RCA TUBE HANDBOOK HB-3

RECEIVING TUBE SECTION — Part 1

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.

In the Application Guide on the following pages, RCA receiving tubes are classified in two ways: (a) by function, and (b) by structure (diode, triode, etc.). The functional classification covers 42 principal types of application.

Tube types are grouped by structure under each classification; they are also keyed to indicate miniature, octal, nuvistor, duodecar, and novar types.

Triodes are designated as *low, medium-,* or *high-mu* types on the following basis: *low,* less than 10; *medium,* 10 or more, but less than 50; *high,* 50 or more. Where applicable, tubes are designated as *sharp-, semiremote,* or *remote-cutoff* on the basis of the ratio, in per cent, of the negative control-grid voltage to the screen-grid voltage (or, for triodes, the plate voltage) for cut-off, as given in the characteristics or typical operation values. These terms are defined as follows: *sharp,* less than 10 per cent; *semiremote,* 10 or more, but less than 20 per cent, *remote,* 20 per cent or more.

APPLICATIONS

1. **Audio-Frequency Amplifiers**
2. **Automatic Gain Control Circuits (AGC and AVC)**
3. **Bandpass Amplifiers (Color TV)**
4. **Blankers**
5. **Burst Amplifiers**
6. **Cathode-Drive RF Amplifiers (Grounded-Grid)**
7. **Chroma Amplifiers**
8. **Color Killers**
9. **Color Matrixing Circuits**
10. **Complex-Wave Generators**
11. **Converters**
12. **Dampers**
13. **Demodulators (Color TV)**
14. **Detectors**
15. **DC Restorers**
16. **Discriminators**
17. **Frequency Dividers**
18. **FM Detectors**
19. **Gated Noise, AGC, and Sync Amplifiers**
20. **Grounded-Grid RF Amplifiers**
21. **Harmonic Generators**
22. **Horizontal-Deflection Circuits**
23. **Intermediate-Frequency Amplifiers**
24. **Keyed AGC Amplifiers**
25. **Limiters**
26. **Mixers—RF**
27. **Mixer-Oscillators—RF**
28. **Multivibrators**
29. **Noise Inverters (Noise Immune Circuits)**
30. **Oscillators**
31. **Phase Inverters**
32. **Phase Splitters**
33. **Radio-Frequency Amplifiers**
34. **Reactance Circuits**
35. **Rectifiers**
36. **Regulators (High Voltage)**
37. **Sync Amplifiers**
38. **Sync Clippers**
39. **Sync Separators**
40. **Tuning Indicators**
41. **Vertical-Deflection Circuits (Oscillator and Amplifier)**
42. **Video Amplifiers**

1. AUDIO-FREQUENCY AMPLIFIERS

Voltage Amplifiers

Medium-Mu Triode with Twin Diode

- 6BF6

Medium-Mu Triode—Sharp-Cutoff Pentode

- 6LQ8
- 11LQ8
- 7199†

Medium-Mu Twin Triode

- 5J6
- 6J6A
- ⊙ 6SN7GTB
- 7AU7
- 9AU7
- 12AU7A/ECC82
- ⊙ 12SN7GTA
- 19J6

Twin Diode—High-Mu Triode

- 3AV6
- 4AV6
- 6AT6
- 6AV6
- 6BN8
- 6CN7
- 8BN8
- 12AT6
- 12AV6
- 14GT8
- 18FY6A

High-Mu Twin Triode

- 6EU7†
- ⊙ 6SL7GT
- 12AX7A/ECC83†
- 12AZ7A
- 12BZ7
- ⊙ 12SL7GT
- 20EZ7
- 7025†

Triple Diode—High-Mu Triode

- 5T8
- 6T8A

High-Mu Triode—Sharp-Cutoff Pentode

- 6KT8

Sharp-Cutoff Pentode

- 3DT6A*
- 4DT6A*
- 5HZ6*
- 6DT6A*
- 6GX6*
- 6HZ6*
- 5879†
- 7543†

Power Amplifiers

Beam Power Tube

- 5AQ5
- 5CZ5
- ⊙ 5V6GT
- 6AQ5A
- 6AS5
- 6CM6
- 6CU5
- 6CZ5
- ⊙ 6DG6GT
- 6DS5
- § 6GC5
- ⊙ 6HG5
- ⊙ 6L6
- ⊙ 6L6GC†
- ⊙ 6V6
- ⊙ 6V6GTA
- ⊙ 6W6GT
- ⊙ 6Y6GA/6Y6G
- 11DS5
- 12AB5
- 12AQ5
- 12CA5
- 12CU5/12C5
- ⊙ 12V6GT
- ⊙ 12W6GT
- 17CU5/17C5
- 25C5
- 25F5A
- 34GD5A
- 35C5
- ⊙ 35L6GT
- 50B5
- 50C5
- ⊙ 50L6GT
- 6973†
- ⊙ 7408†

Beam Power Tube—Sharp-Cutoff Pentode

- ‡ 6AD10
- ‡ 6BF11*
- ‡ 6AL11
- ‡ 12AL11
- ‡ 12BF11*
- ‡ 17BF11*

Pentode—Beam Power Tube

- ‡ 6Z10/6J10
- ‡ 13Z10/13J10

Power Pentode

- 6BQ5/EL84
- 6EH5
- ⊙ 6F6
- 6GK6
- ⊙ 6K6GT
- 8BQ5
- 10BQ5
- 12FX5
- 25EH5
- 35EH5
- 50EH5
- 60FX5
- 7189†
- ▲ 7868†

2. AUTOMATIC GAIN CONTROL CIRCUITS (AGC & AVC)

Diode—Remote-Cutoff Pentode

- 6EQ7
- 12EQ7

Twin Diode—High-Mu Triode

- 3AV6
- 4AV6
- 6AT6
- 6AV6
- 12AT6
- 12AV6
- 18FY6A

Medium-Mu Triode—Sharp-Cutoff Pentode

- 5AN8
- 5GH8A
- 6AN8A
- 6AZ8
- 6BA8A
- 6BH8
- 6CU8
- 6GH8A
- 8BA8A
- 8BH8

High-Mu Triode—Sharp-Cutoff Pentode

- 6AW8A
- 6HF8
- 6JV8
- 8AW8A
- 8JV8
- 10HF8

Sharp-Cutoff Twin Pentode

- 3BU8/3GS8
- 4HS8
- 6BU8
- 6HS8

• Miniature ‡ Duodecar ⊙ Octal ▲ Novar * Dual-control grids † For high-fidelity equipment § Neonoval

3. BANDPASS AMPLIFIER (COLOR TV)

Medium-Mu Triode—Sharp-Cutoff Pentode

- 5GH8A
- 6HL8
- 6MQ8
- 6GH8A

High-Mu Triode—Sharp-Cutoff Pentode

- 6AW8A
- 6KV8
- 8AW8A
- 6KT8
- 6LF8
- 11KV8

4. BLANKERS

Medium-Mu Triode—Sharp-Cutoff Pentode

- 5GH8A
- 6GH8A
- 6MQ8

Medium-Mu Twin Triode

- 6FQ7/6CG7
- 8FQ7/8CG7
- 12BH7A
- 6GU7
- 8GU7

Medium-Mu Triode—Semiremote-Cutoff Pentode

- 6LM8

High-Mu Triode—Sharp-Cutoff Pentode

- 6KT8

5. BURST AMPLIFIERS

Beam-Deflection Tube

- 6JH8

Medium-Mu Triode—Sharp-Cutoff Pentode

- 5EA8
- 6EA8
- 19EA8
- 5GH8A
- 6GH8A

Medium-Mu Triode—Semiremote-Cutoff Pentode

- 6LM8
- 6MU8

Twin Diode—High-Mu Triode

- 6BN8
- 8BN8

Sharp-Cutoff Pentode

- 3JC6A
- 4JC6A
- 6EW6
- 4EW6
- 5EW6
- 6JC6A

6. CATHODE-DRIVE RF AMPLIFIERS (GROUNDED-GRID)

Medium-Mu Triode

- 6BC4

Medium-Mu Twin Triode

- 4BC8
- 5BK7A
- 6BQ7A/6BZ7/6BS8
- 4BQ7A
- 5BQ7A
- 4BS8
- 6BC8/6BZ8
- 4BZ7
- 6BK7B

High-Mu Triode

- △ 2CW4
- 4HQ5
- △ 6DS4
- △ 2DS4
- 6AB4
- 6HQ5
- 2HQ5
- △ 6CW4
- △ 13CW4
- 3HQ5

High-Mu Twin Triode

- 6DT8
- 12AZ7A
- 12DT8
- 12AT7/ECC81

7. CHROMA AMPLIFIERS

Medium-Mu Triode—Sharp-Cutoff Pentode

- 5GH8A
- 6GH8A

Medium-Mu Triple Triode

- ▲ 6MD8
- ▲ 12MD8

Medium-Mu Twin Triode

- 6FQ7/6CG7
- 8FQ7/8CG7
- 12BH7A
- 6GU7
- 8GU7

8. COLOR KILLERS

Quadruple Diode

- 6JU8A
- 8JU8A

Medium-Mu Triode—Sharp-Cutoff Pentode

- 5GH8A
- 6GH8A
- 6MQ8

High-Mu Triode—Sharp-Cutoff Pentode

- 6KT8

• Miniature △ Nuvistor ▲ Novar

9. COLOR MATRIXING CIRCUITS

Medium-Mu Twin Triode

• 6FQ7/6CG7 • 8FQ7/8CG7 • 12BH7A
• 6GU7 • 8GU7

Medium-Mu Triode—Sharp Cutoff Pentode

• 5GH8A • 6GH8A

Medium-Mu Triple Triode

▲ 6MD8 ‡ 6MJ8 ▲ 12MD8

High-Mu Triple Triode

‡ 6MN8

Twin Pentode

• 6LE8 • 10LE8 • 15LE8

Quadruple Diode

• 6JU8A • 8JU8A

10. COMPLEX-WAVE GENERATORS

High-Mu Twin Double-Plate Triode

• 12FQ8

Diode—Sharp-Cutoff, Twin-Plate Tetrode

• 6FA7

Diode—Sharp-Cutoff, Three-Plate Tetrode

• 6KM8

Medium-Mu Triode—Three-Plate Tetrode

• 6FH8

11. CONVERTERS

Medium-Mu Triode—Sharp-Cutoff Pentode

• 4KE8 • 5X8 • 6U8A/
• 5EA8 • 6EA8 6KD8
• 5GH8A • 6GH8A • 9KZ8
• 5KE8 • 6KE8 • 19EA8
• 5U8 • 6KZ8 • 19X8

High-Mu Twin Triode

• 6DT8 • 12AZ7A • 12DT8
• 12AT7/ECC81

Sharp-Cutoff Pentode

• 3AU6 • 6AU6A • 18GD6A
• 4AU6 • 12AU6

Pentagrid

• 6BA7 • 12BE6 • 18FX6A
• 6BE6

12. DAMPERS

Half-Wave (Diode)

⊙ 6AU4GTA ⊙ 6DM4A / ▲ 17BH3A
⊙ 6AX4GTB 6DA4 • 17BR3/
▲ 6AY3B ▲ 6DW4B 17RK19
▲ 6BA3 ⊙ 6W4GT ▲ 17BS3A /
‡ 6BE3/6BZ3 ⊙ 12AX4GTB 17DW4A
▲ 6BH3A ▲ 12AY3A ‡ 17BW3
▲ 6BS3A ‡ 12BE3 ▲ 17CK3
‡ 6CG3/6CE3/ ▲ 12BS3A / • 17CT3
6CD3/6BW3 12DW4A ⊙ 17D4
▲ 6CJ3/6CH3 ▲ 12CL3 ⊙ 17DE4
▲ 6CK3 ⊙ 12D4 ⊙ 17DM4A
▲ 6CL3 ⊙ 17AX4GTA ▲ 22BH3A
▲ 6CM3 ▲ 17AY3A ‡ 22BW3
⊙ 6DE4 / ‡ 17BE3/ ⊙ 22DE4
6CQ4 17BZ3 ⊙ 25AX4GT

13. DEMODULATORS (COLOR TV)

Medium-Mu Twin Triode

• 12BH7A

Medium-Mu Triode—Sharp-Cutoff Pentode

• 5GH8A • 6GH8A

High-Mu Twin Triode

• 12AZ7A

• Miniature ⊙ Octal △ Nuvistor ▲ Novar ‡ Duodecar

Sharp-Cutoff Pentode
• 5HZ6 • 6GY6 ‡ 12BV11
‡ 6BV11 • 6HZ6

Pentagrid Amplifier
• 3BY6 • 6BY6

Twin Pentode
• 6LE8 • 10LE8 • 15LE8

Beam Deflection Tube
• 6JH8 • 6ME8

Sharp-Cutoff Twin Pentode
• 6MK8

14. DETECTORS

Diode—Sharp-Cutoff Pentode
• 5AM8 • 6AM8A
• 5AS8 • 6AS8

Diode—Remote-Cutoff Pentode
• 6CR6 • 12CR6 • 12EQ7
• 6EQ7

Twin Diode
• 3AL5 • 6AL5 • 12AL5

Twin Diode—High-Mu Triode
• 3AV6 • 6BN8 • 12AV6
• 4AV6 • 6CN7 • 14GT8
• 6AT6 • 8BN8 • 18FY6A
• 6AV6 • 12AT6

Triple Diode
• 6BJ7

Triple Diode—High-Mu Triode
•5T8 • 6T8A

Quadruple Diode
• 6JU8A • 8JU8A

Sharp-Cutoff Pentode
• 3DT6A* • 5HZ6* • 6GX6*
• 4DT6A* • 6DT6A* • 6HZ6*
• 5GX6*

15. DC RESTORERS

Diode—Sharp-Cutoff Pentode
• 5AM8 • 6AM8A • 6AS8
• 5AS8

Triple Diode
• 6BJ7

16. DISCRIMINATORS

FM

Twin Diode
• 3AL5 • 6AL5 • 12AL5

Twin Diode—High-Mu Triode
• 6BN8 • 14GT8

Triple Diode—High-Mu Triode
• 5T8 • 6T8A

Beam Tube
• 3BN6 • 4BN6 • 6BN6/6KS6

Beam Power Tube—Sharp-Cutoff Pentode
‡ 6AL11 ‡ 12AL11 ‡ 17BF11
‡ 6BF11 ‡ 12BF11

Pentode—Beam Power Tube
‡ 6Z10/6J10 ‡ 13Z10/13J10 ‡ 17AB10/17X10

FM Quadrature-Grid

Sharp-Cutoff Pentode
• 3DT6A* • 6DT6A* • 6GY6*
• 4DT6A* • 6GX6* • 6HZ6*
• 5HZ6*

Beam Tube
• 3BN6 • 4BN6 • 6BN6/6KS6

Horizontal AFC

Twin Diode—High-Mu Triode
• 6BN8 • 8BN8 • 8CN7
• 6CN7

Twin Diode—Sharp Cutoff Pentode
• 6LT8 • 8LT8 • 11LT8

17. FREQUENCY DIVIDERS

High-Mu Twin Double-Plate Triode
• 12FQ8

18. FM DETECTORS

(See 16. Discriminators)

• Miniature ◎ Octal * Dual-control grids ‡ Duodecar

19. GATED NOISE, AGC, AND SYNC AMPLIFIERS

High-Mu Triode—Sharp-Cutoff Pentode

- 6KA8
- 8KA8
- 8LC8
- 6LC8

Sharp-Cutoff Pentode

- 6GY6*

Sharp-Cutoff Twin Pentode

- 3BU8/3GS8
- 4HS8
- 6BU8
- 6HS8

Pentagrid Amplifier

- 3BY6
- 3CS6
- 4CS6
- 6BY6
- 6CS6

20. GROUNDED-GRID RF AMPLIFIERS

(See 6. Cathode-Drive RF Amplifiers)

21. HARMONIC GENERATORS

(See 10. Complex-Wave Generators)

22. HORIZONTAL-DEFLECTION CIRCUITS

Amplifiers

Beam Power Tube

- ⊙ 6AU5GT
- ⊙ 6AV5GA
- ⊙ 6BQ6GTB/6CU6
- ⊙ 6CB5A
- ⊙ 6CD6GA
- ⊙ 6DQ5
- ▲ 6GJ5A
- ▲ 6GT5A
- ⊙ 6GW6/6DQ6B
- ▲ 6JB6A
- ▲ 6JF6
- ▲ 6JG6A
- ‡ 6JM6A
- ▲ 6JR6
- ‡ 6JS6C
- ▲ 6JT6A
- ▲ 6JU6
- ▲ 6KM6
- ▲ 6LQ6/6JE6C
- ⊙ 12AV5GA
- ⊙ 12BQ6GTB/12CU6
- ▲ 12JB6A
- ▲ 12JT6A
- ⊙ 17BQ6GTB
- ▲ 17GJ5A
- ▲ 17GT5A
- ⊙ 17GW6/17DQ6B
- ▲ 17JB6A
- ▲ 17JG6A
- ‡ 17JM6A
- ▲ 17JT6A
- ▲ 22JF6
- ▲ 22JG6A
- ▲ 22JR6
- ▲ 22KM6
- ▲ 24LQ6/24JE6C
- ⊙ 25AV5GA
- ⊙ 25BQ6GTB/25CU6
- ⊙ 25CD6GB
- ⊙ 25DN6
- ‡ 31JS6C
- ▲ 31LQ6

Oscillators

Medium-Mu Triode—Sharp-Cutoff Pentode

- 5GH8A
- 6GH8A

Medium-Mu Twin Triode

- 6FQ7/6CG7
- 6SN7GTB
- 7AU7
- 8FQ7/8CG7
- 9AU7
- 12AU7A/ECC82
- 12BH7A
- ⊙ 12SN7GTA

23. INTERMEDIATE-FREQUENCY AMPLIFIERS

Medium-Mu Triode—Sharp-Cutoff Tetrode

- 5CQ8
- 6CQ8

Medium-Mu Triode—Sharp-Cutoff Pentode

- 5AN8
- 5GH8A
- 6AN8A
- 6AZ8
- 6BH8
- 6CU8
- 6GH8A
- 11LQ8

High-Mu Triode—Sharp-Cutoff Pentode

- 6AW8A
- 6GN8
- 6HF8
- 6JV8
- 6KT8
- 6KV8
- 8AW8A
- 8GN8/8EB8
- 8JV8
- 10GN8
- 10HF8
- 10JA8/10LZ8
- 11KV8

Sharp-Cutoff Pentode

- 3AU6
- 3BC5/3CE5
- 3CB6/3CF6
- 3DK6
- 3JC6A
- 4AU6
- 4CB6
- 4DE6
- 4DK6
- 4EW6
- 4JC6A
- 4JD6▪
- 5EW6
- 6AG5
- 6AK5/EF95
- 6AU6A
- 6BC5/6CE5
- 6CB6A/6CF6
- 6DC6
- 6DE6
- 6DK6
- 6EJ7/EF184
- 6EW6
- 6HS6
- 6JC6A
- 6JD6▪
- 12AU6
- 12AW6
- 12DK6
- 18GD6A

• Miniature ⊙ Octal * Dual-control grids ‡ Duodecar △ Nuvistor ▲ Novar

Diode—Sharp-Cutoff Pentode

- 5AM8
- 6AM8A
- 6AS8
- 5AS8

Semiremote-Cutoff Pentode

- 3BZ6
- 4KT6
- 6HR6
- 3KT6
- 5GM6
- 6JH6
- 4BZ6
- 6BZ6
- 6KT6
- 4EH7/LF183
- 6EH7/EF183
- 12BZ6
- 4GM6
- 6GM6
- 19HR6
- 4JH6

Remote-Cutoff Pentode

- 6BA6/EF93
- 12BA6
- 18FW6A

Remote-Cutoff Pentode with Diode

- 6EQ7
- 12EQ7

24. KEYED AGC AMPLIFIERS

(See 19. Gated Noise, AGC, and Sync Amplifiers)

25. LIMITERS

Beam Tube

- 3BN6
- 4BN6
- 6BN6/6KS6

Sharp-Cutoff Pentode

- 3AU6
- 6GX6
- 6HZ6
- 4AU6
- 6HS6
- 12AU6
- 6AU6A

Power Pentode—Beam Power Tube

‡ 6Z10/6J10 ‡ 13Z10/13J10 ‡ 17AB10/17X10

26. MIXERS—RF

Medium-Mu Twin Triode

- 5J6
- 6J6A

High-Mu Triode

△ 2CW4 △ 6CW4 △ 13CW4

- 6AB4

27. MIXER-OSCILLATORS—RF

Medium-Mu Triode—Sharp-Cutoff Tetrode

- 5CL8A
- 6CL8A
- 19JN8/19CL8A
- 5CQ8
- 6CQ8

Medium-Mu Triode—Sharp-Cutoff Pentode

- 4KE8
- 5U8
- 6KE8
- 5AT8
- 5X8
- 6KZ8
- 5B8
- 6AT8A
- 6U8A/6KD8
- 5BR8/5FV8
- 6BR8A/6FV8A
- 6X8A
- 5CG8
- 6CG8A
- 9KZ8
- 5EA8
- 6EA8
- 9U8A
- 5FG7
- 6FG7
- 19EA8
- 5KE8
- 6HB7
- 19X8

High-Mu Twin Triode

- 6DT8
- 12AT7/ECC81
- 12DT8

28. MULTIVIBRATORS

Medium-Mu Triode—Sharp-Cutoff Pentode

- 5GH8A
- 6GH8A

Medium-Mu Twin Triode

- 6FQ7/6CG7
- 8FQ7/8CG7
- 12BH7A
- 6GU7
- 8GU7
- ⊙ 12SN7-GTA
- ⊙ 6SN7GTB
- 9AU7
- 7AU7
- 12AU7A/ECC82

High-Mu Twin Triode

- 12AX7A/ECC83

29. NOISE INVERTERS (NOISE IMMUNE CIRCUITS)

High-Mu Triode—Sharp-Cutoff Pentode

- 6KA8
- 8KA8
- 8LC8
- 6LC8

Sharp-Cutoff Pentode

- 6GY6*

Quadruple Diode

- 6JU8A
- 8JU8A

30. OSCILLATORS

Radio Frequency—UHF

Medium-Mu Triode

- 2AF4B/2DZ4
- 3AF4A/3DZ4
- △ 6DV4
- 6DZ4

△ 2DV4 • 6AF4A

• Miniature ⊙ Octal * Dual-control grids △ Nuvistor ‡ Duodecar

▪ Approaches semiremote-cutoff characteristics; used in first-if amplifier applications

Radio Frequency—VHF

Medium-Mu Twin Triode
- 5J6
- 6J6A

High-Mu Triode
- 6AB4

Power Triode
- 6C4 (Class C)

3.58-MHz (Color TV)

Medium-Mu Triode—Sharp-Cutoff Pentode
- 5GH8A
- 6GH8A

High-Mu Triode—Sharp-Cutoff Pentode
- 6KT8

Low Frequency, Sweep Type

Medium-Mu Triode—Sharp-Cutoff Pentode
- 5AN8
- 6AN8A
- 6AU8A
- 6AZ8
- 6BA8A
- 6BH8
- 6CH8
- 8AU8
- 8BA8A
- 8BH8

Twin Diode—High-Mu Triode
- 6BN8
- 6CN7
- 8BN8
- 8CN7

High-Mu Twin Triode
- 12AX7A/ECC83

31. PHASE INVERTERS

Medium-Mu Twin Triode
- 6FQ7/6CG7
- 6GU7
- ⊙ 6SN7GTB
- 7AU7
- 8GU7
- 8FQ7/8CG7
- 9AU7
- 12AU7A/ECC82
- 12BH7A
- ⊙ 12SN7-GTA

High-Mu Triode—Sharp-Cutoff Pentode
- 6AW8A
- 6EB8
- 6GN8
- 6HF8
- 8AW8A
- 8GN8/8EB8
- 10GN8
- 10HF8
- 10JA8/10LZ8

High-Mu Twin Triode
- ⊙ 6SL7GT
- 12AX7A/ECC83
- ⊙ 12SL7GT
- 7025

Medium-Mu Triple Triode
- ‡ 6AV11

32. PHASE SPLITTERS

Medium-Mu Triode—Sharp-Cutoff Tetrode
- 5CQ8
- 6CQ8

Medium-Mu Triode—Sharp-Cutoff Pentode
- 5AN8
- 6AN8A
- 6AZ8
- 6BA8A
- 6CU8
- 8BA8A
- 7199

High-Mu Triode—Sharp-Cutoff Pentode
- 6AW8A
- 8AW8A

33. RADIO-FREQUENCY AMPLIFIERS

Medium-Mu Triode
- 2BN4A
- 3BN4A
- 6BC4
- 6BN4A

Medium-Mu Triode—Sharp-Cutoff Tetrode
- 5CQ8
- 6CQ8

Medium-Mu Twin Triode
- 4BC8
- 4BQ7A
- 4BS8
- 5BK7A
- 5BQ7A
- 5J6
- 6BC8/6BZ8
- 6BK7B
- 6BQ7A/6BZ7/6BS8
- 6J6A

High-Mu Triode
- △ 2CW4
- △ 2DS4
- △ 2EG4
- 2ER5
- 2FH5
- 2GK5/2FQ5A
- 3ER5
- 3FH5
- 3GK5
- 3HM5/3HA5
- 4GK5
- 6AB4
- △ 6CW4
- △ 6DS4
- 6ER5
- 6FH5
- 6GK5/6FQ5A
- 6HM5/6HA5
- △ 13CW4

• Miniature ⊙ Octal △ Nuvistor * Dual-control grids ‡ Duodecar

High-Mu Twin Triode
- • 6DT8 • 12AZ7A • 12DT8

Power Triode
- • 6C4 (Class C)

Sharp-Cutoff Tetrode
- • 2CY5 • 6CY5 • 6FV6
- • 3CY5

Sharp-Cutoff Pentode
- • 3AU6 ⊙ 4DE6 • 6CB6A/6CF6
- • 3BC5/3CE5 • 6AG5 • 6DC6
- • 3CB6/3CF6 • 6AK5/EF95 • 6DE6
- • 4AU6 • 6AU6A • 12AU6
- • 4CB6 • 6BH6 • 12AW6
- • 18GD6A

Remote-Cutoff Pentode
- • 6BA6/EF93 • 12BA6 • 18FW6A
- • 6BJ6

Remote-Cutoff Pentode with Diode
- • 6EQ7 • 12EQ7

34. REACTANCE CIRCUITS

Medium-Mu Triode—Sharp-Cutoff Pentode
- • 5AN8 • 6AZ8 • 6CU8
- • 6AN8A • 6BA8A • 8BA8A

Twin Diodes—High-Mu Triode
- • 6CN7 • 8CN7

High-Mu Triode—Sharp-Cutoff Pentode
- • 6AW8A • 8AW8A

35. RECTIFIERS

Power-Supply Types—Vacuum

Half-Wave (Diode)
- • 35W4 • 36AM3B • 50DC4
- ⊙ 35Z5GT

Full-Wave (Twin Diode)
- ⊙ 3DG4 ⊙ 5V3A • 6CA4
- ⊙ 5AS4A 5AU4 • 6X4
- ▲ 5BC3A ⊙ 5V4GA ⊙ 6X5GT
- ⊙ 5DJ4 ⊙ 5Y3GT • 12X4
- ⊙ 5U4GB

High-Voltage Types (For rf-rectifier or pulsed low-current applications)—Vacuum

Half-Wave (Diode)
- • 1BC2 • 2BJ2 ⊙ 3CN3A
- ⊙ 1G3GT/1B3GT ⊙ 2CN3A ⊙ 3CU3A
- ⊙ 1K3/1J3 ⊙ 3A3B ⊙ 3CX3
- • 1V2 ‡ 3BW2/3BS2A/3BT2 ⊙ 3CZ3
- • 1X2B/1X2A ⊙ 3CA3 ⊙ 3DB3/3CY3
- • 2AV2

36. REGULATORS (HIGH VOLTAGE)

Beam Triode
- ⊙ 6BK4C/6EL4A ⊙ 6LJ6A/6LH6A

Beam Power Tube
- ▲ 17KV6A ▲ 22KV6A

37. SYNC AMPLIFIERS

Medium-Mu Triode—Sharp-Cutoff Pentode
- • 6AU8A • 6CX8 • 8CX8
- • 6AZ8 • 8AU8

Medium-Mu Twin Triode
- • 6FQ7/6CG7 • 8FQ7/8CG7
- • 7AU7 • 9AU7
- • 12AU7A/ECC82

High-Mu Triode with Twin Diode
- • 6CN7 • 8CN7

High-Mu Triode—Sharp-Cutoff Pentode
- • 6AW8A • 6JV8 • 8JV8
- • 6HF8 • 8AW8A • 10HF8

High-Mu Twin Triode
- • 12BZ7

• Miniature ⊙ Octal ▲ Novar ‡ Duodecar

38. SYNC CLIPPERS

Medium-Mu Triode—Sharp-Cutoff Tetrode

- 5CQ8
- 6CQ8

Medium-Mu Triode—Sharp-Cutoff Pentode

- 5AN8
- 6AN8A
- 6AU8A
- 6AZ8
- 6CU8
- 6CX8
- 8AU8
- 8CX8

High-Mu Triode—Sharp-Cutoff Pentode

- 6AW8A
- 6EB8
- 6GN8
- 6GW8/ ECL86
- 6HF8
- 6JV8
- 8AW8A
- 8GN8/ 8EB8
- 8JV8
- 10GN8
- 10HF8
- 10JA8/ 10LZ8

High-Mu Twin Triode

- 12BZ7

Sharp-Cutoff Twin Pentode

- 3BU8/ 3GS8
- 4HS8
- 6BU8
- 6HS8

Pentagrid Amplifier

- 3BY6
- 3CS6
- 4CS6
- 6BY6
- 6CS6

39. SYNC SEPARATORS

Medium-Mu Triode—Sharp-Cutoff Tetrode

- 5CQ8
- 6CQ8

Medium-Mu Triode—Sharp-Cutoff Pentode

- 5AN8
- 5GH8A
- 6AN8A
- 6AU8A
- 6AZ8
- 6CU8
- 6CX8
- 6GH8A
- 6HL8
- 6LQ8
- 6MQ8
- 8AU8
- 8CX8
- 11LQ8

Medium-Mu Twin Triode

- 6FQ7/6CG7
- 7AU7
- 8FQ7/8CG7
- 9AU7
- 12AU7A/ ECC82

Twin Diode—High-Mu Triode

- 6CN7
- 8CN7

High-Mu Triode—Sharp-Cutoff Pentode

- 6AW8A
- 6EB8
- 6GN8
- 6HF8
- 6JV8
- 6KA8
- 6KT8
- 6KV8
- 6LC8
- 8AW8A
- 8GN8/ 8EB8
- 8JV8
- 8KA8
- 8LC8
- 10GN8
- 10HF8
- 10JA8/ 10LZ8
- 11KV8

High-Mu Twin Triode

- 12BZ7

Sharp-Cutoff Twin Pentode

- 3BU8/ 3GS8
- 4HS8
- 6BU8
- 6HS8
- 6MK8

Pentagrid Amplifier

- 3BY6
- 3CS6
- 4CS6
- 6BY6
- 6CS6

40. TUNING INDICATORS

Indicator with Triode Unit

6E5

Twin Indicator Units

⊙ 6AF6G

41. VERTICAL-DEFLECTION CIRCUITS

Oscillators and Amplifiers (Combined)

Medium-Mu Triode—Low-Mu Triode

- 6DE7
- § 6EW7
- 10DE7
- § 10EW7
- 13DE7

Medium-Mu Dual Triode

- 6CM7
- 6CS7
- 8CM7
- 8CS7

Medium-Mu Twin Triode

- 6FQ7/6CG7
- 8FQ7/8CG7

• Miniature ⊙ Octal § Neonoval

High-Mu Triode—Low-Mu Triode

• 6CY7	⊙ 6GL7	• 13DR7
• 6DR7	• 10DR7	⊙ 13EM7/
⊙ 6EM7/6EA7	⊙ 10EM7	15EA7
▲ 6FD7	▲ 10GF7A	▲ 13FD7
▲ 6GF7A	• 11CY7	▲ 13GF7A

High-Mu Triode—Beam Power Tube

▲ 6KY8A ▲ 15KY8A

Dual Triode

⊙ 6EM7/6EA7 ▲ 6GF7A ⊙ 13EM7/ 15EA7

Amplifiers

Low-Mu Triode

• 12B4A

Medium-Mu Triode

• 6S4A

Beam Power Tube

• 5AQ5	• 6EM5	• 12AQ5
• 5CZ5	• 6HR5	• 12JQ6#
⊙ 5V6GT	• 6JQ6#	⊙ 12V6GT
• 6AQ5A	⊙ 6V6	• 17JQ6#
• 6CM6	⊙ 6V6GTA	
• 6CZ5	• 8EM5	

Power Pentode

⊙ 6K6GT

42. VIDEO AMPLIFIERS

Medium-Mu Triode—Sharp-Cutoff Pentode

• 5AN8	• 6BH8	• 6MQ8
• 5GH8A	• 6CU8	• 8AU8
• 6AN8A	• 6CX8	• 8BA8A
• 6AU8A	• 6GH8A	• 8BH8
• 6AZ8	• 6HL8	• 8CX8
• 6BA8A	• 6LQ8	• 11LQ8

High-Mu Triode—Sharp-Cutoff Pentode

• 6AW8A	• 6KV8	• 8JV8
• 6EB8	• 6LF8	• 10GN8
• 6GN8	• 8AW8A	• 10HF8
• 6HF8	• 8GN8/	• 10JA8
• 6JV8	8EB8	• 11KV8
• 6KT8		

Sharp-Cutoff Pentode

• 3JC6A	• 7KY6	• 12BY7A/
• 4JC6A	• 11HM7	12BV7/
• 6JC6A	§ 11HG7	12DQ7

Sharp-Cutoff Pentode

• 5AM8	• 6AM8A	• 12HL7
• 5AS8	• 6AS8	

Power Pentode

⊙ 6AG7 • 6CL6 • 6GK6

• Miniature ⊙ Octal ▲ Novar § Neonoval # With an integral diode

RCA TYPE	DIMENSIONS AND TERMINAL DIAGRAM DIM.	DIMENSIONS AND TERMINAL DIAGRAM T.D.	HEATER E_f V	HEATER I_f A	UNIT	MAXIMUM RATINGS P_b W	e_{bm} V	i_{bm} mA	I_b mA	$I_{b(av)}$ mA	CHARACTERISTICS P_o W	μ	g_m g_1-p μmho	g_m g_3-p μmho	Cutoff E_{c1} V	Cutoff E_{c3} V
□*1AY2 [b]	K8	2-terminal base	1.25F	0.2	D	—	26000	50	—	0.5	—	—	—	—	—	—
■ 1AY2A [b]	K8	2-terminal base	1.25F 1.45●	0.2	D	—	26000●	50	—	0.5	X-Radiation, Maximum = 0.5 mR/hr.♦					
□*1BC2 [b]	B15	9RG	1.25F	0.2	D	—	18000	45	—	0.5	—	—	—	—	—	—
■ 1BC2A [b]	B15	9RG	1.25F 1.45F●	0.2	D	—	18000●	45	—	0.5	X-Radiation, Maximum = 0.5 mR/hr.♦					
□*1BH2 [b]	B17	9RG**	1.25F	0.2	D	—	18000●	45	—	0.5	—	—	—	—	—	—
■ 1BY2A [b]	L14	12HZ	1.25F 1.45F●	0.2	D	—	26000●	50	—	0.5	X-Radiation, Maximum = 0.5 mR/hr.♦					
■ 1DG3 [b]	F50	8ND	1.25F 1.45F●	0.2	D	—	26000●	50	—	0.5	X-Radiation, Maximum = 0.5 mR/hr.♦					
■ 1G3GTA [b]	F45	3C	1.25F 1.45F●	0.2	D	—	26000●	50	—	0.5	X-Radiation, Maximum = 0.5 mR/hr.♦					
■ 1G3GTA/1B3GT [b]	F45	3C	1.25F 1.45F●	0.2	D	—	26000●	50	—	0.5	X-Radiation, Maximum = 0.5 mR/hr.♦					

NOTE: *For key to symbols, footnotes & abbreviations see end of this section.*

RCA TYPE	DIMENSIONS AND TERMINAL DIAGRAM DIM.	T.D.	HEATER E_f V	I_f A	UNIT	MAXIMUM RATINGS P_b W	e_{bm} V	i_{om} mA	I_b mA	$I_{b(av)}$ mA	CHARACTERISTICS P_o W	μ	g_m g_1-p μmho	g_m g_3-p μmho	Cutoff E_{c1} V	Cutoff E_{c3} V
■ 1K3A [b]	F45	3C	1.25F 1.45F●	0.2	D	–	26000●	50	–	0.5	X-Radiation, Maximum = 0.5 mR/hr.♦					
■ 1K3A/1J3 [b]	F45	3C	1.25F 1.45●	0.2	D	–	26000●	50	–	0.5	X-Radiation, Maximum = 0.5 mR/hr.♦					
□*1S2A/DY87 [b]	B16	9DT	1.4 1.5●	0.55	D	–	27000●	40	–	0.8	–	–	–	–	–	–
■ 1X2C [b]	B8	9Y	1.25F 1.45F●	0.2	D	–	22000●	45	–	0.5	X-Radiation, Maximum = 0.5 mR/hr.♦					
2AF4B/2DZ4 [d]	A1	7DK	2.35▲	0.6	T	25	–	–	–	-24	–	13.5	6500	–	–	–
■ 2AS2A [b]	L6	12EW	2.5 2.9●	0.33	D	–	30000●	90	–	1.7	X-Radiation, Maximum = 25 mR/hr.♦					
2BN4A [d]	A2	7EG	2.35▲	0.6	T	2.2	–	–	-22	–	–	43	7700	–	-6	–
■ 2BU2/2AH2 [b]	L6	12JB	2.5 2.9●	0.33	D	–	30000●	80	–	1.5	X-Radiation, Maximum = 0.5 mR/hr.♦					

NOTE: *For key to symbols, footnotes & abbreviations see end of this section.*

RCA TYPE		DIMENSIONS AND TERMINAL DIAGRAM DIM.	T.D.	HEATER E_f V	I_f A	UNIT	MAXIMUM RATINGS P_b W	e_{bm} V	i_{bm} mA	I_b mA	$I_{b(av)}$ mA	CHARACTERISTICS P_o W	μ	g_m g_{1-p} μmho	g_{3-p} μmho	Cutoff E_{c1} V	E_{c3} V
2EG4	e	D1	12AQ	1.7▲	0.6	T	1.5	—	—	—	-15	—	68	12500	—	-6.8	—
2HQ5	e	A2	7GM	2.4▲	0.6	T	2.5	—	—	-22	—	—	78	15000	—	—	—
■ 3A3B	b	F49	8EZ	3.15 3.65●	0.22	D	—	30000●	100	—	2.0	X-Radiation, Maximum = 25 mR/hr.♦					
■ 3A3C	b	F46	8EZ	3.15 3.65●	0.22	D	—	38000●	100	—	2.0	X-Radiation, Maximum = 25 mR/hr.♦					
■ 3AT2B	b	L20	12FV	3.15 3.65●	0.22	D	—	38000●	88	—	1.7	X-Radiation, Maximum = 25 mR/hr.♦					
■ 3AW2A	b	L6	12HA	3.15 3.65●	0.35	D	—	38000●	110	—	2.2	X-Radiation, Maximum = 25 mR/hr.♦					
3BC5/ 3CE5	k	A2	7BD	3.15▲	0.6	P	2	—	—	—	—	—	—	6100	—	-6	—
■ 3BN2A	b	L6	12FV	3.15 3.47●	0.3	D	—	30000●	88	—	1.7	X-Radiation, Maximum = 25 mR/hr.♦					

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RCA TYPE	DIMENSIONS AND TERMINAL DIAGRAM DIM.	T.D.	HEATER E_f V	I_f A	UNIT	MAXIMUM RATINGS P_b W	e_{bm} V	i_{bm} mA	I_b mA	$I_{b(av)}$ mA	CHARACTERISTICS P_o W	μ	g_m g_1-p µmho	g_m g_3-p µmho	Cutoff E_{c_1} V	Cutoff E_{c_3} V
■ 3BW2/3BS2A/3BT2 b	L6	12HY	3.15 3.65●	0.48	D	—	38000●	110	—	2.2	X-Radiation, Maximum = 25 mR/hr.♦					
3BY6 u	A2	7CH♦	3.15▲	0.6	—	2.3	—	—	—	—	—	—	1900	500	-12	-15
3BZ6 j	A2	7CM	3.15▲	0.6	P	2.3	—	—	—	—	—	—	8000	—	-19	—
□ *3CA3 b	F21	8MH	3.6	0.225	D	—	30000	100	—	2.0	—	—	—	—	—	—
■ 3CN3B b	F47	8MU	3.15 3.65●	0.48	D	—	38000●	110	—	2.2	X-Radiation, Maximum = 25 mR/hr.♦					
3CB6/3CF6 k	A2	7CM	3.15▲	0.6	P	2.3	—	—	—	—	—	—	8000	—	-6.5	—
□ *3CX3 b	F16	8MT	3.15▲	0.48	D	—	38000●	110	—	2.2	—	—	—	—	—	—
■ 3DB3/3CY3 b	F48	8MX	3.15 3.65●	0.245	D	—	38000●	100	—	2.0	X-Radiation, Maximum = 25 mR/hr.♦					
■ 3DC3 b	F49	8MZ	3.15 3.65●	0.28	D	—	38000●	110	—	2.2	X-Radiation, Maximum = 25 mR/hr.♦					
3HQ5 e	A2	7GM	3.0▲	0.45	T	2.5		—	-22	—	—	78	15000	—	-2	—

NOTE: *For key to symbols, footnotes & abbreviations see end of this section.*

RCA TYPE	DIMENSIONS AND TERMINAL DIAGRAM DIM.	T.D.	HEATER E_f V	I_f A	UNIT	MAXIMUM RATINGS P_b W	e_{bm} V	i_{bm} mA	I_b mA	$I_{b(av)}$ mA	CHARACTERISTICS P_o W	μ	g_m g_1-p μmho	g_m g_3-p μmho	Cutoff E_{c1} V	Cutoff E_{c3} V
4GJ7/ XCF801[t]	B14	9QA	4.1	0.6	T	1.8	—	—	—	—	—	20	9000	—	-1.3 max.	—
					P	2.4	—	—	—	—	—	55 approx.	11000	—	-1.3 max.	—
4GK5 [e]	A2	7FP	4▲	0.3	T	2.5	—	—	—	-22	—	78	15000	—	-4.2	—
4HQ5 [e]	A2	7GM	4.2▲	0.3	T	2.5	—	—	2.2	—	—	78	15000	—	-4.2	—
4JH6 [j]	A2	7CM	4.2▲	0.45	P	2.3	—	—	—	—	—	—	8000	—	-19	—
6AD10 [r]	L3	12EZ	6.3	1.05	P	1.7	—	—	—	—	—	—	3400	600	-4.5	—7
					B	10	—	—	—	—	4.2	—	6500	—	—	—
6AV11 [g]	L1	12BY	6.3▲	0.6	T_1	2.75	—	—	—	-20	—	17	2200	—	-24	—
					T_2	2.75	—	—	—	-20	—	17	2200	—	-24	—
					T_3	2.75	—	—	—	-20	—	17	2200	—	-24	—

NOTE: *For key to symbols, footnotes & abbreviations see end of this section.*

RCA TYPE	DIMENSIONS AND TERMINAL DIAGRAM		HEATER		UNIT	MAXIMUM RATINGS					CHARACTERISTICS					
													g_m		Cutoff	
	DIM.	T.D.	E_f V	I_f A		P_b W	e_{bm} V	i_{bm} mA	I_b mA	$I_{b(av)}$ mA	P_o W	μ	g_{1-p} μmho	g_{3-p} μmho	E_{c1} V	E_{c3} V
■ 6BK4C/ 6EL4A[c]	F35	8GC	6.3 6.9●	0.2	T	40●	DC Plate Voltage, 27000 V● X-Radiation, Maximum = 0.5 mR/hr.♦									
6BV11[m]	L3	12HB	6.3	0.9	P	1.7	—	—	—	—	—	3700	400	3	—	-5.5
6DM4A/ 6DA4[a]	F16	4CG	6.3	1.2	D	6.5	5000	1100	175	—	—	—	—	—	—	
■ 6EH4A[c]	L21	12FA	6.3	0.2	T	40●	DC Plate Voltage, 27000 V● X-Radiation, Maximum = 0.5 mR/hr.♦									
■ 6EJ4A[c]	L21	12HC	6.3	0.2	T	40●	DC Plate Voltage, 27000 V● X-Radiation, Maximum = 0.5 mR/hr.♦									
■ 6EL4A[c]	F34	8MW	6.3	0.2	T	40●	DC Plate Voltage, 27000 V● X-Radiation, Maximum = 0.5 mR/hr.♦									
6HQ5[e]	A2	7GM		0.2	T	2.5	—	—	-22	—	—	78	15000	—	—	—
6HR5[h]	A3	7BZ	6.3▲	0.45	B	8	1300	-125	—	-35	—	—	3600	—	-43	—

NOTE: *For key to symbols, footnotes & abbreviations see end of this section.*

RCA TYPE	DIMENSIONS AND TERMINAL DIAGRAM		HEATER		UNIT	MAXIMUM RATINGS					CHARACTERISTICS					
													gm		Cutoff	
	DIM.	T.D.	E_f V	I_f A		P_b W	e_{bm} V	i_{bm} mA	I_b mA	$I_{b(av)}$ mA	P_o W	μ	g_1 - p μmho	g_3 - p μmho	E_{c1} V	E_{c3} V
6JM6A s	L9	12FJ	6.3	1.2	B	17.5	6500 -1500	-550	—	-175	—	4.4	7300	—	-42	—
6JS6C s	L10	12FY	6.3	2.25	B	30	7500 -1200	-1200	—	-350	—	3	11500	—	-54	—
▪6LH6A c	F35	8ML	6.3 6.9●	0.2	T	40	DC Plate Voltage, 27000 V.●				X-Radiation, Maximum=0.5mR/hr.♦					
▪6LJ6A/ 6LH6A c	F35	8MQ	6.3 6.9●	0.2	T	40	DC Plate Voltage, 27000 V.●				X-Radiation, Maximum=0.5mR/hr.♦					
6LT8 n	B2	9RL	6.3▲	0.6	D	—	—	20	5	—	—	—	—	—	—	—
					D	—	—	20	5	—	—	—	—	—	—	—
					P	3.1	—	—	—	—	—	—	13000	—	-3.5	—
6MK8 m	B4	9FG	6.3	0.3	P	1.1	—	—	-12	—	—	—	1100	450	-2.3	-3.5
8LT8 n	B2	9RL	8.1▲	0.45	D	—	—	20	5	—	—	—	—	—	—	—
					D	—	—	20	5	—	—	—	—	—	—	—
					P	3.1	—	—	—	—	—	—	13000	—	-3.5	—

NOTE: *For key to symbols, footnotes & abbreviations see end of this section.*

RCA TYPE	DIMENSIONS AND TERMINAL DIAGRAM DIM.	T.D.	HEATER E_f V	I_f A	UNIT	MAXIMUM RATINGS P_b W	e_{bm} V	i_{bm} mA	I_b mA	$I_{b(av)}$ mA	CHARACTERISTICS P_o W	μ	g_m g_1-p μmho	g_3-p μmho	Cutoff E_{c1} V	E_{c3} V
9KZ8 t	B2	9FZ	9.45▲	0.3	T	2.5	–	–	–	–	–	46	8500	–	-8	–
					P	2.5	–	–	–	–	–	–	7500	–	-8	–
10BQ5 l	B10	9CV	10.6▲	0.45	P	12	–	–	-65	–	5.7	–	11300	–	–	–
10EW7 f	H1	9HF	9.7▲	0.6	T_1	1.5	–	-77	0	-22	–	17.5	2000	–	-20	–
					T_2	10	1500	-175	0	-50	–	6	7500	–	-40	–
11LT8 n	B2	9RL	11.4	0.315	D	–	–	20	5	–	–	–	–	–	–	–
					D	–	–	20	5	–	–	–	–	–	–	–
					P	3.1	–	–	–	–	–	–	13000	–	-3.5	–
12BV11 m	L3	12HB	12.6▲	0.45	P	1.7	–	–	–	–	–	67	3700	400	-3	-5.5
12DK6 k	A2	7CM	12.6	0.15	P	2.3	–	–	–	–	–	–	9800	–	-6.5	–
12HL7 k	B18	9BF	12.6	0.3	P	10	–	–	–	–	–	–	21000	–	-7.2	–
12MD8 g	C18	9RQ	12.6▲	0.45	T_1	3	–	–	–	–	–	17	3100	–	-23	–
					T_2	3	–	–	–	–	–	17	3100	–	-23	–
					T_3	3	–	–	–	–	–	17	3100	–	-23	–

NOTE: *For key to symbols, footnotes & abbreviations see end of this section.*

RCA TYPE	DIMENSIONS AND TERMINAL DIAGRAM DIM.	T.D.	HEATER E_f V	I_f A	UNIT	MAXIMUM RATINGS P_b W	e_{bm} V	i_{bm} mA	I_b mA	$I_{b(av)}$ mA	CHARACTERISTICS P_o W	μ	g_m g_{1-p} μmho	g_m g_{3-p} μmho	Cutoff E_{c1} V	Cutoff E_{c3} V
12T10 r	L3	12EZ	12.6▲	0.45	P	1.7	—	—	—	—	—	—	1000	400	-4.5	-4.5
					B	10	—	—	—	—	4.2	—	6500	—	—	—
15LE8 m	B10	9QZ	15▲	0.3	P	2	—	—	—	—	—	—	5800	350	-7.2	-17.4
16LU8A h	L7	12DZ	16▲	0.6	T	2.5	400	-105	—	-30	—	58	3600	—	-6.6	—
					B	14	250	-260	—	-75	—	—	9300	—	-30	—
17AB10/ 17AX10 r	L2	12BT	16.8▲	0.45	P	—	—	—	—	-13	—	—	360	700	-4	-4
					B	6.5	—	—	65	—	2.4	—	8600	—	—	—
17BR3/ 17RK19 a	B20	9CB	16.8▲	0.45	D	6.5	5500	1200	200	—	—	—	—	—	—	—
17BW3 a	L4	12FX	16.8▲	0.6	D	6.5	5000	1100	175	—	—	—	—	—	—	—
17JM6A s	L9	12FJ	16.8▲	0.45	B	17.5	6500 -1500	-550	—	-175	—	4.4	7300	—	-42	—
18AJ10 r	L3	12EZ	18▲	0.315	P	1.7	—	—	—	-60	—	—	2400	750	-4	-3.5
					B	6	—	—	—	—	1.45	—	5600	—	—	—

NOTE: *For key to symbols, footnotes & abbreviations see end of this section.*

RCA TYPE	DIMENSIONS AND TERMINAL DIAGRAM		HEATER		UNIT	MAXIMUM RATINGS					CHARACTERISTICS					
													g_m		Cutoff	
	DIM.	T.D.	E_f V	I_f A		P_b W	e_{bm} V	i_{bm} mA	I_b mA	$I_{b(av)}$ mA	P_o W	μ	g_1-p μmho	g_3-p μmho	E_{c1} V	E_{c3} V
19JN8/ 19CL8A[t]	B2	9FA	18.9	0.15	T	2.5	—	—	—	—	—	46	8500	—	-8	—
					P	2.5	—	—	—	—	—	—	7500	—	-8	—
20AQ3/ LY88 [a]	B12	9CB	20.2	0.45	D	5.0	7500	550	220	—	—	—	—	—	—	—
22BW3 [a]	L4	12FX	22.4▲	0.45	D	6.5	5000	1100	175	—	—	—	—	—	—	—
24BF11 [r]	L3	12EZ	24.2▲	0.315	P	1.7	—	—	—	—	—	—	1000	400	-4.5	-4.5
					B	6.5	—	—	—	—	2.4	—	8600	—	—	—
25JZ8 [h]	L2	12DZ	25.2▲	0.3	T	1	—	-70	—	-20	—	20	2350	—	-11	—
					P	7	2000	-245	—	-70	—	—	7100	—	-25	—
26LX6 [s]	L21	12JA	26▲	0.6	B	33●	7000	-1400	-400	—	—	4	14000	—	—	—
30KD6 [s]	L21	12GW	30▲	0.6	B	33●	7000	-1400	-400	—	—	4	14000	—	—	—
31LR8 [h]	C21	9QT	31.5▲	0.3	T	2.5	—	-105	—	-30	2.5	58	4100	—	-6.6	—
					P	14	2500	-260	—	-75	—	6.5	9200	—	-28	—

NOTE: *For key to symbols, footnotes & abbreviations see end of this section.*

RCA TYPE	DIMENSIONS AND TERMINAL DIAGRAM		HEATER		UNIT	MAXIMUM RATINGS					CHARACTERISTICS						
													g_m		Cutoff		
	DIM.	T.D.	E_f V	I_f A		P_b W	e_{bm} V	i_{bm} mA	I_b mA	$I_{b(av)}$ mA	P_o W	μ	g_{1}-p μmho	g_{3}-p μmho	E_{c1} V	E_{c3} V	
34R3 [a]	B11	9CB	34	0.15	D	—	4500	450	150	—	—	—	—	—	—	—	
36KD6/ 40KD6 [s]	L21	12GW	36▲	0.45	B	33●	7000	-1400	-400	—	—	4	14000	—	—	—	

FOOTNOTES

- a Damper Diode
- b High-Voltage Diode
- c High-Voltage Regulator Beam Triode
- d Medium-Mu Triode
- e High-Mu Triode
- f Dual-Unit Triode
- g Triple-Unit Triode
- h Vertical Deflection-Amplifier Type
- j Semiremote-Cutoff Pentode
- k Sharp-Cutoff Pentode
- l Power Pentode
- m Twin Sharp-Cutoff Pentode
- n Twin Diode-Sharp-Cutoff Pentode
- r Sharp-Cutoff Pentode-Beam Power Tube
- s Horizontal Deflection-Amplifier Type
- t Medium-Mu Triode-Sharp-Cutoff Pentode
- u Pentagrid amplifier

● Absolute-Maximum Value.

** Pins 1 and 5 have solder lugs.

▲ Heater with controlled warm-up time.

◆ Refer type 6BY6 data for terminal diagram.

□Refer to sheet *Safety Precautions (1) for Receiving Tubes* following this listing.

* This type does not have an EIA published value for X-Radiation.

■ Refer to sheet *Safety Precautions (11) for Receiving Tubes* following this listing.

♦ Statistical Value Controlled On a Lot Sampling Basis.

SYMBOL	DEFINITION
e_{bm}	Peak-Pulse Plate Voltage (Beam Tubes) Peak Inverse Plate Voltage (Diodes)
E_{c1}	DC Grid No. 1 Cutoff Voltage
E_{c3}	DC Grid No. 3 Cutoff Voltage
E_f	DC or RMS AC Heater or Filament Voltage (Bogey Value)
g_m	Transconductance (Mutual Conductance)
I_b	DC Plate Current (Positive Values) DC Cathode Current (Negative Values)
$I_{b(av)}$	Average Plate (+) or Cathode (-) Current
i_{bm}	Peak Plate (+) or Cathode (-) Current
I_f	DC or RMS AC Heater or Filament Current (Bogey Value)
P_b	Plate Dissipation
P_o	Maximum-Signal Power Output
μ	Amplification Factor (Mu)

ABBREVIATIONS

A Ampere **B** Beam Unit **D** Diode Unit **F** Filament **g_1** Grid No. 1 **g_3** Grid No. 3

mA Milliampere **mR/hr** Milliroentgens per hour **P** Pentode Unit **p** Plate **T** Triode Unit **V** Volt

W Watt **μmho** Micromho

For *Key to Tube Dimensions* and *Terminal Diagrams*, see following pages.

KEY TO TUBE DIMENSIONS

Symbol	Maximum Overall Length x Diameter Inches	
7-Pin Miniature Types		
A1	1-3/4	x 3/4
A2	2-1/8	x 3/4
A3	2–5/8	x 3/4
9-Pin Miniature Types		
B2	2-3/16	x 7/8
B4	2-5/8	x 7/8
B8	2-27/32	x 7/8
B10	3-1/16	x 7/8
B11	3-9/32	x 7/8
B12	3-1/2	x 7/8
B14	2	x 7/8
B15	2.531	x .875
B16	2.913	x .875
B17	2.716	x .875
B18	2-3/8	x 7/8
B20	3.5	x .875

Symbol	Maximum Overall Length x Diameter Inches	
Novar Type		
C18	2.960	x 1.188
C21	3.710	x 1.562
Nuvistor Type		
D1	0.800	0.440
Octal-Glass Types		
F16	3-13/16	x 1-9/32
F21	4-1/16	x 1-9/32
F34	5	x 1-9/16
F35	5	x 1-23/32
F45	3.563	x 1.377
F46	3-13/16	x 1-1/4
F47	3.812	x 1.377
F48	3.812	x 1.188
F49	3.812	x 1.281
F50	3.563	x 1.188

Symbol	Maximum Overall Length x Diameter Inches	
9-Pin T-9 Bulb Type		
H1	2.90	x 1.188
Other Type		
K8	3.08	x 1.188
12-Pin Types		
L1	1.875	x 1.188
L2	2.375	x 1.188
L3	2.625	x 1.188
L4	2.875	x 1.188
L6	3.625	x 1.188
L7	2.875	x 1.563
L9	3.625	x 1.563
L10	4.125	x 1.563
L14	3.125	x 1.188
L18	4.000	x 1.563
L20	3.625	x 1.250
L21	4.625	x 1.563

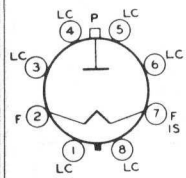
KEY: TERMINAL DIAGRAMS (*Bottom Views*)

LETTER COMBINATIONS

F = Filament End(Unpolarized)
G = Grid (Triode)
G_1 = Grid No. 1
G_2 = Grid No. 2
G_3 = Grid No. 3
H = Heater End (Unpolarized)
H_M = Heater Tap
IC = Do Not Use
IS = Internal Shield
K = Cathode
LC = May be used only under Limited Conditions
NC = No Internal Connection
P = Plate (Vacuum tubes) Anode (Gas-Filled tubes)

SUBSCRIPTS FOR MULTIUNIT TYPES

B = Beam Power Unit
D = Diode Unit
P = Pentode Unit
T = Triode Unit
1, 2, 3, = No. 1, No. 2, No. 3.



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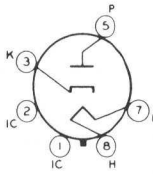

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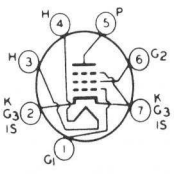

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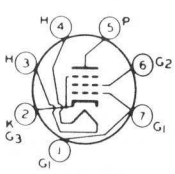

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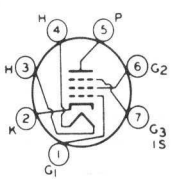

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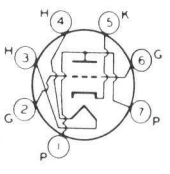

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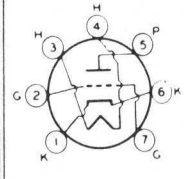

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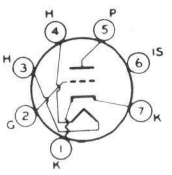

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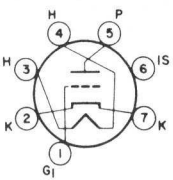

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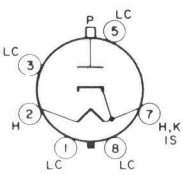

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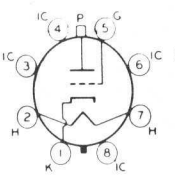

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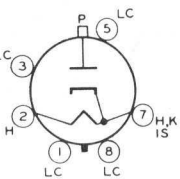


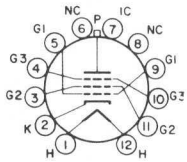
8MH

TERMINAL DIAGRAMS (Cont'd)

TERMINAL DIAGRAMS (Cont'd)

TERMINAL DIAGRAMS (Cont'd)

TERMINAL DIAGRAMS (Cont'd)



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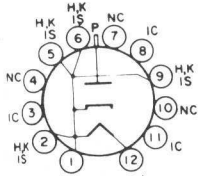

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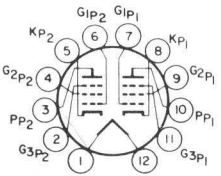

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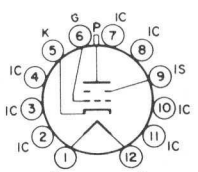

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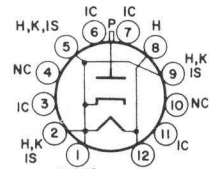

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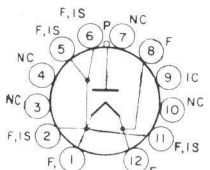

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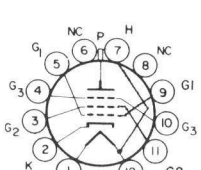

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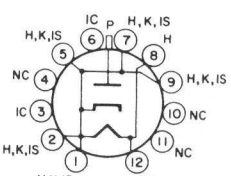

12JB

Type	Name	Tube Dimensions and Basing Diagram△ Dim.	B. D.	Heater or Filament (F) Unless specified all types have heaters. ⊕ Heater with controlled warmup time. Volts	Amps.	Use Values to right give operating conditions and characteristics for indicated typical use	Plate Supply Volts	Grid Bias Volts (v) or Cathode Resistor Ohms (Ω)	Screen Supply Volts	Screen Current mA	Plate Current mA	AC Plate Resistance Ohms	Transconductance Micromhos	Load for Stated Power Output Ohms	Power Output Watts
0Z4	Full-Wave Gas Rectifier	E2 F2	4R	—	—	Rectifier	Starting-Supply Voltage per Plate, 300 min. peak volts. DC Output Current, 75 max., 30 min. mA. Peak Plate Current, 200 max. mA. DC Output Voltage, 300 max. volts.								
1A3	Diode	A2	5AP	1.4	0.15	Rectifier	Max. Peak Plate Inverse Volts, 330 Max. Peak Plate mA, 5					Max. DC Output mA, 0.5 Max. Peak Heater-Cathode Volts, 140			
1A5-GT	Pwr Pentode	F6	6X	1.4F	0.05	Class A Amp	85 90	− 4.5v − 4.5v	85 90	0.7 1.1	3.5 4.0	300000 300000	800 850	25000 25000	0.100 0.115
1L6	Pentagrid Converter ⊕	A2	7DC	1.4F	0.05	Converter	90	0v	45	0.6	0.5	650000	Anode-Grid (#2): 90 max. volts, 1.2 mA.		
							Oscillator Grid (#1) Resistor, 0.2 meg. Conversion Transcond., 300 micromhos.								
1N5-GT	Sharp-Cutoff Pentode	F7	5Y#	1.4F	0.05	Class A Amp	90	0v	90	0.3	1.2	1.5§	750	—	—
1R5	Pentagrid Converter▲	A2	7AT	1.4F	0.05	Converter	45 90	0v 0v	45 67.5	2.1 3.5	0.7 1.5	500000 400000	Convers. Transcond., 210 μmho Convers. Transcond., 280 μmho		
1S4	Pwr Pentode	A2	7AV	1.4F	0.1	Class A Amp	45 90	− 4.5v − 7v	45 67.5	0.8 1.4	3.8 7.4	100000 100000	1250 1575	8000 8000	0.065 0.27
1S5	Diode—Sharp-Cutoff Pentode	A2	6AU	1.4F	0.05	Pentode Unit as AF Amp	Plate Supply, 90 v applied through 1 meg. resistor. Screen Supply, 90 v applied through 3.1 meg. resistor. Grid Bias, 0 volts. Grid Resistor, 10 megohms. Voltage Gain, 66 approx.								
1T4	Remote-Cutoff Pentode	A2	6AR	1.4F	0.05	Class A Amp	45 90	0v 0v	45 67.5	0.7 1.4	1.7 3.5	350000 500000	700 900	—	—
1U4	Sharp-Cutoff Pentode	A2	6AR	1.4F	0.05	Class A Amp	90	0v	90	0.50	1.1	1.0§	900	—	—
1U5	Diode—Sharp-Cutoff Pentode	A2	6BW	1.4F	0.05	Pentode Unit as Class A Amp	67.5	0v	67.5	0.4	1.6	600000	625	—	—

Note: For footnotes, see end of this section. △ For key to tube dimensions, description, and basing diagram, see end of this section.

RCA RECEIVING-TUBE DATA

Types Not Recommended for New Equipment Design

Type	Name	Tube Dimensions and Basing Diagram△ Dim.	B. D.	Heater or Filament (F) Unless specified all types have heaters. ⊕ Heater with controlled warmup time. Volts	Amps.	Use Values to right give operating conditions and characteristics for indicated typical use	Plate Supply Volts	Grid Bias Volts (v) or Cathode Resistor Ohms (Ω)	Screen Supply Volts	Screen Current mA	Plate Current mA	AC Plate Resistance Ohms	Transconductance Micromhos	Load for Stated Power Output Ohms	Power Output Watts
2A3	Power Triode	K11	4D	2.5F	2.5	Class A Amp	250	−45v	Mu = 4.2		60.0	800	5250	2500	3.5
						Push-Pull Class AB_1 Amp	300 300	780Ω♠ −62v	—	—	80.0♠ 80.0♠	—	—	5000 3000	10.0† 15.0†
2EN5	Twin Diode	A2	7FL	2.1⊕	0.45	Horizontal Phase Detector	Max. Peak Heater-Cathode Volts, ±200 DC Volts Not to Exceed +100				Max. DC Plate mA, 5				
3A2	Half-Wave Rectifier	B5	9DT	3.15	0.22	Pulsed Rectifier in TV Receivers	Max. Peak Inverse Plate Volts, 18000 Max. Peak Plate mA, 80				Max. Average Plate mA, 1.5				
3B2	Half-Wave Rectifier	F38	8GH	3.15	0.22	Pulsed Rectifier in TV Service	Max. Peak Plate mA, 80 Max. DC Inverse Plate Volts, 25000 Max. Total DC & Pk Inv Plate Volts, 35000 (Abs.) Max. Av Plate mA, 1.1								
3Q4	Power Pentode	A2	7BA	1.4F 2.8F	0.1 0.05	Class A Amp	For other characteristics, refer to Type 3V4								
3Q5-GT	Beam Power Tube	F6	7AP	1.4F 2.8F	0.1 0.05	Class A Amp	110 110	− 6.6v − 6.6v	110 110	1.4 1.1	10.0 8.5	100000 110000	2200 2000	8000 8000	0.40 0.33
3S4	Power Pentode	A2	7BA	1.4F 2.8F	0.1 0.05	Class A Amp	90 90	− 7v − 7v	67.5 67.5	1.4 1.1	7.4 6.1	100000 100000	1575 1425	8000 8000	0.27 0.235
3V4	Power Pentode	A2	6BX	1.4F 2.8F	0.1 0.05	Class A Amp	90 90	− 4.5v − 4.5v	90 90	2.1 1.7	9.5 7.7	100000 120000	2150 2000	10000 10000	0.27 0.24
5AZ4	Full-Wave Rectifier	J3	5T	5.0F	2.0	With Capacitive Input Filter	Max. AC Volts per Plate (RMS), 350 Max. DC Output mA, 125 Max. Peak Inverse Volts, 1400 Max. Peak Plate mA, 440 Min. Total Effect. Supply Imped. per Plate, 50 ohms								
5BE8	Medium-Mu Triode—Sharp-Cutoff Pentode	B2	9EG	4.7⊕	0.6	Triode Unit as Class A Amp	150	56Ω	Mu = 40		18	5000	8500	—	—
						Pentode Unit as Class A Amp	250	68Ω	110	3.5	10	400000	5200	—	—
5BT8	Twin-Diode—Sharp-Cutoff Pentode	B2	9FE	4.7⊕	0.6	Class A Amp	200	180Ω	150	2.8	9.5	300000	6200	—	—

Type	Name	Tube Dimensions and Basing Diagram △ Dim.	B. D.	Heater or Filament (F) Unless specified all types have heaters. ⊕ Heater with controlled warmup time. Volts	Amps.	Use Values to right give operating conditions and characteristics for indicated typical use	Plate Supply Volts	Grid Bias Volts (v) or Cathode Resistor Ohms (Ω)	Screen Supply Volts	Screen Current mA	Plate Current mA	AC Plate Resistance Ohms	Transconductance Micromhos
5DJ4	Full-Wave Rectifier	F25	8KS	5.0F	3.0	With Capacitive-Input Filter	Max. DC Output mA, 300 for AC Volts per Plate, 500 and Min. Total Effect. Supply Imped. per Plate, 83 ohms Max. Peak Inverse Volts, 1700 Max. Peak Plate mA per Plate, 1000						
						With Inductive-Input Filter	Max. DC Output mA, 300 for AC Volts per Plate, 600 Max. Peak Inverse Volts, 1700 Max. Peak Plate mA per Plate, 1000						
5U4-G	Full-Wave Rectifier	F39	5T‡	5.0F	3.0	With Capacitive-Input Filter	Max. AC Volts per Plate (RMS), 450 Max. DC Output mA, 225 Max. Peak Inverse Volts, 1550 Max. Peak Plate mA, 675 Min. Total Effect. Supply Imped. per Plate, 170 ohms						
5Y4-GA **5Y4-GT**	Full-Wave Rectifier	F25 F8	5Q	5.0F	2.0		Max. Peak Plate mA, 400 For other ratings, refer to Type 5AZ4.						
5Z3	Full-Wave Rectifier	K11	4C	5.0F	3.0		For other ratings, refer to Type 5U4-G.						
5Z4	Full-Wave Rectifier	E4	5L	5.0	2.0	With Capacitive-Input Filter	Max. AC Volts per Plate (RMS), 350 Max. DC Output mA, 125 Max. Peak Inverse Volts, 1400 Max. Peak Plate mA, 375						Min. Total Effect. Supply Imped. per Plate, 50 Ω
						With Inductive-Input Filter	Max. AC Volts per Plate (RMS), 500 Max. DC Output mA, 125 Max. Peak Inverse Volts, 1400 Max. Peak Plate mA, 375 Min. Value of Input Choke, 5 henries						
6A7	Pentagrid Converter ⊙	K5	7C	6.3	0.3	Converter	For other characteristics, refer to Type 6A8.						
6A8	Pentagrid Converter ⊙	E3	8A	6.3	0.3	Converter	250	− 3v	100	2.7	3.5	360000	
							Anode-Grid (#2): 250▲ max. v, 4.0 mA Oscillator-Grid (#1) Res. ●. Conversion Transcond., 550 μmho						
6AC7	Sharp-Cutoff Pentode	E2	8N	6.3	0.45	Class A Amp	300	160Ω	150	2.5	10.0	1.0§	9000

Note: For footnotes, see end of this section. △ For key to tube dimensions, description, and basing diagram, see end of this section.

Type	Name	Tube Dimensions and Basing Diagram△ Dim.	B. D.	Heater or Filament (F) Unless specified all types have heaters. ⊕ Heater with controlled warmup time. Volts	Amps.	Use Values to right give operating conditions and characteristics for indicated typical use	Plate Supply Volts	Grid Bias Volts (v) or Cathode Resistor Ohms (Ω)	Screen Supply Volts	Screen Current mA	Plate Current mA	AC Plate Resistance Ohms	Transconductance Micromhos	Load for Stated Power Output Ohms	Power Output Watts
6AH4-GT	Low-Mu Triode	F6	8EL	6.3	0.75	Vertical Deflection Amp	Max. DC Plate Volts, 500 Max. DC Cathode mA, 60				Max. Peak Positive-Pulse Plate Volts, 2000 Max. Plate Dissipation, 7.5 watts				
6AH6	Sharp-Cutoff Pentode	A2	7BK	6.3	0.45	Class A Amp	300	160Ω	150	2.5	10.0	500000	9000	—	—
6AL7-GT	Electron-Ray Tube	F6	8CH	6.3	0.15	Visual Indicator	Target Voltage, 315 volts Grid Voltage = 0 volts Deflecting-Electrodes—No. 1, No. 2 and No. 3 Voltage = 0				Grid Voltage for Pattern Cutoff, −7 volts approx. Cathode Bias Res., 3300 ohms approx.				
6AM4	High-Mu Triode	B1	9BX	6.3	0.225	Class A Amp	200	100Ω	Mu = 85		10	8700	9800	—	—
6AQ6	Twin-Diode—High-Mu Triode	A2	7BT	6.3	0.15	Triode Unit as Class A Amp	100 250	− 1v − 3v	Mu = 70		0.8 1.0	61000 58000	1150 1200	—	—
6AQ7-GT	Twin-Diode—High-Mu Triode	F6	8CK	6.3	0.3	Triode Unit as Class A Amp	250	− 2v	Mu = 70		2.3	44000	1600	—	—
6AR5	Power Pentode	A3	6CC	6.3	0.4	Class A Amp	250	−18v	250	5.5	32.0	90000	2300	7600	3.4
6AS5	Beam Power Tube	A3	7CV	6.3	0.8	Class A Amp	150	− 8.5v	110	2.0	35	—	5600	4500	2.2
6AV5-GA	Beam Power Tube	F19	6CK	6.3	1.2	Horizontal Deflection Amp	Max. DC Plate Volts, 550 Max. DC Cathode mA, 110				Max. Peak Positive-Pulse Plate Volts, 5500 (Abs.) Max. Plate Dissipation, 11 watts				
6AX8	Medium-Mu Triode—Semiremote Cutoff Pentode	B2	9AE	6.3	0.45	Triode Unit as Class A Amp	150	560Ω	Mu = 40		18	5000	8500	—	—
						Pentode Unit as Class A Amp	250	120Ω	110	3.5	10	400000	4800	—	—
6B8	Twin-Diode—Semiremote-Cutoff Pentode	E3	8E	6.3	0.3	Pentode Unit as Amp	250	− 3v	125	2.3	10	600000	1325	—	—
6BD6	Remote-Cutoff Pentode	A2	7BK	6.3	0.3	Class A Amp	250	− 3v	100	3.0	9.0	800000	2000	—	—

Type	Name	Tube Dimensions and Basing Diagram△ Dim.	B. D.	Heater or Filament (F) Unless specified all types have heaters. ⊕ Heater with controlled warmup time. Volts	Amps.	Use Values to right give operating conditions and characteristics for indicated typical use	Plate Supply Volts	Grid Bias Volts (v) or Cathode Resistor Ohms (Ω)	Screen Supply Volts	Screen Current mA	Plate Current mA	AC Plate Resistance Ohms	Transconductance Micromhos	Load for Stated Power Output Ohms	Power Output Watts
6BF5	Beam Power Tube	A3	7BZ	6.3	1.2	Class A Amp	110	− 7.5v	110	4.0	36.0	12000	7500	2500	1.9
6BF6	Twin-Diode—Medium-Mu Triode	A2	7BT	6.3	0.3	Triode Unit as Class A Amp	250	− 9v	Mu = 16		9.5	8500	1900	Power Output, 300 milliwatts	
6BG6-G 6BG6-GA	Beam Power Tube	F40 F33	5BT	6.3	0.9	Horizontal Deflection Amp	Max. DC Plate Volts, 700 Max. Peak Positive-Pulse Plate Volts, 6600 (Abs.) Max. DC Cathode mA , 110 Max. Plate Dissipation, 20 watts								
6BH8	Medium-Mu Triode—Sharp-Cutoff Pentode	B4	9DX	6.3⊕	0.6	Triode Unit as Class A Amp	150	− 5v	Mu = 17		9.5	5150	3300	—	—
						Pentode Unit as Class A Amp	200	82Ω	125	3.4	15	150000	7000	—	—
6BK5	Beam Power Tube	B4	9BQ	6.3	1.2	Class A Amp	250	− 5v	250	3.5	35	100000	8500	6500	3.5
6BS8	Medium-Mu Twin Triode	B2	9AJ	6.3	0.4	Each Unit as Class A Amp	150	220Ω	Mu = 36		10	5000	7200	—	—
6BV8	Twin Diode—Medium-Mu Triode	B2	9FJ	6.3⊕	0.6	Triode Unit as Class A Amp	200	330Ω	Mu = 33		11	5900	5600	—	—
6BW4	Full-Wave Rectifier	B4	9DJ	6.3	0.9	With Capacitive Input Filter	Max. AC Volts per Plate (RMS), 325 Max. Peak Inverse Volts, 1275 Max. DC Output mA , 62.5 Max. Peak Plate mA per Plate, 350 Total Effect. Supply Imped. per Plate, 82 ohms								
						With Inductive Input Filter	Max. AC Volts per Plate (RMS), 450 Max. Peak Inverse Volts, 1275 Min. Value of Input Choke, 10 henries Max. DC Output mA, 62.5 Max. Peak Plate mA per Plate, 350								

Note: For footnotes, see end of this section. △ For key to tube dimensions, description, and basing diagram, see end of this section.

RCA RECEIVING-TUBE DATA

Types Not Recommended for New Equipment Design

Type	Name	Tube Dimensions and Basing Diagram△		Heater or Filament (F) Unless specified all types have heaters. ⊕ Heater with controlled warmup time.		Use Values to right give operating conditions and characteristics for indicated typical use	Plate Supply Volts	Grid Bias Volts (v) or Cathode Resistor Ohms (Ω)	Screen Supply Volts	Screen Current mA	Plate Current mA	AC Plate Resistance Ohms	Transconductance Micromhos	Amplification Factor
		Dim.	B. D.	Volts	Amps.									
6BX7-GT	Medium-Mu Twin Triode	F6	8BD	6.3	1.5	Vertical Deflection Oscillator	Max. DC Plate Volts, 500 Max. Plate Dissipation: 10 watts either plate; 12 watts both plates						Max. DC Cathode mA, 180	
						Vertical Deflection Amplifier	Max. DC Plate Volts, 500 Max. Pk Positive-Pulse Plate Volts, 2000(Abs.) Max. DC Cath. mA, 180 Max. Plate Dissipation: 10 watts either plate; 12 watts both plates.							
6BY5-GA	Full-Wave Rectifier	F17	6CN	6.3	1.6	Television Damper Service	Max. Peak Inverse Plate Volts, 3000 (Abs.) Max. DC Plate mA, 175 Max. Peak Plate mA, 525 Max. Peak Heater-Cathode Volts: −450, +100							
6C5	Medium-Mu Triode	E2	6Q	6.3	0.3	Class A Amp	250	− 8v	—	—	8.0	10000	2000	20
6C6	Sharp-Cutoff Pentode	K9	6F	6.3	0.3	Amplifier Detector	For other characteristics, refer to Type 6J7.							
6C9	Sharp-Cutoff Dual Tetrode	G1	10F	6.3	0.4	Each Unit as Class A Amp	125	− 1V	80	1.5	10	100000	8000	—
6CH8	Medium-Mu Triode— Sharp-Cutoff Pentode	B2	9FT	6.3	0.45	Triode Unit as Class A Amp	200	− 6v	—	—	13	5750	3300	19
						Pentode Unit as Class A Amp	200	180Ω	150	2.8	9.5	300000	6200	—
6CK4	Low-Mu Triode	F9	8JB	6.3	1.25	Vertical Deflection Amp	Max. DC Plate Volts, 550 Max. Pk Positive-Pulse Plate Volts, 2000 (Abs.) Max. Peak Cathode mA, 350 Max. Plate Dissipation, 12 watts							
6CM8	High-Mu Triode— Sharp-Cutoff Pentode	B2	9FZ	6.3⊕	0.45	Triode Unit as Class A Amp	250	− 2v	—	—	1.8	50000	2000	100
						Pentode Unit as Class A Amp	250	180Ω	150	2.8	9.5	600000	6200	—
6CR6	Diode— Remote-Cutoff Pentode	A2	7EA	6.3	0.3	Pentode Unit as Class A Amplifier	250	− 2v	100	2.6	6	800000	2200	—
							Grid (#1) Volts for transcond. of 10 micromhos, −32							

Type	Name	Tube Dimensions and Basing Diagram△ Dim.	B. D.	Heater or Filament (F) Unless specified all types have heaters. ⊕ Heater with controlled warmup time. Volts	Amps.	Use Values to right give operating conditions and characteristics for indicated typical use	Plate Supply Volts	Grid Bias Volts (v) or Cathode Resistor Ohms (Ω)	Screen Supply Volts	Screen Current mA	Plate Current mA	AC Plate Resistance Ohms	Transconductance Micromhos	Load for Stated Power Output Ohms	Power Output Watts
6DN6	Beam Power Tube	F33	5BT	6.3	2.5	Horizontal Deflection Amp	Max. DC Plate Volts, 700 Max. DC Cathode mA, 200				Max. Peak Positive-Pulse Plate Volts, 6600 (Abs.) Max. Plate Dissipation, 15 watts				
6EH5	Power Pentode	A3	7CV	6.3	1.2	Class A Amp	110	62Ω	115	11.5	42	11000	14600	8000	1.4
6EV7	High-Mu Twin Triode	B4	9LP	6.3	0.6	Relay Control	250 150	0v 0v	2500-ohm relay		18.5 10.0	Grid Volts for Plate μA, 100 = −9 Grid Volts for Plate μA, 100 = −5			
6EZ5	Beam Power Tube	F9	7AC	6.3	0.8	Vertical Deflection Amp	250	−20v	250	3.5	43	50000	4100	—	—
6F5	High-Mu Triode	E3	5M	6.3	0.3	Class A Amplifier	100 250	− 1v − 2v	Mu = 100		0.4 0.9	85000 66000	1150 1500	—	—
6F6 **6F6-GT**	Power Pentode	E4 F9	7S 7S‡	6.3	0.7	Pentode Class A Amp	250 285	−16.5v −20v	250 285	6.5 7.0	34.0 38.0	80000 78000	2500 2550	7000 7000	3.2 4.8
						Pentode Push-Pull Class A Amp	315	−24v	285	12.0♠	62.0♠	—	—	10000	11.0†
6F8-G	Medium-Mu Twin Triode	F24	8G	6.3	0.6	Each Unit as Class A Amp	For other characteristics, refer to Type 6J5.								
6FE5	Beam Power Tube	F15	8KB	6.3	1.2	Class A Amp	145	−16v	145	18	100	8000	9500	1000	5.6
6GY8	Triple High-Mu Triode	B2	9MB	6.3	0.45	Each Unit as Class A Amp	125	− 1v	Mu = 63		4.5	14000	4500	—	—
6J5 **6J5-GT**	Medium-Mu Triode	E2 F7	6Q 6Q✱	6.3	0.3	Class A Amp	90 250	0v − 8v	Mu = 20		10 9	6700 7700	3000 2600	—	—
6J7	Sharp-Cutoff Pentode	E3	7R	6.3	0.3	Pentode Class A RF Amp	100 250	− 3v − 3v	100 100	0.5 0.5	2.0 2.0	1.0§ 1.0§	1185 1225	—	—

Note: For footnotes, see end of this section.

△ For key to tube dimensions, description, and basing diagram, see end of this section.

Type	Name	Tube Dimensions and Basing Diagram△ Dim.	B. D.	Heater or Filament (F) Unless specified all types have heaters. ⊕ Heater with controlled warmup time. Volts	Amps.	Use Values to right give operating conditions and characteristics for indicated typical use	Plate Supply Volts	Grid Bias Volts (v) or Cathode Resistor Ohms (Ω)	Screen Supply Volts	Screen Current mA	Plate Current mA	AC Plate Resistance Ohms	Transconductance Micromhos	Load for Stated Power Output Ohms	Power Output Watts
6K7	Remote-Cutoff Pentode	E3	7R	6.3	0.3	Class A Amp	250	− 3v	125	2.6	10.5	600000	1650	—	—
6K8	Triode-Hexode Converter	E3	8K	6.3	0.3	Triode Unit as Oscillator	100	Grid Res., 50000 ohms			3.8	Triode-Grid & Hexode-Grid Current, 0.15 mA			
						Hexode Unit as Mixer	100	− 3v	100	6.2	2.3	400000	Conv Transcond., 325 μmho		
							250	− 3v	100	6.0	2.5	600000	Conv Transcond.. 350 μmho		
6KL8	Diode—Sharp-Cutoff Pentode	B4	9LQ	6.3	0.3	Pentode Unit as Class A Amp	100	2.2 MΩ Grid Res	100	2.2	5.5	550000	4300	—	—
6L7	Pentagrid Mixer▲	E3	7T	6.3	0.3	Mixer Service	250	− 6v	150	9.2	2.3	Osc Grid (No. 3) Bias, −15 volts Grid-No. 3 Peak Swing, 16 volts min Conv Transcond.. 350 micromhos.			
6N7	Medium-Mu Twin Power Triode	E4	8B	6.3	0.8	Class A Amp (as Driver)°	250	− 5v	Mu = 35		6.0	11300	3100	20000 or more	exceeds 0.4
6N7-GT		F6	8B‡				300	− 6v			7.0	11000	3200		
						Class B Amp	300	0v	Pwr Output for 1 tube at stated plate-to-plate load					8000	10.0
6Q7	Twin Diode High-Mu Triode	E3	7V	6.3	0.3	Triode Unit as Class A Amp	100	− 1v	Mu = 70		0.8	58000	1200	—	—
							250	− 3v			1.1	58000	1200		
6S8-GT	Triple Diode—Hi-Mu Triode	F6	8CB	6.3	0.3	Triode Unit as Class A Amp	250	− 2v	Mu = 100		0.9	91000	1100	—	—
6SB7-Y	Pentagrid Converter▲	E2	8R	6.3	0.3	Mixer	100	− 1v	100	10.2	3.6	500000 Conversion	Grid-No. 1 Res., 20000 Ω Transcond., 950 micromhos		
6SC7	High-Mu Twin Triode	E2	8S	6.3	0.3	Each Unit as Amplifier	250	− 2v	Mu = 70		2.0	53000	1325	—	—
6SF5	High-Mu Triode	E2	6AB	6.3	0.3	Class A Amp	250	− 2v	Mu = 100		0.9	66000	1500	—	—

Type	Name	Tube Dimensions and Basing Diagram △ Dim.	B. D.	Heater or Filament (F) Unless specified all types have heaters. ⊕ Heater with controlled warmup time. Volts	Amps.	Use Values to right give operating conditions and characteristics for indicated typical use	Plate Supply Volts	Grid Bias Volts (v) or Cathode Resistor Ohms (Ω)	Screen Supply Volts	Screen Current mA	Plate Current mA	AC Plate Resistance Ohms	Transconductance Micromhos	Load for Stated Power Output Ohms	Power Output Watts
6SF7	Diode—Remote-Cutoff Pentode	E2	7AZ	6.3	0.3	Pentode Unit as Class A Amp	100 250	− 1v − 1v	100 100	3.4 3.3	12.0 12.4	200000 700000	1975 2050	—	—
6SG7	Semiremote-Cutoff Pentode	E2	8BK	6.3	0.3	Class A Amp	100 250	− 1v − 2.5v	100 150	3.2 3.4	8.2 9.2	250000 1.0§	4100 4000	— —	— —
6SH7	Sharp-Cutoff Pentode	E2	8BK	6.3	0.3	Class A Amp	100 250	− 1v − 1v	100 150	2.1 4.1	5.3 10.8	350000 900000	4000 4900	—	—
6SK7 6SK7-GT	Remote-Cutoff Pentode	E2 F7	8N 8N※	6.3	0.3	Class A Amp	100 250	− 1v − 3v	100 100	4.0 2.6	13.0 9.2	120000 800000	2350 2000	—	—
6SR7	Twin Diode—Medium-Mu Triode	E2	8Q	6.3	0.3	Triode Unit as Class A Amp	250	− 9v		Mu = 16	9.5	8500	1900	—	—
6T4	Medium-Mu Triode	A1	7DK	6.3	0.225	Osc in UHF TV Receivers Class A Amp	Max. DC Plate Volts, 200 Max. DC Cathode mA, 30 80	150Ω		Mu = 13	18	Max. Plate Dissipation, 3.5 watts	7000	Max. Grid mA, 8 —	—
6U5	Electron-Ray Tube	K3	6R	6.3	0.3	Visual Indicator	Plate & Target Supply = 250 volts. Triode Plate Resistor = 1.0 meg. Grid Bias, −22 volts; Shadow Angle, 0°. Bias, 0 volts; Angle, 90°; Target Current = 4.0 m A Plate Current, 0.24 mA								
6V6	Beam Power Tube	E4	7AC	6.3	0.45	Single-Tube Class A Amp	250 315	−12.5v −13v	250 225	4.5 2.2	45.0 34.0	50000 80000	4100 3750	5000 8500	4.5 5.5
						Push-Pull Class AB1 Amp	250 285	−15v −19v	250 285	5.0♠ 4.0♠	70.0♠ 70.0♠	— —	— —	10000 8000	10.0† 14.0†
7A7	Remote-Cutoff Pentode	J2	8V	6.3	0.3	Class A Amp	For other characteristics, refer to Type 6SK7.								
7C5	Beam Power Tube	J3	6AA	6.3	0.45	Class A Amp	For other characteristics, refer to Type 6V6.								

Note: For footnotes, see end of this section. △ For key to tube dimensions, description, and basing diagram, see end of this section.

Type	Name	Tube Dimensions and Basing Diagram△		Heater or Filament (F) Unless specified all types have heaters. ⊕ Heater with controlled warmup time.		Use Values to right give operating conditions and characteristics for indicated typical use	Plate Supply	Grid Bias Volts (v) or Cathode Resistor	Screen Supply	Screen Current	Plate Current	AC Plate Resistance	Transconductance	Amplification Factor
		Dim.	B. D.	Volts	Amps.		Volts	Ohms (Ω)	Volts	mA	mA	Ohms	Micromhos	
7C7	Sharp-Cutoff Pentode	J2	8V	6.3	0.15	Class A Amplifier	250	− 3v	100	0.5	2.0	2.0§	1300	—
7F7	High-Mu Twin Triode	J2	8AC	6.3	0.3	Each Unit as Class A Amplifier	250	− 2v	—	—	2.3	44000	1600	70
7F8	Medium-Mu Twin Triode	J2	8BW	6.3	0.3	Each Unit as Class A Amplifier	250	500Ω	—	—	6.0	—	3300	48
7N7	Medium-Mu Twin-Triode	J3	8AC	6.3	0.6	Each Unit as Class A Amplifier	90 250	0v − 8v	—	—	10.0 9.0	6700 7700	3000 2600	20 20
9BR7	Twin Diode—High-Mu Triode	B2	9CF	4.7⊕ 9.4	0.6 0.3	Triode Unit as Class A Amplifier	250	200Ω	—	—	10	10900	4000	60
9U8-A	Medium-Mu Triode—Sharp-Cutoff Pentode	B2	9AE	9.45⊕	0.3	Triode Unit as Class A Amplifier	125	− 1v	—	—	13.5	5000	7500	40
						Pentode Unit	125	− 1v	110	3.5	9.5	200000	5000	—
10C8	High-Mu Triode—Sharp-Cutoff Pentode	B2	9DA	10.5⊕	0.3	Triode Unit as Class A Amplifier	250	390Ω	—	—	7.3	12000	4400	53
						Pentode Unit as Class A Amplifier	135	100Ω	135	3.2	11.5	190000	8000	—
12AC6	Remote-Cutoff Pentode⊙	A2	7BK	10.0 to 15.9	0.15 approx. at 12.6 v	Class A Amplifier	12.6	—	12.6	.2	.55	500000	730	G_1 Supp V, 0 G_1 Res., 2.2 megohms
12AD6	Pentagrid Converter⊙	A2	7CH	10.0 to 15.9	0.15 approx. at 12.6 v	Converter	12.6	Self-excited	12.6	1.5	0.45	1§	G_1 Res, 33000 Ω Conv Transcond., 260 micromhos	
12AE6-A	Twin Diode—Medium-Mu Triode⊙	A2	7BT	10.0 to 15.9	0.15 approx. at 12.6 v	Triode Unit as Class A Amplifier	12.6	0v	—	—	1	13000	1300	16.7

Type	Name	Tube Dimensions and Basing Diagram △		Heater or Filament (F) Unless specified all types have heaters. ⊙ Heater with controlled warmup time.		Use Values to right give operating conditions and characteristics for indicated typical use	Plate Supply Volts	Grid Bias Volts (v) or Cathode Resistor Ohms (Ω)	Screen Supply Volts	Screen Current mA	Plate Current mA	AC Plate Resistance Ohms	Transconductance Micromhos	Amplification Factor	Load for Stated Power Output Ohms	Power Output Watts
		Dim.	B. D.	Volts	Amps.											
12AF6	Remote-Cutoff Pentode⊙	A2	7BK	10.0 to 15.9	0.15 approx. at 12.6 v	Class A Amp	12.6	—	12.6	0.45	1.1	350000	1500	G_1 Supply Volts, 0 G_1 Res., 2.2 megohms		
12AL8	Medium-Mu Triode—Power Tetrode⊙	B4	9GS	10.0 to 15.9	0.55 approx. at 12.6 v	Triode Unit as Class A Amp	12.6	— 0.9v (across 2.2 megohm res.)			.5	13000	1000	13	—	—
						Tetrode Unit as Class A Amp	Grid-No. 2 (Control Grid) Volts, —.5 (across 2.2 megohm res.) Ampl. Factor (Grid-No. 2 to Plate), 7.2 Grid-No. 1 (Space-Charge Grid) Volts, 12.6 Grid-No. 1 mA, 75 Plate mA, 40 Transcond. (Grid-No. 2 to Plate), 15000 μmho Plate Resistance, 480 ohms					
12AV7	Medium-Mu Twin-Triode	B2	9A	6.3 12.6	0.45 0.225	Each Unit as Class A Amp	150	56Ω	—	—	18	48000	8500	41	Cutoff Volts, —12	
12AW6	Sharp-Cutoff Pentode	A2	7CM	12.6	0.15	Class A Amp	100 250	180Ω 180Ω	100 150	1.4 2.0	4.5 6.5	600000 800000	4500 5000	—	—	—
12BK5	Beam Power Tube	B4	9BQ	12.6⊕	0.6	Class A Amp	250	— 5v	250	3.5	35	100000	8500	—	6500	3.5
12BL6	Remote-Cutoff Pentode⊙	A2	7BK	10.0 to 15.9	0.15 approx. at 12.6 v	Class A Amp	12.6	Grid-No. 1 Supply Volts, 0	12.6	0.5	1.35	500000	1350	C_1 and G_3 Volts for transcond. of 10 micromhos, —5		
12BR7	Twin Diode—Hi-Mu Triode	B2	9CF	6.3 12.6	0.45 0.225	Triode Unit as Class A Amp	100 250	270Ω 200Ω	—	—	3.7 10	15000 10900	4000 5500	60 60	—	—
12BV7	Sharp-Cutoff Pentode	B4	9BF	6.3 12.6	0.6 0.3	Class A Amp	250 250	68Ω — 8v	150 180	6 —	27 0.5	85000 —	13000 —	—	—	—
12BW4	Full-Wave Rectifier	B4	9DJ	12.6	0.45	With Capacitive Input Filter	Max. AC Volts per Plate (RMS) 450 Max. DC Output mA, 62.5 Max. Peak Inverse Volts, 1275 Max. Peak Plate mA, 350 Total Effect. Supply Imped. per Plate, 82 ohms									
12BZ7	High-Mu Twin Triode	B4	9A	6.3 12.6	0.6 0.3	Each Unit as Class A Amp	250	— 2v	—	—	2.5	31800	3200	100	—	—

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RCA RECEIVING-TUBE DATA

Types Not Recommended for New Equipment Design

Type	Name	Tube Dimensions and Basing Diagram △ Dim.	B. D.	Heater or Filament (F) Unless specified all types have heaters. ⊕ Heater with controlled warmup time. Volts	Amps.	Use Values to right give operating conditions and characteristics for indicated typical use	Plate Supply Volts	Grid Bias Volts (v) or Cathode Resistor Ohms (Ω)	Screen Supply Volts	Screen Current mA	Plate Current mA	AC Plate Resistance Ohms	Transconductance Micromhos	Amplification Factor	Load for Stated Power Output Ohms	Power Output Watts
12CN5	Remote-Cutoff Pentode ⊙	A3	7CV	10.0 to 15.9	0.45 approx. at 12.6 v	Class A Amp	12.6	—	12.6	3.5	4.5	40000	3800	Grid-No. 1 Supply Volts, 0 Grid-No. 1 Res., 2.2 meg		
12CX6	Remote-Cutoff Pentode ⊙	A2	7BK	10.0 to 15.9	0.15 approx. at 12.6 v	Class A Amp	12.6	Grid-No. 1 Supply Volts, 0	12.6	1.4	3	40000	3100	G_1 Volts for Plate Current of 10μA, −4.5		
12DQ7	Power Pentode	B4	9BF	6.3⊕ 12.6	0.6 0.3	Class A Amp	200	68Ω	125	5.6	26	53000	10500	—	—	—
12DS7	Twin Diode—Power Tetrode ⊙	B4	9JU	10.0 to 15.9	0.4 approx. at 12.6 v	Tetrode Unit as Class A Amplifier	12.6	12.6v	−0.5 (across 2.2 megohm resistor)	75 (Grid-No. 1)	35	500	19000 (Grid-No. 2 to Plate)	9.1 (Grid-No. 2 to Plate)	—	—
						Diode Units	Diode Plate mA, with 10 Volts Applied, 3 mA								
12DW7	Dual Triode	B2	9A	12.6 6.3	0.15 0.3	Unit No. 1 as Class A Amp	250	− 2v	—	—	1.2	62500	—	100	—	—
						Unit No. 2 as Class A Amp	250	−8.5v	—	—	10.5	7700	2200	17	—	—
12DY8	Medium-Mu Triode—Remote-Cutoff Tetrode ⊙	B2	9JD	10.0 to 15.9	0.35 approx. at 12.6V	Triode Unit as Class A Amp	12.6	—	—	—	1.2	10000	2000	20	—	—
						Tetrode Unit as Signal Seeker Relay	10	—	10	—	5 min.	Grid No. 1 res, 10 meg.		Plate Load, 700 ohms		
							15	− 6v	15	—	3 max.	—	—	Plate Load, 700 ohms		
12ED5	Beam Power Tube	A3	7CV	12.6⊕	0.45	Class A Amp	1.25	− 4.5v	125	7	37	14000	8500	—	4500	1.5
12EK6	Remote-Cutoff Pentode ⊙	A2	7BK	10.0 to 15.9	0.19 approx. at 12.6 v	Class A Amp	12.6	—	12.6	1.7	4	50000	4200	G_1 Supply Volts, 0 G_1 Res. (Bypassed), 2.2 megohms		

Type	Name	Tube Dimensions and Basing Diagram △		Heater or Filament (F) Unless specified all types have heaters. ⊕ Heater with controlled warmup time.		Use Values to right give operating conditions and characteristics for indicated typical use	Plate Supply Volts	Grid Bias Volts (v) or Cathode Resistor Ohms (Ω)	Screen Supply Volts	Screen Current mA	Plate Current mA	AC Plate Resistance Ohms	Transconductance Micromhos	Amplification Factor	Load for Stated Power Output Ohms
		Dim.	B. D.	Volts	Amps.										
12EQ7	Diode—Remote-Cutoff Pentode	B4	9LQ	12.6	0.15	Pentode Unit as Class A Amplifier	100	0v	100	3.5	9	250000	3800	Grid-No. 1 Res., 2.2 megohms	
12F8	Twin Diode—Remote-Cutoff Pentode ⊙	B2	9FH	10.0 to 15.9	0.15 approx. at 12.6 v	Pentode Unit as Class A Amplifier	12.6	0v	12.6	0.38	1	330000	1000	Grid-No. 1 Volts for transcond. of 10 micromhos, −5	
12FK6	Twin Diode—Low-Mu Triode ⊙	A2	7BT	10.0 to 15.9	0.15 approx. at 12.6 v	Triode Unit as Class A Amplifier	12.6	Grid Supply Volts, 0 Grid Res. (Bypassed), 2.2 megohms			1.3	6200	1200	7.4	—
12FM6	Twin Diode—Medium-Mu Triode ⊙	A2	7BT	10.0 to 15.9	0.15 approx. at 12.6 v	Triode Unit as Class A Amplifier	12.6	0v	—	—	1	7700	1300	10	—
12FV7	Medium-Mu Twin Triode	B4	9A	6.3 12.6	0.9 0.45	Each Unit as Class A Amplifier	100	− 2v	—	—	16	2250	9600	21.5	—
12J5-GT	Medium-Mu Triode	F7	6Q	12.6	0.15	Amplifier	For other characteristics, refer to Type 6J5-GT.								
12J8	Twin Diode—Power Tetrode ⊙	B2	9GC	10.0 to 15.9	0.325 approx. at 12.6 v	Tetrode Unit as Class A Amplifier	12.6	− 0v	12.6	1.5	12	6000	5500	—	2700
							Power Output, 0.02 Watts								
12K5	Power Tetrode ⊙	A3	7EK	10.0 to 15.9	0.4 approx. at 12.6 v	Class A Amplifier	DC Plate Volts, 12.6 Grid-No. 2 (Control Grid) Volts, −.5 Grid-No. 1 (Space-Charge Grid) Volts, 12.6 Amplification Factor, DC Plate mA, 40 Grid-No. 1 mA, 75 Grid-No. 2 to Plate, 7.2 Plate Resistance, 480 ohms Transcond., Grid-No. 2 to Plate, 15000 μmho								
12K7-GT	Remote-Cutoff Pentode	F7	7R	12.6	0.15	Amplifier	For other characteristics, refer to Type 6K7-GT.								

Note: For footnotes, see end of this section. △ For key to tube dimensions, description, and basing diagram, see end of this section.

Type	Name	Tube Dimensions and Basing Diagram△		Heater or Filament (F) Unless specified all types have heaters. ⊕ Heater with controlled warmup time.		Use Values to right give operating conditions and characteristics for indicated typical use	Plate Supply	Grid Bias Volts (v) or Cathode Resistor	Screen Supply	Screen Current	Plate Current	AC Plate Resistance	Transconductance	Load for Stated Power Output	Power-Output
		Dim.	B. D.	Volts	Amps.		Volts	Ohms (Ω)	Volts	mA	mA	Ohms	Micromhos	Ohms	Watts
12KL8	Diode—Sharp-Cutoff Pentode	B4	9LQ	12.6	0.15	Pentode Unit as Class A Amplifier	For other characteristics, refer to Type 6KL8.								
12L6-GT	Beam Power Tube	F6	7AC‡	12.6⊕	0.6	Class A Amplifier	110 200	− 7.5v 180Ω	110 125	4.0 2.2	49 46	13000 28000	8000 8000	2000 4000	2.1 3.8
12R5	Beam Power Tube	A3	7CV	12.6⊕	0.6	Vertical Deflection Amplifier	Max. DC Plate Volts, 150 Max. Peak Neg.-Pulse Grid-No. 1 Volts, 150 Max. Peak Cathode mA, 155 Max. Grid-No. 2 Volts, 150 Max. Plate Dissipation, 4.5 watts Max. Peak Positive-Pulse Plate Volts, 1500 (Abs.)								
12SC7	High-Mu Twin Triode	E2	8S	12.6	0.15	Each Unit as Class A Amplifier	For other characteristics, refer to Type 6SC7.								
12SF5	Hi-Mu Triode	E2	6AB	12.6	0.15	Class A Amplifier	For other characteristics, refer to Type 6SF5.								
12SF7	Diode—Remote-Cutoff Pentode	E2	7AZ	12.6	0.15	Pentode Unit as Amplifier	For other characteristics, refer to Type 6SF7.								
12SG7	Semiremote-Cutoff Pentode	E2	8BK	12.6	0.15	Class A Amplifier	For other characteristics, refer to Type 6SG7.								
12SH7	Remote-Cutoff Pentode	E2	8BK	12.6	0.15	Class A Amplifier	For other characteristics, refer to Type 6SH7.								
12SK7 **12SK7-GT**	Remote-Cutoff Pentode	E2 F7	8N 8N	12.6	0.15	Class A Amplifier	For other characteristics, refer to Type 6SK7.								
17BH3	Novar Half-Wave Rectifier	C1	9HP	17.0⊕	0.6	Television Damper Service	Max. Peak Inverse Plate Volts, 5500 Max. Peak Plate mA, 1100								
17BQ6-GTB	Beam Power Tube	F16	6AM	16.8⊕	0.45	Horizontal Deflection Amplifier	Max. DC Plate Volts, 600 Max. Pk. Positive-Pulse Plate Volts, 6000 (Abs.) Max. DC Cathode mA, 112.5 Max. Plate Dissipation, 11 watts								

Type	Name	Tube Dimensions and Basing Diagram△		Heater or Filament (F) Unless specified all types have heaters. ⊕ Heater with controlled warmup time.		Use Values to right give operating conditions and characteristics for indicated typical use	Plate Supply Volts	Grid Bias Volts (v) or Cathode Resistor Ohms (Ω)	Screen Supply Volts	Screen Current mA	Plate Current mA	AC Plate Resistance Ohms	Transconductance Micromhos	Amplification Factor	Load for Stated Power Output Ohms	Power Output Watts
		Dim.	B. D.	Volts	Amps.											
17C9	Sharp-Cutoff Twin Tetrode	G1	10F	16.8	0.15	Each Unit as Class A Amp	125	— 1v	80	1.5	10	100000	8000	—	—	—
17GE5	Beam Power Tube	L2	12BJ	16.8	0.45	Horizontal Deflection Amp	Max. DC Plate Volts, 770 Max. Peak Positive-Pulse Plate Volts, 6500 (Abs.) Max. DC Cathode mA, 175 Max. Plate Dissipation, 17.5 watts									
17GV5	Beam Power Tube	L3	12DR	16.8	0.45	Horizontal Deflection Amp	For other characteristics, refer to Type 17GE5									
19AU4-GTA	Half-Wave Rectifier	F15	4CG	18.9⊕	0.6	Television Damper Service	Max. Peak Inverse Plate Volts, 4500 Max. Average Plate mA, 210 Max. Peak Plate mA, 1300 Max. Plate Dissipation, 6.5 Watts									
19BG6-GA	Beam Power Tube	F33	5BT	18.9	0.3	Horizontal Deflection Amp	Max. DC Plate Volts, 700 Max. Peak Positive-Pulse Plate Volts, 6600 (Abs.) Max. DC Plate Current, 110 mA Max. Plate Dissipation, 20 watts									
19J6	Medium-Mu Twin Triode	A2	7BF	18.9	0.15	Each Unit as Class A Amp	100	50Ω (For both units at the specified conditions)			8.5	7100	5300	38	—	—
19T8	Triple Diode—Hi-Mu Triode	B2	9E	18.9	0.15	Triode Unit as Class A Amp	100 250	— 1v — 3v	— —	— —	0.8 1.0	54000 58000	1300 1200	70 70	— —	— —
19X8	Medium-Mu Triode—Sharp-Cutoff Pentode	B2	9AK	18.9	0.15	Triode Unit as Class A Amp	125	— 1v	—	—	12	6000	6500	40	—	—
						Pentode Unit as Class A Amp	125	— 1v	125	2.2	9	300000	5500	—	—	—
25CA5	Beam Power Tube	A3	7CV	25.0	0.3	Class A Amp	110 125	— 4v — 4.5v	110 125	3.5 4	32 37	16000 15000	8100 9200	—	3500 4500	1.1 1.5
25EC6	Beam Power Tube	F29	5BT	25.0⊕	0.6	Horizontal Deflection Amp	Max. DC Plate Volts, 700 Max. Peak Positive-Pulse Plate Volts, 7000 (Abs.) Max. DC Cathode mA, 200 Max. Plate Dissipation, 10 Watts									
25L6-GT	Beam Power Tube	F6	7AC‡	25.0	0.3	Amplifier	100 200	— 7.5v 180Ω	110 125	4 2.2	49 46	13000 28000	8000 8000	—	2000 4000	2.1 3.8

Note: For footnotes, see end of this section. △ For key to tube dimensions, description, and basing diagram, see end of this section.

Type	Name	Tube Dimensions and Basing Diagram△ Dim.	B. D.	Heater or Filament (F) Unless specified all types have heaters. ⊕ Heater with controlled warmup time. Volts	Amps.	Use Values to right give operating conditions and characteristics for indicated typical use	Plate Supply Volts	Grid Bias Volts (v) or Cathode Resistor Ohms (Ω)	Screen Supply Volts	Screen Current mA	Plate Current mA	AC Plate Resistance Ohms	Transconductance Micromhos	Load for Stated Power Output Ohms	Power Output Watts
25W4-GT	Half-Wave Rectifier	F6	4CG	25.0	0.3	Television Damper Service	Max. Peak Inverse Plate Volts, 3850 (Abs.) Max. Peak Plate mA, 750 | Max. Peak Heater-Cathode Volts: {−500 (Abs.) {+200 Max. DC Plate mA, 125 | DC Component must not exceed 100 volts.								
25Z5	Rectifier-Doubler	K4	6E	25.0	0.3	Rectifier-Doubler	For other ratings, refer to Type 25Z6-GT.								
25Z6-GT	Rectifier-Doubler	F6	7Q‡	25.0	0.3	Voltage Doubler	Max. AC Volts per Plate (RMS), 117 Min. Total Effective Plate-Supply Max. DC Output mA, 75 Imped: Half-Wave, 30 ohms; Full-Wave, 15 ohms								
						Half-Wave Rectifier	Max. AC Volts per Plate (RMS), 235 Min. Total Effect. Supply Imped. per Max. DC Output mA per Plate, 75 Plate: at 117 volts, 15 ohms; at 150 volts, 40 ohms; at 235 volts, 100 ohms								
35B5	Beam Power Tube	A3	7BZ	35.0	0.15	Class A Amp	110	− 7.5v	110	3.0	40.0	13000	5800	2500	1.5
35GL6	Beam Power Tube	A3	7FZ	35.0	0.15	Class A Amp	110	− 7.5v	110	3	45	12000	7500	2500	1.8
35Y4	Half-Wave Rectifier Heater Tap for Pilot	J3	5AL	35.0	0.15	With Capacitive-Input Filter	Max. AC Plate Volts (RMS), 117. Min. Total Effect. Plate-Supply Max. DC Output mA : With Pilot and No Shunt Res, 60; Impedance, 15Ω With Pilot and Shunt Res., 90; Without Pilot, 100.								
		Pilot Between Pins 1 and 4													
35Z4GT	Half-Wave Rectifier	F6	5AA	35.0	0.15	With Capacitive-Input Filter	Min. Total Effective Plate-Supply Impedance: Up to 117 volts, 15 ohms; Max. DC Output mA, 100 at 235 volts, 100 ohms.								
35Z5-GT	Half-Wave Rectifier Heater Tap for Pilot	F6	6AD	35.0	0.15	With Capacitive-Input Filter	Min. Total Effect. Plate-Supply Imped.: Up to 117 volts, 15 ohms; at 235 Max. DC Output mA : With Pilot and volts, 100 ohms. No Shunt Res, 60; With Pilot and Shunt Res, 90; Without Pilot, 100.								
		Pilot Between Pins 2 and 3													
42	Power Pentode	K8	6B	6.3	0.7	Amplifier	For other characteristics, refer to Type 6F6-G.								
43	Power Pentode	K8	6B	25.0	0.3	Class A Amp	95	−15v	95	4	20	45000	2000	4500	0.9
50A5	Beam Power Tube	J3	6AA	50.0	0.15	Single-Tube Class A Amp	100 200	− 7.5v 180Ω	110 125	4 2.2	49 46	13000 28000	8000 8000	2000 4000	2.1 3.8

Type	Name	Tube Dimensions and Basing Diagram△		Heater or Filament (F) Unless specified all types have heaters. ⊕ Heater with controlled warmup time.		Use Values to right give operating conditions and characteristics for indicated typical use	Plate Supply	Grid Bias Volts (v) or Cathode Resistor	Screen Supply	Screen Current	Plate Current	AC Plate Resistance	Transconductance	Load for Stated Power Output	Power Output
		Dim.	B. D.	Volts	Amps.		Volts	Ohms (Ω)	Volts	mA	mA	Ohms	Micromhos	Ohms	Watts
50FK5	Power Pentode	A3	7CV	50.0	0.1	Class A Amp	110	62Ω	115	8.5	32	14000	12800	3000	1.2
50X6	Rectifier-Doubler	J3	7DX	50.0	0.15	Rectifier-Doubler	For other ratings, refer to Type 25Z6-GT.								
50Y6-GT	Rectifier-Doubler	F6	7Q↕	50.0	0.15	Rectifier-Doubler	For other ratings, refer to Type 25Z6-GT.								
80	Full-Wave Rectifier	K8	4C	5.0F	2.0	With Capacitive-Input Filter	AC Volts per Plate (RMS), 350 Max. Peak Inverse Volts, 1400 Min. Total Effect. Supply Imped. per Plate, 50 ohms					DC Output mA, 125 Max. Peak Plate mA, 440			
						With Inductive-Input Filter	AC Volts per Plate (RMS), 500 Max. Peak Inverse Volts, 1400 Min. Value of Input Choke, 10 henries					Max. DC Output mA, 125 Max. Peak Plate mA, 440			
84/6Z4	Full-Wave Rectifier	K4	5D	6.3	0.5	With Capacitive-Input Filter	AC Volts per Plate (RMS), 325 Max. Peak Inverse Volts, 1250 Total Effect. Supply Imped. per Plate, 150 ohms.					DC Output mA, 60 Max. Peak Plate mA, 180			
						With Inductive-Input Filter	AC Volts per Plate (RMS), 450 Max. Peak Inverse Volts. 1250 Value of Input Choke, 10 henries					Max. DC Output mA, 60 Max. Peak Plate mA, 180			
117L7-GT/ 117M7-GT	Rectifier-Beam Power Tube	F9	8AO	117	0.09	Amplifier Unit as Class A Amp	105	− 5.2v	105	4	43	17000	5300	4000	0.85
						Half-Wave Rectifier	Max. AC Plate Volts (RMS), 117 Max. Peak Inverse Volts, 350 Min. Total Effect. Plate-Supply Imped., 15 ohms					Max. DC Output mA, 75 Max. Peak Plate mA, 450			

Note: For footnotes, see end of this section. △ For key to tube dimensions, description, and basing diagram, see end of this section.

Type	Name	Tube Dimensions and Basing Diagram△ Dim.	B. D.	Heater or Filament (F) Unless specified all types have heaters. ⊕ Heater with controlled warmup time. Volts	Amps.	Use Values to right give operating conditions and characteristics for indicated typical use	Plate Supply Volts	Grid Bias Volts (v) or Cathode Resistor Ohms (Ω)	Screen Supply Volts	Screen Current mA	Plate Current mA	AC Plate Resistance Ohms	Transconductance Micromhos	Load for Stated Power Output Ohms	Power Output Watts
117N7-GT	Rectifier-Beam Power Tube	F9	8AV	117	0.09	Amplifier Unit as Class A Amp	100	− 6v	100	5	51	16000	7000	3000	1.2
						Half-Wave Rectifier	Max. AC Plate Volts (RMS), 117				Max. DC Output mA, 75				
							Max. Peak Inverse Volts, 350				Max. Peak Plate mA, 450				
							Min. Total Effect. Plate-Supply Impedance, 15 ohms.								
117Z3	Half-Wave Rectifier	A3	4CB	117	0.04	With Capacitive-Input Filter	Max. Peak Inverse Volts, 330				Max. DC Output mA, 90				
							Min. Total Effect. Plate-Supply Imped., 20 ohms				Max. Peak Plate mA, 540				
5881	Beam Power Tube	F10	7AC	6.3	0.9	Single Tube Class A Amp	250	−14v	250	4.3	75	30000	6100	2500	6.7
							350	−18v	250	2.5	53	48000	5200	4200	11.3
						Push-Pull Class A Amp	250	−16v	250	10♠	120♠	—	—	5000	14.5†
							270	−17.5v	270	11♠	134♠	—	—	5000	17.5†
						Push-Pull Class AB_1 Amp	360	−22.5v	270	5♠	88♠	—	—	6600	26.5†
							360	−22.5v	270	5♠	88♠	—	—	3800	18 †
7247	Dual Triode	B2	9A	12.6	0.15	Unit No. 1 as Class A Amp	250	− 2v	Mu = 100		1.2	62500	1600	—	—
				6.3	0.3	Unit No. 2 as Class A Amp	250	− 8.5v	Mu = 17		10.5	7700	2200	—	—
7695	Beam Power Tube	H2	9PX	50	0.15	Class A Amp	130	−11v	130	5	100	7000	11000	1100	4.5
						Push-Pull Class AB_1 Amp	140	50Ω	140	9♠	210♠	—	—	1500	10†
EM84/6FG6	Electron-Ray Tube	B8	9GA	6.3	0.27	Visual Indicator	Triode Plate Supply Volts, 250				Fluorescent-Target Volts, 250				
							Triode-Plate Resistance, 1 meg.				Triode-Grid Resistance, 0.47 meg.				
							Triode Grid-Supply Volts, −22				Triode Plate mA, 0.06				
							Max. Length of Dark Part of Target, when triode grid resistor = 0, 1.14 inch				Fluorescent Target mA, 1.6				

FOOTNOTES

Note 1: Subscript 1 on class of amplifier service (as AB_1) indicates that grid current does not flow during any part of input cycle.

▣ With tube mounted horizontally and pins No. 4 and No. 8 in a vertical plane (pin No. 4 on top), deflecting electrode No. 1 controls left-hand section of pattern, deflecting electrode No. 2 controls top right-hand section of pattern, deflecting electrode No. 3 controls bottom section of pattern.

◔ Supply voltage applied through 20000-ohm voltage-dropping resistor.

° Both grids connected together; likewise, both plates.

▲ Grids # 2 and # 4 are screen. Grid # 3 is signal-input control grid.

◘ Grids # 3 and # 5 are screen. Grid # 4 is signal-input control grid.

† Power output is for two tubes at stated plate-to-plate load.

✖ Applied through plate resistor of 250000 ohms.

▲ Grids # 2 and # 4 are screen. Grid # 1 is signal-input control grid.

‡ This diagram is like the one having the same designation except that Pin No. 1 has no connection.

✖ This diagram is like the one having the same designation except that base sleeve is connected to Pin No. 1.

⊙ For use in automobile receivers which operate directly from 12-volt storage batteries.

§ Megohms. ♠ For two tubes. ◔ 50000 ohms.

KEY TO TUBE DIMENSIONS

Symbol	Maximum Overall Length	x	Diameter	Description
A1	1-3/4″	x	3/4″	7-Pin Miniature Types
A2	2-1/8″	x	3/4″	
A3	2-5/8″	x	3/4″	
B1	1-3/4″	x	7/8″	9-Pin Miniature Types
B2	2-3/16″	x	7/8″	
B4	2-5/8″	x	7/8″	
B5	2-11/16″	x	7/8″	
B8	2-27/32″	x	7/8″	
C1	3.410″	x	1.188″	Novar Type
E2	2-5/8″	x	1-5/16″	Octal-Metal Types
E3	3-1/8″	x	1-5/16″	
E4	3-1/4″	x	1-5/16″	

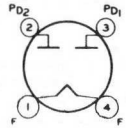
Symbol	Maximum Overall Length	x	Diameter	Description
F1	2-5/16″	x	1-5/16″	Octal-Glass Types
F6	3-5/16″	x	1-9/32″	
F7	3-5/16″	x	1-5/16″	
F8	3-3/8″	x	1-9/32″	
F9	3-7/16″	x	1-9/32″	
F10	3-15/32″	x	1-7/16″	
F15	3-13/16″	x	1-9/32″	
F16	3-7/8″	x	1-9/32″	
F17	3-7/8″	x	1-9/16″	
F19	4″	x	1-9/16″	
F24	4-15/32″	x	1-9/16″	
F25	4-5/8″	x	1-9/16″	
F29	4-3/4″	x	1-9/16″	
F33	5″	x	1-9/16″	
F38	5-7/32″	x	1-23/32″	
F39	5-5/16″	x	2-1/16″	
F40	5-11/16″	x	2-1/16″	

Symbol	Maximum Overall Length	x	Diameter	Description
G1	2.190″	x	0.875″	10-Pin Miniature Type
H2	3.23″	x	1.188″	9-Pin T9-Bulb Type
J2	2-25/32″	x	1-3/16″	Lock-In Types
J3	3-5/32″	x	1-3/16″	
K3	4-3/16″	x	1-3/16″	Other Types
K4	4-3/16″	x	1-9/16″	
K5	4-17/32″	x	1-9/16″	
K8	4-11/16″	x	1-13/16″	
K9	4-15/16″	x	1-9/16″	
K11	5-3/8″	x	2-1/16″	
L2	2.875″	x	1.563″	12-Pin T9-Bulb Types
L3	3.625″	x	1.563″	

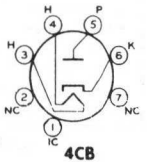
KEY: BASING DIAGRAMS *(Bottom Views)*

- ● = Gas-Type Tube
- BC = Base Sleeve
- BS = Base Shell
- C = External Conductive Coating
- CL = Collector
- DJ = Deflecting Electrode
- ES = External Shield
- F = Filament
- F+ = Filament (positive only)
- F− = Filament (negative only)
- FM = Filament Tap
- G = Grid
- H = Heater
- HL = Heater Tap for Panel Lamp
- HM = Heater Tap
- IC = Internal Connection—Do Not Use
- IS = Internal Shield
- K = Cathode
- LC = Limited Connection—Do Not Use, Except As Specified in Data
- NC = No Internal Connection
- P = Plate (Anode)
- RC = Ray-Control Electrode
- S = Shell
- TA = Target

Subscripts for multi-unit types: B, *beam unit;* D, *diode unit;* HP, *heptode unit;* HX, *hexode unit;* P, *pentode unit;* T, *triode unit;* TR, *tetrode unit.*



4C



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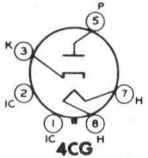

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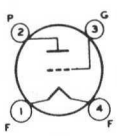

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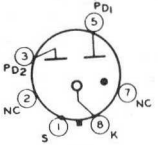

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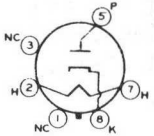

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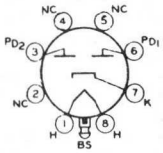

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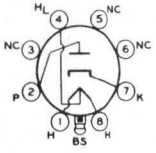

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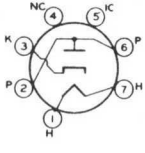

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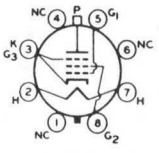

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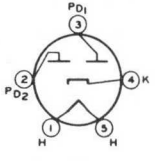

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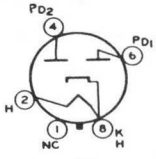

5L

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7BK
7BT
7BZ
7C
7CH
7CM
7CV
7DC
7DK

7DX
7R
8AO
7EA
7S
8AV
7EK
7T
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8BW
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9BQ
9BX
9CF
9DA
9DJ
9DT
9DX
9E
9EG
9FE
9FH
9FJ
9FT

9HP
9MB
9GS
9LQ
12DR
9GC
9LP
12BJ
9GA
9JU
10F
9FZ
9JD
9PX

Safety Precautions (I) For Receiving Tubes

High voltage rectifier and shunt regulator receiving tubes operate at potentials which may result in the production of X-Radiation.

Precautions must be exercised during the servicing of equipment employing these devices 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.

NOTE: For additional Safety Precautions, refer to sheet *Safety Precautions (II) For Receiving Tubes* which follows.

Safety Precautions (II) For Receiving Tubes

SHOCK HAZARD WARNING

Most electron tubes present a shock hazard in use because of the voltages at which they operate. This hazard applies to all applications and is not restricted to high-voltage circuits. Therefore, precautions should be taken when servicing equipment in which electron tubes are used.

Some electron tubes such as high-voltage rectifiers and shunt regulators operate with very high electrode voltages. Extreme care should be taken during testing or adjustment of circuits in which such tubes are employed. Precautions must be exercised during the replacement or servicing of these tubes 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 tube and its associated apparatus, especially all parts which may be at high-potential with respect to ground,should be housed in a protective enclosure. The protective housing should be designed with interlocks so that personnel cannot possibly come in contact with any high-potential point in the electrical system.

It should be noted that high voltages may appear at normally low-potentials points in the circuit as a result of capacitor breakdown or incorrect circuit connections. Therefore, before any part of the circuit is touched, the power supply switch should be turned off and both terminals of any capacitor should be grounded.

X-RADIATION WARNING

High-voltage rectifier and shunt regulator receiving tubes operate at potentials which may result in the production of X-Radiation. Types covered in the HB-3 Handbook which fall into these categories and which have EIA published values for X-Radiation are tested for an X-Radiation characteristic as specified in their published data.

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 Publications No. 73 A, "Recommended Practice for Quality Control of X-Radiation from High Voltage Rectifier and Shunt Regulator Receiving Tubes". These publications are available from the Electronic Industries Association, 2001 Eye St. N. W., Washington, D. C. 20006.

Safety Precautions (II) For Receiving Tubes

Operation of these devices above the design-maximum values indicated in their Maximum Ratings 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.

The high voltages associated with these devices 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 these devices 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.

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

DIODE CONSIDERATIONS
DIODE-TRIODE AND DIODE-PENTODE TUBES

Certain multi-unit tubes contain one or more diode plates, each having its own base pin, in addition to a triode or pentode unit. Such types may employ either a unipotential cathode or a filamentary cathode.

In unipotential-cathode tubes the cathode is common to the triode or pentode unit and the diode(s). In filamentary-cathode tubes the filament is likewise common to the triode or pentode unit and the diode(s). However, in filament types, diode operation is affected by the position of the diode plate(s) with respect to the filament, and, therefore, the position of the diode plate(s) is specified on the individual tube data sheets.

The rectifying action of the diode is commonly used for the following purposes:

Detection: Detection may be accomplished by using either a half-wave or full-wave circuit arrangement to supply signal voltage to the triode or pentode unit of the tube or to another amplifier tube. The half-wave circuit will provide approximately twice the rectified voltage obtainable from a full-wave circuit for the same applied signal voltage. Since the amplitude variation of the envelope of the rectified voltage is usually of greater importance than rectifier power, the half-wave circuit is more commonly used in practice.

AVC: Regulation of amplifier gain, generally called Automatic Volume Control, may be accomplished by using the output of a diode rectifier in a number of ways. The diode output may be applied to the control grids of the preceding amplifier tubes, or it may be applied, in the case of rf pentodes, to their suppressors, plates and/or screens.

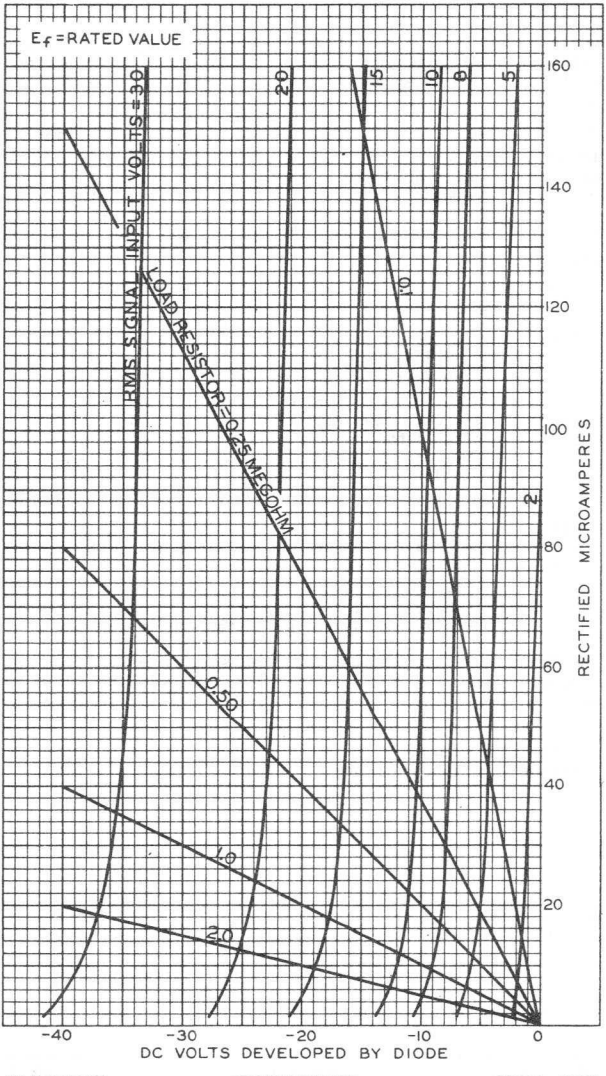
The above functions can be performed simultaneously by using a single diode, two diodes in parallel, or by two diodes operating independently. A number of typical circuit arrangements are shown on the following pages.

Average Characteristic Curves for diodes in diode-triode and diode-pentode tubes are shown on the next page.

AVERAGE DIODE CHARACTERISTICS

HALF-WAVE RECTIFICATION-SINGLE DIODE UNIT

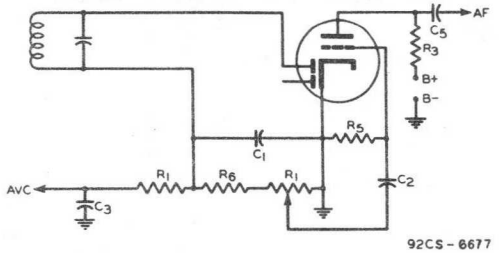
SEE PRECEDING PAGE



DIODE CONSIDERATIONS

TYPICAL DIODE-TRIODE CIRCUITS

HALF-WAVE DETECTOR, AVC, ZERO-BIAS AMPLIFIER



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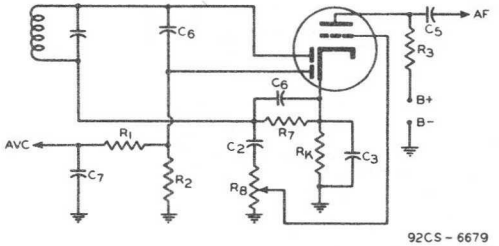
HALF-WAVE DETECTOR AND DELAYED AVC, CATHODE-BIAS AMPLIFIER



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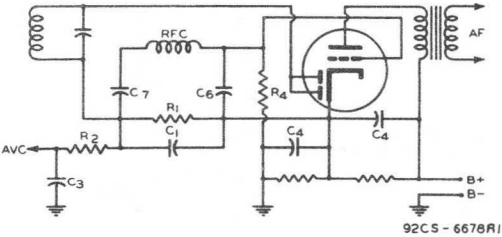
HALF-WAVE DETECTOR, AVC, FIXED-BIAS AMPLIFIER



92CS-6678R1

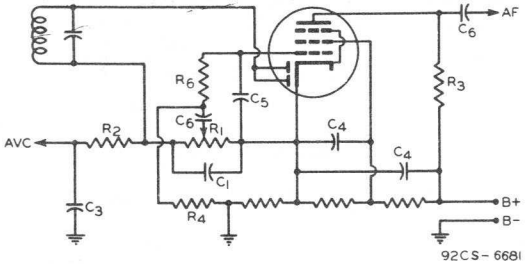
TYPICAL VALUES

C1: 150 μμf for 450-1600 kc
C2: 0.01 μf
C3: 0.1 μf
C4: 0.5 μf or larger
C5: 0.01 to 0.1 μf or larger
C6: 100 μμf
C7: 0.01 to 0.05 μf
R1: 0.5 Megohm
R2: 1.0 Megohm
R3: 0.1 Megohm
R4: 0.05 to 1.0 Megohm
R5: 10 Megohms
R6: 22000 Ohms
R7: 0.25 Megohm
R8: 1 to 2 Megohm

DIODE CONSIDERATIONS

TYPICAL DIODE-PENTODE CIRCUITS

HALF-WAVE DETECTOR AND AVC, FIXED-BIAS AMPLIFIER



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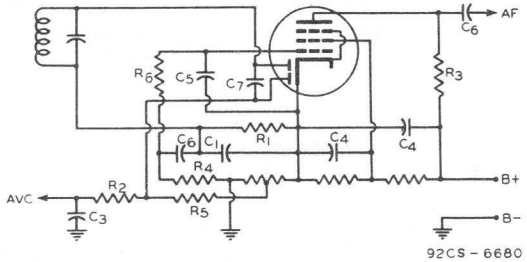
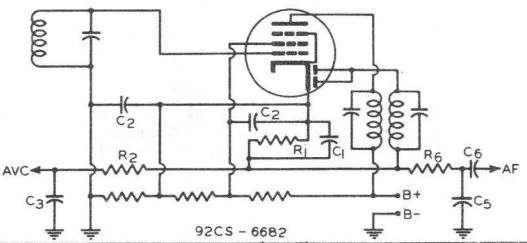
HALF-WAVE DETECTOR, SEPARATE AVC, FIXED-BIAS AMPLIFIER



92CS-6680

HALF-WAVE DETECTOR, AVC, FIXED-BIAS H-F AMPLIFIER



92CS-6682

TYPICAL VALUES

C1: 150 μμf for 450-1600 kc
C2, C3: 0.1 μf
C4: 0.5 μf or larger
C5: 100 μμf or smaller
C6: 0.01 to 0.1 μf
C7: 500 to 1000 μμf

R1: 0.5 to 1.0 Megohm
R2: 1.0 to 1.5 Megohms
R3: 0.1 to 0.2 Megohm
R4: 0.5 to 1.0 Megohm
R5: 1.0 Megohm
R6: 0.1 to 0.2 Megohm

KEY TO RESISTANCE-COUPLED AMPLIFIER CHARTS

Note: Chart number references, listed below, supersede those which may appear on individual tube data sheets for these types.

Tube Type	Chart No.	Tube Type	Chart No.	Tube Type	Chart No.	Tube Type	Chart No.	Tube Type	Chart No.
3AU6....	2	5BK7A...	10	6BZ7.....	10	6T8A.....	5	12AX7A.....	9
3AV6....	9	5BQ7A...	10	6C4.....	3	7AU7.....	3	12AY7.....	1
3BC5....	11	5T8.....	5	6CB6.....	11	8CG7.....	8	12SL7GT....	5
3CB6....	11	6AB4....	4	6CB6A.....	11	8CN7.....	5	12SN7GTA...	8
3CF6....	11	6AG5....	11	6CF6.....	11	8FQ7.....	8	19T8.....	5
4AU6....	2	6AT6....	5	6CG7.....	8	9AU7.....	3	20EZ7.....	9
4AV6....	9	6AU6A...	2	6CN7.....	5	12AT6....	5	5879▲.....	6
4BC5....	11	6AV6....	9	6EU7.....	9	12AT7....	4	5879*.....	7
4BQ7A...	10	6BC5....	11	6FQ7.....	8	12AU6....	2	7025.....	9
4BZ7....	10	6BK7B...	10	6SL7GT....	5	12AU7A...	3	7199▲.....	12
4CB6....	11	6BQ7A...	10	6SN7GTB...	8	12AV6....	9	7199*.....	13

▲ Pentode Unit
* Triode Unit or Triode Connection

SYMBOLS USED IN RESISTANCE-COUPLED AMPLIFIER CHARTS

C = Blocking Capacitor (μf).

C_k = Cathode Bypass Capacitor (μf).

C_{g2} = Screen-Grid Bypass Capacitor (μf).

E_{bb} = Plate-Supply Voltage. Voltage at plate equals plate-supply voltage minus drop in R_p and R_k.

R_k = Cathode Resistor (ohms).

R_{g2} = Screen-Grid Resistor (megohms).

R_g = Grid Resistor (megohms) for following stage.

R_p = Plate Resistor (megohms).

V.G. = Voltage Gain.

E_o = Output Voltage (peak volts). This voltage is obtained across R_g (for following stage) at any frequency within the flat region of the output vs. frequency curve, and is for the condition where the signal level is adequate to swing the grid of the resistance-coupled amplifier tube to the point where its grid starts to draw current.

Note: The listed values for E_o are the peak output voltages available when the grid is driven from a low-impedance source. The listed values for the cathode resistors are optimum for any signal source. With a high-impedance source, protection against severe distortion and loss of gain due to input loading may be obtained by the use of a coupling capacitor connected directly to the input grid and a high-value resistor connected between the grid and ground.

Resistance-Coupled Amplifiers

CIRCUIT ADVANTAGES

For most of the types shown, the data pertain to operation with cathode bias; for all of the pentodes, the data pertain to operation with series screen-grid resistor. The use of a cathode-bias resistor where feasible and a series screen-grid resistor where applicable offers several advantages over fixed-voltage operation.

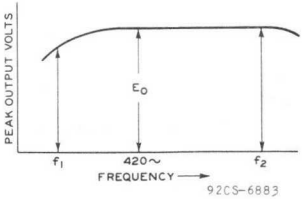
The advantages are: (1) effects of possible tube differences are minimized; (2) operation over a wide range of plate-supply voltages without appreciable change in gain is feasible; (3) the low frequency at which the amplifier cuts off is easily changed; and (4) tendency toward motorboating is minimized.

NUMBER OF STAGES

These advantages can be enhanced by the addition of suitable decoupling filters in the plate supply of each stage of a multi-stage amplifier. With proper filters, three or more amplifier stages can be operated from a single power-supply unit of conventional design without encountering any difficulties due to coupling through the power unit. When decoupling filters are not used, not more than two stages should be operated from a single power-supply unit.

GENERAL CIRCUIT CONSIDERATIONS

In the discussions which follow, the frequency (f_2) is that value at which the high-frequency response begins to fall off. The frequency (f_1) is that value at which the low-frequency response drops below a satisfactory value, as discussed below. A variation of 10 per cent in values of resistors and capacitors has only slight effect on performance. One-half-watt resistors are usually suitable for R_{g2}, R_g, and R_k resistors. Capacitors C and C_{g2} should have a working voltage equal to or greater than E_{bb}. Capacitor C_k may have a low working voltage in the order of 10 to 25 volts.



Triode Amplifier *(Heater-Cathode Type)*

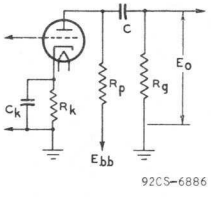


Diagram No.1

Capacitors C and C_k have been chosen to give an output voltage equal to 0.8 E_o for a frequency (f_1) of 100 cycles. For any other values of (f_1), multiply values of C and C_k by $100/f_1$. In the case of capacitor C_k, the values shown in the charts are for an amplifier with dc heater excitation; when ac is used, depending on the character of the associated circuit, the gain, and the value of f_1, it may be necessary to increase the value of C_k to minimize hum disturbances. It may be desirable to operate the heater at a positive voltage of from 15 to 40 volts with respect to the cathode. The voltage output at f_1, or "n" like stage equals $(0.8)^n E_o$ where E_o is peak output voltage of final stage. For an amplifier of typical construction, the value of f_2 is well above the audio-frequency range for any value of R_p.

Pentode Amplifier *(Heater-Cathode Type)*

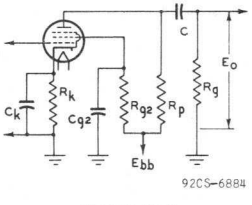


Diagram No.2

Capacitors C, C_k, and C_{g2} have been chosen to give an output voltage equal to 0.7 E_o for a frequency (f_1) of 100 cycles. For any other value of f_1, multiply values of C, C_k, and C_{g2} by $100/f_1$. In the case of capacitor C_k, the values shown in the charts are for an amplifier with dc heater excitation; when ac is used, depending on the character of the associated circuits, the voltage gain, and the value of f_1, it may be necessary to increase the value of C_k to minimize hum disturbances. It may be desirable to operate the heater at a positive voltage of from 15 to 40 volts with respect to the cathode. The voltage output at f_1 for "n" like stages equals $(0.7)^n E_o$ where E_o is the peak output voltage of final stage. For an amplifier of typical construction, and for R_p values of 0.1, 0.25, and 0.5 megohm, approximate values of f_2 are 20000, 10000, and 5000 cps, respectively.

