield
Pin 7 - No. Conn.- Do Not Use
Pin 8 - Filament
Pin 9 - Filament, Int. Shield
Cap - Plate

PULSED-RECTIFIER SERVICE

Maximum Ratings, *Design-Center Values Except as Noted:*

*For operation in a 525-line, 30-frame system**

PEAK INVERSE PLATE VOLTAGE (Absolute Maximum)■	22000●	max.	volts
PEAK PLATE CURRENT	45	max.	ma
AVERAGE PLATE CURRENT	0.5	max.	ma

Typical Operation:

Peak Plate Supply Voltage:		
Positive Pulse Value	18000	volts
Negative Pulse Value	2000	volts
DC Output Voltage (Approx.)	18000	volts
DC Output Current (Approx.)	100	μamp

° With no external shield.

* As described in "Standards of Good Engineering Practice Concerning Television Stations", Federal Communications Commission.

● Under no circumstances should this absolute value be exceeded.

■ The dc component must not exceed 18000 volts.

1X2-B

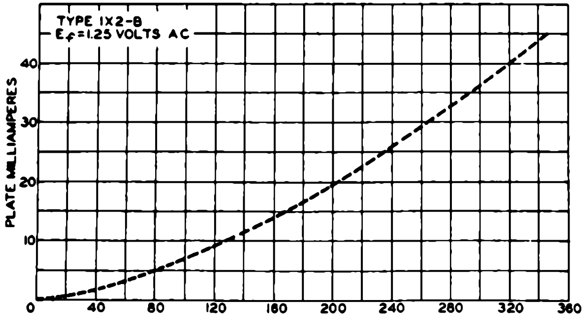
HALF-WAVE VACUUM RECTIFIER

OPERATING NOTES

When the *filament* is operated on rf, the color temperature of the filament operating from a pulse-operated or rf power source may be checked usually by observing in a darkened room the reflection of the incandescent filament upon the surface of the internal shield. A visual comparison of this color temperature with that obtained when the filament of another 1X2-B is operated from a dc or low-frequency ac supply of 1.25 volts, provides a convenient means for adjusting the amount of rf excitation to produce 1.25 volts (rms) at the filament terminals.

The voltages employed in some television receivers and other high-voltage equipment is sufficiently high that high-voltage rectifier tubes may produce *x-rays* which constitute a hazard unless such tubes are adequately shielded. Relatively simple shielding should prove adequate, but the need for this precaution should be considered in equipment design.

AVERAGE PLATE CHARACTERISTIC



92CM-8148T

2A3
POWER TRIODE

GENERAL DATA

Electrical:

Filament, Coated:

Voltage	2.5	ac or dc volts
Current	2.5	amp

Direct Interelectrode Capacitances (Approx.):*

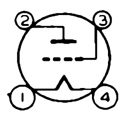
Grid to Plate	16.5	μμf
Grid to Cathode	7.5	μμf
Plate to Cathode	5.5	μμf

* With no external shield.

Mechanical:

Mounting Position	Any ←
Maximum Overall Length	5-3/8"
Maximum Seated Length	4-3/4"
Maximum Diameter	2-1/16"
Bulb	ST-16
Base	Medium-Shell Small 4-Pin
Basing Designation for BOTTOM VIEW	4D

Pin 1 - Filament
Pin 2 - Plate



Pin 3 - Grid
Pin 4 - Filament

AMPLIFIER - Class A_1

Maximum Ratings, ***Design-Center Values:***

PLATE VOLTAGE	300 max.	volts
PLATE DISSIPATION	15 max.	watts

Typical Operation and Characteristics:

Plate Voltage	250	volts
Grid Voltage#▲	-45	volts
Amplification Factor	4.2	
Plate Resistance	800	ohms
Transconductance	5250	μmhos
Plate Current	60	ma.
Load Resistance	2500	ohms
Second Harmonic Distortion	5	%
Power Output	3.5	watts

Maximum Circuit Values:□

Grid-Circuit Resistance	fixed bias	0.05 max.	megohm
	cathode bias	0.5 max.	megohm

#,▲,□: See next page.

← Indicates a change.

2A3

RCA

2A3
POWER TRIODE

PUSH-PULL AMPLIFIER – Class AB_1

Maximum Ratings, ***Design-Center Values:***

PLATE VOLTAGE	300 max.	volts
PLATE DISSIPATION	15 max.	watts

Typical Operation:

Values are for 2 tubes

	Fixed Bias	*Cathode Bias*	
Plate Voltage	300	300● . .	volts
Grid Voltage#	-62	- . .	volts
Cathode-Bias Resistor	-	780 . .	ohms
→ Peak AF Grid-to-Grid Voltage . . .	124	156 . .	volts
Zero-Signal Plate Current	80	80 . .	ma.
→ Max.-Signal Plate Current	147	100 . .	ma.
Effective Load Resistance (plate to plate) . . .	3000	5000 . .	ohms
Total Harmonic Distortion	2.5	5.0 . .	%
Power Output	15	10 . .	watts

Maximum Circuit Values:□

Grid-Circuit Resistance . . .	fixed bias	0.05 max.	megohm
	cathode bias	0.5 max.	megohm

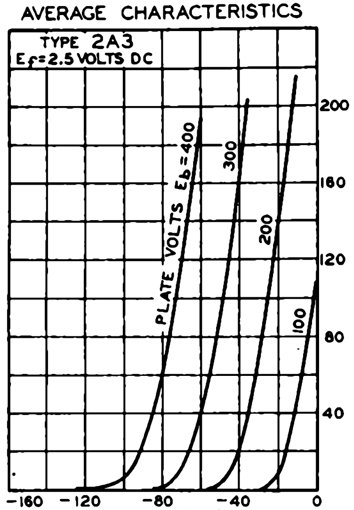
\# Grid voltage referred to mid-point of ac-operated filament.

▲ When a single 2A3 is operated cathode-biased, the cathode-biasing resistor value should be 750 ohms.

□ The type of coupling used should not introduce too much resistance in the grid circuit. Transformer or impedance-coupling devices are recommended.

● For zero-signal conditions.

AVERAGE CHARACTERISTICS



92CM-5328T

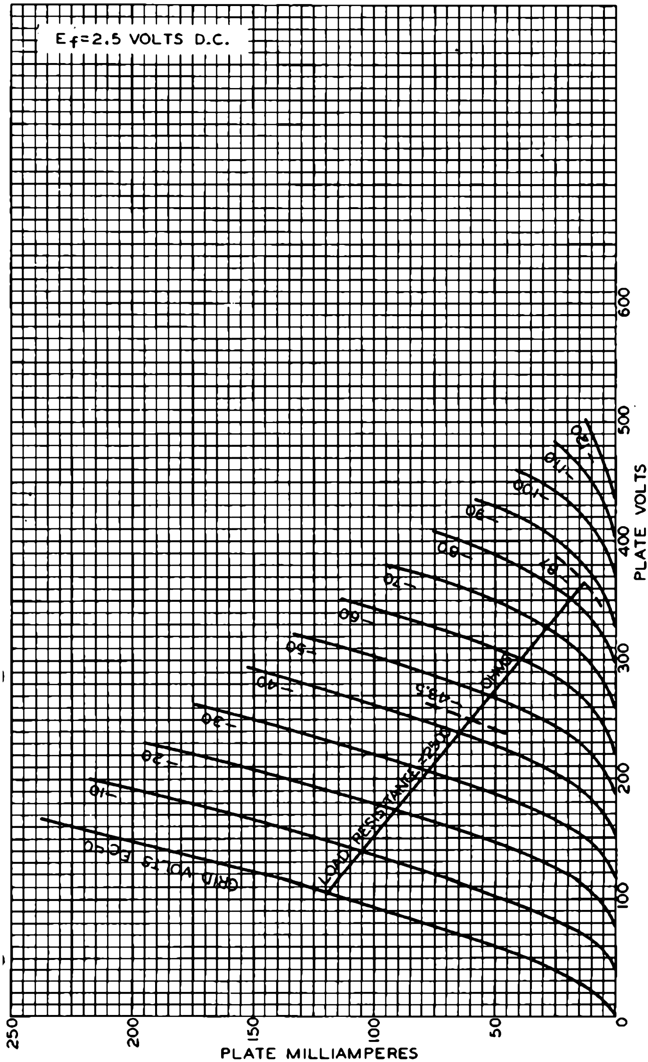
→ Indicates a change.

2A3

Cunningham Radiotron

RCA-2A3

AVERAGE PLATE CHARACTERISTICS



MARCH 9, 1933

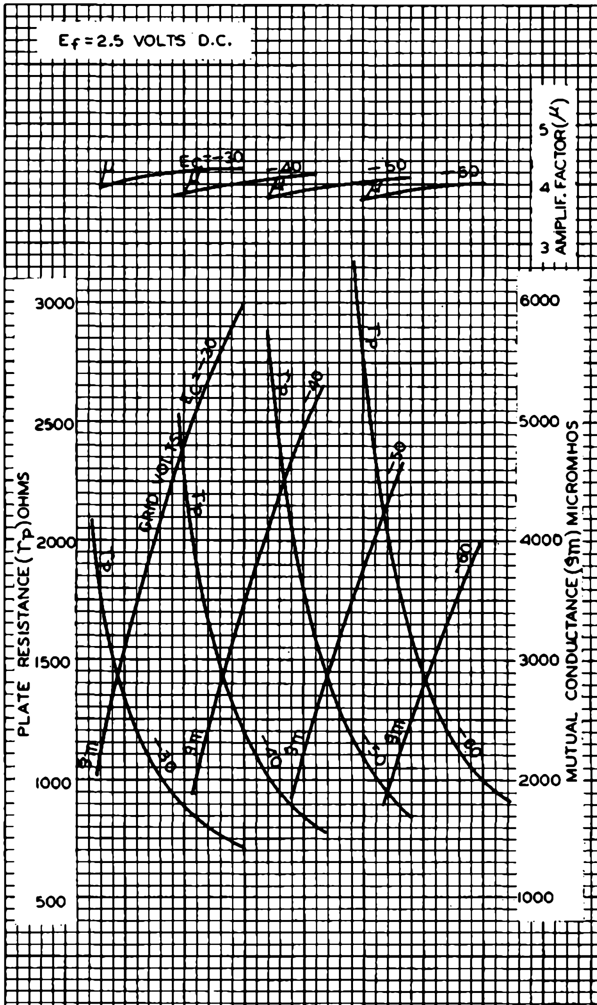
RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

92S-5233R1

2A3

Cunningham Radiotron RCA-2A3

AVERAGE CHARACTERISTICS



JUNE 12, 1933

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

92S-5326R1

Cunningham Radiotron

2A7

RCA-2A7

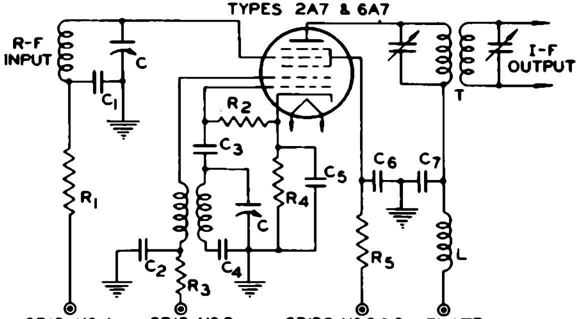
PENTAGRID CONVERTER

Heater	Coated Unipotential Cathode		
Voltage		2.5	a-c or d-c volts
Current		0.8	amp.

For further data, see Type 6A7. The 6A7 and 2A7 are identical except for heater rating.

TYPICAL PENTAGRID CONVERTER CIRCUIT

TYPES 2A7 & 6A7



C = GANGED TUNING CONDENSER (40 TO 350 $\mu\mu f$)

C_1, C_2, C_5, C_6, C_7 = 0.1 μf

C_3 = 0.00025 μf

C_4 = SEE TABLE BELOW

R_1 = 250 000 OHMS, 0.1 WATT

R_2 = 10 000 - 50 000 OHMS, 0.1 WATT

R_3 = OSCILLATOR-ANODE (GRID Nº 2) VOLTAGE-DROPPING RESISTOR

R_4 = 150-300 OHMS, 0.1 WATT

R_5 = SCREEN (GRIDS Nº 3 & 5) FILTER RESISTOR

L = 60-MILLIHENRY R-F CHOKE

T = 465-KC I-F TRANSFORMER

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

TYPES 2A7 AND 6A7

TYPICAL PENTAGRID CONVERTER CIRCUIT

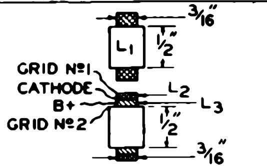
COIL DESIGN DETAILS

(continued from preceding page)

FREQUENCY BAND MEGACYCLES	0.15 TO 0.40		0.55 TO 1.5				1.5 TO 4.0		4.0 TO 10		10 TO 25	
ASSEMBLY №	1		1		2		2		3		3	
	TURNS	WIRE #	TURNS	WIRE #	TURNS	WIRE #	TURNS	WIRE #	TURNS	WIRE #	TURNS	WIRE #
R-F COIL (L_1)	422	36 SSE	116	30 SSE	146	32 ENAM	36.2	30 ENAM	10.1	30 ENAM	4.4	20 ENAM
OSC. GRID COIL (L_2)	198	36 SSE	80	30 SSE	92	32 ENAM	30.9	30 ENAM	9.7	30 ENAM	4.3	20 ENAM
OSC. PLATE COIL (L_3)	60	36 SSE	30	30 SSE	20	32 ENAM	12	30 ENAM	12	36 ENAM	6	36 ENAM
OSC. TRACKING COND. (C_4)	117 μμf		400 μμf				1070 μμf		2900 μμf		7300 μμf	

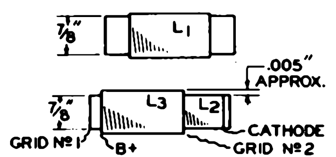
№ 1

MULTI-LAYER COILS



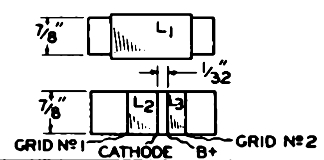
№ 2

SINGLE-LAYER COILS



№ 3

SINGLE-LAYER COILS



RCA

2AF4-A

MEDIUM-MU TRIODE

MINIATURE TYPE

Intended for use in UHF TV equipment having series heater-string arrangement

The 2AF4-A is the same as the 6AF4-A except for the following items:

Heater, for Unipotential Cathode:

Voltage	2.35	ac or dc volts
Current	0.6	amp
Warm-up time (Average)	11	sec

For definition of heater warm-up time and method of determining it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of this Section.

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

2B7

TWIN DIODE—REMOTE-CUTOFF PENTODE

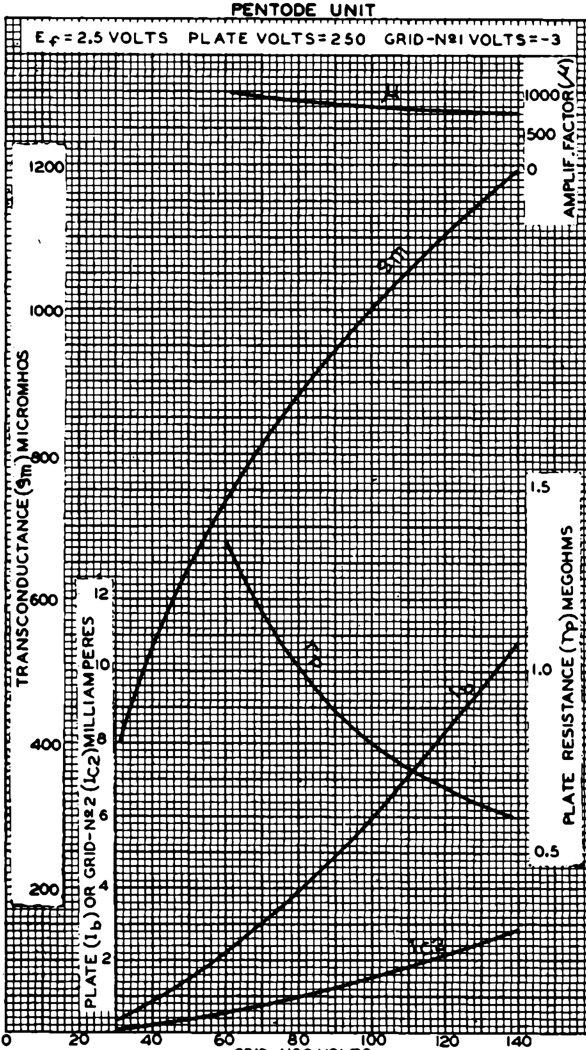
Heater, for Unipotential Cathode:
Voltage. . . . . 2.5 . . . . ac or dc volts
Current. . . . . 0.8 . . . . amp

The 2B7 is the same as the 6B7 except for heater rating.

