RAT BLASTER

Ramsey Electronics Model No. RB1

Got a problem with furry intruders in your yard or garden? Here is a professional strength repeller designed to send those pesky critters running with their tails between their legs. A convenient, nature friendly method of keeping animals away from where you don't want them

- **Around 4 watts of screaming high frequency audio. Inaudible to humans, but a terror to animals.**
- **3 settings for different levels of coverage**
- **Built-in piezo high efficiency speaker**
- **External trigger input for use with motion sensors and other detectors.**
- **Operates on 9 to 15 volts DC or AC.**
- **LED indicator shows when unit is operating.**
- **Informative manual answers questions on theory, hookups and uses - enhances resale value, too!**
- **Add our rugged metal case for years of outdoor or indoor use.**

PARTIAL LIST OF AVAILABLE KITS

RAMSEY TRANSMITTER KITS

- **FM25B FM Stereo Transmitter**
- **AM1 AM Transmitter**
- **TV6 Television Transmitter**
- **FM100B Professional FM Stereo Transmitter**

RAMSEY RECEIVER KITS

- **FR1 FM Broadcast Receiver**
- **AR1 Aircraft Band Receiver**
- **SR2 Shortwave Receiver**
- **AA7 Active Antenna**
- **SC1 Shortwave Converter**

RAMSEY HOBBY KITS

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- **SS70A Speech Scrambler**
- **MD3 Microwave Motion Detector**
- **PH10 Peak hold Meter**
- **STC1 Stereo Transmitter Companion**
- **SHA1 Headphone Amplifier**

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- **HR Series HF All Mode Receivers**
- **QRP Series HF CW Transmitters**
- **CW7 CW Keyer**
- **CPO3 Code Practice Oscillator**
- **QRP Power Amplifiers**

RAMSEY MINI-KITS

Many other kits are available for hobby, school, scouts and just plain FUN. New kits are always under development. Write or call for our free Ramsey catalog.

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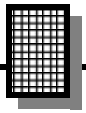

KIT ASSEMBLY AND INSTRUCTION MANUAL FOR

RB1
RAT BLASTER

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RAMSEY ELECTRONICS, INC.
590 Fishers Station Drive
Victor, New York 14564
Phone (585) 924-4560
Fax (585) 924-4555
www.ramseykits.com

INTRODUCTION TO THE RB1 RAT BLASTER

This is a practical project for people with problems with furry intruders in their yard, not just rats. The Rat Blaster is useful in repelling all kinds of wildlife. The list includes deer, dogs, cats, all rodents, and even some insects. This is the safest, most effective way to repel animals from eating your shrubbery or burrowing in your carrot patch. It is also a great help at keeping little surprises out of your lawn left by the neighbor's pets.

Instead of just generating a single constant tone like many competitive units on the market, the RB1 creates a warble tone that varies in frequency. This sound is enough to drive any person crazy if they could hear it. When the RB1 was in its design stages, the frequency was low enough to hear. Three offices up and two doors between was not enough to prevent irritation and complaints from associates. Just imagine what it can do with no obstructions!

This unit is set outside facing the area desired to be protected. It then covers an area in the shape of an oval. On the low frequency setting, it will cover an area of approximately 4000 square feet. On the high frequency setting, it covers an area of around 2500 square feet. The advantage of running the high frequency setting is that it is well out of the human hearing range. The low frequency setting is just at the limit of hearing and can be irritating to some people with acute hearing. The reason the low frequency signals cover a larger area is due to a combination of how good the animals ears are, and how directional the sound is from the transducer.

Built into an easy to mount case of durable construction, the Rat Blaster will operate for years, providing your yard and garden with animal protection. This is truly the gardener's dream come true!

HOW DOES IT WORK?

Here is where we get into a little circuit analysis. If you just want to plug it in and start scaring off critters, you can skip this section. Otherwise here is some insight into why and how this RB1 works. We will use the schematic located at the center of the manual to analyze the circuit.

