

NIXIE® NUMERICAL INDICATOR TUBE

TYPES
B-5750
B-5750S

The B-5750 NIXIE tube is an ultra-long life, high quality, cold-cathode indicator tube having a common anode. It can display the numerals 0-9 and has two decimal points inside the tube (right and left of the numerals) which are independently operable. The numeral aspect ratio (height to width) has been designed to provide the optimum in readability and viewing distance. The small diameter of the tube (0.530" max) permits 0.540" center-to-center mounting and its short seated height (1.500" max including standoff) allows for minimal instrument panel dimensions.

A moveable pin-straightener-standoff, which is used to align the tube pins for ease of PC layout and insertion, is part of the tube assembly. The standoff also allows solder gas to escape during soldering. These tubes have been specifically designed to operate both in normal DC applications and strobed/time sharing applications (See Note 8).

The B-5750S is identical to the B-5750 except its leads are cut to 0.175" ± .015 for use with the SK-207 socket, Bulletin 1138.

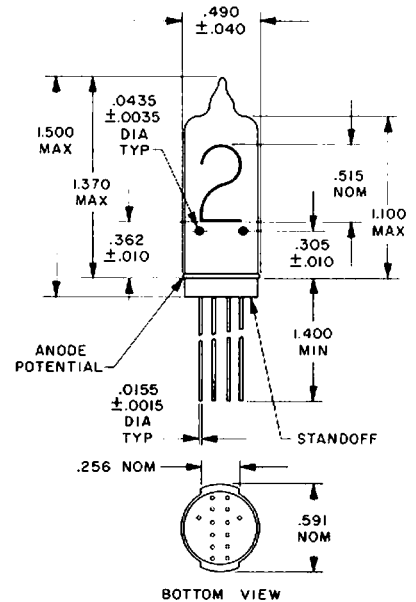
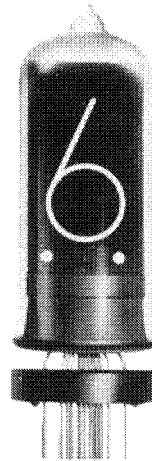


Figure 1. OUTLINE DRAWING
(NOTE 11)

ELECTRICAL SPECIFICATIONS

Absolute Ratings

Ionization Voltage (Note 1, Fig. 5)	+170 Vdc max
Supply Voltage	+170 Vdc min
Numeral Cathode Current (Note 5)	3.8 ma max
Peak Anode Current	
(Notes 8 & 9)	15 ma max
Decimal Point Cathode Current	
(Note 6)	0.1 ma to 0.3 ma
Cathode Pre-bias	+60 Vdc to +120 Vdc

Typical Operating Conditions (Notes 1, 2 & 7, Figures 5 & 6)

Supply Voltage	+170 Vdc
Series Resistor (Table 2)	9.1 kΩ
Anode Current (Figure 5)	2.6 ma typ
Decimal Point Current (Table 2)	0.2 ma typ
Cathode Pre-bias Voltage	+60 Vdc

Test Conditions (Figures 5 and 6)

Test Limits (Figures 5 and 6)

MECHANICAL CHARACTERISTICS

Outline Drawing	Figure 1
Pin Connection	Table 1
Pin Layout	Figure 2
PC Layouts	Figure 3
Weight	0.4 oz. max
Lead Finish	Hot tin dip from 0.150 in. from tube base
Max. Viewing Distance	24 feet

Mounting	Note 3
Color	Neon red
	3650, 4358, 5654 & 5852 angstroms
Basing Diagram	Figure 4
Brightness	200 ft. lamberts
Soldering Heat	260 ± 5°C for 10 ± 1 sec.
	0.150" from tube base

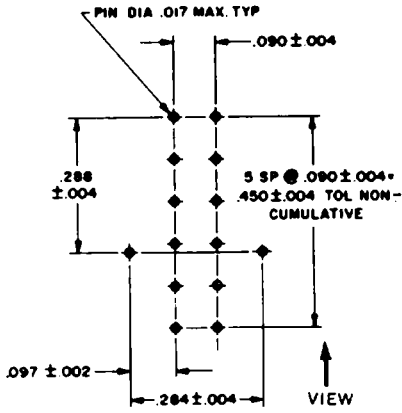


Figure 2. PIN LAYOUT (TOP VIEW)

PIN	CONNECTIONS
1	NUMERAL 1
2	NUMERAL 2
3	NUMERAL 3
4	NUMERAL 4
5	NUMERAL 5
6	NUMERAL 6
7	ANODE *
8	NUMERAL 7
9	NUMERAL 8
10	ANODE *
11	NUMERAL 9
12	NUMERAL 0
13	RT DEC PT
14	LFT DEC PT

*Anode pins are connected internally

Table 1. PIN CONNECTIONS

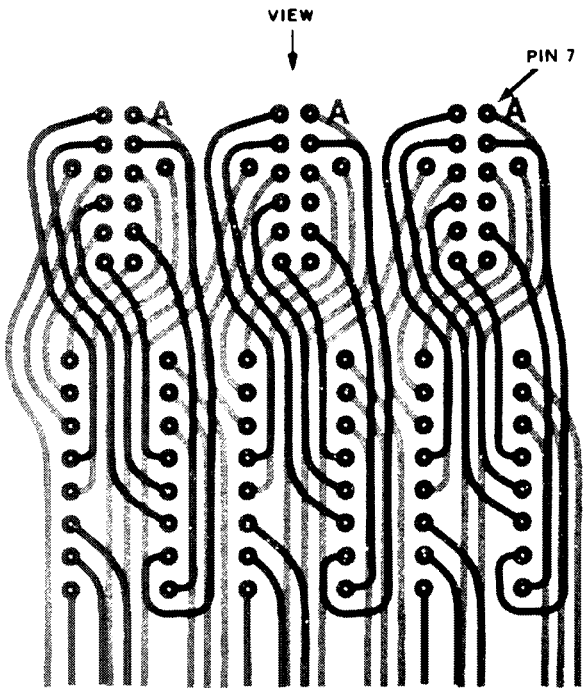


Figure 3a. P.C. LAYOUT WITH FAIRCHILD 9960 (TOP VIEW)
(9960 notch away from viewer)

