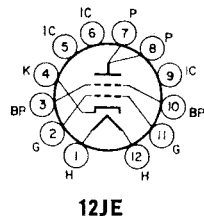


# 6JH5

6JH5/6HZ5/6JD5

## BEAM TRIODE

Duodecar type used as a pulse-type regulator in the high-voltage power supply of color television receivers. Outlines section, 15F; requires duodecar 12-contact socket. Heater: volts (ac/dc), 6.3; amperes, 2.4.



12JE

### Class A<sub>1</sub> Amplifier

#### CHARACTERISTICS

Pulse Plate Voltage*	3500	volts
Grid No.2 (Beam Plate)	Connected to cathode at	socket
Grid-Voltage, Negative-bias value	4.4	volts
Peak Plate Current	300	mA
Amplification Factor	300	
Transconductance	65000	μmhos
Plate Resistance (Approx.)	4600	ohms
Grid Voltage (Approx.) for plate current of 1 mA	-16	volts

\* Duty cycle of the pulse must be less than 2.5%.

### High-Voltage Regulator Service

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

#### MAXIMUM RATINGS (Design-Maximum Values)

Peak Plate Voltage#	5500	volts
Plate Dissipation	35	watts
Peak Plate Current	325	mA
Heater-Cathode Voltage:		
Peak value	+200 —450	volts
Average value	100	volts
Bulb Temperature (At hottest point)	240	°C

#### MAXIMUM CIRCUIT VALUE

Grid-Circuit Resistance <sup>▲</sup>	0.1	megohm
--------------------------------------	-----	--------

# Pulse duration must not exceed 15% of a horizontal scanning cycle (10 microseconds).

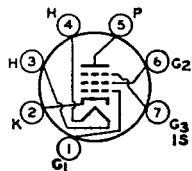
▲ Larger values of grid-circuit resistance may be used if provisions are made to protect the tube.

# 6JH6

4JH6

## SEMIREMOTE-CUTOFF PENTODE

Miniature type used in the gain-controlled picture if-amplifier stages of color and black-and-white television receivers. Outlines section, 5C; requires miniature 7-contact socket. For curves of average plate characteristics, refer to type 6BZ6. Type 4JH6 is identical with type 6JH6 except for heater ratings.



7CM

	4JH6 Series	6JH6 Parallel	
Heater Arrangement			
Heater Voltage (ac/dc)	4.2	6.3	volts
Heater Current	0.45	0.3	ampere
Heater Warm-up Time	11	—	seconds
Heater-Cathode Voltage:			
Peak value	±200 max	±200 max	volts
Average value	100 max	100 max	volts
Direct Interelectrode Capacitances:			
Grid No.1 to Plate	Unshielded 0.025 max	Shielded* 0.015 max	pF
Grid No.1 to Cathode, Heater, Grid No.2, Grid No.3, and Internal Shield	7	7	pF
Plate to Cathode, Heater, Grid No.2, Grid No.3, and Internal Shield	2	3	pF

\* With external shield connected to cathode.

**Class A<sub>1</sub> Amplifier**

**MAXIMUM RATINGS (Design-Maximum Values)**

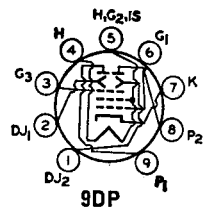
Plate Voltage .....	300	volts
Grid-No.3 (Suppressor-Grid) Voltage, Positive value .....	0	volts
Grid-No.2 (Screen-Grid) Supply Voltage .....	300	volts
Grid-No.2 Voltage .....	See curve page 300	
Grid-No.1 (Control-Grid) Voltage, Positive-bias value .....	0	volts
Grid-No.2 Input:		
For grid-No.2 voltages up to 150 volts .....	0.55	watt
For grid-No.2 voltages between 150 and 300 volts .....	See curve page 300	

**CHARACTERISTICS**

Plate Supply Voltage .....	125	volts
Grid-No.3 .....	Connected to cathode at socket	
Grid-No.2 Supply Voltage .....	125	volts
Cathode-Bias Resistor .....	56	ohms
Plate Resistance (Approx.) .....	0.26	megohm
Transconductance .....	8000	$\mu$ mhos
Transconductance Range for grid-No.1 voltage of -4.5 volts and cathode-bias resistor of 56 ohms .....	400-900	$\mu$ mhos
Plate Current .....	14	mA
Grid-No.2 Current .....	3.6	mA
Grid-No.1 Voltage (Approx.) for transconductance of 50 $\mu$ mhos .....	-19	volts

**MAXIMUM CIRCUIT VALUES**

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



**BEAM-DEFLECTION TUBE**

**6JH8**

Miniature type used in color-demodulator and burst-gate circuits in color television receivers. This type has two plates and two deflecting electrodes; the control grid varies beam deflection. Outlines section, 6E; requires miniature 9-contact socket. Pin 5 should be connected to cathode at socket. The 6JH8 should be so located in the equipment that it is not subjected to stray magnetic fields.

