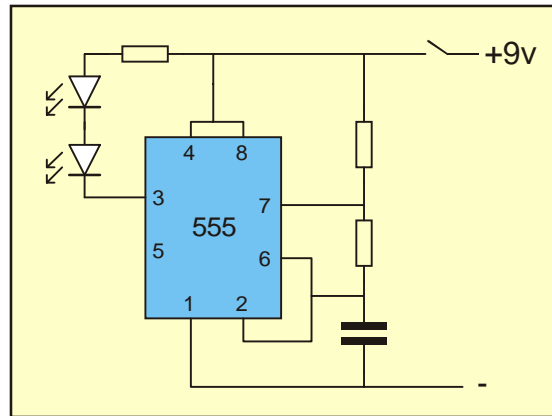


## Infra-Red Switch

### 1. Single Channel Switch Transmitter

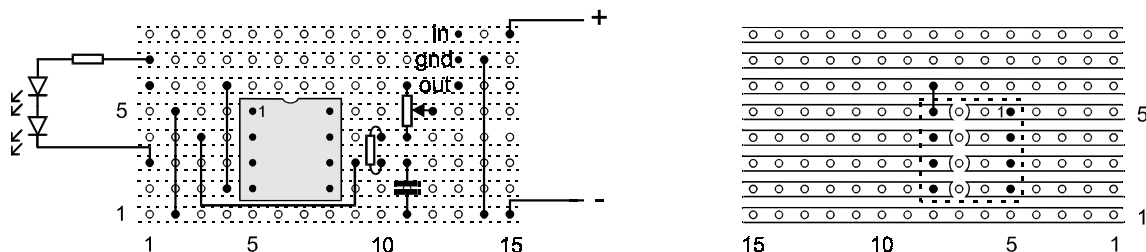


The component values must be chosen to give a frequency of oscillation to suit the receiver module to be used. In most cases this will be 40kHz *but you should verify this before starting construction*. The resistance in series with the diodes should be about  $22\Omega$  (its value is not critical).

To calculate the frequency of oscillation of a 555 oscillator, use the following formula:

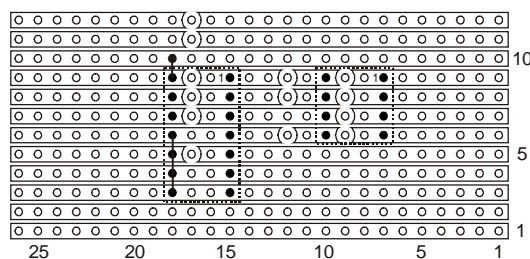
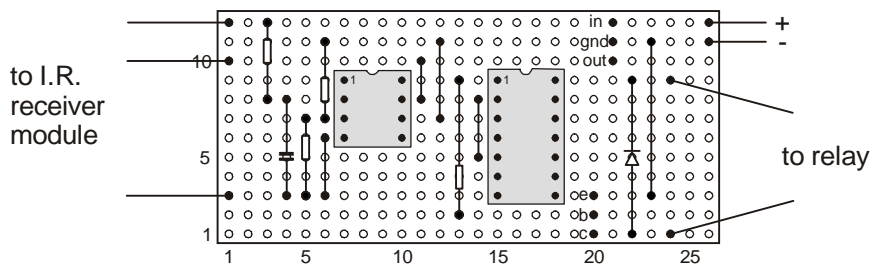
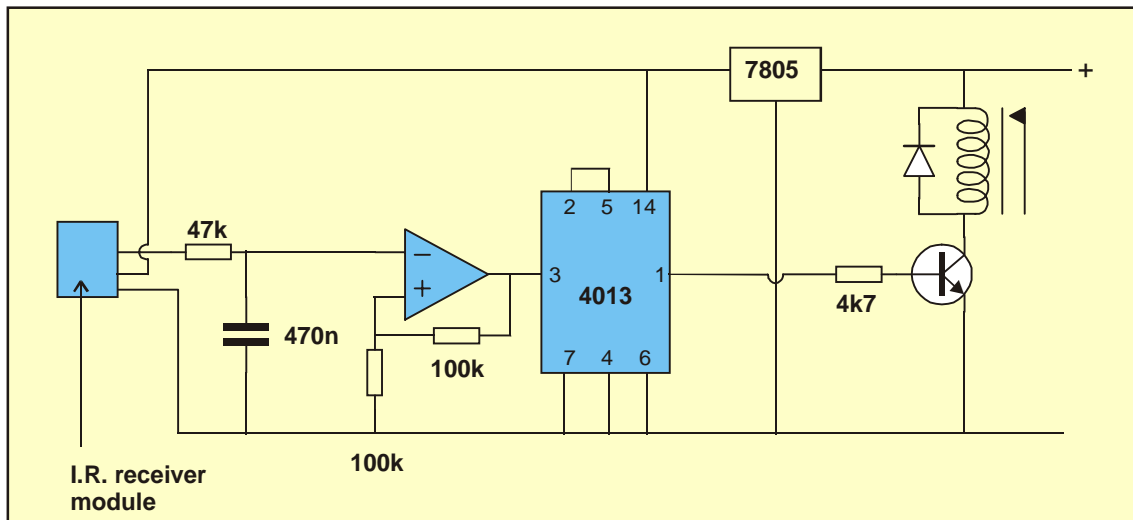
$$f = \frac{1.44}{(R_1 + 2R_2)C}$$

