

Pocket Pain Field Generator (IPG5)

This project shows how to construct a hand-held pocket-sized electronic device producing waves of ultrasonic sound capable of controlling horses, dogs, rodents and many other animals. It also produces an extreme discomfort to women and children, therefore, please bear this in mind when using the device. Some people cannot tolerate this ultrasonic sound and therefore, the device *sometimes* may be used to discourage an attack. However, we do not recommend this particular use of the device since it is not that foolproof and may provoke rather than discourage.

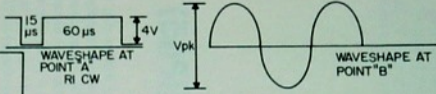
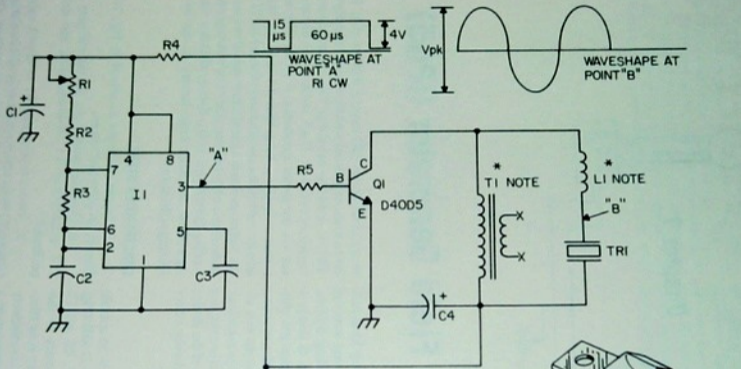
CIRCUIT THEORY

A 555 timer (I1) is connected as an astable oscillator set somewhere between 16-21 kHz (Fig. 7-1 and Table 7-1). R1 along with R2, R3, and C2 determines the frequency and symmetry of this waveform. Adjustment of this frequency is by trimmer (R1). Output is taken via pin 3 and is resistively coupled to the base of Q1, that is operated in a class-C mode. Positive pulses occurring at the col-

lector of Q1 drives TR1 through inductor (L1). L1 forms a resonant circuit with the internal capacity of TR1. It should be noted that TR1 has an inherent capacitance of about $.15 \mu\text{F}$ and this must be tuned out via the series inductance of L1 for efficient power transfer. Note that L1 may be tunable for maximizing results at a set frequency. T1 is the 8-ohm section of a transformer and serves as an audio choke while offering only its dc resistance for feeding the collector of Q1. Battery (B1) is a standard 9-volt transistor radio battery or can be a rechargeable ni-cad.

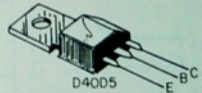
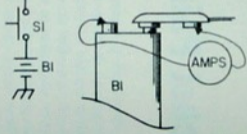
CONSTRUCTION STEPS

1. Layout perfboard as shown in Fig. 7-2. Identify all parts and pieces.
2. Carefully locate holes for the odd pins of IC1, transformer T1 mounting tabs, and drill perfboard.
3. Assemble components to board using component leads whenever possible and insulating tubing whenever a lead bridges one another. Ob-



Vpk	R1	freq.	I Bat
50V	CW	16 KHz	350ma
30V	CCW	21KHz	250ma

NOTE SINE WAVE MAY START TO DISTORT ON LOW FREQ END.



L1.-NOTE PARALLEL TWO 1mh FOR 500 uH. IF ADJUSTABLE IS USED, TUNE FOR PEAK WAVESHAPe ACROSS L1 AT DESIRED FREQUENCY SETTINGS OF R1.
 T1.-USE 8-ohm WINDING OF T1 FOR CHOKE. THIS IS THE LOWER RESISTANCE WINDING OF THE TWO AND IS USUALLY 1-2ohm. WHEN MEASURED ON AN OHMETER.

Table 7-1. Pocket Pain Field Generator Parts List (IPG5).