2B7

RCA

2B7
AVERAGE CHARACTERISTICS
PENTODE UNIT



FEB. 6, 1933 **TUBE DEPARTMENT** 92CM-5254

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

3A2

HALF-WAVE VACUUM RECTIFIER

9-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage	3.15	ac volts
Current	0.22	amp

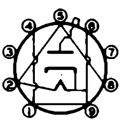
Direct Interelectrode Capacitance (Approx.):*

Plate to heater, cathode, and internal shield	1.0	μμf

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-13/16"
Seated Length	2-7/16" ± 1/8"
Maximum Diameter	7/8"
Bulb	T-6-1/2
Cap	Skirted Miniature (JETEC No.C1-33)
Base	Small-Button Noval 9-Pin (JETEC No.E9-1)
Basing Designation for BOTTOM VIEW	9DT

Pin 1 - Heater, Cathode, Int. Shield
Pin 2 - Heater
Pin 3 - No Connection- Do Not Use
Pin 4 - Heater, Cathode, Int. Shield
Pin 5 - Heater



Pin 6 - Heater, Cathode, Int. Shield
Pin 7 - No Connection- Do Not Use
Pin 8 - Heater
Pin 9 - Heater, Cathode, Int. Shield

PULSED-RECTIFIER SERVICE

Maximum Ratings, *Design-Center Values:*

*For operation in a 525-line, 30-frame system***

PEAK INVERSE PLATE VOLTAGE	18000 max.	volts
PEAK PLATE CURRENT	80 max.	ma
AVERAGE PLATE CURRENT	1.5 max.	ma

* With no external shield.

** As described in "Standards of Good Engineering Practice Concerning Television Stations", Federal Communications Commission.

OPERATING NOTES

Measurement of Heater Voltage. To measure the heater voltage when the heater is at a high dc potential with respect to ground, it is recommended that a voltmeter of the thermocouple type calibrated in rms volts be used. The meter and its leads must be insulated to withstand the dc output voltage. In some circuit designs, particularly in voltage-multiplier circuits where the heater

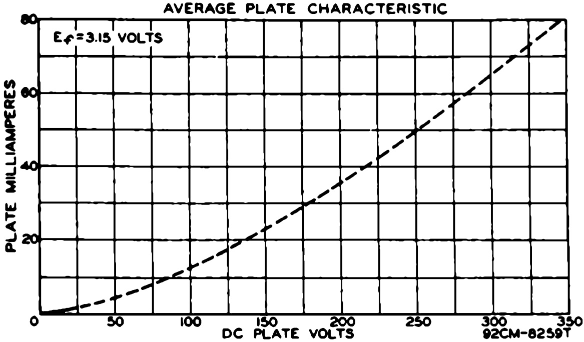
3A2

HALF-WAVE VACUUM RECTIFIER

of a rectifier tube may be at a high ac potential with respect to ground, measurement of the heater voltage of this tube with a thermocouple meter is not practical because the capacitances of the meter and the meter leads will load the circuit and affect circuit operation. Therefore, a simple method utilizing visual comparison of heater temperatures can be used for adjustment of heater power. The color temperature of the heater operating from a pulse-operated power source may be checked visually by observing in a darkened room the reflection of the incandescent heater upon the surface of the internal shield. A visual comparison of this color temperature with that obtained when the heater of another 3A2 is operated from a dc or low-frequency ac supply of 3.15 volts, provides a convenient means for adjusting the heater voltage to the proper rms value.

The voltages employed in some television receivers and other high-voltage equipment are sufficiently high that high-voltage rectifier tubes may produce *x-rays* which can constitute a health hazard unless such tubes are adequately shielded. Relatively simple shielding should prove adequate, but the need for this precaution should be considered in equipment design.

AVERAGE PLATE CHARACTERISTIC



3A3

3A3

HALF-WAVE VACUUM RECTIFIER

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage	3.15	ac volts
Current	0.22	amp

Direct Interelectrode Capacitance (Approx.):●

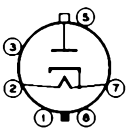
Plate to Heater, Cathode, and Internal Shield	1.5	$\mu\mu$f

Mechanical:

Mounting Position	Any
Maximum Overall Length	4-1/16"
Seated Length	3-5/16" ± 3/16"
Maximum Diameter	1-9/32"
Bulb	T-9
Cap	Small (JETEC No.C1-1)
Base	Intermediate-Shell Octal 6-Pin (JETEC No.B6-8)

BOTTOM VIEW

Pin 1 - Int. Conn.-Do Not Use
Pin 2 - Heater
Pin 3 - Int. Conn.-Do Not Use
Pin 5 - Int. Conn.-Do Not Use



Pin 7 - Heater, Cathode, Int. Shield
Pin 8 - Int. Conn.-Do Not Use
Cap - Plate

PULSED-RECTIFIER SERVICE

Maximum Ratings, *Design-Center Values:*

For operation in a 525-line, 30-frame system▲

PEAK INVERSE PLATE VOLTAGE	30000 max.	volts
PEAK PLATE CURRENT	80 max.	ma
AVERAGE PLATE CURRENT	1.5 max.	ma

● With no external shield.

▲ As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations," Federal Communications Commission.

OPERATING NOTES

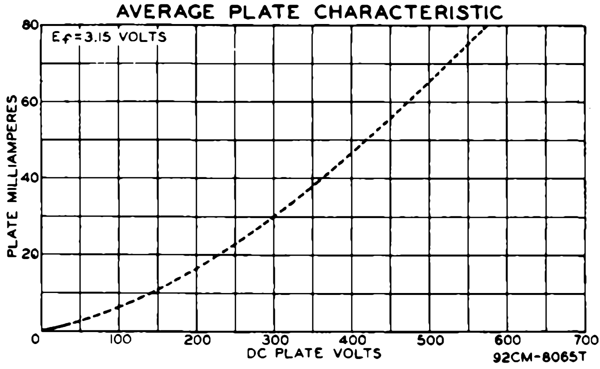
Measurement of Heater Voltage. To measure the heater voltage when the heater is at a high dc potential with respect to ground, it is recommended that a voltmeter of the thermocouple type calibrated in rms volts be used. The meter and its leads must be insulated to withstand 20000 volts and the stray capacitances to ground should be minimized.

MARCH 1, 1954 TUBE DEPARTMENT TENTATIVE DATA
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

3A3

HALF-WAVE VACUUM RECTIFIER

The voltages employed in some television receivers and other high-voltage equipment are sufficiently high that high-voltage rectifier tubes may produce *x-rays* which can constitute a health hazard unless such tubes are adequately shielded. Relatively simple shielding should prove adequate, but the need for this precaution should be considered in equipment design.



RCA

3AL5
TWIN DIODE

7-PIN MINIATURE TYPE

Intended for use in equipment having series heater-string arrangement

The 3AL5 is the same as the 6AL5 except for the following items:

Heater, for Unipotential Cathode:

Voltage	3.15	ac or dc volts
Current	0.6	amp
Warm-up time (Average)*	11	sec

3AU6
SHARP-CUTOFF PENTODE

7-PIN MINIATURE TYPE

Intended for use in equipment having series heater-string arrangement

The 3AU6 is the same as the 6AU6 except for the following items:

Heater, for Unipotential Cathode:

Voltage	3.15	ac or dc volts
Current	0.6	amp
Warm-up time (Average)*	11	sec

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200▲ max.	volts

3AV6
TWIN DIODE—HIGH-MU TRIODE

7-PIN MINIATURE TYPE

Intended for use in equipment having series heater-string arrangement

The 3AV6 is the same as the 6AV6 except for the following items:

Heater, for Unipotential Cathode:

Voltage	3.15	ac or dc volts
Current	0.6	amp
Warm-up time (Average)*	11	sec

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200▲ max.	volts

* *For definition of heater warm-up time and method of determining it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of this Section.*

▲ The dc component must not exceed 100 volts.

3B2

HALF-WAVE VACUUM RECTIFIER

GENERAL DATA

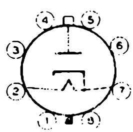
Electrical:

Heater, for Unipotential Cathode:
  Voltage . . . . 3.15 . . . . ac volts
  Current . . . . 0.22 . . . . amp
Direct Interelectrode Capacitance (Approx.):[○]
  Plate to cathode & internal
    shield & heater . . . . 1.8 $\mu\mu$f

Mechanical:

Mounting Position . . . . Any
Maximum Overall Length . . . . 5-7/32"
Seated Length . . . . 4-1/2" ± 3/16"
Maximum Diameter . . . . 1-23/32"
Bulb T-12
Cap . . . . Small (JETEC No.C1-1)
Base . . . . Short Jumbo-Shell Octal 8-Pin
  with External Barriers (JETEC No.B8-71)
  Basing Designation for BOTTOM VIEW 8GH

Pin 1 - Internal Connection-Do Not Use
Pin 2 - Heater
Pin 3 - Same as Pin
Pin 4 - No Connection♦
Pin 5 - Same as Pin 1



Pin 6 - Same as Pin 1
Pin 7 - Heater, Cathode, Internal Shield
Pin 8 - Same as Pin 1
Cap - Plate

PULSED-RECTIFIER SERVICE

Maximum Ratings, *Design-Center Values Except as Noted:*

For operation in a 525-line, 30-frame system[□]

INVERSE PLATE VOLTAGE:
  Total dc and peak
    (Absolute maximum) . . . . 30000[■] max. volts
  DC . . . . 25000 max. volts
PEAK PLATE CURRENT . . . . 50 max. ma
AVERAGE PLATE CURRENT . . . . 1.1 max. ma

[○] Without external shield.
♦ *See Operating Considerations.*
[□] As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations", Federal Communications Commission.
■ Under no circumstances should this absolute value be exceeded.

OPERATING CONSIDERATIONS

Socket Connections. Low-potential circuits should not be connected to any of the socket terminals. Any or all of the following socket terminal connections are permissible

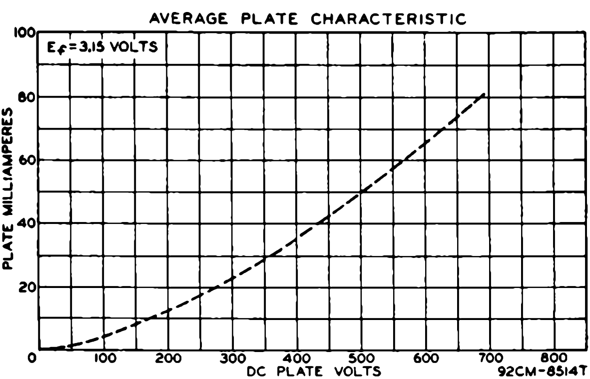
HALF-WAVE VACUUM RECTIFIER

and may aid in corona reduction.

1. Pins 1,3,5, and 7 may be connected together.
2. Pins 2,6, and 8 may be connected together.
3. Pin 4 may be connected to either pin 2 or pin 7, or may be used as a tie point for a heater-voltage dropping resistor. Do not use pin 4 as a low-potential tie point.

Measurement of Heater Voltage. To measure the heater voltage when the heater is at a high dc potential with respect to ground, it is recommended that a simple method utilizing visual comparison of the cathode and heater temperatures be used. The color temperature of the cathode and heater, with the heater operating from a pulse-power source, may be checked visually by comparing in a darkened room this color temperature with that obtained when the heater of another 3B2 is operated from a dc or low-frequency ac supply of 3.15 volts.

X-rays. The voltages employed in some television receivers and other high-voltage equipment are sufficiently high that high-voltage rectifier tubes may produce *X-rays* which can constitute a health hazard unless such tubes are adequately shielded. Relatively simple shielding should prove adequate, but the need for this precaution should be considered in equipment design.



3BC5

SHARP-CUTOFF PENTODE

7-PIN MINIATURE TYPE

Intended for use in equipment having series heater-string arrangement

The 3BC5 is the same as the 6BC5 except for the following items:

Heater, for Unipotential Cathode:

Voltage	3.15	ac or dc volts
Current	0.6	amp
Warm-up time (Average)*	11	sec

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200▲max.	volts

3BN6

BEAM TUBE

7-PIN MINIATURE TYPE

Intended for limiter & discriminator service in FM & TV equipment having series heater-string arrangement

The 3BN6 is the same as the 6BN6 except for the following items:

Heater, for Unipotential Cathode:

Voltage	3.15	ac or dc volts
Current	0.6	amp
Warm-up time (Average)*	11	sec

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200▲max.	volts

3BY6

PENTAGRID AMPLIFIER

7-PIN MINIATURE TYPE

Intended for use in equipment having series heater-string arrangement

The 3BY6 is the same as the 6BY6 except for the following items:

Heater, for Unipotential Cathode:

Voltage	3.15	ac or dc volts
Current	0.6	amp
Warm-up time (Average)*	11	sec

* *For definition of heater warm-up time and method of determining it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of this Section.*

▲ The dc component must not exceed 100 volts.

RCA

3BZ6

SEMIREMOTE-CUTOFF PENTODE

7-PIN MINIATURE TYPE

Intended for use in equipment having series heater-string arrangement

The 3BZ6 is the same as the 6BZ6 except for the following items:

Heater, for Unipotential Cathode:

Voltage	3.15	ac or dc volts
Current	0.6	amp
Warm-up time (Average)*	11	sec

3CB6

SHARP-CUTOFF PENTODE

7-PIN MINIATURE TYPE

Intended for use in equipment having series heater-string arrangement

The 3CB6 is the same as the 6CB6 except for the following items:

Heater, for Unipotential Cathode:

Voltage	3.15	ac or dc volts
Current	0.6	amp
Warm-up time (Average)*	11	sec

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode	300 max.	volts
Heater positive with respect to cathode	200▲max.	volts

3CF6

SHARP-CUTOFF PENTODE

7-PIN MINIATURE TYPE

Intended for use in equipment having series heater-string arrangement

The 3CF6 is the same as the 6CF6 except for the following items:

Heater, for Unipotential Cathode:

Voltage	3.15	ac or dc volts
Current	0.6	amp
Warm-up time (Average)*	11	sec

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode	300 max.	volts
Heater positive with respect to cathode	200▲max.	volts

* *For definition of heater warm-up time and method of determining it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of this Section.*

▲ The dc component must not exceed 100 volts.

3CF6

SHARP-CUTOFF PENTODE

7-PIN MINIATURE TYPE

Intended for use in equipment having series heater-string arrangement

The 3CF6 is the same as the 6CF6 except for the following items:

Heater, for Unipotential Cathode:		
Voltage	3.15	ac or dc volts
Current	0.6	amp
Warm-up time (Average)*	11	sec
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	300 max.	volts
Heater positive with respect to cathode	200▲ max.	volts

3CS6

PENTAGRID AMPLIFIER

7-PIN MINIATURE TYPE

Intended for use in equipment having series heater-string arrangement

The 3CS6 is the same as the 6CS6 except for the following items:

Heater, for Unipotential Cathode:		
Voltage	3.15	ac or dc volts
Current	0.6	amp
Warm-up time (Average)*	11	sec

3DK6

SHARP-CUTOFF PENTODE

7-PIN MINIATURE TYPE

Intended for use in equipment having series heater-string arrangement

The 3DK6 is the same as the 6DK6 except for the following items:

Heater, for Unipotential Cathode:		
Voltage	3.15	ac or dc volts
Current	0.6 ± 6%	amp
Warm-up time (Average)*	11	sec
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	300 max.	volts
Heater positive with respect to cathode	200▲ max.	volts

* *For definition of heater warm-up time and method of determining it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of this Section.*

▲ The dc component must not exceed 100 volts.

