

THREE COLOURED LEDS

This kit is available from:

Talking Electronics

email Colin Mitchell:

talking@tpg.com.au

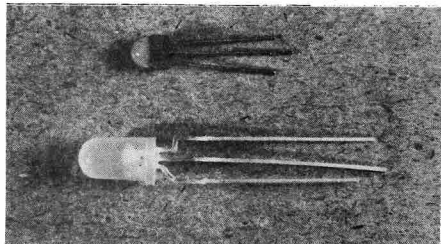
for pricing and postage.

**See:
Searchlight
Adaptor
kit**

HOW TO USE

THREE COLOURED LEDs.

ON MODEL RAILWAYS.

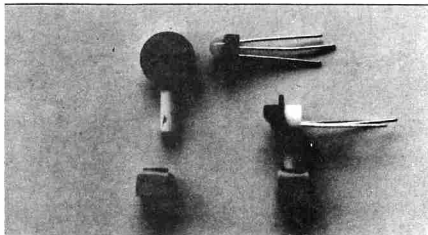


The two types of Dual LED mentioned in this article. The top one is from the F&G kit, the bottom one is from Dick Smith Electronics.

Tri-colour LEDs became available a few years ago. They did not prove to be too successful. The first problem with them was that they only had two leads. This meant that if you wanted to change between red and green you had to reverse the polarity on the LED. The third colour had to be generated by alternating between the red and green LEDs quickly. The amount of circuitry needed to switch between these three colours and also provide an off state, was not worth while. The third colour which was meant to be yellow or orange was very poor because the green and red used to generate it did not mix very well.

There are now some dual LEDs available. These LEDs have both a red LED and a green LED mounted inside them, but the difference is that each LED has its own anode. Because of this, controlling the LED is a lot easier. The 'yellow' is still poor.

This DUAL LED can be of great advantage to the railway modeller. There are two sources of which I am aware. One is Dick Smith Electronics. His dual



The F&G Operating Ground Light kit contains two dual LEDs and four painted metal castings, which is enough to make two ground signals.

LEDs are 5mm LEDs. This makes them a little large for HO scale signals unless they are filed down. They can be adapted for other uses where the larger diameter is acceptable. One such use is the WALK/DON'T WALK signs for the Pedestrian Crossing. These LEDs are common cathode, so a little circuit adaption is needed before they will connect.

The other source of dual LEDs is F&G Models. Their dual LED is not available by itself, but comes in a kit. Two of these dual LEDs are supplied along with some painted metal castings. These make up two small ground signals. They are short 3mm LEDs and when built into the ground signals, do not look at all overscale.

From a DICK SMITH ad.

**Want some of these?
We'll LED you have em!**

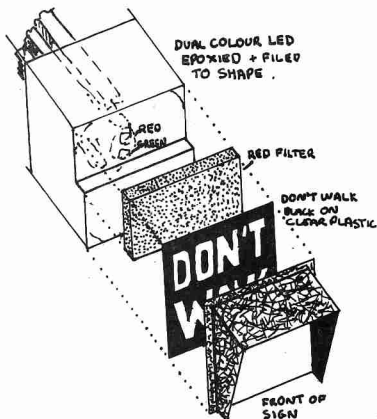
New! Dual Colour (RED/GREEN) in standard 5mm (3 lead) pack great for model train signals!!!
Cat Z-4070

F & G MODELS

BRING YOUR LAYOUT TO LIFE

with our quality painted cast detail parts
eg. train crew, machinery, boom gates
secks, bins, boxes, barrells & many more
at your hobby shop or send SAE for list

These are the only two sources of dual LEDs of which I am aware. The dual LED from Dick Smith Electronics is a 5mm device, while the one from F&G is 3mm.



A very compact WALK/DON'T WALK sign can be made using a dual LED. The LED is filed until it is square. A little epoxy might be needed on the corners. A recess is filed into the front of the LED so that a piece of translucent red plastic can be glued there. The LED should be orientated so that the RED LED wafer is behind this filter, at the top, and the GREEN LED wafer is at the bottom. A piece of film with 'DON'T WALK' written on it is then stuck on the front, along with the sun shield. The DON'T WALK sign can be made by carefully scribing the letters on a piece of black photographic film, such as a developed piece of unexposed slide film. Those with good cameras might even like to try making the signs photographically.

