RCA TUBE
HANDBOOK
HB-3

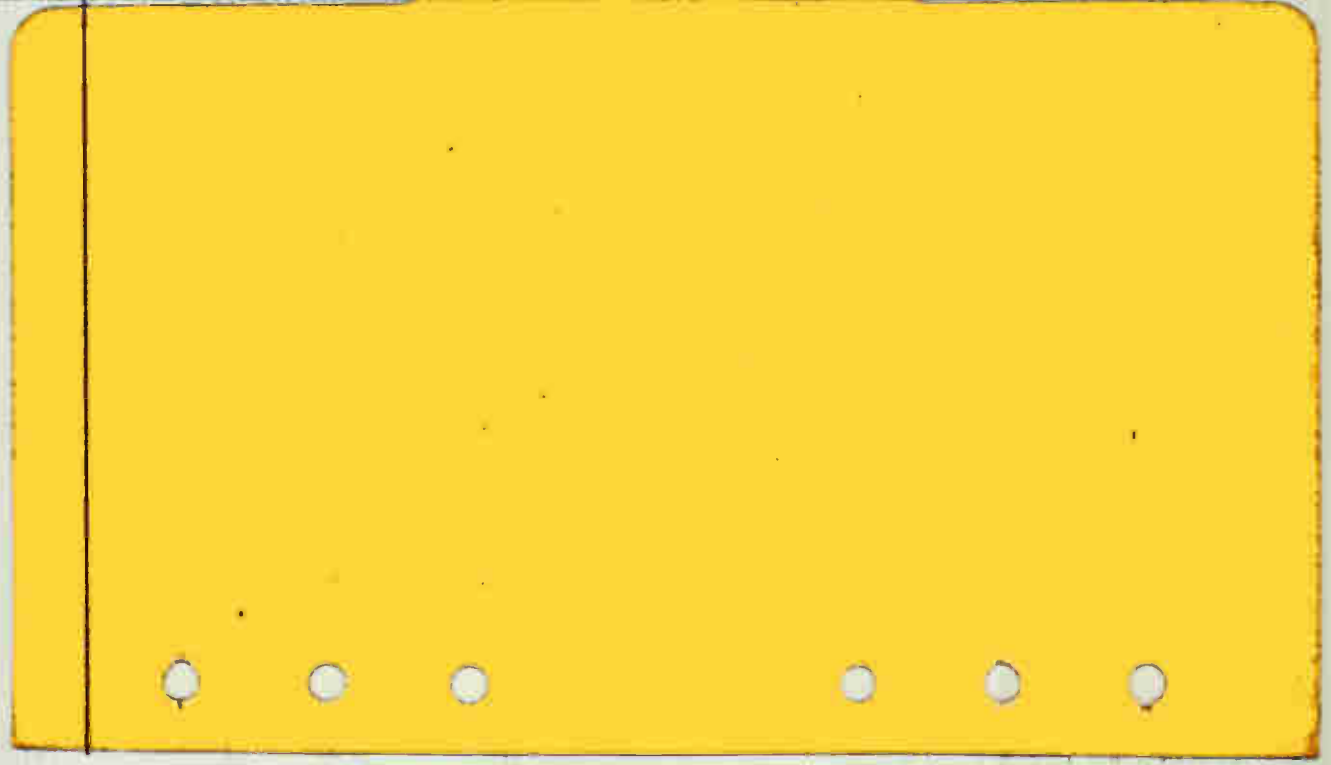
RECEIVING TUBE SECTION — Part 2

This Section contains data for those tubes used primarily in broadcast and home-television receivers.

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

2-57

SEPARATOR



6E5

ELECTRON-RAY TUBE

INDICATOR TYPE WITH TRIODE UNIT

Heater	Coated Unipotential Cathode	
Voltage	6.3	a-c or d-c volts
Current	0.3	amp.
Overall Length		4" ± 3/16" ←
Seated Height		3-3/8" ± 3/16" ←
Maximum Diameter		1-3/16"
Bulb		T-9
Base		Small 6-Pin
Pin 1 - Heater		Pin 4 - Target
Pin 2 - Plate		Pin 5 - Cathode
Pin 3 - Grid		Pin 6 - Heater
Mounting Position	BOTTOM VIEW (6R)	Any* ←

Maximum and Minimum Ratings Are Design-Center Values

INDICATOR SERVICE

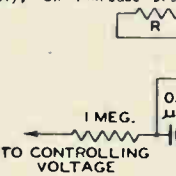
Plate-Supply Voltage		250 max.	volts
Target Voltage		250 max.	volts ←
		125 min.	volts
D-C Heater-Cathode Potential		90 max.	volts
Typical Operation:			←
Plate and Target Supply	125	250	volts
Series Triode-Plate Resistor**	1	1	megohm
Target Current*** †	0.8	2	ma.
Triode-Plate Current***	0.1	0.2	ma.
Triode-Grid Voltage (Approx.):			
For shadow angle of 0°	-4.0	-7.5	volts
For shadow angle of 90°	0	0	volts

* The plane of the ray-control electrode passes through pins No. 2 and No. 5.

** Designated as R in circuit diagram. † Subject to wide variations.

*** For zero triode-grid voltage. ← Indicates a change.

The 6E5 is a high-vacuum type of tube designed to indicate visually the effect of change in the controlling voltage. For different controlling voltages, the shaded pattern produced on the fluorescent target varies through an angle from 90° to approximately 0°. The extent of the shaded area is controlled by the voltage on the ray-control electrode which is an extension of the triode plate between cathode and target. The voltage on the ray-control electrode is determined by the voltage applied to the grid of the triode connected as a d-c amplifier as shown in the circuit. A decrease in triode-grid bias decreases the voltage on the ray-control electrode; conversely, an increase produces an increased voltage on the ray-control electrode. In the practical use of the 6E5 as a tuning indicator, controlling voltage applied to the triode-grid is obtained from a suitable point in the a.v.c. circuit.



92CS-6476V

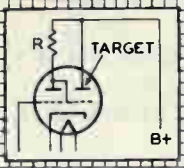
The license extended to the purchaser of tubes appears in the License Notice accompanying them. Information contained herein is furnished without assuming any obligations. ← Indicates a change.

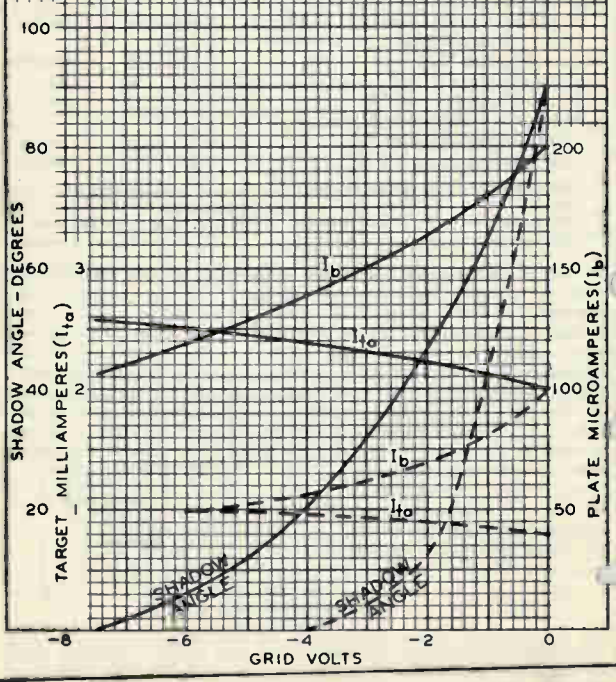
6E5

AVERAGE CONTROL CHARACTERISTICS

E_f = 6.3 VOLTS

CURVE	PLATE-SUPPLY VOLTS (B+)	SERIES PLATE RESISTOR (R)-MEG.
———	250	1.0
- - -	125	1.0





Dual Triode

With High-Mu Unit and Low-Mu Unit

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:		
Voltage (AC or DC)	6.3 ± 10%	volts
Current at 6.3 volts	1.05	amp

Direct Interelectrode Capacitances (Approx.):[a]

	Unit No.1	Unit No.2	
Grid to plate	4	8	μμf
Grid to cathode and heater	2.2	6	μμf
Plate to cathode and heater	0.6	1.3	μμf

Characteristics, Class A_1 Amplifier:

	Unit No.1	Unit No.2		
Plate Voltage	250	60	175	volts
Grid Voltage	-3	0	-25	volts
Amplification Factor	66	-	5.5	
Plate Resistance (Approx.)	30000	-	920	ohms
Transconductance	2200	-	6000	μmhos
Plate Current	2	100[b]	40	ma
Grid Voltage (Approx.) for plate μa = 20	-5.3	-	-	volts
Grid Voltage (Approx.) for plate μa = 200	-	-	-45	volts

Mechanical:

Operating Position	Any
Maximum Overall Length	3"
Maximum Seated Length	2-7/16"
Maximum Diameter	1-9/32"
Bulb	T9
Base	Intermediate-Shell Octal 8-Pin (JEDEC Group 1, B8-6)
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 PLATE VOLTAGE	350	max.	volts
PEAK NEGATIVE-PULSE GRID VOLTAGE	400	max.	volts
PLATE DISSIPATION	1	max.	watt
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200[d]	max.	volts

Maximum Circuit Values:

Grid-Circuit Resistance:			
For fixed-bias operation	1	max.	megohm
For cathode-bias operation	2.2	max.	megohms

VERTICAL-DEFLECTION AMPLIFIER

Values are for Unit No.2

Maximum Ratings, *Design-Maximum Values:*

For operation in a 525-line, 30-frame system[e]

DC PLATE VOLTAGE	550	max.	volts
PEAK POSITIVE-PULSE PLATE VOLTAGE[e]	1500	max.	volts
PEAK NEGATIVE-PULSE GRID VOLTAGE	250	max.	volts
CATHODE CURRENT:			
Peak	175	max.	ma
Average	50	max.	ma
PLATE DISSIPATION	10	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200[d]	max.	volts

Maximum Circuit Values:

Grid-Circuit Resistance:			
For fixed-bias operation	1	max.	megohm
For cathode-bias operation	2.2	max.	megohms

[a] Without external shield.

[b] This value can be measured by a method involving a recurrent wave form such that the maximum ratings of the tube will not be exceeded.

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

[d] The dc component must not exceed 100 volts.

[e] This rating is applicable where the duration of the voltage pulse does not exceed 15 per cent of one vertical scanning cycle. In a 525-line, 30-frame system, 15 per cent of one vertical scanning cycle is 2.5 milliseconds.

Medium-Mu Triode—Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

With Heater Having Controlled Warm-Up Time

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:			
Voltage (AC or DC)		6.3	volts
Current		0.45 ± 6%	amp
Warm-up time (Average)		11	sec
Direct Interelectrode Capacitances:	*Without External Shield*	*With External Shield*[a]	
Triode Unit:			
Grid to plate	1.7	1.7	μμf
Grid to cathode, pentode cathode & pentode grid No.3 & internal shield, and heater	3	3.2	μμf
Plate to cathode, pentode cathode & pentode grid No.3 & internal shield, and heater	1.4	1.9	μμf
Pentode Unit:			
Grid No.1 to plate	0.02 max.	0.01 max.	μμf
Grid No.1 to cathode & grid No.3 & internal shield, grid-No.2, and heater	5	5	μμf
Plate to cathode & grid No.3 & internal shield, grid No.2, and heater	2.6	3.4	μμf
Heater to cathode (Each unit)	3	3[b]	μμf

Characteristics, Class A_1 Amplifier:

	Triode Unit	*Pentode Unit*	
Plate-Supply Voltage	150	125	volts
Grid-No.2 Voltage	–	125	volts
Grid-No.1 Voltage	–	-1	volt
Cathode Resistor	56	–	ohms
Amplification Factor	40	–	
Plate Resistance (Approx.)	5000	200000	ohms
Transconductance	8500	6400	μmhos
Plate Current	18	12	ma
Grid-No.2 Current	–	4	ma
Grid-No.1 Voltage (Approx.) for plate μa = 10	-12	-9	volts

← Indicates a change.

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. 9AE

Pin 1 - Triode Plate
Pin 2 - Pentode Grid No.1
Pin 3 - Pentode Grid No.2
Pin 4 - Heater
Pin 5 - Heater
Pin 6 - Pentode Plate

Pin 7 - Pentode Cathode, Pentode Grid No.3, Internal Shield
Pin 8 - Triode Cathode
Pin 9 - Triode Grid

AMPLIFIER — Class A_1

Maximum Ratings, *Design-Maximum Values:*

	Triode Unit	*Pentode Unit*	
PLATE VOLTAGE	330 max.	330 max.	volts
GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE.	-	330 max.	volts
GRID-No.2 VOLTAGE	-	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
GRID-No.1 (CONTROL-GRID) VOLTAGE: Positive-bias value . . .	0 max.	0 max.	volts
GRID-No.2 INPUT: For grid-No.2 voltages up to 165 volts	-	0.55 max.	watt
For grid-No.2 voltages between 165 and 330 volts	-	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
→ PLATE DISSIPATION	2.5 max.	3.1 max.	watts
PEAK HEATER-CATHODE VOLTAGE: Heater negative with respect to cathode. . .	200 max.	200 max.	volts
Heater positive with respect to cathode. . .	200[c] max.	200[c] max.	volts

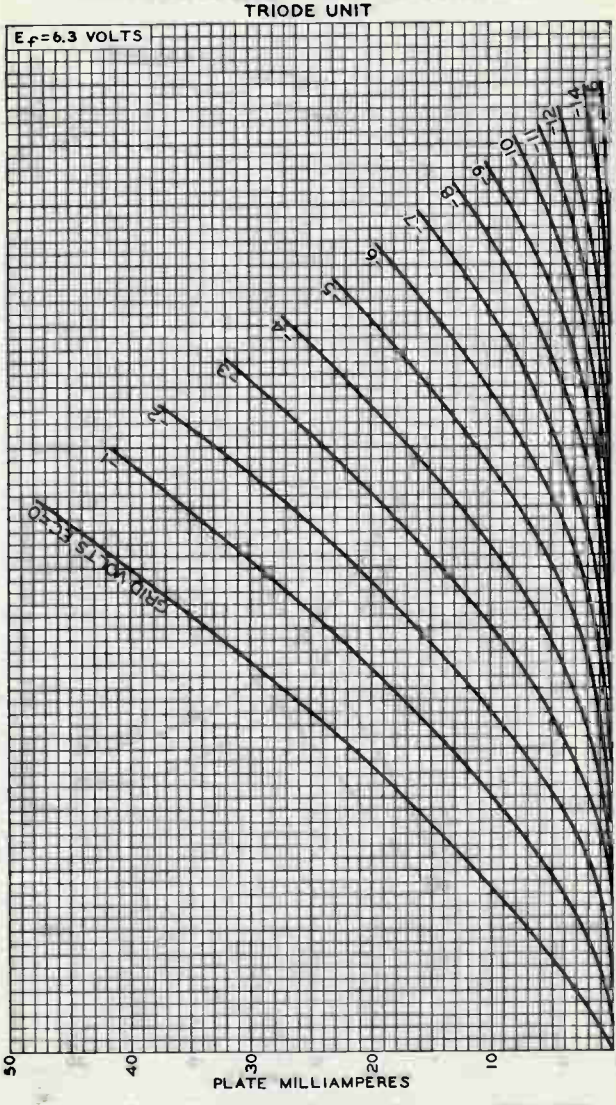
[a] With external shield JEDEC No.315 connected to cathode of unit under test except as noted.
[b] With external shield JEDEC No.315 connected to ground.
[c] The dc component must not exceed 100 volts.

→ Indicates a change.

6EA8

AVERAGE PLATE CHARACTERISTICS

TRIODE UNIT



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92CM-9866

6EA8

RCA

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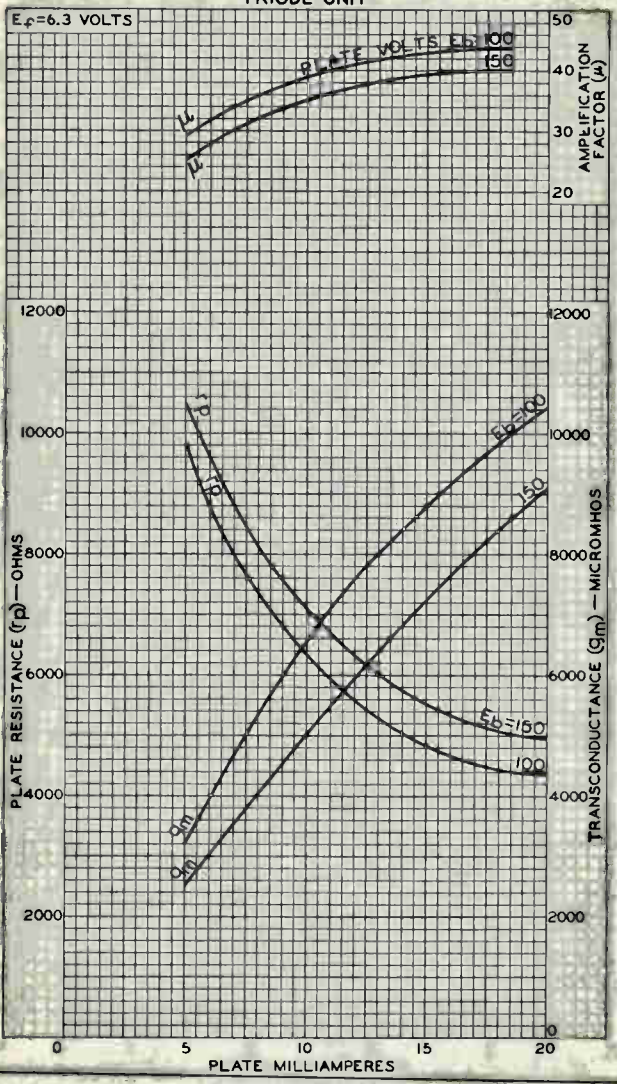
AVERAGE CHARACTERISTICS

TRIODE UNIT



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92CM-9882

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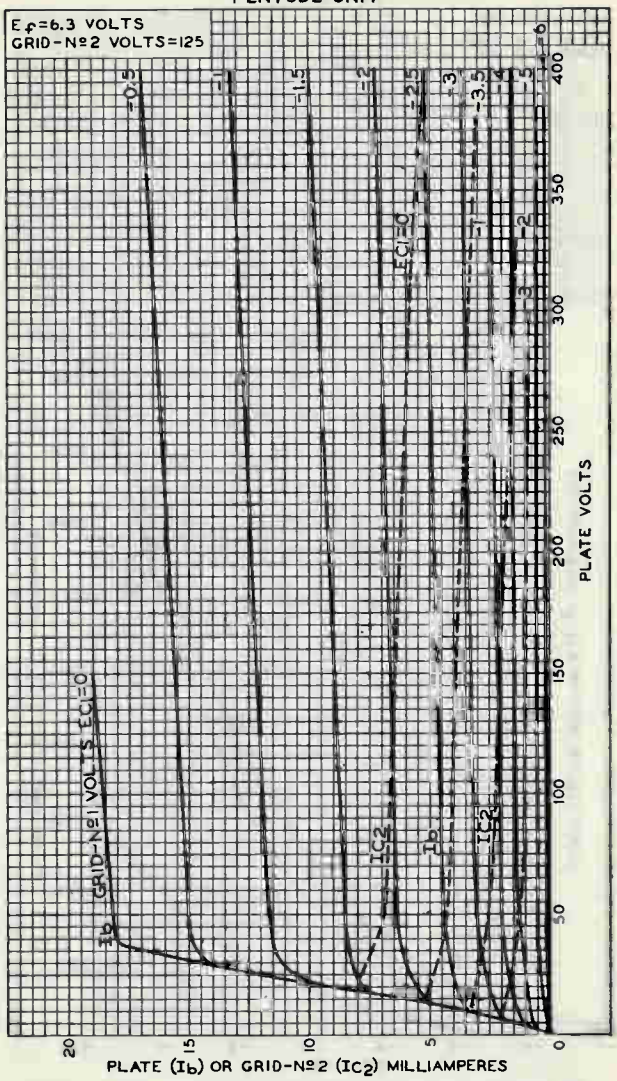
6EA8

AVERAGE CHARACTERISTICS
PENTODE UNIT



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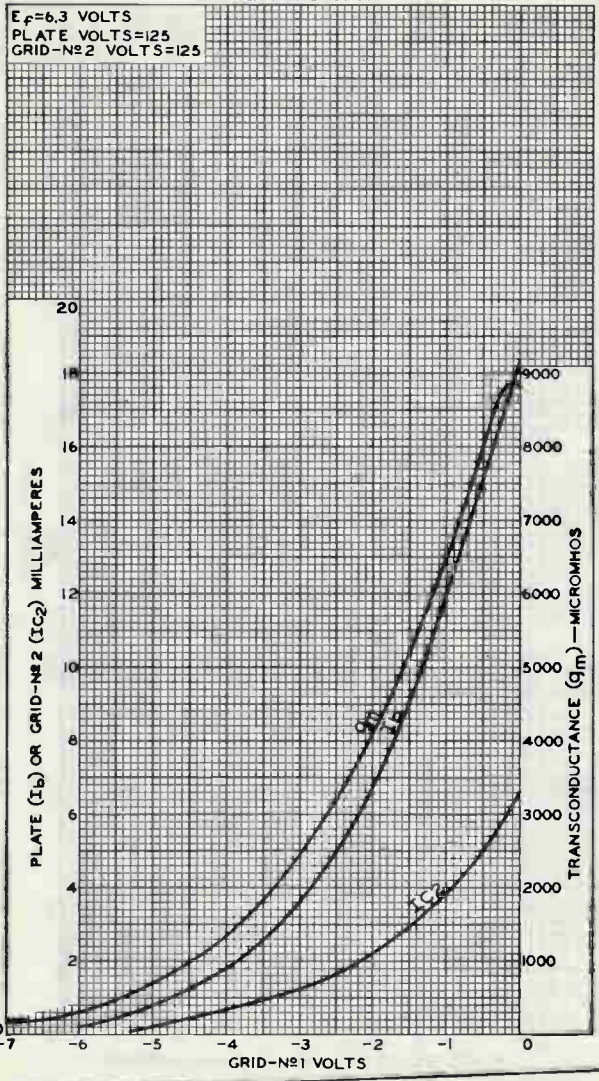
92CM-9867

RCA

6EA8

AVERAGE CHARACTERISTICS

PENTODE UNIT



6EB8

HIGH-MU TRIODE—
SHARP-CUTOFF PENTODE

9-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:		
Voltage	6.3 ± 10%	ac or dc volts
Current	0.75	amp
Direct Interelectrode Capacitances:[0]		
Triode Unit:		
Grid to plate	4.4	μμf
Grid to cathode and heater	2.4	μμf
Plate to cathode and heater	0.36	μμf
Pentode Unit:		
Grid No.1 to plate	0.1 max.	μμf
Grid No.1 to cathode & internal shield & grid No.3, grid No.2, and heater	11	μμf
Plate to cathode & internal shield & grid No.3, grid No.2, and heater	4.2	μμf
Triode grid to pentode plate	0.018 max.	μμf
Pentode grid No.1 to triode plate	0.005 max.	μμf
Pentode plate to triode plate	0.17 max.	μμf

Characteristics, Class A_1 Amplifier:

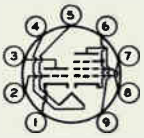
	Triode Unit	*Pentode Unit*		
Plate-Supply Voltage	250	45	200	volts
Grid-No.2 Supply Voltage	-	125	125	volts
Grid-No.1 Voltage	-2	0	-	volts
Cathode Resistor	-	-	68	ohms
Amplification Factor	100	-	-	
Plate Resistance (Approx.)	37000	-	75000	ohms
Transconductance	2700	-	12500	μmhos
Plate Current	2	40*	25	ma
Grid-No.2 Current	-	15*	7	ma
Grid-No.1 Voltage (Approx.) for plate μa = 100	-	-	-9	volts
Grid Voltage (Approx.) for plate μa = 20	-5	-	-	volts

Mechanical:

Operating 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"
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. 9DX

Pin 1 - Triode Cathode
Pin 2 - Triode Grid
Pin 3 - Triode Plate
Pin 4 - Heater
Pin 5 - Heater



Pin 6 - Pentode Cathode, Grid No.3, Internal Shield
Pin 7 - Pentode Grid No.1
Pin 8 - Pentode Grid No.2
Pin 9 - Pentode Plate

AMPLIFIER — Class A_1

Maximum Ratings, *Design-Maximum Values:*

	Triode Unit		*Pentode Unit*		
PLATE VOLTAGE	330	max.	330	max.	volts
GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE.	-		330	max.	volts
GRID-No.2 VOLTAGE	-		*See Grid-No.2 Input Rating Chart at front of Receiving Tube Section*		
GRID-No.1 (CONTROL-GRID) VOLTAGE:					
Positive-bias value . . .	0	max.	0	max.	volts
PLATE DISSIPATION	1	max.	5	max.	watts
GRID-No.2 INPUT:					
For grid-No.2 voltages up to 165 volts	-		1.1	max.	watts
For grid-No.2 voltages between 165 and 330 volts	-		*See Grid-No.2 Input Rating Chart at front of Receiving Tube Section*		
PEAK HEATER-CATHODE VOLTAGE:					
Heater negative with respect to cathode. . .	200	max.	200	max.	volts
Heater positive with respect to cathode. . .	200▲	max.	200▲	max.	volts

Maximum Circuit Values:

	Triode Unit		*Pentode Unit*		
Grid-No.1-Circuit Resistance:					
For fixed-bias operation.	0.5	max.	0.25	max.	megohm
For cathode-bias operation	1	max.	1	max.	megohm

6EB8

HIGH-MU TRIODE—
SHARP-CUTOFF PENTODE

° Without external shield.

* This value can be measured by a method involving a recurrent wave form such that the maximum ratings of the tube will not be exceeded.

▲ The dc component must not exceed 100 volts.

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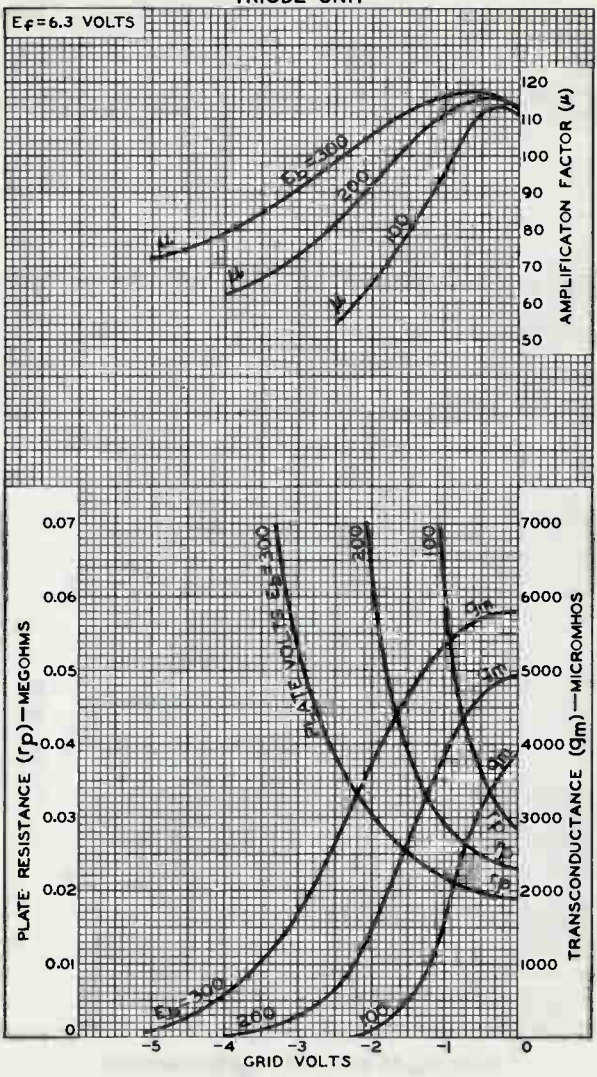
92CM-9907R1

RCA

6EB8

AVERAGE CHARACTERISTICS

TRIODE UNIT



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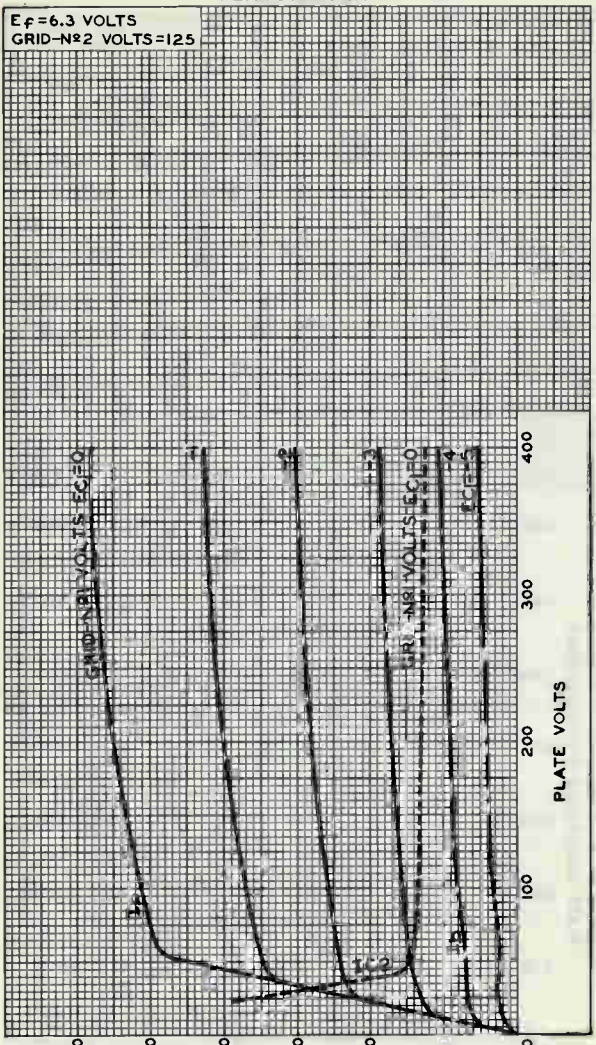
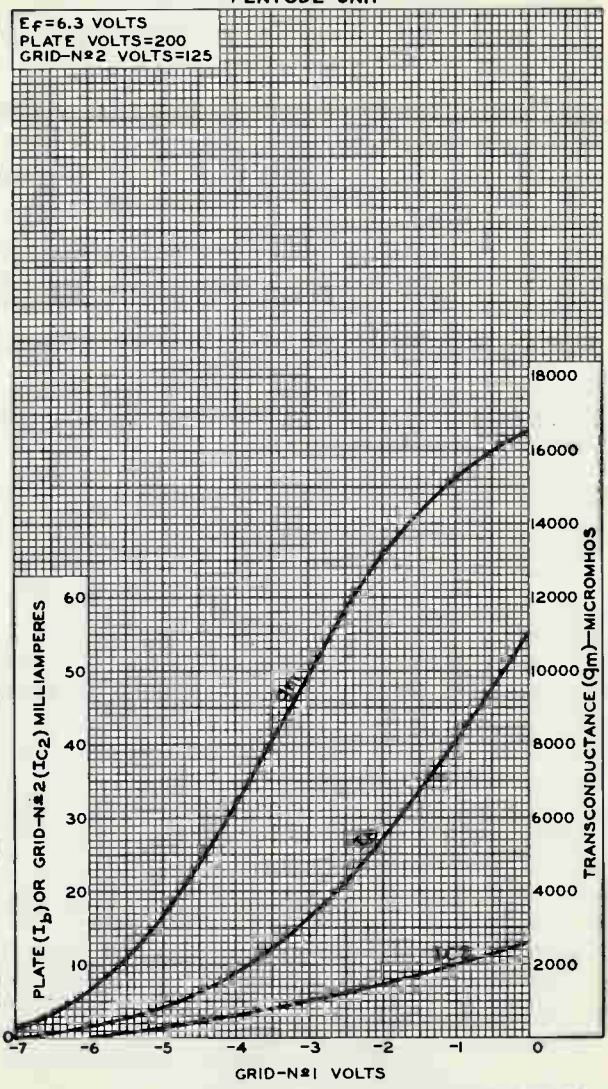
AVERAGE CHARACTERISTICS

PENTODE UNIT



6EB8

AVERAGE CHARACTERISTICS
PENTODE UNIT



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92CM-9905

Semiremote-Cutoff Pentode

9-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater Characteristics and Ratings *(Design-Center Values):*		
Voltage (AC or DC)	6.3 ± 0.6	volts
Current at heater volts = 6.3	0.300	amp
Peak heater-cathode voltage:		
Heater negative with respect to cathode	150 max.	volts
Heater positive with respect to cathode	150 max.	volts
Direct Interelectrode Capacitances:[a]		
Grid No.1 to plate	0.005 max.	μμf
Grid No.1 to cathode, grid No.3, grid No.2, internal shield, and heater	9	μμf
Plate to cathode, grid No.3, grid No.2, internal shield, and heater	3	μμf

Characteristics, Class A$_1$ Amplifier:

Plate Voltage	200	volts
Grid No.3	*Connected to cathode at socket*	
Grid-No.2 Voltage	90	volts
Grid-No.1 Voltage	-2	volts
Plate Resistance (Approx.)	0.5	megohm
Transconductance	12500	μmhos
Plate Current	12	ma
Grid-No.2 Current	4.5	ma

Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	2-13/32"
Maximum Seated Length	2-5/32"
Length, Base Seat to Bulb Top (Excluding tip)	1-25/32" ± 3/32"
Diameter	0.750" to 0.875"
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)
Basing Designation for BOTTOM VIEW	9AQ

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

Pin 6 - Internal Shield
Pin 7 - Plate
Pin 8 - Grid No.2
Pin 9 - Grid No.3

6EH7

AMPLIFIER — Class A[1]

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

PLATE SUPPLY VOLTAGE	550 max.	volts
PLATE VOLTAGE	250 max.	volts
GRID No.3 (SUPPRESSOR GRID)	*Connect to cathode at socket*	
GRID No.2 (SCREEN-GRID) SUPPLY VOLTAGE	550 max.	volts
GRID-No.2 VOLTAGE	250 max.	volts
CATHODE CURRENT	20 max.	ma
GRID-No.2 INPUT	0.65 max.	watt
PLATE DISSIPATION	2.5 max.	watts

Typical Operation:

Plate Voltage	200	200	200	200	volts
Grid No.3	*Connected to cathode at socket*				
Grid-No.2 Supply Voltage	200	200	200	200	volts
Grid-No.2 Series Resistor	22000	22000	22000	22000	ohms
Grid-No.1 Voltage	-19.5	-9.5	-6.5	-2	volts
Transconductance	125	625	1250	12500	μmhos
RMS Grid-No.1 Voltage for cross-modulation factor = 0.01	450	160	100	–	mv

Maximum Circuit Values:

Grid-No.1-Circuit Resistance	1 max.	megohm

[1] Without external shield.

Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater Characteristics and Ratings *(Design-Center Values)*:			
Voltage (AC or DC)	6.3 ± 0.6		volts
Current at heater volts = 6.3	0.300		amp
Peak heater-cathode voltage:			
Heater negative with respect to cathode	150	max.	volts
Heater positive with respect to cathode	150	max.	volts
Direct Interelectrode Capacitances:[a]			
Grid No.1 to plate	0.005	max.	μμf
Grid No.1 to cathode, grid No.3, grid No.2, internal shield, and heater	10		μμf
Plate to cathode, grid No.3, grid No.2, internal shield, and heater	3		μμf

Characteristics, Class A_1 Amplifier:

Plate Voltage	190	200	volts
Grid No.3	*Connected to cathode at socket*		
Grid-No.2 Voltage	190	200	volts
Grid-No.1 Voltage	-2.35	-2.5	volts
Plate Resistance (Approx.)	0.35	0.35	megohm
Transconductance	15000	15000	μmhos
Plate Current	10	10	ma
Grid-No.2 Current	4.1	4.1	ma

Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	2-13/32"
Maximum Seated Length	2-5/32"
Length, Base Seat to Bulb Top (Excluding tip)	1-25/32" ± 3/32"
Diameter	0.750" to 0.875"
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)
Basing Designation for BOTTOM VIEW	9AQ

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

Pin 6 - Internal Shield
Pin 7 - Plate
Pin 8 - Grid No.2
Pin 9 - Grid No.3

6EJ7

AMPLIFIER — Class A1

Maximum Ratings, *Design-Center Values:*

PLATE SUPPLY VOLTAGE	550 max.	volts
PLATE VOLTAGE	250 max.	volts
GRID No.3 (SUPPRESSOR GRID)	*Connect to cathode at socket*	
GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE	550 max.	volts
GRID-No.2 VOLTAGE	250 max.	volts
CATHODE CURRENT	25 max.	ma
GRID-No.2 INPUT	0.9 max.	watt
PLATE DISSIPATION	2.5 max.	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance	1 max.	megohm

[a] Without external shield.

Beam Power Tube

9-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:			
Voltage (AC or DC)	6.3		volts
Current	0.8		amp
Direct Interelectrode Capacitances:[a]			
Grid No.1 to plate	0.7 max.		μμf
Grid No.1 to cathode & grid No.3, grid No.2, and heater	10		μμf
Plate to cathode & grid No.3, grid No.2, and heater	5.1		μμf

Characteristics, Class A_1 Amplifier: ←

Plate Voltage	60	250	volts
Grid-No.2 Voltage	250	250	volts
Grid-No.1 Voltage	0	-18	volts
Mu Factor, Grid No.1 to Grid No.2	-	8.7	
Plate Resistance (Approx.)	-	0.05	megohm
Transconductance	-	5100	μmhos
Plate Current	180[b]	40	ma
Grid-No.2 Current	30[b]	3	ma
Grid-No.1 Voltage (Approx.) for plate ma. = 0.2	-	-37	volts

Mechanical:

Operating Position	Any
Maximum Overall Length	3-1/16"
Maximum Seated Length	2-13/16"
Length, Base Seat to Bulb Top (Excluding tip)	2-7/16" ± 3/32"
Diameter	0.750" to 0.850"
Dimensional Outline	See *General Section*
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)
Basing Designation for BOTTOM VIEW	9HN

Pin 1 - Grid No.2
Pin 2 - No Connection
Pin 3 - Grid No.1
Pin 4 - Heater
Pin 5 - Heater
Pin 6 - Grid No.1
Pin 7 - Cathode, Grid No.3
Pin 8 - Internal Connection—Do Not Use
Pin 9 - Plate

VERTICAL-DEFLECTION AMPLIFIER

Maximum Ratings, *Design-Center Values Except as Noted:*

For operation in a 525-line, 30-frame system[c]

DC PLATE VOLTAGE	315 max.	volts
PEAK POSITIVE-PULSE PLATE VOLTAGE (Absolute maximum)[d]	2200[e] max.	volts

← Indicates a change.

