



# BCD NIXIE® TUBE DECODER/DRIVER

WITH MEMORY (With Integrated Circuits)

TYPES

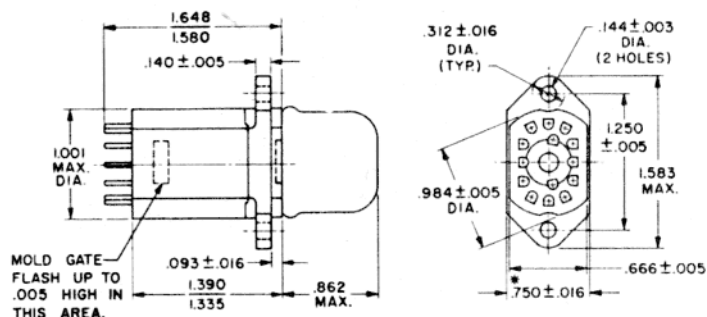
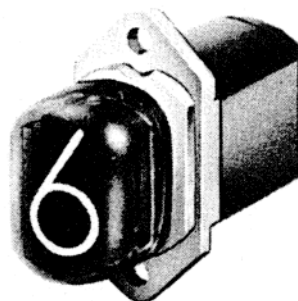
**BIP-8806-1**  
**BIP-8806-2**

The BIP-8806 series integrated circuit decoder/drivers with memory accept 4-line 8-4-2-1 BCD input from DTL and TTL circuitry, and provide decimal readout on integrally mounted NIXIE tubes. The BIP-8806-1 drives a standard rectangular "0-9" NIXIE tube type 8422 (B-5991). The BIP-8806-2 drives the B-59956 standard rectangular "0-9" with decimal point NIXIE tube.

The memory function is provided by a monolithic, four-bit, strobed-latch circuit with a common strobe drive input (Figure 3). Information present at the BCD input terminals is gated to the outputs of the decoder as long as the strobe is in the "Low State." When the strobe goes high, the information present at the BCD input terminals at the time of the transition, is retained and displayed by the NIXIE tube until the strobe is again permitted to go low.

These decoder modules feature a socket pack construction, i.e., the socket and decoder are an integral unit. Height and width dimensions are those of the socket itself, permitting 0.8" center to center spacing of multi-digit displays. By mounting the integrated circuits as close to the NIXIE tube as possible, the undesirable effect of switching transients are minimized. A decoupling capacitor, C1, is used to bypass low voltage power supply transients.

BIP-8806-4 drives the +, -, NIXIE tube, B-5992. (Notes 14 and 15).



\* VIEW OF SOCKET WITHOUT NIXIE TUBE. DIMENSION WITH NIXIE TUBE IS .790 MAX. A DRAFT OF UP TO 0° 30' PER SIDE INCREASES THE PACKAGE WIDTH AT THE PLUG END TO .775 MAX.

Figure 1. OUTLINE DRAWING

## ELECTRICAL SPECIFICATIONS

| (Note 1)<br>INPUT REQUIREMENTS<br>4-lines 8-4-2-1 BCD  | STANDARD<br>SPECIFICATION<br>REFERENCE<br>TERMINAL 7  | ALTERNATE<br>SPECIFICATION<br>REFERENCE<br>TERMINAL 4 (Note 1)  |
|--|---|---|
| Logic "0" (E.)<br>Logic "1" (E.)   | -1.0V to 0.5V<br>1.0V to 4.0V   | -1.0V to +1.0V<br>2.1V to 4.0V  |
| INPUT CURRENT<br>Logic "0" Present<br>Logic "1" Present<br>Pulse Duration (Note 6)   | -20 $\mu$ A to +20 $\mu$ A (Note 2)<br>400 $\mu$ A max. (Note 3)<br>150 nS min.                                       | -20 $\mu$ A to +20 $\mu$ A (Note 4)<br>200 $\mu$ A max. (Note 5)<br>150 nS min.                                       |
| STROBE INPUTS<br>High State<br>Low State<br>Current<br>Pulse Duration (Notes 6 & 8)  | 1.1V min. +4.0V max.<br>-1.0V min. 0.5V max.<br>450 $\mu$ A max. at 1.1V<br>-20 to +20 $\mu$ A at 0.5V<br>100 nS min. | 2.2V min. +4.0V max.<br>-1.0V min. 1.0V max.<br>800 $\mu$ A max. at 2.2V<br>-20 to +20 $\mu$ A at 1.0V<br>100 nS min. |
| POWER REQUIREMENTS<br>Positive High Voltage (Note 7)<br>Positive Low Voltage<br>Current at +200V (BIP 8806-1)<br>(BIP 8806-2)<br>Current at 5.0V | 200V dc $\pm$ 10V<br>5V dc $\pm$ 0.25V<br>2.3 mA typ.; 3.5 mA max.<br>2.8 mA typ.; 4.0 mA max.<br>90 mA max.          | 200V dc $\pm$ 10V<br>5V dc $\pm$ 0.25V dc<br>2.3 mA typ.; 3.5 mA max.<br>2.8 mA typ.; 4.0 mA max.<br>75 mA max.       |