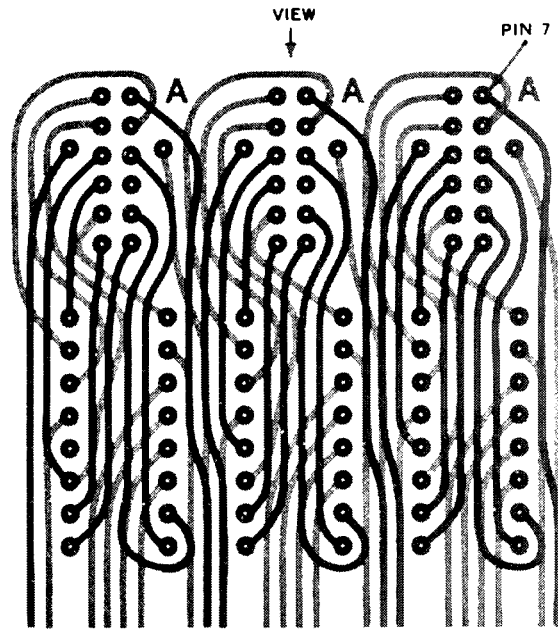


Figure 3b. P.C. LAYOUT WITH TEXAS INSTRUMENTS SN-7441N (TOP VIEW)

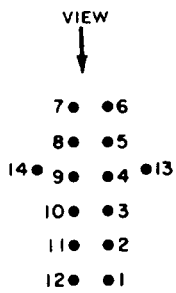
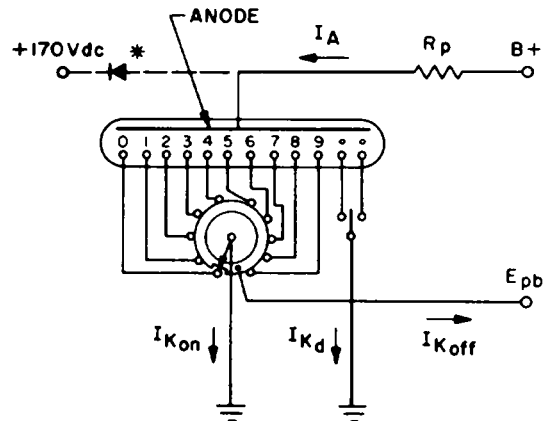


Figure 4. BASING DIAGRAM (BOTTOM VIEW)



* To test for Ionization at +170 Vdc

Figure 5. TEST CIRCUIT

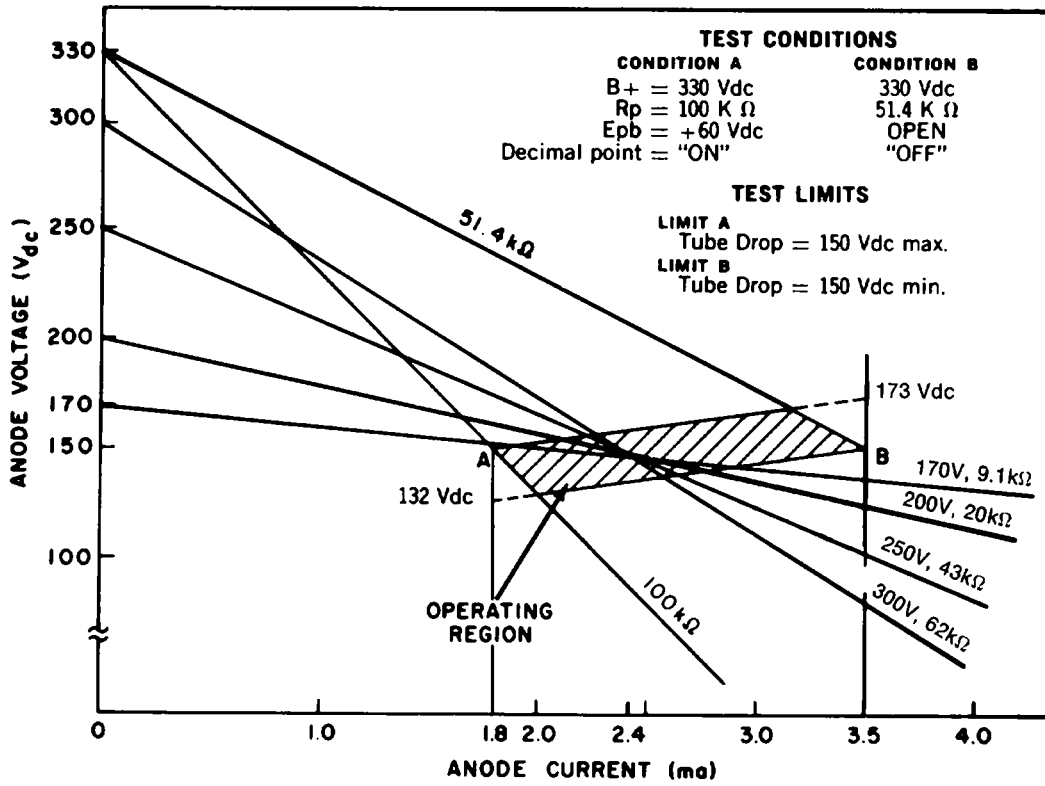


Figure 6. TUBE CHARACTERISTICS (NOTE 7)

