

# Dieter's

## Nixie Tube Data Archive

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If you have more datasheets, articles, books, pictures or other information about Nixie tubes or other display devices please let me know.

Thank you!

Document in this file	Burroughs Specifying Guide - Bulletin 1061K - Year 1970
Display devices in this document	7977, 8421, 8422, 8423, B4032, B4998, B5092, B5750, B-5750, B-5750S, B-5755, B-5850S, B-5853, B-5853ST, B-5855, B-5855ST, B-5856, B-5856ST, B-5859, B-5870, B5971, B5991, B-59956, B-6091, B-7037, B7971, B-8091, B8971, BIP-8804, BIP-8806, BIP-8820, BIP-8821, BIP-8901, BIP-9802, BIP-9806, BR16400, SK-207, SSD1000-0010, SSD1000-0020, SSD1000-0030, SSD1000-0040

# BURROUGHS SPECIFYING GUIDE



E L E C T R O N I C   C O M P O N E N T S   A N D   S Y S T E M S





## SELF-SCAN™ PANEL DISPLAY

The SELF-SCAN panel display is a significant advance in readout technology. Available with or without memory SELF-SCAN panel displays are available in alphanumeric and numeric models. The formed characters and flicker-free, high-contrast display make it easily readable in bright light or dark shadows. And because electronic drive circuitry has been reduced by as much as 90%, SELF-SCAN panel displays are the most economical displays for readouts with 8 to 400 characters of alphanumeric display.

### 16 or 18-POSITION ALPHANUMERIC SELF-SCAN PANEL DISPLAY MODEL SSD 1000-0030

The model SSD 1000-0030 SELF-SCAN panel display is a single row, 16 or 18-position display with a repertoire of 64 characters. Each character is displayed in a five-by-seven dot matrix format with two columns of space between each character on a 16 position display and one column of space between characters on an 18 position display. Each character is defined by a positive logic six bit code. The display is completely self-contained and packaged in a one piece, molded housing which encloses and supports the display panel.

The panel operates in a scanning mode, scanning from left to right, one full column at a time. Six or seven clock pulses must be provided, depending on the level of the count control input. The appropriate six bit code must be present during the first five clock pulses of each character position. After the last character is displayed, a reset pulse must be generated to initiate a new scan. A new scan may be initiated before the last character, at any time during the scan, by generating a reset pulse. This, however, must be done only on a low duty cycle basis. Generating the reset pulse prior to the last character position increases the duty cycle of the positions used, thereby changing their aging characteristics. When operating in this mode, the reset pulse must be held a minimum of  $2t_1$  us. The recommended method of displaying a reduced number of character positions is to supply the appropriate level to the blank disable input.

The following signals are required for proper operation:

**Data Inputs**—A six bit code must be present at the data input terminals during the first five clock pulses of each character position.

**Clock Input**—Seven clock pulses must be supplied for each character position for a 16 position display. Six clock pulses must be supplied for each character position for an 18 position display.

**Reset Input**—One reset pulse must be supplied after each complete scan or after the character to be displayed.

**Count Control Input**—This input determines whether

the display operates in a 16 or 18 position mode. Tying this input to VSS yields an 18 character display with one column of space between characters. Tying it to  $V_{CC}$  yields a 16 character display with two columns of space between characters.

**Blank Disable**—The blank disable input is a switch closure to ground. The display may be blanked at any time by opening this input.

### 16-POSITION ALPHANUMERIC SELF-SCAN PANEL DISPLAY WITH MEMORY MODEL SSD 1000-0040

The model SSD 1000-0040 SELF-SCAN panel display is a single row, sixteen position display with associated drive electronics, packaged in a housing with an integral bezel. The display has a repertoire of sixty four characters and contains a refresh memory. Each character is displayed in a five-by-seven dot matrix format with two columns of space between characters. Each character is defined by a positive logic six bit code.

The display operates in a scanning mode entering characters from left to right. The characters are entered sequentially. The appropriate six bit code must be present one full scan time for each entry. The display will continue in order, entering a total of 16 characters. Character number 17 will be entered in the display such that it replaces the first character on the left. The display may be cleared at any time during the 16 character cycle by presenting the appropriate signal at the clear line for one scan period.

The following signals are required for proper operation:

**Data Inputs**—A six bit code must be present at the data input terminal for a minimum of 20 ms after the initiation of the data present pulse for each display position.

**Data Present Pulse**—A data present pulse must be generated coincident with, or after the initiation of the data inputs.

**Clear Pulse**—A clear pulse must be present at the clear input and held for a minimum of 20 ms to clear the display.

ABCDEFGHIJKLMNOPQRSTUVWXYZ123456  
 78900@~{ } ( ) . = ) ? / % ! ' , \* \$ " + - ! # & < > [ ]  
 SELF-SCAN\* PANEL DISPLAYS---MOST  
 SIGNIFICANT ADVANCE IN READOUT  
 TECHNOLOGY SINCE NIXIE\* TUBES  
 WERE DEVELOPED BY BURROUGHS.....  
 \*SELF-SCAN & NIXIE---TRADEMARKS  
 OF THE BURROUGHS CORPORATION

#### 16 POSITION NUMERIC SELF-SCAN PANEL DISPLAY WITH MEMORY MODEL SSD 1000-0020

The SSD1000-0020 SELF-SCAN panel display offers all the features of the numeric SSD1000-0010 panel plus includes a refresh memory. The unit requires the following signals for proper operation.

**DATA INPUTS**—A four bit code must be present at the data input terminal for at least 20ms after the initiation of the data present pulse.

**DATA PRESENT PULSE**—A data present pulse must be generated coincident with, or after the initiation of data inputs for each character position.

**CLEAR PULSE**—A clear pulse must be present at the clear input and held for 20 ms to clear the display.

The panel may be used to display less than the full sixteen characters by supplying a blank code for the undesired positions.

#### 256 POSITION SELF-SCAN PANEL DISPLAY SUBSYSTEM

The Burroughs SELF-SCAN panel display system concept is unique in that it allows the user to construct custom-tailored stand-alone communication terminals from "off-the-shelf" components. The SSPD (SELF-SCAN panel display) subsystem, introduced by Burroughs in 1969, is the heart of a terminal system. This subsystem, can be purchased as a basic subsystem for integration into existing terminal system design; can be purchased as a complete, packaged, stand-alone system; or, can be purchased at any level of complexity between the basic subsystem and complete stand-alone unit with options.

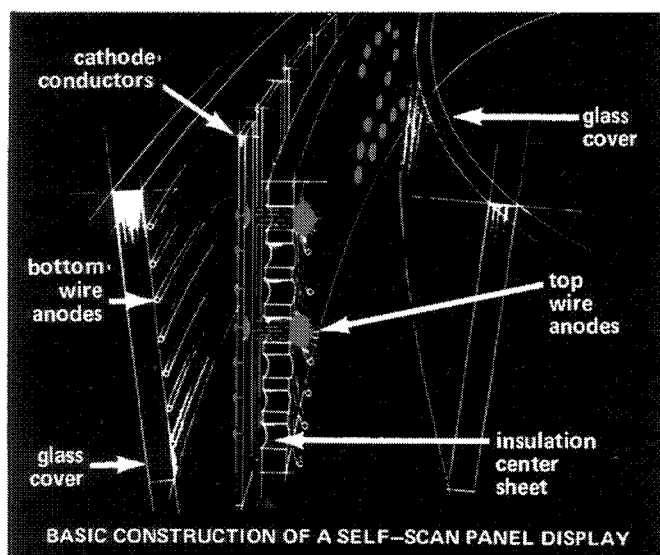
The inherent features of the SELF-SCAN panel display make it the ideal readout for terminal applications. Reduced electronics and a display panel thickness of less than ½ inch allow packaging of the display, and therefore the terminal in a compact enclosure. The Burroughs design features a free-moving display head which can be lowered for convenient portability and even removed from the keyboard for wall or remote installations.

The character format of the SELF-SCAN panel display subsystem is the popular 5 x 7 dot matrix pattern shown

above. There are two sizes of SSPD subsystems and systems. In the larger size the light emitting cavities that form the display matrix have a diameter of .024" and are on .040" centers, providing a character size of 0.18" wide by 0.26" tall. Two columns of dots (approximately 0.1") are employed as spacing between characters and three rows of dots separate the registers. The smaller panel display employs light emitting dots of 0.020" diameter on 0.030" centers. This arrangement provides a character 0.14" wide by 0.20" high. Like its companion panel this subsystem uses two columns of dots between characters and three rows of dots between registers. Both the 0.030" and 0.040" displays are arranged in 8 registers of 32 characters per register. The bright neon-orange characters, contrasted against the dark background, provide a comfortable display which can be read easily from distances up to 20 feet for the .030" panel and 25 feet for the .040" panel. The Burroughs 256 character SSPD subsystem and SSPD system provide all the advantages of comparable CRT displays without the cumbersome bulk and massive electronics associated with the CRT device.

