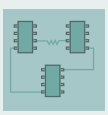
EVASIVE BEEPING THING



Infernal noisemaker turns pals into enemies. By Brad Graham and Kathy McGowan

The Evasive Beeping Thing is appropriately named, since it dutifully does exactly what its name implies: it sends out a 5-second, high-pitched beep every few minutes. The source is extremely difficult to locate because of the way that high frequencies can penetrate objects and trick our ears.

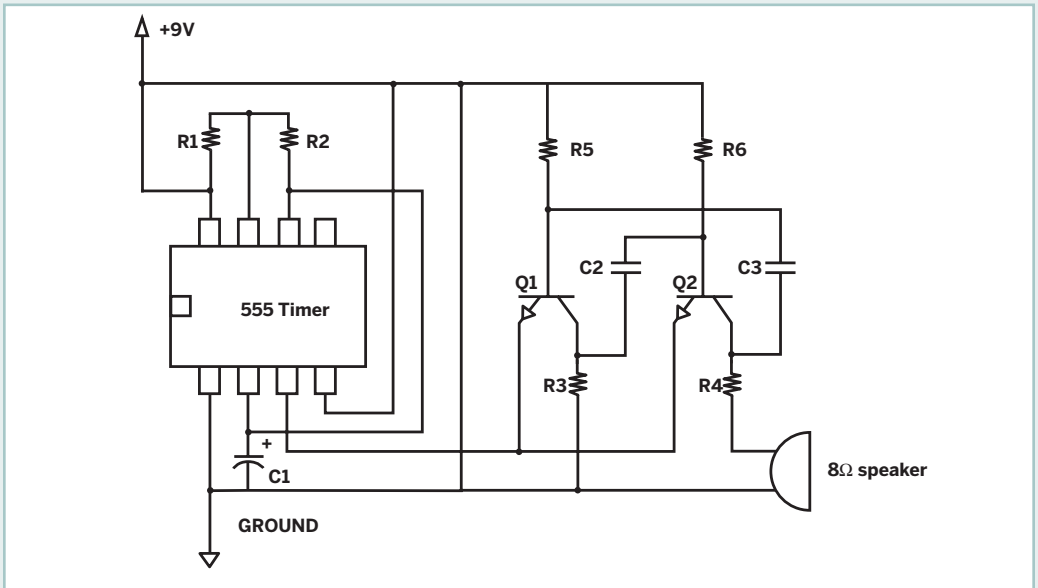
You've probably encountered something similar in the real world, such as a failing appliance or a beeping wristwatch buried deep in a couch. As you know, high-pitched sounds seem like they are coming from all directions, which makes tracking them to the source a real chore. Add the fact that the sound only happens once every several minutes, and it may drive a person loopy as they spend all day looking for the source of the sound. Well, that's our goal, anyhow!

To generate the high-pitched audio wave, you'll connect a small speaker like those found in tiny electronic devices (cellphones, transistor radios, a tweeter from a small speaker system, etc.) to a simple audio oscillator set to a frequency near the upper limits of our hearing capabilities. The oscillator is triggered to run for approximately 5 seconds every few minutes by a 555 timer circuit with its output connected to the oscillator. The higher the frequency rating of the speaker, the farther the

MATERIALS

2N3904 transistors (2) or any generic NPN style
Resistors: 1MΩ, 100kΩ, 10kΩ (2), 1kΩ, and 100Ω
Capacitors: 100µF, 0.01µF
555 timer
Small speaker from a transistor radio or the like
9V battery and battery clip
Small perforated board to wire the parts onto
Container to hide the unit inside

Photograph by Sam Murphy



EVASIVE BEEPING THING SCHEMATIC: The 555 is set up so that its output will turn on the 2 transistor audio oscillators formed by the pair of NPN transistors.

high-pitched sound will travel, which is why a 2" or 3"-diameter tweeter is optimal for this project.

The small speakers shown in Figure B are perfect for this project. The rating of the small speaker is not important, since the audio oscillator will drive speakers from 4Ω to 16Ω with very little power output. The speaker on the top left was the one we decided to use in the final design because it fit nicely into the cabinet we chose to help disguise the evil device. Now, let's get on to the design of the electronics that make this unit work.

Above, you'll see the schematic of the Beeping Thing. The 555 is set up so that its output will turn on the 2 transistor audio oscillators formed by the pair of NPN transistors. Just like most 555 timer circuits, the timing cycle is controlled by the 2 resistors on pins 6, 7, and 8, and by the capacitor connected to pins 1 and 2. If you play around with the values of the 2 resistors, you can control the duty cycle of the timing pulses in order to alter both the off time and on time, to create more or less beeping each time the cycle repeats.