Driving these dual LEDs from your existing signal system is the next problem. If you have a two aspect system, then you will be quite pleased with the dual LED signals. If you have a three aspect signal system, you will have to put up with the poor yellow colour. These LEDs are advertised as being two coloured so the yellow is a bonus anyway.

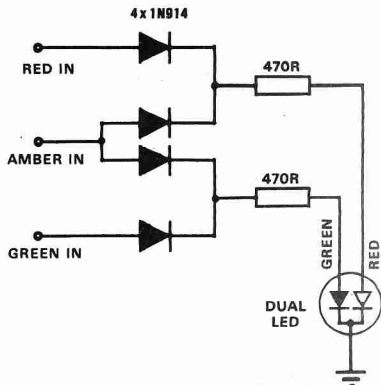
The next thing to consider is that some signal systems use a common earth for the signal while others use a common positive. As the dual LEDs are common cathode they can be connected very easily to a common earth system.

If your signal system is two aspect and uses a common earth, the only components needed to connect the dual LED into the circuit are two 470R to 1K resistors. The old bulb signal is removed and a resistor is soldered to each of the active lines. The anodes of the dual LED are then soldered to the other ends of the resistors, making sure that the red line goes to the red LED and the green line goes to the green LED. The cathode is then soldered to the earth line.

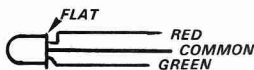
If you have a three aspect common earth system, then wiring is not that much more difficult. Four signal diodes can be used to adapt the three line

system to the two line system needed by the dual LED. These diodes are really forming two simple diode OR gates.

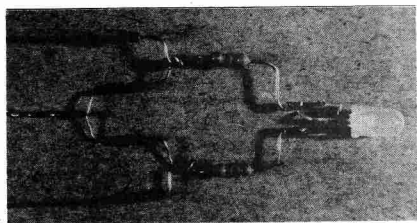
Construction is so easy that the use of a printed circuit board is not worth while. Look at the photo that shows how I wired a dual LED to the diodes and resistors. As the LED would normally be remote from the components, you may find it convenient to solder the components onto a piece of matrix board.



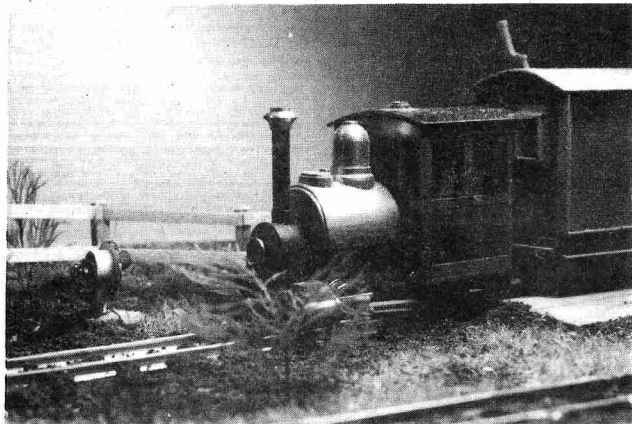
Connecting a dual LED to a three line common earth signalling system is very easy. Only four diodes and two resistors are required.



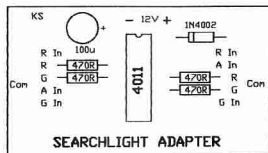
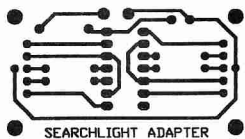
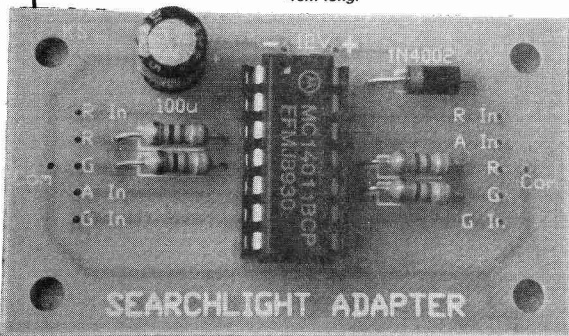
Pinout of the Dick Smith LED.