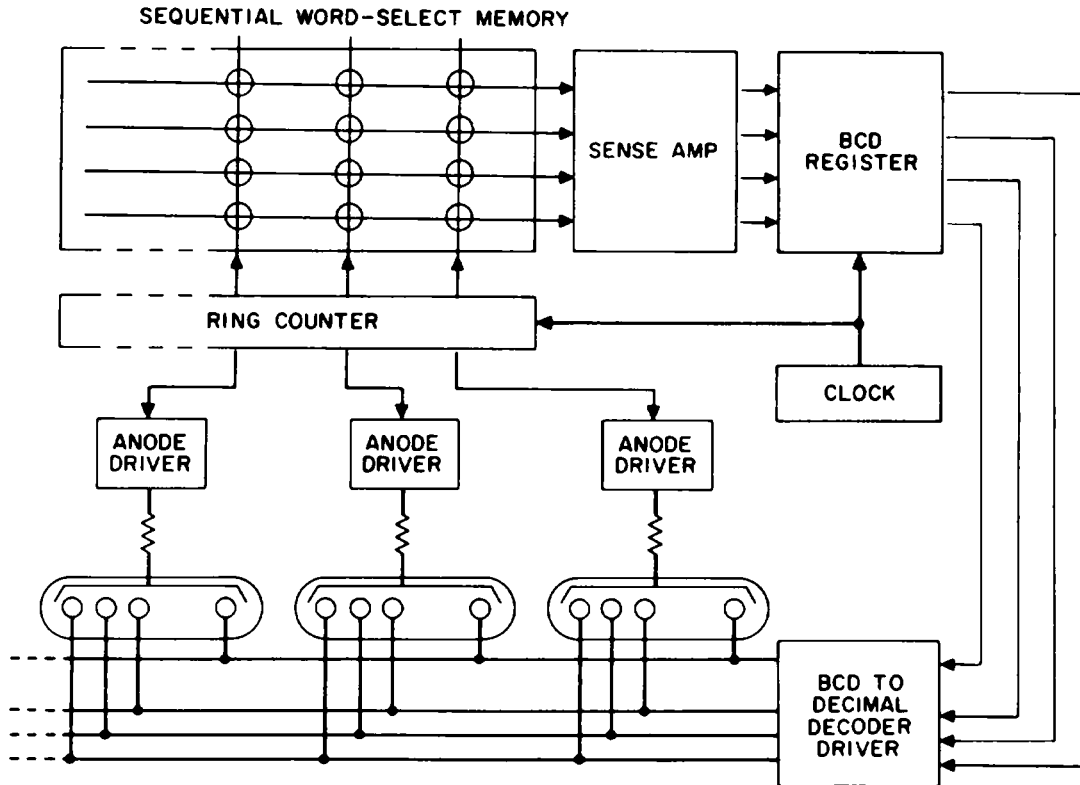


Figure 7. BLOCK DIAGRAM
TYPICAL TIME SHARING APPLICATION (NOTE 8)



NIXIE® NUMERICAL INDICATOR TUBE (FOR TIME SHARING APPLICATIONS)

TYPES
B-5855
B-5855S

The B-5855 NIXIE tube is an ultra-long life, high quality, cold cathode, numeric indicator tube. The tube can display the numerals 0-9 and has two independently operable decimal points inside the tube (right and left of the numerals). Substantial driver-circuitry cost savings can be obtained because the tube has been designed for high peak current-low duty cycle pulsed operation with time shared driver circuitry. Bright clear characters together with an optimum aspect ratio (height to width) provides excellent readability and viewing distance. The small diameter of the tube (0.510" max.) permits 0.520" center-to-center mounting and its short seated height (1.350" max. including standoff) allows for minimal instrument panel dimensions.

A moveable pin straightener-standoff*, which is used to align the tube pins for ease of PC layout and insertion, is part of the tube assembly. Also, the standoff is provided with "bumps" to give clearance so flux gas can escape during soldering.

The B-5855S is identical to the B-5855 except the B-5855S leads are cut to 0.175" ± .015 for use with the SK207 socket, Bulletin 1138.

*Standoff will not be supplied with the tube until after October 1, 1968.

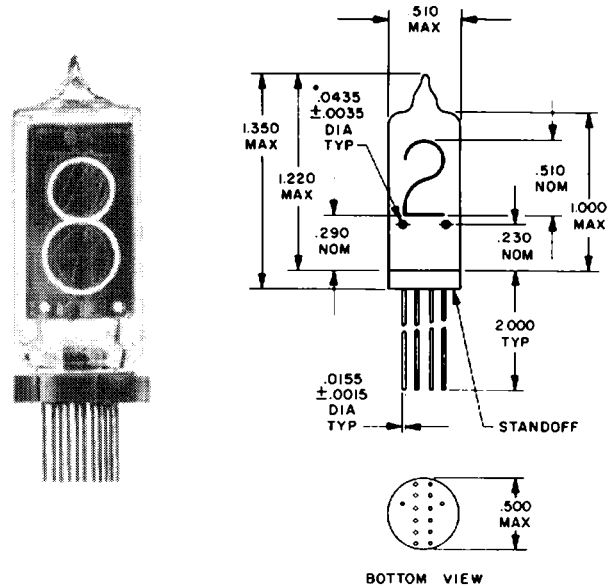


Figure 1. OUTLINE DRAWING
SEE NOTE 4

ELECTRICAL SPECIFICATIONS

Absolute Ratings

Ionization Voltage	+170 Vdc max
Supply Voltage	+180 Vdc min.
Peak Anode Current (Note 3)	17 ma max
Decimal Point Cathode Current	Note 6
Average Total Power Dissipation (Note 5)	0.25 watts

Typical Operating Conditions (Note 1, Figures 2 & 6)

Supply Voltage	+200 Vdc nom.
Peak Anode Current (Figure 2)	14 ma typ
Pulse Durations	100 μsec
Duty Cycle	2 msec

Test Conditions (Figures 2 & 6)

Peak Anode Current	11 ma peak
Pulse Duration	100 μsec
Repetition Rate	500 cps
Test Circuit	Figure 6 (Note 7)

Test Limits

Tube Voltage Drop	180 V peak (Note 8)
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MECHANICAL CHARACTERISTICS

Outline Drawing	Figure 1
Pin Connection	Table 1
Pin Layout	Figure 4
Basing Diagram	Figure 5
Weight	0.4 oz. max
Lead Finish- B-5855	Hot tin dip from 1.000 in. from tube base
Max. Viewing Distance	24 feet
Mounting	Note 2
Color	Neon red 3650, 4358, 5654, & 5852 Angstroms