Heater Voltage (ac/dc) .....	6.3	volts
Heater Current .....	0.3	amperes
Direct Interelectrode Capacitances:		
Grid No.1 to All Other Electrodes, Except Both Plates .....	7.5	pF
Grid No.1 to Deflecting Electrode No.1 .....	0.04 max	pF
Grid No.1 to Deflecting Electrode No.2 .....	0.07 max	pF
Plate No.1 to All Other Electrodes .....	5	pF
Plate No.2 to All Other Electrodes .....	5	pF
Plate No.1 to Plate No.2 .....	0.4	pF
Deflecting Electrode No.1 to All Other Electrodes .....	4.8	pF
Deflecting Electrode No.2 to All Other Electrodes .....	4.8	pF
Deflecting Electrode No. 1 to Deflecting Electrode No.2 .....	0.38	pF

**Color TV Demodulator**

**MAXIMUM RATINGS (Design-Maximum Values)**

Plate Voltage (Each Plate) .....	330	volts
Peak Deflecting-Electrode Voltage (Each Electrode):		
Negative value .....	165	volts
Positive value .....	165	volts
Grid-No.3 (Accelerating-Grid) Voltage .....	330	volts
Grid-No.1 (Control-Grid) Voltage, Positive-bias value .....	0	volts
Cathode Current .....	33	mA
Plate Dissipation (Each Plate) .....	3	watts
Grid-No.3 Input .....	1	watt

**MAXIMUM CIRCUIT VALUES**

Grid-No.1 Circuit Resistance:		
For fixed-bias operation .....	0.1	megohm
For cathode-bias operation .....	0.25	megohm

### Class A<sub>1</sub> Amplifier

With both plates connected together and with both deflecting electrodes connected to cathode at socket

#### CHARACTERISTICS

Plate-No.1 Supply Voltage	250	volts
Plate-No.2 Supply Voltage	250	volts
Grid-No.3 Voltage	250	volts
Cathode-Bias Resistor	220	ohms
Transconductance	4400	$\mu$ mhos
Total Plate Current	14	mA
Grid-No.3 Current	1.5	mA
Grid-No.1 Voltage (Approx.) for total plate current of 10 $\mu$ A	-13	volts

**6JK6** Refer to chart at end of section.

**6JK8** Refer to chart at end of section.

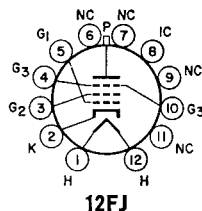
**6JM6** Refer to chart at end of section.

## 6JM6A

17JM6A

### BEAM POWER TUBE

Duodecar types used as horizontal-amplifier tubes in color and black-and-white television receivers. Outlines section, 39A; requires duodecar 12-contact socket. Type 17JM6A is identical with type 6JM6A except for heater ratings.



	6JM6A	17JM6A	
Heater Voltage (ac/dc)	6.3	16.8	volts
Heater Current	1.2	0.45	amperes
Heater Warm-up Time (Average)	—	11	seconds
Heater-Cathode Voltage:			
Peak value	$\pm 200$ max	$\pm 200$ max	volts
Average value	100 max	100 max	volts
Direct Interelectrode Capacitances:			
Grid No.1 to Plate	—	0.6	pF
Grid No.1 to Cathode, Heater, Grid No.2, and Grid No.3	—	16	pF
Plate to Cathode, Heater, Grid No. 2, and Grid No. 3	—	7	pF