RESISTANCE-COUPLED AMPLIFIER CHARTS

(1) 12AY7•

See *Circuit Diagram 1*

E_{bb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o*	V.G.
90	0.1	0.24	—	1800	—	—	—	13	24
	0.24	0.51	—	3700	—	—	—	14	26
	0.51	1.0	—	7800	—	—	—	16	27
180	0.1	0.24	—	1300	—	—	—	31	27
	0.24	0.51	—	2800	—	—	—	33	29
	0.51	1.0	—	5700	—	—	—	33	30
300	0.1	0.24	—	1200	—	—	—	58	28
	0.24	0.51	—	2300	—	—	—	30	30
	0.51	1.0	—	4800	—	—	—	56	31

(2) 3AU6, 4AU6, 6AU6A, 12AU6

See *Circuit Diagram 2*

E_{bb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o*	V.G.
90	0.22	0.22	0.340	2700	0.057	5.8	0.0081	16	79
	0.22	0.47	0.370	2900	0.050	5.4	0.0055	22	104
	0.22	1.0	0.380	3100	0.050	5.3	0.0034	25	125
	0.47	0.47	1.00	6000	0.027	2.8	0.0042	13	105
	0.47	1.0	1.00	6200	0.023	2.7	0.0027	17	137
	0.47	2.2	1.00	6300	0.027	2.8	0.0019	25	161
	1.0	1.0	1.90	10800	0.017	1.7	0.0025	10	139
	1.0	2.2	2.40	13100	0.017	1.7	0.0017	19	184
180	0.22	0.22	0.520	1340	0.059	8.8	0.0081	31	143
	0.22	0.47	0.520	1390	0.059	8.7	0.0053	43	192
	0.22	1.0	0.520	1420	0.059	8.6	0.0032	48	223
	0.47	0.47	1.05	2700	0.039	5.5	0.0041	34	189
	0.47	1.0	1.15	2880	0.037	5.4	0.0027	43	249
	0.47	2.2	1.20	2960	0.036	5.4	0.0019	50	294
	1.0	1.0	2.40	5500	0.028	3.2	0.0023	33	230
	1.0	2.2	2.70	6000	0.022	2.8	0.0015	40	323
300	0.22	0.22	0.530	780	0.077	13.2	0.0082	53	200
	0.22	0.47	0.540	783	0.077	13.2	0.0053	65	270
	0.22	1.0	0.540	800	0.077	13.1	0.0033	74	316
	0.47	0.47	1.15	1590	0.057	8.4	0.0045	56	275
	0.47	1.0	1.22	1650	0.049	7.4	0.0027	72	357
	0.47	2.2	1.31	1720	0.045	7.2	0.0017	82	418
	1.0	1.0	2.50	3300	0.036	5.3	0.0022	57	352
	1.0	2.2	2.80	3500	0.031	4.2	0.0015	72	466

• One triode unit. * Peak volts.
▲ Coupling capacitors should be selected to give desired frequency response. Cathode resistors should be adequately bypassed.

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

RESISTANCE-COUPLED AMPLIFIER CHARTS

(3)

6C4, 7AU7,• 9AU7,• 12AU7A•

See *Circuit Diagram 1*

E_{bb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o*	V.G.
	0.047	0.047	—	1600	—	3.2	0.061	9	10
	0.047	0.1	—	1800	—	2.5	0.033	11	11
	0.047	0.22	—	2000	—	2.0	0.015	14	11
	0.1	0.1	—	3000	—	1.6	0.032	10	11
90	0.1	0.22	—	3800	—	1.1	0.015	15	11
	0.1	0.47	—	4500	—	1.0	0.007	18	11
	0.22	0.22	—	6800	—	0.7	0.015	14	11
	0.22	0.47	—	9500	—	0.5	0.0065	20	11
	0.22	1.0	—	11500	—	0.43	0.0035	24	11
	0.047	0.047	—	920	—	3.9	0.062	20	11
	0.047	0.1	—	1200	—	2.9	0.037	26	12
	0.047	0.22	—	1400	—	2.5	0.016	29	12
	0.1	0.1	—	2000	—	1.9	0.032	24	12
180	0.1	0.22	—	2800	—	1.4	0.016	33	12
	0.1	0.47	—	3600	—	1.1	0.007	40	12
	0.22	0.22	—	5300	—	0.8	0.015	31	12
	0.22	0.47	—	8300	—	0.56	0.007	44	12
	0.22	1.0	—	10000	—	0.48	0.0035	54	12
	0.047	0.047	—	870	—	4.1	0.065	38	12
	0.047	0.1	—	1200	—	3.0	0.034	52	12
	0.047	0.22	—	1500	—	2.4	0.016	68	12
	0.1	0.1	—	1900	—	1.9	0.032	44	12
300	0.1	0.22	—	3000	—	1.3	0.016	68	12
	0.1	0.47	—	4000	—	1.1	0.007	80	12
	0.22	0.22	—	5300	—	0.9	0.015	57	12
	0.22	0.47	—	8800	—	0.52	0.007	82	12
	0.22	1.0	—	11000	—	0.46	0.0035	92	12

• One triode unit. * Peak volts.

RESISTANCE-COUPLED AMPLIFIER CHARTS

(4)

6AB4, 12AT7•

See *Circuit Diagram 1*

E_{bb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o*	V.G.
90	0.1	0.1	—	2680	—	2.4	0.026	8	24
	0.1	0.22	—	3060	—	2.00	0.014	11	25
	0.1	0.47	—	3390	—	1.84	0.0074	13	28
	0.22	0.22	—	5500	—	1.33	0.0136	10	25
	0.22	0.47	—	6300	—	1.01	0.0067	14	28
	0.22	1.0	—	6930	—	0.92	0.0038	15	28
	0.47	0.47	—	10900	—	0.63	0.007	13	26
	0.47	1.0	—	12500	—	0.52	0.0043	14	28
	0.47	2.2	—	13500	—	0.47	0.0031	18	28
180	0.1	0.1	—	1407	—	3.6	0.029	20	31
	0.1	0.22	—	1674	—	3.0	0.016	28	33
	0.1	0.47	—	1786	—	2.6	0.0083	31	34
	0.22	0.22	—	2890	—	1.75	0.0140	24	33
	0.22	0.47	—	3860	—	1.34	0.0077	35	33
	0.22	1.0	—	4660	—	1.14	0.0047	42	33
	0.47	0.47	—	6960	—	0.83	0.0075	31	31
	0.47	1.0	—	8450	—	0.67	0.0046	39	32
	0.47	2.2	—	9600	—	0.55	0.0032	45	32
300	0.1	0.1	—	974	—	4.0	0.028	37	34
	0.1	0.22	—	1404	—	3.1	0.015	57	34
	0.1	0.47	—	2169	—	2.5	0.0083	78	33
	0.22	0.22	—	2510	—	1.9	0.015	50	33
	0.22	0.47	—	4200	—	1.3	0.0074	78	33
	0.22	1.0	—	4950	—	1.1	0.0046	85	32
	0.47	0.47	—	5700	—	0.90	0.0076	57	33
	0.47	1.0	—	8720	—	0.62	0.0041	81	32
	0.47	2.2	—	9700	—	0.57	0.0030	88	32

• One triode unit. * Peak volts.

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

RESISTANCE-COUPLED AMPLIFIER CHARTS

(5)

5T8, 6AT6, 6CN7, 6SL7GT,• 6T8A, 8CN7, 12AT6, 12SL7GT,• 19T8

See *Circuit Diagram 1*

E_{bb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o*	V.G.
	0.1	0.1	—	4200	—	2.5	0.025	5.4	22
	0.1	0.22	—	4600	—	2.2	0.014	7.5	27
	0.1	0.47	—	4800	—	2.0	0.0065	9.1	30
	0.22	0.22	—	7000	—	1.5	0.013	7.3	30
90	0.22	0.47	—	7800	—	1.3	0.007	10	34
	0.22	1.0	—	8100	—	1.1	0.0035	12	37
	0.47	0.47	—	12000	—	0.83	0.006	10	36
	0.47	1.0	—	14000	—	0.7	0.0035	14	39
	0.47	2.2	—	15000	—	0.6	0.002	16	41
	0.1	0.1	—	1900	—	3.6	0.027	19	30
	0.1	0.22	—	2200	—	3.1	0.014	25	35
	0.1	0.47	—	2500	—	2.8	0.0065	32	37
	0.22	0.22	—	3400	—	2.2	0.014	24	38
180	0.22	0.47	—	4100	—	1.7	0,0065	34	42
	0.22	1.0	—	4600	—	1.5	0.0035	38	44
	0.47	0.47	—	6600	—	1.1	0.0065	29	44
	0.47	1.0	—	8100	—	0.9	0.0035	38	46
	0.47	2.2	—	9100	—	0.8	0.002	43	47
	0.1	0.1	—	1500	—	4.4	0.027	40	34
	0.1	0.22	—	1800	—	3.6	0.014	54	38
	0.1	0.47	—	2100	—	3.0	0.0065	63	41
	0.22	0.22	—	2600	—	2.5	0.013	51	42
300	0.22	0.47	—	3200	—	1.9	0.0065	65	46
	0.22	0.1	—	3700	—	1.6	0.0035	77	48
	0.47	0.47	—	5200	—	1.2	0.006	61	48
	0.47	1.0	—	6300	—	1.0	0.0035	74	50
	0.47	2.2	—	7200	—	0.9	0.002	85	51

• One triode unit. * Peak volts.

RESISTANCE-COUPLED AMPLIFIER CHARTS

(6)

As Pentode: 5879

See *Circuit Diagram 2*

E_{bb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o*	V.G.
	0.1	0.1	0.35	1700	0.044	4.6	0.020	13	29
	0.1	0.22	0.35	1700	0.046	4.5	0.012	17	39
	0.1	0.47	0.35	1700	0.047	4.4	0.006	20	47
	0.22	0.22	0.80	3000	0.034	3.2	0.010	15	43
90	0.22	0.47	0.80	3000	0.035	3.1	0.005	21	59
	0.22	1.0	0.80	3000	0.036	3.0	0.003	24	67
	0.47	0.47	1.9	7000	0.021	1.8	0.005	21	59
	0.47	1.0	1.9	7000	0.022	1.7	0.003	25	75
	0.47	2.2	1.9	7000	0.023	1.7	0.002	28	87
	0.1	0.1	0.35	700	0.060	7.4	0.020	24	39
	0.1	0.22	0.35	700	0.062	7.3	0.012	28	56
	0.1	0.47	0.35	700	0.064	7.2	0.006	33	65
	0.22	0.22	0.80	1200	0.045	5.5	0.010	24	65
180	0.22	0.47	0.80	1200	0.046	5.3	0.005	31	87
	0.22	1.0	0.80	1200	0.048	5.2	0.003	34	101
	0.47	0.47	1.9	2500	0.033	3.5	0.005	27	98
	0.47	1.0	1.9	2500	0.034	3.4	0.003	32	122
	0.47	2.2	1.9	2500	0.035	3.3	0.002	37	140
	0.1	0.1	0.35	300	0.075	10.8	0.020	25	51
	0.1	0.22	0.35	300	0.077	10.6	0.012	32	68
	0.1	0.47	0.35	300	0.080	10.5	0.006	35	83
	0.22	0.22	0.80	600	0.056	7.9	0.010	28	81
300	0.22	0.47	0.80	600	0.057	7.5	0.005	37	109
	0.22	1.0	0.80	600	0.058	7.4	0.003	41	123
	0.47	0.47	1.3	1200	0.044	5.3	0.005	34	125
	0.47	1.0	1.3	1200	0.046	5.2	0.003	42	152
	0.47	2.2	1.3	1200	0.047	5.1	0.002	48	174

* Peak volts.

RESISTANCE-COUPLED AMPLIFIER CHARTS

(7)

As Triode: 5879

See *Circuit Diagram 1*

E_{bb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o*	V.G.
	0.047	0.047	—	1800	—	2.9	0.060	9	10
	0.047	0.1	—	2100	—	2.4	0.033	12	11
	0.047	0.22	—	2200	—	2.3	0.016	14	21
	0.1	0.1	—	3200	—	1.8	0.027	10	12
90	0.1	0.22	—	3900	—	1.3	0.015	13	13
	0.1	0.47	—	4300	—	1.0	0.007	16	13
	0.22	0.22	—	6200	—	0.87	0.015	12	13
	0.22	0.47	—	8100	—	0.53	0.006	16	13
	0.22	1.00	—	9000	—	0.49	0.003	19	14
	0.047	0.047	—	1200	—	3.5	0.063	21	12
	0.047	0.1	—	1600	—	2.6	0.033	29	13
	0.047	0.22	—	1800	—	2.4	0.016	35	13
	0.1	0.1	—	2200	—	1.9	0.031	26	13
180	0.1	0.22	—	2900	—	1.35	0.015	33	14
	0.1	0.47	—	3400	—	1.1	0.007	40	14
	0.22	0.22	—	4500	—	0.92	0.015	28	14
	0.22	0.47	—	6400	—	0.61	0.006	39	14
	0.22	1.00	—	8200	—	0.52	0.003	47	14
	0.047	0.047	—	1100	—	3.9	0.063	42	13
	0.047	0.1	—	1500	—	2.8	0.033	65	13
	0.047	0.22	—	1700	—	2.5	0.016	71	14
	0.1	0.1	—	2000	—	2.1	0.032	45	15
300	0.1	0.22	—	3400	—	1.4	0.015	74	15
	0.1	0.47	—	3700	—	1.1	0.007	83	15
	0.1	0.22	—	4300	—	0.97	0.015	50	15
	0.22	0.47	—	7200	—	0.63	0.007	88	15
	0.22	1.00	—	7400	—	0.63	0.003	94	15

* Peak volts.

RESISTANCE-COUPLED AMPLIFIER CHARTS

(8)

6CG7,• 6FQ7,• 6SN7GTB,• 8CG7,• 8FQ7,• 12SN7GTA•

See *Circuit Diagram 1*

E_{bb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o*	V.G.
	0.047	0.047	—	1870	—	3.1	0.063	14	13
	0.047	0.1	—	2230	—	2.5	0.031	18	14
	0.047	0.22	—	2500	—	2.1	0.016	20	14
	0.1	0.1	—	3370	—	1.8	0.034	15	14
90	0.1	0.22	—	4100	—	1.3	0.015	20	14
	0.1	0.47	—	4800	—	1.1	0.006	23	15
	0.22	0.22	—	7000	—	0.80	0.013	16	14
	0.22	0.47	—	9100	—	0.65	0.007	22	14
	0.22	1.00	—	10500	—	0.60	0.004	25	15
	0 047	0.047	—	1500	—	3.6	0.066	33	14
	0.047	0.1	—	1860	—	2.9	0.055	41	14
	0.047	0.22	—	2160	—	2.2	0.015	47	15
	0.1	0.1	—	2750	—	1.8	0.028	35	15
180	0.1	0.22	—	3550	—	1.4	0.015	45	15
	0.1	0.47	—	4140	—	1.3	0.007	51	16
	0.22	0.22	—	5150	—	1.0	0.016	36	16
	0.22	0.47	—	7000	—	0.71	0.007	45	16
	0.22	1.00	—	7800	—	0.61	0.004	51	16
	0.047	0.047	—	1300	—	3.6	0.061	59	14
	0.047	0.1	—	1580	—	3.0	0.032	73	15
	0.047	0.22	—	1800	—	2.5	0.015	83	16
	0.1	0.1	—	2500	—	1.9	0.031	68	16
300	0.1	0.22	—	3130	—	1.4	0.014	82	16
	0.1	0.47	—	3900	—	1.2	0.0065	96	16
	0.22	0.22	—	4800	—	0.95	0.015	68	16
	0.22	0.47	—	6500	—	0.69	0.0065	85	16
	0.22	1.00	—	7800	—	0.58	0.0035	96	16

• One triode unit. * Peak volts.

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

RESISTANCE-COUPLED AMPLIFIER CHARTS

(9)

3AV6, 4AV6, 6AV6, 6EU7,• 12AV6, 12AX7A,• 20EZ7,• 7025•

See *Circuit Diagram 1*

E_{bb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o*	V.G.
90	0.1	0.1	—	4400	—	2.7	0.023	5	29
	0.1	0.22	—	4700	—	2.4	0.013	6	35
	0.1	0.47	—	4800	—	2.3	0.007	8	41
	0.22	0.22	—	7000	—	1.6	0.012	6	39
	0.22	0.47	—	7400	—	1.4	0.006	9	45
	0.22	1.0	—	7600	—	1.3	0.003	11	48
	0.47	0.47	—	12000	—	0.9	0.006	9	48
	0.47	1.0	—	13000	—	0.8	0.003	11	52
	0.47	2.2	—	14000	—	0.7	0.002	13	55
180	0.1	0.1	—	1800	—	4.0	0.025	18	40
	0.1	0.22	—	2000	—	3.5	0.013	25	47
	0.1	0.47	—	2200	—	3.1	0.006	32	52
	0.22	0.22	—	3000	—	2.4	0.012	24	53
	0.22	0.47	—	3500	—	2.1	0.006	34	59
	0.22	1.0	—	3900	—	1.8	0.003	39	63
	0.47	0.47	—	5800	—	1.3	0.006	30	62
	0.47	1.0	—	6700	—	1.1	0.003	39	66
	0.47	2.2	—	7400	—	1.0	0.002	45	68
300	0.1	0.1	—	1300	—	4.6	0.027	43	45
	0.1	0.22	—	1500	—	4.0	0.013	57	52
	0.1	0.47	—	1700	—	3.6	0.006	66	57
	0.22	0.22	—	2200	—	3.0	0.013	54	59
	0.22	0.47	—	2800	—	2.3	0.006	69	65
	0.22	1.0	—	3100	—	2.1	0.003	79	68
	0.47	0.47	—	4300	—	1.6	0.006	62	69
	0.47	1.0	—	5200	—	1.3	0.003	77	73
	0.47	2.2	—	5900	—	1.1	0.002	92	75

• One triode unit. * Peak volts.

RESISTANCE-COUPLED AMPLIFIER CHARTS

(10)

4BQ7A,• 4BZ7,• 5BK7A,• 5BQ7A,• 6BK7B,• 6BQ7A,• 6BZ7•

See *Circuit Diagram 1*

E_{bb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o*	V.G.
	0.047	0.047	—	1580	—	4.0	0.058	9	18
	0.047	0.10	—	1760	—	3.5	0.032	13	19
	0.047	0.22	—	1820	—	3.0	0.015	16	20
	0.1	0.1	—	2920	—	2.1	0.029	12	19
90	0.1	0.22	—	3570	—	1.7	0.015	17	20
	0.1	0.47	—	4020	—	1.4	0.0075	20	20
	0.22	0.22	—	6040	—	0.98	0.0135	16	19
	0.22	0.47	—	7500	—	0.78	0.0075	21	20
	0.22	1.0	—	8800	—	0.63	0.0036	25	20
	0.047	0.047	—	694	—	6.0	0.062	25	23
	0.047	0.1	—	817	—	4.4	0.032	32	24
	0.047	0.22	—	905	—	4.0	0.0155	35	25
	0.10	0.1	—	1596	—	2.80	0.030	30	23
180	0.10	0.22	—	1630	—	2.30	0.0152	32	24
	0.10	0.47	—	1860	—	2.00	0.0073	38	24
	0.22	0.22	—	3950	—	1.24	0.0150	35	22
	0.22	0.47	—	4500	—	0.96	0.0072	41	23
	0.22	1.0	—	5530	—	0.79	0.0038	49	23
	0.047	0.047	—	438	—	6.70	0.062	38	26
	0.047	0.1	—	542	—	5.50	0.032	48	27
	0.047	0.22	—	644	—	4.30	0.016	57	27
	0.10	0.10	—	1009	—	3.5	0.031	42	25
300	0.10	0.22	—	1332	—	2.5	0.015	56	26
	0.10	0.47	—	1609	—	2.1	0.0074	64	25
	0.22	0.22	—	2623	—	1.5	0.015	50	24
	0.22	0.47	—	3900	—	1.1	0.0073	70	24
	0.22	1.0	—	4920	—	0.88	0.0039	84	24

• One triode unit. * Peak volts.

RESISTANCE-COUPLED AMPLIFIER CHARTS

(11)

3BC5, 3CB6, 3CF6, 4BC5, 4CB6, 6AG5, 6BC5, 6CB6, 6CB6A, 6CF6

See *Circuit Diagram 2*

E_{bb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o*	V.G.
	0.22	0.22	0.480	3800	0.046	5.5	0.0084	10	89
	0.22	0.47	0.480	3800	0.049	5.5	0.0054	16	114
	0.22	1.0	0.500	4400	0.045	5.3	0.0034	23	128
	0.47	0.47	1.04	7200	0.033	2.9	0.0044	10	111
90	0.47	1.0	1.04	7700	0.033	2.8	0.0029	15	133
	0.47	2.2	1.10	8400	0.031	2.6	0.0020	18	152
	1.0	1.0	2.50	16000	0.018	1.4	0.0023	10	118
	1.0	2.2	2.50	18600	0.016	1.2	0.0017	11	139
	0.22	0.22	0.550	1600	0.072	9.5	0.0090	30	161
	0.22	0.47	0.620	1800	0.062	8.5	0.0053	36	208
	0.22	1.0	0.650	1900	0.062	8.5	0.0034	43	239
	0.47	0.47	1.00	3400	0.059	6.0	0.0048	34	183
180	0.47	1.0	1.00	3500	0.059	6.0	0.0031	41	229
	0.47	2.2	1.00	3800	0.059	5.8	0.0020	46	262
	1.0	1.0	2.60	7300	0.029	2.7	0.0022	33	227
	1.0	2.2	2.60	7400	0.029	2.7	0.0016	38	281
	0.22	0.22	0.600	980	0.085	13.0	0.0085	51	223
	0.22	0.47	0.680	1090	0.084	12.0	0.0055	64	288
	0.22	1.0	0.700	1150	0.081	11.0	0.0033	74	334
	0.47	0.47	1.25	2000	0.064	7.9	0.0045	52	285
300	0.47	1.0	1.34	2150	0.061	7.6	0.0029	67	363
	0.47	2.2	1.53	2350	0.057	7.1	0.0019	79	416
	1.0	1.0	2.60	4000	0.044	5.2	0.0023	51	334
	1.0	2.2	3.00	4700	0.038	4.3	0.0015	69	427

• One triode unit. * Peak volts.

RESISTANCE-COUPLED AMPLIFIER CHARTS

(12)

7199 (Pentode Unit)

See *Circuit Diagram 2*

E_{bb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o*	V.G.
	0.22	0.22	0.560	3700	0.046	4.50	0.0090	12	73
	0.22	0.47	0.600	3900	0.043	4.30	0.0055	17	95
	0.22	1.0	0.640	4200	0.039	4.00	0.0033	19	109
	0.47	0.47	0.870	6000	0.036	2.70	0.0046	16	95
90	0.47	1.0	0.980	6700	0.044	3.00	0.0030	22	113
	0.47	2.2	1.00	6700	0.043	2.80	0.0020	25	131
	1.0	1.0	2.00	12200	0.021	1.44	0.0028	15	119
	1.0	2.2	2.20	12800	0.024	1.74	0.0016	21	167
	0.22	0.22	0.530	1570	0.069	7.50	0.0088	32	82
	0.22	0.47	0.600	1730	0.064	7.40	0.0064	38	164
	0.22	1.0	0.650	1820	0.061	7.30	0.0034	45	190
	0.47	0.47	1.12	3200	0.053	5.30	0.0046	35	147
180	0.47	1.0	1.40	3500	0.042	5.10	0.0028	40	209
	0.47	2.2	1.57	3740	0.040	5.40	0.0019	45	250
	1.0	1.0	2.50	6500	0.039	2.80	0.0024	34	179
	1.0	2.2	3.40	7500	0.026	2.30	0.0015	39	277
	0.22	0.22	0.600	9200	0.086	11.2	0.0085	52	182
	0.22	0.47	0.670	1010	0.076	10.5	0.0052	66	236
	0.22	1.0	0.720	1100	0.076	10.0	0.0033	77	257
	0.47	0.47	1.25	1950	0.060	7.0	0.0044	41	221
300	0.47	1.0	1.43	3210	0.053	6.4	0.0027	72	296
	0.47	2.2	1.45	2200	0.055	6.3	0.0019	82	345
	1.0	1.0	3.00	4100	0.040	4.2	0.0022	57	295
	1.0	2.2	3.30	4340	0.037	3.6	0.0016	74	378

* Peak volts.

RESISTANCE-COUPLED AMPLIFIER CHARTS

(13)

7199 (Triode Unit)

See *Circuit Diagram 1*

E_{bb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o*	V.G.
	0.047	0.047	—	1292	—	3.3	0.060	8	12
	0.047	0.1	—	1401	—	2.8	0.032	10	13
	0.047	0.22	—	1470	—	2.4	0.016	11	13
	0.10	0.1	—	2630	—	1.60	0.029	9	13
90	0.10	0.22	—	3090	—	1.24	0.015	12	13
	0.10	0.47	—	3440	—	1.10	0.008	14	14
	0.22	0.22	—	6550	—	0.70	0.015	12	12
	0.22	0.47	—	8270	—	0.51	0.0077	16	12
	0.22	1.0	—	9130	—	0.44	0.0045	18	12
	0.047	0.047	—	723	—	4.0	0.061	16	14
	0.047	0.1	—	836	—	3.5	0.032	20	14
	0.047	0.22	—	948	—	2.9	0.016	24	15
	0.10	0.1	—	1543	—	2.0	0.031	17	14
180	0.10	0.22	—	2002	—	1.6	0.016	24	14
	0.10	0.47	—	2522	—	1.2	0.0082	30	13
	0.22	0.22	—	4390	—	0.79	0.015	24	13
	0.22	0.47	—	6122	—	0.57	0.0078	33	12
	0.22	1.0	—	8060	—	0.47	0.0046	41	12
	0.047	0.047	—	534	—	4.0	0.061	27	15
	0.047	0.1	—	726	—	3.6	0.031	38	15
	0.047	0.22	—	840	—	3.0	0.015	44	15
	0.10	0.1	—	1117	—	2.3	0.031	26	15
300	0.10	0.22	—	1613	—	1.7	0.0155	41	14
	0.10	0.47	—	2043	—	1.31	0.0078	51	14
	0.22	0.22	—	3133	—	0.93	0.015	36	13
	0.22	0.47	—	4480	—	0.69	0,0079	51	13
	0.22	1.0	—	4930	—	0.56	0.0045	55	13

* Peak volts.

GRID-No. 2 INPUT RATING CHART

The Grid-No.2 Input Rating Chart shown on the back of this page presents graphically the relationship between the grid-No.2 voltage and the maximum grid-No.2 input for certain multi-electrode tube types.

The chart shows that full rated grid-No.2 input is permissible at grid-No.2 voltages up to 50 per cent of the maximum rated grid-No.2 supply voltage. From the 50 per cent point to the full rated value of supply voltage, the grid-No.2 input must be decreased. The decrease in allowable grid-No.2 input follows a curve of the parabolic form.

This chart is useful for applications utilizing either a fixed grid-No.2 voltage, or a series grid-No.2 voltage-dropping resistor.

Where a fixed grid-No.2 voltage is used, it is necessary only to determine that the grid-No.2 input is within the boundary of the operating area on the chart at the selected value of grid-No.2 voltage to be used.

Where a grid-No.2 voltage-dropping resistor is used, the minimum value of resistor that will assure tube operation within the boundary of the curve can be determined from the following relation:

$$R_{g2} \geq \frac{E_{c2}\ (E_{cc2} - E_{c2})}{P_{c2}}$$

where:

R_{g2} = minimum value for grid-No.2 voltage-dropping resistor in ohms.

E_{c2} = selected value of grid-No.2 voltage in volts.

E_{cc2} = grid-No.2 supply voltage in volts.

P_{c2} = grid-No.2 input in watts corresponding to E_{c2}.

EXAMPLES

Example I - *Use of a Fixed Grid-No.2 Supply Voltage:*

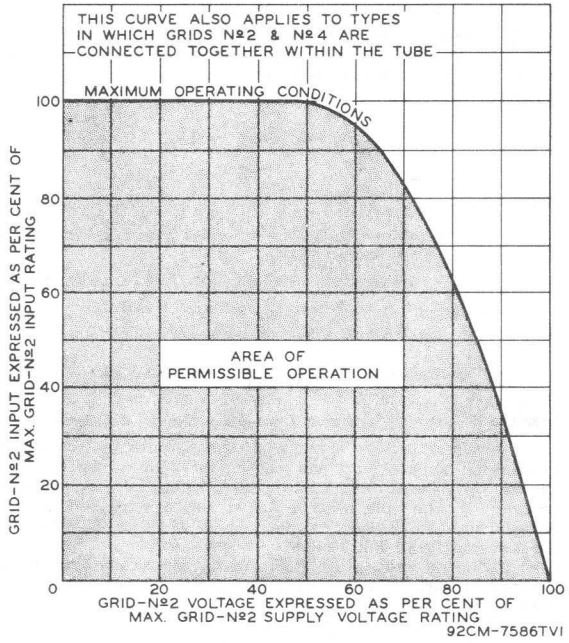
The tube data for a certain tube stipulates a maximum grid-No.2 supply voltage rating of 300 volts, and a maximum grid-No.2 input rating of 1 watt. It is desired to operate the tube with a fixed voltage of 200 volts between grid No.2 and cathode. This value is 66-2/3% of the maximum grid-No.2 supply voltage rating. From the chart, the maximum grid-No.2 input, therefore, must be limited to 88% of the maximum grid-No.2 input rating or 0.88 watt.

GRID-Nº 2 INPUT RATING CHART

Example 2 – *Use of a Grid-No. 2 Voltage-Dropping Resistor:*

The tube data for a certain tube stipulates a maximum grid-No. 2 supply voltage rating of 300 volts, and a maximum grid-No. 2 input rating of 1 watt. It is desired to operate the tube with a grid-No. 2-to-cathode voltage of 250 volts, obtained through a dropping resistor from a 300-volt power supply. Because 250 volts is 83% of 300 volts, the maximum grid-No. 2 input must be limited, as shown on the chart, to 56% of the maximum grid-No. 2 input rating, or 0.56 watt. Then, the minimum value required for the grid-No. 2 voltage-dropping resistor will be:

$$R_{g2} = \frac{250\ (300 - 250)}{0.56} = 22{,}320 \text{ ohms}$$

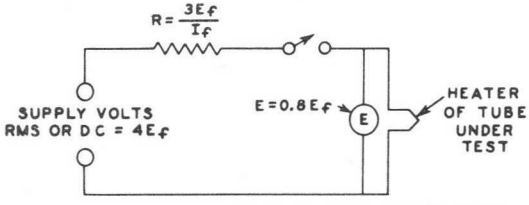


TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

HEATER WARM-UP TIME MEASUREMENT
FOR TUBE TYPES INTENDED FOR USE IN SERIES HEATER-STRING ARRANGEMENT

Heater warm-up time is measured in the circuit shown below as follows: The heater is placed in series with a resistance having a value 3 times the heater operating resistance. A voltage having a value 4 times the rated heater voltage is then applied. Heater warm-up time is then defined as the time required for the voltage across the heater to reach 80 per cent of its rated value.

TEST CIRCUIT FOR DETERMINING HEATER WARM-UP TIME

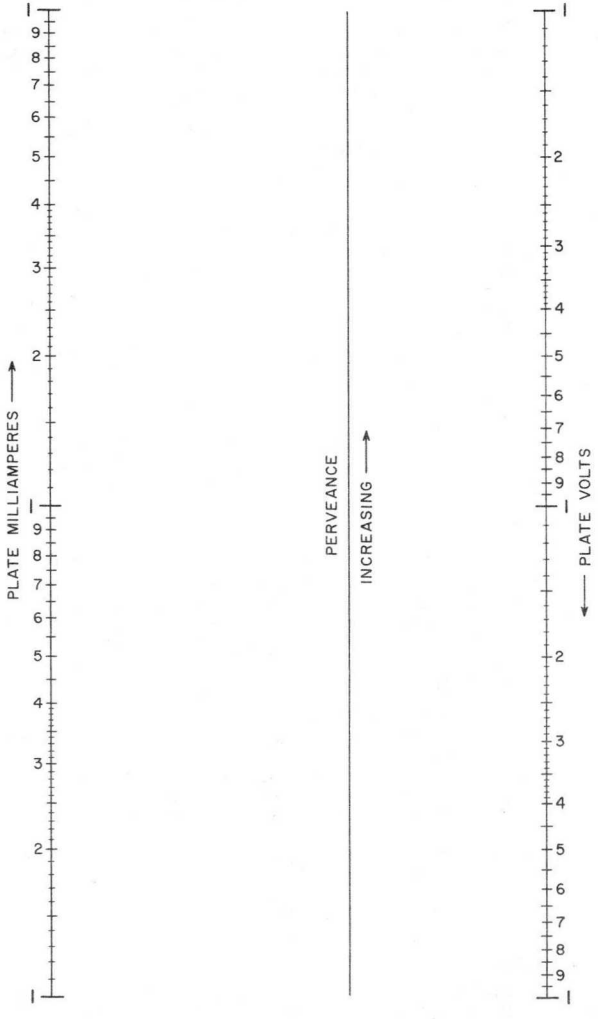


Ef = RATED HEATER VOLTAGE OF TUBE UNDER TEST.
If = RATED HEATER CURRENT OF TUBE UNDER TEST.

92CS-8503

AVERAGE PLATE-CHARACTERISTIC NOMOGRAPH

For Diodes and Rectifiers



92CM-11244

Diode Nomograph

The Diode Nomograph on the preceding page may be used to determine for a diode unit (1) tube voltage drop for any plate current, or (2) plate current for any plate voltage when values for a single plate-voltage, plate-current condition are available from the published data. The nomograph may also be used to compare the perveance ($G = I_b/E_b^{\frac{3}{2}}$) of several diodes.

For convenience, PLATE VOLTS and PLATE MILLIAMPERES are plotted on two-decade logarithmic scales with the PERVEANCE line located between them.

To determine for a specific diode unit the desired tube voltage drop or plate current:

1. Obtain the plate-voltage, plate-current condition from the published data for the type.
2. Select convenient values for the decade scales for PLATE VOLTS and PLATE MILLIAMPERES.
3. Locate and connect with a straightedge the points for PLATE VOLTS and PLATE MILLIAMPERES obtained from the data.
4. Mark the intersection of the straightedge and the PERVEANCE line.
5. With this intersection as a pivot point, line up the straightedge with the desired value of PLATE VOLTS or PLATE MILLIAMPERES, and read the corresponding value of tube voltage drop or plate current on the appropriate scale.

Because the pivot point for a specific diode unit represents its perveance, the pivot points for several units (plotted to the same scales) indicate their relative perveance.

EXAMPLE

The published data for type 5U4GB gives a tube voltage drop (Per plate) of 44 volts at plate ma. = 225.

1. To determine the tube voltage drop at plate ma. = 100:
   a. On the nomograph, establish the decade scale for PLATE VOLTS as 1, 10, 100 (reading down) and the scale for PLATE MILLIAMPERES as 10, 100, 1000 (reading up).
   b. Locate and connect the points "PLATE VOLTS = 44" and "PLATE MILLIAMPERES = 225" with a straightedge.
   c. Mark the intersection of the straightedge and the PERVEANCE line.
   d. Pivot the straightedge about this intersection, line it up with the point "PLATE MILLIAMPERES = 100", and read "PLATE VOLTS = 25"—the tube voltage drop (Per plate).
2. To determine the plate current at plate volts = 33:
   a. Use the same pivot point on the PERVEANCE line as in "1d" above, line up the straightedge with the point "PLATE VOLTS = 33", and read "PLATE MILLIAMPERES = 150".

LIMITATIONS

For readings in the order of 1 volt and/or 1 milliampere or less, the nomograph is not accurate because of the effects of contact potential and initial electron velocity.

OZ4-A

Full-Wave Gas Rectifier

METAL TYPE HAVING IONICALLY HEATED CATHODE

GENERAL DATA

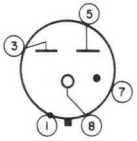
Electrical:

Cathode . . . . . Ionically Heated Type

Mechanical:

Operating Position. . . . . Any
Maximum Overall Length. . . . . 2-5/8"
Maximum Seated Length . . . . . 2-1/16"
Maximum Diameter. . . . . 1-5/16"
Dimensional Outline . . . . . See *General Section*
Envelope. . . . . .Metal Shell MT8G
Base. . . .Small-Wafer Octal 5-Pin (JEDEC Group 1, No.B5-215)
Basing Designation for BOTTOM VIEW. 4R

Pin 1 - Shell
Pin 3 - Plate No.2
Pin 5 - Plate No.1



Pin 7 - No Connection
Pin 8 - Cathode

FULL-WAVE RECTIFIER

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

PEAK INVERSE PLATE VOLTAGE PER PLATE. . . .	880 max.	volts
PEAK STARTING-SUPPLY VOLTAGE PER PLATE. . .	300▲ min.	volts
PEAK PLATE CURRENT PER PLATE.	330 max.	ma
DC OUTPUT CURRENT	110 max.	ma
	30▲ min.	ma

Typical Operation:

With vibrator-type power supply and capacitor input to filter

Peak Plate Supply Voltage Per Plate●.	440	volts
Filter-Input Capacitor.	8	μf
Total Effective Plate Supply Impedance Per Plate .	600	ohms
DC Output Voltage at input to filter.	310	volts
DC Output Current	100	ma

Characteristics:

Tube Voltage Drop for plate ma. = 110 (Per plate) .	24	volts

Minimum Circuit Value:

Total Effective Plate Supply Impedance Per Plate. . . . . 300 min. ohms

▲ Absolute value. Under no circumstances should the tube be operated with less than this value.

● Open-circuit voltage—flat portion of transformer voltage wave.

Half-Wave Vacuum Rectifier

ELECTRICAL

Bogey Values

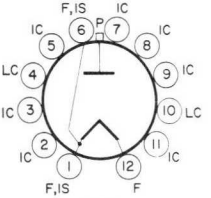
Filament (Coated) Voltage, AC or DC	1.25 V
Filament Current	0.2 A
Direct Interelectrode Capacitance (Approx.)	
Without external shield	
Plate to filament	1.6 pF

MECHANICAL

Operating Position	Any
Type of Cathode	Coated Filament
Maximum Overall Length	3.125 in
Seated Length	2.500 to 2.750 in
Diameter	1.062 to 1.188 in
Dimensional Outline (JEDEC No.9-98)	See *General Section*
Envelope	JEDEC T9
Caps (Alternates)	
Small (JEDEC No.C1-1)	
Small with Tubular Support (JEDEC No.C1-34)	
Base	Small-Button Duodecar 12-Pin (JEDEC No.E12-70)

TERMINAL DIAGRAM (Bottom View)

Pin 1 – Filament, Internal Shield
Pin 2 – Do Not Use[a]
Pin 3 – Do Not Use[a]
Pin 4 – See **Note**
Pin 5 – Do Not Use[a]
Pin 6 – Same as Pin 1
Pin 7 – Do Not Use[a]
Pin 8 – Do Not Use[a]
Pin 9 – Do Not Use[a]
Pin 10 – See **Note**
Pin 11 – Do Not Use[a]
Pin 12 – Filament
Cap – Plate



12GV

Note: *May be used only under conditions specified in Operating Considerations.*

PULSED-RECTIFIER SERVICE

Design-Maximum Ratings

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

Inverse Plate Voltage	
Total dc and peak[b]	26000 V
DC	22000 V
Peak Plate Current	50 mA
Average Plate Current	0.5 mA
Filament Voltage, AC or DC	1.05 to 1.45 V

Characteristics, Instantaneous Value

Tube Voltage Drop for plate mA = 7	225 V

[a] Socket terminals 2, 3, 5, 7, 8, 9, and 11 should not be used as tie points.

[b] This rating is applicable when 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.

← Indicates a change.

OPERATING CONSIDERATIONS

Socket Connections. Socket terminals 4 and 10 may be used as tie points for components at or near the cathode potential; otherwise, do not use.

The high voltages at which the 1AD2 is operated are very dangerous. Great care should be taken in the design of equipment to prevent the operator from coming in contact with these high voltages. Particular care against fatal shock should be taken in the measurement of filament voltage. Under all circumstances, circuit parts which may be at high potentials should be enclosed or adequately insulated.

X-Radiation. The voltages employed in some television receivers and other high-voltage equipment are sufficiently high that high-voltage rectifier tubes may produce *X-radiation* which can constitute a health hazard unless such tubes are adequately shielded. Relatively simple shielding should prove adequate, but the need for this precaution should be considered in equipment design.

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

Half-Wave Vacuum Rectifier

ELECTRICAL

Filament, Coated

	Min	Av	Max	
Voltage (AC)	1.05	1.25	1.45	V
Current at 1.25 volts	-	0.2	-	A

Direct Interelectrode Capacitance (Approx.)[a]

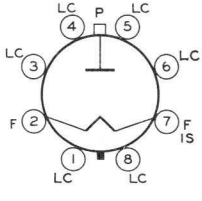
Plate to filament & internal shield	1.3	pF

MECHANICAL

Operating Position . . . . . Any
Maximum Overall Length . . . . . 3-9/16 in
Seated Length . . . . . 2-13/16 ± 3/16 in
Maximum Diameter . . . . . 1-9/32 in
Bulb T9
Cap . . . . . Small with Tubular Support (JEDEC No.C1-34)
Bases (Alternates)
- Intermediate-Shell Octal:
  - 8-Pin (JEDEC Group 1, No.B8-6)
  - 7-Pin, Arrangement 2 (JEDEC Group 1, No.B7-166)
  - 6-Pin, Arrangement 1 (JEDEC Group 1, No.B6-8)
  - 5-Pin, Arrangement 2 (JEDEC Group 1, No.B5-82)
- Short Intermediate-Shell Octal:
  - 7-Pin (JEDEC Group 1, No.B7-47)
- Short Intermediate-Shell Octal with External Barriers:
  - 6-Pin, Arrangement 1 (JEDEC Group 1, No.B6-60)
  - 5-Pin, Arrangement 2 (JEDEC Group 1, No.B5-85)

Basing Designation for BOTTOM VIEW 3C

Pin 1[b] - Limited Connection[c]
Pin 2 - Filament
Pin 3 - Same as Pin 1
Pin 4[d] - Same as Pin 1
Pin 5 - Same as Pin 1
Pin 6[e] - Same as Pin 1
Pin 7 - Filament, Internal Shield
Pin 8 - Same as Pin 1
Cap - Plate



PULSED-RECTIFIER SERVICE

Maximum Ratings, Design-Maximum Values

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

Inverse Plate Voltage		
Total dc and peak[f]	26000	V
DC	22000	V
Peak Plate Current	50	mA
Average Plate Current	0.5	mA

Characteristics, Instantaneous Value

Tube Voltage Drop for plate mA = 7	100	V

1G3GT/1B3GT

RADIO-FREQUENCY RECTIFIER SERVICE

Maximum Ratings, Design-Maximum Values

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

Peak Inverse Plate Voltage	33000	V
Peak Plate Current	35	mA
Average Plate Current	1.1	mA
Frequency Range of Supply Voltage	1.5 to 100	kc/s

Characteristics, Instantaneous Value

Tube Voltage Drop for plate mA = 7	100	V

[a] Without external shield.

[b] On the 5-pin bases, pin 1 is omitted.

[c] See *Operating Considerations*.

[d] On the 5-pin bases, the 6-pin bases, and the 7-pin base JEDEC No.B7-166, pin 4 is omitted.

[e] On the 5-pin bases, the 6-pin bases, and the 7-pin base JEDEC No.B7-47, pin 6 is omitted.

[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.

OPERATING CONSIDERATIONS

Socket Connections. Socket terminals 1, 3, 4, 5, 6, and 8 may be connected to socket terminal 7 or to a corona shield which is connected to socket terminal 7. Socket terminals 4 and 6 may be used as tie points for components at or near filament potential. Otherwise, do not use.

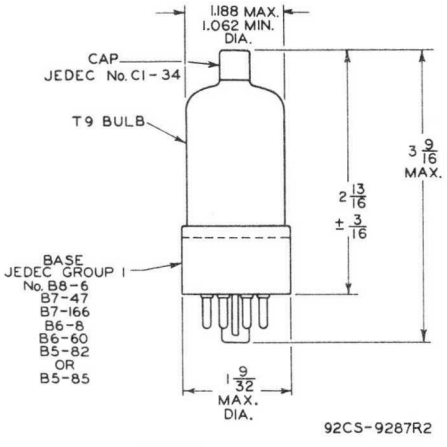
Measurement of Filament Voltage. To measure the filament voltage when the filament is at a high dc potential with respect to ground, it is recommended that a simple method utilizing visual comparison of the filament temperature be used. The color temperature of the filament, operating from a pulse- or rf-power source, may be checked by observing in a darkened room the reflection of the incandescent filament upon the surface of the internal shield. A visual comparison of this color temperature with that obtained when the filament of another 1G3GT/1B3GT is operated from a dc or low-frequency ac supply of 1.25 volts, provides a convenient means for adjusting the amount of excitation to produce 1.25 volts (rms) at the filament terminals.

The high voltages at which the 1G3GT/1B3GT is operated are very dangerous. Great care should be taken in the design of apparatus to prevent the operator from coming in contact with these high voltages. Particular care against fatal shock should be taken in the measurement of filament voltage. Under all circumstances, circuit parts which may be at high potentials should be enclosed or adequately insulated.

X-Radiation. The voltages employed in some television receivers and other high-voltage equipment are sufficiently high that high-voltage rectifier tubes may produce *X-radiation* which can constitute a health hazard unless such tubes are adequately shielded. Relatively simple shielding should prove adequate, but the need for this precaution should be considered in equipment design.

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

DIMENSIONAL OUTLINE



DIMENSIONS IN INCHES

IL4

R-F AMPLIFIER PENTODE

MINIATURE TYPE

Filament	Coated	
Voltage	1.4	d-c volts
Current	0.05	amp.
Direct Interelectrode Capacitances:°		
Grid to Plate	0.008 max.	μμf
Input	3.6	μμf
Output	7.5	μμf
Maximum Overall Length		2-1/8"
Maximum Seated Height		1-7/8"
Maximum Diameter		3/4"
Bulb		T-5-1/2
Base ▲		Miniature Button 7-Pin

Pin 1 {Filament -, Internal Shield
Pin 2 - Plate
Pin 3 - Screen
Pin 4 - No Connection
Pin 5 {Filament -, Internal Shield
Pin 6 - Grid
Pin 7 - Filament +

BOTTOM VIEW (6AR)

RCA Socket — Stock No. 9914
Mounting Position — Any

Maximum And Minimum Ratings Are Design-Center Values

AMPLIFIER

Plate Voltage	110 max. volts
Screen Voltage	90 max. volts
Screen Supply Voltage	110 max. volts
Grid Voltage	0 min. volts
Total Cathode Current	6.5 max. ma.

Typical Operation and Characteristics - Class A_1 Amplifier

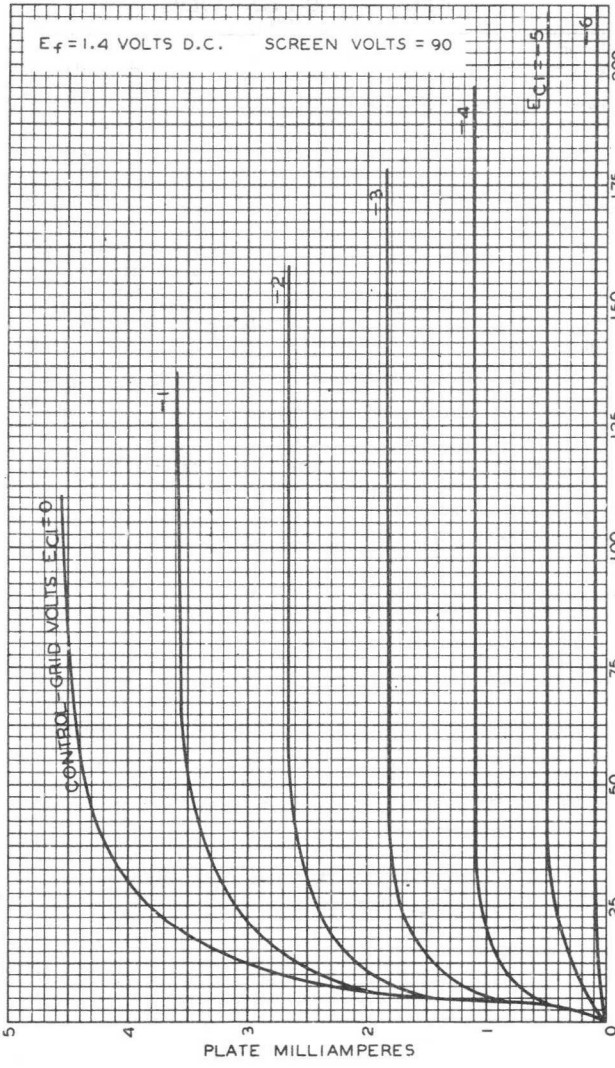
Plate Voltage	90	90	volts
Screen Voltage	67.5	90	volts
Grid Voltage	0	0	volts
Plate Resistance	0.6	0.35	megohm
Transconductance	925	1025	μmhos
Grid Bias for Plate Current = 10 μ amp.	-6	-8	volts
Plate Current	2.9	4.5	ma.
Screen Current	1.2	2.0	ma.

° With no external shield.

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

1L4

AVERAGE PLATE CHARACTERISTICS



MARCH 18, 1942

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

92C-6382

IV2

HALF-WAVE VACUUM RECTIFIER

9-PIN MINIATURE TYPE

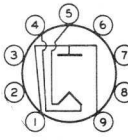
GENERAL DATA

Electrical:

Filament, Coated:		
Voltage*	0.625	ac volt
Current	0.3	amp
Direct Interelectrode Capacitance (Approx.):°		
Plate to filament	0.8	μμf

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"
Maximum Diameter	7/8"
Dimensional Outline	*See General Section*
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JETEC No.E9-1) ←
Basing Designation for BOTTOM VIEW	9U ←



Pin 1 - Plate
Pin 2 - Internal Connection - Do Not Use
Pin 3 - Same as Pin 2
Pin 4 - Filament
Pin 5 - Filament
Pin 6 - No Connection♦
Pin 7 - Same as Pin 2
Pin 8 - Same as Pin 2
Pin 9 - Plate

PULSED-RECTIFIER SERVICE

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

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

INVERSE PLATE VOLTAGE:			
Total dc and peak (Absolute maximum)⊕	8250■	max.	volts ←
DC	6600	max.	volts ←
PEAK PLATE CURRENT	10	max.	ma
AVERAGE PLATE CURRENT	0.5	max.	ma

* Under no circumstances should the filament voltage be less than 0.525 volt or more than 0.725 volt.

° Without external shield.

♦ May be used for a tie point for components at or near filament potential; otherwise do not use.

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

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

■ Under no circumstances should this absolute value be exceeded.

←Indicates a change.

RCA

1V2

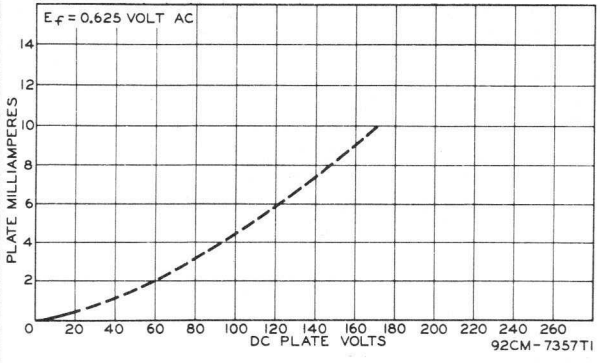
HALF-WAVE VACUUM RECTIFIER

OPERATING CONSIDERATIONS

When the *filament voltage* is measured, it is recommended that a thermal rms voltmeter be used. The meter and its leads must be insulated to withstand 15,000 volts and the stray capacitances to ground should be minimized.

→ To provide the required insulation in Noval sockets designed with a cylindrical center shield, it is necessary to remove the center shield.

AVERAGE PLATE CHARACTERISTIC



→ Indicates a change.

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

Half-Wave Vacuum Rectifier

9-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Filament, Coated:

	Min.	Av.	Max.	
Voltage (AC)	1.05	1.25	1.45	volts
Current at 1.25 volts	–	0.2	–	amp

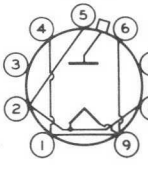
Direct Interelectrode Capacitance (Approx.):[a]

Plate to filament & internal shield		1		μμf

Mechanical:

Operating Position	Any
Maximum Overall Length	2-27/32"
Seated Length	2-7/16" ± 1/8"
Diameter	0.750" to 0.875"
Dimensional Outline	See *General Section*
Bulb	T6-1/2
Cap	Skirted Miniature (JEDEC No.C1-2 or C1-33)
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)
Basing Designation for BOTTOM VIEW	9Y

Pin 1 – Filament, Internal Shield
Pin 2 – Filament
Pin 3 – Limited Connection[b]
Pin 4 – Same as Pin 1



Pin 5 – Same as Pin 2
Pin 6 – Same as Pin 1
Pin 7 – Same as Pin 3
Pin 8 – Same as Pin 2
Pin 9 – Same as Pin 1
Cap – Plate

PULSED-RECTIFIER SERVICE

Maximum Ratings, *Design-Maximum Values:*

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

INVERSE PLATE VOLTAGE:		
Total dc and peak[d]	22000 max.	volts
DC	18000 max.	volts
PEAK PLATE CURRENT	45 max.	ma
AVERAGE PLATE CURRENT	0.5 max.	ma

Characteristics, Instantaneous Value:

Tube Voltage Drop for plate ma. = 7	100	volts

[a] Without external shield.

[b] See *Operating Considerations*.

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

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

← Indicates a change.

OPERATING CONSIDERATIONS

Socket Connections. Socket terminals 3 and 7 may be used as tie points for components at or near filament potential; otherwise, do not use.

Measurement of Filament Voltage. To measure the filament voltage when the filament is at a high dc potential with respect to ground, it is recommended that a simple method utilizing visual comparison of the filament temperature be used. The color temperature of the filament, operating from a pulse-or-rf-power source, may be checked by observing in a darkened room the reflection of the incandescent filament upon the surface of the internal shield. A visual comparison of this color temperature with that obtained when the filament of another 1X2B is operated from a dc or low-frequency ac supply of 1.25 volts, provides a convenient means for adjusting the amount of excitation to produce 1.25 volts (rms) at the filament terminals.

The high voltages at which the 1X2B is operated are very dangerous. Great care should be taken in the design of apparatus to prevent the operator from coming in contact with these high voltages. Particular care against fatal shock should be taken in the measurement of filament voltage. Under all circumstances, circuit parts which may be at high potentials should be enclosed or adequately insulated.

X rays. The voltages employed in some television receivers and other high-voltage equipment are sufficiently high that high-voltage rectifier tubes may produce *X rays* which can constitute a health hazard unless such tubes are adequately shielded. Relatively simple shielding should prove adequate, but the need for this precaution should be considered in equipment design.

Half-Wave Vacuum Rectifier

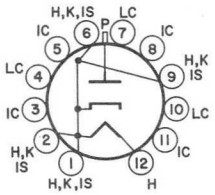
Electrical:

Heater Characteristics and Ratings:		
Voltage (AC or DC)	2.5 ± 0.4	volts
Current at heater volts = 2.5	0.330	amp
Direct Interelectrode Capacitance (Approx.):[a]		
P to (K + IS + H)	1.4	pf

Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	3.625"
Seated Length	3.000" to 3.250"
Diameter	1.062" to 1.188"
Bulb	T9
Cap	Small (JEDEC No.C1-1) or Small With Tubular Support (JEDEC No.C1-34)
Base	Small-Button Duodecar 12-Pin (JEDEC No.E12-70)
Basing Designation for BOTTOM VIEW	12EW

Pin 1 – Heater, Cathode, Internal Shield
Pin 2 – Same as Pin 1
Pin 3 – Do Not Use[b]
Pin 4 – See *Note*
Pin 5 – Do Not Use[b]
Pin 6 – Same as Pin 1
Pin 7 – See *Note*
Pin 8 – Do Not Use[b]
Pin 9 – Same as Pin 1
Pin 10 – See *Note*
Pin 11 – Do Not Use[b]
Pin 12 – Heater
Cap – Plate



NOTE: May be used only under conditions specified in Operating Considerations.

PULSED-RECTIFIER SERVICE

Maximum Ratings, *Design-Maximum Values:*

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

Inverse Plate Voltage:		
Total dc and peak[d]	30000 max.	volts
DC	24000 max.	volts
Peak Plate Current	80 max.	volts
Average Plate Current	1.5 max.	volts

Characteristics, Instantaneous Value:

Tube Voltage Drop for plate ma. = 7	100	volts

[a] Without external shield.
[b] Socket terminals 3, 5, 8, and 11 should not be used as tie points.

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

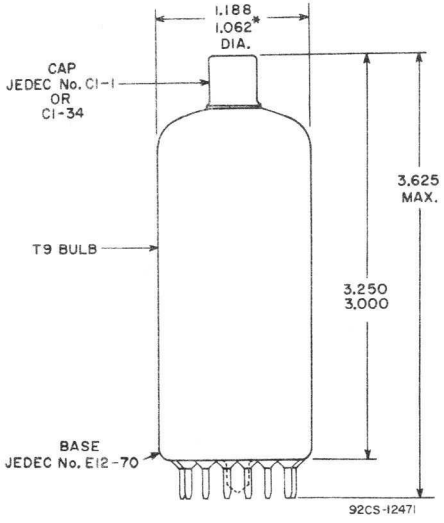
d This rating is applicable when the duration of the voltage pulse does not exceed 15 per cent of one horizontal scanning cycle. In a 525-line, 30-frame system, 15 per cent of one horizontal scanning cycle is 10 microseconds.

OPERATING CONSIDERATIONS

Socket Connections. Socket terminals 4, 7, and 10 may be used as tie points for components at or near the cathode potential; otherwise, do not use.

Ths high voltages at which the 2AS2 is operated are very dangereous. Great care should be taken in the design of equipment to prevent the operator from coming in contact with these high voltages. Particular care against fatal shock should be taken in the measurement of heater voltage. Under all circumstances, circuit parts which may be high potentials should be enclosed or adequately insulated.

X-radiation. The voltages employed in some television receivers and other high-voltage equipment are sufficiently high that high-voltage rectifier tubes may produce *X-radiation* which can constitute a health hazard unless such tubes are adequately shielded. Relatively simple shielding should prove adequate, but the need for this precaution should be considered in equipment design.



DIMENSIONS IN INCHES

* Applies to minimum diameter except in area of seal.

Half-Wave Vacuum Rectifier

Useful in High-Voltage, Low-Current Applications such as Pulse-Operated, Focus-Rectifier Circuits in Color TV Receivers

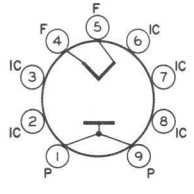
ELECTRICAL

Filament Characteristics and Ratings		
Voltage (AC)	1.80 ± 0.27	V
Current at 1.80 V	0.225	A ←
Direct Interelectrode Capacitance (Approx.)[a]		
Plate to filament	0.8	pF ←

MECHANICAL

Operating Position	Any
Type of Cathode	Coated Filament
Maximum Overall Length	2-3/16 in
Maximum Seated Length	1-15/16 in
Length, Base Seat to Bulb Top (Excluding tip)	1-9/16 ±3/32 in
Diameter	0.750 to 0.875 in
Dimensional Outline	See *General Section*
Bulb	T6-1/2
Socket	See *Operating Considerations*
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)
Basing Designation for BOTTOM VIEW	9U

Pin 1 – Plate
Pin 2 – Do Not Use[b]
Pin 3 – Do Not Use[b]
Pin 4 – Filament
Pin 5 – Filament



Pin 6 – Do Not Use[b]
Pin 7 – Do Not Use[b]
Pin 8 – Do Not Use[b]
Pin 9 – Plate

HALF-WAVE PULSED RECTIFIER

Design-Maximum Ratings

Except as Noted

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

Inverse Plate Voltage		
Peak (Absolute-maximum value)[d]	8250[e]	V
DC	7000	V
Plate Current		
Peak	50	mA ←
Average	0.6	mA

Characteristics, Instantaneous Value

Tube Voltage Drop for plate mA = 1	20	V ←

← Indicates a change.

[a] Without external shield.

[b] See *Operating Considerations*.

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

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

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

OPERATING CONSIDERATIONS

Socket Connections. The base pins of the 2AV2 fit the Noval 9-contact socket. Socket terminals 2, 3, 6, 7, and 8 should not be used as tie points for external-circuit components. The socket should be made of material having low leakage and should have adequate insulation between its filament and plate terminals to withstand the maximum peak-inverse plate voltage. To provide the required insulation in Noval 9-contact sockets having a cylindrical center shield, it is necessary to remove the center shield. In addition, it is recommended that socket clips for pins 2, 3, 6, 7, and 8 be removed to minimize leakage and the possibility of arc-over.

Measurement of Filament Voltage. It is recommended that a thermal rms voltmeter be used to measure filament voltage. The meter and its leads must be insulated to withstand 15,000 volts. To minimize loading of the rectifier circuit during this measurement, stray capacitances to ground should be kept as low as possible.

High Voltages. The high voltage at which the 2AV2 is operated are very dangerous. Great care should be taken in the design of equipment to prevent the operator from coming in contact with these high voltages. Particular care against fatal shock should be taken in measuring the filament voltage particularly in those circuits where the filament is not grounded. In all cases, all circuit parts which may be at high potentials should be enclosed and interlock switches should be used to open the primary circuit of the high-voltage power supply when access to the equipment is required.

Half-Wave Vacuum Rectifier

9-PIN MINIATURE TYPE

For High-Voltage Rectifier Service in Transistorized TV Receivers

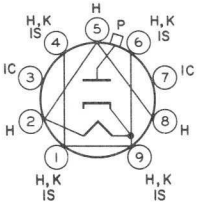
ELECTRICAL

Heater Characteristics and Ratings		
Voltage (AC)	2.30 ± 0.30	V
Current at 2.30 V	0.300	A
Direct Interelectrode Capacitance (Approx.)		
Without external shield		
P to (K + IS + H)	1.0	pF

MECHANICAL

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	2-27/32 in
Seated Length	2-7/16 ± 1/8 in
Diameter	0.750 to 0.875 in
Dimensional Outline (JEDEC No.6-7)	See *General Section*
Bulb	T6-1/2
Cap	Skirted Miniature (JEDEC No.C1-2 or C1-33)
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)
Basing Designation for BOTTOM VIEW	9RT

Pin 1 – Heater, Cathode, Internal Shield
Pin 2 – Heater
Pin 3 – Do Not Use
Pin 4 – Same as Pin 1
Pin 5 – Heater
Pin 6 – Same as Pin 1
Pin 7 – Do Not Use
Pin 8 – Heater
Pin 9 – Same as Pin 1
Cap – Plate



PULSED-RECTIFIER SERVICE

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

Maximum Ratings, Design-Maximum Values

Peak Inverse Plate Voltage[a]	20000	V
Peak Plate Current	80	mA
Average Plate Current	1.0	mA

Characteristic, Instantaneous Value

Tube Voltage Drop for plate mA = 7	80	V

[a] 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.

OPERATING CONSIDERATIONS

Socket Connections. The base pins of the 2BJ2 fit the Noval 9-contact socket. Socket terminals 3 and 7 should not be used as tie points for external-circuit components.

The high voltages at which the 2BJ2 is operated are very dangerous. Great care should be taken in the design of equipment to prevent the operator from coming in contact with these high voltages. Particular care against fatal shock should be taken in the measurement of heater voltage. Under all circumstances, circuit parts which may be at high potentials should be enclosed or adequately insulated.

X-radiation. The voltages employed in some television receivers and other high-voltage equipment are sufficiently high that high-voltage rectifier tubes may produce X-radiation which can constitute a health hazard unless such tubes are adequately shielded. Relatively simple shielding should prove adequate, but the need for this precaution should be considered in equipment design.

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

Half-Wave Vacuum Rectifier

T-9 Duodecar Type

Designed to minimize X-Radiation

$-e_{bm}$ = 30,000 max. V **i_{bm} = 80 mA**

ELECTRICAL CHARACTERISTICS – Bogey Values

Heater Voltage, ac or dc	E_h	2.5 ± 0.4	V
Heater Current at E_h = 2.5 V	I_h	0.33	A
Direct Interelectrode Capacitance:[a]			
P to (K + IS + H)	$c_{p\text{-all}}$	1.4	pF
Instantaneous Tube Voltage Drop for Instantaneous Plate Current (i_b) = 7 mA	e_b	60	V

MECHANICAL CHARACTERISTICS

Maximum Overall Length	3.625 in (92.07 mm)
Maximum Seated Length	3.250 in (82.55 mm)
Maximum Bulb Diameter	1.188 in (30.17 mm)
Envelope	JEDEC T9
Top Cap	Small embossed (JEDEC C1-50)
Base	Small-Button Duodecar 12-pin (JEDEC E12-70)
Terminal Diagram	JEDEC 12-JB
Type of Cathode	Coated Unipotential
Operating Position	Any

MAXIMUM RATINGS[b] – High Voltage Rectifier

For operation as a pulsed rectifier tube in a 525-line, 30-frame system[c]

Inverse Plate Voltage[d]			
Total DC and Peak (absolute max.)	$-e_{bm}$	30,000	V
DC (absolute max.)	$E_{b(av)}$	24,000	V
Plate Current:			
Peak (design max.)	i_{bm}	80	mA
Average (design max.)	$I_{b(av)}$	1.5	mA
Heater Voltage (absolute max.)	E_h	2.9	V
Heater Voltage (absolute min.)	E_h	2.1	V

[a] Measured without external shield in accordance with the current issue of EIA Standard RS-191.

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

[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% of one horizontal scanning cycle. In a 525-line, 30-frame system, 15% of one horizontal scanning cycle is 10μs.

OPERATING CONSIDERATIONS

Socket Connections. The base pins of the 2BU2 fit the standard duodecar socket. Socket terminals 2, 3, 4, 5, 6, 7, 9, 10 and 11 may be connected to terminal 1 or to a corona shield which connects to terminal 1. Terminals 4, 10 and 11 may be used as pie points at or near cathode potential. Otherwise, do not use.

Measurement of Heater Voltage. It is recommended that a thermocouple rms voltmeter be used to measure heater voltage. The meter and its leads must be insulated to withstand 30,000 V. To minimize loading of the rectifier circuit during this measurement, stray capacitances to ground should be kept as low as possible.

X-Radiation Characteristic

X-Radiation, Maximum	**0.5 mR/hr**

Operation of the 2BU2 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.

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

Warning

X-Radiation

The high voltages associated with the 2BU2 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 2BU2 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

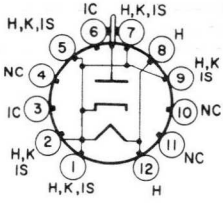
The high voltages at which the 2BU2 is operated can be extremely dangerous to the user or serviceman. Extreme care should be taken in the use of, and for the servicing and adjustment of, any high voltage circuit.

Precautions must be excercised during the replacement or servicing of the 2BU2 in equipment to assure that the high voltage output terminal is properly grounded while inserting or removing the tube from its socket or while disconnecting the top cap connector.

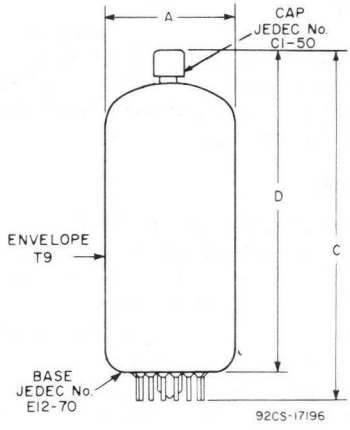
THE EQUIPMENT MANUFACTURER SHOULD PROVIDE A WARNING LABEL IN AN APPROPRIATE POSITION ON THE EQUIPMENT TO ADVISE THE SERVICEMAN OF ALL PRECAUTIONS HEREIN.

TERMINAL DIAGRAM – JEDEC 12JB – Bottom View

Pin 1 - Heater, Cathode, Internal Shield
Pin 2 - Heater, Cathode, Internal Shield
Pin 3 - Do Not Use
Pin 4 - No Connection
Pin 5 - Heater, Cathode, Internal Shield
Pin 6 - Do Not Use
Pin 7 - Heater, Cathode, Internal Shield
Pin 8 - Heater
Pin 9 - Heater, Cathode, Internal Shield
Pin 10 - No Connection
Pin 11 - No Connection
Pin 12 - Heater
Cap - Plate



DIMENSIONAL OUTLINE



DIMENSION	INCHES		MILLIMETERS	
	Min.	Max.	Min.	Max.
A	1.062*	1.188	27.0*	30.17
C	–	3.625	–	92.07
D	3.000	3.250	76.2	82.55

MILLIMETER DIMENSION DERIVED FROM INCH DIMENSION

* Applies to the minimum diameter except in the area of the seal.

2CN3A

Half-Wave Vacuum Rectifier

4-Second Heater Warm-up Time

The 2CN3A is the same as the 3CN3A except for:

Heater Characteristics and Ratings:

Current	0.900 ± 0.050	A
Voltage (ac or dc) at 0.900 A	1.80	V

2CW4

High-Mu Triode

Nuvistor Type

The 2CW4 is the same as the 6CW4 except for:

Heater Characteristics and Ratings:

Current	0.450 ± 0.030	A
Voltage (ac or dc) at 0.450 A	2.1	V
Warm-up Time (Average)	8	s

2CY5

Sharp-Cutoff Tetrode

The 2CY5 is the same as the 6CY5 except for:

Heater Characteristics and Ratings:

Current	0.600 ± 0.040	A
Voltage (ac or dc) at 0.600 A	2.4	V
Warm-up Time (Average)	11	s

2DS4

High-Mu Triode

Nuvistor Type
Having Extended Cutoff Characteristic

The 2DS4 is the same as the 6DS4 except for:

Heater Characteristics and Ratings:

Current	0.450 ± 0.030	A
Voltage (ac or dc) at 0.450 A	2.1	V
Warm-up Time (Average)	8	s

2DV4

Medium-Mu Triode

Nuvistor Type

The 2DV4 is the same as the 6DV4 except for:

Heater a Heater Characteristics and Ratings:

Current	0.450 + 0.030	A
Voltage (ac or dc) at 0.450 A	2.1	V
Warm-up Time (Average)	8	s

2ER5

High-Mu Triode

The 2ER5 is the same as the 6ER5 except for the following items:

Heater Characteristics and Ratings

Current	0.600 ± 0.040	A
Voltage (AC or DC) at 0.600 A	2.3	V

2FH5

High-Mu Triode

The 2FH5 is the same as the 6FH5 except for the following items:

Heater Characteristics and Ratings

Current	0.600 ± 0.040	A
Voltage (AC or DC) at 0.600 A	2.35	V
Warm-up time (Average)	11	s

2FS5

Beam Hexode

The 2FS5 is the same as the 6FS5 except for the following items:

Heater Characteristics and Ratings

Current	0.600 ± 0.040	A
Voltage (AC or DC) at 0.600 A	2.4	V
Warm-up time (Average)	11	s

2GK5

High-Mu Triode

The 2GK5 is the same as the 6GK5 except for the following items:

Heater Characteristics and Ratings

Current	0.600 ± 0.040	A
Voltage (AC or DC) at 0.600 A	2.3	V
Warm-up time (Average)	11	s

2GU5

Beam Hexode

The 2GU5 is the same as the 6GU5 except for the following items:

Heater Characteristics and Ratings

Current	0.600 ± 0.040	A
Voltage (AC or DC) at 0.600 A	2.4	V
Warm-up time (Average)	11	s

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

Half-Wave Vacuum Rectifier

For High-Voltage Rectifier Circuits in Color and Black-and-White TV Receivers

ELECTRICAL CHARACTERISTICS

Bogey Values

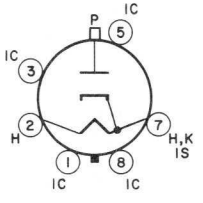
Heater Characteristics and Ratings			
Voltage (AC)	E_h	3.15	V
Current at 3.15 V	I_h	0.220	A
Direct Interelectrode Capacitance (Approx.)			
Without external shield			
P to (K + IS + H)	$C_{p\text{-all}}$	1.5	pF
Instantaneous Tube Voltage Drop			
For i_b = 7 mA	e_b	100	V

MECHANICAL CHARACTERISTICS

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	3.812 in
Maximum Seated Length	3.250 in
Maximum Diameter	1.281 in
Envelope	JEDEC T9
Caps (Alternates)	
Small (JEDEC No.C1-1)	
Small with Tubular Support (JEDEC No.C1-34)	
Base (Alternates)	
Intermediate-Shell Octal:	
6-Pin, Arrangement 1 (JEDEC Group 1, No.B6-8)	
Short Intermediate-Shell Octal with External Barriers:	
6-Pin, Arrangement 1 (JEDEC Group 1, No.B6-60)	

TERMINAL DIAGRAM (Bottom View)

Pin 1 – Do Not Use
Pin 2 – Heater
Pin 3 – Do Not Use
Pin 5 – Do Not Use
Pin 7 – Heater, Cathode, Internal Shield
Pin 8 – Do Not Use
Cap – Plate



Note: May be used only under conditions specified in Operating Considerations.

PULSED-RECTIFIER SERVICE

Design-Maximum Ratings
For operation in a 525-line, 30-frame system

Peak Inverse Plate Voltage[a]	–	30000	V
Peak Plate Current	i_b	100	mA
Average Plate Current	$I_{b(av)}$	2	mA
Heater Voltage, AC	E_h	2.65 min — 3.65 max	V

[a] This rating is applicable when the duration of the voltage pulse does not exceed 15% of one horizontal scanning cycle. In a 525-line, 30-frame system, 15% of one horizontal scanning cycle is 10 μs.

OPERATING CONSIDERATIONS

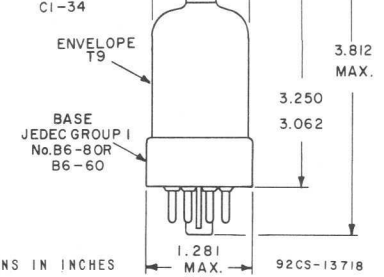
Socket terminals 1, 3, 4, 5, 6 and 8 may be connected to terminal 7 or to a corona shield which connects to terminal 7. Socket terminals 4 and 6 may be used as tie points at or near cathode potential. Otherwise, do not use.

The high voltages at which the 3A3A is operated may be extremely dangerous to the user. Great care should be taken during the adjustment of circuits. The tube and its associated apparatus, especially all parts which may be at high potential above ground, should be housed in a protective enclosure. The protective housing should be designed with interlocks so that personnel cannot possibly come in contact with any high potential points in the electrical system. The interlock devices should function to break the primary circuits of the high-voltage supply when any gate or door on the protective housing is opened, and should prevent the closing of this primary circuit until the door is locked again.

It should be noted that *high voltages* may appear at normally low-potential points in the circuit as a result of capacitor breakdown or incorrect circuit connections. Therefore, before any part of the circuit is touched, the power-supply switch should be turned off and both terminals of any capacitor should be grounded.

Operation of the 3A3A with a plate voltage above approximately 16000 volts (absolute value) results in the production of X-radiations which can constitute a health hazard on prolonged exposure at close range unless the tube is adequately shielded. Relatively simply shielding should prove adequate, but the need for this precaution should be considered in equipment design.

DIMENSIONAL OUTLINE



DIMENSIONS IN INCHES

92CS-13718

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

3AF4A

Medium-Mu Triode

7-PIN MINIATURE TYPE

The 3AF4A is the same as the 6AF4A except for the following items:

Heater Characteristics and Ratings:		
Current	0.450 ± 0.030	amp
Voltage (AC or DC) at heater amperes = 0.450	3.15	volts
Warm-up time (Average)	11	sec

3AL5

Twin Diode

7-PIN MINIATURE TYPE

The 3AL5 is the same as the 6AL5 except for the following items:

Heater Characteristics and Ratings:		
Current	0.600 ± 0.040	amp
Voltage (AC or DC) at heater amperes = 0.600	3.15	volts
Warm-up time (Average)	11	sec

Half-Wave Vacuum Rectifier

DUODECAR TYPE

Electrical:

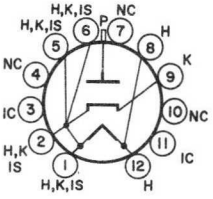
Heater Characteristics and Ratings:

Voltage (AC or DC)	3.15 ± 0.32	volts
Current at heater volts = 3.15	0.220	amp
Direct Interelectrode Capacitance (Approx.):[a]		
P to (K+IS+H)	1.5	pf

Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	3.625"
Seated Length	3.000" to 3.250"
Diameter	1.062" to 1.188"
Dimensional Outline	See *General Section*
Bulb	T9
Cap	Small (JEDEC No.C1-1) or Small With Tubular Support (JEDEC No.C1-34)
Base	Small-Button Duodecar 12-Pin (JEDEC No.E12-70)
Basing Designation for BOTTOM VIEW	12FV

Pin 1 – Heater, Cathode, Internal Shield
Pin 2 – Same as Pin 1
Pin 3 – *Do Not Use*
Pin 4 – No Internal Connection
Pin 5 – Same as Pin 1
Pin 6 – Same as Pin 1
Pin 7 – Same as Pin 4
Pin 8 – Heater
Pin 9 – Same as Pin 1
Pin 10 – Same as Pin 4
Pin 11 – *Do Not Use*
Pin 12 – Heater
Cap – Plate



PULSED-RECTIFIER SERVICE

Maximum Ratings, *Design-Maximum Values:*

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

Peak Inverse Plate Voltage[c]	30000 max.	volts
Peak Plate Current	88 max.	ma
Average Plate Current	1.7 max.	ma

[a] Without external shield.

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

[c] This rating is applicable when 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.

OPERATING CONSIDERATIONS

The high voltages at which the 3AT2 is operated are very dangerous. Great care should be taken in the design of equipment to prevent the operator from coming in contact with these high voltages. Particular care against fatal shock should be taken in the measurement of heater voltage. Under all circumstances, circuit parts which may be at high potentials should be enclosed or adequately insulated.

X-radiation. The voltages employed in some television receivers and other high-voltage equipment are sufficiently high that high-voltage rectifier tubes may produce *X-radiation* which can constitute a health hazard unless such tubes are adequately shielded. Relatively simple shielding should prove adequate, but the need for this precaution should be considered in equipment design.

3AU6

Sharp-Cutoff Pentode

7-PIN MINIATURE TYPE

The 3AU6 is the same as the 6AU6A except for:

Heater Characteristics and Ratings:

Current	0.600 ± 0.040	A
Voltage (AC or DC) at heater amperes = 0.600	3.15	V
Warm-up time (Average)	11	s

3AV6

Twin Diode—High-Mu Triode

7-PIN MINIATURE TYPE

The 3AV6 is the same as the 6AV6 except for:

Heater Characteristics and Ratings:

Current	0.600 ± 0.040	A
Voltage (AC or DC) at heater amperes = 0.600	3.15	V
Warm-up time (Average)	11	s

3BA6

Remote-Cutoff Pentode

The 3BA6 is the same as the 6BA6 except for:

Heater Characteristics and Ratings:

Current	0.600 ± 0.040	A
Voltage (ac or dc) at 0.600 A	3.15	V
Warm-up Time (Average)	11	s

3BN4A

Medium-Mu Triode

The 3BN4A is the same as the 6BN4A except for:

Heater Characteristics and Ratings:

Current	0.450 ± 0.030	A
Voltage (ac or dc) at 0.450 A	3	V
Warm-up Time (Average)	11	s

3BN6

Beam Tube

The 3BN6 is the same as the 6BN6 except for:

Heater Characteristics and Ratings:

Current	0.600 ± 0.040	A
Voltage (ac or dc) at 0.600 A	3.15	V
Warm-up Time (Average)	11	s

3BU8/3GS8

Sharp-Cutoff Twin Pentode

With Common Cathode
Grid No. 1, and Grid No. 2

The 3BU8/3GS8 is the same as the 6BU8 except for:

Heater Characteristics and Ratings:

Current	0.600 ± 0.040	A
Voltage (ac or dc) at 0.600 A	3.15	V
Warm-up Time (Average)	11	s

3BW2

Half-Wave Vacuum Rectifier

T-9 Duodecar Type

Designed to minimize X-Radiation

$-e_{bm}$ = 38,000 max. V **i_{bm} = 110 mA**

ELECTRICAL CHARACTERISTICS — Bogey Values

Heater Voltage, ac or dc	E_h	3.15 ± 0.5	V
Heater Current at E_h = 3.15 V	I_h	0.48	A
Direct Interelectrode Capacitance:[a]			
P to (K + IS + H)	$c_{p\text{-all}}$	1.6	pF
Instantaneous Tube Voltage Drop for Instantaneous Plate Current (i_b) = 7 mA	e_b	70	V

MECHANICAL CHARACTERISTICS

Maximum Overall Length	3.625 in (92.07 mm)
Maximum Seated Length	3.250 in (82.55 mm)
Maximum Bulb Diameter	1.188 in (30.17 mm)
Envelope	JEDEC T9
Top Cap	Small embossed (JEDEC C1-50)
Base	Small-Button Duodecar 12-pin (JEDEC E12-70)
Terminal Diagram	JEDEC 12-HY
Type of Cathode	Coated Unipotential
Operating Position	Any

MAXIMUM RATINGS[b] — High Voltage Rectifier

For operation as a pulsed rectifier tube in a 525-line, 30-frame system[c]

Inverse Plate Voltage[d]			
Total DC and Peak (absolute max.)	$-e_{bm}$	38,000	V
DC (absolute max.)	$E_{b(av)}$	30,000	V
Plate Current:			
Peak (design max.)	i_{bm}	110	mA
Average (design max.)	$I_{b(av)}$	2.2	mA
Heater Voltage (absolute max.)	E_h	3.65	V
Heater Voltage (absolute min.)	E_h	2.65	V

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[a] Measured without external shield in accordance with the current issue of EIA Standard RS-191.

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

[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% of one horizontal scanning cycle. In a 525-line, 30-frame system, 15% of one horizontal scanning cycle is 10μs.

OPERATING CONSIDERATIONS

Socket Connections. The base pins of the 3BW2 fit the standard duodecar socket. Socket terminals 2, 3, 4, 5, 6, 7, 9, 10 and 11 may be connected to terminal 1 or to a corona shield which connects to terminal 1. Terminals 4 and 10 may be used as tie points at or near cathode potential. Otherwise, do not use.

Measurement of Heater Voltage. It is recommended that a thermocouple rms voltmeter be used to measure heater voltage. The meter and its leads must be insulated to withstand 38,000 V. To minimize loading of the rectifier circuit during this measurement, stray capacitances to ground should be kept as low as possible.

X-Radiation Characteristic

X-Radiation, Maximum	**25 mR/hr**

Operation of the 3BW2 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.

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

Warning

X-Radiation

The high voltages associated with the 3BW2 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 3BW2 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

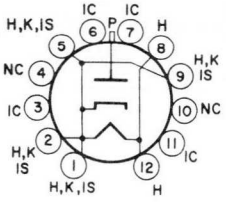
The high voltages at which the 3BW2 is operated can be extremely dangerous to the user or serviceman. Extreme care should be taken in the use of, and for the servicing and adjustment of, any high voltage circuit.

Precautions must be excercised during the replacement or servicing of the 3BW2 in equipment to assure that the high voltage output terminal is properly grounded while inserting or removing the tube from its socket or while disconnecting the top cap connector.

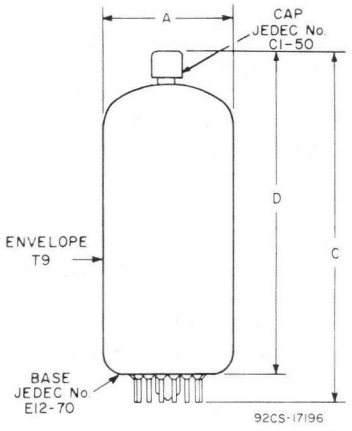
THE EQUIPMENT MANUFACTURER SHOULD PROVIDE A WARNING LABEL IN AN APPROPRIATE POSITION ON THE EQUIPMENT TO ADVISE THE SERVICEMAN OF ALL PRECAUTIONS HEREIN.

TERMINAL DIAGRAM – JEDEC 12 HY – Bottom View

Pin 1 - Heater, Cathode, Internal Shield
Pin 2 - Heater, Cathode, Internal Shield
Pin 3 - Do Not Use
Pin 4 - No Connection
Pin 5 - Heater, Cathode, Internal Shield
Pin 6 - Do Not Use
Pin 7 - Do Not Use
Pin 8 - Heater
Pin 9 - Heater, Cathode, Internal Shield
Pin 10 - No Connection
Pin 11 - Do Not Use
Pin 12 - Heater
Cap - Plate



DIMENSIONAL OUTLINE



DIMENSION	INCHES		MILLIMETERS	
	Min.	Max.	Min.	Max.
A	1.062*	1.188	27.0*	30.17
C	—	3.625	—	92.07
D	3.000	3.250	76.2	82.55
MILLIMETER DIMENSION DERIVED FROM INCH DIMENSION				

* Applies to the minimum diameter except in the area of the seal.

3BY6

Pentagrid Amplifier

The 3BY6 is the same as the 6BY6 except for:

Heater Characteristics and Ratings:

Current	0.600 ± 0.040	A
Voltage (ac or dc) at 0.600 A	3.15	V
Warm-up Time (Average)	11	s

3BZ6

Semiremote-Cutoff Pentode

The 3BZ6 is the same as the 6Bz6 except for:

Heater Characteristics and Ratings:

Current	0.600 ± 0.040	A
Voltage (ac or dc) at 0.600 A	3.15	V
Warm-up Time (Average)	11	s
Heater-Cathode Voltage		
Peak Value	+200, -300 max	V
Average Value	+100, -200 max	V

3CB6/3CF6

Sharp-Cutoff Pentode

The 3CB6 is the same as the 6CB6A except for:

Current	0.600 ± 0.040	A
Voltage (ac or dc) at 0.600 A	3.15	V
Warm-up Time (Average)	11	s
Heater-Cathode Voltage		
Peak Value	+200, -300 max	V
Average Value	100 max	V

Pentagrid Amplifier

The 3CS6 is the same as the 6CS6 except for the following items:

Heater Characteristics and Ratings

Current	0.600 ± 0.040	A
Voltage (ac or dc) at 0.600 A	3.15	V
Warm-up time (Average)	11	s

3CU3A

Half-Wave Vacuum Rectifier

Controlled for X-Radiation

$-e_{bm}$ = 33,000 max. V i_{bm} = 100 mA

ELECTRICAL CHARACTERISTICS — Bogey Values

Filament Voltage, ac or dc	E_h	3.15 ± 0.5	V
Filament Current at E_f = 3.15 V	I_h	0.280	A
Direct Interelectrode Capacitance:[a]			
P to (F + IS)	$c_{p\text{-}all}$	1.5	pF
Instantaneous Tube Voltage Drop for Instantaneous Plate Current (i_b) = 7 mA	e_b	50	V

MECHANICAL CHARACTERISTICS

Maximum Overall Length	3.812 in (96.82 mm)
Maximum Seated Length	3.250 in (82.55 mm)
Maximum Diameter	1.188 in (30.17 mm)
Envelope	JEDEC T9
Top Cap	Small embossed (JEDEC C1-50)
Base	Ultra-Short Small-Wafer Octal with External Barriers: 6-Pin, (JEDEC Group 1, No. B6-253
Terminal Diagram	JEDEC 8 MK
Type of Cathode	Coated Filament
Operating Position	Any

MAXIMUM RATINGS[b] — High Voltage Rectifier

For operation as a pulsed rectifier tube in a 525-line, 30-frame system[c]

Inverse Plate Voltage[d]			
Total DC and Peak (absolute max.)	$-e_{bm}$	33,000	V
DC (absolute max.)	$E_{b(av)}$	27,500	V
Plate Current:			
Peak (design max.)	i_{bm}	100	mA
Average (design max.)	$I_{b(av)}$	2	mA
Filament Voltage (absolute max.)	E_f	3.65	V
Filament Voltage (absolute min.)	E_f	2.65	V

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[a] Measured without external shield in accordance with the current issue of EIA Standard RS-191.

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

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% of one horizontal scanning cycle. In a 525-line, 30-frame system, 15% of one horizontal scanning cycle is 10μs.

OPERATING CONSIDERATIONS

Socket Connections. The base pins of the 3CU3A fit the standard octal socket. Socket terminals 1, 3, 4, 5, 6 and 8 may be connected to terminal 7 or to a corona shield which connects to terminal 7. Terminals 4 and 6 may be used as tie points at or near filament potential. Otherwise, do not use.

Measurement of Filament Voltage. It is recommended that a thermocouple rms voltmeter be used to measure filament voltage. The meter and its leads must be insulated to withstand 33,000 V. To minimize loading of the rectifier circuit during this measurement, stray capacitances to ground should be kept as low as possible.

X-Radiation Characteristic

X-Radiation, Maximum **25 mR/hr**

Operation of the 3CU3A 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.

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

Warning

X-Radiation

The high voltages associated with the 3CU3A 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 3CU3A 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

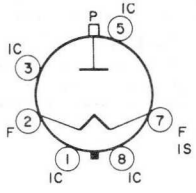
The high voltages at which the 3CU3A is operated can be extremely dangerous to the user or serviceman. Extreme care should be taken in the use of, and for the servicing and adjustment of, any high voltage circuit.

Precautions must be excercised during the replacement or servicing of the 3CU3A in equipment to assure that the high voltage output terminal is properly grounded while inserting or removing the tube from its socket or while 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.

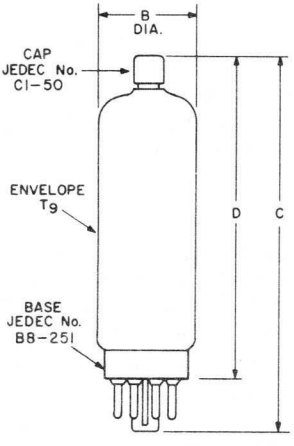
TERMINAL DIAGRAM – JEDEC 8MK – Bottom View

Pin 1 - Do Not Use
Pin 2 - Filament
Pin 3 - Do Not Use
Pin 5 - Do Not Use
Pin 7 - Filament
Internal Shield
Pin 8 - Do Not Use
Top Cap - Plate



3CU3A

DIMENSIONAL OUTLINE



92CS-15232RI

DIMENSION	INCHES		MILLIMETERS	
	Min.	Max.	Min.	Max.
B	1.062*	1.188	26.98*	30.17
C	–	3.812	–	96.82
D	3.062	3.250	77.78	82.55
MILLIMETER DIMENSION DERIVED FROM INCH DIMENSION				

* Applies to the minimum diameter except in the area of the seal.

Sharp-Cutoff Tetrode

The 3CY5 is the same as the 6CY5 except for the following items:

Heater Characteristics and Ratings:

Current	0.450 ± 0.030	A
Voltage (ac or dc) at 0.450 A	2.9	V
Warm-up time (Average)	11	s

Half-Wave Vacuum Rectifier

ELECTRICAL CHARACTERISTICS – Bogey Values

Heater Voltage, ac	E_h	3.15	V
Heater Current at E_h=3.15 V	I_h	0.48	A
Warm-up Time	T_h	4	s
Direct Interelectrode Capacitance:[a]			
P to (K + IS + H)	$c_{p\text{-}all}$	1.6	pF
Instantaneous Tube Voltage Drop for Instantaneous Plate Current (i_b) = 7 mA	e_b	60	V

MECHANICAL CHARACTERISTICS

Maximum Overall Length . . . . . 4.312 in (109.52 mm)

Maximum Seated Length . . . . . 3.750 in (95.25 mm)

Maximum Diameter . . . . . 1.188 in (30.17 mm)

Envelope . . . . . JEDEC T9

Top Cap . . . . . Small embossed (JEDEC C1-48)

Base:

Ultra-Short Small-Wafer with External Barriers:
6-pin (JEDEC No. B6-253)

Terminal-Connections Designation . . . . . JEDEC 8EZ

Type of Cathode . . . . . Coated Unipotential

Operating Position . . . . . Any

MAXIMUM RATINGS – Design-Maximum Values[b]

For operation as a pulsed rectifier tube in a 525-line, 30-frame system

Inverse Plate Voltage:[c]			
Total DC and Peak	$-e_{bm}$	38,000	V
DC	$E_{b(av)}$	30,000	V
Plate Current:			
Peak	i_b	110	mA
Average	$I_{b(av)}$	2.2	mA
Heater Voltage	E_h	2.65 to 3.65	V

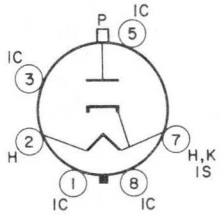
[a] Measured without external shield in accordance with the current issue of EIA Standard RS-191.

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

[c] This rating is applicable when the duration of the voltage pulse does not exceed 15% of one horizontal scanning cycle. In a 525-line, 30-frame system, 15% of one horizontal scanning cycle is 10 μs.

TERMINAL DIAGRAM (Bottom View)

Pin 1 - Do Not Use
Pin 2 - Heater
Pin 3 - Do Not Use
Pin 5 - Do Not Use
Pin 7 - Heater, Cathode, Internal Shield
Pin 8 - Do Not Use
Top Cap - Plate



JEDEC 8EZ

OPERATING CONSIDERATIONS

Socket Connections. The base pins of the 3CZ3 fit the standard octal socket. Socket terminals 1, 3, 4, 5, 6 and 8 may be connected to terminal 7 or to a corona shield which connects to terminal 7. Terminals 4 and 6 may be used as tie points at or near cathode potential. Otherwise, do not use.

High Voltages. The high voltages at which the 3CZ3 is operated may be extremely dangerous to the user. Great care should be taken during the adjustment of circuits. The tube and its associated apparatus, especially all parts which may be at high potential with respect to ground, should be housed in a protective enclosure. The protective housing should be designed with interlocks so that personnel cannot possibly come in contact with any high potential point in the electrical system.

X-Radiation. Operation of the 3CZ3 with a plate voltage above approximately 16,000 V results in the production of X-radiation which can constitute a health hazard on prolonged exposure at close range unless the tube is adequately shielded. Relatively simple shielding should prove adequate, but the need for this precaution should be considered in equipment design.

3DB3

Half-Wave Vacuum Rectifier

Designed to minimize X-Radiation

$-e_{bm}$ = 38,000 max. V i_{bm} = 100 mA

ELECTRICAL CHARACTERISTICS – Bogey Values

Heater Voltage, ac or dc	E_h	3.15 ± 0.5	V
Heater Current at E_h = 3.15 V	I_h	0.245	A
Direct Interelectrode Capacitance:[a]			
P to (K + IS + H)	$c_{p\text{-all}}$	1.5	pF
Instantaneous Tube Voltage Drop for Instantaneous Plate Current (i_b) = 7 mA	e_b	60	V

MECHANICAL CHARACTERISTICS

Maximum Overall Length	3.812 in (96.82 mm)
Maximum Seated Length	3.250 in (82.55 mm)
Maximum Diameter	1.188 in (30.17 mm)
Envelope	JEDEC T9
Top Cap	Small embossed (JEDEC C1-50)
Base	Ultra-Short Small-Wafer with External Barriers: 8-pin (JEDEC No. B8-251)
Terminal Diagram	JEDEC 8 MX
Type of Cathode	Coated Unipotential
Operating Position	Any

MAXIMUM RATINGS[b] – High Voltage Rectifier

For operation as a pulsed rectifier tube in a 525-line, 30-frame system[c]

Inverse Plate Voltage[d]			
Total DC and Peak (absolute max.)	$-e_{bm}$	38,000	V
Average (absolute max.)	$E_{b(av)}$	30,000	V
Plate Current:			
Peak (design max.)	i_{bm}	100	mA
Average (design max.)	$I_{b(av)}$	2.0	mA
Heater Voltage (absolute max.)	E_h	3.65	V
Heater Voltage (absolute min.)	E_h	2.65	V

[a] Measured without external shield in accordance with the current issue of EIA Standard RS-191.

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

[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% of one horizontal scanning cycle. In a 525-line, 30-frame system, 15% of one horizontal scanning cycle is 10μs.

OPERATING CONSIDERATIONS

Socket Connections. The base pins of the 3DB3 fit the standard octal socket. Socket terminals 1, 3, 4, 5, 6, and 8 may be connected to terminal 7 or to a corona shield which connects to terminal 7. Terminals 4 and 6 may be used as tie points at or near cathode potential. Otherwise, do not use.

Measurement of Heater Voltage. It is recommended that a thermocouple rms voltmeter be used to measure heater voltage. The meter and its leads must be insulated to withstand 38,000 V. To minimize loading of the rectifier circuit during this measurement, stray capacitances to ground should be kept as low as possible.

X-Radiation Characteristic

X-Radiation, Maximum **25 mR/hr**

Operation of the 3DB3 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.

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

Warning

X-Radiation

The high voltages associated with the 3DB3 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 3DB3 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

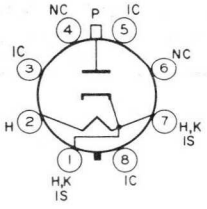
The high voltages at which the 3DB3 is operated can be extremely dangerous to the user or serviceman. Extreme care should be taken in the use of, and for the servicing and adjustment of, any high voltage circuit.

Precautions must be excercised during the replacement or servicing of the 3DB3 in equipment to assure that the high voltage output terminal is properly grounded while inserting or removing the tube from its socket or while 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.

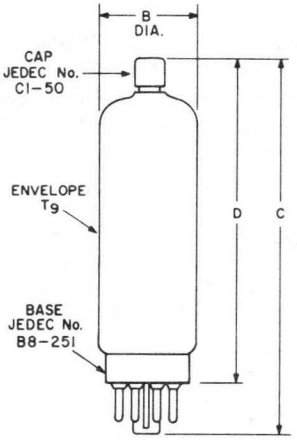
TERMINAL DIAGRAM – JEDEC 8MX – Bottom View

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



3DB3

DIMENSIONAL OUTLINE



92CS-15232RI

DIMENSION	INCHES		MILLIMETERS	
	Min.	Max.	Min.	Max.
B	1.062*	1.188	26.98*	30.17
C	–	3.812	–	96.82
D	3.062	3.250	77.78	82.55
MILLIMETER DIMENSION DERIVED FROM INCH DIMENSION				
* Applies to the minimum diameter except in the area of the seal.				

Half-Wave Vacuum Rectifier

Designed to minimize X-Radiation

$-e_{bm}$ = 38,000 max. V i_{bm} = 110 mA

ELECTRICAL CHARACTERISTICS – Bogey Values

Heater Voltage, ac or dc	E_h	3.15 ± 0.5	V
Heater Current at E_h = 3.15 V	I_h	0.48	A
Direct Interelectrode Capacitance:[a]			
P to (K + IS + H)	$c_{p\text{-}all}$	1.6	pF
Instantaneous Tube Voltage Drop for Instantaneous Plate Current (i_b) = 7 mA	e_b	60	V

MECHANICAL CHARACTERISTICS

Maximum Overall Length	3.812 in (96.82 mm)
Maximum Seated Length	3.250 in (82.55 mm)
Maximum Diameter	1.188 in (30.17 mm)
Envelope	JEDEC T9
Top Cap	Small embossed (JEDEC C1-50)
Base	Ultra-Short Small-Wafer with External Barriers: 8-pin (JEDEC No. B8-251)
Terminal Diagram	JEDEC 8 MT
Type of Cathode	Coated Unipotential
Operating Position	Any

MAXIMUM RATINGS[b] – High Voltage Rectifier

For operation as a pulsed rectifier tube in a 525-line, 30-frame system[c]

Inverse Plate Voltage[d]			
Total DC and Peak (absolute max.)	$-e_{bm}$	38,000	V
DC (absolute max.)	$E_{b(av)}$	30,000	V
Plate Current:			
Peak (design max.)	i_{bm}	110	mA
Average (design max.)	$I_{b(av)}$	2.2	mA
Heater Voltage (absolute max.)	E_h	3.65	V
Heater Voltage (absolute min.)	E_h	2.65	V

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[a] Measured without external shield in accordance with the current issue of EIA Standard RS-191.

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

[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% of one horizontal scanning cycle. In a 525-line, 30-frame system, 15% of one horizontal scanning cycle is 10μs.

OPERATING CONSIDERATIONS

Socket Connections. The base pins of the 3DF3 fit the standard octal socket. Socket terminals 1, 2, 4, 5, 6, and 7 may be connected to terminal 8 or to a corona shield which connects to terminal 8. Terminals 1 and 7 may be used as tie points at or near cathode potential. Otherwise, do not use.

Measurement of Heater Voltage. It is recommended that a thermocouple rms voltmeter be used to measure heater voltage. The meter and its leads must be insulated to withstand 38,000 V. To minimize loading of the rectifier circuit during this measurement, stray capacitances to ground should be kept as low as possible.

X-Radiation Characteristic

X-Radiation, Maximum **25 mR/hr**

Operation of the 3DF3 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.

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

Warning

X-Radiation

The high voltages associated with the 3DF3 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 3DF3 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

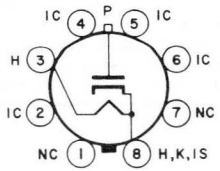
The high voltages at which the 3DF3 is operated can be extremely dangerous to the user or serviceman. Extreme care should be taken in the use of, and for the servicing and adjustment of, any high voltage circuit.

Precautions must be excercised during the replacement or servicing of the 3DF3 in equipment to assure that the high voltage output terminal is properly grounded while inserting or removing the tube from its socket or while 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.

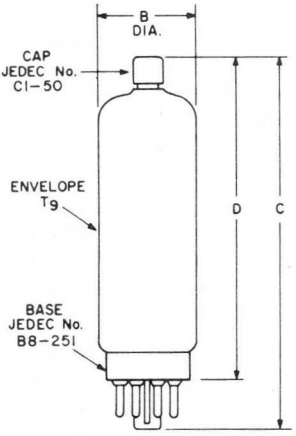
TERMINAL DIAGRAM – JEDEC 8MT – Bottom View

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



3DF3

DIMENSIONAL OUTLINE



92CS-15232R1

DIMENSION	INCHES		MILLIMETERS	
	Min.	Max.	Min.	Max.
B	1.062*	1.188	26.98*	30.17
C	–	3.812	–	96.82
D	3.062	3.250	77.78	82.55

MILLIMETER DIMENSION DERIVED FROM INCH DIMENSION

* Applies to the minimum diameter except in the area of the seal.

Full-Wave Vacuum Rectifier

GENERAL DATA

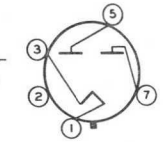
Electrical:

Filament, Coated:		
Voltage (AC or DC)	3.3 ± 10%	volts
Current at 3.3 volts	3.8	amp

Mechanical:

Operating Position	Any
Maximum Overall Length	4-5/8"
Maximum Seated Length	4-1/16"
Diameter	1.438" to 1.562"
Bulb	T12
Base	Short Medium-Shell Octal 5-Pin with External Barriers, Style A (JEDEC Group 1, No.B5-234) or Short Medium-Shell Octal 5-Pin with External Barriers, Style B (JEDEC Group 1, No.B5-239)
Basing Designation for BOTTOM VIEW	5DE

Pin 1 - Filament
Pin 2 - Internal Connection—Do Not Use
Pin 3 - Filament
Pin 5 - Plate No.2
Pin 7 - Plate No.1



FULL-WAVE RECTIFIER

Maximum Ratings, *Design-Maximum Values:*

PEAK INVERSE PLATE VOLTAGE	1050 max.	volts
AC PLATE SUPPLY VOLTAGE PER PLATE (RMS)	See *Rating Chart I*	
PEAK PLATE CURRENT PER PLATE	1.2 max.	amp
HOT-SWITCHING TRANSIENT PLATE CURRENT PER PLATE[a]	6.5 max.	amp
DC OUTPUT CURRENT	See *Rating Chart I*	
BULB TEMPERATURE (At hottest point on bulb surface)	200 max.	°C

Typical Operation:

With capacitor input to filter

AC Plate-to-Plate Supply Voltage (RMS)	550	volts
Filter-Input Capacitor[b]	40	μf
Total Effective Plate Supply Impedance Per Plate	32	ohms
DC Output Voltage (Approx.) at input to filter at full-load current of 350 ma.	300	volts

Characteristics:

Tube-Voltage Drop for plate ma.
= 350 (Per plate). . . . . 25 volts

[a] Even occasional hot-switching with capacitor-input circuits permits the flow of plate current having magnitudes which can adversely affect the life and reliability of rectifier tubes. If capacitor-input circuits are to be used, protect the circuits against the adverse effects of possible hot-switching, and do not exceed a hot-switching transient plate current per plate of 6.5 amperes during the initial cycles of the hot-switching transient. If hot-switching is required in operation, the use of choke-input circuits is recommended. Such circuits limit the hot-switching current to a value no higher than that of the peak plate current.

[b] Values of capacitance higher than those indicated may be used, provided the effective plate supply impedance is increased to prevent exceeding the maximum peak-plate-current rating.

RATING CHARTS and OPERATION CHARACTERISTICS

Rating Chart I represents graphically the relationships between maximum ac voltage input and maximum dc output current derived from the fundamental ratings for conditions of capacitor input and choke input to filters. This graphical presentation gives the equipment designer considerable latitude in choice of operating conditions.

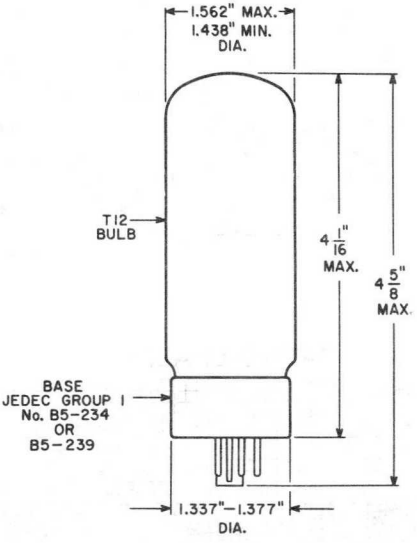
Rating Chart II represents graphically the relationship between maximum rectification efficiency and maximum dc output current per plate for conditions of capacitor input to filter.

A choice of operating values of dc output current per plate and rectification efficiency should be made such that they fall within the area of permissible operation to insure that the maximum peak-plate-current rating will not be exceeded. If the operating values chosen fall outside the permissible operating area, a different choice of parameters should be made. For a given value of ac voltage input and dc output current, it is possible to reduce the rectification efficiency either by increasing the plate supply resistance per plate or by using a smaller value of input filter capacitor.

Rating Chart III represents graphically the relationships between minimum effective plate supply resistance per plate and maximum ac plate supply voltage per plate under no-load conditions of capacitor input to filter when occasional hot-switching is employed.

If occasional hot-switching is required with capacitor-input circuits, it is important to protect the tube and the circuits against the flow of plate currents having magnitudes in excess of the maximum hot-switching-current rating of 6.5 amperes. To limit the hot-switching current, adequate series plate supply resistance per plate is necessary. This resistance value may be determined with the formula shown in legend of *Rating Chart III*. To insure that the maximum hot-switching current is not exceeded, a value of series plate supply resistance per plate should be chosen such that it is equal to or greater than the minimum value indicated by the curve.

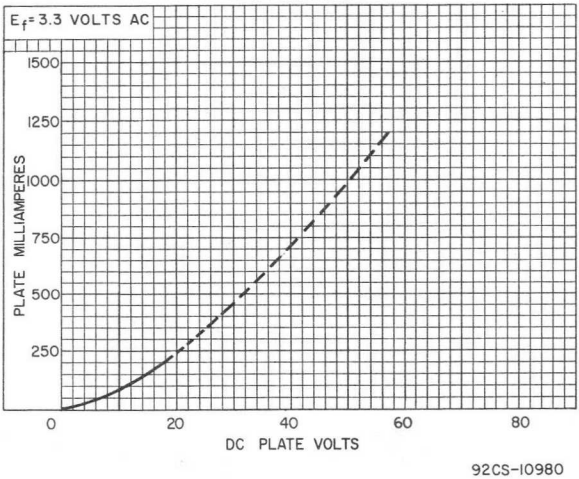
If appreciable series inductance is present in the plate supply, a value of series plate supply resistance smaller than that indicated by the curve may be employed provided it is experimentally determined that the combined effect of inductance and plate supply resistance used are adequate to limit the hot-switching current to the indicated maximum-rated value.



92CS-10983RI

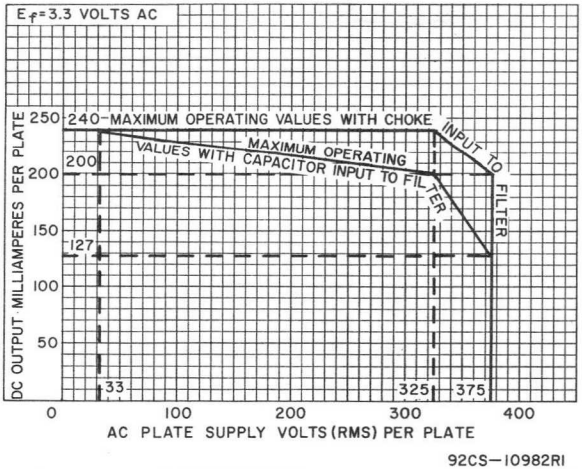
3DG4

AVERAGE PLATE CHARACTERISTIC
Each Plate



92CS-10980

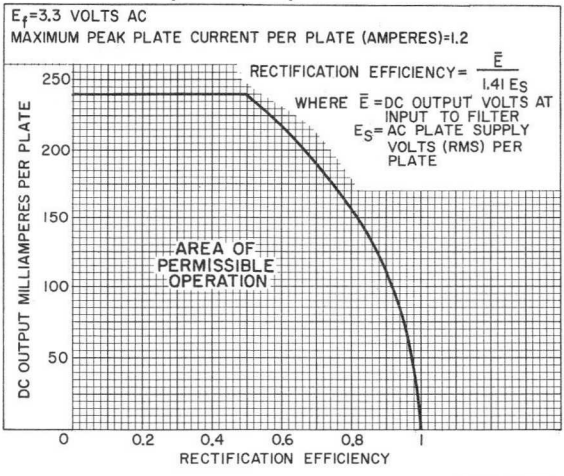
RATING CHART I



92CS-10982RI

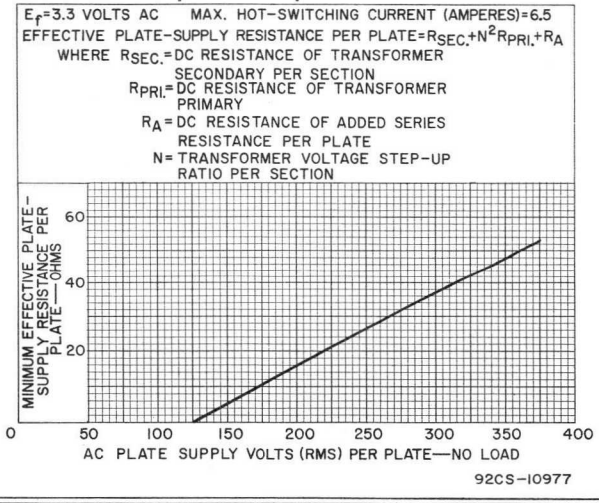
RADIO CORPORATION OF AMERICA
Electron Tube Division Harrison, N. J.

RATING CHART II
Capacitor Input to Filter



92CS-10978

RATING CHART III
Capacitor Input to Filter



92CS-10977

Half-Wave Vacuum Rectifier

Designed to minimize X-Radiation

$-e_{bm}$ = 38,000 max. V **i_{bm} = 100 mA**

ELECTRICAL CHARACTERISTICS – Bogey Values

Heater Voltage, ac or dc	E_h	3.15 ± 0.5	V
Heater Current at E_h = 3.15 V	I_h	0.30	A
Direct Interelectrode Capacitance:[a]			
P to (K + IS + H)	$c_{p\text{-all}}$	1.6	pF
Instantaneous Tube Voltage Drop for Instantaneous Plate Current (i_b) = 7 mA	e_b	70	V

MECHANICAL CHARACTERISTICS

Maximum Overall Length	3.812 in (96.82 mm)
Maximum Seated Length	3.250 in (82.55 mm)
Maximum Diameter	1.188 in (30.17 mm)
Envelope	JEDEC T9
Top Cap	Small embossed (JEDEC C1-50)
Base	Ultra-Short Small-Wafer with External Barriers: 8-pin (JEDEC No. B8-251)
Terminal Diagram	JEDEC 8 MX
Type of Cathode	Coated Unipotential
Operating Position	Any

MAXIMUM RATINGS[b] – High Voltage Rectifier

For operation as a pulsed rectifier tube in a 525-line, 30-frame system[c]

Inverse Plate Voltage[d]			
Total DC and Peak (absolute max.)	$-e_{bm}$	38,000	V
Average (absolute max.)	$E_{b(av)}$	30,000	V
Plate Current:			
Peak (design max.)	i_{bm}	100	mA
Average (design max.)	$I_{b(av)}$	2.0	mA
Heater Voltage (absolute max.)	E_h	3.65	V
Heater Voltage (absolute min.)	E_h	2.65	V

[a] Measured without external shield in accordance with the current issue of EIA Standard RS-191.

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

[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% of one horizontal scanning cycle. In a 525-line, 30-frame system, 15% of one horizontal scanning cycle is 10μs.

OPERATING CONSIDERATIONS

Socket Connections. The base pins of the 3DJ3 fit the standard octal socket. Socket terminals 1, 3, 4, 5, 6, and 8 may be connected to terminal 7 or to a corona shield which connects to terminal 7. Terminals 4 and 6 may be used as tie points at or near cathode potential. Otherwise, do not use.

Measurement of Heater Voltage. It is recommended that a thermocouple rms voltmeter be used to measure heater voltage. The meter and its leads must be insulated to withstand 38,000 V. To minimize loading of the rectifier circuit during this measurement, stray capacitances to ground should be kept as low as possible.

X-Radiation Characteristic

X-Radiation, Maximum **25 mR/hr**

Operation of the 3DJ3 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.

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

Warning

X-Radiation

The high voltages associated with the 3DJ3 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 3DJ3 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

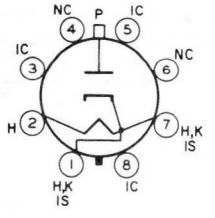
The high voltages at which the 3DJ3 is operated can be extremely dangerous to the user or serviceman. Extreme care should be taken in the use of, and for the servicing and adjustment of, any high voltage circuit.

Precautions must be excercised during the replacement or servicing of the 3DJ3 in equipment to assure that the high voltage output terminal is properly grounded while inserting or removing the tube from its socket or while 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.

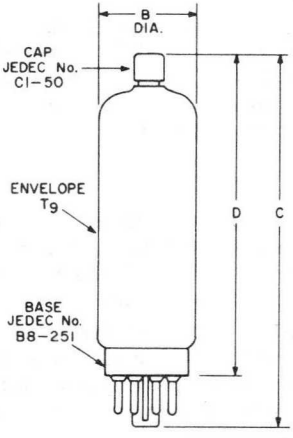
TERMINAL DIAGRAM – JEDEC 8 MX – Bottom View

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



3DJ3

DIMENSIONAL OUTLINE



92CS-15232RI

DIMENSION	INCHES		MILLIMETERS	
	Min.	Max.	Min.	Max.
B	1.062*	1.188	26.98*	30.17
C	–	3.812	–	96.82
D	3.062	3.250	77.78	82.55
MILLIMETER DIMENSION DERIVED FROM INCH DIMENSION				
* Applies to the minimum diameter except in the area of the seal.				

3DK6

Sharp-Cutoff Pentode

7-PIN MINIATURE TYPE

The 3DK6 is the same as the 6DK6 except for the following items:

Heater Characteristics and Ratings:		
Current	0.600 ± 0.040	amp
Voltage (AC or DC) at heater amperes = 0.600	3.15	volts
Warm-up time (Average)	11	sec
Peak heater-cathode voltage:		
Heater negative with respect to cathode	300[a] max.	volts
Heater positive with respect to cathode	200[b] max.	volts

3DT6A

Sharp-Cutoff Pentode

With Two Independent Control Grids

7-PIN MINIATURE TYPE

The 3DT6A is the same as the 6DT6A except for the following items:

Heater Characteristics and Ratings:		
Current	0.600 ± 0.040	amp
Voltage (AC or DC) at heater amperes = 0.600	3.15	volts
Warm-up time (Average)	11	sec

[a] The dc component must not exceed 200 volts.
[b] The dc component must not exceed 100 volts.

3DZ4

Medium-Mu Triode

7-PIN MINIATURE TYPE

The 3DZ4 is the same as the 6DZ4 except for the following items:

Heater Characteristics and Ratings:		
Current	0.450 ± 0.030	amp
Voltage (AC or DC) at heater amperes = 0.450	3.2	volts
Warm-up time (Average)	11	sec
Peak heater-cathode voltage:		
Heater negative with respect to cathode	180 max.	volts
Heater positive with respect to cathode	180[b] max.	sec

3EA5

Sharp-Cutoff Tetrode

7-PIN MINIATURE TYPE

The 3EA5 is the same as the 6EA5 except for the following items:

Heater Characteristics and Ratings:		
Current	0.450 ± 0.030	amp
Voltage (AC or DC) at heater amperes = 0.450	2.9	volts
Warm-up time (Average)	11	sec

3EH7

Semiremote-Cutoff Pentode

9-PIN MINIATURE TYPE

The 3EH7 is the same as the 6EH7 expect for the following items:

Heater Characteristics and Ratings:		
Current	0.600 ± 0.040	amp
Voltage (AC or DC) at heater amperes = 0.600	3.4	volts

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

3EJ7

Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

The 3EJ7 is the same as the 6EJ7 except for the following items:

Heater Characteristics and Ratings:		
Current.	0.600 ± 0.040	amp
Voltage (AC or DC) at heater amperes = 0.600.	3.4	volts

3ER5

High-Mu Triode

7-PIN MINIATURE TYPE

The 3ER5 is the same as the 6ER5 except for the following items:

Heater Characteristics and Ratings:		
Current.	0.450 ± 0.030	amp
Voltage (AC or DC) at heater amperes = 0.450.	2.8	volts

3FH5

High-Mu Triode

7-PIN MINIATURE TYPE

The 3FH5 is the same as the 6FH5 except for the following items:

Heater Characteristics and Ratings:		
Current.	0.450 ± 0.030	amp
Voltage (AC or DC) at heater amperes = 0.450.	3.0	volts
Warm-up time (Average)	11	sec

3FS5

Beam Hexode

7-PIN MINIATURE TYPE

The 3FS5 is the same as the 6FS5 except for the following items:

Heater Characteristics and Ratings:		
Current	0.450 ± 0.030	amp
Voltage (AC or DC) at heater amperes = 0.450	2.9	volts
Warm-up time (Average)	11	sec

3GK5

High-Mu Triode

7-PIN MINIATURE TYPE

The 3GK5 is the same as the 6GK5 except for the following items:

Heater Characteristics and Ratings:		
Current	0.450 ± 0.030	amp
Voltage (AC or DC) at heater amperes = 0.450	2.8	volts
Warm-up time (Average)	11	sec

3GS8

Sharp-Cutoff Twin Pentode

With Common Cathode, Grid No.1, and Grid No.2

The 3GS8 is the same as the 4GS8/4BU8 except for the following items:

Heater Characteristics and Ratings

Current	I_h	0.600 ± 0.040	A
Voltage (AC or DC) at 0.600 A	E_h	3.15	V

3HM5/3HA5

High-Mu Triode

The 3HM5/3HA5 is the same as the 6HM5/6HA5 except for the following items:

Heater Characteristics and Ratings

Current	I_h	0.450 ± 0.030	A
Voltage (AC or DC) at 0.450 A	E_h	2.7	V
Warm-up time (Average)		11	s

3HS8

Sharp-Cutoff Twin Pentode

The 3HS8 is the same as the 6HS8 except for the following items:

Heater Characteristics and Ratings

Current	I_h	0.600 ± 0.040	A
Voltage (AC or DC) at 0.600 A	E_h	3.15	V
Warm-up time (Average)		11	s

3JC6, 3JC6A

Sharp-Cutoff Pentodes

The 3JC6 and 3JC6A are the same as the 6JC6 and 6JC6A, respectively, except for the following items:

Heater Characteristics and Ratings

Current	I_h	0.600 ± 0.040	A
Voltage (AC or DC) at 0.600 A	E_h	3.5	V
Warm-up time (Average)		11	s

3JD6

Sharp-Cutoff Pentode

The 3JD6 is the same as the 6JD6 except for the following items:

Heater Characteristics and Ratings

Current	I_h	0.600 ± 0.040	A
Voltage (AC or DC) at 0.600 A	E_h	3.5	V
Warm-up time (Average)		11	s

3KT6

Semiremote-Cutoff Pentode

The 3KT6 is the same as the 6KT6 except for the following items:

Heater Characteristics and Ratings

Current	I_h	0.600 ± 0.040	A
Voltage (AC or DC) at 0.600 A	E_h	3.5	V
Warm-up time (Average)		11	s

4AU6

Sharp-Cutoff Pentode

7-PIN MINIATURE TYPE

With Heater Having Controlled Warm-Up Time

The 4AU6 is the same as the 6AU6 except for the following items:

Heater Characteristics and Ratings *(Design-Maximum Values)*:		
Current	0.450 ± 0.030	amp
Voltage (AC or DC) at heater amperes = 0.450	4.2	volts
Warm-up time (Average)	11	sec

4AV6

Twin Diode—High-Mu Triode

7-PIN MINIATURE TYPE

With Heater Having Controlled Warm-Up Time

The 4AV6 is the same as the 6AV6 except for the following items:

Heater Characteristics and Ratings *(Design-Maximum Values)*:		
Current	0.450 ± 0.030	amp
Voltage (AC or DC) at heater amperes = 0.450	4.2	volts
Warm-up time (Average)	11	sec

4BC5

Sharp-Cutoff Pentode

7-PIN MINIATURE TYPE

With Heater Having Controlled Warm-Up Time

The 4BC5 is the same as the 6BC5 except for the following items:

Heater Characteristics and Ratings *(Design-Center Values)*:		
Current	0.450 ± 0.030	amp
Voltage (AC or DC) at heater amperes = 0.450	4.2	volts
Warm-up time (Average)	11	sec
Peak heater-cathode voltage:		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200[a] max.	volts

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

4BC8

Medium-Mu Twin Triode

With Semiremote-Cutoff Characteristic

9-PIN MINIATURE TYPE

With Heater Having Controlled Warm-Up Time

The 4BC8 is the same as the 6BC8 except for the following items:

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

Current	0.600 ± 0.040	amp
Voltage (AC or DC) at heater amperes = 0.600	4.2	volts
Warm-up time (Average)	11	sec

4BL8

Medium-Mu Triode— Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

With Heater Having Controlled Warm-Up Time

The 4BL8 is the same as the 6BL8 except for the following items:

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

Current	0.600 ± 0.040	amp
Voltage (AC or DC) at heater amperes = 0.600	4.6	volts

4BN6

Beam Tube

7-PIN MINIATURE TYPE

With Heater Having Controlled Warm-Up Time

The 4BN6 is the same as the 6BN6 except for the following items:

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

Current	0.450 ± 0.030	amp
Voltage (AC or DC) at heater amperes = 0.450	4.2	volts
Warm-up time (Average)	11	sec

4BQ7A

Medium-Mu Twin Triode

9-PIN MINIATURE TYPE

With Heater Having Controlled Warm-Up Time

The 4BQ7A is the same as the 6BQ7A except for the following items:

Heater Characteristics and Ratings *(Design-Center Values)*:		
Current	0.600 ± 0.040	amp
Voltage (AC or DC) at heater current = 0.600	4.2	volts
Warm-up time (Average)	11	sec

4BS8

Medium-Mu Twin Triode

9-PIN MINIATURE TYPE

With Heater Having Controlled Warm-Up Time

The 4BS8 is the same as the 6BS8 except for the following items:

Heater Characteristics and Ratings *(Design-Center Values)*:		
Current	0.600 ± 0.040	amp
Voltage (AC or DC) at heater current = 0.600	4.5	volts
Warm-up time (Average)	11	sec

4BU8

Sharp-Cutoff Twin Pentode

With Common Cathode, Grid No.1, & Grid No.2

9-PIN MINIATURE TYPE

With Heater Having Controlled Warm-Up Time

The 4BU8 is the same as the 6BU8 except for the following items:

Heater Characteristics and Ratings *(Design-Maximum Values)*:		
Current	0.450 ± 0.030	amp
Voltage (AC or DC) at heater current = 0.450	4.2	volts
Warm-up time (Average)	11	sec

4BZ6

Semiremote-Cutoff Pentode

7-PIN MINIATURE TYPE
With Heater Having Controlled Warm-Up Time

The 4BZ6 is the same as the 6BZ6 except for the following items:

Heater Characteristics and Ratings *(Design-Maximum Values)*:		
Current	0.450 ± 0.030	amp
Voltage (AC or DC) at heater current = 0.450	4.2	volts
Warm-up time (Average)	11	sec

4BZ7

Medium-Mu Twin Triode

9-PIN MINIATURE TYPE
With Heater Having Controlled Warm-Up Time

The 4BZ7 is the same as the 6BZ7 except for the following items:

Heater Characteristics and Ratings *(Design-Center Values)*:		
Current	0.600 ± 0.040	amp
Voltage (AC or DC) at heater current = 0.600	4.2	volts
Warm-up time (Average)	11	sec

4CB6

Sharp-Cutoff Pentode

7-PIN MINIATURE TYPE
With Heater Having Controlled Warm-Up Time

The 4CB6 is the same as the 6CB6 except for the following items:

Heater Characteristics and Ratings *(Design-Center Values)*:		
Current	0.450 ± 0.030	amp
Voltage (AC or DC) at heater current = 0.450	4.2	volts
Warm-up time (Average)	11	sec
Peak heater-cathode voltage:		
Heater negative with respect to cathode	300[a] max.	volts
Heater positive with respect to cathode	200[b] max.	volts

[a] The dc component must not exceed 200 volts.
[b] The dc component must not exceed 100 volts.

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

4CS6

Pentagrid Amplifier

7-PIN MINIATURE TYPE

The 4CS6 is the same as the 6CS6 except for the following items:

Heater Characteristics and Ratings:		
Current	0.450 ± 0.030	amp
Voltage (AC or DC) at heater amperes = 0.450	4.2	volts
Warm-up time (Average)	11	sec

4CY5

Sharp-Cutoff Tetrode

7-PIN MINIATURE TYPE

The 4CY5 is the same as the 6CY5 except for the following items:

Heater Characteristics and Ratings:		
Current	0.300 ± 0.020	amp
Voltage (AC or DC) at heater amperes = 0.300	4.5	volts
Warm-up time (Average)	11	sec

4DE6

Sharp-Cutoff Pentode

7-PIN MINIATURE TYPE

The 4DE6 is the same as the 6DE6 except for the following items:

Heater Characteristics and Ratings:		
Current	0.450 ± 0.030	amp
Voltage (AC or DC) at heater amperes = 0.450	4.2	volts
Warm-up time (Average)	11	sec

4DK6

Sharp-Cutoff Pentode

7-PIN MINIATURE TYPE

The 4DK6 is the same as the 6DK6 except for the following items:

Heater Characteristics and Ratings:		
Current.	0.450 ± 0.030	amp
Voltage (AC or DC) at heater amperes = 0.450	4.2	volts
Warm-up time (Average)	11	sec

4DT6A

Sharp-Cutoff Pentode

With Two Independent Control Grids

7-PIN MINIATURE TYPE

The 4DT6A is the same as the 6DT6A except for the following items:

Heater Characteristics and Ratings:		
Current.	0.450 ± 0.030	amp
Voltage (AC or DC) at heater amperes = 0.450	4.2	volts
Warm-up time (Average)	11	sec

4EH7

Semiremote-Cutoff Pentode

9-PIN MINIATURE TYPE

The 4EH7 is the same as the 6EH7 except for the following items:

Heater Characteristics and Ratings:		
Current	0.450 ± 0.030	amp
Voltage (AC or DC) at heater amperes = 0.450	4.4	volts

4EJ7

Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

The 4EJ7 is the same as the 6EJ7 except for the following items:

Heater Characteristics and Ratings:		
Current	0.450 ± 0.030	amp
Voltage (AC or DC) at heater amperes = 0.450	4.4	volts

4ES8

Variable-Mu Twin Triode

9-PIN MINIATURE TYPE

The 4ES8 is the same as the 6ES8 except for the following items:

Heater Characteristics and Ratings:		
Current	0.600 ± 0.040	amp
Voltage (AC or DC) at heater amperes = 0.600	4	volts
Warm-up time (Average)	11	sec

4EW6

Sharp-Cutoff Pentode

7-PIN MINIATURE TYPE

The 4EW6 is the same as the 6EW6 except for the following items:

Heater Characteristics and Ratings:		
Current	0.600 ± 0.040	amp
Voltage (AC or DC) at heater amperes = 0.600	4.2	volts
Warm-up time (Average)	11	sec

4GM6

Semiremote-Cutoff Pentode

7-PIN MINIATURE TYPE

The 4GM6 is the same as the 6GM6 except for the following items:

Heater Characteristics and Ratings:		
Current	0.600 ± 0.040	amp
Voltage (AC or DC) at heater amperes = 0.600	4.2	volts
Warm-up time (Average)	11	sec

4HM6

Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater Characteristics and Ratings:			
Current	0.450 ± 0.030		amp
Voltage (AC or DC) at heater amperes = 0.450	4.2		volts
Warm-up time (Average)	11		sec
Peak heater-cathode voltage:			
Heater negative with respect to cathode	200 max.		volts
Heater positive with respect to cathode	200 max.		volts
Direct Interelectrode Capacitances:			
	Without External Shield	*With External Shield*[a]	
Grid No.1 to plate	0.031	0.024	pf
Grid No.1 to cathode, grid No.3 & internal shield, grid No.2, and heater	8.7	8.7	pf
Plate to cathode, grid No.3 & internal shield, grid No.2, and heater	2.15	3.0	pf

Characteristics, Class A_1 Amplifier:

Plate Supply Voltage	125	volts
Grid No.3 (Suppressor Grid)	*Connected to cathode at socket*	
Grid No.2 Supply Voltage	125	volts
Cathode Resistor	56	ohms
Plate Resistance (Approx.)	0.156	megohm
Transconductance	15000	μmhos
Plate Current	13	ma
Grid No.2 Current	3.2	ma
Grid No.1 Voltage (Approx.) for transconductance (μmhos) = 100	-3	volts

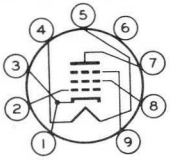
Mechanical:

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)

4HM6

Basing Designation for BOTTOM VIEW. 9PM

Pin 1 – Cathode
Pin 2 – Grid No.1
Pin 3 – Cathode
Pin 4 – Heater
Pin 5 – Heater
Pin 6 – No Internal Connection



Pin 7 – Plate
Pin 8 – Grid No.2
Pin 9 – Grid No.3, Internal Shield

AMPLIFIER — CLASS A_1

Maximum Ratings, *Design-Maximum Values:*

PLATE VOLTAGE	250 max.	volts
GRID No.2 (SCREEN-GRID) SUPPLY VOLTAGE	250 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
CATHODE CURRENT	25 max.	ma
GRID No.2 INPUT:		
For grid-No.2 voltages up to 125 volts	0.6 max.	watt
For grid-No.2 voltages between 125 and 250 volts	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
PLATE DISSIPATION	2.5 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

[a] With JEDEC shield No.315 connected to ground.

Sharp-Cutoff Twin Pentode

9-PIN MINIATURE TYPE

The 4HS8 is the same as the 6HS8 except for the following items:

Heater Characteristics and Ratings:

Current	0.450 ± 0.030	amp
Voltage (AC or DC) at heater amperes = 0.450	4.2	volts
Warm-up time (Average)	11	sec

4JC6, 4JC6A

Sharp-Cutoff Pentodes

The 4JC6 and 4JC6A are the same as the 6JC6 and 6JC6A, respectively, except for the following items:

Heater Characteristics and Ratings

Current	I_h	0.450 ± 0.030	A
Voltage (AC or DC) at 0.450 A	E_h	4.5	V
Warm-up time (Average)		11	s

4JD6

Sharp-Cutoff Pentode

The 4JD6 is the same as the 6JD6 except for the following items:

Heater Characteristics and Ratings

Current	I_h	0.450 ± 0.030	A
Voltage (AC or DC) at 0.450 A	E_h	4.5	V
Warm-up time (Average)		11	s

4KE8

Medium-Mu Triode—Sharp-Cutoff Pentode

The 4KE8 is the same as the 6KE8 except for the following items:

Heater Characteristics and Ratings

Current	I_h	0.600 ± 0.040	A
Voltage (AC or DC) at 0.600 A	E_h	4.5	V
Warm-up time (Average)		11	s

4KT6

Semiremote-Cutoff Pentode

The 4KT6 is the same as the 6KT6 except for the following items:

Heater Characteristics and Ratings

Current	I_h	0.450 ± 0.030	A
Voltage (AC or DC) at 0.450 A	E_h	4.5	V
Warm-up time (Average)		11	s

5AM8

Diode—Sharp-Cutoff Pentode

CONTROLLED HEATER WARM-UP TIME

The 5AM8 is the same as the 6AM8A except for the following items:

Heater Characteristics and Ratings

Current	I_h	0.600 ± 0.040	A
Voltage (AC or DC) at 0.600 A	E_h	4.7	V

5AN8

Medium-Mu Triode—Sharp-Cutoff Pentode

CONTROLLED HEATER WARM-UP TIME

The 5AN8 is the same as the 6AN8A except for the following items:

Heater Characteristics and Ratings

Current	I_h	0.600 ± 0.040	A
Voltage (AC or DC) at 0.600 A	E_h	4.7	V

5AQ5

Beam Power Tube

CONTROLLED HEATER WARM-UP TIME

The 5AQ5 is the same as the 6AQ5A except for the following items:

Heater Characteristics and Ratings

Current	I_h	0.600 ± 0.040	A
Voltage (AC or DC) at 0.600 A	E_h	4.7	V

5AS4-A

FULL-WAVE VACUUM RECTIFIER

GENERAL DATA

Electrical:

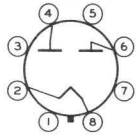
Filament, Coated:

Voltage	5	ac volts
Current	3	amp

Mechanical:

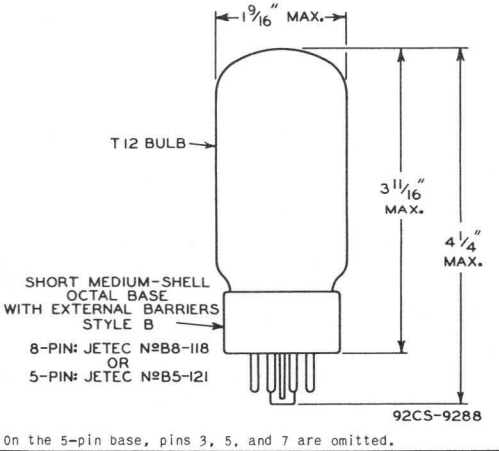
Mounting Position	Vertical, base up or down, or Horizontal with pins 1 and 4 in vertical plane
Maximum Overall Length	4-1/4"
Maximum Seated Length	3-11/16"
Maximum Diameter	1-9/16"
Bulb	T12
Base	Short Medium-Shell Octal 8-Pin with External Barriers, Style B (JETEC No.B8-118), or Short Medium-Shell Octal 5-Pin with External Barriers, Style B (JETEC No.B5-121)
Basing Designation for BOTTOM VIEW	5T

Pin 1 – No Connection
Pin 2 – Filament
Pin 3♦ – Same as Pin 1
Pin 4 – Plate No.2



Pin 5♦ – Same as Pin 1
Pin 6 – Plate No.1
Pin 7♦ – Same as Pin 1
Pin 8 – Filament

MAXIMUM RATINGS, TYPICAL OPERATION, and CURVES for Type 5AS4-A are the same as those shown for Type 5U4-GB



♦ On the 5-pin base, pins 3, 5, and 7 are omitted.

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA

5AS8

Diode—Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

With Heater Having Controlled Warm-Up Time

The 5AS8 is the same as the 6AS8 except for the following items:

Heater, for Unipotential Cathodes:		
Voltage (AC or DC)	4.7	volts
Current	0.6 ± 6%	amp
Warm-up time (Average)	11	sec

5AT8

Medium-Mu Triode—Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

With Heater Having Controlled Warm-Up Time

The 5AT8 is the same as the 6AT8A except for the following items:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	4.7	volts
Current	0.6 ± 6%	amp
Warm-up time (Average)	11	sec

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)	4.7	volts
Current	0.6 ± 6%	amp
Warm-up time (Average)	11	sec
Direct Interelectrode Capacitances:[a]		
Triode Unit:		
Grid to plate	1.5	μμf
Grid to cathode and heater	2	μμf
Plate to cathode and heater	0.34	μμf
Pentode Unit:		
Grid No.1 to plate	0.04 max.	μμf
Grid No.1 to cathode & grid No.3 & internal shield, grid No.2, and heater	7	μμf
Plate to cathode & grid No.3 & internal shield, grid No.2, and heater	3	μμf
Triode grid to pentode plate	0.005	μμf
Pentode grid No.1 to triode plate	0.006	μμf
Pentode plate to triode plate	0.045	μμf

Characteristics, Class A_1 Amplifier:

	Triode Unit	*Pentode Unit*	
Plate Supply Voltage	200	200	volts
Grid-No.2 Supply Voltage	–	150	volts
Grid-No.1 Voltage	–6	–	volts
Cathode Resistor	–	180	ohms
Amplification Factor	19	–	
Plate Resistance (Approx.)	5750	300000	ohms
Transconductance	3300	6200	μmhos
Plate Current	13	9.5	ma
Grid-No.2 Current	–	2.8	ma
Grid-No.1 Voltage (Approx.) for plate μa = 10	–19	–8	volts

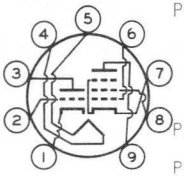
Mechanical:

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

5AV8

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

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



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

AMPLIFIER — Class A_1

Maximum Ratings, *Design-Center Values:*

	Triode Unit	*Pentode Unit*	
PLATE VOLTAGE	300 max.	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.	0 max.	volts
GRID-No.2 INPUT:			
For grid-No.2 voltages up to 150 volts	–	0.5 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	2.5 max.	2 max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode.	200 max.	200 max.	volts
Heater positive with respect to cathode.	200[b] max.	200[b] max.	volts

Maximum Circuit Values:

	Triode Unit	*Pentode Unit*	
Grid-No.1-Circuit Resistance:[c]			
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] The dc component must not exceed 100 volts.
[c] If either unit is operated at maximum-rated conditions, grid-No.1-circuit resistances for both units should not exceed the stated values.