ENVIRONMENTAL SPECIFICATIONS

Shock	250 g's, 1.0 msec., 20 total shocks X1, X2, Y1 and Y2 planes
Thermal Shock	15 sec., 90°C water – immediate transfer to 30°C water, 15 seconds
Ambient temperature	-20 to +55°C -40 to 70°C (reduced life)
Altitude	70,000 ft.
Vibration	10-50-10 cps., 08" total excursion 50-2000 cps 10 g's 15 minutes X1, X2, Y1 planes

NOTES

1. The tube is normally operated from a constant current source. If a constant voltage source is used, the appropriate current limiting resistor should be used to maintain anode current within specified limits.
2. For proper viewing the tube should be oriented so that pins 7 and 6 are closest to the viewer.
3. In a typical strobed/time sharing application, (Figure 6), "same-numeral" cathodes (i.e., all 1's, all 2's, etc.) of all tubes are connected in parallel and the anodes are strobed sequentially. The rapid strobing is above the flicker rate and visual indication is normal. However, since the "on" duty cycle is not 100%, a higher than normal current is used to compensate for loss of brightness. The (B-5855) NIXIE tubes are constructed and specified for these peak current conditions and no extraneous glow is exhibited during this operation.
4. Lead length on B-5855S is $0.175'' \pm .015$ (for use with SK-207 Socket).
5. Maximum on time for calculating average power dissipation is 20 msec.
6. The decimal point must never be operated at a potential more negative than the on numeric cathode.
7. Decimal points are disconnected for this test.
8. This measurement is made after the tube has ionized and near the termination of the 100 μ sec anode pulse.