The keyboard employed in the SELF-SCAN panel display system is similar to a standard electric typewriter keyboard both in layout and key pressure. The shift provision allows use of the full 64 character ASCII code. The keyboard is electronically interlocked so that if two keys are simultaneously depressed no code is emitted. A two key roll over feature is also employed to provide for rapid input of data for display. Transmission of the second code however does require the release of the first key. The keyboard is designed to allow an input rate of at least 80 wpm without data loss. In addition to the standard keyboard which includes the cursor control keys, controls are provided for other normal terminal functions such as power on, local control, transmit, receive, and end of test.

The basic system uses the half duplex asynchronous (RS-232C) method of transmission. This means that at any point in time the system can either transmit or receive data, but not both. In the basic system the method of communication linking the terminal to the central processor is polling and selection.



### 16-POSITION NUMERIC SELF-SCAN PANEL DISPLAY Model SSD 1000-0010

The model SSD 1000-0010 SELF-SCAN panel display is a single row, sixteen position display with associated drive electronics, packaged in a housing with an integral bezel. The display has a repertoire of sixteen characters. Each character is displayed in a five-by-seven dot matrix format with two columns of space between each character. Each character is defined by a positive logic four bit code.

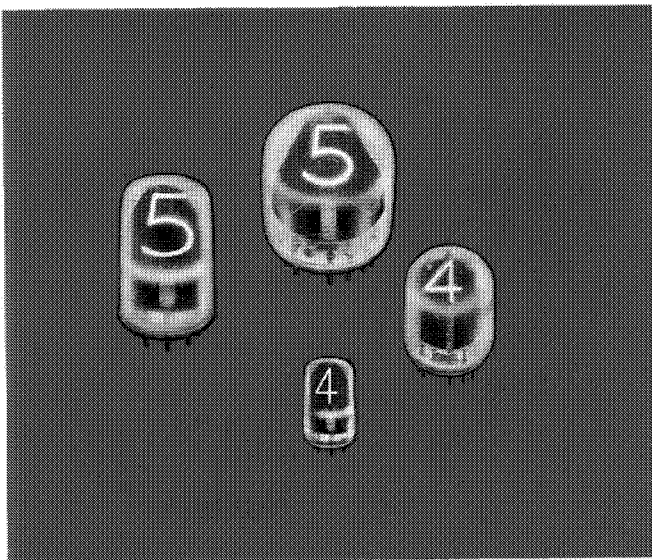
The display operates in a scanning mode, scanning from left to right, one full column at a time. Seven clock pulses must be provided for each character position. The appropriate four bit code must be present during the first five clock pulses of each character position. After the last character is displayed a reset pulse must be generated to initiate a new scan. A new scan may be initiated before the last character, at any time during the scan, by generating a reset pulse. This, however, must be done only on a low duty cycle basis. Generating the reset pulse prior to the sixteenth character position increases the duty cycle of the positions used, thereby changing their aging characteristics. When operating in this mode, the reset pulse must be held a minimum of  $2t_1$  us. The recommended method of displaying less than the full sixteen character positions is to supply a blank code for the undesired positions.

The following signals are required for proper operation:

**CLOCK INPUT**—Seven clock pulses must be supplied for each display position.

**DATA INPUTS**—A four bit code must be present at the data input terminals during the first five clock pulses of each character position.

**RESET INPUT**—One reset pulse must be supplied after each complete scan or after the last character to be displayed.



## MINIATURE NIXIE® INDICATOR TUBES

Available in rectangular and round configurations. Use for airborne and mobile equipment readouts and small lightweight instruments.

Character Size . . . . . 0.3"

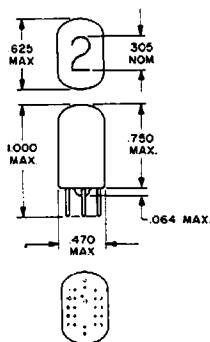
Viewing Distance . . . . . 14.0"

## STANDARD NIXIE INDICATOR TUBES

Available in round and rectangular configurations. Use for desk top displays and bench test equipment.

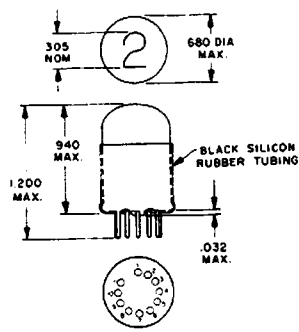
Character Size . . . . . 0.6"

Viewing Distance . . . . . 30.0"



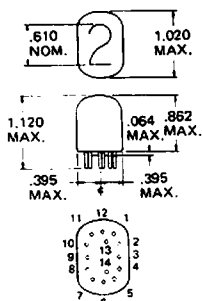
Type B4998 (Rectangular)  
PIN CONNECTIONS  
Pin No. Numeral

1-	2
2-	3
3-	4
4-	5
5-	6
6-	1C
7-	7
8-	8
9-	9
10-	0
11-	anode
12-	1
13-	1C



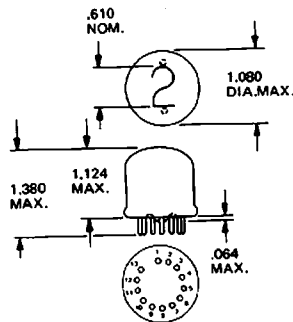
Type B4032 (7977) (round)  
PIN CONNECTIONS  
Pin No. Numeral

1-	1
2-	2
3-	3
4-	4
5-	5
6-	6
7-	7
8-	8
9-	9
10-	0



Type B5991 (8422) (rectangular)  
PIN CONNECTIONS  
Pin No. Numeral

1-	anode
2-	0
3-	9
4-	8
5-	7
6-	6
7-	5
8-	4
9-	3
10-	2
11-	1
12-	1C
13-	1C
14-	1C



Type B5092 (8421) (round)  
PIN CONNECTIONS  
Pin No. Numeral

1-	1C
2-	anode
3-	0
4-	9
5-	8
6-	7
7-	6
8-	1C
9-	5
10-	4
11-	3
12-	2
13-	1

## ELECTRICAL DATA/MINIATURE TUBES (See Note 1) (See Notes 2 & 3)

	B4998 Rectangular	B4032 (7977) Round
<b>Absolute Ratings</b>		
Ionization Voltage (Max)	170 Vdc	170 Vdc
Supply Voltage (Min)	170 Vdc	170 Vdc
Cathode Current (Peak)	2.5 ma	2.0 ma
<b>Test Conditions</b>		
Supply Voltage	170 Vdc	170 Vdc
Series Resistor	15 K	15 K
Cathode Current (Min)	1.0 ma	0.7 ma
(Max)	2.0 ma	1.4 ma
<b>Sockets</b>		
Standard Wiring	SK176	SK116A
Printed Circuit	SK178	SK118A

## ELECTRICAL DATA/STANDARD TUBES (See Note 1) (See Notes 2 & 3)

	B5991 (8422) Rectangular	B5092 (8421) Round
<b>Absolute Ratings</b>		
Ionization Voltage (Max)	170 Vdc	170 Vdc
Supply Voltage (Min)	170 Vdc	170 Vdc
Cathode Current (Peak)	3.5 ma	3.5 ma
<b>Test Conditions</b>		
Supply Voltage	170 Vdc	170 Vdc
Series Resistor	8.2K	10K
Cathode Current (Min)	1.5 ma	1.5 ma
(Max)	3.0 ma	3.0 ma
<b>Sockets</b>		
Standard Wiring	SK169	SK112
Printed Circuit	SK144	SK130

## 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.
2. Special NIXIE tubes such as regular life wide angle types and weldable or tin dipped flying lead types are also available.
3. Special character NIXIE tubes such as + and - tubes, tubes with alphabet characters, and symbols ( $\mu$ , mV) are also available.

## SUPER NIXIE INDICATOR TUBES (B-6091)

Designed for wide angle viewing. Use for desk top displays and bench test equipment.

