

NUMITRON Digital Display Devices

Segmented Incandescent Types

FEATURES:

- high brightness — fully adjustable
- low voltage operation
- high contrast — segmented digits viewed against a dark background
- compatible with IC Decoder/Drivers such as the RCA CD2500E family
- high reliability—rugged construction
- wide-spectrum light emission permits unlimited filter selection
- wide viewing angle
- void of "clutter"
- solderable base pins permits direct PC board mounting
- DR2000 series fits popular low cost 9-pin miniature socket
- DR2100 series fits popular TO-5 style, 10-pin socket
- DR2100V1 series with formed leads facilitates direct PC-board mounting

MECHANICAL

	DR2000 Series	DR2100 Series	DR2100V1 Series
Mounting Position	Any	Any	Any
Maximum Overall Length	1.875 in.	1.660 in.	1.705 in.
Maximum Seated Length	1.625 in.	1.450 in.	1.540 in.
Maximum Diameter	0.785 in.	0.485 in.	0.485 in.

CHARACTERISTICS

	DR2000 Series			DR2100 DR2100V1 Series	
Electrical DC segmented voltage = 4.5 V unless otherwise specified					
Recommended dc Segment					
Voltage Range	3.5 to 5.0	V	3.5 to 5.0	V	
Segment Current	24	mA	24	mA	
Life Expectancy	100,000 h	min.	100,000 h	min.	
Visual DC segment voltage = 4.5 V					
Viewing Angle (included angle)	140°		120°		
Segment Luminance	7000 fL	typ.	7000 fL	typ.	
Response Times:					
ascent (to visibility)	15 ms	typ.	15 ms	typ.	
descent (to 50% of luminance)	<20 ms		<20 ms		
Maximum Segment Deflection					
From a Straight Line	0.005	in.	0.005	in.	

MECHANICAL SPECIFICATIONS FOR DR2000 SERIES, DR2100 SERIES, DR2100V1 SERIES

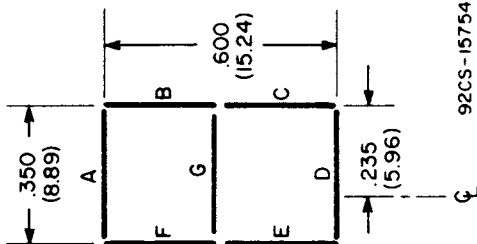
NUMITRON DIGITAL DISPLAY DEVICES

TEST	CONDITIONS	DC Segment Voltage V	MIL-STD	METHOD
SHOCK	a) 100g, 1 ms, Half-Sine Wave	4.5	1311 MIL-E-1F	1041 4.3.3
	b) 50g, 11 ms, Half-Sine Wave	Non-Operating	1311	1042A
VIBRATION	Variable Frequency: 10 to 44 Hz, 0.1-inch DA, and 44 to 200 Hz, 10g	4.5		
	Variable Frequency: 200 to 800 Hz, 1g	4.5		
	Variable Frequency: 800 to 2000 Hz, 10g	4.5		
	Variable Frequency: 10 to 50 to 10 Hz, 0.08-inch DA, 10g maximum	4.5	1311	1031A
	Fatigue: 25 Hz, 2.5g, 96 hr	4.5	1311	1031A

The NUMITRON digital display devices will meet the Radio Technical Commission for Aeronautics (RTCA), Document No. DO-138 Dated June 27, 1968, Specifications for operational and crash safety shock tests; standard environmental vibration for instrument panel location in all types of aircraft.

