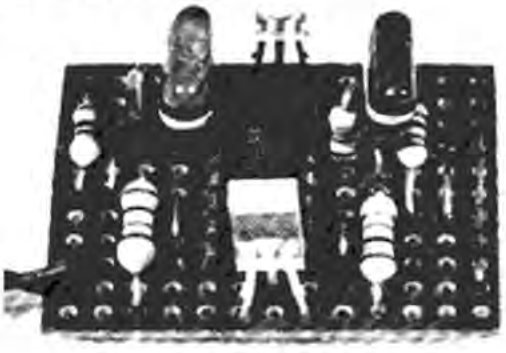
MULTI COLOUR PENDANT

by Robert Penfold



Look to the future with this unusual Electronic Jewellery project

This simple item of electronic jewellery can be constructed as either a pendant or a brooch, as preferred. An attractive effect is obtained by the use of two multicolour LEDs, and one of these flashes through its various states (red, green, yellow, and off) at a rate of a few Hertz. The other LED lights up with the complementary colour of the first LED, so that it flashes green instead of red, red instead of green, off instead of yellow, and yellow instead of off.

The Circuit

Figure 1 shows the full circuit diagram of the LED pendant, and this uses two oscillators of the type used in the Colour Snap Game described elsewhere in this issue; therefore the oscillator operation will not be considered here.

One oscillator is used to drive the red section of D1 by way of current limiting resistor R2, and the other oscillator drives the green section of D1 via R5. The two oscillators have different timing resistor values and therefore operate at slightly different frequencies. This means that sometimes only the red section will be switched, at other times only the green one, and at other times neither or both will be switched on, depending upon what the two output states happen to be at that particular instant. This results in D1 being pulsed through its four possible states at a rate of a few Hertz.

D2 is also driven from the two oscillators, but via an inverting buffer stage so that if the red section of D1 is switched on, the red section of D2 is switched off, and vice versa. Similarly, if the green section of D1 is switched on, the green section of D2 is switched off, and vice versa, giving the complementary LED colours.

Two of the Schmitt Triggers in the 40106 device are not used in this circuit, and their inputs are connected one to each oscillator output so that they are not left floating and vulnerable to damage by static charges. The oscillator outputs are used merely because these are convenient from the constructional point of view.

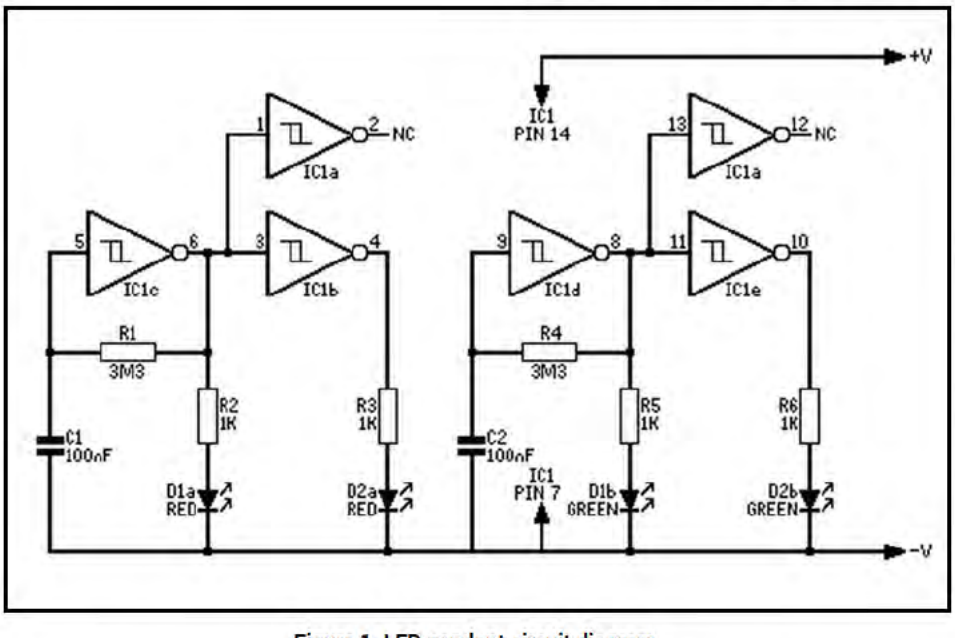


Figure 1. LED pendant circuit diagram.

PARTS LIST FOR THE LED PENDANT

Resistors - all ¼ watt

R1	3M3 10% Orange Orange Green
R2, R3, R5, R6	1K 5% Brown Black Red (4 off)
R4	4M7 Yellow Violet Green

Capacitors

C1, C2	100nF Polyester (2 off)

Semiconductors

IC1	40106BE
D1, D2	Two colour LED (2 off)

Miscellaneous

B1	PP3 battery and connector
	Veroboard 11 strips x 13 holes
	Case

Construction

The pendant can be constructed on a small piece of 0.1 inch matrix Veroboard panel measuring just 11 copper strips by 13 holes using the layout illustrated in Figure 2. IC1 is a CMOS integrated circuit and so the normal MOS handling precautions should be employed.

The board and PP3 size battery could be housed in a small ready made case, but ideally a small home constructed case should be used as this can be given the smallest usable dimensions. It is not essential to mount the battery in the pendant, and it could be fitted separately and connected to the main unit via thin insulated leads. With this method it would be possible to encapsulate the unit in clear resin if desired. If the unit is to have an internal battery and the smallest possible size is desired, a small 6 volt camera type battery (such as a PX28 or equivalent) could be used as the power source, although this would be a relatively expensive method of powering the unit and it would be necessary for the constructor to devise a battery holder and connector. It would also be necessary to reduce R2, R3, R5 and R6 to 680 ohms in value in order to maintain reasonable LED current and brightness. This modification can also be made if a 9 volt supply is used and a brighter display is required.

In order to make the unit as small and neat as possible it is not fitted with an on/off switch, and it is switched off simply by removing the battery.

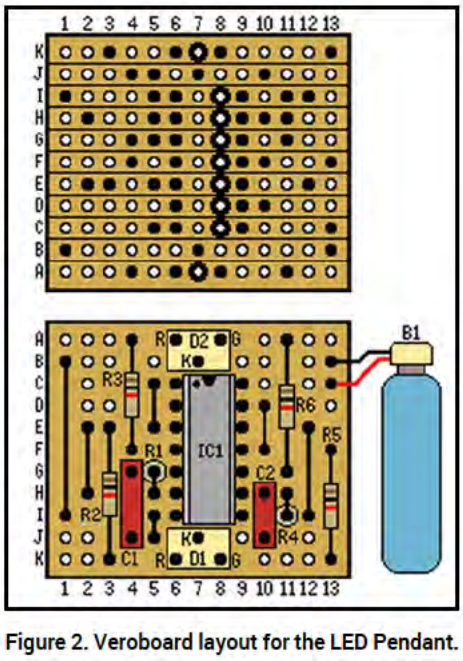


Figure 2. Veroboard layout for the LED Pendant.