3DT6

3DT6

SHARP-CUTOFF PENTODE

7-PIN MINIATURE TYPE

Intended for use in equipment having series heater-string arrangement

The 3DT6 is the same as the 6DT6 except for the following items:

Heater, for Unipotential Cathode:

Voltage	3.15	ac or dc volts
Current	0.6	amp
Warm-up time (Average)	11	sec

For definition of heater warm-up time and method of determining it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of this Section.

ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

3LF4
BEAM POWER AMPLIFIER

GENERAL DATA

Electrical:

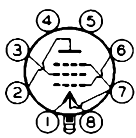
Filament, Coated:

Filament Arrangement	*Series**	*Parallel***	
Voltage	2.8	1.4	dc volts
Current	0.05	0.1	amp

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-25/32"
Maximum Seated Length	2-1/4"
Maximum Diameter	1-3/16"
Bulb	T-9
Base	Lock-in 8-Pin
Basing Designation for BOTTOM VIEW	6BB

Pin 1 - Filament
Pin 2 - Plate
Pin 3 - Grid No.2
Pin 4 - No Connection
Pin 5 - No Connection



Pin 6 - Grid No.1
Pin 7 - Filament Mid-Tap, Grid No.3
Pin 8 - Filament
Plug - Base Shell

AF POWER AMPLIFIER - Class A_1

Maximum Ratings, *Design-Center Values:*

Filament Arrangement	*Series**	*Parallel***	
PLATE VOLTAGE	110 max.	110 max.	volts
GRID-No.2 (SCREEN) VOLTAGE	110 max.	110 max.	volts
TOTAL CATHODE CURRENT	6 max.	12 max.	ma

Typical Operating Conditions and Characteristics are the same as those for Type 3Q5-GT.

Curves shown under Type 1Q5-GT also apply to the 3LF4 with filaments connected in parallel.

* A resistor of 270 ohms must be used in parallel with the negative section of the filament (pins 7 and 8) in order to insure that the value of 6.0 ma. total cathode current for each 1.4-volt section of the filament is not exceeded. When other tubes in series filament circuits contribute to the filament current of the 3LF4, an additional shunt resistor between pins 1 and 8 will be required.

** For parallel operation, connect pins 1 and 8 to the positive of the voltage supply and pin 7 to the negative.

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

3Q4

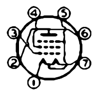
3Q4

POWER AMPLIFIER PENTODE

MINIATURE TYPE

Filament	Coated		
Filament Arrangement	*Series**	*Parallel**	
Voltage	2.8	1.4	d-c volts
Current	0.05	0.1	amp.
Maximum Overall Length			2-1/8"
Maximum Seated Height			1-7/8"
Maximum Diameter			3/4"
Bulb			T-5-1/2
Base▲			Miniature Button 7-Pin

Pin 1 - Fil. (-series)
Pin 2 - Plate
Pin 3 - Grid
Pin 4 - Screen



BOTTOM VIEW (7BA)

Pin 5 - Filament Mid-Tap (-parallel)
Pin 6 - Plate
Pin 7 - Filament+

Mounting Position: Any

AMPLIFIER

Filament Arrangement	*Series**	*Parallel**		
Plate Voltage	90 max.	90 max.		volts
Screen Voltage	90 max.	90 max.		volts
Total Cathode Current	6#max.	12 max.		ma.
Typical Operation and Characteristics - Class A_1 Amplifier:				
Plate Voltage	90	85	90	volts
Screen Voltage	90	85	90	volts
Grid Voltage	-4.5	-5	-4.5	volts
Peak A-F Grid Volt.	4.5	5	4.5	volts
Zero-Sig. Plate Cur.	7.7	6.9	9.5	ma.
Zero-Sig. Screen Cur.	1.7	1.5	2.1	ma.
Plate Res. (approx.)	0.12	0.12	0.1	megohm
Transconductance	2000	1975	2150	μmhos
Load Resistance	10000	10000	10000	ohms
Total Harmonic Dist.	7	10	7	%
Max.-Sig. Power Output	0.24	0.25	0.27	watt

* For series filament arrangement, filament voltage is applied between pins No.1 and No.7. The grid voltage is referred to pin No.1.
For parallel filament arrangement, filament voltage is applied between pin No.5 and pins No.1 and No.7 connected together. The grid voltage is referred to pin No.5.

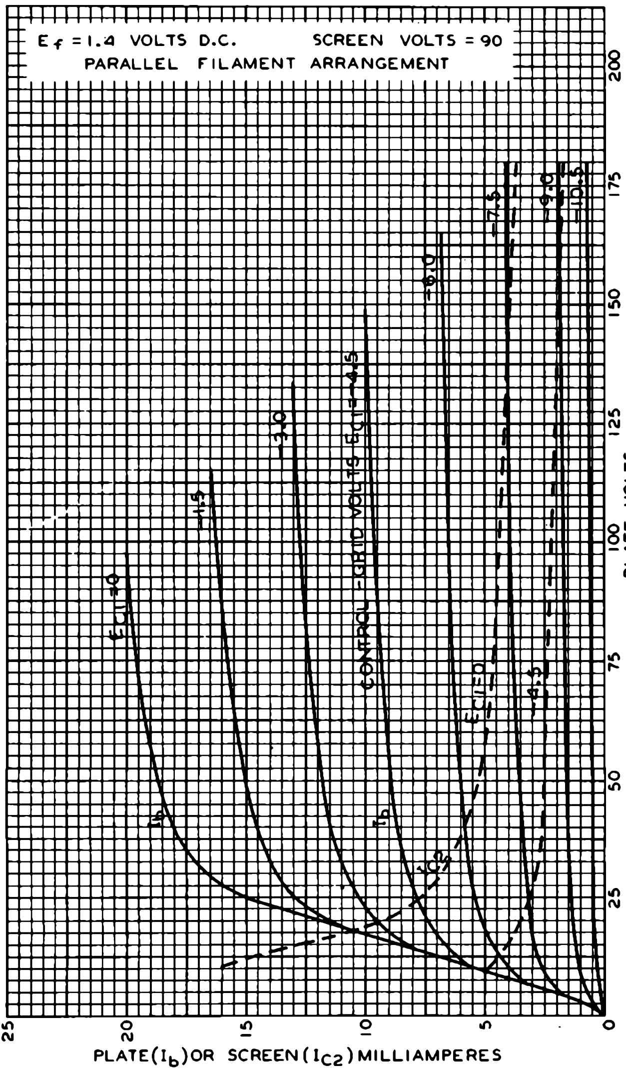
\# For each 1.4-volt filament section. For series operation of the sections, a shunting resistor must be connected across the section between pins No.1 and No.5 to by-pass any cathode current in this section which is in excess of the rated maximum per section. When other tubes in a series-filament arrangement contribute to the filament current of the 3Q4, an additional shunting resistor may be required between pins No.1 and No.7.

▲ *The center hole in sockets designed for this base provides for the possibility that this tube type may be manufactured with the exhaust-tube tip at the base end. For this reason, it is recommended that in equipment employing this tube type, no material be permitted to obstruct the socket hole.*

3Q4

3Q4

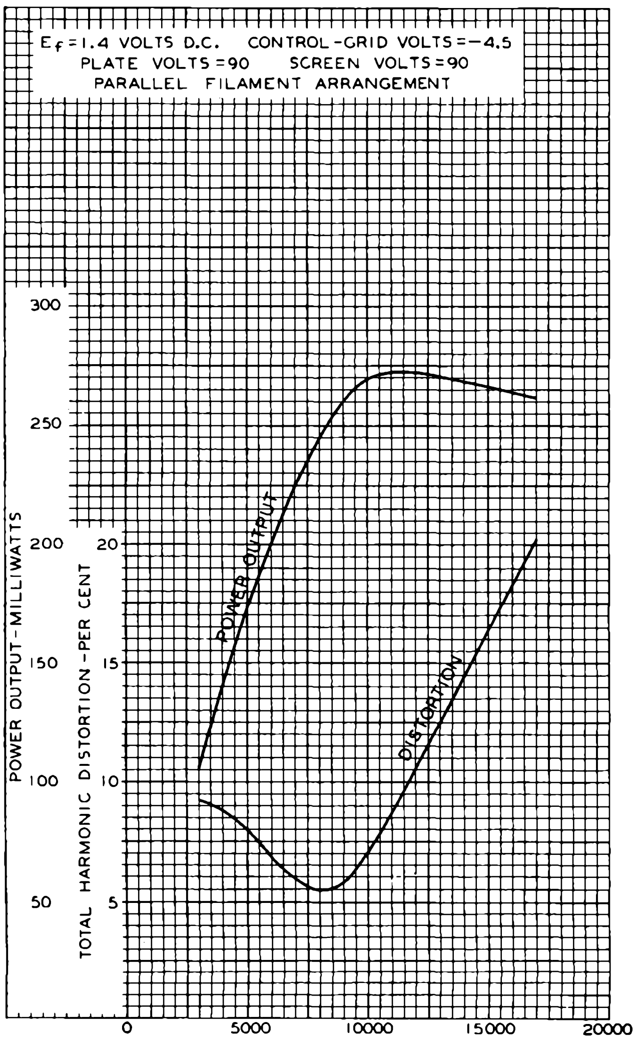
AVERAGE PLATE CHARACTERISTICS



3Q4

3Q4

OPERATION CHARACTERISTICS



MAY 7, 1941

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92C-6281

3Q5-GT/G

3Q5-GT/G

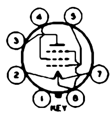
BEAM POWER AMPLIFIER

Filament	Coated		
Filament Arrangement	*Series**	*Parallel***	
Voltage	2.8	1.4	d-c volts
Current	0.05	0.1	amp.

Direct Interelectrode Capacitances (Approx.):°

Grid to Plate	0.6	μμf
Input	8.0	μμf
Output	6.5	μμf

Maximum Overall Length	3-5/16"
Maximum Seated Height	2-3/4"
Maximum Diameter	1-5/16"
Bulb	T-9
Base	Intermediate Shell Octal 7-Pin



Pin 1 - No Connection
Pin 2 - Filament
Pin 3 - Plate
Pin 4 - Screen
Pin 5 - Grid
Pin 7 - Fil.(-, series)
Pin 8 - Fil.(-, parallel)

Mounting Position — Any

BOTTOM VIEW (G-7AP)

Maximum Ratings Are Design-Center Values

AMPLIFIER

Filament Arrangement	*Series**	*Parallel***	
Plate Voltage	110 max.	110 max.	volts
Screen Voltage	110 max.	110 max.	volts
Total Zero-Sig. Cath. Cur.	6#max.	12 max.	ma.

→ ***Typical Operation and Characteristics-Class A_1 Amplifier:***

	Series		Parallel			
Plate	90	110	85	90	110	volts
Screen	90	110	85	90	110	volts
Grid ▲	-4.5	-6.6	-5	-4.5	-6.6	volts
Peak A-F Grid Voltage	4.5	5.1	5	4.5	5.4●	volts
Plate Cur.	8.0	8.5	7.0	9.5	10	ma.
Screen Cur. (approx.)	1.0	1.1	0.8	1.3	1.4	ma.
Plate Res. (approx.)	80000	110000	70000	90000	100000	ohms
Transcond.	2000	2000	1950	2200	2200	μmhos
Load Res.	8000	8000	9000	8000	8000	ohms
Tot. Harm. Dist.	8.5	8.5	5.5	6.0	6.0	%
Max.-Sig. Power Output	230	330	250	270	400	mw.

* Filament voltage applied across the two sections in series between pins No.2 and No.7. Grid voltage is referred to pin No.7.

** Filament voltage applied across the two sections in parallel between pin No.8 and pins No.2 and No.7 connected together. Grid voltage is referred to pin No.8.

\# For each 1.4-volt filament section. For series operation of the sections, a shunting resistor must be connected across the section between pins No.7 and No.8 to by-pass any cathode current in excess of the rated maximum per section. When other tubes in series-filament arrangement contribute to the filament current of the 3Q5-GT/G, an additional shunting resistor may be required between pins No.2 and No.7.

▲ The grid circuit resistance should not exceed 1.0 megohm for either cathode bias or fixed bias operation.

● With a peak a-f grid voltage equal to the grid bias, the power output for the 110-volt condition is: 500 mw at 10% total harmonic distortion for parallel filament operation; and 400 mw at 10% total harmonic distortion for series filament operation.

° With no external shield.

Curves shown under Type 1Q5-GT/G also apply to the 3Q5-GT/G with the filaments connected in parallel.

→-Indicates a change.

3S4

3S4
POWER PENTODE
MINIATURE TYPE

GENERAL DATA

Electrical:

Filament, Coated:

	Series*	Parallel**	
Filament arrangement	Series*	Parallel**	
Voltage	2.8	1.4	volts
Current	0.05	0.1	amp

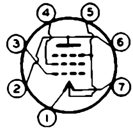
Direct Interelectrode Capacitances:°

Grid No.1 to plate	0.3	μμf
Grid No.1 to filament (mid-tap) & grid No.3, and grid No.2	4.8	μμf
Plate to filament (mid-tap) & grid No.3, and grid No.2	4	μμf

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-1/8"
Maximum Seated Length	1-7/8"
Length, Base Seat to Bulb Top (Excluding tip)	1-1/2" ± 3/32"
Maximum Diameter	3/4"
Bulb	T-5-1/2
Base	Small-Button Miniature 7-Pin (JETEC No.E7-1)
Basing Designation for BOTTOM VIEW	7BA

Pin 1 - Filament (-series)
Pin 2 - Plate
Pin 3 - Grid No.1
Pin 4 - Grid No.2



Pin 5 - Filament Mid-Tap (-parallel), Grid No.3
Pin 6 - Plate
Pin 7 - Filament (+)

AMPLIFIER - Class A_1

Maximum Ratings, *Design-Center Values:*

	Series*	Parallel**	
PLATE VOLTAGE	90 max.	90 max.	volts
GRID-No.2 (SCREEN) VOLTAGE	67.5 max.	67.5 max.	volts
TOTAL MAXIMUM-SIGNAL CATHODE CURRENT	6# max.	12 max.	ma
TOTAL ZERO-SIGNAL CATHODE CURRENT	4.5# max.	9 max.	ma

Typical Operation and Characteristics:

	Series*		Parallel**		
Plate Voltage	67.5	90	67.5	90	volts
Grid-No.2 Voltage	67.5	67.5	67.5	67.5	volts

° Without external shield.

\# For each 1.4-volt filament section. For series operation of the sections, a shunting resistor must be connected across the section between pins No.1 and No.5 to bypass any cathode current in excess of the rated maximum per section. When other tubes in series filament arrangement contribute to the filament current of the 3S4, an additional shunting resistor may be required between pins No.1 and No.7.

*,**: See next page. ← indicates a change.

RCA

3S4

POWER PENTODE

	*Series**		*Parallel***		
Grid-No.1 (Control-Grid) Voltage	-7	-7	-7	-7	volts
Peak AF Grid-No.1 Voltage	7	7	7	7	volts
Zero-Sig. Plate Current	6	6.1	7.2	7.4	ma
Zero-Sig. Grid-No.2 Current	1.2	1.1	1.5	1.4	ma
Plate Resistance (Approx.)	0.1	0.1	0.1	0.1	megohm
Transconductance	1400	1425	1550	1575	μmhos
Load Resistance	5000	8000	5000	8000	ohms
Total Harmonic Distortion	12	13	10	12	%
Max.-Sig. Power Output	160	235	180	270	mw

Maximum Circuit Values (For maximum rated conditions):

Grid-No.1-Circuit Resistance:

For fixed-bias operation	2.2 max.	megohms
For cathode-bias operation	2.2 max.	megohms

Typical Operation with Single Filament Section:●

Filament Voltage	1.4	volts
Filament Current	0.05	amp
Plate Voltage	90	volts
Grid-No.2 Voltage	67.5	volts
Grid-No.1 Voltage	-7	volts
Peak AF Grid-No.1 Voltage	7	volts
Zero-Signal Plate Current	3.7	ma
Zero-Signal Grid-No.2 Current	0.7	ma
Plate Resistance (Approx.)	0.2	megohm
Transconductance	800	μmhos
Load Resistance	16000	ohms
Total Harmonic Distortion	12	%
Maximum-Signal Power Output	145	mw

Maximum Circuit Values (For maximum rated conditions):

Grid-No.1-Circuit Resistance:

For fixed-bias operation	2.2 max.	megohms
For cathode-bias operation	2.2 max.	megohms

* Filament voltage applied across the two sections in series between pins No.1 and No.7. Grid-No.1 voltage is referred to pin No.1.