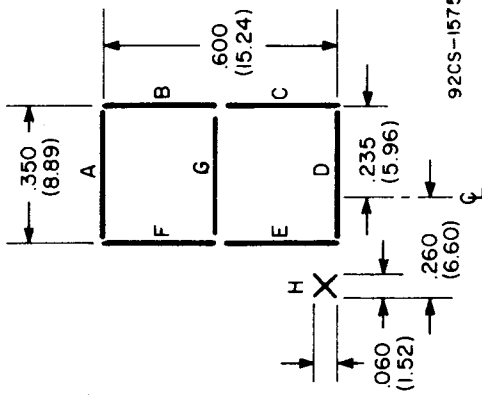
SEGMENT DIMENSIONS

DR2000



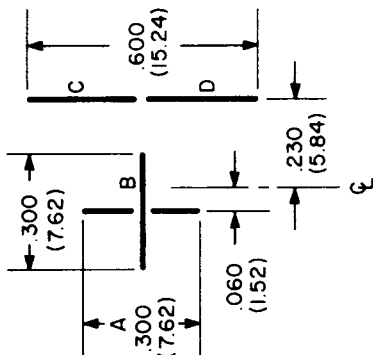
92CS-15754

DR2100



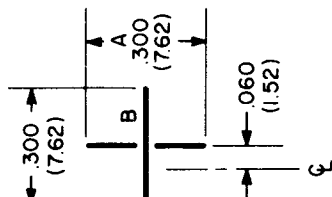
92CS-15755

DR2020



92CS-15756

DR2030



92CS-15757

ϕ = center line of device with pin No. 3 toward viewer.

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

DR2000 DR2100 DR2100VI

Series Series Series

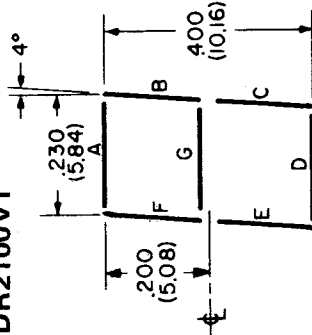
SEGMENT ASSIGNMENT

RCA TYPE	Segment Assignment								
	Pin Designations								
	1	2	3	4	5	6	7	8	9
DR2000	DO NOT USE	C O M M O N	E	D	C	G	A	B	F
DR2010	H		E	D	C	G	A	B	F
DR2020	DO NOT USE		DO NOT USE			D	B	C	A
DR2030	DO NOT USE		DO NOT USE			B	DO NOT USE	A	DO NOT USE

SEGMENT DIMENSIONS

DR2100

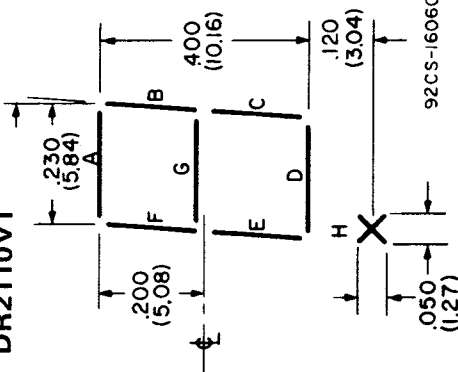
DR2100V1



92CS-16059

DR2110

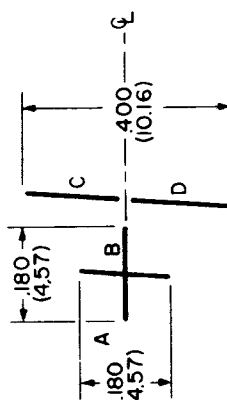
DR2110V1



92CS-16060

DR2120

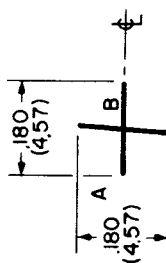
DR2120V1



92CS-16061

DR2130

DR2130V1



92CS-16062

ϕ = center line of display (dimension F above). Pin No.3 toward viewer.

