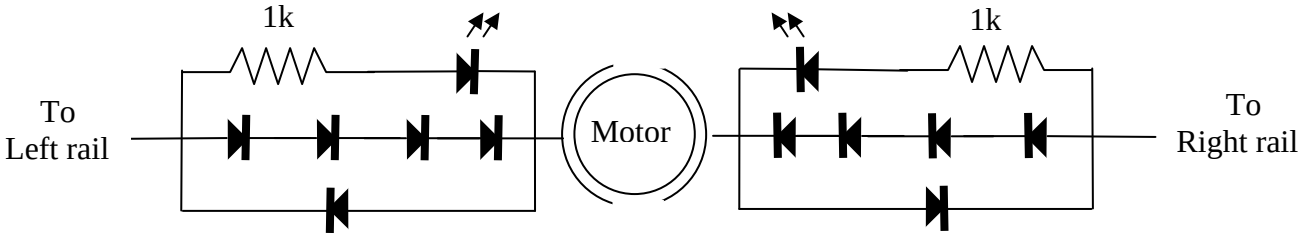
IRREGULAR FEATURE

On The Bench

It has been some months since I have penned these pages mainly due to lack of spare time but things seem to be easing so now I might be able to slip a few pages in occasionally. This edition is about a job that seemed easy enough to begin with but ended by giving me some hassles. I should point out that I 'won' this job because I made the comment that the cables hanging between the loco and tender gave the impression of a toy. No, they did not look like water hoses either. Considering this was to the owner about one of their favourite locos, I should have expected that it would lead to a discussion on improving things and if I could do it. The loco was made by Mantua or more commonly known as Matchbox

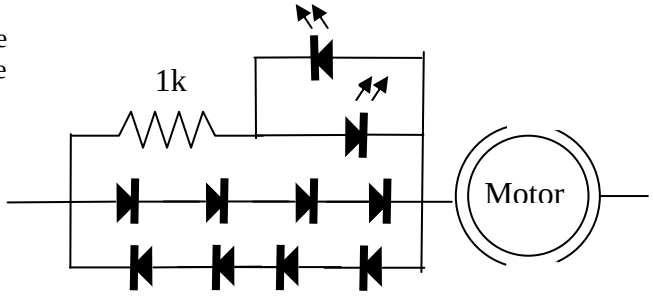
The first issue was to discover why there were two wires when the loco only picks up power on one side and the tender on the other. A little disassembly and all was revealed. The loco and tender are both metal and connected to opposing rails so there is an insulated drawbar and the wires jump across the gap. The light in the tender was directional and this setup was an economy measure to use a 16-volt lamp and save a few diodes. This was the obvious place to start, by swapping the lamp for a LED and bypassing it with diodes for voltage control, only one wire is required. I was then able to hide the remaining wire by fixing it to the edge of the drawbar with black tape.

I used a white 3mm LED obtained recently through the club from DCC Concepts in WA. These white LEDs normally run at 3.5 volts and are very bright but as this was for a steam loco, some experimentation was in order. I finally settled on a string of 4 diodes in parallel and a 1K resistor in series to give the right yellowish hue. A reverse biased diode in parallel with all this protects the LED when the direction is changed. See diagram below. This circuit is then put in series with the motor. Satisfied with the result I reassembled and presented it back to the owner. The reaction was very positive, but what about the front light? Somehow, I knew that was coming, so back to the bench and off with the loco body. The circuit for this is the same except wired in reverse so that it works when the loco is going forward and bypasses in reverse so that both lights are directional.



With the motor and drive in the loco body there is a little less room to play with but diodes are quite small and I was able to squeeze it all in. fitting the LED in the holder on the smoke box required a bit of engineering. I removed the lip at the back of the LED with a file as I had done for the tender and then opened out the holder slightly to give clearance for the leads. Testing with power all was working so I reassembled and checked again. Shock, horror it did not work! With the body on something must be touching so I disassembled and moved a few connections around and taped over others, tested, all working, I reassembled, nothing! After going through this process a couple of times it became rather frustrating, as the situation had not changed, it would work perfectly with the body off but had a short circuit with it on. I was not going to let this beat me so taking a deep breath I removed the body again and poked around with the multimeter, everything was perfect. Sitting thinking about this I allowed a meter probe to touch the body and got a reading. This is when the penny dropped. The short was not caused by the body touching the diodes as it was lying on the bench and only connected by the wires going to the LED. Close inspection revealed that one lead of the LED was shorting to the screw that holds the light bracket to the body and as both are metal, fitting the body completes the circuit and causes the problem. Bending the lead a little and adding some insulation cured this and the owner is very happy with the result, constant brightness and directional lighting.

If you have a tank loco the same circuit can be used but because the wiring can all be in the same unit two diodes and one resistor can be deleted see diagram right.



Catch you down the track...Tony Mikolaj.