CYCLE TIME ..... 200 ns

### DECIMAL POINT DRIVE REQUIREMENTS

V on ..... 0 to +2.0V  
V off ..... 60V to 140V  
I on ..... 0.5 mA max. (Note 9)  
I off ..... 30  $\mu$ A max. (Note 10)

## MECHANICAL SPECIFICATIONS

Connectors ..... 12 pin rectangular base (Note 13)  
Receptacle ..... SK-169 (Figure 4) (Note 11)  
Mounting Diagram ..... Figure 5 (Note 12)  
Outline Drawing ..... Figure 1  
Terminal Connections ..... Table 1  
Weight With Tube ..... 1.5 oz. max.  
Temperature Range —  
Operating (Free Air) ..... 0°C to +75°C  
Non-operating ..... -55°C to +125°C



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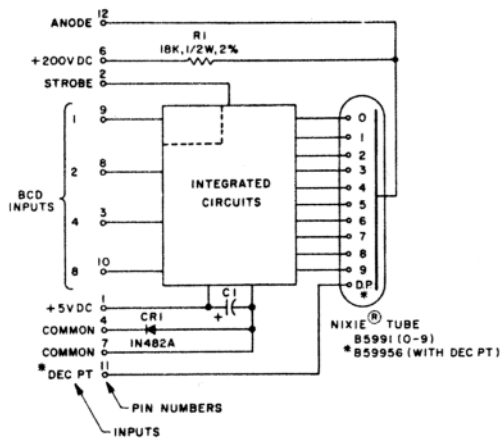


Figure 2. BLOCK DIAGRAM

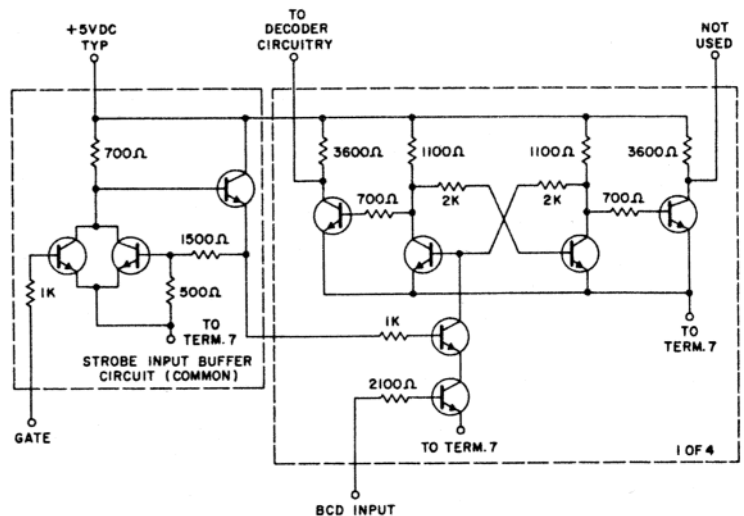


Figure 3. MODULE INPUT CIRCUIT

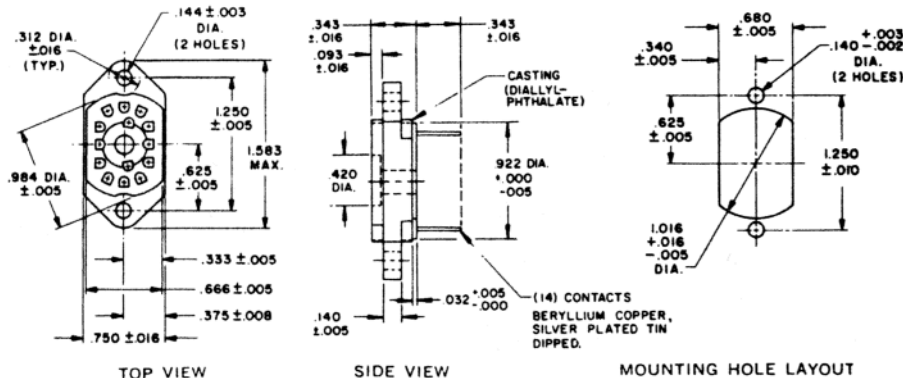


Figure 5. RECEPTACLE SK-169 (Note 11)

