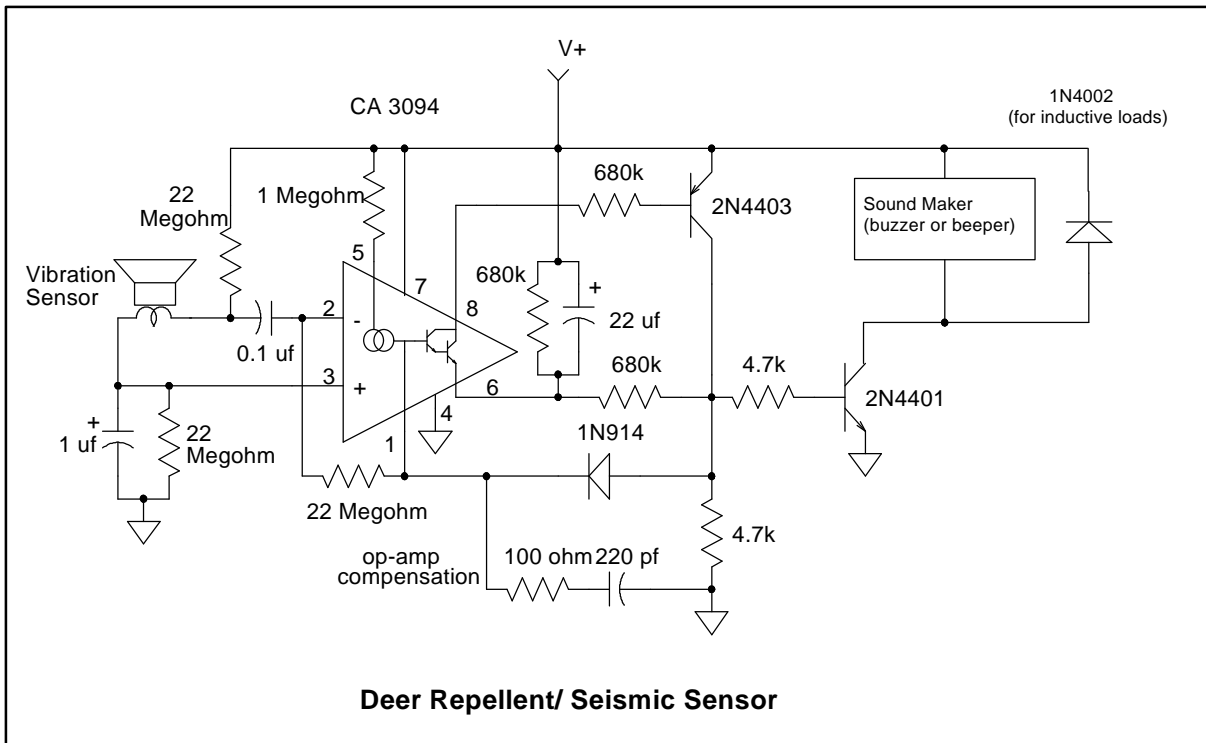


## Deer Repellent/ Seismic Sensor

Here is a simple sensor which can detect the seismic vibrations caused by a person or large animal walking nearby. A representative application for the sensor is a deer repellent for the vegetable garden. When a deer steps near the sensor a loud buzzer or beeper sounds for a few seconds startling the would-be vegetable thief away. The sensor also makes an effective intruder detector to catch trespassers as soon as they step on the property!



The unit is designed to consume minute amounts of power when not rattling to provide many months of unattended protection (practically set by the battery shelf life). The seismic sensor is built from an ordinary 2 inch speaker by gluing a mass to the speaker cone to lower its resonance frequency. A lid from a baby food jar with a little extra weight glued to the inside will work fine.

The CA3094 I.C. is an unusual op-amp consisting of a programmable transconductance amplifier connected to a darlington transistor. In this circuit the darlington is combined with a pnp transistor to form a monostable timer which determines how long the buzzer sounds. When the ground shakes, the vibration sensing speaker generates a small voltage which is amplified causing the voltage on pin 1 to go high. The darlington in the IC and the 2N4403 turn on with regenerative feedback provided by the diode. The 2N4401 turns on, powering the buzzer until the monostable resets.

The circuit may be used to activate a variety of devices including a relay to control line voltage devices, a transmitter to telemeter an alarm from a remote location, a battery-

powered walkway light, or even one of those battery powered squirt guns! The output transistor may be replaced with a power darlington transistor for directly controlling higher current loads.

The circuit may be built into ordinary plumbing PVC pipe or practically any weatherproof enclosure. A larger detection area may be accomplished by burying a long pole or PVC pipe just below the surface of the ground with the seismic sensor located above the pole. Vibrations will readily travel down the pole whenever a footstep occurs anywhere along its length.

The seismic sensor may be replaced with other sensors for different applications. A photocell/ resistor divider will sense changes in light level, a microphone will sense fairly low sound levels, and a diode detector will sense a low-level RF field.