Character Size . . . . . 0.8"

Viewing Distance . . . . . 38.0'

## LARGE NIXIE INDICATOR TUBES (B-8091)

Designed for wide angle top viewing. Use for large audience displays and status boards.

Character Size . . . . . 1.4"

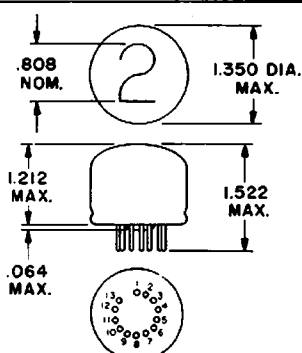
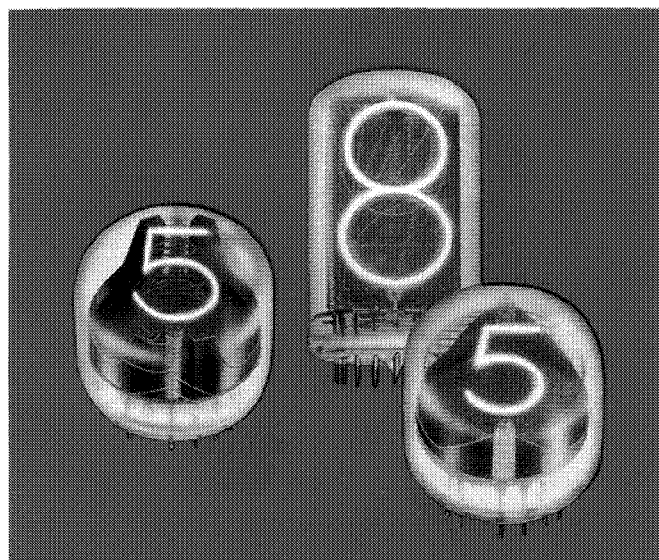
Viewing Distance . . . . . 65.0'

## JUMBO NIXIE INDICATOR TUBES (B-7037)

Designed for wide angle side viewing. Use for large audience displays and status boards.

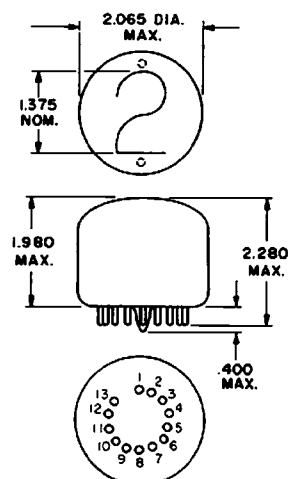
Character Size . . . . . 2.0"

Viewing Distance . . . . . 100.0'



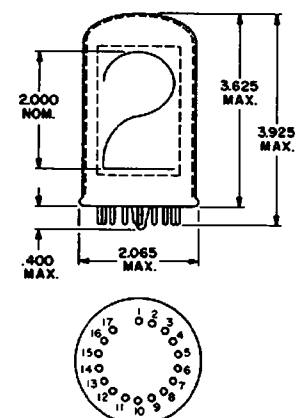
Type B-6091 (8423)  
PIN CONNECTIONS

Pin No.	Numeral
1—	IC
2—	anode
3—	0
4—	9
5—	8
6—	7
7—	6
8—	IC
9—	5
10—	4
11—	3
12—	2
13—	1



Large Type B-8091  
PIN CONNECTIONS

Pin No.	Numeral
1—	IC
2—	anode
3—	0
4—	9
5—	IC
6—	IC
7—	8
8—	7
9—	6
10—	1C
11—	1C
12—	5
13—	4
14—	3
15—	1C
16—	2
17—	1



Jumbo Type B-7037  
PIN CONNECTIONS

Pin No.	Numeral
1—	IC
2—	Anode
3—	6
4—	0
5—	IC
6—	IC
7—	2
8—	4
9—	1
10—	IC
11—	IC
12—	8
13—	9
14—	5
15—	IC
16—	7
17—	3

### ELECTRICAL DATA/SUPER (See Note 1) (See Note 3)

	B-6091 (8423) Wide Angle
<b>Absolute Ratings</b>	
Ionization Voltage (Max)	170 Vdc
Supply Voltage (Min)	170 Vdc
Cathode Current (Peak)	4.5 ma
<b>Test Conditions</b>	
Supply Voltage	170 Vdc
Series Resistor	6.8K $\Omega$
Cathode Current (Min)	1.5 ma
(Max)	4.0 ma
Cathode Prebias Voltage	65 Vdc
<b>Sockets</b>	
Standard Wiring	SK112
Printed Circuit	SK130

### ELECTRICAL DATA/LARGE (See Note 1) (See Note 3)

	B-8091 Wide Angle
<b>Absolute Ratings</b>	
Ionization Voltage (Max)	170 Vdc
Supply Voltage (Min)	170 Vdc
Cathode Current (Peak)	6.5 ma
<b>Test Conditions</b>	
Supply Voltage	170 Vdc
Series Resistor	5.6K $\Omega$
Cathode Current (Min)	3.0 ma
(Max)	6.0 ma
Cathode Prebias Voltage	65 Vdc
<b>Sockets</b>	
Wiring	SK137

### ELECTRICAL DATA/JUMBO (See Note 1) (See Note 3)

	B-7037 Wide Angle/Side View
<b>Absolute Ratings</b>	
Ionization Voltage (Max)	200 Vdc
Supply Voltage (Min)	200 Vdc
Cathode Current (Peak)	7.5 ma
<b>Test Conditions</b>	
Supply Voltage	200 Vdc
Series Resistor	9.1K $\Omega$
Cathode Current (Min)	4.0 ma
(Max)	7.0 ma
Cathode Prebias Voltage	65 Vdc
<b>Socket</b>	
Wiring	SK137

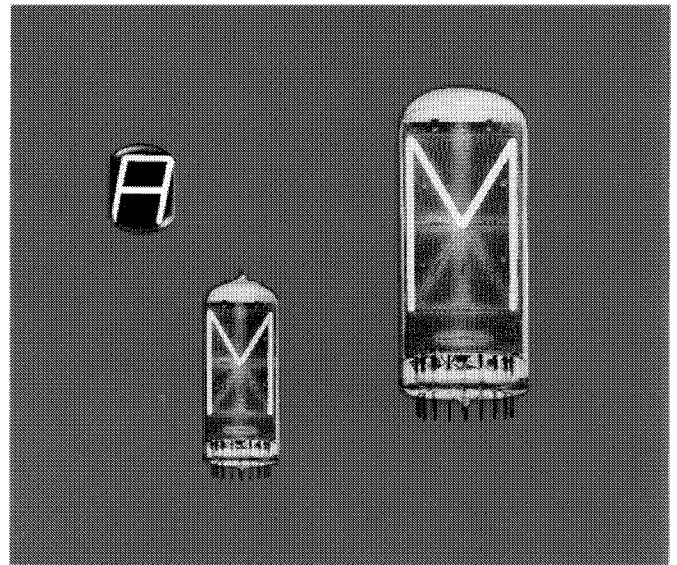




## ALPHANUMERIC NIXIE INDICATOR TUBES

Available in three sizes, standard, medium and large, alphanumeric NIXIE tubes have the capability to display all letters of the alphabet, numerals 0-9 and special characters in a single tube.

	Standard	Medium	Large
Character Size .....	0.6"	1.4"	2.5"
Viewing Distance .....	30.0'	65.0'	100.0'



(continued from page 6)

### PIN CONNECTIONS — B5750

PIN NO.	CONNECTION
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

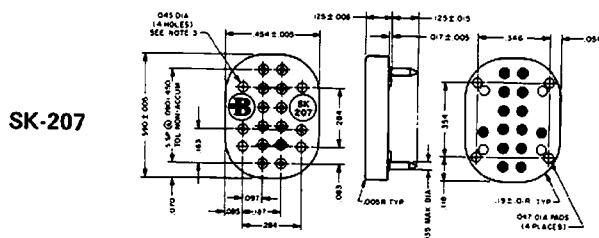
\*Pin 10 removed from B-5850 Series.