We will begin with the IC marked NE555, U1. This is a simple, free running oscillator circuit which is used to generate the lower frequency warble rate of the signal. This rate varies from around 1Hz to 10Hz. The output of this oscillator is a 12V square wave until it is sent through R2 into C7. These parts filter the waveform into a sawtooth waveform.

U2, the XR-2209 is set up to be a voltage controlled oscillator running between 15kHz and 50kHz. The higher the voltage seen on pin 4 of U2, the higher the frequency produced on pin 7 of U2. When the low frequency sawtooth signal from U1 is sent to pin 4, the high frequency signal of U2 modulates or “warbles” at a rate of U1’s output frequency.

S2 controls the average DC voltage of the sawtooth by adjusting the rate of discharge of C7. The less resistance seen from pin 4 to ground, the faster C7 discharges. The faster C7 is discharged, the lower the average voltage of the sawtooth waveform is. In turn, the lower the average voltage on the sawtooth, the lower the average frequency on pin 7 of U2 allowing this unit to cover a larger area.

The output of U2 is then sent to some logic which enables or disables the speaker driver circuitry depending on what signal is seen on pin 2 and 6 of U3. When these pins are at a logic ‘0’, or 0 volts, the transducer driver is enabled, and when it is ‘1’, or 12 volts, it is disabled.

The speaker driver section consists of a push-pull circuit controlled by U3:D, B, and C. U3:B inverts the signal from U3:A so that when pin 3 is high (12 volts) pin 4 is low (0 volts). U3:D and U3:C are set up as inverting buffers to drive the transistors that drive the transducer.

The speaker driver also consists of the four transistors surrounding SP1 which provide more power capability than what U3 offers. When U3 pin 11 is high, Q4 is turned on, and Q1 is turned off. This presents about 12 volts on one side of the transducer. While pin 11 is high, pin 10 is low, which turns on Q2 and Q3 off, pulling the other lead of the transducer to near 0 volts. Now there are almost 12 volts across SP1, allowing the transducer to produce sound. On the next half of the cycle, the transistors that were off are turned on, and the ones that were on are shut off. Now there are 12 volts across the transducer connected in the opposite direction from before. This is all done at a rate of around 15,000 to 50,000 times a second, producing the high frequency signal to scare off the beasties.

NOTE TO NEWCOMERS: If you are a first time kit builder you may find this manual easier to understand than you may have expected. Each part in the kit is checked off as you go, while a detailed description of each part is given. If you follow each step in the manual in order, and practice good soldering and kit building skills, the kit is next to fail-safe. If a problem does occur, the manual will lead you step by step through the troubleshooting guide until you find the problem and are able to correct it.

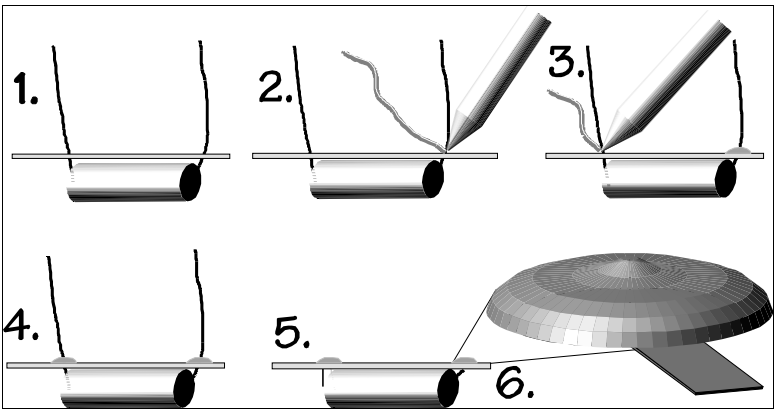
RAMSEY "LEARN-AS-YOU-BUILD" ASSEMBLY STRATEGY

Be sure to read through all of the steps, and check the boxes as you go to be sure you didn't miss any important steps. Although you may be in a hurry to see results, before you switch on the power, check all wiring and capacitors for proper orientation. Also check the board for any possible solder shorts, and/or cold solder joints. All of these mistakes could have detrimental effects on your kit - not to mention your ego!

