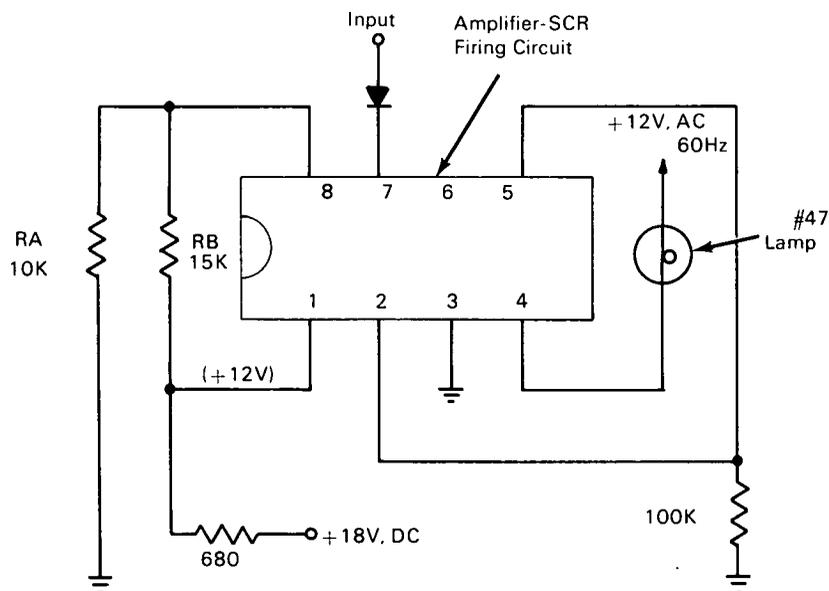


# NASA TECH BRIEF



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## Low-Cost Voltage-Level Detector



### The problem:

A common function in electronic equipment is sensing when voltage level has exceeded (or is below) a given reference level. In many applications, a visual indication is also required.

### The solution:

A very simple and inexpensive means of providing this indication employs an integrated circuit designed for a completely different purpose. This integrated circuit (Westinghouse, WC 316 Amplifier-SCR Firing Circuit, or equivalent) consists of a differential amplifier, an SCR, and a pair of zener diodes to provide a regulated supply, all on one chip, thus combining control and power functions. The integrated circuit connected as shown in the schematic, forms a level detector that will turn on a lamp (or relay) when the

ac input voltage exceeds approximately 5 volts positive peak, the value being set by the voltage divider consisting of  $R_A + R_B$ . In this case, it is assumed that the frequency of the input signal is higher than 60 Hz, so that a smoothing capacitor is not necessary for the triggering signal. If the signal to be sensed is dc, the diode can be eliminated. When it is desired to trigger on undervoltage, the inputs to the differential amplifier (pins 7 and 8) can be interchanged. Two circuits of this type can be connected to one indicator to indicate a voltage deviation above or below a preset level.

### Notes:

1. Designation of commercial company products is only indicative, not exclusive, and is not a recommendation of one company over another.

(continued overleaf)

2. The high input impedance of this circuit permits its use where loading of the source is undesirable such as for overload detection in electronic signal-conditioning circuits. It is also suitable for such tasks as monitoring power supplies for overvoltage or undervoltage.

3. No further documentation is available. Inquiries may be directed to:

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**Patent status:**

No patent action is contemplated by NASA.

Source: J. C. Sturman  
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