008 Noise-Driven Sound Generator

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The sound generator shown here uses its built-in loudspeaker as a microphone when it is in the standby state. As soon as it detects a noise that exceeds an adjustable threshold level, it becomes active. This small, clever circuit can be used as an alarm generator that reacts to noises. You can also use it to help you locate an object in response to a loud sound, such as clapping your hands or whistling loudly.

The gate at the bottom of the schematic diagram acts as a linear low-frequency amplifier, due to the negative feedback resistor R3. It receives its input signal from loudspeaker LS1, which acts as a microphone when T1 is cut off. The amplified output signal from this gate passes via C1 to a second 4011 gate, which triggers a monostable formed by the two gates located before and after C5 and R5. The DC threshold level is applied to pin 2 of IC1 via R2. This DC voltage is superimposed on the signal from C1. Retriggering of the monostable is prevented by the combination of R4, C4 and the first gate, in addition to which the sound generator (IC2) prevents the loudspeaker from acting as a microphone once it has been activated.

A High output signal from pin 4 of the monostable enables a pair of astable multivibrators in IC2. The first of these is a low-frequency generator, which modulates the audio-frequency

tone produced by the second multivibrator. The result is a 'siren' sound. Finally, T1 is driven via R8 to push the loudspeaker quite hard. The loudspeaker current is limited a little bit by R9.

The duration of the alarm signal is determined by the monostable time constant of R5 and C5. A Low level on pin 4 of IC1 blocks the sound generator. After the time delay determined by R4 and C4 has expired, the loudspeaker once again acts as a microphone.

The circuit can be powered by a 5 V to 9 V battery.

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