Kit building tips:

Use a good soldering technique - let your soldering iron tip gently heat the traces to which you are soldering, heating both wires and pads simultaneously. Apply the solder to the iron and the pad when the pad is hot enough to melt the solder. The finished joint should look like a drop of water on paper - somewhat soaked in.

Mount all electrical parts on the top side of the board provided. This is the side that has little or no traces on it. When parts are installed, the part is placed flat to the board, and the leads are bent on the backside of the board to prevent the part from falling out before soldering (1). The part is then soldered securely to the board (2-4), and the remaining lead length is then clipped off (5). Notice how the solder joint looks close up, clean and smooth with no holes or sharp points (6).



RAMSEY RB1 PARTS LIST

Semiconductors

- ❒ 1 4001 Quad dual input NOR gate (U3)
- ❒ 1 XR-2209 voltage controlled oscillator (U2)
- ❒ 1 NE555 timer (U1)
- ❒ 2 2N3904 NPN transistors (TO92 package marked 3904) (Q3,4)
- ❒ 2 221-334 PNP transistors (Flat TO92 package marked 221-334) (Q1,2)
- ❒ 1 1N4002 rectifier diode (D1)
- ❒ 1 Large red LED (D2)

Resistors

- ❒ 4 6.2 ohm resistors [blue-red-gold](R12,R13,R14,R15)
- ❒ 1 2.2K ohm resistor [red-red-red](R16)
- ❒ 1 3.9K ohm resistor [orange-white-red](R10)
- ❒ 1 4.7K ohm resistor [yellow-violet-red](R8)
- ❒ 1 6.8K ohm resistor [blue-gray-red](R7)
- ❒ 2 10K ohm resistors [brown-black-orange](R6,R11)
- ❒ 1 22K ohm resistor [red-red-orange](R1)
- ❒ 2 47K ohm resistors [yellow-violet-orange](R5,R9)
- ❒ 1 100K ohm resistor [brown-black-yellow](R3)
- ❒ 2 150K ohm resistors [brown-green-yellow](R2,R4)