BASING DIAGRAM  
BOTTOM VIEW

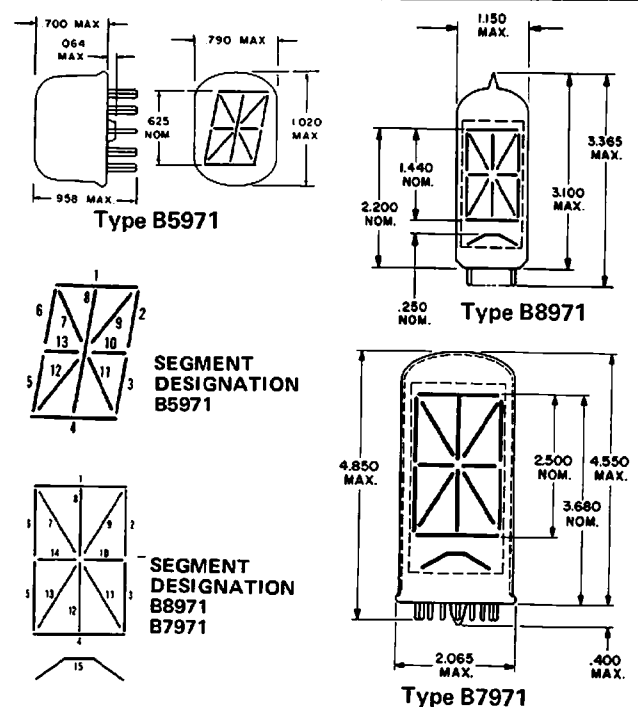
### TUBE DESCRIPTIONS

TYPE	PRES- SURE	OPER- ATION	FORMAT	INTER- CHANGE WITH
B-5750... I	Low..	D.C.	0-9 with d.p. on each side of numeral.	None
B-5755... I	High..	Pulsed	"	None
B-5853... III	High..	Pulsed	"	B-5855
B-5855... II	High..	Pulsed	"	None
B-5859... II	High..	D.C.	"	None
B-5870... III	High..	D.C.	"	B-5859/ B-5870
B-5856... II	Low..	D.C.	(±) plus/minus	None
B-5866... III	Low..	Pulsed/DC(±) plus/minus	"	B-5856

The above tube type numbers are for long lead versions. For short lead versions, the following suffixes should be used.  
S—tube with minimum thickness spacer (0.130" max) and leads cut to 0.190" max.  
ST—tube with thick spacer that makes them mechanically interchangeable with B-5755S.



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



### ELECTRICAL CHARACTERISTICS

B5971	
Absolute Ratings	
Supply Voltage (Ebb)	170 Vdc Min.
Cathode Current	
Ik (Total all cathodes)	12 ma max.
Ik (Individual cathodes, K1 through K12 — except K8, K10)	1.7 ma max.
Ik (Individual cathodes, K10, K13)	1.5 ma max.
Ik (Individual cathode, K8)	3.0 ma max.

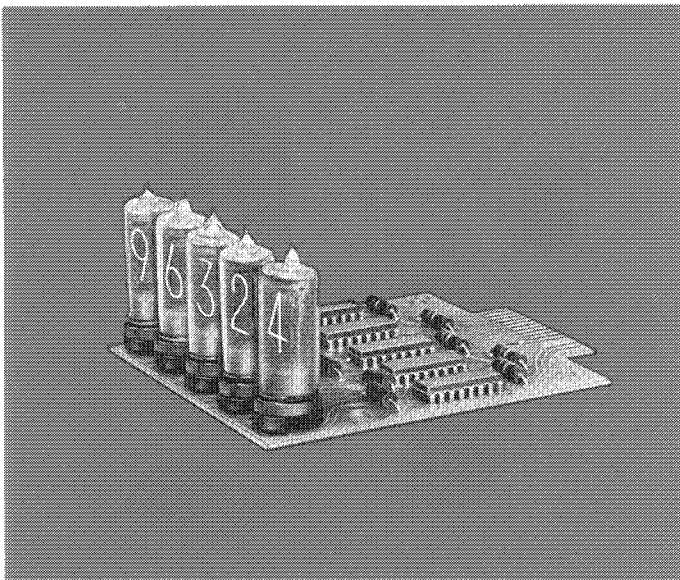
#### Test Conditions

Supply Voltage (Ebb)	170 Vdc
Series Anode Resistor (R <sub>D</sub> )	6.8 K ± 1%

B8971		B7971	
Absolute Ratings			
Supply Voltage (Ebb, Vdc min)	170		170
Individual Cathode Current (Ik, ma max)			
K1, K4, K15	6.0		6.0
K7, K9, K11, K13	5.0		5.5
K10, K14	3.5		4.0
K2, K3, K5, K6, K8, K12	4.5		5.0
Total All Cathodes	14.0		21.0

#### Test Conditions

Supply Voltage, Ebb (Vdc)	170	170
Series Anode Resistor, R <sub>D</sub> (Ohms)	4.3 K ± 1%	1.8 K ± 1%



## C-2500 SERIES MODULES

The C2500 series units are the low cost answer to operating NIXIE tubes with BCD inputs, and to counting applications. Three basic configurations are available. A NIXIE tube BCD decoder driver, a NIXIE tube decoder driver with a memory; and a NIXIE tube decade counting unit with memory. The basic assemblies are designed to be grouped to provide any configuration between 3 and 15 digits. The units are available with an optional bezel assembly which allows front mounting behind a BWB bezel window.

### C2502 DECODER DRIVER

The C2502 decoder driver accepts four line, positive logic, binary coded decimal (8-4-2-1) information from typical DTL or TTL inputs and provides visual readout of decimal numbers. A decimal point control line is available for each digit to light the decimal point located on the left side of the numeral (as viewed from the front). For greatest flexibility there is no circuitry on the control line. A B-5750S NIXIE tube is employed to display the readout. An integrally mounted SK-207 socket is used so the B-5750S NIXIE tube can be easily inserted or removed.

### C2504 DECODER DRIVER WITH MEMORY

The C2504 decoder driver is functionally similar to the C2502 except that the memory function is included. The memory circuitry consists of one, four bit, strobed-latch circuit per digit with one, four bit, strobed-latch circuit per digit with one common strobe per assembly. Information present at the information input terminals is transferred to the outputs of the latch when the strobe is high, and the outputs will follow the information inputs as long as the strobe remains high. When the strobe goes low, the information present at the information inputs at the time the transition occurred is retained at the outputs until the strobe again goes high. The latch output terminals serve as inputs to the decoder portion of the assembly.

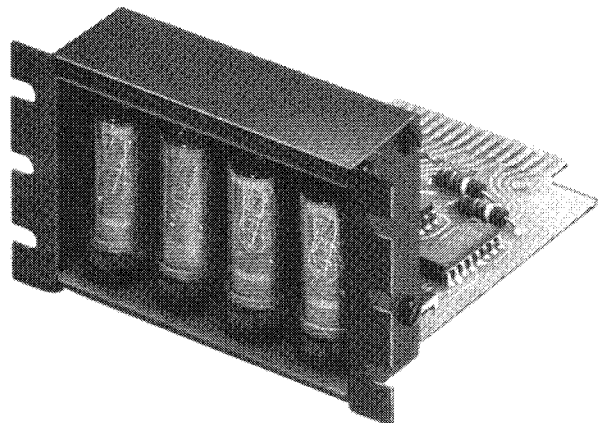
A decimal point control line is available for each digit to light the decimal point located on the left side of the numeral (as viewed from the front). For greatest flexibility there is no circuitry on the control line. A B-5750S NIXIE tube is employed to display the readout. An integrally mounted SK-207 socket is used so the B-5750S NIXIE tube can be easily inserted or removed.

