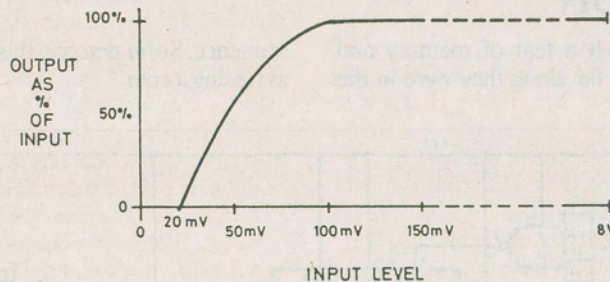
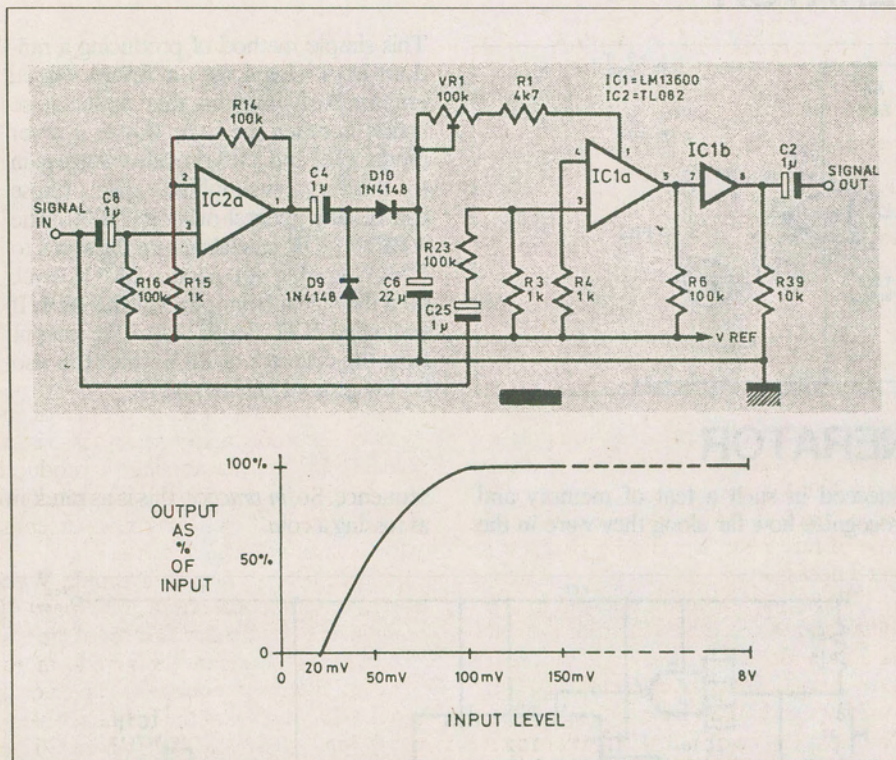
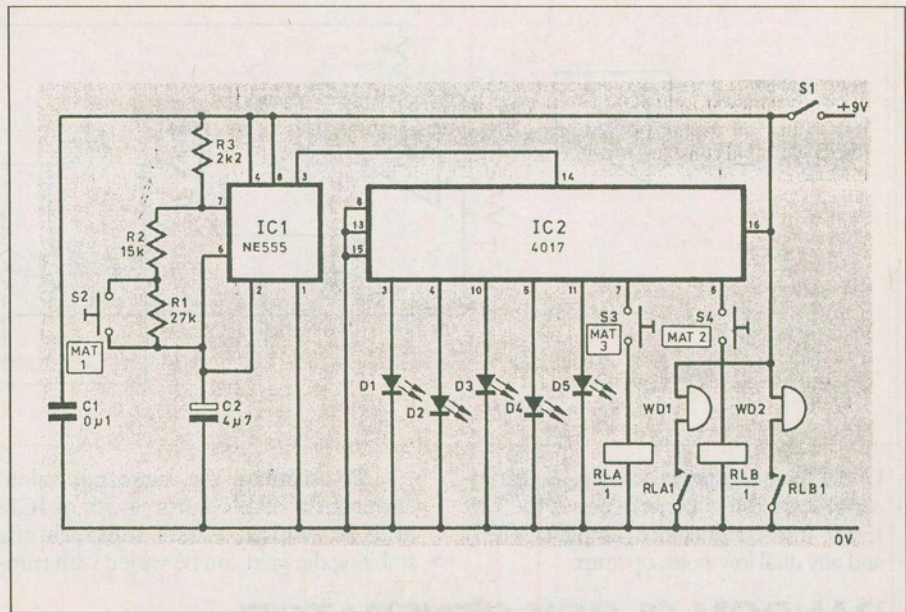


SECURITY MAT TRIGGER

Security mats close a circuit when stepped on, and are available from dealers in home security systems. They can be used to detect intruders, or to monitor children or invalids who shouldn't be getting out of bed. The circuit can also be used with any circuit closure device, such as door switches.

The 555 and 4017 decoder drive five LEDs which flash at a slow rate when on standby. If one mat is triggered, the array speeds up (this is used to indicate that someone has stepped out of bed — it has less use for home security purposes). If other mats switch on, relays operate piezoelectric (or other) buzzers.

The relays should have coils of 500-1000 ohms and operating voltages of 6-9 volts. The battery should be a 9V alkaline or rechargeable; if a line-operated plug-pack is used, heavier relays and audible devices can be substituted.



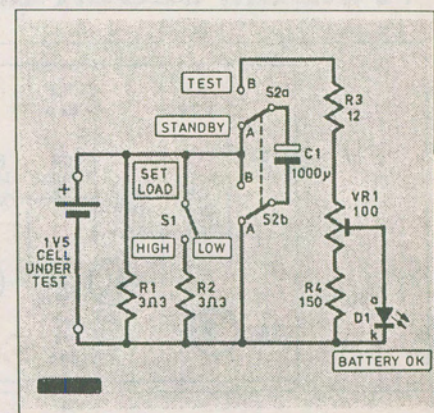
SIMPLE NOISE GATE

A low-noise op amp (TL072, TL082, etc) and an LM13600 transconductance amplifier make up a simple noise gate, which shuts down the audio path in the absence of signal. When a signal is detected, the gate opens.

During high signal levels, capacitor C6 is kept charged and the gate is open.

When the signal falls below threshold levels, the voltage on C6 decreases and the gain is progressively lowered.

The accompanying diagram gives the typical threshold levels, showing the percentage output as the input rises from 20mV (no output) to 100mV (full output).



BATTERY TESTER

Testing a battery with a voltmeter isn't a particularly good test, since the battery voltage can still be quite high if no load current is being drawn. This circuit tests 1.5V batteries by draining about 400mA in the *Low* position and about 800mA in the *High* position.

Since a red LED requires about 1.6V to operate, C1 is switched as a voltage doubler. To adjust VR1, it's easiest to have one good cell and one that's run down but not completely dead. Test the good cell to confirm circuit operation, then test the run-down cell while adjusting VR1 until the LED just fails to flash. It may need some tinkering until you get reliable operation; since the LED does not switch sharply, some interpretation is needed — you'll find that the LED stays on over a fairly large adjustment of VR1.