** Filament voltage applied across the two sections in parallel between pin No.5 and pins No.1 and No.7 connected together. Grid-No.1 voltage is referred to pin No.5.

● Either filament section may be operated singly with the other section floating. It is to be noted, however, that such operation may impair the emission capabilities of the unused section. Although in subsequent operation the unused section may be operated in series with the used section, it should not be operated singly.

Curves shown under Type 1S4 also apply to the 3S4 with the filaments connected in parallel

→ indicates a change.

JAN. 3, 1955

DATA

3V4

3V4
POWER PENTODE

MINIATURE TYPE

GENERAL DATA

Electrical:

Filament, Coated:

	Series*	Parallel**	
Filament arrangement	*Series**	*Parallel***	
Voltage	2.8	1.4	volts
Current	0.05	0.1	amp

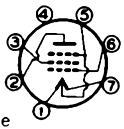
Direct Interelectrode Capacitances (Approx.):°

Grid No.1 to plate	0.20	$\mu\mu f$
Grid No.1 to filament (mid-tap) & grid No.3, and grid No.2	5.5	$\mu\mu f$
Plate to filament (mid-tap) & grid No.3, and grid No.2	3.8	$\mu\mu f$

Mechanical:

Mounting Position . . . . Any
Maximum Overall Length . . . . 2-1/8"
Maximum Seated Length . . . . 1-7/8"
Length, Base Seat to Bulb Top (Excluding tip). 1-1/2" ± 3/32"
Maximum Diameter . . . . 3/4"
Bulb T-5-1/2
Base . . . . . . Small-Button Miniature 7-Pin (JETEC No.E7-1)
Basing Designation for BOTTOM VIEW 6BX

Pin 1 - Filament (-series)
Pin 2 - Plate
Pin 3 - Grid No.2
Pin 4 - No Connection-Do Not Use



Pin 5 - Filament Mid-Tap (-parallel), Grid No.3
Pin 6 - Grid No.1
Pin 7 - Filament (+)

AMPLIFIER - Class A_1

Maximum Ratings, *Design-Center Values:*

	Series*	Parallel**	
PLATE VOLTAGE	90 max.	90 max.	volts
GRID-No.2 (SCREEN) VOLTAGE	90 max.	90 max.	volts
TOTAL MAXIMUM-SIGNAL CATHODE CURRENT	6# max.	12 max.	ma
TOTAL ZERO-SIGNAL CATHODE CURRENT	6# max.	12 max.	ma

Typical Operation and Characteristics:

	Series*	Parallel**		
Plate Voltage	90	85	90	volts
Grid-No.2 Voltage	90	85	90	volts

° Without external shield.

\# For each 1.4-volt filament section. For series operation of the sections, a shunting resistor must be connected across the section between pins No.1 and No.5 to bypass any cathode current in excess of the rated maximum per section. When other tubes in series filament arrangement contribute to the filament current of the 3V4, an additional shunting resistor may be required between pins No.1 and No.7.

*,**: See next page. ← Indicates a change.

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3V4

3V4

POWER PENTODE

	Series*	Parallel**		
Grid-No.1 (Control-Grid) Voltage	-4.5	-5	-4.5	volts
Peak AF Grid-No.1 Voltage	4.5	5	4.5	volts
Zero-Sig. Plate Current	7.7	6.9	9.5	ma
Zero-Sig. Grid-No.2 Current	1.7	1.5	2.1	ma
Plate Resistance (Approx.)	0.12	0.12	0.1	megohm
Transconductance	2000	1975	2150	μmhos
Load Resistance	10000	10000	10000	ohms
Total Harmonic Distortion	7	10	7	%
Max.-Signal Power Output	240	250	270	mw

→ **Maximum Circuit Values (For maximum rated conditions):**

Grid-No.1-Circuit Resistance:

For fixed-bias operation	2.2 max.	megohms
For cathode-bias operation	2.2 max.	megohms

→ **Typical Operation with Single Filament Section:●**

Filament Voltage	1.4	volts
Filament Current	0.05	amp
Plate Voltage	90	volts
Grid-No.2 Voltage	90	volts
Grid-No.1 Voltage	-4.5	volts
Peak AF Grid-No.1 Voltage	4.5	volts
Zero-Signal Plate Current	4.8	ma
Zero-Signal Grid-No.2 Current	1.1	ma
Plate Resistance (Approx.)	0.2	megohm
Transconductance	1100	μmhos
Load Resistance	20000	ohms
Total Harmonic Distortion	7	%
Maximum-Signal Power Output	135	mw

→ **Maximum Circuit Values (For maximum rated conditions):**

Grid-No.1-Circuit Resistance:

For fixed-bias operation	2.2 max.	megohms
For cathode-bias operation	2.2 max.	megohms

* Filament voltage applied across the two sections in series between pins No.1 and No.7. Grid-No.1 voltage is referred to pin No.1.

** Filament voltage applied across the two sections in parallel between pin No.5 and pins No.1 and No.7 connected together. Grid-No.1 voltage is referred to pin No.5.

● Either filament section may be operated singly with the other section floating. It is to be noted, however, that such operation may impair the emission capabilities of the unused section. Although in subsequent operation the unused section may be operated in series with the used section, it should not be operated singly.

Curves shown under Type 3Q4 also apply to the 3V4

→ Indicates a change.

RCA

4BC8

MEDIUM-MU TWIN TRIODE

With Semiremote-Cutoff Characteristic

9-PIN MINIATURE TYPE

Intended for use in equipment having series heater-string arrangement

The 4BC8 in the same as the 6BC8 except for the following items:

Heater, for Unipotential Cathodes:

Voltage	4.2	ac or dc volts
Current	0.6	amp
Warm-up time (Average)*	11	sec

4BQ7-A

MEDIUM-MU TWIN TRIODE

9-PIN MINIATURE TYPE

Intended for use in equipment having series heater-string arrangement

The 4BQ7-A is the same as the 6BQ7-A except for the following items:

Heater, for Unipotential Cathodes:

Voltage	4.2	ac or dc volts
Current	0.6	amp
Warm-up time (Average)*	11	sec

4BZ7

MEDIUM-MU TWIN TRIODE

9-PIN MINIATURE TYPE

Intended for use in equipment having series heater-string arrangement

The 4BZ7 is the same as the 6BZ7 except for the following items:

Heater, for Unipotential Cathodes:

Voltage	4.2	ac or dc volts
Current	0.6	amp
Warm-up time (Average)*	11	sec

* *For definition of heater warm-up time and method of determining it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of this Section.*

RCA

5AM8

DIODE—SHARP-CUTOFF PENTODE

9-PIN MINIATURE TYPE

Intended for use in equipment having series heater-string arrangement

The 5AM8 is the same as the 6AM8 except for the following items:

Heater, for Unipotential Cathodes:

Voltage	4.7	ac or dc volts
Current	0.6	amp
Warm-up time (Average)*	11	sec

5AN8

MEDIUM-MU TRIODE— SHARP-CUTOFF PENTODE

9-PIN MINIATURE TYPE

Intended for use in equipment having series heater-string arrangement

The 5AN8 is the same as the 6AN8 except for the following items:

Heater, for Unipotential Cathodes:

Voltage	4.7	ac or dc volts
Current	0.6	amp
Warm-up time (Average)*	11	sec

5AQ5

BEAM POWER TUBE

7-PIN MINIATURE TYPE

Intended for use in equipment having series heater-string arrangement

The 5AQ5 is the same as the 6AQ5 except for the following items:

Heater, for Unipotential Cathode:

Voltage	4.7	ac or dc volts
Current	0.6	amp
Warm-up time (Average)*	11	sec

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200▲ max.	volts

* *For definition of heater warm-up time and method of determining it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of this Section.*

▲ The dc component must not exceed 100 volts.

RCA

5AS4

FULL-WAVE VACUUM RECTIFIER

GENERAL DATA

Electrical:

Filament, Coated:

Voltage	5	ac volts
Current	3	amp

Mechanical:

Mounting Position . . . . Vertical, base up or down, or Horizontal with pins 1 and 4 in vertical plane

Maximum Overall Length . . . . 5-1/8"

Maximum Seated Length. . . . . 4-9/16"

Maximum Diameter . . . . 2-1/16"

Bulb ST-16

Base . . . . . . Medium-Shell Octal 8-Pin (JETEC No.B8-11), or Medium-Shell Octal 5-Pin (JETEC No.B5-15)

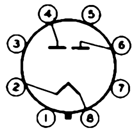
Basing Designation for BOTTOM VIEW 5T

Pin 1 - No Connection

Pin 2 - Filament

Pin 3 - Same as Pin 1

Pin 4 - Plate No.2



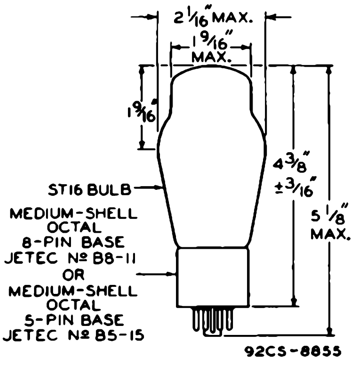
Pin 5 - Same as Pin 1

Pin 6 - Plate No.1

Pin 7 - Same as Pin 1

Pin 8 - Filament

MAXIMUM RATINGS, TYPICAL OPERATION, and CURVES for Type 5AS4 are the same as those shown for Type 5U4-GB



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RCA

5AS8

DIODE–SHARP-CUTOFF PENTODE

9-PIN MINIATURE TYPE

Intended for use in equipment having series heater-string arrangement

The 5AS8 is the same as the 6AS8 except for the following items:

Heater, for Unipotential Cathodes:		
Voltage	4.7	ac or dc volts
Current	0.6	amp
Warm-up time (Average)*	11	sec

5AT8

TRIODE-PENTODE CONVERTER

9-PIN MINIATURE TYPE

Intended for use in equipment having series heater-string arrangement

The 5AT8 is the same as the 6AT8 except for the following items:

Heater, for Unipotential Cathode:			
Voltage	4.7		ac or dc volts
Current	0.6		amp
Warm-up time (Average)*	11		sec
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200▲	max.	volts

* *For definition of heater warm-up time and method of determining it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of this Section.*

▲ The dc component must not exceed 100 volts.

RCA

5AV8

MEDIUM-MU TRIODE — SHARP-CUTOFF PENTODE

9-PIN MINIATURE TYPE

Intended for use in equipment having series heater-string arrangement

The 5AV8 is the same as the 6AN8 except for the following items:

Heater, for Unipotential Cathodes:

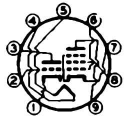
Voltage	4.7	ac or dc volts
Current	0.6	amp
Warm-up time (Average)	11	sec

For definition of heater warm-up time and method of determining it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of this Section.

Base . . . . Small-Button Noval 9-Pin (JETEC No. E9-1)

Basing Designation for BOTTOM VIEW 9DZ

Pin 1 - Triode Cathode
Pin 2 - Triode Grid
Pin 3 - Triode Plate
Pin 4 - Heater
Pin 5 - Heater
Pin 6 - Pentode Grid No. 1



Pin 7 - Pentode Cathode, Pentode Grid No. 3, Internal Shield
Pin 8 - Pentode Grid No. 2
Pin 9 - Pentode Plate

5AZ4

5AZ4

FULL-WAVE VACUUM RECTIFIER

GENERAL DATA

Electrical:

Filament, Coated:

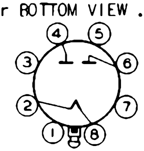
Voltage	5	ac or dc volts
Current	2	amp

Mechanical:

Mounting Position. . . . . Vertical, or Horizontal with pins 2 and 8 in horizontal plane

Maximum Overall Length	3-5/32"
Maximum Seated Length.	2-5/8"
Maximum Diameter	1-3/16"
Bulb	T-9
Base	Lock-in 8-Pin
Basing Designation for BOTTOM VIEW	5T

Pin 1 - No Connection
Pin 2 - Filament
Pin 3 - No Connection
Pin 4 - Plate



Pin 5 - No Connection
Pin 6 - Plate
Pin 7 - No Connection
Pin 8 - Filament
Plug - Base Shell

FULL-WAVE RECTIFIER

Maximum Ratings, ***Design-Center Values:***

PEAK INVERSE PLATE VOLTAGE	1400 max.	volts
PEAK PLATE CURRENT	375 max.	ma
DC OUTPUT CURRENT.	125 max.	ma

Typical Operation:

	Capacitor-Input to Filter	Choke-Input to Filter	
AC Plate-to-Plate Supply Voltage (RMS).	700	1000	volts
Filter Input Capacitor	4	-	µf
Min. Total Effective Plate-Supply Impedance per Plate*. .	50	-	ohms
Min. Filter Input Choke	-	5	henries
DC Output Current.	125	125	ma

* When the input capacitor of the filter exceeds 40 µf, it may be necessary to increase the plate-supply impedance in order to limit the peak current to the rated value.

MAY 20, 1949

TUBE DEPARTMENT
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DATA

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5CG8

TRIODE-PENTODE CONVERTER

9-PIN MINIATURE TYPE

Intended for use in equipment having series heater-string arrangement

The 5CG8 is the same as the 6CG8 except for the following items:

Heater, for Unipotential Cathode:

Voltage	4.7	. . . . . . ac or dc volts
Current	0.6	. . . . amp
Warm-up time (Average)*.	11	. . . . sec

5CL8-A

MEDIUM-MU TRIODE— SHARP-CUTOFF TETRODE

9-PIN MINIATURE TYPE

Intended for use as combined VHF oscillator and mixer tube in TV receivers having series heater-string arrangement

The 5CL8-A is the same as the 6CL8-A except for the following items:

Heater, for Unipotential Cathodes:

Voltage	4.7	. . . . . . ac or dc volts
Current	0.6	. . . . amp

5CQ8

MEDIUM-MU TRIODE— SHARP-CUTOFF TETRODE

9-PIN MINIATURE TYPE

Intended for use in equipment having series heater-string arrangement

The 5CQ8 is the same as the 6CQ8 except for the following items:

Heater, for Unipotential Cathodes:

Voltage	4.7	. . . . . . ac or dc volts
Current	0.6	. . . . amp

** For definition of heater warm-up time and method of determining it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of this section.*

5CZ5

5CZ5

BEAM POWER TUBE

9-PIN MINIATURE TYPE

For vertical-deflection-amplifier service in 110° systems having series heater-string arrangement

The 5CZ5 is the same as the 6CZ5 except for the following items:

Heater, for Unipotential Cathode:

Voltage	4.7	ac or dc volts
Current	0.6	amp

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5J6

MEDIUM-MU TWIN TRIODE

MINIATURE TYPE

Intended for use in equipment having series heater-string arrangement

The 5J6 is the same as the 6J6 except for the following items:

Heater, for Unipotential Cathode:

Voltage	4.7	ac or dc volts
Current	0.6	amp
Warm-up time (Average)	11	sec

For definition of heater warm-up time and method of determining it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of this Section.

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200▲ max.	volts

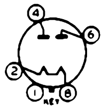
▲ The dc component must not exceed 100 volts.

