from JEDEC release
#2650, Nov. 30, 1959

DUMONT

CATHODE-RAY TUBE

TYPE 10ALP-

The DuMont Type 10ALP- is a 10" diameter, single beam cathode-ray tube having electrostatic focus and deflection. This tube is designed for high voltage operation, and all leads are brought out through a Dimagnal collar-base. By means of the Dimagnal collar, the additional length taken up by standard bases and sockets is eliminated thereby making a more compact display.

The Type 10ALP- is designed to provide excellent performance characteristics for high precision applications. Pattern and deflection distortions, and deflection uniformity have been considerably improved through the use of special deflection plates.

A metal-backed screen is used to increase the light output and also prevent the building up of spurious charges on the screen by successive transients. In the study of single transients or low repetition rate signals these spurious charges may distort succeeding transients.

GENERAL CHARACTERISTICS

Electrical Data

Focusing Method	Electrostatic	
Deflecting Method	Electrostatic	
Direct Interelectrode Capacitances, Approximate		
Cathode to all	7.9	μμf
Grid No. 1 to all	9.6	μμf
D1 to D2	5.2	μμf
D3 to D4	2.3	μμf
D1 to all	11.0	μμf
D2 to all	11.0	μμf
D3 to all	5.9	μμf
D4 to all	5.9	μμf

Optical Data

Phosphor Number	2	7	14	19 (Note 1)	25
Fluorescent Color	Green	Blue	Blue	Orange	Orange
Phosphorescent Color	Green	Yellow	Orange	Orange	Orange
Persistence	Long	Long	Med. Long	Long	Very Long

Faceplate		
Light Transmission at center, Approximate	67	Percent

TL-1313 -2
9/25/59

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

DUMONT

CATHODE-RAY TUBE

TYPE 10ALP-

Mechanical Data

Overall Length	20 ± 1/4	Inches
Greatest Diameter of Bulb	10 1/2 ± 1/8	Inches
Minimum Useful Screen Diameter	9	Inches
Base (Dimagnal, 22-Pin Collar Base)	Special	
Basing	22 A	
Base Alignment		
D1D2 trace aligns with Collar Index Pin No. 1 and tube axis	± 10	Degrees
Positive voltage on D1 deflects beam approximately toward Collar Pin No. 1		
Positive voltage on D3 deflects beam approximately toward Collar Pin No. 18		
Trace Alignment		
Angle between D3D4 and D1D2 traces	90 ± 1	Degrees

RATINGS (ABSOLUTE MAXIMUM VALUES)

Heater Voltage	6.3	Volts
Heater Current at 6.3 Volts	0.6 ± 10%	Ampere
Accelerator Voltage	10,000	Max. Volts DC
Accelerator Input	6	Max. Watts
Focusing Electrode Voltage	3,500	Max. Volts DC
Grid No. 1 Voltage		
Negative Bias Value	300	Max. Volts DC
Positive Bias Value	0	Max. Volts DC
Positive Peak Value	0	Max. Volts
Peak Heater-Cathode Voltage		
Heater negative with respect to cathode		
During warm-up period not to exceed 15 seconds	410	Max. Volts
After equipment warm-up period	180	Max. Volts
Heater Positive with respect to cathode	180	Max. Volts
Peak Voltage between Accelerator and any Deflection Electrode	1,800	Max. Volts

DUMONT

CATHODE-RAY TUBE

TYPE 10ALP-

TYPICAL OPERATING CONDITIONS

Accelerator Voltage	8,000	Volts
Focusing Electrode Voltage	2250 to 3100	Volts
Grid No. 1 Voltage [2]	-155 to -205	Volts
Deflection Factors:		
D1 and D2	155 to 189	Volts DC/Inch
D3 and D4	151 to 185	Volts DC/Inch
Deflection Factor Uniformity [3]	1.5 %	Max.
Deflection Defocusing [4,5]	1:3	Ratio
Pattern Distortion [6]	2%	Max.
Modulation [5]	20	Max. Volts DC
Line Width "A" [5]	.012	Max. Inches
Focusing Electrode Current for any operating condition	-15 to +10	μA
Spot Position (focused and undeflected) [7]	Within a 20 -mm square	

For Accelerator Voltage not shown in the preceding table, the following can be used as a guide:

Focusing Electrode Voltage	28% to 38.8% of Accelerator Volts
Grid No. 1 Voltage	1.94% to 2.56% of Accelerator Volts
D1 and D2	19.4 to 23.6 Volts DC per Inch per Kilovolt of Accelerator
D3 and D4	18.9 to 23.1 Volts DC per Inch per Kilovolt of Accelerator

MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance	1.5	Max. Megohms
Resistance in any Deflecting Electrode Circuit [8]	5.0	Max. Megohms

NOTES

1. To prevent burning, minimum beam current densities should be used.

2. Visual extinction of undeflected, focused spot.

3. The deflection factor (for both D1D2 and D3D4 plate pairs separately) for a deflection of 75% of the useful scan will not differ for the deflection factor for a deflection at 25% of the useful scan by more than the indicated value.

NOTES (Continued)

4. The ratio of the line width of a 2-inch long trace, adjusted for best center focus, to the line width measured on the faceplate axis when the trace is deflected perpendicularly ± 4 inches from the face center by a balanced DC voltage, will not be greater than the specified value.

5. For an Ib3 of 2 μADC measured in accordance with MIL-E-1 specifications.

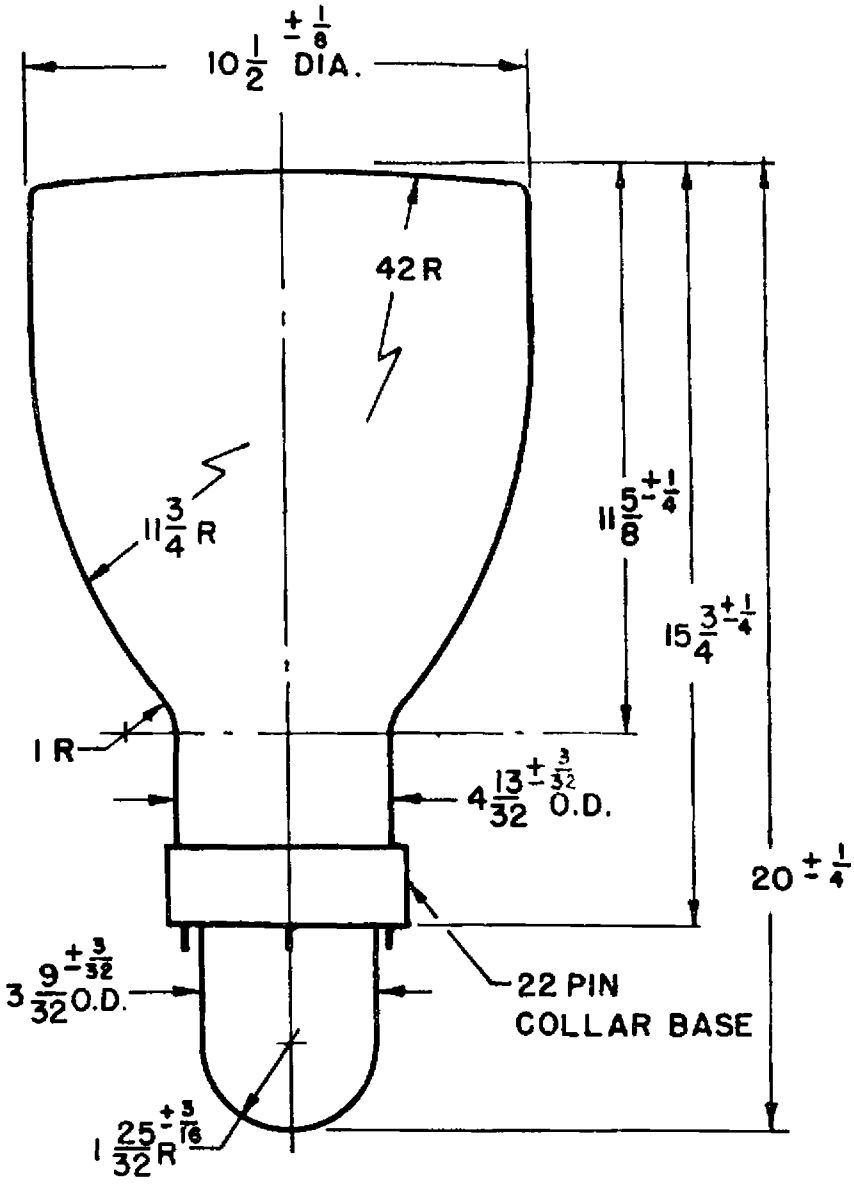
6. All portions of a raster pattern, adjusted so its widest points just touch the sides of a 6.12-inch square, will fall within the area bounded by the 6.12-inch square and an inscribed 6-inch square.

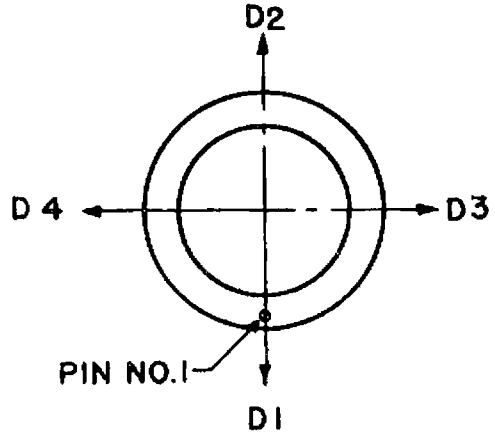
7. Centered with respect to the tube face with tube shielded.

8. It is recommended that the deflecting-electrode circuit resistances be approximately equal.

DUMONT

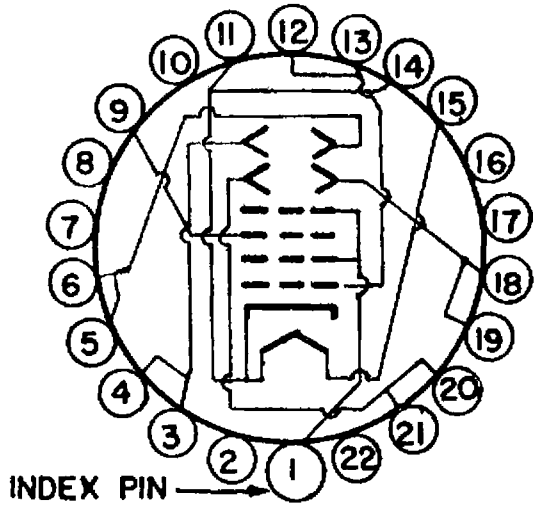
CATHODE-RAY TUBE
TYPE 10ALP-





BOTTOM VIEW OF BASE

22A



BOTTOM VIEW

PIN NO	ELEMENT
1	– ACCELERATOR
3&4	– DEFLECTING ELECTRODE D_1
5&6	– DEFLECTING ELECTRODE D_2
9	– FOCUSING ELECTRODE
11 &14	– HEATER & CATHODE
12&13	– GRID NO.1
15	– HEATER
18 &19	– DEFLECTING ELECTRODE D_3
20&21	– DEFLECTING ELECTRODE D_4

10KP- CATHODE-RAY TUBES

The Type 10KP- Cathode-ray Tubes are magnetically focussed and deflected cathode-ray tubes designed for radar systems and special applications requiring long persistence and large screen size. This tube is typical of the radar-type tubes available from Du Mont.

Radar types similar to the Type 10KP- include the 5-inch 5FP-, the 7-inch 7BP- and the 12-inch 12SP-. Selection of a tube of this type would be determined by the screen size desired and the exact electrical characteristics needed to fit the application.



GENERAL CHARACTERISTICS

Electrical

Heater Voltage	6.3 Volts
Heater Current	0.6 ± 10% Ampere
Focusing Method	Magnetic
Deflecting Method	Magnetic
Deflecting Angle (Approx.)	50 Degrees
Phosphor	No. 7
Fluorescence	Blue
Phosphorescence	Yellow
Persistence	Long
Direct Interelectrode Capacitances, Approx.	
Cathode to all other electrodes	5 $\mu\mu$f.
Grid No. 1 to all other electrodes	6.5 $\mu\mu$f.

Mechanical

Overall Length	17⅝ ± ⅜ Inches
Greatest Diameter of Bulb	10½ ± ⅛ Inches
Minimum Useful Screen Diameter	9 Inches
Bulb Contact (Recessed small cavity cap)	J1-21
Base (Small shell duodecal 7-pin)	B7-51
Basing	12D
Bulb Contact Alignment J1-21 contact aligns with vacant pin position No. 3	± 10 Degrees

MAXIMUM RATINGS—(Design Center Values)

Anode Voltage	10,000 Max. Volts D-C
Grid No. 2 Voltage	700 Max. Volts D-C
Grid No. 1 Voltage	
Negative Bias Value	180 Max. Volts D-C
Positive Bias Value[1]	0 Max. Volts D-C
Positive Peak Value	2 Max. Volts
Peak Grid No. 1 Drive from Cut-off	65 Max. Volts
Peak Heater-Cathode Voltage	
Heater Negative with respect to cathode	150 Max. Volts D-C
Heater Positive with respect to cathode	150 Max. Volts D-C

TYPICAL OPERATING CONDITIONS

Anode Voltage	9,000 Volts D-C
Grid No. 2 Voltage	250 Volts D-C
Grid No. 1 Voltage[2]	−27 to −63 Volts D-C
Focusing Coil Current[3]	105 Approx. Ma. D-C

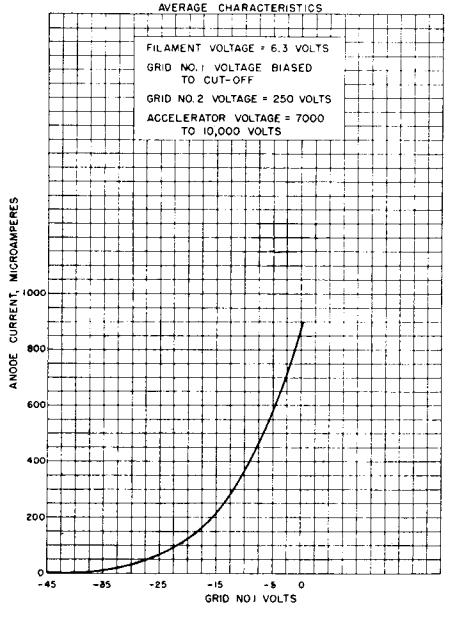
MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance ..... 1.5 Max. Megohms

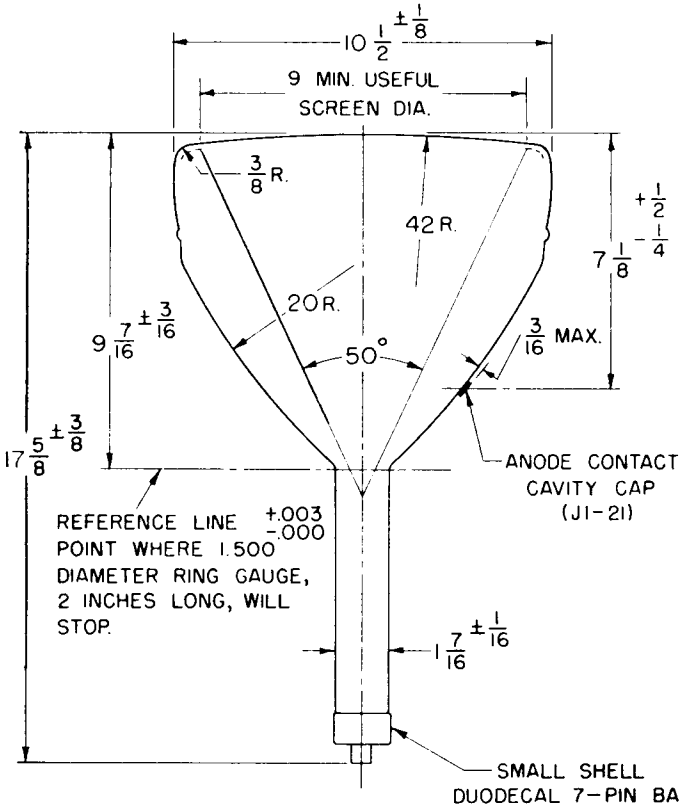
NOTES

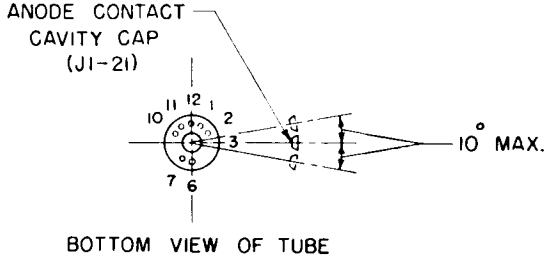
1. At or near this rating, the effective resistance of the anode supply should be adequate to limit the anode input power to 6 watts.
2. Visual extinction of undeflected focused spot.
3. For JETEC standard focus coil No. 106, or equivalent, with the Grid No. 1 voltage adjusted to produce an anode current of 200 microamperes and with distance (D) from reference line to center of air gap equal to 3.25 inches.

10KP-



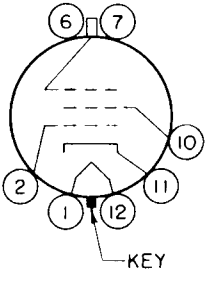
TYPE 10KP-





BOTTOM VIEW OF TUBE

12D



BOTTOM VIEW OF BASE

PIN NO.	ELEMENT
1	HEATER
2	GRID NO. 1
10	GRID NO. 2
11	CATHODE
12	HEATER
CAP	ANODE

DUMONT

CATHODE-RAY TUBE

TYPE 10UP14B

The Du Mont Type 10UP14B is a 10-inch diameter, electrostatic focus and magnetic deflection cathode-ray tube. It is designed for specific applications where high resolution and minimum astigmatism are prime requirements. The neck and bulb alignments and screen blemishes are tightly controlled to assure good mechanical and screen qualities. The focus lens is designed to operate at or near cathode potential to afford substantially automatic focus, independent of accelerator voltage variations. For greater light output and to minimize screen charging effects, the screen is aluminized.

GENERAL CHARACTERISTICS

Electrical Data

Focusing Method	Electrostatic	
Deflecting Method	Magnetic	
Deflecting Angle, Approximate	50	Degrees
Direct Interelectrode Capacitances, Approximate		
Cathode to all other electrodes	5	μμf
Grid No. 1 to all other electrodes	6.5	μμf

Optical Data

Phosphor Number	14	
Fluorescence	Purple	
Phosphorescence	Orange	
Persistence	Medium-Long	
Faceplate	Gray Filter	

Mechanical Data

Overall Length	17 5/8 ± 3/8	Inches
Greatest Diameter of Bulb	10 1/2 ± 1/16	Inches
Minimum Useful Screen Diameter	9	Inches
Bulb Contact	J1-21	
Base	B6-63	
Basing	12M	
Bulb Contact Alignment:		
J1-21 cap aligns with vacant Pin Position No. 3	± 10	Degrees

DE-6029
1/3/61

Allen B. Du Mont Laboratories, ~~Inc.~~
Divisions of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

FORM 909 5C 4-60-8H

from JEDEC release #3146, Feb. 13, 1961

DUMONT

CATHODE-RAY TUBE

TYPE 10UP14B

MAXIMUM RATINGS (Design Maximum Values)

Heater Voltage	6.3	Volts
Heater Current at 6.3 Volts	0.6 ± 10%	Ampere
Accelerator Voltage	13,200	Max. Volts DC
Accelerator Input	6	Max. Watts
Focusing Electrode Voltage	-500 to +1000	Max. Volts DC
Grid No. 2 Voltage	770	Max. Volts DC
Grid No. 1 Voltage		
Negative Bias Value	200	Max. Volts DC
Positive Bias Value	0	Max. Volts DC
Positive Peak Value	2	Max. Volts
Peak Heater-Cathode Voltage		
Heater Negative with respect to cathode	180	Max. Volts
Heater Positive with respect to cathode	180	Max. Volts

TYPICAL OPERATING CONDITIONS

Accelerator Voltage [1]	10,000	Volts DC
Focusing Electrode Voltage [2]	-180 to +180	Volts DC
Focusing Voltage Spread [2]	180	Volts Max.
Focusing Electrode Current	-15 to +15	μADC
Grid No. 2 Voltage	300	Volts DC
Grid No. 1 Voltage [3]	-40 to -77	Volts DC
Line Width "A" [4]	.43	mm Max.
Spot Position [5]	Within an 8-mm radius circle	

MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance	1.5	Max. Megohms

DE-6029

Allen B. Du Mont Laboratories, ~~Inc~~
Divisions of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

DUMONT

CATHODE-RAY TUBE

TYPE 10UP14B

NOTES

1. Brilliance and definition decrease with decreasing accelerator voltage. In general, accelerator voltage should not be less than 7,000 volts.

2. As measured with an Ib2 = 60 μADC, using 35 - 105-line raster expanded with approximately 1/2-inch between lines. An individual line at tube face center is examined and focus voltage varied until the line is of minimum width consistent with the absence of background smear; this is determined as optimum focus, and focus voltage is measured. Focus voltage measurements are taken in each of three planes: 0°, 60°, and 120° through the longitudinal axis of the tube. The 0° reference plane is established with the accelerator cap horizontal and to the right. The focus voltage in each of the planes will be within the limits specified, and the focus voltage spread (astigmatism) will not exceed the specified limit.

3. Visual extinction of the undeflected, focused spot.

4. With an Ib3 = 60 μADC, and measured in accordance with MIL-E-1 specifications, the raster adjusted for optimum focus as described for the focus voltage test (see Note 2). The line width measurement in each of the three planes described shall not exceed the specified limit in any plane.

5. With the tube shielded against external influences, the center of the undeflected, focused spot will fall within a circle of 8-mm radius concentric with the center of the tube.

DE-6029

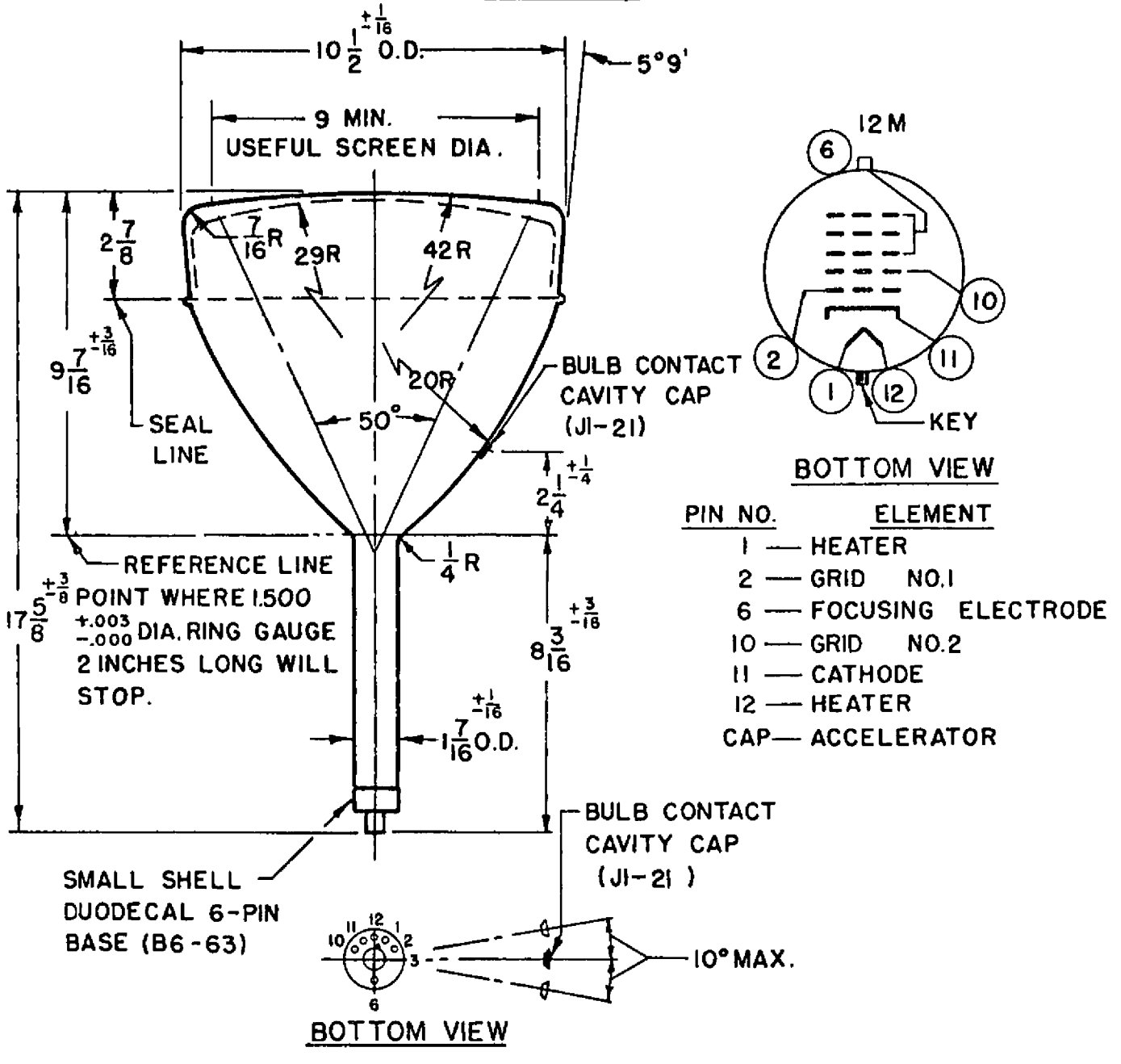
Allen B. Du Mont Laboratories, Inc.
Divisions of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

FORM 809 SC 4-60-SH

DUMONT

CATHODE-RAY TUBE

10UP-B



PIN NO.	ELEMENT
1	HEATER
2	GRID NO.1
6	FOCUSING ELECTRODE
10	GRID NO.2
11	CATHODE
12	HEATER
CAP	ACCELERATOR

Allen B. Du Mont Laboratories, Inc.
Divisions of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

DE-6029
1-3-61
FORM 809-CB-4-55-SH

TYPE 10UP21 CATHODE-RAY TUBE

The Type 10UP- is a 10-inch electrostatic focus and magnetic deflection cathode-ray tube. It is similar to the Type 10KP- but with an electrostatic focus lens system and considerably improved resolution. It is designed for specific applications where high resolution is the prime requirement. The focus lens is designed to operate at or near cathode potential to afford substantially automatic focus, independent of accelerator voltage variations. A gray filter face plate is used in conjunction with a metal-backed screen for improved contrast and brightness.

GENERAL CHARACTERISTICS

Electrical Data

Heater Voltage	6.3	Volts
Heater Current	0.6 ± 10%	Ampere
Focusing Method	Electrostatic	
Deflecting Method	Magnetic	
Deflecting Angle (Approx.)	50	Degrees
Phosphor	No. 21	
Fluorescence	Orange	
Phosphorescence	Orange	
Persistence	Long	
Direct Interelectrode Capacitances, Approx.		
Cathode to all other electrodes	5	uuf.
Grid No. 1 to all other electrodes	6.5	uuf.

Mechanical Data

Overall Length	17 5/8 ± 3/8	Inches
Greatest Diameter of Bulb	10 1/2 ± 1/8	Inches
Minimum Useful Screen Diameter	9	Inches
Bulb Contact (Recessed small cavity cap)	J1-21	
Base (Small shell duodecal 6-Pin)	B6-63	
Basing	12M	
Bulb Contact Alignment		
J1-21 contact aligns with vacant pin position No.3	±10	Degrees

MAXIMUM RATINGS Design Center Values

Accelerator Voltage	12,000	Max. Volts D-C
Focusing Electrode Voltage	-500 to +1000	Max. Volts D-C
Grid No. 2 Voltage	700	Max. Volts D-C
Grid No. 1 Voltage		
Negative Bias Value	180	Max. Volts D-C
Positive Bias Value[1]	0	Max. Volts D-C
Positive Peak Value	2	Max. Volts
Peak Heater-Cathode Voltage		
Heater Negative with respect to cathode	180	Max. Volts D-C
Heater Positive with respect to cathode	180	Max. Volts D-C

TYPICAL OPERATING CONDITIONS

Accelerator Voltage[2]	10,000	Volts D-C
Focusing Electrode Voltage[3]	0 to +200	Volts D-C
Focusing Electrode Current	-15 to + 25	ua. D-C
Grid No. 2 Voltage	300	Volts D-C
Grid No. 1 Voltage[4]	-28 to -72	Volts D-C
Line Width A[5]	.013	Inch Max.
Spot Position (Undeflected)[6]	1/2	Inch

MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance	1.5	Max. Megohms

NOTES

1. At or near this rating, the effective resistance of the accelerator supply should be adequate to limit the accelerator input power to 6 watts.

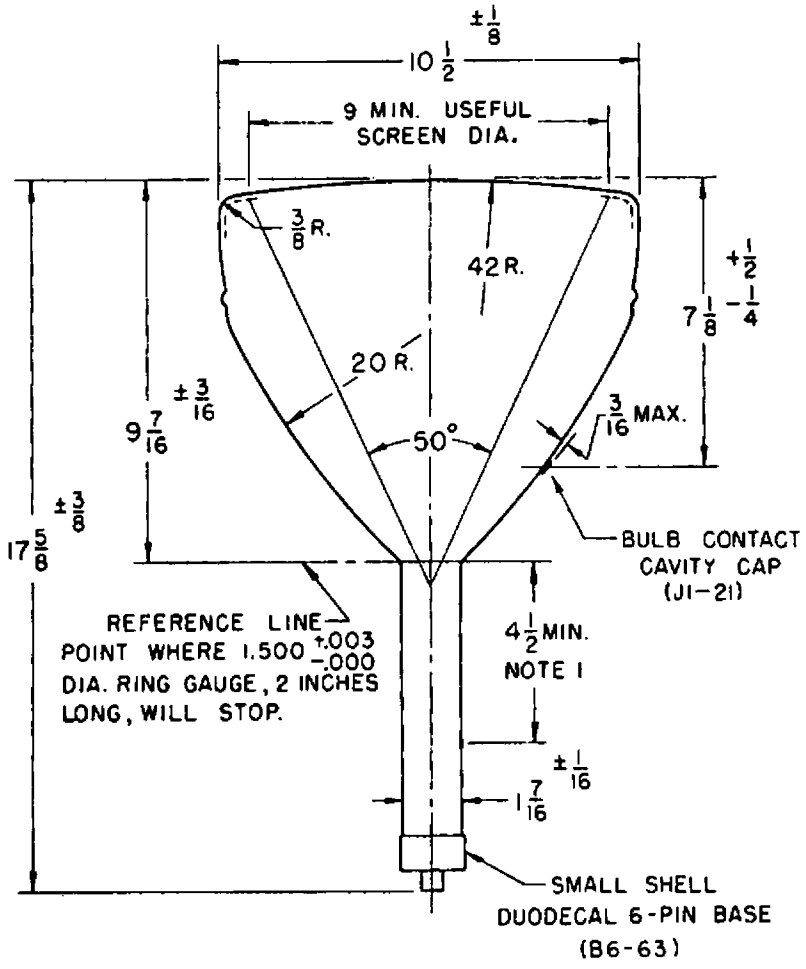
2. Brilliance and definition decrease with decreasing accelerator voltage. In general, accelerator voltage should not be less than 7,000 volts.

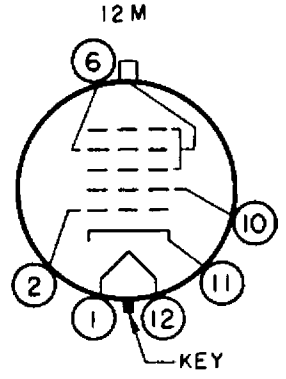
3. With Grid No. 1 voltage adjusted to produce an accelerator current of 50 ua., with the pattern adjusted for best overall focus. Measured with a 525-line interlaced and synchronized 6x8-inch pattern with interlaced line blanking.

4. Visual extinction of focused, 6x8-inch pattern.

5. Measured with a 525-line interlaced and synchronized pattern with interlaced line blanking. Pattern width adjusted to 90% of minimum useful screen diameter. Ib = 25 ua., measured with interlaced line blanking. Line width is the merged raster width divided by the number of lines (262.5).

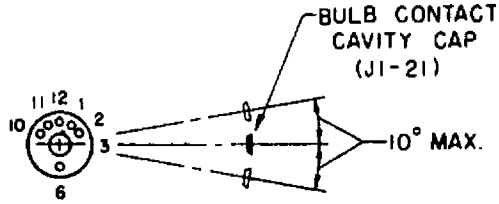
6. The center of the undeflected, focused spot will fall within a circle of 1/2-inch radius concentric with the center of the tube face.





BOTTOM VIEW OF BASE

PIN NO.	ELEMENT
1	HEATER
2	GRID NO.1
6	FOCUSING ELECTRODE
10	GRID NO.2
11	CATHODE
12	HEATER
CAP	ACCELERATOR



BOTTOM VIEW OF TUBE

NOTE 1 - NECK O.D. TO BE $1\frac{7}{16}\ ^{+\frac{1}{32}}_{-\frac{1}{16}}$ WITHIN THIS SPACE.

DUMONT

TYPE 10WP- CATHODE-RAY TUBES

The Type 10WP- is a 10-inch electrostatic focus and magnetic deflection cathode-ray tube suitable for radar applications. A low-voltage electrostatic focus lens is employed, designed to operate at or near cathode potential to afford substantially automatic focus, independent of accelerator voltage variations. In addition, the 10WP- employs a high resolution electron gun.

The Type 10WP-A utilizes an aluminized screen for greater light output and to minimize screen charging effects; it is otherwise identical to the 10WP. If a P19 screen is selected, the aluminized version should be used.



GENERAL CHARACTERISTICS

Electrical

Heater Voltage	6.3 Volts		
Heater Current	0.6 ±10% Ampere		
Focusing Method	Electrostatic		
Deflecting Method	Magnetic		
Deflecting Angle (Approx.)	50 Degrees		
Phosphor	No. 7	No. 14	No. 19
Fluorescence	Blue	Blue	Orange
Phosphorescence	Yellow	Orange	Orange
Persistence	Long	Medium-long	Long

Direct Interelectrode Capacitances, Approx.

Cathode to all other electrodes	5 $\mu\mu$f.
Grid No. 1 to all other electrodes	6 $\mu\mu$f.

Mechanical

Overall Length	16-15/16 ±3/8 Inches
Greatest Diameter of Bulb	10½ ±⅛ Inches
Minimum Useful Screen Diameter	9 Inches
Bulb Contact (Recessed Small Cavity Cap)	J1-21
Base (Small Shell Duodecal 6-pin)	B6-63
Basing	12M

Bulb Contact Alignment

J1-21 Contact aligns with vacant pin position No. 3	±10 Degrees

MAXIMUM RATINGS—(Design Center Values)

Accelerator Voltage	12,000 Max. Volts D-C
Focusing Electrode Voltage	—500 to +1000 Max. Volts D-C
Grid No. 2 Voltage	700 Max. Volts D-C

Grid No. 1 Voltage

Negative Bias Value	180 Max. Volts D-C
Positive Bias Value[1]	0 Max. Volts D-C
Positive Peak Value	0 Max. Volts

Peak Heater-Cathode Voltage

Heater Negative with respect to cathode	180 Max. Volts D-C
Heater Positive with respect to cathode	180 Max. Volts D-C

TYPICAL OPERATING CONDITIONS

Accelerator Voltage[2]	10,000 Volts D-C
Focusing Electrode Voltage[3]	0 to 300 Volts D-C
Focusing Electrode Current	—15 to +15 μA. D-C
Grid No. 2 Voltage	300 Volts D-C
Grid No. 1 Voltage[4]	—28 to —72 Volts D-C
Line Width A[5]	.017 Inch Max.
Spot Position (Undeflected)[6]	½ Inch
Alignment Magnet Field Strength	0-4 Gausses

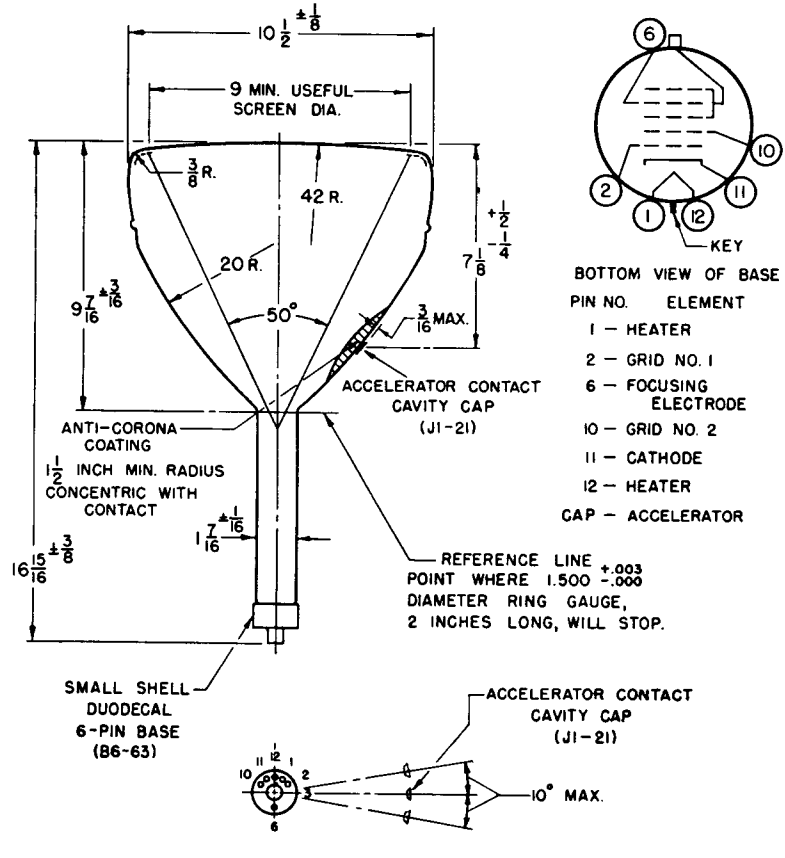
MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance	1.5 Max. Megohms

NOTES

1. At or near this rating, the effective resistance of the accelerator supply should be adequate to limit the accelerator input power to 6 watts. The screen of the 10WP19 can be permanently damaged should the current density be permitted to rise too high. To prevent burning, minimum beam current densities should be employed.
2. Brilliance and definition decrease with decreasing accelerator voltage. In general, accelerator voltage should not be less than 7,000 volts.
3. With Grid No. 1 voltage adjusted to produce an accelerator current of 100 μA. with the pattern adjusted for best overall focus. Measured with a 525-line interlaced and synchronized 6 x 8-inch pattern, with interlaced line blanking (current measured before applying blanking).
4. Visual extinction of focused 6 x 8-inch raster pattern.
5. Measured with a 525-line interlaced and synchronized pattern with interlaced line blanking. Pattern width adjusted to 90% of minimum useful screen diameter. Ib =100 μA., measured before applying blanking. Line width is the merged raster height divided by the number of lines (262.5) (measured in center of tube face). To avoid damage to the screen of the 10WP19, it is recommended that the screen current be not more than 50 μA. when measuring line width. The line width under this condition will be .016 inch maximum (current measured before applying blanking).
6. The center of the undeflected, focused spot will fall within a circle of ½-inch radius concentric with the center of the tube face, with tube shielded.
7. For optimum quality of the focused spot the use of a beam alignment magnet is recommended. This may be obtained by the use of an adjustable magnet of the specified strength, located approximately 5-7/16 inches from the reference line.

TYPE 10WP- 12 M



NOTE:
1-DO NOT HANDLE TUBE BY THE PART OF THE BULB HAVING THE ANTI-CORONA COATING.

TYPE 12ABP-, 12ABP-A CATHODE-RAY TUBES

The Type 12ABP- is a 12-inch electrostatic focus and magnetic deflection cathode-ray tube suitable for radar applications. A low-voltage electrostatic focus lens is employed, designed to operate at or near cathode potential to afford substantially automatic focus, independent of accelerator voltage variations. In addition, the 12ABP- employs a high resolution electron gun. The face plate is of gray filter glass.

The Type 12ABP-A utilizes an aluminized screen for greater light output and to minimize screen charging effects; it is otherwise identical to the 12ABP-.



GENERAL CHARACTERISTICS

Electrical Data

Heater Voltage			6.3 Volts
Heater Current			0.6 ± 10% Ampere
Focusing Method			Electrostatic
Deflecting Method			Magnetic
Deflecting Angle (Approx.)			55 Degrees
Phosphor	No. 7	No. 14	No. 19
Fluorescence	Blue	Blue	Orange
Phosphorescence	Yellow	Orange	Orange
Persistence	Long	Medium-long	Long
Direct Interelectrode Capacitances, Approx.			
Cathode to all other electrodes			5 μμf.
Grid No. 1 to all other electrodes			6 μμf.

Mechanical Data

Overall Length	18 ± 3/8 Inches
Greatest Diameter of Bulb	12-7/16 ± 1/8 Inches
Minimum Useful Screen Diameter	11 Inches
Bulb Contact (Recessed small cavity cap)	J1-21
Base (Small shell duodecal 6-Pin)	B6-63
Basing	12M
Bulb Contact Alignment	
J1-21 contact aligns with vacant pin position No. 3	± 10 Degrees

MAXIMUM RATINGS (Design Center Values)

Accelerator Voltage	12,000 Max. Volts D-C
Focusing Electrode Voltage	—500 to +1000 Max. Volts D-C
Grid No. 2 Voltage	700 Max. Volts D-C
Grid No. 1 Voltage	
Negative Bias Value	180 Max. Volts D-C
Positive Bias Value[1]	0 Max. Volts D-C
Positive Peak Value	0 Max. Volts
Peak Heater-Cathode Voltage	
Heater negative with respect to cathode	180 Max. Volts D-C
Heater positive with respect to cathode	180 Max. Volts D-C

TYPICAL OPERATING CONDITIONS

Accelerator Voltage[2]	10,000 Volts D-C
Focusing Electrode Voltage[3]	0 to 300 Volts D-C
Focusing Electrode Current	—15 to +15 μa. D-C
Grid No. 2 Voltage	300 Volts D-C
Grid No. 1 Voltage[4]	—28 to —72 Volts D-C
Line Width A[5]	.019 Inch
Spot Position (Undeflected)[6]	5/8 Inch
Alignment Magnet Field Strength[7]	0 to 4 Gausses

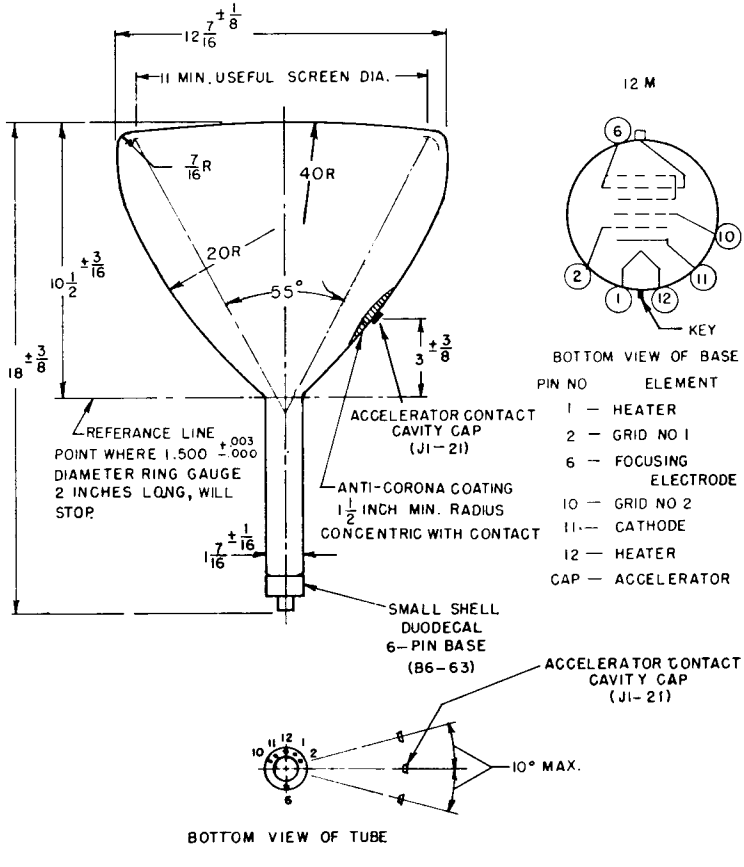
MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance	1.5 Max. Megohms

NOTES

1. At or near this rating, the effective resistance of the accelerator supply should be adequate to limit the accelerator input power to 6 watts. The screen of the 12ABP19 can be permanently damaged should the current density be permitted to rise too high. To prevent burning, minimum beam current densities should be employed.
2. Brilliance and definition decrease with decreasing accelerator voltage. In general, accelerator voltage should not be less than 8,000 volts.
3. With Grid No. 1 voltage adjusted to produce an accelerator current of 100 μA. with the pattern adjusted for best overall focus. Measured with a 525-line interlaced and synchronized 7½ x 10-inch pattern, with interlaced line blanking (current measured before applying blanking).
4. Visual extinction of focused 7½ x 10-inch raster pattern.
5. Measured with a 525-line interlaced and synchronized pattern with interlaced line blanking. Pattern width adjusted to 90% of minimum useful screen diameter. Ib = 100 μA., measured before applying blanking. Line width is the merged raster height divided by the number of lines (262.5). (Measured in center of tube face.)
   To avoid damage to the screen of the 12ABP19, it is recommended that the screen current be not more than 50 μA. when measuring line width. The line width under this condition will be .018 inch maximum (current measured before applying blanking).
6. The center of the undeflected, focused spot will fall within a circle of ⅝-inch radius concentric with the center of the tube face, with the tube shielded.
7. For optimum quality of the focused spot, the use of a beam alignment magnet is recommended. This may be obtained by the use of an adjustable magnet of the specified strength, located approximately 5-7/16 inches from the reference line.

TYPE 12ABP-



NOTE.
1- DO NOT HANDLE TUBE BY THE PART OF THE BULB HAVING THE ANTI-CORONA COATING.

from JETEC release
#2139, March 24, 1958

DUMONT

CATHODE-RAY TUBE

TYPE 12ACP-

TENTATIVE

The Du Mont Type 12ACP- is a 12 1/2-inch diameter, dual beam, electrostatic focus and deflection cathode-ray tube, having a special deflection structure to minimize spot defocusing with deflection and to increase tracking accuracy.

An aluminized screen is used for greater light output and for stabilization of screen potential.

GENERAL CHARACTERISTICS [1]

Electrical Data

Focusing Method	Electrostatic	
Deflecting Method	Electrostatic	
Direct Interelectrode Capacitances, Approx.		
Cathode to all other electrodes	4.7	µµf
Grid #1 to all other electrodes	4.0	µµf
D1 to D2	2.4	µµf
D3 to D4	1.4	µµf
D1 to all other electrodes	2.4	µµf
D2 to all other electrodes	2.4	µµf
D3 to all other electrodes	1.5	µµf
D4 to all other electrodes	1.5	µµf

Optical Data

Phosphor Number	2	7	14	19	25
Fluorescent Color	Green	Blue	Purple	Orange	Orange
Phosphorescent Color	Green	Yellow	Orange	Orange	Orange
Persistence	Long	Long	Med.- Long	Very Long	Very Long

Faceplate	Clear	

Mechanical Data

Overall Length	24 7/8 ± 3/8	Inches
Greatest Diameter of Bulb	12 7/16 ± 1/16	Inches
Minimum Useful Screen Diameter	11	Inches
Bulb Contact	J1-22	
Neck Contacts	J1-25	
Base	B12-37	
Basing	Special	

DUMONT

CATHODE-RAY TUBE

TYPE 12ACP-

TENTATIVE

GENERAL CHARACTERISTICS (Mechanical Data) Cont'd

Bulb Contact Alignment:		
J1-22 contact aligns with trace of D1D2	± 10	Degrees
J1-22 contact on same side as Pin #4		
Base Alignment:		
D1D2 trace aligns with Pin #4 and tube axis	± 10	Degrees
Positive voltage on D1 deflects beam approximately toward Pin #4		
Positive voltage on D3 deflects beam approximately toward Pin #1		
Angle between D3D4 and D1D2 traces	90 ± 1	Degrees

RATINGS (Design Center Values) [1]

Heater Voltage	6.3	Volts
Heater Current at 6.3 Volts	0.6 ± 10%	Ampere
Accelerator Voltage [2]	10,000	Max. Volts DC
Focusing Electrode Voltage	4,000	Max. Volts DC
Grid #1 Voltage		
Negative Bias Value	300	Max. Volts DC
Positive Bias Value	0	Max. Volts DC
Positive Peak Value	0	Max. Volts
Peak Heater-Cathode Voltage		
Heater negative with respect to cathode	180	Max. Volts
Heater positive with respect to cathode	180	Max. Volts
Peak Voltage between Accelerator and any Deflection Electrode	2,500	Max. Volts

TYPICAL OPERATING CONDITIONS [1]

Accelerator Voltage [2]	7,500	Volts
Focusing Electrode Voltage	1,750 to 2,500	Volts
Grid #1 Voltage [3]	-150 to -225	Volts
Deflection Factors:		
D1 and D2	140 to 190	Volts DC per Inch
D3 and D4	130 to 180	Volts DC per Inch
Line Width "A" [4]	.015	Inch Max.
Tracking Accuracy [5]	0.15	Inch

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

FORM 609-1-CB-2-57-8M

DUMONT

CATHODE-RAY TUBE

TYPE 12ACP-

TENTATIVE

TYPICAL OPERATING CONDITIONS (Cont'd)

Interaction [6]		
Deflection Defocusing [7]		
Spot Position [8]	Within a 5/8"	Radius Circle

MAXIMUM CIRCUIT VALUES

Grid #1 Circuit Resistance	1.5	Max. Megohms
Resistance in any Deflecting-Electrode Circuit [9]	5.0	Max. Megohms

NOTES

1. The values shown are for each unit unless otherwise stated.

2. All accelerator terminals must be externally connected.

3. The visual extinction of the focused, undeflected spot.

4. For a beam current of 2 μADC, measured in accordance with MIL-E-1 specifications. (Beam current is measured by applying 1000 volts to either D1 or D2. Adjust the Grid #1 bias voltage to where either D1 or D2 will collect 2 μa.)

5. The registry between the two guns is such that the distance between the two spots never exceeds 0.15 inch at any place within a circle 11 inches in diameter. To achieve this end result, compromise adjustments may be made in the electrical "zero centering" of the spots (that is: the two spots need not be placed in coincidence at the geometric center of the tube but may be offset electrically in any direction by an amount not to exceed 0.15 inch) and in the electrical deflection-voltage ratios used for deflecting the spots.

6. The interaction between the two deflection systems has been held to a minimum. When testing for interaction, the tube should be mounted so that the deflection plates closest to the screen produce vertical traces. The electron beam from the righthand gun "A" (face view) should be positioned horizontally to a point 5 inches to the left of the geometric center of the tube by means of a DC voltage. Now, when the electron beam from the lefthand gun "B" is deflected vertically, a total distance of 10 inches by a 60-cycle AC sinewave voltage, the resulting peak to peak vertical excursion of beam "A" caused by the vertical deflection of beam "B" should be less than .05 inch. Also, when beam "B" is positioned 5 inches to the right of the center of the tube and beam "A" is swept vertically by a 60-cycle AC sinewave voltage, the peak to peak excursion

DUMONT

CATHODE-RAY TUBE

TYPE 12ACP-

TENTATIVE

NOTES (Cont'd)

of beam "B" should be less than .05 inch. The unused plates should be tied to the accelerator.

7. Defocusing of the spot resulting from all causes is a minimum within an area 11 inches in diameter. Specifically, the degradation in spot size anywhere within a circle 11 inches in diameter compared to the spot size at compromise focus will not exceed 1.5 to 1.

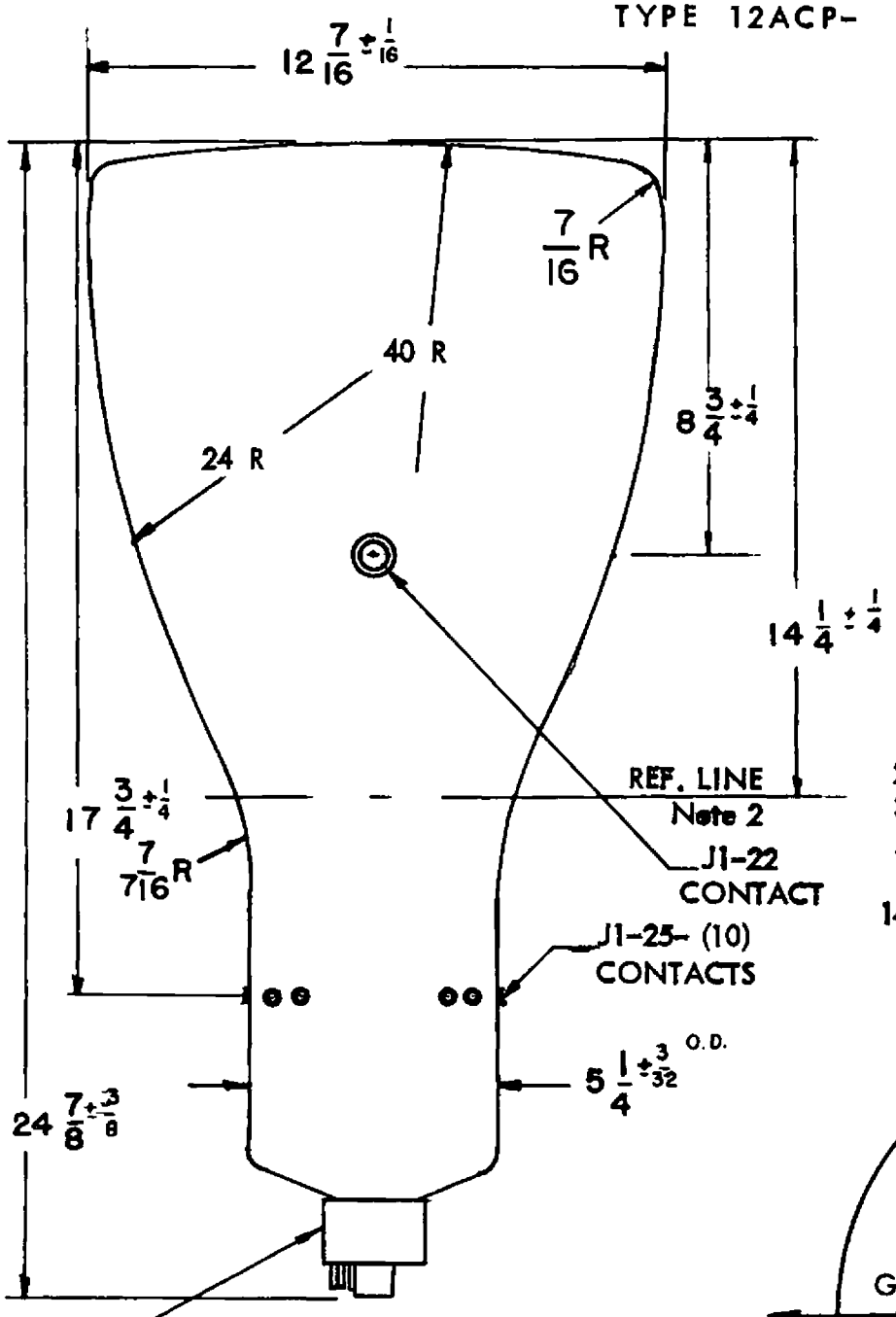
8. When the tube is operated at typical operating conditions, with Ec1 adjusted to avoid damage to the screen, with each of the deflecting electrodes connected to the accelerator, and with the tube shielded against external influences, the spot will fall within a 5/8-inch radius circle, centered on the tube face.

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

FORM 809.1-CB-2-57-SH

DU MONT

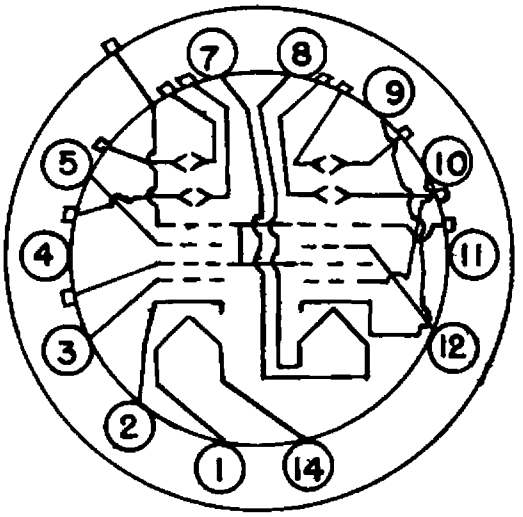
CATHODE-RAY TUBE
TYPE 12ACP-



MEDIUM SHELL 12 PIN
DIHEPTAL BASE (B12-37)

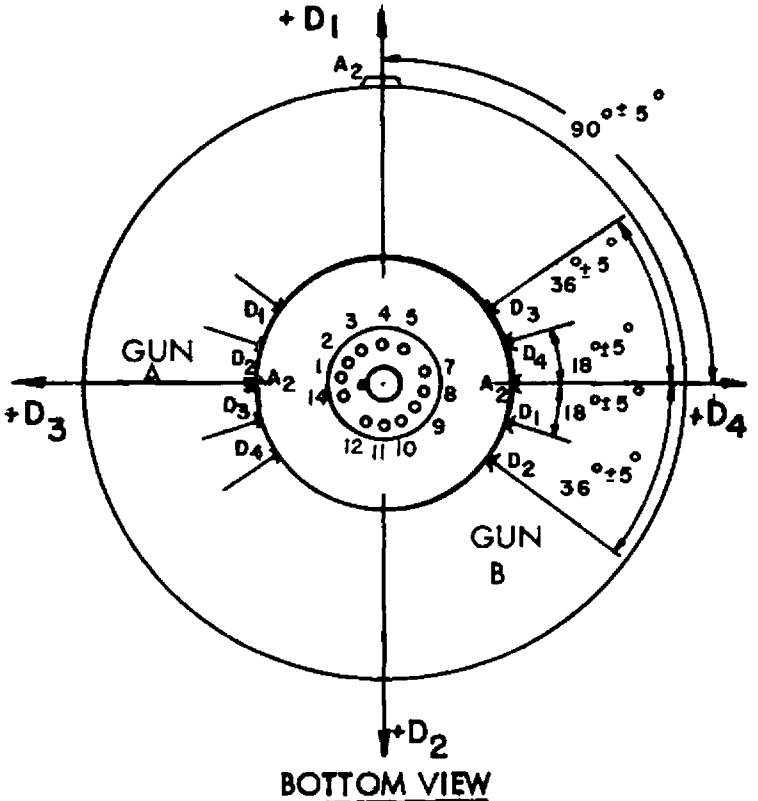
Note: (1) Base Pin #4 Aligns with J1-22 Contact.

(2) Reference Line is that Point where a 5.750 ± .003 Inch Diameter Ring Gauge will stop.



BASING DIAGRAM

GUN A	GUN B
1. HEATER	7. HEATER
2. CATHODE	8. HEATER
3. GRID NO.1	9. CATHODE
5. FOCUSING ELECTRODE	10. GRID NO. 1
14. HEATER	12. FOCUSING ELECTRODE



BOTTOM VIEW

Allen B. Du Mont Laboratories, Inc.
Passaic, New Jersey

TD 5549 A - 2

FORM 6087 M1 10-54-5M

DUMONT

CATHODE-RAY TUBE

TYPE 12AMP-

The Du Mont Type 12AMP- is a 12 7/16-inch diameter, single beam, fast writing rate, electrostatic focus and deflection cathode-ray tube, suitable for high speed radar displays. A unique, advanced design, low-drive electron gun permits the use of transistorized video circuitry with electrostatic deflection. The use of post acceleration allows maximum deflection sensitivity with high overall accelerating voltages. A special deflection structure is incorporated so that minimum spot defocusing is obtained with deflection. The deflection plate connections are made through the neck of the tube to facilitate high frequency operation.

The screen is aluminized for greater light output and to minimize screen charging effects.

GENERAL CHARACTERISTICS

Electrical Data

Focusing Method	Electrostatic	
Deflecting Method	Electrostatic	
Direct Interelectrode Capacitances, Approximate		
Cathode to all other electrodes	3.7	μμf
Grid No. 1 to all other electrodes	9.8	μμf
Modulation Adjustment Electrode to all other electrodes	8.8	μμf
D1 to D2	3.8	μμf
D3 to D4	1.6	μμf
D1 to all other electrodes	8.6	μμf
D2 to all other electrodes	8.6	μμf
D3 to all other electrodes	3.7	μμf
D4 to all other electrodes	3.9	μμf

Optical Data

Phosphor Number	2	7	11	14	19	25
Fluorescent Color	Blue-Green	Blue-White	Blue	Blue	Orange	Orange
Phosphorescent Color	Green	Yellow	----	Orange	Orange	Orange
Persistence	Long	Long	Short	Long	Very Long (Note 1)	Very Long

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

FORM 809 8C-7-59-8H

from JEDEC release #2852, June 20, 1960

DUMONT

CATHODE-RAY TUBE

TYPE 12AMP-

GENERAL CHARACTERISTICS (Continued)

Mechanical Data

Overall Length	23 5/16 ± 3/16	Inches
Greatest Diameter of Bulb	12 7/16 ± 1/16	Inches
Minimum Useful Screen Diameter	11.0	Inches
Bulb Contact	J1-22	
Neck Contacts	J1-25	
Base	B6-63	
Basing	12BH	
Base Alignment:		
D1D2 trace aligns with Pin No. 1 and tube axis	± 10	Degrees
Positive voltage on D1 deflects beam approximately toward Base Pin No. 1		
Positive voltage on D3 deflects beam approximately toward Base Pin No. 10		
Bulb Contact Alignment:		
J1-22 Cap aligns with Pin Position No. 1	± 10	Degrees
J1-22 Cap aligns with D1D2 trace	± 10	Degrees
J1-22 Cap on same side as Pin No. 1		
Trace Alignment:		
Angle between D3D4 and D1D2 traces	90 ± 1	Degrees

RATINGS (Design Maximum Values)

Heater Voltage	6.3	Volts
Heater Current at 6.3 Volts	0.6 ± 10%	Ampere
Post Accelerator Voltage	15,000	Max. Volts DC
Accelerator Voltage	8500	Max. Volts DC
Accelerator Input	6	Max. Watts
Ratio Post Accelerator Voltage to Accelerator Voltage [2]	1.7	
Astigmatism Electrode Voltage	8500	Max. Volts DC
Focusing Electrode Voltage	3000	Max. Volts DC
Modulation Adjustment Electrode	200	Max. Volts DC
Cathode to Grid No. 1 Voltage		
Positive Bias Value	100	Max. Volts DC
Positive Peak Value	100	Max. Volts
Negative Bias Value	0	Max. Volts DC
Negative Peak Value	0	Max. Volts

DUMONT

CATHODE-RAY TUBE

TYPE 12AMP-

RATINGS (Design Maximum Values) (Continued)

Peak Heater-Cathode Voltage:		
Heater negative with respect to cathode		
During warm-up period not to exceed 15 seconds	410	Max. Volts
After equipment warm-up period	180	Max. Volts
Heater positive with respect to cathode	180	Max. Volts
Peak Voltage between Accelerator and any Deflection Electrode	1500	Max. Volts

TYPICAL OPERATING CONDITIONS (Cathode Drive)[3]

Post Accelerator Voltage[2]	9700	Volts DC
Accelerator Voltage[2]	5650	Volts DC
Astigmatism Electrode Voltage[4]	5650	Volts DC
Focusing Electrode Voltage[5]	1550 to 1850	Volts DC
Modulation Adjustment Electrode[6]	40 to 120	Max. Volts DC
Cathode Voltage[6]	11.5	Volts DC
Deflection Factors:		
D1D2	112 to 125	Volts DC/Inch
D3D4	112 to 125	Volts DC/Inch
Modulation[7]	11.5	Volts DC (Max.)
Line Width "A"[8]	.020	Max. Inch
Focusing Electrode Current (for any operating condition)	-5 to +5	μA
Spot Position (Focused and Undeflected)[9]	Within a 3/4-Inch Square	

MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance	1.5	Max. Megohms
Resistance in any Deflecting-Electrode Circuit[10]	5.0	Max. Megohms

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

FORM 809 5C-7-58-6M

DUMONT

CATHODE-RAY TUBE

TYPE 12AMP-

NOTES

1. To avoid severe and permanent damage to the screen when operating under static conditions, it is recommended that the screen current not exceed 5 μADC.

2. This tube is designed for optimum performance when operating at an Eb3/Eb2 ratio of 1.7. Operation at other ratios of Eb3/Eb2 may result in changes in deflection uniformity and pattern distortion.

3. Voltage values measured with respect to the Grid No. 1.

4. The astigmatism electrode should be adjusted for optimum spot shape.

5. Measured in accordance with MIL-E-1 specifications. Dynamic defocusing may be used to improve overall focus.

6. The modulation adjustment electrode is adjusted for a cathode voltage of +11.5 volts for the visual extinction of the undeflected, focused spot.

7. For an Ib3 of 55 μADC.

8. For an Ib3 of 5 μADC. Line width remains essentially constant for a wide range of current.

9. With the deflecting electrodes connected to the accelerator and with the tube shielded against external influences, the focused and undeflected spot will fall within a 3/4-inch square centered with respect to the tube face center and the sides of which are parallel to the traces produced by the deflection plate pairs.

10. It is recommended that the deflecting-electrode circuit resistances be approximately equal.

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

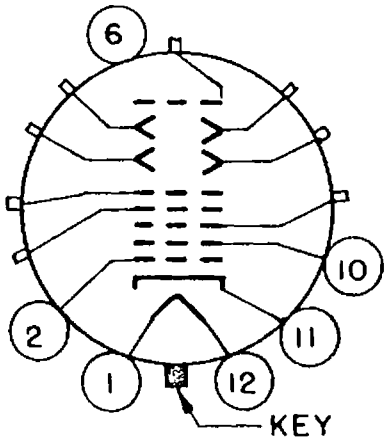
FORM 608 8C-7-58-8M

DUMONT

CATHODE-RAY TUBE

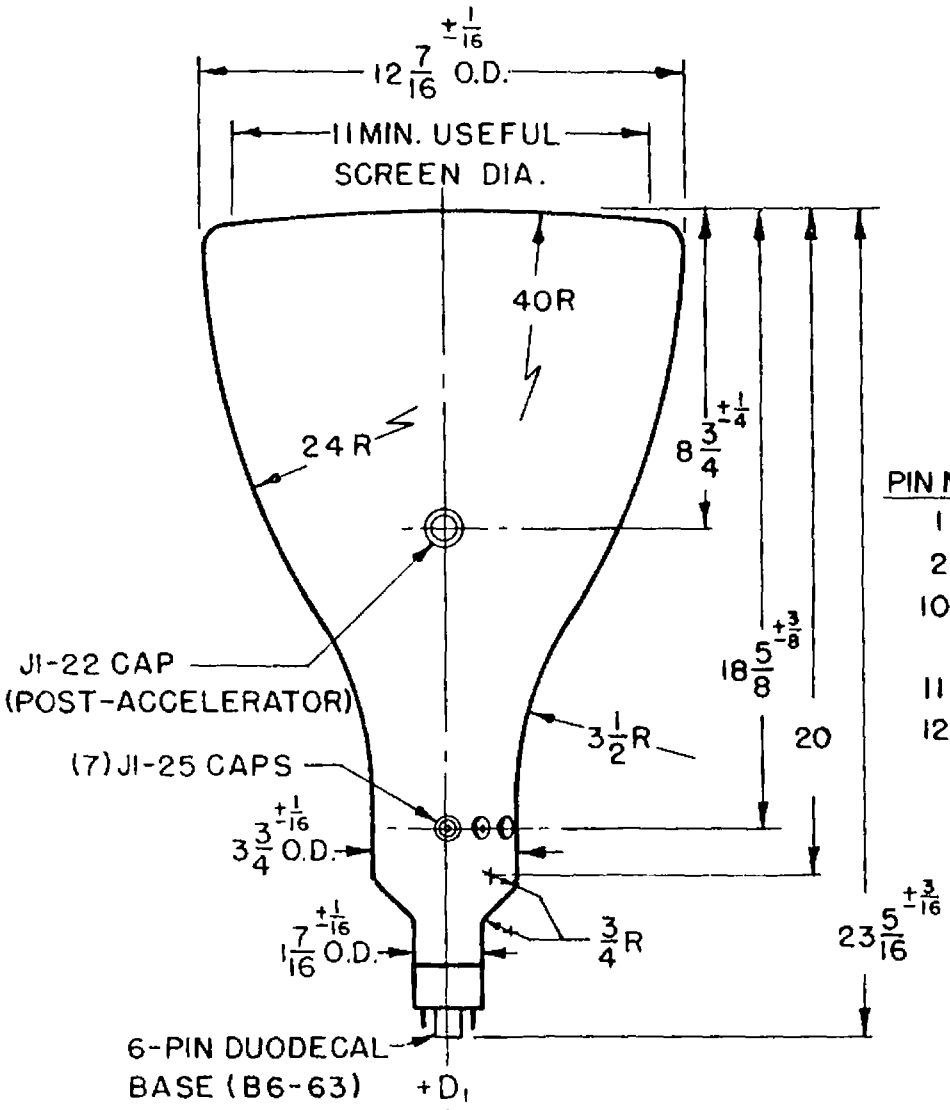
12 AMP-

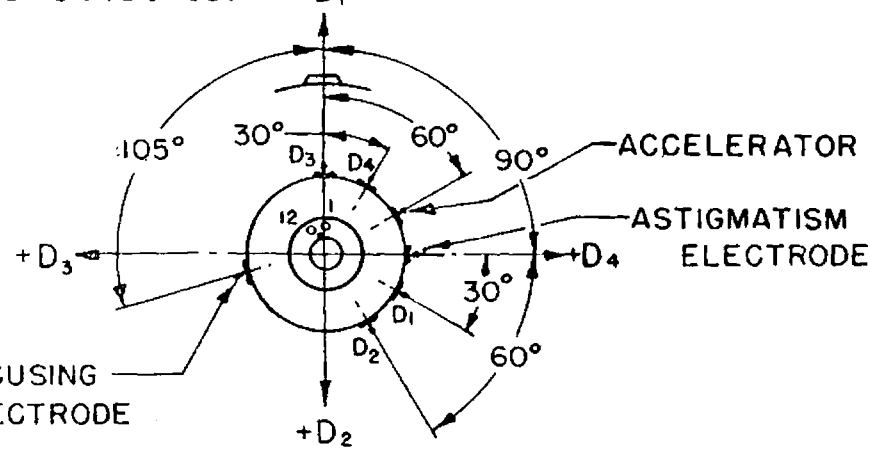
12BH



BOTTOM VIEW

PIN NO.	ELEMENT
1	HEATER
2	GRID NO. 1
10	MODULATION ADJUSTMENT ELECTRODE
11	CATHODE
12	HEATER





BOTTOM VIEW

NOTE:
1. ALL ANGLES ± 5°

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

DE-5845-4
5-27-60
FORM 809-C6-4-55-BH

DU MONT

CATHODE-RAY TUBE

TYPE 12AQP-

The Du Mont Type 12AQP- is a 12 7/16-inch diameter, single beam, fast writing rate, electrostatic focus and deflection cathode-ray tube, suitable for high speed radar display. This tube features a specially-designed, low-drive electron gun permitting the use of transistorized video circuitry. The use of post acceleration allows maximum deflection sensitivity with high overall accelerating voltages. A special deflection structure is incorporated so that minimum spot defocusing is obtained with deflection.

The screen is aluminized for greater light output and to minimize screen charging effects.

GENERAL CHARACTERISTICS

Electrical Data

Focusing Method	Electrostatic	
Deflecting Method	Electrostatic	
Direct Interelectrode Capacitances, Approximate		
Cathode to all	4.5	μμf
Grid No. 1 to all	13.0	μμf
D1 to D2	4.6	μμf
D3 to D4	2.2	μμf
D1 to all other electrodes	14.0	μμf
D2 to all other electrodes	14.0	μμf
D3 to all other electrodes	6.4	μμf
D4 to all other electrodes	6.0	μμf
Modulation Electrode to all other electrodes	9.1	μμf

Optical Data

Phosphor Number	2	7	11	14	19	25
Fluorescent Color	Green	Blue	Blue	Blue	Orange	Orange
Phosphorescent Color	Green	Yellow	----	Orange	Orange	Orange
Persistence	Long	Long	Short	Long	Very Long (Note 1)	Very Long

Faceplate: Clear

DE-6055 - 2
10/7/60

Allen B. Du Mont Laboratories, ~~Inc~~
Divisions of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

FORM 808 6C-7-59-8H

from JEDEC release #3024, Nov. 14, 1960

DUMONT

CATHODE-RAY TUBE

TYPE 12AQP-

GENERAL CHARACTERISTICS (Continued)

Mechanical Data

Overall Length	25 5/8 ± 3/8	Inches
Greatest Diameter of Bulb	12 7/16 ± 1/8	Inches
Minimum Useful Screen Diameter	11.0	Inches
Bulb Contact	J1-22	
Base	B14-38	
Basing	Special	
Base Alignment:		
D1D2 trace aligns with Pin No. 1 and tube axis	± 10	Degrees
Positive voltage on D1 deflects beam approximately toward Base Pin No. 1		
Positive voltage on D3 deflects beam approximately toward Base Pin No. 11		
Bulb Contact Alignment:		
J1-22 Cap aligns with Pin Position No. 1	± 5	Degrees
J1-22 Cap aligns with D1D2 trace	± 5	Degrees
J1-22 Cap on same side as Pin No. 1		
Trace Alignment:		
Angle between D3D4 and D1D2 traces	90 ± 1	Degrees

RATINGS (Design Center Values)

Heater Voltage	6.3	Volts
Heater Current at 6.3 Volts	0.6 ± 10%	Ampere
Post Accelerator Voltage	16,000	Max. Volts DC
Accelerator Voltage	8,000	Max. Volts DC
Astigmatism Electrode Voltage	8,000	Max. Volts DC
Ratio Post Accelerator Voltage to Accelerator Voltage[2]	2.0	
Focusing Electrode Voltage	3,000	Max. Volts DC
Modulation Adjustment Electrode	300	Max. Volts DC
Accelerator Input	6	Max. Watts
Grid No. 1 Voltage		
Negative Bias Value	300	Max. Volts DC
Positive Bias Value	0	Max. Volts DC
Positive Peak Value	0	Max. Volts

DUMONT

CATHODE-RAY TUBE

TYPE 12AQP-

RATINGS (Design Center Values) (Continued)

Peak Heater-Cathode Voltage		
Heater negative with respect to cathode		
During warm-up period not to exceed 15 seconds	410	Max. Volts
After equipment warm-up period	180	Max. Volts
Heater positive with respect to cathode	180	Max. Volts
Peak Voltage between Accelerator and any Deflection Electrode	1,500	Max. Volts

TYPICAL OPERATING CONDITIONS

Post Accelerator Voltage [2]	10,000	Volts DC
Accelerator Voltage [2]	5,000	Volts DC
Astigmatism Electrode Voltage [3]	5,000	Volts DC
Focusing Electrode Voltage [4]	1,350 to 1,650	Volts DC
Grid No. 1 Voltage [5]	-10	Volts DC
Modulation Adjustment Electrode [6]	30 to 100	Max. Volts DC
Deflection Factors:		
D1D2	95 to 105	Volts DC/Inch
D3D4	81 to 90	Volts DC/Inch
Modulation [7]	10	Max. Volts DC
Line Width "A" [4]	.025	Max. Inch
Deflection Defocusing [8]		
Focusing Electrode Current for any operating condition	-15 to +10	μA
Spot Position [9]	Within a 25-mm Square	

MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance	1.5	Max. Megohms
Resistance in any Deflecting-Electrode Circuit [10]	5.0	Max. Megohms

Allen B. Du Mont Laboratories, Inc.
Division of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

FORM 800 8C-7-58-8M

DUMONT

CATHODE-RAY TUBE

TYPE K2007P-

TENTATIVE

NOTES

1. To avoid severe and permanent damage to the P19 screen when operating under static state conditions, it is recommended that the screen current not exceed 5 μADC.

2. This tube is designed for optimum performance when operating at an Eb3/Eb2 ratio of 2.0. Operation at other ratios of Eb3/Eb2 may result in changes in deflection uniformity and patter distortion.

3. The astigmatism electrode should be adjusted for optimum spot shape. For any necessary adjustment, its potential will fall within -300 to +300 volts with respect to the accelerator voltage.

4. For an Ib3 of 25 μADC, measured in accordance with MIL-E-1 specifications.

5. Visual extinction of undeflected, focused spot.

6. The modulation adjustment electrode is adjusted to obtain a Grid No. 1 voltage of -10 volts for the extinction of the undeflected, focused spot.

7. For an Ib3 of 45 μADC, measured in accordance with MIL-E-1 specifications.

8. The ratio of line width at 25 μA Ib3 at maximum deflection to that at the center of the tube shall not exceed 1.5:1 using focusing and astigmatism correction.

9. With the free deflecting electrodes connected to the accelerator, and the tube shielded against external influences, the focused spot will fall within a 25-mm square centered with respect to the tube face and the square parallel to the traces produced by the deflection plate pairs.

10. It is recommended that the deflecting-electrode circuit resistances be approximately equal.

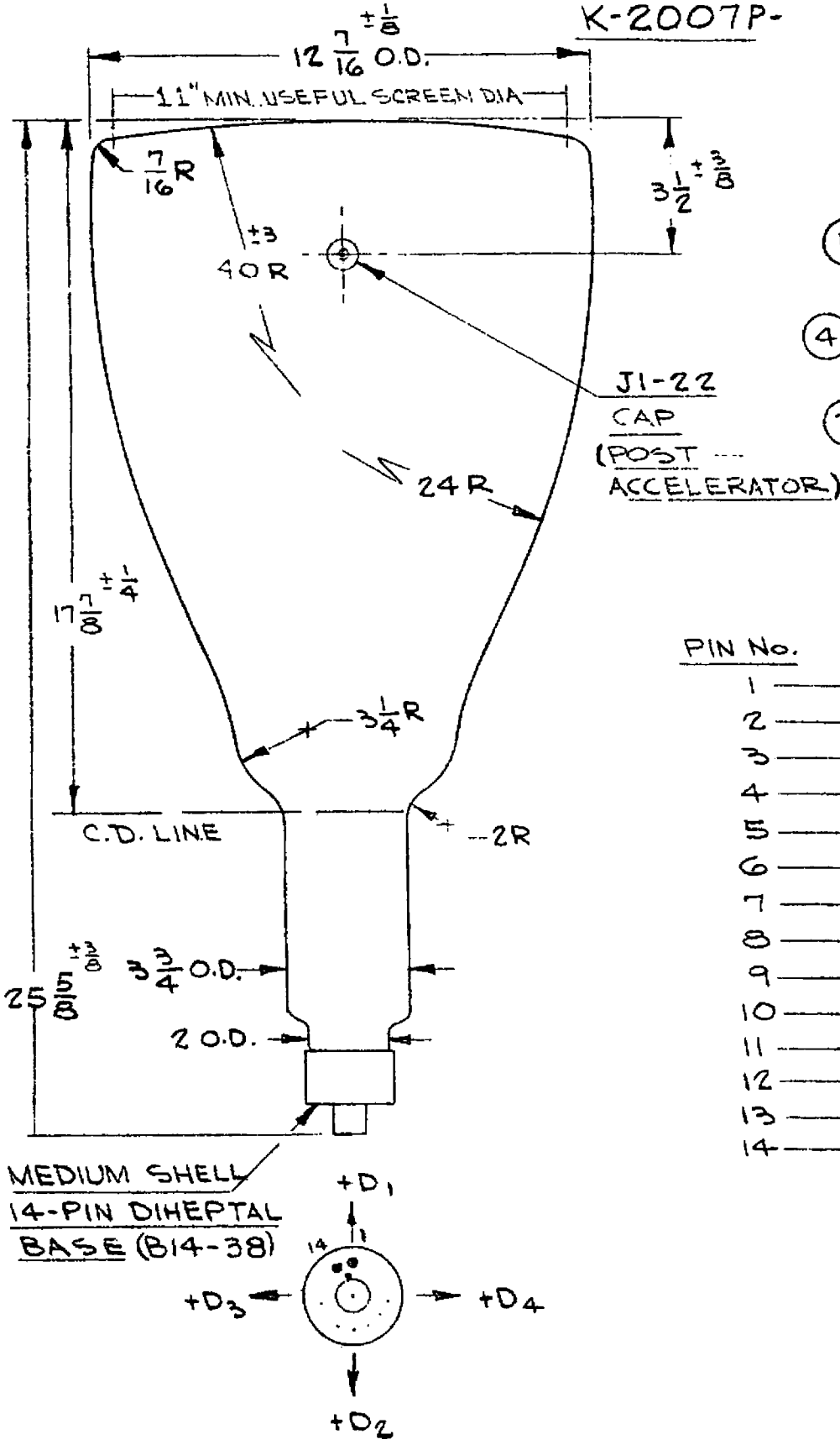
Allen B. Du Mont Laboratories, Inc.
Divisions of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

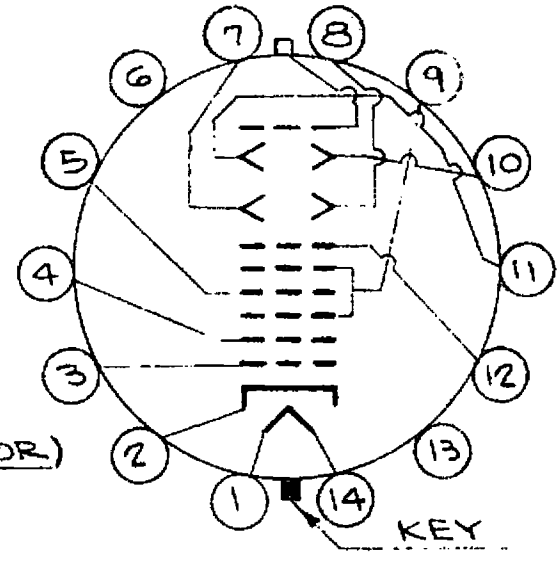
FORM 609 SC 4-60-SH

DUMONT

TENTATIVE

CATHODE-RAY TUBE
K-2007P-





BOTTOM VIEW

PIN No.	ELEMENT
1	HEATER
2	CATHODE
3	GRID NO. 1
4	MODULATION ADJUST. ELECT.
5	FOCUSING ELECTRODE
6	NO CONNECTION
7	DEFLECTING ELECT. D3
8	DEFLECTING ELECT. D4
9	ACCELERATOR
10	DEFLECTING ELECT. D2
11	DEFLECTING ELECT. D1
12	ASTIGMATISM ELECT.
13	NO CONNECTION
14	HEATER

14AX

Allen B. Du Mont Laboratories, Inc. Divisions of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

DE-6055-3
4-18-60
FORM 809-CB-4-58-SH

DUMONT

CATHODE-RAY TUBE

TYPE 12ATP-

The Du Mont Type 12ATP- is a 12 7/16-inch diameter, three beam, electrostatic focus and deflection cathode-ray tube. The use of post acceleration allows maximum deflection sensitivity with high overall accelerating voltages. The deflection plate connections are made through the neck of the tube to facilitate high frequency operation. The screen is aluminized for greater light output and to minimize screen charging effects.

GENERAL CHARACTERISTICS [1]

Electrical Data

Focuring Method	Electrostatic	
Deflection Method	Electrostatic	
Direct Interelectrode Capacitances, Maximum		
Cathode to all other electrodes	7.0	μμf
Grid No. 1 to all other electrodes	7.0	μμf
D1 to D2	5.0	μμf
D3 to D4	5.0	μμf
D1 to all other electrodes	9.9	μμf
D2 to all other electrodes	9.9	μμf
D3 to all other electrodes	8.6	μμf
D4 to all other electrodes	8.6	μμf

Optical Data

Phosphor Number	28	
Fluorescence	Yellow-Green	
Phosphorescence	Yellow-Green	
Persistence	Long	

Mechanical Data

Overall Length	25 5/8 ± 3/8	Inches
Greatest Diameter of Bulb	12 7/16 ± 1/16	Inches
Minimum Useful Screen Diameter	11.0	Inches
Bulb Contact	J1-22	
Neck Contacts	J1-25	
Base	B25-139	
Basing	Special	

Allen B. Du Mont Laboratories
Divisions of Fairchild Camera and Instrument Corp.
Clifton, N. J.

DE-6317
11/17/61

from JEDEC release #3570, Jan. 22, 1962

DUMONT

CATHODE-RAY TUBE

TYPE 12ATP-

GENERAL CHARACTERISTICS (Mechanical Data) (Continued)

Base Alignment:		
D1D2 trace aligns with Base Key	± 10	Degrees
Positive voltage on D1 deflects beam approximately toward Base Key		
Positive voltage on D3 deflects beam approximately toward Base Pin No. 23		
Bulb Contact Alignment:		
J1-22 cap aligns with Base Key	± 10	Degrees
J1-22 cap aligns with D1D2 trace	± 5	Degrees
J1-22 cap on same side as Base Key		
Trace Alignment:		
Angle between D3D4 and D1D2 traces, Guns "A" and "B"	90 ± 1	Degrees
Angle between D3D4 and D1D2 traces, Gun "C"	90 ± 2	Degrees

RATINGS (Absolute Maximum Values)

Heater Voltage	6.3	Volts
Heater Current at 6.3 Volts	1.8 ± 10%	Amperes
Post Accelerator Voltage	15,000	Max. Volts DC
Astigmatism Electrode Voltage	6000	Max. Volts DC
Accelerator Voltage	6000	Max. Volts DC
Accelerator Input	6	Max. Watts
Ratio Post Accelerator Voltage to Accelerator Voltage[2]	2.0	
Focusing Electrode Voltage	2000	Max. Volts DC
Grid No. 1 Voltage		
Negative Bias Value	200	Max. Volts DC
Positive Bias Value	0	Max. Volts DC
Positive Peak Value	0	Max. Volts
Peak Heater-Cathode Voltage		
Heater negative with respect to cathode	180	Max. Volts
Heater positive with respect to cathode	180	Max. Volts
Peak Voltage between Accelerator and any Deflection Electrode	1250	Max. Volts

DUMONT

CATHODE-RAY TUBE

TYPE 12ATP-

TYPICAL OPERATING CONDITIONS

Post Accelerator Voltage [2]	10,000	Volts DC
Astigmatism Electrode Voltage [3]	4900 to 5500	Volts DC
Accelerator Voltage [2]	5000	Volts DC
Focusing Electrode Voltage	1275 to 1725	Volts DC
Grid No. Voltage [4]	-64 to -86	Volts DC
Deflection Factors, Guns "A" and "B"		
D1D2	103 to 127	Volts DC/Inch
D3D4	81 to 99	Volts DC/Inch
Deflection Factors, Gun "C"		
D1D2	103 to 127	Volts DC/Inch
D3D4	67 to 83	Volts DC/Inch
Modulation [5]	30	Volts DC (Max.)
Line Width "A" [3, 5]	.013	Max. Inch
Line Width "B" [3, 5, 9]	.018	Max. Inch
Useful Scan:		
Gun "A"	6.75 x 4.31	Inches
Gun "B"	6.75 x 4.31	Inches
Gun "C"	6.75 x 2.15	Inches
Pattern Distortion [6]		
Focusing Electrode Current (for any operating condition)	-15 to +10	μA
Spot Position (Focused and Undeflected) [7]	Within a 7/16-inch radius circle	

MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance	1.5	Max. Megohms
Resistance in any Deflecting-Electrode Circuit [8]	1.0	Max. Megohms

Allen B. Du Mont Laboratories
Divisions of Fairchild Camera and Instrument Corp.
Clifton, N. J.

DUMONT

CATHODE-RAY TUBE

TYPE 12ATP-

NOTES

1. Values are for each gun unless otherwise specified.

2. This tube is designed for optimum performance when operating at an Eb3/Eb2 ratio of 2.0. Operation at other ratios of Eb3/Eb2 may result in changes in deflection uniformity and pattern distortion.

3. With focus and astigmatism voltages adjusted for the best center line width, line widths "A" and "B" shall be as specified. The specified spot position for each gun shall be used to locate the points for line widths "A" and "B". At no point within the specified scan area of any gun shall the line width exceed 0.030 inch when compromise focus and astigmatism are used.

4. For the visual extinction of the undeflected, focused spot.

5. For an Ib3 of 5 μADC, measured in accordance with MIL-E-1 specifications.

6. For Gun "A": All portions of a raster pattern, adjusted so its widest points just touch the sides of a 6.95 x 4.41-inch rectangle, will fall within the area bounded by the 6.95 x 4.41-inch rectangle and an inscribed 6.55 x 4.21-inch rectangle.

   The horizontal trace of Gun "A", when passing through the tube face center, shall fall entirely within a rectangle of 6.95 x .063 inches, centered about the horizontal trace.

   For Gun "B": All portions of a raster pattern, adjusted so its widest points just touch the sides of a 6.95 x 4.44-inch rectangle, will fall within the area bounded by the 6.95 x 4.44-inch rectangle and an inscribed 6.55 x 4.18-inch rectangle.

   For Gun "C": All portions of a raster pattern, adjusted so its widest points just touch the sides of a 7.15 x 2.27-inch rectangle, will fall within the area bounded by the 7.15 x 2.27-inch rectangle and an inscribed 6.35 x 2.01-inch rectangle.

7. With the deflecting electrodes connected to the accelerator and with the tube shielded against external influences, each focused and undeflected spot will fall within a 7/16-inch radius circle centered about each respective spot position specified on the outline drawing.

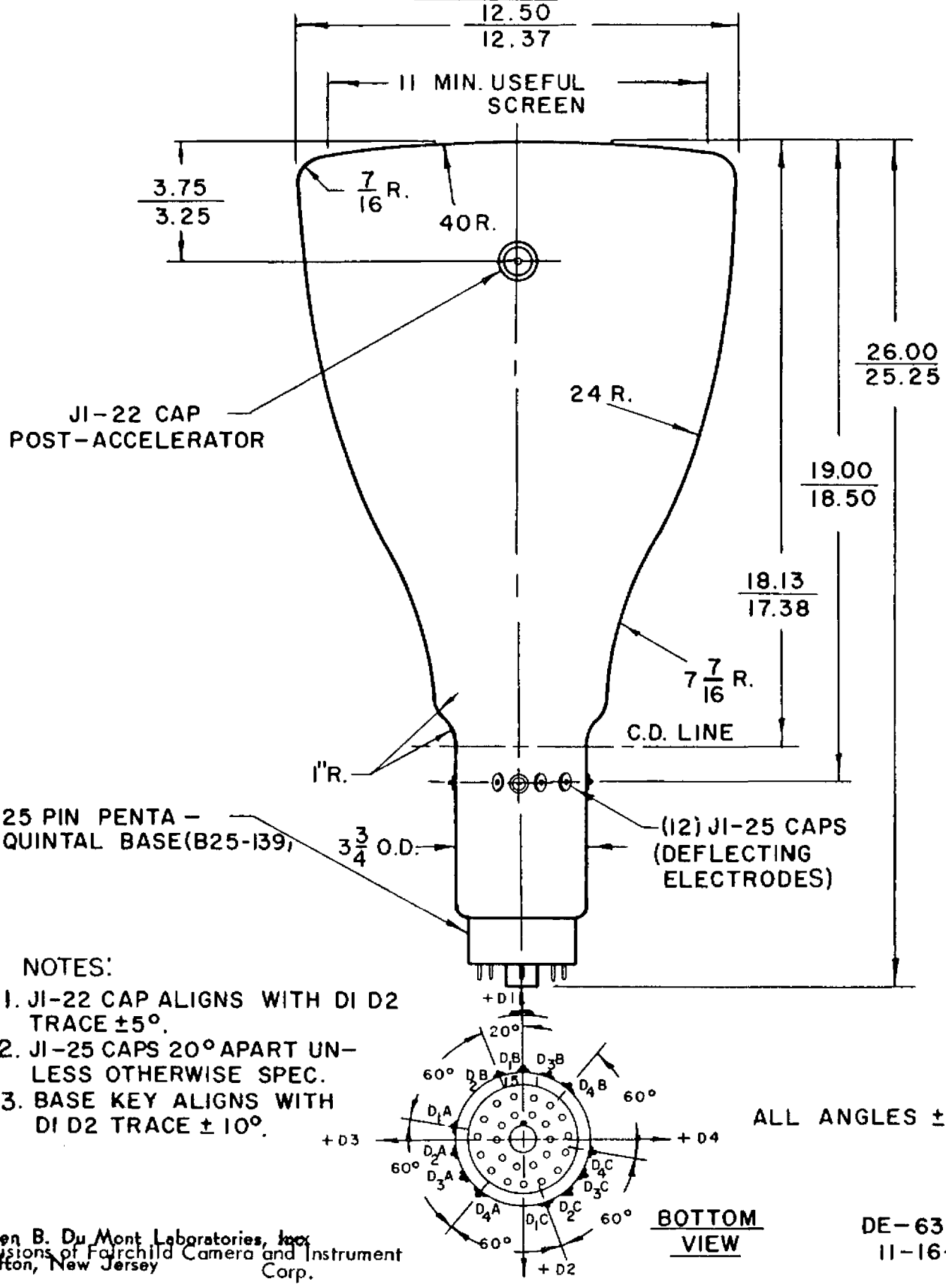
8. It is recommended that the deflecting-electrode circuit resistances be approximately equal. Higher resistance values up to 5 megohms may be used for low beam current operation.

9. Line width "B" shall be measured at 1.6 inches from the undeflected spot positions for guns "A" and "B", and at 0.8 inch for gun "C".

DU MONT

CATHODE-RAY TUBE

12ATP–



NOTES:

1. J1-22 CAP ALIGNS WITH D1 D2 TRACE ±5°.
2. J1-25 CAPS 20° APART UNLESS OTHERWISE SPEC.
3. BASE KEY ALIGNS WITH D1 D2 TRACE ± 10°.

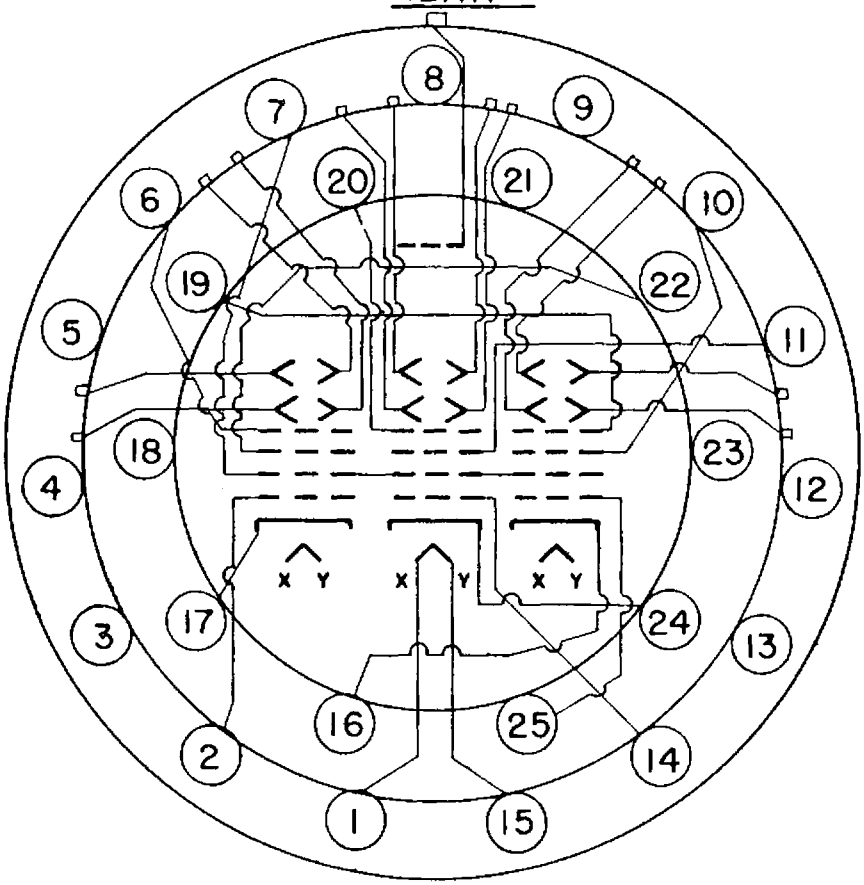
Allen B. Du Mont Laboratories, Inc.
Division of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

DE-6317-5
11-16-61

DUMONT

CATHODE-RAY TUBE

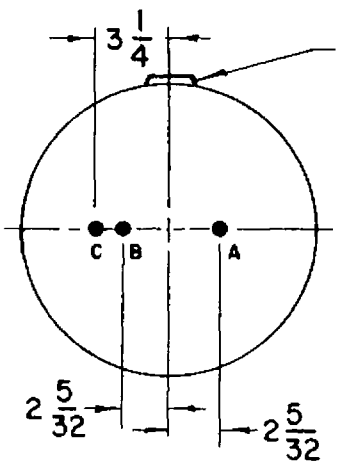
12ATP-



ELEMENT	BOTTOM VIEW PIN NUMBERS UNIT A	UNIT B	UNIT C
HEATER (COMMON)	1	1	1
HEATER (COMMON)	15	15	15
CATHODE	17	24	16
FOCUSING ELECTRODE	22	11	10
ACCELERATOR (COMMON)	7	7	7
ASTIG. ADJUST. ELECTRODE	6	20	19
GRID NO. 1	2	14	25

NOTE:

THE FOCUSED, UNDEFLECTED SPOTS CENTER ON POSITIONS INDICATED WITHIN A 7/16 R. CIRCLE.



REDUCED FACE VIEW
SEE NOTE

Allen B. Du Mont Laboratories, Inc.
Divisions of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

DE-6317-3
11-16-61

DUMONT

Cathode-Ray Tube
Type 12AVP-

The Du Mont Type 12AVP- is a 12 1/2-inch diameter, single beam, electrostatic focus and deflection cathode-ray tube. This tube incorporates a gray glass faceplate in order to obtain the maximum small-area contrast. The use of post acceleration allows us to obtain the maximum deflection sensitivity with high overall accelerating voltages. A special deflection structure is incorporated so that minimum spot defocusing is obtained with deflection. The deflector connections are made through the neck of the tube to facilitate high frequency operation.

GENERAL CHARACTERISTICS

Electrical Data

Focusing Method	Electrostatic	
Deflection Method	Electrostatic	
Direct Interelectrode Capacitances, Maximum		
Cathode to all	6.0	μμf
Grid No. 1 to all	7.0	μμf
D1 to D2	4.0	μμf
D3 to D4	3.5	μμf
D1 to all	12.0	μμf
D2 to all	12.0	μμf
D3 to all	7.0	μμf
D4 to all	7.0	μμf

Optical Data

Phosphor Number	2	7	11
Fluorescence	Yellow-Green	White	Blue
Phosphorescence	Green	Yellow-Green	----
Persistence	Medium	Long	Medium Short
Phosphor Number	14	19	25
Fluorescence	Blue	Orange	Orange
Phosphorescence	Orange	Orange	Orange
Persistence	Medium	Long	Medium

Faceplate		
Light Transmission at Center, Approximate	66	Percent

Allen B. Du Mont Laboratories
Divisions of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

DUMONT

Cathode-Ray Tube
Type 12AVP-

GENERAL CHARACTERISTICS (Continued)

Mechanical Data

Overall Length	22 1/2 ± 3/8	Inches
Greatest Diameter of Bulb	12 7/16 ± 1/16	Inches
Minimum Useful Screen Diameter	11.0	Inches
Bulb Number		
Bulb Contact	J1-22	
Base	B12-37	
Basing	Special	
Base Alignment		
D1D2 trace aligns with Pin No. 1 and tube axis	± 10	Degrees
Positive voltage on D1 deflects beam approximately toward Base Pin No. 1		
Positive voltage on D3 deflects beam approximately toward Base Pin No. 11		
Bulb Contact Alignment		
J1-22 cap aligns with Pin Position No. 1	± 10	Degrees
J1-22 cap aligns with D1D2 trace	± 10	Degrees
J1-22 cap on same side as Pin No. 1		
Trace Alignment		
Angle between D3D4 and D1D2 traces	90 ± 1	Degrees

RATINGS (Absolute Maximum Values)

Heater Voltage	6.3	Volts
Heater Current at 6.3 Volts	0.6 ± 10%	Ampere
Post Accelerator Voltage	11,000	Max. Volts DC
Accelerator Voltage	6700	Max. Volts DC
Ratio Post Accelerator Voltage to Accelerator Voltage [1]	2	
Focusing Electrode Voltage	3000	Max. Volts DC

Allen B. Du Mont Laboratories
Divisions of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

DUMONT

Cathode-Ray Tube
Type 12AVP-

RATINGS (Absolute Maximum Values) (Continued)

Grid No. 1 Voltage		
Negative Bias Value	300	Max. Volts DC
Positive Bias Value	0	Max. Volts DC
Positive Peak Value	0	Max Volts
Peak Heater-Cathode Voltage		
Heater negative with respect to cathode		
During warm-up period not to exceed 15 seconds	410	Max. Volts
After equipment warm-up period	180	Max. Volts
Heater positive with respect to cathode	180	Max. Volts
Peak voltage between accelerator and any deflection electrode	1500	Max. Volts

TYPICAL OPERATING CONDITIONS

Post Accelerator Voltage [1]	9700	Volts
Accelerator Voltage [1]	6100	Volts
Focusing Electrode Voltage	1510 to 2225	Volts
Grid No. 1 Voltage [2]	-135 to -202	Volts
Deflection Factors		
D1D2	100 to 150	Volts DC/Inch
D3D4	100 to 150	Volts DC/Inch
Modulation (at 2 μA)	18	Max. Volts DC
Line Width (at 2 μA) [3]		
Focusing Electrode Current for any operating condition	-15 to +10	μA
Spot Position (focused and undeflected) [4]	Within a 20-mm square	
Pattern Distortion [5]		

MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance	2.0	Max. Megohms
Resistance in any Deflecting-Electrode Circuit [6]	5.0	Max. Megohms

DUMONT

Cathode-Ray Tube
Type 12AVP-

NOTES

1. This tube is designed for optimum performance when operating at an Eb3/Eb2 ratio of 1.6. Operation at other ratios of Eb3/Eb2 may result in changes in deflection uniformity and pattern distortion.

2. Visual extinction of undeflected, focused spot.

3. Line width An is defined as the line width measured at a point N on the tube face with the high frequency scan applied to the D1D2 deflection plates and 60-cycle sawtooth scan applied to the D3D4 plates. Line width Bn is defined as the line width measured at a point N on the tube face with the plate connections interchanged and the focus setting unaltered.

   Refer to Figure 1 for location of line width measurement points. Using a 4-inch raster, focus for best line width Aa. Without changing the focus or astigmatism setting, measure line widths Aa, Ab, Ac, Ad, and Ae. Measurements shall not exceed the specified limits. Reversing the scan direction, measure line widths Ba, Bb, Bc, Bd, and Be, without changing the focus or astigmatism setting. Measurements shall not exceed the specified limits.

Line Width Aa	.32 mm
Line Width Ab	.75 mm
Line Width Ac	.75 mm
Line Width Ad	.32 mm
Line Width Ae	.32 mm
Line Width Ba	.32 mm
Line Width Bb	.60 mm
Line Width Bc	.60 mm
Line Width Bd	.75 mm
Line Width Be	.75 mm

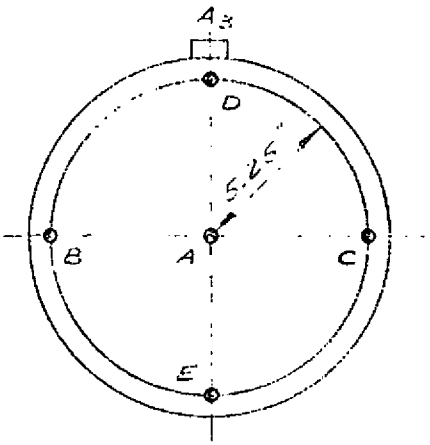


FIG. 1

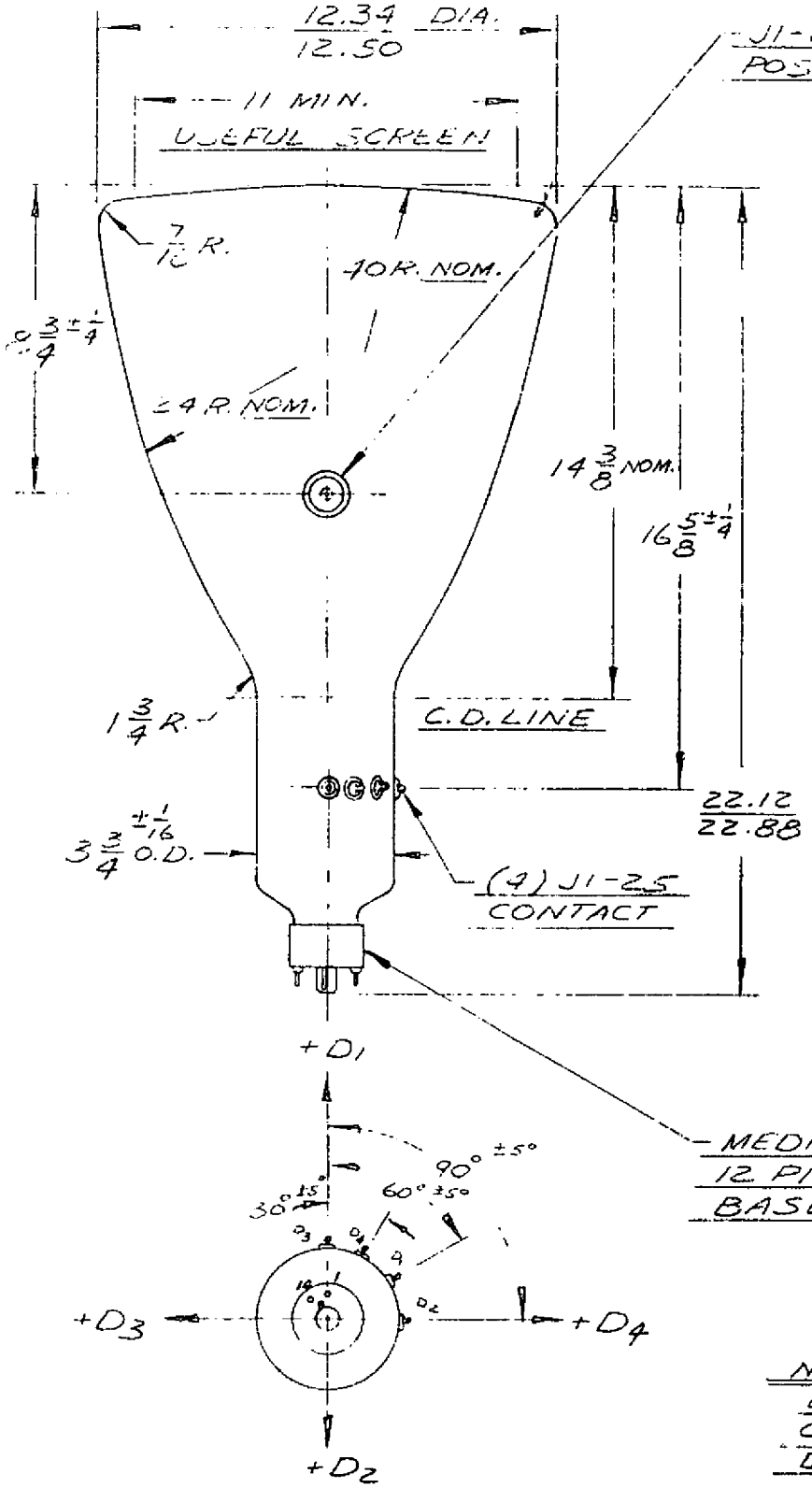
4. Connect free deflecting electrodes to accelerator.

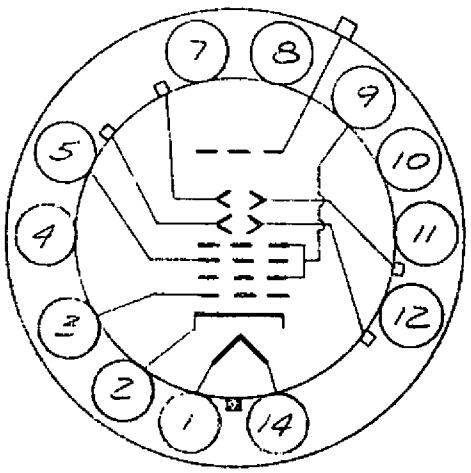
5. The edges of a 7.5 x 7.5-inch raster pattern centered on the tube face will fall within the boundaries of a 7.625-inch square and an inscribed 7.375-inch square.

6. It is recommended that the deflecting-electrode circuit resistances be approximately equal.

DU MONT

CATHODE-RAY TUBE
TYPE 12AVP-





BOTTOM VIEW

PIN NO.	ELEMENT
1	HEATER
2	CATHODE
3	GRID NO.1
4	N.C.
5	FOCUSING ELECTRODE
7 & 8	N.C.
9	ACCELERATOR
10-12	N.C.
14	HEATER

NOTE:
BASE PIN NO.1 & J1-22 CONTACT ALIGN WITH D1, D2 TRACE ±10°.

Allen B. Du Mont Laboratories, Inc.
Division of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

DE-6628
4-4-62
FORM 609 -M1-5-60-DH

CATHODE-RAY TUBE

TYPE 12AWP-

The Du Mont Type 12AWP- is a 12-inch, electrostatic focus, magnetic deflection cathode-ray tube suitable for radar applications. The tube is designed for miniaturized equipments, featuring short overall length, a small diameter neck, and a miniature base. A low current heater is employed, and in conjunction with the small diameter neck affords considerable reduction in power requirements. An aluminized screen is utilized for greater light output and to minimize screen charging effects.

GENERAL CHARACTERISTICS

Electrical Data

Focusing Method	Electrostatic	
Deflection Method	Magnetic	
Deflection Angle, Approximate	70	Degrees
Direct Interelectrode Capacitances, Approximate		
Cathode to all other electrodes	4.5	μμf
Grid No. 1 to all other electrodes	6.5	μμf

Optical Data

Phosphor Number	4	7	12	19	25
Fluorescence	White	White	Orange	Orange	Orange
Phosphorescence	------	Yellow-Green	Orange	Orange	Orange
Persistence	Medium to Medium Short	Long	Long	Long	Medium

Faceplate: Spherical

Mechanical Data

Overall Length (seated height)	12 1/4 ± 3/16	Inches
Greatest Diameter of Bulb	12 7/16 ± 1/8	Inches
Minimum Useful Screen Diameter	11	Inches
Bulb Contact	J1-21	
Base *	E9-37	
Basing	9HT	

* A socket with a center opening to clear the tubulation should be used. Care should be taken in handling the tube to avoid damaging the exposed tubulation and bending the base pins.

Allen B. Du Mont Laboratories
Divisions of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

DE-4766 - 2
1/31/63

FORM 809R

DUMONT

CATHODE-RAY TUBE

TYPE 12AWP-

GENERAL CHARACTERISTICS (Mechanical Data) (Continued)

Bulb Contact Alignment:		
Plane of J1-21 cap passes halfway between Pins No. 1 and 9	± 10	Degrees
J1-21 cap on same side as Pins No. 1 and 9		

MAXIMUM RATINGS (Absolute Maximum Values)

Heater Voltage	6.3	Volts
Heater Current at 6.3 Volts	0.3 ± 10%	Ampere
Accelerator Voltage	13,000	Max. Volts DC
	7000	Min. Volts DC
Focusing Electrode Voltage	-550 to +1100	Max. Volts DC
Grid No. 2 Voltage	770	Max. Volts DC
Grid No. 1 Voltage:		
Negative Bias Value	180	Max. Volts DC
Positive Bias Value	0	Max. Volts DC
Positive Peak Value	0	Max. Volts
Peak Heater-Cathode Voltage		
Heater negative with respect to cathode	180	Max. Volts
Heater positive with respect to cathode	180	Max. Volts

TYPICAL OPERATING CONDITIONS

Accelerator Voltage	10,000	Volts DC
Focusing Electrode Voltage [1]	0 to 450	Volts DC
Grid No. 2 Voltage	300	Volts DC
Grid No. 1 Voltage [2]	-15 to -45	Volts DC
Line Width A [3]	.018	Inch Max.
Spot Position (Undeflected) [4]	5/8	Inch

MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance	1.5	Max. Megohms

Allen B. Du Mont Laboratories
Divisions of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

CATHODE-RAY TUBE

TYPE 12AWP-

NOTES

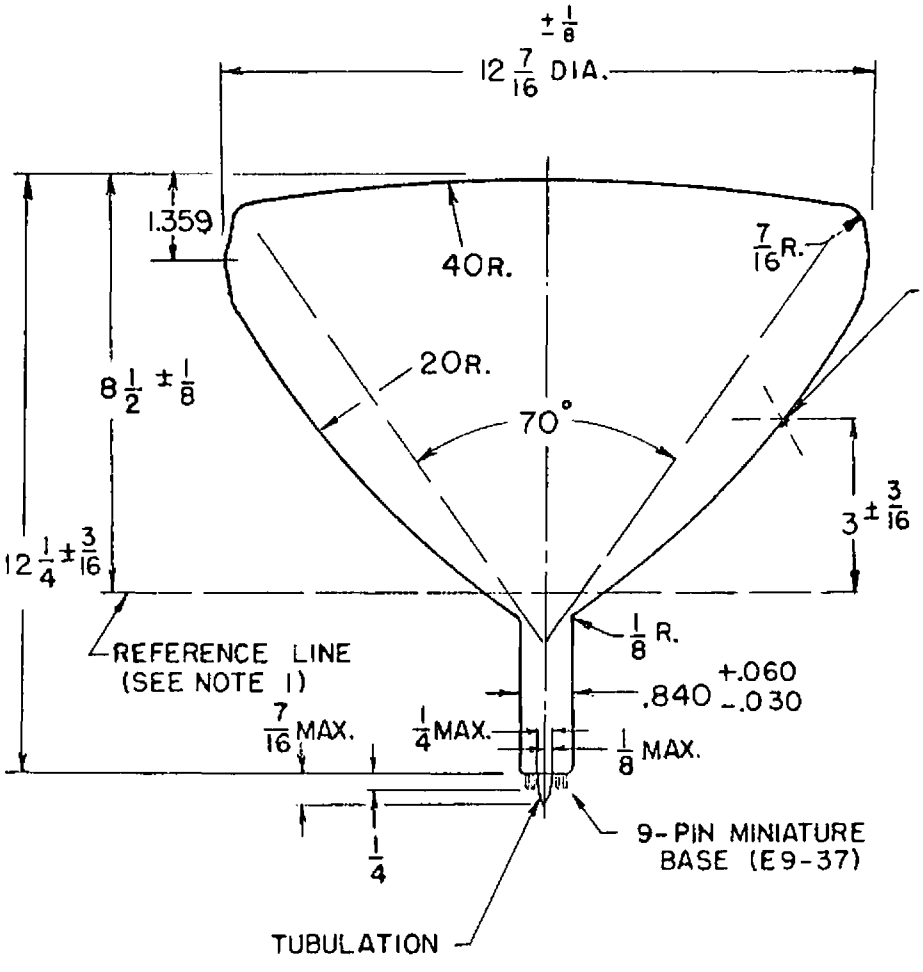
1. With Grid No. 1 voltage adjusted to produce an accelerator current of 25 μA.
2. Visual extinction of undeflected, focused spot.
3. Measured in accordance with MIL-E-1 specifications at an accelerator current of 25 μA.
4. The center of the undeflected, focused spot will fall within a circle of 3/8-inch radius concentric with the center of the tube face, with the tube shielded.
5. The P12, P19 and P25 screens can be permanently damaged if current density is permitted to rise too high. To prevent burning, minimum beam current densities should be employed.

Allen B. Du Mont Laboratories
Divisions of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

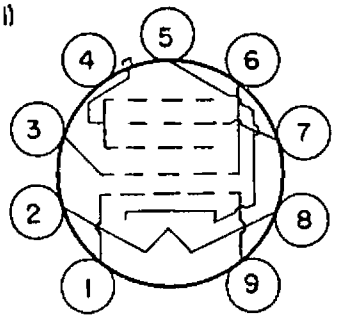
FORM 808R

12 AWP

CATHODE-RAY TUBE



9HT



BOTTOM VIEW OF BASE

PIN NO.	ELEMENT
1	GRID NO.1
2	HEATER
3	GRID NO.2
5	CATHODE
6	GRID NO.2
7	FOCUSING ELECTRODE
8	HEATER
9	GRID NO.1
CONTACT	ACCELERATOR

NOTE

1-REFERENCE LINE IS DETERMINED BY THE POINT WHERE LEADING EDGE OF 1.640" REFERENCE LINE GAUGE WILL STOP, (JETEC NO.128)

DD-27483-A3

1-31-63

12DP-A CATHODE-RAY TUBES

The Type 12DP-A Cathode-ray Tubes are 12-inch magnetically focussed and deflected cathode-ray tubes, primarily designed for radar indicator applications. They feature a large screen area and a long persistence screen (although screens with any persistence characteristic may be ordered).

The Type 12DP-A is recommended only for replacement purposes.



GENERAL CHARACTERISTICS

Electrical

Heater Voltage	6.3 Volts
Heater Current	0.6 ± 10% Ampere
Focusing Method	Magnetic
Deflecting Method	Magnetic
Deflecting Angle (Approx.)	50 Degrees
Phosphor	No. 7
Fluorescence	Blue
Phosphorescence	Yellow
Persistence	Long

Direct Interelectrode Capacitances, Approx.

Cathode to all other electrodes	6 $\mu\mu$f.
Grid No. 1 to all other electrodes	9 $\mu\mu$f.
Grid No. 2 to all other electrodes	7.5 $\mu\mu$f.

Mechanical

Overall Length	19⅝ ± ½ Inches
Greatest Diameter of Bulb	12 ± 3/16 Inches
Minimum Useful Screen Diameter	10 Inches
Bulb Contact (Medium Cap)	C1-5
Base (Medium-Shell Octal 8-Pin)	B8-65
Basing	5AN
Bulb Contact Alignment C1-5 cap aligns with pin No. 5	± 10 Degrees

MAXIMUM RATINGS—(Design Center Values)

Anode Voltage	10,000 Max. Volts D-C
Grid No. 2 Voltage	700 Max. Volts D-C
Grid No. 1 Voltage	
Negative Bias Value	125 Max. Volts D-C
Positive Bias Value[1]	0 Max. Volts D-C
Positive Peak Value	2 Max. Volts
Peak Grid No. 1 Drive from Cut-off	65 Max. Volts
Peak Heater-Cathode Voltage	
Heater Negative with respect to cathode	125 Max. Volts D-C
Heater Positive with respect to cathode	125 Max. Volts D-C

TYPICAL OPERATING CONDITIONS

Anode Voltage	4,000	7,000	Volts D-C
Grid No. 2 Voltage	250	250	Volts D-C
Grid No. 1 Voltage[2]	−25 to −70	−25 to −70	Volts D-C
Focusing Coil Current[3]	75 to 102	99 to 135	Ma. D-C
Spot Position[4]	20	—	mm.

MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance ..... 1.5 Max. Megohms

MINIMUM CIRCUIT VALUES

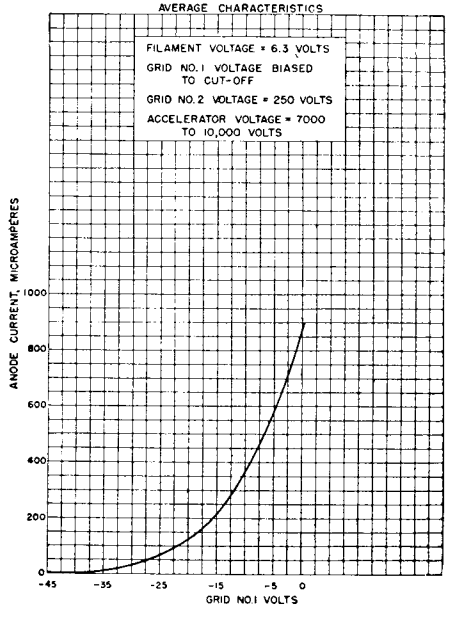
When the output capacitor of the power supply is capable of storing more than 250 microcoulombs, and when the inherent regulation of the power supply permits the instantaneous short-circuit current to exceed 1 ampere, the effective resistance in the circuit between the indicated electrode and the output capacitor should be as follows:

Grid No. 1 Circuit Resistance ..... 150 Min. Ohms
Grid No. 2 Circuit Resistance ..... 820 Min. Ohms
Anode Circuit Resistance ..... 11,000 Min. Ohms

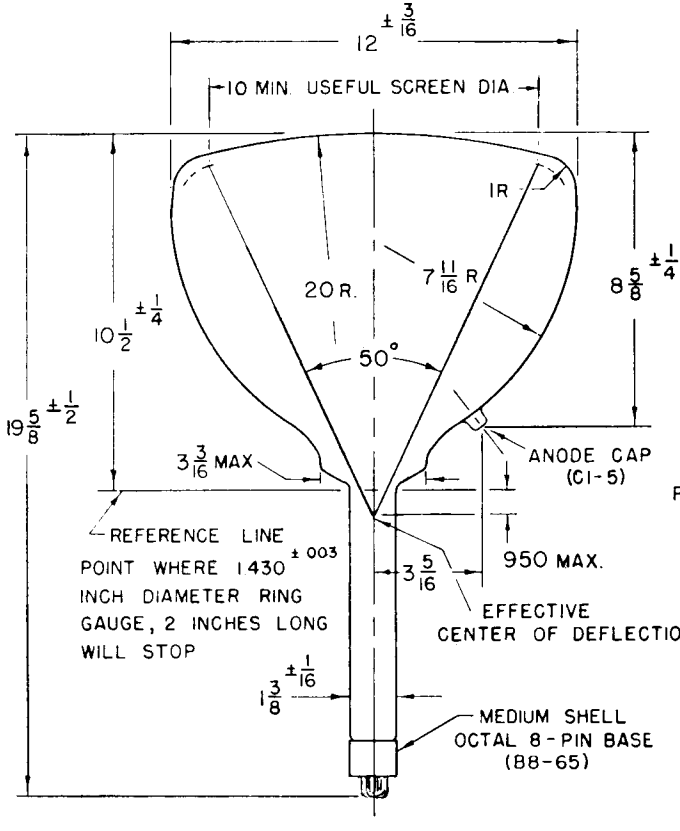
NOTES

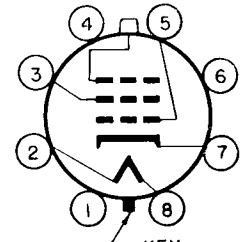
1. At or near this rating, the effective resistance of the anode supply should be adequate to limit the anode input power to 6 watts.
2. Visual extinction of undeflected focused spot.
3. For JETEC standard focus coil No. 106, or equivalent, with the Grid No. 1 voltage adjusted to produce an anode current of 200 microamperes and with distance (D) from reference line to center of air gap equal to 4.125 inches.
4. The center of the undeflected, unfocused spot will fall within a circle of 20 mm. radius concentric with the center of the tube face.

12DP-A



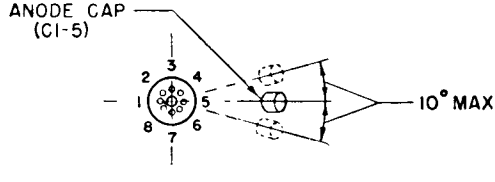
TYPE 12DP-A





BOTTOM VIEW OF BASE

PIN NO	ELEMENT
2	HEATER
3	GRID NO 2
5	GRID NO 1
7	CATHODE
8	HEATER
CAP	ANODE



BOTTOM VIEW OF TUBE

12SP-, 12SP-B CATHODE-RAY TUBES

The Type 12SP- Cathode-ray Tubes are 12-inch magnetically focussed and deflected cathode-ray tubes for radar applications requiring a long persistence screen. The Type 12SP-, designed to be operated at an overall accelerating potential of approximately 9000 volts, produces a brilliant trace with good resolution. In addition, the Type 12SP- features an improved bulb design with grey filter face plate, which combines a minimum of length with a maximum of useful screen diameter. The Type 12SP- is similar to the 5-inch 5FP-, the 7-inch 7BP-, the 10-inch 10KP-, and the 12-inch 12SP-.

The Type 12SP-B utilizes an aluminized screen for greater light output and to minimize screen charging effects; it is otherwise identical to the 12SP-. If a P19 screen is selected, the aluminized version should be used.



GENERAL CHARACTERISTICS

Electrical

Heater Voltage	6.3 Volts
Heater Current	0.6 ± 10% Ampere
Focusing Method	Magnetic
Deflecting Method	Magnetic
Deflecting Angle (Approx.)	55 Degrees
Phosphor	No. 7
Fluorescence	Blue
Phosphorescence	Yellow
Persistence	Long
Direct Interelectrode Capacitances, Approx.	
Cathode to all other electrodes	5 $\mu\mu$f.
Grid No. 1 to all other electrodes	6 $\mu\mu$f.

Mechanical

Overall Length	18¾ ± ⅜ Inches
Greatest Diameter of Bulb	12-7/16 ± ⅛ Inches
Minimum Useful Screen Diameter	11 Inches
Bulb Contact (Recessed small cavity cap)	J1-21
Base (Small shell duodecal 7-Pin)	B7-51
Basing	12D
Bulb Contact Alignment J1-21 contact aligns with vacant pin position No. 3	± 10 Degrees

MAXIMUM RATINGS—(Design Center Values)

Anode Voltage	10,000 Max. Volts D-C
Grid No. 2 Voltage	500 Max. Volts D-C
Grid No. 1 Voltage	
Negative Bias Value	125 Max. Volts D-C
Positive Bias Value	0 Max. Volts D-C
Positive Peak Value	2 Max. Volts
Peak Heater-Cathode Voltage	
Heater negative with respect to cathode	
During warm-up period not to exceed 15 seconds	410 Max. Volts D-C
After equipment warm-up period	180 Max. Volts D-C
Heater Positive with respect to cathode	180 Max. Volts D-C

TYPICAL OPERATING CONDITIONS

Anode Voltage	9,000 Volts D-C
Grid No. 2 Voltage	250 Volts D-C
Grid No. 1 Voltage[1]	−27 to −63 Volts D-C
Focusing Coil Current[2]	105 Approx. Ma. D-C

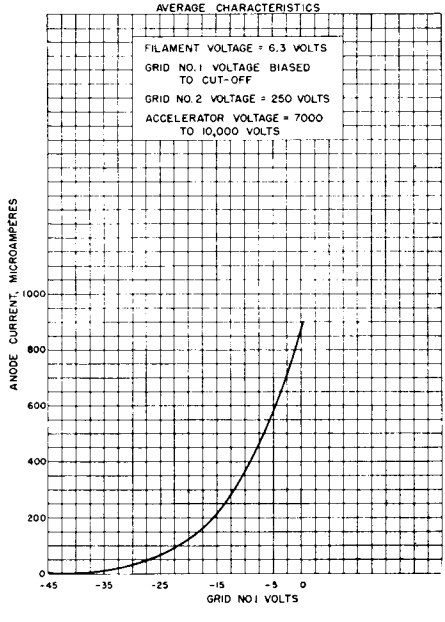
MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance	1.5 Max. Megohms

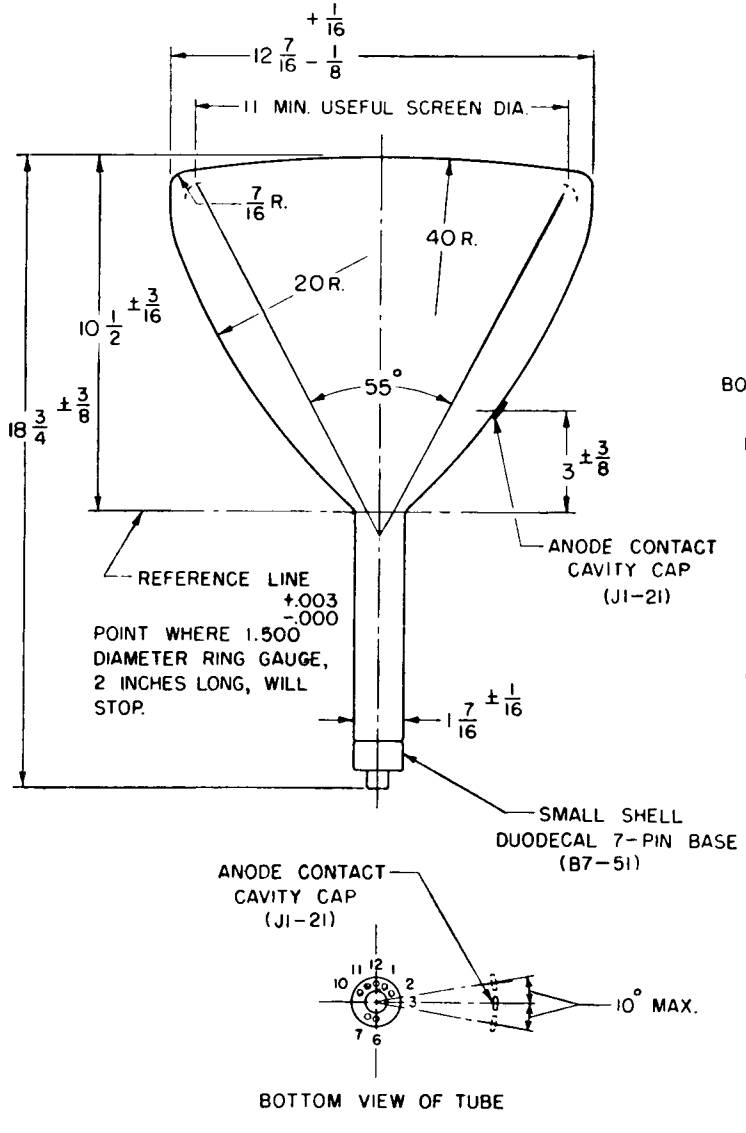
NOTES

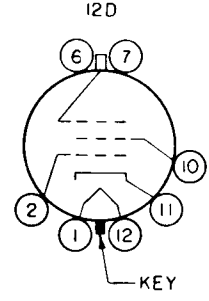
1. Visual extinction of undeflected focused spot.
2. For JETEC standard focus coil No. 106, or equivalent, with the Grid No. 1 voltage adjusted to produce an anode current of 200 microamperes and with distance (D) from reference line to center of air gap equal to 3.25 inches.

12SP-



TYPE 12SP-





BOTTOM VIEW OF BASE

PIN NO.	ELEMENT
1	HEATER
2	GRID NO. 1
10	GRID NO. 2
11	CATHODE
12	HEATER
CAP	ANODE

BOTTOM VIEW OF TUBE

RMA Release # 306 Sept. 24, 1942

DU MONT

CATHODE-RAY TUBES

Types 14AP1, 14AP2, 14AP4, 14AP5

(Formerly designated as Types 2531A14, 2531B14, 2531D14, 2531C14)

The Type 14AP Cathode-Ray Tubes are designed for television and other large screen applications. The insulation employed, the type of sealing, and the wide spacing of the lead wires enable these tubes to be operated at high accelerating potentials.

The 14AP types have a glass bulb approximately fourteen inches in diameter. The screen will provide a brilliant television picture measuring eight inches by ten inches, or for oscillographic applications, a usable screen diameter of about eleven inches. The shape of the glass bulb has been specially designed to withstand stresses induced by atmospheric pressure, and it is tested in production under a pressure greater than three atmospheres.

CHARACTERISTICS

HEATER				
Voltage, a.c. or d.c.			2.5 volts	
Current			2.1 amperes	
DEFLECTION			Electrostatic	
FOCUS			Electrostatic	
SCREEN	14AP1	14AP2	14AP4	14AP5
Phosphor	P1	P2	P4	P5
Fluorescence	Green	Green	White	Blue
Persistence	Medium	Long	Medium	Short
MECHANICAL CHARACTERISTICS				
Overall Length			24¼ ±¾ inches	
Maximum Diameter			13⅜ ±¼ inches	
Bulb			C107Z3C	
Base			12 contact peripheral	
Basing	RMA Basing Designation		12A	

The basing is such that:

1. The direction of the trace produced on the screen by deflecting electrodes D_3 and D_4 will not deviate more than ±10° from a plane through the center of the locating key and the axis of the tube, while the angle between the direction of this trace and that of the trace produced on the screen by deflecting electrodes D_1 and D_2 will be 90° ±3°.
2. With deflecting electrode D_1 (pin No. 11) positive with respect to D_2 (pin No. 9) the spot will be deflected approximately toward pin No. 9; while with D_3 (pin No. 12) positive with respect to D_4 (pin No. 8) the spot will be deflected approximately toward pin No. 7.

DIRECT INTERELECTRODE CAPACITANCES	
Control Electrode (grid) to all other electrodes	6.0 uuf
Deflecting Plate D_1 to Deflecting Plate D_2	2.7 uuf
Deflecting Plate D_3 to Deflecting Plate D_4	1.0 uuf
Deflecting Plate D_1 to all other electrodes	8.3 uuf
Deflecting Plate D_3 to all other electrodes	7.7 uuf
D_1 to all other electrodes except D_2	5.6 uuf
D_2 to all other electrodes except D_1	5.7 uuf
D_3 to all other electrodes except D_4	6.7 uuf
D_4 to all other electrodes except D_3	6.8 uuf
RATINGS	
Heater voltage	2.5 volts
Heater current	2.1 ±0.3 amp
Anode #3 (Intensifier Electrode) voltage (E_{b3})	8000 volts (max.)
Anode #2 (Accelerating Electrode) voltage (E_{b2})	4000 volts (max.)
Anode #1 (Focusing Electrode) voltage (E_{b1})	1800 volts (max.)
Grid (Control Electrode) voltage (E_{c1})	Never positive
Resistance of grid circuit	1.5 megohms (max.)
Impedance of any deflecting electrode circuit at heater supply frequency	1.0 megohms (max.)

TYPICAL OPERATION

Heater voltage	2.5	2.5	volts
Anode #3 voltage (E_{b3})	4000	8000	volts
Anode #2 voltage (E_{b2})	2000	4000	volts
Anode #1 voltage (E_{b1}) for focus when E_{c1} = 75% of cut-off	500	1000	volts ±20%
Grid voltage (E_{c1}) for beam cut-off	—40	—80	volts ±50%
Deflection Factor:			
D_1D_2	65	130	d.c. volts/inch ±20%
D_3D_4	65	130	d.c. volts/inch ±20%
Deflection Sensitivity:			
D_1D_2	0.39	0.20	mm/d.c. volt (av.)
D_3D_4	0.39	0.20	mm/d.c. volt (av.)

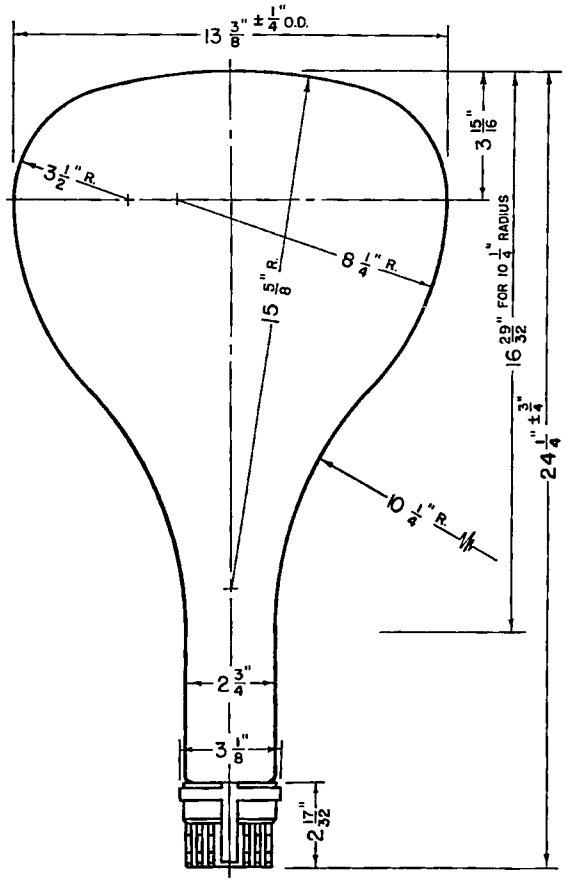
Deflection with Intensifier at Second Anode Potential:

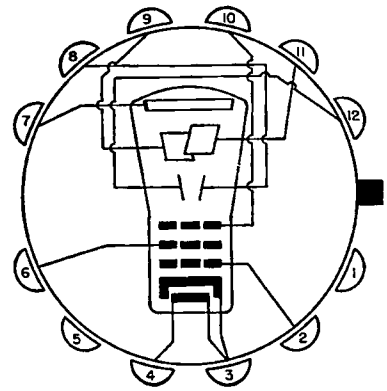
	FACTOR	SENSITIVITY
D_1D_2	28 d.c. volts/kv. in. ±20%	0.91 mm. kv./d.c. volt
D_3D_4	28 d.c. volts/kv. in. ±20%	0.91 mm. kv./d.c. volt

SPECIAL INSTALLATION NOTES

The 14AP Type Cathode-Ray Tubes are mechanically capable of withstanding shocks encountered in ordinary handling and room temperature variations. Because of its large evacuated volume, the glass bulb is under considerable strain due to atmospheric pressure, and the tube must be protected from hard bumps and extreme, sudden changes in temperature. Care should also be taken to avoid scratching the glass bulb since such scratches weaken the glass. It is suggested that a piece of plate glass be placed before the screen of the tube, when mounted in television receivers, to protect it from accidental shocks.

The base of the 14AP types fits a twelve-contact socket which can be supported by the base of the cathode-ray tube. The tube may be mounted in any position. One convenient horizontal mounting consists of a rubber block supporting the neck of the bulb, the screen end resting on a padded support, and the socket supported by the base of the tube itself.





Bottom View of Base

Pin #1	No Connection
2	Control Electrode
3	Heater & Cathode
4	Heater
5	No Connection
6	Focusing Electrode
7	Intensifier Electrode
8	Deflection Plate D_4
9	Deflection Plate D_2
10	Accelerating Electrode
11	Deflection Plate D_1
12	Deflection Plate D_3

ALLEN B. DU MONT LABORATORIES, INC.
Passaic, N. J., U. S. A.

2217K10-9-42

PRINTED IN U.S.A.

DUMONT

CATHODE-RAY TUBE

TYPE 16AGP-

The Du Mont Type 16AGP- is a 16-inch diameter, curved face, single beam, electrostatic focus and magnetic deflection cathode-ray tube suitable for radar applications. A low-voltage electrostatic focus lens is employed, designed to operate at or near cathode potential to afford substantially automatic focus, independent of accelerator voltage variations. The tube utilizes a metal envelope.

GENERAL CHARACTERISTICS

Electrical Data

Focusing Method	Electrostatic		
Deflection Method	Magnetic		
Deflection Angle, Approximate	53		Degrees
Direct Interelectrode Capacitances	Min.	Max.	
Cathode to all other electrodes	3	6	μμf
Grid No. 1 to all other electrodes	5.5	9.5	μμf

Optical Data

Phosphor Number	7	14	19
Fluorescence	White	Blue	Orange
Phosphorescence	Yellow-Green	Orange	Orange
Persistence	Long	Medium	Long

Mechanical Data

Overall Length	21 1/2 ± 3/8	Inches
Greatest Diameter of Bulb	15 7/8 ± 1/8	Inches
Minimum Useful Screen Diameter [1]	14 3/8	Inches
Bulb Contact	Metal Cone Lip	
Base	B7-51	
Basing	12M	

MAXIMUM RATINGS (Absolute Maximum Values)

Heater Voltage	6.3	Volts
Heater Current at 6.3 Volts	0.6 ± 10%	Ampere
Accelerator Voltage [2]	16,500	Max. Volts DC
Focusing Electrode Voltage	-550 to +1100	Max. Volts DC
Grid No. 2 Voltage	770	Max. Volts DC

Allen B. Du Mont Laboratories
Divisions of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

TL-1177 - 5
5/24/63

DUMONT

CATHODE-RAY TUBE

TYPE 16AGP-

MAXIMUM RATINGS (Absolute Maximum Values) (Continued)

Grid No. 1 Voltage		
Negative Bias Value	180	Max. Volts DC
Positive Bias Value [2]	0	Max. Volts DC
Positive Peak Value	0	Max. Volts
Peak Heater-Cathode Voltage		
Heater negative with respect to cathode	180	Max. Volts
Heater positive with respect to cathode	180	Max. Volts

TYPICAL OPERATING CONDITIONS

Accelerator Voltage [3]	12,000	Volts DC
Focusing Electrode Voltage [4]	-135 to +400	Volts DC
Focusing Electrode Current	-15 to +15	μADC
Grid No. 2 Voltage	300	Volts DC
Grid No. 1 Voltage [5]	-35 to -75	Volts DC
Line Width "A" [6]	.018	Inch Max.
Spot Position [7]	5/8	Inch

MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance	1.5	Max. Megohms

NOTES

1. For metalized tubes the minimum useful screen diameter will be 13 5/8 inches.

2. Accelerator power input (average) should be limited to six watts. The 16AGP19 screen can be permanently damaged if the current density is permitted to rise too high. To prevent burning, minimum beam current densities should be employed.

Allen B. Du Mont Laboratories
Divisions of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

DUMONT

CATHODE-RAY TUBE

TYPE 16AGP-

NOTES
(Continued)

3. Brilliance and definition decrease with decreasing accelerator voltage. In general, accelerator voltage should not be less than 9000 volts.

4. With Grid No. 1 voltage adjusted to produce an accelerator current of 20 μA and the pattern adjusted for best overall focus. Measured with a 525-line, 9 x 9-inch pattern.

5. Visual extinction of the focused, undeflected spot.

6. Measured with a 525-line pattern adjusted to 90% of minimum useful screen diameter at Ib = 100 μA. Line width is the merged raster height divided by the number of lines (525) (measured in the center of tube face).

   To avoid damage to the screen of the 16AGP19, it is recommended that the screen current be not more than 50 μA when measuring line width. The line width under this condition will be .017 inch maximum.

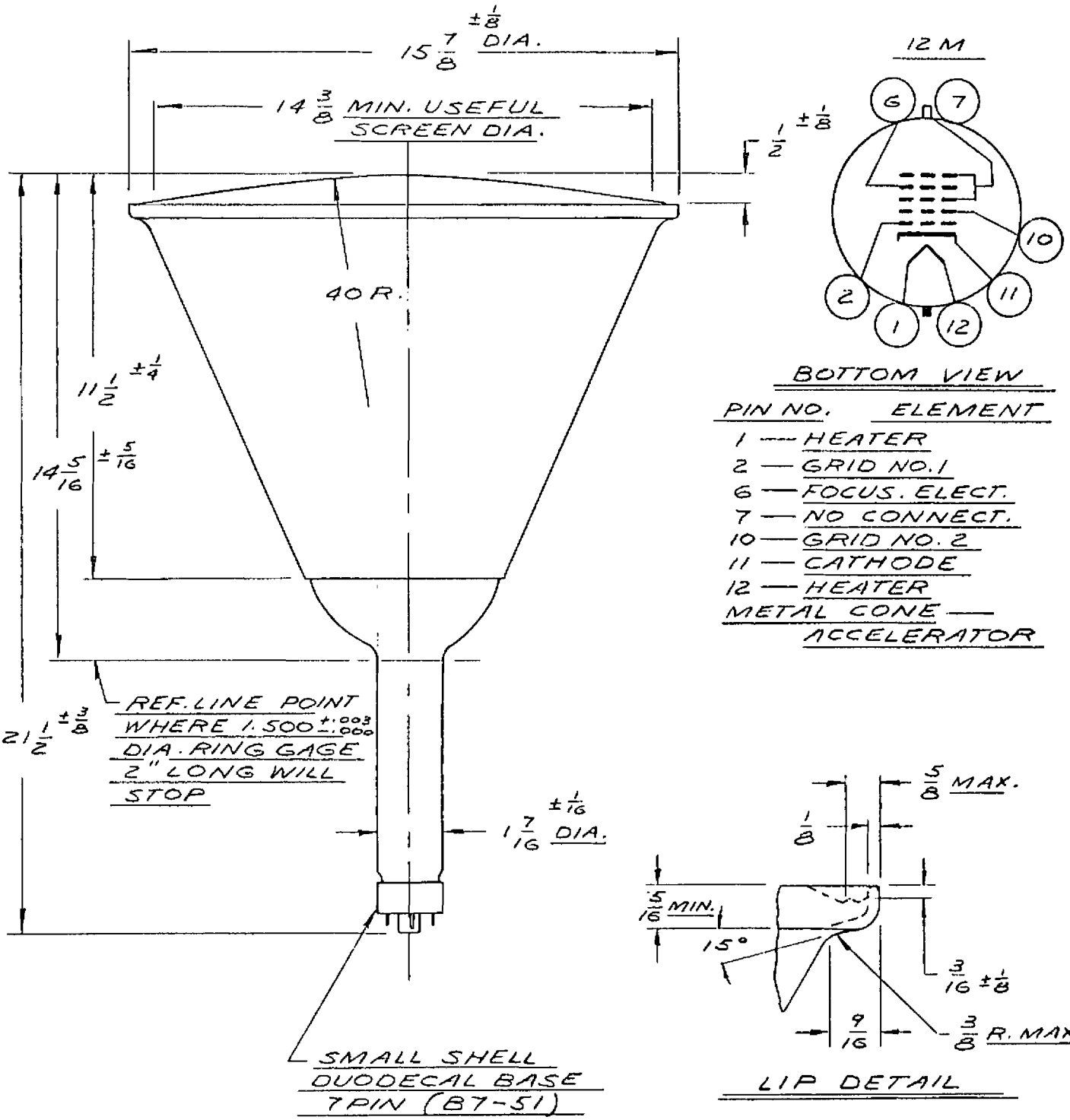
7. The center of the undeflected, focused spot will fall within a circle of 5/8-inch radius concentric with the center of the tube face, with tube shielded.

Allen B. Du Mont Laboratories
Divisions of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

FORM 809H

DU MONT

CATHODE-RAY TUBE
TYPE 16AGP-



PIN NO.	ELEMENT
1	HEATER
2	GRID NO. 1
6	FOCUS. ELECT.
7	NO CONNECT.
10	GRID NO. 2
11	CATHODE
12	HEATER
METAL CONE	ACCELERATOR

DD 30601-A
5.29.63

Allen B. Du Mont Laboratories, Inc.
Divisions of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

FORM 609 -M1-5-60-SH

from JETEC release #1368,
Nov. 1, 1954

DU MONT

19TP22 CATHODE-RAY TUBE

The Du Mont 19TP22 is an all-glass, 19-inch direct view, tricolor picture tube designed for color television purposes. It features a curved shadow mask and a screen which is deposited directly upon the inside surface of the face plate. The tube utilizes magnetic deflection and three electrostatically focused electron beams, with an electrostatic convergence element common to the three beams.

Other features include short overall length and symmetrical screen construction to permit angular positioning of the tube for optimum performance.

GENERAL CHARACTERISTICS

Electrical Data

Electron Guns, Three	Blue, Green, Red	
Focusing Method	Electrostatic	
Convergence Method	Electrostatic	
Deflecting Method	Magnetic	
Deflection Angle, Maximum	60 Degrees	
Direct Interelectrode Capacitances, Approximate		
All cathodes (connected together externally) to all other electrodes	16.5	uuf.
Grid No. 1 (of any gun) to all other electrodes except the No. 1 Grids of the other two guns)	6.0	uuf.
Grid No. 3 (Focusing Electrode) (Grid No. 3 of each gun tied together within tube) to all other electrodes	8.5	uuf.
Grid No. 4 (Convergence Electrode) (common to the three guns) to all other electrodes	10.5	uuf.
External conductive coating to Accelerator	3,000	Max. uuf.
	1,500	Min. uuf.

Optical Data

Phosphor Number (of the three phosphors, collectively)	P22			
Fluorescent Color of the separate phosphors	Red	Blue	Green	
Phosphorescent Color of the separate phosphors	Red	Blue	Green	
Persistence	Medium	Medium	Medium	
Screen (on envelope face panel)				
Type	Metal-backed, Tricolor Phosphor-Dot Type			
Size	16 9/16 x 12 7/16			Inches
Area	185			Sq. Inches

Phosphor-Dot Arrangement	Approximately 440,000 triangular groups, each consisting of a blue dot, green dot, and red dot (total of 1,320,000 dots)
Face Plate Light Transmission, Approximate (Neutral Density Filter)	75%

DUMONT

19TP22 CATHODE-RAY TUBE

GENERAL CHARACTERISTICS (Continued)

Mechanical Data

Overall Length	24 3/8 ± 3/8	Inches
Greatest Diameter of Bulb	19 5/16 ± 3/16	Inches
Greatest Diameter of Metal Flange	20.800	Inches Max.
Neck Length	8 27/32 ± 1/4	Inches
Weight, Approximate	31	Pounds
Bulb Contact	Metal Flange	
Base (Small-shell bidecal 14-Pin)	B14-103	
Preferred Rotation	With any single gun on top	

RATINGS (Design Center Values)

Heater Voltage	6.3	Volts
Heater Current at 6.3 Volts	1.8 ± 10%	Amperes
Accelerator Voltage (Note 1)	22,000	Max. Volts DC
Accelerator Input	20	Max. Watts
Convergence Electrode Voltage (Grid No. 4)	12,000	Max. Volts DC
Focusing Electrode Voltage (Grid No. 3)	4,000	Max. Volts DC
Grid No. 2 Voltage (each gun)	500	Max. Volts DC
Grid No. 1 Voltage (each gun)		
Negative Bias Value	200	Max. Volts DC
Positive Bias Value	0	Max. Volts DC
Positive Peak Value	2	Max. Volts
Peak Heater-Cathode Voltage (each gun)		
Heater negative with respect to cathode		
During equipment warm-up period not to exceed 15 seconds	410	Max. Volts DC
After equipment warm-up period	180	Max. Volts DC
Heater positive with respect to cathode	180	Max. Volts DC

TYPICAL OPERATING CONDITIONS

Accelerator Voltage	20,000	Volts
Convergence Electrode Voltage (Note 2)	8500 to 10,200	Volts
Focusing Electrode Voltage	1950 to 3250	Volts
Grid No. 2 Voltage (Note 3)	200	Volts
Grid No. 1 Voltage for visual extinction of focused raster (Note 3)	-42 to -78	Volts
Maximum Average Accelerator Current	1000	Microamperes
Maximum Average Grid No. 3 Current	300	Microamperes

CIRCUIT VALUES

Grid No. 1 Circuit Resistance (each gun)	1.5	Max. Megohms
Dynamic Converging Voltage, Maximum (Note 4)	1200	Volts
Dynamic Focusing Voltage, Maximum (Note 4)	340	Volts

DUMONT

19TP22 CATHODE-RAY TUBE

NOTES

1. Since this tube operates at voltages in excess of 16,000 volts, x-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range. Such protection may be provided by the protective face viewing window of apparatus using tubes of this type.

   Protection will be adequate if the radiation measured in contact with the face viewing window is not in excess of 6.25 mr/hr.

2. For convergence in center of screen.

3. Grid No. 1 voltage for visual extinction of focused raster will vary linearly with the Grid No. 2 voltage.

4. Peak to peak value. This AC voltage having essentially parabolic waveform is synchronized with scanning and does not include any voltage developed during the blanking time.

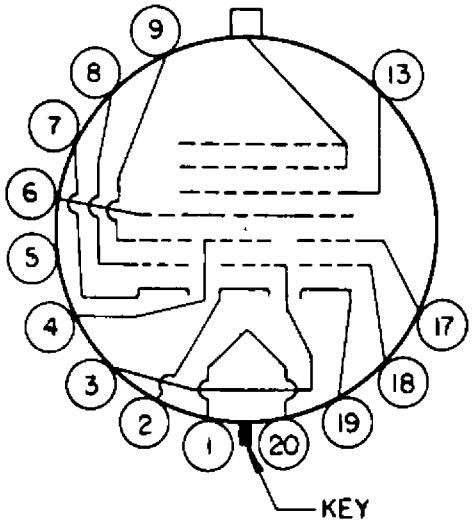
Mounting of External Components

For the proper operation of the Du Mont 19TP22, it is necessary to correctly position the deflection yoke, color purity coil, and beam positioning magnets on the tube neck. Sufficient clearance should be allowed so as to be able to slide the deflection yoke at least one inch from the reference line. The color purity coil and beam positioning magnets should be located behind the deflection yoke and ahead of the focus gaps of the electron guns. The focus gaps are located approximately 4 3/4" from the reference line.

For optimum performance of the 19TP22, it is recommended that a suitable magnetic shield and field neutralizing coil be used.

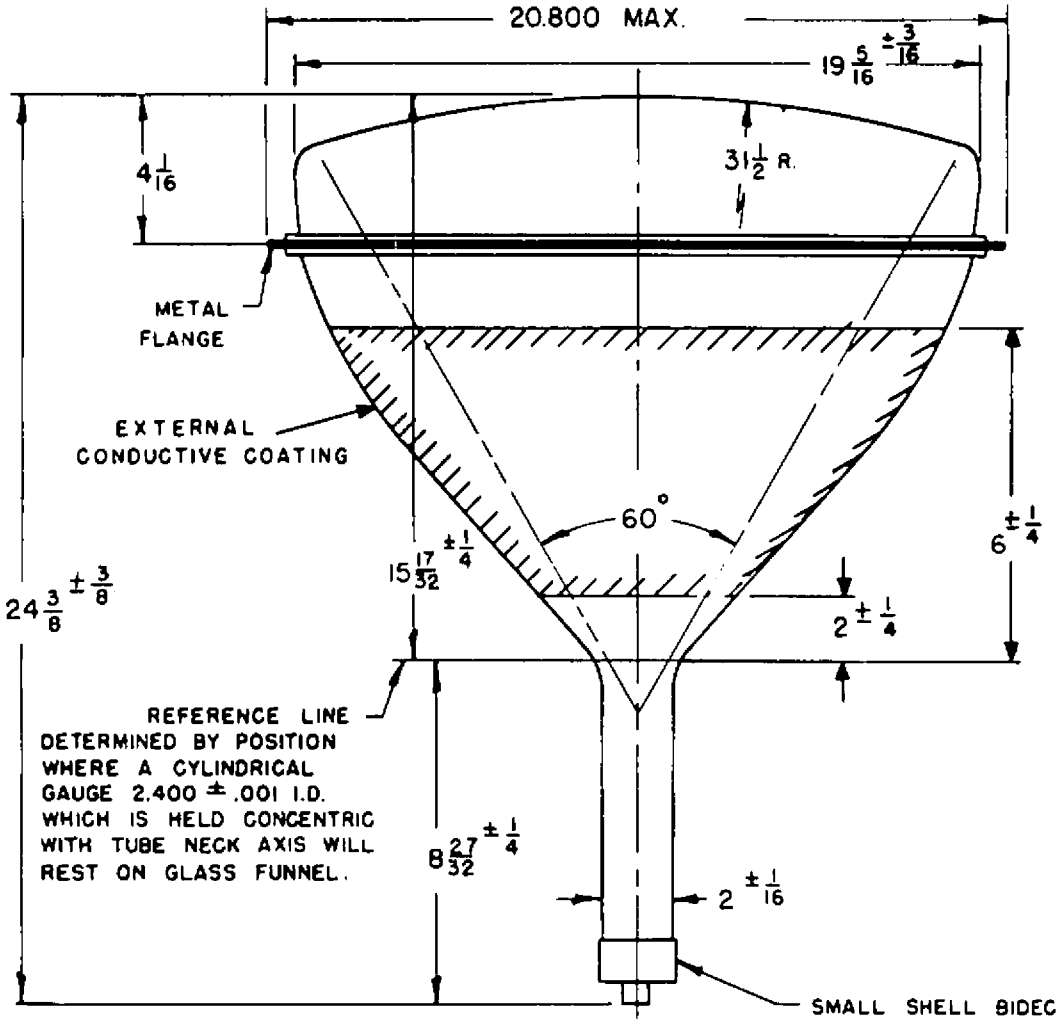
DUMONT

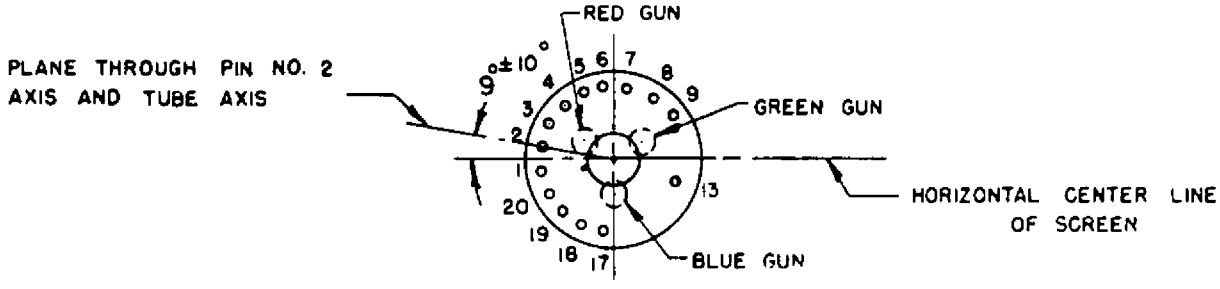
19TP22
CATHODE-RAY TUBE



BOTTOM VIEW OF BASE

PIN NO.	ELEMENT
1	HEATER
2	CATHODE OF RED GUN
3	GRID NO. 1 OF RED GUN
4	GRID NO. 2 OF RED GUN
6	FOCUSING ELECTRODES
7	CATHODE OF GREEN GUN
8	GRID NO. 1 OF GREEN GUN
9	GRID NO. 2 OF GREEN GUN
13	CONVERGENCE ELECTRODE
17	GRID NO. 2 OF BLUE GUN
18	GRID NO. 1 OF BLUE GUN
19	CATHODE OF BLUE GUN
20	HEATER
	METAL FLANGE — ACCELERATOR





Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

DD-26773-A-3
9-9-54

DUMONT

CATHODE-RAY TUBE

TYPE 19WP-

The Du Mont Type 19WP- is a 19-inch diameter metal cone, electrostatic focus cathode-ray tube. The 19WP- incorporates a unique gun design which uses both electrostatic and magnetic deflection.

The electrostatic deflection plates are designed to scan a small raster area which can be deflected to any portion of the screen by the magnetic deflection yoke. By using either monoscope tubes or symbol type generators, it is possible to provide letters or characters along with the display formed by the magnetic deflection yoke. The size of these characters can be varied from about 3/8 inch to over 1 inch, depending upon the amplitude of the deflection voltages applied and the desired tube face area to be scanned.

The gun design used provides a small, dense electron beam and coupled with the electrostatic focus lens high resolution is provided. The high current density beam permits symbol formation in minimum time.

A gray filter-glass faceplate provides the maximum small area contrast. To increase the light output and to prevent build-up of spurious charges on the screen by successive transients, the screens are metal backed.