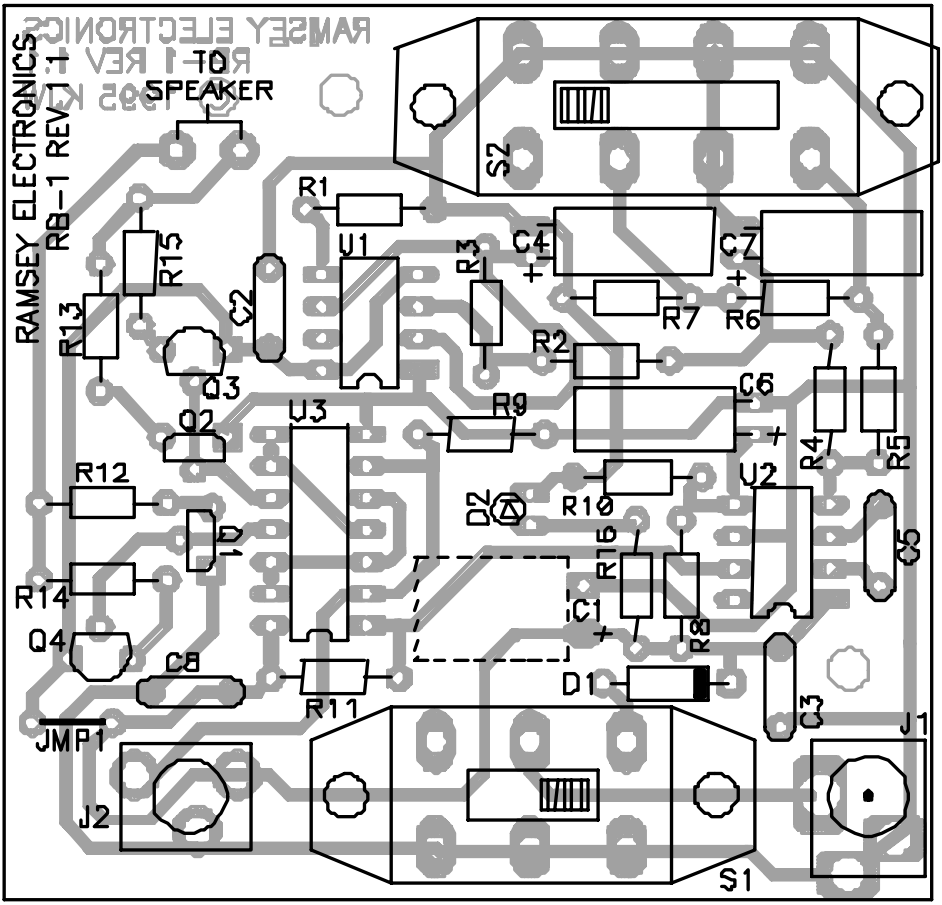
Capacitors

- ❒ 1 330uF electrolytic capacitor (C1)
- ❒ 3 10uF electrolytic capacitors (C4,C6,C7)
- ❒ 3 .1uF ceramic capacitors [Marked .1 or 104](C2,C3,C8)
- ❒ 1 .001 ceramic capacitor [Marked .001 or 102](C5)

Miscellaneous

- ❒ 1 3PDT power setting switch (S2)
- ❒ 1 SPDT power switch (S1)
- ❒ 1 Power jack (J1)
- ❒ 1 stereo jack (J2)
- ❒ 1 piezo power speaker horn (SP1)

RB1 PARTS LAYOUT DIAGRAM

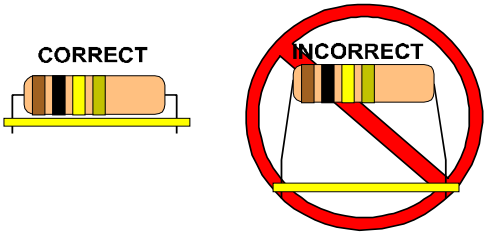


CONSTRUCTION OF THE RAT BLASTER:

Sort out your parts to begin with, making sure you have all of the parts required. You can use old egg cartons to hold various parts to make them easier to find. We will begin building the kit starting with the lower profile parts to make it easier for us to mount them. You will want to use the parts layout diagram to assist you in finding where the components go.

For each part, our word "install" always means these steps:

1. Pick the correct part value to start with.
2. Insert it into the correct PC board location, making sure the part is mounted flush to the PC board unless otherwise noted.



3. Orient it correctly, following the PC board drawing and the written directions for all parts - especially when there's a right way and a wrong way to solder it in. (Diode bands, electrolytic capacitor polarity, transistor shapes, dotted or notched ends of IC's, and so forth.)
4. Solder all connections unless directed otherwise. Use enough heat and solder flow for clean, shiny, completed connections.

❒ 1. Orient the board in the same direction as the parts layout diagram.

❒ 2. Install R6, a 10K ohm resistor (brown-black-orange).

❒ 3. Install R4, a 150K ohm resistor (brown-green-yellow).

❒ 4. Install R5, a 47K ohm resistor (yellow-violet-orange).

❒ 5. Install R7,a 6.8K ohm resistor (blue-gray-red).

❒ 6. Install R2, another 150K ohm resistor (brown-green-yellow).

❒ 7. Install R3, a 100K ohm resistor (brown-black-yellow).

❒ 8. Install R9, a 47K ohm resistor (yellow-violet-orange).

❒ 9. Install R10, a 3.9K ohm resistor (orange-white-red).

❒ 10. Install R8, a 4.7K ohm resistor (yellow-violet-red).

RB1 SCHEMATIC DIAGRAM

❒ 11. Install D1, the 1N4002 power diode. This diode prevents the possibility of someone using the incorrect power supply and inadvertently connecting the power backwards. Make sure the banded end of the diode (cathode) is installed in the same direction as shown in the parts layout diagram.