5B8

MEDIUM-MU TRIODE— SHARP-CUTOFF PENTODE

9-PIN MINIATURE TYPE

Intended for use in equipment having series heater-string arrangement

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:

Voltage	4.7	ac or dc volts
Current	0.6	amp
Warm-up time (Average)	11	sec

For definition of heater warm-up time and method of determining it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of this Section.

Direct Interelectrode Capacitances:°

Triode Unit:		
Grid to plate	1.7	μμf
Grid to cathode & pentode grid No.3 & internal shield, and heater	1.9	μμf
Plate to cathode & pentode grid No.3 & internal shield, and heater	1.4	μμf
Pentode Unit:		
Grid No.1 to plate	0.05 max.	μμf
Grid No.1 to cathode, grid No.2, and heater	6	μμf
Plate to cathode, grid No.3 & triode cathode & internal shield, grid No.2, and heater	2.6	μμf
Plate to cathode, grid No.2, and heater	0.15	μμf
Triode grid to pentode plate	0.0078	μμf
Pentode grid No.1 to triode plate	0.0033	μμf
Pentode plate to triode plate	0.06	μμf

Characteristics, Class A_1 Amplifier:

	Triode Unit	*Pentode Unit*	
Plate-Supply Voltage	200	200	volts
Grid-No.2 Supply Voltage	–	150	volts
Grid Voltage	−6	–	volts
Cathode Resistor	–	180	ohms
Amplification Factor	19	–	
Plate Resistance (Approx.)	5750	300000	ohms
Transconductance	3300	6200	μmhos
Plate Current	13	9.5	ma
Grid-No.2 Current	–	2.8	ma
Grid-No.1 Voltage (Approx.) for plate μa = 10	−19	−8	volts

°: See next page.

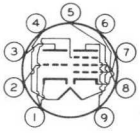
5B8

MEDIUM-MU TRIODE — SHARP-CUTOFF PENTODE

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 (JETEC No.E9-1)
Basing Designation for BOTTOM VIEW	9EC

Pin 1 – Pentode Grid No.3, Triode Cathode, Internal Shield
Pin 2 – Triode Grid
Pin 3 – Triode Plate
Pin 4 – Heater



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

AMPLIFIER — Class A_1

Maximum Ratings, *Design-Center Values:*

	Triode Unit	*Pentode Unit*	
PLATE VOLTAGE	300 max.	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.	0 max.	volts
GRID-No.2 INPUT: For grid-No.2 voltages up to 150 volts	–	0.5 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	2.5 max.	2 max.	watts
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

°,▲: See next page.

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5B8

MEDIUM-MU TRIODE — SHARP-CUTOFF PENTODE

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

° Without external shield.

▲ The dc component must not exceed 100 volts.

* If either unit is operated at maximum rated conditions, grid-No.1-circuit resistances for both units should not exceed the stated values.

Full-Wave Vacuum Rectifier

NOVAR TYPE

For Power Supplies of Equipment Having High DC Power Output Requirements

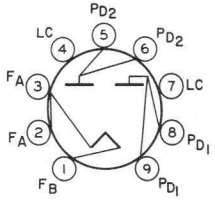
Electrical:

Filament Characteristics and Ratings:		
Voltage (AC)	5.0 ± 0.5	volts
Current at filament volts = 5.0	3.000	amp

Mechanical:

Operating Position	Vertical, base down or up, or Horizontal with pins 2 and 7 in vertical plane
Maximum Overall Length	3.880"
Seated Length	3.250" to 3.500"
Diameter	1.438" to 1.562"
Dimensional Outline (JEDEC No.12-99)	See *General Section*
Bulb	T12
Base	Large-Button Novar 9-Pin with Exhaust Tip (JEDEC No.E9-88)
Basing Designation for BOTTOM VIEW	9QJ

Pin 1 - Filament End B
Pin 2 - Filament End A
Pin 3 - Filament End A
Pin 4 - See Note
Pin 5 - Plate No.2
Pin 6 - Plate No.2
Pin 7 - See Note
Pin 8 - Plate No.1
Pin 9 - Plate No.1



Note: May be used as tie point for ac line providing the peak value of the ac voltage does not exceed 200 volts.

FULL-WAVE RECTIFIER

Maximum Ratings, *Design-Maximum Values:*

Peak Inverse Plate Voltage	1700	volts
AC Plate Supply Voltage Per Plate (RMS, without load)	See accompanying *Rating Chart I*	
Peak Plate Current Per Plate	1	amp
Hot-Switching Transient Plate Current per plate[a]	5	amp
DC Output Current	See accompanying *Rating Chart I*	

Typical Operation:

With capacitor-input filter

AC Plate-to-Plate Supply Voltage (RMS, without load)	600	900	1100	volts
Filter-Input Capacitor[b]	40	40	40	μf
Total Effective Plate Supply Impedance Per Plate	21	67	97	ohms

DC Output Voltage (Approx.) at input to filter at load ma =				
300	290	–	–	volts
275	–	460	–	volts
162	–	–	630	volts
150	335	–	–	volts
137.5	–	520	–	volts
81	–	–	680	volts
With choke-input filter				
AC Plate-to-Plate Supply Voltage (RMS, without load)	900	1100		volts
Filter-Input Choke	10	10		henrys
DC Output Voltage at input to filter (Approx.) at load ma =				
348	340	–		volts
275	–	440		volts
174	355	–		volts
137.5	–	455		volts

[a] Even occasional hot-switching with capacitor-input circuits permits the flow of plate current having magnitudes which can adversely affect the life and reliability of rectifier tubes. If capacitor-input circuits are to be used, protect the circuits against the adverse effects of possible hot-switching, and do not exceed a hot-switching transient plate current per plate of 5 amperes during the initial cycles of the hot-switching transient. If hot-switching is required in operation, the use of choke-input circuits is recommended. Such circuits limit the hot-switching current to a value no higher than that of the peak plate current.

[b] Values of capacitance higher than those indicated may be used, provided the effective plate supply impedance is increased to prevent exceeding the maximum peak-plate-current rating.

RATING CHARTS and OPERATION CHARACTERISTICS

Rating Chart I represents graphically the relationships between maximum ac voltage input and maximum dc output current derived from the fundamental ratings for conditions of capacitor-input and choke-input filters. This graphical presentation gives the equipment designer considerable latitude in choice of operating conditions.

Rating Chart II represents graphically the relationship between maximum rectification efficiency and maximum dc output current per plate for conditions of capacitor-input filter.

A choice of operating values of dc output current per plate and rectification efficiency should be made such that they fall within the area of permissible operation to insure that the maximum peak-plate-current rating will not be exceeded. If the operating values chosen fall outside the permissible operating area, a different choice of parameters should be made. For a given value of ac voltage input and dc output current, it is possible to reduce the rectification efficiency either by increasing the plate supply resistance per plate or by using a smaller value of input filter capacitor.

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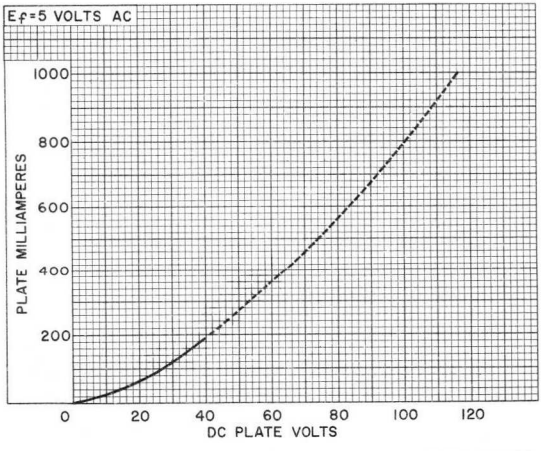
Rating Chart III represents graphically the relationships between minimum effective plate supply resistance per plate and maximum ac plate supply voltage per plate under no-load conditions of capacitor-input filter when occasional hot-switching is employed.

If occasional hot-switching is required with capacitor-input circuits, it is important to protect the tube and the circuits against the flow of plate currents having magnitudes in excess of the maximum hot-switching-current rating of 5 amperes. To limit the hot-switching current, adequate series plate supply resistance per plate is necessary. This resistance value may be determined with the formula shown in legend of *Rating Chart III*. To insure that the maximum hot-switching current is not exceeded, the value of series plate supply resistance per plate should be equal to or greater than the minimum value indicated by the curve.

If appreciable series inductance is present in the plate supply, a value of series plate supply resistance smaller than that indicated by the curve may be employed provided it is experimentally determined that the combined effect of inductance and plate supply resistance used are adequate to limit the hot-switching current to the indicated maximum-rated value.

AVERAGE PLATE CHARACTERISTIC
Each Plate



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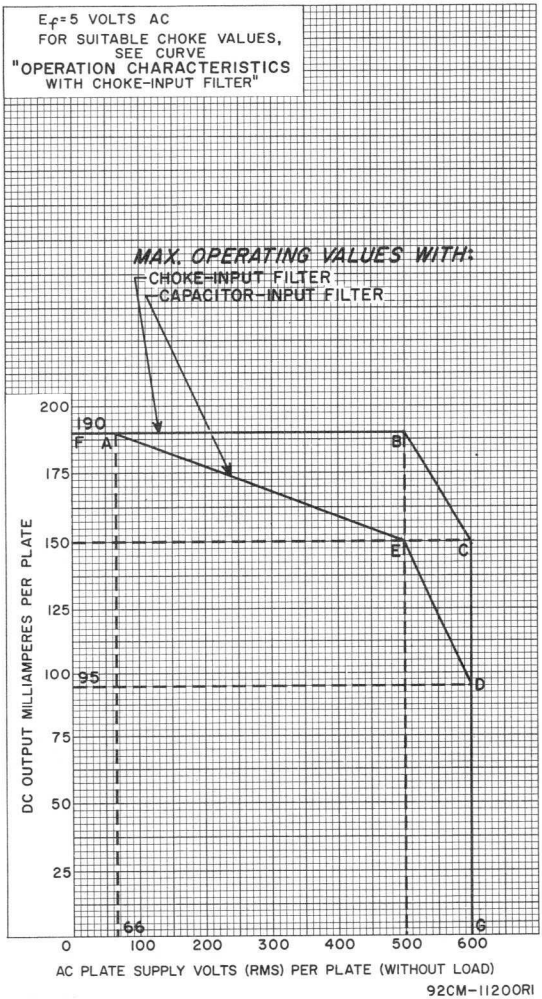
RATING CHART I



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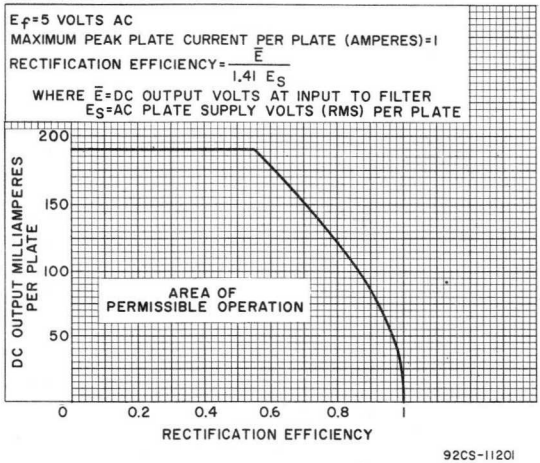
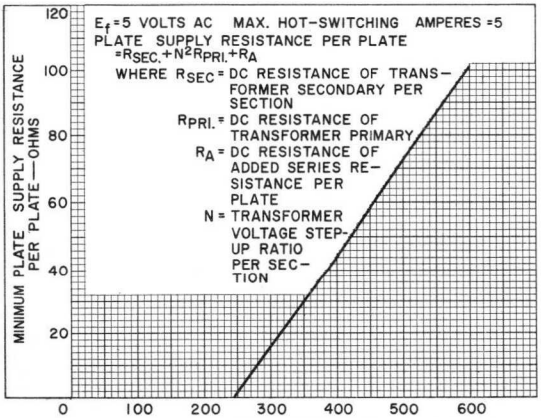
RATING CHART II
Capacitor-Input Filter



92CS-11201

RATING CHART III
Capacitor-Input Filter



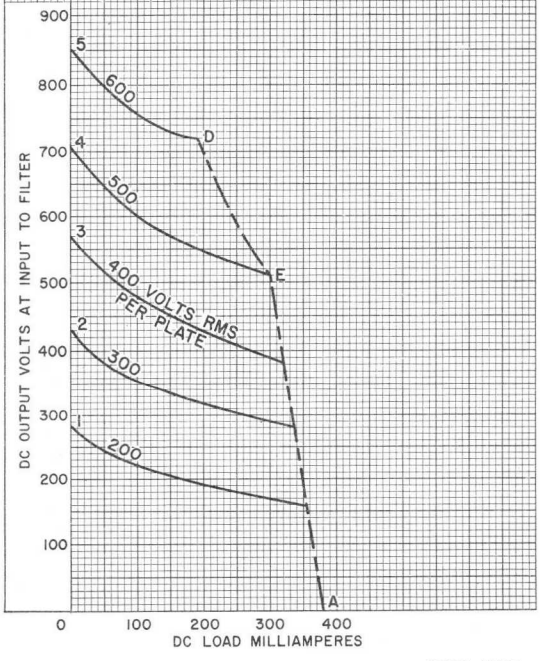
92CS-11194

OPERATION CHARACTERISTICS
Full-Wave Circuit, Capacitor-Input Filter

E_f = 5 VOLTS AC
SUPPLY FREQUENCY (CPS) = 60
CAPACITOR (C) INPUT TO FILTER: 40 μf
TOTAL EFFECTIVE PLATE SUPPLY IMPEDANCE PER PLATE

CURVE	1	2	3	4	5
OHMS	11	20	52	82	112

CURRENT- AND VOLTAGE-BOUNDARY LINE 'DEA' IS THE SAME SHOWN ON RATING CHART I



92CM-11197

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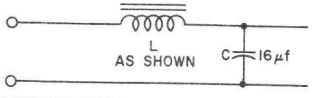
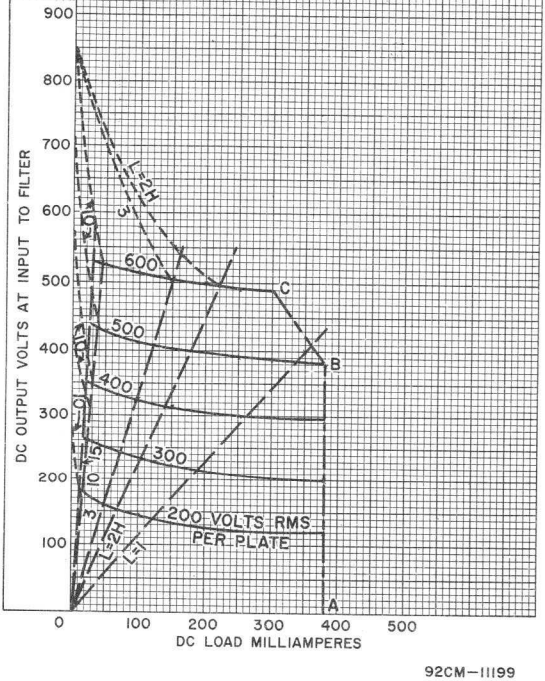
Electronic Components and Devices Harrison, N. J.

OPERATION CHARACTERISTICS
Full-Wave Circuit, Choke-Input Filter

E_f=5 VOLTS AC SUPPLY FREQUENCY (CPS)=60
SOLID–LINE CURVES = CHOKES OF INFINITE INDUCTANCE
LONG–DASH LINES = BOUNDARY LINES FOR CHOKE SIZES AS SHOWN
SHORT–DASH CURVES = REGULATION CURVES FOR REPRESENTATIVE CHOKE SIZES
CURRENT– AND VOLTAGE–BOUNDARY LINE 'CBA' IS THE SAME AS SHOWN ON RATING CHART I





92CM–11199

5BK7-A

MEDIUM-MU TWIN TRIODE

9-PIN MINIATURE TYPE

For use in direct-coupled cathode-drive circuits of TV tuners in equipment having series heater-string arrangement

The 5BK7-A is the same as the 6BK7-B except for the following items:

Heater, for Unipotential Cathodes:		
Voltage	4.7	ac or dc volts
Current	0.6	amp

5BQ7-A

MEDIUM-MU TWIN TRIODE

LOW-NOISE 9-PIN MINIATURE TYPE

For use in direct-coupled cathode-drive circuits of TV tuners in equipment having series heater-string arrangement

The 5BQ7-A is the same as the 6BQ7-A except for the following items:

Heater, for Unipotential Cathodes:		
Voltage	5.6	ac or dc volts
Current	0.45	amp
Warm-up time (Average)*	11	sec

5BR8

MEDIUM-MU TRIODE— SHARP-CUTOFF PENTODE

9-PIN MINIATURE TYPE

Intended for use in equipment having series heater-string arrangement

The 5BR8 is the same as the 6BR8 except for the following items:

Heater, for Unipotential Cathodes:		
Voltage	4.7	ac or dc volts
Current	0.6	amp
Warm-up time (Average)*	11	sec

* *For definition of heater warm-up time and method of determining it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of this Section.*

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

Twin Diode—
Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE
With Heater Having Controlled Warm-Up Time

The 5BW8 is the same as the 6BW8 except for the following items:

Heater, for Unipotential Cathodes:		
Voltage (AC or DC)	4.7	volts
Current	0.6 ± 6%	amp
Warm-up time (Average)	11	sec

5CG8

Medium-Mu Triode—
Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE
With Heater Having Controlled Warm-Up Time

The 5CG8 is the same as the 6CG8A except for the following items:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	4.7	volts
Current	0.6 ± 6%	amp

5CL8A

Medium-Mu Triode—
Sharp-Cutoff Tetrode

9-PIN MINIATURE TYPE
With Heater Having Controlled Warm-Up Time

The 5CL8A is the same as the 6CL8A except for the following items:

Heater, for Unipotential Cathodes:		
Voltage (AC or DC)	4.7	volts
Current	0.6 ± 6%	amp

5CM8

High-Mu Triode—
Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE
With Heater Having Controlled Warm-Up Time

The 5CM8 is the same as the 6CM8 except for the following items:

Heater, for Unipotential Cathodes:		
Voltage (AC or DC)	4.7	volts
Current	0.6 ± 6%	amp

5CQ8

Medium-Mu Triode—
Sharp-Cutoff Tetrode

9-PIN MINIATURE TYPE

With Heater Having Controlled Warm-Up Time

The 5CQ8 is the same as the 6CQ8 except for the following items:

Heater, for Unipotential Cathodes:		
Voltage (AC or DC)	4.7	volts
Current	0.6 ± 6%	amp

5CZ5

Beam Power Tube

9-PIN MINIATURE TYPE

With Heater Having Controlled Warm-Up Time

The 5CZ5 is the same as the 6CZ5 except for the following items:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	4.7	volts
Current	0.6 ± 6%	amp

5EA8

Medium-Mu Triode—Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

With Heater Having Controlled Warm-Up Time

The 5EA8 is the same as the 6EA8 except for the following items:

Heater Characteristics and Ratings *(Design-Maximum Values)*:		
Current	0.600 ± 0.040	amp
Voltage (AC or DC) at heater amperes = 0.600	4.7	volts

5EU8

Medium-Mu Triode—Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

With Heater Having Controlled Warm-Up Time

The 5EU8 is the same as the 6EU8 except for the following items:

Heater Characteristics and Ratings *(Design-Center Values)*:		
Current	0.600 ± 0.040	amp
Voltage (AC or DC) at heater amperes = 0.600	4.7	volts
Cathode Warm-Up Time[a]	35	sec

5EW6

Sharp-Cutoff Pentode

7-PIN MINIATURE TYPE

With Heater Having Controlled Warm-Up Time

The 5EW6 is the same as the 6EW6 except for the following items:

Heater Characteristics and Ratings *(Design-Maximum Values)*:		
Current	0.450 ± 0.030	amp
Voltage (AC or DC) at heater amperes = 0.450	5.6	volts
Warm-up time (Average)	11	sec

[a] 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 amperes = 0.560.

5FG7

Medium-Mu Triode—
Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

With Heater Having Controlled Warm-Up Time

The 5FG7 is the same as the 6FG7 except for the following items:

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

Current	0.600 ± 0.040	amp
Voltage (AC or DC) at heater amperes = 0.600	4.7	volts

5FV8

Medium-Mu Triode—
Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

With Heater Having Controlled Warm-Up Time

The 5FV8 is the same as the 6FV8 except for the following items:

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

Current	0.600 ± 0.040	amp
Voltage (AC or DC) at heater amperes = 0.600	4.7	volts

5GH8A

Medium-Mu Triode—Sharp-Cutoff Pentode

Controlled Heater Warm-up Time

The 5GH8A is the same as the 6GH8A except for:

Heater Characteristics and Ratings

Current	0.600 ± 0.040	A
Voltage (ac or dc) at 0.600 A	4.7	V

5GM6

Semiremote-Cutoff Pentode

The 5GM6 is the same as the 6GM6 except for:

Heater Characteristics and Ratings

Current	0.450 ± 0.030	A
Voltage (ac or dc) at 0.450 A	5.6	V
Warm-up Time (Average)	11	s

5GX6

Sharp-Cutoff Pentode With Two Independent Control Grids

Controlled Heater Warm-up Time

The 5GX6 is the same as the 6GX6 except for:

Heater Characteristics and Ratings

Current	0.600 ± 0.040	A
Voltage (ac or dc) at 0.600 A	4.7	V

5HZ6

Sharp-Cutoff Pentode

With Two Independent Control Grids

Controlled Heater Warm-up Time

The 5HZ6 is the same as the 6HZ6 except for:

Heater Characteristics and Ratings

Current	0.600 ± 0.040	A
Voltage (ac or dc) at 0.600 A	4.75	V

5J6

Medium-Mu Twin Triode

Controlled Heater Warm-up Time

The 5J6 is the same as the 6J6A except for:

Heater Characteristics and Ratings

Current	0.600 ± 0.040	A
Voltage (ac or dc) at 0.600 A	4.7	V

5KE8

Medium-Mu Triode— Sharp-Cutoff Pentode

The 5KE8 is the same as the 6KE8 except for:

Heater Characteristics and Ratings

Current	0.450 ± 0.030	A
Voltage (ac or dc) at 0.450 A	5.6	V
Warm-up Time (Average)	11	s

5MQ8

Medium-Mu Triode— Sharp-Cutoff Pentode

The 5MQ8 is the same as the 6MQ8 except for:

Heater Characteristics and Ratings

Current	0.600 ± 0.040	A
Voltage (ac or dc) at 0.600 A	5.6	V
Warm-up Time (Average)	11	s

5T8

TRIPLE DIODE—HIGH-MU TRIODE

9-PIN MINIATURE TYPE

Intended for use in equipment having series heater-string arrangement

The 5T8 is the same as the 6T8 except for the following items:

Heater, for Unipotential Cathodes:

Voltage	4.7	ac or dc volts
Current	0.6	amp
Warm-up time (Average)	11	sec

For definition of heater warm-up time and method of determining it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of this Section.

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200▲ max.	volts

▲ The dc component must not exceed 100 volts.

Full-Wave Vacuum Rectifier

GENERAL DATA

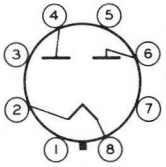
Electrical:

Filament, Coated:
Voltage (AC or DC). . . . . 5 volts
Current . . . . . 3 amp

Mechanical: ←

Operating Position. . . . . Vertical, base down or up, or Horizontal with pins 1 and 4 in vertical plane
Maximum Overall Length. . . . . 4-5/8"
Maximum Seated Length . . . . . 4-1/16"
Diameter. . . . . 1.438" to 1.562"
Bulb. T12
Base. . . . . .Short Medium-Shell Octal 5-Pin with External Barriers, Style B, Arrangement 1 (JEDEC Group 1, No.B5-121), or Short Medium-Shell Octal 8-Pin with External Barriers, Style B (JEDEC Group 1, No.B8-118)
Basing Designation for BOTTOM VIEW. 5T

Pin 1 – No Connection
Pin 2 – Filament
Pin 3[a] – No Connection



Pin 4 – Plate No.2
Pin 5 – Same as Pin 3
Pin 6 – Plate No.1
Pin 7 – Same as Pin 3
Pin 8 – Filament

FULL-WAVE RECTIFIER

Maximum Ratings, *Design-Center Values:* ←

For power-supply frequencies of 25 to 1000 cps

PEAK INVERSE PLATE VOLTAGE. . . . . 1550 max. volts
AC PLATE SUPPLY VOLTAGE PER PLATE (RMS, without load) . . . . . .See *Rating Chart I*
STEADY-STATE PEAK PLATE CURRENT PER PLATE (See *Rating Chart II*) . . . . . 1 max. amp
TRANSIENT PEAK PLATE CURRENT PER PLATE (See *Rating Chart III*). . . . . 4.6 max. amp
DC OUTPUT CURRENT . . . . . .See *Rating Chart I*

Typical Operation: ←

	With capacitor-input filter		*With choke-input filter*	
AC Plate-to-Plate Supply Voltage (RMS, without load) . .	600	900	1100	volts
Filter-Input Capacitor[b] .	40	40	–	μf
Filter-Input Choke. . . .	–	–	10	henrys

←Indicates a change.

Total Effective Plate Supply Impedance Per Plate	21	67	–	ohms
DC Output Voltage at input to filter	290	460	420	volts
DC Output Current	300	275	275	ma

→ Characteristics:

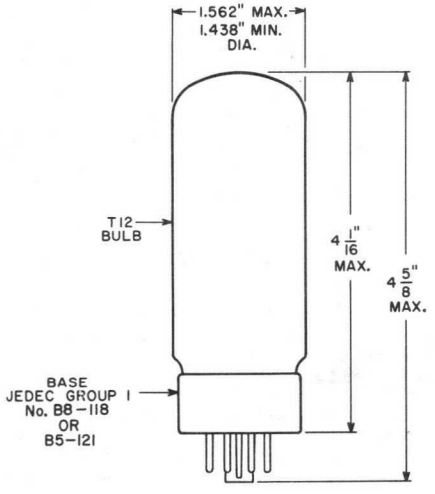
Tube Voltage Drop for plate ma. (Per plate) =

225	44 volts
275	50 volts
300	54 volts

[a] On the 5-pin base, pins 3, 5, and 7 are omitted.

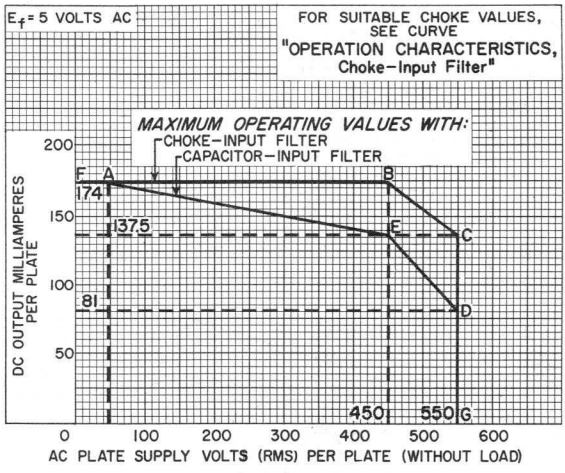
[b] Values of capacitance greater than 40 μf may be used, provided the plate supply impedance is increased to prevent exceeding the maximum peak-plate-current rating.

→ Indicates a change.



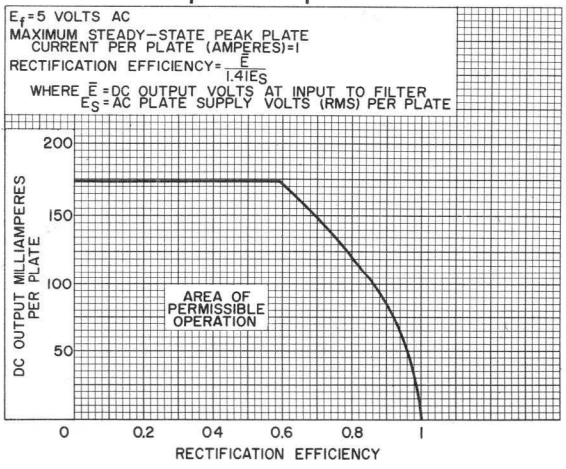
92CS-8444R2

RATING CHART I



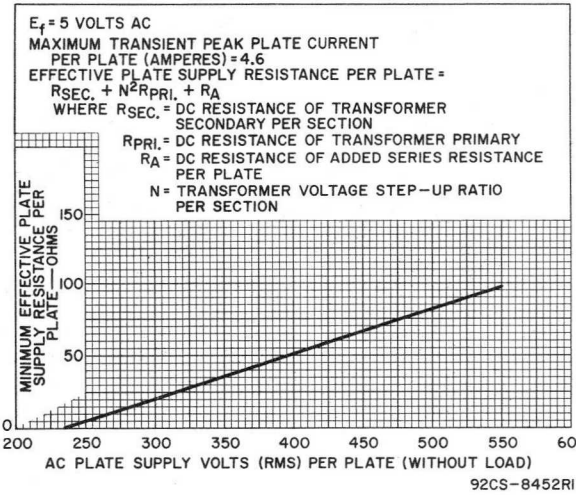
92CS-8450RI

RATING CHART II
Capacitor-Input Filter



92CS-8451RI

RATING CHART III
Capacitor-Input Filter



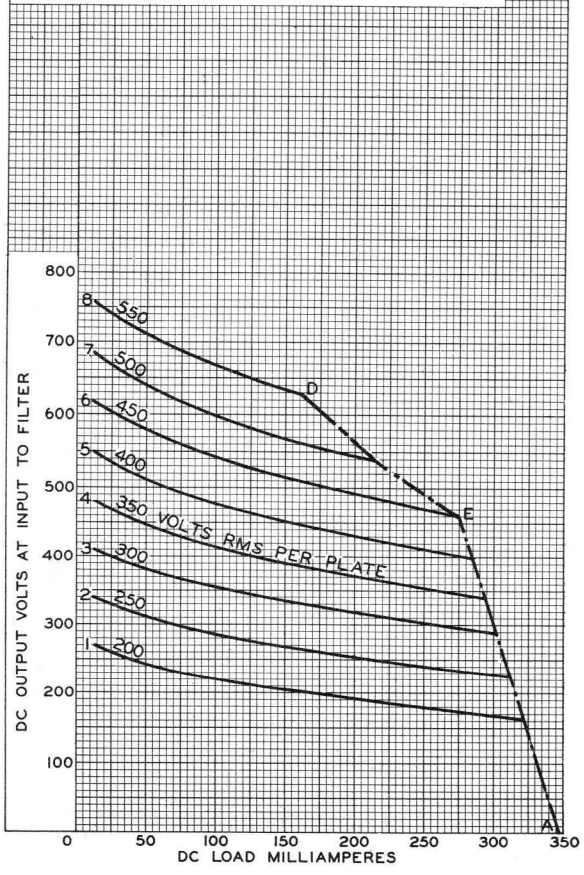
92CS-8452RI

OPERATION CHARACTERISTICS
Full-Wave Circuit, Capacitor-Input Filter

E_f = 5 VOLTS AC
SUPPLY FREQUENCY (CPS) = 60
CAPACITOR (C) INPUT TO FILTER: (μf) = 40
TOTAL EFFECTIVE PLATE SUPPLY IMPEDANCE

PER PLATE	CURVE	1	2	3	4	5	6	7	8
	OHMS	11	11	20	36	52	67	82	97

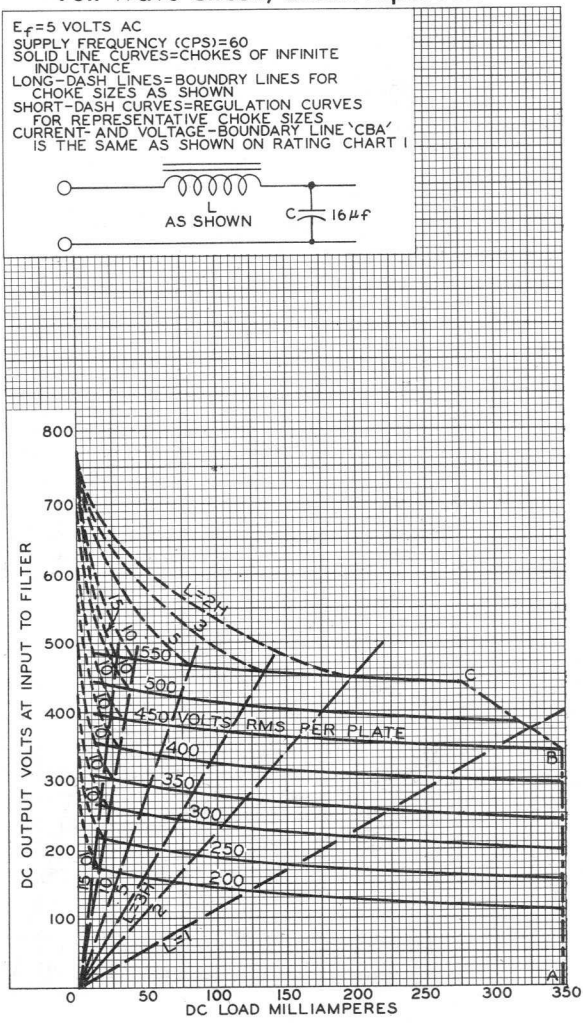
CURRENT- AND VOLTAGE-BOUNDARY LINE 'DEA' IS THE SAME AS SHOWN ON RATING CHART I



92CM-8446RI

5U4GB

OPERATION CHARACTERISTICS
Full-Wave Circuit, Choke-Input Filter



92CM-8447RI

RCA

5U8

MEDIUM-MU TRIODE–SHARP-CUTOFF PENTODE

9-PIN MINIATURE TYPE

Intended for use in equipment having series heater-string arrangement

The 5U8 is the same as the 6U8 except for the following items:

Heater, for Unipotential Cathodes:

Voltage	4.7	ac or dc volts
Current	0.6	amp
Warm-up time (Average)	11	sec

For definition of heater warm-up time and method of determining it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of this Section.

PEAK HEATER–CATHODE VOLTAGE:

Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200▲max.	volts

▲ The dc component must not exceed 100 volts.

Full-Wave Vacuum Rectifier

GENERAL DATA

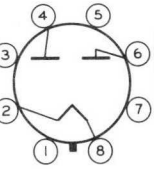
Electrical:

Filament, Coated:		
Voltage (AC or DC)	5 ± 10%	volts
Current at 5 volts	3	amp

Mechanical:

Operating Position	Vertical, base down or up, or Horizontal with pins 2 and 4 in vertical plane
Maximum Overall Length	4-5/8"
Maximum Seated Length	4-1/16"
Diameter	1.438" to 1.562"
Bulb	T12
Base	Short Medium-Shell Octal 8-Pin with External Barriers Style B (JEDEC Group 1, No.B8-118) or Style A (JEDEC Group 1, No.B8-110), or Short Medium-Shell Octal 5-Pin with External Barriers, Style B, Arrangement 1 (JEDEC Group 1, No.B5-121)
Basing Designation for BOTTOM VIEW	5T

Pin 1 – No Connection
Pin 2 – Filament
Pin 3[a] – Same as Pin 1
Pin 4 – Plate No.2



Pin 5 – Same as Pin 1
Pin 6 – Plate No.1
Pin 7 – Same as Pin 1
Pin 8 – Filament

FULL-WAVE RECTIFIER

Maximum Ratings, *Design-Maximum Values:*

For power-supply frequencies of 25 to 1000 cps

PEAK INVERSE PLATE VOLTAGE	1550 max.	volts
AC PLATE SUPPLY VOLTAGE PER PLATE (RMS, without load)	550 max.	volts
STEADY-STATE PEAK PLATE CURRENT PER PLATE	1.4 max.	amp
TRANSIENT PEAK PLATE CURRENT PER PLATE	6.6 max.	amp
DC OUTPUT CURRENT with capacitor-input filter for ac plate supply volts (RMS, per plate, without load) = 470	415 max.	ma

Typical Operation:

	With capacitor-input filter		*With choke-input filter*	
AC Plate-to-Plate Supply Voltage (RMS, without load)	600	850	1000	volts
Filter-Input Capacitor[b]	40	40	–	μf
Filter-Input Choke	–	–	10	henrys

Total Effective Plate Supply Impedance Per Plate	20	50	–	ohms
DC Output Voltage at input to filter . . .	300	440	390	volts
DC Output Current . . .	380	350	350	ma

Characteristics:

Tube-Voltage Drop for plate ma. = 350 (Per plate)	42	volts

[a] On the 5-pin base, pin 3 as well as pins 5 and 7 is omitted.

[b] When capacitance values higher than 40 μf are used, the effective plate supply impedance should be increased so that the maximum peak-plate-current rating is not exceeded.

5V4-GA

FULL-WAVE VACUUM RECTIFIER

For use in full-wave power supplies having high dc requirements

GENERAL DATA

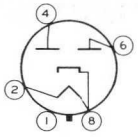
Electrical:

Heater, for Unipotential Cathode:
Voltage . . . . . 5 . . . . . ac or dc volts
Current . . . . . 2 . . . . . amp

Mechanical:

Operating Position . . . . . Any
Maximum Overall Length . . . . . 3-7/8"
Maximum Seated Length . . . . . 3-5/16"
Maximum Diameter . . . . . 1-9/16"
Bulb T12
Base . . . . . Medium-Shell Octal 5-Pin (JETEC No.B5-15), or Short Medium-Shell Octal 5-Pin with External Barriers, Style B, Arrangement 1 (JETEC No.B5-121)
Basing Designation for BOTTOM VIEW 5L

Pin 1 – No Connection
Pin 2 – Heater
Pin 4 – Plate of Unit No.2



Pin 6 – Plate of Unit No.1
Pin 8 – Heater, Cathode

FULL-WAVE RECTIFIER

Maximum Ratings, *Design-Center Values:*

PEAK INVERSE PLATE VOLTAGE	1400 max.	volts
AC PLATE-SUPPLY VOLTAGE PER PLATE (RMS):		
With capacitor-input filter.	375 max.	volts
With choke-input filter.	500 max.	volts
PEAK PLATE CURRENT PER PLATE	525 max.	ma
DC OUTPUT CURRENT.	175 max.	ma

HOT-SWITCHING TRANSIENT PLATE CURRENT PER PLATE:

Even occasional hot-switching with capacitor-input circuits permits the flow of plate current having magnitudes which can adversely affect the life and reliability of tubes. If capacitor-input circuits are to be used, protect the circuits against the possibility of hot-switching and do not exceed a maximum peak current value per plate of 3.5 amperes during the initial cycles of the hot-switching transient. If hot-switching is required in operation, the use of choke-input circuits is recommended. Such circuits limit the hot-switching current to a value no higher than that of the peak plate current.

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

TENTATIVE DATA

5V4-GA

FULL-WAVE VACUUM RECTIFIER

Typical Operation:

With capacitor input to filter		
AC Plate-to-Plate Supply Voltage (RMS). .	750	volts
Filter-Input Capacitor*	10	μf
Total Effective Plate-Supply Impedance Per Plate	100	ohms
DC Output Voltage at Input to Filter (Approx.) for dc output current of 175 ma.	410	volts
With choke input to filter		
AC Plate-to-Plate Supply Voltage (RMS). .	1000	volts
Filter-Input Choke.	4	henries
DC Output Voltage at Input to Filter (Approx.) for dc output current of 175 ma.	410	volts

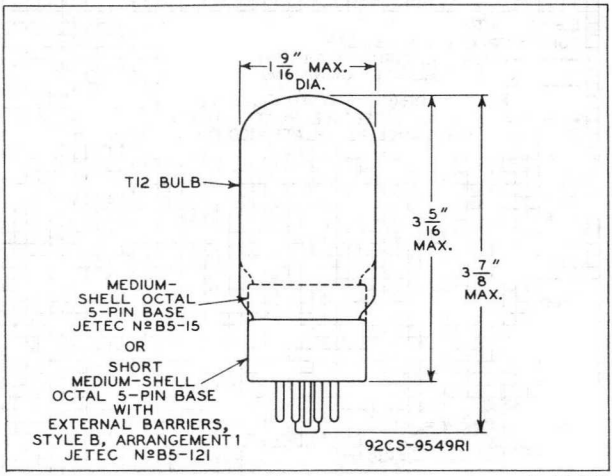
* Higher values of capacitance than indicated may be used, but the effective plate-supply impedance should be increased to prevent exceeding the maximum rating for peak plate current.

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

TENTATIVE DATA

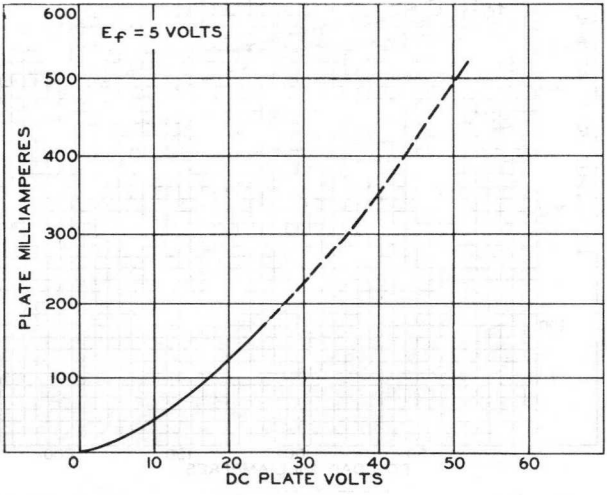
5V4-GA

FULL-WAVE VACUUM RECTIFIER



CE-9549R1

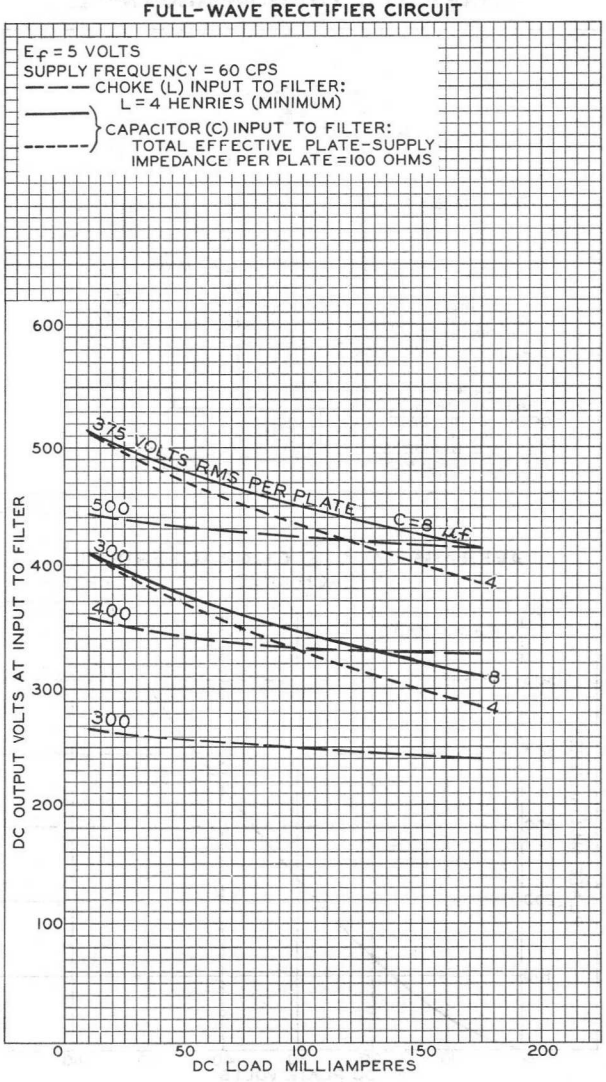
AVERAGE PLATE CHARACTERISTIC
EACH UNIT



5V4-GA

OPERATION CHARACTERISTICS

FULL-WAVE RECTIFIER CIRCUIT



5V6-GT

BEAM POWER TUBE

Intended for use in equipment having series heater-string arrangement

The 5V6-GT is the same as the 6V6-GT except for the following items:

Heater, for Unipotential Cathode:

Voltage	4.7	ac or dc volts
Current	0.6	amp
Warm-up time (Average)	11	sec

For definition of heater warm-up time and method of determining it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of this Section.

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode.	200 max.	volts
Heater positive with respect to cathode.	200▲ max.	volts

▲ The dc component must not exceed 100 volts.

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

5X8
TRIODE-PENTODE CONVERTER

9-PIN MINIATURE TYPE

Intended for use in equipment having series heater-string arrangement

The 5X8 is the same as the 6X8 except for the following items:

Heater, for Unipotential Cathode:

Voltage	4.7	ac or dc volts
Current	0.6	amp
Warm-up time (Average)	11	sec

For definition of heater warm-up time and method of determining it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of this section.

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200▲ max.	volts

▲ The dc component must not exceed 100 volts.

Full-Wave Vacuum Rectifier

GENERAL DATA

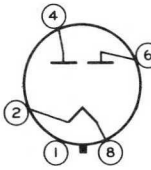
Electrical:

Filament, Coated:
Voltage (AC or DC). . . . . 5 volts
Current . . . . . 2 amp

Mechanical:

Operating Position. . . . . Vertical, base down or up, or Horizontal with pins 2 and 4 in vertical plane ←
Maximum Overall Length. . . . . 3-3/8"
Maximum Seated Length . . . . . 2-13/16"
Maximum Diameter. . . . . 1-9/32" ←
Dimensional Outline . . . . . See *General Section*
Bulb. T9
Base. . . . . Intermediate-Shell Octal 5-Pin, Arrangement 1 (JEDEC Group 1, No.B5-10), or Short Intermediate-Shell Octal 5-Pin with External Barriers, Arrangement 1 (JEDEC Group 1, No.B5-62) ←
Basing Designation for BOTTOM VIEW. 5T

Pin 1 – No Connection
Pin 2 – Filament



Pin 4 – Plate No.2
Pin 6 – Plate No.1
Pin 8 – Filament

FULL-WAVE RECTIFIER

Maximum Ratings, *Design-Center Values:* ←

For power-supply frequencies of 25 to 1000 cps

PEAK INVERSE PLATE VOLTAGE.	1400 max.	volts
AC PLATE SUPPLY VOLTAGE PER PLATE (RMS, without load)	See *Rating Chart I*	
STEADY-STATE PEAK PLATE CURRENT PER PLATE (See *Rating Chart II*)	440 max.	ma
TRANSIENT PEAK PLATE CURRENT PER PLATE (See *Rating Chart III*).	2.5 max.	amp
DC OUTPUT CURRENT	See *Rating Chart I*	

Typical Operation: ←

	With capacitor-input filter	*With choke-input filter*	
AC Plate-to-Plate Supply Voltage (RMS, without load)	700	1000	volts
Filter-Input Capacitor[a] .	20	–	μf

← Indicates a change.

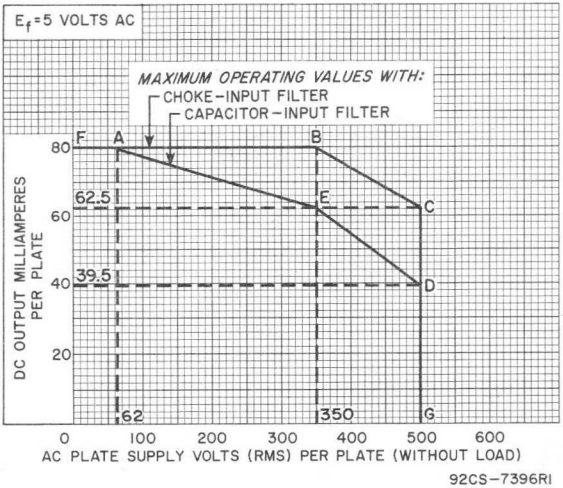
Filter-Input Choke. . . .	–	10	henrys
Total Effective Plate Supply Impedance Per Plate	50	–	ohms
DC Output Voltage at input to filter	360	380	volts
DC Output Current	125	125	ma

→**Characteristics, Instantaneous Test Condition:**

Tube-Voltage Drop for plate ma. = 125 (Per plate)	50 volts

[a] Values of capacitance greater than 20 μf may be used, provided the plate supply impedance is increased to prevent exceeding the maximum peak-plate-current rating.

RATING CHART I



92CS-7396RI

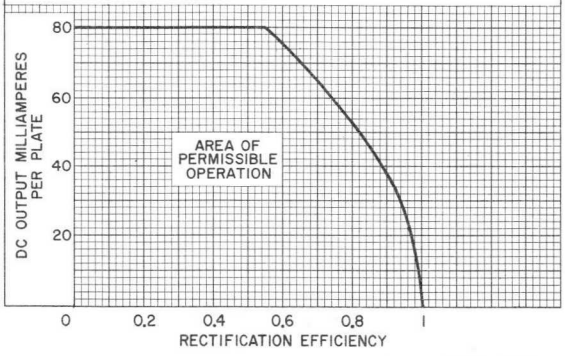
→Indicates a change.

RATING CHART II
Capacitor-Input Filter

E_f = 5 VOLTS AC MAXIMUM STEADY-STATE PEAK PLATE CURRENT PER PLATE (MILLIAMPERES) = 440

RECTIFICATION EFFICIENCY = $\frac{\bar{E}}{1.41\,E_S}$,

WHERE $\bar{E}$ = DC OUTPUT VOLTS AT INPUT TO FILTER
E_S = AC PLATE SUPPLY VOLTS (RMS) PER PLATE



92CS-11212

RATING CHART III
Capacitor-Input Filter

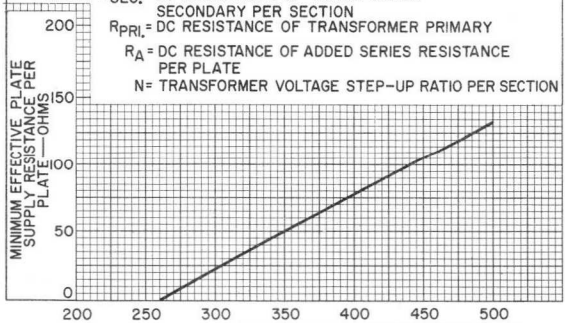
E_f = 5 VOLTS AC

MAXIMUM TRANSIENT PEAK PLATE CURRENT PER PLATE (AMPERES) = 2.5

EFFECTIVE PLATE SUPPLY RESISTANCE PER PLATE =

$R_{SEC.} + N^2 R_{PRI.} + R_A$

WHERE $R_{SEC.}$ = DC RESISTANCE OF TRANSFORMER SECONDARY PER SECTION
$R_{PRI.}$ = DC RESISTANCE OF TRANSFORMER PRIMARY
R_A = DC RESISTANCE OF ADDED SERIES RESISTANCE PER PLATE
N = TRANSFORMER VOLTAGE STEP-UP RATIO PER SECTION



92CS-11213

6AB4

HIGH-MU TRIODE

MINIATURE TYPE PARTICULARLY SUITABLE FOR CATHODE-DRIVE CIRCUITS

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

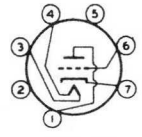
Voltage	6.3		ac or dc volts
Current	0.15		amp

Direct Interelectrode Capacitances:	*Without External Shield*	*With External Shield No. 316 Tied to Cathode*	
Grid to Plate	1.5	1.5	μμf
Grid to Heater and Cathode.	2.2	2.2	μμf
Plate to Heater and Cathode.	0.5	1.4	μμf
Heater to Cathode	2.9	2.9	μμf
Plate to Cathode.	0.24	0.2	μμf
Cathode to Heater and Grid.	5.0	5.2	μμf
Plate to Heater and Grid.	1.7	2.6	μμf

Mechanical:

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

Pin 1 – Plate
Pin 2 – Internal Shield
Pin 3 – Heater
Pin 4 – Heater



Pin 5 – No Connection
Pin 6 – Grid
Pin 7 – Cathode

AMPLIFIER - Class A_1

Maximum Ratings, *Design-Center Values*:

PLATE VOLTAGE	300 max.	volts
GRID VOLTAGE:		
Negative bias value	50 max.	volts
Positive bias value	0 max.	volts
PLATE DISSIPATION	2.5 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	90 max.	volts
Heater positive with respect to cathode	90 max.	volts

Characteristics:

Plate Voltage	100	250	volts
Cathode-bias Resistor	270	200	ohms
Internal Shield	Connected to ground		
Amplification Factor	60	60	

←Indicates a change

6AB4

HIGH-MU TRIODE

Plate Resistance (Approx.)	15000	10900	ohms
Transconductance	4000	5500	μmhos
Grid Bias (Approx.) for plate current of 10 μamp.	-5	-12	volts
Plate Current	3.7	10	ma

CURVES
for the 6AB4 are the same
as those for each unit of Type 12AT7

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6AF3
HALF-WAVE VACUUM RECTIFIER

9-PIN MINIATURE TYPE

For television damper service

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	6.3 ± 10%	volts
Current	1.2	amp
Direct Interelectrode Capacitances (Approx.):○		
Plate to cathode and heater	6	μμf
Cathode to plate and heater	9	μμf
Heater to cathode	2.8	μμf

Mechanical:

Operating Position	Any
Maximum Overall Length	3-9/32"
Maximum Seated Length	2-7/8" ± 1/8"
Diameter	0.750" to 0.875"
Dimensional Outline	*See General Section*
Bulb	T6-1/2
Cap	Skirted Miniature (JEDEC No.C1-2)
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)
Basing Designation for BOTTOM VIEW	9CB

Pin 1 – Internal Connection—Do Not Use♦
Pin 2 – Same as Pin 1
Pin 3 – Same as Pin 1
Pin 4 – Heater

Pin 5 – Heater
Pin 6 – Same as Pin 1
Pin 7 – Same as Pin 1
Pin 8 – Same as Pin 1
Pin 9 – Plate
Cap – Cathode

DAMPER SERVICE

Maximum Ratings, *Design-Maximum Values:*

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

PEAK INVERSE PLATE VOLTAGE	4500■	max.	volts
PEAK PLATE CURRENT	750	max.	ma
DC PLATE CURRENT	185	max.	ma
PLATE DISSIPATION	6	max.	watts
PEAK HEATER CATHODE VOLTAGE:			
Heater negative with respect to cathode	4500*	max.	volts
Heater positive with respect to cathode	300▲	max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)	210	max.	°C

Characteristics:

Tube-Voltage Drop for plate ma. = 340	30	volts

○ Without external shield.

♦ Socket terminals 1,2,3,6,7, and 8 should not be used as tie points.

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

6AF3

HALF-WAVE VACUUM RECTIFIER

■ This rating is applicable where the duty cycle 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.

* The dc component must not exceed 1000 volts.

▲ The dc component must not exceed 100 volts.

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

6AF4

MEDIUM-MU TRIODE

MINIATURE TYPE

For UHF TV service

The 6AF4 is the same as the 6AF4-A except for the following mechanical dimensions:

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"

6AF4A

Medium-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	0.225	amp
Direct Interelectrode Capacitance (Approx.):[a]		
Grid to plate	1.9	μμf
Grid to cathode and heater	2.2	μμf
Plate to cathode and heater	1.4	μμf
Heater to cathode	2.2[b]	μμf

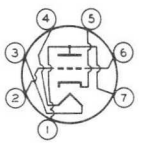
Characteristics, Class A_1 Amplifier:

Plate Supply Voltage	80	volts
Cathode Resistor	150	ohms
Amplification Factor	13.5	
Plate Resistance (Approx.)	2100	ohms
Transconductance	6500	μmhos
Plate Current	17.5	ma

Mechanical:

Operating Position	Any
Maximum Overall Length	1-3/4"
Maximum Seated Length	1-1/2"
Length, Base Seat to Bulb Top (Excluding tip)	1-1/8" ± 3/32"
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	7DK

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



Pin 5 – Cathode
Pin 6 – Grid
Pin 7 – Plate

UHF OSCILLATOR

Maximum Ratings, *Design-Maximum Values:*

PLATE VOLTAGE	150	max.	volts
GRID VOLTAGE:			
Negative-bias value	50	max.	volts
GRID CURRENT	2	max.	ma
CATHODE CURRENT	24	max.	ma
PLATE DISSIPATION	2.5	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	50	max.	volts
Heater positive with respect to cathode	50[c]	max.	volts

← Indicates a change.

Typical Operation:

At frequency of 1000 Mc

Plate Supply Voltage	100	volts
Plate Resistor	220	ohms
Grid Resistor	10000	ohms
Plate Current	17	ma
Grid Current (Approx.)	750	μa

Maximum Circuit Values:

Grid-Circuit Resistance:

For fixed-bias operation	Not recommended
For cathode-bias operation	0.5 max. megohm

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

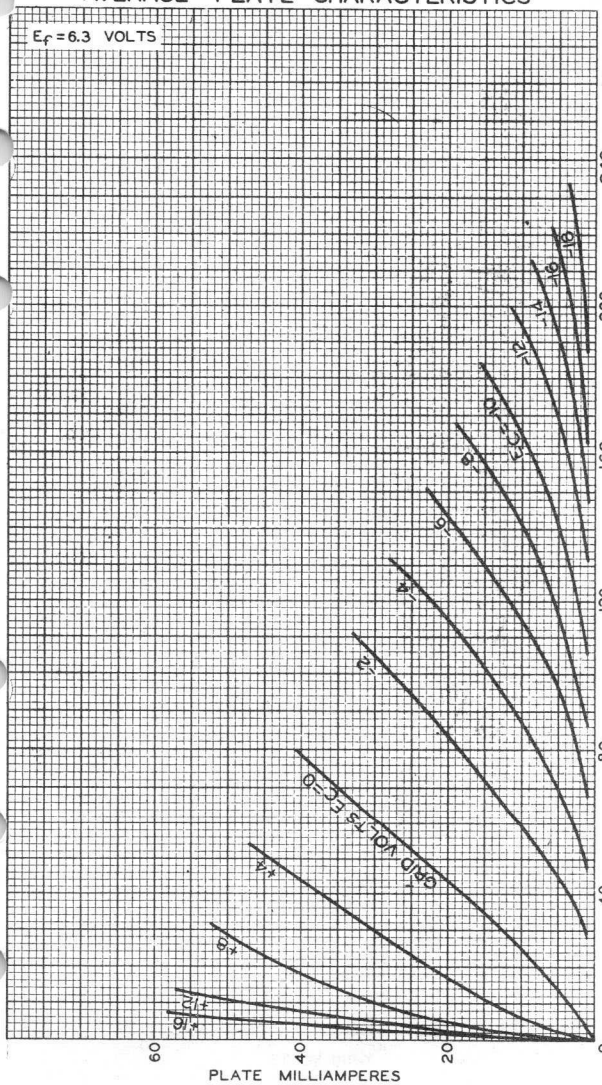
[b] With external shield JEDEC No.316 connected to plate.

[c] The dc component must not exceed 25 volts.

RCA

6AF4-A

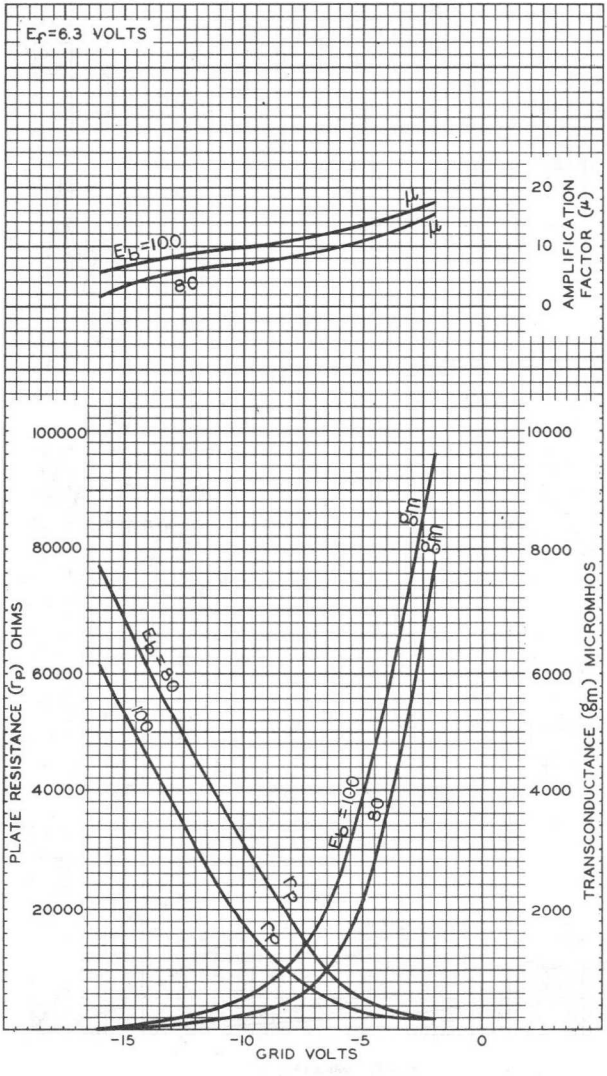
AVERAGE PLATE CHARACTERISTICS



RCA

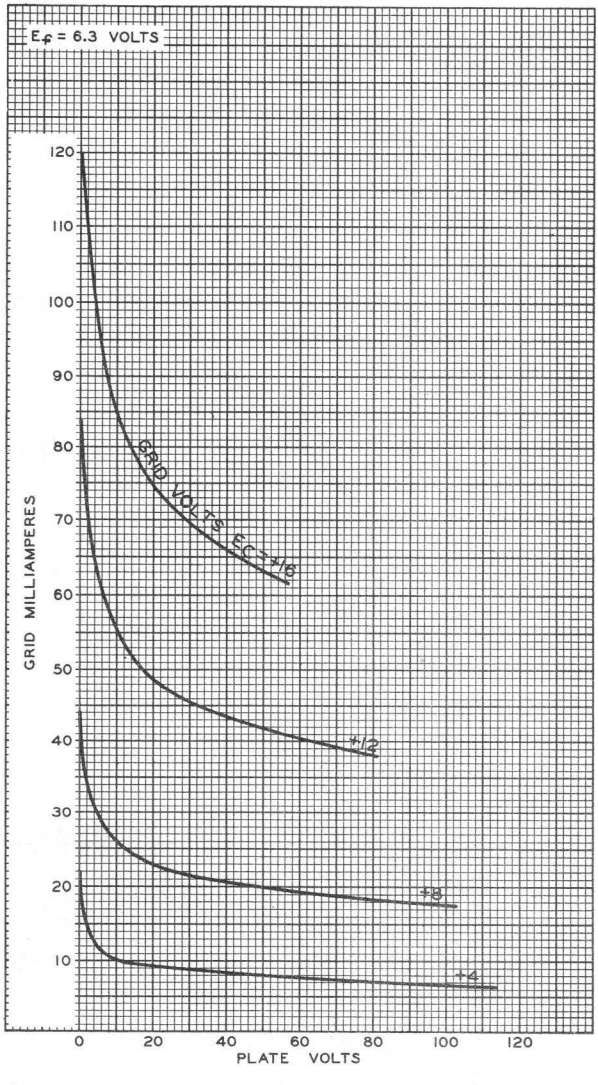
6AF4-A

AVERAGE CHARACTERISTICS



6AF4-A

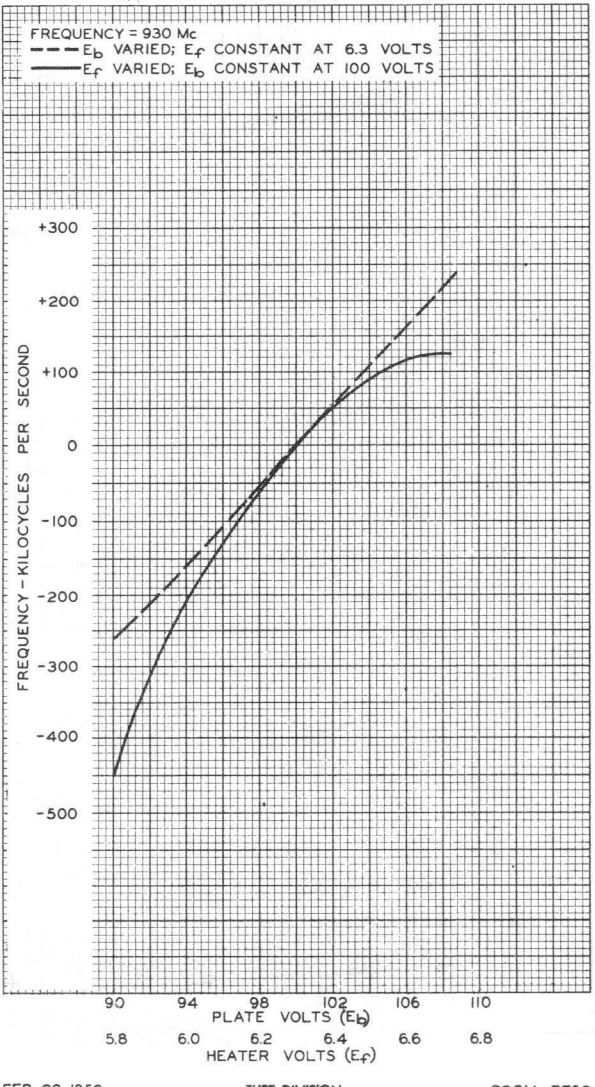
AVERAGE CHARACTERISTICS



RCA

6AF4-A

FREQUENCY SHIFT CHARACTERISTICS



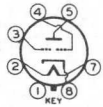
6AF6-G

ELECTRON-RAY TUBE

TWIN-INDICATOR TYPE

Heater	Coated Unipotential Cathode	
Voltage	6.3	a-c or d-c volts
Current	0.15	amp.
Overall Length		2-1/4" {+1/16" -1/4" ←
Seated Height		1-11/16" {+1/16" -1/4 ←
Maximum Diameter		1-5/16"
Bulb		T-9
Base		Intermed. Sh. Octal 7-Pin

Pin 1 – No Connection
Pin 2 – Heater
Pin 3 – Ray-Control Electrode, Unit No. 2



Pin 4 – Ray-Control Electrode, Unit No. 1
Pin 5 – Target
Pin 7 – Heater
Pin 8 – Cathode

Mounting Position — BOTTOM VIEW (7AG) — Any**

Maximum and Minimum Ratings Are Design-Center Values

INDICATOR SERVICE

Target Voltage			250 max.	volts ←
			125 min.	volts ←
Ray-Control Electrode Supply Voltage			250 max.	volts ←
D-C Heater-Cathode Potential			90 max.	volts ←
Typical Operation:				←
Target Voltage	125	250		volts
Series Resistor □	0.5	1.0		megohm
Target Current*	0.65	2.2		ma.
Ray-Control Electrode Voltage †	80	160	approx.	volts
Ray-Control Electrode Voltage ††	0	0	approx.	volts

** The plane of the ray-control electrodes passes through pins No. 3 and No. 7.

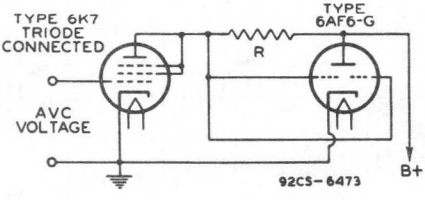
□ Designated R in circuit diagram below.

* With 0 volts on ray-control electrodes. Subject to wide variations.

† For shadow angle of 0° produced by either ray-control electrode.

†† For shadow angle of 95° produced by either ray-control electrode.

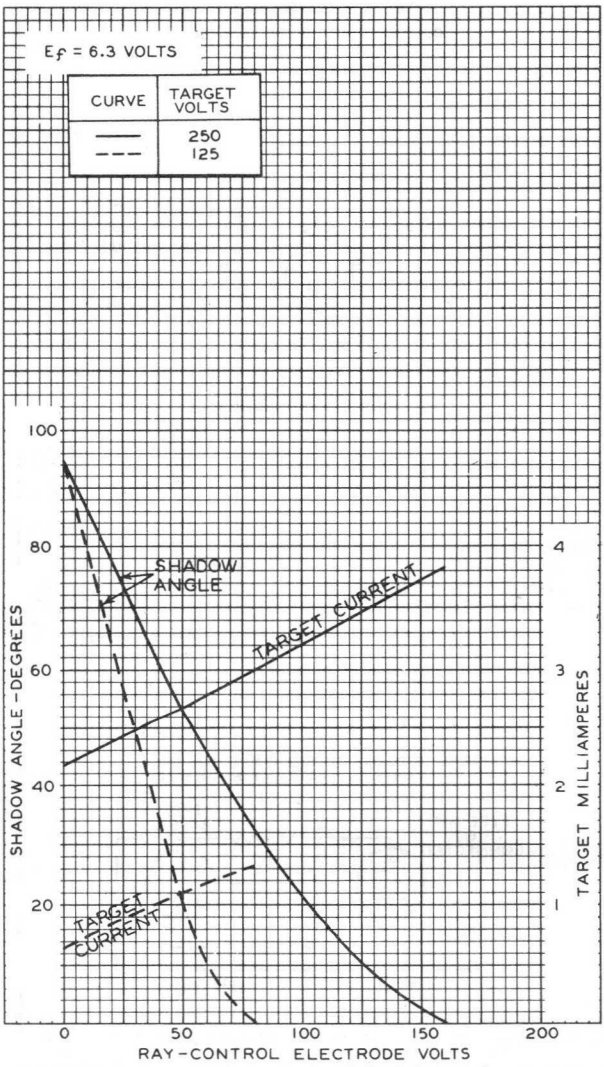
TYPICAL CIRCUIT USING TYPE 6AF6-G
WITH RAY-CONTROL ELECTRODES IN PARALLEL



 ← Indicates a change.

6AF6-G

AVERAGE CHARACTERISTICS



SEPT. 25, 1944 RCA VICTOR DIVISION 92CM-4909R1
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

Dual Triode—Sharp-Cutoff Pentode

Dual Triode Has High-Mu Unit & Medium-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:		
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: (Without external shield)		
Triode Unit No.1		
Grid to plate	1.9	pf
Input: G_{T1} to (K_{T1}, K_{T2} + IS, Kp + G3p + IS, H)	3.0	pf
Output: P_{T1} to (K_{T1}, K_{T2} + IS, Kp + G3p + IS, H)	2.2	pf
Triode Unit No.2		
Grid to plate	3.6	pf
Input: G_{T2} to (K_{T2} + IS, Kp + G3p + IS, H)	2.4	pf
Output: P_{T2} to (K_{T2} + IS, Kp + G3p + IS, H)	3.8	pf
Pentode Unit		
Grid No.1 to plate	0.12	pf
Input: G1p to (K_{T2} + IS, Kp + G3p + IS, G2p, H)	10.0	pf
Output: Pp to (K_{T2} + IS, Kp + G3p + IS, G2p, H)	4.5	pf
Pentode plate to plate of triode No.2	0.045 max.	pf
Plate of triode No.1 to plate of triode No.2	0.06 max.	pf

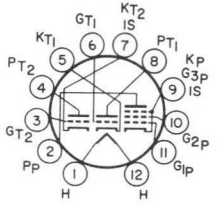
Characteristics, Class A_1 Amplifier:

Triode Units	*No.1*	*No.2*	
Plate Supply Voltage	200	200	volts
Grid Voltage	−2	−	volts
Cathode Resistor	−	220	ohms
Amplification Factor	68	41	
Plate Resistance (Approx.)	12400	9400	ohms
Transconductance	5500	4400	μmhos
Plate Current	7	9.2	ma
Grid Voltage for I_b = 10 μa	−5.5	−	volts
Grid Voltage for I_b = 100 μa	−	−6.5	volts
Pentode Unit			
Plate Supply Voltage	50	200	volts
Grid-No.2 Supply Voltage	150	150	volts
Grid-No.1 Voltage	0	−	volts
Cathode Resistor	−	100	ohms
Plate Resistance (Approx.)	−	68000	ohms
Transconductance	−	11000	μmhos
Plate Current	55[a]	24	ma
Grid-No.2 Current	18[a]	4.8	ma
Grid No.1 Voltage for I_b = 100 μa	−	−10	volts

Mechanical:

Operating Position . . . . . Any
Types 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 12DP

Pin 1 - Heater
Pin 2 - Pentode Plate
Pin 3 - Grid of Triode Unit No.2
Pin 4 - Plate of Triode Unit No.2
Pin 5 - Cathode of Triode Unit No.1
Pin 6 - Grid of Triode Unit No.1
Pin 7 - Cathode of Triode Unit No.2, Internal Shield
Pin 8 - Plate of Triode Unit No.1
Pin 9 - Pentode Cathode, Pentode Grid No.3, Internal Shield
Pin 10 - Pentode Grid No.2
Pin 11 - Pentode Grid No.1
Pin 12 - Heater



AMPLIFIER — Class A_1

Maximum Ratings, *Design-Maximum Values:*

	Triode Units No.1	No.2	
Plate Voltage.	330	330	volts
Grid (Control-Grid) Voltage:			
Positive-bias value.	0	0	volts
Plate Dissipation.	1.1	2	watts

Pentode Unit

Plate Voltage.	330	volts
Grid-No.2 (Screen-Grid) Supply Voltage	330	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	volts
Grid-No.2 Input:		
For grid-No.2 voltages up to 165 volts	1.25	watts
For grid-No.2 voltages between 165 and 330 volts. .	See *Grid-No.2 Input Rating Chart*	
Plate Dissipation	5	watts

Maximum Circuit Values: *(Values are for Each Unit)*

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

[a] Value measured by recurrent waveform such that maximum ratings of tube are not exceeded.

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

6AG5

SHARP-CUTOFF PENTODE

MINIATURE TYPE

Useful at Frequencies up to 400 Mc

GENERAL DATA

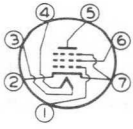
Electrical:

Heater, for Unipotential Cathode:			
Voltage	6.3		ac or dc volts
Current	0.3		amp
Direct Interelectrode Capacitances:	*Without Shield*	*With Shield°*	
Pentode Connection:			
Grid No.1 to plate	0.030 max.	0.020 max.	μμf
Grid No.1 to cathode & grid No.3 & internal shield, grid No.2, and heater	6.5	6.6	μμf
Plate to cathode & grid No.3 & internal shield, grid No.2, and heater	1.8	3.1	μμf
Triode Connection, Grid No.2 tied to Plate:			
Grid No.1 to plate and grid No.2	2.5	2.5	μμf
Grid No.1 to cathode & grid No.3 & internal shield, and heater	3.6	3.6	μμf
Plate and grid No.2 to cathode & grid No.3 & internal shield, and heater	3	4.3	μμf

Mechanical:

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

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



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

° With external shield JETEC No.316 connected to pin No.7.

←indicates a change.

6AG5

6AG5

SHARP-CUTOFF PENTODE

AMPLIFIER - Class A_1

Pentode Connection

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

PLATE VOLTAGE	300 max.	volts
GRID-No.2 (SCREEN) 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
PLATE DISSIPATION	2 max.	watts
GRID-No.2 INPUT:		
For grid-No.2 voltages up to 150 volts	0.5 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*	
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	90 max.	volts
Heater positive with respect to cathode	90 max.	volts

→ **Typical Operation and Characteristics:**

Plate Voltage	100	125	250	volts
Grid-No.2 Voltage	100	125	150	volts
Cathode-Bias Resistor	180	100	180	ohms
Plate Resistance (Approx.)	0.6	0.5	0.8	megohm
Transconductance	4500	5100	5000	μmhos
Plate Current	4.5	7.2	6.5	ma
Grid-No.2 Current	1.4	2.1	2.0	ma
Grid-No.1 Voltage (Approx.) for plate current = 10 μamp	−5	−6	−8	volts

AMPLIFIER - Class A_1

Triode Connection - Grid No.2 Connected to Plate

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

PLATE VOLTAGE	300 max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Positive bias value	0 max.	volts
PLATE AND GRID-No.2 DISSIPATION (TOTAL)	2.5 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	90 max.	volts
Heater positive with respect to cathode	90 max.	volts

Typical Operation and Characteristics:

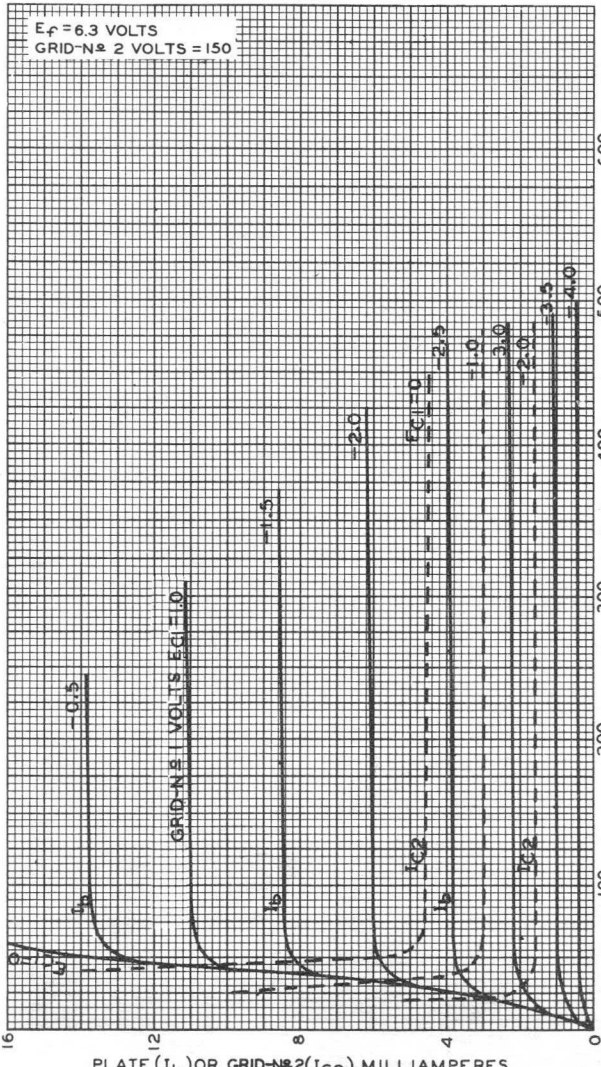
Plate Voltage	180	250	volts
→ Cathode-Bias Resistor	330	820	ohms
→ Plate Resistance (Approx.)	0.008	0.01	megohm
Amplification Factor	45	42	
Transconductance	5700	3800	μmhos
Plate & Grid-No.2 Current (Total)	7	5.5	ma

→ Indicates a change.

RCA

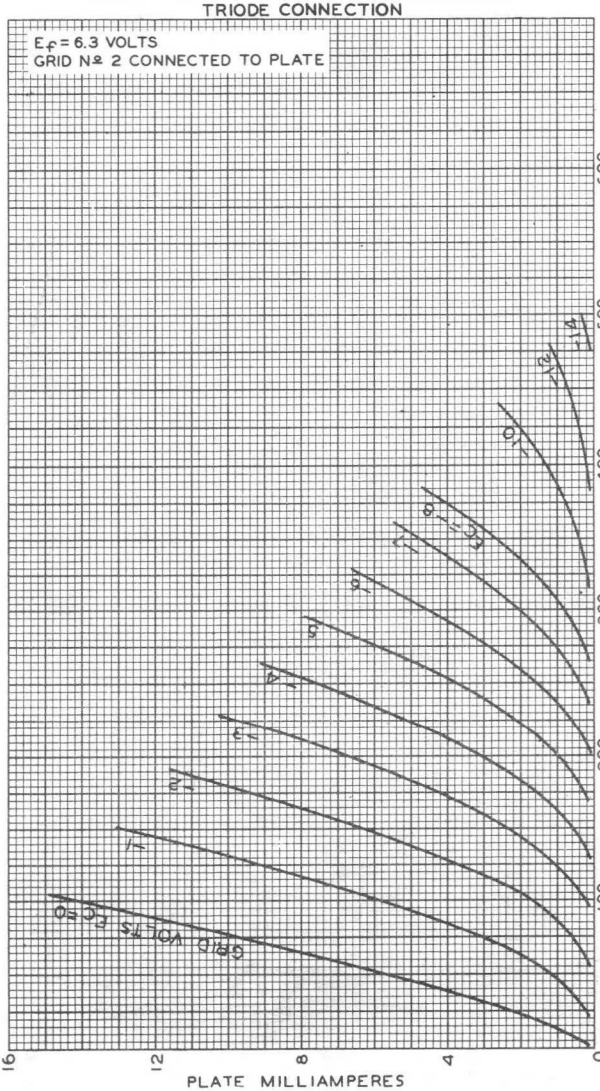
6AG5

AVERAGE PLATE CHARACTERISTICS



6AG5

6AG5
AVERAGE PLATE CHARACTERISTICS
TRIODE CONNECTION



6AG7
POWER PENTODE

SINGLE-ENDED METAL TYPE

GENERAL DATA

Electrical:

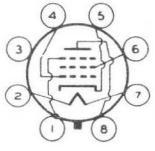
Heater, for Unipotential Cathode:		
Voltage	6.3	ac or dc volts
Current	0.65	amp
Direct Interelectrode Capacitances:		
With Pin No.1 and Pin No.3 connected to Pin No.5		
Grid No.1 to Plate	0.06 max.	μμf
Input	13	μμf
Output	7.5	μμf

Characteristics, Amplifier Class A_1

Plate Voltage	300	volts
Grid-No.2 Voltage	150	volts
Grid-No.1 Voltage	-3	volts
Peak AF Grid-No.1 Signal Voltage	3	volts
Zero-Signal DC Plate Current	30	ma
Max.-Signal DC Plate Current	30.5	ma
Zero-Signal DC Grid-No.2 Current	7	ma
Max.-Signal DC Grid-No.2 Current	9	ma
Plate Resistance (Approx.)	0.13	megohm
Transconductance	11000	μmhos
Load Resistance	10000	ohms
Total Harmonic Distortion	7	per cent
Max.-Signal Power Output	3	watts

Mechanical:

Mounting Position	Any
Maximum Overall Length	3-1/4"
Seated Length	2-19/32" ± 3/32" ←
Maximum Diameter	1-5/16"
Bulb	Metal Shell, MT-8
Base	Small-Wafer Octal 8-Pin (JETEC No.B8-21)
Basing Designation for BOTTOM VIEW	8Y ←



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

AMPLIFIER - Class A_1

Maximum Ratings, *Design-Center Values*:

PLATE VOLTAGE	300 max.	volts
GRID-No.2 (SCREEN) VOLTAGE	300 max.	volts

← Indicates a change

6AG7
POWER PENTODE

GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Positive bias value	0 max.	volts
PLATE DISSIPATION	9 max.	watts
GRID-No.2 INPUT	1.5 max.	watts
→ PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	90 max.	volts
Heater positive with respect to cathode	90 max.	volts

Typical Operation in 4-Mc Bandwidth Video Amplifier
Circuit of Fig. 1:

With Grid-Resistor Bias

Used where dc restoration is accomplished in grid-No.1 circuit of the 6AG7

Plate Supply Voltage	300	volts
Grid-No.2 Voltage†	115	volts
Zero-Signal Grid-No.1 Voltage	0	volts
Grid-No.1 Resistor	0.25 to 0.5	megohm
Grid-No.1 Signal Voltage (Peak to Peak)	4	volts
Zero-Signal Plate Current	45	ma
Zero-Signal Grid-No.2 Current	13	ma
Load Resistor	3500	ohms
Voltage Output (Peak to Peak)	135	volts

With Cathode-Resistor Bias

Plate Supply Voltage	300	volts
Grid-No.2 Voltage°	125	volts
from series resistor of	25000	ohms
Grid-No.1 Voltage	-2	volts
Cathode Resistor (Bypassed with capacitor of 250 μf, approx.)	57	ohms
Grid-No.1 Signal Voltage (Peak to Peak)	4	volts
Zero-Signal Plate Current	28	ma
Zero-Signal Grid-No.2 Current	7	ma
Load Resistor	3500	ohms
Voltage Output (Peak to Peak)	140	volts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:		
For fixed-bias operation	0.25 max.	megohm
For cathode-bias operation	1.0 max.	megohm

† Obtained from supply having good regulation.

° Obtained preferably from 300-volt plate supply through resistor of value shown.

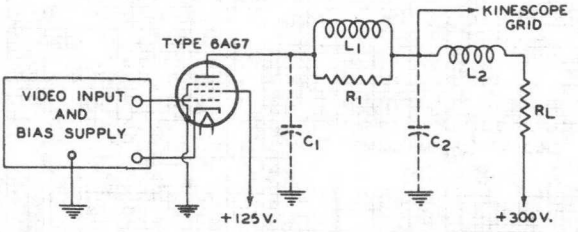
→ Indicates a change

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6AG7

POWER PENTODE

Fig. 1 – Typical Video Voltage Amplifier Circuit Having Bandwidth of 4 Mc.



C_1 = 9.5 μμf = Tube Output Capacitance + Socket Capacitance + Wiring Capacitance + Coil Capacitance

C_2 = 19 μμf = Kinescope Capacitance + Socket Capacitance + Wiring Capacitance + Coil Capacitance

L_1 = 250 μh Filter Inductor

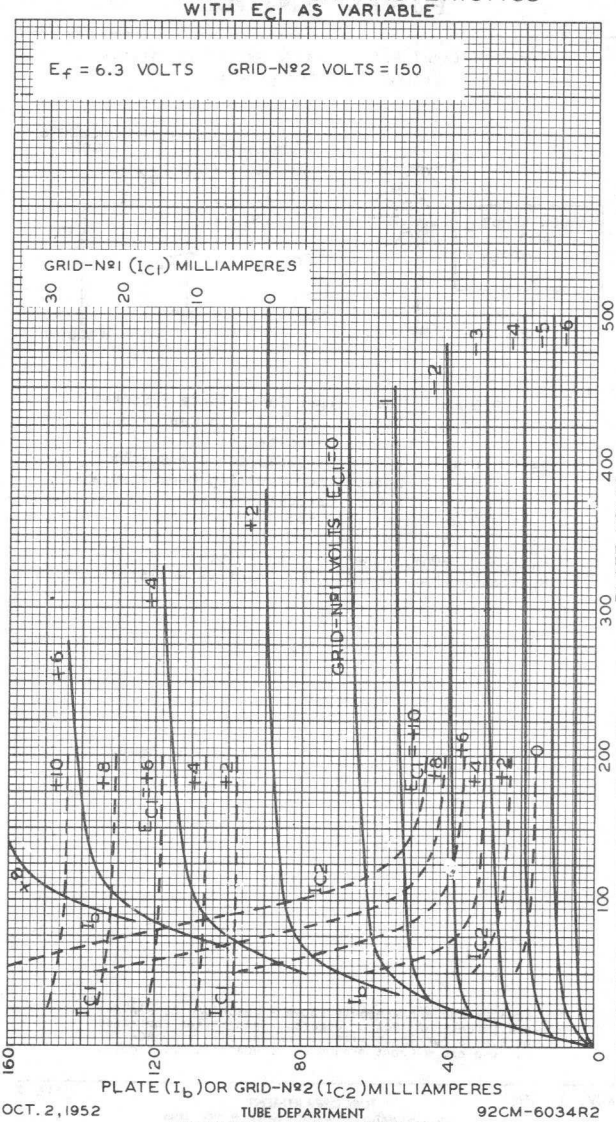
L_2 = 125 μh Filter Inductor

R_1 = 20000-Ohm, Non-Reactive Resistor

R_L = 3500-Ohm, 10-Watt, Non-Reactive Resistor

6AG7

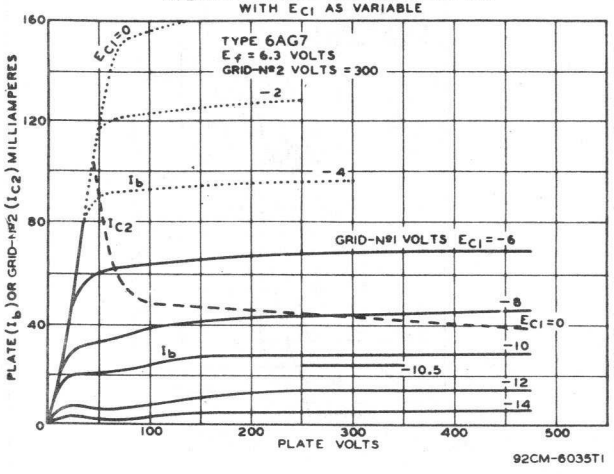
6AG7
AVERAGE PLATE CHARACTERISTICS
WITH E_{C1} AS VARIABLE

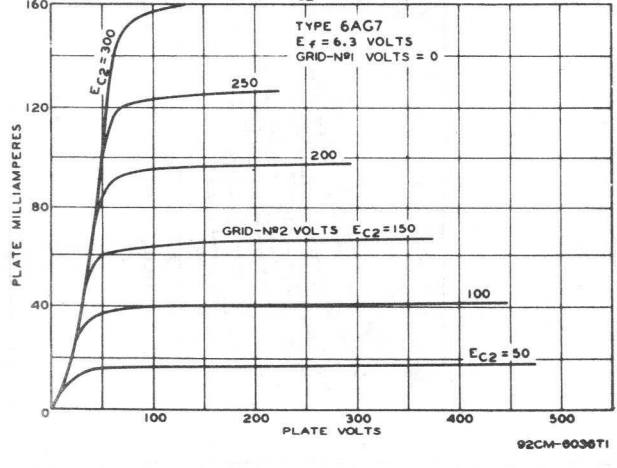


OCT. 2, 1952 TUBE DEPARTMENT 92CM-6034R2

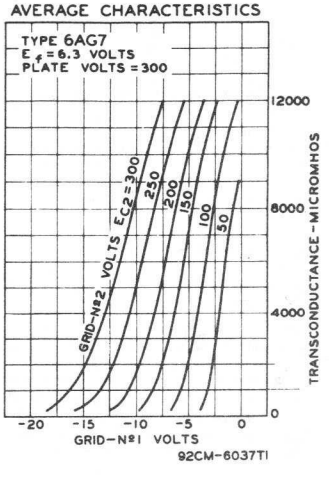
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

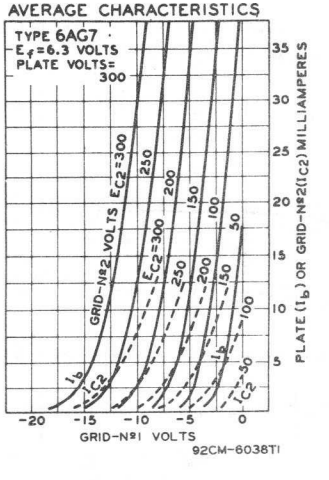
6AG7
POWER PENTODE





6AG7
POWER PENTODE





6AK5

SHARP-CUTOFF PENTODE

7-PIN MINIATURE TYPE

Useful at frequencies up to 400 Mc

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:
Voltage. . . . . 6.3 . . . . . ac or dc volts
Current. . . . . 0.175 . . . . . amp

Direct Interelectrode Capacitances:

	Without External Shield	*With External Shield*[0]	
Grid No.1 to plate	0.03 max.	0.02 max.	μμf
Grid No.1 to cathode & grid No.3 & internal shield, grid No.2, and heater	4	4	μμf
Plate to cathode & grid No.3 & internal shield, grid No.2, and heater	2.1	2.8	μμf

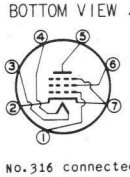
Characteristics, Class A_1 Amplifier:

Plate Voltage.	120	180	volts
Grid-No.2 (Screen) Voltage	120	120	volts
Cathode-Bias Resistor.	180	180	ohms
Plate Resistance (Approx.)	0.30	0.50	megohm
Transconductance	5000	5100	μmhos
Plate Current.	7.5	7.7	ma
Grid-No.2 Current.	2.5	2.4	ma
Grid-No.1 Voltage (Approx.) for plate current of 10 μamp	-8.5	-8.5	volts

Mechanical:

Mounting Position. . . . . Any
Maximum Overall Length . . . . . 1-3/4"
Maximum Seated Length. . . . . 1-1/2"
Length, Base Seat to Bulb Top (Excluding tip). 1-1/8" ±3/32"
Maximum Diameter . . . . . 3/4"
Dimensional Outline. . . . . *See General Section*
Bulb T-5-1/2
Base . . . . . Small-Button Miniature 7-Pin (JETEC No.E7-1)
Basing Designation for BOTTOM VIEW 7BD

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



Pin 4 - Heater
Pin 5 - Plate
Pin 6 - Grid No.2
Pin 7 - Same as Pin 2

[0] With external shield JETEC No.316 connected to cathode.

← Indicates a change.

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6AK5

SHARP-CUTOFF PENTODE

AMPLIFIER - Class A_1

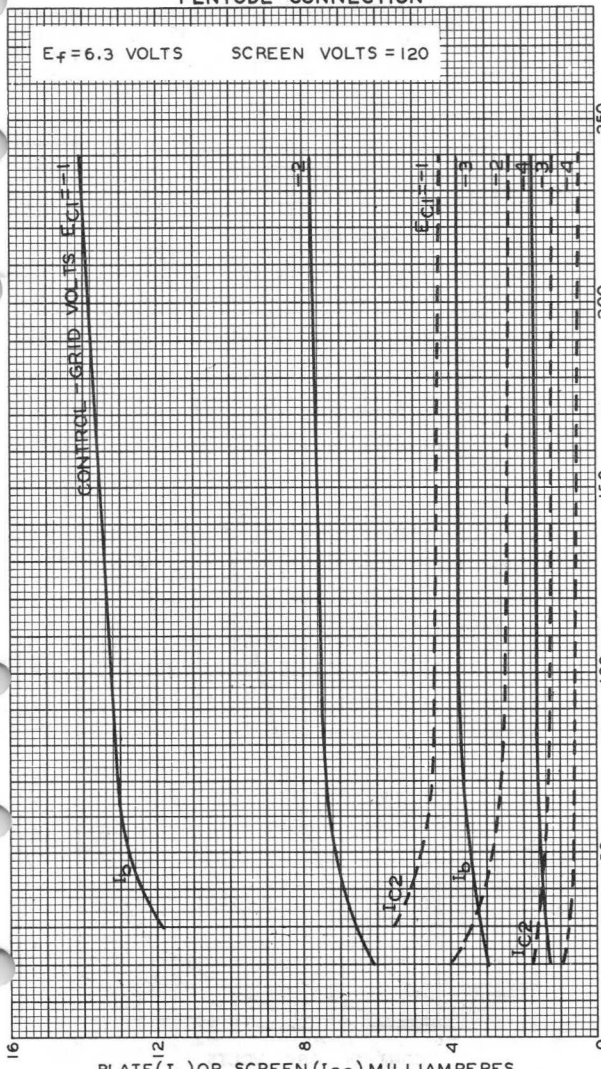
→ **Maximum Ratings,** *Design-Center Values:*

PLATE VOLTAGE	180 max.	volts
GRID-No.2 (SCREEN) 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
PLATE DISSIPATION	1.7 max.	watts
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*	
CATHODE CURRENT	18 max.	ma
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to catnode	120 max.	volts
Heater positive with respect to cathode	120 max.	volts

→ Indicates a change.

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6AK5
AVERAGE PLATE CHARACTERISTICS
PENTODE CONNECTION



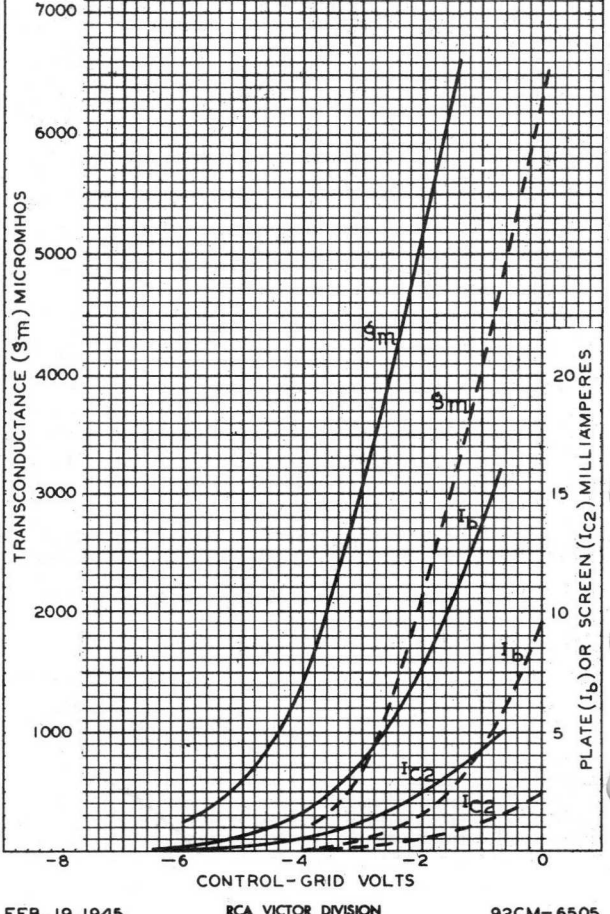
6AK5

6AK5

AVERAGE CHARACTERISTICS
PENTODE CONNECTION

E_f = 6.3 VOLTS

CURVES	SCREEN VOLTS	PLATE VOLTS
———	120	180
– – –	75	180



Half-Wave Vacuum Rectifier

9-PIN MINIATURE TYPE

GENERAL DATA

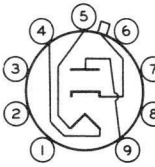
Electrical:

Heater Characteristics and Ratings *(Design-Center Values):*		
Voltage (AC or DC)	6.3 ± 0.6	volts
Current at heater volts = 6.3	1.550	amp
Peak heater-cathode voltage	6600 max.	volts
Direct Interelectrode Capacitances (Approx.):[a]		
Plate to cathode and heater	8.6	μμf
Heater to cathode	2	μμf

Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	3-1/2"
Maximum Seated Length	3-1/4"
Diameter	0.750" to 0.875"
Bulb	T6-1/2
Cap	Skirted Miniature (JEDEC No.C1-2)
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)
Basing Designation for BOTTOM VIEW	9CB

Pin 1 – Do Not Use[b]
Pin 2 – Same as Pin 1
Pin 3 – Same as Pin 1
Pin 4 – Heater
Pin 5 – Heater



Pin 6 – Same as Pin 1
Pin 7 – Same as Pin 1
Pin 8 – Same as Pin 1
Pin 9 – Plate
Cap – Cathode

DAMPER SERVICE

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

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

PEAK INVERSE PLATE VOLTAGE (Absolute-maximum value)[d]	7500[e]	max.	volts
PEAK PLATE CURRENT	550	max.	ma
DC PLATE CURRENT	220	max.	ma
PLATE DISSIPATION	5	max.	watts

[a] Without external shield.

[b] Socket terminals 1,2,3,6,7, and 8 should not be used as tie points.

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

[d] This rating is applicable where the duty cycle 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] Under no circumstances should this absolute-maximum value be exceeded.

6AL5

TWIN DIODE

MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:		
Voltage	6.3	ac or dc volts
Current	0.3	amp
Direct Interelectrode Capacitances (Approx.):[o]		
Plate No. 1 to Cathode No. 1, Heater, and Internal Shield*	2.5	μμf
Plate No. 2 to Cathode No. 2, Heater, and Internal Shield●	2.5	μμf
Cathode No. 1 to Plate No. 1, Heater, and Internal Shield*	3.4	μμf
Cathode No. 2 to Plate No. 2, Heater, and Internal Shield●	3.4	μμf
Plate No. 1 to Plate No. 2[□]	0.068 max.	μμf
Cold Resonant Frequency (Each Unit, Approx.)	700	Mc

[o] With no external shield.
* With plate and cathode of unit No.2 grounded.
● With plate and cathode of unit No.1 grounded.
□ With all other electrodes and internal shield grounded.

Mechanical:

Mounting Position	Any
Maximum Overall Length	1-3/4"
Maximum Seated Length	1-1/2"
Length, Base Seat to Bulb Top (Excluding tip)	1-1/8" ± 3/32"
Maximum Diameter	3/4"
Bulb	T-5-1/2
Base — Small-Button Miniature 7-Pin (JETEC No.E7-1)	
Basing Designation for BOTTOM VIEW	6BT

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

RECTIFIER

Maximum Ratings, *Design-Center Values*:

PEAK INVERSE PLATE VOLTAGE	330 max.	volts
PEAK PLATE CURRENT PER PLATE	54 max.	ma
DC OUTPUT CURRENT PER PLATE	9 max.	ma
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	330 max.	volts
Heater positive with respect to cathode	330 max.	volts

← Indicates a change.

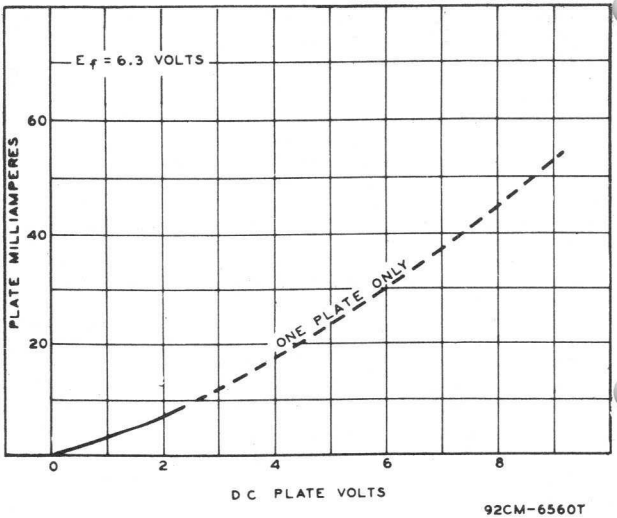
6AL5

6AL5

TWIN DIODE

Typical Operation as Half-Wave Rectifier: *The Two Units May Be Used Separately or in Parallel*		
AC Plate Voltage per Plate (RMS)	117	volts
Min. Total Effect. Plate-Supply Impedance per Plate	300	ohms
DC Output Current per Plate	9	ma

AVERAGE PLATE CHARACTERISTIC

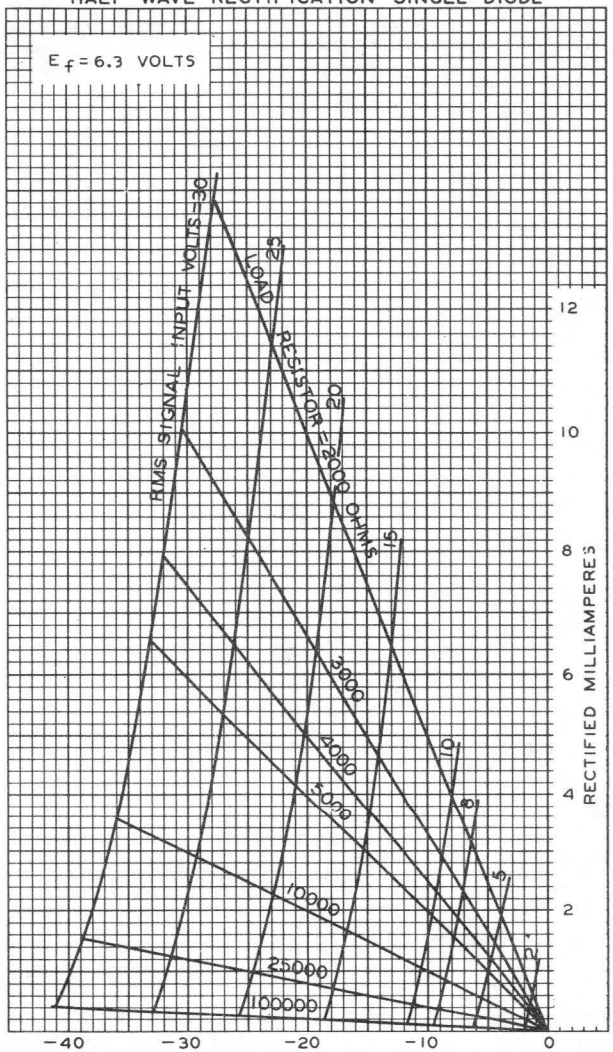


92CM-6560T

RCA

6AL5

AVERAGE CHARACTERISTICS
HALF-WAVE RECTIFICATION - SINGLE DIODE



JUNE 7, 1944

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6561

6AL11

Beam Power Tube—
Sharp-Cutoff Pentode

For Combined FM Detector and Audio-Frequency Output Amplifier Applications in TV Receivers

DUODECAR TYPE

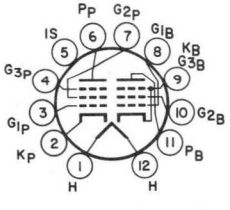
Electrical:

Heater Characteristics and Ratings:		
Voltage (AC or DC)	6.3 ± 0.6	volts
Current at heater volts = 6.3	0.9	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
Input: $G1_B$ to (K_B+$G3_B$,$G2_B$,IS,H)	11	pf
Output: P_B to (K_B+$G3_B$,$G2_B$,IS,H)	12	pf
Pentode Unit:		
$G1_P$ to P_P	0.034	pf
$G3_P$ to P_P	3.2	pf
$G1_P$ to (K_P,$G2_P$,$G3_P$,IS,H)	6.5	pf
$G3_P$ to (K_P,$G1_P$,$G2_P$,P_P,IS,H)	7.5	pf
$G1_P$ to $G3_P$	0.24	pf
P_B to P_P	0.12	pf

Mechanical:

Operating Position	Any
Type of Cathodes	Coated Unipotential
Maximum Overall Length	2.625" ←
Seated Length	2.000" to 2.250" ←
Diameter	1.062" to 1.188"
Dimensional Outline (JEDEC 9-59)	See *General Section*
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 Grid No.3
Pin 10 – Beam Power Grid No.2
Pin 11 – Beam Power Plate
Pin 12 – Heater



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

← Indicates a change.

6AL11

Characteristics, Class A_1 Amplifier (Pentode Unit):

Plate Supply Voltage	150	volts
Grid-No.3	*Connected to cathode at socket*	
Grid-No.2 Supply Voltage	100	volts
Grid-No.1	*Connected to negative end of cathode resistor*	
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	2.1	ma
Grid-No.1 Voltage (Approx.) for plate μa = 30	-4.5	volts
Grid-No.3 Voltage (Approx.) for plate μa = 50	-4.5	volts

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	275 max.	volts
Grid-No.2 (Screen-Grid) Voltage	275 max.	volts
Plate Dissipation	10 max.	watts
Grid-No.2 Input	2 max.	watts

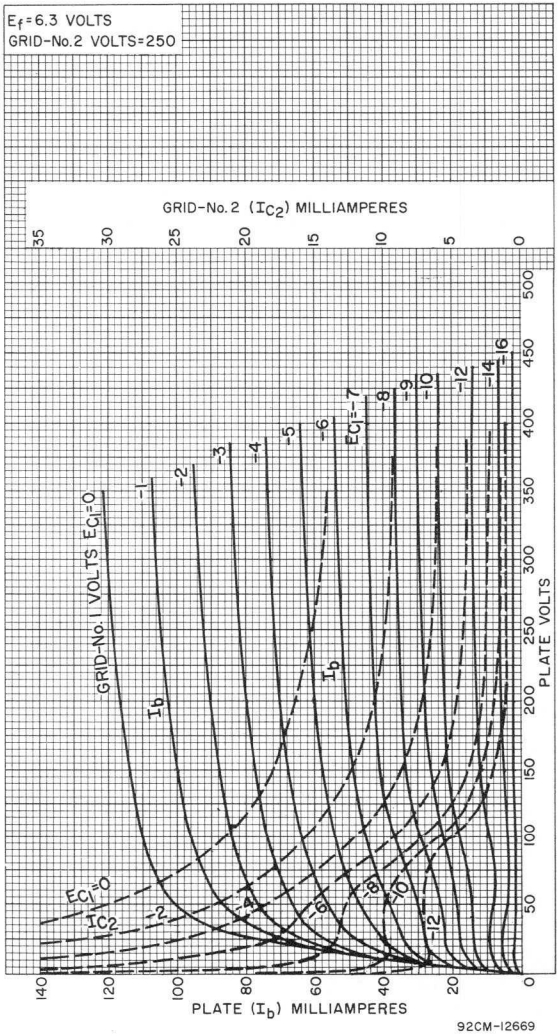
Typical Operation and Characteristics:

Plate Voltage	250	volts
Grid-No.2 Voltage	250	volts
Grid-No.1 (Control-Grid) Voltage	-8	volts
Peak AF Grid-No.1 Voltage	8	volts
Zero-Signal Plate Current	35	ma
Max.-Signal Plate Current	39	ma
Zero-Signal Grid-No.2 Current	2.5	ma
Max.-Signal Grid-No.2 Current	7	ma
Plate Resistance (Approx.)	0.1	megohm
Transconductance	6500	μmhos
Load Resistance	5000	ohms
Total Harmonic Distortion	10	per cent
Max.-Signal Power Output	4.2	watts

Maximum Circuit Values:

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

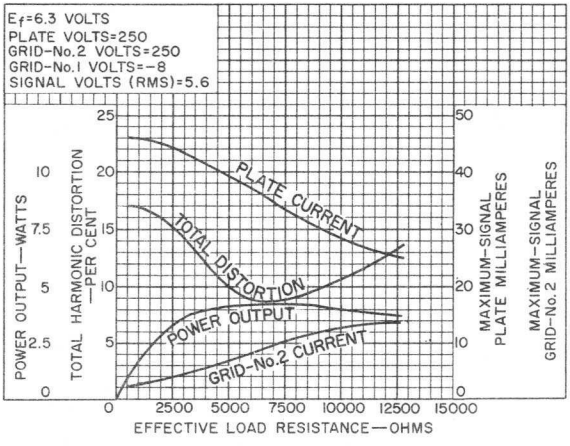
AVERAGE CHARACTERISTICS
Beam Power Unit



92CM-12669

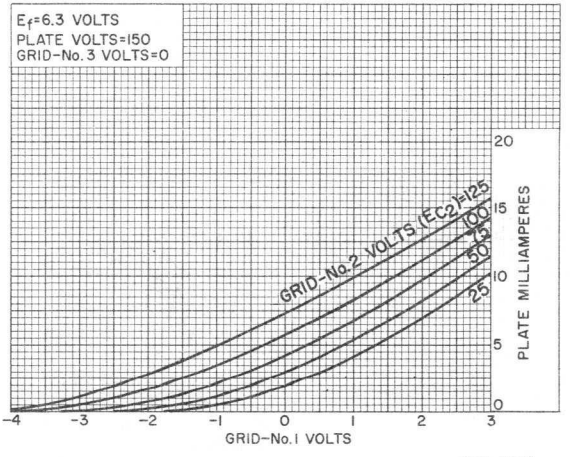
6AL11

OPERATION CHARACTERISTICS
Beam Power Unit



92CS-12663

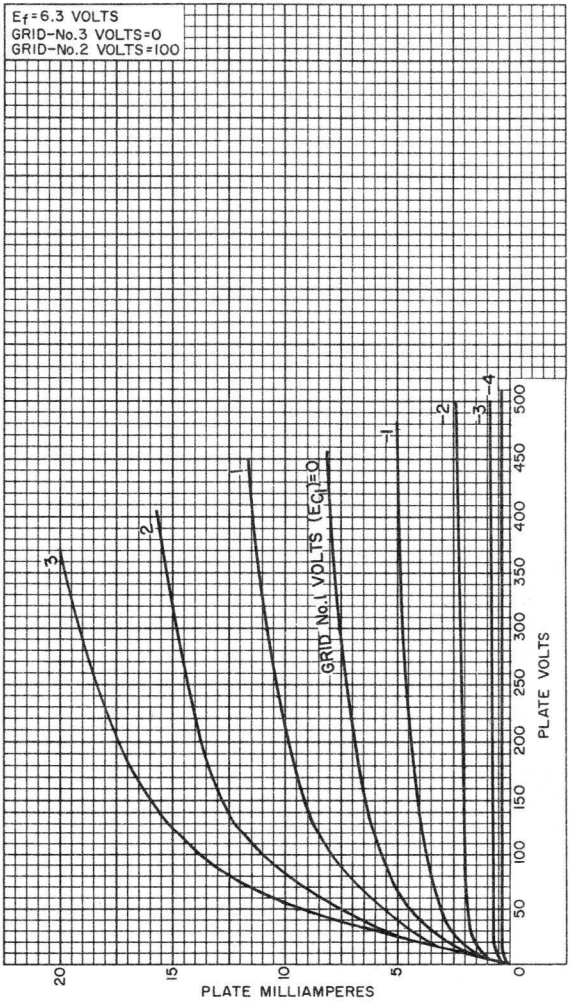
AVERAGE CHARACTERISTICS
Pentode Unit



92CS-12670

AVERAGE PLATE CHARACTERISTICS

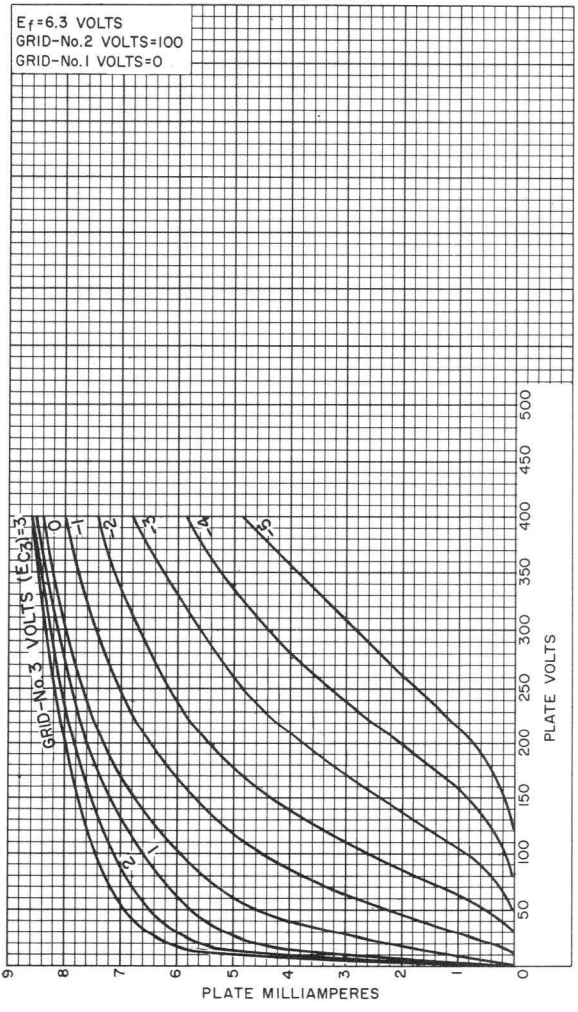
Pentode Unit



92CM-12671

6AL11

AVERAGE PLATE CHARACTERISTICS
Pentode Unit



92CM-12672

6AM8-A
DIODE—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:		
Diode Unit:		
Plate to cathode and heater	1.8	μμf
Cathode to plate and heater	3	μμf
Pentode Unit:		
Grid No.1 to plate	0.015 max.	μμf
Grid No.1 to cathode, grid No.3 & internal shield, grid No.2, and heater	6.5	μμf
Plate to cathode, grid No.3 & internal shield, grid No.2, and heater	2.6	μμf
Pentode grid No.1 to diode plate	0.006 max.	μμf
Pentode plate to diode cathode	0.15 max.	μμf
Pentode plate to diode plate	1 max.	μμf

Characteristics, Class A_1 Amplifier (Pentode Unit):

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.)	0.3	megohm
Transconductance	7800	μmhos
Plate Current	12.5	ma
Grid-No.2 Current	3.2	ma
Grid-No.1 Voltage (Approx.) for plate μa = 20	−6	volts
Grid-No.1 Voltage (Approx.) for plate ma. = 2, and cathode resistor (ohms) = 0	−3	volts

Mechanical:

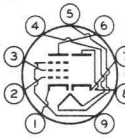
Operating Position	Any
Maximum Overall Length	2-3/16"

← Indicates a change.

6AM8-A

DIODE—SHARP-CUTOFF PENTODE

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	9CY



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

PENTODE UNIT — Class A_1 Amplifier

→ **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	0.55	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	3.2	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:			
For fixed-bias operation	0.25	max.	megohm
For cathode-bias operation	1	max.	megohm

DIODE UNIT

Maximum Ratings, *Design-Maximum Values:*

DC PLATE CURRENT	5	max.	ma

→ Indicates a change.

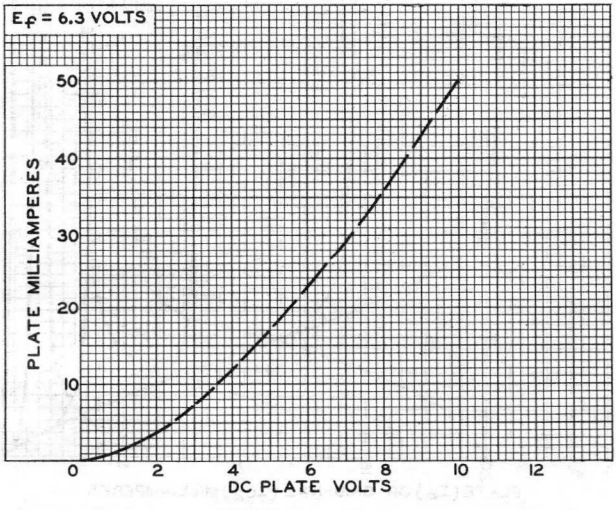
6AM8-A

DIODE—SHARP-CUTOFF PENTODE

PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode.	200▲ max.	volts
Heater positive with respect to cathode.	200▲ max.	volts

○ Without external shield.
▲ The dc component must not exceed 100 volts.

AVERAGE PLATE CHARACTERISTIC
DIODE UNIT

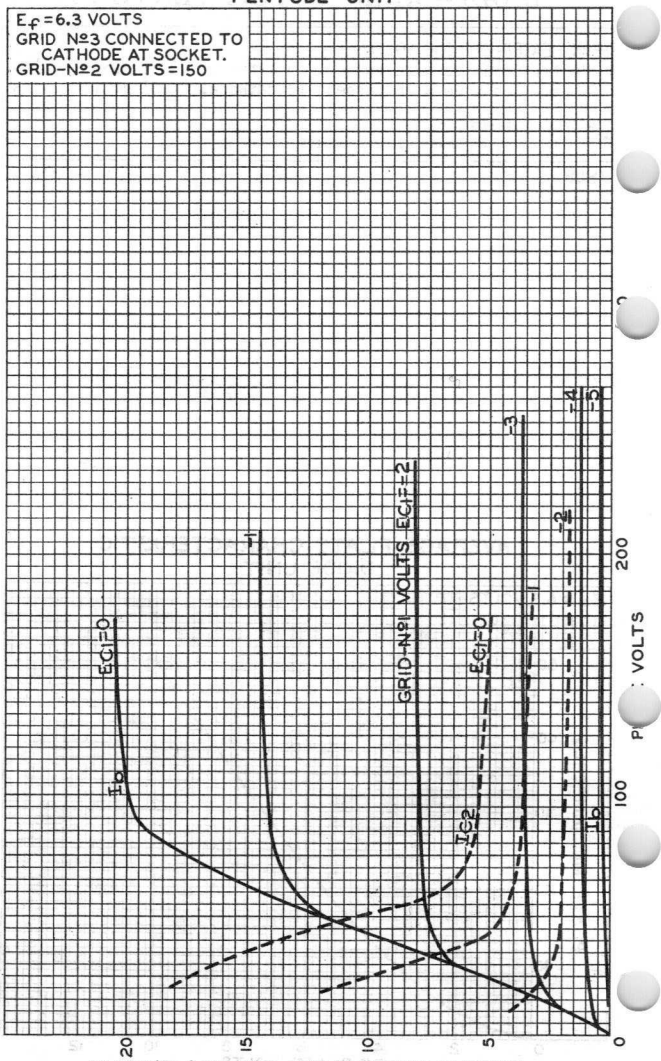


ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY
92CS-8504RI

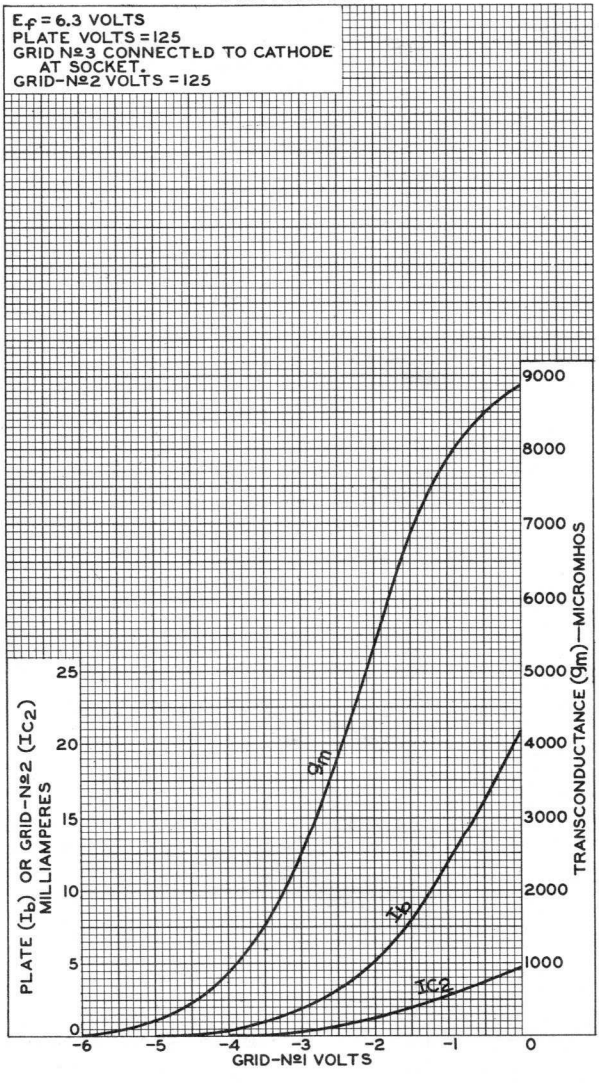
6AM8-A

AVERAGE CHARACTERISTICS

PENTODE UNIT



6AM8-A
AVERAGE CHARACTERISTICS
PENTODE UNIT



6AN4

HIGH-MU TRIODE

7-PIN MINIATURE TYPE

For UHF TV service

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage	6.3	ac or dc volts
Current	0.225	amp

Direct Interelectrode Capacitances (Approx.):

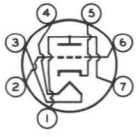
	Without External Shield	*With External Shield°*	
Grid to plate	1.7	1.7	μμf
Grid to cathode and heater	2.9	3.3	μμf
Plate to cathode and heater	0.25	1.8	μμf
Heater to cathode	3	2.9●	μμf
Grid to cathode	2.6	2.6●	μμf
Plate to cathode	0.2	0.18●	μμf
Cathode to grid and heater	5.5	5.7♦	μμf
Plate to grid and heater	1.8	3.4♦	μμf

Characteristics, Class A_1 Amplifier:

Plate-Supply Voltage	200	volts
Cathode Resistor	100	ohms
Amplification Factor	70	
Transconductance	10000	μmhos
Plate Current	13	ma
Grid Voltage (Approx.) for plate current of 20 μa	-7	volts

Mechanical:

Mounting Position	Any
Maximum Overall Length	1-3/4"
Maximum Seated Length	1-1/2"
Length, Base Seat to Bulb Top (Excluding tip)	1-1/8" ±3/32"
Maximum Diameter	3/4"
Dimensional Outline	*See General Section*
Bulb	T5-1/2
Base	Small-Button Miniature 7-Pin (JETEC No.E7-1)
Basing Designation for BOTTOM VIEW	7DK



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

° With external shield JETEC No.316 connected to cathode except as noted.
● With external shield JETEC No.316 connected to ground.
♦ With external shield JETEC No.316 connected to grid.

TENTATIVE DATA

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

6AN4

HIGH-MU TRIODE

AMPLIFIER - Class A_1

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	300	max.	volts
CATHODE CURRENT	30	max.	ma
PLATE DISSIPATION	4	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-Circuit Resistance:			
For fixed-bias operation.	0.1	max.	megohm
For cathode-bias operation.	0.5	max.	megohm

▲ The dc component must not exceed 100 volts.

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

6AN8-A

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:▲		
Triode Unit:		
Grid to plate	1.5	μμf
Grid to cathode and heater	2	μμf
Plate to cathode and heater	0.26	μμf
Pentode Unit:		
Grid No.1 to plate	0.04 max.	μμf
Grid No.1 to cathode & grid No.3 & internal shield, grid No.2, and heater	7	μμf
Plate to cathode & grid No.3 & internal shield, grid No.2, and heater	2.4	μμf
Triode grid to pentode plate	0.02 max.	μμf
Pentode grid No.1 to triode plate	0.02 max.	μμf
Pentode plate to triode plate	0.15 max.	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 Supply Voltage	–3	0	volts
Cathode Resistor	0	56	ohms
Amplification Factor	21	–	
Plate Resistance (Approx.)	4700	170000	ohms
Transconductance	4500	7800	μmhos
Plate Current	15	12	ma
Grid-No.2 Current	–	3.8	ma
Grid-No.1 Voltage (Approx.) for plate μa = 20	–17	–6	volts
Grid-No.1 Voltage (Approx.) for plate ma. = 1.6, and cathode resistor (ohms) = 0	–	–3	volts

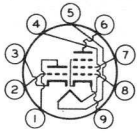
Mechanical:

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"

6AN8-A

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. 9DA

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



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

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	2.8	max.	2.3	max.	watts
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:

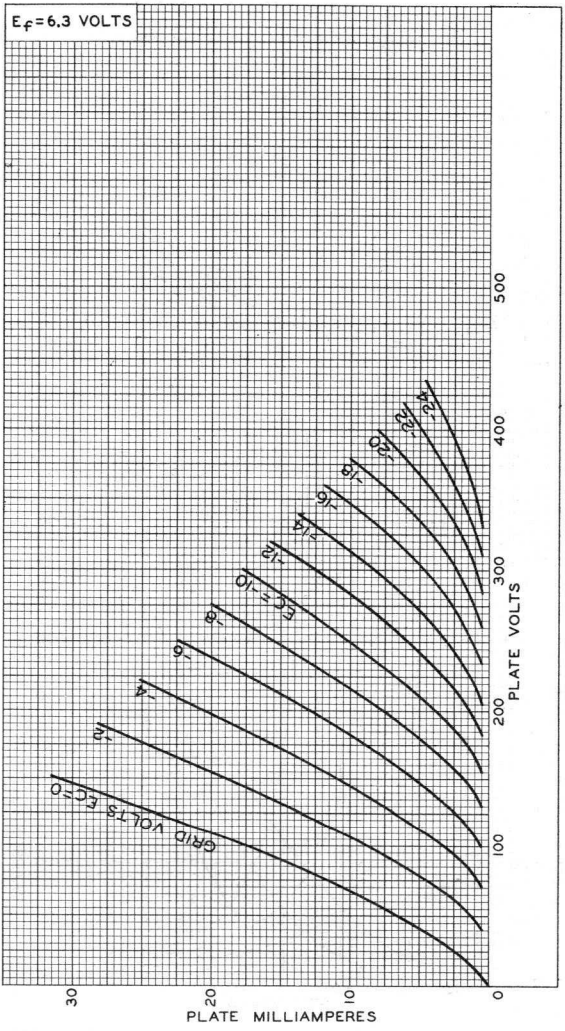
	Triode Unit		*Pentode Unit*		
Grid-No.1-Circuit Resistance:★					
For fixed-bias operation	0.5	max.	0.25	max.	megohm
For cathode-bias operation	1	max.	1	max.	megohm

▲ Without external shield.

● The dc component must not exceed 100 volts.

★ If either unit is operated at maximum-rated conditions, grid-No.1-circuit resistances for both units should not exceed the stated values.

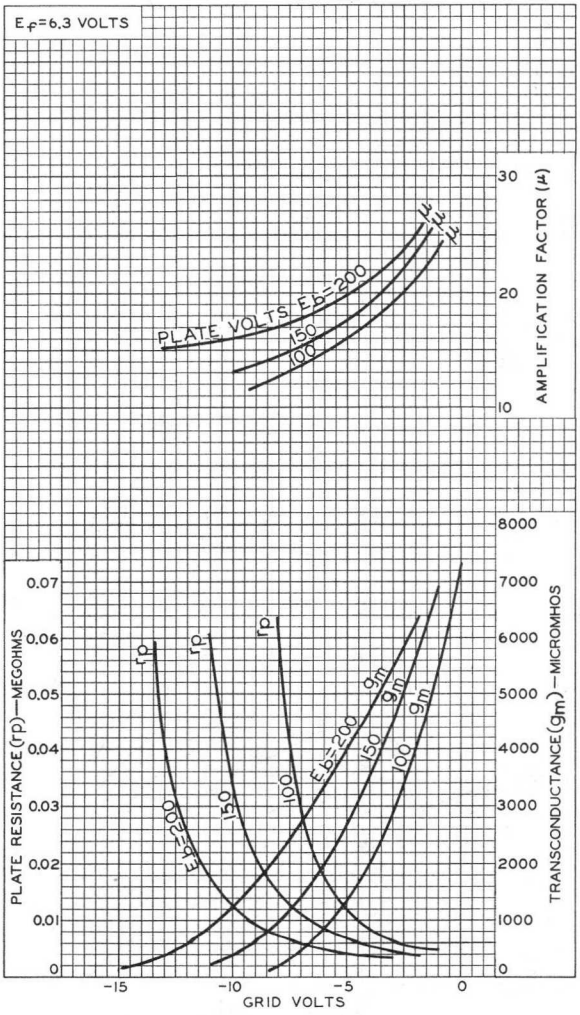
AVERAGE PLATE CHARACTERISTICS
Triode Unit



92CM-8209

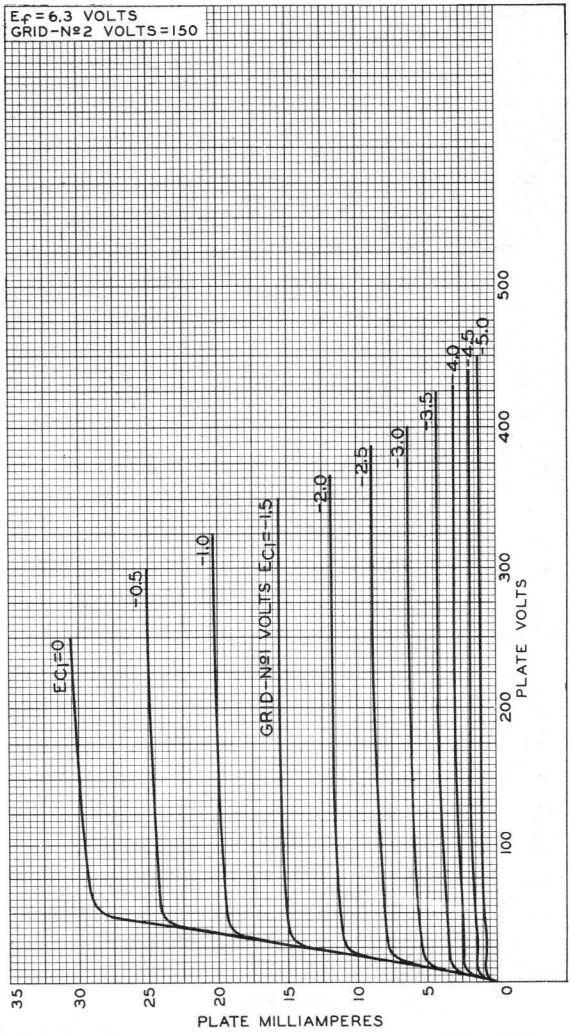
6AN8-A

AVERAGE CHARACTERISTICS
Triode Unit



92CM-8207RI

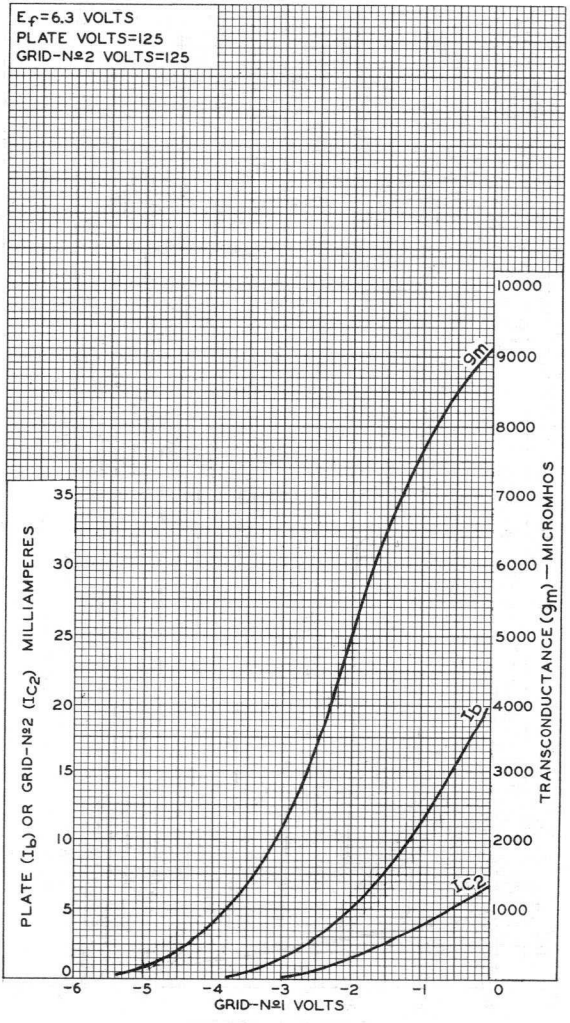
AVERAGE PLATE CHARACTERISTICS
Pentode Unit



92CM-8206

6AN8-A

AVERAGE CHARACTERISTICS
Pentode Unit



92CM-8208RI

6AQ5-A

BEAM POWER TUBE

7-PIN MINIATURE TYPE

With heater having controlled warm-up time

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:			
Voltage	6.3		ac or dc volts
Current	0.45		amp
Warm-up time (Average)	11		sec

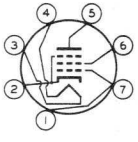
For definition of heater warm-up time and method of determining it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of this Section.

Direct Interelectrode Capacitances (Approx.):[o]		
Grid No.1 to plate	0.4	μμf
Grid No.1 to cathode & grid No.3, grid No.2, and heater	8	μμf
Plate to cathode & grid No.3, grid No.2, and heater	8.5	μμf

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	0.650" to 0.750"
Dimensional Outline	*See General Section*
Bulb	T5-1/2
Base	Small-Button Miniature 7-Pin (JETEC No.E7-1)
Basing Designation for BOTTOM VIEW	7BZ

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



Pin 4 – Heater
Pin 5 – Plate
Pin 6 – Grid No.2
Pin 7 – Grid No.1

AMPLIFIER — Class A_1

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	250	max.	volts
GRID-No.2 (SCREEN-GRID) VOLTAGE	250	max.	volts
GRID-No.2 INPUT	2	max.	watts
PLATE DISSIPATION	12	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200▲	max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)	250	max.	°C

o, ▲: See next page. ← Indicates a change.

6AQ5-A

BEAM POWER TUBE

Typical Operation and Characteristics:

Plate Voltage	180	250	volts
Grid-No.2 Voltage	180	250	volts
Grid-No.1 (Control-Grid) Voltage	-8.5	-12.5	volts
Peak AF Grid-No.1 Voltage	8.5	12.5	volts
Zero-Signal Plate Current	29	45	ma
Max.-Signal Plate Current	30	47	ma
Zero-Signal Grid-No.2 Current	3	4.5	ma
Max.-Signal Grid-No.2 Current	4	7	ma
Plate Resistance (Approx.)	58000	52000	ohms
Transconductance	3700	4100	μmhos
Load Resistance	5500	5000	ohms
Total Harmonic Distortion	8	8	%
Max.-Signal Power Output	2	4.5	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

AMPLIFIER — Class AB_1

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	250	max.	volts
GRID-No.2 (SCREEN-GRID) VOLTAGE	250	max.	volts
GRID-No.2 INPUT	2	max.	watts
PLATE DISSIPATION	12	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200▲	max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)	250	max.	°C

Typical Push-Pull Operation:

Unless otherwise specified, values are for 2 tubes

Plate Voltage	250	volts
Grid-No.2 Voltage	250	volts
Grid-No.1 (Control-Grid) Voltage●	-15	volts
Peak AF Grid-No.1-to-Grid-No.1 Voltage	30	volts
Zero-Signal Plate Current	70	ma
Max.-Signal Plate Current	79	ma
Zero-Signal Grid-No.2 Current	5	ma
Max.-Signal Grid-No.2 Current	13	ma
Effective Load Resistance (Plate to plate)	10000	ohms
Total Harmonic Distortion	5	%
Max.-Signal Power Output	10	watts

°,▲,●: See next page.

6AQ5-A

BEAM POWER TUBE

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:●		
For fixed-bias operation	0.1 max.	megohm
For cathode-bias operation	0.5 max.	megohm

VERTICAL-DEFLECTION AMPLIFIER

Triode Connection†

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

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

DC PLATE VOLTAGE	250 max.	volts
PEAK POSITIVE-PULSE PLATE VOLTAGE# (Absolute maximum)	1100■ max.	volts
PEAK NEGATIVE-PULSE GRID-No.1 (CONTROL-GRID) VOLTAGE	250 max.	volts
PEAK CATHODE CURRENT	105 max.	ma
DC CATHODE CURRENT	35 max.	ma
PLATE DISSIPATION	9 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200▲ max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)	250 max.	°C

Characteristics:

Plate Voltage	250	volts
Grid-No.1 Voltage	-12.5	volts
Amplification Factor	9.5	
Plate Resistance (Approx.)	1970	ohms
Transconductance	4800	μmhos
Plate Current	49.5	ma
Grid-No.1 Voltage (Approx.) for plate ma. = 0.5	-37	volts

Maximum Circuit Values:

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

° Without external shield.

▲ The dc component must not exceed 100 volts.

● The type of input coupling used should not introduce too much resistance in the grid-No.1 circuit. Transformer- or impedance-coupling devices are recommended.

† Grid-No.2 (Screen-grid) connected to plate.

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

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.

■ Under no circumstances should this absolute value be exceeded.

← Indicates a change.

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

6AQ5-A

BEAM POWER TUBE

CURVES
For the 6AQ5-A, within its ratings, are the same as those shown for Type 6V6

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

Semiremote-Cutoff Twin Pentode

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	0.800		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:[b]			
Unit No.1:			
Grid No.1 to plate	0.026		pf
Grid No.1 to cathode, grid No.2, grid No.3 & internal shield, and heater	10		pf
Plate to cathode, grid No.2, grid No.3 & internal shield, and heater	2.8		pf
Unit No.2:			
Grid No.1 to plate	0.026		pf
Grid No.1 to cathode, grid No.2, grid No.3, grid No.3 of unit No.1 & internal shield, and heater	10		pf
Plate to cathode, grid No.2, grid No.3, grid No.3 of unit No.1 & internal shield, and heater	3.0		pf
Plate of unit No.1 to plate of unit No.2	0.02	max.	pf
Grid No.1 of unit No.1 to plate of unit No.2	0.002	max.	pf
Grid No.1 of unit No.2 to plate of unit No.1	0.002	max.	pf

Characteristics, Class A_1 Amplifier (Each Unit):

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	10500	μmhos
Plate Current	11	ma
Grid-No.2 Current	3.5	ma
Grid-No.1 Voltage (Approx.) for transconductance (μmhos) = 50	-15	volts

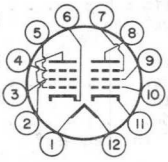
Mechanical:

Operating Position	Any
Type of Cathodes	Coated Unipotential
Maximum Overall Length	1.875"

6AR11

Seated Length	1.250" to 1.500"
Diameter	1.062" to 1.188"
Bulb	T9
Base	Small-Button Duodecar 12-Pin (JEDEC No.E12-70)
Basing Designation for BOTTOM VIEW	12DM

Pin 1 – Heater
Pin 2 – Plate of Unit No.2
Pin 3 – Grid No.2 of Unit No.2
Pin 4 – Grid No.3 of Unit No.2
Pin 5 – Grid No.1 of Unit No.2
Pin 6 – Cathode of Unit No.2
Pin 7 – Grid No.3 of Unit No.1, Internal Shield
Pin 8 – Plate of Unit No.1
Pin 9 – Grid No.2 of Unit No.1
Pin 10 – Grid No.1 of Unit No.1
Pin 11 – Cathode of Unit No.1
Pin 12 – Heater



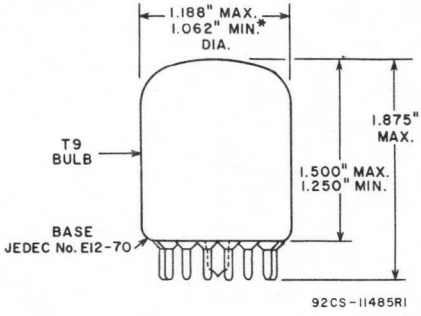
AMPLIFIER — Class A_1

Values are for Each Unit

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

[a] The dc component must not exceed 100 volts.
[b] With external shield JEDEC No.309 connected to cathode of unit under test.