GENERAL CHARACTERISTICS

Electrical Data

Focusing Method	Electrostatic	
Deflection Method [1]	Electrostatic and Magnetic	
Deflection Angle, Approximate	66	Degrees
Direct Interelectrode Capacitances, Approximate		
Cathode to all	4.0	μμf
Grid No. 1 to all	5.0	μμf
D1 to D2	1.6	μμf
D3 to D4	1.6	μμf
D1 to all	2.5	μμf
D2 to all	2.5	μμf
D3 to all	2.5	μμf
D4 to all	2.5	μμf

TL-1159 - 8
2/2/60

from JEDEC release #2773, April 4, 1960

DUMONT

CATHODE-RAY TUBE

TYPE 19WP-

GENERAL CHARACTERISTICS (Continued)

Optical Data

Phosphor No.[2]	2	7	12	14	19	25
Fluorescent Color	Blue-Green	Blue-White	Orange	Purple	Orange	Orange
Phosphorescent Color	Green	Yellow	Orange	Orange	Orange	Orange
Persistence	Long	Long	Medium-Long	Medium-Long	Very Long	Very Long

Faceplate		
Light Transmission at Center, Approximate	55	Percent

Mechanical Data

Overall Length	24 11/16 ± 3/8	Inches
Greatest Diameter of Bulb	18 5/8 ± 1/8	Inches
Minimum Useful Screen Diameter	17 3/8	Inches
Neck Length[3]	10 5/16 ± 3/16	Inches
Base	B7-51	
Basing	12AV	
Base Alignment:		
D3D4 trace aligns with Pin No. 2 and tube axis	± 30	Degrees
Positive voltage on D1 deflects beam approximately toward Pin No. 5		
Positive voltage on D3 deflects beam approximately toward Pin No. 2		
Angle between D3D4 and D1D2 traces	90 ± 2	Degrees

RATINGS (Design Maximum Values)

Heater Voltage	6.3	Volts
Heater Current at 6.3 Volts	0.6 ± 10%	Ampere
Accelerator Voltage	13,200	Max. Volts DC
Accelerator Input	6	Max. Watts
Focusing Electrode Voltage	6,000	Max. Volts DC
Grid No. 2 Voltage	770	Max. Volts DC
Grid No. 1 Voltage		
Negative Bias Value	200	Max. Volts DC
Positive Bias Value	0	Max. Volts DC
Positive Peak Value	0	Max. Volts

DUMONT

CATHODE-RAY TUBE

TYPE 19WP-

RATINGS (Design Maximum Values) (Continued)

Peak Heater-Cathode Voltage		
Heater negative with respect to cathode		
During warm-up period not to exceed 15 seconds	410	Max. Volts
After equipment warm-up period	180	Max. Volts
Heater positive with respect to cathode	180	Max. Volts
Peak Voltage between Accelerator and any Deflection Electrode	550	Max. Volts

TYPICAL OPERATING CONDITIONS

Accelerator Voltage	10,000	7500	Volts DC
Focusing Electrode Voltage [4]	3400 to 4600	2550 to 3450	Volts DC
Grid No. 2 Voltage	300	300	Volts DC
Grid No. 1 Voltage [5]	-35 to -72	-35 to -72	Volts DC
Modulation [6]	15	15	Max. Volts
Deflection Factors:			
D1D2	170 to 210	128 to 160	Volts DC/Inch
D3D4	160 to 200	121 to 150	Volts DC/Inch
Focusing Electrode Current for any operating condition		-15 to +10	μA
Spot Position (focused and undeflected) [7]		Within a 25-mm Square	
Line Width "A" [8]	0.024	0.026	Max. Inch

For accelerator voltage not shown in the preceding table, the following can be used as a guide:

Focusing Electrode Voltage	34% to 46% of Accelerator Volts
D1D2	17 to 21 Volts DC/Inch/Kilovolt of Accelerator Volts
D3D4	16 to 20 Volts DC/Inch/Kilovolt of Accelerator Volts

MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance	1.5	Max. Megohms
Resistance in any Deflecting-Electrode Circuit [9]	5.0	Max. Megohms

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

FORM 809 8C-7-58-8H

DUMONT

CATHODE-RAY TUBE

TYPE 19WP-

NOTES

1. The electrostatic deflection plates are designed to form a 1/2-inch square raster which can be deflected to any portion of the screen by the magnetic deflection yoke. Other size rasters may be used with a decrease in magnetic deflection area for the larger ones.

2. The No. 12 and No. 19 screens can be permanently damaged if the current density is permitted to rise too high. To prevent burning, minimum beam current densities should be employed.

3. The maximum O.D. of the neck, including deflection plate connections, is 1.500 inches.

4. For any value of beam current.

5. Visual extinction of undeflected, focused spot.

6. Measured in accordance with MIL-E-1 specifications for an Ib = 2 μA.

7. With deflecting electrodes connected to accelerator, the spot will fall within a 25-mm square centered on the face.

8. Measured in accordance with MIL-E-1 specifications, using a 50-line raster having a length of 3 inches on the high-frequency axis and a beam current of 2 μA.

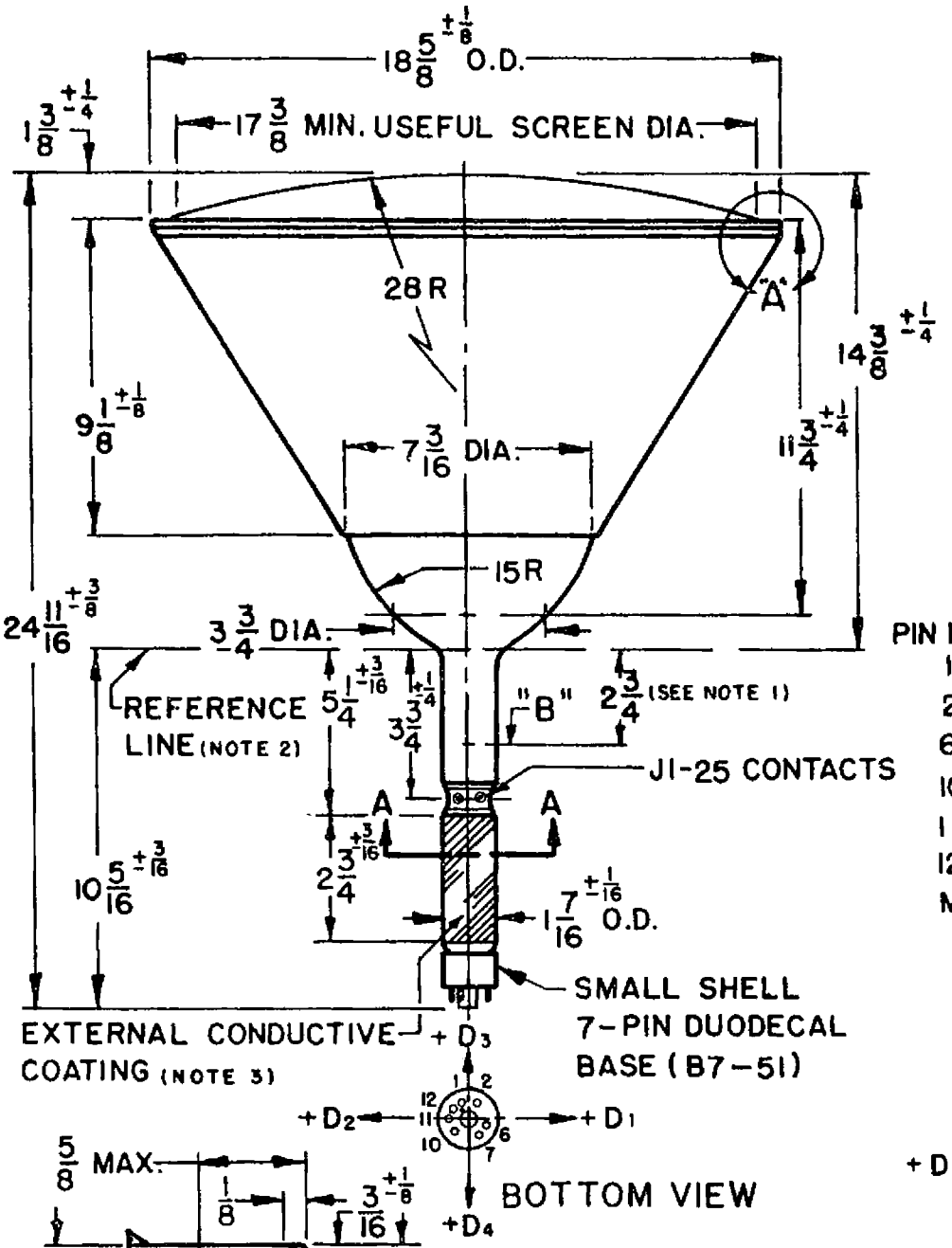
9. It is recommended that the deflecting-electrode circuit resistances be approximately equal.

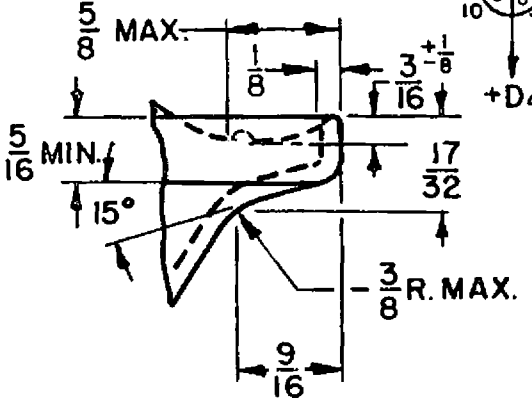
Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

FORM 809 8C-7-58-5M

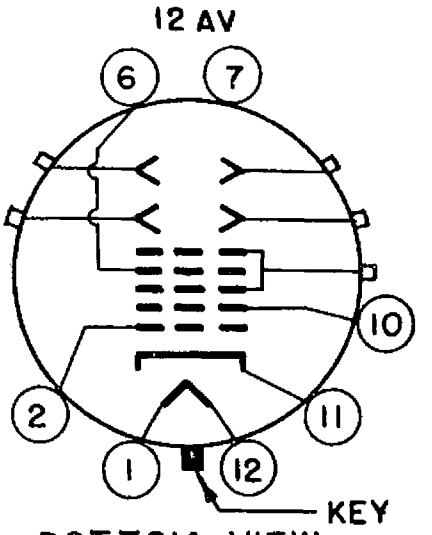
DU MONT

CATHODE-RAY TUBE
19WP-





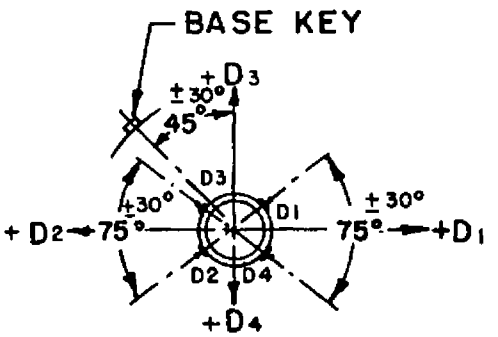
DETAIL "A"
METAL CONE LIP



BOTTOM VIEW

PIN NO.	ELEMENT
1	HEATER
2	GRID NO.1
6	FOCUSING ELECTRODE
10	GRID NO.2
11	CATHODE
12	HEATER

METAL CONE LIP-ACCELERATOR



SECTION A-A

NOTES:

1. THE MAGNETIC DEFLECTION FIELD SHOULD NOT EXTEND BELOW LINE "B"
2. WHEN TUBE NECK IS INSERTED THROUGH JEDEC G-112 GAUGE, REFERENCE LINE WILL BE DETERMINED BY POSITION WHERE GAUGE WILL REST ON FUNNEL
3. EXTERNAL CONDUCTIVE COATING MUST BE CONNECTED TO METAL CONE.

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

TD-2731-A10
2-2-60
FORM 808-CS-4-58-RH

RMA Release # 306 Sept. 24, 1942

DU MONT

CATHODE-RAY TUBES

Types 20AP1, 20AP2, 20AP4, 20AP5

(Formerly designated as Types 2532A20, 2532B20, 2532D20, 2532C20)

The Type 20AP Cathode-Ray Tubes are designed for television and other large screen applications. The insulation employed, the type of sealing, and the wide spacing of the lead wires enable these tubes to be operated at high accelerating potentials.

The 20AP types have a glass bulb approximately twenty inches in diameter. The screen will provide a brilliant television picture measuring 11¼ inches by 15 inches, or for oscillographic applications a usable screen diameter of about 17 inches. The shape of the glass bulb has been specially designed to withstand stresses induced by atmospheric pressure, and it is tested in production under a pressure greater than three atmospheres.

CHARACTERISTICS

HEATER				
Voltage, a.c. or d.c.			2.5 volts	
Current			2.1 amperes	
DEFLECTION			Electrostatic	
FOCUS			Electrostatic	
SCREEN	20AP1	20AP2	20AP4	20AP5
Phosphor	P1	P2	P4	P5
Fluorescence	Green	Green	White	Blue
Persistence	Medium	Long	Medium	Short
MECHANICAL CHARACTERISTICS				
Overall Length			27⅞ ±¾ inches	
Maximum Diameter			20 ±⅜ inches	
Bulb			C160Z1C	
Base			12 contact peripheral	
Basing RMA Basing Designation			12A	

The basing is such that:

1. The direction of the trace produced on the screen by deflecting electrodes D_3 and D_4 will not deviate more than ±10° from a plane through the center of the locating key and the axis of the tube, while the angle between the direction of this trace and that of the trace produced on the screen by deflecting electrodes D_1 and D_2 will be 90° ±3°.
2. With deflecting electrode D_1 (pin No. 11) positive with respect to D_2 (pin No. 9) the spot will be deflected approximately toward pin No. 9, while with D_3 (pin No. 12) positive with respect to D_4 (pin No. 8) the spot will be deflected approximately toward pin No. 7.

DIRECT INTERELECTRODE CAPACITANCES	
Control Electrode (grid) to all other electrodes	6.0 uuf
Deflecting Plate D_1 to Deflecting Plate D_2	1.9 uuf
Deflecting Plate D_3 to Deflecting Plate D_4	1.2 uuf
Deflecting Plate D_1 to all other electrodes	8.5 uuf
Deflecting Plate D_3 to all other electrodes	7.4 uuf
D_1 to all other electrodes except D_2	6.6 uuf
D_2 to all other electrodes except D_1	6.9 uuf
D_3 to all other electrodes except D_4	6.2 uuf
D_4 to all other electrodes except D_3	6.2 uuf

RATINGS	
Heater voltage	2.5 volts
Heater current	2.1 ±0.3 amp.
Anode #3 (Intensifier Electrode) voltage (E_{b3})	8000 volts (max.)
Anode #2 (Accelerating Electrode) voltage (E_{b2})	4000 volts (max.)
Anode #1 (Focusing Electrode) voltage (E_{b1})	1800 volts (max.)
Grid (Control Electrode) voltage (E_{c1})	Never positive
Grid Circuit Resistance	1.5 meg. (max.)
Impedance of any deflecting electrode circuit at heater supply frequency	1.0 meg. (max.)

TYPICAL OPERATION

Heater voltage	2.5	2.5	volts
Anode #3 voltage (E_{b3})	4000	8000	volts
Anode #2 voltage (E_{b2})	2000	4000	volts
Anode #1 voltage (E_{b1}) for focus when E_{c1} = 75% cut-off	500	1000	volts ±20%
Grid voltage (E_{c1}) for beam cut-off	—40	—80	volts ±50%
Deflection Factor:			
D_1D_2 Plates	55	110	d.c. volts/inch ±20%
D_3D_4 Plates	55	110	d.c. volts/inch ±20%
Deflection Sensitivity:			
D_1D_2 Plates	0.46	0.23	mm/d.c. volt (av.)
D_3D_4 Plates	0.46	0.23	mm/d.c. volt (av.)

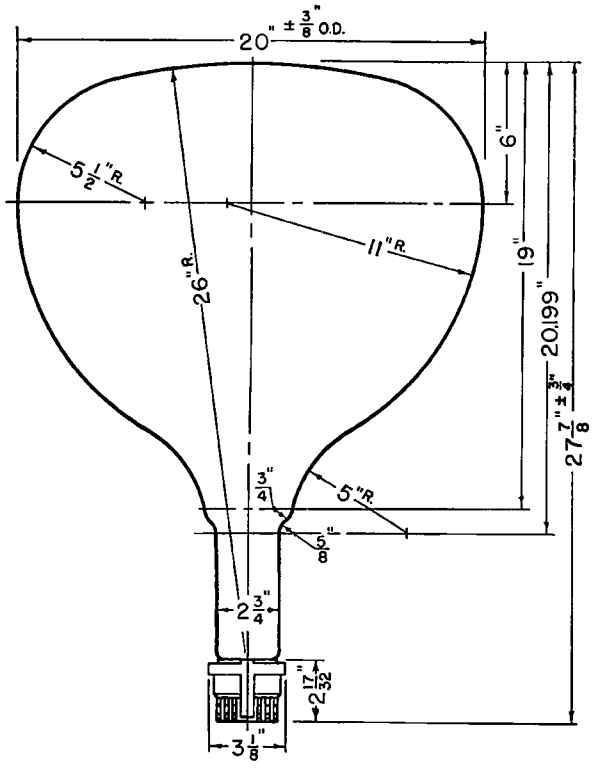
Deflection with Intensifier at Second Anode Potential

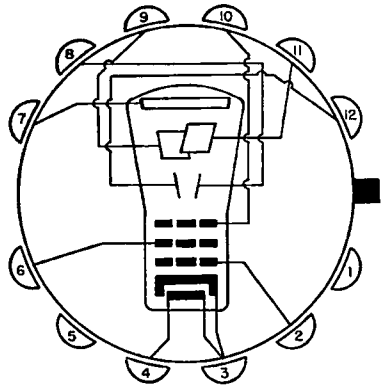
	FACTOR	SENSITIVITY
D_1D_2	22 d.c. volts/kv. in. ±20%	0.12 mm. kv./d.c. volt (av.)
D_3D_4	18 d.c. volts/kv. in ±20%	0.14 mm. kv./d.c. volt (av.)

SPECIAL INSTALLATION NOTES

The 20AP type Cathode-Ray Tubes are mechanically capable of withstanding shocks encountered in ordinary handling and room temperature variations. Because of its large evacuated volume, the glass bulb is under considerable strain due o atmospheric pressure, and the tube must be protected from hard bumps and extreme, sudden changes in temperature. Care should also be taken to avoid scratching the glass bulb since such scratches weaken the glass. It is suggested that a piece of plate glass be placed before the screen on the tube when mounted in television receivers, to protect it from accidental shocks.

The base of the 20AP types fits a twelve-contact socket which can be supported by the base of the cathode-ray tube. The tube may be mounted in any position. One convenient horizontal mounting consists of a rubber block supporting the neck of the bulb, the screen end resting on a padded support, and the socket supported by the base of the tube itself.





Bottom View of Base

Pin #1	No Connection
2	Control Electrode
3	Heater & Cathode
4	Heater
5	No Connection
6	Focusing Electrode
7	Intensifier Electrode
8	Deflection Plate D_4
9	Deflection Plate D_2
10	Accelerating Electrode
11	Deflection Plate D_1
12	Deflection Plate D_3

ALLEN B. DU MONT LABORATORIES, INC.
Passaic, N. J., U. S. A.

275K10-9-42

PRINTED IN U.S.A.

from JEDEC release #4553,
Jan. 6, 1964

DUMONT

CATHODE-RAY TUBE

TYPE 22GP-

The Du Mont Type 22GP- is a 22-inch, metal envelope, magnetic deflection and electrostatic focus cathode-ray tube suitable for radar applications. This tube features an almost completely flat faceplate, minimizing parallax error. The screen is aluminized to increase light output and prevent build-up of spurious screen charges.

GENERAL CHARACTERISTICS

Electrical Data

Focusing Method	Electrostatic	
Deflection Method	Magnetic	
Deflection Angle, Approximate	70	Degrees
Direct Interelectrode Capacitances, Approximate		
Cathode to all other electrodes	5	μμf
Grid No. 1 to all other electrodes	6	μμf

Optical Data

Phosphor Number	2	
Fluorescence	Yellow-Green	
Phosphorescence	Green	
Persistence	Medium	
Faceplate	Clear	

Mechanical Data

Overall Length	23 3/4	Max. Inches
Greatest Diameter of Envelope	21 3/4 ± 1/8	Inches
Minimum Useful Screen Diameter	20	Inches
Envelope Contact	Metal Cone Lip	
Base	B7-51	
Basing	12M	

Allen B. Du Mont Laboratories
Divisions of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

DE-6261 - 2
11/4/63

DUMONT

CATHODE-RAY TUBE

TYPE 22GP-

RATINGS (Absolute Maximum Values)

Heater Voltage	6.3	Volts
Heater Current at 6.3 Volts	0.6 ± 10%	Ampere
Accelerator Voltage	24,000	Max. Volts DC
Accelerator Input	6	Max. Watts
Focusing Electrode Voltage	-1500 to +1500	Max. Volts DC
Grid No. 2 Voltage	800	Max. Volts DC
Grid No. 1 Voltage		
Negative Bias Value	125	Max. Volts DC
Positive Bias Value	0	Max. Volts DC
Positive Peak Value	2	Max. Volts
Peak Heater-Cathode Voltage		
Heater negative with respect to cathode		
During warm-up period not to exceed 15 seconds	410	Max. Volts
After equipment warm-up period	180	Max. Volts
Heater positive with respect to cathode	180	Max. Volts

TYPICAL OPERATING CONDITIONS

Accelerator Voltage	18,000	Volts DC
Grid No. 2 Voltage	400	Volts DC
Grid No. 1 Voltage [1]	-45 to -70	Volts DC
Focusing Voltage [2, 3]	0 to 400	Volts DC
Resolution [3]		
Modulation [2]	35	Volts Max.
Spot Position [4]	20	MM

MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance	1.5	Max. Megohms

Allen B. Du Mont Laboratories
Divisions of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

DUMONT

CATHODE-RAY TUBE

TYPE 22GP-

NOTES

1. Visual extinction of the undeflected, focused spot.

2. Drive voltage from cutoff to a light output of 100 foot lamberts, measured with a 20-inch square focused raster and using 840 (minimum) active lines. Measure anywhere within the usable tube diameter. Weston 759 Foot-Lambert Meter (or equivalent) used. Cathode current will not exceed 300 μA.

3. a. With optimum focus, 840 active lines will be resolved by the eye (without dynamic focusing).

   b. A sine wave voltage is applied to the grid such that the frequency represents 500 (minimum) white dots across the central horizontal axis. The peak voltage of the sine wave is such that it establishes the same grid-cathode voltage relationship required for Note 2, above. Under these conditions the dots will be resolvable by the eye at any and all points within the usable surface area without refocusing. Peak-to-peak amplitude of the sine wave is to be 45 volts or less.

   c. Tests made using a uniform field uncorrected yoke.

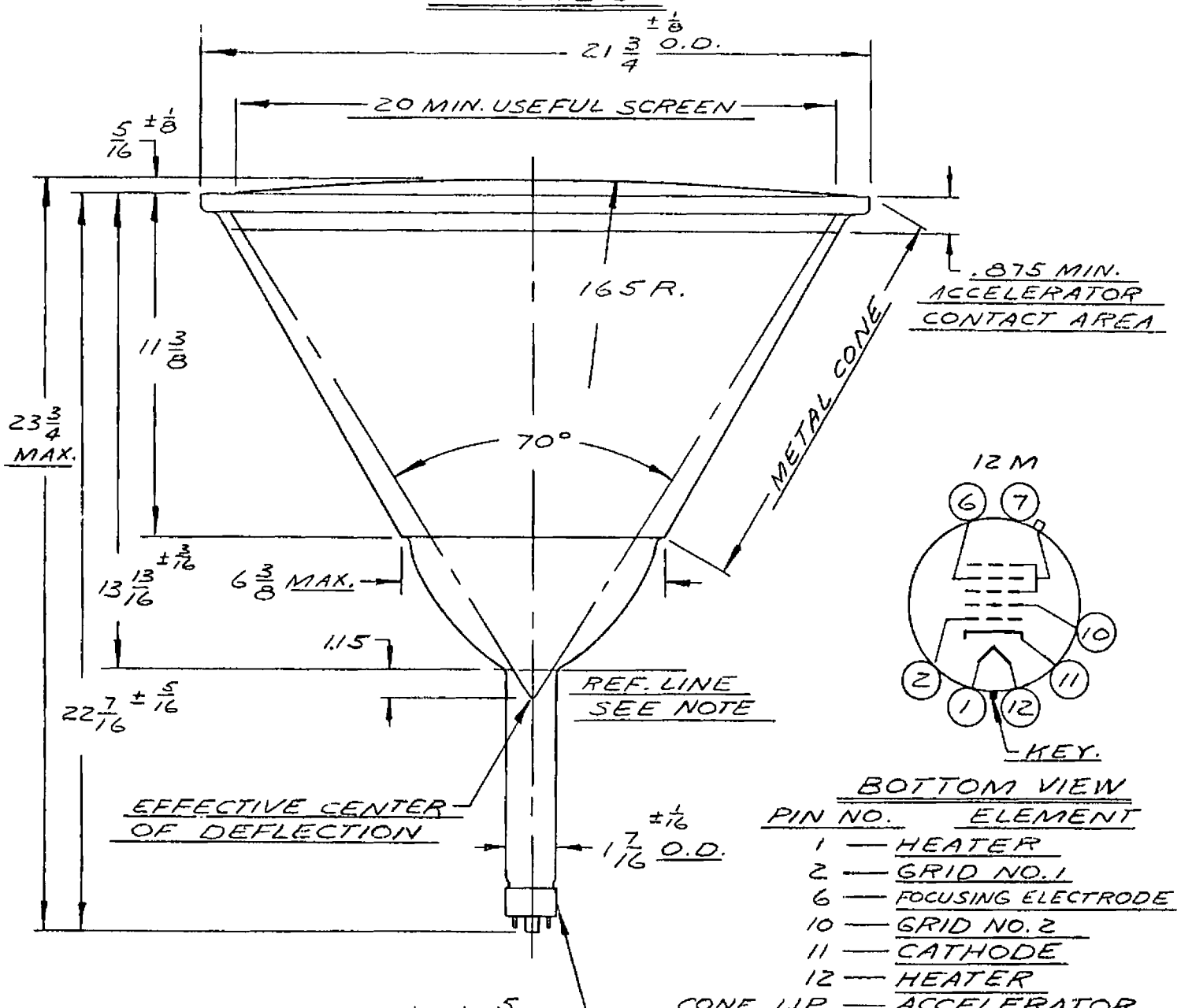
4. The center of the undeflected, focused spot will fall within a 20-mm radius circle concentric with the tube face center.

Allen B. Du Mont Laboratories
Divisions of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

FORM 809R

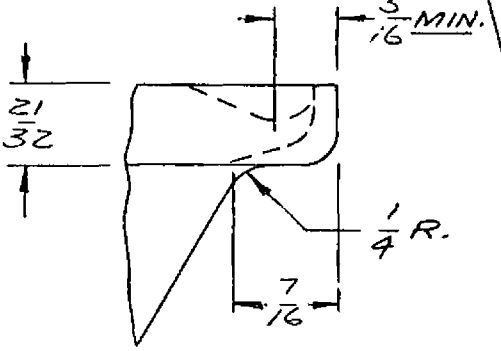
DUMONT

CATHODE-RAY TUBE
TYPE 22GP-



BOTTOM VIEW

PIN NO.	ELEMENT
1	HEATER
2	GRID NO. 1
6	FOCUSING ELECTRODE
10	GRID NO. 2
11	CATHODE
12	HEATER
CONE LIP	ACCELERATOR



DETAIL OF CONE LIP

SMALL SHELL OCTODECAL 7 PIN BASE (B7-51)

NOTE:
REF. LINE DETERMINED BY POSITION WHERE A 1.500 +.003 -.000 DIA. RING GAGE (JEDEC #110) 2 INCHES LONG WILL STOP.

Allen B. Du Mont Laboratories, Inc.
Divisions of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

DE-6261-4
11-4-63

FORM 609 -M1-8-60-SH

DU MONT GAS TRIODES

Types 2B4 and 6Q5G

Mechanical Dimensions, Basing, and Average Operating Characteristics

The Types 2B4 and 6Q5G Gas Triodes are intended for use in Du Mont Cathode-ray Oscillographs for sweep oscillator service. They are also designed for applications where a gas triode is required for control and counter circuits and where a wide frequency range is desired for sweep oscillators.

CHARACTERISTICS

	6Q5G	2B4
Heater		
Voltage (A-C or D-C)	6.3	2.5 volts
Current	0.6	1.4 ampere

Direct Interelectrode Capitances (Nominal)

Grid to anode	2.8 $\mu\mu$f.
Grid to cathode	1.7 $\mu\mu$f.
Anode to cathode	2.0 $\mu\mu$f.

Tube Voltage Drop		19 volts approx.
Maximum Overall Length	4⅛"	4-3/16"
Maximum Diameter	1-9/16"	1-9/16"
Bulb	ST12	ST12
Base	Small shell	Small
	Octal 8 pin	5 pin
Basing—RMA Basing Designation	6Q	5A

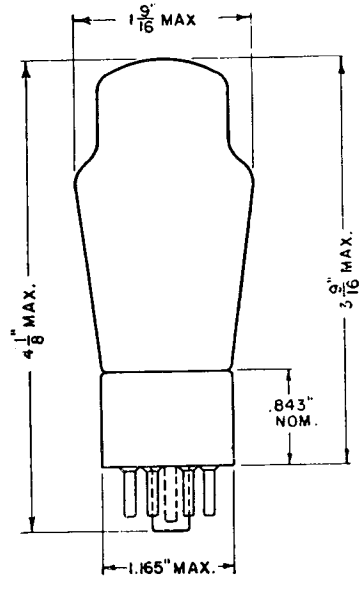
SWEEP-CIRCUIT OSCILLATOR SERVICE

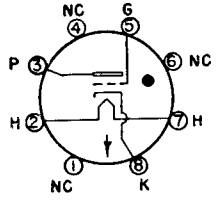
Anode Voltage (Instantaneous)	300 volts (max.)
Peak Anode Current	300 milliamperes (max.)
Average Anode Current	1 milliampere (max.)
Grid Resistance	10,000 ohms (min.) to 100,000 ohms (max.)

Frequency Range:

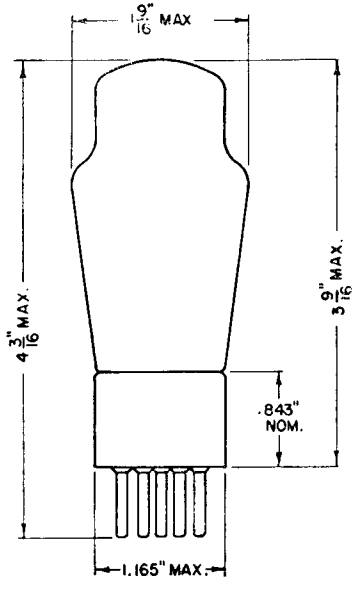
2B4	1-30,000 cps
6Q5G	1-50,000 cps

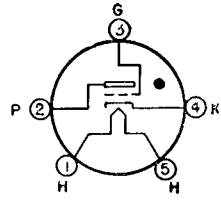
Mechanical Dimensions, Basing, and Average Operating Characteristics



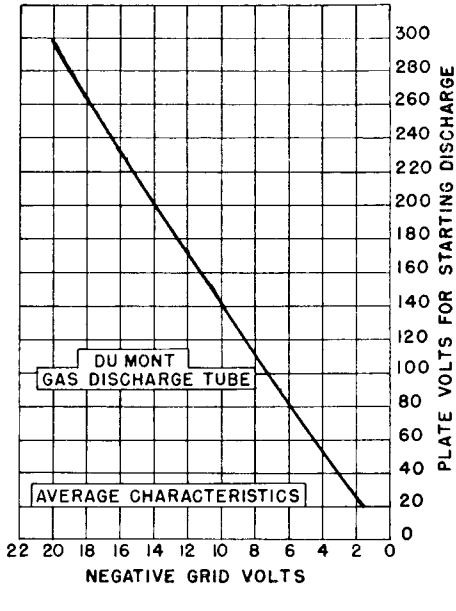


6-Q
Type 6Q5G





5-A
Type 2B4



3ABP- CATHODE-RAY TUBE

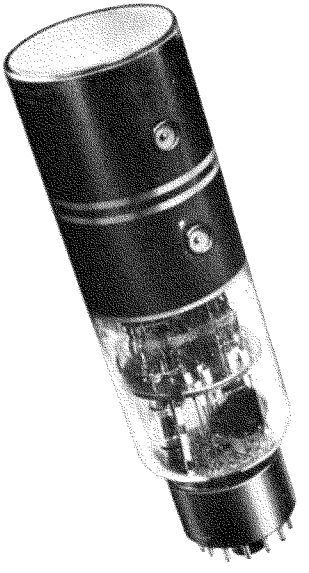
The Du Mont Type 3ABP- is a flat-faced electrostatically focused and deflected cathode-ray tube containing two separate electron-guns. Each electron beam is independent of the other except for the accelerator, heater and cathode connections. For high brightness with maximum deflection sensitivity, post-acceleration is utilized. The Type 3ABP- is one of the line of Du Mont tight-tolerance cathode-ray tubes.

The Type 3ABP- is used in applications requiring a two-beam presentation with high deflection sensitivity and good tracking accuracy on a short three-inch cathode-ray tube.

Deflection electrodes are designed for excellent deflection and tracking accuracy and are electrostatically shielded from each other to prevent interaction.

Both electron-guns employ a design requiring essentially zero focusing anode current.

All connections except for the accelerator and post-accelerator are brought out to the base pins to simplify the problem of connection. For insulation, the accelerator and post-accelerator connections are bulb terminals.



GENERAL CHARACTERISTICS (Note 1)

Electrical

Heater Voltage	6.3 Volts
Heater Current (Both Units)	1.2±10% Ampere
Focusing Method	Electrostatic
Deflecting Method	Electrostatic

Phosphor	No. 1	No. 2	No. 7	No. 11
Fluorescence	Green	Green	Blue	Blue
Phosphorescence	———	Green	Yellow	———
Persistence	Medium	Long	Long	Short

Direct Interelectrode Capacitances	Min.	Max.	
Cathodes to all other electrodes	4.8	7.2	μμf
Grid No. 1 to all other electrodes	3.7	5.5	μμf
D1 to D2	1.7	2.6	μμf
D3 to D4	1.7	2.6	μμf
D1 to all other electrodes except D2	5.6	8.4	μμf
D2 to all other electrodes except D1	5.6	8.4	μμf
D3 to all other electrodes except D4	4.9	7.3	μμf
D4 to all other electrodes except D3	4.9	7.3	μμf

Mechanical

Overall Length	10¾±¼ Inches
Greatest Diameter of Bulb	3±1/16 Inches
Minimum Useful Screen Diameter	2.62 Inches
Bulb Contacts (Recessed Small Ball Caps)	J1-22
Base (Medium shell diheptal, 14 Pin)	B14-38
Basing	14T
Base Alignment	
D3D4 trace aligns with Pin No. 5 and Tube Axis	±10 Degrees

Positive voltage on D1 deflects beam approximately towards Pin No. 1
Positive voltage on D3 deflects beam approximately towards Pin No. 12

Bulb Contact Aligment
J1-22 contacts align with D3D4 trace ..... ±10 Degrees
J1-22 contacts on same side as Pin No. 5

Trace Aligment
Angle between D1D2 and D3D4 traces ..... 90±1 Degree
Corresponding traces of each gun align with each other ..... Within 1 Degree

MAXIMUM RATINGS

Post-Accelerator Voltage ..... 6,000 Max. Volts D-C
Accelerator Voltage (Note 2) ..... 2,000 Max. Volts D-C
Ratio Post-Accelerator Voltage to
Accelerator Voltage (Note 3) ..... 3 Max.
Focusing Voltage ..... 1,000 Max. Volts D-C
Grid No. 1 Voltage
Negative Bias Value ..... 200 Max. Volts D-C
Positive Peak Value ..... 0 Max. Volts D-C
Positive Bias Value ..... 0 Max. Volts
Peak Voltage between Accelerator and any
Deflection Electrode ..... 550 Max. Volts

TYPICAL OPERATING CONDITIONS

For Post-Accelerator Voltage of ..... 4,000 Volts D-C
For Accelerator Voltage of ..... 2,000 Volts D-C
Focusing Voltage ..... 380 to 580 Volts D-C
Grid No. 1 Voltage (Note 4) ..... −45 to −75 Volts D-C
Modulation Factor (Note 5) ..... 40 Max. Volts D-C
Line Width "A" (Note 6) ..... .018 Max. Inches
P1 Light Output (Note 6) ..... 20 Ft. L. Min.
Deflection Factors:
D1 and D2 ..... 164 to 198 Volts DC/Inch
D3 and D4 ..... 148 to 181 Volts DC/Inch
Deflection Factor Uniformity (Note 7) ..... 2½% Maximum
Tracking Error (Note 8) 2%
Pattern Distortion @ 75% of Minimum
Useful Screen Diameter (Note 9) ..... 2% Max.
Interaction Factor (Note 11) ..... .000012 Max. Inches/Volt
Spot Position (Undeflected, Focused) (Note 12) ..... Within a ¼ Inch Radius Circle

CIRCUIT DESIGN VALUES

Focusing Voltage ..... 190 to 290 Volts per Kilovolt of Accelerator Voltage
Focusing Current for any operating condition ..... −50 to +10 Microamperes
Grid No. 1 Voltage (Note 4) .... −22.5 to −37.5 Volts per Kilovolt of Accelerator Voltage
Grid No. 1 Circuit Resistance ..... 1.5 Max. Megohms
Deflection Factors:
Post-Accelerator Voltage = Accelerator Voltage
D1 and D2 63 to 77 Volts D-C/Inch/KV of Accelerator Voltage
D3 and D4 59.5 to 72.5 Volts D-C/Inch/KV of Accelerator Voltage
Resistance in any Deflecting-Electrode Circuit (Note 13) ..... 5.0 Max. Megohms

NOTES

1. Values are for each unit unless otherwise stated.
2. Accelerator power input (avg.) should be limited to 6 watts.
3. This tube is designed for optimum performance when operating at an Eb3/Eb2 ratio of 2.0. Operation at other ratios of Eb3/Eb2 may result in increased deflection (non) uniformity, pattern distortion and tracking error.
4. For visual extinction of the focused undeflected spot.
5. The increase in Grid No. 1 voltage from cut-off to produce an Ib3 of 25 μADC.
6. Measured in accordance with MIL-E-1 specifications using an Ib3 of 25 μADC.
7. The deflection factor (For both D1D2 and D3D4 plate pairs, separately) for deflections of less than 75% of the useful scan will not differ from the deflection factor for a deflection of 25% of the useful scan by more than the indicated value.

8. The positions of the spot of each beam, when deflected from the center by applied voltages proportional to the deflection factor will not deviate from each other by more than the indicated percentage of the deflection.

9. The edges of a raster pattern, whose mean dimensions are the indicated percentage of useful screen diameter, shall not deviate from the mean dimension rectangle by more than the specified amount.

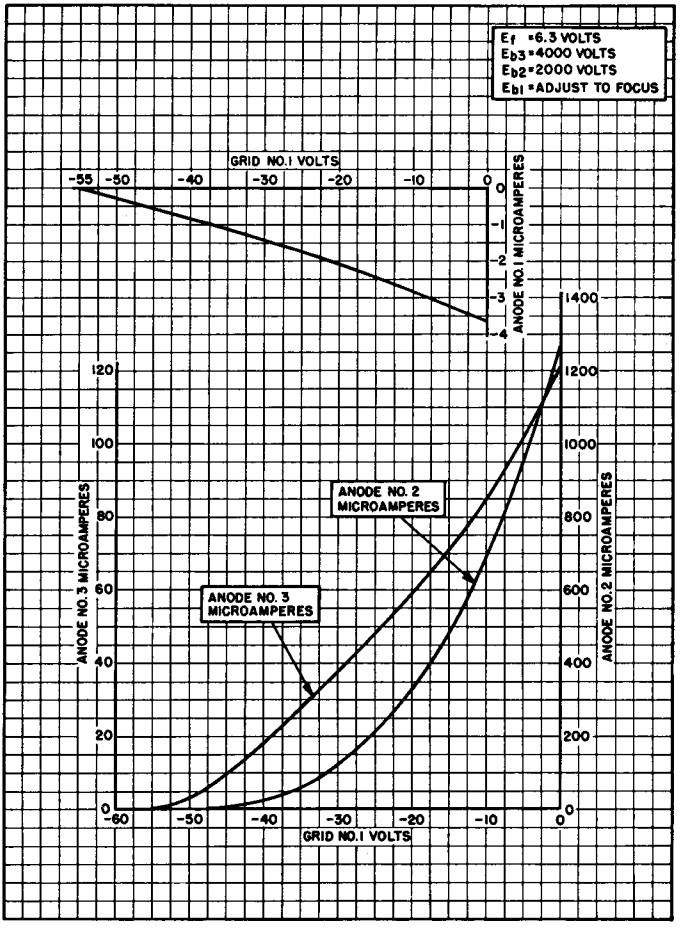
10. Deflection accuracy may be obtained by combining angle between traces, deflection factor uniformity and pattern distortion characteristics. In general, for deflections less than those indicated the accuracy will improve.

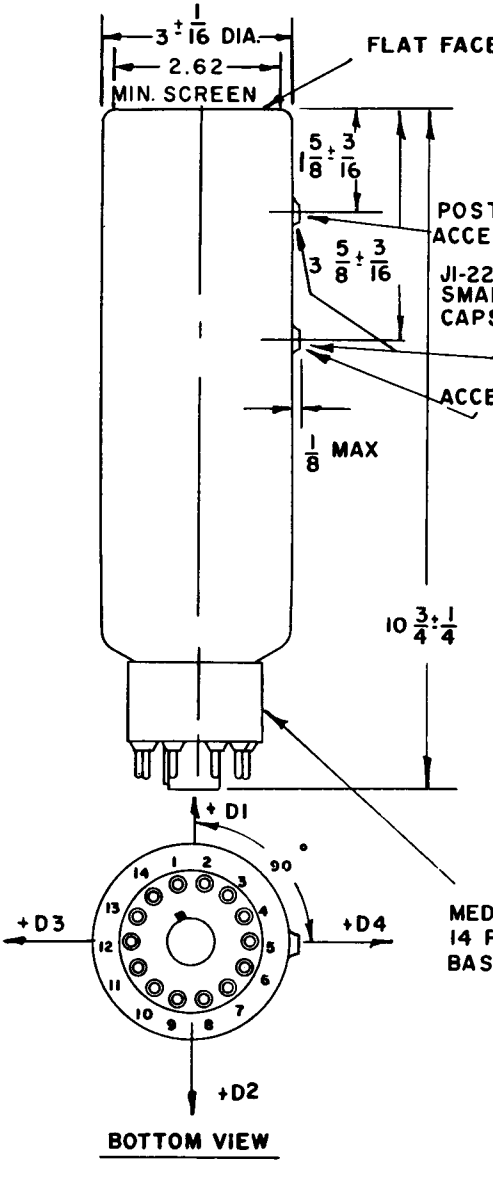
11. The deflection of one beam when balanced DC Voltages are applied to the deflection electrodes of the other beam will not be greater than the indicated value.

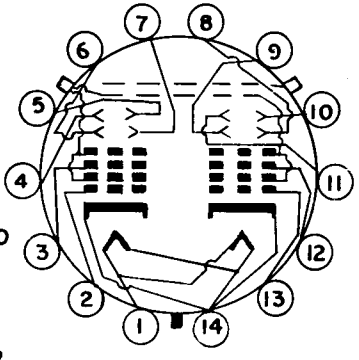
12. Centered with respect to the tube face and with the tube shielded.

13. Deflection electrode circuit resistance should be equal.

TYPE 3ABP-
AVERAGE CHARACTERISTICS







UNIT A		UNIT B	
PIN NO.	ELEMENT	PIN NO.	ELEMENT
1	HEATER	8	DEFLECTOR 4
2	GRID NO.1	9	DEFLECTOR 3
3	FOCUSING ELECTRODE	10	DEFLECTOR 2
		11	DEFLECTOR 1
4	DEFLECTOR 1	12	FOCUSING ELECTRODE
5	DEFLECTOR 2		
6	DEFLECTOR 3	13	GRID NO.1
7	DEFLECTOR 4	14	HEATER & CATHODE

NOTE: 1. PIN NOS. 1 AND 14, HEATER AND CATHODE ARE COMMON TO BOTH UNITS.
2. THE BULB SHALL BE A J24-X1

3ACP1
3ACP7 3ACP 2
3ACP11

DUMONT

3ACP- CATHODE-RAY TUBE

The Du Mont Type 3ACP- is a flat face, single beam, electrostatic deflection and focus cathode-ray tube. Post-Acceleration is used in order that the maximum deflection sensitivity can be obtained with high brightness. The deflection structure is designed such as to improve the deflection accuracy and is electrostatically shielded where possible in order to minimize interaction. The electron gun is so designed as to require no appreciable focus electrode current. The electrode connections are so arranged as to give the maximum insulation yet retain simplicity of connection.

GENERAL CHARACTERISTICS

Electrical Data

Heater Voltage		6.3		Volts
Heater Current		0.6 ± 10%		Amperes
Focusing Method		Electrostatic		
Deflecting Method		Electrostatic		
Phosphor	No. 1	No. 2	No. 7	No. 11
Fluorescence	Green	Green	Blue	Blue
Phosphorescence	-	Green	Yellow	-
Persistence	Medium	Long	Long	Short
Direct Interelectrode Capacitances		Min.	Max.	
Cathode to all other electrodes		2.8	4.2	uuf
Grid No. 1 to all other electrodes		4.4	6.6	uuf
D1 to D2		1.3	1.9	uuf
D3 to D4		.9	1.3	uuf
D1 to all other electrodes except D2		3.3	4.9	uuf
D2 to all other electrodes except D1		3.1	4.7	uuf
D3 to all other electrodes except D4		2.4	3.6	uuf
D4 to all other electrodes except D3		2.3	3.5	uuf

Mechanical Data

Overall Length	10 ± 3/16	Inches
Greatest Bulb Diameter	3 ± 1/16	Inches
Minimum Useful Screen Diameter	2.68	Inches
Bulb Contact (Recessed Small Ball Cap)	J1-22	
Base (Medium Shell Diheptal 12-pin)	B12-37	
Basing	14J	
Base Alignment		
D1D2 trace aligns with Pin No. 5 and tube axis	0 ± 10	Degrees

Positive voltage on D1 deflects the beam approximately towards Pin No. 5
Positive voltage on D3 deflects the beam approximately towards Pin No. 2

Bulb Contact Alignment		
J1-22 contact aligns with D1D2 trace	0 ± 10	Degrees
J1-22 contact on same side as Pin No. 5		
Trace Alignment		
Angle between D3D4 and D1D2 trace	90 ± 1	Degrees

DUMONT

3ACP- CATHODE-RAY TUBE

MAXIMUM RATINGS Design Center Values

Post Accelerator Voltage	6,000	Max. Volts D-C
Accelerator Voltage (Note 1)	2,000	Max. Volts D-C
Ratio Post-Accelerator Voltage to Accelerator Voltage (Note 2)	3.0	Max.
Focusing Voltage	1,500	Max. Volts D-C
Grid No. 1 Voltage		
Negative Bias Value	200	Max. Volts D-C
Positive Bias Value	0	Max. Volts D-C
Positive Peak Value	0	Max. Volts D-C
Peak Heater to Cathode Voltage		
Heater Negative with respect to Cathode	180	Max. Volts D-C
Heater Positive with respect to Cathode	180	Max. Volts D-C
Peak Voltage between Accelerator and any Deflection Electrode	550	Max. Volts D-C

TYPICAL OPERATING CONDITIONS

For Post-Accelerator Voltage of	4,000	Volts D-C
For Accelerator Voltage of (Note 3)	2,000	Volts D-C
Focusing Voltage	400 to 690	Volts D-C
Grid No. 1 Voltage (Note 4)	-45 to -75	Volts D-C
Modulation Factor (Note 5)	38	Volts Max.
Line Width A (Note 6)	.020	Inches Max.
P1 Light Output (Note 6)	20	Ft. L. Min.
Deflection Factors		
D1 and D2	180 to 220	Volts D-C/Inch
D3 and D4	133 to 163	Volts D-C/Inch
Deflection Factor Uniformity (Note 7)	2%	Max.
Useful Scan (Note 8)		
D1D2	2.62	Inches
D3D4	2.62	Inches
Pattern Distortion @ 75% of useful scan (Note 9)	2%	Max.
Spot Position (Undeflected and focused)(Note 11)	Within a 3/16-inch radius circle	

CIRCUIT DESIGN VALUES

Focusing Voltage	200 to 345 Volts per Kilovolt of Accelerator Voltage	
Focusing Current for any operating condition	-50 to + 10	Microamperes
Grid No. 1 Voltage (Note 4)	-22.5 to -37.5 Volts per Kilovolt of Accelerator Voltage	
Grid No. 1 Circuit Resistance	1.5	Max. Megohms
Deflection Factors:		
Post-Accelerator Voltage = Accelerator Voltage		
D1 and D2	72 to 88 Volts D-C/Inch/KV of Accelerator Voltage	
D3 and D4	55 to 67 Volts D-C/Inch/KV of Accelerator Voltage	
Resistance in any Deflecting-Electrode Circuit(Note 12)	5.0	Max. Megohms

3ACP1
3ACP7
3ACP11

DUMONT

3ACP- CATHODE-RAY TUBE

NOTES

1. Accelerator power input (Avg.) should be limited to 6 watts.

2. This tube is designed for optimum performance when operating at an Eb3/Eb2 ratio of 2.0. Operation at other ratios of Eb3/Eb2 may result in increased deflection (non) uniformity and pattern distortion.

3. Accelerator and Grid No. 2 are connected internally and referred to herein as accelerator.

4. Visual extinction of the undeflected focused spot.

5. The increase in Grid No. 1 voltage from cut-off to produce an Ib3 of 25 uADC.

6. Measured in accordance with Jan-1A specifications dated 20 May 1949 using an Ib3 of 25 uA D.C.

7. The deflection factor (for both D1D2 and D3D4 plate pairs, separately) for deflection of less than 75% of the useful scan will not differ from the deflection factor for a deflection of 25% of the useful scan by more than the indicated value.

8. Values shown are applicable to any operating condition with Post-Accelerator Voltage to Accelerator Voltage Ratios up to 2.0.

9. The edges of a raster pattern, whose mean dimensions are the indicated percentage of useful scan, shall not deviate from the mean dimension rectangle by more than the specified amount.

10. Deflection accuracy may be obtained by combining angle between traces, deflection factor uniformity and pattern distortion characteristics. In general, for deflections less than those indicated the accuracy will improve.

11. Centered with respect to the tube face and with the tube shielded.

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

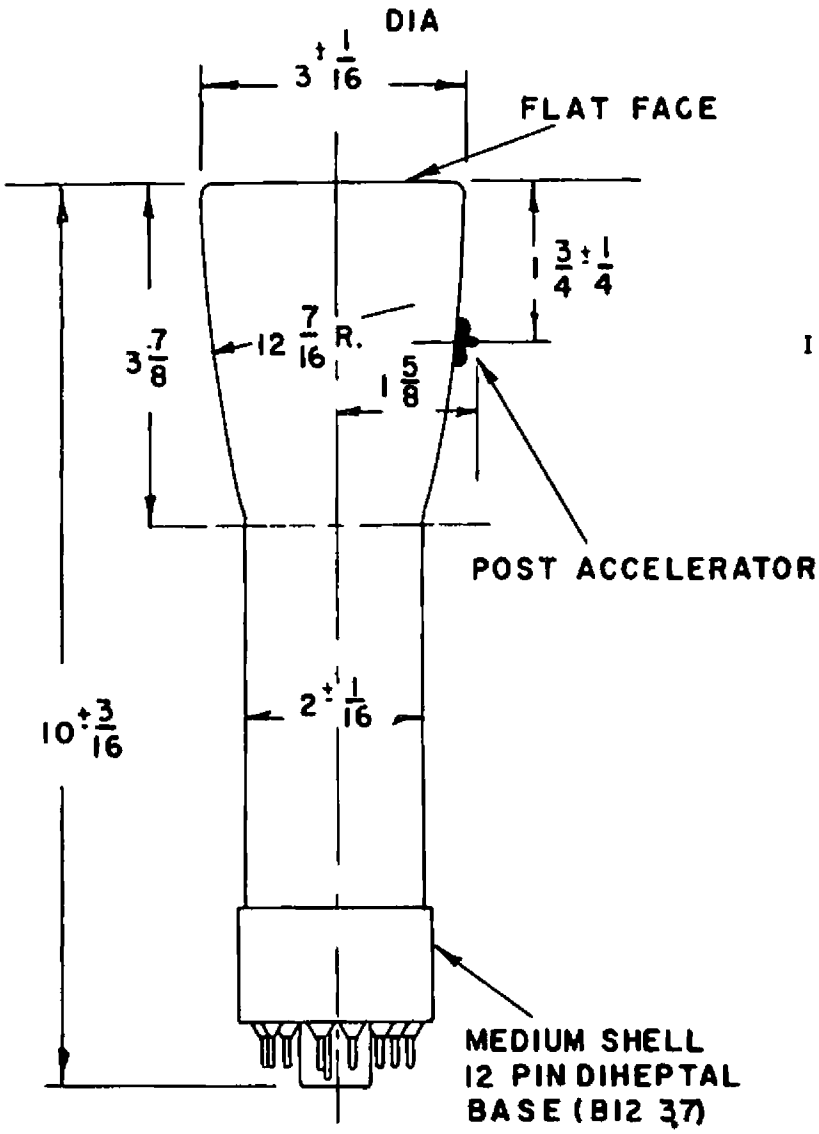
JT

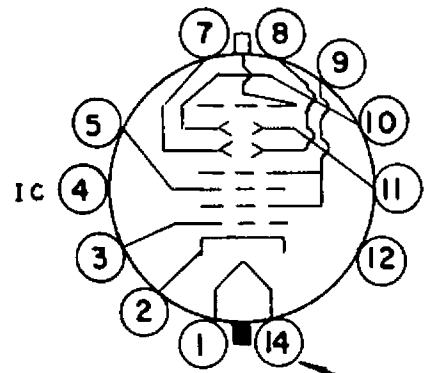
TL-1042-5
12 February 1953

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

CATHODE-RAY TUBE

TYPE 3ACP-

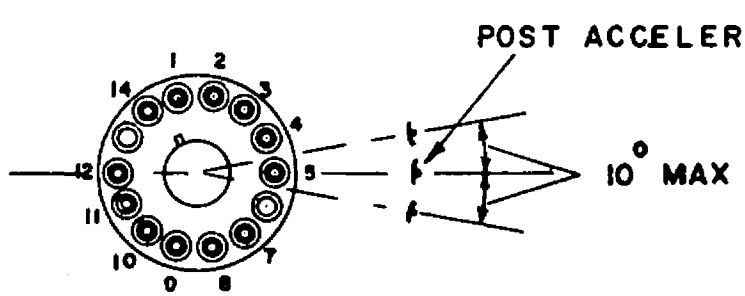




14 J

BOTTOM VIEW

PIN NO	ELEMENT
1	HEATER
2	CATHODE
3	GRID NO.1
4	INTERNAL CONNECTION
5	FOCUSING ELECTRODE
7	DEFLECTING ELECTRODE D3
8	DEFLECTING ELECTRODE D4
9	ACCELERATOR
10	DEFLECTING ELECTRODE D2
11	DEFLECTING ELECTRODE D1
14	HEATER



TYPE 3ACP-A CATHODE-RAY TUBES

The Du Mont Type 3ACP-A is a flat face, single beam, electrostatic deflection and focus Cathode-ray Tube. A combination of post-acceleration and a very efficient gun design results in high light output, high deflection sensitivity and small spot size. The deflection structure is designed so as to improve the deflection accuracy and is electrostatically shielded where possible in order to minimize interaction. The electron gun is so designed as to require no appreciable focus electrode current. The electrode connections are arranged to give maximum insulation yet retain simplicity of connection. The 3ACP-A is one of the line of Du Mont tight-tolerance cathode-ray tubes.



GENERAL CHARACTERISTICS

Electrical Data

Focusing Method	Electrostatic
Deflecting Method	Electrostatic
Direct Interelectrode Capacitances - Maximum	
Cathode to all	4.2 $\mu\mu$f
Grid No. 1 to all	5.5 $\mu\mu$f
D1 to D2	2.1 $\mu\mu$f
D3 to D4	1.5 $\mu\mu$f
D1 to all	5.8 $\mu\mu$f
D2 to all	5.8 $\mu\mu$f
D3 to all	4.5 $\mu\mu$f
D4 to all	4.5 $\mu\mu$f

Optical Data

Phosphor Number	1	2	7	11
Fluorescent Color	Green	Green	Blue	Blue
Phosphorescent Color	——	Green	Yellow	——
Persistence	Medium	Long	Long	Short

Mechanical Data

Overall Length	10 ± 3/16 Inches
Greatest Diameter of Bulb	3 ± 1/16 Inches
Minimum Useful Screen Diameter	2.68 Inches
Bulb Number	J24-V1
Bulb Contact — Recessed Small Ball Cap	J1-22
Base — Medium Shell Diheptal, 12 Pin	B12-37
Basing	14J
Base Alignment	
D1D2 trace aligns with Pin No. 5 and tube axis	0 ± 10 Degrees
Positive voltage on D1 deflects beam approximately toward Base Pin No. 5	
Positive voltage on D3 deflects beam approximately toward Base Pin No. 2	
Bulb Contact Alignment	
J1-22 contact aligns with D1D2 trace	0 ± 10 Degrees
J1-22 contact on same side as Pin No. 5	
Trace Alignment	
Angle between D3D4 and D1D2 traces	90 ± 1 Degrees

MAXIMUM RATINGS (Design Center Value)

Heater Voltage	6.3 Volts
Heater Current at 6.3 Volts	0.6 ± 10% Ampere
Post-Accelerator Voltage	6000 Max. Volts D-C
Accelerator Voltage	2000 Max. Volts D-C
Ratio Post-Accelerator Voltage to Accelerator Voltage (Note 1)	3.0
Accelerator Input (Avg.)	6.0 Max. Watts
Focusing Electrode Voltage	1500 Max. Volts D-C
Grid No. 1 Voltage	
Negative Bias Value	200 Max. Volts D-C
Positive Bias Value	0 Max. Volts D-C
Positive Peak Value	0 Max. Volts
Peak Heater-Cathode Voltage	
Heater negative with respect to cathode	180 Max. Volts
Heater positive with respect to cathode	180 Max. Volts
Peak Voltage between Accelerator and any Deflection Electrode	550 Max. Volts

TYPICAL OPERATING CONDITIONS

Post-Accelerator Voltage	4000 Volts
Accelerator Voltage	2000 Volts
Focusing Electrode Voltage	390 to 550 Volts
Grid No. 1 Voltage (Note 2)	—45 to —75 Volts
Anode No. 3 Current (Note 3)	500 Min. μADC
Cathode Current (Note 4)	125 Max. μADC
Cathode Current (Note 5)	600 Max. μADC
Deflection Factors:	
D1 and D2	175 to 205 Volts D-C per Inch
D3 and D4	138 to 158 Volts D-C per Inch
Deflection Factor Uniformity (Note 6)	2% Max.
Pattern Distortion (Note 7)	2% Max.
Modulation (Note 8)	21 Max. Volts D-C
Modulation (Note 9)	45 Max. Volts D-C
Line Width "A" (Note 10)	0.016 Max. Inches
Line Width "A" (Note 9)	0.028 Max. Inches
Light Output (Note 11)	
P1	80 Foot Lamberts Min.
P11	35 Foot Lamberts Min.
Focusing Electrode Current for any operating condition	—15 to +5 μA
Spot Position (focused and undeflected) (Note 12)	within a 3/16 Inch radius circle

For Accelerator Voltage not shown in the preceding table, the following can be used as a guide:

Focusing Electrode Voltage	19.5% to 27.5% of Accelerator Volts
Grid No. 1 Voltage	2.2% to 3.8% of Accelerator Volts
Ratio Post-Accelerator to Accelerator Voltage	1.0
D1 and D2	71 to 81.5 Volts D-C per Inch per Kilovolt of Accelerator
D3 and D4	55 to 63.5 Volts D-C per Inch per Kilovolt of Accelerator
Ratio Post-Accelerator to Accelerator Voltage	2.0
D1 and D2	87.5 to 102.5 Volts D-C per Inch per Kilovolt of Accelerator
D3 and D4	69 to 79 Volts D-C per Inch per Kilovolt of Accelerator

MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance	1.5 Max. Megohms
Resistance in any Deflecting Electrode Circuit (Note 13)	1.0 Max. Megohms

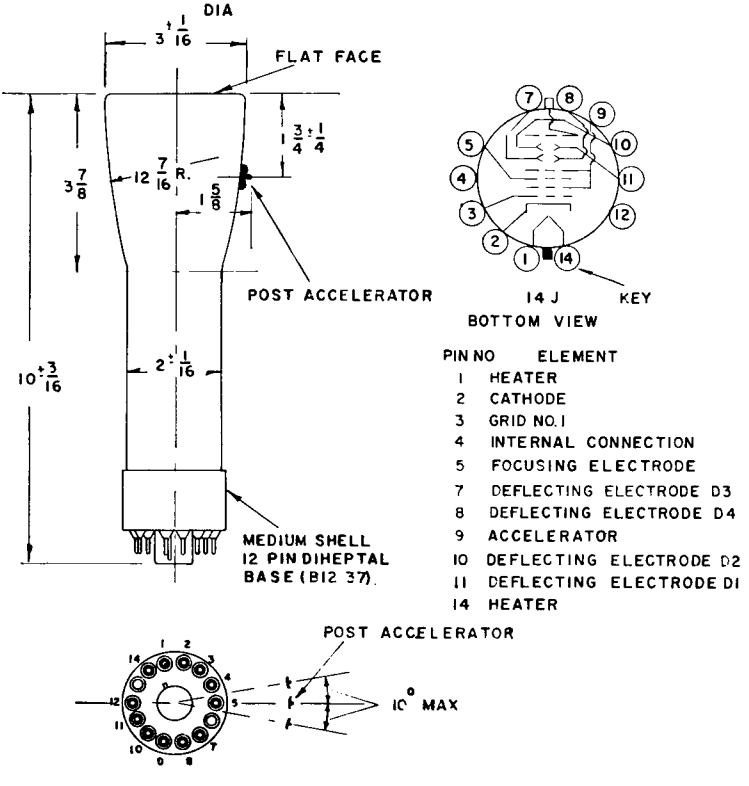
NOTES

1. This tube is designed for optimum performance when operating at an Eb3/Eb2 ratio of 2.0. Operation at other ratios of Eb3/Eb2 may result in changes in deflection uniformity and pattern distortion.
2. Visual extinction of undeflected focused spot.
3. For Ec1 = 0 VDC.
4. For an Ib3 of 50 μADC.
5. For an Ib3 of 200 μADC.
6. As per MIL-E-1B specifications.
7. All portions of a raster pattern, adjusted so its widest points just touch the sides of a 1.938 inch square, will fall within the area bounded by the 1.938 inch square and an inscribed 1.862 inch square.
8. For an Ib3 of 25 μADC measured in accordance with MIL-E-1 specifications.
9. For an Ib3 of 200 μADC measured in accordance with MIL-E-1 specifications.

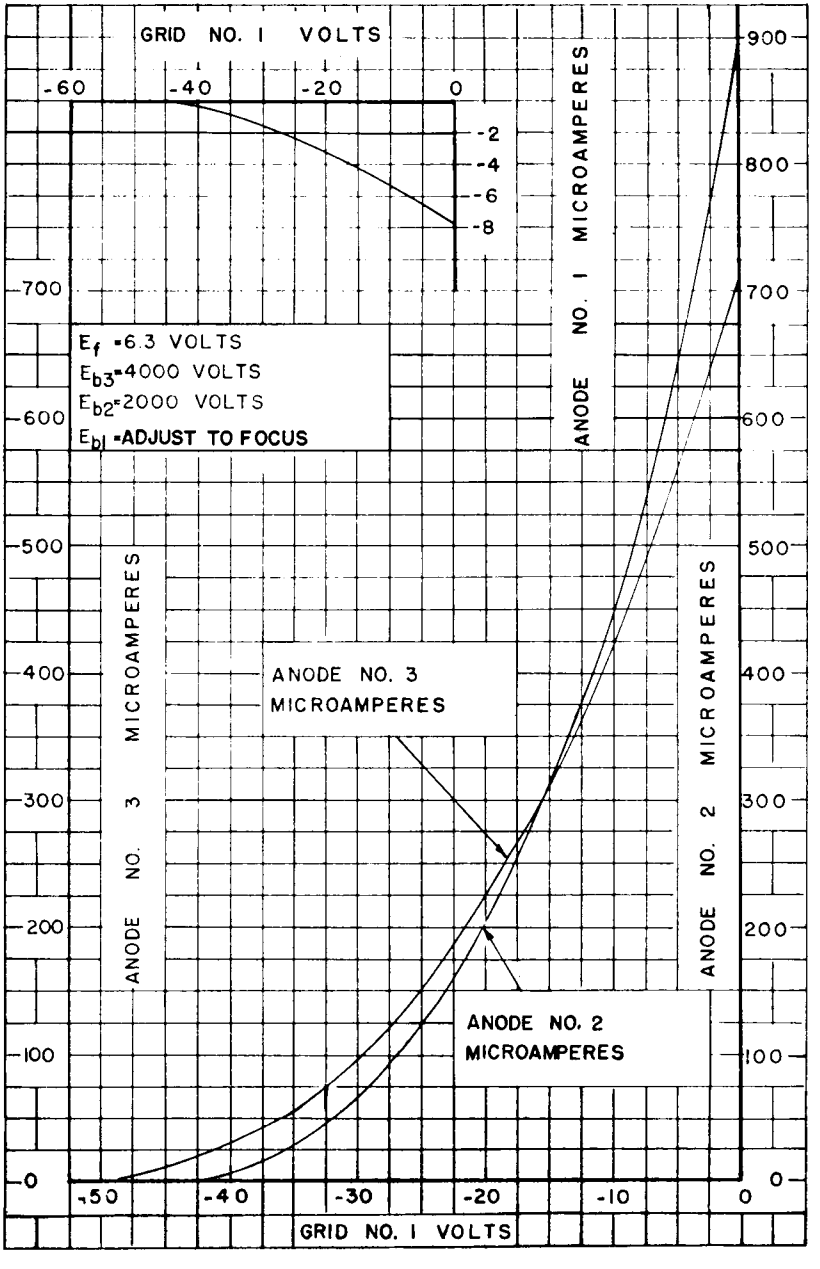
10. For an Ib3 of 50 μADC measured in accordance with MIL-E-1 specifications.
11. For an Ib3 of 100 μADC measured in accordance with MIL-E-1 specifications using a raster size of $1\frac{7}{8}$ x $1\frac{7}{8}$ inches. The P11 phosphor is measured with a photronic cell without eye correction.
12. Centered with respect to the tube face and with the tube shielded. Connect free deflecting electrodes to accelerator.
13. It is recommended that the deflecting-electrode circuit resistance be approximately equal. Higher resistance values up to five megohms may be used for low beam current operation.

TYPE 3ACP-

2.68 MIN. SCREEN



TYPE 3ACP-
AVERAGE CHARACTERISTICS



TYPE 3ADP- CATHODE-RAY-TUBES

The Du Mont Type 3ADP- is a 3 inch, flat face, single beam, electrostatic deflection and focus Cathode-ray Tube of compact design. Post-acceleration coupled with restricted deflection area provides high light output, very high deflection sensitivity, and small spot size. The electron gun is so designed as to require no appreciable focus electrode current. The deflector and anode leads are brought out directly through the bulb wall in order to provide maximum insulation while minimizing lead inductance and capacitance. The 3ADP- is one of the line of Du Mont Tight-tolerance Cathode-ray Tubes.



GENERAL CHARACTERISTICS

Electrical Data

Focusing Method	Electrostatic
Deflecting Method	Electrostatic

Direct Interelectrode Capacitances	Min.	Max.	
Cathode to all	3.0	4.5	$\mu\mu f$
Grid No. 1 to all	5.5	7.2	$\mu\mu f$
D1 to D2	1.4	2.0	$\mu\mu f$
D3 to D4	0.9	1.5	$\mu\mu f$
D1 to all	3.6	4.6	$\mu\mu f$
D2 to all	3.6	4.6	$\mu\mu f$
D3 to all	2.7	3.6	$\mu\mu f$
D4 to all	2.7	3.6	$\mu\mu f$

Optical Data

Phosphor Number	1	2	7	11
Fluorescent Color	Green	Green	Blue	Blue
Phosphorescent Color	——	Green	Yellow	——
Persistence	Medium	Long	Long	Short

Mechanical Data

Overall Length	10 ± ¼ Inches
Greatest Diameter of Bulb	3 ± 1/16 Inches
Minimum Useful Screen Diameter	2.68 Inches
Bulb Number	J24ZA1
Bulb Contact	J1-22
Neck Contacts	J1-25
Base — Small Shell, 12 Pin Duodecal	B12-43
Basing	12Z
Base Alignment	
D1D2 trace aligns with Pin No. 5 and tube axis	± 10 Degrees
Positive voltage on D1 deflects beam approximately toward Base Pin No. 5	
Positive voltage on D3 deflects beam approximately toward Base Pin No. 2	
Bulb Contact Alignment	
J1-22 contact aligns with D1D2 trace	± 10 Degrees
J1-22 contact on same side as Pin No. 5	
Trace Alignment	
Angle between D3D4 and D1D2 traces	90 ± 1 Degrees

MAXIMUM RATINGS (Design Center Values)

Heater Voltage	6.3 Volts
Heater Current at 6.3 Volts	0.6 ± 10% Ampere
Post-Accelerator Voltage	6000 Max. Volts D-C
Accelerator Voltage	3000 Max. Volts D-C
Ratio Post-Accelerator Voltage to Accelerator Voltage (Note 1)	2.0
Accelerator Input (Avg.)	6.0 Max. Watts
Focusing Electrode Voltage	1000 Max. Volts D-C
Grid No. 1 Voltage	
Negative Bias Value	200 Max. Volts D-C
Positive Bias Value	0 Max. Volts D-C
Positive Peak Value	0 Max. Volts
Peak Heater-Cathode Voltage	
Heater negative with respect to cathode	180 Max. Volts
Heater positive with respect to cathode	180 Max. Volts
Peak Voltage between Accelerator and any Deflection Electrode	550 Max. Volts

TYPICAL OPERATING CONDITIONS

Post-Accelerator Voltage	4000 Volts
Accelerator Voltage	2000 Volts
Focusing Electrode Voltage	320 to 470 Volts
Grid No. 1 Voltage (Note 2)	—52 to —87 Volts
Deflection Factors:	
D1 and D2	140 to 155 Volts D-C per Inch
D3 and D4	61 to 68 Volts D-C per Inch
Deflection Factor Uniformity (Note 3)	2% Max.
Useful Scan	
D1 and D2	2.63 (± 1.315 from tube face center) Min. Inches
D3 and D4	1.5 (± 0.750 from tube face center) Min. Inches
Pattern Distortion (Note 4)	2% Max.
Modulation (Note 5)	38 Max. Volts D-C
Line Width "A" (Note 5)	.014 Max. Inches
Light Output (Note 6)	
P1 (Note 7)	38 Foot Lamberts Min.
P11 (Note 8)	14 Foot Lamberts Min.
Focusing Electrode Current for any operating condition	—15 to +5 μA
Spot Position (focused and undeflected) (Note 9)	Within a 10 mm Square

For Accelerator Voltage not shown in the preceding table, the following can be used as a guide:

Focusing Electrode Voltage	16% to 23.5% of Accelerator Volts
Grid No. 1 Voltage	2.6% to 4.4% of Accelerator Volts
Ratio Post-Accelerator to Accelerator Voltage	2.0
D1 and D2	70 to 78 Volts D-C per Inch per Kilovolt of Accelerator
D3 and D4	30 to 34 Volts D-C per Inch per Kilovolt of Accelerator

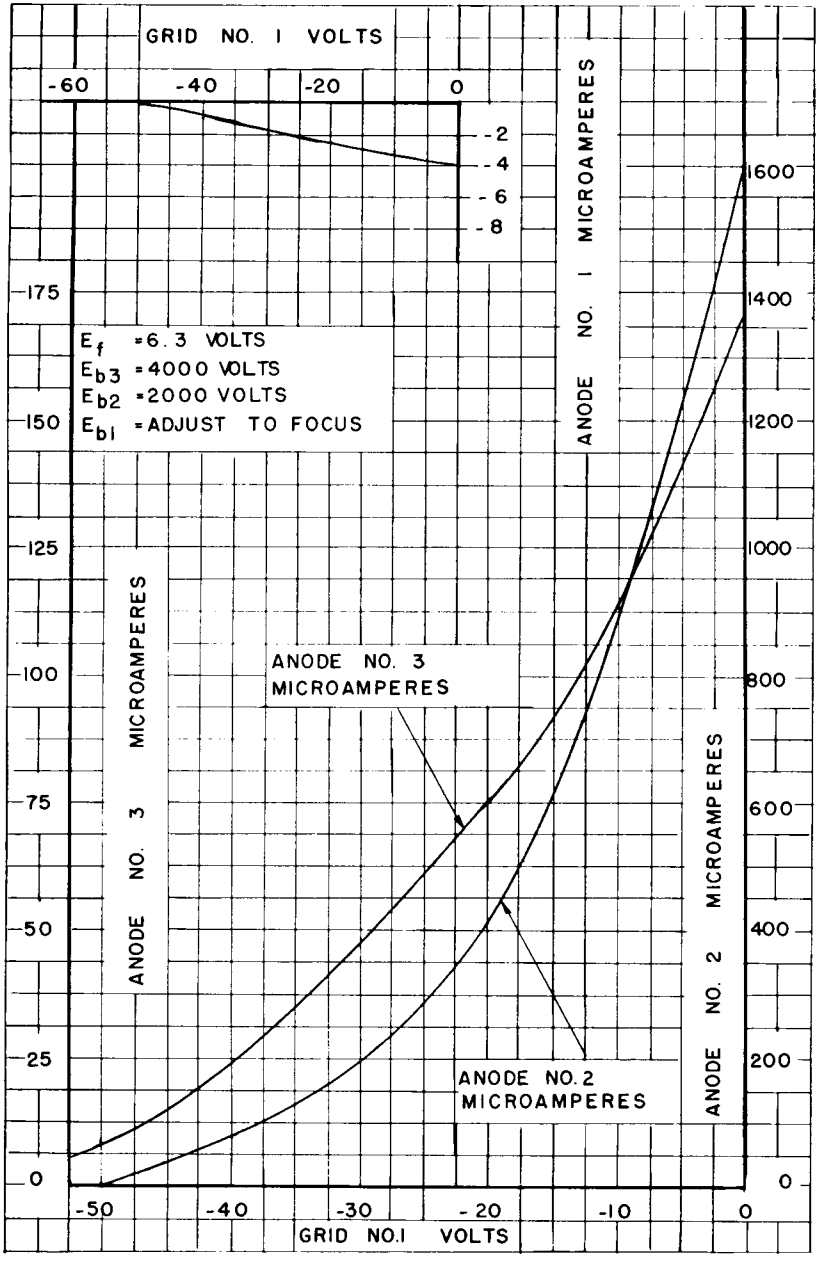
MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance	1.5 Max. Megohms
Resistance in any Deflecting Electrode Circuit (Note 10)	1.0 Max. Megohms

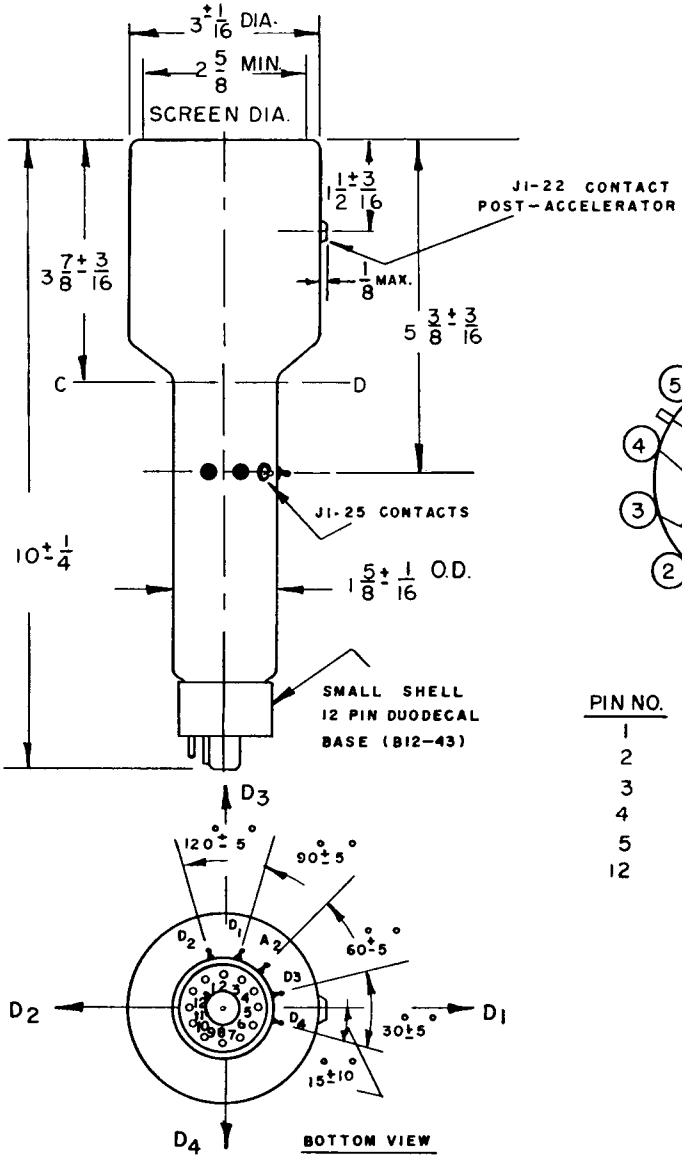
NOTES

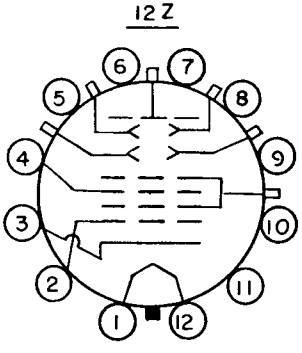
1. This tube is designed for optimum performance when operating at an Eb3/Eb2 ratio of 2.0. Operation at other ratios of Eb3/Eb2 may result in changes in deflection uniformity and pattern distortion.
2. Visual extinction of undeflected focused spot.
3. As per MIL-E-1 specifications using useful scan as reference.
4. All portions of a raster pattern, adjusted so its widest points just touch the sides of a 2.295 x 1.530 inch rectangle, will fall within the area bounded by the 2.295 x 1.530 inch rectangle and an inscribed 2.205 x 1.470 inch rectangle.
5. For an Ib3 of 25 μADC measured in accordance with MIL-E-1 specifications.
6. Using a raster size of 2¼ x 1½ inches and an Ib3 of 25 μADC.
7. Using a #594 Photronic cell with Viscor filter (for eye correction).
8. Using a #594 Photronic cell without Viscor filter (without eye correction).
9. Centered with respect to the tube face and with the tube shielded. Connect free deflecting electrodes to accelerator.
10. It is recommended that the deflecting-electrode circuit resistance be approximately equal.

TYPE 3ADP-
AVERAGE CHARACTERISTICS



TYPE 3ADP-





PIN NO.	ELEMENT
1	HEATER
2	GRID NO.1
3	CATHODE
4	FOCUSING ELECTRODE
5	INTERNAL CONNECTION
12	HEATER

from JEDEC release
#2698, Jan. 18, 1960

DUMONT

CATHODE-RAY TUBE

TYPE 3AGP-

The Type 3AGP- is a 3-inch electrostatic focus, magnetic deflection cathode-ray tube suitable for radar applications. The tube is designed for miniaturized equipment, featuring short overall length, a small diameter neck, and a miniature base. A low current heater is employed, and in conjunction with the small diameter neck affords considerable reduction in power requirements. An aluminized screen is utilized for greater light output and to minimize screen charging effects.

GENERAL CHARACTERISTICS

Electrical Data

Focusing Method	Electrostatic	
Deflecting Method	Magnetic	
Deflecting Angle (Approximate)	70	Degrees
Direct Interelectrode Capacitances, Approximate		
Cathode to all other electrodes	3.0	µµf
Grid No. 1 to all other electrodes	6.5	µµf

Optical Data

Phosphor Number	4	7	16	19	25
Fluorescence	White	Blue	Violet	Orange	Orange
Phosphorescence	-----	Yellow	-----	Orange	Orange
Persistence	Short-to medium	Long	Extremely Short	Long	Long

Faceplate (Flat)	Clear, spherical

Mechanical Data

Overall Length (seated height)	5 3/8 ± 3/16	Inches
Greatest Diameter of Bulb	3 ± 1/16	Inches
Minimum Useful Screen Diameter	2 3/4	Inches
Bulb Contact	J1-25	
Base *	E9-37	
Basing	9HT	

* A socket with a center opening to clear the tubulation should be used. Care should be taken in handling the tube to avoid damaging the exposed tubulation and bending the base pins.

DE-4584 -3
10/6/59

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

DUMONT

CATHODE-RAY TUBE

TYPE 3AGP-

GENERAL CHARACTERISTICS (MECHANICAL DATA) (Continued)

Bulb Contact Alignment; Plane of J1-25 cap passes halfway between Pins No. 1 and 9 J1-25 cap on same side as Pins No. 1 and 9	± 10	Degrees
Weight, Approximate	6	Ounces

MAXIMUM RATINGS (ABSOLUTE MAXIMUM VALUES)

Heater Voltage	6.3	Volts
Heater Current at 6.3 Volts	0.3 ± 10%	Ampere
Accelerator Voltage	9,000	Max. Volts DC
Focusing Electrode Voltage	-550 to +1100	Max. Volts DC
Grid No. 2 Voltage	770	Max. Volts DC
Grid No. 1 Voltage:		
Negative Bias Value	180	Max. Volts DC
Positive Bias Value	0	Max. Volts DC
Positive Peak Value	0	Max. Volts
Peak Heater-Cathode Voltage		
Heater negative with respect to cathode	180	Max. Volts
Heater positive with respect to cathode	180	Max. Volts

TYPICAL OPERATING CONDITIONS

Accelerator Voltage [1]	7,000	Volts DC
Focusing Electrode Voltage [2]	-40 to +325	Volts DC
Grid No. 2 Voltage	300	Volts DC
Grid No. 1 Voltage [3]	-15 to -45	Volts DC
Line Width "A" [4]	.012	Inch Max.
Spot Position (Undeflected) [5]	3/16	Inch

MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance	1.5	Max. Megohms

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

FORM 609 M1 3-59 SH

DUMONT

CATHODE-RAY TUBE

TYPE 3AGP-

NOTES

1. Brilliance and definition decrease with decreasing accelerator voltage. In general, accelerator voltage should not be less than 6,000 volts.
2. With Grid No. 1 voltage adjusted to produce an accelerator current of 100 μA.
3. Visual extinction of undeflected, focused spot.
4. Measured in accordance with MIL-E-1 specifications at an accelerator current of 100 μA.
5. The center of the undeflected, focused spot will fall within a circle of 3/16-inch radius concentric with the center of the tube face, with the tube shielded.
6. The P16, P19 and P25 screens can be permanently damaged if current density is permitted to rise too high. To prevent burning, minimum beam current densities should be employed.

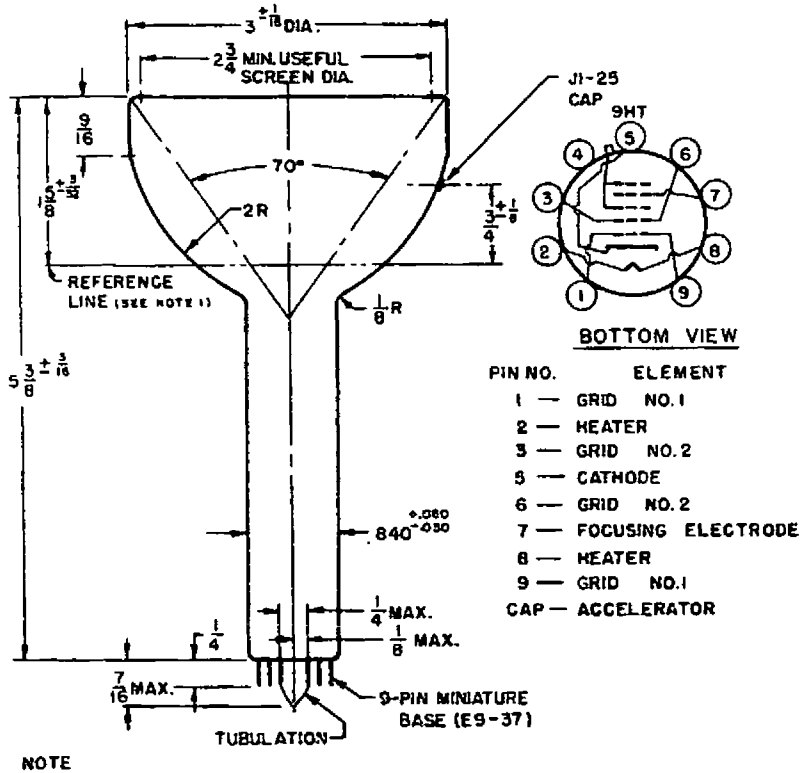
Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

FORM 609 M1 3-59 BH

DUMONT

CATHODE - RAY TUBE

3AGP-



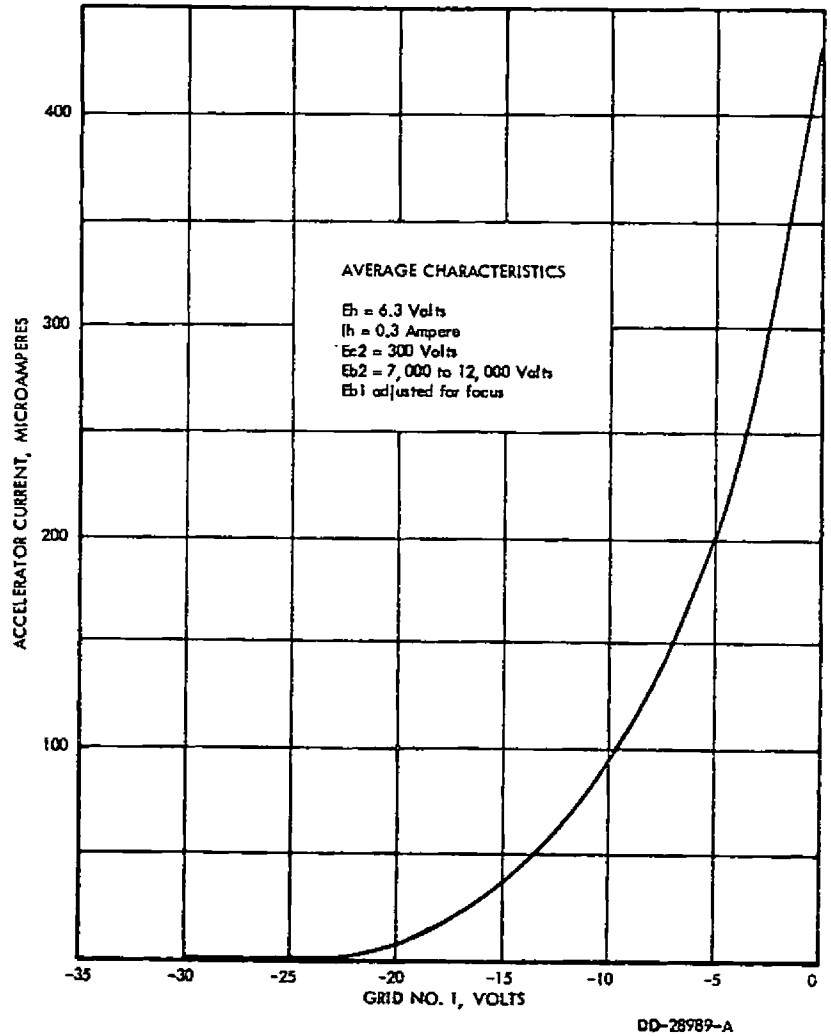
BOTTOM VIEW

PIN NO.	ELEMENT
1	GRID NO. 1
2	HEATER
3	GRID NO. 2
5	CATHODE
6	GRID NO. 2
7	FOCUSING ELECTRODE
8	HEATER
9	GRID NO. 1
CAP	ACCELERATOR

NOTE
1- REFERENCE LINE IS DETERMINED BY THE POINT WHERE LEADING EDGE OF JEDEC G-123 REFERENCE LINE GAUGE WILL STOP.

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

DD-27099-A4
10-23-59



DD-28989-A

from JETEC release
#2067, Dec. 30, 1957

DU MONT

TYPE 3AKP-A CATHODE-RAY TUBE

TENTATIVE

The Du Mont Type 3AKP-A is a 3-inch diameter, flat face, single beam, low voltage electrostatic focus, magnetic deflection cathode-ray tube. The bulb is an all-glass blank only 6 3/8 inches long, having a 7/8-inch diameter neck offset for sector scanning.

The Type 3AKP-A is particularly suitable for miniaturization techniques employed in airborne marine and portable radar receivers.

The screen is aluminized to provide high brightness and for stabilization of screen potential.

GENERAL CHARACTERISTICS

Electrical Data

Focusing Method	Electrostatic	
Deflecting Method	Magnetic	
Direct Interelectrode Capacitances, Approximate		
Cathode to all other electrodes	9.5	µµf
Grid #1 to all other electrodes	12.0	µµf

Optical Data

Phosphor Number	2	4	7	14	19	25
Fluorescent Color	Green	White	Blue	Purple	Orange	Orange
Phosphorescent Color	Green	----	Yellow	Orange	Orange	Orange
Persistence	Long	Short-to-Medium	Long	Medium-Long	Very Long	Very Long

Face Plate: Clear

Mechanical Data

Overall Length	6 3/8 ± 1/8	Inches
Greatest Diameter of Bulb	3 ± 1/16	Inches
Minimum Useful Screen Diameter	2 3/4	Inches

Bulb Contact: Special Molded Lead
Base: Special Molded Base with Color Coded Leads

DUMONT

TYPE 3AKP-A CATHODE-RAY TUBE

TENTATIVE

RATINGS (Design Center Values)

Heater Voltage	6.3	Volts
Heater Current at 6.3 Volts	0.3 ± 10%	Ampere
Accelerator Voltage	9,000	Max. Volts DC
Accelerator Input	6	Max. Watts
Focusing Electrode Voltage	-500 to +1,000	Max. Volts DC
Grid #2 Voltage	500	Max. Volts DC
Grid #1 Voltage		
Negative Bias Value	150	Max. Volts DC
Positive Bias Value	0	Max. Volts DC
Positive Peak Value	0	Max. Volts
Peak Heater-Cathode Voltage		
Heater Negative with respect to cathode	180	Max. Volts
Heater Positive with respect to cathode	180	Max. Volts

TYPICAL OPERATING CONDITIONS

Accelerator Voltage	7,000	Volts DC
Focusing Electrode Voltage[1]	-105 to +250	Volts DC
Grid #2 Voltage	300	Volts DC
Grid #1 Voltage[2]	-45 to -95	Volts DC
Modulation [3]	33	Volts Max.
Line Width A[3]	0.011	Inch Max.
Focusing Electrode Current for any operating condition	-15 to +15	Microamperes

MAXIMUM CIRCUIT VALUES

Grid #1 Circuit Resistance	1.5	Max. Megohms

NOTES

1. With the Grid #1 bias voltage adjusted to give an accelerator current of 50 microamperes on a 2 x 2-inch raster pattern.

2. Visual extinction of undeflected focused spot.

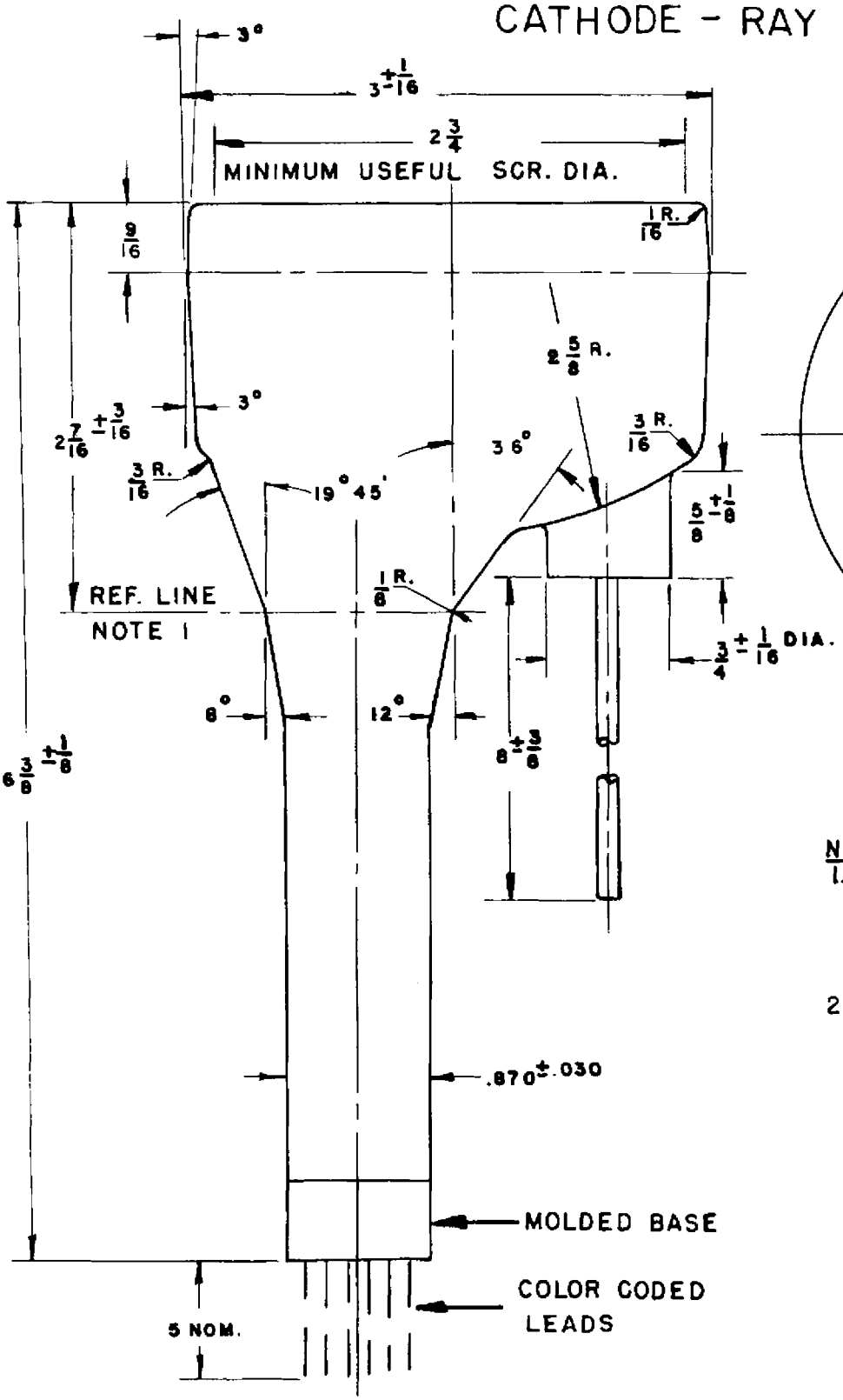
3. Measured in accordance with MIL-E-1 specifications with an accelerator current of 50 microamperes.

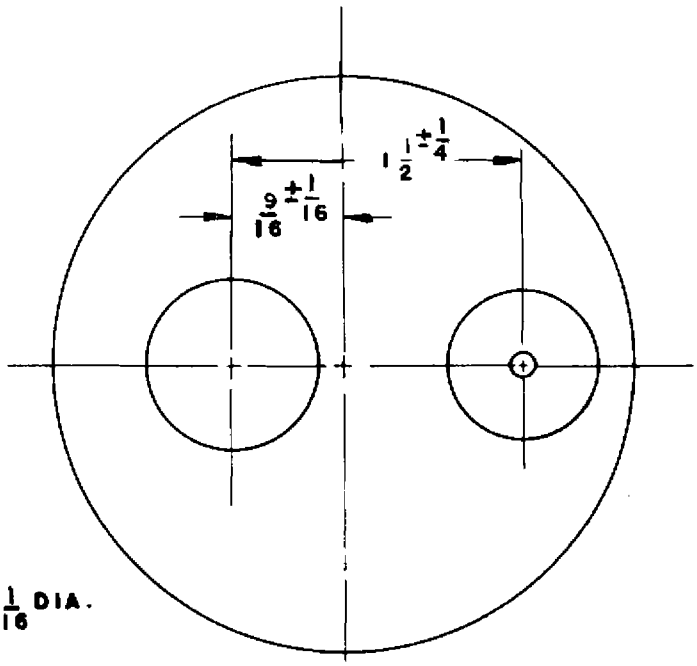
Allen B. Du Mont Laboratories, Inc.
Passaic, New Jersey

FORM 809 C5 5-54-5M

DU MONT

3AKP-
CATHODE - RAY TUBE





BOTTOM VIEW

NOTE:

1. REF. LINE IS THAT POINT WHERE A 1.000 $^{+.003}_{-.000}$ INCH DIA. RING GAGE 1 1/2 INCHES LONG WILL STOP

2. BASING

BLACK	HEATER
BLACK	HEATER
YELLOW	CATHODE
GREEN	GRID NO. 1
BLUE	GRID NO. 2
RED	FOCUSING ELECTRODE

MOLDED LEAD, ACCELERATOR

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

FORM 809-C8-4-58-9M

DUMONT

CATHODE-RAY TUBE

TYPE 3AYP-

TENTATIVE

The DuMont 3AYP- is a 3 x 1 1/2-inch rectangular face electrostatic deflection and focus cathode-ray tube, designed for small, light weight oscillograph applications. It features a pressed faceplate with uniform glass surface to reduce errors from parallax. A newly-designed gun structure is used for greater rigidity and improved electrical stability.
The 3AYP- is designed as a replacement for the 3XP-.

GENERAL CHARACTERISTICS

Electrical Data

Focusing Method			Electorstatic	
Deflection Method			Electrostatic	
Direct Interelectrode Capacitance (Approx.)				
Grid No. 1 to all other electrodes			5.7	μμf
Cathode to all other electrodes			5.2	μμf
D1 to D2			6.9	μμf
D3 to D4			5.4	μμf
D1 to all other electrodes			7.0	μμf
D2 to all other electrodes			7.4	μμf
D3 to all other electrodes			8.0	μμf
D4 to all other electrodes			7.3	μμf

Optical Data

Phosphor	1	2	7	11
Fluorescent Color	Green	Blue-Green	Blue-White	Blue
Phosphorescent Color	------	Green	Yellow	---
Persistence	Medium	Long	Long	Short
Faceplate			Clear	

Mechanical Data

Overall Length	8.875 ± .125	Inches
Greatest Dimensions:		
Width	3.016 ± .031	Inches
Height	1.516	Max. Inches
Minimum Useful Screen Dimensions:		
Horizontal	2.750	Inches
Vertical	1.125	Inches
Base	D8-1	

DE-5770 -2
8/24/59

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

from JEDEC release #2585, Sept. 14, 1959

FORM 808 M1 3 59 BH

DUMONT

CATHODE-RAY TUBE

TYPE 3AYP-

Mechanical Data (Cont'd)

Trace Alignment		
D1D2 trace aligns with bulb wall	± 1	Degree
Angle between D1D2 and D3D4 traces	90 ± 1	Degrees
Base Alignment:		
D1D2 trace aligns with tube axis and Pin No. 3	± 10	Degrees
Positive voltage on D1 deflects beam approximately toward Pin No. 3		
Positive voltage on D3 deflects beam approximately toward Pin No. 5		

MAXIMUM RATINGS (DESIGN CENTER VALUES)

Heater Voltage	6.3	Volts
Heater Current	0.6 ± 10%	Ampere
Accelerator Voltage	2750	Max. Volts DC
Accelerator Input	6	Max. Watts
Focusing Electrode Voltage	1100	Max. Volts DC
Grid No. 1 Voltage:		
Negative Bias Value	125	Max. Volts DC
Positive Bias Value	0	Max. Volts DC
Positive Peak Value	2	Max. Volts
Peak Voltage between accelerator and any deflection electrode	550	Max. Volts

TYPICAL OPERATING CONDITIONS

Accelerator Voltage	1000	2000	Volts DC
Focusing Electrode Voltage	200 to 350	400 to 700	Volts DC
Grid No. 1 Voltage [1]	-14.5 to -33.5	-28.5 to -67.5	Volts DC
Deflection Factors:			
D1D2	34 to 46	68 to 92	VDC/Inch
D3D4	14 to 19	28 to 38	VDC/Inch
Focusing Electrode Current for any operating conditions		-15 to +10	μADC
Spot Position [2]		Within a 7	MM Radius Circle

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

FORM 808-M1-8-58-GH

TYPE 3AYP-

MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance	1.5	Max. Megohms
Resistance in any Deflection Electrode Circuit [3]	1.0	Max. Megohms

NOTES

1. Visual extinction of the undeflected, focused spot.

2. When the tube is operated at typical operating conditions, with Ec1 adjusted to avoid damage to the screen, and with each of the deflection electrodes connected to the accelerator, and the tube shielded against external influences, the spot will fall within a 7 mm radius circle, centered with respect to the tube center.

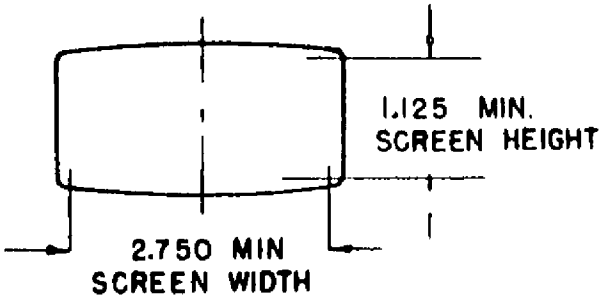
3. It is recommended that the deflection electrode circuit resistances be approximately equal.

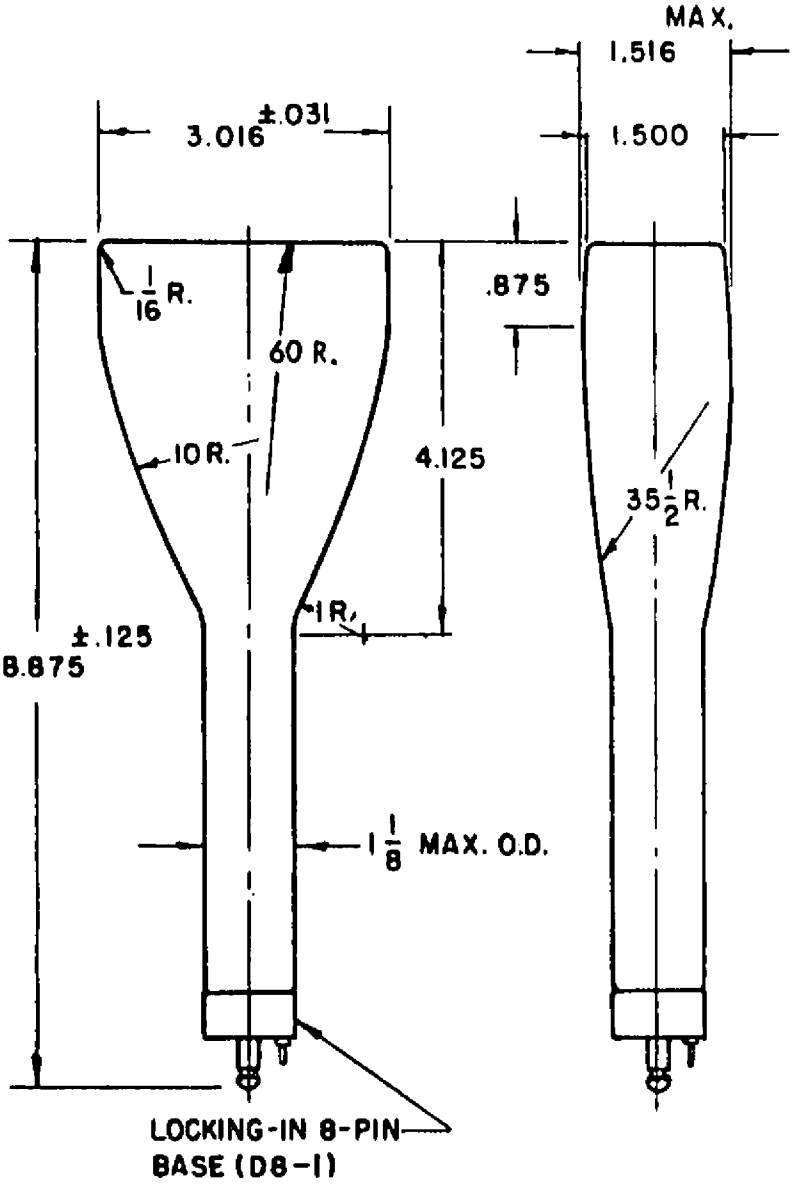
Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

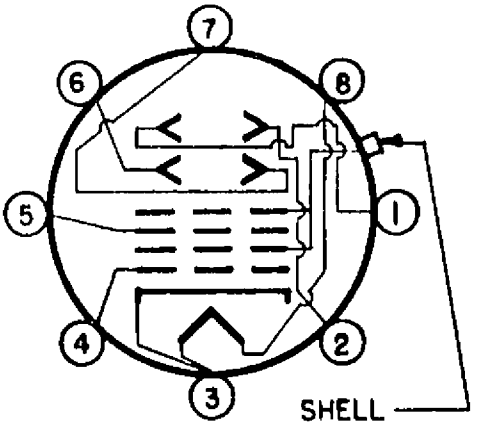
FORM 808-M1-3-58-SH

DU MONT

CATHODE-RAY TUBE
3AYP-







BOTTOM VIEW OF BASE

PIN NO.	ELEMENT
1	— DEFLECTING ELECTRODE D_2
2	— DEFLECTING ELECTRODE D_1
3	— HEATER & CATHODE
4	— GRID NO.1
5	— FOCUSING ELECTRODE
6	— DEFLECTING ELECTRODE D_3
7	— DEFLECTING ELECTRODE D_4
8	— HEATER
SHELL	— ACCELERATOR

DE-5770-2
8-24-59

Allen B. Du Mont Laboratories, Inc.
Passaic, New Jersey

FORM 8057 MB 8-57-5M

DUMONT

CATHODE-RAY TUBE

TYPE 3BDP-

The Du Mont Type 3BDP- is a 3 x 1 1/2-inch rectangular face, electrostatic deflection and focus cathode-ray tube, designed for small, light weight oscillograph applications. A newly-designed gun structure is used for greater rigidity and improved electrical stability. A pressed faceplate with uniform glass surface is used to reduce errors from parallax.

The 3BDP- is designed as a replacement for the 3SP-.

GENERAL CHARACTERISTICS

Electrical Data

Focusing Method	Electrostatic	
Deflecting Method	Electrostatic	
Direct Interelectrode Capacitance (Approximate)		
Grid No. 1 to all other electrodes	8.3	µµf
Cathode to all other electrodes	5.6	µµf
D1 to D2	7.2	µµf
D3 to D4	5.7	µµf
D1 to all other electrodes	9.3	µµf
D2 to all other electrodes	8.2	µµf
D3 to all other electrodes	7.3	µµf
D4 to all other electrodes	7.8	µµf

Optical Data

Phosphor No.	1	2	7	11
Fluorescent Color	Green	Blue-Green	Blue-White	Blue
Phosphorescent Color	-----	Green	Yellow	----
Persistence	Medium	Long	Long	Short

Faceplate: Clear

Mechanical Data

Overall Length	9 1/8 ± 1/4	Inches
Greatest Dimensions of Bulb:		
Width	3 ± 1/16	Inches
Height	1 1/2 ± 1/16	Inches
Minimum Useful Screen Dimensions:		
Horizontal	2 3/4	Inches
Vertical	1 1/8	Inches
Base	B12-43	
Basing	12E	

DE-5790 - 2
9/15/59

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

DUMONT

CATHODE-RAY TUBE

TYPE 3BDP-

GENERAL CHARACTERISTICS (MECHANICAL DATA) (Continued)

Trace Alignment:		
D1D2 trace aligns with bulb wall	± 1.0	Degree
Angle between D1D2 and D3D4 traces	90 ± 1	Degrees
Base Alignment:		
D1D2 trace aligns with tube axis and key	± 5	Degrees

Positive voltage on D1 deflects beam approximately toward key
Positive voltage on D3 deflects beam approximately toward Pin No. 4

MAXIMUM RATINGS (DESIGN CENTER VALUES)

Heater Voltage	6.3	Volts
Heater Current at 6.3 Volts	0.6 ± 10%	Ampere
Accelerator Voltage	2,750	Max. Volts DC
Accelerator Input	6	Max. Watts
Focusing Electrode Voltage	1,100	Max. Volts DC
Grid No. 1 Voltage:		
Negative Bias Value	200	Max. Volts DC
Positive Bias Value	0	Max. Volts DC
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 Accelerator and any Deflection Electrode	550	Max. Volts

TYPICAL OPERATING CONDITIONS

Accelerator Voltage	1,000	2,000	Volts DC
Focusing Electrode Voltage	165 to 310	330 to 620	Volts DC
Grid No. 1 Voltage [1]	-29 to -67.5	-58 to -135	Volts DC
Deflection Factors:			
D1D2	73 to 99	146 to 198	VDC/Inch
D3D4	52 to 70	104 to 140	VDC/Inch
Focusing Electrode Current for any operating condition		-15 to +10	μADC
Spot Position [2]		Within a 6-mm radius circle	

DUMONT

CATHODE-RAY TUBE

TYPE 3BDP-

NOTES

1. Visual extinction of the undeflected, focused spot.

2. When the tube is operated at typical operating conditions, with Ec1 adjusted to avoid damage to the screen, and with each of the deflection electrodes connected to the accelerator, and the tube shielded against external influences, the spot will fall within a 6-mm radius circle, centered with respect to the tube center.

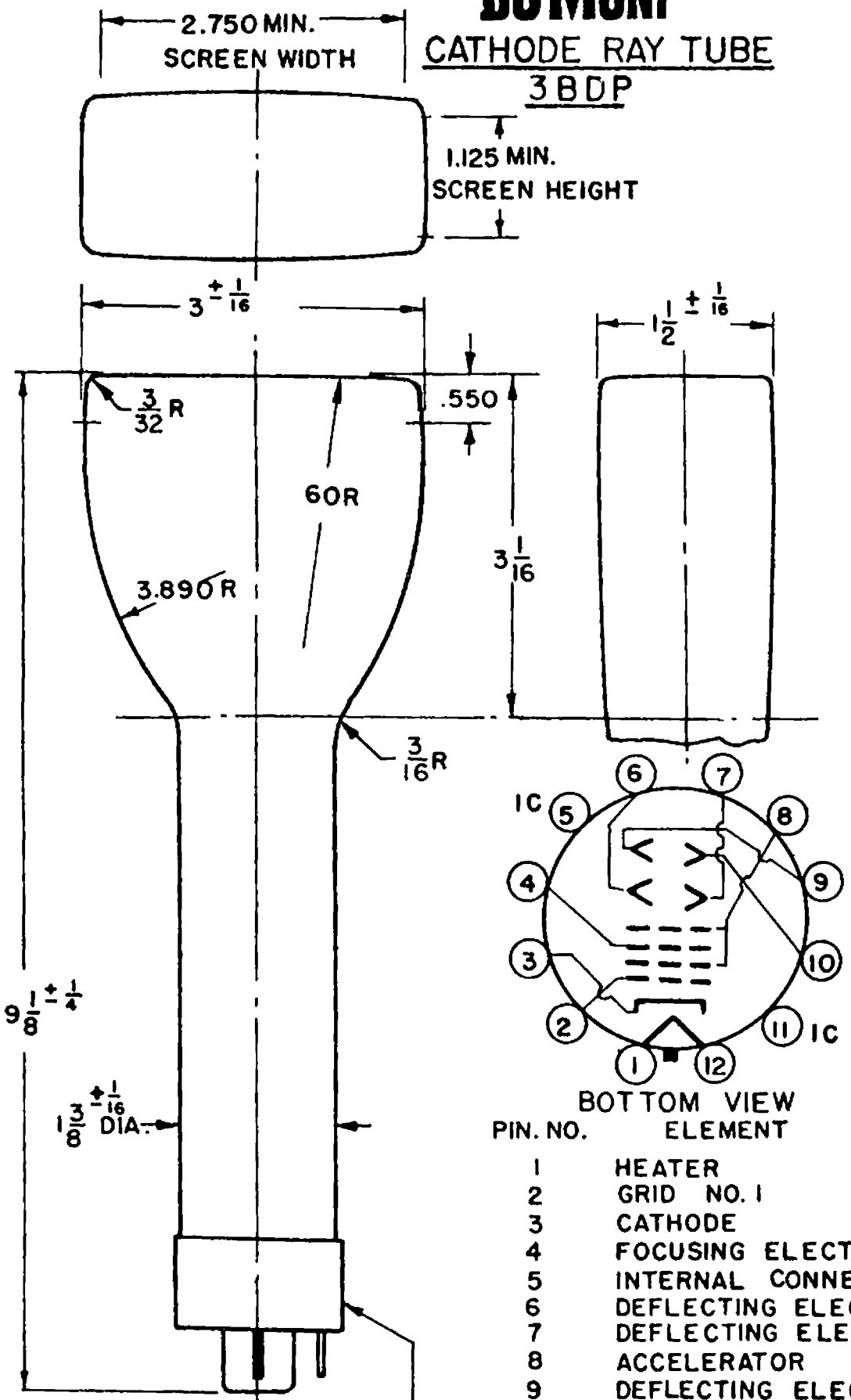
3. It is recommended that the deflection-electrode circuit resistances be approximately equal.

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

FORM 809-M1-3-56-SH

DU MONT

CATHODE RAY TUBE
3BDP



BOTTOM VIEW

PIN. NO.	ELEMENT
1	HEATER
2	GRID NO. 1
3	CATHODE
4	FOCUSING ELECTRODE
5	INTERNAL CONNECTION
6	DEFLECTING ELECTRODE D_3
7	DEFLECTING ELECTRODE D_4
8	ACCELERATOR
9	DEFLECTING ELECTRODE D_2
10	DEFLECTING ELECTRODE D_1
11	INTERNAL CONNECTION
12	HEATER

SMALL SHELL DUODECAL
12-PIN BASE (B12-43)

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

DE-5790-2
9-16-59
FORM 609-CS-4-59-SH

DUMONT

CATHODE-RAY TUBE

TYPE 3BFP-

The Du Mont Type 3BFP- is a 3-inch, flat face, electrostatic focus and deflection cathode-ray tube with very high deflection sensitivities and full scan.

This tube features a linear post accelerator for maximum deflection uniformity and minimum pattern distortion. The extremely low deflection factors permit use of this tube in compact transitorized equipment.

GENERAL CHARACTERISTICS

Electrical Data

Focusing Method	Electrostatic	
Deflecting Method	Electrostatic	
Direct Interelectrode Capacitances, Approx.		
Cathode to all other electrodes	3.5	μμf
Grid No. 1 to all other electrodes	7.2	μμf
D1 to D2	3.6	μμf
D3 to D4	2.6	μμf
D1 to all other electrodes	7.0	μμf
D2 to all other electrodes	7.0	μμf
D3 to all other electrodes	5.7	μμf
D4 to all other electrodes	5.7	μμf

Optical Data

Phosphor	P1	P2	P7	P11
Fluorescent Color	Green	Blue-Green	Blue-White	Blue
Phosphorescent Color	------	Green	Yellow	----
Persistence	Medium	Long	Long	Short

Faceplate	Flat, Clear	

Mechanical Data

Overall Length	13 3/4 ± 3/8	Inches
Greatest Diameter of Bulb	3 ± 1/16	Inches
Minimum Useful Screen Diameter	2 3/4	Inches
Base (Small Shell 12-pin Duodecal)	B12-43	

DE-5862 - 2

2/8/60

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

from JEDEC release #2738, Feb. 22, 1960

DUMONT

CATHODE-RAY TUBE

TYPE 3BFP-

GENERAL CHARACTERISTICS (MECHANICAL DATA) (Continued)

Basing	12BE	
Base Alignment:		
D1D2 trace aligns with Pin No. 3 and tube axis	± 10	Degrees
Positive voltage on D1 deflects beam approximately toward Pin No. 3		
Positive voltage on D3 deflects beam approximately toward Pin No. 12		
Angle between D3D4 and D1D2 traces	90 ± 1	Degrees
Bulb Contact Alignment:		
J1-22 contact aligns with D3D4	± 10	Degrees
J1-22 contact on same side as Pin No. 6		

RATINGS (ABSOLUTE MAXIMUM VALUES)

Heater Voltage	6.3	Volts
Heater Current at 6.3 Volts	0.6 ±10%	Ampere
Post Accelerator Voltage	3,500	Max. Volts DC
Post Accelerator Resistance	100	Min. Megohms
Accelerator Voltage	1,250	Max. Volts DC
Ratio Post Accelerator Voltage to Accelerator Voltage	3	Max.
Accelerator Input	6	Max. Watts
Focusing Voltage	450	Max. Volts DC
Grid No. 1 Voltage		
Negative Bias Value	200	Max. Volts DC
Positive Bias Value	0	Max. Volts DC
Positive Peak Value	0	Max. Volts
Peak Heater-Cathode Voltage		
Heater Negative with respect to Cathode	180	Max. Volts
Heater Positive with respect to Cathode	180	Max. Volts
Peak Voltage between Accelerator and any Deflection Electrode	200	Max. Volts

TYPICAL OPERATING CONDITIONS

Post Accelerator Voltage	1,500	Volts
Accelerator Voltage	500	Volts
Post Accelerator Current [1]	10	Microamperes Max.
Focusing Voltage	25 to 125	Volts

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

FORM 609 M1 3-59 SH

DUMONT

CATHODE-RAY TUBE

TYPE 3BFP-

TYPICAL OPERATING CONDITIONS (Continued)

Grid No. 1 Voltage [2]	-30 to -60	Volts
Modulation [3]	35	Volts Max.
Line Width "A" [3]	.030	Inch Max.
P1 Light Output [3]	3.0	FT. L. Min.
Deflection Factors:		
D1D2	12 to 15	Volts DC/Inch
D3D4	9 to 12	Volts DC/Inch
Focusing Current for any operating condition	-15 to +15	Microamperes
Spot Position (Undeflected)[4]	Within a 3/16-inch radius circle	

MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance	1.5	Max. Megohms
Resistance in any Deflecting-Electrode Circuit [5]	5	Max. Megohms

NOTES

1. Measured with the beam cut-off. All readings of beam current shall be in addition to the reading obtained for post accelerator current.

2. Visual extinction of the undeflected, focused spot.

3. Measured in accordance with MIL-E-1 specifications with a beam current of 15 μADC.

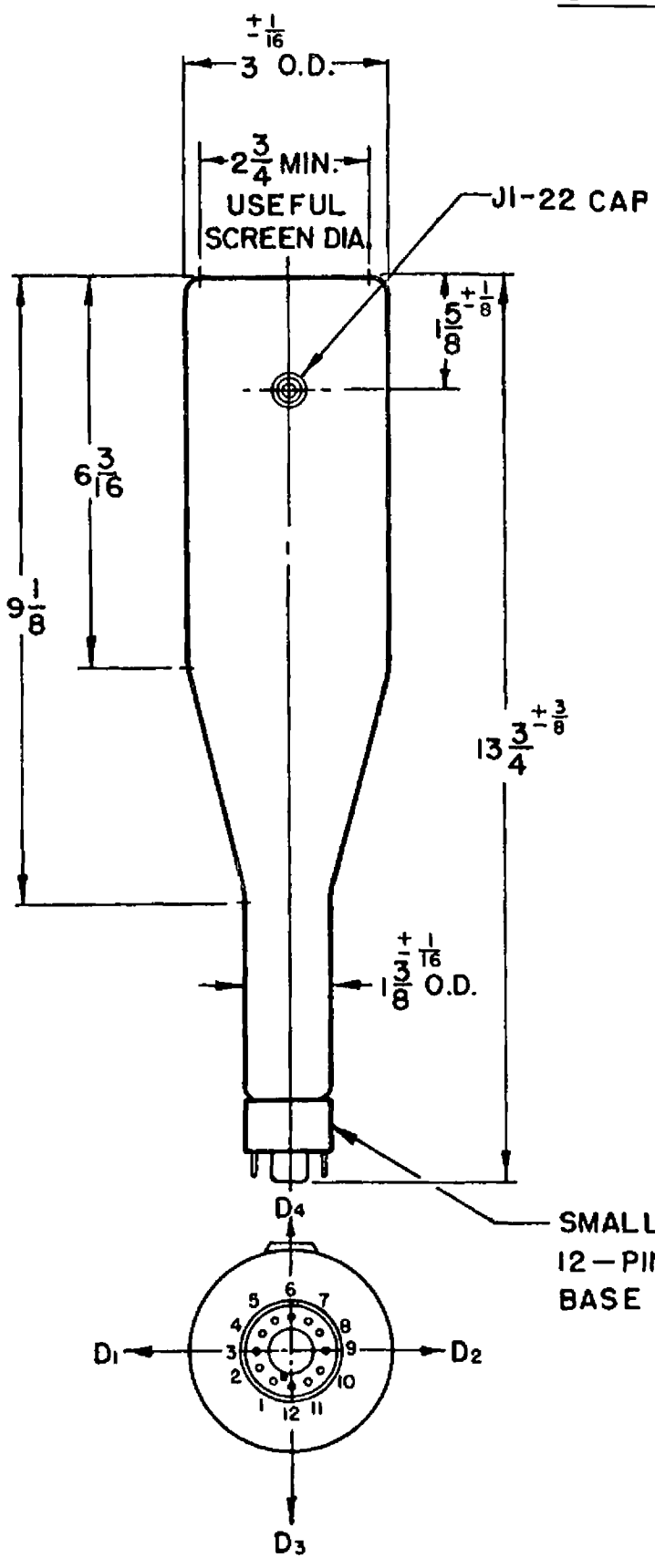
4. When the tube is operated at typical operating conditions, Ec1 adjusted to avoid damage to the screen, with each of the deflecting electrodes connected to the accelerator, and with the tube shielded against external influences; the spot will fall within a 3/16-inch radius circle centered on the tube face.

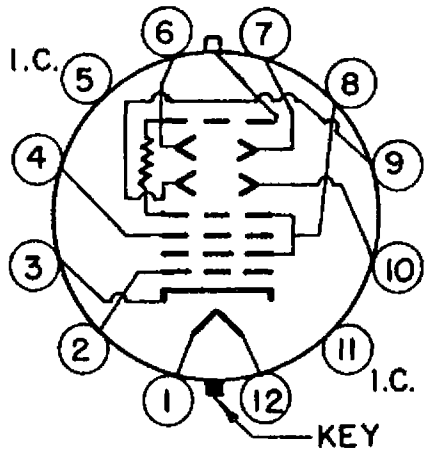
5. It is recommended that the deflecting-electrode circuit resistances be approximately equal.

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

FORM 809 M1 3-59 SH

DUMONT
CATHODE-RAY TUBE
3BFP-





BOTTOM VIEW

PIN NO.	ELEMENT
1	HEATER
2	GRID NO.1
3	CATHODE
4	FOCUS ELECTRODE
5	INTERNAL CONNECTION
6	DEFLECTING ELECTRODE D_1
7	DEFLECTING ELECTRODE D_2
8	ACCELERATOR
9	DEFLECTING ELECTRODE D_4
10	DEFLECTING ELECTRODE D_3
11	INTERNAL CONNECTION
12	HEATER
CAP	POST ACCELERATOR

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

DE-5862-2
2-8-60
FORM 809-CB-4-60-BH

from JEDEC release #3093,
Jan. 2, 1961

DUMONT

TYPE 38QP-

The Du Mont Type 38QP- is a 3 x 1 1/2-inch, rectangular face, electrostatic deflection and focus cathode-ray tube, designed for small, light weight oscillograph applications. It features a flat faceplate with uniform glass surface to reduce errors from parallax. A newly-designed gun structure is used for greater rigidity and improved electrical stability. Nine color-coded leads in axial position, encapsulated, are provided for connecting tube elements.

GENERAL CHARACTERISTICS

Electrical Data

Focusing Method	Electrostatic	
Deflecting Method	Electrostatic	
Direct Interelectrode Capacitances, Approximate		
Grid No. 1 to all other electrodes	9	µµf
D1 to D2	4	µµf
D3 to D4	4	µµf
D1 to all other electrodes	12.5	µµf
D2 to all other electrodes	12.5	µµf
D3 to all other electrodes	11.5	µµf
D4 to all other electrodes	11.5	µµf

Optical Data

Phosphor Number	1	2	5	7	11
Fluorescence	Green	Blue-Green	Blue	Blue-White	Blue
Phosphorescence	-----	Green	----	Yellow	----
Persistence	Medium	Long	Short	Long	Short

Faceplate: Clear

Mechanical Data

Overall Length	8 15/16 ± 1/4	Inches
Greatest Dimensions of Bulb:		
Width	3.016 ± .031	Inches
Height	1.516	Max. Inches
Minimum Useful Screen Dimensions:		
Horizontal	2.750	Inches
Vertical	1.125	Inches

Base: Encapsulated, Octal (B8-11) Base Shell

DE-5633 - 3
10/18/60

Allen B. Du Mont Laboratories, ~~Inc.~~
Divisions of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

DUMONT

TYPE 3BQP-

GENERAL CHARACTERISTICS (Mechanical Data) (Continued)

Trace Alignment:		
D1D2 trace aligns with bulb wall	± 1	Degrees
Angle between D1D2 and D3D4 traces	90 ± 1	Degrees

MAXIMUM RATINGS (Design Maximum Values)

Heater Voltage	6.3	Volts
Heater Current at 6.3 Volts	0.6 ± 10%	Ampere
Accelerator Voltage	3,000	Max. Volts DC
Accelerator Input	6	Max. Watts
Focusing Electrode Voltage	1,200	Max. Volts DC
Grid No. 1 Voltage:		
Negative Bias Value	125	Max. Volts DC
Positive Bias Value	0	Max. Volts DC
Positive Peak Value	2	Max. Volts
Peak Voltage between accelerator and any deflection electrode	550	Max. Volts

TYPICAL OPERATING CONDITIONS

Accelerator Voltage	1,000	2,000	Volts DC
Focusing Electrode Voltage	200 to 350	400 to 700	Volts DC
Grid No. 1 Voltage [1]	-14.5 to -33.5	-28.5 to -67.5	Volts DC
Deflection Factors:			
D1D2	34 to 46	68 to 92	VDC/Inch
D3D4	14 to 19	28 to 38	VDC/Inch
Focusing Electrode Current for any operating condition		-15 to +10	μADC
Spot Position [2]		Within a 7-mm Radius Circle	

MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance	1.5	Max. Megohms
Resistance in any Deflection-Electrode Circuit [3]	1.0	Max. Megohms

DUMONT

TYPE 3BQP-

NOTES

1. Visual extinction of the undeflected, focused spot.

2. When the tube is operated at typical operating conditions, with Ec1 adjusted to avoid damage to the screen, and with each of the deflection electrodes connected to the accelerator, and the tube shielded against external influences, the spot will fall within a 7-mm radius circle, centered with respect to the tube face center.

3. It is recommended that the deflection-electrode circuit resistances be approximately equal.

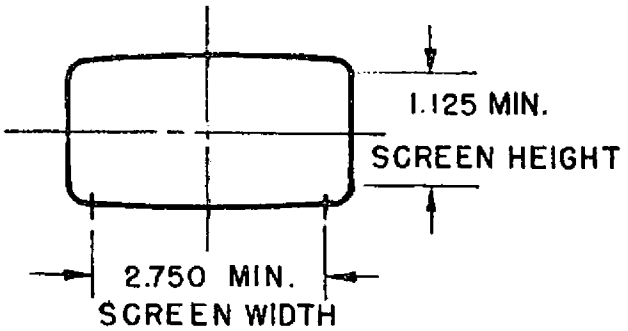
Allen B. Du Mont Laboratories, ~~Inc.~~
Divisions of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

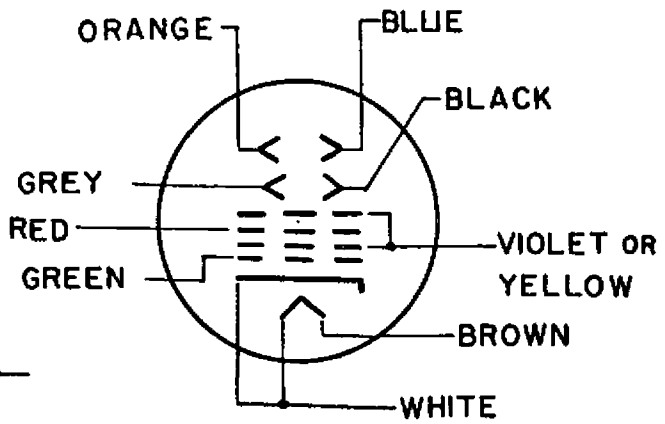
FORM 809 SC 4-60-SH

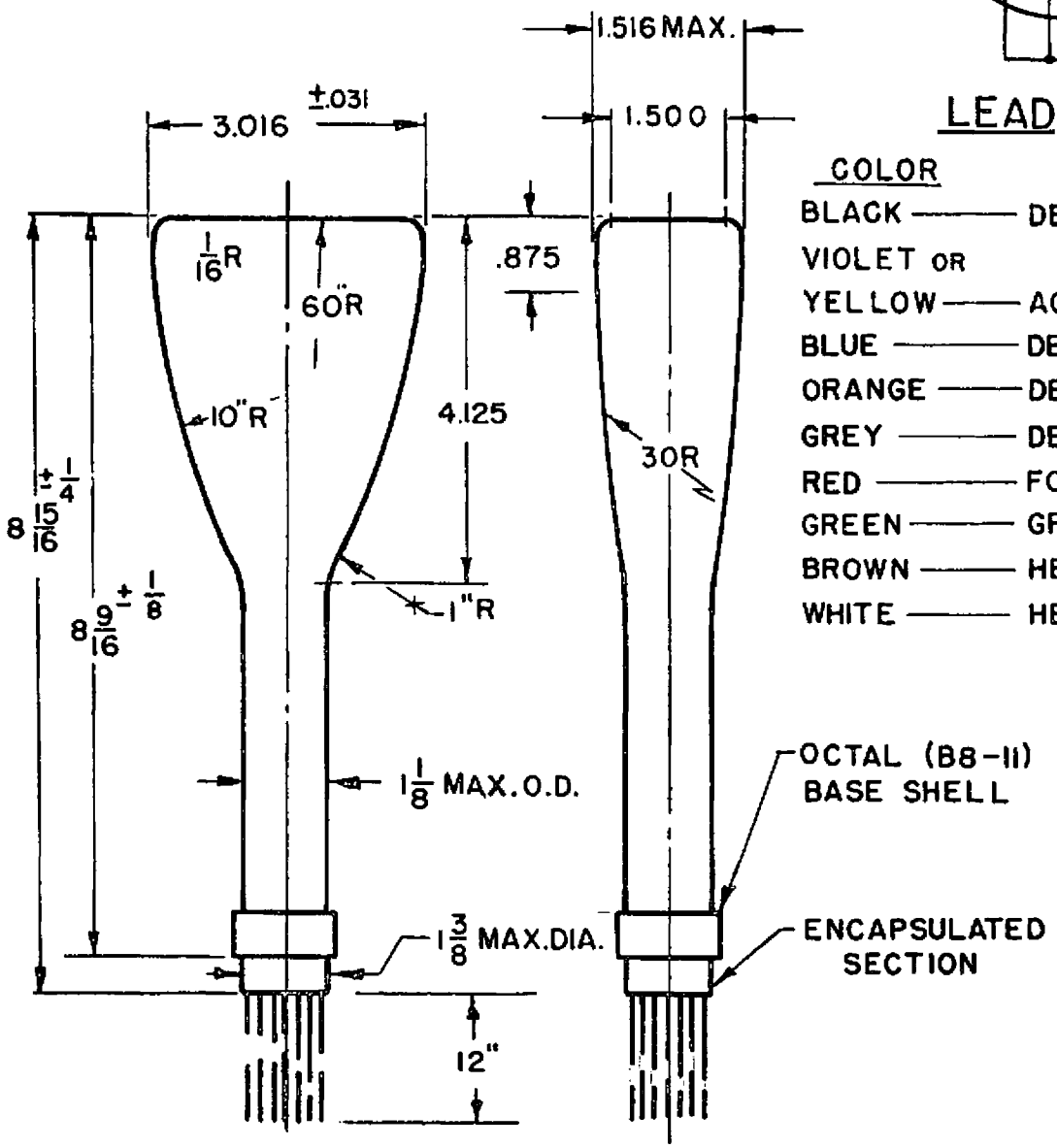
DUMONT

CATHODE RAY TUBE

3BQP-







LEAD

COLOR	ELEMENT
BLACK	DEFL. ELECT. D4
VIOLET OR YELLOW	ACCELERATOR
BLUE	DEFL. ELECT. D1
ORANGE	DEFL. ELECT. D2
GREY	DEFL. ELECT. D3
RED	FOCUSING ELECT.
GREEN	GRID NO.1
BROWN	HEATER
WHITE	HEATER - CATHODE

Allen B. Du Mont Laboratories, ~~Inc.~~ Divisions of Fairchild Camera and Instrument Corp.
Clifton, New Jersey.

DE-5633-3
10-18-60

DUMONT

CATHODE-RAY TUBE

TYPE 3BRP-

The Du Mont Type 3BRP- is a high resolution, flat face, dual beam, electrostatic deflection and focus cathode-ray tube. Each beam is independent of the other except for a common accelerating electrode. Post acceleration is used to obtain high deflection sensitivity and brightness. The deflection system is designed for precise deflection and tracking accuracy. Deflection electrodes of each beam are electrostatically shielded from each other to prevent interaction.

GENERAL CHARACTERISTICS [1]

Electrical Data

Focusing Method	Electrostatic	
Deflecting Method	Electrostatic	
Direct Interelectrode Capacitances, Approximate		
Cathode to all	5.6	μμf
Grid No. 1 to all	7.2	μμf
D1 to D2	2.7	μμf
D3 to D4	2.5	μμf
D1 to all	6.7	μμf
D2 to all	6.7	μμf
D3 to all	6.4	μμf
D4 to all	6.4	μμf

Optical Data

Phosphor Number	1	2	7	11
Fluorescence	Green	Blue-Green	Blue-White	Blue
Phosphorescence	------	Green	Yellow	----
Persistence	Medium	Long	Long	Short

Mechanical Data

Overall Length	11 3/4 ± 1/4	Inches
Greatest Diameter of Bulb	3 ± 1/16	Inches
Minimum Useful Screen Diameter	2 5/8	Inches
Bulb Contact	J1-22	
Base	B25-139	
Basing	Special	

DE-5603 - 2
11/3/60

Allen B. Du Mont Laboratories, ~~Inc.~~
Divisions of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

FORM 809 SC 4-60-8H

from JEDEC release #3112, Jan. 16, 1961

DUMONT

CATHODE-RAY TUBE

TYPE 3BRP-

GENERAL CHARACTERISTICS (Mechanical Data) (Continued)

Base Alignment:		
D3D4 trace aligns with Pin No. 18 and tube axis	± 10	Degrees
Positive voltage on D1 deflects beam approximately toward Base Key		
Positive voltage on D3 deflects beam approximately toward Pin No. 23		
Bulb Contact Alignment:		
J1-22 cap aligns with D3D4 trace	± 10	Degrees
J1-22 cap on same side as Pin No. 18		
Trace Alignment:		
Angle between D1D2 and D3D4 traces	90 ± 1	Degrees
Corresponding traces of each gun align with each other within one degree		

RATINGS (Design Maximum Values)

Heater Voltage	6.3	Volts
Heater Current at 6.3 Volts	0.6 ± 10%	Ampere
Post Accelerator Voltage	6,600	Max. Volts DC
Accelerator Voltage	2,200	Max. Volts DC
Accelerator Input	6	Max. Watts
Ratio Post Accelerator Voltage to Accelerator Voltage [2]	3	Max.
Focusing Voltage	1,100	Max. Volts DC
Grid No. 1 Voltage		
Negative Bias Value	200	Max. Volts DC
Positive Bias Value	0	Max. Volts DC
Positive Peak Value	0	Max. Volts
Peak Voltage between Accelerator and any Deflection Electrode	550	Max. Volts

TYPICAL OPERATING CONDITIONS

Post Accelerator Voltage	4,000	Volts DC
Accelerator Voltage	2,000	Volts DC
Focusing Voltage	380 to 580	Volts DC
Grid No. 1 Voltage [3]	-45 to -75	Volts DC

Allen B. Du Mont Laboratories, ~~Inc.~~
Divisions of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

FORM 809 BC 4-60-5M

DUMONT

CATHODE-RAY TUBE

TYPE 3BRP-

TYPICAL OPERATING CONDITIONS (Continued)

Modulation[4]	55	Max. Volts DC
Line Width "A"[5]	.006	Max. Inch
P1 Light Output[5]	15	Ft. L. Min.
Deflection Factors:		
D1D2	164 to 198	Volts DC/Inch
D3D4	148 to 181	Volts DC/Inch
Deflection Factor Uniformity[6]	2 1/2%	Max.
Tracking Error[7]	2%	Max.
Pattern Distortion at 75% of Minimum Useful Screen Diameter[8]	2%	Max.
Interaction Factor[10]	.000012	Max. Inch/Volt
Spot Position[11]	Within a 1/4-inch radius circle	

CIRCUIT DESIGN VALUES

Focusing Voltage	190 to 290 Volts/KV of Accelerator Voltage	
Focusing Current for any operating condition	-50 to +10	Microamperes
Grid No. 1 Voltage[3]	-22.5 to -37.5 Volts/KV of Accelerator Voltage	
Grid No. 1 Circuit Resistance	1.5	Max. Megohms
Deflection Factors:		
Post Accelerator Voltage = Accelerator Voltage		
D1D2	63 to 77 Volts DC/Inch/KV of Accelerator Voltage	
D3D4	59.5 to 72.5 Volts DC/Inch/KV of Accelerator Voltage	
Resistance in any Deflecting-Electrode Circuit[12]	5.0	Max. Megohms

NOTES

1. Values are for each unit unless otherwise stated.

2. This tube is designed for optimum performance when operating at an Eb3/Eb2 ratio of 2.0. Operation at other ratios of Eb3/Eb2 may result in increased deflection (non) uniformity, pattern distortion and tracking error.

3. For visual extinction of the focused, undeflected spot.

DUMONT

CATHODE-RAY TUBE

TYPE 3BRP-

NOTES
(Continued)

4. The increase in Grid No. 1 voltage from cut-off to produce an Ib3 of 20 μADC.

5. Measured in accordance with MIL-E-1 specifications, using an Ib3 of 20 μADC.

6. The deflection factor (for both D1D2 and D3D4 plate pairs, separately) for deflections of less than 75% of the useful scan will not differ from the deflection factor for a deflection at 25% of the useful scan by more than the indicated value.

7. The positions of the spot of each beam when deflected from the center by applied voltages proportional to the deflection factor will not deviate from each other by more than the indicated percentage of the deflection.

8. The edges of a raster pattern, whose mean dimensions are the indicated percentage of useful screen diameter, shall not deviate from the mean dimension rectangle by more than the specified amount.

9. Deflection accuracy may be obtained by combining angle between traces, deflection factor uniformity and pattern distortion characteristics. In general, for deflections of less than those indicated, the accuracy will improve.

10. The deflection of one beam when balanced DC voltages are applied to the deflection electrodes of the other beam will not be greater than the indicated value.

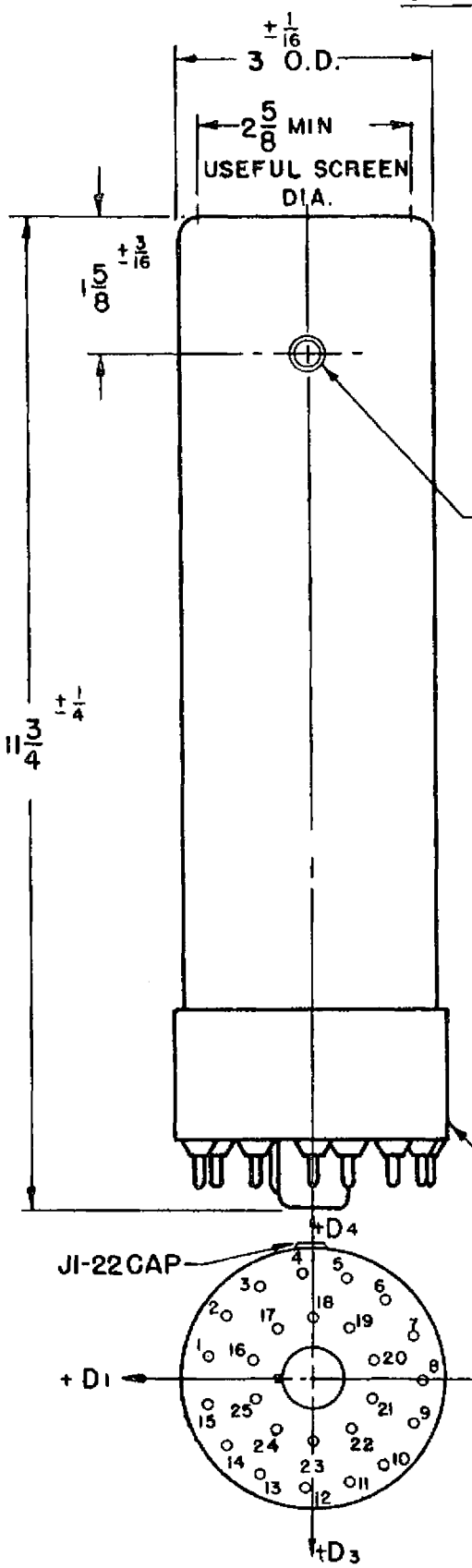
11. The undeflected and focused spot will fall within a 1/4-inch radius circle centered with respect to the tube face and with the tube shielded.

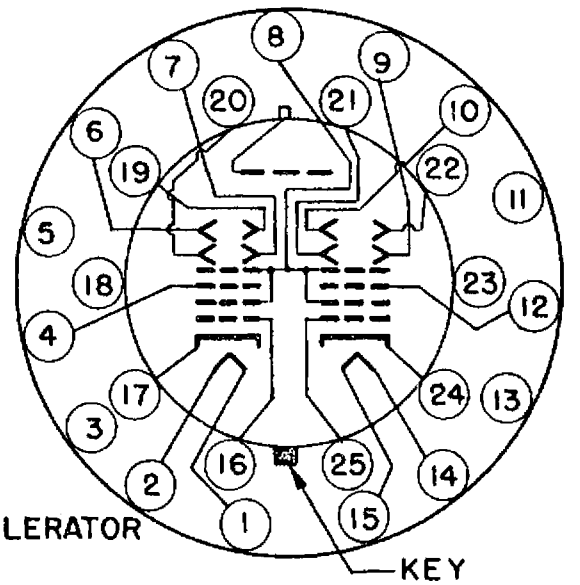
12. It is recommended that the deflection-electrode circuit resistances be approximately equal.

Allen B. Du Mont Laboratories, Inc.
Divisions of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

FORM 009 SC 4-60-BH

DU MONT
CATHODE-RAY TUBE
3BRP-





BOTTOM VIEW

ELEMENT	UNIT "A" PIN NO.	UNIT "B" PIN NO.
HEATER	14	1
HEATER	15	2
GRID NO.1	25	16
CATHODE	24	17
FOCUSING ELECTRODE	12	4
DEFLECTING ELECTRODE D_1	22	6
DEFLECTING ELECTRODE D_2	10	19
DEFLECTING ELECTRODE D_3	9	20
DEFLECTING ELECTRODE D_4	21	7
ACCELERATOR (COMMON)	8	8

NOTE:
1. J1-22 CAP ALIGNS WITH D_3 D_4 TRACE ±10°

Allen B. Du Mont Laboratories, Inc. Divisions of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

DE-5603-3
11-14-60
FORM 609 M1-5-60-SH

RMA Release # 306 Sept. 24, 1942

R. M. A.
REGISTRATION
FILE

DU MONT

CATHODE-RAY TUBES

Types 3GP1, 3GP4, 3GP5

The Type 3GP Cathode-Ray Tubes are designed for oscillographic and other applications where small spot size, a brilliant trace, and a minimum of defocusing with deflection are required. The three types differ only in the characteristics of the fluorescent screens.

CHARACTERISTICS

HEATER			
Voltage, a.c. or d.c.		6.3 volts	
Current		0.6 ampere	
DEFLECTION		Electrostatic	
FOCUS		Electrostatic	
SCREEN	3GP1	3GP4	3GP5
Phosphor	P1	P4	P5
Fluorescence	Green	White	Blue
Persistence	Medium	Medium	Short

MECHANICAL CHARACTERISTICS

Overall Length	11½" ±⅜"
Maximum Diameter	3" $\pm\frac{1}{16}$"
Bulb	C24W1C
Base	Medium magnal
Basing RMA Basing Designation	11A

The basing is such that:

1. The direction of the trace produced in the screen by deflecting electrodes D_3 and D_4 will not deviate more than ±10° from a plane through pin No. 1 and the axis of the tube, while the angle between the direction of this trace and that of the trace produced on the screen by deflecting electrodes D_1 and D_2 will be 90° ±3°.
2. With deflection electrode D_3 (pin No. 9) positive with respect to D_4 (pin No. 6) the spot will be deflected approximately toward pin No. 1; while with deflection electrode D_1 (pin No. 3) positive with respect to D_2 (pin No. 8) the spot will be deflected approximately toward pin No. 4.

DIRECT INTERELECTRODE CAPACITANCES

Control Electrode (grid) to all other electrodes	8.9 uuf
Deflection Plate D_1 to Deflection Plate D_2	1.6 uuf
Deflection Plate D_3 to Deflection Plate D_4	1.2 uuf
D_1 to all other electrodes	11.7 uuf
D_3 to all other electrodes	6.9 uuf
D_1 to all other electrodes except D_2	10.1 uuf
D_2 to all other electrodes except D_1	10.2 uuf
D_3 to all other electrodes except D_4	5.7 uuf
D_4 to all other electrodes except D_3	5.8 uuf

RATINGS

Heater voltage	6.3 volts
Heater current	0.6 amp. ±10%
Anode #2 (Accelerating Electrode) voltage (E_{b2})	1500 volts (max.)
Anode #1 (Focusing Electrode) voltage (E_{b1})	1000 volts (max.)
Grid (Control Electrode) voltage (E_{c1})	Never positive
Peak voltage between Anode #2 and any deflecting plate	500 volts (max.)
Grid circuit resistance	1.5 megohms (max.)
Impedance of any deflecting electrode circuit at heater supply frequency	1.0 megohms (max.)

TYPICAL OPERATION

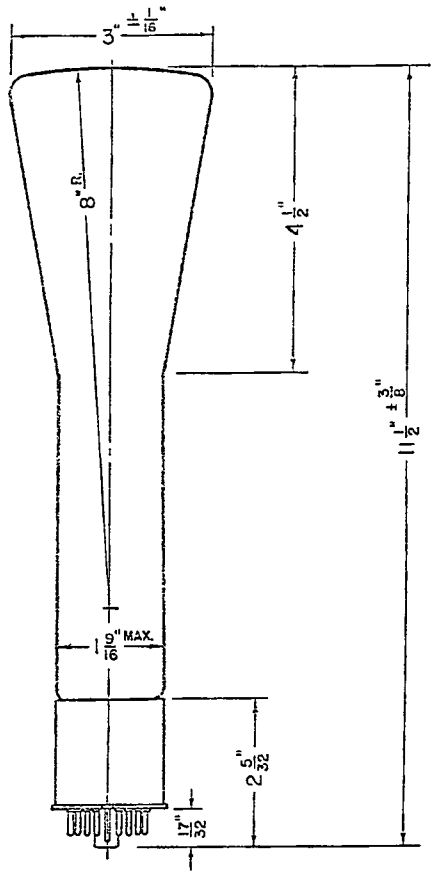
Heater voltage	6.3	6.3	volts
Anode #2 voltage (E_{b2})	1000	1500	volts
Anode #1 voltage (E_{b1}) for focus when E_{c1} = 75% of cut-off value	234	350	volts ±20%
Range of E_{b1} to focus with values of E_{c1} between 0 and cut-off	234	350	volts +25%, —30%
Grid voltage (E_{c1}) for beam cut-off	33	50	volts ±50%
Anode #1 current, I_{b1}, at E_{c1} = 0; E_{b1} adjusted for focus		1330	microamp. max.

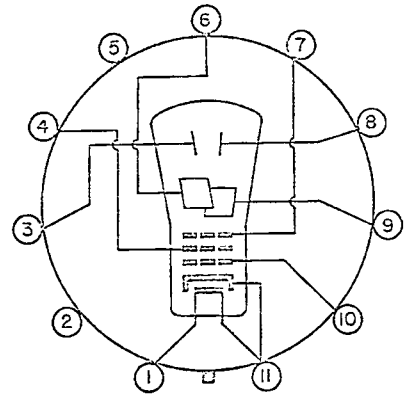
DEFLECTION	FACTOR	SENSITIVITY
D_1D_2	80 d.c. volts/kv. in. ±20%	0.32 mm. kv./d.c. volt (av.)
D_3D_4	70 d.c. volts/kv. in. ±20%	0.36 mm. kv./d.c. volt (av.)

SPOT POSITION

When the tube is operated at (1) normal heater voltage; (2) E_{b2} = 1500 volts; (3) E_{b1} adjusted for focus; (4) E_{c1} set at such a value as will avoid damage to the screen with (5) each of the deflecting electrodes connected to Anode #2 through a one megohm resistor and (6) with the tube shielded against external influences:

The spot will fall within a 15 mm. square, the center of which coincides with the geometric center of the tube face and the sides of which are parallel to the traces produced by deflection electrodes D_1 and D_2 and by deflection electrodes D_3 and D_4 respectively.





Bottom View of Base

Pin #1	Heater
2	No Connection
3	Deflection Plate D_1
4	Focusing Electrode
5	No Connection
6	Deflection Plate D_4
7	Accelerating Electrode
8	Deflection Plate D_2
9	Deflection Plate D_3
10	Control Electrode
11	Heater-Cathode

ALLEN B. DU MONT LABORATORIES, INC.
Passaic, N. J., U. S. A.

268K10-8-42

3GP-A CATHODE-RAY TUBES

The 3GP-A Cathode-ray Tubes are designed for oscillographic and other applications where small spot size, a brilliant trace, and a minimum of defocusing with deflection are required. The gun is designed to draw negligible focusing electrode current.

The 3GP-A is recommended for replacement only.



GENERAL CHARACTERISTICS

Electrical

Heater Voltage	6.3 Volts	
Heater Current	0.6 ± 10% Ampere	
Focusing Method	Electrostatic	
Deflecting Method	Electrostatic	
Phosphor	No. 1	No. 11
Fluorescence	Green	Blue
Persistence	Medium	Short
Direct Interelectrode Capacitances,		
Nominal Grid No. 1 to all other electrodes	7 μμf.	
D1 to D2	2 μμf.	
D3 to D4	1.5 μμf.	
D1 to all other electrodes except D2	7 μμf.	
D2 to all other electrodes except D1	6 μμf.	
D3 to all other electrodes except D4	5 μμf.	
D4 to all other electrodes except D3	5 μμf.	

Mechanical

Overall Length	11½ ± ⅜ Inches
Greatest Diameter of Bulb	3 ± 1/16 Inches
Minimum Useful Screen Diameter	2¾ Inches
Base	Medium Magnal
Basing	11N
Base Alignment	
D3D4 trace aligns with Pin No. 6 and tube axis	+10 Degrees
Positive voltage on D1 deflects beam approximately toward Pin No. 3	
Positive voltage on D3 deflects beam approximately toward locating key	
Angle between D3D4 and D1D2 traces	90 ±3 Degrees

MAXIMUM RATINGS—(Design Center Values)

Anode No. 2 Voltage[1,2]	1500 Max. Volts D-C
Anode No. 1 Voltage	1000 Max. Volts D-C
Grid No. 1 Voltage:	
Negative Bias Value	125 Max. Volts D-C
Positive Bias Value	0 Max. Volts D-C
Positive Peak Value	2 Max. Volts
Peak Voltage between Anode No. 2 and any Deflection Electrode	550 Max. Volts

TYPICAL OPERATING CONDITIONS

For Anode No. 2 Voltage of	1000	1500	Volts
Anode No. 1 Voltage for focus	163 to 291	245 to 437	Volts
Grid No. 1 Voltage[3]	−16.5 to −49.5	−25 to −75	Volts
Deflection Factors:			
D1 and D2	64 to 96	96 to 144	Volts D-C per Inch
D3 and D4	56 to 84	84 to 126	Volts D-C per Inch

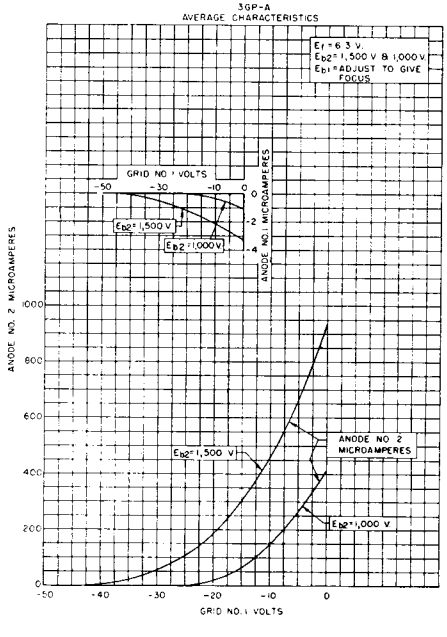
Anode No. 1 Voltage for focus ..... 16.3% to 29.1% of Eb2 Volts
Grid No. 1 Voltage[3] ..... 1.7% to 5% of Eb2 Volts
Anode No. 1 Current for any operating condition ..... −50 to +10 Microamperes
Spot Position (Undeflected)[4] ..... Within a 7½ millimeter radius circle

MAXIMUM CIRCUIT VALUES

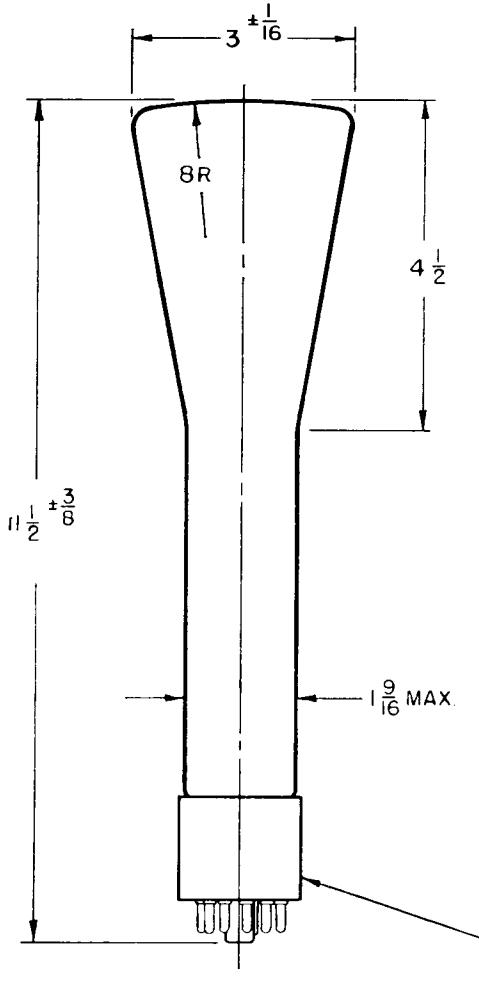
Grid No. 1 Circuit Resistance ..... 1.5 Max. Megohms
Resistance in any Deflecting Electrode Circuit[5] ..... 5 Max. Megohms

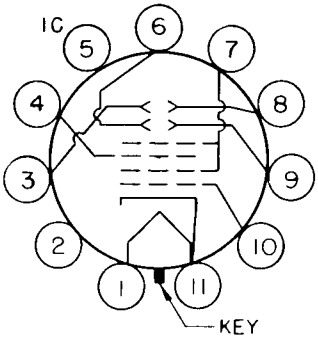
NOTES

1. The product of Anode No. 2 voltage and average Anode No. 2 current should be limited to 6 watts.
2. Anode No. 2 and Grid No. 2, which are connected together within the tube, are referred to herein as Anode No. 2.
3. Visual extinction of undeflected focused spot.
4. Centered with respect to the tube face with the tube shielded.
5. It is recommended that the deflecting electrode circuit resistances be approximately equal.
6. For optimum focus the average potentials of the deflection plates and second anode should be the same.



TYPE 3GP-

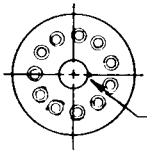




11N

BOTTOM VIEW OF BASE

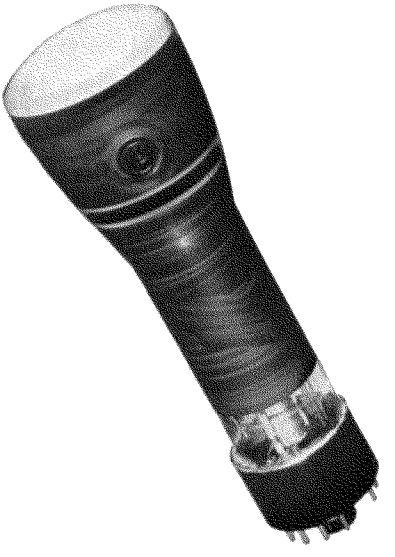
PIN NO.	ELEMENT
1	HEATER
3	DEFLECTING ELECTRODE D_1
4	ANODE NO 1
5	INTERNAL CONNECTION
6	DEFLECTING ELECTRODE D_4
7	ANODE NO 2, GRID NO 2
8	DEFLECTING ELECTRODE D_2
9	DEFLECTING ELECTRODE D_3
10	GRID NO 1
11	HEATER, CATHODE



3JP- CATHODE-RAY TUBES

The Type 3JP- Cathode-ray Tubes are designed for oscillographic applications requiring a small short tube with very high light output and good deflection sensitivity. The intensifier electrode and extremely high current gun provide high excitation of the screen. The gun is designed so that the focusing electrode current under operating conditions is negligible. The 2" diameter neck and diheptal base provide adequate insulation between electrode leads for high altitude installation.

The four types differ only in the characteristics of the fluorescent screens. Other screen types may be obtained on special order.



GENERAL CHARACTERISTICS

Electrical

Heater Voltage	6.3 Volts
Heater Current	0.6 ± 10% Ampere
Focusing Method	Electrostatic
Deflecting Method	Electrostatic

Phosphor	No. 1	No. 2	No. 7	No. 11
Fluorescence	Green	Green	Blue	Blue
Phosphorescence	—	Green	Yellow	—
Persistence	Medium	Long	Long	Short

Direct Interelectrode Capacitances, Nominal

Cathode to all other electrodes	8 μμf.
Grid No. 1 to all other electrodes	8 μμf.
D1 to D2	2.5 μμf.
D3 to D4	2 μμf.
D1 to all other electrodes except D2	8 μμf.
D2 to all other electrodes except D1	7 μμf.
D3 to all other electrodes except D4	7 μμf.
D4 to all other electrodes except D3	8 μμf.

