



2BP1

2BP1

# OSCILLOGRAPH TUBE

ELECTROSTATIC FOCUS

ELECTROSTATIC DEFLECTION

## DATA

### General:

Heater, for Unipotential Cathode:

Voltage . . . . .	6.3	ac or dc volts
Current . . . . .	0.6	amp

Direct Interelectrode Capacitances (Approx.):

Grid No.1 to All Other Electrodes . . . . .	8	$\mu\mu\text{f}$
DJ <sub>1</sub> to DJ <sub>2</sub> . . . . .	2	$\mu\mu\text{f}$
DJ <sub>3</sub> to DJ <sub>4</sub> . . . . .	2	$\mu\mu\text{f}$
DJ <sub>1</sub> to All Other Electrodes . . . . .	11	$\mu\mu\text{f}$
DJ <sub>2</sub> to All Other Electrodes . . . . .	8	$\mu\mu\text{f}$
DJ <sub>3</sub> to All Other Electrodes . . . . .	7	$\mu\mu\text{f}$
DJ <sub>4</sub> to All Other Electrodes . . . . .	8	$\mu\mu\text{f}$

Phosphor (For Curves, see front of this Section) . . . . . No.1

Fluorescence . . . . .	Green
Persistence . . . . .	Medium

Focusing Method . . . . . Electrostatic

Deflection Method . . . . . Electrostatic

Overall Length . . . . . 7-5/8"  $\pm$  3/16"

Greatest Diameter of Eulb. . . . . 2"  $\pm$  1/16"

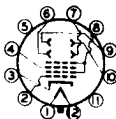
Minimum Useful Screen Diameter . . . . . 1-3/4"

Mounting Position . . . . . Any

Base . . . . . Small-Shell Duodecal 12-Pin

Basing Designation for BOTTOM VIEW . . . . . 12E

Pin 1 - Heater	Pin 8 - Anode No. 2, Grid No. 2
Pin 2 - Grid No. 1	Pin 9 - Deflecting Electrode DJ <sub>2</sub>
Pin 3 - Cathode	Pin 10 - Deflecting Electrode DJ <sub>1</sub>
Pin 4 - Anode No. 1	Pin 11 - Internal Connection-- Do Not Use
Pin 5 - Internal Connection-- Do Not Use	Pin 12 - Heater
Pin 6 - Deflecting Electrode DJ <sub>3</sub>	
Pin 7 - Deflecting Electrode DJ <sub>4</sub>	



*DJ<sub>1</sub> and DJ<sub>2</sub> are nearer the screen  
DJ<sub>3</sub> and DJ<sub>4</sub> are nearer the base*

With DJ<sub>1</sub> positive with respect to DJ<sub>2</sub>, the spot is deflected toward pin 4. With DJ<sub>3</sub> positive with respect to DJ<sub>4</sub>, the spot is deflected toward pin 1.

The plane through the tube axis and pin No. 4 may vary from the trace produced by DJ<sub>1</sub> and DJ<sub>2</sub> by an angular tolerance (measured about the tube axis) of 10°.

The angle between DJ<sub>1</sub> - DJ<sub>2</sub> trace and DJ<sub>3</sub> - DJ<sub>4</sub> trace is 90°  $\pm$  3°.

← Indicates a change.



## OSCILLOGRAPH TUBE

### Maximum Ratings, Design-Center Values:

ANODE-No.2* VOLTAGE. . . . .	2500 max.	volts
ANODE-No.1 VOLTAGE . . . . .	1000 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 VOLTAGE BETWEEN ANODE No.2 AND ANY DEFLECTING ELECTRODE. .	500 max.	volts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode.	125 max.	volts
Heater positive with respect to cathode.	125 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
→ Max. Grid-No.1 Voltage for Visual Cutoff. . . . .	6.75% of $E_{b2}$	volts
Max. Anode-No.1 Current Range. . . . .	-15 to +10	microamperes
Deflection Factors:		
DJ <sub>1</sub> & DJ <sub>2</sub> . . . . .	115 to 155	v dc/in./kv of $E_{b2}$
DJ <sub>3</sub> & DJ <sub>4</sub> . . . . .	74 to 100	v dc/in./kv of $E_{b2}$
→ Spot Position. . . . .	□	

### Examples of Use of Design Ranges:

For anode-No.2 voltage of 1000	2000	volts
Anode-No.1 Voltage . . . . .	150 - 280	300 - 560 . . . . . volts
Max. Grid-No.1 Voltage for Visual Cutoff. . . . .	-67.5	-135 . . . . . volts
Deflection Factors:		
DJ <sub>1</sub> & DJ <sub>2</sub> . . . . .	115 - 155	230 - 310 volts dc/in.
DJ <sub>3</sub> & DJ <sub>4</sub> . . . . .	74 - 100	148 - 200 volts dc/in.

