

## Beam Power Tube

## QUICK-HEATING FILAMENT

90 WATTS CW INPUT (ICAS) UP TO 60 Mc

60 WATTS CW INPUT (ICAS) AT 175 Mc

For Use in Push-to-Talk Mobile and Emergency-Communications Equipment as an RF Power-Amplifier Tube

## GENERAL DATA

## Electrical:

Filament, Coated:

Voltage (AC or DC) . . . . . 6.3  $\pm$  10% volts

Current at 6.3 volts. . . . . 0.65 amp

Heating time. . . . . 1 sec

Transconductance, for plate volts = 200,

grid-No.2 volts = 200, and plate

ma. = 100 . . . . . 6000  $\mu$ hos

Mu-Factor, Grid No.2 to Grid No.1 for

plate volts = 200, grid-No.2 volts

= 200, and plate ma. = 100. . . . . 4

Direct Interelectrode Capacitances:

Grid No.1 to plate. . . . . 0.24 max.  $\mu$ f

Grid No.1 to filament &amp; grid No.3 &amp;

internal shield, grid No.2, and

base sleeve . . . . . 11  $\mu$ f

Plate to filament &amp; grid No.3 &amp;

internal shield, grid No.2, and

base sleeve . . . . . 8.5  $\mu$ f

## Mechanical:

Operating Position. . . . . Vertical, base down or up, or

Horizontal with pins 3 and 7 in vertical plane

Maximum Overall Length. . . . . 3-13/16"

Seated Length . . . . . 3-1/8"  $\pm$  1/8"

Maximum Diameter. . . . . 1-21/32"

Bulb. . . . . T12

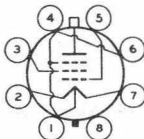
Cap. . . . . Small (JEDEC No.C1-1)

Socket. . . . . Standard Octal 8-Contact

Base. . . . . Small Wafer Octal 8-Pin with "770" Sleeve

(JEDEC Group 1, No.B8-150)

Basing Designation for BOTTOM VIEW. . . . . 7CL

Pin 1-Filament Tap,  
Grid No.3,  
Internal  
ShieldPin 2-Filament  
Pin 3-Grid No.2Pin 4-Same as Pin 1  
Pin 5-Grid No.1  
Pin 6-Same as Pin 1  
Pin 7-Filament  
Pin 8-Base Sleeve  
Cap-Plate

# 4604

## RF POWER AMPLIFIER & OSCILLATOR — Class C Telegraphy<sup>▲</sup> and

## RF POWER AMPLIFIER — Class C FM Telephony

Maximum ICAS<sup>®</sup> Ratings, Absolute-Maximum Values:

|                                                                  | Up to 60 Mc |       |
|------------------------------------------------------------------|-------------|-------|
| DC PLATE VOLTAGE. . . . .                                        | 750 max.    | volts |
| DC GRID-No.2 VOLTAGE. . . . .                                    | 250 max.    | volts |
| DC GRID-No.1 VOLTAGE. . . . .                                    | -150 max.   | volts |
| DC PLATE CURRENT. . . . .                                        | 150 max.    | ma    |
| DC GRID-No.1 CURRENT. . . . .                                    | 4 max.      | ma    |
| PLATE INPUT. . . . .                                             | 90 max.     | watts |
| GRID-No.2 INPUT. . . . .                                         | 3 max.      | watts |
| PLATE DISSIPATION. . . . .                                       | 25 max.     | watts |
| BULB TEMPERATURE (At hottest point on<br>bulb surface) . . . . . | 220 max.    | °C    |

### Typical Operation:

As amplifier at 175 Mc

|                                             |       |       |
|---------------------------------------------|-------|-------|
| DC Plate Voltage. . . . .                   | 400   | volts |
| DC Grid-No.2 Voltage <sup>★</sup> . . . . . | 190   | volts |
| From a series resistor of . . . . .         | 18000 | ohms  |
| DC Grid-No.1 Voltage <sup>◆</sup> . . . . . | -60   | volts |
| From a grid resistor of . . . . .           | 30000 | ohms  |
| DC Plate Current. . . . .                   | 150   | ma    |
| DC Grid-No.2 Current. . . . .               | 11    | ma    |
| DC Grid-No.1 Current (Approx.) . . . . .    | 2     | ma    |
| Driving Power (Approx.) . . . . .           | 4.5   | watts |
| Power Output (Approx.) . . . . .            | 30    | watts |

### Maximum Circuit Values:

|                                                     |            |      |
|-----------------------------------------------------|------------|------|
| Grid-No.1-Circuit Resistance <sup>◆</sup> . . . . . | 30000 max. | ohms |
|-----------------------------------------------------|------------|------|

<sup>▲</sup> Key-down conditions per tube without amplitude modulation. Amplitude 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.

