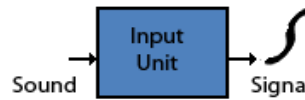


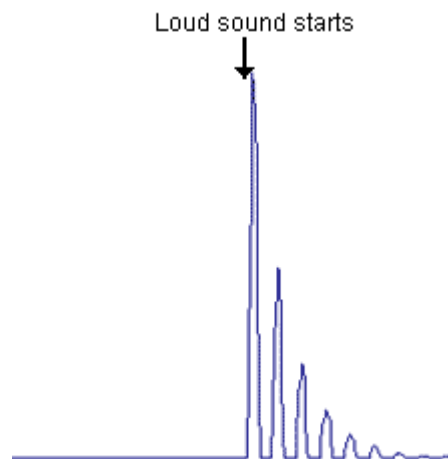
Sound Sensor - Input unit

What does it do?

The sound sensor provides an output signal voltage that responds to sound detected by a microphone. It will only respond to loud sounds.



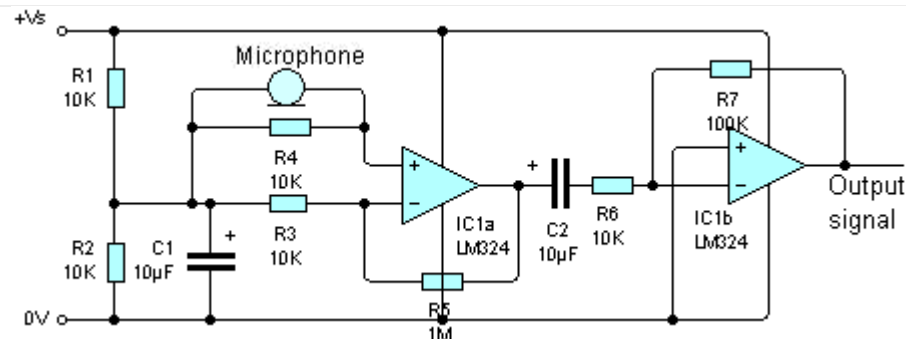
How does it operate?



If no sound is picked up, the output voltage is low, close to 0V.

If the microphone picks up sound the voltage pulses rapidly above to the sound wave.

The graph shows the kind of output signal that would be produced by noise, such as a hand clap.



Click on the circuit diagram to download a [Livewire](#) file of the circuit that you can investigate and [add](#) to your own.



Microphone circuit diagram symbol

The symbol used for the microphone in the circuit diagram is a [d](#) into Livewire. Therefore the operation of the microphone cannot Livewire.

When a sound wave strikes the microphone it produces a very small a.c. voltage, proportional to the pressure change in the sound wave. This a.c. voltage is amplified by the two [operational amplifier circuits](#).

A wide range of microphones is available. The one that has been tested with this circuit diagram was not actually designed as a microphone; it is an uncased [piezo transducer](#) (Rapid order code 35-0200). This is low in cost and works effectively.

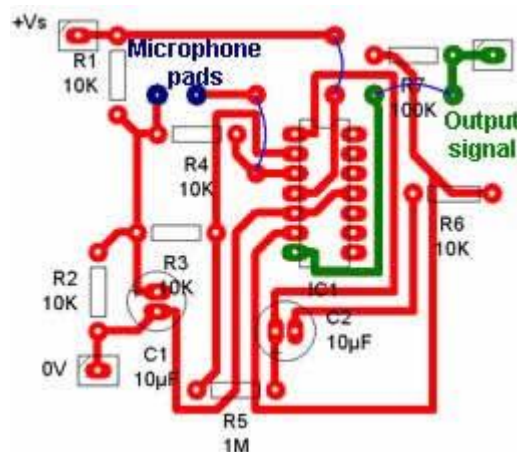
The circuit will respond to loud sounds (such as a hand clap). Its sensitivity can be increased (so that it responds to quite loud music) by reducing the value of the resistor R6 in the circuit diagram from 10k to 1k. However, if the resistor R6 is reduced even further to give higher sensitivity, [electrical noise](#) can swamp the output signal and give random output voltages.

Because the output signal (like the sound wave) changes very rapidly it is usually necessary to follow the sound sensor with a subsystem that will react quickly to the oscillations, such as a [delay unit](#), a [retriggerable monostable](#), a [555 monostable](#), a [positive latch](#) or a [thyristor](#).

Possible applications

A toy that responds to hand claps

Making



How part of the PCB might look

The 'microphone' (the piezo transducer) is connected to the two pads highlighted in blue.

Testing

This subsystem is difficult to test because of the unusual a.c. output signal. If you have an oscilloscope you can use it to 'see' the rapidly varying output signal.

If you do not have access to an oscilloscope then the unit can be tested by adding the next subsystem and checking that its output signal is triggered when there is a loud sound.

Fault finding

If there is a fault, check that:

The voltage on pin 11 is low (0V)

The voltage on pin 4 is high (the supply voltage)

The capacitors and IC are the right way round

If there is a fault, check the tracks and solder joints.

If you have access to an oscilloscope, check the output signal from the first operational amplifier stage (pin 1).

When there is a loud noise this should be an a.c. signal of a few hundred mV.

Web links

Manufacturer's data sheet for [LM 324 operational amplifier](#)

[How microphones work](#)

[Return to list of datasheets](#)