6EM5

DC GRID-No.2 (SCREEN-GRID) VOLTAGE	285	max.	volts
PEAK NEGATIVE-PULSE GRID-No.1 (CONTROL-GRID) VOLTAGE	250	max.	volts
CATHODE CURRENT:			
Peak	210	max.	ma
Average	60	max.	ma
GRID-No.2 INPUT	1.5	max.	watts
PLATE DISSIPATION	10	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200[f]	max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)	250	max.	°C

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:			
For fixed-bias operation	2.2	max.	megohms
For cathode-bias operation	2.2	max.	megohms

[a] Without external shield.

[b] This value can be measured by a method involving a recurrent wave form such that the maximum ratings of the tube will not be exceeded.

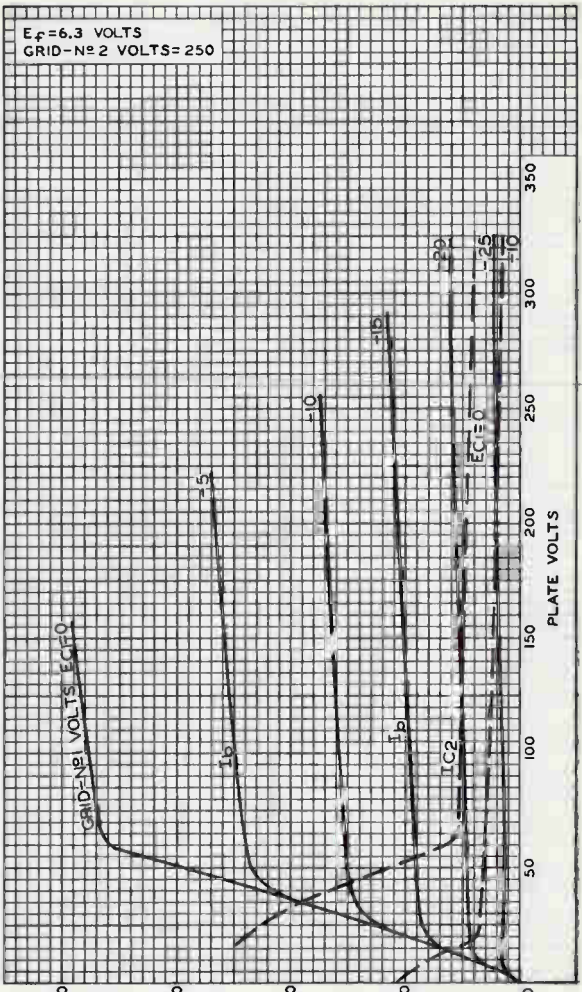
[c] As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations," Federal Communications Commission.

[d] This rating is applicable when the duration of the voltage pulse does not exceed 15 per cent of one vertical scanning cycle. In a 525-line, 30-frame system, 15 per cent of one vertical scanning cycle is 2.5 milliseconds.

[e] Under no circumstances should this absolute-maximum value be exceeded.

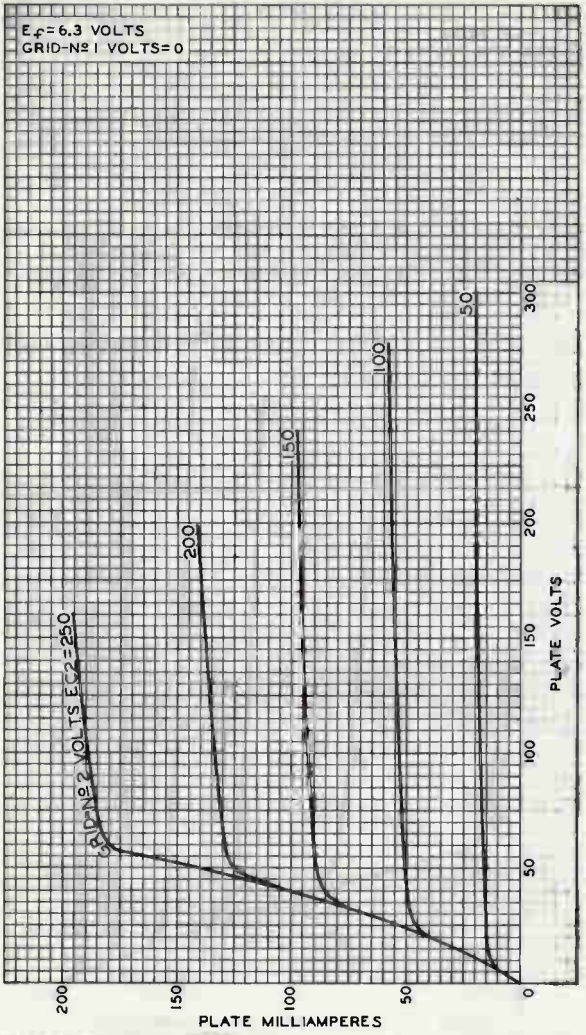
[f] The dc component must not exceed 100 volts.

AVERAGE CHARACTERISTICS



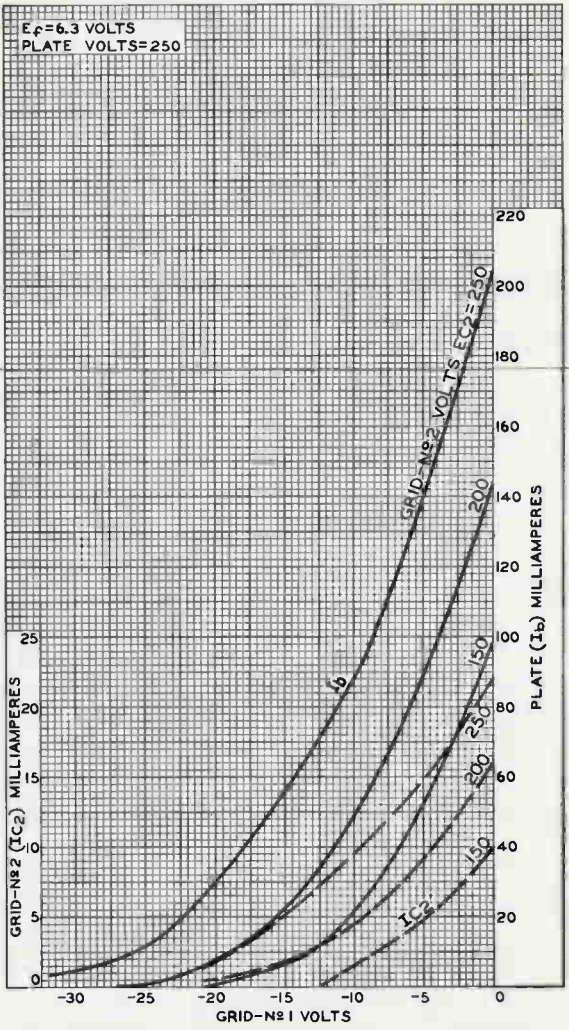
92CM-9797RI

AVERAGE PLATE CHARACTERISTICS



92CM-9672

AVERAGE CHARACTERISTICS



92CM-9673R1

6EM7

Dual Triode

With High-Mu Unit and Low-Mu Unit

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:			
Voltage (AC or DC)		6.3 ± 10%	volts
Current at 6.3 volts		0.925	amp
Direct Interelectrode Capacitances (Approx.):[a]			
	Unit No.1	*Unit No.2*	
Grid to plate	4.8	10	μμf
Grid to cathode and heater	2.2	7	μμf
Plate to cathode and heater	0.6	1.8	μμf

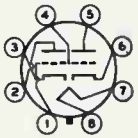
Characteristics, Class A_1 Amplifier:

	Unit No.1	*Unit No.2*	
Plate Voltage	250	150	volts
Grid Voltage	-3	-20	volts
Amplification Factor	68	5.4	
Plate Resistance (Approx.)	40000	750	ohms
Transconductance	1600	7200	μmhos
Plate Current	1.4	50	ma
Plate Current for plate volts = 60 and grid volts = 0	-	95	ma
Plate Current for grid volts = -28	-	10	ma
Grid Voltage (Approx.) for plate μa = 10	-5.5	-	volts
Grid Voltage (Approx.) for plate μa = 100	-	-45	volts

Mechanical:

Operating Position	Any
Maximum Overall Length	2-7/8" ←
Maximum Seated Length	2-5/16" ←
Maximum Diameter	1-9/32"
Bulb	T9
Base	Short Intermediate-Shell Octal 8-Pin with External Barriers (JEDEC Group 1, B8-58)
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

← Indicates a change.

VERTICAL-DEFLECTION OSCILLATOR

Values are for Unit No.1

Maximum Ratings, *Design-Maximum Values:*

For operation in a 525-line, 30-frame system[b]

DC PLATE VOLTAGE	330	max.	volts
PEAK NEGATIVE-PULSE GRID VOLTAGE	400	max.	volts
CATHODE CURRENT:			
Peak	77	max.	ma
Average	22	max.	ma
PLATE DISSIPATION	1.5	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200[c]	max.	volts

Maximum Circuit Values:

Grid-Circuit Resistance:			
For grid-resistor-bias or cathode-bias operation	2.2	max.	megohms

VERTICAL-DEFLECTION AMPLIFIER

Values are for Unit No.2

Maximum Ratings, *Design-Maximum Values:*

For operation in a 525-line, 30-frame system[b]

DC PLATE VOLTAGE	330	max.	volts
PEAK POSITIVE-PULSE PLATE VOLTAGE[d]	1500	max.	volts
PEAK NEGATIVE-PULSE GRID VOLTAGE	250	max.	volts
CATHODE CURRENT:			
Peak	175	max.	ma
Average	50	max.	ma
PLATE DISSIPATION	10	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200[c]	max.	volts

Maximum Circuit Values:

Grid-Circuit Resistance:			
For grid-resistor-bias or cathode-bias operation	2.2	max.	megohms

[a] Without external shield.

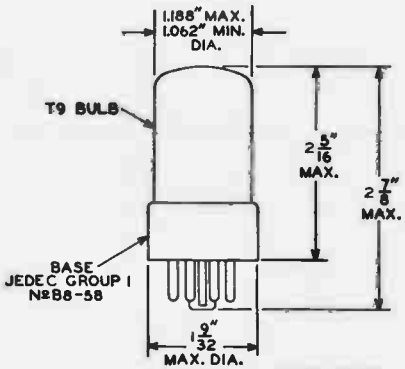
[b] As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations," Federal Communications Commission.

[c] The dc component must not exceed 100 volts.

[d] This rating is applicable where the duration of the voltage pulse does not exceed 15 per cent of one vertical scanning cycle. In a 525-line, 30-frame system, 15 per cent of one vertical scanning cycle is 2.5 milliseconds.

OPERATING CONSIDERATIONS

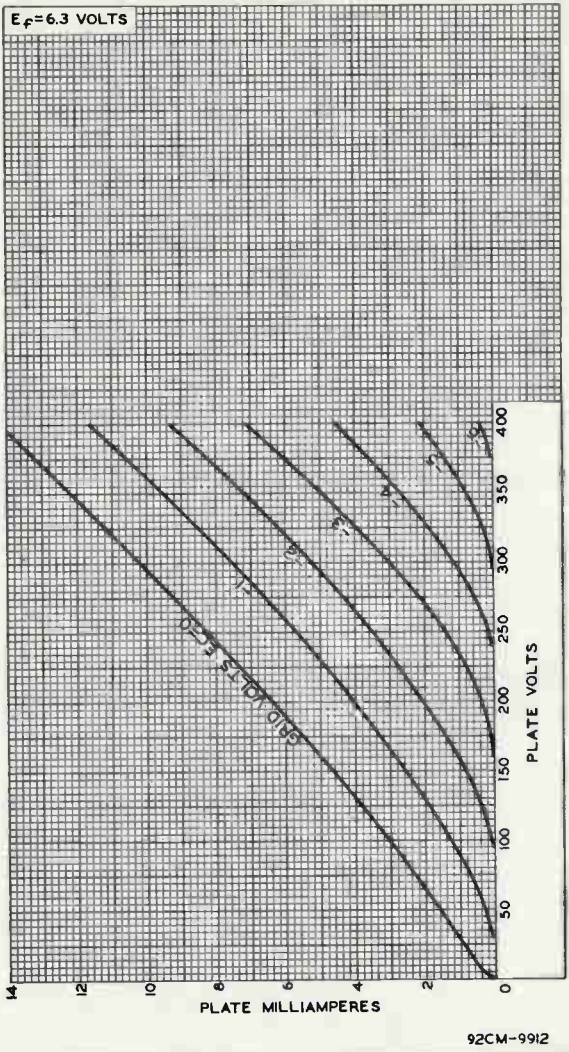
The *bulb* becomes hot during operation. To insure adequate cooling, therefore, it is essential that free circulation of air be provided.


1.188" MAX.
1.062" MIN.
DIA.
T9 BULB
2 5/16" MAX.
2 7/8" MAX.
BASE
JEDEC GROUP I
N2B8-58
1 9/32" MAX. DIA.

92CS-10880

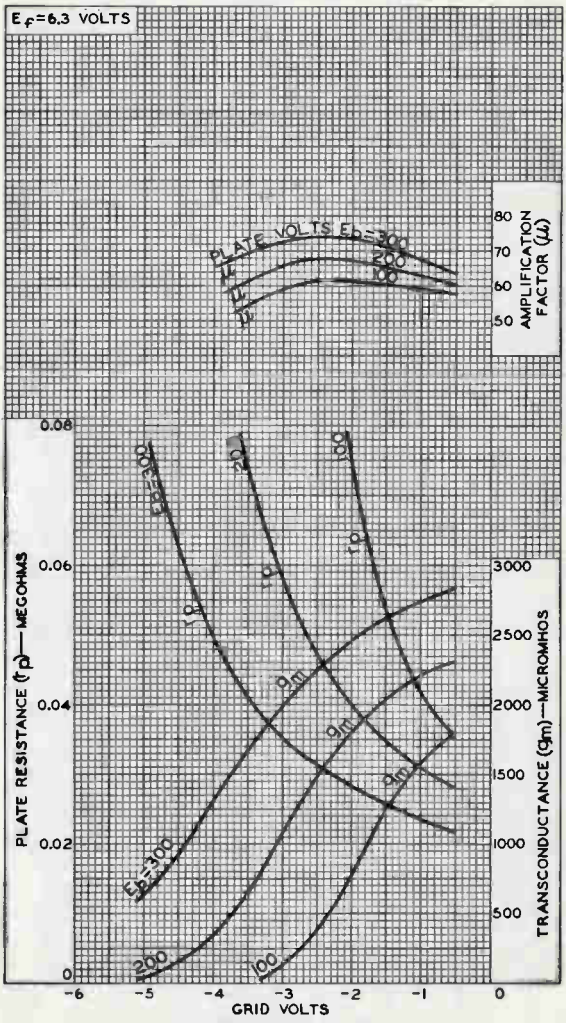
6EM7

AVERAGE PLATE CHARACTERISTICS
Unit No.1



92CM-9912

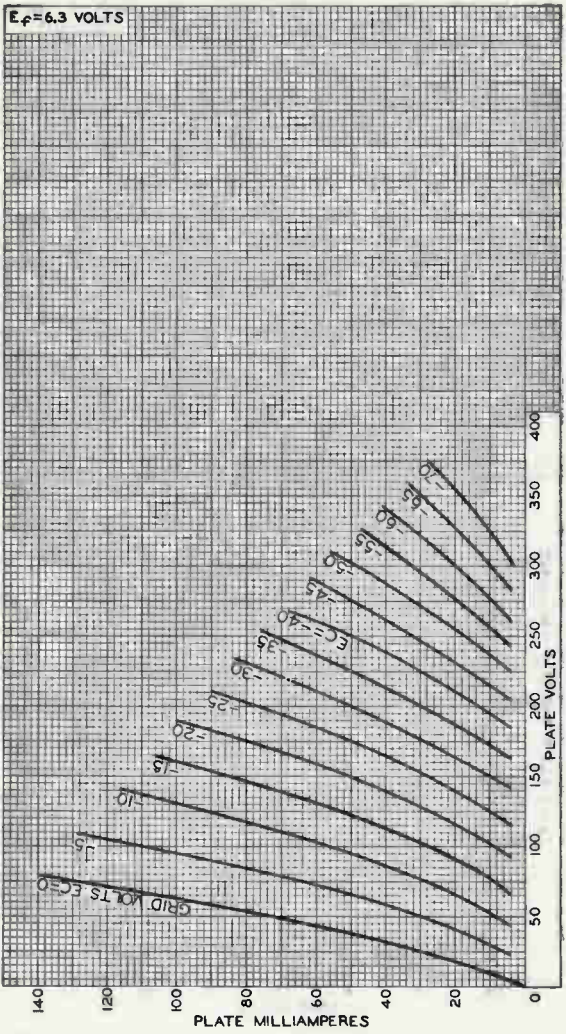
AVERAGE CHARACTERISTICS
Unit No.1



92CM-9915RI

6EM7

AVERAGE PLATE CHARACTERISTICS
Unit No.2



92CM-10466

RADIO CORPORATION OF AMERICA
Electron Tube Division
Harrison, N. J.

Sharp-Cutoff Beam Triode

High-Voltage, Low-Current Type Shunt Voltage-Regulator For DC Power Supplies in Color-TV Receivers

Designed to minimize X-radiation.

Max. DC Plate Volts	Max. Plate Dissipation
= 30000 V	= 40 watts

ELECTRICAL CHARACTERISTICS – Bogey Values

Heater Voltage, ac or dc	E_h	6.3	V
Heater Current	I_h	0.2	A
Direct Interelectrode Capacitances (approx.)			
Grid to plate	c_{g-p}	1.0	pF
Input: G to (K,H)	c_i	2.6	pF
Output: P to (K,H)	c_o	1.0	pF
Amplification Factor (Approx.)	μ	2000	

MECHANICAL CHARACTERISTICS

Maximum Overall Length	5.00 in (127.0 mm)
Maximum Seated Length	4.4375 in (112.7 mm)
Maximum Diameter	1.562 in (39.6 mm)
Envelope	JEDEC T12
Cap	Small (JEDEC No. C1-50)
Base	Short Medium-Shell Octal 8-Pin With External Barriers, Style B (JEDEC Group 1, No. B8-118)
Terminal Diagram	JEDEC 8NH
Type of Cathode	Coated Unipotential
Operating Position	Any

MAXIMUM RATINGS[a]

SHUNT VOLTAGE-REGULATOR SERVICE

DC Plate Voltage (absolute maximum)	E_b	30000	V
Unregulated DC Supply Voltage	E_{bb}	60000	V
Grid Voltage:			
Negative dc value	$-E_c$	135	V
Negative peak value for 20 seconds maximum during equipment warm-up period	$-E_{cm}$	440	V
DC Plate Current (absolute maximum)	I_b	1.6	mA
Plate Dissipation (absolute maximum)	P_b	40	W
Peak heater-cathode voltage:			V
Heater negative with respect to cathode	$-E_{hk}$	450[b]	V
Heater positive with respect to cathode	$+E_{hk}$	Not Recommended	

Heater Voltage (absolute maximum)	E_h	6.9	V
Heater Voltage (absolute minimum)	E_h	5.7	V

MAXIMUM CIRCUIT VALUES:

Grid-Circuit Resistance	$R_{g(CKT)}$	3	MΩ

Typical Operation:

As Shunt Voltage-Regulator Tube in Accompanying Circuit

Unregulated Supply:		
DC Voltage	36000	V
Equivalent resistance	11	MΩ
Voltage Divider Values:		
R_1 (5 watts)	220	MΩ
R_2 (2 watts)	1	MΩ
R_3 (½ watt)	0.82	MΩ
Reference Voltage Supply:		
DC Value	200	V
Equivalent resistance	1000	Ω
Effective Grid-Plate Transconductance	200	μmhos
DC Plate Current:		
For load current of 0 ma	1000	μA
For load current of 1 ma	45	μA
Regulated DC Output Voltage:		
For load current of 0 ma	25000	V
For load current of 1 ma	24500	V

[a] As defined in the current issue of EIA Standard RS-239A.

[b] Sufficient impedance should be used in series with the cathode to limit the cathode current under prolonged short-circuit conditions to 450 mA. This protective impedance will minimize the danger of heater burnout in case of a momentary internal arc within the tube.

CHARACTERISTIC RANGE VALUES FOR EQUIPMENT DESIGN

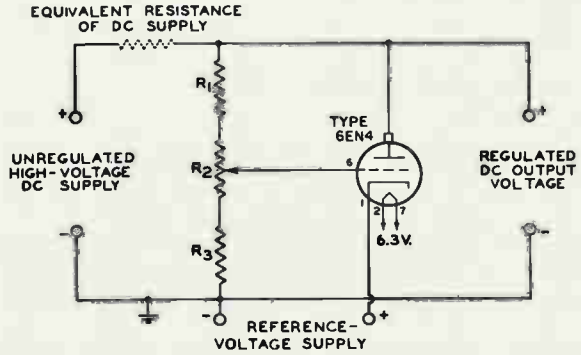
	Note	*Min.*	*Max.*	
Grid Voltage (1)	1	-7	-	V
Grid Voltage (2)	2	-	-40	V
Grid Voltage Change	3	-	9	V

Note 1: With dc plate voltage of 30000 V and dc plate current of 1 mA.

Note 2: With dc plate voltage of 30000 V and dc plate current of 0.1 mA.

Note 3: Difference between grid voltage (1) and grid voltage (2).

SHUNT VOLTAGE-REGULATOR CIRCUIT



Typical performance data for this basic circuit with certain characteristics of the unregulated dc supply and related voltage-divider values are given in the tabulated data. Other combinations are feasible within the maximum ratings and the maximum circuit values for the 6EN4.

OPERATING CONSIDERATIONS

The *base pins* of the 6EN4 fit the standard octal socket. Socket terminals for pins 3, 4 and 8 *should not be used for tie points.* If this precaution is not followed, tube performance may be adversely affected.

The 6EN4 may exhibit a blue glow on the upper half of the inner surface of the bulb wall under normal operating conditions. This effect is caused by fluorescence and is not to be mistaken for gas.

The *plate* of the 6EN4 shows a dull red color when the tube is operated at maximum plate dissipation. Connection to the plate cap should be made by a suitable connector with flexible lead to prevent any strain on the seal of the cap.

The *bulb* of the 6EN4 becomes hot during operation. To insure adequate cooling, it is essential that free circulation of air be provided around the 6EN4. The bulb will eventually darken during service. This darkening is normal and has no effect on tube performance.

X-RADIATION CHARACTERISTIC

X-Radiation, Maximum

Statistical Value Controlled On A Lot
Sampling Basis 0.5mR/hr

X-Radiation is measured in accordance with JEDEC Publication No. 67 A, "Recommended Practice for Measurement of X-Radiation from Receiving Tubes", and controlled in accordance with JEDEC Publication No. 73 A, "Recommended Practice for Quality Control of X-Radiation Emitted from High Voltage Rectifier and Shunt Regulator Receiving Tubes".

Operation of the 6EN4 outside of the absolute values indicated above may result in either temporary or permanent changes in the X-radiation characteristic of the tube. Equipment design must be such that these absolute values are not exceeded.

WARNING

X-Radiation

The high voltage associated with the 6EN4 result in production of X-Radiation which may constitute a health hazard on prolonged exposure at close range unless the tube is adequately shielded. Equipment design must provide for this shielding.

Precautions must be exercised during the servicing of equipment employing the 6EN4 to assure that the high voltage is adjusted to the recommended value and that any shielding components are replaced to their intended positions before the equipment is operated.

SHOCK HAZARD

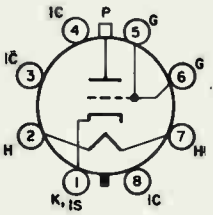
The high voltages at which the 6EN4 is operated can be extremely dangerous to the user or serviceman. Extreme care should be taken in the use of, and for the servicing and adjustment of, any high voltage circuit.

Precautions must be exercised during the replacement or servicing of the 6EN4 in equipment to assure that the high voltage output terminal is properly grounded while inserting or removing the tube from its socket or while connecting or disconnecting the top cap connector.

THE EQUIPMENT MANUFACTURER SHOULD PROVIDE A WARNING LABEL IN AN APPROPRIATE POSITION ON THE EQUIPMENT TO ADVISE THE SERVICEMAN OF ALL PRECAUTIONS HEREIN.

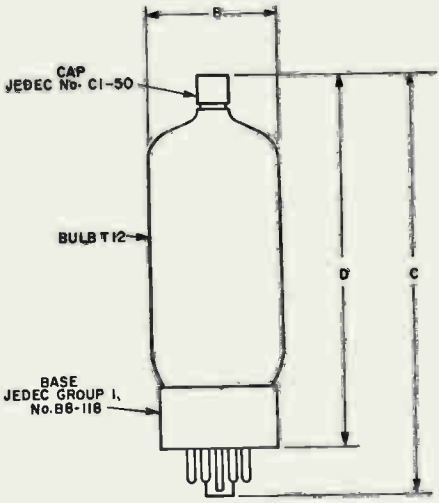
TERMINAL DIAGRAM – JEDEC 8NH – Bottom View

Pin 1: Cathode, Internal Shield
Pin 2: Heater
Pin 3: Do Not Use
Pin 4: Do Not Use
Pin 5: Grid
Pin 6: Grid
Pin 7: Heater
Pin 8: Do Not Use
Cap : Plate



Note: For new equipment design make grid connection to pin 6 only.

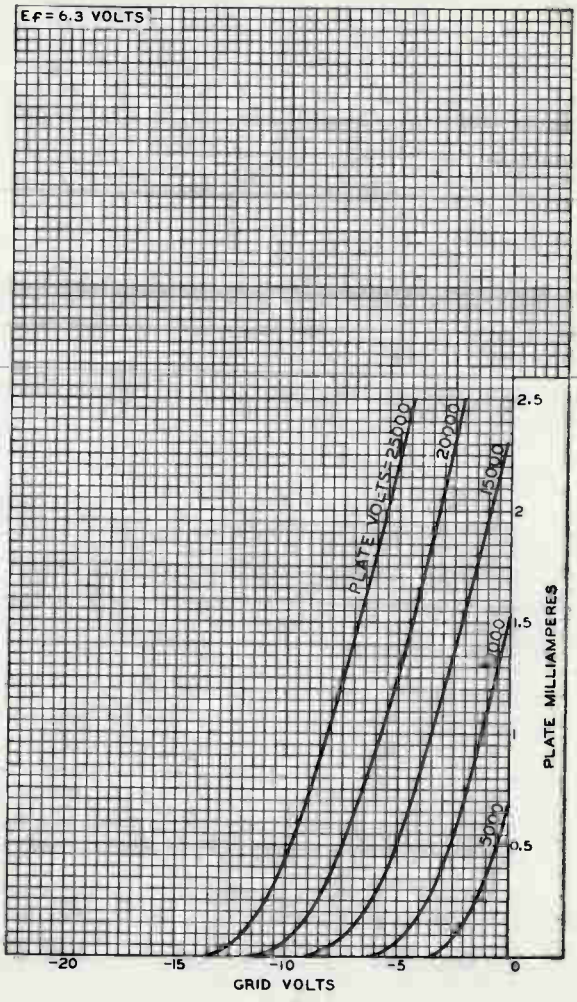
DIMENSIONAL OUTLINE



DIMENSION	INCHES			MILLIMETERS		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
B	1.438	–	1.562	36.6	–	39.6
C	–	–	5.00	–	–	127.0
D	4.0625	4.25	4.4375	103.2	108.0	112.7

MILLIMETER DIMENSION DERIVED FROM INCH DIMENSION

AVERAGE TRANSFER CHARACTERISTICS



92CM-8432RI

Diode—Remote-Cutoff Pentode

9-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	6.3 ± 10%	volts
Current at 6.3 volts	0.3	amp
Direct Interelectrode Capacitances:▲		
Pentode Unit:		
Grid No.1 to plate	0.002 max.	μμf
Grid No.1 to cathode, grid No.3, grid No.2, internal shield, and heater	5.5	μμf
Plate to cathode, grid No.3, grid No.2, internal shield, and heater	5	μμf
Pentode grid No.1 to diode plate	0.0015 max.	μμf
Pentode plate to diode plate	0.095	μμf

Characteristics, Class A_1 Amplifier (Pentode Unit):

Plate Voltage	100	volts
Grid No.3	*Connected to cathode at socket*	
Internal Shield	*Connected to cathode at socket*	
Grid-No.2 Voltage	100	volts
Grid-No.1 Supply Voltage	0	volts
Grid-No.1 Resistor (Bypassed)	2.2	megohms
Plate Resistance (Approx.)	0.25	megohm
Transconductance	3800	μmhos
Plate Current	9	ma
Grid-No.2 Current	3.5	ma
Grid-No.1 Voltage (Approx.) for transconductance (μmhos) = 40	-20	volts

Mechanical:

Operating 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"
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	9LQ

Pin 1 – Pentode Grid No.3
Pin 2 – Pentode Grid No.1
Pin 3 – Cathode
Pin 4 – Heater
Pin 5 – Heater

Pin 6 – Pentode Grid No.2
Pin 7 – Pentode Plate
Pin 8 – Diode Plate
Pin 9 – Internal Shield

PENTODE UNIT — AMPLIFIER — CLASS A_1

Maximum Ratings, *Design-Maximum Values:*

PLATE VOLTAGE	300	max.	volts
GRID-No.3 (SUPPRESSOR-GRID) VOLTAGE:			
Positive value	300	max.	volts
Negative value	300	max.	volts
GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE	300	max.	volts
GRID-No.2 VOLTAGE	*See Grid-No.2 Input Rating Chart at front of Receiving Tube Section*		
GRID-No.1 (CONTROL-GRID) VOLTAGE:			
Positive-bias value	0	max.	volts
Negative-bias value	50	max.	volts
GRID-No.3 INPUT	0.2	max.	watt
GRID-No.2 INPUT:			
For grid-No.2 voltages up to 150 volts	0.6	max.	watt
For grid-No.2 voltages between 150 and 300 volts	*See Grid-No.2 Input Rating Chart at front of Receiving Tube Section*		
PLATE DISSIPATION	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)	150	max.	°C

DIODE UNIT

Maximum Ratings, *Design-Maximum Values:*

PLATE CURRENT	1	max.	ma

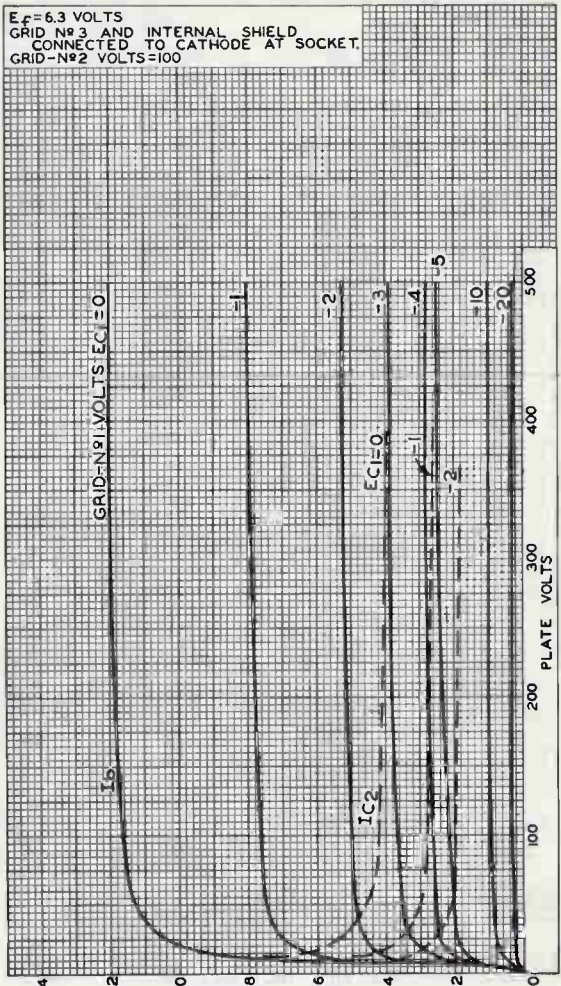
Characteristics, Instantaneous Test Condition:

Plate Current for plate volts = 10	2		ma

▲ Without external shield.

● The dc component must not exceed 100 volts.

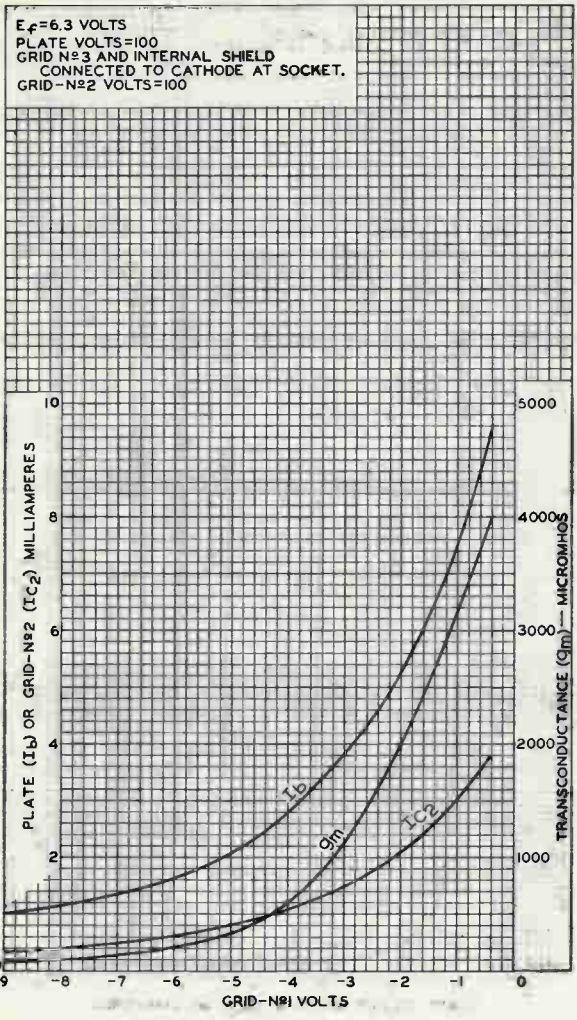
AVERAGE CHARACTERISTICS
Pentode Unit



92CM-10680

6EQ7

AVERAGE CHARACTERISTICS
Pentode Unit



92CM-10674

High-Mu Triode

7-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	6.3	volts
Current	0.18	amp
Direct Interelectrode Capacitances:		

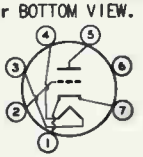
	Without External Shield	*With External Shield°*	
Grid to plate	0.38	0.36	μμf
Grid to cathode, internal shield, and heater	4.4	4.4	μμf
Plate to cathode, internal shield, and heater	3	4	μμf
Grid to heater	0.28 max.	0.28 max.	μμf
Plate to cathode	0.24	0.2•	μμf
Cathode to grid	3.1	3.1•	μμf
Heater to cathode	2.5	2.5•	μμf

Characteristics, Class A_1 Amplifier:

Plate Voltage	200	volts
Grid Voltage	-1.2	volts
Amplification Factor	80	
Plate Resistance (Approx.)	8000	ohms
Transconductance	10500	μmhos
Plate Current	10	ma
Grid Voltage (Approx.) for transconductance (μmhos) = 500	-3.8	volts
Grid Voltage (Approx.) for transconductance (μmhos) = 100	-5.6	volts

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	7FP



Pin 1 – Cathode
Pin 2 – Grid
Pin 3 – Heater
Pin 4 – Heater
Pin 5 – Plate
Pin 6 – Internal Shield
Pin 7 – Cathode

← Indicates a change.

6ER5

AMPLIFIER — Class A_1

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

PLATE VOLTAGE	250 max.	volts
GRID VOLTAGE:		
Negative-bias value	50 max.	volts
CATHODE CURRENT	20 max.	ma
PLATE DISSIPATION	2.2 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	100 max.	volts
Heater positive with respect to cathode	100 max.	volts

Maximum Circuit Values:

Grid-Circuit Resistance	1 max.	megohm

○ With external shield JEDEC No.316 connected to cathode except as noted.
● With external shield JEDEC No.316 connected to ground.

→ Indicates a change.

6ES5

High-Mu Triode

7-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:			
Voltage (AC or DC)	6.3 ± 10%		volts
Current at 6.3 volts	0.2		amp
Direct Interelectrode Capacitances:	*Without External Shield*	*With External Shield*[a]	
Grid to plate	0.5 max.	0.5 max.	μμf
Grid to cathode, internal shield, and heater	3.2	3.2	μμf
Plate to cathode, internal shield, and heater	3.2	4	μμf

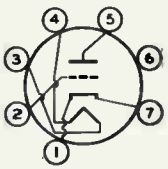
Characteristics, Class A_1 Amplifier:

Plate Voltage	200	volts
Grid Voltage	−1	volt
Amplification Factor	75	
Plate Resistance (Approx.)	8000	ohms
Transconductance	9000	μmhos
Plate Current	10	ma
Grid Voltage (Approx.) for plate μa = 100	−6	volts

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	7FP

Pin 1 – Cathode
Pin 2 – Grid
Pin 3 – Heater
Pin 4 – Heater



Pin 5 – Plate
Pin 6 – Internal Shield
Pin 7 – Cathode

AMPLIFIER — Class A_1

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

PLATE VOLTAGE	250 max.	volts
GRID VOLTAGE:		
Positive-bias value	0 max.	volts

CATHODE CURRENT	22 max.	ma
PLATE DISSIPATION	2.2 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	100 max.	volts
Heater positive with respect to cathode	100 max.	volts

Maximum Circuit Values:

Grid-Circuit Resistance	1 max.	megohm

[a] With external shield JEDEC No.316 connected to cathode.

