



5ABPI

OSCILLOGRAPH TUBE

POST-DEFLECTION ACCELERATOR

ELECTROSTATIC FOCUS

ELECTROSTATIC DEFLECTION

5ABPI

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 μf Cathode to All Other Electrodes 5 μf DJ₁ to DJ₂ 2.5 μf DJ₃ to DJ₄ 1.3 μf DJ₁ to All Other Electrodes 9 μf DJ₂ to All Other Electrodes 9 μf DJ₃ to All Other Electrodes 5 μf DJ₄ to All Other Electrodes 6 μf

Faceplate, Flat Clear Glass

Phosphor (For Curves, see front of this Section). P1

Fluorescence and Phosphorescence Green

Persistence of Phosphorescence Medium

Focusing Method Electrostatic

Deflection Method Electrostatic

Overall Length 16-3/4" $\pm$ 3/8"Greatest Diameter of Bulb 5-1/4" $\pm$ 3/32"

Minimum Useful Screen Diameter 4-9/16"

Bulb J42

Weight (Approx.) 2-1/2 lbs

Mounting Position Any

Cap Recessed Small Ball (JETEC No.J1-22)

Base Medium-Shell Diheptal 12-Pin (JETEC No.B12-37)

BOTTOM VIEW

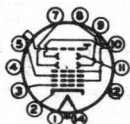
Pin 1-Heater

Pin 2-Cathode

Pin 3-Grid No.1

Pin 4-No Conn-
section—
Do Not Use

Pin 5-Grid No.3

Pin 7-Deflecting
Electrode DJ₃Pin 8-Deflecting
Electrode DJ₄

Pin 9-Ultor

(Grid No.2,
Grid No.4)Pin 10-Deflecting
Electrode DJ₂Pin 11-Deflecting
Electrode DJ₁

Pin 12-No. Conn.

Pin 14-Heater

Cap-Post-Ultor
(Grid No.5,
Collector)*DJ₁ and DJ₂ are nearer the screen**DJ₃ and DJ₄ are nearer the base*

With DJ₁ positive with respect to DJ₂, the spot is deflected toward pin 5. With DJ₃ positive with respect to DJ₄, the spot is deflected toward pin 2.

The plane through the tube axis and each of the following items may vary from the trace produced by DJ₁ and DJ₂ by

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the following angular tolerances (measured about the tube axis): Pin 5, 10° ; side terminal (on same side of tube as pin 5), 10° . Angle between $DJ_1 - DJ_2$ trace and $DJ_3 - DJ_4$ trace is $90^{\circ} \pm 1.5^{\circ}$.

Maximum Ratings, Design-Center Values:

POST-ULTOR [•] VOLTAGE	6000 max.	volts
ULTOR [▲] VOLTAGE	2600 max.	volts
RATIO OF POST-ULTOR VOLTAGE TO ULTOR VOLTAGE	2.3:1 max.	
GRID-No.3 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 ULTOR 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 post-ultor voltage (E_{C5}) between 2000* and 6000 volts
and any ultor voltage (E_{C4}) between 1500** and 2600 volts

Grid-No.3 Voltage for Focus . . 20% to 34.5% of E_{C4} . . . volts

Grid-No.1 Voltage for Visual

Extinction of Undelected

 Focused Spot 2.6% to 4.3% of E_{C4} . . . volts

Grid-No.3 Current for Any

Operating Condition -15 to +10 . . . μ amp

Deflection Factors: #

$$\text{When } E_{C5} = 2 \times E_{C4}$$

DJ_1 & DJ_2 26.5 to 36 v dc/in./kvof E_{C4}

DJ_3 & DJ_4 18 to 24 v dc/in./kvof E_{C4}

$$\text{When } E_{C5} = E_{C4}$$

DJ_1 & DJ_2 21.5 to 29 v dc/in./kvof E_{C4}

DJ_3 & DJ_4 14.5 to 19.5 v dc/in./kvof E_{C4}

Spot Position

##

Examples of Use of Design Ranges:

For post-ultor

voltage of

2000

3000

4000

volts

and ultor

voltage of

2000

1500

2000

volts

Grid-No.3 Volt.

for Focus

400 to 690

300 to 515

400 to 690

volts

Grid-No.1 Volt.[□]

-52 to -87

-39 to -65

-52 to -87

volts

•, ▲, ○, *, **, #, ##, □: See next page.

