

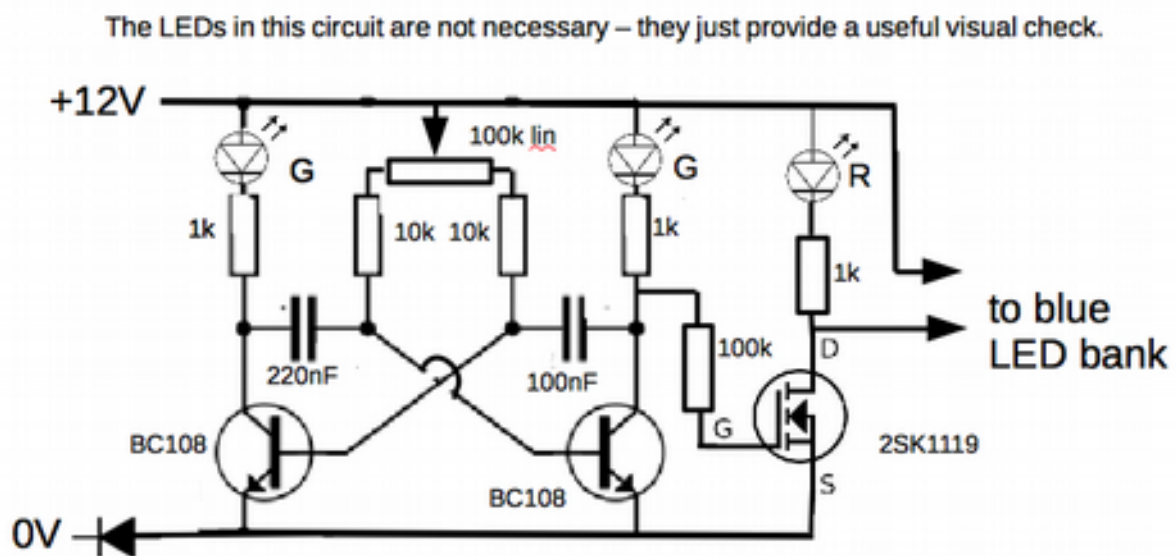
## Tea and Cakes in the Cell Culture Lab



Every so often, when the happy band of post-docs and grad students in the lab want a non-standard piece of electronic equipment, they remind me that I have the letters MIEEE after my name, and give me a meaningful look.

The latest to do this was Alazne, a brilliant young synthetic biologist who is working to make genetic systems that control stem cells using light. She could build her constructions in natural daylight but, to use them, she needed the cells to be in a dark place that could be illuminated with blue light, and she needed this in a hurry. Our collaborators in Germany (Matias Zurbriggen's lab), who have been working on light-sensitive proteins for some years, were able to recommend some blue LEDs from OSRAM. I ordered them for next-day delivery, and then dashed out to a local shop – the same one that supplies garish nail varnish for our slides (see other blog posts) – to look for a suitable light-proof container of the right size. There was one - a decorated cake tin. With a hole drilled into it to take a 90-degree pipe bend to let gas in, and with copper-clad board glued into the lid, with 'Manhattan' pads on it to hold the surface-mount LEDs, and a few resistors, it turned out to be just what was needed and would fit into the incubator nice and snugly.

Pilot experiments suggested that dimmable LEDs would be a good idea. The simplest way of achieving this seemed to me to be pulse-width modulation – that is, feeding the LEDs with a rectangular wave that could be altered from a duty cycle of long off-period, short on-period, through 50/50, to short off-period, long on-period. I went home that evening and rummaged around in both my memory and my attic, to come up with a circuit that would do the job without anything else needing to be ordered.



The improvised dimmer circuit: the contents are a compromise between designing for function and designing for what I could find in my boxes of electronic junk.

The dimmer unit had to live outside the incubator, of course, and that meant finding another box. I was clean out of 'proper' project boxes and knocking something up from scrap wood would not be at all suitable for the ultra-clean environment of the room. Stuck, I did what I always do – put the kettle on to make a large mug of strong tea, convinced that this is always the best way to a solution. And so it proved to be: a promotion by Taylors of Harrogate meant that their tea was, for that month or so, supplied in metal tins. One of these tins (I do drink a lot of tea!) turned out to be the perfect size to hold the circuit board and heat sink.

So, on the far bench in the cell culture lab, amongst the shiny commercial incubators and microscopes and stainless steel water baths sits a tea tin with a control knob on top. Next to it,

unless it is in the incubator and holding cells, is a cake tin with a long flat cable. For the first couple of days, people gave the new additions strange looks but, after a week, these items have sort-of blended in and their presence seems almost normal. Alazne's experiments are working well so, when the time comes, it will be fun working out how to describe our equipment in the formal, cold language of a scientific paper.

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