

Electronics Design Guide 8: Security devices

A security device is used to keep something valuable safe. It warns the owner if someone tampers with it. Or it may provide an alarm when it detects a danger – a child who has wandered off or the presence of an intruder. These devices often use proximity sensors.

Situations

Many security products are already on the market so look for gaps in the market and find situations where few, if any products, are available.



Sensing input signals

With a tamper alarm you can keep sensors hidden to stop a thief avoiding them – or make them obvious to put thieves off. If the leads to a sensor are cut, the alarm should be triggered.

You can make your own tamper sensors from a range of materials. Tamper alarms may use a code, input through switches, to arm and disarm them.

A proximity alarm may be triggered when something is either too close or too far away. Infrared or ultrasound signals and sensors may be used.

Producing output signals

The output signal will alert the user to the danger. A tamper alarm may have some of the following additional features:

- ◆ an intrusive signal to attract the attention of other people and to deter the thief;
- ◆ a delay to allow the user to deactivate the alarm or to provide time to catch the thief.

Remember that there are rules about the duration and volume of noisy alarms.

Electronic processing

Your alarm will need some of the following features:

- ◆ **A latch to keep the alarm on once triggered**

A thyristor will provide simple latching on an analogue signal and also act as a driver for the output device. For more complex digital systems use a digital latch. Don't forget to include a reset.

- ◆ **A delay after triggering**

Use either an RC network or a digital delay.

- ◆ **Coding and decoding of arm and disarm**

Input from a keypad can be coded using digital logic. You could arrange for the alarm to be triggered if the wrong code is entered.

- ◆ **High frequency pulse generator**

For use with ultrasound transmitters. The frequency should be around 40 kHz. Use matched receivers and transmitters for ultrasonic or infrared proximity sensors.

- ◆ **Programmable ICs**

For a complex digital circuit, program the alarm control into a single IC.