BATTERY CHARGER WITH AUTOMATIC SWITCH-OFF

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This smart charger automatically switches off when your re-chargeable batteries reach the full charge.

The circuit comprises a bistable multivibrator wired around timer IC 555. The bistable output is fed to an ammeter (via diode D1) and potmeter VR1 before it goes to three Ni-Cd batteries that are to be charged.

Normally, the full charge potential of an Ni-Cd cell is 1.2V. Trigger the bistable by pressing switch S1 and adjust potmeter VR1 for 60mA current through the ammeter.

Now remove the ammeter and connect a jumper wire between its points 'a' and 'b.' Connect the positive output terminal of the batteries to the emitter of pnp transistor T1. The base of transistor T1 is held at 2.9V by adjusting potmeter VR2. The output of transistor T1 is inverted twice by npn transistors T2 and T3.

Thus when the batteries are fully charged to 3×1.2V=3.6V, a voltage higher than this makes transistor T1 to conduct. Transistor T2 also conducts and transistor T3 goes off. The threshold level of timer 555 reaches 6V, which is more than $2/3 \times V_{CC} = 2/3 \times 6 = 4V$, to turn off the timer.

During charging, the threshold level of the timer is held low. The green LED (LED1) glows during charging of the batteries and goes off at the attainment of full charge.

Note that this circuit can be used only for 1.2V, 600mAH Ni-Cd rechargeable batteries that require 60 mA of current for 15 hours to charge fully. ●