* APPLIES TO MINIMUM DIAMETER EXCEPT IN AREA OF SEAL.

6AS8

DIODE–SHARP-CUTOFF PENTODE

9-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:		
Voltage	6.3	ac or dc volts
Current	0.45	amp
Direct Interelectrode Capacitances (Approx.):*		
Diode Unit:		
Plate to heater and cathode and internal shield	3.0	μμf
Pentode Unit:		
Grid No.1 to plate	0.04 max.	μμf
Input	7	μμf
Output	2.2	μμf
Pentode grid to diode plate	0.005 max.	μμf
Pentode plate to diode cathode	0.15 max.	μμf
Pentode plate to diode plate	0.10 max.	μμf

Characteristics, Class A_1:

Plate-Supply Voltage	200	volts
Grid No.3	Connected to cathode at socket	
Grid-No.2 Supply Voltage	150	volts
Cathode-Bias Resistor	180	ohms
Plate Resistance (Approx.)	300000	ohms
Transconductance	6200	μmhos
Grid-No.1 Bias (Approx.) for Plate Current of 10 μamp	-8	volts
Plate Current	9.5	ma
Grid-No.2 Current	3	ma

Mechanical:

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

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

Pin 6 – Diode Plate
Pin 7 – Pentode Grid No.3, Int.Shield
Pin 8 – Diode Cathode
Pin 9 – Pentode Plate

* With no external shield.

6AS8

DIODE–SHARP-CUTOFF PENTODE

PENTODE UNIT – Class A_1 Amplifier

Maximum Ratings, *Design-Center Values*:

PLATE VOLTAGE	300 max.	volts
GRID-No.3 (SUPPRESSOR) VOLTAGE	0 max.	volts
GRID-No.2 SUPPLY VOLTAGE	300 max.	volts
GRID-No.2 (SCREEN) VOLTAGE	*See Rating Curve at front of this Section*	
GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Positive bias value	0 max.	volts
PLATE DISSIPATION	2.5 max.	watts
GRID-No.2 INPUT	0.5 max.	watt
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 (For maximum rated conditions):

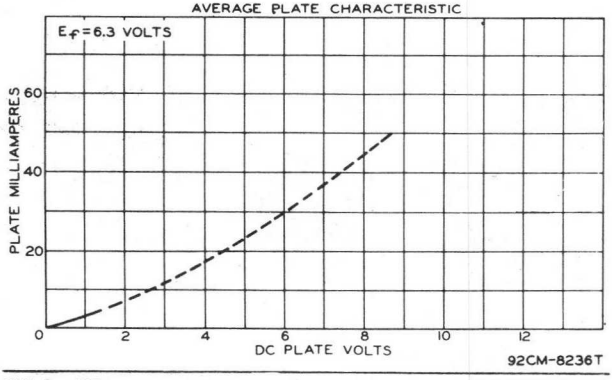
Grid-No.1-Circuit Resistance:		
For cathode-bias operation	1.0 max.	megohm
For fixed-bias operation	0.25 max.	megohm

DIODE UNIT

Maximum Ratings, *Design-Center Values*:

PEAK INVERSE PLATE VOLTAGE	330 max.	volts
PEAK PLATE CURRENT	50 max.	ma
DC 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● max.	volts

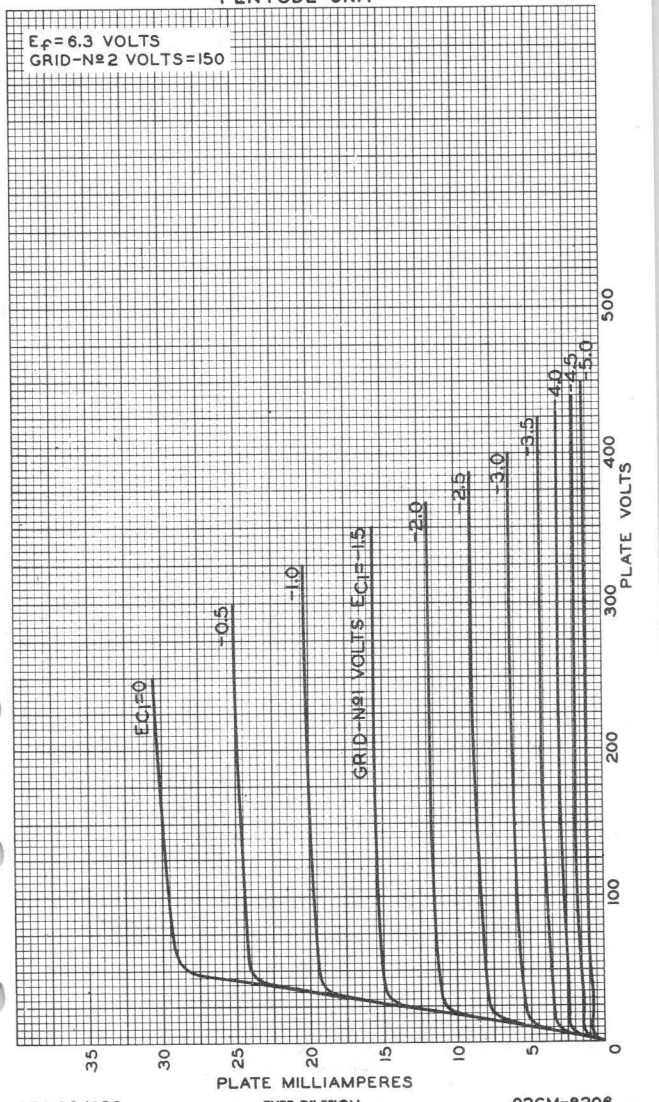
● The dc component must not exceed 100 volts.



RCA

6AS8

AVERAGE PLATE CHARACTERISTICS
PENTODE UNIT



RCA

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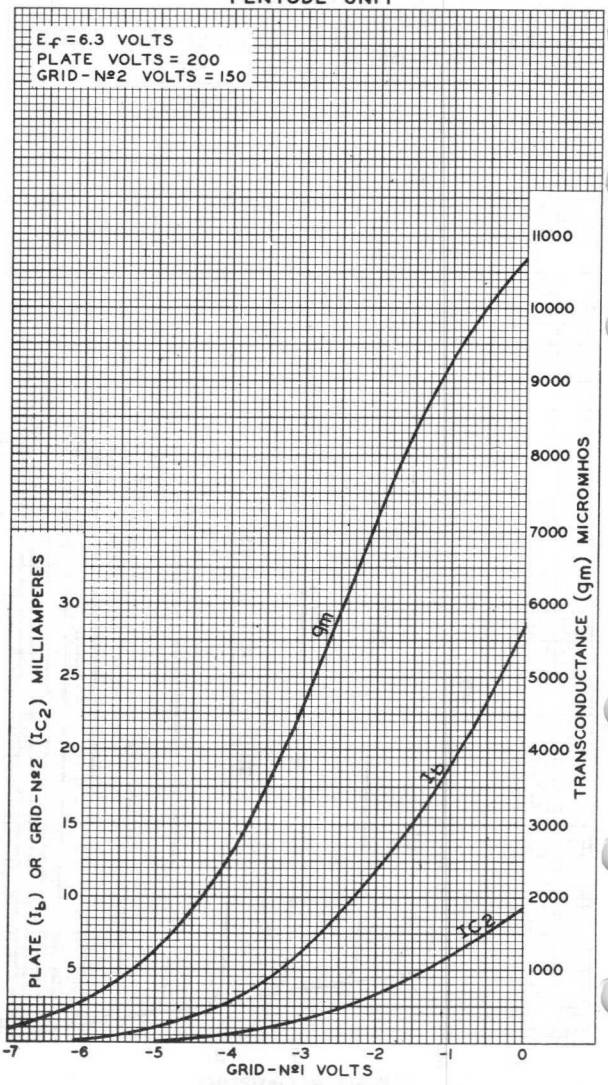
AVERAGE CHARACTERISTICS
PENTODE UNIT



Dual Triode—Sharp-Cutoff Pentode

Dual Triode Has High-Mu Unit & Medium-Mu Unit

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	1.050		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:[b]			
Triode Unit No.1:			
Grid to plate	1.9		pf
Grid to cathode, cathode of triode unit No.2 & internal shield, pentode cathode & pentode grid No.3 & internal shield, and heater.	3.0		pf
Plate to cathode, cathode of triode unit No.2 & internal shield, pentode cathode & pentode grid No.3 & internal shield, and heater.	2.2		pf
Triode Unit No.2:			
Grid to plate	3.6		pf
Grid to cathode & internal shield, pentode cathode & pentode grid No.3 & internal shield, and heater.	2.4		pf
Plate to cathode & internal shield, pentode cathode & pentode grid No.3 & internal shield, and heater.	3.8		pf
Pentode Unit:			
Grid No.1 to plate	0.11		pf
Grid No.1 to cathode of triode unit No.2 & internal shield, cathode & grid No.3 & internal shield, grid No.2, and heater	9.5		pf
Plate to cathode of triode unit No.2 & internal shield, cathode & grid No.3 & internal shield, grid No.2, and heater	4.4		pf
Pentode plate to plate of triode unit No.2	0.044	max.	pf
Plate of triode unit No.1 to plate of triode unit No.2	0.06	max.	pf

6AS11

Characteristics, Class A_1 Amplifier:

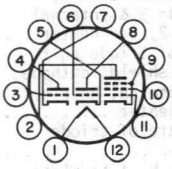
	Triode Units		
	Unit No.1	*Unit No.2*	
Plate Supply Voltage	200	200	volts
Grid Voltage	-2	-	volts
Cathode Resistor	-	220	ohms
Amplification Factor	68	41	
Plate Resistance (Approx.)	12400	9400	ohms
Transconductance	5500	4400	μmhos
Plate Current	7	9.2	ma
Grid Voltage (Approx.) for plate μa = 10	-5.5	-	volts
Grid Voltage (Approx.) for plate μa = 100	-	-6.5	volts

Pentode Unit		
Plate Supply Voltage	200	volts
Grid-No.2 Supply Voltage	125	volts
Cathode Resistor	68	ohms
Plate Resistance(Approx.)	70000	ohms
Transconductance	10500	μmhos
Plate Current	24	ma
Grid-No.2 Current	5.2	ma
Grid-No.1 Voltage (Approx.) for plate μa = 100	-8	volts

Mechanical:

Operating Position . . . . . Any
Types 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 12DP

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



Pin 8 – Plate of Triode Unit No.1
Pin 9 – Pentode Cathode, Pentode Grid No.3, Internal Shield
Pin 10 – Pentode Grid No.2
Pin 11 – Pentode Grid No.1
Pin 12 – Heater

AMPLIFIER — Class A_1

Maximum Ratings, *Design-Maximum Values:*

Triode Units

	Unit No.1	*Unit No.2*	
PLATE VOLTAGE	330 max.	330 max.	volts
GRID (CONTROL-GRID) VOLTAGE:			
Positive-bias value	0 max.	0 max.	volts
PLATE DISSIPATION	1.5 max.	2 max.	watts

Pentode Unit

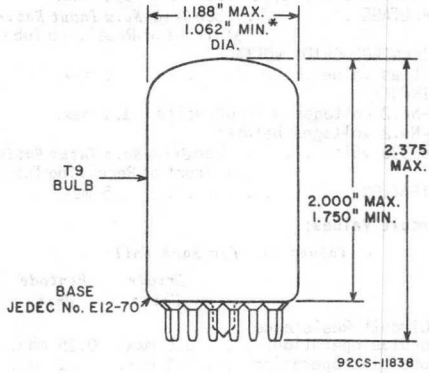
PLATE VOLTAGE	330 max.	volts
GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE	330 max.	volts
GRID-No.2 VOLTAGE	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Positive-bias value	0 max.	volts
GRID-No.2 INPUT:		
For grid-No.2 voltages up to 165 volts.	1.1 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	
PLATE DISSIPATION	5 max.	watts

Maximum Circuit Values:

Values are for Each Unit

	Triode Units	*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] The dc component must not exceed 100 volts.
[b] Without external shield.



* APPLIES TO MINIMUM DIAMETER EXCEPT IN AREA OF SEAL.

6AT6
TWIN DIODE—HIGH-MU TRIODE

7-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage	6.3	ac or dc volts
Current	0.3	amp

Direct Interelectrode Capacitances:

	Without External Shield	*With External Shield°*	
Grid to triode plate	2.0	2.0	μμf
Grid to cathode and heater	2.2	2.2	μμf
Plate to cathode and heater	0.8	1.2	μμf
Plate of diode unit No.2 to triode grid	0.04 max.		μμf

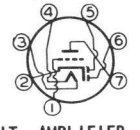
Characteristics, Class A_1 Amplifier (Triode Unit):

Plate Voltage	100	250	volts
Grid Voltage	−1	−3	volts
Amplification Factor	70	70	
Plate Resistance (Approx.)	54000	58000	ohms
Transconductance	1300	1200	μmhos
Plate Current	0.8	1	ma

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-1/8"
Maximum Seated Length	1-7/8"
Length, Base Seat to Bulb Top (Excluding tip)	1-1/2" ± 3/32"
Maximum Diameter	3/4"
Dimensional Outline	*See General Section*
Bulb	T-5-1/2
Base	Small-Button Miniature 7-Pin (JETEC No.E7-1)
Basing Designation for BOTTOM VIEW	7BT

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



Pin 5 – Diode Plate No.2
Pin 6 – Diode Plate No.1
Pin 7 – Triode Plate

TRIODE UNIT—AMPLIFIER - Class A_1

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	300 max.	volts
GRID VOLTAGE:		
Positive bias value	0 max.	volts
PLATE DISSIPATION	0.5 max.	watt
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	90 max.	volts
Heater positive with respect to cathode	90 max.	volts

° With external shield JETEC No.316 connected to cathode.

← Indicates a change.

6AT6

TWIN DIODE—HIGH-MU TRIODE

→ **Typical Operation as Resistance-Coupled Amplifier:**

See RESISTANCE-COUPLED AMPLIFIER CHART No.7 at front of this Section

→ **DIODE UNITS**

Maximum Ratings, *Design-Center Values:*

PLATE CURRENT (For each diode). . . . . 1.0 max. ma

Diode Considerations:

Consideration of these units, including typical circuits and diode curves, is given at the front of this Section. Diode biasing of the triode unit of the 6AT6 is not suitable.

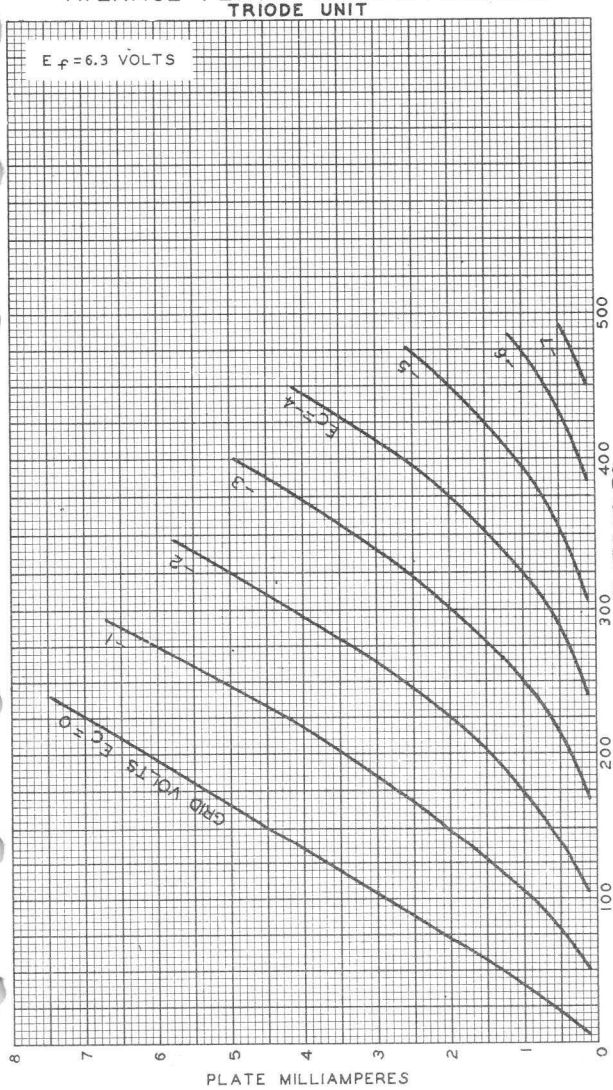
→ Indicates a change.

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6AT6

AVERAGE PLATE CHARACTERISTICS

TRIODE UNIT



OCT. 19, 1945 RCA VICTOR DIVISION 92CM-6610
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

Medium-Mu Triode—Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

With Heater Having Controlled Warm-Up Time

The 6AT8-A is the same as the 6X8 except for the following items:

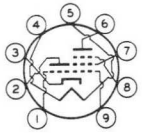
Electrical:

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:			
	Without External Shield	*With External Shield▲*	
Triode Unit:			
Grid to plate	1.5	1.5	μμf
Grid to cathode and heater	2	2.4	μμf
Plate to cathode and heater	0.5	1	μμf
Pentode Unit:			
Grid No.1 to plate	0.06 max.	0.03 max.	μμf
Grid No.1 to cathode, grid No.3, grid No.2, and heater	4.6	4.8	μμf
Plate to cathode, grid No.3, grid No.2, and heater	0.9	1.6	μμf
Pentode grid No.1 to triode plate	0.05 max.	0.04 max.	μμf
Pentode plate to triode plate	0.05 max.	0.008 max.	μμf
Heater to cathode	6	6●	μμf

Mechanical:

Basing Designation for BOTTOM VIEW 9DW

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 – Pentode Grid No.3
Pin 9 – Pentode Grid No.1



▲ With external shield JEDEC No.315 connected to cathode except as noted.
● With external shield JEDEC No.315 connected to pentode plate.

← Indicates a change.

6AU4-GTA

HALF-WAVE VACUUM RECTIFIER

For television damper service

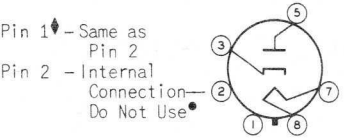
GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	6.3 ± 10%	volts
Current	1.8	amp
Direct Interelectrode Capacitances (Approx.):[○]		
Plate to cathode and heater	8.5	μμf
Cathode to heater and plate	11.5	μμf
Heater to cathode	4	μμf

Mechanical:

Operating Position	Any
Maximum Overall Length	3-13/16"
Maximum Seated Length	3-1/4"
Maximum Diameter	1-9/32"
Bulb	T9
Base	Short Intermediate-Shell Octal 5-Pin with External Barriers, Arrangement 2 (JEDEC Group 1, No.B5-85), or Short Intermediate-Shell Octal 6-Pin with External Barriers, Arrangement 1 (JEDEC Group 1, No.B6-60)
Basing Designation for BOTTOM VIEW	4CG



DAMPER SERVICE

Maximum Ratings, *Design-Maximum Values:*

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

PEAK INVERSE PLATE VOLTAGE	4500 max.	volts
PEAK PLATE CURRENT	1300 max.	ma
DC PLATE CURRENT	210 max.	ma
PLATE DISSIPATION	6.5 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	4500[▲] max.	volts
Heater positive with respect to cathode	300[#] max.	volts

○ Without external shield.

♦ On the 5-pin base, pin 1 as well as pins 4 and 6 is omitted.

● Socket terminals 1, 2, 4, and 6 should not be used as tie points.

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

▲ The dc component must not exceed 900 volts.

\# The dc component must not exceed 100 volts.

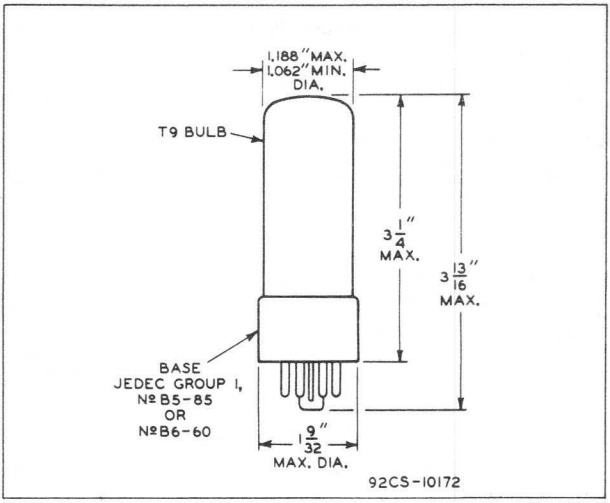
← Indicates a change.

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

6AU4-GTA

6AU4-GTA

HALF-WAVE VACUUM RECTIFIER



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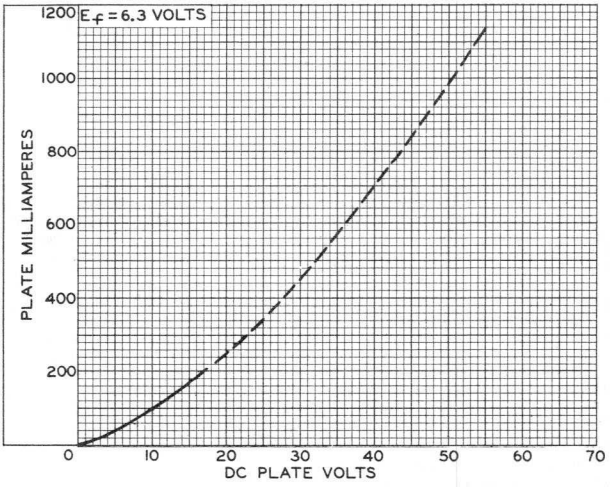
AVERAGE PLATE CHARACTERISTIC



92CS-8651R1

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

6AU5-GT

BEAM POWER TUBE

GENERAL DATA

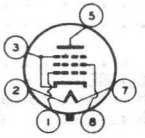
Electrical:

Heater, for Unipotential Cathode:		
Voltage	6.3	ac or dc volts
Current	1.25	amp
Direct Interelectrode Capacitances (Approx.):°		
Grid No.1 to plate	0.5	μμf
Grid No.1 to cathode & grid No.3, grid No.2, and heater	11.3	μμf
Plate to cathode & grid No.3, grid No.2, and heater	7	μμf
Transconductance#	5600	μmhos ←
Mu-Factor, Grid No.2 to Grid No.1■	5.9	

Mechanical:

Mounting Position	Any
Maximum Overall Length	3-5/16"
Maximum Seated Length	2-3/4"
Maximum Diameter	1-9/32"
Bulb	T-9
Base	Intermediate-Shell Octal 6-Pin (JETEC No.B6-8) ← or Short Intermediate-Shell Octal 6-Pin (JETEC No.B6-60)
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

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

Maximum Ratings, *Design-Center Values:* ←

DC PLATE VOLTAGE	550 max.	volts
PEAK POSITIVE-PULSE PLATE VOLTAGE* (Absolute maximum)	5500● max.	volts
PEAK NEGATIVE-PULSE PLATE VOLTAGE*	-1250 max.	volts
DC GRID-No.2 (SCREEN) VOLTAGE†	200 max.	volts

° With no external shield.

For plate volts = 115, grid-No.2 volts = 175, grid-No.1 volts = -20.

■ For plate volts = 100, grid-No.2 volts = 100, grid-No.1 volts = -4.5.

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

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

● Under no circumstances should this absolute value be exceeded.

† Preferably obtained through a series dropping resistor of sufficient magnitude to limit the grid-No.2 input to the rated maximum value.

←Indicates a change.

6AU5-GT

BEAM POWER TUBE

PEAK NEGATIVE-PULSE GRID-No.1 (CONTROL-GRID) VOLTAGE	-300 max.	volts
CATHODE CURRENT:		
Peak	400 max.	ma
Average	110 max.	ma
GRID-No.2 INPUT	2.5 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♦max.	volts
BULB TEMPERATURE (At hottest point)▲	210 max.	°C

Maximum Circuit Values:

→Grid-No.1-Circuit Resistance	0.47 max.	megohm

→ **VOLTAGE REGULATOR SERVICE**

Triode Connection--Grid No.2 Connected to Plate

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	300 max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Negative bias value	125 max.	volts
Positive bias value	0 max.	volts
CATHODE CURRENT	110 max.	ma
PLATE & GRID-No.2 DISSIPATION (Total)	10 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode.	200 max.	volts
Heater positive with respect to cathode.	200♦max.	volts

◇ An adequate cathode-bias resistor or other suitable means is required to protect the tube in the absence of excitation.

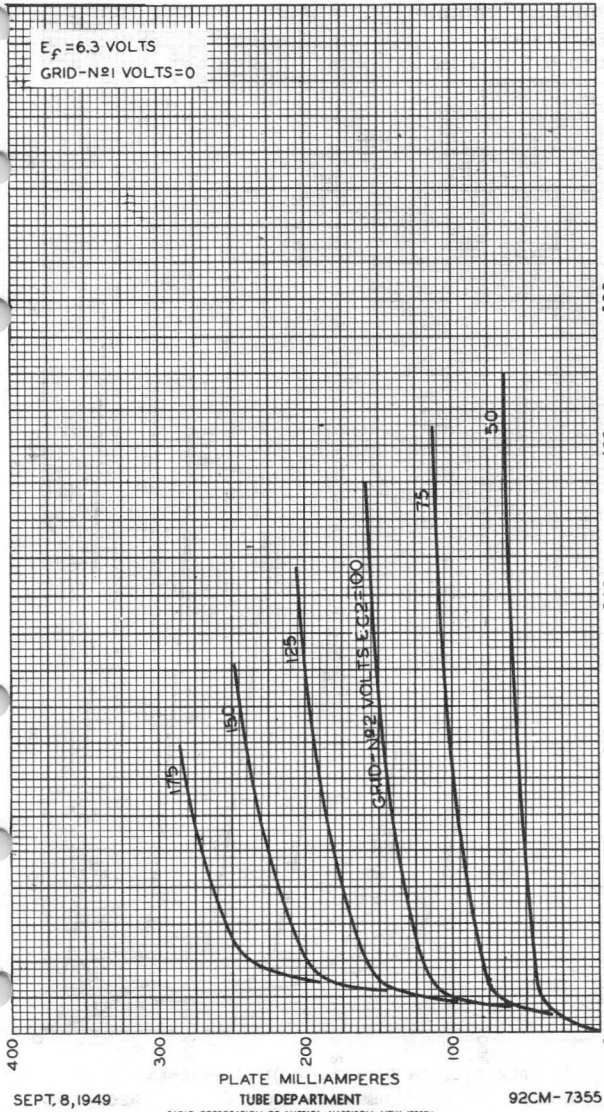
♦ The dc component must not exceed 100 volts.

▲ For tube in vertical position with base down in free space and with natural ventilation, the hottest point on the bulb is in the center of the dome just above open end of cathode sleeve.

→Indicates a change.

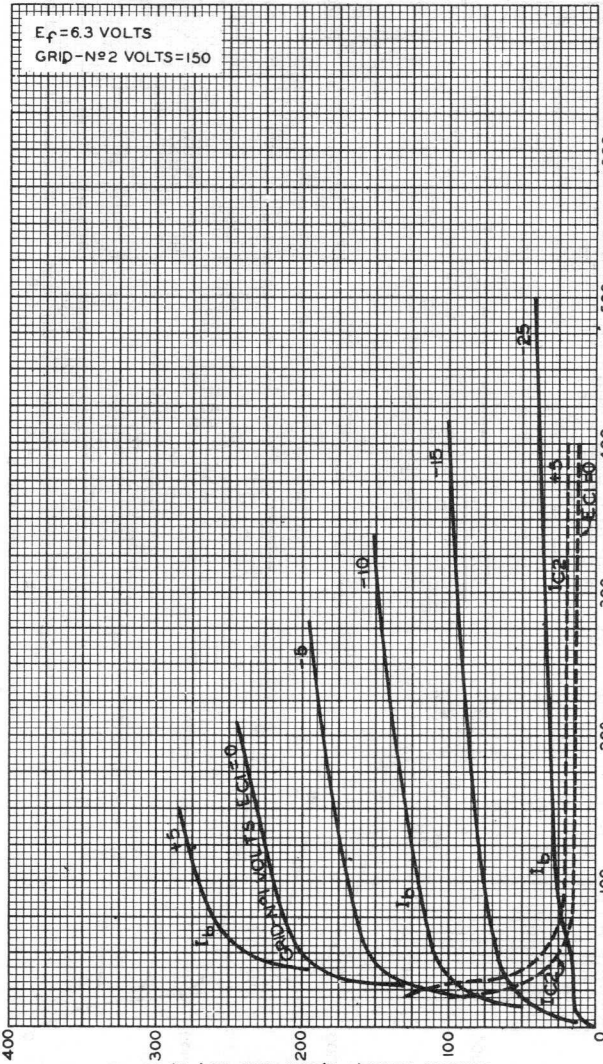
6AU5-GT

AVERAGE PLATE CHARACTERISTICS



6AU5-GT

AVERAGE PLATE CHARACTERISTICS



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	0.6 ± 6%	amp
Warm-up time (Average)	11	sec
Direct Interelectrode Capacitances:[a]		
Triode Unit:		
Grid to plate	2.2	μμf
Grid to cathode and heater	2.6	μμf
Plate to cathode and heater	0.34	μμf
Pentode Unit:		
Grid No.1 to plate	0.06	μμf
Grid No.1 to cathode & internal shield & grid No.3, grid No.2, and heater	7.5	μμf
Plate to cathode & internal shield & grid No.3, grid No.2, and heater	3.4	μμf
Triode grid to pentode plate	0.022 max.	μμf
Pentode grid No.1 to triode plate	0.006 max.	μμf
Pentode plate to triode plate	0.12 max.	μμf

Characteristics, Class A_1 Amplifier:

	Triode Unit	*Pentode Unit*		
Plate Supply Voltage	150	40	200	volts
Grid-No.2 Supply Voltage	–	125	125	volts
Cathode Resistor	150	–	82	ohms
Amplification Factor	43	–	–	
Plate Resistance (Approx.)	8100	–	100000	ohms
Transconductance	5300	–	8000	μmhos
Plate Current	9.5	28[b]	17	ma
Grid-No.2 Current	–	10[b]	3.4	ma
Grid-No.1 Voltage (Approx.) for plate μa = 100	-6.5	–	-7.5	volts

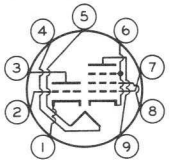
Mechanical:

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)

6AU8A

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
GRID-No.2 INPUT: For grid-No.2 voltages up to 165 volts	–	1 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	2.8 max.	3.3 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

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

OPERATING CONSIDERATIONS

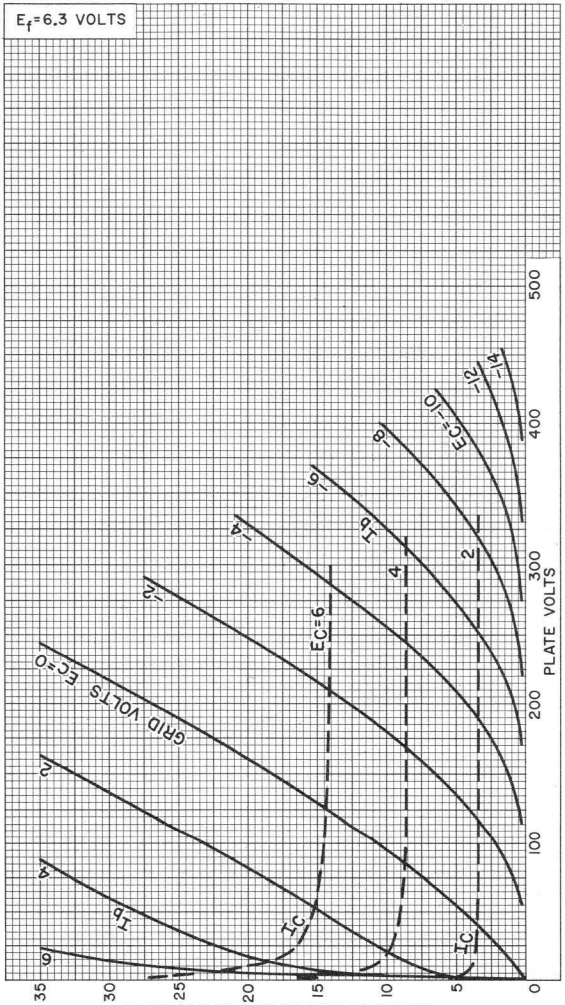
Because the *internal shield* is connected to the cathode and grid No.3, the impedance in the cathode circuit should be kept as low as possible to minimize cross-coupling effects.

[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.

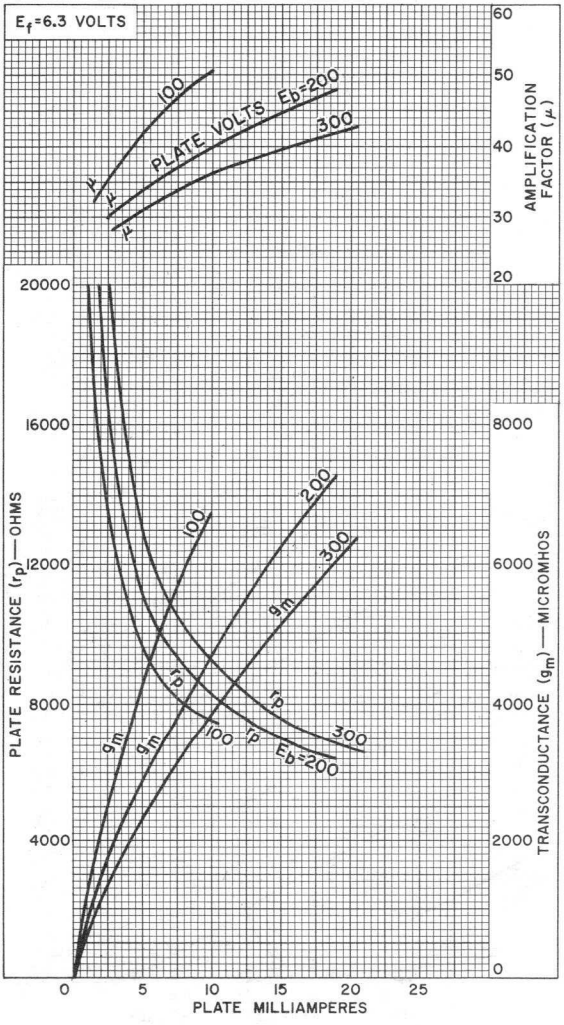
AVERAGE CHARACTERISTICS
Triode Unit



92CM-11140

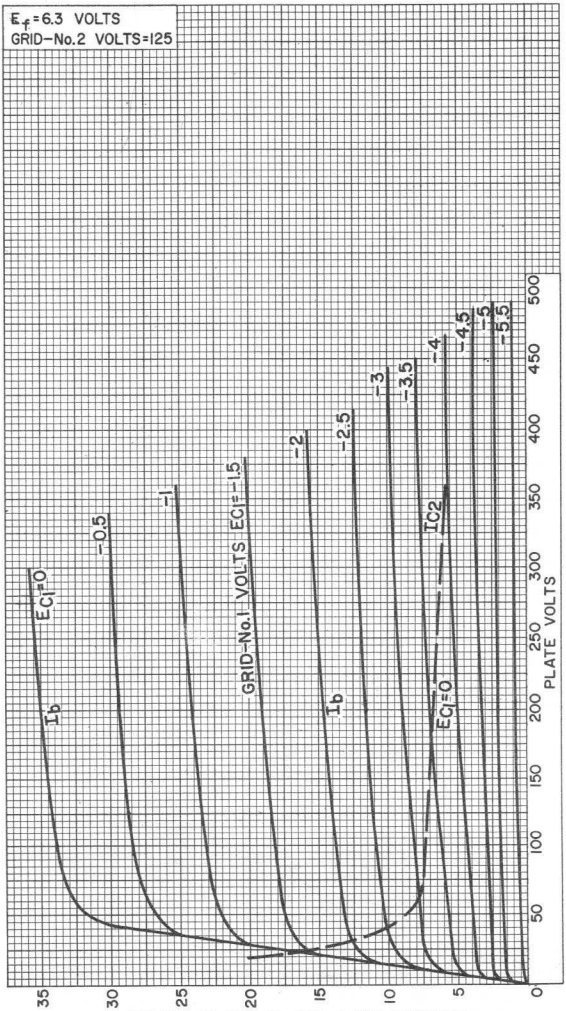
6AU8A

AVERAGE CHARACTERISTICS
Triode Unit



92CM-11144RI

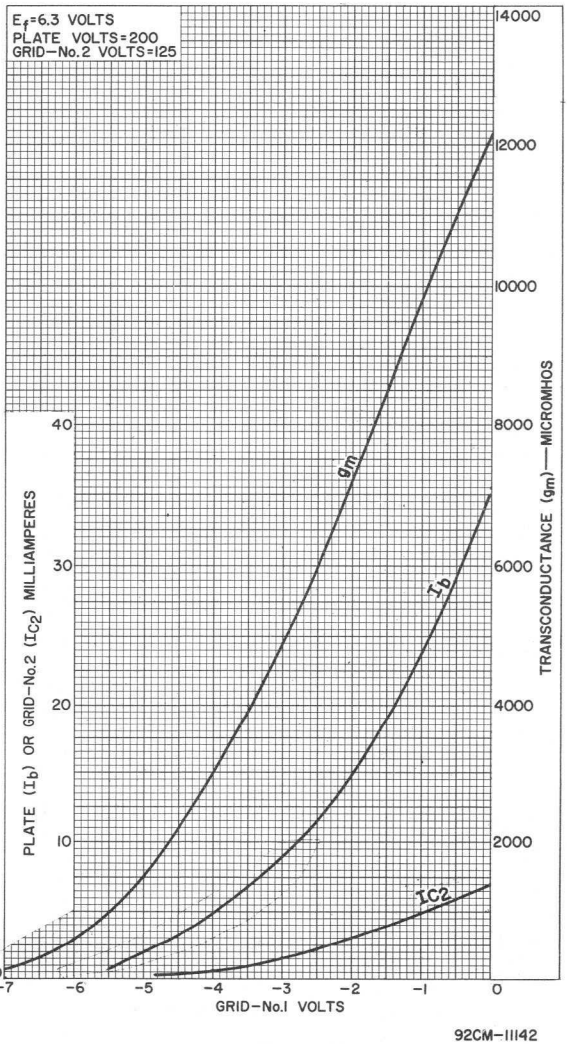
AVERAGE CHARACTERISTICS
Pentode Unit



92CM-11141

6AU8A

AVERAGE CHARACTERISTICS
Pentode Unit



92CM—11142

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

6AV6

TWIN DIODE—HIGH-MU TRIODE

7-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage (AC or DC)	6.3 ± 10%	volts
Current	0.3	amp

Direct Interelectrode Capacitances:

	Without External Shield	*With External Shield*[o]	
Triode Unit:			
Grid to plate	2	2	μμf
Grid to cathode and heater	2.2	2.2	μμf
Plate to cathode and heater	0.8	1.2	μμf
Diode-No. 2 plate to triode grid	0.04 max.	0.04 max.	μμf

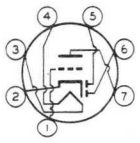
Characteristics, Class A_1 Amplifier (Triode Unit):

Plate Voltage	100	250	volts
Grid Voltage	−1	−2	volts
Amplification Factor	100	100	
Plate Resistance (Approx.)	0.08	0.0625	megohm
Transconductance	1250	1600	μmhos
Plate Current	0.5	1.2	ma

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	7BT

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



Pin 5 – Diode Plate No. 2
Pin 6 – Diode Plate No. 1
Pin 7 – Triode Plate

TRIODE UNIT — AMPLIFIER — Class A_1

Maximum Ratings, *Design-Maximum Values:*

PLATE VOLTAGE	330	max.	volts
GRID VOLTAGE:			
Positive-bias value	0	max.	volts
PLATE DISSIPATION	0.55	max.	watt

→ Indicates a change.

6AV6

TWIN DIODE—HIGH-MU TRIODE

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

DIODE UNITS — Two

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

PLATE CURRENT (For each diode)	1 max.	ma

→ **Characteristics:**

Values are for Each Unit

Plate Current for plate volts = 10	2	ma

Diode Considerations:

Consideration of these units, including typical circuits and diode curves, is given at the front of this Section. Diode biasing of the triode unit of the 6AV6 is not suitable.

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

▲ The dc component must not exceed 100 volts.

Curves for the triode unit of the 6AV6 are the same as those shown for Type 12AX7

→ Indicates a change.

High-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 ± 0.6	volts
Current at 6.3 volts		0.6[a]	amp
Warm-up time (Average)		11	sec
Direct Interelectrode Capacitances:	*Without External Shield*	*With External Shield*[b]	
Triode Unit:			
Grid to plate	2.2	2.2	μμf
Grid to cathode, pentode cathode & grid No.3 & internal shield, and heater	3.2	3.4	μμf
Plate to cathode, pentode cathode & grid No.3 & internal shield, and heater	1.8	3	μμf
Pentode Unit:			
Grid No.1 to plate	0.05 max.	0.04 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	3.6	4.5	μμf
Pentode grid No.1 to triode plate	0.008 max.	0.005 max.	μμf
Pentode plate to triode plate	0.150 max.	0.025 max.	μμf

Characteristics, Class A_1 Amplifier: ←

	Triode Unit	*Pentode Unit*		
Plate Supply Voltage	200	65	150	volts
Grid-No.2 Supply Voltage	–	150	150	volts
Grid-No.1 Voltage	-2	0	–	volts
Cathode Resistor	–	–	150	ohms
Amplification Factor	70	–	–	
Plate Resistance (Approx.)	0.0175	–	0.2	megohm

←Indicates a change.

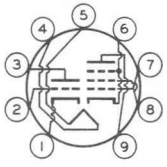
6AW8A

	Triode Unit	*Pentode Unit*	
Transconductance	4000	9500	μmhos
Plate Current	4	46[c] 15	ma
Grid-No.2 Current	–	15[c] 3.5	ma
Grid-No.1 Voltage (Approx.) for plate μa = 20	-5	-8	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	1.1 max.	3.75 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	

→Indicates a change.

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:			
For fixed-bias operation	0.5 max.	0.25 max.	megohm
For cathode-bias operation	1 max.	1 max.	megohm

[a] In series-heater-string operation, the heater current rating is 0.600 ± 0.040 ampere at 6.3 volts.

[b] With external shield JEDEC No.315 connected to pins 4 and 5.

[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.

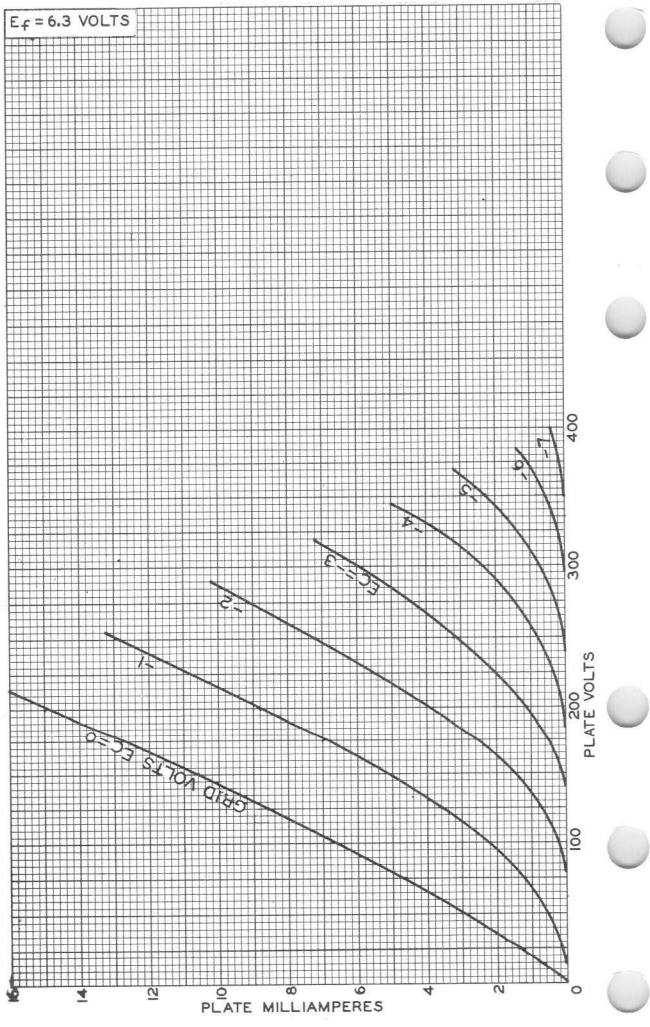
[d] The dc component must not exceed 100 volts.

OPERATING CONSIDERATIONS

Because the internal shield is connected to the pentode cathode and grid No.3, the impedance in the cathode circuit should be kept as low as possible to minimize cross-coupling effects.

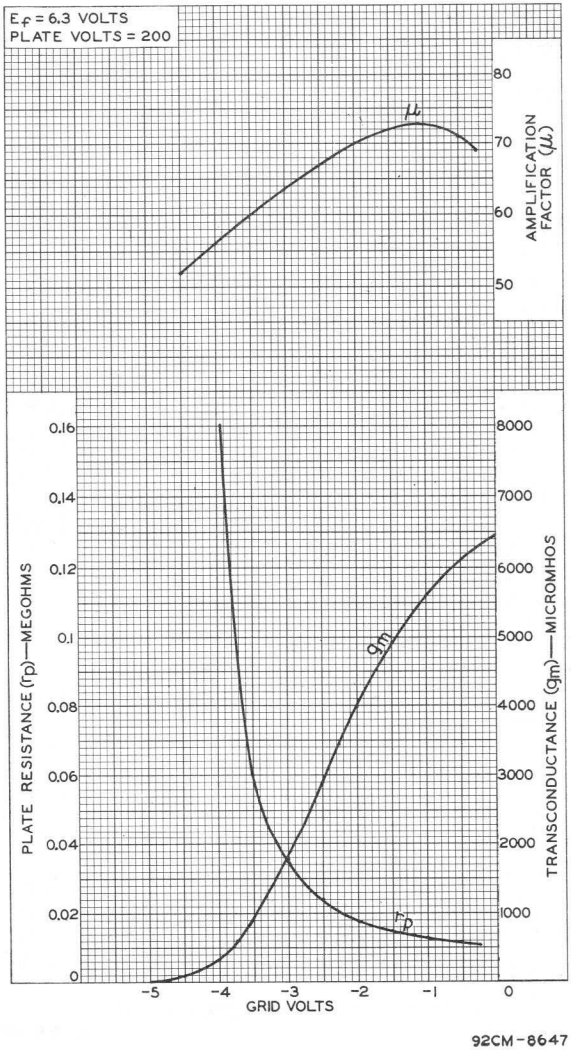
6AW8A

AVERAGE PLATE CHARACTERISTICS
Triode Unit



92CM-8644

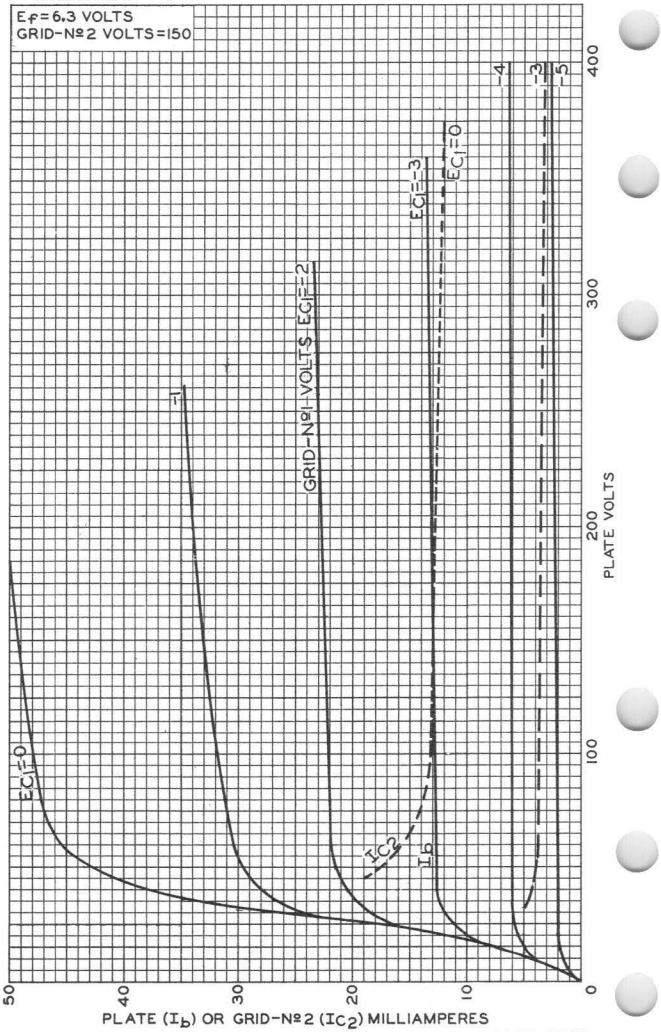
AVERAGE CHARACTERISTICS
Triode Unit



92CM-8647

6AW8A

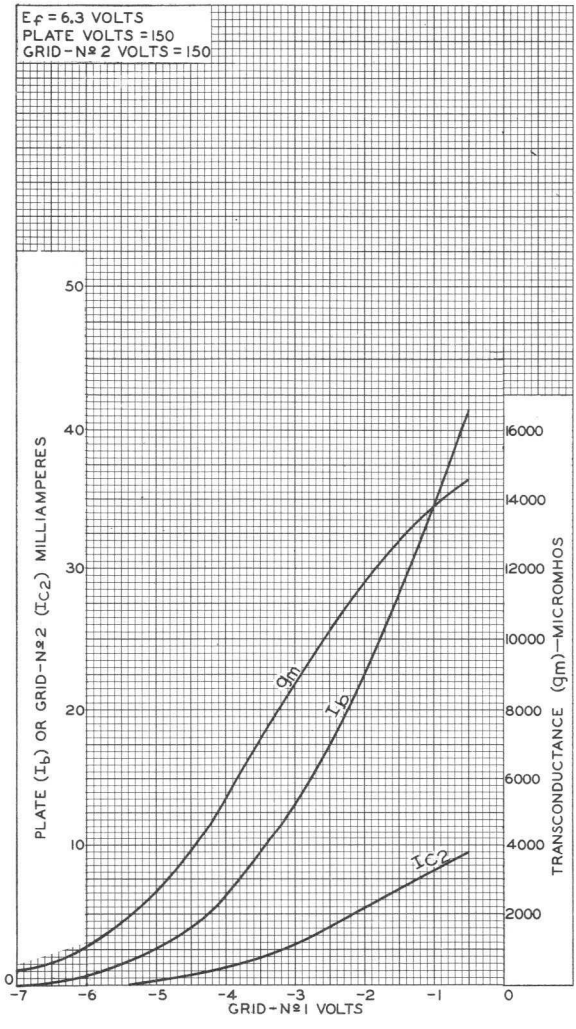
AVERAGE CHARACTERISTICS
Pentode Unit



92CM-9173RI

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

AVERAGE CHARACTERISTICS
Pentode Unit



92CS-8646RI

Half-Wave Vacuum Rectifier

DUODECAR TYPE

GENERAL DATA

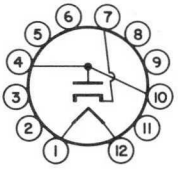
Electrical:

Heater Characteristics and Ratings *(Design-Maximum Values):*		
Voltage (AC or DC)	6.3 ± 0.6	volts
Current at heater volts = 6.3	1.200	amp
Peak heater-cathode voltage:		
Heater negative with respect to cathode[a]	5000[b] max.	volts
Heater positive with respect to cathode	300[c] max.	volts
Direct Interelectrode Capacitances (Approx.):[d]		
Plate to cathode and heater	5.5	μμf
Cathode to plate and heater	7.5	μμf
Heater to cathode	2.8	μμf

Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	2.625"
Seated Length	2.000" to 2.250"
Diameter	1.062" to 1.188"
Bulb	T9
Base	Small-Button Duodecar 12-Pin (JEDEC No.E12-70)
Basing Designation for BOTTOM VIEW	12BL

Pin 1 – Heater
Pin 2 – No Internal Connection
Pin 3 – Same as Pin 2
Pin 4 – Plate
Pin 5 – Do Not Use[e]
Pin 6 – Do Not Use[e]
Pin 7 – Cathode
Pin 8 – Do Not Use[e]
Pin 9 – Do Not Use[e]
Pin 10 – Plate
Pin 11 – Same as Pin 2
Pin 12 – Heater



DAMPER SERVICE

Maximum Ratings, *Design-Maximum Values:*

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

PEAK INVERSE PLATE VOLTAGE[a]	5000 max.	volts
PEAK PLATE CURRENT	1000 max.	ma
DC PLATE CURRENT	165 max.	ma
PLATE DISSIPATION	5.3 max.	watts

Characteristics, Instantaneous Value:

Tube Voltage Drop for plate ma. = 250	32	volts

[a] This rating is applicable when 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.

[b] The dc component must not exceed 900 volts.

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

[d] Without external shield.

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

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

6AX4-GTB

Half-Wave Vacuum Rectifier

For Television Damper Service

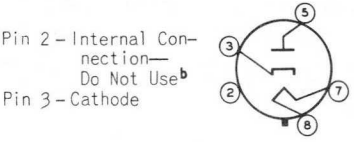
GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	6.3 ± 10%	volts
Current at 6.3 volts	1.2	amp
Direct Interelectrode Capacitances (Approx.):[a]		
Plate to cathode and heater	5	μμf
Cathode to plate and heater	8.5	μμf
Heater to cathode	4	μμf

Mechanical:

Operating Position	Any
Maximum Overall Length	3-5/16"
Maximum Seated Length	2-3/4"
Maximum Diameter	1-9/32"
Dimensional Outline	See *General Section*
Bulb	T9
Base	Intermediate-Shell Octal 5-Pin, Arrangement 2 (JEDEC Group 1, No.B5-82)
Basing Designation for BOTTOM VIEW	4CG



DAMPER SERVICE

Maximum Ratings, *Design-Maximum Values:*

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

PEAK INVERSE PLATE VOLTAGE[d]	5000	max.	volts
PEAK PLATE CURRENT	1000	max.	ma
DC PLATE CURRENT	165	max.	ma
PLATE DISSIPATION	5.3	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	5000[e]	max.	volts
Heater positive with respect to cathode	300[f]	max.	volts

Characteristics, Instantaneous Test Condition:

Tube Voltage Drop for plate ma. = 250	32	volts

[a] Without external shield.

[b] Socket terminals 1,2,4 and 6 should not be used as tie points.

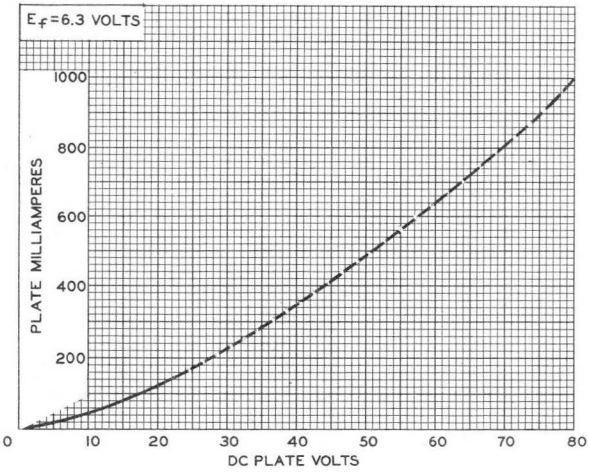
[c] As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations," Federal Communications Commission.

[d] This rating is applicable when the duty cycle 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] The dc component must not exceed 900 volts.

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

AVERAGE PLATE CHARACTERISTIC



92CS-10850

6AX5-GT

FULL-WAVE VACUUM RECTIFIER

GENERAL DATA

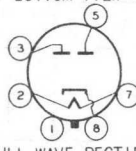
Electrical:

Heater, for Unipotential Cathode:		
Voltage	6.3	ac volts
Current	1.2	amp

Mechanical:

Mounting Position	Any
Maximum Overall Length	3-5/16"
Maximum Seated Length	2-3/4"
Maximum Diameter	1-9/32"
Bulb	T-9
Base	Short-Intermediate-Shell Octal 6-Pin
Basing Designation for BOTTOM VIEW	G-6S

Pin 1 – No Connection
Pin 2 – Heater
Pin 3 – Plate of Diode No.2
Pin 5 – Plate of Diode No.1
Pin 7 – Heater
Pin 8 – Cathode



FULL-WAVE RECTIFIER

Maximum Ratings, *Design-Center Values*:

PEAK INVERSE PLATE VOLTAGE	1250 max.	volts
PEAK PLATE CURRENT PER PLATE	375 max.	ma
HOT-SWITCHING TRANSIENT PLATE CURRENT For duration of 0.2 second maximum	2.6 max.	amp
AC PLATE SUPPLY VOLTAGE (RMS) PER PLATE	See Rating Chart	
DC OUTPUT CURRENT PER PLATE	See Rating Chart	
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	450 max.	volts
Heater positive with respect to cathode	450 max.	volts

Typical Operation with Capacitor-Input Filter:

AC Plate-to-Plate Supply Voltage (RMS)	700	900	volts
Filter-Input Capacitor▲	10	10	μf
Effective Plate-Supply Impedance Per Plate	50	105	ohms
DC Output Voltage at Input to Filter (Approx.):			
At half-load cur. of 62.5 ma.	395	–	volts
At half-load cur. of 40 ma.	–	540	volts
At full-load cur. of 125 ma.	350	–	volts
At full-load cur. of 80 ma.	–	490	volts
Voltage Regulation (Approx.):			
Half-load to full-load current	45	50	volts

▲ Higher values of capacitance than indicated may be used but the effective plate supply impedance may have to be increased to prevent exceeding the maximum rating for hot-switching transient plate current.

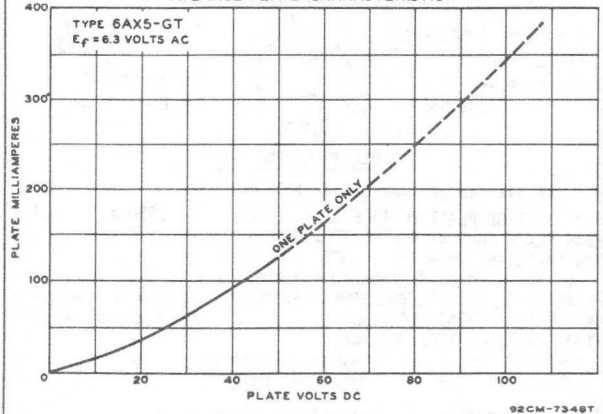
6AX5 - GT

FULL-WAVE VACUUM RECTIFIER

Typical Operation with Choke-Input Filter:

AC Plate-to-Plate Supply Voltage (RMS)	700	900	volts
Filter-Input Choke	10	10	henries
DC Output Voltage at Input to Filter (Approx.):			
At half-load cur. of 75 ma.	270	–	volts
At half-load cur. of 62.5 ma.	–	365	volts
At full-load cur. of 150 ma.	250	–	volts
At full-load cur. of 125 ma.	–	350	volts
Voltage Regulation (Approx.):			
Half-load to full-load Current	20	15	volts

AVERAGE PLATE CHARACTERISTIC



92CM-7348T

RATING CHART and OPERATION CHARACTERISTICS

The *Rating Chart* presents graphically the relationships between maximum ac voltage input and maximum dc output current derived from the fundamental ratings for conditions of capacitor-input and choke-input filters. This graphical presentation gives the equipment designer considerable latitude in choice of operating conditions.

The *Operation Characteristics for Full-Wave Circuit with Capacitor-Input Filter* show not only the typical operating curves for such a circuit, but also show by means of boundary lines "ADK" the limiting current and voltage relationships presented on the Rating Chart.

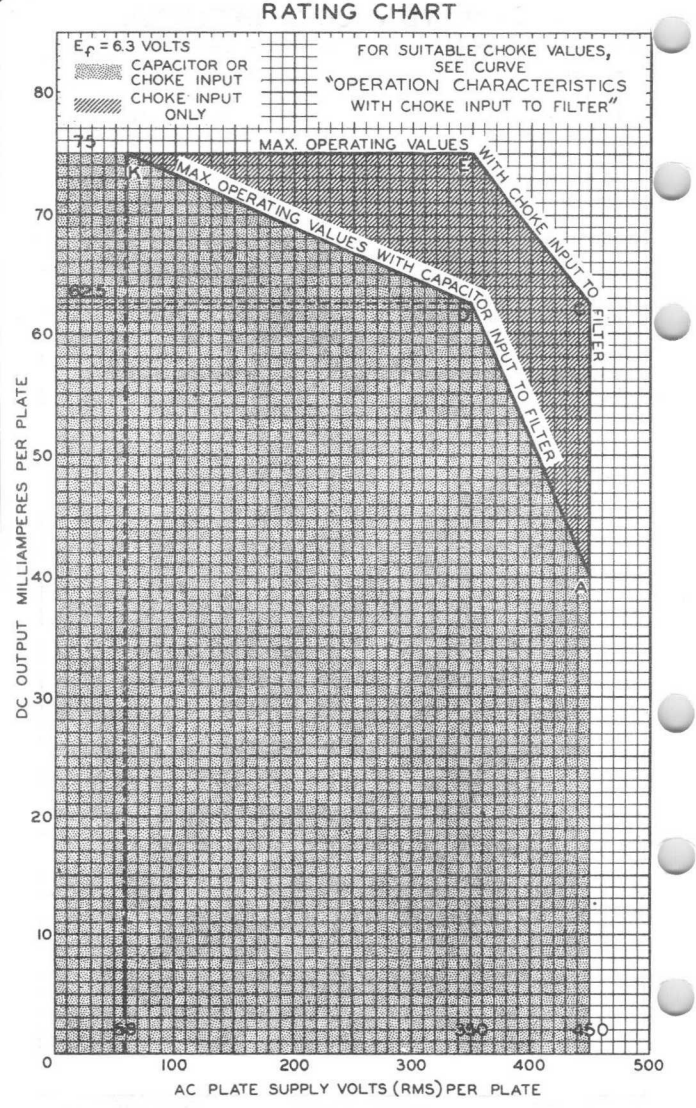
6AX5-GT

FULL-WAVE VACUUM RECTIFIER

The *Operation Characteristics for Full-Wave Circuit with Choke-Input Filter* show the typical operating curves for such a circuit. They not only show by means of boundary line "CEK" the limiting current and voltage relationships presented on the *Rating Chart*, but also give information as to the effect on regulation of various sizes of chokes. The solid-line curves show the dc voltage outputs which would be obtained if the filter chokes had infinite inductance. The long-dash lines radiating from the zero position are boundary lines for various sizes of chokes as indicated. The intersection of one of these lines with a solid-line curve indicates the point on the curve at which the choke no longer behaves as though it has infinite inductance. To the left of the choke boundary line, the regulation curves depart from the solid-line curves as shown by the representative short-dash regulation curves.

6AX5-GT

RATING CHART

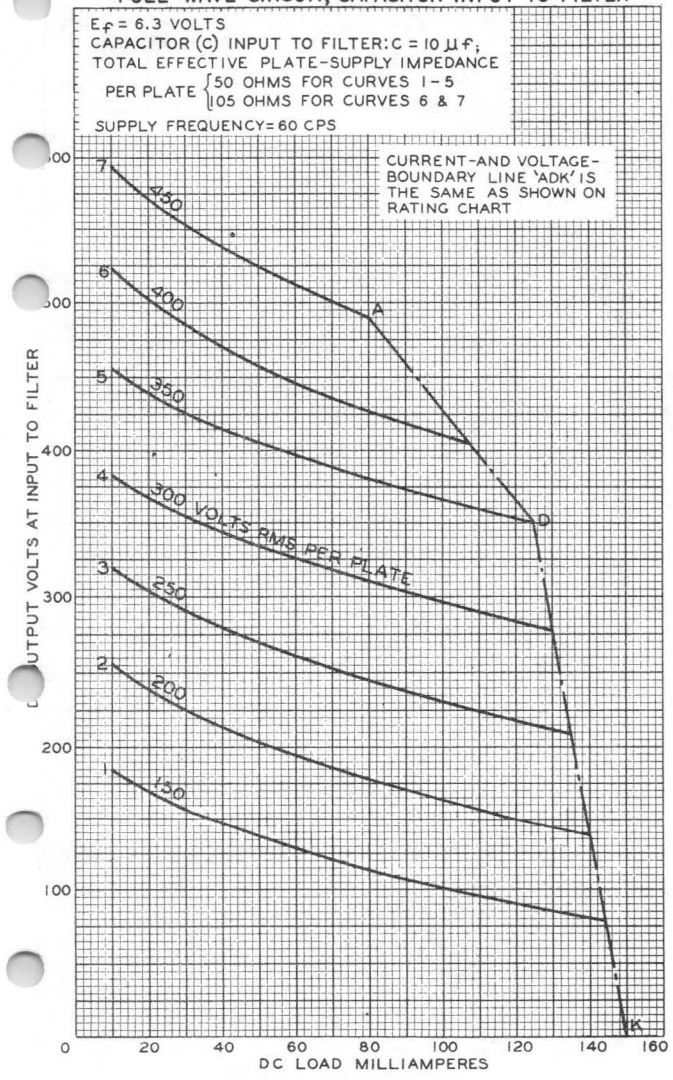


RCA

6AX5-GT

OPERATION CHARACTERISTICS

FULL-WAVE CIRCUIT, CAPACITOR INPUT TO FILTER

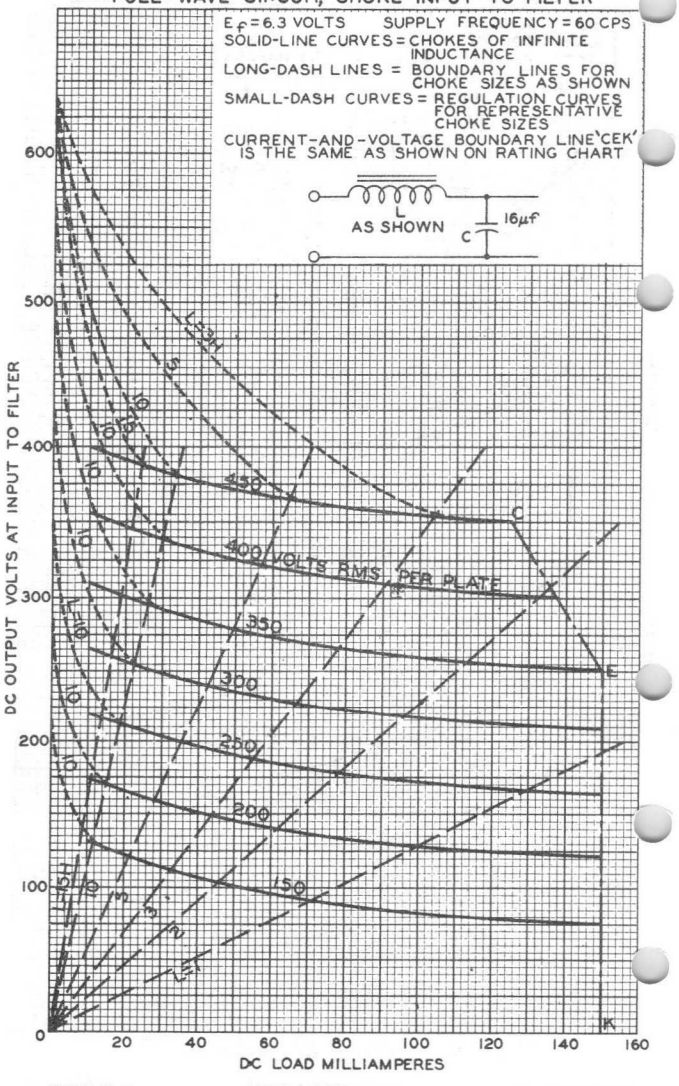


6AX5-GT

6AX5-GT

OPERATION CHARACTERISTICS

FULL-WAVE CIRCUIT, CHOKE INPUT TO FILTER



6AX8
MEDIUM-MU TRIODE—SHARP-CUTOFF PENTODE

9-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:		
Voltage (AC or DC)	6.3	volts
Current	0.45	amp
Direct Interelectrode Capacitances:[o]		
Triode Unit:		
Grid to plate	1.8	μμf
Grid to cathode and heater	2.5	μμf
Plate to cathode and heater	1	μμf
Pentode Unit:		
Grid No.1 to plate	0.006 max.	μμf
Grid No.1 to cathode & grid No.3 & internal shield, grid No.2, and heater	5	μμf
Plate to cathode & grid No.3 & internal shield, grid No.2, and heater	3.5	μμf
Heater to cathode (Each unit)	3.5[•]	μμf

Characteristics, Class A_1 Amplifier:

	Triode Unit	*Pentode Unit*	
Plate Supply Voltage	150	250	volts
Grid-No.2 Supply Voltage	–	110	volts
Cathode Resistor	56	120	ohms
Amplification Factor	40	–	
Plate Resistance (Approx.)	0.005	0.4	megohm
Transconductance	8500	4800	μmhos
Plate Current	18	10	ma
Grid-No.2 Current	–	3.5	ma
Grid-No.1 Voltage (Approx.) for plate μa = 10	-12	-12	volts

Mechanical:

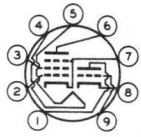
Operating Position	Any
Maximum Overall Length	2-3/16"
Maximum Seated Length	1-15/16"
Length, Base Seat to Bulb Top (Excluding tip)	1-9/16" ± 3/32"
Diameter	0.750" to 0.875"
Dimensional Outline	*See General Section*
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)

6AX8

6AX8
MEDIUM-MU TRIODE– SHARP-CUTOFF PENTODE

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-Center Values:*

	Triode Unit	*Pentode Unit*	
PLATE VOLTAGE.	300 max.	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.	0 max.	volts
GRID-No.2 INPUT: For grid-No.2 voltages up to 150 volts.	–	0.5 max.	watt
For grid-No.2 voltages between 150 and 300 volts. .	–	*See Grid-No.2 Input Rating Chart at front of Recieving Tube Section*	
PLATE DISSIPATION.	2.7 max.	2.8 max.	watts
PEAK HEATER-CATHODE VOLTAGE: Heater negative with respect to cathode	90 max.	90 max.	volts
Heater positive with respect to cathode	90 max.	90 max.	volts

Maximum Circuit Values:

	Triode Unit	*Pentode Unit*	
Grid-No.1 Circuit Resistance:			
For fixed-bias operation . . .	0.1 max.	0.1 max.	megohm
For cathode-bias operation . .	0.5 max.	0.5 max.	megohm

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

• With external shield JEDEC No.315 connected to ground.

Half-Wave Vacuum Rectifier

NOVAR TYPE

For Television Damper Service

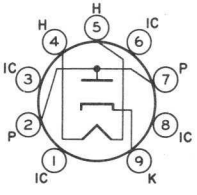
Electrical:

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[a]	5000[b] max.	volts
Heater positive with respect to cathode	300[c] max.	volts
Direct Interelectrode Capacitances (Approx.):[d]		
P to (K,H)	6.5	pf
K to (P,H)	9.0	pf
Heater to cathode	2.8	pf

Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	3.005"
Seated Length	2.375" to 2.625"
Dimensional Outline	See *General Section*
Diameter	1.062" to 1.188"
Bulb	T9
Base	Small-Button Novar 9-Pin with Exhaust Tip (JEDEC No. E9-89)
Basing Designation for BOTTOM VIEW	9HP

Pin 1 – Do Not Use[e]
Pin 2 – Plate
Pin 3 – Do Not Use[e]
Pin 4 – Heater



Pin 5 – Heater
Pin 6 – Do Not Use[e]
Pin 7 – Plate
Pin 8 – Do Not Use[e]
Pin 9 – Cathode

DAMPER SERVICE

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

Maximum Ratings, *Design-Maximum Values:*

Peak Inverse Plate Voltage[a]	5000	max.	volts
Peak Plate Current	1100	max.	ma
Average Plate Current	175	max.	ma
Plate Dissipation	6.5	max.	watts

Characteristic, Instantaneous Value:

Tube Voltage Drop for plate ma = 350	32	volts

[a] This rating is applicable when 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.

[b] The dc component must not exceed 900 volts.

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

[d] Without external shield.

[e] Socket terminals 1, 3, 6, and 8 should not be used as tie points. It is recommended that the socket clips for these pins be removed to reduce the possibility of arc-over and to minimize leakage.

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

6AZ8
MEDIUM-MU TRIODE—
SEMIREMOTE-CUTOFF PENTODE

9-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:		
Voltage	6.3	ac or dc volts
Current	0.45	amp
Direct Interelectrode Capacitances:○		
Triode Unit:		
Grid to plate	1.7	μμf
Grid to cathode, internal shield & heater	2	μμf
Plate to cathode, internal shield & heater	1.7	μμf
Pentode Unit:		
Grid No.1 to plate	0.02	μμf
Grid No.1 to cathode, grid No.2, grid No.3 & internal shield & heater	6.5	μμf
Plate to cathode, grid No.2, grid No.3 & internal shield & heater	2.2	μμf
Triode grid to pentode plate	0.027 max.	μμf
Pentode grid No.1 to triode plate	0.020 max.	μμf
Pentode plate to triode plate	0.045 max.	μμf

Characteristics, Class A_1 Amplifier:

	Triode Unit	*Pentode Unit*	
Plate Supply Voltage	200	200	volts
Grid-No.2 Supply Voltage	–	150	volts
Grid-No.1 Voltage	-6	–	volts
Cathode-Bias Resistor	–	180	ohms
Amplification Factor	19	–	
Plate Resistance (Approx.)	5750	300000	ohms
Transconductance	3300	6000	μmhos
Plate Current	13	9.5	ma
Grid-No.2 Current	–	3	ma
Grid-No.1 Voltage (Approx.) for plate current of 10 μamp	-19	–	volts
Grid-No.1 Voltage (Approx.) for transconductance of 10 μmhos	–	-12.5	volts

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-3/16"
Maximum Seated Length	1-15/16"
Length, Base Seat to Bulb Top (Excluding tip)	1-9/16" ± 3/32"

○ Without external shield.

●: See next page.

6AZ8

MEDIUM-MU TRIODE—
SEMIREMOTE-CUTOFF PENTODE

Maximum Diameter . . . . . 7/8"
Bulb T-6-1/2
Base . . . . . Small-Button Noval 9-Pin (JETEC No.E9-1)
Basing Designation for BOTTOM VIEW 9ED

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

AMPLIFIER - Class A_1

Maximum Ratings, *Design-Center Values*:

	Triode Unit	*Pentode Unit*●	
PLATE VOLTAGE.	300 max.	300 max.	volts
GRID-No.3 (SUPPRESSOR) VOLTAGE.	–	*See Operating Considerations*	
GRID-No.2 (SCREEN) 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.	0 max.	volts
PLATE DISSIPATION. . . .	2.5 max.	2 max.	watts
GRID-No.2 INPUT:			
For grid-No.2 voltages up to 150 volts. . .	–	0.5 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*	
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode .	200 max.	▲	volts
Heater positive with respect to cathode .	200# max.	▲	volts

● The pentode unit is provided with a separate base pin for the cathode and for grid No.3 and internal shield which are connected internally to one of the heater leads. This arrangement facilitates the use of an unbypassed cathode resistor to minimize changes in input resistance and input capacitance with bias without causing oscillation which otherwise might occur if grid No.3 were internally connected to the cathode.

The dc component must not exceed 100 volts.

▲: See next page.

6AZ8
MEDIUM-MU TRIODE—
SEMIREMOTE-CUTOFF PENTODE

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. .	1.0 max.	1.0 max.	megohm

OPERATING CONSIDERATIONS

Because *grid No.3* is connected within the tube to one side of the heater (pin No.5), it is important that pin No.5 be connected to ground to maintain grid No.3 at ground potential. If this precaution is not observed and pin No.5 is connected to the ungrounded side of the heater supply, grid No.3 will operate at the heater-supply voltage. As a result, tube characteristics will be changed. Furthermore, if an ac heater supply is used, ac voltage will be applied to grid No.3 with resulting amplitude modulation of the grid-No.3 voltage.

▲ The heater-cathode voltage should not exceed the value of the operating cathode bias. If the heater-cathode voltage exceeds the operating cathode bias value, grid No.3 will be made negative with respect to cathode, and thus possibly cause a change in tube characteristics.

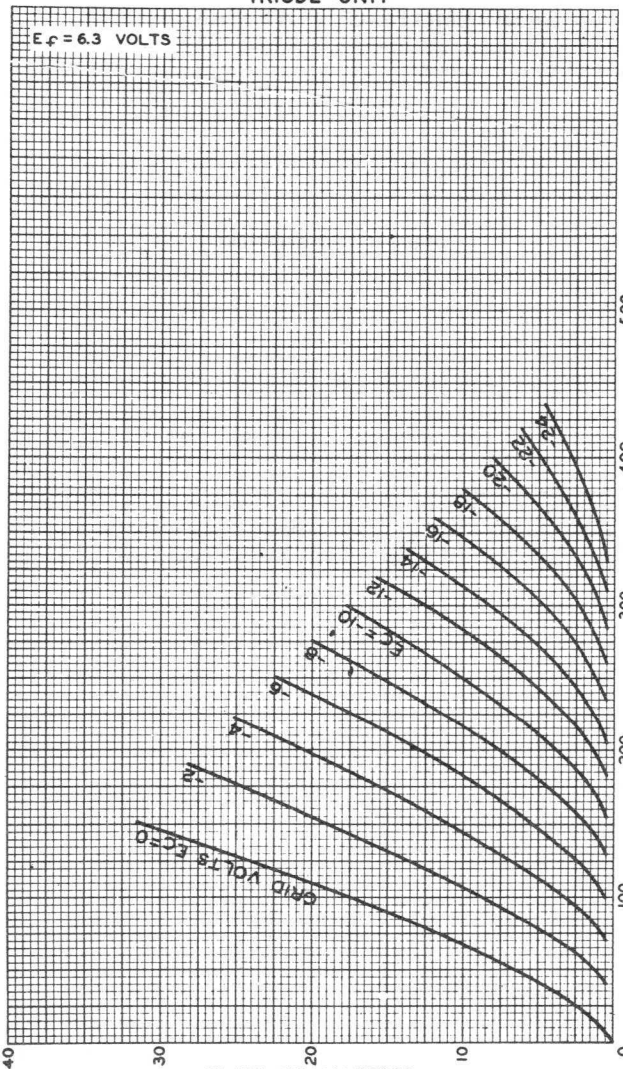
* If either unit is operated at maximum rated conditions, grid-No.1-circuit resistances for both units should not exceed the stated values.

6AZ8

6AZ8

AVERAGE PLATE CHARACTERISTICS

TRIODE UNIT



FEB. 2, 1955

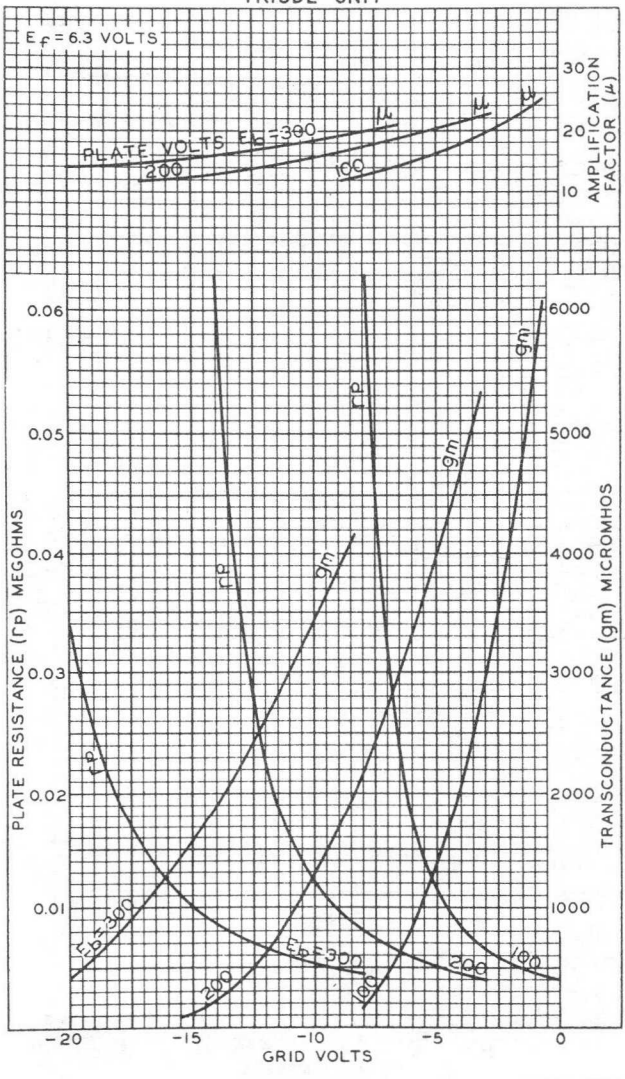
TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-8520

RCA

6AZ8

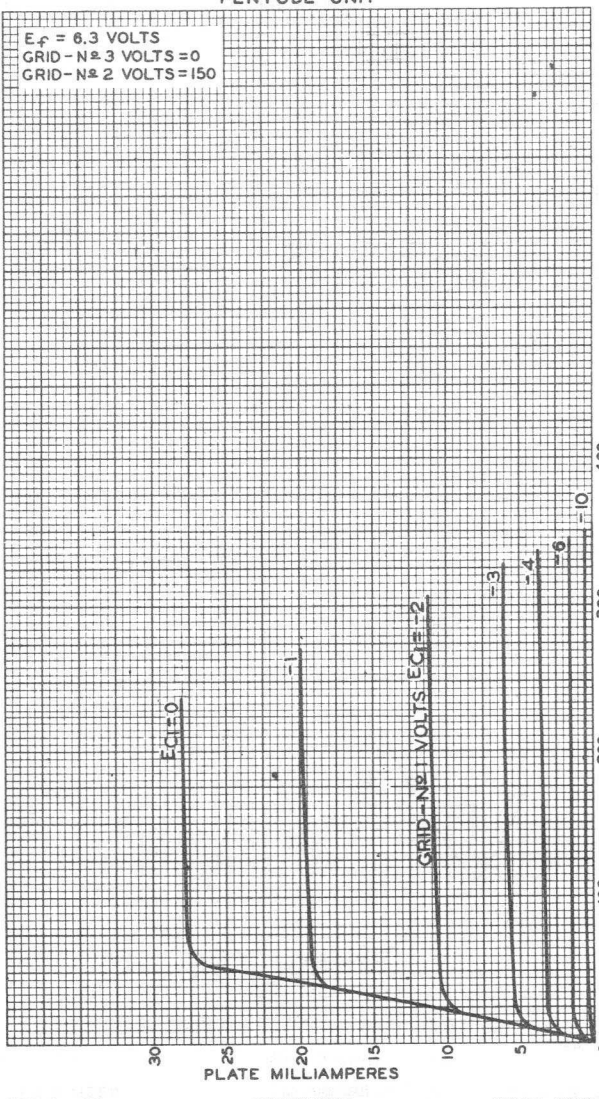
AVERAGE CHARACTERISTICS
TRIODE UNIT



6AZ8

AVERAGE PLATE CHARACTERISTICS

PENTODE UNIT



FEB. 3, 1955

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-8525

RCA

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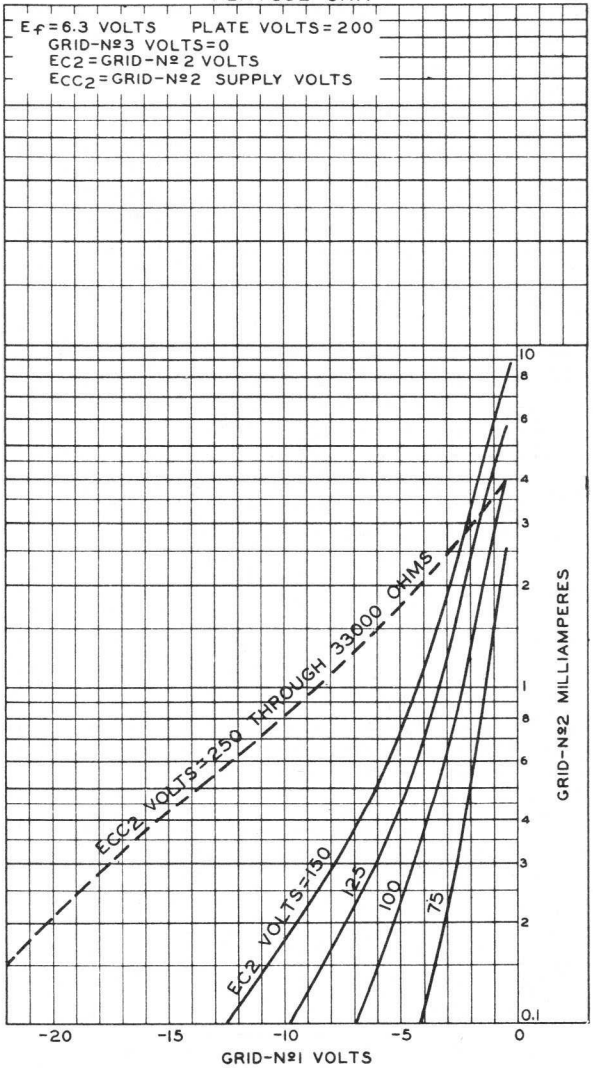
AVERAGE CHARACTERISTICS

PENTODE UNIT



RCA

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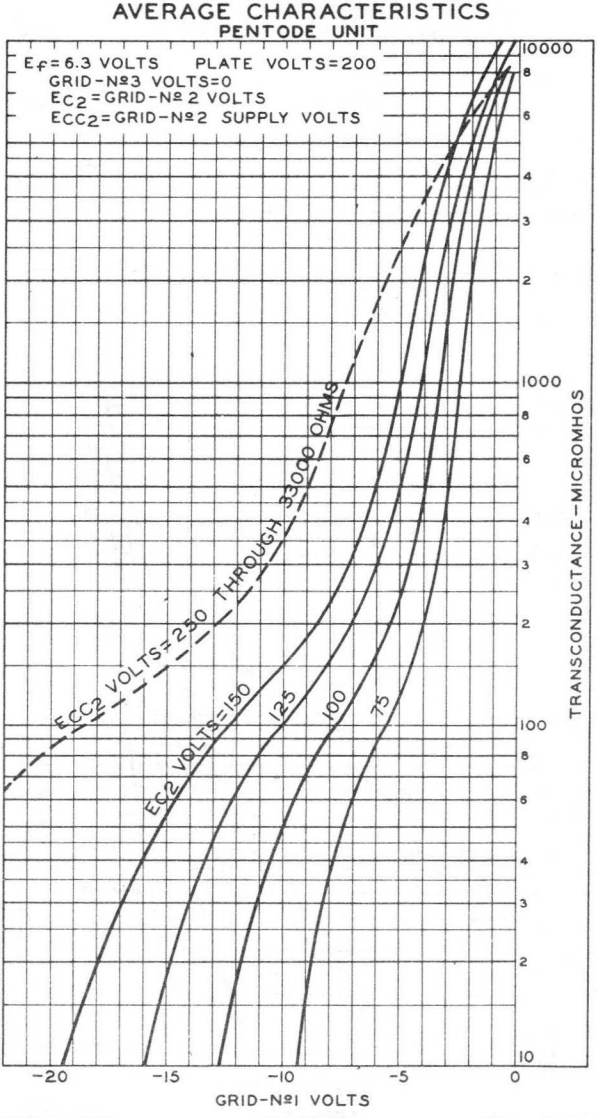
AVERAGE CHARACTERISTICS

PENTODE UNIT

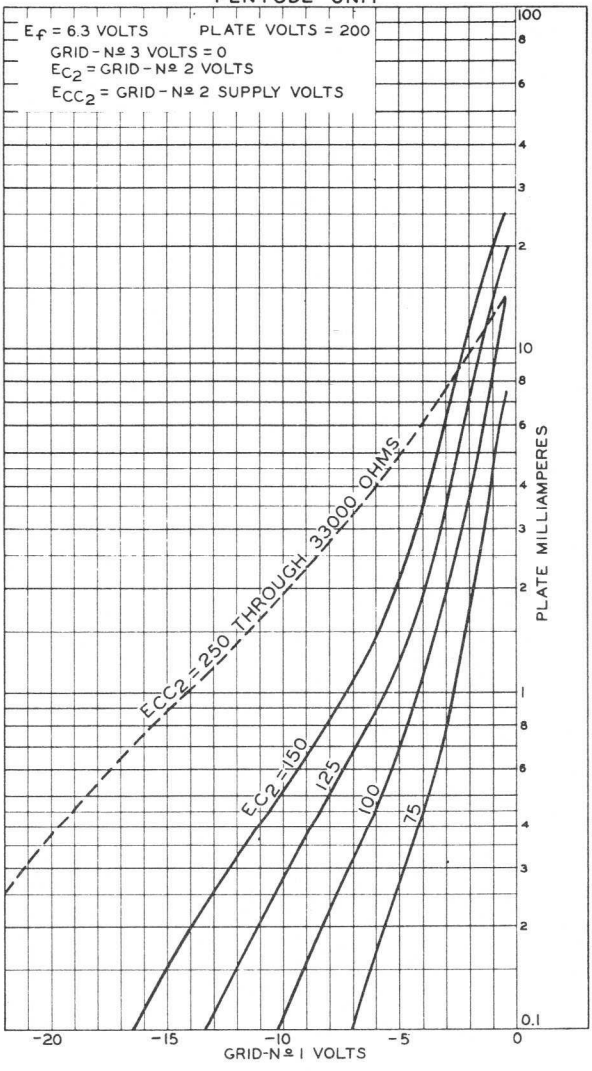


FEB. 2, 1955 TUBE DIVISION 92CM-8522
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6AZ8

AVERAGE CHARACTERISTICS

PENTODE UNIT



TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

Twin Diode—Medium-Mu-Twin Triode

DUODECAR 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	0.600 ± 0.040	0.600[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 (Approx.):[d]			
Diode Units:			
Plate of unit No.1 to cathode, internal shield, and heater	1.9		pf
Plate of unit No.2 to cathode, internal shield, and heater	1.8		pf
Triode Units:	*Unit No.1*	*Unit No.2*	
Grid to plate	1.5	1.5	pf
Grid to cathode, internal shield, and heater	1.7	1.8	pf
Plate to cathode, internal shield, and heater	1.6	0.6	pf
Plate of diode unit No.1 to plate of diode unit No.2	0.7		pf
Triode grid to plate of diode unit No.1	0.015	0.005	pf
Triode grid to plate of diode unit No.2	0.02	0.005	pf
Plate of triode unit No.1 to plate of triode unit No.2	0.9		pf

Characteristics, Class A_1 Amplifier (Each Triode Unit):

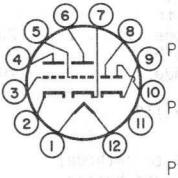
Plate Voltage	250	volts
Grid Voltage	−8	volts
Amplification Factor	18	
Plate Resistance (Approx.)	7200	ohms
Transconductance	2500	μmhos
Plate Current	10	ma
Grid Voltage (Approx.) for plate μa = 50	−20	volts

6B10

Mechanical:

Operating Position	Any
Types of Cathodes	Coated Unipotential
Maximum Overall Length	1.875"
Seated Length	1.250" to 1.500"
Diameter	1.062" to 1.188"
Bulb	T9
Base	Small-Button Duodecar 12-Pin (JEDEC No.E12-70)
Basing Designation for BOTTOM VIEW	12BF

Pin 1 – Heater
Pin 2 – Cathode of Triode Unit No.2
Pin 3 – Grid of Triode Unit No.2
Pin 4 – Plate of Triode Unit No.2
Pin 5 – Grid of Triode Unit No.1
Pin 6 – Plate of Triode Unit No.1



Pin 7 – Cathode of Triode Unit No.1
Pin 8 – Plate of Diode Unit No.2
Pin 9 – Cathode of Diode Units No.1 & No.2
Pin 10 – Plate of Diode Unit No.1
Pin 11 – Internal Shield
Pin 12 – Heater

TRIODE UNITS — AMPLIFIER — Class A_1

Values are for Each Unit

Maximum Ratings, *Design-Maximum Values:*

PLATE VOLTAGE	330 max.	volts
DC CATHODE CURRENT	20 max.	ma
PLATE DISSIPATION	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

DIODE UNITS — Two

Values are for Each Unit

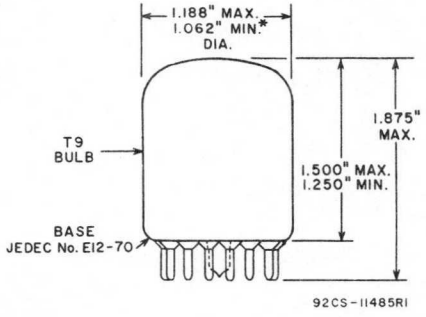
Maximum Ratings, *Design-Maximum Values:*

PLATE CURRENT	5 max.	ma

Characteristics, Instantaneous Value:

Plate Current for plate volts = 5	20	ma

[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.



* APPLIES TO MINIMUM DIAMETER EXCEPT IN AREA OF SEAL.

Half-Wave Vacuum Rectifier

NOVAR TYPE

For Television Damper Service

Electrical:

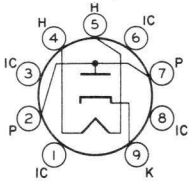
Heater Characteristics and Ratings:		
Voltage (AC or DC)	6.3 ± 0.6	volts
Current at heater volts = 6.3	1.200	amp
Maximum Heater-Cathode Voltage:		
Heater negative with respect to cathode:[a]		
Peak	5500	volts
DC component	900	volts
Heater positive with respect to cathode:		
Peak	300	volts
DC component	100	volts
Direct Interelectrode Capacitances (Approx.):[b]		
Plate to cathode and heater	4.4	pf
Cathode to plate and heater	6.0	pf
Heater to cathode	1.8	pf

Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	3.080"
Maximum Seated Length	2.700"
Diameter	1.062" to 1.188"
Dimensional Outline	See *General Section*
Bulb	T9

Bases (Alternates):
- Small-Button Novar 9-Pin (JEDEC No. E9-75)
- Small-Button Novar 9-Pin with Exhaust Tip (JEDEC No. E9-89)
- Basing Designation for BOTTOM VIEW 9HP

Pin 1 – Do Not Use[c]
Pin 2 – Plate
Pin 3 – Do Not Use[c]
Pin 4 – Heater
Pin 5 – Heater
Pin 6 – Do Not Use[c]
Pin 7 – Plate
Pin 8 – Do Not Use[c]
Pin 9 – Cathode



DAMPER SERVICE

Maximum Ratings, *Design-Maximum Values:*

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

Peak Inverse Plate Voltage[a]	5000	volts
Peak Plate Current	1000	ma
DC Plate Current	165	ma
Plate Dissipation	5.3	watts

Characteristics, Instantaneous Value:

Tube Voltage Drop for plate ma = 250	32	volts

[a] 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.

[b] Without external shield.

[c] Socket terminals 1, 3, 6, and 8 should not be used for tie points. It is also recommended that socket clips for these pins be removed to reduce the possibility of arc-over and to minimize leakage.

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

Remote-Cutoff Pentode

7-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:			
Voltage (AC or DC)		6.3 ± 10%	volts ←
Current at 6.3 volts		0.3	amp
Direct Interelectrode Capacitances:			←
	Without External Shield	*With External Shield*▲	
Grid No.1 to plate	0.0035 max.	0.0035 max.	μμf
Grid No.1 to cathode, grid No.3 & internal shield, grid No.2, and heater	5.5	5.5	μμf
Plate to cathode, grid No.3 & internal shield, grid No.2, and heater	5	5.5	μμf

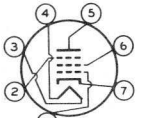
Characteristics, Class A_1 Amplifier:

Plate Supply Voltage	100	250	volts
Grid No.3	*Connected to cathode at socket*		
Grid-No.2 Supply Voltage	100	100	volts
Cathode Resistor	68	68	ohms
Plate Resistance (Approx.)	0.25	1	megohm
Transconductance	4300	4400	μmhos
Plate Current	10.8	11	ma
Grid-No.2 Current	4.4	4.2	ma
Grid-No.1 Voltage (Approx.) for transconductance (μmhos) = 40	-20	-20	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	7BK ←

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



Pin 4 - Heater
Pin 5 - Plate
Pin 6 - Grid No.2
Pin 7 - Cathode

← Indicates a change.

→ **AMPLIFIER — Class A_1**

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:		
Negative-bias value	55 max.	volts
Positive-bias value	0 max.	volts
GRID-No.2 INPUT:		
For grid-No.2 voltages up to 165 volts	0.7 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	3.4 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.

→ Indicates a change.

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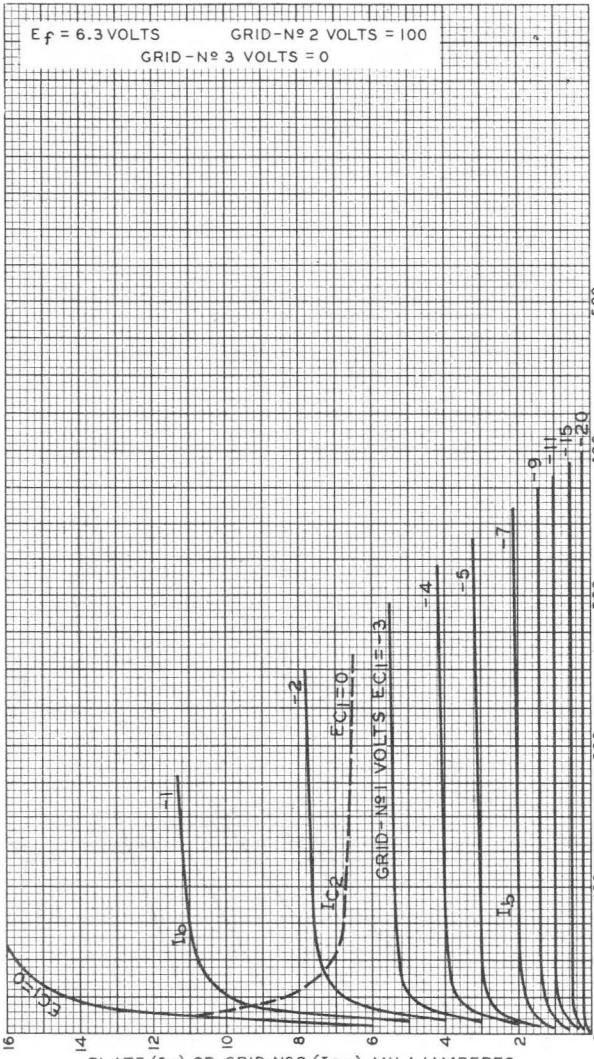
AVERAGE PLATE CHARACTERISTICS



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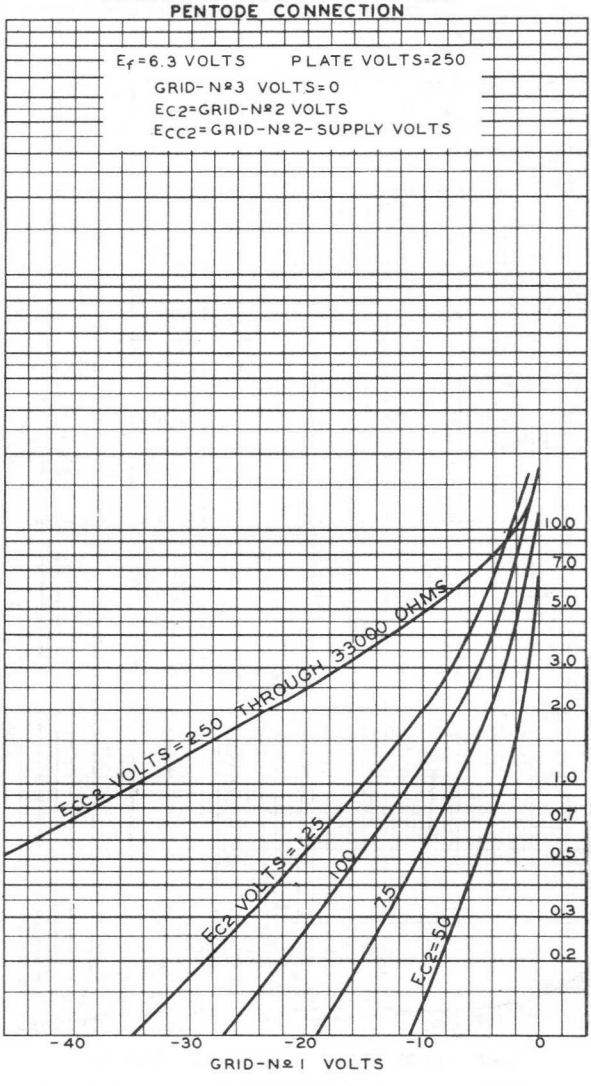
AVERAGE CHARACTERISTICS
PENTODE CONNECTION



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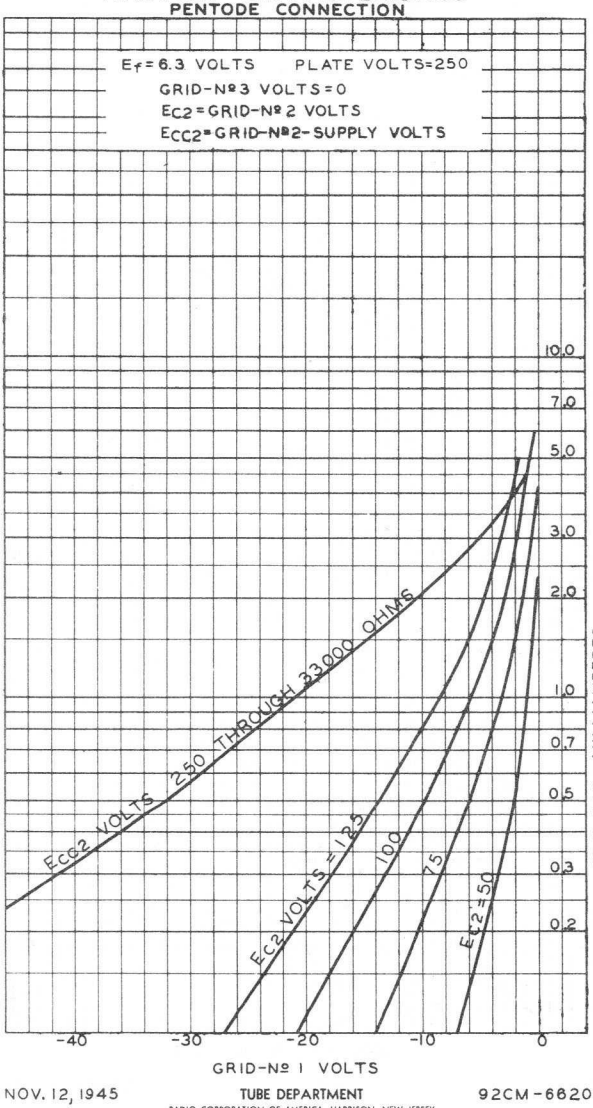
AVERAGE CHARACTERISTICS
PENTODE CONNECTION



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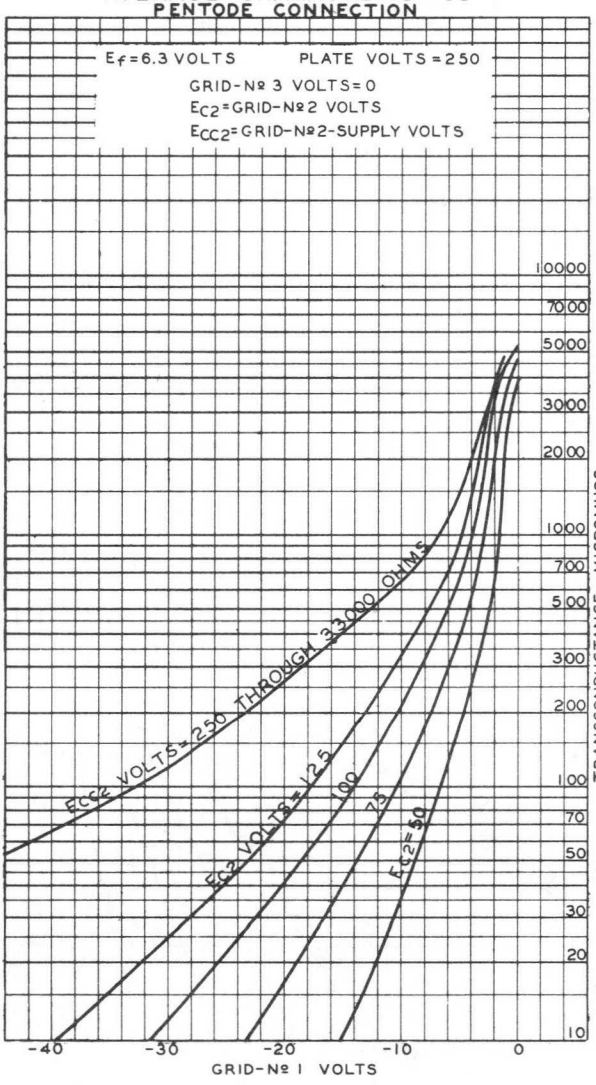
AVERAGE CHARACTERISTICS
PENTODE CONNECTION



6BA7

PENTAGRID CONVERTER

9-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

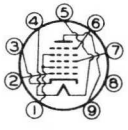
Heater, for Unipotential Cathode:		
Voltage	6.3	ac or dc volts
Current	0.3	amp
Direct Interelectrode Capacitances:o		
Grid No.3 to All Other Electrodes (RF Input)	9.5	μμf
Plate to All Other Electrodes (Mixer Output)	8.3	μμf
Grid No.1 to All Other Electrodes (Osc. Input)	6.7	μμf
Grid No.3 to Plate	0.19 max.	μμf
Grid No.3 to Grid No.1	0.1 max.	μμf
Grid No.1 to Plate	0.05 max.	μμf
Grid No.1 to All Other Electrodes Except Cathode	3.4	μμf
Grid No.1 to Cathode	3.3	μμf
Cathode to All Other Electrodes Except Grid No.1	4.0	μμf

o With no external shield.

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-5/8"
Maximum Seated Length	2-3/8"
Length, Base Seat to Bulb Top (excluding tip)	2" ± 3/32"
Maximum Diameter	7/8"
Bulb	T-6-1/2
Base	Small-Button Noval 9-Pin
Basing Designation for BOTTOM VIEW	8CT

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



Pin 6 – Grid No.5, Internal Shield
Pin 7 – Grid No.3
Pin 8 – Internal Shield
Pin 9 – Plate

CONVERTER SERVICE

Maximum Ratings, *Design-Center Values*:

PLATE VOLTAGE	300 max.	volts
GRID-No.5 & INTERNAL-SHIELD VOLTAGE ▲	0 max.	volts
GRIDS-No.2 & No.4 VOLTAGE	100 max.	volts
GRIDS-No.2 & No.4 SUPPLY VOLTAGE	300 max.	volts
PLATE DISSIPATION	2.0 max.	watts
GRIDS-No.2 & No.4 DISSIPATION	1.5 max.	watts
TOTAL CATHODE CURRENT	22 max.	ma

▲ See next page.

6BA7
PENTAGRID CONVERTER

GRID-No.3 VOLTAGE:			
Negative bias value.		100 max.	volts
Positive bias value.		0 max.	volts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode.		90 max.	volts
Heater positive with respect to cathode.		90 max.	volts
Characteristics - *Separate Excitation*:*			
Plate Voltage.	100	250	volts
Grid-No.5 & Internal Shield. .	Connected directly to ground		
Grids-No.2 & No.4 (Screen) Voltage . . .	100	100	volts
Grid-No.3 (Control Grid) Voltage	-1	-1	volt
Grid-No.1 (Cscillator Grid) Resistor . .	20000	20000	ohms
Plate Resistance (Approx.)	0.5	1	megohm
Conversion Transconductance	900	950	μmhos
Conversion Transconductance (Approx.)# .	3.5	3.5	μmhos
Plate Current.	3.6	3.8	ma
Grids-No.2 & No.4 Current.	10.2	10	ma
Grid-No.1 Current.	0.35	0.35	ma
Total Cathode Current.	14.2	14.2	ma

NOTE: The transconductance between grid No.1 and grids No.2 & No.4 connected to plate (not oscillating) is approximately 8000 micromhos under the following conditions: signal applied to grid No.1 at zero bias; grids-No.2 and No.4 and plate at 100 volts; grid No.3 grounded. Under the same conditions, the plate current is 32 milliamperes and the amplification factor is 16.5.

▲ Internal shield (Pins No.6 and No.8) connected directly to ground.

* The characteristics shown with separate excitation correspond very closely with those obtained in a self-excited oscillator circuit operating with zero bias.

\# With grid-No.3 bias of -20 volts.

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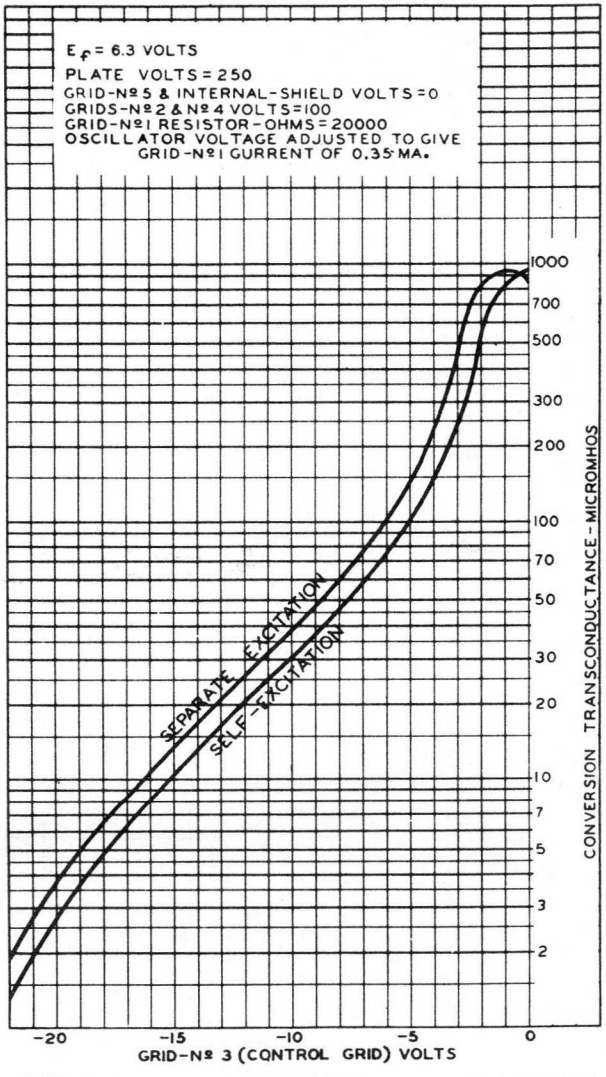
OPERATION CHARACTERISTICS

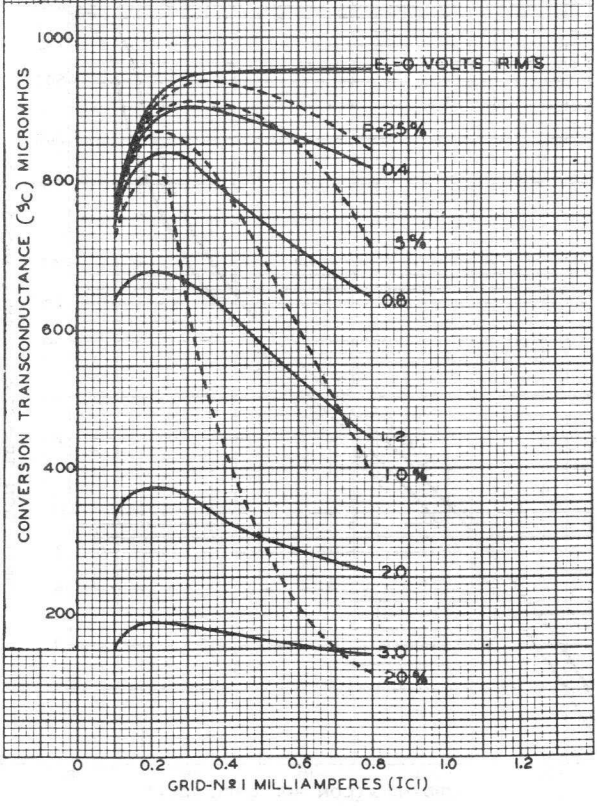


6BA7

6BA7

OPERATION CHARACTERISTICS WITH SELF-EXCITATION

E_f = 6.3 VOLTS
PLATE VOLTS = 250
GRID-№5 & INTERNAL-SHIELD VOLTS=0
GRIDS-№2 & №4 VOLTS = 100
GRID-№3 (CONTROL GRID) VOLTS = -1
GRID-№1 RESISTOR-OHMS = 20000
P-PERCENTAGE RATIO OF E_K TO $E_K + E_g$, WHERE
E_K = VOLTAGE ACROSS OSCILLATOR-COIL SECTION BETWEEN GROUND AND CATHODE AND
E_g = OSCILLATOR VOLTAGE BETWEEN CATHODE AND GRID



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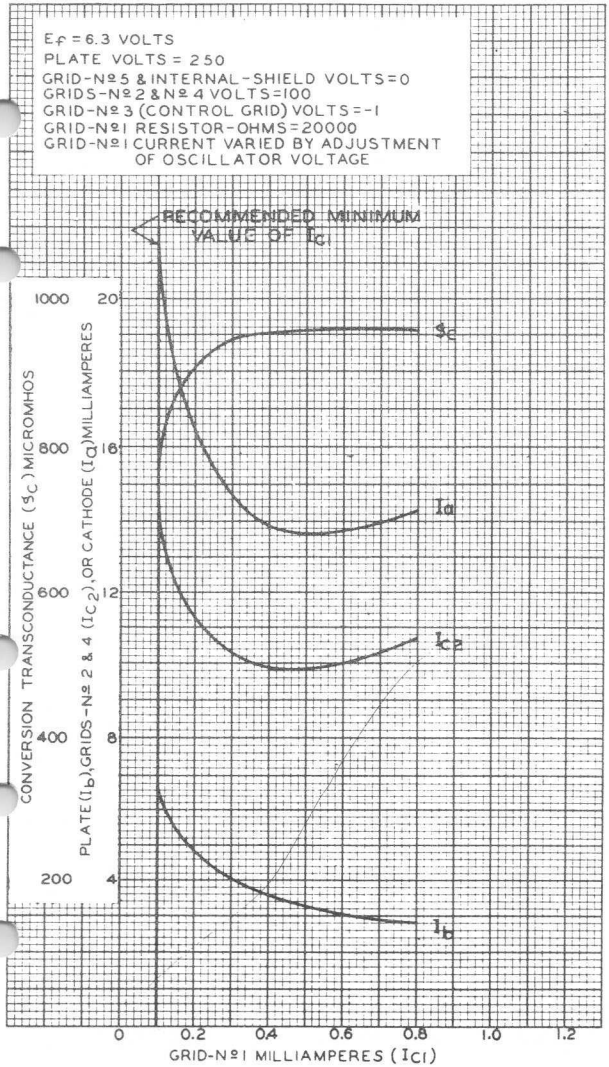
OPERATION CHARACTERISTICS
WITH SEPARATE OSCILLATOR EXCITATION

E_f = 6.3 VOLTS
PLATE VOLTS = 250
GRID-№5 & INTERNAL-SHIELD VOLTS=0
GRIDS-№2 & №4 VOLTS=100
GRID-№3 (CONTROL GRID) VOLTS=-1
GRID-№1 RESISTOR-OHMS=20000
GRID-№1 CURRENT VARIED BY ADJUSTMENT OF OSCILLATOR VOLTAGE



RCA

6BA8-A

MEDIUM-MU TRIODE — SHARP-CUTOFF PENTODE

9-PIN MINIATURE TYPE

Intended for use in equipment having series heater-string arrangement

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:

Voltage	6.3	ac or dc volts
Current	0.6	amp
Warm-up time (Average)	11	sec

For definition of heater warm-up time and method of determining it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of this Section.

Direct Interelectrode Capacitances (Approx.):

	Without External Shield	*With External Shield°*	
Triode Unit:			
Grid to plate	2.2	2.2	μμf
Grid to cathode and heater	2.5	2.7	μμf
Plate to cathode and heater	0.4	1.9	μμf
Pentode Unit:			
Grid No.1 to plate	0.04	0.03	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	3.6	4.5	μμf
Triode grid to pentode plate	0.016	0.006	μμf
Pentode grid No.1 to triode plate	0.006	0.003	μμf
Pentode plate to triode plate	0.15	0.023	μμf

Characteristics, Class A_1 Amplifier:

	Triode Unit	*Pentode Unit*		
Plate-Supply Voltage	200	65	200	volts
Grid-No.2 Supply Voltage	–	150	150	volts
Grid-No.1 Voltage	-8	0	0	volts
Cathode Resistor	–	–	180	ohms
Amplification Factor	18	–	–	
Plate Resistance (Approx.)	6700	–	400000	ohms

° With external shield JETEC No.315 connected to cathode of unit under test.

6BA8-A

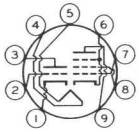
MEDIUM-MU TRIODE— SHARP-CUTOFF PENTODE

	Triode Unit	*Pentode Unit*		
Transconductance	2700	–	9000	μmhos
Plate Current	8	42*	13	ma
Grid-No.2 Current	–	12.5*	3.5	ma
Grid-No.1 Voltage (Approx.) for plate current of 10 μa	-16	–	-10	volts

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-5/8"
Maximum Seated Length	2-3/8"
Length, Base Seat to Bulb-Top (Excluding tip)	2" ± 3/32"
Maximum Diameter	7/8"
Dimensional Outline	*See General Section*
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JETEC 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-Center Values:*

	Triode Unit	*Pentode Unit*	
PLATE VOLTAGE	300 max.	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:			
Negative bias value	–	50 max.	volts
Positive bias value	–	0 max.	volts
PLATE DISSIPATION	2 max.	3.25 max.	watts
GRID-No.2 INPUT: For grid-No.2 voltages up to 150 volts	–	1 max.	watt

* These values can be measured by a method involving a recurrent wave form such that the grid-No.2 input will be kept within ratings in order to prevent damage to the tube.

6BA8-A

MEDIUM-MU TRIODE — SHARP-CUTOFF PENTODE

	Triode Unit	*Pentode Unit*	
For grid-No.2 voltages between 150 and 300 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	1.0 max.	1.0 max.	megohm

▲ The dc component must not exceed 100 volts.

OPERATING CONSIDERATIONS

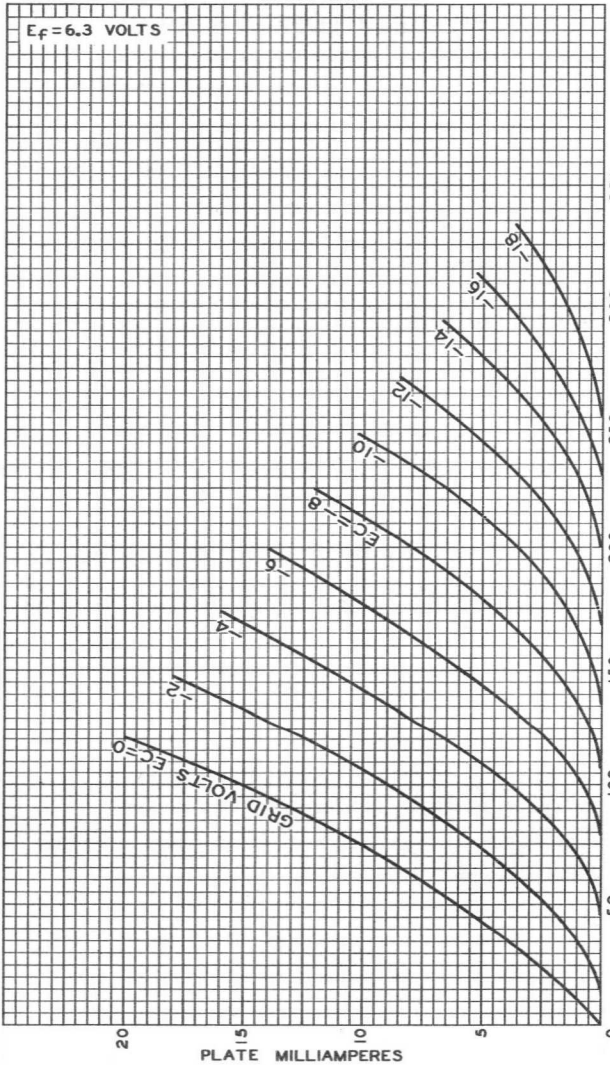
Because the internal shield is connected to the cathode and grid No.3, the impedance in the cathode circuit should be kept as low as possible to minimize cross-coupling effects.

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

6BA8-A

AVERAGE PLATE CHARACTERISTICS

TRIODE UNIT



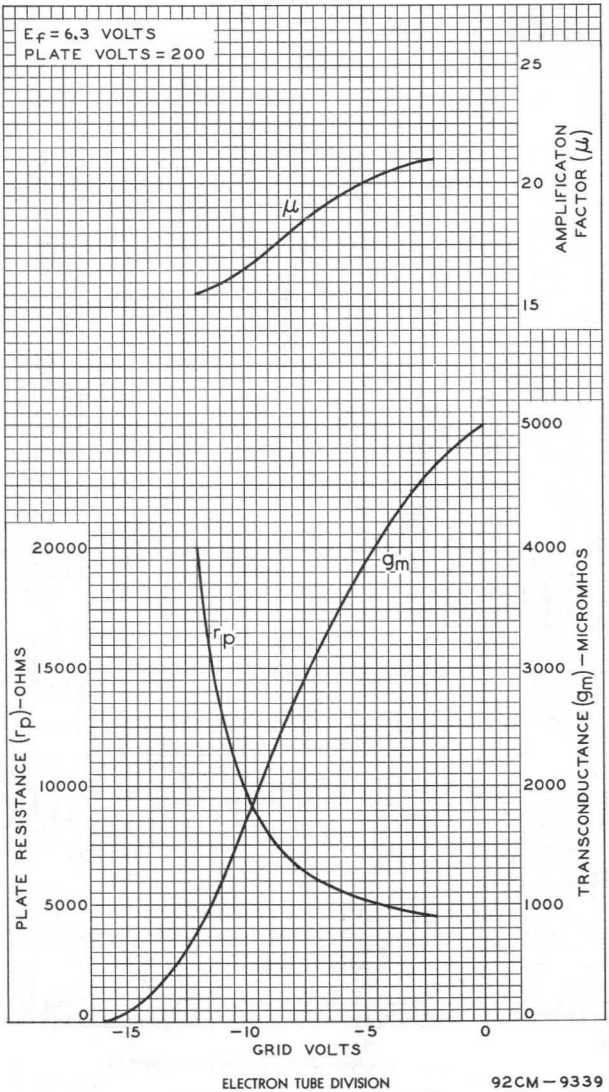
ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-9338

6BA8-A

AVERAGE CHARACTERISTICS

TRIODE UNIT



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

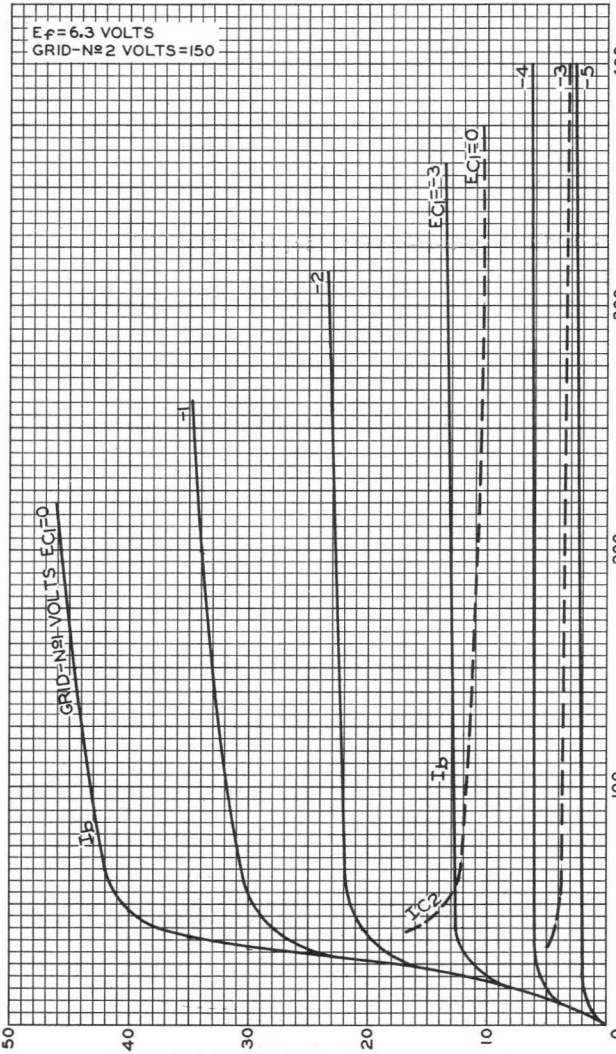
92CM-9339

RCA

6BA8-A

AVERAGE CHARACTERISTICS

PENTODE UNIT



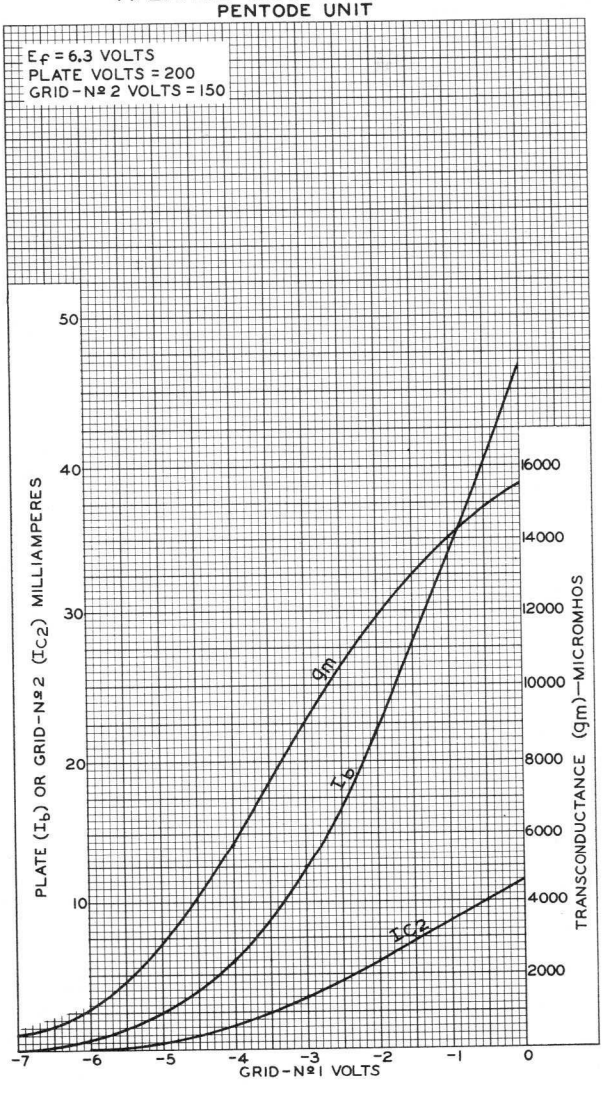
ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-9173

6BA8-A

AVERAGE CHARACTERISTICS

PENTODE UNIT



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

92CM-8646

Medium-Mu Triode—
Sharp-Cutoff Twin Pentode

DUODECAR TYPE

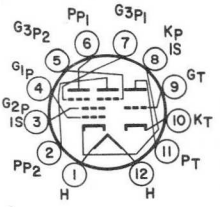
Electrical:

Heater Characteristics and Ratings:		
Voltage (AC or DC)	6.3 ± 0.6[a]	volts
Current at heater volts = 6.3	0.600[b]	amp
Warm-up time (Average)	11	sec
Peak heater-cathode voltage:		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200[c] max.	volts
Direct Interelectrode Capacitances:[d]		
Triode Unit:		
Grid to plate	2.0	pf
Input: G_T to (K_T,H)	2.0	pf
Output: P_T to (K_T,IS,H)	1.9	pf
Each Pentode Unit:		
$G3_P$ to P_P	2.0	pf
$G3_P$ to all other electrodes	3.6	pf
$G1_P$ to all other electrodes	6.0	pf
P_P to all other electrodes	3.0	pf
$G3_{P1}$ to $G3_{P2}$	0.026 max.	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	See *General Section*
Bulb	T9
Base	Small-Button Duodecar 12-Pin (JEDEC E12-70)
Basing Designation for BOTTOM VIEW	12ER

Pin 1 – Heater
Pin 2 – Plate of Pentode Unit No.2
Pin 3 – Pentodes Grid No.2, Internal Shield
Pin 4 – Pentodes Grid No.1
Pin 5 – Grid No.3 of Pentode Unit No.2
Pin 6 – Plate of Pentode Unit No.1
Pin 7 – Grid No.3 of Pentode Unit No.1
Pin 8 – Pentodes Cathode, Internal Shield
Pin 9 – Triode Grid
Pin 10 – Triode Cathode
Pin 11 – Triode Plate
Pin 12 – Heater



6BA11

Characteristics, Class A_1 Amplifier:

	Triode Unit	*Pentode Units*				
		Each Separately[e]		*Both Operating*[f]		
Plate Voltage	250	100	100	100	100	volts
Grid-No.3 Voltage	–	0	0	-10	0	volts
Grid-No.2 Voltage	–	67.5	67.5	67.5	67.5	volts
Grid-No.1 Voltage	-11	0	g	g	g	volts
Amplification Factor	18	–	–	–	–	
Grid No.3 Transconductance	–	–	450	–	–	μmhos
Grid No.1 Transconductance	1800	1700	–	–	–	μmhos
Plate Current	5	–	2.5	0	2.5	ma
Grid No.2 Current	–	–	–	7	4.4	ma
Grid-No.3 Voltage (Approx.) for plate μa = 100	–	–	-3.2	–	–	volts
Grid-No.1 Voltage (Approx.) for plate μa = 100	-18	2.3	–	–	–	volts

AMPLIFIER — Class A_1

	Triode Unit	*Pentode Unit*	
Maximum Ratings, *Design-Maximum Values:*			
Plate Voltage	300 max.	300 max.	volts
Grid-No.3 (Suppressor-Grid) Voltage:			
Peak positive value	–	50 max.	volts
DC negative value	–	50 max.	volts
DC positive value	–	3 max.	volts
Grid-No.2 (Screen-Grid) Voltage	–	150 max.	volts
Grid-No.1 (Control-Grid) Voltage:			
Negative-bias value	–	50 max.	volts
Cathode Current	20	12 max.	ma
Grid-No.2 Input	–	0.75 max.	watts
Plate Dissipation (Each Plate)	1.5	1.1 max.	watts
Maximum Circuit Values:			
Grid-No.3-Circuit Resistance (Each Grid)	–	0.5 max.	megohm
Grid-No.1-Circuit Resistance:			
For fixed-bias operation	0.25 max.	0.5 max.	megohm
For cathode-bias operation	1 max.	0.5 max.	megohm

[a] For parallel heater operation.

[b] For series heater operation current must be limited to 0.600 ± 0.040 amperes.

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

[d] Without external shield.

[e] Plate and grid 3 of opposite unit grounded.

[f] Voltages and plate current apply to each section.

[g] Adjusted to give a dc grid-No.1 current of 100 microamperes.

6BC4

MEDIUM-MU TRIODE

9-PIN MINIATURE TYPE

For use as rf amplifier in cathode-drive circuits of TV tuners covering range of 470-890 Mc

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage	6.3	ac or dc volts
Current	0.225	amp
Direct Interelectrode Capacitances (Approx.):*		
Grid to plate	1.6	μμf
Grid to heater and cathode	2.9	μμf
Plate to heater and cathode	0.26	μμf
Heater to cathode	2.7	μμf

Characteristics - Class A_1 Amplifier:

Plate Supply Voltage	150	volts
Cathode-Bias Resistor	100	ohms
Amplification Factor	48	
Plate Resistance	4800	ohms
Transconductance	10000	μmhos
Grid Voltage (Approx.) for plate current of 10 μamp	-10	volts
Plate Current	14.5	ma

Mechanical:

Mounting Position	Any
Maximum Overall Length	1-3/4"
Maximum Seated Length	1-1/2"
Length, Base Seat to Bulb Top (Excluding Tip)	1-1/8" ± 3/32"
Maximum Diameter	7/8"
Bulb	T-6-1/2
Base	Small-Button Noval 9-Pin (JETEC No. E9-1)
Basing Designation for BOTTOM VIEW	

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

Pin 6 - Cathode
Pin 7 - Grid
Pin 8 - Grid
Pin 9 - Plate

AMPLIFIER - Class A_1

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	250 max.	volts
PLATE DISSIPATION	2.5 max.	watts
CATHODE CURRENT	25 max.	ma
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	75 max.	volts
Heater positive with respect to cathode	75 max.	volts

* With no external shield.

6BC4

MEDIUM-MU TRIODE

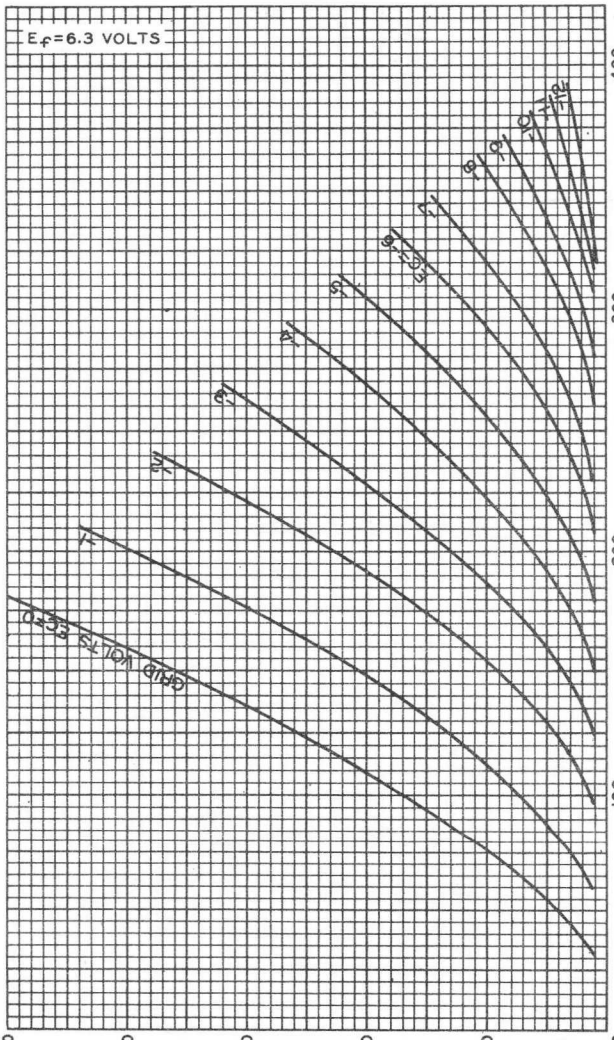
Maximum Circuit Values (For maximum rated conditions):

Grid-Circuit Resistance:

For cathode-bias operation	0.5 max. megohm
For fixed-bias operation	not recommended

6BC4

AVERAGE PLATE CHARACTERISTICS



FEB.12,1954

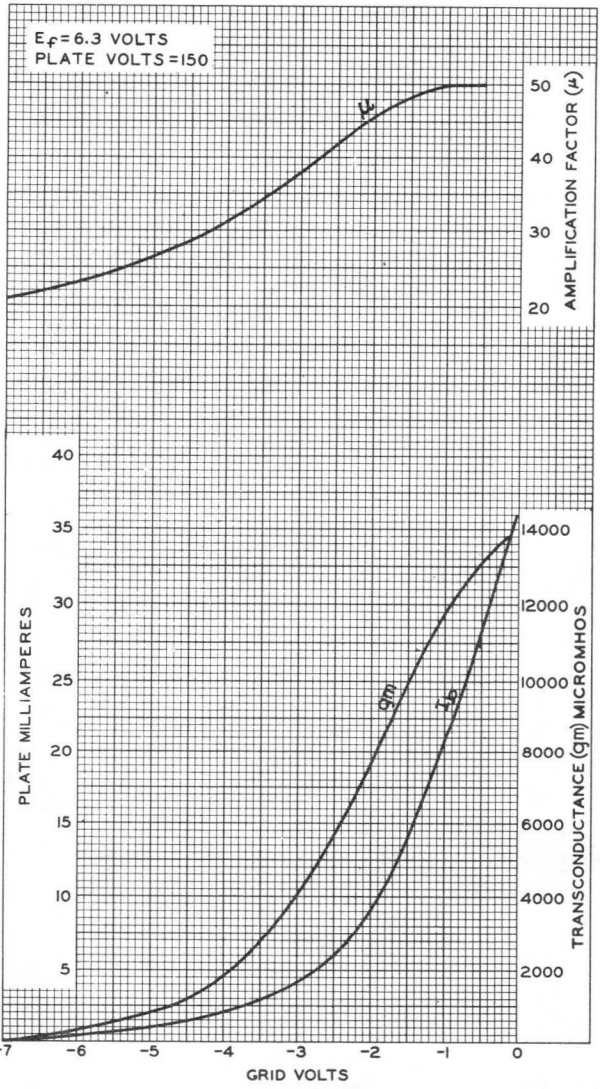
TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-8241

RCA

6BC4

AVERAGE CHARACTERISTICS



6BC5

SHARP-CUTOFF PENTODE

MINIATURE TYPE

Useful at Frequencies up to 400 Mc

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage	6.3	ac or dc volts
Current	0.3	amp

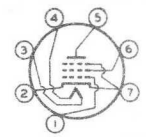
Direct Interelectrode Capacitances:

	Without External Shield	*With External Shield°*	
Pentode Connection:			
Grid No.1 to plate	0.030 max.	0.020 max.	μμf
Grid No.1 to cathode & grid No.3 & internal shield, grid No.2, and heater	6.5	6.6	μμf
Plate to cathode & grid No.3 & internal shield, grid No.2, and heater	1.8	2.6	μμf
Triode Connection, Grid No.2 connected to plate:			
Grid No.1 to plate and grid No.2	2.5	2.5	μμf
Grid No.1 to cathode & grid No.3 & internal shield, and heater	3.9	4.0	μμf
Plate and grid No.2 to cathode & grid No.3 & internal shield, and heater	3.0	4.3	μμf

Mechanical:

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

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



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

° With external shield JETEC No.316 connected to cathode.

← Indicates a change.

