# 042 Battery Discharger

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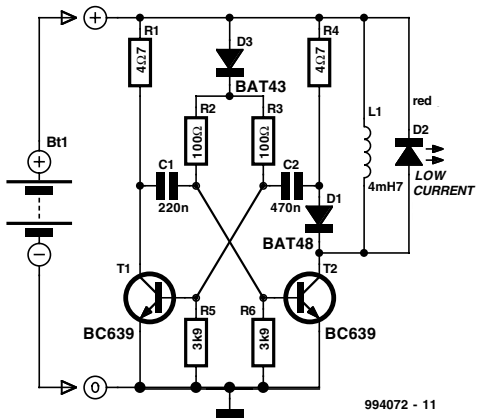
The battery discharger published in the June 1998 issue of this magazine may be improved by adding a Schottky diode ($D_3$). This ensures that a NiCd cell is discharged not to 0.6–0.7 V, but to just under 1 V as recommended by the manufacturers. An additional effect is then that light-emitting diode $D_2$ flashes when the battery connected to the terminals is flat.

The circuit in the diagram is based on an astable multivibrator operating at a frequency of about 25 kHz. When transistor $T_2$ conducts, a current flows through inductor $L_1$, whereupon energy is stored in the resulting electromagnetic field. When $T_2$ is cut off, the field collapses, whereupon a counter-emf is produced at a level that exceeds the forward voltage (about 1.6 V) of $D_2$. A current then flows through the diode so that this lights. Diode $D_1$ prevents the current flowing through $R_4$ and $C_2$. This process is halted only when the battery voltage no longer provides a sufficient base potential for the transistors. In the original circuit, this happened at about 0.65 V. The addition of the forward bias of $D_3$ (about 0.3 V), the final discharge voltage of the battery is raised to 0.9–1.0 V. Additional resistors $R_5$ and $R_6$ ensure that sufficient current flows through $D_3$. When the battery is discharged to the recommended level, it must be removed from the discharger since, in contrast to the original circuit, a small current continues to flow through $D_3$, $R_{2\text{-}R}3$, and $R_{5\text{-}R}6$ until the battery is totally discharged




The flashing of $D_2$ when the battery is nearing recommended discharge is caused by the increasing internal resistance of the battery lowering the terminal voltage to below the threshold level. If no current flows, the internal resistance is of no consequence since the terminal voltage rises to the threshold voltage by taking some energy from the battery. When the discharge is complete to the recommended level, the LED goes out. It should therefore be noted that the battery is discharged sufficiently when the LED begins to flash. [994072]