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Ultrasonic pest repellent

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It is well know that pests like rats, mice etc are repelled by ultrasonic frequency in the range of 30 kHz to 50 kHz. Human beings can't hear these high-frequency sounds. Unfortunately, all pests do not react at the same ultrasonic frequency. While some pests get repelled at 35 kHz, some others get repelled at 38 to 40 kHz. Thus to increase the effectiveness, frequency of ultrasonic oscillator has to be continuously varied between certain limits. By using this circuit design, frequency of emission of ultrasonic sound is continuously varied step-by-step automatically. Here five steps of variation are used but the same can be extended up to 10 steps, if desired. For each clock pulse output from op-amp IC1 CA3130 (which is wired here as a low-frequency square wave oscillator), the logic 1 output of IC2 CD4017 (which is a well-known decade counter) shifts from Q0 to Q4 (or Q0 to Q9). Five presets VR2 through VR6 (one each connected at Q0 to Q4 output pins) are set for different values and connected to pin 7 of IC3 (NE555) electronically. VR1 is used to change clock pulse rate. IC3 is wired as an astable multivibrator operating at a frequency of nearly 80 kHz. Its output is not symmetrical. IC4 is CD4013, a D-type flip-flop which delivers symmetrical 40kHz signals at its Q and Q outputs which are amplified in push-pull mode by transistors T1, T2, T3 and T4 to drive a low-cost, high-frequency piezo tweeter. For frequency adjustments, you may use an oscilloscope. It can be done by trial and error also if you do not have an oscilloscope. This pest repeller would prove to be much more effective than those published earlier because here ultrasonic frequency is automatically changed to cover different pests and the power output is also sufficiently high. If you want low-power output in 30-50 kHz ultrasonic frequency range then the crystal transducer may be directly connected across Q and Q outputs of IC4 (transistor amplifier is not necessary).

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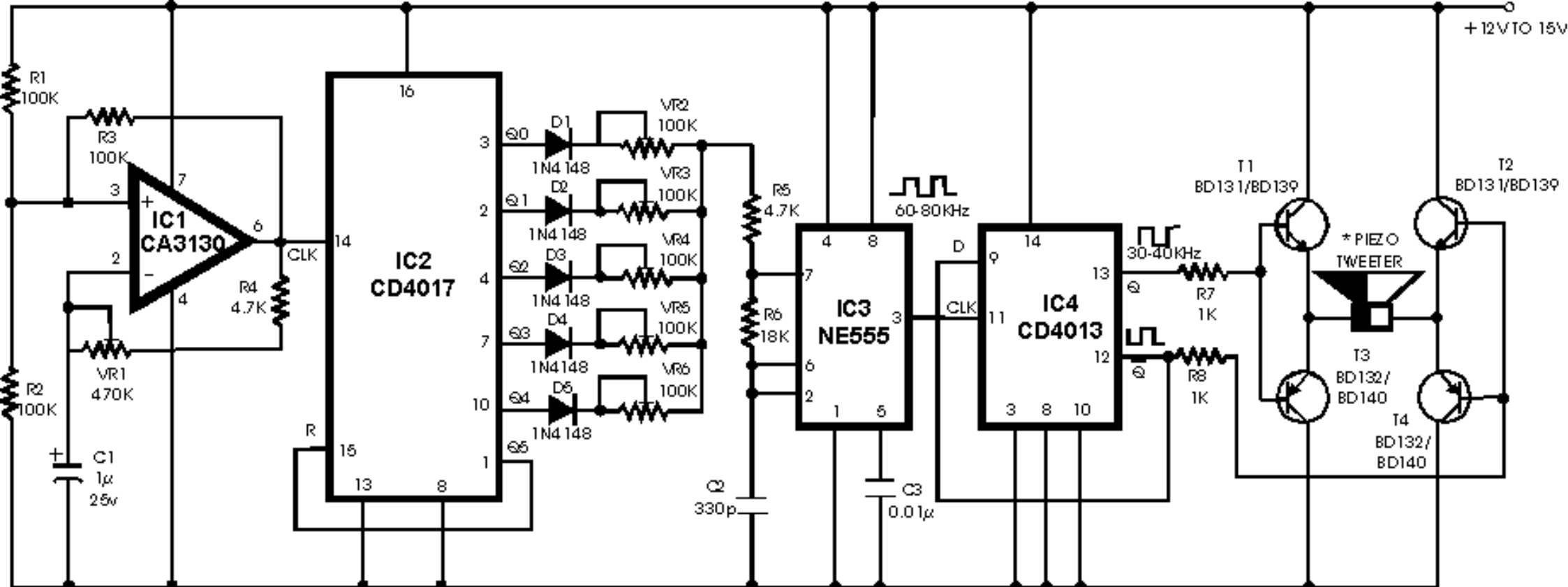
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*TESTED WITH CERMIC EAR PIECE USED IN TELEPHONE HEADSET

VR1 TO VR6 ARE SET FOR DIFFERENT VALUES TO GENERATE DIFFERENT FREQUENCIES IN ULTRASONIC FREQUENCY RANGE