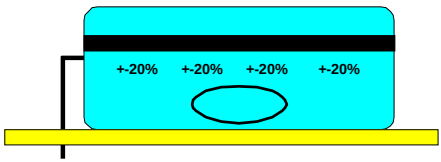
❒ 12. Install R16, a 2.2K ohm resistor (red-red-red).

❒ 13. Install R1, a 22K ohm resistor (red-red-orange).

❒ 14. Install R12, R13, R14, and R15 all 6.2 ohm resistors (blue-red-gold).

❒ 15.Install R11, a 10K ohm resistor (brown-black-orange).

❒ 16. Install C7, one of the 10uF electrolytic capacitors. Make sure to mount this part in the correct direction! If you look at the component you will see a stripe down one side, usually indicating the negative (-) terminal of the component. You will notice on the parts layout diagram that the hole for the positive terminal is denoted. You will want to install this component with the positive (+) lead in the same orientation as shown in the parts layout diagram. If you do not install it correctly, you will end up with all sorts of problems in the circuit. Before soldering, place the leads in the appropriate holes, then carefully bend the capacitor over making sure the leads don't cross and remain as short as possible. Then solder the component.



❒ 17. Install C4, another 10uF electrolytic capacitor using the same procedure as with C7. Pay close attention to polarity orientation!

❒ 18. Install C6, another 10uF electrolytic capacitor. Make sure that the part is installed in the correct orientation, bend the component over in the same orientation as shown in the parts layout diagram, then solder.

❒ 19. Install U1, the NE555 IC. Notice that one end of the chip is marked with a dot, notch, or band. Be sure to orient this end as shown in the parts layout diagram and the silkscreen. You may use an IC socket if you wish but be aware that our technicians see more repair problems due to sockets than due to chips burned out from overheating with a soldering iron. Be careful not to "bridge" the pins together.

❒ 20. Install U3, the 4001 IC. Be sure to orient it as shown on the parts layout.

❒ 21. Install U2, an XR-2209 IC, making sure to orient it correctly.

❒ 22. Install C5, a .001uF disc capacitor (marked .001 or 102).

❒ 23. Install C3, a .1uF disc capacitor (marked .1 or 104).

❒ 24. Install C8, another .1uF disc capacitor (marked .1 or 104).

❒ 25. Install C2, the last .1uF disc capacitor (marked .1 or 104).

❒ 26. It is time to install the transistors, starting with Q3, a 2N3904. Transistors have three legs and must be mounted correctly. Notice that the part has a flat side. Orient the flat side as shown on the parts layout. To install, slide the legs through the circuit board and push the component as close to the board as possible without straining the leads. Solder all three connections securely.

❒ 27. Install Q2, a PNP transistor (marked 221334). This transistor and Q1 each appear to have two flat sides. Orient the part using the larger flat side with no writing on it and install Q2 just as you did Q3 in step 26.

❒ 28. In the same way, install Q1 the other 221334 transistor.

❒ 29. Install Q4 the last transistor, a 2N3904. Watch your orientation.

❒ 30. Before installing the larger parts, we have to install JMP1. From a scrap component lead, form this jumper and install it as you would a resistor. Jumpers act like small “bridges” to route traces to the top side of the board and over obstacles (other traces).

❒ 31. Now we will install the stereo jack, J2. It is located next to JMP1. This part only fits into the PC board one way and should be placed with the body of the part as close to the board as possible. Gently bend the tabs over if necessary to hold the part in place and solder all three connections.

❒ 32. The next part to be installed is J1, the power jack. Press it firmly into the board and solder all three leads.

There are two components in the center of the PC board that have not been soldered in yet. Before installing the switches, we will install these parts.

❒ 33. Install D2, the large red LED. Note that one of the two leads is longer. This is the anode and should be placed in the hole closest to the outline for C1. Install the part with the leads standing about an eighth of an inch above the board and solder both legs.

