ULTRASONIC PEST REPELLER

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Here is a circuit of an electronic pest repeller. It is effective over a radius of about 8 meters.

A wide variety of electric mosquito repellers are available in market. These basically consist of a small hot plate and a chemical mat to produce fumes. These fumes not only affect the mosquitoes but also have an adverse effect on human beings. These devices are costly in operation.

Insects are repelled by ultrasonic frequencies. This circuit uses ultrasonic waves rather than chemical fumes. This circuit generates an output from 30 kHz to 50 kHz, which is not audible and hence is harmless to human beings. The block diagram of the circuit is given in Fig. 1. The circuit is based on a NE555 timer (IC1) clocks this decade counter. The ultrasonic oscillator is built around another NE555 timer (IC2). The frequency of the IC3 changes according to the table 1.

The output frequency is not kept constant firstly because a certain frequency has maximum effect only on a certain category of pests. Hence, by varying the frequency a wide variety of pests are efficiently covered. Secondly it was found that the pests become immune to one frequency. The circuit is given in Fig. 2. Use IC socket for IC1.

Adjustment

Take the IC1 out from the circuit. Provide clock pulses to pin 14 of IC2 by

Adjust	Output of IC3
VR1	30KHz
VR2	33KHz
VR3	35KHz
VR4	37KHz
VR5	39KHz
VR6	41KHz
VR7	43KHz
VR8	45KHz
VR9	47KHz
VR10	50KHz

Table 1

The frequency at the output of IC3 can be measured by connecting a Digital Frequency Meter between the pin 3 of the IC and the ground. The frequencies listed in the table are not critical. A point to note here is that ultrasonic waves are highly directional. So, the speaker should be placed in a position where maximum efficiency is obtained.

The device should be kept far away from pets such as dog.

Fig. 1: Block Diagram

CD4017 decade counter having ten outputs, and each output goes high sequentially. The oscillator built around

connecting it to the +ve supply rail. Adjust the presets VR1 to VR10 to obtain frequencies as shown in the table below.

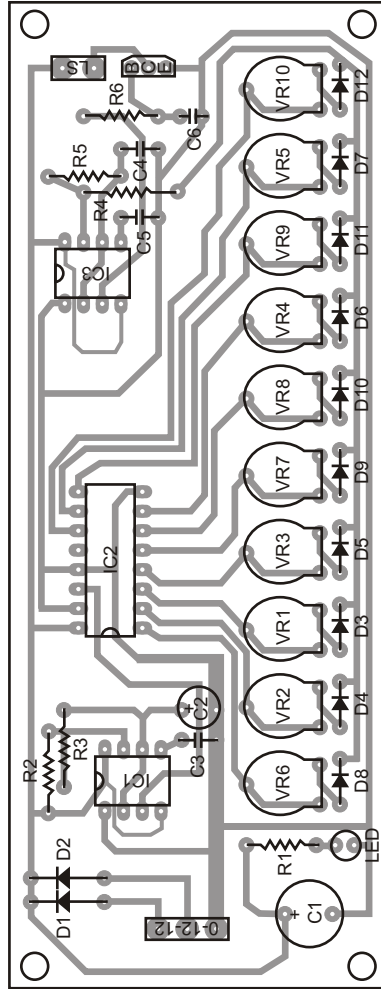*Fig. 2: Circuit diagram of the Ultrasonic Pest Repeller.*

Fig.3: Actual - size, solder-side PCB layout.

Fig. 4: Component layout for the PCB.

SEMICONDUCTORS
IC1,IC3	NE555
IC2	CD4017
Q1	2N5294
D1-D2	1N4001
D3-D12	1N4148
LED	RED

RESISTORS
R1	1K	
R2	120	
R3	470K	
R4	39K	(METAL FILM)
R5	10K	(METAL FILM)
R6	470K	
VR1-VR10	47K Preset	

CAPACITORS
C1	1000μF/25V
C2	1μF/25V
C3,C5	0.01μF
C4	470pF
C6	3.3pF

MISCELLANEOUS
X1	230V AC Primary to 12V- 0-12V, 500mA Secondary Transformer
LS	8 Ohms Tweeter