### Class A<sub>1</sub> Amplifier

#### CHARACTERISTICS

	Pentode Connection			Triode** Connection	
Plate Voltage	5000	55	250	150	volts
Grid-No.3 (Suppressor-Grid)	—	—	—	Connected to cathode at socket	
Grid-No.2 (Screen-Grid) Voltage	150	150	150	150	volts
Grid-No.1 (Control-Grid) Voltage	—	0	-22.5	-22.5	volts
Plate Resistance (Approx.)	—	—	15000	—	ohms
Transconductance	—	—	7300	—	$\mu$ mhos
Plate Current	—	345*	65	—	mA
Grid-No.2 Current	—	30*	1.8	—	mA
Grid-No.1 Voltage (Approx.) for plate current of 1 $\mu$ A	-100	—	-42	—	volts
Amplification Factor	—	—	—	4.4	

#### MAXIMUM CIRCUIT VALUE

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

\* This value can be measured by a method utilizing a recurrent waveform such that the maximum ratings of the tube will not be exceeded.

\*\* Grid No.2 tied to plate.

### Horizontal-Deflection Amplifier

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

#### MAXIMUM RATINGS (Design-Maximum Values)

DC Plate Supply Voltage	770	volts
Peak Positive-Pulse Plate Voltage#	6500	volts
Peak Negative-Pulse Plate Voltage	1500	volts
DC Grid-No.3 Voltage	70	volts

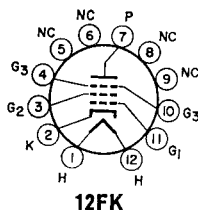
DC Grid-No.2 Voltage	220	volts
DC Grid-No.1 Voltage, Negative-bias value	55	volts
Peak Negative-Pulse Grid-No.1 Voltage	330	volts
Average Cathode Current	175	mA
Peak Cathode Current	550	mA
Plate Dissipation##	17.5	watts
Grid-No.2 Input	3.5	watts
Bulb Temperature (At hottest point)	220	°C

# Pulse duration must not exceed 15% of a horizontal scanning cycle (10 microseconds).  
 ## A bias resistor or other means is required to protect the tube in absence of excitation.

## 6JN6

12JN6, 17JN6

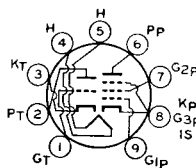
### BEAM POWER TUBE



12FK

Duodecar type used as horizontal-amplifier tube in color and black-and-white television receivers. Outlines section, 15A; requires duodecar 12-contact socket. This type is electrically identical with type 6JM6 except that it has a slightly lower grid-No.1-to-plate capacitance. Types 12JN6 and 17JN6 are identical with type 6JN6 except for heater ratings.

Heater Voltage (ac/dc)	6JN6	12JN6	17JN6	
Heater Current	6.3	12.6	16.8	volts
Heater Warm-up Time (Average)	1.2	0.6	0.45	amperes
Direct Interelectrode Capacitances:				seconds
Grid No.1 to Plate			0.34	pF
Grid No.1 to Cathode, Heater, Grid No.2, and Grid No.3			16	pF
Plate to Cathode, Heater, Grid No.2, and Grid No.3			7	pF



9FA

### MEDIUM-MU TRIODE— SHARP-CUTOFF PENTODE

## 6JN8

19JN8/19CL8A

Miniature type used as FM converter and rf amplifier in radio receivers. Outlines section, 6B; requires miniature 9-contact socket. Type 19JN8/19CL8A is identical with type 6JN8 except for heater ratings.

Heater Voltage (ac/dc)	6JN8	19JN8/ 19CL8A	
Heater Current	6.3	18.9	volts
Heater Warm-up Time (Average)	0.45	0.15	ampere
Heater-Cathode Voltage:	11	—	seconds
Peak value	±200 max	±200 max	volts
Average value	100 max	100 max	volts
Direct Interelectrode Capacitances*:			
Pentode Unit:			
Grid No.1 to Plate		0.01	pF
Grid No.1 to Cathode, Heater, Grid No.2, Grid No.3, and Internal Shield		5.5	pF
Plate to Cathode, Heater, Grid No.2, Grid No.3, and Internal Shield		3.4	pF
Triode Unit:			
Grid to Plate		1.7	pF
Grid to Cathode, Heater, Pentode Cathode, Grid No.3, and Internal Shield		3.2	pF
Plate to Cathode, Heater, Pentode Cathode, Grid No.3, and Internal Shield		2.2	pF

\* With external shield connected to cathode of unit under test.

