



## CATHODE-RAY TUBE

### DESCRIPTION

The GL-2BP1 is a small cathode-ray tube with a small, brilliant, focused spot and high deflection sensitivity. The two-inch, medium-persistence, green-fluorescence screen provides high contrast. The tube is designed for use as an indicator and is also recommended for use in general oscillographic applications where compactness is an essential consideration.

With separate base-pin connections provided for each of the four deflecting electrodes, the 2BP1 is intended primarily for use in balanced electrostatic deflection circuits and gives best definition when so used. However, it is also well suited for use with unbalanced deflection because of design features

which minimize the spot and pattern distortion characteristic of such operation.

The spot in this tube can be focused sharply on the screen, both at the center and at the edges, and remains sharp when beam current is varied over a wide range. This feature results from the electron gun used in the 2BP1 in which the Grid No. 2 operates at voltage high enough to keep the beam current from being affected by changes in the anode-No. 1 voltage. Another feature, the very small current taken by Anode No. 1, permits the use of a low-current voltage-divider system and hence the use of a small filter capacitor.

GENERAL  ELECTRIC

  
*Electron*  
TUBE

## TECHNICAL INFORMATION

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

## GENERAL

## Electrical Data

|                                                 |               |        |
|-------------------------------------------------|---------------|--------|
| Heater voltage (A-C or D-C)                     | 6.3 $\pm$ 10% | volts  |
| Heater current                                  | 0.6           | ampere |
| Focusing method—Electrostatic                   |               |        |
| Deflecting method—Electrostatic                 |               |        |
| Phosphor—P1                                     |               |        |
| Fluorescence—Green                              |               |        |
| Persistence—Medium                              |               |        |
| Direct interelectrode capacitances, approximate |               |        |
| Grid No. 1 to all other electrodes              | .8            | uuf    |
| D1 to D2                                        | .2            | uuf    |
| D3 to D4                                        | .2            | uuf    |
| D1 to all other electrodes                      | .11           | uuf    |
| D2 to all other electrodes                      | .8            | uuf    |
| D3 to all other electrodes                      | .7            | uuf    |
| D4 to all other electrodes                      | .8            | uuf    |

## Mechanical Data

|                                              |                                 |        |
|----------------------------------------------|---------------------------------|--------|
| Mounting position—Any                        |                                 |        |
| Over-all length                              | $7\frac{5}{8} \pm \frac{3}{16}$ | inches |
| Greatest diameter of bulb                    | $2\frac{1}{16}$                 | inches |
| Minimum useful screen diameter               | $1\frac{3}{4}$                  | inches |
| Base No. B12-43, small-shell duodecal 12-pin |                                 |        |

## MAXIMUM RATINGS Design Center Values

|                                                               |      |           |
|---------------------------------------------------------------|------|-----------|
| Anode No. 2 voltage*                                          | 2500 | max volts |
| Anode No. 1 voltage                                           | 1000 | max volts |
| Grid No. 2 voltage                                            | 2500 | max volts |
| Grid No. 1 voltage                                            |      |           |
| Negative-bias value                                           | 200  | max volts |
| Positive-bias value                                           | .0   | max volts |
| Positive-peak value                                           | .2   | max volts |
| Peak heater-cathode voltage                                   |      |           |
| Heater negative with respect to cathode                       | 125  | max volts |
| Heater positive with respect to cathode                       | 125  | max volts |
| Peak voltage between anode—No. 2 and any deflection electrode | 500  | max volts |

## EQUIPMENT DESIGN RANGES

For any anode No. 2 voltage ( $E_{b2}$ ) between 500\*\* and 2500 volts

|                                                 |            |                                             |
|-------------------------------------------------|------------|---------------------------------------------|
| Anode No. 1 voltage                             | 15% to 28% | of $E_{b2}$ volts                           |
| Grid No. 1 voltage for visual cutoff, maximum   | 6.75%      | of $E_{b2}$ volts                           |
| Anode No. 1 current for any operating condition | -15 to +10 | microamperes                                |
| Deflection factors                              |            |                                             |
| D1 and D2                                       | 115 to 155 | volts D-C per inch per kilovolt of $E_{b2}$ |
| D3 and D4                                       | 74 to 100  | volts D-C per inch per kilovolt of $E_{b2}$ |

