

## 30C1/PCF80



## TRIODE PENTODE FREQUENCY CHANGER

GENERAL

The 30C1/PCF80 is a miniature based indirectly heated triode-pentode valve which has been designed for use as a frequency changer at V.H.F. It is suitable for use in AC/DC powered equipment having series connected heater chains. The two sections of the valve are provided with separate cathodes.

RATING

|                                                  |                |         |        |
|--------------------------------------------------|----------------|---------|--------|
| Heater Current (amps)                            | $I_h$          | 0.3     |        |
| Heater Voltage (volts)                           | $V_h$          | 9.0     |        |
|                                                  |                | Pentode | Triode |
| Maximum Anode Voltage (volts)                    | $V_a$ (max)    | 250     | 250    |
| Maximum Screen Voltage (volts)                   | $V_{g2}$ (max) | 175     | —      |
| Mutual Conductance (mA/V)                        | $g_m$          | 6.2*    | 5.0†   |
| Amplification Factor                             | $\mu$          |         | 20     |
| Maximum Anode Dissipation (watts)                | $P_a$ (max)    | 1.7     | 1.5    |
| Maximum Screen Dissipation (watts)               | $P_{g2}$ (max) | 0.5     |        |
| Maximum Cathode Current (mA)                     | $I_k$ (max)    | 14      | 14     |
| Maximum Heater to Cathode Voltage (volts r.m.s.) | $V_{h-k}$      | 200 ‡   |        |

\* Taken at  $V_a = 170$  :  $V_{g2} = 170$  :  $I_a = 10\text{mA}$  :  $V_{g1} = -2\text{V}$

† Taken at  $V_a = 100$  :  $I_a = 14\text{mA}$

‡ Measured with respect to the higher potential heater pin.

Indicates a change ←

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INTER-ELECTRODE CAPACITANCES (pF)

|                                  |                  | ‡     | §     |
|----------------------------------|------------------|-------|-------|
| Grid I (Pentode)/All             | $c_{g1(p)-all}$  | 6.1   | 7.35  |
| Anode (Pentode)/All              | $c_{a(p)-all}$   | 4.9   | 6.15  |
| Grid I (Pentode)/Anode (Pentode) | $c_{g1(p)-a(p)}$ | 0.013 | 0.014 |
| Grid (Triode)/Earth              | $c_{in(t)}$      | 3.1   | 4.4   |
| Grid (Triode)/Anode (Triode)     | $c_{g(t)-a(t)}$  | 1.7   | 1.7   |
| Anode (Triode)/Earth             | $c_{out(t)}$     | 2.9   | 4.2   |
| Grid (Triode)/Anode (Pentode)    | $c_{g(t)-a(p)}$  | 0.007 | 0.01  |
| Grid I (Pentode)/Anode (Triode)  | $c_{g1(p)-a(t)}$ | 0.3   | 0.6   |
| Anode (Pentode)/Anode (Triode)   | $c_{a(p)-a(t)}$  | 0.023 | 0.023 |

‡ Inter-electrode capacitances taken with holder capacity balanced out, but with cylindrical screen can.

§ Total capacity including ceramic B9A holder with cylindrical screen, Carr Fastener type 76/804E/T.

"Earth" denotes electrodes of any second valve section and the remaining earthy potential electrodes of the section under measurement, heater and shields joined to cathode.

DIMENSIONS

|                                 |               |
|---------------------------------|---------------|
| Maximum Overall Length (mm)     | 56            |
| Maximum Diameter (mm)           | 22.2          |
| Maximum Seated Height (mm)      | 49            |
| Approximate Nett Weight (ozs)   | $\frac{1}{2}$ |
| Approximate Packed Weight (ozs) | $\frac{3}{4}$ |

MOUNTING POSITION—Unrestricted

Indicates a change ←

### 30C1/PCF80



### TRIODE PENTODE FREQUENCY CHANGER

TYPICAL OPERATION—As a frequency changer with oscillator volts applied to  $g_1$ .

| <u>Pentode Section</u>                         |               | *      |        |
|------------------------------------------------|---------------|--------|--------|
| Anode Voltage (volts)                          | $V_a$         | 170    | 180    |
| Screen Voltage (volts)                         | $V_{g2}$      | 145    | 165    |
| Grid 1 Resistance for grid current bias (ohms) | $R_{g1}$      | 33,000 | 33,000 |
| Grid 1 Current ( $\mu A$ )                     | $I_{g1}$      | 130    | 130    |
| Conversion Conductance (mA/V)                  | $g_c$         | 2.0    | 2.1    |
| Peak Heterodyne Voltage (volts)                | $V_{het(pk)}$ | 5.0    | 5.0    |
| Anode Current (approx) (mA)                    | $I_a$         | 6.8    | 7.7    |
| Screen Current (approx) (mA)                   | $I_{g2}$      | 2.0    | 2.4    |

\* If the design of the tuner is such that it is possible for the 30C1/PCF80 to be left running without the triode section oscillating (e.g., by being switched to blank coil positions), the lower screen and anode voltage should be employed.

