

DR2000000

RCA NUMITRON Digital Display Devices

DR2000, DR2100, DR2200 Series

The NUMITRON digital-display devices DR2000, DR2100, and DR2200 series are incandescent readout devices that provide sharp, high-brightness displays ideally suited for most types of digital-readout systems. These low-voltage devices, which may be operated in either a dc or multiplex mode, offer the designers of digital-display systems the following major advantages:

- high-contrast clutter-free displays viewed against a dark background
- high reliability (mean life expectancy of 100,000 hours)
- low-voltage operation
- wide viewing angle
- wide-spectrum light emission permits filter selection for a wide variety of color displays
- use of standard low-cost sockets
- freedom from induced or radiated interference
- full compatibility with low-cost integrated-circuit decoder/drivers

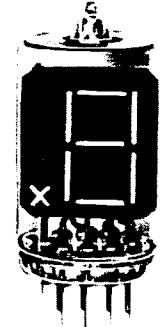
These NUMITRON devices utilize a rugged, single-plane unit construction which results in a highly reliable device with very long life expectancy. The "up-front" display surface permits a wide viewing angle with a display that is free of "clutter" and residual images. Brightness is completely adjustable, with simple voltage controls, from zero output to a level that is easily viewable under very high ambient light conditions. The devices are free of induced or radiated interference.

The DR2000 and DR2100 series NUMITRON devices have identical power requirements (108 mW/segment); the DR2200 series NUMITRON devices, however, operate with approximately 70% less power (35 mW/segment) yet still provide excellent contrast and only a 40% reduction in brightness.

The DR2000 series NUMITRON devices fit a standard 9-contact miniature electron tube socket or they may be soldered directly into PC boards.

The DR2100 and DR2200 series NUMITRON devices may be mounted on a 0.5-inch center-to-center directly on PC boards or a standard TO-5 style, 10-contact socket may be used. The DR2100 and DR2200 series devices are supplied with straight leads and are physically identical.

The DR2100V1 and DR2200V1 versions are electrically and visually identical to the DR2100 and DR2200 series respectively but are supplied with formed leads for easier direct PC-board mounting.



DR2000



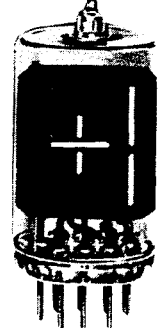
DR2100
DR2200

0 through 9

DR2010

DR2110
DR2210

0 through 9 with left hand decimal point

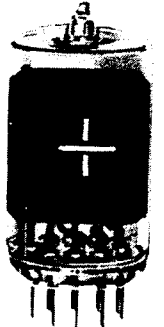


DR2020



DR2120
DR2220

Plus-Minus sign and numeral 1



DR2030



DR2130
DR2230

Plus-Minus Sign

Characteristics

	DR2000 Series	DR2100 Series	DR2200 Series	
Electrical				
Recommended dc Segment Voltage Range	3.5 to 5.0	3.5 to 5.0	1.5 to 3.0	V
DC Segment Voltage	4.5	4.5	2.5	V
Segment Current @ Rated Voltage	24	24	14	mA
Segment Dissipation	108	108	35	mW
Mean Life Expectancy (at 95% confidence)	100,000	100,000	100,000	h
Visual				
Viewing Angle (included angle)	140°	120°	120°	
Segment Luminance (typ.)	7000	7000	4000	fL
Contrast Ratio	30:1	30:1	30:1	
Response Times:				
Ascent to Visibility (typ.)	15	15	8	ms
Descent to 50% of Luminance	<20	<20	<10	ms
Maximum Segment Deflection From a Straight Line	0.005	0.004	0.004	in

