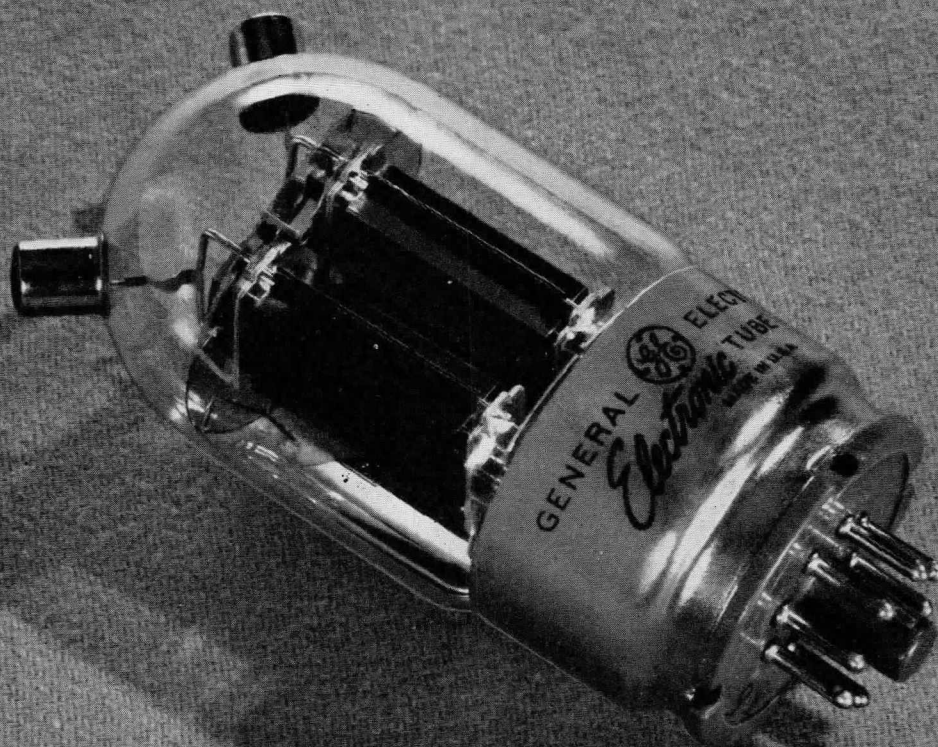




BEAM POWER TUBE

DESCRIPTION

The GL-815 is a push-pull beam tube designed for use in amateur bands from 160 meters to $2\frac{1}{2}$ meters. Neutralization is generally unnecessary in properly shielded circuits. The 815 contains in one envelope two beam power units whose total maximum plate dissipation is 25 watts. The high efficiency and exceptional power sensitivity of the 815 permit operation at rated maximum input with very low driving power. A single 815 operated in push-pull Class C telegraph service is capable of handling a power input of 75 watts (ICAS) with less than 0.2 watt of driving power.

The two units of the 815 may be used in push-pull as a modulator, oscillator, or radio-frequency amplifier, or separately, as single-ended amplifiers. Thus, the tube is well suited for use as a frequency multiplier and driver for another 815.

Exceptional efficiency at the ultra-high frequencies is made possible by the compact structure of the beam units, excellent internal shielding, and close electrode spacing. Short internal leads minimize lead inductance and resistance. The heaters are arranged to allow operation from either a 12.6- or 6.3-volt supply.

TECHNICAL INFORMATION

These data are for reference only. For design information refer to specifications.