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Deflection Factors:

DJ ₁ & DJ ₂	43 to 58	40 to 54	53 to 72	v dc/in.
DJ ₃ & DJ ₄	29 to 39	27 to 36	36 to 48	v dc/in.

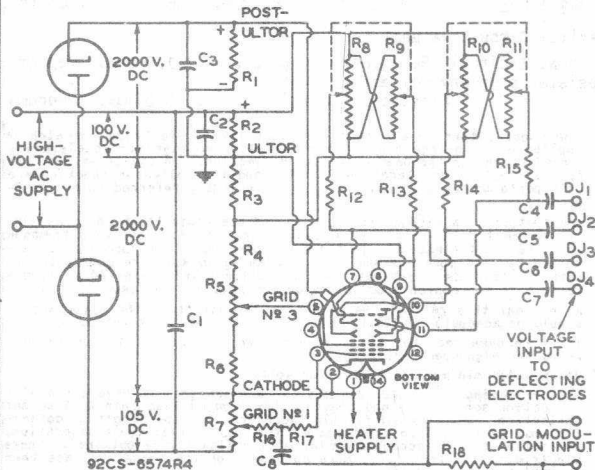
Maximum Circuit Values:

Grid-No.1-Circuit Resistance	1.5 max.	megohms
Resistance in Any Deflecting-Electrode Circuit [■]	5.0 max.	megohms

- The "post-ultor" in a cathode-ray tube is the electrode to which is applied a dc voltage higher than the ultor voltage for accelerating the electrons in the beam after its deflection. In the 5AB-types, the post-deflection acceleration function and the collector function are both performed by grid No.5 which is conveniently referred to as "post-ultor".
- ▲ The "ultor" in a cathode-ray tube is the electrode to which is applied the highest dc voltage for accelerating the electrons in the beam prior to its deflection. In the 5AB-types, the ultor function is performed by grid No.4. Since grid No.4 and grid No.2 are connected together within the 5AB-types, they are collectively referred to simply as "ultor" for convenience in presenting data and curves.
- At or near this rating, the effective resistance of the ultor supply should be adequate to limit the ultor input power to 6 watts.
- * It is recommended that the post-ultor voltage be not less than 3000 volts for high-speed scanning.
- ** Recommended minimum value of ultor voltage.
- # The deflecting electrodes DJ₃ and DJ₄ are designed to have extra-high deflection sensitivity and consequently produce less than full-screen deflection. With post-deflection acceleration, the length of deflection may be limited to 4 inches; without post-deflection acceleration, deflection to full screen diameter will ordinarily be obtained. These electrodes are, therefore, more suitable for the signal voltage than for the time-base voltage.
- ## With heater voltage of 6.3 volts, post-ultor voltage of 4000 volts, ultor voltage of 2000 volts, grid-No.3 voltage adjusted to give focus, grid-No.1 voltage adjusted to give spot that is just visible, each deflecting electrode connected through a 1-megohm resistor to ultor, and tube shielded from all extraneous fields, the center of the undeflected, focused spot will fall within a circle having a 12.5-mm radius concentric with the center of the tube face.
- For visual cutoff of undeflected focused spot.
- It is recommended that the deflecting-electrode-circuit resistances be approximately equal.

OSCILLOGRAPH TUBE

TYPICAL OSCILLOGRAPH CIRCUIT



- C1: 0.1 μ f, 2500 Volts
C2: 1.0 μ f, 200 Volts
C3: 0.1 μ f, 2500 Volts
C4 C5 C6 C7: 0.05- μ f,
Blocking Capacitors ★
C8: 0.0001 μ f, 2500 Volts
R1: 50 Megohms (Five 10-Meg-
ohm, 1-Watt Resistors
in Series)
R2 R3: 2 Megohms, 0.5 watt
R4: 5.5 Megohms, 2 Watts

- R5: 2-Megohm Potentiometer
R6: 1.5 Megohms, 0.5 Watt
R7: 0.5-Megohm Potentiometer
R8 R9: 5-Megohm Potentiometer
R10 R11: Dual 5-Megohm Potentiometer
R12 R13 R14 R15: 2 Megohms, 0.5 Watt
R16: 0.5 Megohm, 0.5 Watt
R17: Not less than 2000 ohms per
volt of positive signal
R18: 5 Megohms, 0.5 Watt

When cathode is grounded, capacitors should have high voltage rating (2500 volts); when ultor is grounded, they may have low voltage rating (200 volts). 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 ultor be returned to a point in the amplifier system which will give the lowest possible potential difference between ultor and the deflecting electrodes.

