

# Dieter's Nixie Tube Data Archive

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Document in this file	Sylvania datasheet: 6476 Dekatron tube
Display devices in this document	6476

**MECHANICAL DATA**

Mounting Position . . . . . Any (Count is Read from Top of Tube)  
 Zero Position (Cathode No. 10) . . . . . Aligned with Pin 12  $\pm 10^\circ$

**ELECTRICAL DATA**

**RATINGS (Absolute Values)**

Total Anode Current . . . . . 0.60 Ma. Max.  
 Voltage Between Electrodes  
 (Other Than Anode) . . . . . 140 Volts Max.  
 Supply Voltage (Anode to Cathode) . . . . . 350 Volts Min.  
 Input Frequency . . . . . 4,000 P.P.S. Max.

**TYPICAL OPERATION**

DC Supply Voltage . . . . . 400 Volts  
 Anode Resistor . . . . . 0.47 Megohm  
 Nominal Tube Drop  
 (Under These Conditions) . . . . . 191 Volts  
 Cathode Resistor . . . . . 68,000 Ohms  
 Output Voltage  
 (Developed Across Cathode Resistor) . . . . . 28 Volts

**APPLICATION DATA**

The Sylvania Type 6476 is a cold cathode, bidirectional decade counter tube. It is designed for use in medium speed decimal counting apparatus such as scalers, computers and dividers. The count is determined by noting the position of the glow on any one of the ten radially spaced cathodes around an axially positioned anode. The multiple output cathode arrangement allows the selection of pre-set conditions with the addition of suitable external circuitry.

**PRINCIPLES OF OPERATION**

**General Principles**

The 6476 operates on the principle that the ionization or starting voltage of gas filled tubes is lowered if ions or electrons are already present in the anode-cathode gap. Under these conditions, a glow discharge can then be made to move from one cathode to an adjacent one by means of a relatively small negative voltage pulse on the new cathode, provided that electrons or ions are able to diffuse into this new anode-cathode gap. If a series of cathodes are present about a common anode, the discharge can be made to move in succession along the cathode series by a successive application of voltage pulses to each cathode.

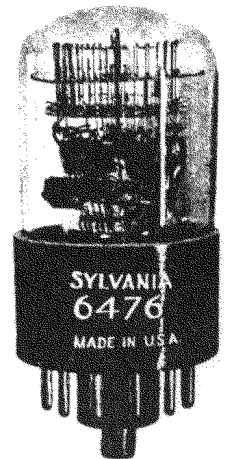
**Details of Operation**

The 6476 has 30 cathodes equally spaced on a circle about a central anode disc. The cathodes are divided into 10 main or output cathodes and 20 intermediate guide cathodes — two of which are located between every main cathode interval, see Fig. 1.

*(Continued on reverse)*

**QUICK REFERENCE DATA**

The Sylvania Type 6476 is a multiple output cold cathode, bidirectional decade counter. The 6476 is similar to the Type 6482 which has a single output cathode.



**SYLVANIA ELECTRIC PRODUCTS INC.**

**ELECTRONICS DIVISION WOBURN, MASS.**

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**PAGE 1 OF 4**

PRINCIPLES OF OPERATION (cont'd.)

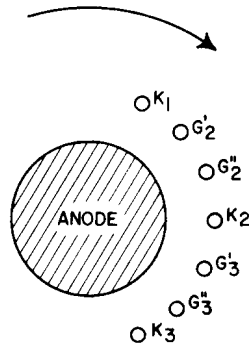


FIG. 1 — ELECTRODE ARRANGEMENT

The two guide cathodes are necessary to make certain that the glow always moves in the desired direction and does not return to the original cathode upon removal of the voltage from the new cathode. A description of the transfer mechanism from one main cathode to the next adjacent one will make this clearer. Assuming that a glow is present on K<sub>1</sub>, a negative pulse on the G'<sub>2</sub> (Fig. 2) will move the glow to G'<sub>2</sub>. At the end of this pulse, a second negative pulse is applied to G''<sub>2</sub> moving the glow on to G''<sub>2</sub>. Because the guide cathodes are normally biased above the main cathodes, (Fig. 2), removal of the negative pulse from G'' means that the glow will go to a main cathode. The preferential influence of the ionization near K<sub>2</sub> causes the glow to settle on K<sub>2</sub> rather than return to K<sub>1</sub>. The glow will remain on K<sub>2</sub> until the sequence is repeated for the next set of cathodes. In practice, all of the G' electrodes are connected together as are also all of the G'' electrodes, Fig. 3. Although the negative transfer pulse is applied to all ten guide cathodes simultaneously, the priming influence of the discharge moves the glow to the guide cathode which is closest to the discharge.