Mechanical

Overall Length	10 ± ¼ Inches
Greatest Diameter of Bulb	3 ± 1/16 Inches
Minimum Useful Screen Diameter	2¾ Inches
Bulb Contact (Recessed Small Ball Cap)	J1-22
Base (Medium Shell Diheptal 12-Pin)	B12-37
Basing	14J

Base Alignment

D1D2 trace aligns with Pin No. 5 and tube axis	±10 Degrees
Positive voltage on D1 deflects beam approximately toward Pin No. 5	
Positive voltage on D3 deflects beam approximately toward Pin No. 2	
Angle between D3D4 and D1D2 traces	90 ± 3 Degrees

Bulb Contact Alignment

J1-22 Cap aligns with D1D2 trace	±10 Degrees
J1-22 Cap on same side as Pin No. 5	

MAXIMUM RATINGS—(Design Center Values)

Anode No. 3 Voltage (Accelerator High-Voltage Electrode) ..... 4,000 Max. Volts D-C
Anode No. 2 Voltage[1,2] ..... 2,000 Max. Volts D-C
Ratio Anode No. 3 Voltage to Anode No. 2 Voltage ..... 2.3 Max.
Anode No. 1 Voltage ..... 1,000 Max. Volts D-C

Grid No. 1 Voltage
- Negative Bias Value ..... 200 Max. Volts D-C
- Positive Bias Value ..... 0 Max. Volts D-C
- Positive Peak Value ..... 2 Max. Volts

Peak Heater Cathode Voltage
- Heater Negative with respect to cathode ..... 125 Max. Volts D-C
- Heater positive with respect to cathode ..... 125 Max. Volts D-C

Peak Voltage between Anode No. 2 and any deflection Electrode ..... 500 Max. Volts

TYPICAL OPERATING CONDITIONS

For Anode No. 3 Voltage of	1,500	3,000	4,000	Volts
For Anode No. 2 Voltage of	1,500	1,500	2,000	Volts
Anode No. 1 Voltage for focus	300 to 515	300 to 515	400 to 690	Volts
Grid No. 1 Voltage[3]	−22.5 to −67.5	−22.5 to −67.5	−30 to −90	Volts
Deflection Factors:				
D1 and D2	102 to 138	127 to 173	170 to 230	Volts D-C per Inch
D3 and D4	76 to 102	94 to 128	125 to 170	Volts D-C per Inch

Anode No. 1 Voltage for focus ..... 20% to 34.5% of Eb2 Volts
Grid No. 1 Voltage[3] ..... 1.5% to 4.5% of Eb2 Volts
Anode No. 1 Current for any operating condition ..... −50 to +10 Microamperes

Deflection Factors:
No 3rd Anode or Eb3 = Eb2
- D1 and D2 ..... 68 to 92 Volts D-C per Inch per Kilovolt of Eb2
- D3 and D4 ..... 50 to 68 Volts D-C per Inch per Kilovolt of Eb2

Eb3 = Twice Eb2
- D1 and D2 ..... 85 to 115 Volts D-C per Inch per Kilovolt of Eb2
- D3 and D4 ..... 62.5 to 85 Volts D-C per Inch per Kilovolt of Eb2

Spot Position (Undeflected)[4] ..... Within a 6 millimeter radius circle.

MAXIMUM CIRCUIT VALUES

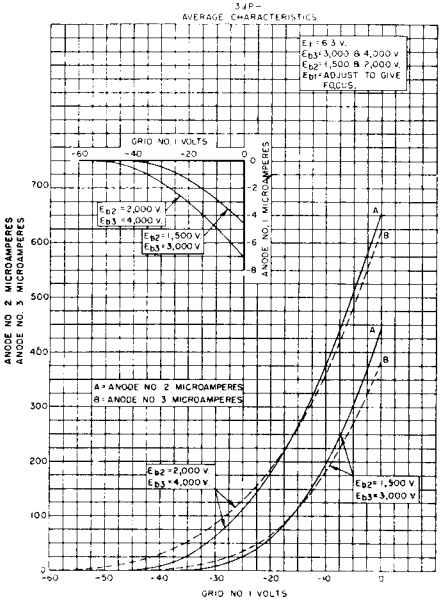
Grid No. 1 Circuit Resistance ..... 1.5 Max. Megohms
Resistance in any Deflecting Electrode Circuit[5] ..... 5 Max. Megohms

NOTES

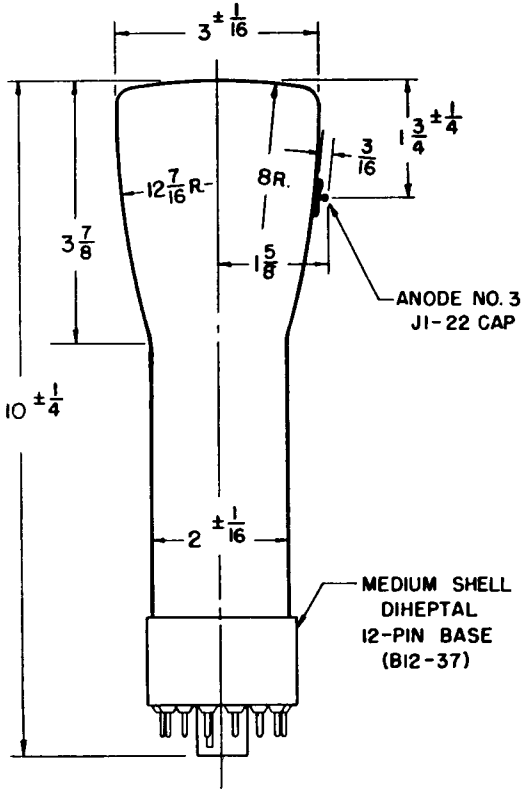
1. Anode No. 2 and Grid No. 2, which are connected together within the tube, are referred to herein as Anode No. 2.
2. The product of Anode No. 2 voltage and average Anode No. 2 current should be limited to 6 watts.
3. Visual extinction of undeflected focused spot.
4. Centered with respect to the tube face with the tube shielded.

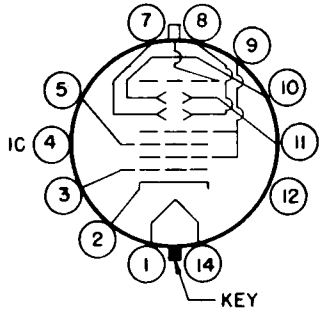
5. It is recommended that the deflecting electrode circuit resistances be approximately equal.

6. For optimum focus the average potentials of the deflection plates and second anode should be the same.



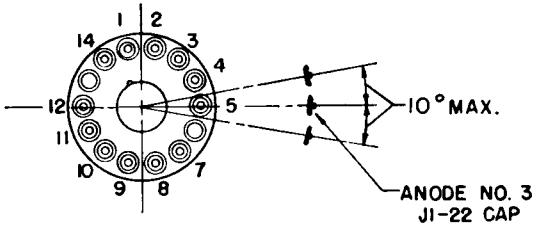
TYPE 3JP-





BOTTOM VIEW OF BASE

PIN NO.	ELEMENT
1	HEATER
2	CATHODE
3	GRID NO 1
4	INTERNAL CONNECTION
5	ANODE NO. 1
7	DEFLECTING ELECTRODE D_3
8	DEFLECTING ELECTRODE D_4
9	ANODE NO. 2, GRID NO. 2
10	DEFLECTING ELECTRODE D_2
11	DEFLECTING ELECTRODE D_1
14	HEATER



from JETEC release #1398,
Jan. 10, 1955, & release #1398A,
Feb. 7, 1955

DU MONT

3JP-A CATHODE-RAY TUBE

TENTATIVE

The Du Mont Type 3JP-A is an electrostatic focus and deflection cathode-ray tube. It is similar to the Type 3JP- with the exception of having closely controlled tolerances. Deflection factors are held to within 10%, with low pattern distortions. Angle alignment between the D1D2 and D3D4 traces is held to within 1°. Grid cut-off bias is held to within 25%.

ELECTRICAL DATA

Focusing Method	Electrostatic		
Deflecting Method	Electrostatic		
Direct Interelectrode Capacitances, Approximate	Min.	Max.	
Cathode to all other electrodes	2.8	5.2	uuf.
Grid #1 to all other electrodes	3.9	7.3	uuf.
D1 to D2	1.1	2.1	uuf.
D3 to D4	1.3	2.4	uuf.
D1 to all other electrodes	3.8	7.0	uuf.
D2 to all other electrodes	3.6	6.7	uuf.
D3 to all other electrodes	3.5	6.5	uuf.
D4 to all other electrodes	3.2	5.9	uuf.

OPTICAL DATA

Phosphor Number	No. 1	No. 2	No. 7	No. 11
Fluorescent Color	Green	Green	Blue	Blue
Phosphorescent Color	-----	Green	Yellow	-----
Persistence	Medium	Long	Long	Short

MECHANICAL DATA

Overall Length	10 ± 3/16	Inches
Greatest Diameter of Bulb	3 ± 1/16	Inches
Minimum Useful Screen Diameter	2 3/4	Inches
Bulb Number	J24G	
Bulb Contact (Recessed Small Ball Contact)	J1-22	
Base (Medium Shell Diheptal, 12-pin)	B12-37	
Basing	14J	
Bulb Contact Alignment		
J1-22 contact aligns with trace of D1D2	±10	Degrees
J1-22 contact on same side as pin No. 5		
Base Alignment		
D1D2 trace aligns with pin No. 5 and tube axis	±10	Degrees
Positive Voltage on D1 deflects beam approximately toward pin No. 5		
Positive Voltage on D3 deflects beam approximately toward pin No. 2		
Angle between D3D4 and D1D2 traces	90 ± 1	Degrees

DU MONT

3JP-A CATHODE-RAY TUBE

RATINGS (Design Center Values)

Heater Voltage	6.3	Volts
Heater Current at 6.3 Volts	0.6 ±10%	Ampere
Post Accelerator Voltage	6000	Max. Volts D-C
Accelerator Voltage	2000	Max. Volts D-C
Ratio Post Accelerator Voltage to Accelerator Voltage	3.0	Max.
Accelerator Input	6	Max. Watts
Focusing Electrode Voltage	1500	Max. Volts D-C
Grid No. 1 Voltage		
Negative Bias Value	200	Max. Volts D-C
Positive Bias Value	0	Max. Volts D-C
Positive Peak Value	0	Max. Volts
Peak Heater-Cathode Voltage		
Heater Negative with respect to cathode	180	Max. Volts
Heater Positive with respect to cathode	180	Max. Volts
Peak Voltage between Accelerator and any Deflection Electrode	550	Max. Volts

TYPICAL OPERATING CONDITIONS

Post Accelerator Voltage	3000	4000	Volts
Accelerator Voltage	1500	2000	Volts
Focusing Electrode Voltage	300 to 515	400 to 690	Volts
Grid No. 1 Voltage[1]	-34 to -56	-45 to -75	Volts
P1 Light Output[2]	25	~~25~~	Ft. L. Min.
Modulation[2]	35 ←	~~35~~	Max. Volts D-C
Line Width "A"[2]	.03	~~.03~~	Inch Max.
Deflection Factors:			
D1 and D2	135 to 165	180 to 220	Volts D-C per Inch
D3 and D4	100 to 122	133 to 163	Volts D-C per Inch
Deflection Factor Uniformity[3]	3	3	% Max.
Focusing Electrode Current for any Operating Condition		-15 to +15	Microamperes
Spot Position		Within a 3/16-inch radius circle[4]	
Pattern Distortion @ 75% of Useful Scan[5]		2%	Max.

DUMONT

3JP-A CATHODE-RAY TUBE

CIRCUIT DESIGN VALUES

Focusing Electrode Voltage	200 to 345 Volts/Kilovolt of Accelerator Voltage
Grid No. 1 Voltage	22.5 to 37.5 Volts/Kilovolt of Accelerator Voltage

Deflection Factors:

No Post Accelerator, or Post Accelerator Voltage = Accelerator Voltage

D1 and D2	72 to 88 Volts D-C per inch per Kilovolt of Accelerator
D3 and D4	53 to 65 Volts D-C per inch per Kilovolt of Accelerator

Post Accelerator Voltage = twice Accelerator Voltage

D1 and D2	90 to 110 Volts D-C per inch per Kilovolt of Accelerator
D3 and D4	66.5 to 81.5 Volts D-C per inch per Kilovolt of Accelerator

MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance	1.5	Max. Megohms
Resistance in any Deflecting-Electrode Circuit[7]	5	Max. Megohms

NOTES

1. Visual extinction of undeflected focused spot.

2. Measured in accordance with MIL-E-1B Specifications @ I_{b3} = 100 ua.

3. The deflection factor (for both D1D2 and D3D4 plate pairs, separately) for any deflection of less than 75% of the useful scan* will not differ from the deflection factor for a deflection at 25% of the useful scan* by more than the indicated value.

4. When the tube is operated at typical operating conditions (E_h = 6.3 V., E_{b3} = 4000 V., E_{b2} = 2000 V., E_{b1} at focus); E_{c1} adjusted to avoid damage to the screen; with each of the deflecting electrodes connected to the accelerator; and with the tube shielded against external influences, the spot will fall within a 3/16-inch radius circle, centered on the tube face.

5. All portions of a raster pattern adjusted so its widest points just touch the sides of a 2.104-inch square, will fall within the area bounded by the 2.104-inch square and an inscribed 2.021-inch square.

6. Deflection accuracy may be obtained by combining angle between traces, deflection factor uniformity and pattern distortion characteristics. In general, for deflections less than those indicated, the accuracy will improve.

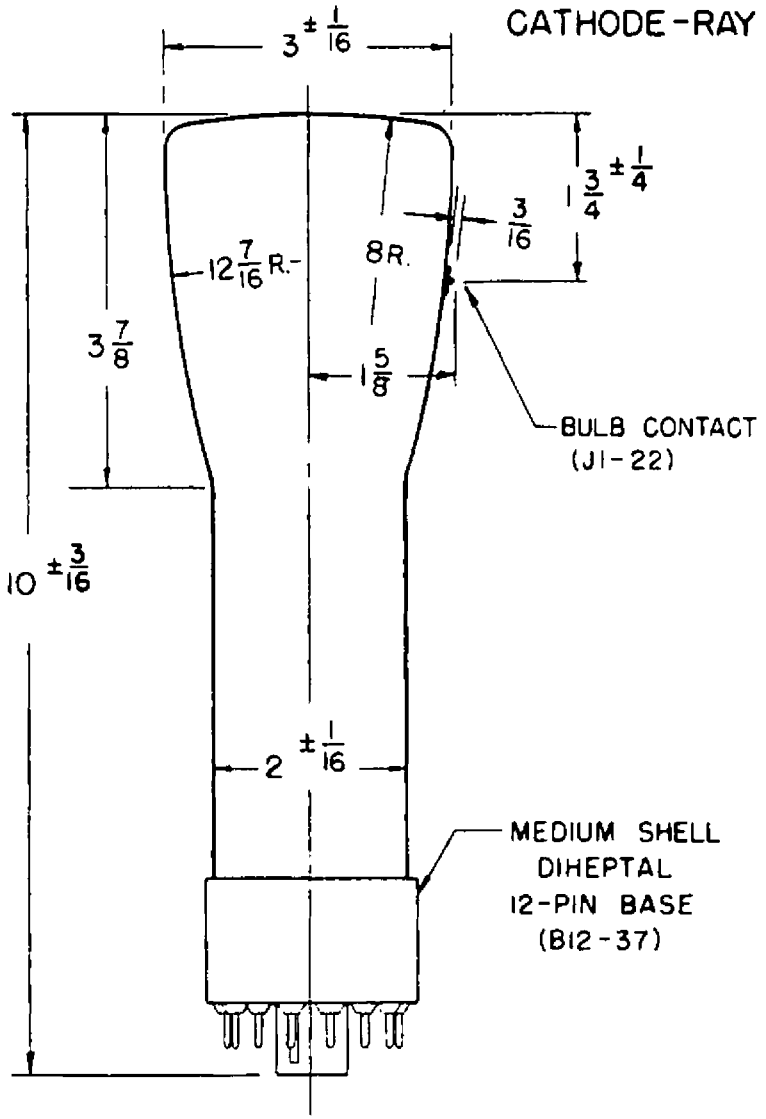
7. It is recommended that the deflecting electrode circuit resistances be approximately equal.

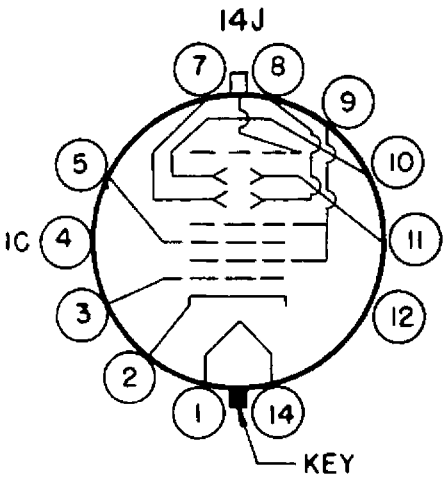
* Useful scan is the area included within the useful screen diameter.

DUMONT

3JP-A

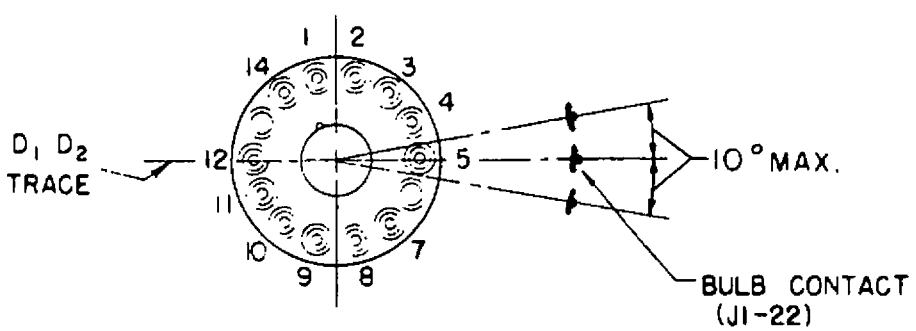
CATHODE-RAY TUBE





BOTTOM VIEW OF BASE

PIN NO.	ELEMENT
1	HEATER
2	CATHODE
3	GRID NO. 1
4	INTERNAL CONNECTION
5	FOCUSING ELECTRODE
7	DEFLECTING ELECTRODE D_3
8	DEFLECTING ELECTRODE D_4
9	ACCELERATOR
10	DEFLECTING ELECTRODE D_2
11	DEFLECTING ELECTRODE D_1
14	HEATER
CONTACT	POST ACCELERATOR



ALLEN B. DUMONT LABS. INC.
CLIFTON, N. J.

DD-26860-A
11-24-54

3RP-A CATHODE-RAY TUBES

The Type 3RP-A is a short, flat-face, 3" cathode-ray tube. High brilliance and definition at relatively low Anode No. 2 voltages, and negligible focusing electrode current, make the Type 3RP-A ideally suited for low- and medium-voltage oscillographic applications.

The Type 3RP-A features high deflection sensitivity with a maximum Anode No. 2 rating of 2500 volts. Special construction of deflection plates D1-D2 minimizes pin-cushion distortion, usually found in flat-face tubes of such short overall length.

Each deflection plate of the Type 3RP-A is connected to a separate pin of a 12-pin duo-decal base, permitting the use of balanced deflection voltages. This greatly reduces astigmatic distortion of both the spot and the pattern it describes.

The flat surface of its tube-face and new production techniques greatly improve the optical qualities of the Type 3RP-A.



GENERAL CHARACTERISTICS

Electrical

Heater Voltage	6.3 Volts
Heater Current	0.6 ± 10% Ampere
Focusing Method	Electrostatic
Deflecting Method	Electrostatic
Phosphor	P1
Fluorescence	Green
Persistence	Medium

Direct Interelectrode Capacitances, Approx.

Cathode to all other electrodes	6 μμf.
Grid No. 1 to all other electrodes	8 μμf.
D1 to D2	2 μμf.
D3 to D4	2 μμf.
D1 to all other electrodes except D2	13 μμf.
D2 to all other electrodes except D1	10 μμf.
D3 to all other electrodes except D4	9 μμf.
D4 to all other electrodes except D3	10 μμf.

Mechanical

Overall Length	9⅛ ± ¼ Inches
Greatest Diameter of Bulb	3 ± 1/16 Inches
Minimum Useful Screen Diameter	2¾ Inches
Base (Small Shell 12-Pin Duodecal)	B12-43
Basing	12E

Base Alignment

D3D4 trace aligns with Pin No. 1 and tube axis	±10 Degrees
Positive voltage on D1 deflects beam approximately toward Pin No. 4	
Positive voltage on D3 deflects beam approximately toward Pin No. 1	
Angle between D3D4 and D1D2 traces	90 ± 3 Degrees

MAXIMUM RATINGS—(Design Center Values)

Anode No. 2 Voltage[1,2] ..... 2,500 Max. Volts D-C
Anode No. 1 Voltage ..... 1,000 Max. Volts D-C

Grid No. 1 Voltage
- Negative Bias Value ..... 200 Max. Volts D-C
- Positive Bias Value ..... 0 Max. Volts D-C
- Positive Peak Value ..... 2 Max. Volts

Peak Heater-Cathode Voltage
- Heater Negative with respect to Cathode ..... 125 Max. Volts D-C
- Heater Positive with respect to Cathode ..... 125 Max. Volts D-C

Peak Voltage between Anode No. 2 and any Deflection Electrode ..... 500 Max. Volts

TYPICAL OPERATING CONDITIONS

For Anode No. 2 Voltage of	1,000	2,000	Volts
Anode No. 1 Voltage for focus	165 to 310	330 to 620	Volts
Grid No. 1 Voltage[3]	−22.5 to −67.5	−45 to −135	Volts
Deflection Factors:			
D1D2	73 to 99	146 to 198	Volts D-C per Inch
D3D4	52 to 70	104 to 140	Volts D-C per Inch

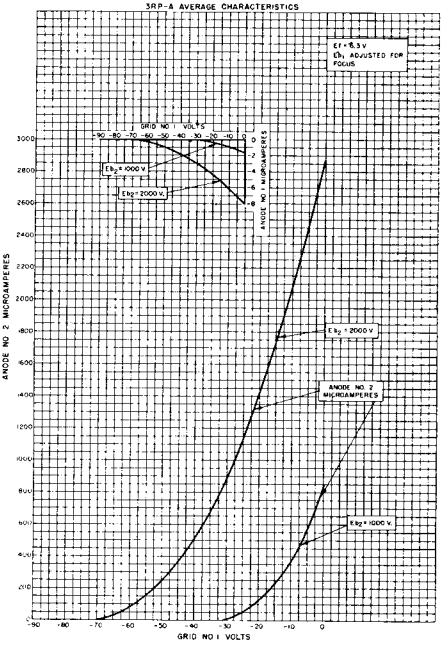
Anode No. 1 Voltage for focus ..... 16.5% to 31% of Eb2 Volts
Grid No. 1 Voltage[3] ..... 2.25% to 6.75% of Eb2 Volts
Anode No. 1 Current for any operating condition ..... −15 to +10 Microamperes
Spot Position (Undeflected)[4] ..... Within a 7½ millimeter radius circle

MAXIMUM CIRCUIT VALUES

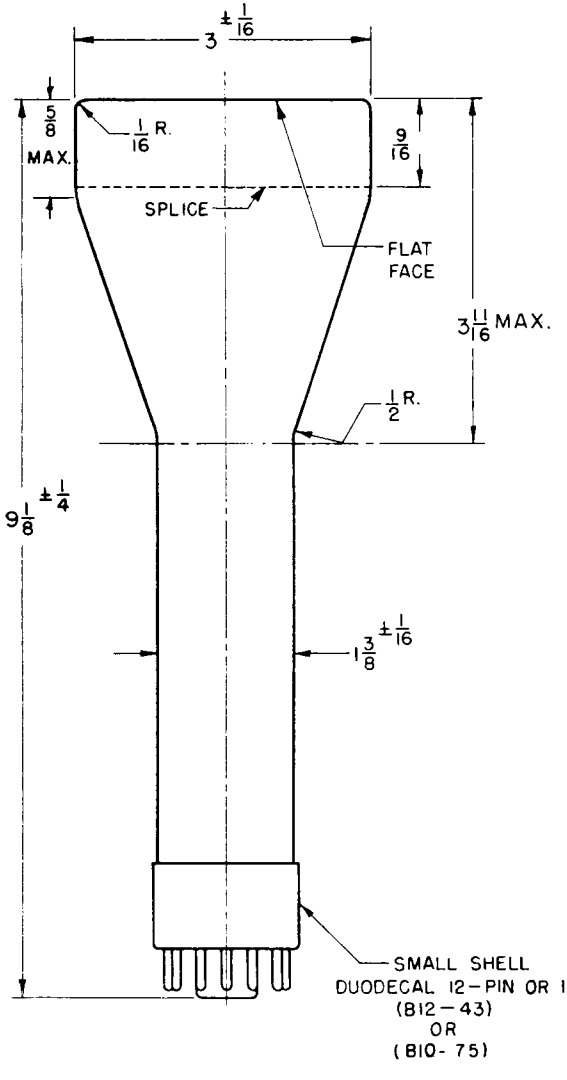
Grid No. 1 Circuit Resistance ..... 1.5 Max. Megohms
Resistance in any Deflecting-Electrode Circuit[5] ..... 5 Max. Megohms

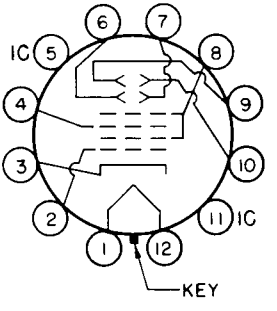
NOTES

1. Anode No. 2 and Grid No. 2, which are connected together within the tube, are referred to herein as Anode No. 2.
2. The product of Anode No. 2 voltage and average Anode No. 2 current should be limited to 6 watts.
3. Visual extinction of undeflected focused spot.
4. Centered with respect to the tube face with the tube shielded.
5. It is recommended that the deflecting electrode circuit resistances be approximately equal.
6. For optimum focus the average potentials of the deflection plates and second anode should be the same.



TYPE 3RP-A





12E

BOTTOM VIEW OF BASE

PIN NO.	ELEMENT
1	HEATER
2	GRID NO 1
3	CATHODE
4	FOCUSING ELECTRODE
5	INTERNAL CONNECTION *
6	DEFLECTING ELECTRODE D_3
7	DEFLECTING ELECTRODE D_4
8	ACCELERATOR
9	DEFLECTING ELECTRODE D_2
10	DEFLECTING ELECTRODE D_1
11	INTERNAL CONNECTION *
12	HEATER

* — 12-PIN BASE ONLY

3WP- CATHODE-RAY TUBES

The Type 3WP- Cathode-ray Tubes are designed for applications where tight tolerances and high sensitivity are important. Among the important features of this line of industrial tubes are: reduction by 50% in critical tolerances for deflection sensitivity and grid cutoff; improved perpendicularity with angle alignment between "X" and "Y" deflection plates held to 90° ± 1°; greatly improved sensitivity on both axes without reduction in useful scan and a flat face to reduce parallactic error.

The inherently higher sensitivity of this line of "Tight-tolerance" cathode-ray tubes, such as the Type 3WP-, over previously available commercial tubes permits smaller, lower cost amplifiers, while tight tolerances afford greater freedom in cathode-ray equipment design.



GENERAL CHARACTERISTICS

Electrical

Heater Voltage	6.3 Volts
Heater Current	0.6 ± 10% Ampere
Focusing Method	Electrostatic
Deflecting Method	Electrostatic

Phosphor	P1	P11
Fluorescence	Green	Blue
Persistence	Medium	Short

Direct Interelectrode Capacitances

	Min.	Max.	
Cathode to all other electrodes	3.0	5.7	μμf.
Grid No. 1 to all other electrodes	4.6	8.7	μμf.
D1 to D2	1.7	3.3	μμf.
D3 to D4	1.0	2.0	μμf.
D1 to all other electrodes except D2	3.8	7.2	μμf.
D2 to all other electrodes except D1	3.8	7.2	μμf.
D3 to all other electrodes except D4	2.5	4.8	μμf.
D4 to all other electrodes except D3	2.5	4.8	μμf.

Mechanical

Overall Length	11½ ± ⅛ Inches
Greatest Diameter of Bulb	3 ± 1/16 Inches
Minimum Useful Screen Diameter	2¾ Inches
Base (Small Shell 12-pin Duodecal)	B12-43
Basing	12T

Base Alignment

D1D2 trace aligns with Pin No. 3 and tube axis ..... ±10 Degrees

Positive voltage on D1 deflects beam approximately toward Pin No. 3

Positive voltage on D3 deflects beam approximately toward Pin No. 12

Angle between D3D4 and D1D2 traces ..... 90 ± 1 Degrees

MAXIMUM RATINGS—(Design Center Values)

Accelerator Voltage[1] ..... 2,500 Max. Volts D-C
Focusing Voltage ..... 1,000 Max. Volts D-C
Grid No. 1 Voltage
  Negative Bias Value ..... 200 Max. Volts D-C
  Positive Bias Value ..... 0 Max. Volts D-C
  Positive Peak Value ..... 0 Max. Volts
Peak Heater-Cathode Voltage
  Heater Negative with respect to Cathode ..... 180 Max. Volts D-C
  Heater Positive with respect to Cathode ..... 180 Max. Volts D-C
Peak Voltage between Accelerator and any Deflection Electrode ..... 500 Max. Volts

TYPICAL OPERATING CONDITIONS

For Accelerator Voltage of ..... 1,500 Volts
Focusing Voltage ..... 247 to 465 Volts
Grid No. 1 Voltage[2] ..... −45 to −75 Volts
Modulation[3] ..... 50 Volts Max.
Line Width A[3] ..... .026 Inch Max.
P1 Light Output[3] ..... 7 Ft. L. Min.
Deflection Factors:
  D1D2 ..... 62 to 76 Volts D-C per Inch
  D3D4 ..... 43 to 52 Volts D-C per Inch
Deflection Factor Uniformity[4] ..... 2% Maximum
Useful Scan
  D1D2 ..... 2.50 Inches*
  D3D4 ..... 2.25 Inches**
Pattern Distortion at 90% of Useful Scan[5] ..... 2% Max.
Spot Position (Undeflected) ..... Within a 3/16-inch radius circle[7]

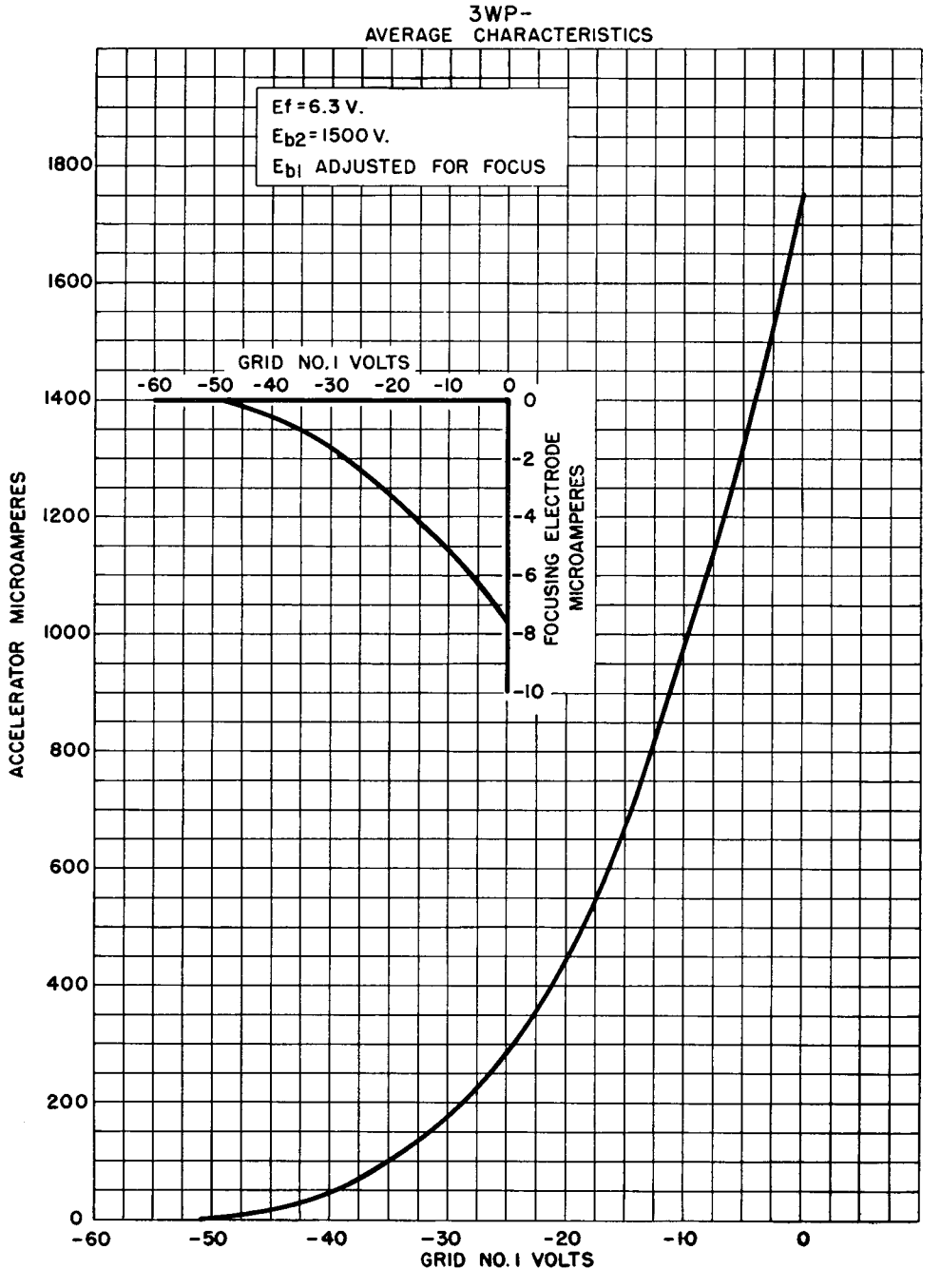
CIRCUIT DESIGN VALUES

Focusing Voltage ..... 165 to 310 Volts per Kilovolt of Accelerator Voltage
Focusing Current for any operating condition ..... −15 to +10 Microamperes
Grid No. 1 Voltage[2] ..... 30 to 50 Volts per Kilovolt of Accelerator Voltage
Grid No. 1 Circuit Resistance ..... 1.5 Max. Megohms
Deflection Factors
  D1 and D2 ..... 41.5 to 50.5 Volts D-C/Inch/KV of Accelerator Voltage
  D3 and D4 ..... 28.5 to 35.0 Volts D-C/Inch/KV of Accelerator Voltage
Resistance in any Deflecting-Electrode Circuit[8] ..... 5 Max. Megohms

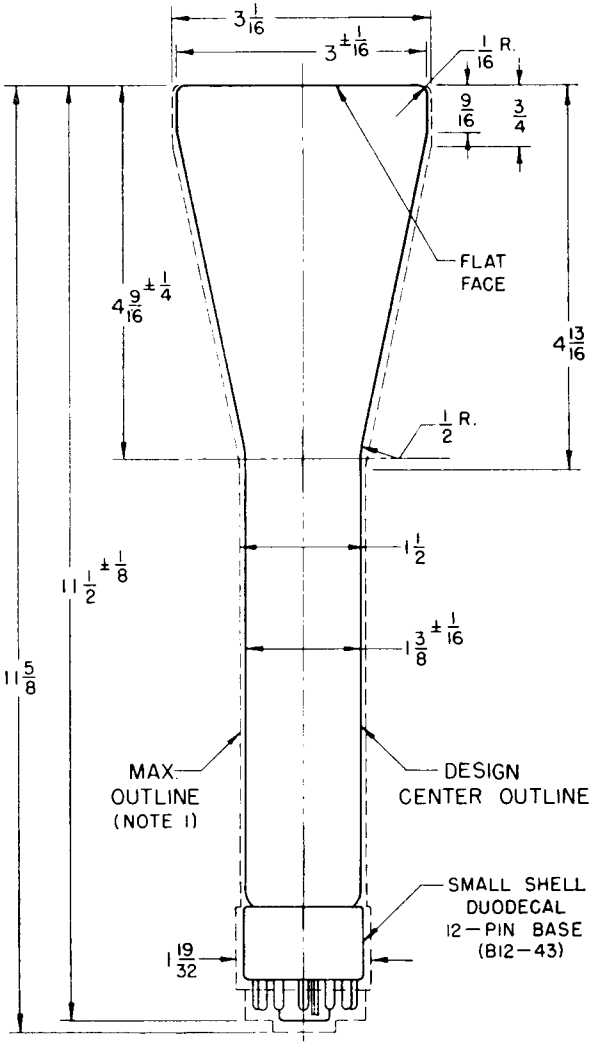
* ± 1.25" minimum from tube face center
** ± 1.125" minimum from tube face center

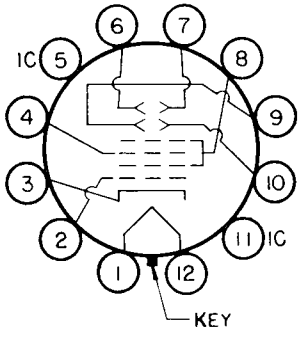
NOTES

1. The product of Accelerator voltage and average Accelerator current should be limited to 6 watts.
2. Visual extinction of undeflected focused spot.
3. Measured in accordance with MIL-E-1 specifications.
4. The deflection factor (for both D1D2 and D3D4 plate pairs, separately) for a deflection of less than 75% of the useful scan will not differ from the deflection factor for a deflection at 25% of the useful scan by more than the indicated value.
5. All portions of a raster pattern, adjusted so its widest points just touch the sides of a 2.295 x 2.065-inch rectangle, will fall within the area bounded by the 2.295 x 2.065-inch rectangle and an inscribed 2.205 x 1.985-inch rectangle.
6. Deflection accuracy may be obtained by combining angle between traces, deflection factor uniformity and pattern distortion characteristics. In general, for deflections less than those indicated the accuracy will improve.
7. When the tube is operated at typical operating conditions (Eh = 6.3 V., Eb2 = 1500 V., Eb1 at focus); Ec1 adjusted to avoid damage to the screen; with each of the deflecting electrodes connected to the accelerator; and with the tube shielded against external influences, the spot will fall within a 3/16-inch radius circle centered on the tube face.
8. It is recommended that the deflecting electrode circuit resistances be approximately equal.
9. For optimum focus the average potentials of the deflection plates and second anode should be the same.


3WP-
AVERAGE CHARACTERISTICS
Ef = 6.3 V.
Eb2 = 1500 V.
Eb1 ADJUSTED FOR FOCUS
GRID NO. 1 VOLTS
-60 -50 -40 -30 -20 -10 0
0 -2 -4 -6 -8 -10
FOCUSING ELECTRODE MICROAMPERES
ACCELERATOR MICROAMPERES
0 200 400 600 800 1000 1200 1400 1600 1800
-60 -50 -40 -30 -20 -10 0
GRID NO. 1 VOLTS

TYPE 3WP-





BOTTOM VIEW OF BASE

PIN NO.	ELEMENT
1	HEATER
2	GRID NO. 1
3	CATHODE
4	FOCUSING ELECTRODE
5	INTERNAL CONNECTION
6	DEFLECTING ELECTRODE D_1
7	DEFLECTING ELECTRODE D_2
8	ACCELERATOR
9	DEFLECTING ELECTRODE D_4
10	DEFLECTING ELECTRODE D_3
11	INTERNAL CONNECTION
12	HEATER

NOTE:
1—NO TUBE WILL EXCEED MAXIMUM OUTLINE.

4DP- CATHODE-RAY TUBES

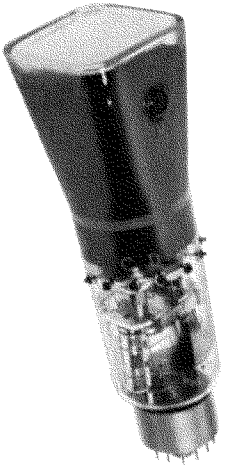
The Du Mont Type 4DP- is a dual-beam cathode-ray tube featuring the usable screen area of 5-inch tubes without occupying the space a five-inch tube requires. The 3.5-inch *square* faceplate of the 4DP- is partly responsible for this feature. Short overall length adds further to the space-saving design.

The two electron guns mounted in the 4DP- are completely independent of one another except for common accelerator and post-accelerator connections. In addition, deflection-plate and accelerator electrode leads are brought out through the tube wall for minimum capacitances and as insulation from other terminals.

Post-acceleration of the electron streams provides greater trace brilliance with minimum sacrifice in deflection sensitivity. Increased deflection sensitivity appreciably reduces the necessary gain of driver-amplifiers.

Du Mont's exclusive tight-tolerance manufacturing technique results in excellent tracking accuracy between beams.

Screen types other than those listed are available on order.



GENERAL CHARACTERISTICS (Note 1)

Electrical Data

Heater Voltage			6.3 Volts	
Heater Current			0.6 ± 10% Ampere	
Deflection Method			Electrostatic	
Focusing Method			Electrostatic	
Phosphor	No. 1	No. 2	No. 7	No. 11
Fluorescence	Green	Green	Blue	Blue
Phosphorescence	——	Green	Yellow	——
Persistence	Medium	Long	Long	Short

Direct Interelectrode Capacitances	Min.	Max.	
Cathode to all other electrodes	3.6	5.0	μμf
Grid No. 1 to all other electrodes	3.7	5.1	μμf
D1 to D2	1.5	2.3	μμf
D3 to D4	1.5	2.3	μμf
D1 to all	4.0	5.3	μμf
D2 to all	4.0	5.3	μμf
D3 to all	4.8	6.5	μμf
D4 to all	4.8	6.5	μμf

Mechanical Data

Overall Length	12¼ ± ¼ Inches
Greatest Bulb Dimension (Diagonal)	4¼ ± 3/32 Inches
Minimum Useful Screen Dimensions (Rounded Corners)	2⅞ x 2⅞ Inches
Bulb Contacts (Post Accelerator)	
Recessed Small Ball Cap	J1-22
Bulb Contacts (Accelerator and Deflection Electrodes)	
Small Ball Cap	J1-25
Base — Medium Shell Diheptal, 12 Pin	B12-37
Basing	14Y
Base Alignment	
D3D4 trace aligns with Base Key and Tube Axis	± 10 Degrees
Positive Voltage on D1 deflects the beam approximately toward Pin. No. 4	
Positive Voltage on D3 deflects the beam approximately toward the Base Key	

Bulb Contact Alignment
Post Accelerator and Accelerator Contacts align with D1D2 trace ..... ± 10 Degrees
Bulb Contact (J1-22) on same side as Base Pin No. 4
Trace Alignment
Angle between D1D2 and D3D4 traces ..... 90 ± 2 Degrees
Corresponding traces of each gun align within ..... ± 2 Degrees
D1D2 trace aligns with bulb wall ..... ± 3 Degrees

MAXIMUM RATINGS (Design Center Values)

Post-Accelerator Voltage ..... 6000 Max. Volts D-C
Accelerator Voltage ..... 3000 Max. Volts D-C
Ratio Post-Accelerator Voltage to Accelerator Voltage (Note 2) ..... 2.0 Max.
Focusing Voltage ..... 1500 Max. Volts. D-C
Grid No. 1 Voltage
Negative Bias Value ..... 200 Max. Volts D-C
Positive Bias Value ..... 0 Max. Volts D-C
Positive Peak Value ..... 0 Max. Volts
Peak Heater to Cathode Voltage
Heater Negative with respect to Cathode ..... 180 Max. Volts
Heater Positive with respect to Cathode ..... 180 Max. Volts
Peak Voltage between Accelerator and any Deflection Electrodes ..... 750 Volts

TYPICAL OPERATING CONDITIONS

For Post-Accelerator Voltage of ..... 4000 Volts D-C
For Accelerator Voltage of ..... 2000 Volts D-C
Focusing Voltage ..... 335 to 615 Volts D-C
Grid No. 1 Voltage (Note 3) ..... —52 to —87 Volts D-C
Modulation (Note 4) ..... 35 Max. Volts D-C
Line Width "A" (Note 5) ..... .024 Max. Inches
Deflection Factors:
D1 and D2 ..... 115 to 140 Volts D-C/Inch
D3 and D4 ..... 90 to 115 Volts D-C/Inch
Spot Position (Note 6) ..... Within 5/8 Inch Square
Tracking Error (Note 7)

CIRCUIT DESIGN VALUES

Focusing Voltage ..... 167 to 308 Volts per Kilovolt of Accelerator Voltage
Focusing Current for any operating condition ..... —15 to +10 Microamperes
Grid No. 1 Voltage (Note 3) ..... —26 to —44 Volts per Kilovolt of Accelerator Voltage
Grid No. 1 Circuit Resistance ..... 1.5 Max. Megohms
Deflection Factors:
Ratio Post-Accelerator Voltage to Accelerator Voltage 1.0
D1 and D2 ..... 44 to 54 Volts D-C/Inch/KV of Accelerator Voltage
D3 and D4 ..... 39 to 50 Volts D-C/Inch/KV of Accelerator Voltage
Ratio Post-Accelerator Voltage to Accelerator Voltage 2.0
D1 and D2 ..... 57.5 to 70 Volts D-C/Inch/KV of Accelerator Voltage
D3 and D4 ..... 45 to 57.5 Volts D-C/Inch/KV of Accelerator Voltage
Resistance in any Deflection Electrode Circuit (Note 8) ..... 1.0 Max. Megohms

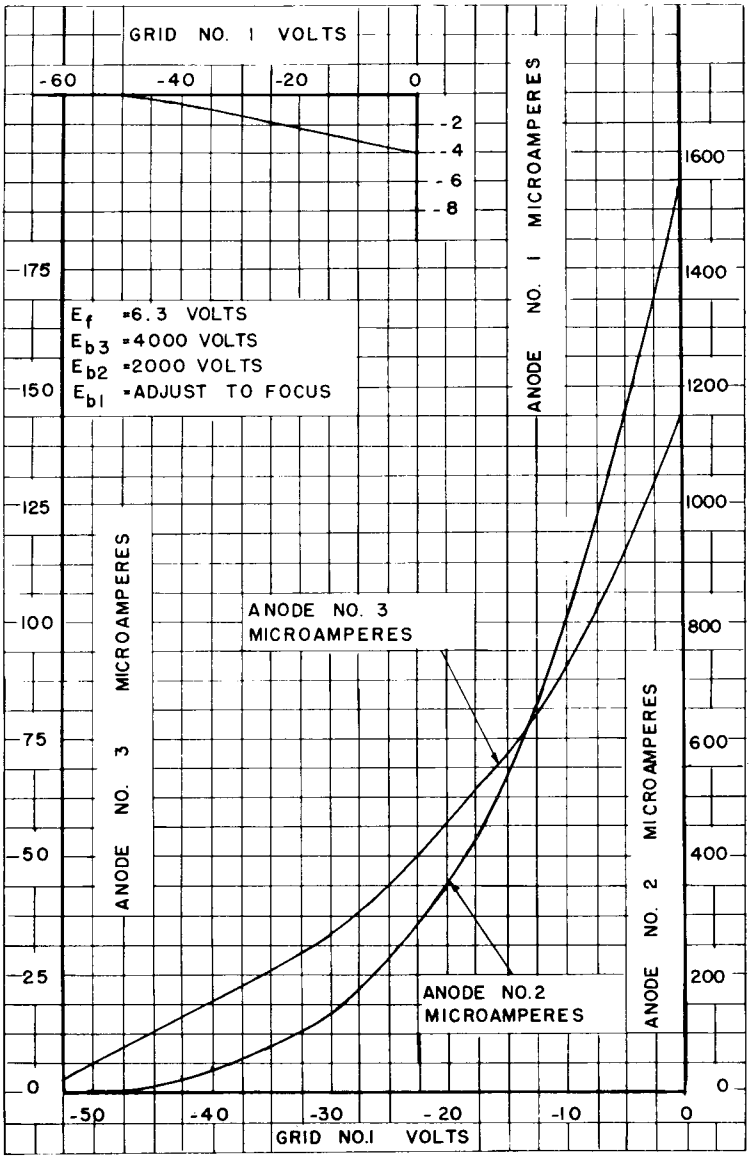
NOTES

1. The values shown are for each unit unless otherwise stated. All tests are to be made on each gun separately.
2. This tube is designed for optimum performance when operating at an Eb3/Eb2 ratio of 2.0. Operation at other ratios of Eb3/Eb2 may result in changes in deflection uniformity, pattern distortion, and tracking accuracy.
3. The visual extinction of the focused, undeflected spot.
4. The increase in Grid No. 1 voltage from cut-off to produce an Ib3 of 25 μAD-C.
5. Measured in accordance with MIL-E-1 specifications, using an Ib3 of 25 μAD-C.
6. When the tube is operated at typical operating conditions, and with (1) Eb1 adjusted for focus, (2) Ec1 set at such a value as will avoid damage to the screen, (3) each of the deflecting electrodes connected to the accelerator and (4) the tube shielded against external influences; the spots will fall within a 5/8 inch square, the center of which coincides with the geometric center of the tube face, and the sides of which are parallel to the traces produced by deflecting electrodes D1 and D2 and by deflecting electrodes D3 and D4 respectively.
7. The tracking accuracy over an area bounded by ± 1-7/16 inches from the geometric center of the tube in the D1D2 plane and ± 1 1/8 inches in the D3D4 plane shall be such that if the two spots are made coincident at the tube face center and then each

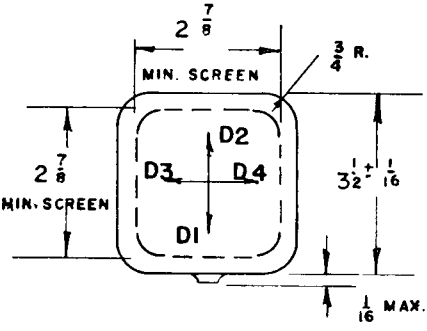
is moved to any spot within above area by means of deflection voltages that should give corresponding deflections in the D1D2 or D3D4 direction from the tube face center, the two spots will lie within 0.043 of an inch of each other.

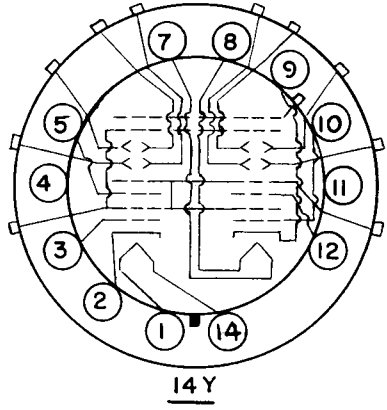
8. It is recommended that the deflection electrode circuit resistance be approximately equal. Higher resistance values up to 5.0 megohms may be used for low beam current operation.
9. After compensation for deflection sensitivity and centering, the deviation of the D1D2 trace shall not vary from a straight line tangent to the trace by more than .050 of an inch at ± 1⅛ inches from the geometric center of the tube face.

TYPE 4DP-
AVERAGE CHARACTERISTICS

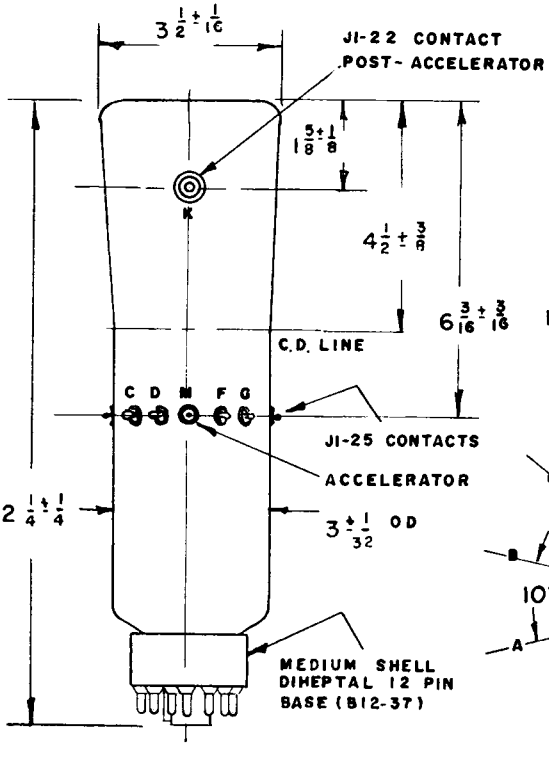


TYPE 4DP-

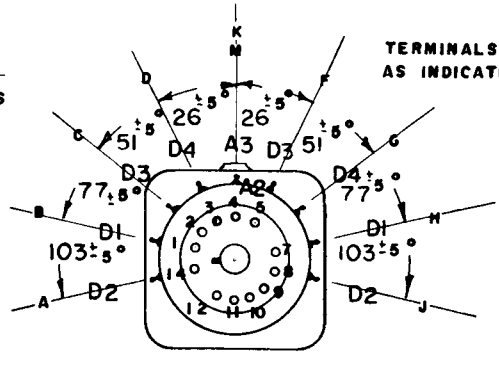




14Y



UNIT A		UNIT B	
PIN		PIN	
1	HEATER	7	HEATER
2	CATHODE	8	HEATER
3	GRID NO.1	9	CATHODE
5	FOCUSING ELECTRODE	10	GRID NO.1
		12	FOCUSING ELECTRODE
14	HEATER		



BOTTOM VIEW

TERMINALS MARKED AS INDICATED

NOTE: 1. ANGLES WITH RESPECT TO ACCELERATOR CONTACT.
2. THE BULB SHALL BE A TYPE J28-B1

DUMONT

CATHODE-RAY TUBE

TYPE 4FP-

The Du Mont Type 4FP- is a 3 1/2-inch square, single beam, electrostatic deflection and focus cathode-ray tube designed to scan the full useful screen area. The deflection electrodes and accelerator leads are brought out through the neck in order to produce maximum insulation while minimizing inductance and capacitance. Post acceleration is used to obtain high brightness with small spot size.

GENERAL CHARACTERISTICS

Electrical Data

Focusing Method	Electrostatic	
Deflection Method	Electrostatic	
Direct Interelectrode Capacitances, Approximate		
Cathode to all other electrodes	3.90	µµf
Grid No. 1 to all other electrodes	6.20	µµf
D1 to D2	1.75	µµf
D3 to D4	1.00	µµf
D1 to all other electrodes	3.90	µµf
D2 to all other electrodes	4.15	µµf
D3 to all other electrodes	2.95	µµf
D4 to all other electrodes	2.80	µµf

Optical Data

Phosphor No.	1	2	7	11
Fluorescence	Green	Blue-Green	Blue-White	Blue
Phosphorescence	Green	Green	Yellow	-----
Persistence	Medium	Long	Long	Short

Mechanical Data

Overall Length	12 ± 1/4	Inches
Greatest Bulb Dimensions:		
Height	3 1/2 ± 1/16	Inches
Width	3 1/2 ± 1/16	Inches
Diagonal	4 1/4 ± 3/32	Inches
Minimum Useful Screen Dimensions:		
Width	2 7/8	Inches
Height	2 7/8	Inches

TL-1163 - 7
2/2/60

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

from JEDEC release #2773, April 4, 1960

DUMONT

CATHODE-RAY TUBE

TYPE 4FP-

GENERAL CHARACTERISTICS (Mechanical Data) (Continued)

Bulb Contact	J1-22	
Neck Contacts	J1-25	
Base (Medium Shell Diheptal, 12-Pin)	B12-37	
Basing	14Q	
Base Alignment:		
D1D2 trace aligns with Pin No. 4 and tube axis	± 10	Degrees
Positive voltage on D1 deflects beam approximately toward Pin No. 11		
Positive voltage on D3 deflects beam approximately toward J1-22 contact		
Bulb Contact Alignment:		
J1-22 contact aligns with D3D4 trace	± 10	Degrees
J1-22 contact on same side as Pin No. 7		
Centerline of J1-22 contact lies on centerline of side wall	± 3/16	Inch
Trace Alignment:		
Angle between D3D4 and D1D2 traces	90 ± 1	Degrees
D3D4 trace aligns with bulb wall	± 3	Degrees

MAXIMUM RATINGS (Design Maximum Values)

Heater Voltage	6.3	Volts
Heater Current at 6.3 Volts	0.6 ± 10%	Ampere
Post Accelerator Voltage	6600	Max. Volts DC
Accelerator Voltage	3300	Max. Volts DC
Ratio Post Accelerator Voltage to Accelerator Voltage	2.0	Max.
Accelerator Input (Average)	6	Max. Watts
Focusing Voltage	1650	Max. Volts DC
Grid No. 1 Voltage		
Negative Bias Value	200	Max. Volts DC
Positive Bias Value	0	Max. Volts DC
Positive Peak Value	0	Max. Volts
Peak Heater-Cathode Voltage		
Heater Negative with respect to cathode	180	Max. Volts
Heater Positive with respect to cathode	180	Max. Volts
Peak Voltage between Accelerator and any deflection electrode	750	Volts

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

FORM 809 SC-7-59-SH

DUMONT

CATHODE-RAY TUBE

TYPE 4FP-

TYPICAL OPERATING CONDITIONS

Post Accelerator Voltage	4000	Volts DC
Accelerator Voltage	2000	Volts DC
Focusing Voltage	335 to 615	Volts DC
Focusing Voltage [1]	430 to 470	Volts DC
Grid No. 1 Voltage [2]	-52 to -87	Volts DC
Deflection Factors:		
D1D2	105 to 145	Volts DC/Inch
D3D4	85 to 115	Volts DC/Inch
Line Width "A" [3]	.017	Inch Max.
Modulation [3]	35	Volts Max.
Deflection Distortion [4]		
Spot Position [5]	Within a 10-mm Square	
Useful Scan:		
D1D2	Full Scan	
D3D4	Full Scan	

CIRCUIT DESIGN VALUES

Grid No. 1 Circuit Resistance	1.5	Max. Megohms
Resistance in any Deflection-Electrode Circuit [6]	1.0	Max. Megohms

NOTES

1. For a vertical trace 2.5 inches at a post accelerator current of 2 μA.
2. For visual extinction of the focused, undeflected spot.
3. Measured in accordance with MIL-E-1 specifications at a post accelerator current of 25 μADC.

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

FORM 809 8C-7-58-8M

DUMONT

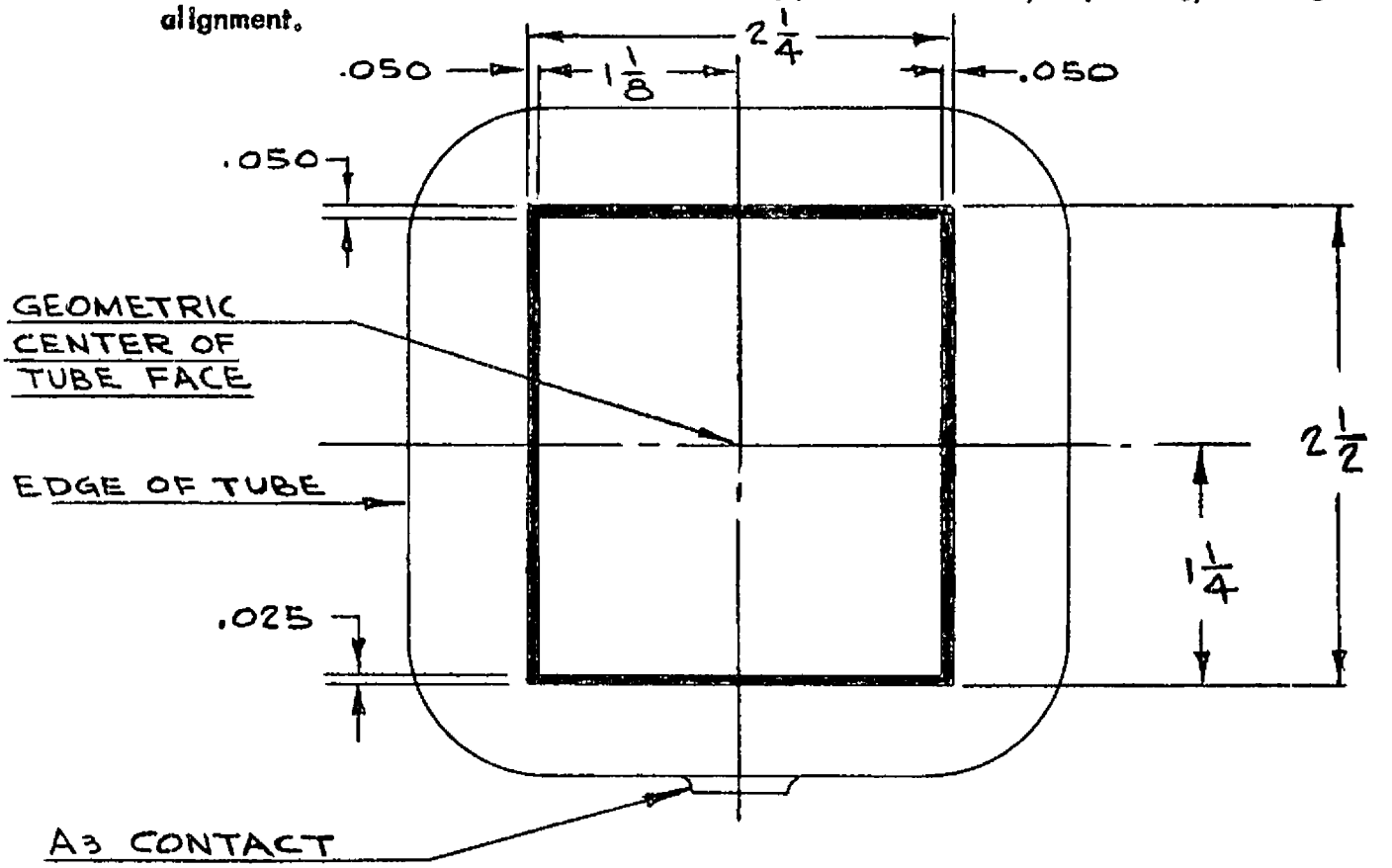
CATHODE-RAY TUBE

TYPE 4FP-

NOTES
(Continued)

4. The edges of a focused raster pattern 2 1/4 inches wide and 2 1/2 inches high, centered with respect to the tube face, will fall within the shaded area formed by the two rectangles as shown below.

This test shall include all deviations including pattern distortion, keystoning, and angle alignment.



5. With the deflecting electrodes connected to the accelerator, and the tube shielded against external influences, the focused spot will fall within a 10-mm square centered with respect to the tube face and the sides of the square parallel to the traces produced by the deflection plate pairs.

6. It is recommended that the deflection-electrode circuit resistances be approximately equal. Higher resistance values up to 5 megohms may be used for low beam current operation.

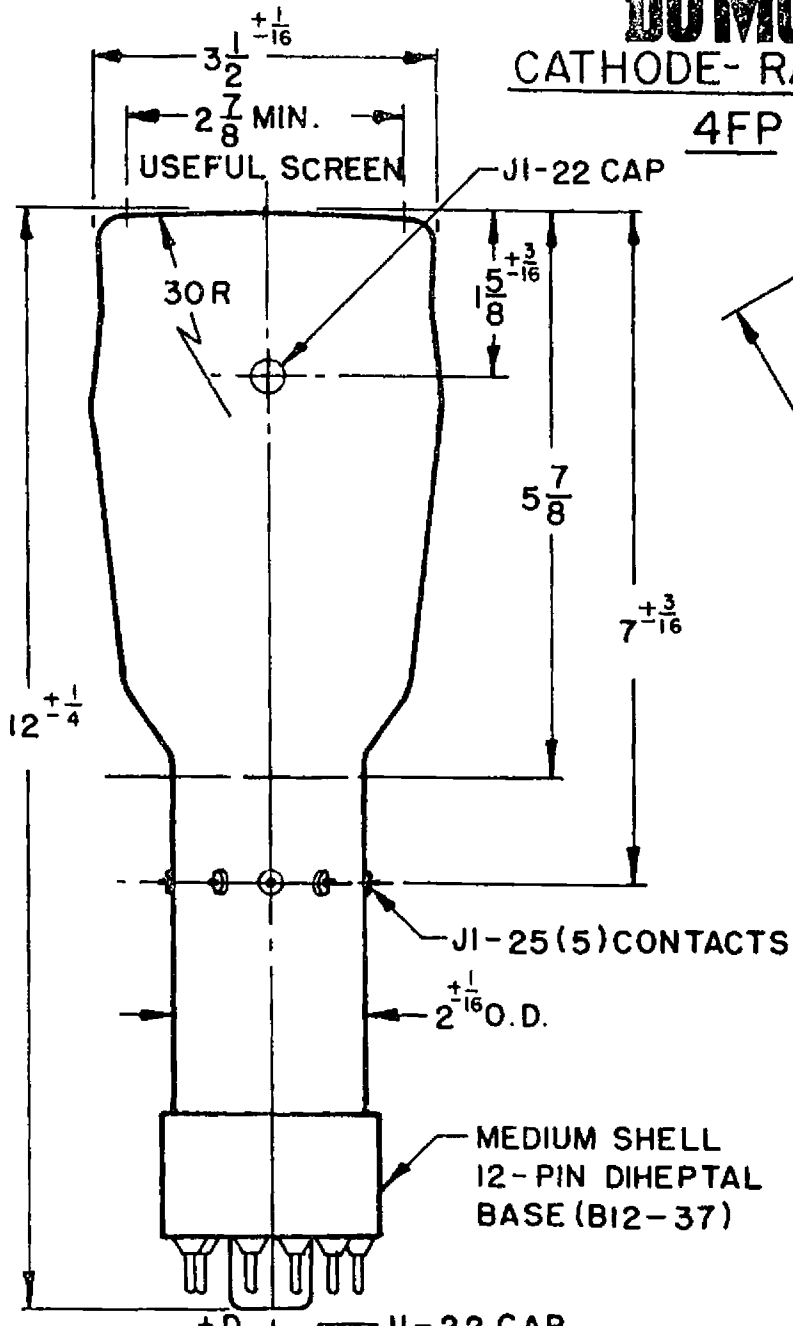
Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

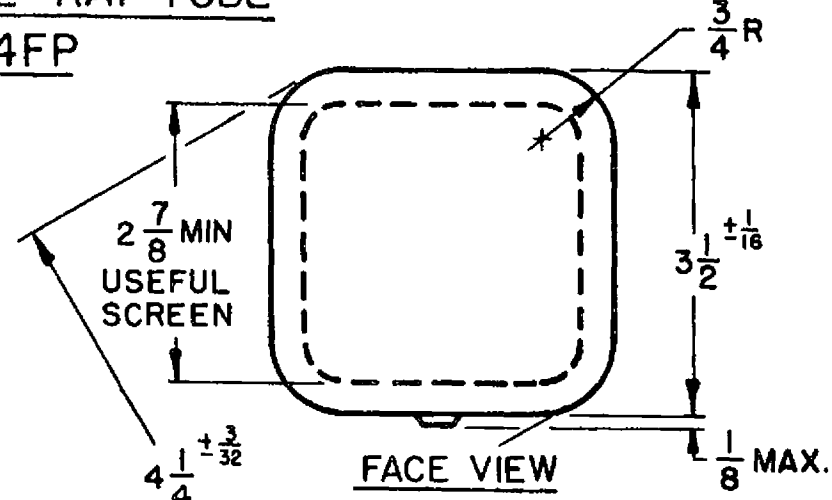
FORM 808 8C-7-59-5M

DU MONT

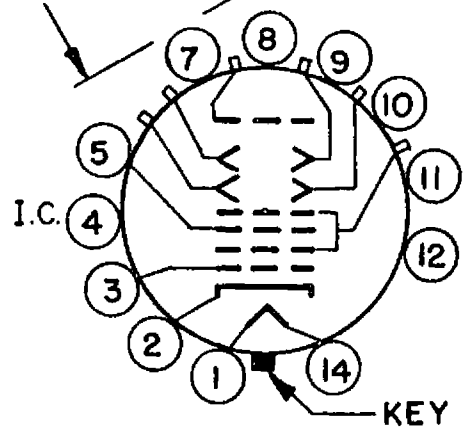
CATHODE-RAY TUBE

4FP





FACE VIEW

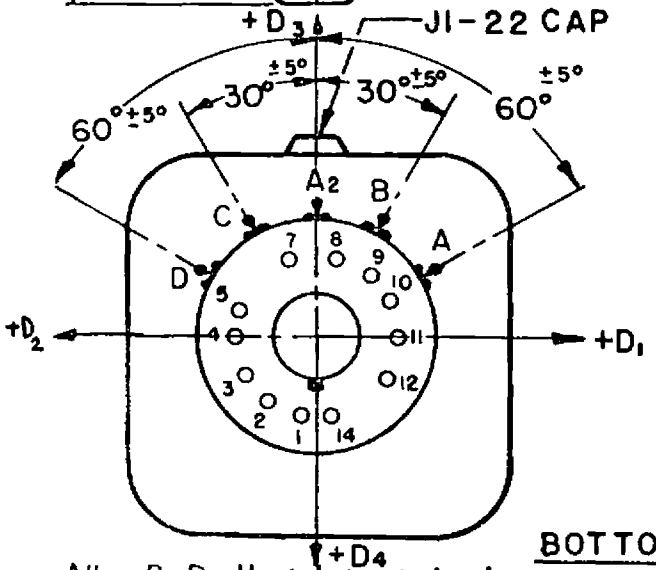


BOTTOM VIEW

PIN NO.	ELEMENT
1	HEATER
2	CATHODE
3	GRID NO.1
4	INTERNAL CONNECTION
5	FOCUSING ELECTRODE
14	HEATER
CAP	POST ACCELERATOR

TERMINALS

A — DEFLECTING ELECTRODE-D_1
B — DEFLECTING ELECTRODE-D_2
C — DEFLECTING ELECTRODE-D_3
D — DEFLECTING ELECTRODE-D_4
A_2 — ACCELERATOR



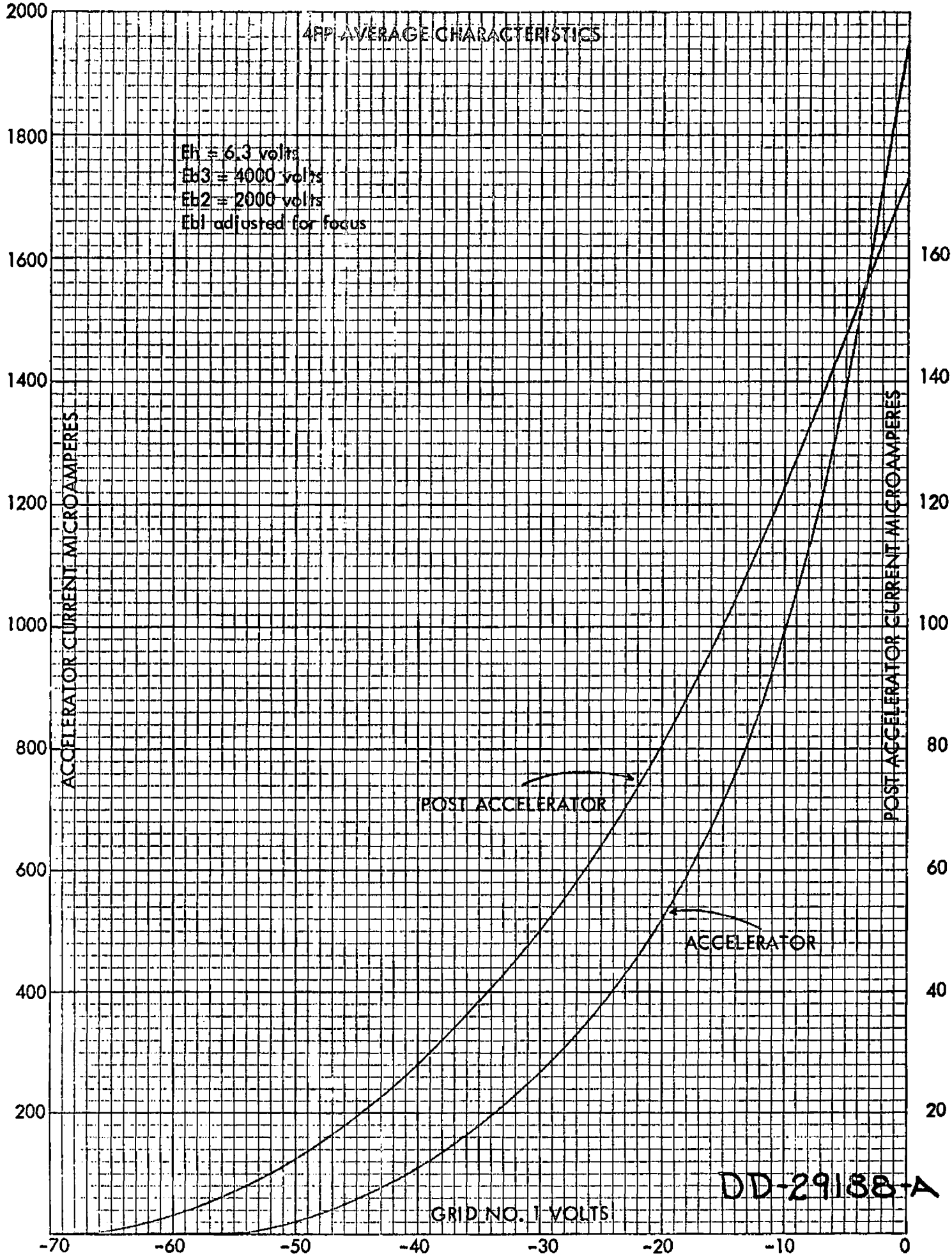
BOTTOM VIEW

NOTE:

1. J1-22 CAP LOCATED ON TUBE CENTER LINE $\pm\frac{3}{16}$ INCH.

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

TD-4836-2
2-19-60
FORM 809-CG-4-56-BM


4PP AVERAGE CHARACTERISTICS
Eh = 6.3 volts
Eb3 = 4000 volts
Eb2 = 2000 volts
Eb1 adjusted for focus
ACCELERATOR CURRENT MICROAMPERES
POST ACCELERATOR CURRENT MICROAMPERES
POST ACCELERATOR
ACCELERATOR
GRID NO. 1 VOLTS
2000
1800
1600
1400
1200
1000
800
600
400
200
160
140
120
100
80
60
40
20
-70
-60
-50
-40
-30
-20
-10
0
DD-29188-A

DUMONT

CATHODE-RAY TUBE

TYPE 5ABP-A

The Du Mont Type 5ABP-A is similar to Type 5ABP- except for tightened tolerances on angle between traces, pattern distortion, deflection factor uniformity, and spot centering. Other features of the 5ABP-A are reduced deflection defocusing and greater light output at a lower screen voltage. An aluminized screen is used, specially designed to give greater light output at voltages as low as 2,500 volts.

GENERAL CHARACTERISTICS

Electrical Data

Focusing Method	Electrostatic	
Deflection Method	Electrostatic	
Direct Interelectrode Capacitances, Approximate		
Cathode to all other electrodes	5	μμf
Grid No. 1 to all other electrodes	8	μμf
D1 to D2	2.5	μμf
D3 to D4	1.3	μμf
D1 to all other electrodes	9	μμf
D2 to all other electrodes	9	μμf
D3 to all other electrodes	5	μμf
D4 to all other electrodes	6	μμf

Optical Data

Phosphor Number	1	4	7	11	31
Fluorescence	Green	White	Blue	Blue	Green
Phosphorescence	-----	-----	Yellow	----	-----
Persistence	Medium	Short-to-medium	Long	Short	Short

Faceplate: Flat, clear

Mechanical Data

Overall Length	16 3/4 ± 3/16	Inches
Greatest Diameter of Bulb	5 1/4 ± 3/32	Inches
Minimum Useful Screen Diameter	4 1/2	Inches
Bulb Contact	J1-22	
Base	B12-37	
Basing	14J	

DE-6151
7/6/60

Allen B. Du Mont Laboratories, Clifton, New Jersey
Division of Fairchild Camera and Instrument Corp.

from JEDEC release #2940, Aug. 22, 1960

DUMONT

CATHODE-RAY TUBE

TYPE 5ABP-A

GENERAL CHARACTERISTICS (Mechanical Data) (Continued)

Base Alignment:		
D1D2 trace aligns with Pin No. 5 and Tube Axis	± 10	Degrees
Positive voltage on D1 deflects beam approximately toward Pin No. 5		
Positive voltage on D3 deflects beam approximately toward Pin No. 2		
Angle between D3D4 and D1D2 traces	90 ± .8	Degrees
Bulb Contact Alignment:		
J1-22 cap aligns with D1D2 trace	± 10	Degrees
J1-22 cap on same side as Pin No. 5		
Weight	2 1/4	Pounds Approx.

MAXIMUM RATINGS (Design Maximum Values)

Heater Voltage	6.3	Volts
Heater Current at 6.3 Volts	0.6 ± 10%	Ampere
Post Accelerator Voltage	6,600	Max. Volts DC
Accelerator Voltage	2,860	Max. Volts DC
Accelerator Input	6	Max. Watts
Ratio Post Accelerator Voltage to Accelerator Voltage	2.3	Max.
Focusing Voltage	1,100	Max. Volts DC
Grid No. 1 Voltage		
Negative Bias Value	200	Max. Volts DC
Positive Bias Value	0	Max. Volts DC
Positive Peak Value	2	Max. Volts
Peak Heater-Cathode Voltage		
Heater negative with respect to cathode	180	Max. Volts
Heater positive with respect to cathode	180	Max. Volts
Peak Voltage between Accelerator and any Deflection Electrode	550	Max. Volts

Allen B. Du Mont Laboratories, Clifton, New Jersey
Division of Fairchild Camera and Instrument Corp.
FORM 808 8C-7-58-8M

DUMONT

CATHODE-RAY TUBE

TYPE 5ABP-A

TYPICAL OPERATING CONDITIONS

Post Accelerator Voltage	3,000	Volts
Accelerator Voltage	1,500	Volts
Focusing Voltage	300 to 515	Volts
Grid No. 1 Voltage [1]	-39 to -65	Volts
Modulation [2]	45	Volts Max.
Line Width "A" [2]	.030	Inch Max.
P1 Light Output [2]	22	Ft. L. Min.
Deflection Factors:		
D1D2	40 to 54	Volts DC/Inch
D3D4	27 to 36	Volts DC/Inch
Deflection Factor Uniformity [3]	1.5%	Max.
Useful Scan [4]		
D1D2	Full Scan	
D3D4	4	Inches *
Pattern Distortion at 100% of Useful Scan [5]	1.5%	Max.
Spot Position (Undeflected) [6]	Within a 5/16-inch radius circle	

CIRCUIT DESIGN VALUES

Focusing Voltage	200 to 345 Volts/KV of Accelerator Voltage	
Focusing Current for any operating condition	-15 to +10	Microamperes
Grid No. 1 Voltage [1]	26 to 43.5 Volts/KV of Accelerator Voltage	
Grid No. 1 Circuit Resistance	1.5	Max. Megohms
Deflection Factors:		
Post Accelerator Voltage = Accelerator Voltage		
D1 and D2	21.5 to 29 Volts DC/Inch/KV of Accelerator Voltage	
D3 and D4	14.5 to 19.5 Volts DC/Inch/KV of Accelerator Voltage	
Resistance in any Deflecting-Electrode Circuit [7]	5	Max. Megohms

* ± 2 inches minimum from tube face center

DE-6151

DUMONT

CATHODE-RAY TUBE

TYPE 5ABP-A

NOTES

1. Visual extinction of undeflected, focused spot.

2. Measured in accordance with MIL-E-1 specifications.

3. The deflection factor (for both D1D2 and D3D4 plate pairs, separately) for any deflection of less than 90% of the useful scan will not differ from the deflection factor for a deflection at 30% of the useful scan by more than the indicated value.

4. Reduction in useful scan when post accelerator voltage is greater than accelerator voltage, is determined by the ratio of these voltages measured with respect to cathode. Values shown are therefore applicable to any operating condition with the same voltage ratios.

5. All portions of a raster pattern, adjusted so its widest points just touch the sides of a 4.000-inch square, will fall within the area bounded by the 4.000-inch square and an inscribed 3.880-inch square, except at the corners where the geometry of the tube makes this impossible.

6. With Ec1 adjusted to avoid damage to the screen, with each deflecting electrode connected to the accelerator, and with the tube shielded against external influences, the spot will fall within a 5/16-inch radius circle, concentric with the tube face.

7. It is recommended that the deflecting-electrode circuit resistances be approximately equal.

Allen B. Du Mont Laboratories, Clifton, New Jersey

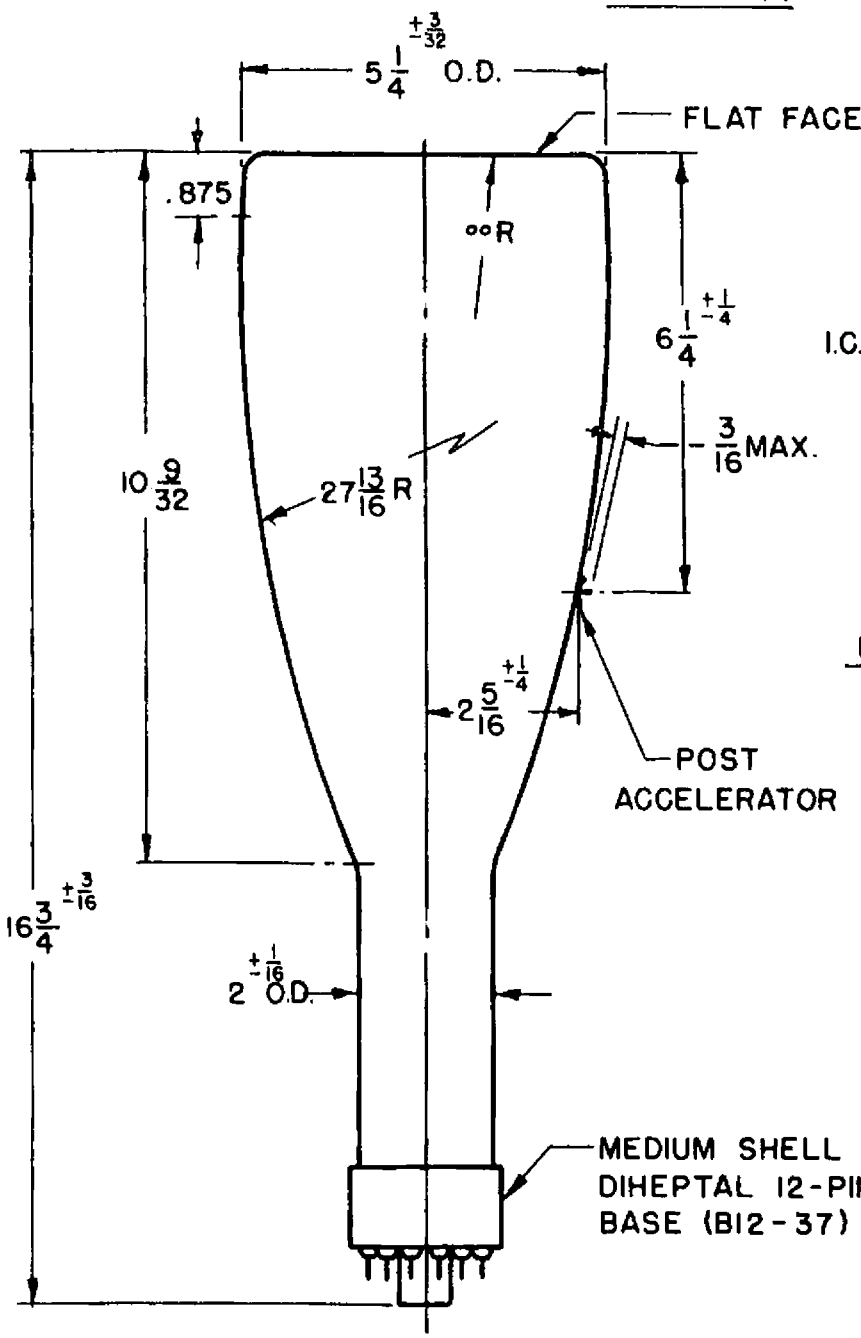
Division of Fairchild Camera and Instrument Corp.

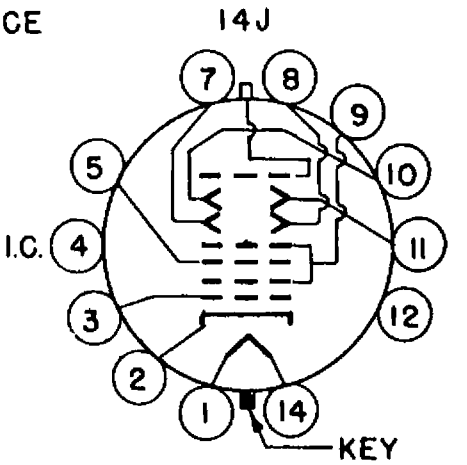
FORM 809 SC-7-59-SH

DUMONT

CATHODE-RAY TUBE

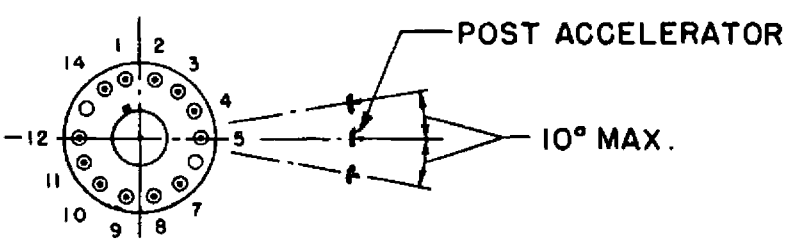
5ABP-A





BOTTOM VIEW

PIN NO.	ELEMENT
1	HEATER
2	CATHODE
3	GRID NO.1
4	INTERNAL CONNECTION
5	FOCUSING ELECTRODE
7	DEFLECTING ELECTRODE D_3
8	DEFLECTING ELECTRODE D_4
9	ACCELERATOR
10	DEFLECTING ELECTRODE D_2
11	DEFLECTING ELECTRODE D_1
14	HEATER



Allen B. Du Mont Laboratories,
Clifton, New Jersey

Division of Fairchild Camera
and Instrument Corp.

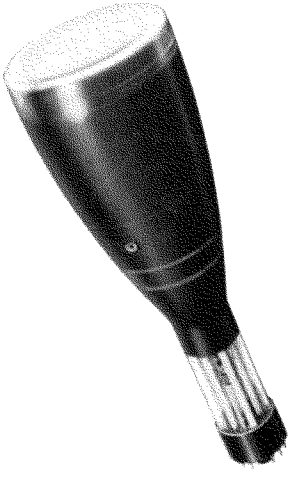
DE-6151
7-6-60
FORM 809 -M1-8-60-SH

5ADP- CATHODE-RAY TUBES

The Type 5ADP- Cathode-ray Tubes are flat-faced electrostatically focused and deflected cathode-ray tubes, designed for applications where tight tolerances and high sensitivity are important. The high sensitivity is achieved by the use of long deflection plates.

Tolerances are very closely controlled: angle alignment between the D1D2 and D3D4 traces is held to within 1°, while deflection factors are held to within 10% with low pattern distortion. Grid cutoff bias is maintained within 25%. A gun which draws negligible focussing electrode current is also employed.

Similar to the Type 3WP- Cathode-ray Tubes, the Type 5ADP- Cathode-ray Tubes permit smaller, lower cost amplifiers, while tight tolerances afford greater freedom in cathode-ray equipment design.



GENERAL CHARACTERISTICS

Electrical

Heater Voltage	6.3 Volts			
Heater Current	0.6 ± 10% Ampere			
Focusing Method	Electrostatic			
Deflecting Method	Electrostatic			
Phosphor	No. 1	No. 2	No. 7	No. 11
Fluorescence	Green	Green	Blue	Blue
Phosphorescence	—	Green	Yellow	—
Persistence	Medium	Long	Long	Short

Direct Interelectrode Capacitances

	Min.	Max.	
Cathode to all other electrodes	3.1	5.8	μμf.
Grid No. 1 to all other electrodes	4.2	7.9	μμf.
D1 to D2	1.7	3.1	μμf.
D3 to D4	.7	1.3	μμf.
D1 to all other electrodes except D2	2.7	6.1	μμf.
D2 to all other electrodes except D1	2.7	6.1	μμf.
D3 to all other electrodes except D4	2.1	4.0	μμf.
D4 to all other electrodes except D3	2.1	5.0	μμf.

Mechanical

Overall Length ..... 16¾ ± 3/16 Inches
Greatest Diameter of Bulb ..... 5¼ ± 3/32 Inches
Minimum Useful Screen Diameter ..... 4½ Inches
Bulb Contact (Recessed Small Ball Cap) J1-22
Base (Medium Shell Diheptal 12-pin) B12-37
Basing 14J
Base Alignment
D1D2 trace aligns with Pin No. 5 and Tube Axis ..... ±10 Degrees
Positive voltage on D1 deflects beam approximately toward pin No. 5
Positive voltage on D3 deflects beam approximately toward pin No. 2
Angle between D3D4 and D1D2 traces ..... 90 ± 1 Degrees
Bulb Contact Alignment
J1-22 contact aligns with D1D2 trace ..... ± 10 Degrees
J1-22 contact on same side as Pin No. 5

MAXIMUM RATINGS—(Design Center Values)

Post Accelerator Voltage ..... 6,000 Max. Volts D-C
Accelerator Voltage[1] ..... 2,600 Max. Volts D-C
Ratio Post Accelerator Voltage to Accelerator Voltage ..... 2.3 Max.
Focusing Voltage ..... 1,000 Max. Volts D-C
Grid No. 1 Voltage
  Negative Bias Value ..... 200 Max. Volts D-C
  Positive Bias Value ..... 0 Max. Volts D-C
  Positive Peak Value ..... 0 Max. Volts
Peak Heater-Cathode Voltage
  Heater Negative with respect to Cathode ..... 180 Max. Volts D-C
  Heater Positive with respect to Cathode ..... 180 Max. Volts D-C
Peak Voltage between Accelerator and any Deflection Electrode ..... 500 Max. Volts

TYPICAL OPERATING CONDITIONS

For Post Accelerator Voltage of ..... 3,000 Volts
For Accelerator Voltage of ..... 1,500 Volts
Focusing Voltage ..... 300 to 515 Volts
Grid No. 1 Voltage[2] ..... −34 to −56 Volts
Modulation[3] ..... 45 Volts Max.
Line Width A[3] ..... .030 Inches Max.
P1 Light Output[3] ..... 15 Ft. L. Min.
Deflection Factors:
  D1 and D2 ..... 40 to 50 Volts D-C per Inch
  D3 and D4 ..... 30.5 to 37.5 Volts D-C per Inch
Deflection factor uniformity[4] ..... 2% Maximum
Useful Scan[5]
  D1D2 ..... 4 Inches*
  D3D4 ..... 4 Inches*
Pattern Distortion at 75% of useful scan[6] ..... 2½% Max.
Spot Position (Undeflected) ..... Within a 5/16-inch radius circle[8]

CIRCUIT DESIGN VALUES

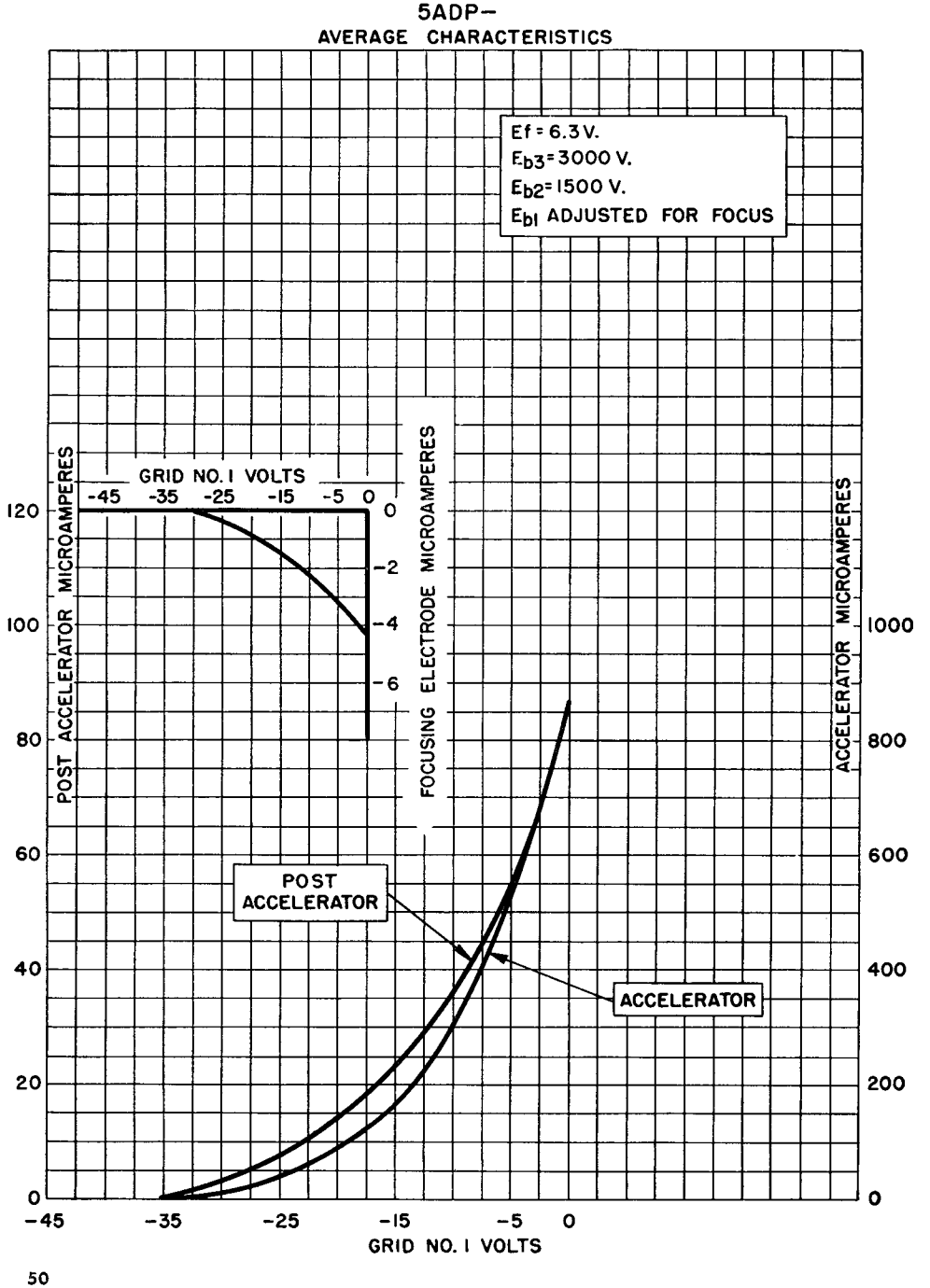
Focusing Voltage ..... 187 to 345 Volts per Kilovolt of Accelerator Voltage
Focusing Current for any operating condition ..... −15 to +10 Microamperes
Grid No. 1 Voltage[2] ..... 22.5 to 37.5 Volts per Kilovolt of Accelerator Voltage
Grid No. 1 Circuit Resistance ..... 1.5 Max. Megohms
Deflection Factors:
  Post Accelerator Voltage = Accelerator Voltage
  D1 and D2 ..... 21.5 to 26.5 Volts D-C/Inch/KV of Accelerator Voltage
  D3 and D4 ..... 16 to 20 Volts D-C/Inch/KV of Accelerator Voltage
Resistance in any Deflecting-Electrode Circuit[9] ..... 5 Max. Megohms

* ±2" minimum from tube face center.

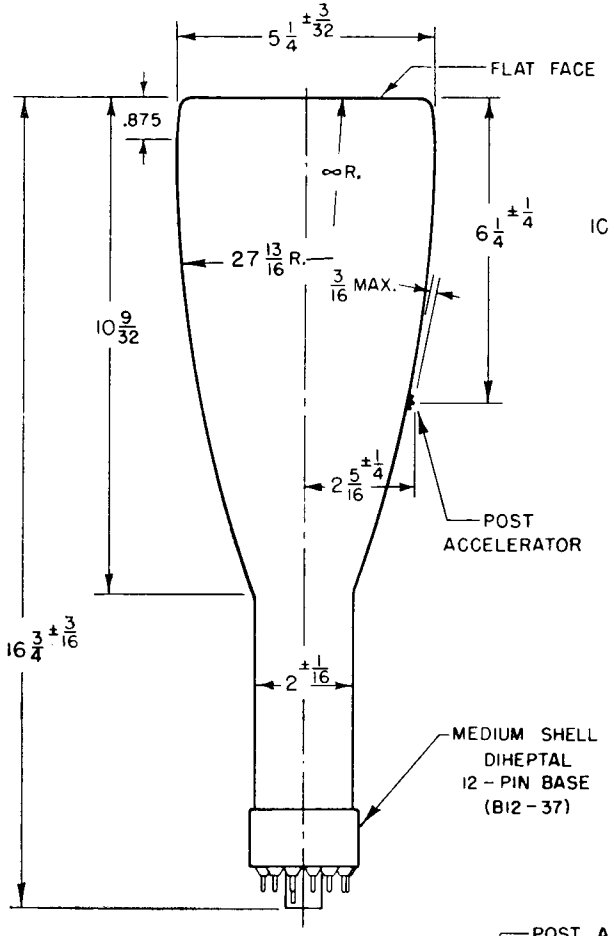
NOTES

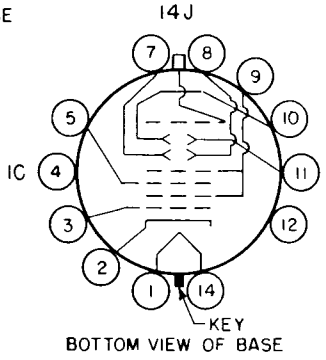
1. The product of Accelerator Voltage and average Accelerator Current should be limited to 6 watts.
2. Visual extinction of undeflected focused spot.
3. Measured in accordance with JAN-1A Specifications at Post Accelerator Current = 25 ua.
4. The deflection factor (for both D1D2 and D3D4 plate pairs, separately) for any deflection of less than 75% of the useful scan will not differ from the deflection factor for a deflection at 25% of the useful scan by more than the indicated value.
5. Reduction in useful scan when Post Accelerator Voltage is greater than Accelerator Voltage is determined by the ratio of these voltages measured with respect to cathode. Values shown are therefore applicable to any operating condition with the same voltage ratios.
6. The edges of a raster pattern, whose mean dimensions are the indicated percentage of useful scan, shall not deviate from the mean dimension rectangle by more than the specified amount.
7. Deflection accuracy may be obtained by combining angle between traces, deflection factor uniformity and pattern distortion characteristics. In general, for deflections less than those indicated the accuracy will improve.

8. Centered with respect to the tube face with the tube shielded.
9. It is recommended that the deflecting electrode circuit resistances be approximately equal.
10. For optimum focus the average potentials of the deflection plates and second anode should be the same.

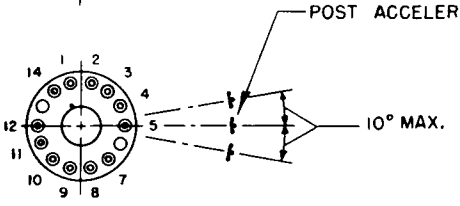


TYPE 5ADP-





PIN NO.	ELEMENT
1	HEATER
2	CATHODE
3	GRID NO. 1
4	INTERNAL CONNECTION
5	FOCUSING ELECTRODE
7	DEFLECTING ELECTRODE D_3
8	DEFLECTING ELECTRODE D_4
9	ACCELERATOR
10	DEFLECTING ELECTRODE D_2
11	DEFLECTING ELECTRODE D_1
14	HEATER



5AFP- CATHODE-RAY TUBE

The Du Mont Type 5AFP- is a five-inch flat-faced electrostatically focused and deflected cathode-ray tube containing two independent beams. The Type 5AFP- features extremely low interaction between traces plus high deflection sensitivity and excellent deflection accuracy. It is one of the line of Du Mont tight-tolerance cathode-ray tubes.

The Type 5AFP- is designed for applications requiring a dual-beam presentation with high brightness level, excellent deflection accuracy, and minimum spot-size.

High brightness levels can be obtained because of the post-accelerator type of construction. Deflection sensitivity is maintained high, even at high accelerating potentials, by use of limited-scan deflection electrodes.

Termination of deflection electrodes and accelerators are made through the bulb wall, at a ring base, for ease of connection. This minimizes lead inductance and capacitance and improves insulation. The two accelerators, the intergun-shield and the first ring of the post-accelerator which are normally tied together, are provided with separate connections in the Type 5AFP-. These independent and separate connections assure maximum versatility in specialized applications.



GENERAL CHARACTERISTICS

Electrical

Heater Voltage	6.3 Volts
Heater Current	0.6±10% Amperes
Focusing Method	Electrostatic
Deflecting Method	Electrostatic

Phosphor	No. 1	No. 2	No. 7	No. 11
Fluorescence	Green	Green	Blue	Blue
Phosphorescence	———	Green	Yellow	———
Persistence	Medium	Long	Long	Short

Direct Interelectrode Capacitances	Min.	Max.	
Cathode to all other electrodes	3.4	4.6	μμf
Grid No. 1 to all other electrodes	3.2	4.0	μμf
D1 to D2	1.5	2.1	μμf
D3 to D4	0.9	1.4	μμf
D1 to all	4.0	5.0	μμf
D2 to all	4.0	5.0	μμf
D3 to all	3.1	4.1	μμf
D4 to all	3.1	4.1	μμf

Mechanical

Overall Length	18¼±¼ Inches
Greatest Diameter of Bulb	5¼±3/32 Inches
Minimum Useful Screen Diameter	4.5 Inches
Bulb Contacts	J1-22
Collar (12 Pin Diheptal)	Special
Base (Medium Shell Diheptal 12-pin)	B12-37

Basing ..... Special

Collar and Base Alignment

Collar Pin No. 1 and Base Key each aligns with the D3D4 trace ..... ±10 Degrees

Positive Voltage on D1 deflects the beam approximately towards Pin No. 4

Positive Voltage on D3 deflects the beam approximately towards Base Key

Bulb Contact Alignment

Bulb Contacts align with D3D4 trace ..... ±10 Degrees

Bulb Contact is on the same side as the Base Key

Trace Alignment

D1D2 trace aligns with D3D4 trace ..... 90±1 Degrees

Corresponding traces align within ..... 1 Degree

MAXIMUM RATINGS—(Design Center Values)

Post Accelerator Voltage ..... 10,500 Max. Volts D-C

Accelerator Voltage (Note 2) ..... 3,500 Max. Volts D-C

Ratio Post-Accelerator Voltage to Accelerator Voltage (Note 3) ..... 3.0 Max.

Focusing Voltage ..... 1,750 Max. Volts D-C

Grid No. 1 Voltage

Negative Bias Value ..... 200 Max. Volts D-C

Positive Bias Value ..... 0 Max. Volts D-C

Positive Peak Value ..... 0 Max. Volts D-C

Peak Heater to Cathode Voltage

Heater Negative with respect to Cathode ..... 180 Max. Volts D-C

Heater Positive with respect to Cathode ..... 180 Max. Volts D-C

Peak Voltage between Accelerator and any Deflection Electrode ..... 750 Max. Volts

TYPICAL OPERATING CONDITIONS

For Post-Accelerator Voltage of ..... 4,000 Volts

For Accelerator Voltage of (Note 4) ..... 2,000 Volts

Focusing Voltage ..... 400 to 684 Volts

Grid No. 1 Voltage (Note 5) ..... −87 to −53 Volts

Modulation Factor (Note 6) ..... 45 Volts Max.

Line Width (Note 7) ..... .030 Inches Max.

P1 Light Output (Note 7) ..... 20 Ft. L. Min.

Deflection Factors:

D1 and D2 ..... 54 to 66 Volts D-C/Inch

D3 and D4 ..... 43 to 53 Volts D-C/Inch

Deflection factor uniformity (Note 8) ..... 2% Max.

Useful Scan (Note 9)

D1D2 ..... 4 Inches*

D3D4 ..... 4 Inches*

Pattern Distortion @ 75% of useful scan (Note 10) ..... 2½% Max.

Tracking Error (Note 11) ..... 2% Max.

Interaction Factor (Note 12) ..... 0.000014 Inches/Volt D-C Max.

Spot Position (Undeflected) (Note 9) ..... Within a 5/16-inch radius circle

* ±2" minimum from tube face center

CIRCUIT DESIGN VALUES

Focusing Voltage ..... 200 to 342 Volts per Kilovolt of Accelerator Voltage

Focusing Current for any operating condition ..... −15 to +10 Microamperes

Grid No. 1 Voltage (Note 5) ..... −44 to −26 Volts per Kilovolt of Accelerator Voltage

Grid No. 1 Circuit Resistance ..... 1.5 Max. Megohms

Deflection Factors:

Ratio Post-Accelerator Voltage to Accelerator Voltage 2.0

D1 and D2 ..... 27 to 33 Volts D-C/Inch/KV of Accelerator Voltage

D3 and D4 ..... 24 to 30 Volts D-C/Inch/KV of Accelerator Voltage

Resistance in any Deflecting-Electrode Circuit (Note 13) ..... 5.0 Max. Megohms

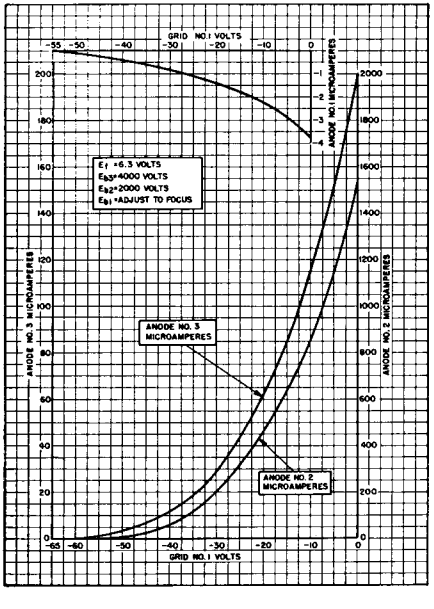
NOTES

1. Values are for each unit unless otherwise stated.
2. Accelerator power input (Avg.) should be limited to 6 Watts.
3. This tube is designed for optimum performance when operating at an Eb3/Eb2 ratio of 2.0. Operation at other ratios of Eb3/Eb2 may result in increased deflection (non) uniformity, pattern distortion and tracking error.

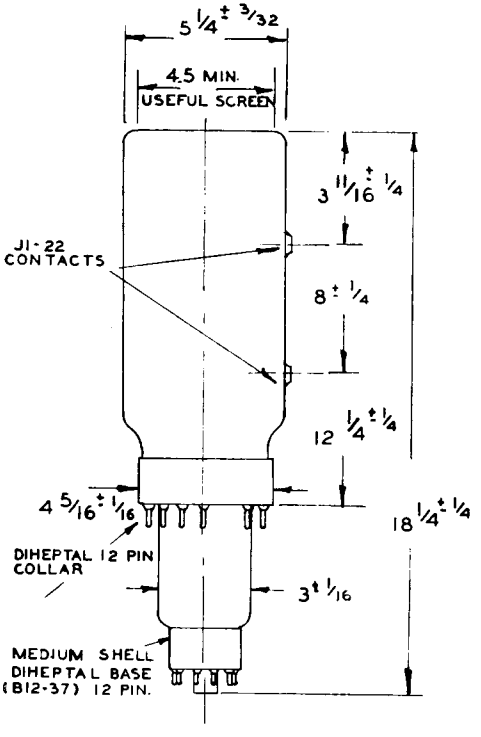
4. Grid No. 4 and Grid No. 2 are connected internally and referred to herein as accelerator. The shield electrode and the accelerator electrodes are connected together in the normal operating condition. However, the accelerators as well as the first ring of the post-deflection accelerating system may be operated at different potentials if desired and the shield potential should then be adjusted for optimum performance.
5. Visual extinction of the focused, undeflected spot.
6. The increase in Grid No. 1 voltage from cutoff to produce an Ib3 of 25 μADC.
7. Measured in accordance with MIL-E-1 specifications using an Ib3 of 25 μADC.
8. The deflection factor (For both D1D2 and D3D4 plate pairs, separately) for deflections of less than 75% of the useful scan will not differ from the deflection factor for a deflection of 25% of the useful scan by more than the indicated value.
9. Centered with respect to the tube face and with the tube shielded.
10. The edges of a raster pattern, whose mean dimensions are the indicated percentage of useful scan, will not deviate from the mean dimension by more than the specified amount.
11. The positions of the spot of each beam, when deflected from the center by applied voltages proportional to the deflection factor will not deviate from each other by more than the indicated percentage of the deflection.
12. The deflection of one beam when balanced d.c. voltages are applied to the deflection electrodes of the other beam will not be greater than the indicated value.
13. Deflection electrode circuit resistances should be equal.
14. The ratio of the deflection factors of corresponding deflection electrodes will not exceed 1.15.
15. Deflection accuracy may be computed from the angle between traces, deflection factor (non) uniformity and pattern distortion characteristics. In general, for deflections less than those indicated the accuracy will improve.
16. The deflection errors including those from pattern distortion and deflection factor (non) uniformity but not including that from angle between traces will not exceed 3.5% of the deflection.

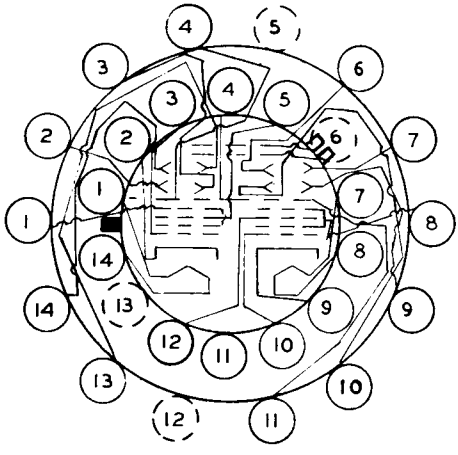
TYPE 5AFP-

AVERAGE CHARACTERISTICS



TYPE 5AFP-

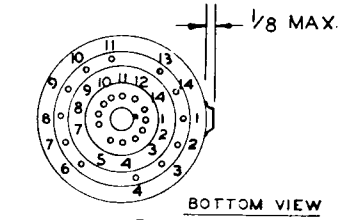


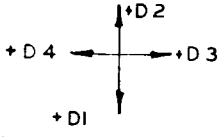


BASE AND COLLAR CONNECTIONS

COLLAR PIN NO.		ELEMENT
BEAM A	14	DEFLECTOR D1
	13	DEFLECTOR D2
	1	ACCELERATOR G2&4
	2	DEFLECTOR **D3**
	3	DEFLECTOR D4
	4	SHIELD
BEAM B	6	DEFLECTOR D1
	7	DEFLECTOR D2
	8	ACCELERATOR G2&4
	9	DEFLECTOR **D4**
	10	DEFLECTOR **D3**
	11	SHIELD

BASE PIN NO		ELEMENT
BEAM A	1 & 14	HEATER
	2	CATHODE
	3	GRID NO1
	4	INTERNAL CONNECTION
	5	ANODE NO1
BEAM B	7 & 8	HEATER
	9	CATHODE
	10	GRID NO1
	11	INTERNAL CONNECTION
	12	ANODE NO1





DEFLECTION DIRECTIONS SHOWN WITH REFERENCE TO ABOVE BOTTOM VIEW

NOTE: SHIELD(COLLAR PINS NO 4&11)IS COMMON TO BOTH BEAMS
J1-22 CONTACTS, COLLAR PIN NO1, AND BASE KEY EACH ALIGN WITH THE 3D4 TRACE ± 10.°

from JEDEC release
#2630, Nov. 9, 1959

DUMONT

CATHODE-RAY TUBE

5AGP-

The DuMont Type 5AGP- is a 5-inch diameter, flat face, single beam, post accelerator, electrostatic deflection and focus cathode-ray tube designed for oscillographic applications. Deflection plate and accelerator leads are brought out through the neck for reduced capacitances.

GENERAL CHARACTERISTICS

Electrical Data

Deflection Method	Electrostatic	
Focusing Method	Electrostatic	
Direct Interelectrode Capacitances, Approx.		
Cathode to all other electrodes	4.1	µµf
Grid No. 1 to all other electrodes	4.9	µµf
D1 to D2	1.6	µµf
D3 to D4	1.1	µµf
D1 to all other electrodes except D2	2.2	µµf
D2 to all other electrodes except D1	2.3	µµf
D3 to all other electrodes except D4	1.6	µµf
D4 to all other electrodes except D3	1.6	µµf

Optical Data

Phosphor No.	1	2	7	11
Fluorescence	Green	Blue-Green	Blue	Blue
Phosphorescence	-----	Green	Yellow	----
Persistence	Medium	Long	Long	Short
Faceplate			Flat, Clear	

Mechanical Data

Overall Length	16 3/4 ± 1/4	Inches
Greatest Bulb Diameter	5 1/4 ± 3/32	Inches
Minimum Useful Screen Diameter	4.5	Inches
Bulb Contact (Recessed Small Ball)	J1-22	
Neck Contacts (Small Ball)	J1-25	
Base (Medium Shell Diheptal 12-Pin)	B12-37	
Basing	14Q	
Base Alignment:		
D1D2 trace aligns with Pin No. 5 and Tube Axis	± 10	Degrees
Positive Voltage on D1 deflects beam approx. towards Pin No. 5		
Positive Voltage on D3 deflects beam approx. towards Pin No. 1		
Angle between D1D2 and D3D4 traces	90 ± 1	Degrees

DUMONT

CATHODE-RAY TUBE

5AGP-

GENERAL CHARACTERISTICS (MECHANICAL DATA) (Continued)

Bulb Contact Alignment:		
J1-22 Contact aligns with D1D2 trace	± 10	Degrees
J1-22 Contact on same side as Pin No. 5		

RATINGS (ABSOLUTE MAXIMUM VALUES)

Heater Voltage	6.3	Volts
Heater Current at 6.3 Volts	0.6 ± 10%	Ampere
Post Accelerator Voltage	7,700	Max. Volts DC
Accelerator Voltage	3,850	Max. Volts DC
Accelerator Input	6	Max. Watts
Focusing Electrode Voltage	2,000	Max. Volts DC
Ratio Post Accelerator to Accelerator Voltage	2	Max.
Grid No. 1 Voltage		
Negative Bias Value	200	Max. Volts DC
Positive Bias Value	0	Max. Volts DC
Positive Peak Value	2	Max. Volts
Peak Heater to Cathode Voltage		
Heater Negative with respect to cathode	180	Max. Volts
Heater Positive with respect to cathode	180	Max. Volts
Peak Voltage between Accelerator and any Deflection Electrode	800	Max. Volts

TYPICAL OPERATING CONDITIONS

Post Accelerator Voltage	4,000	Volts DC
Accelerator Voltage	2,000	Volts DC
Focusing Electrode Voltage [1]	400 to 685	Volts DC
Grid No. 1 Voltage [2]	-52 to -88	Volts DC
Modulation [3]	35	Max. Volts DC
Line Width "A" [3]	.022	Max. Inch
Spot Position [4]	Within a 15 mm square	
Pattern Distortion [5]		
Deflection Factors:		
D1D2	68 to 92	Volts DC/Inch
D3D4	59 to 81	Volts DC/Inch
Deflection Factor Uniformity [6]	2%	Max.

CIRCUIT DESIGN VALUES

Focusing Voltage	200 to 342 Volts per Kilovolt	of Accelerator Voltage
Focusing Current for any operating condition	-15 to +10	Microamperes
Grid No. 1 Voltage [2]	-26 to -44 Volts per Kilovolt	of Accelerator Voltage
Grid No. 1 Circuit Resistance	1.5	Max. Megohms
Deflection Factors:		
Ratio Post Accelerator to Accelerator Voltage	2.0	
D1 and D2	34 to 46 Volts DC/Inch/KV	of Accelerator Voltage
D3 and D4	29.5 to 40.5 Volts DC/Inch/KV	of Accelerator Voltage
Resistance in any Deflecting-Electrode Circuit [7]	5.0	Max. Megohms

NOTES

1. For any value of beam current.

2. Visual extinction of the undeflected, focused spot.

3. Measured in accordance with MIL-E-1 specifications with a beam current of 25 μADC.

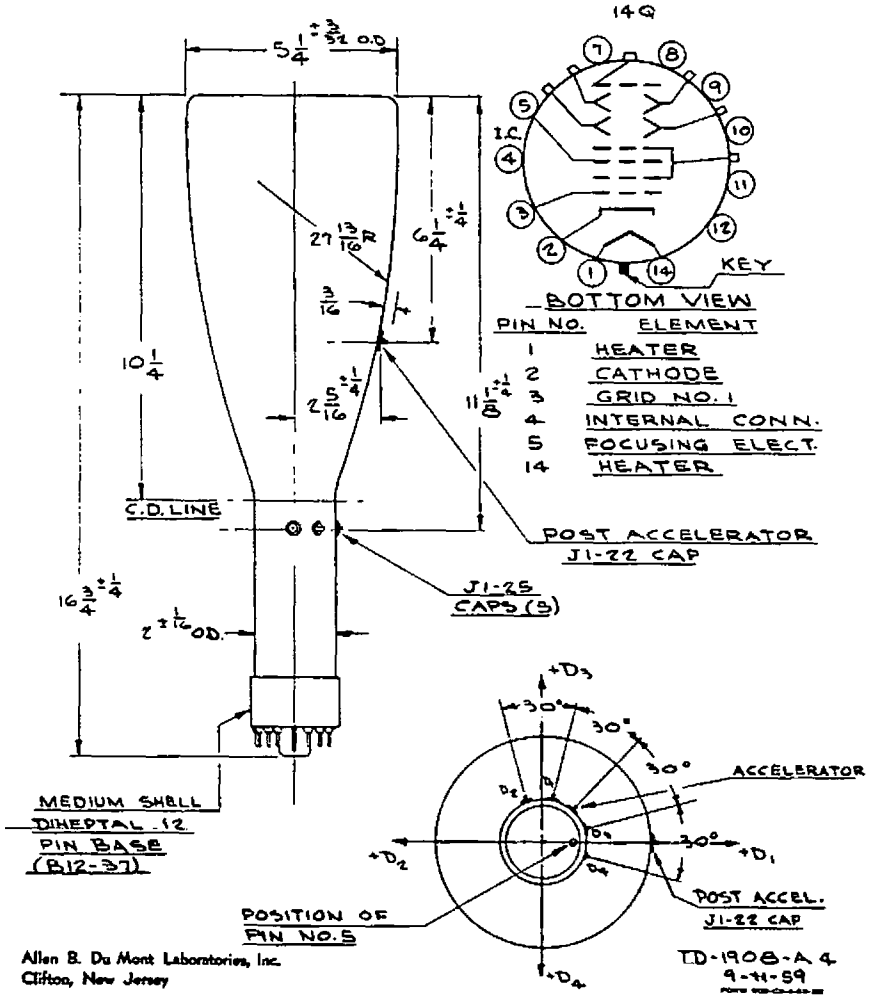
4. With Ec1 adjusted to avoid damage to the screen, with each deflecting-electrode connected to the accelerator, and with the tube shielded, the undeflected spot will fall within a 15 mm square concentric with tube face.

5. With a raster pattern the size of which is adjusted so that the widest points of a pattern just touch the sides of a 3.075-inch square, no point on these pattern sides will lie within an inscribed 2.925-inch square.

6. The deflection factor (for both D1D2 and D3D4 plate pairs, separately) for any deflection of less than 75% of the useful scan will not differ from the deflection factor for a deflection at 25% of the useful screen by more than the indicated value.

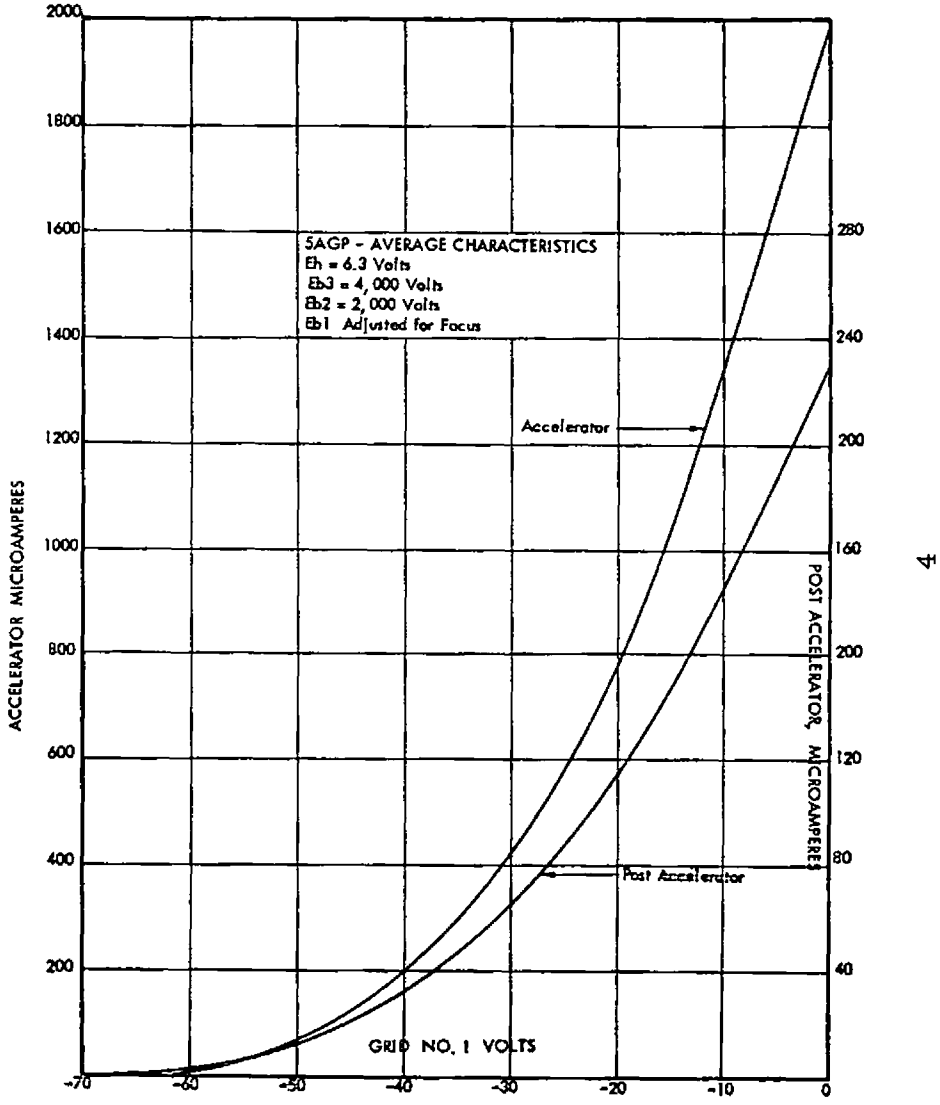
7. It is recommended that the deflection-electrode circuit resistance be equal.

DUMONT
CATHODE-RAY TUBE
5AGP-



Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

TD-1908-A 4
9-11-59



TYPE 5AHP-, 5AHP-A CATHODE-RAY TUBE

The Type 5AHP- is a 5-in electrostatic focus and magnetic deflection cathode-ray tube suitable for radar applications. A low-voltage electrostatic focus lens is employed, designed to operate at or near cathode potential to afford substantially automatic focus, independent of accelerator voltage variations. In addition, the 5AHP- employs the Du Mont high-resolution electron gun. Spot size of the Self-focus Type 5AHP- is materially better than that of magnetically focused types, with a gain of approximately 20% in resolution over the magnetically focused types. Little sacrifice in internal light output is observed and weight and space are saved by the elimination of the focus coil.

The Type 5AHP-A utilizes an aluminized screen for greater light output and to minimize screen charging effects; it is otherwise identical to the 5AHP-. If a P19 screen is selected, the aluminized version should be used.



GENERAL CHARACTERISTICS

Electrical

Heater Voltage	6.3 Volts		
Heater Current	0.6±10% Ampere		
Focusing Method	Electrostatic		
Deflecting Method	Magnetic		
Deflecting Angle (approx.)	53 Degrees		
Phosphor	No. 7	No. 14	No. 19
Fluorescence	Blue	Blue	Orange
Phosphorescence	Yellow	Orange	Orange
Persistence	Long	Medium-long	Long
Direct Interelectrode Capacitances, Approx.			
Cathode to all other electrodes	5		μμf.
Grid No. 1 to all other electrodes	6		μμf.

Mechanical

Overall Length	11⅛±¼ Inches
Greatest Diameter of Bulb	4 15/16±3/32 Inches
Minimum Useful Screen Diameter	4¼ Inches
Bulb Contact (Recessed Small Ball Cap)	J1-22
Base (Medium-Shell Octal 8-Pin)	B8-65 or B8-11
Basing	8EF
Bulb Contact Alignment	
J1-22 Contact aligns with pin No. 5	±10 Degrees

MAXIMUM RATINGS—(Design Center Values)

Accelerator Voltage	10,000 Max. Volts D-C
Focusing Electrode Voltage	—500 to +1000 Max. Volts D-C
Grid No. 2 Voltage	700 Max. Volts D-C
Grid No. 1 Voltage	
Negative Bias Value	180 Max. Volts D-C
Positive Bias Value[1]	0 Max. Volts D-C
Positive Peak Value	0 Max. Volts
Peak Heater-Cathode Voltage	
Heater Negative with respect to Cathode	180 Max. Volts D-C
Heater Positive with respect to Cathode	180 Max. Volts D-C

TYPICAL OPERATING CONDITIONS

Accelerator Voltage[2]	5,000	7,000	Volts D-C
Focusing Electrode Voltage[3]	0 to 200	0 to 250	Volts D-C
Focusing Electrode Current	—15 to +15	—15 to +15	μA. D-C
Grid No. 2 Voltage	300	300	Volts D-C
Grid No. 1 Voltage[4]	—28 to —72	—28 to —72	Volts D-C
Line Width A[5]	.010	.009	Inch Max.
Spot Position (Undeflected)[6]	5/16	5/16	Inch
Alignment Magnet Field Strength	0-4	0-4	Gausses

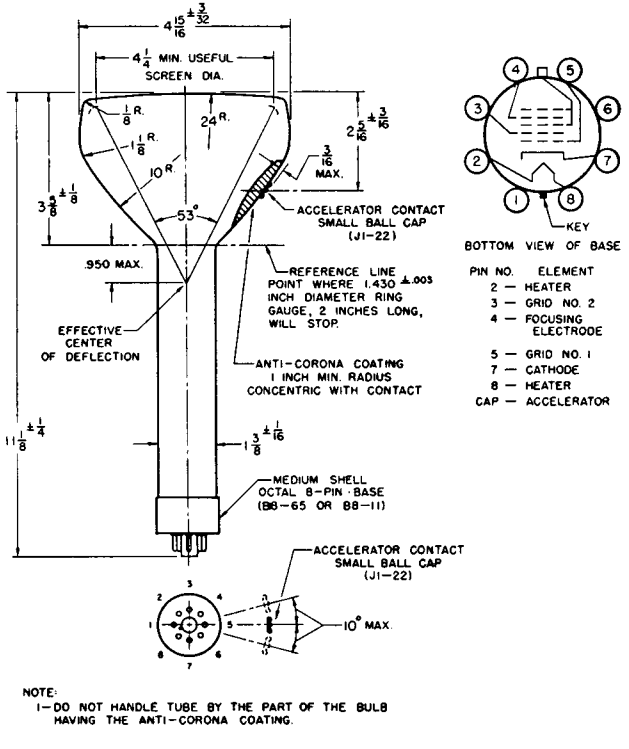
MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance ..... 1.5 Max. Megohms

NOTES

1. At or near this rating, the effective resistance of the accelerator supply should be adequate to limit the accelerator input power to 6 watts. The screen of the 5AHP19-A can be permanently damaged should the current density be permitted to rise too high. To prevent burning, minimum beam current densities should be employed.
2. Brilliance and definition decrease with decreasing accelerator voltage. In general, accelerator voltage should not be less than 5,000 volts, except for the 5AHP19-A. For this type, the accelerator voltage should not be less than 7,000 volts.
3. With Grid No. 1 voltage adjusted to produce an accelerator current of 100 μA., with the pattern adjusted for best overall focus. Measured with a 525-line interlaced and synchronized 2¾x3¾-inch pattern, with interlaced line blanking (current measured before applying blanking).
4. Visual extinction of focused 2¾x3¾-inch raster pattern.
5. Measured with a 525-line interlaced and synchronized pattern with interlaced line blanking. Pattern width adjusted to 90% of minimum useful screen diameter. Ib=100 μA., measured before applying blanking. Line width is the merged raster height divided by the number of lines (262.5) (measured in center of tube face).
   The 5AHP19-A should be checked at 7,000 volts. To avoid damage to the screen, it is recommended that the screen current be not more than 50 μA. when measuring line width. The line width under these conditions will be .009 inch maximum (current measured before applying blanking).
6. The center of the undeflected, focused spot will fall within a circle of 5/16-inch radius concentric with the center of the tube face, with the tube shielded.
7. For optimum quality of the focussed spot, the use of a beam alignment magnet is recommended. This may be obtained by the use of an adjustable magnet of the specified strength located approximately 5⅛ inches from the reference line.

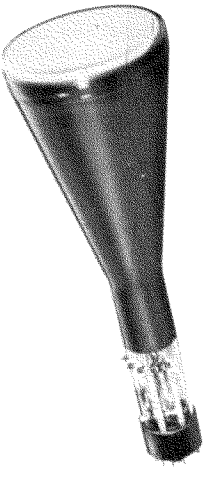
TYPE 5AHP-



NOTE:
1—DO NOT HANDLE TUBE BY THE PART OF THE BULB HAVING THE ANTI-CORONA COATING.

5AMP- CATHODE-RAY TUBES

The Du Mont Type 5AMP- is a tight-tolerance 5-inch cathode-ray tube employing the mono-accelerator principle of beam acceleration. Electrostatically focused and deflected, the Type 5AMP- features high deflection sensitivity, exceptional deflection linearity and a flat faceplate.



The usable screen area of the Type 5AMP- measures 2.5 x 4 inches, designed this way to provide very high deflection sensitivity in the Y-axis. This sensitivity considerably reduces the output amplitude requirements of wide-band amplifiers and consequently reduces the cost of such amplifiers.

The mono-accelerator principle requires that all electron stream acceleration take place *before* the beam enters the deflection system. Under this arrangement, exceptional spot uniformity and deflection linearity are achieved.

Deflection-plate connections are provided at the tube neck rather than through the tube base to appreciably reduce lead inductance and capacitance to these electrodes.

GENERAL CHARACTERISTICS

Electrical Data

Heater Voltage	6.3 Volts
Heater Current	0.6 ± 10% Ampere
Focusing Method	Electrostatic
Deflecting Method	Electrostatic

Phosphor	No. 1	No. 2	No. 7	No. 11
Fluorescence	Green	Green	Blue	Blue
Phosphorescence	——	Green	Yellow	——
Persistence	Medium	Long	Long	Short

Direct Interelectrode Capacitances	Min.	Max.	
Cathode to all other electrodes	2.7	4.9	μμf
Grid No. 1 to all other electrodes	2.9	5.5	μμf
D1 to D2	2.1	3.9	μμf
D3 to D4	1.3	2.5	μμf
D1 to all other electrodes	4.3	7.9	μμf
D2 to all other electrodes	4.0	7.4	μμf
D3 to all other electrodes	2.9	5.5	μμf
D4 to all other electrodes	2.6	4.8	μμf

Mechanical Data

Overall Length	17⅝ ± ¼ Inches
Greatest Diameter of Bulb	5¼ ± 3/32 Inches
Minimum Useful Screen Diameter	4½ Inches
Neck Contacts (Small Ball Caps)	J1-25
Base (Medium Shell Diheptal 12-Pin)	B12-37
Basing	14U
Base Alignment:	
D1D2 trace aligns with Pin No. 5 and tube axis	± 10 Degrees
Positive voltage on D1 deflects beam approximately toward Pin No. 5	
Positive voltage on D3 deflects beam approximately toward Pin No. 2	
Angle between D3D4 and D1D2 traces	90 ± 1 Degrees

MAXIMUM RATINGS (Design Center Values)

Accelerator Voltage[1]	6,000 Max. Volts D-C
Focusing Voltage	1,500 Max. Volts D-C
Grid No. 1 Voltage	
Negative Bias Value	200 Max. Volts D-C
Positive Bias Value	0 Max. Volts D-C
Positive Peak Value	0 Max. Volts
Peak Heater Cathode Voltage	
Heater Negative with respect to Cathode	180 Max. Volts D-C
Heater Positive with respect to Cathode	180 Max. Volts D-C
Peak Voltage between Accelerator and any Deflection Electrode	1,200 Max. Volts

TYPICAL OPERATING CONDITIONS

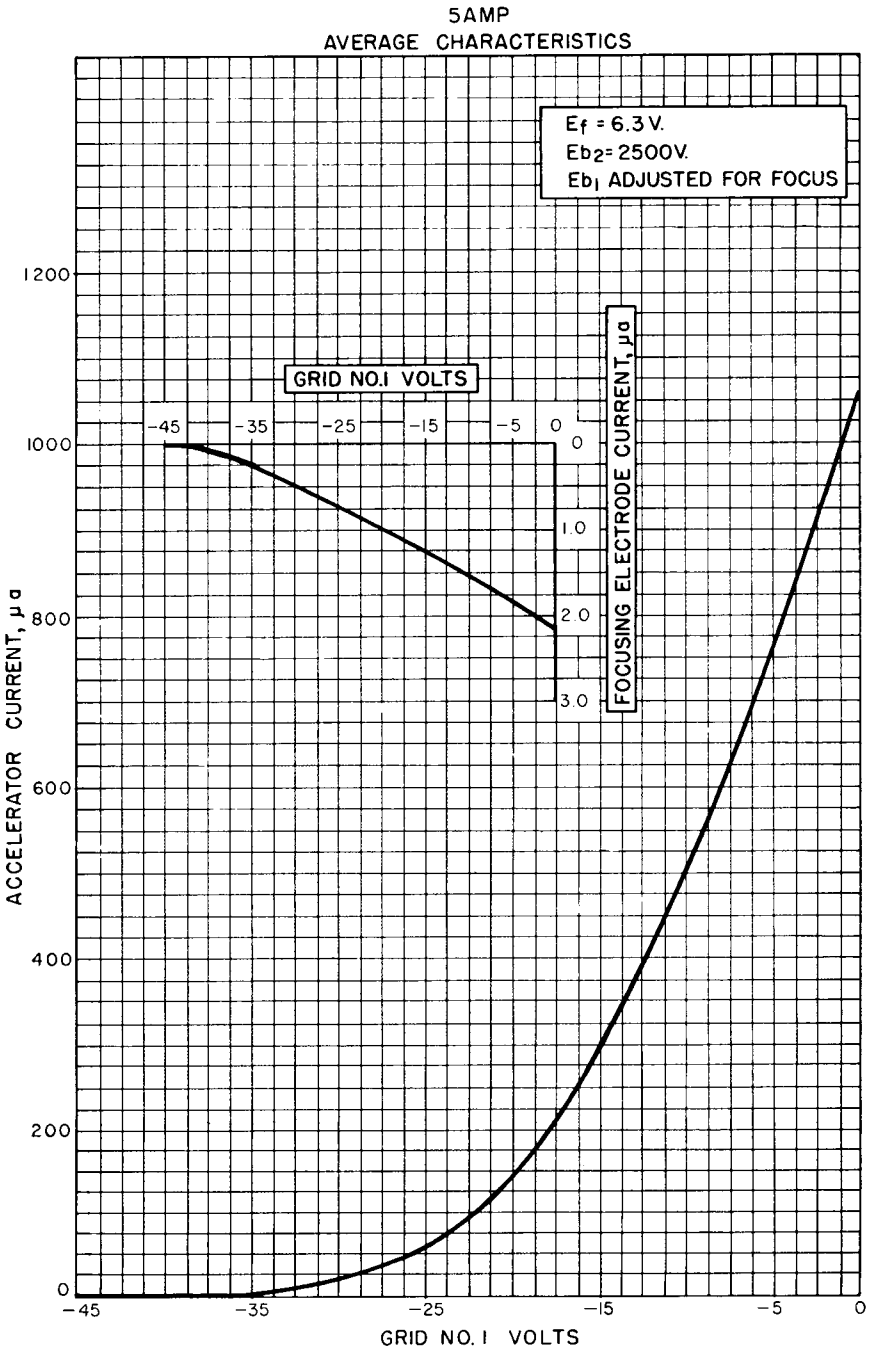
For Accelerator Voltage of	2,500 Volts D-C
Focusing Voltage	0 to 300 Volts D-C
Grid No. 1 Voltage[2]	—34 to —56 Volts D-C
P1 Light Output[3]	15 Ft. L. Min.
Modulation[3]	45 Max. Volts D-C
Line Width A[3]	.032 Inch Max.
Accelerator Current[2]	800 Max. Microamperes D-C
Deflection Factors:	
D1 and D2	40 to 50 Volts D-C per Inch
D3 and D4	20 to 25 Volts D-C per Inch
Deflection Factor Uniformity[4]	1% Max.
Useful Scan	
D1 and D2	4.00 (± 2.00 min. from tube face center) Inches
D3 and D4	2.50 (± 1.25 min. from tube face center) Inches
Pattern Distortion @ 90% of useful scan[5]	2% Max.
Spot Position	Within a 5/16-inch radius circle[7]

CIRCUIT DESIGN VALUES

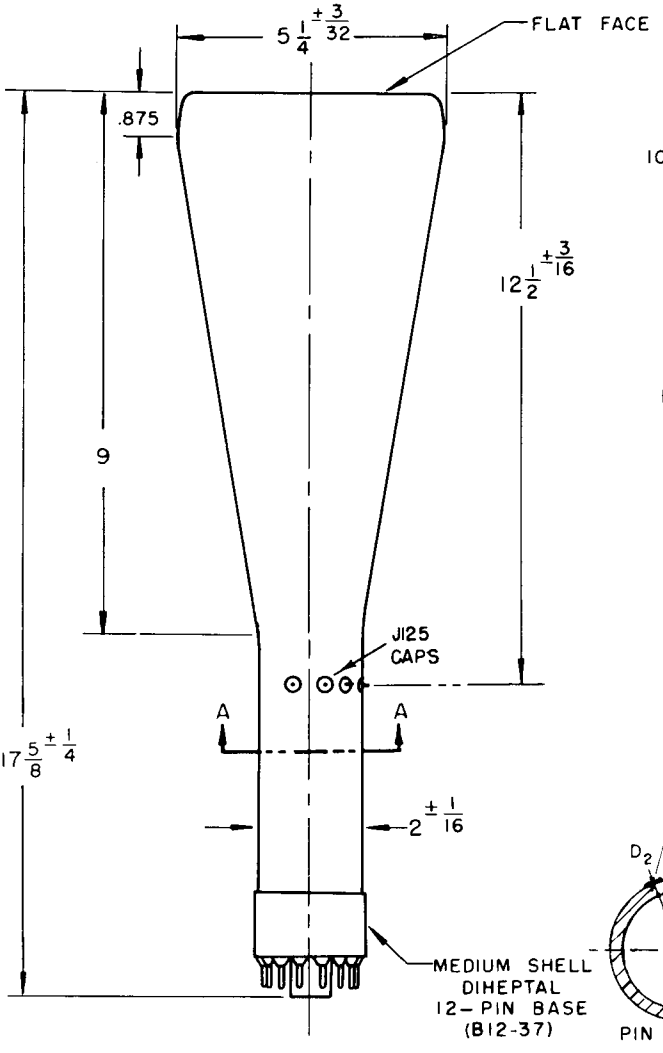
Focusing Current for any operating condition	—15 to +15 Microamperes D-C
Grid No. 1 Voltage[2]	—13.6 to —22.4 Volts D-C per Kilovolt of Accelerator Voltage
Grid No. 1 Circuit Resistance	1.5 Max. Megohms
Deflection Factors:	
D1 and D2	16 to 20 Volts D-C/Inch/KV of Accelerator Voltage
D3 and D4	8 to 10 Volts D-C/Inch/KV of Accelerator Voltage
Resistance in any Deflecting Electrode Circuit[8]	1 Max. Megohm

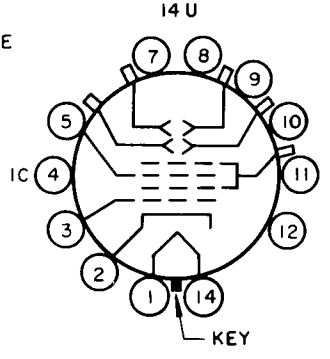
NOTES

1. The product of accelerator voltage and average accelerator current should be limited to 6 watts.
2. Visual extinction of undeflected focused spot.
3. Measured in accordance with MIL-E-1 Specifications.
4. The deflection factor (for both D1D2 and D3D4 plate pairs, separately) for any deflection of less than 75% of the useful scan will not differ from the deflection factor for a deflection at 25% of the useful scan by more than the indicated value.
5. All portions of a raster pattern, adjusted so its widest points just touch the sides of a 2.295 x 3.672-inch rectangle, will fall within the area bounded by the 2.295 x 3.672-inch rectangle and an inscribed 2.205 x 3.528-inch rectangle.
6. Deflection accuracy may be obtained by combining angle between traces, deflection factor uniformity and pattern distortion characteristics. In general, for deflections less than those indicated, the accuracy will improve.
7. When the tube is operated at typical operating conditions (Eh = 6.3 V., Eb2 = 2500 V., Eb1 at focus); Ec1 adjusted to avoid damage to the screen; with each of the deflecting electrodes connected to the accelerator; and with the tube shielded against external influences, the spot will fall within a 5/16-inch radius circle, centered on the tube face.
   Under stable operating conditions, the position of the spot will not shift with changes in intensity by more than .025 inch.
8. It is recommended that the deflecting electrode circuit resistances be approximately equal.
9. An adjustable D.C. potential between the accelerator and the deflection plates may be used to secure best overall focus.


5AMP
AVERAGE CHARACTERISTICS
Ef = 6.3 V.
Eb2 = 2500V.
Eb1 ADJUSTED FOR FOCUS
GRID NO.1 VOLTS
-45
-35
-25
-15
-5
0
FOCUSING ELECTRODE CURRENT, μa
0
1.0
2.0
3.0
ACCELERATOR CURRENT, μa
1200
1000
800
600
400
200
0
-45
-35
-25
-15
-5
0
GRID NO. 1 VOLTS

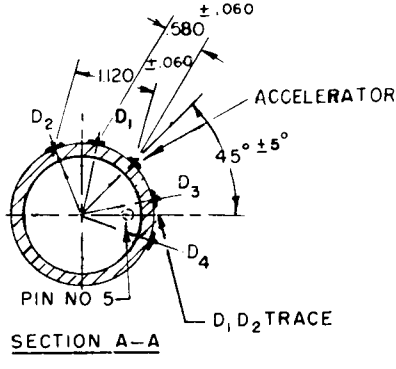
TYPE 5AMP-





BOTTOM VIEW OF BASE

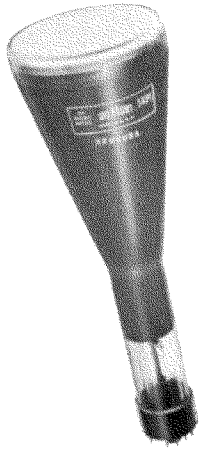
PIN NO.	ELEMENT
1 -	HEATER
2 -	CATHODE
3 -	GRID NO. 1
4 -	INTERNAL CONNECTION
5 -	FOCUSING ELECTRODE
14 -	HEATER



SECTION A-A

5AQP- CATHODE-RAY TUBES

The new Du Mont Type 5AQP- is a flat-faced, tight-tolerance mono-accelerator cathode-ray tube employing electrostatic focus and deflection. Scanning is limited in both axes to 4 inches to afford high deflection sensitivities. This simplifies the output requirements of low- and medium-frequency deflection amplifiers for which these tubes are intended.



The mono-accelerator principle requires that all beam acceleration occur *before* the beam enters the deflection system and consequently, field distortion effects on the beam are virtually eliminated. This results in excellent deflection linearity.

Since the Type 5AQP- is intended for low- and medium-frequency applications, all electrode leads are wired through the tube base to simplify the mechanical design of the equipment in which the tube is used. For high-frequency tubes, see Types 5AMP- and 5ATP-.

GENERAL CHARACTERISTICS

Electrical Data

Heater Voltage	6.3 Volts
Heater Current	0.6 ± 10% Ampere
Focusing Method	Electrostatic
Deflecting Method	Electrostatic

Phosphor	No. 1	No. 2	No. 7	No. 11
Fluorescence	Green	Green	Blue	Blue
Phosphorescence	——	Green	Yellow	——
Persistence	Medium	Long	Long	Short

Direct Interelectrode Capacitances	Min.	Max.	
Cathode to all other electrodes	2.7	5.0	μμf.
Grid No. 1 to all other electrodes	3.7	6.9	μμf.
D1 to D2	2.4	4.5	μμf.
D3 to D4	.8	1.6	μμf.
D1 to all other electrodes	5.0	9.3	μμf.
D2 to all other electrodes	5.0	9.3	μμf.
D3 to all other electrodes	3.3	6.3	μμf.
D4 to all other electrodes	3.3	6.3	μμf.

Mechanical Data

Overall Length	16¾ ± 3/16 Inches
Greatest Diameter of Bulb	5¼ ± 3/32 Inches
Minimum Useful Screen Diameter	4½ Inches
Base (Medium Shell Diheptal 12-pin)	B12-37
Basing	14G

Base Alignment

D1D2 trace aligns with Pin No. 5 and Tube Axis ± 10 Degrees
Positive voltage on D1 deflects beam approximately toward pin No. 5
Positive voltage on D3 deflects beam approximately toward pin No. 2
Angle between D3D4 and D1D2 traces 90 ± 1 Degrees

MAXIMUM RATINGS (Design Center Values)

Accelerator Voltage[1]	4,000 Max. Volts D-C
Focusing Voltage	1,500 Max. Volts D-C
Grid No. 1 Voltage	
Negative Bias Value	200 Max. Volts D-C
Positive Bias Value	0 Max. Volts D-C
Positive Peak Value	0 Max. Volts
Peak Heater-Cathode Voltage	
Heater Negative with respect to Cathode	180 Max. Volts D-C
Heater Positive with respect to Cathode	180 Max. Volts D-C
Peak Voltage between Accelerator and any Deflection Electrode	1,200 Max. Volts

TYPICAL OPERATING CONDITIONS

For Accelerator Voltage of	2,500 Volts D-C
Focusing Voltage	0 to 300 Volts D-C
Grid No. 1 Voltage[2]	—34 to —56 Volts D-C
P1 Light Output[3]	15 Ft. L. Min.
Modulation[3]	40 Max. Volts D-C
Line Width A[3]	.030 Inches Max.
Accelerator Current[3]	400 Max. Microamperes D-C
Deflection Factors:	
D1 and D2	40 to 50 Volts D-C per Inch
D3 and D4	31.5 to 38.5 Volts D-C per Inch
Deflection Factor Uniformity[4]	1% Maximum
Useful Scan	
D1D2	4 Inches*
D3D4	4 Inches*
Pattern Distortion @ 90% of useful scan[5]	2% Maximum
Spot Position	Within a 5/16-inch radius circle[7]

CIRCUIT DESIGN VALUES

Focusing Current for any operating condition	—15 to +15 Microamperes D-C
Grid No. 1 Voltage[2]	13.6 to 22.4 Volts D-C per Kilovolt of Accelerator Voltage
Grid No. 1 Circuit Resistance	1.5 Max. Megohms
Resistance in any Deflecting-Electrode Circuit[8]	1 Max. Megohm
Deflection Factors	
D1 and D2	16 to 20 Volts D-C/Inch/KV of Accelerator Voltage
D3 and D4	12.6 to 15.4 Volts D-C/Inch/KV of Accelerator Voltage

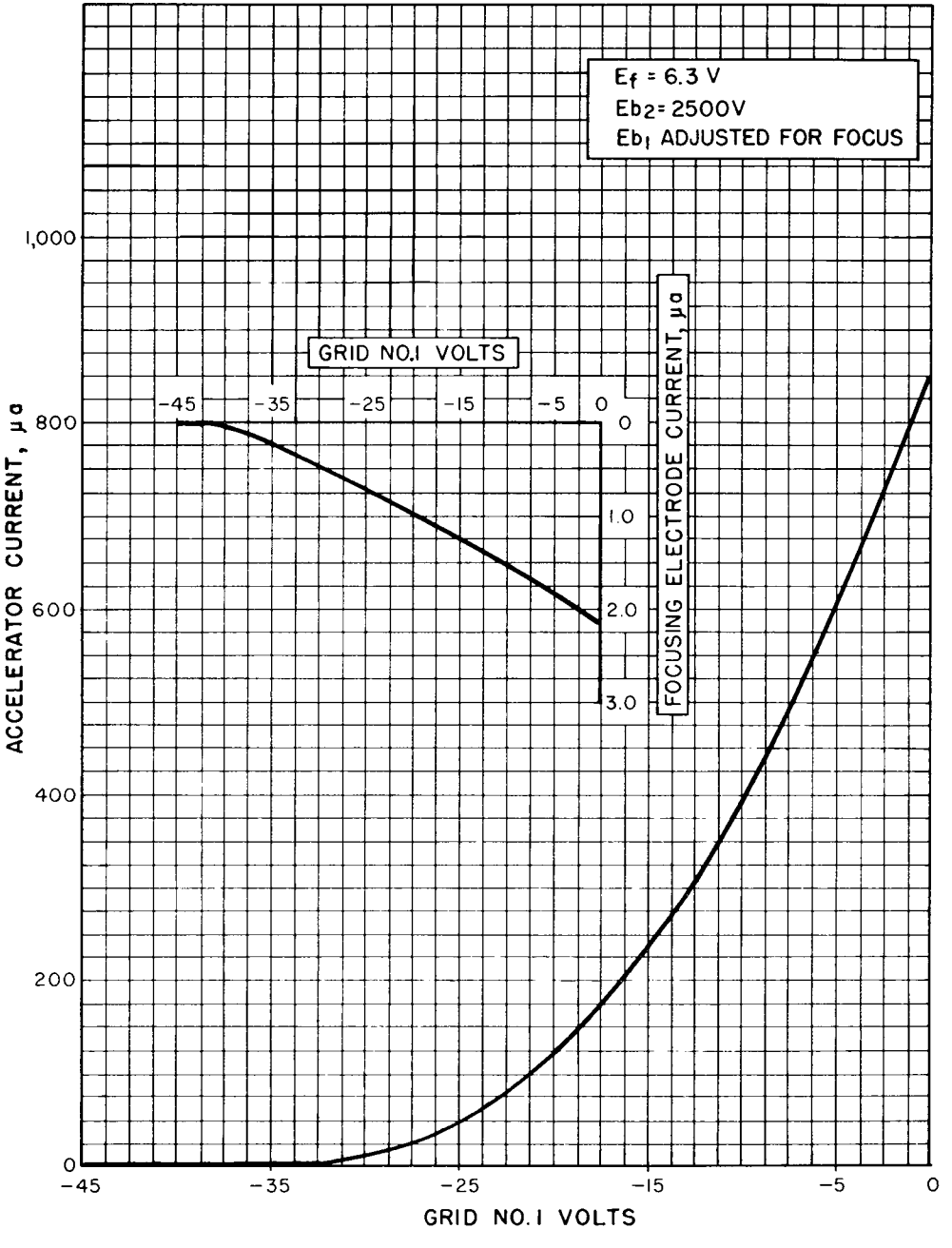
* ± 2″ minimum from tube face center

NOTES

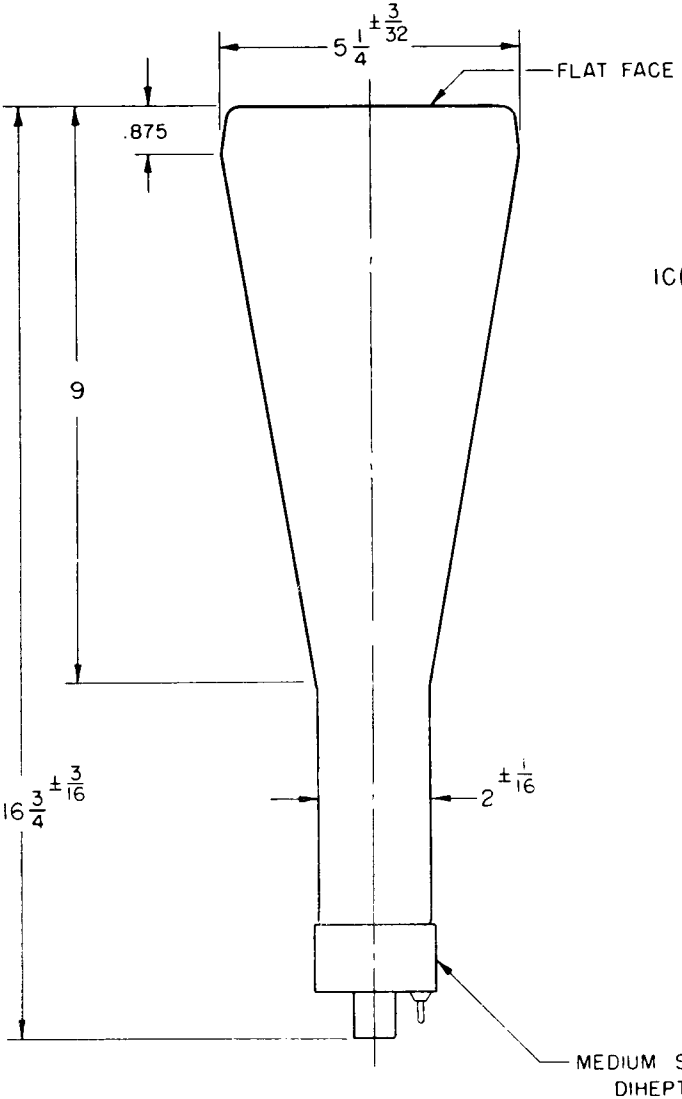
1. The product of Accelerator Voltage and average Accelerator Current should be limited to 6 watts.
2. Visual extinction of undeflected focused spot.
3. Measured in accordance with MIL-E-1 Specifications.
4. The deflection factor (for both D1D2 and D3D4 plate pairs, separately) for any deflection of less than 75% of the useful scan will not differ from the deflection factor for a deflection at 25% of the useful scan by more than the indicated value.
5. All portions of a raster pattern, adjusted so its widest points just touch the sides of a 3.672-inch square, will fall within the area bounded by the 3.672-inch square and an inscribed 3.528-inch square.
6. Deflection accuracy may be obtained by combining angle between traces, deflection factor uniformity and pattern distortion characteristics. In general, for deflections less than those indicated, the accuracy will improve.
7. When the tube is operated at typical operating conditions (Eh = 6.3 V., Eb2 = 2500 V., Eb1 at focus); Ec1 adjusted to avoid damage to the screen; with each of the deflecting electrodes connected to the accelerator; and with the tube shielded against external influences, the spot will fall within a 5/16-inch radius circle, centered on the tube face.
   Under stable operating conditions, the position of the spot will not shift with changes in intensity by more than .025 inch.
8. It is recommended that the deflecting electrode circuit resistances be approximately equal.
9. An adjustable D.C. potential between the accelerator and the deflection plates may be used to secure best overall focus.

TYPE 5AQP-

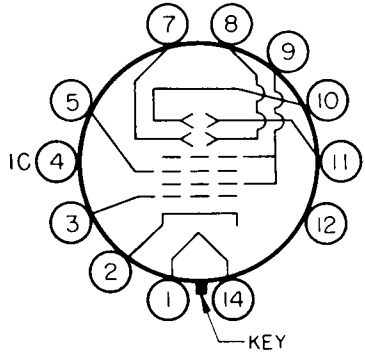
AVERAGE CHARACTERISTICS



TYPE 5AQP-



14G

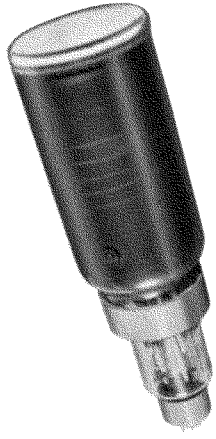


BOTTOM VIEW OF BASE

PIN NO.	ELEMENT
1	HEATER
2	CATHODE
3	GRID NO 1
4	INTERNAL CONNECTION
5	FOCUSING ELECTRODE
7	DEFLECTING ELECTRODE D_3
8	DEFLECTING ELECTRODE D_4
9	ACCELERATOR
10	DEFLECTING ELECTRODE D_2
11	DEFLECTING ELECTRODE D_1
14	HEATER

5ARP- CATHODE-RAY TUBE

The Type 5ARP- is a two-gun electrostatic deflection and focus monoaccelerator cathode-ray tube, with each gun having similar electrical characteristics to the Type 5AQP-. The two guns are independent of each other with the exception of the accelerators and pattern adjustment electrodes. Both accelerators and the internal shielding are connected together.



The deflection plates, astigmatism control, accelerator, and pattern adjustment electrode connections for each gun are brought out to a special ring base located at the upper end of the bulb neck. This allows for minimum deflection plate capacitance and maximum voltage insulation without resorting to individual bulb contacts.

GENERAL CHARACTERISTICS

Electrical Data

Focusing Method	Electrostatic	
Deflecting Method	Electrostatic	
Direct Interelectrode Capacitances, Approx. (for each unit)		
Cathode to all other electrodes	3.6	$\mu\mu$f.
Grid #1 to all other electrodes	4.4	$\mu\mu$f.
D1 to D2	2.0	$\mu\mu$f.
D3 to D4	1.4	$\mu\mu$f.
D1 to all other electrodes	4.2	$\mu\mu$f.
D2 to all other electrodes	4.2	$\mu\mu$f.
D3 to all other electrodes	3.5	$\mu\mu$f.
D4 to all other electrodes	3.5	$\mu\mu$f.