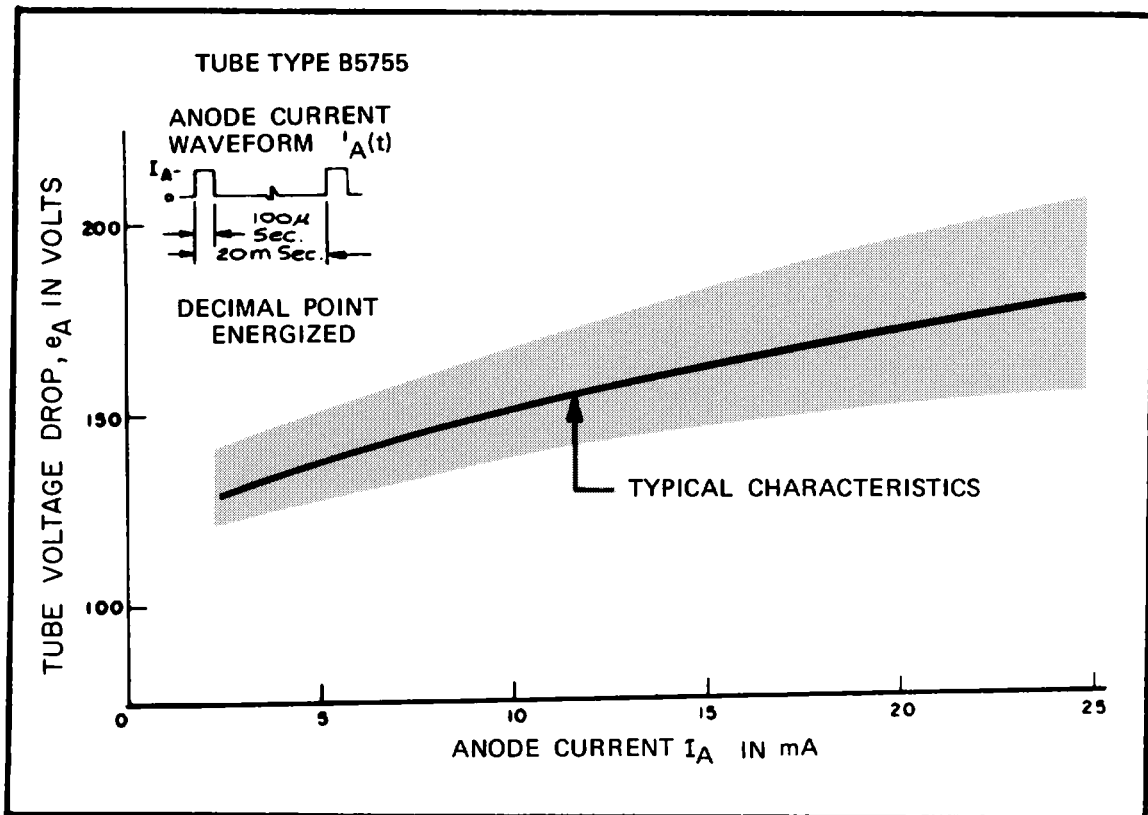


Figure 2 NIXIE TUBE, V-I CHARACTERISTICS

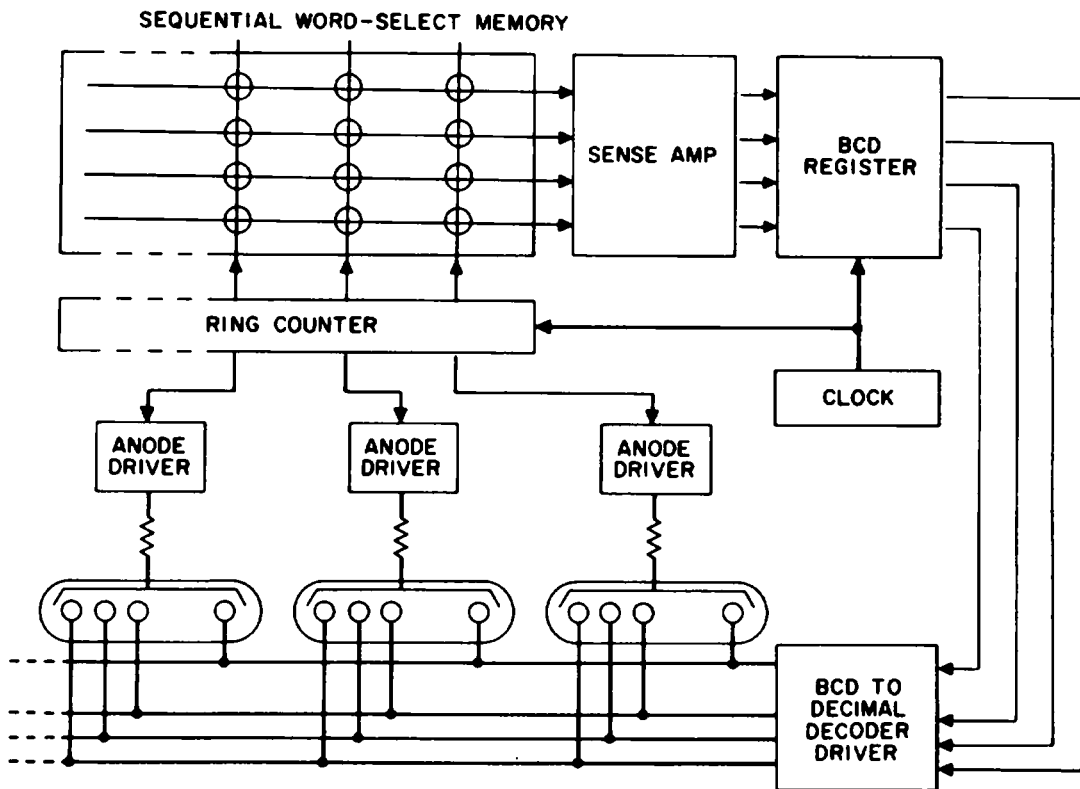


Figure 3 BLOCK DIAGRAM TYPICAL TIME SHARING APPLICATION (Note 3)

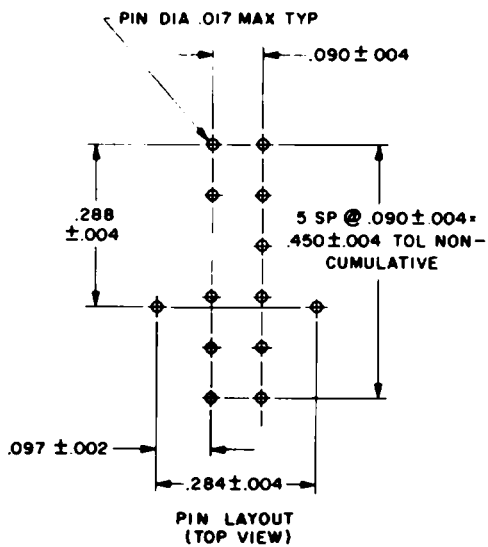


Figure 4. PIN LAYOUT (Top View)

PIN	CONNECTIONS
1	NUMERAL 1
2	NUMERAL 2
3	NUMERAL 3
4	NUMERAL 4
5	NUMERAL 5
6	NUMERAL 6
7	ANODE
8	NUMERAL 7
9	NUMERAL 8
10	NO STEM LEAD
11	NUMERAL 9
12	NUMERAL 0
13	RT DEC PT
14	LFT DEC PT

Table 1. PIN CONNECTIONS

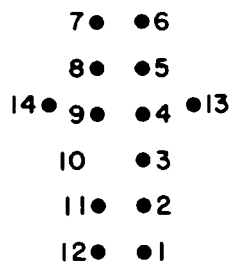


Figure 5. BASING DIAGRAM (Bottom View)

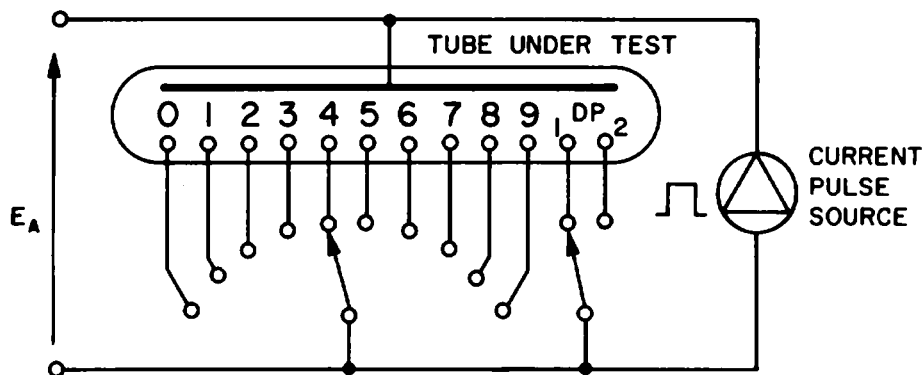


Figure 6. TEST CIRCUIT

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Printed in U S A



NIXIE® PLUS-MINUS INDICATOR TUBE

(FOR DC APPLICATIONS)

TYPES
B-5856
B-5856S

PRELIMINARY INFORMATION

The B-5856 NIXIE tube is an ultra-long life, high quality, cold-cathode indicator tube having a common anode with +, - display. The numeral aspect ratio (height to width) has been designed to provide the optimum in readability and viewing distance. The small diameter of the tube (0.510" max) permits 0.520" center-to-center mounting and its short seated height (1.350" max including standoff) allows for minimal instrument panel dimensions.

A moveable pin-straightener-standoff, which is used to align the tube pins for ease of PC layout and insertion, is part of the tube assembly: The standoff also allows solder gas to escape during soldering.

These tubes have been specifically designed to operate only in DC applications.

The B-5856S is identical to the B-5856 except its leads are cut to 0.175" ± .015 for use with the SK-207 socket, Bulletin 1138.

