LED Flasher Circuit

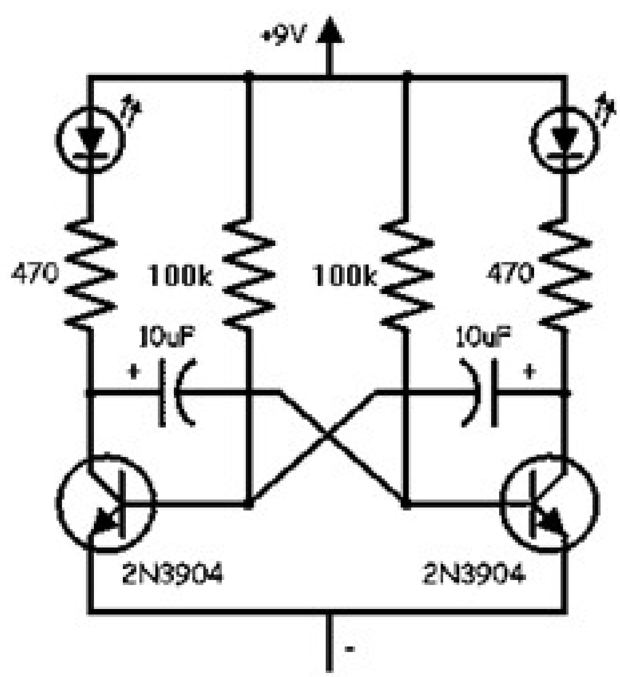
Simple LED flasher circuits

By simple, I mean that these circuits only flash one or two LEDs. This is opposed to the light chaser circuits that can flash four or more. Of course, the simplest LED flasher is simply to use a flashing LED. The problem with that approach is you have no control over the flash rate, but it does have its use for eye catching displays for selling stuff. The circuits below give you that control, plus they can flash two LEDs alternately.

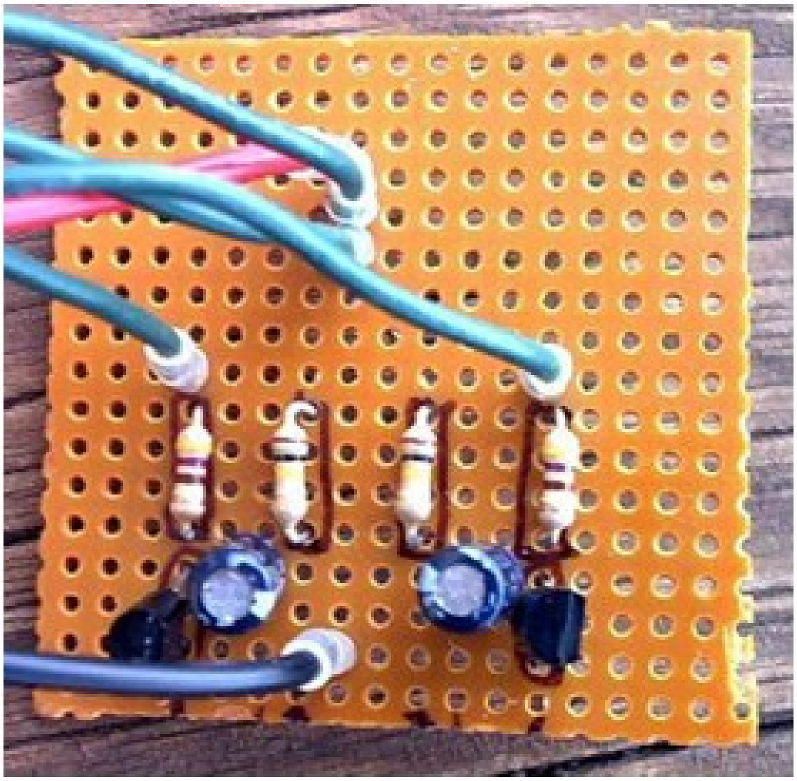
There are many possible applications for the circuits below, especially for kids, who love flashing lights. Here's some possible uses.

- Railroad crossing signal for model railroads.
- Safety blinkers for bicycles, etc.
- Fun stuff for Halloween, like making those plastic Jack-O-lanterns blink (try using ultraviolet LEDs here).
- Christmas decorations.
- Blinkers to locate items in the dark.