Optical Data

Phosphor Number	No. 1	No. 2	No. 7	No. 11
Fluorescent Color	Green	Green	Blue	Blue
Phosphorescent Color	——	Green	Yellow	——
Persistence	Medium	Long	Long	Short

Mechanical Data

Overall Length	18½ ± ¼ Inches
Greatest Diameter of Bulb	5¼ ± 3/32 Inches
Minimum Useful Screen Diameter	4½ Inches
Bases	B12-37
Basing	Special Ring Base

B12-37 Base Alignment (for each unit):
D1D2 trace aligns with Pin #4 and tube axis ..... ± 10 Degrees
Positive voltage on D1 deflects beam approximately toward Pin #11
Positive voltage on D3 deflects beam approximately toward Pin #8
Angle between D3D4 and D1D2 traces ..... 90 ± 1 Degrees

Trace Alignment.
Corresponding traces of each gun are within 1.0 degree of each other, in center of tube

MAXIMUM RATINGS (Design Center Values)
(Values are for each unit)

Heater Voltage	6.3 Volts
Heater Current at 6.3 Volts	0.6 ± 10% Ampere
Accelerator Voltage	6000 Max. Volts D-C
Astigmatism Control Electrode Voltage	6000 Max. Volts D-C
Accelerator Input	6 Max. Watts
Astigmatism Control Electrode Input	6 Max. Watts
Focusing Electrode Voltage	1500 Max. Volts D-C
Grid #1 Voltage	
Negative Bias Value	200 Max. Volts D-C
Positive Bias Value	0 Max. Volts D-C
Positive Peak Value	0 Max. Volts
Peak Heater-Cathode Voltage	
Heater negative with respect to cathode	180 Max. Volts
Heater positive with respect to cathode	180 Max. Volts
Peak Voltage between Accelerator and any Deflection Electrode	1100 Max. Volts
Peak Voltage between Accelerator and Pattern Adjustment Electrode	280 Max. Volts

[1]TYPICAL OPERATING CONDITIONS
(Values are for each unit unless otherwise indicated)

Accelerator Voltage[2]	2500 Volts D-C
Astigmatism Control Voltage[2]	2500 Volts D-C
Focusing Electrode Voltage	0 to 300 Volts D-C
Grid #1 Voltage[3]	—34 to —56 Volts D-C
P1 Light Output[4]	15 Ft. L. Min.
Modulation[4]	40 Max. Volts D-C
Line Width A[4]	0.030 Inch Max.
Deflection Factors:	
D1D2	45 to 55 Volts D-C per Inch
D3D4	31.5 to 38.5 Volts D-C per Inch
Deflection Ractor Uniformity[5]	1.5% Max.
Useful Scan:	
D1D2	4 Inches*
D3D4	3.3 Inches*
Pattern Distortion[6]	
Tracking Error[7]	0.050 Inch Max.
Spot Position[8]	Within a 5/16-inch radius circle

CIRCUIT DESIGN VALUES (For each unit)

Focusing Electrode Current for any operating condition	—15 to +15 μa.
Grid #1 Voltage[3]	—13.6 to —22.4 Volts/Kilovolt of Accelerator Voltage
Grid #1 Circuit Resistance	1.5 Max. Megohms
Deflection Factors:	
D1D2	18 to 22 Volts D-C per Inch per Kilovolt of Accelerator
D3D4	12.6 to 15.4 Volts D-C per Inch per Kilovolt of Accelerator
Resistance in any Deflecting-Electrode Circuit[9]	1 Max. Megohm

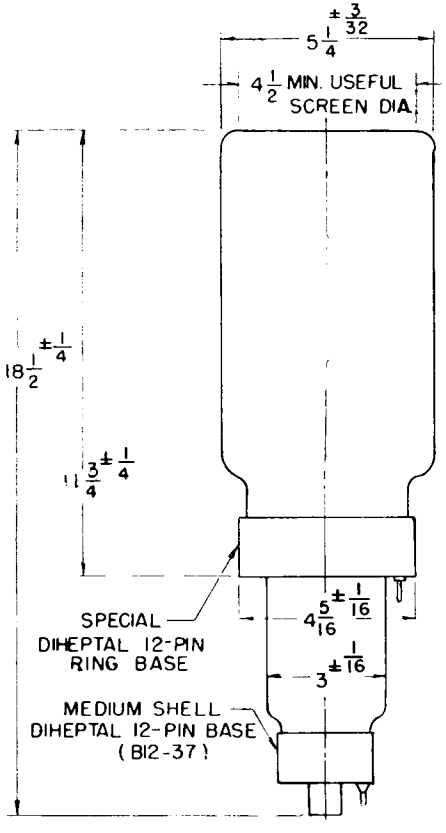
* centered

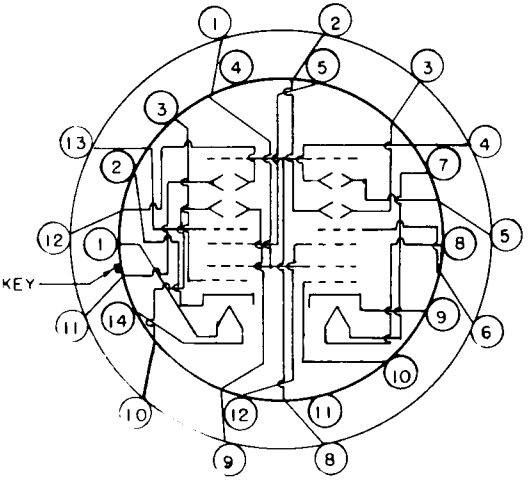
NOTES

1. Values given are for balanced deflection voltages. These values are measured with the accelerator, astigmatism control, and pattern adjustment electrodes connected together.
2. Deflection uniformity, tracking error, or pattern distortion may be improved by the use of a difference potential applied between accelerator and pattern adjustment electrodes.
   When this difference potential is used, slight changes may be noted in deflection factors, grid cut-off voltage, light output and line width.
   The astigmatism control electrode voltage should be adjusted to obtain optimum spot shape.
3. Visual extinction of undeflected focused spot.
4. Measured in accordance with MIL-E-1 specifications.
5. The deflection factor (for both D1D2 and D3D4 plate pairs, separately) for any deflection of less than 90% of the useful scan will not differ from the deflection factor for a deflection at 30% of the useful scan by more than the indicated value.
6. All portions of a raster pattern, adjusted so its widest points just touch the sides of a 3.672 x 3.060-inch rectangle, will fall within the area bounded by the 3.672 x 3.060-inch rectangle and an inscribed 3.528 x 2.940-inch rectangle.

7. The positions of the spot of each beam, when deflected from the center by applied voltages proportional to the deflection factor, will not deviate from each other by more than the indicated value within 90% of the useful scan dimensions.
8. When the tube is operated at typical operating conditions (Eh = 6.3 V., Eb2 = 2500 V., Eb1 at focus); Ec1 adjusted to avoid damage to the screen; with each of the deflecting electrodes connected to the accelerator; and with the tube shielded against external influences, both spots will fall within a 5/16-inch radius circle centered on the tube face.
   The distance between each spot will be no greater than 5/16 inch.
9. It is recommended that the deflecting electrode circuit resistances be approximately equal.

TYPE 5ARP-

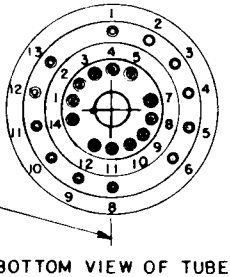




BASING

RING BASE

PIN NO	ELEMENT
1	– ACCELERATOR, SHIELD
8	– PATTERN ADJUSTMENT ELECTRODE
	GUN "B"
2	– DEFLECTING ELECTRODE D_4
3	– DEFLECTING ELECTRODE D_3
4	– DEFLECTING ELECTRODE D_2
5	– DEFLECTING ELECTRODE D_1
6	– ASTIGMATISM CONTROL ELECTRODE
	GUN "A"
9	– DEFLECTING ELECTRODE D_3
10	– DEFLECTING ELECTRODE D_4
11	– DEFLECTING ELECTRODE D_1
12	– DEFLECTING ELECTRODE D_2
13	– ASTIGMATISM CONTROL ELECTRODE

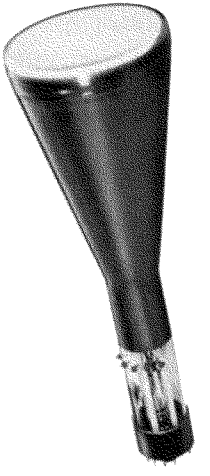


BOTTOM VIEW OF TUBE

B12-37 BASE

GUN "A"		GUN "B"	
PIN NO.	ELEMENT	PIN. NO.	ELEMENT
1	– HEATER	7	– HEATER
2	– CATHODE	8	– HEATER
3	– GRID NO. 1	9	– CATHODE
5	– FOCUSING ELECTRODE	10	– GRID NO. 1
14	– HEATER	12	– FOCUSING ELECTRODE

5ATP- CATHODE-RAY TUBES



The Du Mont Type 5ATP- are high-voltage, tight-tolerance electrostatically focused and deflected cathode-ray tubes operating on the new mono-accelerator principle.

Mono-accelerator construction provides a considerable improvement in the performance of cathode-ray tubes with no sacrifice in spot size, trace brilliance or deflection sensitivity. In the radically new electron gun, all beam acceleration takes place *before* the beam enters the deflection system. Under this arrangement, the beam path is such that field distortion is virtually nonexistent. This distortion eliminated, excellent deflection linearity is achieved as well as uniform spot size and intensity over the entire scanned area.

The 5ATP- is designed for accelerating potentials up to 6000 volts. At this voltage, screen illumination comparable to other tube designs, operating at voltages up to 60% higher, is obtained with much greater deflection sensitivity. The deflection sensitivity is further increased through location of the deflection plates so that the useful screen area measures 2.5 x 4 inches, with the shorter dimension in the Y-axis. Critical tolerances of mono-accelerator design only possible through Du Mont pioneered tight-tolerance construction.

Deflection-plate connections are brought out through the tube wall at the neck to minimize lead inductance and capacitance. A flat faceplate reduces measurement error owing to parallax between screen and scale. These features, combined with the high degree of accuracy inherent in the tight-tolerance design make the Type 5ATP- particularly well suited for accurate analysis of high frequencies and rapidly occurring pulses and transients.

GENERAL CHARACTERISTICS

Electrical Data

Focusing Method		Electrostatic	
Deflecting Method		Electrostatic	
Direct Interelectrode Capacitances	Min.	Max.	
Cathode to all other electrodes	3.3	6.1	$\mu\mu$f.
Grid #1 to all other electrodes	5.8	11.0	$\mu\mu$f.
D1 to D2	2.1	3.9	$\mu\mu$f.
D3 to D4	1.5	2.7	$\mu\mu$f.
D1 to all other electrodes	5.0	9.2	$\mu\mu$f.
D2 to all other electrodes	4.9	9.1	$\mu\mu$f.
D3 to all other electrodes	3.7	6.9	$\mu\mu$f.
D4 to all other electrodes	3.2	6.0	$\mu\mu$f.

Optical Data

Phosphor Number	No. 1	No. 2	No. 7	No. 11
Fluorescent Color	Green	Green	Blue	Blue
Phosphorescent Color	——	Green	Yellow	——
Persistence	Medium	Long	Long	Short

Mechanical Data

Overall Length	17⅝ ± ¼ Inches
Greatest Diameter of Bulb	5¼ ± 3/32 Inches
Minimum Useful Screen Diameter	4¼ Inches
Bulb Number	J42P1
Neck Contacts	J1-25
Base	B12-37
Basing	14V

Base Alignment
D1D2 trace aligns with Pin #5 and tube axis ..... ± 10 Degrees
Positive voltage on D1 deflects beam approximately toward Pin #5
Positive voltage on D3 deflects beam approximately toward Pin #2
Angle between D3D4 and D1D2 traces ..... 90 ± 1 Degrees

MAXIMUM RATINGS (Design Center Values)

Heater Voltage ..... 6.3 Volts
Heater Current at 6.3 Volts ..... 0.6 ± 10% Ampere
Accelerator Voltage ..... 10,000 Max. Volts D-C
Grid #2 Voltage ..... 700 Max. Volts D-C
Accelerator Input ..... 4½ Max. Watts
Focusing Electrode Voltage ..... —500 to +1000 Max. Volts D-C
Grid #1 Voltage
Negative Bias Value ..... 200 Max. Volts D-C
Positive Bias Value ..... 0 Max. Volts D-C
Positive Peak Value ..... 0 Max. Volts
Peak Heater-Cathode Voltage
Heater Negative with respect to cathode ..... 180 Max. Volts
Heater Positive with respect to cathode ..... 180 Max. Volts
Peak Voltage between Accelerator and any Deflection Electrode ..... 2000 Max. Volts

TYPICAL OPERATING CONDITIONS

Accelerator Voltage ..... 6000 Volts D-C
Grid #2 Voltage ..... 300 Volts D-C
Focusing Electrode Voltage ..... 0 to 700 Volts D-C
Grid #1 Voltage[1] ..... —34 to —56 Volts D-C
P11 Light Output[2] ..... 100 Min. Ft. L.
Modulation[2] ..... 40 Max. Volts D-C
Line Width "A"[2] ..... .035 Max. Inch
Accelerator Current[2] ..... 750 Max. Microamperes D-C
Deflection Factors:
D1D2 ..... 94 to 116 Volts D-C per Inch
D3D4 ..... 34 to 42 Volts D-C per Inch
Deflection Factor Uniformity[3] ..... 1% Max.
Useful Scan:
D1D2 ..... 3.50 (± 1.75 min. from tube face center) Inches
D3D4 ..... 1.60 (± .80 min. from tube face center) Inches
Pattern Distortion @ 90% of Useful Scan[4] ..... 2% Max.
Focusing Electrode Current for any operating condition ..... —15 to +15 Microamperes
Spot Position (undeflected) ..... Within a 5/16-inch radius circle[6]

CIRCUIT DESIGN VALUES

D1D2 Deflection Factor ..... 15.6 to 19.3 Volts D-C per Inch per Kilovolt of Accelerator
D3D4 Deflection Factor ..... 5.7 to 7.0 Volts D-C per Inch per Kilovolt of Accelerator

MAXIMUM CIRCUIT VALUES

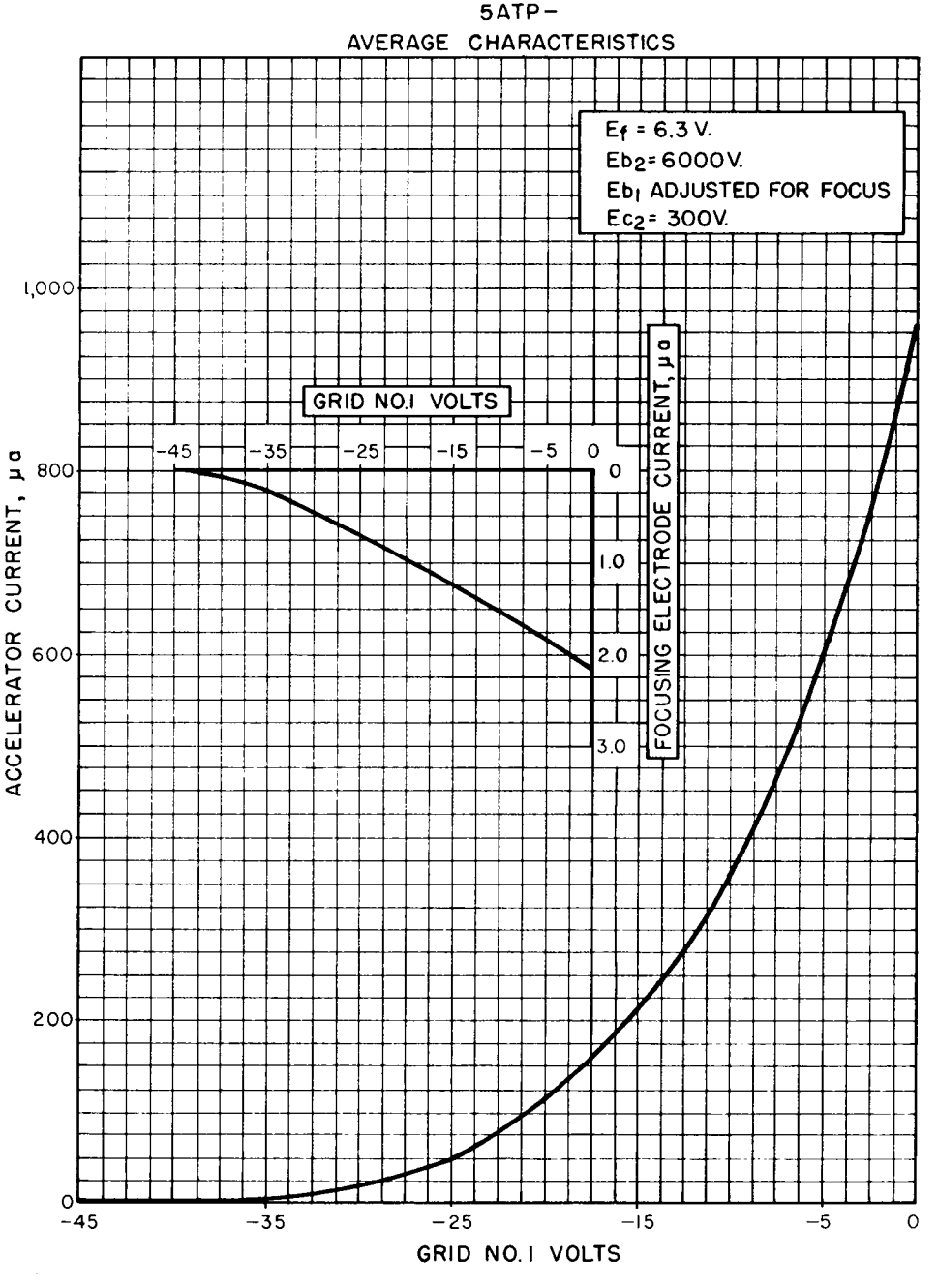
Grid #1 Circuit Resistance ..... 1.5 Max. Megohms
Resistance in any Deflecting-Electrode Circuit[7] ..... 1 Max. Megohm

NOTES

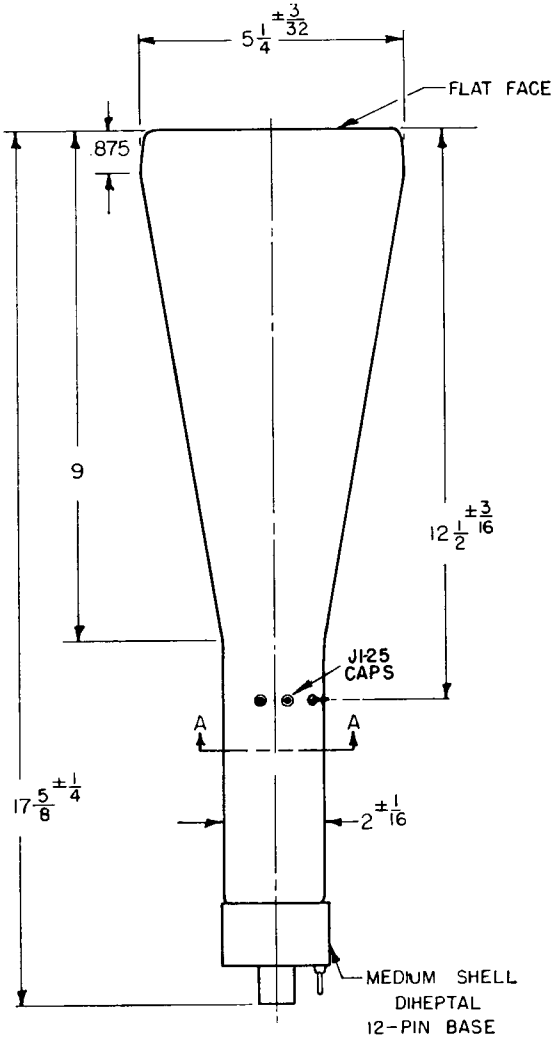
1. Visual extinction of undeflected focused spot.
2. Measured in accordance with MIL-E-1 specifications. Light output measured with Type 3 Photronic Cell without eye correction.
3. The deflection factor (for both D1D2 and D3D4 plate pairs, separately) for any deflection of less than 75% of the useful scan will not differ from the deflection factor for a deflection at 25% of the useful scan by more than the indicated value.
4. All portions of a raster pattern, adjusted so its widest points just touch the sides of a 1.469 x 3.213-inch rectangle, will fall within the area bounded by the 1.469 x 3.213-inch rectangle and an inscribed 1.411 x 3.087-inch rectangle.
5. Deflection accuracy may be obtained by combining angle between traces, deflection factor uniformity and pattern distortion characteristics. In general, for deflections less than those indicated the accuracy will improve.
6. When the tube is operated at typical operating conditions (Eh = 6.3 V., Eb2 = 6000 V., Eb1 at focus, Ec2 = 300 V.); Ec1 adjusted to avoid damage to the screen; with each of the deflecting electrodes connected to the accelerator; and with the tube shielded against external influences, the spot will fall within a 5/16-inch radius circle, centered on the tube face.

Under stable operating conditions, the position of the spot will not shift with changes in intensity by more than .025 inch.

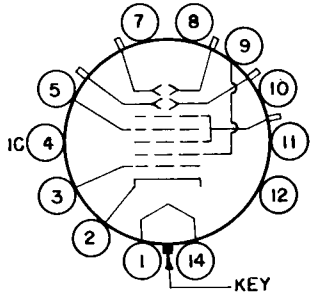
7. It is recommended that the deflecting electrode circuit resistances be approximately equal.
8. An adjustable D.C. potential between the accelerator and the deflection plates may be used to secure best overall focus.



TYPE 5ATP-

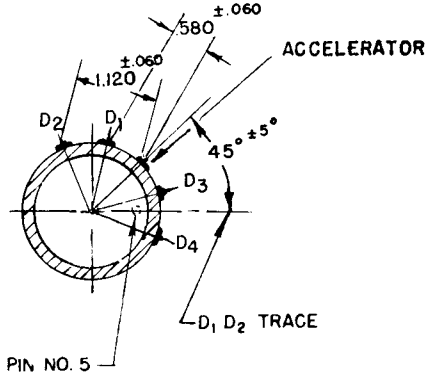


14 V



BOTTOM VIEW OF BASE

PIN NO.	ELEMENT
1	HEATER
2	CATHODE
3	GRID NO. 1
4	INTERNAL CONNECTION
5	FOCUSING ELECTRODE
9	GRID NO. 2
14	HEATER



SECTION A-A

TYPE 5AWP- CATHODE-RAY TUBES

The Du Mont Type 5AWP- Cathode-ray Tubes are high voltage tubes which incorporate an intensifier subdivided into several steps. This feature permits the use of much higher overall accelerating voltages with deflection sensitivities only slightly less than heretofore obtainable in low voltage cathode-ray tubes. This tube has a flat face, cylindrical body, special deflection srtucture for minimum defocusing, and the deflection plate and anode connections are made through the neck instead of through the base. Low capacity deflection plate leads facilitate high frequency operation. The gun is designed to draw negligible focusing electrode current. To prevent film-fogging, and for maximum brightness and stability in performance, all screens are provided with a highly reflective metal backing. The 5AWP- is one of the line of Du Mont Tight-tolerance Cathode-ray Tubes.



GENERAL CHARACTERISTICS

Electrical Data

Focusing Method	Electrostatic
Deflecting Method	Electrostatic

Direct Interelectrode Capacitances	Min.	Max.	
Cathode to all	3.0	4.1	$\mu\mu f$
Grid No. 1 to all	3.5	5.0	$\mu\mu f$
D1 to D2	1.4	2.2	$\mu\mu f$
D3 to D4	0.9	1.5	$\mu\mu f$
D1 to all	4.4	5.4	$\mu\mu f$
D2 to all	4.8	6.1	$\mu\mu f$
D3 to all	3.5	4.5	$\mu\mu f$
D4 to all	3.0	3.9	$\mu\mu f$

Optical Data

Phosphor Number	1	2	7	11
Fluorescent Color	Green	Green	Blue	Blue
Phosphorescent Color	——	Green	Yellow	——
Persistence	Medium	Long	Long	Short

Mechanical Data

Overall Length	$16\frac{3}{4} \pm \frac{1}{4}$ Inches
Greatest Diameter of Bulb	$5\frac{1}{4} \pm 3/32$ Inches
Minimum Useful Screen Diameter	$4\frac{1}{2}$ Inches
Bulb Number	J42L1
Bulb Contacts — Recessed Small Ball Caps	J1-22
Neck Contacts — Small Ball Caps	J1-25
Base — Medium Shell Diheptal, 12 Pin	B12-37
Basing	14P

Base Alignment

D3D4 trace aligns with Pin No. 5 and tube axis ± 10 Degrees

Positive voltage on D1 deflects beam approximately toward Base Pin No. 8

Positive voltage on D3 deflects beam approximately toward Base Pin No. 5

Bulb Contact Alignment

J1-22 contacts align with D3D4 trace ± 10 Degrees

J1-22 contacts on same side as Pin No. 5

Trace Alignment

Angle between D3D4 and D1D2 traces 90 ± 1 Degrees

MAXIMUM RATINGS (Design Center Values)

Heater Voltage	6.3 Volts
Heater Current at 6.3 Volts	0.6 ± 10% Ampere
Post-Accelerator Voltage (Note 1)	15000 Max. Volts D-C
Accelerator Voltage (Note 1)	3500 Max. Volts D-C
Ratio Post-Accelerator Voltage to Accelerator Voltage (Note 2)	4.5
Accelerator Input (Avg.)	6.0 Max. Watts
Focusing Electrode Voltage	1500 Max. Volts D-C
Grid No. 1 Voltage	
Negative Bias Value	200 Max. Volts D-C
Positive Bias Value	0 Max. Volts D-C
Positive Peak Value	0 Max. Volts
Peak Heater-Cathode Voltage	
Heater negative with respect to cathode	180 Max. Volts
Heater positive with respect to cathode	180 Max. Volts
Peak Voltage between Accelerator and any Deflection Electrode	1200 Max. Volts

TYPICAL OPERATING CONDITIONS

Post-Accelerator Voltage (Note 1)	10300 Volts
Accelerator Voltage (Note 1)	2300 Volts
Focusing Electrode Voltage for all values of Ib3	500 to 730 Volts
Grid No. 1 Voltage (Note 3)	—33 to —55 Volts
Deflection Factors: (Note 4)	
D1 and D2	113 to 128 Volts D-C per Inch
D3 and D4	113 to 128 Volts D-C per Inch
Deflection Factory Uniformity (Note 5)	2% Max.
Deflection Defocusing (Note 6)	1:2 Ratio
Useful Scan (Note 7)	
D1 and D2	4 (± 2 from tube face center) Min. Inches
D3 and D4	4 (± 2 from tube face center) Min. Inches
Pattern Distortion (Note 8)	
Modulation (Note 9)	35 Max. Volts D-C
Line Width "A" (Note 9)	.016 Max. Inches
Focusing Electrode current for any operating condition	—15 to +10 μA
Spot Position (focused and undeflected) (Note 10)	Within a 15 mm Square

For Accelerator Voltage not shown in the preceding table, the following can be used as a guide:

Focusing Electrode Voltage	21% to 32% of Accelerator Volts
Grid No. 1 Voltage (Note 3)	1.4% to 2.4% of Accelerator Volts
Ratio Post-Accelerator to Accelerator Voltage	4.5
D1 and D2	49 to 56 Volts D-C per Inch per Kilovolt of Accelerator
D3 and D4	49 to 56 Volts D-C per Inch per Kilovolt of Accelerator

MAXIMUM CIRCUIT VALUES

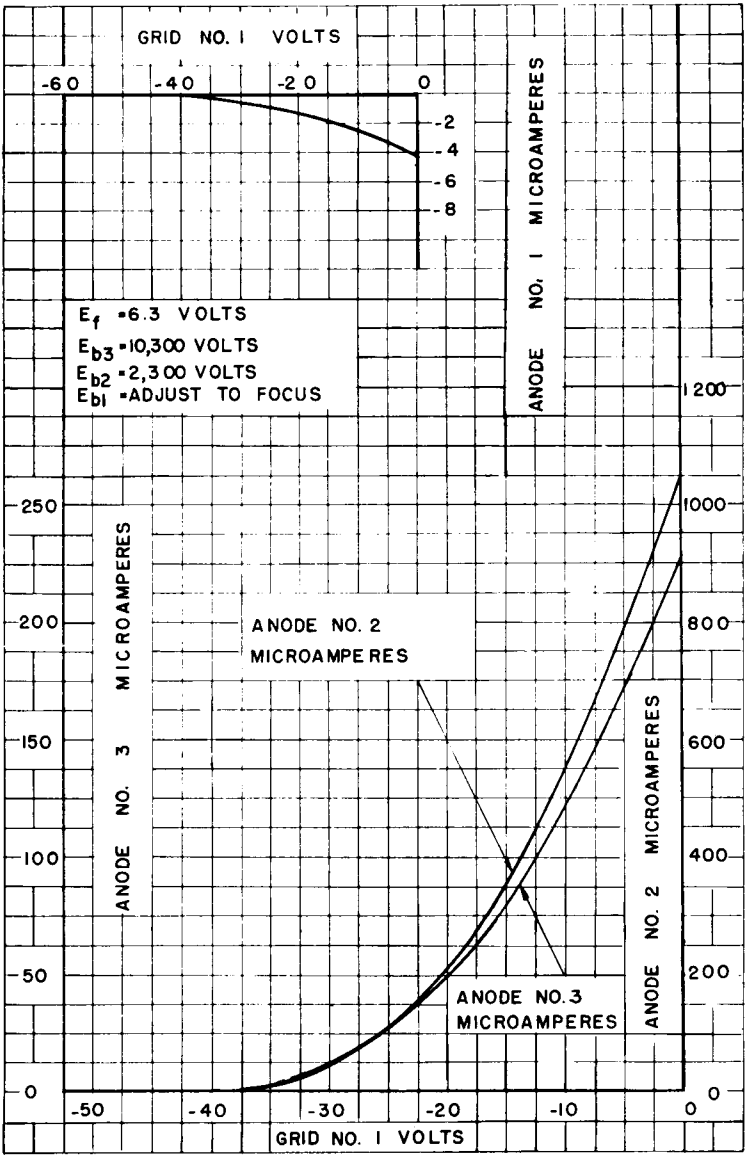
Grid No. 1 Circuit Resistance	1.5 Max. Megohms
Resistance in any Deflecting Electrode Circuit (Note 11)	1.0 Max. Megohm

NOTES

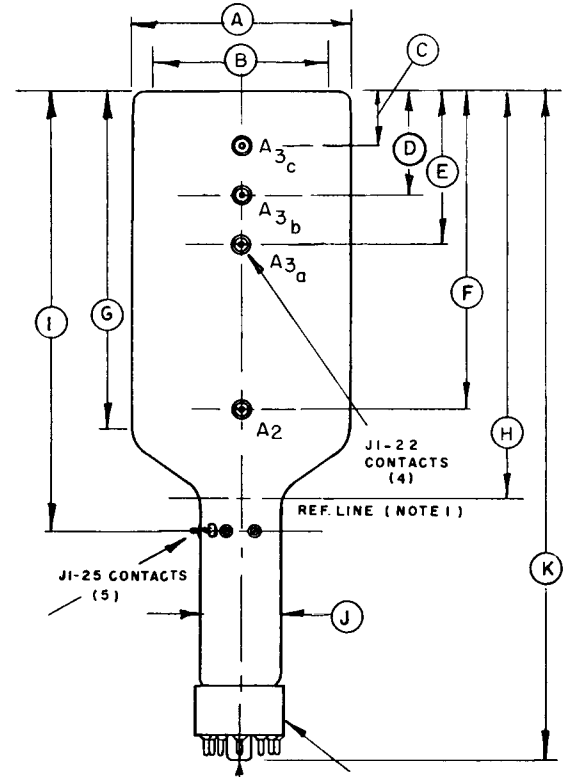
1. Accelerator to final intensifier electrode voltage equally divided over the three intensifier electrodes by 25 megohm resistors connected between each intensifier and the accelerator.
2. This tube is designed for optimum performance when operating at an Eb3/Eb2 ratio of 4.5. Operation at other ratios of Eb3/Eb2 may result in changes in deflection uniformity and pattern distortion.
3. Visual extinction of undeflected focused spot.
4. D1D2 deflection factor within 8 volts of D3D4.
5. The deflection factor (for both D1D2 and D3D4 plate pairs, separately) for a deflection of 25% of the useful scan will not differ from the deflection factor for a deflection at 75% of the useful scan by more than the indicated value.
6. The ratio of the line width of a 4 inch long trace, adjusted for best center focus, to the line width measured on the faceplate axis when the trace is deflected perpendicularly ± 2 inches from the face center by a balanced D-C voltage, will not be greater than the specified value.
7. Reduction in useful scan when Post-Accelerator voltage is greater than Accelerator voltage is determined by the ratio of these voltages measured with respect to cathode. Values shown are therefore applicable to any operating condition with the same voltage ratios.

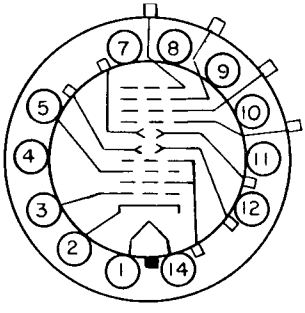
8. All portions of a raster pattern, adjusted so its widest points just touch the sides of a 3.040 inch square, will fall within the area bounded by the 3.040 inch square and an inscribed 2.960 inch square.
9. For an Ib3 of 25 μADC measured in accordance with MIL-E-1 specifications.
10. Centered with respect to the tube face and with the tube shielded. Connect free deflecting electrodes to accelerator.
11. It is recommended that the deflection electrode circuit resistances be one megohm or less and approximately equal, otherwise beam shift at high drives can be expected. Higher resistance values up to five megohms may be used for low beam current operation.

TYPE 5AWP-
AVERAGE CHARACTERISTICS



TYPE 5AWP-

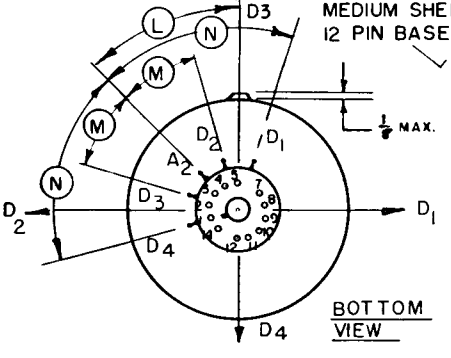




14P PIN NO.	BOTTOM VIEW ELEMENT
1	HEATER
2	CATHODE
3	GRID NO.1
4	INTERNAL CONNECTION
5	FOCUSING ELECTRODE
7-12	NO CONNECTION
14	HEATER

NOTE: 1. REFERENCE LINE, POINT WHERE RING GAUGE 2.063 +.001 -.000 I.D. 1/2 LONG WILL STOP.

2. THE BULB SHALL BE J42L1 WITHOUT BUTTONS.



MEDIUM SHELL DIHEPTAL
12 PIN BASE (B12-37)

REF.	DIMENSION
A	5 1/4 ± 3/32 DIA.
B	4 1/2 MIN. SCREEN
C	1 7/16 ± 3/16
D	2 9/16 ± 3/16
E	3 11/16 ± 3/16
F	8 ± 3/16
G	8 1/2 NOM.
H	10 1/4 ± 3/16
I	11 ± 1/4
J	2 ± 1/16 O.D.
K	16 3/4 ± 1/4
L	45° ± 10°
M	30° ± 5°
N	60° ± 5°

TYPE 5BDP- CATHODE-RAY TUBES

The Du Mont Type 5BDP- is a five inch, flat-faced, electrostatically focused and deflected Cathode-ray Tube with two independently controlled beams and incorporating an intensifier sub-divided into several steps. This feature permits operation at high voltages and ratios of intensifier to second anode voltage resulting in a high writing rate. The deflector leads are brought out directly through the bulb wall in order to minimize lead inductance and capacitance. To prevent film-fogging, and for maximum brightness and stability in performance, all screens are provided with a highly reflective metal backing.

Metallized screen types other than those listed below are available on special order.



GENERAL CHARACTERISTICS (Note 1)

Electrical Data

Heater Voltage			6.3 Volts	
Heater Current			0.6 ± 10% Amperes	
Focusing Method			Electrostatic	
Deflecting Method			Electrostatic	
Phosphor	No. 1	No. 2	No. 7	No. 11
Fluorescence	Green	Green	Blue	Blue
Phosphorescence	——	Green	Yellow	——
Persistence	Medium	Long	Long	Short
Direct Interelectrode Capacitances		Min.	Max.	
Cathode to all		3.4	4.4	μμf
Grid No. 1 to all		3.1	4.1	μμf
D1 to D2		1.8	2.7	μμf
D3 to D4		1.3	2.1	μμf
D1 to all		5.3	6.8	μμf
D2 to all		5.3	6.8	μμf
D3 to all		4.5	5.8	μμf
D4 to all		4.5	5.8	μμf

Mechanical Data

Overall Length ..... 18¼ ± ¼ Inches
Greatest Diameter of Bulb ..... 5¼ ± 3/32 Inches
Minimum Useful Screen Diameter ..... 4¼ Inches
Bulb Contacts — Recessed Small Ball Cap J1-22
Neck Contacts — Skirted Miniature C1-2
Base — Medium Shell Diheptal, 12 pin B12-37
Basing 14AB
Base Alignment
  Base Key aligns with the D1D2 trace ..... ± 10 Degrees
  Positive voltage on D2 deflects the beam approximately towards Base Key
  Positive voltage on D3 deflects the beam approximately towards Base Pin No. 4
Bulb Contact Alignment
  Bulb Contacts Align with D3D4 trace ..... ± 10 Degrees
Bulb Contacts on same side as Base Pin No. 4
Trace Alignment
  D1D2 trace aligns with D3D4 trace ..... 90 ± 2 Degrees
  Corresponding traces of each gun align within ..... ± 2 Degrees

MAXIMUM RATINGS (Design Center Values)

Post-Accelerator Voltage ..... 25,500 Max. Volts D-C
Accelerator Voltage (Note 2) ..... 3,500 Max. Volts D-C
Ratio Post-Accelerator Voltage to Accelerator Voltage ..... 10 Max.
Focusing Voltage ..... 1,550 Max. Volts D-C

Grid No. 1 Voltage	
Negative Bias Value	200 Max. Volts D-C
Positive Bias Value	0 Max. Volts D-C
Positive Peak Value	0 Max. Volts D-C
Peak Heater to Cathode Voltage	
Heater Negative with respect to Cathode	180 Max. Volts D-C
Heater Positive with respect to Cathode	180 Max. Volts D-C
Peak Voltage between Accelerator and any Deflection Electrode	1,200 Max. Volts

TYPICAL OPERATING CONDITIONS

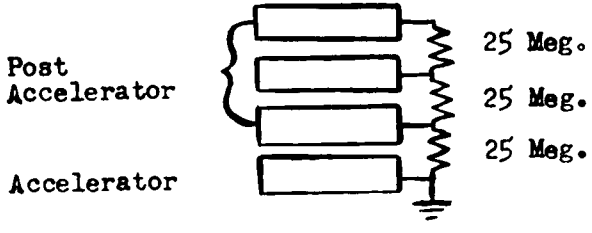
For Post-Accelerator Voltage of (Note 3)	14,000 Volts
For Accelerator Voltage of (Note 3)	2,000 Volts
Focusing Voltage	400 to 630 Volts
Grid No. 1 Voltage (Note 4)	—45 to —75 Volts
Modulation (Note 5)	45 Max. Volts
Line Width "A" (Note 5)	.020 Max. Inches
Line Width "B" (Note 5)	.024 Max. Inches
Interaction Factor: (Note 6)	14×10^{-6} In./Volt D-C Max.
Deflection Factors:	
D1 and D2	130 to 160 Volts D-C/Inch
D3 and D4	111 to 133 Volts D-C/Inch
Spot Position (Undeflected) (Note 7)	Within a 16 mm Square
Useful Scan (Note 8)	
Pattern Distortion (Note 9 & 10)	

CIRCUIT DESIGN VALUES

Focusing Voltage	200 to 315 Volts per Kilovolt of Accelerator Voltage
Focusing Current for any operating conditions	—15 to +10 Microamperes
Grid No. 1 Voltage (Note 4)	—22.5 to —37.5 Volts per Kilovolt of Accelerator Voltage
Grid No. 1 Circuit Resistance	1.5 Max. Megohms
Resistance in any Deflecting-Electrode Circuit (Note 11)	1.0 Max. Megohm

NOTES

1. Values are for each unit unless otherwise stated.
2. Accelerator power input (Avg.) should be limited to six watts. At 100 μA D-C beam current, the cathode current shall not exceed 2 mA D-C. To protect tube against damage this measurement should be taken by pulsing the grid from cutoff to the specified beam current at a 10% cycle and multiplying the current meter readings by 10.
3. Equally divided over the three intensifier electrodes.
   Suggested method of connection:



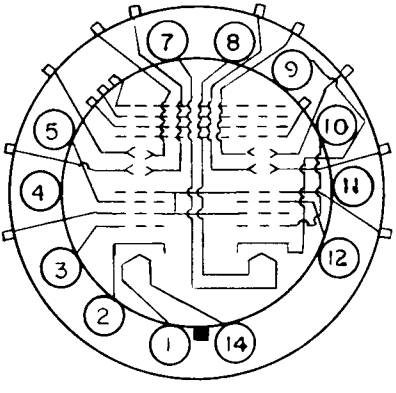
4. Visual extinction of undeflected focused spot.
5. For an Ib3 of 50 μA D-C.
6. The deflection of one beam when balanced D-C voltages are applied to the deflection electrodes of the other beam will not be greater than the specified value.
7. With the tube shielded against external influences, Eb3 = 14,000 volts, Eb2 = 2,000 volts, and Eb1 adjusted for focus centered with respect to the tube face.

8. Minimum useful scan diameter is limited at high ratios of Eb3/Eb2 to 4 inches at 5:1, 3.5 inches at 7:1 and 2.5 inches at 10:1.

9. The total vertical movement of the upper edge of a 3 inch vertical trace, (centered with respect to the tube face), deflected horizontally 1.5 inches to the left and right of the center of the tube face, shall not exceed 0.12 inch. The total vertical movement of the lower edge of the 3 inch trace also shall not exceed 0.12 inch. The D3D4 trace shall be considered vertical.

10. The sum of the total horizontal movement of the left and right edges of a 3 inch horizontal trace, (centered with respect to the tube face), deflected vertically 1.5 inches above and below the center of the tube face, shall not exceed 0.12 inch. The D1D2 trace shall be considered horizontal.

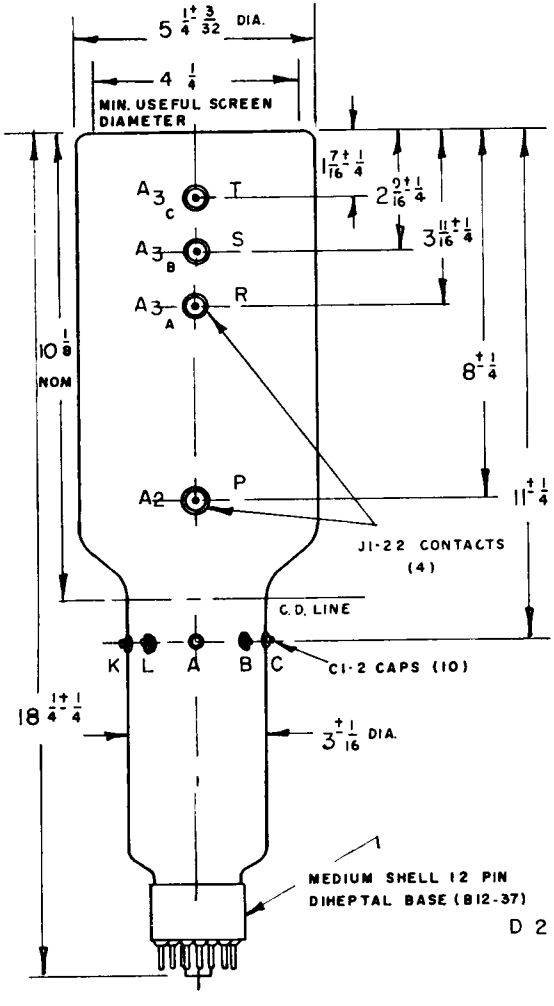
11. It is recommended that the deflecting electrode circuit resistances be approximately equal. Higher resistance values up to 5.0 megohms may be used for low beam current operation.



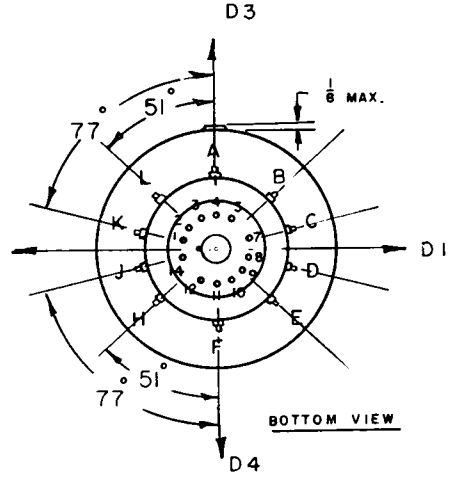
BOTTOM VIEW

UNIT A		UNIT B	
PIN NO.	ELEMENT	PIN NO.	ELEMENT
1	HEATER	7	HEATER
2	CATHODE	8	HEATER
3	GRID NO. 1	9	CATHODE
4	NO CONNECTION	10	GRID NO. 1
5	FOCUSING ELECTRODE	11	NO CONNECTION
14	HEATER	12	FOCUSING ELECTRODE

TYPE 5BDP-



ENVELOPE TERMINALS	CORRESPONDING INTERNAL ELEMENTS
A	ACCELERATOR- GUNS A B B
	GUN - B
B	RIGHT HORIZ. DEFL. PLATE
C	LEFT HORIZ. DEFL. PLATE
D	UPPER VERT. DEFL. PLATE
E	LOWER VERT. DEFL. PLATE
F	ACCELERATOR- GUNS A B B
	GUN - A
H	LEFT HORIZ. DEFL. PLATE
J	RIGHT HORIZ. DEFL. PLATE
K	LOWER VERT. DEFL. PLATE
L	UPPER VERT. DEFL. PLATE
P	FIRST BAND- ACCELERATOR
R	POST ACCELERATOR - 3A (INTENSIFIER) LOWER POTENTIAL
S	POST ACCELERATOR-3B (INTENSIFIER) MEDIUM POTENTIAL
T	POST ACCELERATOR-3C (INTENSIFIER) HIGHEST POTENTIAL

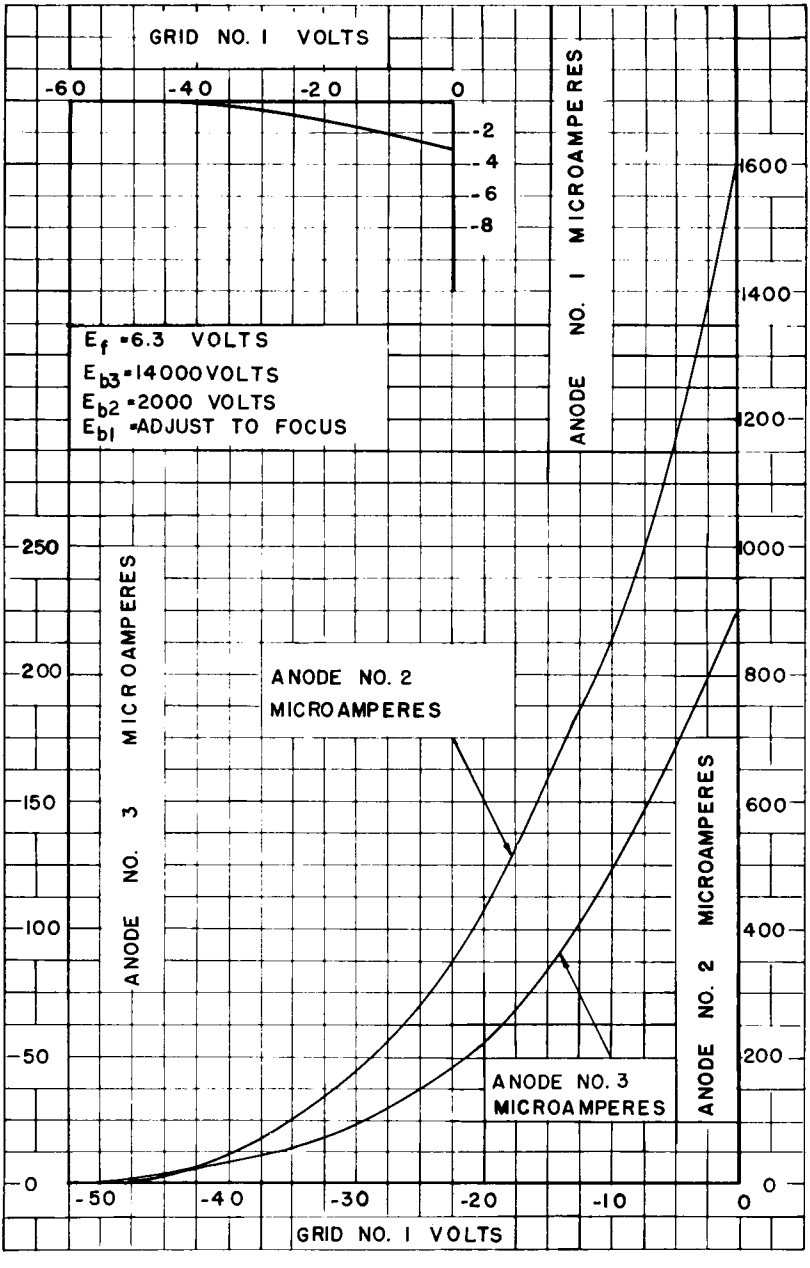


NOTE 1- BULB CONTACTS AND BASE PIN NO. 4 ALIGN WITH D3 D4 TRACE ± 10 DEGREES.

2- ANGULAR DIMENSIONS HAVE A TOLERANCE OF ± 5 DEGREES.

3. THE BULB SHALL BE A TYPE J42-M1 WITHOUT CONTACTS.

TYPE 5BDP-
AVERAGE CHARACTERISTICS

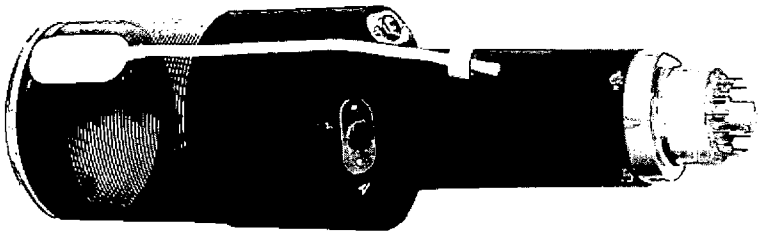


from JEDEC release #2462, May 11, 1959

DU MONT

INDUSTRIAL CATHODE-RAY TUBES

TYPES: 5BFP1, 5BFP2, 5BFP7, 5BFP11



GENERAL CHARACTERISTICS[1]

ELECTRICAL DATA

Focusing Method	Electrostatic
Deflecting Method	Electrostatic
Direct Interelectrode Capacitances, Approximate:	
Cathode to all	4.2 μμf
Grid No. 1 to all	4.3 μμf
D1 to D2	2.4 μμf
D3 to D4	2.0 μμf
D1 to all	11.5 μμf
D2 to all	12.6 μμf
D3 to all	10.9 μμf
D4 to all	10.6 μμf

OPTICAL DATA

Phosphor Number	1	2	7	11
Fluorescent Color	Green	Green	Blue	Blue
Phosphorescent Color	—	Green	Yellow	—

Phosphor Number	1	2	7	11
Persistance	Medium	Long	Long	Short

Faceplate: Clear Glass

MECHANICAL DATA

Overall Length	18 5/16 ± 1/16 Inches
Greatest Diameter of Bulb	5 1/4 ± 3/32 Inches
Minimum Useful Screen Diameter	4 1/2 Inches
Bulb Contact - Molded Contact Cover	Special
Connectors (Deflection plates, A2 and Shield)	Special
Base - Double Shell Diheptal, 12-Pin	Special
Basing	Special
Weight (Approximate)	4 Pounds
Base Alignment:	
D1D2 trace aligns with base key and tube axis	± 10 Degrees
Positive voltage on D1 deflects beam approximately toward base Pin No. 7	
Positive voltage on D3 deflects beam approximately toward Base Pin No. 4	
Bulb Contact Alignment:	
Molded contact cover aligns with D3D4 trace	± 10 Degrees
Molded contact cover on same side as Pin No. 4	
Trace Alignment:	
Angle between D3D4 and D1D2 traces	90 ± 2 Degrees
Corresponding traces align within	2 Degrees
Post Accelerator Helix (Spiral) Resistance Minimum	165 Megohms

RATINGS (Absolute Maximum Values)

Heater Voltage	6.3 Volts
Heater Current at 6.3 Volts	0.6 ± 10% Ampere
Post Accelerator Voltage	15,000 Max. Volts DC
Accelerator Voltage	4,000 Max. Volts DC
Ratio Post Accelerator Voltage to Accelerator Voltage	4.9 Max.
Accelerator Input[2]	6 Max. Watts
Focusing Electrode Voltage	1,550 Max. Volts DC
Grid No. 1 Voltage	
Negative Bias Value	200 Max. Volts DC
Positive Bias Value	0 Max. Volts DC
Positive Peak Value	0 Max. Volts
Peak Heater-Cathode Voltage	
Heater negative with respect to cathode	
During warm-up period not to exceed 15 seconds	410 Max. Volts
After equipment warm-up period	180 Max. Volts
Heater positive with respect to Cathode	180 Max. Volts
Peak Voltage between Accelerator and any Deflection Electrode	600 Max. Volts

TYPICAL OPERATING CONDITIONS

Post Accelerator Voltage	13,250 Volts
Accelerator Voltage	2,750 Volts
Post Accelerator Current[3]	65 Max. μADC
Focusing Electrode Voltage	600 to 900 Volts
Grid No. 1 Voltage[4]	−35 to −65 Volts
Deflection Factors:	
D1 and D2	130 to 161 Volts DC per Inch
D3 and D4	110 to 138 Volts DC per Inch
Useful Scan:	
D1 and D2 4 (± 2 from tube face center)	Min. Inches
D3 and D4 4 (± 2 from tube face center)	Min. Inches
Interaction Factor[5]	14 x 10^{-6} Max. Inches/Volt
Pattern Distortion[6, 7]	
Modulation[8]	36 Max. Volts DC
Line Width "A"[9]	.020 Max. Inch
Line Width "B"[8, 9]	.024 Max. Inch
Focusing Electrode Current for any operating condition	−10 to +5 μA
Spot Position (Focused and Undeflected)[10]	Within a 16-mm Square

FEATURES

- 2 Independently Controlled Beams
- Integral Mu-Metal Shield
- Linear Post Accelerator
- Aluminized Screen
- Flat Faceplate
- Fast Writing Rates
- Low Pattern Distortion
- Designed for 70,000 Foot Altitude
- Proven Performance as Du Mont Type K1253
- Meets Requirements of MIL-E-1
- Plug-In Neck DP Connectors Minimize "C" and "L" Effects

APPLICATIONS

- Oscillography
- Radar
- Dual Beam Indicator

DU MONT
INDUSTRIAL TUBE SALES DEPARTMENT
750 Bloomfield Avenue Clifton, New Jersey, U.S.A.

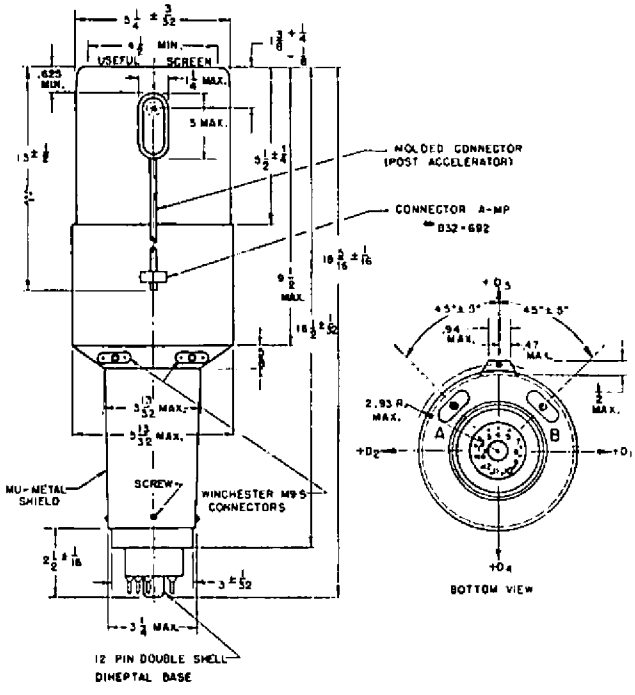
MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance	1.5 Max. Megohms
Resistance in any Deflecting-Electrode Circuit[11]	1.0 Max. Megohms

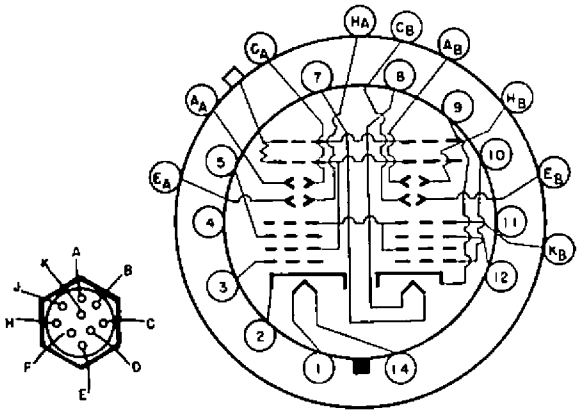
NOTES

1. Values are for each unit unless otherwise stated.
2. Accelerator power input (average) should be limited to six watts. At 100 μA beam current the cathode current shall not exceed 1.0 mA DC. To protect tube against damage, this measurement should be taken by pulsing the grid from cut-off to the specified beam current at a 10 percent duty cycle and multiplying the current meter readings by 10.
3. With beams cut off. All readings of beam current shall be in addition to the reading obtained for post accelerator current.
4. Visual extinction of undeflected focused spot.
5. The deflection of one beam when balanced DC voltages are applied to the deflection electrodes of the other will not be greater than the indicated value.
6. The total vertical movement of the upper end of a 3-inch vertical trace (centered with respect to the tube face), deflected horizontally 1.5 inches to the left and right of the center of the tube face, shall not exceed 0.10 inch. The total vertical movement of the lower end of the 3-inch trace also shall not exceed 0.10 inch. The D3D4 trace shall be considered vertical.
7. The sum of the total horizontal movement of the left and right ends of a 3-inch horizontal trace (centered with respect to the tube face), deflected vertically 1.5 inches above and below the center of the tube face, shall not exceed 0.10 inch. The D1D2 trace shall be considered horizontal.
8. For an Ib3 of 50 μADC measured in accordance with MIL-E-1 specifications.
9. To be measured at ± 1.625 inches from the tube face center.
10. Centered with respect to the tube face and with the tube shielded and deflecting electrodes connected to accelerator.
11. It is recommended that the deflecting-electrode circuit resistances be approximately equal. Higher resistance values up to five megohms may be used for low beam current operation.

OUTLINE DRAWING TYPE 5BFP—



BASING TYPE 5BFP—



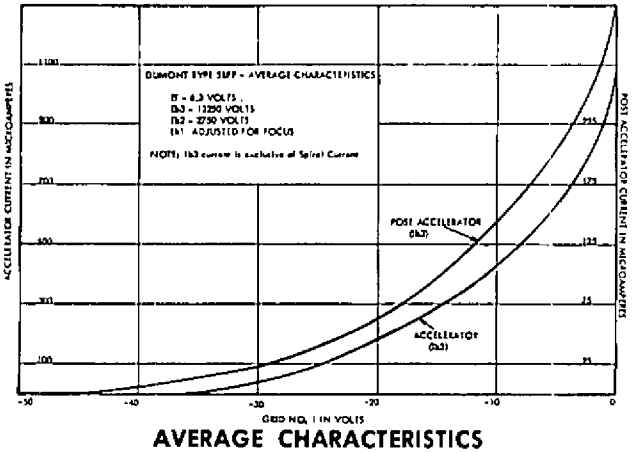
UNIT—A ELEMENT	RECEPTACLE
DEFLECTING ELECTRODE D_1	C
DEFLECTING ELECTRODE D_2	A
DEFLECTING ELECTRODE D_3	H
DEFLECTING ELECTRODE D_4	E
SHIELD	B

UNIT—A PIN NO.	UNIT—A ELEMENT
1	HEATER
2	CATHODE
3	GRID NO. 1
5	FOCUSING ELECTRODE
14	HEATER

UNIT—B	
ACCELERATOR	K
DEFLECTING ELECTRODE D_1	H
DEFLECTING ELECTRODE D_2	A
DEFLECTING ELECTRODE D_3	E
DEFLECTING ELECTRODE D_4	C

UNIT—B	
7	HEATER
8	HEATER
9	CATHODE
10	GRID NO. 1
12	FOCUSING ELECTRODE

Recommended accessories: Socket Du Mont P/N 34001610, Socket Mounting Ring Du Mont P/N 35001750, Post Accelerator Connector Du Mont P/N 243-19, and two (2) Deflection Plate Connectors Du Mont P/N 243-20.



AVERAGE CHARACTERISTICS TYPE 5BFP—

© 1959

PRINTED IN U.S.A.

ALLEN B. DU MONT LABORATORIES, INC. INDUSTRIAL TUBE SALES DEPARTMENT
750 Bloomfield Avenue Clifton, New Jersey

5BP-A CATHODE-RAY TUBES

The Type 5BP-A Cathode-ray Tubes are electrostatically focussed and deflected cathode-ray tubes with four free deflection plates for balanced deflection. Employing low accelerating voltages, the Type 5BP-A Cathode-ray Tubes are designed for applications where the use of an intensifier is not essential. The electron gun is designed to draw negligible focusing electrode current.

The Type 5BP-A is recommended for replacement only.



GENERAL CHARACTERISTICS

Electrical

Heater Voltage	6.3 Volts
Heater Current	0.6 ±10% Ampere
Focusing Method	Electrostatic
Deflecting Method	Electrostatic

Phosphor	No. 1	No. 11
Fluorescence	Green	Blue
Persistence	Medium	Short

Direct Interelectrode Capacitances, Nominal

Grid No. 1 to all other electrodes	8.0 μμf.
D1 to D2	1.4 μμf.
D3 to D4	1.2 μμf.
D1 to all other electrodes except D2	8.0 μμf.
D2 to all other electrodes except D1	7.5 μμf.
D3 to all other electrodes except D4	10.0 μμf.
D4 to all other electrodes except D3	7.5 μμf.

Mechanical

Overall Length	16¾ ± ⅜ Inches
Greatest Diameter of Bulb	5¼ + 1/16, Inches −3/32 Inches
Minimum Useful Screen Diameter	4½ Inches
Base	Medium Magnal
Basing	11N

Base Alignment

3D4 trace aligns with Pin No. 1 and tube axis ± 10 Degrees

Positive voltage on D1 deflects beam approximately toward Pin No. 4.

Positive voltage on D3 deflects beam approximately toward Pin No. 1.

Angle between 3D4 and 1D2 traces 90 ± 3 Degrees

MAXIMUM RATINGS—(Design Center Values)

Anode No. 2 Voltage	2000 Max. Volts D-C
Anode No. 1 Voltage[1]	1000 Max. Volts D-C
Grid No. 1 Voltage	
Negative Bias Value	125 Max. Volts D-C
Positive Bias Value	0 Max. Volts D-C
Positive Peak Value	2 Max. Volts
Peak Voltage between Anode No. 2 and any Deflection Electrode	500 Max. Volts

TYPICAL OPERATING CONDITIONS

For Anode No. 2 Voltage of	1500	2000	Volts
Anode No. 1 Voltage for focus	253 to 422	338 to 562	Volts
Grid No. 1 Voltage[2]	−15 to −45	−20 to −60	Volts
Deflection Factors:			
D1 and D2	52 to 74	70 to 98	Volts D-C per Inch
D3 and D4	47 to 67	63 to 89	Volts D-C per Inch

Anode No. 1 Voltage for focus ..... 16.9% to 28.1% of Eb2 Volts
Grid No. 1 Voltage[2] ..... 1% to 3% of Eb2 Volts
Anode No. 1 Current for any operating condition ..... −50 to +10 Microamperes

Deflection Factors:
D1 and D2 ..... 35 to 49 Volts D-C per Inch per Kilovolt of Eb2
D3 and D4 ..... 31.5 to 44.5 Volts D-C per Inch per Kilovolt of Eb2

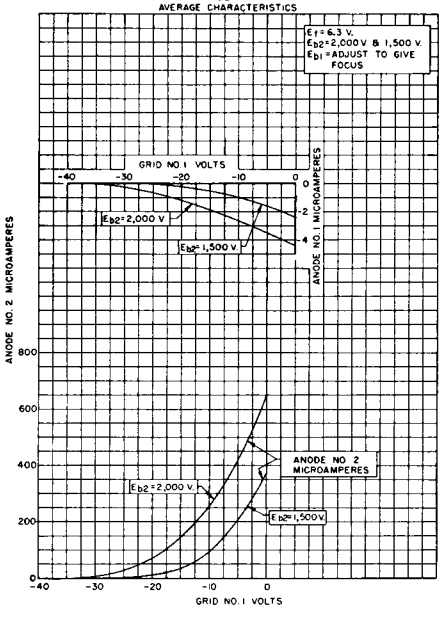
Spot Position (Undeflected)[3] ..... Within 15 Millimeters square

MAXIMUM CIRCUIT VALUES

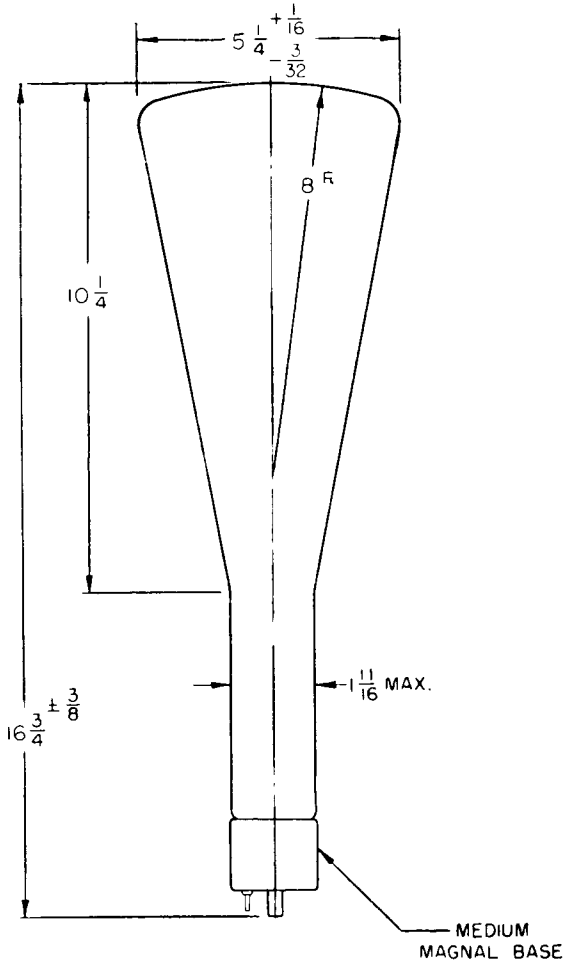
Grid No. 1 Circuit Resistance ..... 1.5 Max. Megohms
Resistance in any Deflecting Electrode Circuit[4] ..... 5 Max. Megohms

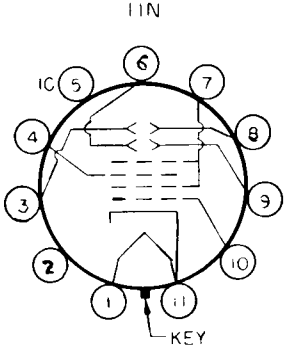
NOTES

1. Anode No. 2 and Grid No. 2, which are connected together within the tube, are referred to herein as Anode No. 2.
2. Visual extinction of undeflected focused spot.
3. With Eb2=1500 volts and Eb1 adjusted for focus.
4. It is recommended that the deflecting electrode circuit resistances be approximately equal.
5. For optimum focus the average potentials of the deflection plates and second anode should be the same.



TYPE 5BP-A





BOTTOM VIEW OF BASE

PIN NO.	ELEMENT
1	HEATER
2	NO CONNECTION
3	DEFLECTING ELECTRODE D_1
4	ANODE NO. 1
5	INTERNAL CONNECTION
6	DEFLECTING ELECTRODE D_4
7	ANODE NO. 2, GRID NO. 2
8	DEFLECTING ELECTRODE D_2
9	DEFLECTING ELECTRODE D_3
10	GRID NO. 1
11	HEATER AND CATHODE

from JEDEC release #2819,
May 23, 1960

DU MONT

CATHODE-RAY TUBE

TYPE 5BWP-

The Type 5BWP- is a high voltage, 5-inch, flat face, electrostatic focus and deflection cathode-ray tube. The tube features a linear post accelerator - a spiral resistance winding - which extends from the tube face to the deflection plate region, allowing for a gradual voltage gradient. Other features of the 5BWP- are high deflection sensitivity coupled with high writing rate, astigmatism and pattern adjustment controls to insure distortionless displays.

An aluminized screen is provided for maximum light output and stability.

The 5BWP- is similar to the 5BHP- except for increased voltage rating, and utilization of a molded, high voltage lead.

GENERAL CHARACTERISTICS

Electrical Data

Focusing Method	Electrostatic	
Deflecting Method	Electrostatic	
Direct Interelectrode Capacitances, Approximate		
Cathode to all other electrodes	4.6	µµf
Grid No. 1 to all other electrodes	6.4	µµf
D1 to D2	1.9	µµf
D3 to D4	1.5	µµf
D1 to all other electrodes except D2	3.5	µµf
D2 to all other electrodes except D1	3.5	µµf
D3 to all other electrodes except D4	2.8	µµf
D4 to all other electrodes except D3	2.8	µµf
Post Accelerator Helix Resistance (Spiral)	200 to 600	Megohms

Optical Data

Phosphor Number	1	2	5	7	11	15
Fluorescent Color	Green	Blue-Green	Blue	Blue-White	Blue	Blue-Green
Phosphorescent Color	-----	Green	----	Yellow	----	-----
Persistence	Medium	Long	Very short	Long	Short	Extremely short

Faceplate: Clear

Mechanical Data

Overall Length	18 1/4 ± 3/16	Inches
Greatest Diameter of Bulb	5 1/4 ± 3/32	Inches
Minimum Useful Screen Diameter	4 1/2	Inches

DUMONT

CATHODE-RAY TUBE

TYPE 5BWP-

GENERAL CHARACTERISTICS (Mechanical Data) (Continued)

Bulb Number	J42K	
Bulb Contact	Molded Lead	
Base	B12-37	
Basing	14AG	
Base Alignment:		
D3D4 trace aligns with Pin No. 1 and Tube Axis	± 10	Degrees
Positive voltage on D1 deflects beam approximately toward Pin No. 4		
Positive voltage on D3 deflects beam approximately toward Pin No. 1		
Angle between D1D2 and D3D4 traces	90 ± 1	Degrees
Bulb Contact Alignment:		
Centerline of molded lead aligns with trace of D1D2	± 10	Degrees
Centerline of molded lead on same side as Pin No. 4		

RATINGS (Design Maximum Values)

Heater Voltage	6.3	Volts
Heater Current at 6.3 Volts	0.6 ± 10%	Ampere
Post Accelerator Voltage	24,000	Max. Volts DC
Isolation Shield Voltage	4,240	Max. Volts DC
Deflection Plate Shield Voltage	4,180	Max. Volts DC
Accelerator Voltage	4,000	Max. Volts DC
Ratio Post Accelerator Voltage to Accelerator Voltage	6	Max.
Accelerator Input	6	Max. Watts
Focusing Electrode Voltage	2,000	Max. Volts DC
Grid No. 1 Voltage		
Negative Bias Value	200	Max. Volts DC
Positive Bias Value	0	Max. Volts DC
Positive Peak Value	2	Max. Volts
Peak Heater-Cathode Voltage		
Heater negative with respect to cathode		
During warm-up period not to exceed 15 seconds	410	Max. Volts
After equipment warm-up period	180	Max. Volts
Heater positive with respect to cathode	180	Max. Volts
Peak Voltage between Accelerator and any Deflection Electrode	1,100	Max. Volts

DUMONT

CATHODE-RAY TUBE

TYPE 5BWP-

TYPICAL OPERATING CONDITIONS

Post Accelerator Voltage	24,000	Volts
Isolation Shield Voltage [1]	3,760 to 4,240	Volts
Deflection Plate Shield Voltage [2]	3,760 to 4,180	Volts
Accelerator Voltage [3]	4,000	Volts
Focusing Electrode Voltage	435 to 1,250	Volts
Grid No. 1 Voltage [4]	-128 to -200	Volts
Modulation [5]	80	Max. Volts
Line Width "A" [5]	.025	Max. Inch
Deflection Factors: [6]		
D1D2	160 to 189	Volts DC/Inch
D3D4	34 to 49	Volts DC/Inch
Useful Scan:		
D1D2	3.9	Inches (100 mm)*
D3D4	1.6	Inches (40 mm)*
Focusing Electrode Current for any operating condition	-15 to +10	Microamperes
Spot Position (Undeflected) [7]	Within a 3/16-Inch radius circle *	
Pattern Distortion [8]		
Post Accelerator Current	100	Max. μA

* Centered with respect to the tube face

MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance	1.5	Max. Megohms
Resistance in any Deflecting-Electrode Circuit [9]	1.0	Max. Megohms

NOTES

1. The isolation shield and the lower end of the post accelerator helix are connected together within the tube. With the proper potentials on this electrode combination, barrel and pincushion distortions are minimized.

2. Adjustment of deflection plate shield voltage provides improved linearity of D3D4 deflection by controlling the edge effect of the D3D4 plate field. In many applications the deflection plate shield may be connected externally to the isolation shield.

DUMONT

CATHODE-RAY TUBE

TYPE 5BWP-

NOTES
(Continued)

3. Under the typical operating conditions listed, the accelerator voltage may be varied to provide for astigmatism control.

4. Visual extinction of undeflected, focused spot.

5. For an Ib3 of 25 μADC measured in accordance with MIL-E-1 specifications. All readings of beam current shall be in addition to the reading obtained for post accelerator current with the beam cut-off.

6. If use is made of the full deflection capabilities of the tube, the deflection plates will intercept part of the electron beam near the edge of scan; hence a low impedance deflection plate drive is desirable.

7. When the tube is operated at typical operating conditions, with Ec1 adjusted to avoid damage to the screen, with each of the deflecting electrodes connected to the accelerator, and with the tube shielded against external influences, the spot will fall within a 3/16-inch (5 mm) radius circle centered on the tube face.

8. With a 1.6 x 3.9-inch (40 x 100 mm) raster centered on the face of the tube, the raster edges will not deviate from straight parallel lines by more than .039 inch (1 mm) total on the left and right edges, nor by more than .020 inch (.5 mm) total on the top and bottom.

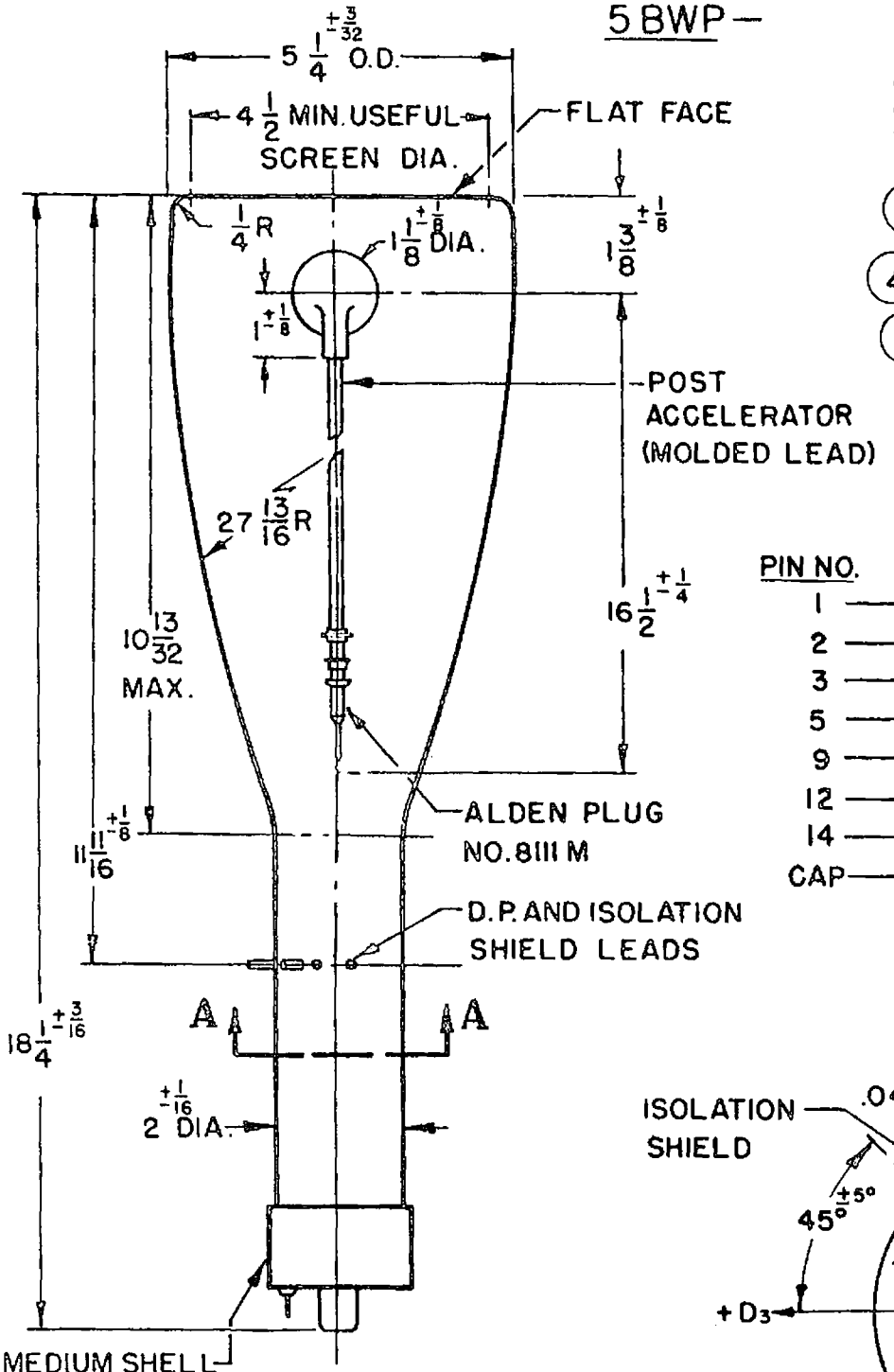
9. It is recommended that the deflecting-electrode circuit resistances be approximately equal. Higher resistance values up to 5 megohms may be used for low beam current operation.

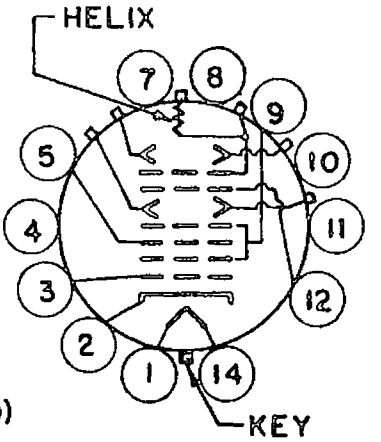
Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

FORM 909 8C-Y-58-8H

DUMONT
CATHODE-RAY TUBE

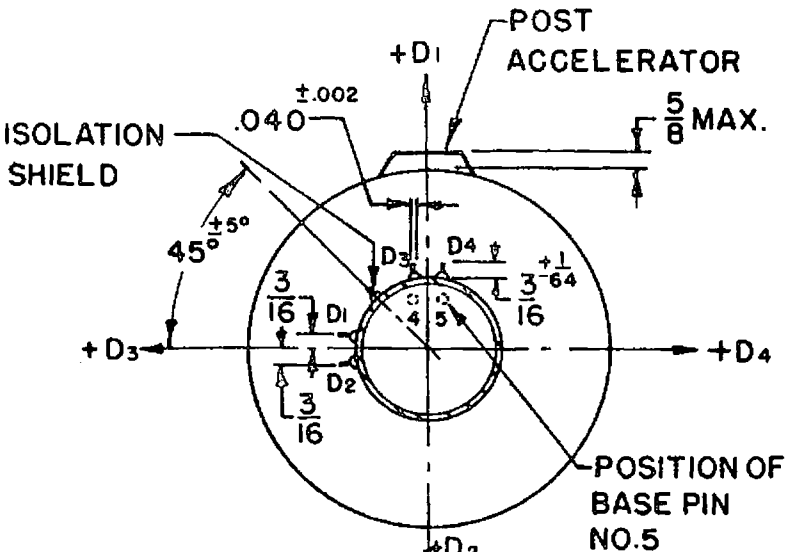
5BWP—





BOTTOM VIEW

PIN NO.	ELEMENT
1	HEATER
2	CATHODE
3	GRID NO. 1
5	FOCUSING ELECTRODE
9	ACCELERATOR
12	DEFLECTION PLATE SHIELD
14	HEATER
CAP	POST-ACCELERATOR



SECTION A-A

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

DE-6059
3-30-60
FORM 809-CB-4-58-SM

DUMONT

CATHODE-RAY TUBE

TYPE 5BXP-

The Du Mont Type 5BXP- is a 4 5/8 x 2 5/8-inch, electrostatic focus and deflection cathode-ray tube. It uses a rectangular bulb designed to show only the useful scan.

The electron gun has a low voltage electrostatic focus lens, requiring only a small fraction of the accelerator voltage for focusing.

The faceplate of the 5BXP- is flat, allowing for more accurate visual observation.

GENERAL CHARACTERISTICS

Electrical Data

Focusing Method	Electrostatic	
Deflecting Method	Electrostatic	
Direct Interelectrode Capacitances, Approximate		
Cathode to all other electrodes	3.8	μμf
Grid No. 1 to all other electrodes	4.2	μμf
D1 to D2	3.0	μμf
D3 to D4	1.9	μμf
D1 to all other electrodes	6.1	μμf
D2 to all other electrodes	5.7	μμf
D3 to all other electrodes	4.2	μμf
D4 to all other electrodes	3.7	μμf

Optical Data

Phosphor Number	1	2	7	11
Fluorescence	Green	Green	Blue	Blue
Phosphorescence	-----	Green	Yellow	----
Persistence	Medium	Long	Long	Short

Mechanical Data

Overall Length	17 5/8 ± 1/4	Inches
Greatest Dimension of Bulb		
Width	4 5/8 ± 1/16	Inches
Height	2 5/8 ± 1/16	Inches
Minimum Useful Screen Dimensions		
Width (Major Axis)	4 1/8	Inches
Height (Minor Axis)	2 1/8	Inches
Neck Contacts	J1-25	

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

DE-4698 - 2
5/24/60

FORM 609 EC-7-59-6M

from JEDEC release #2860, June 27, 1960

DUMONT

CATHODE-RAY TUBE

TYPE 5BXP-

GENERAL CHARACTERISTICS (Mechanical Data) (Continued)

Base	B12-37	
Basing	14U	
Base Alignment:		
D1D2 trace aligns with Pin No. 5 and tube axis	± 10	Degrees
Positive voltage on D1 deflects beam approximately toward Pin No. 5		
Positive voltage on D3 deflects beam approximately toward Pin No. 2		
Trace Alignment:		
Angle between D3D4 and D1D2 traces	90 ± 1	Degrees
D1D2 trace aligns with major axis of tube face	± 3	Degrees

MAXIMUM RATINGS (Design Maximum Values)

Heater Voltage	6.3	Volts
Heater Current at 6.3 Volts	0.6 ± 10%	Ampere
Accelerator Voltage	6600	Max. Volts DC
Accelerator Input	6	Max. Watts
Focusing Electrode Voltage	1650	Max. Volts DC
Grid No. 1 Voltage		
Negative Bias Value	200	Max. Volts DC
Positive Bias Value	0	Max. Volts DC
Positive Peak Value	0	Max. Volts
Peak Heater-Cathode Voltage		
Heater negative with respect to cathode	180	Max. Volts
Heater positive with respect to cathode	180	Max. Volts
Peak Voltage between Accelerator and any deflection electrode	1200	Max. Volts

TYPICAL OPERATING CONDITIONS

Accelerator Voltage	2500	Volts DC
Focusing Electrode Voltage	0 to 300	Volts DC
Grid No. 1 Voltage [1]	-34 to -56	Volts DC
P1 Light Output [2]	15	Ft. L. Min.
Modulation [2]	45	Max. Volts DC
Line Width "A" [2]	.032	Inch Max.

DUMONT

CATHODE-RAY TUBE

TYPE 5BXP-

TYPICAL OPERATING CONDITIONS (Continued)

Accelerator Current [2]	800	Max. μADC
Deflection Factors:		
D1D2	40 to 50	Volts DC/Inch
D3D4	20 to 25	Volts DC/Inch
Deflection Factor Uniformity [3]	1%	Max.
Useful Scan:		
D1D2	4.12 (± 2.06 min. from tube face center)	Inches
D3D4	2.12 (± 1.06 min. from tube face center)	Inches
Pattern Distortion [4]		
Spot Position [5]	Within a 5/16-inch radius circle	

CIRCUIT DESIGN VALUES

Focusing Current for any operating condition	-15 to +15	μADC
Grid No. 1 Voltage [1]	-13.6 to -22.4 Volts DC per Kilovolt of Accelerator Voltage	
Grid No. 1 Circuit Resistance	1.5	Max. Megohms
Deflection Factors:		
D1D2	16 to 20 Volts DC/Inch/KV of Accelerator Voltage	
D3D4	8 to 10 Volts DC/Inch/KV of Accelerator Voltage	
Resistance in any Deflecting-Electrode Circuit [6]	1	Max. Megohms

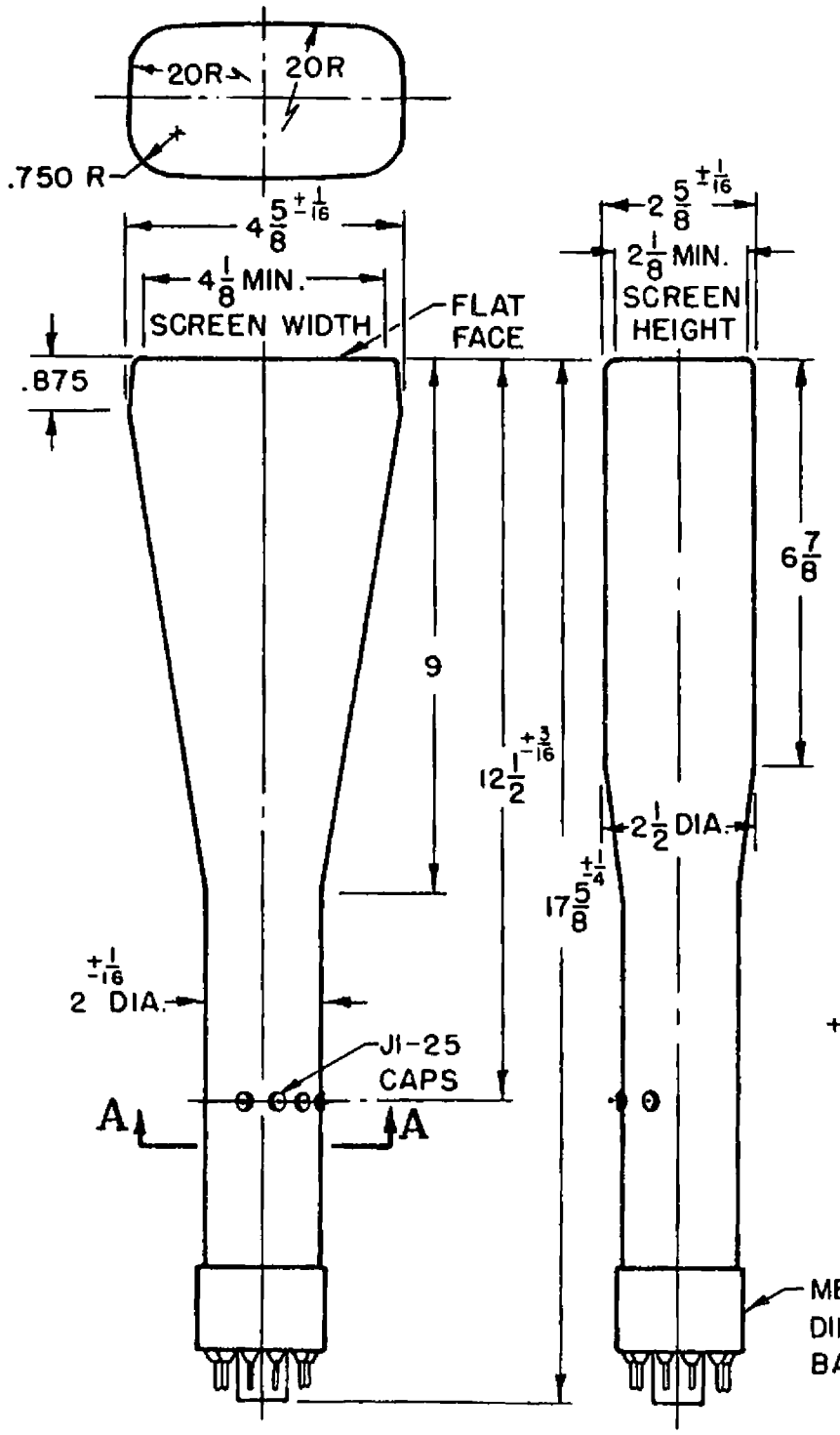
NOTES

1. Visual extinction of undeflected, focused spot.
2. Measured in accordance with MIL-E-1 specifications.
3. The deflection factor (for both D1D2 and D3D4 plate pairs, separately) for any deflection of less than 90% of the useful scan will not differ from the deflection factor for a deflection at 30% of the useful scan by more than the indicated value.
4. All portions of a raster pattern, adjusted so its widest points just touch the sides of a 1.744 x 3.195-inch rectangle, will fall within the area bounded by the 1.744 x 3.195-inch rectangle and an inscribed 1.676 x 3.105-inch rectangle.
5. When the tube is operated at typical operating conditions with Ec1 adjusted to avoid damage to the screen, with each of the deflecting electrodes connected to the accelerator, and with the tube shielded against external influences, the spot will fall within a 5/16-inch radius circle, centered on the tube face.
6. It is recommended that the deflecting-electrode circuit resistances be approximately equal.
7. An adjustable D.C. potential between the accelerator and the deflection plates may be used to secure best overall focus.

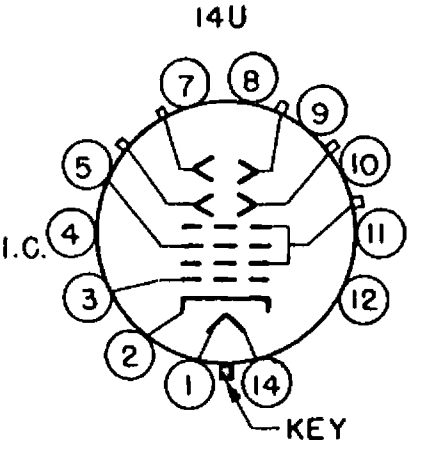
DU MONT

CATHODE - RAY TUBE

5BXP-

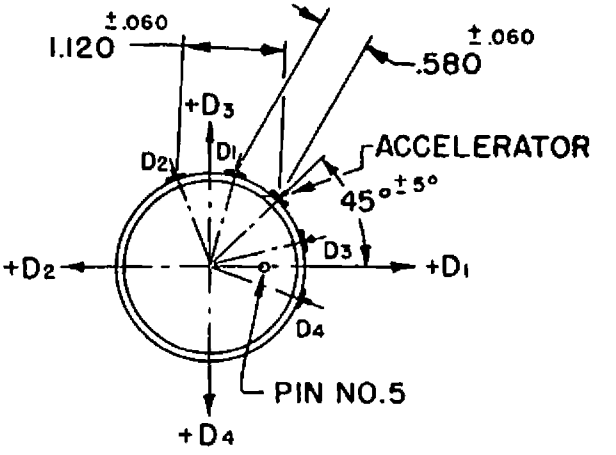


14U



BOTTOM VIEW

PIN NO.	ELEMENT
1	HEATER
2	CATHODE
3	GRID NO.1
4	INTERNAL CONNECTION
5	FOCUSING ELECTRODE
14	HEATER



SECTION A-A

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

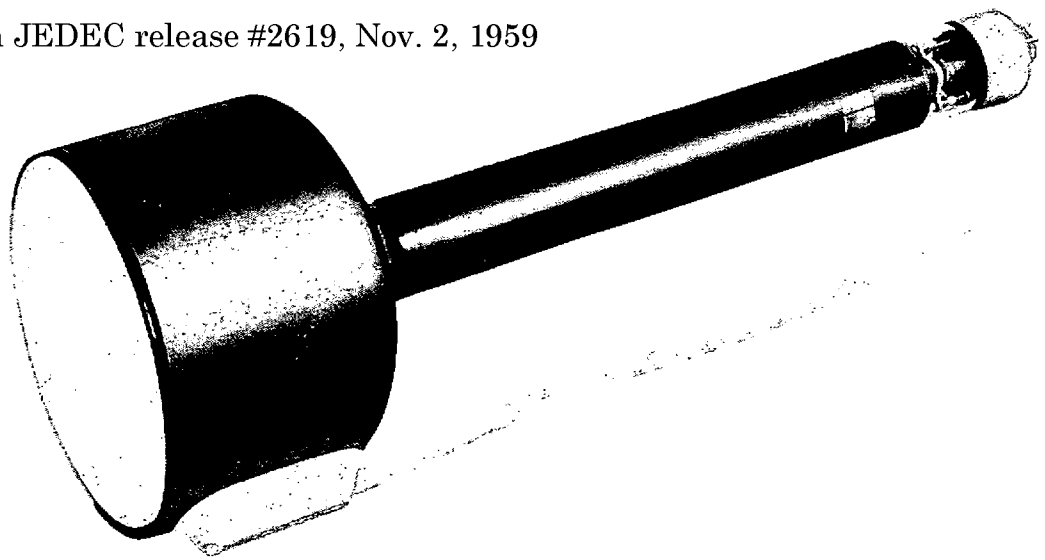
DD-27316-A-2
5-25-60
FORM 809-CO-4-55-6M

DU MONT

INDUSTRIAL CATHODE-RAY TUBES

TYPE:
5CKP1, 5CKP16

from JEDEC release #2619, Nov. 2, 1959



GENERAL CHARACTERISTICS

ELECTRICAL DATA

Focusing Method	Magnetic
Deflection Method	Magnetic
Deflection Angle (Approx.)	42 Degrees
Direct Interelectrode Capacitances, Approx. Values	
Cathode to all other electrodes	2.0 μμf
Grid #1 to all other electrode	9.0 μμf

OPTICAL DATA

Phosphor Number	1	16
Fluorescence	Green	Violet
Persistence	Medium	Extremely Short
Faceplate	Clear, non-browning	

MECHANICAL DATA

Overall Length	16⅝ ± ⅜ Inches
Greatest Diameter of Bulb	5¼ ± 3/32 Inches
Minimum useful screen diameter	4¼ Inches
Neck Length	12⅛ Inches
Bulb Contact	Special Molded Contact
Bulb Contact Alignment:	
Centerline of molded contact aligns with Vacant Pin Position #3	± 10 Degrees
Base	B7-51
Basing	12 AM
Weight (Approx.)	2 Pounds

MAXIMUM RATINGS
(Design Center Values)

Heater Voltage	6.3 Volts
Heater Current at 6.3 Volts	0.6 ± 10% Ampere
Accelerator Voltage	20,000 Max. Volts DC
Grid No. 2 Voltage	1,250 Max. Volts DC
Grid No. 1 Voltage	
Negative Bias Value	200 Max. Volts DC
Positive Bias Value	—2 Max. Volts DC
Positive Peak Value	0 Max. Volts
Peak Heater to Cathode Voltage	
Heater negative with respect to cathode	180 Max. Volts
Heater positive with respect to cathode	180 Max. Volts

TYPICAL OPERATING CONDITIONS

Accelerator Voltage	20,000 Volts DC
Grid No. 2 Voltage	1,000 Volts DC
Grid No. 1 Voltage[1]	—35 to —110 Volts DC
Line Width "A"[2]	.001 Inch Max.
Focusing Coil Current[3]	135 Approx. Ma. DC
Spot Position[4]	Within a 15 mm. Radius Circle

MAXIMUM CIRCUIT VALUES

Grid #1 Circuit Resistance	1.5 Max. Megohms

NOTES

1. Visual extinction of the undeflected, focused spot.
2. For an accelerator current of 25μA DC. Line width is measured with a 525-line interlaced pattern, the pattern width adjusted to 90% of minimum useful screen diameter. Line width is the merged focused raster height divided by the number of lines (525) measured in the tube face center.
3. Using JETEC #106 Focus coil, with Grid No. 1 bias voltage adjusted to produce an accelerator current of 25 microamperes and with the distance from reference line to center of air gap equal to 3½ inches.
4. The center of the undeflected, unfocused spot will fall within a 15 mm. radius circle concentric with the tube face center, with the tube shielded.
5. If this tube is operated at voltages in excess of 16,000 volts, X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range. Such protection may be provided by the protective face viewing window of apparatus using tubes of this type. Protection will be adequate if the radiation measured in contact with the face viewing window is not in excess of 6.25 mr/hr.

FEATURES

- High Resolution with one mil Spot Size*
- Uses Conventional Focus Coil
- Uses Conventional Deflection Yoke
- Extremely Fine Screen With Minimum Voids
- Flat-Non-Browning Faceplate Ground and Polished
- Optical Quality Faceplate
- Molded Accelerator Lead For High Voltage and High Altitude Operation
- Light Weight

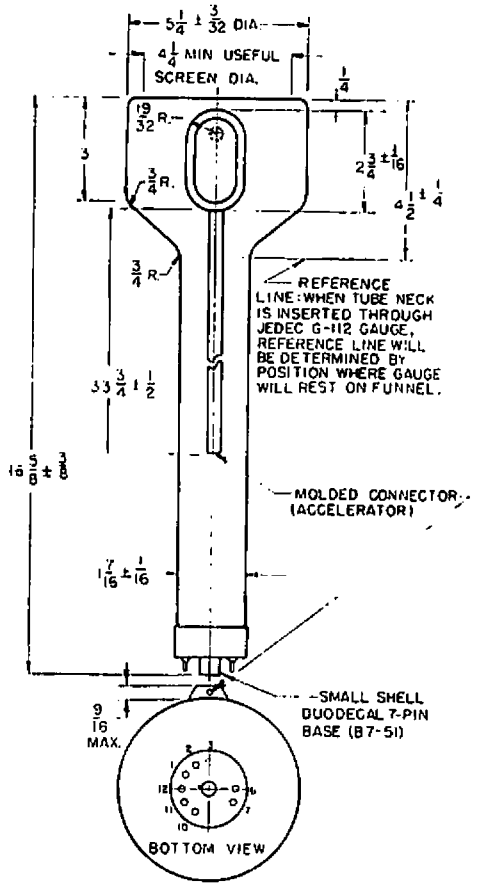
*Measured by Shrinking Raster Method

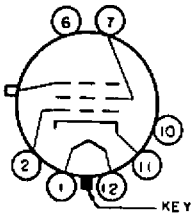
APPLICATIONS

- Flying Spot Scanner
- Precision Radar
- Photographic
- Intermediate Film Transmission Systems

DU MONT
ELECTRONIC TUBE SALES DEPARTMENT
750 Bloomfield Avenue Clifton, New Jersey, U.S.A.

OUTLINE DRAWING TYPE 5CKP-





BOTTOM VIEW OF BASE

PIN NO.	ELEMENT
1	— HEATER
2	— GRID NO. 1
7	— GRID NO. 2
11	— CATHODE
12	— HEATER
MOLDED CONNECTOR	— ACCELERATOR

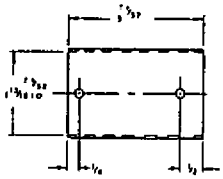
ACCESSORIES

For your convenience in ordering, from a single source, a complete line of accessories is available. Sockets recommended are the Du Mont part number 34003960 with mounting tabs and exposed contacts, or the self-supporting part number 34003620 with covered contacts. Base clamp 37007171 may be used with the 34003620 socket.

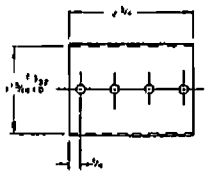
An adjustable, felt-lined, mu-metal shield, part number 243-4, can be used to shield the gun section of the tube when the tube is used in the presence of high electrostatic or magnetic fields. Adjustment is available to adapt the shield for a variety of deflection yoke sizes.

While this tube may be used with conventional deflection yokes, custom designed deflection yokes can be supplied to suit your unique applications. Information is available on request.

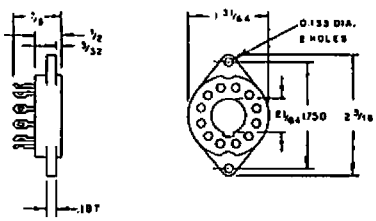
SHIELD PART #243-4



FELT-LINED BULB SECTION
Material: .025 mu-metal. 4 sets of 2 holes (0.166 dia.) equally spaced at 90° as shown.

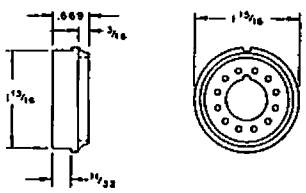


TELESCOPING HOOD SECTION
Material: 0.025 mu-metal. 4 sets of 4 holes (0.166 dia.) equally spaced at 90°, 3/4 inch apart as shown.



12 PRONG (DUODECAL)

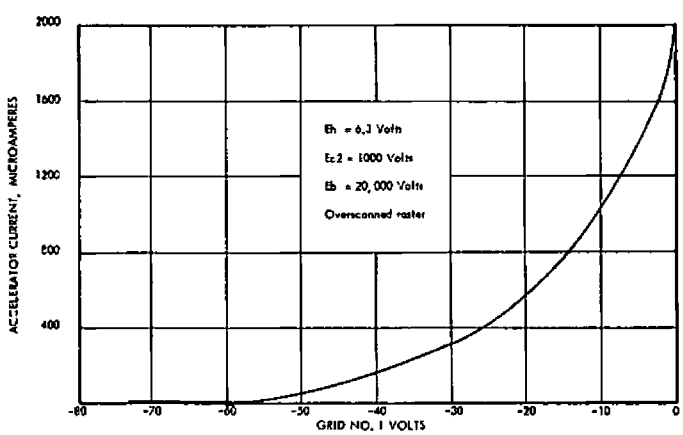
BASE SOCKET: DUMONT PART NO. 34003960



12 PRONG (DUODECAL)

BASE SOCKET: DUMONT PART NO. 34003620

TYPE 5CKP- AVERAGE CHARACTERISTICS



© 1958

PRINTED IN U.S.A.

ALLEN B. DU MONT LABORATORIES, INC.
750 Bloomfield Avenue
ELECTRONIC TUBE SALES DEPARTMENT
Clifton, New Jersey

5CP-A CATHODE-RAY TUBES

The Type 5CP-A Cathode-ray Tubes are designed for oscillographic applications. The intensifier principle is used to provide a maximum deflection sensitivity for a given final accelerating voltage. A glass envelope has been designed to provide great mechanical strength and the tube base design provides adequate insulation between electrode leads for high altitude installation. The gun is designed to draw negligible focusing electrode current.

The four types differ only in the characteristics of the fluorescent screens. Other screen types may be obtained on special order.



GENERAL CHARACTERISTICS

Electrical

Heater Voltage	6.3 Volts
Heater Current	0.6 ± 10% Ampere
Focusing Method	Electrostatic
Deflecting Method	Electrostatic

Phosphor	No. 1	No. 2	No. 7	No. 11
Fluorescence	Green	Green	Blue	Blue
Phosphorescence	—	Green	Yellow	—
Persistence	Medium	Long	Long	Short

Direct Interelectrode Capacitances, Nominal

Cathode to all other electrodes	9 μμf.
Grid No. 1 to all other electrodes	8 μμf.
D1 to D2	2 μμf.
D3 to D4	2 μμf.
D1 to all other electrodes except D2	7 μμf.
D2 to all other electrodes except D1	7 μμf.
D3 to all other electrodes except D4	5 μμf.
D4 to all other electrodes except D3	6 μμf.

Mechanical

Overall Length	16¾ ± ⅜ Inches
Greatest Diameter of Bulb	5¼ ± 3/32 Inches
Minimum Useful Screen Diameter	4½ Inches
Bulb Contact	J1-22
Base	B12-37
Basing	14J

Base Alignment:

D1D2 trace aligns with Pin No. 5 and tube axis	± 10 Degrees

Positive voltage on D1 deflects beam approximately toward Pin No. 5.
Positive voltage on D3 deflects beam approximately toward Pin No. 2.

Angle between D3D4 and D1D2 traces	90 ± 3 Degrees

Bulb contact alignment:

J1-22 contact aligns with D1D2 trace	± 10 Degrees

J1-22 contact on same side as Pin No. 5

MAXIMUM RATINGS—(Design Center Values)

Anode No. 3 Voltage (Accelerator High-Voltage Electrode) ..... 4000 Max. Volts D-C
Anode No. 2 Voltage[1] ..... 2000 Max. Volts D-C
Ratio Anode No. 3 Voltage to Anode No. 2 Voltage ..... 2.3 Max.
Anode No. 1 Voltage ..... 1000 Max. Volts D-C

Grid No. 1 Voltage
- Negative Bias Value ..... 200 Max. Volts D-C
- Positive Bias Value ..... 0 Max. Volts D-C
- Positive Peak Value ..... 2 Max. Volts

Peak Heater-Cathode Voltage
- Heater Negative with respect to Cathode ..... 125 Max. Volts D-C
- Heater Positive with respect to Cathode ..... 125 Max. Volts D-C

Peak Voltage between Anode No. 2 and any Deflection Electrode ..... 500 Max. Volts

TYPICAL OPERATING CONDITIONS

For Anode No. 3 Voltage of	2000	3000	4000 Volts
For Anode No. 2 Voltage of	2000	1500	2000 Volts
Anode No. 1 Voltage for focus	375 to 690	280 to 515	375 to 690 Volts
Grid No. 1 Voltage[2]	−30 to −90	−22.5 to −67.5	−30 to −90 Volts
Deflection Factors:			
D1 and D2	62 to 84	58 to 80	78 to 106 D-C V/in.
D3 and D4	54 to 74	50 to 68	66 to 90 D-C V/in.

Anode No. 1 Voltage for focus ..... 18.7% to 34.5% of Eb2 Volts
Grid No. 1 Voltage[2] ..... 1.5% to 4.5% to Eb2 Volts
Anode No. 1 Current for any operating condition ..... −15 to +10 Microamperes

Deflection Factors:
- No 3rd Anode or Eb3 = Eb2
  - D1 and D2 ..... 31 to 42 Volts D-C per inch per Kilovolt of Eb2
  - D3 and D4 ..... 27 to 37 Volts D-C per inch per Kilovolt of Eb2
- Eb3 = Twice Eb2
  - D1 and D2 ..... 39 to 53 Volts D-C per inch per Kilovolt of Eb2
  - D3 and D4 ..... 33 to 45 Volts D-C per inch per Kilovolt of Eb2

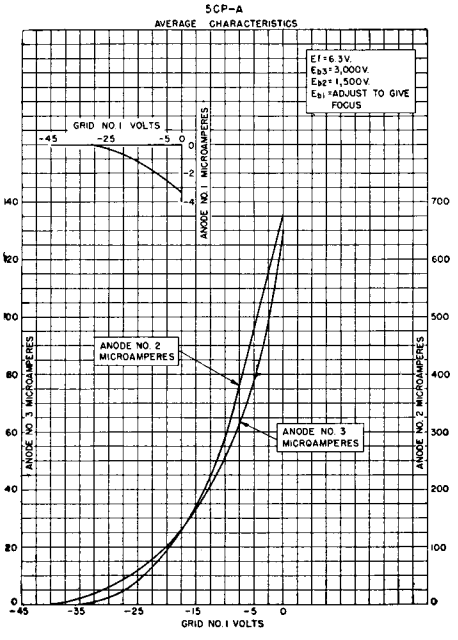
Spot Position (Undeflected)[3] ..... Within 25 Millimeters square

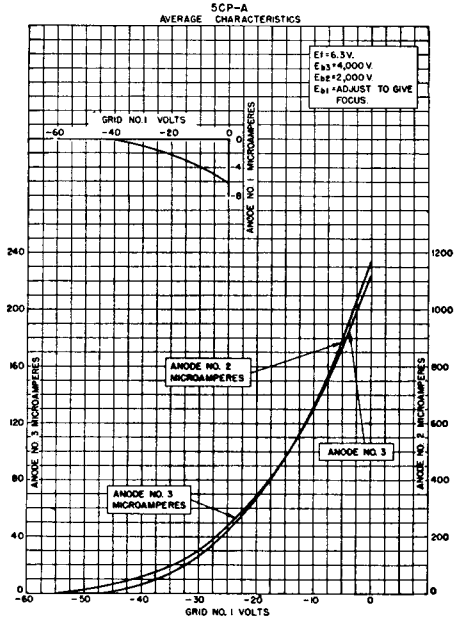
MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance ..... 1.5 Max. Megohms
Resistance in any Deflecting-Electrode Circuit[4] ..... 5 Max. Megohms

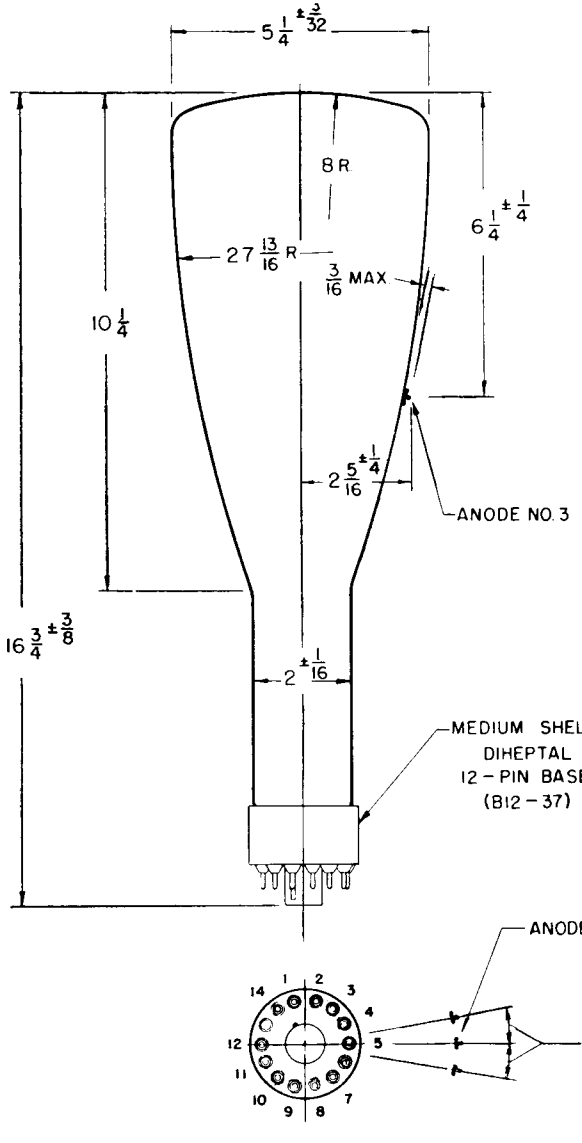
NOTES

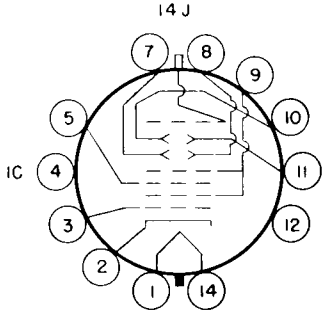
1. The product of Anode No. 2 voltage and average Anode No. 2 current should be limited to 6 watts.
2. Visual extinction of undeflected focused spot.
3. When the tube is operated at (1) normal heater voltage; (2) Eb3 = 3000 volts; (3) Eb2 = 1500 volts; (4) Eb1 adjusted for focus; (5) Ec1 set at such a value as will avoid damage to the screen; (6) with each of the deflecting electrodes connected to Anode No. 2; and (7) with the tube shielded against external influences:
   The spot will fall within a 25 mm. square, the center of which coincides with the geometric center of the tube face and the sides of which are parallel to the traces produced by deflecting electrodes D1 and D2 and by deflecting electrodes D3 and D4 respectively.
4. It is recommended that the deflecting electrode circuit resistances be approximately equal.
5. For optimum focus the average potentials of the deflection plates and second anode should be the same.


5CP-A
AVERAGE CHARACTERISTICS
Ef = 6.3 V.
Eb3 = 3,000 V.
Eb2 = 1,500 V.
Eb1 = ADJUST TO GIVE FOCUS
GRID NO. 1 VOLTS
-45 -25 -5 0
0 -2 -4
ANODE NO. 1 MICROAMPERES
ANODE NO. 2 MICROAMPERES
ANODE NO. 3 MICROAMPERES
ANODE NO. 3 MICROAMPERES
ANODE NO. 2 MICROAMPERES
140 120 100 80 60 40 20 0
700 600 500 400 300 200 100 0
-45 -35 -25 -15 -5 0
GRID NO. 1 VOLTS


5CP-A
AVERAGE CHARACTERISTICS
Ef = 6.3 V.
Eb3 = 4,000 V.
Eb2 = 2,000 V.
Eb1 = ADJUST TO GIVE FOCUS.
GRID NO. 1 VOLTS
-60 -40 -20 0
0 -4 -8
ANODE NO. 1 MICROAMPERES
ANODE NO. 2 MICROAMPERES
ANODE NO. 3
ANODE NO. 3 MICROAMPERES
ANODE NO. 3 MICROAMPERES
ANODE NO. 2 MICROAMPERES
240 200 160 120 80 40 0
1200 1000 800 600 400 200 0
-60 -50 -40 -30 -20 -10 0
GRID NO. 1 VOLTS

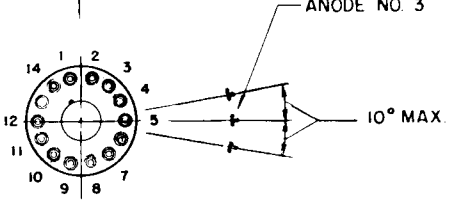
TYPE 5CP-A





BOTTOM VIEW OF BASE

PIN NO	ELEMENT
1	HEATER
2	CATHODE
3	GRID NO. 1
4	INTERNAL CONNECTION
5	ANODE NO. 1
7	DEFLECTING ELECTRODE D_3
8	DEFLECTING ELECTRODE D_4
9	ANODE NO. 2, GRID NO. 2
10	DEFLECTING ELECTRODE D_2
11	DEFLECTING ELECTRODE D_1
14	HEATER



from JETEC release #1402,
Jan. 24, 1955

DUMONT

5CP-B CATHODE-RAY TUBE

TENTATIVE

The Du Mont Type 5CP-B is an electrostatic focus and deflection cathode-ray tube, designed for oscillographic applications. It is similar to the Type 5CP-A with the exception of having greatly reduced tolerances. Deflection factors are held to within 10%, angle alignment to within 1°, and grid cut-off bias to within 25%.

GENERAL CHARACTERISTICS

Electrical Data

Focusing Method	Electrostatic		
Deflecting Method	Electrostatic		
Direct Interelectrode Capacitances	Min.	Max.	
Cathode to all other electrodes	3.2	6.0	uuf.
Grid #1 to all other electrodes	4.5	8.3	uuf.
D1 to D2	1.2	2.2	uuf.
D3 to D4	1.0	1.8	uuf.
D1 to all other electrodes except D2	3.1	5.8	uuf.
D2 to all other electrodes except D1	2.9	5.5	uuf.
D3 to all other electrodes except D4	2.6	4.8	uuf.
D4 to all other electrodes except D3	2.4	4.5	uuf.

Optical Data

Phosphor Number	1	2	7	11
Fluorescent Color	Green	Green	Blue	Blue
Phosphorescent Color	-----	Green	Yellow	----
Persistence	Medium	Long	Long	Short

Mechanical Data

Overall Length	16 3/4 ± 3/16	Inches
Greatest Diameter of Bulb	5 1/4 ± 3/32	Inches
Minimum Useful Screen Diameter	4 1/2	Inches
Bulb Number	J42F	
Bulb Contact	J1-22	
Base	B12-37	
Basing	14J	
Bulb Contact Alignment		
J1-22 contact aligns with trace of D1D2	±10	Degrees
J1-22 contact on same side as pin #5		
Base Alignment		
D1D2 trace aligns with pin #5 and tube axis	±10	Degrees
Positive voltage on D1 deflects beam approximately toward pin #5		
Positive voltage on D3 deflects beam approximately toward pin #2		
Angle between D3D4 and D1D2 traces	90 ±1	Degrees

DUMONT

5CP-B CATHODE-RAY TUBE

RATINGS (Design Center Values)

Heater Voltage	6.3	Volts
Heater Current at 6.3 Volts	0.6 ±10%	Ampere
Post-Accelerator Voltage	4000	Max. Volts D-C
Accelerator Voltage	2000	Max. Volts D-C
Ratio Post-Accelerator Voltage to Accelerator Voltage	2.3	Max.
Accelerator Input	6	Max. Watts
Focusing Electrode Voltage	1000	Max. Volts D-C
Grid #1 Voltage		
Negative Bias Value	200	Max. Volts D-C
Positive Bias Value	0	Max. Volts D-C
Positive Peak Value	0	Max. Volts
Peak Heater-Cathode Voltage		
Heater Negative with respect to cathode	180	Max. Volts
Heater Positive with respect to cathode	180	Max. Volts
Peak Voltage between Accelerator and any Deflection Electrode	500	Max. Volts

TYPICAL OPERATING CONDITIONS

Post-Accelerator Voltage	3000	4000	Volts
Accelerator Voltage	1500	2000	Volts
Focusing Electrode Voltage	300 to 515	400 to 690	Volts
Grid #1 Voltage[1]	-34 to -56	-45 to -75	Volts
P1 Light Output[2]	15		Ft. L. Min.
Modulation[2]	45		Max. Volts D-C
Line Width "A"[2]	.030		Inch Max.
Deflection Factors			
D1 and D2	62 to 76	83 to 101	Volts D-C per Inch
D3 and D4	53 to 65	70 to 86	Volts D-C per Inch
Focusing Electrode Current for any Operating Condition		-15 to +10	Microamperes
Spot Position		Within a 5/16-inch radius circle[3]	

CIRCUIT DESIGN VALUES

Focusing Electrode Voltage	20% to 34.5% of Accelerator Volts
Grid #1 Voltage[1]	2.25% to 3.75% of Accelerator Volts
No Post-Accelerator or Post-Accelerator = Accelerator	
D1 and D2	33 to 40 Volts D-C per Inch per Kilovolt of Accelerator
D3 and D4	29 to 35 Volts D-C per Inch per Kilovolt of Accelerator
Post-Accelerator = Twice Accelerator	
D1 and D2	41.5 to 50.5 Volts D-C per Inch per Kilovolt of Accelerator
D3 and D4	35 to 43 Volts D-C per Inch per Kilovolt of Accelerator

MAXIMUM CIRCUIT VALUES

Grid #1 Circuit Resistance	1.5	Max. Megohms
Resistance in any Deflecting-Electrode Circuit[4]	5	Max. Megohms

DU MONT

5CP-B CATHODE-RAY TUBE

NOTES

1. Visual extinction of undeflected focused spot.

2. Measured in accordance with MIL-E-1B Specifications.

3. When the tube is operated at typical operating conditions (Eh = 6.3 V., Eb3 = 3000 V., Eb2 = 1500 V., Eb at focus); Ec1 adjusted to avoid damage to the screen; with each of the deflecting electrodes connected to the accelerator; and with the tube shielded against external influences, the spot will fall within a 5/16-inch radius circle, centered on the tube face.

4. It is recommended that the deflecting-electrode-circuit resistances be approximately equal.

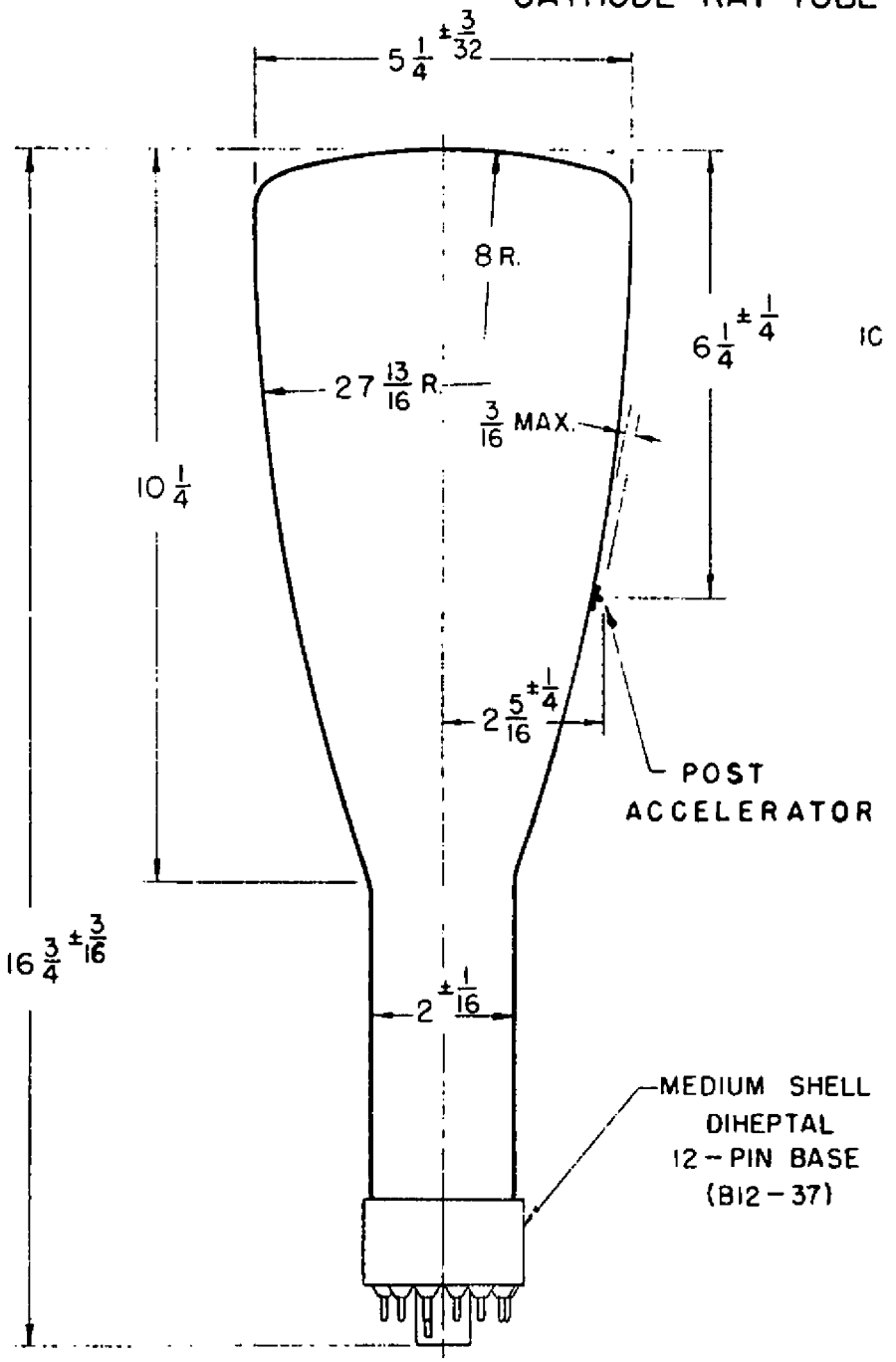
Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

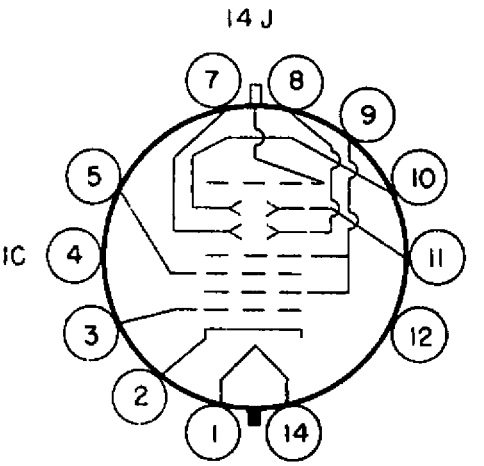
FORM BUP MI-2 52 SM

DUMONT

5CP-B

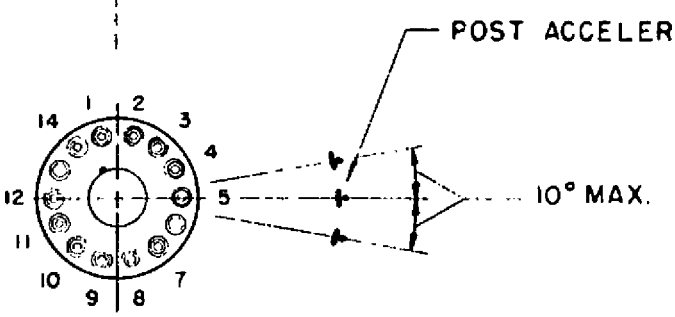
CATHODE-RAY TUBE





BOTTOM VIEW OF BASE

PIN NO.	ELEMENT
1	HEATER
2	CATHODE
3	GRID NO. 1
4	INTERNAL CONNECTION
5	FOCUSING ELECTRODE
7	DEFLECTING ELECTRODE D_3
8	DEFLECTING ELECTRODE D_4
9	ACCELERATOR
10	DEFLECTING ELECTRODE D_2
11	DEFLECTING ELECTRODE D_1
14	HEATER



ALLEN B. DUMONT LABS. INC.
CLIFTON, N.J.

DD-26848-A
10-4-54

DUMONT

CATHODE-RAY TUBE

TYPE 5CWP-

The Du Mont Type 5CWP- is a flat face, two beam, electrostatic deflection and focus cathode-ray tube having improved deflection sensitivity, accuracy and low interaction between traces. The increased maximum ratings of the tube permit high brightness to be obtained, and the use of post acceleration and limited scan deflection electrodes improves the deflection sensitivity. The deflection electrode and acceleration electrode connections are brought out through the bulb wall to minimize lead inductance and capacity and to improve the insulation. This tube features a pattern adjustment electrode and individual astigmatism adjustment electrodes which are also brought out through the neck. A collar or ring base has been designed and incorporated into this tube for ease of connection to these leads.

The screen is aluminized for greater light output and to minimize screen charging effects.

GENERAL CHARACTERISTICS [1]

Electrical Data

Focusing Method	Electrostatic	
Deflecting Method	Electrostatic	
Direct Interelectrode Capacitances, Approx.		
Cathode to all	6.0	μμf
Grid No. 1 to all	4.0	μμf
D1 to D2	3.0	μμf
D3 to D4	2.0	μμf
D1 to all	7.0	μμf
D2 to all	7.0	μμf
D3 to all	4.0	μμf
D4 to all	4.0	μμf

Optical Data

Phosphor Number	1	2	7	11
Fluorescent Color	Green	Blue-Green	Blue-White	Blue
Phosphorescent Color	-----	Green	Yellow	----
Persistence	Medium	Long	Long	Short

Faceplate: Flat, Clear

DE-5830 - 2
4/13/60

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

FORM 609 M1 3 60 SH

from JEDEC release #2803, May 9, 1960

DUMONT

CATHODE-RAY TUBE

TYPE 5CWP-

GENERAL CHARACTERISTICS (Continued)

Mechanical Data

Overall Length	20 ± 1/4	Inches
Greatest Diameter of Bulb	5 1/4 ± 3/32	Inches
Minimum Useful Screen Diameter	4 1/2	Inches
Bulb Contact	J1-22	
Collar	A14-93	
Base	B12-37	
Basing	Special	
Collar and Base Alignment		
Collar Pin No. 1 and Base Pin No. 4 each aligns with the D1D2 trace	± 10	Degrees

Positive Voltage on D1 deflects the beam approximately toward Base Pin No. 4
Positive Voltage on D3 deflects the beam approximately toward Base Key

Bulb Contact Alignment:		
Bulb Contact aligns with D1D2 trace	± 10	Degrees
Bulb Contact is on same side as the Base Pin No. 11		
Trace Alignment:		
D1D2 trace aligns with D3D4 trace	90 ± 1	Degrees
Corresponding traces of each gun align within	1	Degree

MAXIMUM RATINGS (ABSOLUTE MAXIMUM VALUES)

Heater Voltage	6.3	Volts
Heater Current at 6.3 Volts	0.6 ± 10%	Ampere
Post Accelerator Voltage	11,000	Max. Volts DC
Accelerator Voltage	5,500	Max. Volts DC
Accelerator Input	6	Max. Watts
Ratio Post Accelerator Voltage to Accelerator Voltage [2]	3	Max.
Astigmatism Electrode Voltage	5,500	Max. Volts DC
Astigmatism Electrode Input	6	Max. Watts
Pattern Adjustment Electrode Voltage	5,500	Max. Volts DC
Focusing Electrode Voltage	1,650	Max. Volts DC

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

FORM 80D M1 3-59 BH

DUMONT

CATHODE-RAY TUBE

TYPE 5CWP-

MAXIMUM RATINGS (ABSOLUTE MAXIMUM VALUES) (Continued)

Grid No. 1 Voltage		
Negative Bias Value	200	Max. Volts DC
Positive Bias Value	0	Max. Volts DC
Positive Peak Value	0	Max. Volts
Peak Heater to Cathode Voltage		
Heater negative with respect to cathode	180	Max. Volts
Heater positive with respect to cathode	180	Max. Volts
Peak Voltage between Accelerator and any Deflection Electrode	1,100	Max. Volts

TYPICAL OPERATING CONDITIONS [3]

Post Accelerator Voltage	8,000	Volts
Accelerator Voltage	3,000	Volts
Astigmatism Electrode Voltage [4]	3,000	Volts
Pattern Adjustment Electrode Voltage [5]	3,000	Volts
Focusing Electrode Voltage	0 to 450	Volts
Grid No. 1 Voltage [6]	-45 to -75	Volts
Modulation [7]	35	Volts Max.
Line Width "A" [7a]	.25	MM Max.
Deflection Factors:		
D1 and D2	65 to 85	Volts DC/Inch
D3 and D4	45 to 65	Volts DC/Inch
Deflection factor uniformity [8]	2%	Max.
Useful Scan [9]		
D1D2 (±2" minimum from tube face center)	4	Inches
D3D4 (±1 1/2" minimum from tube face center)	3	Inches
Pattern Distortion [10]	3%	Max.
Tracking Error [11]	0.060	Max. Inches
Interaction Factor [12]	20×10^{-6}	In./Volt DC Max.
Spot Position (Undeflected) [13]	Within a 10-mm square	
Focusing Electrode Current for any operating condition	-15 to +10	Microamperes

DUMONT

CATHODE-RAY TUBE

TYPE 5CWP-

MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance	14	1.5	Max. Megohms
Resistance in any Deflecting-Electrode Circuit		1.0	Max. Megohms

NOTES

1. Values are for each unit unless otherwise stated.

2. This tube is designed for optimum performance when operating at an Eb3/Eb2 ratio of 2.6. Operation at other ratios of Eb3/Eb2 may result in changes in deflection uniformity, pattern distortion, tracking error, and useful scan.

3. Values given are for balanced deflection voltages. These values are measured with the accelerator, astigmatism and pattern adjustment electrodes connected together.

4. The astigmatism electrode should be adjusted for optimum spot shape. For any necessary adjustment, its potential will fall within a range of ± 100 volts with respect to the accelerator voltage.

5. The pattern adjustment electrode should be adjusted for optimum performance. For any necessary adjustment, its potential will be within a range of -300 to +50 volts with respect to the mean D1D2 plate potential.

6. Visual extinction of the focused, undeflected spot.

7. For a beam current of 25 μADC., measured in accordance with MIL-E-1 specifications.
   a. For a beam current of 2 μADC., measured in accordance with MIL-E-1 specifications.

8. The deflection factor (for both D1D2 and D3D4 plate pairs, separately) for deflections of less than 75% of the useful scan will not differ from the deflection factor for a deflection of 25% of the useful scan by more than the indicated value.

9. Centered with respect to the tube face and with the tube shielded.

10. All portions of a raster pattern, adjusted so its widest points just touch the sides of a 4.120 x 1.545-inch rectangle, will fall within the area bounded by the 4.120 x 1.545-inch rectangle and an inscribed 3.880 x 1.455-inch rectangle.

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

FORM 609 M1 3-60 BH

DU MONT

CATHODE-RAY TUBE

TYPE 5CWP-

N O T E S (Continued)

11. With two-inch vertical traces (D3D4) superimposed at the tube face center and deflected horizontally ± 2 inches by voltages proportional to the relative deflection factors, horizontal separation of corresponding points on the traces shall not be greater than the indicated value.

12. The deflection of one beam when balanced DC voltages are applied to the deflection-electrodes of the other beam will not be greater than the indicated value.

13. With the free deflecting electrodes connected to the accelerator, and the tube shielded against external influences, the undeflected, focused spot will fall within a 10-mm square centered with respect to the tube face center.

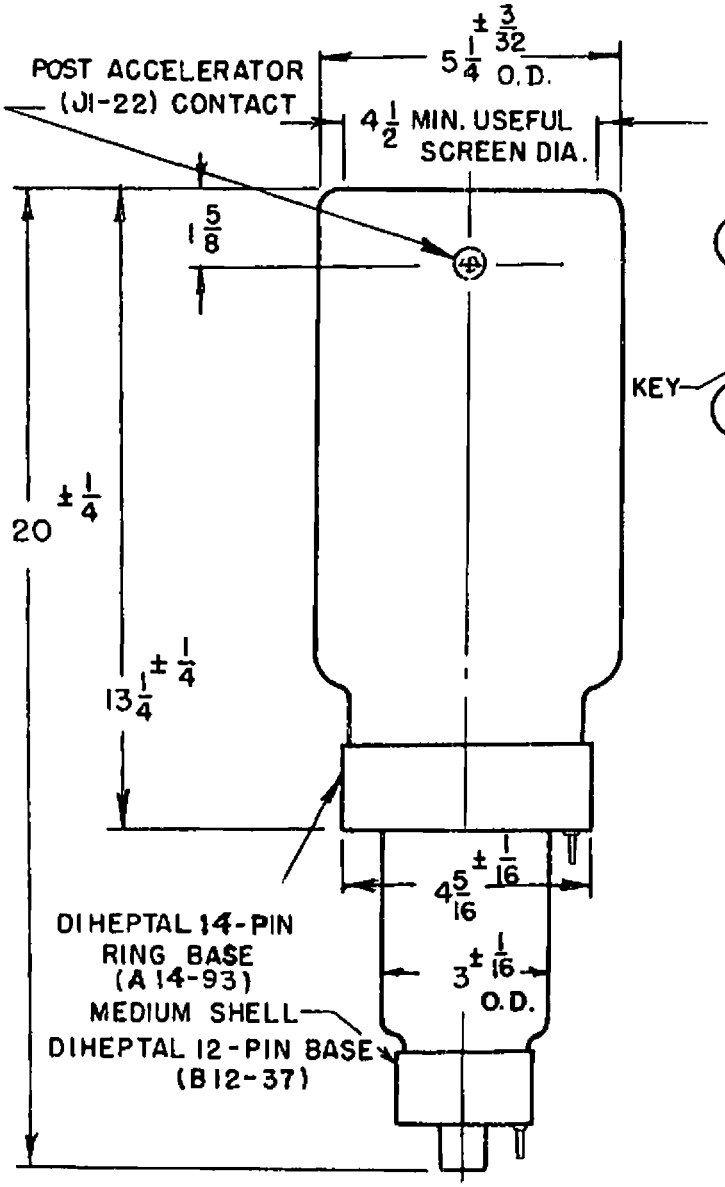
14. It is recommended that the deflecting-electrode circuit resistances be approximately equal. Higher resistance values up to 5.0 megohms may be used for low beam current operation.

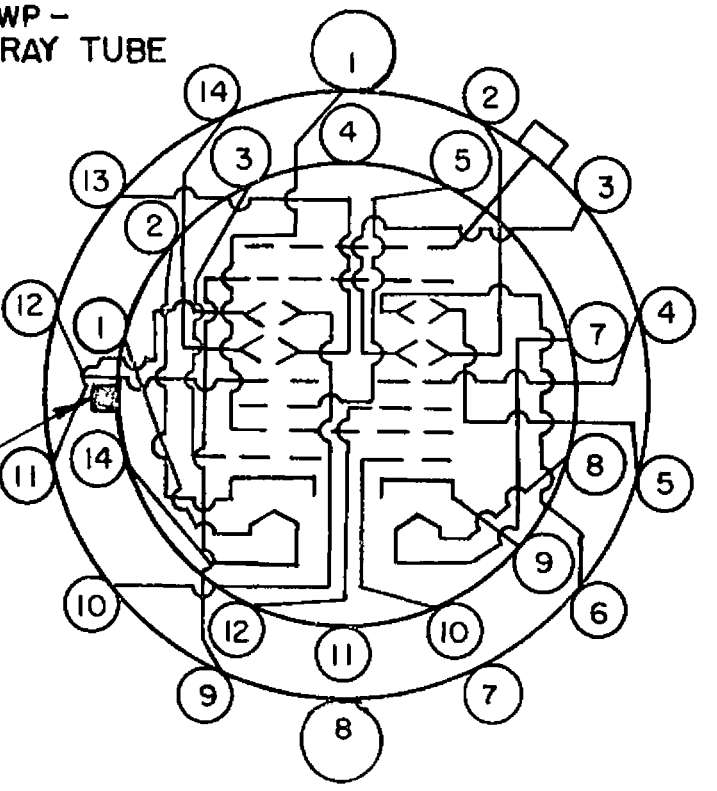
Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

FORM 609 M1 3-59 BM

DUMONT

5 CWP – CATHODE-RAY TUBE

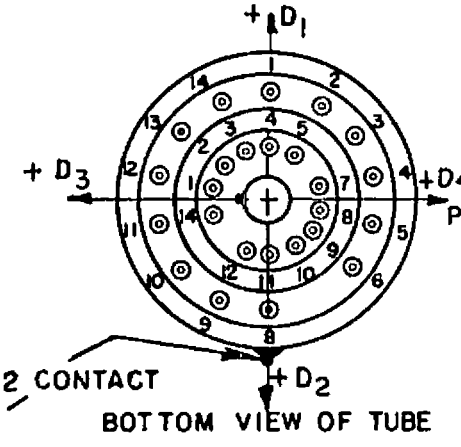




BASING

RING BASE

PIN NO.	ELEMENT
1	ACCELERATOR SHIELD
9	PATTERN ADJUSTMENT ELECTRODE GUN "B"
2	DEFLECTING ELECTRODE D_3
3	DEFLECTING ELECTRODE D_4
4	ASTIGMATISM CONTROL ELECTRODE
5	DEFLECTING ELECTRODE D_1
6	DEFLECTING ELECTRODE D_2
	GUN "A"
10	DEFLECTING ELECTRODE D_2
11	DEFLECTING ELECTRODE D_1
12	ASTIGMATISM CONTROL ELECTRODE
13	DEFLECTING ELECTRODE D_3
14	DEFLECTING ELECTRODE D_4



BOTTOM VIEW OF TUBE

B12-37 BASE

GUN "A" PIN NO.	GUN "A" ELEMENT	GUN "B" PIN NO.	GUN "B" ELEMENT
1	HEATER	7	HEATER
2	CATHODE	8	HEATER
3	GRID NO. 1	9	CATHODE
5	FOCUSING ELECTRODE	10	GRID NO.1
14	HEATER	12	FOCUSING ELECTRODE

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

DD-27888-A3
4-14-60
FORM 609-CB-4-60-RH

DUMONT

CATHODE-RAY TUBE

TYPE 5DAP-

The Du Mont Type 5DAP- is a 5 1/4-inch diameter, single beam, electrostatic focus and deflection cathode-ray tube. The focusing electrode draws negligible electron current. The tube features a linear post accelerator - a spiral resistance winding - which extends from the tube face to the deflection plate region, allowing for a gradual voltage gradient. Other features of the 5DAP- are high deflection sensitivities, high writing rates, and a pattern adjustment electrode to minimize pattern distortion. An astigmatism electrode is provided to allow for optimum spot shape adjustment.

For maximum brightness and stability in performance, all screens are provided with a highly-reflective metal backing.

GENERAL CHARACTERISTICS

Electrical Data

Focusing Method	Electrostatic	
Deflection Method	Electrostatic	
Direct Interelectrode Capacitances, Approximate		
Cathode to all other electrodes	3.3	μμf
Grid No. 1 to all other electrodes	5.1	μμf
D1 to D2	2.2	μμf
D3 to D4	1.4	μμf
D1 to all electrodes	4.9	μμf
D2 to all electrodes	4.9	μμf
D3 to all electrodes	3.5	μμf
D4 to all electrodes	3.5	μμf

Optical Data

Phosphor Number	1	2	5	7	11	15
Fluorescent Color	Green	Blue-Green	Blue	Blue-White	Blue	Blue-Green
Phosphorescent Color	-----	Green	----	Yellow	----	----------
Persistence	Medium	Long	Very Short	Long	Short	Extremely Short

Mechanical Data

Overall Length	21 1/4 ± 3/16	Inches
Greatest Diameter of Bulb	5 1/4 ± 3/32	Inches
Minimum Useful Screen	4 1/4	Inches

DE-6104
5/23/60

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

FORM 808 SC-7-58-RM

from JEDEC release #2852, June 20, 1960

DUMONT

CATHODE-RAY TUBE

TYPE 5DAP-

GENERAL CHARACTERISTICS (Mechanical Data) (Continued)

Bulb	Special	
Bulb Contact	J1-21	
Basing	14AP	
Base	B12-37	
Base Alignment:		
D3D4 trace aligns with Pin No. 1 and tube axis	± 10	Degrees
Positive voltage on D1 deflects beam approximately toward Pin No. 5		
Positive voltage on D3 deflects beam approximately toward Pin No. 1		
Bulb Contact Alignment:		
Cap aligns with Pin No. 1	± 10	Degrees
Cap aligns with D3D4 trace	± 10	Degrees
Cap on same side as Pin No. 1		
Trace Alignment:		
Angle between D3D4 and D1D2 traces	90 ± 1	Degrees

RATINGS (Design Maximum Values)

Heater Voltage	6.3	Volts
Heater Current at 6.3 Volts	0.6 ± 10%	Ampere
Post Accelerator Voltage	15,000	Max. Volts DC
Pattern Adjustment Electrode Voltage	2700	Max. Volts DC
Deflection Plate Shield Voltage	2700	Max. Volts DC
Astigmatism Electrode Voltage	2700	Max. Volts DC
Astigmatism Electrode Input	6	Max. Watts
Focusing Electrode Voltage	1600	Max. Volts DC
Accelerator Voltage	2700	Max. Volts DC
Accelerator Input	6	Max. Watts
Ratio Post Accelerator Voltage to Accelerator Voltage [1]	9.0	Max.

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

FORM 809 5C-7-58-EH

DUMONT

CATHODE-RAY TUBE

TYPE 5DAP-

RATINGS (Design Maximum Values) (Continued)

Grid No. 1 Voltage		
Negative Bias Value	200	Max. Volts DC
Positive Bias Value	0	Max. Volts DC
Positive Peak Value	0	Max. Volts
Peak Heater-Cathode Voltage		
Heater negative with respect to cathode		
During warm-up period not to exceed 15 seconds	410	Max. Volts
After equipment warm-up period	180	Max. Volts
Heater positive with respect to cathode	180	Max. Volts
Peak voltage between accelerator and any deflection electrode	550	Max. Volts
Post Accelerator Resistance	210 to 750	Megohms

TYPICAL OPERATING CONDITIONS

Post Accelerator Voltage	12,000	Volts
Pattern Adjustment Electrode Voltage [2]	1400	Volts
Deflection Plate Shield Voltage [3]	1400	Volts
Astigmatism Electrode Voltage [4]	1400	Volts
Focusing Electrode Voltage	180 to 580	Volts
Accelerator Voltage	1400	Volts
Grid No. 1 Voltage [5]	-40 to -65	Volts
Modulation [6]	45	Max. Volts DC
Deflection Factors:		
D1D2	48 to 63	Volts DC/Inch
D3D4	13 to 16.5	Volts DC/Inch
Useful Scan:		
D1D2	3.94 (10 cm)	Min. Inches
D3D4	1.97 (5 cm)	Min. Inches
Pattern Distortion [7]		
Line Width "A" [8]	.030	Max. Inch

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

FORM 609 8C-7-59-BH

DUMONT

CATHODE-RAY TUBE

TYPE 5DAP-

TYPICAL OPERATING CONDITIONS (Continued)

Gun Efficiency [9]	6.0	Min. Percent
Focusing Electrode Current for any operating condition	-15 to +10	μA
Spot Position [10]		
P2 Light Output [11]	225	Ft. L. Min.
P11 Light Output [12]	300	Ft. L.. Min.
Post Accelerator Current [13]	50	Max. μA
Deflection Defocusing [14]		

MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance	2.0	Max. Megohms
Resistance in any deflecting-electrode circuit [15]	1.0	Max. Megohms

NOTES

1. This tube is designed for optimum performance when operating at a ratio of 8.5. Operation at other ratios may result in changes in deflection uniformity, pattern distortion and/or useful scan.

2. The pattern adjustment electrode should be adjusted for optimum performance. For any necessary adjustment, its potential will be within a range of -90 to +60 volts with respect to the mean D1D2 plate potential.

3. Adjustment of the deflection plate shield voltage provides improved linearity of D3D4 deflection. For any necessary adjustment, its potential should not exceed ± 20 volts with respect to the mean D3D4 plate potential.

4. The astigmatism electrode should be adjusted for optimum spot shape. For any necessary adjustment, its potential will not exceed ± 100 volts with respect to the accelerator voltage.

5. Visual extinction of the undeflected, focused spot.

6. For a beam current of 25 μADC, measured in accordance with MIL-E-1 specifications. All readings of beam current shall be in addition to the reading obtained for post accelerator current with beam cut-off.

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

FORM 609 8C-7-58-8M

DUMONT

CATHODE-RAY TUBE

TYPE 5DAP-

NOTES
(Continued)

7. All portions of a raster pattern adjusted so its widest points just touch the sides of a 4.052 x 2.032-inch rectangle (centered horizontally with respect to the tube face) will fall within the area bounded by this rectangle and an inscribed 3.94 x 1.97-inch rectangle.

8. For a beam current of 25 μADC, measured in accordance with MIL-E-1 specifications. All readings of beam current shall be in addition to the reading obtained for post accelerator current with beam cut-off.

9. The gun efficiency is the ratio of the beam current to the cathode current.

10. The undeflected and focused spot shall fall within a 9 x 19-mm rectangle centered with respect to the tube face center. The 19-mm dimension shall be in the D1D2 scan direction.

11. Measured with a Type 3 Photronic Cell, corrected for spectral response of the eye, using a 1.5 x 1.5-inch, 50-line raster, with Ib3 = 25 μA.

12. Measured with a Type 3 Photronic Cell, without eye correction, using a 1.5 x 1.5-inch, 50-line raster, with Ib3 = 25 μA.

13. Measured with Grid No. 1 at cut-off. Post accelerator current is the current flowing through the post accelerator resistance which is connected between the post accelerator and pattern adjustment electrode.

14. With the D1D2 scan reversed (D1D2 scanning vertically, D3D4 scanning horizontally), the raster adjusted for best overall focus, and Ib3 at 25 μA, the line width anywhere within the minimum useful scan shall not exceed .050 inch.

15. It is recommended that the deflecting-electrode circuit resistances be approximately equal. Higher resistance values up to five meoghms may be used for low beam current operation.

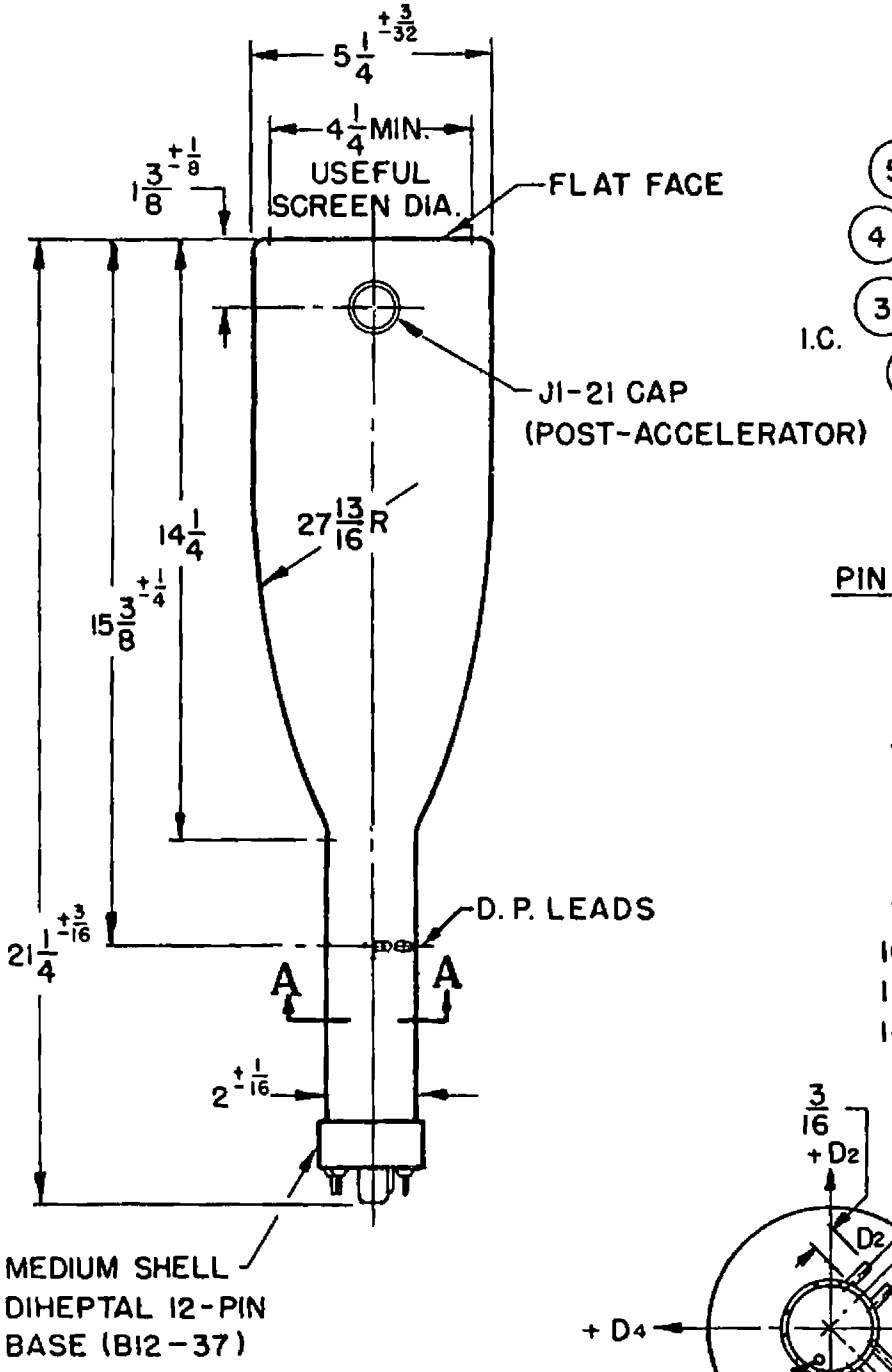
Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

FORM 609 8C-7-58-8M

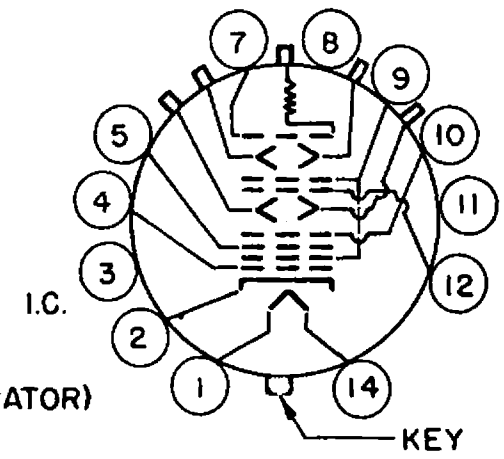
DUMONT

CATHODE-RAY TUBE

5DAP-

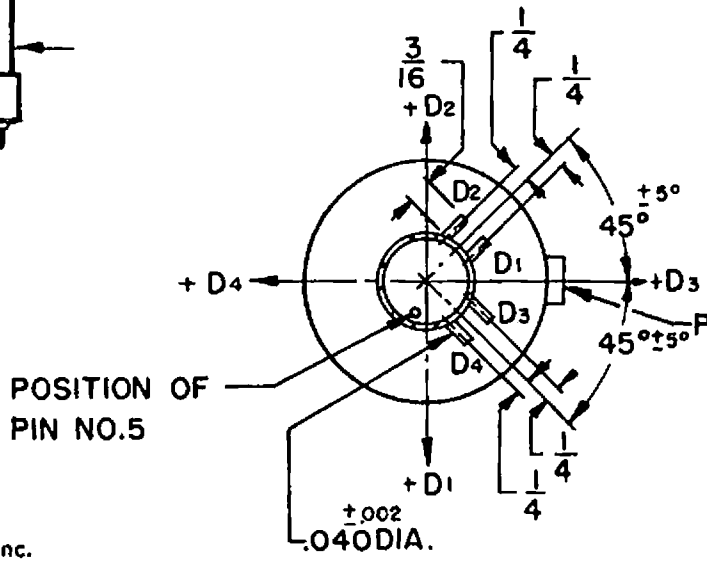


14AP



BOTTOM VIEW

PIN NO	ELEMEMT
1	HEATER
2	CATHODE
3	INTERNAL CONNECTION
4	GRID NO.1
5	FOCUSING ELECTRODE
7	PATTERN ADJUSTMENT ELECTRODE
9	ACCELERATOR
10	ASTIGMATISM ELECTRODE
12	DEFLECTION PLATE SHIELD
14	HEATER



SECTION A-A

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

DE-6104
5-23-60
FORM 609-CG-4-65-SM

DUMONT

CATHODE-RAY TUBE

TYPE 5DBP-

The Du Mont Type 5DBP- is a 5 1/4-inch diameter, single beam, electrostatic focus and deflection cathode-ray tube. The focusing electrode draws negligible electron current. The tube features a linear post accelerator - a spiral resistance winding - which extends from the tube face to the deflection plate region, allowing for a gradual voltage gradient. The deflection plate structure has been designed to minimize deflection plate splash. Other features of the 5DBP- are high deflection sensitivities, high writing rates, and a pattern adjustment electrode to minimize pattern distortion. An astigmatism electrode is provided to allow for optimum spot shape adjustment. A low current heater is employed to reduce power requirements.

GENERAL CHARACTERISTICS

Electrical Data

Focusing Method	Electrostatic	
Deflection Method	Electrostatic	
Direct Interelectrode Capacitances, Approximate		
Cathode to all other electrodes	3.5	μμf
Grid No. 1 to all other electrodes	5.5	μμf
D1 to D2	2.5	μμf
D3 to D4	1.2	μμf
D1 to all electrodes	6.2	μμf
D2 to all electrodes	5.7	μμf
D3 to all electrodes	4.2	μμf
D4 to all electrodes	3.7	μμf

Optical Data

Phosphor Number	1	2	5	7	11	15
Fluorescent Color	Green	Blue-Green	Blue	Blue-White	Blue	Blue-Green
Phosphorescent Color	-----	Green	----	Yellow	----	----------
Persistence	Medium	Long	Very Short	Long	Short	Extremely Short

Mechanical Data

Overall Length	19 1/2 ± 1/4	Inches
Greatest Diameter of Bulb	5 1/4 ± 3/32	Inches
Minimum Useful Screen Diameter	4 1/4	Inches
Bulb	Special	
Bulb Contact	J1-21	

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

DE-5768 - 3
5/12/60

FORM 809 8C-7-59-5M

from JEDEC release #2837, June 13, 1960

DUMONT

CATHODE-RAY TUBE

TYPE 5DBP-

GENERAL CHARACTERISTICS (Mechanical Data) (Continued)

Basing	14AT	
Base	B14-37	
Base Alignment:		
D3D4 trace aligns with Pin No. 1 and tube axis	± 10	Degrees
Positive voltage on D1 deflects beam approximately toward Pin No. 5		
Positive voltage on D3 deflects beam approximately toward Pin No. 1		
Bulb Contact Alignment:		
Cap aligns with Pin No. 1	± 10	Degrees
Cap aligns with D3D4 trace	± 10	Degrees
Cap on same side as Pin No. 1		
Trace Alignment:		
Angle between D3D4 and D1D2 traces	90 ± 1	Degrees

RATINGS (Design Maximum Values)

Heater Voltage	6.3	Volts
Heater Current at 6.3 Volts	0.3 ± 10%	Ampere
Post Accelerator Voltage	8000	Max. Volts DC
Pattern Adjustment Electrode Voltage	2700	Max. Volts DC
Astigmatism Electrode Voltage	2700	Max. Volts DC
Astigmatism Electrode Input	6	Max. Watts
Focusing Electrode Voltage	1500	Max. Volts DC
Accelerator Voltage	2700	Max. Volts DC
Accelerator Input	6	Max. Watts
Ratio Post Accelerator Voltage to Accelerator Voltage [1]	3.5	Max.
Grid No. 1 Voltage		
Negative Bias Value	200	Max. Volts DC
Positive Bias Value	0	Max. Volts DC
Positive Peak Value	0	Max. Volts
Peak Heater-Cathode Voltage		
Heater negative with respect to cathode		
During warm-up period not to exceed 15 seconds	410	Max. Volts
After equipment warm-up period	180	Max. Volts
Heater positive with respect to cathode	180	Max. Volts

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

FORM 808 8C-7-58-8M

DUMONT

CATHODE-RAY TUBE

TYPE 5DBP-

RATINGS (Design Maximum Values) (Continued)

Peak voltage between accelerator and any deflection electrode	550	Max. Volts
Post Accelerator Resistance	48 to 240	Megohms

TYPICAL OPERATING CONDITIONS

Post Accelerator Voltage	5000	Volts
Accelerator Voltage	1400	Volts
Pattern Adjustment Electrode Voltage [2]	1400	Volts
Astigmatism Electrode Voltage [3]	1400	Volts
Focusing Electrode Voltage	180 to 580	Volts
Post Accelerator Current [4]	15 to 75	μA
Grid No. 1 Voltage [5]	-34 to -56	Volts
Modulation [6]	40	Max. Volts DC
Deflection Factors:		
D1D2	25 to 35	Volts DC/Inch
D3D4	25 to 35	Volts DC/Inch
Useful Scan:		
D1D2	4.25	Inches
D3D4	4.25	Inches
Pattern Distortion [7]		
Line Width "A" [6]	.022	Max. Inch
Cathode Current [8]	425	Max. μADC
Focusing Electrode Current for any operating condition	-15 to +10	μA
Spot Position [9]	Within a 5/16-inch radius circle	
P1 Light Output [10]	25	Ft. L. Min.
P2 Light Output [10]	18	Ft. L. Min.
P11 Light Output [11]	20	Ft. L. Min.
Deflection Defocusing [12]		

MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance	2.0	Max. Megohms
Resistance in any Deflecting-Electrode Circuit [13]	1.0	Max. Megohms

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

FORM 808 8C-7-58-8M

DUMONT

CATHODE-RAY TUBE

TYPE 5DBP-

NOTES

1. This tube is designed for optimum performance when operating at a ratio of 3.5. Operation at other rations may result in changes in deflection uniformity, pattern distortion and/or useful scan.

2. The pattern adjustment electrode should be adjusted for optimum performance. For any necessary adjustment, its potential will be within a range of -50 to +100 volts with respect to the mean D1D2 plate potential.

3. The astigmastims electrode should be adjusted for optimum spot shape. For any necessary adjustment, its potential will fall within -50 to +125 volts with respect to the accelerator voltage.

