

LED Bike Light

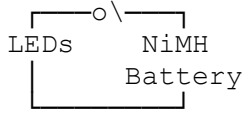
By G8MNY

(New Jan 10)

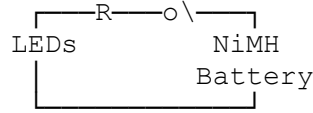
(8 Bit ASCII Graphics use code page 437 or 850)

After a recent club talk on these with several connection ideas...

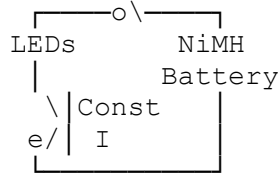
No Current Control



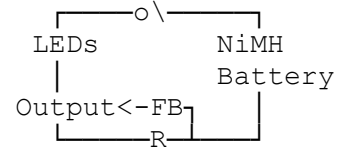
Resistive Current Control



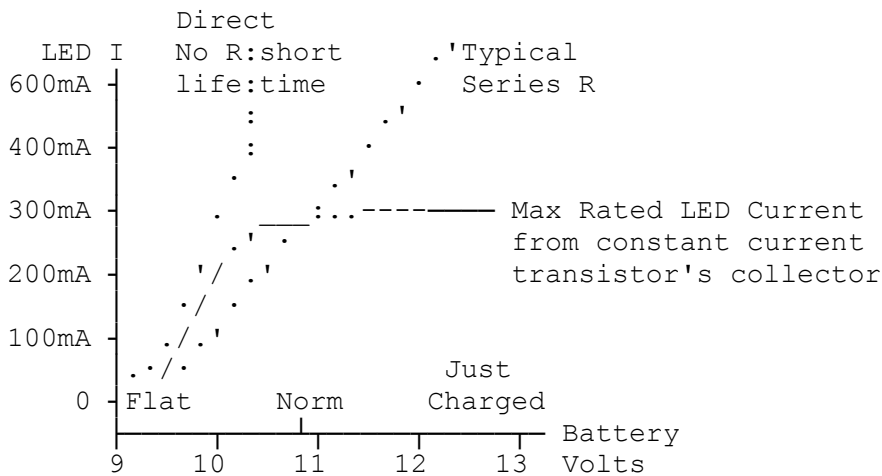
Constant Current Control



Switch Mode Current Control

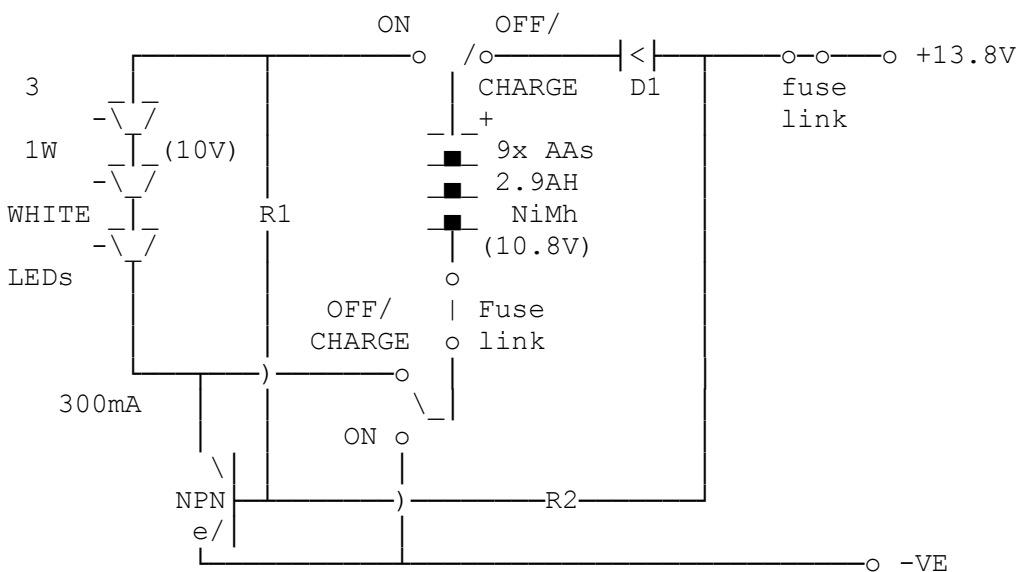


This is the sort of LED current (light) graph with 3 LEDs powered from 9 cells.



MY CIRCUIT

Without going into loads of components if a switch mode design, I just used a single transistor in a constant current mode to not only feed the 3 LEDs, but also feeds the battery charging in this design...



The NPN should be a high gain TAB transistor. Although bias voltage is quite temperature sensitive, current gain is not, & feeding the base with almost constant current results in a nearly constant collector current down to about 0.1V drop. This is much better than the usual series resistor used to reduce the current.

R1 sets the LED current & for a Transistor with Hfe of 100 it needs to be about 3k3 this will need selecting on test for your transistor with a charged up battery! Best measured with the lowest resistance ammeter e.g. a DMM on 20A.

Different R1 values could be switched in, or a variable could be used (with series R) allowing you to set the brilliance needed.

R2 sets the charging current for your battery, & if 290mA is wanted with 13.8V then again with Hfe=100, then R2 will need to be about 4k7. Higher current can be used, but only until the cells get hot!

Voltages less than 13.8V may not fully charge the battery as the cell voltage can be as high as 1.35V/cell (12.15V for 9)! D1 can be a 1N4001, but a schottky type 1N5817 may be better to get full charge with some batteries @ 13.8V

290mA charge for 14 hours should be the max rate for 100% charge on 2900mAH cells & in use should give a good 8 hours discharge @ 300mA for 300 charge discharge cycles of battery life.

Do not short out either R1 or R2 if presets are used! Use a series R of 1/2 the total value with your preset.

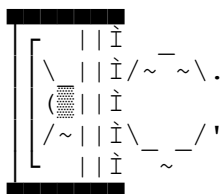
The switch is any good 1A double pole slide/toggle type. With the switch in CHARGE (OFF) position & no external power connection made, no current will flow from the battery.

N.B. Do Not Switch to "ON" with 13,8V power connected. This will double the LED current & shorten their life!

The battery pack & input supply need fuses, I suggest very thin 1A wire (relay coil etc) be used to bridge PCB solder points at least 1cm apart, should provide some short out safety (assuming, no inflammable material nearby!)

MOUNTING

The white LEDs need heat sinking or their lifetime is very short! At the talk 3x 3W LEDs (1Amp) were used with different lenses/reflectors to get a reasonable beam spread, & were mounted in an aluminium U channel with special sticky heatsink pads onto the back of the U channel.



Clips are mounted one the rear to fit the handlebar. The battery pack was actually separate in a drinks canister.

See my bul "Cheap Battery/12v LED Light", "LED Lights", "Windup Torch info", "Recovering Old NICAD/NIMH Cells", & "7AH "F" NiCad Battery Pack".

Why Don't U send an interesting bul?  
73 de John G8MNY @ GB7CIP