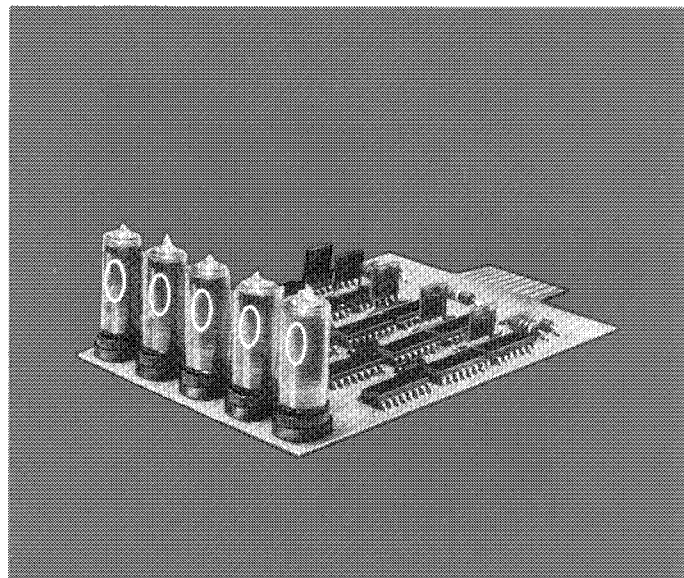
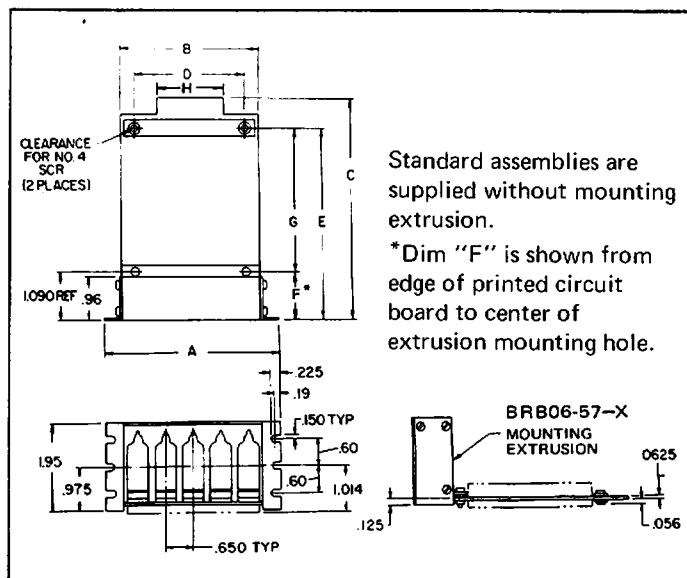
### C2506 DECADE COUNTER WITH MEMORY

The C2506 decade counter contains one 20 MHz decade counter, a four-bit strobed latch circuit, a decoder driver, and a B-5750S NIXIE tube per digit. Its counter operates from typical DTL or TTL inputs.

The decade counter is a positive logic counter and changes state on the negative going edge of the clock pulse. When the reset input is brought to the low state the counter resets to zero. The counter binary coded decimal (8-4-2-1) outputs serve as inputs to the latch circuit.

The latch circuit outputs are made available for use in external logic. The latch circuit outputs also serve as inputs to the positive logic four line, binary coded decimal (8-4-2-1) decoder driver. Outputs of the decoder driver are decimal outputs which drive the B-5750 NIXIE Indicator Tube.





## SPECIFICATIONS

TYPE	CONNECTOR	EXTRUSION	BEZEL	A	B	C	D	E	F	G	H
C2502-3	SR123	BPB06-57-3	BWB 17	2.770	1.940	3.910	1.300	3.215	1.080	2.125	1.085±.007
-4	SR115	-4	18	3.420	2.590		1.950				1.585±.007
-5	SR115	-5	19	4.070	3.240		2.600				1.585±.007
C2504-3	SR123	-3	17	2.770	1.940	5.060	1.300	4.360		3.270	1.085±.007
-4	SR115	-4	18	3.420	2.590		1.950				1.585±.007
-5	SR115	-5	19	4.070	3.240		2.600				1.585±.007
C2506-3	SR115	-3	17	2.770	1.940	5.760	1.300	5.060		3.970	1.585±.007
-4	SR115	-4	18	3.420	2.590		1.950				1.585±.007
-5	SR124	-5	19	4.070	3.240		2.600				1.985±.007
-6	SR125	-6	20	4.720	3.890		3.250				2.685±.007
-7	SR125	-7	21	5.370	4.540		3.900				2.685±.007

## ELECTRICAL CHARACTERISTICS

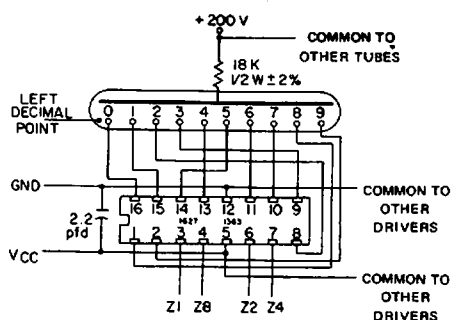
	C2502	C2504	C2506
<b>Power Requirements</b>			
V <sub>CC</sub> H	190 to 210V (200V typ)	190 to 210V (200V typ)	190 to 210V (200V typ)
V <sub>CC</sub> L	4.75 to 5.25V (5V typ)	4.75 to 5.25V (5V typ)	4.75 to 5.25V (5V typ)
I <sub>CC</sub> H	2.6ma (typ)	2.6ma (typ)	2.6ma (typ)
I <sub>CC</sub> L	20ma (max)	75ma (max)	112ma (max)

### Operating Temperature Range

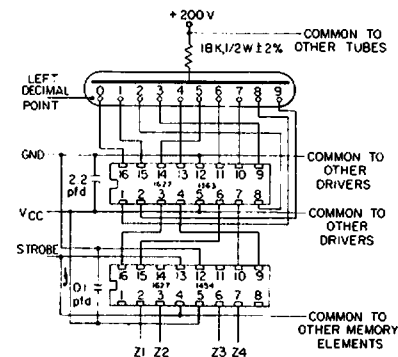
0 to +70° C

### Electrical Characteristics

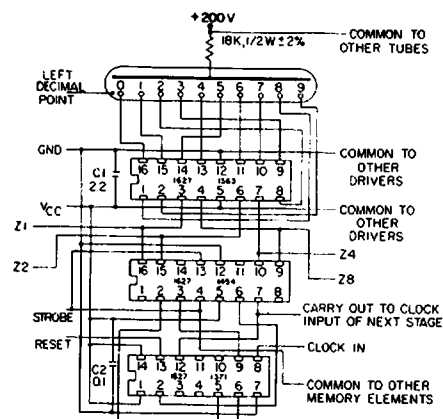
V <sub>IN</sub> (1) D	2.0V min	2.0V min	2.0V min
V <sub>IN</sub> (0) D	0.8V min	0.8V min	0.8V min
V <sub>IN</sub> (1) R (reset)	na	na	2.0V min
V <sub>IN</sub> (0) R (reset)	na	na	0.5V max
V <sub>OUT</sub> (1)	na	na	2.4V min
V <sub>OUT</sub> (0)	na	na	0.4V max



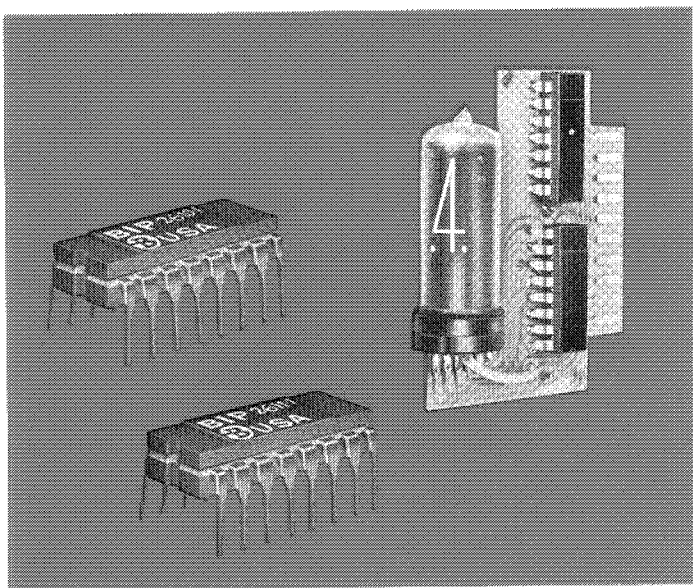
SCHEMATIC DIAGRAM C2502 SERIES



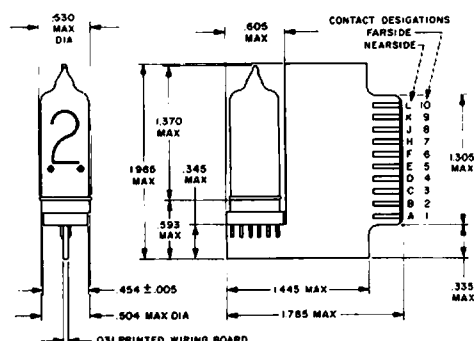
SCHEMATIC DIAGRAM C2504 SERIES



SCHEMATIC DIAGRAM C2506 SERIES



These modules are non-latching and require a continuously available BCD information input.



