

Monoscopes^a

**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 ^b Part No.3M14, or equivalent
Bulb Terminals (Two)	Small Ball JEDEC J1-25
Bulb Terminal Contacts	Cinch ^b Part No.3A1, or equivalent

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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 ^c	{ 6.9 max. V 5.7 min. V

RECOMMENDED OPERATING VALUES^d

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

Output Signal Electrode Voltage	Ground ^e
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 ^f (Astigmatism)	0 to +70 V

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

TYPICAL PERFORMANCE CHARACTERISTICS AT RECOMMENDED OPERATING VALUES

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

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

^b Made by Cinch Manufacturing Company, 1501 Morse Avenue, Elk Grove Village, IL 60007.

^c For maximum cathode life, it is recommended that the heater supply be regulated at 6.3 volts.

^d 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.

^e The output signal electrode is grounded through a 1000-ohm load resistor.

^f Adjust for minimum astigmatism.

^g Adjust as required.

^h One side of heater terminal (Pin No.1) is connected to -1800 V dc.

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- 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.

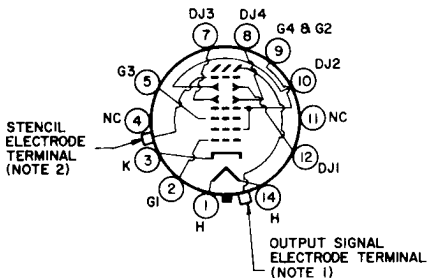
In the monoscope, electrons which pass through the stencil are collected on the output signal electrode and generate a video signal across the output load resistor. This signal is amplified and then applied to the grid of the display cathode-ray tube.

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 -

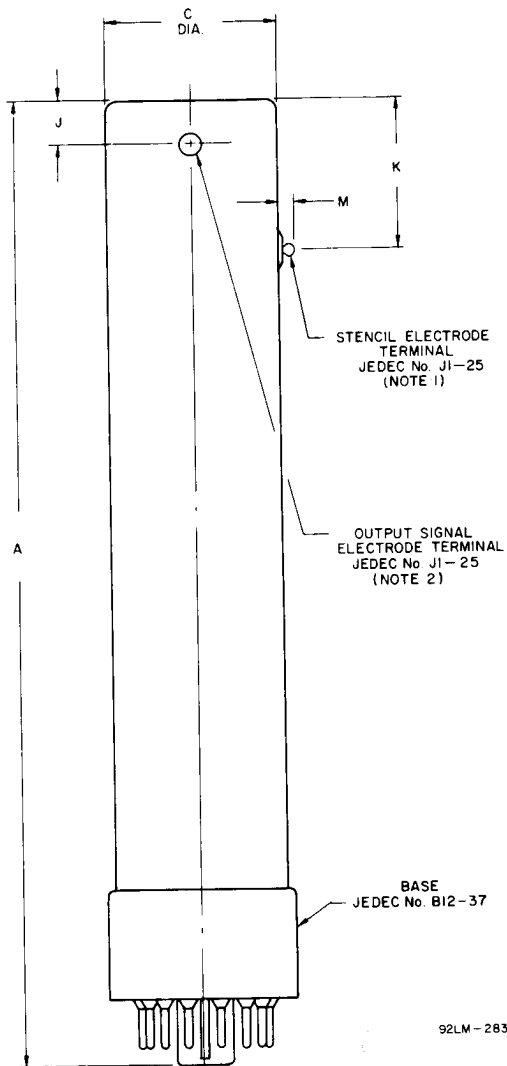
Nearest Base: Stencil Electrode

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

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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 ± 4.77
C	$2.050 \pm .050$ Dia.	52.07 ± 1.27 Dia.
J	$.500 \pm .062$	12.70 ± 1.57
K	$1.750 \pm .125$	44.45 ± 3.17
M	.185 max.	4.69 max.