R1	(1)	2 k vert. trim pot
R2,3	(2)	2.2 k 1/4 watt resistor
R4	(1)	10 ohm 1/4 watt resistor
R5	(1)	1 k 1/4 watt resistor
C1	(1)	100 μ F/25 volt electrolytic capacitor
C2	(1)	.01 μ F 50 volt poly capacitor
C3	(1)	.01 μ F 50 volt disc capacitor
C4	(1)	1 μ F 50 volt electrolytic capacitor
I1	(1)	555 timer dip pack
Q1	(1)	D4005 npn power tab transistor
T1	(1)	1 k 8 ohm transformer
L1	(2)	1 mH inductor
TR1	(1)	Piezo driver #1023
S1	(1)	Push-button switch
CL1	(1)	6" snap clips
CA1	(1)	4.4" x 2.44" x 1.06 plastic box
PB1	(1)	2" x 1.3" x .1 grid perfboard
SCR1	(1)	2" x 2" fine screen mesh
WR3	(10")	#24 wire, plastic hook-up
B1	(1)	9 volt transistor battery (not included in parts kit)

served polarity of C1, C4 and position of I1. Wire and solder as in Figs. 7-1 and 7-2 showing connections as dashed lines. Connect TR1, CL1 and S1 using wire leads.

4. Remove the high impedance (1000 ohm leads) of T1. These can be identified by measuring with an ohmmeter and are the higher resistance windings (usually about 30 ohms).

5. Carefully check wiring for accuracy and shorts especially around I1.

TESTING

Obtain a Simpson Multimeter and check for absence of a short circuit across battery connection when S1 is depressed. This test verifies any gross errors such as shorts, etc., and helps prevent damage that could be done by the ni-cad battery. Rotate R1 full ccw (lowest frequency end). Insert a meter set on amps across the contacts of S1 and note a current reading of about 250 mA. Rotate R1 to full cw and note current increasing to approximately 350 mA. You will also note a piercing, uncomfortable sound in your ears or back of your neck usually depending where R1 is set. It may be necessary to

wear ear protection as this can be extremely painful to most people. A further check of circuit operation can be accomplished by connecting an oscilloscope across the terminals of TR1 and note the waveforms as shown in Fig. 7-1.

FINAL ASSEMBLY

1. Fabricate plastic case CA1 as shown in Fig. 7-3. Carefully fabricate a 1/4" to 1/2" hole for transducers. Drill hole for S1 and small access hole for adjustment of R1.

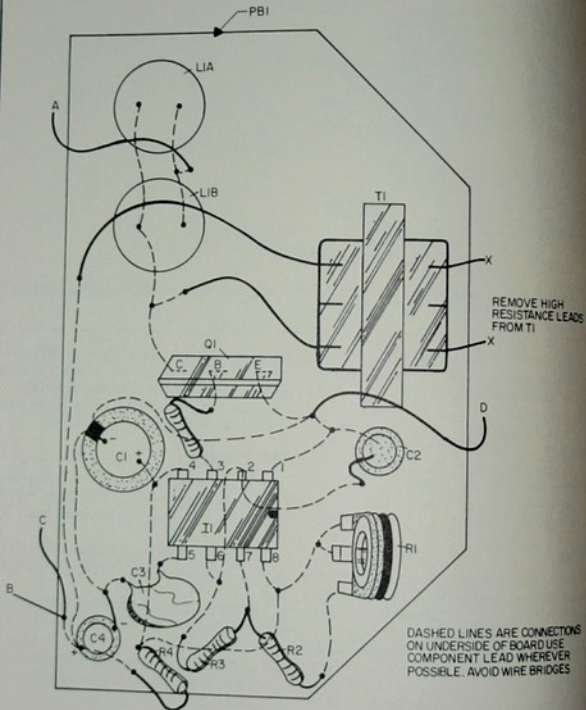
2. Place screen and glue in place using RTV. Attach TR1 transducer also using RTV or similar sealer.