For example, if we choose  $C = 1.5\text{nF}$  and  $R_2 = 10\text{k}$  this gives  $R_1 =$  (about)  $5\text{k}$  for a frequency of 40kHz. We should therefore use a  $10\text{k}$  variable resistor for  $R_1$ . This will allow us to set the frequency to exactly 40kHz. For stability of frequency, a voltage regulator is recommended (the vero diagram below includes a regulator).



## Receiver

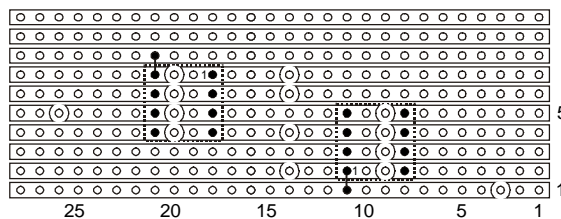
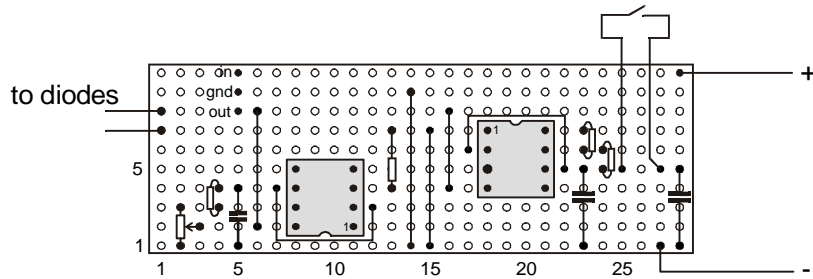
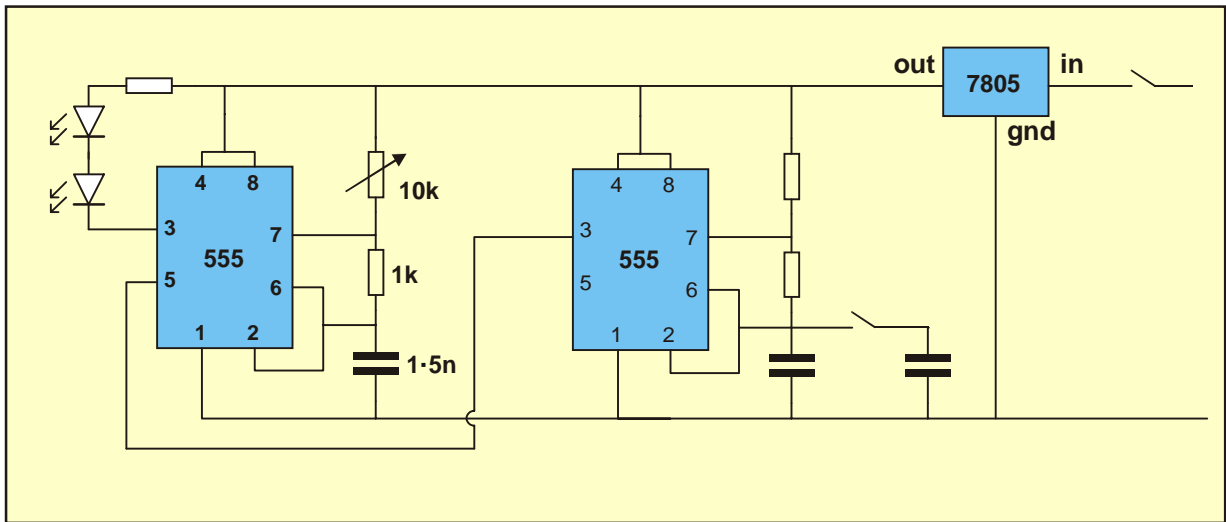
This circuit uses a ready-made I.R. receiver module. These modules are *very sensitive* and this simplifies the construction. The modules need a stable power supply so the 7805 voltage regulator is necessary. The op-amp is a TL081.



## 2. Two Channel Switch

### Transmitter

The 555 oscillator connected to the diodes is set to oscillate at the correct frequency for the I.R. receiver module to be used. The second oscillator modulates the first oscillator at a frequency of a few hundred Hertz. By varying the frequency of the modulation, we can change the "channel".



## Receiver

The 567 chips are needed to demodulate the signal sent by the transmitter. The circuit below was originally designed to drive a small d.c. motor (connected to points x and y). Activating one channel drives the motor one way and the other channel drives it the opposite way. However, the outputs of the 567 chips could be used to drive relays if required.

