

## Battery Care

### Safety

The Bat detector is not suitable for use by children under 3 years and use by older children should be supervised.

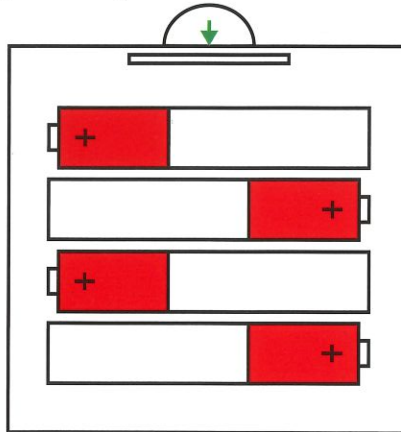
### Batteries

4 AAA batteries are required. The battery cover is released by pressing down the flexible bar shown here by the green arrow. It should click into place when refitted.

Always be aware that even small batteries contain a considerable amount of energy and should be handled and disposed of with care. Switch off before fitting new batteries, and make sure that the Negative terminals connect to the coiled springs in the battery holder. Note that the batteries fit in alternate directions as shown in the diagram below. It is easier to fit the top and bottom batteries first and then the two inner ones.

Test the detector as soon as the batteries are fitted - If the batteries are weak, or one battery is inserted the wrong way, the torch led may still light but there will not be any sound. Incorrectly inserted batteries will not damage the detector circuit but should be removed immediately.

Faulty or incorrectly inserted batteries could become short-circuited and may overheat. If so remove them all and check for damage to their insulating outer sleeves. Also check the springs in the battery holder.



20-25	Noctule
25	Leisler's
27	Serotine
32	Barbastelle
39	Nathusius's Pipistrelle
45	Pipistrelle(45) Whiskered Brandt's Daubenton's
45-50	Brown Long Eared Grey Long Eared
50	Natterer's Bechstein
55	Pipistrelle(55)
80	Greater Horseshoe
108	Lesser Horseshoe

Cut out and keep the credit card size table above as a handy reference. Frequencies shown in kHz. Much more information about bats can be obtained from the Bat Conservation Trust.

### Care and Service

Your Bat detector is reliable, robust and will give many years of good service with a minimum of care. It should be protected from rain, but will cope with occasional exposure if it is wiped and allowed to dry at room temperature. Take care to avoid getting water directly into the microphone, and not to scratch the display window. A fresh set of batteries should give several months normal use. Remove the batteries before storing for longer periods. In the event of any difficulty or technical questions contact Magenta directly.

## The Magenta Bat 5 Bat Detector



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## The Magenta Bat5

### Introduction

Bats use inaudible ultrasound like a sophisticated radar system to avoid obstacles and locate prey.

The Bat5 detector converts high frequency ultrasound between 10 and 130 kHz to lower frequencies in the range of human hearing. The sounds are heard via a built in waterproof loudspeaker or headphones (not supplied) or can be recorded via a separate low level output socket

### How it Works

The detector uses the Heterodyne principle. Ultrasound is received, amplified and mixed electronically with another local signal generated in the bat detector. In a typical situation a bat may be sending ultrasound at 45kHz. Mixing this with 43kHz from the Bat detector produces the audible 2kHz difference frequency.

### Controls

There are two rotary controls. A combined volume on/off switch, and a large rotary control which adjusts local signal frequency, to be mixed with the ultrasound from the bat. An accurate four digit LCD with a red backlight shows the local frequency.

A small push button turns on a bright white LED torch light.

### Batteries

Four AAA batteries are required. The current drain is small, but we recommend Duracel batteries which give reliable operation, will last a very long time with normal use, and aren't prone to leakage if left unused for long periods. Modern Rechargeable cells are also suitable.

### Checking

There are many common sources of ultrasound - jangling keys, rustling newspapers, rubbing fingers together and paper clips dropped onto a hard surface, all produce interesting and different responses. Computer fans make ultrasonic whistles and Induction cooker hobs are extremely noisy.

Any of these sources can be used to check that the detector is working. Start with the volume half way, and set the frequency control around 25kHz.

The 'heterodyne' principle is demonstrated very well if continuous source such as a computer fan is available. As the frequency control is rotated, the pitch of the detector output will change and fall to zero when the frequency of the fan noise and the local signal are equal. Rotating the frequency control in either direction will result in the pitch rising, as the difference between the two signals increases.

## Bat detecting!

### Setting

When seeking bats, start off with the frequency set to 45kHz, where many different bat species echolocate; or if you are aware of a particular species in the area, set the frequency appropriately.

Scan the area by sweeping the detector side to side, and up and down. Ultrasound is very 'directional' and the microphone at the front of the detector is much more sensitive to head-on signals. It is often possible to locate a bat by pointing to the strongest ultrasound long before it can be seen.

Once bats are detected, the frequency control can be fine tuned to get the best signal. If there are two relatively close settings that give similar signals, always chose the lower one\*.

The detector only receives ultrasound. It does not transmit anything that will disturb the bats. The only output is the audio frequency signal from the loudspeaker, which appears to be of no interest to bats.

*\* Heterodyne detectors produce the difference between the bat frequency and that of the locally generated signal. If the bat frequency is below the local signal, a fall in the bat frequency will result in a rise in the pitch of the audible signal because the difference will be greater, thereby inverting the frequency spectrum. If the bat signal frequency is above the local signal a fall in the bat frequency will reduce the difference and produce a corresponding fall in the audible signal pitch so that the frequency spectrum is correct.*

### Technical Details

<b>Frequency Range</b>	<b>10kHz to 120kHz</b>
<b>Audio Bandwidth</b>	<b>+/- 8kHz</b>
<b>Output Power</b>	<b>400mW</b>
<b>Headphone socket</b>	<b>3.5mm Stereo</b>
<b>Recorder Socket</b>	<b>3.5mm Stereo</b>
<b>Recorder Signal level</b>	<b>100mV typical</b>
<b>Batteries</b>	<b>4xAAA</b>
<b>Loudspeaker</b>	<b>50mm diameter mylar</b>
<b>Microphone</b>	<b>MEMS type - wide band</b>

**Recommended headphones are low impedance (dynamic) stereo type. Impedance 8 ohms min. 32 ohms typical.**

**The output is mono and is delivered to both earpieces.**

**Connecting headphones mute the speaker.**

**The recorder output is a mono signal common to the L and R channels. Output impedance is 5k typical line level.**

There are 16 species of bat in the UK. Your detector is capable of detecting all of these and many other insect feeding bats around the world. All of the UK species echolocate in the range 18 to 120 kHz. The table overleaf indicates the frequency of the strongest signals.

Some bats are easy to identify because they have distinctive sounds and frequencies, others are harder and information about location, habitat and wing profile will be needed.

## Magenta

[www.magenta2000.co.uk](http://www.magenta2000.co.uk)

### About Magenta

We have been making bat detectors for over 15 years. The design has changed steadily over that period to use the latest components and improve performance. Notable advances have been made in reducing the battery drain, and increasing the sensitivity to ultrasound by using the latest MEMS microphones and low noise circuits.

### Disposal

The detector is built to RoHS standards which limit the use of substances hazardous to health. Disposal should be at a waste electronic equipment (WEEE) recycling point, not with general domestic waste.