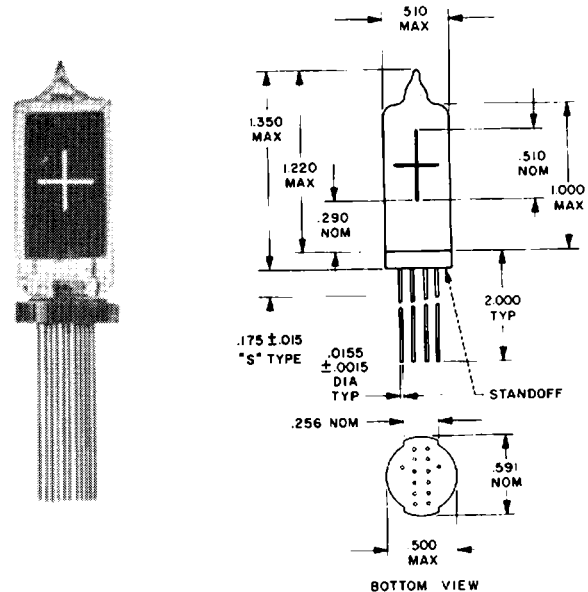


Figure 1. OUTLINE DRAWING

ELECTRICAL SPECIFICATIONS

Absolute Ratings

Ionization Voltage (Note 1, Fig. 4)	+170 Vdc max
Supply Voltage	+170 Vdc min
Anode Current	2.8 ma max
Cathode Pre-bias	+60 Vdc to +110 Vdc

Typical Operating Conditions (Note 1, Figure 4)

Supply Voltage	+170 Vdc
Series Resistor (Table 2)	15 kΩ
Anode Current (Figure 4)	2.0 ma typ
Cathode Pre-bias Voltage	+60 Vdc

Test Conditions (Figure 4)

Test Limits (Figure 4)

MECHANICAL SPECIFICATIONS

Outline Drawing	Figure 1
Pin Connection	Table 1
Pin Layout	Figure 2
Basing Diagram	Figure 3
Weight	0.4 oz. max
Lead Finish B-5856	Hot tin dip from 0.600 in. from tube base
Max. Viewing Distance	24 feet

Mounting	Note 2
Color	Neon red
	3650, 4358, 5654 & 5852 angstroms
Brightness	200 ft. lamberts
Soldering Heat B-5856	260 ± 5°C for 10 ± 1 sec.
	0.250" from tube base

ENVIRONMENTAL DATA

Shock	250 g's, 1.0 msec., 20 total shocks X1, X2, Y1 and Y2 planes	Ambient temperature	-20 to +55°C -40 to 70°C (reduced life)
Thermal Shock	15 sec., 90°C water - immediate transfer to 30°C water, 15 seconds	Altitude	70,000 ft.
Life Expectancy (dynamic)	(200,000 hours) (Note 10)	Vibration	10-50-10 cps., 08" total excursion 50-2000 cps 10 g's 15 minutes X1, X2, Y1 planes

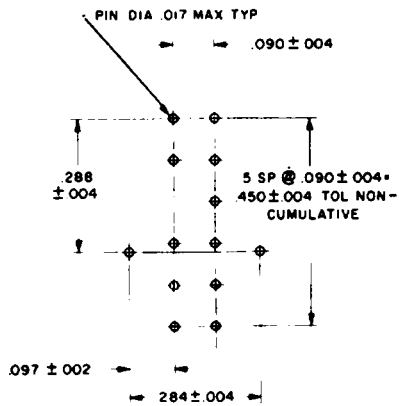
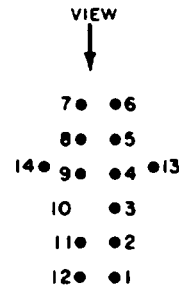


Figure 2. PIN LAYOUT (TOP VIEW)



(BOTTOM VIEW)

Figure 3. BASING DIAGRAM

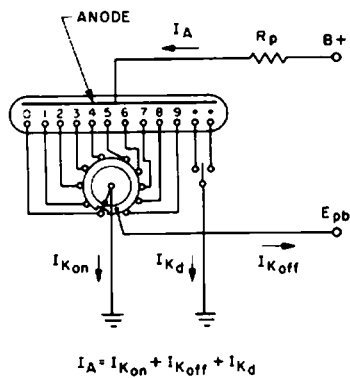


Figure 4. TEST CIRCUIT

PIN	CONNECTIONS
1	-, MINUS
2	
3	
4	
5	
6	+, PLUS
7	ANODE
8	
9	
10	NO PIN
11	
12	
13	
14	

BLANK SPACES REPRESENT INTERNAL CONNECTIONS

Table 1. PIN CONNECTIONS

NOTES

1. The minimum supply voltage should be +170 Vdc, however, the use of the highest voltage available with an appropriate series resistor is recommended to provide: 1) greater tolerance of B+ & Rp; 2) more uniform brightness; 3) more constant current operation; 4) improved operation with temperature and 5) improved life. (See Table 2)

Supply Voltage (Vdc)	170	200	250	300
Anode Resistor (Rp) (kΩ)	15	30	56	82

Table 2. Anode Resistor Values

2. For proper viewing the tube should be oriented so that pins 7 and 6 are closest to the viewer (Figure 3.)
3. Lead length on B-5856S is 0.175" ± .015 (for use with SK-207 socket).
4. Under normal DC operating conditions.



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Printed in U.S.A.



NIXIE® NUMERICAL INDICATOR TUBE

(FOR DC AND TIME SHARING APPLICATIONS)

TYPES
B-5859
B-5859S

PRELIMINARY INFORMATION

The B-5859 NIXIE tube is an ultra-long life, high quality, cold-cathode indicator tube having a common anode. It can display the numerals 0-9 and has two decimal points inside the tube (right and left of the numerals) which are independently operable. The numeral aspect ratio (height to width) has been designed to provide the optimum in readability and viewing distance. The small diameter of the tube (0.510" max) permits 0.520" center-to-center mounting and its short seated height (1.350" max including standoff) allows for minimal instrument panel dimensions.

A moveable pin-straightener-standoff, which is used to align the tube pins for ease of PC layout and insertion, is part of the tube assembly. The standoff also allows solder gas to escape during soldering. These tubes have been specifically designed to operate both in normal DC applications and strobed/time sharing applications (See Note 8).

The B-5859S is identical to the B-5859 except its leads are cut to 0.175" ± .015 for use with the SK-207 socket, Bulletin 1138.

