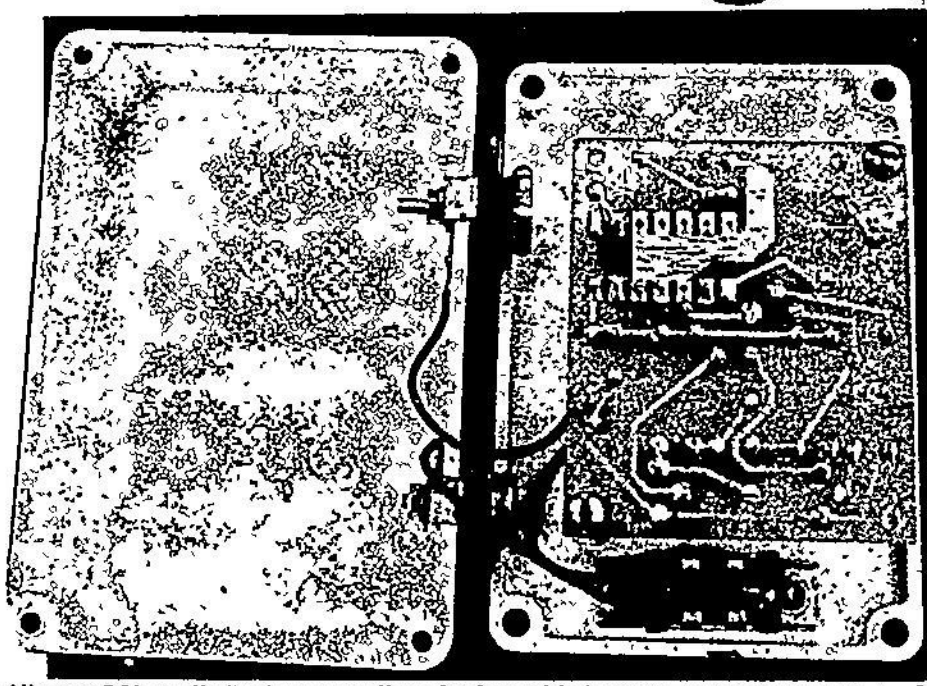
Pest Control

PROJECT

If I could talk to the animals ... I'd tell 'em to go away. Get the message across with this harmless little gadget. Design and development by Phil Walker.



The Allez-cat PCB easily fits into a small potting box, with the battery connectors bolted through the side of the case

IS YOUR GARDEN the main attraction for all the local neighbourhood cats, dogs, hedgehogs, rats, voles, aardvarks and other small furry creatures? If so, this device should protect your seedlings, kiddies' sandbox or trashcan from their attentions until you can make a more permanent arrangement. It is harmless to the animals themselves, being merely annoying rather than painful.

Our first design involved frequency-shifting a tape of Barry Manilow up into the ultrasonic range so that only animals could hear it, but it was felt that this would lay us open to prosecution by the SPCA. Consequently a second approach was adopted.

Many people have noticed that, when they operate the ultrasonic remote controls on their TVs or hi-fis, their household pets will protest loudly and leave the vicinity rapidly. We have designed this little device to capitalise on the phenomenon, in reponse to our readers requests for a gadget capable of protecting precious plants without the need for violence!

The 'Allez-Cat' consists of two basic parts: the first is an oscillator tuned to 40 kHz while the second is a voltage doubler and pulse generator. The pulses are about 10 milliseconds long and occur two to three times a second. This is done to reduce battery drain and increase the annoyance factor (for a cat, dog, hedgehog...). The voltage doubling action increases the available output power for a given battery voltage.

The whole device (apart from the battery) fits into a small plastic box and can use 6V or 9V batteries. If it is to be used out of doors, some form of protection from rain or other water should be provided as the transducer isn't waterproof.

Construction

The device is constructed in a small plastic box which is modified to clip onto a battery using the battery connectors. The assembly of the PCB should offer no problems provided that care is taken with the polarity of capacitors and diodes. Do not fit the transducer to the board at this stage.

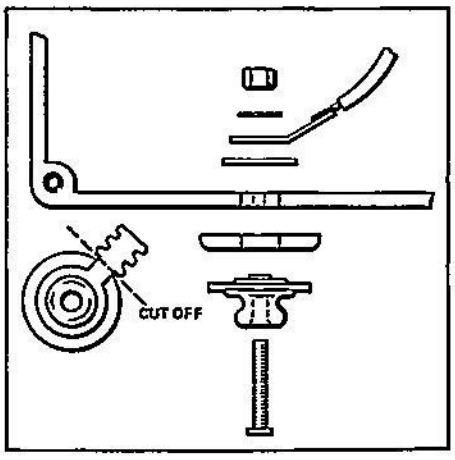
Mount the switch on the lid of the box using two short bolts. The large grommet should fit fairly loosely into the large hole in the lid and the transducer may be pushed into its centre using reasonable care. (Push in from the rear and avoid pressing the mesh front). Attach some thin single strand wire to its pins, and put the lid on one side for the time being.

Assemble the battery connectors to the side of the box as shown in Fig. 1, remembering to attach wires about 2" long to the solder tags first. The small grommet is cut in half (ie into two discs), each half being sandwiched between the battery connector and the case. This gives a steadier mounting, as the rear of the connectors is bowed slightly. Attach the wire from one connector to its proper hole on the PCB. Then attach another short length of wire to the other supp-

Fig. 1. (right) Constructional details of the battery terminals.

ly hole on the PCB.

Bolt the PCB to the lid of the box using the spacers and ensure that the wires to the transducer are soldered to the proper holes on the board. Connect the two remaining wires to the switch and assemble the two halves of the box with self-tapping screws (these are provided with the box). You are now ready to control the migratory habits of the animal kingdom.