GENERAL CHARACTERISTICS

GENERAL CHARACTERISTICS				4
Number of electrodes				
Electrical		Series	Parallel	
Cathode—Indirectly-heated				
Filament voltage		12.6	6.3	volts
Filament current		0.8	1.6	amperes
Grid-screen amplification factor			6.5	
Grid-plate transconductance, for anode current of 25 ma			4000	micromhos
Frequency for maximum ratings			150	megacycles

GENERAL ELECTRIC


Electronic
TUBE

TECHNICAL INFORMATION (CONT'D)

Direct interelectrode capacitances, each unit		
Grid-plate, with external shielding.....	0.2	micromicrofarad
Input.....	14	micromicrofarads
Output.....	8.5	micromicrofarads

Mechanical

Base or terminal description.....	large wafer octal 8-pin, sleeve
Net weight, approximate.....	3 ounces
Shipping weight, approximate.....	3 pounds
Mounting position.....	any

MAXIMUM RATINGS AND TYPICAL OPERATING CONDITIONS**CLASS AB₂ AUDIO-FREQUENCY POWER AMPLIFIER AND MODULATOR**

	Typical Operation		Maximum Ratings	
	CCS	ICAS	CCS	ICAS
Filament voltage.....			6.3	volts
D-c plate voltage.....	400	500	400	500 volts
Maximum signal plate current*.....			150	150 milliamperes
D-c maximum signal plate input*.....			60	75 watts
Maximum signal screen input*.....			4.5	4.5 watts
Plate dissipation*.....			20	25 watts
D-c grid voltage.....	-15	-15		volts
D-c screen voltage.....	125	125	225	225 volts
Peak a-f grid-to-grid voltage.....	60	60		volts
Zero signal plate current.....	20	22		milliamperes
Maximum signal plate current.....	150	150		milliamperes
Maximum signal screen current.....	32	32		milliamperes
Maximum signal driving power†, approximate.....	0.36	0.36		watts
Load resistance, per plate.....	1550	2000		ohms
Effective load, plate-to-plate.....	6200	8000		ohms
Maximum signal plate power output.....	42	54		watts

CLASS B RADIO-FREQUENCY POWER AMPLIFIER

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

Filament voltage.....			6.3	volts
D-c plate voltage.....	400	500	400	500 volts
D-c grid voltage.....	-25	-25		volts
D-c screen voltage.....	125‡	125‡	225	225 volts
D-c plate current.....	75	75	75	75 milliamperes
D-c screen current.....	4	3		milliamperes
Plate input.....			30	37.5 watts
Screen input.....			4.0	4.0 watts
Plate dissipation.....			20	25 watts
Peak r-f grid-to-grid voltage.....	50	50		volts
Driving power§, approximate.....	0.8	0.7		watts
Plate power output.....	10.5	13		watts

CLASS C RADIO-FREQUENCY POWER AMPLIFIER AND OSCILLATOR—GRID-MODULATED

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

Filament voltage.....			6.3	volts
D-c plate voltage.....	400	500	400	500 volts
D-c grid voltage.....	-40	-40	-175	-175 volts
D-c screen voltage.....	125‡	125‡	225	225 volts
D-c plate current.....	75	75	75	75 milliamperes
D-c grid current, approximate.....	0.4	0.4		milliamperes
D-c screen current.....	3	3		milliamperes
Plate input.....			30	37.5 watts
Screen input.....			4.0	4.0 watts
Plate dissipation.....			20	25 watts
Peak r-f grid-to-grid voltage, approximate.....	80	80		volts
Peak a-f grid voltage.....	19	17		volts
Driving power§, approximate.....	0.32	0.28		watts
Plate power output.....	10.5	13		watts

CLASS C RADIO-FREQUENCY POWER AMPLIFIER AND OSCILLATOR—PLATE-MODULATED

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

	CCS	ICAS	CCS	ICAS	
Filament voltage.....			6.3		volts
D-c plate voltage.....	325	400	325	400	volts
D-c grid voltage of.....	-45	-45	-175	-175	volts
From a grid resistor of ♦.....	11250	15000			ohms
D-c screen voltage.....			225	225	volts
From a fixed supply of †.....	165	175			volts
From a series resistor of.....	10000	15000			ohms
D-c plate current.....	123	150	125	150	milliamperes
D-c grid current, approximate.....	4	3	7	7	milliamperes
D-c screen current.....	16	15			milliamperes
Plate input.....			40	60	watts
Screen input.....			4.0	4.0	watts
Plate dissipation.....			13.5	20	watts
Peak r-f grid-to-grid voltage, approximate.....	112	116			volts
Driving power, approximate.....	0.2	0.16			watts
Plate power output.....	30	45			watts