The three line to two line conversion circuit is so simple that no PCB is needed.

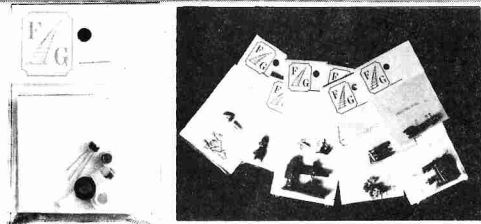


A narrow gauge locomotive pauses, waiting for the ground signal to turn green. The locomotive is about 4cm long.

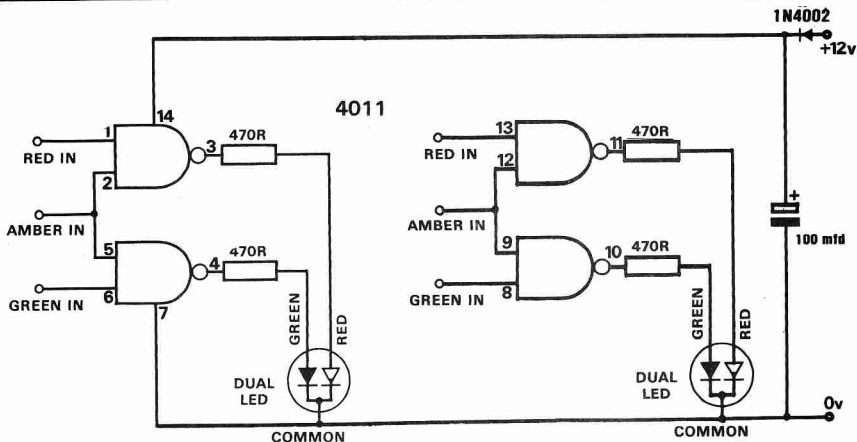


SEARCHLIGHT ADAPTER PARTS LIST

- 4 - 470R
- 6 - 100K
- 1 - 100 mfd electro
- 1 - 1N4002 diode
- 1 - 4011 quad NAND
- 1 - 14 pin IC socket
- 1 - Searchlight Adapter PCB



The Operating Ground Light kit comes neatly packed on a small card. Some wiring instructions are included. The kit is one of a range of excellent metal castings offered by F&G models.



There are two adapter circuits on the Searchlight Adapter PC board. Pull-up resistors are needed on each input of the circuit, if they are being driven by a relay or an open collector transistor driver.

Connecting a dual LED to a common positive system is not as easy. It requires a little extra circuitry. Look at the circuit diagram of the Search Light adapter. All of the signals from the common positive signal drivers need to be inverted. This is because each time a lamp is to be turned on, the active line to it goes LOW. This means that the active lines of all lamps that are not lit will be HIGH. If your system is only two aspect, this may not seem to be such a problem. Sometimes all that you have to do is swap the red and green wires around and wire the common of the dual LED to earth instead of positive. Resistors will be needed in each active line again. However, this will not work for all two aspect systems. If the output to the signal lamps is from a relay or transistor, it is likely that the circuit is not capable of taking the anode of the LED to positive. Now a chip is needed to invert the signal to the dual LED. This is what the Search Light Adapter does. It also works on three aspect signals.

The three lines from your existing system are connected to the corresponding inputs on one of the two adapters that are on the Searchlight Adapter PC board. An external 100K pull-up resistor is needed on each input of the adapter if the signal system uses relays or open collector drivers. If the signal system uses digital chips the pull-up resistors can be omitted.

Wire the dual LED to the output of the adapter and test the signal. If you only have a two aspect signal, take the input of the colour not in use to positive. On a HOME signal, this will be Amber and on a DISTANT signal it will be RED.

The dual LEDs can also be mounted on the track plan display, to give a novel indication of signal status.