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

SEGMENT ASSIGNMENT

RCA TYPE	Segment Assignment								
	Pin Designations								
	1	2	3	4	5	6	7	8	9
DR2100	DO NOT USE	C	E	D	C	G	A	B	F
DR2110	H	O	E	D	C	G	A	B	F
DR2120	DO NOT USE	M	DO NOT USE			D	B	C	A
DR2130	DO NOT USE	N	DO NOT USE			DO NOT USE	B	DO NOT USE	A

DR2000 Series

DR2100 Series

DR2100V1 Series

PIN CONNECTION CHART

Display	Device Pin Designation				
	Pin No. 2 Common For All Types				
	DR2000 DR2100	DR2010 DR2110	DR2020 DR2120	DR2030	DR2130
	3,4,5,7,8,9	3,4,5,7,8,9			
	5, 8	5,8	6,8		
	3,4,6,7,8	3,4,6,7,8			
	4,5,6,7,8	4,5,6,7,8			
	5,6,8,9	5,6,8,9			
	4,5,6,7,9	4,5,6,7,9			
	3,4,5,6,7,9	3,4,5,6,7,9			
	5,7,8	5,7,8			
	3,4,5,6,7,8,9	3,4,5,6,7,8,9			
	4,5,6,7,8,9	4,5,6,7,8,9			
			7,9	6,8	7,9
			7	6	7
		1			

OPERATING CONSIDERATIONS

Character Generation

The preceding chart gives the pin connections for forming the various decimal-character displays for each device. Pin No.2 is the common connection for all segments in each device. For example, to form a numeral one using type DR2000, connect the segment voltage between pin No.2 (common) and pin Nos.5 and 8.

Integrated Circuit Decoder/Driver

The NUMITRON series devices are compatible with the RCA Integrated Circuit Decoder/Driver types CD2500E and CD2501E. The integrated circuit decoder/driver accepts four inputs in BCD (8-4-2-1 code) and decodes them into outputs representing a decimal number from 0 to 9 on a 7-segment display. See basic interconnection circuit of decoder/driver and the NUMITRON display devices on next page. For data on CD2500E and CD2501E integrated circuit types see RCA Semiconductor Products DATABOOK, SPD-100, File No.392.

Mounting Arrangements

The Numitron devices are designed for mounting in either commercially available sockets or directly on printed circuit boards. The DR2000 series devices fit into a standard 9-pin miniature electron tube socket. A commercial PC board socket which permits 0.8-inch center-to-center mounting is available.■ The DR2100 series Numitron devices are available in two electrically identical versions: DR2100 series with straight leads and the DR2100V1 series with formed leads. The DR2100 series may be mounted on 0.5-inch centers directly on PC boards or, if required a standard TO-5 style, 10-pin socket may be used. See listing on DATA 6 sheet of some commercially available sockets for the DR2100 series devices. The DR2100V1 series devices facilitate direct PC board mounting techniques and maintain a mounting distance between devices of 0.5-inch center-to-center, including space for an inter-unit shield.

Power Supply Requirements

The Numitron Series devices do not require critical voltage regulation over the useable operating range of 3.5 to 5.0 Vdc. As in the case with any incandescent type device, dc voltage operation above the recommended value may result in reduced life expectancy. For multiplex operation, segment voltage above 5.0 volts may be used provided that the appropriate duty factor is observed.