CLASS C RADIO-FREQUENCY POWER AMPLIFIER AND OSCILLATOR

Key-down conditions per tube without modulation π

Filament voltage.....			6.3		volts
D-c plate voltage.....	400	500	400	500	volts
D-c grid voltage.....			-175	-175	volts
From a fixed supply of.....	-45	-45			volts
From a cathode resistor of.....	260	265			ohms
From a grid resistor of ♦.....	10000	13000			ohms
D-c screen voltage Δ			225	225	volts
From a fixed supply of.....	145	200			volts
From a series resistor of.....	15000	17500			ohms
D-c plate current.....	150	150	150	150	milliamperes
D-c grid current, approximate.....	4.5	3.5	7	7	milliamperes
D-c screen current.....	17	17			milliamperes
Plate input.....			60	75	watts
Plate dissipation.....			20	25	watts
Screen input.....			4.5	4.5	watts
Peak r-f grid-to-grid voltage, approximate.....	116	112			volts
Driving power, approximate.....	0.23	0.18			watts
Plate power output.....	44	56			watts

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

† Driver stage should be capable of supplying the grids of the AB_2 stage with the specified driving power at low distortion. The effective resistance per grid circuit of the Class AB_2 stage should be kept below 500 ohms and the effective impedance at the highest desired response frequency should not exceed 700 ohms.

‡ In applications requiring the use of screen voltages above 135 volts, provision should be made for the adjustment of control-grid bias for each unit separately. The necessity for this adjustment at the lower screen voltages depends on the distortion requirements and on whether the plate-dissipation rating is exceeded at zero-signal plate current.

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

♦ The grid-circuit resistance should never exceed 15000 ohms total per tube, or 30000 ohms per unit. Any additional bias required must be supplied by a cathode resistor or a fixed supply.

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

Δ The screen voltage must not exceed 600 volts under key-up conditions.