4. Measured with Grid No. 1 at cut-off. Post accelerator current is the current flowing through the post accelerator resistance which is connected between the post accelerator and pattern adjustment electrode. All readings of beam current shall be in addition to the reading obtained for post accelerator current.

5. Visual extinction of the undeflected, focused spot.

6. For a beam current of 25 μADC, measured in accordance with MIL-E-1 specifications.

7. With a raster pattern centered on tube face and the size of which is adjusted so that the widest points of the pattern just touch the sides of a 3.300-inch square, no point on these pattern sides will lie within an inscribed 3.200-inch square.

8. For a beam current of 25 μADC.

9. With the deflecting electrodes connected to the accelerator and the tube shielded against external influences, the undeflected and focused spot will fall within a 5/16-inch radius circle centered with respect to the tube face center.

10. Measured with a Type 3 Photronic Cell, corrected for spectral response of the eye, using a 2 x 2-inch, 50-line raster, with Ib3 = 25 μA.

11. Measured with a Type 3 Photronic Cell, without eye correction, using a 2 x 2-inch, 50-line raster, with Ib3 = 25 μA.

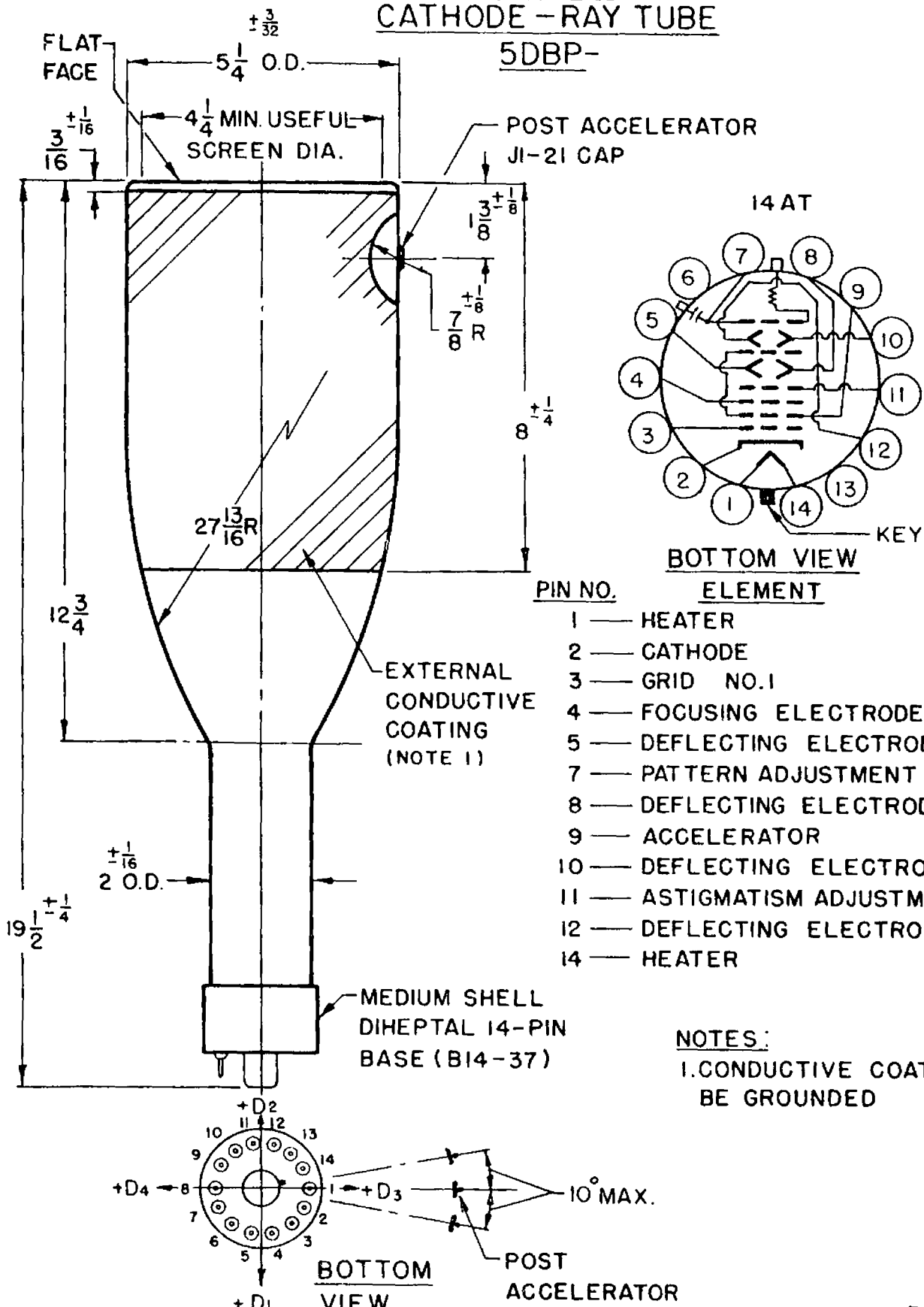
12. Maximum deflection defocusing ± 2 inches from the center in either scan direction shall not exceed 1 3/4 times line width "A". Correction voltages are to be adjusted only when measuring line width "A".

13. It is recommended that the deflecting-electrode circuit resistances be approximately equal. Higher resistance values up to five megohms may be used for low beam current operation.

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

FORM 808 EC-7-58-BH

DUMONT
CATHODE-RAY TUBE
5DBP-



PIN NO.	ELEMENT
1	HEATER
2	CATHODE
3	GRID NO.1
4	FOCUSING ELECTRODE
5	DEFLECTING ELECTRODE D_4
7	PATTERN ADJUSTMENT ELECTRODE
8	DEFLECTING ELECTRODE D_3
9	ACCELERATOR
10	DEFLECTING ELECTRODE D_1
11	ASTIGMATISM ADJUSTMENT ELECTRODE
12	DEFLECTING ELECTRODE D_2
14	HEATER

NOTES:
1. CONDUCTIVE COATING MUST BE GROUNDED

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

DE-5768-9
5-23-60
FORM 609-CS-4-58-8H

DUMONT

CATHODE-RAY TUBE

TYPE 5DWP-

The Du Mont Type 5DWP- is a 5 1/4-inch diameter, single beam, electrostatic focus and deflection cathode-ray tube. The tube features 10 cm. vertical and horizontal scan, high deflection sensitivities, high writing rates, and a pattern adjustment electrode to minimize pattern distortion. An astigmatism electrode is provided to allow adjustment for optimum spot shape. A low current heater is employed to reduce power requirements. Beam gating electrodes are provided to cut off the beam independent of Grid No. 1.

GENERAL CHARACTERISTICS

Electrical Data

Focusing Method	Electrostatic	
Deflection Method	Electrostatic	
Direct Interelectrode Capacitances, Approximate		
Cathode to all other electrodes	3.0	μμf
Grid No. 1 to all other electrodes	5.7	μμf
D1 to D2	2.0	μμf
D3 to D4	1.1	μμf
D1 to all electrodes	5.2	μμf
D2 to all electrodes	5.0	μμf
D3 to all electrodes	3.3	μμf
D4 to all electrodes	2.8	μμf
Beam Gating Electrodes		

Optical Data

Phosphor Number	1	2	5	7
Fluorescence	Yellow-Green	Yellow-Green	Blue	White
Phosphorescence	----------	Green	----	Yellow-Green
Persistence	Medium	Medium	Medium-Short	Long

Phosphor Number	11	15	31
Fluorescence	Blue	Green	Green
Phosphorescence	----	-----	-----
Persistence	Medium-Short	Very Short	Medium-Short

Allen B. Du Mont Laboratories
Divisions of Fairchild Camera and Instrument Corp.
Clifton, N. J.

from JEDEC release #4189, March 18, 1963

DUMONT

CATHODE-RAY TUBE

TYPE 5DWP-

GENERAL CHARACTERISTICS (Continued)

Mechanical Data

Overall Length	20 1/4	Inches Max.
Greatest Diameter of Bulb	5 1/4 ± 3/32	Inches
Minimum Useful Screen Diameter	4 1/4	Inches
Bulb	Special	
Bulb Contact	J1-21	
Basing	Special	
Base	B14-38	
Base Alignment:		
D3D4 trace aligns with Pin No. 1 and tube axis	± 10	Degrees
Positive voltage on D1 deflects beam approximately toward Pin No. 5		
Positive voltage on D3 deflects beam approximately toward Pin No. 1		
Bulb Contact Alignment:		
Cap aligns midway between Pins No. 11 and 12	± 10	Degrees
Cap aligns with D1D2 trace	± 10	Degrees
Cap on same side as Pin No. 11		
Trace Alignment:		
Angle between D3D4 and D1D2 traces	90 ± 1	Degrees

RATINGS (Design Maximum Values)

Heater Voltage	6.3	Volts
Heater Current at 6.3 Volts	~~0.3~~ 0.6 ± 10%	Ampere
Post Accelerator Voltage	8000	Max. Volts DC
Pattern Adjustment Electrode Voltage	2700	Max. Volts DC
Astigmatism Electrode Voltage	2700	Max. Volts DC
Astigmatism Electrode Input	6	Max. Watts
Focusing Electrode Voltage	1500	Max. Volts DC
Accelerator Voltage	2700	Max. Volts DC
Accelerator Input	6	Max. Watts
Ratio Post Accelerator Voltage to Accelerator Voltage [1]	3.6	Max.

DUMONT

CATHODE-RAY TUBE

TYPE 5DWP-

RATINGS (Design Maximum Values) (Continued)

Grid No. 1 Voltage		
Negative Bias Value	200	Max. Volts DC
Positive Bias Value	0	Max. Volts DC
Positive Peak Value	0	Max. Volts
Peak Heater-Cathode Voltage		
Heater negative with respect to cathode		
During warm-up period not to exceed 15 seconds	410	Max. Volts
After equipment warm-up period	180	Max. Volts
Heater positive with respect to cathode	180	Max. Volts
Peak voltage between accelerator and any deflection electrode	550	Max. Volts
Peak voltage between accelerator and any beam gating electrode	100	Max. Volts

TYPICAL OPERATING CONDITIONS

Post Accelerator Voltage	5000	Volts
Accelerator Voltage	1400	Volts
Pattern Adjustment Electrode Voltage[2]	1400	Volts
Astigmatism Electrode Voltage[3]	1400	Volts
Interelectrode Shield Voltage	1400	Volts
Focusing Electrode Voltage	180 to 580	Volts
Post Accelerator Current[4]	15 to 75	μA
Grid No. 1 Voltage[5]	-34 to -64	Volts
Modulation[6]	45	Max. Volts DC
Deflection Factors:		
D1D2	25 to 35	Volts DC/Inch
D3D4	25 to 35	Volts DC/Inch
Useful Scan:		
D1D2	10	Cm
D3D4	10	Cm

Allen B. Du Mont Laboratories
Divisions of Fairchild Camera and Instrument Corp.
Clifton, N. J.

DUMONT

CATHODE-RAY TUBE

TYPE 5DWP-

TYPICAL OPERATING CONDITIONS (Continued)

Beam Gating Voltage [14, 15, 16]	70	Max. Volts
Pattern Distortion [7]		
Line Width "A" [6]	.030	Max. Inch
Cathode Current [8]	625	Max. μADC
Focusing Electrode Current for any operating condition	-15 to +10	μA
Spot Position [9]	Within a 5/16-inch radius circle	
P1 Light Output [10]	25	Ft. L. Min.
P2 Light Output [10]	18	Ft. L. Min.
P11 Light Output [11]	20	Ft. L. Min.
Deflection Defocusing [12]		
Gun Efficiency [8, 17]	4%	Min.
Pattern Shift [16]	5/16	Inch Max.

MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance	2.0	Max. Megohms
Resistance in any Deflecting-Electrode Circuit [13]	1.0	Max. Megohms

NOTES

1. This tube is designed for optimum performance when operating at a ratio of 3.6. Operation at other ratios may result in changes in deflection uniformity, pattern distortion and/or useful scan.
2. The pattern adjustment electrode should be adjusted for optimum performance. For any necessary adjustment, its potential will be within a range of -50 to +100 volts with respect to the mean D1D2 plate potential.
3. The astigmatism electrode should be adjusted for optimum spot shape. For any necessary adjustment, its potential will fall within -50 to +125 volts with respect to the accelerator voltage.
4. Measured with Grid No. 1 at cut-off. Post accelerator current is the current flowing through the post accelerator resistance which is connected between the post accelerator and pattern adjustment electrode. All readings of beam current shall be in addition to the reading obtained for post accelerator current.

Allen B. Du Mont Laboratories
Divisions of Fairchild Camera and Instrument Corp.
Clifton, N. J.

FORM 809R

DUMONT

CATHODE-RAY TUBE

TYPE 5DWP-

NOTES
(Continued)

5. Visual extinction of the undeflected, focused spot.

6. For a beam current of 25 μADC, measured in accordance with MIL-E-1 specifications. In no case will the Grid No. 1 voltage be less than -5 volts for a beam current of 25 μADC.

7. With a raster pattern centered on tube face and the size of which is adjusted so that the widest points of the pattern just touch the sides of a 3.3-inch square, no point on these pattern sides will lie within an inscribed 3.2-inch square.

8. For a beam current of 25 μADC.

9. With the deflecting electrodes connected to the accelerator and the tube shielded against external influences, the undeflected and focused spot will fall within a 5/16-inch radius circle centered with respect to the tube face center.

10. Measured with a Type 3 Photronic Cell, corrected for spectral response of the eye, using a 2 x 2-inch, 50-line raster, with maximum Ib3 = 25 μA.

11. Measured with a Type 3 Photronic Cell, without eye correction, using a 2 x 2-inch, 50-line raster, with maximum Ib3 = 25 μA.

12. Design Goal (final specification to be determined). Maximum deflection defocusing ± 2 inches from the center in the horizontal direction and ± 2 inches from the center in the vertical direction shall not exceed 1 3/4 times line width "A". Correction voltages are to be adjusted only when measuring line width "A".

13. It is recommended that the deflecting-electrode circuit resistances be approximately equal. Higher resistance values up to five megohms may be used for low beam current operation.

14. Voltage necessary for raster cut-off at minimum specified light output. For optimum performance, one beam gating electrode should be connected to the accelerator, and the beam gating voltage applied to the other electrode should be positive with respect to the accelerator voltage.

15. Beam Gating Stray Emission Specification to be determined.

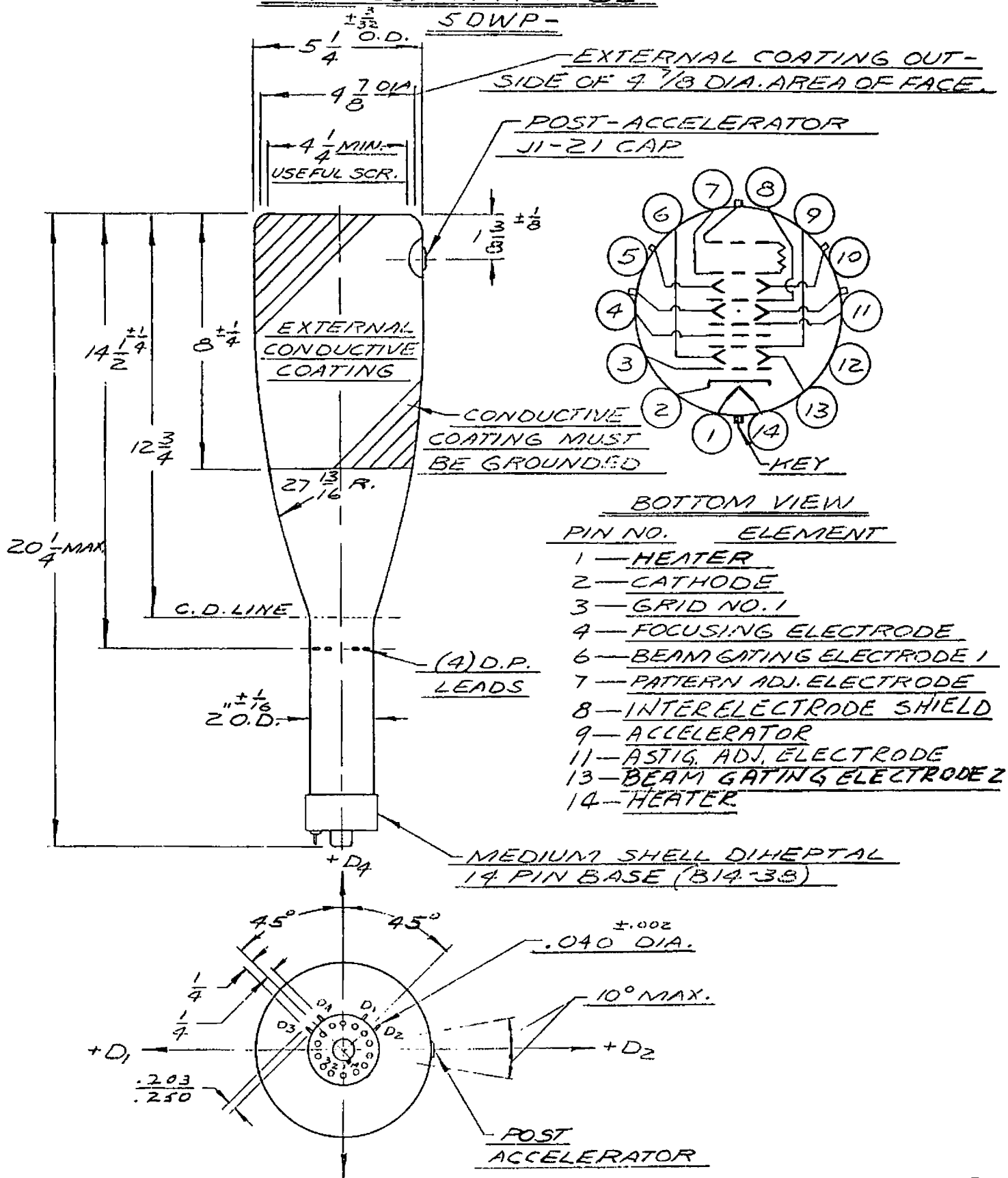
16. Pattern shift during beam gating, with beam current of 25 μA, will be no more than 5/16 inch and will be in the direction of the D1D2 trace.

17. The gun efficiency is the ratio of the beam current to the cathode current.

DUMONT

CATHODE RAY TUBE

5DWP-



PIN NO.	ELEMENT
1	HEATER
2	CATHODE
3	GRID NO. 1
4	FOCUSING ELECTRODE
6	BEAM GATING ELECTRODE 1
7	PATTERN ADJ. ELECTRODE
8	INTERELECTRODE SHIELD
9	ACCELERATOR
11	ASTIG. ADJ. ELECTRODE
13	BEAM GATING ELECTRODE 2
14	HEATER

Allen B. Du Mont Laboratories, Inc.
Division of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

DE-6495-4
1-18-63

FORM 609 -MI-9-60-BH

DUMONT

CATHODE-RAY TUBE

TYPE 5DXP-

The Du Mont Type 5DXP- is a 5 1/4-inch diameter, single beam, electrostatic focus and deflection cathode-ray tube. The tube features 6 cm. vertical and 10 cm. horizontal scan, high deflection sensitivities, high writing rates, and a pattern adjustment electrode to minimize pattern distortion. An astigmatism electrode is provided to allow adjustment for optimum spot shape. A low current heater is employed to reduce power requirements. Beam gating electrodes are provided to cut off the beam independent of Grid No. 1.

GENERAL CHARACTERISTICS

Electrical Data

Focusing Method	Electrostatic	
Deflection Method	Electrostatic	
Direct Interelectrode Capacitances, Approximate		
Cathode to all other electrodes	3.0	μμf
Grid No. 1 to all other electrodes	5.7	μμf
D1 to D2	2.0	μμf
D3 to D4	1.1	μμf
D1 to all electrodes	5.2	μμf
D2 to all electrodes	5.0	μμf
D3 to all electrodes	3.3	μμf
D4 to all electrodes	2.8	μμf
Beam Gating Electrodes		

Optical Data

Phosphor Number	1	2	5	7
Fluorescence	Yellow-Green	Yellow-Green	Blue	White
Phosphorescence	----------	Green	----	Yellow-Green
Persistence	Medium	Medium	Medium-Short	Long

Phosphor Number	11	15	31
Fluorescence	Blue	Green	Green
Phosphorescence	----	-----	-----
Persistence	Medium-Short	Very Short	Medium Short

from JEDEC release #4189, March 18, 1963

Allen B. Du Mont Laboratories
Divisions of Fairchild Camera and Instrument Corp.
Clifton, N. J.

DE-6332 - 3
1/18/63

DUMONT

CATHODE-RAY TUBE

TYPE 5DXP-

GENERAL CHARACTERISTICS (Continued)

Mechanical Data

Overall Length	20 1/4	Inches Max.
Greatest Diameter of Bulb	5 1/4 ± 3/32	Inches
Minimum Useful Screen Diameter	4 1/4	Inches
Bulb	Special	
Bulb Contact	J1-21	
Basing	Special	
Base	B14-38	
Base Alignment:		
D3D4 trace aligns with Pin No. 1 and tube axis	± 10	Degrees
Positive voltage on D1 deflects beam approximately toward Pin No. 5		
Positive voltage on D3 deflects beam approximately toward Pin No. 1		
Bulb Contact Alignment:		
Cap aligns midway between Pins No. 11 and 12	± 10	Degrees
Cap aligns with D1D2 trace	± 10	Degrees
Cap on same side as Pin No. 11		
Trace Alignment:		
Angle between D3D4 and D1D2 traces	90 ± 1	Degrees

RATINGS (Design Maximum Values)

Heater Voltage	6.3	Volts
Heater Current at 6.3 Volts	0.3 ± 10%	Ampere
Post Accelerator Voltage	8000	Max. Volts DC
Pattern Adjustment Electrode Voltage	2700	Max. Volts DC
Astigmatism Electrode Voltage	2700	Max. Volts DC
Astigmatism Electrode Input	6	Max. Watts
Focusing Electrode Voltage	1500	Max. Volts DC
Accelerator Voltage	2700	Max. Volts DC
Accelerator Input	6	Max. Watts
Ratio Post Accelerator Voltage to Accelerator Voltage [1]	3.6	Max.

DUMONT

CATHODE-RAY TUBE

TYPE 5DXP-

RATINGS (Design Maximum Values) (Continued)

Grid No. 1 Voltage		
Negative Bias Value	200	Max. Volts DC
Positive Bias Value	0	Max. Volts DC
Positive Peak Value	0	Max. Volts
Peak Heater-Cathode Voltage		
Heater negative with respect to cathode		
During warm-up period not to exceed 15 seconds	410	Max. Volts
After equipment warm-up period	180	Max. Volts
Heater positive with respect to cathode	180	Max. Volts
Peak voltage between accelerator and any deflection electrode	550	Max. Volts
Peak voltage between accelerator and any beam gating electrode	100	Max. Volts

TYPICAL OPERATING CONDITIONS

Post Accelerator Voltage	5000	Volts
Accelerator Voltage	1400	Volts
Pattern Adjustment Electrode Voltage[2]	1400	Volts
Astigmatism Electrode Voltage[3]	1400	Volts
Interelectrode Shield Voltage	1400	Volts
Focusing Electrode Voltage	180 to 580	Volts
Post Accelerator Current[4]	15 to 75	μA
Grid No. 1 Voltage[5]	-34 to -64	Volts
Modulation[6]	45	Max. Volts DC
Deflection Factors:		
D1D2	30 to 35	Volts DC/Inch
D3D4	13 to 18	Volts DC/Inch
Useful Scan:		
D1D2	10	Cm
D3D4	6	Cm

Allen B. Du Mont Laboratories
Divisions of Fairchild Camera and Instrument Corp.
Clifton, N. J.

DUMONT

CATHODE-RAY TUBE

TYPE 5DXP-

TYPICAL OPERATING CONDITIONS (Continued)

Beam Gating Voltage [14, 15, 16]	70	Max. Volts
Pattern Distortion [7]		
Line Width "A" [6]	.030	Max. Inch
Cathode Current [8]	625	Max. μADC
Focusing Electrode Current for any operating condition	-15 to +10	μA
Spot Position [9]	Within a 5/16-inch radius circle	
P1 Light Output [10]	25	Ft. L. Min.
P2 Light Output [10]	18	Ft. L. Min.
P11 Light Output [11]	20	Ft. L. Min.
Deflection Defocusing [12]		
Gun Efficiency [17]	4%	Min.
Pattern Shift [16]	5/16	Inch Max.

MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance	2.0	Max. Megohms
Resistance in any Deflecting-Electrode Circuit [13]	1.0	Max. Megohms

NOTES

1. This tube is designed for optimum performance when operating at a ratio of 3.6. Operation at other ratios may result in changes in deflection uniformity, pattern distortion and/or useful scan.

2. The pattern adjustment electrode should be adjusted for optimum performance. For any necessary adjustment, its potential will be within a range of -50 to +100 volts with respect to the mean D1D2 plate potential.

3. The astigmatism electrode should be adjusted for optimum spot shape. For any necessary adjustment, its potential will fall within -50 to +125 volts with respect to the accelerator voltage.

4. Measured with Grid No. 1 at cut-off. Post accelerator current is the current flowing through the post accelerator resistance which is connected between the post accelerator and pattern adjustment electrode. All readings of beam current shall be in addition to the reading obtained for post accelerator current.

DUMONT

CATHODE-RAY TUBE

TYPE 5DXP-

NOTES
(Continued)

5. Visual extinction of the undeflected, focused spot.

6. For a beam current of 25 μADC, measured in accordance with MIL-E-1 specifications. In no case will the Grid No. 1 voltage be less than -5 volts for a beam current of 25 μADC.

7. With a raster pattern centered on tube face and the size of which is adjusted so that the widest points of the pattern just touch the sides of a 6 x 10-cm rectangle, no point on these pattern sides will lie within an inscribed 5.75 x 9.75-cm rectangle.

8. For a beam current of 25 μADC.

9. With the deflecting electrodes connected to the accelerator and the tube shielded against external influences, the undeflected and focused spot will fall within a 5/16-inch radius circle centered with respect to the tube face center.

10. Measured with a Type 3 Photronic Cell, corrected for spectral response of the eye, using a 2 x 2-inch, 50-line raster, with maximum Ib3 = 25 μA.

11. Measured with a Type 3 Photronic Cell, without eye correction, using a 2 x 2-inch, 50-line raster, with maximum Ib3 = 25 μA.

12. Design Goal (final specification to be determined). Maximum deflection defocusing ± 2 inches from the center in the horizontal direction and ± 3/4 inch from the center in the vertical direction shall not exceed 1 3/4 times line width "A". Correction voltages are to be adjusted only when measuring line width "A".

13. It is recommended that the deflecting-electrode circuit resistances be approximately equal. Higher resistance values up to five megohms may be used for low beam current operation.

14. Voltage necessary for raster cut-off at minimum specified light output. For optimum performance, one beam gating electrode should be connected to the accelerator, and the beam gating voltage applied to the other electrode should be positive with respect to the accelerator voltage.

15. Beam Gating Stray Emission Specification to be determined.

16. Pattern shift during beam gating, with beam current of 25 μA, will be no more than 5/16 inch and will be in the direction of the D1D2 trace.

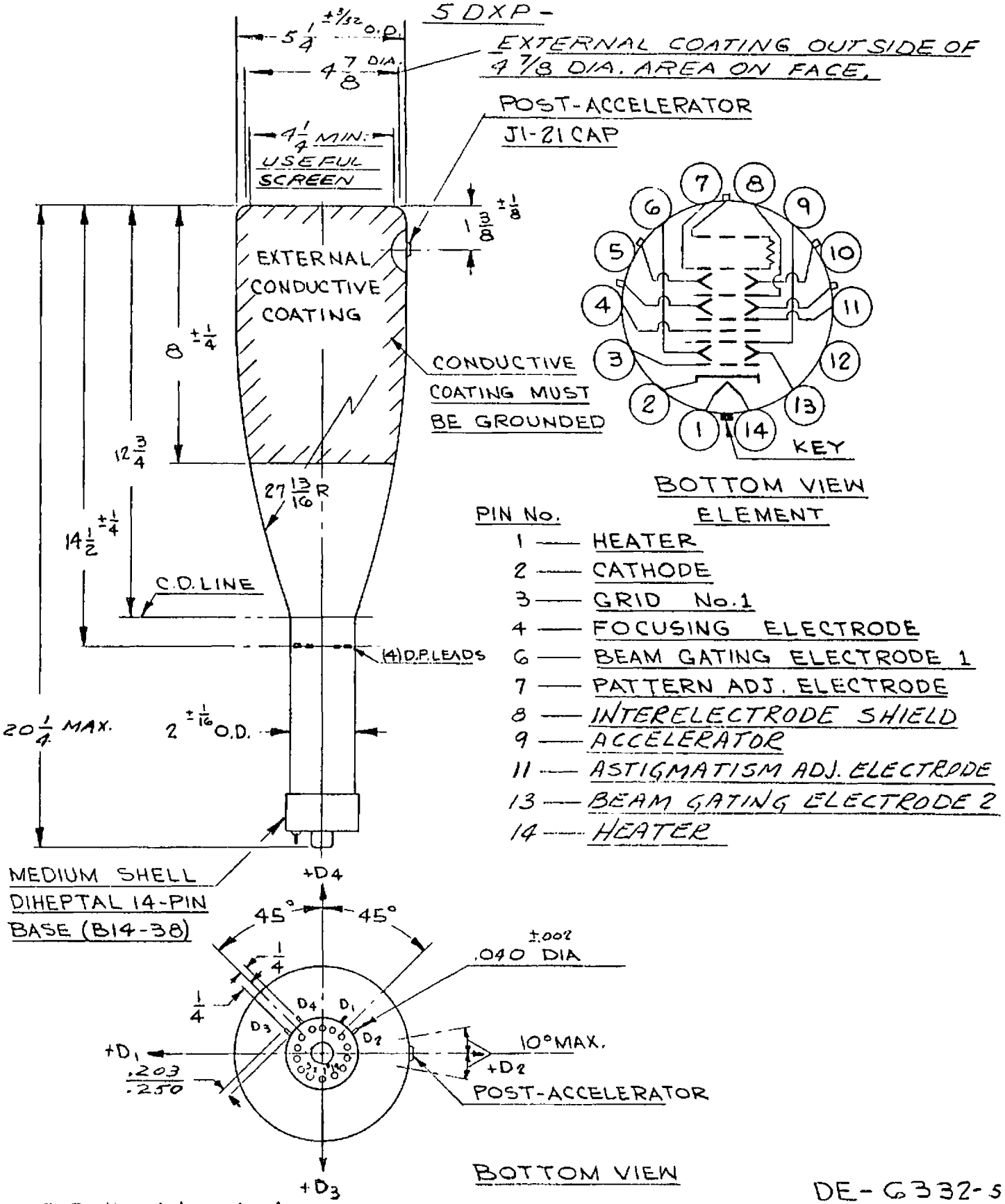
17. The gun efficiency is the ratio of the beam current to the cathode current.

Allen B. Du Mont Laboratories
Divisions of Fairchild Camera and Instrument Corp.
Clifton, N. J.

DUMONT

CATHODE - RAY TUBE

5DXP-



PIN No.	ELEMENT
1	HEATER
2	CATHODE
3	GRID No.1
4	FOCUSING ELECTRODE
6	BEAM GATING ELECTRODE 1
7	PATTERN ADJ. ELECTRODE
8	INTERELECTRODE SHIELD
9	ACCELERATOR
11	ASTIGMATISM ADJ. ELECTRODE
13	BEAM GATING ELECTRODE 2
14	HEATER

Allen B. Du Mont Laboratories, Inc.
Division of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

DE-6332-5
1-18-63

from JEDEC release #3883, Sept. 17, 1962

DUMONT

CATHODE-RAY TUBE

TYPE 5EAP-

The Du Mont Type 5EAP- is a 5-inch diameter, single beam, low voltage electrostatic focus, magnetic deflection cathode-ray tube. The bulb is an all-glass blank only 8 1/8 inches long, having a 7/8-inch diameter neck offset for sector scanning.

The Type 5EAP- is particularly suitable for miniaturization techniques employed in airborne marine and portable radar receivers.

The screen is aluminized to provide high brightness and for stabilization of screen potential.

GENERAL CHARACTERISTICS

Electrical Data

Focusing Method	Electrostatic	
Deflecting Method	Magnetic	
Direct Interelectrode Capacitances, Approximate		
Cathode to all other electrodes	3.2	μμf
Grid No. 1 to all other electrodes	6.4	μμf

Optical Data

Phosphor Number	7	
Fluorescence	White	
Phosphorescence	Yellow-Green	
Persistence	Long	
Faceplate	Clear	

Mechanical Data

Overall Length (Seated Height)	$9\ 1/8\ ^{+0}_{-1/8}$	Inches
Greatest Diameter of Bulb	4.950 ± .062	Inches
Minimum Useful Screen Diameter	4 1/2	Inches
Bulb Contact	J1-22	
Base *	E9-37	

* A socket with a center opening to clear the tubulation should be used. Care should be taken in handling the tube to avoid damaging the exposed tubulation and bending the base pins.

Allen B. Du Mont Laboratories
Divisions of Fairchild Camera and Instrument Corp.
Clifton, N. J.

DUMONT

CATHODE-RAY TUBE

TYPE 5EAP-

GENERAL CHARACTERISTICS (Mechanical Data) (Continued)

Bulb Contact Alignment:		
Plane of J1-22 cap passes halfway between Pins No. 1 and No. 9	± 10	Degrees
J1-22 cap on same side as Pins No. 1 and No. 9		

RATINGS (Design Center Values)[1]

Heater Voltage	6.3	Volts
Heater Current at 6.3 Volts	0.3 ± 5%	Ampere
Accelerator Voltage	11,000	Max. Volts DC
Accelerator Input	6	Max. Watts
Focusing Electrode Voltage	-500 to +1000	Max. Volts DC
Grid No. 2 Voltage	500	Max. Volts DC
Cathode Voltage		
Negative Bias Value	0	Max. Volts DC
Negative Peak Value	0	Max. Volts
Positive Bias Value	150	Max. Volts DC
Positive Peak Value	180	Max. Volts
Peak Heater-Cathode Voltage		
Heater negative with respect to cathode	180	Max. Volts
Heater positive with respect to cathode	180	Max. Volts

TYPICAL OPERATING CONDITIONS[1]

Accelerator Voltage	8000	Volts DC
Focusing Electrode Voltage[2]	-40 to +250	Volts DC
Grid No. 2 Voltage	250	Volts DC
Cathode Voltage[3]	10 to 25	Volts DC
Modulation[4]	-20	Volts Max.
Line Width "A"[4]	0.014	Inch Max.
Focusing Electrode Current for any operating condition	-15 to +15	Microamperes

DUMONT

CATHODE-RAY TUBE

TYPE 5EAP-

MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance	1.5	Max. Megohms

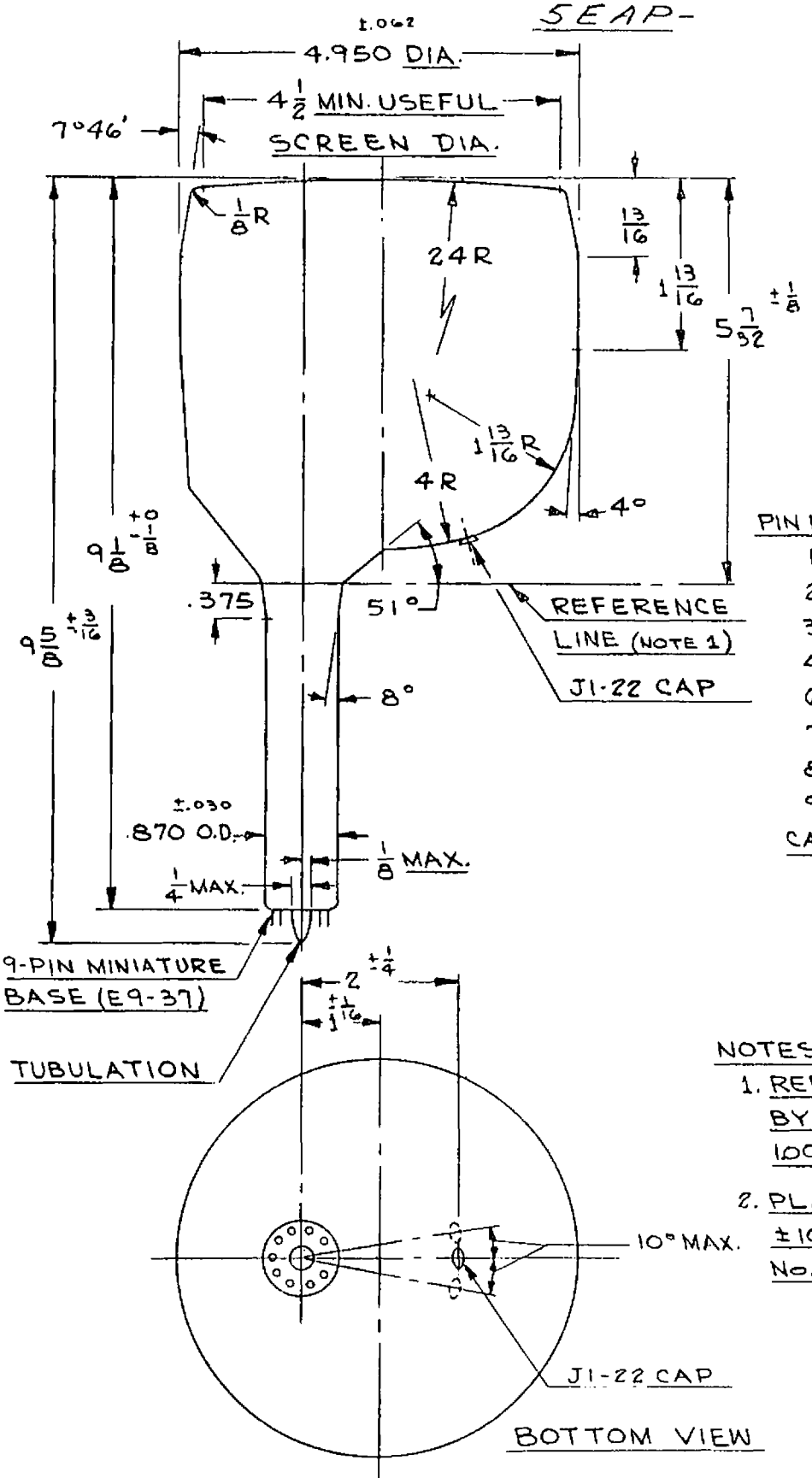
NOTES

1. Voltage values measured with respect to Grid No. 1.
2. With the cathode voltage adjusted to give an accelerator current of 100 microamperes on a 2 x 2-inch raster pattern.
3. Visual extinction of the undeflected, focused spot.
4. Measured in accordance with MIL-E-1 specifications with an accelerator current of 100 microamperes.

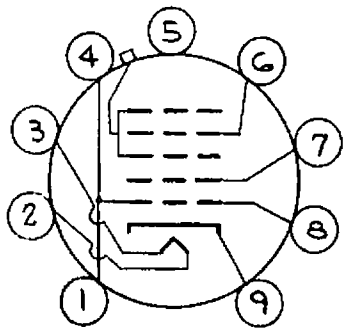
DU MONT

CATHODE-RAY TUBE

SEAP-



9QH



BOTTOM VIEW

PIN No	ELEMENT
1 —	GRID No. 1
2 —	HEATER
3 —	HEATER
4 —	GRID No. 1
6 —	FOCUSING ELECTRODE
7 —	GRID No. 2
8 —	GRID No. 1
9 —	CATHODE
CAP —	ACCELERATOR

NOTES:

1. REFERENCE LINE DETERMINED BY POINT WHERE RING GAUGE 1.000 +.003 -.000 I.D. 1.500 LONG WILL STOP.
2. PLANE OF J1-22 CAP ALIGNS ±10° MIDWAY BETWEEN PINS No. 1 & No. 9 & ON THE SAME SIDE.

Allen B. Du Mont Laboratories, Inc.
Division of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

DE-6263-2
6-15-62
FORM 509 -M1-8-60-RH

from JEDEC release #3883, Sept. 17, 1962

DUMONT

CATHODE-RAY TUBE

TYPE 5EBP-

The Du Mont Type 5EBP- is a 5-inch diameter, single beam, low voltage electrostatic focus, magnetic deflection cathode-ray tube. The bulb is an all-glass blank only 8 1/8 inches long, having a 7/8-inch diameter neck offset for sector scanning.

The Type 5EBP- is particularly suitable for miniaturization techniques employed in airborne marine and portable radar receivers.

The screen is aluminized to provide high brightness and for stabilization of screen potential.

GENERAL CHARACTERISTICS

Electrical Data

Focusing Method	Electrostatic	
Deflecting Method	Magnetic	
Direct Interelectrode Capacitances, Approximate		
Cathode to all other electrodes	3.2	μμf
Grid #1 to all other electrodes	7.9	μμf

Optical Data

Phosphor Number	7	
Fluorescent Color	Blue	
Phosphorescent Color	Yellow	
Persistence	Long	
Faceplate	Clear	

Mechanical Data

Overall Length (Seated Height)	$8\ 1/8\ ^{+0}_{-1/8}$	Inches
Greatest Diameter of Bulb	4.950 ± 1/16	Inches
Minimum Useful Screen Diameter	4 1/4	Inches
Bulb Contact	J1-22	
Base *	E9-37	
Bulb Contact Alignment:		
Plane of J1-22 cap passes halfway between Pins No. 1 and No. 9	± 10	Degrees
J1-22 cap on same side as Pins No. 1 and No. 9		

* A socket with a center opening to clear the tubulation should be used. Care should be taken in handling the tube to avoid damaging the exposed tubulation and bending the base pins.

DUMONT

CATHODE-RAY TUBE

TYPE 5EBP-

RATINGS (DESIGN CENTER VALUES) [1]

Heater Voltage	6.3	Volts
Heater Current at 6.3 Volts	0.3 ± 5%	Ampere
Accelerator Voltage	11,000	Max. Volts DC
Accelerator Input	6	Max. Watts
Focusing Electrode Voltage	-500 to +1,000	Max. Volts DC
Grid #2 Voltage	500	Max. Volts DC
Cathode Voltage		
Negative Bias Value	0	Max. Volts DC
Negative Peak Value	0	Max. Volts
Positive Bias Value	150	Max. Volts DC
Positive Peak Value	180	Max. Volts
Peak Heater-Cathode Voltage		
Heater Negative with respect to cathode	180	Max. Volts
Heater Positive with respect to cathode	180	Max. Volts

TYPICAL OPERATING CONDITIONS [1]

Accelerator Voltage	8,000	Volts DC
Focusing Electrode Voltage [2]	-105 to +250	Volts DC
Grid #2 Voltage	250	Volts DC
Cathode Voltage [3]	40 to 85	Volts DC
Modulation [4]	-20 to -40	Volts
Line Width A [4]	0.014	Inch Max.
Focusing Electrode Current for any operating condition	-15 to +15	Microamperes

MAXIMUM CIRCUIT VALUES

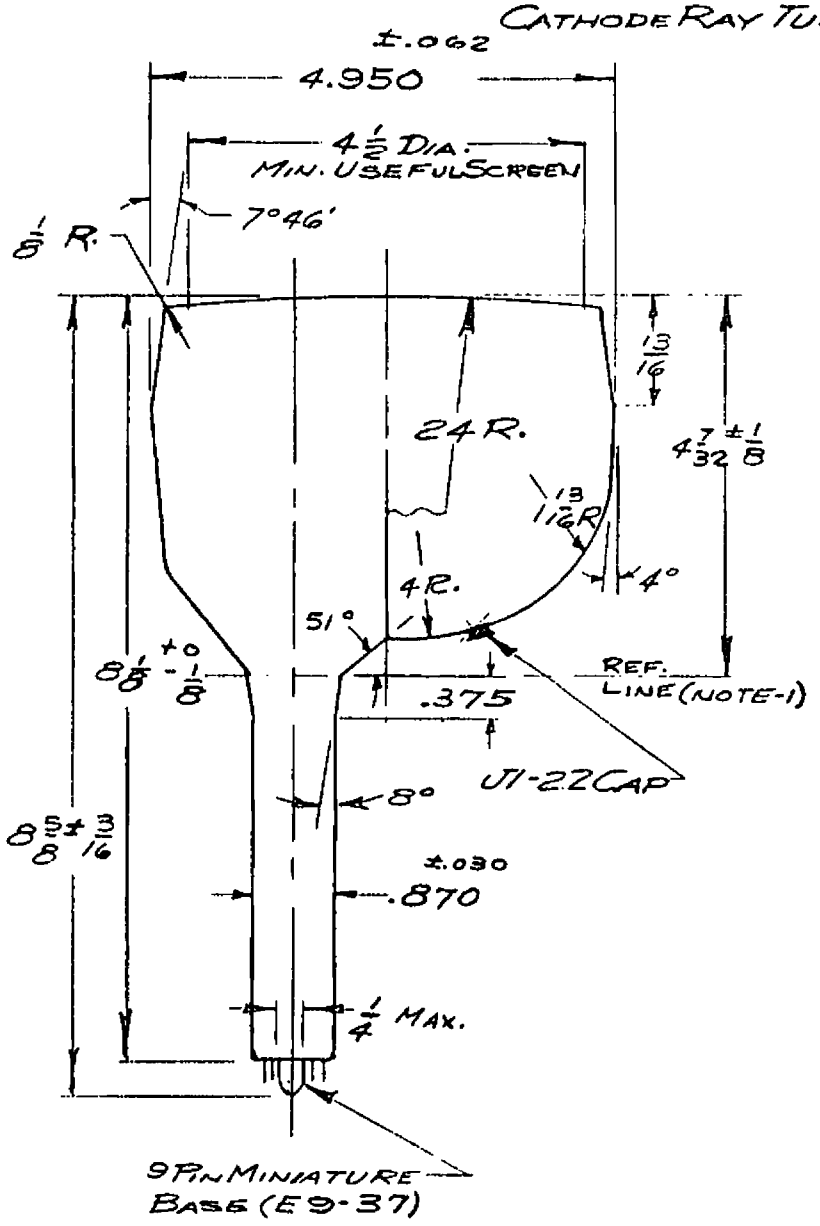
Grid #1 Circuit Resistance	1.5	Max. Megohms

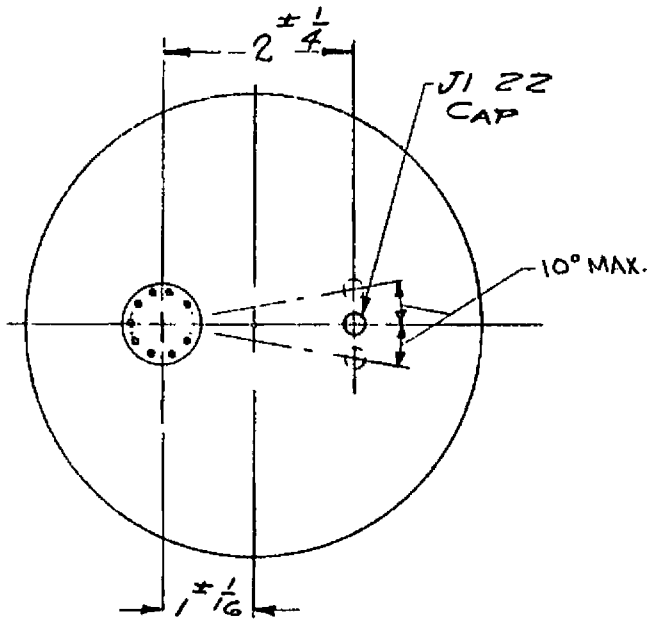
NOTES

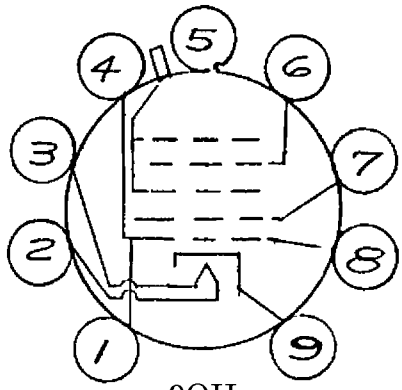
1. Voltage values measured with respect to Grid #1.
2. With the cathode voltage adjusted to give an accelerator current of 100 microamperes on a 2 x 2-inch raster pattern.
3. Visual extinction of undeflected focused spot.
4. Measured in accordance with MIL-E-1 specifications with an accelerator current of 100 microamperes.

DUMONT

5EBP-
CATHODE RAY TUBE







9QH

BOTTOM VIEW OF BASE

PIN NO.	ELEMENT
1	GRID NO. 1
2	HEATER
3	HEATER
4	GRID NO. 1
6	FOCUSING ELECTRODE
7	GRID NO. 2
8	GRID NO. 1
9	CATHODE
CAP	ACCELERATOR

NOTES:

1- REFERENCE LINE DETERMINED BY POINT WHERE RING GAUGE 1.000 +.003" -.000" I.D., 1.5" LONG WILL STOP.

2 PLANE OF J1-22 CAP ALIGNS ±10° MIDWAY BETWEEN PINS NO. 1 & NO. 9, & ON THE SAME SIDE

Allen B. Du Mont Laboratories, Inc.
Divisions of Fairchild Camera and Instrument Corp.
Passaic, New Jersey

DE-5056-4
6-15-62
FORM 5001 M4 6-57-6M

5FP- CATHODE-RAY TUBES

The Types 5FP- Cathode-ray Tubes are magnetically focussed and deflected cathode-ray tubes with a relatively large and flat screen area. Primarily designed for radar indicator applications, the Type 5FP- features an electron gun with a limiting aperture to produce a sharp, round spot at high screen currents.

The Type 5FP- Cathode-ray Tubes are similar to the 7-inch 7BP-, the 10-inch 10KP-, and the 12-inch 12SP-. Selection of one of these radar-type tubes would be determined by the screen size desired and the exact electrical characteristics needed to fit the application.



GENERAL CHARACTERISTICS

Electrical

Heater Voltage	6.3 Volts
Heater Current	0.6 ± 10% Ampere
Focusing Method	Magnetic
Deflecting Method	Magnetic
Deflecting Angle (Approx.)	53 Degrees

Phosphor	No. 5	No. 7	No. 14
Fluorescence	Blue	Blue	Blue
Phosphorescence	—	Yellow	Orange
Persistence	Short	Long	Medium-long

Direct Interelectrode Capacitances, Approx.

Cathode to all other electrodes	5 $\mu\mu$f.
Grid No. 1 to all other electrodes	8 $\mu\mu$f.

Mechanical

Overall Length	11⅛ ± ⅜ Inches
Greatest Diameter of Bulb	4-15/16 ± 3/32 Inches
Minimum Useful Screen Diameter	4¼ Inches
Bulb Contact (Recessed Small Ball Cap)	J1-22
Base (Medium-Shell Octal 8-Pin)	B8-65 or B8-11
Basing	5AN
Bulb Contact Alignment J1-22 Contact aligns with Pin No. 5	±10 Degrees

MAXIMUM RATINGS—(Design Center Values)

Anode Voltage	8,000 Max. Volts D-C
Grid No. 2 Voltage	700 Max. Volts D-C
Grid No. 1 Voltage	
Negative Bias Value	180 Max. Volts D-C
Positive Bias Value[1]	0 Max. Volts D-C
Positive Peak Value	2 Max. Volts
Peak Heater-Cathode Voltage	
Heater Negative with respect to Cathode	125 Max. Volts D-C
Heater Positive with respect to Cathode	125 Max. Volts D-C

TYPICAL OPERATING CONDITIONS

Anode Voltage	4,000	7,000	Volts D-C
Grid No. 2 Voltage	250	250	Volts D-C
Grid No. 1 Voltage[2]	−25 to −70	−25 to −70	Volts D-C
Focusing Coil Current[3]	75 to 102	99 to 135	Ma. D-C
Spot Position (Undeflected)[4]	9	—	mm.

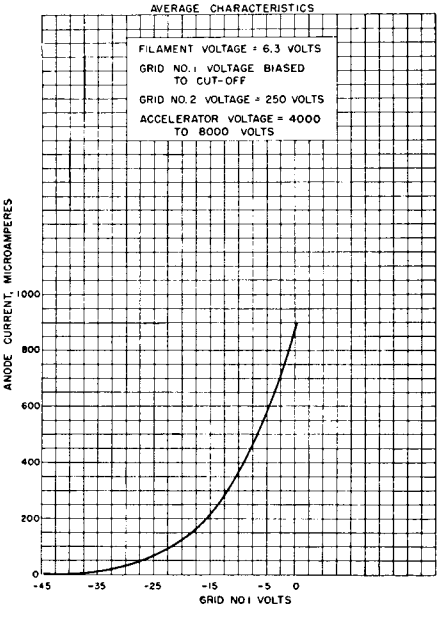
MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance ..... 1.5 Max. Megohms

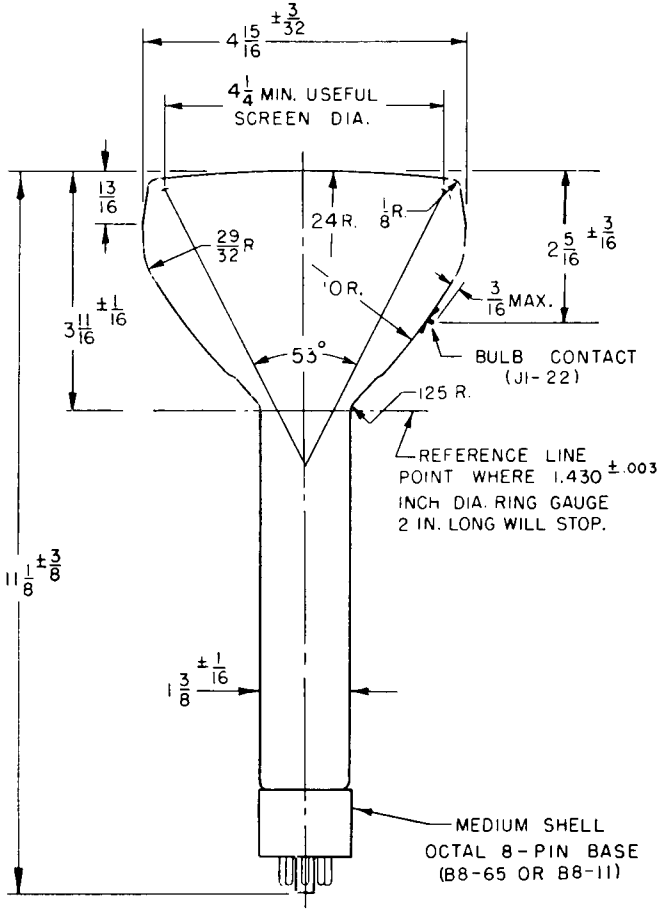
NOTES

1. At or near this rating, the effective resistance of the anode supply should be adequate to limit the anode input power to 6 watts.
2. Visual extinction of undeflected focused spot.
3. For JETEC standard focus coil No. 106, or equivalent, with the grid No. 1 voltage adjusted to produce an anode current of 200 microamperes and with distance (D) from reference line to center of air gap equal to 2.75 inches.
4. The center of the undeflected, unfocused spot will fall within a circle of 9 mm. radius concentric with the center of the tube face.

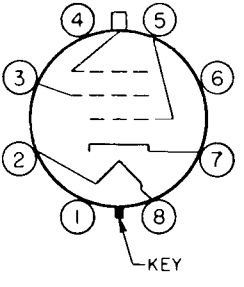
5FP-



TYPE 5FP-

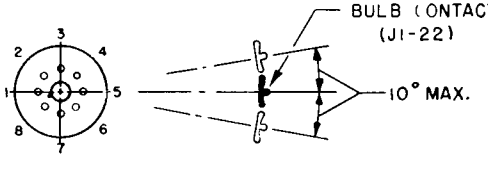


5AN



BOTTOM VIEW OF BASE

PIN NO.	ELEMENT
2	HEATER
3	GRID NO 2
5	GRID NO. 1
7	CATHODE
8	HEATER
CAP	ACCELERATOR



BOTTOM VIEW OF TUBE

5JP-A CATHODE-RAY TUBES

The Type 5JP-A Cathode-ray Tubes are designed for oscillographic applications where low deflection plate capacitances are essential. The deflection plate leads are short and direct, terminating in caps on the wall of the tube rather than in the tube base. The intensifier principle is used to provide a maximum deflection sensitivity for a given final accelerating voltage. The gun is designed to draw negligible focusing electrode current.

The four types differ only in the characteristics of the fluorescent screens. Other screen types may be obtained on special order.



GENERAL CHARACTERISTICS

Electrical

Heater Voltage	6.3 Volts
Heater Current	0.6 ± 10% Ampere
Focusing Method	Electrostatic
Deflecting Method	Electrostatic

Phosphor	No. 1	No. 2	No. 7	No. 11
Fluorescence	Green	Green	Blue	Blue
Phosphorescence	—	Green	Yellow	—
Persistence	Medium	Long	Long	Short

Direct Interelectrode Capacitances, Nominal

Grid No. 1 to all other electrodes	8 μμf.
D1 to D2	1.5 μμf.
D3 to D4	1.5 μμf.
D1 to all other electrodes except D2	2.5 μμf.
D2 to all other electrodes except D1	3 μμf.
D3 to all other electrodes except D4	2.5 μμf.
D4 to all other electrodes except D3	2.5 μμf.

Mechanical

Overall Length	16¾ ± ⅜ Inches
Greatest Diameter of Bulb	5-5/16 ± 1/16 Inches
Minimum Useful Screen Diameter	4½ Inches
Bulb Contact (Anode No. 3)	Small Cap (C1-1)
Bulb Contacts (Deflection Plate)	Miniature Cap (C1-2)
Base	Medium Magnal
Basing	11S

Base Alignment

D3D4 trace aligns with Pin No. 6 and tube axis	±10 Degrees

Positive voltage on D1 deflects beam approximately toward Pin No. 3.
Positive voltage on D3 deflects beam approximately toward locating key.

Angle between D3D4 and D1D2 traces	90 ± 3 Degrees

Bulb Contact Alignment

Anode No. 3 contact aligns with D3D4 trace	±10 Degrees

Anode No. 3 contact on same side as locating key
Deflection Plate contacts are within 10 degrees of the plane through the tube axis and their respective traces.

MAXIMUM RATINGS—(Design Center Values)

Anode No. 3 Voltage (Accelerator High Voltage Electrode) ..... 4000 Max. Volts D-C
Anode No. 2 Voltage[1, 2] ..... 2000 Max. Volts D-C
Ratio Anode No. 3 Voltage to Anode No. 2 Voltage ..... 2.0 Max.
Anode No. 1 Voltage ..... 1000 Max. Volts D-C

Grid No. 1 Voltage
- Negative Bias Value ..... 125 Max. Volts D-C
- Positive Bias Value ..... 0 Max. Volts D-C
- Positive Peak Value ..... 2 Max. Volts
- Peak Voltage between Anode No. 2 and any Deflection Electrode ..... 500 Max. Volts

TYPICAL OPERATING CONDITIONS

For Anode No. 3 Voltage of	3000	4000	Volts
For Anode No. 2 Voltage of	1500	2000	Volts
Anode No. 1 Voltage for focus	250 to 472	333 to 630	Volts
Grid No. 1 Voltage[3]	−34 to −79	−45 to −105	Volts
Deflection Factors:			
D1 and D2	58 to 86	77 to 115	Volts D-C per Inch
D3 and D4	58 to 86	77 to 115	Volts D-C per Inch

Anode No. 1 Voltage for focus ..... 16.6% to 31.5% of Eb2 Volts
Grid No. 1 Voltage[3] ..... 2.3% to 5.3% of Eb2 Volts
Anode No. 1 Current for any operating condition ..... −50 to +10 Microamperes

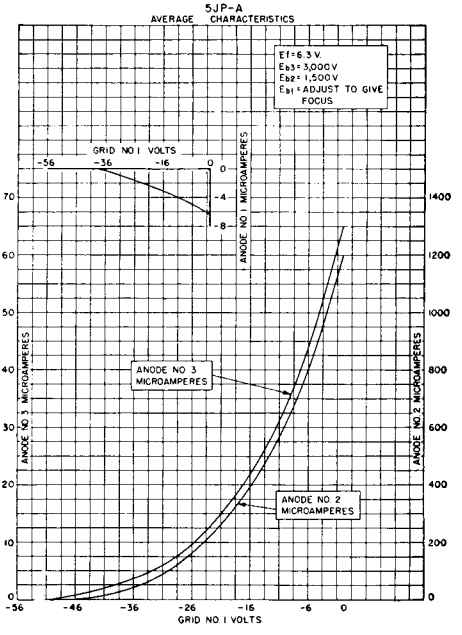
Deflection Factors:
- No 3rd Anode or Eb3 = Eb2
  - D1 and D2 ..... 34 to 50 Volts D-C per inch per Kilovolt of Eb2
  - D3 and D4 ..... 34 to 50 Volts D-C per inch per Kilovolt of Eb2
- Eb3 = Twice Eb2
  - D1 and D2 ..... 38 to 58 Volts D-C per inch per Kilovolt of Eb2
  - D3 and D4 ..... 38 to 58 Volts D-C per inch per Kilovolt of Eb2
- Spot Position (Undeflected) ..... Within a 7.5 millimeter radius circle[4]

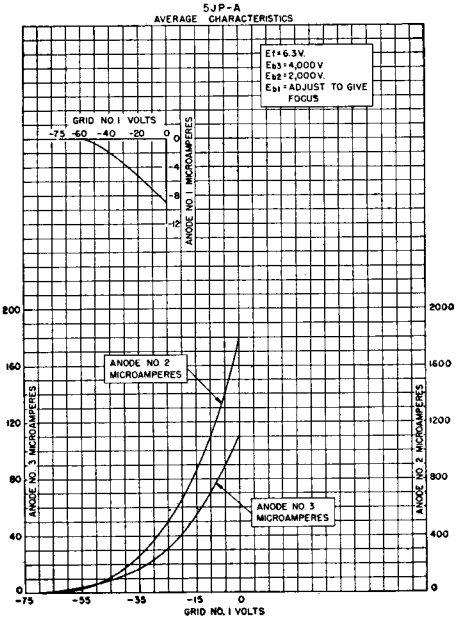
MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance ..... 1.5 Max. Megohms
Resistance in any Deflecting Electrode Circuit[5] ..... 5 Max. Megohms

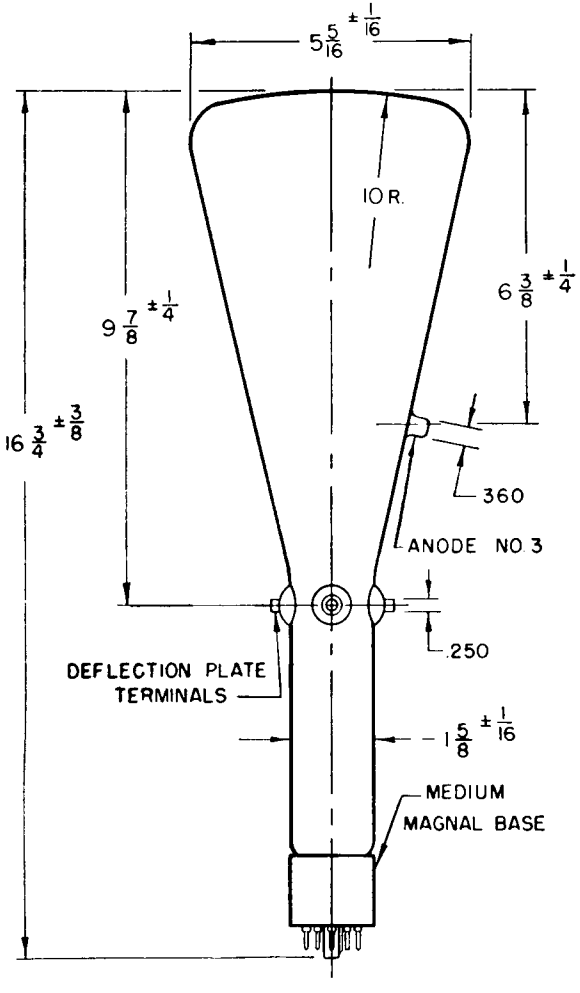
NOTES

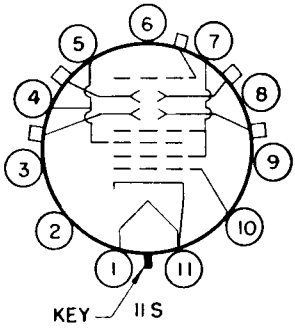
1. Anode No. 2 and Grid No. 2, which are connected together within the tube, are referred to herein as Anode No. 2.
2. The product of Anode No. 2 voltage and Average Anode No. 2 current should be limited to 6 watts.
3. Visual extinction of undeflected focused spot.
4. Centered with respect to the tube face with the tube shielded.
5. It is recommended that the deflecting electrode circuit resistances be approximately equal.
6. For optimum focus the average potentials of the deflection plates and second anode should be the same.


5JP-A
AVERAGE CHARACTERISTICS
Ef = 6.3 V.
Eb3 = 3,000 V
Eb2 = 1,500 V
Eb1 = ADJUST TO GIVE FOCUS
GRID NO 1 VOLTS
-56 -36 -16 0
0 -4 -8
ANODE NO 1 MICROAMPERES
ANODE NO 3 MICROAMPERES
ANODE NO 2 MICROAMPERES
ANODE NO 3 MICROAMPERES
ANODE NO 2 MICROAMPERES
0 10 20 30 40 50 60 70
0 200 400 600 800 1000 1200 1400
-56 -46 -36 -26 -16 -6 0
GRID NO 1 VOLTS


5JP-A
AVERAGE CHARACTERISTICS
Ef = 6.3 V.
Eb3 = 4,000 V
Eb2 = 2,000 V.
Eb1 = ADJUST TO GIVE FOCUS
GRID NO 1 VOLTS
-75 -60 -40 -20 0
0 -4 -8 -12
ANODE NO 1 MICROAMPERES
ANODE NO 2 MICROAMPERES
ANODE NO 3 MICROAMPERES
ANODE NO 3 MICROAMPERES
ANODE NO 2 MICROAMPERES
0 40 80 120 160 200
0 400 800 1200 1600 2000
-75 -55 -35 -15 0
GRID NO. 1 VOLTS

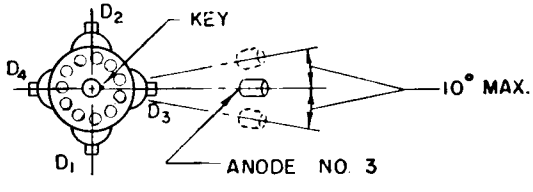
TYPE 5JP-A





BOTTOM VIEW OF BASE

PIN NO.	ELEMENT
1	HEATER
4	ANODE NO 1
5	INTERNAL CONNECTION
7	ANODE NO 2, GRID NO. 2
10	GRID NO. 1
11	HEATER & CATHODE



From EIA registration # 306, Sept. 24, 1942

DU MONT

CATHODE-RAY TUBES

Types 5LP1, 5LP2, 5LP4, 5LP5

Formerly designated as Types 2511A5, 2511B5, 2511D5, 2511C5

The Type 5LP cathode-ray tubes are designed for oscillographic and television picture tube applications. The four types differ only in the characteristics of the fluorescent screens. The intensifier principle is used to provide a maximum deflection sensitivity for a given final accelerating voltage.

CHARACTERISTICS

HEATER				
Voltage, a.c. or d.c.	6.3 volts			
Current	0.6 ampere			
DEFLECTION	Electrostatic			
FOCUS	Electrostatic			
SCREEN	5LP1	5LP2	5LP4	5LP5
Phosphor	P1	P2	P4	P5
Fluorescence	Green	Green	White	Blue
Persistence	Medium	Long	Medium	Short

MECHANICAL CHARACTERISTICS

Overall length	16 3/4" ± 3/8"
Maximum diameter	5 5/16" ± 1/16"
Bulb	C42 ½ YIC
Base	Medium magnal
Basing	RMA Basing Designation 11F

The basing is such that:

1. The direction of the trace produced on the screen by deflecting electrodes D_3 and D_4 will not deviate more than ±10° from a plane through pin No. 6 and the axis of the tube, while the angle between the direction of this trace and that of the trace produced on the screen by deflecting electrodes D_1 and D_2 will be 90° ±3°.
2. With deflecting electrode D_1 (pin No. 3) positive with respect to D_2 (pin No. 8) the spot will be deflected approximately toward pin No. 3, while with deflecting electrode D_4, (pin No. 6) positive with respect to D_3 (pin No. 9) the spot will be deflected approximately toward pin No. 6.

DIRECT INTERELECTRODE CAPACITANCES (NOMINAL)

Control electrode (grid) to all other electrodes	8.0 uuf
Deflecting Plate D_1 to Deflecting Plate D_2	2.6 uuf
Deflecting Plate D_3 to Deflecting Plate D_4	1.9 uuf
D_1 to all other electrodes	8.2 uuf
D_3 to all other electrodes	5.6 uuf
D_1 to all other electrodes except D_2	5.6 uuf
D_2 to all other electrodes except D_1	5.6 uuf
D_3 to all other electrodes except D_4	3.7 uuf
D_4 to all other electrodes except D_3	3.7 uuf

RATINGS

Heater voltage	6.3 volts
Heater current	0.6 amp. ± 10%
Anode No. 3. (Intensifier electrode) voltage (E_{b3})	4000 volts max.
Anode No. 2 (Accelerating electrode) voltage (E_{b2})	2000 volts max.
Anode No. 1 (Focusing electrode) voltage (E_{b1})	1000 volts max.
Grid (Control electrode) voltage (Ec_1)	Never positive
Peak voltage between Anode No. 2 and any deflecting electrode	500 volts max.
Grid (Control electrode) voltage (E_{c1})	1.5 megohms max.
Impedance of any deflecting electrode circuit at heater supply frequency	1.0 megohms max.

TYPICAL OPERATION

Heater voltage	6.3	6.3	6.3	volts
Anode No. 3 voltage (E_{b3})	2000	3000	4000	volts
Anode No. 2 voltage (E_{b2})	1000	1500	2000	volts
Anode No. 1 voltage (E_{b1}) for focus when E_{c1} is 75% of cut-off value	250	375	500	volts ± 20%
Grid voltage (E_{c1}) for beam cut-off	—30	—45	—60	volts ± 50%
Deflection Sensitivity:				
D_1D_2	0.49	0.33	0.25	mm/d.c. volt (av.)
D_3D_4	0.56	0.37	0.28	mm/d.c. volt (av.)
Deflection Factor:				
D_1D_2	52	77	103	d.c. volts/inch ± 20%
D_3D_4	45	68	90	d.c. volts/inch ± 20%

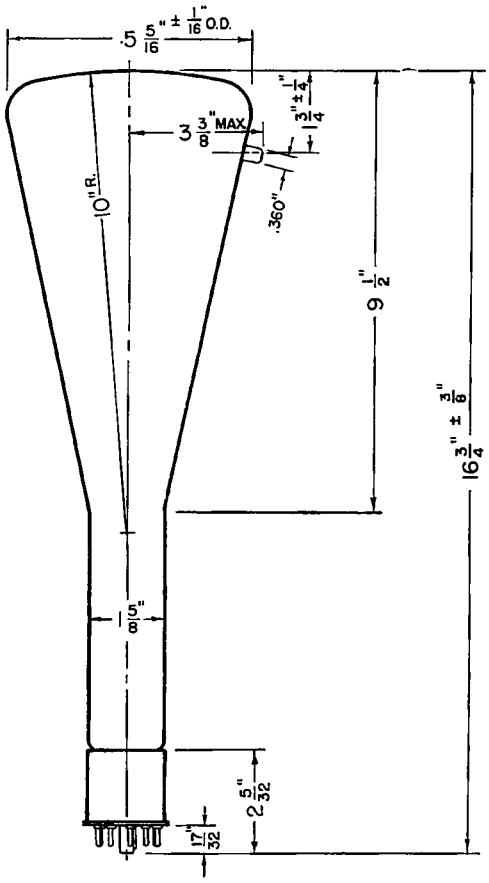
Deflection with Intensifier at Second Anode Potential:

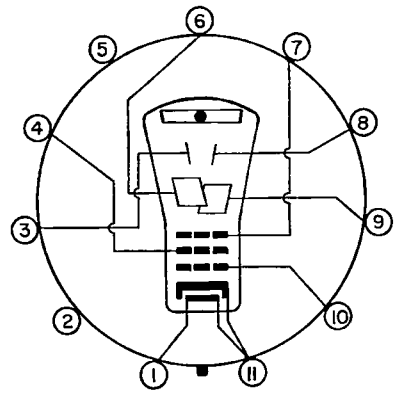
	FACTOR	SENSITIVITY
D_1D_2	42 d.c. volts/kv. in. ± 20%	0.60 mm. kv./d.c. volt (av.)
D_3D_4	38 d.c. volts/kv. in ± 20%	0.67 mm. kv./d.c. volt (av.)

SPOT POSITION

When the tube is operated at (1) normal heater voltage; (2) E_{b2} 2000 volts; (3) E_{b1}, adjusted for focus; (4) E_{c1} set at such a value as will avoid damage to the screen; (5) with each of the deflecting electrodes connected to Anode #2 through a one megohm resistor; and (6) with the tube shielded against external influences:

The spot will fall within a 30 mm. square, the center of which coincides with the geometric center of the tube face, and the sides of which are parallel to the traces produced by deflecting elctrodes D_1 and D_2 and by deflecting electrodes D_3 and D_4 respectively.





Bottom View of Base

Pin No.	1	Heater
	2	No Connection
	3	Deflection Plate D1
	4	Focusing Electrode
	5	Internal Connection. Do not use.
	6	Deflection Plate D4
	7	Accelerating Electrode
	8	Deflection Plate D2
	9	Deflection Plate D3
	10	Control Electrode
	11	Heater and Cathode

Terminal A Intensifier Electrode

The intensifier terminal is within ± 10° of the plane through the D3 D4 trace and the tube axis and is on the same side of the tube as the locating key.

ALLEN B. DU MONT LABORATORIES, INC.

Passaic, N. J., U. S. A.

211K10-7-42

PRINTED IN U.S.A.

5LP-A CATHODE-RAY TUBES

The Type 5LP-A cathode-ray tubes are designed for oscillographic applications. The intensifier principle is used to provide a maximum deflection sensitivity for a given final accelerating voltage. The gun is designed to draw negligible focusing electrode current.

The Type 5LP-A is recommended for replacement only.



GENERAL CHARACTERISTICS

Electrical

Heater Voltage	6.3 Volts
Heater Current	0.6 ± 10% Ampere
Focusing Method	Electrostatic
Deflecting Method	Electrostatic

Phosphor	No. 1	No. 2	No. 7	No. 11
Fluorescence	Green	Green	Blue	Blue
Phosphorescence	—	Green	Yellow	—
Persistence	Medium	Long	Long	Short

Direct Interelectrode Capacitances, Nominal

Grid No. 1 to all other electrodes	9 μμf.
D1 to D2	2 μμf.
D3 to D4	1.5 μμf.
D1 to all other electrodes except D2	8 μμf.
D2 to all other electrodes except D1	8 μμf.
D3 to all other electrodes except D4	6 μμf.
D4 to all other electrodes except D3	7 μμf.

Mechanical

Overall Length	16¾ ± ⅜ Inches
Greatest Diameter of Bulb	5-5/16 ± 1/16 Inches
Minimum Useful Screen Diameter	4½ Inches
Bulb Contact (Anode No. 3)	Small Cap (C1-1)
Base	Medium Magnal
Basing	11T

Base Alignment

D3D4 trace aligns with Pin No. 6 and tube axis ± 10 Degrees

Positive voltage on D1 deflects beam approximately toward Pin No. 3

Positive voltage on D3 deflects beam approximately toward locating key.

Angle between D3D4 and D1D2 traces 90 ±3 Degrees

Bulb Contact Alignment:

Anode No. 3 Contact aligns with D3D4 trace ± 10 Degrees

Anode No. 3 Contact on same side as locating key.

MAXIMUM RATINGS—(Design Center Values)

Anode No. 3 Voltage (Accelerator High Voltage Electrode)	4000 Max. Volts D-C
Anode No. 2 Voltage[1,2]	2000 Max. Volts D-C
Ratio Anode No. 3 Voltage to Anode No. 2 Voltage	2 Max.
Anode No. 1 Voltage	1000 Max. Volts D-C
Grid No. 1 Voltage	
Negative Bias Value	125 Max. Volts D-C
Positive Bias Value	0 Max. Volts D-C
Positive Peak Value	2 Max. Volts
Peak Voltage between Anode No. 2 and any Deflection Electrode	550 Max. Volts

TYPICAL OPERATING CONDITIONS

For Anode No. 3 Voltage of	3000	4000	Volts
For Anode No. 2 Voltage of	1500	2000	Volts
Anode No. 1 Voltage for focus	282 to 475	375 to 632	Volts
Grid No. 1 Voltage[3]	−22.5 to −67.5	−30 to −90	Volts

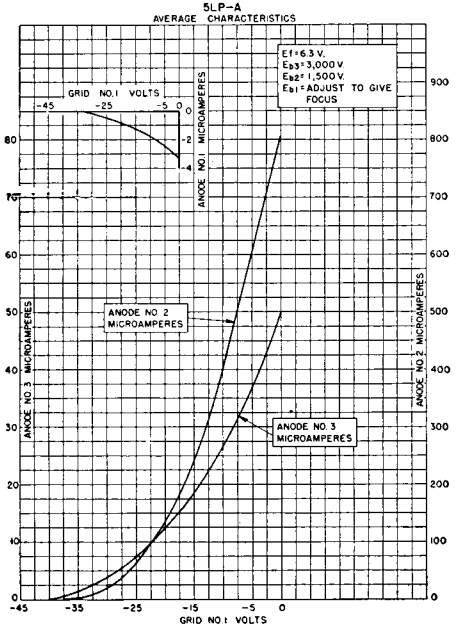
Deflection Factors:			
D1 and D2	62 to 93	82 to 124	Volts D-C per Inch
D3 and D4	54 to 81	73 to 109	Volts D-C per Inch
Anode No. 1 Voltage for focus			18.8% to 31.6% of Eb2 Volts
Grid No. 1 Voltage[3]			1.5% to 4.5% of Eb2 Volts
Anode No. 1 Current for any operating condition			−50 to +10 Microamperes
Deflection Factors:			
No 3rd Anode or Eb3 = Eb2			
D1 and D2			33 to 51 Volts D-C per Inch per Kilovolt of Eb2
D3 and D4			31 to 45 Volts D-C per Inch per Kilovolt of Eb2
Eb3 = Twice Eb2			
D1 and D2			41 to 62 Volts D-C per Inch per Kilovolt of Eb2
D3 and D4			36 to 54 Volts D-C per Inch per Kilovolt of Eb2
Spot Position (Undeflected)			Within a 10 millimeter radius circle[4]

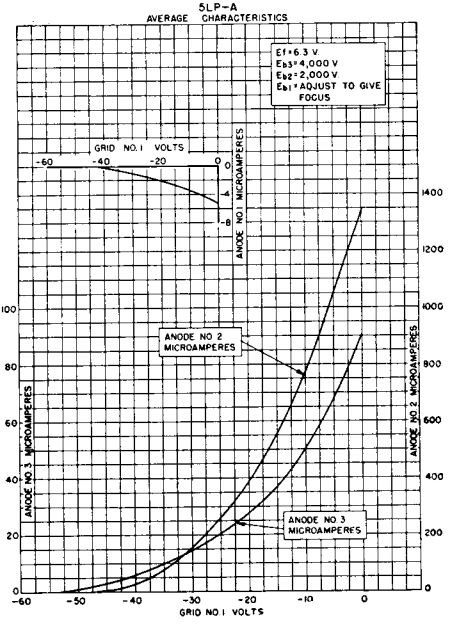
MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance	1.5 Max. Megohms
Resistance in any Deflecting Electrode Circuit[5]	5 Max. Megohms

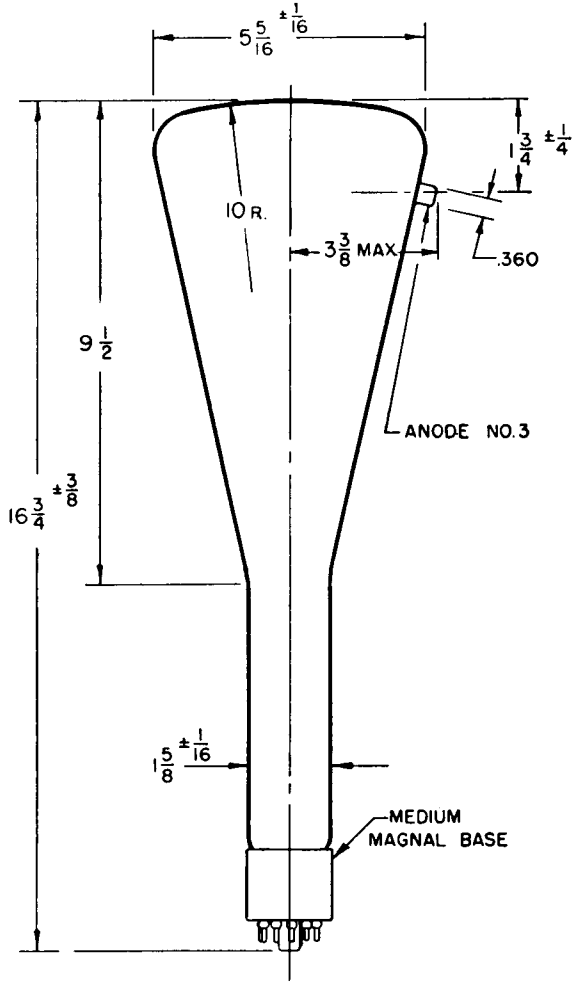
NOTES

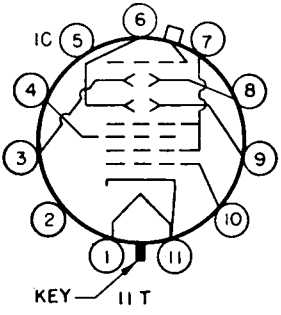
1. Anode No. 2 and Grid No. 2, which are connected together within the tube, are referred to herein as Anode No. 2.
2. The product of Anode No. 2 Voltage and Average Anode No. 2 current should be limited to 6 watts.
3. Visual extinction of undeflected focused spot.
4. Centered with respect to the tube face, with the tube shielded.
5. It is recommended that the deflecting electrode circuit resistances be approximately equal.
6. For optimum focus the average potentials of the deflection plates and second anode should be the same.





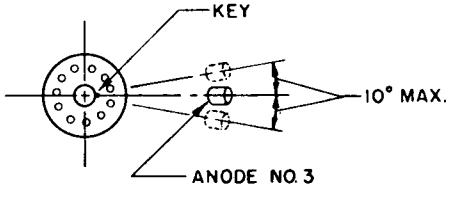
TYPE 5LP-A





BOTTOM VIEW OF BASE

PIN NO.	ELEMENT
1	HEATER
3	DEFLECTING ELECTRODE D_1
4	ANODE NO. 1
5	INTERNAL CONNECTION
6	DEFLECTING ELECTRODE D_4
7	ANODE NO.2, GRID NO.2
8	DEFLECTING ELECTRODE D_2
9	DEFLECTING ELECTRODE D_3
10	GRID NO. 1
11	HEATER & CATHODE



RMA Release # 306 Sept. 24, 1942

DU MONT

CATHODE-RAY TUBES

Types 5MP1, 5MP4, 5MP5

(Formerly designated as Types 2505A5, 2505D5, 2505C5)

The Type 5MP cathode-ray tubes are designed for oscillographic and other applications where simplicity of the equipment is of paramount importance. A small bright spot is obtained at low accelerating voltage and without balanced deflection. The three types differ only in the characteristics of the fluorescent screens.

CHARACTERISTICS

HEATER			
Voltage, a.c. or d.c.			2.5 volts
Current			2.1 amperes
DEFLECTION			Electrostatic
FOCUS			Electrostatic
SCREEN	5MP1	5MP4	5MP5
Phosphor	P1	P4	P5
Fluorescence	Green	White	Blue
Persistence	Medium	Medium	Short

MECHANICAL CHARACTERISTICS

Overall Length	15 7/8" ±3/8"
Maximum Diameter	5 5/16" ±1/16"
Bulb	C42½Y1C
Base	Large 7 pin
Basing RMA Basing Designation	7AN

The basing is such that:

1. The direction of the trace produced on the screen by deflecting electrodes D_1 and D_2 will not deviate more than ±10° from a plane through pin No. 4 and the axis of the tube; while the angle between the direction of this trace and that of the trace produced on the screen by deflecting electrodes D_3 and D_4 will be 90° ±3°.

2. With deflecting electrode D_1 (pin No. 5) positive with respect to D_2 (pin No. 6) the spot will be deflected approximately toward pin No. 4; while with deflecting electrode D_3 (pin No. 3) positive with respect to D_4 (pin No. 6) the spot will be deflected approximately toward pin No. 2.

DIRECT INTERELECTRODE CAPACITANCES (NOMINAL)

Control electrode (grid) to all other electrodes	7.5 uuf
Deflecting Plate D_1 to all other electrodes	6.5 uuf
Deflecting Plate D_3 to all other electrodes	6.0 uuf

RATINGS

Heater voltage	2.5 volts
Heater current	2.1 ±0.3 amp.
Anode #2 (Accelerating Electrode) voltage (E_{b2})	1500 volts (max.)
Anode #1 (Focusing Electrode) voltage (E_{b1})	1000 volts (max.)
Grid (control electrode) voltage (E_{c1})	Never positive
Peak voltage between Anode #2 and any deflecting electrode	600 volts (max.)
Grid circuit resistance	1.5 meg. (max.)
Impedance of any deflecting electrode circuit at heater supply frequency	1.0 meg. (max.)

TYPICAL OPERATION

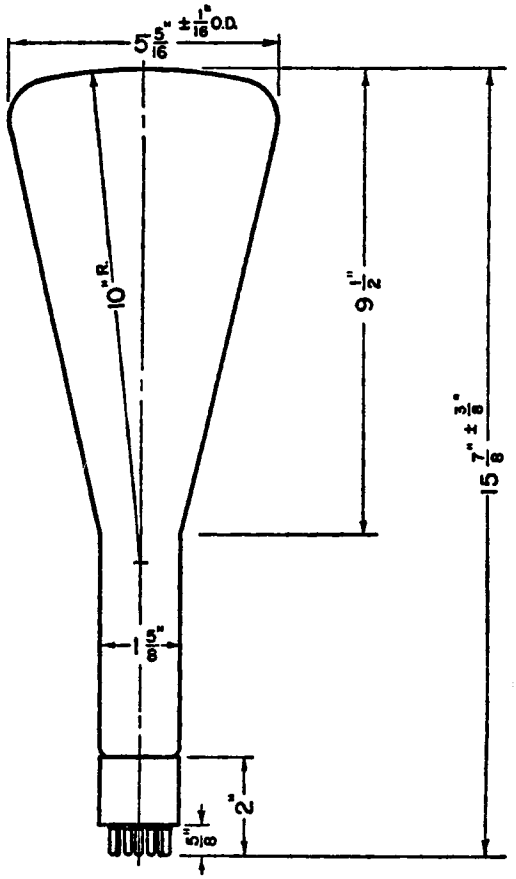
Heater voltage	2.5	2.5	volts
Anode #2 voltage (E_{b2})	1000	1500	volts
Anode #1 voltage (E_{b1}) for focus when E_{c1} is 75% of cut-off value	250	375	volts ±20%
Range of E_{b1} to focus with values of E_{c1} between 0 and cut-off	250	375	volts +25%, —30%
Grid voltage (E_{c1}) for beam cut-off	—33	—50	volts ±50%
Anode #1 current, I_{b1}, at E_{c1} = 0 and E_{b1} adjusted for focus		1330	microamp. max.

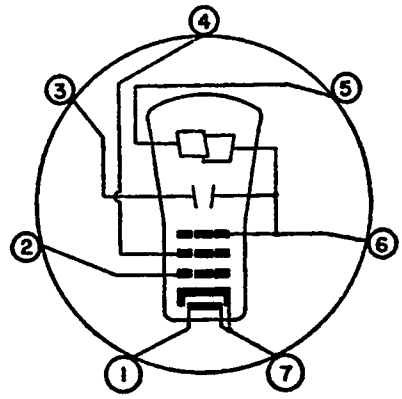
DEFLECTION	FACTOR	SENSITIVITY
D_1D_2	44 d.c. volts/kv. in. ±20%	0.58 mm. kv./d.c. volt (av.)
D_3D_4	40 d.c. volts/kv. in. ±20%	0.64 mm. kv./d.c. volt (av.)

SPOT POSITION

When the tube is operated at (1) normal heater voltage; (2) E_{b2} = 1500 volts; (3) E_{b1} adjusted for focus; (4) E_{c1} set at such a value as will avoid damage to the screen; (5) with each of the deflecting electrodes connected to anode #2 through a one megohm resistor; and (6) with the tube shielded against external influences:

The spot will fall within a 30 mm. square, the center of which coincides with the geometric center of the tube face, and the sides of which are parallel to the traces produced by deflecting electrodes D_1 and D_2 and by deflecting electrodes D_3 and D_4 respectively.





Bottom View of Base

Pin # 1	Heater
2	Control Electrode
3	Deflection Plate D_3
4	Focusing Electrode
5	Deflection Plate D_1
6	Accelerating Electrode Deflection Plates D_2 & D_4
7	Heater & Cathode

ALLEN B. DU MONT LABORATORIES, INC.
Passaic, N. J., U. S. A.

273K16-8-42

DUMONT

Release No. 654

April 30, 1948

CATHODE-RAY TUBE

TYPES: 5RP1, 5RP2, 5RP4 5RP5, 5RP7, 5RP11

GENERAL CHARACTERISTICS

Electrical

Heater Voltage	6.3 ± 10% Volts
Heater Current	0.6 ± 10% Ampere
Focusing Method	Electrostatic
Deflecting Method	Electrostatic

Phosphor	P1	P2	P4	P5	P7	P11
Fluorescence	Green	Green	White	Blue	Blue	Blue
Phosphorescence	--	Green	--	--	Yellow	--
Persistence	Medium	Long	Medium	Short	Long	Short

Direct Interelectrode Capacitances, Nominal

Cathode to all other electrodes	5.0 uuf.
Grid #1 to all other electrodes	5.4 uuf.
D1 to D2	1.8 uuf.
D3 to D4	1.8 uuf.
D1 to all other electrodes except D2	2.3 uuf.
D2 to all other electrodes except D1	2.1 uuf.
D3 to all other electrodes except D4	2.4 uuf.
D4 to all other electrodes except D3	2.2 uuf.

Mechanical

Overall Length	16 3/4" ± 3/8"
Greatest Diameter of Bulb	5 1/4" ± 3/32"
Minimum Useful Screen Diameter	4 1/4"
Bulb Contacts	Snap terminal ball contact
Neck Contacts	Special lateral contacts
Base	Medium 12-pin diheptal
Basing	14F

Base Alignment 1D2 trace aligns with
Pin #5 and tube axis ± 10 Degrees
Positive voltage on D1 deflects beam approximately toward Pin #5.
Positive voltage on D3 deflects beam approximately toward Pin #2.

Bulb contact alignment:
Snap terminal contacts align with 1D2 trace ± 10 Degrees
Contacts on same side as Pin #5.

DUMONT

Release No. 654

April 30, 1948

CATHODE-RAY TUBE

TYPES: 5RP1, 5RP2, 5RP4
5RP5, 5RP7, 5RP11

MAXIMUM RATINGS Design Center Values

Anode No. 3 Voltage (accelerator High Voltage Electrode)	25,500 Max. Volts D-C
Anode No. 2 Voltage	3,500 Max. Volts D-C
Ratio Anode No. 3 Voltage to Anode No. 2 Voltage	10 Max.
Anode No. 1 Voltage	1,550 Max. Volts D-C
Grid No. 1 Voltage	
Negative Bias Value	125 Max. Volts D-C
Positive Bias Value	0 Max. Volts D-C
Positive Peak Value	2 Max. Volts
Peak Heater Cathode Voltage[1]	
Heater Negative with respect to Cathode	125 Max. Volts D-C
Heater Positive with respect to Cathode	125 Max. Volts D-C
Peak Voltage between Anode No. 2 and any Deflection Electrode	1,200 Max. Volts

TYPICAL OPERATING CONDITIONS

For Anode No. 3 Voltage[2] of	10,000	20,000 Volts
For Anode No. 2 Voltage of	2,000	2,000 Volts
Anode No. 1 Voltage for focus	362 to 695	362 to 695 Volts
Grid No. 1 Voltage[3]	-30 to -90	-30 to -90 Volts
Deflection Factors:		
D1 and D2	102 to 154	140 to 210 Volts D-C per Inch
D3 and D4	97 to 145	131 to 197 Volts D-C per Inch
Anode No. 1 Voltage for focus	18.1% to 34.8% of Eb2 Volts	
Grid No. 1 Voltage[3]	1.5% to 4.5% of Eb2 Volts	
Anode No. 1 Current for any operating condition	0 to 600 Microamperes	

Deflection Factors:

No 3rd Anode or Eb3 = Eb2	
D1 and D2	30 to 45 Volts D-C per inch per Kilovolt of Eb2
D3 and D4	30 to 45 Volts D-C per inch per Kilovolt of Eb2
Eb3 = Twice Eb2	
D1 and D2	36 to 54 Volts D-C per inch per Kilovolt of Eb2
D3 and D4	36 to 54 Volts D-C per inch per Kilovolt of Eb2

Spot Position (Undeflected)[4] Within 20 Millimeters square

Allen B. Du Mont Laboratories, Inc.
Passaic, New Jersey

DUMONT

Release No. 654

April 30, 1948

CATHODE-RAY TUBE

TYPES: 5RP1, 5RP2, 5RP4
5RP5, 5RP7, 5RP11

MAXIMUM CIRCUIT VALUES

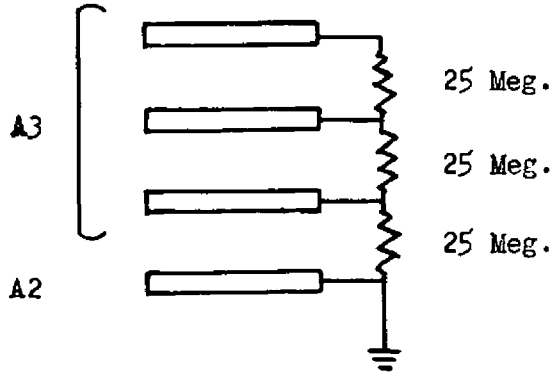
Grid No. 1 Circuit Resistance	1.5 Max. Megohms
Resistance in any Deflecting Electrode Circuit[5]	5 Max. Megohms

NOTES

1. Cathode should be returned to one side or to the mid-tap of the heater transformer winding.

2. Equally divided over the three intensifier electrodes.

   Suggested method of connection:



3. Visual extinction of undeflected focused spot.

4. When the tube is operated at (1) normal heater voltage; (2) Eb2= 2000 volts; (3) Eb3=10,000 volts; (4) Eb1 adjusted for focus; (5) Ec1 set at such a value as will avoid damage to the screen; (6) with each of the deflecting electrodes connected to Anode No. 2; and (7) with the tube shielded against external influences:

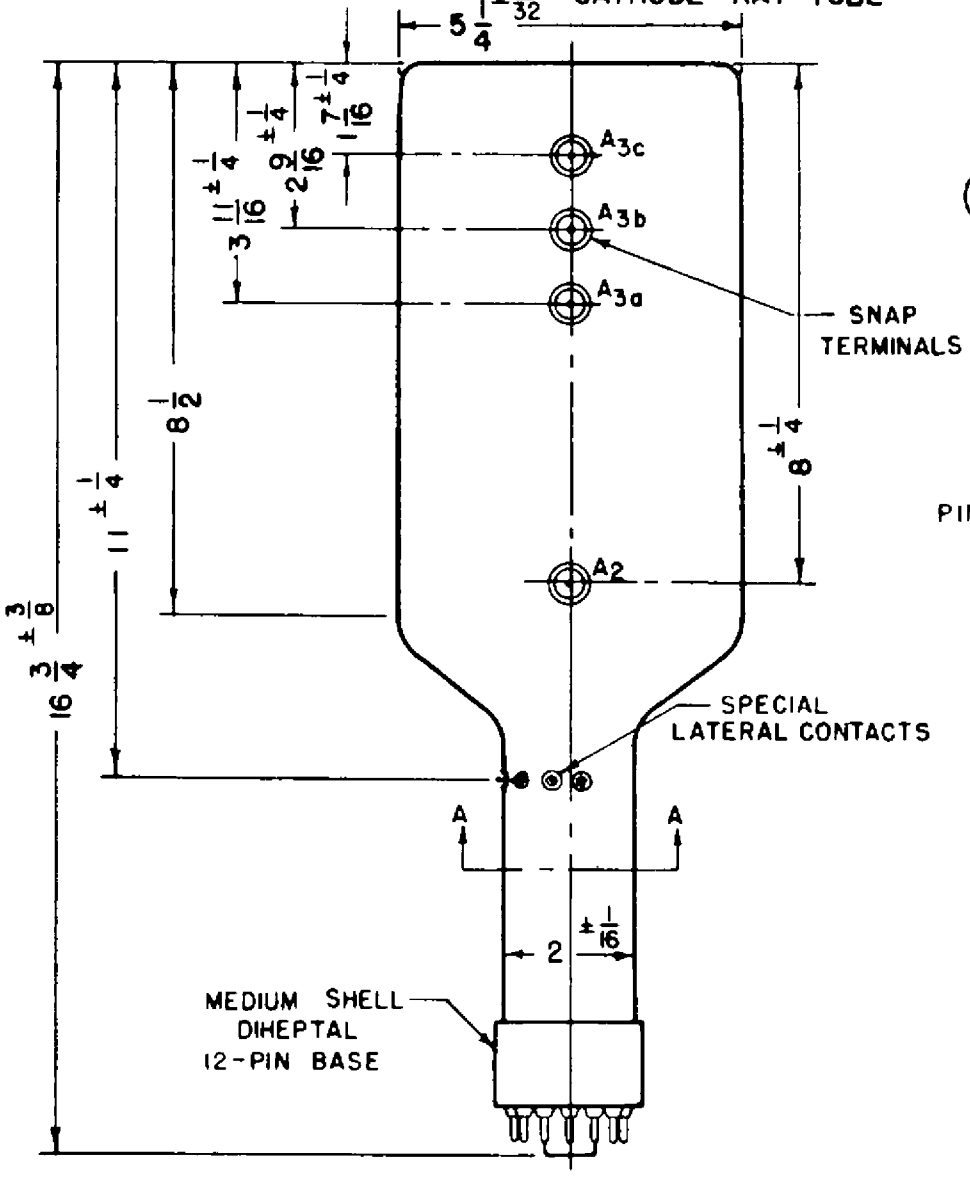
   The spot will fall within a 20 mm. square, the center of which coincides with the geometric center of the tube face and the sides of which are parallel to the traces produced by deflecting electrodes D1 and D2 and by deflecting electrodes D3 and D4 respectively.

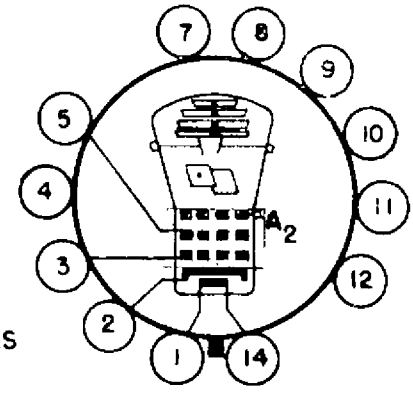
5. It is recommended that the deflecting electrode circuit resistances be approximately equal.

DUMONT

Release No. 654
April 30, 1948

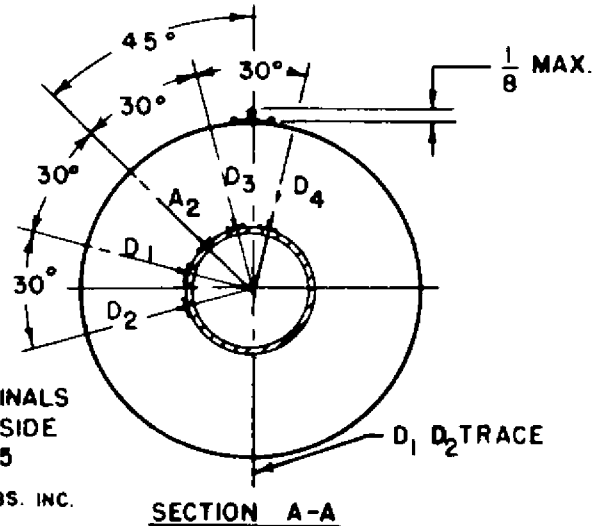
5RP1, 5RP2, 5RP4, 5RP5, 5RP7, 5RP11, CATHODE-RAY TUBE





14 F
BOTTOM VIEW OF BASE

PIN NO.	ELEMENT
1	HEATER
2	CATHODE
3	CONTROL ELECTRODE
4	INTERNAL CONNECTION
5	FOCUSING ELECTRODE
7	NO CONNECTION
8	" "
9	" "
10	" "
11	" "
12	" "
14	HEATER



SNAP TERMINALS ON SAME SIDE AS PIN 5

SECTION A-A

ALLEN B. DUMONT LABS. INC.
PASSAIC, N.J.

5-7-48

RADIO MANUFACTURERS ASSOCIATION

SUITE 701-4 AMERICAN BUILDING
1317 F STREET, N.W.
WASHINGTON, D. C.

E. I. A.
REGISTRATION
FILE

R.M.A. DATA BUREAU
90 West Street
New York, N. Y.

SUPPLEMENTARY

Release No. 654

November 4, 1949

To
Tube Engineers:

On April 30, 1948 in Release No. 654, referring to cathode ray tube types

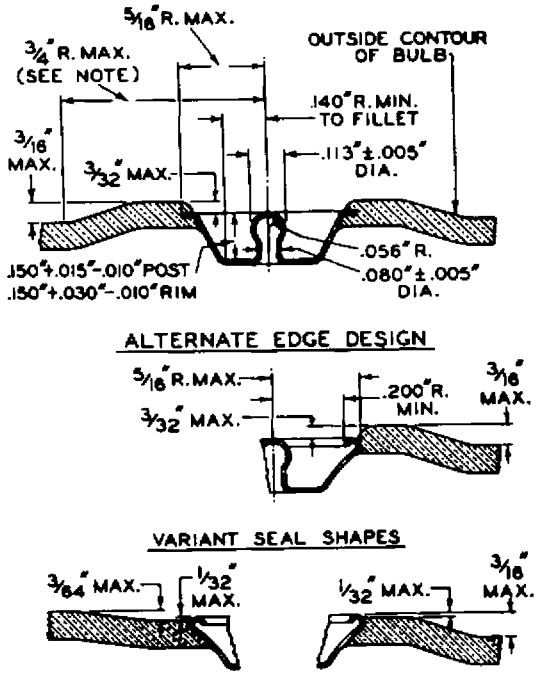
5RP1, 5RP2, 5RP4, 5RP5, 5RP7 and 5RP11

reference is made to the inclusion of two types of terminals which are referred to only by name and not otherwise specified. The Data Bureau, having been queried as to the specific detail as to these two terminals, the sponsor, A. B. DuMont Laboratories, Inc., has provided for the following additional information:

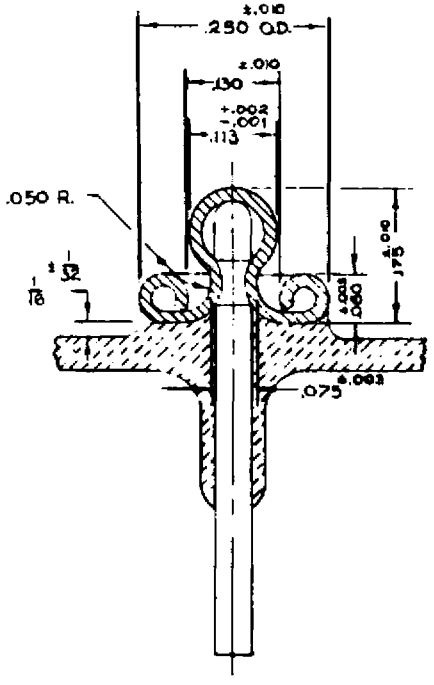
a) The "snap terminal ball contact" to which reference is made is, in fact, the J1-22 Recessed Small Ball Cap which is here shown as to salient dimensional detail.

b) The "special lateral contact" to which reference is made is, in fact, the J1-25 Small Ball Cap which is here shown as to salient dimensional detail.

J1-22



J1-25



Respectfully yours,

RMA DATA BUREAU

By _____

LCFHorle/cap

5RP-A CATHODE-RAY TUBES

The Type 5RP-A Cathode-ray Tubes are high-voltage tubes which incorporate an intensifier subdivided into several steps. This feature permits the use of much higher overall accelerating voltages with deflection sensitivities only slightly less than heretofore obtainable in low-voltage cathode-ray tubes. Operation with intensifier to second anode voltage ratios as high as 10:1 are made possible by the multiband feature. The tube has a flat face and a cylindrical body. The deflection plate and anode connections are made through the neck of the tube instead of through the base. Low-capacity deflection plate leads facilitate high-frequency operation. The gun is designed to draw negligible focusing electrode current.

The four types differ only in the characteristics of the fluorescent screens. Other screen types may be obtained on special order.



GENERAL CHARACTERISTICS

Electrical

Heater Voltage	6.3 Volts
Heater Current	0.6 ± 10% Ampere
Focusing Method	Electrostatic
Deflecting Method	Electrostatic

Phosphor	No. 1	No. 2	No. 7	No. 11
Fluorescence	Green	Green	Blue	Blue
Phosphorescence	—	Green	Yellow	—
Persistence	Medium	Long	Long	Short

Direct Interelectrode Capacitances, Nominal

Cathode to all other electrodes	5 μμf.
Grid No. 1 to all other electrodes	5 μμf.
D1 to D2	2 μμf.
D3 to D4	2 μμf.
D1 to all other electrodes except D2	2.5 μμf.
D2 to all other electrodes except D1	2 μμf.
D3 to all other electrodes except D4	2.5 μμf.
D4 to all other electrodes except D3	2 μμf.

Mechanical

Overall Length	16¾ ± ⅜ Inches
Greatest Diameter of Bulb	5¼ ± 3/32 Inches
Minimum Useful Screen Diameter	4¼ Inches
Bulb Contacts (Recessed Small Ball Caps)	J1-22
Neck Contacts (Small Ball Caps)	J1-25
Base (Medium Shell Diheptal 12-Pin)	B12-37
Basing	14P

Base Alignment

D1D2 trace aligns with Pin No. 5 and tube axis	± 10 Degrees

Positive voltage on D1 deflects beam approximately toward Pin No. 5
Positive voltage on D3 deflects beam approximately toward Pin No. 2

Angle between D3D4 and D1D2 traces	90 ±2 Degrees

Bulb Contact Alignment:

J1-22 contacts align with D1D2 trace	± 10 Degrees

J1-22 contacts on same side as Pin No. 5.

MAXIMUM RATINGS—(Design Center Values)

Anode No. 3 Voltage (Accelerator High Voltage Electrode)	25,500 Max. Volts D-C
Anode No. 2 Voltage[1,2]	3,500 Max. Volts D-C
Ratio Anode No. 3 Voltage to Anode No. 2 Voltage	10 Max.
Anode No. 1 Voltage	1,550 Max. Volts D-C

Grid No. 1 Voltage
- Negative Bias Value ..... 200 Max. Volts D-C
- Positive Bias Value ..... 0 Max. Volts D-C
- Positive Peak Value ..... 2 Max. Volts

Peak Heater Cathode Voltage
- Heater Negative with respect to Cathode ..... 125 Max. Volts D-C
- Heater Positive with respect to Cathode ..... 125 Max. Volts D-C

Peak Voltage between Anode No. 2 and any Deflection Electrode ..... 1,200 Max. Volts

TYPICAL OPERATING CONDITIONS

For Anode No. 3 Voltage[3] of	10,000	20,000	Volts
For Anode No. 2 Voltage of	2,000	2,000	Volts
Anode No. 1 Voltage for focus	362 to 695	362 to 695	Volts
Grid No. 1 Voltage[1]	−30 to −90	−30 to −90	Volts
Deflection Factors:			
D1 and D2	102 to 154	140 to 210	Volts D-C per Inch
D3 and D4	97 to 145	131 to 197	Volts D-C per Inch

Anode No. 1 Voltage for focus ..... 18.1% to 34.8% of Eb2 Volts
Grid No. 1 Voltage[1] ..... 1.5% to 4.5% of Eb2 Volts
Anode No. 1 Current for any operating condition ..... −50 to +10 Microamperes
Deflection Factors:
No 3rd Anode or Eb3 = Eb2
- D1 and D2 ..... 30 to 45 Volts D-C per inch per Kilovolt of Eb2
- D3 and D4 ..... 30 to 45 Volts D-C per inch per Kilovolt of Eb2

Eb3 = Twice Eb2
- D1 and D2 ..... 36 to 54 Volts D-C per inch per Kilovolt of Eb2
- D3 and D4 ..... 36 to 54 Volts D-C per inch per Kilovolt of Eb2

Spot Position (Undeflected) ..... Within a 10 Millimeter radius circle[5]

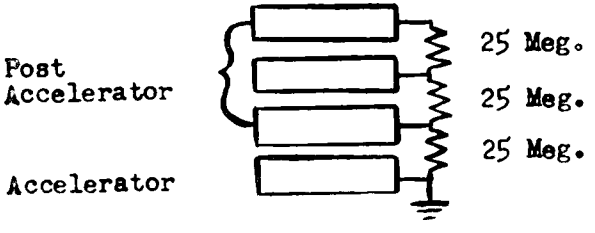
MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance ..... 1.5 Max. Megohms
Resistance in any Deflecting Electrode Circuit[6] ..... 5 Max. Megohms

NOTES

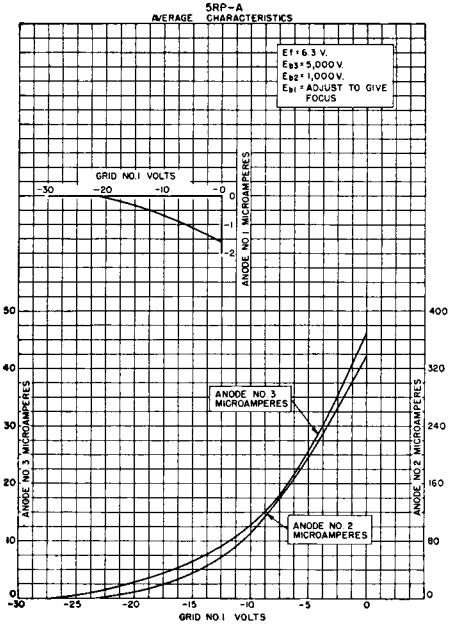
1. Anode No. 2 and Grid No. 2, which are connected together within the tube, are referred to herein as Anode No. 2.
2. The product of Anode No. 2 voltage and average Anode No. 2 current should be limited to 6 watts.
3. Anode No. 2 to final intensifier electrode voltage equally divided over the three intensifier electrodes.

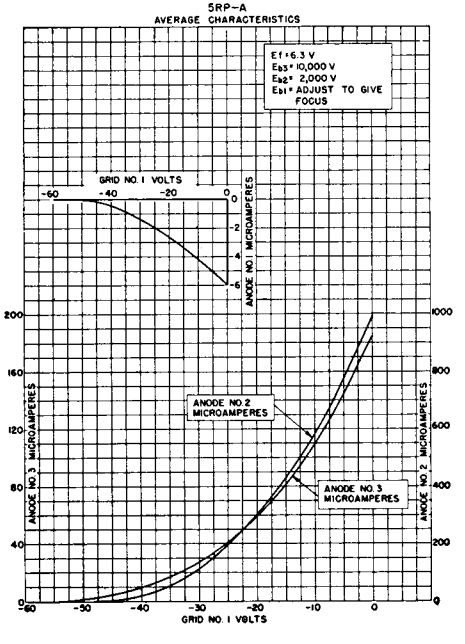
Suggested Method of Intensifier Connection



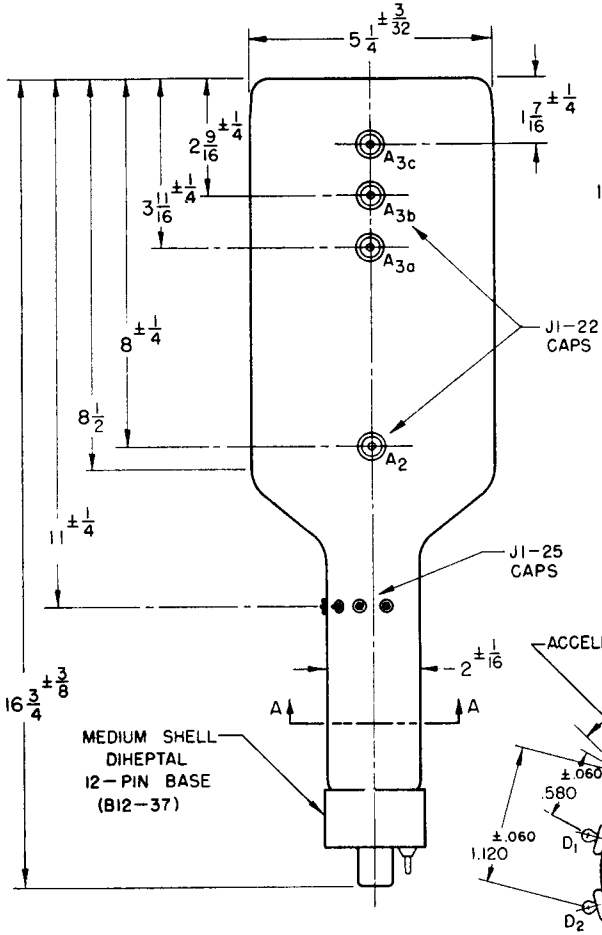
The two accelerator terminals must be connected together.

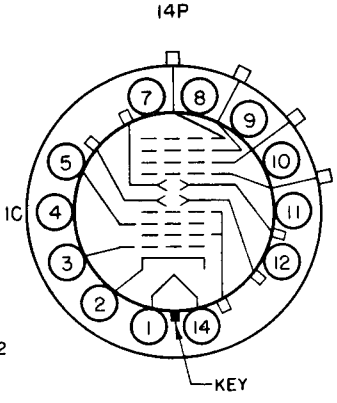
4. Visual extinction of undeflected focused spot.
5. Centered with respect to the tube face with the tube shielded.
6. It is recommended that the deflecting electrode circuit resistances be approximately equal.
7. For optimum focus the average potentials of the deflection plates and second anode should be the same.


5RP-A
AVERAGE CHARACTERISTICS
Ef = 6.3 V.
Eb3 = 5,000 V.
Eb2 = 1,000 V.
Eb1 = ADJUST TO GIVE FOCUS
GRID NO.1 VOLTS
-30
-20
-10
-0
0
-1
-2
ANODE NO.1 MICROAMPERES
ANODE NO.3 MICROAMPERES
ANODE NO.2 MICROAMPERES
ANODE NO.3 MICROAMPERES
ANODE NO.2 MICROAMPERES
50
40
30
20
10
0
400
320
240
160
80
0
-30
-25
-20
-15
-10
-5
0
GRID NO.1 VOLTS


5RP-A
AVERAGE CHARACTERISTICS
Ef = 6.3 V
Eb3 = 10,000 V
Eb2 = 2,000 V
Eb1 = ADJUST TO GIVE FOCUS
GRID NO.1 VOLTS
-60
-40
-20
0
0
-2
-4
-6
ANODE NO.1 MICROAMPERES
ANODE NO.3 MICROAMPERES
ANODE NO.2 MICROAMPERES
ANODE NO.2 MICROAMPERES
ANODE NO.3 MICROAMPERES
200
160
120
80
40
0
1000
800
600
400
200
0
-60
-50
-40
-30
-20
-10
0
GRID NO.1 VOLTS

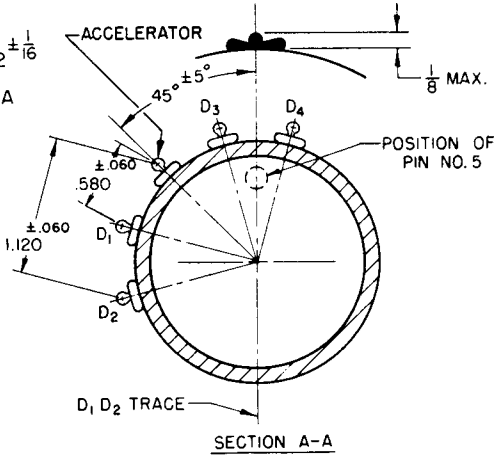
TPPE 5RP-A





BOTTOM VIEW OF BASE

PIN NO.	ELEMENT
1	HEATER
2	CATHODE
3	GRID NO. 1
4	INTERNAL CONNECTION
5	FOCUSING ELECTRODE
14	HEATER



SECTION A-A

RADIO MANUFACTURERS ASSOCIATION
ENGINEERING DEPARTMENT

TYPES

5SP1
5SP2
5SP4
5SP7
5SP11

Release No. 431

August 25, 1945

sponsor:
A.B. DuMont Laboratories

Twin Cathode Ray Tube
Intensifier Type

GENERAL CHARACTERISTICS

HEATER					
Voltage, a.c. or d.c.					6.3 volts
Current (for each unit)					0.6 ampere
DEFLECTION					Electrostatic
FOCUS					Electrostatic
SCREEN					
Type Number	5SP1	5SP2	5SP4	5SP7	5SP11
Fluorescence	Green	Green	White	Blue	Blue
Phosphorescence	--	--	--	Yellow	--
Persistence	Medium	Long	Medium	Long	Short

MECHANICAL CHARACTERISTICS

Overall Length		18-1/2" ± 3/8"
Body Diameter		5-1/4" ± 3/32"
Base	(Diheptal)	Medium 12-Pin
Basing		14K

The basing for each unit is such that:

1. The direction of the trace produced on the screen by deflecting electrodes D_3 and D_4 will not deviate more than ± 10° from a plane through pin No. 5 and the axis of the tube, while the angle between the direction of this trace and that of the trace produced on the screen by deflecting electrodes D_1 and D_2, will be 90° ± 3°.
2. With deflecting electrode D_4 positive with respect to D_3 the spot will be deflected approximately toward pin No. 5, while with deflecting electrode D_1 positive with respect to D_2 the spot will be deflected approximately toward pin No. 2.
3. The snap terminals are on the same side as pin No. 5 and are within 10° of the plane through the D_3D_4 trace.
4. The accelerating electrode terminals are within 10° of the plane through the D_3D_4 trace.
5. Connections. (See outline drawing)

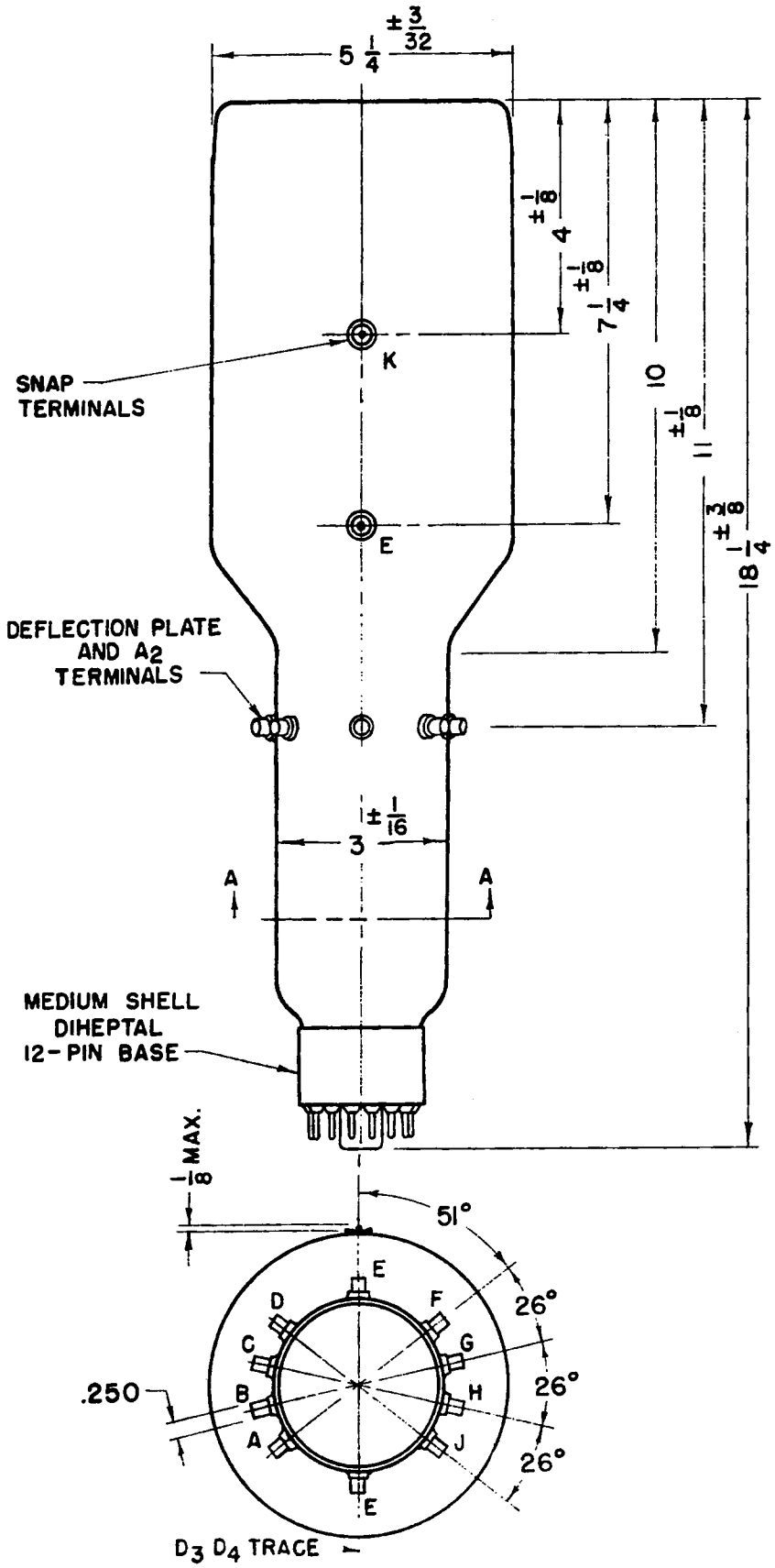
RATINGS (Values are for each unit)

Heater Voltage	6.3 volts
Heater Current	0.6 ± 0.06 ampere
Anode No. 3 (Intensifier Electrode) Voltage (E_{b3})	4400 volts max.
Anode No. 2 (Accelerating Electrode) Voltage (E_{b2})	2200 volts max.
Anode No. 1 (Focusing Electrode) Voltage (E_{b1})	1100 volts max.

Grid (Control Electrode) Voltage (E_{c1})	Never Positive
Peak Potential between accelerating electrode and any deflection plate	550 volts max.
Peak Potential between Heater and Cathode	125 volts max.
Grid Circuit Resistance	1.5 meg. max.
Impedance of any deflecting electrode circuit at heater supply frequency	1.0 meg. max.
E_{b3}/E_{b2} Ratio	2.3

TYPICAL OPERATION (Values are for each unit)

Heater Voltage	6.3	6.3	6.3 volts
Anode No. 3 Voltage (E_{b3})	1500	3000	4000 volts
Anode No. 2 Voltage (E_{b2})	1500	1500	2000 volts
Anode No. 1 Voltage (E_{b1}) for focus when E_{c1} is 75% of cut-off value	431	431	575 volts ± 20%
Grid (Control Electrode) Voltage for beam cut-off (E_{c1}) i.e. visual extinction of undeflected focused spot	-45	-45	-60 volts ± 50%
Deflection Sensitivity:			
D_1D_2	.46	.37	.28 mm/dc volt (av)
D_3D_4	.53	.43	.32 mm/dc volt (av)
Deflection Factor:			
D_1D_2	55	69	92 dc volts/in±20%
D_3D_4	48	59	79 dc volts/in±20%


5 1/4 ±3/32
4 ±1/8
7 1/4 ±1/8
10 ±1/8
11 ±3/8
18 1/4
K
E
SNAP TERMINALS
DEFLECTION PLATE AND A2 TERMINALS
3 ±1/16
A
A
MEDIUM SHELL DIHEPTAL 12-PIN BASE
1/8 MAX.
51°
26°
26°
26°
.250
A
B
C
D
E
F
G
H
J
E
D3 D4 TRACE

TYPE 5SP-A CATHODE-RAY TUBES

The Du Mont Type 5SP-A is a two-beam electrostatic focus and deflection cathode-ray tube. It is identical to the Du Mont Type 5SP- with the exception of having very closely controlled tolerances. Deflection factors are held to within 10%; angle alignment is held to within 1°; and grid cut-off bias is held to within 25%.



GENERAL CHARACTERISTICS

Electrical

Heater Voltage	6.3 Volts
Heater Current	0.6 ±10% Ampere
Focusing Method	Electrostatic
Deflecting Method	Electrostatic

Phosphor	No. 1	No. 2	No. 7	No. 11
Fluorescence	Green	Green	Blue	Blue
Phosphorescence	—	Green	Yellow	—
Persistence	Medium	Long	Long	Short

Direct Interelectrode Capacitances (for each unit)	Min.	Max.
Cathode to all other electrodes	2.7	5.0 μμf.
Grid No. 1 to all other electrodes	3.5	6.5 μμf.
D1 to D2	1.0	2.0 μμf.
D3 to D4	1.1	2.2 μμf.
D1 to all other electrodes	2.2	4.7 μμf.
D2 to all other electrodes	2.2	4.7 μμf.
D3 to all other electrodes	2.5	5.1 μμf.
D4 to all other electrodes	2.5	5.1 μμf.

Mechanical

Overall Length	18¼ ±¼ Inches
Greatest Diameter of Bulb	5¼ ±3/32 Inches
Minimum Useful Screen Diameter	4½ Inches
Bulb Contacts (Recessed Small Ball Caps)	J1-22
Neck Contacts (Miniature Caps)	C1-2
Base (Medium Shell Diheptal 12-Pin)	B12-37
Basing	14K
Base Alignment: (for each unit)	
D3D4 trace aligns with Pin No. 4 and tube axis	±10 Degrees
Positive voltage on D1 deflects beam approximately toward Pin No. 1	
Positive voltage on D3 deflects beam approximately toward Pin No. 11	
Angle between D3D4 and D1D2 traces	90 ±1 Degrees
Trace Alignment:	
Corresponding traces of each gun are within 1 degree of each other	
Bulb Contact Alignment:	
J1-22 contacts align with D3D4 trace	±10 Degrees
Contacts on same side as Pin No. 4	

MAXIMUM RATINGS—Design Center Values (Values are for each unit)

Post Accelerator Voltage	7,500 Max. Volts D-C
Accelerator Voltage[1]	2,500 Max. Volts D-C
Ratio Post Accelerator Voltage to Accelerator Voltage	3 Max.
Focusing Voltage	1,000 Max. Volts D-C
Grid No. 1 Voltage	
Negative Bias Value	200 Max. Volts D-C
Positive Bias Value	0 Max. Volts D-C
Positive Peak Value	0 Max. Volts
Peak Heater Cathode Voltage	

Heater Negative with respect to Cathode ..... 180 Max. Volts D-C
Heater Positive with respect to Cathode ..... 180 Max. Volts D-C
Peak Voltage between Accelerator and any
Peak Voltage between Accelerator and any Deflection Electrode ..... 550 Max. Volts

TYPICAL OPERATING CONDITIONS (Values are for each unit)

For Post Accelerator Voltage of	3,000	4,000	Volts
For Accelerator Voltage of	1,500	2,000	Volts
Focusing Voltage	272 to 521	363 to 695	Volts
Grid No. 1 Voltage[2]	—34 to —56	—45 to —75	Volts
Modulation[3]	32		Volts Max.
Line Width A[3]	.027		Inch Max.
P1 Light Output[3]	10		Ft. L. Min.
Deflection Factors[4]			
D1 and D2	62 to 76	83 to 101	Volts D-C per Inch
D3 and D4	53 to 65	70 to 86	Volts D-C per Inch
Deflection Factor Uniformity[5]	2	2	% Max.
Pattern Distortion at 75% of Useful Scan[6] ..	2½	2½	% Max.

Tracking Error[7] ..... 2% Max.
Interaction Factor[8] ..... 14 x 10^{-6} Inch/Volt D-C Max.
Spot Position ..... Within a 5/16-inch radius circle[9]

CIRCUIT DESIGN VALUES

Focusing Voltage ..... 181 to 348 Volts/Kilovolt of Accelerator Voltage
Focusing Current for any operating condition ..... —50 to +10 Microamperes
Grid No. 1 Voltage[2] ..... —22.5 to —37.5 Volts/Kilovolt of Accelerator Voltage
Grid No. 1 Circuit Resistance ..... 1.5 Max. Megohms

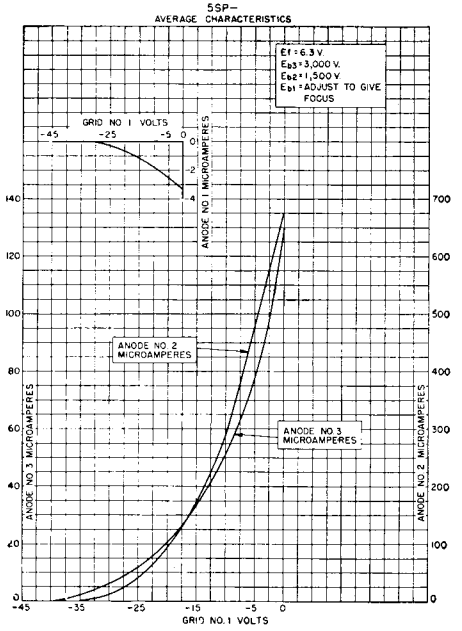
Deflection Factors[4]:
Post Accelerator Voltage = Accelerator Voltage
D1 and D2 ..... 32.5 to 40.5 Volts D-C/Inch/KV of Accelerator Voltage
D3 and D4 ..... 28.5 to 35.5 Volts D-C/Inch/KV of Accelerator Voltage
Resistance in any Deflecting Electrode Circuit[10] ..... 5 Max. Megohms

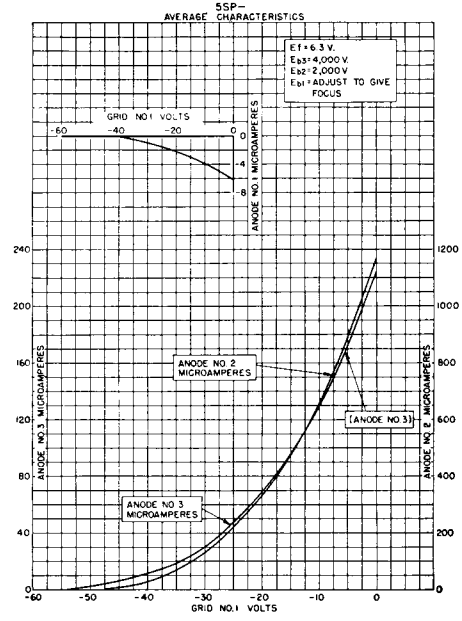
NOTES

1. The product of Accelerator Voltage and Average Accelerator current should be limited to 6 watts.
2. Visual extinction of undeflected focused spot.
3. Measured in accordance with MIL-E-1 specifications.
4. Ratio of deflection factors of corresponding sets of deflection plates (larger deflection factor) divided by lower deflection factor shall not exceed 1.15.
5. The deflection factor (for both D1D2 and D3D4 plate pairs, separately) for any deflection of less than 75% of the useful scan* will not differ from the deflection factor for a deflection at 25% of the useful scan* by more than the indicated value.
6. The edges of a raster pattern, whose mean dimensions are the indicated percentage of useful scan* shall not deviate from the mean dimension rectangle by more than the specified amount.
7. The positions of the spot of each beam, when deflected from the center by applied voltages proportional to the deflection factor, will not deviate from each other by more than the indicated percentage of deflection.
8. The deflection of one beam when balanced D-C voltages are applied to the deflection electrodes of the other beam will not be greater than the indicated value.
9. When the tube is operated at typical operating conditions (Eh = 6.3 V., Eb 3 = 3000 V., Eb2 = 1500 V., Eb1 at focus); Ecl adjusted to avoid damage to the screen; with each of the deflecting electrodes connected to the accelerator; and with the tube shielded against external influences, both spots will fall within a 5/16-inch radius circle centered on the tube face.
   Under stable operating conditions, the position of either spot will not shift with changes in intensity by more than .025-inch.
10. It is recommended that the deflecting electrode circuit resistances be approximately equal.

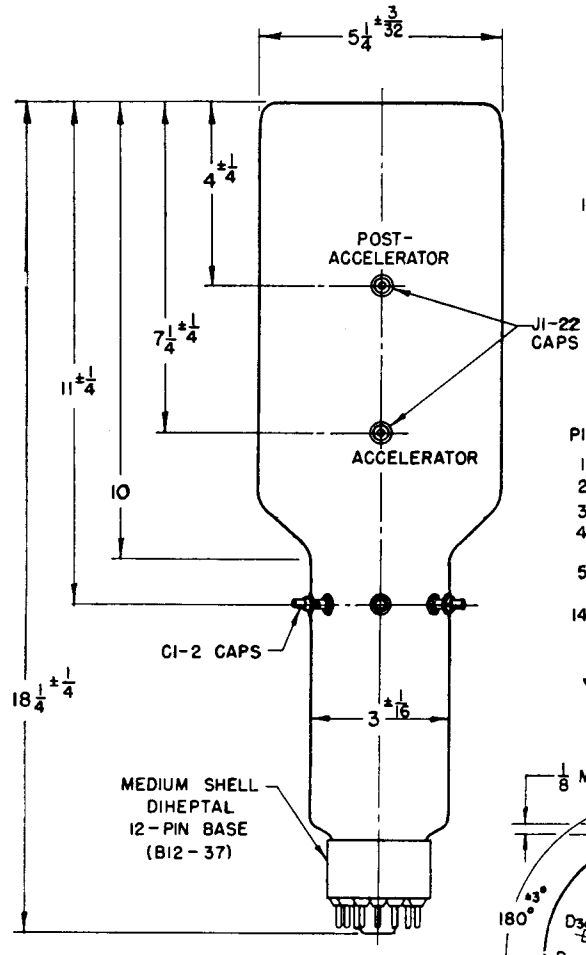
---

* Useful scan is equal to the useful screen diameter.


5SP–
AVERAGE CHARACTERISTICS
Ef = 6.3 V.
Eb3 = 3,000 V.
Eb2 = 1,500 V.
Eb1 = ADJUST TO GIVE FOCUS
GRID NO. 1 VOLTS
-45
-25
-5
0
0
-4
ANODE NO. 1 MICROAMPERES
ANODE NO. 2 MICROAMPERES
ANODE NO. 3 MICROAMPERES
ANODE NO. 3 MICROAMPERES
ANODE NO. 2 MICROAMPERES
0
20
40
60
80
100
120
140
0
100
200
300
400
500
600
700
-45
-35
-25
-15
-5
0
GRID NO. 1 VOLTS

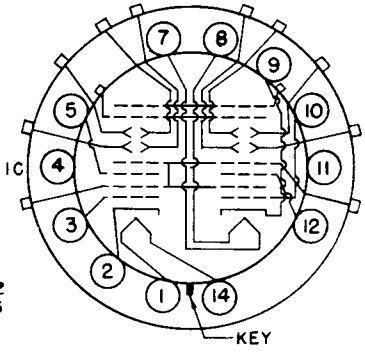

5SP–
AVERAGE CHARACTERISTICS
Ef = 6.3 V.
Eb3 = 4,000 V.
Eb2 = 2,000 V.
Eb1 = ADJUST TO GIVE FOCUS
GRID NO. 1 VOLTS
-60
-40
-20
0
0
-4
-8
ANODE NO. 1 MICROAMPERES
ANODE NO. 2 MICROAMPERES
(ANODE NO. 3)
ANODE NO. 3 MICROAMPERES
ANODE NO. 3 MICROAMPERES
ANODE NO. 2 MICROAMPERES
0
40
80
120
160
200
240
0
200
400
600
800
1000
1200
-60
-50
-40
-30
-20
-10
0
GRID NO. 1 VOLTS

TYPE 5SP-A

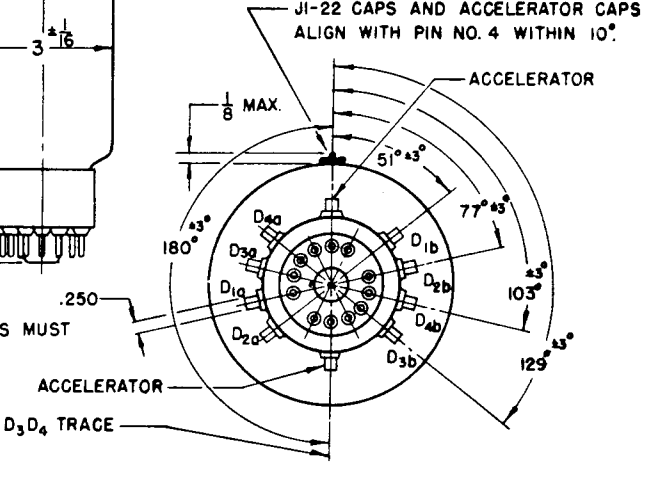


NOTE:
THE THREE ACCELERATOR CAPS MUST BE CONNECTED TOGETHER

14 K



UNIT "A"	UNIT "B"
PIN	PIN
1 – HEATER	7 – HEATER
2 – CATHODE	8 – HEATER
3 – GRID NO. 1	9 – CATHODE
4 – INTERNAL CONNECTION	10 – GRID NO. 1
5 – FOCUSING ELECTRODE	12 – FOCUSING ELECTRODE
14 – HEATER	



RADIO MANUFACTURERS ASSOCIATION

SUITE 701-4 AMERICAN BUILDING
1317 F STREET, N.W.
WASHINGTON, D. C.

R.M.A. DATA BUREAU
90 West Street
New York, N. Y.

Release No. 718

December 9, 1948

sponsor: Allen B. Dumont Laboratories

5XP1, 5XP2, 5XP11 CATHODE-RAY TUBES

The Type 5XP- is an electrostatic focus and deflection Cathode-ray Tube, with very high sensitivity D3D4 deflection plates, and with an intensifier subdivided into several steps for operation at high voltages and at high ratios of intensifier to second anode voltage.

The high D3D4 sensitivity is achieved by using long deflecting plates and limiting the D3D4 scan to a useful portion of the full screen diameter. Capacitances are low, being comparable to other types such as the 5JP-A and 5RP-A where deflection connections are made through the neck instead of the base.

The Type 5XP- is particularly useful for wide band oscillographs and for any application requiring high D3D4 deflection plate sensitivity, and the high writing rate capabilities of a multi-band cathode-ray tube.

GENERAL CHARACTERISTICS

Electrical

Heater Voltage			6.3 Volts
Heater Current			0.6 ± 10% Ampere
Focusing Method			Electrostatic
Deflecting Method			Electrostatic
Phosphor	P1	P2	P11
Fluorescence	Green	Green	Blue
Phosphorescence	--	Green	--
Persistence	Medium	Long	Short

Direct Interelectrode Capacitances, Approx.

Cathode to all other electrodes	5.0 uuf.
Grid No. 1 to all other electrodes	5.4 uuf.
D1 to D2	1.7 uuf.
D3 to D4	1.7 uuf.
D1 to all other electrodes except D2	2.5 uuf.
D2 to all other electrodes except D1	2.3 uuf.
D3 to all other electrodes except D4	1.9 uuf.
D4 to all other electrodes except D3	1.8 uuf.

Mechanical

Overall Length	17 5/8" ± 3/8"
Greatest Diameter of Bulb	5 1/4" ± 3/32"
Bulb Contacts	J1-22 (recessed small ball contact)
Neck Contacts	Special lateral contacts
Base	Medium 12-pin diheptal
Basing	14F
Base Alignment: 1D2 trace aligns with	
Pin No. 5 and tube axis	± 10 Degrees

Positive voltage on D1 deflects beam approximately toward Pin No. 5.
Positive voltage on D3 deflects beam approximately toward Pin No. 2.

Bulb contact alignment:
J1-22 contacts align with 1D2 trace ± 10 degrees
J1-22 contacts on same side as Pin No. 5.

MAXIMUM RATINGS Design Center Values

Anode No. 3 Voltage (Accelerator High Voltage Electrode)	25,500 Max. Volts D-C
Anode No. 2 Voltage	3,500 Max. Volts D-C
Ratio Anode No. 3 Voltage to Anode No. 2 Voltage	10 Max.
Anode No. 1 Voltage	1,550 Max. Volts D-C
Grid No. 1 Voltage	
Negative Bias Value	125 Max. Volts D-C
Positive Bias Value	0 Max. Volts D-C
Positive Peak Value	2 Max. Volts
Peak Heater Cathode Voltage[1]	
Heater Negative with respect to Cathode	125 Max. Volts D-C
Heater Positive with respect to Cathode	125 Max. Volts D-C
Peak Voltage between Anode No. 2 and any Deflection Electrode	1,200 Max. Volts

TYPICAL OPERATING CONDITIONS

For Anode No. 3 Voltage[2] of	4,000	10,000	20,000	Volts
For Anode No. 2 Voltage of	2,000	2,000	2,000	Volts
Anode No. 1 Voltage for focus	362 to 695	362 to 695	362 to 695	Volts
Grid No. 1 Voltage[3]	-30 to -90	-30 to -90	-30 to -90	Volts
Deflection Factors:				
D1 and D2	72 to 108	102 to 154	140 to 210	Volts D-C per Inch
D3 and D4	24 to 36	34 to 52	46 to 68	Volts D-C per Inch
Useful Scan:[4]				
D1 and D2	4.25	4.25	3.5	Inches
D3 and D4	2.50	1.75	1.25	Inches
Frequency for 10% reduction in D3D4 deflection factor due to transit time [5]	200	200	200	mc.

Anode No. 1 Voltage for focus	18.1% to 34.8% of Eb2	Volts
Grid No. 1 Voltage[3]	1.5% to 4.5% of Eb2	Volts

Anode No. 1 Current for any operating condition	-50 to + 10 Microampere

Deflection Factors:

No 3rd Anode or Eb3 = Eb2	
D1 and D2	30 to 45 Volts D-C per inch per Kilovolt of Eb2
D3 and D4	9.5 to 14.5 Volts D-C per inch per Kilovolt of Eb2
Eb3 = Twice Eb2	
D1 and D2	36 to 54 Volts D-C per inch per Kilovolt of Eb2
D3 and D4	12 to 18 Volts D-C per inch per Kilovolt of Eb2

Spot Position (Undeflected)[6] Within 20 Millimeters square

MAXIMUM CIRCUIT VALUES

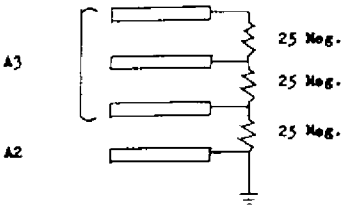
Grid No. 1 Circuit Resistance	1.5 Max. Megohms
Resistance in any Deflecting Electrode Circuit[7]	5 Max. Megohms

NOTES

1. Cathode should be returned to one side or to the mid-tap of the heater transformer winding.

2. Anode No. 2 to final intensifier electrode voltage equally divided over the three intensifier electrodes.

   Suggested method of connection:



   The two A2 terminals must be connected together.

3. Visual extinction of undeflected focused spot.

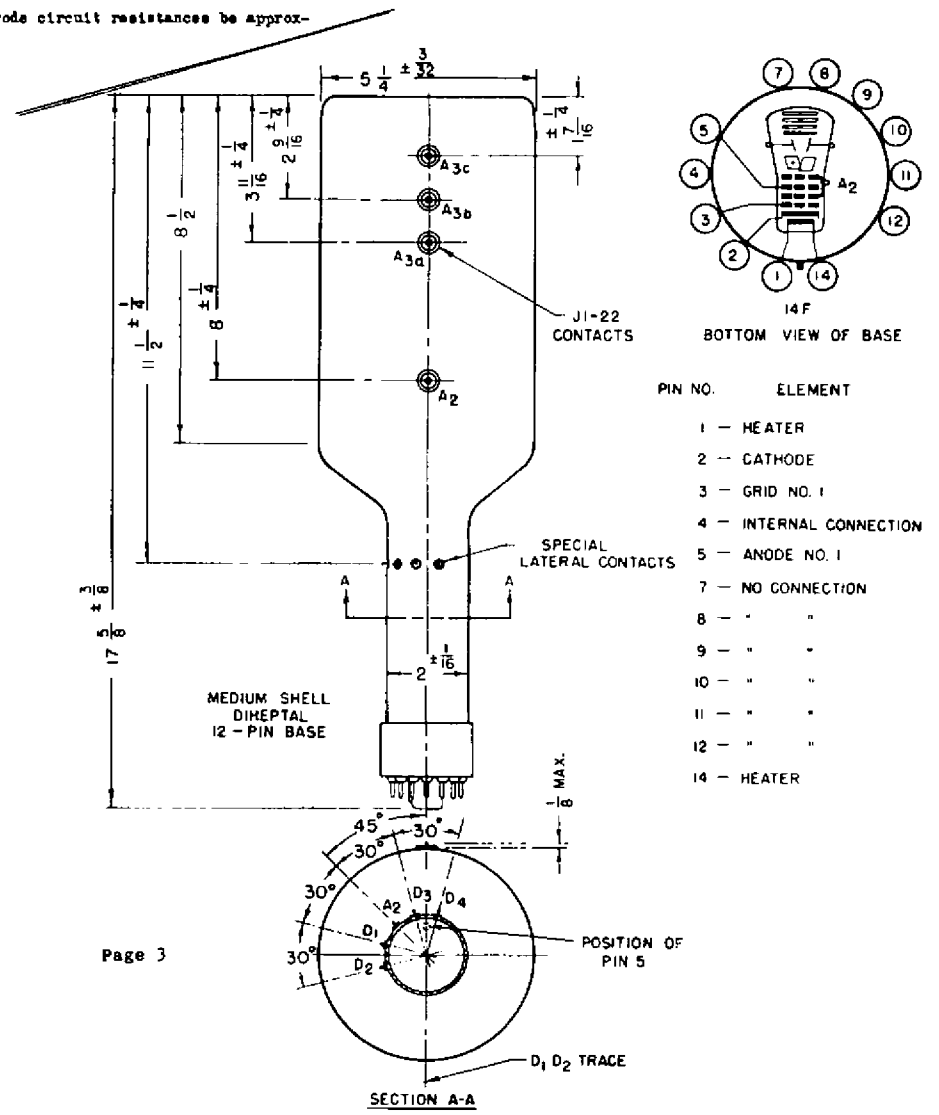
4. Reduction in useful scan when E_{b3} is greater than E_{b2} is determined by the ratio of E_{b3} to E_{b2} (note both voltages are with respect to cathode). Values shown are therefore applicable to any operating condition with E_{b3} to E_{b2} ratios of 2:1, 5:1, and 10:1.

5. Computed.

6. When the tube is operated at (1) normal heater voltage; (2) E_{b2} = 2000 volts; (3) E_{b3} = 10,000 volts; (4) E_{b1} adjusted for focus; (5) E_{c1} set at such a value as will avoid damage to the screen; (6) with each of the deflecting electrodes connected to Anode No. 2; and (7) with the tube shielded against external influences:

   The spot will fall within a 20 mm. square, the center of which coincides with the geometric center of the tube face and the sides of which are parallel to the traces produced by deflecting electrodes D1 and D2 and by deflecting electrodes D3 and D4 respectively.

7. It is recommended that the deflecting electrode circuit resistances be approximately equal.



PIN NO.	ELEMENT
1	HEATER
2	CATHODE
3	GRID NO. 1
4	INTERNAL CONNECTION
5	ANODE NO. 1
7	NO CONNECTION
8	" "
9	" "
10	" "
11	" "
12	" "
14	HEATER

5XP-A CATHODE-RAY TUBES

The Types 5XP-A Cathode-ray Tubes are tight-tolerance, electrostatically focused and deflected cathode-ray tubes containing very high sensitivity D3D4 deflection plates and an intensifier sub-divided into several steps for operation at high voltages and at high ratios of intensifier to second anode voltage.

High D3D4 sensitivity is achieved by using long deflection plates and limiting the D3D4 scan to a useful portion of the full screen diameter. Capacitances are low, being comparable to other types such as the 5JP-A and 5RP-A where deflection connections are made through the neck instead of the base.

Manufacturing tolerances have been reduced considerably in the Type 5XP-A. Deflection factors are held to within 10%, and the angle alignment between the D1D2 and D3D4 traces is held to within 1°. Grid cut-off tolerance has been halved to 25%.

Although the Type 5XP-A Cathode-ray Tubes are particularly useful for wide-band oscillographs, they are suitable for any application requiring high precision, high D3D4 deflection plate sensitivity, and the high writing rate capabilities of multi-band tubes.



GENERAL CHARACTERISTICS

Electrical

Heater Voltage	6.3 Volts
Heater Current	0.6 ± 10% Ampere
Focusing Method	Electrostatic
Deflecting Method	Electrostatic

Phosphor	No. 1	No. 2	No. 11
Fluorescence	Green	Green	Blue
Phosphorescence	—	Green	—
Persistence	Medium	Long	Short

Direct Interelectrode Capacitances

	Min.	*Max.*
Cathode to all other electrodes	3.1	5.8 μμf.
Grid No. 1 to all other electrodes	3.3	6.2 μμf.
D1 to D2	1.0	2.0 μμf.
D3 to D4	1.0	2.0 μμf.
D1 to all other electrodes except D2	1.4	2.8 μμf.
D2 to all other electrodes except D1	1.4	2.8 μμf.
D3 to all other electrodes except D4	1.1	2.3 μμf.
D4 to all other electrodes except D3	1.1	2.3 μμf.

Mechanical

Overall Length	17⅝ ± ¼ Inches
Greatest Diameter of Bulb	5¼ ± 3/32 Inches
Minimum Useful Screen Diameter	4¼ Inches
Bulb Contacts (Recessed Small Ball Caps)	J1-22
Neck Contacts (Small Ball Caps)	J1-25
Base (Medium Shell Diheptal 12-Pin)	B12-37
Basing	14P

Base Alignment:

D1D2 trace aligns with Pin No. 5 and tube axis ..... ±10 Degrees

Positive voltage on D1 deflects beam approximately toward Pin No. 5

Positive voltage on D3 deflects beam approximately toward Pin No. 2
Angle between D3D4 and D1D2 traces ..... 90 ± 1 Degrees
Bulb Contact Alignment:
J1-22 contacts align with D1D2 trace ..... ± 10 Degrees
J1-22 contacts on same side as Pin No. 5

MAXIMUM RATINGS—(Design Center Values)

Post Accelerator Voltage ..... 25,500 Max. Volts D-C
Accelerator Voltage[1] ..... 3,650 Max. Volts D-C
Ratio Post Accelerator Voltage to Accelerator Voltage[2] ..... 10 Max.
Focusing Voltage ..... 1,550 Max. Volts D-C
Grid No. 1 Voltage
Negative Bias Value ..... 200 Max. Volts D-C
Positive Bias Value ..... 0 Max. Volts D-C
Positive Peak Value ..... 0 Max. Volts
Peak Heater Cathode Voltage
Heater Negative with respect to Cathode ..... 180 Max. Volts D-C
Heater Positive with respect to Cathode ..... 180 Max. Volts D-C
Peak Voltage between Accelerator and any Deflection Electrode ..... 1,200 Max. Volts

TYPICAL OPERATING CONDITIONS

For Post Accelerator Voltage[3] of ..... 12,000 Volts
For Accelerator Voltage of ..... 2,000 Volts
Focusing Voltage ..... 362 to 695 Volts
Grid No. 1 Voltage[4] ..... −45 to −75 Volts
Modulation[5] ..... 52 Volts Max.
Line Width A[5] ..... .020 Inch Max.
P1 Light Output[5] (at Ib3 = 10 ua.) ..... 20 Ft. L. Min.
Deflection Factors:
D1 and D2 ..... 130 to 159 Volts D-C per Inch
D3 and D4 ..... 42 to 52 Volts D-C per Inch
Deflection Factor Uniformity[6] ..... 5% Maximum
Useful Scan[7]
D1 and D2 ..... 4.25 Inches*
D3 and D4 ..... 1.60 Inches**
Pattern Distortion at 75% of Useful Scan[2,8] ..... 2% Maximum
Frequency for 10% reduction in D3D4 deflection
amplitude due to transit time[10] ..... 200 mc.
Spot Position (Undeflected) ..... Within a 5/16-inch radius circle[11]

CIRCUIT DESIGN VALUES

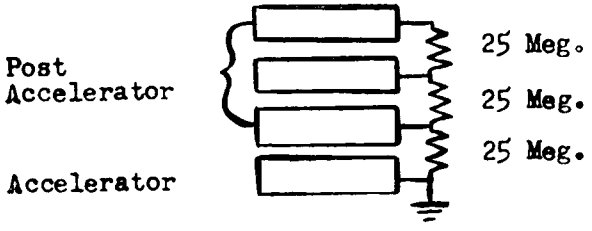
Focusing Voltage ..... 181 to 348 Volts per Kilovolt of Accelerator Voltage
Focusing Current for any operating condition ..... −15 to +10 Microamperes
Grid No. 1 Voltage[4] ..... 22.5 to 37.5 Volts per Kilovolt of Accelerator Voltage
Grid No. 1 Circuit Resistance ..... 1.5 Max. Megohms
Deflection Factors
Post Accelerator Voltage = Accelerator Voltage
D1 and D2 ..... 38 to 46 Volts D-C/Inch/KV of Accelerator Voltage
D3 and D4 ..... 12 to 15 Volts D-C/Inch/KV of Accelerator Voltage
Resistance in any Deflecting Electrode Circuit[12] ..... 5 Max. Megohms

* ± 2.125" minimum from tube face center.
** ± .8" minimum from tube face center.

NOTES

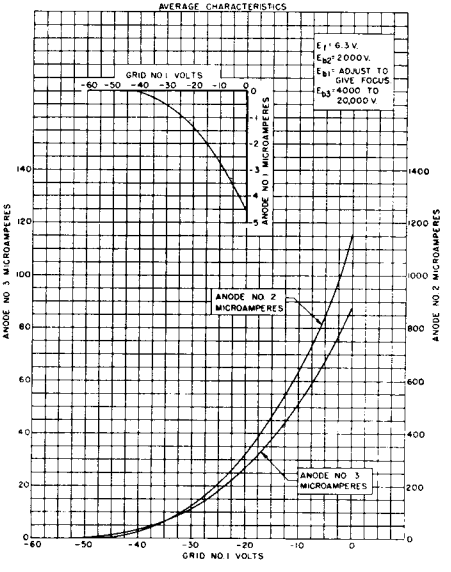
1. The product of Accelerator Voltage and average Accelerator Current should be limited to 6 watts.
2. It is recommended that Post Accelerator to Accelerator Voltage ratio be not more than 6 to 1 in applications where minimum pattern distortion is required.
3. Accelerator to final intensifier electrode voltage equally divided over the three intensifier electrodes.

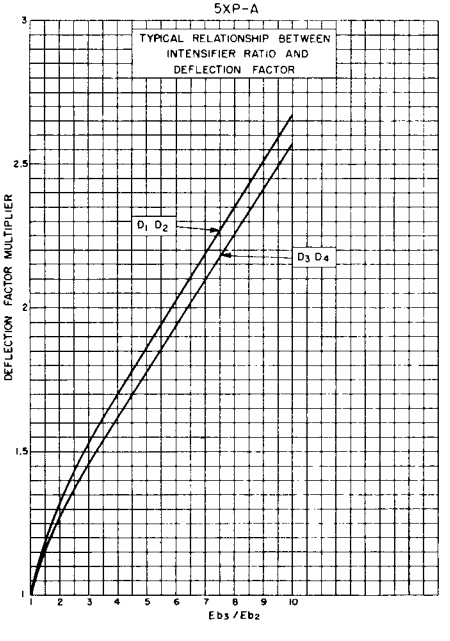
Suggested Method of Intensifier Connection



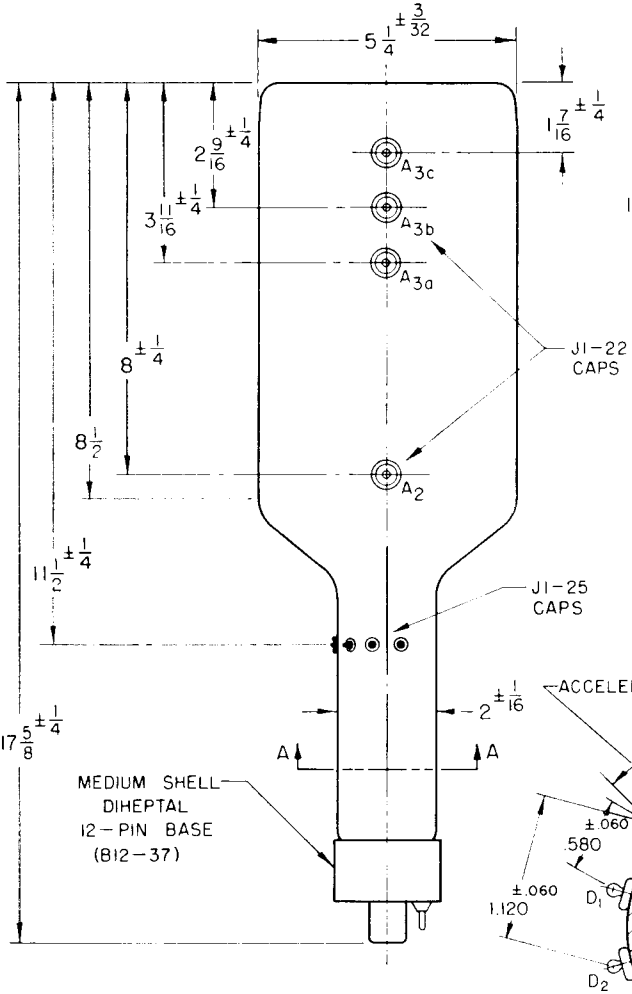
The two accelerator terminals must be connected together.