Variable-Mu Twin Triode

9-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:			
Voltage (AC or DC)		6.3	volts
Current		0.365	amp
Direct Interelectrode Capacitances:			
	Without External Shield	*With External Shield*[a]	
Grid to plate (Each unit)	1.9	1.9	μμf
Plate to cathode (Each unit)	0.18	0.17	μμf
Heater to cathode (Each unit)	3	3[b]	μμf
Plate of unit No.2 to plate of unit No.1	0.04 max.	0.015 max.	μμf
Plate of unit No.2 to grid of unit No.1	0.003 max.	0.003 max.	μμf
Grid of unit No.1 to cathode of unit No.2	0.002 max.	0.002 max.	μμf

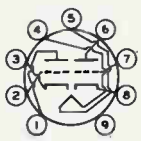
Characteristics, Class A_1 Amplifier (Each Unit):

Plate Voltage	90	90	90	volts
Grid Voltage	-1.2	-5	-9	volts
Plate Resistance (Approx.)	2500	–	–	ohms
Transconductance	12500	625	125	μmhos
Plate Current	15	–	–	ma

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	9AJ

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 – Internal Shield

AMPLIFIER — Cascode Type

Maximum Ratings, *Design-Center Values:*

PLATE SUPPLY VOLTAGE with plate current = 0.	550 max.	volts
PLATE VOLTAGE (Each Unit)	130 max.	volts
GRID VOLTAGE:		
Negative-bias value (Each Unit)	50 max.	volts
CATHODE CURRENT (Each Unit)	22 max.	ma
PLATE DISSIPATION (Each Unit)	1.8 max.	watts
HEATER-CATHODE VOLTAGE:		
Unit No. 1:[c]		
RMS voltage between cathode and heater	50 max.	volts
Unit No. 2:[d]		
RMS voltage between cathode and heater[e]	50 max.	volts
DC voltage between cathode and heater[e]	130 max.	volts

Typical Operation:

In a cascode-type circuit with the grid of the output unit connected to a voltage divider[f]

Supply Voltage	180	volts
Plate Current	15	ma
Transconductance	12500	μmhos
Noise Figure[g]	6.5	db
Grid Voltage (Approx.) for transconductance (μmhos) = 125	−9	volts
Input Voltage for cross-modulation factor = 0.01 and transconductance (μmhos) = 125	500	millivolts

Maximum Circuit Values:

Grid-Circuit Resistance (Each Unit)	1 max.	megohm

[a] With external shield JEDEC No. 315 connected to cathode of unit under test except as noted.

[b] With external shield JEDEC No. 315 connected to ground.

[c] Grounded-cathode input unit—pins 6, 7, and 8.

[d] Grounded-grid output unit—pins 1, 2, and 3.

[e] Cathode positive with respect to heater.

[f] In order not to exceed the maximum-rated plate voltage when the cascode-type amplifier is controlled, it is necessary to use a voltage divider for the grid of the grounded-grid output unit.

[g] Measured with tube operating in a television tuner.

High-Mu Twin Triode

9-PIN MINIATURE TYPE

For High-Fidelity Audio-Amplifier Applications Critical as to Noise and Hum

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:		
Voltage (AC or DC)	6.3 ± 10%	volts
Current at 6.3 volts	0.3	amp
Direct Interelectrode Capacitances (Each Unit, Approx.):		
Grid to plate	1.5	μμf
Grid to cathode and heater	1.6	μμf
Plate to cathode and heater	0.2	μμf

Equivalent Noise and Hum Voltage (Referenced to Grid, Each Unit):

Average Value (RMS) . . . . . 1.8 μvolts

Measured in "true rms" units under the following conditions: Heater volts (AC)= 6.3; center-tap of heater transformer connected to ground; plate supply volts (DC)= 250; plate load resistor (megohms)= 0.1; cathode resistor (ohms)= 2700; cathode bypass capacitor (μf)= 100; grid resistor (ohms)= 0; amplifier frequency range 25 to 10000 cps.

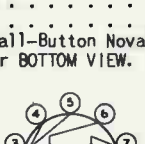
Characteristics, Class A$_1$ Amplifier (Each Unit):

Plate Voltage	100	250	volts
Grid Voltage	−1	−2	volts
Amplification Factor	100	100	
Plate Resistance (Approx.)	80000	62500	ohms
Transconductance	1250	1600	μmhos
Plate Current	0.5	1.2	ma

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	9LS

Pin 1 – Heater
Pin 2 – Heater
Pin 3 – No Connection
Pin 4 – Cathode of Unit No.2
Pin 5 – Grid of Unit No.2



Pin 6 – Plate of Unit No.2
Pin 7 – Plate of Unit No.1
Pin 8 – Grid of Unit No.1
Pin 9 – Cathode of Unit No.1

AMPLIFIER — Class A1

Values are for Each Unit

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

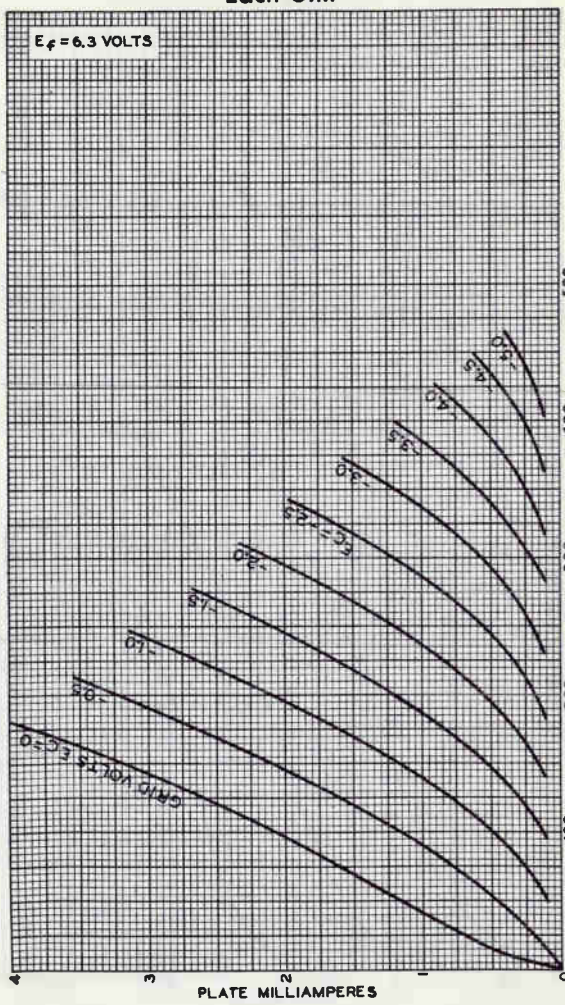
PLATE VOLTAGE	330	max.	volts
GRID VOLTAGE:			
Negative-bias value	55	max.	volts
Positive-bias value	0	max.	volts
PLATE DISSIPATION	1.2	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200▲	max.	volts

Typical Operation as Resistance-Coupled Amplifier:

See RESISTANCE-COUPLED-AMPLIFIER CHART No. 25 at front of this Section

▲ The dc component must not exceed 100 volts.

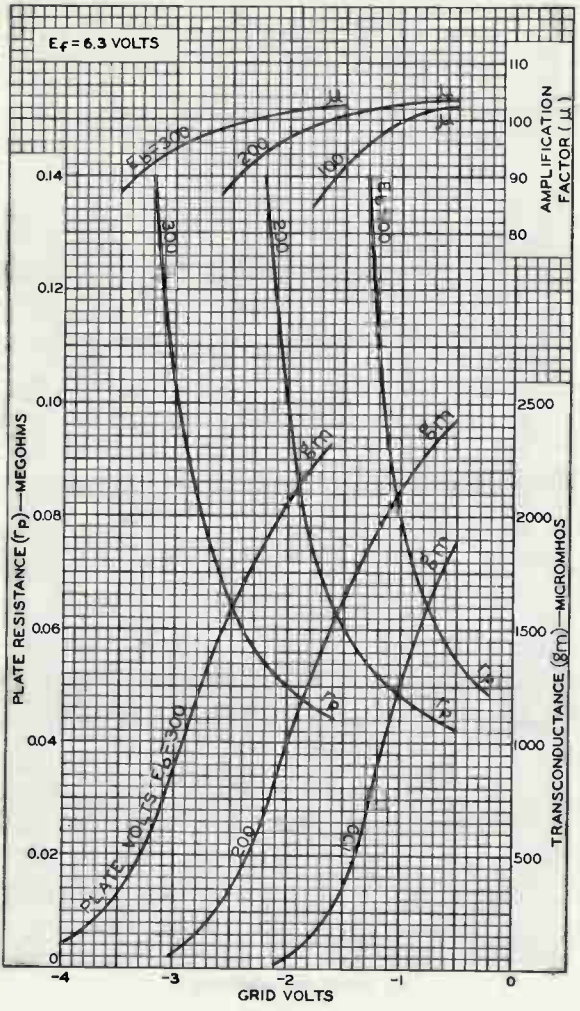
AVERAGE PLATE CHARACTERISTICS
Each Unit



92CM-10470

6EU7

AVERAGE CHARACTERISTICS
Each Unit



92CM-10471

Medium-Mu Triode—Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

With Heater Having Controlled Warm-Up Time

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:			
Voltage (AC or DC)	6.3		volts
Current	0.45 ± 6%		amp
Warm-up time (Average)	11		sec
Direct Interelectrode Capacitances:	*Without External Shield*	*With External Shield*[a]	
Triode Unit:			
Grid to plate	1.7	1.7	μμf
Grid to cathode and heater	3	3.2	μμf
Plate to cathode and heater	1.6	1.1	μμf
Pentode Unit:			
Grid No.1 to plate	0.02 max.	0.1 max.	μμf
Grid No.1 to cathode & grid No.3 & internal shield, grid No.2, and heater	5	5	μμf
Plate to cathode & grid No.3 & internal shield, grid No.2, and heater	2.6	3.4	μμf
Heater to cathode (Each unit)	3.6	3.6[b]	μμf

Characteristics, Class A_1 Amplifier:

	Triode Unit	*Pentode Unit*	
Plate Supply Voltage	150	125	volts
Grid-No.2 Supply Voltage	–	125	volts
Grid-No.1 Voltage	–	-1	volt
Cathode Resistor	56	–	ohms
Amplification Factor	40	–	
Plate Resistance (Approx.)	5000	80000	ohms
Transconductance	8500	6400	μmhos
Plate Current	18	12	ma
Grid-No.2 Current	–	4	ma
Grid-No.1 Voltage (Approx.) for plate μa = 10	-12	-9	volts
Cathode Warm-Up Time[c]	35	–	sec

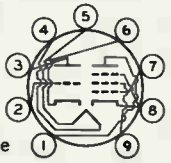
Mechanical:

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"

6EU8

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. 9JF

Pin 1 – Pentode Plate
Pin 2 – Triode Grid
Pin 3 – Triode Plate
Pin 4 – Heater
Pin 5 – Heater
Pin 6 – Triode Cathode



Pin 7 – Pentode Grid No.1
Pin 8 – Pentode Cathode, Grid No.3, Internal Shield
Pin 9 – Pentode Grid No.2

AMPLIFIER — Class A_1

Maximum Ratings, *Design-Center Values:*

	Triode Unit	*Pentode Unit*	
PLATE VOLTAGE	330 max.	330 max.	volts
GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE	–	330 max.	volts
GRID-No.2 VOLTAGE	–	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
GRID-No.1 (CONTROL-GRID) VOLTAGE: Positive-bias value	0 max.	0 max.	volts
GRID-No.2 INPUT: For grid-No.2 voltages up to 165 volts	–	0.55 max.	watt
For grid-No.2 voltages between 165 and 330 volts	–	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
PLATE DISSIPATION	3 max.	3.1 max.	watts
PEAK HEATER-CATHODE VOLTAGE: Heater negative with respect to cathode	200 max.	200 max.	volts
Heater positive with respect to cathode	200[d] max.	200[d] max.	volts

Maximum Circuit Values:

	Triode Unit	*Pentode Unit*	
Grid-No.1-Circuit Resistance	0.1 max.	0.1 max.	megohm

[a] With external shield JEDEC No.315 connected to cathode of unit under test except as noted.

[b] With external shield JEDEC No.315 connected to ground.

[c] The time required for the transconductance to reach 6500 μmhos when the tube is operated from a cold start with dc plate volts = 100, grid volts = 0, and heater volts = 5.5.

[d] The dc component must not exceed 100 volts.

Sharp-Cutoff Tetrode

7-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

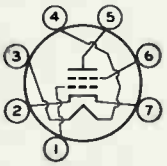
Heater, for Unipotential Cathode:		
Voltage (AC or DC)	6.3 ± 10%	volts
Current at 6.3 volts	0.2	amp
Direct Interelectrode Capacitances:[a]		
Grid No.1 to plate	0.035 max.	μμf
Grid No.1 to cathode & internal shield, grid No.2, and heater	4.50	μμf
Plate to cathode & internal shield, grid No.2, and heater	2.90	μμf

Characteristics, Class A_1 Amplifier:

Plate Voltage	250	volts
Grid-No.2 Voltage	80	volts
Grid-No.1 Voltage	-1	volt
Plate Resistance (Approx.)	0.15	megohm
Transconductance	8800	μmhos
Plate Current	11.5	ma
Grid-No.2 Current	0.9	ma
Grid-No.1 Voltage (Approx.) for transconductance (μmhos) = 100	-4.5	volts

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	7EW



Pin 1 - Grid No.1
Pin 2 - Cathode, Internal Shield
Pin 3 - Heater
Pin 4 - Heater
Pin 5 - Plate
Pin 6 - Grid No.2
Pin 7 - Cathode, Internal Shield

AMPLIFIER — Class A_1

Maximum Ratings, *Design-Maximum Values:*

PLATE VOLTAGE	275 max.	volts
GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE	180 max.	volts
GRID-No.2 VOLTAGE	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	

GRID-No.1 (CONTROL-GRID) VOLTAGE:			
Positive-bias value.	0	max.	volts
CATHODE CURRENT.	20	max.	ma
GRID-No.2 INPUT:			
For grid-No.2 voltages up to 90 volts. .	0.2	max.	watt
For grid-No.2 voltages between 90 and 180 volts.	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section		
PLATE DISSIPATION.	3.25	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode.	100	max.	volts
Heater positive with respect to cathode.	100[b]	max.	volts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance	0.5	max.	megohm

[a] With external shield JEDEC No.316 connected to cathode.
[b] The dc component must not exceed 50 volts.

6EW6

SHARP-CUTOFF PENTODE

7-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	6.3 ± 10%	volts
Current	0.4	amp

Direct Interelectrode Capacitances:

	Without External Shield	With External Shield[D]	
Grid No.1 to plate	0.04 max.	0.03 max.	μμf
Grid No.1 to cathode, grid No.3 & internal shield, grid No.2, and heater	10	10	μμf
Plate to cathode, grid No.3 & internal shield, grid No.2, and heater	2.4	3.4	μμf

Characteristics, Class A_1 Amplifier:

Plate Supply Voltage	125	volts
Grid No.3	*Connected to cathode at socket*	
Grid-No.2 Supply Voltage	125	volts
Cathode Resistor	56	ohms
Plate Resistance (Approx.)	0.2	megohm
Transconductance	14000	μmhos
Plate Current	11	ma
Grid-No.2 Current	3.2	ma
Grid-No.1 Voltage (Approx.) for plate μa = 20	-3.5	volts

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	7CM

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, Internal Shield

RCA

6EW6

SHARP-CUTOFF PENTODE

AMPLIFIER — Class A_1

Maximum Ratings, *Design-Maximum Values:*

PLATE VOLTAGE	330 max.	volts
GRID-No.3 (SUPPRESSOR-GRID) VOLTAGE	0 max.	volts
GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE	330 max.	volts
GRID-No.2 VOLTAGE	*See Grid-No.2 Input Rating Chart at front of Receiving Tube Section*	
GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Positive-bias value	0 max.	volts
GRID-No.2 INPUT:		
For grid-No.2 voltages up to 165 volts	0.65 max.	watt
For grid-No.2 voltages between 165 and 330 volts	*See Grid-No.2 Input Rating Chart at front of Receiving Tube Section*	
PLATE DISSIPATION	3.1 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200▲max.	volts

o With external shield JEDEC No.316 connected to cathode.

▲ The dc component must not exceed 100 volts.

6EW6

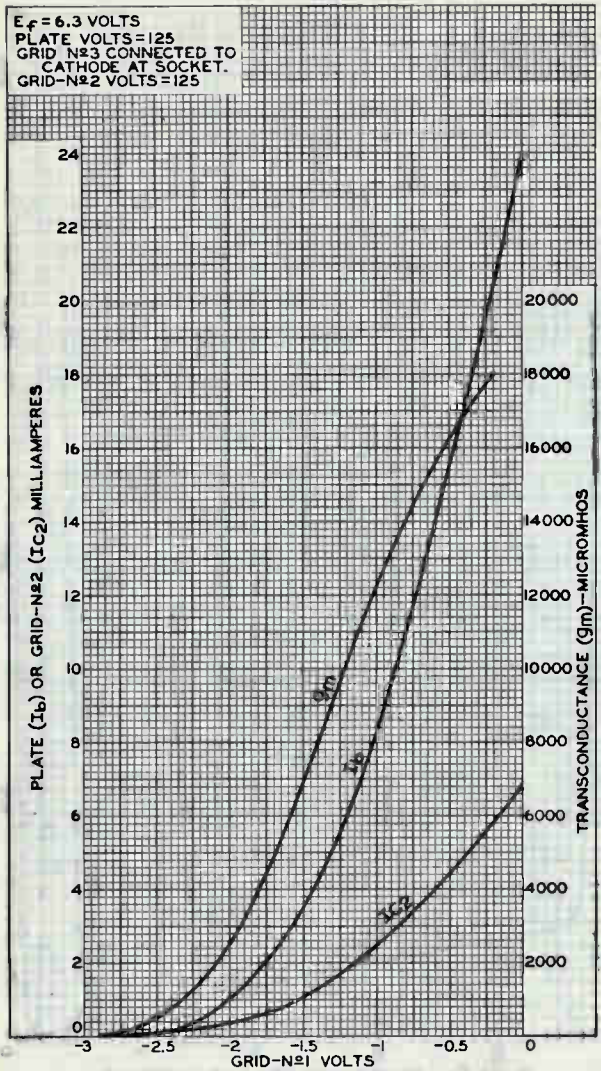
AVERAGE CHARACTERISTICS

ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY
92CM-9968

6EW6

6EW6

AVERAGE CHARACTERISTICS



6EW7

Dual Triode

With Medium-Mu Unit and Low-Mu Unit

NEONOVAL TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:			
Voltage (AC or DC)	6.3 ± 10%		volts
Current at 6.3 volts	0.9		amp
Direct Interelectrode Capacitances (Approx.):[a]			
	Unit No.1	*Unit No.2*	
Grid to plate	4.2	9	μμf
Grid to cathode and heater	2.2	7	μμf
Plate to cathode and heater	0.4	1.2	μμf

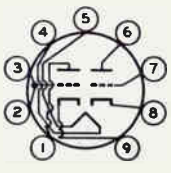
Characteristics, Class A_1 Amplifier:

	Unit No.1	*Unit No.2*	
Plate Voltage	250	150	volts
Grid Voltage	−11	−17.5	volts
Amplification Factor	17.5	6	
Plate Resistance (Approx.)	8750	800	ohms
Transconductance	2000	7500	μmhos
Plate Current	5.5	45	ma
Plate Current for plate volts = 60 and grid volts = 0	–	95	ma
Plate Current for grid volts = −25	–	8	ma
Grid Voltage (Approx.) for plate μa = 10	−20	–	volts
Grid Voltage (Approx.) for plate μa = 100	–	−40	volts

Mechanical:

Operating Position	Any
Maximum Overall Length	2.93"
Maximum Seated Length	2.62"
Length, Base Seat to Bulb Top (Excluding tip)	2.07" to 2.31"
Diameter	1.062" to 1.188"
Bulb	T9
Base	Large-Button Neonoval 9-Pin (JEDEC No.E9-68)
Basing Designation for BOTTOM VIEW	9HF

Pin 1 – Plate of Unit No.2
Pin 2 – Grid of Unit No.2
Pin 3 – Grid 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 – Cathode of Unit No.2

VERTICAL-DEFLECTION OSCILLATOR

Values are for Unit No.1

Maximum Ratings, *Design-Maximum Values:*

For operation in a 525-line, 30-frame system[b]

DC PLATE VOLTAGE	330	max.	volts
PEAK NEGATIVE-PULSE GRID VOLTAGE	400	maax.	volts
CATHODE CURRENT:			
Peak	77	max.	ma
Average	22	max.	ma
PLATE DISSIPATION	1.5	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200[c]	max.	volts

Maximum Circuit Values:

Grid-Circuit Resistance:			
For grid-resistor-bias or cathode-bias operation	2.2	max.	megohms

VERTICAL-DEFLECTION AMPLIFIER

Values are for Unit No.2

Maximum Ratings, *Design-Maximum Values:*

For operation in a 525-line, 30-frame system[b]

DC PLATE VOLTAGE	330	max.	volts
PEAK POSITIVE-PULSE PLATE VOLTAGE[d]	1500	max.	volts
PEAK NEGATIVE-PULSE GRID VOLTAGE	250	max.	volts
CATHODE CURRENT:			
Peak	175	max.	ma
Average	50	max.	ma
PLATE DISSIPATION	10	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200[c]	max.	volts

Maximum Circuit Values:

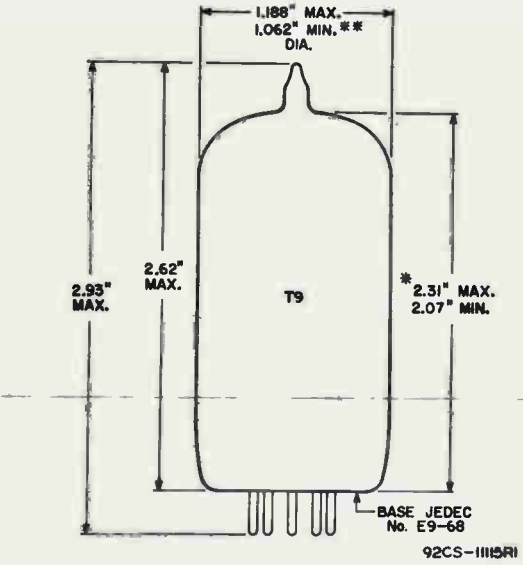
Grid-Circuit Resistance:			
For grid-resistor-bias or cathode-bias operation	2.2	max.	megohms

[a] Without external shield.

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

[c] The dc component must not exceed 100 volts.

[d] This rating is applicable where the duration of the voltage pulse does not exceed 15 per cent of one vertical scanning cycle. In a 525-line, 30-frame system, 15 per cent of one vertical scanning cycle is 2.5 milliseconds.

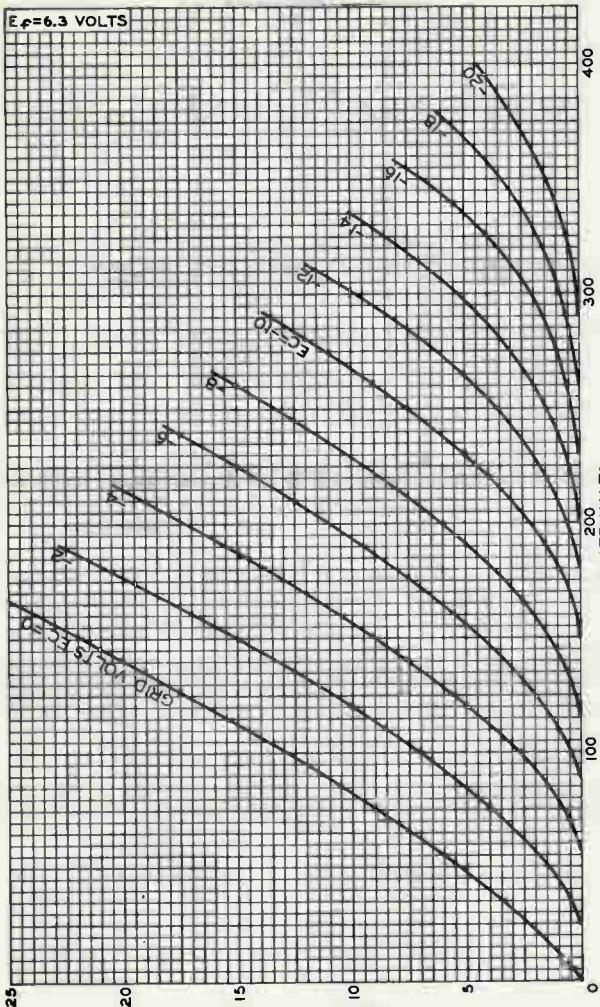


* MEASURED FROM BASE SEAT TO BULB-TOP LINE AS DETERMINED BY A RING GAUGE OF 0.600" INTERNAL DIAMETER.

** APPLIES IN ZONE STARTING 0.375" FROM BASE SEAT.

6EW7

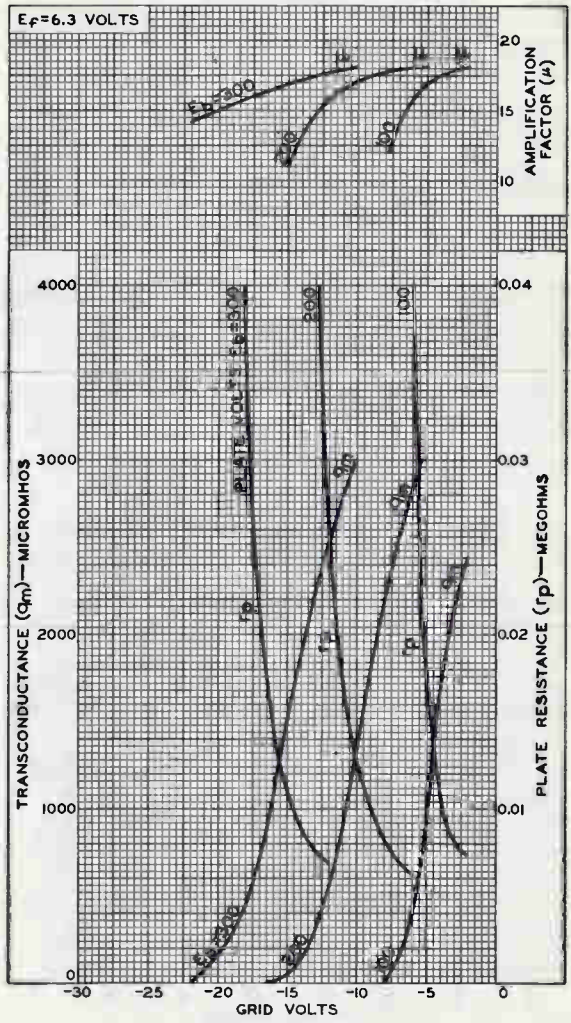
AVERAGE PLATE CHARACTERISTICS
Unit No.1



92CM-9988

RADIO CORPORATION OF AMERICA
Electron Tube Division
Harrison, N. J.

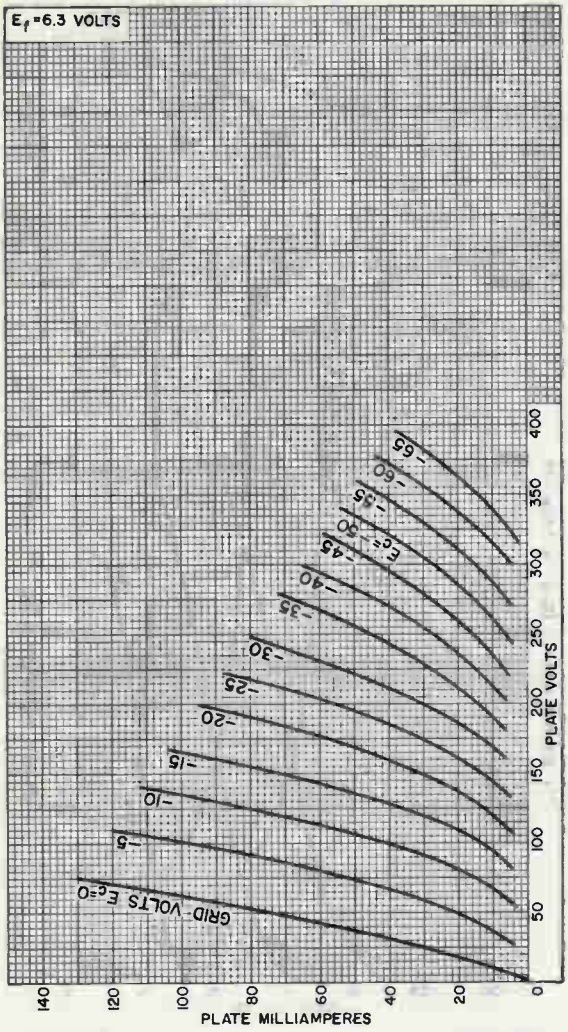
AVERAGE CHARACTERISTICS
Unit No.1



92CM-9991

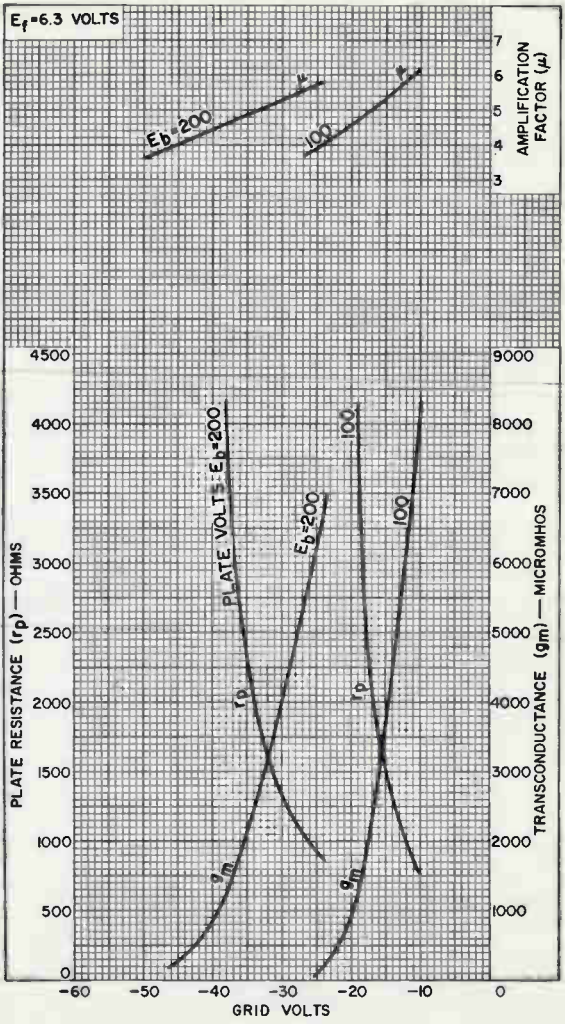
6EW7

AVERAGE PLATE CHARACTERISTICS
Unit No.2



92CM—IIIII

AVERAGE CHARACTERISTICS
Unit No.2



92CM-11113

High-Mu Triple Triode

9-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:			
Voltage (AC or DC)		6.3 ± 10%	volts
Current at 6.3 volts		0.45	amp
Direct Interelectrode Capacitances (Approx.):			
	Without External Shield	*With External Shield*[a]	
Grid to plate (Each Unit)	1.5	1.5	μμf
Grid of unit No.1 to cathode of unit No.1 & cathode of unit No.2, and heater	2.4	2.6	μμf
Grid of unit No.2 to cathode of unit No.2 & cathode of unit No.1, and heater	2.4	2.6	μμf
Grid of unit No.3 to cathode of unit No.3 and heater	2.4	2.6	μμf
Plate of unit No.1 to cathode of unit No.1 & cathode of unit No.2, and heater	0.21	1.4	μμf
Plate of unit No.2 to cathode of unit No.2 & cathode of unit No.1, and heater	0.4	1.2	μμf
Plate of unit No.3 to cathode of unit No.3 and heater	0.36	1.2	μμf
Heater of unit No.3 to cathode of unit No.3	0.17	0.15[b]	μμf

Characteristics, Class A_1 Amplifier (Each Unit):

Plate Voltage	125	volts
Grid Voltage	−1	volt
Amplification Factor	57	
Plate Resistance (Approx.)	13600	ohms
Transconductance	4200	μmhos
Plate Current	4.2	ma
Grid Voltage (Approx.) for plate μa = 20	−4	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)

6EZ8

Basing Designation for BOTTOM VIEW. 9KA

Pin 1 – Cathode of Unit No.3
Pin 2 – Grid of Unit No.3
Pin 3 – Plate of Unit No.3
Pin 4 – Cathode of Unit No.2, Cathode of Unit No.1, Heater

Pin 5 – Heater
Pin 6 – Plate of Unit No.2
Pin 7 – Grid of Unit No.2
Pin 8 – Plate of Unit No.1
Pin 9 – Grid of Unit No.1

AMPLIFIER — Class A_1

Unless Otherwise Specified, Values are for Each Unit

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

PLATE VOLTAGE	330 max.	volts
GRID VOLTAGE:		
Negative-bias value	50 max.	volts
Positive-bias value	0 max.	volts
PLATE DISSIPATION	2 max.	watts
TOTAL PLATE DISSIPATION (ALL PLATES)	5 max.	watts
HEATER-CATHODE VOLTAGE (Unit No.3):		
Heater negative with respect to cathode	100 max.	volts
Heater positive with respect to cathode	100 max.	volts

[a] With external shield JEDEC No.315 connected to cathode of unit under test except as noted.

[b] With external shield JEDEC No.315 connected to ground.

Diode—Sharp-Cutoff Twin-Plate Tetrode

9-PIN MINIATURE TYPE

For Frequency-Divider and Complex-Wave-Generator Circuits of Electronic Musical Instruments

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	6.3 ± 10%	volts
Current at 6.3 volts	0.3	amp
Direct Interelectrode Capacitances:▲		
Tetrode Unit:		
Grid No.1 to plate A	0.04	μμf
Grid No.1 to plate B	0.03 max.	μμf
Grid No.1 to cathode & internal shield, grid No.2, and heater	5.5	μμf
Plate A to cathode & internal shield, grid No.2, and heater	1.8	μμf
Plate B to cathode & internal shield, grid No.2, and heater	1.8	μμf
Tetrode grid No.1 to diode plate	0.022	μμf
Tetrode plate A to diode plate	0.02 max.	μμf
Tetrode plate B to diode plate	0.055	μμf

Characteristics, Class A_1 Amplifier (Tetrode Unit):

Plates A and B connected together

Plate Voltage	100	volts
Grid-No.2 Voltage	100	volts
Grid-No.1 Supply Voltage	0	volts
Grid-No.1 Resistor (Bypassed)	2.2	megohms
Plate Resistance (Approx.)	90000	ohms
Transconductance	3200	μmhos
Plate Current	3.8	ma
Grid-No.2 Current	1.7	ma
Grid-No.1 Voltage (Approx.) for plate μa = 20	−4	volts

Using either Plate A or B, with plate not in use connected to ground

Plate Voltage	100	volts
Grid-No.2 Voltage	100	volts
Grid-No.1 Supply Voltage	0	volts
Grid-No.1 Resistor (Bypassed)	2.2	megohms
Plate Resistance (Approx.)	130000	ohms
Transconductance	1900	μmhos
Plate Current	2.2	ma
Grid-No.2 Current	3	ma

Mechanical:

Operating Position	Any
Maximum Overall Length	2-5/8"
Maximum Seated Length	2-3/8"

6FA7

Length, Base Seat to Bulb Top (Excluding tip)	2" ± 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	9MR

Pin 1 – Tetrode Plate B
Pin 2 – No Connection
Pin 3 – Diode Plate
Pin 4 – Heater
Pin 5 – Heater

Pin 6 – Cathode, Internal Shield
Pin 7 – Tetrode Grid No.1
Pin 8 – Tetrode Grid No.2
Pin 9 – Tetrode Plate A

FREQUENCY-DIVIDER & COMPLEX-WAVE-GENERATOR SERVICE

TETRODE UNIT

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

PLATE A VOLTAGE	330	max.	volts
PLATE B VOLTAGE	330	max.	volts
GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE	330	max.	volts
GRID-No.2 VOLTAGE	See *Grid-No.2 Input Rating Chart at front of Receiving Tube Section*		
GRID-No.1 (CONTROL-GRID) VOLTAGE:			
Negative-bias value	50	max.	volts
Positive-bias value	0	max.	volts
GRID-No.2 INPUT:			
For grid-No.2 voltages up to 165 volts	0.65	max.	watt
For grid-No.2 voltages between 165 and 330 volts	See *Grid-No.2 Input Rating Chart at front of Receiving Tube Section*		
PLATE A DISSIPATION	1.5	max.	watts
PLATE B DISSIPATION	1.5	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200●	max.	volts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:			
For grid-No.1-resistor-bias operation	2.2	max.	megohms

DIODE UNIT

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

PLATE CURRENT	1	max.	ma

Characteristics, Instantaneous Test Condition:

Plate Current for plate volts = 10	2	ma

▲ Without external shield.

