Low-drop Series Regulator using a TL431

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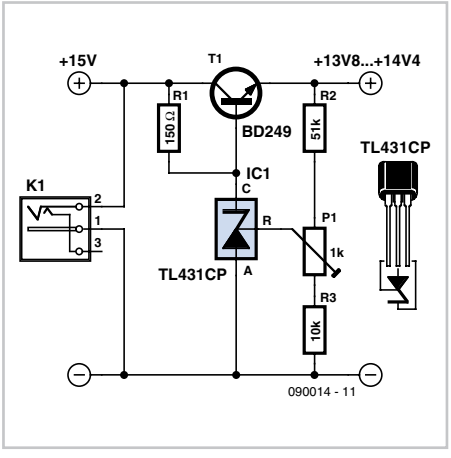
Like the author you may keep some 12 V lead-acid batteries (such as the sealed gel cell type) in stock until you come to need them. A simple way of charging them is to hook up a small unregulated 15 V 'wall wart' power supply. This can easily lead to overcharging, though, because the off-load voltage is really too high. The remedy is a small but precise series regulator using just six components, which is connected directly between the power pack and the battery (see schematic) and doesn't need any heatsink.

The circuit is adequatele proof against short circuits (min. 10 seconds), with a voltage drop of typically no more than 1 V across the collector-emitter path of the transistor.

For the voltage source you can use any transformer power supply from around 12 V to 15 V delivering a maximum of 0.5 A. By providing a heatsink for T1 and reducing the value of R1 you can also redesign the circuit for higher currents.



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Internet Link

http://focus.ti.com/lit/ds/symlink/tl431.pdf