## EXAMPLES OF USE OF DESIGN RANGES

|                                      |            |            |                    |
|--------------------------------------|------------|------------|--------------------|
| For anode No. 2 voltage of           | 1000       | 2000       | volts              |
| Anode No. 1 voltage                  | 150 to 280 | 300 to 560 | volts              |
| Grid No. 1 voltage for visual cutoff | -67.5      | -135       | volts              |
| Deflection factors                   |            |            |                    |
| D1 and D2                            | 115 to 155 | 230 to 310 | volts D-C per inch |
| D3 and D4                            | 74 to 100  | 148 to 200 | volts D-C per inch |

## MAXIMUM CIRCUIT VALUES

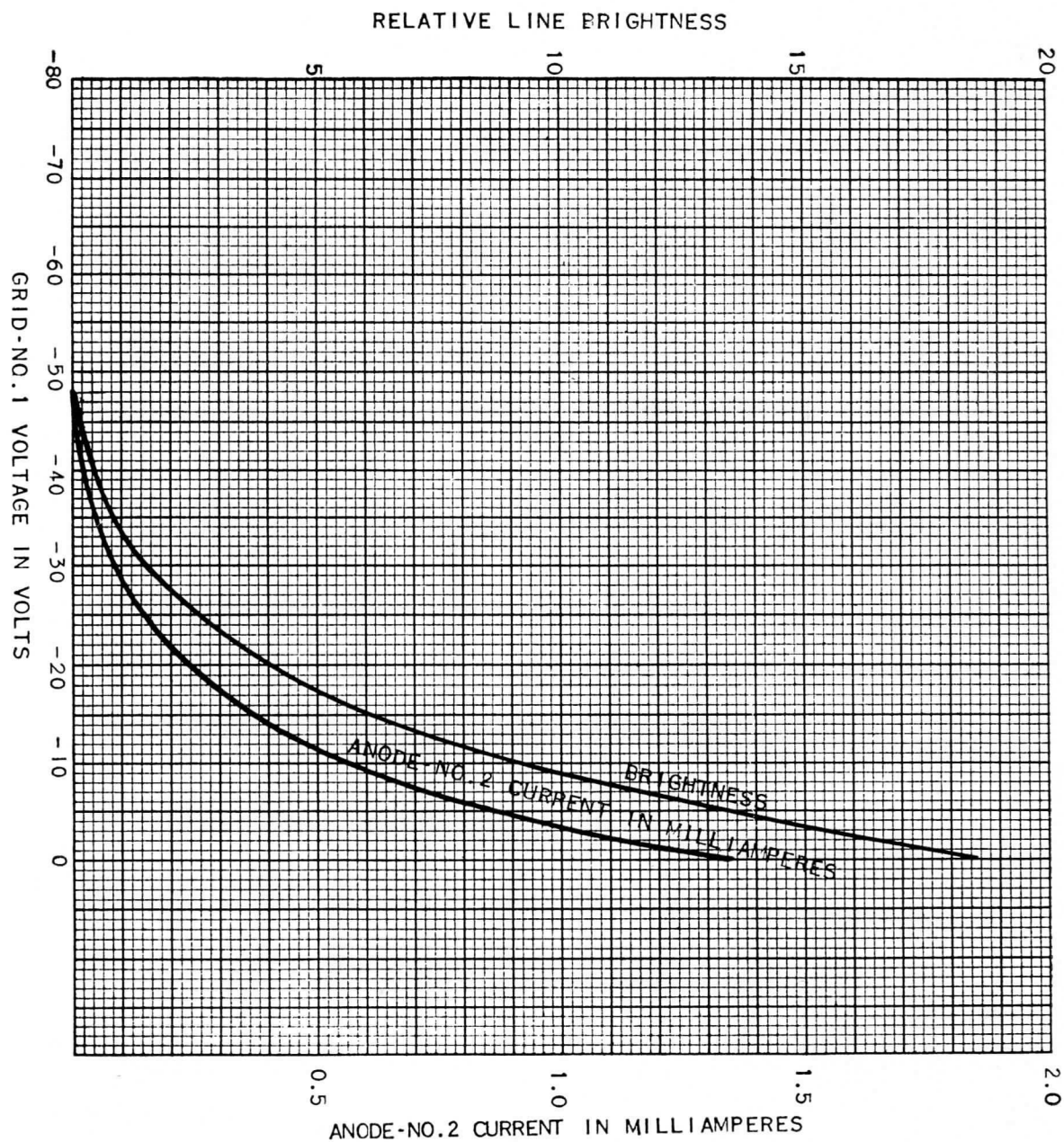
|                                                 |     |             |
|-------------------------------------------------|-----|-------------|
| Grid No. 1—Circuit resistance                   | 1.5 | max megohms |
| Resistance in any deflecting-electrode circuit† | 5.0 | max megohms |

\*Anode No. 2 and Grid No. 2 which are connected together within the tube are referred to herein as Anode No. 2.

