

4QP- CATHODE RAY TUBE

The E.T.C. 4QP- is a rectangular 3-1/4 inches by 2-3/4 inches flat face, electrostatic focus and deflection cathode ray tube. The 4QP- is designed for a minimum useful scan of 2-1/2 inches horizontal and 2-1/4 inches vertically and a high light output with very low deflection factors. These design features permit the use of this tube in compact transistorized equipment.

This tube also features a linear Post-Accelerator and a Geometry adjust electrode for maximum deflection uniformity and minimum pattern distortion.

GENERAL CHARACTERISTICS

Electrical Data

Heater Voltage	6.3 $\pm$ 10% Volts			
Heater Current	0.6 $\pm$ 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	Max.			
Cathode to all other electrodes	5.3 uuf			
Grid #1 to all other electrodes	6.8 uuf			
D1 to D2	2.8 uuf			
D3 to D4	1.0 uuf			
D1 to all	6.3 uuf			
D2 to all	6.7 uuf			
D3 to all	3.8 uuf			
D4 to all	3.8 uuf			

Mechanical Data

Overall Length	13-1/2 $\pm$ 1/4 Inches
Greatest Bulb Diameter (Diagonal)	3.765 Inches
Minimum Useful Screen (Rounded Corner)	2-13/16 x 2-5/16 Inches
Bulb Contacts (Deflection Electrode)	Pins
Bulb Contact	J1-22
Base (Small shell, 12 Pin Duodecal)	Special
Basing	Special

Base Alignment

D3D4 trace aligns with Pin #4

Positive voltage on D1 deflects the beam approx. towards Pin #4

Positive voltage on D3 deflects the beam approx. towards Pin #1

CATHODE RAY TUBE

Bulb Contact Alignment

J1-22 contact aligns with D1D2 trace ± 10 Degrees
 J1-22 contact on same side as #4

Trace Alignment

Angle between D1D2 and D3D4 trace 90 ± 1 Degrees
 Each Trace aligns with bulb wall $\pm .5$ Degrees

MAXIMUM RATINGS = Design Center Values

Post-Accelerator Voltage	3400 Max. Volts D-C
Accelerator Voltage	650 Max. Volts D-C
Ratio Post-Accelerator Voltage to Accelerator Voltage	5.2 Max.
Focusing Voltage	100 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 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	200 Max. Volts

TYPICAL OPERATING CONDITIONS

For Post-Accelerator Voltage of	3000 Volts D-C
For Accelerator Voltage of	575 to 625 Volts D-C
Post-Accelerator Current (Note 1)	40 uAdc
Focusing Voltage	40 - 160 Volts D-C
Grid #1 Voltage (Note 2)	30 - 40 - 50 Volts D-C
Modulation Factor (Note 3) at 15uA	35 Volts Max.
Geometry Adjust (Note 5)	575 to 625 Volts D-C
Deflection Plate Shield Voltage (3D4) (Note 6)	550 to 600 Volts D-C
Deflection Factors (No Pattern Correction)	
D1 and D2	25.0 to 30.0 Volts D-C/Inch
D3 and D4	12.5 to 15.5 Volts D-C/Inch
Spot Position (Note 4) within 3/16 Inch Square	
Minimum Useful Scan	D1D2 = 2-1/2 3D4 = 2-1/4
Light Output at 10uA	5 Ft. L. Min.