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6BC5
SHARP-CUTOFF PENTODE

AMPLIFIER - Class A_1

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	300 max.	volts
GRID-No.2 (SCREEN) 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
PLATE DISSIPATION	2 max.	watts
→ GRID-No.2 INPUT:		
For grid-No.2 voltages up to 150 volts	0.5 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*	
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	90 max.	volts
Heater positive with respect to cathode	90 max.	volts

Typical Operation and Characteristics:

Plate Voltage	100	125	250	volts
Grid-No.2 Voltage	100	125	150	volts
Cathode-Bias Resistor	180	100	180	ohms
Plate Resistance (Approx.)	0.6	0.5	0.8	megohm
Transconductance	4900	6100	5700	μmhos
Grid-No.1 Voltage (Approx.) for plate current of 10 μamp	−5	−6	−8	volts
Plate Current	4.7	8	7.5	ma
Grid-No.2 Current	1.4	2.4	2.1	ma

AMPLIFIER - Class A_1

Triode Connection - Grid No.2 Connected to Plate

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	300 max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Positive bias value	0 max.	volts
PLATE & GRID-No.2 DISSIPATION (TOTAL)	2.5 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	90 max.	volts
Heater positive with respect to cathode	90 max.	volts

Typical Operation and Characteristics:

Plate Voltage	180	250	volts
Cathode-Bias Resistor	330	820	ohms
Amplification Factor	42	40	
Plate Resistance (Approx.)	6000	9000	ohms
Transconductance	6000	4400	μmhos
Plate & Grid-No.2 Current (Total)	8	6	ma

→ Indicates a change.

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6BC7

TRIPLE DIODE

9-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

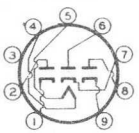
Heater, for Unipotential Cathodes:		
Voltage	6.3	ac or dc volts
Current	0.450	amp
Direct Interelectrode Capacitances (Approx.):°		
Plate No.1 to Cathode No.1, Heater, and Internal Shield	3.5	μμf
Plate No.2 to Cathode No.2, Heater, and Internal Shield	5.5	μμf
Plate No.3 to Cathode No.3, Heater, and Internal Shield	3.5	μμf

° With no external shield.

Mechanical:

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

Pin 1 – Cathode of Diode No.3
Pin 2 – Plate of Diode No.3
Pin 3 – Internal Shield
Pin 4 – Heater
Pin 5 – Heater



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

EACH DIODE

Maximum Ratings, *Design-Center Values:*

PEAK INVERSE PLATE VOLTAGE	330 max.	volts
PEAK PLATE CURRENT□	54 max.	ma
DC OUTPUT CURRENT	12 max.	ma
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200 max.	volts

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Note	*Min.*	*Av.*	*Max.*	
Heater Current	1	0.410	0.450	0.490	amp
Plate Current (1) (Each Unit)	1,2	–	15	21	μamp

□ In rectifier service, the minimum total effective plate-supply impedance per plate is 560 ohms.

6BC7

TRIPLE DIODE

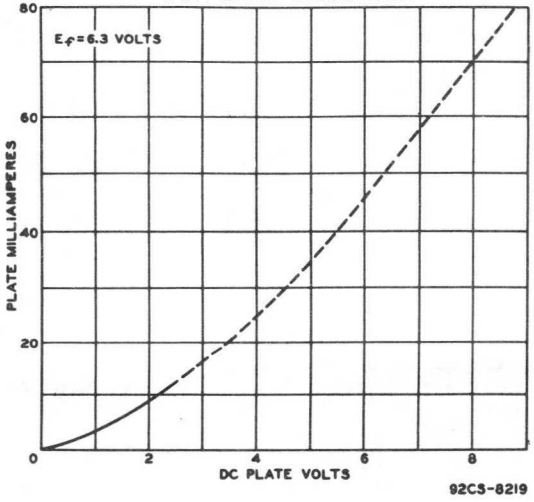
	Note	Min.	Av.	Max.	
Plate Current (2) (Each Unit)	1,3	18	35	65	ma
Ratio of Plate Current of Unit No.3 to Plate Current of Unit No.1 .	1,3	0.77	1	1.3	

Note 1: With 6.3 volts ac or dc on heater.

Note 2: With plate voltage of 0 volts, and plate load resistance of 40000 ohms. Each unit tested separately.

Note 3: With plate voltage of 5 volts and no plate load resistance. Each unit tested separately.

AVERAGE PLATE CHARACTERISTIC FOR EACH DIODE UNIT



Medium-Mu Twin Triode With Semiremote-Cutoff Characteristic

9-PIN MINIATURE TYPE

For Use in Cascode-Type Circuits of VHF TV Tuners

ELECTRICAL

Heater Characteristics and Ratings		
Voltage (AC or DC)	6.3 ± 0.6	V
Current at 6.3 V.	0.400	A
Heater–Cathode Voltage:		
Peak positive	200	V
Peak negative[a]	200	V
Average	100	V

Direct Interelectrode Capacitances (Approx.)[b] ←

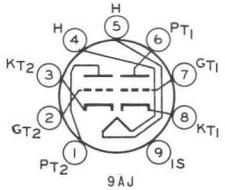
	Unit No.1	*Unit No.2*	
Grid to plate	1.2	1.2	pF
Input: G to (K, IS, H)	2.6	-	pF
Input:[c] K to (G, IS, H)	-	5.5	pF
Output: P to (K, IS, H)	1.3	-	pF
Output:[c] P to (G, IS, H)	-	2.4	pF
Plate to cathode	-	0.12	pF
Heater to cathode	2.8	2.8	pF
Plate of unit No.1 to plate of unit No.2	0.02		pF
Plate of unit No.2 to plate and grid of unit No.1	0.04		pF

MECHANICAL

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	2.187 in
Maximum Seated Length	1.937 in
Maximum Diameter	0.875 in
Length, Base Seat to Bulb Top	
Excluding tip	1.469 to 1.656 in
Dimensional Outline (JEDEC 6-2)	See *General Section*
Envelope	JEDEC T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC E9-1)

TERMINAL DIAGRAM (Bottom View)

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



9AJ

← Indicates a change.

CHARACTERISTICS, CLASS A_1 AMPLIFIER

Values are for Each Unit

Plate Voltage	150	V
Cathode Resistor	220	Ω
Amplification Factor	35	
→ Plate Resistance (Approx.)	5300	Ω
Transconductance	6200	μmho
Plate Current	10	mA
Grid Voltage for g_m = 50 μmho	-13	V

→

AMPLIFIER—CLASS A_1

Values are for Each Unit

Design-Maximum Ratings

Plate Voltage[a]	150	V
Cathode Current	22	mA
Plate Dissipation	2.2	W

MAXIMUM CIRCUIT VALUES

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

[a] This rating may be as high as 300 volts under cutoff conditions when the tube is used as a cascode amplifier and the two units are connected in series.

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

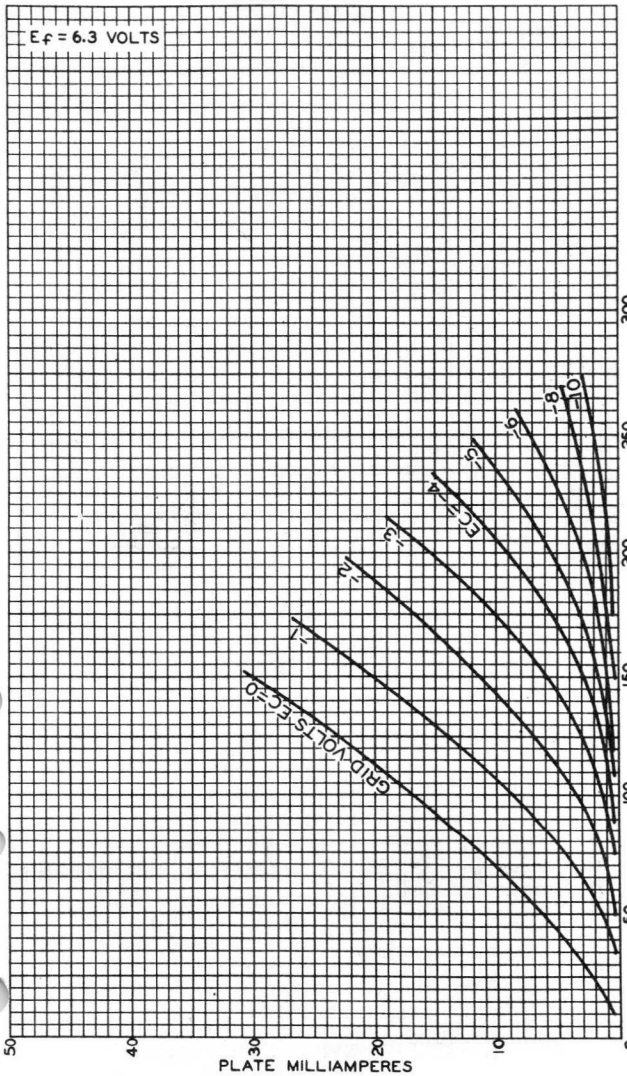
[c] Read as grounded grid amplifier.

→ Indicates a change.

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

6BC8

AVERAGE PLATE CHARACTERISTICS
FOR EACH UNIT

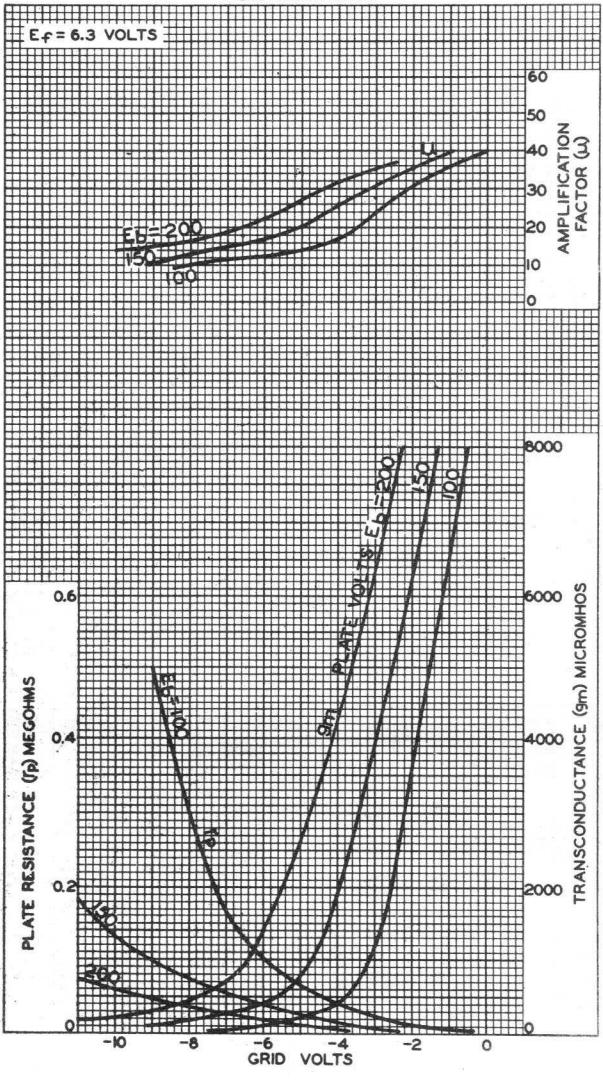


TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-8789

6BC8

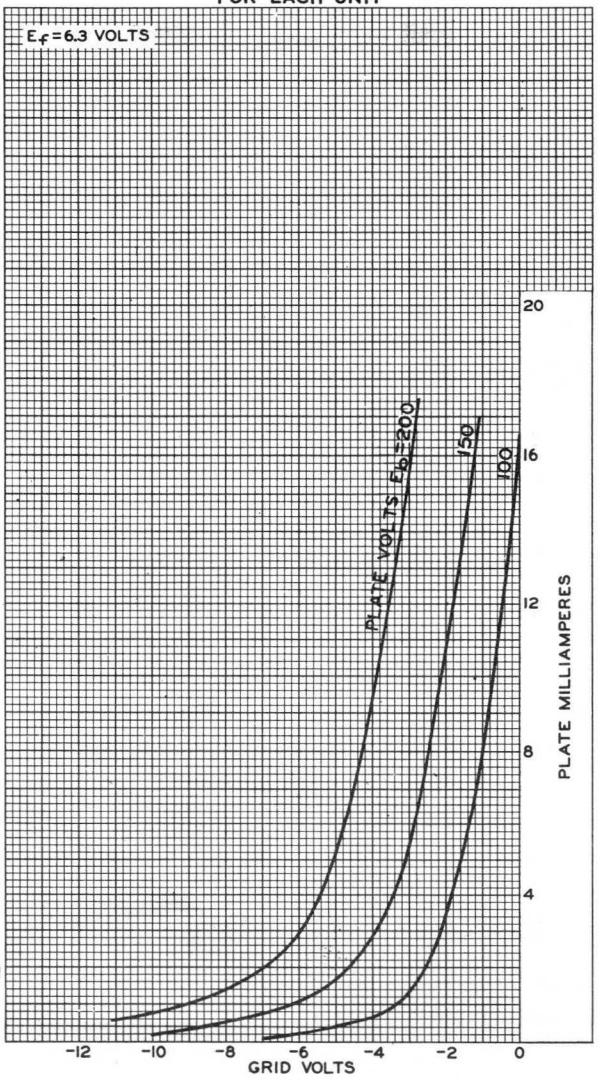
AVERAGE CHARACTERISTICS
FOR EACH UNIT



RCA

6BC8

AVERAGE CHARACTERISTICS
FOR EACH UNIT



Dual Triode—Sharp-Cutoff Pentode

Dual Triode Has High-Mu & Medium-Mu Units

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:		
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: (Without external shield)		
Triode Unit No.1		
Grid to plate	1.9	pf
Input: G_{T1} to (K_{T1}, K_{T2} + IS, Kp + G3p + IS, H)	3.0	pf
Output: P_{T1} to (K_{T1}, K_{T2} + IS, Kp + G3p + IS, H)	2.2	pf
Triode Unit No.2		
Grid to plate	3.6	pf
Input: G_{T2} to (K_{T2} + IS, Kp + G3p + IS, H)	2.4	pf
Output: P_{T2} to (K_{T2} + IS, Kp + G3p + IS, H)	3.8	pf
Pentode Unit		
Grid No.1 to plate	0.13	pf
Input: G1p to (K_{T2} + IS, Kp + G3p + IS, G2p, H)	11.0	pf
Output: Pp to (K_{T2} + IS, Kp + G3p + IS, G2p, H)	4.6	pf
Pentode plate to plate of triode No.2	0.045 max.	pf
Plate of triode No.1 to plate of triode No.2	0.075 max.	pf

Characteristics, Class A_1 Amplifier:

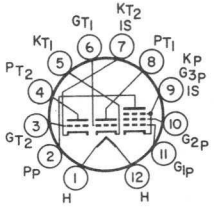
	Triode Units No.1	No.2	
Plate Supply Voltage	200	200	volts
Grid Voltage	−2	−	volts
Cathode Resistor	−	220	ohms
Amplification Factor	68	41	
Plate Resistance (Approx.)	12400	9400	ohms
Transconductance	5500	4400	μmhos
Plate Current	7	9.2	ma
Grid Voltage for plate μa = 100	−5.5	−6.5	volts

	Pentode Unit		
Plate Supply Voltage	35	135	volts
Grid-No.2 Supply Voltage	135	135	volts
Grid-No.1 Voltage	0[a]	−	volts
Cathode Resistor	−	100	ohms
Plate Resistance (Approx.)	−	45000	ohms
Transconductance	−	10400	μmhos
Plate Current	34[b]	17	ma
Grid-No.2 Current	13[b]	4	ma
Grid-No.1 Voltage (Approx.) for plate μa = 100	−	−6	volts

Mechanical:

Operating Position	Any
Types 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	12DP

Pin 1 – Heater
Pin 2 – Pentode Plate
Pin 3 – Grid of Triode Unit No.2
Pin 4 – Plate of Triode Unit No.2
Pin 5 – Cathode of Triode Unit No.1
Pin 6 – Grid of Triode Unit No.1
Pin 7 – Cathode of Triode Unit No.2, Internal Shield
Pin 8 – Plate of Triode Unit No.1
Pin 9 – Pentode Cathode, Pentode Grid No.3, Internal Shield
Pin 10 – Pentode Grid No.2
Pin 11 – Pentode Grid No.1
Pin 12 – Heater



AMPLIFIER — Class A$_1$

Maximum Ratings, *Design-Maximum Values:*

	Triode Units No.1	*No.2*	
Plate Voltage	330	330	volts
Grid (Control-Grid) Voltage:			
Positive-bias value	0	0	volts
Plate Dissipation	1.5	2	watts
Pentode Unit			
Plate Voltage		330	volts
Grid-No.2 (Screen-Grid) Supply Voltage		330	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	volts
Grid-No.2 Input:			
For grid-No.2 voltages up to 165 volts		1.1	watts
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		4	watts

Maximum Circuit Values: *(Values are for Each Unit)*

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

[a] Applied for short interval (2 sec. max.) so as not to damage tube.
[b] Value measured by recurrent waveform such that maximum ratings of tube are not exceeded.

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Half-Wave Vacuum Rectifier

DUODECAR TYPE

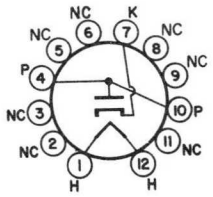
Electrical:

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[a]	5000[b] max.	volts
Heater positive with respect to cathode	300[c] max.	volts
Direct Interelectrode Capacitances(Approx.):[d]		
P to (K,H)	10	pf
K to (P,H)	8.0	pf
H to K	3.4	pf

Mechanical:

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

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



DAMPER SERVICE

Maximum Ratings, *Design-Maximum Values:*

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

Peak Inverse Plate Voltage[a]	5000 max.	volts
Peak Plate Current	1200 max.	ma
DC Plate Current	200 max.	ma
Plate Dissipation	6.5 max.	watts

Characteristics, Instantaneous Value:

Tube Voltage Drop for plate ma. = 350	25	volts

[a] This rating is applicable when 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.

[b] The dc component must not exceed 900 volts.

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

[d] Without external shield.

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

Pentagrid Converter

7-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

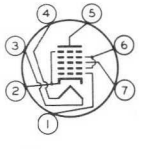
Voltage (AC or DC)	6.3 ± 10%	volts
Current at 6.3 volts	0.3	amp

Direct Interelectrode Capacitances:

	Without External Shield	*With External Shield*[a]	
Grid No.3 to all other electrodes (RF input)	7	7	μμf
Plate to all other electrodes (Mixer input)	8	13	μμf
Grid No.1 to all other electrodes (Oscillator input)	5.5	5.5	μμf
Grid No.3 to plate	0.3 max.	0.25 max.	μμf
Grid No.3 to grid No.1	0.15 max.	0.15 max.	μμf
Grid No.1 to plate	0.1 max.	0.05 max.	μμf
Grid No.1 to cathode & grid No.5	3	3	μμf
Cathode & grid No.5 to all other electrodes except grid No.1	15	20	μμf

Mechanical:

Operating Position	Any
Maximum Overall Length	2-1/8"
Maximum Seated Length	1-7/8"
Length, Base Seat to Bulb Top (Excluding tip)	1-1/2" ± 3/32"
Diameter	0.650" to 0.750"
Dimensional Outline	See *General Section*
Bulb	T5-1/2
Base	Small-Button Miniature 7-Pin (JEDEC No.E7-1)
Basing Designation for BOTTOM VIEW	7CH



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

CONVERTER

Maximum Ratings, *Design-Maximum Values:*

PLATE VOLTAGE	330 max.	volts
GRID-No.3 (CONTROL-GRID) VOLTAGE:		
Negative-bias value	55 max.	volts
Positive-bias value	0 max.	volts
GRIDS-No.2 & No.4 (SCREEN-GRID) SUPPLY VOLTAGE	330 max.	volts
GRIDS-No.2 & No.4 VOLTAGE	110 max.	volts

← Indicates a change.

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CATHODE CURRENT	15.5	max.	ma
GRIDS–No.2 & No.4 INPUT	1.1	max.	watts
PLATE DISSIPATION	1.1	max.	watts
PEAK HEATER–CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200[b]	max.	volts

Characteristics:

With separate excitation[c]

Plate Voltage	100	250	volts
Grid–No.3 Voltage	–1.5	–1.5	volts
Grids–No.2 & No.4 Voltage	100	100	volts
RMS Grid–No.1 (Oscillator Grid) Voltage.	10	10	volts
Grid–No.1 Resistor.	20000	20000	ohms
Plate Resistance (Approx.).	0.4	1	megohm
Conversion Transconductance	455	475	μmhos
Grid–No.3 Voltage (Approx.) for conversion transconductance (μmhos) =			
10.	–30	–30	volts
100	–6	–6	volts
Plate Current	2.6	2.9	ma
Grids No.2 & No.4 Current	7	6.8	ma
Grid–No.1 Current	0.5	0.5	ma
Cathode Current	10.1	10.2	ma

Oscillator Characteristics (Not Oscillating):

With grids No.2 & No.4 connected to plate

Plate and Grids–No.2 & No.4 Voltage	100	volts
Grid–No.3 Voltage	0	volts
Grid–No.1 Voltage	0	volts
Amplification Factor between grid No.1 and grids No.2 & No.4 connected to plate.	20	
Transconductance between grid No.1 and grids No.2 & No.4 connected to plate.	7250	μmhos
Cathode Current	25	ma
Grid–No.1 Voltage (Approx.) for plate μa = 10.	–11	volts

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

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

[c] The characteristics shown with separate excitation correspond very closely with those obtained in a self-excited oscillator circuit operating with zero bias.

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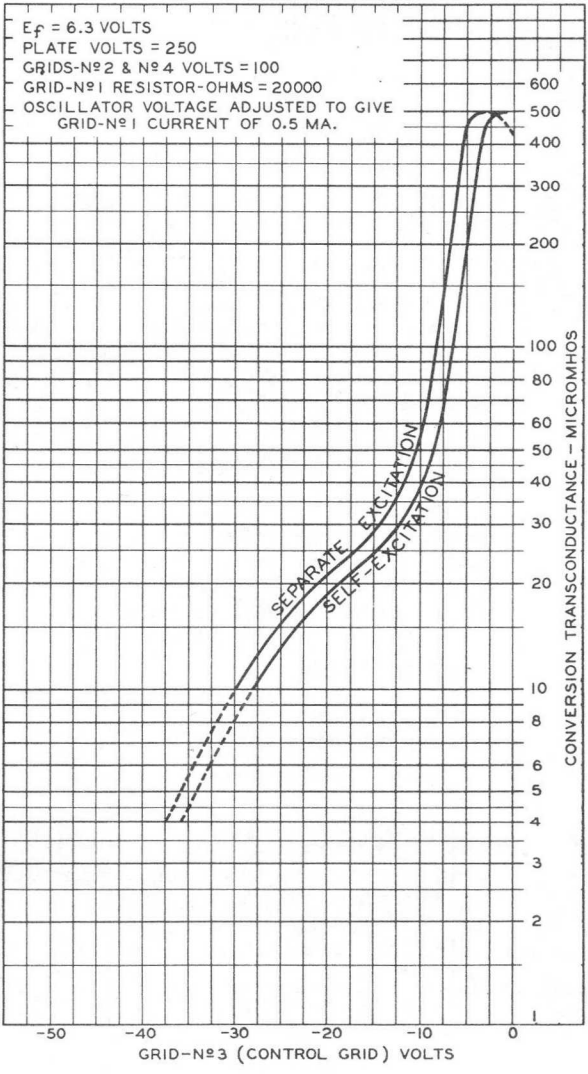
OPERATION CHARACTERISTICS



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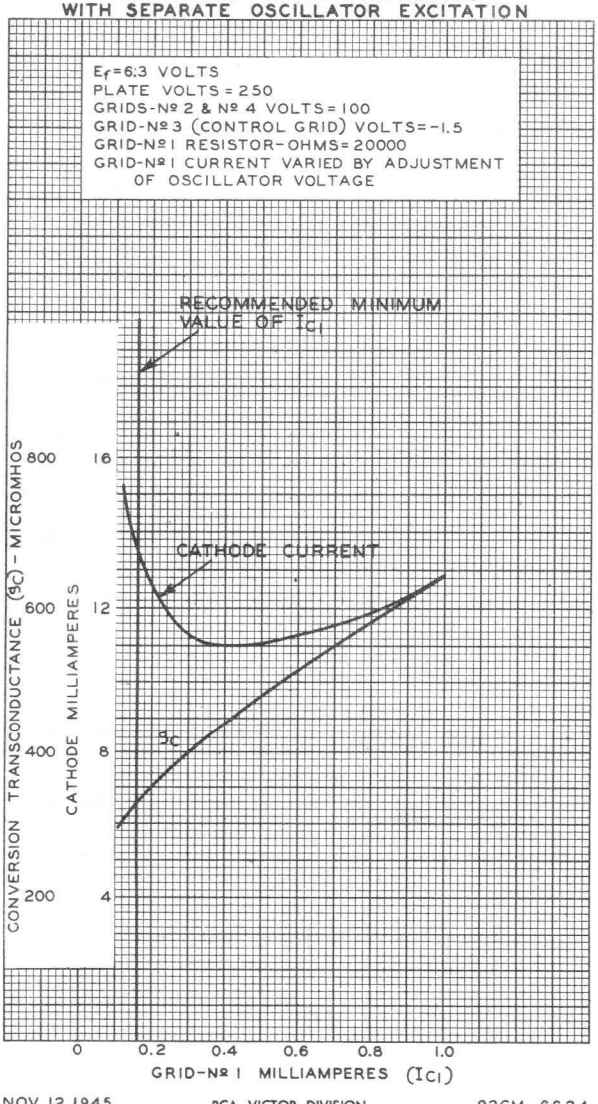
OPERATION CHARACTERISTICS
WITH SEPARATE OSCILLATOR EXCITATION



NOV. 12, 1945

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92CM-6624

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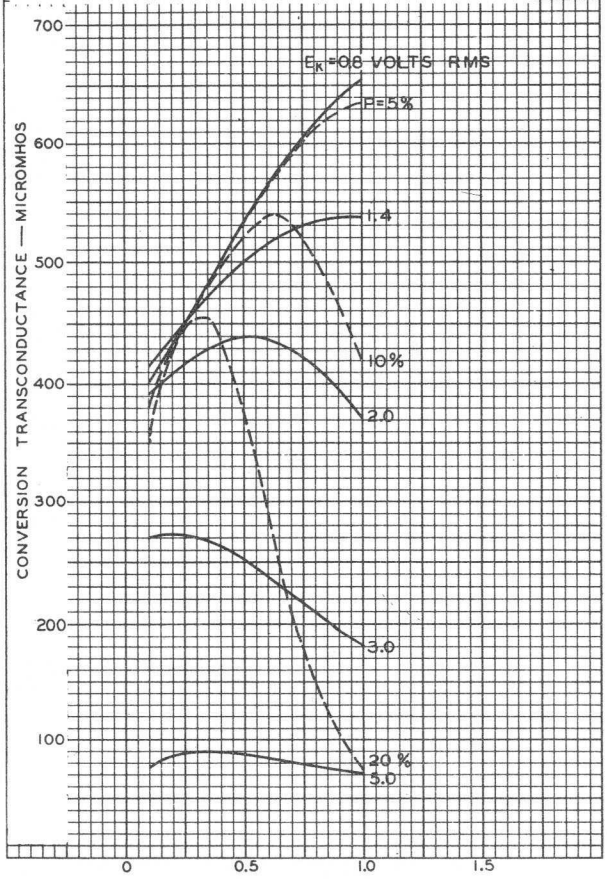
OPERATION CHARACTERISTICS
WITH SELF-EXCITATION

E_f = 6.3 VOLTS — PLATE VOLTS = 250
GRIDS – Nº 2 & Nº 4 VOLTS = 100
GRID – Nº 3 CONTROL-GRID VOLTS = – 1
GRID – Nº 1 RESISTOR-OHMS = 20000
P – PERCENTAGE RATIO OF E_K TO $E_K + E_g$, WHERE
E_K = VOLTAGE ACROSS OSCILLATOR-COIL SECTION BETWEEN GROUND & CATHODE
E_g = OSCILLATOR VOLTAGE BETWEEN CATHODE & GRID



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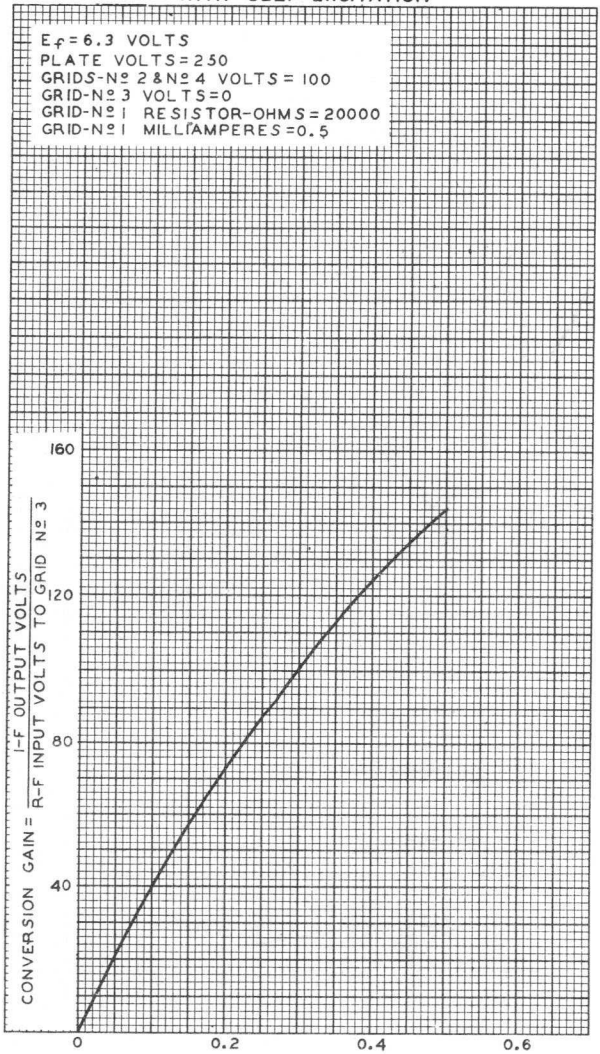
OPERATION CHARACTERISTIC

WITH SELF-EXCITATION



OCT. 16, 1945

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

92CM - 6605

Dual-Control Sharp-Cutoff Pentode—Beam Power Tube

DUODECAR TYPE

For Combined FM-Sound-Detector & AF-Power-Amplifier Applications in Low-B^+ TV Receivers

ELECTRICAL CHARACTERISTICS

Bogey Values

Heater Voltage (AC or DC)	E_h	6.3	V
Heater Current	I_h	1.200	A ←
Direct Interelectrode Capacitances			
Without external shield			
Pentode Unit:			
Grid No.1 to plate	c_{g1-p}	0.036	pF
Grid No.3 to plate	c_{g3-p}	3.2	pF
Input: G1 to (K,IS,G3,G2,H)	c_i	6.5	pF
Grid No.3 to all: G3 to (K,IS,P,G2, G1,H)	c_{g3-all}	8.0	pF
Grid No.1 to Grid No.3	c_{g1-g3}	0.11	pF
Beam Power Unit:			
Grid No.1 to plate	c_{g1-p}	0.24	pF
Input: G1 to (K,G3,G2,IS,H)	c_i	13	pF
Output: P to (K,G3,G2,IS,H)	c_o	10	pF
Coupling:			
Pentode plate to beam-power plate	c_{p-p}	0.13	pF

For the following characteristics, see Conditions

		Pentode Unit	*Beam Power Unit*	
Plate Resistance (Approx.)	r_p	150	30	kΩ
Transconductance				
Grid No.1 to plate	$g_{m(g1-p)}$	1000	8600	μmho
Grid No.3 to plate	$g_{m(g3-p)}$	400	-	μmho
Zero-Signal Plate Current	I_{bo}	1.3	36	mA
Max-Signal Plate Current	I_b	-	40	mA
Zero-Signal Grid-No.2 Current	I_{c2}	2	3	mA
Max-Signal Grid-No.2 Current	I_{c2}	-	9	mA
Total Harmonic Distortion		-	10	%
Max-Signal Power Output	P_o	-	2.4	W
Cutoff DC Grid-No.1 Voltage for I_b = 10 μA	$E_{c1(co)}$	-4.5	-	V
Cutoff DC Grid-No.3 Voltage for I_b = 10 μA	$E_{c3(co)}$	-4.5	-	V

Conditions

Heater Voltage	E_h	—Bogey value—		V
DC Plate Supply Voltage	E_{bb}	150	145	V

← Indicates a change.

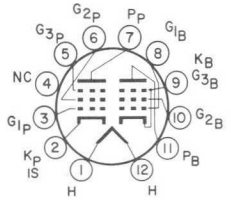
Grid No.3	-	Connected to negative end of R_k	- V
DC Grid-No.2 Supply Voltage	E_{cc2}	100	110 V
Grid No.1	-	Connected to negative end of R_k	-
DC Grid-No.1 Voltage	E_{c1}	-	-6 V
Peak AF Grid-No.1 Voltage	e_{g1m}	-	6 V
Cathode Resistor	R_k	560	- Ω
Load Resistor	R_L	-	3000 Ω

MECHANICAL CHARACTERISTICS

Operating Position	Any
Type of Cathodes	Coated Unipotential
Maximum Overall Length	2.625 in
Maximum Seated Length	2.250 in
Maximum Diameter	1.188 in
Dimensional Outline (JEDEC 9-59)	See *General Section*
Envelope	JEDEC T9
Base	Small-Button Duodecar 12-Pin (JEDEC E12-70)

TERMINAL DIAGRAM (Bottom View)

Pin 1 – Heater
Pin 2 – Pentode Cathode, Internal Shield
Pin 3 – Pentode Grid No.1
Pin 4 – No Internal Connection
Pin 5 – Pentode Grid No.3
Pin 6 – Pentode Grid No.2
Pin 7 – Pentode Plate
Pin 8 – Beam-Power Grid No.1
Pin 9 – Beam-Power Cathode, Beam-Power Grid No.3
Pin 10 – Beam-Power Grid No.2
Pin 11 – Beam-Power Plate
Pin 12 – Heater



12EZ

DESIGN-MAXIMUM RATINGS

For operation with Pendode Unit as FM Sound Detector and Beam Power Unit as AF Power Amplifier

		Pentode Unit	*Beam Power Unit*	
DC Plate Voltage	E_b	330	165	V
DC Grid-No.3 (Control-Grid) Voltage	E_{c3}	28	-	V
DC Grid-No.2 (Screen-Grid) Supply Voltage	E_{cc2}	330	-	V
DC Grid-No.2 Voltage	E_{c2}	See *Grid-No.2-Input Rating Chart* at front of Receiving Tube Section	150	V

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		Pentode Unit	*Beam Power Unit*	
Positive DC Grid-No.1 (Control-Grid) Voltage. .	E_{c1}	0	-	V
Heater-Cathode Voltage				
Peak	e_{hkm}	±200	±200	V
Average[a]	$E_{hk(av)}$	100	100	V
Heater Voltage (AC or DC).	E_h	5.7 to 6.9		V
Average Cathode Current[a] .	$I_{k(av)}$	-	65	mA
Grid-No.2 Input.	P_{g2}	-	1.8	W
For $E_{c2} \leq 165$ V.	-	1.1	-	W
For $E_{c2} > 165$ V and ≤ 330 V		See *Grid-No.2-Input Rating Chart* at front of Receiving Tube Section	-	W
Plate Dissipation. . . .	P_b	1.7	6.5	W

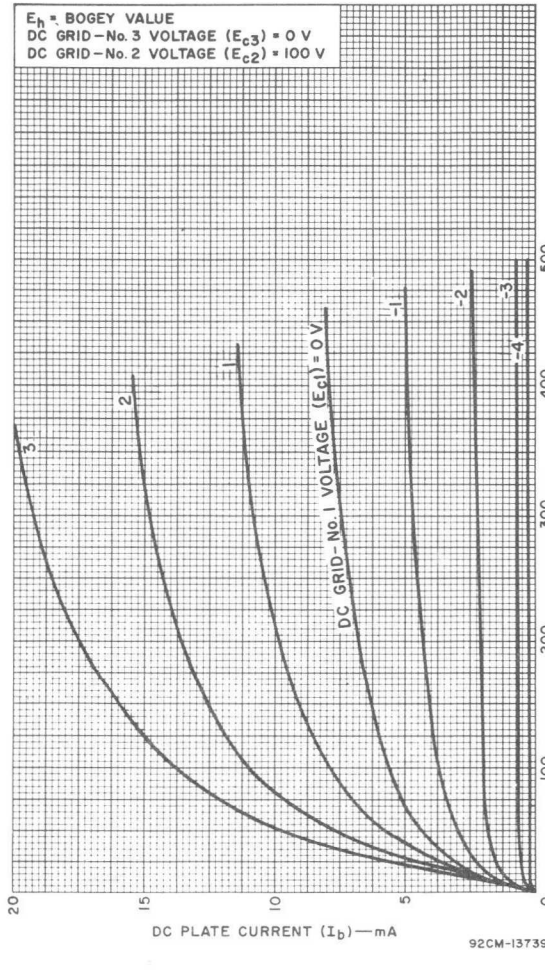
MAXIMUM CIRCUIT VALUES

		Pentode Unit	*Beam Power Unit*	
Grid-No.1-Circuit Resistance:	$R_{g1(ckt)}$			
For fixed-bias operation	-	250	250	kΩ
For cathode-bias operation	-	500	500	kΩ

[a] Measured with a dc meter.

Typical Plate Characteristics

Pentode Unit



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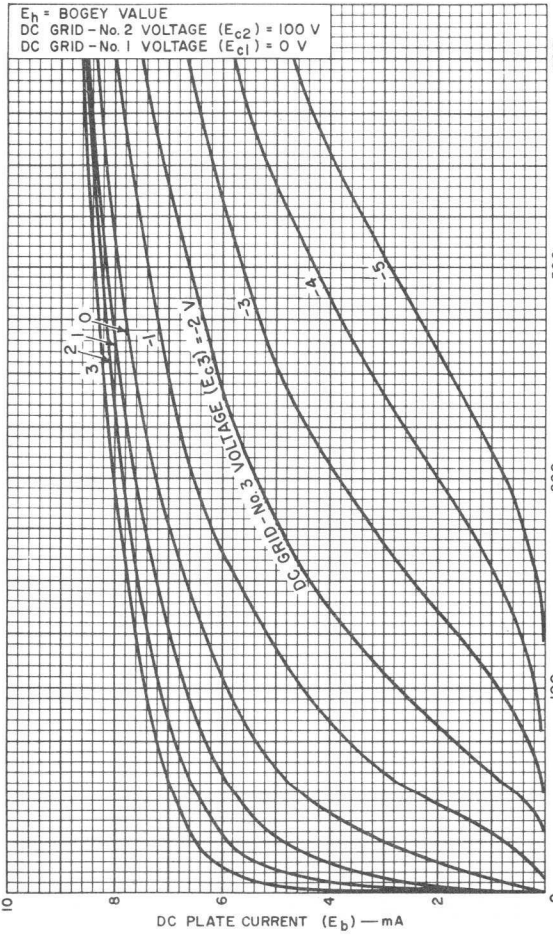
Typical Plate Characteristics

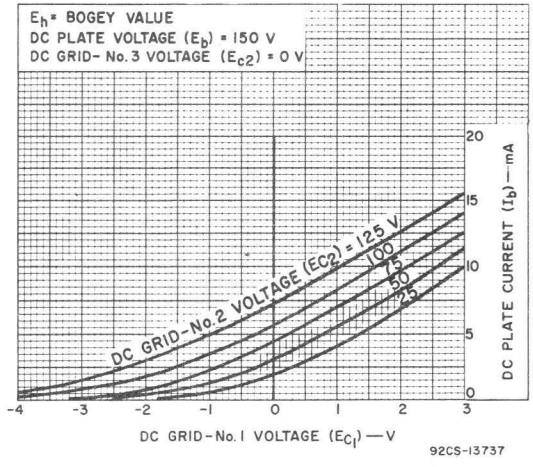
Pentode Unit



92CM-13740

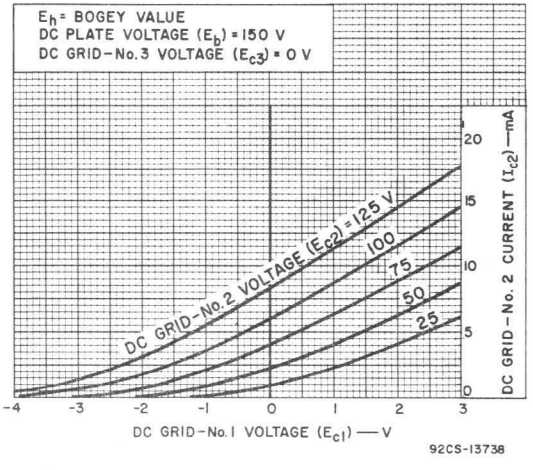
Typical Transfer Characteristics

Pentode Unit



Typical Transfer Characteristics

Pentode Unit



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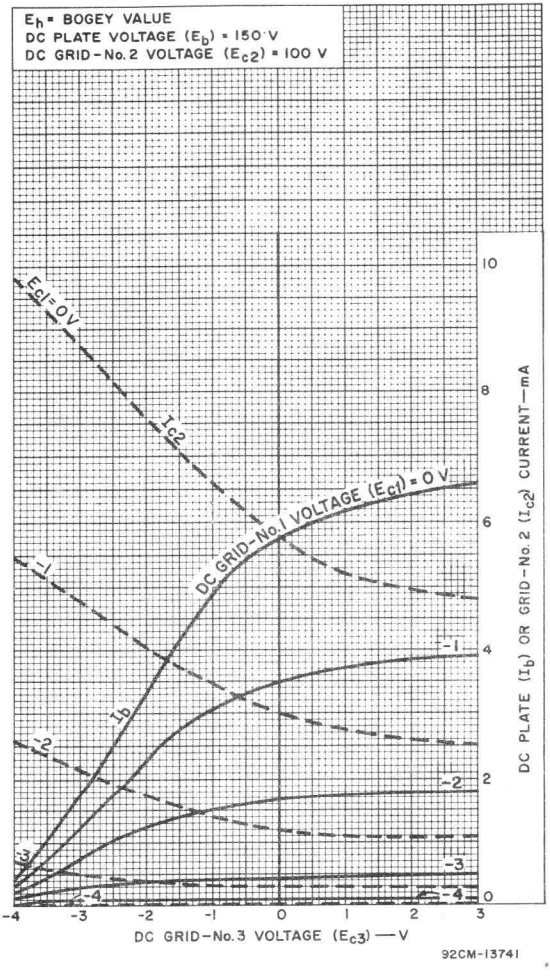
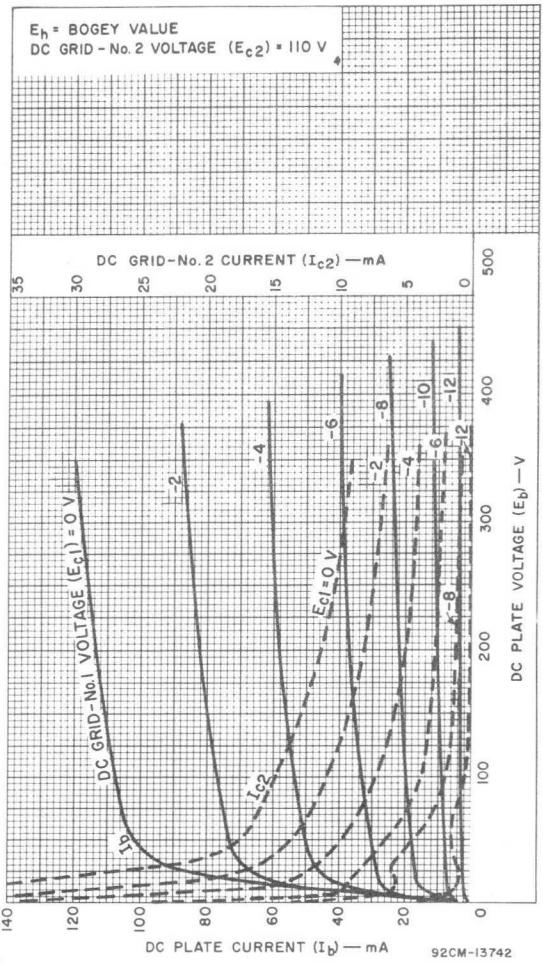
Typical Transfer Characteristics

Pentode Unit



Typical Characteristics

Beam Power Unit



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Half-Wave Vacuum Rectifier

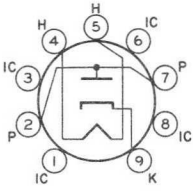
NOVAR TYPE
For Television Damper Service

Electrical:

Heater Characteristics and Ratings:		
Voltage (AC or DC)	6.3 ± 0.6	volts
Current at heater volts = 6.3	1.600	amp
Peak heater-cathode voltage:		
Heater negative with respect to cathode[a]	5500[b] max.	volts
Heater positive with respect to cathode	300[c] max.	volts
Direct Interelectrode Capacitances (Approx):[d]		
P to (H,K)	6.5	pf
K to (P,H)	9.0	pf
Heater to cathode	2.8	pf

Mechanical:

Mounting Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	3.005"
Seated Length	2.375" to 2.625"
Diameter	1.062" to 1.188"
Dimensional Outline	See *General Section*
Bulb	T9
Socket	Novar 9-Contact
Base	Small-Button Novar 9-Pin with Exhaust (JEDEC No. E9-89)
Basing Designation for BOTTOM VIEW	9HP



Pin 1 – Do Not Use[e]
Pin 2 – Plate
Pin 3 – Do Not Use[e]
Pin 4 – Heater
Pin 5 – Heater
Pin 6 – Do Not Use[e]
Pin 7 – Plate
Pin 8 – Do Not Use[e]
Pin 9 – Cathode

DAMPER SERVICE

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

Maximum Ratings, *Design-Maximum Values:*

Peak Inverse Plate Voltage[a]	5500	max.	volts
Peak Plate Current	1100	max.	ma
Average Plate Current	180	max.	ma
Plate Dissipation	6.8	max.	watts

Characteristic, Instantaneous Value:

Tube Voltage Drop for plate ma = 350	32	volts

[a] This rating is applicable when the duty cycle 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.

[b] The dc component must not exceed 900 volts.

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

[d] Without external shield.

[e] Socket terminals 1, 3, 6, and 8 should not be used as tie points. It is recommended that the socket clips for these pins be removed to reduce the possibility of arc-over and to minimize leakage.

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

6BH6
SHARP-CUTOFF PENTODE

7-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:
Voltage . . . . . 6.3 . . . . . ac or dc volts
Current . . . . . 0.15 . . . . . amp

Direct Interelectrode Capacitances: ←

	Without External Shield	*With External Shield°*	
Grid No.1 to plate	0.0035 max.	0.0035 max.	μμf
Grid No.1 to cathode, grid No.3 & internal shield, grid No.2, and heater	5.4	5.4	μμf
Plate to cathode, grid No.3 & internal shield, grid No.2, and heater	4.4	4.4	μμf

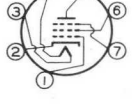
Characteristics, Class A_1 Amplifier:

Plate Voltage	100	250	volts
Grid No.3 (Suppressor)	*Connected to cathode at socket*		
Grid-No.2 Voltage	100	150	volts
Grid-No.1 Voltage	-1	-1	volt
Plate Resistance (Approx.)	0.7	1.4	megohm
Transconductance	3400	4600	μmhos
Plate Current	3.6	7.4	ma
Grid-No.2 Current	1.4	2.9	ma
Grid-No.1 Voltage (Approx.) for plate current of 10 μamp	-5	-7.7	volts

Mechanical:

Mounting Position . . . . . Any
Maximum Overall Length . . . . . 2-1/8"
Maximum Seated Length . . . . . 1-7/8"
Length, Base Seat to Bulb Top (Excluding tip) 1-1/2" ±3-3/32"
Maximum Diameter . . . . . 3/4"
Dimensional Outline . . . . . *See General Section*
Bulb T-5-1/2
Base . . . . . Small-Button Miniature 7-Pin (JETEC 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

° With external shield JETEC No.316 connected to cathode.

← Indicates a change.

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6BH6

SHARP-CUTOFF PENTODE

AMPLIFIER - Class A_1

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	300 max.	volts
GRID-No.2 (SCREEN) 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
PLATE DISSIPATION	3 max.	watts
→ GRID-No.2 INPUT:		
For grid-No.2 voltages up to 150 volts	0.5 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*		
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	90 max.	volts
Heater positive with respect to cathode	90 max.	volts

→ Indicates a change.

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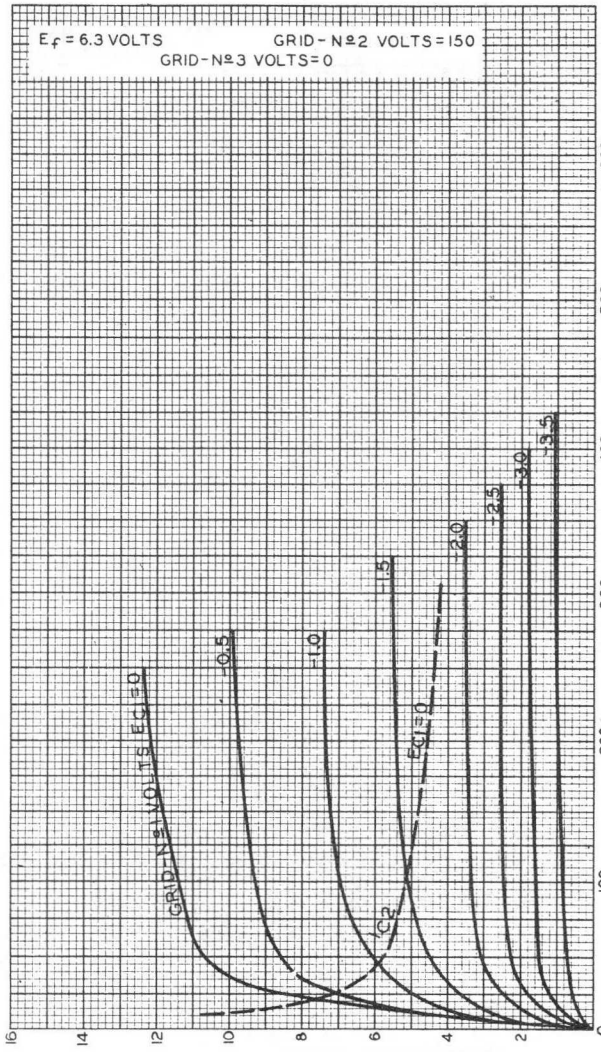
RCA

6BH6

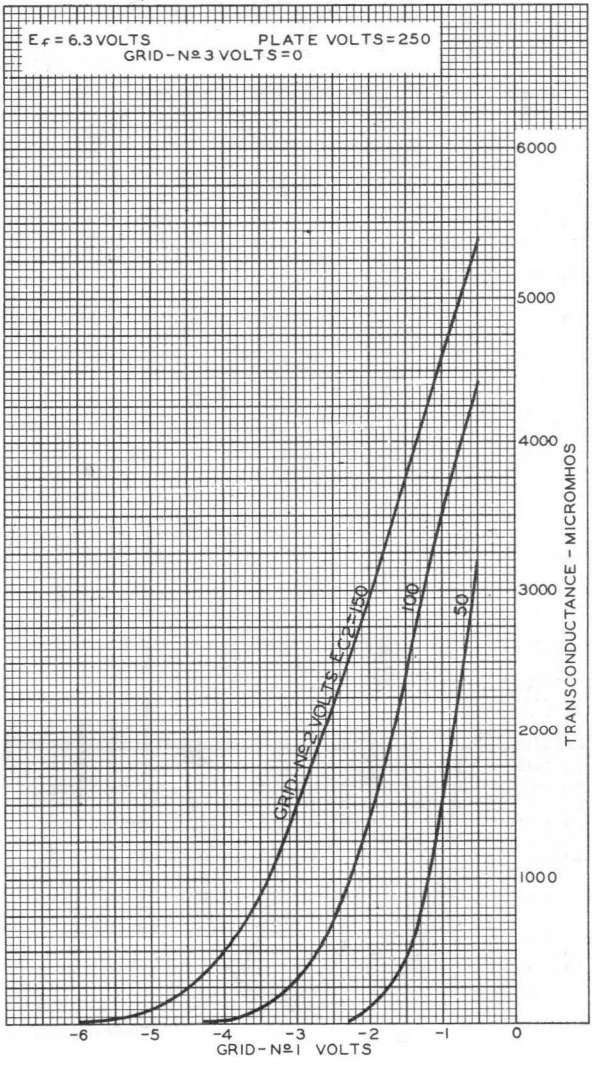
AVERAGE PLATE CHARACTERISTICS



RCA

6BH6

AVERAGE CHARACTERISTICS

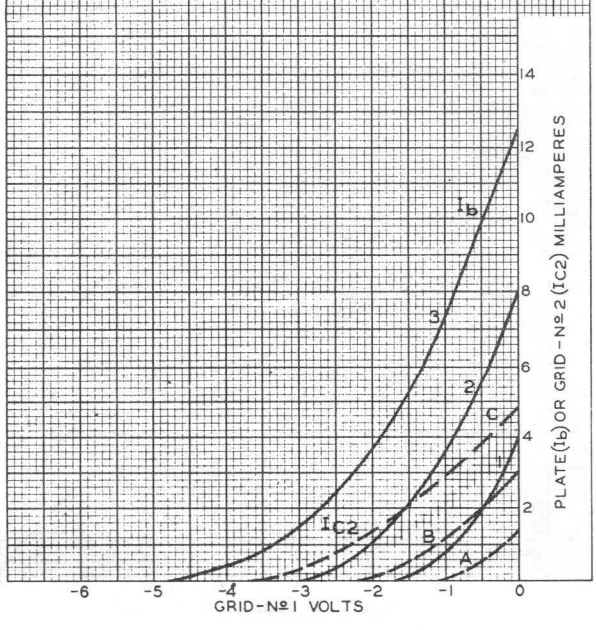


6BH6

AVERAGE CHARACTERISTICS

E_f = 6.3 VOLTS PLATE VOLTS = 250 GRID-№3 VOLTS = 0

CURVES		GRID-№2 VOLTS
I_b ——	I_{C2} – –	
1	A	50
2	B	100
3	C	150

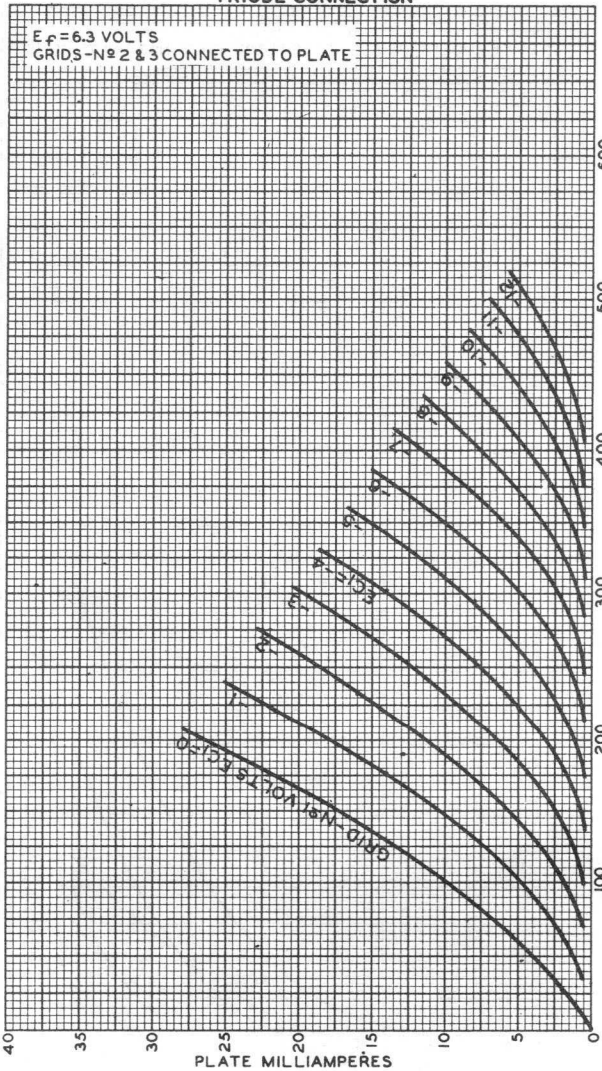


RCA

6BH6

AVERAGE PLATE CHARACTERISTICS

TRIODE CONNECTION



DEC.10,1947

TUBE DEPARTMENT
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92CM-6896

Half-Wave Vacuum Rectifier

DUODECAR TYPE

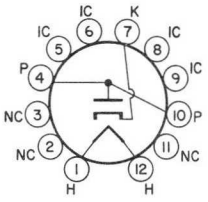
Electrical:

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[a]	3300[b] max.	volts
Heater positive with respect to cathode	300[c] max.	volts
Direct Interelectrode Capacitances (Approx.):[d]		
K to (P,H)	8.0	pf
P to (K,H)	5.5	pf
H to K	2.7	pf

Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	2.625"
Seated Length	2.000" to 2.250"
Diameter	1.062" to 1.188"
Bulb	T9
Base	Small-Button Duodecar 12-Pin (JEDEC No. E12-70)
Basing Designation for BOTTOM VIEW	12BL

Pin 1 – Heater
Pin 2 – No Internal Connection
Pin 3 – Same as Pin 2
Pin 4 – Plate
Pin 5 – Do Not Use[e]
Pin 6 – Do Not Use[e]
Pin 7 – Cathode
Pin 8 – Do Not Use[e]
Pin 9 – Do Not Use[e]
Pin 10 – Plate
Pin 11 – Same as Pin 2
Pin 12 – Heater



DAMPER SERVICE

Maximum Ratings, *Design-Maximum Values:*

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

Peak Inverse Plate Voltage[a]	3300 max.	volts
Peak Plate Current	840 max.	ma
DC Plate Current	140 max.	ma
Plate Dissipation	4 max.	watts

Characteristics, Instantaneous Value.

Tube Voltage Drop for plate ma. = 250	21	volts

[a] This rating is applicable when 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.

[b] The dc component must not exceed 600 volts.

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

[d] Without external shield.

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

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

6BJ6
REMOTE-CUTOFF PENTODE

7-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:
Voltage . . . . . 6.3 . . . . . ac or dc volts
Current . . . . . 0.15 . . . . . amp

Direct Interelectrode Capacitances:

	Without External Shield	*With External Shield°*	
Grid No.1 to plate	0.0035 max.	0.0035 max.	μμf
Grid No.1 to cathode, grid No.3 & internal shield, grid No.2, and heater	4.5	4.5	μμf
Plate to cathode, grid No.3 & internal shield, grid No.2, and heater	5.5	5.5	μμf

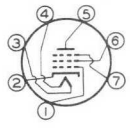
Characteristics, Class A_1 Amplifier:

Plate Voltage	100	250	volts
Grid No.3 (Suppressor)	*Connected to cathode at socket*		
Grid-No.2 Voltage	100	100	volts
Grid-No.1 Voltage	-1	-1	volt
Plate Resistance (Approx.)	0.25	1.3	megohm
Transconductance	3650	3600	μmhos ←
Plate Current	9	9.2	ma
Grid-No.2 Current	3.5	3.3	ma
Grid-No.1 Voltage (Approx.) for transconductance of 10 μmhos	-20	-20	volts ←

Mechanical:

Mounting Position . . . . . Any
Maximum Overall Length . . . . . 2-1/8"
Maximum Seated Length . . . . . 1-7/8"
Length, Base Seat to Bulb Top (Excluding tip) 1-1/2" ± 3/32"
Maximum Diameter . . . . . 3/4"
Dimensional Outline . . . . . *See General Section*
Bulb T-5-1/2
Base . . . . . Small-Button Miniature 7-Pin (JETEC 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

° With external shield JETEC No.316 connected to cathode.

← Indicates a change.

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6BJ6

REMOTE-CUTOFF PENTODE

AMPLIFIER - Class A$_1$

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	300 max.	volts
GRID-No.2 (SCREEN) 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
PLATE DISSIPATION	3 max.	watts
→ 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*		
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	90 max.	volts
Heater positive with respect to cathode	90 max.	volts

→ Indicates a change.

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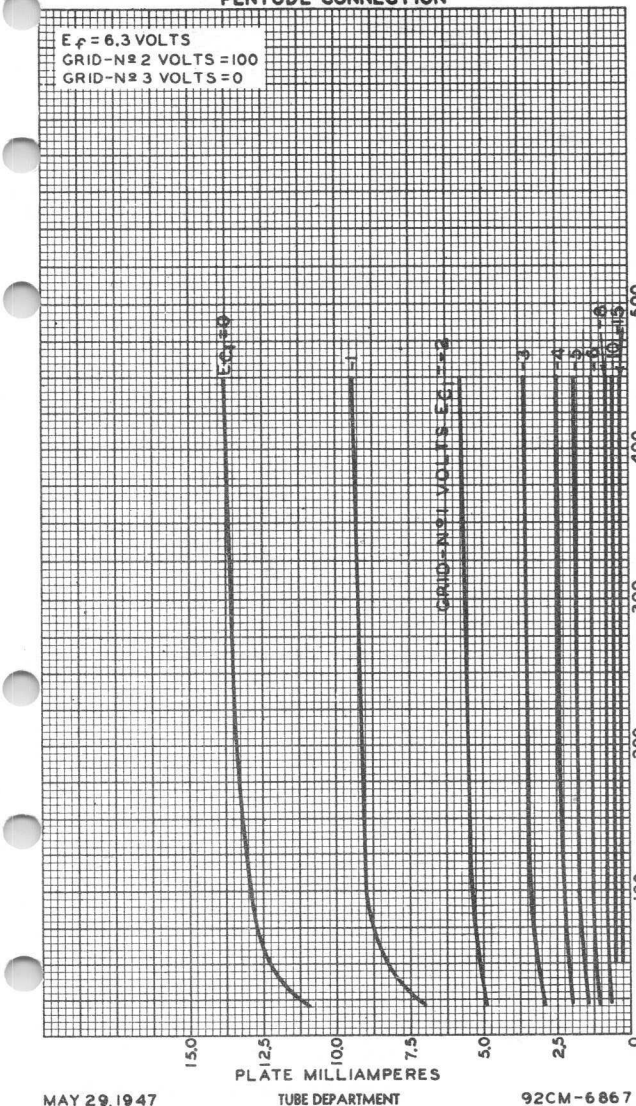
6BJ6

AVERAGE PLATE CHARACTERISTICS

PENTODE CONNECTION



MAY 29, 1947

TUBE DEPARTMENT
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92CM-6867

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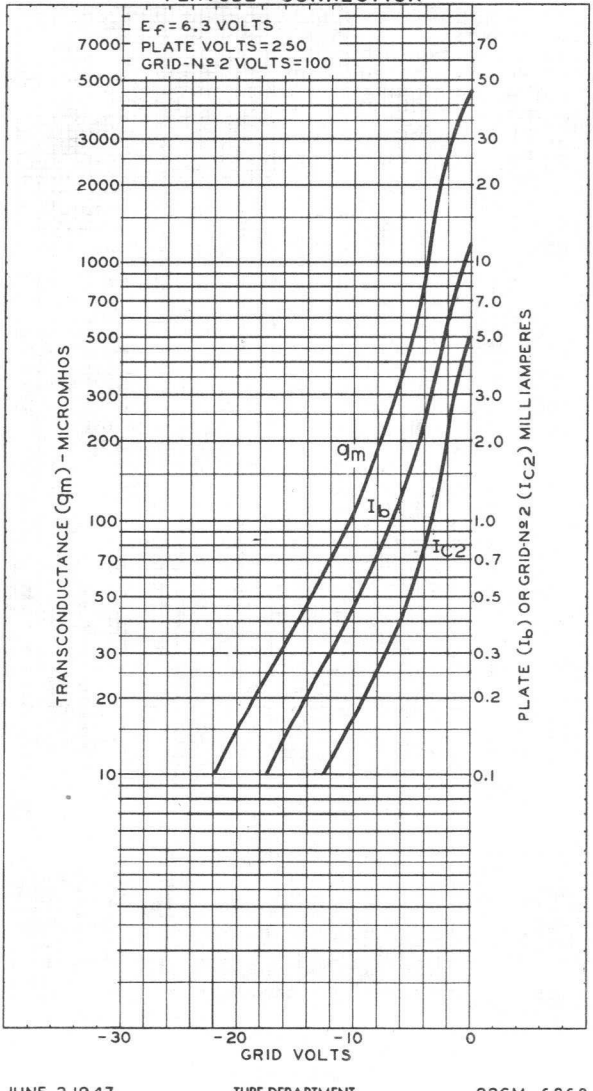
6BJ6

AVERAGE CHARACTERISTICS

PENTODE CONNECTION



RCA

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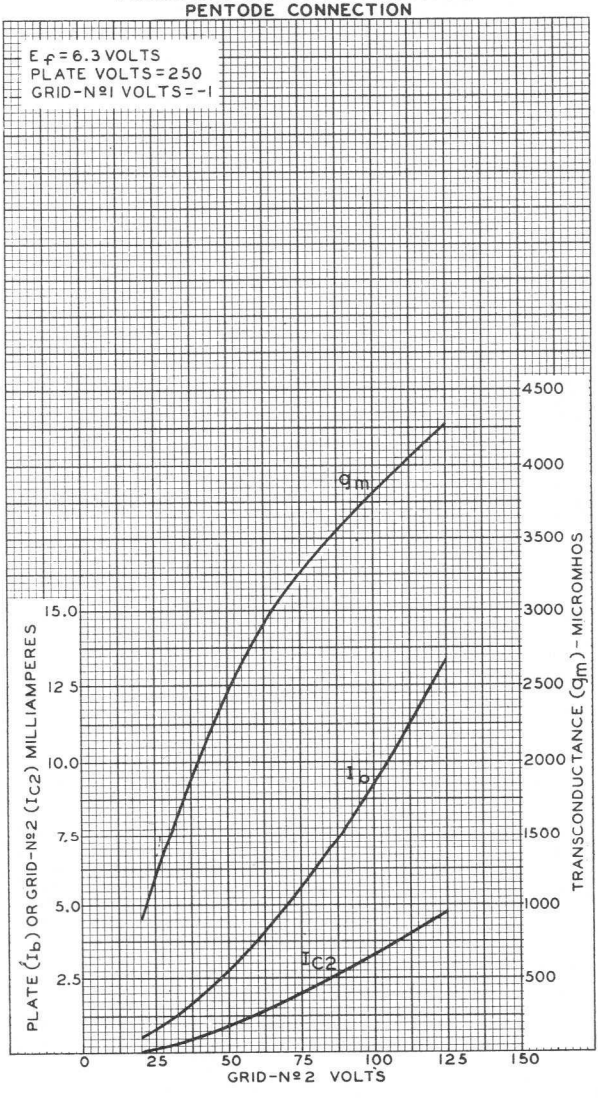
AVERAGE CHARACTERISTICS
PENTODE CONNECTION



6BJ7
TRIPLE DIODE

9-PIN MINIATURE TYPE

For dc restorer service

GENERAL DATA

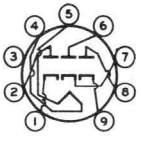
Electrical:

Heater, for Unipotential Cathodes:		
Voltage (AC or DC)	6.3	volts
Current	0.45	amp
Direct Interelectrode Capacitances (Approx.):[o]		
Plate of unit No.1 to cathode of unit No.1, internal shield, and heater	3	μμf
Plate of unit No.2 to cathode of unit No.2, internal shield, and heater	2.6	μμf
Plate of unit No.3 to cathode of unit No.3, internal shield, and heater	2.6	μμf
Cathode of unit No.1 to plate of unit No.1, internal shield, and heater	4	μμf
Cathode of unit No.2 to plate of unit No.2, internal shield, and heater	3.8	μμf
Cathode of unit No.3 to plate of unit No.3, internal shield, and heater	4	μμf
Plate of unit No.1 to plate of unit No.2	0.055	μμf
Plate of unit No.2 to plate of unit No.3	0.036	μμf
Plate of unit No.3 to plate of unit No.1	0.036	μμf

Mechanical:

Operating Position	Any
Maximum Overall Length	2-3/16"
Maximum Seated Length	1-15/16"
Length, Base Seat to Bulb Top (Excluding tip)	1-9/16" ± 3/32"
Diameter	0.750" to 0.875"
Dimensional Outline	*See General Section*
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)
Basing Designation for BOTTOM VIEW	9AX

Pin 1 - Cathode of Unit No.3
Pin 2 - Plate of Unit No.3
Pin 3 - Internal Shield
Pin 4 - Heater
Pin 5 - Heater
Pin 6 - Plate of Unit No.2
Pin 7 - Cathode of Unit No.2
Pin 8 - Plate of Unit No.1
Pin 9 - Cathode of Unit No.1



DC RESTORER SERVICE

Values are for Each Unit

Maximum Ratings, *Design-Center Values:*

PEAK INVERSE PLATE VOLTAGE	330 max.	volts
PEAK PLATE CURRENT	10 max.	ma

[o] Without external shield.

ELECTRON TUBE DIVISION
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6BJ7
TRIPLE DIODE

DC OUTPUT CURRENT.	1 max.	ma
PEAK HEATER–CATHODE VOLTAGE:		
Heater negative with respect to cathode . .	330 max.	volts
Heater positive with respect to cathode . .	100 max.	volts

Characteristics:

Plate Current for plate volts = 2.7.	10	ma

6BJ8

TWIN DIODE—MEDIUM-MU TRIODE

9-PIN MINIATURE TYPE

Intended for use in equipment having series heater-string arrangement

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:

Voltage	6.3	ac or dc volts
Current	0.6	amp
Warm-up time (Average)	11	sec

For definition of heater warm-up time and method of determining it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of this Section.

Direct Interelectrode Capacitances:[o]

Triode Unit:		
Grid to plate	2.6	μμf
Grid to heater and cathode	2.8	μμf
Plate to heater and cathode	0.31	μμf
Diode Units:		
Diode-No.1 plate to triode grid	0.07 max.	μμf
Diode-No.2 plate to triode grid	0.11 max.	μμf
Diode-No.1 cathode to all other electrodes	4.8	μμf
Diode-No.2 cathode to all other electrodes	4.8	μμf
Diode-No.1 plate to diode-No.2 plate	0.06 max.	μμf
Diode-No.1 plate to diode-No.1 cathode and heater	1.9	μμf
Diode-No.2 plate to diode-No.2 cathode and heater	1.9	μμf
Diode-No.1 cathode to diode-No.1 plate and heater	4.6	μμf
Diode-No.2 cathode to diode-No.2 plate and heater	4.6	μμf
Diode-No.1 plate to all other electrodes	3	μμf
Diode-No.2 plate to all other electrodes	3	μμf

Characteristics, Class A_1 Amplifier (Triode Unit):

Plate Voltage	90	250	volts
Grid Voltage	0	−9	volts
Amplification Factor	22	20	
Plate Resistance (Approx.)	4700	7150	ohms
Transconductance	4700	2800	μmhos
Plate Current	13.5	8	ma
Plate Current for grid volts = −12.5	−	1.7	ma
Grid Voltage (Approx.) for plate μa. = 10	−7	−18	volts

[o]: See next page.

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RCA

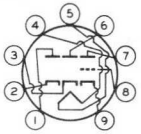
6BJ8

TWIN DIODE—MEDIUM-MU TRIODE

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"
Maximum Diameter	7/8"
Dimensional Outline	*See General Section*
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JETEC No.E9-1)
Basing Designation for BOTTOM VIEW	9ER

Pin 1 – Diode-No.2 Plate
Pin 2 – Diode-No.2 Cathode
Pin 3 – Diode-No.1 Cathode
Pin 4 – Heater



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

TRIODE UNIT — AMPLIFIER — Class A_1

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	300	max.	volts
GRID VOLTAGE:			
Positive bias value	0	max.	volts
AVERAGE CATHODE CURRENT	20	max.	ma
PLATE DISSIPATION	3.5	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-Circuit Resistance	1	max.	megohm

TRIODE UNIT — VERTICAL DEFLECTION AMPLIFIER

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

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

DC PLATE VOLTAGE	300	max.	volts
PEAK POSITIVE-PULSE PLATE VOLTAGE (Absolute maximum)#	1200■	max.	volts
PEAK NEGATIVE-PULSE GRID VOLTAGE	250	max.	volts
CATHODE CURRENT:			
Peak	70	max.	ma
Average	20	max.	ma
PLATE DISSIPATION	3.5	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200▲	max.	volts

○,▲,□,#,■: See next page.

6BJ8

TWIN DIODE—MEDIUM-MU TRIODE

Maximum Circuit Values:

Grid-Circuit Resistance:

For cathode-bias operation.	2.2	max.	megohms

DIODE UNITS — Two

Maximum Ratings, *Design-Center Values:*

Values are for Each Unit

PEAK PLATE CURRENT.	54	max.	ma
DC PLATE CURRENT.	9	max.	ma
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode .	200	max.	volts
Heater positive with respect to cathode .	200▲	max.	volts

○ Without external shield.

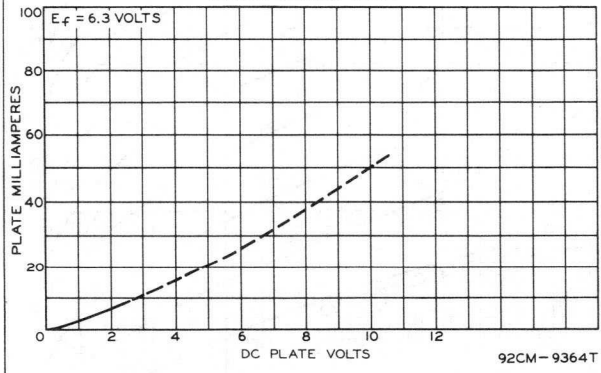
▲ The dc component must not exceed 100 volts.

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

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.

■ Under no circumstances should this absolute value be exceeded.

AVERAGE PLATE CHARACTERISTIC
EACH DIODE UNIT



6BJ8

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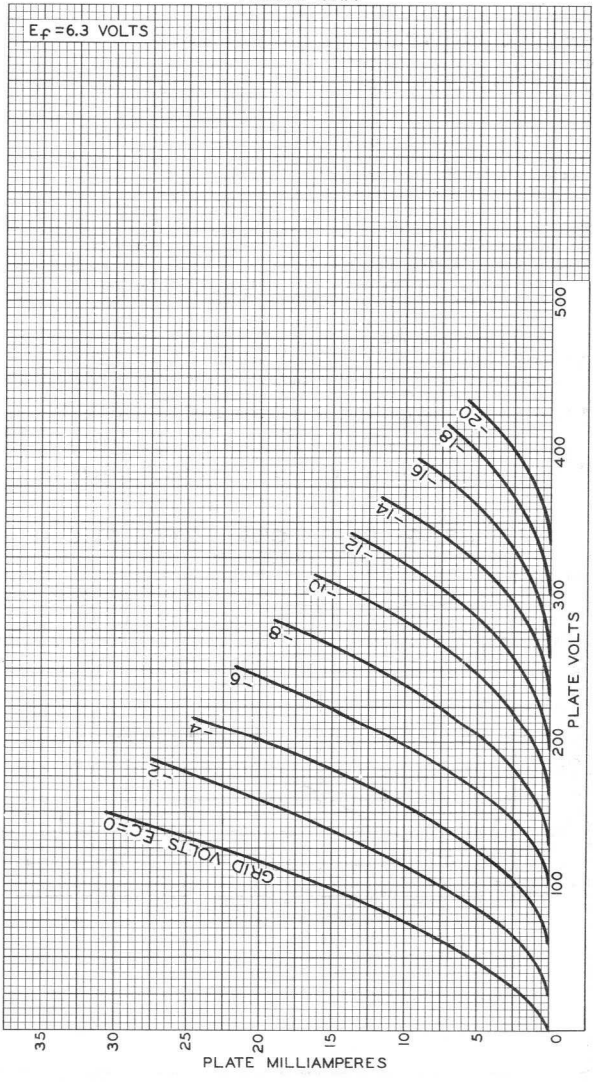
6BJ8

AVERAGE PLATE CHARACTERISTICS

TRIODE UNIT



ELECTRON TUBE DIVISION

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-9531

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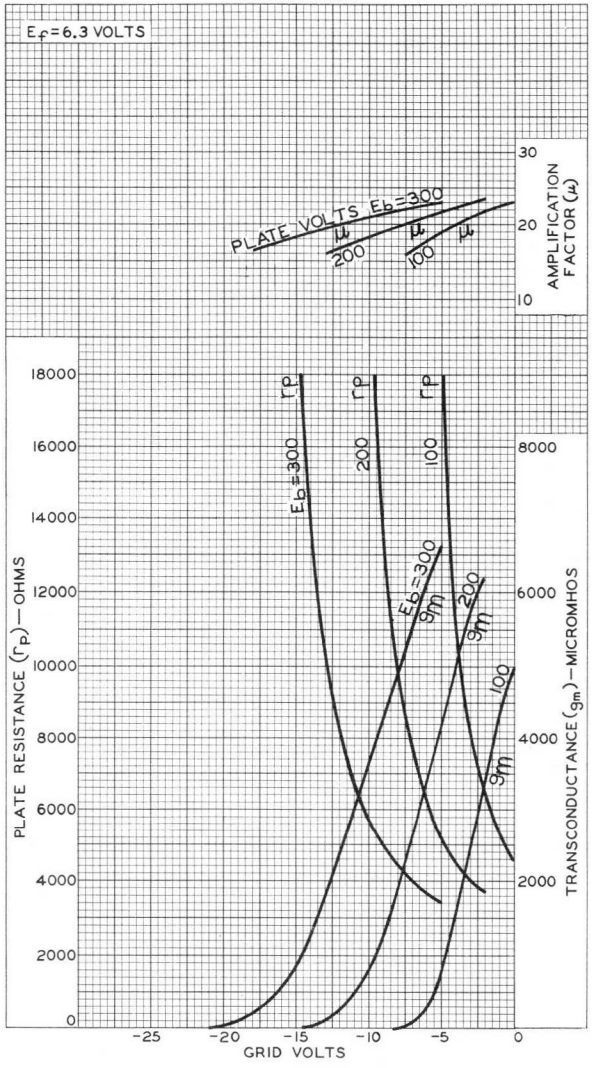
6BJ8

AVERAGE CHARACTERISTICS
TRIODE UNIT



6BK4B

Beam Triode

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

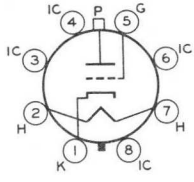
ELECTRICAL

Heater Characteristics and Ratings		
Voltage (AC or DC)	6.3 ± 0.6	V
Current at 6.3 V	0.200	A
Peak heater-cathode voltage:		
Heater negative with respect to cathode	450[a] max	V
Heater positive with respect to cathode	Not Recommended	
Direct Interelectrode Capacitances (Approx.)		
Without external shield		
Grid to plate	0.03	pF
Grid to cathode and heater	2.6	pF
Plate to cathode and heater	1.0	pF

MECHANICAL

Operating Position	Any
Maximum Overall Length	5 in
Seated Length	4-1/4 ± 3/16 in
Maximum Diameter	1-23/32 in
Bulb	T12
Cap	Small (JEDEC No.C1-1 or C1-34)
Base (Alternates)	
Short Jumbo-Shell Octal with External Barriers: 8-Pin (JEDEC Group 1, No.B8-71)	
Short Medium-Shell Octal with External Barriers: 8-Pin, Style B (JEDEC Group 1, No.B8-118)	
Basing Designation for BOTTOM VIEW	8GC

Pin 1 – Cathode
Pin 2 – Heater
Pin 3 – Do Not Use
Pin 4 – Do Not Use
Pin 5 – Grid
Pin 6 – Do Not Use
Pin 7 – Heater
Pin 8 – Do Not Use
Cap – Plate



SHUNT VOLTAGE-REGULATOR SERVICE

Maximum Ratings, Design-Maximum Values

DC Plate Voltage	27000	V
Unregulated DC Supply Voltage	60000	V
Grid Voltage		
Peak[b]	-440	V
DC	-135	V
DC Plate Current	1.6	mA
Plate Dissipation	40	W

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 W)	220	MΩ
R_2 (2 W)	1	MΩ
R_3 (1/2 W)	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

MAXIMUM CIRCUIT VALUE

Grid-Circuit Resistance	3	MΩ

[a] 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.

[b] For 20 seconds maximum duration during equipment warm-up period.

CHARACTERISTICS RANGE VALUES

	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 volts and dc plate current of 1 mA.

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

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

OPERATING CONSIDERATIONS

The 6BK4B *base pins* fit the standard octal socket. Socket terminals for pins 3, 4, 6, and 8 *should not be used for tie points.* Otherwise, tube performance may be adversely affected.

The high voltages at which the 6BK4B is operated may be extremely dangerous to the user. Great care should be taken during the adjustment of circuits. The tube and its associated apparatus, especially all parts which may be at high potential with respect to ground, should be housed in a protective enclosure.

At maximum plate dissipation the *plate* of the 6BK4B shows a dull red color. Connection to the plate cap should be made by a connector with flexible lead to prevent any strain on the seal of the cap.

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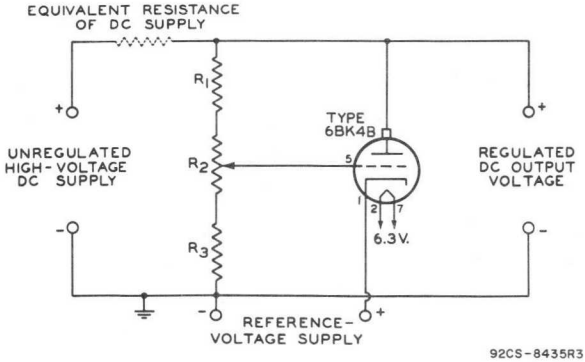
Operation of the 6BK4B with a plate voltage above approximately 16000 volts (absolute value) results in the production of X-Rays which can constitute a health hazard on prolonged exposure at close range unless the tube is adequately shielded. Relatively simple shielding should prove adequate, but the need for this precaution should be considered in equipment design.

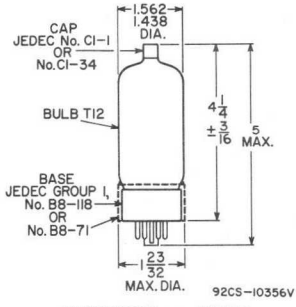
SHUNT VOLTAGE-REGULATOR CIRCUIT



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 6BK4B.

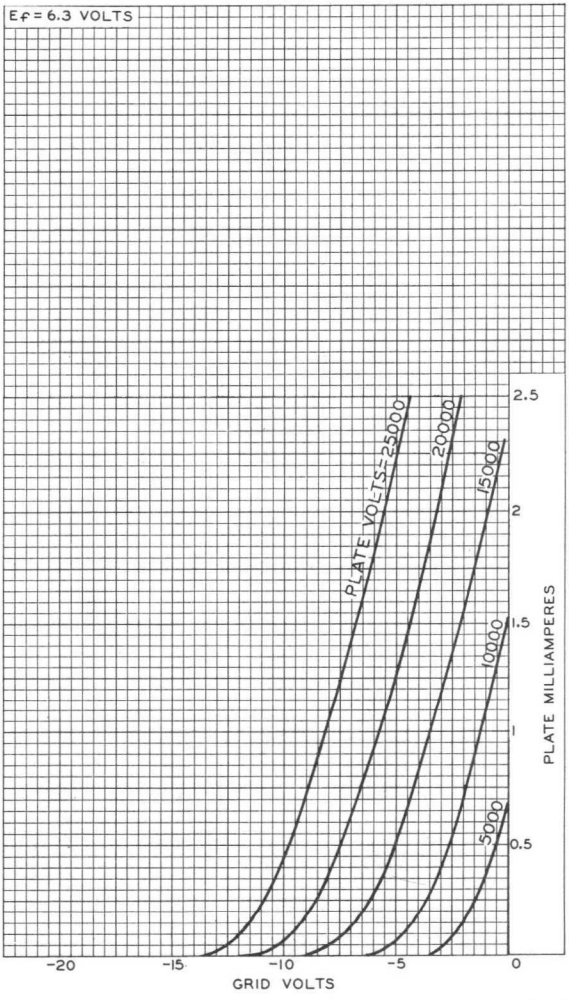
DIMENSIONAL OUTLINE

JEDEC No. 12-36



DIMENSIONS IN INCHES

Average Transfer Characteristics



92CM-8432RI

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6BK7-B

MEDIUM-MU TWIN TRIODE

9-PIN MINIATURE TYPE

With heater having controlled warm-up time. For TV tuners using direct-coupled cathode-drive circuits.

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:		
Voltage	6.3	ac or dc volts
Current	0.45	amp
Warm-up time (Average)	11	sec

For definition of heater warm-up time and method of determining it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of this Section.

Direct Interelectrode Capacitances:[o]

	Unit No.1	*Unit No.2*	
Grid to plate	1.8	1.8	μμf
Grid to cathode, internal shield, and heater	3	3	μμf
Plate to cathode, internal shield, and heater	1	0.9	μμf
Heater to cathode	2.8	3	μμf
Plate to cathode	0.22	0.22	μμf
Cathode to grid, internal shield, and heater	6	6	μμf
Plate to grid, internal shield, and heater	2.4	2.4	μμf
Grid of unit No.1 to grid of unit No.2	0.004 max.		μμf
Plate of unit No.1 to plate of unit No.2	0.075 max.		μμf

Characteristics, Class A_1 Amplifier (Each Unit):

Plate-Supply Voltage	150	volts
Cathode Resistor	56	ohms
Amplification Factor	43	
Plate Resistance (Approx.)	4600	ohms
Transconductance	9300	μmhos
Plate Current	18	ma
Grid Volts (Approx.) for plate μa = 10.	−11	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

[o] Without external shield.

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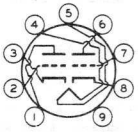
6BK7-B

MEDIUM-MU TWIN TRIODE

Base. . . . . .Small-Button Noval 9-Pin (JETEC 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 — Class A_1

Values are for Each Unit

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	300 max.	volts
GRID VOLTAGE:		
Negative-bias value	50 max.	volts
PLATE DISSIPATION	2.7 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode.	200■ max.	volts
Heater positive with respect to cathode.	200▲ max.	volts

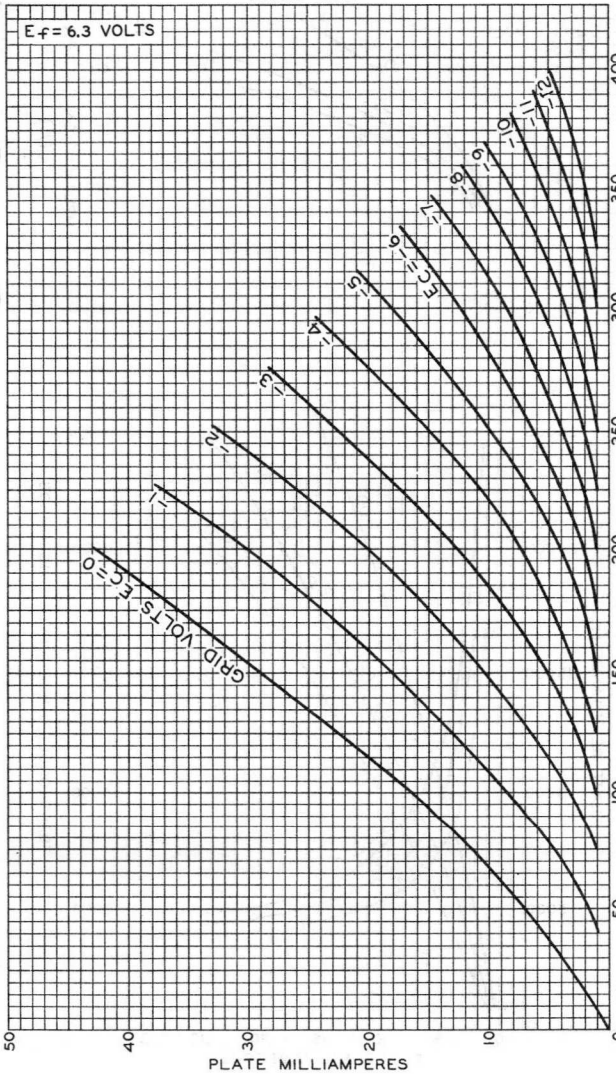
■ Under cutoff conditions in direct-coupled cathode-drive circuits, it is permissible for this voltage to be as high as 300 volts.

▲ The dc component must not exceed 100 volts.

6BK7-B

AVERAGE PLATE CHARACTERISTICS

EACH UNIT



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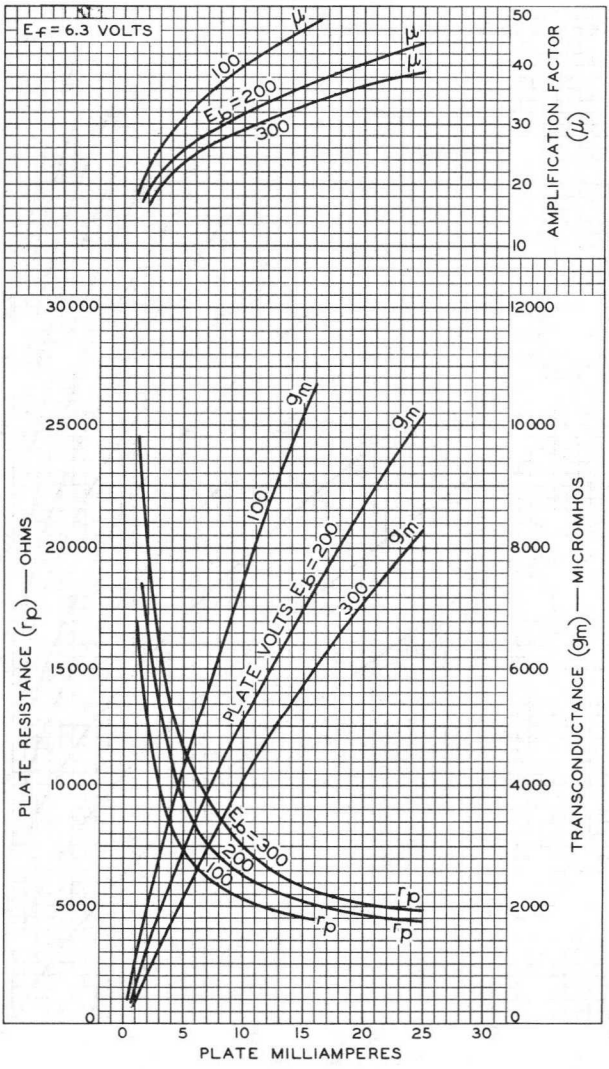
92CM-9764

6BK7-B

6BK7-B

AVERAGE CHARACTERISTICS
EACH UNIT



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92CM-9768

6BL7-GTA

MEDIUM-MU TWIN TRIODE

GENERAL DATA

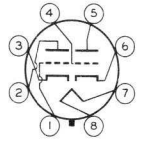
Electrical:

Heater, for Unipotential Cathodes:				
Voltage	6.3			ac or dc volts
Current	1.5			amp
Direct Interelectrode Capacitances (Approx.):○	*Unit No.1*		*Unit No.2*	
Grid to plate	6		6	μμf
Grid to cathode and heater	4.2		4.6	μμf
Plate to cathode and heater	0.9		0.9	μμf
Characteristics, Class A_1 Amplifier (Each Unit):				
Plate Voltage	150	250	250	volts
Grid Voltage	0	-17	-9	volts
Amplification Factor	–	–	15	
Plate Resistance (Approx.)	–	–	2150	ohms
Transconductance	–	–	7000	μmhos
Plate Current	65*	4	40	ma
Grid Voltage (Approx.) for plate current of 50 μa	–	–	-23	volts

Mechanical:

Operating Position	Any
Maximum Overall Length	3-5/16"
Maximum Seated Length	2-3/4"
Maximum Diameter	1-9/32"
Dimensional Outline	*See General Section*
Bulb	T9
Base	Short Intermediate-Shell Octal 8-Pin with External Barriers (JETEC No.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

VERTICAL DEFLECTION OSCILLATOR♦

Unless Otherwise Specified, Values are for Each Unit

Maximum Ratings, *Design-Center Values:*

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

DC PLATE VOLTAGE	500 max.	volts
PEAK NEGATIVE-PULSE GRID VOLTAGE	400 max.	volts

○,*,♦,□: See next page.

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TENTATIVE DATA

6BL7-GTA

MEDIUM-MU TWIN TRIODE

CATHODE CURRENT:			
Peak	210	max.	ma
DC	60	max.	ma
PLATE DISSIPATION:			
Either plate	10	max.	watts
Both plates (Both units operating)	12	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-Circuit Resistance	4.7	max.	megohms

VERTICAL DEFLECTION AMPLIFIER♦

Unless Otherwise Specified, Values are for Each Unit

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

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

DC PLATE VOLTAGE	500	max.	volts
PEAK POSITIVE-PULSE PLATE VOLTAGE# (Absolute maximum)	2000■	max.	volts
PEAK NEGATIVE-PULSE GRID VOLTAGE	250	max.	volts
CATHODE CURRENT:			
Peak	210	max.	ma
DC	60	max.	ma
PLATE DISSIPATION:			
Either plate†	10	max.	watts
Both plates (Both units operating)	12	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-Circuit Resistance:			
For Cathode-bias operation†	4.7	max.	megohms

○ 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.

♦ When this tube type is operated as a combined vertical deflection oscillator and amplifier, it is recommended that unit No. 1 (pins 4, 5, and 6) be used as the oscillator.

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

▲ The dc component must not exceed 100 volts.

\# 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.

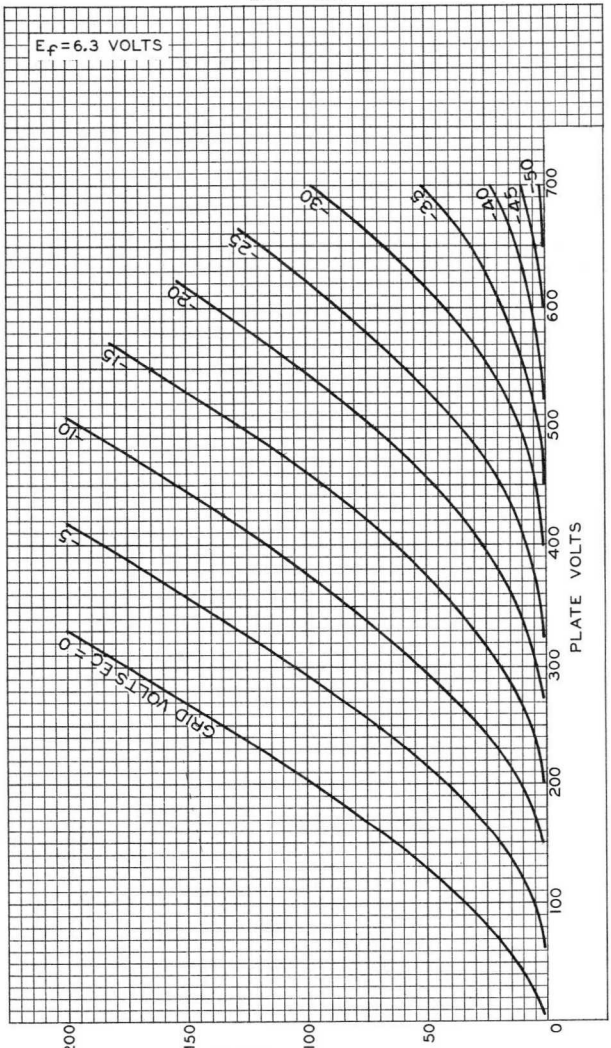
■ Under no circumstances should this absolute value be exceeded.

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

6BL7-GTA

AVERAGE PLATE CHARACTERISTICS

EACH UNIT



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92CM-9526

Medium-Mu Triode—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	0.450	amp
Peak heater-cathode voltage (Each unit):		
Heater negative with respect to cathode	100 max.	volts
Heater positive with respect to cathode	100 max.	volts
Direct Interelectrode Capacitances:[a]		
Triode Unit:		
Grid to plate	1.5	μμf
Grid to cathode and heater	2.5	μμf
Plate to cathode and heater	1.8	μμf
Pentode Unit:		
Grid No.1 to plate	0.025 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	3.8	μμf
Pentode plate to triode grid	0.02 max.	μμf
Pentode grid No.1 to triode plate	0.16 max.	μμf
Pentode plate to triode plate	0.07 max.	μμf

Characteristics, Class A$_1$ Amplifier:

	Triode Unit	*Pentode Unit*	
Plate Voltage	100	170	volts
Grid-No.2 Voltage	–	170	volts
Grid-No.1 Voltage	-2	-2	volts
Amplification Factor	20	–	
Amplification Factor, Grid No.2 to Grid No.1	–	47	
Plate Resistance (Approx.)	–	0.4	megohm
Transconductance	5000	6200	μmhos
Plate Current	14	10	ma
Grid-No.2 Current	–	2.8	ma
Input Resistance at frequency (Mc) = 50	–	0.01	megohm
Equivalent Noise Resistance	–	1500	ohms

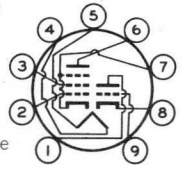
Mechanical:

Operating Position	Any
Type of Cathodes	Coated Unipotential

6BL8

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. 9DC

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

AMPLIFIER — Class A_1

Maximum Ratings, *Design-Center Values:*

	Triode Unit	*Pentode Unit*	
PLATE SUPPLY VOLTAGE.	550 max.	550 max.	volts
PLATE VOLTAGE	250 max.	250 max.	volts
GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE.	–	550 max.	volts
GRID-No.2 VOLTAGE:			
With cathode ma. = 14	–	175 max.	volts
With cathode ma. < 10	–	200 max.	volts
CATHODE CURRENT	14 max.	14 max.	ma
GRID-No.2 INPUT:			
With plate dissipation (watts) > 1.2	–	0.5 max.	watt
With plate dissipation (watts) < 1.2	–	0.75 max.	watt
PLATE DISSIPATION	1.5 max.	1.7 max.	watts

Maximum Circuit Values:

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

[a] Without external shield.

6BM8/ECL82

High-Mu Triode—Power Pentode

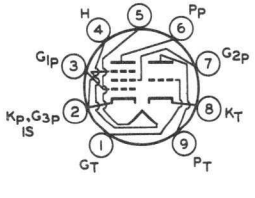
Electrical:

Heater Characteristics and Ratings:		
Voltage (AC or DC)	6.3 ± 0.6	volts
Current at heater volts = 6.3	0.780	amp
Peak heater-cathode voltage	100	volts
Direct Interelectrode Capacitances:		
Triode Unit:		
Grid to plate	4.0	pf
Input: G_T to (K_T, H)	2.7	pf
Output: P_T to (K_T, H)	4.0	pf
Grid to heater	0.1 max.	pf
Pentode Unit:		
Grid No.1 to plate	0.3 max.	pf
Input: G1p to (Kp + G3p + IS, G2p, H)	9.3	pf
Output: Pp to (Kp + G3p + IS, G2p, H)	8.0	pf
Grid-No.1 to heater	0.3 max.	pf
Triode plate to pentode grid No.1	0.02 max.	pf
Triode grid to pentode plate	0.02 max.	pf
Triode grid to pentode grid No.1	0.025 max.	pf
Triode plate to pentode plate	0.25 max.	pf

Mechanical:

Operating Position	Any
Type of Cathodes	Coated Unipotential
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	9EX

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



CLASS A_1 AMPLIFIER

Characteristics:

	Triode Unit	*Pentode Unit*	
Plate Voltage	100	200	volts
Grid-No.2 Voltage	–	200	volts
Grid-No.1 Voltage	0	-16	volts
Grid-No.1 Voltage (RMS)	–	6.6	volts
Amplification Factor	70	9.5[a]	
Plate Resistance (Approx.)	–	20000	ohms
Transconductance	2500	6400	μmhos
Plate Current	3.5	35[b]	ma
Zero-Signal Grid-No.2 Current	–	7	ma
Load Resistance	–	5600	ohms
Total Harmonic Distortion	–	10	%
Max.-Signal Power Output	–	3.5	watts

Maximum Ratings, *Design-Center Values:*

Plate Supply Voltage	550	900	volts
Plate Voltage	300	600	volts
Grid-No.2 Supply Voltage	–	550	volts
Grid-No.2 Voltage	–	300	volts
Grid-No.2 Input	–	1.8	watts
Plate Dissipation	1	[c]	watts
Average Cathode Current	15	50	ma

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:			
For fixed-bias operation	1	1	megohm
For cathode-bias operation	2	2	megohms
Between heater and cathode	0.02	0.02	megohm

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

[b] Zero-signal plate current.

[c] At plate voltage less than 250 volts, maximum plate dissipation is 7 watts; at plate voltage greater than 250 volts, maximum plate dissipation is 5 watts.

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Medium-Mu Triode

7-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	6.3	volts
Current	0.2	amp
Direct Interelectrode Capacitances (Approx.):[a]		
Grid to plate	1.2	μμf
Grid to cathode and heater	3.2	μμf
Plate to cathode and heater	1.4	μμf

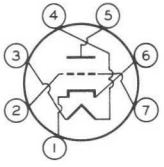
Characteristics, Class A_1 Amplifier:

Plate Supply Voltage	150	volts
Cathode Resistor	220	ohms
Amplification Factor	43	
Plate Resistance (Approx.)	5400	ohms
Transconductance	7700	μmhos ←
Plate Current	9	ma
Grid Volts (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	7EG

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



Pin 5 – Plate
Pin 6 – Cathode
Pin 7 – Grid

AMPLIFIER — Class A_1

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	275 max.	volts
GRID VOLTAGE:		
Positive-bias value	0 max.	volts
CATHODE CURRENT	22 max.	ma
PLATE DISSIPATION	2.2 max.	watts

← Indicates a change.

PEAK HEATER–CATHODE VOLTAGE:		
Heater negative with respect to cathode.	100 max.	volts
Heater positive with respect to cathode.	100 max.	volts

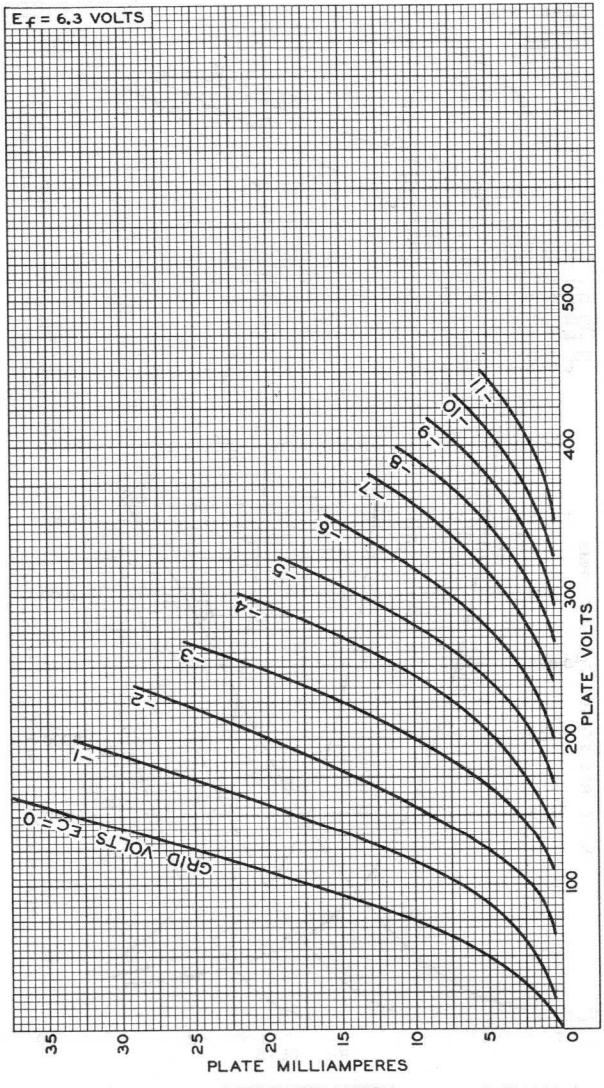
Maximum Circuit Values:

Grid–Circuit Resistance	0.5 max.	megohm

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

6BN4-A

AVERAGE PLATE CHARACTERISTICS



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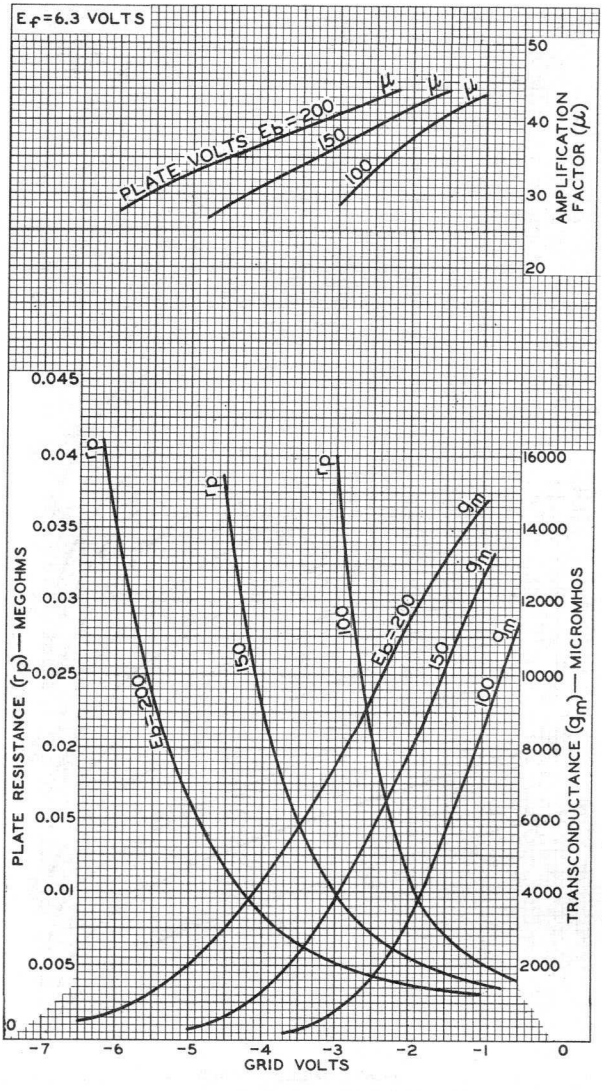
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY
92CM-9941

RCA

6BN4-A

AVERAGE CHARACTERISTICS



Beam Tube

7-PIN MINIATURE TYPE

For Use in FM and TV Receivers As Combined Limiter, Discriminator, and Audio-Voltage-Amplifier Tube

GENERAL DATA

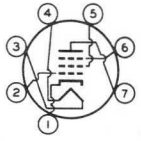
Electrical:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	6.3 ± 10%	volts ←
Current at 6.3 volts	0.3	amp
Direct Interelectrode Capacitances:▲		
Grid No.1 to cathode & internal shields, plate, grid No.3, grid No.2, and heater	4.2	μμf
Grid No.3 to cathode & internal shields, plate, grid No.2, grid No.1, and heater	3.3	μμf
Grid No.1 to grid No.3	0.004 max.	μμf

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"
Maximum 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	7DF

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



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

LIMITER & DISCRIMINATOR SERVICE ←

Maximum Ratings, *Design-Maximum Values:*

PLATE SUPPLY VOLTAGE	330 max. volts
GRID-No.3 (QUADRATURE-GRID) VOLTAGE	•
GRID-No.2 (ACCELERATOR-GRID) VOLTAGE	110 max. volts
GRID-No.1 (LIMITER-GRID) VOLTAGE:	
Positive-peak value	60 max. volts
CATHODE CURRENT	13 max. ma
PEAK HEATER-CATHODE VOLTAGE:	
Heater negative with respect to cathode	200 max. volts
Heater positive with respect to cathode	200 max. volts

← Indicates a change.

Typical Operation:

In accompanying typical quadrature-grid-fm-detector circuit

Input-Signal Center Frequency	*4.5*	*10.7*	*10.7*	*Mc*
Plate Supply Voltage.	270	85	285	volts
Plate Voltage	121	63	122	volts
Grid-No.3 Voltage . .	•	•	•	
Grid-No.2 Voltage . .	100	55	100	volts
Cathode-Circuit Resistance★	200 to 400	200 to 400	200 to 400	ohms
Peak AF Output Voltage	16.8	6	16.6	volts
Minimum Grid-No.1 Signal Voltage (RMS) for AM rejection★ .	2	1.25	2	volts
Minimum Grid-No.1 Signal Voltage (RMS) for limiting action♦	1.25	1.25	1.25	volts
Plate Current	0.44	0.25	0.49	ma
Grid-No.2 Current . .	10	4.1	9.8	ma
Plate Load Resistor .	0.33	0.085	0.33	megohm
Linearity Resistor. .	1000	470	1500	ohms
Integrating Capacitor	0.001	0.002	0.001	μf
Coupling Capacitor. .	0.25	0.25	0.01	μf
Frequency Deviation .	±25	±75	±75	kc
AM Rejection:				
For grid-No.1 signal volts (RMS) = 2 .	25	31	20	db
For grid-No.1 signal volts (RMS) = 3 .	30	30	29	db
Total Harmonic Distortion.	1.8	2	1.6	%

▲ Without external shield.

● For proper operation of this electron tube in the accompanying Typical Quadrature-Grid-FM Detector Circuit, the Q of the quadrature-grid tuned circuit (L_1, C6) should be sufficiently high to assure that a 4-volt rms signal is developed at the quadrature grid when a 2-volt rms signal at the center frequency is applied to grid No.1.

It is recommended that L_1 be shunted by a capacitance of at least 10 μμf. This capacitance may be composed of tube capacitance, stray capacitance, the distributed capacitance of L_1, and a fixed capacitor.

■ The dc component must not exceed 100 volts.

★ The cathode-circuit resistance should be adjusted for maximum AM rejection at the AF output of the circuit at the specified grid-No.1 signal voltage. AM rejection is measured with an applied signal containing 30 per cent amplitude modulation and 30 per cent frequency modulation.

♦ At signal levels above specified value, limiting is within ±2 decibels.

OPERATING CONSIDERATIONS

To insure proper phasing of the signal voltage developed at the quadrature grid, the components of the quadrature-grid circuit should be shielded from those of the control-grid circuit.

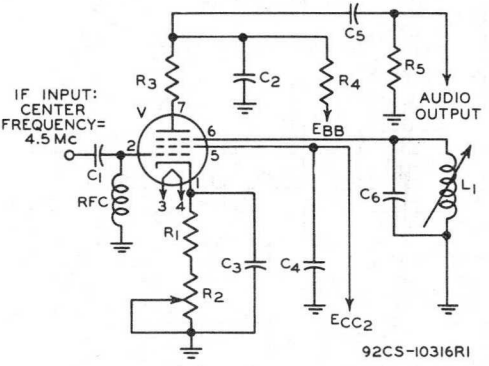
To obtain a symmetrical discriminator-response curve, the plate currents for no input signal and for unmodulated

→ Indicates a change.

input signal should be equal. To assure this equality, it is necessary that the plate voltage and grid-No.2 voltage have the proper values.

The proper plate voltage for any grid-No.2 voltage may be determined from the accompanying *Operation Characteristics* curve. This curve may also be used to determine the average dynamic plate current for any combination of grid-No.2 voltage and plate voltage.

TYPICAL QUADRATURE-GRID-FM-DETECTOR CIRCUIT



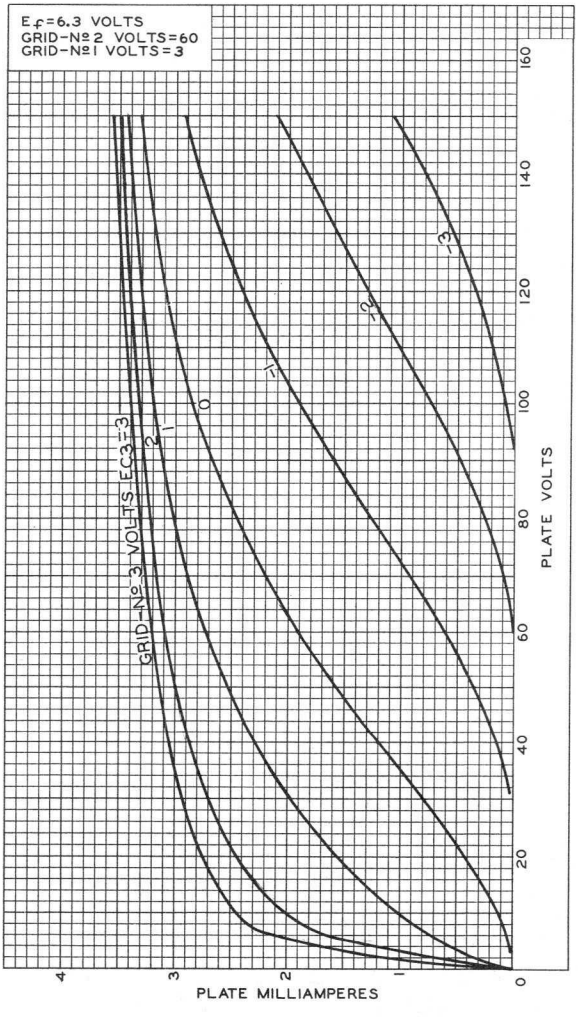
C_1: 100 $\mu\mu$f
C_2: Integrating capacitor, 0.001 μf
C_3 C_4: 0.01 μf
C_5: 0.25 μf
C_6: 10 $\mu\mu$f•
L_1: •
R_1: 200 ohms
R_2: Cathode-bias potentiometer, 200 ohms
R_3: Linearity resistor, 1000 ohms
R_4: Plate-load resistor, 0.33 megohm
R_5: 0.47 megohm
V: Electron-tube-type 6BN6

• For proper operation of this electron tube in the accompanying Typical Quadrature-Grid-FM Detector Circuit, the Q of the quadrature-grid tuned circuit (L_1, C_6) should be sufficiently high to assure that a 4-volt rms signal is developed at the quadrature grid when a 2-volt rms signal at the center frequency is applied to grid No.1.

It is recommended that L_1 be shunted by a capacitance of at least 10 $\mu\mu$f. This capacitance may be composed of tube capacitance, stray capacitance, the distributed capacitance of L_1, and a fixed capacitor.

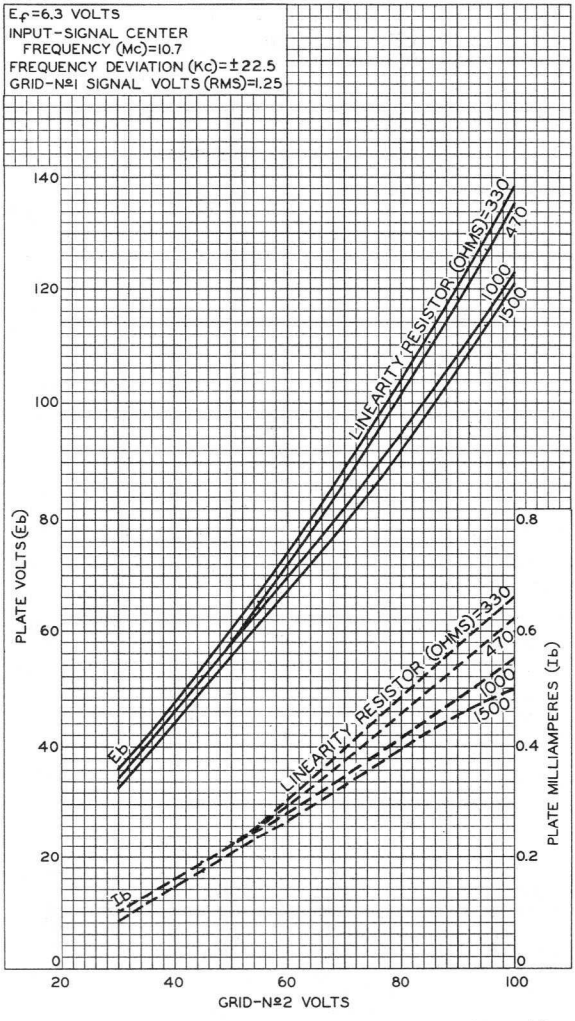
6BN6

AVERAGE PLATE CHARACTERISTICS



92CM-10319

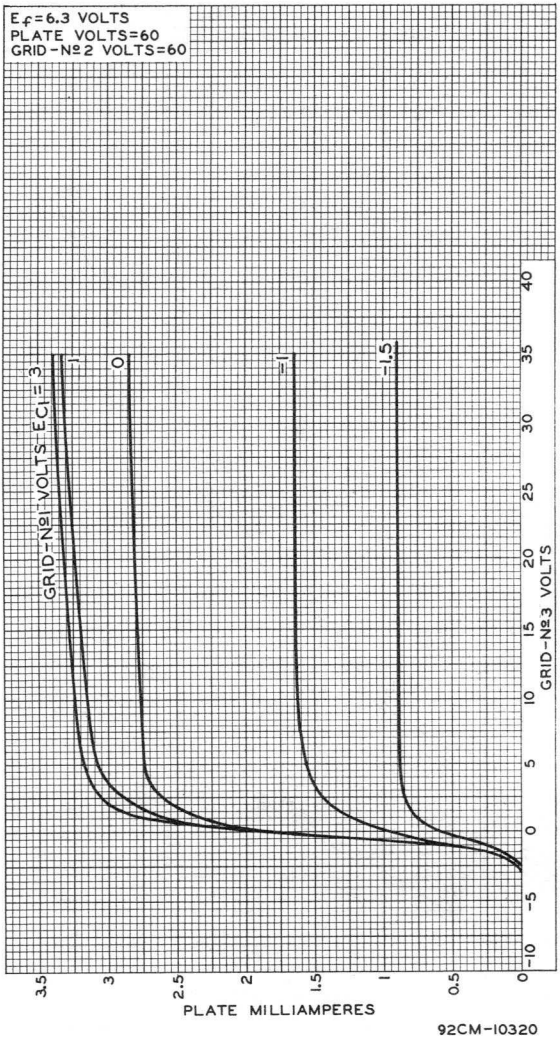
OPERATION CHARACTERISTICS



92CM-10321

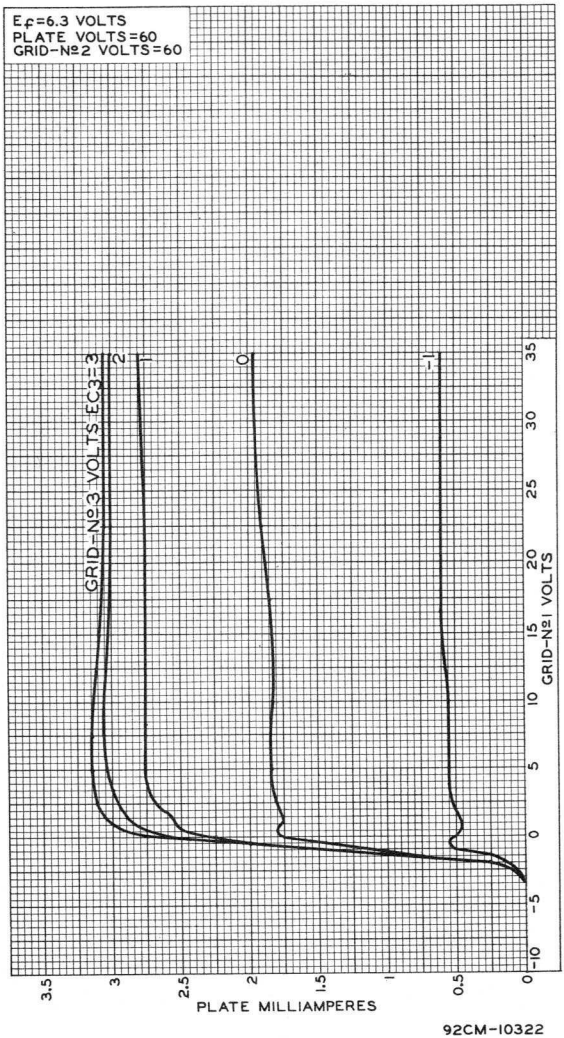
6BN6

AVERAGE CHARACTERISTICS



92CM-10320

AVERAGE CHARACTERISTICS



92CM-10322

6BN8

TWIN DIODE—HIGH-MU 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:[o]		
Triode Unit:		
Grid to plate	2.5	μμf
Grid to heater and cathode	3.6	μμf
Plate to heater and cathode	0.25	μμf
Diode Units:		
Diode-No.1 plate to triode grid	0.06 max.	μμf
Diode-No.2 plate to triode grid	0.1 max.	μμf
Diode-No.1 cathode to all other electrodes	5	μμf
Diode-No.2 cathode to all other electrodes	5	μμf
Diode-No.1 plate to diode-No.2 plate	0.07 max.	μμf
Diode-No.1 plate to diode-No.1 cathode and heater	1.9	μμf
Diode-No.2 plate to diode-No.2 cathode and heater	1.9	μμf
Diode-No.1 cathode to diode-No.1 plate and heater	4.8	μμf
Diode-No.2 cathode to diode-No.2 plate and heater	4.8	μμf
Diode-No.1 plate to all other electrodes	3	μμf
Diode-No.2 plate to all other electrodes	3	μμf

Characteristics, Class A_1 Amplifier (Triode Unit):

Plate Voltage	100	250	volts
Grid Voltage	−1	−3	volts
Amplification Factor	75	70	
Plate Resistance (Approx.)	21000	28000	ohms
Transconductance	3500	2500	μmhos
Plate Current	1.5	1.6	ma
Grid Voltage (Approx.) for plate μa = 10	−2.5	−5.5	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*

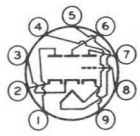
← Indicates a change.

6BN8

TWIN DIODE—HIGH-MU TRIODE

Bulb. T6-1/2
Base. . . . . Small-Button Noval 9-Pin (JEDEC No. E9-1)
Basing Designation for BOTTOM VIEW. 9ER

Pin 1 – Diode-No. 2 Plate
Pin 2 – Diode-No. 2 Cathode
Pin 3 – Diode-No. 1 Cathode
Pin 4 – Heater



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

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	1.7	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-Circuit Resistance	1	max.	megohm

DIODE UNITS — Two

Maximum Ratings, *Design-Maximum Values:*

Values are for Each Unit

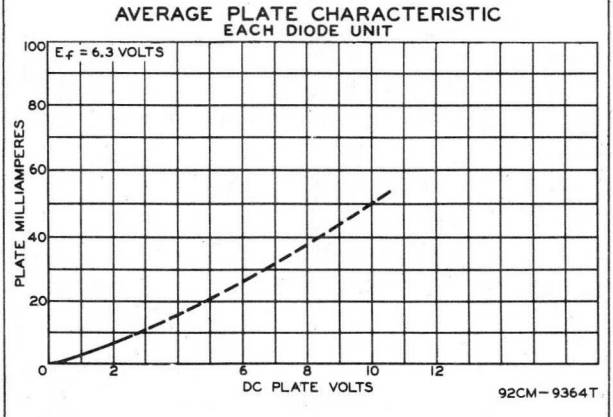
PEAK PLATE CURRENT	54	max.	ma
DC PLATE CURRENT	9	max.	ma
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200▲	max.	volts

○ Without external shield.
▲ The dc component must not exceed 100 volts.

→ Indicates a change.

6BN8

TWIN DIODE—HIGH-MU TRIODE

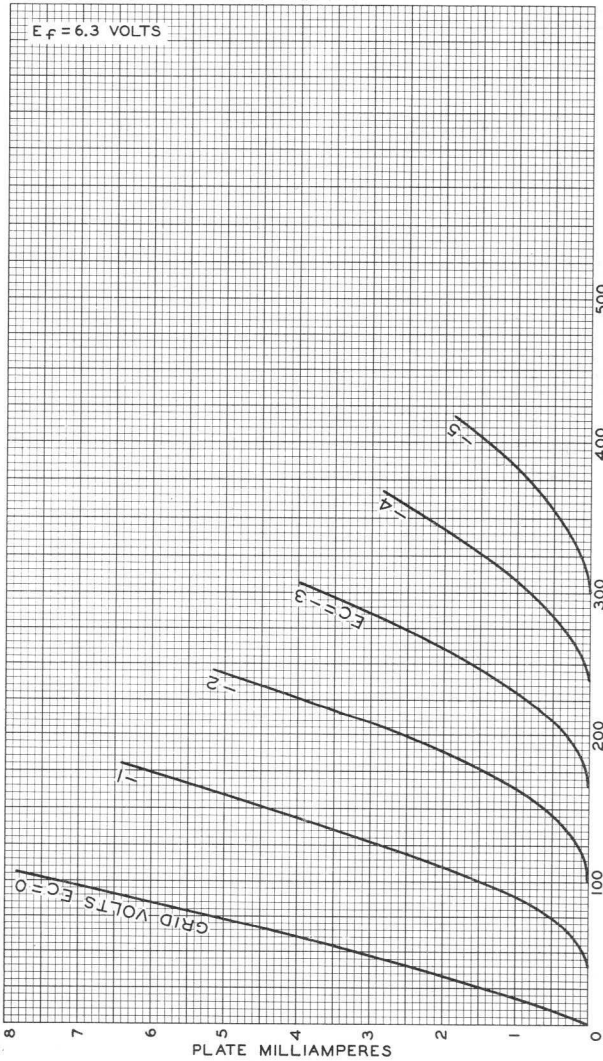


ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6BN8

AVERAGE PLATE CHARACTERISTICS

TRIODE UNIT



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

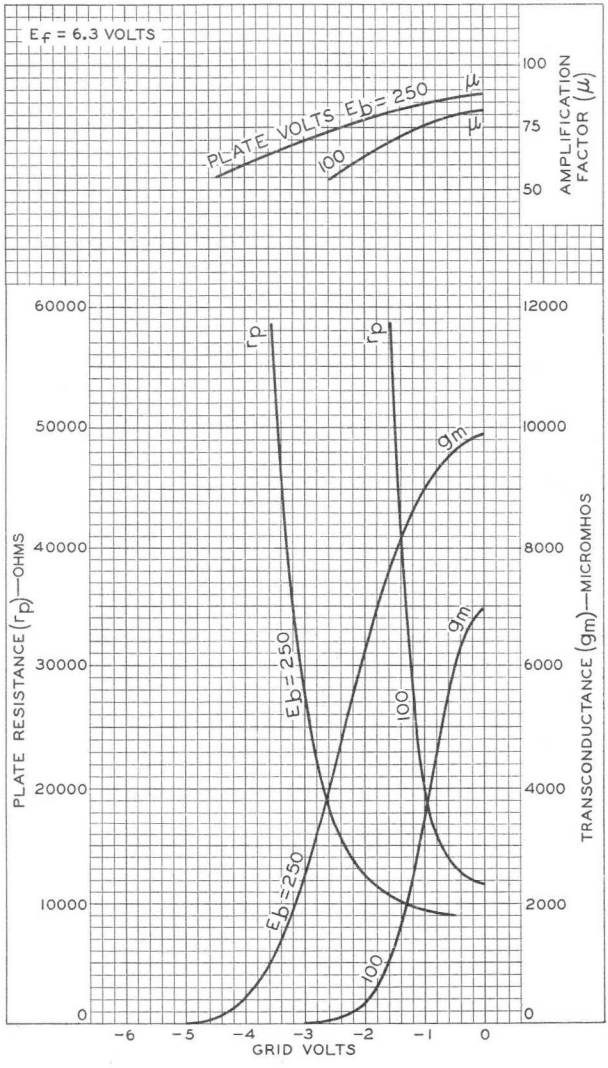
92CM-9363

RCA

6BN8

AVERAGE CHARACTERISTICS

TRIODE UNIT



6BQ5
POWER PENTODE

9-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage	6.3	ac or dc volts
Current	0.76	amp
Direct Interelectrode Capacitances:[o]		
Grid No.1 to plate	0.5 max.	μμf
Grid No.1 to cathode & grid No.3, grid No.2, and heater	10.8	μμf
Plate to cathode & grid No.3, grid No.2, and heater	6.5	μμf

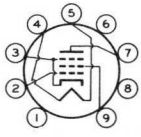
Characteristics, Class A_1 Amplifier:

Plate Voltage	250	volts
Grid-No.2 (Screen-grid) Voltage	250	volts
Grid-No.1 (Control-grid) Voltage	-7.3	volts
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	9CV

Pin 1 - Internal Connection—Do Not Use
Pin 2 - Grid No.1
Pin 3 - Cathode, Grid No.3



Pin 4 - Heater
Pin 5 - Heater
Pin 6 - Same as Pin 1
Pin 7 - Plate
Pin 8 - Same as Pin 1
Pin 9 - Grid No.2

AMPLIFIER — Class A_1

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	300	max.	volts
GRID-No.2 (SCREEN-GRID) VOLTAGE	300	max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:			
Positive-bias value	0	max.	volts
CATHODE CURRENT	65	max.	ma
PLATE DISSIPATION	12	max.	watts
GRID-No.2 INPUT[•]	2	max.	watts

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

TENTATIVE DATA

6BQ5

POWER PENTODE

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 Voltage.	250	volts
Grid-No.2 Voltage.	250	volts
Grid-No.1 Voltage.	-7.3	volts
Peak AF Grid-No.1 Voltage.	6.2	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.	4500	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

○ Without external shield.

● Grid-No.2 input must not exceed 4 watts under maximum-signal conditions.

▲ The dc component must not exceed 100 volts.

OPERATING CONSIDERATIONS

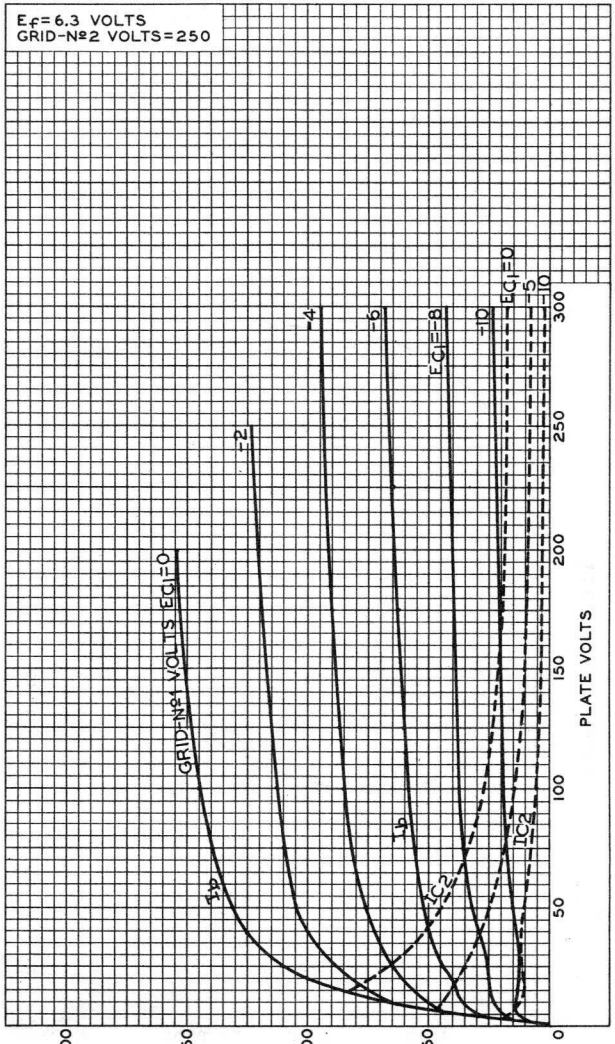
The *bulb* becomes hot during operation. To insure adequate cooling, therefore, it is essential that free circulation of air be provided.

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

TENTATIVE DATA

6BQ5

AVERAGE CHARACTERISTICS

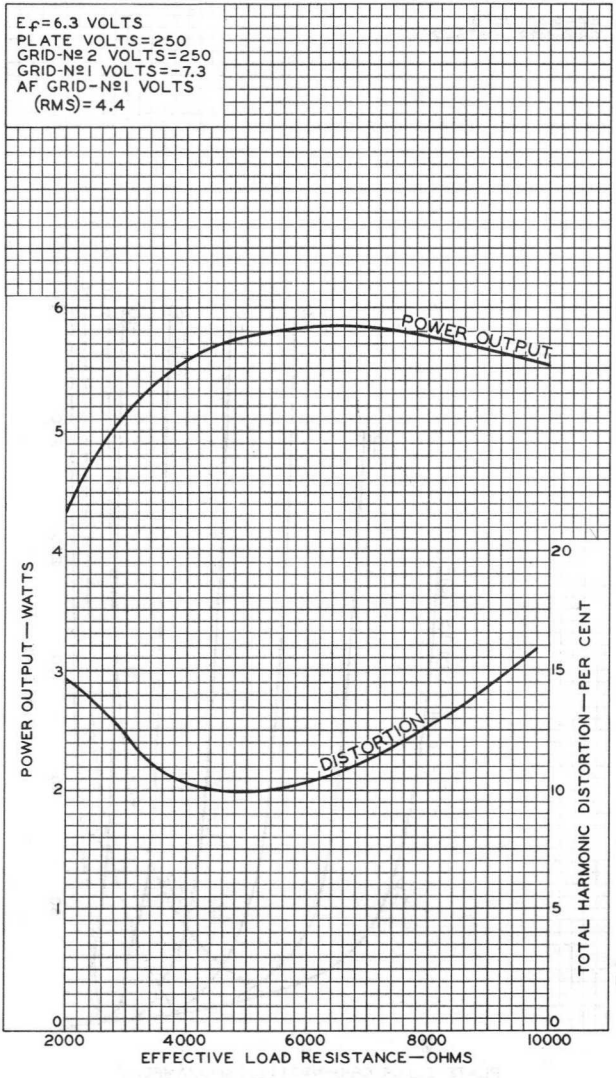


ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-9903

6BQ5

OPERATION CHARACTERISTICS



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

92CM-9902

Beam Power Tube

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:				
Voltage (AC or DC)			6.3	volts
Current			1.2	amp
Direct Interelectrode Capacitances (Approx.):[a]				
Grid No.1 to plate			0.6	μμf
Grid No.1 to cathode & grid No.3, grid No.2, and heater			15	μμf
Plate to cathode & grid No.3, grid No.2, and heater			7	μμf ←

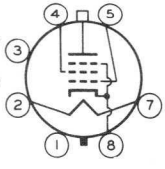
Characteristics, Class A_1 Amplifier: ←

Plate Voltage	60	150	250	volts
Grid-No.2 Voltage	150	150	150	volts
Grid-No.1 Voltage	0	-22.5	-22.5	volts
Mu-Factor, Grid No.2 to Grid No.1	–	4.3	–	
Plate Resistance (Approx.)	–	–	14500	ohms
Transconductance	–	–	5900	μmhos
Plate Current	260[b]	–	57	ma
Grid-No.2 Current	26[b]	–	2.1	ma
Grid-No.1 Voltage (Approx.) for plate ma. = 1	–	–	-43	volts

Mechanical: ←

Operating Position . . . . . Any
Maximum Overall Length . . . . . 3-7/8"
Seated Length . . . . . 2-7/8" to 3-5/16"
Maximum Diameter . . . . . 1-9/32"
Bulb T9
Cap . . . . Skirted Miniature (JEDEC No.C1-2, C1-3, or C1-33)
Bases (Alternates):
- Intermediate-Shell Octal:
  - 7-Pin, Arrangement 1 (JEDEC Group 1, No.B7-7)
  - 6-Pin, Arrangement 2 (JEDEC Group 1, No.B6-81)
- Short Intermediate-Shell Octal with External Barriers:
  - 7-Pin (JEDEC Group 1, No.B7-59)
  - 6-Pin, Arrangement 2 (JEDEC Group 1, No.B6-84)
  - 5-Pin, Arrangement 3 (JEDEC Group 1, No.B5-187)

Basing Designation for BOTTOM VIEW 6AM



Pin 1[c] – No Connection
Pin 2 – Heater
Pin 3[c] – No Connection
Pin 4 – Grid No.2
Pin 5 – Grid No.1
Pin 7 – Heater
Pin 8 – Cathode, Grid No.3
Cap – Plate

← Indicates a change.

HORIZONTAL-DEFLECTION AMPLIFIER

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

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

DC PLATE-SUPPLY VOLTAGE	600	max.	volts
PEAK POSITIVE-PULSE PLATE VOLTAGE (Absolute maximum)[e]	6000[f]	max.	volts
PEAK NEGATIVE-PULSE PLATE VOLTAGE	1250	max.	volts
DC GRID-No.2 (SCREEN-GRID) VOLTAGE	200	max.	volts
PEAK NEGATIVE-PULSE GRID-No.1 (CONTROL-GRID) VOLTAGE	300	max.	volts
CATHODE CURRENT:			
Peak	400	max.	ma
→ Average	110	max.	ma
GRID-No.2 INPUT	2.5	max.	watts
PLATE DISSIPATION[g]	11	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200[h]	max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)	220	max.	°C

→Maximum Circuit Values:

Grid-No.1-Circuit Resistance	0.47	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] On the 6-pin bases, pin 1 as well as pin 6 is omitted. On the 5-pin base, pins 1 and 3 as well as pin 6 are omitted.

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

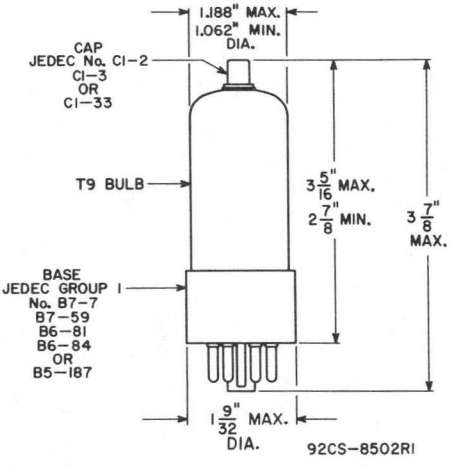
[e] This rating is applicable where the duration of the voltage pulse does not exceed 15 per cent of one horizontal scanning cycle. In a 525-line, 30-frame system, 15 per cent of one horizontal scanning cycle is 10 microseconds.

[f] Under no circumstances should this absolute value be exceeded.

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

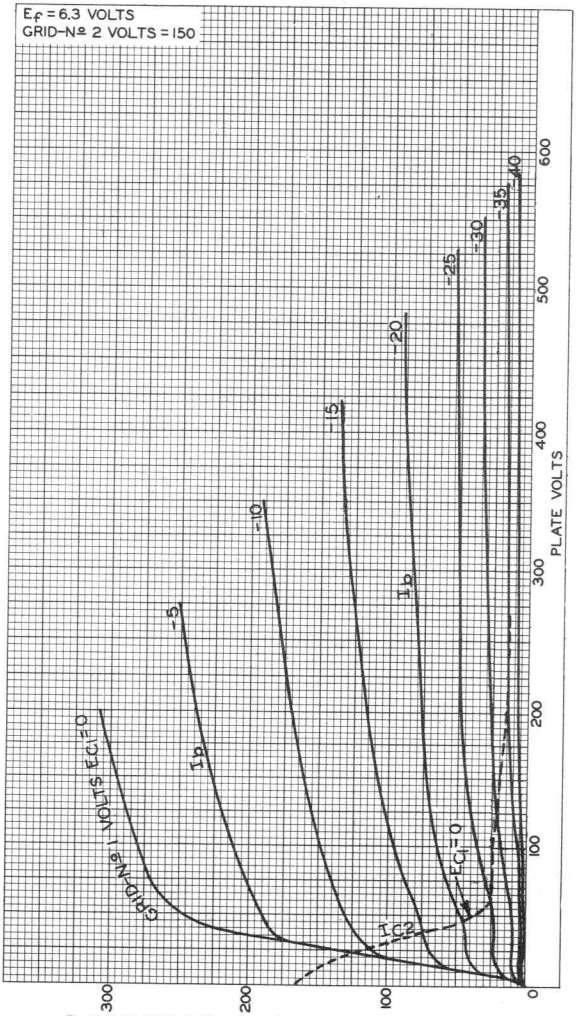
[h] The dc component must not exceed 100 volts.