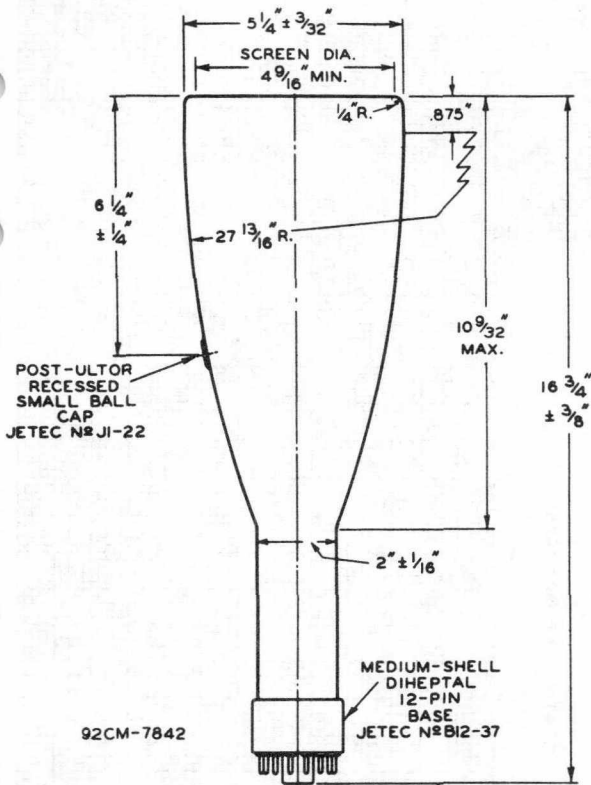
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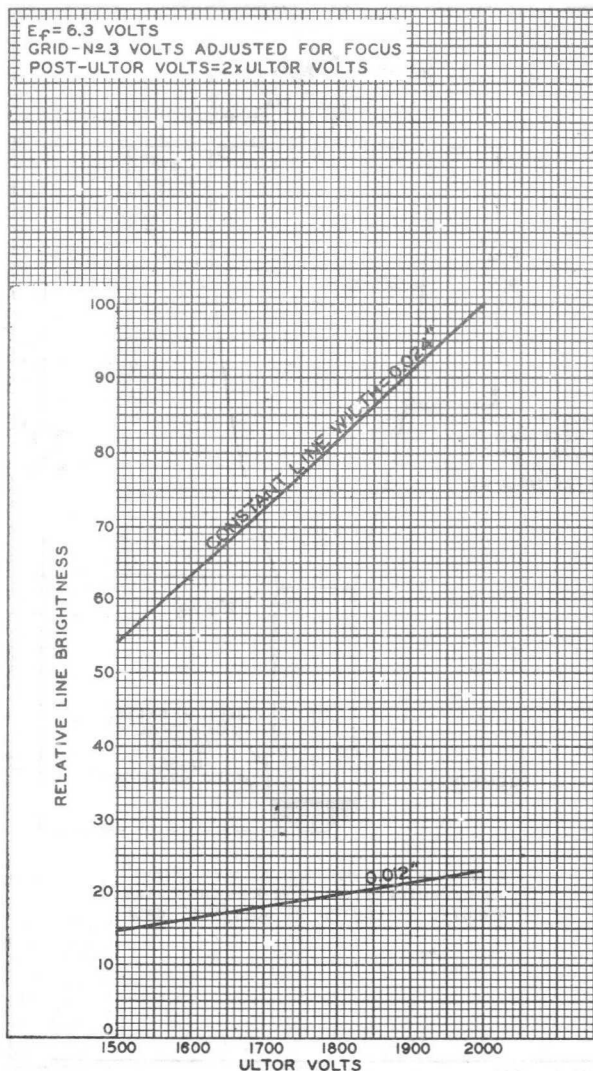
CL OF BULB WILL NOT DEVIATE MORE THAN 2° IN ANY DIRECTION FROM PERPENDICULAR ERECTED AT CENTER OF BOTTOM OF BASE