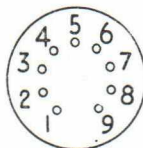
#### Triode Section

|                              |             |     |
|------------------------------|-------------|-----|
| Anode Voltage (volts)        | $V_a$       | 120 |
| Anode Current (average) (mA) | $I_{a(av)}$ | 6.0 |

Indicates a change ←

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## TRIODE PENTODE FREQUENCY CHANGER

BASE - Noval (B9A)

Viewed from Free End of Pins

CONNECTIONS

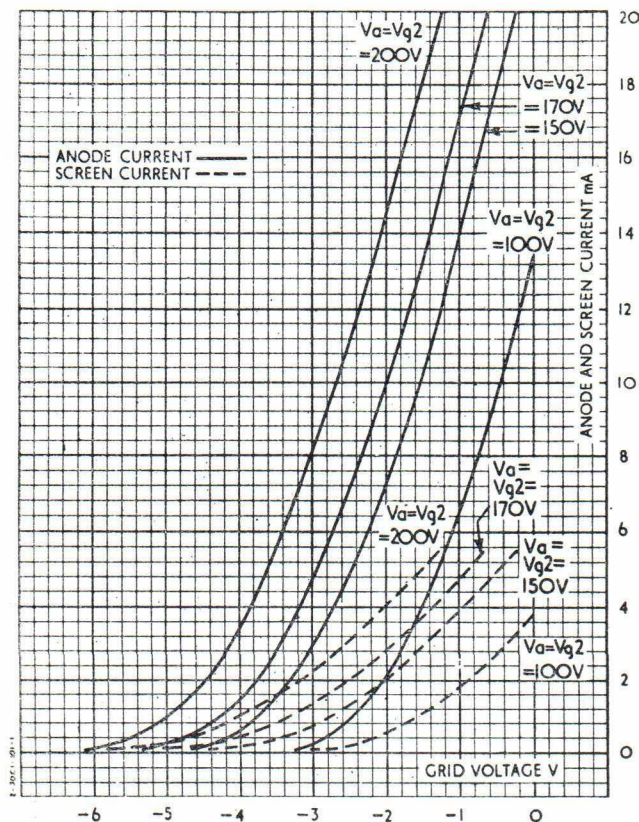
|       |                                   |               |
|-------|-----------------------------------|---------------|
| Pin 1 | Triode Anode                      | $a_t$         |
| Pin 2 | Pentode Grid 1                    | $g_1$         |
| Pin 3 | Pentode Grid 2                    | $g_2$         |
| Pin 4 | Heater                            | $h$           |
| Pin 5 | Heater                            | $h$           |
| Pin 6 | Pentode Anode                     | $a_p$         |
| Pin 7 | Pentode Cathode Shield and Grid 3 | $k_{p,s,g_3}$ |
| Pin 8 | Triode Cathode                    | $k_t$         |
| Pin 9 | Triode Grid                       | $g_t$         |

Indicates a change ←

### 30C1/PCF80 TRIODE PENTODE FREQUENCY CHANGER Indirectly heated—for series operation

AVERAGE CHARACTERISTIC CURVES :  $I_a, I_{g2}/V_g$

Pentode Section



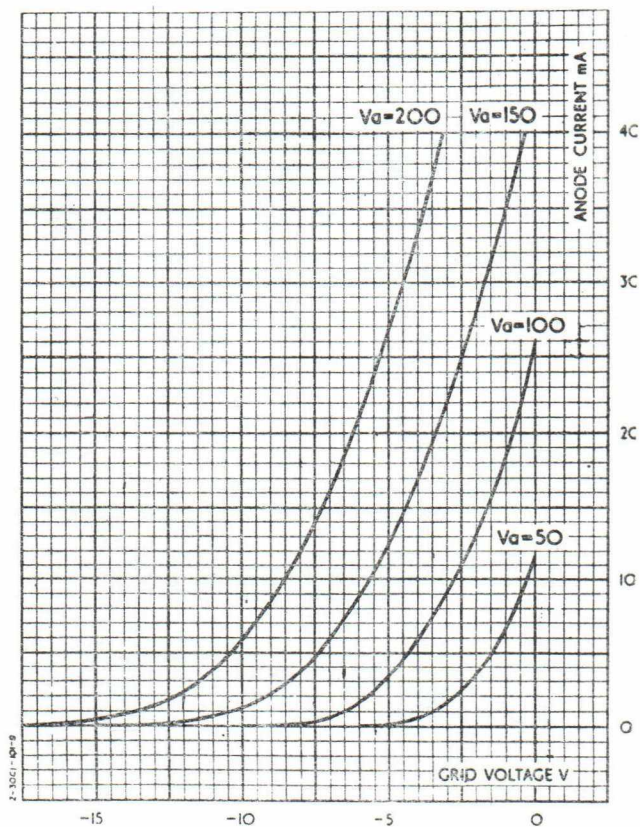
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## TRIODE PENTODE FREQUENCY CHANGER