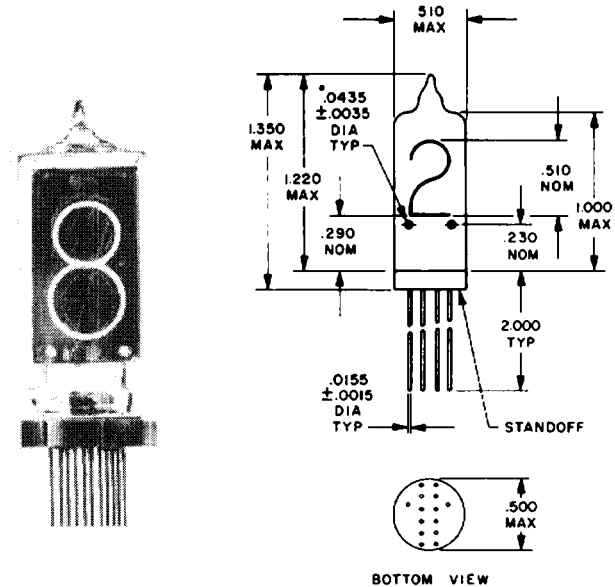


Figure 1. OUTLINE DRAWING

ELECTRICAL SPECIFICATIONS

Absolute Ratings

Ionization Voltage (Note 1, Fig. 4)	+170 Vdc max
Supply Voltage	+170 Vdc min
Anode Current (Note 5)	5.0 ma max
Peak Anode Current	
(Notes 8 & 9)	20 ma max
Decimal Point Cathode Current	
(Note 6)	0.1 ma to 0.5 ma
Cathode Pre-bias	+60 Vdc to +110 Vdc

Typical Operating Conditions (Notes 1, 2 & 7, Figures 4, 5 & 6)

Supply Voltage	+170 Vdc
Series Resistor (Table 2)	10 kΩ
Anode Current (Figure 4)	3.4 ma typ
Decimal Point Current (Table 2)	0.35 ma typ
Cathode Pre-bias Voltage	+60 Vdc

Test Conditions (Figures 4, 5 and 6)

Test Limits (Figures 4, 5 and 6)

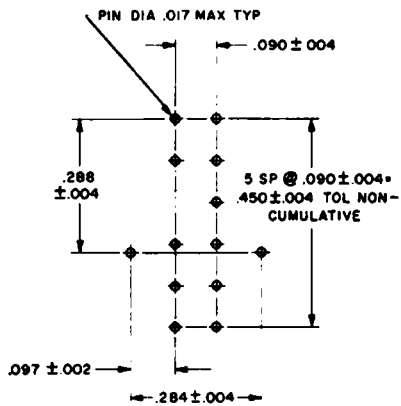
MECHANICAL SPECIFICATIONS

Outline Drawing	Figure 1
Pin Connection	Table 1
Pin Layout	Figure 2
Basing Diagram	Figure 3
Weight	0.4 oz. max
Lead Finish B-5859	Hot tin dip from 0.600 in. from tube base
Max. Viewing Distance	24 feet

Mounting	Note 3
Color	Neon red
	3650, 4358, 5654 & 5852 angstroms
Brightness	200 ft. lamberts
Soldering Heat B-5859	260 ± 5°C for 10 ± 1 sec.
	0.250" from tube base

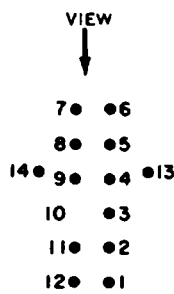
ENVIRONMENTAL DATA

Shock	250 g's, 1.0 msec., 20 total shocks	Ambient temperature	-20 to +55°C
	X1, X2, Y1 and Y2 planes		-40 to 70°C (reduced life)
Thermal Shock	15 sec., 90°C water - immediate transfer to 30°C water, 15 seconds	Altitude	70,000 ft.
Life Expectancy		Vibration	10-50-10 cps., 08" total excursion
(dynamic)	(200,000 hours) (Note 10)		50-2000 cps 10 g's 15 minutes
			X1, X2, Y1 planes



PIN	CONNECTIONS
1	NUMERAL 1
2	NUMERAL 2
3	NUMERAL 3
4	NUMERAL 4
5	NUMERAL 5
6	NUMERAL 6
7	ANODE
8	NUMERAL 7
9	NUMERAL 8
10	NO PIN
11	NUMERAL 9
12	NUMERAL 0
13	RT DEC PT
14	LFT DEC PT

Table 1. PIN CONNECTIONS



(BOTTOM VIEW)

Figure 3. BASING DIAGRAM

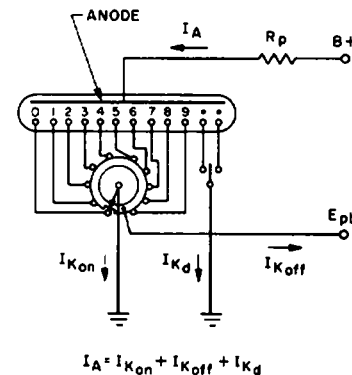


Figure 4. TEST CIRCUIT

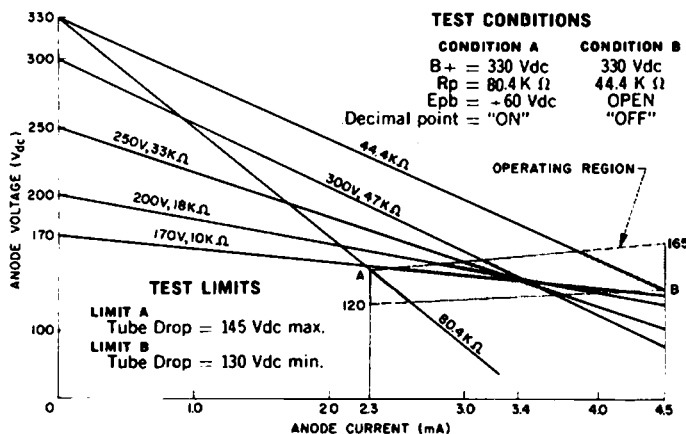


Figure 5. TUBE CHARACTERISTICS DC (NOTE 7)