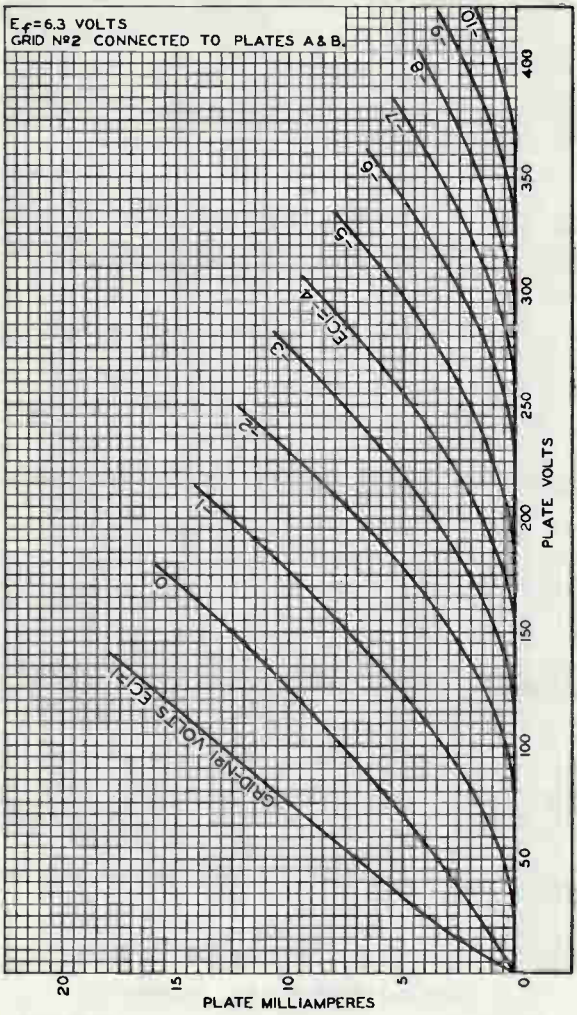
● The dc component must not exceed 100 volts.

AVERAGE CHARACTERISTICS
Tetrode Unit

92CM-10693

6FA7

AVERAGE PLATE CHARACTERISTICS
Tetrode Unit—Triode Connection



92CM-10695

Dual Triode

With High-Mu Unit and Low-Mu Unit

GENERAL DATA

Electrical:

Heater Characteristics and Ratings *(Design-Maximum Values):*			
Voltage (AC or DC)	6.3 ± 0.6		volts
Current at heater volts = 6.3	0.925		amp
Peak heater-cathode voltage (Each unit):			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200[a]	max.	volts

Direct Interelectrode Capacitances (Approx.):[b]

	Unit No.1	*Unit No.2*	
Grid to plate	4.5	10	μμf
Grid to cathode and heater	2.2	6.5	μμf
Plate to cathode and heater	0.4	1.2	μμf

Characteristics, Class A$_1$ Amplifier:

	Unit No.1	*Unit No.2*		
Plate Voltage	250	60	150	volts
Grid Voltage	-3	0	-17.5	volts
Amplification Factor	64	–	6	
Plate Resistance (Approx.)	40000	–	800	ohms
Transconductance	1600	–	7500	μmhos
Plate Current	1.4	95[c]	40	ma
Grid Voltage (Approx.) for plate μa =.				
10	-5.5	–	–	volts
100.	–	–	-40	volts
Transconductance for plate ma. = 1.	–	–	500	μmhos
Plate Current for grid volts = -25	–	–	6	ma

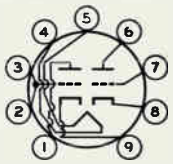
Mechanical:

Operating Position	Any
Type of Cathodes	Coated Unipotential
Maximum Overall Length	2.900"
Maximum Seated Length	2.620"
Length, Base Seat to Bulb Top (Excluding tip)	2.070" to 2.310"
Diameter	1.062" to 1.188"
Bulb	T9
Base	JEDEC No.E9-82

6FD7

Basing Designation for BOTTOM VIEW. 9HF

Pin 1 – Plate of Unit No.2
Pin 2 – Grid of Unit No.2
Pin 3 – Grid 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 – Cathode of Unit No.2

VERTICAL-DEFLECTION OSCILLATOR

Values are for Unit No.1

Maximum Ratings, *Design-Maximum Values:*

For operation in a 525-line, 30-frame system[d]

DC PLATE VOLTAGE	330 max.	volts
PEAK NEGATIVE-PULSE GRID VOLTAGE	400 max.	volts
CATHODE CURRENT:		
Peak	70 max.	ma
Average	20 max.	ma
PLATE DISSIPATION	1.5 max.	watts

Maximum Circuit Values:

Grid-Circuit Resistance:		
For grid-resistor-bias or cathode-bias operation	2.2 max.	megohms

VERTICAL-DEFLECTION AMPLIFIER

Values are for Unit No.2

Maximum Ratings, *Design-Maximum Values:*

For operation in a 525-line, 30-frame system[d]

DC PLATE VOLTAGE	330 max.	volts
PEAK POSITIVE-PULSE PLATE VOLTAGE[e]	1500 max.	volts
PEAK NEGATIVE-PULSE GRID VOLTAGE	250 max.	volts
CATHODE CURRENT:		
Peak	175 max.	ma
Average	50 max.	ma
PLATE DISSIPATION	10 max.	watts

Maximum Circuit Values:

Grid-Circuit Resistance:		
For grid-resistor-bias or cathode-bias operation	2.2 max.	megohms

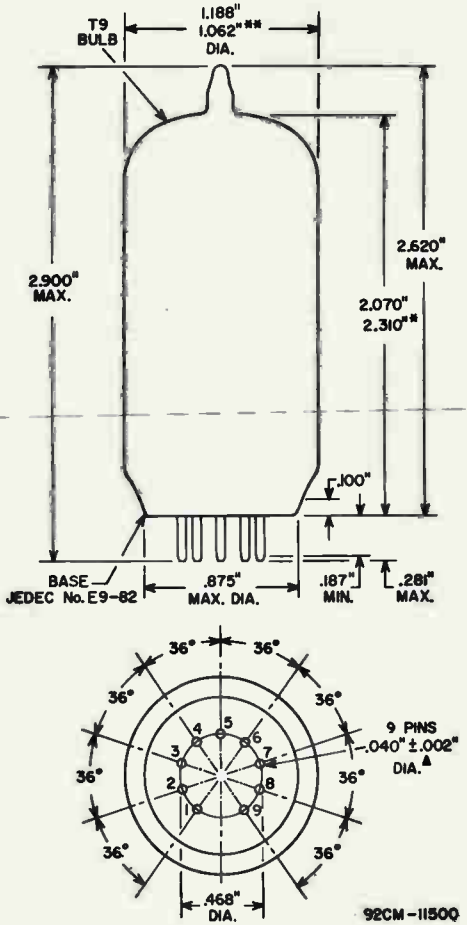
[a] The dc component must not exceed 100 volts.

[b] Without external shield.

[c] This value can be measured by a method involving a recurrent wave form such that the maximum ratings of the tube will not be exceeded

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

[e] This rating is applicable when the duration of the voltage pulse does not exceed 15 per cent of one vertical scanning cycle. In a 525-line, 30-frame system, 15 per cent of one vertical scanning cycle is 2.5 milliseconds.



** APPLIES IN ZONE STARTING D.625" FROM BASE SEAT.

* MEASURED FROM BASE SEAT TO BULB-TOP LINE AS DETERMINED BY A RING GAUGE OF 0.600" INSIDE DIAMETER.

▲ BASE-PIN CONTOUR AND GAUGE (JEDEC No. GE9-4) INFORMATION FOR THIS BASE IS THE SAME AS THAT SHOWN IN GENERAL SECTION FOR BASE JEDEC No. E9-6B (LARGE-BUTTON NEONOVAL 9-PIN).

Medium-Mu Triode—Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

With Heater Having Controlled Warm-Up Time

GENERAL DATA

Electrical:

Heater Characteristics and Ratings *(Design-Maximum Values):*

Voltage (AC or DC) . . .	6.3[a]	6.3 ± 0.6	volts
Current.	0.450 ± 0.030	0.450[b]	amp
Warm-up time (Average) .	11	–	sec
Peak heater-cathode voltage (Each unit):			
Heater negative with respect to cathode .	200 max.		volts
Heater positive with respect to cathode .	200[c] max.		volts

Direct Interelectrode Capacitances:

	Without External Shield	*With External Shield[d]*	
Triode Unit:			
Grid to plate.	1.8	1.8	μμf
Grid to cathode & pentode grid No.3, and heater. . .	3	3	μμf
Plate to cathode & pentode grid No.3, and heater. . .	1.3	1.9	μμf
Pentode Unit:			
Grid No.1 to plate	0.02 max.	0.01 max.	μμf
Grid No.1 to cathode & grid No.3, grid No.2, and heater	5	5	μμf
Plate to cathode & grid No.3, grid No.2, and heater	2.4	3.4	μμf
Heater to cathode & pentode grid No.3.	6	6[e]	μμf

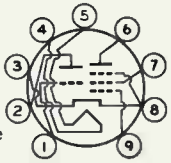
Characteristics, Class A_1 Amplifier:

	Triode Unit	*Pentode Unit*		
Plate Voltage.	125	100	125	volts
Grid-No.2 Voltage.	–	100	125	volts
Grid-No.1 Voltage.	−1	0	−1	volts
Amplification Factor	43	–	–	
Plate Resistance (Approx.) . .	5700	–	180000	ohms
Transconductance	7500	7400	6000	μmhos
Plate Current.	13	–	11	ma
Grid-No.2 Current.	–	–	4	ma
Grid-No.1 Voltage (Approx.) for plate μa = 30.	−6.5	–	−7.5	volts

6FG7

Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
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	9GF



Pin 1 – Triode Grid
Pin 2 – Triode Plate
Pin 3 – Cathode
Pin 4 – Heater
Pin 5 – Heater
Pin 6 – Pentode Plate
Pin 7 – Pentode Grid No.2
Pin 8 – Cathode, Pentode Grid No.3
Pin 9 – Pentode Grid No.1

AMPLIFIER — Class A_1

Maximum Ratings, *Design-Maximum Values:*

	Triode Unit	*Pentode Unit*	
PLATE VOLTAGE	330 max.	330 max.	volts
GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE	–	330 max.	volts
GRID-No.2 VOLTAGE	–	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
GRID-No.1 (CONTROL-GRID) VOLTAGE: Positive-bias value	0 max.	0 max.	volts
GRID-No.2 INPUT: For grid-No.2 voltages up to 165 volts	–	0.55 max.	watt
For grid-No.2 voltages between 165 and 330 volts	–	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
PLATE DISSIPATION	2.5 max.	3 max.	watts

[a] At heater amperes = 0.450.
[b] At heater volts = 6.3.
[c] The dc component must not exceed 100 volts.
[d] With external shield JEDEC No.315 connected to cathode except as noted.
[e] With external shield JEDEC No.315 connected to ground.

6FH5

High-Mu Triode

7-PIN MINIATURE TYPE

For VHF Tuner and Amplifier Applications

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:			
Voltage (AC or DC)		6.3 ± 10%	volts
Current at 6.3 volts		0.2	amp
Direct Interelectrode Capacitances:			
	Without External Shield	*With External Shield*[o]	
Grid to plate	0.6 max.	0.6 max.	μμf
Grid to cathode, internal shield, and heater	3.2	3.2	μμf
Plate to cathode, internal shield, and heater	3.2	4	μμf

Characteristics, Class A_1 Amplifier:

Plate Voltage	135	volts
Grid Voltage	−1	volt
Amplification Factor	50	
Plate Resistance (Approx.)	5600	ohms
Transconductance	9000	μmhos
Plate Current	11	ma
Grid Voltage (Approx.) for plate μa = 100	−5.5	volts

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	7FP

Pin 1 – Cathode
Pin 2 – Grid
Pin 3 – Heater
Pin 4 – Heater
Pin 5 – Plate
Pin 6 – Internal Shield
Pin 7 – Cathode

AMPLIFIER — Class A1

Maximum Ratings, *Design-Maximum Values:*

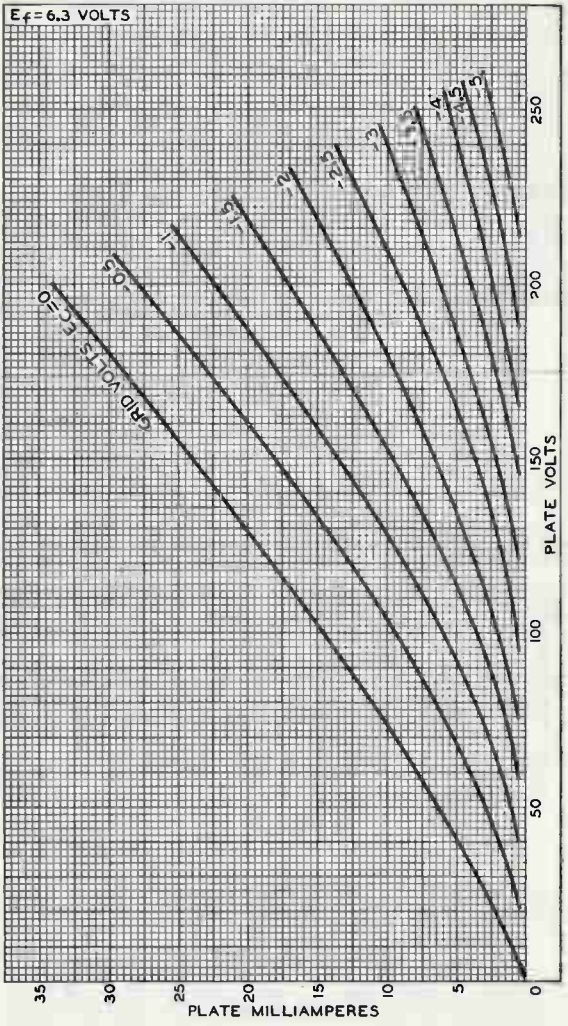
PLATE VOLTAGE	150 max.	volts
GRID VOLTAGE:		
Positive-bias value	0 max.	volts
CATHODE CURRENT	22 max.	ma
PLATE DISSIPATION	2.2 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	100 max.	volts
Heater positive with respect to cathode	100 max.	volts

Maximum Circuit Values:

Grid-Circuit Resistance:		
For cathode-bias operation	1 max.	megohm

○ With external shield JEDEC No.916 connected to cathode.

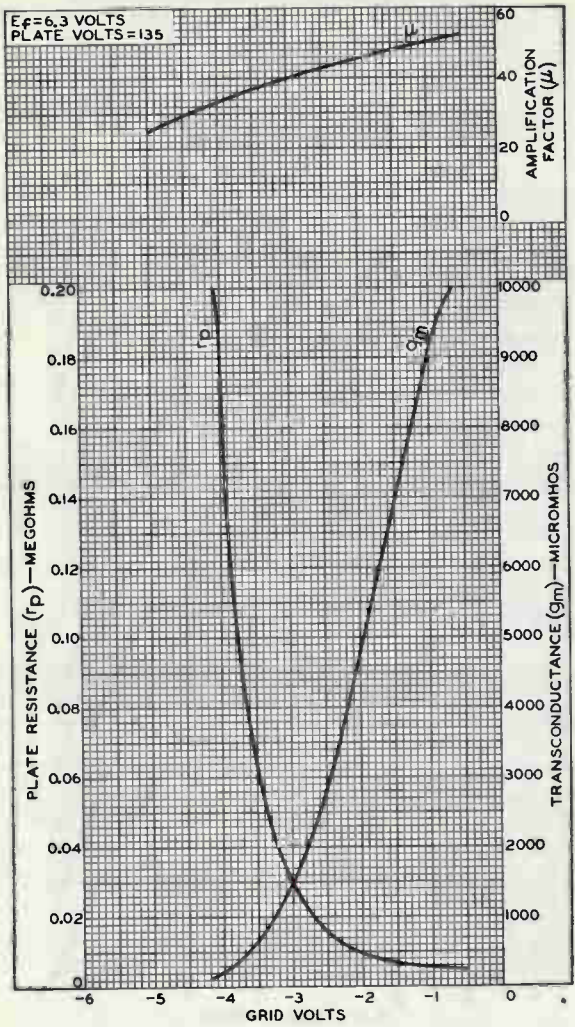
AVERAGE PLATE CHARACTERISTICS



92CM-10355RI

6FH5

AVERAGE CHARACTERISTICS



92CM-10354RI

RCA

6FH8

MEDIUM-MU TRIODE—THREE-PLATE TETRODE

9-PIN MINIATURE TYPE

For harmonic-generator applications

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	6.3 ± 10%	volts
Current	0.45	amp
Direct Interelectrode Capacitances:[o]		
Triode Unit:		
Grid to plate	1.4	μμf
Grid to cathode & heater	2.6	μμf
Plate to cathode & heater	1	μμf
Tetrode Unit:		
Grid No.1 to plate No.1	0.06 max.	μμf
Grid No.1 to cathode & heater, plate No.3, plate No.2, and grid No.2	4.5	μμf
Plate No.1 to cathode & heater, plate No.3, plate No.2, and grid No.2	1.4	μμf
Tetrode grid No.1 to triode plate	0.35 max.	μμf
Tetrode plate No.1 to triode plate	0.008 max.	μμf

Characteristics, Class A_1 Amplifier:

Triode Unit		
Plate Voltage	100	volts
Grid Voltage	−1	volt
Amplification Factor	40	
Plate Resistance (Approx.)	7400	ohms
Transconductance	5400	μmhos
Plate Current	7.9	ma
Grid Voltage (Approx.) for plate μa = 100	−7	volts
Tetrode Unit with plates No.2 and No.3 connected to cathode		
Plate-No.1 Voltage	250	volts
Grid-No.2 Voltage	250	volts
Grid-No.1 Voltage	−2	volts
Plate-No.1 Resistance (Approx.)	0.75	megohm
Transconductance, Grid No.1 to Plate No.1	4400	μmhos
Plate-No.1 Current	7.3	ma
Grid-No.2 Current	1.4	ma
Grid-No.1 Voltage (Approx.) for plate-No.1 μa = 100	−7	volts

[o] With external shield JEDEC No.315 connected to cathode.

RCA

6FH8

MEDIUM-MU TRIODE—THREE-PLATE TETRODE

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	9KP

Pin 1 – Tetrode Plate No.3
Pin 2 – Triode Grid
Pin 3 – Triode Plate
Pin 4 – Heater, Cathode
Pin 5 – Heater

Pin 6 – Tetrode Grid No.1
Pin 7 – Tetrode Grid No.2
Pin 8 – Tetrode Plate No.2
Pin 9 – Tetrode Plate No.1

HARMONIC-GENERATOR SERVICE

Maximum Ratings, *Design-Maximum Values:*

	Triode Unit	*Tetrode Unit*	
PLATE VOLTAGE	275 max.	–	volts
PLATE-No.1 VOLTAGE	–	275 max.	volts
PLATE-No.2 VOLTAGE	–	200 max.	volts
PLATE-No.3 VOLTAGE	–	200 max.	volts
GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE	–	275 max.	volts
GRID-No.2 VOLTAGE	–	*See Grid-No.2 Input Rating Chart at front of Receiving Tube Section*	
GRID-No.1 (CONTROL-GRID) VOLTAGE:			
Negative-bias value	40 max.	40 max.	volts
Positive-bias value	0 max.	0 max.	volts
GRID-No.2 INPUT:			
For grid-No.2 voltages up to 137.5 volts	–	0.45 max.	watt
For grid-No.2 voltages between 137.5 and 275 volts	–	*See Grid-No.2 Input Rating Chart at front of Receiving Tube Section*	
PLATE DISSIPATION	1.7 max.	–	watts
PLATE-No.1 DISSIPATION	–	2.3 max.	watts
PLATE-No.2 DISSIPATION	–	0.3 max.	watt
PLATE-No.3 DISSIPATION	–	0.3 max.	watt

6FH8

MEDIUM-MU TRIODE—THREE-PLATE TETRODE

Typical Operation:

	Tetrode Unit with separate plate operation	
Plates–No.1, No.2, and No.3 Voltage	100	volts
Grid–No.2 Voltage	50	volts
Grid–No.1 Voltage	−1	volt
Plate–No.1 Current	1.6	ma
Plate–No.2 Current	0.04	ma
Plate–No.3 Current	0.04	ma
Grid–No.2 Current	0.3	ma
Transconductance (Approx.):		
Grid No.1 to plate No.1	2500	μmhos
Grid No.1 to plate No.2	70	μmhos
Grid No.1 to plate No.3	70	μmhos

Maximum Circuit Values:

	Triode Unit	*Tetrode Unit*	
Grid–No.1–Circuit Resistance: For fixed-bias operation	0.5 max.	0.5 max.	megohm

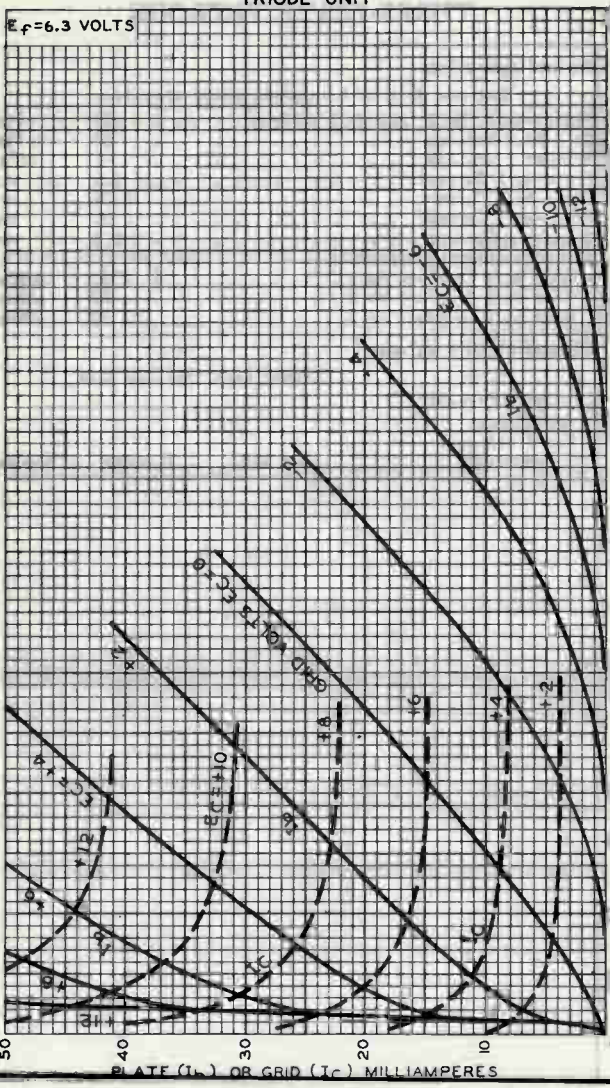
6FH8

RCA

6FH8

AVERAGE CHARACTERISTICS

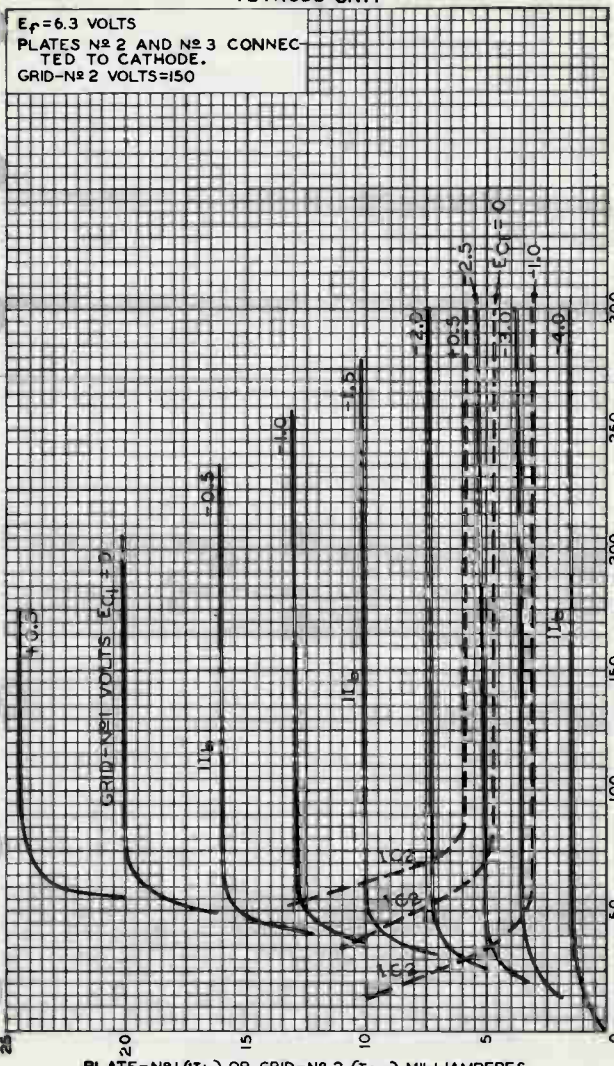
TRIODE UNIT



RCA

6FH8

AVERAGE CHARACTERISTICS
TETRODE UNIT



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

92CM-10221

Medium-Mu Dual Triode

DUODECAR TYPE

GENERAL DATA

Electrical:

Heater Characteristics and Ratings *(Design-Maximum Values)*:			
Voltage (AC or DC)	6.3 ± 0.6		volts
Current at heater volts = 6.3	0.900		amp
Peak heater-cathode voltage (Each unit):			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200[a]	max.	volts

Direct Interelectrode Capacitances (Approx.):[b]

	Unit No.1	*Unit No.2*	
Grid to plate	3.8	5.0	pf
Grid to cathode and heater	2.2	4.0	pf
Plate to cathode and heater	0.48	0.54	pf

Characteristics, Class A1 Amplifier:

	Unit No.1	*Unit No.2*		
Plate Voltage	250	150	250	volts
Grid Voltage	-8	0	-9.5	volts
Amplification Factor	22.5	–	15.4	
Plate Resistance (Approx.)	9000	–	2000	ohms
Transconductance	2500	–	7700	μmhos
Plate Current	8	68[c]	41	ma
Grid Voltage (Approx.) for plate μa = 10	-18	–	–	volts
Grid Voltage (Approx.) for plate μa = 50	–	–	-23	volts

Mechanical:

Operating Position	Any
Type of Cathodes	Coated Unipotential
Maximum Overall Length	2.375"
Seated Length	1.750" to 2.000"
Diameter	1.062" to 1.188"
Bulb	T9
Base	Small-Button Duodecar 12-Pin (JEDEC No.E12-70)
Basing Designation for BOTTOM VIEW	12BM

Pin 1 – Heater
Pin 2 – No Internal Connection
Pin 3 – Grid of Unit No.2
Pin 4 – Same as Pin 2
Pin 5 – Plate of Unit No.2
Pin 6 – Do Not Use
Pin 7 – Cathode of Unit No.2
Pin 8 – Same as Pin 2
Pin 9 – Cathode of Unit No.1
Pin 10 – Grid of Unit No.1
Pin 11 – Plate of Unit No.1
Pin 12 – Heater

VERTICAL-DEFLECTION OSCILLATOR

Values are for Unit No.1

Maximum Ratings, *Design-Maximum Values:*

DC PLATE VOLTAGE	350	max.	volts
PEAK NEGATIVE-PULSE GRID VOLTAGE	400	max.	volts
PLATE DISSIPATION	1	max.	watt

Maximum Circuit Values:

Grid-Circuit Resistance:			
For fixed-bias or cathode-bias operation	2.2	max.	megohms

VERTICAL-DEFLECTION AMPLIFIER

Values are for Unit No.2

Maximum Ratings, *Design-Maximum Values:*

For operation in a 525-line, 30-frame system[d]

DC PLATE VOLTAGE	550	max.	volts
PEAK POSITIVE-PULSE PLATE VOLTAGE[e]	2500	max.	volts
PEAK NEGATIVE-PULSE GRID VOLTAGE	250	max.	volts
CATHODE CURRENT:			
Peak	150	max.	ma
Average	50	max.	ma
PLATE DISSIPATION	10	max.	watts

Maximum Circuit Values:

Grid-Circuit Resistance:			
For fixed-bias operation	2.2	max.	megohms

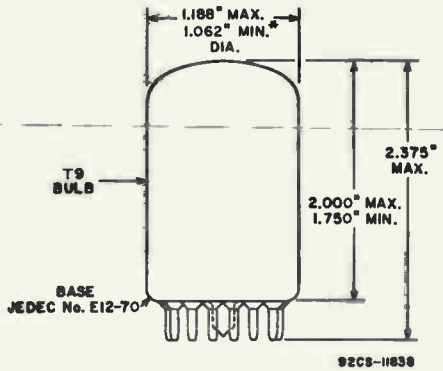
[a] The dc component must not exceed 100 volts.

[b] Without external shield.

[c] This value can be measured by a method involving a recurrent wave form such that the maximum ratings of the tube will not be exceeded.

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

[e] This rating is applicable when the duration of the voltage pulse does not exceed 15 per cent of one vertical scanning cycle. In a 525-line, 30-frame system, 15 per cent of one vertical scanning cycle is 2.5 milliseconds.



* APPLIES TO MINIMUM DIAMETER EXCEPT IN AREA OF SEAL.

Dual Triode
With High-Mu Unit and Low-Mu Unit

DUODECAR TYPE

Electrical:

Heater Characteristics and Ratings:		
Voltage (AC or DC)	6.3 ± 0.6	volts
Current at 6.3 volts	1.050	amp
Maximum heater-cathode voltage (Each unit):		
Heater negative with respect to cathode:		
Peak	200	volts
Heater positive with respect to cathode:		
Peak	200	volts
DC component	100	volts

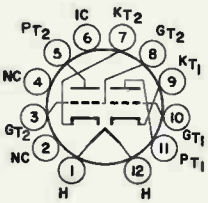
Direct Interelectrode Capacitances (Approx.):[a]

	Unit No.1	Unit No.2	
Grid to plate	4.0	7.0	pf
Input: G to (K, H)	2.4	7.0	pf
Output: P to (K, H)	0.4	1.1	pf

Mechanical:

Operating Position	Any
Type of Cathodes	Coated Unipotential
Maximum Overall Length	2.375"
Seated Length	1.750" to 2.000"
Diameter	1.062" to 1.188"
Dimensional Outline (JEDEC 9-58)	See *General Section*
Bulb	T9
Base	Small-Button Duodecar 12-Pin (JEDEC No.E12-70)
Basing Designation for BOTTOM VIEW	12EJ

Pin 1 - Heater
Pin 2 - No Internal Connection
Pin 3 - Grid of Unit No.2
Pin 4 - No Internal Connection
Pin 5 - Plate of Unit No.2
Pin 6 - Do Not Use
Pin 7 - Cathode of Unit No.2
Pin 8 - Grid of Unit No.2
Pin 9 - Cathode of Unit No.1
Pin 10 - Grid of Unit No.1
Pin 11 - Plate of Unit No.1
Pin 12 - Heater



Characteristics, Class A1 Amplifier:

	Unit No.1	Unit No.2		
Plate Voltage	250	60	175	volts
Grid Voltage	-3	0[b]	-25	volts
Amplification Factor	66	-	5.5	
Plate Resistance (Approx.)	30000	-	920	ohms
Transconductance	2200	-	6000	μmhos
Plate Current	2	95	40	ma
Grid-Voltage (Approx.) for plate:				
μa = 20	-5.3	-	-	volts
μa = 200	-	-	-45	volts

VERTICAL DEFLECTION OSCILLATOR AND AMPLIFIER

Maximum Ratings, *Design-Maximum Values:*

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

	Unit No.1 (Oscillator)	*Unit No.2 (Amplifier)*	
DC Plate Voltage	350	550	volts
Peak Positive-Pulse Plate Voltage	–	1500[c]	volts
Peak Negative Pulse-Grid Voltage	400	250	volts
Cathode Current:			
Peak	–	175	ma
Average	–	50	ma
Plate Dissipation	1	10[d]	watts
Maximum Circuit Values:			
Grid-Circuit Resistance:			
For fixed-bias operation	1	1	megohm
For cathode-bias operation	2.2	2.2	megohms

[a] Without external shield.

[b] Applied for short interval (2 seconds maximum) so as not to damage tube.

[c] This rating is applicable where the duration of the voltage pulse does not exceed 15 per cent of one vertical scanning cycle. In a 525-line, 30-frame system, 15 per cent of one vertical scanning cycle is 2.5 milliseconds.

[d] An adequate bias resistor or other means is required to protect the tube in the absence of excitation.

Twin Diode—High-Mu Triode

9-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:		
Voltage (AC or DC)	6.3 ± 10%	volts
Current at 6.3 volts	0.45	amp
Direct Interelectrode Capacitances (Approx.):[a]		
Triode Unit:		
Grid to plate	1.8	μμf
Grid to cathode and heater	1.5	μμf
Plate to cathode and heater	0.16	μμf
Diode Units:		
Diode-No.1 plate to triode grid	0.05	μμf
Diode-No.2 plate to triode grid	0.04	μμf
Diode-No.1 cathode to all other tube electrodes	4.6	μμf
Diode-No.2 cathode to all other tube electrodes	4.8	μμf
Diode-No.1 plate to cathode and heater	2.4	μμf
Diode-No.2 plate to cathode and heater	2.2	μμf

Characteristics, Class A_1 Amplifier (Triode Unit):

Plate Voltage	250	volts
Grid Voltage	-3	volts
Amplification Factor	70	
Plate Resistance (Approx.)	58000	ohms
Transconductance	1200	μmhos
Plate Current	1	ma

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	9KR

Pin 1 – Diode-No.2 Cathode
Pin 2 – Diode-No.1 Plate
Pin 3 – Diode-No.1 Cathode
Pin 4 – Heater
Pin 5 – Heater
Pin 6 – Diode-No.2 Plate
Pin 7 – Triode Cathode
Pin 8 – Triode Grid
Pin 9 – Triode Plate

TRIODE UNIT — AMPLIFIER — Class A_1

Maximum Ratings, *Design-Maximum Values:*

PLATE VOLTAGE	330	max.	volts
GRID VOLTAGE:			
Positive-bias value	0	max.	volts
PLATE DISSIPATION	1.1	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200[b]	max.	volts

DIODE UNITS — Two

Values are for Each Unit

Maximum Ratings, *Design-Maximum Values:*

PLATE CURRENT	5	max.	ma
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200[b]	max.	volts

Characteristics, Instantaneous Test Condition:

Plate Current for plate volts = 5	20	ma

[a] Without external shield.
[b] The dc component must not exceed 100 volts.

6FQ5A

High-Mu Triode

7-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

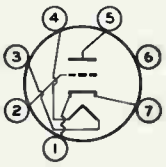
Heater Characteristics and Ratings *(Design-Maximum Values):*		
Voltage (AC or DC)	6.3 ± 0.6	volts
Current at heater volts = 6.3	0.180	amp
Peak heater-cathode voltage:		
Heater negative with respect to cathode	100 max.	volts
Heater positive with respect to cathode	100 max.	volts
Direct Interelectrode Capacitances (Approx.):[a]		
Grid to plate	0.52	μμf
Grid to cathode, internal shield, and heater	5.0	μμf
Plate to cathode, internal shield, and heater	3.5	μμf
Heater to cathode	2.5[b]	μμf

Characteristics, Class A_1 Amplifier:

Plate Voltage	135	volts
Grid Voltage	-1.2	volts
Amplification Factor	74	
Plate Resistance (Approx.)	6300	ohms
Transconductance	12000	μmhos
Plate Current	8.9	ma
Grid Voltage (Approx.) for plate μa = 100	-4.5	volts

Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
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	7FP



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

6FQ5A

AMPLIFIER — Class A_1

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

PLATE VOLTAGE	200 max.	volts
GRID VOLTAGE:		
Negative-bias value	50 max.	volts
CATHODE CURRENT	22 max.	ma
PLATE DISSIPATION	2.5 max.	watts

Maximum Circuit Values:

Grid-Circuit Resistance:		
For cathode-bias operation	1 max.	megohm

[a] With external shield JEDEC No.316 connected to cathode except as noted.
[b] With external shield JEDEC No.316 connected to ground.