Indirectly heated—for series operation

AVERAGE CHARACTERISTIC CURVES :  $I_a/V_g$ 

Triode Section



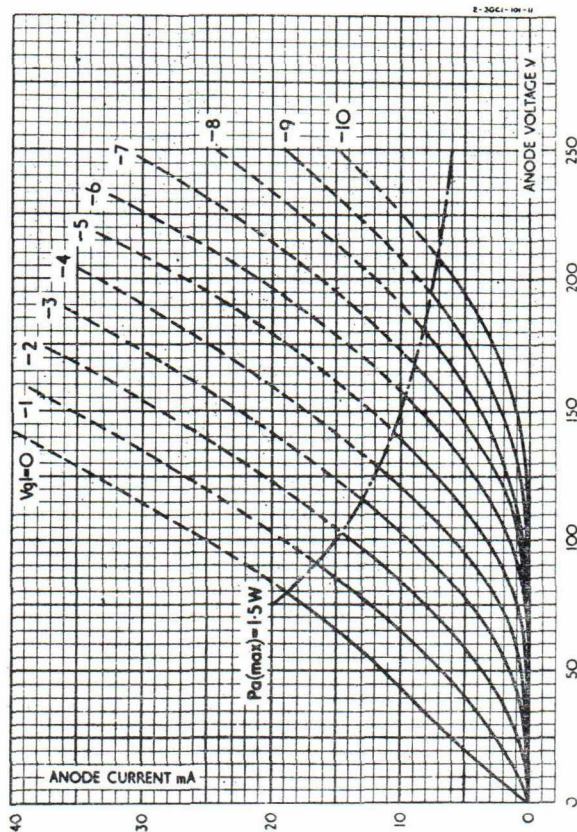
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#### TRIODE PENTODE FREQUENCY CHANGER