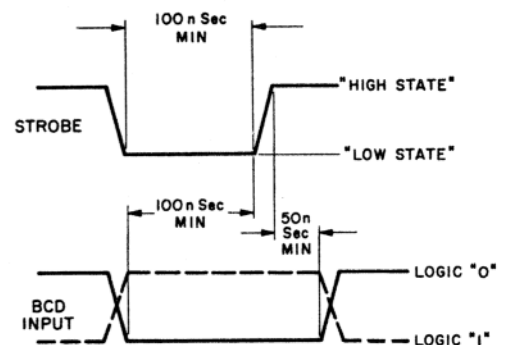


Figure 4. TIMING DIAGRAM

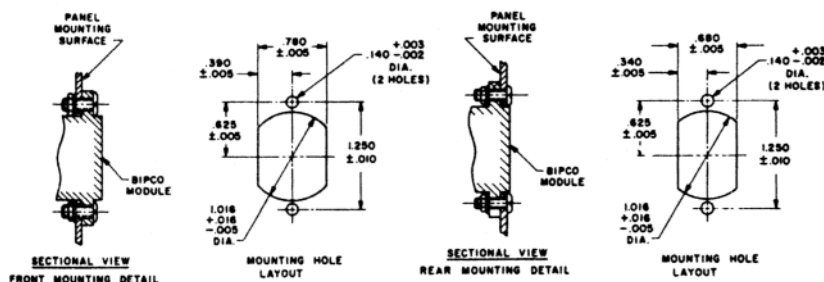


Figure 6. MOUNTING DIAGRAM (Note 12)

| TERMINAL | INPUT             |
|----------|-------------------|
| 1        | + 5V dc           |
| 2        | Strobe            |
| 3        | BCD 4             |
| 4        | Common            |
| 5        | N.C.              |
| 6        | + 200V            |
| 7        | Common            |
| 8        | BCD 2             |
| 9        | BCD 1             |
| 10       | BCD 8             |
| 11       | Decimal Point*    |
| 12       | Not Normally Used |

\* When using the BIP-8806-1 (B-5991 NIXIE tube) terminal 11 must be left open.

Table 1. TERMINAL CONNECTIONS

| NUMERAL | CODE |   |   |   |
|---------|------|---|---|---|
|         | 8    | 4 | 2 | 1 |
| 0       | 0    | 0 | 0 | 0 |
| 1       | 0    | 0 | 0 | 1 |
| 2       | 0    | 0 | 1 | 0 |
| 3       | 0    | 0 | 1 | 1 |
| 4       | 0    | 1 | 0 | 0 |
| 5       | 0    | 1 | 0 | 1 |
| 6       | 0    | 1 | 1 | 0 |
| 7       | 0    | 1 | 1 | 1 |
| 8       | 1    | 0 | 0 | 0 |
| 9       | 1    | 0 | 0 | 1 |

Table 2. TRUTH TABLE (NOTE 15)

## NOTES

- Two common terminals are available; only one may be used in any given application. "Common" terminal 7 can be used for most DTL or TTL logic sources. "Common" terminal 4 is intended for use when the device driving the BIP-8806 is required to simultaneously drive other devices having logic "1" inputs greater than 2.1V.
- When  $E_o$  is 1.0V.
- When  $E_i$  is 2.1V.
- When  $E_o$  is 0.5V.
- When  $E_i$  is 1.0V.
- The data inputs must be in a quiescent state for at least 100 ns before the strobe input goes above the specified "low state" and must remain in the same state for at least 50 ns after the strobe input reaches the specified "high state." Rise and fall times are not critical.
- The absolute maximum rating for the positive high voltage is +300V. This rating applies for a maximum pulse width of 100 ns at a maximum duty cycle of 10%.
- This is the minimum time the logic "one" and "zero" level must exist.
- This is current out of the module.
- This is current out of the module when V on is 60V.
- The receptacle SK-169 is not included as part of the module and must be ordered separately.
- Modules may be mounted either in front of, or behind the panel (Figure 6). Front mounting should be employed only when there is no back lighting. Rear mounting may be used whether or not back lighting is present.
- A polarizing pin is added to the connector. This pin is not internally connected and mates with terminal 14 of receptacle SK-169.
- It is recommended that a  $47K\Omega \pm 2\%$ ,  $\frac{1}{2}W$  resistor be used externally in series with anode pin 12 and that pin 6 be left open. Voltage is  $200V \pm 10V$ .
- Code for + and - tube is the same as Numeral 7 (+) and Numeral 4 (-).

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