The capacitor controls the actual frequency of the timing pulses: the larger the value, the longer the duration between each timing cycle. In a really large room, you might want a longer beep and cycle, so a 220µF capacitor could be used, and the 100kΩ resistor could be swapped for a 220kΩ resistor. For a smaller room, where it may be easier to locate the device (e.g. a friend's office), the capacitor could be changed to 47µF and the 100kΩ resistor to a 10kΩ for a very short beep. The best plan is to simply build the unit as is, and then fine-tune the components until you're happy with its operation. And yes, a variable resistor would be easy to adjust.

Now, where do you hide the beast? Well, since this unit emits hard-to-locate high frequencies, your options are endless. The high-pitched sound will exit through the smallest hole in whatever box you place the parts into. We decided to cram the works into an old wall adapter (Figure A) that has all of the guts removed, including any connection to the AC lines. The little speaker fits nicely into the top of the box, and there's just enough room for the 9V battery and small circuit board. Figure C shows the completed circuit going into the wall wart box.

There was just enough room to get all the parts inside, so we couldn't install an on/off switch. But that was OK since the top of the box just snapped together and we could simply unclip the battery. The unit will run for many days on a full battery, and if you strategically place the beeper, it may take that

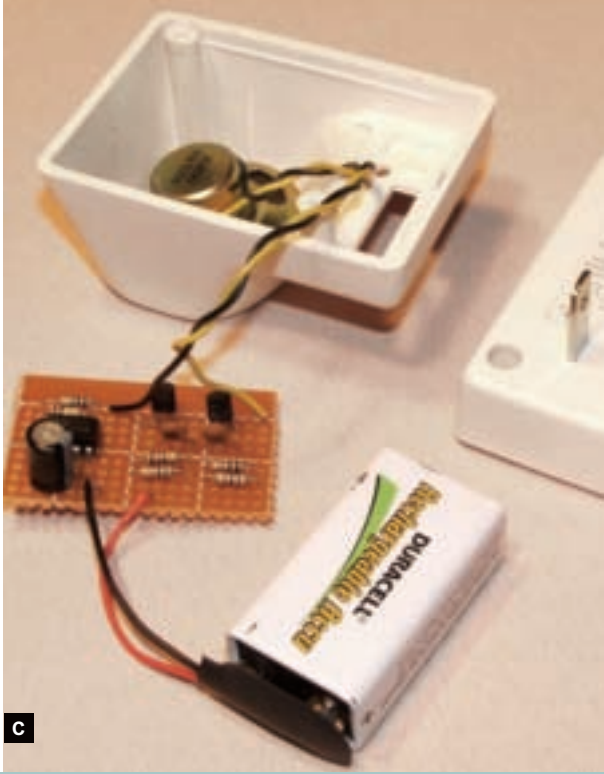


Fig. A: This annoying device eludes detection.
Fig. B: Several small, high-frequency speakers; the rating isn't important.

Fig. C: Installing the parts into an innocuous wall wart case makes it hard to find the source of the annoying beep!

long for the unsuspecting victim to find it! If you plan to use a wall wart cabinet for the device like we did, ensure that there's no connection between the plug prongs and the AC lines. It's a good idea to remove the prongs completely.

Some other good hiding places might be a pop can, lunch box, wall clock, tissue box, or even a working appliance. A solid cabinet will need a small hole for the speaker. We found that a ¼" hole was large enough for the tiny 2" speaker we used. You can also use a piezo buzzer instead of a speaker, which would make the unit even smaller and possibly louder owing to the very good high-pitched operation of the piezo element. To use a piezo buzzer in place of the speaker, connect resistor R4 (which used to connect to one of the speaker terminals) directly to the +9V line, where the other speaker terminal used to connect.

Now you can place the piezo buzzer in parallel with R4 to make it function. This is done because the piezo element will offer very high resistance as compared to the very low resistance of the speaker, and the current from the battery needs to flow to transistor Q2's collector.

The final product looks at home just about anywhere there is a wall socket, and can be easily hidden under furniture or inside another appliance for truly covert, mind-warping, annoying fun and games. We covered up the voltage switch from the original wall wart with black tape, and the little hole on the top of the case is barely large enough to pass a decent amount of high-pitched sound.

With the component values given, the beep emits about once every 3 minutes and lasts for approximately 5 seconds, just enough time to entice the victim to look for the source of the sound before it goes silent. We like to drop the unit in a room, then claim that we can't hear any beeping. This really gets the "beeper hunter" ticked off, and they try even harder to track down the evasive beeping thing to no avail. "I don't hear anything, pal, maybe you need an ear exam, or you should stop listening to pirated music on your MP3 player. I heard that the new copy protection can make your ears ring for days!"

Reprinted with permission from 51 High-Tech Practical Jokes for the Evil Genius *(McGraw-Hill/TAB Electronics), by Brad Graham and Kathy McGowan.*

Brad Graham is an author and inventor of electronics, custom bikes, robots, and Evil Genius works. He also hosts atomiczombie.com with his partner Kathy McGowan.

Photography by Brad Graham