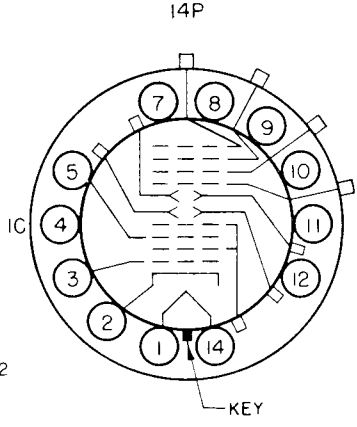
4. Visual extinction of undeflected focused spot.
5. Measured in accordance with MIL-E-1 specifications at Ib3 = 25 ua.
6. The deflection factor (for both D1D2 and D3D4 plate pairs, separately) for a deflection of less than 75% of the useful scan will not differ from the deflection factor for a deflection at 25% of the useful scan by more than the indicated value.
7. Reduction in useful scan when Post Accelerator voltage is greater than Accelerator voltage is determined by the ratio of these voltages measured with respect to cathode. Values shown are therefore applicable to any operating condition with the same voltage ratios.
8. All portions of a raster pattern, adjusted so its widest points just touch the sides of a 1.275 x 3.060-inch rectangle, will fall within the area bounded by the 1.275 x 3.060-inch rectangle and an inscribed 1.225 x 2.940-inch rectangle.
9. Deflection accuracy may be obtained by combining angle between traces, deflection factor uniformity and pattern distortion characteristics. In general, for deflections less than those indicated the accuracy will improve.
10. Computed.
11. When the tube is operated at typical operating conditions (Eh = 6.3 V., Eb3 = 12,000 V., Eb2 = 2,000 V., Eb1 at focus); with Ec1 adjusted to avoid damage to the screen; with each of the deflecting electrodes connected to the accelerator; and with the tube shielded against external influences, the spot will fall within a 5/16-inch radius circle, centered on the tube face.
    Under stable operating conditions, the position of the spot will not shift with changes in intensity by more than .025 inch.
12. It is recommended that the deflecting electrode circuit resistances be approximately equal.
13. For optimum focus the average potentials of the deflection plates and second anode should be the same.


AVERAGE CHARACTERISTICS
E_f = 6.3 V.
E_{b2} = 2000 V.
E_{b1} = ADJUST TO GIVE FOCUS
E_{b3} = 4000 TO 20,000 V.
GRID NO.1 VOLTS
-60 -50 -40 -30 -20 -10 0
ANODE NO.1 MICROAMPERES
ANODE NO. 3 MICROAMPERES
ANODE NO. 2 MICROAMPERES
ANODE NO. 2 MICROAMPERES
ANODE NO. 3 MICROAMPERES
GRID NO.1 VOLTS


5XP-A
TYPICAL RELATIONSHIP BETWEEN INTENSIFIER RATIO AND DEFLECTION FACTOR
DEFLECTION FACTOR MULTIPLIER
D_1 D_2
D_3 D_4
E_{b3}/E_{b2}

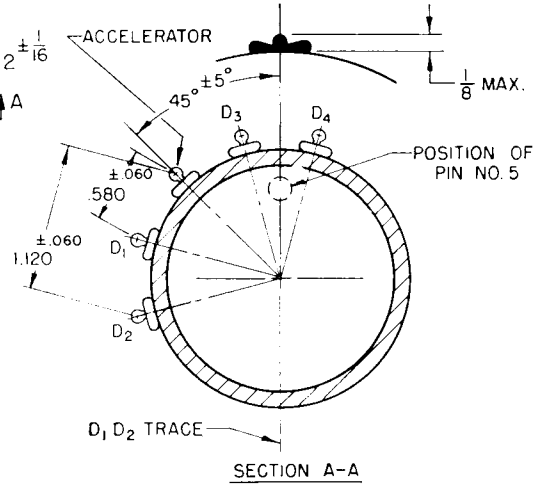
TYPE 5XP-A





BOTTOM VIEW OF BASE

PIN NO.	ELEMENT
1 —	HEATER
2 —	CATHODE
3 —	GRID NO. 1
4 —	INTERNAL CONNECTION
5 —	FOCUSING ELECTRODE
14. —	HEATER



SECTION A-A

5XP-B CATHODE-RAY TUBES

The Types 5XP-B Cathode-ray Tubes are identical to the Types 5XP-A Cathode-ray Tubes, except for the addition of a metallized screen.

In the study of high frequency signals of low repetition rates, or single transients, the use of a metallized screen is a significant advantage. Metallization increases the light output of the screen, which is very desirable in these high frequency applications, and also prevents the building up of spurious charges on the screen by successive transients. Under some circumstances, these spurious charges may distort succeeding transients.

Film-fogging, a problem encountered when photo-recording with high-speed cameras, is also minimized by metallization. This fogging, partly caused by cathode glow passing through an unmetallized screen, may occur when the shutter is held open for a time, awaiting a single transient. In the Type 5XP-B Cathode-ray Tube, cathode glow cannot be transmitted through the metallized layer, thereby eliminating film fogging from this cause.



GENERAL CHARACTERISTICS

Electrical

Heater Voltage	6.3 Volts
Heater Current	0.6 ± 10% Ampere
Focusing Method	Electrostatic
Deflecting Method	Electrostatic

Phosphor	No. 1	No. 2	No. 11
Fluorescence	Green	Green	Blue
Phosphorescence	—	Green	—
Persistence	Medium	Long	Short

Direct Interelectrode Capacitances	Min.	Max
Cathode to all other electrodes	3.1	5.8 μμf.
Grid No. 1 to all other electrodes	3.3	6.2 μμf.
D1 to D2	1.0	2.0 μμf.
D3 to D4	1.0	2.0 μμf.
D1 to all other electrodes except D2	1.4	2.8 μμf.
D2 to all other electrodes except D1	1.4	2.8 μμf.
D3 to all other electrodes except D4	1.1	2.3 μμf.
D4 to all other electrodes except D3	1.1	2.3 μμf.

Mechanical

Overall Length	17⅝ ± ¼ Inches
Greatest Diameter of Bulb	5¼ ± 3/32 Inches
Minimum Useful Screen Diameter	4¼ Inches
Bulb Contacts (Recessed Small Ball Caps)	J1-22
Neck Contacts (Small Ball Caps)	J1-25
Base (Medium Shell Diheptal 12-Pin)	B12-37
Basing	14P
Base Alignment:	
D1D2 trace aligns with Pin No. 5 and tube axis	± 10 Degrees
Positive voltage on D1 deflects beam approximately toward Pin No. 5	
Positive voltage on D3 deflects beam approximately toward Pin No. 2	
Angle between D3D4 and D1D2 traces	90 ± 1 Degrees
Bulb Contact Alignment:	
J1-22 contacts align with D1D2 trace	± 10 Degrees
J1-22 contacts on same side as Pin No. 5	

MAXIMUM RATINGS—(Design Center Values)

Post Accelerator Voltage ..... 25,500 Max. Volts D-C
5,000 Min. Volts D-C
Accelerator Voltage[1] ..... 3,650 Max. Volts D-C
Ratio Post Accelerator Voltage to Accelerator Voltage[2] ..... 10 Max.
Focusing Voltage ..... 1,550 Max. Volts D-C
Grid No. 1 Voltage
Negative Bias Value ..... 200 Max. Volts D-C
Positive Bias Value ..... 0 Max. Volts D-C
Positive Peak Value ..... 0 Max. Volts
Peak Heater Cathode Voltage
Heater Negative with respect to Cathode ..... 180 Max. Volts D-C
Heater Positive with respect to Cathode ..... 180 Max. Volts D-C
Peak Voltage between Accelerator and any Deflection Electrode ..... 1,200 Max. Volts

TYPICAL OPERATING CONDITIONS

For Post Accelerator Voltage[3] of ..... 12,000 Volts
For Accelerator Voltage of ..... 2,000 Volts
Focusing Voltage ..... 362 to 695 Volts
Grid No. 1 Voltage[4] ..... −45 to −75 Volts
Modulation[5] ..... 52 Volts Max.
Line Width A[5] ..... .020 Inch Max.
P1 Light Output[5] (at Ib3 = 10 ua.) ..... 40 Ft. L. Min.
Deflection Factors:
D1 and D2 ..... 130 to 159 Volts D-C per Inch
D3 and D4 ..... 42 to 52 Volts D-C per Inch
Deflection Factor Uniformity[6] ..... 5% Maximum
Useful Scan[7]
D1 and D2 ..... 4.25 Inches*
D3 and D4 ..... 1.60 Inches**
Pattern Distortion at 75% of Useful Scan[2,8] ..... 2% Maximum
Frequency for 10% reduction in D3D4 deflection amplitude
due to transit time[10] ..... 200 mc.
Spot Position (Undeflected) ..... Within a 5/16-inch radius circle[11]

CIRCUIT DESIGN VALUES

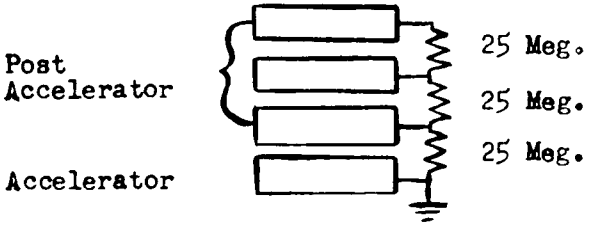
Focusing Voltage ..... 181 to 348 Volts per Kilovolt of Accelerator Voltage
Focusing Current for any operating condition ..... −15 to +10 Microamperes
Grid No. 1 Voltage[4] ..... 22.5 to 37.5 Volts per Kilovolt of Accelerator Voltage
Grid No. 1 Circuit Resistance ..... 1.5 Max. Megohms
Deflection Factors
Post Accelerator Voltage = Accelerator Voltage
D1 and D2 ..... 38 to 46 Volts D-C/Inch/KV of Accelerator Voltage
D3 and D4 ..... 12 to 15 Volts D-C/Inch/KV of Accelerator Voltage
Resistance in any Deflecting Electrode Circuit[12] ..... 5 Max. Megohms

* ± 2.125" minimum from tube face center
** ± .8" minimum from tube face center

NOTES

1. The product of Accelerator Voltage and average Accelerator Current should be limited to 6 watts.
2. It is recommended that Post Accelerator to Accelerator Voltage ratio be not more than 6 to 1 in applications where minimum pattern distortion is required.
3. Accelerator to final intensifier electrode voltage equally divided over the three intensifier electrodes.

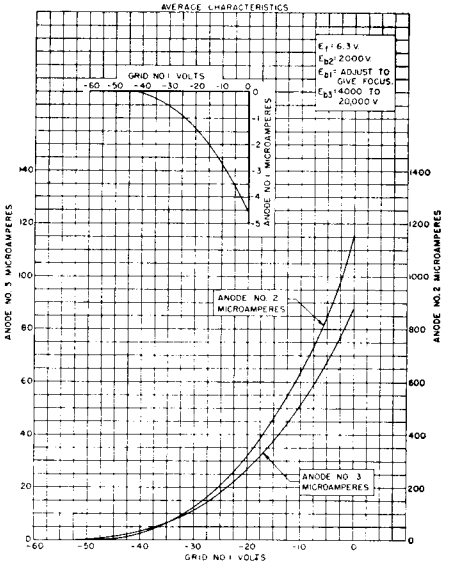
Suggested Method of Intensifier Connection



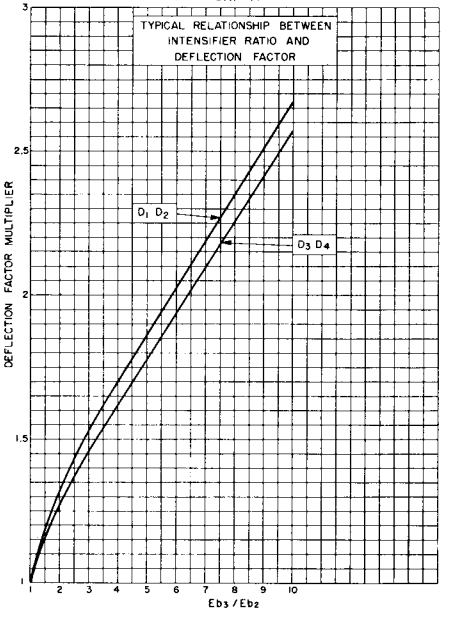
The two accelerator terminals must be connected together.

4. Visual extinction of undeflected focused spot.
5. Measured in accordance with MIL-E-1 specifications at Ib3 = 25 ua.
6. The deflection factor (for both D1D2 and D3D4 plate pairs, separately) for a deflection of less than 75% of the useful scan will not differ from the deflection factor for a deflection at 25% of the useful scan by more than the indicated value.
7. Reduction in useful scan when Post Accelerator voltage is greater than Accelerator voltage is determined by the ratio of these voltages measured with respect to cathode. Values shown are therefore applicable to any operating condition with the same voltage ratios.
8. All portions of a raster pattern, adjusted so its widest points just touch the sides of a 1.275 x 3.060-inch rectangle, will fall within the area bounded by the 1.275 x 3.060-inch rectangle and an inscribed 1.225 x 2.940-inch rectangle.
9. Deflection accuracy may be obtained by combining angle between traces, deflection factor uniformity and pattern distortion characteristics. In general, for deflections less than those indicated the accuracy will improve.
10. Computed.
11. When the tube is operated at typical operating conditions (Eh = 6.3 V., Eb3 = 12,000 V., Eb2 = 2,000 V., Eb1 at focus); with Ec1 adjusted to avoid damage to the screen; with each of the deflecting electrodes connected to the accelerator; and with the tube shielded against external influences, the spot will fall within a 5/16-inch radius circle, centered on the tube face.
    Under stable operating conditions, the position of the spot will not shift with changes in intensity by more than .025 inch.
12. It is recommended that the deflecting electrode circuit resistances be approximately equal.
13. For optimum focus the average potentials of the deflection plates and second anode should be the same.

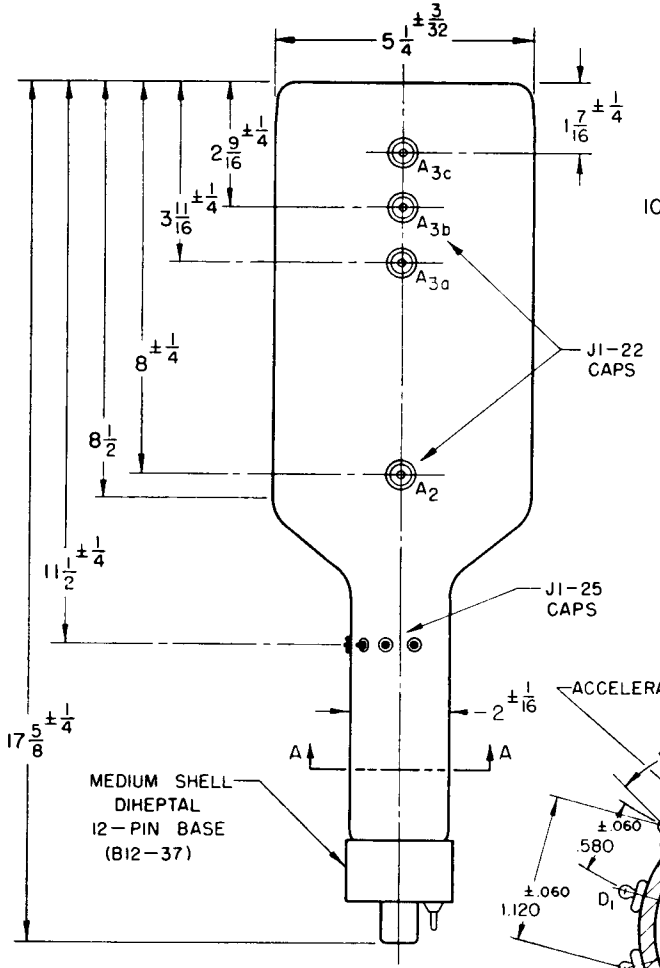
5XP1-B, 5XP2-B, 5XP11-B

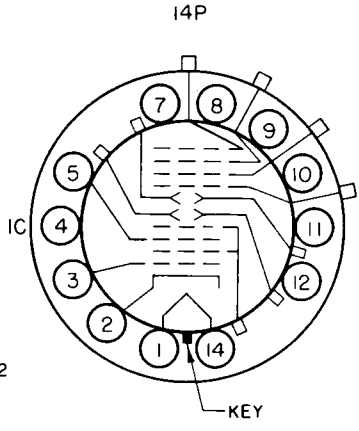


5XP-B AND 5XP-A



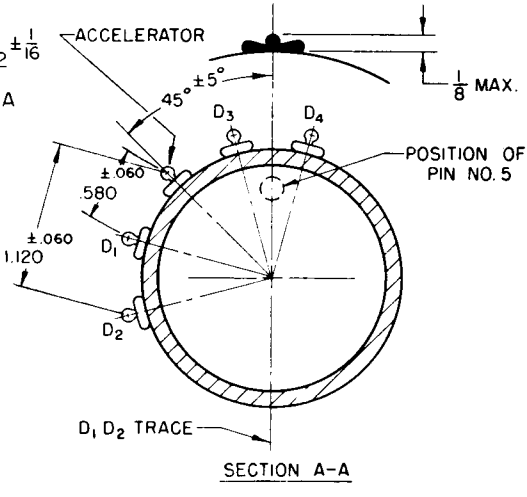
TYPE 5XP-B





BOTTOM VIEW OF BASE

PIN NO.	ELEMENT
1	HEATER
2	CATHODE
3	GRID NO. 1
4	INTERNAL CONNECTION
5	FOCUSING ELECTRODE
14.	HEATER



SECTION A-A

5YP- CATHODE-RAY TUBES

The Type 5YP- is an electrostatic focus and deflection cathode-ray tube, with very high sensitivity D3D4 deflection plates, featuring an intensifier for increased brightness and writing rate, with a minimum loss in deflection sensitivity.

The high D3D4 sensitivity is achieved by using long deflection plates and limiting the D3D4 scan to a useful portion of the full screen diameter. Capacitances are low, being comparable to other types such as the 5JP-A and 5RP-A, where deflection connections are made through the neck instead of the base.

The 5YP- is particularly useful for wide band oscillographs and for any application requiring high D3D4 deflection plate sensitivity.



GENERAL CHARACTERISTICS

Electrical

Heater Voltage ..... 6.3 Volts
Heater Current ..... 0.6 ± 10% Ampere
Focusing Method ..... Electrostatic
Deflecting Method ..... Electrostatic

Phosphor	No. 1	No. 2	No. 7	No. 11
Fluorescence	Green	Green	Blue	Blue
Phosphorescence	—	Green	Yellow	—
Persistence	Medium	Long	Long	Short

Direct Interelectrode Capacitances, Approx.
Cathode to all other electrodes .....5 $\mu\mu$f.
Grid No. 1 to all other electrodes .....5 $\mu\mu$f.
D1 to D2 .....2 $\mu\mu$f.
D3 to D4 .....2 $\mu\mu$f.
D1 to all other electrodes except D2 .....2.5 $\mu\mu$f.
D2 to all other electrodes except D1 .....2.5 $\mu\mu$f.
D3 to all other electrodes except D4 .....2 $\mu\mu$f.
D4 to all other electrodes except D3 .....2 $\mu\mu$f.

Mechanical

Overall Length ..... 17 5/8 ± 3/8 Inches
Greatest Diameter of Bulb ..... 5 1/4 ± 3/32 Inches
Minimum Useful Screen Diameter ..... 4 1/4 Inches
Bulb Contact (Recessed Small Ball Cap) J1-22
Neck Contacts (Small Ball Caps) J1-25
Base (Medium Shell Diheptal 12-Pin) B12-37
Basing 14Q
Base Alignment:
D1D2 trace aligns with Pin No. 5 and tube axis ..... ± 10 Degrees
Positive voltage on D1 deflects beam approximately toward Pin No. 5
Positive voltage on D3 deflects beam approximately toward Pin No. 2
Angle between D3D4 and D1D2 traces ..... 90 ± 2 Degrees
Bulb Contact Alignment:
J1-22 contact aligns with D1D2 trace ..... ± 10 Degrees
J1-22 contact on same side as Pin No. 5

MAXIMUM RATINGS—(Design Center Values)

Post Accelerator Voltage ..... 8,000 Max. Volts D-C
Accelerator Voltage[1] ..... 3,500 Max. Volts D-C
Ratio Post Accelerator Voltage to Accelerator Voltage ..... 2.3 Max.
Focusing Voltage ..... 1,550 Max. Volts D-C

Grid No. 1 Voltage
- Negative Bias Value ..... 200 Max. Volts D-C
- Positive Bias Value ..... 0 Max. Volts D-C
- Positive Peak Value ..... 0 Max. Volts

Peak Heater Cathode Voltage
- Heater Negative with respect to Cathode ..... 180 Max. Volts D-C
- Heater Positive with respect to Cathode ..... 180 Max. Volts D-C

Peak Voltage between Accelerator and any
- Deflection Electrode ..... 1,200 Max. Volts

TYPICAL OPERATING CONDITIONS

For Post Accelerator Voltage of ..... 4,000 Volts
For Accelerator Voltage of ..... 2,000 Volts
Focusing Voltage ..... 362 to 695 Volts
Grid No. 1 Voltage[2] ..... −30 to −90 Volts
Modulation[3] ..... 52 Volts Max.
Line Width A[3] ..... .032 Inch Max.
P1 Light Output[3] ..... 15 Ft. L. Min.
Deflection Factors:
- D1 and D2 ..... 72 to 108 Volts D-C per Inch
- D3 and D4 ..... 24 to 36 Volts D-C per Inch

Deflection Factor Uniformity[4] ..... 2% Max.
Useful Scan[5]:
- D1 and D2 ..... 4.25 (±2.125 from tube face center) Inches
- D3 and D4 ..... 2.50 (±1.25 from tube face center) Inches

Pattern Distortion at 75% of useful scan[6] ..... 2½% Max.
Frequency for 10% reduction in D3D4 deflection amplitude due to transit time[7] ..... 200 mc.
Spot Position (Focused and Undeflected) ..... Within a 5/16-inch radius circle[9]

CIRCUIT DESIGN VALUES

Focusing Voltage ..... 181 to 348 Volts per Kilovolt of Accelerator Voltage
Focusing Current for any operating condition ..... −15 to +10 Microamperes
Grid No. 1 Voltage[2] ..... 15 to 45 Volts per Kilovolt of Accelerator Voltage
Grid No. 1 Circuit Resistance ..... 1.5 Max. Megohms
Deflection Factors:
- Post Accelerator Voltage = Accelerator Voltage
- D1 and D2 ..... 30 to 45 Volts D-C/Inch/KV of Accelerator Voltage
- D3 and D4 ..... 9.5 to 14.5 Volts D-C/Inch/KV of Accelerator Voltage

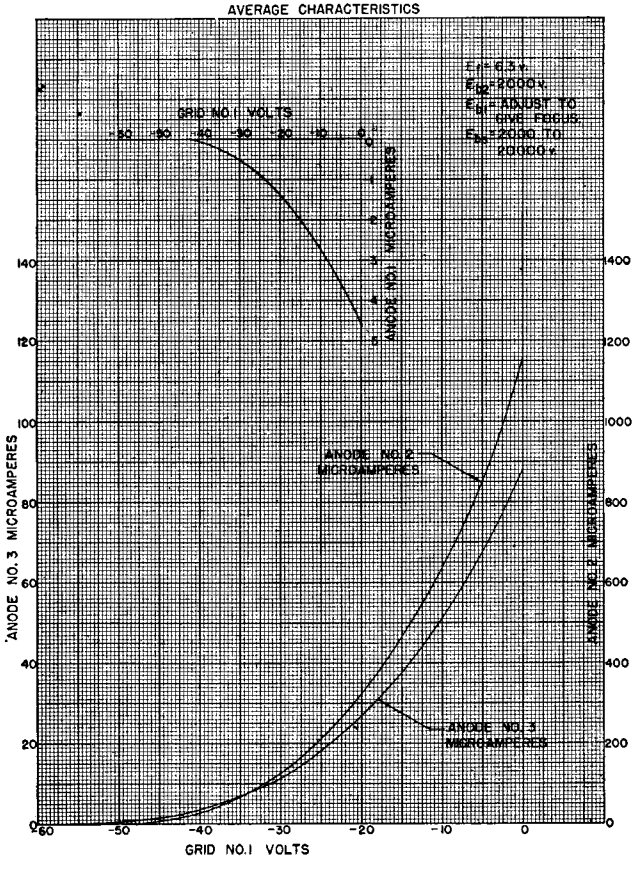
Resistance in any Deflecting Electrode Circuit[10] ..... 5 Max. Megohms

NOTES

1. The product of accelerator voltage and average accelerator current should be limited to 6 watts.
2. Visual extinction of undeflected focused spot.
3. Measured in accordance with JAN-1A Specifications at a post accelerator current of 25 ua.
4. The deflection factor (for both D1D2 and D3D4 plate pairs, separately) for a deflection of less than 75% of the useful scan will not differ from the deflection factor for a deflection at 25% of the useful scan by more than the indicated value.
5. Reduction in useful scan when post accelerator voltage is greater than accelerator voltage is determined by the ratio of these voltages measured with respect to cathode. Values shown are therefore applicable to any operating condition with the same voltage ratios.
6. The edges of a raster pattern, whose mean dimensions are the indicated percentage of useful scan, shall not deviate from the mean dimension rectangle by more than the specified amount.
7. Computed.

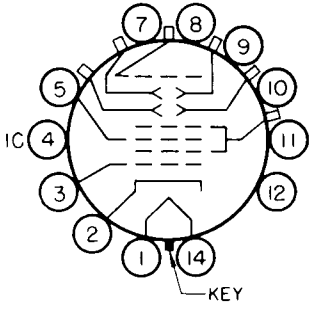
8. Deflection accuracy may be obtained by combining angle between traces, deflection factor uniformity and pattern distortion characteristics. In general, for deflections less than those indicated, the accuracy will improve.
9. Centered with respect to the tube face with the tube shielded.
10. It is recommended that the deflecting electrode circuit resistances be approximately equal.
11. For optimum focus the average potentials of the deflection plates and second anode should be the same.

5YP1, 5YP2, 5YP11



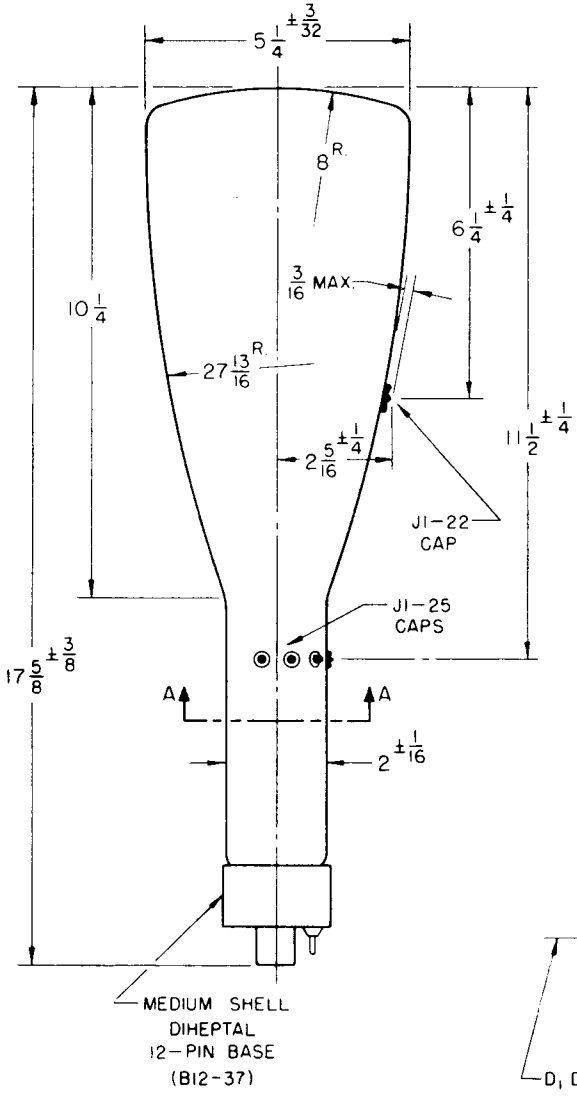
TYPE 5YP-

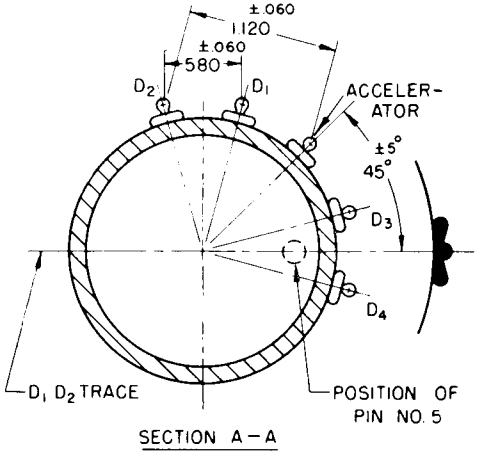
14Q



BOTTOM VIEW OF BASE

PIN NO.	ELEMENT
1	— HEATER
2	— CATHODE
3	— GRID NO 1
4	— INTERNAL CONNECTION
5	— FOCUSING ELECTRODE
14	— HEATER





SECTION A-A

TYPE 6291

The 6291 is a 10 stage multiplier phototube of the end-window type predominately sensitive to visible radiation.

ELECTRICAL DATA	Min.	Bog.	Max.	(units)
Spectral response		S9		
Cathode luminous sensitivity at 210 volts, 0 cycles between cathode and all other electrodes	40	60		ua/l
Anode luminous sensitivity				
105 volts/stage, 0 cycles	4	13		A/l
145 volts/stage, 0 cycles	28	120		A/l
Wavelength at maximum response	4300	4800	5300	Angstroms
Cathode sensitivity at maximum response at 210 volts between cathode and all other electrodes		3.7×10^{-2}		uA/uW
Anode dark current at 105 volts/stage			.05	uA
Interelectrode dark current at 105 volts/stage			.05	uA
Current amplification				
at 105 volts/stage	100,000	215,000		
at 145	700,000	2,000,000		
Interelectrode capacitances				
anode to all other electrodes		3.3		uuf
anode to last dynode		1.3		uuf

MECHANICAL DATA

Window dimensions	1 1/4			In. Dia.
Seated height to center of window		4 1/4 ± 1/4		
Tube diameter		1 1/2 ± 1/16		
Overall Length		4 3/4 ± 1/4		

Base type Small shell duodecal 12 pin (B12-43)

Mounting position Any

MAXIMUM RATINGS	Min.	Bog.	Max.	(units)
Peak cathode current ✓			20	ua
Average anode current *			5	mA
Peak anode current			25	mA
Average anode dissipation *			0.5	W
Peak anode dissipation			2.5	W

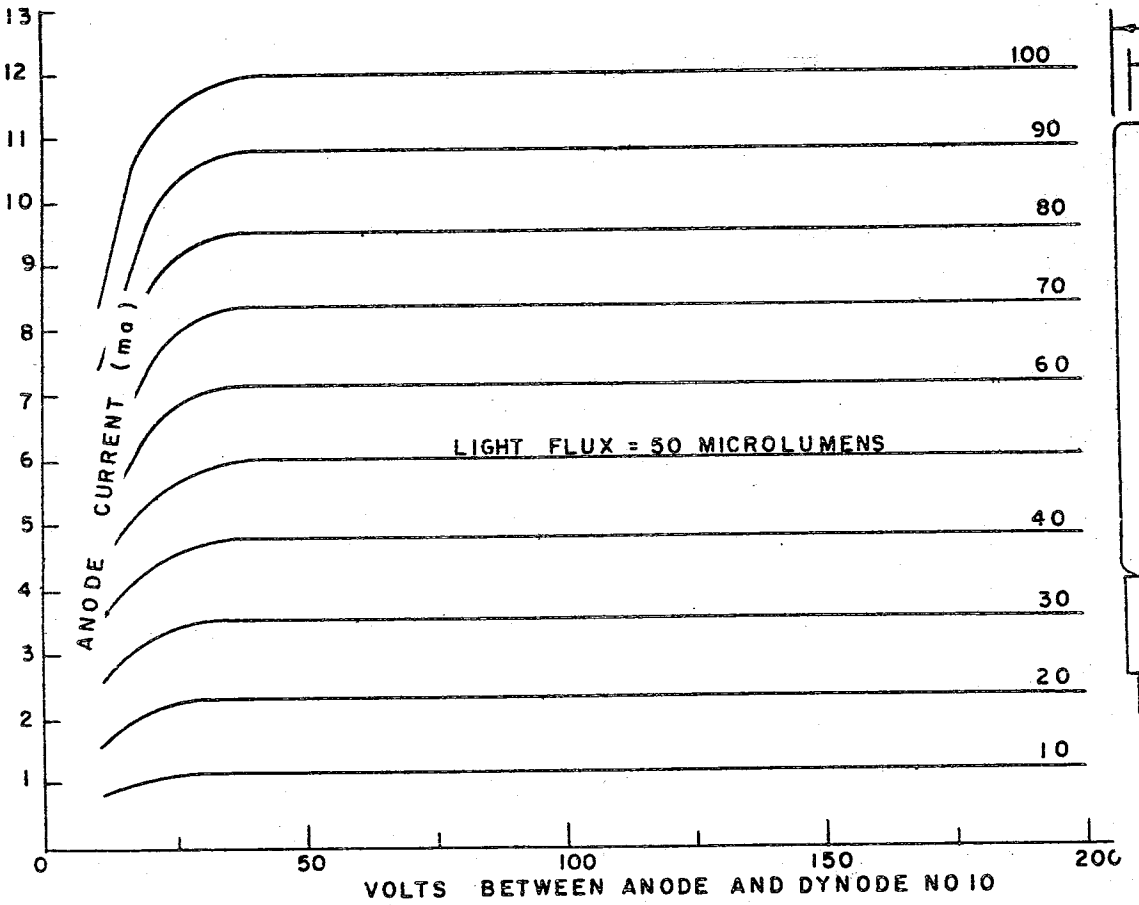
Supply voltage between anode and cathode

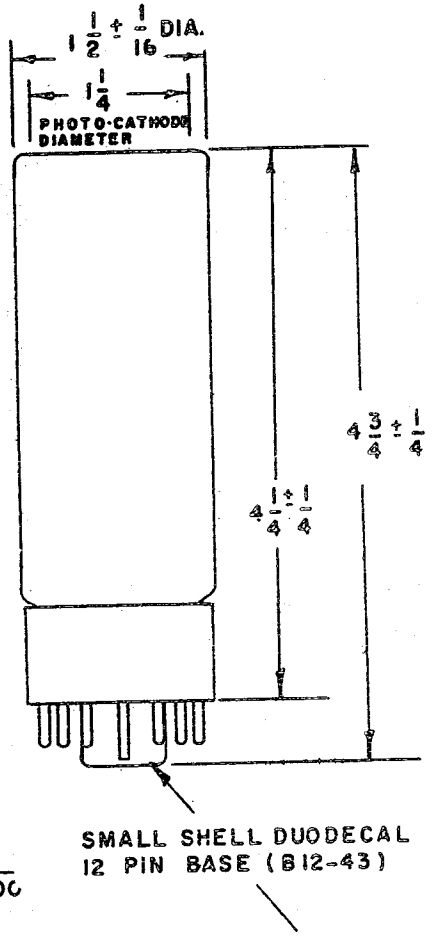
✓ The cathode current given here is that current at which the response of the cathode current ceases to be a linear function of the light intensity because of cathode resistance. In general, the cathode current must be kept well below this value in order to satisfy the maximum ratings on the anode current.

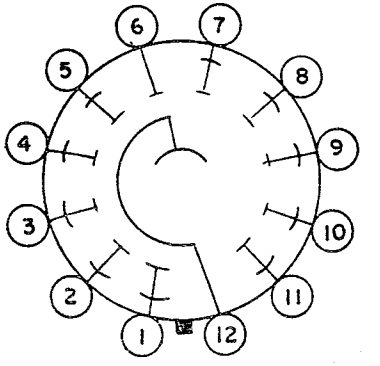
* Averaged over a 30 second interval maximum.

PHOTO-MULTIPLIER TUBE
TYPE 6291

AVERAGE ANODE CHARACTERISTIC 6291 VOLTAGE / STAGE = 145





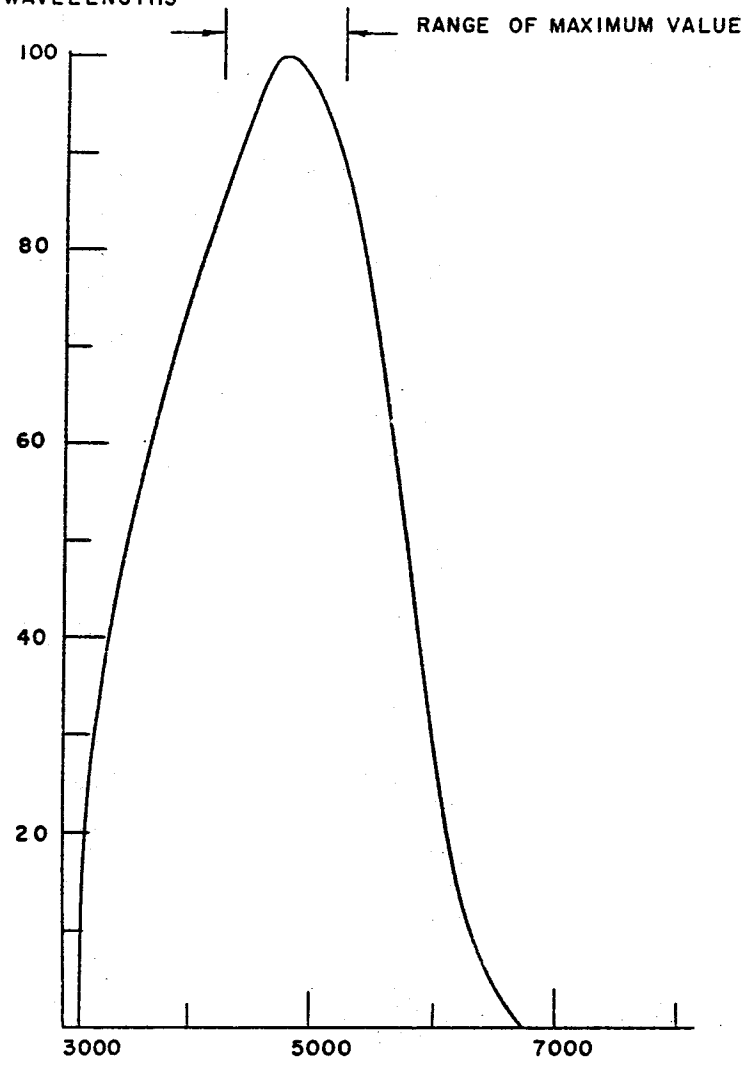


BOTTOM VIEW

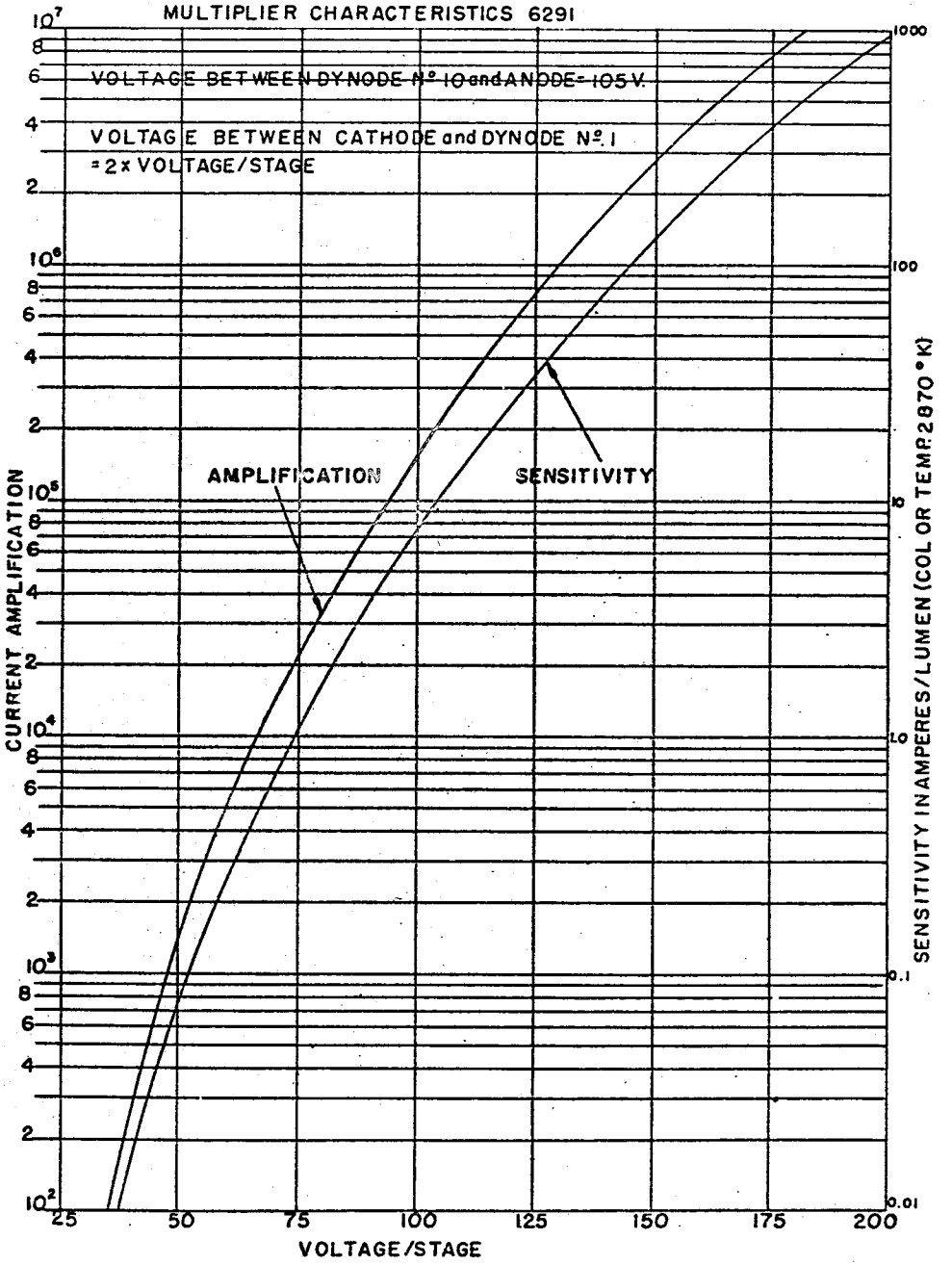
PIN NO.		ELEMENT
1	DYNODE	NO. 1
2	DYNODE	NO 3
3	DYNODE	NO 5
4	DYNODE	NO 7
5	DYNODE	NO 9
6	ANODE	
7	DYNODE	NO 10
8	DYNODE	NO 8
9	DYNODE	NO 6
10	DYNODE	NO 4
11	DYNODE	NO 2
12	CATHODE	

NOTE: DIRECTION OF LIGHT INTO END OF BULB

SPECTRAL SENSITIVITY CHARACTERISTIC OF 6291 FOR EQUAL VALUES OF RADIANT FLUX AT ALL WAVELENGTHS



MULTIPLIER CHARACTERISTICS 6291



DATA FORM

MULTIPLIER PHOTOTUBE

TYPE 6292

The 6292 is a 10 stage multiplier phototube of the end-window type predominately sensitive to visible radiation.

ELECTRICAL DATA	Min.	Bog.	Max.	(units)
Spectral response		S9		
Cathode luminous sensitivity at 210 volts, 0 cycles between cathode and all other electrodes	40	60		ua/l
Anode luminous sensitivity				
105 volts/stage, 0 cycles	4	13		A/l
145 volts/stage, 0 cycles	28	120		A/l
Wavelength at maximum response	4300	4800	5300	Angstroms
Cathode sensitivity at maximum response at 210 volts between cathode and all other electrodes		3.7×10^{-2}		uA/uW
Anode dark current at 105 volts/stage			.05	uA
Interelectrode dark current at 105 volts/stage			.05	uA
Current amplification				
at 105 volts/stage	100,000	215,000		
at 145	700,000	2,000,000		
Interelectrode capacitances				
anode to all other electrodes		3.3		uuf
anode to last dynode		1.3		uuf

MECHANICAL DATA				
Window dimensions	1.5			in. Dia.
Seated height to center of window		4 7/8 ± 3/16		in.
Tube diameter		2 ± 1/16		in.
Overall Length		5 5/8 ± 3/16		in.

Base type Medium-shell diheptal 14 pin (B14-38)

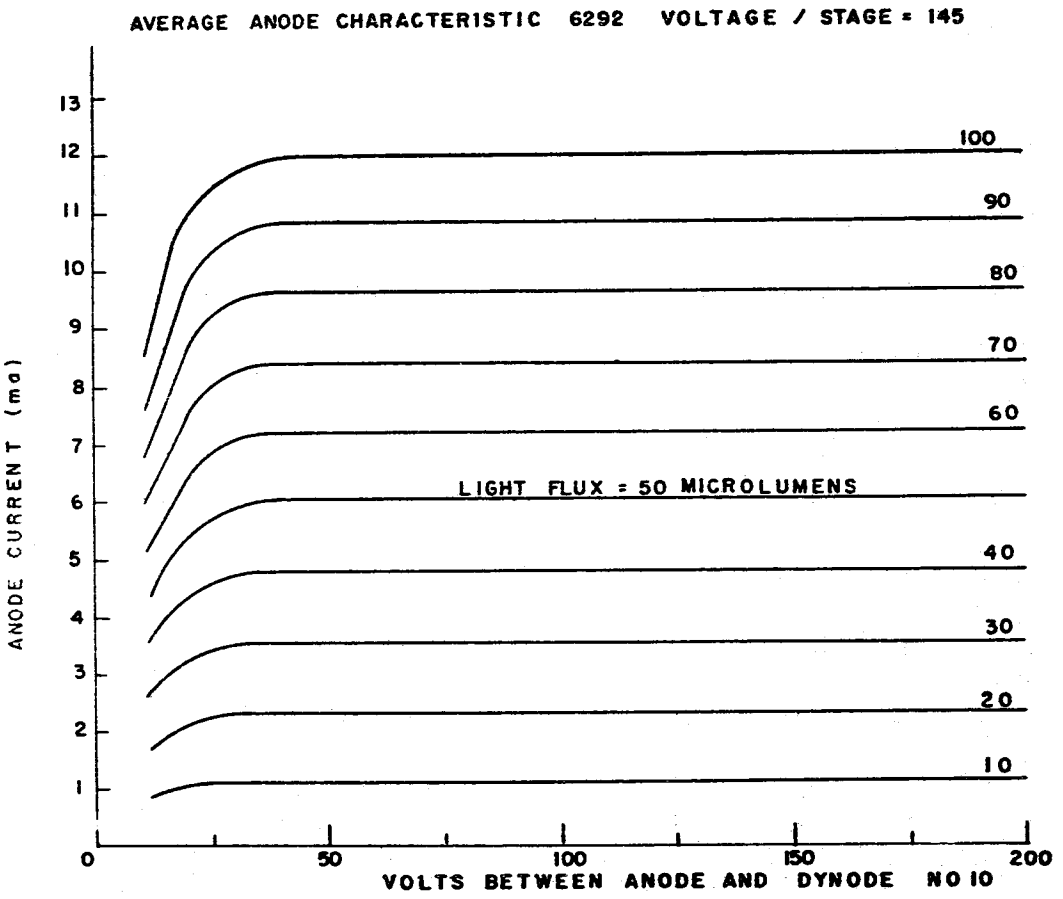
Mounting Position Any

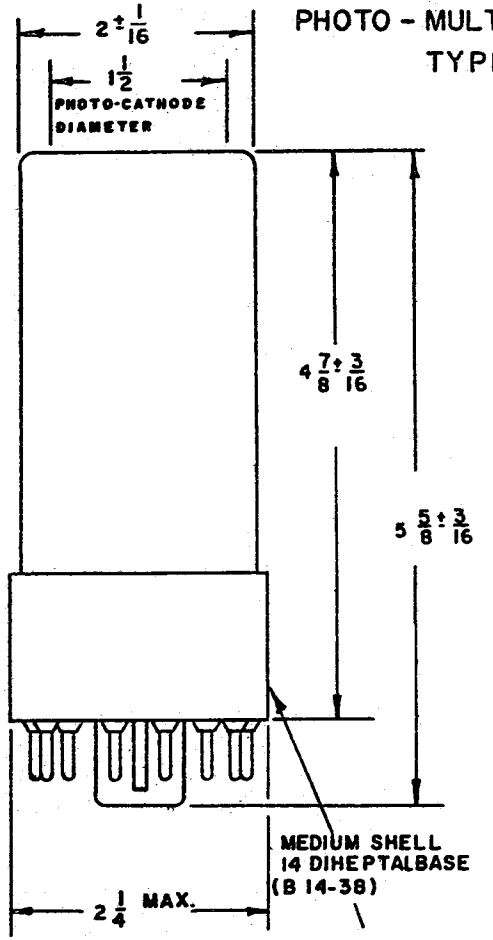
MAXIMUM RATINGS		
Peak cathode current ∮	20	ua
Average anode current *	5	mA
Peak anode current	25	mA
Average anode dissipation *	0.5	W
Peak anode dissipation	2.5	W
Supply voltage between anode and cathode (DC or peak AC)	2,100	Volts

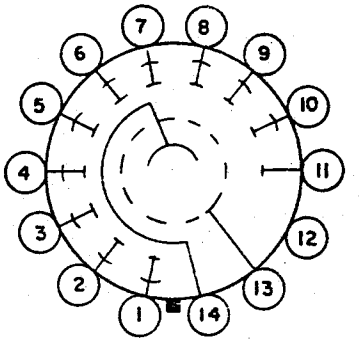
∮ The cathode current given here is that current at which the response of the cathode current ceases to be a linear function of the light intensity because of cathode resistance. In general, the cathode current must be kept well below this value in order to satisfy the maximum ratings on the anode current.

* Averaged over a 30 second interval maximum.

PHOTO - MULTIPLIER TUBE
TYPE 6292



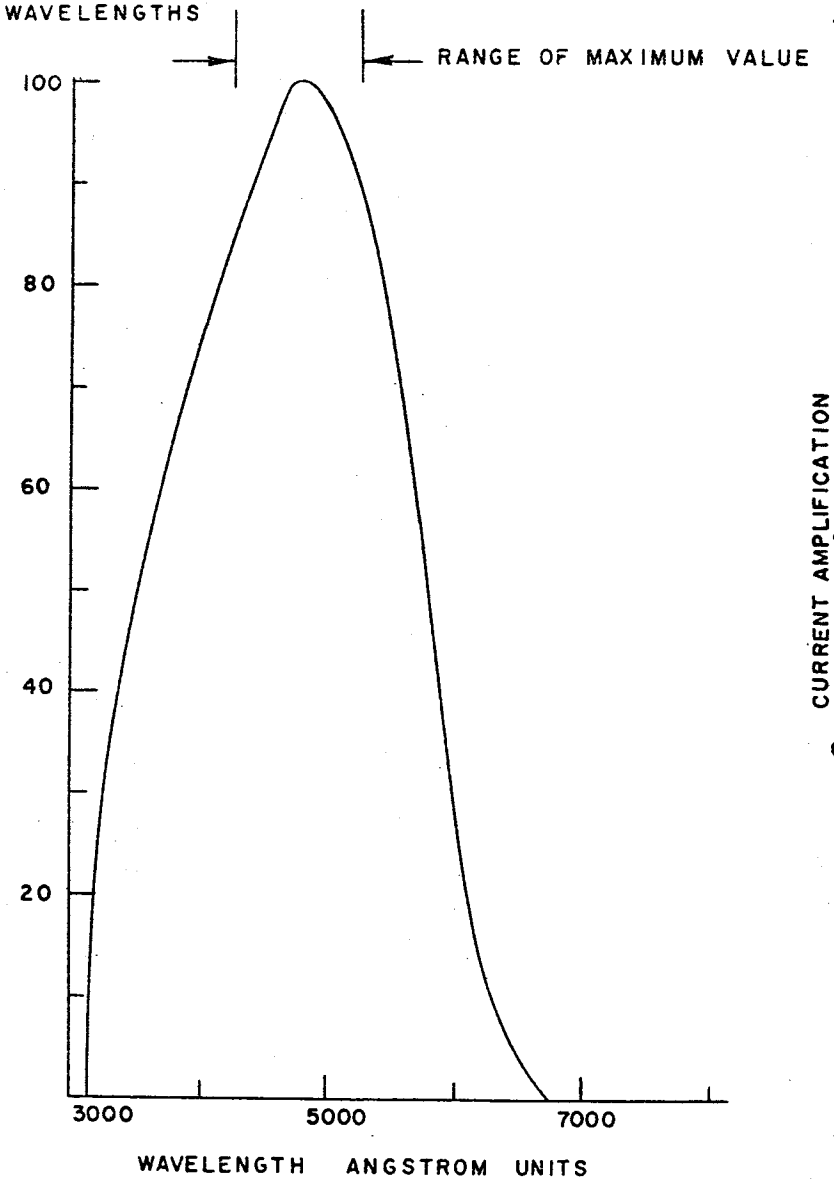


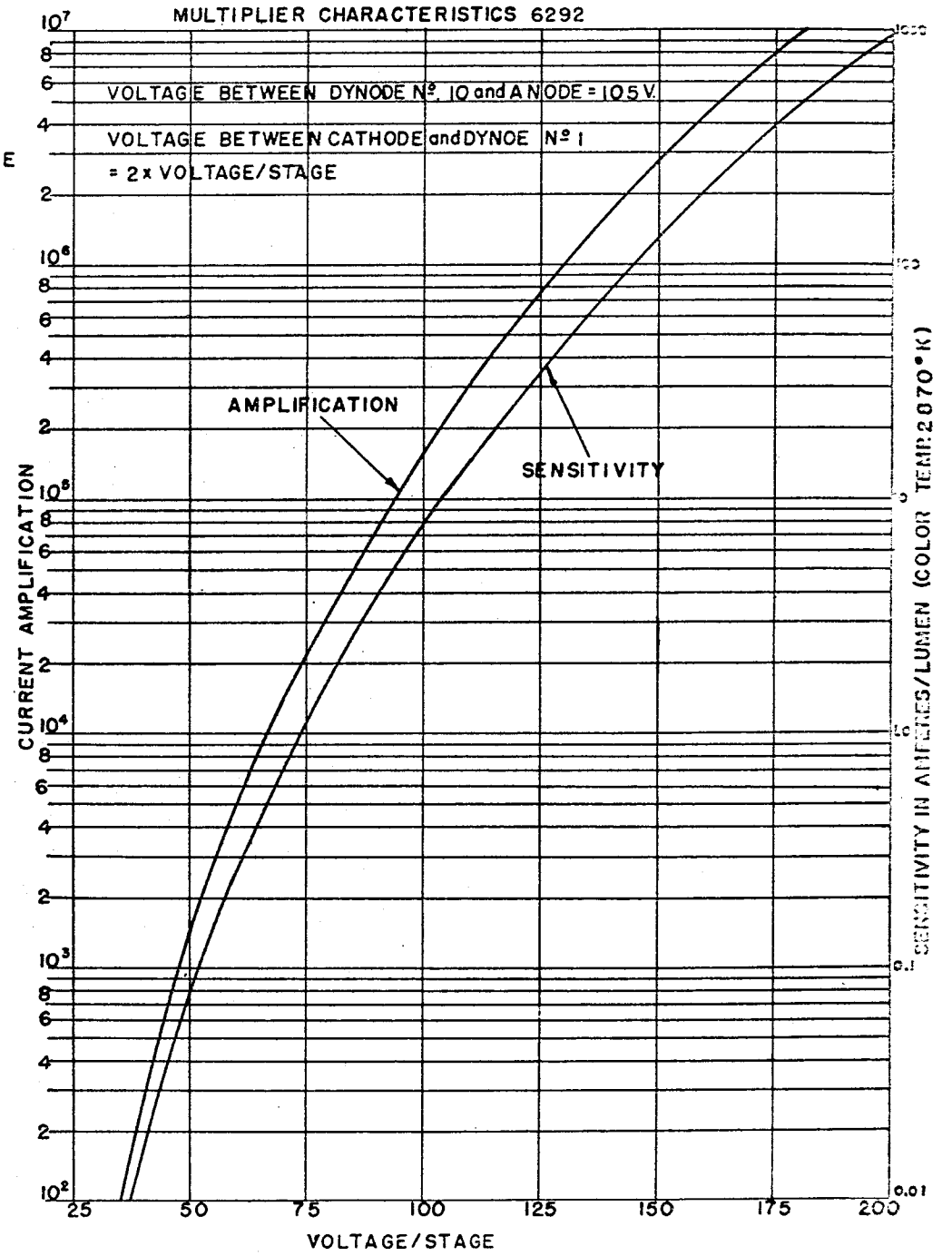


PIN NO	ELEMENT
1	DYNODE NO 1
2	DYNODE NO 2
3	DYNODE NO 3
4	DYNODE NO 4
5	DYNODE NO 5
6	DYNODE NO 6
7	DYNODE NO 7
8	DYNODE NO 8
9	DYNODE NO 9
10	DYNODE NO 10
11	ANODE
12	INTERNAL CONNECTION
13	SHIELD
14	CATHODE

NOTE: DIRECTION OF LIGHT INTO END OF BULB

SPECTRAL SENSITIVITY CHARACTERISTIC OF 6292
FOR EQUAL VALUES OF RADIANT FLUX AT ALL
WAVELENGTHS



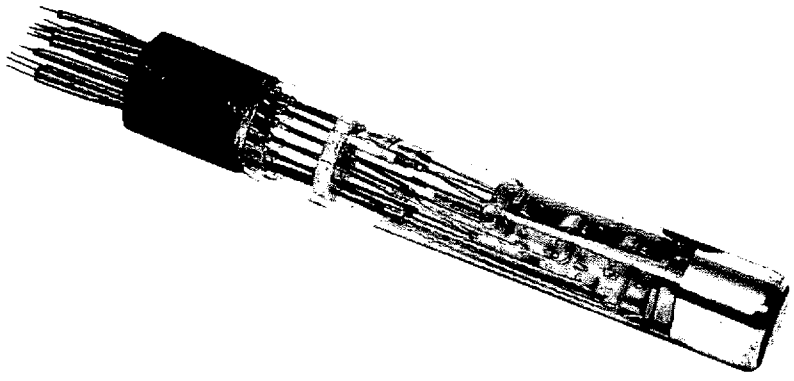


from JEDEC release #2462, May 11, 1959

DU MONT

INDUSTRIAL MULTIPLIER PHOTOTUBES

TYPE: 6362



GENERAL CHARACTERISTICS

ELECTRICAL DATA	Min.	Avg.	Max.	Units
Spectral response		S11		
Cathode luminous sensitivity at 210 volts, 0 cycles between cathode and all other electrodes	30	50		μA/lumen
Anode luminous sensitivity 105 volts/stage, 0 cycles	3	7.5		A/lumen
Cathode sensitivity at maximum response at 210 volts between cathode and all other electrodes		.045		μA/μW
Anode dark current at 105 volts/stage (25°C)			.05	μA
Current amplification at 105 volts/stage		150,000		
Wavelength at maximum response		4400 ± 500		Angstroms
Wavelength at 10% of maximum response on long wavelength side		6125 ± 275		Angstroms
Wavelength at 10% of maximum response on short wavelength side		3250 ± 250		Angstroms

MECHANICAL DATA		
Window dimensions, minimum	½	In Dia.
Tube Diameter	¾ ± 1/32	In.
Overall Length	4 7/8 ± ¼	In.
Base — Resin (potted) flexible leads		
Mounting Position	Any	
Window index of refraction	1.5	

MAXIMUM RATINGS		
Peak cathode current (Note 1)	10	μA
Average anode current (Note 2)	1	mA
Peak anode current	5	mA
Average anode dissipation (Note 2)	0.5	W
Peak anode dissipation	2.0	W
Supply voltage between anode and cathode (DC or peak AC)	1300	Volts
Supply voltage between last dynode and anode (DC or peak AC)	125	Volts
Supply voltage between cathode and 1st dynode (DC or peak AC)	250	Volts
Ambient Temperature	75	°C

NOTES

1. The cathode current given here is that current at which the response of the cathode current ceases to be a linear function of the light intensity because of cathode resistance. In general, the cathode current must be kept well below this value in order to satisfy the maximum ratings of the anode current.
2. Averaged over a 30 second interval maximum.

RECOMMENDED ACCESSORY: MU-METAL SHIELD DU MONT P/N 243-2

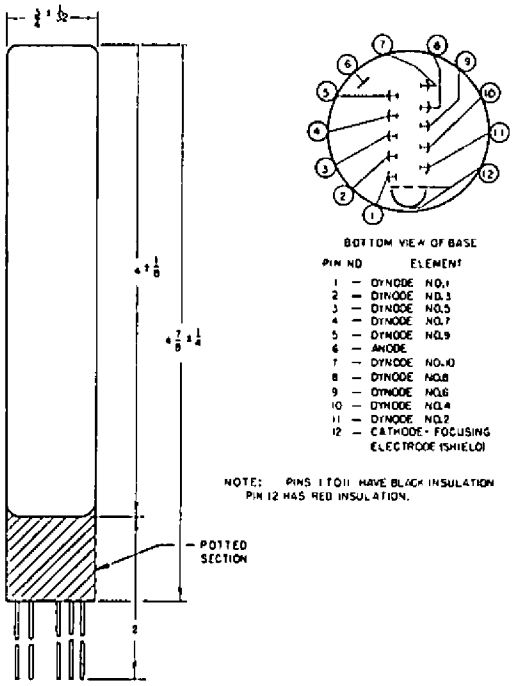
FEATURES

- S11 Response
- 10 Dynode Stages
- ¾ Inch Diameter
- Silver Magnesium Dynodes
- Potted Base for:
  - a. Moisture Resistance
  - b. Shock Resistance
  - c. Socket Elimination
  - d. Noise Free Connections
- Comparable Performance with Large Diameter Tubes
- Maximum Stability at High Voltages
- Small Size for Limited Space Use

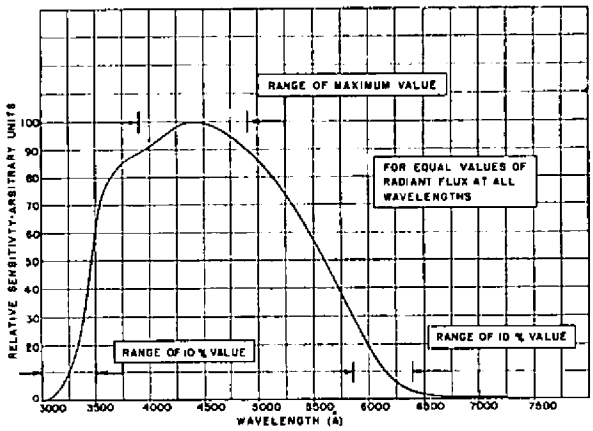
APPLICATIONS

- Scintillation Probes
- Analysis Low Level Light Sources
- Oil Exploration
- Spectroscopy

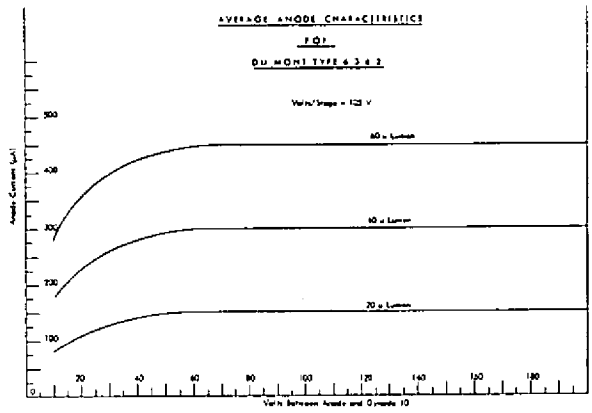
DU MONT INDUSTRIAL TUBE SALES DEPARTMENT
750 Bloomfield Avenue Clifton, New Jersey, U.S.A.

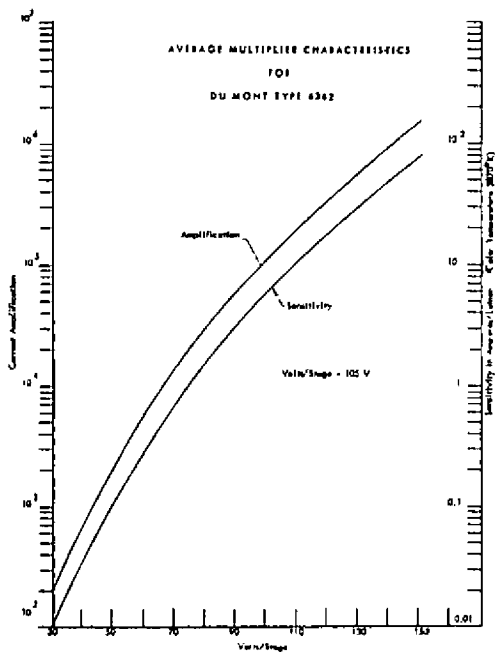


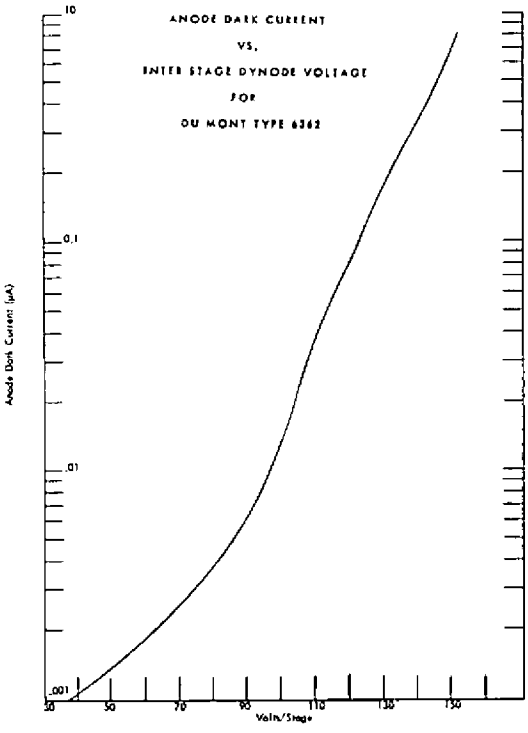
OUTLINE DRAWING TYPE 6362



SPECTRAL RESPONSE OF S11 PHOTOCATHODE







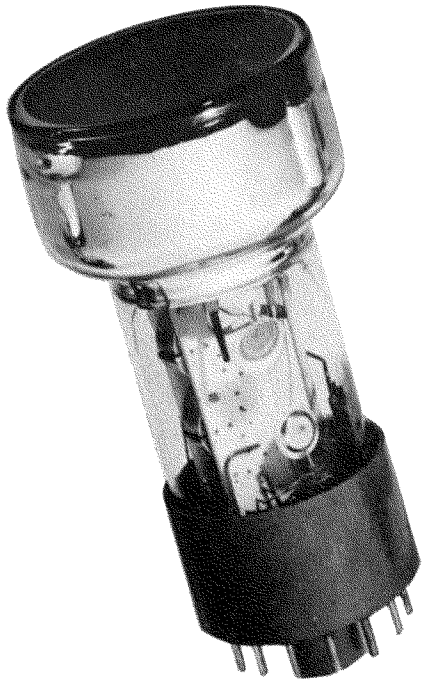
© 1959

ALLEN B. DU MONT LABORATORIES, INC. INDUSTRIAL TUBE SALES DEPARTMENT
750 Bloomfield Avenue Clifton, New Jersey

DU MONT

type 6363

Multiplier Phototube



The Du Mont Type 6363 is a 10-stage multiplier phototube of the end-window type with a spectral response predominantly in the visible region (see spectral sensitivity curve). The Type 6363 is 3 inches in diameter.

The Type 6363 features a highly sensitive uniform photocathode with an average sensitivity of 60 ua/lumen. Optimum photo-electron collection is accomplished by adjustment of the potential between the separate shield and photocathode. This optimum photo-electron collection assures excellent signal-to-noise ratio, particularly at low light levels.

Advanced construction in the Type 6363 provides an arrangement of the box-type dynodes in linear cascade. This permits a large physical separation between the anode and photocathode resulting in low leakage currents because of the long leakage paths in the tube, resulting in an appreciable improvement in the signal-to-noise ratio.

Because of the new construction, as well as the material and construction of the dynodes, the Type 6363 has very excellent stability over long periods of time.

The fairly large end-window dimension of the Type 6363 makes it particularly useful for scintillation counting using crystals of medium size.

GENERAL CHARACTERISTICS

Electrical

	Min.	Avg.	Max.	(units)
Spectral response		S4		
Cathode luminous sensitivity at 210 volts, 0 cycles between cathode and all other electrodes	40	60		μA/lumen
Anode luminous sensitivity				
105 volts/stage, 0 cycles	4	13		A/lumen
145 volts/stage, 0 cycles	28	120		A/lumen
Wavelength at maximum response	3500	4000	4500	Angstroms
Cathode sensitivity at maximum response at 210 volts between cathode and all other electrodes		.056		μA/μW
Anode dark current at 105 volts/stage (25°C)			.05	μA
Interelectrode dark current at 105 volts/stage (25°C)			.05	μA
Current amplification at:				
105 volts/stage	100,000	215,00		
145 volts/stage	700,000	2,000,000		
Interelectrode capacitances				
anode to all other electrodes				
Anode to last dynode		3.3		μμf
Shield Potential (Note 3)		1.3		μμf

Mechanical

	Min.	Avg.	Max.	(units)
Window dimension	2½			in. Dia.
Greatest bulb diameter		3 ± 3/32		in.
Neck diameter		2 ± 1/16		in.
Seated height		5-3/8 ± 3/16		in.
Overall length		6-1/8 ± 3/16		in.
Base - Medium shell diheptal, 14 pin (B14-38)				
Mounting position		Any		

Maximum Ratings (Design Center Values)

Peak cathode current (Note 1)	20	μA
Average anode current	5	mA
(Note 2)	25	mA
Peak anode current	0.5	W
Average anode dissipation	2.5	W
(Note 2)		
Peak anode dissipation		
Supply voltage between anode and cathode (DC or peak AC)	1800	Volts
Ambient Temperature	75	°C

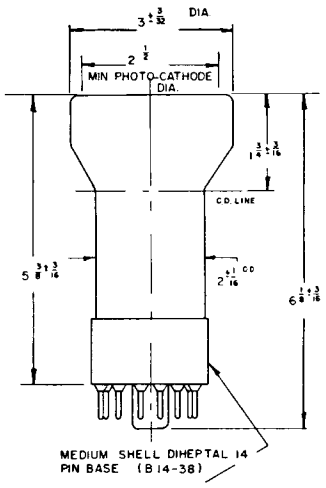
NOTES

1. The cathode current given here is that current at which the response of the cathode current ceases to be a linear function of the light intensity because of cathode resistance. In general, the cathode current must be kept well below this value in order to satisfy the maximum ratings on the anode current.

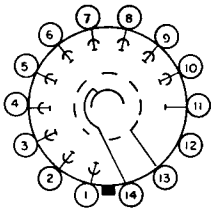
2. Averaged over a 30 second interval maximum.

3. Shield potential may be operated at any point between photocathode and dynode No. 1. In general, however, optimum signal-to-noise ratio is obtained when the shield potential is 10 to 40% of that between photocathode and dynode No. 1.

Technical Sales Department
ALLEN B. DU MONT LABORATORIES, INC.
760 Bloomfield Avenue, Clifton, New Jersey

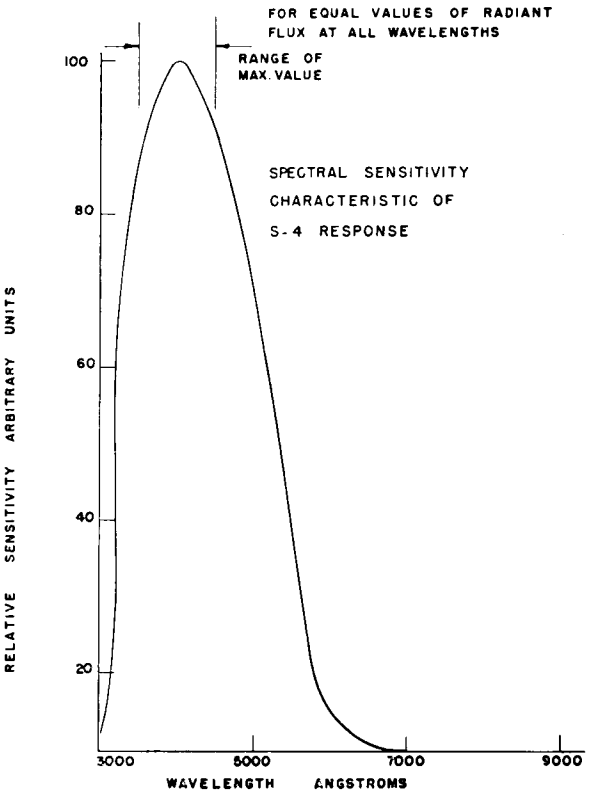


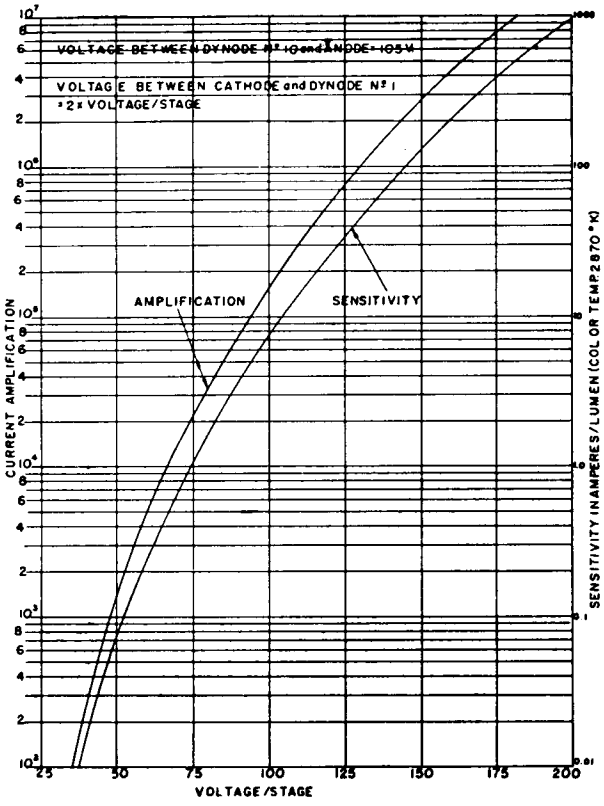
NOTE: DIRECTION OF LIGHT INTO END OF BULB.

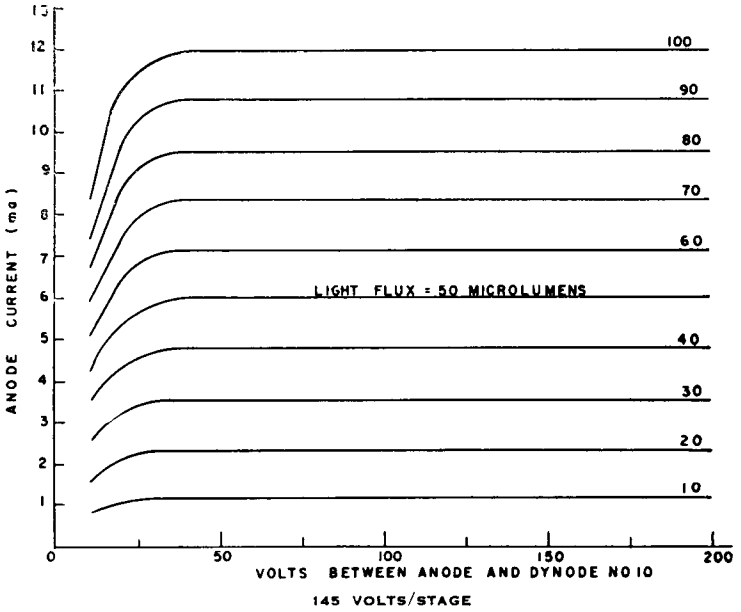


BOTTOM VIEW

PIN NO.	ELEMENT
1	DYNODE NO.1
2	DYNODE NO.2
3	DYNODE NO.3
4	DYNODE NO.4
5	DYNODE NO.5
6	DYNODE NO.6
7	DYNODE NO.7
8	DYNODE NO.8
9	DYNODE NO.9
10	DYNODE NO.10
11	ANODE
12	INTERNAL CONNECTION
13	SHIELD
14	CATHODE







DU MONT

type 6364

Multiplier Phototube



The Du Mont Type 6364 is a 10-stage multiplier phototube of the end-window type with a spectral response, see curve, predominantly in the visible region. The Type 6364 is 5¼ inches in diameter with a minimum window diameter of 4-3/16 inches.

The Type 6364 features a highly sensitive uniform photocathode with an average sensitivity of 60 ua/lumen. Optimum photo-electron collection is accomplished by adjustment of the potential between the separate shield and photocathode. This optimum photo-electron collection assures excellent signal-to-noise ratio, particularly at low light levels.

Advanced construction in the Type 6364 provides an arrangement of the box-type dynodes in linear cascade. This permits a large physical separation between the anode and photocathode resulting in low leakage currents because of the long leakage paths in the tube, resulting in an appreciable improvement in the signal-to-noise ratio.

Because of the new construction, as well as the material and construction of the dynodes, the Type 6364 has very excellent stability over long periods of time.

The large end-window dimension of the Type 6364 makes it particularly valuable in those applications where the large area gives a good statistical count of widely distributed light pulses such as in scintillation counting using crystals of greater than average size.

GENERAL CHARACTERISTICS

Electrical

	Min.	Avg.	Max.	(units)
Spectral response		S4		
Cathode luminous sensitivity at 210 volts, 0 cycles between cathode and all other electrodes	40	60		μA/lumen
Anode luminous sensitivity				
105 volts/stage, 0 cycles	4	13		A/lumen
145 volts/stage, 0 cycles	28	120		A/lumen
Wavelength at maximum response	3500	4000	4500	Angstroms
Cathode sensitivity at maximum response at 210 volts between cathode and all other electrodes		.056		μA/μW
Anode dark current at 105 volts/stage (25°C)			.05	μA
Interelectrode dark current at 105 volts/stage (25°C)			.05	μA
Current amplification at:				μμf.
105 volts/stage	100,000	215,000		μμf.
145 volts/stage	700,000	2,000,000		
Interelectrode capacitances				
anode to all other electrodes		3.3		
anode to last dynode		1.3		
Shield Potential (Note 3)				

Mechanical

	Min.	Avg.	Max.	(units)
Window dimension	4-3/16			
Greatest bulb diameter		5-1/4 ± 3/32		in. Dia.
Neck diameter		2 ± 1/16		in.
Seated height		6-3/4 ± 3/16		in.
Overall length		7-1/2 ± 3/16		in.
Base - Medium shell diheptal, 14 pin (B14-38)				
Mounting position		Any		in.

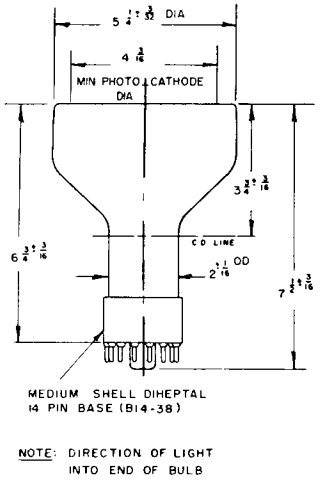
Maximum Ratings (Design Center Values)

Peak Cathode current (Note 1)	20	μA
Average anode current (Note 2)	5	mA
Peak anode current	25	mA
Average anode dissipation (Note 2)	0.5	W
Peak anode dissipation	2.5	W
Supply voltage between anode and cathode (DC or peak AC)	1800	Volts
Ambient Temperature	75	°C

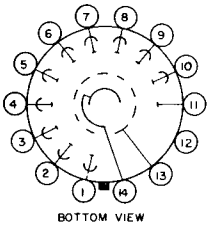
NOTES

1. The cathode current given here is that current at which the response of the cathode current ceases to be a linear function of the light intensity because of cathode resistance. In general, the cathode current must be kept well below this value in order to satisfy the maximum ratings on the anode current.
2. Averaged over a 30 second interval maximum.
3. Shield potential may be operated at any point between photocathode and dynode No. 1. In general, however, optimum signal-to-noise ratio is obtained when the shield potential is 10 to 40% of that between photocathode and dynode No. 1.

Technical Sales Department
ALLEN B. DU MONT LABORATORIES, INC.
760 Bloomfield Avenue, Clifton, New Jersey

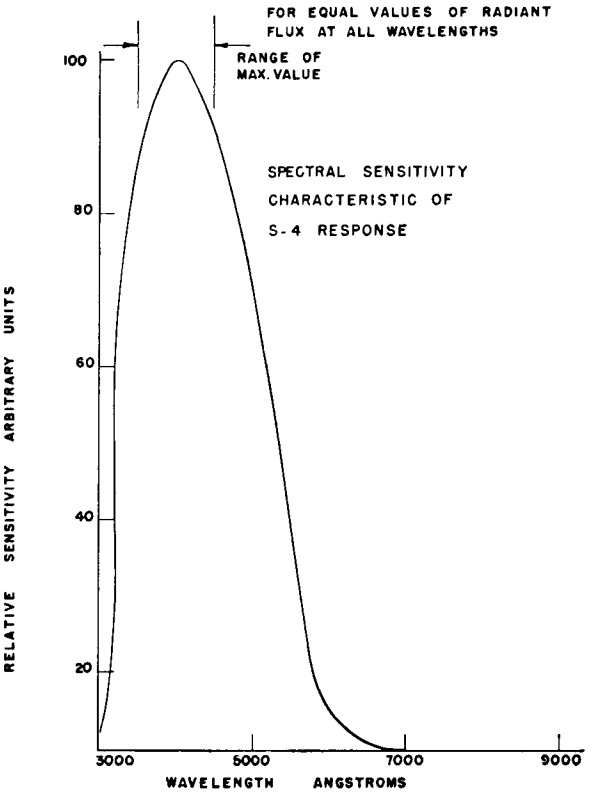


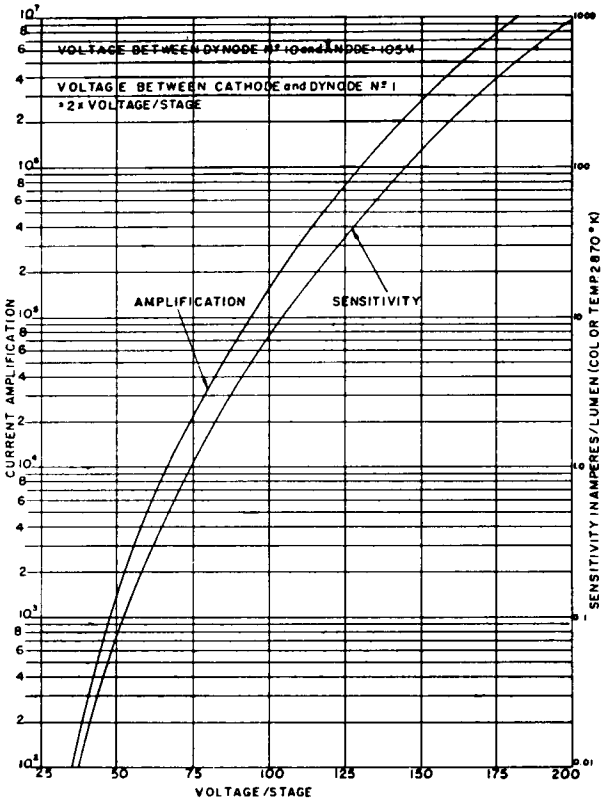
NOTE: DIRECTION OF LIGHT INTO END OF BULB

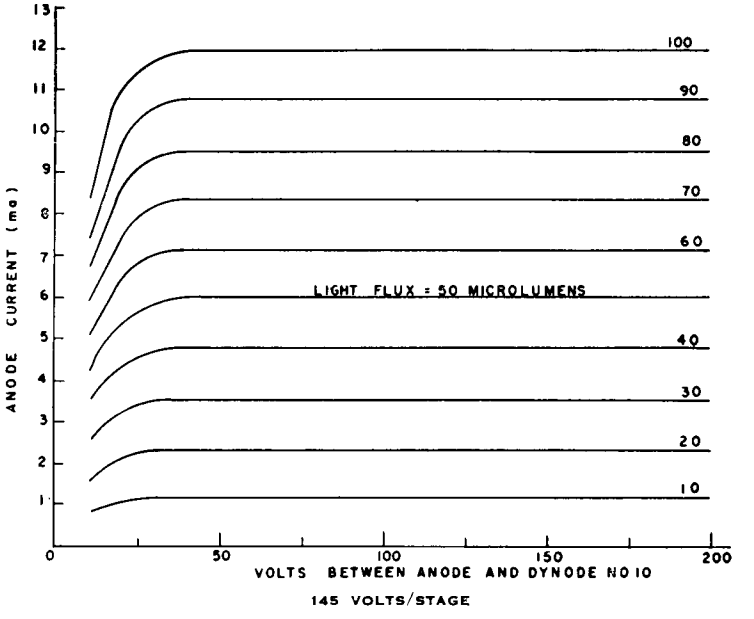


BOTTOM VIEW

PIN NO.	ELEMENT
1	DYNODE NO 1
2	DYNODE NO 2
3	DYNODE NO 3
4	DYNODE NO 4
5	DYNODE NO 5
6	DYNODE NO 6
7	DYNODE NO 7
8	DYNODE NO 8
9	DYNODE NO 9
10	DYNODE NO 10
11	ANODE
12	INTERNAL CONNECTION
13	SHIELD
14	CATHODE







from JETEC release #1427,
March 7, 1955

DUMONT

MULTIPLIER PHOTOTUBE

TYPE 6365

The Du Mont Type 6365 is a 6-stage multiplier phototube with a flat end-window type photocathode having a S-11 spectral response. The average photocathode luminous sensitivity is 50 microamperes per lumen. The diameter of this tube is 3/4 of an inch. Because of its small size, it is ideal for applications where space is at a premium but where operational requirements are exacting. The focusing shield has been connected internally for the optimum photoelectron collection.

GENERAL CHARACTERISTICS

Electrical Data

	Avg.	
Spectral response	S11	
Cathode sensitivity at 210 volts, 0 cycles between cathode and all other electrodes	50	uA/lumen
Cathode radiant sensitivity at maximum response at 210 volts between cathode and all other electrodes	0.056	uA/uW
Wavelength at maximum response	4400 ± 500	Angstroms
Anode sensitivity at 150 volts/stage, 0 cycles (Note 1)	150	ma/lumen
Current amplification at 150 volts/stage (Note 1)	3000	
Anode dark current, at 150 volts/stage (25°C)	1.0	uA

Mechanical Data

Window dimension, minimum	1/2	In. Dia.
Seated height	2 3/16 ± 1/16	In.
Tube diameter	3/4 ± 1/16	In.
Overall Length, maximum	2 3/4	In.
Base type	DuMont 9 Pin miniature	
Mounting position	Any	
Window index of refraction	1.5	

MAXIMUM RATINGS

Peak cathode current (Note 2)	10	uA
Average anode current (Note 3)	1	ma
Peak anode current	5	ma
Average anode dissipation (Note 3)	0.5	W
Peak anode dissipation	2.0	W
Supply voltage between anode and cathode (DC or peak AC)	1300	Volts
Supply voltage between last dynode and anode (DC or peak AC)	150	Volts
Supply voltage between cathode and 1st dynode (DC or peak AC)	300	Volts
Ambient Temperature	75	°C

Allen B. Du Mont Laboratories, Inc.
Passaic, New Jersey

TL-1180-3
11 JAN 1955

MULTIPLIER PHOTOTUBE

TYPE 6365

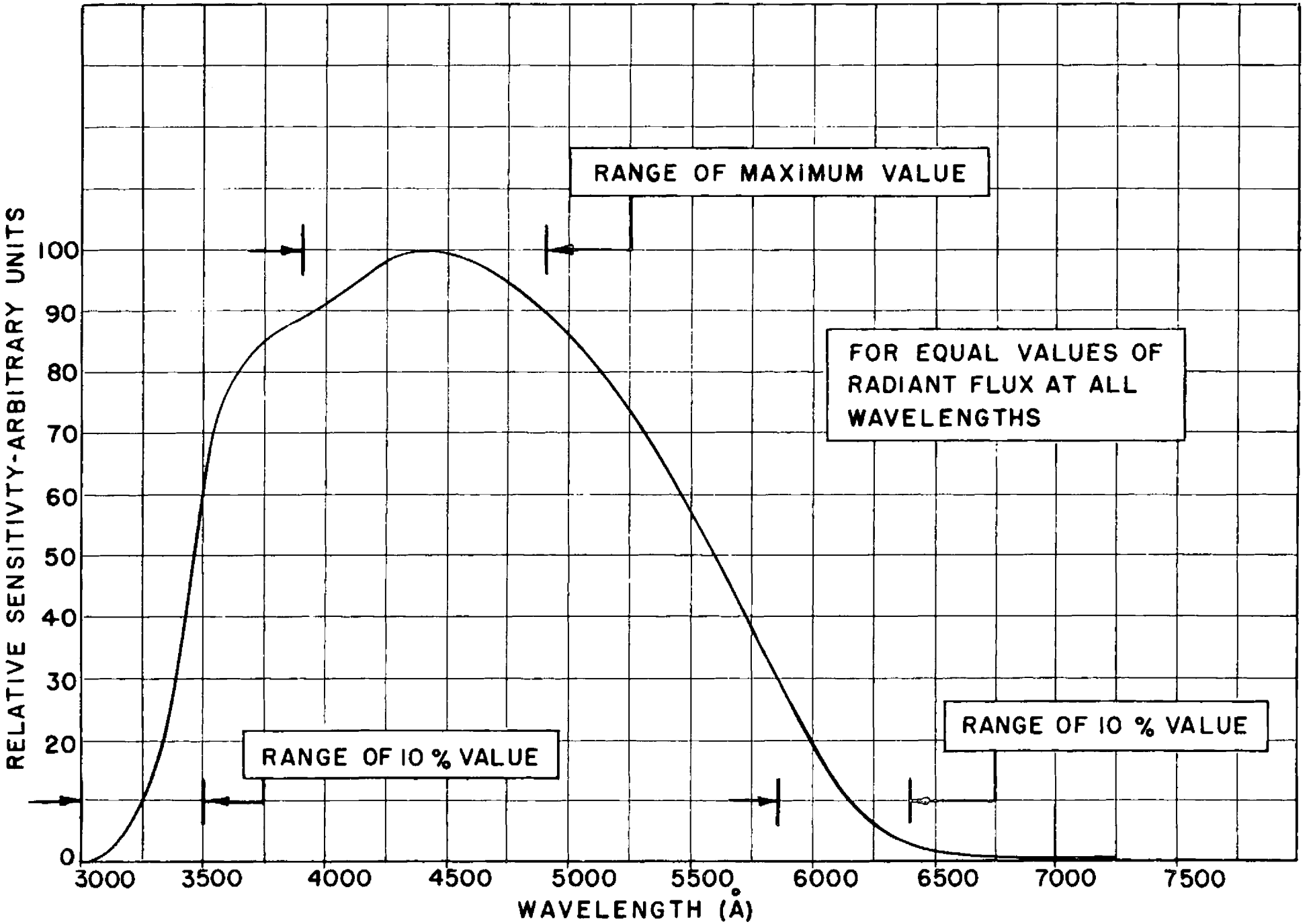
NOTES

1. V_{pc-D_1} = 300 volts.

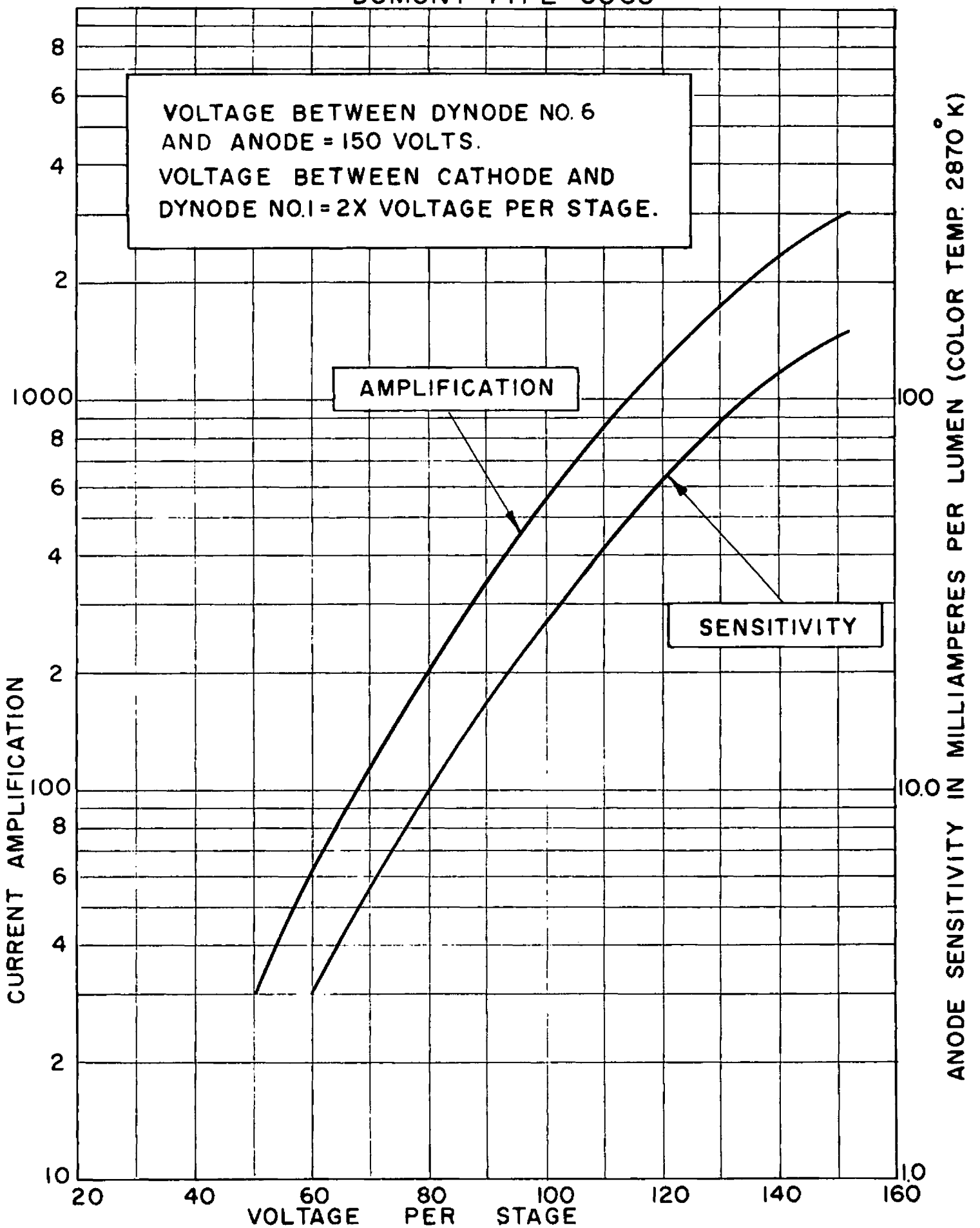
2. The cathode current given here is that current at which the response of the cathode current ceases to be a linear function of the light intensity because of cathode resistance. In general, the cathode current must be kept well below this value in order to satisfy the maximum ratings on the anode current.

3. Averaged over a 30 second interval maximum.

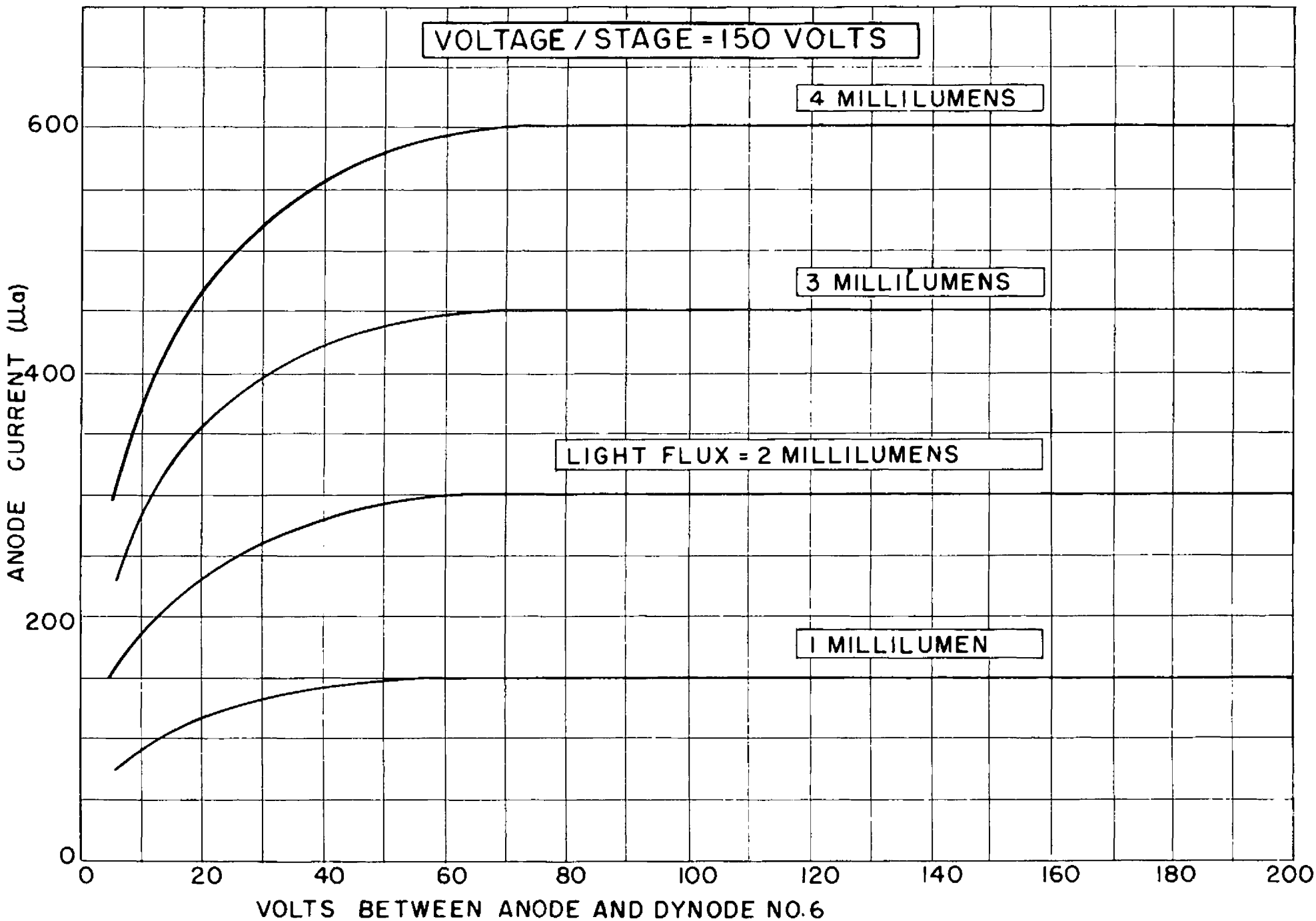
SPECTRAL SENSITIVITY CHARACTERISTICS OF S-II RESPONSE



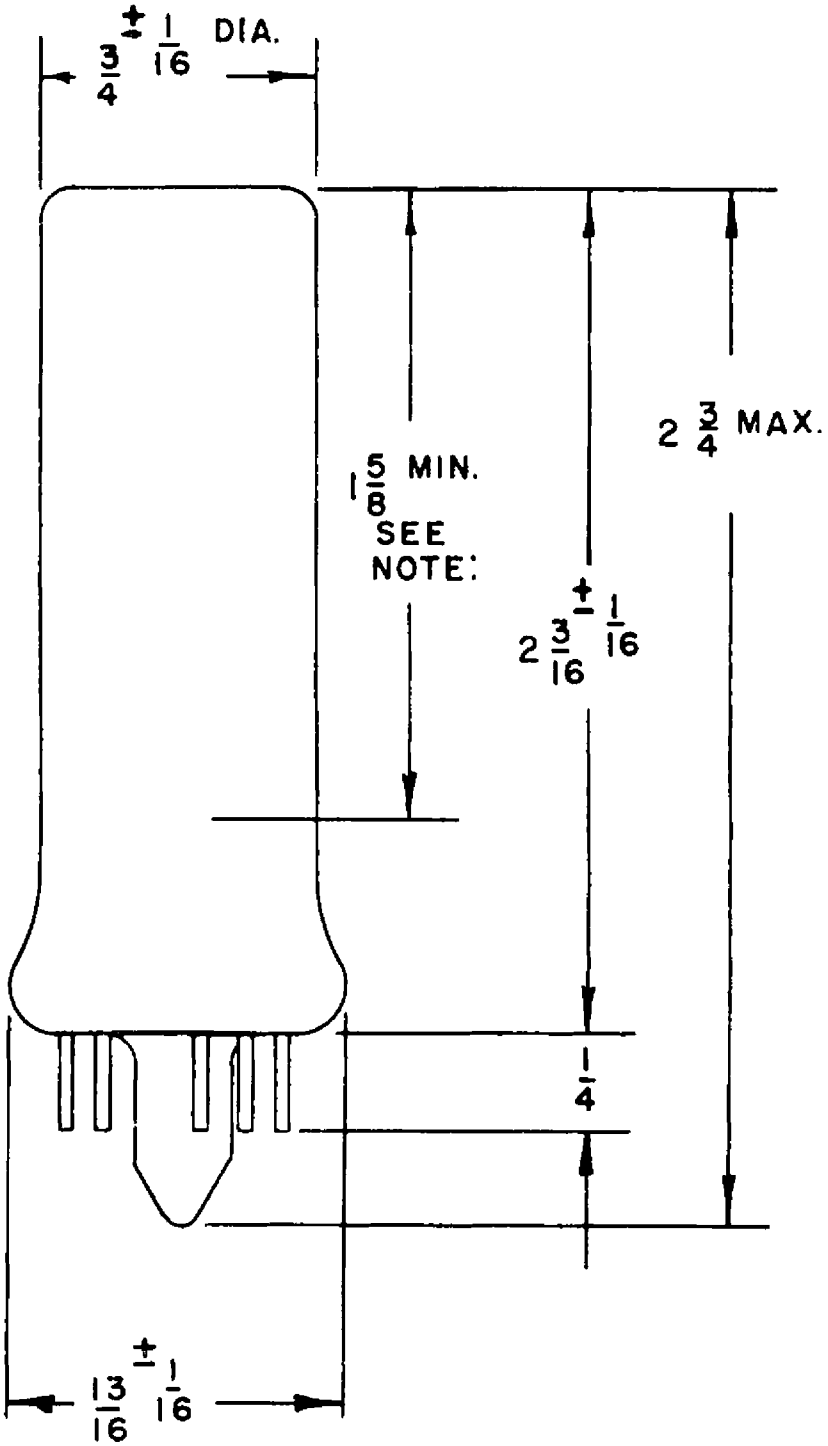
AVERAGE MULTIPLIER CHARACTERISTICS
DUMONT TYPE 6365



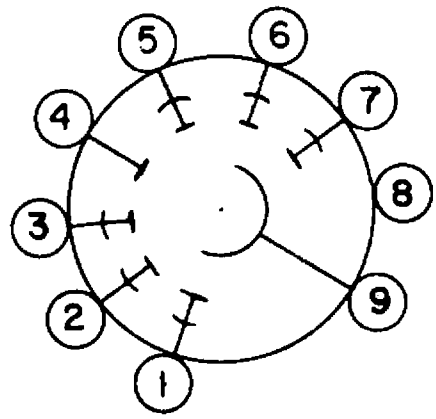
AVERAGE ANODE CHARACTERISTIC FOR DUMONT TYPE 6365



MULTIPLIER PHOTOTUBE
TYPE 6365



9 PIN MINIATURE STEM



BOTTOM VIEW

PIN NO.	ELEMENT
1	DYNODE NO. 1
2	DYNODE NO. 3
3	DYNODE NO. 5
4	ANODE
5	DYNODE NO. 6
6	DYNODE NO. 4
7	DYNODE NO. 2
8	INTERNAL CONNECTION
9	CATHODE

NOTE: DIRECTION OF LIGHT INTO END OF BULB.

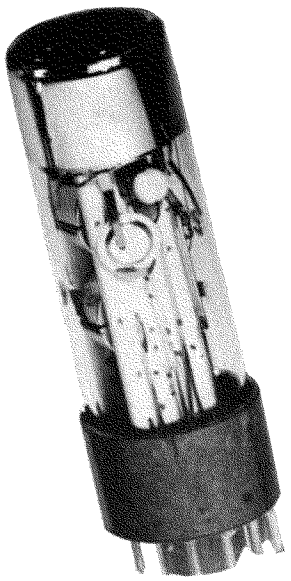
NOTE: THIS DIMENSION DENOTES THE MINIMUM DISTANCE FROM THE FACE PLATE OVER WHICH THE FACE PLATE DIMENSION HOLDS.

TD 3636-A

DU MONT

type 6467

Multiplier Phototube



The Du Mont Type 6467 is a 10-stage multiplier phototube of the end-window type with a spectral response predominantly in the visible region (see spectral sensitivity curve). The Type 6467 is 1¼" in diameter.

The Type 6467 features a highly sensitive photocathode with the very high average luminous sensitivity of 60 ua/-lumen. The excellent photo-electron collection has been made optimum by the design of the internally connected shield and photocathode resulting in high signal-to-noise ratios at low light levels.

The large physical separation between the anode and photo-cathode of the Type 6467 is achieved by an arrangement of the silver-magnesium dynodes in linear cascade. This assures a low leakage current because of the long leakage paths in the tube with an appreciable improvement in signal-to-noise ratio.

Stability in the Type 6467 is superior to previous multiplier phototubes owing to the material and construction of the dynodes as well as their arrangement within the tube.

The Type 6467 is particularly useful for applications where space requirements are stringent. The small outside diameter permits the use of a magnetic shield without exceeding 1½" in diameter.

GENERAL CHARACTERISTICS

Electrical

	Min.	Avg.	Max.	(units)
Special response		S4		
Cathode luminous sensitivity at 210 volts, 0 cycles between cathode and all other electrodes	40	60		μA/lumen
Anode luminous sensitivity				
105 volts/stage, 0 cycles	4	13		A/lumen
145 volts/stage, 0 cycles	28	120		A/lumen
Wavelength at maximum response. Cathode sensitivity at maximum response at 210 volts between cathode and all other electrodes	3500	4000	4500	Angstroms
		.056		μA/μW
Anode dark current at 105 volts/stage (25°C)			.05	μA
Interelectrode dark current at 105 volts/stage (25°C)			.05	μA
Current amplification at:				
105 volts/stage	100,000	215,000		
145 volts/stage	700,000	2,000,000		
Interelectrode capacitances				
anode to all other electrodes		3.3		μμf
anode to last dynode		1.3		μμf

Mechanical

	Min.	Avg.	Max.	(units)
Window dimensions	1			in. Dia.
Tube diameter		1-1/4 ± 1/16		in.
Seated height		4 ± 3/16		in.
Overall length		4-1/2 ± 3/16		in.
Base - Small shell duodecal 12 pin (B12-43)				
Mounting position		Any		

Maximum Ratings (Design Center Values)

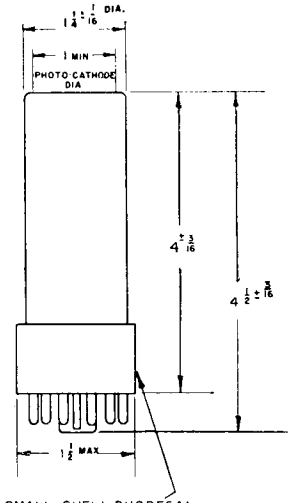
Peak Cathode current (Note 1)	20	μA
Average anode current (Note 2)	5	mA
Peak anode current	25	mA
Average anode dissipation (Note 2)	0.5	W
Peak anode dissipation	2.5	W
Supply voltage between anode and cathode (DC or peak AC)	1800	Volts
Ambient Temperature	75	°C

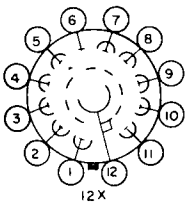
NOTES

1. The cathode current given here is that current at which the response of the cathode current ceases to be a linear function of the light intensity because of cathode resistance. In general, the cathode current must be kept well below this value in order to satisfy the maximum ratings on the anode current.

2. Averaged over a 30 second interval maximum.

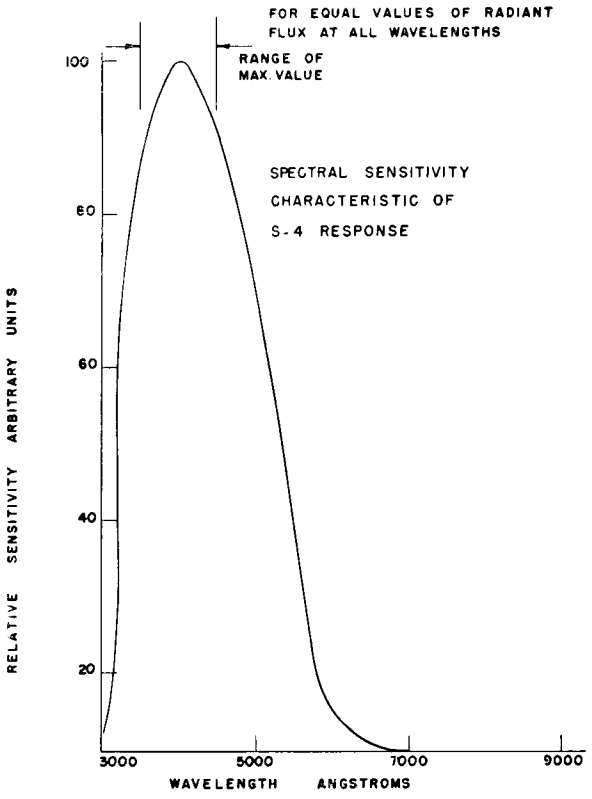
Technical Sales Department
ALLEN B. DU MONT LABORATORIES, INC.
760 Bloomfield Avenue, Clifton, New Jersey

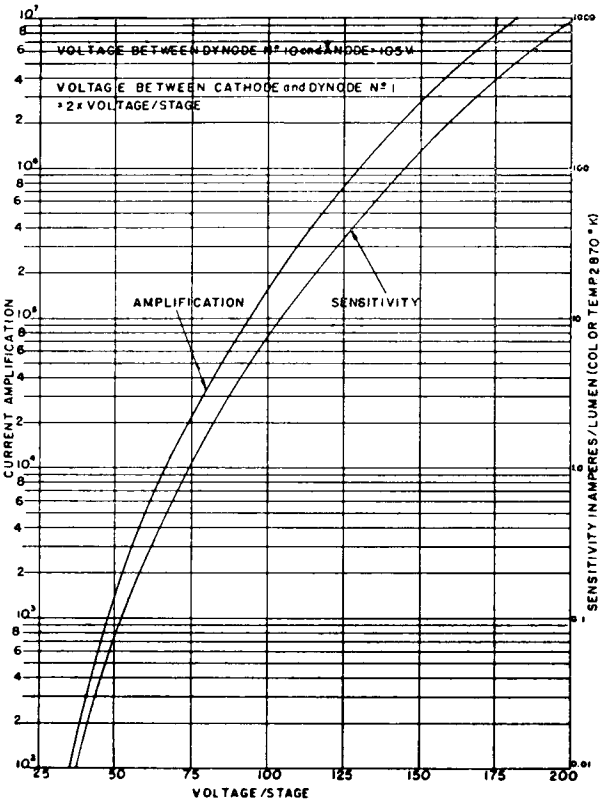


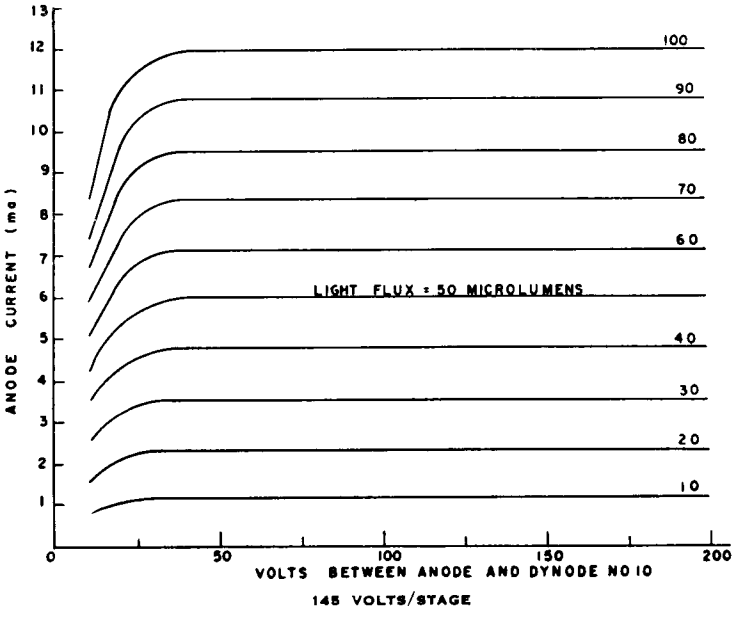


PIN NO.	ELEMENT
1	DYNODE NO. 1
2	DYNODE NO. 3
3	DYNODE NO. 5
4	DYNODE NO. 7
5	DYNODE NO. 9
6	ANODE
7	DYNODE NO. 10
8	DYNODE NO. 8
9	DYNODE NO. 6
10	DYNODE NO. 4
11	DYNODE NO. 2
12	CATHODE & SHIELD

NOTE: DIRECTION OF LIGHT INTO END OF BULB.

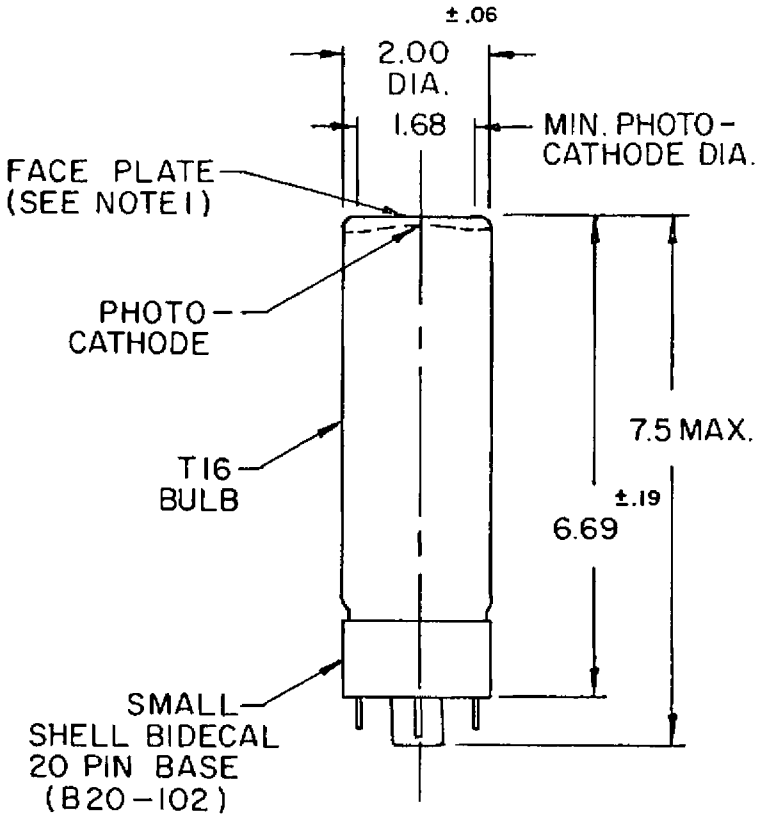


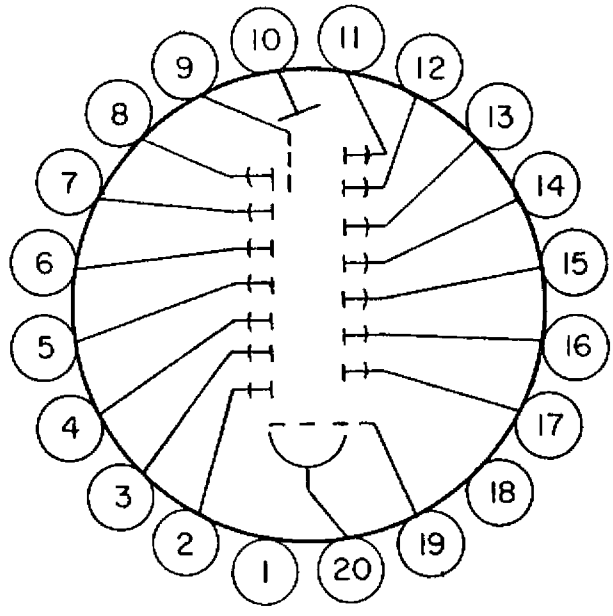




DU MONT

MULTIPLIER PHOTOTUBE
TYPE 6810B





BOTTOM VIEW

PIN NO.	ELEMENT
2	DYNODE NO. 1
3	DYNODE NO. 3
4	DYNODE NO. 5
5	DYNODE NO. 7
6	DYNODE NO. 9
7	DYNODE NO. 11
8	DYNODE NO. 13
9	GRID NO. 2 (ACCELERATING ELECTRODE)
10	ANODE
11	DYNODE NO. 14
12	DYNODE NO. 12
13	DYNODE NO. 10
14	DYNODE NO. 8
15	DYNODE NO. 6
16	DYNODE NO. 4
17	DYNODE NO. 2
19	GRID NO. 1 (FOCUSING ELECTRODE)
20	PHOTOCATHODE

NOTES:

1. WITHIN 1.68 DIAMETER, DEVIATION FROM FLATNESS OF EXTERNAL SURFACE OF THE FACEPLATE WILL NOT EXCEED .005 FROM PEAK TO VALLEY.
2. THE CENTER LINE OF THE BULB WILL NOT DEVIATE MORE THAN 2° IN ANY DIRECTION FROM THE PERPENDICULAR ERECTED AT THE CENTER OF THE BOTTOM OF BASE.
3. DIRECTION OF LIGHT INTO END OF BULB.

from JEDEC release #3662, April 2, 1962
6810B is the same as 6810A except for the outline drawing.

Allen B. Du Mont Laboratories, Inc.
Division of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

DE-6376-2
3-6-62

FORM 809 -M1-5-60-SH

from JETEC release
#1867, March 11, 1957

DUMONT

MULTIPLIER PHOTOTUBE

TYPE 6911

The Du Mont Type 6911 is a 10-stage, flat end window, multiplier phototube with an infrared sensitive photocathode having an average luminous sensitivity of 18 microamperes per lumen. The dark current of the 6911 can be reduced considerably by applying dry ice or liquid air to the tube.

The Du Mont Type 6911 is useful in fnfrared spectroscopy, ranging applications, temperature analysis plus numerous other industrial and scientific applications.

GENERAL CHARACTERISTICS

Electrical Data	Min.	Avg.	Max.	Units
Spectral response		Infrared		
Cathode luminous sensitivity at 210 volts, 0 cycles between cathode and all other electrodes	14	18		µA/lumen
Anode luminous sensitivity 105 volts/stage, 0 cycles	3	9		A/lumen
Cathode sensitivity at maximum response at 210 volts between cathode and all other electrodes		.0016		µA/µW
Anode dark current at 105 volts/stage (25°C)			15	µA
IR Sensitivity (Note 1)		10		%
Current Amplification at 105 volts/stage		500,000		
Interelectrode capacitances				
anode to all other electrodes		3.3		µµf
anode to last dynode		1.3		µµf
Wavelength at maximum response		8000 ± 500		Angstroms

Mechanical Data		
Window dimension, minimum	1 1/2	In. Dia.
Seated height to center of window	4 7/8 ± 3/16	In.
Tube Diameter	2 ± 1/16	In.
Overall Length	5 5/8 ± 3/16	In.
Base - Medium shell diheptal, 14 pin (B14-38)		
Mounting position	any	
Window index of refraction	1.5	

DUMONT

MULTIPLIER PHOTOTUBE

TYPE 6911

MAXIMUM RATINGS	Max.	Units
Peak cathode current (Note 2)	20	μA
Average anode current (Note 3)	5	mA
Peak anode current	25	mA
Average anode dissipation (Note 3)	0.5	W
Peak anode dissipation	2.5	W
Supply voltage between anode and cathode (DC or peak AC)	1600	Volts
Supply voltage between last dynode and anode (DC or peak AC)	200	Volts
Supply voltage between cathode and 1st dynode (DC or peak AC)	400	Volts
Focusing electrode voltage (Note 4)		
Ambient Temperature	75	°C

NOTES

1. The IR response is measured in the following manner:
A tungsten filament lamp operating at 2870 K is used as a light source. The output of the tube is measured using an infrared filter in conjunction with the light source and another reading is obtained without the IR filter. The ratio of the reading with the filter to the reading without the filter x 100 is the percentage IR response. A Corning Filter Type No. 2540, Form Melt 1613 and 2.61 mm thickness is employed as an infrared filter.

2. The cathode current given here is that current at which the response of the cathode current ceases to be a linear function of the light intensity because of cathode resistance. In general the cathode current must be kept well below this value in order to satisfy the maximum ratings on the anode current.

3. Averaged over a 30 second interval maximum.

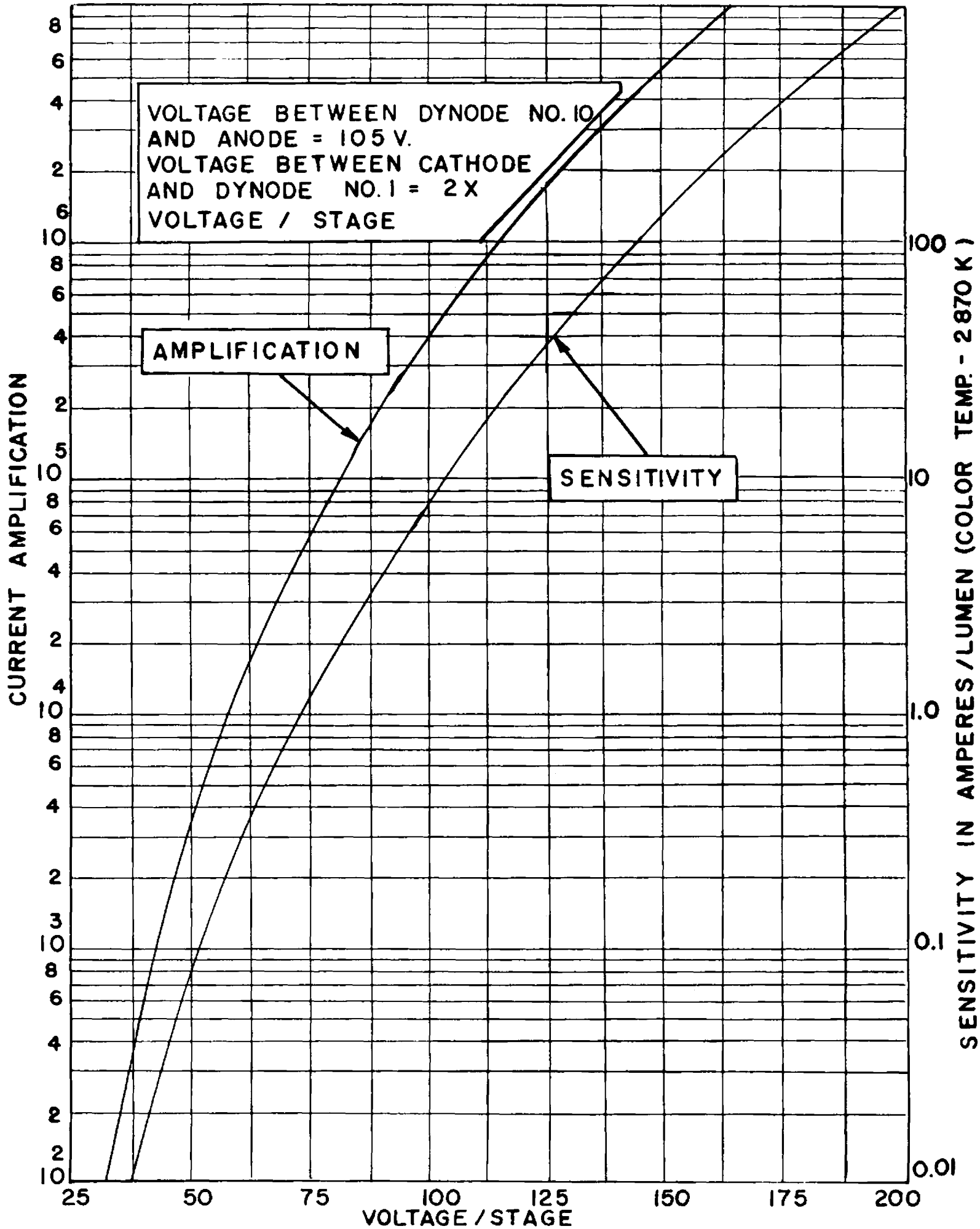
4. The focusing electrode (shield) voltage should be adjusted between cathode and 1st dynode potentials for optimum photoelectron collection efficiency. This will vary from tube to tube but will usually be several volts more positive than the cathode.

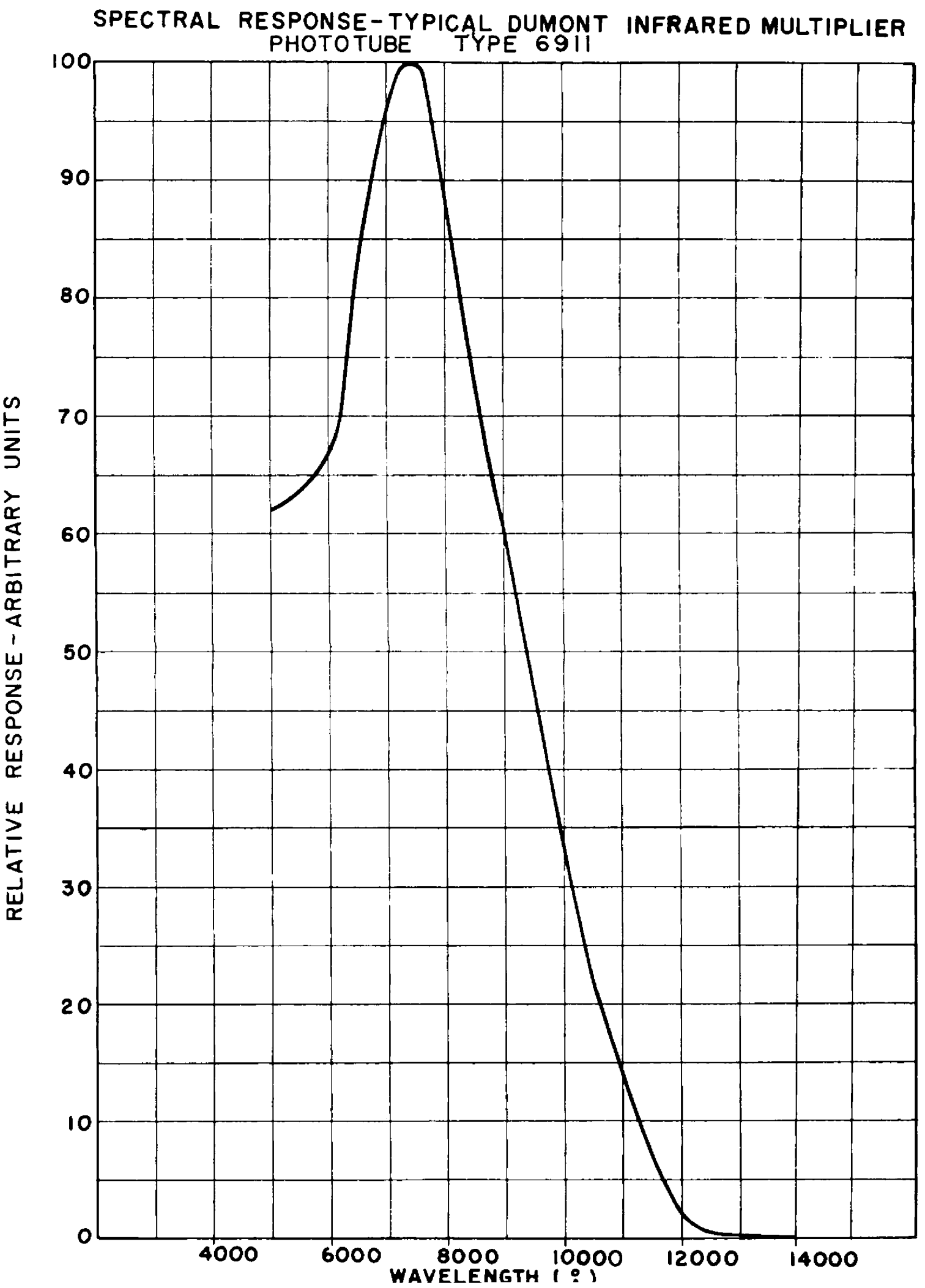
GP/pw

TL-1297
11 SEPT 1956

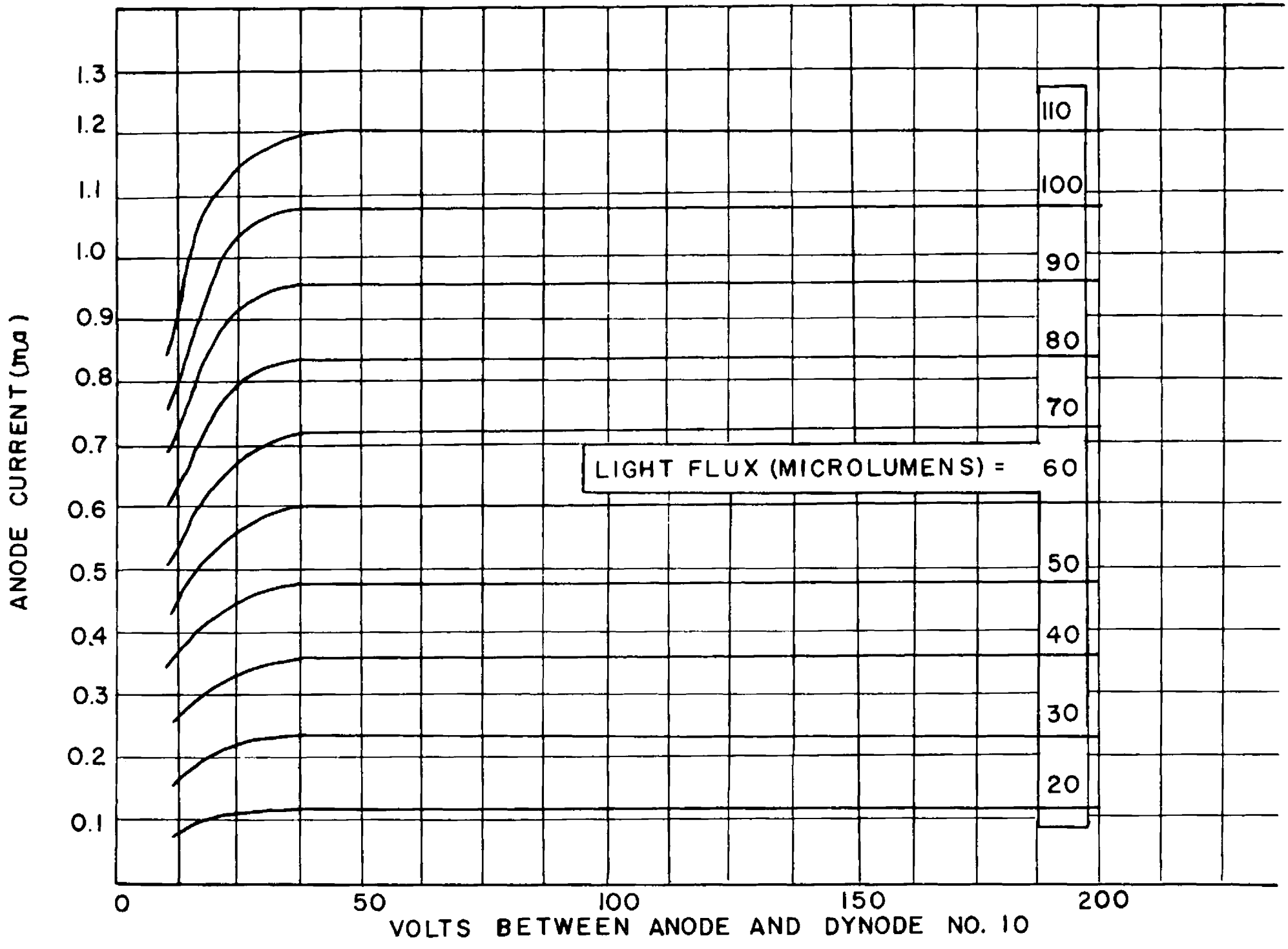
Allen B. Du Mont Laboratories, Inc.
Passaic, New Jersey

AVERAGE MULTIPLIER CHARACTERISTICS DUMONT TYPE 6911




SPECTRAL RESPONSE-TYPICAL DUMONT INFRARED MULTIPLIER PHOTOTUBE TYPE 6911
RELATIVE RESPONSE-ARBITRARY UNITS
100
90
80
70
60
50
40
30
20
10
0
4000
6000
8000
10000
12000
14000
WAVELENGTH (Å)

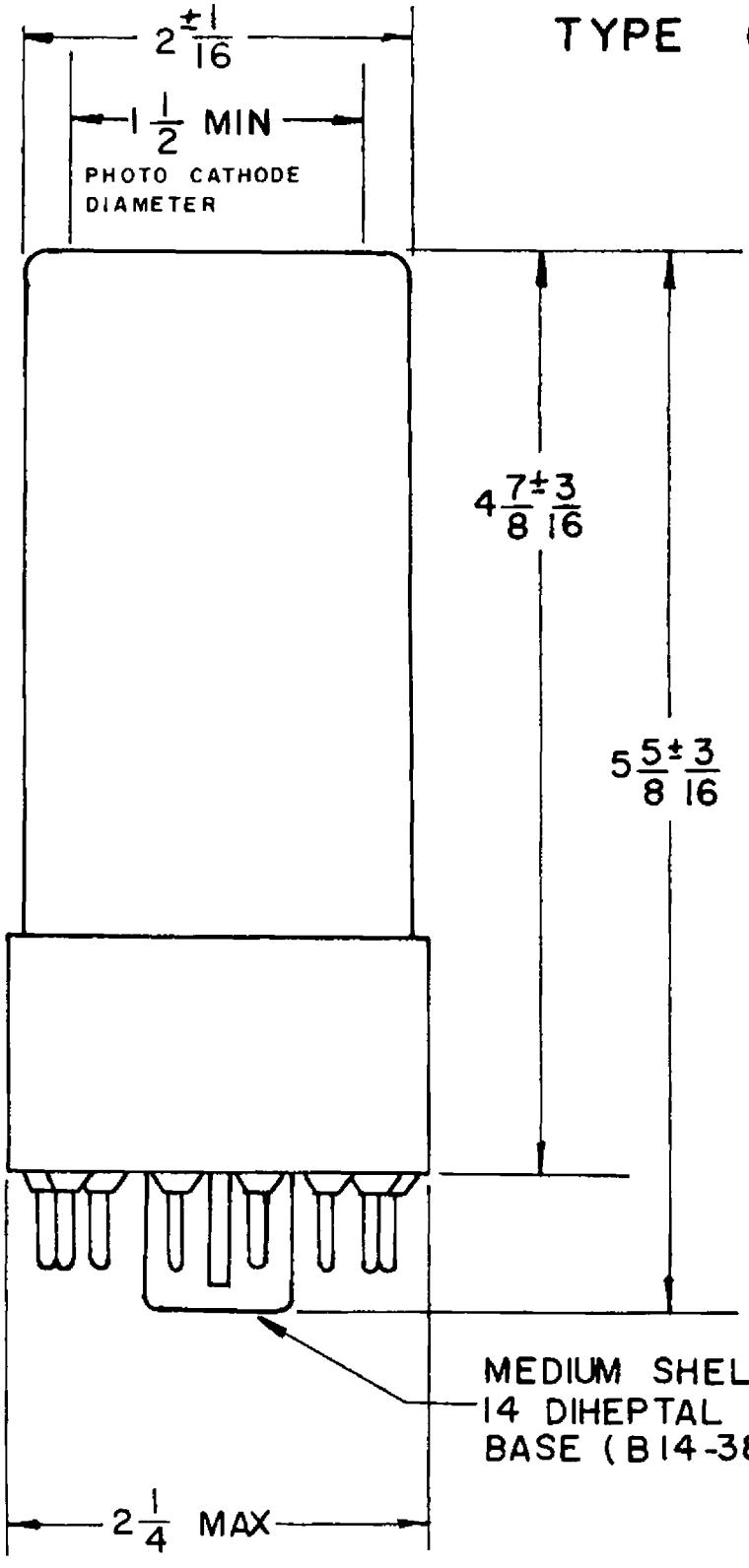
AVERAGE ANODE CHARACTERISTICS OF DUMONT TYPE 6911

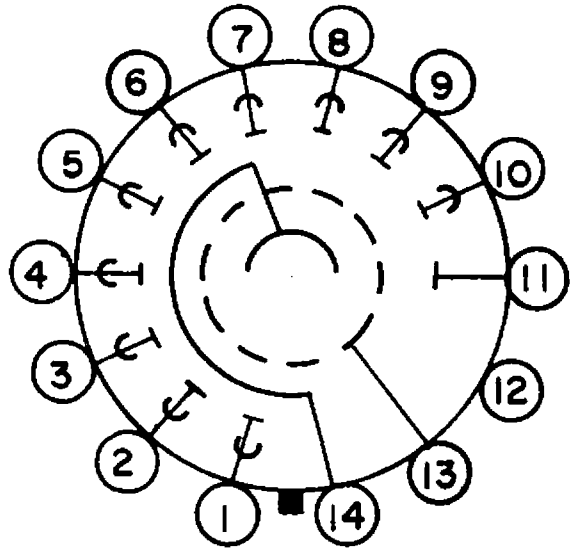


DUMONT

MULTIPLIER PHOTOTUBE

TYPE 6911





BOTTOM VIEW

PIN NO.	ELEMENT
1	DYNODE NO 1
2	DYNODE NO 2
3	DYNODE NO 3
4	DYNODE NO 4
5	DYNODE NO 5
6	DYNODE NO 6
7	DYNODE NO 7
8	DYNODE NO 8
9	DYNODE NO 9
10	DYNODE NO 10
11	ANODE
12	INTERNAL CONNECTION
13	FOCUSING ELECTRODE (SHIELD)
14	CATHODE

NOTE: DIRECTION OF LIGHT INTO END OF BULB.

Allen B. Du Mont Laboratories, Inc.
Passaic, New Jersey

TD 4793A
10-5-56 N. VACCA
FORM 8007 (1) 10-52

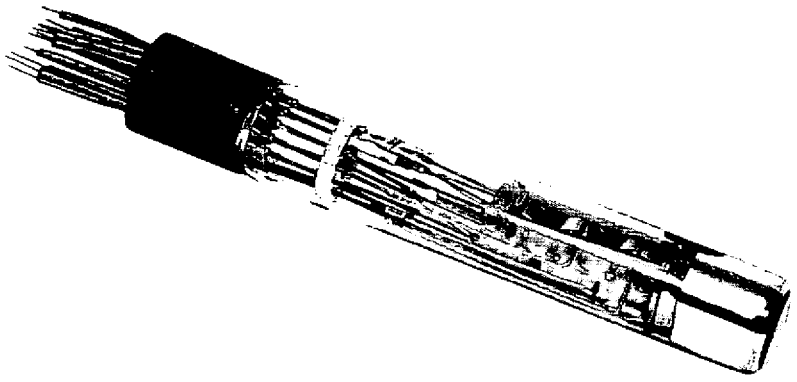
from JEDEC release #2462, May 11, 1959

DU MONT

INDUSTRIAL MULTIPLIER PHOTOTUBES

TYPE:

6935



GENERAL CHARACTERISTICS

ELECTRICAL DATA	Min.	Avg.	Max.	Units
Spectral response		S11		
Cathode luminous sensitivity at 210 volts, 0 cycles between cathode and all other electrodes	30	50		μA/lumen
Anode luminous sensitivity 105 volts/stage, 0 cycles	6	15		A/lumen
Cathode sensitivity at maximum response at 210 volts between cathode and all other electrodes		.045		μA/μW
Anode dark current at 105 volts/stage (25°C)			0.1	μA
Current amplification at 105 volts/stage		300,000		
Wavelength at maximum response		4400 ± 500		Angstroms
Wavelength at 10% of maximum response on long wavelength side		6125 ± 275		Angstroms
Wavelength at 10% of maximum response on short wavelength side		3250 ± 250		Angstroms

MECHANICAL DATA		
Window dimensions, minimum	½	In Dia.
Tube Diameter	¾ ± 1/32	In.
Overall Length	4⅞ ± ¼	In.
Base — Resin (potted) flexible leads		
Mounting Position	Any	
Window index of refraction	1.5	

MAXIMUM RATINGS		
Peak cathode current (Note 1)	10	μA
Average anode current (Note 2)	0.1	mA
Peak anode current	1.0	mA
Average anode dissipation (Note 2)	0.05	W
Peak anode dissipation	0.5	W
Supply voltage between anode and cathode (DC or peak AC)	1300	Volts
Supply voltage between last dynode and anode (DC or peak AC)	125	Volts
Supply voltage between cathode and 1st dynode (DC or peak AC)	250	Volts
Ambient Temperature	75	°C

NOTES

1. The cathode current given here is that current at which the response of the cathode current ceases to be a linear function of the light intensity because of cathode resistance. In general, the cathode current must be kept well below this value in order to satisfy the maximum ratings of the anode current.
2. Averaged over a 30 second interval maximum.
3. Supply voltage between cathode and first dynode should be 2 times supply voltage between succeeding dynodes.

RECOMMENDED ACCESSORY: MU-METAL SHIELD DU MONT P/N 243-2

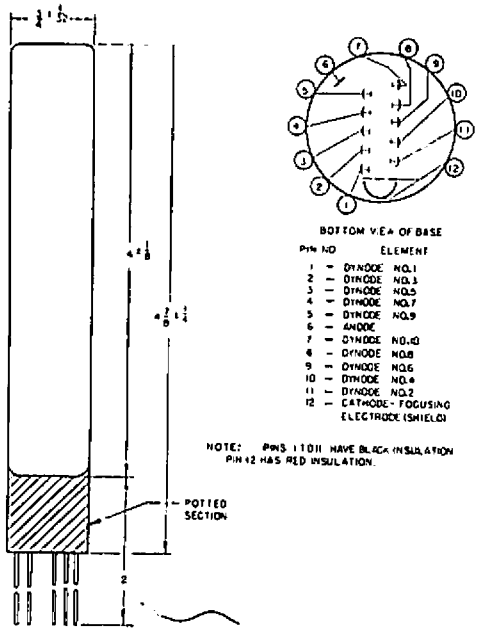
FEATURES

- S11 Response
- 10 Dynode Stages
- ¾ Inch Diameter
- Cesium Antimony Dynodes
- Potted Base for:
  - a. Moisture Resistance
  - b. Shock Resistance
  - c. Socket Elimination
  - d. Noise Free Connections
- Comparable Performance with Large Diameter Tubes
- High Gain at Low Operating Voltages
- Small Size for Limited Space Use

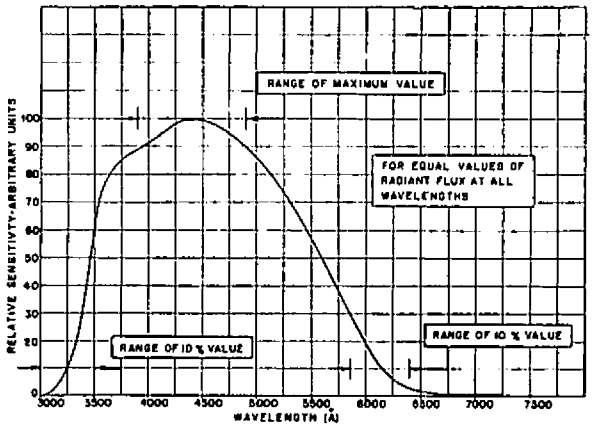
APPLICATIONS

- Scintillation Probes
- Analysis Low Level Light Sources
- Oil Exploration
- Spectroscopy

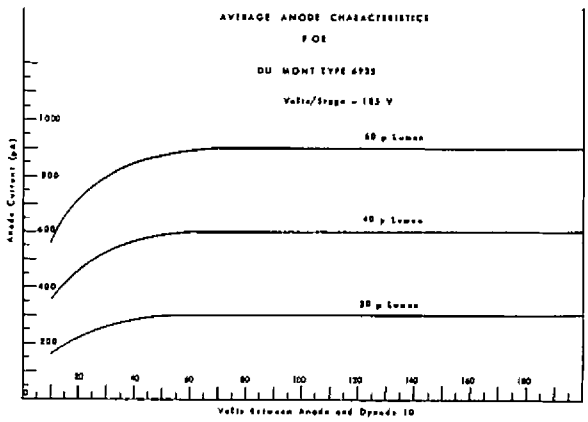
DU MONT
INDUSTRIAL TUBE SALES DEPARTMENT
750 Bloomfield Avenue Clifton, New Jersey, U.S.A.

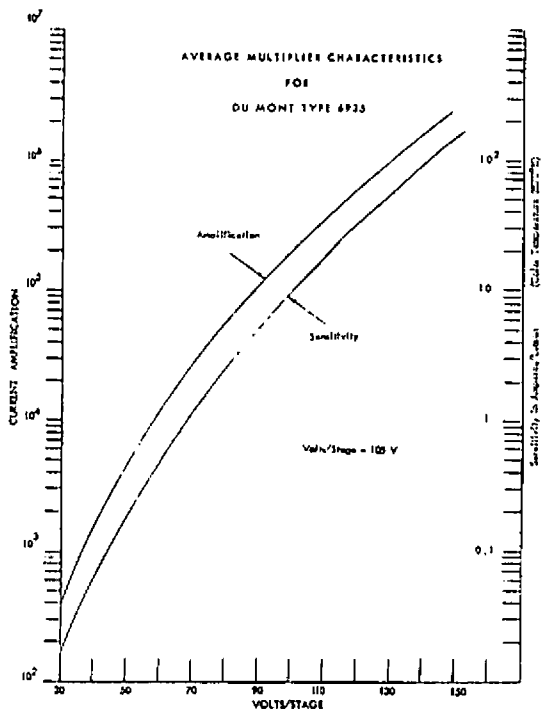


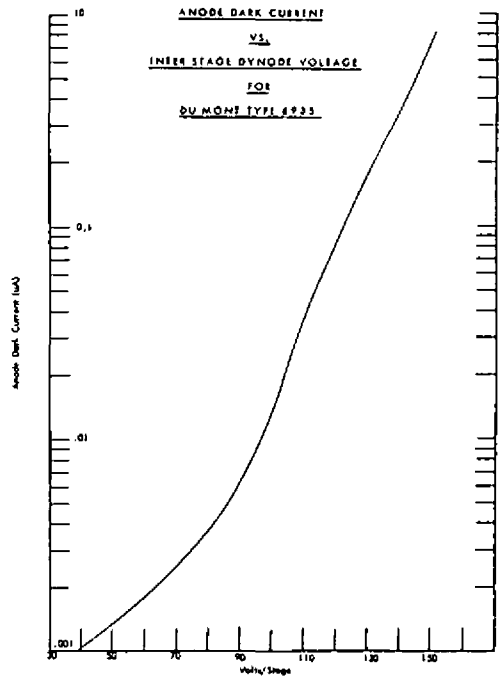
OUTLINE DRAWING TYPE 6935



SPECTRAL RESPONSE OF S11 PHOTOCATHODE







© 1959

PRINTED IN U.S.A.

ALLEN B. DU MONT LABORATORIES, INC.
750 Bloomfield Avenue
INDUSTRIAL TUBE SALES DEPARTMENT
Clifton, New Jersey

DUMONT

MULTIPLIER PHOTOTUBE

TYPE 7064

The DuMont Type 7064 is a high gain, 10-stage, 2 inch diameter multiplier phototube with a flat end-window type photocathode having an S-11 spectral response and an average cathode luminous sensitivity of 60 microamperes per lumen.

The Type 7064 features a focusing shield that can be adjusted for optimum collection of photoelectrons. This is accomplished by varying the potential on the shield between photocathode and dynode 1 potentials. The 7064 is applicable in the fields of nuclear physics, medicine, biology, astronomy, and in industrial and scientific applications such as flying spot scanners, nuclear radiation detection and in the detection of very low light levels.

GENERAL CHARACTERISTICS

Electrical Data	Min.	Avg.	Max.	Units
Spectral response		S-11		
Cathode luminous sensitivity at 210 volts, 0 cycles between cathode and all other electrodes	40	60		μA/lumen
Anode luminous sensitivity 90 volts/stage, 0 cycles	10	45		A/lumen
Cathode sensitivity at maximum response at 210 volts between cathode and all other electrodes		.056		μA/μW
Anode dark current at 90 volts/stage (25°C)			.05	μA
Current Amplification at 90 volts/stage		750,000		
Interelectrode capacitances				
anode to all other electrodes		3.3		μμf
anode to last dynode		1.3		μμf
Wavelength at maximum response		4400 ± 500		Angstroms
Wavelength at 10% of maximum response on long wavelength side		6125 ± 275		Angstroms
Wavelength at 10% of maximum response on short wavelength side		3250 ± 250		Angstroms

Mechanical Data		
Window dimensions, minimum	1 1/2	In. Dia.
Seated height to center of window	4 7/8 ± 3/16	In.
Tube diameter	2 ± 1/16	In.
Overall Length	5 5/8 ± 3/16	In.

TL-1335
20 JUNE 1957

Allen B. Du Mont Laboratories, Inc.
Passaic, New Jersey

from JETEC release #1990, Aug. 5, 1957

DUMONT

MULTIPLIER PHOTOTUBE

TYPE 7064

Mechanical Data (Cont'd)	Avg.	Max.	Units
Base-Medium diheptal 14 Pin (B14-38)			
Mounting Position	any		
Window index of refraction	1.5		

MAXIMUM RATINGS

Peak cathode current (Note 1)	20	μA
Average anode current (Note 2)	.75	mA
Peak anode current	7.5	mA
Average anode dissipation (Note 2)	.075	W
Peak anode dissipation	1.125	W
Supply voltage between anode and cathode (DC or peak AC)	1300	Volts
Supply voltage between last dynode and anode (DC or peak AC)	150	Volts
Supply voltage between cathode and 1st dynode (DC or peak AC)	300	Volts
Focusing electrode voltage (Note 3)		
Ambient Temperature	75	°C

NOTES

1. The cathode current given here is that current at which the response of the cathode current ceases to be a linear function of the light intensity because of cathode resistance. In general, the cathode current must be kept well below this value in order to satisfy the maximum ratings on the anode current.

2. Averaged over a 30 second interval maximum.

3. The focusing electrode (shield) voltage should be adjusted between cathode and 1st dynode potentials for optimum photoelectron collection efficiency. This will vary from tube to tube but will usually be several volts more positive than the cathode.

4. Supply voltage between cathode and 1st dynode should be two times the supply voltage between succeeding dynodes.

TL-1335
20 JUNE 1957

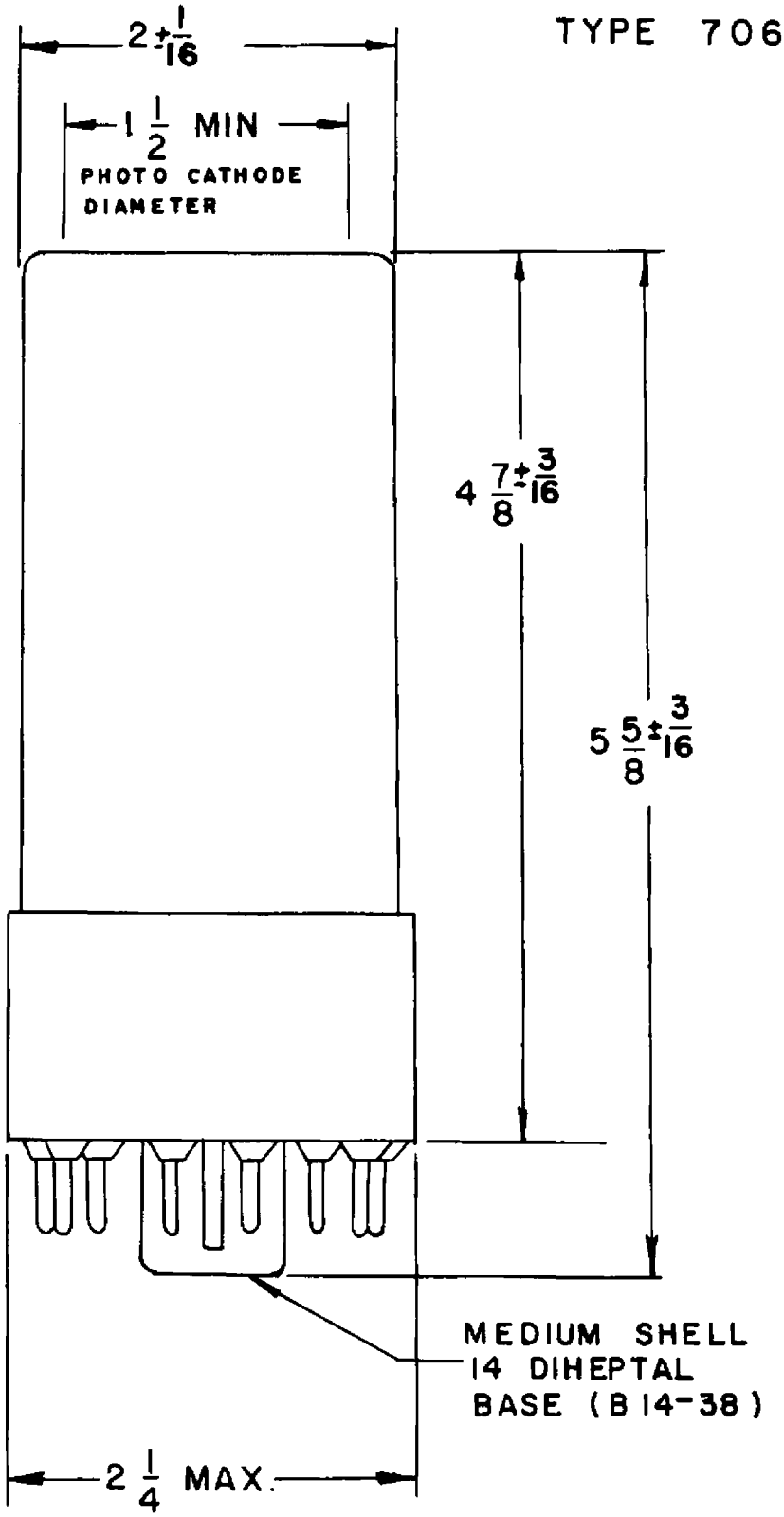
Allen B. Du Mont Laboratories, Inc.
Passaic, New Jersey AD/

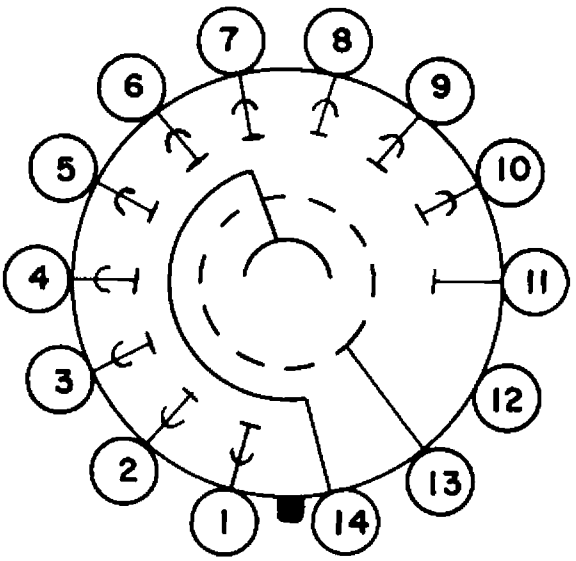
FORM 609T M1 10-56-5M

DUMONT

MULTIPLIER PHOTOTUBE

TYPE 7064





BOTTOM VIEW

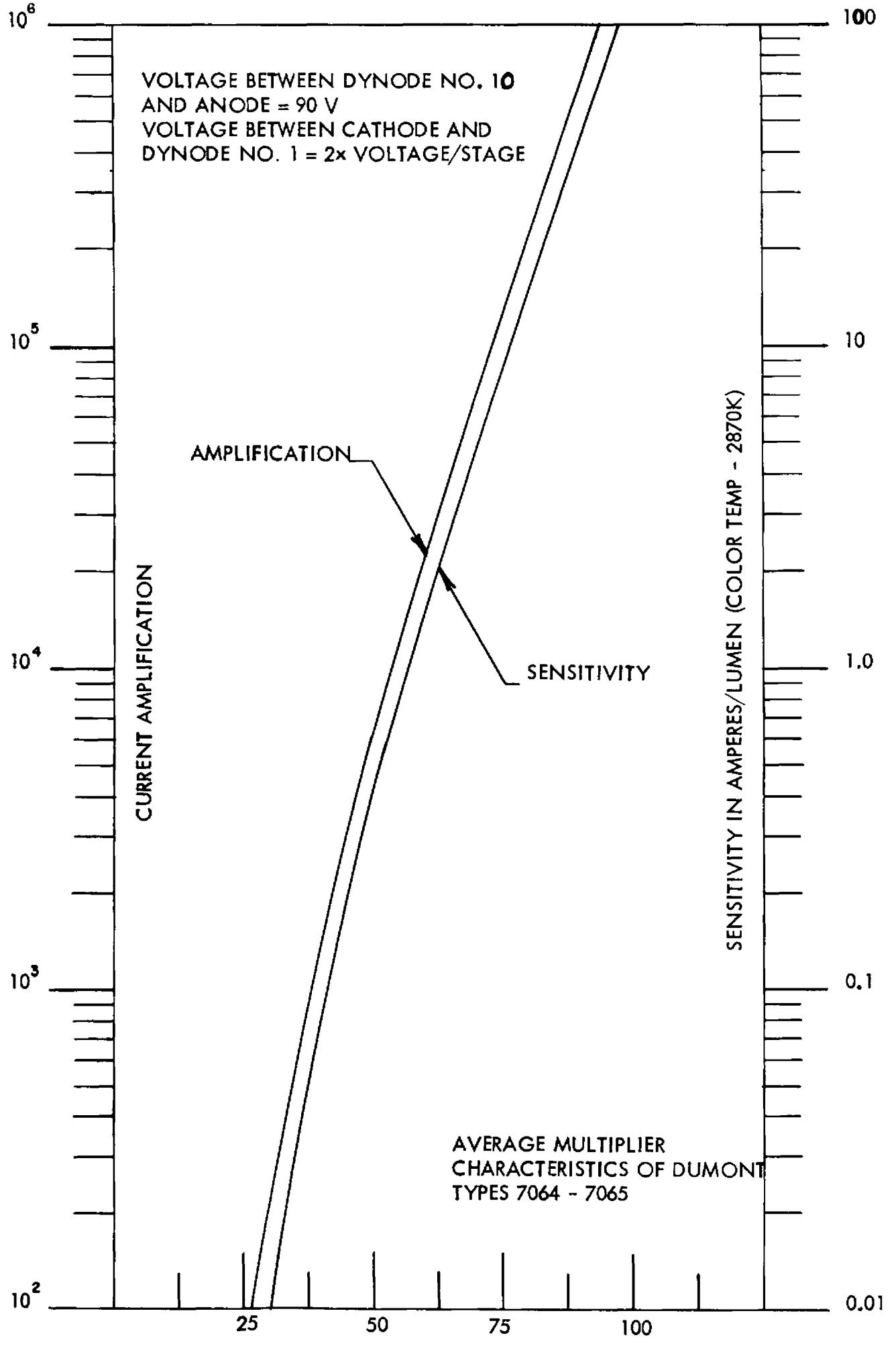
PIN NO	ELEMENT
1	DYNODE NO 1
2	DYNODE NO 2
3	DYNODE NO 3
4	DYNODE NO 4
5	DYNODE NO 5
6	DYNODE NO 6
7	DYNODE NO 7
8	DYNODE NO 8
9	DYNODE NO 9
10	DYNODE NO 10
11	ANODE
12	INTERNAL CONNECTION
13	FOCUSING ELECTRODE (SHIELD)
14	CATHODE

NOTE: DIRECTION OF LIGHT INTO END OF BULB

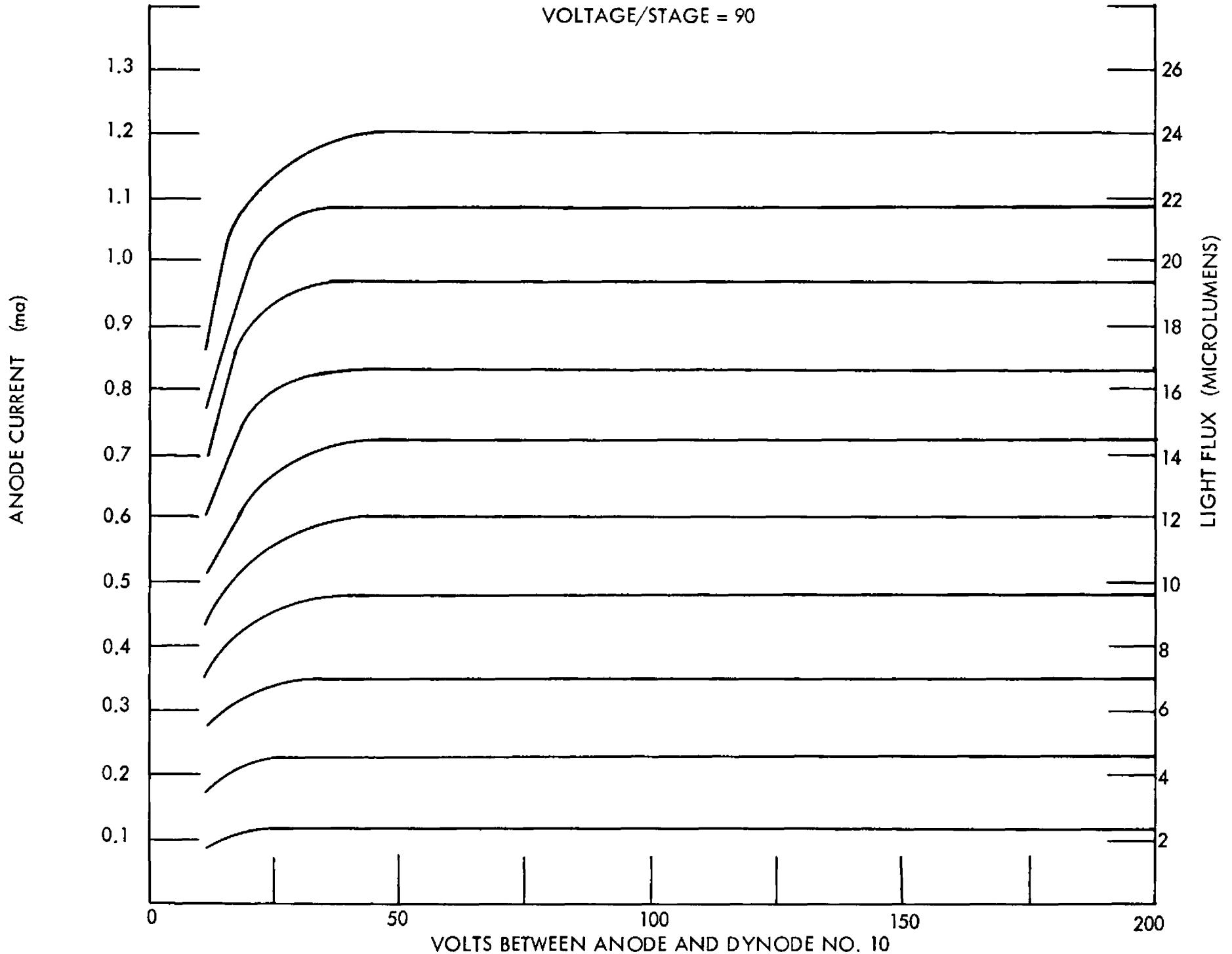
Allen B. Du Mont Laboratories, Inc.
Passaic, New Jersey

TD 5489 A
H.B.