CURVES
shown under Type 6GK5 also apply to the 6FQ5A

Medium-Mu Twin Triode

9-PIN MINIATURE TYPE

With Heater Having Controlled Warm-Up Time

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:		
Voltage (AC or DC)	6.3	volts
Current	0.6 ± 6%	amp
Warm-up time (Average)	11	sec

Direct Interelectrode Capacitances (Approx.):[a]

	Unit No.1	Unit No.2	
Grid to plate	3.6	3.8	μμf
Grid to cathode and heater	2.4	2.4	μμf
Plate to cathode and heater	0.34	0.26	μμf
Plate of unit No.1 to plate of unit No.2	1		μμf

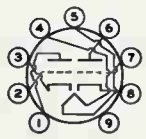
Characteristics, Class A$_1$ Amplifier (Each Unit):

Plate Voltage	90	250	volts
Grid Voltage	0	−8	volts
Amplification Factor	20	20	
Plate Resistance (Approx.)	6700	7700	ohms
Transconductance	3000	2600	μmhos
Plate Current	10	9	ma
Plate Current for grid volts = −12.5	−	1.3	ma
Grid Voltage (Approx.) for plate μa = 10	−7	−18	volts

Mechanical:

Operating 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"
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	9LP

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 – No Connection

AMPLIFIER — Class A1

Values are for Each Unit

Maximum Ratings, *Design-Maximum Values:*

PLATE VOLTAGE	330	max.	volts
GRID VOLTAGE:			
Positive-bias value	0	max.	volts
CATHODE CURRENT	22	max.	ma
PLATE DISSIPATION:			
Either plate	4	max.	watts
Both plates (Both units operating)	5.7	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200[b]	max.	volts

Typical Operation as Resistance-Coupled Amplifier:

See *RESISTANCE-COUPLED AMPLIFIER CHART No.29* at front of this Section

Maximum Circuit Values:

Grid-Circuit Resistance:			
For fixed-bias operation	1	max.	megohm

HORIZONTAL-DEFLECTION OSCILLATOR

Values are for Each Unit

Maximum Ratings, *Design-Maximum Values:*

For operation in a 525-line, 30-frame system[c]

DC PLATE VOLTAGE	330	max.	volts
PEAK NEGATIVE-PULSE GRID VOLTAGE	660	max.	volts
CATHODE CURRENT:			
Peak	330	max.	ma
Average	22	max.	ma
PLATE DISSIPATION:			
Either plate	4	max.	watts
Both plates (Both units operating)	5.7	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200[b]	max.	volts

Maximum Circuit Values:

Grid-Circuit Resistance	2.2	max.	megohms

VERTICAL-DEFLECTION OSCILLATOR

Values are for Each Unit

Maximum Ratings, *Design-Maximum Values:*

For operation in a 525-line, 30-frame system[c]

DC PLATE VOLTAGE	330	max.	volts
PEAK NEGATIVE-PULSE GRID VOLTAGE	440	max.	volts
CATHODE CURRENT:			
Peak	77	max.	ma
Average	22	max.	ma

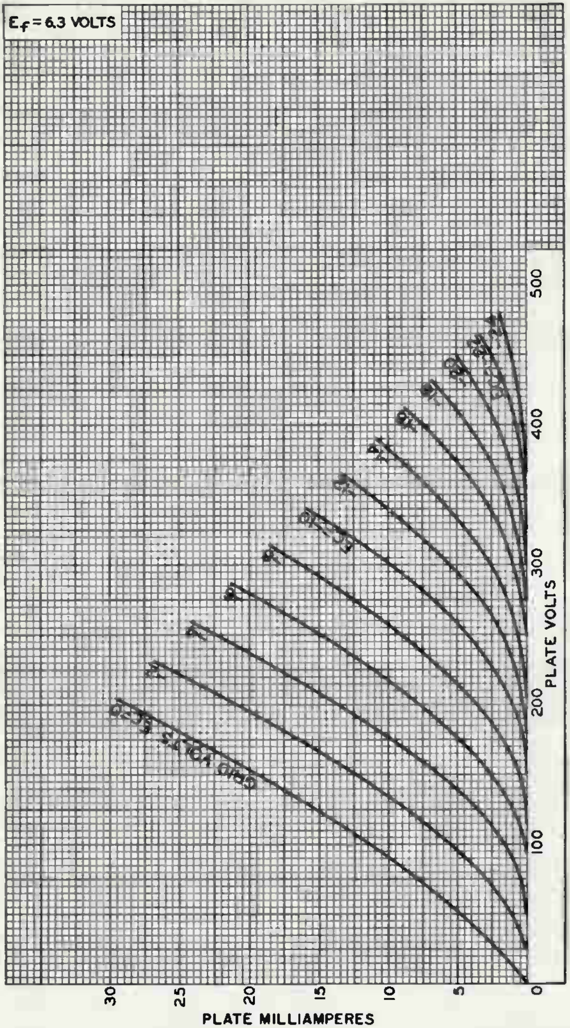
PLATE DISSIPATION:			
Either plate	4	max.	watts
Both plates (Both units operating)	5.7	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200[b]	max.	volts
Maximum Circuit Values:			
Grid-Circuit Resistance	2.2	max.	megohms

[a] Without external shield.

[b] The dc component must not exceed 100 volts.

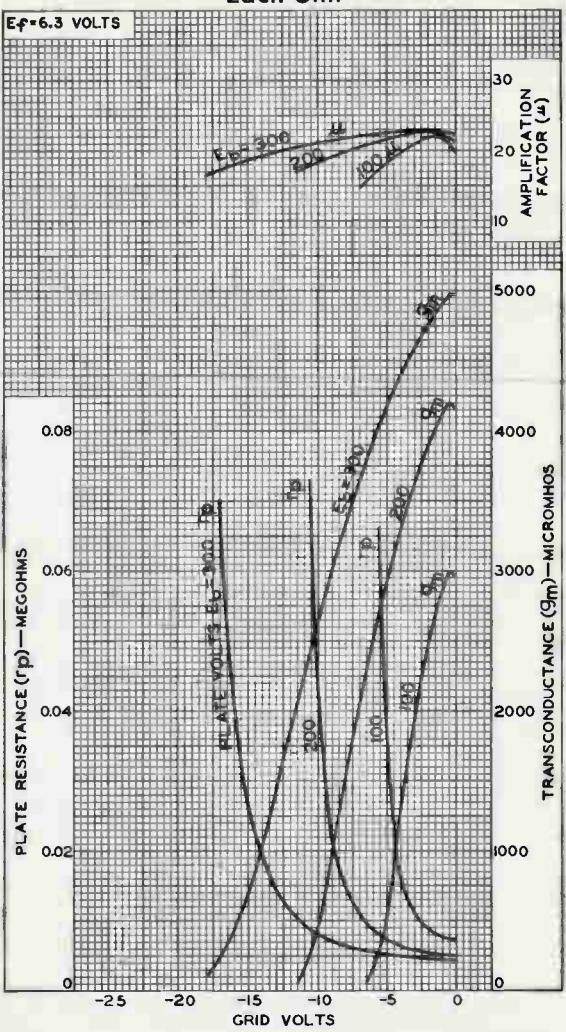
[c] As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations," Federal Communications Commission.

AVERAGE PLATE CHARACTERISTICS
Each Unit



92CM-8442

AVERAGE CHARACTERISTICS
Each Unit



92CM-8441RI

Beam Hexode

7-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater Characteristics and Ratings *(Design-Maximum Values)*:		
Voltage (AC or DC)	6.3 ± 0.6	volts
Current at heater volts = 6.3	0.200	amp
Peak heater-cathode voltage:		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200[a] max.	volts

Direct Interelectrode Capacitances (Approx.):

	Without External Shield	*With External Shield*[b]	
Grid No.1 to plate	0.03	0.016	μμf
Grid No.1 to cathode & grid No.4 & grid No.2, grid No.3, and heater	4.8	4.8	μμf
Plate to cathode & grid No.4 & grid No.2, grid No.3, and heater	2	2.8	μμf

Characteristics, Class A_1 Amplifier:

Plate Voltage	275	volts
Grid-No.3 Voltage	135	volts
Grid-No.1 Voltage	−0.2	volt
Plate Resistance (Approx.)	0.24	megohm
Transconductance	10000	μmhos
Plate Current	9	ma
Grid-No.3 Current	0.17	ma
Grid-No.1 Voltage (Approx.) for transconductance (μmhos) = 100	−5	volts

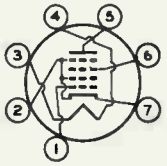
Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
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)

6FS5

Basing Designation for BOTTOM VIEW. 7GA

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



Pin 5 – Plate
Pin 6 – Grid No.3
Pin 7 – Cathode, Grid No.2, Grid No.4

AMPLIFIER — Class A_1

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

PLATE VOLTAGE	300 max.	volts
GRID-No.3 (SCREEN-GRID) VOLTAGE	150 max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Negative-bias value	50 max.	volts
Positive-bias value	0 max.	volts
CATHODE CURRENT	20 max.	ma
GRID-No.3 INPUT	0.15 max.	watt
PLATE DISSIPATION	3.25 max.	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:		
For fixed-bias operation.	0.5 max.	megohm

[a] The dc component must not exceed 100 volts.
[b] With external shield JEDEC No.316 connected to pin 7.

OPERATING CONSIDERATIONS

This type has four grids—grid No.1 (Control grid), grid No.2 (Focusing grid), grid No.3 (Screen grid), and grid No.4 (Suppressor grid). Grid No.2 is (1) internally connected to cathode and grid No.4, (2) aligned with grid No.3, and (3) located between grids No.1 and No.3. The addition of grid No.2 results in an increase in the plate-current-to-screen-current ratio with subsequent noise reduction.

6FV6

SHARP-CUTOFF TETRODE

7-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage	6.3 ± 10%	ac or dc volts
Current	0.2	amp
Direct Interelectrode Capacitances:[a]		
Grid No.1 to plate	0.03 max.	μμf
Grid No.1 to cathode, grid No.2, internal shield, and heater	4.5	μμf
Plate to cathode, grid No.2, internal shield, and heater	3	μμf
Cathode to heater	2.7[b]	μμf

Characteristics, Class A_1 Amplifier:

Plate Voltage	125	volts
Grid-No.2 (Screen-grid) Voltage	80	volts
Grid-No.1 (Control-grid) Voltage	-1	volt
Plate Resistance (Approx.)	0.1	megohm
Transconductance	8000	μmhos
Plate Current	10	ma
Grid-No.2 Current	1.5	ma
Grid-No.1 Voltage (Approx.) for plate μa = 20	-6	volts

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	7FQ

Pin 1 - Grid No.1
Pin 2 - Internal Shield
Pin 3 - Heater
Pin 4 - Heater
Pin 5 - Plate
Pin 6 - Grid No.2
Pin 7 - Cathode

AMPLIFIER — Class A_1

Maximum Ratings, *Design-Maximum Values:*

PLATE VOLTAGE	275 max.	volts
GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE	180 max.	volts
GRID-No.2 VOLTAGE	*See Grid-No.2 Input Rating Chart at front of Receiving Tube Section*	

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

TENTATIVE DATA

6FV6

SHARP-CUTOFF TETRODE

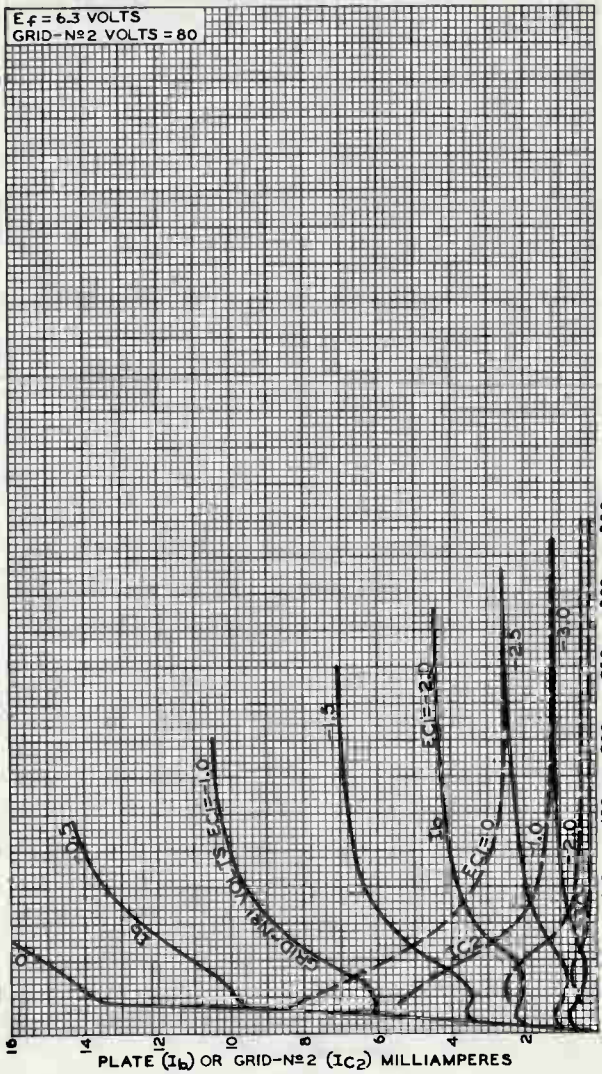
GRID-No.1 (CONTROL-GRID) VOLTAGE:			
Positive-bias value.	0	max.	volts
CATHODE CURRENT.	20	max.	ma
GRID-No.2 INPUT:			
For grid-No.2 voltages up to 90 volts	0.5	max.	watt
For grid-No.2 voltages between 90 and 180 volts	*See Grid-No.2 Input Rating Chart at front of Receiving Tube Section*		
PLATE DISSIPATION.	2	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode.	200	max.	volts
Heater positive with respect to cathode.	200*	max.	volts
Maximum Circuit Values:			
Grid-No.1-Circuit Resistance	0.5	max.	megohm

° With external shield JEDEC No.316 connected to cathode except as noted.
• With external shield JEDEC No.316 connected to ground.
* The dc component must not exceed 100 volts.

RCA

6FV6

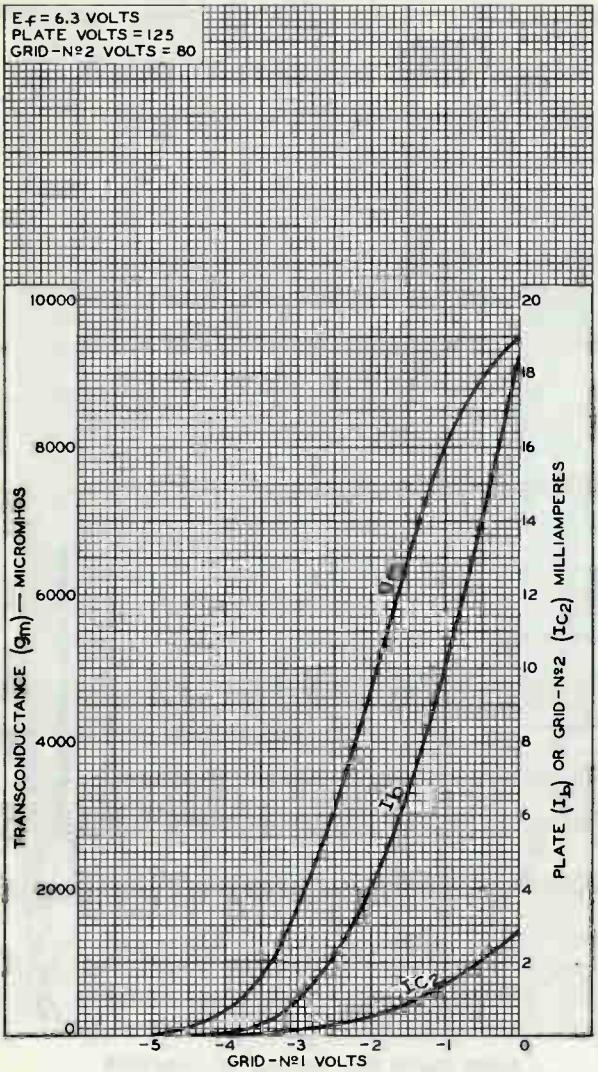
AVERAGE CHARACTERISTICS



RCA

6FV6

AVERAGE CHARACTERISTICS



6FV8A

Medium-Mu Triode-Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

Electrical:

Heater Characteristics and Ratings:

Voltage (AC or DC)	6.3[a]	6.3 ± 0.6	volts
Current	0.450 ± 0.030	0.450[b]	amp
Warm-up time (Average)	11	–	sec

Peak heater-cathode voltage (Each unit):

Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200[c] max.	volts

Direct Interelectrode Capacitances:

	Without External Shield	*With External Shield*[d]	
Triode Unit:			
Grid to plate	1.8	1.8	pf
Grid to cathode, pentode cathode & pentode No. 3 & internal shield, and heater	2.8	2.8	pf
Plate to cathode, pentode cathode & pentode grid No. 3 & internal shield, and heater	1.5	2	pf
Pentode Unit:			
Grid No. 1 to plate	0.02 max.	0.01 max.	pf
Grid No. 1 to cathode & grid No. 3 & internal shield, grid No. 2, and heater	5	5	pf
Plate to cathode & grid No. 3 & internal shield, grid No. 2, and heater	2	3	pf
Pentode plate to triode plate	0.15 max.	0.03 max.	pf

Characteristics, Class A_1 Amplifier:

	Triode Unit	*Pentode Unit*	
Plate Voltage	125	125	volts
Grid-No. 2 Voltage	–	125	volts
Grid-No. 1 Voltage	-1	-1	volt
Amplification Factor	45	–	
Plate Resistance (Approx.)	5600	200000	ohms
Transconductance	8000	6500	μmhos
Plate Current	12	12	ma
Grid-No. 2 Current	–	4	ma
Grid-No. 1 Voltage (Approx.) for plate μa = 20	-7.5	-9	volts

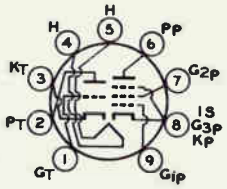
Mechanical:

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"

6FV8A

Dimensional Outline . . . . . See *General Section*
Bulb. T6-1/2
Base. . . . . Small-Button Noval 9-Pin (JEDEC No.E9-1)
Basing Designation for BOTTOM VIEW. 9FA

Pin 1 - Triode Grid
Pin 2 - Triode Plate
Pin 3 - Triode Cathode
Pin 4 - Heater
Pin 5 - Heater
Pin 6 - Pentode Plate
Pin 7 - Pentode Grid No.2
Pin 8 - Pentode Cathode, Grid No.3, Internal Shield
Pin 9 - Pentode Grid No.1



AMPLIFIER — Class A_1 *(Pentode Unit)*

Maximum Ratings, *Design-Maximum Values:*

Plate Voltage	330 max.	volts
Grid-No.2 (Screen-Grid) Supply Voltage	330 max.	volts
Grid-No.2 Voltage	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
Grid-No.1 (Control-Grid) Voltage:		
Positive-bias value	0 max.	volts
Grid-No.2 Input:		
For grid-No.2 voltages up to 165 volts	0.55 max.	watt
For grid-No.2 voltages between 165 and 330 volts	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
Plate Dissipation	2.3 max.	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:		
For fixed-bias operation	0.25 max.	megohm
For cathode-bias operation	1 max.	megohm

VERTICAL-DEFLECTION OSCILLATOR *(Triode Unit)*

Maximum Ratings, *Design-Maximum Values:*
For operation in a 525-line, 30-frame system[e]

DC Plate Voltage	330 max.	volts
Peak Negative-Pulse Grid Voltage	250 max.	volts
Cathode Current:		
Peak	70 max.	ma
Average	20 max.	ma
Plate Dissipation	2 max.	watts

Maximum Circuit Values:

Grid-Circuit Resistance:		
For cathode-bias operation	3 max.	megohms

[a] At heater amperes = 0.450.
[b] At heater volts = 6.3.
[c] The dc component must not exceed 100 volts.
[d] With external shield JEDEC No.315 connected to pin 8.
[e] As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations," Federal Communications Commission.

Beam Power Tube

GENERAL DATA

Electrical:

Heater Characteristics and Ratings *(Design-Maximum Values):*			
Voltage (AC or DC)	6.3 ± 0.6		volts
Current at heater volts = 6.3	1.200		amp
Peak heater-cathode voltage:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200[a]	max.	volts
Direct Interelectrode Capacitances (Approx.):[b]			
Grid No.1 to plate	0.5		μμf
Grid No.1 to cathode & grid No.3, grid No.2, and heater	15.0		μμf
Plate to cathode & grid No.3, grid No.2, and heater	7.0		μμf

Characteristics, Class A_1 Amplifier:

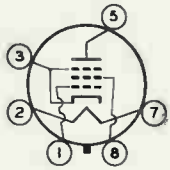
Plate Voltage	60	150	250	volts
Grid-No.2 Voltage	150	150	150	volts
Grid-No.1 Voltage	0	-22.5	-22.5	volts
Amplification Factor	–	4.4	–	
Plate Resistance (Approx.)	–	–	18000	ohms
Transconductance	–	–	7300	μmhos
Plate Current	345[c]	–	65	ma
Grid-No.2 Current	27[c]	–	1.8	ma
Grid-No.1 Voltage (Approx.) for plate ma. = 1	–	–	-42	volts
Grid-No.1 Voltage (Approx.) for peak positive-pulse plate volts = 5000, grid-No.2 volts = 150, and plate ma. = 1	–	–	-100	volts

Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	3-7/8"
Maximum Seated Length	3-5/16"
Diameter	1.438" to 1.562"
Bulb	T12
Base	Short Medium-Shell Octal 6-Pin with External Barriers, Arrangement 1, Style A, (JEDEC Group 1, No.B6-112)

6FW5

Basing Designation for BOTTOM VIEW. 6CK



Pin 1 – Grid No.1
Pin 2 – Heater
Pin 3 – Cathode, Grid No.3
Pin 5 – Plate
Pin 7 – Heater
Pin 8 – Grid No.2

HORIZONTAL-DEFLECTION AMPLIFIER

Maximum Ratings, *Design-Maximum Values:*

For operation in a 525-line, 30-frame system[d]

DC PLATE VOLTAGE.	770 max.	volts
PEAK POSITIVE-PULSE PLATE VOLTAGE[e]. . .	6500 max.	volts
DC GRID-No.2 (SCREEN-GRID) VOLTAGE. . .	220 max.	volts
PEAK NEGATIVE-PULSE GRID-No.1 VOLTAGE .	330 max.	volts
DC GRID-No.1 (CONTROL-GRID) VOLTAGE . .	-55 max.	volts
CATHODE CURRENT:		
Peak.	610 max.	ma
Average	175 max.	ma
GRID-No.2 INPUT	3.6 max.	watts
PLATE DISSIPATION[f].	18 max.	watts
BULB TEMPERATURE (At hottest point on bulb surface).	220 max.	°C

Maximum Circuit Values:

Grid-No.1-Circuit Resistance.	1 max.	megohm

[a] The dc component must not exceed 100 volts.

[b] Without external shield.

[c] This value can be measured by a method involving a recurrent wave form such that the maximum ratings of the tube will not be exceeded.

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

[e] This rating is applicable where the duration of the voltage pulse does 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.

[f] An adequate bias resistor or other means is required to protect the tube in the absence of excitation.

6FY7

Dual Triode

With High-Mu Unit and Low-Mu Unit

DUODECAR TYPE

Electrical:

Heater Characteristics and Ratings:		
Voltage (AC or DC)	6.3 ± 0.6	volts
Current at 6.3 volts	1.050	amp
Maximum heater-cathode voltage (Each unit):		
Heater negative with respect to cathode:		
Peak	200	volts
Heater positive with respect to cathode:		
Peak	200	volts
DC component	100	volts

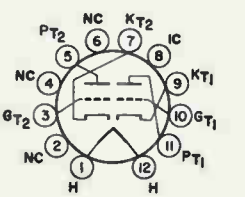
Direct Interelectrode Capacitances (Approx.):[a]

	Unit No.1	*Unit No.2*	
Grid to plate	4.4	9.5	pf
Input: G to (K, H)	2.2	6.5	pf
~~Output: P to (K, H)~~	~~0.4~~	~~1.2~~	~~pf~~

Mechanical:

Operating Position	Any
Type of Cathodes	Coated Unipotential
Maximum Overall Length	2.875"
Seated Length	2.250" to 2.500"
Diameter	1.062" to 1.188"
Dimensional Outline (JEDEC 9-60)	See *General Section*
Bulb	T9
Base	Small-Button Duodecar 12-Pin (JEDEC No.E12-70)
Basing Designation for BOTTOM VIEW	12E0

Pin 1 - Heater
Pin 2 - No Internal Connection
Pin 3 - Grid of Unit No.2
Pin 4 - No Internal Connection
Pin 5 - Plate of Unit No.2
Pin 6 - No Internal Connection
Pin 7 - Cathode of Unit No.2
Pin 8 - Do Not Use
Pin 9 - Cathode of Unit No.1
Pin 10 - Grid of Unit No.1
Pin 11 - Plate of Unit No.1
Pin 12 - Heater



Characteristics, Class A1 Amplifier:

	Unit No.1	*Unit No.2*		
Plate Voltage	250	60	150	volts
Grid Voltage	-3	0[b]	-17.5	volts
Amplification Factor	65	-	6	
Plate Resistance (Approx.)	40500	-	920	ohms
Transconductance	1600	-	6500	μmhos
Plate Current	1.4	95	35	ma
Plate Current for grid volts = -25	-	-	6	ma
Grid-Voltage for plate μa = 30	-5.5	-	-	volts
Grid-Voltage for plate μa = 50	-	-	-36	volts

VERTICAL DEFLECTION OSCILLATOR AND AMPLIFIER

Maximum Ratings, *Design-Maximum Values:*

For operation in a 525-line, 30-frame system[c]

	Unit No.1 (Oscillator)	*Unit No.2 (Amplifier)*	
DC Plate Voltage	330	275	volts
Peak Positive-Pulse Plate Voltage	–	2000	volts
Peak Negative Pulse-Grid Voltage	400	250	volts
Cathode Current:			
Peak	70	175	ma
Average	20	50	ma
Plate Dissipation	1	7[d]	watts
Maximum Circuit Values:			
Grid-Circuit Resistance	2.2	2.2	megohms

[a] Without external shield.

[b] Applied for short interval (2 seconds maximum) so as not to damage tube.

[c] This rating is applicable where the duration of the voltage pulse does not exceed 15 per cent of one vertical scanning cycle. In a 525-line, 30-frame system, 15 per cent of one vertical scanning cycle is 2.5 milliseconds.

[d] An adequate bias resistor or other means is required to protect the tube in the absence of excitation.

Beam Power Tube—Sharp-Cutoff Pentode

DUODECAR TYPE

GENERAL DATA

Electrical:

Heater Characteristics and Ratings:		
Voltage (AC or DC)	6.3 ±0.6	volts
Current at heater volts = 6.3	1.200	amp
Peak heater–cathode voltage (Each unit):		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200[a] max.	volts
Direct Interelectrode Capacitances (Approx.):[b]		
Beam Power Unit:		
Grid No.1 to plate	0.26	pf
Grid No.1 to cathode & grid No.3, grid No.2, internal shield, and heater	12.0	pf
Plate to cathode & grid No.3, grid No.2, internal shield, and heater	12.0	pf
Pentode Unit:		
Grid No.1 to plate	0.034	pf
Grid No.3 to plate	2.8	pf
Grid No.1 to cathode, grid No.2, grid No.3, internal shield, and heater	6.5	pf
Grid No.3 to cathode, grid No.1, grid No.2, plate, internal shield, and heater	7.5	pf
Grid No.1 to grid No.3	0.24	pf
Plate of beam power unit to plate of pentode unit	0.12	pf

Characteristics, Class A_1 Amplifier (Pentode Unit):

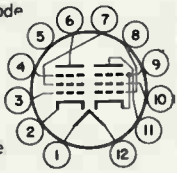
Plate Supply Voltage	150	volts
Grid–No.3 Supply Voltage	*Connected to cathode at socket*	
Grid–No.2 Supply Voltage	100	volts
Cathode Resistor	560	ohms
Plate Resistance (Approx.)	0.15	megohm
Transconductance, Grid No.1 to Plate	1000	μmhos
Transconductance, Grid No.3 to Plate	400	μmhos
Plate Current	1.3	ma
Grid–No.2 Current	2	ma
Grid–No.1 Voltage (Approx.) for plate μa = 10	−4.5	volts
Grid–No.3 Voltage (Approx.) for plate μa = 10	−4.5	volts

6G11

Mechanical:

Operating Position	Any
Type of Cathodes	Coated Unipotential
Maximum Overall Length	2.375"
Seated Length	1.750" to 2.000"
Diameter	1.062" to 1.188"
Bulb	T9
Base	Small-Button Duodecar 12-Pin (JEDEC No.E12-70)
Basing Designation for BOTTOM VIEW	12BU

Pin 1 – Heater
Pin 2 – Pentode Cathode
Pin 3 – Pentode Grid No.1
Pin 4 – Pentode Grid No.3
Pin 5 – Internal Shield
Pin 6 – Pentode Plate
Pin 7 – Pentode Grid No.2



Pin 8 – Beam Power Grid No.1
Pin 9 – Beam Power Cathode, Beam Power Plate
Pin 10 – Beam Power Grid No.2
Pin 11 – Beam Power Plate
Pin 12 – Heater

PENTODE UNIT — FM SOUND DETECTOR

Maximum Ratings, *Design-Maximum Values:*

PLATE VOLTAGE	330 max.	volts
GRID-No.3 (SUPPRESSOR-GRID) VOLTAGE	28 max.	volts
GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE	330 max.	volts
GRID-No.2 VOLTAGE	*See Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Positive-bias value	0 max.	volts
PLATE DISSIPATION	1.7 max.	watts
GRID-No.2 INPUT:		
For grid-No.2 voltages up to 165 volts	1.1 max.	watts
For grid-No.2 voltages between 165 and 330 volts	*See Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	

BEAM POWER UNIT — AMPLIFIER — Class A_1

Maximum Ratings, *Design-Maximum Values:*

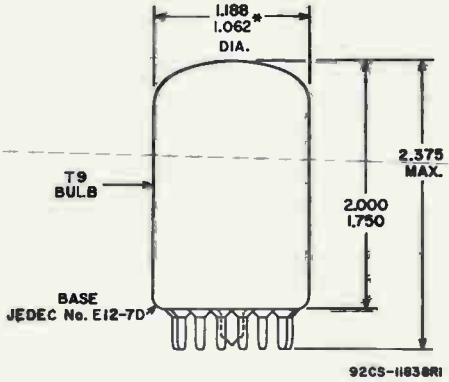
PLATE VOLTAGE	150 max.	volts
GRID-No.2 (SCREEN-GRID) VOLTAGE	135 max.	volts
AVERAGE CATHODE CURRENT	65 max.	ma
PLATE DISSIPATION	6.5 max.	watts
GRID-No.2 INPUT	1.8 max.	watts

Typical Operation and Characteristics:

Plate Voltage	120	volts
Grid-No.2 Voltage	110	volts
Grid-No.1 (Control-Grid) Voltage	-8	volts
Peak AF Grid-No.1 Voltage	8	volts

Zero-Signal Plate Current	49	ma
Max.-Signal Plate Current	50	ma
Zero-Signal Grid-No.2 Current	4	ma
Max.-Signal Grid-No.2 Current	8.5	ma
Plate Resistance (Approx.)	10000	ohms
Transconductance	7500	μmhos
Load Resistance	2500	ohms
Total Harmonic Distortion	10	per cent
Max.-Signal Power Output	2.3	watts

[a] The dc component must not exceed 100 volts.
[b] Without external shield.



DIMENSIONS IN INCHES

* APPLIES TO MINIMUM DIAMETER EXCEPT IN AREA OF SEAL.

Beam Power Tube

MAGNOVAL TYPE

ELECTRICAL

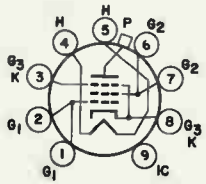
Heater Characteristics and Ratings		
Voltage (AC or DC)	6.3 ± 0.6	V
Current at 6.3 V	1.380	A
Maximum heater–cathode voltage		
Heater negative with respect to cathode:		
Peak	250	V
DC component	125	V
Heater positive with respect to cathode:		
Peak	250	V
DC component	125	V

MECHANICAL

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	4.125 in
Maximum Seated Length	3.750 in
Diameter	1.062 to 1.188 in
Envelope	JEDEC T9
Cap	Skirted Miniature (JEDEC No.C1-2)
Base	Small-Button Magnoval 9-Pin (JEDEC No.E9-23) ←

TERMINAL DIAGRAM (Bottom View)

Pin 1 – Grid–No.1
Pin 2 – Grid–No.1
Pin 3 – Cathode, Grid No.3
Pin 4 – Heater
Pin 5 – Heater
Pin 6 – Grid No.2
Pin 7 – Grid No.2
Pin 8 – Cathode, Grid No.3
Pin 9 – Do Not Use
Cap – Plate



9NN

CHARACTERISTICS, INSTANTANEOUS VALUES[a]

Plate Voltage	75	V
Grid-No.2 (Screen-Grid) Voltage	200	V
Grid-No.1 (Control-Grid) Voltage	-10	V
Plate Current	440	mA
Grid-No.2 Current	37	mA

HORIZONTAL-DEFLECTION AMPLIFIER

Maximum Ratings, Design-Maximum Values

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

DC Plate-Supply Voltage	275	V
Peak Positive-Pulse Plate Voltage[b]	7700	V
DC Grid-No.2 Voltage	275	V

← Indicates a change.

Average Cathode Current	275	mA
Grid-No.2 Input[c]	5	W
Plate Dissipation[d]	17	W

MAXIMUM CIRCUIT VALUES

Grid-No.1-Circuit Resistance		
Without grid current	0.5	MΩ
With grid current (Horizontal output service only)	2.2	MΩ

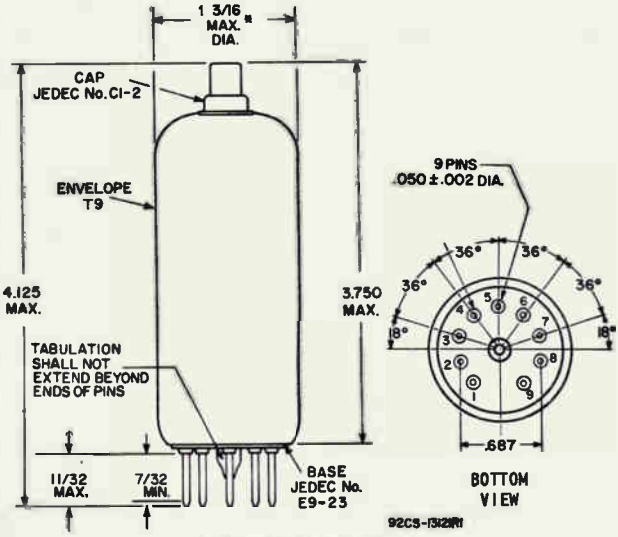
[a] Not to be tested under DC conditions.

[b] This rating is applicable where the duration of the voltage pulse does 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.

[c] Grid-No.2 input may reach 6 watts for plate-dissipation values below 11 watts.

[d] An adequate bias resistor or other means is required to protect the tube in the absence of excitation.

DIMENSIONAL OUTLINE



DIMENSIONS IN INCHES

For pin alignment use gauge No.GE9-2.

* Applies in zone starting 0.375 inch from base seat.

Power Pentode

NEONOVAL TYPE

GENERAL DATA

Electrical:

Heater Characteristics and Ratings *(Design-Maximum Values):*			
Voltage (AC or DC)	6.3 ± 0.6		volts
Current at heater volts = 6.3	1.200		amp
Peak heater-cathode voltage:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200[a]	max.	volts
Direct Interelectrode Capacitances (Approx.):[b]			
Grid No.1 to plate	0.9		μμf
Grid No.1 to cathode & grid No.3, grid No.2, and heater	18.0		μμf
Plate to cathode & grid No.3, grid No.2 and heater	7.0		μμf

Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	3.230"
Maximum Seated Length	2.920"
Length, Base Seat to Bulb Top (Excluding tip)	2.370" to 2.610"
Diameter	1.062" to 1.188"
Bulb	T9
Base	Large-Button Neonoval 9-Pin (JEDEC No.E9-68)
Basing Designation for BOTTOM VIEW	9EU

Pin 1 – Grid No.2
Pin 2 – No Internal Connection
Pin 3 – Grid No.1
Pin 4 – Heater
Pin 5 – Heater
Pin 6 – Grid No.1
Pin 7 – Cathode, Grid No.3
Pin 8 – Grid No.2
Pin 9 – Plate

AF POWER AMPLIFIER — Class A_1

Maximum Ratings, *Design-Maximum Values:*

PLATE VOLTAGE	220 max.	volts
GRID-No.2 (SCREEN-GRID) VOLTAGE	140 max.	volts
GRID-No.2 INPUT	1.4 max.	watts
PLATE DISSIPATION	12 max.	watts

6GC5

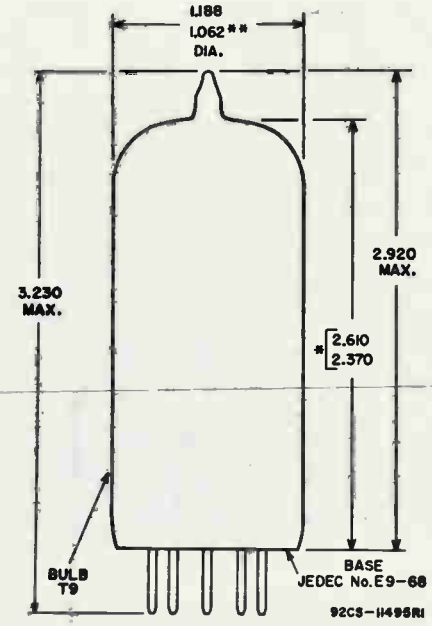
Typical Operation and Characteristics:

	Fixed Bias	*Cathode Bias*	
Plate Supply Voltage.	110	200	volts
Grid-No.2 Supply Voltage.	110	125	volts
Grid-No.1 (Control-Grid) Voltage. .	-7.5	-	volts
Cathode Resistor.	-	180	ohms
Peak AF Grid-No.1 Voltage	7.5	8.5	volts
Zero-Signal Plate Current	49	46	ma
Max.-Signal Plate Current	50	47	ma
Zero-Signal Grid-No.2 Current . . .	4	2.2	ma
Max.-Signal Grid-No.2 Current . . .	10	8.5	ma
Plate Resistance (Approx.).	13000	28000	ohms
Transconductance.	8000	8000	μmhos
Load Resistance	2000	4000	ohms
Total Harmonic Distortion	10	10	%
Max.-Signal Power Output.	2.1	3.8	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

[a] The dc component must not exceed 100 volts.
[b] Without external shield.



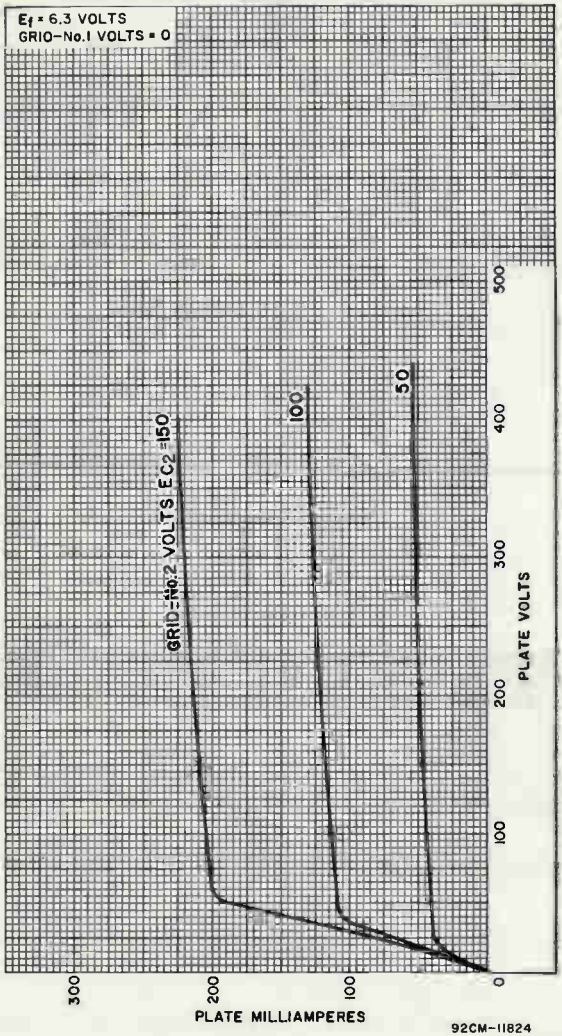
ALL DIMENSIONS IN INCHES

** APPLIES IN ZONE STARTING 0.375" FROM BASE SEAT.

* MEASURED FROM BASE SEAT TO BULB-TOP LINE AS DETERMINED BY A RING GAUGE OF 0.600" INSIDE DIAMETER.

