

Monoscopes<sup>a</sup>

**Custom-Built 2"-Diameter, Electrostatic-Focus,  
Electrostatic-Deflection Monoscope Tubes For  
Use As Alpha-Numeric Character Generators**

**ELECTRICAL**

Heater Current at 6.3 volts . . . . .	0.6 A
Focusing Method . . . . .	Electrostatic
Deflection Method . . . . .	Electrostatic
Direct Interelectrode Capacitances (Approx.):	
Grid No.1 to all other electrodes . . . . .	7 pF
Cathode to all other electrodes . . . . .	5 pF
Output Signal Electrode to all other electrodes . . . . .	8 pF
DJ1 to all other electrodes . . . . .	10 pF
DJ2 to all other electrodes . . . . .	10 pF
DJ3 to all other electrodes . . . . .	7 pF
DJ4 to all other electrodes . . . . .	7 pF
DJ1 to DJ2 . . . . .	3 pF
DJ3 to DJ4 . . . . .	3 pF

## Deflection Direction:

A positive voltage on DJ1 deflects the beam toward top of stencil.

A positive voltage on DJ3 deflects the beam toward the left side of the stencil.

**MECHANICAL**

## Tube Dimensions:

Maximum Overall Length . . . . .	11.5 in
Maximum Diameter Including Bulb Terminals . . . . .	2.285 in
Bulb (Glass) . . . . .	T16
Base . . . . .	Medium-Shell, Diheptal 12-Pin JEDEC No.B12-37
Socket . . . . .	Cinch <sup>b</sup> Part No.3M14, or equivalent
Bulb Terminals (Two) . . . . .	Small Ball JEDEC J1-25
Bulb Terminal Contacts . . . . .	Cinch <sup>b</sup> Part No.3A1, or equivalent

# 4560

## Stencil Electrode:

Useful area . . . . .	1.1 x 1.1 in
Typical Pattern . . . . .	See accompanying pattern.
Operating Position . . . . .	Any
Weight (Approx.) . . . . .	13 oz

## MAXIMUM AND MINIMUM RATINGS,

### Absolute-Maximum Values

Unless otherwise stated, values are positive with respect to cathode.

Output Signal Electrode Voltage . . . . .	2500 max. V
Stencil-Electrode Voltage . . . . .	2500 max. V
Deflecting Electrode Voltage:	
DJ1 and DJ2 . . . . .	2500 max. V
DJ3 and DJ4 . . . . .	2500 max. V
Grid-No.4 & Grid-No.2 Voltage . . . . .	2500 max. V
Grid-No.3 Voltage . . . . .	1000 max. V
Grid-No.1 Voltage:	
Negative Bias Value . . . . .	200 max. V
Positive Bias Value . . . . .	0 max. V
Positive Peak Value . . . . .	2 max. V
Peak Heater-Cathode Voltage:	
Heater Negative with respect to Cathode . . . . .	200 max. V
Heater Positive with respect to Cathode . . . . .	200 max. V
Heater Voltage (ac or dc):	
Under Operating Conditions <sup>c</sup> . . . . .	{ 6.9 max. V 5.7 min. V

## RECOMMENDED OPERATING VALUES<sup>d</sup>

Unless otherwise specified, values are positive with respect to output signal electrode.

Output Signal Electrode Voltage . . . . .	Ground <sup>e</sup>
Stencil-Electrode Voltage . . . . .	-15 V
Average Deflecting Electrode Voltage:	
Vertical (DJ1 and DJ2) . . . . .	+35 V
Horizontal (DJ3 and DJ4) . . . . .	+35 V
Grid-No.4 & Grid-No.2 Voltage <sup>f</sup> (Astigmatism) . .	0 to +70 V

Grid-No.3 (Focusing Electrode) Voltage . . . . .	-1600 to -1500 V
Grid-No.1 Voltage <sup>g</sup> . . . . .	-1865 to -1800 V
Cathode Voltage . . . . .	-1800 V
Heater Voltage <sup>h</sup> . . . . .	6.3 V

### TYPICAL PERFORMANCE CHARACTERISTICS AT RECOMMENDED OPERATING VALUES

	Min.	Typical	Max.	
Output Signal Current <sup>i</sup> . . . . .	—	5	—	μA
Trace Angle:				
Vertical . . . . .	—	2	5	degrees
Horizontal . . . . .	—	2	5	degrees
Between Vertical and Horizontal Traces . . . . .	89	90	91	degrees
Deflection Factors: <sup>k</sup>				
Vertical (DJ1 and DJ2) . . . . .	46	—	60	V/in
Horizontal (DJ3 and DJ4) . . . . .	46	—	60	V/in
Undelected Spot Position <sup>m</sup> . . . . .	—	—	0.15	in

<sup>a</sup> A specific tube designation in the 4560 series will be assigned to each type employing a different stencil pattern.

<sup>b</sup> Made by Cinch Manufacturing Company, 1501 Morse Avenue, Elk Grove Village, IL 60007.

<sup>c</sup> For maximum cathode life, it is recommended that the heater supply be regulated at 6.3 volts.

<sup>d</sup> The tube must be shielded to prevent stray magnetic fields from affecting performance. At no time should the undelected beam be allowed to rest on the usable 1.1" x 1.1" area of the stencil electrode pattern.

<sup>e</sup> The output signal electrode is grounded through a 1000-ohm load resistor.

<sup>f</sup> Adjust for minimum astigmatism.

<sup>g</sup> Adjust as required.

<sup>h</sup> One side of heater terminal (Pin No.1) is connected to -1800 V dc.