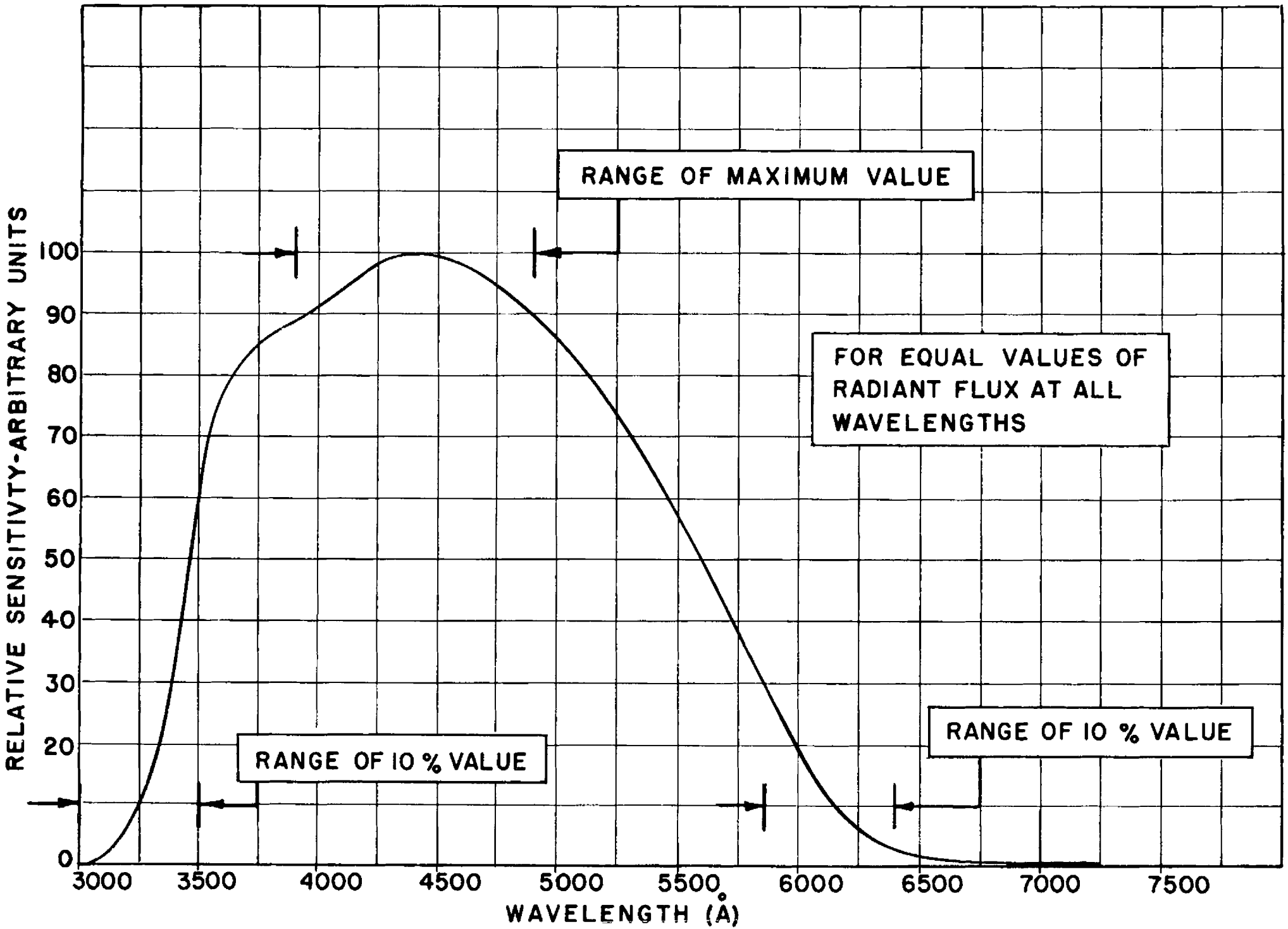
FORM 809T M2 5-57-BH


VOLTAGE BETWEEN DYNODE NO. 10
AND ANODE = 90 V
VOLTAGE BETWEEN CATHODE AND
DYNODE NO. 1 = 2x VOLTAGE/STAGE
AMPLIFICATION
SENSITIVITY
CURRENT AMPLIFICATION
SENSITIVITY IN AMPERES/LUMEN (COLOR TEMP - 2870K)
10^6
10^5
10^4
10^3
10^2
100
10
1.0
0.1
0.01
25
50
75
100
AVERAGE MULTIPLIER
CHARACTERISTICS OF DUMONT
TYPES 7064 - 7065

AVERAGE ANODE CHARACTERISTICS OF DUMONT MULTIPLIER PHOTOTUBE TYPES 7064 - 7065



SPECTRAL SENSITIVITY CHARACTERISTICS OF S-11 RESPONSE



DUMONT

MULTIPLIER PHOTOTUBE

TYPE 7065

The DuMont Type 7065 is a 1 1/2 inch diameter, 10 stage, flat end-window, multiplier phototube with an S-11 end-window type photocathode having an average luminous sensitivity of 60 microamperes per lumen. The DuMont 7065 is applicable in the fields of nuclear physics and industrial and scientific applications for the detection of very low light levels.

GENERAL CHARACTERISTICS

Electrical Data	Min.	Avg.	Max.	Units
Spectral response		S-11		
Cathode luminous sensitivity at 210 volts, 0 cycles between cathode and all other electrodes	40	60		μA/L
Anode luminous sensitivity 90 volts/stage, 0 cycles	10	45		A/L
Cathode sensitivity at maximum response at 210 volts between cathode and all other electrodes		.056		μA/μW
Anode dark current at 90 volts/stage (25°C)			.05	μA
Current amplification at 90 volts/stage		750,000		
Interelectrode capacitances				
anode to all other electrodes		3.3		μμf
anode to last dynode		1.3		μμf
Wavelength at maximum response		4400 ± 500		Angstroms
Wavelength at 10% maximum response on long wavelength side		6125 ± 275		Angstroms
Wavelength at 10% of maximum response on short wavelength side		3250 ± 250		Angstroms

Mechanical Data	
Window dimensions, minimum	1 1/4 In. Dia.
Seated height to center of window	4 1/4 ± 1/4 In.
Tube Diameter	1 1/2 ± 1/16 In.
Overall length	4 3/4 ± 1/4 In.
Base-Small Shell Duodecal 12 Pin (B12-43)	
Mounting Position	any
Window index of refraction	1.5

TL-1336
20 JUNE 1957

from JETEC release #1990, Aug. 5, 1957

Allen B. Du Mont Laboratories, Inc.
Passaic, New Jersey

DUMONT

MULTIPLIER PHOTOTUBE

TYPE 7065

MAXIMUM RATINGS	Max.	Units
Peak cathode current (Note 1)	20	μA
Average anode current (Note 2)	.75	mA
Peak anode current	7.5	mA
Average anode dissipation (Note 2)	.075	W
Peak anode dissipation	1.125	W
Supply voltage between anode and cathode (DC or peak AC)	1300	Volts
Supply voltage between last dynode and anode (DC or peak AC)	150	Volts
Supply voltage between cathode and 1st dynode (DC or peak AC)	300	Volts
Ambient Temperature	75	°C

NOTES

1. The cathode current given here is that current at which the response of the cathode current ceases to be a linear function of the light intensity because of cathode resistance. In general the cathode current must be kept well below this value in order to satisfy the maximum ratings on the anode current.

2. Averaged over a 30 second interval maximum.

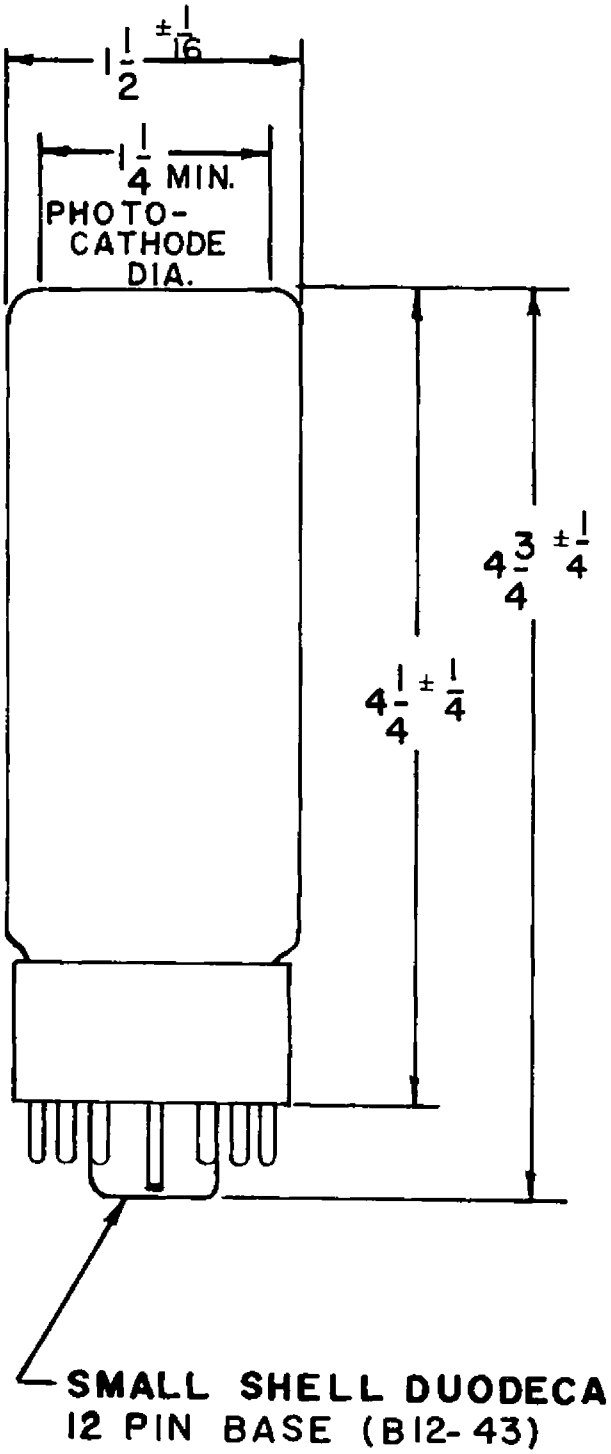
3. Supply voltage between cathode and 1st dynode should be two times the supply voltage between succeeding dynodes.

TL-1336
20 JUNE 1957

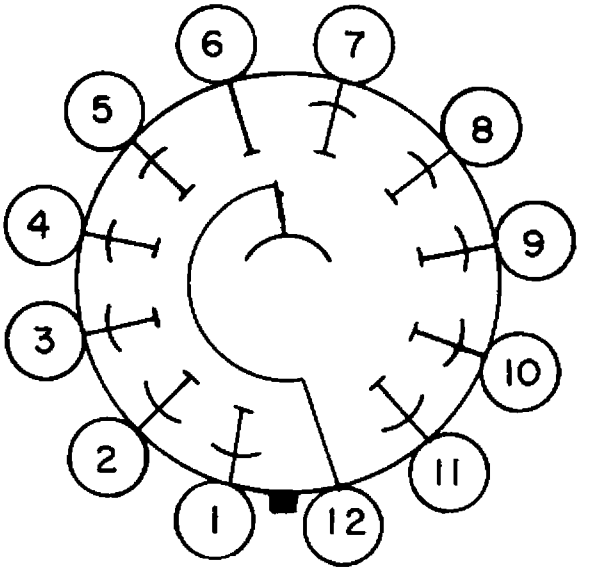
Allen B. Du Mont Laboratories, Inc.
Passaic, New Jersey AD/

DUMONT

MULTIPLIER PHOTOTUBE
TYPE 7065



SMALL SHELL DUODECAL
12 PIN BASE (B12-43)



BOTTOM VIEW

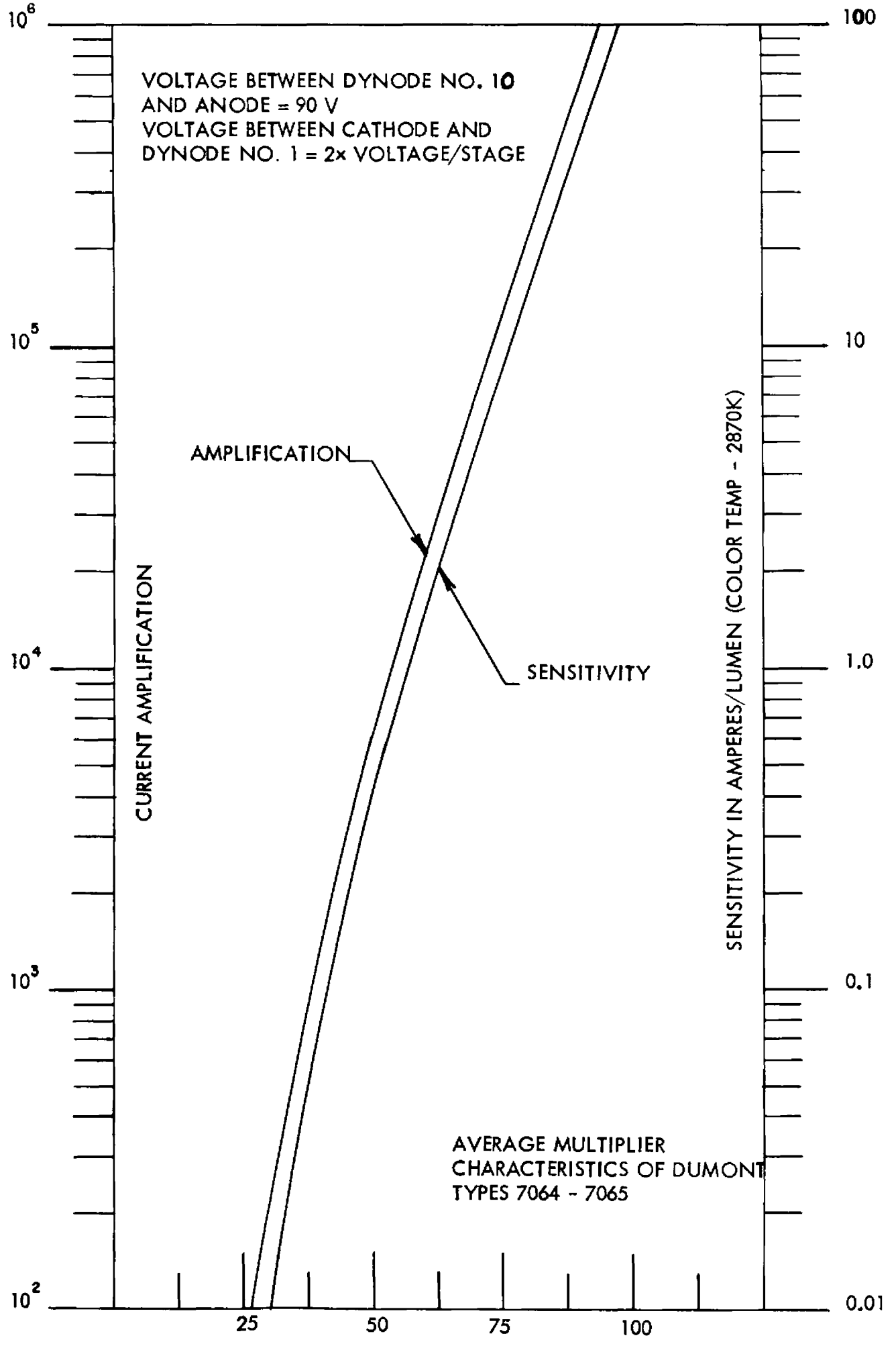
PIN NO.	ELEMENT
1	DYNODE NO. 1
2	DYNODE NO. 3
3	DYNODE NO. 5
4	DYNODE NO. 7
5	DYNODE NO. 9
6	ANODE
7	DYNODE NO. 10
8	DYNODE NO. 8
9	DYNODE NO. 6
10	DYNODE NO. 4
11	DYNODE NO. 2
12	CATHODE

NOTE:
DIRECTION OF LIGHT INTO END OF BULB.

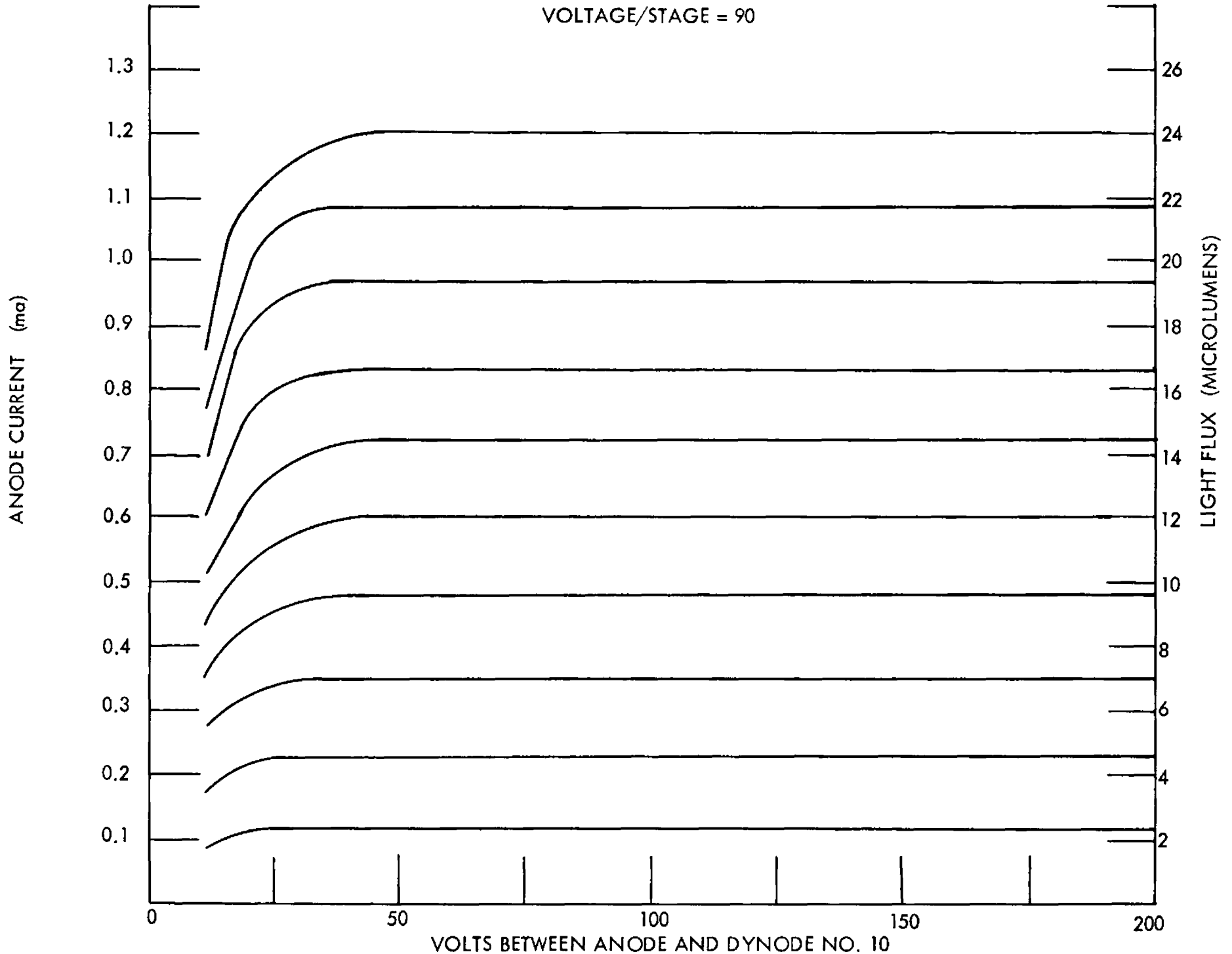
Allen B. Du Mont Laboratories, Inc.
Passaic, New Jersey

TD 5488 A
N. VACCA

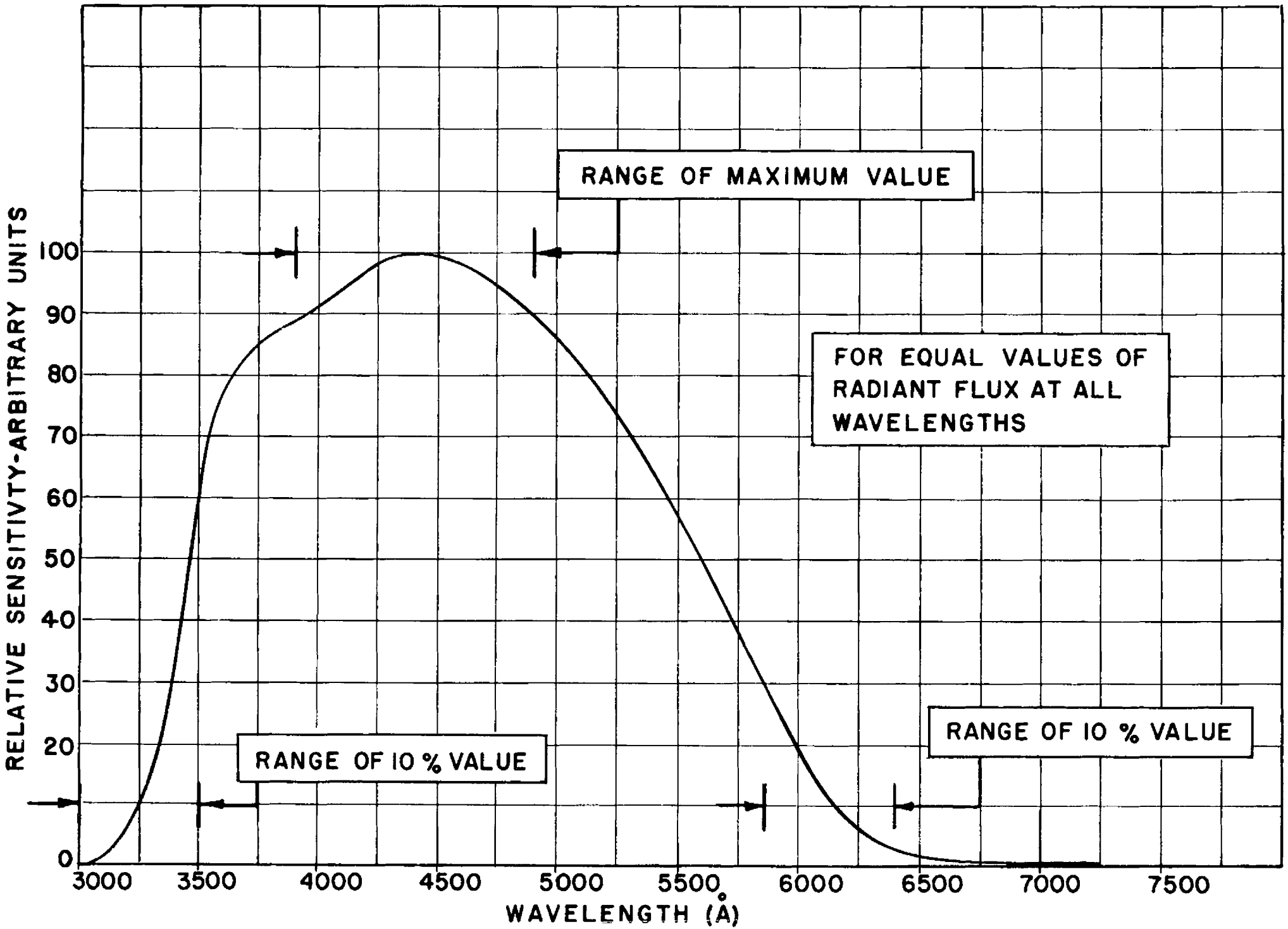
FORM 609T MI 10-56-6H


VOLTAGE BETWEEN DYNODE NO. 10
AND ANODE = 90 V
VOLTAGE BETWEEN CATHODE AND
DYNODE NO. 1 = 2x VOLTAGE/STAGE
AMPLIFICATION
SENSITIVITY
CURRENT AMPLIFICATION
SENSITIVITY IN AMPERES/LUMEN (COLOR TEMP - 2870K)
10^6
10^5
10^4
10^3
10^2
100
10
1.0
0.1
0.01
25
50
75
100
AVERAGE MULTIPLIER
CHARACTERISTICS OF DUMONT
TYPES 7064 - 7065

AVERAGE ANODE CHARACTERISTICS OF DUMONT MULTIPLIER PHOTOTUBE TYPES 7064 - 7065



SPECTRAL SENSITIVITY CHARACTERISTICS OF S-11 RESPONSE



MULTIPLIER PHOTOTUBE

TYPE 7664

The Du Mont Type 7664 is a 10 stage, 2 inch, end on multiplier phototube with an ultra violet sensitive cathode having an S-13 spectral response. The cathode is essentially that used for an S-11 response enclosed in a fused silica envelope allowing transmission of ultra violet radiation down to 1800 A°. The 7664 has an average luminous sensitivity of 60 microamperes per lumen for white light. The 10 stage multiplier structure employs a focusing electrode for adjusting to optimum photo-electron collection efficiency.

GENERAL CHARACTERISTICS

Electrical Data	Min.	Avg.	Max.	Units
Spectral Response		S-13		
Cathode luminous sensitivity at 210 volts, 0 cycle between cathode and all other electrodes	50	60		µA/L
Anode luminous sensitivity				
105 volts/stage, 0 cycles	4	13		A/L
145 volts/stage, 0 cycles	28	120		A/L
Cathode sensitivity at maximum response at 210 volts between cathode and all other electrodes		.056		µA/µW
Anode dark current at 105 volts/stage (25°C)			.05	µA
Current amplification at				
105 volts/stage		215,000		
150 volts/stage		2,000,000		
Interelectrode capacitances				
anode to all other electrodes		3.3		µµf
anode to last dynode		1.3		µµf

Mechanical Data		
Window dimensions, minimum	1 1/2	Inch Dia.
Seated height to center of window	4 7/8 ± 3/16	Inch
Tube Diameter	2 ± 1/8	Inch
Overall Length	5 5/8 ± 3/16	Inch
Base - Medium shell diheptal 14 pin (B14-38)		
Mounting position	Any	
Window index of refraction	1.458	

TL-1304 -2
1/8/60

Allen B. Du Mont Laboratories, Inc.
Passaic, New Jersey

from JEDEC release #2728, Feb. 15, 1960

MULTIPLIER PHOTOTUBE

TYPE 7664

MAXIMUM RATINGS	Min.	Avg.	Max.	Units
Peak cathode current (Note 1)			20	μA
Average anode current (Note 2)			5	mA
Peak anode current			25	mA
Average anode dissipation (Note 2)			0.5	W
Peak anode dissipation			2.5	W
Supply voltage between anode and cathode (DC or Peak AC)			1800	Volts
Supply voltage between last dynode and anode (DC or Peak AC)			200	Volts
Supply voltage between cathode and 1st dynode (DC or Peak AC)			400	Volts
Focusing electrode voltage (Note 3)				
Ambient temperature			75	°C

NOTES

1. The cathode current given here is that current at which the response of the cathode current ceases to be a linear function of the light intensity because of cathode resistance. In general, the cathode current must be kept well below this value in order to satisfy the maximum ratings on the anode current.

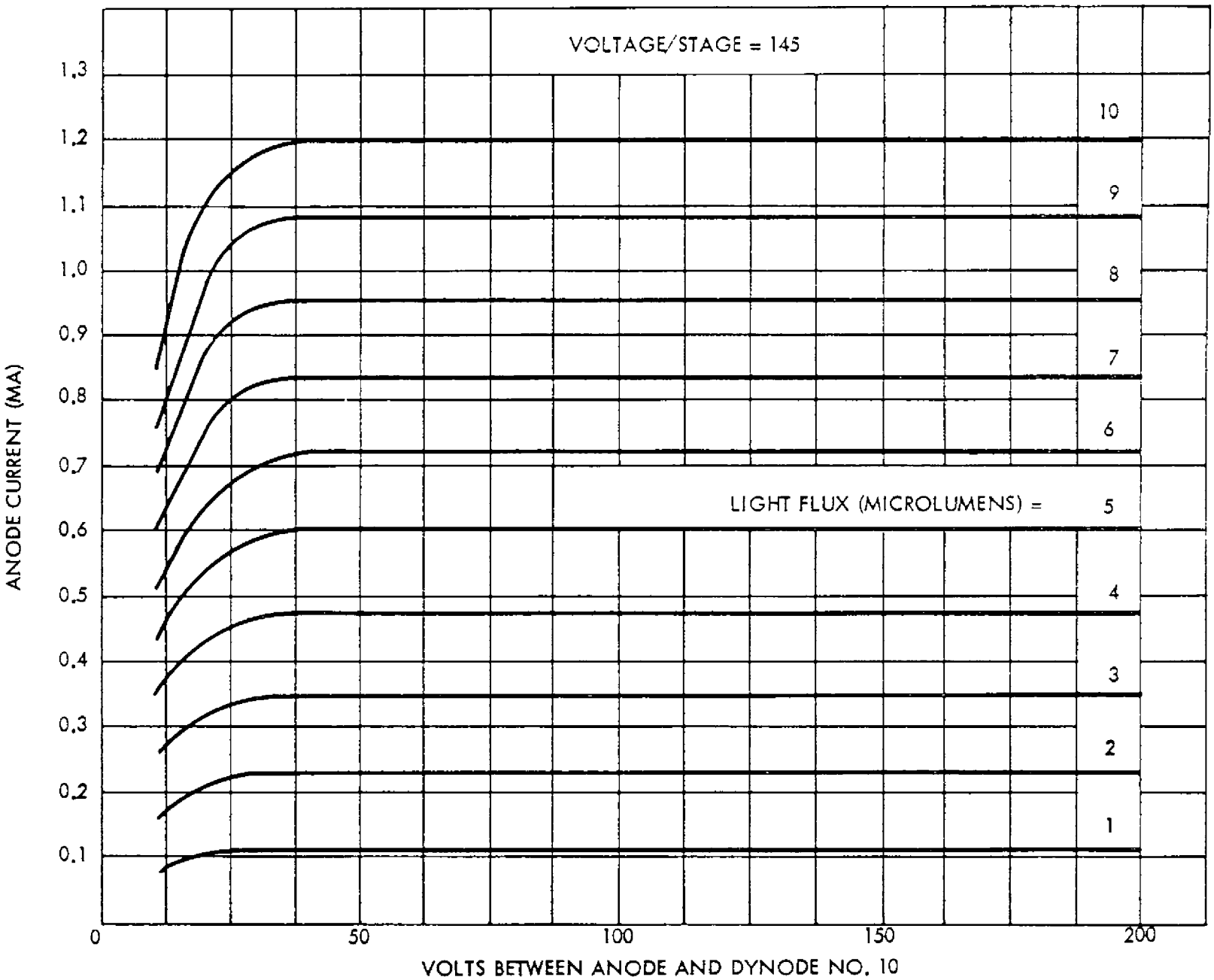
2. Averaged over a 30 second interval maximum.

3. The focusing electrode (shield) voltage should be adjusted between cathode and 1st dynode potentials for optimum photoelectron collection efficiency. This will vary from tube to tube but will usually be several volts more positive than the cathode.

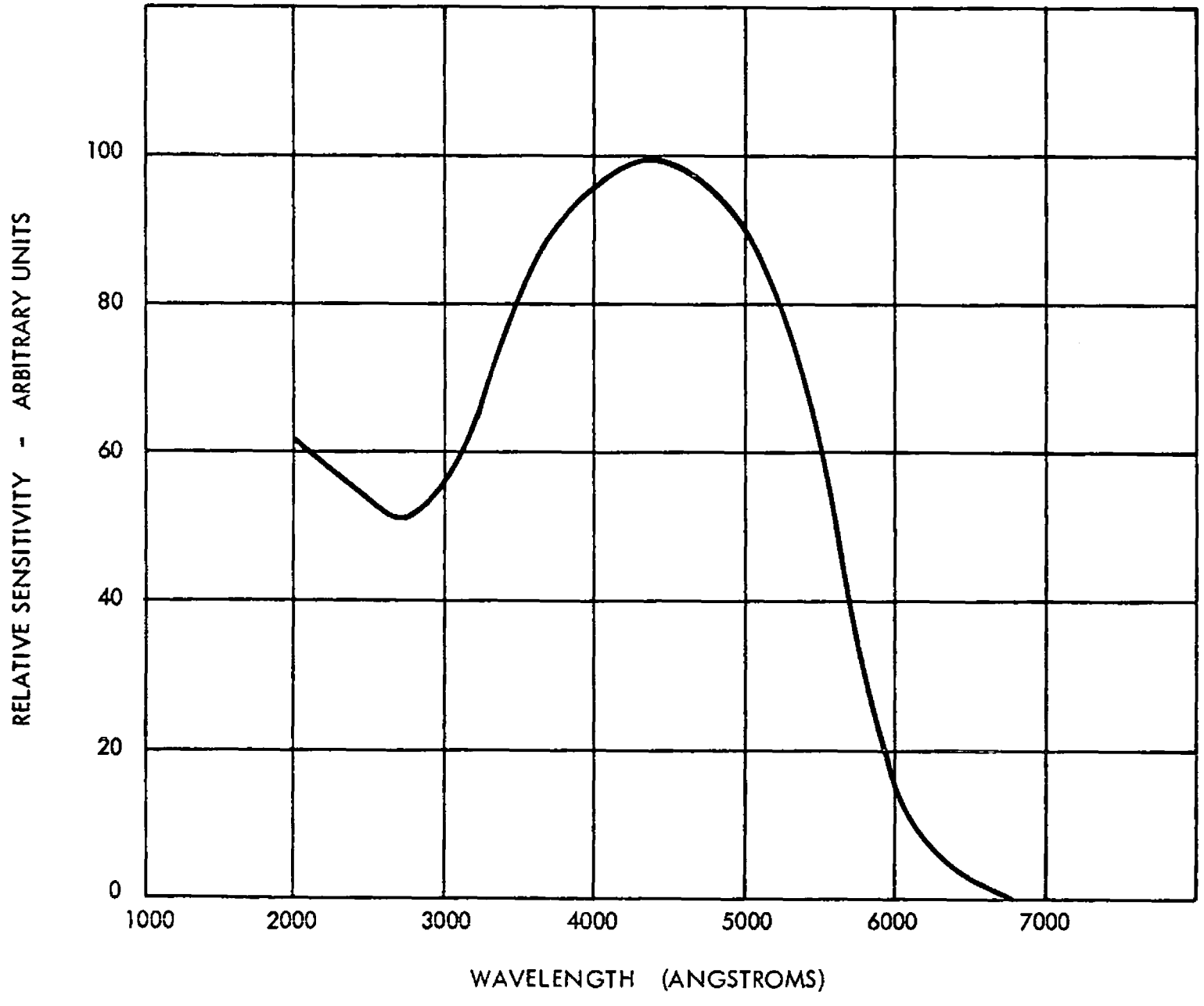
TL-1304 -2

Allen B. Du Mont Laboratories, Inc.
Passaic, New Jersey

AVERAGE ANODE CHARACTERISTICS OF DU MONT TYPE 7664



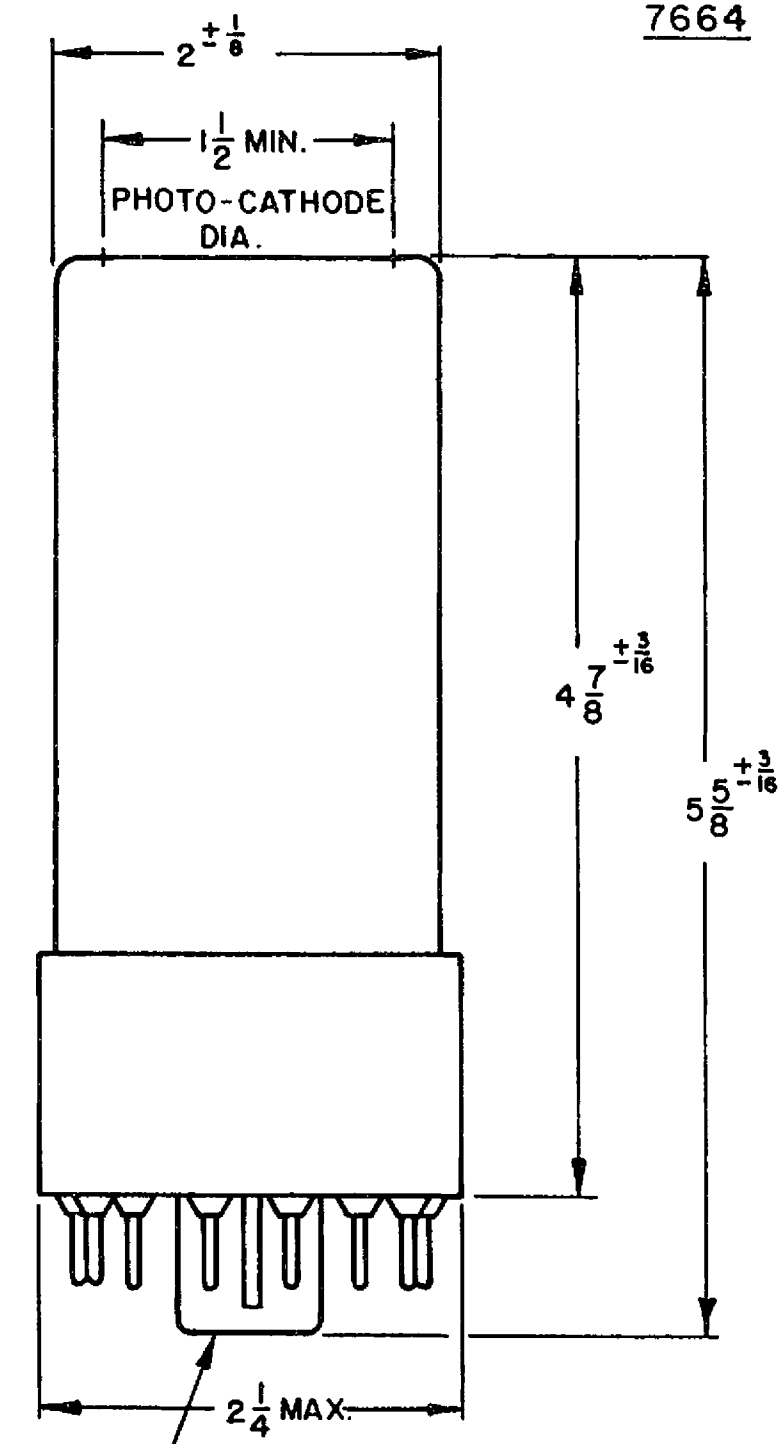
SPECTRAL SENSITIVITY CHARACTERISTICS OF S-13 RESPONSE

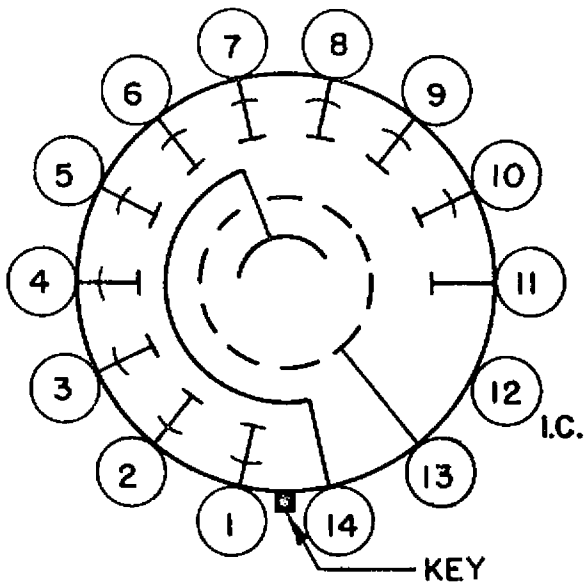


DU MONT

MULTIPLIER PHOTOTUBE

7664





BOTTOM VIEW

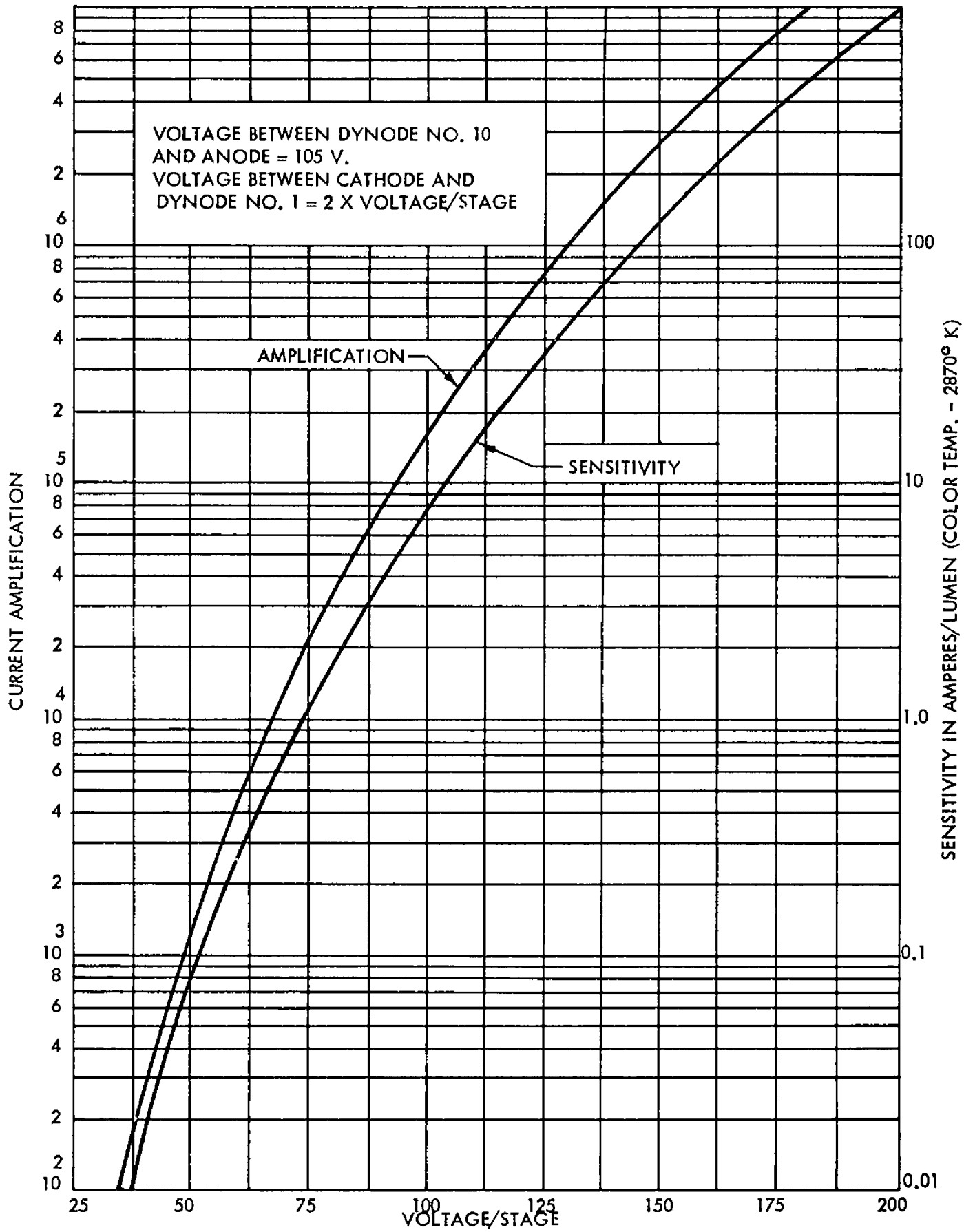
PIN NO.	ELEMENT
1	DYNODE NO.1
2	DYNODE NO.2
3	DYNODE NO.3
4	DYNODE NO.4
5	DYNODE NO.5
6	DYNODE NO.6
7	DYNODE NO.7
8	DYNODE NO.8
9	DYNODE NO.9
10	DYNODE NO.10
11	ANODE
12	INTERNAL CONNECTION
13	FOCUSING ELECTRODE (SHIELD)
14	CATHODE

NOTE:
DIRECTION OF LIGHT INTO END OF BULB

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

TD-5148A-2
1-8-60
FORM 809-C6-4-55-BH

AVERAGE MULTIPLIER CHARACTERISTICS
DU MONT TYPE 7664



DUMONT

TYPE 7739

The 7739 is a planar type triode designed for use in pulse oscillator applications at frequencies in the order of 4,000 to 5,000 megacycles.

GENERAL CHARACTERISTICS

Electrical Data

	Min.	Bog.	Max.	
Heater Voltage		6.1		Volts
Heater Current		1.18		Amperes
Direct Interelectrode Capacitances				
Grid to Plate	1.25	1.45	1.60	μμf
Grid to Shell[1]	7.8	12.4	17.0	μμf
Grid to Shell, Hot (Ef=6.3 V; Eb=0 V)[1]	7.1	8.7	10.3	μμf
Plate to Shell[1]			0.050	μμf
Cathode to Shell	27	42.5	58	μμf

Mechanical Data

Cathode		Unipotential
Mounting Position		Any
Weight, Approximate	1	Ounce

MAXIMUM RATINGS (ABSOLUTE VALUES)

Frequency	5,000	Megacycles
Pulse Width	0.45 ± .05	Microseconds
Duty Cycle	0.04	
Peak Plate Voltage	350	Volts
Peak Plate Current	325	Milliamperes
Plate Dissipation	7.5	Watts

TYPICAL OPERATION

Frequency	4,000 to 5,000	Megacycles
Pulse Width	0.45 ± .05	Microseconds
Duty Cycle	0.04	

DE-6047
3/21/60

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

from JEDEC release #2787, April 18, 1960

DUMONT

TYPE 7739

TYPICAL OPERATION (Continued)

Peak Plate Voltage	350	Volts
Peak Plate Current	250	Milliamperes
Peak Power Output	3	Watts Min.

NOTE 1: Cathode connected to shell through cathode-to-shell capacitance.

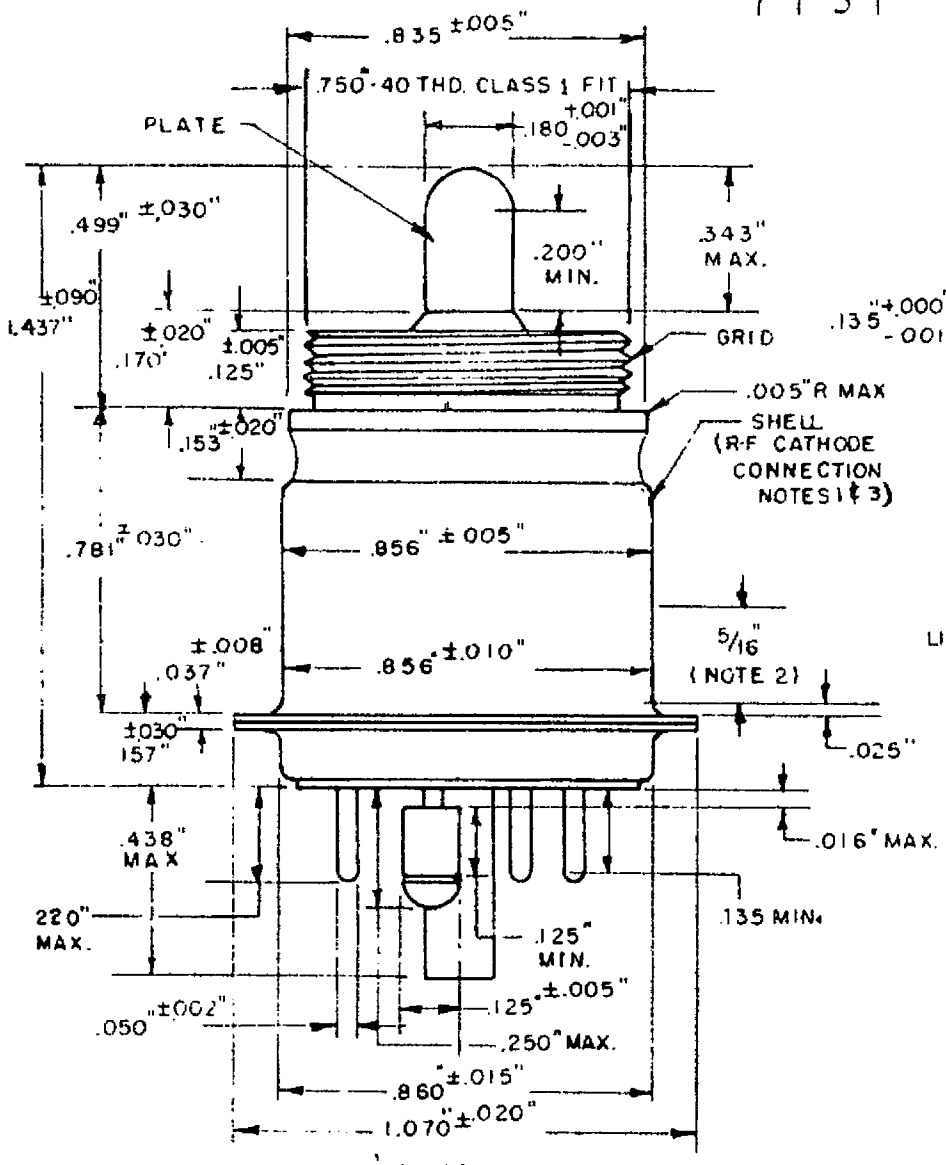
NOTE 2: Sufficient conduction and convection cooling should be provided to limit the grid and plate seal temperatures under all operating conditions. Maximum grid seal temperature is 100° C; maximum plate seal temperature is 150° C.

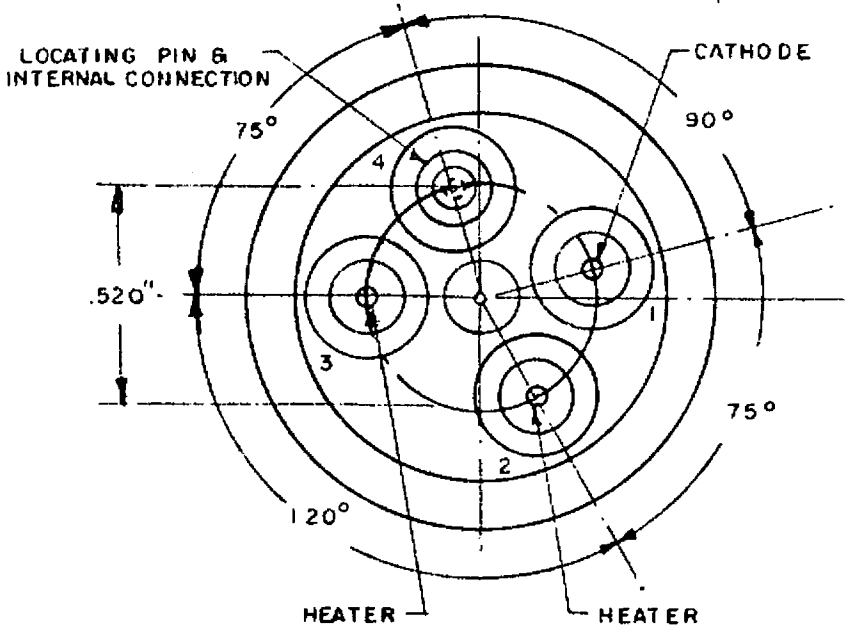
Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

FORM 8CP 5C-7-59-5M

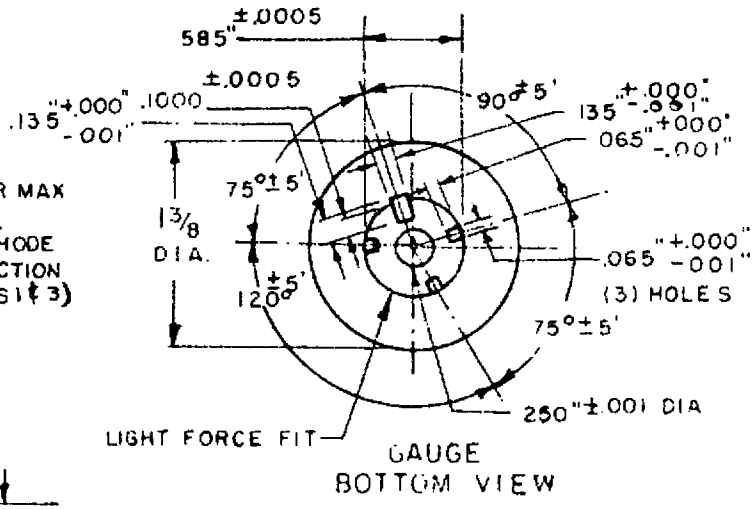
DUMONT

7739





BASE SHALL BE CAPABLE OF BEING INSERTED FREELY INTO A 7/16" THICK GAUGE WITH 5 HOLES DISPOSED AS SHOWN.



NOTES:

1. SURFACES OF R-F CATHODE, GRID AND ANODE CONNECTIONS ARE GOLD PLATED.
2. .856" ± .010" DIMENSION APPLIES ONLY OVER THE 5/16" LENGTH
3. CATHODE CONNECTED TO SHELL THROUGH CATHODE TO SHELL CAPACITANCE.
4. WITH THE .750"-40 THD. SCREWED INTO A GAUGE HAVING A THREAD WITH A .750"-40 CLASS 1 FIT THE .856", 1.070" AND .180" DIAMETERS MUST FIT IN CYLINDERS CONCENTRIC WITH THE .750"-40 THREAD AND HAVING DIAMETERS OF .835" X .720" LONG, 1.135" X .157" LONG, AND .210" X .375" LONG. ALLOWANCES FOR THESE TOLERANCES MUST BE MADE IN ANY CIRCUIT DESIGN.

Allen B. Du Mont Laboratories, Inc.
Passaic, New Jersey

DE-6047
3-21-60

FORM 8007 MR A PT 8M

from JEDEC release #3137, Feb. 6, 1961

DU MONT
ALLEN B. DU MONT LABORATORIES, Clifton, N. J.
DIVISIONS OF FAIRCHILD CAMERA AND INSTRUMENT CORPORATION

TYPE 7860

INDUSTRIAL MULTIPLIER PHOTOTUBE

Ruggedized 10-stage Multiplier Phototube



ACTUAL SIZE

SMALL SIZE FOR LIMITED SPACE USE

The type 7860 is a 10-stage multiplier phototube with a flat end-window type photocathode having an S-11 response. This tube employs silver magnesium dynodes. Silver magnesium is used because it has very stable secondary emitting characteristics over long periods of time.

RIGOROUS SHOCK AND VIBRATION TESTS

Du Mont multiplier phototubes are subjected to rigorous shock and vibration tests. The ruggedized 7860 is tested for VIBRATION at 10g, 25 to 2000 cycles and shock at 40g, 11 millisecond duration. Both tests are performed in each of 3 mutually perpendicular planes for increased reliability.

A potted base is used to keep the maximum diameter equivalent to that of the bulb, and to improve shock resistance.

SPECIFICATIONS

The Du Mont Type 7860 overall length has been shortened considerably over that of conventional types. In conjunction with its small diameter, it is ideally suited for applications where space considerations are of major importance. A potted base is used to keep the maximum diameter equivalent to that of the bulb, and to improve shock resistance. This tube type employs silver magnesium dynodes.

GENERAL CHARACTERISTICS

Electrical Data	Min.	Avg.	Max.	Units
Spectral Response		S-11		
Cathode luminous sensitivity at 210 volts, 0 cycles between cathode and all other electrodes	30	50		μA/Lumen
Anode luminous sensitivity at 105 volts/stage, 0 cycles	3	7.5		A/Lumen
Cathode sensitivity at maximum response at 210 volts between cathode and all other electrodes		.045		μA/μW
Anode dark current at 105 volts/stage (25°C.)			.05	μA
Current amplification at 105 volts/stage		150,000		
Wavelength at maximum response		4,400 ± 500		Angstroms

FEATURES

- 10 Dynode Stage
- S-11 Response
- Small Size:
  - overall length — 3⅞"
  - Diameter bulb — ¾"
- Silver Magnesium Dynodes
- Maximum Stability at high voltage
- Potted Base For:
  - a. Shock Resistance
  - b. Moisture Resistance
  - c. Socket Elimination
  - d. Noise Free Connections

APPLICATION

- Scintillation Probes
- Analysis Low Level Light Sources
- Oil Exploration
- Spectroscopy

PRINTED IN U.S.A.

DU MONT ELECTRONIC TUBE SALES DEPARTMENT
750 Bloomfield Avenue Clifton, New Jersey, U.S.A.

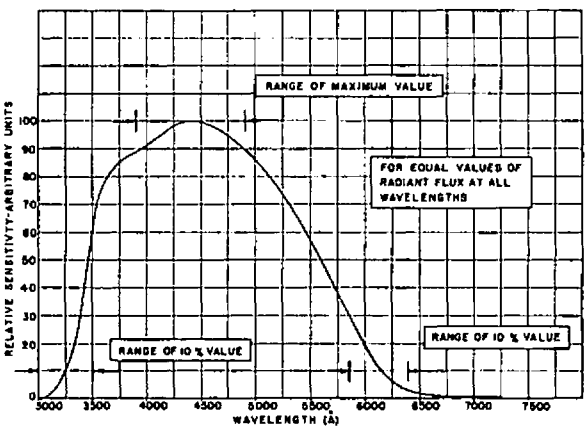
	Avg.	Units
Electrical Data		
Wavelength at 10% of maximum response on long wavelength side	6,125 ± 275	Angstroms
Wavelength at 10% of maximum response on short wavelength side	3,250 ± 250	Angstroms
Mechanical Data		
Window dimensions, minimum	½	Inch Dia.
Tube diameter	¾ ± 1/32	Inch
Overall length	3⅞ ± ¼	Inches
Base — Resin (potted) flexible leads		
Mounting position	Any	
Window index of refraction	1.5	

MAXIMUM RATINGS

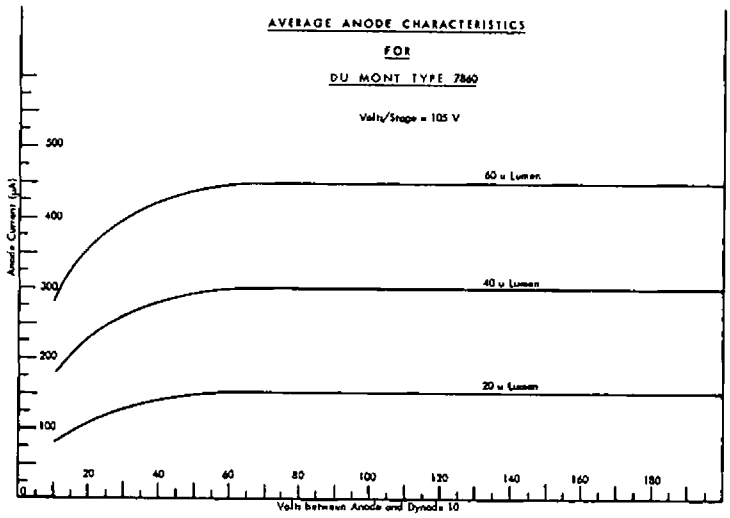
	Max.	Units
Peak cathode current[1]	10	μA
Average anode current[2]	1	mA
Average anode dissipation[2]	0.5	W
Peak anode dissipation	2.0	W
Supply voltage between anode and cathode (DC or peak AC)	1,300	Volts
Supply voltage between last dynode and anode (DC or peak AC)	125	Volts
Supply voltage between cathode and first dynode (DC or peak AC)	250	Volts
Ambient temperature	75°	C

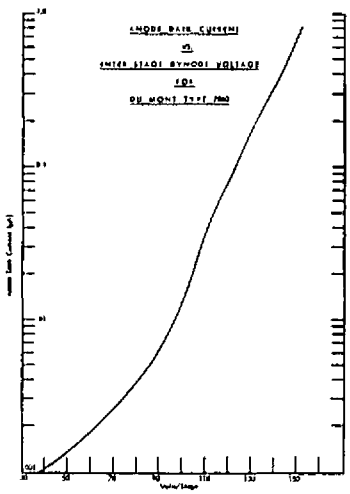
NOTES

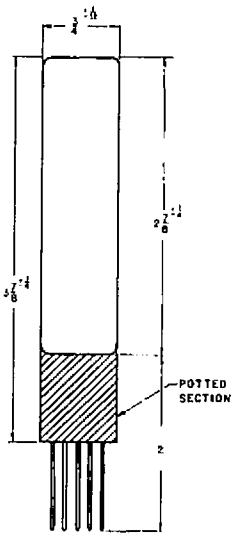
1. The cathode current given here is that current at which the response of the cathode ceases to be a linear function of the light intensity because of cathode resistance. In general, the cathode current must be kept well below this value in order to satisfy the maximum ratings on the anode current.
2. Averaged over a 30 second interval maximum.

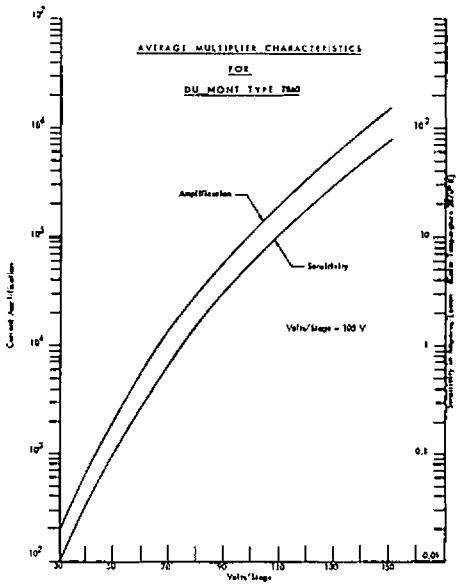


SPECTRAL RESPONSE OF S11 PHOTOCATHODE









JOINT ELECTRON DEVICE ENGINEERING COUNCIL

2260 Salmon Tower
11 West Forty-Second Street
New York 36, N. Y.
Telephone: LOngacre 5-0717

E. I. A.
REGISTRATION
FILE

Supplementary Information
of
Electron Device Type Registration

Release No. 3137

March 6, 1961

The Joint Electron Device Engineering Council announced the registration of the following electron device designation

7860

on February 6, 1961, under the sponsorship of Allen B. Du Mont Laboratories, Clifton, New Jersey.

The specification for registration of type 7860 failed to show the basing diagram. Please note the following:

Pin 1	Dynode	No. 1
Pin 2	Dynode	No. 3
Pin 3	Dynode	No. 5
Pin 4	Dynode	No. 7
Pin 5	Dynode	No. 9
Pin 6	Anode	
Pin 7	Dynode	No. 10
Pin 8	Dynode	No. 8
Pin 9	Dynode	No. 6
Pin 10	Dynode	No. 4
Pin 11	Dynode	No. 2
Pin 12	Cathode and Focussing Electrode (Shield)	

The first lead counter-clockwise from the red lead is Pin No. 1 (viewing from bottom of tube).

TYPE 7ABP-, 7ABP-A CATHODE-RAY TUBES

The Type 7ABP- Cathode-ray Tube is electrostatically focused and magnetically deflected and employs a high-resolution electron-gun. The Type 7ABP- is designed for radar systems requiring good resolution and high-brightness displays. Three long persistence screens, the P7, P14 and P19 screens, are recommended for use with the Type 7ABP-.

To afford substantially automatic focus independent of accelerator voltage variations, a low-voltage electrostatic lens is supplied which is designed to be operated at or near the potential of the cathode. This feature eliminates the necessity for a front panel focus control in equipment design.

The Type 7ABP-A utilizes an aluminized screen for greater light output and to minimize screen charging effects; it is otherwise identical to the 7ABP-. If a P19 screen is selected, the aluminized version should be used.



GENERAL CHARACTERISTICS

Electrical

Heater Voltage	6.3 Volts
Heater Current	0.6 ± 10% Ampere
Focusing Method	Electrostatic
Deflecting Method	Magnetic
Deflecting Angle (Approx.)	50 Degrees

Phosphor	No. 7	No. 14	No .19
Fluorescence	Blue	Blue	Orange
Phosphorescence	Yellow	Orange	Orange
Persistence	Long	Medium-long	Long

Direct Interelectric Capacitances, Approx.

Cathode to all other electrodes	5 μμf.
Grid No. 1 to all other electrodes	6 μμf.

Mechanical

Overall Length	13¼ ±¼ Inches
Greatest Diameter of Bulb	7-3/16 ±⅛ Inches
Minimum Useful Screen Diameter	6 Inches
Bulb Contact (Recessed Small Cavity Cap)	J1-21
Base (Small Shell Duodecal 6-Pin)	B6-63
Basing	12M
Bulb Contact Alignment	
J1-21 Contact aligns with vacant pin position No. 3	±10 Degrees

MAXIMUM RATINGS—(Design Center Values)

Accelerator Voltage	10,000 Max. Volts D-C
Focusing Electrode Voltage	—500 to +1000 Max. Volts D-C
Grid No. 2 Voltage	700 Max. Volts D-C
Grid No. 1 Voltage	
Negative Bias Value	180 Max. Volts D-C
Positive Bias Value[1]	0 Max. Volts D-C
Positive Peak Value	0 Max. Volts
Peak Heater-Cathode Voltage	
Heater Negative with respect to cathode	180 Max. Volts D-C
Heater Positive with respect to cathode	180 Max. Volts D-C

TYPICAL OPERATING CONDITIONS

Accelerator Voltage[2]	7,000	Volts D-C
Focusing Electrode Voltage[3]	0 to 250	Volts D-C
Focusing Electrode Current	—15 to +15	μA. D-C
Grid No. 2 Voltage	300	Volts D-C
Grid No. 1 Voltage[4]	—28 to —72	Volts D-C
Line Width A[5]	.012	Inch Max.
Spot Position (undeflected)[6]	⅜	Inch
Alignment Magnet Field Strength	0-4	Gausses

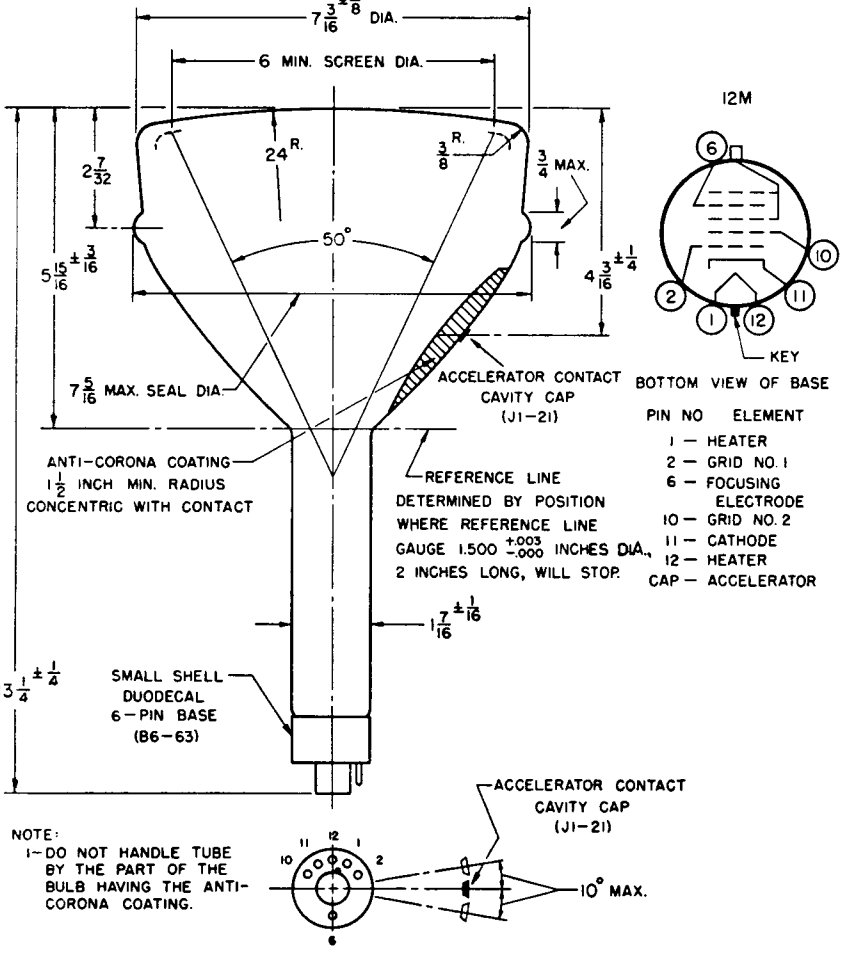
MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance	1.5 Max. Megohms

NOTES

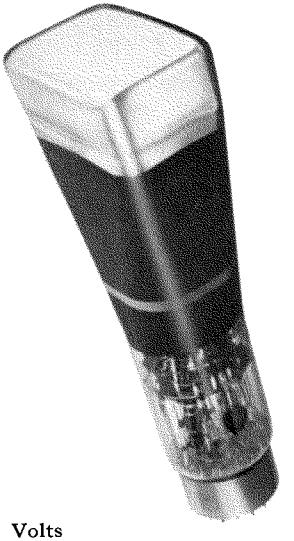
1. At or near this rating, the effective resistance of the accelerator supply should be adequate to limit the accelerator input power to 6 watts. The screen of the 7ABP19 can be permanently damaged should the current density be permitted to rise too high. To prevent burning, minimum beam current densities should be employed.
2. Brilliance and definition decrease with decreasing accelerator voltage. In general, accelerator voltage should not be less than 5,000 volts, except for the 7ABP19. For this type, the accelerator voltage should not be less than 7,000 volts.
3. With Grid No. 1 voltage adjusted to produce an accelerator current of 100 μA. with the pattern adjusted for best overall focus. Measured with a 525-line interlaced and synchronized 4¼ x 5¾-inch pattern, with interlaced line blanking (current measured before applying blanking).
4. Visual extinction of focused 4¼ x 5¾-inch raster pattern.
5. Measured with a 525-line interlaced and synchronized pattern with interlaced line blanking. Pattern width adjusted to 90% of minimum useful screen diameter. Ib = 100 μA. measured before applying blanking. Line width is the merged raster height divided by the number of lines (262.5) (measured in center of tube face). To avoid damage to the screen of the 7ABP19, it is recommended that the screen current be not more than 50 μA. when measuring line width. The line width under this condition will be .011 inch maximum (current measured before applying blanking).
6. The center of the undeflected, focused spot will fall within a circle of ⅜-inch radius concentric with the center of the tube face, with the tube shielded.
7. For optimum quality of the focused spot, the use of a beam alignment magnet is recommended. This may be obtained by the use of an adjustable magnet of specified strength, located approximately 5¼ inches from the reference line.

TYPE 7ABP-



7ACP- CATHODE-RAY TUBE

The Du Mont Type 7ACP- is a 4 x 6 inch rectangular, three beam, electrostatic focus and deflection cathode-ray tube. Each beam is independent of the other except for accelerating potentials and heater connections. Post-acceleration is used to obtain maximum deflection sensitivity with high brightness. The electron gun structures are so designed as to require no appreciable focusing current. As many of the electrode connections as is practical have been brought out through the base pins in order to simplify the problem of connection. The Post-accelerator is connected to a bulb contact in order to obtain maximum insulation. For maximum brightness and stability in performance, all screens are provided with a highly reflective metal backing.



GENERAL CHARACTERISTICS (Note 1)

Electrical Data

Heater Voltage	6.3 Volts
Heater Current (All units)	1.8 ± 10% Amperes
Focusing Method	Electrostatic
Deflecting Method	Electrostatic

Phosphor	No. 2	No. 7	No. 19
Fluorescence	Green	Blue	Orange
Phosphorescence	Green	Yellow	Orange
Persistence	Long	Long	Long

Direct Interelectrode Capacitances	Min.	Max.	
Cathode to all other electrodes	5.0	7.0	μμf
Grid No. 1 to all other electrodes	5.0	7.0	μμf
D1 to D2	2.2	4.0	μμf
D3 to D4	1.4	2.8	μμf
D1 to all other electrodes	9.5	13.2	μμf
D2 to all other electrodes	9.3	13.2	μμf
D3 to all other electrodes	8.0	11.0	μμf
D4 to all other electrodes	8.0	11.0	μμf

Mechanical Data

Overall Length	17¾ ± ⅜ Inches
Greatest Bulb Dimension (Diagonal)	6⅝ ± 1/16 Inches
Minimum Screen Dimensions (Along Tube Axes)	3¼ x 5¼ Inches
Bulb Contact (Recessed Small Ball Cap)	J1-22
Base (25 Pin)	B25-139
Basing	Special
Base Alignment	
D3D4 trace aligns with Base Key and Tube Axis	± 10 Degrees
Positive voltage on D1 deflects beam approximately towards Pin No. 18	
Positive voltage on D3 deflects beam approximately towards Base Key	
Bulb Contact Alignment	
Bulb contact located on tube center line	± ¼ Inch
Bulb contact on same side as Base Key	
Trace Alignment	
Angle between D1D2 and D3D4 traces	90 ± 2 Degrees
Corresponding traces of each gun align within	± 2 Degrees
D3D4 trace aligns with Bulb Side Wall	± 3 Degrees

MAXIMUM RATINGS (Design Center Values)

Post-Accelerator Voltage	10,500 Max. Volts D-C
Accelerator Voltage (Note 2)	3,500 Max. Volts D-C
Ratio Post-Accelerator Voltage to Accelerator Voltage (Note 3)	3.0 Max.
Focusing Voltage	2,700 Max. Volts D-C
Grid No. 1 Voltage	
Negative Bias Value	300 Max. Volts D-C
Positive Bias Value	0 Max. Volts D-C
Positive Peak Value	0 Max. Volts
Peak Heater to Cathode Voltage	
Heater Negative with respect to Cathode	180 Max. Volts
Heater Positive with respect to Cathode	180 Max. Volts
Peak Voltage between Accelerator and any Deflection Electrode	1,000 Volts

TYPICAL OPERATING CONDITIONS

For Post-Accelerator Voltage of	9,000 Volts D-C	
For Accelerator Voltage of	3,000 Volts D-C	
Focusing Voltage	595 to 1020 Volts D-C	
Grid No. 1 Voltage (Note 4)	—67 to —112 Volts D-C	
	Phosphors Nos. 2 & 7	No. 19
Modulation	15 (Note 5)	20 (Note 6) Max. Volts D-C
Line Width "A"	.036 (Note 7)	.024 (Note 8) Max. Inches
Light Output (Note 9)	100 (P2) Min. Ft. Lamberts	
Deflection Factors:		
D1 and D2	86 to 130 Volts D-C/Inch	
D3 and D4	84 to 126 Volts D-C/Inch	
Useful Scan (Note 10)		
Spot Position (Note 11)	Within 15 mm Square	

CIRCUIT DESIGN VALUES

Focusing Voltage	198 to 340 Volts per Kilovolt of Accelerator Voltage
Focusing Current for any operating condition	—15 to +10 Microamperes
Grid No. 1 Voltage (Note 4)	—37.5 to —22 Volts per Kilovolt of Accelerator Voltage
Grid No. 1 Circuit Resistance	1.5 Max. Megohms
Deflection Factors:	
Ratio Post-Accelerator Voltage to Accelerator Voltage	1.0
D1 and D2	19 to 29 Volts D-C/Inch/KV of Accelerator Voltage
D3 and D4	19.5 to 30 Volts D-C/Inch/KV of Accelerator Voltage
Ratio Post-Accelerator Voltage to Accelerator Voltage	3.0
D1 and D2	28.5 to 43.5 Volts D-C/Inch/KV of Accelerator Voltage
D3 and D4	28 to 42 Volts D-C/Inch/KV of Accelerator Voltage
Resistance in any Deflection Electrode Circuit (Note 12)	1.0 Max. Megohms

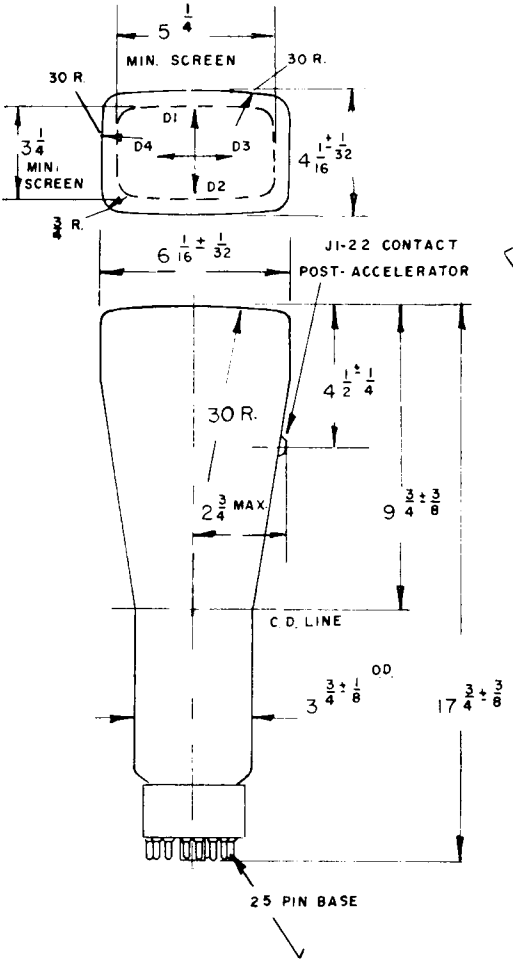
NOTES

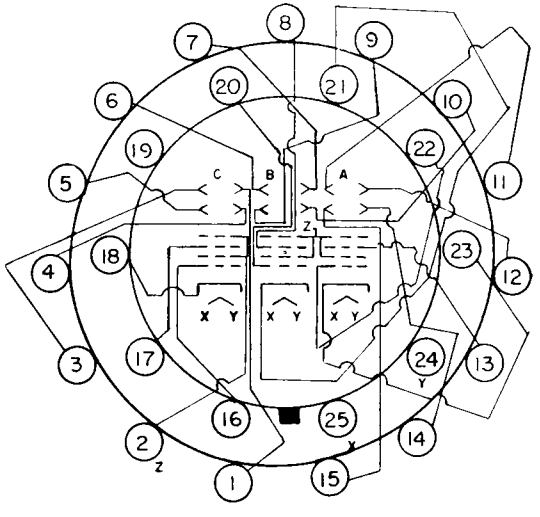
1. All tests to be made on each gun separately. Values are for each unit unless otherwise stated.
2. Accelerator power input (Avg.) should be limited to six watts. The P19 screen can be permanently damaged if the current density is permitted to rise too high. To prevent burning, minimum beam current densities should be employed.
3. This tube is designed for optimum performance when operating at an Eb3/Eb2 ratio of 3.0. Operation at other ratios of Eb3/Eb2 may result in changes in deflection uniformity and pattern distortion.
4. For visual extinction of the focused undeflected spot.
5. The increase in Grid No. 1 voltage from cut-off to produce an Ib3 of 50 μAD-C.
6. The increase in Grid No. 1 voltage from cut-off to produce an Ib3 of 5 μAD-C.
7. Measured in accordance with MIL-E-1 specifications using an Ib3 of 50 μAD-C.
8. Measured in accordance with MIL-E-1 specifications using an Ib3 of 5 μAD-C.
9. P2 and P7 Light Output — Measured in accordance with MIL-E-1 specifications with an Ib3 of 50 μAD-C.
10. The minimum useful scan of Guns A and C is:
    D1D2 = 3.0 inches and D3D4 = 2.25 inches.
    The minimum useful scan of Gun B is:
    D1D2 = 3.0 inches and D3D4 = 3.0 inches.
11. When the tube is operated at typical operating conditions, and with (1) Eb1 adjusted for focus, (2) Ec1 set at such a value as will avoid damage to the screen, (3) each of the deflecting electrodes connected to the accelerator, and (4) the tube shielded against external influences; the spots will fall within 15 mm squares, the

centers of which are 1.5 inches from the geometric center of the tube face towards the bulb contact for guns A and C and 1.0 inch from the geometric center of the tube face away from the bulb contact for gun B, and the sides of which are parallel to the traces produced by deflecting electrodes D3 and D4 respectively.

12. It is recommended that the deflection electrode circuit resistances be approximately equal. Higher resistance values up to 5 megohms may be used for low beam current operation.

TYPE 7ACP-

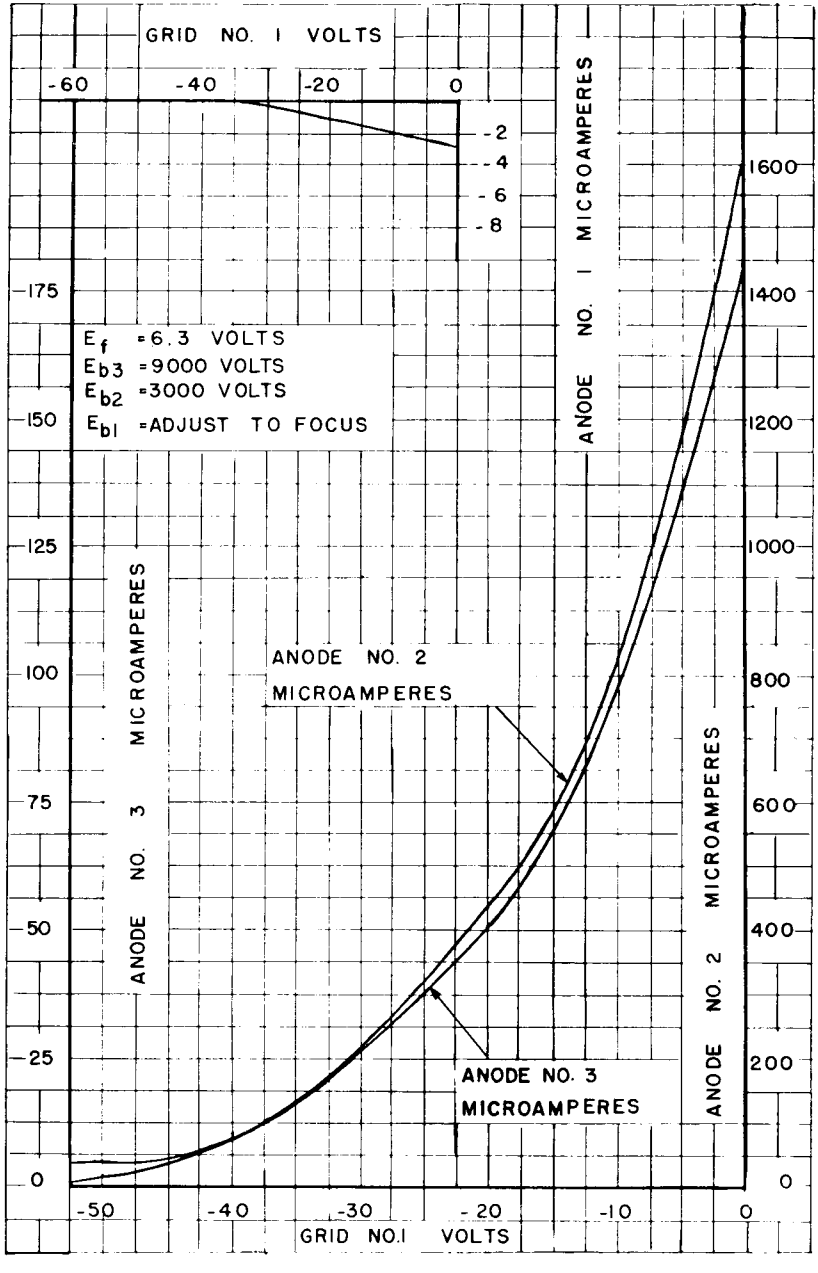




BOTTOM VIEW

	PIN NO.	ELEMENT
	2	ACCELERATOR COMMON (Z)
	24	HEATER COMMON (Y)
	25	HEATER COMMON (X)
	11	DEFLECTOR D1
UNIT A	12	DEFLECTOR D2
	13	FOCUSING ELECTRODE
	14	DEFLECTOR D3
	15	DEFLECTOR D4
	22	GRID NO.1
	23	CATHODE
	6	DEFLECTOR D1
	7	DEFLECTOR D2
	8	FOCUSING ELECTRODE
	9	DEFLECTOR D4
UNIT B	10	DEFLECTOR D3
	20	GRID NO.1
	21	CATHODE
	1	DEFLECTOR D2
	3	DEFLECTOR D1
UNIT C	4	DEFLECTOR D3
	5	DEFLECTOR D4
	16	GRID NO.1
	17	FOCUSING ELECTRODE
	18	CATHODE

TYPE 7ACP-
AVERAGE CHARACTERISTICS



TYPE 7AEP- CATHODE-RAY TUBES

The Du Mont Type 7AEP- is a 7 inch diameter, single beam, post-accelerator, electrostatic focus and deflection cathode-ray tube employing a flat face plate to reduce parallactic error. Tolerances are tightly controlled and feature: angle between D1D2 and D3D4 traces held to 90° ± 1°, deflection factors held to within 10% with low pattern distortion, and grid cutoff bias is maintained to within 25%. The gun employed draws negligible focusing electrode current.

The inherently higher sensitivity of this line of "Tight-Tolerance" cathode-ray tubes, such as the 5AFP-, over previously available commercial tubes permits smaller, lower cost amplifiers, while tight tolerances afford greater freedom in cathode-ray and radar equipment design.



GENERAL CHARACTERISTICS

Electrical Data

Focusing Method		Electrostatic	
Deflecting Method		Electrostatic	
Direct Interelectrode Capacitances	Min.	Max.	
Cathode to all	2.9	4.5	μμf
Grid No. 1 to all	3.7	6.4	μμf
D1 to D2	1.7	2.7	μμf
D3 to D4	1.0	1.8	μμf
D1 to all	5.4	7.6	μμf
D2 to all	5.4	7.6	μμf
D3 to all	3.4	5.5	μμf
D4 to all	3.4	5.5	μμf

Optical Data

Phosphor Number	1	2	7	11
Fluorescent Color	Green	Green	Blue	Blue
Phosphorescent Color	——	Green	Yellow	——
Persistence	Medium	Long	Long	Short

Mechanical Data

Overall Length	15½ ± ¼ Inches
Greatest Diameter of Bulb	7 ± 3/32 Inches
Minimum Useful Screen Diameter	6⅛ Inches
Bulb Number	J56Y1
Bulb Contact — Recessed Small Ball Cap	J1-22
Base — Medium Shell Diheptal, 12 Pin	B12-37
Basing	14J
Base Alignment	
D1D2 trace aligns with Pin No. 5 and tube axis	0 ± 10 Degrees
Positive voltage on D1 deflects beam approximately toward Base Pin No. 5	
Positive voltage on D3 deflects beam approximately toward Base Pin No. 2	
Bulb Contact Alignment	
J1-22 contact aligns with D1D2 trace	0 ± 10 Degrees
J1-22 contact on same side as Pin No. 5	
Trace Alignment	
Angle between D3D4 and D1D2 traces	90 ± 1 Degrees

MAXIMUM RATINGS (Design Center Values)

Heater Voltage	6.3 Volts
Heater Current at 6.3 Volts	0.6 ± 10% Ampere
Post-Accelerator Voltage	8000 Max. Volts D-C
Accelerator Voltage	4000 Max. Volts D-C
Ratio Post-Accelerator Voltage to Accelerator Voltage (Note 1)	2.0
Accelerator Input	6.0 Max. Watts
Focusing Electrode Voltage	1250 Max. Volts D-C
Grid No. 1. Voltage	
Negative Bias Value	200 Max. Volts D-C
Positive Bias Value	0 Max. Volts D-C
Positive Peak Value	0 Max. Volts
Peak Heater-Cathode Voltage	
Heater negative with respect to cathode	180 Max. Volts
Heater positive with respect to cathode	180 Max. Volts
Peak Voltage between Accelerator and any Deflection Electrode	750 Max. Volts

TYPICAL OPERATING CONDITIONS

Post-Accelerator Voltage	4000 Volts
Accelerator Voltage	2000 Volts
Focusing Electrode Voltage	380 to 620 Volts
Grid No. 1 Voltage (Note 2)	—45 to —75 Volts
Deflection Factors:	
D1 and D2	81 to 101 Volts D-C per Inch
D3 and D4	67 to 83 Volts D-C per Inch
Deflection Factor Uniformity (Note 3)	3% Max.
Pattern Distortion (Note 4)	2½% Max.
Modulation (Note 5)	37 Max. Volts D-C
Line Width "A" (Note 5)	.022 Max. Inches
Light Output (Note 5) Phosphor #1	20 Foot Lamberts Min.
Focusing Electrode Current for any operating condition	—15 to +10 μA
Spot Position (focused and undeflected) (Note 6)	Within a 15 mm Square
For Accelerator Voltage not shown in the preceding table, the following can be used as a guide:	
Focusing Electrode Voltage	19% to 31% of Accelerator Volts
Grid No. 1 Voltage	2.2% to 3.8% of Accelerator Volts
Ratio Post-Accelerator to Accelerator Voltage	1.0
D1 and D2	33 to 40 Volts D-C per Inch per Kilovolt of Accelerator Voltage
D3 and D4	27 to 33 Volts D-C per Inch per Kilovolt of Accelerator Voltage
Ratio Post-Accelerator to Accelerator Voltage	2.0
D1 and D2	40 to 52 Volts D-C per Inch per Kilovolt of Accelerator Voltage
D3 and D4	33 to 42 Volts D-C per Inch per Kilovolt of Accelerator Voltage

MAXIMUM CIRCUIT VALUES

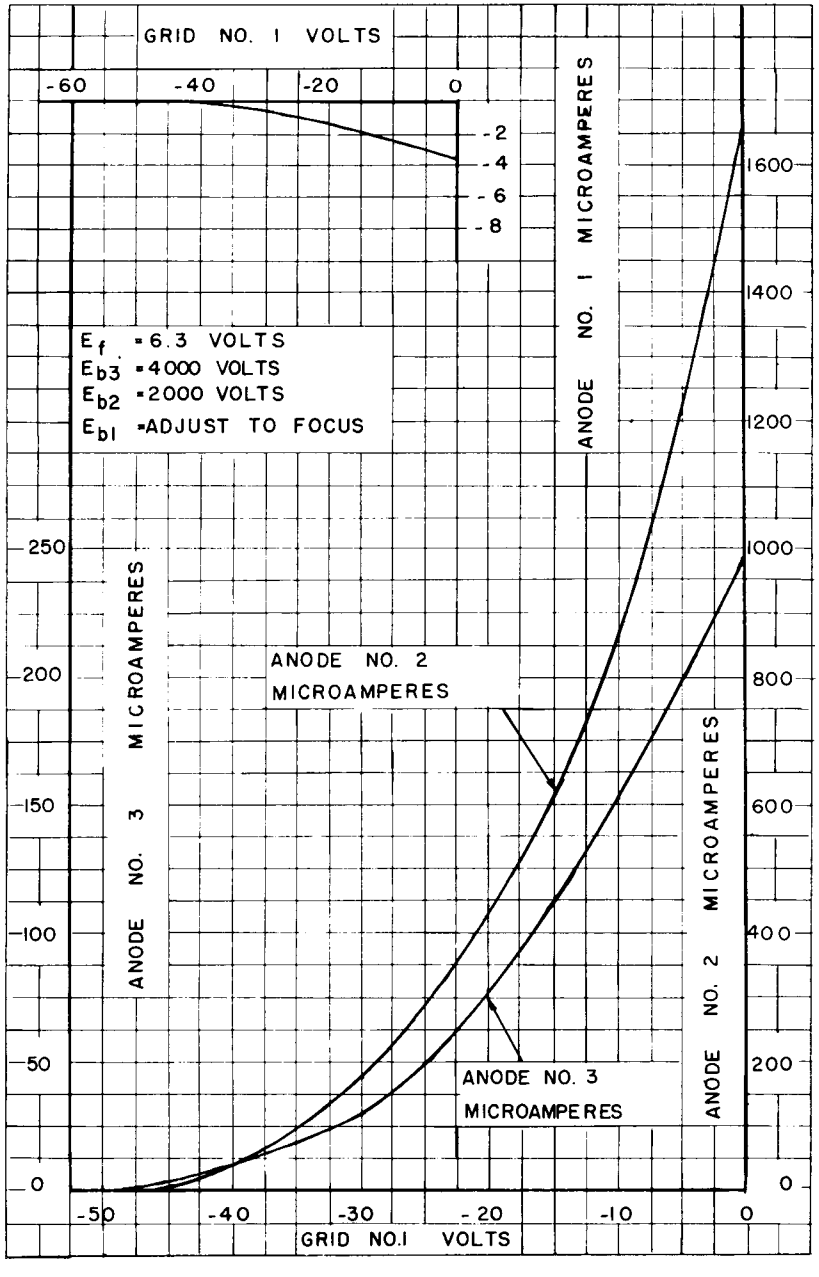
Grid No. 1 Circuit Resistance	1.5 Max. Megohms
Resistance in any Deflecting Electrode Circuit (Note 7)	1.0 Max. Megohms

NOTES

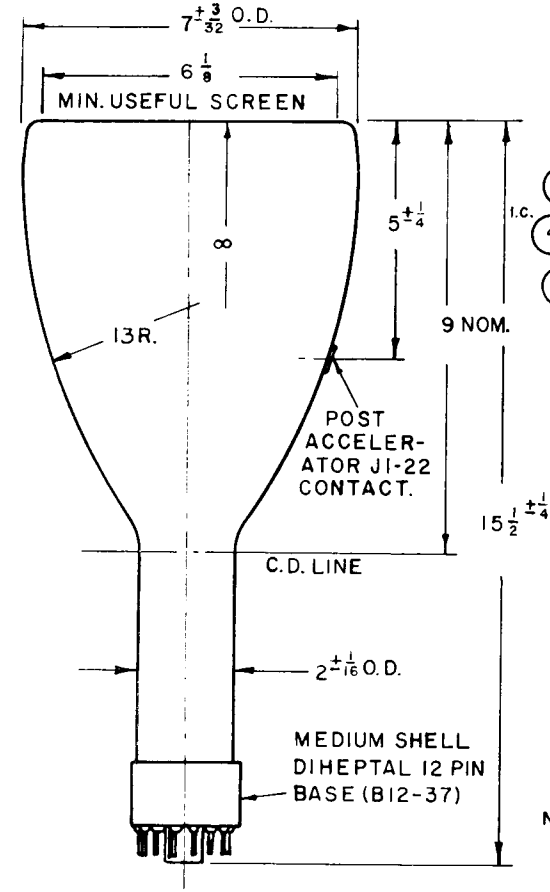
1. This tube is designed for optimum performance when operating at an Eb3/Eb2 ratio of 2.0. Operation at other ratios of Eb3/Eb2 may result in changes in deflection uniformity and pattern distortion.
2. Visual extinction of undeflected focused spot.
3. As per MIL-E-1 specifications.
4. All portions of a raster pattern, adjusted so its widest points just touch the sides of a 4.100 inch square will fall within the area bounded by the 4.100 inch square and an inscribed 3.900 inch square.
5. For an Ib3 of 25 μADC measured in accordance with MIL-E-1 specifications.
6. Centered with respect to the tube face and with the tube shielded. Connect free deflecting electrodes to accelerator.
7. It is recommended that the deflecting-electrode circuit resistance be approximately equal. Higher resistance values up to five megohms may be used for low beam current operation.

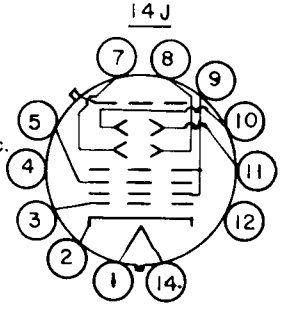
TYPE 7AEP-

AVERAGE CHARACTERISTICS



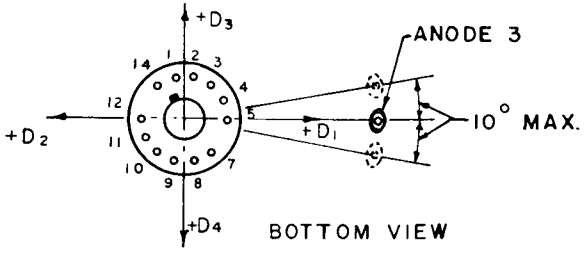
TYPE 7AEP-





PIN NO.	ELEMENT
1	HEATER
14	HEATER
2	CATHODE
3	GRID NO. 1
5	FOCUSING ELECTRODE
11	DEFLECTOR D_1
10	DEFLECTOR D_2
7	DEFLECTOR D_3
8	DEFLECTOR D_4
9	ACCELERATOR
4	INTERNAL CONNECTION

NOTE:
1. THE BULB SHALL BE A J56Y1 TYPE.



DUMONT

CATHODE-RAY TUBES

TYPE 7AJP-

The DuMont Type 7AJP- is a 7 inch diagonal, square face, magnetic focus and deflection cathode-ray tube. The use of this square type of face allows the maximum possible screen display area in relation to the bulb area. The Type 7AJP-, also, features an extended neck to accommodate more than one deflection coil. One of the suggested uses for this feature is to form letters or symbols with one deflection yoke while positioning them on the screen with the other yoke.

The Type 7AJP- is supplied with a metal backed screen to increase the light output and minimize the build-up of spurious charges on the screen by successive transients.

Screen types other than those listed below are available on order.

GENERAL CHARACTERISTICS

Electrical Data

Focusing Method	Magnetic	
Deflecting Method	Magnetic	
Deflection Angle, Approximate		
Horizontal	28	Degrees
Vertical	28	Degrees
Diagonal	40	Degrees
Direct Interelectrode Capacitances, Approx.		
Cathode to all	5	µµf
Grid No. 1 to all	7	µµf

Optical Data

Phosphor Number	1	2	7	11	14	19 (Note 1)	25 (Note 2)
Fluorescent Color	Green	Bl-Grn.	Bl-Wh.	Blue	Purple	Orange	Orange
Phosphorescent Color	Green	Green	Yellow	Blue	Orange	Orange	Orange
Persistence	Med.	Long	Long	Short	Med. Long	Long	Long
Faceplate							Clear

Mechanical Data

Overall Length	19 ± 3/8	Inches
Greatest Dimensions of Bulb		
Diagonal	6 15/16 ± 1/16	Inches
Width	5 1/2 + 1/32 -1/16	Inches
Height	5 1/2 + 1/32 -1/16	Inches

from JETEC release #1866, March 11, 1957

Allen B. Du Mont Laboratories, Inc.
Passaic, New Jersey

TL-1314
7 FEB 1957

DUMONT
CATHODE-RAY TUBES

TYPE 7AJP-

Mechanical Data (Cont'd)

Minimum Useful Screen Dimensions (Note 3)		
Diagonal	6	Inches
Width	4.5	Inches
Height	4.5	Inches
Neck Length	11	Inches
Bulb Contact	J1-21	
Base	B6-63	
Basing	12D	
Bulb Contact Alignment		
J1-21 contact aligns with Pin position No. 3	± 30	Degrees
J1-21 contact located on tube center line	± 1/4	Inch

RATINGS (Design Center Values)

Heater Voltage	6.3	Volts
Heater Current at 6.3 Volts	0.6 ± 10%	Ampere
Accelerator Voltage	16000	Max. Volts DC
Accelerator Input (Notes 1 & 2)	8	Max. Watts
Grid No. 2 Voltage	700	Max. Volts DC
Grid No. 1 Voltage		
Negative Bias Value	200	Max. Volts DC
Positive Bias Value	0	Max. Volts DC
Positive Peak Value	0	Max. Volts
Peak Heater-Cathode Voltage		
Heater negative with respect to cathode		
During warm-up period not to exceed 15 seconds	410	Max. Volts
After Equipment warm-up period	180	Max. Volts
Heater positive with respect to cathode	180	Max. Volts

TYPICAL OPERATING CONDITIONS

Accelerator Voltage	14000	Volts DC
Grid No. 2 Voltage	550	Volts DC
Grid No. 1 Voltage (Note 4)	-75 to -150	Volts DC
Focusing Coil Current (Notes 5 & 6)	77	Approx. mA. DC
Modulation (Notes 6 & 7)	40	Max. Volts DC
Line Width "A" (Notes 6 & 7)	.008	Max. Inches
Spot Position (Note 8)	12	Max. mm

Allen B. Du Mont Laboratories, Inc.
Passaic, New Jersey

FORM 609T M1 10-56-SH

DUMONT

CATHODE-RAY TUBES

TYPE 7AJP-

MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance	1.5	Max. Megohms

NOTES

1. The P19 screen can be permanently damaged if the current density is permitted to rise too high. To prevent burning, use minimum current densities with this screen.

2. To prevent burning the P25 screen, the power input to the screen should not be allowed to rise more than 5×10^{-3} watts/cm^2.

3. Following bulb contour.

4. Visual extinction of undeflected focused spot.

5. For JETEC Focus Coil No. 109 or equivalent. Distance from reference line to center of air gap on focus coil shall be 3 3/4 inches. For other locations of the air gap different values of coil current and line width will be obtained.

6. For an Ib2 of 100 μADC measured in accordance with MIL-E-1 specifications.

7. Because of their tendency to burn, the P19 and P25 screens should always be used with much lower beam currents and therefore the modulation will be lower and finer spot size will be obtained with these screens.

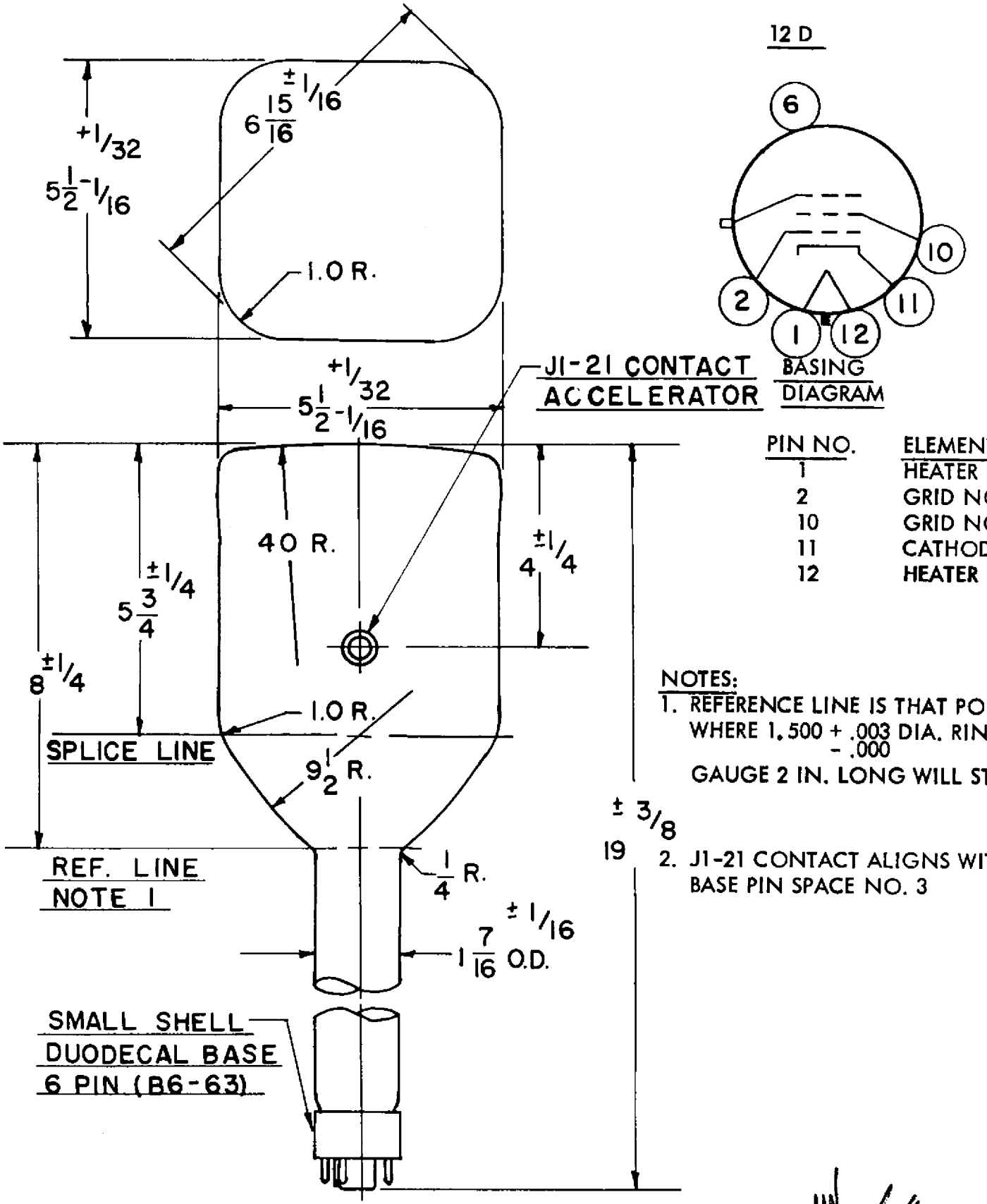
8. The center of the undeflected, unfocused spot will fall within a circle of 12 millimeters radius concentric with the tube face.

TL-1314
7 FEB 1957

Allen B. Du Mont Laboratories, Inc.
Passaic, New Jersey AD/MM

DU MONT

CATHODE-RAY TUBE
TYPE 7AJP-



12 D

BASING DIAGRAM

PIN NO.	ELEMENT
1	HEATER
2	GRID NO. 1
10	GRID NO. 2
11	CATHODE
12	HEATER

NOTES:

1. REFERENCE LINE IS THAT POINT WHERE 1.500 +.003 -.000 DIA. RING GAUGE 2 IN. LONG WILL STOP.
2. J1-21 CONTACT ALIGNS WITH BASE PIN SPACE NO. 3

Allen B. Du Mont Laboratories, Inc.
Passaic, New Jersey

TD 5021A

N. VACCA 2-8-57

FORM 6097 M1 10-56-6H

DUMONT

CATHODE-RAY TUBE

TYPE 7AMP-

The Du Mont Type 7AMP- is a 7-inch diagonal, square face, two beam, electrostatic deflection and focus cathode-ray tube having improved deflection sensitivity, accuracy and extremely low interaction between traces. The use of a post accelerator with high maximum ratings permits high brightnesses and small spot sizes to be obtained. The deflection electrode and acceleration electrode connections are brought out through the bulb wall to minimize lead inductance and capacity and to improve insulation. The two second anodes and the shield, normally tied together, have separate connections for astigmatism control and special applications. A collar or ring base has been designed and incorporated into this tube for ease of connection to these leads.

GENERAL CHARACTERISTICS [1]

Electrical Data

Focusing Method	Electrostatic	
Deflection Method	Electrostatic	
Direct Interelectrode Capacitances, Maximum		
Cathode to all	4.6	μμf
Grid No. 1 to all	4.0	μμf
D1 to D2	2.1	μμf
D3 to D4	1.4	μμf
D1 to all	5.0	μμf
D2 to all	5.0	μμf
D3 to all	4.1	μμf
D4 to all	4.1	μμf

Optical Data

Phosphor Number	1	2	7	11	14
Fluorescence	Yellow-Green	Yellow-Green	White	Blue	Blue
Phosphorescence	----------	Green	Yellow-Green	----	Orange
Persistence	Medium	Medium	Long	Medium Short	Medium

Mechanical Data

Overall Length	17 5/8 ± 1/4	Inches
Greatest Bulb Diagonal	7 1/32 ± 3/32	Inches
Minimum Useful Screen Width [2]	4.5	Inches
Bulb Contact	J1-22	
Collar (12-Pin Diheptal)	Special	

Du Mont Laboratories
Subsidiary of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

TL-1117 - 5
1/12/62

FORM 80PH

from JEDEC release #3625, March 5, 1962

DUMONT

CATHODE-RAY TUBE

TYPE 7AMP-

GENERAL CHARACTERISTICS (Mechanical Data) (Continued)

Base	B12-37	
Basing	Special	
Collar and Base Alignment:		
Collar Pin No. 1 and Base Key each aligns with the D3D4 trace	± 10	Degrees
Positive voltage on D1 deflects the beam approximately toward Base Pin No. 4		
Positive voltage on D3 deflects the beam approximately toward Base Key		
Bulb Contact Alignment:		
Bulb cap aligns with D3D4 trace	± 10	Degrees
Bulb cap on same side as Base Key		
Trace Alignment:		
D1D2 trace aligns with D3D4 trace	90 ± 1	Degrees
Corresponding traces align with	1	Degree

MAXIMUM RATINGS (Absolute Maximum Values)

Heater Voltage	6.3	Volts
Heater Current at 6.3 Volts	0.6 ± 10%	Ampere
Post Accelerator Voltage	11,500	Max. Volts DC
Accelerator Voltage[3]	3850	Max. Volts DC
Ratio Post Accelerator Voltage to Accelerator Voltage[4]	3.0	Max.
Focusing Voltage	1900	Max. Volts DC
Grid No. 1 Voltage		
Negative Bias Value	200	Max. Volts DC
Positive Bias Value	0	Max. Volts DC
Positive Peak Value	0	Max. Volts DC
Peak Heater-Cathode Voltage		
Heater negative with respect to cathode	180	Max. Volts
Heater positive with respect to cathode	180	Max. Volts
Peak Voltage between Accelerator and any Deflection Electrode	750	Max. Volts

DUMONT

CATHODE-RAY TUBE

TYPE 7AMP-

TYPICAL OPERATING CONDITIONS

Post Accelerator Voltage	4000	Volts
Accelerator Voltage	2000	Volts
Focusing Voltage	400 to 680	Volts
Grid No. 1 Voltage[5]	-45 to -75	Volts
Modulation[6]	45	Volts Max.
Line Width[7]	.030	Inch Max.
P1 Light Output[7]	20	Ft. L. Min.
Deflection Factors:		
D1D2	63 to 80	Volts DC/Inch
D3D4	48 to 62	Volts DC/Inch
Deflection Factor Uniformity[8]		
D1D2	2%	Max.
D3D4	3%	Max.
Pattern Distortion at 75% of Useful Screen Width[9]	2 1/2 %	Max.
Tracking Error[10]	2%	Max.
Interaction Factor[11]	0.000014	Inch/Volt DC Max.
Spot Position (Undeflected)[12]	Within a 5/16-inch radius circle	
Focusing Current for any operating condition	-15 to +10	Microamperes
Grid No. 1 Circuit Resistance	1.5	Max. Megohms
Resistance in any Deflecting-Electrode Circuit[13]	1.0	Max. Megohms

NOTES

1. Values are for each unit unless otherwise stated.

2. Following the bulb contour.

3. Accelerator power input (average) should be limited to six watts.

4. This tube is designed for optimum performance when operating at an Eb3/Eb2 ratio of 2.0. Operation at other ratios of Eb3/Eb2 may result in increased deflection non-uniformity, pattern distortion, and tracking error.

DUMONT

CATHODE-RAY TUBE

TYPE 7AMP-

NOTES
(Continued)

5. Visual extinction of the focused, undeflected spot.

6. The increase in Grid No. 1 voltage from cut-off to produce an Ib3 of 25 μADC.

7. Measured in accordance with MIL-E-1 specifications, using an Ib3 of 25 μADC.

8. The deflection factor for deflections of less than 75% of the useful scan will not differ from the deflection factor for a deflection of 25% of the useful scan by more than the indicated value.

9. The edges of a raster pattern, whose mean dimensions are the indicated percentage of useful screen width, will not deviate from the mean dimension by more than the specified amount.

10. The positions of the spot of each beam, when deflected from the center by applied voltages proportional to the deflection factor, will not deviate from each other by more than the indicated percentage of the deflection.

11. The deflection of one beam when balanced D.C. voltages are applied to the deflection electrodes of the other beam will not be greater than the indicated value.

12. Centered with respect to the tube face and with the tube shielded.

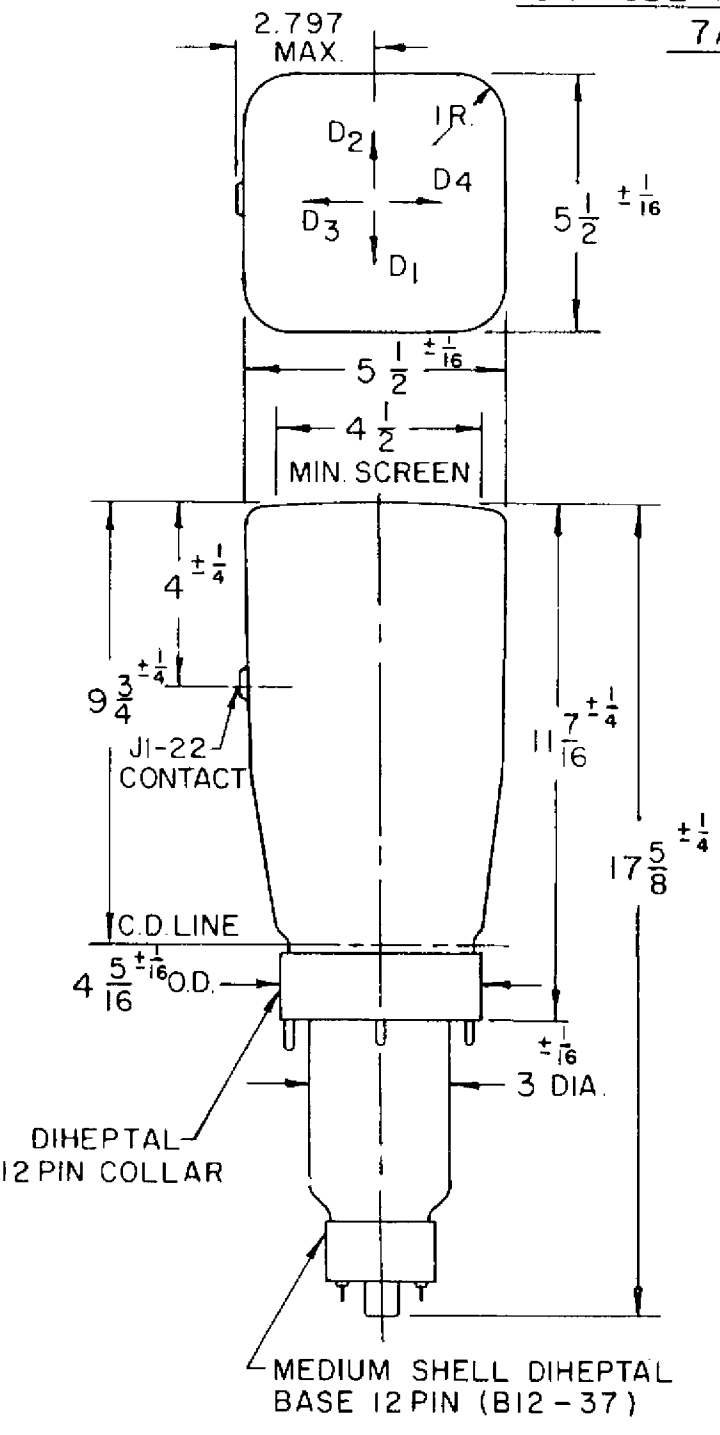
13. Deflection-electrode circuit resistances should be equal. Higher resistance values up to 5.0 megohms may be used for low beam current operation.

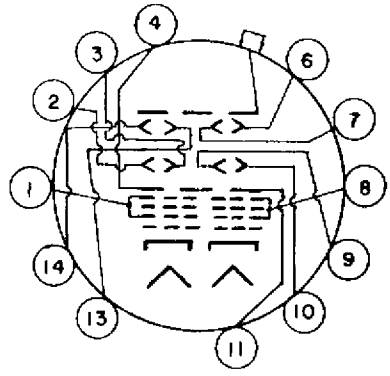
Allen B. Du Mont Laboratories
Divisions of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

DU MONT

CATHODE RAY TUBE

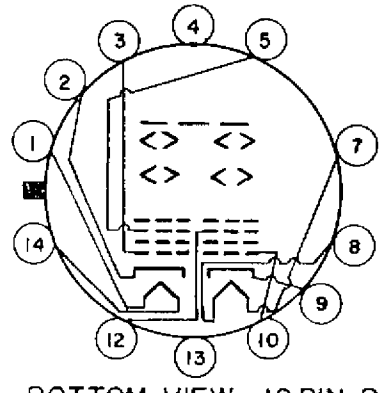
7AMP-





BOTTOM VIEW - 12 PIN COLLAR

PIN NO.	ELEMENT		BEAM
1	ACCELERATOR		A
2	DEFLECTOR	D3	A
3	DEFLECTOR	D4	A
4	SHIELD		A
13	DEFLECTOR	D2	A
14	DEFLECTOR	D1	A
6	DEFLECTOR	D1	B
7	DEFLECTOR	D2	B
8	ACCELERATOR		B
9	DEFLECTOR	D4	B
10	DEFLECTOR	D3	B
11	SHIELD		B
BULB CONTACT	POST ACCELERATOR		



BOTTOM VIEW - 12 PIN BASE

PIN NO.	ELEMENT	BEAM
1	HEATER	A
2	CATHODE	A
3	GRID NO. 1	A
4	INTERNAL CONNECTION	A
5	FOCUSING ELECTRODE	A
14	HEATER	A
7	HEATER	B
8	HEATER	B
9	CATHODE	B
10	GRID NO. 1	B
11	INTERNAL CONNECTION	B
12	FOCUSING ELECTRODE	B

NOTES.

1. SHIELD (COLLAR PINS NO. 4 & 11) IS COMMON TO BOTH BEAMS.
2. J1-22 CONTACT, COLLAR PIN NO. 1 AND BASE KEY ALIGN WITH D3, D4 TRACE ± 10°.

Allen B. Du Mont Laboratories, Inc.
Divisions of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

TD1872-A-8
1-19-62
FORM 809 - M1-5-60-SH

product of the pioneer

DU MONT

from JEDEC release #2641, Nov. 23, 1959

INDUSTRIAL CATHODE-RAY TUBES

TYPES: 7AQP4, 7AQP7, 7AQP16, 7AQP19, 7AQP25

GENERAL CHARACTERISTICS

ELECTRICAL DATA

Focusing Method	Electrostatic
Deflecting Method	Magnetic
Deflecting Angle (Approximate)	70 Degrees
Direct Interelectrode Capacitances, Approximate	
Cathode to all other electrodes	3.0 μμf
Grid No. 1 to all other electrodes	6.5 μμf

OPTICAL DATA

Phosphor Number	4	7	16	19	25
Fluorescence	White	Blue	Violet	Orange	Orange
Phosphorescence	.....	Yellow	.....	Orange	Orange
Persistence	Short-to-medium	Long	Extremely Short	Long	Long

Faceplate ..... Clear, spherical

MECHANICAL DATA

Overall Length (seated height)	$8\frac{1}{8} \pm \frac{3}{16}$ Inches
Greatest Diameter of Bulb	$7 \pm \frac{1}{8}$ Inches
Minimum Useful Screen Diameter	6 Inches
Bulb Contact	J1-22
Base[1]	E9-37
Basing	9HT
Bulb Contact Alignment:	
Plane of J1-22 cap passes halfway between Pins No. 1 and 9	±10 Degrees
J1-22 cap on same side as Pins No. 1 and 9	
Weight, Approximate	2¼ Pounds

MAXIMUM RATINGS
(Absolute Maximum Values)

Heater Voltage	6.3 Volts
Heater Current at 6.3 Volts	0.3 ± 10% Ampere
Accelerator Voltage	12,000 Max. Volts DC
Focusing Electrode Voltage	−550 to +1100 Max. Volts DC
Grid No. 2 Voltage	770 Max. Volts DC
Grid No. 1 Voltage:	
Negative Bias Value	180 Max. Volts DC
Positive Bias Value	0 Max. Volts DC
Positive Peak Value	0 Max. Volts
Peak Heater-Cathode Voltage	
Heater negative with respect to cathode	180 Max. Volts
Heater positive with respect to cathode	180 Max. Volts

TYPICAL OPERATING CONDITIONS

Accelerator Voltage[2]	10,000 Volts DC
Focusing Electrode Voltage[3]	−50 to +350 Volts DC
Grid No. 2 Voltage	300 Volts DC
Grid No. 1 Voltage[4]	−15 to −45 Volts DC
Line Width[5]	.015 Inch Max.
Spot Position (Undeflected)[6]	⅜ Inch

MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance ..... 1.5 Max. Megohms

NOTES

1. A socket with a center opening to clear the tubulation should be used. Care should be taken in handling the tube to avoid damaging the exposed tubulation and bending the base pins.
2. Brilliance and definition decrease with decreasing accelerator voltage. In general, accelerator voltage should not be less than 7,000 volts.
3. With Grid No. 1 voltage adjusted to produce an accelerator current of 100 μA.
4. Visual extinction of undeflected, focused spot.
5. Measured in accordance with ML-E-1 specifications at an accelerator current of 100 μA.
6. The center of the undeflected, focused spot will fall within a circle of ⅜-inch radius concentric with the center of the tube face, with the tube shielded.

The P16, P19 and P25 screens can be permanently damaged if current density is permitted to rise too high. To prevent burning, minimum beam current densities should be employed.

FEATURES

- Space Saving Tube for Miniaturized Equipments
- Light Weight
- Short Overall Length
- Small Neck Diameter
- Miniature Base
- Low Heater Current
- Low Deflection Power Requirements
- Metallized Screen for High Light Output
- Other Phosphors Available

APPLICATIONS

- Air-Borne Radar
- Radar
- Monitor
- Slave Display Unit

10.9

DU MONT®

precision electronics is our business

ELECTRONIC TUBES/INDUSTRIAL TV/MILITARY ELECTRONICS/MOBILE COMMUNICATIONS/SCIENTIFIC INSTRUMENTS/AUTOMOTIVE TEST EQUIPMENT

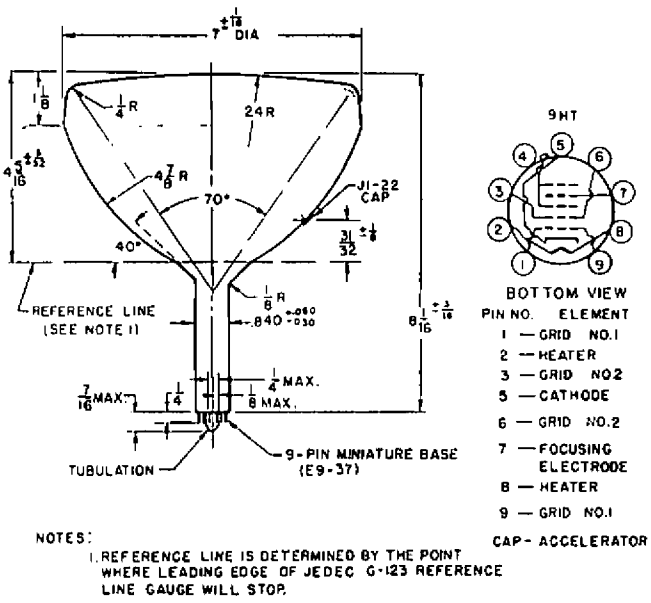
ELECTRONIC TUBE SALES DEPARTMENT

Allen B. Du Mont

ALLEN B. DU MONT LABORATORIES, INC., CLIFTON, N. J., U. S. A.

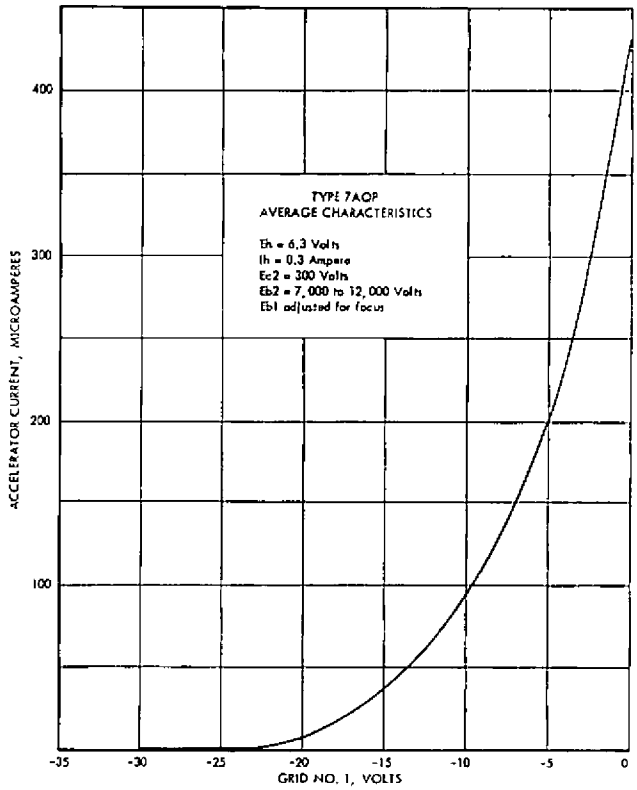
INTERNATIONAL DIVISION • 515 MADISON AVENUE, NEW YORK 22, N. Y. • CABLES: ALBEEDU, NEW YORK

OUTLINE DRAWING TYPE 7AQP—



NOTES:
1. REFERENCE LINE IS DETERMINED BY THE POINT WHERE LEADING EDGE OF JEDEC G-123 REFERENCE LINE GAUGE WILL STOP.

AVERAGE CHARACTERISTICS TYPE 7AQP—



ACCESSORIES

Base Socket Du Mont P/N 34003170S and 1 (one) Connector Du Mont P/N 36000500.

DUMONT

CATHODE-RAY TUBE

TYPE 7BAP-

The Du Mont Type 7BAP- is a 4 x 6-inch rectangular, dual beam, electrostatic focus and deflection cathode-ray tube. Post acceleration is used to obtain maximum deflection sensitivity with high brightness. The electron gun structures are so designed as to require no appreciable focusing current. The deflection-electrode connections are brought out through the neck to minimize lead inductance and capacitance and to improve insulation.

GENERAL CHARACTERISTICS [1]

Electrical Data

Focusing Method	Electrostatic	
Deflecting Method	Electrostatic	
Direct Interelectrode Capacitances, Approximate		
Cathode to all other electrodes	4.0	μμf
Grid No. 1 to all other electrodes	5.0	μμf
D1 to D2	1.5	μμf
D3 to D4	1.5	μμf
D1 to all other electrodes except D2	2.4	μμf
D2 to all other electrodes except D1	2.4	μμf
D3 to all other electrodes except D4	2.4	μμf
D4 to all other electrodes except D3	2.4	μμf

Optical Data

Phosphor Number	P1	P2	P7	P11
Fluorescence	Green	Blue-Green	Blue-White	Blue
Phosphorescence	------	Green	Yellow	----
Persistence	Medium	Long	Long	Short

Mechanical Data

Overall Length	18 1/4± 1/4	Inches
Greatest Bulb Dimension		
Width	6 1/16 ± 1/32	Inches
Height	4 1/16 ± 1/32	Inches
Minimum Useful Screen Dimensions		
Width	5 1/4	Inches
Height	3 1/4	Inches
Bulb Contact	J1-22	
Neck Contacts	C1-2	
Base	B12-37	

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

DE-5579 - 2
4/13/60

FORM 809 M1 3 60 SH

from JEDEC release #2803, May 9, 1960

DUMONT

CATHODE-RAY TUBE

TYPE 7BAP-

GENERAL CHARACTERISTICS (MECHANICAL DATA) (Continued)

Basing	14 K	
Base Alignment:		
D1D2 trace aligns with Base Key and Tube Axis	± 10	Degrees
Positive voltage on D1 deflects beam approximately toward Base Key.		
Positive voltage on D3 deflects beam approximately toward Pin No. 11.		
Bulb Contact Alignment:		
J1-22 contact aligns with D1D2 trace	± 10	Degrees
J1-22 contact located on tube center line	± 1/4	Inch
J1-22 contact on same side as Base Key		
Trace Alignment:		
Angle between D1D2 and D3D4 traces	90 ± 1	Degrees
Corresponding traces of each gun align within	1	Degree
D3D4 trace aligns with Bulb Side Wall	3	Degrees

MAXIMUM RATINGS (ABSOLUTE VALUES) [1]

Heater Voltage	6.3	Volts
Heater Current at 6.3 Volts	0.6 ± 10%	Ampere
Post Accelerator Voltage	8,250	Max. Volts DC
Accelerator Voltage [2]	2,750	Max. Volts DC
Accelerator Input	6	Max. Watts
Ratio Post Accelerator Voltage to Accelerator Voltage [2]	3.0	Max.
Focusing Voltage	1,100	Max. Volts DC
Grid No. 1 Voltage		
Negative Bias Value	200	Max. Volts DC
Positive Bias Value	0	Max. Volts DC
Positive Peak Value	0	Max. Volts
Peak Heater to Cathode Voltage		
Heater Negative with respect to Cathode	180	Max. Volts
Heater Positive with respect to Cathode	180	Max. Volts
Peak Voltage between Accelerator and any Deflection-Electrode	600	Max. Volts

TYPICAL OPERATING CONDITIONS [1]

Post Accelerator Voltage	4,000	Volts DC
Accelerator Voltage	2,000	Volts DC
Focusing Voltage	363 to 695	Volts DC
Grid No. 1 Voltage [3]	-45 to -75	Volts DC
Modulation [4]	42	Max. Volts DC

DU MONT

CATHODE-RAY TUBE

TYPE 7BAP-

TYPICAL OPERATING CONDITIONS (Continued)

Line Width "A" [4]	0.70	Max. MM
Deflection Factors: [8]		
D1 and D2	84 to 102	Volts DC/Inch
D3 and D4	67 to 81	Volts DC/Inch
Interaction Factor [5]	14×10^{-6}	Inch/Volt DC Max.
Spot Position [6]	Within a 15 -mm square	
Deflection Factor Uniformity [7]	2%	Max.

MAXIMUM CIRCUIT VALUES [1]

Grid No. 1 Circuit Resistance	1.5	Max. Megohms
Resistance in any Deflection-Electrode Circuit [9]	5.0	Max. Megohms

NOTES

1. Values are for each unit unless otherwise stated.

2. This tube is designed for optimum performance when operating at an Eb3/Eb2 ratio of 2.0. Operation at other ratios of Eb3/Eb2 may result in changes in deflection uniformity and pattern distortion.

3. Visual extinction of the focused, undeflected spot.

4. Measured in accordance with MIL-E-1 specifications, using a beam current of 25 μADC.

5. The deflection of one beam when balanced DC voltages are applied to the deflection electrodes of the other beam will not be greater than the indicated value.

6. With the tube shielded against external influences, and the deflecting electrodes connected to the accelerator, the undeflected and focused spot will fall within a 15-mm square centered on the tube face, one side of which is parallel to the D3D4 trace.

7. The deflection factor (for both D1D2 and D3D4 plate pairs, separately) for any deflection of less than 75% of the useful screen will not differ from the deflection factor for a deflection at 25% of the useful screen by more than the indicated value.

8. Ratio of deflection factors of corresponding sets of deflection plates (larger deflection factor divided by lower deflection factor) will not excel 1.15.

9. It is recommended that the deflection-electrode circuit resistances be approximately equal.

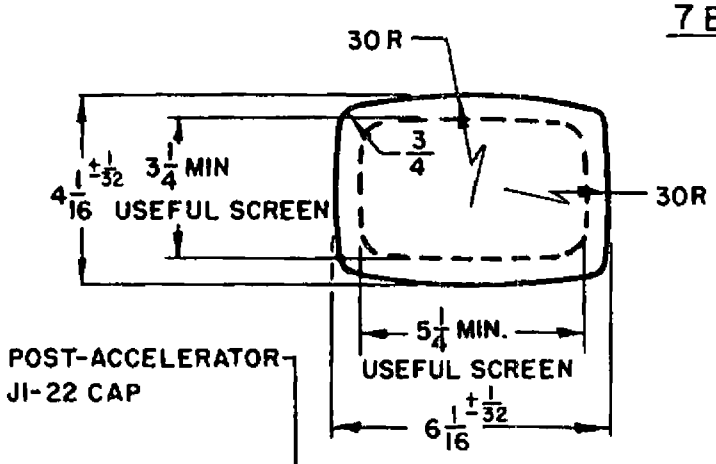
Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

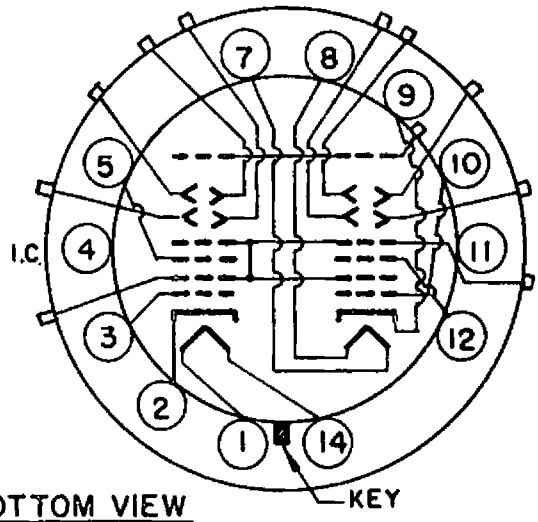
FORM 608 MT 3-69 SH

DU MONT

CATHODE – RAY TUBE

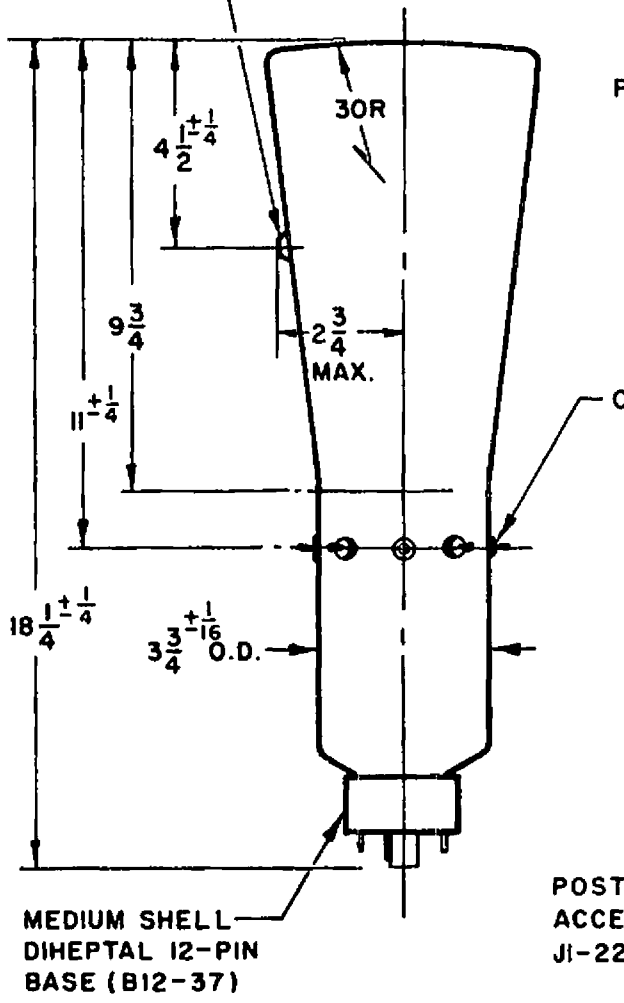
7BAP–

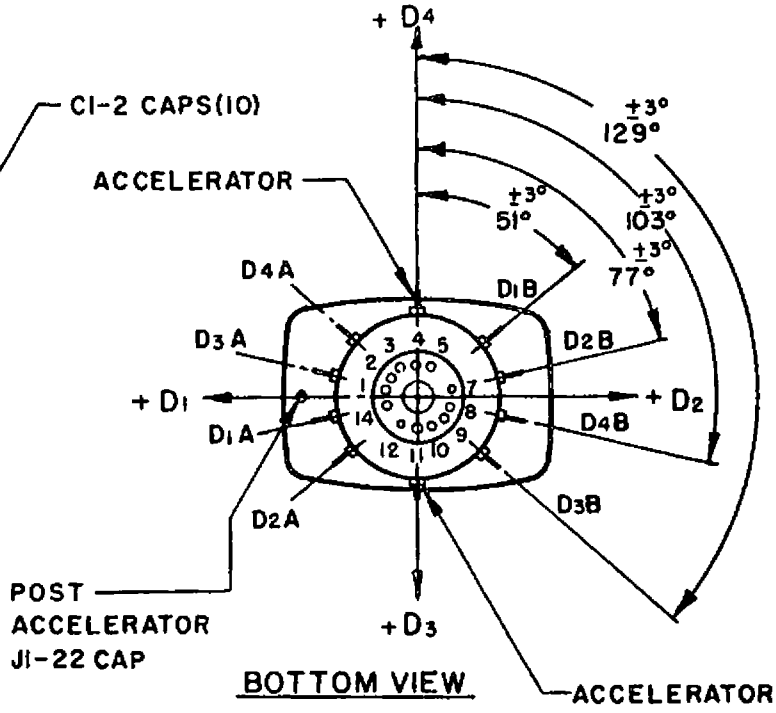




BOTTOM VIEW

UNIT "A" PIN NO.	ELEMEMT	UNIT "B" PIN NO	ELEMENT
1	HEATER	7	HEATER
2	CATHODE	8	HEATER
3	GRID NO.1	9	CATHODE
4	INTERNAL CONNECTION	10	GRID NO.1
5	FOCUSING ELECTRODE	12	FOCUSING ELECTRODE
14	HEATER		





BOTTOM VIEW

NOTES:

1. D_1 D_2 TRACE TO ALIGN WITH J1-22 CAP AND BASE KEY ± 10°
2. J1-22 CAP LOCATED ON TUBE CENTER LINE ± 1/4 INCH

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

DE-5579-3
4-14-60
FORM 800-CB-4-60-8M

DUMONT

CATHODE-RAY TUBE

TYPE 7BCP-

The Du Mont Type 7BCP- is a 7 1/2-inch magnetic focus and deflection cathode-ray tube especially designed for use as the flying spot scanner in high quality color video-signal generators and photo recording. By using the appropriate pickup units, television signals may be obtained from transparencies as well as 16 mm and 35 mm motion picture film, both color and monochrome.

The 7BCP- features a metal-backed phosphor which essentially doubles the radiant energy of the electron spot over that obtainable with an unmetallized phosphor. The persistence of the phosphor is extremely short which minimizes trailing in the reproduced picture, giving a good signal-to-noise ratio and simplifying the phosphor correction circuits.

To further aid the reproduced picture, a grey glass is used for the faceplate which allows a 100:1 small area contrast range, whereas a clear faceplate allows only a 10:1 range. The faceplate has the additional feature of non-browning glass which prevents the glass from burning due to the high velocity electrons.

The faceplate of the 7BCP- is carefully manufactured to conform to a uniform standard of curvature and thickness and has an optical quality which will not limit the performance of a high-quality objective lens needed to provide maximum signal resolution.

To prevent moisture from condensing on the bulb body, thereby causing sparking over the surface of the glass under high humidity conditions, an external insulating coating is applied to the bulb body. An external conductive coating is applied to the neck to prevent corona between the yoke and the neck.

C A U T I O N: Before placing in operation, see OPERATING NOTES.

GENERAL CHARACTERISTICS

Electrical Data

Focusing Method	Magnetic	
Deflection Method	Magnetic	
Deflection Angle (Approx.) [1, 2]	45	Degrees
Direct Interelectrode Capacitances, Approx.		
Cathode to all other electrodes	5	μμf
Grid No. 1 to all other electrodes	7	μμf

Optical Data

Phosphor Number	15	24
Fluorescence	Blue-Green	Blue-Green
Persistence	Very Short	Very Short

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

FORM 809 MI 3-59 BH

from JEDEC release #2729, Feb. 15, 1960

DUMONT

CATHODE-RAY TUBE

TYPE 7BCP-

GENERAL CHARACTERISTICS (Optical Data) (Continued)

Faceplate		
Light Transmission at center, Approx.	66	Percent
Radius of Curvature [3]	30	Inches
Mechanical Data		
Overall Length	18 3/8 ± 1/4	Inches
Greatest Diameter of Bulb	7 1/2 ± 1/8	Inches
Minimum Useful Screen Diameter	6 3/4	Inches
Bulb Contact	J1-21	
Base	B7-51	
Basing	Special	
Bulb Contact Alignment		
J1-21 contact aligns with vacant Pin Position No. 3	± 10	Degrees

MAXIMUM RATINGS (DESIGN-MAXIMUM VALUES)

Heater Voltage	6.3	Volts
Heater Current at 6.3 Volts	0.6 ± 10%	Amperes
Accelerator Voltage	42,000	Max. Volts DC
Grid No. 2 Voltage	770	Max. Volts DC
Grid No. 1 Voltage		
Negative Bias Value	200	Max. Volts DC
Positive Bias Value	0	Max. Volts DC
Positive Peak Value	0	Max. Volts
Peak Heater to Cathode Voltage [4]		
Heater negative with respect to cathode	180	Max. Volts
Heater positive with respect to cathode	180	Max. Volts
Maximum Cathode Current	400	Microamperes DC

TYPICAL OPERATING CONDITIONS -Monochrome Scanning

Accelerator Voltage	37,000	Volts DC
Grid No. 2 Voltage	350	Volts DC
Grid No. 2 Current	-25 to +25	Microamperes DC
Grid No. 1 Voltage [5]	-40 to -87	Volts DC
Cathode Current	300	Microamperes DC

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

FORM 609 M1 3-59 BH

DUMONT

CATHODE-RAY TUBE

TYPE 7BCP-

TYPICAL OPERATING CONDITIONS (Continued)

Focusing Ampere Turns, Approx. [6]	735	Ampere Turns
Spot Position (Undeflected)	Within 15-mm radius circle	

EQUIPMENT INFORMATION (Circuit Design Information)

Grid No. 1 Circuit Resistance	1.5	Max. Megohms
Accelerator Circuit Series Resistance [7]	0.1	Min. Megohms

NOTES

1. With a raster size approximately 4 inches x 5.5 inches, the electron beam will be deflected through an angle of approximately 45 degrees.

2. To provide maximum corner resolution, the yoke design should be of the anastigmatic type (cosine function) which will minimize deflection defocusing. The deflection yoke should be designed so that the effective center of deflection of the beam is not more than 0.9 inch below the reference line.

3. For optimum results the objective lens should be of high quality. For 35 mm slides the following lenses or equivalents may be used depending upon the throw required: Summarit Leitz, 50 mm, f1.5; Wollensak, 75 mm, f1.9; Schneider, 180 mm, f3.5. For film scanning, the Du Mont Cinecon Unit is recommended.

4. Continuous operation at high heater to cathode voltage is not recommended.

5. Visual extinction of the undeflected, focused spot.

6. The effective center of the focusing field should be approximately 2 3/4 inches below the reference line.

7. The accelerator power supply should contain some provision to limit the instantaneous short-circuit current to less than 500 milliamperes. It is recommended that the power supply be of the limited-peak-energy type.

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

FORM 808 M1 3-59 BH

DUMONT

CATHODE-RAY TUBE

TYPE 7BCP-

OPERATING NOTES

1. To prevent the formation of corona between tube neck and the yoke which may cause break-down of the glass neck and/or yoke insulation, the external conductive coating must be grounded. This may be accomplished by fastening a flexible metal band at least 1/4 inch wide securely around the coated portion of the neck with sufficient tension to insure good electrical contact, but not so tight as to set up glass strains in the neck. Care should be exercised in connecting the band that the coating is not scratched or damaged in any way.

2. The yoke insulation must be adequate for operation of the yoke against the external grounded coating. It is recommended that a high-voltage insulating sleeve be placed between the deflection yoke and the grounded coating on the neck. The resistance of the coating is high enough that damping of the yoke deflecting energy is negligible.

3. Adequate clearance between the bulb body and all grounded portions of associated equipment and tube supports must be maintained to prevent corona and arc-over. Sharp points or irregularities on grounded surfaces around the tube and support must be avoided.

4. Before touching the tube or high voltage circuits, be sure the power supply is turned off, all high voltage capacitors grounded, and the static charge on the face and sides of the tube discharged by means of a wand connected to the ground.

5. Care should be taken to keep the tube and high voltage supply as free as possible from dust. The deposition of dust is accelerated by the high voltages used and will cause a decrease in light output from the face of the tube as well as a reduction of insulative qualities of the tube and associated circuits and equipment.

6. A neon or gas discharge protective circuit, not to break down below 100 volts, should be connected between the grid and cathode with leads as short as possible. Two (2) NE-48's (or equivalent), connected in series, are recommended. This is required because equipment arc-overs produce secondary discharges in the tube circuits which, if not protected, will cause loss of cathode emission.

7. The tube must be adequately shielded for X-ray radiation to protect personnel. These X-rays are generated when the tube is operated at its normal accelerating potential and can constitute a health hazard.

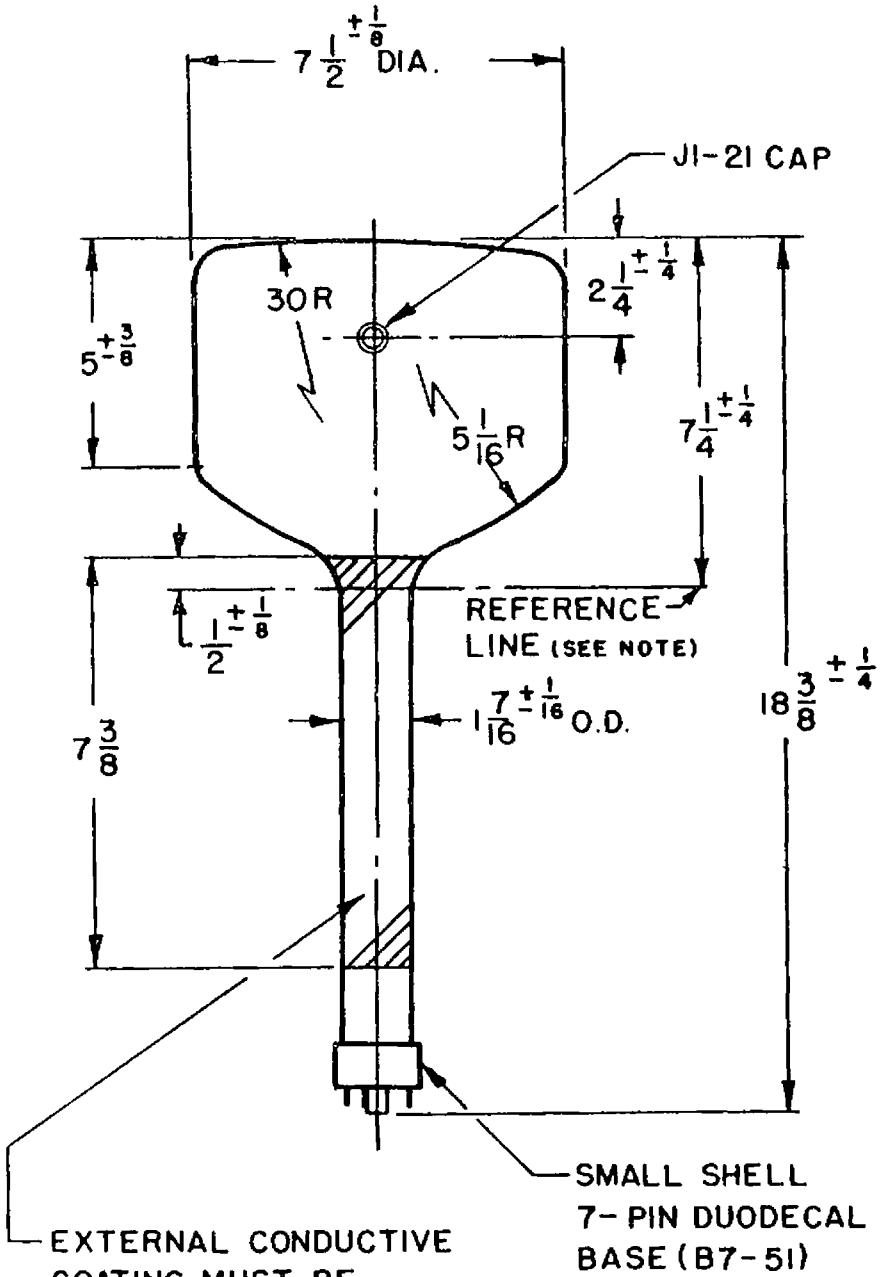
8. In the event of scan failure, in either one or both directions, serious damage to the tube may result due to concentration of the beam in one spot. Adequate precautions in circuitry should be taken to remove the high voltage and extinguish the beam immediately when this occurs.

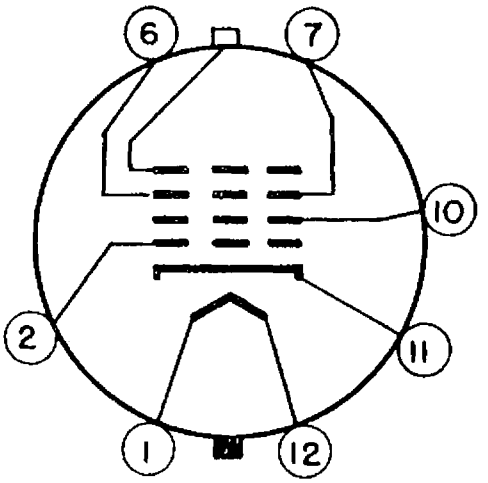
9. During operation the face of the 7BCP- tube must be air-cooled. With the air stream directed toward the face of the tube at an angle, approximately 50 cubic feet per minute will be required. The air should be filtered to prevent the deposition of dust or moisture (see Note 5.). To prevent damage to the tube the blower should start to operate automatically when the anode power supply is turned on.

DUMONT

CATHODE-RAY TUBE

7 BCP-





BOTTOM VIEW

PIN NO	ELEMENT
1	HEATER
2	GRID NO.1
6	GRID NO.3 (GUARD RING)
7	GRID NO.3 (GUARD RING)
10	GRID NO.2
11	CATHODE
12	HEATER
CAP	ACCELERATOR

NOTES:

1. PINS NO. 6 & 7 SHOULD BE CONNECTED TO GROUND
2. WHEN TUBE NECK IS INSERTED THROUGH JEDEC G-112 GAUGE, REFERENCE LINE WILL BE DETERMINED BY POSITION WHERE GAUGE WILL REST ON FUNNEL

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

DD-29070-A
12-24-59
FORM 809-C8-4-58-8M

from JEDEC release
#2714, Feb. 7, 1960

DUMONT

CATHODE-RAY TUBE

TYPE 7BDP-

The Du Mont Type 7BDP- is a 7-inch diagonal square face, five beam, electrostatic deflection and focus cathode-ray tube. Each beam is independently controllable, utilizes limited available scan with increased deflection sensitivity in the D3D4 direction and is so positioned that they scan separate areas of the screen. The deflection electrode and acceleration electrode connections are brought out through the bulb wall to minimize lead inductance and capacity and to improve insulation. A collar or ring base provides ease of connection to these leads.

GENERAL CHARACTERISTICS[1]

Electrical Data

Focusing Method	Electrostatic	
Deflecting Method	Electrostatic	
Direct Interelectrode Capacitances	Max.	
Cathode to all	6.0	µµf
Grid No. 1 to all	5.8	µµf
D1 to D2	2.5	µµf
D3 to D4	2.9	µµf
D1 to all	7.8	µµf
D2 to all	7.8	µµf
D3 to all	7.2	µµf
D4 to all	7.2	µµf

Optical Data

Phosphor Number	1	2	4	7	11
Fluorescence	Green	Blue-Green	White	Blue-White	Blue
Phosphorescence	------	Green	-----	Yellow	----
Persistence	Medium	Long	Medium	Long	Short

Mechanical Data

Overall Length	20 5/8 ± 3/8	Inches
Greatest Bulb Diagonal	7 1/32	Inches
Minimum Useful Screen Width[2]	4.5	
Bulb Contact (Recessed Small Ball Cap)	J1-22	
Collar (22 Pin)	Special	
Base (25 Pin)	B25-139	
Basing	Special	

DE-5784 - 2
1/13/60

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

DUMONT
CATHODE-RAY TUBE

TYPE 7BDP-

GENERAL CHARACTERISTICS (MECHANICAL DATA) (Continued)[1]

Collar and Base Alignment:		
Collar Pin No. 1 and Base Key each aligns with the D3D4 trace	± 10	Degrees
Positive voltage on D3 deflects the beam towards the index pin of the Ring Base		
Positive voltage on D1 deflects the beam approximately towards Pin 6 of the Ring Base		
Bulb Contact Alignment:		
Bulb Contact Aligns with D3D4 trace	± 10	Degrees
Bulb Contact on same side as Base Key and Collar Pin No. 1		
Bulb Contact located on Tube Center Line	± 1/4	Inch
Bulb Wall (with contact) aligns with D1D2 trace	± 3	Degrees
Trace Alignment:		
D1D2 trace aligns with D3D4 trace	90 ± 2	Degrees
Corresponding traces align within	2	Degrees

MAXIMUM RATINGS (DESIGN CENTER VALUES)

Heater Voltage	6.3	Volts
Heater Current at 6.3 Volts	0.6 ± 10%	Amperes
Post Accelerator Voltage	7,000	Max. Volts DC
Accelerator Voltage[3]	3,500	Max. Volts DC
Ratio Post Accelerator Voltage to Accelerator Voltage[4]	2.0	Max.
Focusing Voltage	1,500	Max. Volts DC
Grid No. 1 Voltage		
Negative Bias Value	200	Max. Volts DC
Positive Bias Value	0	Max. Volts DC
Positive Peak Value	0	Max. Volts
Peak Heater to Cathode Voltage		
Heater negative with respect to cathode	180	Max. Volts
Heater positive with respect to cathode	180	Max. Volts
Peak Voltage between Accelerator and any deflection electrode	1,250	Volts

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

FORM 809 M1 3-59 BH

DUMONT

CATHODE-RAY TUBE

TYPE 7BDP-

TYPICAL OPERATING CONDITIONS

Post Accelerator Voltage	4,000	Volts DC
Accelerator Voltage	2,000	Volts DC
Focusing Voltage	450 to 650	Volts DC
Grid No. 1 Voltage[5]	-50 to -90	Volts DC
Modulation[6]	60	Max. Volts DC
Line Width "A"[7]	.026	Max. Inches
Deflection Factors:		
D1 and D2	52 to 68	Volts DC/Inch
D3 and D4	17 to 23	Volts DC/Inch
Deflection Factor Uniformity[9]	2%	Max.
Useful Scan[10]		
D1 and D2	4.5	Min. Inches
D3 and D4	1.5	Min. Inches
Interaction Factor[11]	.00001	Max. Inches/Volt

CIRCUIT DESIGN VALUES

Focusing Voltage	225 to 325 Volts per Kilovolt of Accelerator Voltage		
Focusing Current for any operating condition		-15 to +10	Microamperes
Grid No. 1 Voltage[5]	-25 to -45 Volts per Kilovolt of Accelerator Voltage		
Grid No. 1 Circuit Resistance		1.5	Max. Megohms
Deflection Factors:			
Ratio Post Accelerator Voltage to Accelerator Voltage		2.0	
D1 and D2	26 to 34 Volts DC/Inch/KV of Accelerator Voltage		
D3 and D4	8.5 to 11.5 Volts DC/Inch/KV of Accelerator Voltage		
Resistance in any Deflecting-Electrode Circuit[12]		1.0	Max. Megohms

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

FORM 609 M1 3-59 SH

DUMONT
CATHODE-RAY TUBE

TYPE 7BDP-

NOTES

1. Values are for each unit unless otherwise stated.
2. Following the bulb contour.
3. Accelerator power input (avg.) should be limited to six watts.
4. This tube is designed for optimum performance when operating at an Eb3/Eb2 ratio of 2.0. Operation at other ratios of Eb3/Eb2 may result in changes in deflection uniformity and pattern distortion.
5. Visual extinction of the undeflected, focused spot.
6. The increase in Grid No. 1 voltage from cut-off to produce an Ib3 of 50 μADC.
7. Measured in accordance with MIL-E-1B specifications using an Ib3 of 25 μADC.
8. The deflection in this direction is limited to ± .75 min. inches from the undeflected spot position.
9. Measured in accordance with MIL-E-1B specifications.
10. Centered about normal undeflected spot position.
11. The deflection of one beam when balanced DC Voltages are applied to the deflection electrodes of the other will not be greater than the indicated value.
12. It is recommended that the deflecting-electrode circuit resistance be approximately equal. Higher resistance values up to five megohms may be used for low beam current operation.

