

LED Map-reading Torch

Powering an LED in series with a dropper resistor isn't original, but the present application requires some thought and optimisation. Whilst on the return leg of a long car journey, at night on unlit roads, I found map-reading quite hard. Torchlight was difficult to control and the driver complained of dazzle. The bright light meant that my night vision wasn't at its best for picking out road signs and the whole exercise was wasteful of batteries. Even a red filter over an incandescent bulb is not ideal, giving poor colour rendition when reading road atlases and Ordnance maps. It is also questionable whether the red light really does not detract from night vision.

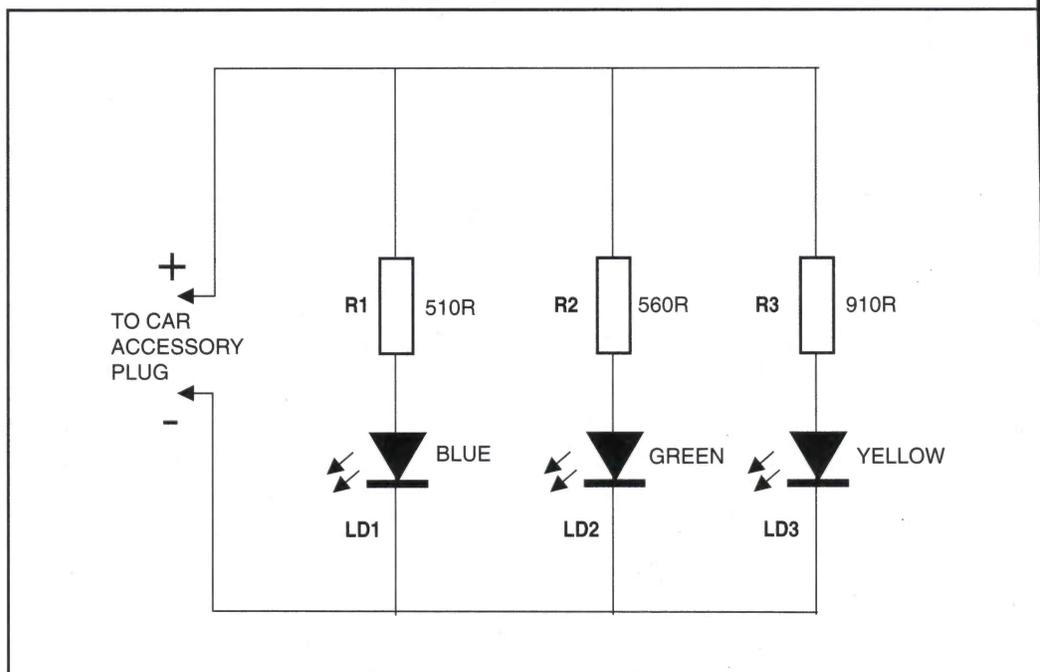
My design optimises the use of LEDs as a light source that the navigator can safely leave on throughout the journey without either dazzling the driver, reducing night vision, wasting batteries or burning out bulbs; the unit is powered from the vehicle's cigarette lighter socket. It was not possible to produce a pool of white light by aiming red, green and blue LEDs onto the map, since the colours are not sufficiently pure. However, colour rendition is still good enough to read a map easily. In fact, yellow LEDs pick out red A-road markings adequately and so there is no red LED in the final design.

Construction is by a 'freestyle' method. Although the LEDs could perhaps be mounted in some sort of box, I found this clumsy. The dropper resistors are soldered hard against their LED with the shortest intervening lead. Heatshrink sleeving is then applied to cover the resistor. Each LED is fitted with the appropriate size of clip. The three LED sub-assemblies are then mounted on a lump of 'Blu-Tack' (from stationers such as W. H. Smith) which has previously been moulded into a slightly conical shape. Apply 13-8V to the LEDs via test leads and darken the room. Aiming the light at white paper, press the LEDs into the Blu-Tack until their pools of light coincide about 3cm away. Perfect overlap is neither

Circuit MAKER

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the vicinity of the navigator, but this light is less obtrusive than that from the car's instrument panel. The navigator can pick out feature local to the current map position. This light enables the route to be followed and the position updated, but it is not intended to illuminate a large area of the map for planning purposes. This should be done before embarking! The resistors are within their power ratings but the unit does become noticeably warm after an hour. There is no on/off switch; just rest the lamp face-down on the



possible nor necessary. Seal the LEDs in position with plenty of epoxy resin.

The wiring must be well insulated and plenty of heatshrink will help here. Finally, solder a length of twinflex to the assembly and terminate with a car cigarette lighter plug. Wrap the assembly with self-amalgamating tape for strength and insulation. A sleeve of black plastic is now wrapped around the assembly so as to recess the LEDs themselves in a manner resembling the lens hood on a camera. Black PVC adhesive insulating tape binds the hood to the assembly. Finish off with an outer tube of 'race pack' heatshrink sleeving.

Even at this stage, there were visible gaps between the LEDs. I filled these with 'Milliput' compound (from model shops) and painted this with Humbrol model enamel paint (colour 33, matt black).

On road testing, there were no reflections in the windscreen and no dazzle. The driver is aware of a faint pool of light in

map to occult the light, or pull out the cigarette lighter plug. Current consumption is less than 40mA.

LED MAP-READING LIGHT PARTS LIST

RESISTORS: All 0-6W 1% Metal Film

R1	510Ω	1	(M510R)
R2	560Ω	1	(M560R)
R3	910Ω	1	(M910R)

SEMICONDUCTORS

LD1	3mm Blue LED	1	(JA19V)
LD2	10mm Green LED	1	(UK26D)
LD3	10mm Yellow LED	1	(UK27E)

MISCELLANEOUS

Cigarette Lighter Plug	1	(HW12N)
3mm LED Clip	1	(YY39N)
10mm LED Clip	2	(UK17T)
Twin Syringe Epoxy	1	(BA11M)
4-6mm Black PVC Tape	1 Reel	(FT20W)
Self-amalgamating Tape	1 Reel	(KW29G)
Twin-core Flex	As Req.	(XR39N)
Heatshrink Sleeving	As Req.	(XS11M)
Blu-Tack	As Req.	
Milliput	As Req.	
Humbrol Matt 33 Paint	1 Tin	