# 4560

- i For cathode current not exceeding 110 microamperes.
- k Useful area of stencil electrode is 1.1" x 1.1".
- m The undeflected spot position must fall within a circle having a 0.15 inch diameter (maximum) centered on the stencil electrode pattern.

## TYPICAL STENCIL ELECTRODE PATTERN



## OPERATING CONSIDERATIONS

Tubes in the 4560 series are intended for use as character generators in conjunction with display cathode-ray tubes in computer data terminal display equipment. In such equipment, the electron beam in the monoscope is first deflected to a desired character location on the stencil and at the same time the display cathode-ray tube electron beam is deflected to a desired position in the display. The monoscope electron beam is then rapidly scanned over the selected character in the stencil

and the display cathode-ray tube electron beam is synchronously deflected on the phosphor screen.

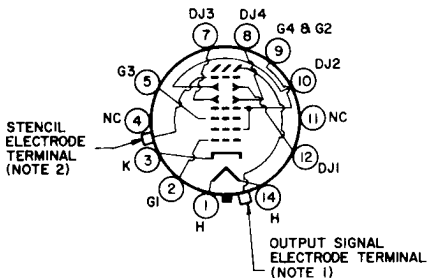
In the monoscope, electrons which pass through the stencil are collected on the output signal electrode and generate a video signal across the output load resistor. This signal is amplified and then applied to the grid of the display cathode-ray tube.

The effect of this operation is that the character stenciled into the monoscope is displayed on the phosphor screen of the display cathode-ray tube. Other characters may be chosen by positioning the monoscope electron beam at different locations on the stencil. A character may be located anywhere in the cathode-ray tube display by appropriate positioning of its electron beam.

#### **NOTE**

Stencil patterns supplied to RCA for incorporation in the 4560 family of monoscopes should be at least 10 times larger than the useful 1.1" x 1.1" area of the stencil electrode. The alpha-numeric characters of the pattern should be white on a dark background. Such patterns or requests for information on RCA fabricated stencil patterns should be directed to Storage Tube Marketing, RCA, Lancaster, PA 17604, or to the nearest Sales Office.

## TERMINAL DIAGRAM (Bottom View)



Pin No.1: Heater

Pin No.2: Grid No.1

Pin No.3: Cathode

Pin No.4: No connection

Pin No.5: Grid No.3

Pin No.7: Deflecting Electrode DJ3

Pin No.8: Deflecting Electrode DJ4

Pin No.9: Grid No.4 and Grid No.2

Pin No.10: Deflecting Electrode DJ2

Pin No.11: No connection

Pin No.12: Deflection Electrode DJ1

Pin No.14: Heater

Terminals -

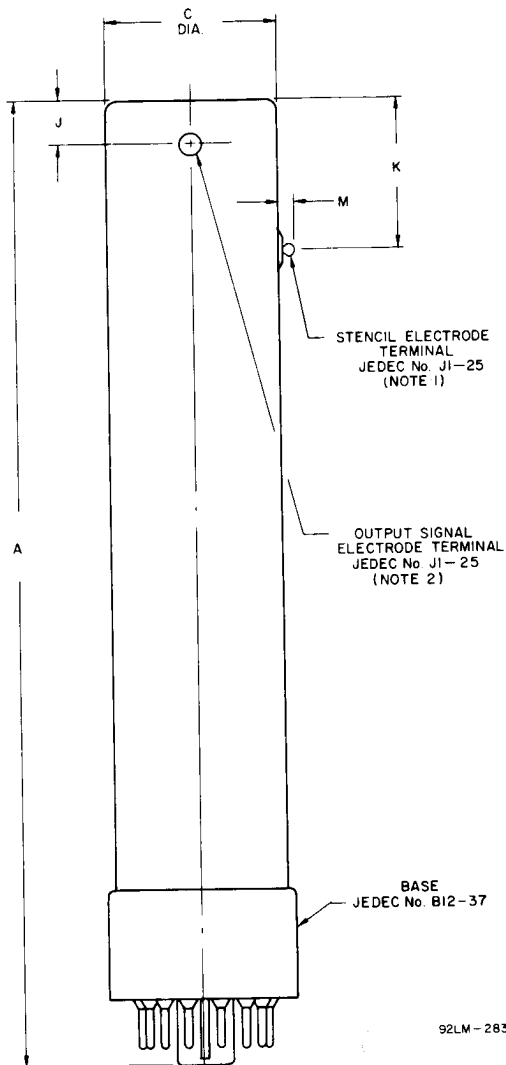
Nearest Base: Stencil Electrode

Furthest from Base: Output Signal Electrode

**Note 1:** The plane passing through the tube axis and the key of the base does not deviate more than  $\pm 10^\circ$  from the plane passing through the tube axis and the output signal electrode terminal cap.

**Note 2:** The plane passing through the tube axis and Pin No.4 of the base does not deviate more than  $\pm 10^\circ$  from the plane passing through the tube axis and the stencil electrode cap.

## DIMENSIONAL OUTLINE



92LM-2831

# 4560

## NOTES FOR DIMENSIONAL OUTLINE

**Note 1:** Angular orientation of the stencil electrode terminal with respect to pin No.4 of base is  $\pm 10^{\circ}$ .

**Note 2:** Angular orientation of the output signal electrode terminal with respect to key of base is  $\pm 10^{\circ}$ .

## OUTLINE DIMENSIONS

Dimensions	Inches	mm
A	$11.312 \pm .188$	$287.32 \pm 4.77$
C	$2.050 \pm .050$ Dia.	$52.07 \pm 1.27$ Dia.
J	$.500 \pm .062$	$12.70 \pm 1.57$
K	$1.750 \pm .125$	$44.45 \pm 3.17$
M	.185 max.	4.69 max.