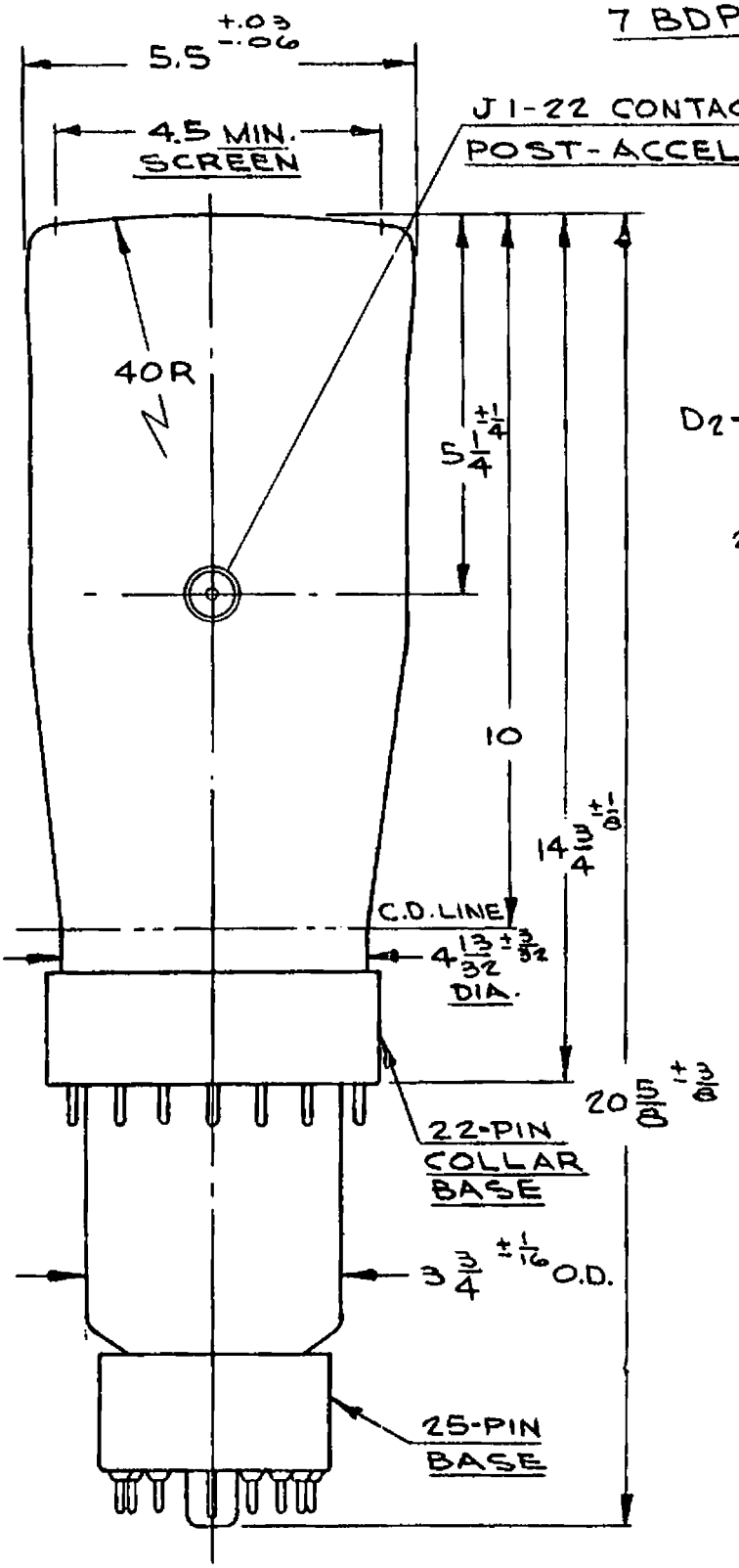
Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

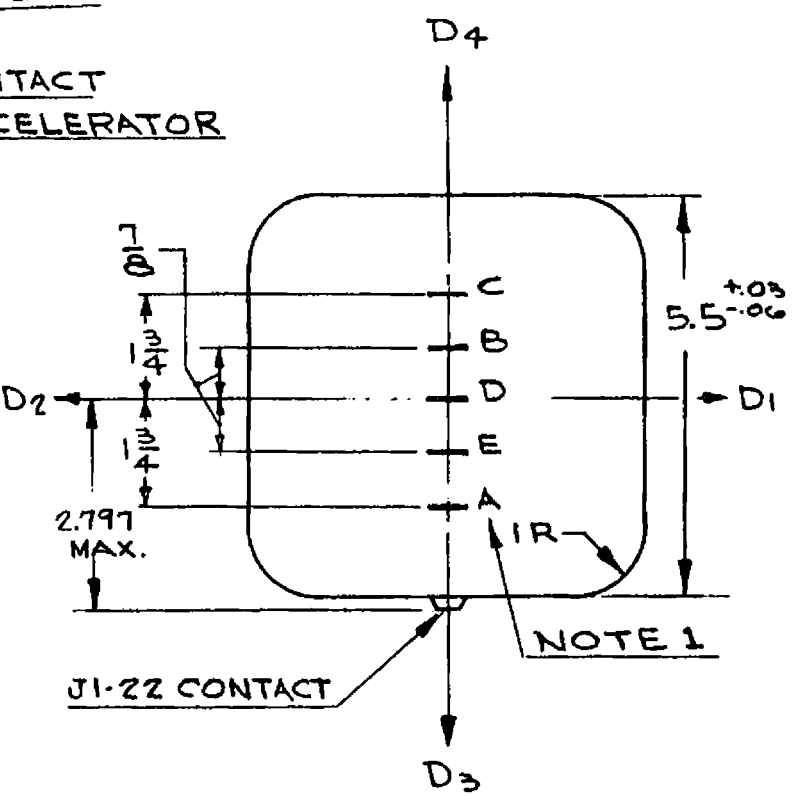
FORM 809 M1 3-59 GH

DU MONT

CATHODE-RAY TUBE

7 BDP-





FACE VIEW

NOTES:

1 BEAM A CENTERSON POSITION A, ETC. WITHIN 5/16R. CIRCLE. INDEX PIN, KEY & BULB CONTACT EACH ALIGN WITH D3 D4 TRACE ±10°

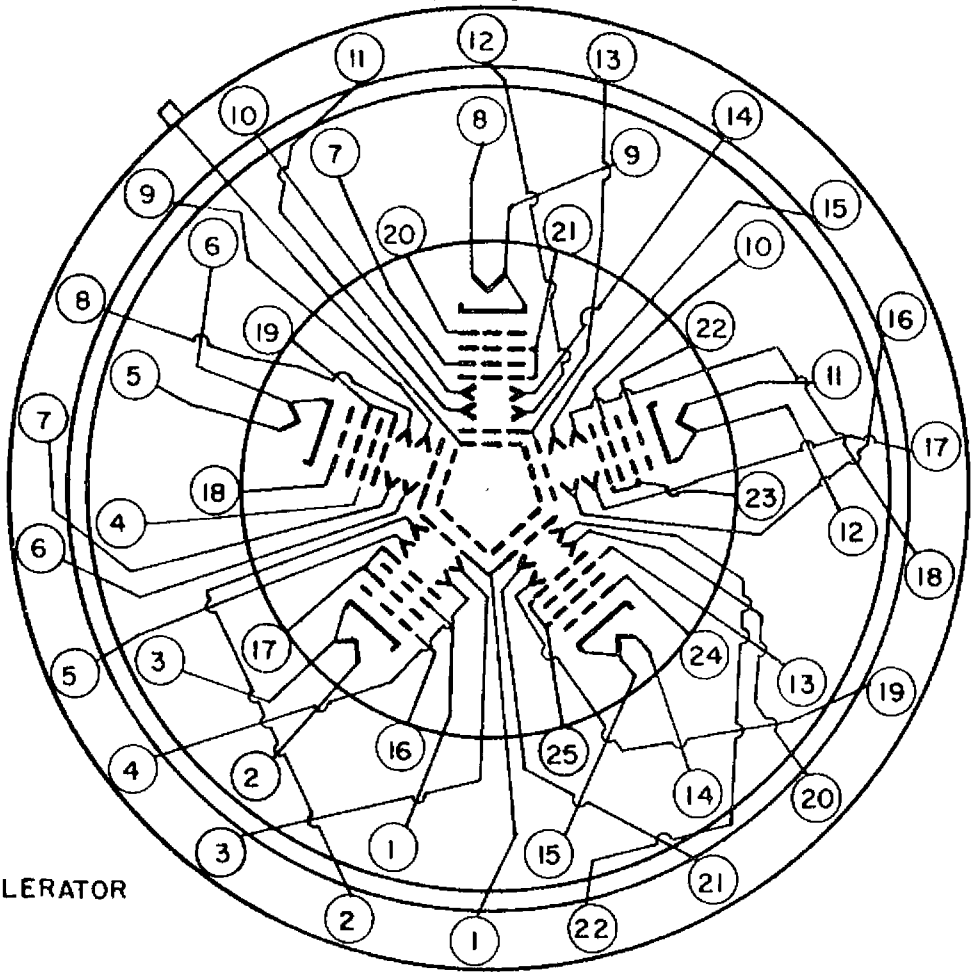
Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

DE-5784-3
1-13-60
FORM 800-C6-4-58-BH

DUMONT

BASING

7 BDP-



CAP

POST - ACCELERATOR

BOTTOM VIEW

22-PIN COLLAR BASE

PIN NO.	ELEMENT		BEAM
1	ACCELERATOR-SHIELD		
2	DEFLECTOR	D_2	A
3	DEFLECTOR	D_1	A
4	DEFLECTOR	D_3	A
5	DEFLECTOR	D_4	A
6	DEFLECTOR	D_1	B
7	DEFLECTOR	D_3	B
8	DEFLECTOR	D_4	B
9	DEFLECTOR	D_2	B
10	DEFLECTOR	D_3	C
11	DEFLECTOR	D_1	C
12	DEFLECTOR	D_2	C
13	ACCELERATOR-SHIELD		
14	DEFLECTOR	D_4	C
15	DEFLECTOR	D_1	D
16	DEFLECTOR	D_2	D
17	DEFLECTOR	D_4	D
18	DEFLECTOR	D_3	D
19	DEFLECTOR	D_4	E
20	DEFLECTOR	D_3	E
21	DEFLECTOR	D_2	E
22	DEFLECTOR	D_1	E

25 PIN BASE

PIN NO.	ELEMENT	BEAM
1	FOCUSING ELECTRODE	A
2	HEATER	A
3	HEATER & CATHODE	A
4	FOCUSING ELECTRODE	B
5	HEATER	B
6	HEATER & CATHODE	B
7	FOCUSING ELECTRODE	C
8	HEATER	C
9	HEATER & CATHODE	C
10	FOCUSING ELECTRODE	D
11	HEATER	D
12	HEATER & CATHODE	D
13	FOCUSING ELECTRODE	E
14	HEATER	E
15	HEATER & CATHODE	E
16	GRID NO.1	A
17	ACCELERATOR	A
18	GRID NO.1	B
19	ACCELERATOR	B
20	GRID NO.1	C
21	ACCELERATOR	C
22	GRID NO.1	D
23	ACCELERATOR	D
24	GRID NO.1	E
25	ACCELERATOR	E

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

DE-5784-3
1-13-60
FORM 809-CB-4-58-SH

from JEDEC release #2895,
July 25, 1960

DUMONT

CATHODE-RAY TUBE

TYPE 7BFP-

The Du Mont Type 7BFP- is a 4 x 6-inch rectangular, three beam, electrostatic focus and deflection cathode-ray tube. Each beam is independently controllable with common accelerator and heater connections. The tube features a linear post accelerator which when combined with an advanced gun design affords high deflection sensitivity and brightness. Each beam scans a separate screen area, permitting three simultaneous displays. All connections, with the exception of the post accelerator, are brought out through base pins for ease of connection.

For maximum brightness and stability in performance, the screens are provided with a highly reflective metal backing.

GENERAL CHARACTERISTICS [1]

Electrical Data

Focusing Method	Electrostatic	
Deflecting Method	Electrostatic	
Direct Interelectrode Capacitances, Approximate		
Cathode to all other electrodes	4.8	μμf
Grid No. 1 to all other electrodes	5.1	μμf
D1 to D2	5.2	μμf
D3 to D4	1.8	μμf
D1 to all other electrodes	13.0	μμf
D2 to all other electrodes	12.6	μμf
D3 to all other electrodes	4.9	μμf
D4 to all other electrodes	5.0	μμf

Optical Data

Phosphor Number	2	7
Fluorescence	Blue-Green	Blue-White
Phosphorescence	Green	Yellow
Persistence	Long	Long

Mechanical Data

Overall Length	18 3/4 ± 3/8	Inches
Greatest Bulb Dimensions:		
Diagonal	6 5/8 ± 1/16	Inches
Width	6 1/16 ± 1/32	Inches
Height	4 1/16 ± 1/32	Inches

Allen B. Du Mont Laboratories,
A Division of Fairchild Camera and Instrument Corporation

FORM 609 8C-7-59-SH

DUMONT

CATHODE-RAY TUBE

TYPE 7BFP-

GENERAL CHARACTERISTICS (Mechanical Data) (Continued)

Minimum Screen Dimensions (along tube axes):		
Width	5 1/4	Inches
Height	3 1/4	Inches
Bulb Contact	J1-22	
Base	B25-139	
Basing	Special	
Base Alignment:		
D3D4 trace of Gun "B" aligns with Base Key and Tube Axis	± 10	Degrees
Positive voltage on D1 deflects beam approximately toward Pin No. 23		
Positive voltage on D3 deflects beam approximately toward Pin No. 8		
Bulb Contact Alignment:		
Bulb cap located on tube center line	± 1/4	Inch
Bulb cap aligns with Base Key	± 10	Degrees
Bulb cap on same side as Base Key		
Trace Alignment:		
Angle between D1D2 and D3D4 traces	90 ± 2	Degrees
Corresponding traces of each gun align within	± 2	Degrees
D3D4 trace aligns with Bulb Side Wall	± 3	Degrees

RATINGS (Design Maximum Values)

Heater Voltage	6.3	Volts
Heater Current at 6.3 Volts	1.8 ± 10%	Amperes
Post Accelerator Voltage	12,000	Max. Volts DC
Accelerator Voltage	4,000	Max. Volts DC
Ratio Post Accelerator Voltage to Accelerator Voltage[2]	3.0	Max.
Accelerator Input	6	Max. Watts
Post Accelerator Resistance	400 to 800	Megohms
Focusing Voltage	1,000	Max. Volts DC
Grid No. 1 Voltage		
Negative Bias Value	300	Max. Volts DC
Positive Bias Value	0	Max. Volts DC
Positive Peak Value	0	Max. Volts

Allen B. Du Mont Laboratories,
A Division of Fairchild Camera and Instrument Corporation

FORM 808 6C-7-59-SM

DUMONT

CATHODE-RAY TUBE

TYPE 7BFP-

RATINGS (Design Maximum Values) (Continued)

Peak Heater-Cathode Voltage		
Heater negative with respect to cathode	180	Max. Volts
Heater positive with respect to cathode	180	Max. Volts
Peak Voltage between Accelerator and any Deflection Electrode	500	Volts

TYPICAL OPERATING CONDITIONS

Post Accelerator Voltage	9,000	Volts DC
Accelerator Voltage	3,000	Volts DC
Post Accelerator Current [3]	7.5 to 15	μADC
Focusing Voltage	300 to 575	Volts DC
Grid No. 1 Voltage [4]	-70 to -130	Volts DC
Focusing Electrode Current (for any operating condition)	-15 to +10	μADC
Modulation [5]	50	Max. Volts DC
Line Width "A" [5]	.026	Max. Inch
Deflection Factors:		
D1D2	53 to 73	Volts DC/Inch
D3D4	40 to 54	Volts DC/Inch

Useful Scan:	UNIT "B"	UNITS "A" & "C"	
D1D2	2 1/4	1 3/4	Min. Inches
D3D4	Full Scan	Full Scan	

Spot Position [6]

MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance	1.5	Max. Megohms
Resistance in any Deflection-Electrode Circuit [7]	1.0	Max. Megohms

Allen B. Du Mont Laboratories,
A Division of Fairchild Camera and Instrument Corporation FORM 609 8C-7-59-SH

DUMONT

CATHODE-RAY TUBE

TYPE 7BFP-

NOTES

1. All tests to be made on each beam separately; values are for each unit unless otherwise stated.

2. This tube is designed for optimum performance when operating at an Eb3/Eb2 ratio of 3.0; operation at any other ratios may result in changes in deflection uniformity and pattern distortion.

3. With all beams cut off, the post accelerator current will be within the limits specified. All readings of beam current (Ib3) shall be in addition to the reading obtained for post accelerator current.

4. Visual extinction of the undeflected, focused spot.

5. Measured in accordance with MIL-E-1 specifications with an Ib3 of 25 μADC.

6. With the tube positioned such that the J1-22 contact is on top, and shielded against external influences, the undeflected, focused spot will fall within the following positions:

   Beam A: Within a 3/8-inch radius circle which is concentric with a position on the major axis 1 3/4 inches to the left of the tube face center.

   Beam B: Within a 3/8-inch radius circle concentric with the tube face center.

   Beam C: Within a 3/8-inch radius circle which is concentric with a position on the major axis 1 3/4 inches to the right of the tube face center.

7. It is recommended that the deflection-electrode circuit resistances be approximately equal. Higher resistance values up to 5 megohms may be used for low beam current operation.

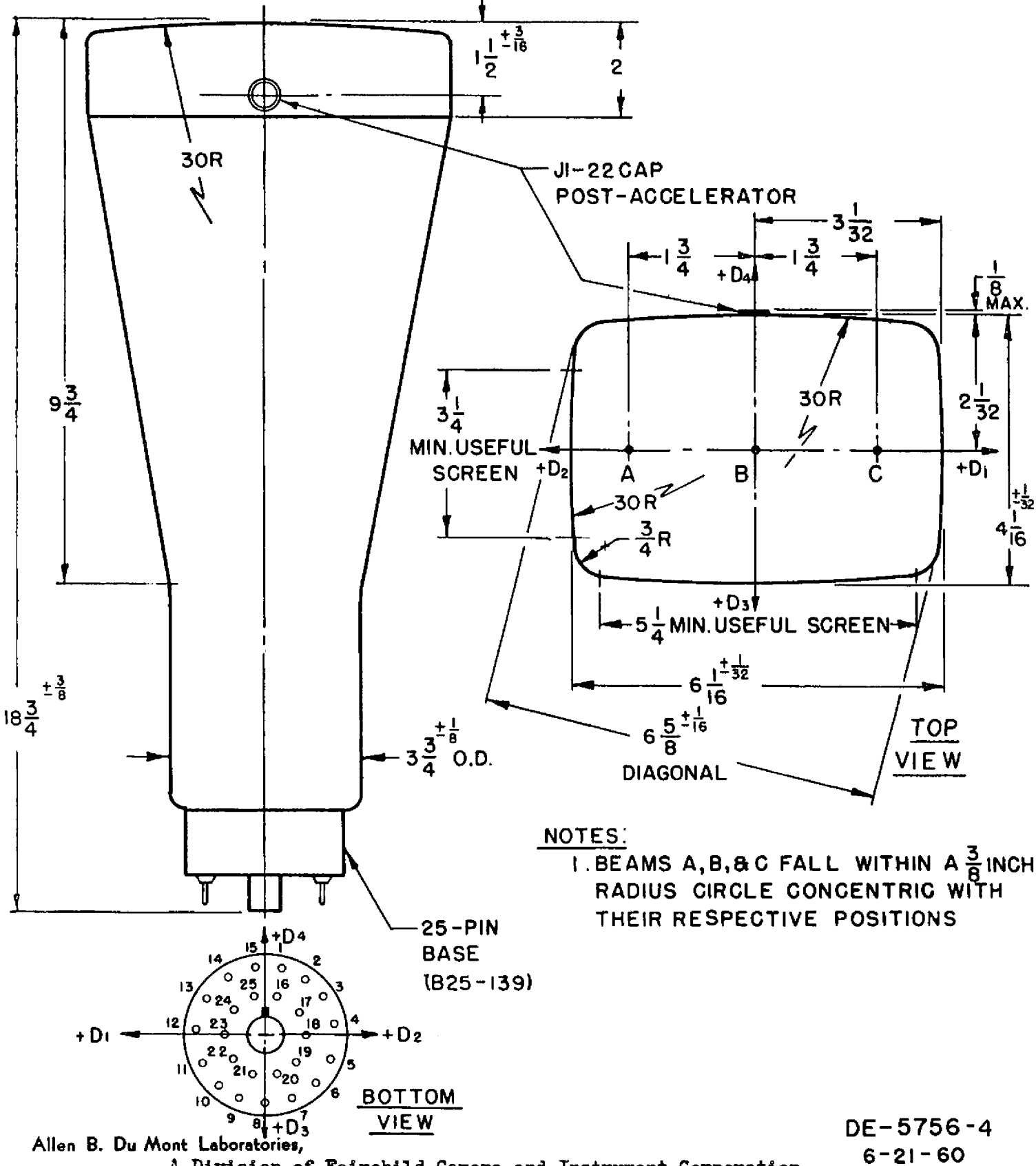
Allen B. Du Mont Laboratories,
A Division of Fairchild Camera and Instrument Corporation

FORM 808 8C-7-58-8H

DU MONT

CATHODE—RAY TUBE

7BFP—



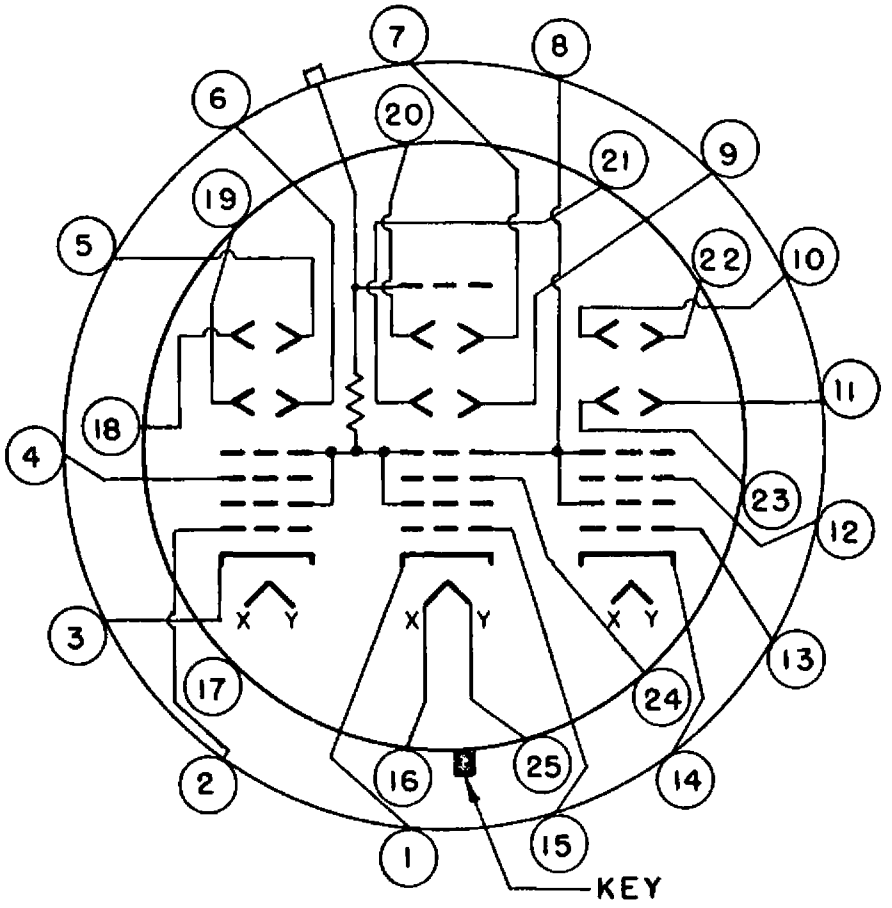
NOTES:

1. BEAMS A, B, & C FALL WITHIN A 3/8 INCH RADIUS CIRCLE CONCENTRIC WITH THEIR RESPECTIVE POSITIONS

Allen B. Du Mont Laboratories,
A Division of Fairchild Camera and Instrument Corporation

DE-5756-4
6-21-60
FORM 808 -M1-8-60-6H

DUMONT
CATHODE-RAY TUBE
7BFP-



ELEMENT		PIN NUMBERS UNIT "A"	UNIT "B"	UNIT "C"
HEATER (COMMON)		16 & 25	16 & 25	16 & 25
CATHODE		3	1	14
GRID NO. 1		2	15	13
FOCUSING ELECTRODE		4	24	12
ACCELERATOR (COMMON)		8	8	8
DEFLECTING ELECTRODE	D_1	18	20	10
DEFLECTING ELECTRODE	D_2	5	7	22
DEFLECTING ELECTRODE	D_3	6	9	11
DEFLECTING ELECTRODE	D_4	19	21	23

Allen B. Du Mont Laboratories,
A Division of Fairchild Camera and Instrument Corporation

DE-5756-5
6-21-60
FORM 808 -M1-8-60-SH

from JEDEC release #3803, July 9, 1962

DUMONT

CATHODE-RAY TUBE

TYPE 7BGP-

The Du Mont Type 7BGP- is a 7-inch, flat face, electrostatic focus and deflection cathode-ray tube with very high deflection sensitivities and full scan.

This tube features a linear post accelerator for maximum deflection uniformity and minimum pattern distortion. The extremely low deflection factors permit use of this tube in compact transistorized equipment.

GENERAL CHARACTERISTICS

Electrical Data

Focusing Method	Electrostatic	
Deflecting Method	Electrostatic	
Direct Interelectrode Capacitances, Approximate		
Cathode to all other electrodes	3.1	μμf
Grid No. 1 to all other electrodes	6.5	μμf
D1 to D2	2.4	μμf
D3 to D4	1.4	μμf
D1 to all other electrodes	5.4	μμf
D2 to all other electrodes	5.4	μμf
D3 to all other electrodes	3.5	μμf
D4 to all other electrodes	3.7	μμf

Optical Data

Phosphor Number	1	2	7	11
Fluorescence	Green	Blue-Green	Blue-White	Blue
Phosphorescence	-----	Green	Yellow	----
Persistence	Medium	Medium	Long	Short

Faceplate: Flat, clear

Mechanical Data

Overall Length	18 3/4 ± 1/4	Inches
Greatest Diameter of Bulb	7 ± 1/8	Inches
Minimum Useful Screen Diameter	6.0	Inches
Base	B14-38	

Allen B. Du Mont Laboratories, Inc.
Division of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

DE-6240-2
2/3/61

DUMONT

CATHODE-RAY TUBE

TYPE 7BGP-

GENERAL CHARACTERISTICS (Mechanical Data) (Continued)

Basing	14AY	
Base Alignment:		
D1D2 trace aligns with Pin No. 5 and tube axis	± 10	Degrees
Positive voltage on D1 deflects beam approximately toward Pin No. 5		
Positive voltage on D3 deflects beam approximately toward Pin No. 1		
Angle between D3D4 and D1D2 traces	90 ± 1	Degrees
Bulb Contact Alignment:		
J1-22 cap aligns with D1D2 trace	± 10	Degrees
J1-22 cap aligns with Pin No. 5	± 10	Degrees
J1-22 cap on same side as Pin No. 5		

RATINGS (Design Maximum Values)

Heater Voltage	6.3	Volts
Heater Current at 6.3 Volts	0.6 ± 10%	Ampere
Post Accelerator Voltage	8,000	Max. Volts DC
Post Accelerator Resistance	200 to 500	Megohms
Accelerator Voltage	2,000	Max. Volts DC
Ratio Post Accelerator Voltage to Accelerator Voltage [1]	4.0	Max.
Accelerator Input	6	Max. Watts
Focusing Voltage	500	Max. Volts DC
Grid No. 1 Voltage		
Negative Bias Value	200	Max. Volts DC
Positive Bias Value	0	Max. Volts DC
Positive Peak Value	0	Max. Volts
Peak Heater-Cathode Voltage		
Heater negative with respect to cathode	180	Max. Volts
Heater positive with respect to cathode	180	Max. Volts
Peak Voltage between Accelerator and any Deflection Electrode	200	Max. Volts

Allen B. Du Mont Laboratories, Inc.
Division of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

DUMONT

CATHODE-RAY TUBE

TYPE 7BGP-

TYPICAL OPERATING CONDITIONS

Post Accelerator Voltage	2,000	4,000	Volts
Accelerator Voltage	1,000	1,000	Volts
Post Accelerator Current [1]	2 to 5	6 to 15	Microamperes
Focusing Voltage	100 to 300	100 to 300	Volts
Grid No. 1 Voltage [2]	-60 to -100	-60 to -100	Volts
Line Width "A" [3]	.030	.024	Inch Max.
Modulation [3]	45	45	Volts Max.
P1 Light Output [3]	3.0	8.0	Ft. L. Min.
Useful Scan:			
D1D2	Full Scan	5	Inches Min.
D3D4	Full Scan	5	Inches Min.
Deflection Factors:			
D1D2	15 to 21	20 to 27	Volts DC/Inch
D3D4	15 to 21	19 to 26	Volts DC/Inch
Focusing Current for any operating condition		-15 to +15	Microamperes
Spot Position (Undeflected) [4]		Within a 5/16-inch radius circle	

MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance	1.5	Max. Megohms
Resistance in any Deflecting-Electrode Circuit [5]	5	Max. Megohms

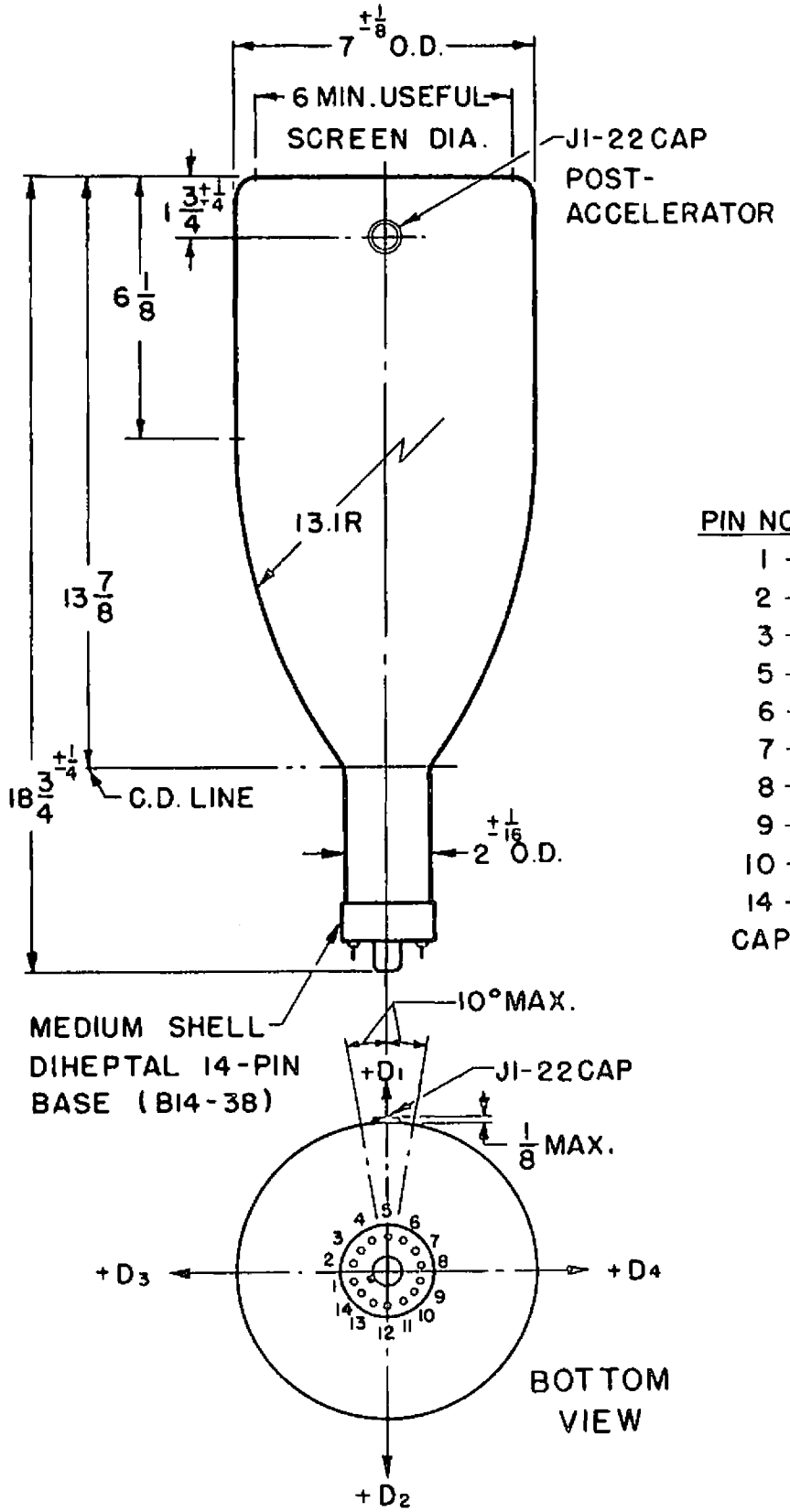
NOTES

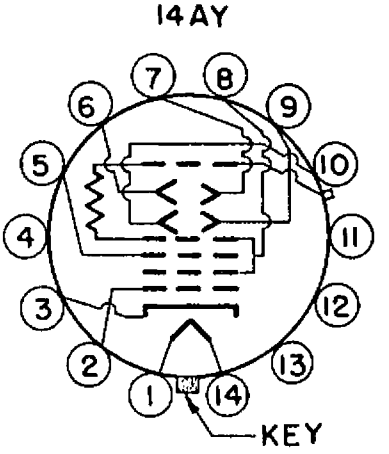
1. Measured with the beam cut off. All readings of beam current shall be in addition to the reading obtained for post accelerator current.
2. Visual extinction of the undeflected, focused spot.
3. Measured in accordance with MIL-E-1 specifications at a beam current of 15 μA.
4. When the tube is operated at typical operating conditions, with Ec1 adjusted to avoid damage to the screen, with each of the deflecting electrodes connected to the accelerator, and with the tube shielded against external influences, the focused spot will fall within a 5/16-inch radius circle centered on the tube face.
5. It is recommended that the deflecting-electrode circuit resistances be approximately equal.

DUMONT

CATHODE-RAY TUBE

7BGP-





BOTTOM VIEW

PIN NO.	ELEMENT
1	HEATER
2	GRID NO.1
3	CATHODE
5	FOCUSING ELECTRODE
6	DEFLECTING ELECTRODE D_1
7	DEFLECTING ELECTRODE D_2
8	ACCELERATOR
9	DEFLECTING ELECTRODE D_4
10	DEFLECTING ELECTRODE D_3
14	HEATER
CAP	POST-ACCELERATOR

Allen B. Du Mont Laboratories, Inc.
Division of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

DE-6240-2
2-6-61

7BP- CATHODE-RAY TUBES

The Types 7BP- Cathode-ray Tubes are 7-inch magnetically focussed and deflected cathode-ray tubes primarily designed for radar indicator and other applications requiring a relatively large, flat screen area and a long persistence screen. The Type 7BP- is very similar to the Type 7MP-, the chief difference being in bulb shape. Other typical radar tubes include the Types 5FP-, 10KP- and 12SP-.



GENERAL CHARACTERISTICS

Electrical

Heater Voltage	6.3 Volts
Heater Current	0.6 ± 10% Ampere
Focusing Method	Magnetic
Deflecting Method	Magnetic
Deflecting Angle (Approx.)	53 Degrees
Phosphor	No. 7
Fluorescence	Blue
Phosphorescence	Yellow
Persistence	Long
Direct Interelectrode Capacitances, Approx.	
Cathode to all other electrodes	5 $\mu\mu$f.
Grid No. 1 to all other electrodes	3.5 $\mu\mu$f.
Grid No. 2 to all other electrodes	7 $\mu\mu$f.

Mechanical

Overall Length	13¼ ± ⅜ Inches
Greatest Diameter of Bulb	7 ± ⅛ Inches
Minimum Useful Screen Diameter	6 Inches
Bulb Contact (Recessed Small Ball Cap)	J1-22
Base (Medium-Shell Octal 8-Pin)	B8-65
Basing	5AN
Bulb Contact Alignment J1-22 Contact aligns with pin No. 5	± 10 Degrees

MAXIMUM RATINGS—(Design Center Values)

Anode Voltage	8,000 Max. Volts D-C
Grid No. 2 Voltage	700 Max. Volts D-C
Grid No. 1 Voltage	
Negative Bias Value	125 Max. Volts D-C
Positive Bias Value[1]	0 Max. Volts D-C
Positive Peak Value	2 Max. Volts
Peak Grid No. 1 Drive from Cut-off	65 Max. Volts
Peak Heater-Cathode Voltage	
Heater Negative with respect to cathode	125 Max. Volts D-C
Heater Positive with respect to cathode	125 Max. Volts D-C

TYPICAL OPERATING CONDITIONS

Anode Voltage	4,000	7,000	Volts D-C
Grid No. 2 Voltage	250	250	Volts D-C
Grid No. 1 Voltage[2]	−25 to −70	−25 to −70	Volts D-C
Focusing Coil Current[3]	75 to 102	99 to 135	Ma. D-C
Spot Position[4]	12	—	mm.

MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance ..... 1.5 Max. Megohms

MINIMUM CIRCUIT VALUES

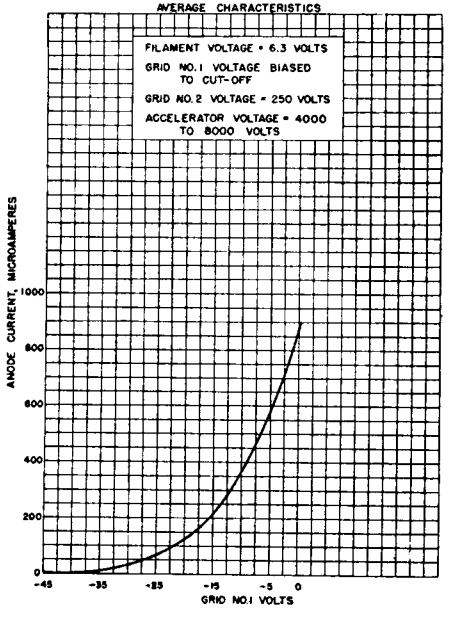
When the output capacitor of the power supply is capable of storing more than 250 microcoulombs, and when the inherent regulation of the power supply permits the instantaneous short-circuit current to exceed 1 ampere, the effective resistance in the circuit between the indicated electrode and the output capacitor should be as follows:

Grid No. 1 Circuit Resistance ..... 150 Min. Ohms
Grid No. 2 Circuit Resistance ..... 820 Min. Ohms
Anode Circuit Resistance ..... 9,100 Min. Ohms

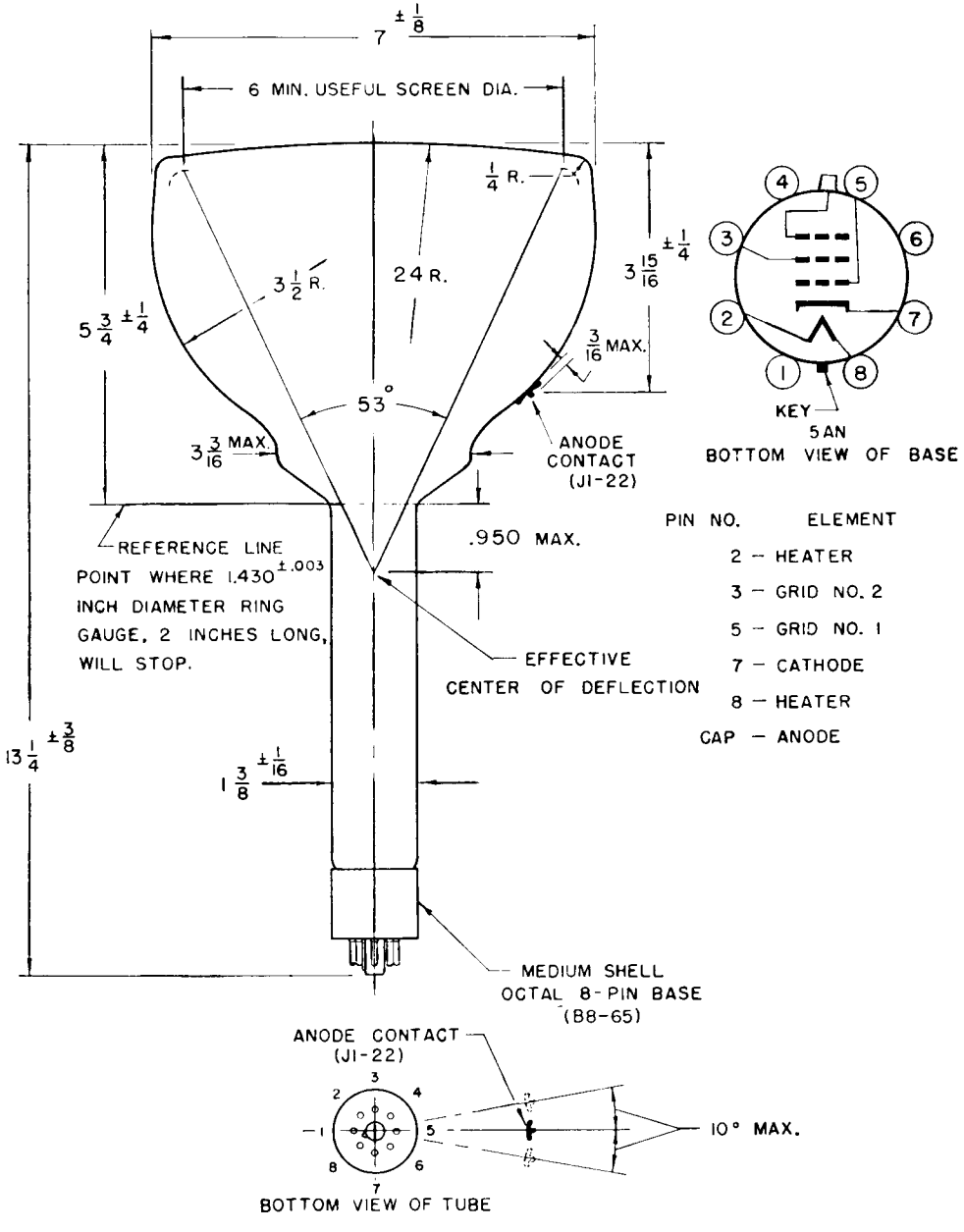
NOTES

1. At or near this rating, the effective resistance of the anode supply should be adequate to limit the anode input power to 6 watts.
2. Visual extinction of undeflected focused spot.
3. For JETEC standard focus coil No. 106, or equivalent, with the grid No. 1 voltage adjusted to produce an anode current of 200 microamperes and with distance (D) from reference line to center of air gap equal to 2.75 inches.
4. The center of the undeflected, unfocused spot will fall within a circle of 12 mm. radius concentric with the center of the tube face.

7BP-



TYPE 7BP-



PIN NO.	ELEMENT
2	HEATER
3	GRID NO. 2
5	GRID NO. 1
7	CATHODE
8	HEATER
CAP	ANODE

DUMONT

CATHODE-RAY TUBE

TYPE 7BRP-

The Du Mont Type 7BRP- is a 7-inch diagonal, square face, five beam, post accelerator, electrostatic deflection and focus cathode-ray tube. All electrodes, with the exception of the accelerator and post accelerator electrodes (Anode No. 2 and Anode No. 3), are independent.

GENERAL CHARACTERISTICS [1]

Electrical Data

Focusing Method	Electrostatic	
Deflection Method	Electrostatic	
Direct Interelectrode Capacitances, Approximate		
Grid No. 1 to all	6.6	μμf
Cathode to all	5.6	μμf
D1 to D2	1.7	μμf
D3 to D4	1.6	μμf
D1 to all	5.2	μμf
D2 to all	5.0	μμf
D3 to all	4.5	μμf
D4 to all	4.6	μμf

Optical Data

Phosphor Number	1	2	4
Fluorescence	Yellow-Green	Yellow-Green	White
Phosphorescence	----------	Green	-----
Persistence	Medium	Medium	Medium to Medium Short

Phosphor Number	7	11	14
Fluorescence	White	Blue	Blue
Phosphorescence	Yellow-Green	----	Orange
Persistence	Long	Medium Short	Medium

Mechanical Data

Overall Length	18 5/8 ± 3/8	Inches
Greatest Bulb Diagonal	7 1/32	Inches
Minimum Useful Screen Width [2]	4.5	Inches
Bulb Contact	J1-22	
Base, Collar	Special	
Base	B25-139	

DUMONT

CATHODE-RAY TUBE

TYPE 7BRP-

GENERAL CHARACTERISTICS (Mechanical Data) (Continued)

Collar and Base Alignment:		
1D2 trace aligns with Collar Base Index Pin No. 1 and tube axis	± 10	Degrees
1D2 trace aligns with Base Key and tube axis	± 10	Degrees
Positive voltage on D2 deflects beam approximately toward Collar Base Pin No. 1 and the End Base Key		
Positive voltage on D3 deflects beam approximately toward Collar Base Pin No. 6		
Bulb Contact Alignment:		
Bulb cap aligns with D1D2 trace and tube axis	± 10	Degrees
Bulb cap on same side as End Base Key and Collar Pin No. 1		
Bulb cap located on tube center line	± 1/4	Inch
Bulb wall (with cap) aligns with D3D4 trace	± 3	Degrees
Trace Alignment:		
D1D2 trace aligns with D3D4 trace	90 ± 2	Degrees
Corresponding traces align within	2	Degrees

RATINGS (Absolute Maximum Values)

Heater Voltage	6.3	Volts
Heater Current at 6.3 Volts	0.6 ± 10%	Ampere
Post Accelerator Voltage	7700	Max. Volts DC
Accelerator Voltage [3]	3850	Max. Volts DC
Ratio Post Accelerator Voltage to Accelerator Voltage [4]	2.0	Max.
Focusing Voltage	1650	Max. Volts DC
Grid No. 1 Voltage		
Negative Bias Value	200	Max. Volts DC
Positive Bias Value	0	Max. Volts DC
Positive Peak Value	0	Max. Volts
Peak Heater-Cathode Voltage		
Heater negative with respect to cathode	180	Max. Volts
Heater positive with respect to cathode	180	Max. Volts
Peak Voltage between Accelerator and any deflection electrode	750	Volts
Maximum Cathode Current	1.0	mADC

DUMONT

CATHODE-RAY TUBE

TYPE 7BRP-

TYPICAL OPERATING CONDITIONS

Post Accelerator Voltage	4000	Volts DC
Accelerator Voltage	2000	Volts DC
Focusing Voltage	440 to 755	Volts DC
Grid No. 1 Voltage [5]	-30 to -68	Volts DC
Modulation [6]	45	Max. Volts DC
Line Width "A" [7]	.028	Max. Inch
Deflection Factors:		
D1D2	63 to 99	Volts DC/Inch
D3D4	59 to 94	Volts DC/Inch
Useful Scan [8]		
D1D2	4.5	Min. Inches
D3D4	4.5	Min. Inches
Interaction Factor [9]	.00001	Max. Inch/Volt
Spot Position (Undeflected) [10]	Within a 20-mm square	

CIRCUIT DESIGN VALUES

Focusing Voltage	220 to 377.5 Volts per Kilovolt of Accelerator Voltage	
Focusing Current for any operating condition	-15 to +10	Microamperes
Grid No. 1 Voltage [5]	-15 to -34 Volts per Kilovolt of Accelerator Voltage	
Grid No. 1 Circuit Resistance	1.5	Max. Megohms
Deflection Factors:		
Ratio Post Accelerator Voltage to Accelerator Voltage	2.0	
D1D2	31.5 to 49.5 Volts DC/Inch/KV of Accelerator Voltage	
D3D4	29.5 to 47.0 Volts DC/Inch/KV of Accelerator Voltage	
Resistance in any Deflecting-Electrode Circuit [11]	1.0	Max. Megohms

Allen B. Du Mont Laboratories
Divisions of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

DUMONT

CATHODE-RAY TUBE

TYPE 7BRP-

NOTES

1. Values are for each unit unless otherwise stated.

2. Following the bulb contour.

3. Accelerator power input (average) should be limited to six watts.

4. This tube is designed for optimum performance when operating at an Eb3/Eb2 ratio of 2.0. Operation at other ratios of Eb3/Eb2 may result in changes in deflection uniformity and pattern distortion.

5. Visual extinction of the undeflected, focused spot.

6. The increase in Grid No. 1 voltage from cut-off to produce an Ib3 of 25 μADC.

7. Measured in accordance with MIL-E-1 specifications, using an Ib3 of 25 μADC.

8. Centered about normal undeflected spot position.

9. The deflection of one beam when balanced DC voltages are applied to the deflection electrodes of the other will not be greater than the indicated value.

10. With Ec1 adjusted to avoid damage to the screen, with each deflecting electrode connected to the accelerator, and with the tube shielded against external influences, the spot will fall within a 20-mm square, centered on the tube face.

11. It is recommended that the deflecting-electrode circuit resistances be approximately equal. Higher resistance values up to five megohms may be used for low beam current operation.

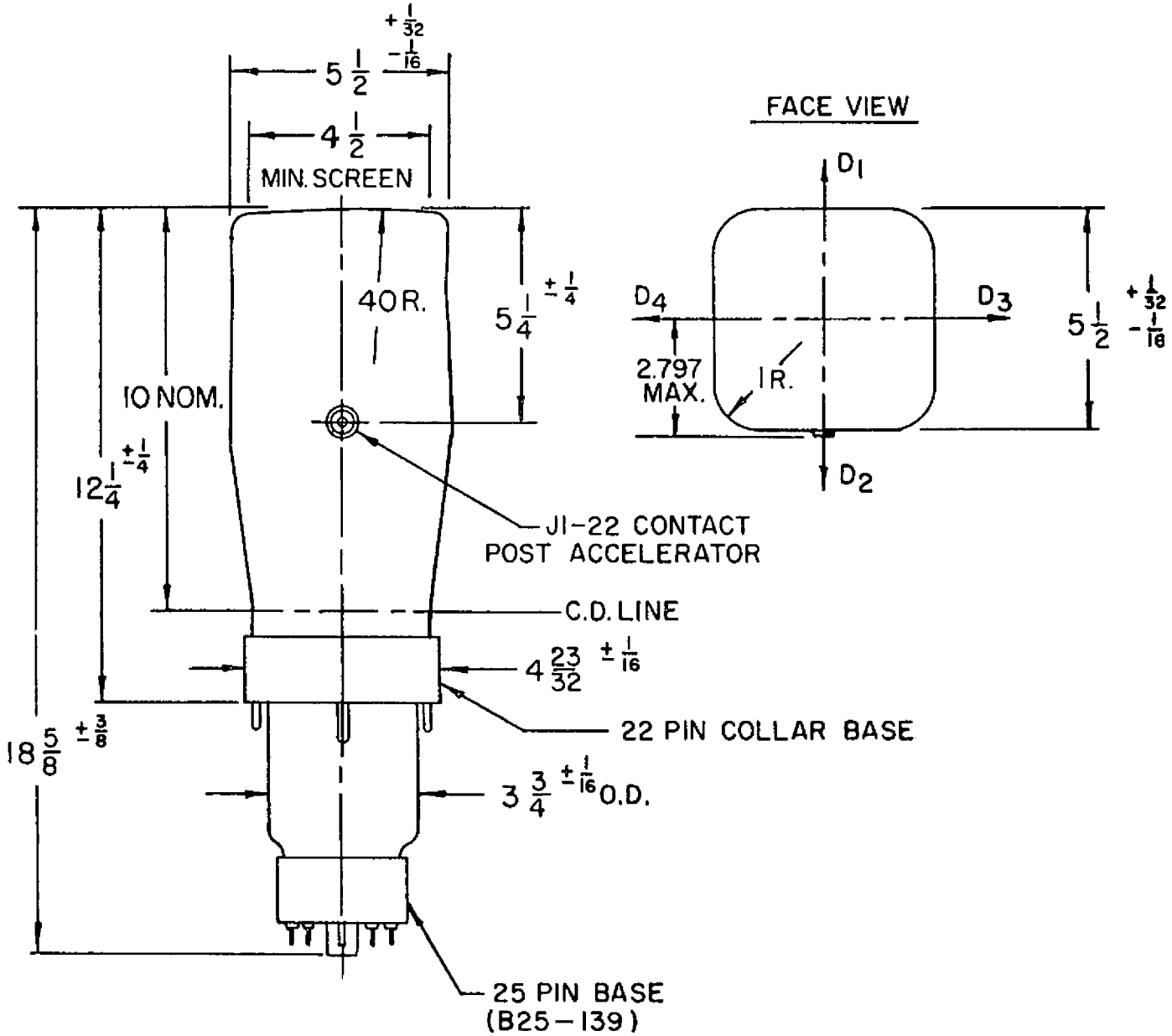
Allen B. Du Mont Laboratories
Divisions of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

FORM 8098

DU MONT

CATHODE-RAY TUBE

7BRP-



NOTES:

1. MAX. BASE TILT WITH RESPECT TO TUBE AXIS ± 3°.
2. BULB CONTACT INDEX PIN & BASE KEY ALIGN WITH D1,D2 TRACE ±10°.

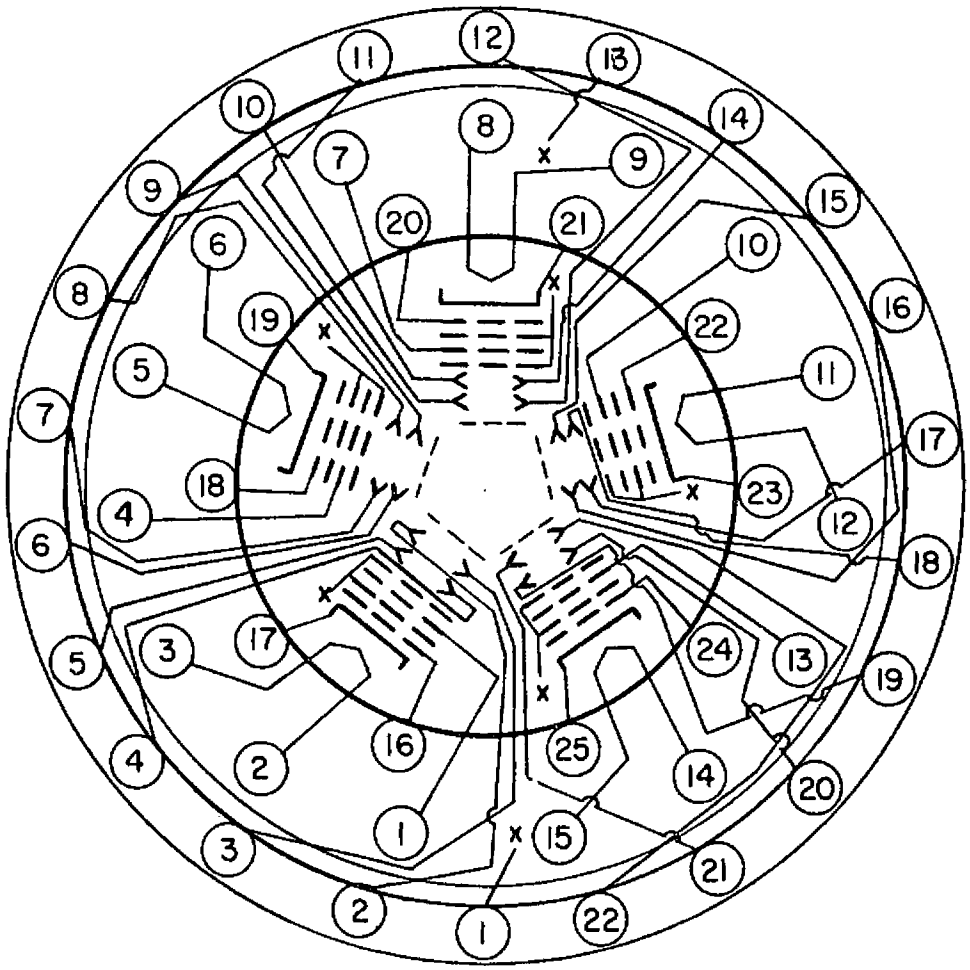
Allen B. Du Mont Laboratories, Inc.
Division of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

TD 4817-1-A-2
1-18-62
FORM 009 -M1-9-60-SH

DU MONT

BASING

TYPE 7BRP—



BOTTOM VIEW

22 PIN COLLAR BASE

PIN NO.	ELEMENT	BEAM
1	ANODE 2 - COMMON TO ALL	BEAMS
2	DEFLECTOR D4	A
3	DEFLECTOR D3	A
4	DEFLECTOR D2	A
5	DEFLECTOR D1	A
6	DEFLECTOR D3	B
7	DEFLECTOR D2	B
8	DEFLECTOR D1	B
9	DEFLECTOR D4	B
10	DEFLECTOR D2	C
11	DEFLECTOR D3	C
12	DEFLECTOR D4	C
13	ANODE 2 - COMMON TO ALL	BEAMS
14	DEFLECTOR D1	C
15	DEFLECTOR D3	D
16	DEFLECTOR D4	D
17	DEFLECTOR D1	D
18	DEFLECTOR D2	D
19	DEFLECTOR D1	E
20	DEFLECTOR D2	E
21	DEFLECTOR D4	E
22	DEFLECTOR D3	E

25 PIN BASE

PIN NO.	ELEMENT	BEAM
1	ANODE 1	A
2	HEATER	A
3	HEATER	A
16	GRID 1	A
17	CATHODE	A
4	ANODE 1	B
5	HEATER	B
6	HEATER	B
18	GRID 1	B
19	CATHODE	B
7	ANODE 1	C
8	HEATER	C
9	HEATER	C
20	GRID 1	C
21	CATHODE	C
10	ANODE 1	D
11	HEATER	D
12	HEATER	D
22	GRID 1	D
23	CATHODE	D
13	ANODE 1	E
14	HEATER	E
15	HEATER	E
24	GRID 1	E
25	CATHODE	E

Allen B. Du Mont Laboratories, Inc.
Division of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

TD 4817-2-A-2
1-18-62
FORM 609 -M1-8-60-SN

DUMONT

CATHODE-RAY TUBE

TYPE 7BSP-

The Type 7BSP- is a 7-inch diameter, flat face, electrostatic focus and deflection cathode-ray tube containing five independent beams and featuring a linear post accelerator. The deflection electrodes and acceleration electrode connections are brought out through the bulb wall to minimize lead inductance and capacity and to improve insulation. A collar base provides ease of connection to these leads.

GENERAL CHARACTERISTICS [1]

Electrical Data

Focusing Method	Electrostatic	
Deflection Method	Electrostatic	
Direct Interelectrode Capacitances, Approximate		
Cathode to all other electrodes	4.3	μμf
Grid No. 1 to all other electrodes	4.0	μμf
D1 to D2	1.9	μμf
D3 to D4	1.2	μμf
D1 to all other electrodes	2.7	μμf
D2 to all other electrodes	2.7	μμf
D3 to all other electrodes	2.0	μμf
D4 to all other electrodes	2.0	μμf

Optical Data

Phosphor Number	2	7
Fluorescence	Yellow-Green	White
Phosphorescence	Green	Yellow-Green
Persistence	Medium	Long

Mechanical Data

Overall Length	22 7/8 ± 1/4	Inches
Greatest Diameter of Bulb	7 ± 1/8	Inches
Minimum Useful Screen Diameter	6.0	Inches
Bulb Contact (Post Accelerator)	J1-22	
Base (Pentaquintal)	B25-139	
Collar Base (22 Pin)	A22-105	
Basing	Special	

Allen B. Du Mont Laboratories
Divisions of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

DE-5408 - 4
4/18/62

FORM 809R

from JEDEC release #3753, June 4, 1962

DUMONT

CATHODE-RAY TUBE

TYPE 7BSP-

GENERAL CHARACTERISTICS (Mechanical Data) (Continued)

Collar and Base Alignment		
Collar Pin No. 1 and Base Key each aligns with D1D2 Trace	± 10	Degrees
Positive voltage on D1 deflects beam approximately toward Base Key		
Positive voltage on D3 deflects beam approximately toward Base Pin No. 12		
Bulb Contact Alignment		
J1-22 cap aligns with D1D2 trace	± 5	Degrees
J1-22 cap on same side as Base Key		
Trace Alignment		
Angle between D3D4 and D1D2 traces	90 ± 1 1/2	Degrees
Corresponding traces align within	2	Degrees

RATINGS (Absolute Maximum Values)

Heater Voltage	6.3	Volts
Heater Current at 6.3 Volts (All Units)	2.8 ± 10%	Amperes
Post Accelerator Voltage	8800	Max. Volts DC
Accelerator Voltage	4400	Max. Volts DC
Accelerator Input	6	Max. Watts
Ratio Post Accelerator Voltage to Accelerator Voltage[2]	2.0	
Focusing Electrode Voltage	1650	Max. Volts DC
Post Accelerator Resistance	165	Min. Megohms
Grid No. 1 Voltage		
Negative Bias Value	200	Max. Volts DC
Positive Bias Value	0	Max. Volts DC
Positive Peak Value	0	Max. Volts
Peak Heater-Cathode Voltage		
Heater negative with respect to cathode		
During warm-up period not to exceed 15 seconds	410	Max. Volts
After equipment warm-up period	180	Max. Volts
Heater positive with respect to cathode	180	Max. Volts
Peak Voltage between Accelerator and any Deflection Electrode	800	Max. Volts

DUMONT

CATHODE-RAY TUBE

TYPE 7BSP-

TYPICAL OPERATING CONDITIONS

Post Accelerator Voltage	6000	Volts DC
Accelerator Voltage	3000	Volts DC
Post Accelerator Current [3]	18	μA Max.
Focusing Electrode Voltage [4]	755 to 1000	Volts DC
Focusing Electrode Voltage (For any value of Beam Current)	700 to 1050	Volts DC
Grid No. 1 Voltage [5]	-42 to -72	Volts DC
Deflection Factors		
D1D2	71 to 95	Volts DC/Inch
D3D4	77 to 105	Volts DC/Inch
Deflection Factor Uniformity [6]	2	Max. Percent
Pattern Distortion (at 75% of useful scan) [7]	2	Max. Percent
Modulation [10]	35	Max. Volts DC
Line Width "A" [4]	.015	Max. Inch
Line Width "B" [4]	.035	Max. Inch
Line Width A[1] [4]	.022	Max. Inch
Focusing Electrode Current for any operating condition	-15 to +5	μA
Spot Position (Focused and Undeflected) [8]	Within a 20-mm square	

MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance	1.5	Max. Megohms
Resistance in any Deflecting-Electrode Circuit [9]	1.0	Max. Megohms

Allen B. Du Mont Laboratories
Divisions of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

DUMONT

CATHODE-RAY TUBE

TYPE 7BSP-

NOTES

1. Values are for each unit unless otherwise specified.

2. This tube is designed for optimum performance when operating at an Eb3/Eb2 ratio of 2.0. Operation at other ratios of Eb3/Eb2 may result in changes in deflection uniformity and pattern distortion.

3. Measured between the post accelerator and the accelerator with beams cut off. All readings of beam current shall be in addition to the reading obtained for post accelerator current.

4. For an Ib3 of 2 μADC, measured in accordance with MIL-E-1 specifications.

5. Visual extinction of undeflected, focused spot.

6. Measured per MIL-E-1 specifications.

7. All portions of a raster pattern, adjusted so its widest points just touch the sides of a 4.590-inch square, will fall within the area bounded by a 4.590-inch square and an inscribed 4.410-inch square.

8. Centered with respect to the tube face and with the tube shielded.

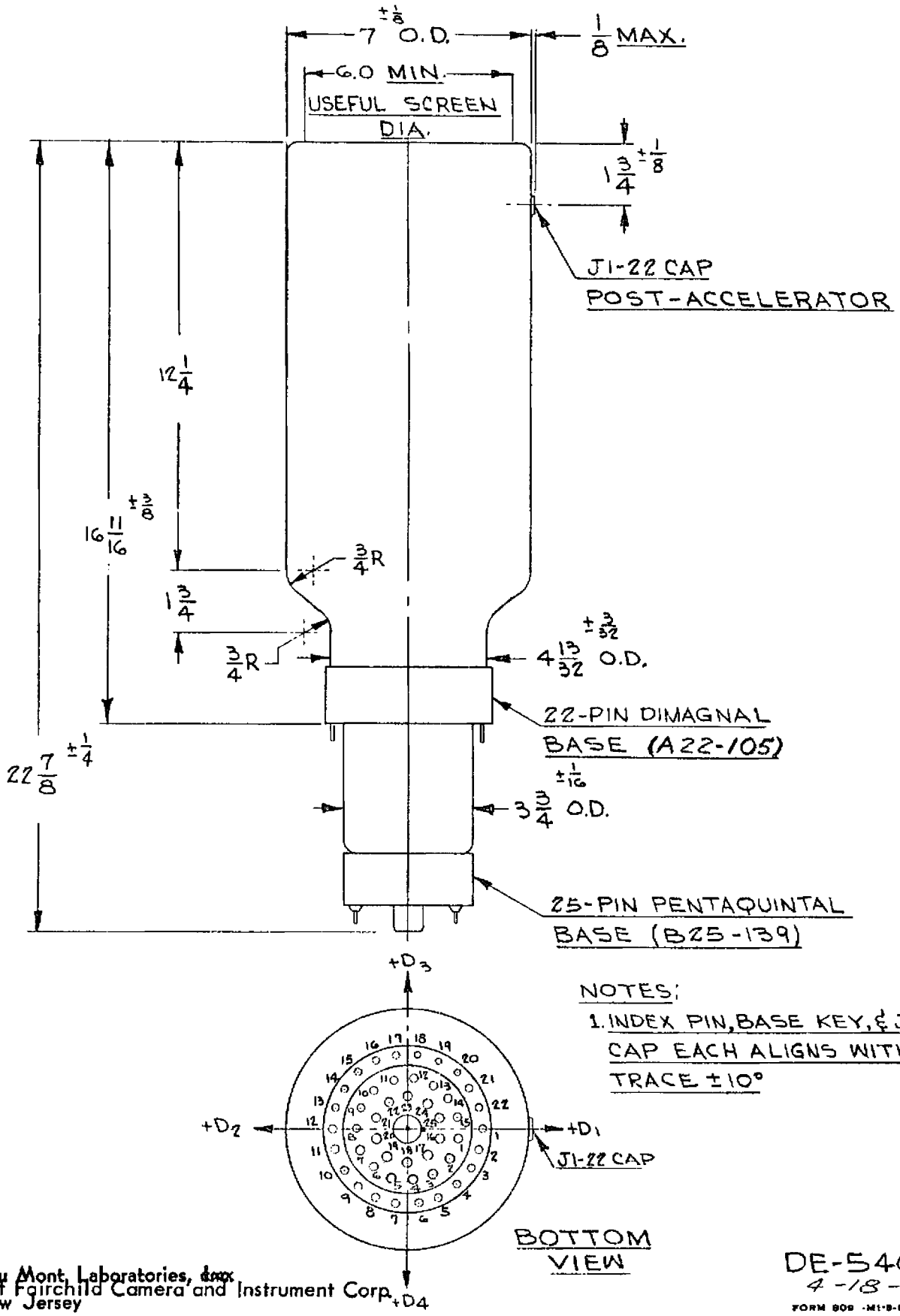
9. It is recommended that the deflecting-electrode circuit resistances be approximately equal. Higher resistance values up to five megohms may be used for low beam current operation.

10. For an Ib3 of 25 μADC, measured in accordance with MIL-E-1 specifications.

DUMONT

CATHODE-RAY TUBE

TYPE 7BSP-



NOTES:

1. INDEX PIN, BASE KEY, & J1-22 CAP EACH ALIGNS WITH D_1 D_2 TRACE ±10°

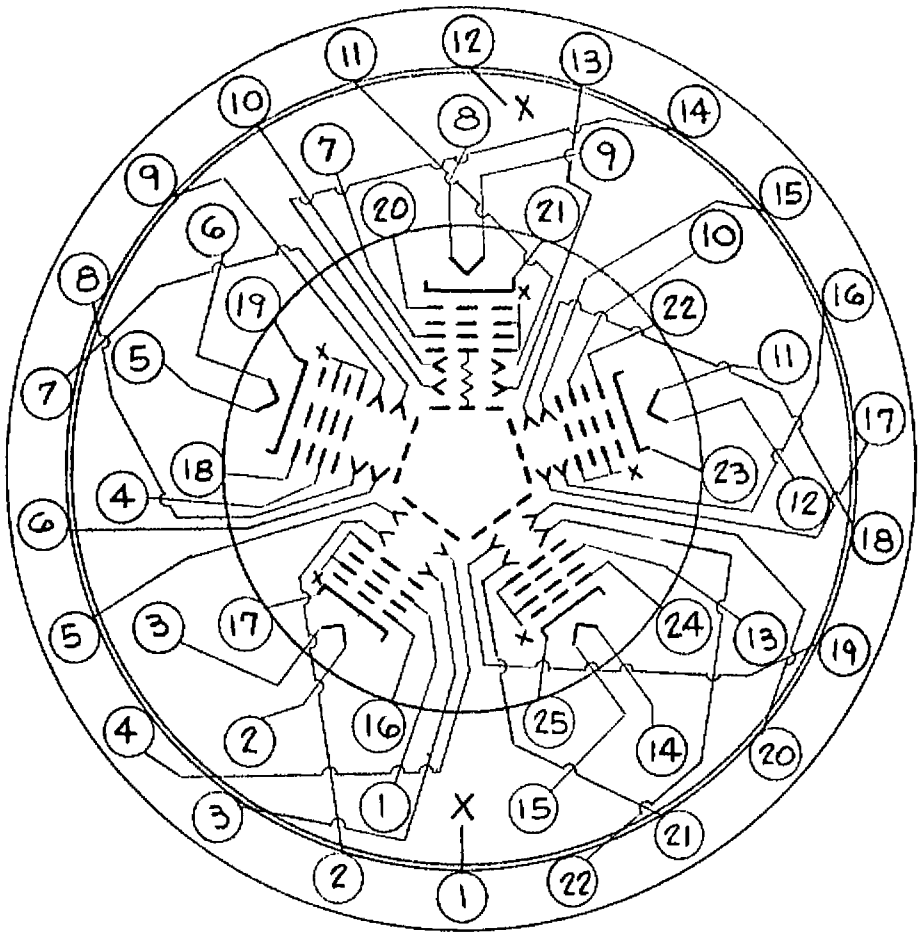
Allen B. Du Mont Laboratories, Inc.
Division of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

DE-5408-5
4-18-62
FORM 909 -M1-9-60-SH

DUMONT

BASING

TYPE 7BSP-



BASE & COLLAR CONNECTIONS

ELEMENT	UNIT "A"	UNIT "B"	UNIT "C"	UNIT "D"	UNIT "E"
25-PIN BASE NUMBERS					
HEATER	2	5	8	11	14
HEATER	3	6	9	12	15
CATHODE	17	19	21	23	25
GRID No. 1	16	18	20	22	24
FOCUSING ELECTRODE	1	4	7	10	13
22-PIN COLLAR NUMBERS					
ACCELERATOR (COMMON)	1 & 12	1 & 12	1 & 12	1 & 12	1 & 12
DEFLECTING ELECTRODE D_1	4	6	14	18	20
DEFLECTING ELECTRODE D_2	5	7	13	17	19
DEFLECTING ELECTRODE D_3	2	9	11	16	21
DEFLECTING ELECTRODE D4	3	8	10	15	22

Allen B. Du Mont Laboratories, Inc.
Division of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

DE-5408-3
4-18-62
FORM 609 -MI-5-60-BM

7MP- CATHODE-RAY TUBES

Highly similar to the Type 7BP- Cathode-ray Tubes, except in bulb shape, are the Type 7MP- Cathode-ray Tubes. These are magnetically focussed and deflected cathode-ray tubes primarily designed for radar indicator and other applications requiring a relatively large, flat screen area and a long persistence screen. Among the other radar-type tubes which may be ordered from Du Mont are the Types 5FP-, 10KP- and 12SP-.



GENERAL CHARACTERISTICS

Electrical

Heater Voltage	6.3 Volts
Heater Current	0.6 ± 10% Ampere
Focusing Method	Magnetic
Deflecting Method	Magnetic
Deflecting Angle (Approx.)	50 Degrees
Phosphor	No. 7
Fluorescence	Blue
Phosphorescence	Yellow
Persistence	Long
Direct Interelectrode Capacitances, Approx.	
Cathode to all other electrodes	5 $\mu\mu$f.
Grid No. 1 to all other electrodes	6 $\mu\mu$f.

Mechanical

Overall Length	12¾ ± ⅜ Inches
Greatest Diameter of Bulb	7-3/16 ± ⅛ Inches
Minimum Useful Screen Diameter	6 Inches
Bulb Contact (Recessed Small Cavity Cap)	J1-21
Base (Small Shell Duodecal 5-Pin)	B5-57
Basing	12D
Bulb Contact Alignment	
J1-21 Contact aligns with vacant pin position No. 3	± 10 Degrees

MAXIMUM RATINGS—(Design Center Values)

Anode Voltage	8,000 Max. Volts D-C
Grid No. 2 Voltage	−180 to +700 Max. Volts D-C or Peak A-C
Grid No. 1 Voltage	
Negative Bias Value	180 Max. Volts D-C
Positive Bias Value[1]	0 Max. Volts D-C
Positive Peak Value	2 Max. Volts
Peak Grid No. 1 Drive from Cut-off	65 Max. Volts
Peak Heater-Cathode Voltage	
Heater Negative with respect to cathode	125 Max. Volts D-C
Heater Positive with respect to cathode	125 Max. Volts D-C

TYPICAL OPERATING CONDITIONS

Anode Voltage	4,000	7,000	Volts D-C
Grid No. 2 Voltage	250	250	Volts D-C
Grid No. 2 Current	−15 to +15	−15 to +15	ua. D-C
Grid No. 1 Voltage[2]	−27 to −63	−27 to −63	Volts D-C
Focusing Coil Current[3]	64 ± 15%	85 ± 15%	Ma. D-C
Spot Position[4]	12	—	mm

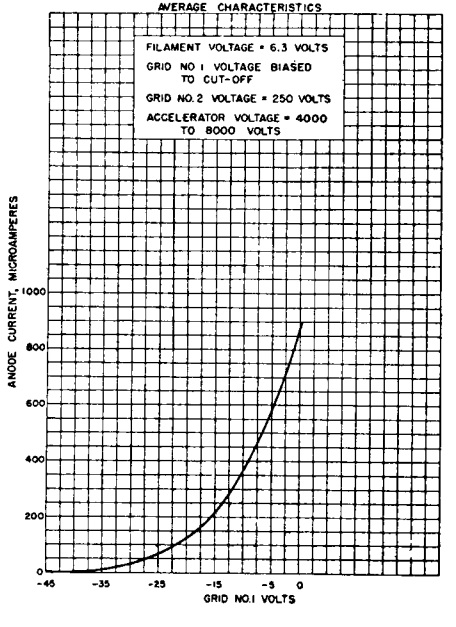
MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance ..... 1.5 Max. Megohms

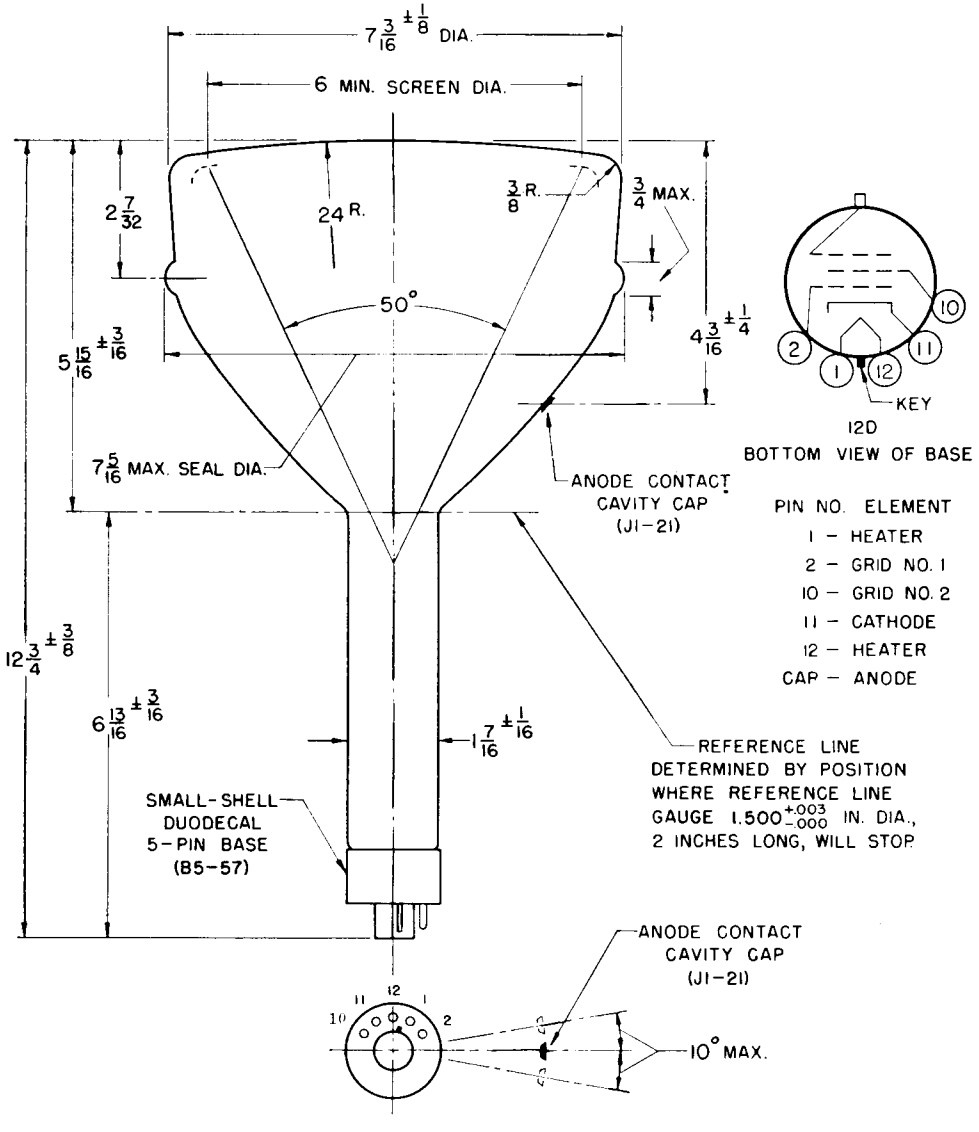
NOTES

1. At or near this rating, the effective resistance of the anode supply should be adequate to limit the anode input power to 6 watts.
2. Visual extinction of undeflected focused spot.
3. For JETEC standard focus coil No. 109, or equivalent, with the Grid No. 1 voltage adjusted to produce an anode current of 200 microamperes and with distance (D) from reference line to center of air gap equal to 2.75 inches.
4. The center of the undeflected, unfocused spot will fall within a circle of 12 mm. radius concentric with the center of the tube face.

7MP-



TYPE 7MP-


7 3/16 ± 1/8 DIA.
6 MIN. SCREEN DIA.
2 7/32
24 R.
3/8 R.
3/4 MAX.
50°
5 15/16 ± 3/16
4 3/16 ± 1/4
7 5/16 MAX. SEAL DIA.
ANODE CONTACT CAVITY CAP (J1-21)
12 3/4 ± 3/8
6 13/16 ± 3/16
1 7/16 ± 1/16
SMALL-SHELL DUODECAL 5-PIN BASE (B5-57)
REFERENCE LINE DETERMINED BY POSITION WHERE REFERENCE LINE GAUGE 1.500 +.003 -.000 IN. DIA., 2 INCHES LONG, WILL STOP
ANODE CONTACT CAVITY CAP (J1-21)
10° MAX.
10
2
11
1
12
KEY
12D
BOTTOM VIEW OF BASE
PIN NO. ELEMENT
1 - HEATER
2 - GRID NO. 1
10 - GRID NO. 2
11 - CATHODE
12 - HEATER
CAP - ANODE

7UP7 CATHODE-RAY TUBE

The Type 7UP7 is a 7-inch magnetic focus and deflection cathode-ray tube with a relatively large and flat screen area. It is designed for applications requiring a long persistent type screen. The screen is metal-backed.



GENERAL CHARACTERISTICS

Electrical Data

Heater Voltage	6.3	Volts
Heater Current	0.6 ± 10%	Ampere
Focusing Method		Magnetic
Deflecting Method		Magnetic
Deflecting Angle (Approx.)	53	Degrees
Phosphor		No. 7
Fluorescence		Blue
Phosphorescence		Yellow
Persistence		Long
Direct Interelectrode Capacitances, Approx.		
Cathode to all other electrodes	5	μμf.
Grid No. 1 to all other electrodes	8.5	μμf.

Mechanical Data

Overall Length	13¼ ± ⅜ Inches
Greatest Diameter of Bulb	7 ± ⅛ Inches
Minimum Useful Screen Diameter	6 Inches
Bulb Contact (Recessed Small Cavity Cap)	J1-21
Base (Long Medium-Shell Octal 8-Pin or)	B8-65 or
(Long Medium-Shell Octal 5-Pin)	B5-80
Basing	5AN
Bulb Contact Alignment	
J1-21 Contact aligns with Pin No. 5	± 10 Degrees

MAXIMUM RATINGS (Design Center Values)

Accelerator Voltage	10,000 Max. Volts D-C
Grid No. 2 Voltage	700 Max. Volts D-C
Grid No. 1 Voltage	
Negative Bias Value	180 Max. Volts D-C
Positive Bias Value[1]	0 Max. Volts D-C
Positive Peak Value	2 Max. Volts
Peak Heater-Cathode Voltage	
Heater Negative with respect to cathode	
During warm-up period not to exceed 15 seconds	410 Max. Volts D-C
After equipment warm-up period	180 Max. Volts D-C
Heater Positive with respect to cathode	180 Max. Volts D-C

TYPICAL OPERATING CONDITIONS

Accelerator Voltage	7,000 Volts D-C
Grid No. 2 Voltage	250 Volts D-C
Grid No. 1 Voltage[2]	—25 to —70 Volts D-C
Focusing Coil Current[3]	99 to 135 Ma. D-C

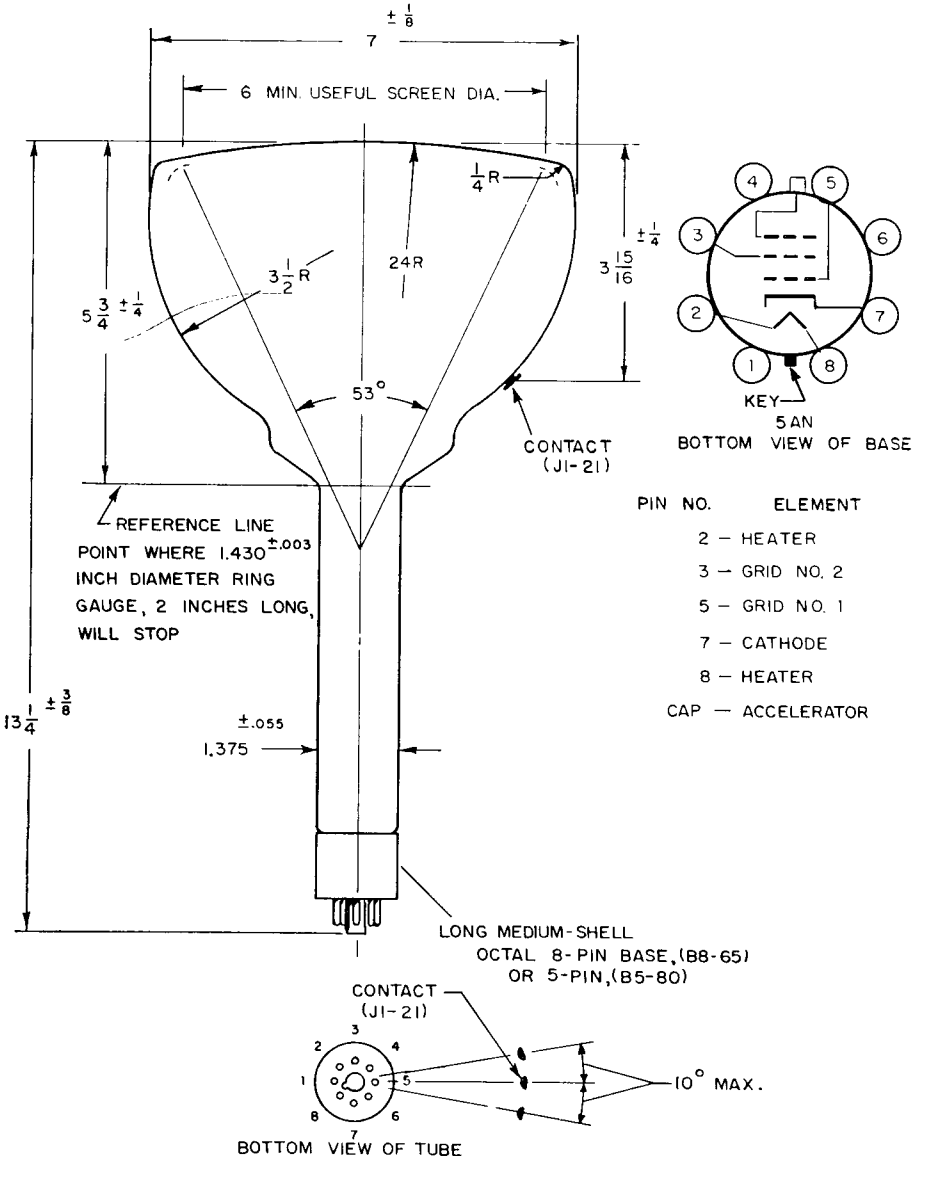
MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance	1.5 Max. Megohms

NOTES

1. At or near this rating, the effective resistance of the accelerator supply should be adequate to limit the accelerator input power to 6 watts.
2. Visual extinction of undeflected focused spot.
3. For JETEC standard focus coil No. 106, or equivalent, with the grid voltage adjusted to produce an accelerator current of 200 microamperes and with distance (D) from reference line to center of air gap equal to 2.75 inches.

TYPE 7UP-



PIN NO.	ELEMENT
2	HEATER
3	GRID NO. 2
5	GRID NO. 1
7	CATHODE
8	HEATER
CAP	ACCELERATOR

7YP- CATHODE-RAY TUBE

The Du Mont Type 7YP- is a seven-inch diagonal, square-faced flat-faced, electrostatically deflected and focused cathode-ray tube containing five electron-guns in a single glass envelope. Each electron beam may be independently focused, deflected and intensity-modulated. The single post-accelerator is common to all the electron-guns. The Type 7YP- is one of the line of Du Mont tight-tolerance cathode-ray tubes.



The Type 7YP- is utilized in those applications requiring the display of five independent phenomena on a single cathode-ray tube screen for comparison and observation. Each of the electron guns is positioned to scan adjacent separate areas of the screen and the 3D4 scan of each is limited to provide maximum sensitivity on this axis. The deflection electrode and accelerator connections are brought out through the bulb wall to minimize lead inductance and capacity and to improve insulation. A collar or ring-base provides easy connections to these leads.

GENERAL CHARACTERISTICS (Note 1)

Electrical

Heater Voltage	6.3 Volts
Heater Current	0.6±10% Amperes
Focusing Method	Electrostatic
Deflecting Method	Electrostatic

Phosphor	No. 1	No. 2	No. 7	No. 11
Fluorescence	Green	Green	Blue	Blue
Phosphorescence	———	Green	Yellow	———
Persistence	Medium	Long	Long	Short

Direct Interelectrode Capacitances	Min.	Max.	
Cathodes to all other electrodes	3.5	6.5	μμf
Grid No. 1 to all other electrodes	4.0	7.0	μμf
D1 to D2	1.3	2.7	μμf
D3 to D4	1.6	3.2	μμf
D1 to all other electrodes	5.5	8.1	μμf
D2 to all other electrodes	5.5	8.0	μμf
D4 to all other electrodes	5.2	7.8	μμf
D3 to all other electrodes	5.2	7.8	μμf

Mechanical

Overall Length	18½±⅔ Inches
Greatest Bulb Diagonal	7-1/32 Inches
Minimum Useful Screen Width (Note 2)	4.5 Inches
Bulb Contact (Recessed Small Ball Cap)	J1-22
Collar (22 Pin)	Special
Base (25 Pin)	B25-139
Basing	Special

Collar and Base Alignment

Collar Pin No. 1 and Base Key each aligns with the D3D4 trace ..... ±10 Degrees

Positive voltage on D3 deflects the beam towards the index pin of the Ring Base

Positive voltage on D1 deflects the beam approximately towards Pin 6 of the Ring Base

Bulb Contact Alignment	
Bulb Contact Aligns with D3D4 trace	±10 Degrees
Bulb Contact on same side as Base Key and Collar Pin No. 1	± ¼ Inch
Bulb Contact located on tube center line	± 3 Degrees
Bulb Wall (wih Contact) Aligns with D1D2 Trace	
Trace Alignment	
D1D2 trace aligns with D3D4 trace	90±2 Degrees
Corresponding traces align within	2 Degrees

MAXIMUM RATINGS—(Design Center Values)

Post-Accelerator Voltage	7,000 Max. Volts D-C
Accelerator Voltage (Note 3)	3,500 Max. Volts D-C
Ratio Post-Accelerator Voltage to Accelerator Voltage (Note 4)	2.0 Max.
Focusing Voltage	1,500 Max. Volts D-C
Grid No. 1 Voltage	
Negative Bias Value	200 Max. Volts D-C
Positive Bias Value	0 Max. Volts D-C
Positive Peak Value	0 Max. Volts D-C
Peak Heater to Cathode Voltage	
Heater Negative with respect to Cathode	180 Max. Volts
Heater Positive with respect to Cathode	180 Max. Volts
Peak Voltage between Accelerator and any deflection electrode	1,250 Volts

TYPICAL OPERATING CONDITIONS

For Post-Accelerator Voltage of	4,000 Volts D-C
For Accelerator Voltage of	2,000 Volts D-C
Focusing Voltage	450 to 650 Volts D-C
Grid No. 1 Voltage (Note 5)	—50 to —90 Volts D-C
Modulation Factor (Note 6)	55 Max. Volts D-C
Line Width "A" (Note 7)	.026 Max. Inches
Deflection Factors:	
D1 and D2	68 to 84 Volts D-C/Inch
D3 and D4 (Note 8)	27 to 37 Volts D-C/Inch
Deflection Factor Uniformity (Note 9)	2% Max.
Useful Scan (Note 10)	
D1 and D2	4.5 Min. Inches
D3 and D4	1.5 Min. Inches
Interaction Factor (Note 11)	.00001 Max. Inches/Volt

CIRCUIT DESIGN VALUES

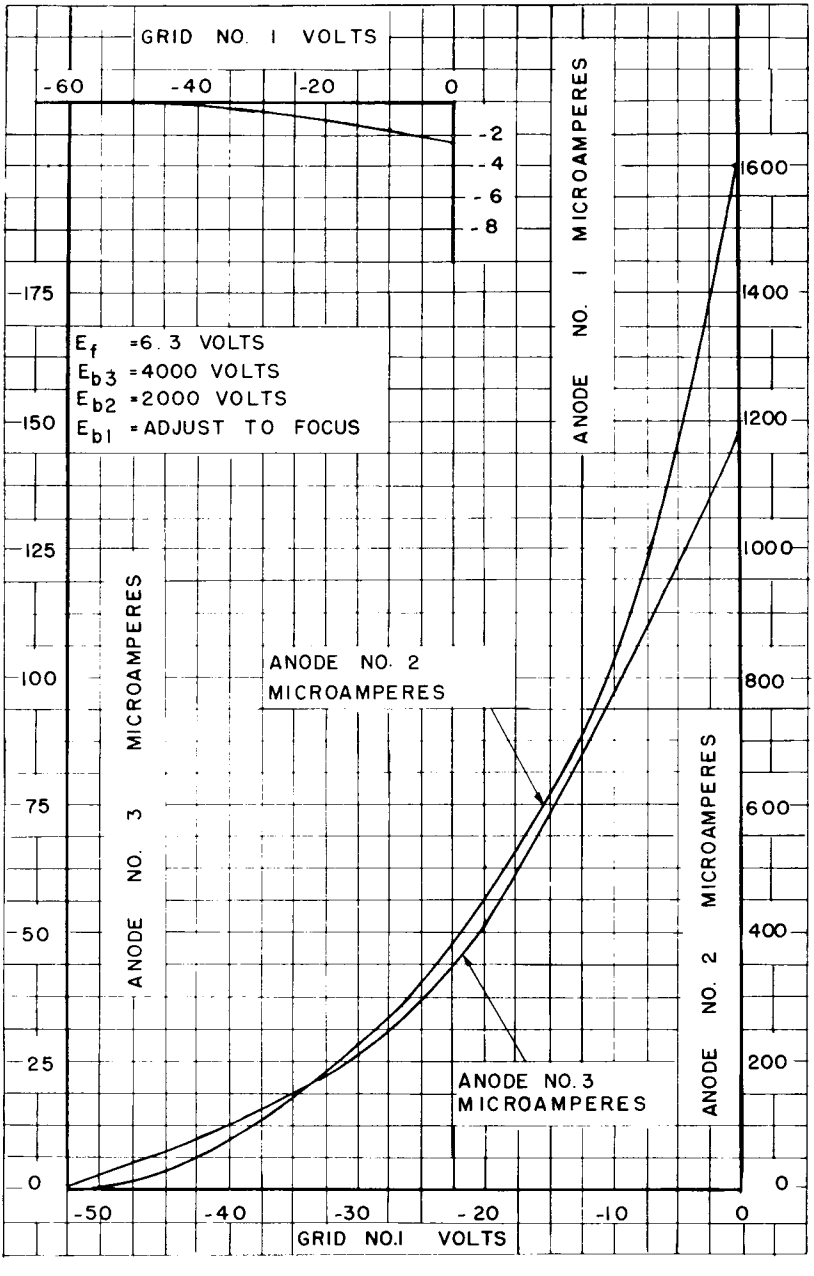
Focusing Voltage	225 to 325 Volts per Kilovolt of Accelerator Voltage
Focusing Current for any operating condition	—15 to +10 Microamperes
Grid No. 1 Voltage for (Note 5)	—25 to —45 volts per Kilovolt of Accelerator Voltage
Grid No. 1 Circuit Resistance	1.5 Max. Megohms
Deflection Factors:	
Ratio Post-Accelerator Voltage to Accelerator Voltage	1.0
D1 and D2	25 to 33 Volts D-C/Inch/KV of Accelerator Voltage
D3 and D4	11 to 16 Volts D-C/Inch/KV of Accelerator Voltage
Ratio Post-Accelerator Voltage to Accelerator Voltage	2.0
D1 and D2	34 to 42 Volts D-C/Inch/KV of Accelerator Voltage
D3 and D4	13.5 to 18.5 Volts D-C/Inch/KV of Accelerator Voltage
Resistance in any Deflecting-Electrode Circuit (Note 12)	1.0 Max. Megohms

NOTES

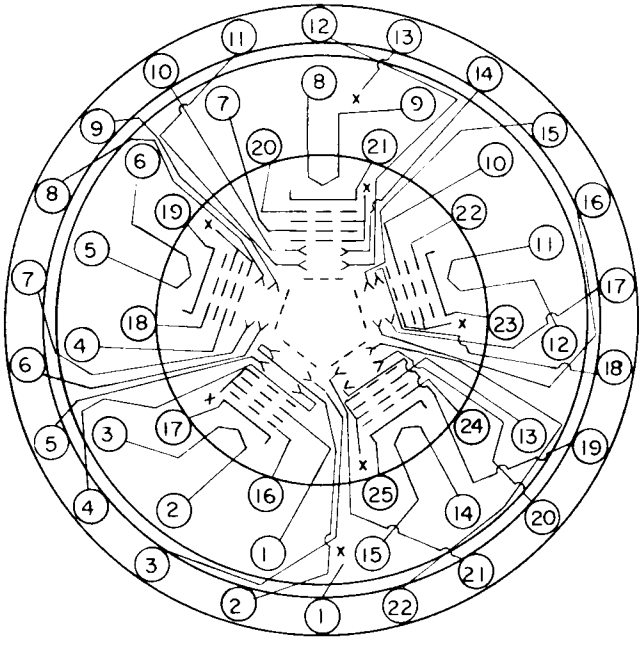
1. Values are for each unit unless otherwise stated.
2. Following the bulb contour.
3. Accelerator power input (Avg.) should be limited to 6 watts.
4. This tube is designed for optimum performance when operating at an Eb3/Eb2 ratio of 2.0. Operation at other ratios of Eb2/Eb2 may result in changes in deflection uniformity and pattern distortion.
5. Visual extinction of the undeflected, focused spot.
6. The increase in Grid No. 1 voltage from cut-off to produce an Ib3 of 50 μADC.
7. Measured in accordance with MIL-E-1 specification using an Ib3 of 25 μADC.

TYPE 7YP-

AVERAGE CHARACTERISTICS



TYPE 7YP-



BOTTOM VIEW

22 PIN COLLAR BASE

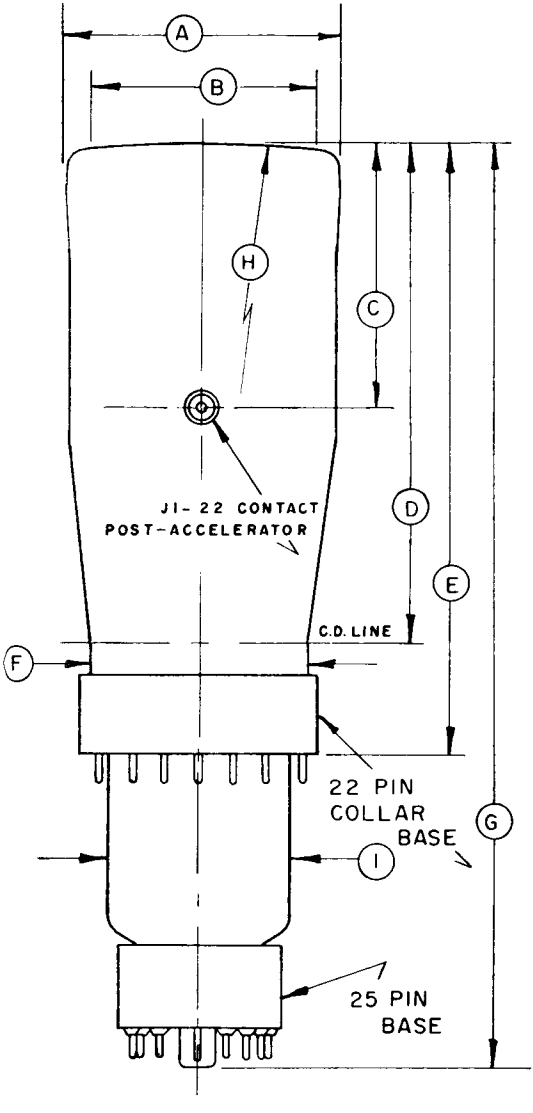
PIN NO.	ELEMENT	BEAM
1	ACCELERATOR	
2	DEFLECTOR D2	A
3	DEFLECTOR D1	A
4	DEFLECTOR D3	A
5	DEFLECTOR D4	A
6	DEFLECTOR D1	B
7	DEFLECTOR D3	B
8	DEFLECTOR D4	B
9	DEFLECTOR D2	B
10	DEFLECTOR D3	C
11	DEFLECTOR D1	C
12	DEFLECTOR D2	C
13	ACCELERATOR	
14	DEFLECTOR D4	C
15	DEFLECTOR D1	D
16	DEFLECTOR D2	D
17	DEFLECTOR D4	D
18	DEFLECTOR D3	D
19	DEFLECTOR D4	E
20	DEFLECTOR D3	E
21	DEFLECTOR D2	E
22	DEFLECTOR D1	E

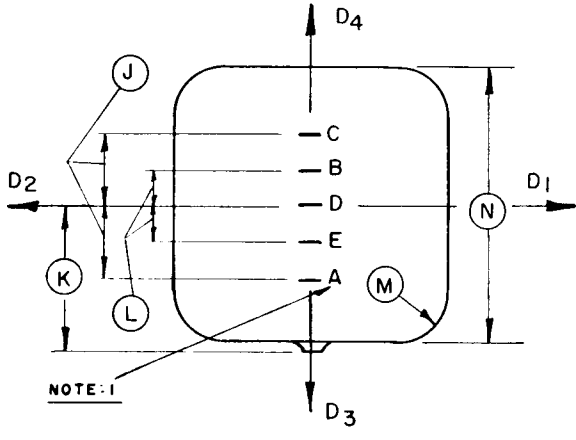
25 PIN BASE

PIN NO	ELEMENT	BEAM
1	FOCUSING ELECTRODE	A
2	HEATER	A
3	HEATER	A
4	FOCUSING ELECTRODE	B
5	HEATER	B
6	HEATER	B
7	FOCUSING ELECTRODE	C
8	HEATER	C
9	HEATER	C
10	FOCUSING ELECTRODE	D
11	HEATER	D
12	HEATER	D
13	FOCUSING ELECTRODE	E
14	HEATER	E
15	HEATER	E
16	GRID NO.1	A
17	CATHODE	A
18	GRID NO.1	B
19	CATHODE	B
20	GRID NO.1	C
21	CATHODE	C
22	GRID NO.1	D
23	CATHODE	D
24	GRID NO.1	E
25	CATHODE	E

8. The deflection in this direction is limited to ±.75 Min. Inches from the undeflected spot position.
9. Measured in accordance with MIL-E-1 specification.
10. Centered about normal undeflected spot positions.
11. The deflection of one beam when balanced D-C Voltages are applied to the deflection electrodes of the other will not be greater than the indicated value.
12. It is recommended that the deflecting electrode circuit resistances be approximately equal.

TYPE 7YP-





FACE VIEW

NOTE: 1 BEAM A CENTERS ON POSITION A, ETC. WITHIN 5/16 RADIUS CIRCLE. INDEX PIN, KEY AND BULB CONTACT EACH ALIGN WITH D3D4 TRACE ± 10.°

REF.	DIMENSIONS
A	5.5 $^{+.03}_{-.06}$ DIA.
B	4.5 MIN. SCREEN
C	5 1/4 ± 1/4
D	10 NOM.
E	12 1/4 ± 1/8
F	4 13/32 ± 3/32 DIA.
G	18 1/2 ± 3/8
H	40 R.
I	3 3/4 ± 1/16 O.D.
J	1 1/2 NOM.
K	2.797 MAX.
L	3/4 NOM.
M	1 R.
N	5.5 $^{+.03}_{-.06}$ DIA.

MULTIPLIER PHOTOTUBE

TYPE 8062

The Du Mont Type 8062 is a 10-stage, flat end window, multiplier phototube with an infrared sensitive photocathode having an average luminous sensitivity of 18 microamperes per lumen. The dark current of the Type 8062 can be reduced considerably by applying dry ice or liquid air to the tube.

The Du Mont Type 8062 is useful in infrared spectroscopy, ranging applications, temperature analysis plus numerous other industrial and scientific applications.

GENERAL CHARACTERISTICS

Electrical Data	Min.	Median	Max.	Units
Spectral response		S-1		
Cathode luminous sensitivity at 210 volts, 0 cycles between cathode and all other electrodes	10	18		μA/Lumen
Anode luminous sensitivity at 105 volts/stage, 0 cycles	3	9		A/Lumen
Cathode sensitivity at maximum response at 210 volts between cathode and all other electrodes		.0016		μA/μW
Anode dark current at 105 volts/stage (25° C)			15	μA
IR Sensitivity [1]		10		%
Current amplification at 105 volts/stage		500,000		
Interelectrode capacitances:				
Anode to all other electrodes		3.3		μμf
Anode to last dynode		1.3		μμf
Wavelength at maximum response		8000		Angstroms
Mechanical Data				
Window dimension, minimum		1		Inch Dia.
Seated height to center of window		4 ± 3/16		Inches
Tube diameter		1 1/4 ± 1/16		Inches
Overall length		4 1/2 ± 3/16		Inches
Base, Small Shell Duodecal (B12-43)				
Mounting position		Any		
Window index of refraction		1.5		

Allen B. Du Mont Laboratories
Divisions of Fairchild Camera and Instrument Corp.
Clifton, N. J.

from JEDEC release #3567, Jan. 15, 1962

DUMONT

MULTIPLIER PHOTOTUBE

TYPE 8062

MAXIMUM RATINGS

	Min.	Median	Max.	Units
Peak cathode current [2]			15	μA
Average anode current [3]			0.1	mA
Average anode dissipation [3]			0.5	W
Supply voltage between anode and cathode (DC or peak AC)			1600	Volts
Supply voltage between last dynode and anode (DC or peak AC)			200	Volts
Supply voltage between cathode and 1st dynode (DC or peak AC)			400	Volts
Focusing electrode voltage [4]				
Ambient temperature			75	°C

NOTES

1. The IR response is measured in the following manner: A tungsten filament lamp operating at 2870° K is used as a light source. The output of the tube is measured using an infrared filter in conjunction with the light source and another reading is obtained without the IR filter. The ratio of the reading with the filter to the reading without the filter x 100 is the percentage IR response. A Corning Filter Type No. 2540, Form Melt 1613 and 2.61 mm thickness is employed as an infrared filter.

2. The cathode current given here is that current at which the response of the cathode current ceases to be a linear function of the light intensity because of cathode resistance. In general, the cathode current must be kept well below this value in order to satisfy the maximum ratings on the anode current.

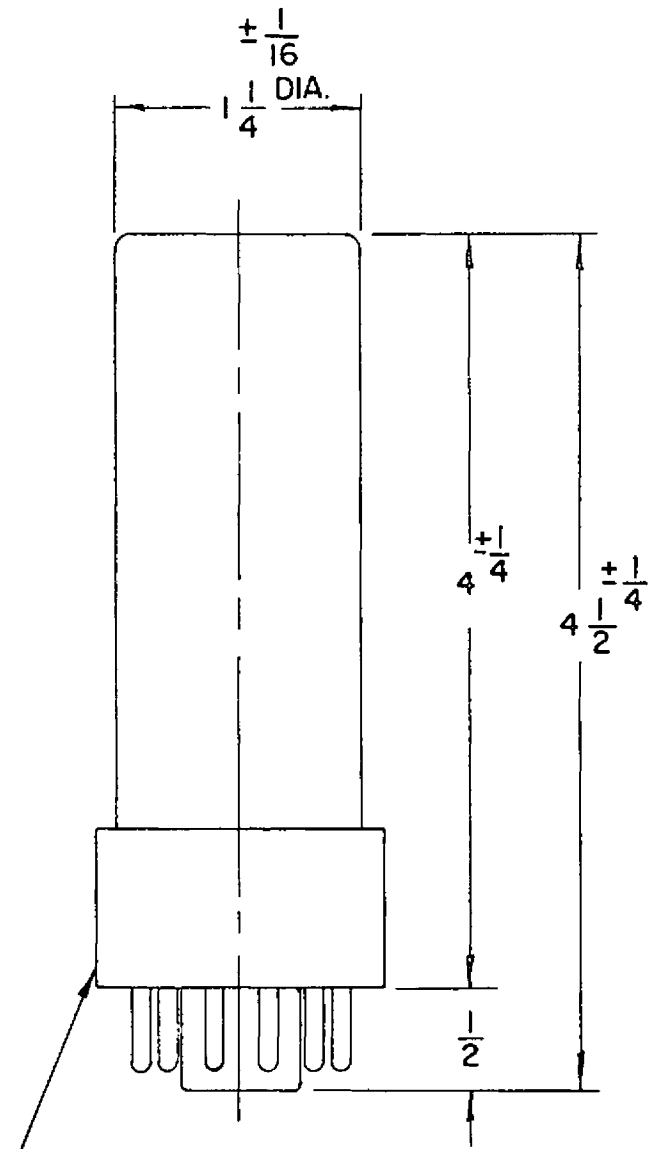
3. Averaged over a 30-second interval maximum.

4. The focusing electrode (shield) voltage should be adjusted between cathode and first dynode potentials for optimum photoelectron collection efficiency. This will vary from tube to tube but will usually be several volts more positive than the cathode.

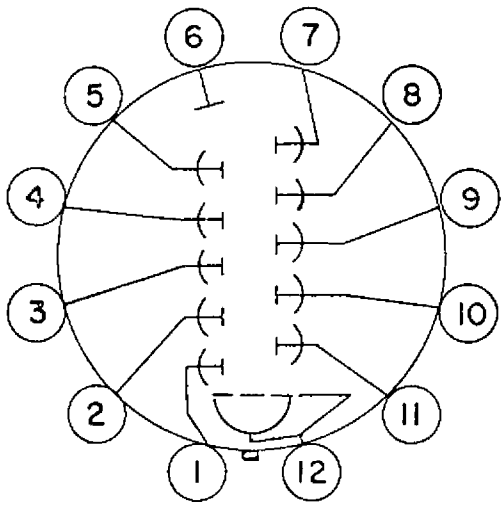
DU MONT

MULTIPLIER PHOTO-TUBE

8062



DIRECTION OF LIGHT: INTO END OF BULB



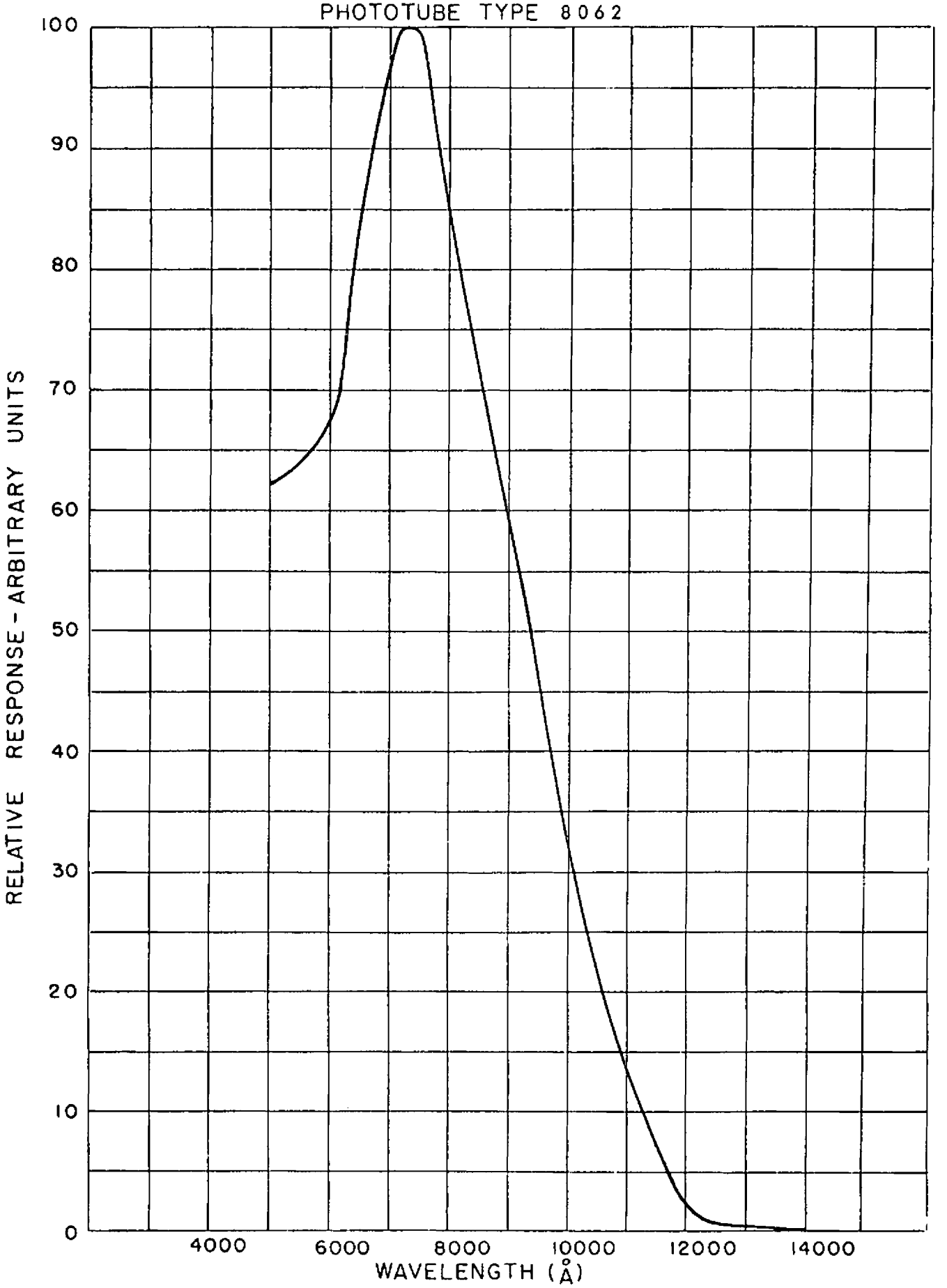
BOTTOM VIEW

PIN NO.	ELEMENT
1	DYNODE NO. 1
2	DYNODE NO. 3
3	DYNODE NO. 5
4	DYNODE NO. 7
5	DYNODE NO. 9
6	ANODE
7	DYNODE NO. 10
8	DYNODE NO. 8
9	DYNODE NO. 6
10	DYNODE NO. 4
11	DYNODE NO. 2
12	CATHODE AND FOCUSING ELECTRODE (SHIELD)

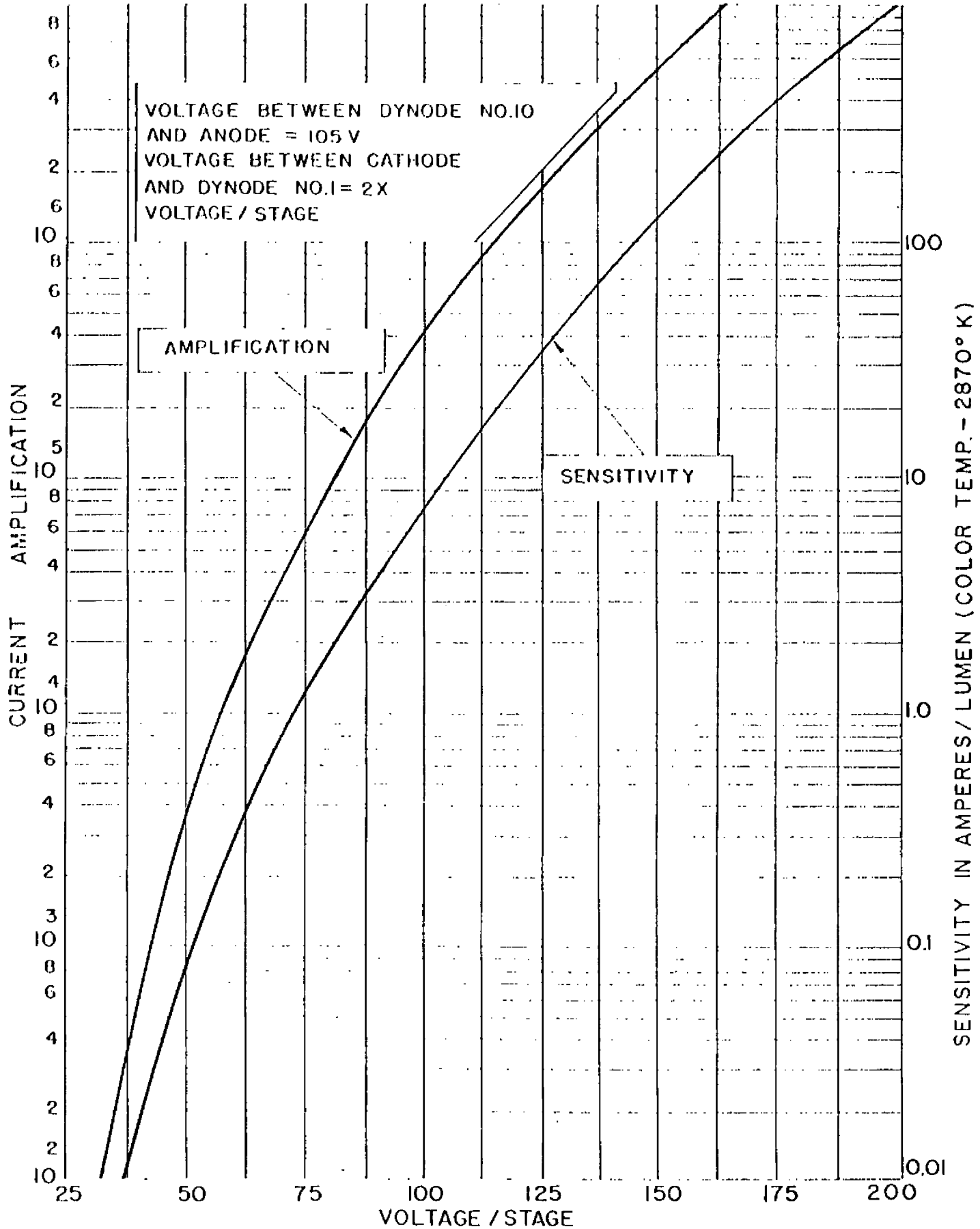
Allen B. Du Mont Laboratories, Inc.
Division of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

TD4408-A-4
4-27-61

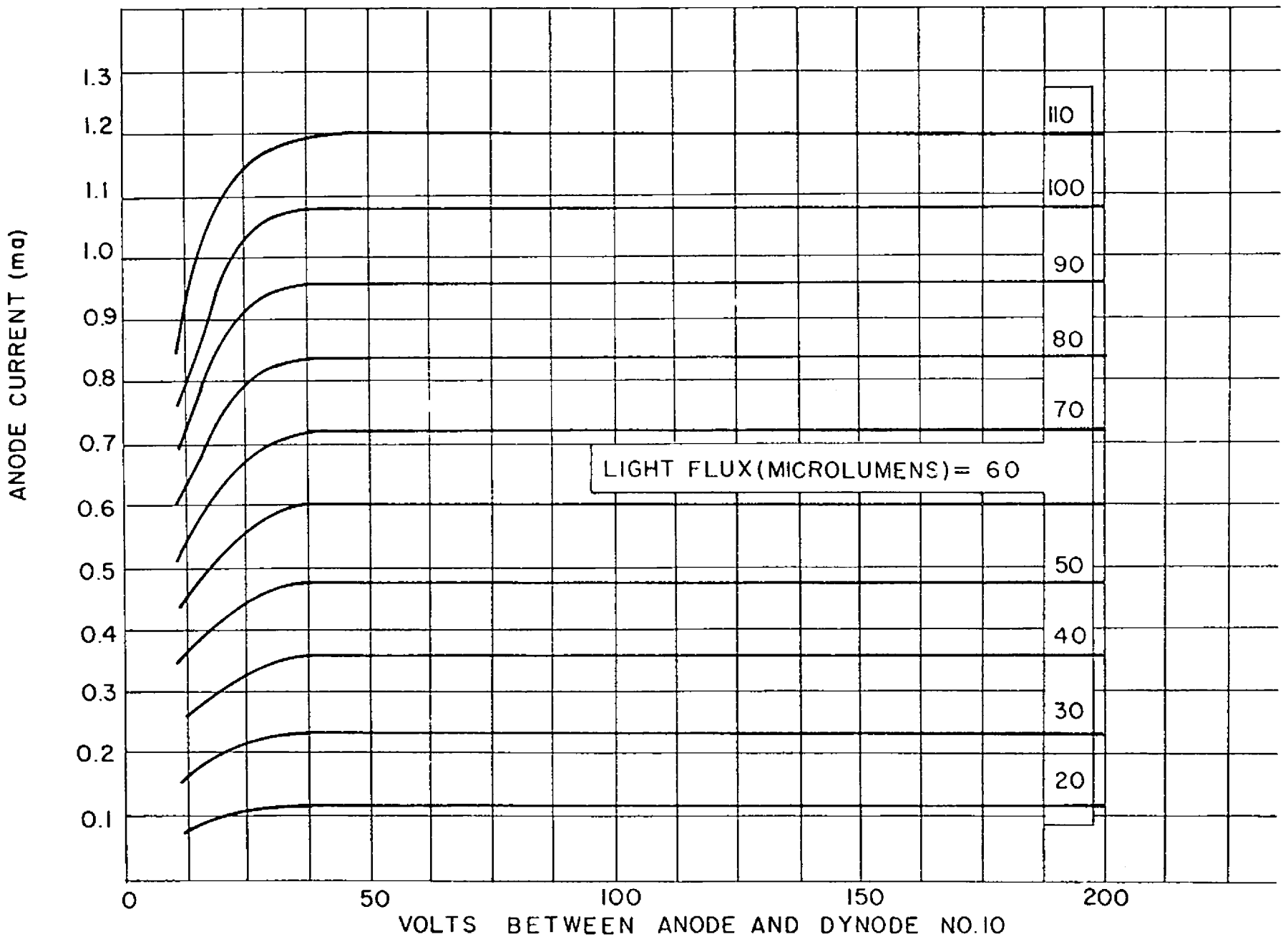
SPECTRAL RESPONSE – TYPICAL DUMONT INFRARED MULTIPLIER PHOTOTUBE TYPE 8062



AVERAGE MULTIPLIER CHARACTERISTICS DUMONT TYPE 8062



AVERAGE ANODE CHARACTERISTICS OF DUMONT TYPE 8062



DU MONT

DIRECT VIEW STORATRON TUBE

TYPE 8124

The Du Mont Type 8124 is a ten (10) inch nominal diameter Direct View Storatron Tube with a useful screen diameter of eight (8) inches. Three glass rodded electron guns are employed: two write guns and a view gun mounted on one sturdy bracket system and placed in a centrally located, three and three-quarter (3 3/4) inch diameter neck.

The write guns are identical high current, high velocity, electrostatically deflected and focused guns. Their modulated beams "write" the information into the storage target as a series of electrostatically-charged areas.

The view gun is a high current, low velocity gun which produces a "flood" of electrons which transfers the stored written information to the phosphor screen to be viewed.

The 8124 features 0 (zero) deflection plate current on both write guns and consequently a deflection linearity comparable to standard cathode-ray tubes. Other features are high light output, fast writing speed for television applications and short erase time. Although both write guns are mounted off-axis, built-in corrections maintain accurate raster orthogonality and high tracking accuracy.

The tube base is a twenty-five (25) pin phenolic base. Connections to the target assembly and screen are made through four (4) contacts in the funnel.

TYPICAL OPERATING CONDITIONS

	Typical Current	Typical Voltage	Maximum Voltage
View Gun			
Heater	600 MA	6.3 ± 5%	
Cathode	2.5 MA	0.0	0.0
Grid No. 1		0 to -100	-200
*Accelerator	250 μA (Note 1)	175	250
Writing Guns A and B			
Heater	600 MA	6.3 ± 5%	
Cathode		-2500	-3000
**Grid No. 1		-80 to -120	-200
*Accelerator		-105	
**Focusing Electrode		520 to 750	2500
Deflection Factors	0	28 to 40 Volts DC/ Inch/KV	
*D.P. Reference Voltage		-105	

* With respect to view gun cathode

** With respect to writing gun cathode

DE-6212 - 3
1/30/62

Allen B. Du Mont Laboratories
Divisions of Fairchild Camera and Instrument Corp.
Clifton, N. J.

FORM 8008

from JEDEC release #3724, May 14, 1962

DIRECT VIEW STORATRON TUBE

TYPE 8124

TYPICAL OPERATING CONDITIONS (Continued)

Phosphor P20 (can be supplied with P4 phosphor for T.V. applications)

Weight Approximately 12 Pounds

	Typical Voltage	Typical Current (ma)	Maximum Volts	Minimum Volts
Target Assembly				
Screen	10,000	.5	15,000	0
Backing Electrode	0 to 25	0	30	0
Collector Electrode	200	2.5	250	0
Collimating Electrode, E	15 to 50	5 to 50 μA	100	0
Collimating Electrode, D	30 to 65	5 to 50 μA	100	0

GENERAL CHARACTERISTICS

Write Guns Spot Position	Center of undeflected, focused spot of each gun will fall within a .5 inch radius at center of tube face.
Deflection Linearity (Note 2)	1%
Raster Orthogonality (Note 3)	
Cathode Heating Time	30 seconds minimum before applying other voltages
Peak Heater to Cathode Voltage	± 200 volts
Temperature Range:	
Operating	0° C to 50° C
Non-operating	-60° C to 80° C
Humidity Range (Non-operating)	Maximum of 95% R. H.

Allen B. Du Mont Laboratories
Divisions of Fairchild Camera and Instrument Corp.
Clifton, N. J.

DIRECT VIEW STORATRON TUBE

TYPE 8124

GENERAL CHARACTERISTICS (Continued)

Altitude:		
Operating		10,000 feet
Non-Operating		50,000 feet
Vibration (Non-operating)		.0150 total displacement from 10 to 50 cps.
Shock (Non-operating) (Packaged)		20 g
Display Brightness	Note 4)	600 foot lamberts at 10 KV
Erasing Uniformity	Note 5)	Maximum of .5
Storage Time	Note 6)	Minimum of 3 minutes
Erase Time	Note 7)	100 milliseconds maximum
Writing Speed	Note 8)	Minimum of 200,000 inches per second
Resolution	Note 8)	Minimum of 40 lines per inch
Brightness Levels	Note 9)	Minimum of 6 levels of display brightness

OPERATING CONSIDERATIONS

View Gun Operation

1. Apply 6.3 volts to the view gun heater and allow approximately thirty (30) seconds for warm-up.

2. Establish the following potentials: Accelerator: +175 volts
   Collector: +200 volts
   Backing Electrode: +20 volts
   Screen: +10,000 volts

3. Adjust the flood gun bias and collimators "E" and "D" within the range of voltages as recommended under "Typical Operating Conditions" to provide a uniform display brightness covering the useful screen area.

4. The most precise collimation adjustment can be made when the backing electrode voltage is adjusted so as to effect near visual extinction of the display brightness.

Allen B. Du Mont Laboratories
Divisions of Fairchild Camera and Instrument Corp.
Clifton, N. J.

DUMONT

DIRECT VIEW STORATRON TUBE

TYPE 8124

OPERATING CONSIDERATIONS (View Gun Operation) (Continued)

5. To prevent possible damage to the tube, allow the viewing gun beam current to reach its normal operating value before turning on the writing gun. The viewing beam should be kept on until after the writing beam is turned off.

Initial Writing Gun Adjustment

1. Maintain sufficient negative bias to cut off the beam currents of both guns.
2. Adjust the backing electrode to plus (+) eight (8) volts.
3. Apply erasing pulses of approximately the following characteristics:
   a) A repetition rate of 1,000 cycles per second.
   b) A duty cycle of five percent (5%).
   c) An amplitude of twelve (12) volts.
4. Lower the screen potential to 1.5 KV.
5. Decrease the writing gun bias on "A" gun until the write gun display is just visible. The beam current should be kept as low as possible during these adjustments to prevent damage to the tube.
6. Vary focus potential to attain optimum focus.
7. Cut off "A" gun and apply the same procedure to adjust "B" gun.
8. Centering voltages may be applied while adjusting beam "A" or "B" to position the spot or display to the desired location on the screen.
9. To obtain optimum focus over the display area of the screen, it may be necessary to apply small static astigmatism correction voltages to the deflection plates either positive or negative with respect to the accelerator to each set of deflection plates. Refocus and repeat the above procedure several times if necessary.

Allen B. Du Mont Laboratories
Divisions of Fairchild Camera and Instrument Corp.
Clifton, N. J.

FORM 809R

DUMONT

DIRECT VIEW STORATRON TUBE

TYPE 8124

OPERATING CONSIDERATIONS (Continued)

Writing Information Into Storage

1. Restore the screen potential to ten (10) KV.
2. Remove the erase pulses and adjust the backing electrode bias to present a display as described in Note 4-a and 4-b.
3. Decrease the writing gun bias while applying modulation voltages to either or both guns until the display appears.
4. Cut off the write gun or guns.
5. The information is now stored.

Erasure

1. Manual erasure: raise the backing electrode potential to plus twenty (+20) volts for a short period of time and restore it to the display brightness cut-off point.
2. Continuous erasure: apply erase pulses as outlined in Note 4.

NOTES

1. This current will rise by reflection from the backing electrode when it is cut off.
2. Deflection linearity (deflection factor uniformity): the deflection factor (for both D1D2 and D3D4 plate pairs, separately) for a deflection of 75% of useful scan will not differ from the deflection factor for a deflection at 25% of the useful scan by more than the indicated value.
3. Raster orthogonality: all portions of the raster pattern from either gun, adjusted so the widest points just touch the sides of a 5.550-inch square, will fall within the area bounded by the 5.550-inch square and an inscribed 5.450-inch square.

DIRECT VIEW STORATRON TUBE

TYPE 8124

NOTES
(Continued)

4. Display brightness should be measured with the entire screen illuminated under the following conditions:

   a) Adjust the ambient illumination so that two (2) foot lamberts plus or minus (±) ten percent (10%) is reflected from the phosphor on the face of the tube.

   b) The backing electrode should be adjusted from zero (0) to some positive voltage with respect to the flood gun cathode until any further increase would result in an increase in the measured screen brightness.

   c) With scan adjusted to prevent screen damage, bias one writing gun grid to slightly above cut-off potential while biasing the other gun to cut-off. Overscan the entire display area with the writing gun beam while moving the raster position with the centering controls so as to completely charge the entire display area to saturation as uniformly as possible.

   d) Cut the writing beam current off.

   e) Measure the display brightness with a Spectro-Spot Foot Lambert Photometer (Foto Research Corp., Model U.P., or equivalent). The brightness shall be 600 foot lamberts or greater.

5. Set up the tube using the procedure outlined under Note 4, modifying section "b" as follows:

   a) Set the backing electrode to plus 12 (+12) volts.

   b) Apply positive rectangular pulses to the backing electrode having an amplitude equal to the B. E. modulation range at a repetition rate of between 100 and 1,000 cycles per second and a duty cycle of five (5) to ten (10) percent so as to obtain complete erasure in approximately ten (10) seconds.

   c) Measure time (t1) from start of erasing to the instant at which any area within the minimum useful viewing diameter is reduced to ambient background-brightness level. Record time (t2) from start of erasing to the instant at which the entire area within the minimum useful viewing diameter area is reduced to background brightness level. The erasing-uniformity factor is defined as $(t2 - t1)/t2$.

DIRECT VIEW STORATRON TUBE

TYPE 8124

NOTES (Continued)

6. Storage time is defined as the time required for background brightness to increase at the center of the display from ambient light level to thirty percent (30%) of the maximum light output as defined in Note 4.

7. Shortest erase time is defined as the time required to erase a signal of fifty (50) foot lamberts highlight brightness to one (1) foot lambert above ambient light level under the following conditions:

   a) Set backing electrode potential as required in Note 4b.

   b) Write into storage, a fifty (50) line raster one (1) inch high by two (2) inches wide to a brightness of fifty (50) foot lamberts.

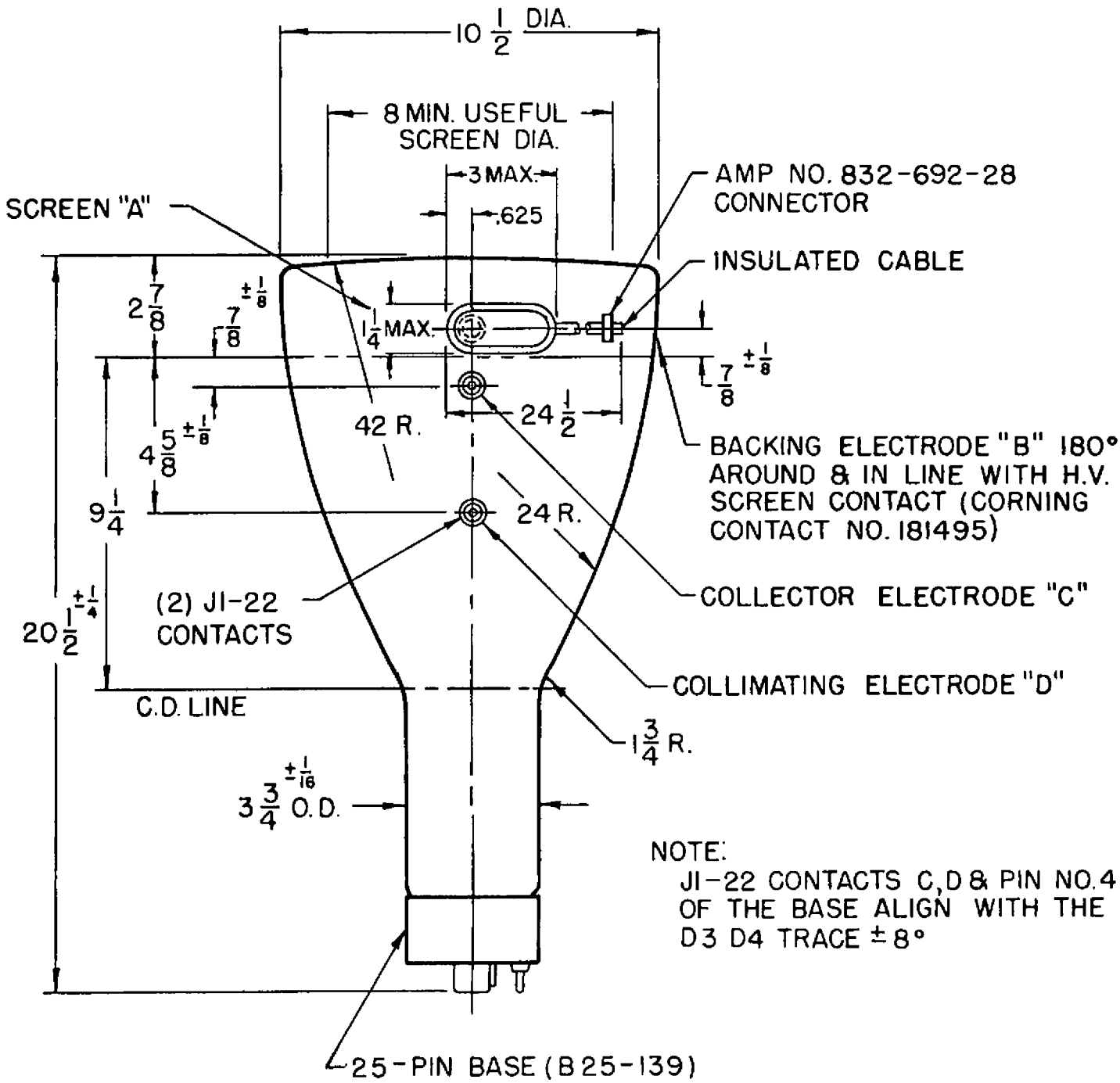
   c) Apply rectangular pulse or pulses with an amplitude equal to the modulation range of the backing electrode, the duration of whose sum is equal to a maximum of 100 milliseconds. The brightness at the end of this period should be not more than one (1) foot lambert above ambient light level.

8. Write a fifty (50) line raster at a writing rate of 200,000 inches per second to a display brightness of fifty (50) foot lamberts. A minimum resolution of forty (40) lines per inch by the shrinking raster method shall result. To write at a writing speed other than 200,000 inches per second, adjust beam current for maximum resolution.

9. Brightness levels may be determined visually by employing six equal steps of a staircase waveform applied to a writing gun control grid. The brightness variation of successive steps shall produce six (6) steps of display brightness.

DUMONT

DIRECT VIEW STORAGE TUBE
TYPE 8124

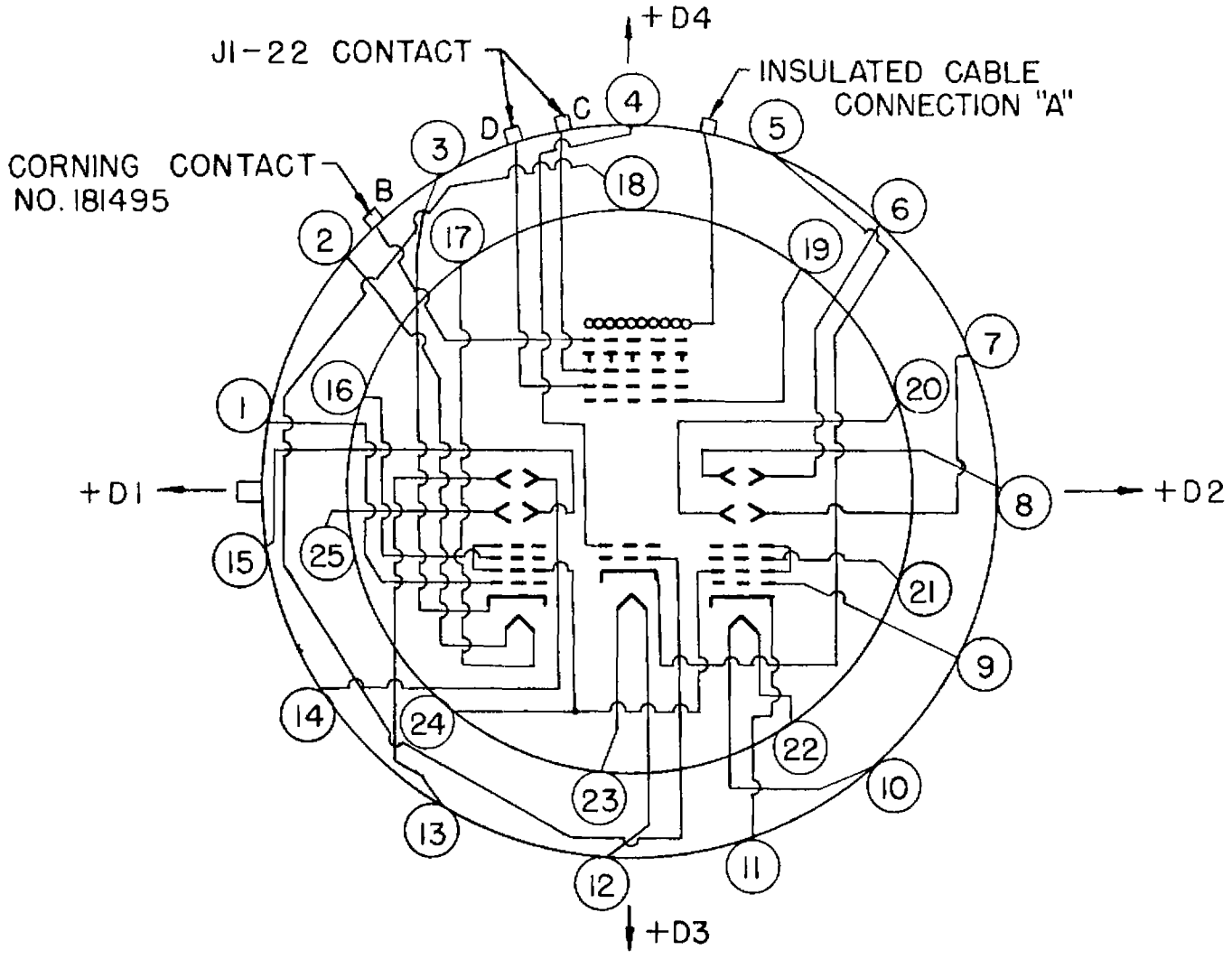


Allen B. Du Mont Laboratories, Inc.
Division of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

DE-6212-2
2-23-62
FORM 609 -M1-5-60-SH

DUMONT

DIRECT VIEW STORAGE TUBE
TYPE 8124



WRITING GUN A

PIN NO.	ELEMENT
1	GRID NO. 1
2	HEATER
3	CATHODE
13	DEFL. ELECT. D2
14	DEFL. ELECT. D1
15	DEFL. ELECT. D4
16	FOCUSING ELECT.
17	HEATER
24	ACCELERATOR
25	DEFL. ELECT. D3

VIEWING GUN

PIN NO.	ELEMENT
4	ACCELERATOR
5	CATHODE
12	HEATER
18	GRID NO. 1
23	HEATER

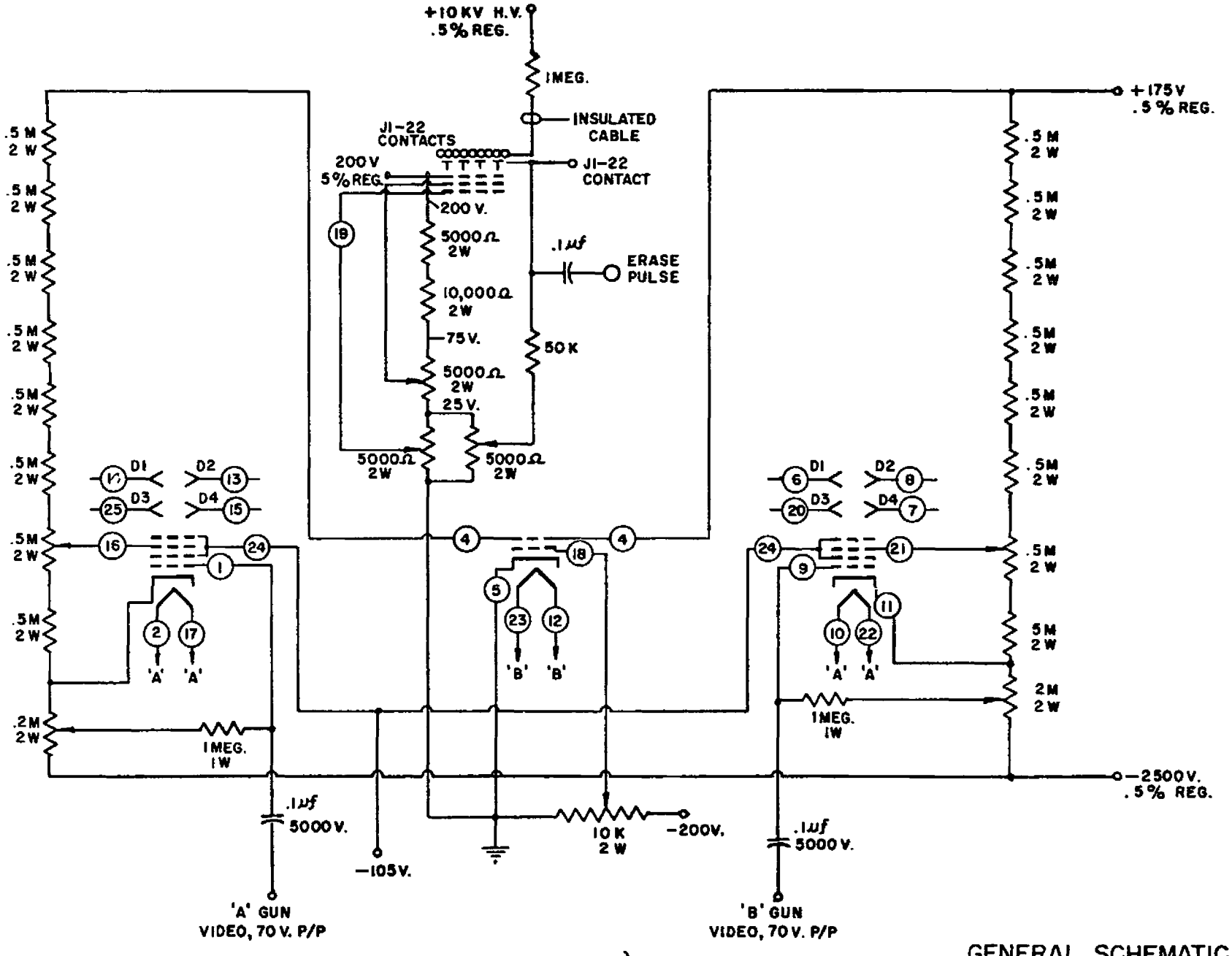
WRITING GUN B

PIN NO.	ELEMENT
6	DEFL. ELECT. D1
7	DEFL. ELECT. D4
8	DEFL. ELECT. D2
9	GRID NO. 1
10	HEATER
11	CATHODE
19	COLLIMATING ELECT.
20	DEFL. ELECT. D3
21	FOCUSING ELECT.
22	HEATER
24	ACCELERATOR

NOTE:
INSULATED CABLE - SCREEN CONNECTOR.

Allen B. Du Mont Laboratories, Inc.
Division of Fairchild Camera and Instrument Corp.
Clifton, New Jersey

DE-6212-2
2-23-62
FORM 809 -M1-5-60-SH



'A' 'A' REQUIRE 5000 V. INSULATION PRI. TO SEC. OF TRANSFORMER } 1 TRANSFORMER

'B' 'B' 250V. INSULATION PRI. TO SEC. - 1 TRANSFORMER

GENERAL SCHEMATIC DIRECT VIEW STORATRON 8124

DE-6212

Sheet 10 of 10

from JEDEC release
#2666, Dec. 14, 1959

DUMONT

CATHODE-RAY TUBE

8MP-

The 8MP- is a small, electrostatic focus and magnetic deflection, cathode-ray tube, using an 8-inch, rectangular, glass envelope. It is designed particularly for monitor applications. The electron gun features a low-voltage focus system, and is of the straight-gun type, designed to eliminate the need for an ion trap magnet. An external conductive coating is provided to serve as a filter capacitor. The screen is aluminized for high light output and increased contrast.

GENERAL CHARACTERISTICS

Electrical Data

Focusing Method	Electrostatic	
Deflecting Method	Magnetic	
Deflection Angle, Approximately		
Horizontal	85	Degrees
Vertical	68	Degrees
Diagonal	90	Degrees
Direct Interelectrode Capacitances, Approx.		
Cathode to all other electrodes	5	μμf
Grid No. 1 to all other electrodes	6	μμf
External Conductive Coating to Accelerator	350	Max. μμf
	250	Min. μμf

Optical Data

Phosphor Number	18	4	
Fluorescent Color	White	White	
Persistence	Medium	Short	
Faceplate		Spherical	
Light Transmission at Center, Approx.		80	Percent

Mechanical Data

Overall Length	$9\ 15/16 \pm 5/16$	Inches
Greatest Dimensions of Bulb		
Diagonal	$8\ 7/16\ ^{+\ 1/16}_{-\ 1/32}$	Inches
Width	$7\ 7/8\ ^{+\ 1/16}_{-\ 1/32}$	Inches
Height	$6\ 1/16\ ^{+\ 1/16}_{-\ 1/32}$	Inches

DE-4710 - 5
11/3/59

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

DUMONT

CATHODE-RAY TUBE

8MP-

GENERAL CHARACTERISTICS (MECHANICAL DATA) (Continued)

Minimum Useful Screen Dimensions		
Diagonal	7 13/16	Inches
Width	7 3/16	Inches
Height	5 3/8	Inches
Area	35 1/2	Sq. Inches
Neck Length	6 ± 3/16	Inches
Bulb Number	J67 1/2	
Bulb Contact	J1-21	
Base	B6-63	
Basing	12L	
Bulb Contact Alignment		
J1-21 Contact aligns with Pin Position No. 6	± 30	Degrees
Weight	2 1/2	Pounds (Approx.)

RATINGS (ABSOLUTE MAXIMUM VALUES)

Heater Voltage	6.3	Volts
Heater Current at 6.3 Volts	0.6 ± 10%	Ampere
Accelerator Voltage	18,000	Max. Volts DC
Accelerator Input	6	Max. Watts
Focusing Electrode Voltage	-550 to + 1,100	Max. Volts DC
Grid No. 2 Voltage	550	Max. Volts DC
Grid No. 1 Voltage		
Negative Bias Value	155	Max. Volts DC
Negative Peak Value	220	Max. Volts
Positive Bias Value	0	Max. Volts DC
Positive Peak Value	2	Max. Volts
Peak Heater-Cathode Voltage		
Heater Negative with respect to cathode	180	Max. Volts
Heater Positive with respect to cathode	180	Max. Volts

TYPICAL OPERATING CONDITIONS

Accelerator Voltage	15,000	Volts DC
Focusing Electrode Voltage [1]	0 to 450	Volts DC
Focusing Electrode Current	-25 to +25	μA
Grid No. 2 Voltage	300	Volts DC
Grid No. 1 Voltage [2]	-28 to -72	Volts DC
Resolution at 100 μA [3]	600	Lines Min.

DUMONT

CATHODE-RAY TUBE

8MP-

MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance	1.5	Max. Megohms

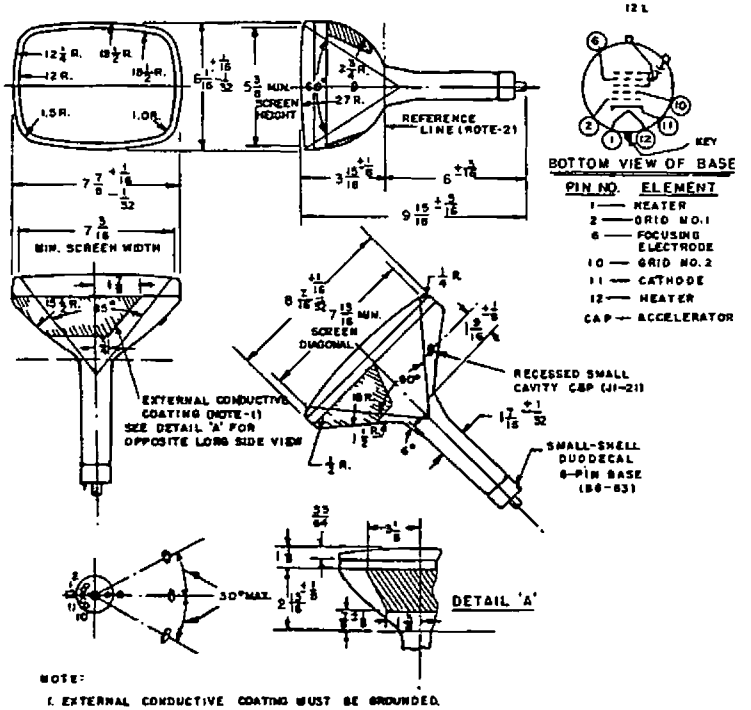
NOTES

1. With the combined Grid No. 1 bias voltage and video-signal voltage adjusted to give an accelerator current of 100 microamperes on a 7 3/16 x 5 3/8-inch picture size.
2. Visual extinction of focused 7 3/16 x 5 3/8-inch raster.
3. Measured at the center of the screen.

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

DUMONT

8 MP-
CATHODE-RAY TUBE-

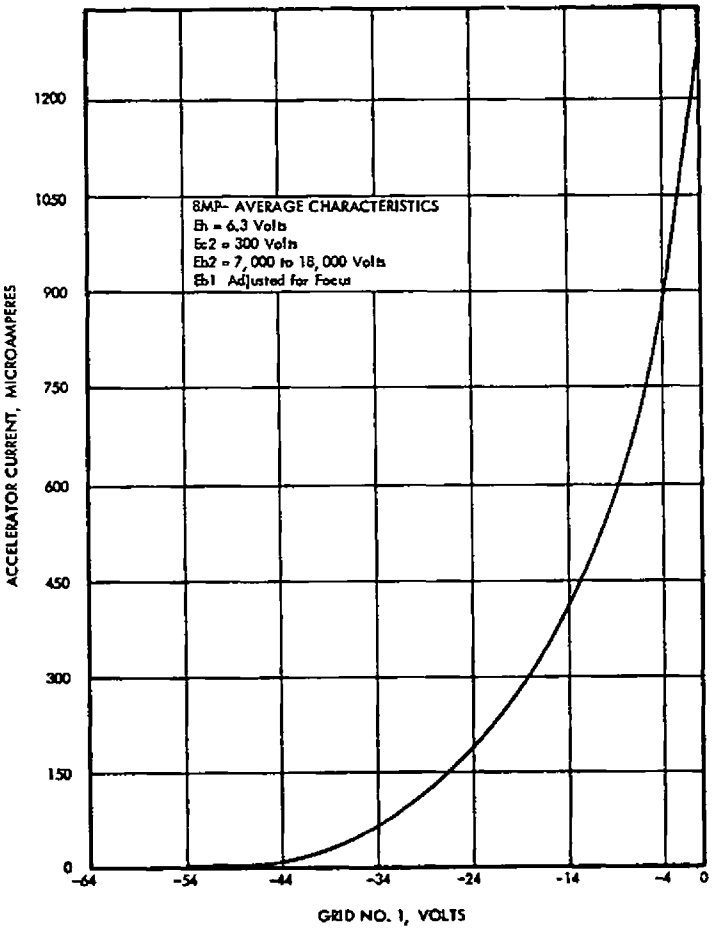


NOTE:

1. EXTERNAL CONDUCTIVE COATING MUST BE GROUNDED.
2. WHEN TUBE NECK IS INSERTED THROUGH REFERENCE LINE GAUGE JEDEC NO. 8-118 REFERENCE LINE WILL BE DETERMINED BY PLANE C-C' WHEN GAUGE IS RESTING ON FUNNEL.

Allen B. Du Mont Laboratories, Inc.
Clifton, New Jersey

2JP-2787-A-3
10-30-50



DUMONT

Type K-1211 Photo-Multiplier Tube

TENTATIVE

The Du Mont Type K-1211 is a 3/4 inch diameter, 6 stage, photo-multiplier tube of the end-window type.

GENERAL CHARACTERISTICS

	Min.	Avg.	Max.
Electrical			
Spectral response		S4	
Cathode sensitivity		50	uA/lumen
Cathode radiant sensitivity at maximum response		0.056	uA/uW
Wavelength at maximum response	3500	4000	4500 Angstroms
Anode sensitivity : 150 V/stage (Note 1)		150	ma/lumen
Gain : 150 V/stage (Note 1)		3000	
Anode dark current at 150 V/stage		1.0	uA
Mechanical			
Window dimension	1/2		in. diam.
Seated height		2 3/16 ± 1/16	in.
Tube diameter		3/4 ± 1/32	in.
Overall length			2 3/4 in.
Base Type	Du Mont 9 pin miniature		
Mounting position	Any		

MAXIMUM RATINGS

Peak cathode current (Note 2)	10 uA
Average anode current (Note 3)	1 ma
Peak anode current	5 ma
Average anode dissipation (Note 3)	0.5 W
Peak anode dissipation	2.0 W
Supply voltage between anode and cathode (DC or peak AC)	1300 V
Ambient temperature	75° C

NOTES

1. Voltage between photo-cathode and dynode no. 1 is 300 volts.

2. The cathode current given here is that current at which the response of the cathode current ceases to be a linear function of the light intensity because of cathode resistance. In general, the cathode current must be kept well below this value in order to satisfy the maximum ratings on the anode current.

3. Averaged over a 30 second interval maximum.

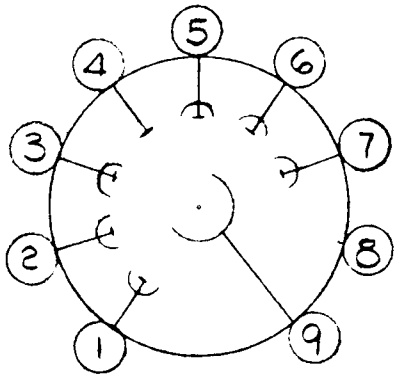
cb

TL-1180
Dec. 4, 1953

DUMONT

PHOTO-MULTIPLIER
TUBE TYPE K 1211

9-PIN MINATURE STEM

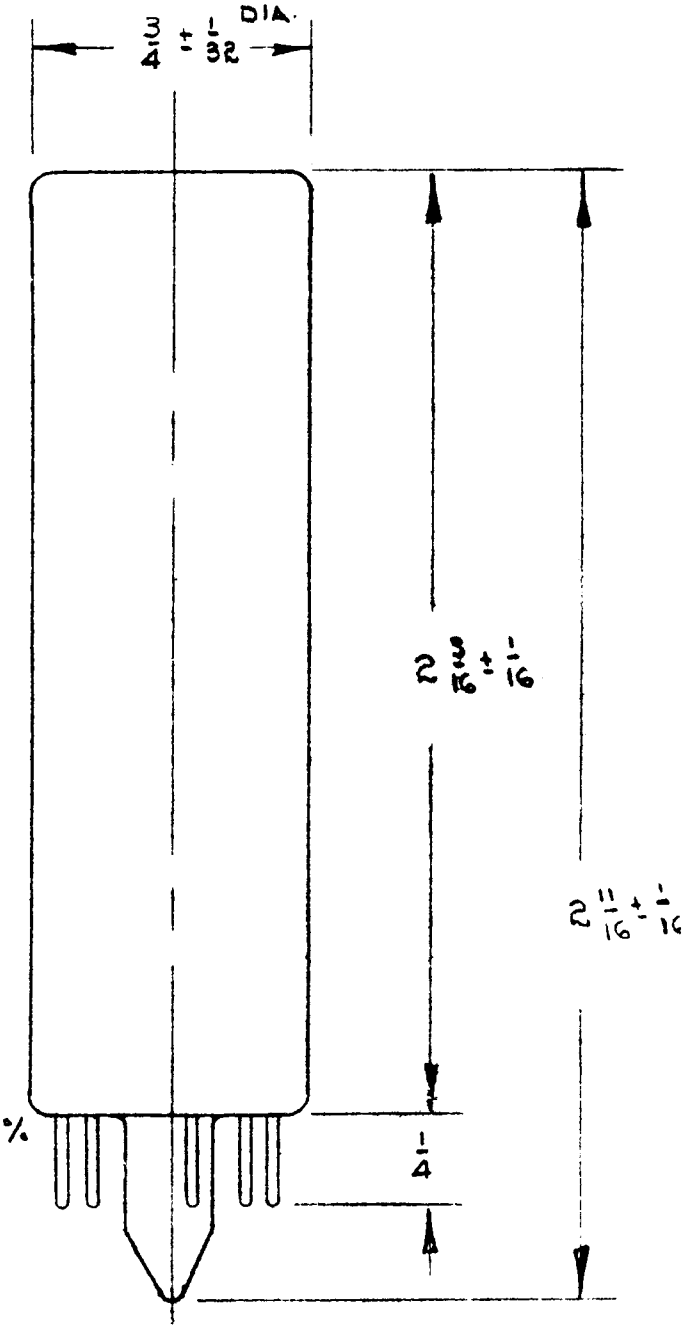


TENTATIVE

DIRECTION OF LIGHT: INTO END OF BULB

BOTTOM VIEW

1	DYNODE #1
2	DYNODE #3
3	DYNODE #5
4	ANODE NO1
5	DYNODE #6
6	DYNODE #4
7	DYNODE #2
8	INTERNAL CONNECTION
9	CATHODE



150 VOLTS - DYNODES TO CATHODE
SENSITIVITY - CLEAR ___ μa./L 51/3 ___ %

CATHODE TO D1 - 212 VOLTS: ANODE 106 VOLTS MULTIPLIER GAIN AT 150 VOLTS / STAGE GAIN. ___ ___ ___

TUBE NO. ___ ___ ___ ___

Allen B. Du Mont Laboratories, Inc.
Passaic, New Jersey