→Indicates a change.


1.188" MAX.
1.062" MIN.
DIA.
CAP
JEDEC No. C1-2
C1-3
OR
C1-33
T9 BULB
3 5/16" MAX.
2 7/8" MIN.
3 7/8"
MAX.
BASE
JEDEC GROUP 1
No. B7-7
B7-59
B6-81
B6-84
OR
B5-187
1 9/32" MAX.
DIA.
92CS-8502R1

6BQ6GTB/6CU6

AVERAGE CHARACTERISTICS



92CM-8501RI

Medium-Mu Twin Triode

9-PIN MINIATURE TYPE

For TV Tuners Using Direct-Coupled Cathode-Drive Circuits

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:		
Voltage (AC or DC)	6.3	volts
Current	0.4	amp

Direct Interelectrode Capacitances:[a] ←

	Unit No.1	*Unit No.2*	
Grid to plate	1.2	1.2	μμf
Grid to cathode, internal shield, and heater	2.6	–	μμf
Cathode to grid, internal shield, and heater	–	5	μμf
Plate to cathode, internal shield, and heater	1.2	–	μμf
Plate to grid, internal shield, and heater	–	2.2	μμf
Plate to cathode	0.12	0.12	μμf
Heater to cathode	2.6	2.6	μμf
Plate of unit No.1 to plate of unit No.2	0.010 max.		μμf
Plate of unit No.2 to plate and grid of unit No.1	0.024 max.		μμf

Characteristics, Class A_1 Amplifier (Each Unit): ←

Plate Supply Voltage	150	volts
Cathode Resistor	220	ohms
Amplification Factor	38	
Plate Resistance (Approx.)	5900	ohms
Transconductance	6400	μmhos
Plate Current	9	ma
Grid Voltage (Approx.) for plate μa = 100	-6.5	volts

Mechanical:

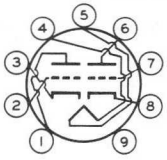
Operating Position	Any
Maximum Overall Length	2-3/16"
Maximum Seated Length	1-15/16"
Length, Base Seat to Bulb Top (Excluding tip)	1-9/16" ± 3/32"
Diameter	0.750" to 0.875"
Dimensional Outline	See *General Section*
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)

← Indicates a change.

6BQ7A

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 — Class A_1

Values are for Each Unit

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	250[b] max.	volts
PLATE DISSIPATION	2 max.	watts
CATHODE CURRENT	20 max.	ma
→ PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode.	200[b] max.	volts
Heater positive with respect to cathode.	200[c] max.	volts

Maximum Circuit Values:

Grid-Circuit Resistance	0.5 max.	megohm

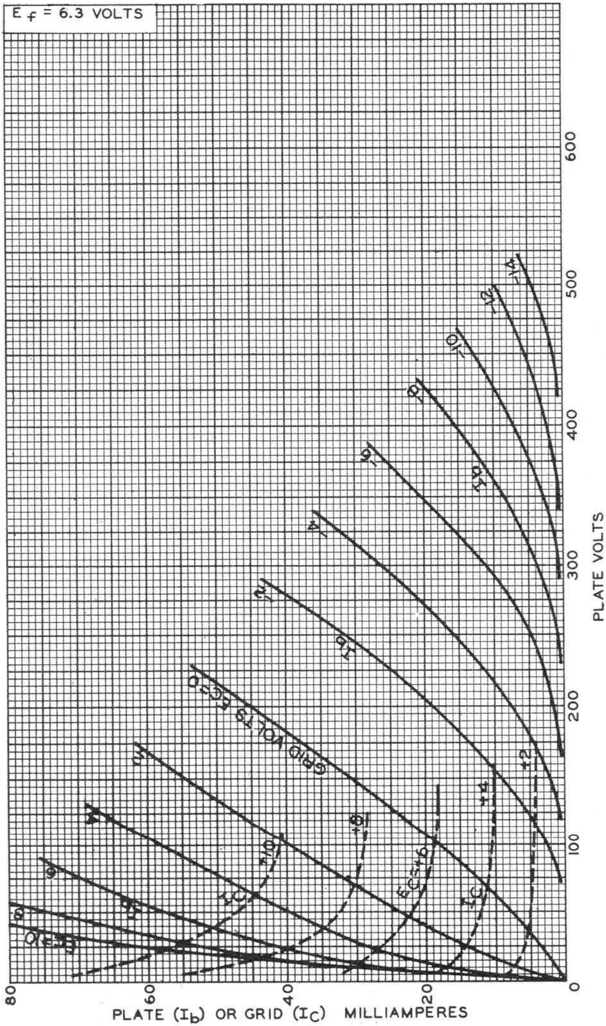
[a] With external shield JEDEC No.315 connected to internal shield.

[b] Under cutoff conditions in direct-coupled cathode-drive circuits, it is permissible for this voltage to be as high as 300 volts.

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

→ Indicates a change.

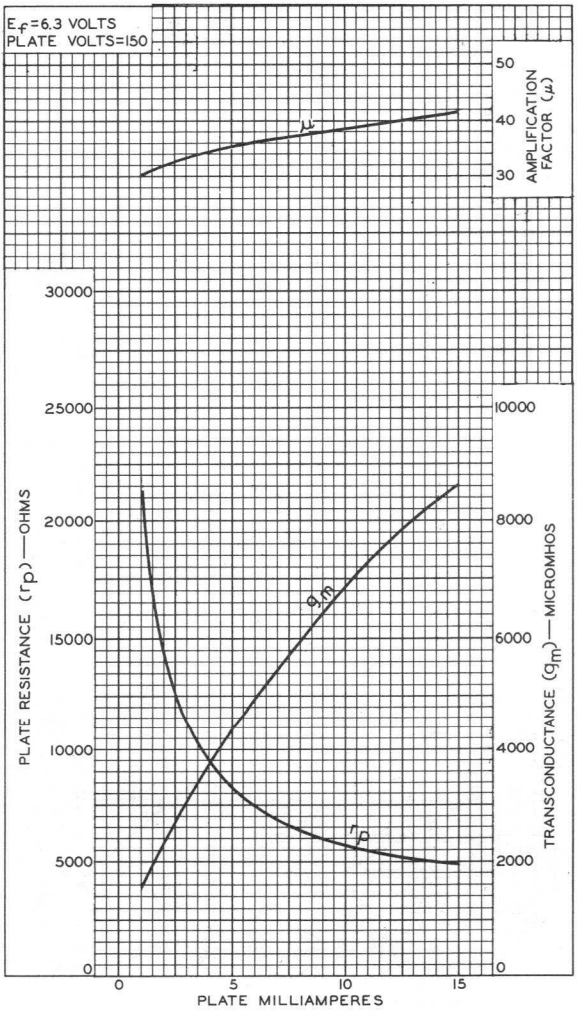
AVERAGE CHARACTERISTICS
Each Unit



92CM-7536R1

6BQ7A

AVERAGE CHARACTERISTICS
Each Unit



92CM-7538R2

Medium-Mu Triode—Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

Especially Useful as Combined Triode Oscillator and Pentode Mixer in VHF TV Tuners

ELECTRICAL

Heater Characteristics and Ratings

Voltage (AC or DC)	6.3[a]	6.3 ± 0.6	V
Current	0.450 ± 0.030	0.450[b]	A
Warm-up time (average)	11	-	s
Peak heater-cathode voltage (Each unit)			
Heater negative with respect to cathode		200 max	V
Heater positive with respect to cathode		200[c] max	V

Direct Interelectrode Capacitances (Approx.) ←

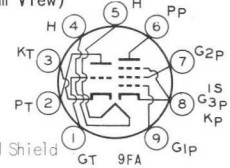
	Without External Shield	*With External Shield*[d]	
Triode Unit			
Grid to plate	1.8	1.8	pF
Input: G_T to (K_T, Kp + G3p + IS, H)	2.8	2.8	pF
Output: P_T to (K_T, Kp + G3p + IS, H)	1.5	2.0	pF
Pentode Unit			
Grid No.1 to plate	0.02	0.01	pF
Input: G1p to (Kp + G3p + IS, G2p, H)	4.6	4.6	pF
Output: Pp to (Kp + G3p + IS, G2p, H)	2.4	3.2	pF
Triode Cathode to Heater	2.4	2.4[e]	pF
Pentode Cathode to Heater	2.4	2.4[e]	pF
Pentode Grid No.1 to Triode Plate	0.2 max	0.2 max	pF
Pentode Plate to Triode Plate	0.1 max	0.02 max	pF

MECHANICAL

Operating Position . . . . . Any
Type of Cathode . . . . . Coated Unipotential
Maximum Overall Length . . . . . 2.187 in
Maximum Seated Length . . . . . 1.937 in
Maximum Diameter . . . . . 0.875 in
Length, Base Seat to Bulb Top . . . . . 1.469 to 1.656 in
Excluding tip
Dimensional Outline (JEDEC 6-2) . . . . . See *General Section*
Envelope . . . . . JEDEC T6-1/2
Base . . . . . Small-Button Noval 9-Pin (JEDEC E9-1)

TERMINAL DIAGRAM (Bottom View)

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



← Indicates a change.

CHARACTERISTICS, CLASS A_1 AMPLIFIER

	Triode Unit	*Pentode Unit*	
Plate Voltage	125	125	V
Grid No.2 Voltage	-	110	V
Grid No.1 Voltage	-1	-1	V
Amplification Factor	40	-	
Plate Resistance (Approx.)	-	0.2	MΩ
Transconductance	7500	5000	μmho
Plate Current	13.5	9.5	mA
Grid-No.2 Current	-	3.5	mA
Grid-No.1 Voltage (Approx.) for plate μA = 20	-9	-9	V

CLASS A_1 AMPLIFIER

Design Maximum Ratings

	Triode Unit	*Pentode Unit*	
Plate Voltage	330	330	V
Grid-No.2 (Screen-Grid) Supply Voltage	-	330	V
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	0	V
Grid-No.2 Input			
For grid-No.2 voltages up to 165 volts	-	0.55	W
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	3	W

[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 4, except as noted.

[e] With external shield JEDEC No.315 connected to Pin 6.

Curves shown under Type 6U8A also apply to the 6BR8A.

→ Indicates a change.

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

Half-Wave Vacuum Rectifier

NOVAR TYPE

For Television Damper Service

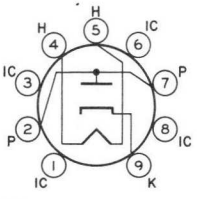
Electrical:

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[a]	5000[b] max.	volts
Heater positive with respect to cathode	300[c] max.	volts
Direct Interelectrode Capacitances (Approx):[d]		
P to (K,H)	6.5	pf
K to (P,H)	9.0	pf
Heater to cathode	2.8	pf

Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	3.005"
Seated Length	2.375" to 2.625"
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	9HP

Pin 1 – Do Not Use[e]
Pin 2 – Plate
Pin 3 – Do Not Use[e]
Pin 4 – Heater
Pin 5 – Heater
Pin 6 – Do Not Use[e]
Pin 7 – Plate
Pin 8 – Do Not Use[e]
Pin 9 – Cathode



DAMPER SERVICE

Maximum Ratings, *Design-Maxium Values:*

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

Peak Inverse Plate Voltage[a]	5000 max.	volts
Peak Plate Current	1100 max.	ma
Average Plate Current	200 max.	ma
Plate Dissipation	6 max.	watts

Characteristics, Instantaneous Value:

Tube Voltage Drop for plate ma = 140	12	volts

[a] 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.

[b] The dc component must not exceed 900 volts.

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

[d] Without external shield.

[e] Socket terminals 1, 3, 6, and 8 should not be used for tie points. It is also recommended that socket clips for these pins be removed to reduce the possibility of arc-over and to minimize leakage.

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

Sharp-Cutoff Twin Pentode

With Common Cathode, Grid No.1, and Grid No.2

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:[a]		
Grid No.3 to plate (Each unit)	1.9	μμf
Grid No.1 to all other electrodes	6	μμf
Grid No.3 to all other electrodes (Each unit)	3.6	μμf
Plate to all other electrodes (Each unit)	3	μμf
Grid No.3 (Unit No.1) to grid No.3 (Unit No.2)	0.015 max.	μμf

Characteristics, Class A_1 Amplifier:

With both units operating

Plate Voltage (Each Unit)	100	100	volts
Grid-No.3 Voltage (Each Unit)	−10	0	volts
Grid-No.2 Voltage	67.5	67.5	volts
Grid-No.1 Voltage	[b]	[b]	volts
Plate Current (Each Unit)	−	2.2	ma
Grid-No.2 Current	6.5	3.3	ma
Cathode Current	6.6	7.8	ma

With one unit operating[c]

Plate Voltage	100	100	volts
Grid-No.3 Voltage	0	0	volts
Grid-No.2 Voltage	67.5	67.5	volts
Grid-No.1 Voltage	0	[b]	volts
Grid-No.3-to-Plate Transconductance	−	180	μmhos
Grid-No.1-to-Plate Transconductance	1500	−	μmhos
Plate Current	−	2.2	ma
Grid-No.3 Voltage (Approx.) for plate μa = 100.	−	−4.5	volts
Grid-No.1 Voltage (Approx.) for plate μa = 100.	−	−2.3	volts

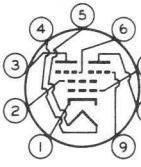
Mechanical:

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

6BU8

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

Pin 1 – Cathode
Pin 2 – Grid No.2, Internal Shield
Pin 3 – Plate of Unit No.2
Pin 4 – Heater
Pin 5 – Heater



Pin 6 – Grid No.3 of Unit No.2
Pin 7 – Grid No.1
Pin 8 – Plate of Unit No.1
Pin 9 – Grid No.3 of Unit No.1

AMPLIFIER — Class A_1

Maximum Ratings, *Design-Maximum Values:* ←

PLATE VOLTAGE (Each unit).	300	max.	volts
GRID-No.3 (SUPPRESSOR-GRID) VOLTAGE (Each unit):			
Peak-positive value.	50	max.	volts
Negative-bias value.	0	max.	volts
Positive-bias value.	3	max.	volts
GRID-No.2 (SCREEN-GRID) VOLTAGE.	150	max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:			
Negative-bias value.	50	max.	volts
CATHODE CURRENT.	12	max.	ma
GRID-No.2 INPUT.	0.75	max.	watt
PLATE DISSIPATION (Each unit).	1.1	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-No.3-Circuit Resistance (Each unit) .	0.5	max.	megohm
Grid-No.1-Circuit Resistance	0.5	max.	megohm

[a] Without external shield.
[b] Adjusted to give a dc grid-No.1 current of 100 microamperes.
[c] With plate and grid No.3 of the other unit connected to ground.
[d] The dc component must not exceed 100 volts.

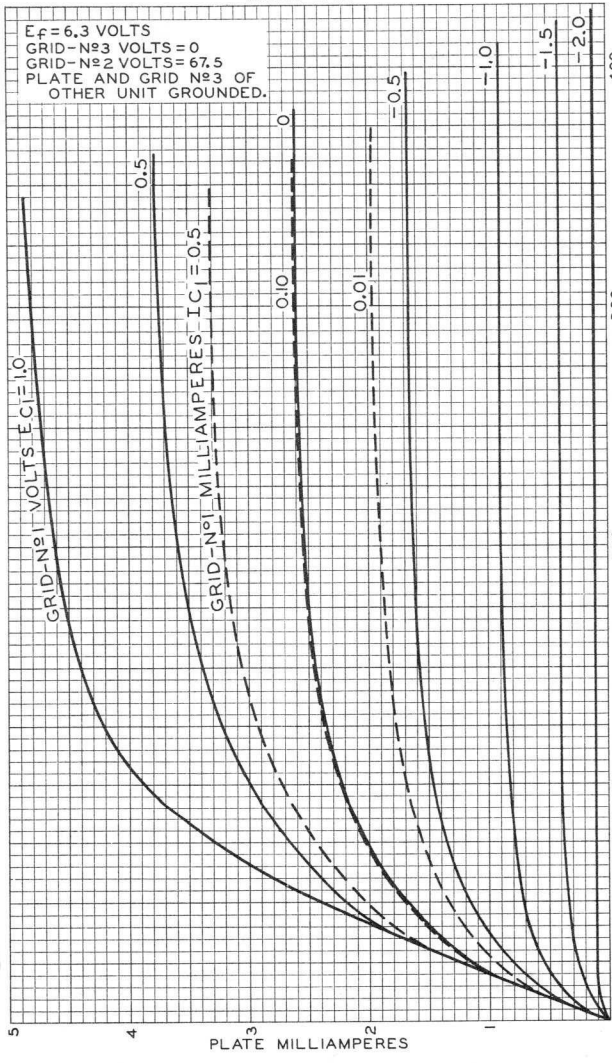
← Indicates a change.

RCA

6BU8

AVERAGE PLATE CHARACTERISTICS

EACH UNIT

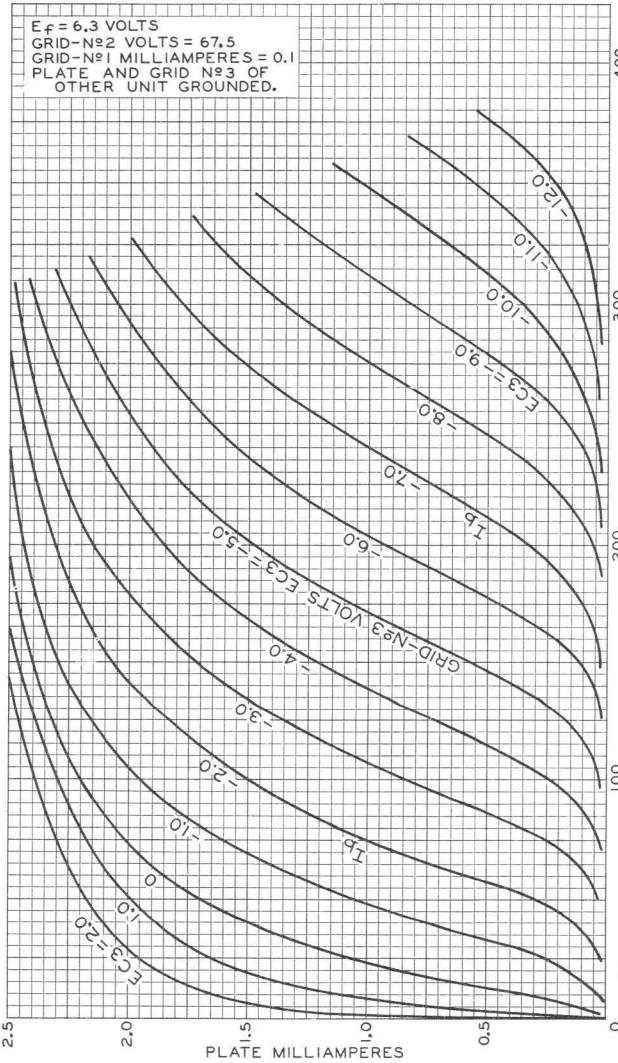


RCA

6BU8

AVERAGE PLATE CHARACTERISTICS

EACH UNIT



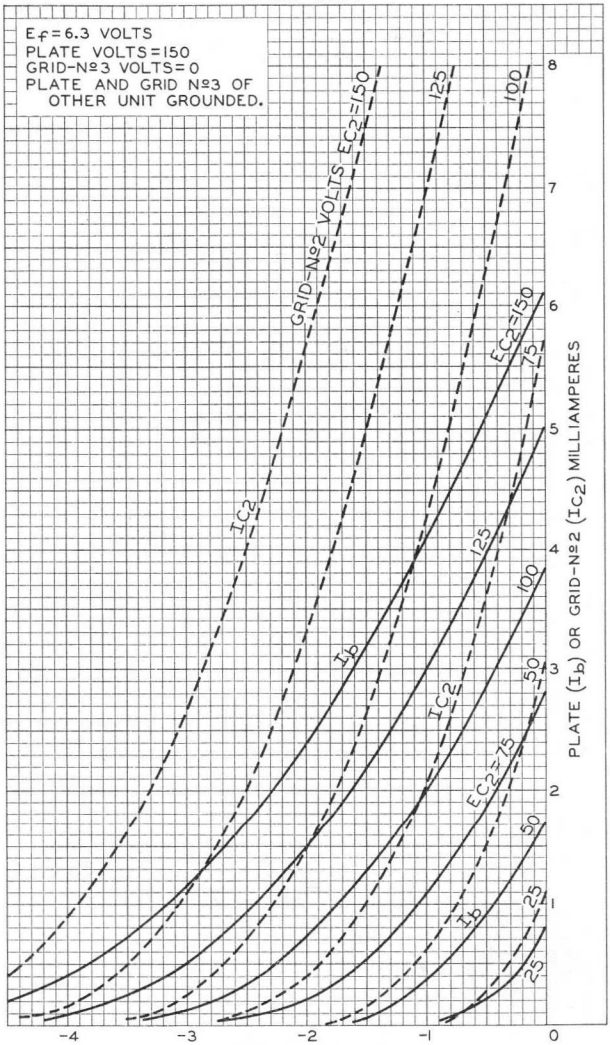
ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-9429

RCA

6BU8

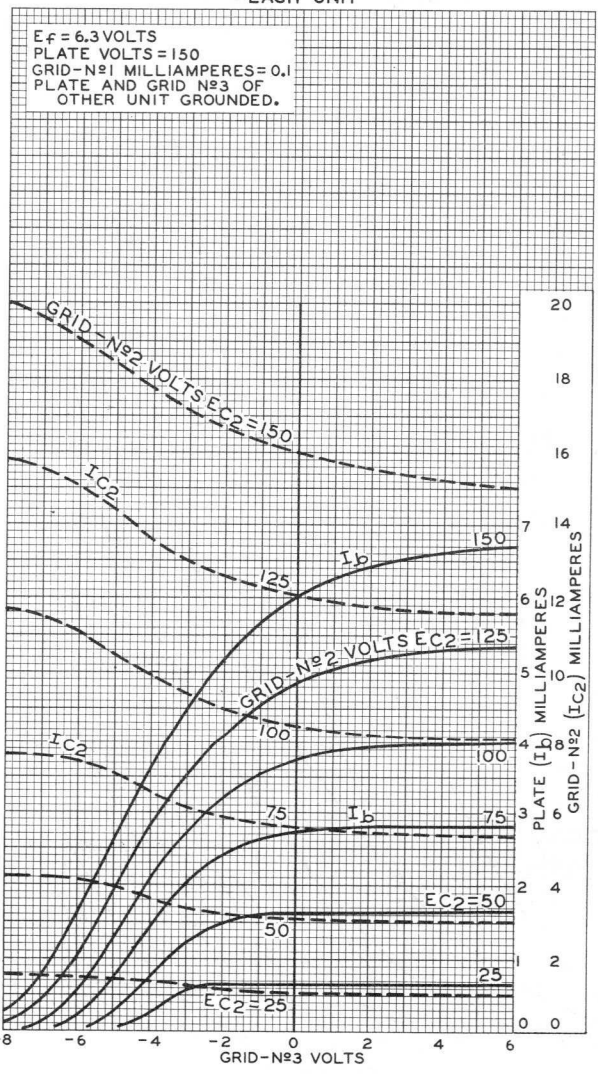
AVERAGE CHARACTERISTICS
EACH UNIT



RCA

6BU8

AVERAGE CHARACTERISTICS
EACH UNIT



Twin Diode—Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:		
Voltage (AC or DC)	6.3 ± 10%	volts
Current	0.45	amp
Direct Interelectrode Capacitances:[a]		
Pentode Unit:		
Grid No.1 to plate	0.02 max.	μμf
Grid No.1 to cathode & grid No.3 & internal shield, grid No.2, and heater	4.8	μμf
Plate to cathode & grid No.3 & internal shield, grid No.2, and heater	2.6	μμf
Diode Units:		
Diode-No.1 plate to cathode and heater	1.3	μμf
Diode-No.2 plate to cathode and heater	1.2	μμf
Pentode grid No.1 to either diode plate	0.006 max.	μμf

Characteristics, Class A_1 Amplifier (Pentode Unit):

Plate Supply Voltage	250	volts
Grid-No.2 Supply Voltage	110	volts
Cathode Resistor	68	ohms
Plate Resistance (Approx.)	0.25	megohm
Transconductance	5200	μmhos
Grid-No.2 Current	3.5	ma
Plate Current	10	ma
Grid-No.1 Voltage (Approx.) for plate μa = 10	-10	volts

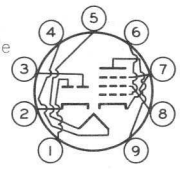
Mechanical:

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)

6BW8

Basing Designation for BOTTOM VIEW. 9HK

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



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

PENTODE UNIT — AMPLIFIER — Class A_1

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:			
Negative-bias value	55	max.	volts
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	3	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.1-Circuit Resistance:			
For fixed-bias operation	0.1	max.	megohm
For cathode-bias operation	0.5	max.	megohm

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.

6BY6

PENTAGRID AMPLIFIER

MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage	6.3	ac or dc volts
Current	0.3	amp
Direct Interelectrode Capacitances:*		
Grid No.1 to Plate	0.08 max.	μμf
Grid No.3 to Plate	0.35 max.	μμf
Grid No.1 to Grid No.3	0.15 max.	μμf
Grid No.1 to All Other Electrodes and Heater	5.4	μμf
Grid No.3 to All Other Electrodes and Heater	6.9	μμf
Plate to All Other Electrodes and Heater	7.6	μμf

Characteristics, Class A_1 Amplifier:

Plate Voltage	250	volts
Grids-No.2-and-No.4 Voltage	100	volts
Grid-No.3 Voltage	-2.5	volts
Grid-No.1 Voltage	-2.5	volts
Grid-No.3-to-Plate Transconductance	500	μmhos
Grid-No.1-to-Plate Transconductance	1900	μmhos
Plate Current	6.5	ma
Grids-No.2-and-No.4 Current	9	ma
Grid-No.3 Volts (Approx.) for plate current of 35 μamp and grid-No.1 volts = -4	-15	volts
Grid-No.1 Volts (Approx.) for plate current of 35 μamp and grid-No.3 volts = 0	-12	volts

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-1/8"
Maximum Seated Length	1-7/8"
Length from Base Seat to Bulb Top (Excluding tip)	1-1/2" ± 3/32"
Maximum Diameter	3/4"
Bulb	T-5-1/2
Base	Small-Button Miniature 7-Pin (JETEC No.E7-1)

BOTTOM VIEW

Pin 1: Grid No.1
Pin 2: Cathode, Grid No.5
Pin 3: Heater
Pin 4: Heater
Pin 5: Plate
Pin 6: Grid No.2, Grid No.4
Pin 7: Grid No.3

*: With no external shield.

6BY6

PENTAGRID AMPLIFIER

GATED AMPLIFIER SERVICE

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	300 max.	volts
GRIDS-No.2-and-No.4 VOLTAGE	*See Rating Curve at front of this Section*	
GRIDS-No.2-and-No.4 SUPPLY VOLTAGE	300 max.	volts
GRID-No.3 SUPPLY VOLTAGE:		
Negative Bias Value	50 max.	volts
Positive Bias Value	0 max.	volts
Positive Peak Value	25 max.	volts
GRID-No.1 SUPPLY VOLTAGE:		
Negative Bias Value	100 max.	volts
PLATE DISSIPATION	2 max.	watts
GRID-No.3 INPUT	0.1 max.	watt
GRIDS-No.2-and-No.4 INPUT	1 max.	watt
GRID-No.1 INPUT	0.1 max.	watt
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200# max.	volts

Characteristics as Sync Separator and Sync Clipper:

Plate Voltage	10	volts
Grid-No.3 Voltage	0	volts
Grids-No.2-and-No.4 Voltage	25	volts
Grid-No.1 Voltage	0	volts
Plate Current	1.4	ma
Grids-No.2-and-No.4 Current	3.5	ma
Grid-No.3 Bias Volts (Approx.) for plate voltage of 25 volts, grids-No.2-and-No.4 voltage of 25 volts, grid-No.1 voltage of 0 volts, and plate current of 50 μamp	-2.5	volts
Grid-No.1 Bias Volts (Approx.) for plate voltage of 25 volts, grids-No.2-and-No.4 voltage of 25 volts, grid-No.3 voltage of 0 volts, and plate current of 50 μamp	-2.3	volts

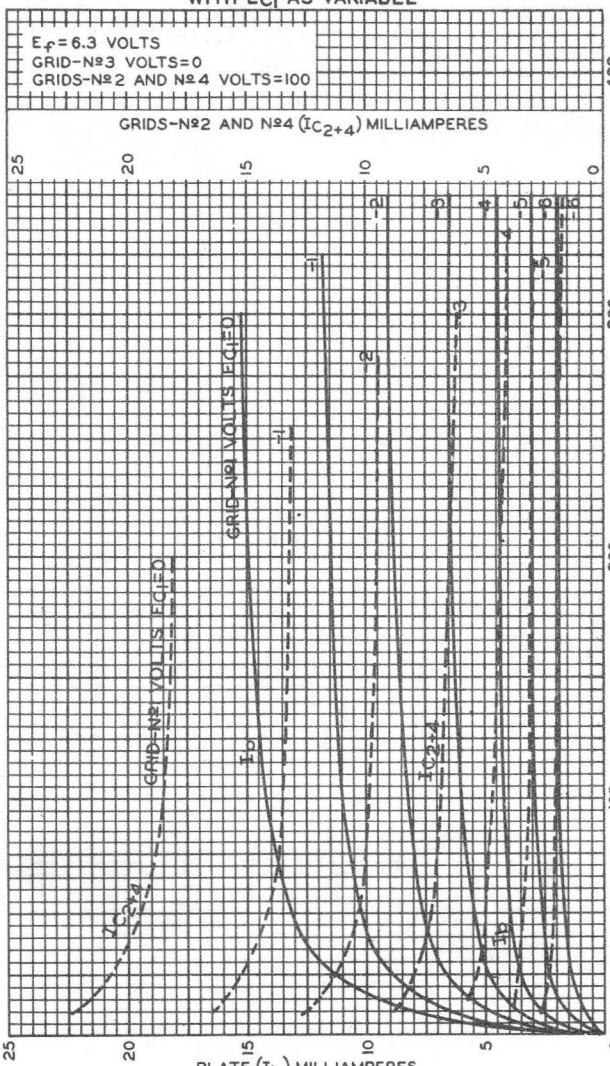
Maximum Circuit Values:

Grid-No.1 or Grid-No.3-Circuit Resistance:		
For fixed-bias operation	0.5 max.	megohm
For cathode-bias operation	1.0 max.	megohm

The dc component must not exceed 100 volts.

6BY6

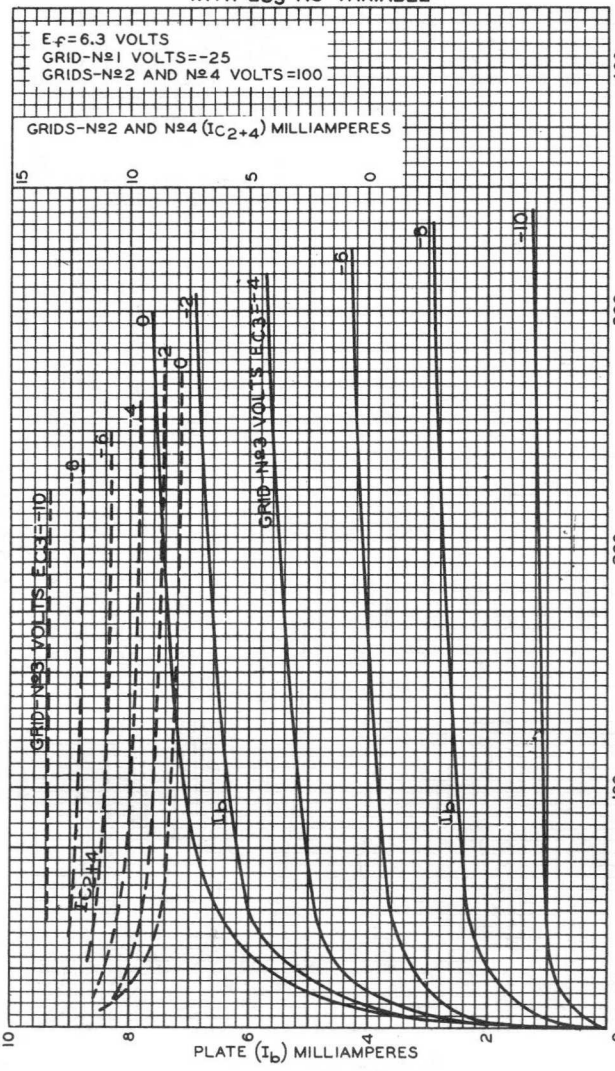
AVERAGE OPERATION CHARACTERISTICS WITH E_{C1} AS VARIABLE



6BY6

6BY6

AVERAGE OPERATION CHARACTERISTICS WITH E_{C3} AS VARIABLE



NOV.5,1953

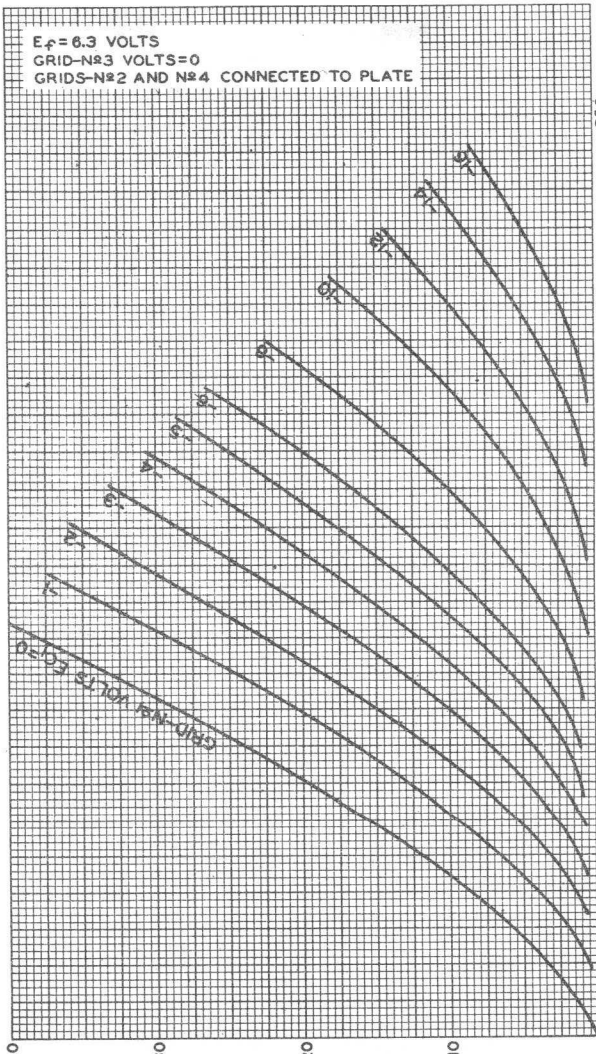
TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-8139

RCA

6BY6

AVERAGE PLATE CHARACTERISTICS



NOV. 5, 1953

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-8138

6BY8

DIODE—SHARP-CUTOFF PENTODE

9-PIN MINIATURE TYPE

Intended for use in equipment having series heater-string arrangement

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:		
Voltage	6.3	ac or dc volts
Current	0.6	amp
Warm-up time (Average)	11	sec

For definition of heater warm-up time and method of determining it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of this Section.

Direct Interelectrode Capacitances:°

Diode Unit:		
Plate to cathode, pentode plate, pentode grid No.3 & internal shield, pentode grid No.2, pentode grid No.1, pentode cathode, and heater	4.8•	μμf
Pentode Unit:		
Grid No.1 to plate	0.0035 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	5	μμf

Characteristics, Class A_1 Amplifier (Pentode Unit):

Plate-Supply Voltage	100	250	volts
Grid No.3 (Suppressor Grid)	*Connected to cathode at socket*		
Grid-No.2 (Screen-Grid) Supply Voltage	100	150	volts
Cathode Resistor	150	68	ohms
Plate Resistance (Approx.)	0.5	1	megohm
Transconductance	3900	5200	μmhos
Plate Current	5	10.6	ma
Grid-No.2 Current	2.1	4.3	ma
Grid-No.1 (Control-Grid) Voltage (Approx.) for plate μa = 10	-4.2	-6.5	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 (JETEC No.E9-1)

°,•: See next page.

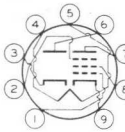
RCA

6BY8

DIODE—SHARP-CUTOFF PENTODE

Basing Designation for BOTTOM VIEW 9FN

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



Pin 4 – Heater
Pin 5 – Heater
Pin 6 – Diode Plate
Pin 7 – Pentode Plate
Pin 8 – Pentode Grid No.2
Pin 9 – Pentode Cathode

PENTODE UNIT — AMPLIFIER - Class A_1

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE.	300	max.	volts
GRID-No.3 (SUPPRESSOR-GRID) VOLTAGE. . .	0	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.	0.65	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

Maximum Circuit Values:

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

DIODE UNIT

Maximum Ratings, *Design-Center Values:*

PEAK INVERSE PLATE VOLTAGE	430	max.	volts
PLATE CURRENT:			
Peak	180	max.	ma
DC	45	max.	ma
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 JETEC No.315 connected to pentode cathode (pin 9) except as noted.
● With external shield JETEC No.315 connected to ground.
▲ The dc component must not exceed 100 volts.

6BY8

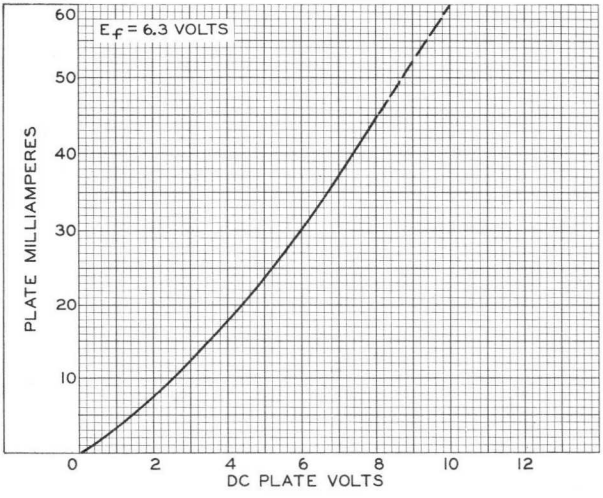
DIODE—SHARP-CUTOFF PENTODE

CURVES
shown under Type 6AU6 also apply to the pentode unit of the 6BY8

9-58

TENTATIVE DATA 2

AVERAGE PLATE CHARACTERISTIC
DIODE UNIT



92CS-9616

6BZ6

SEMIREMOTE-CUTOFF PENTODE

7-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:			
Voltage (AC or DC)		6.3 ± 10%	volts
Current		0.3	amp
Direct Interelectrode Capacitances:			
	Without External Shield	*With External Shield*[a]	
Grid No.1 to plate	0.025 max.	0.015 max.	μμf
Grid No.1 to cathode, grid No.3 & internal shield, grid No.2, and heater	7	7	μμf
Plate to cathode, grid No.3 & internal shield, grid No.2, and heater	2	3	μμf

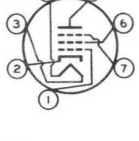
Characteristics, Class A1 Amplifier:

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.)	0.26	megohm
Transconductance	8000	μmhos
Plate Current	14	ma
Grid-No.2 Current	3.6	ma
Grid-No.1 Voltage (Approx.) for transconductance (μmhos) = 50	-19	volts
Grid-No.1 Voltage (Approx.) for transconductance (μmhos) = 700 and cathode resistor (ohms) = 0	-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	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

← Indicates a change.

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

6BZ6

SEMIREMOTE-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	0.55	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
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 fixed-bias operation	0.25	max.	megohm
For cathode-bias operation	1	max.	megohm

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

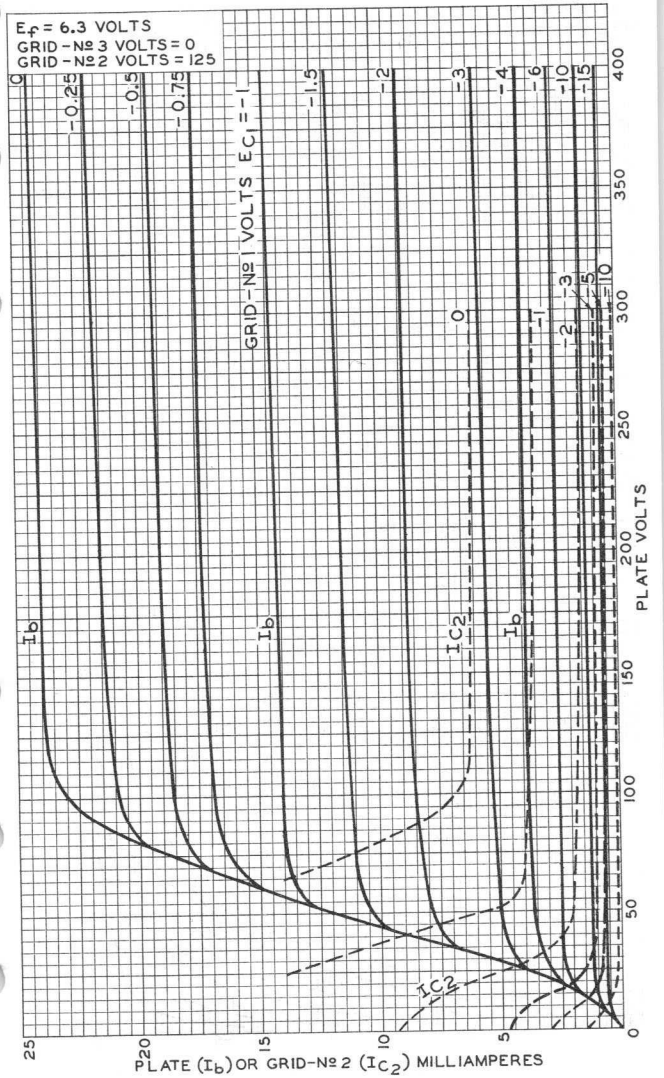
▲ The dc component must not exceed 100 volts.

→ Indicates a change.

RCA

6BZ6

AVERAGE CHARACTERISTICS



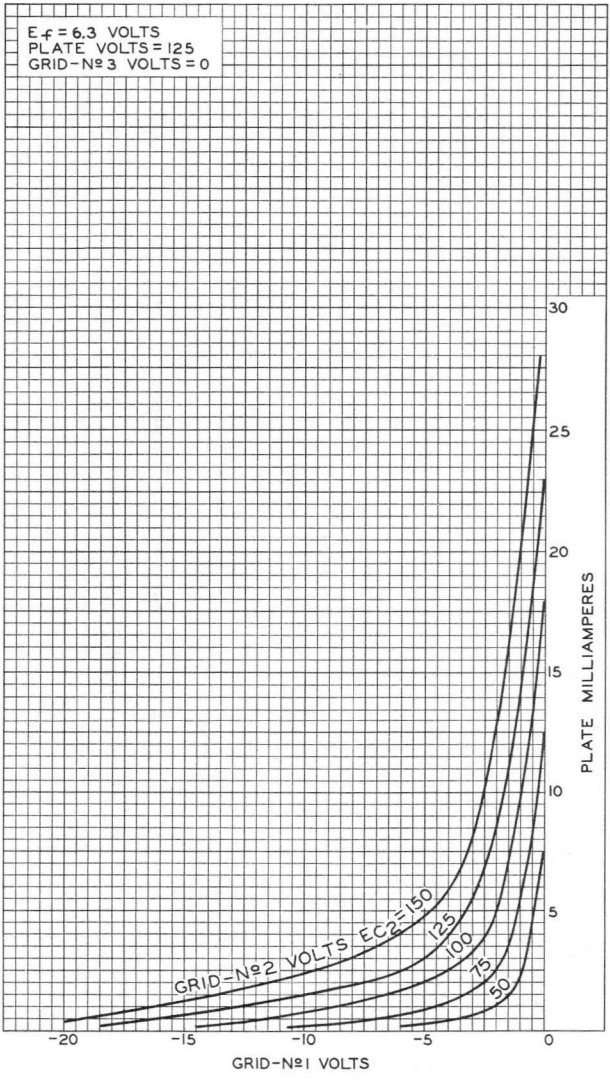
ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-8508R2

RCA

6BZ6

AVERAGE CHARACTERISTICS



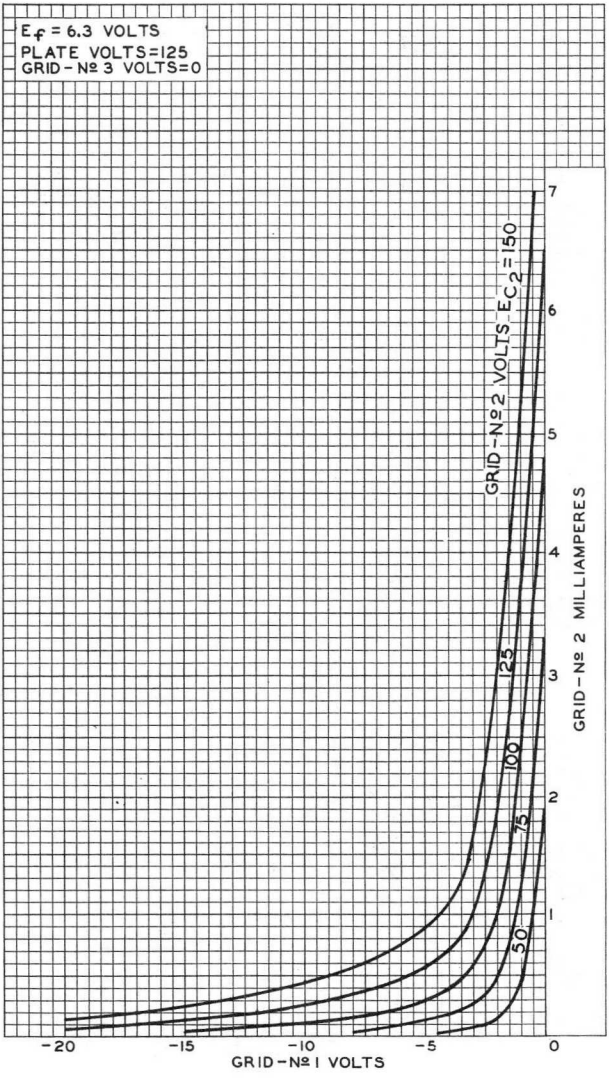
ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-9481RI

RCA

6BZ6

AVERAGE CHARACTERISTICS

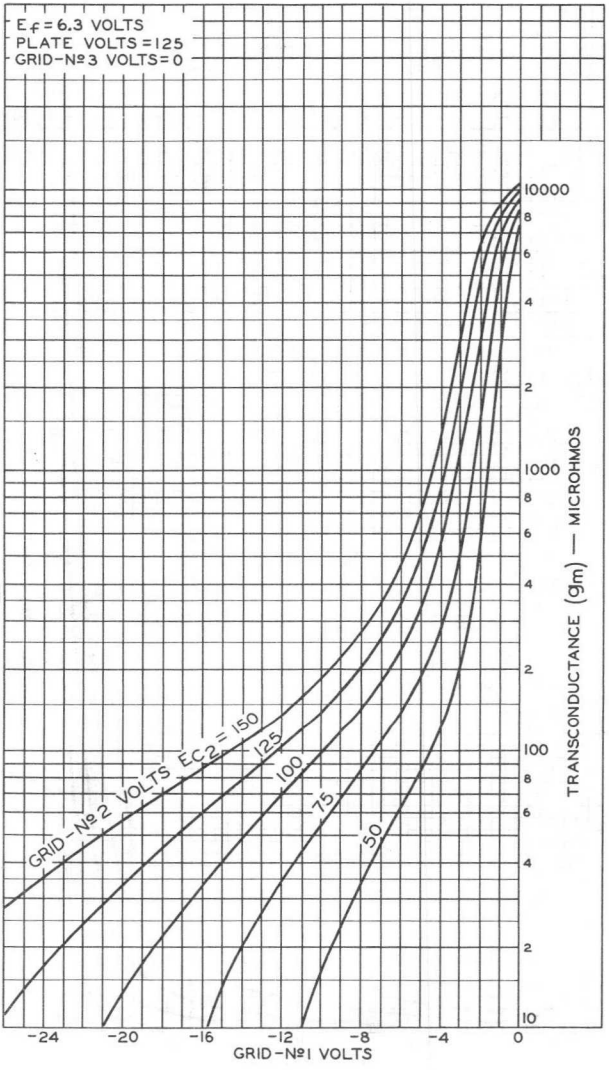


ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-9485RI

6BZ6

AVERAGE CHARACTERISTICS



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

92CM-8509RI

Medium-Mu Twin Triode

9-PIN MINIATURE TYPE

For TV Tuners Using Direct-Coupled Cathode-Drive Circuits

GENERAL DATA

Electrical:

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

Direct Interelectrode Capacitances: [a] ←

	Unit No.1	*Unit No.2*	
Grid to plate	1.2	1.2	μμf
Grid to cathode, internal shield, and heater	2.6	–	μμf
Plate to cathode, internal shield, and heater	1.2	–	μμf
Plate to cathode	0.12	0.12	μμf
Heater to cathode	2.6	2.6	μμf
Cathode to grid, internal shield, and heater	–	5	μμf
Plate to grid, internal shield, and heater	–	2.2	μμf
Plate of unit No.1 to plate of unit No.2	0.010 max.		μμf
Plate of unit No.2 to plate and grid of unit No.1	0.024 max.		μμf

Characteristics, Class A_1 Amplifier (Each Unit): ←

Plate Supply Voltage	150	volts
Cathode Resistor	220	ohms
Amplification Factor	36	
Plate Resistance (Approx.)	5300	ohms
Transconductance	6800	μmhos
Plate Current	10	ma
Grid Voltage (Approx.) for plate μa = 100	-7	volts

Mechanical:

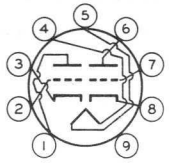
Operating Position	Any
Maximum Overall Length	2-3/16"
Maximum Seated Length	1-15/16"
Length, Base Seat to Bulb Top (Excluding tip)	1-9/16" ± 3/32"
Diameter	0.750" to 0.875"
Dimensional Outline	See *General Section*
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)

← Indicates a change.

6BZ7

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 — Class A_1

Values are for Each Unit

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	250[b] max.	volts
PLATE DISSIPATION	2 max.	watts
CATHODE CURRENT	20 max.	ma
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	200[b] max.	volts
Heater positive with respect to cathode	200[c] max.	volts

→**Maximum Circuit Values:**

Grid-Circuit Resistance	0.5 max.	megohm

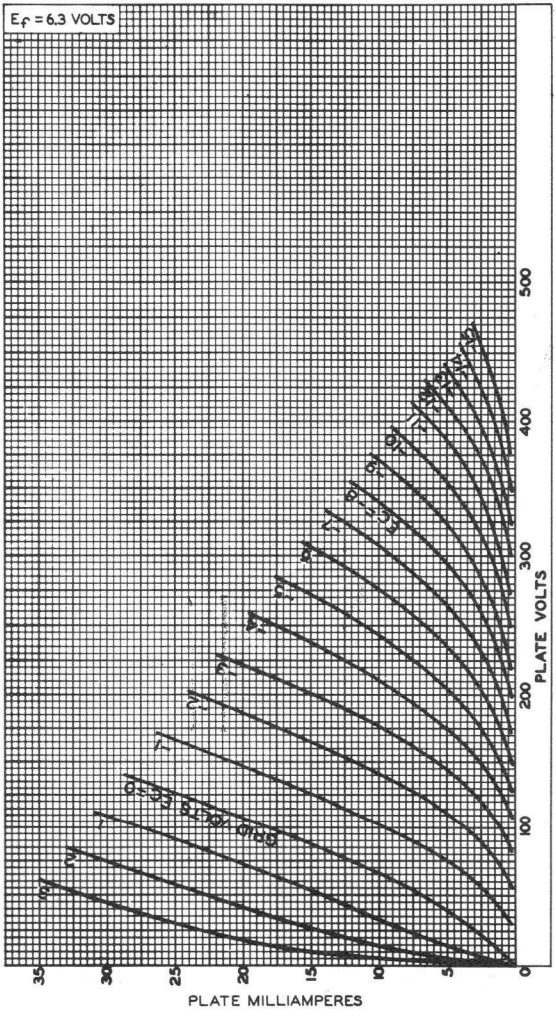
[a] With external shield JEDEC No.315 connected to internal shield.

→[b] Under cutoff conditions in direct-coupled cathode-drive circuits, it is permissible for this voltage to be as high as 300 volts.

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

→Indicates a change.

AVERAGE PLATE CHARACTERISTICS
Each Unit



92CM-9231

6C4

MEDIUM-MU TRIODE

For use in FM and other HF circuits

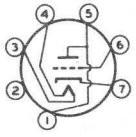
GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage	6.3	ac or dc volts
Current	0.15	amp
Direct Interelectrode Capacitances:[o]		
Grid to plate	1.6	μμf
Grid to cathode and heater	1.8	μμf
Plate to cathode and heater	1.3	μμf

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-1/8"
Maximum Seated Length	1-7/8" ←
Length, Base Seat to Bulb Top (Excluding tip)	1-1/2" ± 3/32" ←
Maximum Diameter	3/4"
Bulb	T-5-1/2
Base	Small-Button Miniature 7-Pin (JETEC No. E7-1) ←
Basing Designation for BOTTOM VIEW	6BG



Pin 1 – Plate
Pin 2 – Internal Connection Do Not Use
Pin 3 – Heater
Pin 4 – Heater
Pin 5 – Plate
Pin 6 – Grid
Pin 7 – Cathode

AMPLIFIER – Class A_1

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	300 max.	volts
PLATE DISSIPATION	3.5 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		←
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200■ max.	volts

Characteristics:

Plate Voltage	100	250	volts
Grid Voltage	0	−8.5	volts
Amplification Factor	19.5	17	
Plate Resistance (Approx.)	6250	7700	ohms
Transconductance	3100	2200	μmhos
Plate Current	11.8	10.5	ma

Maximum Circuit Values: ←

Grid-Circuit Resistance:		
For fixed-bias operation	0.25 max.	megohm
For cathode-bias operation	1.0 max.	megohm

[o] With no external shield.

■: See next page.

← Indicates a change.

RCA

6C4

MEDIUM-MU TRIODE

→ Typical Operation as Resistance-Coupled Amplifier:

See RESISTANCE-COUPLED AMPLIFIER CHART No. 10 at front of this Section.

RF POWER AMPLIFIER & OSCILLATOR—Class C Telegraphy

Maximum Ratings, *Design-Center Values:*

DC PLATE VOLTAGE	300 max.	volts
DC GRID VOLTAGE	-50 max.	volts
DC PLATE CURRENT	25 max.	ma
DC GRID CURRENT	8 max.	ma
PLATE DISSIPATION	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

Typical Operation at Frequencies up to 50 Mc:●

DC Plate Voltage	300	volts
DC Grid Voltage	-27	volts
DC Plate Current	25	ma
DC Grid Current (Approx.)	7	ma
Driving Power (Approx.)	0.35	watt
Useful Power Output (Approx.)	5.5	watts

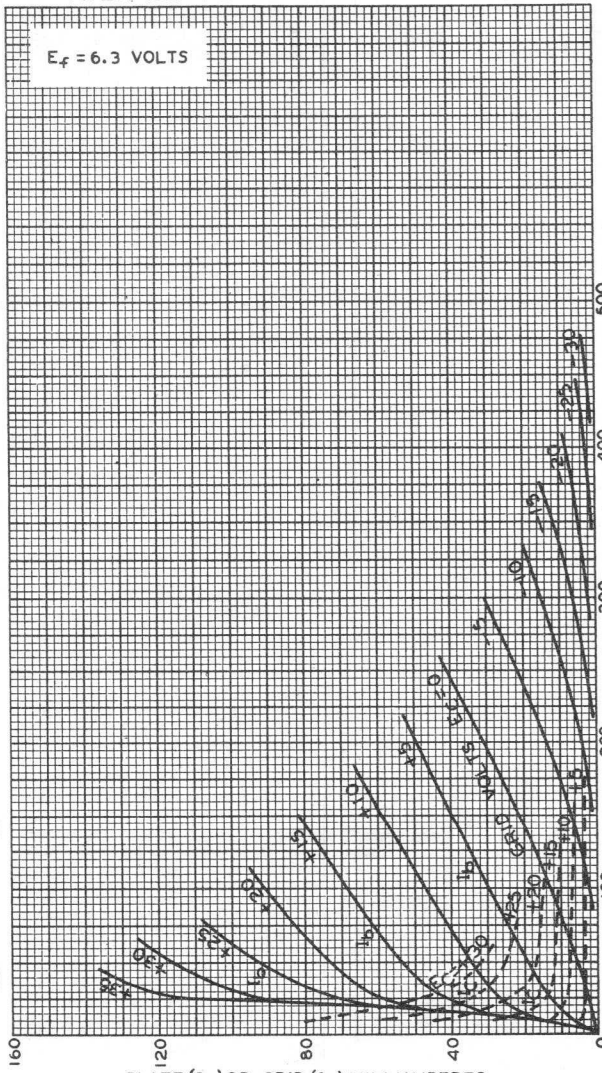
■ The dc component must not exceed 100 volts.

● Approximately 2.5 watts can be obtained when the 6C4 is used at 150 Mc as an oscillator with grid resistor of 10000 ohms and maximum rated input.

→ Indicates a change.

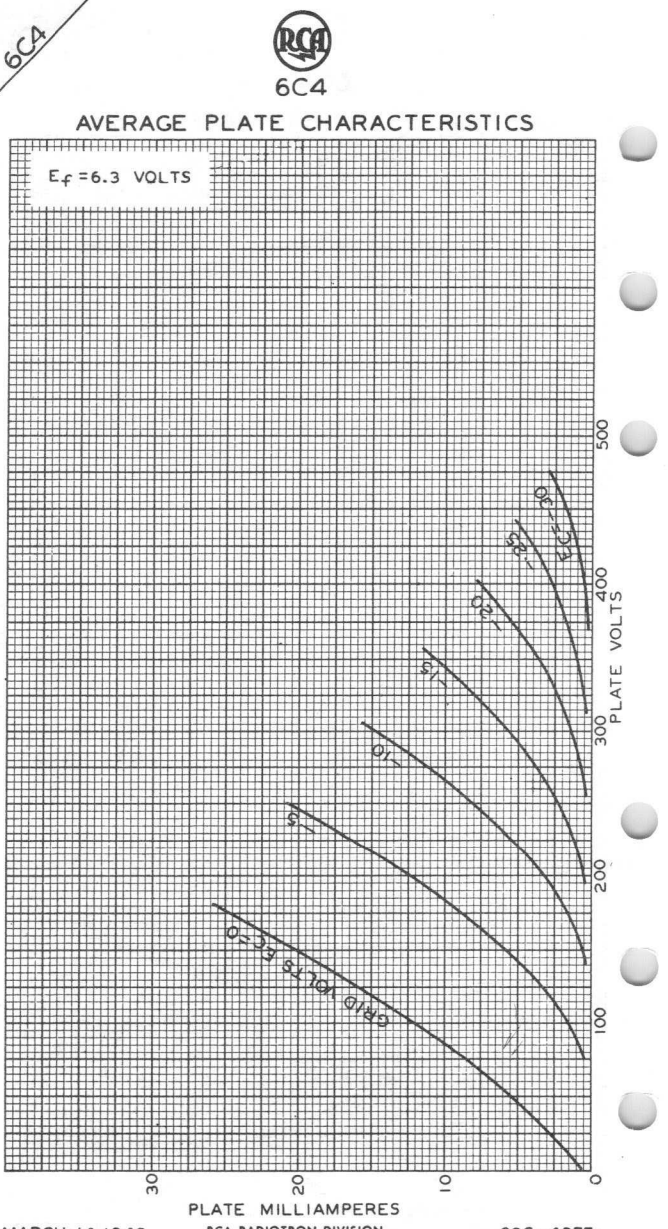
6C4

AVERAGE PLATE CHARACTERISTICS



MARCH 16, 1942
RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.
92C-6378

6C4



MARCH 14, 1942

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

92C-6377

Full-Wave Vacuum Rectifier

9-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

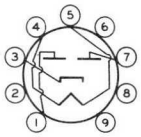
Heater, for Unipotential Cathode:

Voltage (AC or DC)	6.3	volts
Current	1	amp

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	9M

Pin 1 – Plate No.1
Pin 2 – No Connection
Pin 3 – Cathode
Pin 4 – Heater
Pin 5 – Heater



Pin 6 – No Connection
Pin 7 – Plate No.2
Pin 8 – No.Connection
Pin 9 – No Connection

FULL-WAVE RECTIFIER

Maximum Ratings, *Design-Center Values:*

PEAK INVERSE PLATE VOLTAGE	1000 max.	volts
AC PLATE SUPPLY VOLTAGE PER PLATE (RMS):		
With capacitor-input to filter	350 max.	volts
PEAK PLATE CURRENT PER PLATE	450 max.	ma
DC OUTPUT CURRENT	150 max.	ma

HOT-SWITCHING TRANSIENT PLATE CURRENT PER PLATE:

Even occasional hot-switching with capacitor-input circuits permits the flow of plate current having magnitudes which can adversely affect the life and reliability of tubes. If capacitor-input circuits are to be used, protect the circuits against possible adverse effects of hot-switching by the use of a circuit arrangement which will limit the maximum peak current value per plate to a value of I ampere during the initial cycles of the hot-switching transient.

PEAK HEATER-CATHODE VOLTAGE:

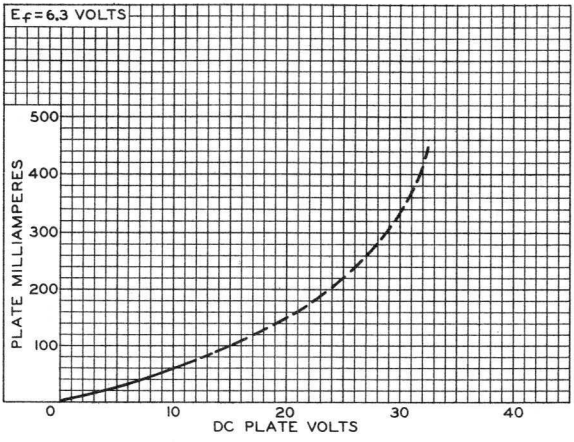
Heater negative with respect to cathode	500 max.	volts

Typical Operation:

With capacitor input to filter

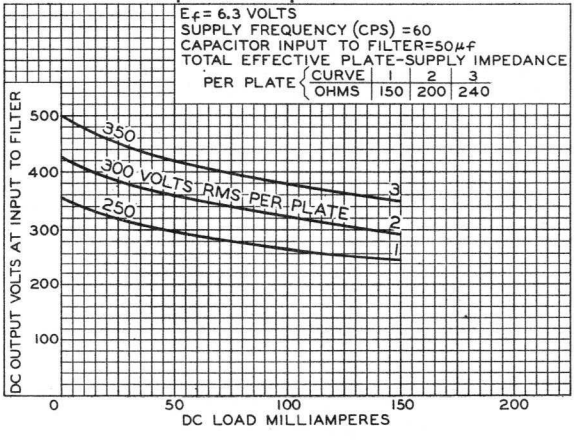
AC Plate-To-Plate Supply Voltage (RMS)	500	600	700	volts
Filter-Input Capacitor	50	50	50	μf
Total Effective Plate-Supply Impedance Per Plate	150	200	240	ohms
DC Output Voltage at Input to Filter (Approx.) for dc output ma. = 150	245	293	347	volts

AVERAGE PLATE CHARACTERISTIC
Each Unit



92CS-10378

OPERATION CHARACTERISTICS
Capacitor Input to Filter



92CS-10379

6CA5

Beam Power Tube

7-PIN MINIATURE TYPE

GENERAL DATA

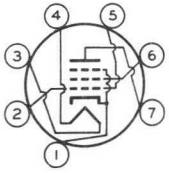
Electrical:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	6.3	volts
Current	1.2	amp
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	15	μμf
Plate to cathode & grid No.3, grid No.2, and heater	9	μμf

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	0.650" 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	7CV

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



Pin 4 - Heater
Pin 5 - Grid No.1
Pin 6 - Grid No.2
Pin 7 - Plate

AMPLIFIER — Class A_1

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	130	max.	volts
GRID-No.2 (SCREEN-GRID) VOLTAGE	130	max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:			
Positive-bias value	0	max.	volts
GRID-No.2 INPUT	1.4	max.	watts
PLATE DISSIPATION	5	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
BULB TEMPERATURE (At hottest point on bulb surface)	180	max.	°C

Typical Operation and Characteristics:

Plate Voltage	110	125	volts
Grid-No.2 Voltage	110	125	volts

Grid-No.1 Voltage	−4	−4.5	volts
Peak AF Grid-No.1 Voltage	4	4.5	volts
Zero-Signal Plate Current	32	37	ma
Max.-Signal Plate Current	31	36	ma
Zero-Signal Grid-No.2 Current	3.5	4	ma
Max.-Signal Grid-No.2 Current	7.5	11	ma
Plate Resistance (Approx.)	16000	15000	ohms
Transconductance	8100	9200	μmhos
Load Resistance	3500	4500	ohms
Total Harmonic Distortion	5	6	%
Max.-Signal Power Output	1.1	1.5	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] Without external shield.

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

6CB5-A

BEAM POWER TUBE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:			
Voltage (AC or DC)		6.3 ± 10%	volts
Current		2.5	amp
Direct Interelectrode Capacitances (Approx.):[o]			
Grid No.1 to plate		0.4	μμf
Grid No.1 to cathode & grid No.3, grid No.2, and heater		22	μμf
Plate to cathode & grid No.3, grid No.2, and heater		10	μμf

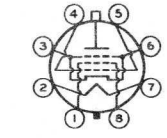
Characteristics, Class A$_1$ Amplifier:

Plate Voltage	75	175	volts
Grid-No.2 Voltage	150	175	volts
Grid-No.1 Voltage	0	-30	volts
Mu-Factor, Grid No.2 to Grid No.1	-	3.8	
Plate Resistance (Approx.)	-	5000	ohms
Transconductance	-	8800	μmhos
Plate Current	460*	90	ma
Grid-No.2 Current	42*	6	ma
Grid-No.1 Voltage (Approx.) for plate ma. = 1	-	-60	volts

Mechanical:

Operating Position	Any
Maximum Overall Length	5"
Seated Length	4-1/4" ± 3/16"
Maximum Diameter	1-23/32"
Bulb	T12
Cap	Small (JEDEC No.C1-1)
Base	Short Jumbo-Shell Octal 8-Pin with External Barriers (JEDEC Group 1, No.B8-71), or Short Medium-Shell Octal 8-Pin with External Barriers, Style B (JEDEC Group 1, No.B8-118)
Basing Designation for BOTTOM VIEW	8GD

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



Pin 6 - Cathode, Grid No.3
Pin 7 - Heater
Pin 8 - Grid No.2
Cap - Plate

HORIZONTAL-DEFLECTION AMPLIFIER

Maximum Ratings, *Design-Maximum Values:*

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

DC (Including boost) PLATE VOLTAGE	880 max.	volts
PEAK POSITIVE-PULSE PLATE VOLTAGE[#]	6800 max.	volts

← indicates a change.

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

6CB5-A

BEAM POWER TUBE

PEAK NEGATIVE-PULSE PLATE VOLTAGE . . .	1650	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 .	220	max.	volts
CATHODE CURRENT:			
Peak.	850	max.	ma
DC.	240	max.	ma
GRID-No.2 INPUT	4	max.	watts
PLATE DISSIPATION†	26	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).	220	max.	°C

Maximum Circuit Values:

Grid-No.1-Circuit Resistance: For grid-resistor-bias operation. . .	0.47	max.	megohm

° Without external shield.

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

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

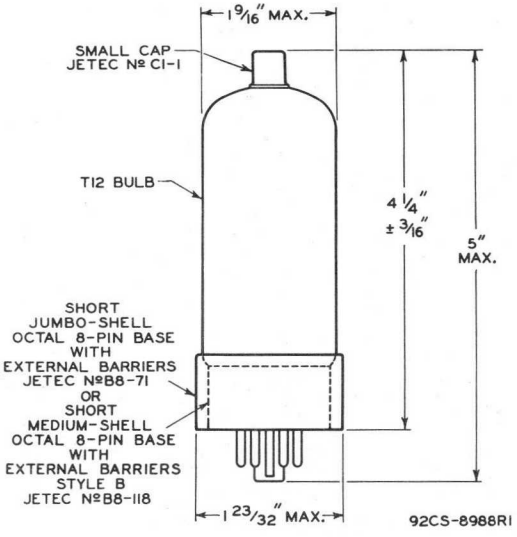
The duration of the voltage pulse must not exceed 15 per cent of one horizontal scanning cycle. In a 525-line, 30-frame system, 15 per cent of one horizontal scanning cycle is 10 microseconds.

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

▲ The dc component must not exceed 100 volts.

6CB5-A

BEAM POWER TUBE



6CB5-A

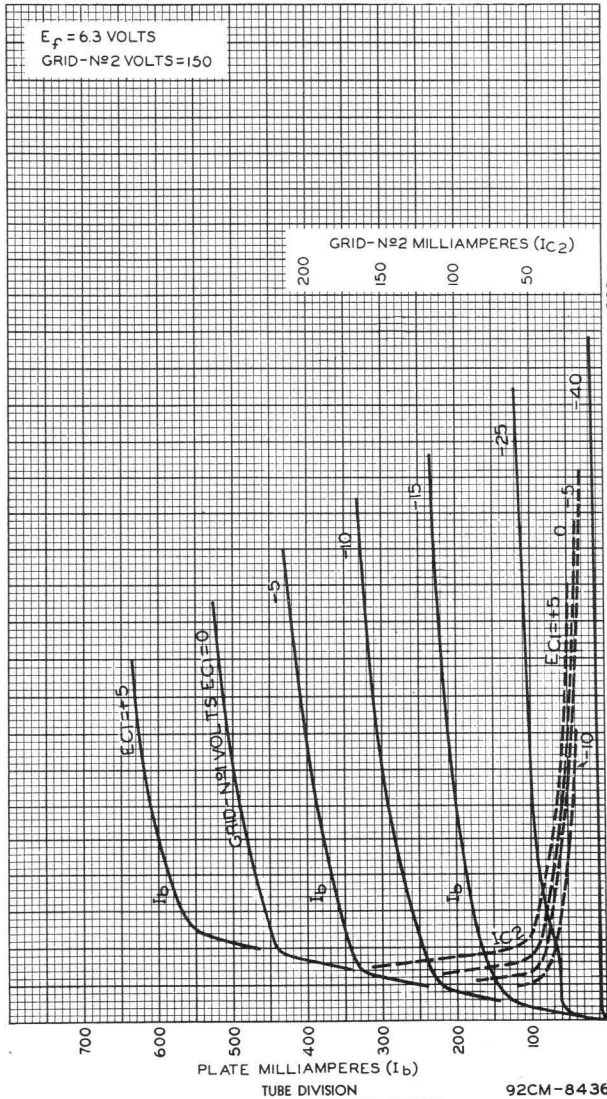
AVERAGE CHARACTERISTICS

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-8437RI

6CB5-A

AVERAGE CHARACTERISTICS



TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-8436

6CB6

SHARP-CUTOFF PENTODE

→ PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode .	200 max.	volts
Heater positive with respect to cathode .	200▲max.	volts

Typical Operation and Characteristics:

Plate Voltage	200	volts
Grid No.3 (Suppressor).	*Connected to cathode at socket*	
Grid-No.2 Voltage	150	volts
Cathode-Bias Resistor	180	ohms
Plate Resistance (Approx.).	0.6	megohm
Transconductance.	6200	μmhos
Grid-No.1 Voltage (Approx.) for plate current of 10 μamp.	−8	volts
Plate Current	9.5	ma
Grid-No.2 Current	2.8	ma

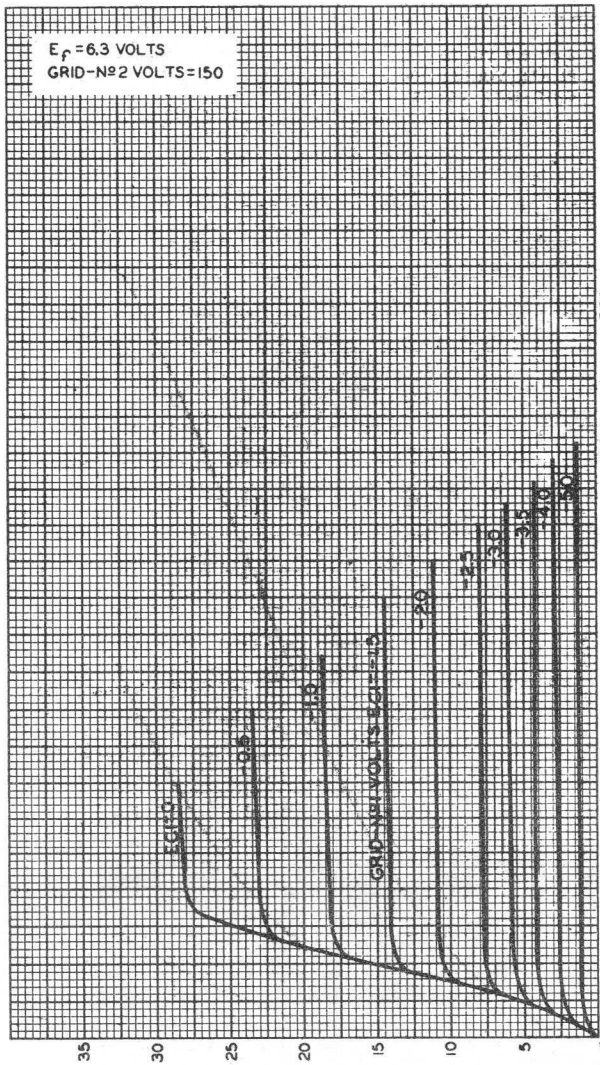
▲ The dc component must not exceed 100 volts.

→ Indicates a change.

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6CB6

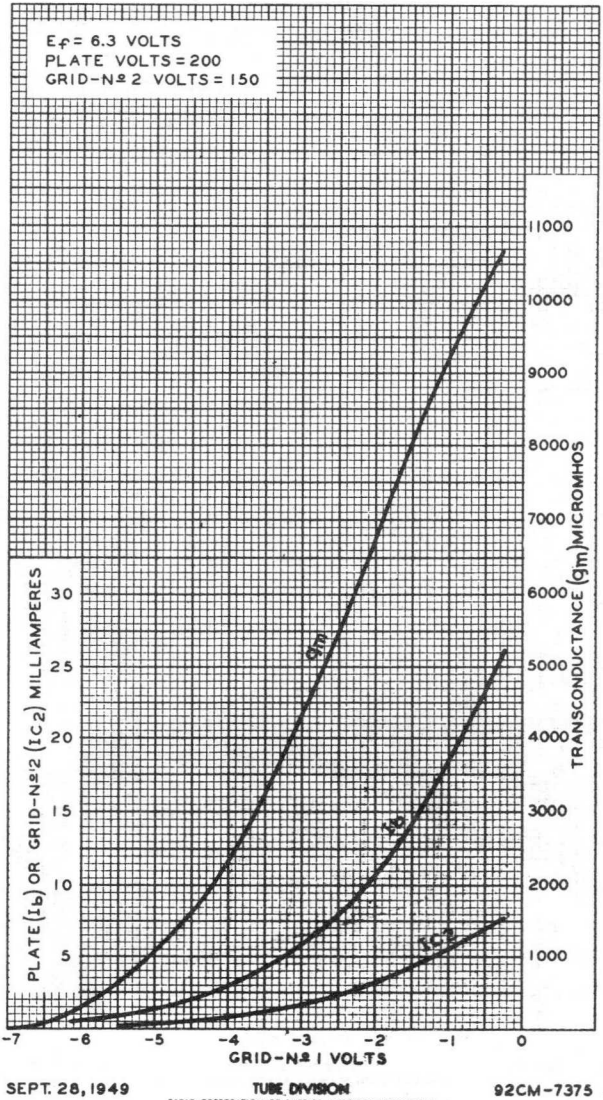
AVERAGE PLATE CHARACTERISTICS



RCA

6CB6

AVERAGE CHARACTERISTICS



6CB6-A

SHARP-CUTOFF PENTODE

7-PIN MINIATURE TYPE

With heater having controlled warm-up time

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage	6.3	ac or dc volts
Current	0.3 ± 6%	amp
Warm-up time (Average)	11	sec

For definition of heater warm-up time and method of determining it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of this Section.

Direct Interelectrode Capacitances:

	Without External Shield	*With External Shield*°	
Grid No.1 to plate	0.025 max.	0.015 max.	μμf
Grid No.1 to cathode & internal shield & grid No.3, grid No.2, and heater	6.5	6.5	μμf
Plate to cathode & internal shield & grid No.3, grid No.2, and heater	2	3	μμf

Characteristics, Class A_1 Amplifier:

Plate-Supply Voltage	125	125	volts
Grid No.3	♦	♦	
Grid-No.2 Supply Voltage	125	125	volts
Grid-No.1 Voltage	−3	−	volts
Cathode Resistor	−	56	ohms
Plate Resistance (Approx.)	−	0.28	megohm
Transconductance	−	8000	μmhos
Plate Current	2.8	13	ma
Grid-No.2 Current	−	3.7	ma
Grid-No.1 Voltage (Approx.) for plate μa = 20	−	−6.5	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)

°, ♦: See next page.

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

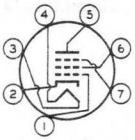
TENTATIVE DATA

6CB6-A

SHARP-CUTOFF PENTODE

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

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	0.55	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
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 fixed-bias operation	0.25	max.	megohm
For cathode-bias operation	1	max.	megohm

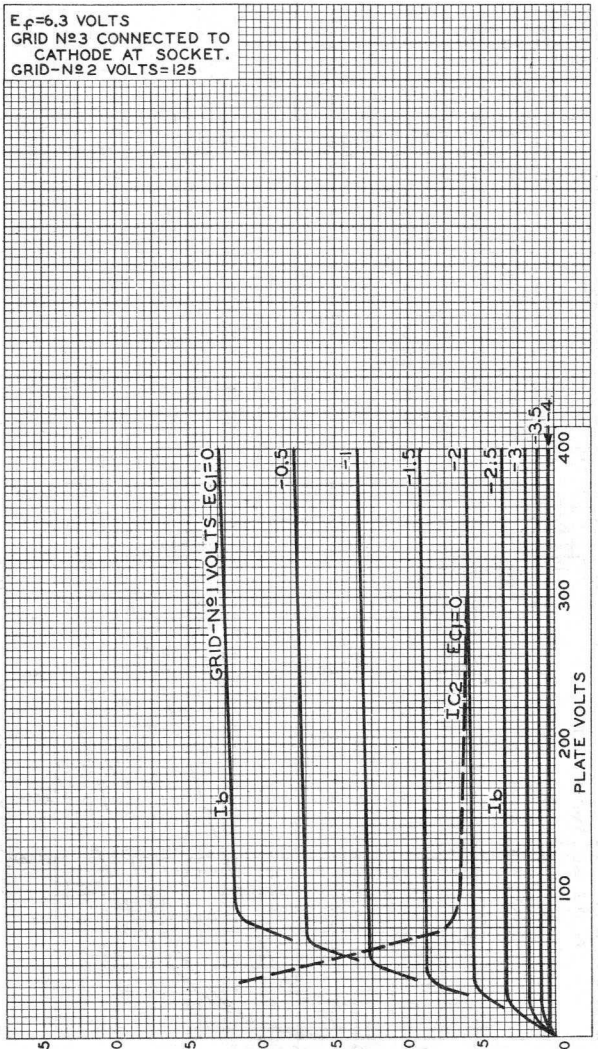
o With external shield JEDEC No.316 connected to cathode.
♦ Connected to cathode at socket.
▲ The dc component must not exceed 100 volts.

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

TENTATIVE DATA

6CB6-A

AVERAGE CHARACTERISTICS

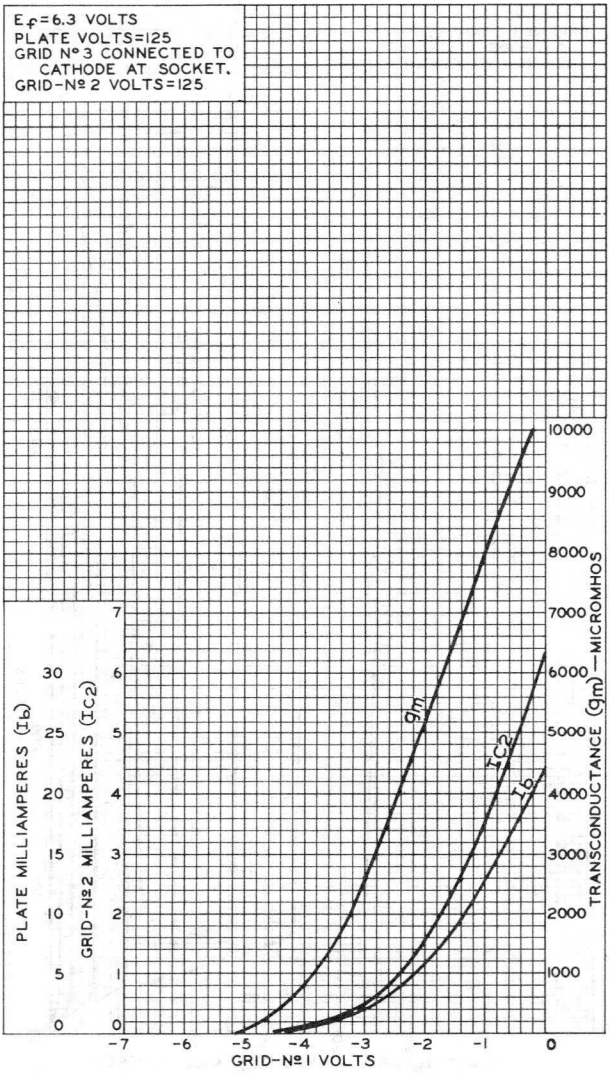


ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-9854

6CB6-A

AVERAGE CHARACTERISTICS



6CD6-GA
BEAM POWER TUBE

Supersedes Type 6CD6-G

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage	6.3	ac or dc volts
Current	2.5	amp
Direct Interelectrode Capacitances (Approx.):[o]		
Grid No.1 to plate	1.1	μμf
Grid No.1 to cathode & grid No.3, grid No.2, and heater	22	μμf
Plate to cathode & grid No.3, grid No.2, and heater	8.5	μμf

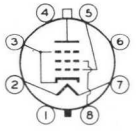
Characteristics, Class A_1 Amplifier:

Plate Voltage	60	175	volts
Grid-No.2 (Screen-Grid) Voltage	100	175	volts
Grid-No.1 (Control-Grid) Voltage	0	−30	volts
Mu-Factor, Grid No.2 to Grid No.1	−	3.9	
Plate Resistance (Approx.)	−	7200	ohms
Transconductance	−	7700	μmhos
Plate Current	230*	75	ma
Grid-No.2 Current	21*	5.5	ma
Grid-No.1 Voltage (Approx.) for plate current of 1 ma	−	−55	volts

Mechanical:

Mounting Position	Vertical, base up or down, or Horizontal with pins 2 and 7 in vertical plane
Maximum Overall Length	5"
Seated Length	4-1/4" ± 3/16"
Maximum Diameter	1-9/16"
Bulb	T-12
Cap	Small (JETEC No.C1-1)
Base	Short Medium-Shell Octal 8-Pin with External Barriers, Style A (JETEC No.B8-110), or Short Medium-Shell Octal 8-Pin with External Barriers, Style B (JETEC No.B8-118)
Basing Designation for BOTTOM VIEW	5BT

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



Pin 5 – Grid No.1
Pin 6 – No Connection
Pin 7 – Heater
Pin 8 – Grid No.2
Cap – Plate

[o] Without external shield.

* These values can be measured by a method involving a recurrent wave form such that the cathode current will be kept within ratings in order to prevent damage to the tube.

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6CD6-GA

BEAM POWER TUBE

HORIZONTAL DEFLECTION AMPLIFIER

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

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

DC PLATE VOLTAGE	700	max.	volts
PEAK POSITIVE-PULSE PLATE VOLTAGE (Absolute maximum)⊕	7000■	max.	volts
PEAK NEGATIVE-PULSE PLATE VOLTAGE	1500	max.	volts
DC GRID-No.2 (SCREEN-GRID) VOLTAGE	175	max.	volts
DC GRID-No.1 (CONTROL-GRID) VOLTAGE	-50	max.	volts
PEAK NEGATIVE-PULSE GRID-No.1 VOLTAGE	200	max.	volts
CATHODE CURRENT:			
Peak	700	max.	ma
Average	200	max.	ma
GRID-No.2 INPUT	3	max.	watts
PLATE DISSIPATION†	20	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)	225	max.	°C

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:			
For grid-resistor-bias operation†	0.47	max.	megohm

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

■ Under no circumstances should this absolute value be exceeded.

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

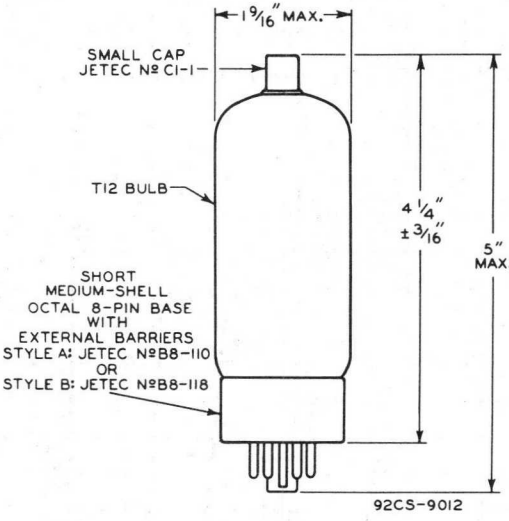
† It is essential that the plate dissipation be limited in the event of loss of grid signal. For this purpose, some protective means such as a cathode resistor of suitable value should be employed.

▲ The dc component must not exceed 100 volts.

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6CD6-GA

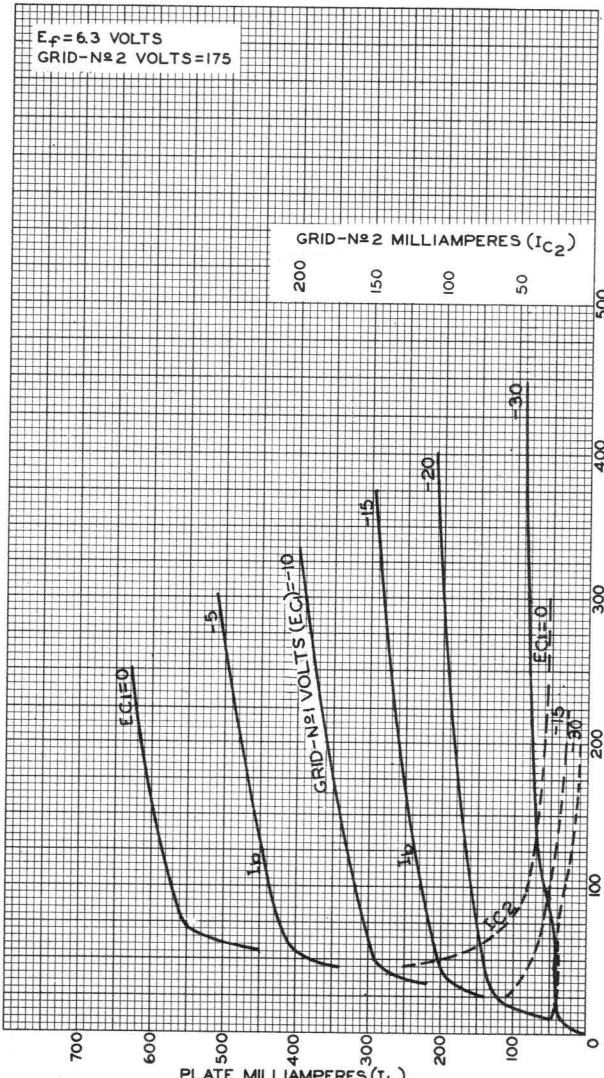
BEAM POWER TUBE



6CD6-GA

6CD6-GA

AVERAGE CHARACTERISTICS



92CM-9017

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6CD6-GA

AVERAGE CHARACTERISTICS

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-9016

Half-Wave Vacuum Rectifier

Duodecar Type
Pressure-Welded Cathode Coating
For Color-TV Damper-Diode Applications

ELECTRICAL CHARACTERISTICS – Bogey Values

Heater Voltage, ac or dc	E_h	6.3	V
Heater Current	I_h	2.5	A
Direct Interelectrode Capacitances:[a]			
Plate to cathode and heater	$c_{p(k+h)}$	13	pF
Cathode to plate and heater	$c_{k(p+h)}$	18	pF
Heater to cathode	c_{h-k}	5.5	pF
Instantaneous Tube Voltage Drop for instantaneous plate current (i_b) = 680 mA	e_b	20	V

MECHANICAL CHARACTERISTICS

Maximum Overall Length	3.375 in (85.72 mm)
Maximum Seated Length	3.000 in (76.2 mm)
Maximum Diameter	1.188 in (30.1 mm)
Envelope	JEDEC T9
Base[b]	Duodecar 12-Pin with Exhaust Tip (JEDEC E12-70)
Terminal Diagram	JEDEC 12GK
Type of Cathode	Coated Unipotential
Operating Position	Any

MAXIMUM RATINGS – Design-Maximum Values[c]

For operation as a Damper Tube in Color-TV Receivers utilizing a 525-line, 30-frame system

Peak Inverse Plate Voltage	$-e_{bm}$	5000[d]	V
Heater-Cathode Voltage:			
Peak	e_{hkm}	+300 -5000	V V
Average[e]	$E_{hk(av)}$	+100 -900	V V
Heater Voltage, ac or dc	E_h	5.7 to 6.9	V
Plate Current:			
Peak	i_{bm}	1500	mA
Average[e]	$I_{b(av)}$	350	mA
Plate Dissipation	P_b	11	W

Envelope Temperature (at hottest point on envelope surface)	T_E	220	°C

[a] Measured without external shield in accordance with the current issue of EIA Standard RS-191.

[b] Designed to mate with Duodecar 12-Contact Socket generally available from your local RCA Distributor.

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

[d] This rating is applicable when the duration of the voltage pulse does not exceed 15% of one horizontal scanning cycle. In a 525-line, 30-frame system, 15% of one horizontal scanning cycle is 10 μs.

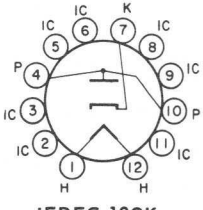
[e] Measured with a dc meter.

OPERATING CONSIDERATIONS

Socket terminals 2, 3, 5, 6, 8, 9 and 11 should not be used as tie points for external-circuit components. It is recommended that the socket tabs be removed to reduce the possibility of arc-over and to minimize leakage.

TERMINAL DIAGRAM (Bottom View)

Pin 1: Heater
Pin 2: Do Not Use
Pin 3: Do Not Use
Pin 4: Plate
Pin 5: Do Not Use
Pin 6: Do Not Use
Pin 7: Cathode
Pin 8: Do Not Use
Pin 9: Do Not Use
Pin 10: Plate
Pin 11: Do Not Use
Pin 12: Heater



JEDEC 12GK

Half-Wave Vacuum Rectifier

Duodecar Type
Pressure-Welded Cathode Coating
For Color-TV Damper-Diode Applications

ELECTRICAL CHARACTERISTICS – Bogey Values

Heater Voltage, ac or dc	E_h	6.3	V
Heater Current	I_h	1.8	A
Direct Interelectrode Capacitances:[a]			
Plate to cathode and heater	$c_{p(k+h)}$	13	pF
Cathode to plate and heater	$c_{k(p+h)}$	16	pF
Heater to cathode	c_{h-k}	4.0	pF
Instantaneous Tube Voltage Drop for instantaneous plate current (i_b) = 700 mA	e_b	25	V

MECHANICAL CHARACTERISTICS

Maximum Overall Length	3.375 in (85.72 mm)
Maximum Seated Length	3.000 in (76.2 mm)
Maximum Diameter	1.188 in (30.1 mm)
Envelope	JEDEC T9
Base[b]	Duodecar 12-Pin with Exhaust Tip (JEDEC E12-70)
Terminal Diagram	JEDEC 12HF
Type of Cathode	Coated Unipotential
Operating Position	Any

MAXIMUM RATINGS – Design-Maximum Values[c]

For operation as a Damper Tube in Color-TV Receivers utilizing a 525-line, 30-frame system

Peak Inverse Plate Voltage	$-e_{bm}$	5000[d]	V
Heater-Cathode Voltage:			
Peak	e_{hkm}	+300	V
		-5000	V
Average[e]	$E_{hk(av)}$	+100	V
		-900	V
Heater Voltage, ac or dc	E_h	5.7 to 6.9	V
Plate Current:			
Peak	i_{bm}	2100	mA
Average[e]	$I_{b(av)}$	350	mA
Plate Dissipation	P_b	6.5	W

Envelope Temperature (at hottest point on envelope surface)	T_E	220	°C

a Measured without external shield in accordance with the current issue of EIA Standard RS-191.

b Designed to mate with Duodecar 12-Contact Socket generally available from your local RCA Distributor.

c As defined in the current issue of EIA Standard RS-239.

d This rating is applicable when the duration of the voltage pulse does not exceed 15% of one horizontal scanning cycle. In a 525-line, 30-frame system, 15% of one horizontal scanning cycle is 10 μs.

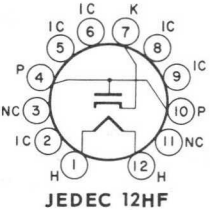
e Measured with a dc meter.

OPERATING CONSIDERATIONS

Socket terminals 2, 5, 6, 8 and 9 should not be used as tie points for external-circuit components. It is recommended that the socket tabs be removed to reduce the possibility of arc-over and to minimize leakage.

TERMINAL DIAGRAM (Bottom View)

Pin 1: Heater
Pin 2: Do Not Use
Pin 3: No Internal Connection
Pin 4: Plate
Pin 5: Do Not Use
Pin 6: Do Not Use
Pin 7: Cathode
Pin 8: Do Not Use
Pin 9: Do Not Use
Pin 10: Plate
Pin 11: No Internal Connection
Pin 12: Heater



JEDEC 12HF

Half-Wave Vacuum Rectifier

Novar Type

For Black-and-White-TV Damper Diode Applications

ELECTRICAL CHARACTERISTICS – Bogey Values

Heater Voltage, ac or dc	E_h	6.3	V
Heater Current	I_h	1.2	A
Direct Interelectrode Capacitances:[a]			
Plate to cathode and heater	$c_{p(k+h)}$	6.5	pF
Cathode to plate and heater	$c_{k(p+h)}$	9.0	pF
Heater to cathode	c_{hk}	3.0	pF
Instantaneous Tube Voltage Drop for instantaneous plate current (i_b) = 350 mA	e_b	16	V

MECHANICAL CHARACTERISTICS

Maximum Overall Length (l_m) . . . . . 3.410in.(86.61 mm)

Maximum Seated Length (l_{sm}) . . . . . 3.030in.(76.96 mm)

Maximum Diameter (d_m) . . . . . 1.188in.(30.1 mm)

Envelope . . . . . JEDEC Designation T9

Base[b] . . . . . Small-Button Novar 9-Pin with Exhaust Tip (JEDEC Designation E9-89)

Terminal Connections (See *TERMINAL DIAGRAM*) . . . . . JEDEC Designation 9HP

Type of Cathode . . . . . Coated Unipotential

Operating Position . . . . . Any

MAXIMUM RATINGS – Design-Maximum Values[c]

For operation as a Damper Tube in Black-and-White-TV Receivers utilizing a 525-line, 30-frame system[d]

Peak Inverse Plate Voltage	$-e_{bm}$	5200[e]	V
Heater-Cathode Voltage: Peak	e_{hkm}	+300 -5200	V V
Average[f]	$E_{hk(av)}$	+100 -900	V V
Heater Voltage	E_h	5.7 to 6.9	V

Plate Current:			
Peak	i_{bm}	1200	mA
Average[f]	$I_{b(av)}$	250	mA
Plate Dissipation	P_b	6.5	W
Envelope Temperature (at hottest point on envelope surface)	T_E	220	°C

[a]Measured without external shield in accordance with the current issue of EIA Standard RS-191.

[b]Designed to mate with Novar 9-Contact Socket generally available from your local RCA Distributor.

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

[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% of one horizontal scanning cycle. In a 525-line, 30-frame system, 15% on one horizontal scanning cycle is 10 μs.

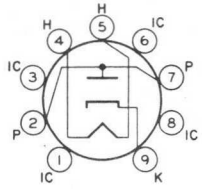
[f]Measured with a dc meter.

OPERATING CONSIDERATIONS

Socket terminals 1, 3, 6, and 8 should not be used as tie points for external-circuit components. It is recommended that these socket tabs be removed to reduce the possibility of arc-over and to minimize leakage.

TERMINAL DIAGRAM (Bottom View)

Pin 1 - Do Not Use
Pin 2 - Plate
Pin 3 - Do Not Use
Pin 4 - Heater
Pin 5 - Heater
Pin 6 - Do Not Use
Pin 7 - Plate
Pin 8 - Do Not Use
Pin 9 - Cathode



JEDEC 9HP

6CK4

LOW-MU TRIODE

GENERAL DATA

Electrical:

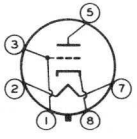
Heater, for Unipotential Cathode:			
Voltage (AC or DC)	6.3 ± 10%		volts
Current	1.25		amp
Direct Interelectrode Capacitances (Approx.):[o]			
Grid to plate	6.5		μμf
Grid to cathode and heater	8		μμf
Plate to cathode and heater	1.8		μμf

Characteristics, Class A_1 Amplifier:

Plate Voltage	100	250	volts
Grid Voltage	0	-28	volts
Amplification Factor	–	6.6	
Plate Resistance (Approx.)	–	1200	ohms
Transconductance	–	5500	μmhos
Plate Current	125*	40	ma
Plate Current for grid volts = -38.	–	10	ma
Grid Voltage (Approx.) for plate ma. = 0.5	–	-50	volts

Mechanical:

Operating Position	Any
Maximum Overall Length	3-7/16"
Maximum Seated Length	2-7/8"
Maximum Diameter	1-9/32"
Dimensional Outline	*See General Section*
Bulb	T9
Base	Short Intermediate-Shell Octal 6-Pin with External Barriers, Arrangement 1 (JEDEC Group 1, No.B6-60)
Basing Designation for BOTTOM VIEW	8JB



Pin 1 – Grid
Pin 2 – Heater
Pin 3 – Grid
Pin 5 – Plate
Pin 7 – Heater
Pin 8 – Cathode

VERTICAL-DEFLECTION AMPLIFIER

Maximum Ratings, *Design-Maximum Values:*

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

DC PLATE VOLTAGE	550	max.	volts
PEAK POSITIVE-PULSE PLATE VOLTAGE[#]	2000	max.	volts
PEAK NEGATIVE-PULSE GRID VOLTAGE	250	max.	volts
CATHODE CURRENT:			
Peak	350	max.	ma
Average	100	max.	ma

RCA

6CK4

LOW-MU TRIODE

PLATE DISSIPATION.	12	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-Circuit Resistance:

For cathode–bias operation.	2.2	max.	megohms

○ 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.

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

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.

▲ The dc component must not exceed 100 volts.

Half-Wave Vacuum Rectifier

NOVAR TYPE

PRESSURE-WELDED CATHODE COATING

For Color-TV Damper-Diode Applications

ELECTRICAL CHARACTERISTICS

Bogey Values

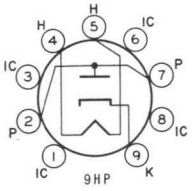
Heater Voltage (AC or DC)	E_h	6.3	V
Heater Current	I_h	1.2	A
Direct Interelectrode Capacitances			
Without external shield			
Plate to cathode and heater	$c_{p(k+h)}$	6.5	pF
Cathode to plate and heater	$c_{k(p+h)}$	9.0	pF
Heater to cathode	c_{h-k}	3.0	pF
Instantaneous Tube Voltage Drop	e_b	16	V
For instantaneous plate current (i_b) = 350 mA			

MECHANICAL CHARACTERISTICS

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	3.005 in
Maximum Seated Length	2.625 in
Maximum Diameter	1.188 in
Dimensional Outline	See *General Section*
Envelope	T9
Base	Small-Button Novar 9-Pin with Exhaust Tip (JEDEC E9-89)

TERMINAL DIAGRAM (Bottom View)

Pin 1 – Do Not Use
Pin 2 – Plate
Pin 3 – Do Not Use
Pin 4 – Heater
Pin 5 – Heater
Pin 6 – Do Not Use
Pin 7 – Plate
Pin 8 – Do Not Use
Pin 9 – Cathode



DESIGN-MAXIMUM RATINGS

For operation as a Damper Tube in Black-and-White TV Receivers utilizing a 525-line, 30-frame system

Peak Inverse Plate Voltage	$-e_{bm}$	5500[a]	V
Heater-Cathode Voltage			
Peak	e_{hkm}	+300	V
		-5500	V
Average[b]	$E_{hk(av)}$	+100	V
		-900	V
Heater Voltage (AC or DC)	E_h	5.7 to 6.9	V

Plate Current			
Peak	i_{bm}	1300	mA
Average[b]	$I_{b(av)}$	250	mA
Plate Dissipation	P_b	8.5	W
Envelope Temperature	T_E	220	°C
At hottest point on envelope surface			

[a] This rating is applicable when the duration of the voltage pulse does not exceed 15% of one horizontal scanning cycle. In a 525-line, 30-frame system, 15% of one horizontal scanning cycle is 10 μs.

[b] Measured with a dc meter.

OPERATING CONSIDERATIONS

Socket terminals 1, 3, 6, and 8 should not be used as tie points for external-circuit components. It is recommended that these socket tabs be removed to reduce the possibility of arc-over and to minimize leakage.

Medium-Mu Triode—Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

With Heater Having Controlled Warm-up Time

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:

	Without External Shield	*With External Shield*	
Triode Unit:			
Grid to plate	1.5	1.5	μμf
Grid to cathode & pentode grid No.3, and heater	2	2.4	μμf
Plate to cathode & pentode grid No.3, and heater	0.5	1	μμf
Pentode Unit:			
Grid No.1 to plate	0.09 max.	0.06 max.	μμf
Grid No.1 to cathode & grid No.3, grid No.2, and heater	4.6	4.8	μμf
Plate to cathode & grid No.3, grid No.2, and heater	0.9	1.6	μμf
Pentode grid No.1 to triode plate	0.05 max.	0.04 max.	μμf
Pentode plate to triode plate	0.05 max.	0.008 max.	μμf
Heater to cathode	6.5	6.5●	μμf

Characteristics, Class A_1 Amplifier:

	Triode Unit	*Pentode Unit*		
Plate Voltage	125	100	125	volts
Grid No.3	–	*Connected to cathode at socket*		
Grid-No.2 Voltage	–	70	125	volts
Grid-No.1 Voltage	-1	–	-1	volt
Amplification Factor	40	–	–	
Plate Resistance (Approx.)	6000	–	300000	ohms
Transconductance	6500	5700	5500	μmhos
Plate Current	12	–	9	ma
Grid-No.2 Current	–	–	2.2	ma
Grid-No.1 Voltage (Approx.) for plate μa = 20	-7	–	-6.5	volts

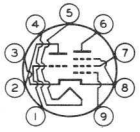
← Indicates a change.

6CG8-A

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	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 – Pentode Grid No.3, Cathode
Pin 9 – Pentode Grid No.1

→ **AMPLIFIER — Class A_1**

Maximum Ratings, *Design-Maximum Values:*

	Triode Unit	*Pentode Unit*
PLATE VOLTAGE	275 max.	275 max. volts
GRID No.3 (SUPPRESSOR GRID)	–	*Connect to cathode at socket*
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: 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.	2.3 max. watts
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

▲ With external shield JEDEC No.315 connected to cathode except as noted.
● With external shield JEDEC No.315 connected to pentode plate.
★ The dc component must not exceed 100 volts.

Curves shown under Type 6X8 also apply to the 6CG8-A

→ Indicates a change.

Half-Wave Vacuum Rectifier

Novar Type

For Color-TV Damper-Diode Applications

ELECTRICAL CHARACTERISTICS — Bogey Values

Heater Voltage, ac or dc	E_h	6.3	V
Heater Current	I_h	1.8	A
Direct Interelectrode Capacitances:[a]			
Plate to cathode and heater	$c_{p(k+h)}$	13	pF
Cathode to plate and heater	$c_{k(p+h)}$	16	pF
Heater to cathode	c_{h-k}	4.0	pF
Instantaneous Tube Voltage Drop for instantaneous plate current (i_b) = 700 mA	e_b	25	V

MECHANICAL CHARACTERISTICS

Maximum Overall Length	3.380 in (85.85 mm)
Maximum Seated Length	3.000 in (76.20 mm)
Maximum Diameter	1.188 in (30.17 mm)
Envelope	JEDEC T9
Base[b]	Small-Button Novar 9-Pin with Exhaust Tip (JEDEC E9-89)
Terminal Diagram	JEDEC 9HP
Type of Cathode	Coated Unipotential
Operating Position	Any

MAXIMUM RATINGS — Design-Maximum Values[c]

For operation as a Damper Tube in Color-TV Receivers utilizing a 525-line, 30-frame system

Peak Inverse Plate Voltage.	$-e_{bm}$	5500[d]	V
Heater-Cathode Voltage:			
Peak	e_{hkm}	+300 -5500	V V
Average[e]	$E_{hk(av)}$	+100 -900	V V
Heater Voltage, ac or dc	E_h	5.7 to 6.9	V
Plate Current:			
Peak	i_{bm}	2100	mA
Average[e]	$I_{b(av)}$	350	mA
Plate Dissipation	P_b	6.5	W
Envelope Temperature (at hottest point on envelope surface)	T_E	220	°C

[a] Measured without external shield in accordance with the current issue of EIA Standard RS-191.

[b] Designed to mate with Novar 9-Contact Socket generally available from your local RCA Distributor.

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

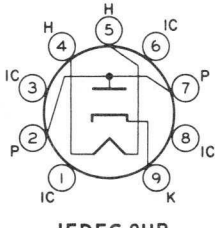
[d] This rating is applicable when the duration of the voltage pulse does not exceed 15% of one horizontal scanning cycle. In a 525-line, 30-frame system, 15% of one horizontal scanning cycle is 10 μs.

[e] Measured with a dc meter.

OPERATING CONSIDERATIONS

Socket terminals 1, 3, 6, and 8 should not be used as tie points for external-circuit components. It is recommended that the socket tabs be removed to reduce the possibility of arc-over and to minimize leakage.

TERMINAL DIAGRAM (Bottom View)



JEDEC 9HP

Pin 1 - Do Not Use
Pin 2 - Plate
Pin 3 - Do Not Use
Pin 4 - Heater
Pin 5 - Heater
Pin 6 - Do Not Use
Pin 7 - Plate
Pin 8 - Do Not Use
Pin 9 - Cathode

6CL6

POWER PENTODE

MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage	6.3	ac or dc volts
Current	0.65	amp
Direct Interelectrode Capacitances (Without external shield):		
Grid No.1 to Plate	0.120	μμf
Input	11	μμf
Output	5.5	μμf

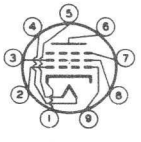
Characteristics, Amplifier Class A_1:

Plate Voltage	250	volts
Grid No.3	Connected to cathode at socket	
Grid-No.2 Voltage	150	volts
Grid-No.1 Voltage	-3	volts
Peak AF Grid-No.1 Signal Voltage	3	volts
Zero-Signal DC Plate Current	30	ma
Max.-Signal DC Plate Current	31	ma
Zero-Signal DC Grid-No.2 Current	7	ma
Max.-Signal DC Grid-No.2 Current	7.2	ma
Plate Resistance (Approx.)	0.15	megohm
Transconductance	11000	μmhos
Grid-No.1 Voltage (Approx.) for plate current of 10 μamp	-14	volts
Load Resistance	7500	ohms
Total Harmonic Distortion	8	per cent
Max.-Signal Power Output	2.8	watts

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-5/8"
Maximum Seated Length	2-3/8"
Length, Base Seat to Bulb Top (excluding tip)	2" ± 3/32"
Maximum Diameter	7/8"
Bulb	T-6-1/2
Base	Small-Button Noval 9-Pin (JETEC No.E9-1)

BOTTOM VIEW



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

AMPLIFIER - Class A_1

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	300 max.	volts
PLATE SUPPLY VOLTAGE	300 max.	volts
GRID-No.3 (SUPPRESSOR) VOLTAGE	0 max.	volts

6CL6

POWER PENTODE

GRID-No.2 (SCREEN) VOLTAGE	*See Rating Curve at front of this Section*	
GRID-No.2 SUPPLY VOLTAGE	300 max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Negative bias value	50 max.	volts
Positive bias value	0 max.	volts
PLATE DISSIPATION	7.5 max.	watts
GRID-No.2 INPUT	1.7 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	90 max.	volts
Heater positive with respect to cathode	90 max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)	200 max.	°C

Typical Operation in 4-Mc Bandwidth Video Amplifier Circuit of Fig. 1:

Plate Supply Voltage	300	volts
Grid No.3	Connected to cathode at socket	
Grid-No.2 Supply Voltage	300	volts
Grid-No.1 Bias Voltage	-2	volts
Grid-No.1 Signal Voltage (Peak to Peak)	3	volts
Grid-No.2 Resistor	24000	ohms
Grid-No.1 Resistor	0.1	megohm
Load Resistor	3900	ohms
Zero-Signal Plate Current	30	ma
Zero-Signal Grid-No.2 Current	7.0	ma
Voltage Output (Peak to Peak)	132	volts

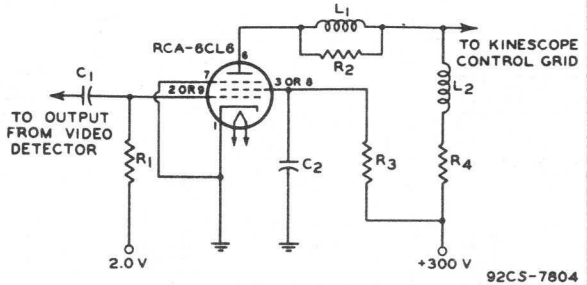
Maximum Circuit Values:

Grid-No.1-Circuit Resistance:		
For fixed-bias operation	0.1 max.	megohm
For cathode-bias operation	0.5 max.	megohm

6CL6

POWER PENTODE

Fig. 1 – Typical Video Voltage Amplifier Circuit Having Bandwidth of 4 Mc.

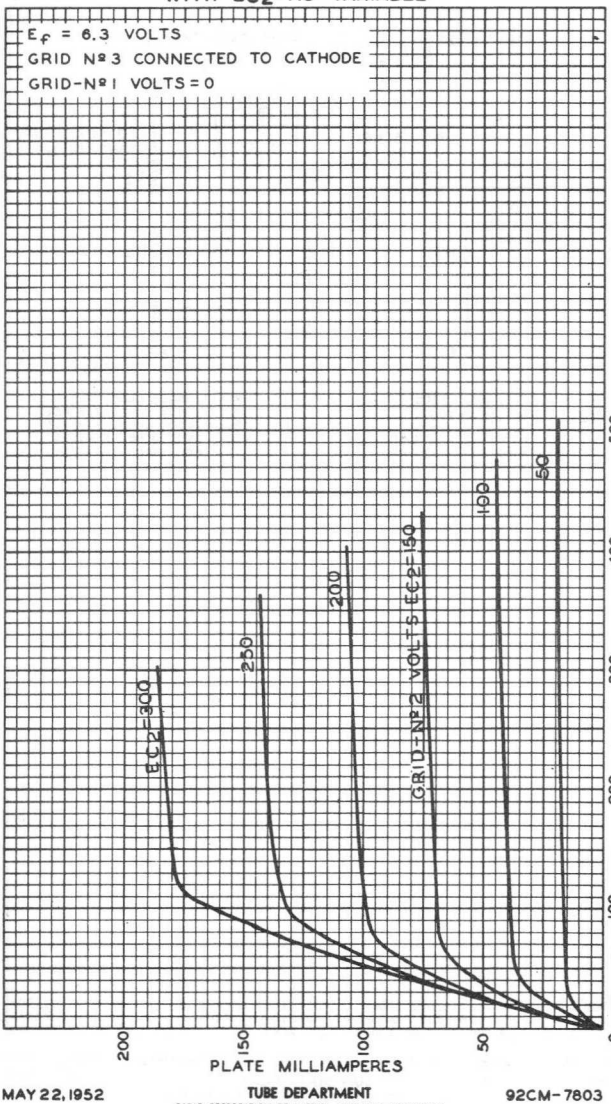


C1: 0.1 μf, 400 volts
C2: 4 μf, 400 volts
L1: Peaking Coil, 180 μh
L2: Peaking Coil, 120 μh

R1: 100000 ohms, 0.5 watt
R2: 47000 ohms, 0.5 watt
R3: 24000 ohms, 2 watts
R4: 3900 ohms, 5 watts non-inductive type

6CL6

AVERAGE PLATE CHARACTERISTICS
WITH E_{C2} AS VARIABLE



MAY 22, 1952

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7803

RCA

6CL6

AVERAGE PLATE CHARACTERISTICS
WITH E_{C1} AS VARIABLE

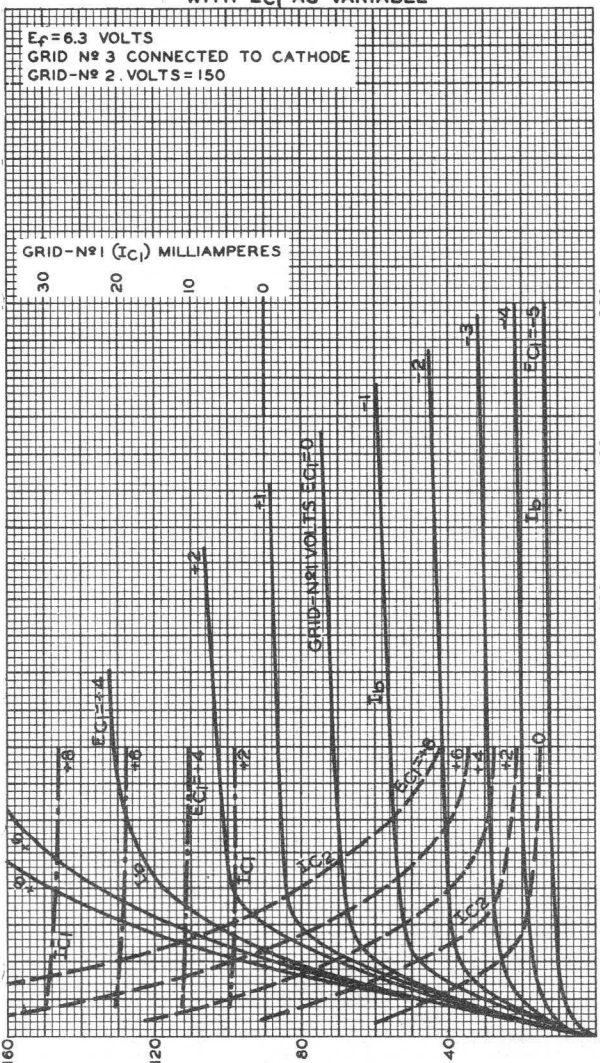


PLATE (I_b) OR GRID-Nº2 (I_{C2}) MILLIAMPERES

MAY 22, 1952 TUBE DEPARTMENT 92CM - 7802

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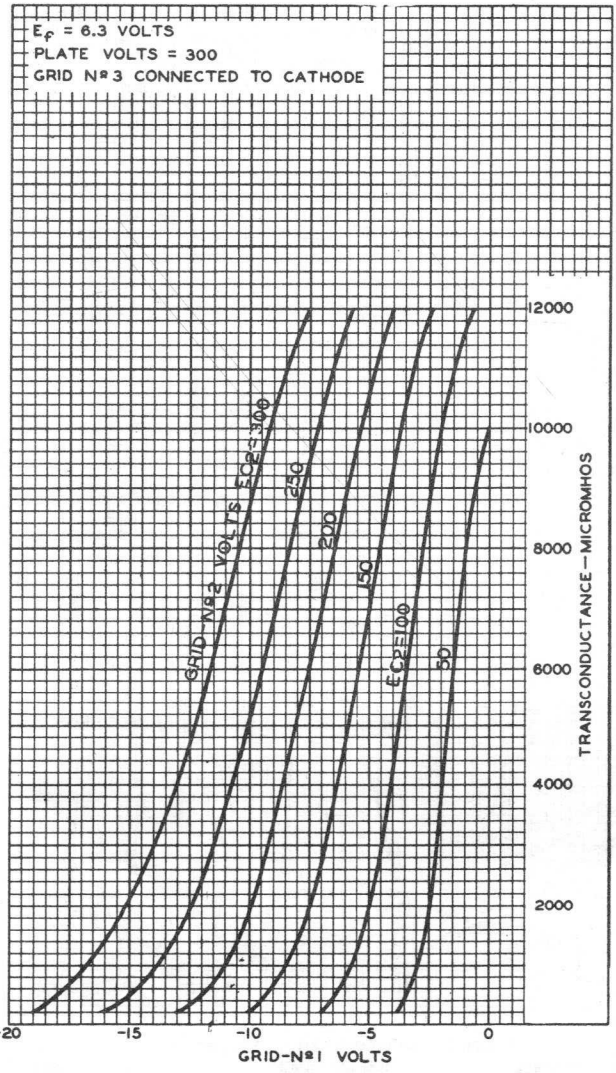
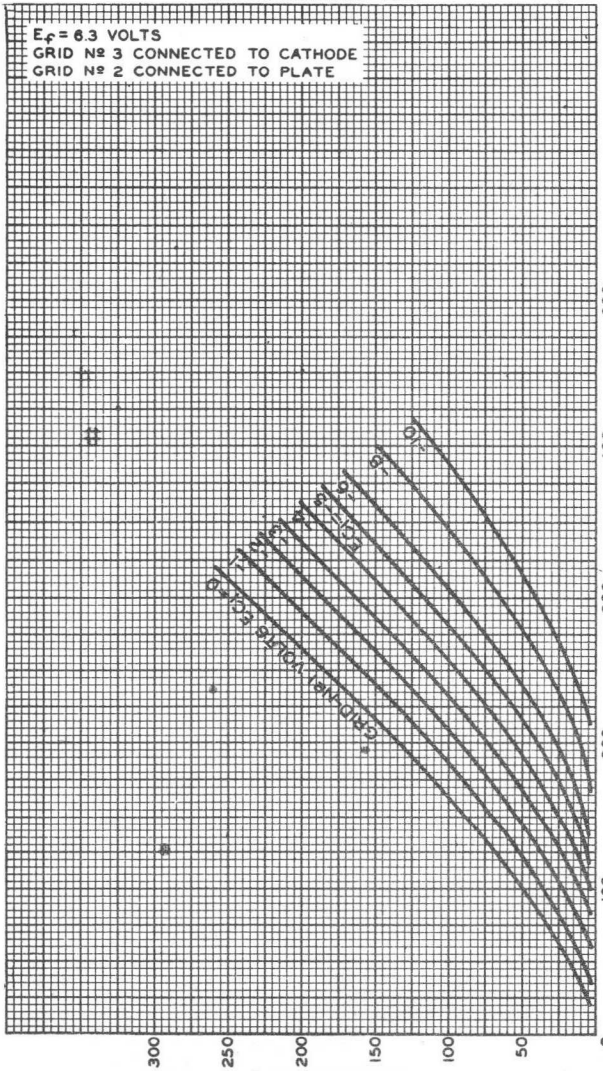
6CL6

AVERAGE CHARACTERISTICS



6CL6

AVERAGE PLATE CHARACTERISTICS
TRIODE CONNECTION



MAY 26, 1952

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7808

6CL8-A

MEDIUM-MU TRIODE— SHARP-CUTOFF TETRODE

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[D]*	
Triode Unit:			
Grid to plate	1.8	1.8	μμf
Grid to cathode, tetrode cathode & internal shield, and heater	2.8	2.8	μμf
Plate to cathode, tetrode cathode & internal shield, and heater	1.5	2	μμf
Tetrode Unit:			
Grid No.1 to plate	0.02 max.	0.01 max.	μμf
Grid No.1 to cathode & internal shield, grid No.2, and heater	5	5	μμf
Plate to cathode & internal shield, grid No.2, and heater	2	3	μμf
Tetrode grid No.1 to triode plate	0.015 max.	0.01 max.	μμf
Tetrode plate to triode plate	0.15 max.	0.03 max.	μμf
Heater to cathode (Each Unit)	3	3●	μμf

Characteristics, Class A_1 Amplifier:

	Triode Unit	*Tetrode Unit*		
Plate Voltage	125	100	125	volts
Grid-No.2 Voltage	–	70	125	volts
Grid-No.1 Voltage	−1	–	−1	volt
Amplification Factor	40	–	–	
Plate Resistance (Approx.)	5000	–	200000	ohms
Transconductance	8000	7000	6500	μmhos
Plate Current	14	–	12	ma
Grid-No.2 Current	–	–	4	ma
Grid-No.1 Voltage (Approx.) for plate μa = 20	−9	–	−9	volts

← Indicates a change.

RCA

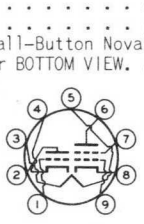
6CL8-A

MEDIUM-MU TRIODE—SHARP-CUTOFF 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	9FX

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



CONVERTER

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

	Triode Unit as Osc.	*Tetrode Unit as Mixer*	
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
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

→ Indicates a change.

6CL8-A

MEDIUM-MU TRIODE—SHARP-CUTOFF TETRODE

Maximum Circuit Values:

	Triode Unit	*Tetrode 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

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

● With external shield JEDEC No.315 connected to ground.

▲ The dc component must not exceed 100 volts.

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

Half-Wave Vacuum Rectifier

NOVAR TYPE

"PRESSURE-WELDED" CATHODE COATING

For Color-TV Damper-Diode Applications

ELECTRICAL CHARACTERISTICS

Bogey Values

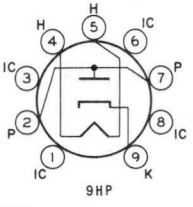
Heater Voltage (AC or DC)	E_h	6.3	V
Heater Current	I_h	2.4	A
Direct Interelectrode Capacitances			
Without external shield			
Plate to cathode and heater	$c_p(k+h)$	20	pF
Cathode to plate and heater	$c_k(p+h)$	18	pF
Heater to cathode	c_{h-k}	4.0	pF
Instantaneous Tube Voltage Drop	e_b	10	V
For instantaneous plate current (i_b) = 350 mA			

MECHANICAL CHARACTERISTICS

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	3.005 in
Maximum Seated Length	2.625 in
Maximum Diameter	1.188 in
Dimensional Outline	See *General Section*
Envelope	T9
Base	Small-Button Novar 9-Pin With Exhaust Tip (JEDEC E9-89)

TERMINAL DIAGRAM (Bottom View)

Pin 1 – Do Not Use
Pin 2 – Plate
Pin 3 – Do Not Use
Pin 4 – Heater
Pin 5 – Heater
Pin 6 – Do Not Use
Pin 7 – Plate
Pin 8 – Do Not Use
Pin 9 – Cathode



9HP

DESIGN-MAXIMUM RATINGS

For operation as a Damper Tube in Color TV Receivers utilizing a 525-line, 30-frame system

Peak Inverse Plate Voltage	$-e_{bm}$	5500[a]	V
Heater-Cathode Voltage			
Peak	e_{hkm}	+300	V
		-5500	V
Average	$E_{hk(av)}$	+100	V
		-900	V
Heater Voltage (AC or DC)	E_h	5.7 to 6.9	V

Plate Current			
Peak	i_{bm}	1700	mA
Average	$I_{b(av)}$	400	mA
Plate Dissipation	P_b	12	W

[a] This rating is applicable when the duration of the voltage pulse does not exceed 15% of one horizontal scanning cycle. In a 525-line, 30-frame system, 15% of one horizontal scanning cycle is 10 μs.

OPERATING CONSIDERATIONS

Socket terminals 1, 3, 6, and 8 should not be used as tie points for external-circuit components. It is recommended that these socket tabs be removed to reduce the possibility of arc-over and to minimize leakage.

6CM6

BEAM POWER TUBE

9-PIN MINIATURE TYPE

GENERAL DATA

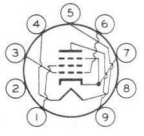
Electrical:

Heater, for Unipotential Cathode:		
Voltage	6.3	ac or dc volts
Current	0.45	amp
Direct Interelectrode Capacitances (Approx.):[o]		
Grid No.1 to plate	0.7	μμf
Grid No.1 to cathode, grid No.3, grid No.2, and heater	8	μμf
Plate to cathode, grid No.3, grid No.2, and heater	8.5	μμf

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 (JETEC No.E9-1)
Basing Designation for BOTTOM VIEW	9CK

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 – No Connection
Pin 9 – Plate

AMPLIFIER — Class A_1

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	315 max.	volts
GRID-No.2 (SCREEN-GRID) VOLTAGE	285 max.	volts
GRID-No.2 INPUT	2 max.	watts
PLATE DISSIPATION	12 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 and Characteristics:

Plate Voltage	180	250	315	volts
Grid-No.2 Voltage	180	250	225	volts
Grid-No.1 (Control-Grid) Voltage	-8.5	-12.5	-13	volts
Peak AF Grid-No.1 Voltage	8.5	12.5	13	volts
Zero-Signal Plate Current	29	45	34	ma
Max.-Signal Plate Current	30	47	35	ma
Zero-Signal Grid-No.2 Current	3	4.5	2.2	ma
Max.-Signal Grid-No.2 Current	4	7	6	ma

o, ▲: See next page.

6CM6

BEAM POWER TUBE

Plate Resistance (Approx.). . . .	50000	50000	80000	ohms
Transconductance.	3700	4100	3750	μmhos
Load Resistance	5500	5000	8500	ohms
Total Harmonic Distortion	8	8	12	%
Max.-Signal Power Output.	2	4.5	5.5	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

VERTICAL-DEFLECTION AMPLIFIER

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

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

DC PLATE VOLTAGE.	315 max.	volts
PEAK POSITIVE-PULSE PLATE VOLTAGE# (Absolute maximum).	2000■ max.	volts
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.	120 max.	ma
DC.	40 max.	ma
GRID-No.2 INPUT	1.75 max.	watts
PLATE DISSIPATION	8 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 cathode-bias operation.	2.2 max.	megohms

VERTICAL-DEFLECTION AMPLIFIER

Triode Connection†

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

DC PLATE VOLTAGE.	315 max.	volts
PEAK POSITIVE-PULSE PLATE VOLTAGE# (Absolute maximum).	2000■ max.	volts
PEAK NEGATIVE-PULSE GRID-No.1 (CONTROL-GRID) VOLTAGE	250 max.	volts
CATHODE CURRENT:		
Peak.	120 max.	ma
DC.	40 max.	ma
PLATE DISSIPATION	9 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200▲ max.	volts

○,▲,□,#,■,†: See next page.

6CM6

BEAM POWER TUBE

Characteristics:

Plate Voltage	250	volts
Grid-No.1 Voltage	-12.5	volts
Amplification Factor	9.8	
Plate Resistance (Approx.)	1960	ohms
Transconductance	5000	μmhos
Plate Current	49.5	ma
Grid-No.1 Voltage (Approx.) for plate ma. = 0.5	-37	volts

Maximum Circuit Values:

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

[C] Without external shield.

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

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

[#] 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.

[■] Under no circumstances should this absolute value be exceeded.

[†] Grid-No.2 connected to plate.

CURVES
shown under Types 6V6 and 6V6-GT, within ratings, also apply to the 6CM6

Medium-Mu Dual Triode

With Dissimilar Units

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	3.8	3	μμf
Grid to cathode and heater	2	3.5	μμf
Plate to cathode and heater	0.5	0.4	μμf

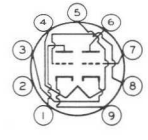
Characteristics, Class A_1 Amplifier: ←

	Unit No.1	*Unit No.2*	
Plate Voltage	200	250	volts
Grid Voltage	−7	−8	volts
Amplification Factor	21	18	
Plate Resistance (Approx.)	10500	4100	ohms
Transconductance	2000	4400	μmhos
Plate Current	5	20	ma
Plate Current for grid volts = −10.	−1	−	ma
Grid Voltage (Approx.) for plate μa = 10	−14	−	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	9ES

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



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

← 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	550	max.	volts
PEAK NEGATIVE-PULSE GRID VOLTAGE	220	max.	volts
CATHODE CURRENT:			
Peak	77	max.	ma
Average	17	max.	ma
PLATE DISSIPATION	1.45	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 fixed-bias, 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	550	max.	volts
PEAK POSITIVE-PULSE PLATE VOLTAGE[d]	2200	max.	volts
PEAK NEGATIVE-PULSE GRID VOLTAGE	220	max.	volts
CATHODE CURRENT:			
Peak	77	max.	ma
Average	22	max.	ma
PLATE DISSIPATION	6	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 fixed-bias operation	1	max.	megohm
For cathode-bias operation	2.5	max.	megohms

[a] Without external shield.

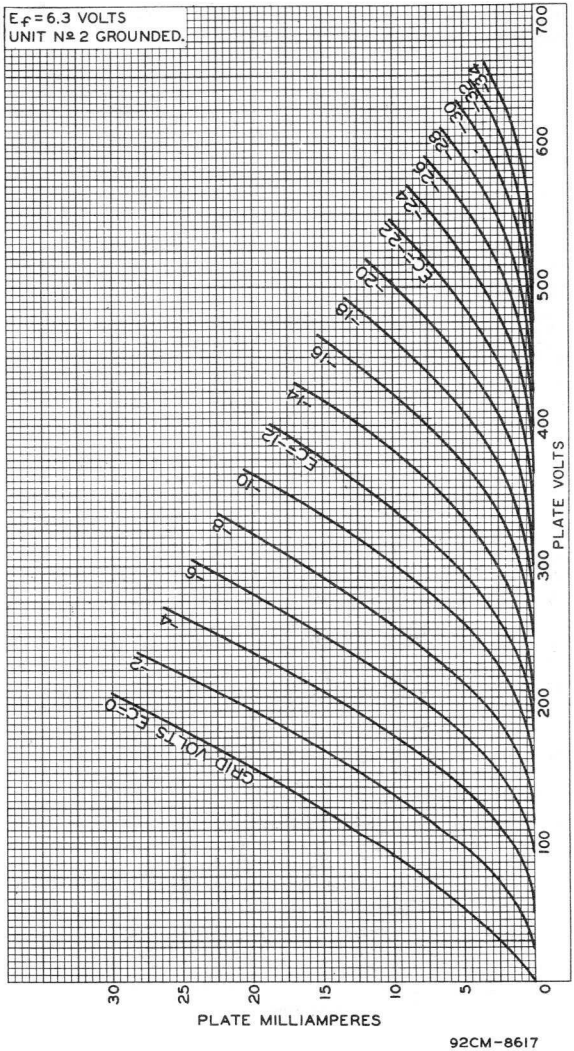
[b] As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations," Federal Communications Commission.

[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.

→Indicates a change.

AVERAGE PLATE CHARACTERISTICS
Unit No.1



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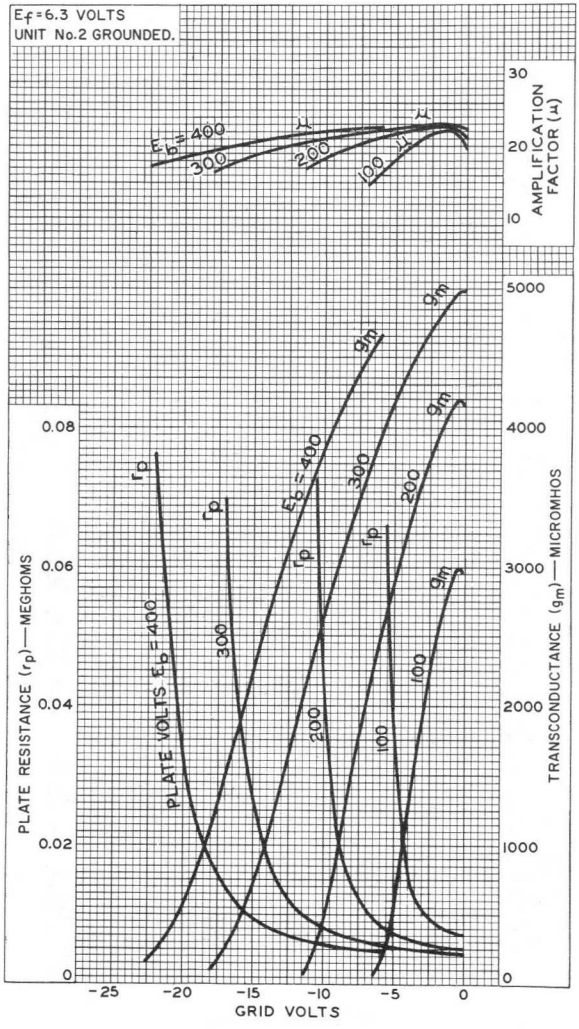
6CM7

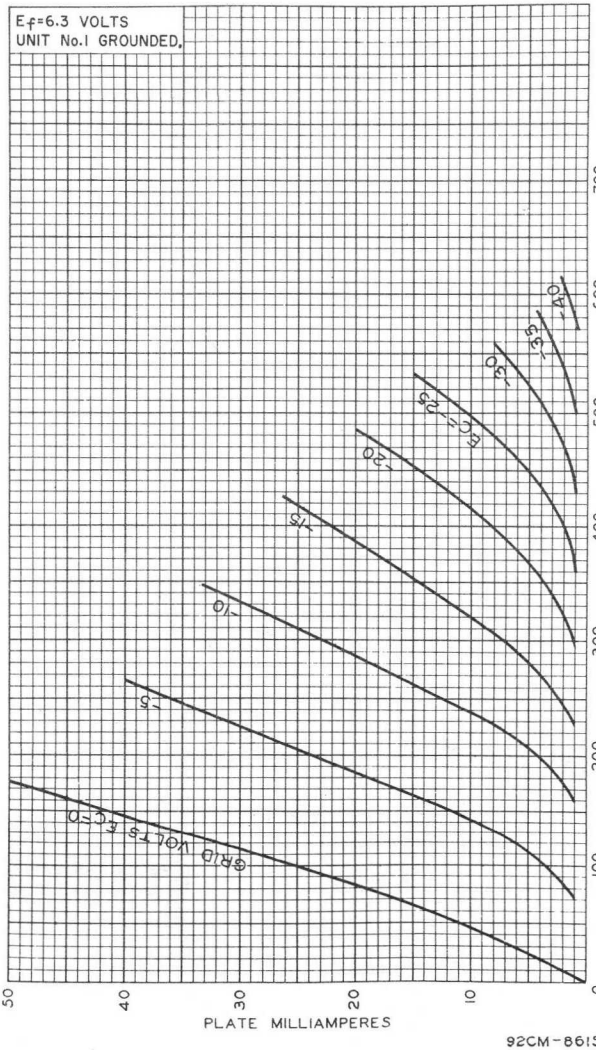
AVERAGE CHARACTERISTICS
Unit No.1



92CM-8616RI

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

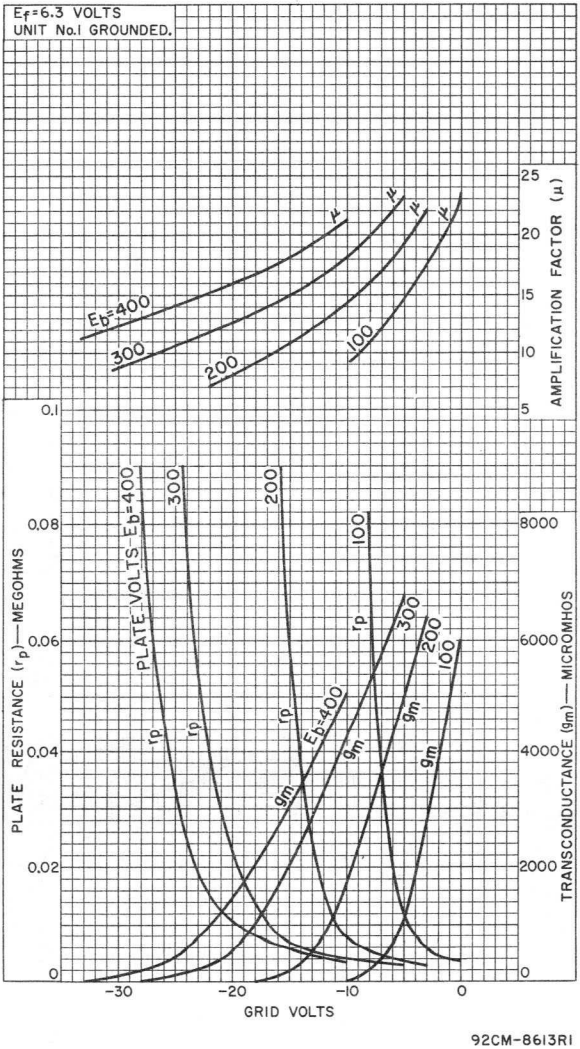
AVERAGE PLATE CHARACTERISTICS
Unit No.2



92CM-8615

6CM7

AVERAGE CHARACTERISTICS
Unit No.2



92CM-8613R1

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

Twin Diode—High-Mu Triode

9-PIN MINIATURE TYPE
With Heater Having Controlled Warm-Up Time

GENERAL DATA

Electrical:

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

Heater-section arrangement	*Parallel*	*Series*	*Series*	
Voltage (AC or DC)	3.15[a]	6.3[b]	6.3 ± 0.6	volts
Current	0.600 ± 0.040	0.300 ± 0.020	0.300[c]	amp
Warm-up time (Average)	11	11	–	sec

Peak heater-cathode voltage (Each unit):			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200[d]	max.	volts

Direct Interelectrode Capacitances (Approx):[e]

Triode Unit:		
Grid to plate	1.8	pf
Grid to cathode and heater	1.5	pf
Plate to cathode and heater	0.5	pf
Diode Units:		
Diode-No.1 plate to cathode of diodes No.1 and No.2 & internal shield, and heater	3.6	pf
Diode-No.2 plate to cathode of diodes No.1 and No.2 & internal shield, and heater	3.6	pf
Triode grid to either diode plate	0.006	pf

Characteristics, Class A_1 Amplifier (Triode Unit):

Plate Voltage	100	250	volts
Grid Voltage	−1	−3	volts
Amplification Factor	70	70	
Plate Resistance (Approx.)	54000	58000	ohms
Transconductance	1300	1200	μmhos
Plate Current	0.8	1	ma

Mechanical:

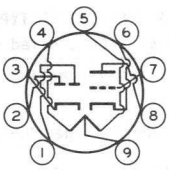
Operating Position	Any
Type of Cathodes	Coated Unipotential
Maximum Overall Length	2-3/16"
Maximum Seated Length	1-15/16"
Length, Base Seat to Bulb Top (Excluding tip)	1-9/16" ± 3/32"
Diameter	0.750" to 0.875"
Dimensional Outline	See *General Section*
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)

←Indicates a change.