### Maximum Circuit Values:

Grid-No.1-Circuit Resistance . . . . .	1.5 max.	megohms
Resistance in Any Deflecting- Electrode Circuit <sup>o</sup> . . . . .	5.0 max.	megohms

\* 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 resistances be approximately equal.
- Anode No.2 and grid No.2 which are connected together within tube, are referred to herein as anode No.2. The product of anode-No.2 voltage and average anode-No.2 current should be limited to 6 watts.
- The center of the undeflected, focused spot will fall within a circle having a 5.0-mm radius concentric with the center of the tube face.

→ Indicates a change.

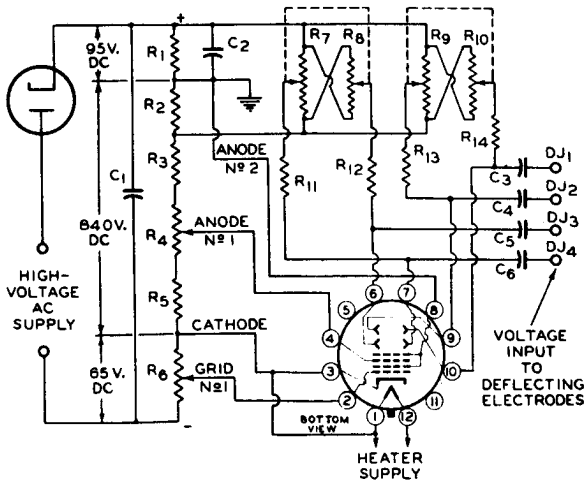


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## TYPICAL OSCILLOGRAPH CIRCUIT



92CM-6777R1

C1: 0.2  $\mu$ f  
 C2: 1.0  $\mu$ f  
 C3 C4 C5 C6: 0.05- $\mu$ f Blocking  
 Capacitors\*

R1 R2: 2.5 Megohms, 0.5 Watt  
 R3: 2.5 Megohms, 1 Watt

R4: 1.0-Megohm Potentiometer  
 R5: 0.5 Megohm, 0.5 Watt  
 R6: 0.35 Megohm, 0.5 Watt  
 R7 R8: Dual 5-Megohm Potentiometer  
 R9 R10: Dual 5-Megohm Potentiometer  
 R11 R12 R13 R14: 2 Megohms, 0.5 watt

\* When cathode is grounded, capacitors should have high voltage rating; when anode No.2 is grounded, they may have low voltage rating. For dc amplifier service, deflecting electrodes should be connected direct to amplifier output. In this service, it is preferable usually to remove deflecting-electrode resistors to minimize loading effect on amplifier. In order to minimize spot defocusing, it is essential that anode No.2 be returned to a point in the amplifier system which will give the lowest possible potential difference between anode No.2 and the deflecting electrodes.

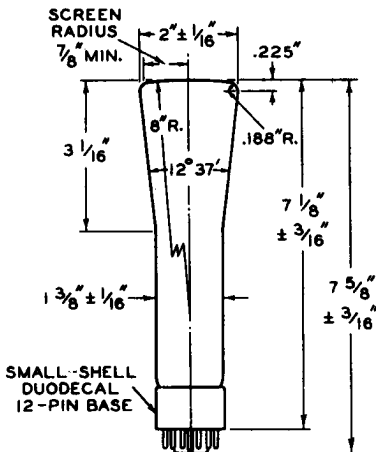
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## OSCILLOGRAPH TUBE