❒ 34. C1, a 330uF electrolytic capacitor, must be installed on the solder side of the PC board. This part also has a polarity which is marked on the top side of the board. One side of the capacitor has a stripe which denotes the negative side, while the PC board silkscreen marks the positive side. Be sure to orient the part correctly. On the back or solder side of the board, insert C1’s leads through to the top side, making sure the polarity is right.

Bend the capacitor over so that it is lying down on the board and solder both leads (with the cap lying down you should have plenty of room to solder it in).

❒ 35. Flip the board back over and locate S1, the SPDT power switch. It is the smaller of the two switches and has six leads. Press it firmly into the board and solder all six leads.

❒ 36. Install S2, the 3PDT power setting switch. After pushing firmly into the board, solder all eight connections.

❒ 37. It is now time to install the hookup wire that will connect your completed board to the speaker. Strip back all four ends of the wire provided about an eighth of an inch and lightly "tin" them with solder. One pair of ends should be inserted in the holes next to S2 marked "to speaker". Solder these wires to the board. The other ends should be hooked around the tabs on the speaker and soldered. The speaker has no polarity so the wires can be hooked up either way.

This completes the assembly of your Rat Blaster! The following steps show you how to install your kit in the optional case. If you don't have the case, skip ahead to the initial testing section.

ASSEMBLY INSTRUCTIONS FOR CUSTOM CASE SET

Parts included with the optional custom case set:

❒ 1 case (top and bottom)
❒ 1 Rat Blaster sticker
❒ 6 #6 black 3/8 inch screws
❒ 1 mounting bracket
❒ 1 #20 1/4 inch bolt (for mounting bracket)

❒ Mount the PC board inside the case using two of the #6 screws provided.

❒ Mount the speaker inside the case and attach it using two more #6 screws.

❒ The final two #6 screws are for attaching the top cover to the bottom cover. You may want to wait until after initial testing to screw the top cover on.

❒ The mounting bracket can be attached once a suitable place is found to mount your Rat Blaster.

INITIAL TESTING:

- ❒ Connect a suitable 12 volt supply to J1- either 12 VAC or 12 VDC (positive tip).
- ❒ Set the frequency range switch to LOW.
- ❒ BEFORE turning on the power, please read the WARNING below (also on the back of the case)

WARNING

TO ELIMINATE ANY POSSIBLE RISK OF HEARING LOSS, AVOID NEARBY EXPOSURE TO THE "RAT BLASTER" SOUNDS. THIS UNIT CAN CAUSE PERMANENT HEARING DAMAGE.

- ❒ Turn on the power. The LED should light and you should hear an annoying, high pitched whine. If so, your Rat Blaster is working and ready to chase away those nasty critters bothering you. You can change the frequency range to whatever you desire and place the Rat Blaster wherever it is needed. The unit is tested on low frequency because it is easier for the human ear to hear. If it is functioning on low, rest assured that it will function on medium and high frequency too!
- ❒ If you are not able to hear the high frequency noise and you have a voltmeter,you can still check to be sure that your Rat Blaster is functioning. Set the meter to AC volts and with the meter leads across the speaker terminals you should see about 12 to 15 VRMS on a typical meter. Voltage readings will depend on the supply used, of course. If you are getting a reading of some kind even if it is not 12 –15 volts, this can be due to the variations in different meters but the voltage reading indicates that the unit is working. If you're using a scope, a bench power supply will give you readings of about 33vpp and our AC125 will read about 25vpp.

If you hear no sound and get no voltmeter reading, it is time to consult the troubleshooting guide.

TROUBLESHOOTING GUIDE:

If your RB1 does not work at all, recheck the following:

- ❒ correct orientation of diodes, electrolytic capacitors, ICs and transistors.
- ❒ resistor color codes; 2.2K and 22K resistors are easily confused. The orange and red color bands look the same under certain conditions. This is also true for 4.7K and 47K resistors.
- ❒ soldering; solder bridges and cold solder joints are two of the most common problems we see on kits returned for repair. You shouldn't need a magnifying glass. If a connection is suspect, resolder it!
- ❒ the power supply; make sure you have 12 volts and if you're using a DC supply, be sure that the tip is positive.