**BIP-8910-1**

<b>Input Requirements</b> .....	4-line 8-4-2-1 positive BCD
Logic "0" ( $E_0$ ) .....	-0.5V to +0.85V
Logic "1" ( $E_1$ ) .....	+2.0V to +6.0V
<b>Input Current</b> .....	
Logic "0" present .....	1.5 ma max. @ -0.45V
Logic "1" present .....	10 $\mu$ a max. @ 4.0V
<b>Power Requirements</b> .....	
Positive High Voltage .....	+200 Vdc $\pm$ 10V
Positive Low Voltage .....	5 Vdc $\pm$ 0.25V
Current at +200 Vdc .....	2.6 ma typ.
Current at +5 Vdc .....	60 ma max.
<b>Temperature</b> .....	
Operating (Free Air) .....	0° to +75°
Non-operating .....	-55° to +85°

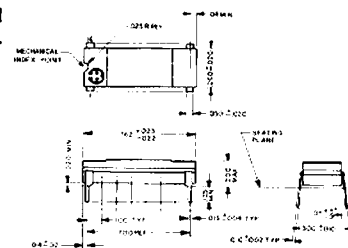
## SIDE VIEWING DRIVER

## IC DECADE COUNTERS /NIXIE

The BIP-2610 is designed to operate as a resettable pulse counter with sufficient power to drive any standard, super or side view NIXIE indicator tube. The BIP-2611 is similar except it is not designed to drive NIXIE tube directly.

The BIP-2610 is a monolithic integrated circuit consisting of ten dual SCS (Silicon Controlled Switch) stages with reset and driving circuits.

The BIP-2610 and BIP-2611 offer the following features.



BIP-2610/2611

## ELECTRICAL CHARACTERISTICS AT 25°C

Parameter	Condition	BIP-2610		BIP-2611		Units	Tolerance
		-1	-1	-1	-1		
Output Breakdown Voltage .....	IOH-0 thru IOH-9	15	15	V	Min		
VOH-0 thru VOH-9	IOH-9: 100 uA						
Output Saturation Voltage .....	VCC1- 14.5V	3	3	V	Max		
VOL-0 thru VOL-9	ICC2- 3.0mA RG- 510Ω, ±5%						
Carry Output Saturation Voltage, VCOL (tenth count information transferring)	VCC1- 11.5V ICO- 3.0mA RG- 510Ω, ±5%	2.5	2.5	V	Max		
Output Leakage Current, IOH-0 thru IOH-9	VOH-0 thru VOH-9: 50V (BIP-2610-1)	3		uA	Max		
	VOH-0 thru VOH-9: 12V (BIP-2611-1)		10	uA	Max		

**ABSOLUTE MAXIMUM RATINGS AT 25°C**

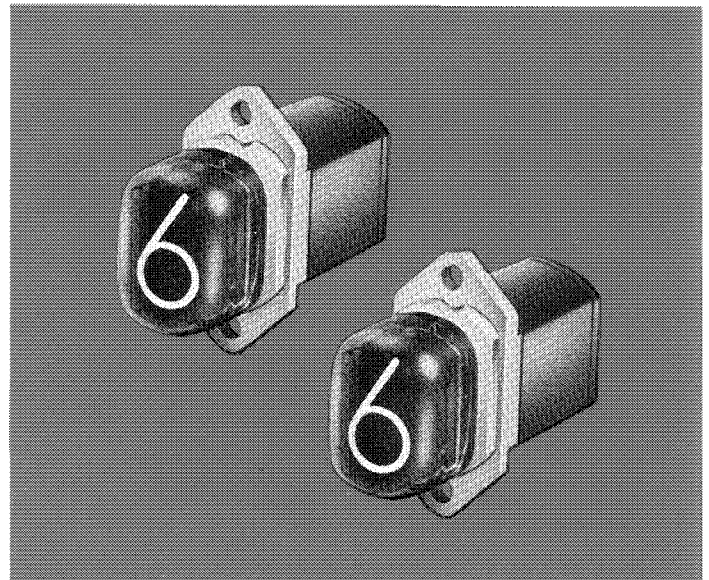
Parameter	BIP-2610-1	BIP-2611-1	Units	Notes
Supply Voltage, V <sub>CC1</sub> .....	14.5 .....	14.5 .....	V	
Count Input Breakdown Voltage, V <sub>I</sub> .....	20.0 .....	15.0 .....	V	
Count Output Voltage, V <sub>O-0</sub> thru V <sub>O-9</sub> .....	55.0 .....	15.0 .....	V	4, 10
Supply Current, I <sub>CC1</sub> .....	40.0 .....	40.0 .....	mA	
Count Input Current, I <sub>I</sub> .....	-2.5 .....	-3.5 .....	mA	
Count Output Current, I <sub>O-0</sub> thru I <sub>O-9</sub> .....	4.0 .....	3.0 .....	mA	2, 3
Count Pulse Repetition Rate, PRR .....	200 .....	500 .....	KHz	11
Power Dissipation, P <sub>T</sub> @ 55°C .....	200 .....	200 .....	mW	
Operating Temperature Range, T <sub>OPT</sub> .....	0 to 55 .....	0 to 55 .....	°C	
Storage Temperature Range, T <sub>STG</sub> .....	-55 to +150 .....	-55 to +150 .....	°C	

## NIXIE TUBE DECADE COUNTING UNITS

These modules are available in two models, the BIP-8820 with BCD output and the BIP-8821 with preset input. Both are positive logic TTL compatible modules which change state during the negative going edge of the clock pulse. A master reset input is also available on the modules to reset the counter to zero.

## NIXIE TUBE DECODER/DRIVERS

BIP-8804 Series Decoder/Driver and the BIP-8806 Decoder/Driver with memory are integrated circuit decoder/drivers which accept 4-line positive logic 8-4-2-1 BCD inputs from DTL and TTL circuitry and provide decimal readout on integrally mounted NIXIE Tubes.



The BIP-8820 and BIP-8821 Modules are 20 MHz Decade Counters with NIXIE tube readout. A decimal point control line is provided for the decimal point located on the left side of the numerals in the B-59956 NIXIE tube when the decimal point module is required. Control circuits are not provided for the decimal point line.

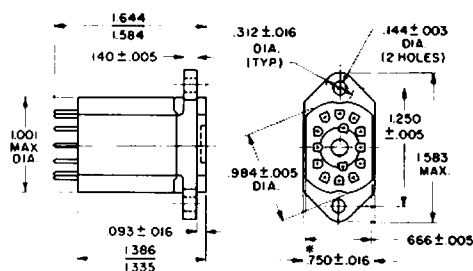
The BIP-8820 provides 4 line, parallel BCD outputs of the count for use in external coincidence detection circuits and other logic.

The BIP-8821 can be set to any predetermined number by 4-line parallel BCD inputs at the data input terminals when the strobe input goes to the low state. When the strobe is in the high state, the counter is unaffected by data on the input lines.

The BIP-8804 series modules are non-latching in that they require a continuously available BCD information input.

The BIP-8806 series modules have memory capability; they do not require a continuously available BCD information input.

The BIP-8804-1 and BIP-8806-1 modules drive a standard rectangular "0-9" NIXIE tube type 8422 (B-5991). The BIP-8804-2 and BIP-8806-2 modules drive the B-59956 standard rectangular NIXIE tube "0-9 with a decimal point." The NIXIE tube is supplied as part of the module and prices include both the module and the tube.



\* A DRAFT OF UP TO 0°30' PER SIDE INCREASING THE PACKAGE WIDTH AT THE PLUG END TO 775 MAX IS STANDARD

BIP-8820/8821

BIP-8804/8806

## BIP-8820/8821

TABLE 1 GENERAL CHARACTERISTICS

	Preset Input	BCD Output	Decimal Point
BIP-8820-1	No	Yes	No
BIP-8820-2	No	Yes	Yes
BIP-8821-1	Yes	No	No
BIP-8821-2	Yes	No	Yes

## ABSOLUTE MAXIMUM RATINGS

Rating	Value
High Voltage Supply	300V Pulsed
V <sub>CCL</sub> Low Voltage Supply	6V
V <sub>IN</sub> (Logic 1)	6V
V <sub>IN</sub> (Logic 0)	-0.5V
I <sub>OFF</sub> Decimal Output Current (off)	1.5ma
I <sub>ON</sub> Decimal Output Current (on)	15ma
Output Current at Counter Output	
Terminals	±100ma
Operating Temperature Range	0 to 75°C
Storage Temperature Range	-20 to +125°C