<sup>●</sup> Intermittent Commercial and Amateur Service.

<sup>★</sup> Obtained preferably from a separate source, or from the plate supply voltage with a voltage divider, or through a series resistor. A series grid-No.2 resistor should be used only when the 4604 is used in a circuit which is not keyed. Grid-No.2 voltage must not exceed 400 volts under key-up conditions.

<sup>◆</sup> Obtained from fixed supply, by grid-No.1 resistor, or by combination methods.

<sup>◆</sup> When grid No.1 is driven positive and the 4604 is operated at maximum ratings, the total dc grid-No.1-circuit resistance should not exceed the specified value of 30,000 ohms. If this value is insufficient to provide adequate bias, the additional required bias must be supplied by a fixed supply.

### CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

|                                           | Min. | Max. |     |
|-------------------------------------------|------|------|-----|
| Filament Current at 6.3 volts ac. . . . . | 0.59 | 0.71 | amp |



## Direct Interelectrode Capacitances:

|                                                                                                 |     |      |                  |
|-------------------------------------------------------------------------------------------------|-----|------|------------------|
| Grid No.1 to plate. . . . .                                                                     | -   | 0.24 | $\mu\mu\text{f}$ |
| Grid No.1 to filament & grid No.3<br>& internal shield, grid No.2, and<br>base sleeve . . . . . | 9.5 | 12.5 | $\mu\mu\text{f}$ |
| Plate to filament & grid No.3 &<br>internal shield, grid No.2, and<br>base sleeve . . . . .     | 7.3 | 9.5  | $\mu\mu\text{f}$ |
| Plate Current <sup>♣</sup> . . . . .                                                            | 46  | 94   | ma               |
| Grid-No.2 Current <sup>♣</sup> . . . . .                                                        | -   | 5.5  | ma               |
| Useful Power Output <sup>♣</sup> . . . . .                                                      | 47  | -    | watts            |

<sup>♣</sup> With 6.3 volts ac on filament, dc plate voltage of 300 volts, dc grid-No.2 voltage of 200 volts, and dc grid-No.1 voltage of -29 volts. ←

<sup>♣</sup> In a single-tube, self-excited-oscillator circuit, and with 6.3 volts ac on filament, dc plate voltage of 600 volts, dc grid-No.2 voltage of 200 volts, grid-No.1 resistor of  $30,000 \pm 10\%$  ohms, dc plate current of 100 to 112 ma., dc grid-No.1 current of 2 to 2.5 ma., and frequency of 15 Mc.

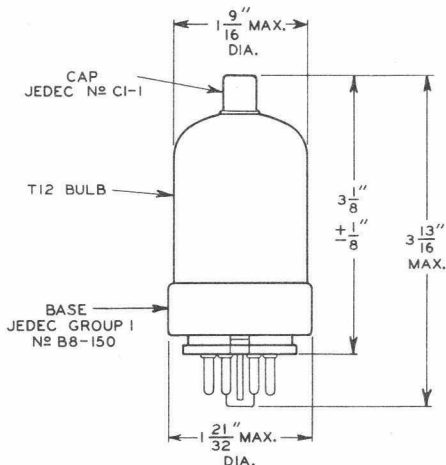
## OPERATING CONSIDERATIONS

The *bulb* becomes hot during operation. To insure adequate cooling, therefore, it is essential that free circulation of air be provided around the 4604.

The *plate* shows no color when the 4604 is operated at full ratings under ICAS conditions. Connections to the plate should be made with a flexible lead to prevent any strain on the seal at the cap.

← Indicates a change.

