

TYPE 5CBP

Page 1 of 6

Cathode-Ray Tube

Type 5CBP_ is a 5-inch flat-faced cathode ray tube with electrostatic focus and deflection for use in oscilloscopes. A primary feature of this tube is a helical resistance winding extending from near the horizontal deflection plates to the face of the tube. This construction insures a smooth voltage gradient over the region of post-deflection acceleration. The tube is designed to combine high sensitivity of both the vertical and horizontal deflection plates with accurate axial alignment and freedom from pattern distortion.

ELECTRICAL DATA

	Focusing method			Electrostatic			
	Deflecting method			Ele	Electrostatic		
	Direct Interelectrode Capacitance, Approximate:						
	Cathode to all other electrodes			4.7	4.7 μμf		
	Grid #1 to all other electrodes			7.0	7.0 μμf		
	Dl to D2			1.9	1.9 μμf		
	D3 to D4			1.4	1.4 μμf		
	Dl to all other electrodes except D2			3.6	3.6 µµf		
	D2 to all other electrodes except Di			3.6 µµf			
	D3 to all other electrodes except D4			3.2	3.2 µµf		
	D4 to all other electrodes except D3			3.1	3.1 μμf		
Post-Accelerator Helix Resistance OPTICAL DATA			200 to 600 megohms				
Phosphor	Number:	Pl	P2		P7	Pll	
Fluorescent Color		Green	Blue-green	1	Blue-white	Blue	
Phosphorescent Color		Green	Green		Yellow	Blue	
Persistence		Medium	Long		Long	Short	
Faceplate		Clear, flat	Clear, flat		Clear, flat	Clear, flat	
P.O. Box	NIX, INC. 831 7, Oregon				March	20, 1958	



Page 2 of 6

Cathode-Ray Tube

MECHANICAL DATA

Overall length $18-1/4 \pm 3/16$ inches

Greatest diameter of bulb $5-1/4 \pm 3/32$ inches

Minimum useful screen diameter 4-1/2 inches

Bulb number J42K1 - Modified

Bulb contact J1 - 21

Base B12-37

Basing 14AG

Bulb contact alignment:

J1 - 21 contact aligns with trace of D1-D2 \pm 10 degrees

J1 - 21 contact on same side as pin #4.

Base alignment:

Pin #1 aligns with D3-D4 trace ± 10 degrees.

Positive voltage on D1 deflects beam approximately toward pin #4.

Positive voltage on D3 deflects beam approximately toward pin #1.

Angle between D1-D2 and D3-D4 traces: 90 ± 1 degrees

RATINGS (Design Center Values) (Note 1)

Heater voltage 6.3 volts

Heater current at 6.3 volts 0.6 ± 10% ampere

Post-Accelerator voltage 6,000 Max volts DC

Isolation Shield voltage 2,100 Max volts DC

Deflection Plate Shield Voltage 2,100 Max volts DC

Accelerator voltage 2,000 Max volts DC

Ratio Post-Accelerator voltage to

Accelerator voltage: 3 Max

Accelerator input 6 Max watts



Page 3 of 6

Cathode-Ray Tube

Grid #3 (Focusing electrode) voltage

800 Max volts DC

Grid #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:

180 Max volts

After equipment warm-up period

125 Max volts

Heater positive with respect to Cathode

125 Max volts

Peak voltage between Accelerator and any deflection

electrode

500 Max volts

TYPICAL OPERATING CONDITIONS (Note 1)

Post-Accelerator voltage

4000 Volts

Isolation Shield voltage (Note 2)

1775 to 1975 Volts

Deflection Plate Shield Voltage (Note 3)

1775 to 1975 Volts

Accelerator voltage (Note 4)

1900 Volts

Grid #3 voltage (focusing electrode)

190 to 565 Volts

Grid #1 voltage (Note 5)

-62 to -85 Volts

Deflection factors: (Note 6)

D1 and D2

19 to 23 Volts DC per cm

D3 and D4

6 to 7-1/2 Volts DC per cm

Useful scan D1-D2

10 cm

Useful scan D3-D4

6 cm

Focusing electrode current for any

operating condition:

-15 to +10 microamperes

Spot position (undeflected) (Note 7)

5 Max millimeters from center

March 20, 1958



Page 4 of 6

Cathode-Ray Tube

TYPICAL OPERATING CONDITIONS, con't.