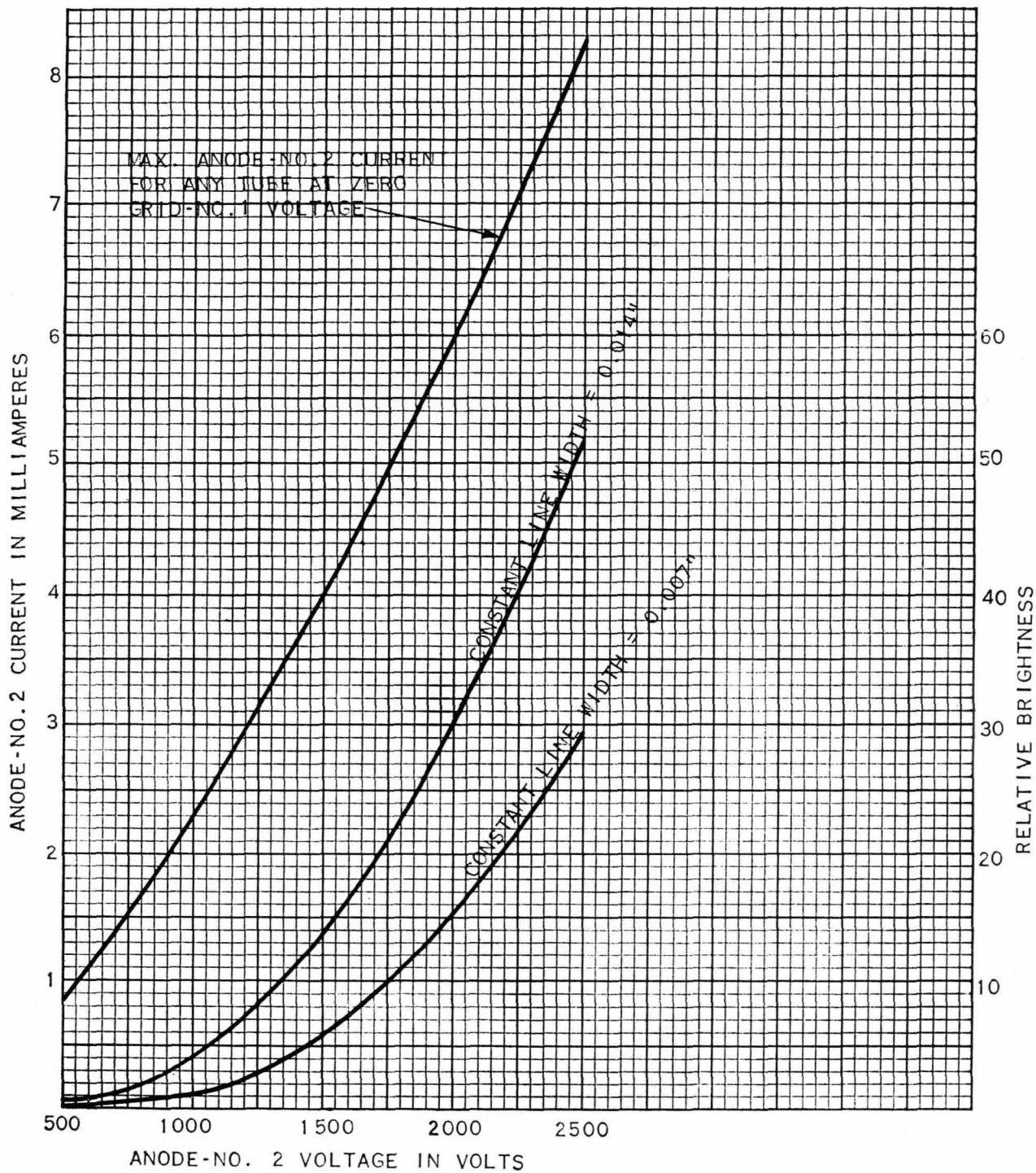
\*\*Brilliance and definition decrease with decreasing Anode No. 2 voltage. A value as low as 500 volts is recommended only for low-velocity deflection and low room-light levels.