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

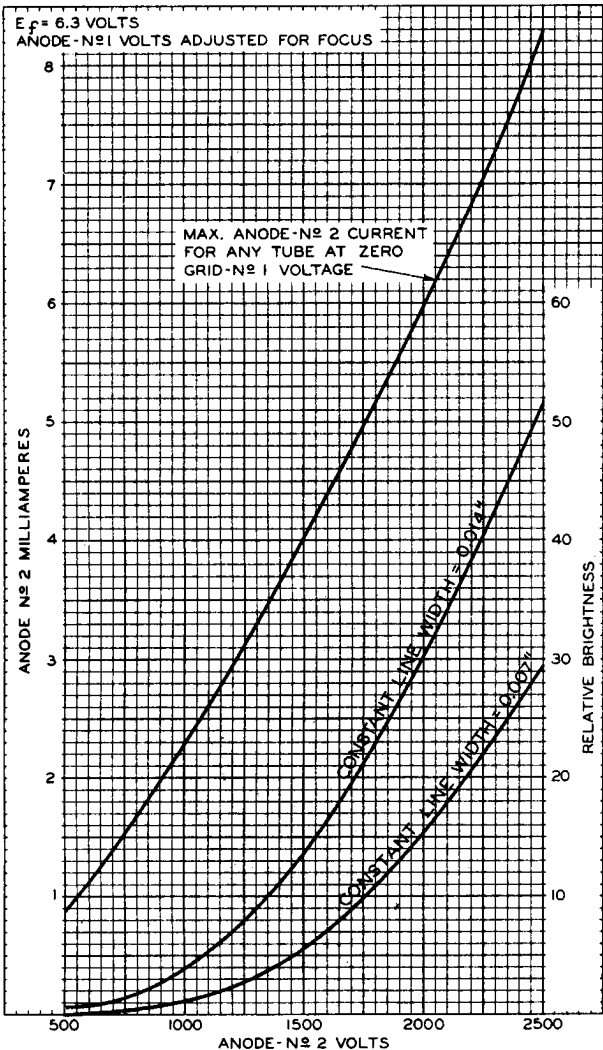
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# CHARACTERISTICS

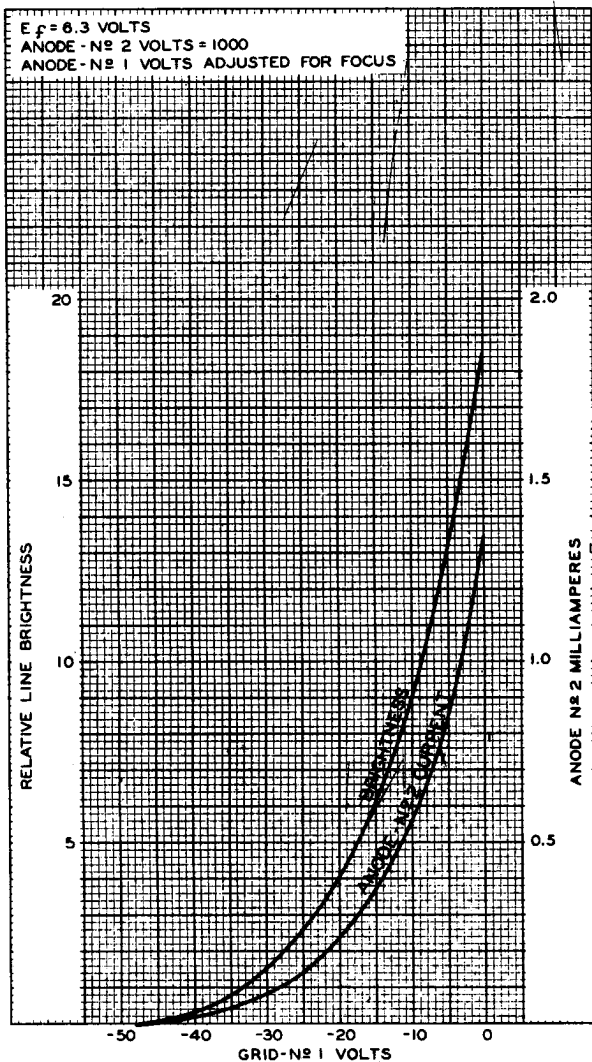


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# AVERAGE CHARACTERISTICS



AUGUST 14, 1950

TUBE DEPARTMENT  
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6747R1



2BP11

2BP11

## OSCILLOGRAPH TUBE

ELECTROSTATIC FOCUS

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The 2BP11 is the same as the 2BP1 except that it has a phosphor of the short-persistence, blue-fluorescence type designated P11. The blue radiation of the P11 screen is highly actinic and has sufficiently short persistence to permit use of the 2BP11 in all moving film photographic applications without blurring except in those where film moves at a high speed. The 2BP11 is also quite satisfactory for visual observation of phenomena because its phosphor has unusually high brightness for a blue screen.

In general, operation of the 2BP11 at an anode-No.2 voltage less than 1000 volts is not recommended.

THE SPECTRAL-ENERGY EMISSION CHARACTERISTIC  
and the PERSISTENCE CHARACTERISTIC of  
the P11 Phosphor are shown at the  
front of this Section