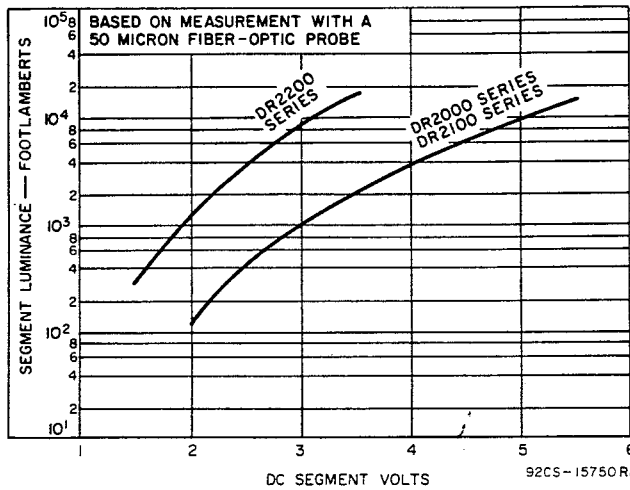


Fig. 1— Segment luminance characteristics

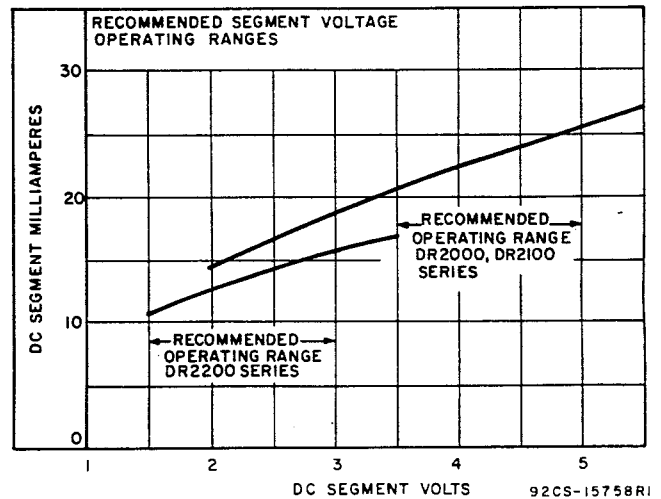


Fig. 2 — Segment Current vs. Segment Voltage

Hardware and Accessories

Sockets

Noval 9-contact Types

DR2000 Series

- Methode Electronics, Inc., M8610 (For 0.8-inch centers) and P460 (standard)
- Cinch Mfg. Co., 121-51-00-040 (standard)

TO-5 10-contact Types

DR2100, DR2200 Series

- Methode Electronics, Inc., M8620
- Cinch Mfg. Co., 133-99-92-054
133-99-92-065 (Spread-Lead Type)

Filters

Polaroid Corp., Cambridge Mass. 02139

Circular Polarizer:

Standard and Diffused Surface for Broader Stroke

Panelgraphic Corp., West Caldwell, N.J. 07006

Chromafilter CF-131: Anti-Reflection Filters

Plastic Light Shield to Reduce Side Reflections

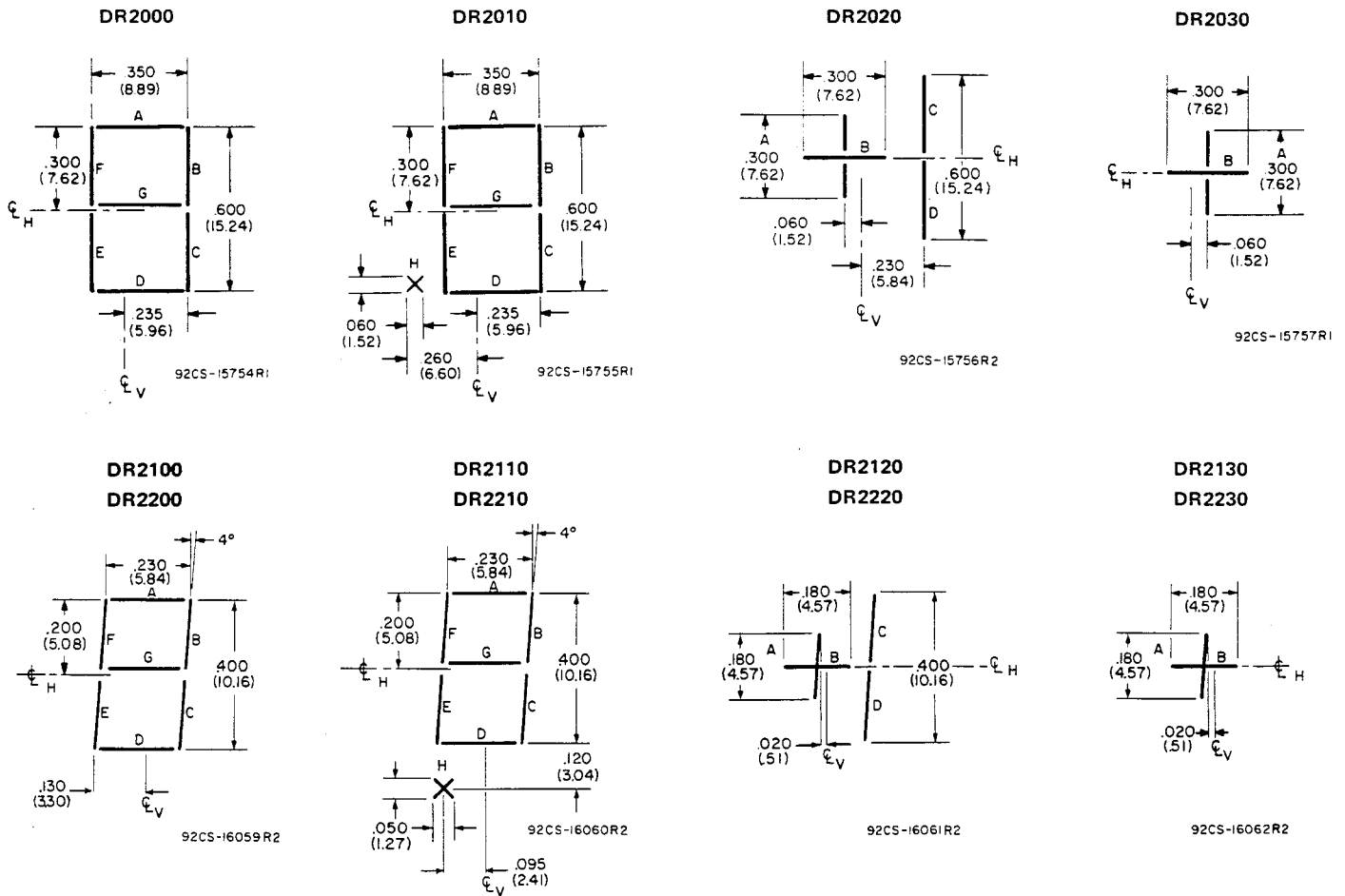
DR2100, DR2200 Series

- RCA DS3000

DR2000 Series

- RCA DS3001

Segment Dimensions and Designations



C_H = Horizontal center line of display (dimension F) with pin No. 3 toward viewer. Segment "G" is 0.030" above C_H .

C_V = Vertical center line of device

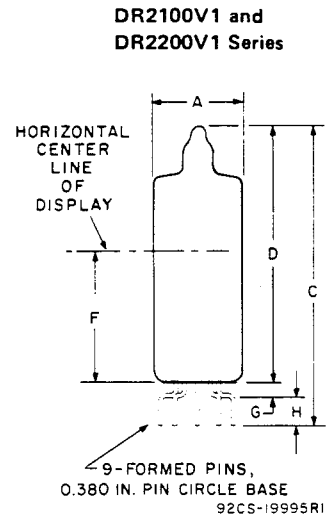
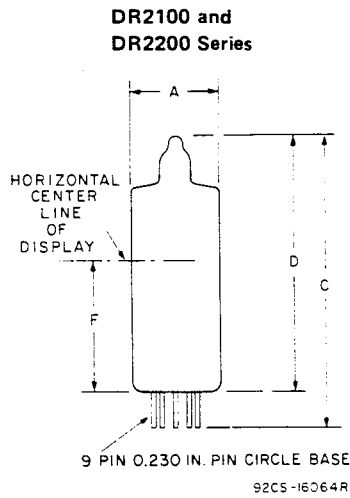
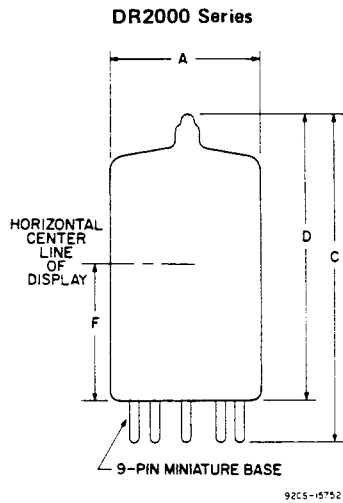
On DR2100 and DR2200 series vertical center line of display coincides with vertical center line of device.