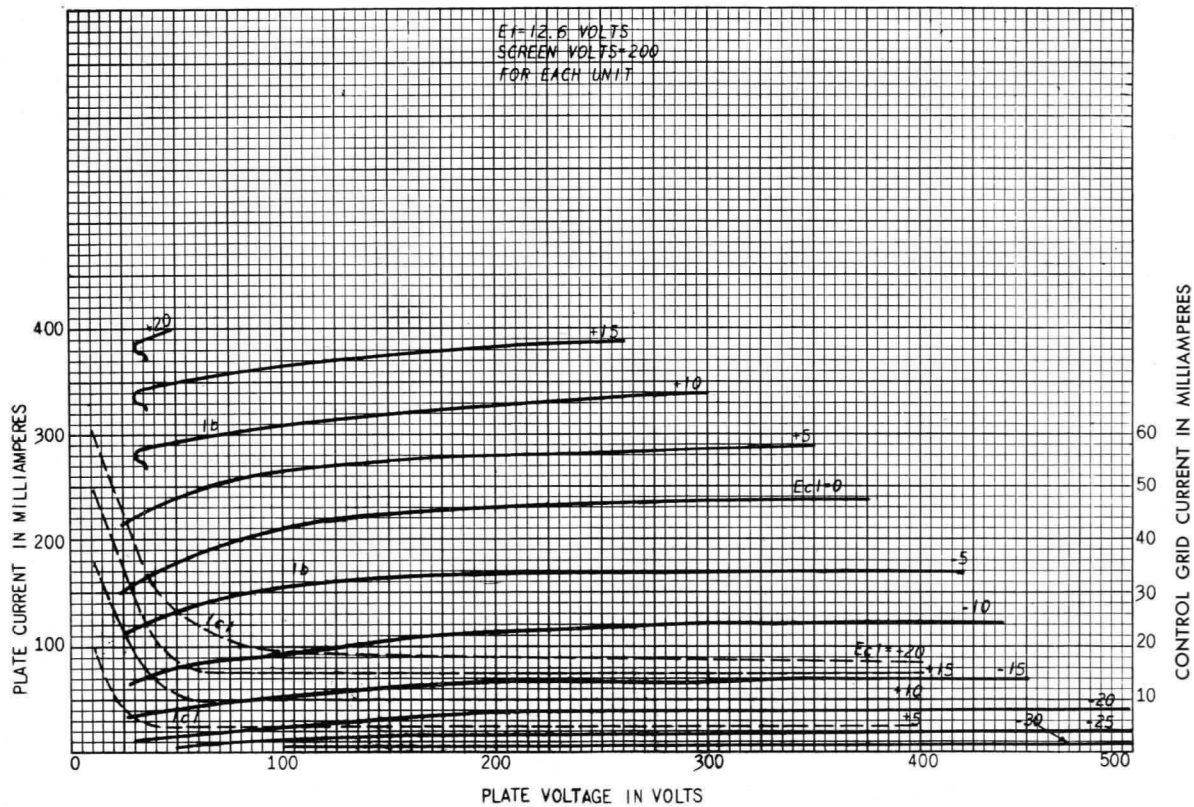
APPLICATION NOTES

The GL-815 can be operated at frequencies as high as 150 megacycles. The tube may be operated at higher frequencies provided the maximum values of plate voltage and power input are reduced as the frequency is raised (other maximum ratings are the same as shown above). The tabulation below shows the highest percentage of

maximum plate voltage and power input that can be used up to 225 megacycles for the various classes of service. Special attention should be given to shielding, radio-frequency by-passing, and adequate ventilation of the bulb at these frequencies.

Frequency.....	150	200	225	megacycles
Maximum permissible percentage of maximum rated plate voltage and plate input				
Class B, r-f.....	100	85	75	per cent
Class C, grid-modulated.....	100	85	75	per cent
Class C, plate-modulated.....	100	80	70	per cent
Class C, telegraphy.....	100	80	70	per cent