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5T4

FULL-WAVE HIGH-VACUUM RECTIFIER

Filament	Coated	
Voltage	5.0	a-c volts
Current	2.0	amp.
Maximum Overall Length		4-5/16"
Maximum Diameter		1-5/8"
Bulb		Metal Shell, MT-10
Base		Small Wafer Octal 5-Pin
Pin 1 - Shell		Pin 6 - Plate #1
Pin 2 - Filament		Pin 8 - Filament
Pin 4 - Plate #2		
Mounting Position		Vertical◊



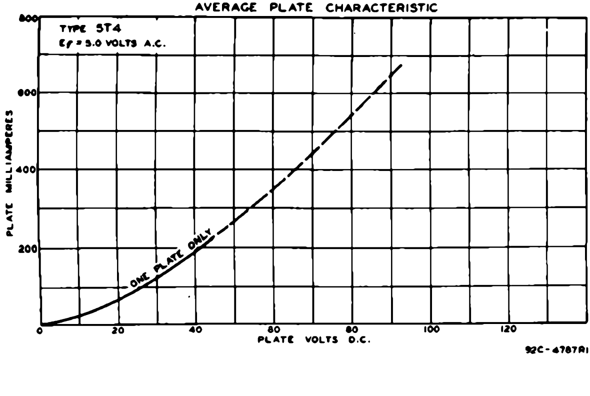
BOTTOM VIEW (5T)

FULL-WAVE RECTIFIER

Peak Inverse Voltage	1550	max.	volts
Peak Plate Current per Plate	675	max.	ma.
Typical Operation with Condenser-Input Filter:			
A-C Plate Voltage per Plate (RMS)	450	max.	volts
Total Effective Plate-Supply Impedance per Plate ▲	150	min.	ohms
D-C Output Current	225	max.	ma.
Typical Operation with Choke-Input filter:			
A-C Plate Voltage per Plate (RMS)	550	max.	volts
Input-Choke Inductance	3	min.	henries
D-C Output Current	225	max.	ma.

◊ Horizontal operation permitted if pins 2 and 4 are in vertical plane.
▲ When a filter-input condenser larger than 40 μf is used, it may be necessary to use more plate-supply impedance than the minimum value shown to limit the peak plate current to the rated value.

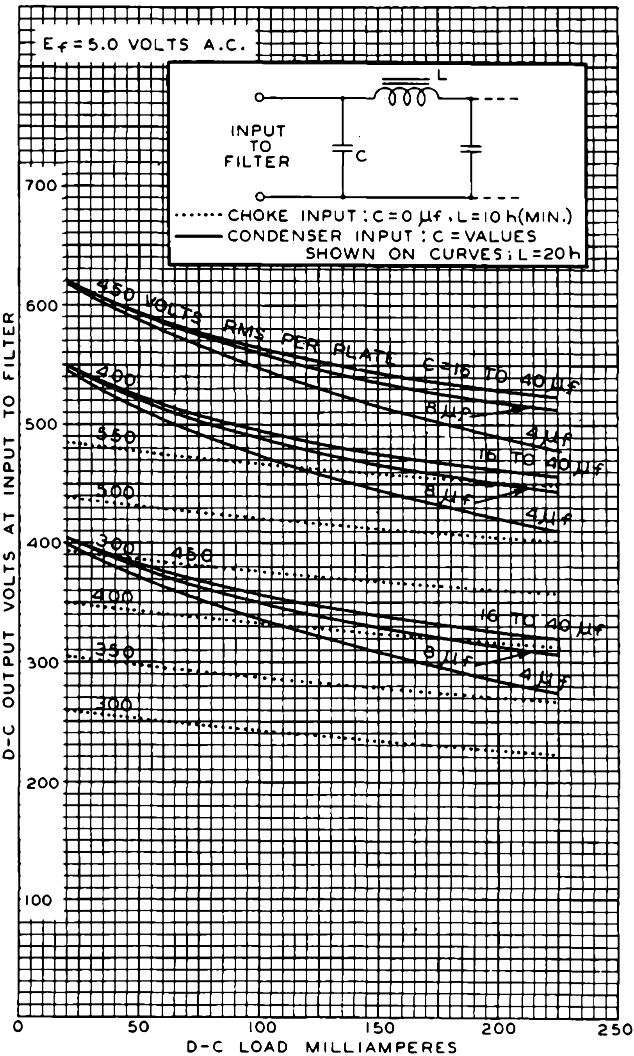
AVERAGE PLATE CHARACTERISTIC



RCA

5T4

OPERATION CHARACTERISTICS



5T8

5T8

TRIPLE DIODE—HIGH-MU TRIODE

9-PIN MINIATURE TYPE

Intended for use in equipment having series heater-string arrangement

The 5T8 is the same as the 6T8 except for the following items:

Heater, for Unipotential Cathodes:

Voltage	4.7	. . . . . . ac or dc volts
Current	0.6	. . . . .amp
Warm-up time (Average) .	11	. . . . .sec

For definition of heater warm-up time and method of determining it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of this Section.

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode .	200	max.	volts
Heater positive with respect to cathode .	200▲	max.	volts

▲ The dc component must not exceed 100 volts.

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5U4-G

5U4-G

FULL-WAVE VACUUM RECTIFIER

GENERAL DATA

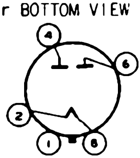
Electrical:

Filament, Coated:		
Voltage.	5	ac volts
Current.	3	amp

Mechanical:

Mounting Position.	Vertical, or Horizontal with pins 1 and 4 in vertical plane
Maximum Overall Length	5-5/16"
Maximum Seated Length.	4-3/4"
Maximum Diameter	2-1/16"
Bulb	ST-16
Base	Medium-Shell Octal 5-Pin
Basing Designation for BOTTOM VIEW	G-5T

Pin 1 - No Connection
Pin 2 - Filament
Pin 4 - Plate No. 2



Pin 6 - Plate No. 1
Pin 8 - Filament

FULL-WAVE RECTIFIER

Maximum Ratings, *Design-Center Values*: ←

PEAK INVERSE PLATE VOLTAGE	1550 max.	volts
PEAK PLATE CURRENT PER PLATE	675 max.	ma
AC PLATE SUPPLY VOLTAGE (RMS) PER PLATE.	See Rating Chart	
DC OUTPUT CURRENT PER PLATE.	See Rating Chart	
HOT-SWITCHING TRANSIENT PLATE CURRENT PER PLATE For duration of 0.2 second maximum . . .	2.35 max.	amp

Typical Operation with Capacitor-Input Filter: ←

AC Plate-to-Plate Supply Voltage (RMS)	900	1100	volts
Filter-Input Capacitor°	10	10	μf
Total Effect. Plate-Supply Impedance Per Plate.	170	230	ohms
DC Output Voltage at Input to Filter (Approx.):			
At Half-Load Cur. of 112.5 ma. .	510	-	volts
At Half-Load Cur. of 78 ma. .	-	660	volts
At Full-Load Cur. of 225 ma. .	430	-	volts
At Full-Load Cur. of 156 ma. .	-	590	volts
Voltage Regulation, Half-Load to Full-Load Current (Approx.) .	80	70	volts

° When a filter input capacitor larger than 10 μf is used, it may be necessary to increase the effective plate-supply impedance in order not to exceed the hot-switching transient plate current.

← Indicates a change.

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RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5U4-G

5U4-G

FULL-WAVE VACUUM RECTIFIER

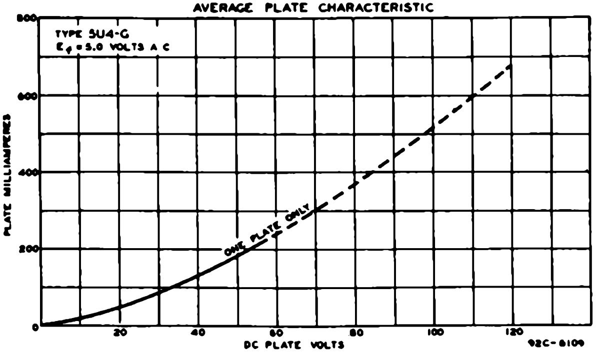
→ **Typical Operation with Choke-Input Filter:**

AC Plate-to-Plate Supply Voltage (RMS)	900	1100	volts
Filter-Input Choke	10*	10**	henries
DC Output Voltage at Input to Filter (Approx.):			
At Half-Load Cur. of 135 ma. .	365	-	volts
At Half-Load Cur. of 112.5 ma. .	-	460	volts
At Full-Load Cur. of 270 ma. .	345	-	volts
At Full-Load Cur. of 225 ma. .	-	440	volts
Voltage Regulation, Half-Load to Full-Load Current (Approx.) .	20	20	volts

* This value is adequate to maintain optimum regulation in the region to the right of line L=10H on curve OPERATION CHARACTERISTICS with Choke-Input to Filter, provided the load current is not less than 35 ma. For load currents less than 35 ma., a larger value of inductance is required for optimum regulation.

** This value is adequate to maintain optimum regulation in the region to the right of line L=10H on curve OPERATION CHARACTERISTICS with Choke-Input to Filter, provided the load current is not less than 45 ma. For load currents less than 45 ma., a larger value of inductance is required for optimum regulation.

AVERAGE PLATE CHARACTERISTIC



→ **RATING CHART and OPERATION CHARACTERISTICS**

The *Rating Chart* presents graphically the relationships between maximum ac voltage input and maximum dc output current derived from the fundamental ratings for conditions of capacitor-input and choke-input filters. This graphical presentation gives the equipment designer considerable latitude in choice of operating conditions.

The *Operation Characteristics for Full-Wave Circuit with Capacitor-Input Filter* show not only the typical operating curves for such a circuit, but also show by means of boundary lines "ADK" the limiting current and voltage relationships presented on the Rating Chart.

→ Indicates a change.

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RCA

5U4-G

FULL-WAVE VACUUM RECTIFIER

The *Operation Characteristics for Full-Wave Circuit with Choke-Input Filter* show the typical operating curves for such a circuit. They not only show by means of boundary line "CEK" the limiting current and voltage relationships presented on the *Rating Chart*, but also give information as to the effect on regulation of various sizes of chokes. The solid-line curves show the dc voltage outputs which would be obtained if the filter chokes had infinite inductance. The long-dash lines radiating from the zero position are boundary lines for various sizes of chokes as indicated. The intersection of one of these lines with a solid-line curve indicates the point on the curve at which the choke no longer behaves as though it had infinite inductance. To the left of the choke boundary line, the regulation curves depart from the solid-line curves as shown by the representative short-dash regulation curves.

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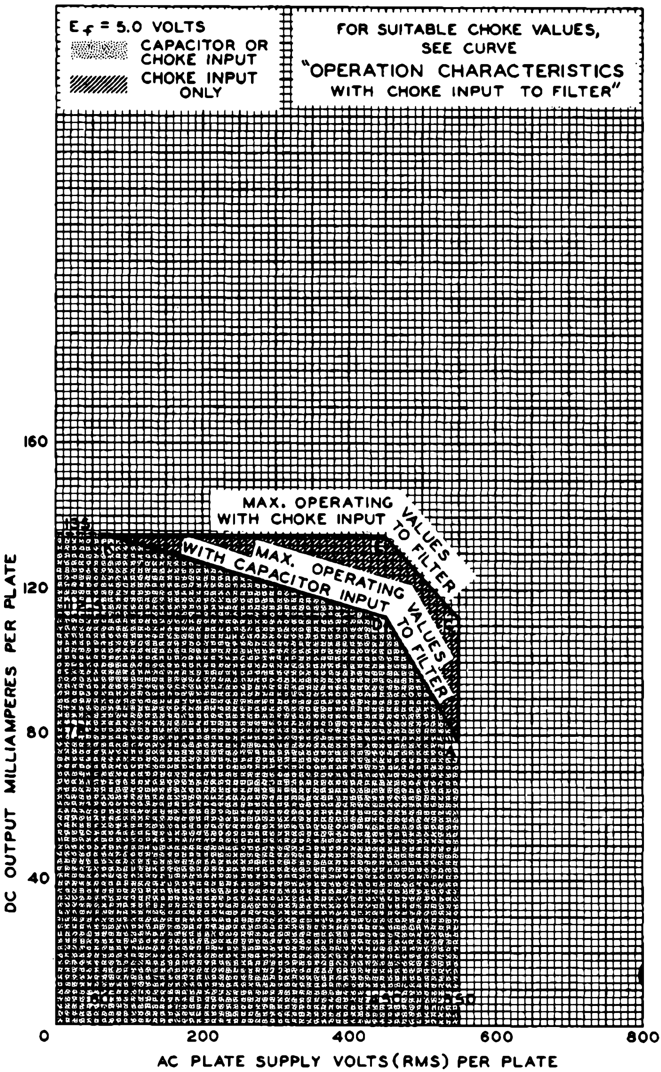
5U4-G

5U4-G
RATING CHART



MAY 25, 1950

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RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7494

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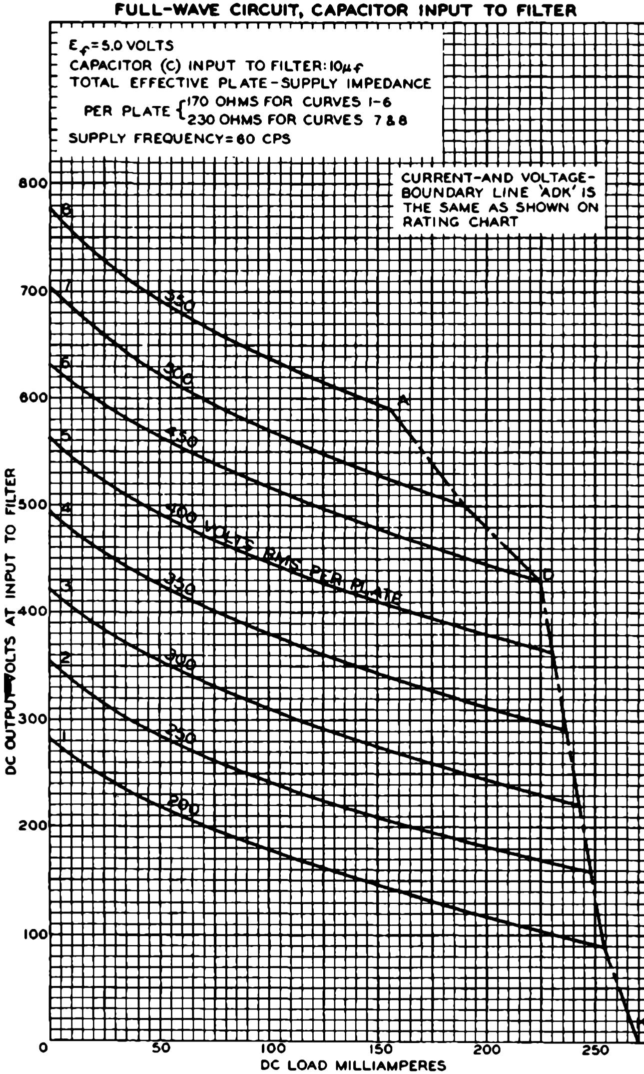
5U4-G

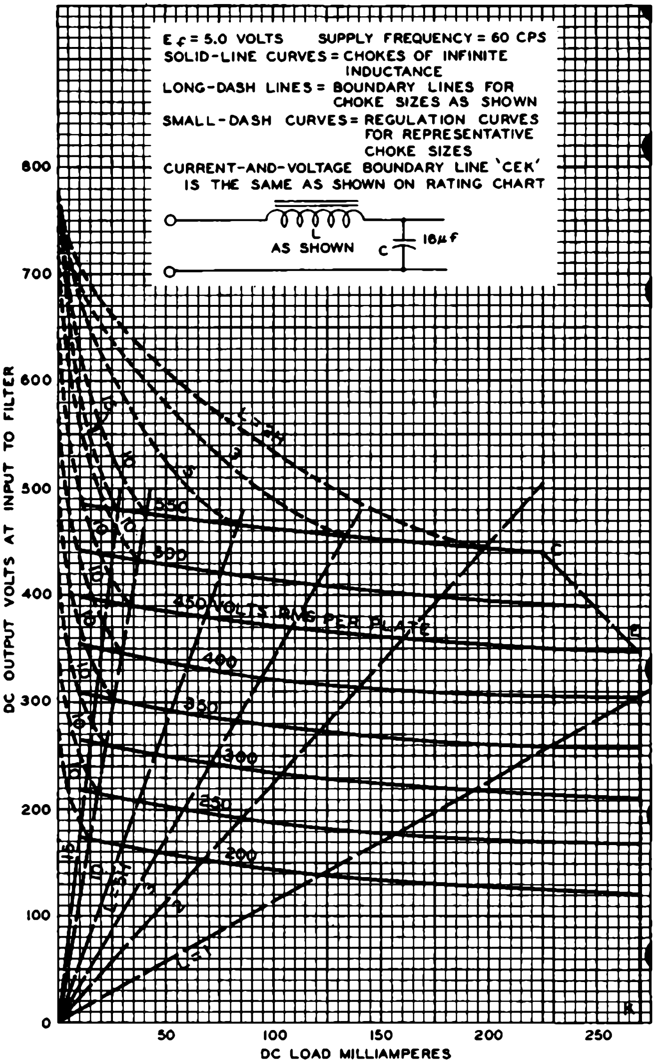
OPERATION CHARACTERISTICS

FULL-WAVE CIRCUIT, CAPACITOR INPUT TO FILTER



5U4-G

OPERATION CHARACTERISTICS
FULL-WAVE CIRCUIT, CHOKE INPUT TO FILTER



JULY 25, 1950

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7496

5U4-GB

5U4-GB

FULL-WAVE VACUUM RECTIFIER

GENERAL DATA

Electrical:

Filament, Coated:

Voltage	5	ac volts
Current	3	amp

Mechanical:

Mounting Position . . . . Vertical, base up or down, or Horizontal with pins 2 and 4 in vertical plane

Maximum Overall Length . . . . 4-3/4"

Maximum Seated Length . . . . 4-3/16"

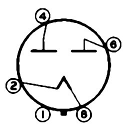
Maximum Diameter . . . . 1-23/32"

Bulb T-12

Base . . . . Flared Medium-Shell Octal 5-Pin with External Barriers (JETEC No.B5-127) or Short Medium-Shell Octal 5-Pin with External Barriers (JETEC No.B5-121)

Basing Designation for BOTTOM VIEW G-5T

Pin 1 - No Connection
Pin 2 - Filament
Pin 4 - Plate No.2



Pin 6 - Plate No.1
Pin 8 - Filament

FULL-WAVE RECTIFIER

Maximum Ratings, *Design-Center Values:*

PEAK INVERSE PLATE VOLTAGE	1550 max.	volts
PEAK PLATE CURRENT PER PLATE	1 max.	amp
AC PLATE SUPPLY VOLTAGE (RMS) PER PLATE	*See Rating Chart I*	
DC OUTPUT CURRENT PER PLATE	*See Rating Chart I*	
HOT-SWITCHING TRANSIENT PLATE CURRENT PER PLATE	*See Operating Considerations*	

Typical Operation with Capacitor-Input to Filter:

AC Plate-to-Plate Supply Voltage (RMS)	600	900	1100	volts
Filter-Input Capacitor▲	40	40	40	μf
Total Effective Plate-Supply Impedance Per Plate	21	67	97	ohms
DC Output Voltage at Input to Filter (Approx.):				
At full-load current of 300 ma	290	-	-	volts
275 ma	-	460	-	volts
162 ma	-	-	630	volts

▲ When capacitance values higher than 40 uf are used, the effective plate-supply impedance should be increased so that the maximum rating for peak plate current is not exceeded.

RCA

5U4-GB

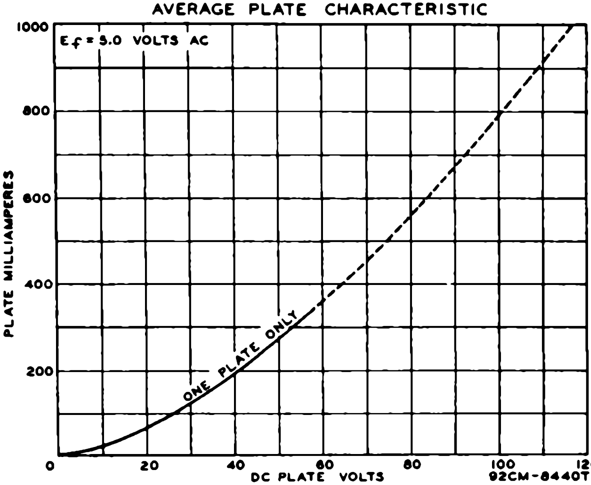
FULL-WAVE VACUUM RECTIFIER

DC Output Voltage at Input to Filter (Approx.):				
At half-load current of 150 ma	335	-	-	volts
137.5 ma	-	520	-	volts
81 ma	-	-	680	volts
Voltage Regulation (Approx.):				
Half-load to full-load current	45	60	50	volts

Typical Operation with Choke-Input to Filter:

AC Plate-to-Plate Supply Voltage (RMS)	900	1100	volts
Filter-Input Choke	10	10	henries
DC Output Voltage at Input to Filter (Approx.):			
At full-load current of 348 ma	340	-	volts
275 ma	-	440	volts
At half-load current of 174 ma	355	-	volts
137.5 ma	-	455	volts
Voltage Regulation (Approx.):			
Half-load to full-load current	15	15	volts

AVERAGE PLATE CHARACTERISTIC



OPERATING CONSIDERATIONS

Even occasional *hot-switching* with capacitor-input circuits permits the flow of plate current having magnitudes which can adversely affect tube life and reliability. If

5U4-GB

FULL-WAVE VACUUM RECTIFIER

capacitor-input circuits are to be used, it is essential that the tube be protected against the possible adverse effects of hot-switching. The tube can be protected by circuits, designed to incorporate sufficient plate-supply resistance, as determined from Rating Chart III, to limit the maximum peak current value per plate to 4.6 amperes during the initial cycles of hot-switching operation. For applications in which hot-switching is required, choke-input circuits are recommended. Such circuits limit the hot-switching current to a value no higher than that of the peak plate current.

RATING CHARTS AND OPERATION CHARACTERISTICS

Rating Chart I represents graphically the relationships between maximum ac voltage input and maximum dc output current derived from the fundamental ratings for conditions of capacitor-input and choke-input filters. This graphical presentation gives the equipment designer considerable latitude in choice of operating conditions.

Rating Chart II represents graphically the relationship between maximum rectification efficiency and maximum dc output current per plate for conditions of capacitor-input to filter.

A choice of operating values of dc output current per plate and rectification efficiency should be made such that they fall within the area of permissible operation to insure that the maximum peak plate current will not be exceeded. If the operating values chosen fall outside the permissible operating area, a different choice of parameters should be made. For a given value of ac voltage input and dc output current, it is possible to reduce the rectification efficiency by either increasing the plate-supply resistance per plate or by using a smaller value of input filter capacitor.

Rating Chart III represents graphically the relationships between minimum plate-supply resistance per plate and maximum ac plate-supply voltage per plate under no-load conditions of capacitor-input filter when occasional hot-switching is employed.

If occasional hot-switching is required with capacitor-input circuits, it is important to protect the tube and the circuits against the flow of plate currents having magnitude in excess of the maximum permissible hot-switching current of 4.6 amperes. To limit the hot-switching current, adequate series plate-supply resistance per plate is necessary. The minimum value of this resistance may be determined from Rating Chart III. If the transformer windings do not provide this minimum value of resistance, then additional dc series resistance is required. The value of this dc resistance, R_A, may be determined from the relationship shown in the legend for Rating Chart III.

5U4-GB

FULL-WAVE VACUUM RECTIFIER

If appreciable series inductance is present in the plate supply, a value of series plate-supply resistance smaller than that indicated by the curve may be employed provided it is experimentally determined that the combined effect of inductance and plate-supply resistance used are adequate to limit the hot-switching current to the indicated maximum value.

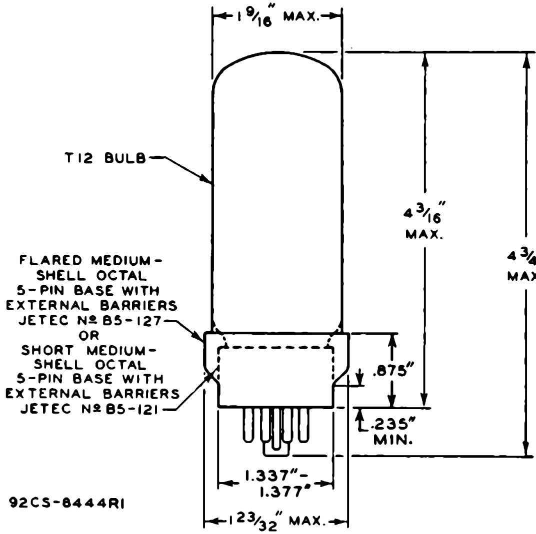
The *Operation Characteristics for Full-Wave Circuit with Capacitor-Input to Filter* show the usual typical operating curves for a full-wave rectifier with capacitor-input filter. In addition, they show by means of the boundary line "AED" the limiting current and voltage relationships presented in Rating Chart I. A choice of operating values to the left of the boundary line should be made such that the operation of the tube at these values will insure that the maximum ratings will not be exceeded.

The *Operation Characteristics for Full-Wave Circuit with Choke-Input to Filter* show the usual typical operating curves for a full-wave rectifier with choke-input filter. They not only show by means of boundary line "ABC" the limiting current and voltage relationships presented in Rating Chart I, but also give information as to the effect of various sizes of chokes on regulation. The solid-line curves show the dc voltage outputs which would be obtained if the filter chokes had infinite inductance. The long-dash lines radiating from the zero position are boundary lines for various sizes of chokes as indicated. The intersection of one of these lines with a solid-line curve indicates the point on the curve at which the choke no longer behaves as though it had infinite inductance. To the left of the choke boundary line, the regulation curves depart from the solid-line curves as shown by the representative short-dash regulation curves. It will be noted that regulation improves with an increase in value of choke inductance, but for cost reasons, the value of inductance is usually held to the smallest value which will give the desired regulation over the operating current range. It is also to be noted that at the lower load currents, higher values of inductance are required to maintain good regulation. A choice of operating values to the left of the boundary line "ABC" should be made such that operation of the tube at these values will insure that the maximum ratings are not exceeded.

5U4-GB

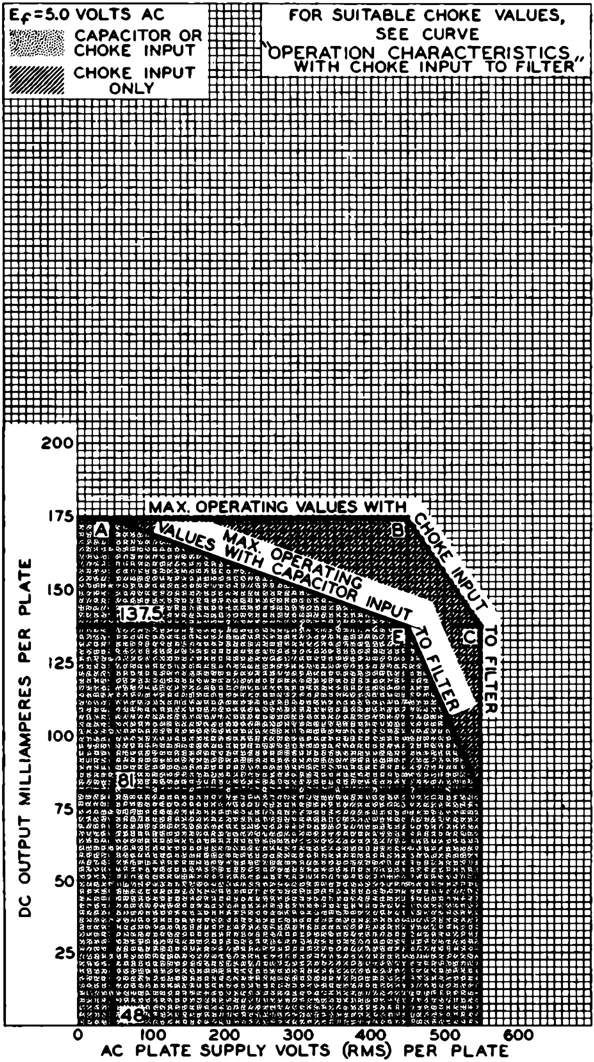
5U4-GB

FULL-WAVE VACUUM RECTIFIER



5U4-GB

RATING CHART I



OCT. 5, 1954 — TUBE DIVISION — 92CM-8450

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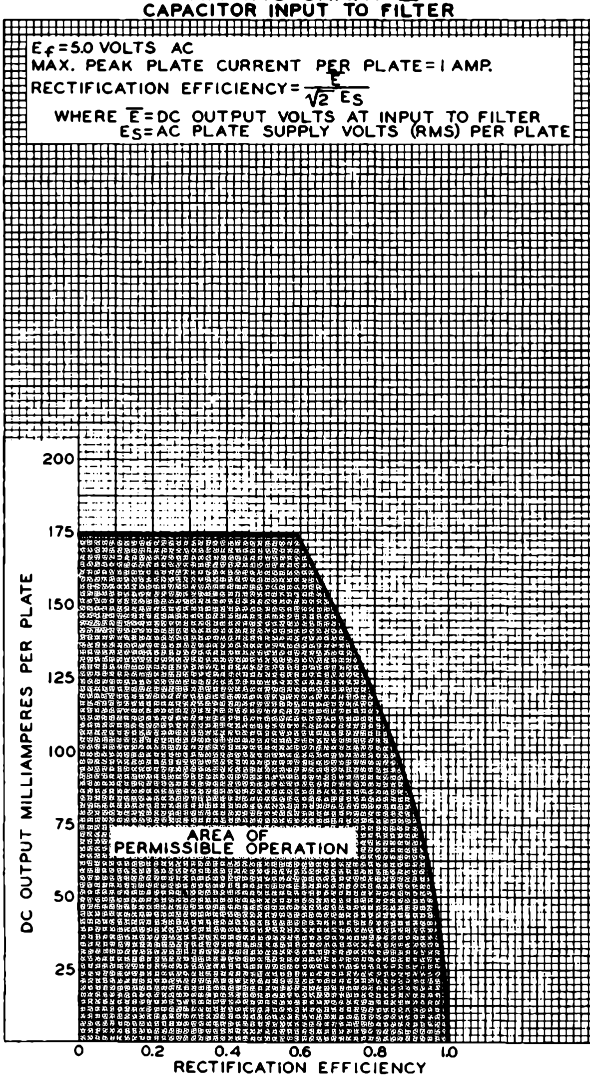
5U4-GB

RATING CHART II
CAPACITOR INPUT TO FILTER



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RATING CHART III
CAPACITOR INPUT TO FILTER

E_f = 5.0 VOLTS AC MAX. HOT-SWITCHING CUR. = 4.6 AMP.