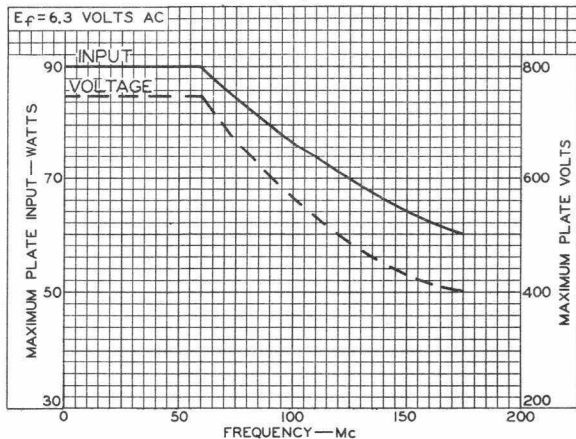




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## RATING CHART

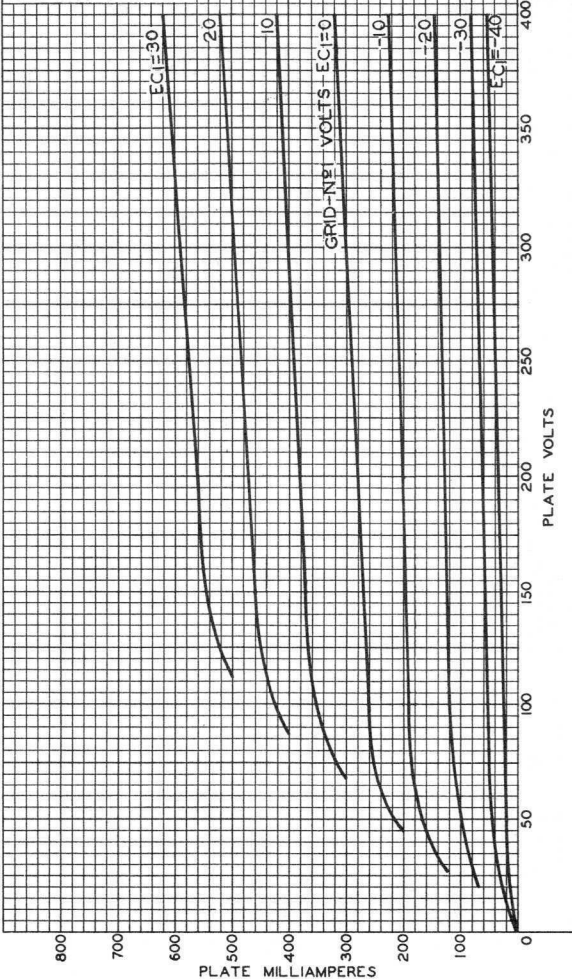
### ICAS Class-C Telegraphy or Telephony Service



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## TYPICAL PLATE CHARACTERISTICS

$E_f = 6.3$  VOLTS AC  
 GRID-N $\phi$ 2 VOLTS=200



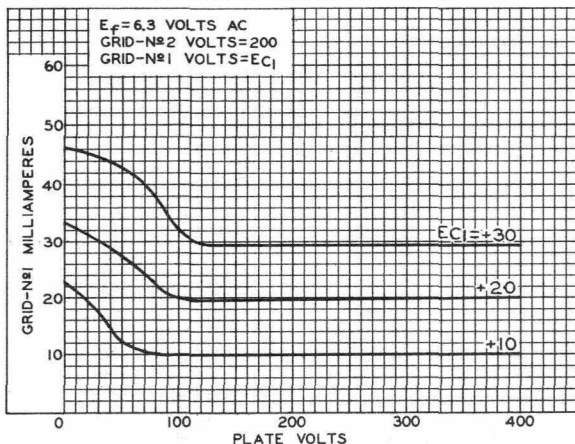
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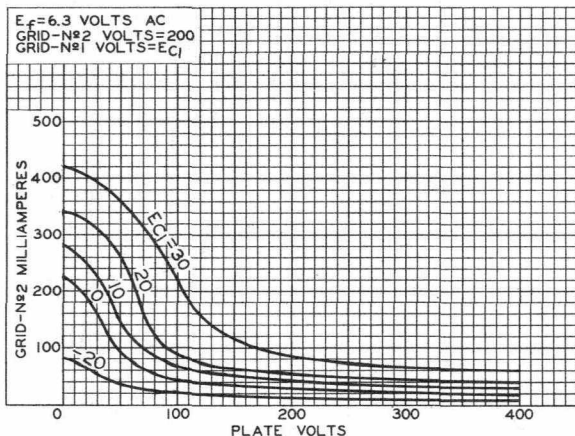
RADIO CORPORATION OF AMERICA  
 Electron Tube Division  
 Harrison, N. J.

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## TYPICAL CHARACTERISTICS



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