3. Install assembly board and battery. Attach rear cover and note position and dress of wires.

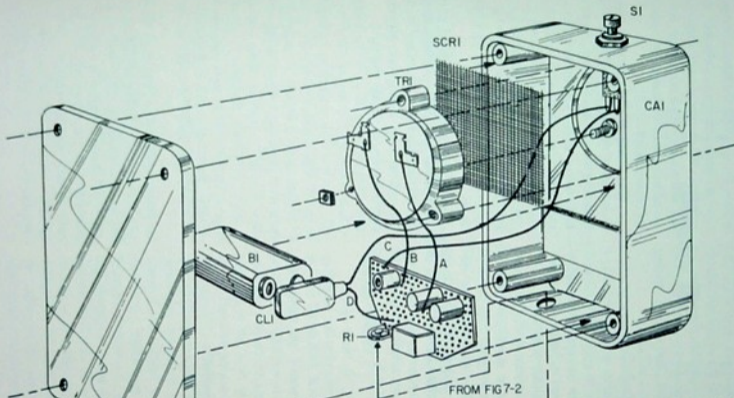
Please take note that this device is intended for intermittent use. There is inadequate heatsinking of the components in this compact layout for continuous use.

OPERATION AND APPLICATIONS

Your IPG5 Ultrasonic Control Device is an unique, patented electronic device that when used



TO USE THIS UNIT, SIMPLY DIRECT THE OPENING TOWARDS THE PROBLEM AREA AND PUSH THE BUTTON. AN IMMEDIATE EFFECT SHOULD BE NOTICED BY THE SUBJECT. THE RANGE OR THE UNIT DEPENDS ON THE ACOUSTICAL SENSITIVITY OF THE TARGET.



PLEASE NOTE THAT

YOUR UNIT IS DESIGNED

FOR PRODUCING INTERMITTENT
BURSTS OF ULTRASONIC ENERGY

CONTINUED
UNNECESSARY USE WILL WEAR BATTERY DOWN AND
MAY DAMAGE TRANSDUCERS USE IN 2-5 SEC. BURSTS.

USE SMALL NARROW BLADE
SCREW DRIVER TO ADJUST
FREQUENCY FROM 16-21 KHZ
SET FOR MAXIMUM EFFECT
ON TARGET.



properly will prevent harassment from unruly, uncontrolled dogs. The device emits an acoustical beam of energy that dogs find intolerable, but most humans cannot hear but will feel (Fig. 7-3). This energy causes discomfort to these animals and obviously becomes more severe the closer the dog approaches. Most dogs may *only* be affected by this device when in a hyperactive state such as chasing, fighting, attacking, etc.

Children and young people are more prone to hearing this energy than adults and consequently it should be used bearing this in mind. *The unit could be used to discourage certain unwanted personal encounters, however, we do not recommend it as personal defense device in a hostile situation.*

You may adjust the tone from 16-21 kHz using a small screwdriver. *Adjust to maximum effect on particular target subject.* To use your unit, you must remember and observe the following: Your unit emits this energy from the wire mesh cut out in the front. It should be continually pushed on and off repeatedly until the animal retreats and should not be left on constantly in any single situation. An aggressive dog may approach several times at

which you give him a shot each time until he retreats.

The unit should only be used when the need arises. Do not press the button or use around house pets as these animals *usually will not appear to be affected* in the same way as an unruly or strange dog, but will accept it as a reprimand, etc., because the sound will cause discomfort to these house pets for no reason at all.

Use common sense, do not approach and use on a known vicious or malicious dog. Indicate by thrusting the unit towards the menacing dog letting him realize where the discomfort is coming from. Do not provoke a dog and then use this device. This is unnecessary and cruel and if brought to the attention of the authorities could result in a stiff penalty. Do not expect to control dogs at great distances because the energy drops off increasingly with distance.

Caution—This is not a toy—keep away from children. Do not place near your ear. Do not use on deaf or extremely menacing dogs. Do not use on command attack dogs. Use common sense at all times.