

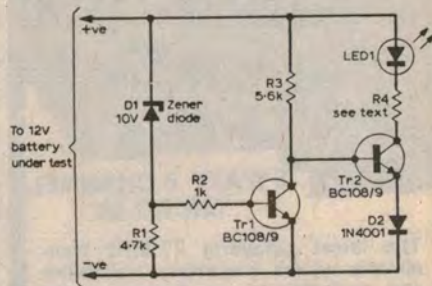
## Battery discharge indicator

This simple circuit gives an early warning of the discharge of batteries. In many cases, due to the varying loads on lead-acid batteries, it is often difficult to determine their state of charge. The simplest method is to use a voltmeter, and keep an eye on it when drawing current. This is adequate if the user can read a meter out of the corner of his eye, and is in a position where he can obtain meters at reasonable prices.

The circuit here will give a 'GO' or 'NO GO' visual indication of any significant

fall in supply voltage. The zener diode D1 is chosen for the voltage below which an indication is required. (The values shown in this case are for 12V operation.) In this instance the zener is a 10V device and was chosen as it puts about 2V on the junction of R1, R2 causing TR1 to conduct. The collector voltage thus falls to a low value keeping TR2 switched off.

Should the supply drop to below 10V, D1 will cease to conduct causing TR1 to shut off. Its collector voltage will now rise causing TR2 to start conducting via LED



1 and its limiting resistor R4.  
 $R4 = \frac{\text{voltage of zener diode} - 2}{\text{LED current}}$

Layout is by no means critical, as fifteen units have been built with uses ranging from a car battery indicator to a battery indicator for a cheap radio using a 9V battery. D1 in this latter case was a 6.8V zener.

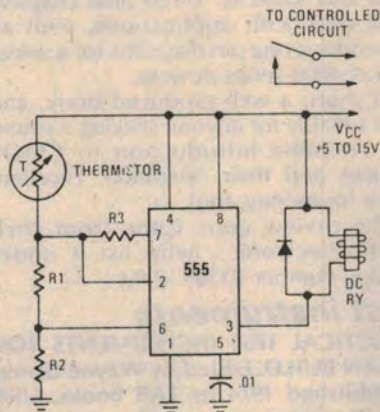
(From "Practical Wireless".)

## Electronic thermostat

This non-timer use of the 555 is as a thermostat or an interface between a thermistor and a power supply. For example, it can be used to turn on a cooling or ventilator fan when the temperature reaches a certain level and turn it off when the temperature has dropped to a preset low level. Similarly, the circuit might be used to control the temperature of photo processing chemicals and baths.

The on and off states of the controlled device are determined by the values of R1, R2 and R3 and on the resistance and temperature coefficients of the thermistor.

(By Robert F. Scott, in "Radio-Electronics".)



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