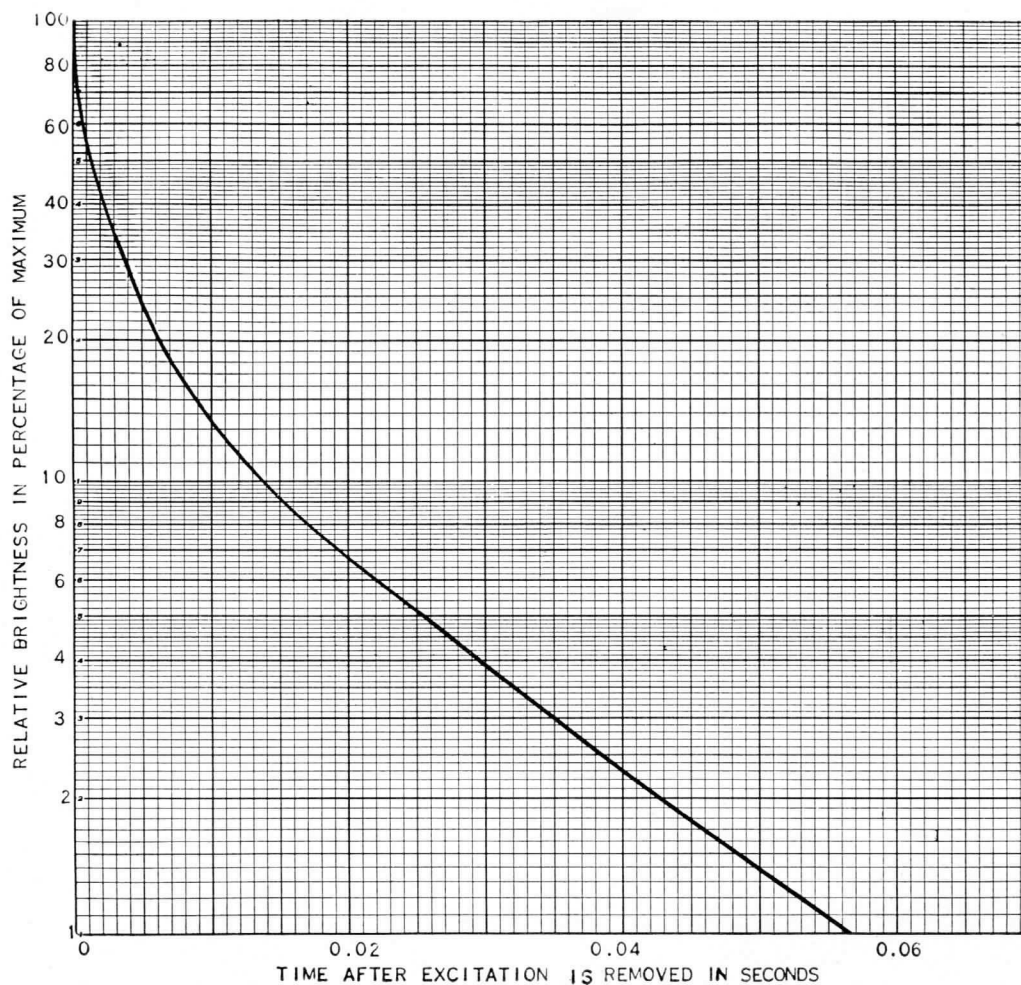
†It is recommended that the deflecting-electrode-circuit resistance be approximately equal.

GL-2BP1  
AVERAGE CHARACTERISTIC  
ANODE NO. 1 VOLTAGE ADJUSTED FOR FOCUS  
ANODE NO. 2 VOLTAGE = 1000  
 $E_f = 6.3$  VOLTS



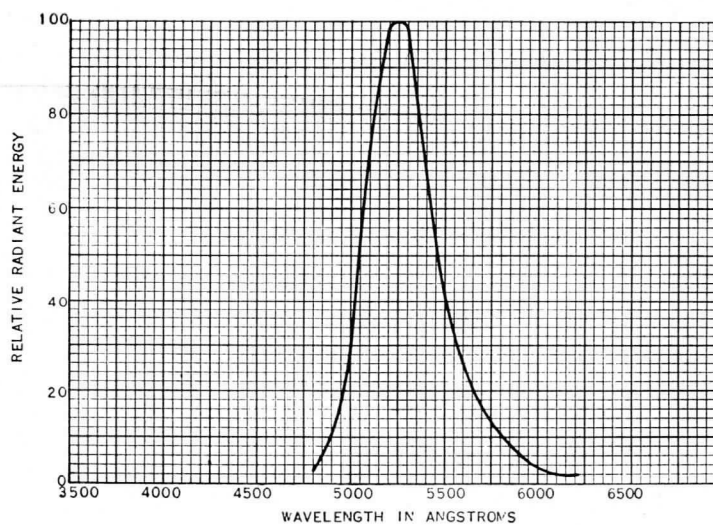
GL-2BP1  
CHARACTERISTICS  
ANODE NO. 1 VOLTAGE ADJUSTED FOR FOCUS  
 $E_f = 6.3$  VOLTS