6CN7

Basing Designation for BOTTOM VIEW. 9EN

Pin 1 – Diode–No.2 Plate
Pin 2 – Diode–No.1 Plate
Pin 3 – Cathode of Diodes No.1 & No.2, Internal Shield



Pin 4 – Heater
Pin 5 – Heater
Pin 6 – Triode Cathode
Pin 7 – Triode Grid
Pin 8 – Triode Plate
Pin 9 – Heater Tap

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

Typical Operation as Resistance-Coupled Amplifier:

See *RESISTANCE-COUPLED AMPLIFIER CHART No.7* at front of this section

DIODE UNITS — Two

Values are for Each Unit

Maximum Ratings, *Design-Maximum Values:*

PLATE CURRENT	5.5	max.	ma

Characteristics, Instantaneous Value:

Plate Current for plate volts = 5	20	ma

[a] At heater amperes = 0.600.
[b] At heater amperes = 0.300.
[c] At heater volts = 6.3
[d] The dc component must not exceed 100 volts.
[e] Without external shield.

CURVES

For Triode shown under Type 6T8A also apply to the 6CN7

Half-Wave Vacuum Rectifier

GENERAL DATA

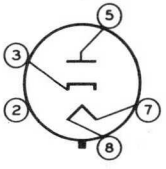
Electrical:

Heater Characteristics and Ratings *(Design-Maximum Values)*:		
Voltage (AC or DC)	6.3 ± 0.6	volts
Current at heater volts = 6.3	1.600	amp
Peak heater-cathode voltage:		
Heater negative with respect to cathode[a]	5500[b] max.	volts
Heater positive with respect to cathode	300[c] max.	volts
Direct Interelectrode Capacitances (Approx.):[d]		
Plate to cathode and heater	8.5	μμf
Cathode to plate and heater	11.5	μμf
Heater to cathode	4	μμf

Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	3-13/16"
Maximum Seated Length	3-1/4"
Maximum Diameter	1-9/32"
Bulb	T9
Bases (Alternates):	
Intermediate-Shell Octal with External Barriers: 5-Pin, Arrangement 2 (JEDEC Group 1, No.B5-147)	
Short Intermediate-Shell Octal with External Barriers: 5-Pin, Arrangement 2 (JEDEC Group 1, No.B5-85)	
Basing Designation for BOTTOM VIEW	4CG

Pin 2 – Do Not Use[e]
Pin 3 – Cathode
Pin 5 – Plate



Pin 7 – Heater
Pin 8 – Heater

DAMPER SERVICE

Maximum Ratings, *Design-Maximum Values:*

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

PEAK INVERSE PLATE VOLTAGE[a]	5500 max.	volts
PEAK PLATE CURRENT	1200 max.	ma
DC PLATE CURRENT	190 max.	ma
PLATE DISSIPATION	6.5 max.	watts

Characteristics, Instantaneous Value:

Tube Voltage Drop for plate ma. = 250	25	volts

[a] This rating is applicable when the duty cycle 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.

[b] The dc component must not exceed 900 volts.

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

[d] Without external shield.

[e] Socket terminals 1, 2, 4, and 6 should not be used as tie points.

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

Medium-Mu Triode—
Sharp-Cutoff Tetrode

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▲*	
Triode Unit:			
Grid to plate	1.8	1.8	μμf
Grid to cathode and heater	2.7	2.7	μμf
Plate to cathode and heater	0.4	1.2	μμf
Tetrode Unit:			
Grid No.1 to plate	0.019 max.	0.015 max.	μμf
Grid No.1 to cathode & internal shield, grid No.2, and heater	5	5	μμf
Plate to cathode & internal shield, grid No.2, and heater	2.5	3.3	μμf
Tetrode plate to triode plate	0.07 max.	0.01 max.	μμf
Heater to cathode (Each unit)	3	3●	μμf

Characteristics, Class A_1 Amplifier:

	Triode Unit	*Tetrode Unit*	
Plate Supply Voltage	125	125	volts
Grid-No.2 Supply Voltage	–	125	volts
Grid-No.1 Supply Voltage	–	-1	volt
Cathode Resistor	56	–	ohms
Amplification Factor	40	–	
Plate Resistance (Approx.)	5000	140000	ohms
Transconductance	8000	5800	μmhos
Plate Current	15	12	ma
Grid-No.2 Current	–	4.2	ma
Grid-No.1 Voltage (Approx.) for plate μa = 100	-7	-7	volts

Mechanical:

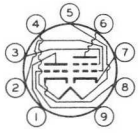
Operating Position . . . . . Any

← Indicates a change.

6CQ8

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. 9GE

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



Pin 7 – Tetrode Cathode, Internal Shield
Pin 8 – Triode Cathode
Pin 9 – Triode Grid

AMPLIFIER — Class A_1

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

	Triode Unit	*Tetrode 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	–	0.7 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	
GRID INPUT.	0.55 max.	–	watt
PLATE DISSIPATION	3.1 max.	3.2 max.	watts
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	*Tetrode 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

→Indicates a change.

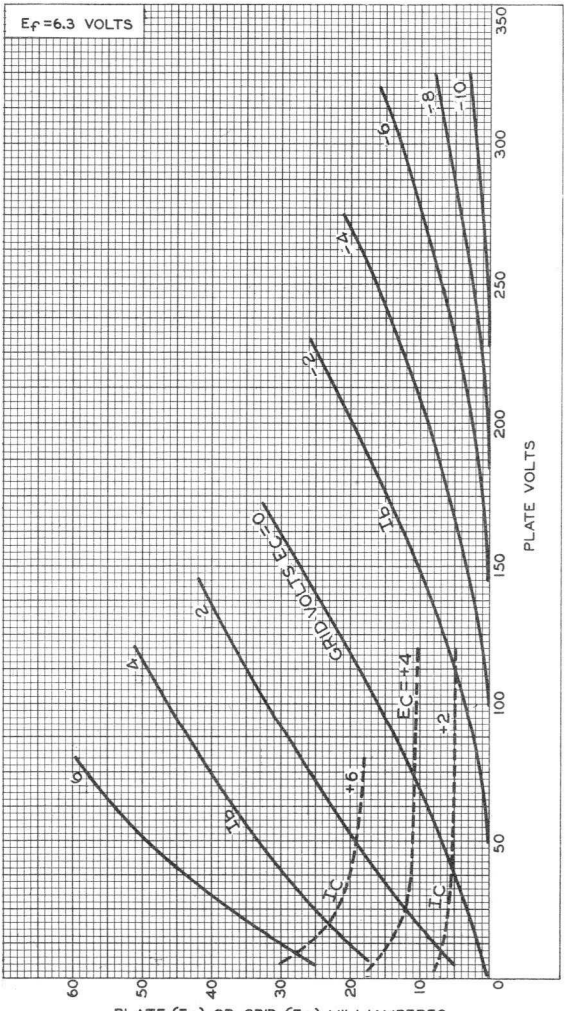
▲ With external shield JEDEC No.315 connected to cathode of unit under test except as noted.

● With external shield JEDEC No.315 connected to ground.

★ The dc component must not exceed 100 volts.

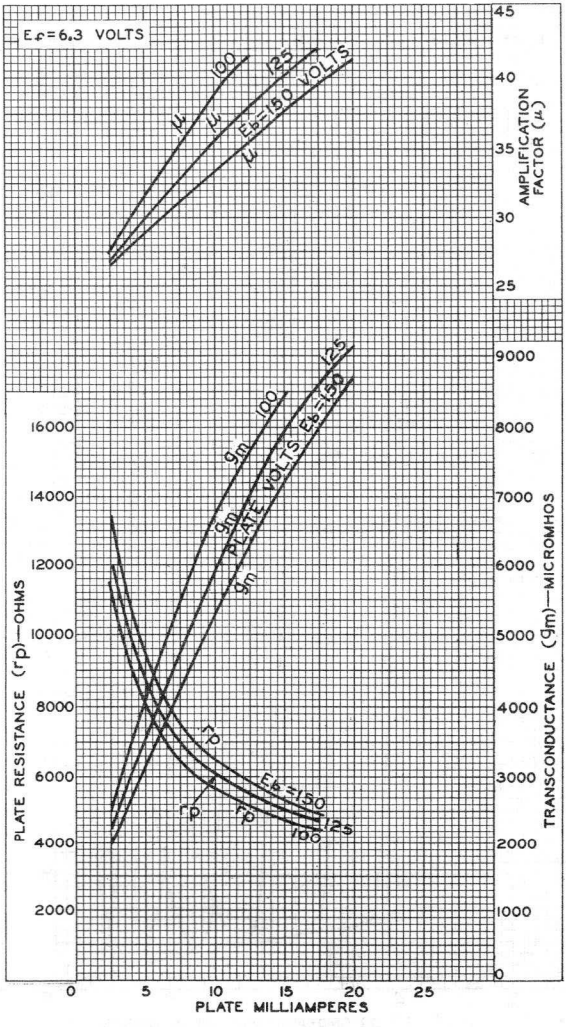
6CQ8

AVERAGE CHARACTERISTICS
Triode Unit



92CM-9190RI

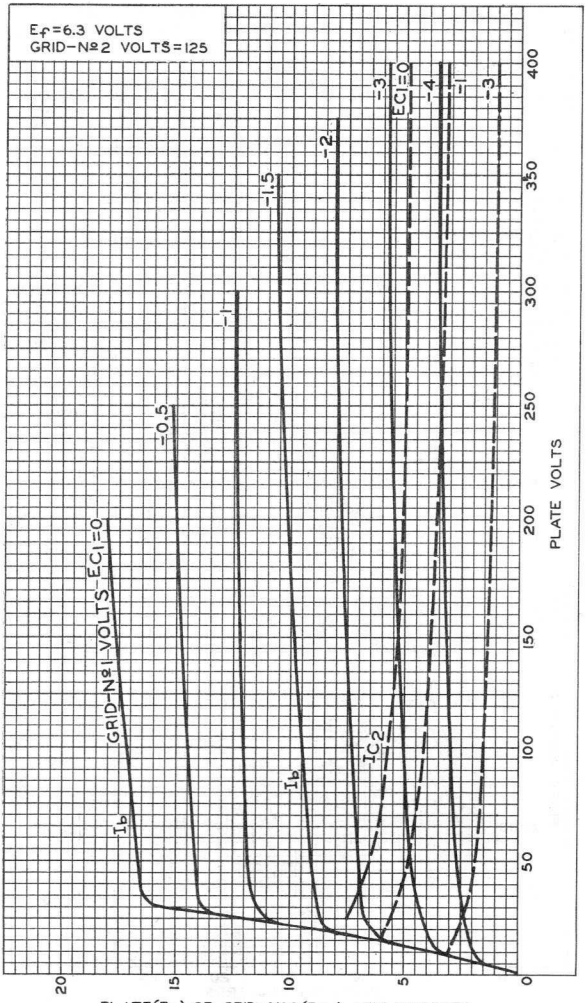
AVERAGE CHARACTERISTICS
Triode Unit



92CM-7871RI

6CQ8

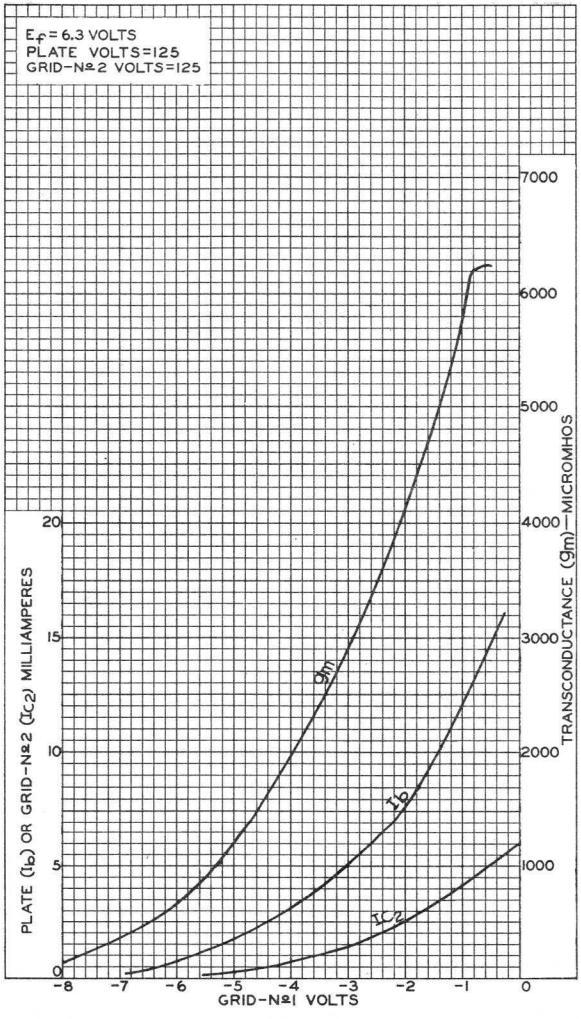
AVERAGE CHARACTERISTICS
Tetrode Unit



92CM-9197

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

AVERAGE CHARACTERISTICS
Tetrode Unit



92CM-9195

6CS6

PENTAGRID AMPLIFIER

7-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage	6.3	ac or dc volts
Current	0.3	amp
Direct Interelectrode Capacitances (Approx.):°		
Grid No.1 to plate	0.07 max.	μμf ←
Grid No.3 to plate	0.36 max.	μμf
Grid No.1 to grid No.3	0.22 max.	μμf ←
Grid No.1 to cathode & grid No.5, grid No.4 & grid No.2, grid No.3, and heater	5.5	μμf
Grid No.3 to cathode & grid No.5, grid No.4 & grid No.2, grid No.1, and heater	7	μμf
Plate to cathode & grid No.5, grid No.4 & grid No.2, grid No.3, grid No.1, and heater	7.5	μμf

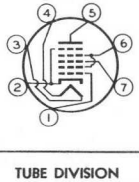
Characteristics, Class A_1 Amplifier:

Plate Voltage	100	100	volts
Grid-No.2 & Grid-No.4 Voltage	30	30	volts
Grid-No.3 Voltage	-1	0	volt
Grid-No.1 Voltage	0	-1	volt
Plate Resistance (Approx.)	0.7	1	megohm
Grid-No.3-to-Plate Transconductance	1500	-	μmhos ←
Grid-No.1-to-Plate Transconductance	-	1100	μmhos ←
Plate Current	0.8	1	ma ←
Grid-No.2 & Grid-No.4 Current	5.5	1.3	ma ←
Grid-No.3 Voltage (Approx.) for plate current of 50 μamp	-2.2	-	volts
Grid-No.1 Voltage (Approx.) for plate current of 50 μamp	-	-2.5	volts

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-1/8"
Maximum Seated Length	1-7/8"
Length, Base Seat to Bulb Top (Excluding tip)	1-1/2" ± 3/32"
Maximum Diameter	3/4"
Dimensional Outline	*See General Section*
Bulb	T-5-1/2
Base	Small-Button Miniature 7-Pin (JETEC No.E7-1)
Basing Designation for BOTTOM VIEW	7CH

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



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

° Without external shield.

← Indicates a change.

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6CS6

PENTAGRID AMPLIFIER

GATED AMPLIFIER SERVICE

Maximum Ratings, *Design-Center Values*:

PLATE VOLTAGE	300	max.	volts
GRID-No.2 & GRID-No.4 SUPPLY VOLTAGE	300	max.	volts
GRID-No.2 & GRID-No.4 VOLTAGE	*See Grid-No.2 Input Rating Chart at front of Receiving Tube Section*		
PLATE DISSIPATION	1	max.	watt
GRID-No.2 & GRID-No.4 INPUT:			
For grid-No.2 & grid-No.4 voltages up to 150 volts	1	max.	watt
For grid-No.2 & grid-No.4 voltages between 150 and 300 volts	*See Grid-No.2 Input Rating Chart at front of Receiving Tube Section*		
CATHODE CURRENT	14	max.	ma
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 Sync Separator and Sync Clipper:

Plate Voltage	10	volts
Grid-No.2 & Grid-No.4 Voltage	30	volts
Grid-No.3 Voltage	0	volts
Grid-No.1 Voltage	0	volts
→ Plate Current	2.0	ma
→ Grid-No.2 & Grid-No.4 Current	4.5	ma

Maximum Circuit Values:

Grid-No.1-Circuit Resistance	0.47	max.	megohm
Grid-No.3-Circuit Resistance	2.2	max.	megohms

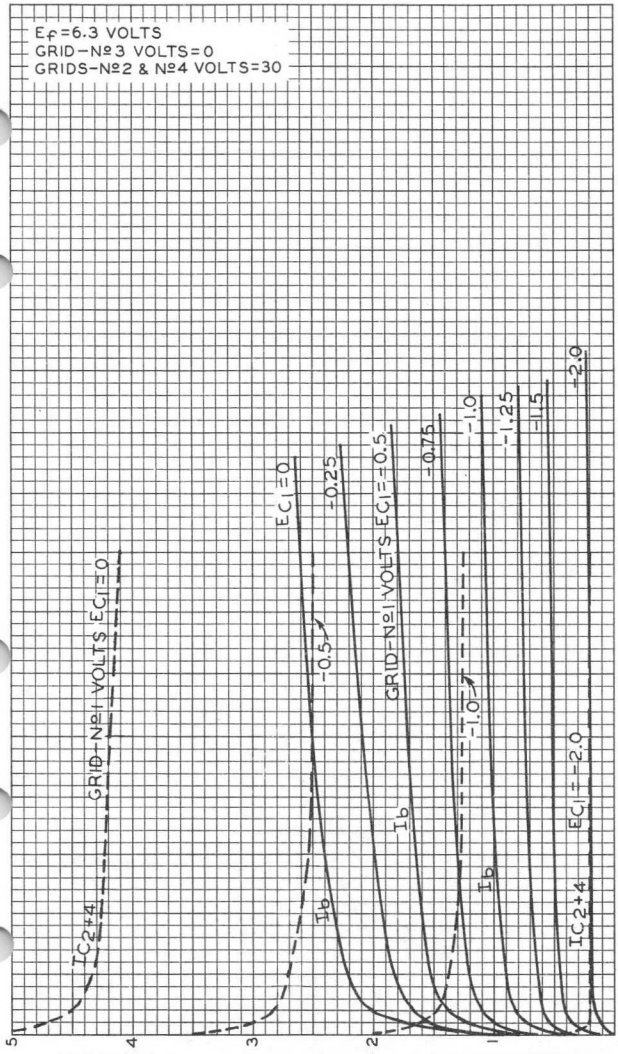
▲ The dc component must not exceed 100 volts.

→ Indicates a change.

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

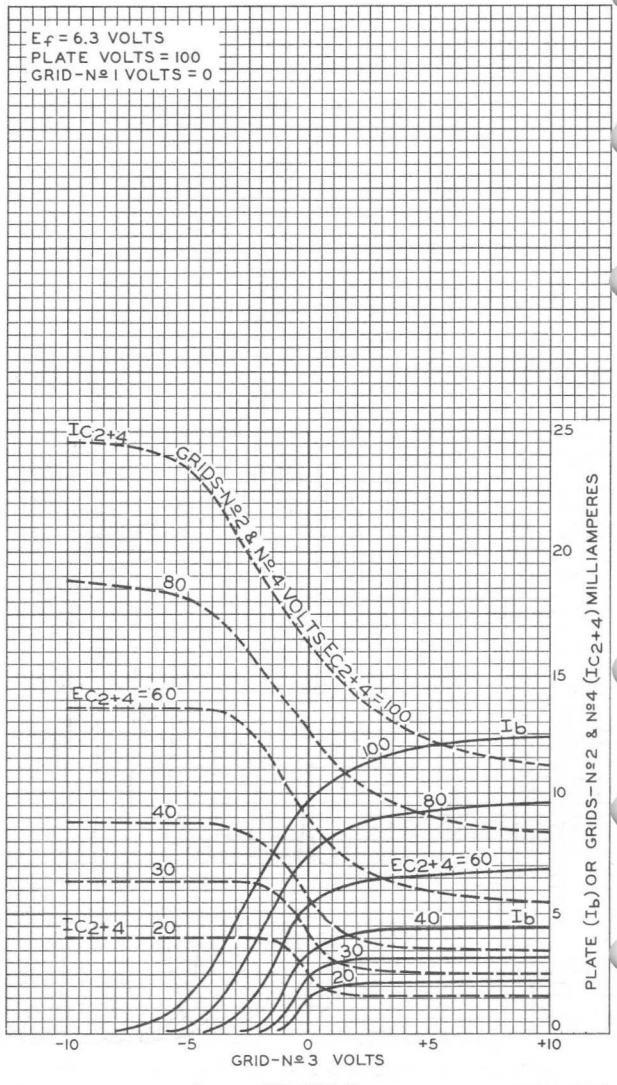
6CS6

AVERAGE CHARACTERISTICS



6CS6

AVERAGE CHARACTERISTICS



TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-8926

6CS7

MEDIUM-MU DUAL TRIODE
With Dissimilar Units

9-PIN MINIATURE TYPE

Intended for use in equipment having series heater-string arrangement

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:

Voltage	6.3	ac or dc volts
Current	0.6	amp
Warm-up time (Average)	11	sec

For definition of heater warm-up time and method of determining it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of this Section.

Direct Interelectrode Capacitances (Approx.):°

	Unit No.1 Oscillator	*Unit No.2 Amplifier*	
Grid to plate	2.6	2.6	μμf
Grid to cathode and heater	1.8	3	μμf
Plate to cathode and heater	0.5	0.5	μμf

Characteristics, Class A_1 Amplifier:

	Unit No.1 Oscillator	*Unit No.2 Amplifier*	
Plate Voltage	250	250	volts
Grid Voltage	-8.5	-10.5	volts
Amplification Factor	17	15.5	
Plate Resistance (Approx.)	7700	3450	ohms
Transconductance	2200	4500	μmhos
Plate Current	10.5	19	ma
Plate Current for grid volts = -16	-	3	ma
Grid Voltage (Approx.) for plate current of:			
10 microamperes	-24	-	volts
50 microamperes	-	-22	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

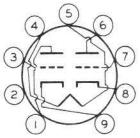
°: See next page.

6CS7

MEDIUM-MU DUAL TRIODE
With Dissimilar Units

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

Pin 1 - Plate of Unit No.2
Pin 2 - No Connection
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-Center Values:*

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

DC PLATE VOLTAGE.	500	max.	volts
PEAK NEGATIVE-PULSE GRID VOLTAGE.	400	max.	volts
CATHODE CURRENT:			
Peak.	70	max.	ma
DC.	20	max.	ma
PLATE DISSIPATION	1.25	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-Circuit Resistance	2.2	max.	megohms

VERTICAL-DEFLECTION AMPLIFIER

Values are for Unit No.2

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

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

DC PLATE VOLTAGE.	500	max.	volts
PEAK POSITIVE-PULSE PLATE VOLTAGE* (Absolute maximum).	2200■	max.	volts
PEAK NEGATIVE-PULSE GRID VOLTAGE.	250	max.	volts
CATHODE CURRENT:			
Peak.	105	max.	ma
DC.	30	max.	ma
PLATE DISSIPATION	6.5	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode.	200	max.	volts
Heater positive with respect to cathode.	200▲	max.	volts

o,□,▲,#,■: See next page.

6CS7

MEDIUM-MU DUAL TRIODE

With Dissimilar Units

Maximum Circuit Values:

Grid-Circuit Resistance. . . . . 2.2 max. megohms

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

▲ The dc component must not exceed 100 volts.

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.

■ Under no circumstances should this absolute value be exceeded.

○ Without external shield.

Half-Wave Rectifier

9-Pin Miniature Type

i_{bm} = 1200 max. mA P_b = 4.75 max. W

For Black-and-White and Small-Screen Color-TV Damper Diode Applications

ELECTRICAL CHARACTERISTICS - Bogey Values

Heater Voltage, ac or dc	E_h	6.3	V
Heater Current	I_h	1.2	A
Direct Interelectrode Capacitances:[a]			
Plate to cathode and heater	$c_{p(k+h)}$	12.0	pF
Cathode to plate and heater	$c_{k(p+h)}$	9.5	pF
Heater to cathode	c_{hk}	2.8	pF
Instantaneous Tube Voltage Drop for instantaneous plate current (i_b) = 350 mA.	e_b	16	V

MECHANICAL CHARACTERISTICS

Maximum Overall Length (l_m) . . . . . 3.125 in (79.37 mm)
Maximum Seated Length (l_{sm}) . . . . . 2.875 in (73.02 mm)
Maximum Diameter (d_m) . . . . . 0.875 in (22.22 mm)
Envelope . . . . . JEDEC Designation 6-1/2
Base . . . . Small-Button Noval 9-Pin JEDEC Designation E9-1
Terminal Connections
(See *TERMINAL DIAGRAM*) . . . . JEDEC Designation 9RX
Type of Cathode . . . . . Coated Unipotential
Operating Position . . . . . Any

MAXIMUM RATINGS - Design-Maximum Values[b]

For operation as a Damper Tube in TV Receivers utilizing a 525-line, 30-frame system[c]

Peak Inverse Plate Voltage	$-e_{bm}$	5000[d]	V
Heater-Cathode Voltage:			
Peak	e_{hkm}	+300	V
		-5000	V

Average[e]	$E_{hk(av)}$	+100	V
		-900	V
Heater Voltage, ac or dc	E_h	5.7 to 6.9	V
Plate Current:			
Peak	i_{bm}	1200	mA
Average[e]	$I_{b(av)}$	250	mA
Plate Dissipation	P_b	4.75	W
Envelope Temperature (at hottest point on envelope surface)	T_E	220	°C

[a] Measured without external shield in accordance with the current issue of EIA Standard RS-191.

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

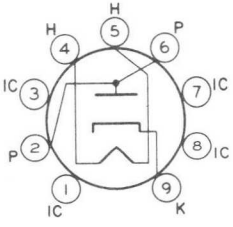
[c] As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations", Federal Communications Commission.

[d] This rating is applicable when the duration of the voltage pulse does not exceed 15% of one horizontal scanning cycle. In a 525-line, 30-frame system, 15% of one horizontal scanning cycle is 10 μs.

[e] Measured with a dc meter.

TERMINAL DIAGRAM (Bottom View)

Pin 1 - Do Not Use
Pin 2 - Plate
Pin 3 - Do Not Use
Pin 4 - Heater
Pin 5 - Heater
Pin 6 - Plate
Pin 7 - Do Not Use
Pin 8 - Do Not Use
Pin 9 - Cathode



JEDEC 9RX

OPERATING CONSIDERATIONS

Socket terminals 1, 3, 7, and 8 should not be used as tie points for external-circuit components. It is recommended that these socket tabs be removed to reduce the possibility of arc-over and to minimize leakage.

Beam Power Tube

7-PIN MINIATURE TYPE

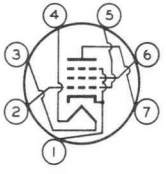
GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	6.3 ± 10%	volts
Current at 6.3 volts	1.2	amp
Direct Interelectrode Capacitances (Approx.):[a]		
Grid No.1 to plate	0.6	μμf
Grid No.1 to cathode & grid No.3, grid No.2, and heater	13	μμf
Plate to cathode & grid No.3, grid No.2, and heater	8.5	μμf

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	0.650" 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	7CV



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

AMPLIFIER — Class A_1

Maximum Ratings, *Design-Maximum Values:*

PLATE VOLTAGE	150	max.	volts
GRID-No.2 (SCREEN-GRID) VOLTAGE	130	max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:			
Positive-bias value	0	max.	volts
PLATE DISSIPATION	7	max.	watts
GRID-No.2 INPUT	1.4	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
BULB TEMPERATURE (At hottest point on bulb surface)	220	max.	°C

← Indicates a change.

Typical Operation and Characteristics:

Plate Voltage	120	volts
Grid-No.2 Voltage	110	volts
Grid-No.1 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	%
Max.-Signal Power Output	2.3	watts

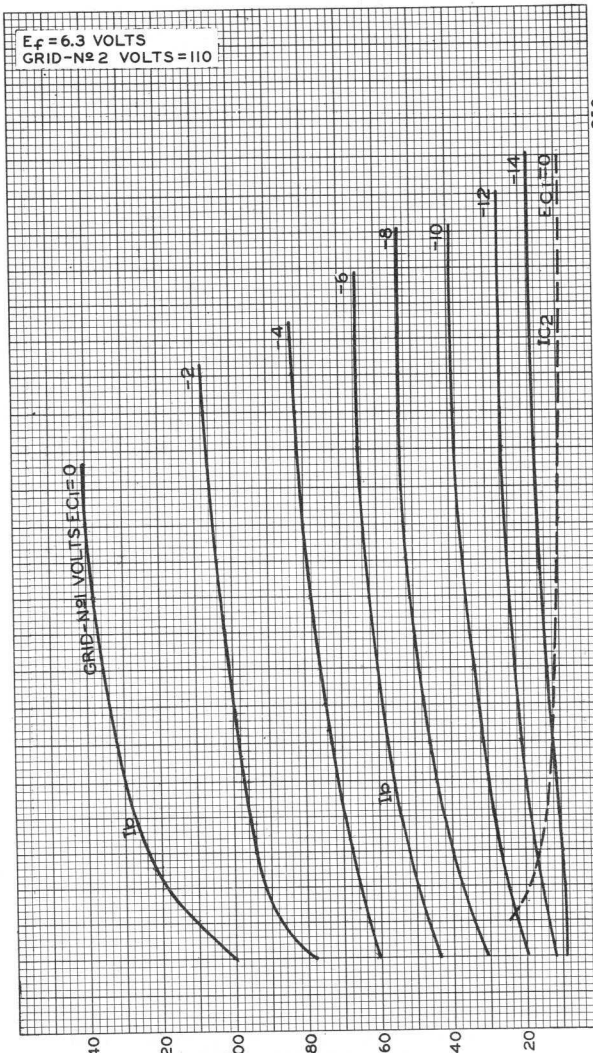
Maximum Circuit Values:

Grid-No.1-Circuit Resistance:		
For fixed-bias operation	0.1 max.	megohm
For cathode-bias operation	0.5 max.	megohm

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

6CU5

AVERAGE CHARACTERISTICS

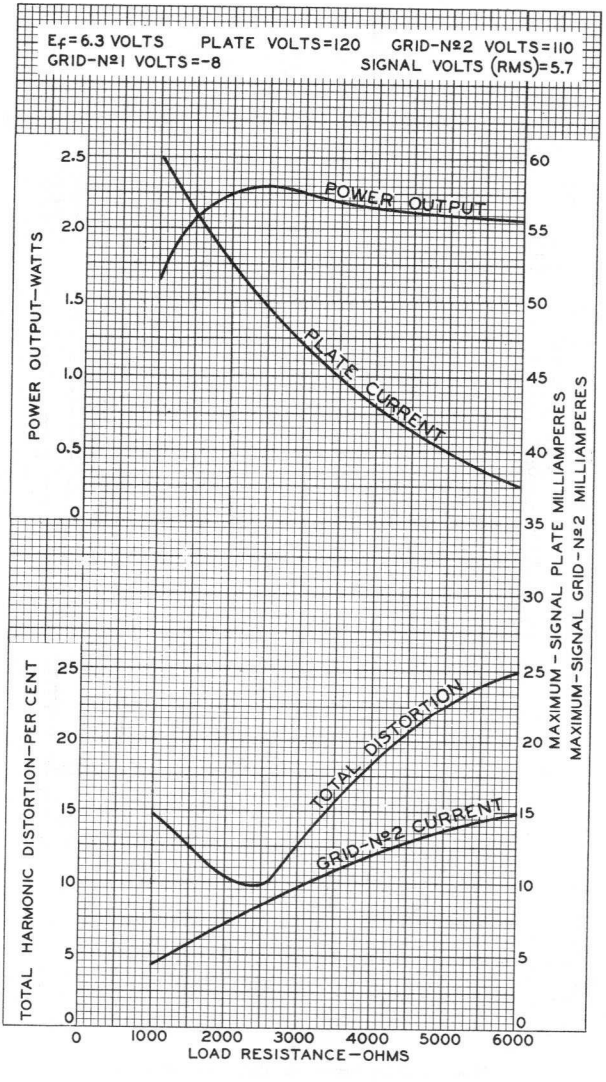


TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY
92CM-8908RI

RCA

6CU5

OPERATION CHARACTERISTICS



6CU8

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:[o]		
Triode Unit:		
Grid to plate	1.6	μμf
Grid to cathode & pentode grid No.3 & internal shield, and heater	1.9	μμf
Plate to cathode & pentode grid No.3 & internal shield, and heater	1.6	μμf
Pentode Unit:		
Grid No.1 to plate	0.025 max.	μμf
Grid No.1 cathode, grid No.3 & triode cathode & internal shield, grid No.2, and heater	7	μμf
Plate to cathode, grid No.3 & triode cathode & internal shield, grid No.2, and heater	2.4	μμf
Pentode grid No.1 to triode plate	0.03 max.	μμf
Pentode plate to triode plate	0.07 max.	μμf

Characteristics, Class A_1 Amplifier:

	Triode Unit	*Pentode Unit*	
Plate Supply Voltage	125	125	volts
Grid-No.2 Supply Voltage	–	125	volts
Grid-No.1 Voltage	-1	0	volts
Cathode Resistor	0	56	ohms
Amplification Factor	24	–	
Plate Resistance (Approx.)	4100	170000	ohms
Transconductance	5800	7800	μmhos
Plate Current	17	12	ma
Grid-No.2 Current	–	3.8	ma
Grid-No.1 Voltage (Approx.) for plate μa = 20	-12	-6	volts
Grid-No.1 Voltage (Approx.) for plate ma. = 1.6, and cathode resistor (ohms) = 0	–	-3	volts

Mechanical:

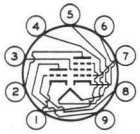
Operating Position	Any
Maximum Overall Length	2-3/16"
Maximum Seated Length	1-15/16"

→ Indicates a change.

6CU8
MEDIUM-MU TRIODE—SHARP-CUTOFF PENTODE

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	9GM

Pin 1 – Triode Cathode, Pentode Grid No.3, Internal Shield
Pin 2 – Pentode Plate
Pin 3 – Pentode Grid No.2



Pin 4 – Heater
Pin 5 – Heater
Pin 6 – Pentode Cathode
Pin 7 – Pentode Grid No.1
Pin 8 – Triode Grid
Pin 9 – Triode 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
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	2.8 max.	2.3 max.	watts
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

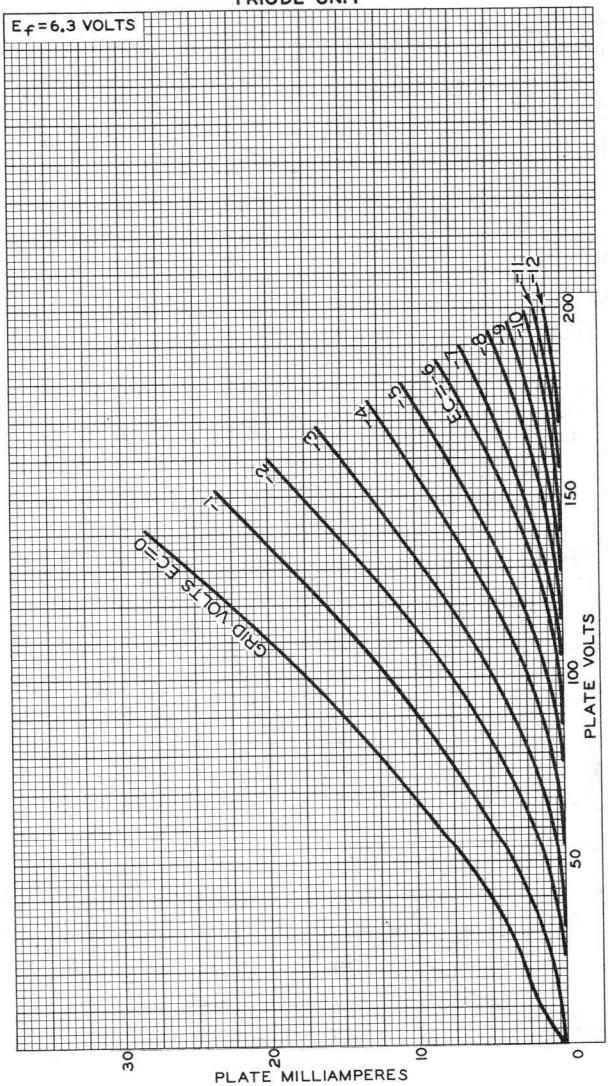
○ Without external shield.
▲ The dc component must not exceed 100 volts.

→ Indicates a change.

6CU8

AVERAGE PLATE CHARACTERISTICS

TRIODE UNIT



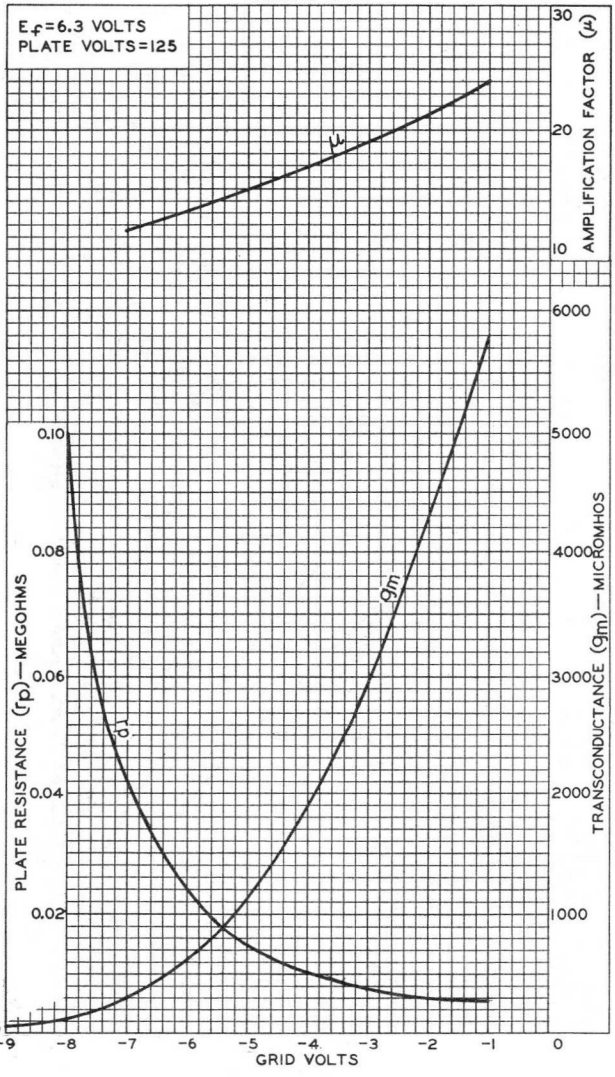
ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-10353

RCA

6CU8

AVERAGE CHARACTERISTICS
TRIODE UNIT



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

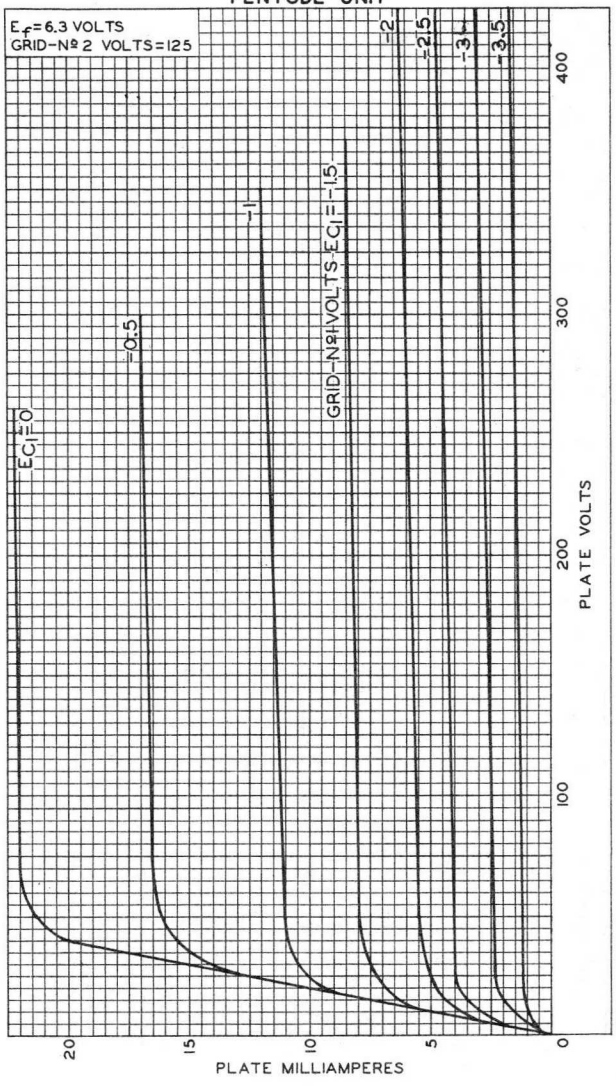
92CM-10352

RCA

6CU8

AVERAGE PLATE CHARACTERISTICS

PENTODE UNIT



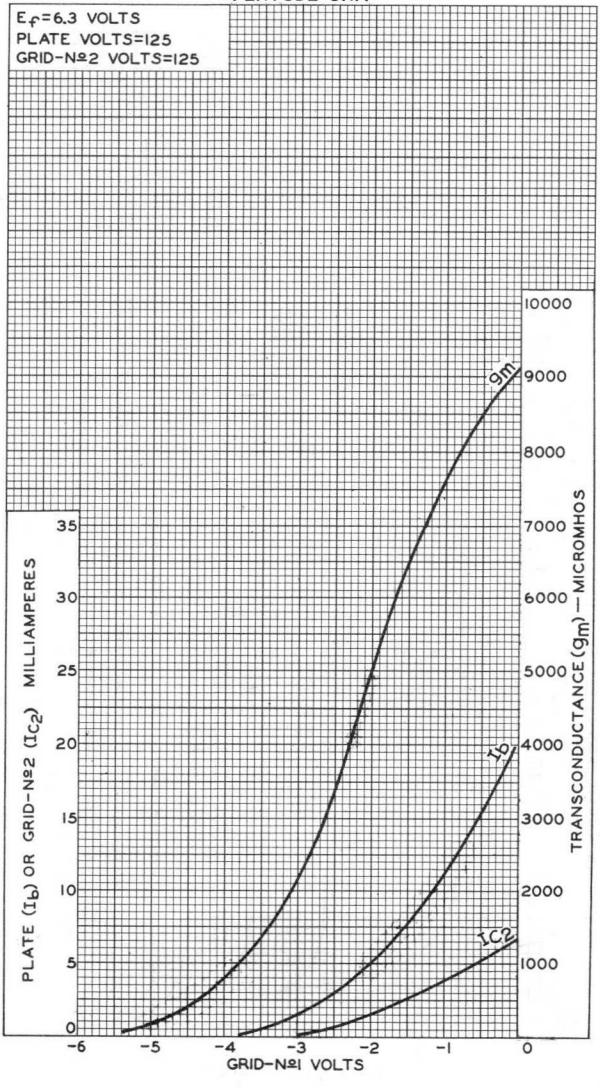
ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-10646

6CU8

6CU8

AVERAGE CHARACTERISTICS
PENTODE UNIT



6CW4

High-Mu Triode

NUVISTOR TYPE

For Use as Grounded-Cathode, Neutralized RF-Amplifier Tube in Tuners of VHF Television and FM Receivers

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	0.135	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.):		
Grid to plate	0.92	pf
Grid to cathode, shell, and heater	4.3	pf
Plate to cathode, shell, and heater	1.8	pf
Plate to cathode	0.18	pf
Heater to cathode	1.6	pf

Characteristics, Class A$_1$ Amplifier:

Plate Supply Voltage	110	volts
Grid Supply Voltage	0	volts
Cathode Resistor	130	ohms
Amplification Factor	65	
Plate Resistance (Approx.)	6600	ohms
Transconductance	9800	μmhos
Plate Current	7	ma
Grid Voltage (Approx.) for plate μa = 10.	-4	volts

Mechanical:

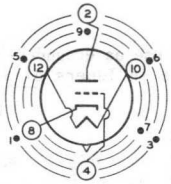
Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	0.800"
Maximum Seated Length	0.625"
Maximum Diameter	0.440"
Envelope	Metal Shell MT4
Socket	Cinch Mfg. Corp. No. 133 65 10 001, ← Industrial Electronic Hardware Co. No. Nu 5044 or No. Nu 5060, or equivalent
Base	Medium Ceramic-Wafer Twelvar 5-Pin (JEDEC No. E5-65)

← Indicates a change.

6CW4

Basing Designation for BOTTOM VIEW. 12AQ

Pin 1[a] – Do Not Use
Pin 2 – Plate
Pin 3 – Same as Pin 1
Pin 4 – Grid
Pin 5 – Same as Pin 1
Pin 6 – Same as Pin 1
Pin 7 – Same as Pin 1
Pin 8 – Cathode
Pin 9 – Same as Pin 1
Pin 10 – Heater
Pin 12 – Heater



INDEX=LARGE LUG
●=SHORT PIN

AMPLIFIER — Class A1

Maximum Ratings, *Design-Maximum Values:*

PLATE SUPPLY VOLTAGE.	300[b]	max.	volts
→ PLATE VOLTAGE	135	max.	volts
GRID VOLTAGE:			
Negative-bias value	55	max.	volts
Peak-positive value	0	max.	volts
CATHODE CURRENT	15	max.	ma
→ PLATE DISSIPATION:			
With a minimum series plate-circuit resistance of 5000 ohms	1.5	max.	watts
For lower values of series plate-circuit resistance.	See accompanying *Plate-Dissipation-Rating Chart*		

Typical Operation:

Plate Voltage	70	volts
Grid Supply Voltage	0	volts
Grid Resistor	47000	ohms
Amplification Factor.	68	
Plate Resistance (Approx.).	5440	ohms
Transconductance.	12500	μmhos
→ Plate Current	7.2	ma

Maximum Circuit Values:

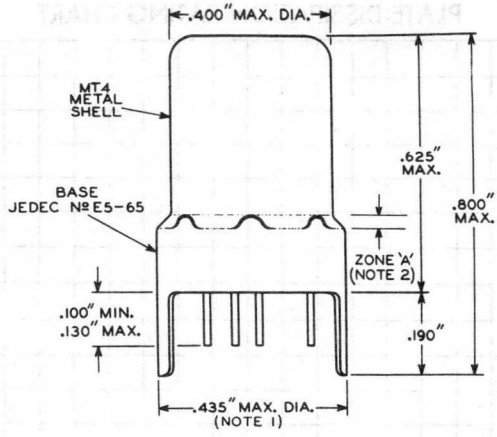
Grid-Circuit Resistance:[c]			
For fixed-bias operation.	0.5	max.	megohm
For cathode-bias operation.	2.2	max.	megohms

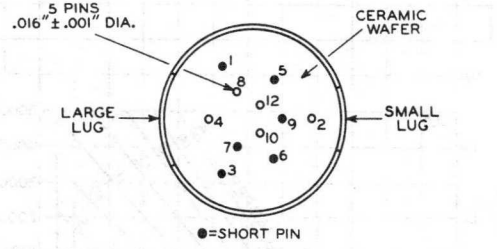
[a] Pin is of a length such that its end does not touch the socket insertion plane.

→ [b] A plate supply voltage of 300 volts may be used provided sufficient plate-circuit resistance and agc voltage are used to limit the voltage at the plate of the tube to 135 volts under conditions of maximum-rated plate dissipation (1.5 watts).

→ [c] For operation at metal-shell temperatures up to 135° C.

→ Indicates a change.



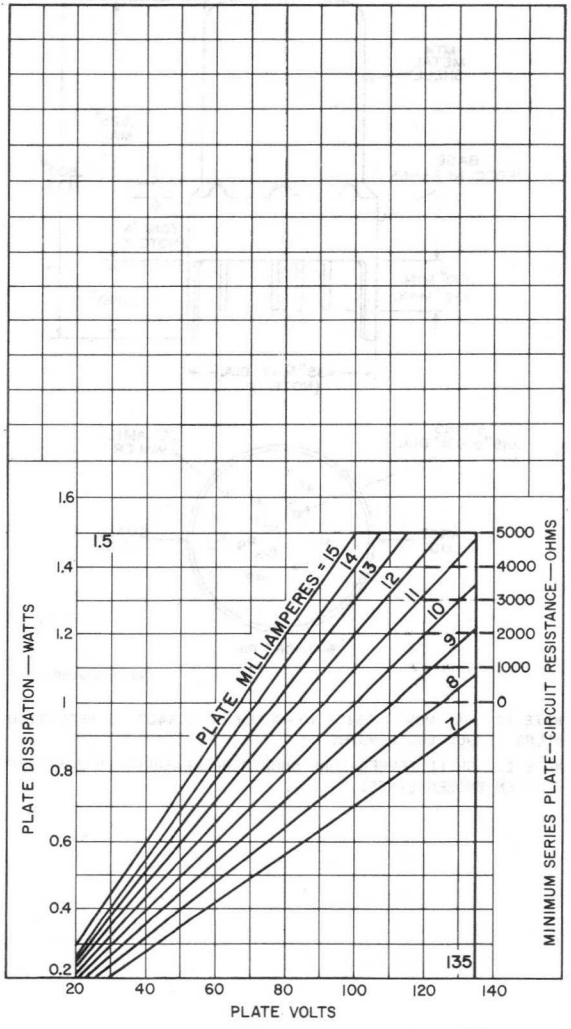


92CS-10970R3

NOTE 1: MAXIMUM OUTSIDE DIAMETER OF 0.440" IS PERMITTED ALONG 0.190" LUG LENGTH.

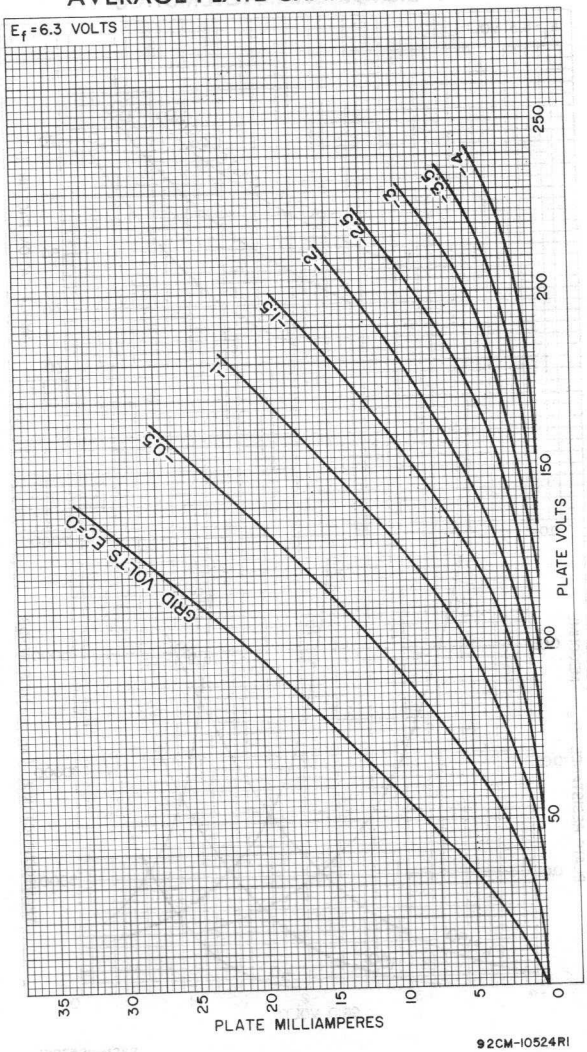
NOTE 2: SHELL TEMPERATURE SHOULD BE MEASURED IN ZONE "A" BETWEEN BROKEN LINES.

PLATE-DISSIPATION-RATING CHART



92CM-11681

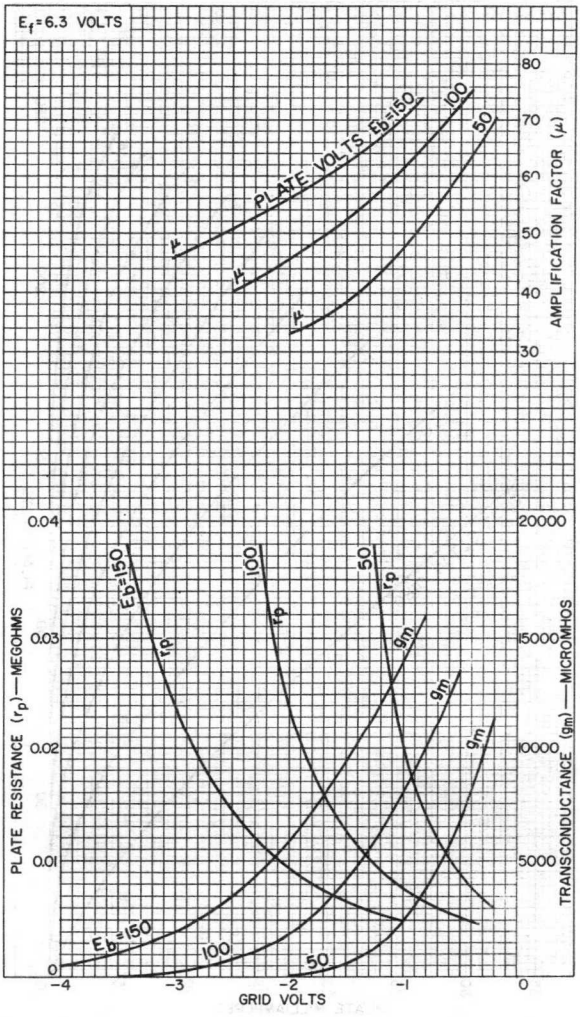
AVERAGE PLATE CHARACTERISTICS



92CM-10524RI

6CW4

AVERAGE CHARACTERISTICS



92CM-10520R1

6CW5

Beam Power Tube

Electrical:

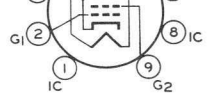
Heater Characteristics and Ratings:		
Voltage (AC or DC)	6.3 ± 0.6	volts
Current at 6.3 volts	0.760	amp
Maximum Heater-Cathode Voltage:		
Heater negative with respect to cathode:		
Peak	330	volts
DC Component	220	volts
Heater positive with respect to cathode:		
Peak	330	volts
DC Component	220	volts
Direct Interelectrode Capacitances:		
Input: G1 to (K + G3, G2, H)	13.0	pf
Output: P to (K + G3, G2, H)	6.8	pf
Plate to grid No.1	0.6 max.	pf
Grid No.1 to heater	0.25 max.	pf

Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
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 9CV

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



AMPLIFIER — Class A1

Characteristics:

Plate Voltage	170	volts
Grid-No.2 (Screen-Grid) Voltage	170	volts
Grid-No.1 (Control-Grid) Voltage	-12.5	volts
Mu-Factor, Grid No.2 to Grid No.1	8	
Plate Resistance (Approx.)	26000	ohms
Transconductance	11000	μmhos
Plate Current	70	ma
Grid-No.2 Current	3.5	ma

Maximum Ratings, *Design-Maximum Values:*

Plate Supply Voltage	600	volts
Plate Voltage	275	volts
Grid No.2 Supply Voltage	600	volts
Grid No.2 Voltage	220	volts
Average Cathode Current	110	ma
Grid No.2 Input:		
Peak	7	watts
Average	2.1	watts
Plate Dissipation	14	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance	1	megohm

VERTICAL-DEFLECTION AMPLIFIER

Maximum Ratings, *Design-Maximum Values:*

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

DC Plate Voltage	275	volts
Peak Positive-Pulse Plate Voltage	2200[b]	volts
DC Grid-No.2 Voltage	275	volts
Peak Negative-Pulse Grid-No.1 Voltage	250	volts
Cathode Current:		
Peak	240	ma
Average	110	ma
Grid No.2 Input	2.1	watts
Plate Dissipation	12	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance	2.2	megohms

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

[b] Maximum pulse duration 6 percent of a cycle with a maximum of 1.2 milliseconds.

6CX8

MEDIUM-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	0.75	amp
Direct Interelectrode Capacitances:°		
Triode Unit:		
Grid to plate	4.4	μμf
Grid to cathode and heater	2.2	μμf
Plate to cathode and heater	0.38	μμf
Pentode Unit:		
Grid No.1 to plate	0.06	μμf
Grid No.1 to cathode & internal shield & grid No.3, grid No.2, and heater	9	μμf
Plate to cathode & internal shield & grid No.3, grid No.2, and heater	4.4	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	150	40	200	volts
Grid-No.2 Supply Voltage	–	125	125	volts
Grid-No.1 Voltage	–	0	–	volts
Cathode Resistor	150	–	68	ohms
Amplification Factor	40	–	–	
Plate Resistance (Approx.)	8700	–	70000	ohms
Transconductance	4600	–	10000	μmhos
Plate Current	9.2	40*	24	ma
Grid-No.2 Current	–	15.5*	5.2	ma
Grid-No.1 Voltage (Approx.) for plate μa = 100	-5	–	-8.5	volts

Mechanical:

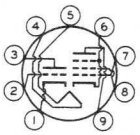
Operating Position	Any
Maximum Overall Length	2-5/8"
Maximum Seated Length	2-3/8"
Length, Base Seat to Bulb Top (Excluding tip)	2" ± 3/32"
Diameter	0.750" to 0.875"
Dimensional Outline	*See General Section*
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)

6CX8

MEDIUM-MU TRIODE–SHARP-CUTOFF PENTODE

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
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*		
PLATE DISSIPATION.	2	max.	5	max.	watts
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

o 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.

6CY5
SHARP-CUTOFF TETRODE

7-PIN MINIATURE TYPE

For use as rf amplifier in VHF tuners of television receivers

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	6.3 ± 10%	volts ←
Current	0.2	amp
Direct Interelectrode Capacitances (Approx.):		
Grid No.1 to plate	0.03	μμf
Grid No.1 to cathode & internal shield, grid No.2, and heater	4.5	μμf
Plate to cathode & internal shield, grid No.2, and heater	3	μμf

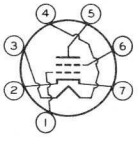
Characteristics, Class A_1 Amplifier:

Plate Voltage	125	volts
Grid-No.2 Voltage	80	volts
Grid-No.1 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	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	180 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*	

← Indicates a change.

6CY5

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	100 max.	volts
Heater positive with respect to cathode	100 max.	volts

Maximum Circuit Values:

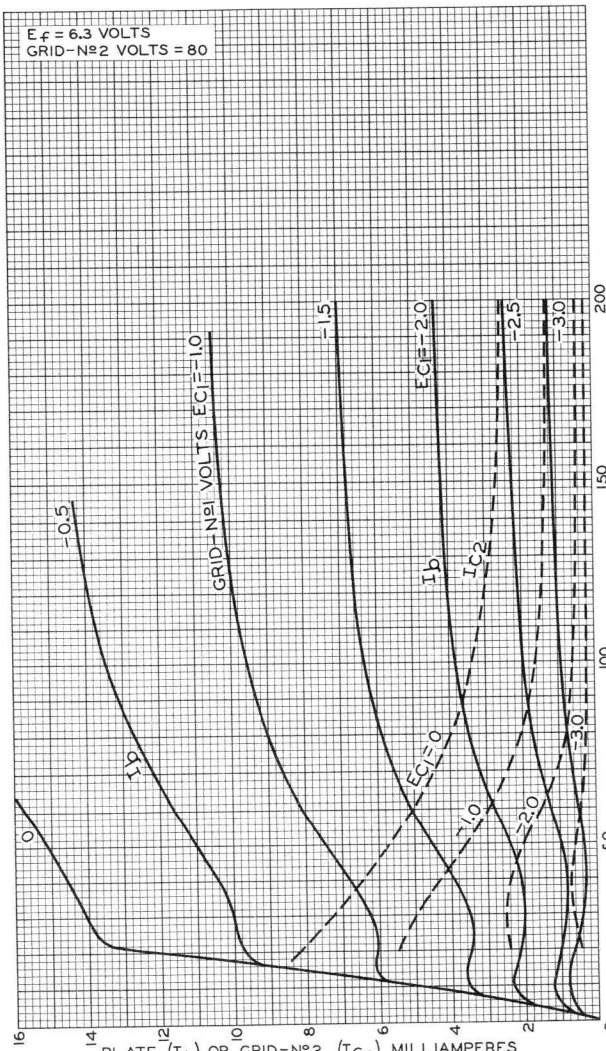
Grid-No.1-Circuit Resistance	0.5 max.	megohm

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

RCA

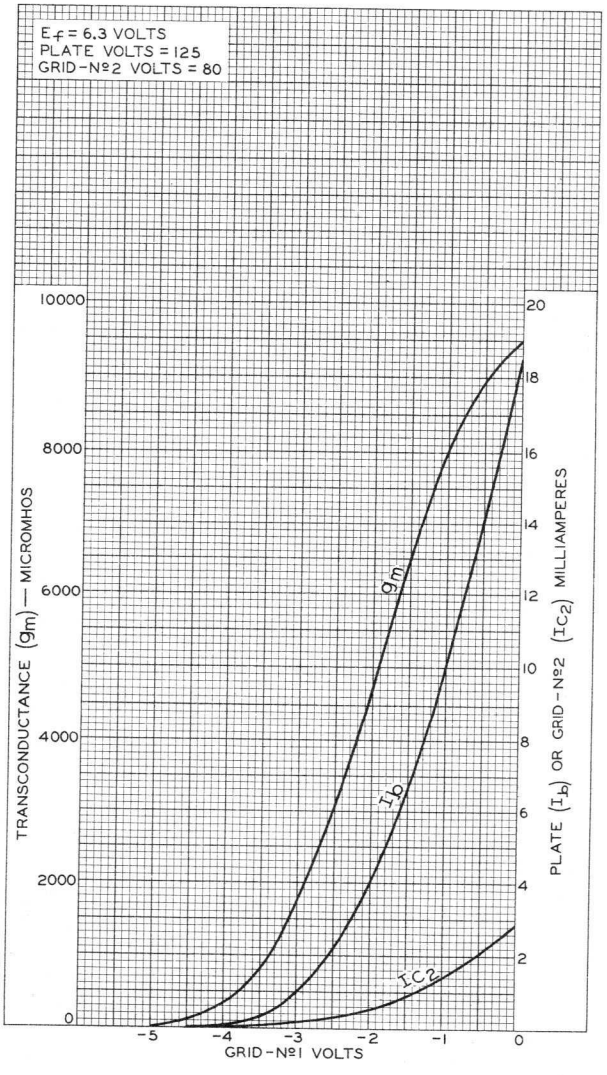
6CY5

AVERAGE CHARACTERISTICS



6CY5

AVERAGE CHARACTERISTICS



6CY7

DUAL TRIODE

With High-Mu Unit and Low-Mu Unit

9-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:			
Voltage (AC or DC)	6.3 ± 10%		volts
Current	0.75		amp
Direct Interelectrode Capacitances (Approx.):◇	*Unit No.1*	*Unit No.2*	
Grid to plate	1.8	4.4	μμf
Grid to cathode and heater	1.5	5	μμf
Plate to cathode and heater	0.3	1	μμf

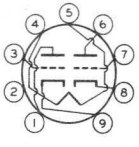
Characteristics, Class A_1 Amplifier:

	Unit No.1	*Unit No.2*		
Plate Supply Voltage	250	60	150	volts
Grid Voltage	-3	0	-	volts
Cathode Resistor	-	-	620	ohms
Amplification Factor	68	-	5	
Plate Resistance (Approx.)	52000	-	920	ohms
Transconductance	1300	-	5400	μmhos
Plate Current	1.2	80*	30	ma
Plate Current for grid volts = -30	-	-	3.5	ma
Grid Voltage (Approx.) for plate μa = 10	-5.5	-	-	volts
Grid Voltage (Approx.) for plate μa = 200	-	-	-40	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	9LG

Pin 1 - Plate of Unit No.2
Pin 2 - Internal Connection—Do Not Use
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



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

6CY7
DUAL TRIODE
With High-Mu Unit and Low-Mu Unit

VERTICAL-DEFLECTION OSCILLATOR

Values are for Unit No.1

Maximum Ratings, *Design-Maximum Values:*

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

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	max.	volts

Maximum Circuit Values:

Grid-Circuit Resistance	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□

DC PLATE VOLTAGE	350	max.	volts
PEAK POSITIVE-PULSE PLATE VOLTAGE#	1800	max.	volts
PEAK NEGATIVE-PULSE GRID VOLTAGE	250	max.	volts
CATHODE CURRENT:			
Peak	120	max.	ma
Average	35	max.	ma
PLATE DISSIPATION	5.5	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-Circuit Resistance:			
For cathode-bias operation	2.2	max.	megohms

○ 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.

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

▲ The dc component must not exceed 100 volts.

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.

6CZ5

Beam Power Tube

9-PIN MINIATURE TYPE
With Heater Having Controlled Warm-Up Time

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:▲		
Grid No.1 to plate	0.4 max.	μμf
Grid No.1 to cathode & grid No.3, grid No.2, and heater	9	μμf
Plate to cathode & grid No.3, grid No.2, and heater	6	μμf

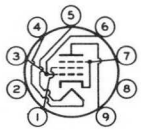
Characteristics, Class A_1 Amplifier:

Plate Voltage	75	250	volts
Grid-No.2 Voltage	250	250	volts
Grid-No.1 Voltage	0	−15	volts ←
Plate Resistance (Approx.)	–	73000	ohms
Transconductance	–	4800	μmhos
Plate Current	130●	46	ma
Grid-No.2 Current	16●	4.6	ma
Grid-No.1 Voltage (Approx.) for plate μa = 100	–	−40	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"
Maximum 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	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



← Indicates a change.

6CZ5

VERTICAL-DEFLECTION AMPLIFIER

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

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

DC PLATE VOLTAGE	350	max.	volts
PEAK POSITIVE-PULSE PLATE VOLTAGE♦	2200	max.	volts
DC GRID-No.2 (SCREEN-GRID) VOLTAGE	315	max.	volts
PEAK NEGATIVE-PULSE GRID-No.1 (CONTROL-GRID) VOLTAGE	275	max.	volts
CATHODE CURRENT:			
Peak	155	max.	ma
Average	45	max.	ma
GRID-No.2 INPUT	2.2	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♦	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	0.5	max.	megohm
For cathode-bias operation	1	max.	megohm

▲ 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.

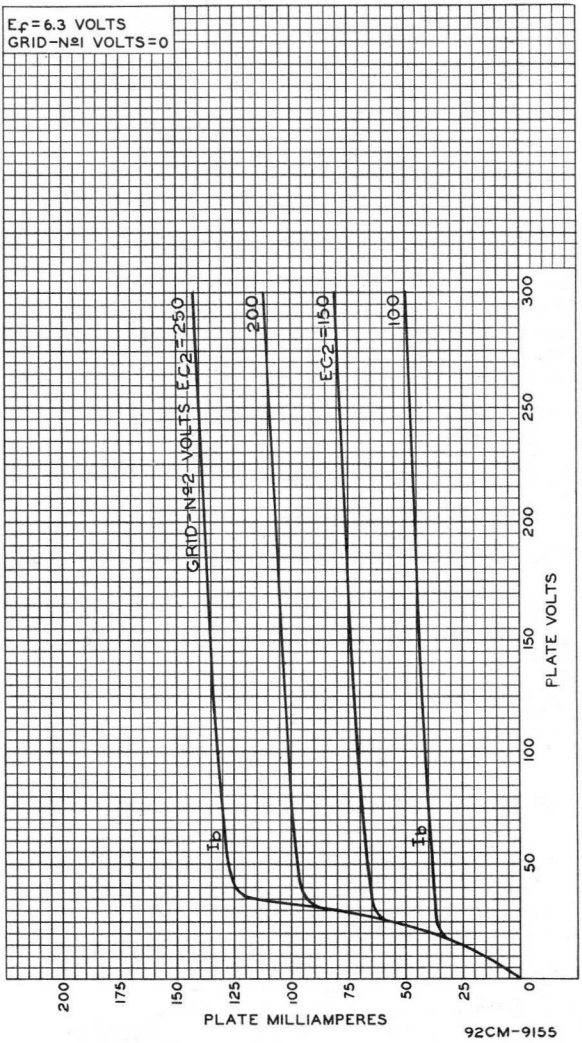
★ As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations," Federal Communications Commission.

♦ 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.

♦ The dc component must not exceed 100 volts.

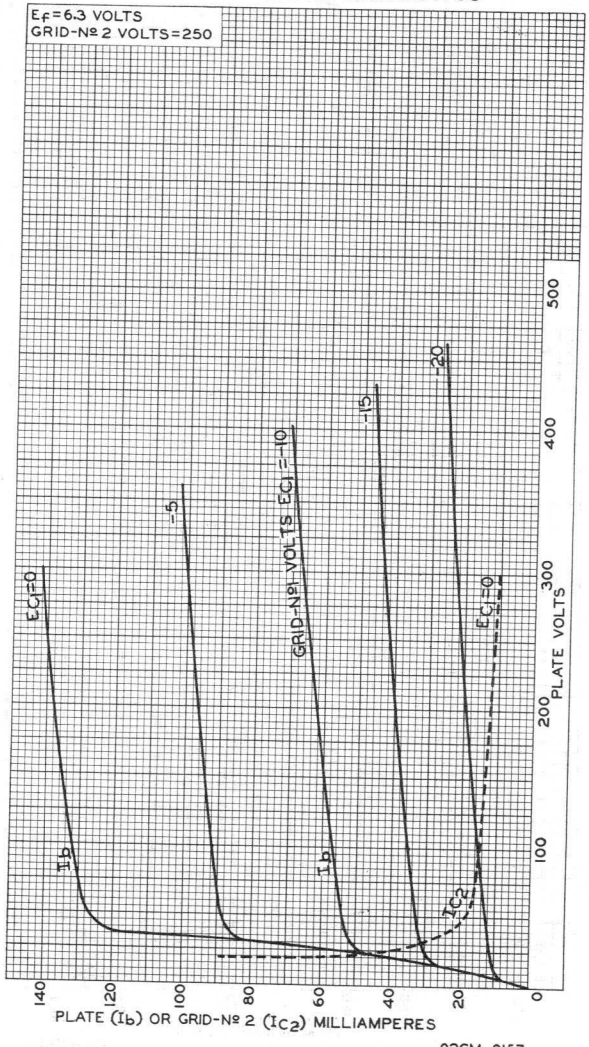
→ Indicates a change.

AVERAGE PLATE CHARACTERISTICS



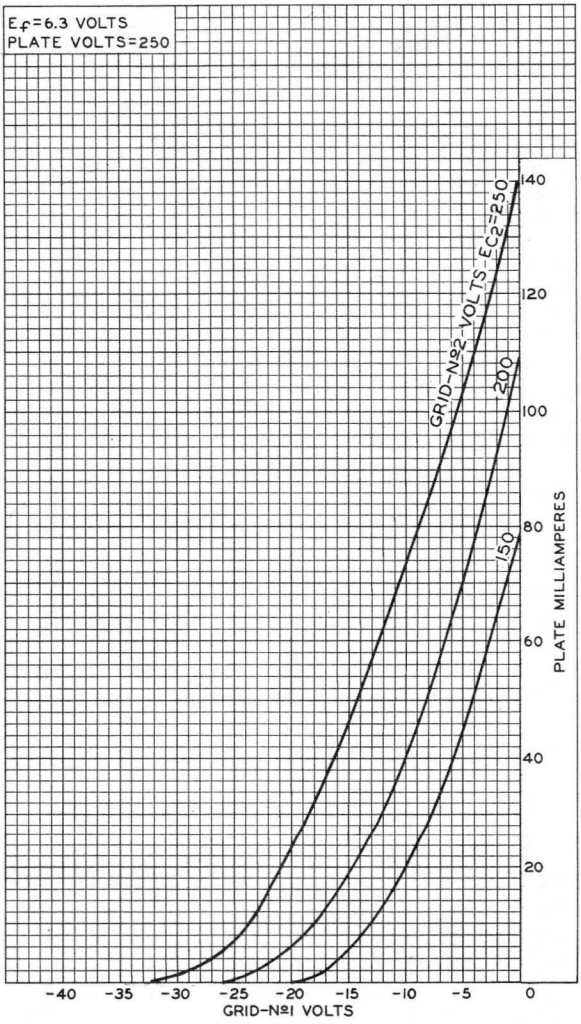
6CZ5

AVERAGE CHARACTERISTICS



92CM-9157

AVERAGE CHARACTERISTICS



92CM-9156R1

6DA4

HALF-WAVE VACUUM RECTIFIER

For television damper service

GENERAL DATA

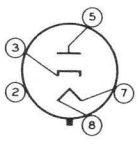
Electrical:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	6.3 ± 10%	volts
Current	1.2	amp
Direct Interelectrode Capacitances (Approx.):[o]		
Plate to cathode and heater	6	μμf
Cathode to plate and heater	8	μμf
Heater to cathode	3	μμf

Mechanical:

Operating Position	Any
Maximum Overall Length	3-5/16"
Maximum Seated Length	2-3/4"
Maximum Diameter	1-9/32"
Dimensional Outline	*See General Section*
Bulb	T9
Base	Intermediate-Shell Octal 5-Pin, Arrangement 2 (JEDEC Group 1, No.B5-82), Intermediate-Shell Octal 6-Pin, Arrangement 1 (JEDEC Group 1, No.B6-8), Short Intermediate-Shell Octal 5-Pin with External Barriers, Arrangement 2 (JEDEC Group 1, No.B5-85), or Short Intermediate-Shell Octal 6-Pin with External Barriers, Arrangement 1 (JEDEC Group 1, No.B6-60)
Basing Designation for BOTTOM VIEW	4CG

Pin 1◆ – Same as Pin 2
Pin 2 – Internal Connection—Do Not Use●



Pin 3 – Cathode
Pin 5 – Plate
Pin 7 – Heater
Pin 8 – Heater

DAMPER SERVICE

Maximum Ratings, *Design-Maximum Values:*

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

PEAK INVERSE PLATE VOLTAGE*	4400	max.	volts
PEAK PLATE CURRENT	900	max.	ma
DC PLATE CURRENT	155	max.	ma
PLATE DISSIPATION	5.5	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	4400▲	max.	volts
Heater positive with respect to cathode	300#	max.	volts

6DA4

HALF-WAVE VACUUM RECTIFIER

Characteristics:

Tube-Voltage Drop for plate ma. = 250 . . . . . 22 volts

○ Without external shield.

◆ On the 5-pin bases, pin 1 as well as pins 4 and 6 is omitted.

● Socket terminals 1,2,4 and 6 should not be used as tie points.

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

* This rating is applicable when the duty cycle 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.

▲ The dc component must not exceed 900 volts.

The dc component must not exceed 100 volts.

6DB5

Beam Power Tube

9-PIN MINIATURE TYPE

GENERAL DATA

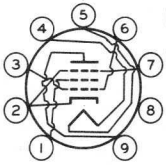
Electrical:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	6.3	volts
Current	1.2	amp
Direct Interelectrode Capacitances (Approx.):[a]		
Grid No.1 to plate	0.2	μμf
Grid No.1 to cathode & grid No.3, grid No.2, and heater	13	μμf
Plate to cathode & grid No.3, grid No.2, and heater	8	μμf

Mechanical:

Operating Position	Any
Maximum Overall Length	2-3/4"
Maximum Seated Length	2-1/2"
Length, Base Seat to Bulb Top (Excluding tip)	2-1/8" ± 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	9GR

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

AMPLIFIER — Class A_1

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	300	max.	volts
GRID-No.2 (SCREEN-GRID) VOLTAGE	150	max.	volts
GRID-No.2 INPUT	1.25	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[b]	max.	volts

Typical Operation and Characteristics:

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	2.2 max.	megohms

VERTICAL-DEFLECTION AMPLIFIER

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

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

DC PLATE VOLTAGE	300	max.	volts
PEAK POSITIVE-PULSE PLATE VOLTAGE (Absolute maximum)[d]	2000[e]	max.	volts
DC GRID-No.2 (SCREEN-GRID) VOLTAGE	150	max.	volts
PEAK NEGATIVE-PULSE GRID-No.1 (CONTROL-GRID) VOLTAGE	250	max.	volts
CATHODE CURRENT:			
Peak	200	max.	ma
Average	55	max.	ma
GRID-No.2 INPUT	1.25	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[b]	max.	volts

Maximum Circuit Values:

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

[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.

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

RCA

6DC6

SEMIREMOTE-CUTOFF PENTODE

MINIATURE TYPE

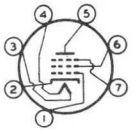
GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage	6.3	ac or dc volts
Current	0.3	amp
Direct Interelectrode Capacitances (No external shield):		
Grid No.1 to plate	0.02 max.	μμf
Input	6.5	μμf
Output	2	μμf

Mechanical:

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

AMPLIFIER - Class A_1

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	300 max.	volts
GRID-No.3 (SUPPRESSOR) VOLTAGE	0 max.	volts
GRID-No.2 SUPPLY VOLTAGE	300 max.	volts
GRID-No.2 (SCREEN) VOLTAGE	See Rating Curve at front of this Section	
GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Positive bias value	0 max.	volts
PLATE DISSIPATION	2 max.	watts
GRID-No.2 INPUT	0.5 max.	watt
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200▲ max.	volts

Typical Operation and Characteristics:

Plate Supply Voltage	200	volts
Grid No.3	Connected to cathode at socket	
Grid-No.2 Voltage	150	volts
Cathode-Bias Resistor	180	ohms
Plate Resistance (Approx.)	0.5	megohm

▲ The dc component must not exceed 100 volts.

6DC6

SEMIREMOTE-CUTOFF PENTODE

Transconductance	5500	μmhos
Grid-No.1 Voltage (Approx.) for transconductance of 50 μmhos	-12.5	volts
Plate Current	9	ma
Grid-No.2 Current	3	ma

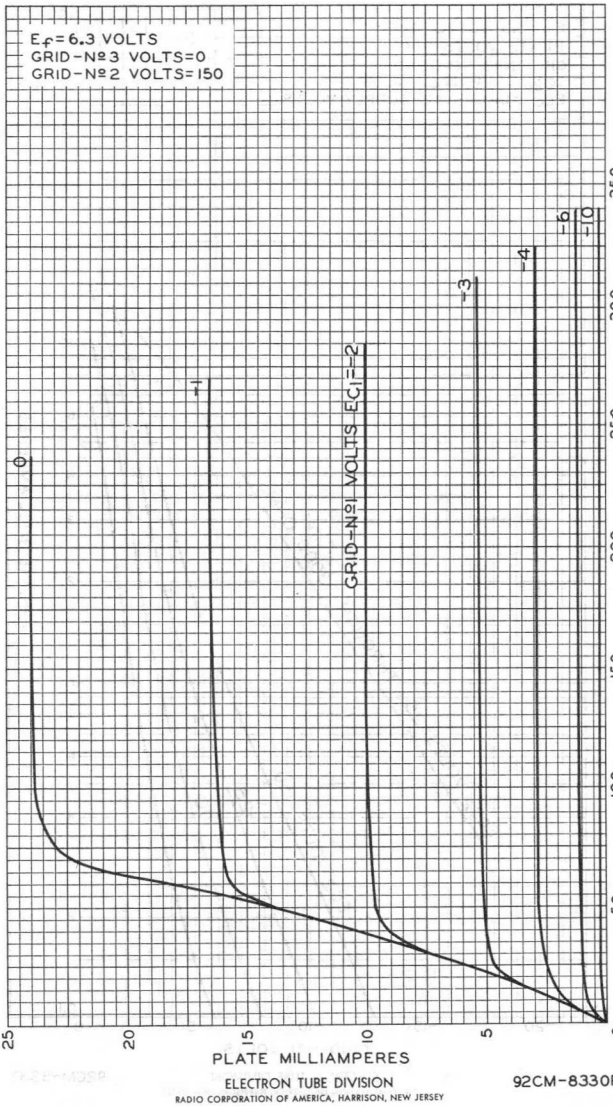
Maximum Circuit Values (For maximum rated conditions):

Grid-No.1-Circuit Resistance:		
For fixed-bias operation	0.25 max.	megohm
For cathode-bias operation	1.0 max.	megohm

RCA

6DC6

AVERAGE PLATE CHARACTERISTICS



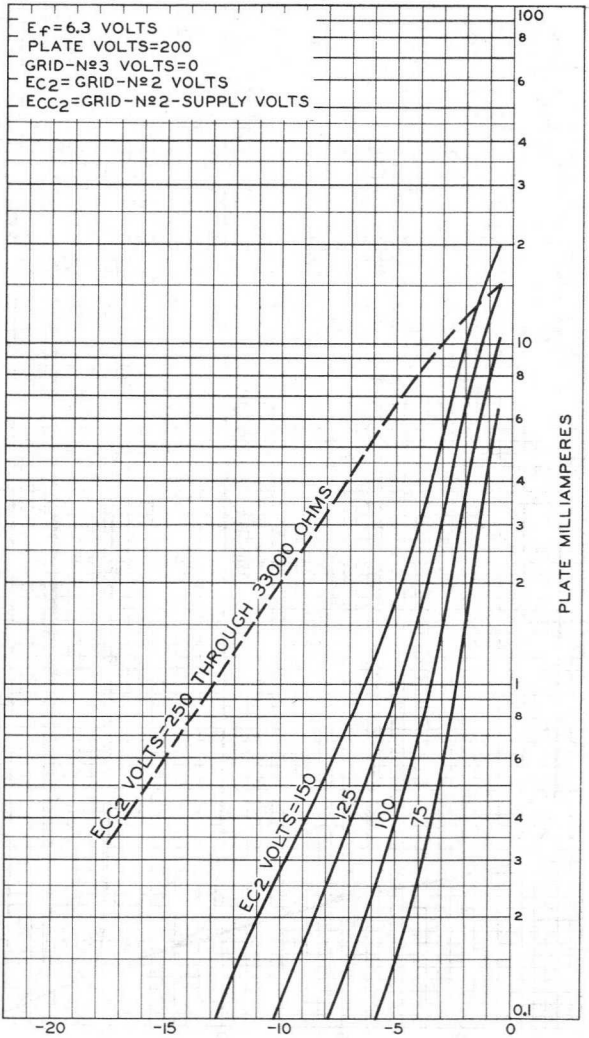
ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-8330RI

RCA

6DC6

AVERAGE CHARACTERISTICS

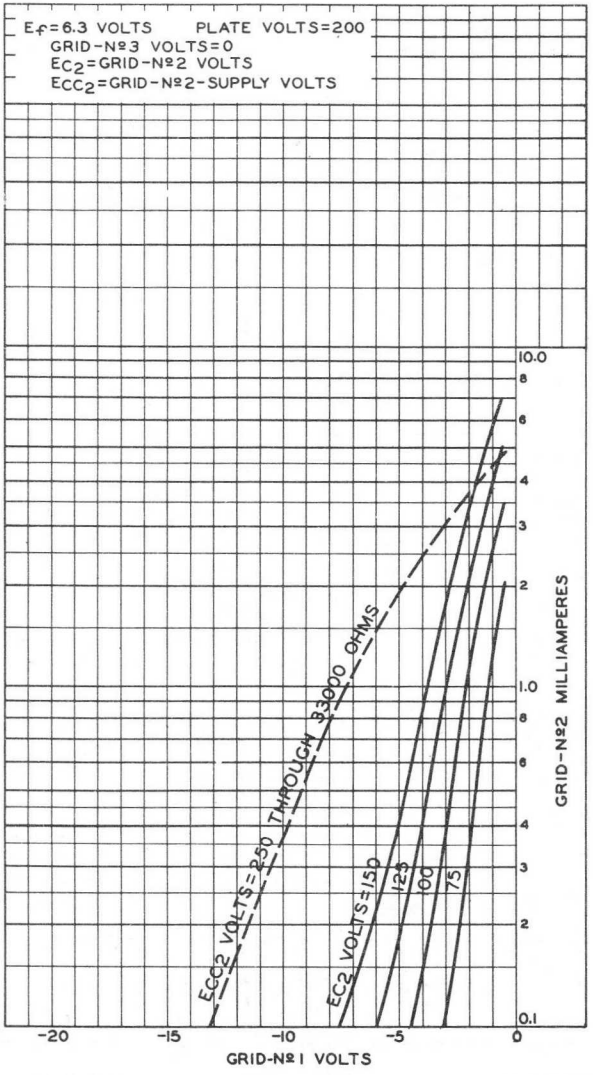


ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-8337

6DC6

AVERAGE CHARACTERISTICS

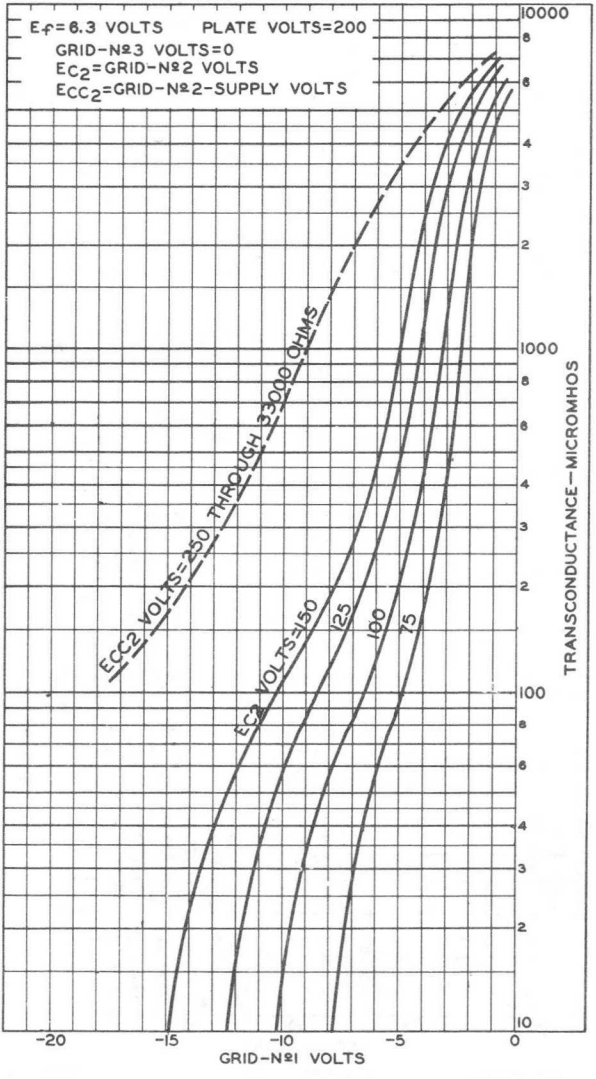


JUNE 15,1954 TUBE DIVISION 92CM-8338
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

RCA

6DC6

AVERAGE CHARACTERISTICS



6DE6
SHARP-CUTOFF PENTODE

7-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:			
Voltage		6.3 ± 10%	volts
Current		0.3	amp
Direct Interelectrode Capacitances:			
	Without External Shield	*With External Shield°*	
Grid No.1 to plate	0.025 max.	0.015 max.	μμf
Grid No.1 to cathode, grid No.3 & internal shield, grid No.2, and heater	6.5	6.5	μμf
Plate to cathode, grid No.3 & internal shield, grid No.2, and heater	2	3	μμf

Characteristics, Class A_1 Amplifier:

Plate Supply Voltage	125	volts
Grid No.3	♦	
Grid-No.2 Supply Voltage	125	volts
Cathode Resistor	56	ohms
Plate Resistance (Approx.)	0.25	megohm
Transconductance	8000	μmhos
Plate Current	15.5	ma
Grid-No.2 Current	4.2	ma
Grid-No.1 Voltage (Approx.) for plate μa = 20	-9	volts
Grid-No.1 Voltage (Approx.) for transconductance (μmhos) = 700 and cathode resistor (ohms) = 0	-5.5	volts

Mechanical:

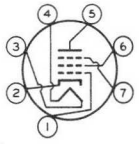
Operating Position	Any
Maximum Overall Length	2-1/8"
Maximum Seated Length	1-7/8"
Length, Base Seat to Bulb Top (Excluding tip)	1-1/2" ± 3/32"
Diameter	0.650" to 0.750"
Dimensional Outline	*See General Section*
Bulb	T5-1/2
Base	Small-Button Miniature 7-Pin (JEDEC No.E7-1)

← Indicates a change.

6DE6

SHARP-CUTOFF PENTODE

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

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	0.55	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
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 fixed-bias operation	0.25	max.	megohm
For cathode-bias operation	1	max.	megohm

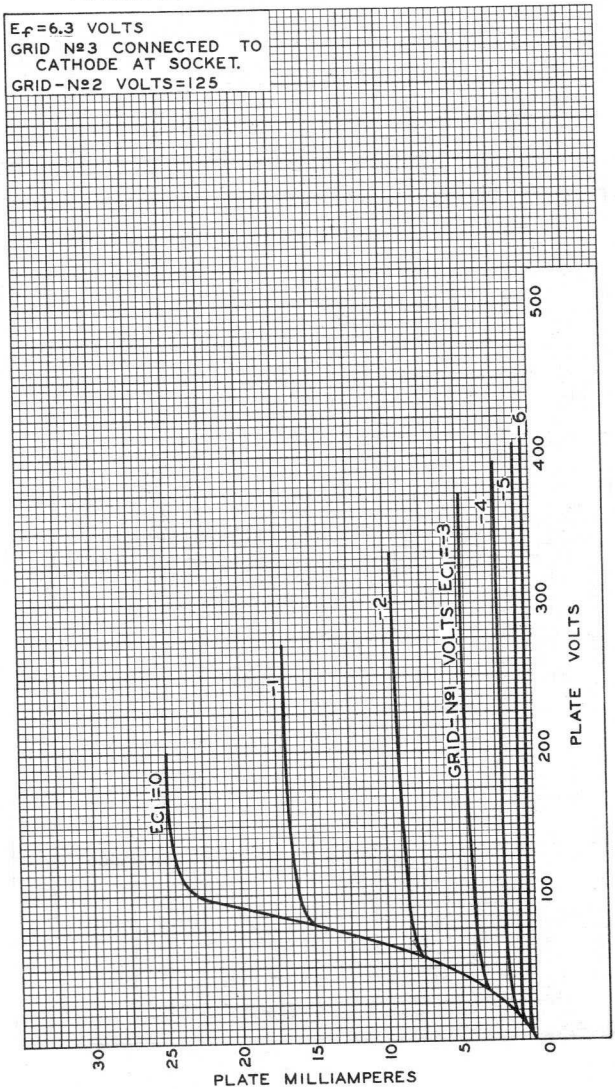
○ With external shield JEDEC No.316 connected to cathode.
◆ Connected to cathode at socket.
▲ The dc component must not exceed 100 volts.

→ Indicates a change.

RCA

6DE6

AVERAGE PLATE CHARACTERISTICS

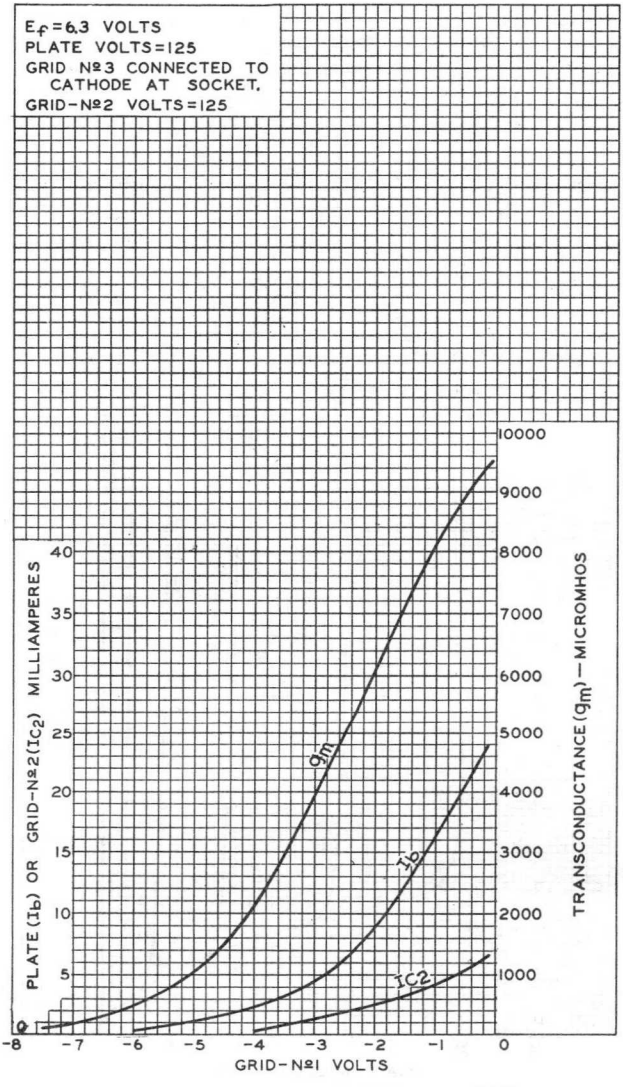


ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY
92CM-8578RI

RCA

6DE6

AVERAGE CHARACTERISTICS



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

92CM-8575R1

Dual Triode

With Medium-Mu Unit and Low-Mu Unit

9-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	0.900		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	4.0	8.5	μμf
Grid to cathode and heater	2.2	5.5	μμf
Plate to cathode and heater	0.52	1.0	μμf

Characteristics, Class A_1 Amplifier:

	Unit No.1	*Unit No.2*		
Plate Voltage	250	60	150	volts
Grid Voltage	-11	0	-17.5	volts
Amplification Factor	17.5	–	6	
Plate Resistance (Approx.)	8750	–	925	ohms
Transconductance	2000	–	6500	μmhos
Plate Current	5.5	80[c]	35	ma
Plate Current for grid volts = -24	–	–	10	ma
Grid Voltage (Approx.) for plate μa = 10	-20	–	–	volts
Grid Voltage (Approx.) for plate μa = 50	–	–	-44	volts

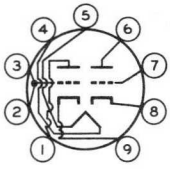
Mechanical:

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)

6DE7

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.	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:*

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

DC PLATE VOLTAGE.	275 max.	volts
PEAK POSITIVE-PULSE PLATE VOLTAGE[#]. . . .	1500 max.	volts
PEAK NEGATIVE-PULSE GRID VOLTAGE.	250 max.	volts
CATHODE CURRENT:		
Peak.	175 max.	ma
Average	50 max.	ma
PLATE DISSIPATION	7 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.

→ Indicates a change.

6DE7
DUAL TRIODE
With Medium-Mu Unit and Low-Mu Unit

9-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:

Voltage	6.3 ± 10%	ac or dc volts
Current	0.9	amp

Direct Interelectrode Capacitances (Approx.):[o]

	Unit No.1	*Unit No.2*	
Grid to plate	4	8.5	μμf
Grid to cathode and heater	2.2	5.5	μμf
Plate to cathode and heater	0.52	1	μμf

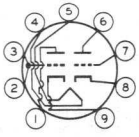
Characteristics, Class A_1 Amplifier:

	Unit No.1	*Unit No.2*		
Plate Voltage	250	60	150	volts
Grid Voltage	-11	0	-17.5	volts
Amplification Factor	17.5	–	6	
Plate Resistance (Approx.)	8750	–	925	ohms
Transconductance	2000	–	6500	μmhos
Plate Current	5.5	80*	35	ma
Plate Current for grid voltage of -24 volts	–	–	10	ma
Grid Voltage (Approx.) for plate current of 10 μa.	-20	–	–	volts
Grid Voltage (Approx.) for plate current of 50 μa.	–	–	-44	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	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

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

6DE7

DUAL TRIODE

With Medium-Mu Unit and Low-Mu Unit

VERTICAL-DEFLECTION OSCILLATOR

Values are for Unit No.1

Maximum Ratings, *Design-Maximum Values:*

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

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⊕	7	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-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□

DC PLATE VOLTAGE	275	max.	volts
PEAK POSITIVE-PULSE PLATE VOLTAGE*	1500	max.	volts
PEAK NEGATIVE-PULSE GRID VOLTAGE	250	max.	volts
CATHODE CURRENT:			
Peak	175	max.	ma
Average	50	max.	ma
PLATE DISSIPATION⊕	7	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-Circuit Resistance:			
For grid-resistor-bias or cathode-bias operation	2.2	max.	megohms

° 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.

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

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

▲ The dc component must not exceed 100 volts.

TENTATIVE DATA 1

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

6DE7

DUAL TRIODE

With Medium-Mu Unit and Low-Mu Unit

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.

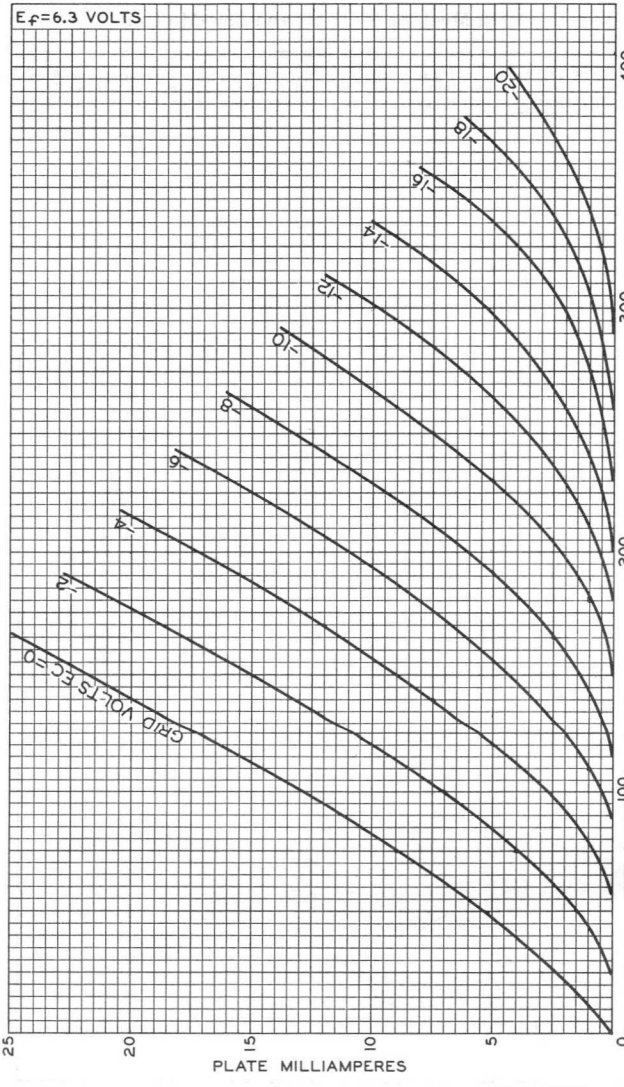
ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6DE7

6DE7

AVERAGE PLATE CHARACTERISTICS

UNIT Nº1



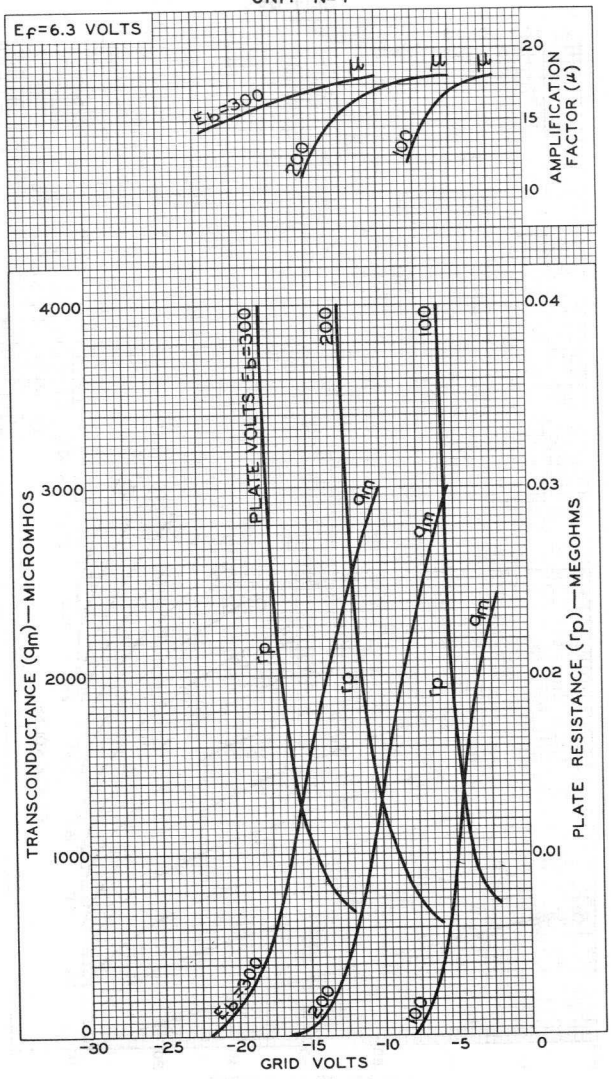
ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-9988

6DE7

AVERAGE CHARACTERISTICS

UNIT Nº1

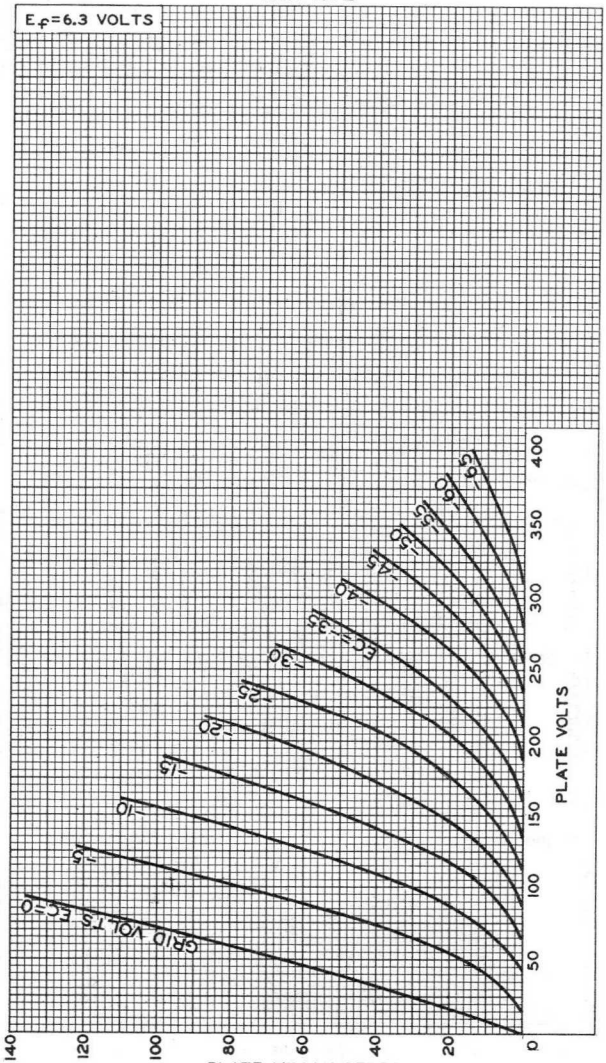


ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-9991

6DE7

AVERAGE PLATE CHARACTERISTICS
UNIT Nº 2

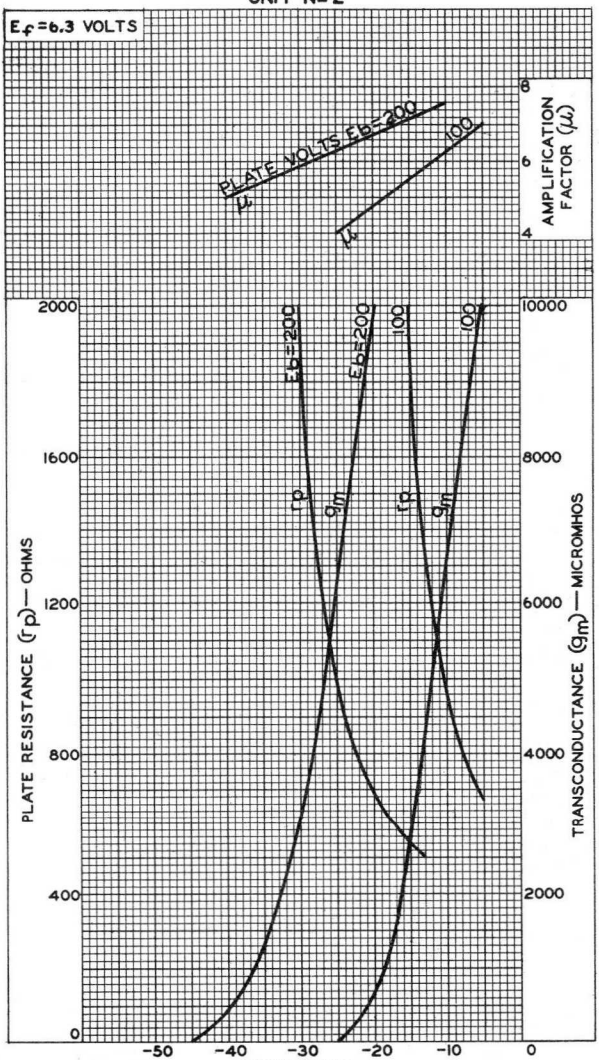


ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY 92CM-9913

RCA

6DE7

AVERAGE CHARACTERISTICS
UNIT Nº 2



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

92CM-9914

6DG6-GT

BEAM POWER TUBE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage	6.3	ac or dc volts
Current	1.2	amp
Direct Interelectrode Capacitances (Approx.):°		
Grid No.1 to plate	0.6	μμf
Grid No.1 to cathode & grid No.3, grid No.2, and heater	15	μμf
Plate to cathode & grid No.3, grid No.2, and heater	10	μμf

Mechanical:

Mounting Position	Any
Maximum Overall Length	3-5/16"
Maximum Seated Length	2-3/4"
Maximum Diameter	1-9/32"
Dimensional Outline	*See General Section*
Bulb	T-9
Base	Intermediate-Shell Octal 7-Pin (JETEC No.B7-7), Short Intermediate-Shell Octal 7-Pin with External Barriers (JETEC No.B7-59), Intermediate-Shell Octal 6-Pin (JETEC No.B6-81), or Short Intermediate-Shell Octal 6-Pin with External Barriers (JETEC No.B6-84)
Basing Designation for BOTTOM VIEW	7S

Pin 1♦ - No Connection
Pin 2 - Heater
Pin 3 - Plate
Pin 4 - Grid No.2

Pin 5 - Grid No.1
Pin 7 - Heater
Pin 8 - Cathode, Grid No.3

AMPLIFIER - Class A_1

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	200 max.	volts
GRID-No.2 (SCREEN-GRID) VOLTAGE	125 max.	volts
PLATE DISSIPATION	10 max.	watts
GRID-No.2 INPUT	1.25 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	90 max.	volts
Heater positive with respect to cathode	90 max.	volts

Typical Operation and Characteristics:

Plate Voltage	110	200	volts
Grid-No.2 Voltage	110	125	volts
Grid-No.1 (Control-Grid) Voltage	-7.5	0	volts

° Without external shield.

♦ On the 6-pin bases, pin 1 as well as pin 6 is omitted.

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6DG6-GT

BEAM POWER TUBE

Peak AF Grid-No.1 Voltage.	7.5	8.5	volts
Cathode Resistor	0	180	ohms
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

Curves shown under Type 50L6-GT also apply to the 6DG6-GT

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6DK6

SHARP-CUTOFF PENTODE

7-PIN MINIATURE TYPE

DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage	6.3	ac or dc volts
Current	0.3	amp
Direct Interelectrode Capacitances:°		
Grid No.1 to plate	0.02 max.	μμf
Grid No.1 to cathode, grid No.3 & internal shield, grid No.2, and heater	6.3	μμf
Plate to cathode, grid No.3 & internal shield, grid No.2, and heater	1.9	μμf

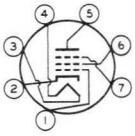
Characteristics, Class A$_1$ Amplifier:

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.)	0.35	megohm
Transconductance	9800	μmhos
Plate Current	12	ma
Grid-No.2 Current	3.8	ma
Grid-No.1 Voltage (Approx.) for plate μa = 20	-6.5	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



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

°: See next page.

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

TENTATIVE DATA

6DK6

SHARP-CUTOFF PENTODE

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
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 fixed-bias operation	0.25 max.	megohm
For cathode-bias operation	1 max.	megohm

○ Without external shield.

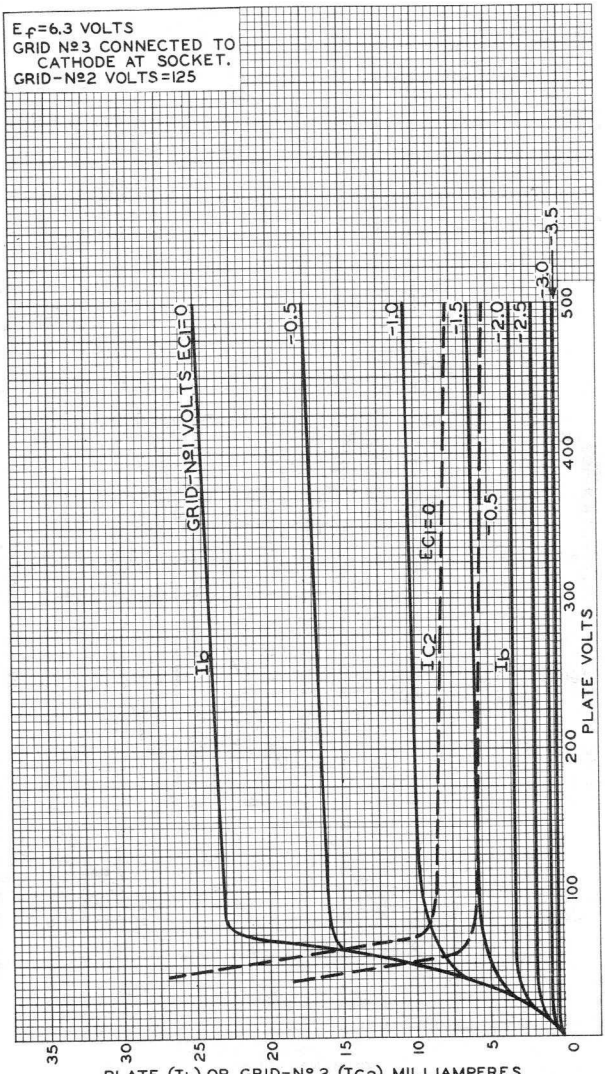
▲ The dc component must not exceed 100 volts.

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

RCA

6DK6

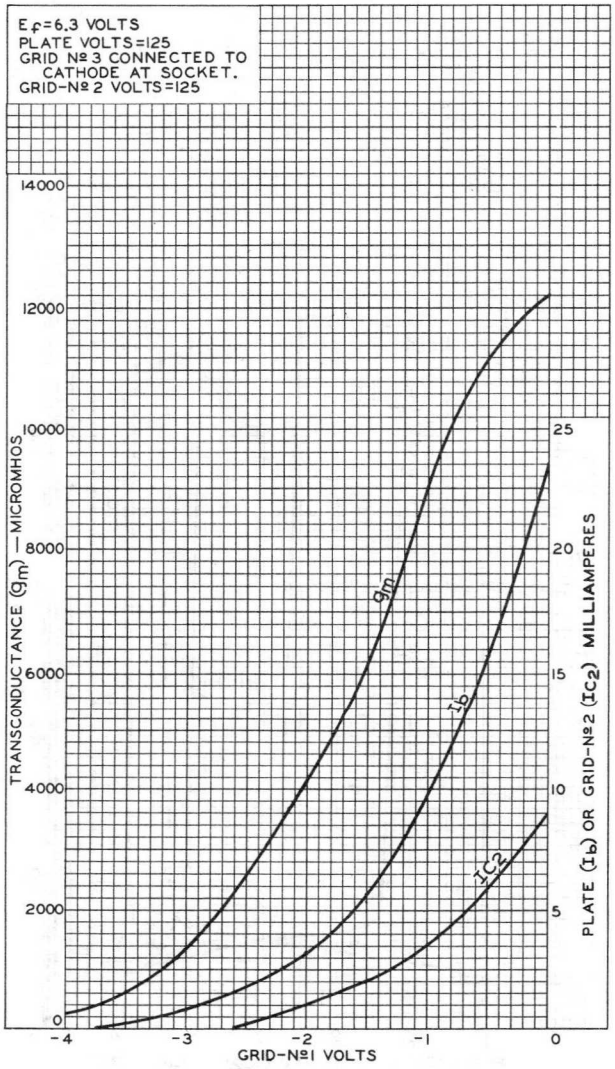
AVERAGE CHARACTERISTICS



RCA

6DK6

AVERAGE CHARACTERISTICS



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

92CM-9852

Half-Wave Vacuum Rectifier

For Color-TV Damper – Diode Applications

ELECTRICAL CHARACTERISTICS – Bogey Values

Heater Voltage, ac or dc	E_h	6.3	V
Heater Current	I_h	2.4	A
Direct Interelectrode Capacitances:[a]			
Plate to cathode and heater	$c_{p(k+h)}$	13	pF
Cathode to plate and heater	$c_{k(p+h)}$	16	pF
Heater to cathode	c_{h-k}	4.0	pF
Instantaneous Tube Voltage Drop for instantaneous plate current (i_b) = 350 mA	e_b	14	V

MECHANICAL CHARACTERISTICS

Maximum Overall Length	3.380 in (85.85 mm)
Maximum Seated Length	3.000 in (76.20 mm)
Maximum Diameter	1.188 in (30.17 mm)
Envelope	JEDEC T9
Base[b]	Small-Button Novar 9-Pin with Exhaust Tip (JEDEC E9-89)
Terminal Diagram	JEDEC 9HP
Type of Cathode	Coated Unipotential
Operating Position	Any

MAXIMUM RATINGS – Design-Maximum Values[c]

For operation as a Damper Tube in Color-TV Receivers utilizing a 525-line, 30-frame system

Peak Inverse Plate Voltage.	$-e_{bm}$	5500[d]	V
Heater-Cathode Voltage:			
Peak	e_{hkm}	+300 -5500	V V
Average[e]	$E_{hk(av)}$	+100 -900	V V
Heater Voltage, ac or dc	E_h	5.7 to 6.9	V
Plate Current:			
Peak	i_{bm}	2100	mA
Average[e]	$I_{b(av)}$	350	mA
Plate Dissipation	P_b	9.0	W
Envelope Temperature (at hottest point on envelope surface)	T_E	220	°C

[a] Measured without external shield in accordance with the current issue of EIA Standard RS-191.

[b] Designed to mate with Novar 9-Contact Socket generally available from your local RCA Distributor.

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

[d] This rating is applicable when the duration of the voltage pulse does not exceed 15% of one horizontal scanning cycle. In a 525-line, 30-frame system, 15% of one horizontal scanning cycle is 10 μs.

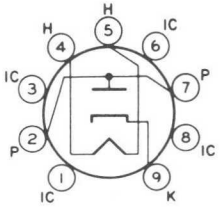
[e] Measured with a dc meter.

OPERATING CONSIDERATIONS

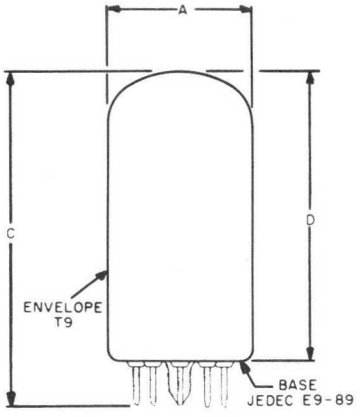
Socket terminals 1, 3, 6, and 8 should not be used as tie points for external-circuit components. It is recommended that the socket tabs be removed to reduce the possibility of arc-over and to minimize leakage.

TERMINAL DIAGRAM (Bottom View) – JEDEC 9HP

Pin 1 - Do Not Use
Pin 2 - Plate
Pin 3 - Do Not Use
Pin 4 - Heater
Pin 5 - Heater
Pin 6 - Do Not Use
Pin 7 - Plate
Pin 8 - Do Not Use
Pin 9 - Cathode



DIMENSIONAL OUTLINE – JEDEC 9-111



92CS-13350R1

DIMENSION	INCHES			MILLIMETERS		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	1.062*	–	1.188	26.96*	–	30.17
C	–	–	3.380	–	–	85.85
D	–	–	3.000	–	–	76.20

MILLIMETER DIMENSION DERIVED FROM INCH DIMENSION

* Applies to the minimum diameter except in the area of the seal.

6DN7

MEDIUM-MU DUAL TRIODE

With Dissimilar Units

GENERAL DATA

Electrical;

Heater, for Unipotential Cathodes:			
Voltage (AC or DC)		6.3 ± 10%	volts
Current		0.9	amp
Direct Interelectrode Capacitances (Approx.):○			
	Unit No.1	*Unit No.2*	
Grid to plate	4	5.5	μμf
Grid to cathode and heater	2.2	4.6	μμf
Plate to cathode and heater	0.7	1	μμf

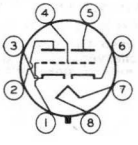
Characteristics, Class A_1 Amplifier:

	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*	41	ma
Grid Voltage (Approx.) for plate ma. = 10	−18	—	—	volts
Grid Voltage (Approx.) for plate ma. = 50	—	—	−23	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 with External Barriers (JEDEC Group 1, B8-142)
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□

DC PLATE VOLTAGE	350 max.	volts

6DN7

MEDIUM-MU DUAL TRIODE
With Dissimilar Units

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▲	max.	volts

Maximum Circuit Values:

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

DC PLATE VOLTAGE.	550	max.	volts
PEAK POSITIVE-PULSE PLATE VOLTAGE#. . . .	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
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-Circuit Resistance:			
For fixed-bias operation.	2.2	max.	megohms

○ 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.

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

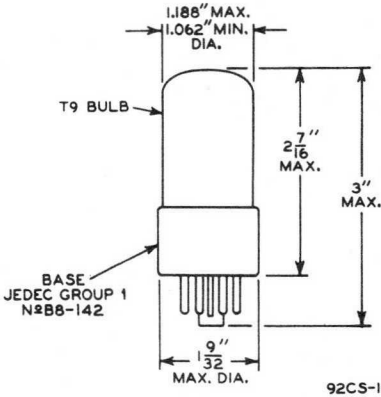
▲ The dc component must not exceed 100 volts.

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.

6DN7

MEDIUM-MU DUAL TRIODE

With Dissimilar Units



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

Beam Power Tube

For Use as a Horizontal-Deflection Amplifier Tube in Color and Black-and-White Television Receivers

GENERAL DATA

Electrical:

Heater Characteristics and Ratings:			
Voltage (AC or DC)	6.3 ± 0.6		volts
Current at heater volts = 6.3	2.500		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:[b]			
Grid No.1 to plate	0.5		pf
Grid No.1 to cathode & grid No.3, grid No.2, and heater	23.0		pf
Plate to cathode & grid No.3, grid No.2, and heater	11.0		pf

Characteristics, Class A_1 Amplifier:

			Triode Connection[c]	
Plate Voltage	70	175	125	volts
Grid No.2 (Screen-Grid) Voltage	125	125	–	volts
Grid No.1 (Control-Grid) Voltage	0	-25	-25	volts
Amplification Factor	–	–	3.3	
Plate Resistance (Approx.)	–	5500	–	ohms
Transconductance	–	10500	–	μmhos
Plate Current	550[d]	110	–	ma
Grid-No.2 Current	42[d]	5	–	ma
Grid-No.1 Voltage (Approx.) for plate ma. = 1	–	-55	–	volts

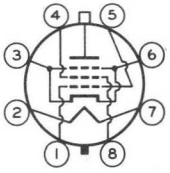
Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	5"
Seated Length	4-1/4" ± 3/16"
Maximum Diameter	1-9/16"
Bulb	T12
Cap	Small (JEDEC No.C1-1)
Base	Short Meduim-Shell Octal 8-Pin with External Barriers, Style B (JEDEC No.B8-118)

6DQ5

Basing Designation for BOTTOM VIEW. 8JC

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



Pin 6 – Cathode, Grid No.3
Pin 7 – Heater
Pin 8 – Grid No.2
Cap – Plate

HORIZONTAL-DEFLECTION AMPLIFIER

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

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

DC PLATE-SUPPLY VOLTAGE	990 max.	volts
PEAK POSITIVE-PULSE PLATE VOLTAGE[f] . . .	6500 max.	volts
PEAK NEGATIVE-PULSE PLATE VOLTAGE	1100 max.	volts
DC GRID-No.2 (SCREEN-GRID) VOLTAGE. . . .	190 max.	volts
PEAK NEGATIVE-PULSE GRID-No.1 VOLTAGE . .	250 max.	volts
CATHODE CURRENT:		
Peak.	1100 max.	ma
Average	315 max.	ma
GRID-No.2 INPUT	3.2 max.	watts
PLATE DISSIPATION[g].	24 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[g] . . .	0.47 max.	megohm

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

[b] Without external shield.

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

[d] These values can be measured by a method involving a recurrent wave form such that the plate dissipation, grid-No.2 input, and cathode current will be kept within ratings in order to prevent damage to the tube.

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

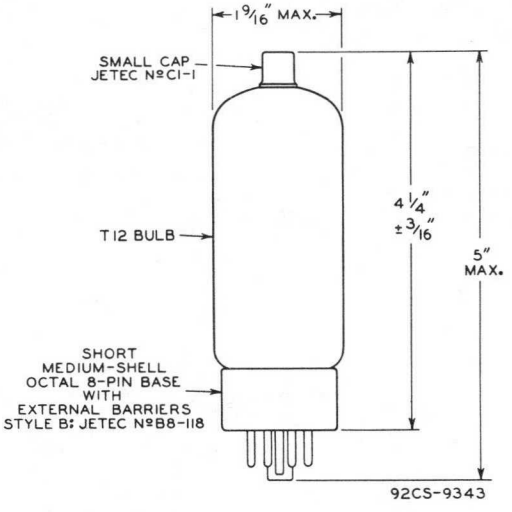
[f] This rating is applicable where the duration of the voltage pulse does not exceed 15 per cent of one horizontal scanning cycle. In a 525-line, 30-frame system, 15 per cent of one horizontal scanning cycle is 10 microseconds.

[g] It is essential that the plate dissipation be limited in the event of loss of grid signal. For this purpose, some protective means such as a cathode resistor of suitable value be employed.

→ Indicates a change.

6DQ5

BEAM POWER TUBE



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

6DQ5

RCA

6DQ5

AVERAGE CHARACTERISTICS

ELECTRON TUBE DIVISION
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92CM-9311

RCA

6DQ5

AVERAGE CHARACTERISTICS

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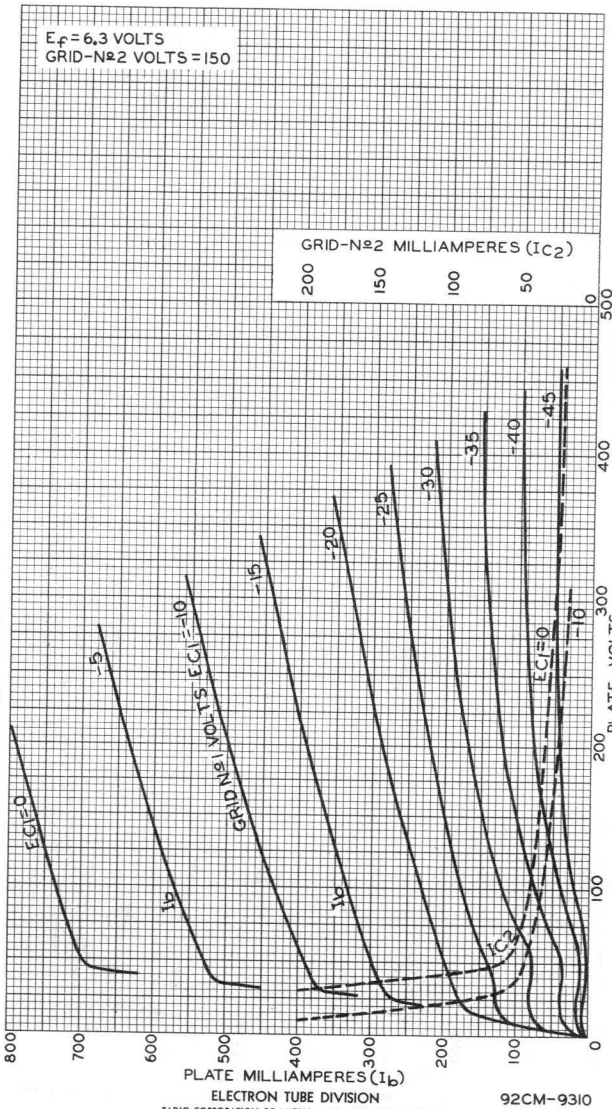
RCA

6DQ5

AVERAGE CHARACTERISTICS



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

92CM-9310

6DR7

DUAL TRIODE

With High-Mu Unit and Low-Mu Unit

9-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:
Voltage. . . . . 6.3 ± 10% . . . ac or dc volts
Current. . . . . 0.9 . . . . . amp

Direct Interelectrode Capacitances (Approx.):[0]

	Unit No.1	*Unit No.2*	
Grid to plate.	4.5	8.5	μμf
Grid to cathode and heater . . .	2.2	5.5	μμf
Plate to cathode and heater. . .	0.34	1	μμf

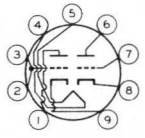
Characteristics, Class A_1 Amplifier:

	Unit No.1	*Unit No.2*	
Plate Voltage.	250	150	volts
Grid Voltage	-3	-17.5	volts
Amplification Factor	68	6	
Plate Resistance (Approx.)	40000	925	ohms
Transconductance	1600	6500	μmhos
Plate Current.	1.4	35	ma
Plate Current for plate volts = 60 and grid volts = 0	–	80	ma
Plate Current for grid volts = -24.	–	10	ma
Grid Voltage (Approx.) for plate μa = 10.	-5.5	–	volts
Grid Voltage (Approx.) for plate μa = 50.	–	-44	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 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

TENTATIVE DATA

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

RCA

6DR7

DUAL TRIODE
With High-Mu Unit and Low-Mu Unit

VERTICAL-DEFLECTION OSCILLATOR

Values are for Unit No.1

Maximum Ratings, *Design-Maximum Values:*

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

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	max.	watt
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-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●

DC PLATE VOLTAGE	275	max.	volts
PEAK POSITIVE-PULSE PLATE VOLTAGE#	1500	max.	volts
PEAK NEGATIVE-PULSE GRID VOLTAGE	250	max.	volts
CATHODE CURRENT:			
Peak	175	max.	ma
Average	50	max.	ma
PLATE DISSIPATION	7	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-Circuit Resistance:			
For grid-resistor-bias or cathode-bias operation	2.2	max.	megohms

○ Without external shield.

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

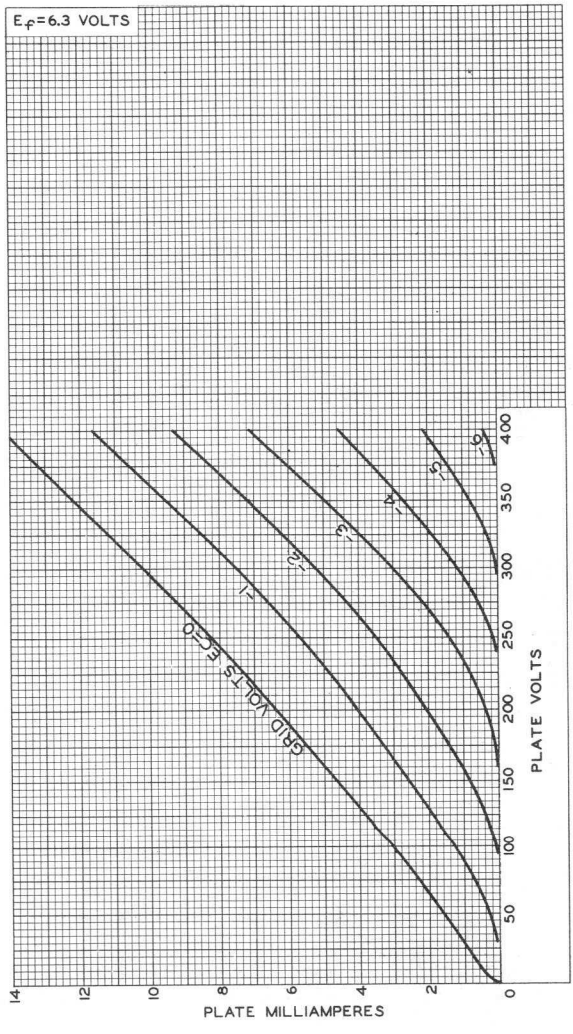
This rating is applicable where the duration of the voltage pulse does not exceed 15 per cent of one vertical scanning cycle. In a 525-line, 30-frame system, 15 per cent of one vertical scanning cycle is 2.5 milliseconds.

■ The dc component must not exceed 100 volts.

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

TENTATIVE DATA

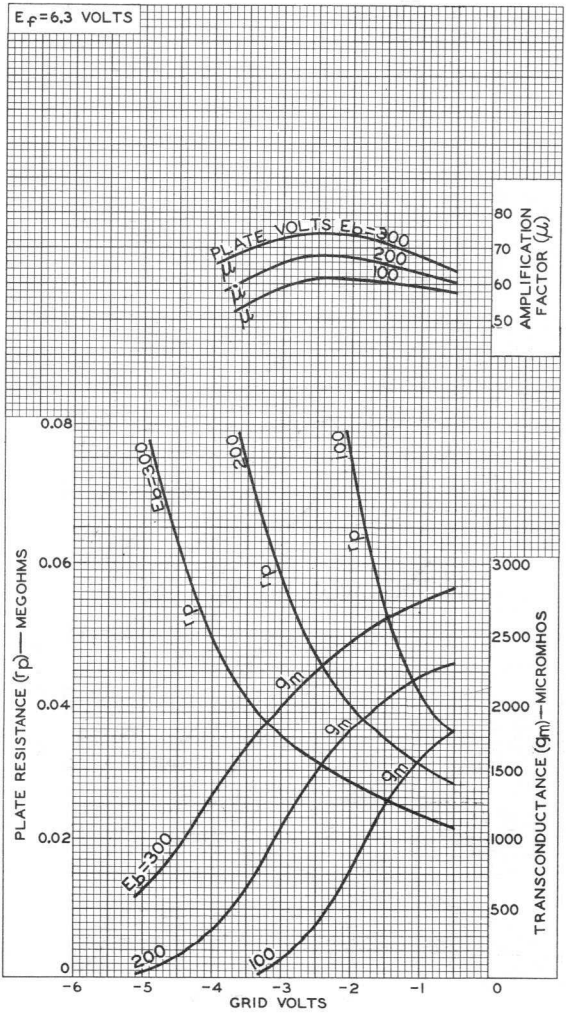
AVERAGE PLATE CHARACTERISTICS
Unit No.1



92CM-9912

6DR7

AVERAGE CHARACTERISTICS
Unit No.1



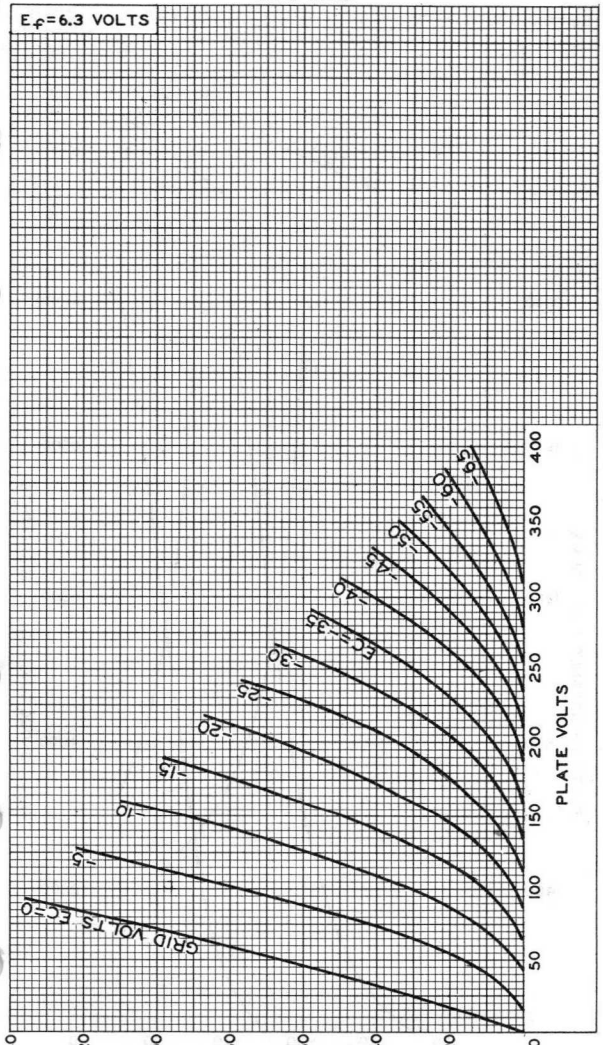
92CM-9915RI

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

RCA

6DR7

AVERAGE PLATE CHARACTERISTICS
UNIT Nº 2



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

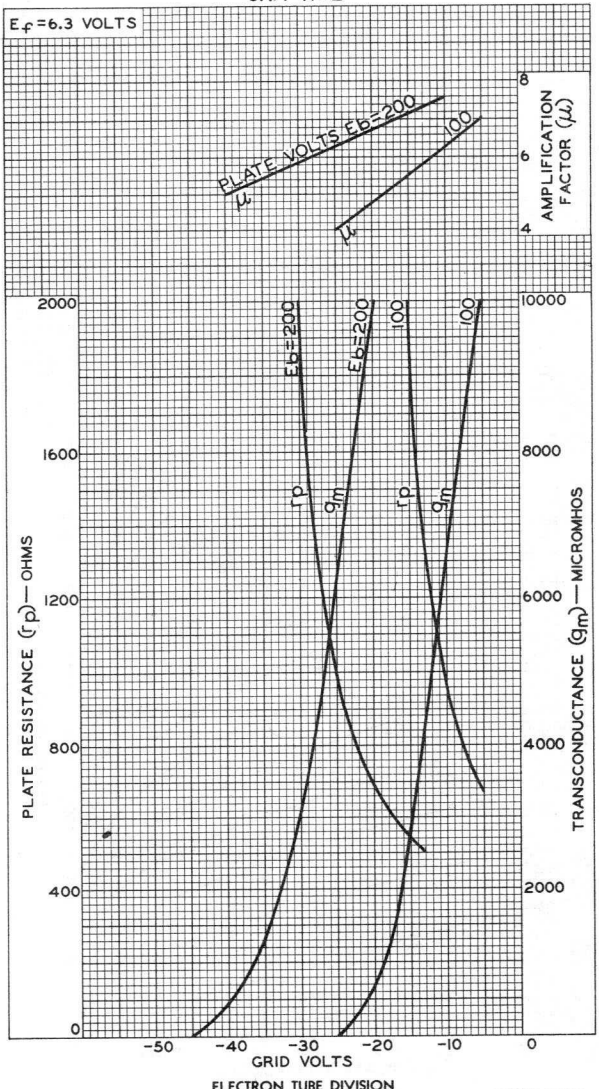
92CM-9913

6DR7

RCA

6DR7

AVERAGE CHARACTERISTICS
UNIT Nº 2



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

92CM-9914

6DS4

High-Mu Triode

NUVISTOR TYPE

HAVING EXTENDED CUTOFF CHARACTERISTIC

For Use as Grounded-Cathode, Neutralized RF-Amplifier Tube in Tuners of VHF Television and FM Receivers Featuring Improved Weak-Signal-Area Reception

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	0.135	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.):		
Grid to plate	0.92	μμf
Grid to cathode, shell, and heater	4.3	μμf
Plate to cathode, shell, and heater	1.8	μμf
Plate to cathode	0.18	μμf
Heater to cathode	1.6	μμf

Characteristics, Class A$_1$ Amplifier:

Plate Supply Voltage	110	volts
Grid Supply Voltage	0	volts
Cathode Resistor	130	ohms
Amplification Factor	63	
Plate Resistance (Approx.)	7000	ohms
Transconductance	9000	μmhos
Plate Current	6.5	ma
Grid Voltage (Approx.) for plate μa = 100.	-5	volts
Grid Voltage (Approx.) for plate μa = 10 .	-6.8	volts

Mechanical:

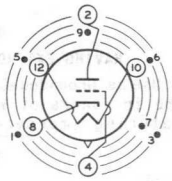
Operating Position . . . . . Any
Type of Cathode . . . . . Coated Unipotential
Maximum Overall Length . . . . . .0.800"
Maximum Seated Length . . . . . 0.625"
Maximum Diameter . . . . . 0.440"
Envelope . . . . . Metal Shell MT4
Socket . . . . . .Cinch Mfg. Corp. No.133 65 10 001,
Industrial Electronic Hardware Co. No. Nu 5044
or No. Nu 5060, or equivalent
Base . . . Medium Ceramic-Wafer Twelvar 5-Pin (JEDEC No.E5-65)

← Indicates a change.

6DS4

Basing Designation for BOTTOM VIEW. 12AQ

Pin 1[a] – Do Not Use
Pin 2 – Plate
Pin 3 – Same as Pin 1
Pin 4 – Grid
Pin 5 – Same as Pin 1
Pin 6 – Same as Pin 1
Pin 7 – Same as Pin 1
Pin 8 – Cathode
Pin 9 – Same as Pin 1
Pin 10 – Heater
Pin 12 – Heater



INDEX=LARGE LUG
●=SHORT PIN

AMPLIFIER — Class A$_1$

Maximum Ratings, *Design-Maximum Values:*

PLATE SUPPLY VOLTAGE.	300[b]	max.	volts
PLATE VOLTAGE	135	max.	volts
GRID VOLTAGE:			
Negative-bias value	55	max.	volts
Peak-positive value	0	max.	volts
CATHODE CURRENT	15	max.	ma
→ PLATE DISSIPATION:			
With a minimum series plate-circuit resistance of 5000 ohms	1.5	max.	watts
For lower values of series plate-circuit resistance.	See accompanying *Plate-Dissipation-Rating Chart*		

Typical Operation:

Plate Voltage	70	volts
Grid Supply Voltage	0	volts
Grid Resistor	47000	ohms
Amplification Factor.	68	
Plate Resistance (Approx.).	5440	ohms
Transconductance.	12500	μmhos
→ Plate Current	7	ma

Maximum Circuit Values:

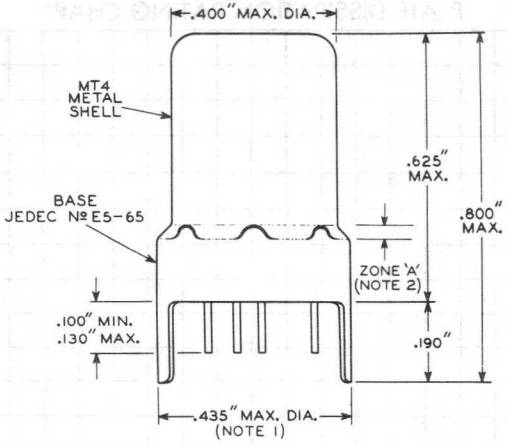
Grid-Circuit Resistance:[c]			
For fixed-bias operation.	0.5	max.	megohm
For cathode-bias operation.	2.2	max.	megohms

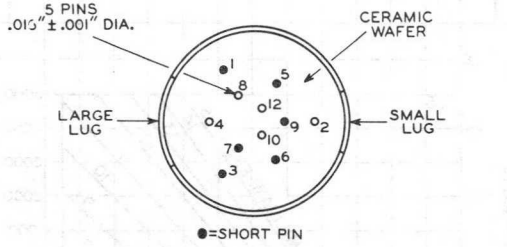
[a] Pin is of a length such that its end does not touch the socket insertion plane.