### Class A<sub>1</sub> Amplifier

<b>MAXIMUM RATINGS</b> (Design-Maximum Values)	<b>Triode Unit</b>	<b>Pentode Unit</b>	
Plate Voltage	300	300	volts
Grid-No.2 (Screen-Grid) Supply Voltage	—	300	volts
Grid-No.2 Voltage	—	See curve page 300	

Grid-No.1 (Control-Grid) Voltage, Positive-bias value	0	0	volts
Plate Dissipation	2.5	2.5	watts
Grid-No.2 Input:			
For grid-No.2 voltages up to 150 volts	—	0.55	watt
For grid-No.2 voltages between 150 and 300 volts	—	See curve page 300	

**CHARACTERISTICS**

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	$\mu$ mhos
Plate Current	13.5	12	mA
Grid-No.2 Current	—	4	mA
Grid-No.1 Voltage (Approx.) for plate current of 10 $\mu$ A	—8	—8	volts

**MAXIMUM CIRCUIT VALUES**

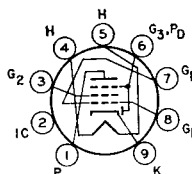
Grid-No.1-Circuit Resistance:			
For fixed-bias operation	2.2	2.2	megohms
For cathode-bias operation	2.2	2.2	megohms

**6JQ6**

12JQ6, 17JQ6,

**BEAM POWER TUBE  
with integral diode**

Miniature type featuring integral diode, internally connected to grid No.3, used in feedback-stabilized vertical-deflection-amplifier applications in color and black-and-white television receivers. Outlines section, 6G; requires miniature 9-contact socket. Types 12JQ6 and 17JQ6 are identical with type 6JQ6 except for heater ratings.

**9RA**

	6JQ6	12JQ6	17JQ6	
Heater Voltage (ac/dc)	6.3	12.6	17	volts
Heater Current	1.2	0.6	0.45	amperes
Heater Warm-up Time (Average)	—	11	11	seconds
Heater-Cathode Voltage:				
Peak value	$\pm 200$ max	$\pm 200$ max	$\pm 200$ max	volts
Average value	100 max	100 max	100 max	volts
Direct Interelectrode Capacitances:				
Grid No.1 to Plate			0.32	pF
Grid No.1 to Cathode, Heater, Grid No.2, Grid No.3, and Diode Plate			13	pF
Plate to Cathode, Heater, Grid No.2, Grid No.3, and Diode Plate			6	pF

**Class A<sub>1</sub> Amplifier****CHARACTERISTICS**

Plate Voltage	40	140	volts
Grid-No.3 (Suppressor-Grid) Voltage	0	0	volts
Grid-No.2 (Screen-Grid) Voltage	120	140	volts
Grid-No.1 (Control-Grid) Voltage	0	—18	volts
Triode Amplification Factor*	—	6.5	
Plate Resistance (Approx.)	—	10500	ohms
Transconductance	—	4200	$\mu$ mhos
Plate Current	150#	35	mA
Grid-No.2 Current	20#	2.5	mA
Grid-No.1 Voltage for plate current of 1 mA	—	—37	volts
Instantaneous Diode-Plate-to-Cathode Voltage Drop for Instantaneous Diode-Plate Current of 2 mA	—	5	volts

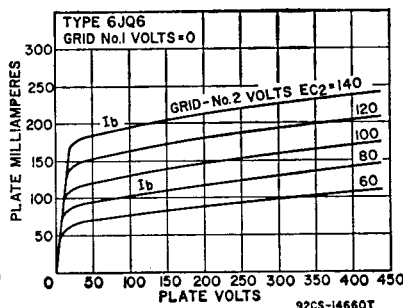
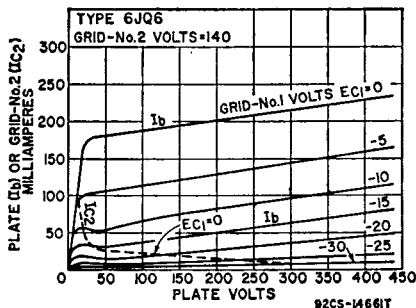
**Vertical-Deflection Amplifier**

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

**MAXIMUM RATINGS (Design-Maximum Values)**

DC Plate Voltage	425	volts
Peak Positive-Pulse Plate Voltage (Absolute-Maximum Value)*	2000	volts
DC Grid-No.3 and Diode-Plate Voltage	+10 —150	volts