(above). The whole project clips directly onto a lantern battery.

PARTS LIST

Resistors (all ¼W, 5%)	
R1,6	1k0
R2,3,4,5	10k
R7	100R
R8	10R

Capacitors	
C1,2,3	100u tantalum
C4	10n polycarbonate

Semiconductors	
IC1	LM380
Q1,2	2N3904
Q3	2N2926
D1,2	1N4148

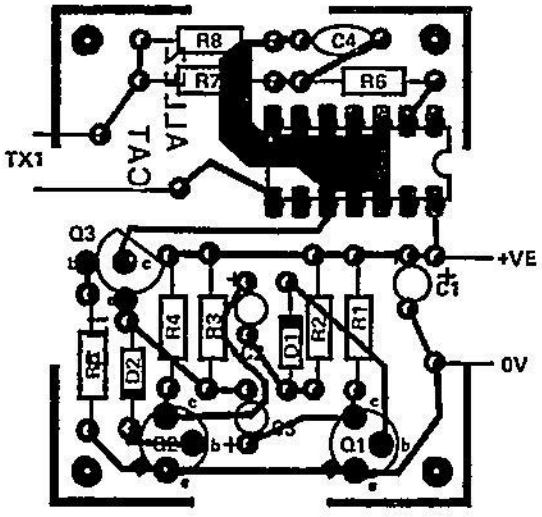
Miscellaneous	
SW1	miniature rocker or slide switch
TX1	40 kHz ultrasonic transmitter

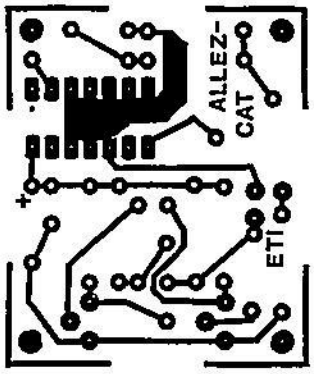
PCB battery; pair of battery connectors, two solder tags; mounting hardware; grommets; case

HOW IT WORKS

IC1-R6-R7-R8-C4 together with TX1 form a power oscillator which drives TX1 at its resonant frequency of 40 kHz for maximum efficiency. Q1,Q2 and their associated components form a standard multivibrator oscillator with a low natural frequency. R5 and Q3 form an electronic switch which applies the negative spikes occuring at the junction of C3, R3 and D2 to IC1. This means that the power supply to IC1 consists of short spikes of up to twice the battery voltage. The duration of the spikes depends on the current drawn by IC1, since this current flow alters the mark/space ratio of the multivibrator from a square wave to a series of widely spaced pulses. The repetition rate of these pulses is determined by C2 and its associated timing resistors.

Fig. 2 (below) Component overlay for the Allez-cat pest control project.





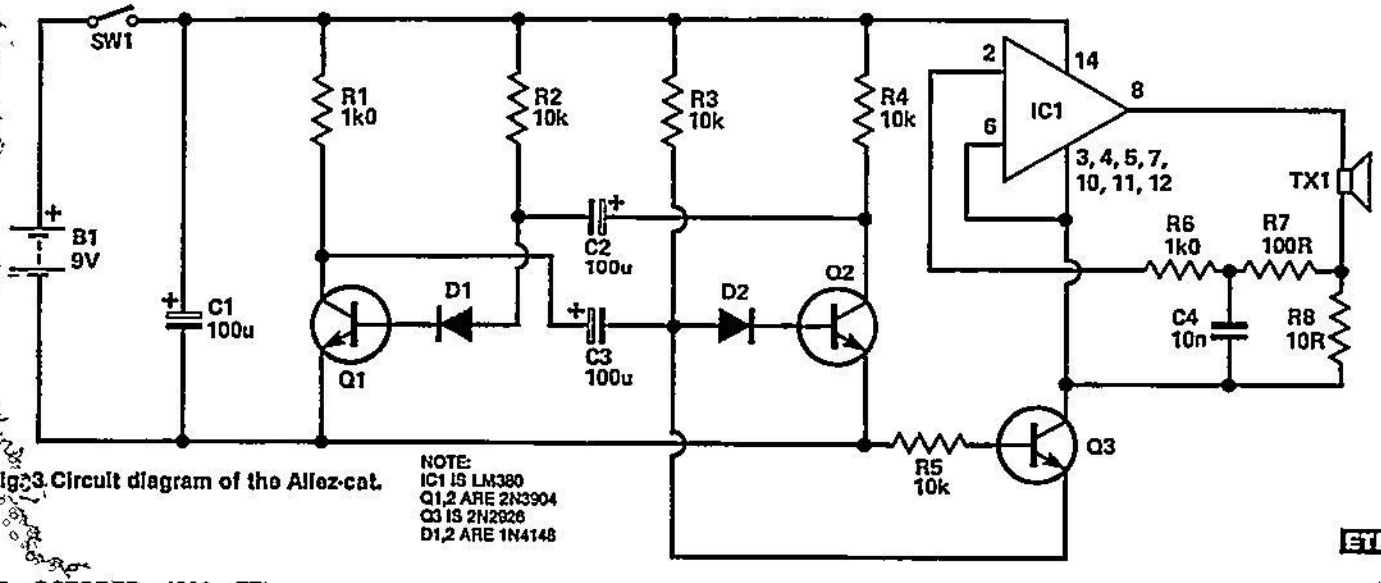


Fig. 3. Circuit diagram of the Allez-cat.

NOTE:
IC1 IS LM380
Q1,2 ARE 2N3904
Q3 IS 2N2926
D1,2 ARE 1N4148

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