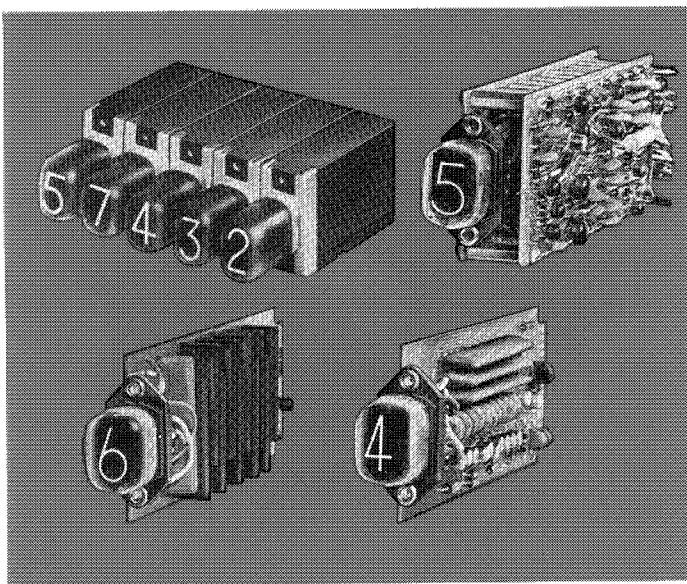
## POWER REQUIREMENTS

V <sub>CCH</sub> High Voltage Supply	190 to 210V (200V typ.)
V <sub>CCL</sub> Low Voltage Supply	4.75 to 5.25V (5V typ.)
I <sub>CCH</sub> High Voltage Supply	2.8ma typ. (4.0ma Max.)
I <sub>CCH</sub> High Voltage Supply	2.3ma typ. (3.5ma Max.)
I <sub>CCL</sub>	57ma Max. @ 5.25V

## BIP-8804/8806

## ELECTRICAL SPECIFICATIONS

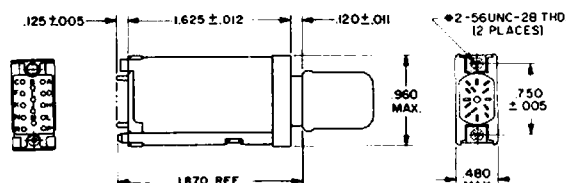
	BIP-8804	BIP-8806
Input Requirements	4 line 8-4-2-1 BCD	4 lines 8-4-2-1 BCD
Logic "0" (E <sub>0</sub> )	-0.5 to +0.85V	-1.0V to +1.0V
Logic "1" (E <sub>1</sub> )	2.0V to 6.0V	2.1V to 4.0V
Input Current		
Logic "0" present	1.5 ma max.	-20 µa max.
Logic "1" present	10 µa max.	200 µa max.
Power Requirements		
Positive High Voltage	+200 Vdc ±10V	200 Vdc ±10V
Positive Low Voltage	5 Vdc ±0.25V	5Vdc ±0.25V
Current at 200V	2.3 ma typ. (BIP-8804-1)	2.3 ma typ. (BIP-8806-1)
	2.8 ma typ. (BIP-8804-2)	2.8 ma typ. (BIP-8806-2)
Current at 5.0V	60 ma max.	75 ma typ.
Temperature		
Operating (free air)	0°C to +75°C	0°C to +75°C
Non-operating	-55°C to +125°C	-55°C to +125°C



The modules accept 4-line, positive logic 8-4-2-1 BCD input from DTL and TTL circuitry. The BIP-9801 modules are approximately .85 inches shorter than the BIP-9802 and BIP-9806 modules shown in the outline drawing.

The individual characteristics of each module are described below. • BIP-9801-1 Miniature (4998) NIXIE tube decoder/driver • BIP-9801-2 Miniature +, - NIXIE tube decoder/driver • BIP-9802-1. Same electrically as BIP-9801-1 except features blanking, dimming and temperature range to +125°C • BIP-9806-1 Same as BIP-9802-1 except features memory.

The modules feature the use of integrated circuits for decoding and driving, and are potted in anodized sheet aluminum enclosures which can be mounted on 0.5" centers. A tantalum decoupling capacitor is used to bypass 5V power supply transients while a 2% metal glaze anode resistor is used to optimize performance.



**BIP-9800**

#### ELECTRICAL SPECIFICATIONS

	BIP-9801-1 BIP-9801-2	BIP-9802-1	BIP-9806-1
<b>Input Requirements ...</b>	4 line 8-4-2-1 BCD		
Logic "0" (E <sub>0</sub> )	-0.5V to ... +0.8V	-0.5V to ... +0.8V	-0.5V to ... +0.8V
Logic 1	+2.1V to ... +6.0V	+2.1V to ... +6.0V	+2.1V to ... +6.0V
<b>Input Current</b>			
Logic 0 present	1.6ma @ x. -45V	1.6ma @ -45V	1.6ma @ -45V
Logic 1 present	5µa @ 4.0V	5µa @ 4.0V	5µa @ 4.0V
<b>Power Requirements</b>			
Positive High Voltage	+200Vdc ±10V		
Positive Low Voltage	+5.0Vdc ±0.5V		
Current at +200Vdc	1.5ma typ.	2.0ma typ.	2.0ma typ.
Current at +5.0Vdc	60ma max.		135ma max.
<b>Temperature</b>			
Operating (Free Air)	-25°C to ... +100°C	-55°C to ... +125°C	-55°C to ... +125°C
Non-operating	-55°C to ... +125°C	-55°C to ... +125°C	-55°C to ... +125°C

## NIXIE TUBE DECODER/DRIVERS

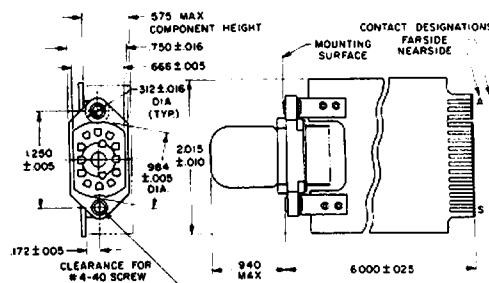
The BIP-9800 series of modules are miniature integrated circuit decoder/drivers designed for military, mobile or airborne applications. They drive the B-4998 NIXIE tube which displays a 0.3" high number or character.

## DECADE COUNTERS

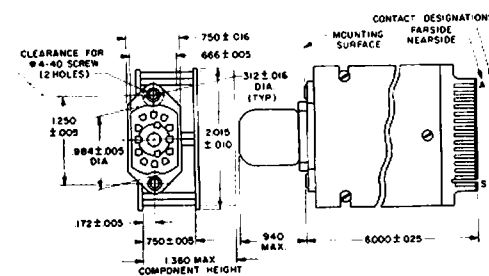
The BIP-8054 and BIP-8701 are bi-directional decade counters and the BIP-8055 is a unidirectional decade counter. They are 10-position ring counters which utilize silicon controlled switches as the active element in the circuits. The counters are presettable and resettable, have plug-in printed circuit construction and have an integral NIXIE Tube readout. A carry output is provided to drive succeeding counters for cascaded multi-decade operation.

Burroughs decade counters offer:

- Uni- or Bi-directional counting
- NIXIE tube visual readout
- Electrical Decimal outputs
- Preset and reset capabilities
- Support modules for complete accumulators: Pre-amplifier (BIP-8606, BIP-8617); polarity detector (BIP-8006); buffer amplifier (BIP-8611); preset/reset module (BIP-8609, BIP-8613)