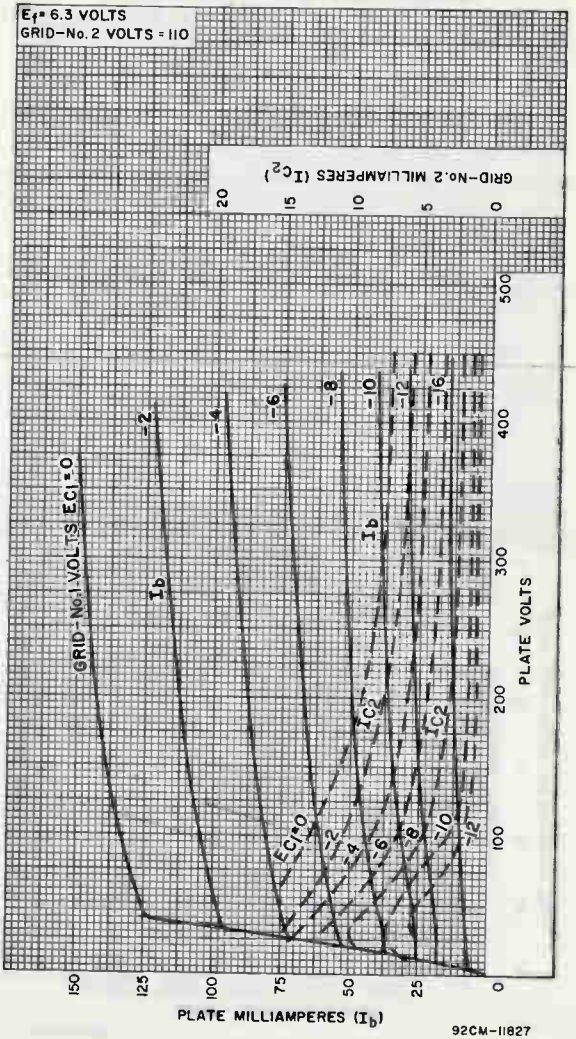
6GC5

AVERAGE PLATE CHARACTERISTICS

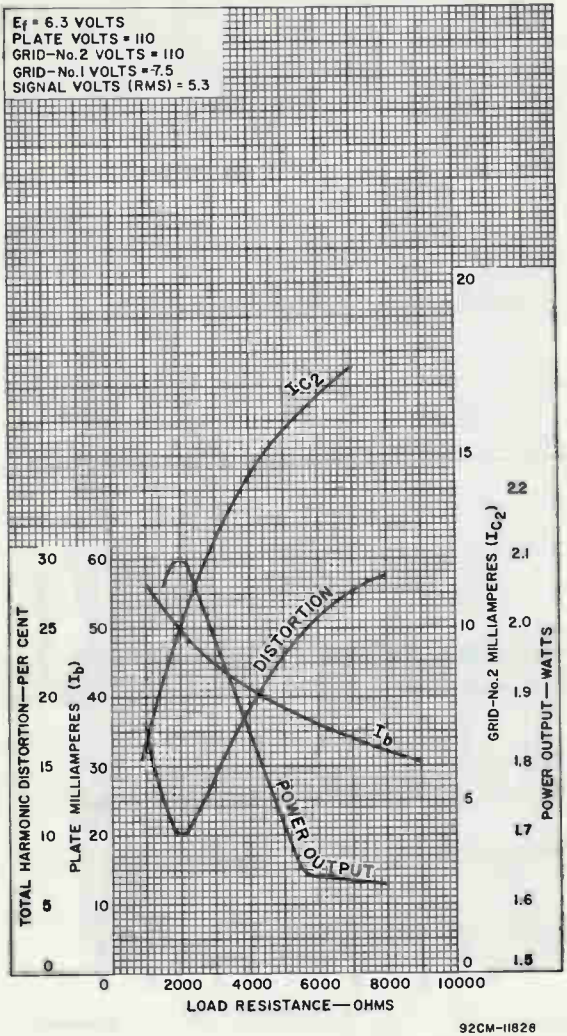


RADIO CORPORATION OF AMERICA
Electron Tube Division
Harrison, N. J.

AVERAGE CHARACTERISTICS



OPERATION CHARACTERISTICS



6GE5

Beam Power Tube

DUODECAR TYPE

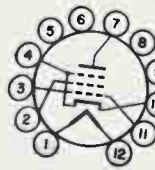
GENERAL DATA

Electrical:

Heater Characteristics and Ratings:					
Voltage (AC or DC)				6.3 ± 0.6	volts
Current at heater volts = 6.3				1.200	amp
Peak heater—cathode voltage:					
Heater negative with respect to cathode				200 max.	volts
Heater positive with respect to cathode				200[a] max.	volts
Direct Interelectrode Capacitances (Approx.):[b]					
Grid No. 1 to plate				0.34	pf
Grid No.1 to cathode & grid No.3, grid No.2, and heater				16.0	pf
Plate to cathode & grid No.3, grid No.2, and heater				7.0	pf
Characteristics, Class A_1 Amplifier:					
Plate Voltage	60	150	250	5000	volts
Grid-No.2 Voltage	150	150	150	150	volts
Grid-No.1 Voltage	0	-22.5	-22.5	–	volts
Mu-Factor, Grid No.2 to Grid No.1	–	4.4	–		
Plate Resistance (Approx.)	–	–	18000	–	ohms
Transconductance	–	–	7300	–	μmhos
Plate Current	345[c]	–	65	–	ma
Grid-No.2 Current	27[c]	–	1.8	–	ma
Grid-No.1 Voltage (Approx.) for plate ma. = 1	–	–	-42	-100	volts

Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	2.875"
Seated Length	2.250" to 2.500"
Diameter	1.437" to 1.563"
Bulb	T12
Base	Large-Button Duodecar 12-Pin (JEDEC No.E12-74)
Basing Designation for BOTTOM VIEW	12BJ



Pin 1 – Heater
Pin 2 – Grid No.2
Pin 3 – Grid No.1
Pin 4 – Cathode, Grid No.3
Pin 5 – Do Not Use[d]
Pin 6 – Do Not Use[d]
Pin 7 – Plate
Pin 8 – Do Not Use[d]
Pin 9 – Do Not Use[d]
Pin 10 – Cathode, Grid No.3
Pin 11 – Grid No.1
Pin 12 – Heater

6GE5

HORIZONTAL-DEFLECTION AMPLIFIER

Maximum Ratings, *Design-Maximum Values:*

For operation in a 525-line, 30-frame system[e]

DC PLATE-SUPPLY VOLTAGE	770 max.	volts
PEAK POSITIVE-PULSE PLATE VOLTAGE[f]	6500 max.	volts
PEAK NEGATIVE-PULSE PLATE VOLTAGE	1500 max.	volts
DC GRID-No.2 (SCREEN-GRID) VOLTAGE	220 max.	volts
DC GRID-No.1 (CONTROL-GRID) VOLTAGE	-55 max.	volt.
PEAK NEGATIVE-PULSE GRID-No.1 VOLTAGE	330 max.	volt
CATHODE CURRENT:		
Peak	550 max.	ma
Average	175 max.	ma
GRID-No.2 INPUT	3.5 max.	watts
PLATE DISSIPATION[g]	17.5 max.	watts
BULB TEMPERATURE (At hottest point on bulb surface)	220 max.	°C

Maximum Circuit Values:

Grid-No.1-Circuit Resistance: For grid resistor-bias operation	1 max. megohm

[a] The dc component must not exceed 100 volts.

[b] Without external shield.

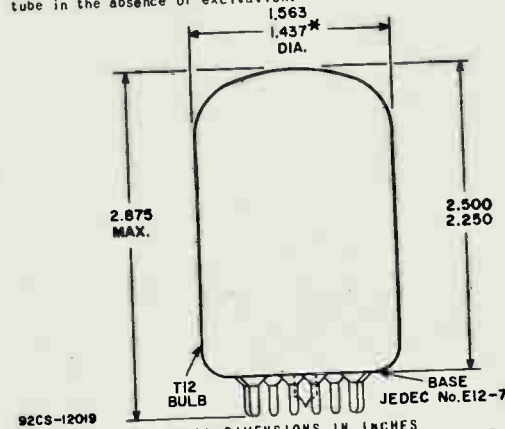
[c] This value can be measured by a method involving a recurrent wave form such that the maximum ratings of the tube will not be exceeded.

[d] Socket terminals 5,6,8, and 9 should not be used as tie points.

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

[f] This rating is applicable where the duration of the voltage pulse does 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.

[g] An adequate bias resistor or other means is required to protect the tube in the absence of excitation.



ALL DIMENSIONS IN INCHES

*APPLIES TO MINIMUM DIAMETER EXCEPT IN THE AREA OF THE SEAL.

RADIO CORPORATION OF AMERICA
Electron Tube Division
Harrison, N. J.

6GF7A

Dual Triode

With High-Mu Unit and Low-Mu Unit

NOVAR TYPE

For Combined Vertical-Deflection-Oscillator and-Amplifier Service in TV Receivers

Electrical:

Heater Characteristics and Ratings:

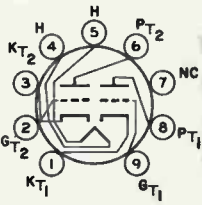
Voltage (AC or DC)	6.3 ± 0.6	volts
Current at heater volts = 6.3	0.985	amp
Peak heater–cathode voltage (Each unit):		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200[a] max.	volts

Direct Interelectrode Capacitances (Approx.):

	Unit No.1	*Unit No.2*	
Grid to plate	4.6	9.0	pf
G to (K,H)	2.4	6.5	pf
P to (K,H)	0.26	1.4	pf

Mechanical:

Operating Position	Any
Types of Cathodes	Coated Unipotential
Maximum Overall Length	2.380"
Seated Length	1.750" to 2.000"
Diameter	1.062" to 1.188"
Dimensional Outline	See *General Section*
Bulb	T9
Base	Small-Button Novar, 9-Pin with Exhaust Tip (JEDEC No. E9-89)
Basing Designation for BOTTOM VIEW	9QD



Pin 1 – Cathode of Unit No.1
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.2
Pin 7 – No Internal Connection
Pin 8 – Plate of Unit No.1
Pin 9 – Grid of Unit No.1

Characteristics, Class A_1 Amplifier:

	Unit No.1	*Unit No.2*			
Plate Voltage	250	60	150	250	volts
Grid Voltage	-3	0	-20	-28	volts
Amplification Factor	64	–	5.4	–	
Plate Resistance (Approx.)	40000	–	750	–	ohms
Plate Current	1.4	95	50	10	ma
Grid-Voltage (Approx.) for plate μa = 10	-5.5	–	–	–	volts
100	–	–	-45	–	volts

VERTICAL-DEFLECTION OSCILLATOR

Values are for Unit No. 1

Maximum Ratings, *Design-Maximum Values:*

For operation in a 525-line, 30-frame system[b]

DC Plate Voltage	330	max.	volts
Peak Negative Pulse-Grid Voltage	400	max.	volts
Cathode Current:			
Peak	77	max.	ma
Average	22	max.	ma
Plate Dissipation	1.5	max.	watts

Maximum Circuit Values:

Grid-Circuit Resistance:			
For grid-resistor-bias or cathode-bias operation	2.2	max.	megohms

VERTICAL-DEFLECTION AMPLIFIER

Values are for Unit No. 2

Maximum Ratings, *Design-Maximum Values Except as Noted:*

For operation in a 525-line, 30-frame system[b]

DC Plate Voltage	330	max.	volts
Peak Positive-Pulse Plate Voltage (Absolute-maximum value)[c]	1500[d]	max.	volts
Peak Negative-Pulse Grid Voltage	250	max.	volts
Cathode Current:			
Peak	175	max.	ma
Average	50	max.	ma
Plate Dissipation	11	max.	watts

Maximum Circuit Values:

Grid-Circuit Resistance:			
For grid-resistor-bias operation	2.2	max.	megohms
For cathode-bias operation	2.2	max.	megohms

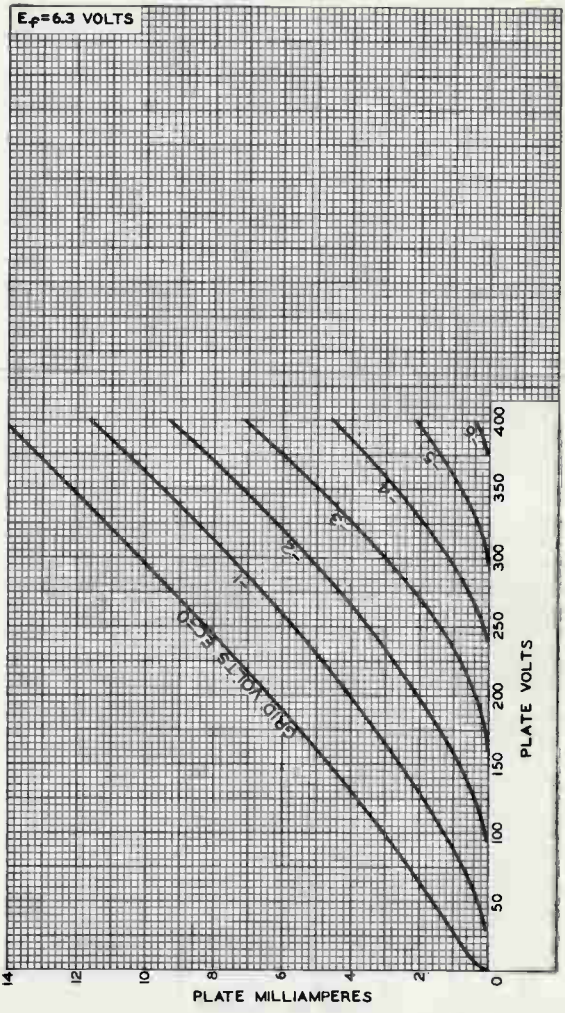
[a] The dc component must not exceed 100 volts.

[b] As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations" Federal Communications Commission.

[c] This rating is applicable where the duration of the voltage pulse does not exceed 15 per cent of one vertical scanning cycle. In a 525-line, 30-frame system, 15 per cent of one vertical scanning cycle is 2.5 milliseconds.

[d] Under no circumstances should this absolute-maximum value be exceeded.

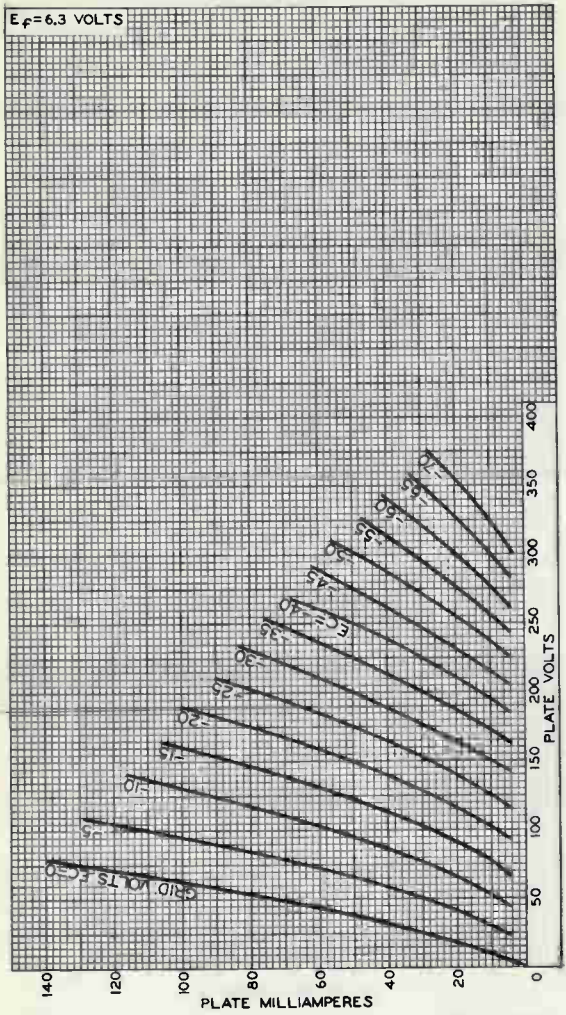
AVERAGE PLATE CHARACTERISTICS
Unit No.1



92CM-9912

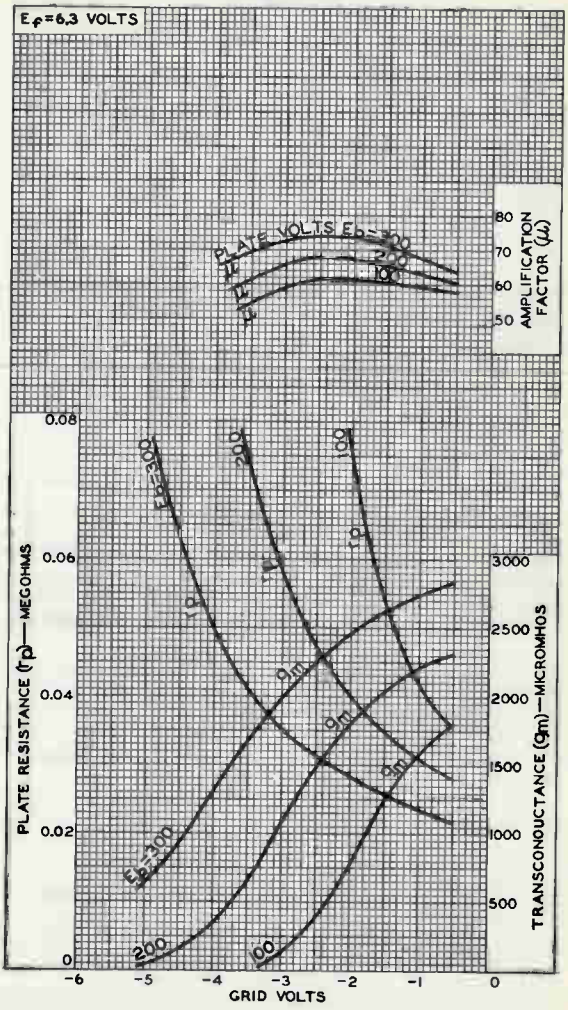
6GF7A

AVERAGE PLATE CHARACTERISTICS
Unit No.2



92CM-10466

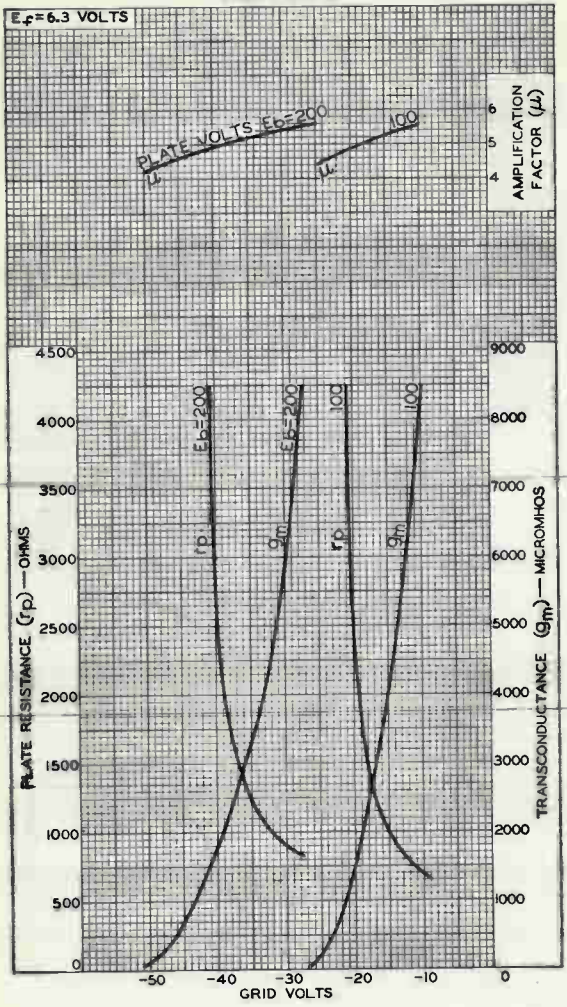
AVERAGE CHARACTERISTICS
Unit No.1



92CM-9915RI

6GF7A

AVERAGE CHARACTERISTICS
Unit No.2



92CM-10467

Medium-Mu Triode—Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

For Multivibrator-Type Horizontal-Deflection Oscillator, AGC Amplifier, and Sync-Separator Applications

GENERAL DATA

Electrical:

Heater Characteristics and Ratings:

Voltage (AC or DC)	6.3[a]	6.3 ± 0.6	volts
Current	0.450 ± 0.030	0.450[b]	amp
Warm-up time (Average)	11	–	sec
Peak heater-cathode voltage (Each unit):			
Heater negative with respect to cathode		200 max.	volts
Heater positive with respect to cathode		200[c] max.	volts

Direct Interelectrode Capacitances:

	Without External Shield	*With External Shield*[d]	
Triode Unit:			
Grid to plate	1.7	1.7	pf
Grid to cathode, pentode grid No.3 & pentode cathode & internal shield, and heater	3.0	3.2	pf
Plate to cathode, pentode grid No.3 & pentode cathode & internal shield, and heater	1.4	1.9	pf
Heater to cathode	3.0	3.0[e]	pf
Pentode Unit:			
Grid No.1 to plate	0.02 max.	0.01 max.	pf
Grid No.1 to cathode & grid No.3 & internal shield, grid No.2, and heater	5.0	5.0	pf
Plate to cathode & grid No.3 & internal shield, grid No.2, and heater	2.6	3.4	pf
Heater to cathode & grid No.3 & internal shield	3.0	3.0[e]	pf

Characteristics, Class A_1 Amplifier:

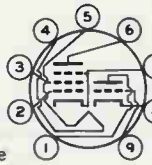
	Triode Unit	*Pentode Unit*	
Plate Voltage	125	125	volts
Grid-No.2 Voltage	–	125	volts
Grid-No.1 Voltage	−1	−1	volt
Amplification Factor	46	–	
Plate Resistance (Approx.)	5400	200000	ohms
Transconductance	8500	7500	μmhos

Plate Current	13.5	12	ma
Grid-No.2 Current	–	4	ma
Grid-No.1 Voltage (Approx.) for plate μa = 10	-8	-8	volts

Mechanical:

Operating Position	Any
Type of Cathodes	Coated Unipotential
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	9AE

Pin 1 – Triode Plate
Pin 2 – Pentode Grid No.1
Pin 3 – Pentode Grid No.2
Pin 4 – Heater
Pin 5 – Heater
Pin 6 – Pentode Plate



Pin 7 – Pentode Cathode, Pentode Grid No.3, Internal Shield
Pin 8 – Triode Cathode
Pin 9 – Triode Grid

HORIZONTAL-DEFLECTION OSCILLATOR

For operation in a 525-line, 30-frame system[f]

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

	Triode Unit	*Pentode Unit*	
PLATE VOLTAGE	330 max.	350 max.	volts
GRID-No.2 (SCREEN-GRID) VOLTAGE	–	330 max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:			
Positive-bias value	0 max.	0 max.	volts
Peak-negative value	–	175 max.	volts
PLATE DISSIPATION	2.5 max.	2.5 max.	watts
GRID-No.2 INPUT	–	0.55 max.	watts
CATHODE CURRENT:			
Peak	–	300 max.	ma
Average	–	20 max.	ma

Maximum Circuit Values (Each Unit):

Grid-No.1-Circuit Resistance: For fixed-bias or cathode-bias operation	2.2 max.	megohms

[a] At heater amperes = 0.450.
[b] At heater volts = 6.3.
[c] The dc component must not exceed 100 volts.
[d] With external shield JEDEC No.315 connected to cathode of unit under test except as noted.
[e] With external shield JEDEC No.315 connected to ground.
[f] As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations," Federal Communications Commission.

INTERELECTRODE LEAKAGE

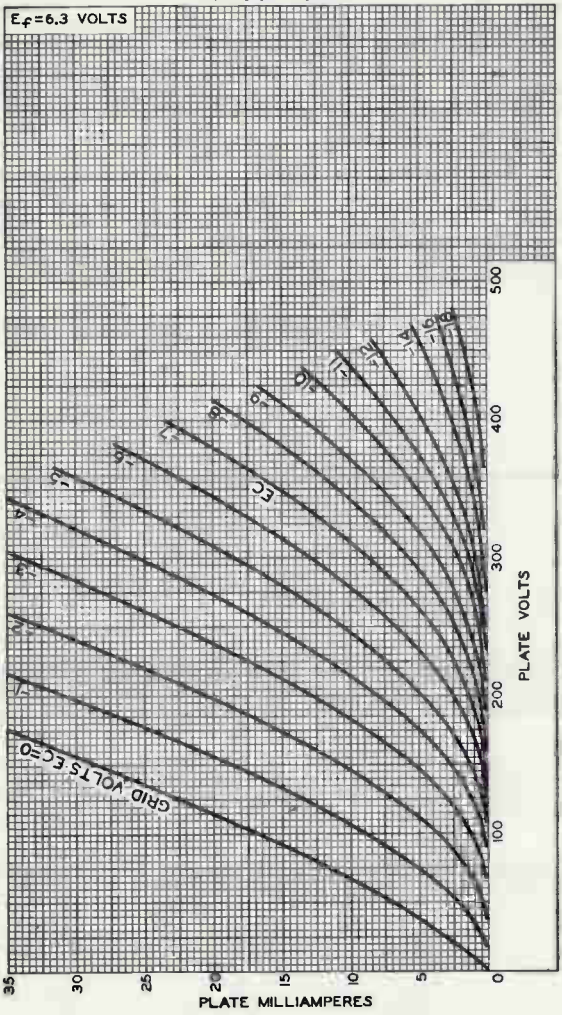
Leakage Resistance between Plate of Each Unit and All Other Electrodes of both units tied together . . . . . 100 min. megohms

This test is performed under the following conditions: heater volts = 6.3; and plate 300 volts negative with respect to all other electrodes tied together.

Leakage Resistance between Grid No.1 of Each Unit and All Other Electrodes of both units tied together . . . . . 100 min. megohms

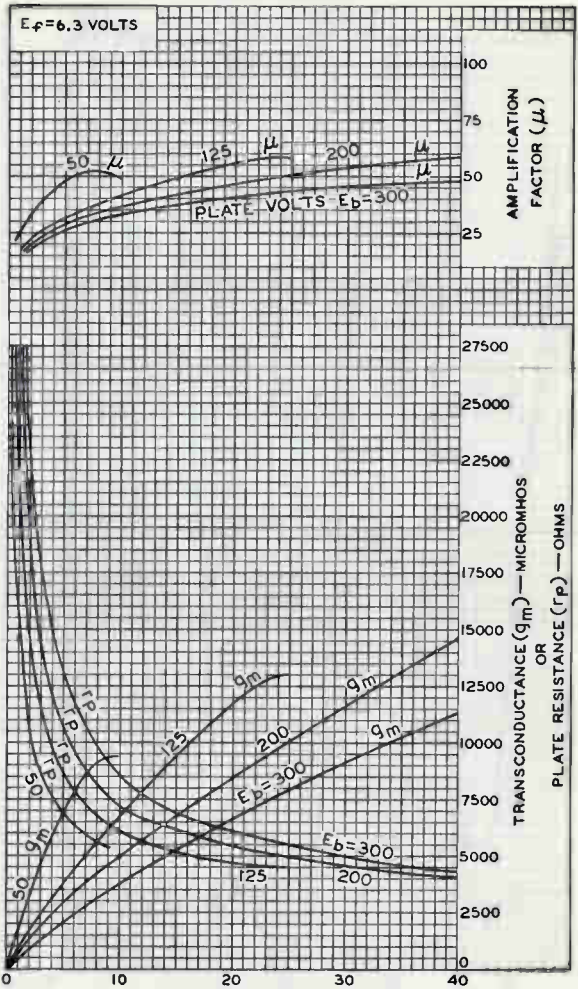
This test is performed under the following conditions: heater volts = 6.3; and grid 100 volts negative with respect to all other electrodes tied together.

AVERAGE PLATE CHARACTERISTICS
Triode Unit



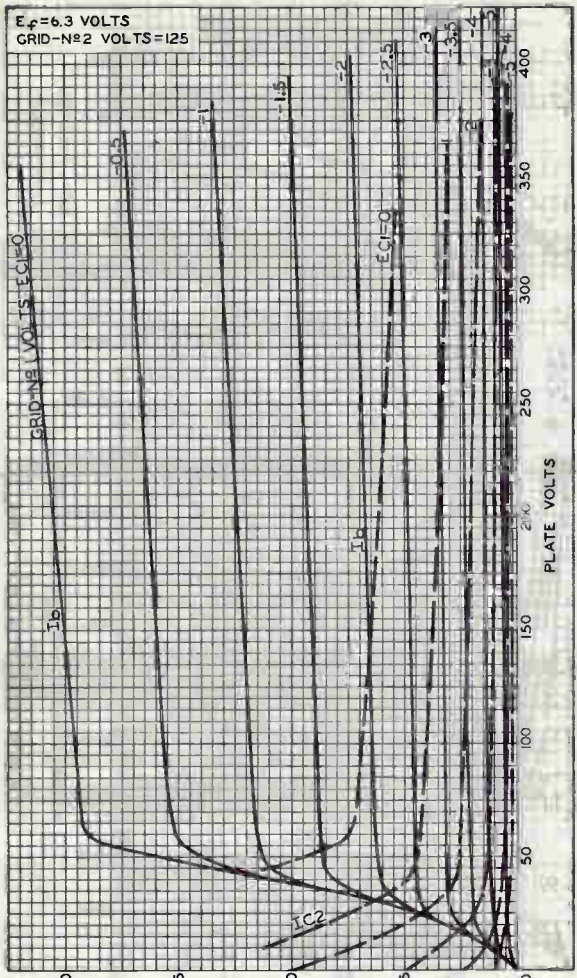
92CM-10421RI

AVERAGE CHARACTERISTICS
Triode Unit



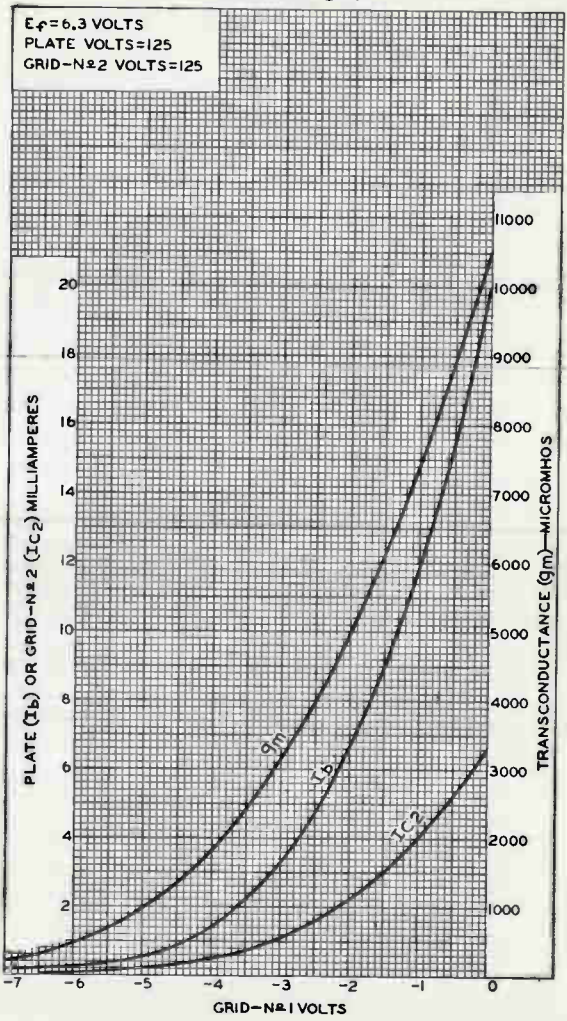
92CM—10428

AVERAGE CHARACTERISTICS
Pentode Unit



92CM-10436

AVERAGE CHARACTERISTICS
Pentode Unit



92CM-10417

6GJ5A

Beam Power Tube

NOVAR TYPE

For Horizontal-Deflection-Amplifier Service in Black-and-White TV Receivers

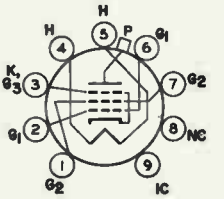
Electrical:

Heater Ratings and Characteristics:		
Voltage (AC or DC)	6.3 ± 0.6	volts
Current at heater volts = 6.3	1.200	amp
Peak heater-cathode voltage:		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200 max.[a]	volts
Direct Interelectrode Capacitances (Approx.):[b]		
Grid No.1 to plate	0.26	pf
Input: G1 to (K,G3,G2,H)	15.0	pf
Output: P to (K,G3,G2,H)	6.5	pf

Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	3.505"
Seated Length	2.875" to 3.125"
Diameter	1.438" to 1.562"
Dimensional Outline	See *General Section*
Bulb	T12
Cap	Skirted Miniature (JEDEC C1-2 or C1-3)
Base	Large-Button Novar 9-Pin with Exhaust Tip (JEDEC No.E9-88)
Basing Designation for BOTTOM VIEW	9QK

Pin 1 - Grid No.2
Pin 2 - Grid No.1
Pin 3 - Cathode, Grid No.3
Pin 4 - Heater
Pin 5 - Heater
Pin 6 - Grid No.1
Pin 7 - Grid No.2
Pin 8 - No Internal Connection
Pin 9 - Do Not Use
Cap - Plate



Characteristics, Class A_1 Amplifier:

	Triode Connection	*Pentode Connection*		
Plate Voltage	150	60	250	volts
Grid-No.2 Voltage	150	150	150	volts
Grid-No.1 Voltage	-22.5	0	-22.5	volts
Mu-factor, Grid No.2 to Grid No.1	4.4	–	–	
Plate Resistance (Approx.)	–	–	15000	ohms
Transconductance	–	–	7100	μmhos

	Triode Connection	Pentode Connection		
Plate Current	–	390[c]	70	ma
Grid-No. 2 Current	–	32[c]	2.1	ma
Grid-No. 1 Voltage (Approx.) for plate ma = 1.	–	–	−42	volts

HORIZONTAL-DEFLECTION AMPLIFIER

Maximum Ratings, *Design-Maximum Values:*

For operation in a 525-line, 30-frame system[d]

DC Plate-Supply Voltage	770	max.	volts
Peak Positive-Pulse Plate Voltage[e]	6500	max.	volts
Peak Negative-Pulse Plate Voltage	1500	max.	volts
DC Grid-No. 2 (Screen-Grid) Voltage	220	max.	volts
DC Grid-No. 1 (Control-Grid) Voltage	−55	max.	volts
Peak Negative-Pulse Grid-No. 1 Voltage	330	max.	volts
Cathode Current:			
Peak	550	max.	ma
Average	175	max.	ma
Grid-No. 2 Input	3.5	max.	watts
Plate Dissipation[f]	17.5	max.	watts
Bulb Temperature (At hottest point on bulb surface)	240	max.	°C

Maximum Circuit Values:

Grid-No. 1-Circuit Resistance: For grid resistor-bias operation	1	max.	megohm

[a] The dc component must not exceed 100 volts.

[b] Without external shield.

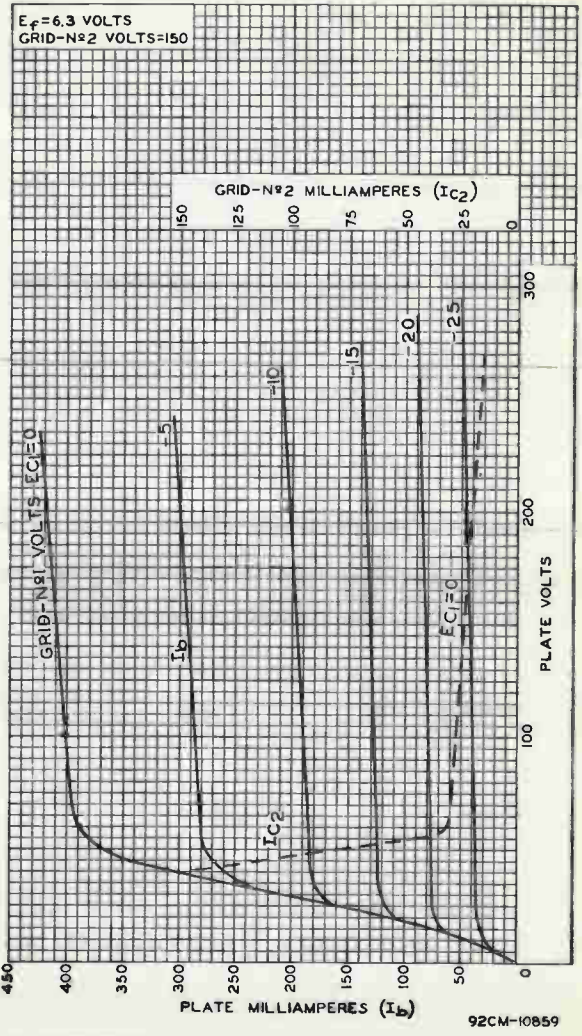
[c] This value can be measured by a method involving a recurrent wave form such that the maximum ratings of the tube will not be exceeded.

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

[e] This rating is applicable where the duration of the voltage pulse does 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.

[f] An adequate bias resistor or other means is required to protect the tube in the absence of excitation.