If you have given your kit a thorough visual inspection, touched up any solder connections that look less than perfect, and still haven't found the problem, you are ready for some more serious troubleshooting. There are several points that can be checked with a voltmeter or an oscilloscope and may lead you to the problem. If you have no test equipment of any kind and can't borrow a meter from someone, move on to the warranty section at the back of the manual. If you have a voltmeter you can check the following:

- ❒ Across the speaker terminals you should see about 12 to 15 VRMS. If you get any reading move on to the next step.
- ❒ You can check the output of U1 on pin 3. On AC, the voltage will vary from 0.4 to 2.2 VRMS. On DC, the voltage will vary from 0.2 to 10.5 VDC. The best way to see what is happening is to check pin 3 with an oscilloscope. You should see a square wave from zero (0) to twelve (12) volts (or source voltage if you're using something other than a 12 volt input) with a period of two (2) seconds.
- ❒ If the output of U1 is good, check the output of U2 at pin 7. You should have about 6 VDC, or approximately 11.5 vpp (AC volts will be changing constantly. On the oscilloscope you will see a square wave, 0 to 12 (or source) volts that is sweeping back and forth. The period of the wave will depend on the frequency setting at S2. If the square wave is not sweeping but is steady, the problem is in or around the NE555 IC.

The same signal seen on pin 7 of U2 should also be on pin 3 and pin 11 of U3. If you have a good signal at pin 3 and not at pin 11, U3 may be bad. If you have a good signal at pin 11 and nothing across the speaker terminals, the problem is centered around the speaker - Q1, 2, 3, or 4 or R12, 13, 14, or 15.

USING YOUR RAT BLASTER:

Certain animals are affected by different frequency settings and other factors that you can change to repel the pests that are bothering you. The information below should help you get the best results from your Rat Blaster.

DOGS: Dogs respond best to the low frequency setting. This is due to the fact that as they age, domestic dogs lose some of their high frequency hearing. (That's why Old Yeller doesn't seem to hear me when I whistle for him!?!)

CATS: Cats are best repelled using the high frequency setting. If you're trying to get rid of both dogs and cats at the same time, the medium or low setting should be best.

FERAL CATS AND OTHER WILD ANIMALS: Any setting may be useful against a number of different wild animals because of their acute hearing.

COMMON GARDEN AND YARD PESTS: These would include; rats, ferrets, weasels, opossums, raccoons, skunks, and woodchucks. The low frequency setting works best on these types of critters.

DEER: Deer respond best to the medium frequency setting. They can be difficult to repel and keeping them out of your yard and garden may require more diligence on your part. You should move your Rat Blaster around and even change the height at which it is mounted. The frequency setting can also be changed periodically when using the Rat Blaster to repel deer. A motion sensor with its output applied to J2 is the most effective way to keep deer off your property.

CONNECTING AN EXTERNAL TRIGGER:

If you would like to trigger the RB1 externally, you may do so by using a 1/8 inch stereo plug and the external trigger input. The tip of the stereo plug should be held high (disabling the unit) until switched or triggered low. By pulling pin 6 of U3:B low, the RB1 is enabled and will continue to generate the high frequency signal until pin 6 is again pulled high. Be sure to use a stereo plug only! A mono phono plug will short your +12 volt input to ground.

The Ramsey Kit Warranty

Please read carefully BEFORE calling or writing in about your kit. Most problems can be solved without contacting the factory.

Notice that this is not a "fine print" warranty. We want you to understand your rights and ours too! All Ramsey kits will work if assembled properly. The very fact that your kit includes this new manual is your assurance that a team of knowledgeable people have field-tested several "copies" of this kit straight from the Ramsey inventory. If you need help, please read through your manual carefully. All information required to properly build and test your kit is contained within the pages!