Dimensions in parentheses are in millimeters and are derived from the basic inch dimensions as indicated.

Display	Type	Segment Designations A-H								
		1	2	3	Base Pin Number				7	8
	DR2000	NC	COMMON	E	D	C	G	A	B	F
	DR2100									
	DR2200									
	DR2010	H		E	D	C	G	A	B	F
	DR2110									
	DR2020	NC	NC	NC	D	B	C	A		
	DR2120									
	DR2030	NC	NC	NC	B	NC	A	NC		
	DR2130									
	DR2200	NC	NC	NC	NC	B	NC	A		
	DR2220									
	DR2210	NC	NC	NC	NC	NC	B	NC	A	
	DR2230									

NC = no connection - may be used as tie point.

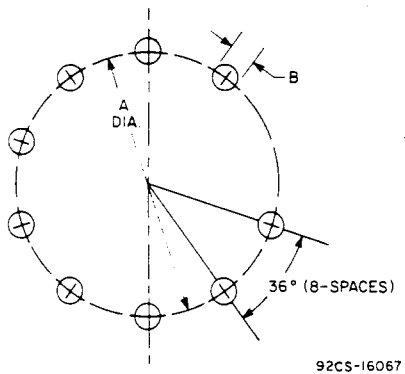
Dimensional Outlines



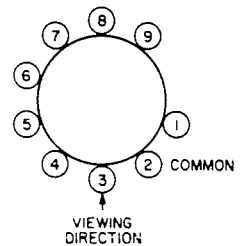
DIMENSION	DR2000 Series				DR2100 and DR2200 Series				DR2100V1 and DR2200V1 Series			
	INCHES		MILLIMETERS		INCHES		MILLIMETERS		INCHES		MILLIMETERS	
	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
A		0.800		20.32		0.485		12.32		0.485		12.32
C		1.875		47.62		1.700		43.18		1.665		42.29
D		1.625		41.27		1.450		36.83		1.450		36.83
F	0.700	0.730	17.78	18.54	0.625	0.655	15.87	16.64	0.625	0.655	15.87	16.64
G									0.060	0.090	1.52	2.28
H									0.095	0.125	2.41	3.18

MILLIMETER DIMENSION DERIVED FROM INCH DIMENSION

Pin Circle Dimensions



NUMITRON SERIES	DIMENSION (INCHES)		
	A	B	
		Nominal	MIN.
DR2000	0.468	0.038	0.042
DR2100 and DR2200	0.230	0.018	0.022
DR2100V1 and DR2200V1	0.380	0.018	0.022



Base Diagram (All Series) Bottom View

Environmental Tests

DR2000 and DR2100 Series

Shock*

A Peak Impact Acceleration.....	100 g
Duration of Approximate Half Sine-Wave Mechanical Shock Pulse.....	1 ms
Operating Condition During Test:	
DC Segment Voltage.....	4.5 V
B Peak Impact Acceleration.....	50 g
Duration of Approximate Half Sine-Wave Mechanical Shock Pulse.....	11 ms
Operating Condition During Test:	
Segment Voltage Not Applied.....	-

Vibration Fatigue*

Peak Vibrational Acceleration.....	2.5 g
Vibration Frequency.....	25 Hz
Duration of Test.....	96 h
DC Segment Voltage.....	4.5 V