DC Grid-No.2 Voltage .....	330	volts
Peak Negative-Pulse Grid-No.1 Voltage .....	150	volts
Average Cathode Current .....	70	mA
Peak Cathode Current .....	250	mA
Average Diode-Plate (and Grid-No.3) Current .....	1	mA
Plate Dissipation .....	10	watts
Grid-No.2 Input .....	2	watts
Bulb Temperature (At hottest point) .....	240	°C



**MAXIMUM CIRCUIT VALUES**

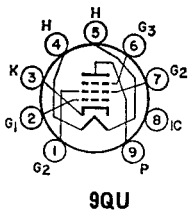
Grid-No.1—Circuit Resistance:

For grid-No.1-resistor-bias operation .....	2.2	megohms
For cathode-bias operation .....	2.2	megohms

\* Grid No.3 and diode plate connected to cathode, and grid-No.2 connected to plate at socket.

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

\* Pulse duration must not exceed 15% of a vertical scanning cycle (2.5 milliseconds).



**BEAM POWER TUBE**

**6JR6**

17JR6, 22JR6, 33JR6

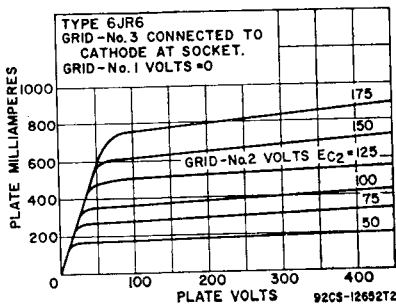
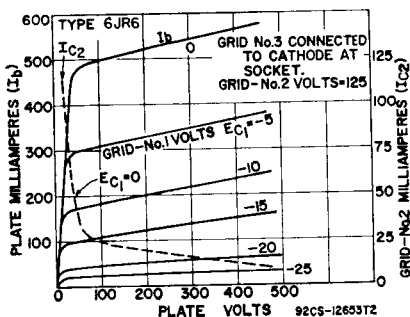
Novar type used for horizontal-deflection amplifier service in low B+, black-and-white television receivers. Outlines section, 31D; requires novar 9-contact socket. Types 17JR6, 22JR6 and 33JR6 are identical with type 6JR6 except for heater ratings.

	6JR6	17JR6	22JR6	33JR6	
Heater Voltage (ac/dc)	6.3	16.8	22	33	volts
Heater Current	1.6	0.6	0.45	0.3	amperes
Heater Warm-up Time (Average)	—	11	11	11	seconds
Heater-Cathode Voltage:					
Peak value	±200 max	±200 max	±200 max	±200 max	volts
Average value	100 max	100 max	100 max	100 max	volts
Direct Interelectrode Capacitances (Approx.):					
Grid No.1 to Plate				0.7	pF
Grid No.1 to Cathode, Heater, Grid No.2, and Grid No.3				22	pF
Plate to Cathode, Heater, Grid No.2, and Grid No.3				9	pF

**Class A<sub>1</sub> Amplifier**

CHARACTERISTICS	Triode* Connection			Pentode Connection		
	125	—	—	50	130	—
Plate Voltage	—	—	—	50	130	—
Peak Positive-Pulse Plate Voltage#	—	—	6500	—	—	—
Grid No.3 (Suppressor Grid)	—	—	—	Connected to cathode at socket		
Grid-No.2 (Screen-Grid) Voltage	125	—	—	125	125	—
Grid-No.1 (Control-Grid) Voltage	—20	—	—	0	—20	—
Plate Resistance (Approx.):	—	—	—	—	18000	—
Transconductance	—	—	—	—	7000	—

Plate Current .....	—	—	470‡	45	mA
Grid-No.2 Current .....	—	—	32‡	1.5	mA
Grid-No.1 Voltage for plate current of 1 mA .....	—	-75	—	-32	volts
Amplification Factor .....	4.7	—	—	—	



**Horizontal-Deflection Amplifier**

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

**MAXIMUM RATINGS (Design-Maximum Ratings)**

Plate Supply Voltage .....	770	volts
Peak Positive-Pulse Plate Voltage# .....	6500	volts
Peak Negative-Pulse Plate Voltage .....	1500	volts
Grid-No.3 Voltage* .....	75	volts
Grid-No.2 Voltage .....	220	volts
Grid-No.1 Voltage, Negative-bias value .....	55	volts
Peak Negative-Pulse Grid-No.1 Voltage .....	330	volts
Peak Cathode Current .....	950	mA
Average Cathode Current .....	275	mA
Grid-No.2 Input .....	3.5	watts
Plate Dissipation* .....	17	watts
Bulb Temperature (At hottest point) .....	240	°C