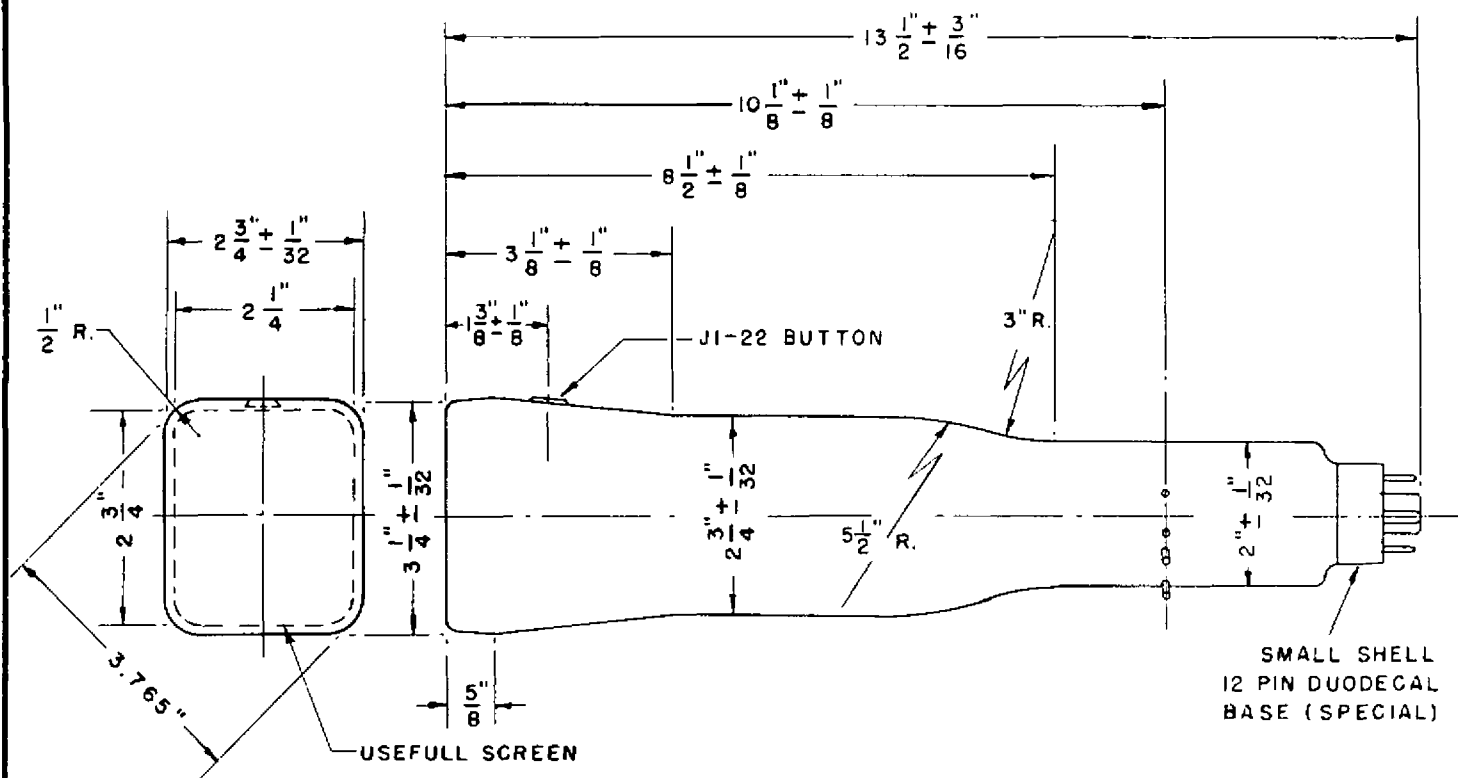
CIRCUIT DESIGN VALUES

Focusing Current for any operating condition	-15 to ± 10 Microamperes
Grid #1 Circuit Resistance	1.5 Max. Megohms
Resistance in any deflecting-electrode circuit (Note 7)	1 Megohms

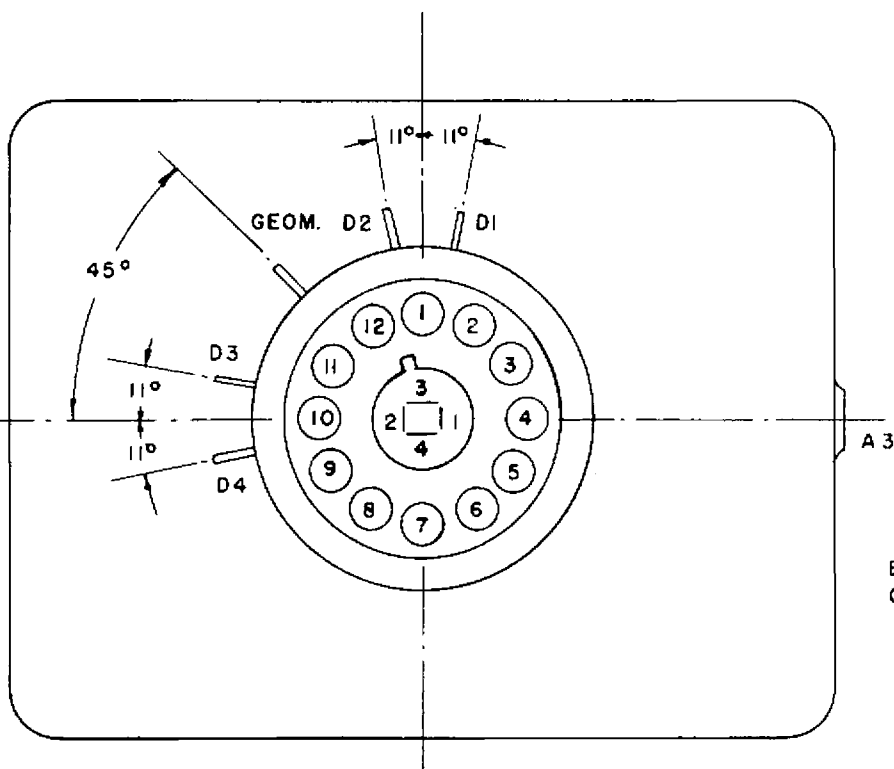
CATHODE RAY TUBE

NOTES

- 1 - Measured with the beam cutoff. All readings of beam current shall be in addition to the readings 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 uAdc.
- 4 - Centered with respect to the tube face and with the tube shielded.
- 5 - The Post-Accelerator spiral band lower end and the Geometry Adjust are connected internally. By voltage potential adjustment on this electrode combination, pin cushion and barrel distortions are minimized.
- 6 - Normally operated at accelerator potential linearity improvements can be obtained by proper adjustment of deflection plate shield voltage which controls the edge effect of the 304 plate field.
- 7 - It is recommended that the deflection electrode circuit resistance be approximately equal.



PIN NO.	ELEMENT
1	HEATER
2	CATHODE
3	GRID
4	N.C.
5	A1
6	N.C.
7	A2
8	N.C.
9	V SHIELD
10	N.C.
11	N.C.
12	HEATER



BOTTOM VIEW OF
BASE AND NECK
CONNECTIONS.

NOTE:

+102 TOWARDS PIN #4
+3D4 TOWARDS PIN #1



ELECTRONIC TUBE CORPORATION

PHILADELPHIA, PA.

TITLE

4QP TUBE OUTLINE DRAWING

TOLERANCES

DEC.

FRAC.

ANG.

ENG. *R.S. Martin*

DATE 9-14-60

APP.

DR. J. E. G. JR.

SCALE *1/8"*

DRAWING NO.

A 3619

CKD. *1/8 Warren*

REV. 338-1-4-61.