

Re: Help Getting Started – Simple DC Circuit

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- *From:* Randy Day <ruthal@xxxxxxxxxxx>
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Mark Jerde wrote:

(I apologize for posting this basic circuit question. 25 years ago in college I had to know $E=IR$ etc. Just having problems getting started...)

I'm trying to "invent" a mechanical device. I've been having some alignment problems with it and this afternoon it occurred to me some simple electronics would help a lot. But it has been many years since I've done anything more complicated with electronics than change batteries in the household smoke detectors. ;-) I'm looking at the Jameco web site, seeing if I can find enough info to play with $E=IR$ but there are just too many options & choices...

I want to go to my neighborhood Radio Shack and buy

- 30 ea SPST NO switches
- 30 ea green LEDs
- 30 (?) ea resistors to limit current to the LEDs
- A circuit board to solder the LEDs & resistors to
- A battery case (e.g. 4 "D" cells) or 9v clip

I have an electronics soldering iron and plenty of wire.

The goal: When everything is lined up right on my mechanical device, all the switches will be closed and all 30 LEDs will be glowing. Then I'll unplug the battery, as the machine is ok once all the switches are closed. (E.g., no long-term lighting requirement.)

How can I get started with this? For the battery which value to use, 1.5, 3, 6 or 9 volts? Does each LED need its own resistor or is one resistor enough? (I don't care how bright the LEDs are so long as they are visible.)

2 'C' cells in series should give you enough power for short periods, and 3 volts will be sufficient to light the LEDs. You could try 2 'AA' cells, but I'm guessing they won't handle $30 \times 0.02A = .6A$ for very long (if at all).

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Each LED&switch will need a separate resistor.
Don't try to parallel them thru 1 resistor; you'll
let the magic smoke out of the LED's. :(

To calculate the resistor values:

$$R = (V_{cc} - V_{led}) / I_{led}$$

where V_{cc} is the supply voltage, V_{led} is the
forward voltage drop of the LED, and I_{led} is the
operating current of the LED.

You can find a minimum R value for your LED's,
and try larger values that still give acceptable
brightness with less power consumption.

HTH

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