



Title:

Batdetector based on frequency division.

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Analog and digital electronics

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Project group:

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Abstract:

This report describes the construction of a bat detector. The detector transforms bat sounds from the ultrasonic spectrum to the human audible spectrum, by dividing the frequency by ten.

Initially, an analysis of the Danish bat species is made, to determine exactly what type of signals, the detector will have process.

In order to choose a suitable microphone, a study of common types of microphones is made.

Next a microphone preamplifier, based on three transistor stages, is designed to amplify the signal, before it is converted into a square wave, by a Schmitt trigger.

The frequency is then divided by ten by a digital decade counter, of which a logic analysis is made. The square waves are then converted back into sinewaves by a passive R-C low pass filter. To preserve the general structure of the original signal, the divided signal is amplified by an amplifier, whose gain is controlled by the output of the preamplifier.

To make the signal audible, a class AB power amplifier, is designed, to deliver a modest power to the built-in speaker. An analog volume control is implemented in connection with the power amplifier.

To enable recording the sound, or connection of headphones, at different places in the circuit, a number of "line out" connections are made in the device.

A complete device is constructed and tested, and the conclusion is, that it meets the requirements in a satisfactory way.