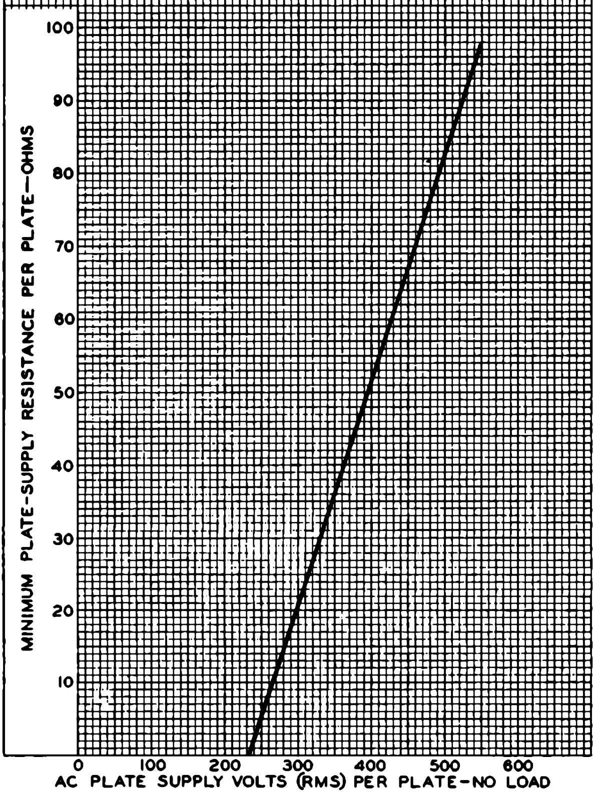
PLATE-SUPPLY RESISTANCE PER PLATE = $R_{SEC.} + N^2 R_{PRI.} + R_A$

WHERE $R_{SEC.}$ = DC RESISTANCE OF TRANSFORMER SECONDARY PER SECTION

$R_{PRI.}$ = DC RESISTANCE OF TRANSFORMER PRIMARY

R_A = DC RESISTANCE OF ADDED SERIES RESISTANCE PER PLATE

N = TRANSFORMER VOLTAGE STEP-UP RATIO PER SECTION



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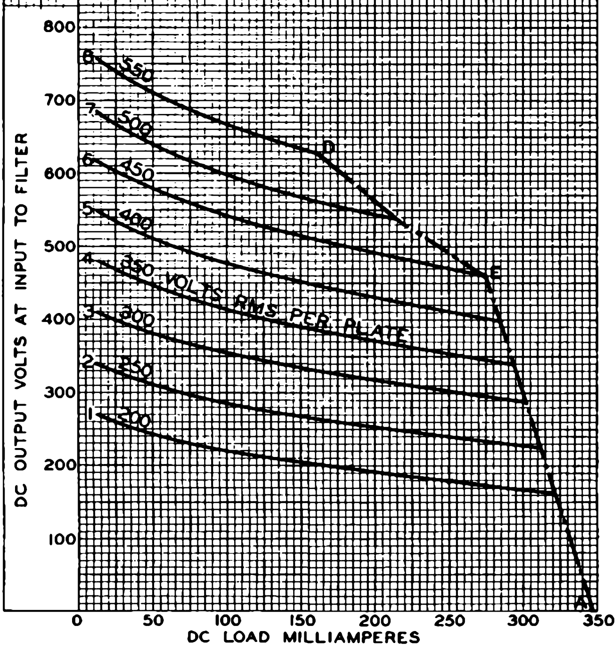
OPERATION CHARACTERISTICS
FULL-WAVE CIRCUIT, CAPACITOR INPUT TO FILTER

E_f = 5.0 VOLTS AC
SUPPLY FREQUENCY = 60 CPS
CAPACITOR (C) INPUT TO FILTER: 40 μf
TOTAL EFFECTIVE PLATE-SUPPLY IMPEDANCE PER PLATE

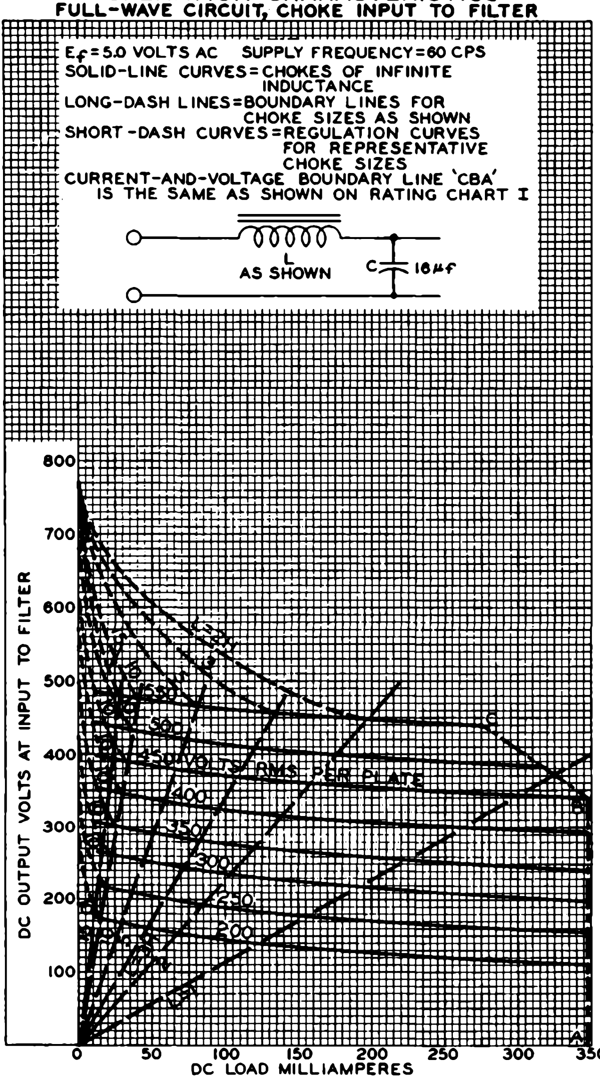
CURVE	1	2	3	4	5	6	7	8
OHMS	11	11	20	36	52	67	82	97

CURRENT-AND VOLTAGE BOUNDARY LINE 'DEA' IS THE SAME AS SHOWN ON RATING CHART I



5U4-GB

OPERATION CHARACTERISTICS
FULL-WAVE CIRCUIT, CHOKE INPUT TO FILTER



5U8

MEDIUM-MU TRIODE—SHARP-CUTOFF PENTODE

9-PIN MINIATURE TYPE

Intended for use in equipment having series heater-string arrangement

The 5U8 is the same as the 6U8 except for the following items:

Heater, for Unipotential Cathodes:

Voltage	4.7	ac or dc volts
Current	0.6	amp
Warm-up time (Average). .	11	sec

For definition of heater warm-up time and method of determining it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of this Section.

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode .	200 max.	volts
Heater positive with respect to cathode .	200▲ max.	volts

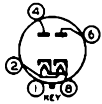
▲ The dc component must not exceed 100 volts.

5V4-G

5V4-G

FULL-WAVE HIGH-VACUUM RECTIFIER

Heater	Coated Unipotential Cathode	
Voltage	5.0	a-c volts
Current	2.0	amp.
Maximum Overall Length		4-5/8"
Maximum Seated Height		4-1/16"
Maximum Diameter		1-13/16"
Bulb		ST-14
Base		Medium Shell Octal 5-Pin
Pin 1 - No Connection		Pin 6 - Plate #1
Pin 2 - Heater		Pin 8 - Heater & Cathode
Pin 4 - Plate #2		
Mounting Position		Any



BOTTOM VIEW (G-5L)

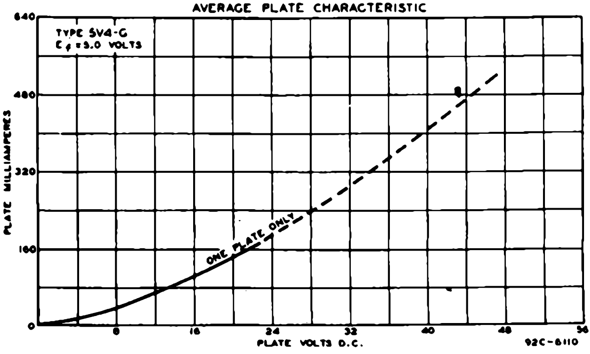
FULL-WAVE RECTIFIER

Peak Inverse Voltage	1400 max.	volts
Peak Plate Current per Plate	525 max.	ma.
With Condenser-Input Filter:		
A-C Plate Voltage per Plate (RMS)	375 max.	volts
Total Effective Plate-Supply Impedance per Plate ▲	100 min.	ohms
D-C Output Current	175 max.	ma.
With Choke-Input Filter:		
A-C Plate Voltage per Plate (RMS)	500 max.	volts
Input-Choke Inductance	4 min.	henries
D-C Output Current	175 max.	ma.

▲ When a filter-input condenser larger than 40 μf is used, it may be necessary to use more plate-supply impedance than the minimum value shown to limit the peak plate current to the rated value.

→ Indicates a change.

AVERAGE PLATE CHARACTERISTIC



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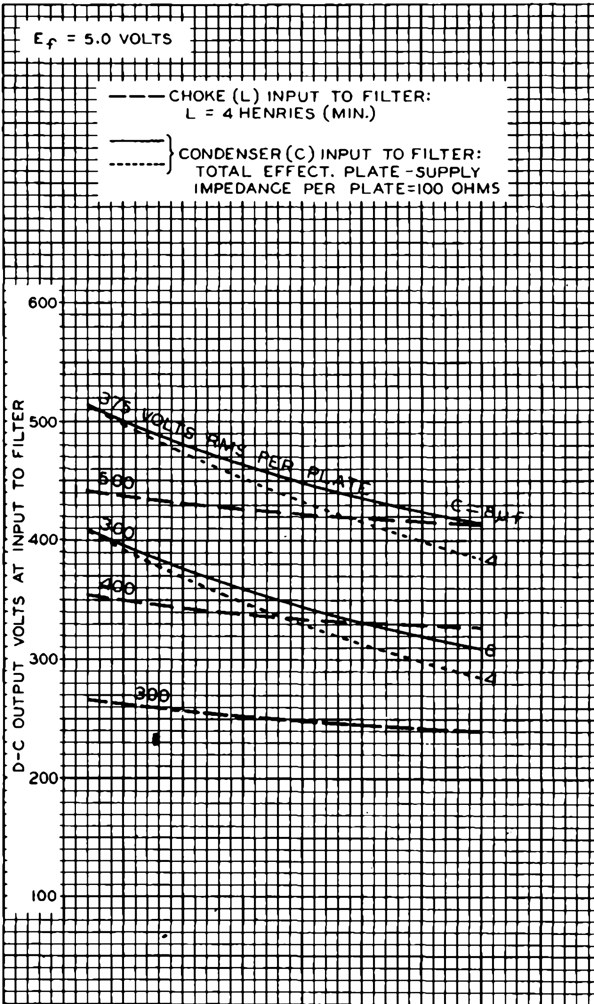
5V4-G

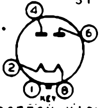
OPERATION CHARACTERISTICS



5W4, 5W4-GT/G

FULL-WAVE HIGH-VACUUM RECTIFIER

Filament	Coated		
Voltage	5.0		a-c volts
Current	1.5		amp.
	5W4	*5W4-GT/G*	
Maximum Overall Length	3-1/4"	3-3/8"	
Maximum Seated Height	2-11/16"	2-13/16"	
Maximum Diameter	1-5/16"	1-5/16"	
Bulb	Metal Shell, MT-8	T-9	
Base	Small Wafer Octal 5-Pin	Intermed. Sh. Octal 5-Pin	
Basing Designation	5T	G-5T	
Pin 1 {5W4, Shell; 5W4-GT/G, No Con.		Pin 4 - Plate #2	
		Pin 6 - Plate #1	
Pin 2 - Filament		Pin 8 - Filament	
Mounting Position		Vertical◊	



BOTTOM VIEW

Maximum Ratings Are Design-Center Values

FULL-WAVE RECTIFIER

Peak Inverse Plate Voltage	1400 max.	volts
Peak Plate Current per Plate	300 max.	ma.
D-C Output Current:		
With condenser input to filter	100 max.	ma.
With choke input to filter	100● max.	ma.

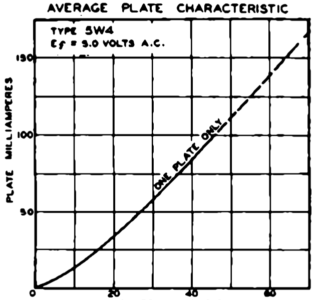
Typical Operation:	*Condenser-Input Filter*	*Choke-Input Filter*	
A-C Plate-to-Plate Supply Voltage (RMS)	700	1000	volts
Filter Input Condenser	4	-	μf
Min. Total Effect. Plate-Supply Imped. per Plate	50	-	ohms
Filter Input Choke	-	6	henries
D-C Output Current	100	100	ma.
D-C Voltage (At input to filter):*			
At half-load current (50 ma.)	410	420	volts
At full-load current (100 ma.)	360	405	volts
Difference (Voltage Regulation)	50	15	volts
Percentage Regulation	12	3.5	%

◊ Horizontal operation of the 5W4 permitted if pins 2 and 8 are in a vertical plane. Horizontal operation of the 5W4-GT/G permitted if pins 2 and 8 are in a horizontal plane.

● For choke not less than 6 henries.

* Approximate values.

AVERAGE PLATE CHARACTERISTIC



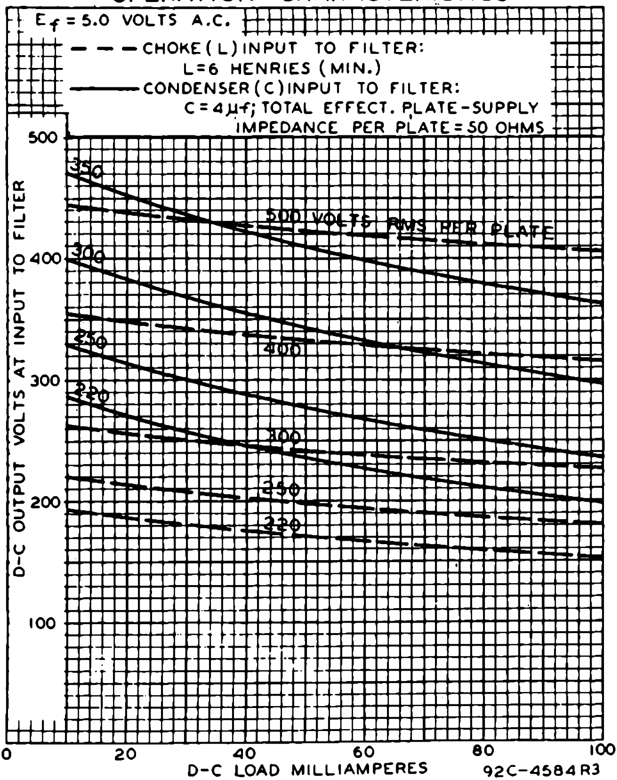
92C-6008R1

◄ Indicates a change.

5W4
5X4-G

5W4

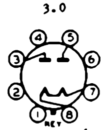
OPERATION CHARACTERISTICS



5X4-G

FULL-WAVE HIGH-VACUUM RECTIFIER

Filament	Coated	
Voltage	5.0	a-c volts
Current	3.0	amp.
Maximum Overall Length		5-5/16"
Maximum Seated Height		4-3/4"
Maximum Diameter		2-1/16"
Bulb		ST-16
Base		Medium Shell Octal 8-Pin



BOTTOM VIEW (G-5Q)

Pin 1 - No Connection	Pin 5 - Plate #1
Pin 2 - No Connection	Pin 6 - No Connection
Pin 3 - Plate #2	Pin 7 - Filament
Pin 4 - No Connection	Pin 8 - Filament

Mounting Position: Vertical◇

◇ Horizontal operation permitted if pins 2 and 7 are in horizontal plane.

Maximum Ratings, Operating Conditions, and Curves for the 5X4-G are the same as those for Type 5U4-G.

5X8
TRIODE-PENTODE CONVERTER

9-PIN MINIATURE TYPE

Intended for use in equipment having series heater-string arrangement

The 5X8 is the same as the 6X8 except for the following items:

Heater, for Unipotential Cathode:

Voltage	4.7	ac or dc volts
Current	0.6	amp
Warm-up time (Average)	11	sec

For definition of heater warm-up time and method of determining it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of this section.

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200▲	max.	volts

▲ The dc component must not exceed 100 volts.