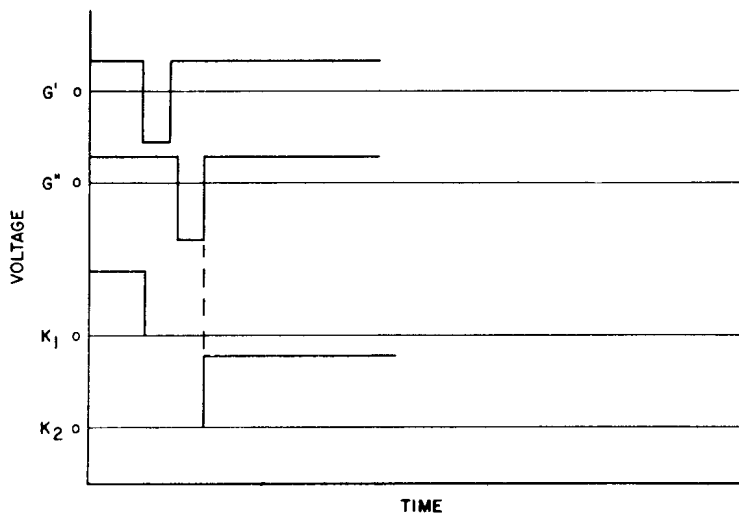


FIG. 2 — VOLTAGE-TIME CHARACTERISTICS

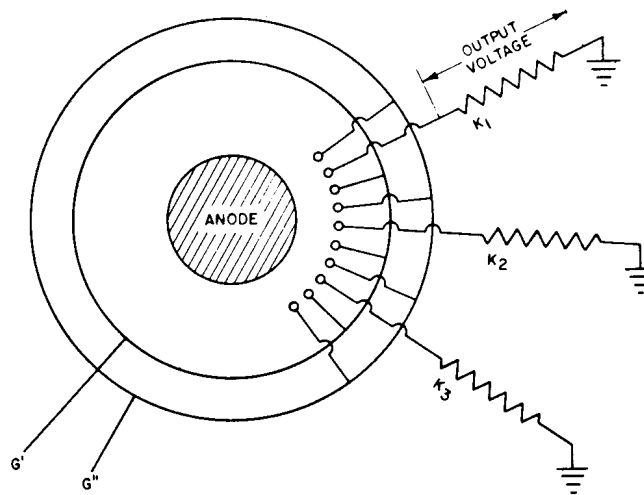


FIG. 3 — ELECTRODE ARRANGEMENT WITH CIRCUIT CONNECTIONS

An output pulse can be obtained from each main cathode as the glow moves onto it. If preferred, an output can be derived from selective cathodes only. It should also be noted that reversal of the pulse sequence applied to G' and G'' will reverse the direction of the glow transfer.

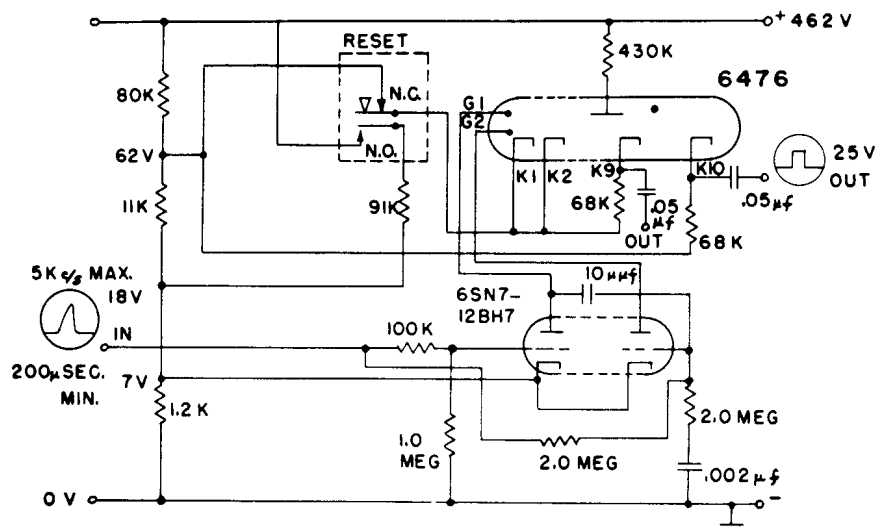
The glow is restricted to one main cathode only when the anode voltage is first applied by the action of the anode resistor (Fig. 3) which immediately lowers the voltage across the anode-cathode gap to the maintaining value. This is below the starting voltage of the other main cathodes or the transfer voltage of the guide cathodes.

The driving circuit given below offers certain advantages over the previously published circuits.

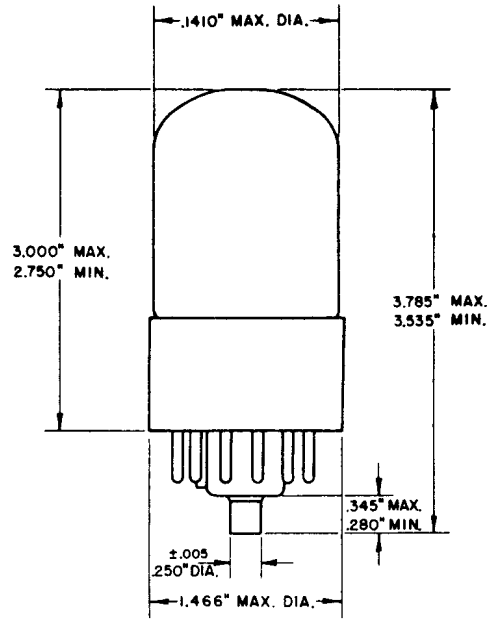
### TYPICAL DRIVING CIRCUIT

The important feature of the new circuit is that it provides an essentially square wave pulse to the guide pins. A square wave driving pulse assures stable operation throughout the life of the 6476 in spite of small changes which may occur in the guide voltages.

NOTE: The B+ of the driver is obtained through the guide to anode capacity of the counter tube.



OUTLINE DRAWING



BASE CONNECTIONS