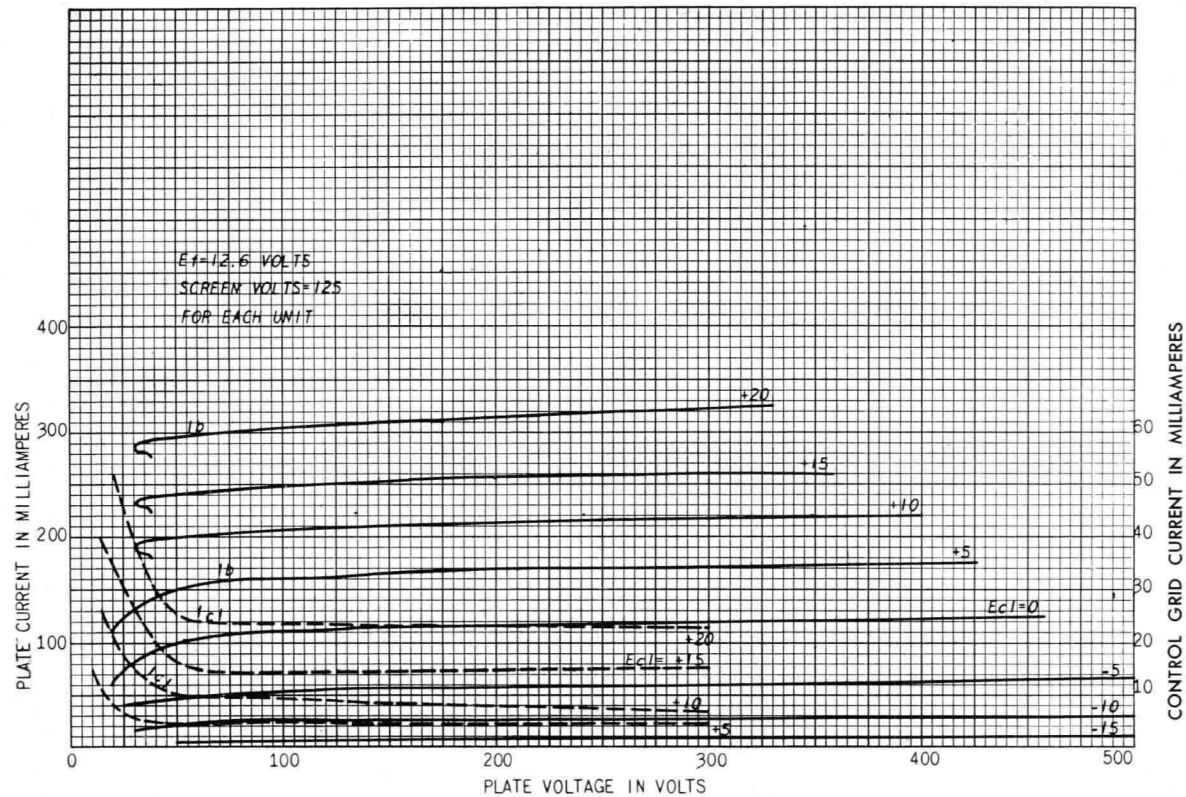
GL-815 AVERAGE PLATE CHARACTERISTICS



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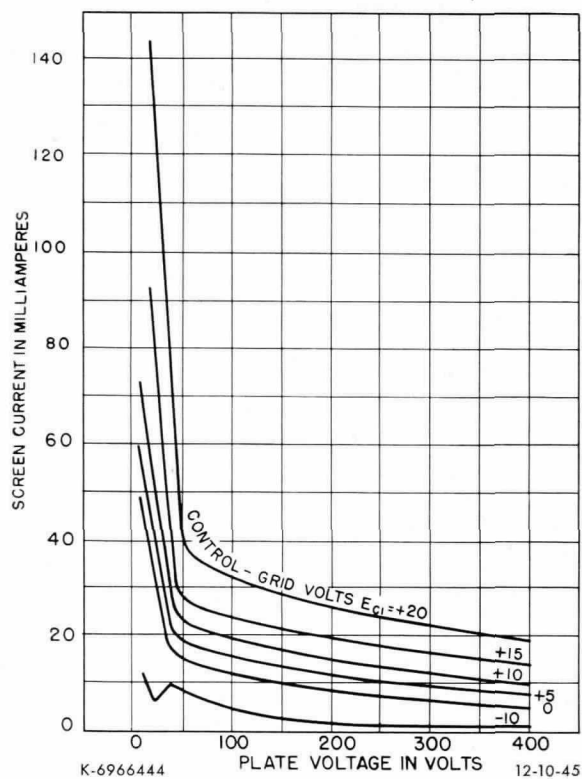
GL-815 AVERAGE PLATE CHARACTERISTICS