Transistor LED flasher



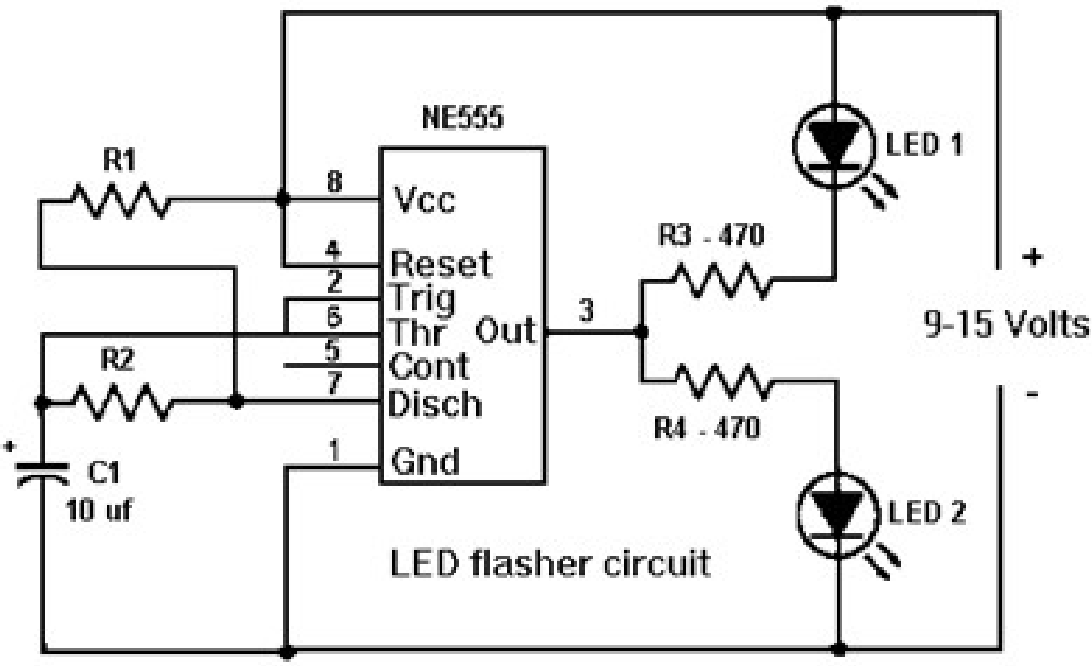
This circuit has a lot going for it. For one thing, it only consists of two transistors, two capacitors and four resistors. That also means it consumes very little power. You can control the flash rate by changing the size of the 100k resistors (100k makes for a pretty slow rate). You can also control the duty cycle by using resistors of different values on the two sides. The 470 ohm resistors control the current through the LEDs. Normally you want to limit this to 20mA, but to conserve battery power, you may need to limit it even further. You can also connect several LEDs in series, instead of using only one for each side. With red LEDs (1 per side) and the values shown, the circuit draws about 11mA. Here's what the actual circuit looks like:



On this circuit, the green wires connect to the LEDs, but you can mount them on the actual circuit board for some applications. The picture is about twice actual size. Here is an example of the use of this circuit:

Basic LED flasher circuit using NE555 timer IC

This circuit consumes more power, but it's advantage is when you need a variable flash rate, like for strobe circuits. You can actually use this circuit as a remote control for strobes that have a remote input. Of course, it has many other applications besides strobes.



- R1, R2, C1 and the supply voltage determine the flash rate. Using a regulated power supply will do much to insure a stable flash rate. For a variable flash rate, replace R1 with a 1 megohm pot in series with a 22k resistor.
- The *duty cycle* of the circuit (the percentage of the time LED 1 is on to the time it is off during each cycle) is determined by the ratio of R1 to R2. If the value of R1 is low in relationship to R2, the duty cycle will be near 50 percent. If you use both LEDs, you will probably want a 50 percent duty cycle. On the other hand, if R2 is low compared to R1, the duty cycle will be less than 50 percent. This is useful to conserve battery life, or to produce a strobe type effect, when only LED1 is used.
- The NE555 timer chip can be damaged by reverse polarity voltage being applied to it. You can make the circuit goof proof by placing a diode in series with one of the supply leads.
- The purpose of R3 and R4 is to limit current through the LEDs to the maximum they can handle (usually 20 milliamps). You should select the value of these according to the supply voltage. 470 ohms works well with a supply voltage of 9-12 volts. You will need to reduce the value for lower supply voltages.
- Rainbow Kits offers several kits to build the above circuit. You can also order these kits from RadioShack.com. The Radio Shack catalog numbers (and web pages) are as follows: standard kit with two 5mm red LEDs, (990-0067), kit with two red, two green and two yellow 3mm LEDs, (990-0063), kit with jumbo green LEDs, (990-0048), kit with jumbo red LEDs, (990-0049). You can also buy all the parts to build the circuit at your local Radio Shack store, including a circuit board (276-159B).

I have built a miniature strobe circuit as follows. Use a 250k pot in series with a 4.7k resistor for R1. The 4.7k resistor sets the upper flash rate limit. Use 2.2k for R2. That sets a really short duty cycle. For this circuit, you don't use LED 2 or R4. For LED 1, I used a two Radio Shack white LEDs in series and no R-3. The circuit runs on a 9 v battery.

LM3909 LED flasher chip

In the late 70s, National Semiconductor came out with the LM3909 LED flasher chip. Many of the electronics magazines made a big deal about it at the time, and I got one from Radio Shack, experimented around with it and concluded it wasn't such a big deal after all, although I did use the circuit in an LED flasher, I took to my first Rainbow gathering. After that, it was never seen or heard from again. I have no idea what happened to it, but I think the fact that it disappeared without a trace shows I had little nostalgia for that chip, or found it useful in any way, although I wish I still had it so I could show people exactly *why* it isn't that useful.

A couple of years ago, when I tried to find out what had become of that IC (Radio Shack no longer sold it), I found out that it had been discontinued, so I guess I wasn't the only one who thought the chip sucked. I don't remember exactly why I didn't like it. It's most suited for very slow LED blinkers that need to run on 1.5 Volts or less that use very little power consumption. You can still get these chips for a king's ransom, but I can't figure out why anyone would want one, except for historical reasons, in the *chips that failed* category. You can also still download the data sheet.

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electronics/flasher.html