**MAXIMUM CIRCUIT VALUES**

Grid-No.1-Circuit Resistance:		
Cathode bias (with min. $R_K = 100\Omega$ ) .....	1	megohm
Grid-leak bias (with signal peak clamped to zero bias) .....	10	megohms
Fixed bias (where positive grid current is not drawn) .....	0.47	megohm

\* Grid No. 2 connected to plate at socket.

# Pulse duration must not exceed 15% of one horizontal scanning cycle (10 microseconds).  
 ‡ This value can be measured by a method involving a recurrent waveform such that the maximum ratings of the tube will not be exceeded.

■ In this service, a positive value may be applied to grid No.3 to minimize "snivets" interference; a typical value for this voltage is 30 volts.

• A bias resistor or other means is required to protect the tube in absence of excitation.

**6JS6  
6JS6A**

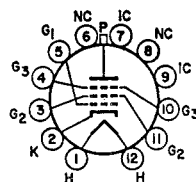
Refer to chart at end of section.

**6JS6C**

**BEAM POWER TUBE**

23JS6A, 31JS6C

Duodecar types used as horizontal-deflection amplifiers in color and black-and-white television receivers. Outlines section, 16B; requires duodecar 12-contact socket. Types 23JS6A and 31JS6A are identical with type 6JS6C except for heater ratings.



12FY

Heater Voltage (ac/dc) .....	6.3	23.6	31.5	volts
Heater Current .....	2.25	0.6	0.45	amperes
Heater Warm-up Tme (Average) .....	—	11	11	seconds

<b>Heater-Cathode Voltage:</b>				
Peak value .....	±200 max	±200 max	±200 max	volts
Average value .....	100 max	100 max	100 max	volts
<b>Direct Interelectrode Capacitances:</b>				
Grid No.1 to Plate .....			0.7	pF
Grid No.1 to Cathode, Heater, Grid No.2, and Grid No.3 .....			24	pF
Plate to Cathode, Heater, Grid No.2, and Grid No.3 .....			10	pF

**Class A<sub>1</sub> Amplifier**

CHARACTERISTICS	Triode††		Pentode Connection		
	125	5000	60	175	
Plate Voltage .....	125	5000	60	175	volts
Grid No.3 (Suppressor Grid) .....	—	—	Connected to cathode at socket		
Grid-No.2 (Screen-Grid) Voltage .....	125	125	125	125	volts
Grid-No.1 (Control-Grid) Voltage .....	-25	—	0	-25	volts
Plate Resistance (Approx.) .....	—	—	—	5500	ohms
Transconductance .....	—	—	—	11500	μmhos
Plate Current .....	—	—	600‡	130	mA
Grid-No.2 Current .....	—	—	32‡	2.8	mA
Grid-No.1 Voltage (Approx.) for plate current of 1 mA .....	—	-125	—	-54	volts
Triode Amplification Factor .....	3	—	—	—	

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

†† Grid No.2 connected to plate.

**Horizontal-Deflection Amplifier**

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

**MAXIMUM RATINGS (Design-Maximum Values)**

DC Plate Supply Voltage .....	990	volts
Peak Positive-Pulse Plate Voltage# .....	7500	volts
Peak Negative-Pulse Plate Voltage .....	1200	volts
DC Grid-No.3 Voltage .....	75	volts
DC Grid-No.2 Voltage .....	220	volts
Peak Negative-Pulse Grid-No.1 Voltage .....	330	volts
Average Cathode Current .....	350	mA
Peak Cathode Current .....	1200	mA
Plate Dissipation** .....	30	watts
Grid-No.2 Input .....	5.5	watts
Bulb Temperature (At hottest point) .....	225	°C

**MAXIMUM CIRCUIT VALUE**

Grid-No.1-Circuit Resistance		
For grid bias feedback HV regulation .....	0.47	megohm
For dc or pulse shunt HV regulation .....	10	megohms

# Pulse duration must not exceed 15% of one horizontal scanning cycle (10 microseconds).

\*\* A bias resistor or other means is required to protect the tube in absence of excitation