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TYPICAL CHARACTERISTICS



FEB. 11, 1953

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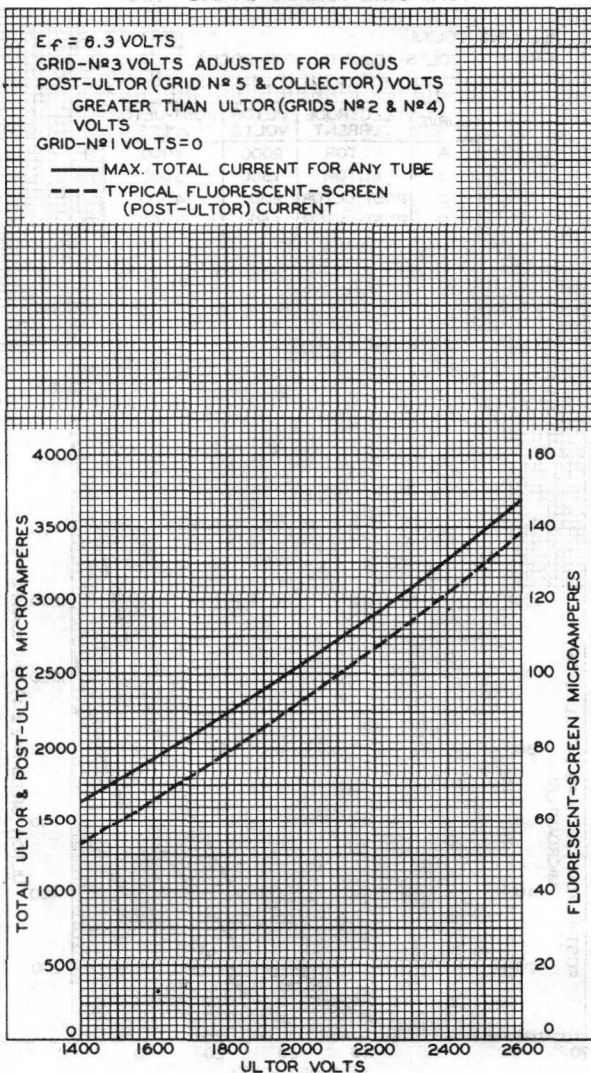
92CM-6820RI



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CHARACTERISTICS



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92CM-7910

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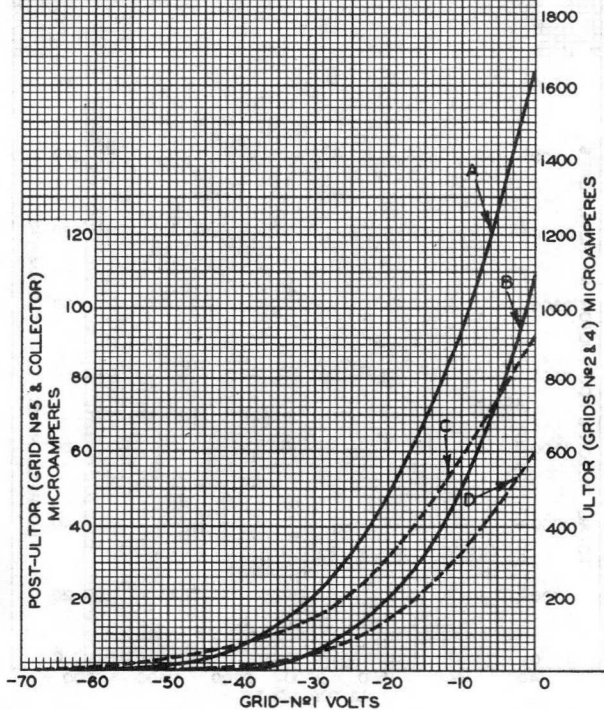
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AVERAGE CHARACTERISTICS

 $E_f = 6.3$ VOLTS

GRID-Nº3 VOLTS ADJUSTED FOR FOCUS

CURVE	ELECTRODE CURRENT	ULTOR VOLTS	POST-ULTOR VOLTS
A	ULTOR	2000	4000
B	ULTOR	1500	3000
C	POST-ULTOR	2000	4000
D	POST-ULTOR	1500	3000



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92CM-7911