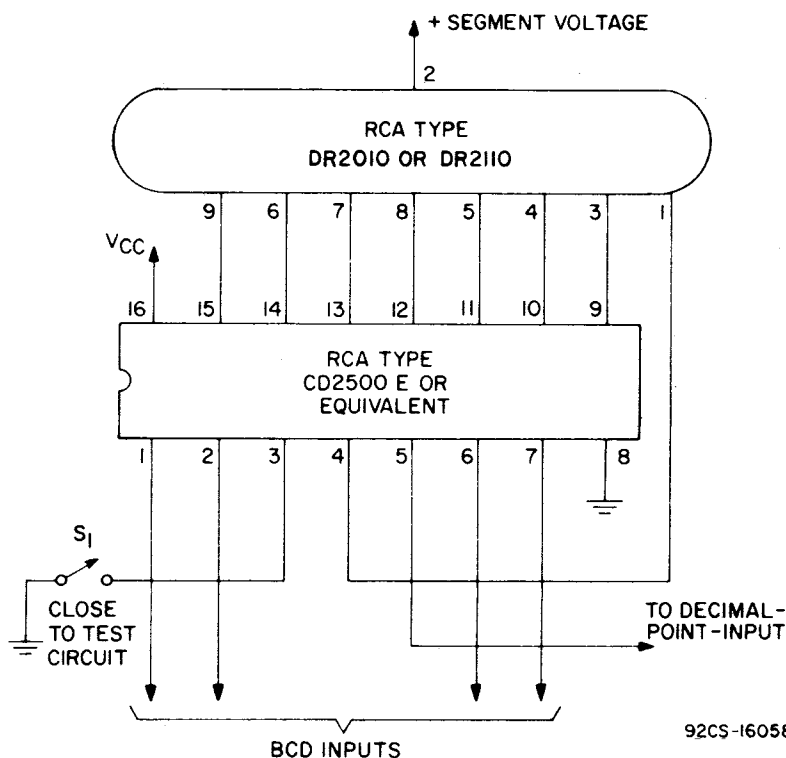
Display

Because these Numitron devices have a wide-band light spectrum emission, an unlimited choice of filters can be used to produce any desired color display. If a broader stroke is desired, it can be obtained with an etched glass such as "Trusite"*. When a larger size display is needed, a Fresnel lens may be used in front of the display.

* Trademark "Trusite" - Dearborn Glass Co., Chicago, Illinois.

■ Methode Electronics, Inc. part No. PN-8610.

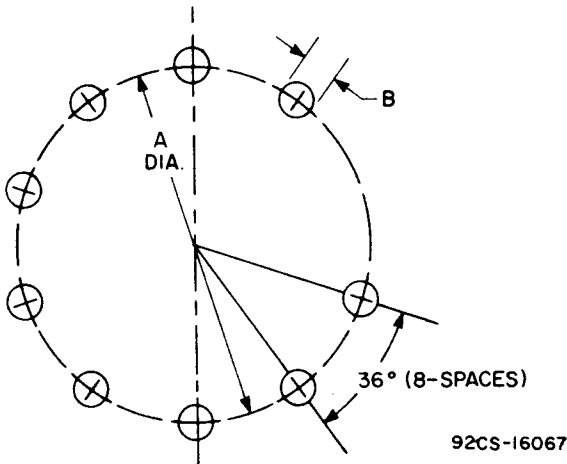
BASIC INTERCONNECTION CIRCUIT OF NUMITRON DIGITAL DISPLAY DEVICE AND DECODER-DRIVER



DR2000 DR2100 DR2100V1

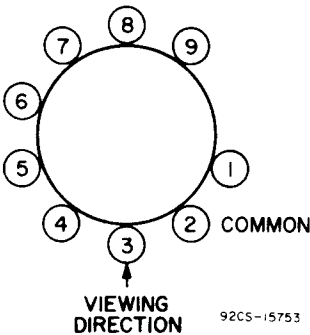
Series Series Series

BASE DIAGRAM AND PIN CIRCLE DIMENSIONS FOR DR2000, DR2100, AND DR2100V1 SERIES DIGITAL DISPLAY DEVICES.



NUMITRON Type Number	DIMENSION		
	A Nominal	Min.	Max.
DR2000	0.468	0.038	0.042
DR2100	0.230	0.018	0.022
DR2100V1	0.380	0.018	0.022
DIMENSIONS IN INCHES			

Bottom View



DR2000 DR2100 DR2100V1 Series Series Series

SOME COMMERCIALLY AVAILABLE SOCKETS FOR THE DR2100 SERIES NUMITRON DIGITAL DISPLAY DEVICES

10-Lead TO-5 Style

Augat, Inc.

8058-1G22
8058-2HG1

Miniature, Teflon* for chassis mounting
Miniature, Teflon, for printed-circuit boards

Barnes Corp.

MG-1002
MGR-102
MF-02-10
MF-03-10

Miniature, Teflon, press-fit type
Miniature, Teflon, for printed-circuit boards
For chassis mounting, chamfered-lead
entrance
For printed-circuit boards, chamfered-lead
entrance

Cinch Mfg. Co.