AVERAGE CHARACTERISTICS



Medium-Mu Triode—Sharp-Cutoff Pentode

ELECTRICAL

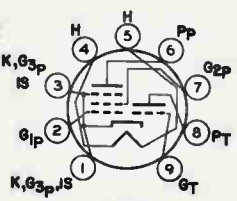
Heater Characteristics and Ratings		
Voltage (AC or DC)	6.3 ± 0.6	V
Current at 6.3 V	0.410	A
Heater-cathode voltage[a]	110 max	V
Direct Interelectrode Capacitances (Approx.)		
Triode Unit		
P_T to G_T	1.8	pF
G_T to K, H	3.3	pF
P_T to all except G1p	1.7	pF
Pentode Unit (With external shield)		
Input	6.2	pF
Output	3.5	pF
Pp to G1p	0.009	pF
G1p to G2p	1.5	pF
Between Triode and Pentode Units		
P_T to Pp	0.025 max	pF
Pp to G_T	0.01 max	pF
P_T to G1p	0.01 max	pF
G_T to G1p	0.01 max	pF

MECHANICAL

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	2 in
Maximum Seated Length	1-3/4 in
Diameter	0.750 to 0.875 in
Envelope	JEDEC T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)

TERMINAL DIAGRAM (Bottom View)

Pin 1 – Cathode, Pentode Grid No.3, Internal Shield
Pin 2 – Pentode Grid No.1
Pin 3 – Same as Pin 1
Pin 4 – Heater
Pin 5 – Heater
Pin 6 – Pentode Plate
Pin 7 – Pentode Grid No.2
Pin 8 – Triode Plate
Pin 9 – Triode Grid



90A

CHARACTERISTICS

	Triode Unit	*Pentode Unit*	
Plate Voltage	100	170	V
Grid-No.2 Voltage	-	120	V
Grid-No.1 Voltage	-8	-1.2	V
Amplification Factor	20	55[b]	

	Triode Unit	Pentode Unit	
Plate Resistance (Approx.)	-	0.35	MΩ
Transconductance	9000	11000	μmhos
Plate Current	15	10	mA
Grid No.2 Current	-	3	mA

DESIGN-MAXIMUM RATINGS

	Triode Unit	Pentode Unit	
Plate-Supply Voltage	600	600	V
DC Plate Voltage	140	275	V
Grid-No.2 Supply Voltage	-	600	V
DC Grid-No.2 (Screen-Grid) Voltage	-	275	V
DC Grid-No.1 (Control-Grid) Voltage	-	-50	V
Cathode Current	22	20	mA
Plate Dissipation	1.8	2.4	W
Grid-No.2 Input[c]	-	0.55	W

MAXIMUM CIRCUIT VALUES

Grid-No.1-Circuit Resistance			
For fixed-bias operation	0.5	1	MΩ
For cathode-bias operation	0.5	2.2	MΩ

[a] The hum should be minimized in intercarrier receiver applications by limiting the heater-cathode voltage to 100 volts rms, and in AM receivers to 50 volts rms.

[b] Grid No.2 to grid No.1; approximate value.

[c] When control grid bias is between -1.5 and -2 volts, screen dissipation is limited to 0.50 watt. When this bias is greater than -2 volts, maximum screen dissipation is 0.36 watt.

RADIO CORPORATION OF AMERICA
Electronic Components and Devices Harrison, N. J.

High-Mu Triode

7-PIN MINIATURE TYPE

For VHF-Amplifier Applications

GENERAL DATA

Electrical:

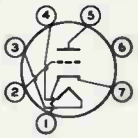
Heater, for Unipotential Cathode:		
Voltage (AC or DC)	6.3 ± 10%	volts
Current at 6.3 volts	0.18	amp
Direct Interelectrode Capacitances (Approx.):[a]		
Grid to plate	0.52	μμf
Grid to cathode, internal shield, and heater	5	μμf
Plate to cathode, internal shield, and heater	3.5	μμf
Heater to cathode	2.5[b]	μμf

Characteristics, Class A_1 Amplifier:

Plate Voltage	135	volts
Grid Voltage	-1	volt
Amplification Factor	78	
Plate Resistance (Approx.)	5400	ohms
Transconductance	15000	μmhos
Plate Current	11.5	ma
Grid Voltage (Approx.) for transconductance (μmhos) =		
150	-4.2	volts
1500	-2.5	volts
Input Resistance[c]	275	ohms
Input Capacitance[c]	11.2	μμf
Noise Figure[d]	4.7	db

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	7FP



Pin 1 – Cathode
Pin 2 – Grid
Pin 3 – Heater
Pin 4 – Heater
Pin 5 – Plate
Pin 6 – Internal Shield
Pin 7 – Cathode

AMPLIFIER — Class A_1

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

PLATE VOLTAGE	200 max.	volts
GRID VOLTAGE:		
Negative-bias value	50 max.	volts
Positive-bias value	0 max.	volts
AVERAGE CATHODE CURRENT	22 max.	ma
PLATE DISSIPATION	2.5 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	100 max.	volts
Heater positive with respect to cathode	100 max.	volts

Maximum Circuit Values:

Grid-Circuit Resistance:		
For cathode-bias operation	1 max.	megohm

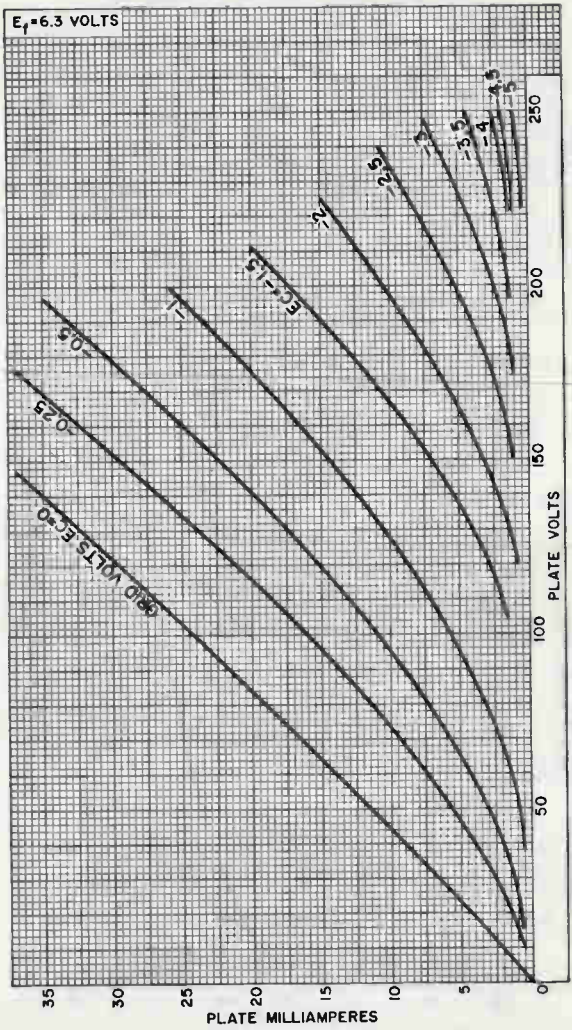
[a] With external shield JEDEC No.316 connected to cathode except as noted.

[b] With external shield JEDEC No.316 and internal shield connected to ground.

[c] Measured at 200 Mc with heater volts = 6.3 and plate effectively grounded for rf voltages.

[d] For a neutralized triode amplifier at a frequency of 200 Mc with signal-source impedance adjusted for minimum noise output.

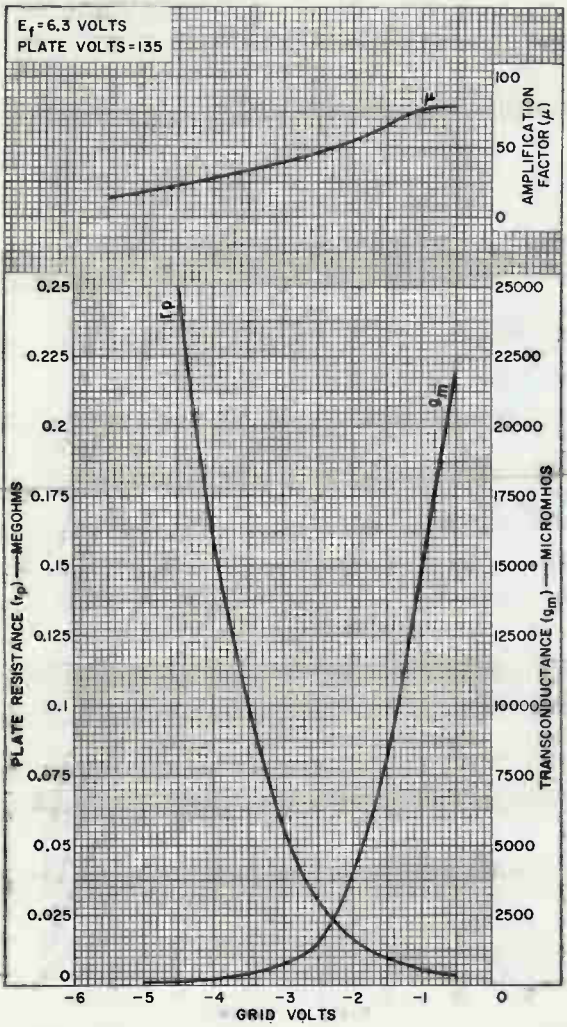
AVERAGE PLATE CHARACTERISTICS



92CM-11024

6GK5

AVERAGE CHARACTERISTICS



92CM-11023

Power Pentode

9-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	6.3 ± 10%	volts
Current at 6.3 volts	0.76	amp
Direct Interelectrode Capacitances:[a]		
Grid No.1 to plate	0.14 max.	μμf
Grid No.1 to cathode, grid No.3 & internal shield, grid No.2, and heater	10	μμf
Plate to cathode, grid No.3 & internal shield, grid No.2, and heater	7	μμf

Characteristics, Class A_1 Amplifier:

Plate Supply Voltage	250	volts
Grid-No.2 Supply Voltage	250	volts
Cathode Resistor	135	ohms
Mu-Factor, Grid No.2 to Grid No.1	19	
Plate Resistance (Approx.)	38000	ohms
Transconductance	11300	μmhos
Plate Current	48	ma
Grid-No.2 Current	5.5	ma

Mechanical:

Operating Position	Any
Maximum Overall Length	3-1/16"
Maximum Seated Length	2-13/16"
Length, Base Seat to Bulb Top (Excluding tip)	2-7/16" ± 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	9GK

Pin 1 - Cathode
Pin 2 - Grid No.1
Pin 3 - Grid No.3, Internal Shield
Pin 4 - Heater
Pin 5 - Heater

Pin 6 - No Connection
Pin 7 - Plate
Pin 8 - Grid No.2
Pin 9 - Grid No.3, Internal Shield

AF POWER AMPLIFIER — Class A_1

Maximum Ratings, *Design-Maximum Values:*

PLATE SUPPLY VOLTAGE	600 max.	volts
PLATE VOLTAGE	330 max.	volts
GRID-No.2 SUPPLY VOLTAGE	600 max.	volts
GRID-No.2 (SCREEN-GRID) VOLTAGE	330 max.	volts

GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Negative-bias value	100 max.	volts
CATHODE CURRENT	65 max.	ma
GRID-No.2 INPUT:		
Peak	4 max.	watts
Average	2 max.	watts
PLATE DISSIPATION	13.2 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:

Plate Supply Voltage	250	volts
Grid-No.2 Supply Voltage	250	volts
Cathode Resistor	135	ohms
Peak AF Grid-No.1 Voltage	7.3	volts
Zero-Signal Plate Current	48	ma
Max.-Signal Plate Current	50.6	ma
Zero-Signal Grid-No.2 Current	5.5	ma
Max.-Signal Grid-No.2 Current	10	ma
Effective Load Resistance	5200	ohms
Total Harmonic Distortion	10	%
Max.-Signal Power Output	5.7	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:		
For fixed-bias operation	0.3 max.	megohm
For cathode-bias operation	1 max.	megohm

PUSH-PULL AF POWER AMPLIFIER — Class AB_1

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

PLATE SUPPLY VOLTAGE	600 max.	volts
PLATE VOLTAGE	330 max.	volts
GRID-No.2 SUPPLY VOLTAGE	600 max.	volts
GRID-No.2 (SCREEN-GRID) VOLTAGE	330 max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Negative-bias value	100 max.	volts
CATHODE CURRENT	65 max.	ma
GRID-No.2 INPUT:		
Peak	4 max.	watts
Average	2 max.	watts
PLATE DISSIPATION	13.2 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:

	Values are for 2 tubes		
Plate Supply Voltage	250	300	volts
Grid-No.2 Supply Voltage	250	300	volts
Cathode Resistor	130	130	ohms
Peak AF Grid-No.1-to-Grid-No.1 Voltage	22.4	28	volts
Zero-Signal Plate Current	62	72	ma

Max.-Signal Plate Current	75	92	ma
Zero-Signal Grid-No.2 Current	7	8	ma
Max.-Signal Grid-No.2 Current	15	22	ma
Effective Load Resistance (Plate to plate)	8000	8000	ohms
Total Harmonic Distortion	3	4	%
Max.-Signal Power Output	11	17	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:		
For fixed-bias operation	0.3 max.	megohm
For cathode-bias operation	1 max.	megohm

PUSH-PULL AF POWER AMPLIFIER — Class B

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

PLATE SUPPLY VOLTAGE	600 max.	volts
PLATE VOLTAGE	330 max.	volts
GRID-No.2 SUPPLY VOLTAGE	600 max.	volts
GRID-No.2 (SCREEN-GRID) VOLTAGE	330 max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Negative-bias value	100 max.	volts
CATHODE CURRENT	65 max.	ma
GRID-No.2 INPUT:		
Peak	4 max.	watts
Average	2 max.	watts
PLATE DISSIPATION	13.2 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:

Values are for 2 tubes

Plate Voltage	250	300	volts
Grid-No.2 Voltage	250	300	volts
Grid-No.1 Voltage	-11.6	-14.7	volts
Peak AF Grid-No.1-to-Grid-No.1 Voltage	22.4	28	volts
Zero-Signal Plate Current	20	15	ma
Max.-Signal Plate Current	75	92	ma
Zero-Signal Grid-No.2 Current	2.2	1.6	ma
Max.-Signal Grid-No.2 Current	15	22	ma
Effective Load Resistance (Plate to plate)	8000	8000	ohms
Total Harmonic Distortion	3	4	%
Max.-Signal Power Output	11	17	watts

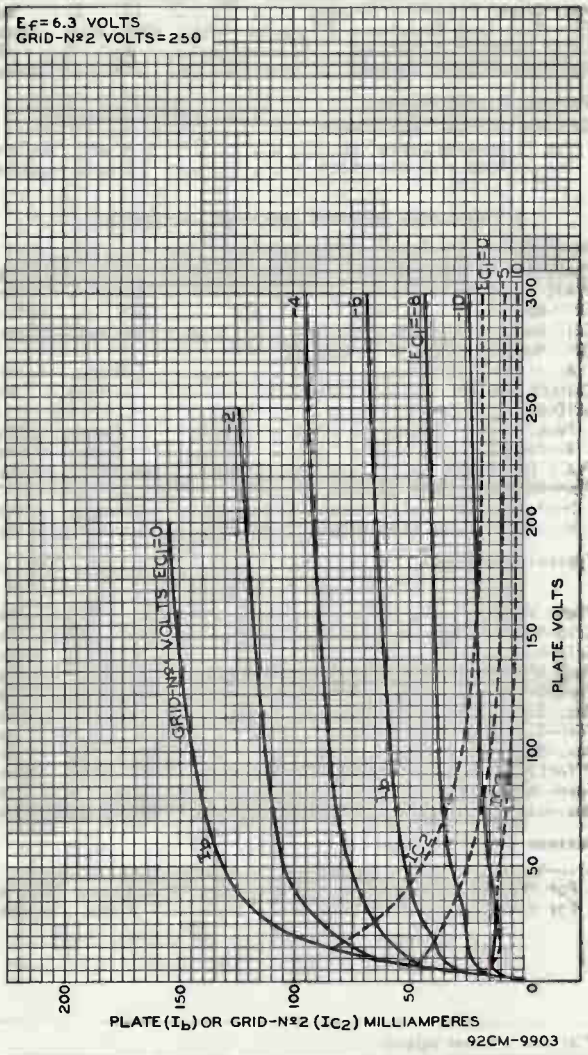
Maximum Circuit Values:

Grid-No.1-Circuit Resistance:		
For fixed-bias operation	0.3 max.	megohm
For cathode-bias operation	1 max.	megohm

[a] Without external shield.

6GK6

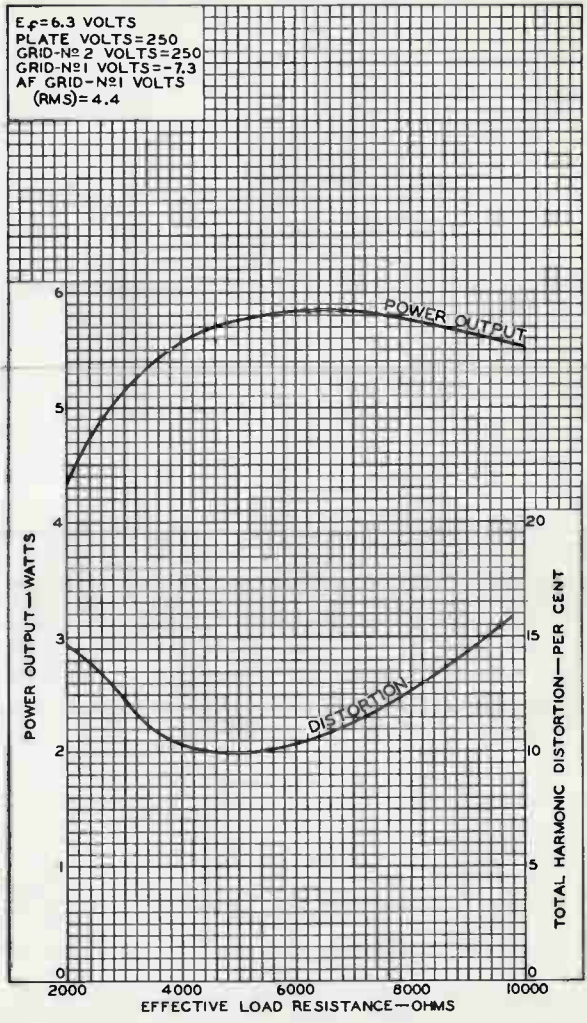
AVERAGE CHARACTERISTICS



92CM-9903

RADIO CORPORATION OF AMERICA
Electron Tube Division
Harrison, N. J.

OPERATION CHARACTERISTICS



92CM-9902

Dual Triode

With High-Mu Unit and Low-Mu Unit

GENERAL DATA

Electrical:

Heater Characteristics and Ratings:		
Voltage (AC or DC)	6.3 ± 0.6	volts
Current at heater volts = 6.3	1.05	amp
Peak heater-cathode voltage (Each unit):		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200[a] max.	volts

Direct Interelectrode Capacitances (Approx.):[b]

	Unit No.1	Unit No.2	
Grid to plate	4.0	8.0	pf
Grid to cathode and heater	2.2	6.0	pf
Plate to cathode and heater	0.6	1.3	pf

Characteristics, Class A_1 Amplifier:

	Unit No.1		Unit No.2		
Plate Voltage	250	275	60	175	volts
Grid Voltage	-3	[c]	0[d]	-25	volts
Amplification Factor	66	–	–	5	
Plate Resistance (Approx.)	30000	–	–	780	ohms
Transconductance	2200	1600	–	6400	μmhos
Plate Current	2	13	100	46	ma
Grid Voltage (Approx.) for plate μa =					
20	-5.3	–	–	–	volts
200	–	–	–	-60	volts

Mechanical:

Operating Position	Any
Type of Cathodes	Coated Unipotential
Maximum Overall Length	3"
Maximum Seated Length	2-7/16"
Maximum Diameter	1-9/32"
Bulb	T9
Base	Intermediate-Shell Octal 8-Pin, (JEDEC Group 1, No.88-6)
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

VERTICAL-DEFLECTION OSCILLATOR

Values are for Unit No.1

Maximum Ratings, *Design-Maximum Values:*

For operation in a 525-line, 30-frame system[e]

DC PLATE VOLTAGE	350 max.	volts
PEAK NEGATIVE-PULSE GRID VOLTAGE	400 max.	volts
PLATE DISSIPATION	1 max.	watt

Maximum Circuit Values:

Grid-Circuit Resistance:

For fixed-bias operation	1 max.	megohm
For cathode-bias operation	2.2 max.	megohms

VERTICAL-DEFLECTION AMPLIFIER

Values are for Unit No.2

Maximum Ratings, *Design-Maximum Values:*

For operation in a 525-line, 30-frame system[e]

DC PLATE VOLTAGE	550 max.	volts
PEAK POSITIVE-PULSE PLATE VOLTAGE[f]	1500 max.	volts
PEAK NEGATIVE-PULSE GRID VOLTAGE	250 max.	volts
CATHODE CURRENT:		
Peak	175 max.	ma
Average	50 max.	ma
PLATE DISSIPATION	10[g] max.	watts

Maximum Circuit Values:

Grid-Circuit Resistance:

For fixed-bias operation	1 max.	megohm
For cathode-bias operation	2.2 max.	megohms

[a] The dc component must not exceed 100 volts.

[b] Without external shield.

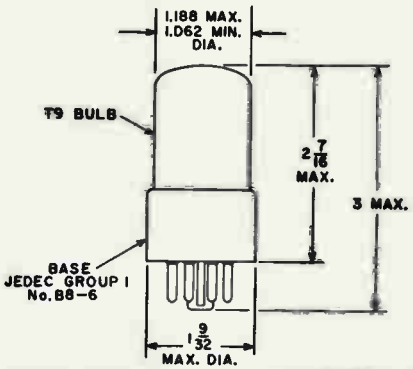
[c] Adjusted for plate ma.=13.

[d] Applied for short interval (two seconds maximum) so as not to damage tube.

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

[f] This rating is applicable when the duration of the voltage pulse does not exceed 15 per cent of one vertical scanning cycle. In a 525-line, 30-frame system, 15 per cent of one vertical scanning cycle is 2.5 milliseconds.

[g] In stages operating with grid-leak bias, an adequate cathode-bias resistor or other suitable means is required to protect the tube in the absence of excitation.



9263-11963

ALL DIMENSIONS IN INCHES

Semiremote-Cutoff Pentode

7-PIN MINIATURE TYPE

For Gain-Controlled, 40-Mc, Picture-IF Stages of TV Receivers

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:			
Voltage (AC or DC)		6.3 ± 10%	volts
Current at 6.3 volts		0.4	amp
Direct Interelectrode Capacitances:	*Without External Shield*	*With External Shield*▲	
Grid No.1 to plate	0.036 max.	0.026 max.	μμf
Grid No.1 to cathode, grid No.3 & internal shield, grid No.2, and heater	10	10	μμf
Plate to cathode, grid No.3 & internal shield, grid No.2, and heater	2.4	3.4	μμf

Characteristics, Class A_1 Amplifier:

Plate Supply Voltage	125	volts
Grid No.3 and Internal Shield	*Connected to cathode at socket*	
Grid-No.2 Supply Voltage	125	volts
Cathode Resistor	56	ohms
Plate Resistance (Approx.)	0.2	megohm
Transconductance	13000	μmhos
Plate Current	14	ma
Grid-No.2 Current	3.4	ma
Grid-No.1 Voltage (Approx.) for transconductance (μmhos)= 60	-15	volts

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	7CM

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, Internal Shield

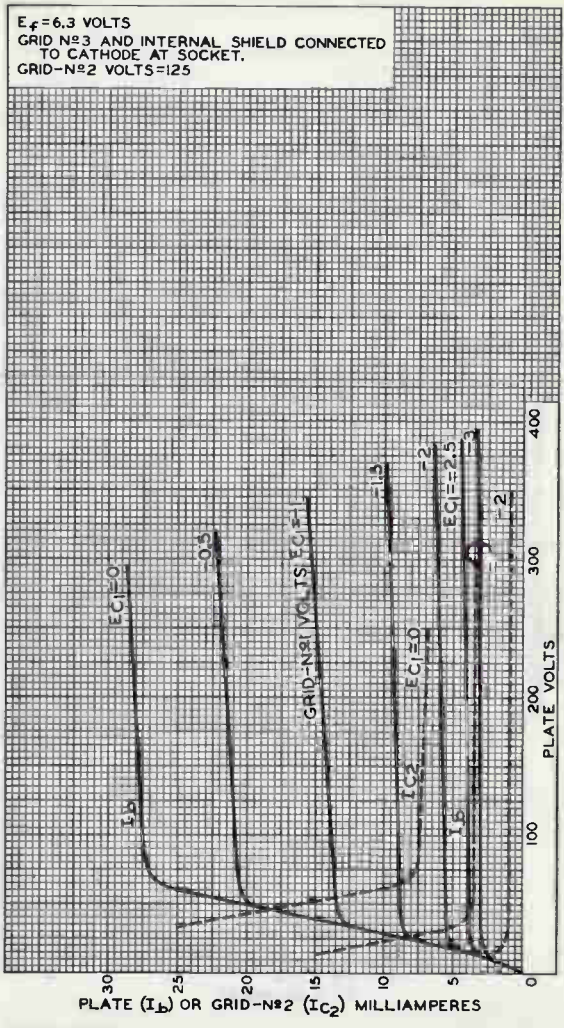
Maximum Ratings, *Design-Maximum Values:*

PLATE VOLTAGE	330 max.	volts
GRID No.3 (SUPPRESSOR GRID)	*Connect to cathode at socket*	
GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE	330 max.	volts
GRID-No.2 VOLTAGE	*See Grid-No.2 Input Rating Chart at front of Receiving Tube Section*	
GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Positive-bias value	0 max.	volts
GRID-No.2 INPUT:		
For grid-No.2 voltages up to 165 volts	0.65 max.	watt
For grid-No.2 voltages between 165 and 330 volts	*See Grid-No.2 Input Rating Chart at front of Receiving Tube Section*	
PLATE DISSIPATION	3.1 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200● max.	volts

▲ With external shield JEDEC No.316 connected to cathode.

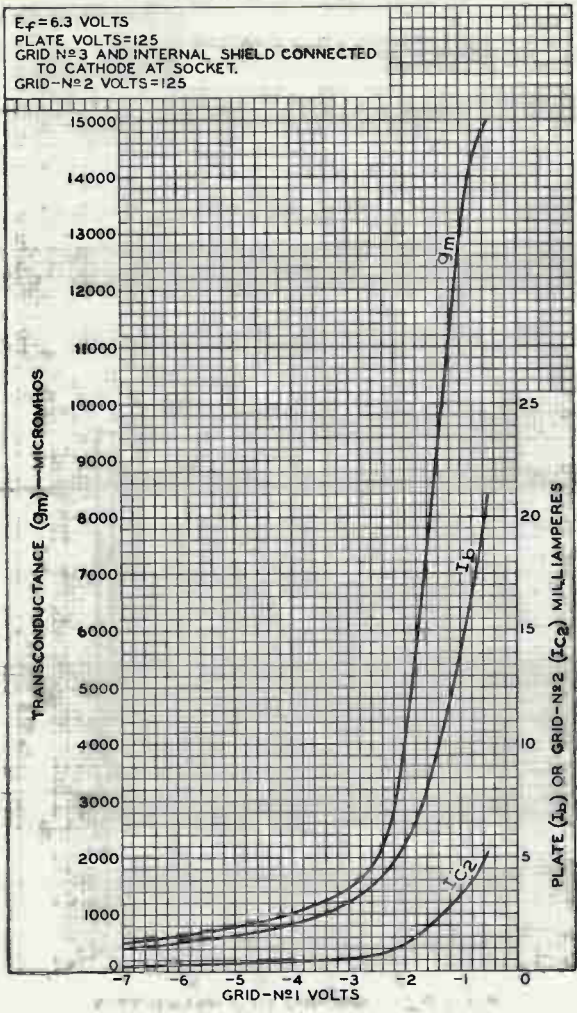
● The dc component must not exceed 100 volts.

AVERAGE CHARACTERISTICS



92CM-10390RI

AVERAGE CHARACTERISTICS



92CM-10391R1

High-Mu Triode—
Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:		
Voltage (AC or DC)	6.3 ± 10%	volts
Current at 6.3 volts	0.75	amp
Direct Interelectrode Capacitances:[a]		
Triode Unit:		
Grid to plate	4.4	μμf
Grid to cathode and heater	2.4	μμf
Plate to cathode and heater	0.36	μμf
Pentode Unit:		
Grid No.1 to plate	0.1 max.	μμf
Grid No.1 to cathode & internal shield & grid No.3, grid No.2, and heater	11	μμf
Plate to cathode & internal shield & grid No.3, grid No.2, and heater	4.2	μμf
Triode grid to pentode plate	0.018 max.	μμf
Pentode grid No.1 to triode plate	0.005 max.	μμf
Pentode plate to triode plate	0.17 max.	μμf

Characteristics, Class A_1 Amplifier:

	Triode Unit	*Pentode Unit*		
Plate Supply Voltage	250	60	200	volts
Grid-No.2 Supply Voltage	–	150	150	volts
Grid-No.1 Voltage	-2	0	–	volts
Cathode Resistor	–	–	100	ohms
Amplification Factor	100	–	–	
Plate Resistance (Approx.)	37000	–	60000	ohms
Transconductance	2700	–	11500	μmhos
Plate Current	2	55[b]	25	ma
Grid-No.2 Current	–	18[b]	5.5	ma
Grid-No.1 Voltage (Approx.) for plate μa = 100	–	–	-10	volts
Grid Voltage (Approx.) for plate μa = 20	-5	–	–	volts

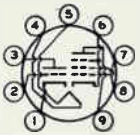
Mechanical:

Operating 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"
Diameter	0.750" to 0.875"
Dimensional Outline	See *General Section*
Bulb	T6-1/2

6GN8

Base. . . . . .Small-Button Noval 9-Pin (JEDEC No.E9-1)
Basing Designation for BOTTOM VIEW. 9DX

Pin 1 – Triode Cathode
Pin 2 – Triode Grid
Pin 3 – Triode Plate
Pin 4 – Heater
Pin 5 – Heater



Pin 6 – Pentode Cathode, Grid No.3, Internal Shield
Pin 7 – Pentode Grid No.1
Pin 8 – Pentode Grid No.2
Pin 9 – Pentode Plate

AMPLIFIER — Class A_1

Maximum Ratings, *Design-Maximum Values:*

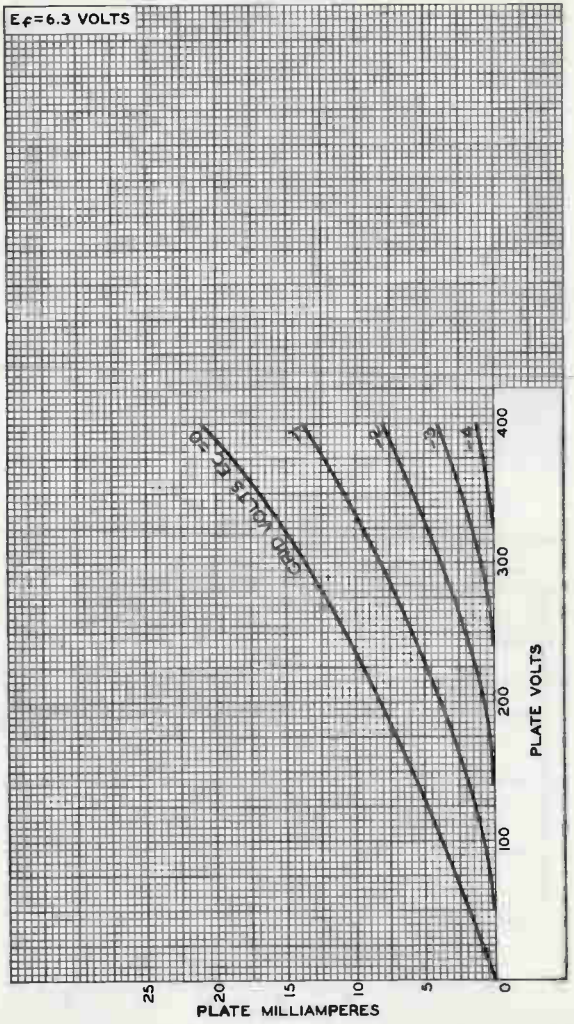
	Triode Unit		*Pentode Unit*		
PLATE VOLTAGE	330	max.	330	max.	volts
GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE	–		330	max.	volts
GRID-No.2 VOLTAGE	–		See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section		
GRID-No.1 (CONTROL-GRID) VOLTAGE:					
Positive-bias value	0	max.	0	max.	volts
PLATE DISSIPATION	1	max.	5	max.	watts
GRID-No.2 INPUT:					
For grid-No.2 voltages up to 165 volts	–		1.1	max.	watts
For grid-No.2 voltages between 165 and 330 volts			See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section		
PEAK HEATER-CATHODE VOLTAGE:					
Heater negative with respect to cathode	200	max.	200	max.	volts
Heater positive with respect to cathode	200[c]	max.	200[c]	max.	volts

Maximum Circuit Values:

	Triode Unit		*Pentode Unit*		
Grid-No.1-Circuit Resistance:					
For fixed-bias operation	0.5	max.	0.25	max.	megohm
For cathode-bias operation	1	max.	1	max.	megohm

[a] Without external shield.
[b] This value can be measured by a method involving a recurrent wave form such that the maximum ratings of the tube will not be exceeded.
[c] The dc component must not exceed 100 volts.

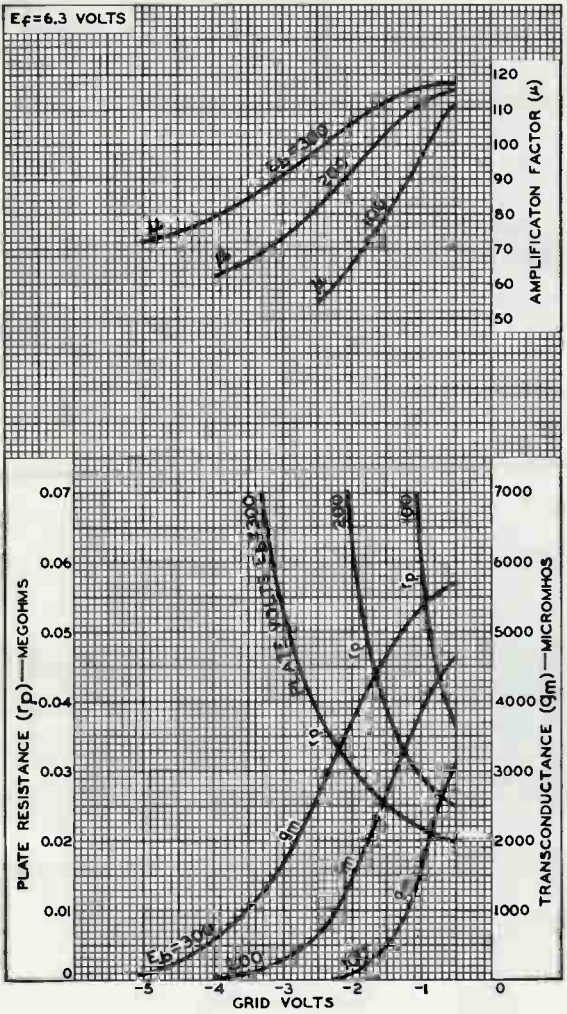
AVERAGE PLATE CHARACTERISTICS
Triode Unit



92CM-9907R1

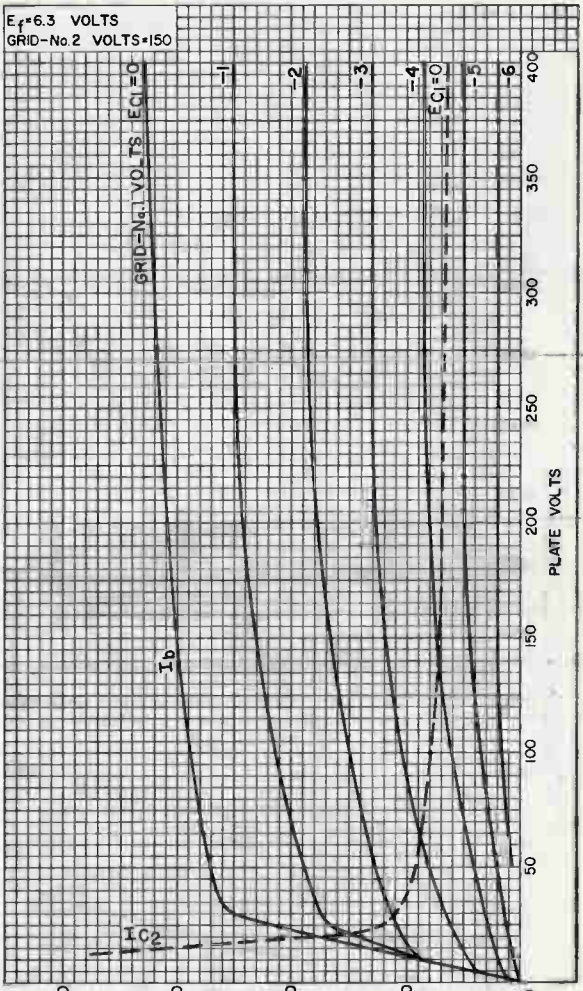
6GN8

AVERAGE CHARACTERISTICS
Triode Unit



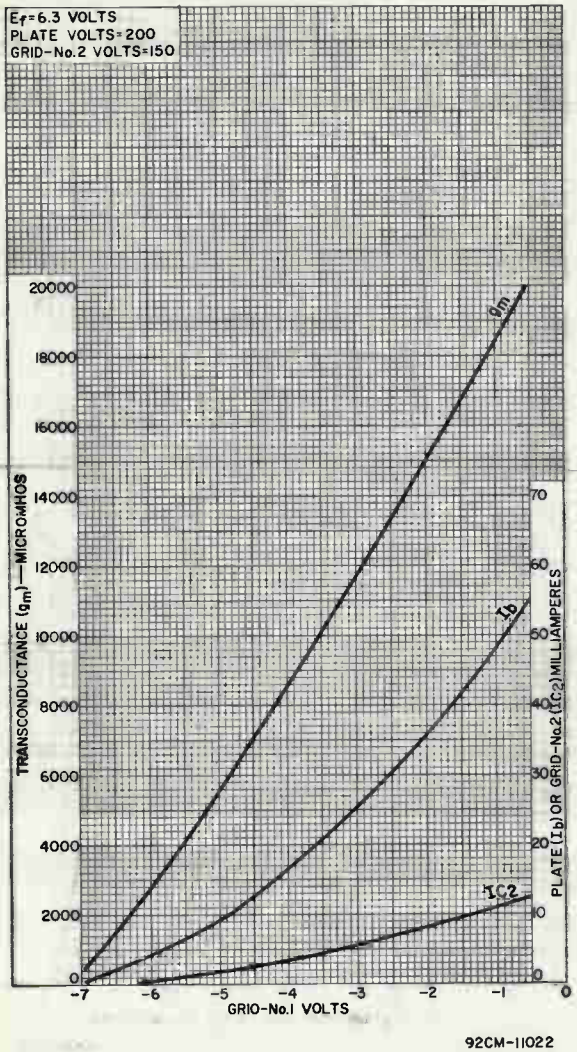
92CM-11025

AVERAGE CHARACTERISTICS
Pentode Unit



92CM-11021

AVERAGE CHARACTERISTICS
Pentode Unit



92CM-11022

RADIO CORPORATION OF AMERICA
Electron Tube Division
Harrison, N. J.