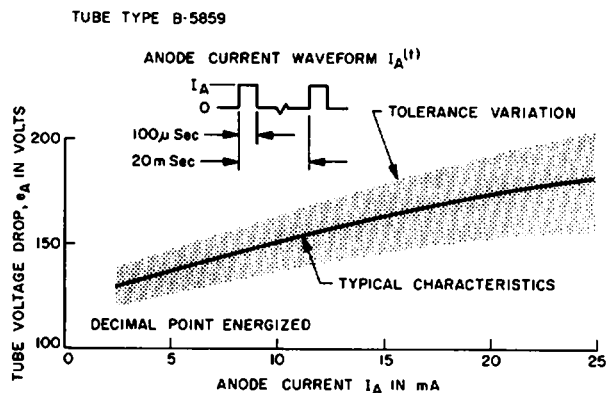


Figure 6. TUBE CHARACTERISTICS (TIME SHARING) (NOTES 7 AND 8)

NOTES

- The minimum supply voltage should be +170 Vdc, however, the use of the highest voltage available with an appropriate series resistor is recommended to provide: 1) greater tolerance of B+ & Rp; 2) more uniform brightness; 3) more constant current operation; 4) improved operation with temperature and 5) improved life. (See Table 2 and Note 7)
- This NIXIE tube can be used in 4 modes of operation (Figure 4)
 - When a numeral is always "on" and a decimal point will never be "on."
 - When a numeral is always "on" and a decimal point may or may not be "on."
 - When a numeral is always "on" and a decimal point is always "on."
 - When a numeral or a decimal point will be "on" but not at the same time (numeral or decimal point are lighted alone) — use the anode resistor plus a decimal point resistor.

In cases a, b and c, only the limiting anode resistor is necessary. (See Table 2)

NOTE: In cases a, b and c, a numeral must be "on" when the decimal point is "on" to prevent the decimal point from receiving excessive current.

Supply Voltage (Vdc)	170	200	250	300
Anode Resistor (Rp) (kΩ)	10	18	33	47
Decimal point resistor (Rkd) (kΩ)	100	180	330	470

Table 2

- For proper viewing the tube should be oriented so that pins 7 and 6 are closest to the viewer (Figure 3.)
- Lead length on B-5859S is 0.175" ± .015 (for use with SK-207 socket).
- Value when decimal point is "off."
- Value when only the decimal point is "on."
- For proper NIXIE tube operation, a load line must pass through the operating region (shaded area) above point "A" and below point "B" in Figure 5. Operation at an anode current below point "A" can result in partial or incomplete numeral glow. Operation at an anode current above point "B" can result in shorter life. Typical load lines for 170 Vdc-10 kΩ, 200 Vdc-18 kΩ, 250 Vdc-33 kΩ, and 300 Vdc-47 kΩ are shown. The limits of the operating region were determined at the 330 V-80.4kΩ, 330 V-44.4 kΩ. At these limits the tubes will exhibit an anode current within the limits of 2.3 ma min. and 4.5 ma max. These limits can be used to determine if a tube meets the specification.
- In a typical strobed/time sharing application, (Figure 6) "same-numeral" cathodes (i.e., all 1's, all 2's, etc.) of all tubes are connected in parallel and the anodes are strobed sequentially. The rapid strobing is above the flicker rate and visual indication is normal. However, since the "on" duty cycle is not 100%, a higher than normal current is used to compensate for loss of brightness. The B-5859 NIXIE tubes are constructed and specified for these peak current conditions and no extraneous glow is exhibited during this operation.
- The maximum pulse duration is 5.0 milliseconds with a 10% max duty cycle.
- Under normal DC operating conditions.

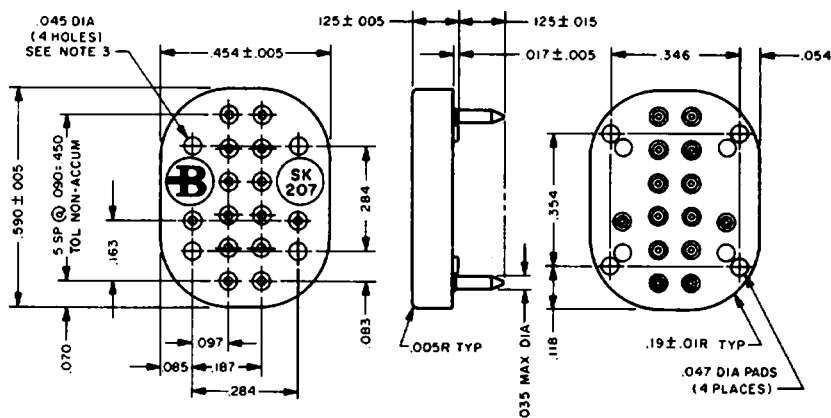
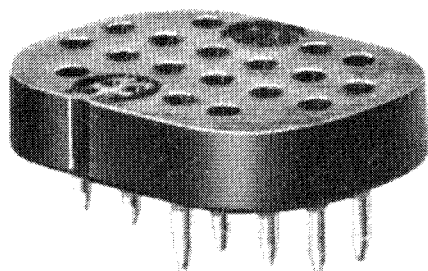
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NIXIE® TUBE SOCKET

TYPE
SK-207



NOTES

1. ALL TOLERANCES TO BE ±.003 UNLESS OTHERWISE SPECIFIED.
2. MATERIALS AND FINISHES:
 A CONTACTS BERYLLIUM COPPER, GOLD PLATED .00002 THK MIN
 R HOUSING NYLON, 20%-30% GLASS FIBER FILLED, BLACK MATTE FINISH
3. .005 MAX MOLD FLASH AT BOTTOM OF HOLE.

OUTLINE DRAWING

The SK-207 Sockets are intended for use with Burroughs B-5750S and B-5850S series NIXIE® tubes.

NEW TECHNIQUES PROVIDE THESE UNIQUE FEATURES:

- NIXIE tube insertion force is less than withdrawal force.
- Socket height only adds 0.125" to tube seated height.
- Pin layout is designed for IC compatibility and interfacing.
- Socket width is less than that of the NIXIE tube.
- "Holes" on top of the socket mate and register with NIXIE tube standoff-"bumps" for alignment and ease of insertion.
- "Feet" on the bottom of the socket provide space to facilitate solder flow, allow solder gas to escape and permit solder flux to be cleaned from PC cards.



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