→ [b] A plate supply voltage of 300 volts may be used provided sufficient plate-circuit resistance and agc voltage are used to limit the voltage at the plate of the tube to 135 volts under conditions of maximum-rated plate dissipation (1.5 watts).

→ [c] For operation at metal-shell temperatures up to 135° C.

→ Indicates a change.





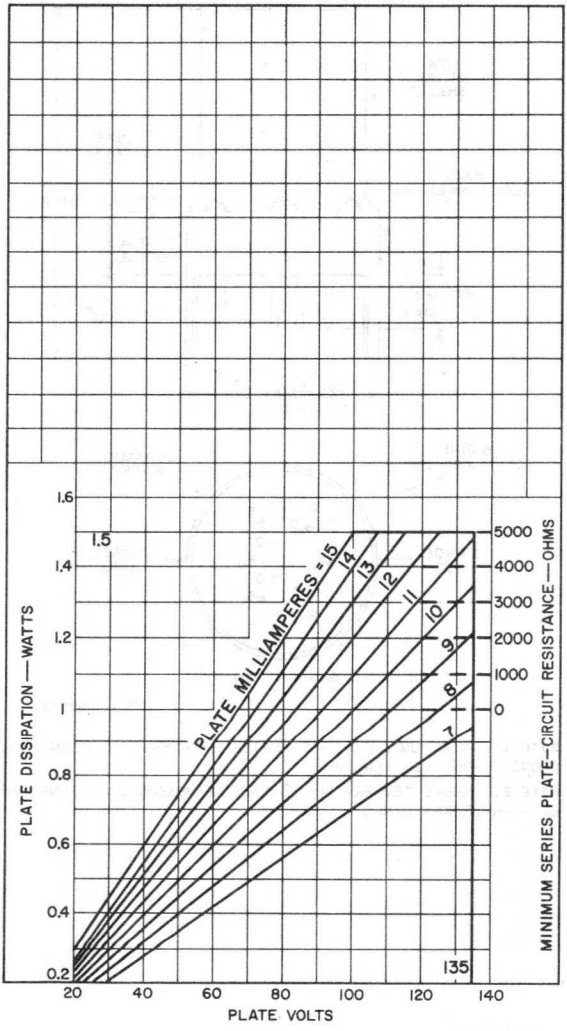
92CS-10970R3

NOTE 1: MAXIMUM OUTSIDE DIAMETER OF 0.440" IS PERMITTED ALONG 0.190" LUG LENGTH.

NOTE 2: SHELL TEMPERATURE SHOULD BE MEASURED IN ZONE "A" BETWEEN BROKEN LINES.

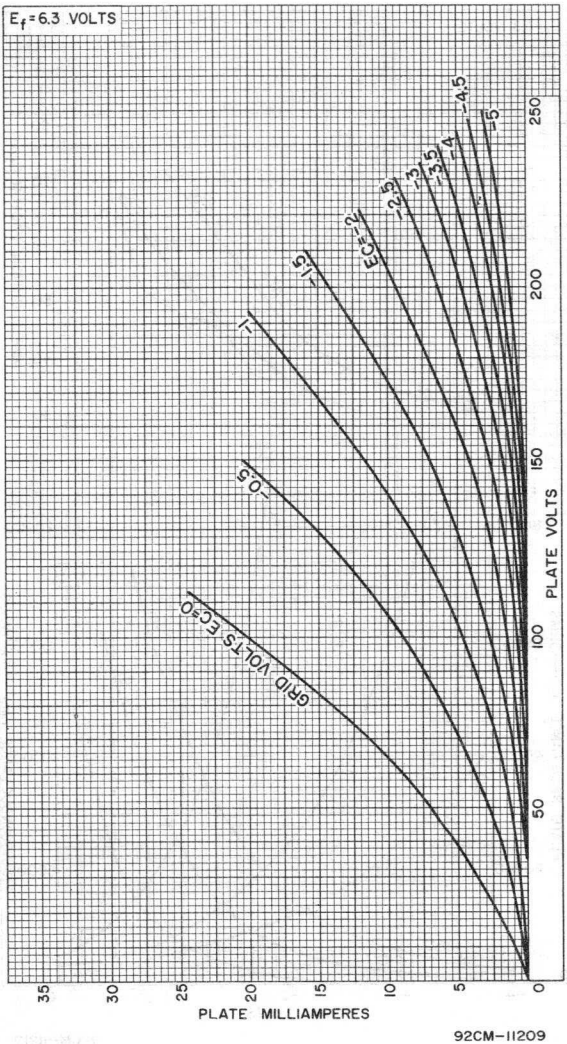
6DS4

PLATE-DISSIPATION-RATING CHART



92CM-11681

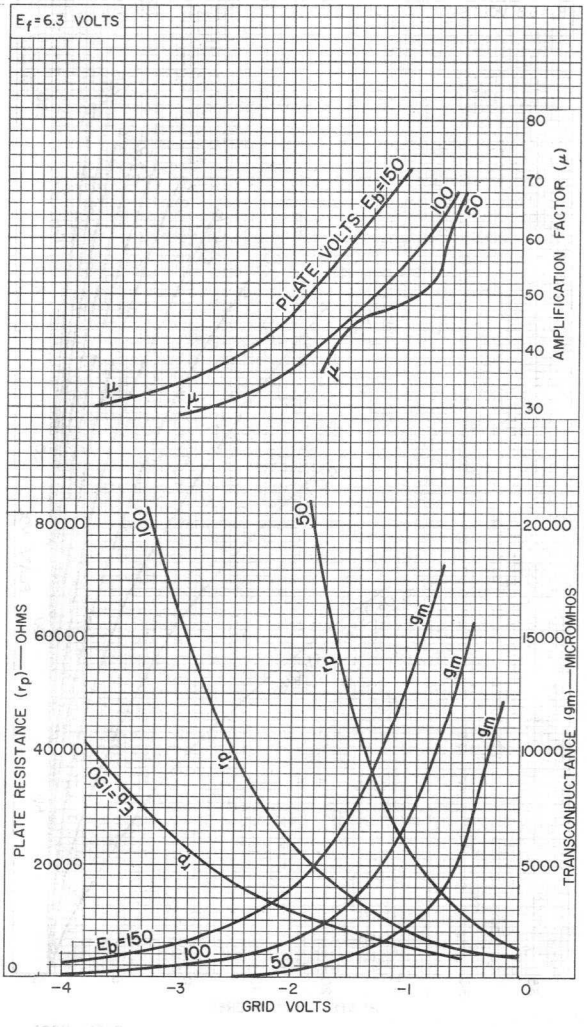
AVERAGE PLATE CHARACTERISTICS



92CM-11209

6DS4

AVERAGE CHARACTERISTICS



92CM-11210

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

Beam Power Tube

7-PIN MINIATURE TYPE

For Audio Output Service in TV and Radio Receivers

ELECTRICAL CHARACTERISTICS – Bogey Values[a]

Heater Voltage, ac or dc	E_h	6.3	V
Heater Current	I_h	0.8	A
Direct Interelectrode Capacitances:[b]			
Grid No.1 to plate	c_{g1-p}	0.19	pF
Input: G1 to (K, G3, G2, H)	c_i	9.5	pF
Output: P to (K, G3, G2, H)	c_o	6.3	pF

TYPICAL OPERATION AND CHARACTERISTICS

Cathode-Bias Operation

For the following characteristics, see Conditions below:

Zero-Signal Plate Current	I_b	34.5	27	mA
Max.-Signal Plate Current	$I_{b(max.-sig.)}$	32.5	25	mA
Zero-Signal Grid-No.2 Current	I_{c2}	3.5	3	mA
Max.-Signal Grid-No.2 Current	$I_{c2(max.-sig.)}$	9	9	mA
Plate Resistance (Approx.)	r_p	28000	28000	Ω
Transconductance	g_m	6000	5800	μmho
Load Resistance	R_l	6000	8000	Ω
Total Harmonic Distortion	D_t	10	10	%
Max.-Signal Power Output	P_o	2.8	3.6	W
Conditions:				
Heater Voltage	E_h	6.3	6.3	V
Plate Supply Voltage	E_{bb}	200	250	V
Grid-No.2 Voltage	E_{c2}	200	200	V
Cathode-Bias Resistor	R_k	180	270	Ω
Peak AF Grid-No.1 Voltage	e_{c1m}	7.5	9.2	V

Fixed-Bias Operation

For the following characteristics, see Conditions below:

Zero-Signal Plate Current	I_b	35	29	mA
Max.-Signal Plate Current	$I_{b(max.-sig.)}$	36	32	mA
Zero-Signal Grid-No.2 Current	I_{c2}	3	3	mA
Max.-Signal Grid-No.2 Current	$I_{c2(max.-sig.)}$	9	10	mA
Plate Resistance (Approx.)	r_p	28000	28000	Ω
Transconductance	g_m	6000	5800	μmho
Load Resistance	R_l	6000	8000	Ω

Total Harmonic Distortion	D_t	9	10 %
Max.-Signal Power Output	P_o	3	3.8 W
Conditions:			
Heater Voltage	E_h	6.3	6.3 V
Plate Voltage	E_b	200	250 V
Grid-No.2 Voltage	E_{c2}	200	200 V
Grid-No.1 (Control-Grid) Voltage	E_{c1}	-7.5	-8.5 V
Peak AF Grid-No.1 Voltage	e_{c1m}	7.5	8.5 V

MECHANICAL CHARACTERISTICS

Dimensional Outline	JEDEC 5-3
Maximum Overall Length	2.625 in (66.67 mm)
Maximum Seated Length	2.375 in (60.32 mm)
Maximum Diameter	0.750 in (19.05 mm)
Bulb	T 5-1/2
Base	Small-Button Miniature 7-Pin (JEDEC No.E7-1)
Terminal Connections (See *TERMINAL DIAGRAM*)	JEDEC Designation 7BZ
Type of Cathode	Coated Unipotential
Mounting Position	Any

MAXIMUM RATINGS – Design-Maximum Values[c]

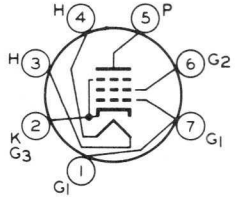
Plate Voltage	E_b	275	V
Grid-No.2 Voltage	E_{c2}	275	V
Grid-No.1 Voltage:			
Positive bias value	E_{c1}	0	V
Plate Dissipation	P_b	9	W
Grid-No.2 Input	P_{g2}	2.2	W
Heater Voltage	E_h	5.7 to 6.9	V
Heater-Cathode Voltage:			
Peak	e_{hkm}	+200	V
DC	E_{hk}	100	V
Envelope Temperature (At hottest point on envelope surface)	T_E	250	°C

MAXIMUM CIRCUIT VALUES

Grid-No.1-Circuit Resistance:	$\bar{R}_{g1(ckt)}$		
For fixed-bias operation		0.1	MΩ
For cathode-bias operation		1.0	MΩ

a Unless otherwise specified.
b Without external shield. Measured in accordance with the current issue of EIA Standard RS-191.
c As defined in the current issue of EIA Standard RS-239.

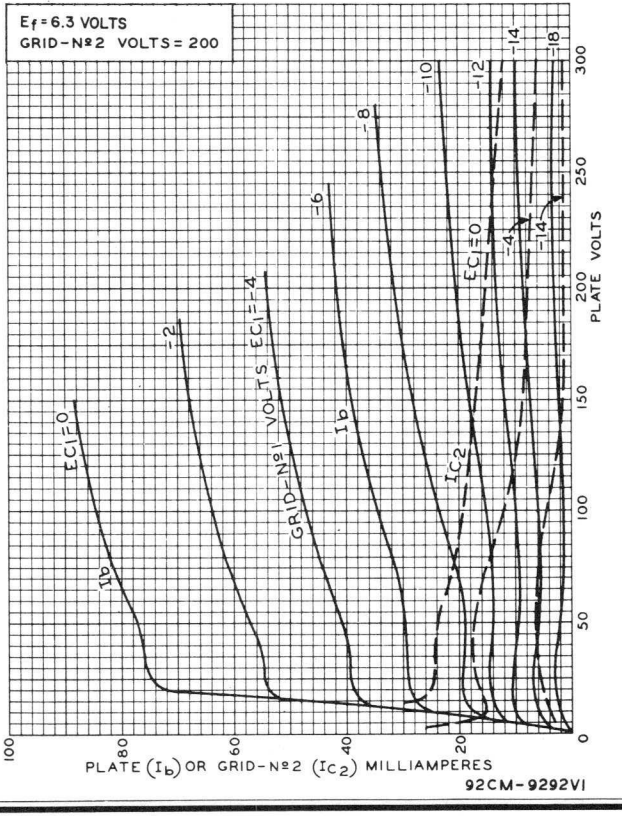
TERMINAL DIAGRAM - Bottom View



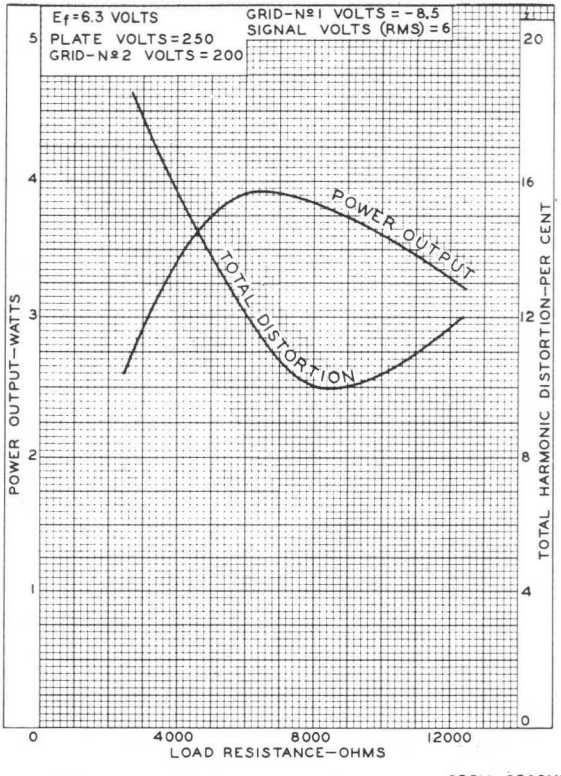
JEDEC 7BZ

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

AVERAGE CHARACTERISTICS



OPERATION CHARACTERISTICS



92CM-9293VI

6DT5
BEAM POWER TUBE

9-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	6.3 ± 10%	volts
Current	1.2	amp
Direct Interelectrode Capacitances (Approx.):[o]		
Grid No.1 to plate	0.57	μμf
Grid No.1 to cathode & grid No.3, grid No.2, and heater	12.5	μμf
Plate to cathode & grid No.3, grid No.2, and heater	4.9	μμf

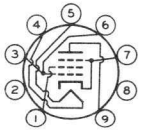
Characteristics, Class A_1 Amplifier:

Plate Voltage	60	80	250	volts
Grid-No.2 Voltage	150	250	250	volts
Grid-No.1 Voltage	0	0	-16.5	volts
Transconductance	–	–	6200	μmhos
Plate Current	95*	195*	44	ma
Grid-No.2 Current	8.5	19	1.5	ma
Grid-No.1 Voltage (Approx.) for plate ma. = 100	–	–	-35	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	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-Maximum Values:*

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

DC PLATE VOLTAGE	315 max.	volts
PEAK POSITIVE-PULSE PLATE VOLTAGE*	2200 max.	volts
DC GRID-No.2 (SCREEN-GRID) VOLTAGE	285 max.	volts
PEAK NEGATIVE-PULSE GRID-No.1 (CONTROL-GRID) VOLTAGE	250 max.	volts

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

6DT5

BEAM POWER TUBE

CATHODE CURRENT:			
Peak	190	max.	ma
Average	55	max.	ma
GRID-No.2 INPUT	2	max.	watts
PLATE DISSIPATION	9	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 fixed-bias operation	0.5	max.	megohm
For cathode-bias operation	1	max.	megohm

° 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.

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

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.

▲ The dc component must not exceed 100 volts.

6DT6-A

Sharp-Cutoff Pentode

With Two Independent Control Grids

7-PIN MINIATURE TYPE
For FM Detector Service

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 (Approx.):▲		
Grid No.1 to plate	0.02	μμf
Grid No.1 to cathode & internal shield, grid No.3, grid No.2, and heater	5.8	μμf
Grid No.3 to plate	1.7	μμf
Grid No.1 to grid No.3	0.1	μμf
Grid No.3 to cathode & internal shield, plate, grid No.2, grid No.1, and heater	6.1	μμf

Characteristics, Class A_1 Amplifier:

Plate Supply Voltage	150	volts
Grid No.3	*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	1350	μmhos
Transconductance, Grid No.3 to Plate	515	μmhos
Plate Current	1.55	ma
Grid-No.2 Current	1.8	ma
Grid-No.1 Voltage (Approx.) for plate μa = 10	-5.2	volts
Grid-No.3 Voltage (Approx.) for plate μa = 10	-4.2	volts

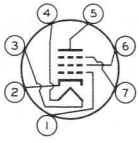
Mechanical:

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)

6DT6-A

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 DETECTOR

Maximum Ratings, *Design-Maximum Values:*

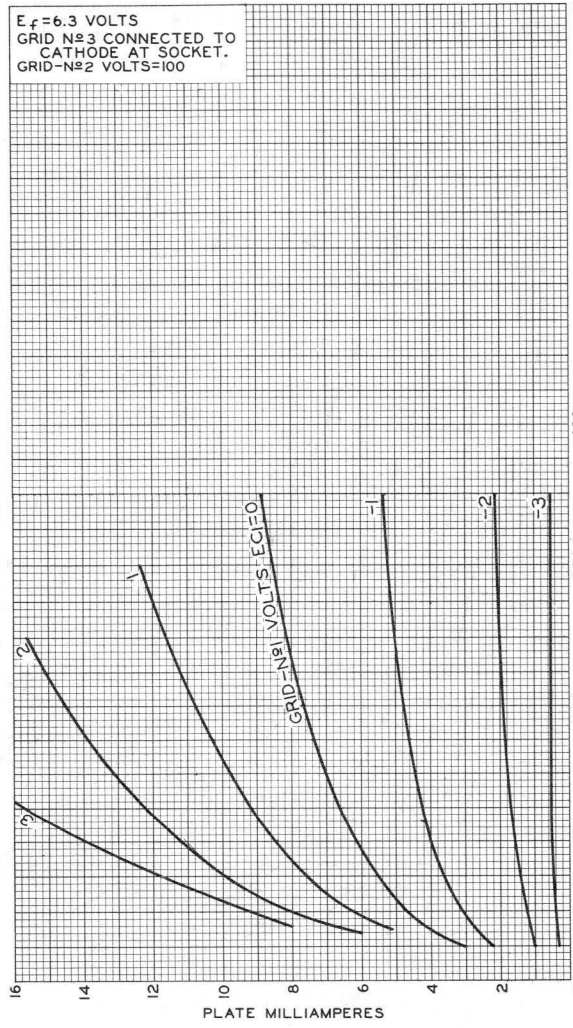
PLATE VOLTAGE.	330 max. volts
GRID-No.3 (CONTROL-GRID) VOLTAGE	28 max. volts
GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE . .	330 max. volts
GRID-No.2 VOLTAGE.	*See Grid-No.2 Input Rating Chart at front of Receiving Tube Section*
GRID-No.1 (CONTROL-GRID) VOLTAGE:	
Positive-bias value.	0 max. volts
GRID-No.2 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*
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● max. volts

Maximum Circuit Values:

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

▲ With external shield JEDEC No.316 connected to cathode.
● The dc component must not exceed 100 volts.

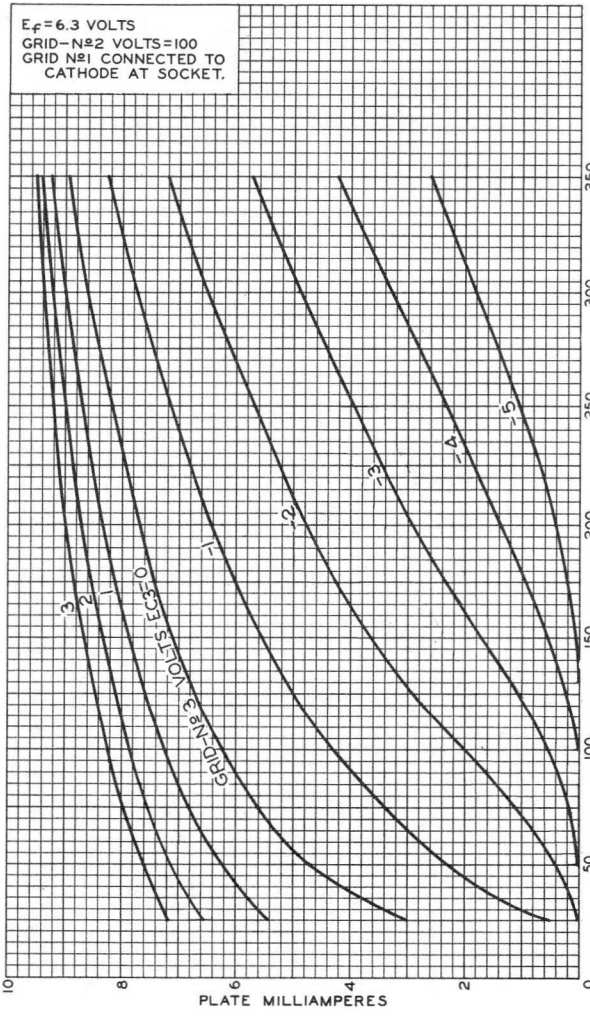
AVERAGE PLATE CHARACTERISTICS



92CM-8827R2

6DT6-A

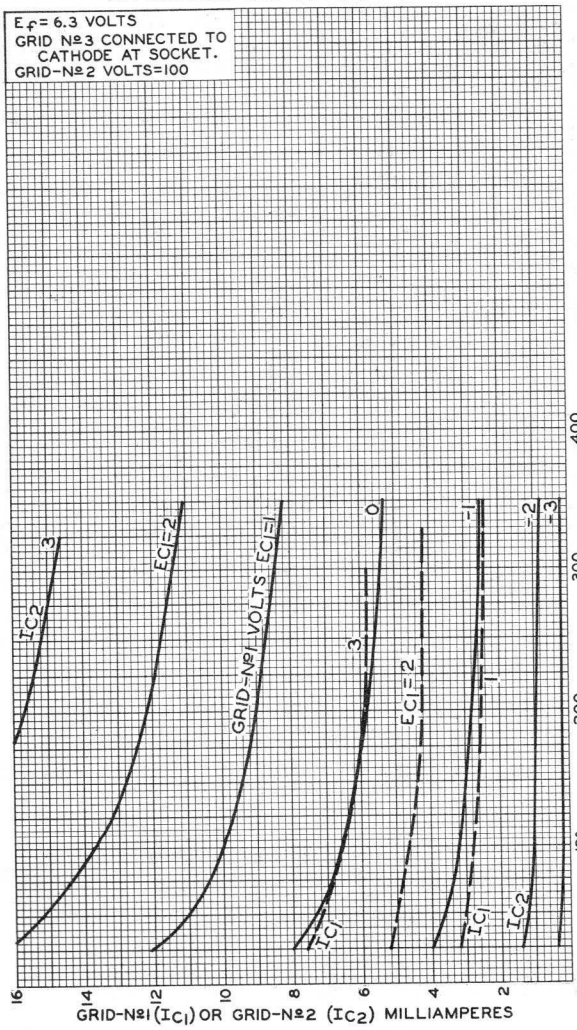
AVERAGE PLATE CHARACTERISTICS



92CM-8830R2

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

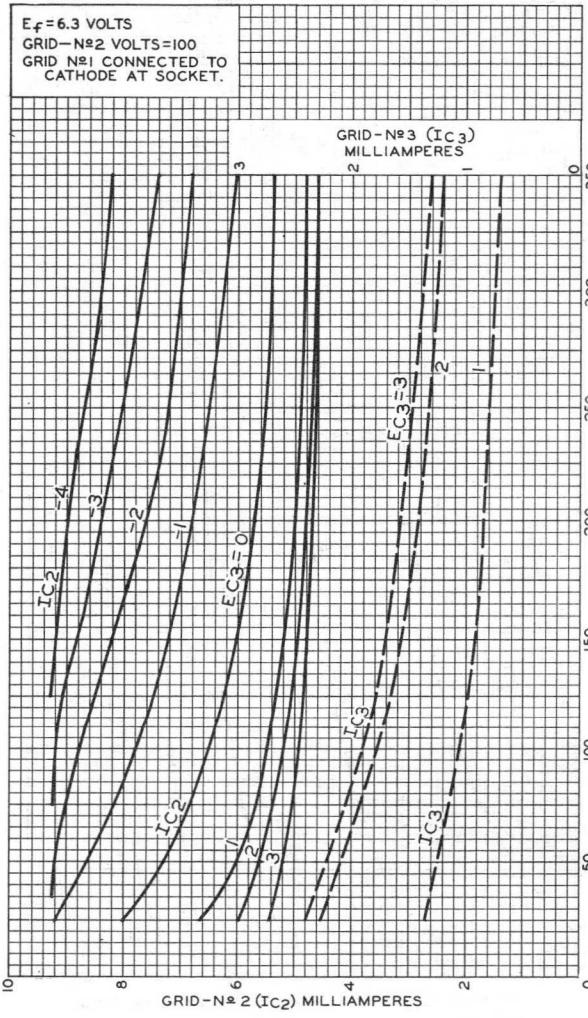
AVERAGE CHARACTERISTICS



92CM-8828R2

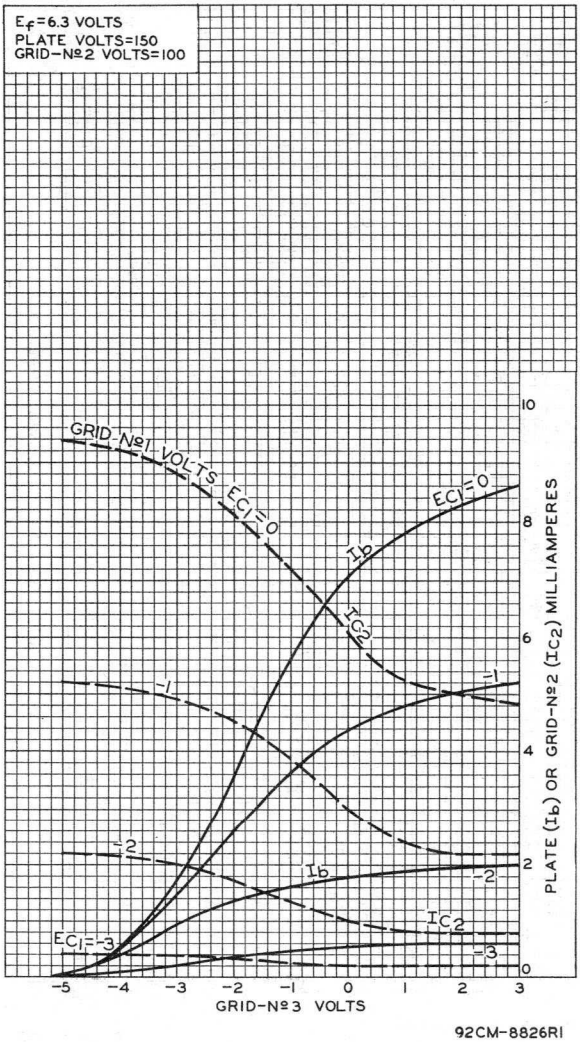
6DT6-A

AVERAGE CHARACTERISTICS



92CM-8829R2

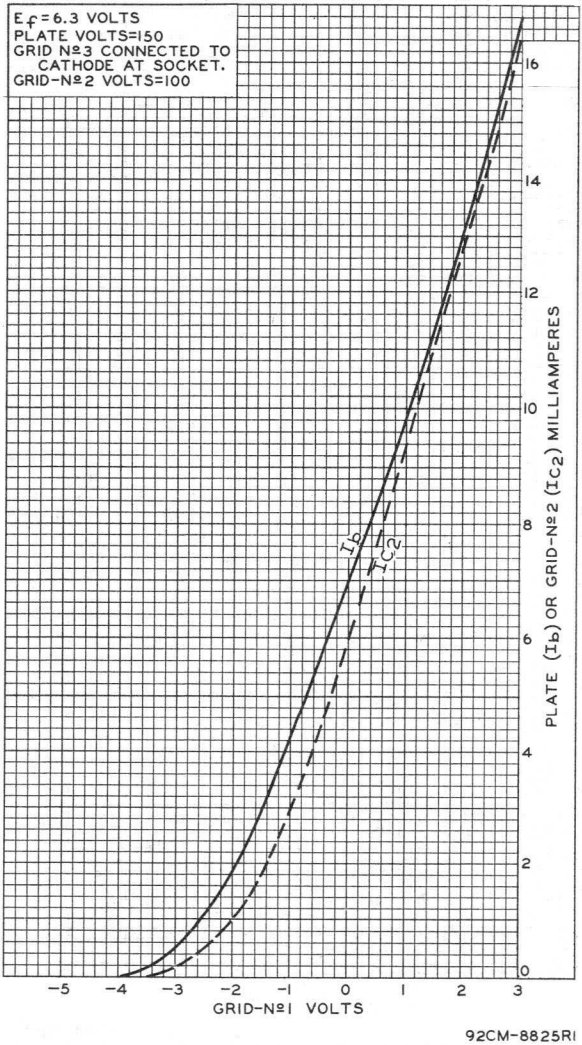
AVERAGE CHARACTERISTICS



92CM-8826RI

6DT6-A

AVERAGE CHARACTERISTICS



92CM-8825RI

6DT8

HIGH-MU TWIN TRIODE

9-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

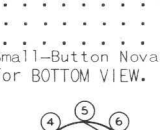
Heater, for Unipotential Cathodes:			
Voltage	6.3		ac or dc volts
Current	0.3		amp
Direct Interelectrode Capacitances (Approx.):	*Unit No.1*	*Unit No.2*	
Grid-Drive Operation:[o]			
Grid to plate	1.6	1.6	μμf
Grid to cathode, internal shield, and heater	2.7	2.7	μμf
Plate to cathode, internal shield, and heater	1.6	1.6	μμf
Heater to cathode[●]	3	3	μμf
Cathode-Drive Operation:[□]			
Cathode to grid, internal shield, and heater	–	5.3	μμf
Plate to grid, internal shield, and heater	–	2.8	μμf

Characteristics, Class A_1 Amplifier (Each Unit):			
Plate-Supply Voltage	100	250	volts
Cathode Resistor	270	200	ohms
Amplification Factor	60	60	
Plate Resistance (Approx.)	15000	10900	ohms
Transconductance	4000	5500	μmhos
Plate Current	3.7	10	ma
Grid Voltage (Approx.) for plate current of 10 μa	-5	-12	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"
Maximum Diameter	7/8"
Dimensional Outline	*See General Section*
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JETEC 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

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

●,□: See next page.

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

TENTATIVE DATA

6DT8

HIGH-MU TWIN TRIODE

AMPLIFIER — Class A_1

Values are for Each Unit

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	300	max.	volts
GRID VOLTAGE:			
Negative bias value	50	max.	volts
PLATE DISSIPATION	2.5	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-Circuit Resistance:			
For fixed-bias operation.	0.25	max.	megohm
For cathode-bias operation.	1	max.	megohm

● With external shield JETEC No.315 connected to ground.
□
▲ With external shield JETEC No.315 connected to grid of unit under test. The dc component must not exceed 100 volts.

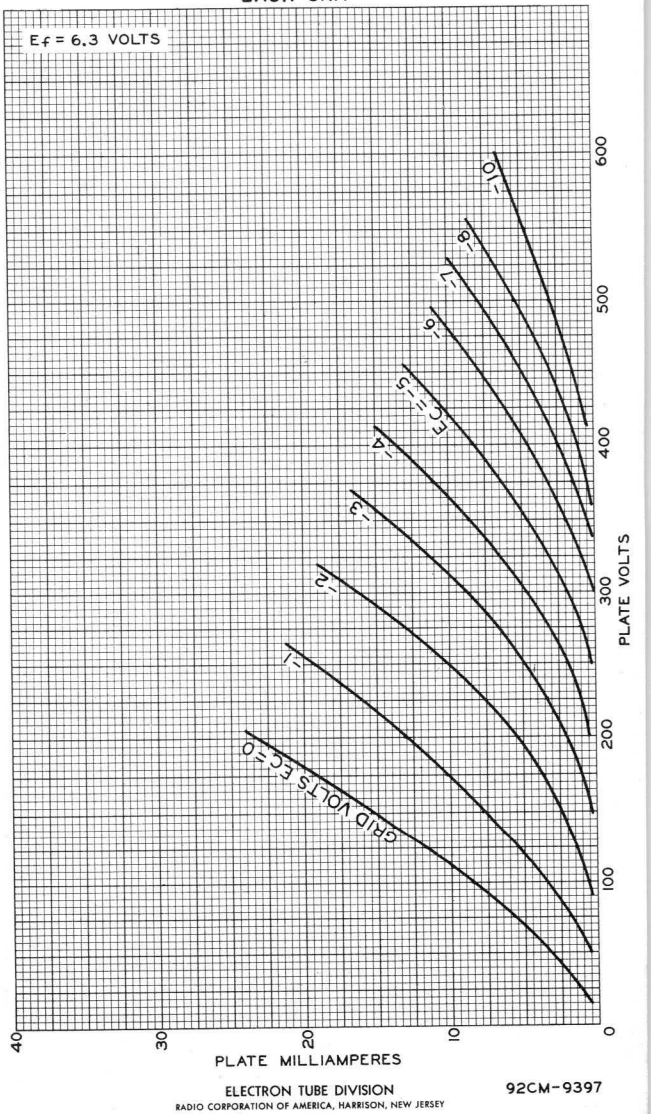
ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA

RCA

6DT8

AVERAGE PLATE CHARACTERISTICS
EACH UNIT



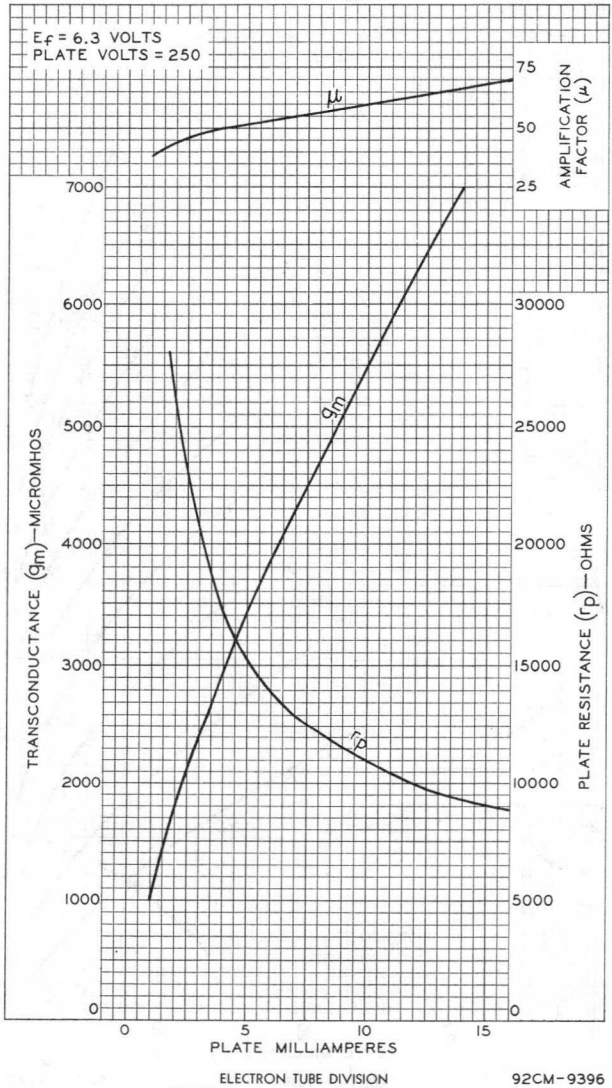
ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-9397

RCA

6DT8

AVERAGE CHARACTERISTICS
EACH UNIT



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

92CM-9396

6DV4

Medium-Mu Triode

NUVISTOR TYPE

Having Gold-Plated Envelope and Base Pins to Assure Positive Grounding and Low Pin-Contact Resistance for Oscillator Applications at UHF Frequencies

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	0.135	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.):		
Grid to plate	1.8	pf
Grid to cathode, shell, and heater	4.4	pf
Plate to cathode, shell, and heater	1.9	pf
Plate to cathode	0.25	pf
Heater to cathode	1.4	pf
Grid to cathode	3.7	pf

Characteristics, Class A_1 Amplifier:

Plate Supply Voltage	75	volts
Cathode Resistor	100	ohms
Amplification Factor	35	
Plate Resistance (Approx.)	3100	ohms
Transconductance	11500	μmhos
Plate Current	10.5	ma
Grid Voltage (Approx.) for plate μa = 10.	-7	volts

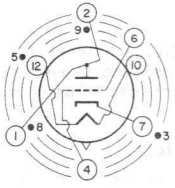
Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	0.800"
Maximum Seated Length	0.625"
Maximum Diameter	0.440"
Envelope	Metal Shell MT4
Socket	Industrial Electronic Hardware Corp. No. MSN0707-1, or equivalent
Base	Medium Ceramic-Wafer Twelvar 7-Pin (JEDEC No.E7-83)

6DV4

Basing Designation for BOTTOM VIEW. 12EA

Pin 1 – Plate
Pin 2 – Plate
Pin 3[a] – Do Not Use
Pin 4 – Grid
Pin 5 – Same as Pin 3
Pin 6 – Grid
Pin 7 – Cathode
Pin 8 – Same as Pin 3
Pin 9 – Same as Pin 3
Pin 10 – Heater
Pin 12 – Heater



INDEX = LARGE LUG
● = SHORT PIN

AMPLIFIER — Class A_1

Maximum Ratings, *Design-Maximum Values:*

PLATE SUPPLY VOLTAGE	300[b]	max.	volts
PLATE VOLTAGE	125	max.	volts
GRID VOLTAGE:			
Negative-bias value	55	max.	volts
Peak-positive value	2	max.	volts
CATHODE CURRENT	15	max.	ma
PLATE DISSIPATION	1	max.	watt

Typical Operation:

As oscillator at 950 Mc

Plate Voltage	60	volts
Grid Voltage	−2	volts
Grid Resistor	5600	ohms
Plate Current	8	ma
Grid Current	350	μa

Maximum Circuit Values:

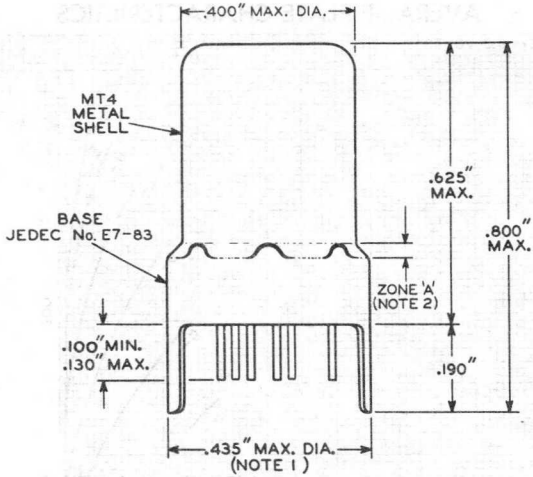
Grid-Circuit Resistance:[c]

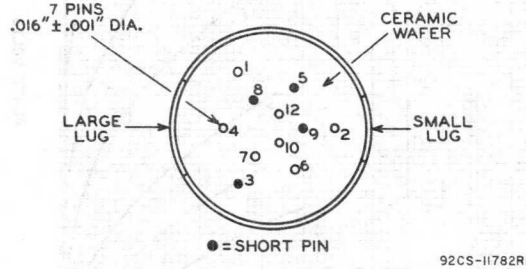
For fixed-bias operation	0.1	max.	megohm
For cathode-bias operation	0.2	max.	megohm

[a] Pin is of a length such that its end does not touch the socket insertion plane.

[b] A plate supply voltage of 300 volts may be used provided that a sufficiently large resistor is used in the plate circuit to limit the plate dissipation to one watt under any condition of operation.

[c] For operation at metal-shell temperatures up to 135° C.



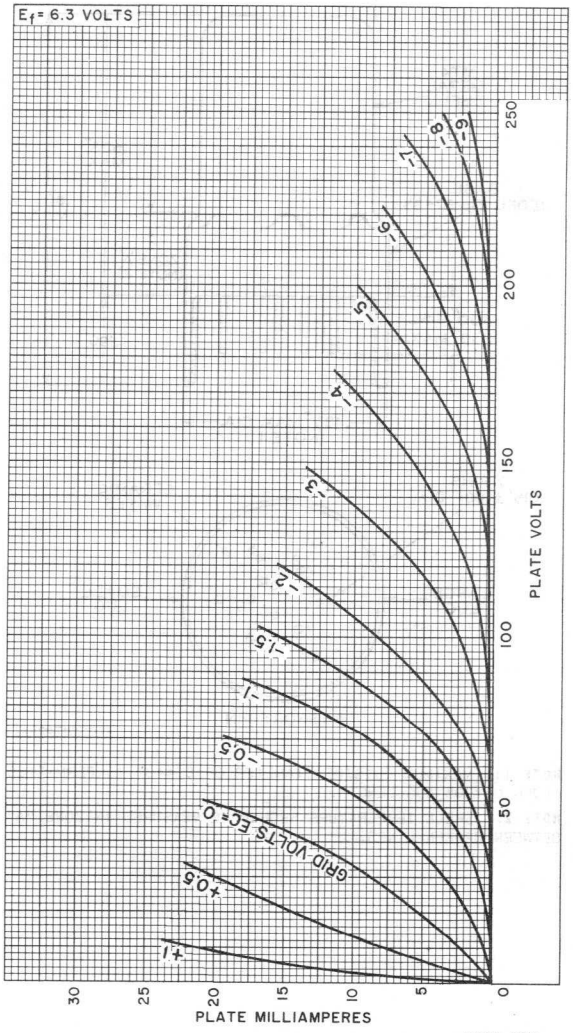


NOTE 1: MAXIMUM OUTSIDE DIAMETER OF 0.440" IS PERMITTED ALONG 0.190" LUG LENGTH.

NOTE 2: SHELL TEMPERATURE SHOULD BE MEASURED IN ZONE "A" BETWEEN BROKEN LINES.

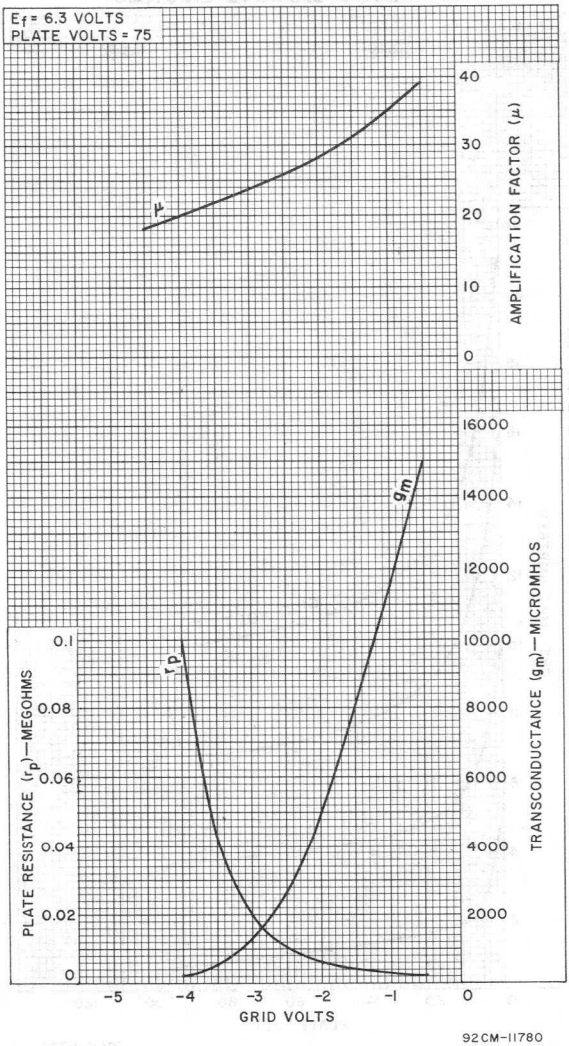
6DV4

AVERAGE PLATE CHARACTERISTICS



92CM-11781

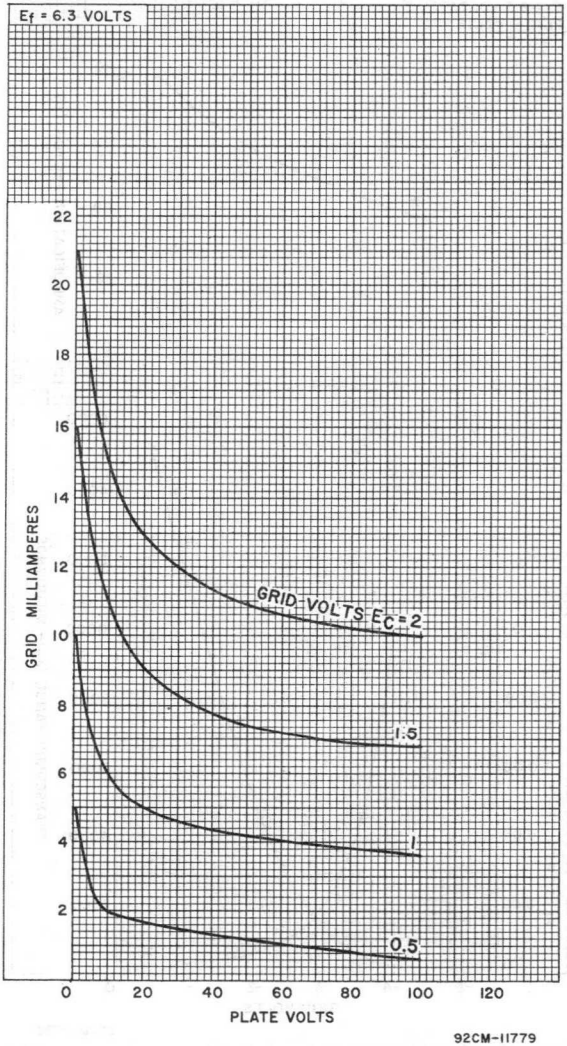
AVERAGE CHARACTERISTICS



92CM-11780

6DV4

AVERAGE CHARACTERISTICS



92CM-11779

Half-Wave Vacuum Rectifier

NOVAR TYPE

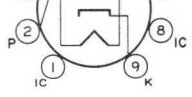
For Television Damper Service

Electrical:

Heater Characteristics and Ratings:		
Voltage (AC or DC)	6.3 ± 0.6	volts
Current at heater volts = 6.3	1.200	amp
Maximum heater-cathode voltage:		
Heater negative with respect to cathode:[a]		
Peak	5500	volts
DC component	900	volts
Heater positive with respect to cathode:		
Peak	300	volts
DC component	100	volts
Direct Interelectrode Capacitances (Approx.):[b]		
Plate to cathode and heater	6.5	pf
Cathode to plate and heater	9.0	pf
Heater to cathode	2.8	pf

Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	3.005"
Seated Length	2.375" to 2.625"
Diameter	1.062" to 1.188"
Dimensional Outline (JEDEC 12-99)	See *General Section*
Bulb	T9
Base	Small-Button Novar 9-Pin with Exhaust Tip (JEDEC No.E9-89)
Basing Designation for BOTTOM VIEW	9HP



Pin 1 – Do Not Use[c]
Pin 2 – Plate
Pin 3 – Do Not Use[c]
Pin 4 – Heater
Pin 5 – Heater
Pin 6 – Do Not Use[c]
Pin 7 – Plate
Pin 8 – Do Not Use[c]
Pin 9 – Cathode

DAMPER SERVICE

Maximum Ratings, *Design-Maximum Values:*

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

Peak Inverse Plate Voltage[a]	5500	volts
Peak Plate Current	1300	ma
DC Plate Current	250	ma
Plate Dissipation	8.5	watts

Characteristics, Instantaneous Value:

Tube Voltage Drop for plate ma = 350	25	volts

[a] This rating is applicable when 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.

[b] Without external shield.

[c] Socket terminals 1, 3, 6, and 8 should not be used as tie points. It is recommended that the socket clips for these pins be removed to reduce the possibility of arc-over and to minimize leakage.

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

High-Mu Triode—
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	0.720	amp
Peak heater-cathode voltage (Each unit):		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200 max.	volts
Direct Interelectrode Capacitances:[a]		
Triode Unit:		
Grid to plate	2.7	μμf
Grid to all other elements except plate	4.0	μμf
Plate to all other elements except grid	2.3	μμf
Grid to heater	0.1 max.	μμf
Pentode Unit:		
Grid No.1 to plate	0.1 max.	μμf
Grid No.1 to all other elements except plate	9.0	μμf
Plate to all other elements except grid No.1	4.5	μμf
Grid No.1 to heater	0.1 max.	μμf
Triode plate to pentode grid No.1	0.01 max.	μμf
Triode grid to pentode grid No.1	0.01 max.	μμf

Characteristics, Class A_1 Amplifier:

	Triode Unit	*Pentode Unit*			
Plate Voltage	200	170	200	220	volts
Grid-No.2 Voltage	–	170	200	220	volts
Grid-No.1 Voltage	-1.7	-2.1	-2.9	-3.4	volts
Amplification Factor	65	–	–	–	
Mu Factor, Grid No.2 to Grid No.1	–	36	36	36	
Plate Resistance (Approx.)	–	0.1	0.13	0.15	megohm
Transconductance	4000	11000	10400	10000	μmhos
Plate Current	3	18	18	18	ma
Grid-No.2 Current	–	3	3	3	ma

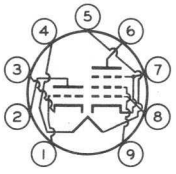
Mechanical:

Operating Position	Any
Type of Cathodes	Coated Unipotential
Maximum Overall Length	2-5/8"
Maximum Seated Length	2-3/8"

6DX8

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. 9HX

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

AMPLIFIER — Class A_1

Maximum Ratings, *Design-Center Values:*

	Triode Unit	*Pentode Unit*	
PLATE SUPPLY VOLTAGE.	550 max.	550 max.	volts
PEAK PLATE VOLTAGE with maximum plate ma. = 0.1[b] .	600 max.	–	volts
PLATE VOLTAGE	300 max.	300 max.	volts
GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE.	–	550 max.	volts
GRID-No.2 VOLTAGE	–	300 max.	volts
CATHODE CURRENT	12 max.	40 max.	ma
GRID-No.2 INPUT	–	1.7 max.	watts
PLATE DISSIPATION	1 max.	4 max.	watts

Typical Operation (Pentode Unit):

As video-output tube

Plate Supply Voltage.	170	200	220	volts
Series Plate Resistor	3000	3000	3000	ohms
Grid-No.2 Voltage	170	200	220	volts
Grid-No.1 Voltage	-2	-2.8	-3.3	volts
Transconductance.	10400	10000	9700	μmhos
Plate Current	18	18	18	ma
Grid-No.2 Current	3.2	3.1	3.1	ma

Maximum Circuit Values:

	Triode Unit	*Pentode Unit*	
Grid-No.1-Circuit Resistance:			
For fixed-bias operation. . . .	1 max.	1 max.	megohm
For cathode-bias operation. . .	3 max.	2 max.	megohms

[a] Without external shield.
[b] With duty factor = 0.18 maximum and pulse duration = 18 microseconds maximum.

6DZ4

Medium-Mu Triode

7-PIN MINIATURE TYPE

For UHF-Oscillator Service in TV Receivers

GENERAL DATA

Electrical:

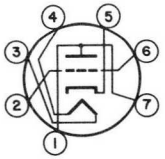
Heater Characteristics and Ratings:		
Voltage (AC or DC)	6.3 ± 0.6	volts
Current at heater volts = 6.3	0.225	amp
Peak heater-cathode voltage:		
Heater negative with respect to cathode	50 max.	volts
Heater positive with respect to cathode	50[a] max.	volts
Direct Interelectrode Capacitances (Approx):[b]		
Grid to plate	1.8	pf
Grid to cathode and heater	2.2	pf
Plate to cathode and heater	1.3	pf

Characteristics, Class A_1 Amplifier:

Plate Supply Voltage	80	volts
Plate Resistor	2700	ohms
Amplification Factor	14	
Plate Resistance (Approx)	2000	ohms
Transconductance	6700	μmhos
Plate Current	15	ma
Grid Voltage (Approx) for plate μa = 20	-11	volts

Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	1-3/4"
Maximum Seated Length	1-1/2"
Length, Base Seat to Bulb Top (Excluding tip)	1-1/8" ±3/32"
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	7DK



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

6DZ4

UHF OSCILLATOR

Maximum Ratings, *Design-Maximum Values:*

PLATE VOLTAGE	135 max.	volts
GRID VOLTAGE:		
Negative-bias value	50 max.	volts
GRID CURRENT	2 max.	ma
CATHODE CURRENT	20 max.	ma
PLATE DISSIPATION	2.3 max.	watts

Typical Operation:[c]

At frequency of 1000 Mc

Plate Supply Voltage	135	volts
Plate-Circuit Resistance	2700	ohms
Grid Resistor	10000	ohms
Plate Current	15.5	ma
Grid Current (Approx)	800	μa

Maximum Circuit Values:

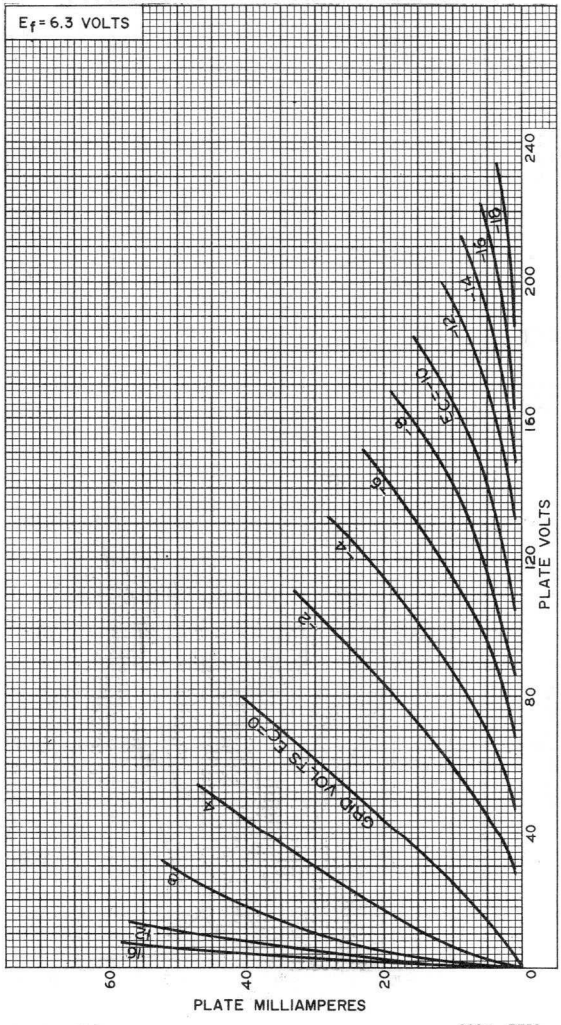
Grid-Circuit Resistance:	
For fixed-bias operation	Not recommended
For cathode-bias operation	0.5 max. megohm

[a] The dc component must not exceed 25 volts.

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

[c] Measured in JEDEC STANDARD OSCILLATION TEST SET No.400 with external, added resistance in plate circuit.

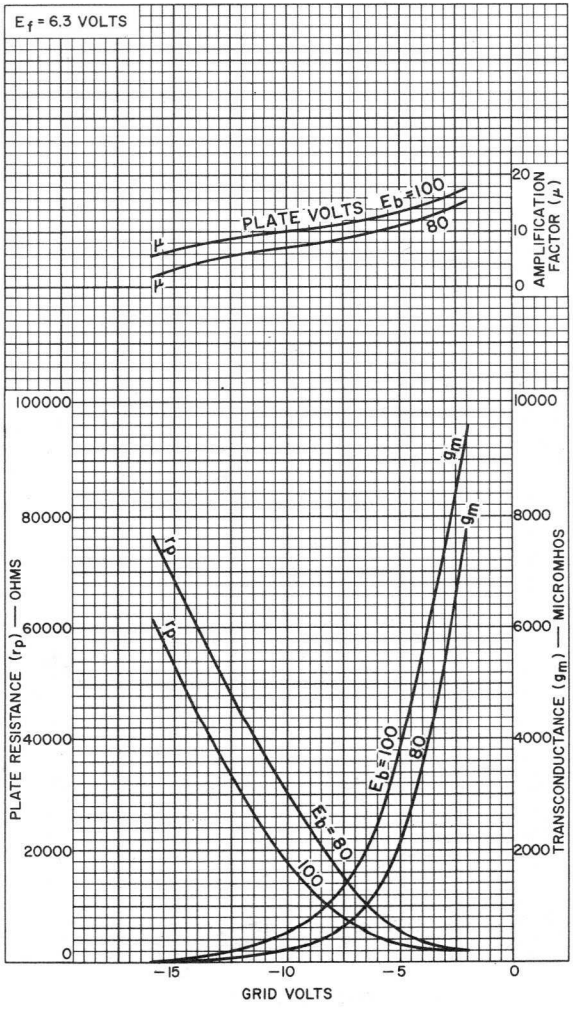
AVERAGE PLATE CHARACTERISTICS



92CM—7756

6DZ4

AVERAGE CHARACTERISTICS



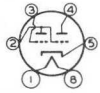
92CM — 7758RI

6E5

ELECTRON-RAY TUBE

INDICAIOR 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

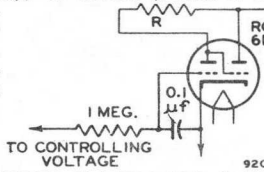
Plate-Supply Voltage		250 max.	volts
Target Voltage		250 max. 125 min.	volts ←
D-C Heater-Cathode Potential		90 max.	volts
Typical Operation:			←
Plate and Target Supply	125	250	volts
Series Triode-Plate Resistor**	1	1	megohm
Target Current*** †	0.8	2	ma.
Triode-Plate Current***	0.1	0.2	ma.
Triode-Grid 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.



 ← Indicates a change.

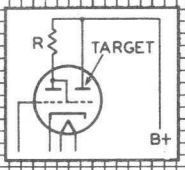
6E5

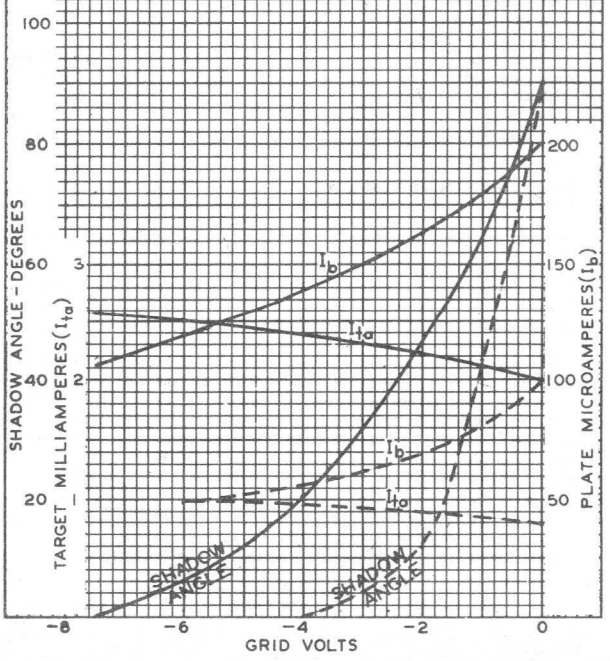
6E5

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

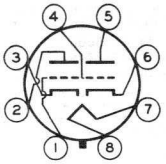
Characteristics, Class A_1 Amplifier:

	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

VERTICAL-DEFLECTION OSCILLATOR

Values are for Unit No.1

Maximum Ratings, *Design-Maximum Values:*

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

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[c]

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

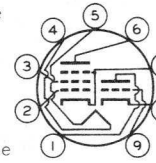
← Indicates a change.

6EA8

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	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.

RCA

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:[o]		
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

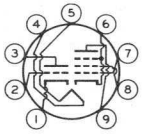
ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6EB8

HIGH-MU TRIODE— SHARP-CUTOFF PENTODE

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

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

6EB8

HIGH-MU TRIODE—
SHARP-CUTOFF PENTODE

o 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.

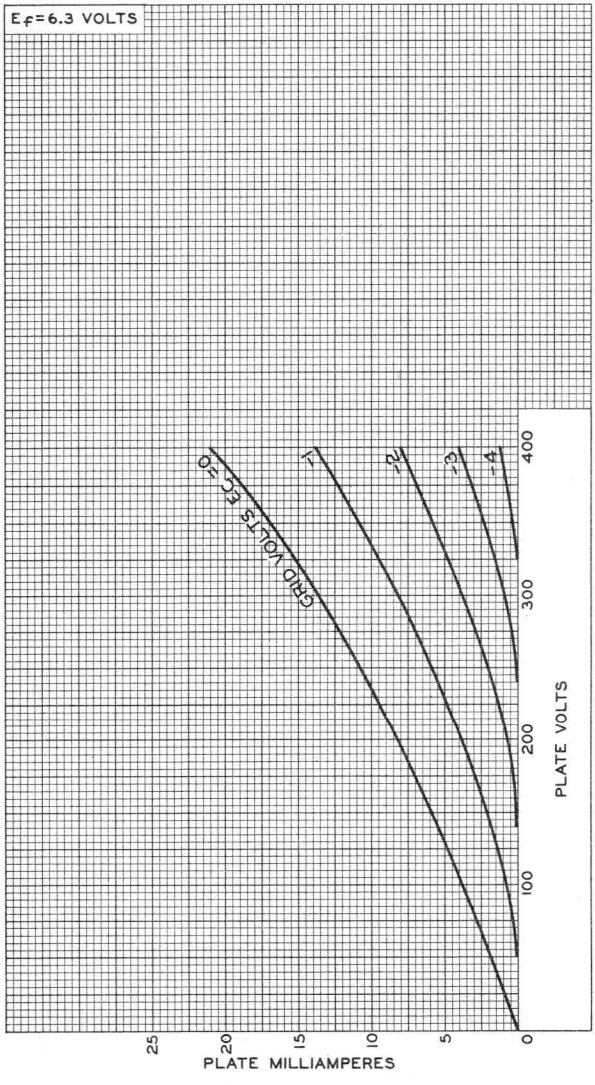
▲ The dc component must not exceed 100 volts.

RCA

6EB8

AVERAGE PLATE CHARACTERISTICS

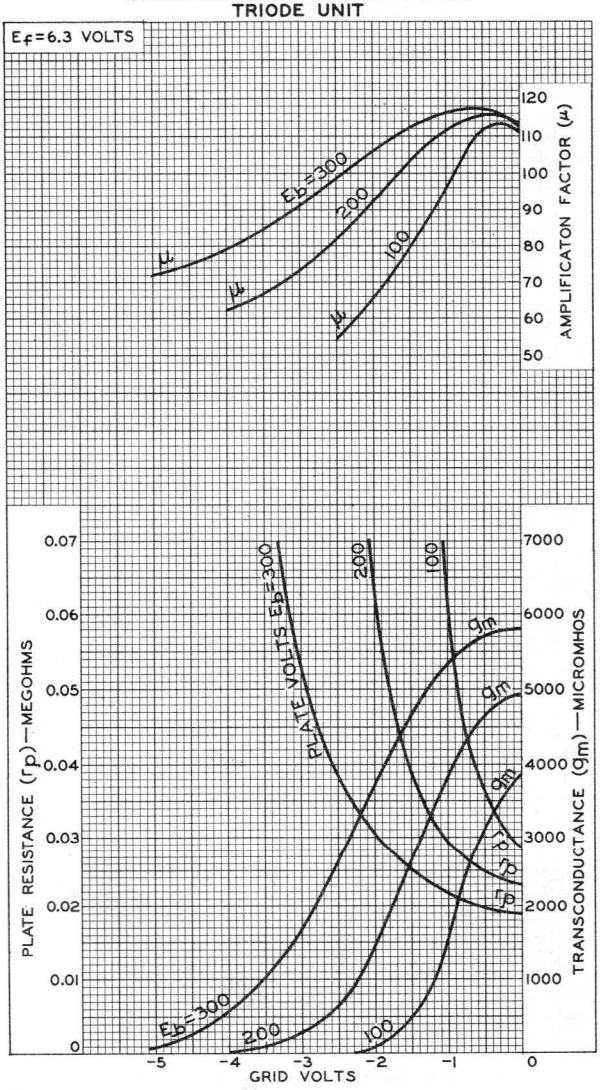
TRIODE UNIT



6EB8

AVERAGE CHARACTERISTICS

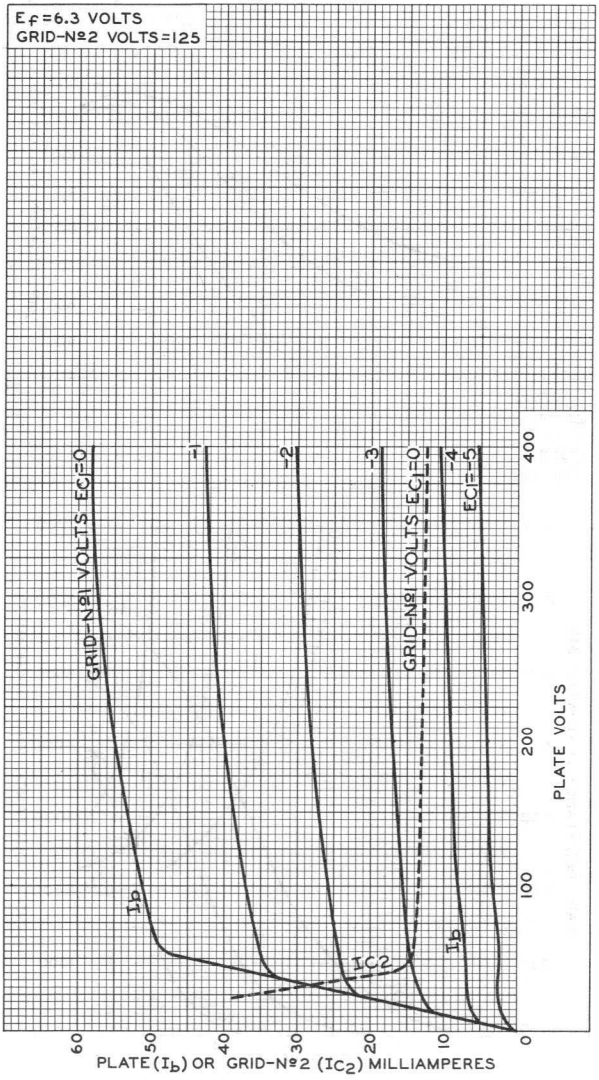
TRIODE UNIT



6EB8

AVERAGE CHARACTERISTICS

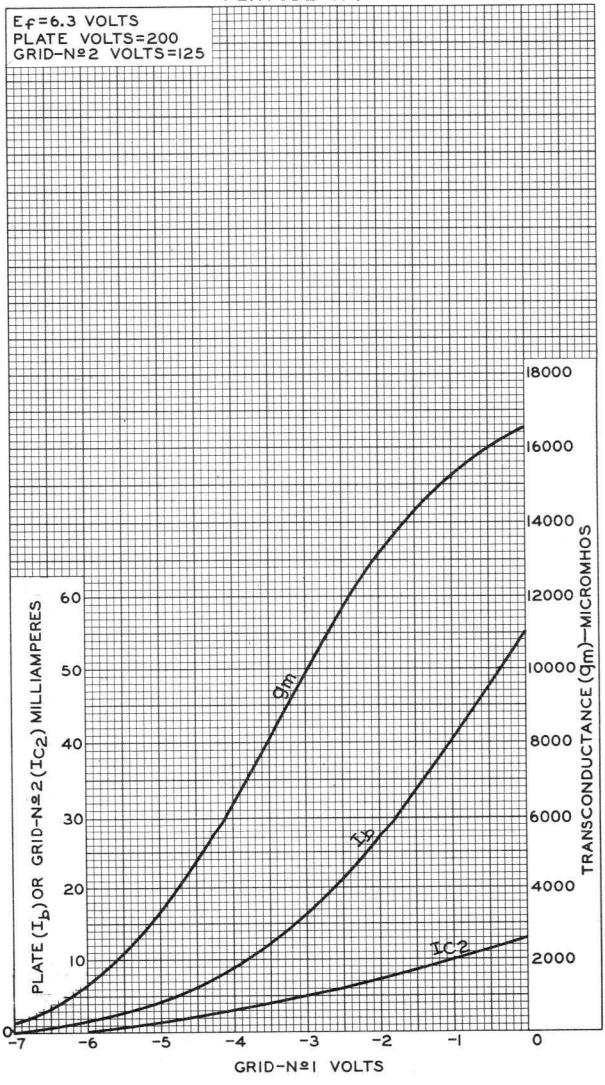
PENTODE UNIT



RCA

6EB8

AVERAGE CHARACTERISTICS
PENTODE UNIT



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

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

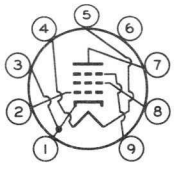
Characteristics, Class A$_1$ Amplifier:

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

[a] 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

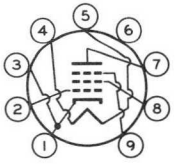
Characteristics, Class A_1 Amplifier:

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

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	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

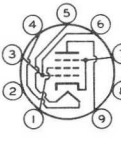
Characteristics, Class A_1 Amplifier:

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.

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.

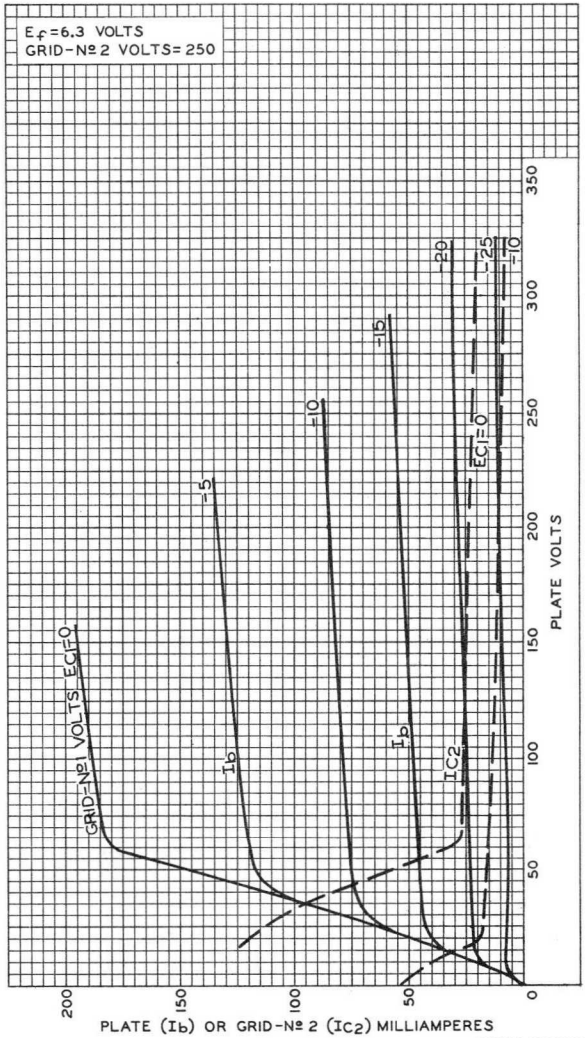
[c] As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations," Federal Communications Commission.

[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.

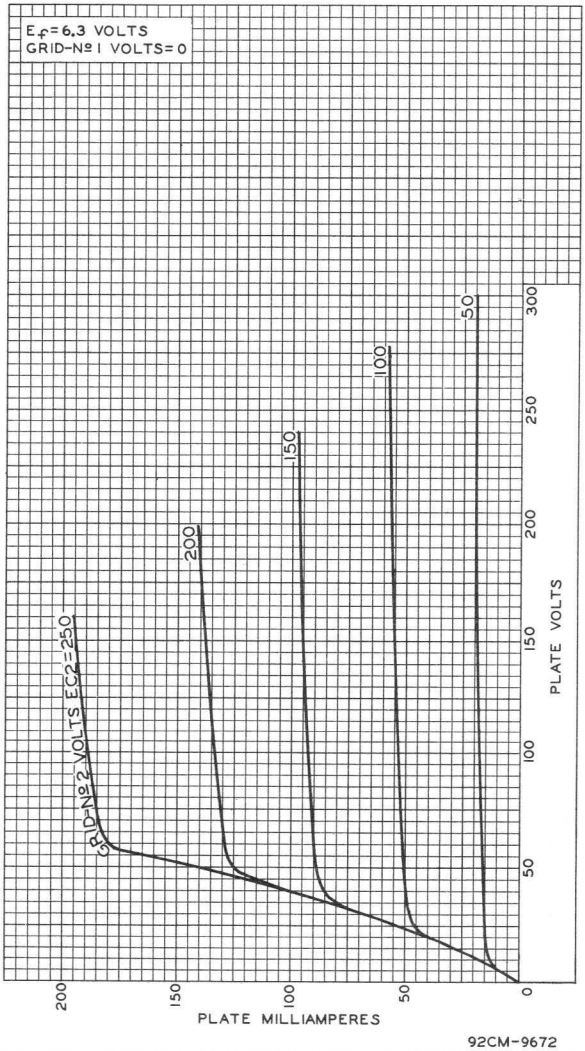
AVERAGE CHARACTERISTICS



92CM-9797RI

6EM5

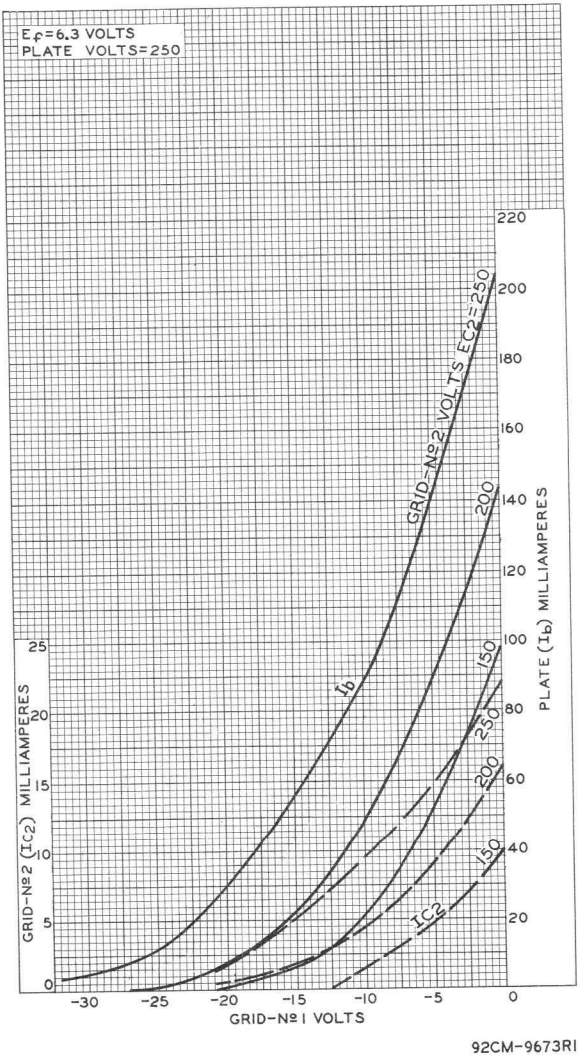
AVERAGE PLATE CHARACTERISTICS



92CM-9672

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

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

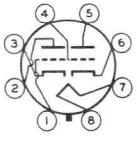
Characteristics, Class A_1 Amplifier:

	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.

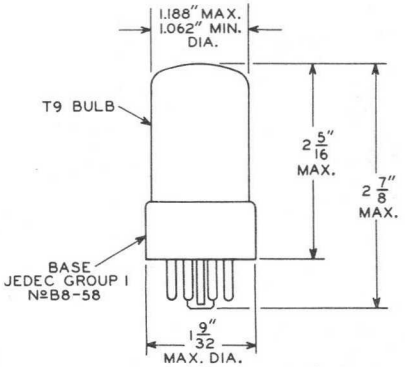
[b] As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations," Federal Communications Commission.

[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.

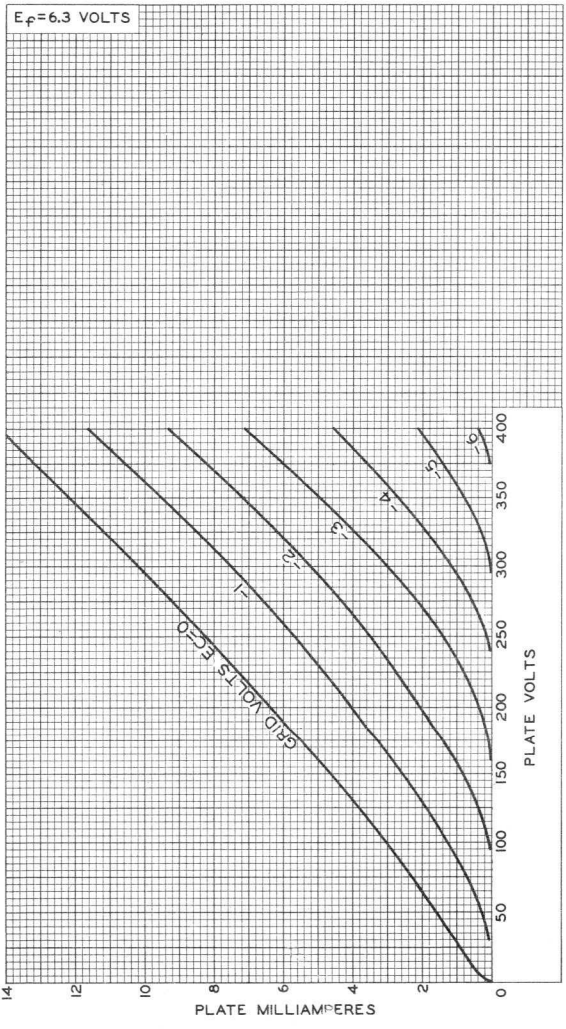
OPERATING CONSIDERATIONS

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 1
№B8-58
1 9/32"
MAX. DIA.
92CS-10880

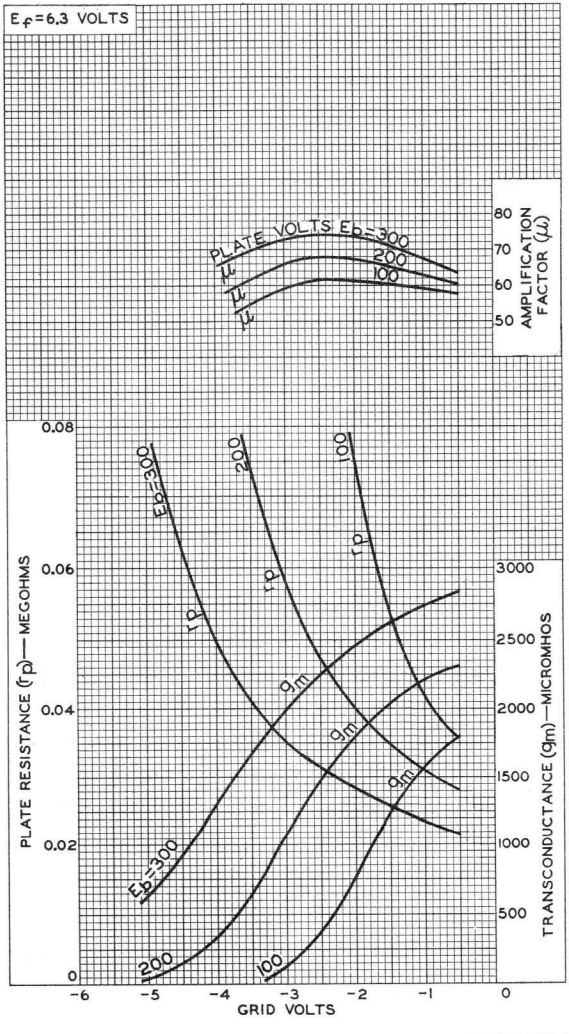
6EM7

AVERAGE PLATE CHARACTERISTICS
Unit No.1



92CM-9912

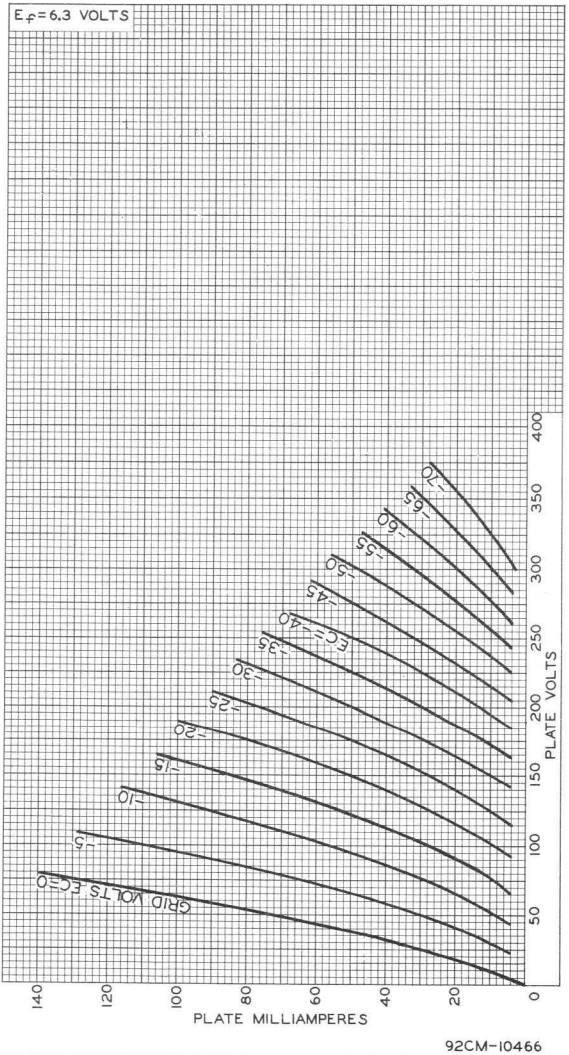
AVERAGE CHARACTERISTICS
Unit No.1



92CM-9915R1

6EM7

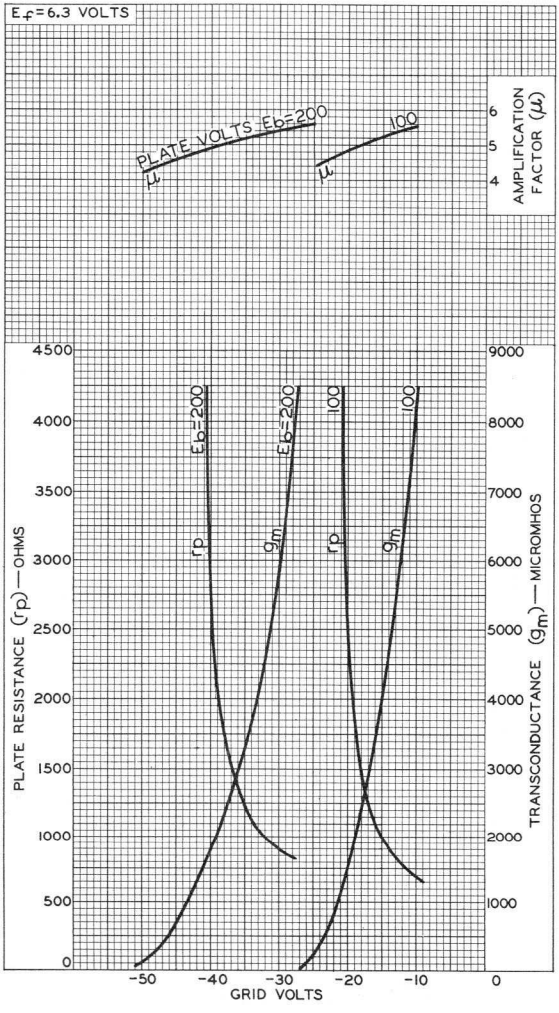
AVERAGE PLATE CHARACTERISTICS
Unit No.2



92CM-10466

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

AVERAGE CHARACTERISTICS
Unit No. 2



92CM-10467

6EN4

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	$c_{g\text{-}p}$	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

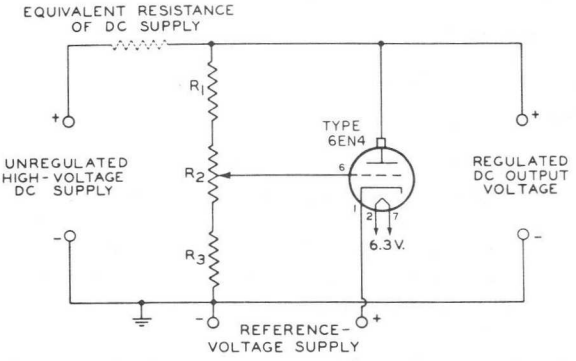
	Note	*Min.*	*Max.*	
Grid Voltage (1)	1	-7	-	V
Grid Voltage (2)	2	-	-40	V
Grid Voltage Change	3	-	9	V

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

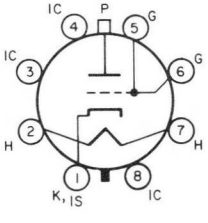
The high voltages at which the 6EN4 is operated can be extremely dangerous to the user or serviceman. Extreme care should be taken in the use of, and for the servicing and adjustment of, any high voltage circuit.

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.

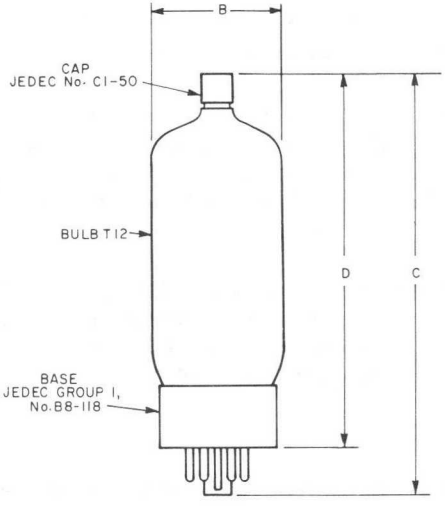
TERMINAL DIAGRAM – JEDEC 8NH – Bottom View

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



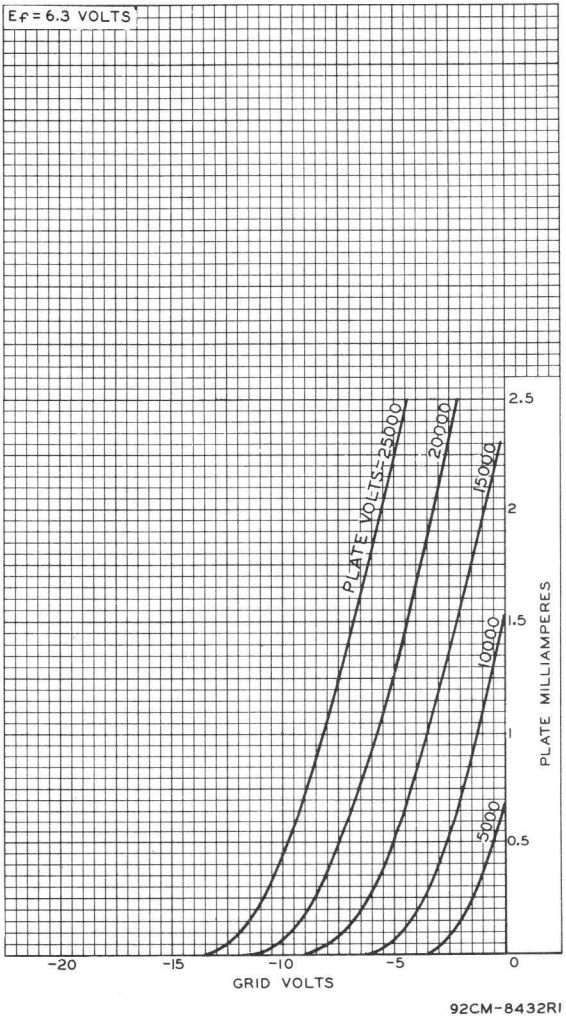
Note: For new equipment design make grid connection to pin 6 only.

DIMENSIONAL OUTLINE



DI-MEN-SION	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

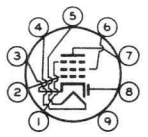
Characteristics, Class A_1 Amplifier (Pentode Unit):

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

6EQ7

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

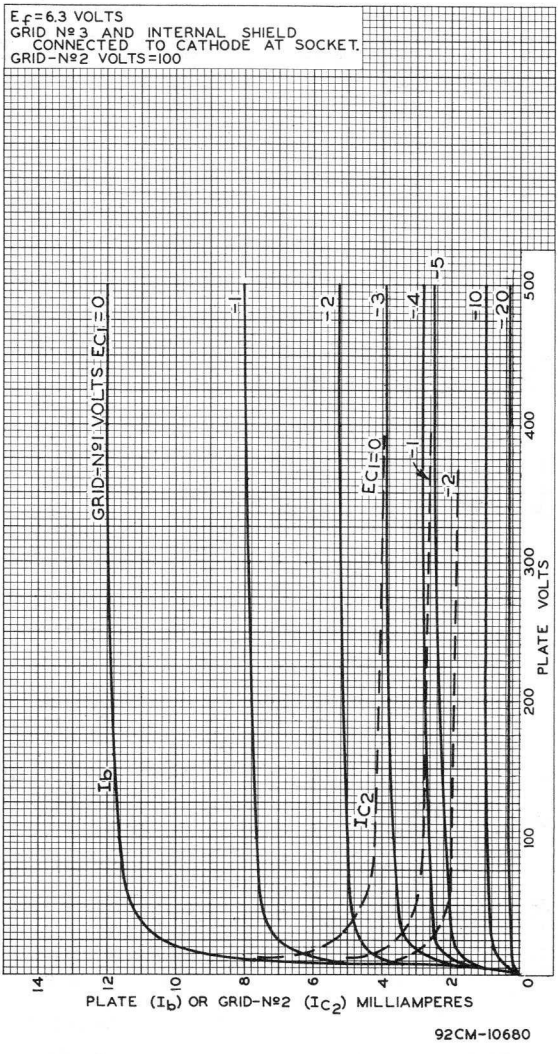
Characteristics, Instantaneous Test Condition:

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

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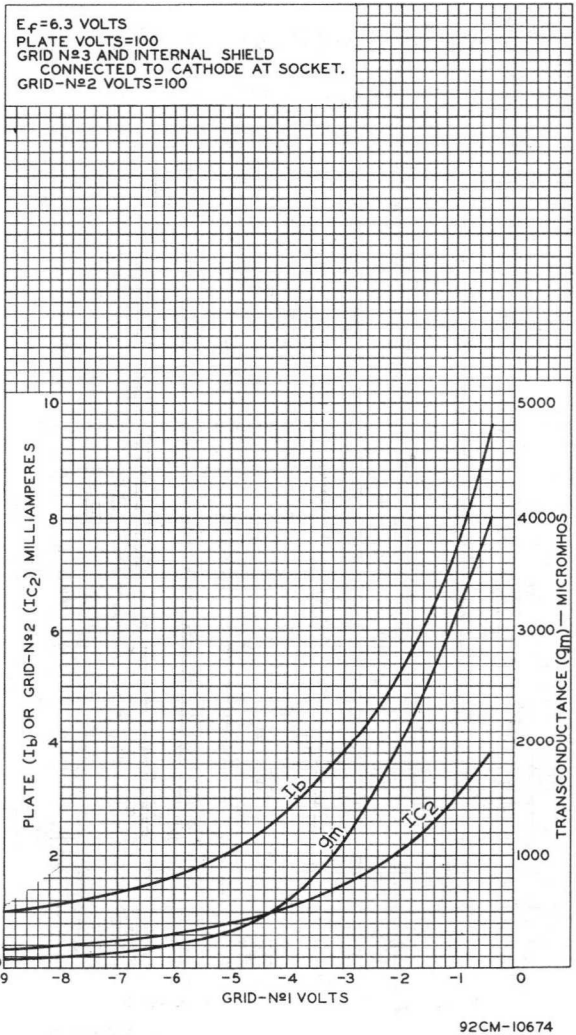
AVERAGE CHARACTERISTICS
Pentode Unit



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*[o]	
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

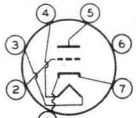
Characteristics, Class A_1 Amplifier: ←

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.

High-Mu Triode

7-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

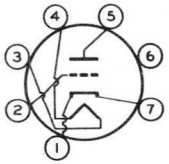
Heater, for Unipotential Cathode:			
Voltage (AC or DC)		6.3 ± 10%	volts
Current at 6.3 volts		0.2	amp
Direct Interelectrode Capacitances:			
	Without External Shield	*With External Shield*[a]	
Grid to plate	0.5 max.	0.5 max.	μμf
Grid to cathode, internal shield, and heater	3.2	3.2	μμf
Plate to cathode,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

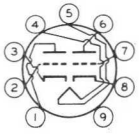
Heater, for Unipotential Cathodes:			
Voltage (AC or DC)	6.3		volts
Current	0.365		amp
Direct Interelectrode Capacitances:	*Without External Shield*	*With External Shield*[a]	
Grid to plate (Each unit)	1.9	1.9	μμf
Plate to cathode (Each unit)	0.18	0.17	μμf
Heater to cathode (Each unit)	3	3[b]	μμf
Plate 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

6ES8

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.

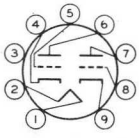
Characteristics, Class A_1 Amplifier (Each Unit):

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:*

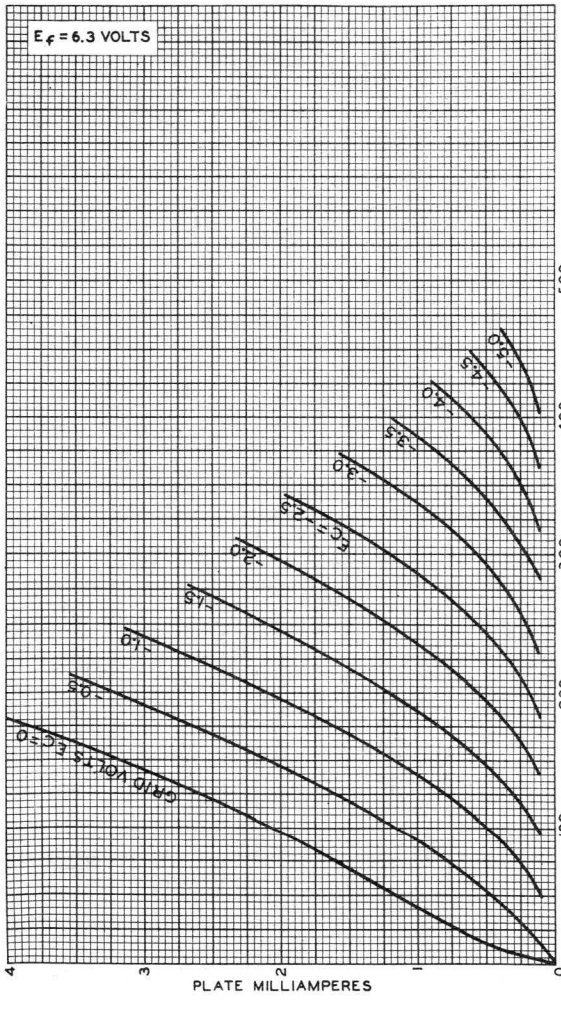
PLATE VOLTAGE	330 max.	volts
GRID VOLTAGE:		
Negative-bias value	55 max.	volts
Positive-bias value	0 max.	volts
PLATE DISSIPATION	1.2 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200▲ max.	volts

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

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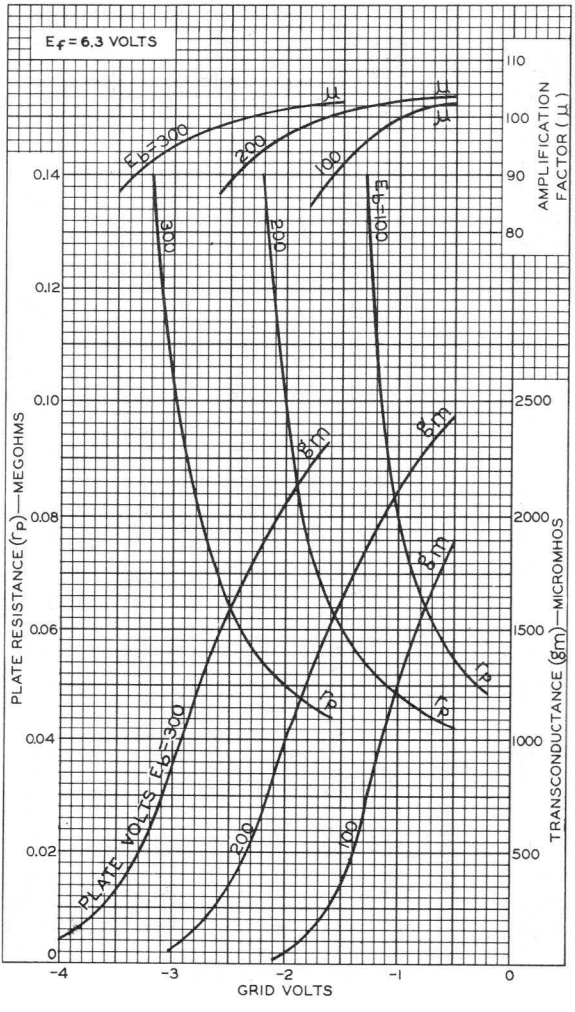
AVERAGE CHARACTERISTICS
Each Unit



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

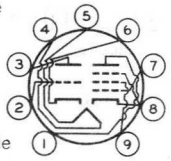
Mechanical:

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:

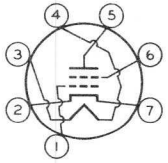
Heater, for Unipotential Cathode:		
Voltage (AC or DC)	6.3 ± 10%	volts
Current at 6.3 volts	0.2	amp
Direct Interelectrode Capacitances:[a]		
Grid No.1 to plate	0.035 max.	μμf
Grid No.1 to cathode & internal shield, grid No.2, and heater	4.50	μμf
Plate to cathode & internal shield, grid No.2, and heater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

6EV5

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

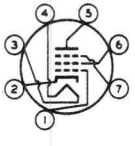
Characteristics, Class A_1 Amplifier:

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

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6EW6

SHARP-CUTOFF PENTODE

AMPLIFIER — Class A_1

Maximum Ratings, *Design-Maximum Values:*

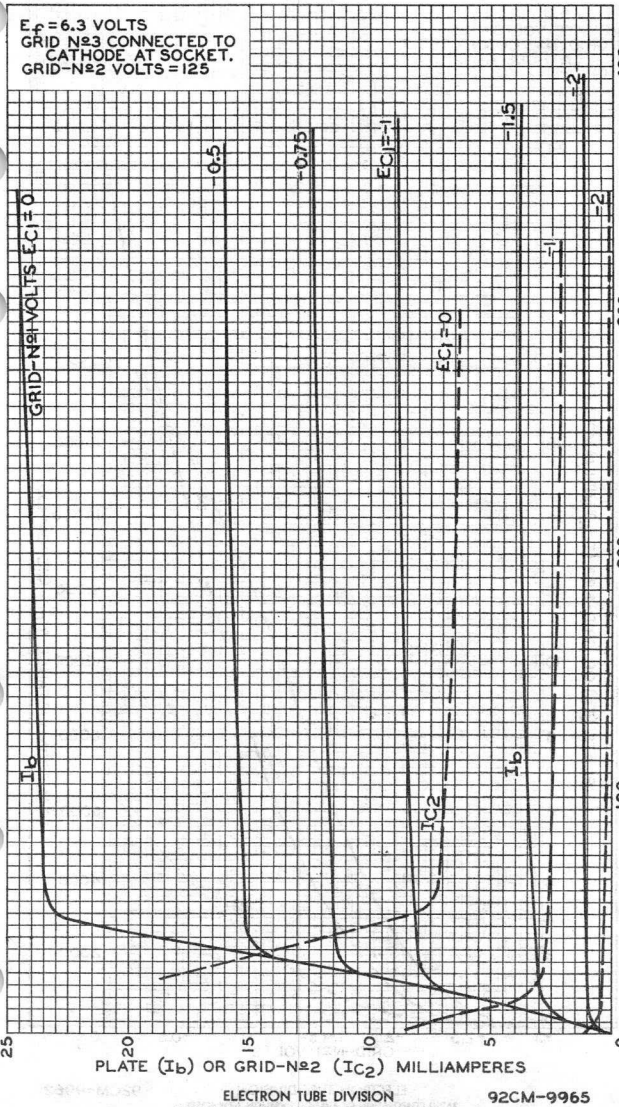
PLATE VOLTAGE	330 max.	volts
GRID-No.3 (SUPPRESSOR-GRID) VOLTAGE	0 max.	volts
GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE	330 max.	volts
GRID-No.2 VOLTAGE	*See Grid-No.2 Input Rating Chart at front of Receiving Tube Section*	
GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Positive-bias value	0 max.	volts
GRID-No.2 INPUT:		
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

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

▲ The dc component must not exceed 100 volts.

6EW6

AVERAGE CHARACTERISTICS



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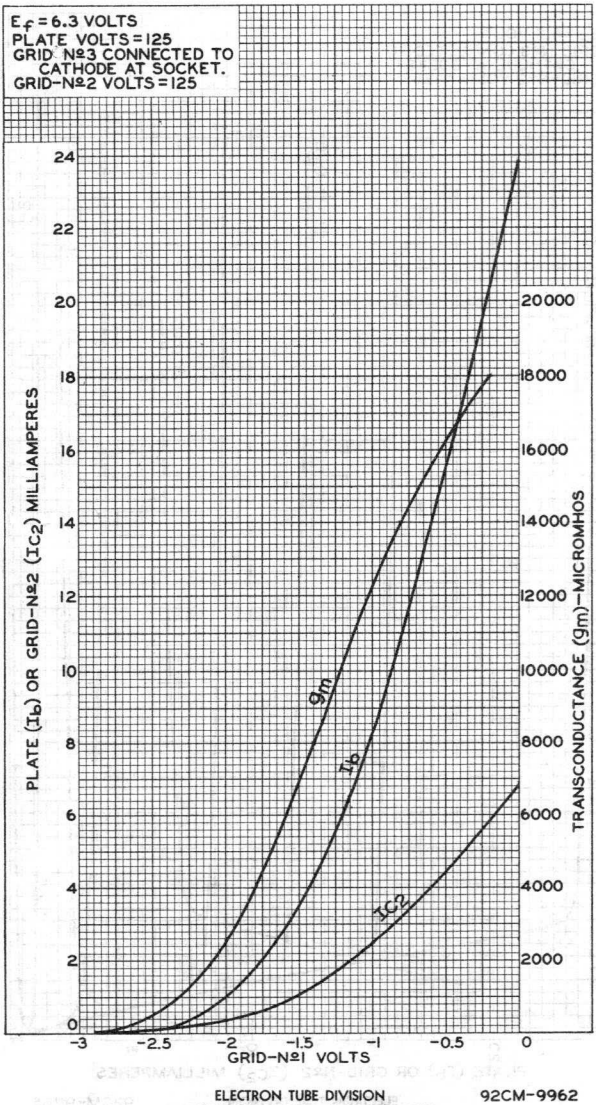
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY
92CM-9965

RCA

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

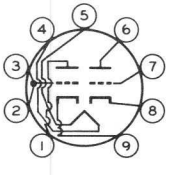
Characteristics, Class A_1 Amplifier:

	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

6EW7

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:

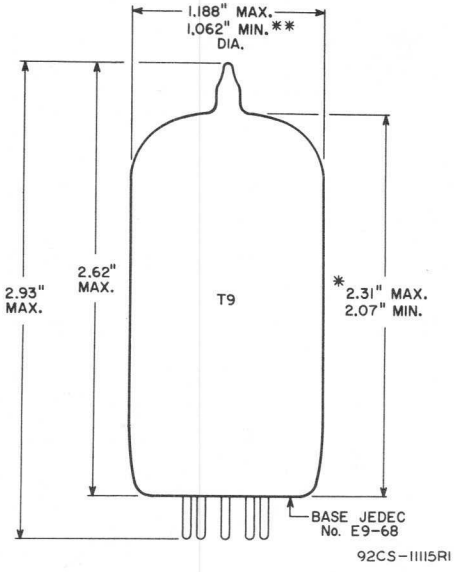
Grid-Circuit Resistance:			
For grid-resistor-bias or cathode-bias operation	2.2	max.	megohms

[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.

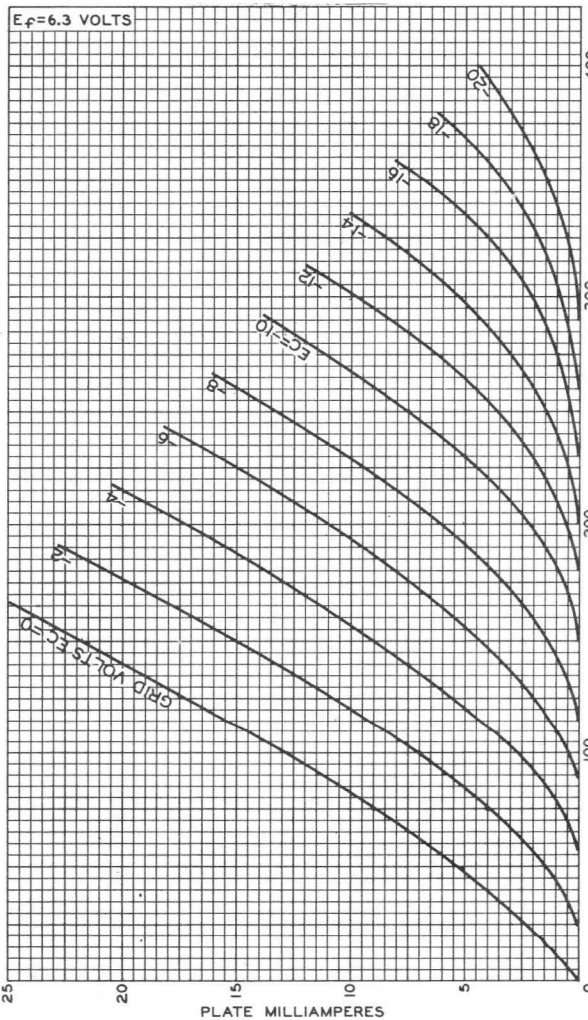


* MEASURED FROM BASE SEAT TO BULB-TOP LINE AS DETERMINED BY A RING GAUGE OF 0.600" INTERNAL DIAMETER.

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

6EW7

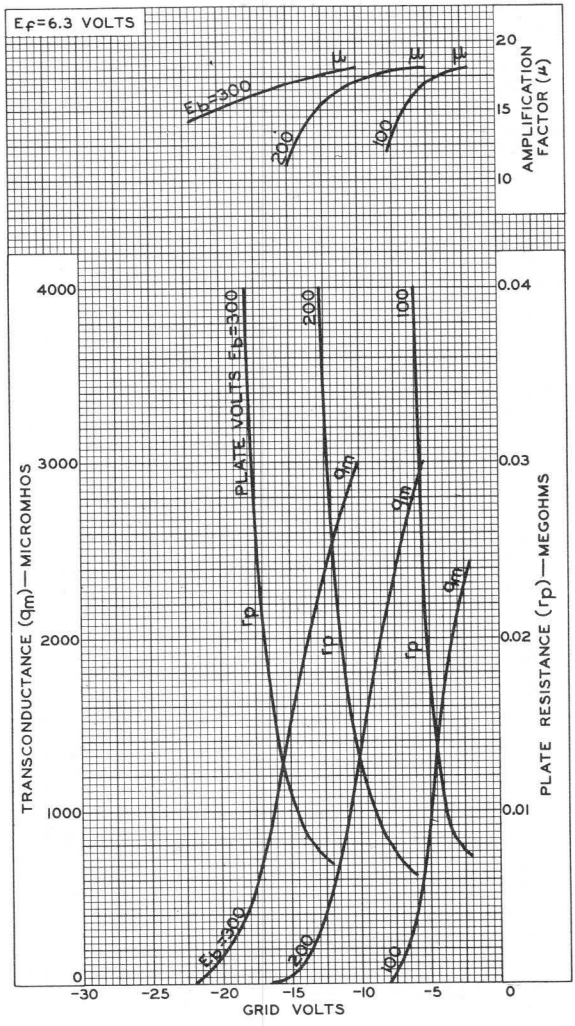
AVERAGE PLATE CHARACTERISTICS
Unit No.1



92CM-9988

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

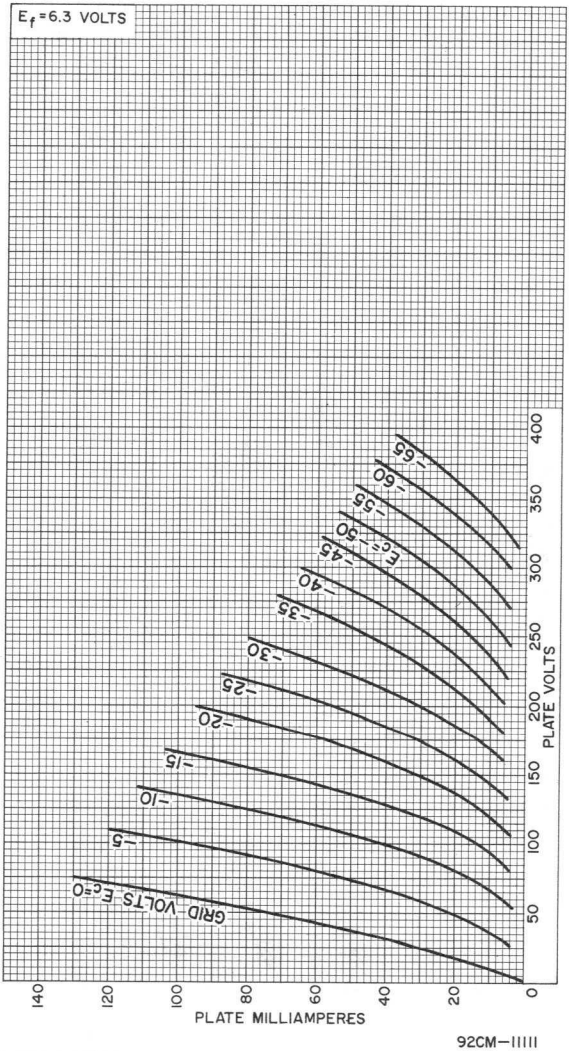
AVERAGE CHARACTERISTICS
Unit No.1



92CM-9991

6EW7

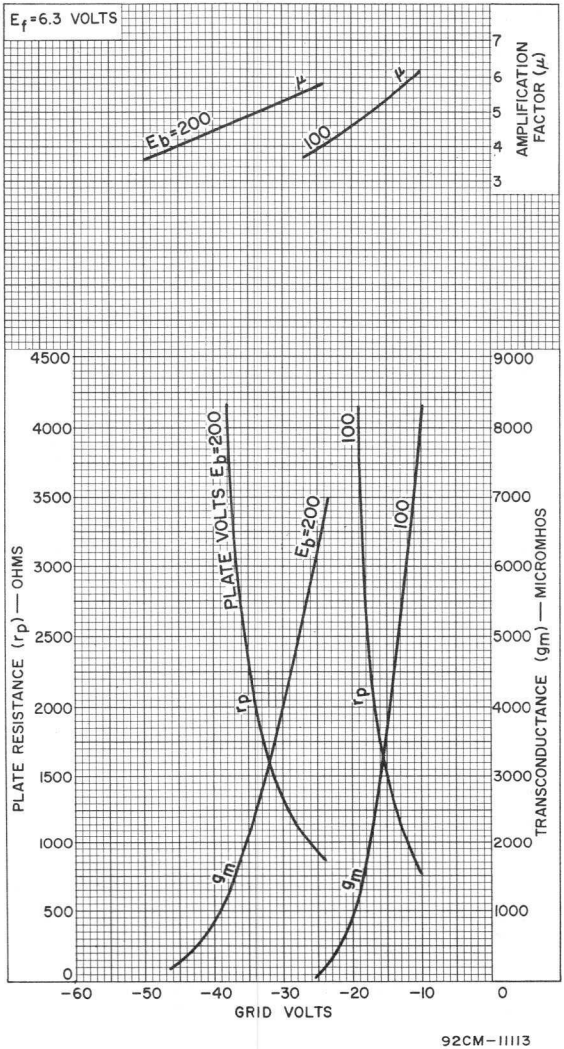
AVERAGE PLATE CHARACTERISTICS
Unit No.2



92CM—IIIII

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

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

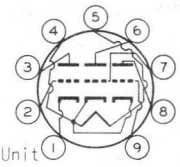
Mechanical:

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

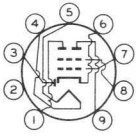
Mechanical:

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

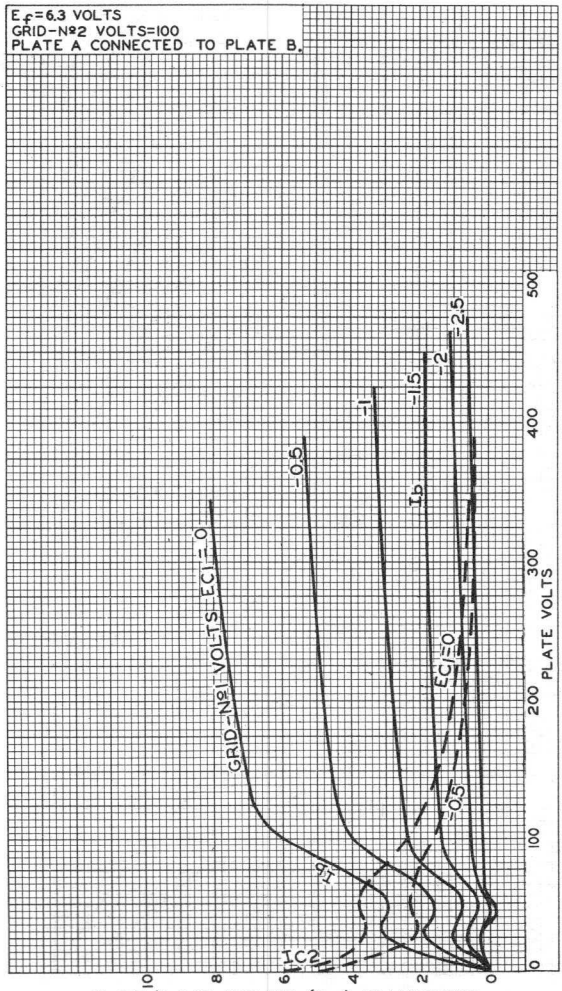
Characteristics, Instantaneous Test Condition:

Plate Current for plate volts = 10. . . .	2	ma

▲ Without external shield.

● The dc component must not exceed 100 volts.

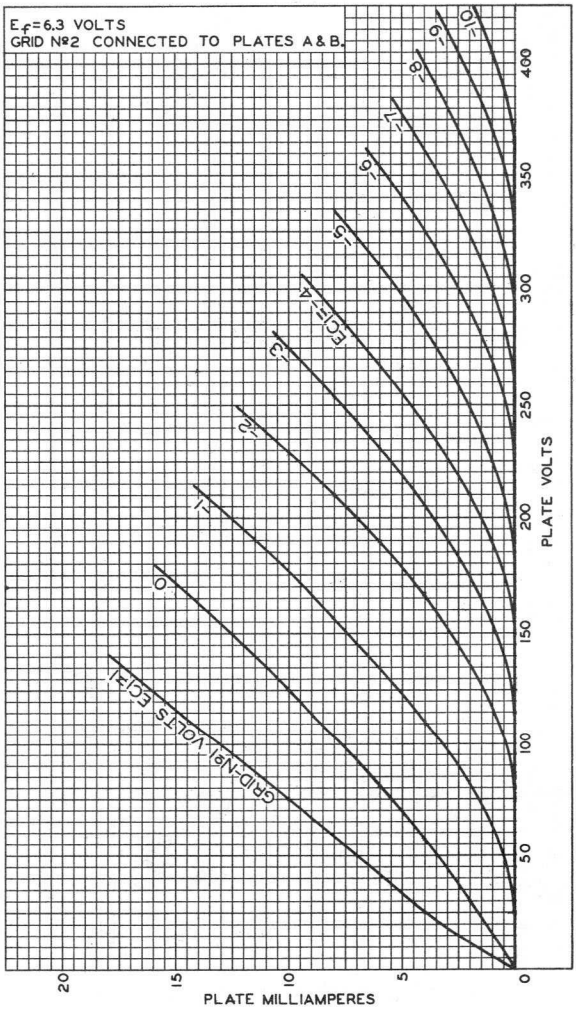
AVERAGE CHARACTERISTICS
Tetrode Unit



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

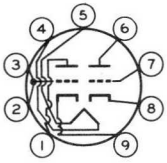
Mechanical:

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

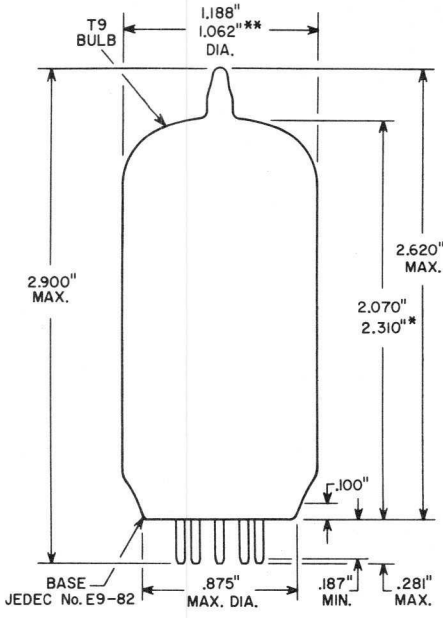
[a] The dc component must not exceed 100 volts.

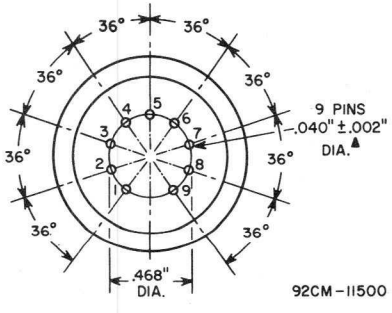
[b] Without external shield.

[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 0.625" 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. E9-68 (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

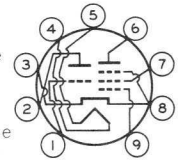
Characteristics, Class A_1 Amplifier:

	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

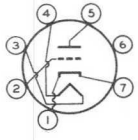
Characteristics, Class A_1 Amplifier:

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:*

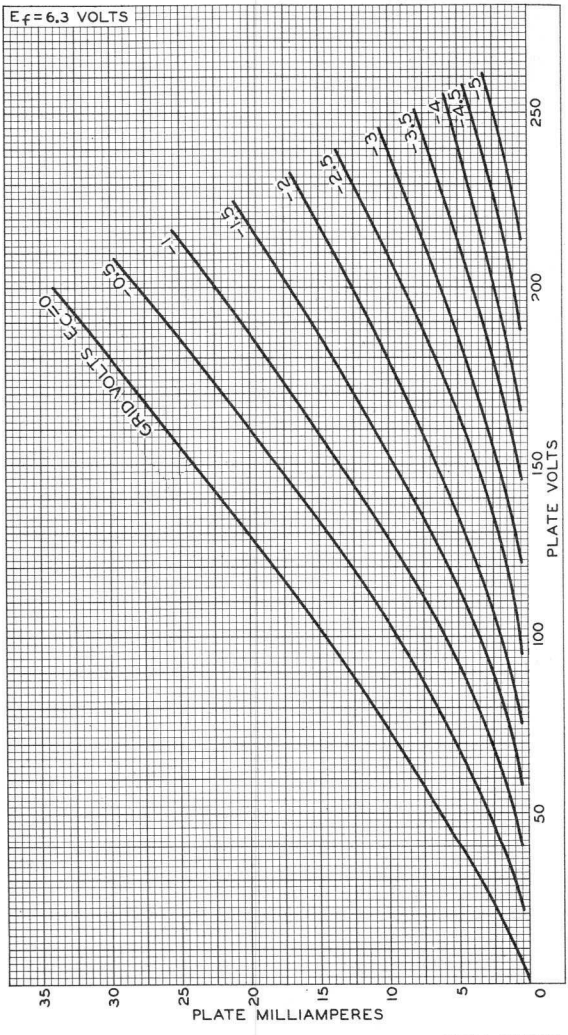
PLATE VOLTAGE	150 max.	volts
GRID VOLTAGE:		
Positive-bias value	0 max.	volts
CATHODE CURRENT	22 max.	ma
PLATE DISSIPATION	2.2 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	100 max.	volts
Heater positive with respect to cathode	100 max.	volts

Maximum Circuit Values:

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

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

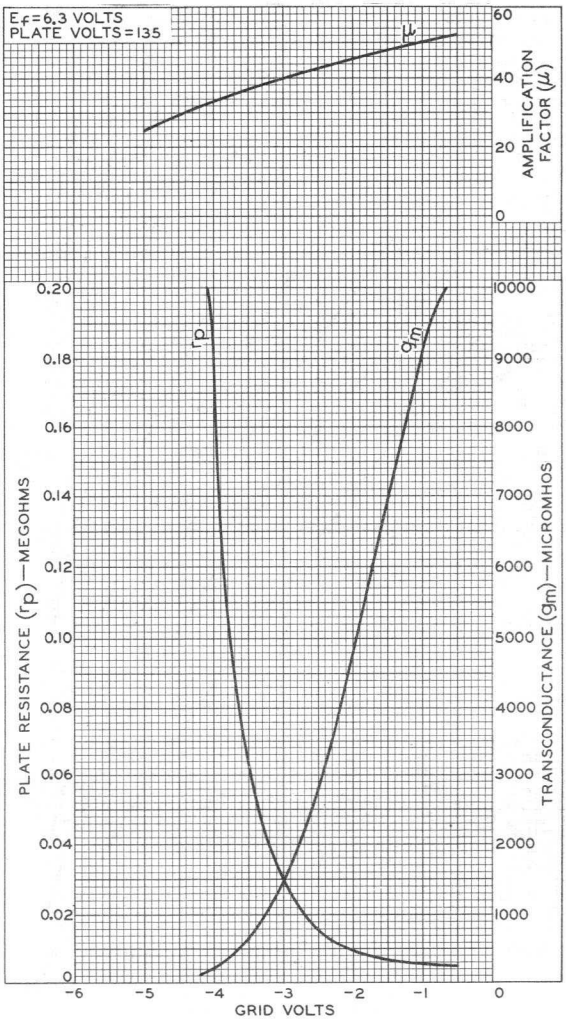
AVERAGE PLATE CHARACTERISTICS



92CM-10355R1

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.

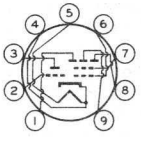
6FH8

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:

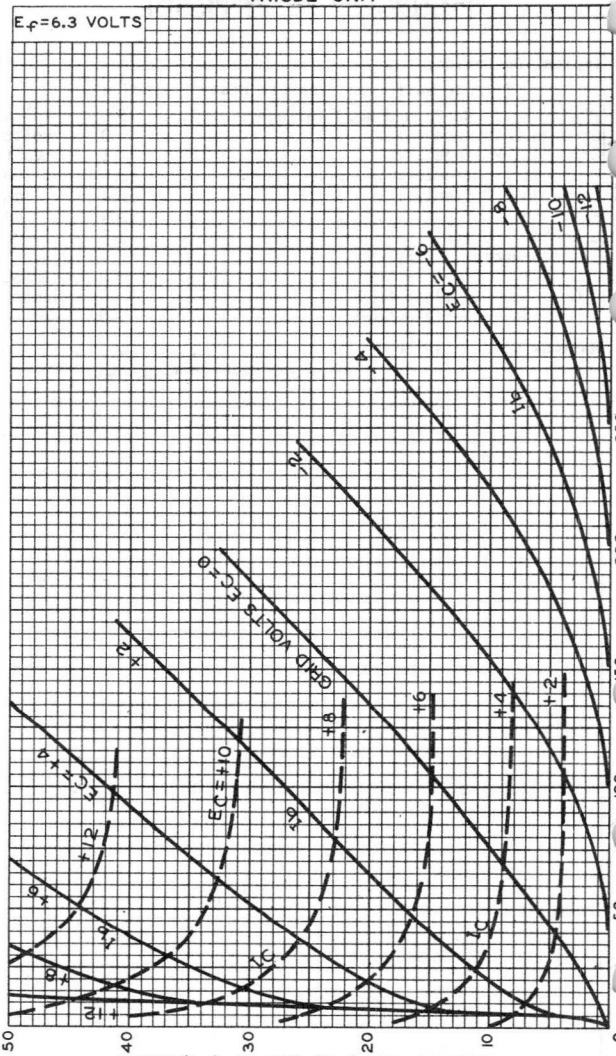
	Triode Unit	*Tetrode Unit*	
Grid–No.1–Circuit Resistance: For fixed-bias operation	0.5 max.	0.5 max.	megohm

RCA

6FH8

AVERAGE CHARACTERISTICS

TRIODE UNIT



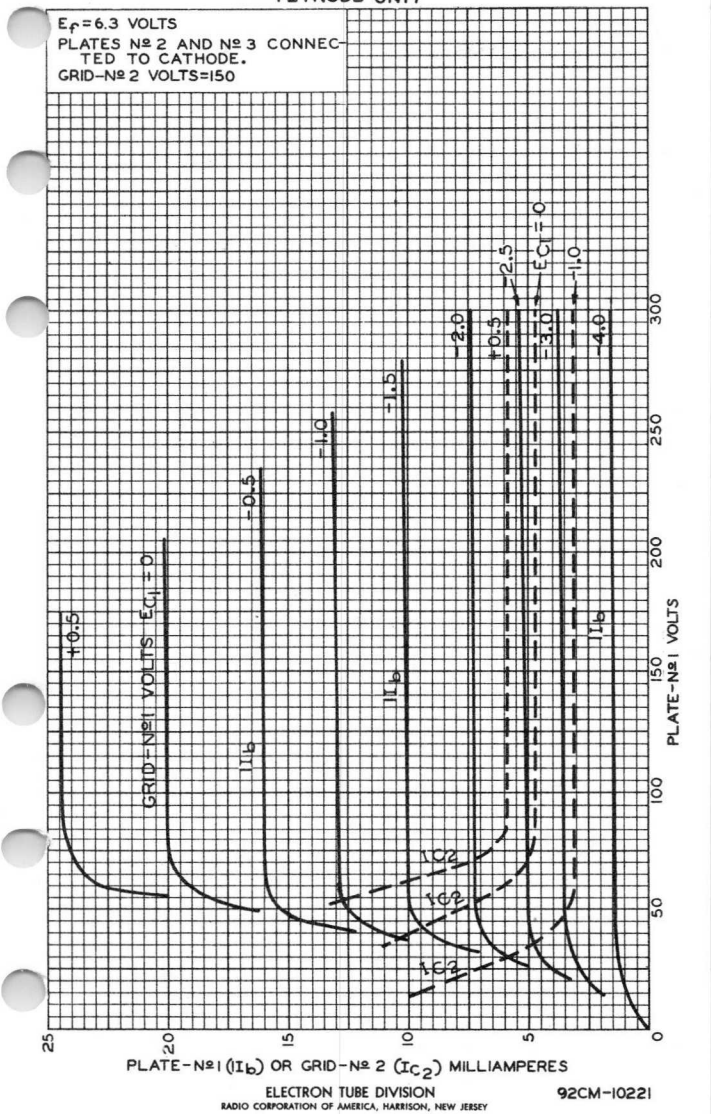
ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-10220

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

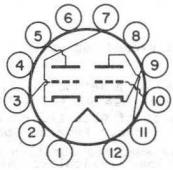
Characteristics, Class A$_1$ Amplifier:

	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

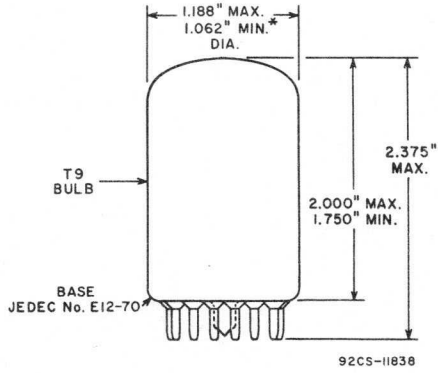
[a] The dc component must not exceed 100 volts.

[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.

6FM7

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

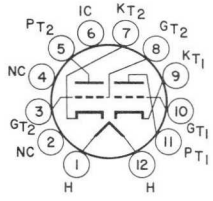
Direct Interelectrode Capacitances (Approx.):[a]

	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 A$_1$ 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

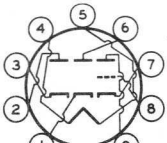
Characteristics, Class A_1 Amplifier (Triode Unit):

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:

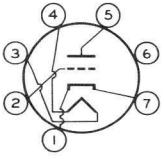
Heater Characteristics and Ratings *(Design-Maximum Values)*:		
Voltage (AC or DC)	6.3 ± 0.6	volts
Current at heater volts = 6.3	0.180	amp
Peak heater-cathode voltage:		
Heater negative with respect to cathode	100 max.	volts
Heater positive with respect to cathode	100 max.	volts
Direct Interelectrode 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

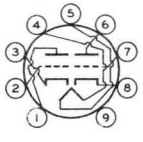
Characteristics, Class A_1 Amplifier (Each Unit):

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 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
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

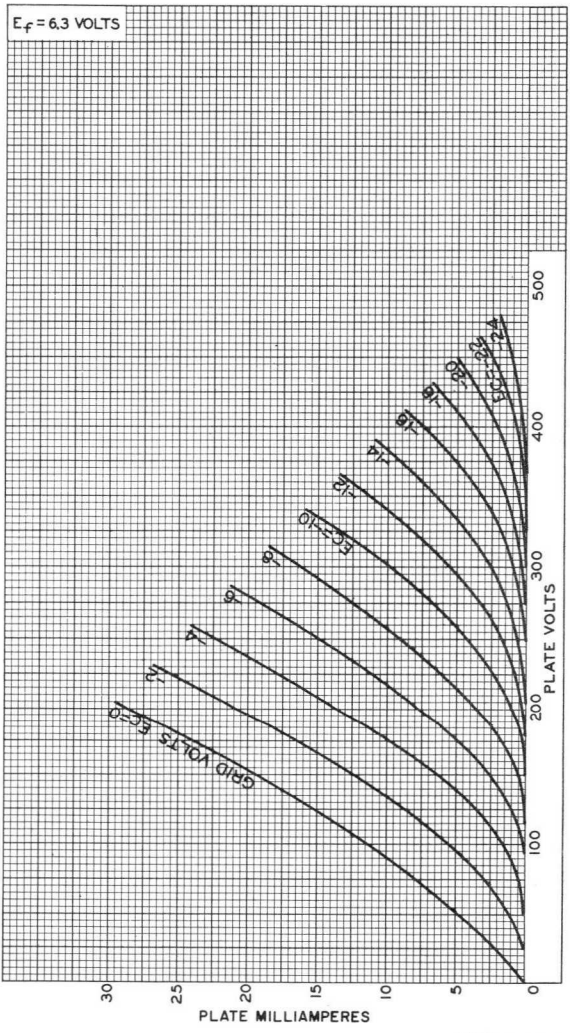
[a] Without external shield.

[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.

6FQ7

AVERAGE PLATE CHARACTERISTICS
Each Unit



92CM-8442

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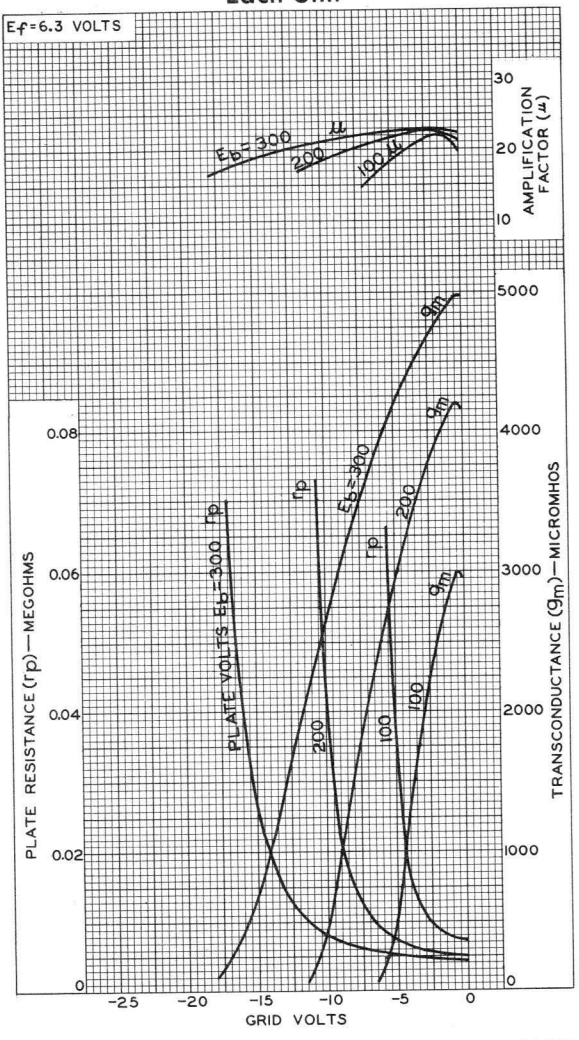
Electron Tube Division
Harrison, N. J.

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 ax.	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

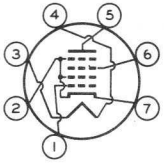
Mechanical:

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:

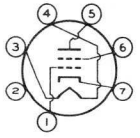
Heater, for Unipotential Cathode:		
Voltage	6.3 ± 10%	ac or dc volts
Current	0.2	amp
Direct Interelectrode Capacitances:[D]		
Grid No.1 to plate	0.03 max.	μμf
Grid No.1 to cathode, grid No.2, internal shield, and heater	4.5	μμf
Plate to cathode, grid No.2, internal shield, and heater	3	μμf
Cathode to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

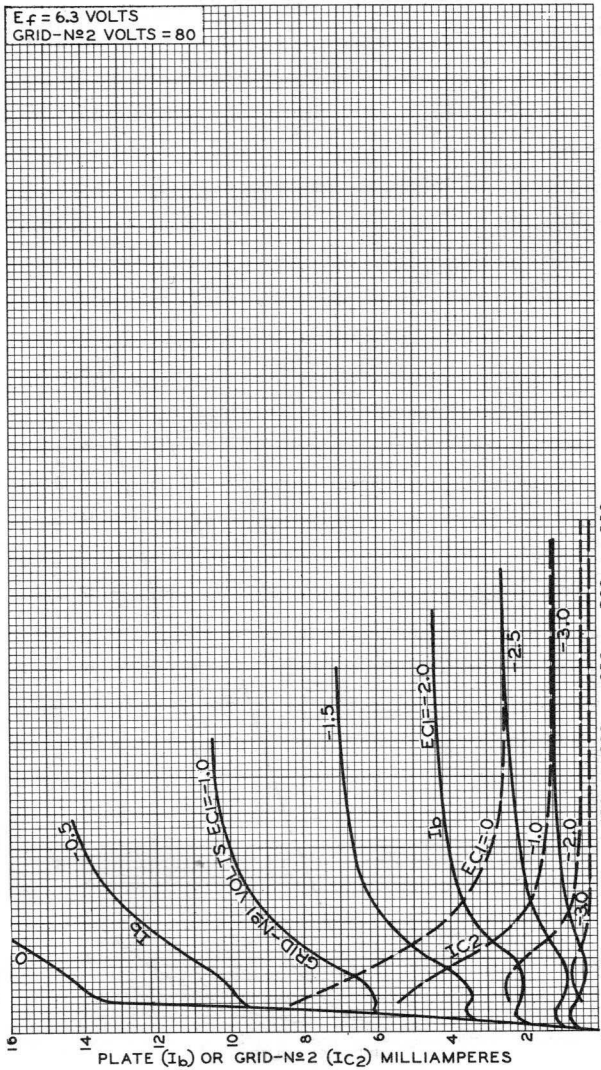
° With external shield JEDEC No.316 connected to cathode except as noted.
● With external shield JEDEC No.316 connected to ground.
* The dc component must not exceed 100 volts.

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

RCA

6FV6

AVERAGE CHARACTERISTICS



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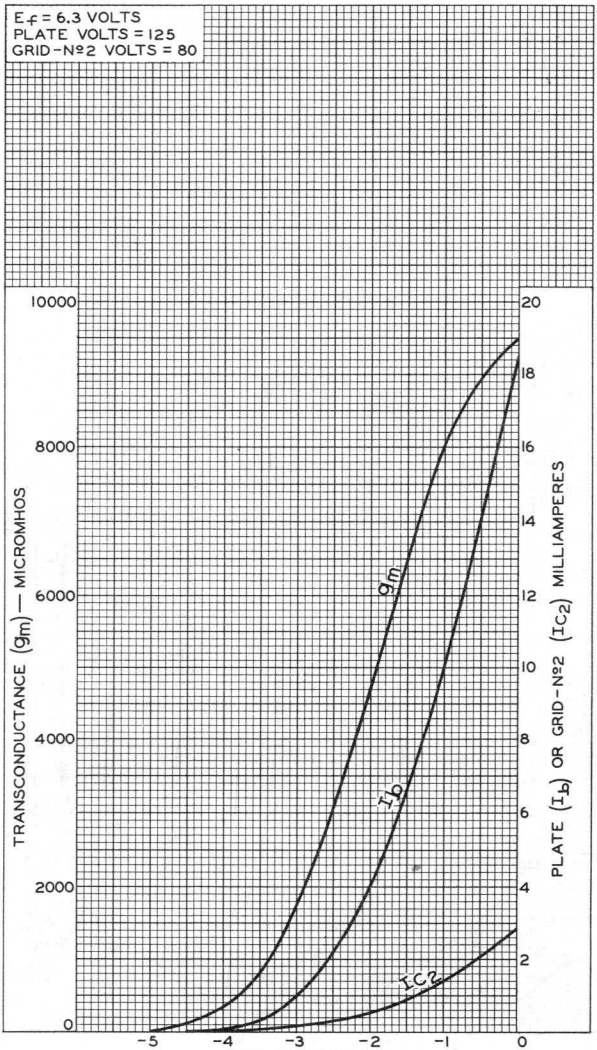
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-10058

RCA

6FV6

AVERAGE CHARACTERISTICS



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

92CM-9519

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:

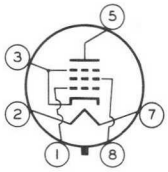
Plate Voltage	60	150	250	volts
Grid-No.2 Voltage	150	150	150	volts
Grid-No.1 Voltage	0	-22.5	-22.5	volts
Amplification Factor	–	4.4	–	
Plate Resistance (Approx.)	–	–	18000	ohms
Transconductance	–	–	7300	μmhos
Plate Current	345[c]	–	65	ma
Grid-No.2 Current	27[c]	–	1.8	ma
Grid-No.1 Voltage (Approx.) for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

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

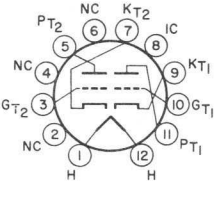
Direct Interelectrode Capacitances (Approx.):[a]

	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.

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Electronic Components and Devices Harrison, N. J.