

## Re: Sensor/LED circuit–more help needed please–multiV's and dimmer

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*Source:* <http://sci.tech–archive.net/Archive/sci.electronics.basics/2005–08/msg00634.html>

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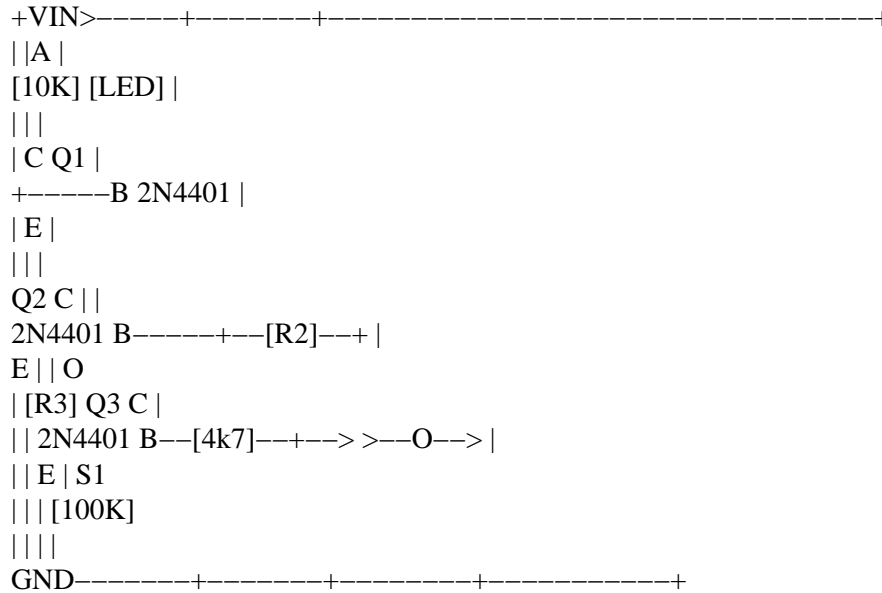
- *From:* John Fields <jfields@xxxxxxxxxxxxxxxxxxxxxx>
  - *Date:* Sat, 20 Aug 2005 17:14:06 –0500
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On 19 Aug 2005 14:59:49 –0700, "Gman" <ghojan@xxxxxxxxxxxx> wrote:

>Hi there,  
>  
>Thanks for the help on the test button question. Got another  
>non–electronics technician problem.  
>  
>I am still working on this Sensor Circuit with LED indicators. The box  
>I'm building, I want it to be able to be used on either system voltage  
>of 14Vdc or 28Vdc with a spdt switch setting the box for the  
>appropriate voltage.  
>  
>So I have eight sensors, eight LEDs (some with different ratings, see  
>below), two voltages and two states of DAYTIME (Bright) and NIGHTTIME  
>(Dim).  
>  
>The LEDs are supplied directly by the sensors. This means that each LED  
>has it's own power supply so speak. But, all supplies will either be  
>14Vdc at one time, or 28Vdc at one time (you will not have both  
>voltages at the same time).  
>  
>Because of the different LED colors I have to deal with a 2V and a 3V  
>LED at the two voltages of 14Vdc and 28Vdc, so my resistances are 550,  
>600, 1.25K and 1.3K at 20mA.  
>  
>Its easy enough just to put a 600 ohm R inline with each LED, but how  
>do I switch so that ALL LEDs have a 1.3K R in front of them without  
>running all the power through my voltage selector switch (which would  
>defeat the purpose of using the power from the sensors and having an  
>indicator light up when power is supplied by the sensor)?  
>  
>My next problem will be to DIM all the LEDs for the NIGHTTIME setting,  
>yet a third resistive value???

>  
>I'm trying to use more passive components rather than ICs and trying to  
>keep it simple as possible all the way, any suggestions are hugely  
>appreciated.

I think the easiest way to do it would be with 8 constant-current sources, like this:



Vin is the output voltage from your sensor, and Q1 and Q2 form a constant current source where R3 determines the current through the LED. I just built one to see how well it would work, and with 39 ohms for R3 I got 17.07mA through the LED with Vin = 14V, and 17.83mA with Vin = 28V. Not bad!

R2 and Q3 do the dimming, and when Q3 is turned on by closing S1, (the common BRIGHT/DIM switch) R2 will be placed in parallel with R3, requiring more current to flow in order to bring the circuit into regulation. That means that "BRIGHT" will be when the switch is closed, and "DIM" will be when it's open.

After I tried the basic circuit I added on the dimmer, and with R2 and R3 both equal to 39 Ohms, here's what I got:

Vin	Idim	Ibrt
V	mA	mA
14	16.4	29.8
28	16.0	32.9

You'll have to fiddle with R2 and R3 to get the ratio of bright to dim to be what you want but, basically, it works.

Also, I forgot to show it on the schematic, but I bypassed the supply, at the circuit, with 0.1µF.

Re: Sensor/LED circuit–more help needed please–multiV's and dimmer

John Fields  
Professional Circuit Designer

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- **Follow-Ups:**

- ◆ **Re: Sensor/LED circuit–more help needed please–multiV's and dimmer**  
◇ From: John Fields

- **References:**

- ◆ **Sensor/LED circuit–more help needed please–multiV's and dimmer**  
◇ From: Gman

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