



## Minuscule MEMS microphone — for the Bat DetectorPLUS

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**FEEDBACK.** In the article it states that special ultrasonic microphones are very difficult to find. That's not strictly true :-).

As an old 'night owl' I am also a bit of a bat fan (the creatures, not the superhero) and have built several bat signal detectors over the years. First purely digital (using a 7493 divider), later an analog down-converter design (using an SO42P). I needed microphones suitable for the application and found the ultrasonic module a good (and cheap) source. Try searching for 'HC-SR04' at an online auction site like eBay.

This module, otherwise known as a 'ping sensor' contains an ultrasonic microphone along with some other chips in SMD-outline that could be salvaged for use in other projects. It also has an ultrasonic transmitter or loudspeaker module which can be used for sending ultrasonic signals (as used with early TV remotes). These HC-SR04 modules are a popular choice for obstacle avoidance and distance sensing applications for robotics with Arduino systems. Some suppliers offer discounts on packs of 5. The transducers are bigger than the original unit and much easier to handle. They use standard electret transducers making them compatible with many different types of bat detector circuits.

Another advantage of their size is they can be easily fitted with a parabolic reflector (made from stiff paper) with the transducer positioned at the focal point. This makes the microphone directional and helps pinpoint the creature at a greater range. The microphones can detect signals beyond 100 kHz, but most native bats don't squawk at such high frequencies.

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