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5Y3-G, 5Y3-GT

FULL-WAVE VACUUM RECTIFIER

GENERAL DATA

Electrical:

Filament, Coated:

Voltage	5	ac volts
Current	2	amp

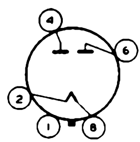
Mechanical:

Mounting Position . . . . . Vertical, or Horizontal with pins 2 and 8 in horizontal plane

	5Y3-G	*5Y3-GT*
Maximum Overall Length	4-5/8"	3-3/8"
Maximum Seated Length	4-1/16"	2-13/16"
Maximum Diameter	1-13/16"	1-5/16"
Bulb	ST-14	T-9
Base	Med.-Shell Octal 5-Pin	Inter.-Shell Octal 5-Pin

Basing Designation for BOTTOM VIEW G-5T

Pin 1 – No Connection
Pin 2 – Filament
Pin 4 – Plate No.2



Pin 6 – Plate No.1
Pin 8 – Filament

FULL-WAVE RECTIFIER

Maximum Ratings, ***Design-Center Values'***

PEAK INVERSE PLATE VOLTAGE	1400 max.	volts
PEAK PLATE CURRENT PER PLATE	400 max.	ma
AC PLATE SUPPLY VOLTAGE (RMS) PER PLATE	See Rating Chart	
DC OUTPUT CURRENT PER PLATE	See Rating Chart	
HOT-SWITCHING TRANSIENT PLATE CURRENT PER PLATE For duration of 0.2 second maximum	2.2 max.	amp

Typical Operation with Capacitor-Input Filter:

AC Plate-to-Plate Supply Voltage (RMS)	700	1000	volts
Filter-Input Capacitor	10	10	μf
Total Effect. Plate-Supply Impedance Per Plate	50	140	ohms
DC Output Voltage at Input to Filter (Approx.):			
At Half-Load Cur. of 62.5 ma.	390	–	volts
At Half-Load Cur. of 42 ma.	–	610	volts
At Full-Load Cur. of 125 ma.	350	–	volts
At Full-Load Cur. of 84 ma.	–	560	volts
Voltage Regulation, Half-Load to Full-Load Current (Approx.)	40	50	volts

5Y3-G
5Y3-GT

RCA

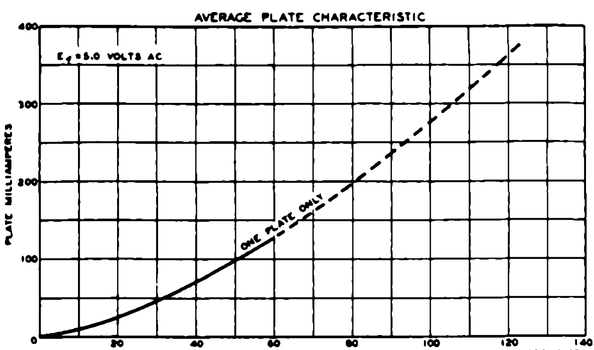
5Y3-G, 5Y3-GT
FULL-WAVE VACUUM RECTIFIER

Typical Operation with Choke-Input Filter:

AC Plate-to-Plate Supply Voltage (RMS)	700	1000	volts
Filter-Input Choke	10*	10**	henries
DC Output Voltage at Input to Filter (Approx.):			
At Half-Load Cur. of 75 ma. .	270		volts
At Half-Load Cur. of 62.5 ma. .	-	405	volts
At Full-Load Cur. of 150 ma. .	245		volts
At Full-Load Cur. of 125 ma. .	-	390	volts
Voltage Regulation, Half-Load to Full-Load Current (Approx.) .	25	15	volts

* This value is adequate to maintain optimum regulation in the region to the right of line L=10H on curve OPERATION CHARACTERISTICS With Choke-Input to Filter, provided the load current is not less than 35 ma. For load currents less than 35 ma., a larger value of inductance is required for optimum regulation.

** This value is adequate to maintain optimum regulation in the region to the right of line L=10H on curve OPERATION CHARACTERISTICS With Choke-Input to Filter, provided the load current is not less than 50 ma. For load currents less than 50 ma., a larger value of inductance is required for optimum regulation.



RATING CHART AND OPERATION CHARACTERISTICS

The *Rating Chart* presents graphically the relationships between maximum ac voltage input and maximum dc output current derived from the fundamental ratings for conditions of capacitor-input and choke-input filters. This graphical presentation gives the equipment designer considerable latitude in choice of operating conditions.

The *Operation Characteristics for Full-Wave Circuit with Capacitor-Input Filter* show not only the typical operating curves for such a circuit, but also show by means of boundary lines "ADK" the limiting current and voltage relation-

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5Y3-G, 5Y3-GT

FULL-WAVE VACUUM RECTIFIER

ships presented on the Rating Chart.

The *Operation Characteristics for Full-Wave Circuit with Choke-Input Filter* show the typical operating curves for such a circuit. They not only show by means of boundary line "CEK" the limiting current and voltage relationships presented on the *Rating Chart*, but also give information as to the effect on regulation of various sizes of chokes. The solid-line curves show the dc voltage outputs which would be obtained if the filter chokes had infinite inductance. The long-dash lines radiating from the zero position are boundary lines for various sizes of chokes as indicated. The intersection of one of these lines with a solid-line curve indicates the point on the curve at which the choke no longer behaves as though it had infinite inductance. To the left of the choke boundary line, the regulation curves depart from the solid-line curves as shown by the representative short-dash regulation curves.

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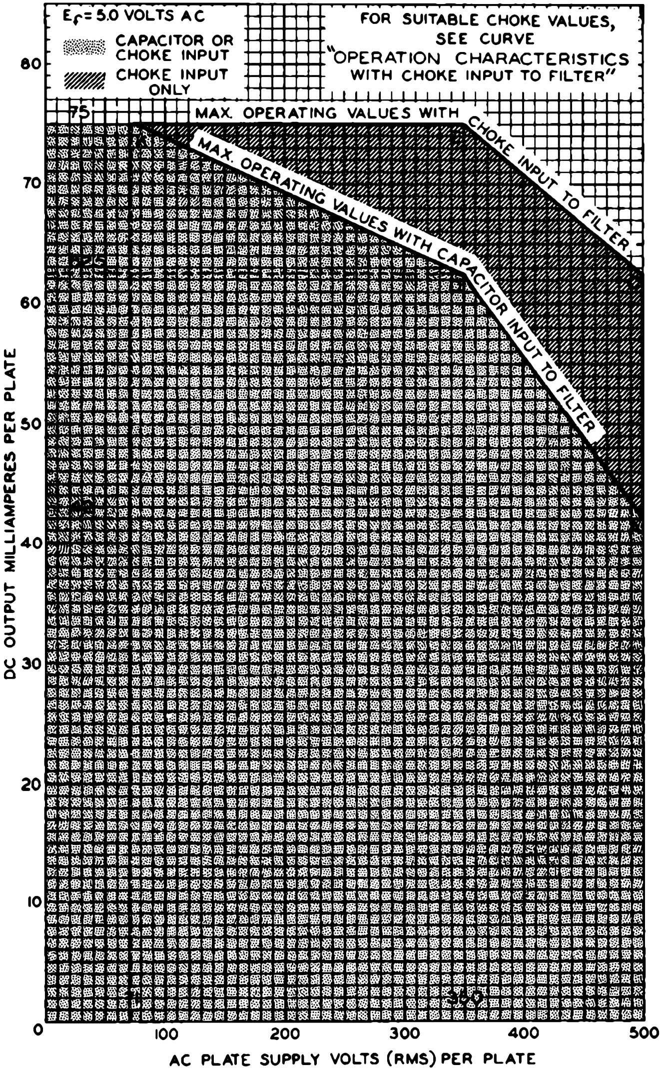
5Y3-GT

5Y3-GT

RATING CHART



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92CM-7396

5Y3-GT

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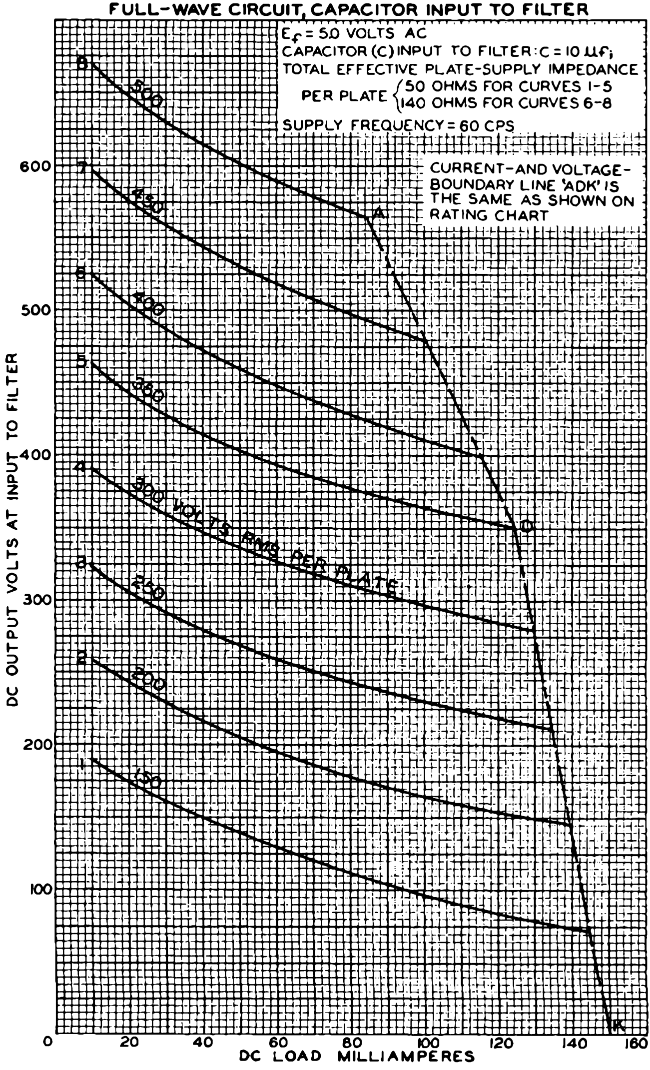
5Y3-GT

OPERATION CHARACTERISTICS

FULL-WAVE CIRCUIT, CAPACITOR INPUT TO FILTER



OCT. 31, 1949

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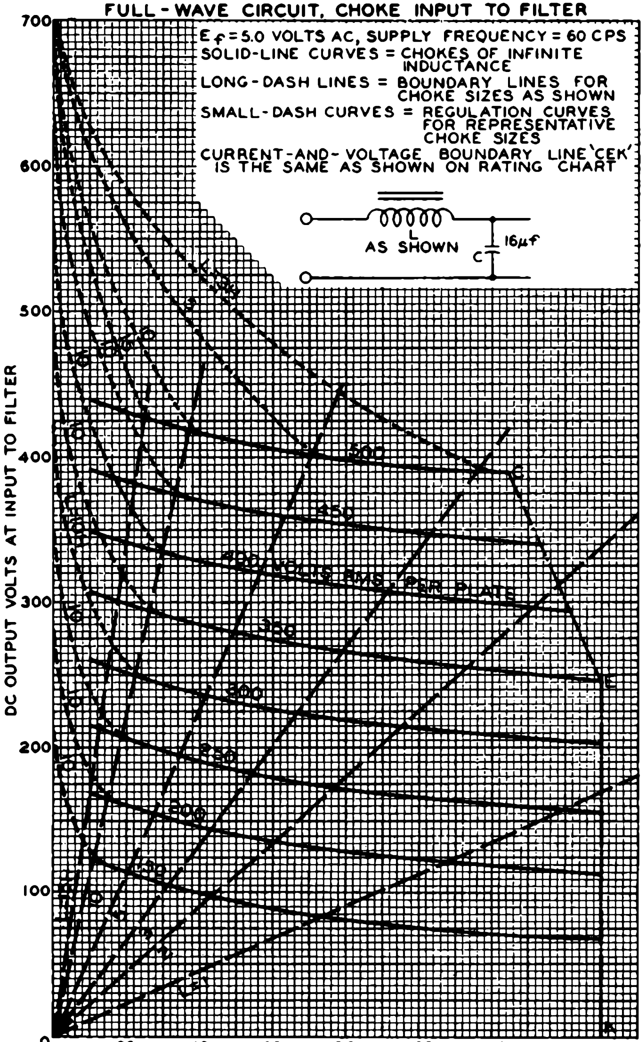
92CM-7395

5Y3-GT

5Y3-GT

OPERATION CHARACTERISTICS

FULL-WAVE CIRCUIT, CHOKE INPUT TO FILTER



OCT. 28, 1949 TUBE DEPARTMENT 92CM-7394

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5Y4-G

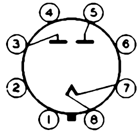
FULL-WAVE VACUUM RECTIFIER

The 5Y4-G is the same as the 5Y3-G except for the following items:

Mechanical:

Mounting Position . . . . Vertical, base up or down, or Horizontal with pins 2 and 7 in horizontal plane
Base . . . . Medium-Shell Octal 8-Pin (JETEC No. B8-11)
Basing Designation for BOTTOM VIEW. 5Q

Pin 1 – No Connection
Pin 2 – No Connection
Pin 3 – Plate No. 2
Pin 4 – No Connection



Pin 5 – Plate No. 1
Pin 6 – No Connection
Pin 7 – Filament
Pin 8 – Filament

5Y4-GT

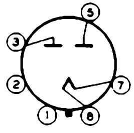
FULL-WAVE VACUUM RECTIFIER

The 5Y4-GT is the same as the 5Y3-GT except for the following items:

Mechanical:

Mounting Position . . . . Vertical, base up or down, or Horizontal with pins 2 and 7 in horizontal plane
Base . . . . Intermediate-Shell Octal 6-Pin (JETEC No. B6-8), or Short Intermediate-Shell Octal 6-Pin (JETEC No. B6-48)
Basing Designation for BOTTOM VIEW 5Q

Pin 1 – No Connection
Pin 2 – No Connection



Pin 3 – Plate No. 2
Pin 5 – Plate No. 1
Pin 7 – Filament
Pin 8 – Filament

5Z3

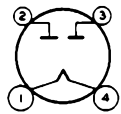
FULL-WAVE VACUUM RECTIFIER

The 5Z3 is the same as the 5U4-G except for the following items:

Mechanical:

Mounting Position. . . . . .Vertical, base up or down, or Horizontal with pins 1 and 4 in horizontal plane
Maximum Overall Length . . . . 5-3/8"
Base . . . . Medium-Shell Small 4-Pin (JETEC No.A4-9)
Basing Designation for BOTTOM VIEW 4C

Pin 1 - Filament
Pin 2 - Plate No.2



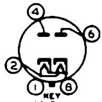
Pin 3 - Plate No.1
Pin 4 - Filament

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5Z4

FULL-WAVE HIGH-VACUUM RECTIFIER

Heater	Coated Unipotential Cathode	
Voltage	5.0	a-c volts
Current	2.0	amp.
Maximum Overall Length		3-1/4"
Maximum Seated Height		2-11/16" ←
Maximum Diameter		1-5/16"
Bulb		Metal Shell, MT-8
Base		Small Wafer Octal 5-Pin
Pin 1 - Shell		Pin 6 - Plate #1
Pin 2 - Heater		Pin 8 - Heater & Cathode
Pin 4 - Plate #2		
Mounting Position		Any



BOTTOM VIEW (5L)

FULL-WAVE RECTIFIER

Peak Inverse Voltage	1400	max.	volts
Peak Plate Current per Plate	375	max.	ma.
With Condenser-Input Filter:			
A-C Plate Voltage per Plate (RMS)	350	max.	volts
Total Effective Plate-Supply Impedance per Plate▲	50	min.	ohms ←
D-C Output Current	125	max.	ma.
With Choke-Input Filter:			
A-C Plate Voltage per Plate (RMS)	500	max.	volts
Input-Choke Inductance	5	min.	henries
D-C Output Current	125	max.	ma.

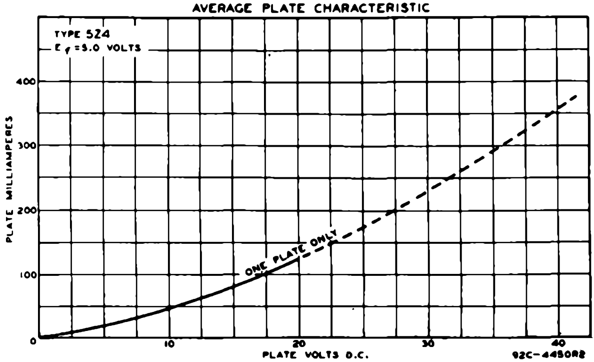
▲ When a filter-input condenser larger than 40 μf is used, it may be necessary to use more plate-supply impedance than the minimum value shown to limit the peak plate current to the rated value.

HALF-WAVE RECTIFIER

As a half-wave rectifier, the 5Z4 may be operated with plates connected in parallel at the socket. Two 5Z4's so connected in a full-wave circuit will deliver twice the d-c output current obtainable from one tube. In this service the allowable voltage and load conditions per tube are the same as for full-wave service.

← Indicates a change.

AVERAGE PLATE CHARACTERISTIC



RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

5Z4

5Z4

OPERATION CHARACTERISTICS