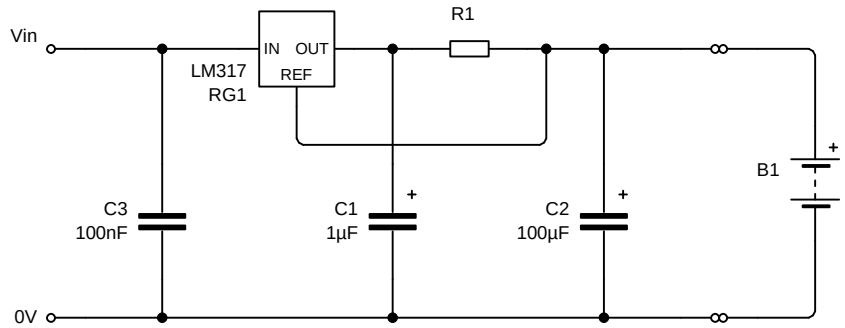
AUTOMATIC BATTERY CHARGER

THis circuit uses the LM317 voltage regulator. Normally this regulator works using a reference voltage Vref, of 1.25v between the output and the adjustment terminals. This combined with an external resistor, normally 240ohms, regulates it's output according to the formula:

$V_o = V_{ref} \times 1 + (R2/R1)$, (ignoring I_{adj} error)

Vref can also be used to control the current in the output by adjusting its voltage to gain the set current flow through R1.



The charge current is found using:

$I_{out} = V_{ref} / R1$

So for a charge current of 500mA:

$R1 = Vref / Iout = 1.25 / 0.5 = 2.5$ ohms

Other current can be set up to the maximum current rating of the regulator. The LM317T will provide about 1.5Amps and LM317K around 5Amps, but you must use a heatsink. Also the supply to the charger must be a least 5 to 10 volts above the battery being charged, more so for high current settings.

It is important to note that the regulator will heat up most charging low voltage batteries at high current since the power dissipation in the regulator will be much higher. If you are charging a 1.5 volt battery from a 12 volt source at 1 amp, the power dissipated in the regulator will be:

$P = I \times V = 1 \times (12 - 10.5) = 10.5$ Watts

but a charging a 6 volt battery would only dissipate $1 \times (12 - 6) = 6$ Watts

Taking care selecting an appropriate supply voltage can significantly reduce heat generation from the regulator.

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