**BIP-8054/8055**

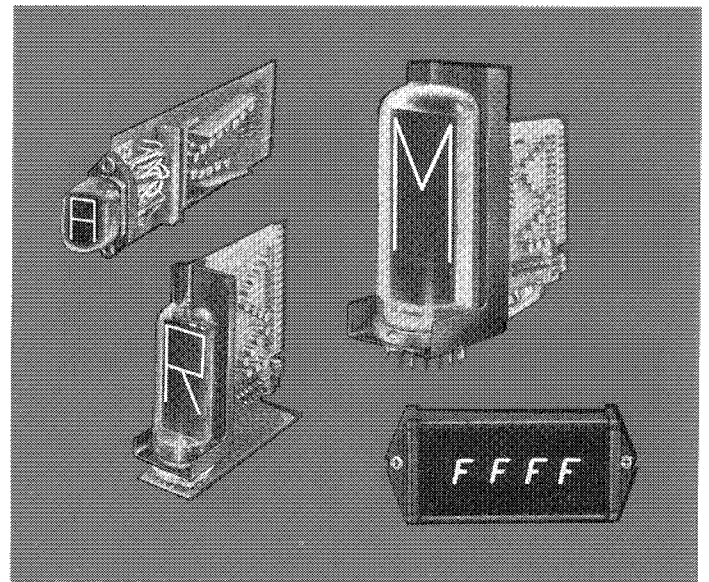


**BIP-8701**

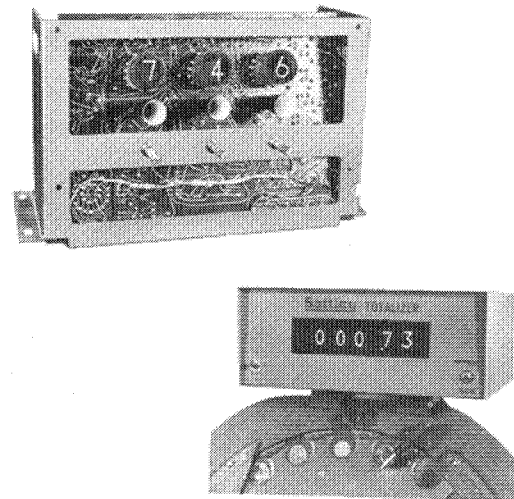
INPUT REQUIREMENTS	BI-DIRECTIONAL		UNI-DIRECTIONAL
	BIP-8701	BIP-8054	BIP-8055
Maximum Frequency	500 KHZ	110 KHZ	150 KHZ
Pulse Amplitude	10.5 - 13 V (pos)	10.5 - 13 V (Pos)	6V to 12V (capacitor input)
Pulse Duration	0.5 µsec.	2.0 µsec.	2.0 µsec.



Application flexibility of NIXIE indicator tubes and SELF-SCAN panel displays is such that Burroughs is able to customize complete readout systems to your exact requirements.



<b>Information Input</b>	
Logic Zero Voltage .....	-12V $\pm$ 2V
Logic One Voltage .....	0 to -2.0V
Impedance .....	20 K typ.
Pulse Duration .....	10 $\mu$ sec. min.
Logic Separation .....	-8V min.
Cycle Time .....	200 $\mu$ sec. min.
<b>Power Requirements</b>	
Positive Low Voltage .....	12V typ.
Current at +12V .....	157 ma max. (BIP-8503) 407 ma max. (BIP-8509) 400 ma max. (BIP-8510)
Positive High Voltage .....	170 $\pm$ 2V
Current at +170V .....	18 ma max. (BIP-8503) 23 ma max. (BIP-8509) 16 ma max. (BIP-8510)



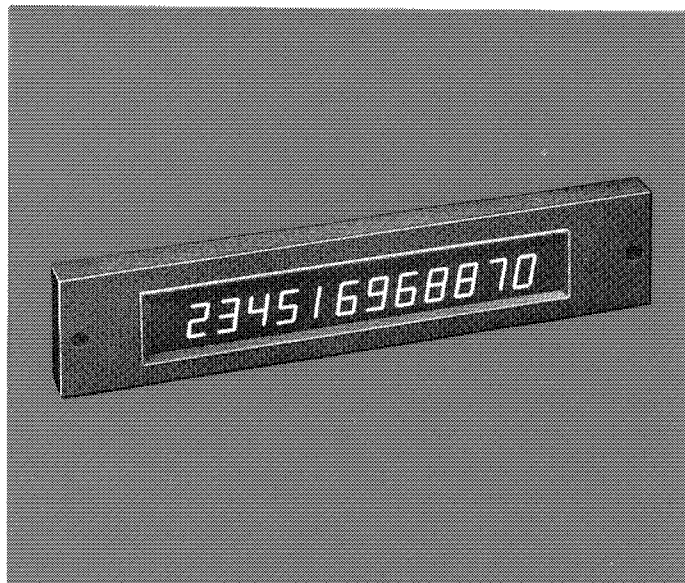
The Hexidecimal Display Unit, produced by Burroughs for the Foxboro Company has the capability to display the numerals 0 through 9 and the letters A through F. This four place display utilizes B-5971 alphanumeric NIXIE tubes. The unit is used by the Foxboro Company on computer interface for a large scale process control system. The process is read out in four letter-number designations.





# PANAPLEX NUMERIC PANEL DISPLAY BR16400

The BR16400 PANAPLEX panel display is a 16 character model in Burroughs new series of 9-segment, multi-character cold-cathode, gas discharge readout tubes. The nine cathode segments form numerals 0 thru 9, +, -. Decimal points are also included in the tube. The unique single envelope construction of this tube permits it to be priced at a per digit price less than that for any other comparable readout. Designed for the time-shared mode of operation, it offers additional cost savings by minimizing the necessary drive electronics. Other models of the PANAPLEX tube with as low as eight character positions are also available.



Advantages of the PANAPLEX panel display include:

- Low price
- Low cost drive circuitry
- Wide viewing angle
- High brightness
- Low power
- Minimum digit spacing
- Less than 2 connections per digit
- Inherent character alignment
- Streamlined, compact package

## TYPICAL OPERATING CONDITIONS @ 25°C

	Units
Supply Voltage, $E_{bb}$	160 to 180 Vdc (170 Vdc typ)
Cathode Prebias Voltage, $E_{pb}$	115 Vdc typ
Anode Off Voltage, $E_{os}$	115 Vdc typ
Isolation Screen Current, $i_{GSO}$	.05X Total Cathode Current
Individual Cathode Peak Segment Current, $i_{ks}$	3.0 mA typ
Decimal Current, $i_{kd}$	1.0 mA typ
Timing Cycle, $t_c$	1.3 to 13.0 msec
Digit Duration, $t_d$	80 to 800 $\mu$ sec (266 to 400 $\mu$ sec typ)
Blanking Interval, $t_{kb}$	20 to 100 $\mu$ sec
Individual Cathode Segment Voltage Drop, $E_{SD}$	130 to 155 Vdc (143 Vdc typ)
Screen Bias	(See Bull. 1163)

## ABSOLUTE MAXIMUM RATINGS @ 25°C

Parameter	Units
Anode Supply Voltage, $E_{bb}$	180 Vdc
Peak Cathode Current (number 8 displayed), $i_k$	25 mA
Peak Cathode Current (single segment), $i_k$	3.5 mA
Cathode Current (decimal point), $i_{kd}$	1.2 mA
Ambient Temperature, $T_a$	0 to +55°C
Storage Temperature (non-operating), $T_{stg}$	-40 to +75°C
Altitude	70,000 ft.

## MECHANICAL CHARACTERISTICS

Color	Neon Red
Viewing Angle	120°
Segment Configuration and Pin Out	Figure 2
Character Size	Figure 2
Number of Pins	28
Package Outline Drawing	Figure 1

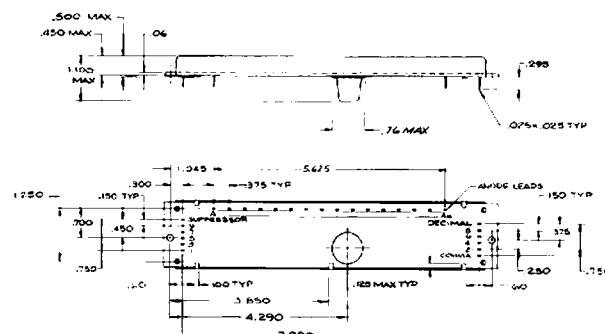


Figure 1 — Panel Outline Drawing

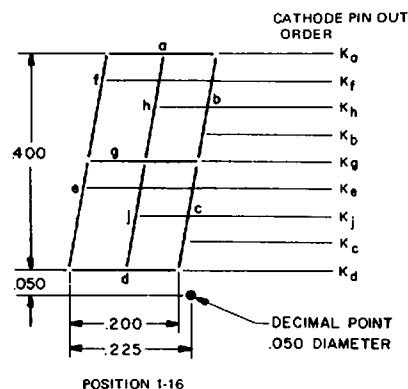


Figure 2 — Character Size And Configuration

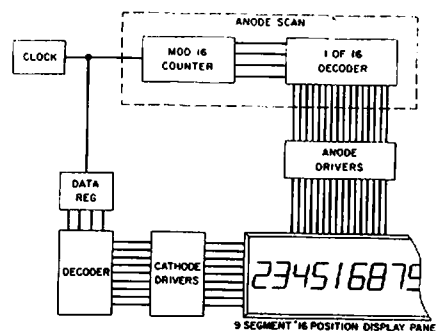


Figure 3 — PANAPLEX Panel Display Typical System



*For further information contact your nearest  
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New Jersey 07061. Tel: (201) 757-3400*

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