Beam Power Tube

NOVAR TYPE

For TV Horizontal-Deflection-Amplifier Applications

GENERAL DATA

Electrical:

Heater Characteristics and Ratings:			
Voltage (AC or DC)	6.3 ± 0.6		volts
Current at heater volts = 6.3	1.200		amp
Peak heater-cathode voltage:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200[a]	max.	volts
Direct Interelectrode Capacitances (Approx.):[b]			
Grid No.1 to plate	0.26		pf
Grid No.1 to cathode & grid No.3, grid No.2, and heater	15.0		pf
Plate to cathode & grid No.3, grid No.2, and heater	6.5		pf

Characteristics, Class A_1 Amplifier:

			Triode Connection[c]	
Plate Voltage	60	250	150	volts
Grid-No.2 Voltage	150	150	150	volts
Grid-No.1 Voltage	0	-22.5	-22.5	volts
Amplification Factor	-	-	4.4	
Plate Resistance (Approx.)	-	15000	-	ohms
Transconductance	-	7100	-	μmhos
Plate Current	390[d]	70	-	ma
Grid-No.2 Current	32[d]	2.1	-	ma
Grid-No.1 Voltage (Approx.) for plate ma. = 0.1	-	-42	-	volts

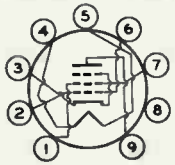
Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	3.410"
Maximum Seated Length	3.030"
Length, Base Seat to Bulb Top (Excluding tip)	2.510" to 2.690"
Diameter	1.438" to 1.562"
Bulb	T12
Socket	.Cinch Mfg. Co. No. 149 19 00 033, Industrial Electronic Hardware Co. No. SO-0968-SLI, or equivalent
Base	Large-Button Novar 9-Pin (JEDEC No. E9-76)

→ Indicates a change.

6GT5

Basing Designation for BOTTOM VIEW. 9NZ



Pin 1 – Grid No.2
Pin 2 – Grid No.1
Pin 3 – Cathode, Grid No.3
Pin 4 – Heater
Pin 5 – Heater
Pin 6 – Grid No.1
Pin 7 – Grid No.2
Pin 8 – Do Not Use
Pin 9 – Plate

HORIZONTAL-DEFLECTION AMPLIFIER

Maximum Ratings, *Design-Maximum Values:*

For operation in a 525-line, 30-frame system[e]

DC PLATE-SUPPLY VOLTAGE	770 max.	volts
PEAK POSITIVE-PULSE PLATE VOLTAGE[f]	6500 max.	volts
PEAK NEGATIVE-PULSE PLATE VOLTAGE	1500 max.	volts
DC GRID-No.2 (SCREEN-GRID) VOLTAGE.	220 max.	volts
DC GRID-No.1 (CONTROL-GRID) VOLTAGE	-55 max.	volts
PEAK NEGATIVE-PULSE GRID-No.1 VOLTAGE . . .	330 max.	volts
CATHODE CURRENT:		
Peak.	550 max.	ma
Average	175 max.	ma
GRID-No.2 INPUT	3.5 max.	watts
PLATE DISSIPATION[g].	17.5 max.	watts
BULB TEMPERATURE (At hottest point on bulb surface).	240 max.	°C

Maximum Circuit Values:

Grid-No.1-Circuit Resistance: For grid-resistor-bias operation.	1 max.	megohm

[a] The dc component must not exceed 100 volts.

[b] Without external shield.

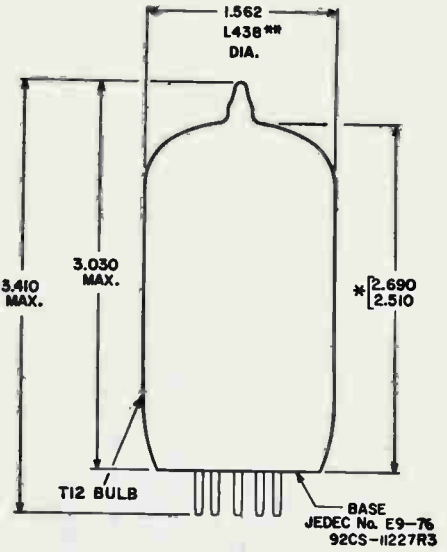
[c] With grid No.2 connected to plate.

[d] This value can be measured by a method involving a recurrent wave form such that the maximum ratings of the tube will not be exceeded.

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

[f] This rating is applicable where the duration of the voltage pulse does 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.

[g] An adequate bias resistor or other means is required to protect the tube in the absence of excitation.



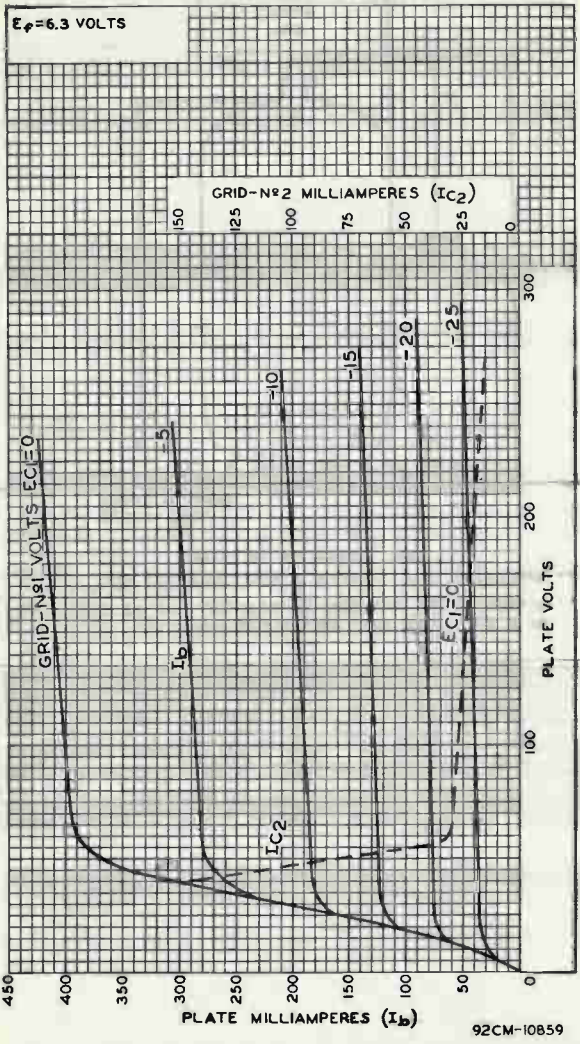
ALL DIMENSIONS IN INCHES

** APPLIES IN ZONE STARTING 0.375" FROM BASE SEAT.

* MEASURED FROM BASE SEAT TO BULB-TOP LINE AS DETERMINED BY A RING GAUGE OF 0.600" INSIDE DIAMETER.

6GT5

AVERAGE CHARACTERISTICS



Beam Power Tube

NOVAR TYPE

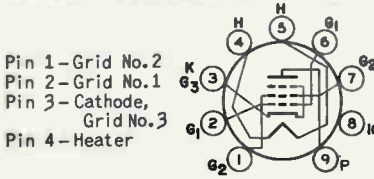
For Horizontal-Deflection-Amplifier Service in Black-and-White TV Receivers

Electrical:

Heater Characteristics and Ratings:		
Voltage (AC or DC)	6.3 ± 0.6	volts
Current at heater volts = 6.3	1.200	amp
Peak heater-cathode voltage:		
Heater negative with respect to cathode.	200 max.	volts
Heater positive with respect to cathode.	200[a] max.	volts
Direct Interelectrode Capacitances (Approx):[b]		
Grid No.1 to Plate	0.26	pf
Input: G1 to (K+G3,G2,H)	15.0	pf
Output: P to (K+G3,G2,H)	6.5	pf

Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	2.880"
Seated Length	2.250" to 2.500"
Diameter	1.438" to 1.562"
Dimensional Outline	See *General Section*
Bulb	T12
Base	Large-Button Novar 9-Pin with Exhaust Tip (JEDEC No. E9-88)
Basing Designation for BOTTOM VIEW	9NZ



Pin 1 - Grid No.2
Pin 2 - Grid No.1
Pin 3 - Cathode, Grid No.3
Pin 4 - Heater
Pin 5 - Heater
Pin 6 - Grid No.1
Pin 7 - Grid No.2
Pin 8 - Do Not Use
Pin 9 - Plate

Characteristics, Class A_1 Amplifier:

	Triode Connection[c]	*Pentode Connection*		
Plate Voltage	150	60	250	volts
Grid-No.2 Voltage	150	150	150	volts
Grid-No.1 Voltage	-22.5	0	-22.5	volts
Amplification Factor	4.4	–	–	
Plate Resistance (Approx.)	–	–	15000	ohms
Transconductance	–	–	7100	μmhos
Plate Current	–	39[d]	70	ma
Grid-No.2 Current	–	32[d]	2.1	ma
Grid-No.1 Voltage (Approx.) for plate ma = 0.1	–	–	-42	volts

HORIZONTAL-DEFLECTION AMPLIFIER

Maximum Ratings, *Design-Maximum Values:*

For operation in a 525-line, 30-frame system[e]

DC Plate-Supply Voltage	770 max.	volts
Peak Positive-Pulse Plate Voltage[f]	6500 max.	volts
Peak Negative-Pulse Plate Voltage	1500 max.	volts
DC Grid-No.2 (Screen-Grid) Voltage	220 max.	volts
DC Grid-No.1 (Control-Grid) Voltage	-55 max.	volts
Peak Negative-Pulse Grid-No.1 Voltage	330 max.	volts
Cathode Current:		
Peak	550 max.	ma
Average	175 max.	ma
Grid-No.2 Input	3.5 max.	watts
Plate Dissipation[g]	17.5 max.	watts
Bulb Temperature (At hottest point on bulb surface)	240 max.	°C

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:		
For grid-resistor-bias operation	1 max.	megohm

[a] The dc component must not exceed 100 volts.

[b] Without external shield.

[c] With grid No.2 connected to plate.

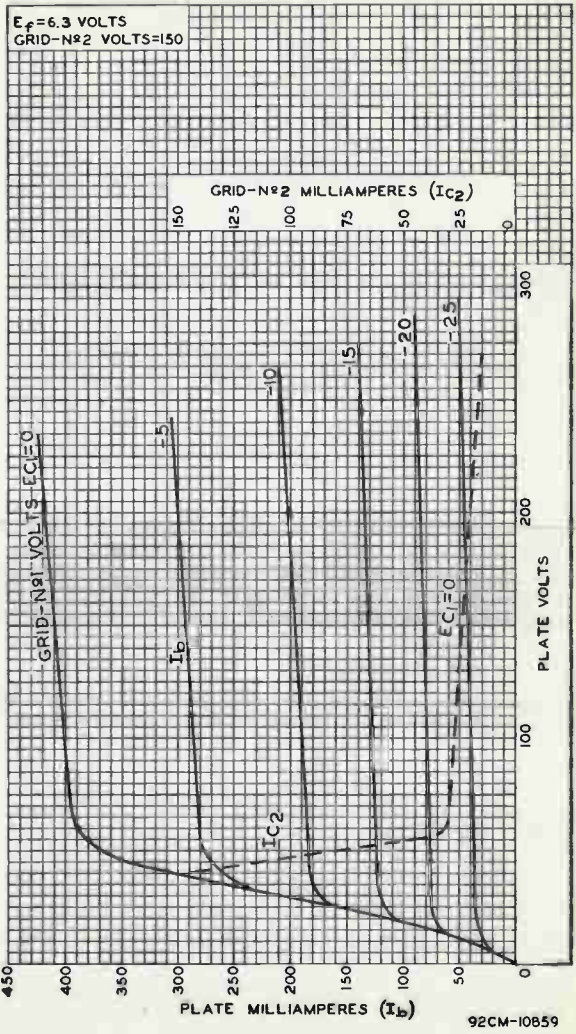
[d] This value can be measured by a method involving a recurrent wave form such that the maximum ratings of the tube will not be exceeded.

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

[f] This rating is applicable where the duration of the voltage pulse does 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.

[g] An adequate bias resistor or other means is required to protect the tube in the absence of excitation.

AVERAGE CHARACTERISTICS



Beam Hexode

ELECTRICAL

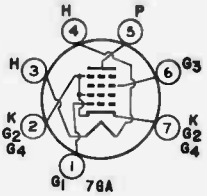
Heater Characteristics and Ratings		
Voltage (AC or DC)	6.3 ± 0.6	V
Current at 6.3 V	0.220	A
Maximum heater-cathode voltage		
Heater negative with respect to cathode		
Peak	200	V
Heater positive with respect to cathode		
Peak	200	V
DC component	100	V
Direct Interelectrode Capacitances (Approx.)		
Without external shield		
Grid No.1 to plate	0.018	pF
Input: G1 to (K + G4 + G2, G3, H)	7.0	pF
Output: P to (K + G4 + G2, G3, H)	3.2	pF

MECHANICAL

Operating Position . . . . . Any
Type of Cathode . . . . . Coated Unipotential
Maximum Overall Length . . . . . 2-1/8 in
Maximum Seated Length . . . . . 1-7/8 in
Length, Base Seat to Bulb Top (Excluding tip) . . 1-1/2 ± 3/32 in
Diameter . . . . . 0.650 to 0.750 in
Dimensional Outline (JEDEC No.5-2) . . . See *General Section*
Envelope . . . . . JEDEC T5-1/2
Base . . . . . Small-Button Miniature 7-Pin (JEDEC No.E7-1)

TERMINAL DIAGRAM (Bottom View)

Pin 1 – Grid No.1
Pin 2 – Cathode, Grid No.2, Grid No.4
Pin 3 – Heater
Pin 4 – Heater
Pin 5 – Plate
Pin 6 – Grid No.3
Pin 7 – Same as Pin 2



CHARACTERISTICS

Plate Voltage	135	275	V
Grid-No.3 Voltage	135	135	V
Grid-No.1 Voltage	-0.4	-0.4	V
Plate Resistance (Approx.)	0.67	0.165	MΩ
Transconductance	15000	15500	μmhos
Plate Current	9	10	mA
Grid-No.3 Current	0.25	0.17	mA
Grid-No.1 Voltage (Approx.)	-6.2	-6.5	V
For transconductance = 100 μmhos			
Noise Figure	5.9	5.7	dB
At 200 Mc/s			

DESIGN-MAXIMUM RATINGS

Plate Voltage	300	V
Grid-No.3 (Screen-Grid) Voltage	150	V
Grid-No.1 (Control-Grid) Voltage		
Negative-bias value	50	V
Positive-bias value	0	V
Cathode Current	20	mA
Grid-No.3 Input	0.15	W
Plate Dissipation	3	W

MAXIMUM CIRCUIT VALUES

Grid-No.1-Circuit Resistance		
For fixed-bias operation	0.5	MΩ

RADIO CORPORATION OF AMERICA
Electronic Components and Devices Harrison, N. J.

Medium-Mu Twin Triode

9-PIN MINIATURE TYPE

For Use in the Matrixing Circuits of Color TV Receivers. Also Useful in Phase-Inverter and Multivibrator Circuits, and as a General-Purpose Amplifier Tube.

GENERAL DATA

Electrical:

Heater Characteristics and Ratings:

Voltage (AC or DC)	6.3[a]	6.3 ± 0.6	volts
Current	0.600 ± 0.040	0.600[b]	ma
Warm-up time (Average)	11	-	sec
Peak heater-cathode voltage (Each unit):			
Heater negative with respect to cathode	200 max.		volts
Heater positive with respect to cathode	200[c] max.		volts

Direct Interelectrode Capacitances (Approx.):[d]

	Unit No.1	Unit No.2	
Grid to plate	3.0	3.0	pf
Grid to cathode and heater	3.4	3.6	pf
Plate to cathode and heater	0.44	0.34	pf
Plate of unit No.1 to plate of unit No.2	1.0	1.0	pf

Characteristics, Class A_1 Amplifier (Each unit):

Plate Voltage	250	volts
Grid Voltage	-10.5	volts
Amplification Factor	17	
Plate Resistance (Approx.)	5500	ohms
Transconductance	3100	μmhos
Plate Current	11.5	ma
Plate Current for grid volts = -14	4	ma
Grid Voltage (Approx.) for plate μa = 50	-23	volts

Mechanical:

Operating Position	Any
Type of Cathodes	Coated Unipotential
Maximum Overall Length	2-5/8"
Maximum Seated Length	2-3/8"
Length, Base Seat to Bulb Top (Excluding tip)	2" ± 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)

6GU7

Basing Designation for BOTTOM VIEW. 9LP

Pin 1 – Plate of Triode No.2
Pin 2 – Grid of Triode No.2
Pin 3 – Cathode of Triode No.2
Pin 4 – Heater
Pin 5 – Heater
Pin 6 – Plate of Triode No.1
Pin 7 – Grid of Triode No.1
Pin 8 – Cathode of Triode No.1
Pin 9 – No Internal Connection

AMPLIFIER — Class A_1

Values are for Each Unit

Maximum Ratings, *Design-Maximum Values:*

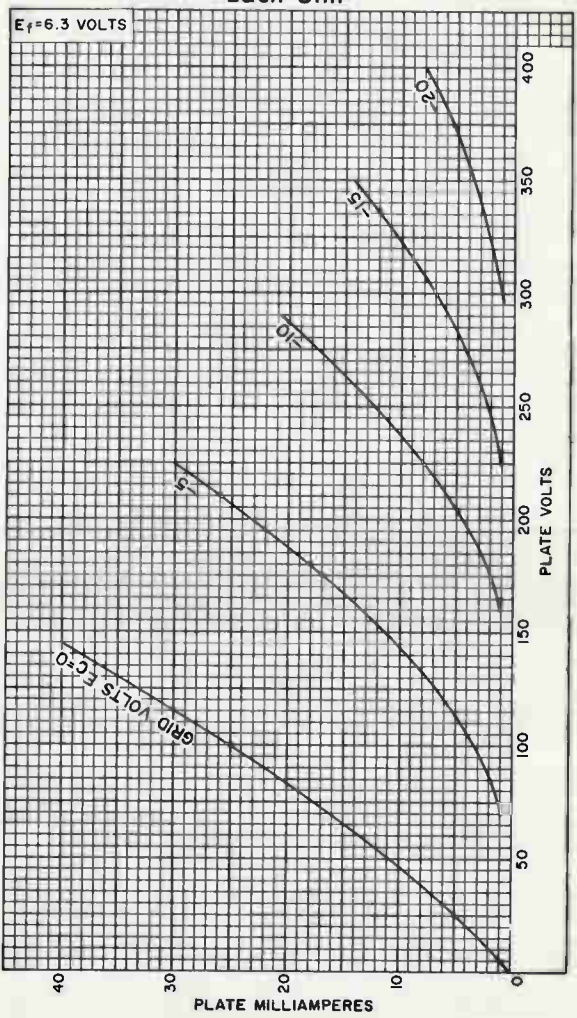
PLATE VOLTAGE.	330 max.	volts
GRID VOLTAGE:		
Positive-bias value.	0 max.	volts
PLATE DISSIPATION.	3 max.	watts

Maximum Circuit Values:

Grid-Circuit Resistance:		
For fixed-bias operation	1 max.	megohm

[a] At heater amperes = 0.600.
[b] At heater volts = 6.3.
[c] The dc component must not exceed 100 volts.
[d] Without external shield.

AVERAGE PLATE CHARACTERISTICS
Each Unit



92CM-11966

6GV5

Beam Power Tube

DUODECAR TYPE

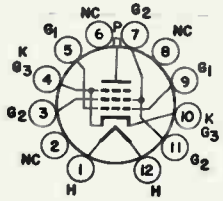
Electrical:

Heater Characteristics and Ratings:		
Voltage (AC or DC)	6.3±0.6	volts
Current at heater volts = 6.3	1.200	amp
Peak heater–cathode voltage:		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200[a] max.	volts
Direct Interelectrode Capacitances (Approx):[b]		
G1 to P	0.6	pf
Input: G1 to (K+G3,G2,H)	16	pf
Output: P to (K+G3,G2,H)	7.0	pf

Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	3.625"
Seated Length	2.000" to 2.250"
Diameter	1.437" to 1.563"
Dimensional Outline	See *General Section*
Bulb	T12
Cap	Skirted Miniature (JEDEC No.C1-3)
Base	Large-Button Duodecar 12-Pin (JEDEC No.E12-74)
Basing Designation for BOTTOM VIEW	12DR

Pin 1 – Heater
Pin 2 – No Internal Connection
Pin 3 – Grid No.2
Pin 4 – Cathode, Grid No.3
Pin 5 – Grid No.1
Pin 6 – Same as Pin 2
Pin 7 – Grid No.2
Pin 8 – Same as Pin 2
Pin 9 – Grid No.1
Pin 10 – Same as Pin 4
Pin 11 – Grid No.2
Pin 12 – Heater
Cap – Plate



Characteristics, Class A_1 Amplifier:

				Triode Connection[c]	
Plate Voltage	5000	60	250	150	volts
Grid–No.2 Voltage	150	150	150	150	volts
Grid–No.1 Voltage	–	0	-22.5	-22.5	volts
Amplification Factor	–	–	–	4.4	
Plate Resistance (Approx.)	–	–	18000	–	ohms
Transconductance	–	–	7300	–	μmhos
Plate Current	–	345[d]	65	–	ma
Grid–No.2 Current	–	27[d]	1.8	–	ma
Grid–No.1 Voltage (Approx.) for plate ma. = 1	-100	–	-42	–	volts

Maximum Ratings, *Design-Maximum Values:*

For operation in a 525-line, 30-frame system[e]

DC Plate-Supply Voltage	770 max.	volts
Peak Positive-Pulse Plate Voltage[f]	6500 max.	volts
Peak Negative-Pulse Plate Voltage	1500 max.	volts
DC Grid-No.2 (Screen-Grid) Voltage	220 max.	volts
DC Grid-No.1 (Control-Grid) Voltage	-55 max.	volts
Peak Negative-Pulse Grid-No.1 Voltage	330 max.	volts
Cathode Current:		
Peak	550 max.	ma
Average	175 max.	ma
Grid-No.2 Input	3.5 max.	watts
Plate Dissipation[g]	17.5 max.	watts
Bulb Temperature (At hottest point on bulb surface)	220 max.	°C

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:		
For grid-resistor-bias operation	1 max.	megohm

[a] The dc component must not exceed 100 volts.

[b] Without external shield.

[c] With grid No.2 connected to plate.

[d] This value can be measured by a method involving a recurrent wave form such that the maximum ratings of the tube will not be exceeded.

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

[f] This rating is applicable where the duration of the voltage pulse does 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.

[g] An adequate bias resistor or other means is required to protect the tube in the absence of excitation.

Beam Power Tube

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:			
Voltage (AC or DC)	6.3 ± 10%		volts
Current at 6.3 volts	1.2		amp
Mu-Factor, Grid No.2 to Grid No.1 for plate volts = 150, grid-No.2 volts = 150, grid-No.1 volts = -22.5	4.4		
Direct Interelectrode Capacitances (Approx.):[a]			
Grid No.1 to plate	0.5		μμf
Grid No.1 to cathode & grid No.3, grid No.2, and heater	17		μμf
Plate to cathode & grid No.3, grid No.2, and heater	7		μμf

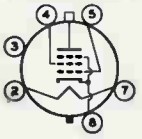
Characteristics, Class A_1 Amplifier:

Plate Voltage	60	250	volts
Grid-No.2 Voltage	150	150	volts
Grid-No.1 Voltage	0	-22.5	volts
Plate Resistance (Approx.)	–	15000	ohms
Transconductance	–	7100	μmhos
Plate Current	39[b]	70	ma
Grid-No.2 Current	3.2[b]	2.1	ma
Grid-No.1 Voltage (Approx.) for plate ma. = 1	–	-42	volts

Mechanical:

Operating Position	Any
Maximum Overall Length	4-1/4"
Seated Length	3-1/2" ± 3/16"
Diameter	1.438" to 1.562"
Bulb	T12
Cap	Skirted Miniature (JEDEC No.C1-3)
Base	Short Medium-Shell Octal 6-Pin with External Barriers, Style B, Arrangement 2 (JEDEC No.B6-122)
Basing Designation for BOTTOM VIEW	6AM

Pin 2 - Heater
Pin 3 - No Connection
Pin 4 - Grid No.2
Pin 5 - Grid No.1



Pin 7 - Heater
Pin 8 - Cathode, Grid No.3
Cap - Plate

6GW6

HORIZONTAL-DEFLECTION AMPLIFIER

Maximum Ratings, *Design-Maximum Values:*

	For operation in a 525-line, 30-frame system[c]		
DC PLATE-SUPPLY VOLTAGE	770	max.	volts
PEAK POSITIVE-PULSE PLATE VOLTAGE[d]	6500	max.	volts
PEAK NEGATIVE-PULSE PLATE VOLTAGE	1500	max.	volts
DC GRID-No.2 (SCREEN-GRID) VOLTAGE	220	max.	volts
DC GRID-No.1 (CONTROL-GRID) VOLTAGE	-55	max.	volts
PEAK NEGATIVE-PULSE GRID-No.1 VOLTAGE	330	max.	volts
CATHODE CURRENT:			
Peak	550	max.	ma
Average	175	max.	ma
GRID-No.2 INPUT	3.5	max.	watts
PLATE DISSIPATION[e]	17.5	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200[f]	max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)	240	max.	°C

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:			
For grid resistor-bias operation	1	max.	megohm

[a] Without external shield.

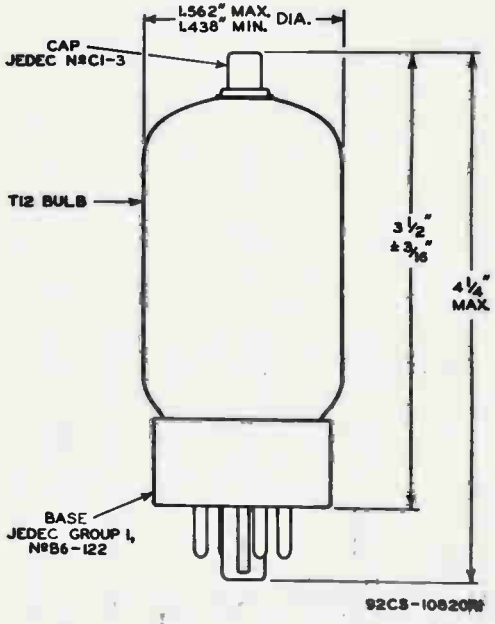
[b] This value can be measured by a method involving a recurrent wave form such that the maximum ratings of the tube will not be exceeded.

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

[d] This rating is applicable where the duration of the voltage pulse does 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.

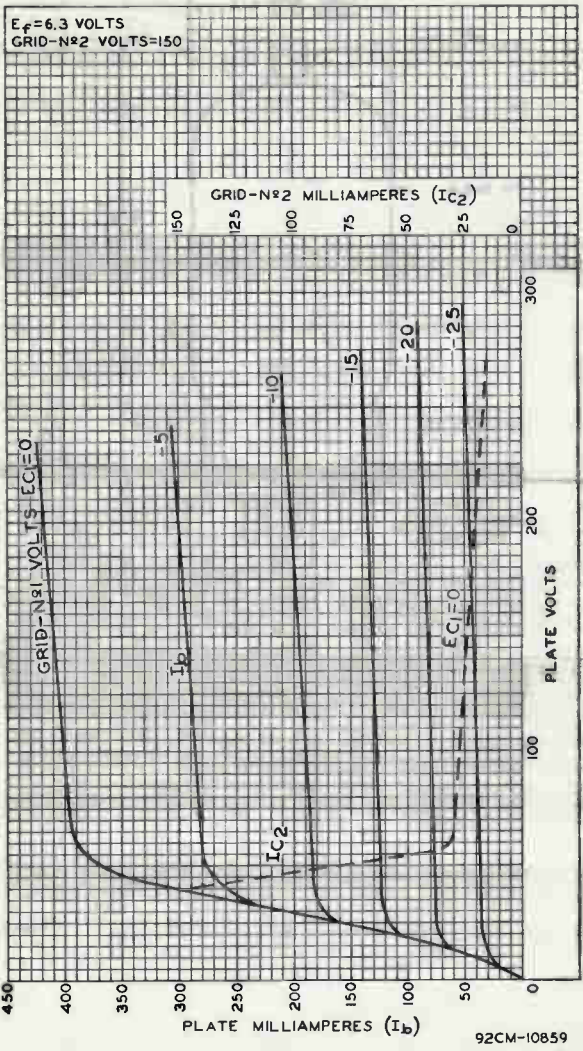
[e] An adequate bias resistor or other means is required to protect the tube in the absence of excitation.

[f] The dc component must not exceed 100 volts.


1.562" MAX.
1.438" MIN. DIA.
CAP
JEDEC No.C1-3
T12 BULB
3 1/2"
± 3/16"
4 1/4"
MAX.
BASE
JEDEC GROUP 1,
No.B6-122
92CS-10820R1

6GW6

AVERAGE CHARACTERISTICS



92CM-10859

High-Mu Triode-Sharp-Cutoff Pentode

Electrical:

Heater Characteristics and Ratings:		
Voltage (AC or DC)	6.3	volts
Current at heater volts = 6.3	0.660	amp
Peak heater-cathode voltage	100	volts
Direct Interelectrode Capacitances:		
Triode Unit:		
Grid to plate	1.4	pf
Input: G_T to (K_T, H)	2.3	pf
Output: P_T to (K_T, H)	2.5	pf
Grid to heater	0.006 max.	pf
Pentode Unit:		
Grid No.1 to plate	0.4 max.	pf
Input: G1P to (Kp+G3p+IS, G2P, H)	10.0	pf
Grid No.1 to heater	0.24 max.	pf
Triode plate to pentode grid No.1	0.2 max.	pf
Triode grid to pentode plate	0.006 max.	pf
Triode grid to pentode grid No.1	0.02 max.	pf
Triode plate to pentode plate	0.15 max.	pf

Mechanical:

Operating Position	Any
Maximum Overall Length	3-1/16"
Maximum Seated Length	2-13/16"
Length, Base Seat to Bulb Top (Excluding Tip)	2-7/16" ±3/32"
Diameter	0.750" to 0.875"
Dimensional Outline (JEDEC No.6-4)	See *General Section*
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)
Basing Designation for BOTTOM VIEW	9LZ

Pin 1 – Triode Grid
Pin 2 – Triode Cathode
Pin 3 – Pentode Grid No.2
Pin 4 – Heater
Pin 5 – Heater
Pin 6 – Pentode Plate
Pin 7 – Pentode Cathode, Grid No.3, Internal Shield
Pin 8 – Pentode Grid No.1
Pin 9 – Triode Plate

CLASS A_1 AMPLIFIER

Characteristics:

	Triode Unit	*Pentode Unit*	
Plate Voltage	250	250	volts
Grid No.2 (Screen-Grid) Voltage	–	250	volts
Grid No.1 (Control-Grid) Voltage	-1.9	-7	volts
Amplification Factor	100	21[a]	
Plate Resistance (Approx.)	–	48000	ohms
Transconductance	1600	10000	μmhos
Plate Current	1.2	36	ma
Grid-No.2 Current	–	6	ma

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

Plate Supply Voltage	550	550	volts
Plate Voltage	300	300	volts
Grid-No.2 Supply Voltage	–	550	volts
Grid-No.2 Voltage	–	300	volts
Average Cathode Current	4	55	ma
Grid-No.2 Input	–	1.8	watts
Plate Dissipation	0.5	9	watts
Grid-No.1 Voltage at grid No.1 μa = 0.3	-1.3	-1.3	volts

Maximum Circuit Values:

Grid-No.1 Circuit Resistance:			
For fixed-bias operation	1	0.5	megohm

[a] Grid No.1 to Grid No.2

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Electronic Components and Devices Harrison, N. J.

Sharp-Cutoff Pentode

With Two Independent Control Grids

7-PIN MINIATURE TYPE

For FM Sound-Detector Service

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	6.3	volts
Current	0.45 ± 6%	amp
Warm-up time (Average)	11	sec
Direct Interelectrode Capacitances (Approx.):[a]		
Grid No.1 to plate	0.022	μμf
Grid No.1 to cathode & internal shield, grid No.3, grid No.2, and heater	8	μμf
Grid No.3 to plate	1.6	μμf
Grid No.1 to grid No.3	0.11	μμf
Grid No.3 to cathode & internal shield, plate, grid No.2, grid No.1, and heater	7.5	μμf

Characteristics, Class A_1 Amplifier:

Plate Supply Voltage	150	volts
Grid-No.3 Supply Voltage	0	volts
Grid-No.2 Supply Voltage	100	volts
Grid-No.1 Supply Voltage	0	volts
Cathode Resistor	180	ohms
Plate Resistance (Approx.)	0.14	megohm
Transconductance, Grid No.1 to Plate	3700	μmhos
Transconductance, Grid No.3 to Plate	750	μmhos
Plate Current	3.7	ma
Grid-No.2 Current	3	ma
Grid-No.1 Supply Voltage (Approx.) for plate μa = 20	-4.5	volts
Grid-No.3 Supply Voltage (Approx.) for plate μa = 20	-7	volts

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)

6GX6

Basing Designation for BOTTOM VIEW. 7EN

Pin 1 – Grid No.1
Pin 2 – Cathode, Internal Shield
Pin 3 – Heater

Pin 4 – Heater
Pin 5 – Plate
Pin 6 – Grid No.2
Pin 7 – Grid No.3

FM SOUND-DETECTOR SERVICE

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

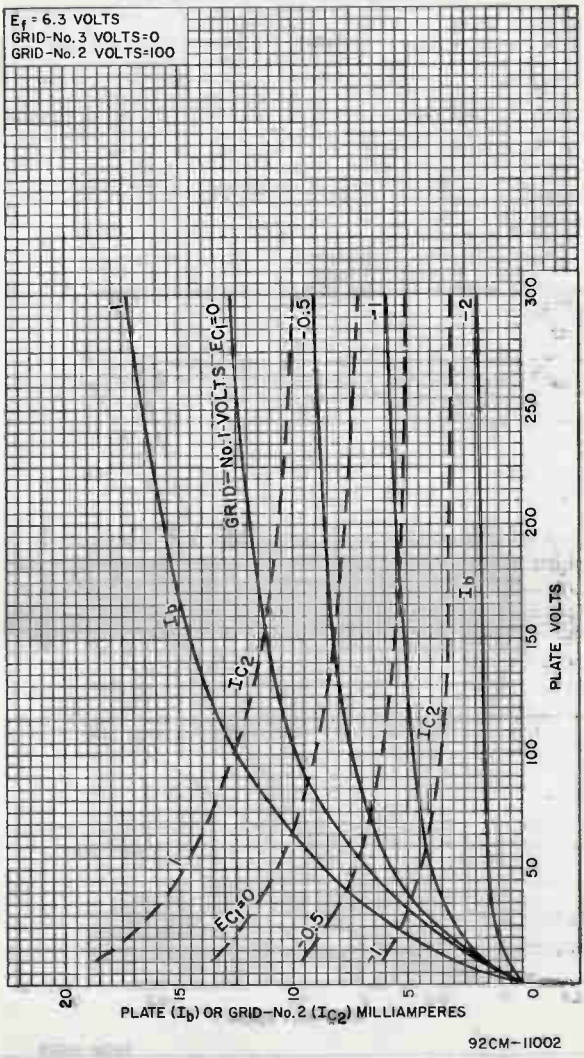
PLATE VOLTAGE	300	max.	volts
GRID-No.3 (CONTROL-GRID) VOLTAGE:			
Negative value (DC and Peak AC)	100	max.	volts
Positive value (DC and Peak AC)	25	max.	volts
GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE	300	max.	volts
GRID-No.2 VOLTAGE . . . . . See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section			
GRID-No.1 (CONTROL-GRID) VOLTAGE:			
Negative-bias value	50	max.	volts
Positive-bias value	0	max.	volts
GRID-No.2 INPUT:			
For grid-No.2 voltages up to 150 volts	1	max.	watt
For grid-No.2 voltages between 150 and 300 volts . . . . . See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section			
GRID-No.3 INPUT	0.1	max.	watt
PLATE DISSIPATION	1.7	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200[b]	max.	volts

Maximum Circuit Values:

Grid-No.3-Circuit Resistance	0.68	max.	megohm
Grid-No.1-Circuit Resistance:			
For fixed-bias operation	0.22	max.	megohm
For cathode-bias operation	0.47	max.	megohm

[a] Without external shield.
[b] The dc component must not exceed 100 volts.

AVERAGE CHARACTERISTICS



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