Indirectly heated—for series operation

AVERAGE CHARACTERISTIC CURVES :  $I_a/V_a$

Triode Section



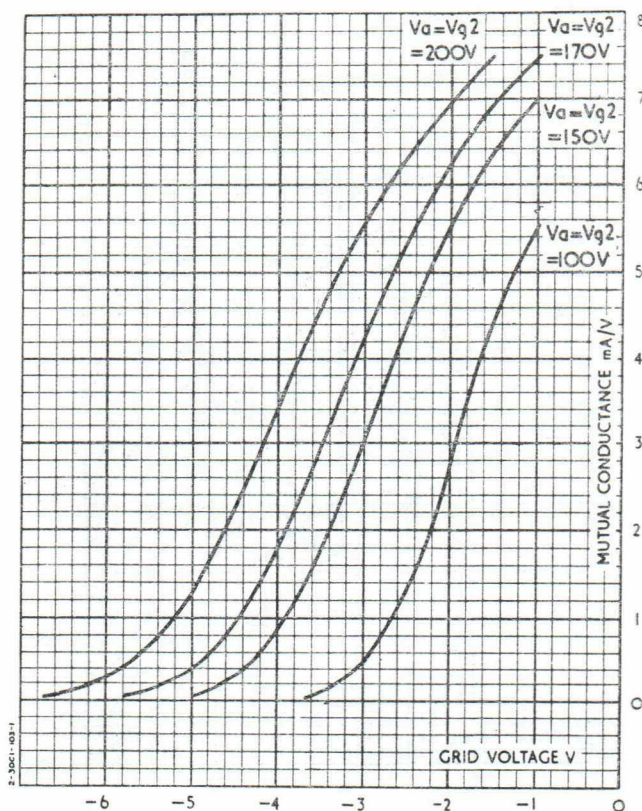
## 30C1/PCF80

## TRIODE PENTODE FREQUENCY CHANGER

Indirectly heated—for series operation

AVERAGE CHARACTERISTIC CURVES:  $\mu_m/V_g$ 

Pentode Section



### 30C1/PCF80

#### TRIODE PENTODE FREQUENCY CHANGER

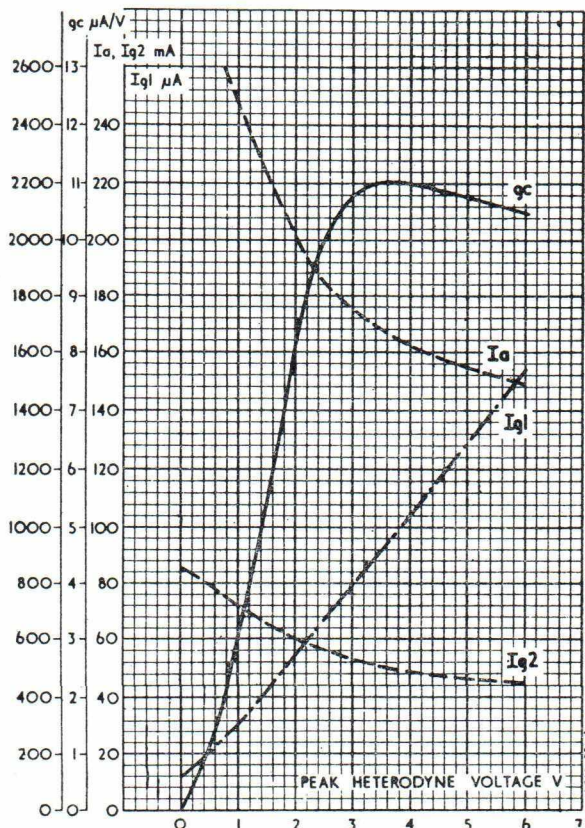
Indirectly heated—for series operation

### TENTATIVE

CHARACTERISTIC CURVES:  $I_a$ ,  $I_{g2}$ ,  $I_{g1}$ ,  $g_c/V_{het}$  (pk)

$R_2 = 2.2K \Omega$   $R_3 = 15K \Omega$

See "Test Circuit"



## 30C1/PCF80

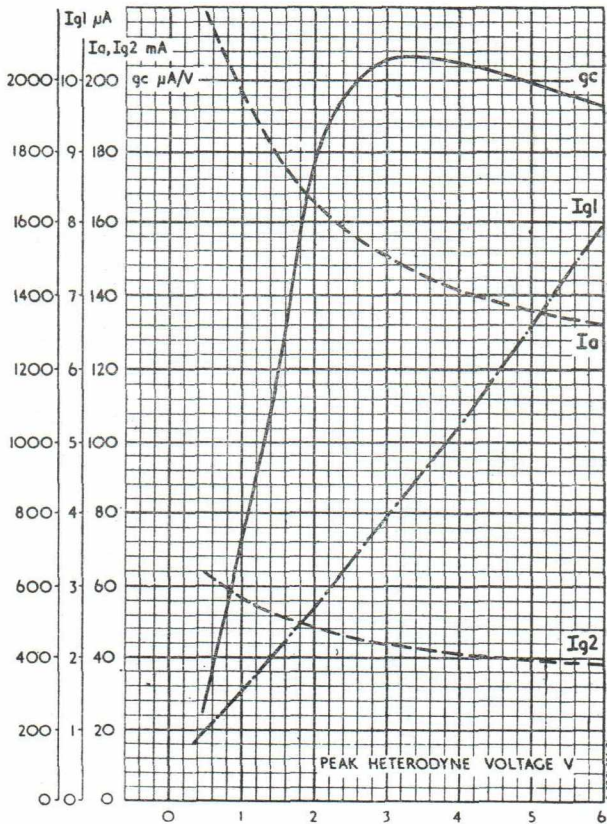
## TRIODE PENTODE FREQUENCY CHANGER

Indirectly heated—for series operation

## TENTATIVE

CHARACTERISTIC CURVES:  $I_a$ ,  $I_{g2}$ ,  $I_{g1}$ ,  $g_c/V_{het}$  (pk) $R_2 = 4.7K\Omega$   $R_3 = 27K\Omega$ 

See "Test Circuit"



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#### TRIODE PENTODE FREQUENCY CHANGER

Indirectly heated—for series operation

#### TENTATIVE

#### TEST CIRCUIT

for

CHARACTERISTIC CURVES:  $I_a$ ,  $I_{g2}$ ,  $I_{g1}$ ,  $g_c/V_{het}(pk)$

$f = 1 \text{ Mc/s.}$