Pattern distortion at 100% of useful scan

1.5% Max

(Note 8)

MAXIMUM CIRCUIT VALUES

Grid #1 circuit resistance

1.5 Max megohms

PIN CONNECTIONS

Pin 1 Heater Pin 5 Grid #3 - Focus Pin 10 NC
Pin 2 Cathode Pin 7 NC Pin 11 NC

Pin 3 Grid #1 Pin 8 NC Pin 12 Deflection Plate Shield

Pin 4 NC Pin 9 Accelerator Pin 14 Heater

Notes

- 1. All voltages taken with respect to cathode.
- 2. The isolation shield and the lower end of the post-accelerator helix are connected together within the tube. With the proper potential on this electrode combination, barrel and pin-cushion distortions are minimized.
- 3. Adjustment of deflection plate shield voltage provides improved linearity of D3-D4 deflection by controlling the edge effect of D3-D4 plate field. In many applications base pin 12 may be connected externally to the isolation shield.
- 4. Under the typical operating conditions listed the accelerator voltage is made variable from 1775 volts to 1975 volts to provide for astigmatism control. In order to maintain proper astigmatism adjustment as total cathode current is varied, it is recommended that the resistance in the accelerator circuit be limited to 25,000 ohms.
- 5. Visual extinction of undeflected focused spot.
- 6. If use is made of the full deflection capabilities of the tube, the deflection plates will intercept part

March 20, 1958



Page 5 of 6

Cathode-Ray Tube

Notes, con't.

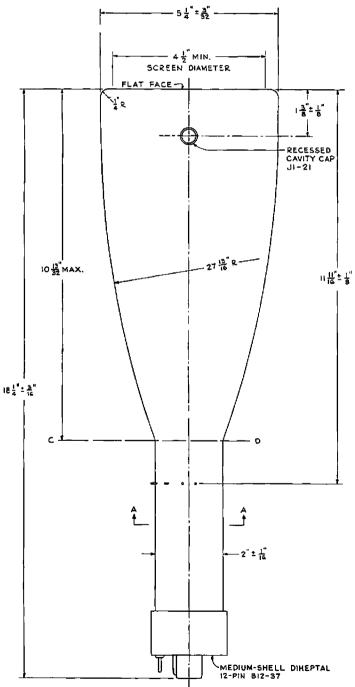
of the electron beam near the edge of scan; hence a low impedance deflection plate drive is desirable.

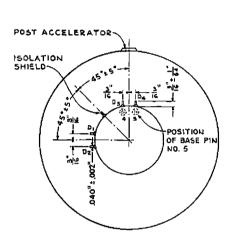
- 7. Connect free deflecting electrodes to accelerator.
- 8. With a 6 x 10 cm rectangular raster centered on the face of the tube, the raster edges will not deviate from straight parallel lines by more than 1 mm total on the left and right edges, nor by more than 0.5 mm total on the top and bottom.



TYPE 5CBP_

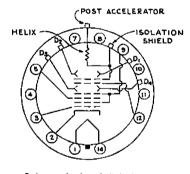
CATHODE-RAY TUBE





PAGE 6 OF 6

SECTION "A-A"



Outer contact on bulb body.

14AG

NOTE: The plane through the tube axis and each of the following items may vary from the trace produced by D₁ and D₂ by the following angular tolerances measured about the tube exist JI-21 contact (on some side of tube as pin 4), 10°; point midway between pins 4 and 5, 10°.