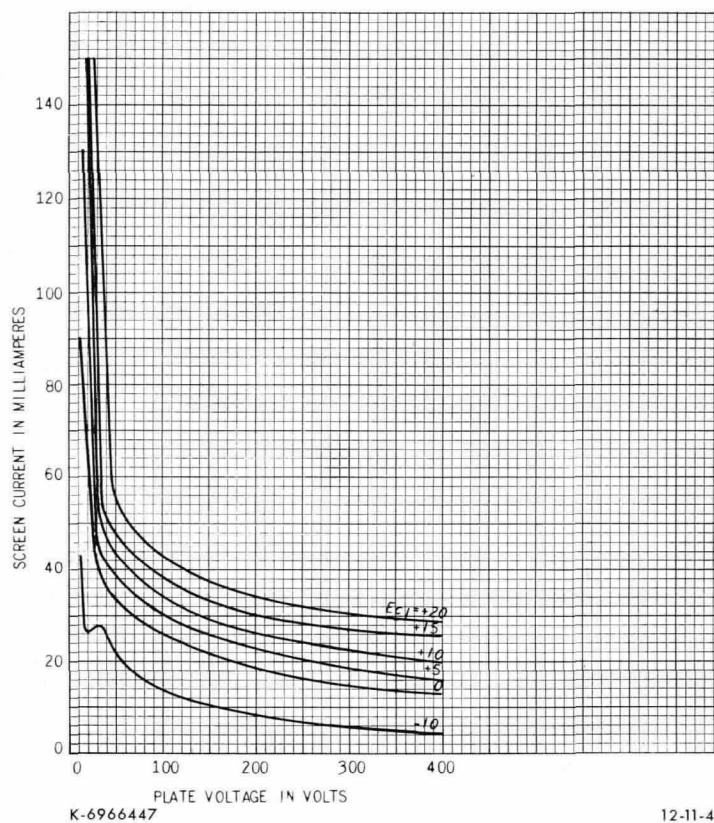
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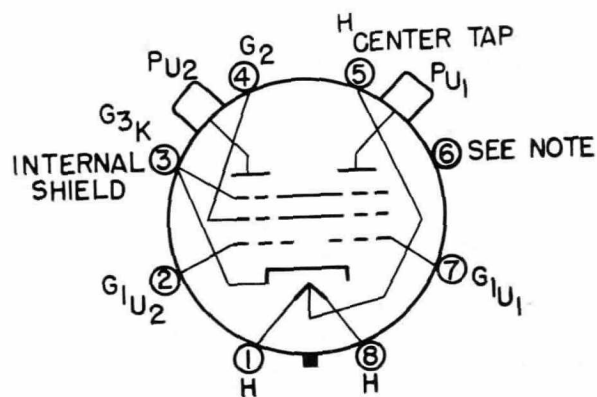
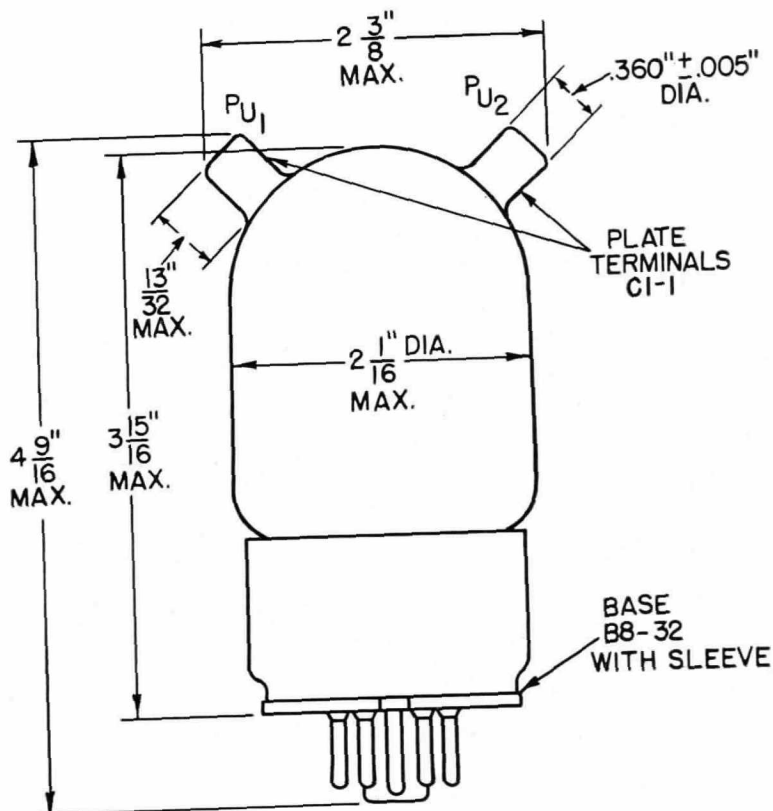
GL-815 AVERAGE CHARACTERISTICS FOR EACH UNIT

 $(E_f = 12.6 \text{ VOLTS, SCREEN VOLTS} = 125)$ 

GL-815 AVERAGE CHARACTERISTICS FOR EACH UNIT

 $(E_f = 12.6 \text{ VOLTS, SCREEN VOLTS} = 200)$ 

GL-815 OUTLINE



NOTE: TERMINALS 3 & 6 MUST BE CONNECTED TOGETHER.

BASING DIAGRAM

GL-815 OUTLINE

K-6979116

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Electronics Department
GENERAL ELECTRIC
 Schenectady, N. Y.