PERSISTENCE CHARACTERISTIC  
P1 PHOSPHOR

K-69087-72A326

12-13-49

SPECTRAL-ENERGY EMISSION  
CHARACTERISTIC  
P1 PHOSPHOR

K-69087-72A327

12-13-49

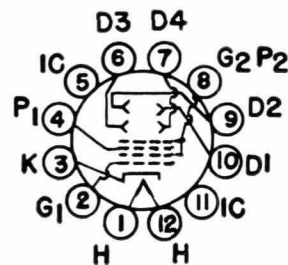
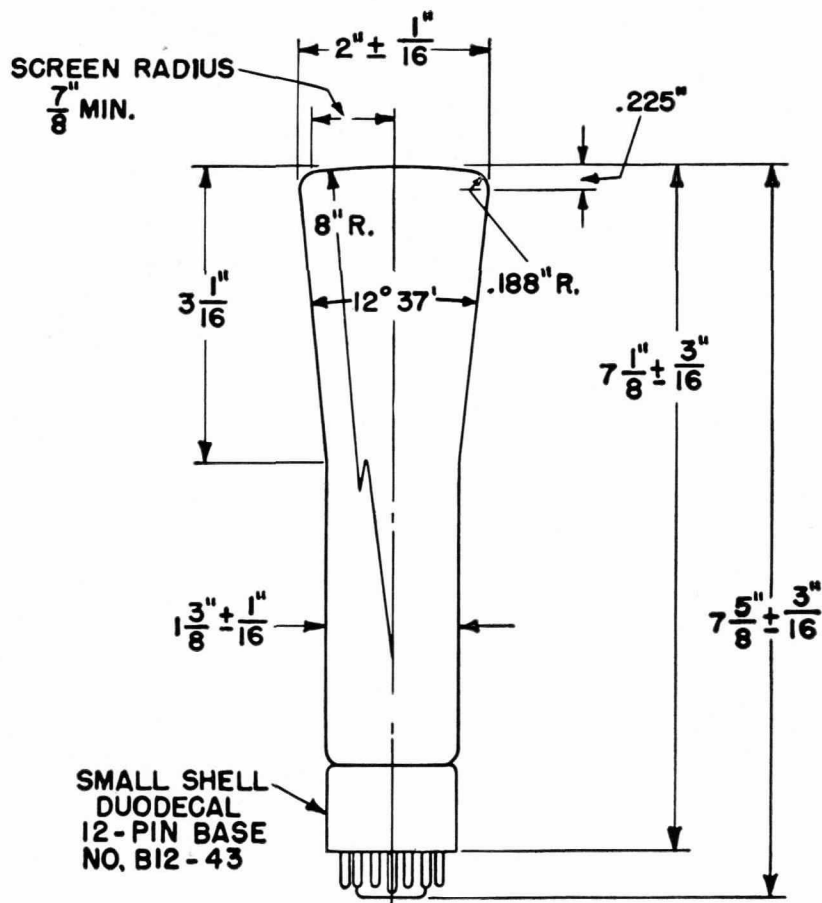
# GL-2BP1

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## OUTLINE CATHODE-RAY TUBE GL-2BP1



**BASING DIAGRAM**

☉ OF BULB WILL NOT DEVIATE MORE THAN  $2^\circ$  IN ANY DIRECTION FROM THE PERPENDICULAR ERECTED AT THE CENTER OF BOTTOM OF THE BASE.

THE PLANE THROUGH THE TUBE AXIS AND PIN NO. 4 MAY VARY FROM THE TRACE PRODUCED BY DI AND D2 BY AN ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF  $10^\circ$ . ANGLE BETWEEN DI - D2 TRACE AND D3 - D4 TRACE IS  $90^\circ \pm 3^\circ$ .

DI AND D2 ARE NEARER THE SCREEN; D3 AND D4 ARE NEARER THE BASE. WITH DI POSITIVE WITH RESPECT TO D2, THE SPOT WILL BE DEFLECTED TOWARD PIN NO. 4; LIKEWISE, WITH D3 POSITIVE WITH RESPECT TO D4, THE SPOT WILL BE DEFLECTED TOWARD PIN NO. 1.

N-15160AZ

12-9-49

Tube Divisions, Electronics Department

**GENERAL  ELECTRIC**

Schenectady, N. Y.