133-99-92-054
133-99-92-065

Miniature, diallyl phthalate, for printed-
circuit boards
Miniature spread lead type, diallyl
phthalate, for printed-circuit boards

Sealectro Corp.

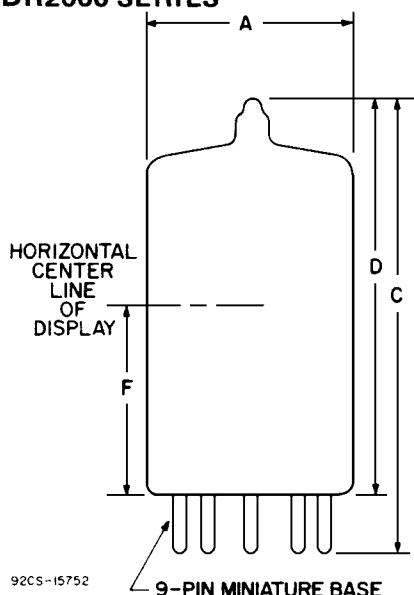
Series 60#

Press-fit type, Teflon

* Registered Trade Mark, E. I. DuPont De Nemours and Co.

Registered Trade Mark, Sealectro Corporation

DIMENSIONAL OUTLINE DR2000 SERIES



DI- MEN- SION	INCHES		MILLIMETERS	
	MIN.	MAX.	MIN.	MAX.
A		0.785		19.93
C		1.875		47.62
D		1.625		41.27
F	0.700	0.730	17.78	18.54
MILLIMETER DIMENSION DERIVED FROM INCH DIMENSION				

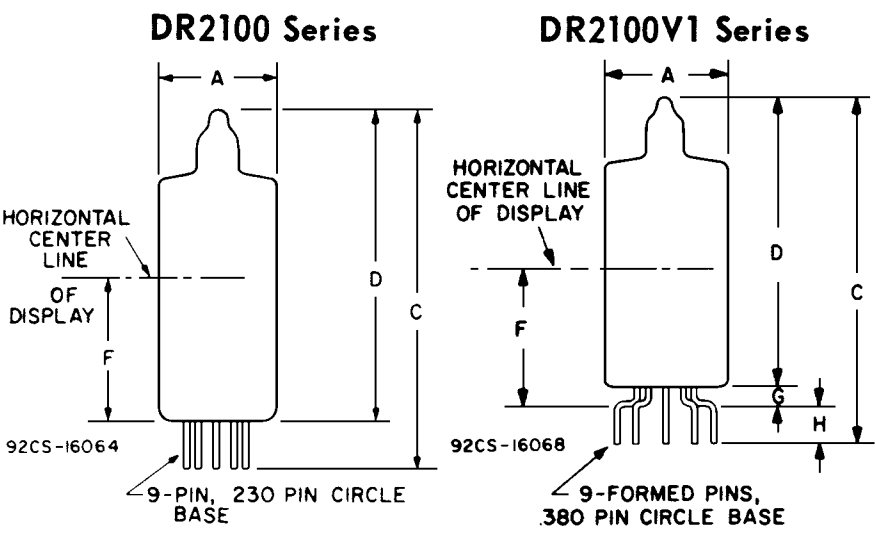
PC board socket for 0.8-inch
center-to-center mounting:
Methode Electronics, Inc. PN-8610
or equivalent.

DR2000 Series

DR2100 Series

DR2100V1 Series

DIMENSIONAL OUTLINE



DIMENSION	DR2100 Series				DR2100V1 Series			
	INCHES		MILLIMETERS		INCHES		MILLIMETERS	
	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
A		0.485		12.32		0.485		12.32
C		1.660		42.16		1.705		43.30
D		1.450		36.83		1.450		36.83
F	0.625	0.655	16.51	17.27	0.685	0.745	17.39	18.92
G					0.060	0.090	1.52	2.28
H					0.135	0.165	3.43	4.19
MILLIMETER DIMENSION DERIVED FROM INCH DIMENSION								