1. DEFECTIVE PARTS: It's always easy to blame a part for a problem in your kit, Before you conclude that a part may be bad, thoroughly check your work. Today's semiconductors and passive components have reached incredibly high reliability levels, and its sad to say that our human construction skills have not! But on rare occasions a sour component can slip through. All our kit parts carry the Ramsey Electronics Warranty that they are free from defects for a full ninety (90) days from the date of purchase. Defective parts will be replaced promptly at our expense. If you suspect any part to be defective, please mail it to our factory for testing and replacement. Please send only the defective part(s), not the entire kit. The part(s) MUST be returned to us in suitable condition for testing. Please be aware that testing can usually determine if the part was truly defective or damaged by assembly or usage. Don't be afraid of telling us that you 'blew-it', we're all human and in most cases, replacement parts are very reasonably priced.

2. MISSING PARTS: Before assuming a part value is incorrect, check the parts listing carefully to see if it is a critical value such as a specific coil or IC, or whether a RANGE of values is suitable (such as "100 to 500 uF"). Often times, common sense will solve a mysterious missing part problem. If you're missing five 10K ohm resistors and received five extra 1K resistors, you can pretty much be assured that the '1K ohm' resistors are actually the 'missing' 10 K parts ("Hum-m-m, I guess the 'red' band really does look orange!") Ramsey Electronics project kits are packed with pride in the USA. If you believe we packed an incorrect part or omitted a part clearly indicated in your assembly manual as supplied with the basic kit by Ramsey, please write or call us with information on the part you need and proof of kit purchase

3. FACTORY REPAIR OF ASSEMBLED KITS:

To qualify for Ramsey Electronics factory repair, kits MUST:

1. NOT be assembled with acid core solder or flux.
2. NOT be modified in any manner.
3. BE returned in fully-assembled form, not partially assembled.
4. BE accompanied by the proper repair fee. No repair will be undertaken until we have received the MINIMUM repair fee (1/2 hour labor) of $25.00, or authorization to charge it to your credit card account.
5. INCLUDE a **description of the problem** and legible return address. DO NOT send a separate letter; include all correspondence with the unit. Please do not include your own hardware such as non-Ramsey cabinets, knobs, cables, external battery packs and the like. Ramsey Electronics, Inc., reserves the right to refuse repair on ANY item in which we find excessive problems or damage due to construction methods. To assist customers in such situations, Ramsey Electronics, Inc., reserves the right to solve their needs on a case-by-case basis.

The repair is $50.00 per hour, regardless of the cost of the kit. Please understand that our technicians are not volunteers and that set-up, testing, diagnosis, repair and repacking and paperwork can take nearly an hour of paid employee time on even a simple kit. Of course, if we find that a part was defective in manufacture, there will be no charge to repair your kit (But please realize that our technicians know the difference between a defective part and parts burned out or damaged through improper use or assembly).

4. REFUNDS: You are given ten (10) days to examine our products. If you are not satisfied, you may return your unassembled kit with all the parts and instructions and proof of purchase to the factory for a full refund. The return package should be packed securely. Insurance is recommended. Please do not cause needless delays, read all information carefully.

RB1 Rat Blaster Pest Eliminator Kit
Quick Reference Page Guide

REQUIRED TOOLS

- Soldering Iron Ramsey WLC100
- Thin Rosin Core Solder Ramsey RTS12
- Needle Nose Pliers Ramsey MPP4 or RTS05
- Small Diagonal Cutters Ramsey RTS04

<OR> Technician's Tool Kit TK405

ADDITIONAL SUGGESTED ITEMS

- Holder for PC Board/Parts Ramsey HH3
- Desoldering Braid Ramsey RTS08
- Digital Multimeter Ramsey M133

TOTAL SOLDER POINTS
118

ESTIMATED ASSEMBLY TIME
Beginner ....2.5 hrs
Intermediate..... 1.5 hrs
Advanced..... 1 hr

Price: $5.00
Ramsey Publication No. MRB1

Assembly and Instruction manual for:
RAMSEY MODEL NO. RB1

RAMSEY ELECTRONICS, INC.
590 Fishers Station Drive
Victor, New York 14564
Phone (585) 924-4560
Fax (585) 924-4555
www.ramseykits.com