

## Home security

**Home security is a subject close to many peoples' minds. As the years go by we all build up collections of valued possessions. Insurance is all very well, but it won't replace those items with sentimental value or make you feel any better about intruders violating your home. If you can stop them getting in, you have protected more than a house full of possessions. You have protected your family's way of life.**

It need not cost much to protect your home and you do not have to be an expert to fit a security system. If you can wire a three-pin plug, you can learn how to fit a burglar alarm.

Your initial decision is to choose between a hardwired system or a wireless system that uses low power radio circuits to connect the sensors to the main alarm unit. Each system has its own features and benefits:

### Hardwired alarm systems

#### Pros

Hardwired alarm systems rely on simple switching circuits to operate, so they are easy to understand. They do not need complex electronics, so they can be inexpensive to buy. They run from one main power supply, so they do not need several batteries periodically changing. Wired alarm systems do not use radio signals, so their arm and disarm codes cannot be 'cloned' by enterprising technological criminals.

#### Cons

Hardwired alarm systems need to have cables run from the main control panel to each window, door or motion sensor and there are a number of ways to connect them together for correct operation. Care must be taken to keep the wiring well away from any place where burglars could tamper with it, disconnecting sensors from the system.

### Wireless Alarm systems

#### Pros

Wireless alarm systems have no cables connecting sensors to the main control panel, so they are extremely easy to fit and do not create redecoration work. Nearby sheds or garages can be covered without the need for external cables. They are controlled by convenient keyfob remote control units, with no complex disarm codes to remember. Some wireless systems even have solar-powered wireless external bellboxes

#### Cons

Each sensor has its own battery and these must be monitored and changed periodically, but many wireless control systems will let you know when a battery is getting low. Some Wireless systems still use a wired external bellbox connection for added reliability. With very specialised receiver/decoder equipment it is possible (though very unlikely) that transmitted arm and disarm codes may be 'grabbed' and 'cloned', or transmissions may sometimes be jammed so that the panel cannot receive sensor alarm signals.

*No burglar alarm will be absolutely infallible, but any alarm that you fit will be a deterrent to potential intruders. If the bellbox is visible, it indicates that your premises are not going to be a pushover. If intruders do trigger your alarm, the resultant ear-splitting din should see them off before they ever set foot inside your home, as well as alerting your neighbours that something is amiss.*



### Installation Hardwired systems

As the name suggests, hardwired systems rely on wired inputs to inform the main control panel what is going on in your home. The most fundamental part of a wired alarm system is the 'closed loop'. This simply means that, all being well, the control panel expects to see a short circuit between two sense terminals. It passes a signal to one end of the loop and expects to see it come back at the other. If any door or window fitted with a sensor is opened a magnetic switch in the sensor opens and the loop is broken.

So, in essence, all that you need to do is to fit a sensor to each window or door that you wish to protect, run a cable back to the panel, connect the mains supply and bell box and presto! Your home is secure. In practice, there is a bit more to it than this, but it is not too complicated.

### Sensors and Zones

The sensors connected to an alarm panel could all be wired up as described previously to a single input on the control panel (called a zone), but there are advantages to having several zones covering different parts of the house. Firstly and most obviously, you can tell what part of the house the sensor is in if the alarm is triggered. This narrows down the search for signs of an intruder or an open window.

Having several separate zones rationalises the wiring too, as you end up with several spurs of wire running out from the control panel to each part of the house instead of one huge loop that must pass through every room, upstairs and downstairs.

The use of separate zones allows you to 'part arm' the system. At night, the lower floor could be armed, with upstairs bedrooms disarmed so that windows could be left open in summer and movement detectors do not trigger if you turn over in bed and so on.

In addition to the normal zones that you use to cover the different parts of your home, there are often extra zones dedicated to special functions. The 24 hour zone or anti-tamper (confusingly often referred to as 'tamper') zone will be triggered if anyone attempts to cut the wiring or dismantle the control panel, the bell box, or any of the sensors connected to the system, whether the alarm is armed or not. Likewise you may fit a panic button to the 24 hour zone or personal attack (PA) zone near to the front door which will trigger the alarm instantly when pressed.

One zone, usually connected to the front or back door, is called the 'Entry / Exit Zone'. This zone is fitted with (often programmable) time delays which allow you to leave the house having set the alarm, as well as allowing (say) 30 seconds for you to disarm the alarm upon entry detection before firing the sirens. Some panels have a dedicated fire zone for heat sensors or smash panels, which is a 24 hour zone with outputs for a separate fire siren.

Apart from the magnetic sensors already mentioned, the other main choice for covering a whole room is

the passive infra-red (or PIR) movement detector. This is a motion detector that works by sensing moving body heat in its field of view. A PIR is not triggered by moving curtains or lights being switched on, nor by slowly changing heat sources like a radiator or storage heater, but pets may trigger the sensor. Some PIRs use special lenses that look up away from the, but cats with a tendency to run up the curtains may well cause problems!

The various sensors fitted to a burglar alarm system are wired to each other and to the control panel using multi-cored cable. Door and window switch sensors generally require a 4-wire connection. One pair of wires are connected to the zone 'alarm' terminals. This pair will be shorted by a magnetic switch when the window or door is closed (a magnet mounted on the door / window will be in close proximity to the switch), and opening the door will result in the switch opening the loop. Another pair of anti-tamper wires are fitted to each sensor which are shorted under normal conditions by a switch that is held in place by the screws securing the sensor casing. If the screws are removed, the 'tamper' loop will be broken and the panel will sound the sirens. PIRs need 6 wires; 2 for power, 2 for alarm and 2 for tamper and most bell boxes also require a 6-wire connection. Therefore, a good choice is to use a reel of 6-core cable for the whole installation.

*Apart from the magnetic switched sensors and PIRs already described, there are a few special sensors which may be fitted to a security system. Glass break detectors and motion or shock sensors based upon trembler switches protect against entry via broken windows and photoelectric beam break sensors will trigger the alarm if an intruder crosses a certain point.*

### Wireless systems

The zone arrangement on a wireless system is much the same as with a wired one, with several separate zones to cover different areas and 24 hour PA and tamper zones. The obvious difference is that the sensors within a zone do not need wiring together and usually identify their zone number to the panel by transmitting a digital code to the receiver.

A magnetic switch sensor combined with a transmitter is used for windows and doors, and some sensor / trans-

mitters allow you to wire in several additional normal magnetic switches for a large window with several casements, for instance.

PIRs are the easiest sensors to fit as they need no wired connections whatsoever. Simply set the internal switches to indicate which zone the sensor belongs to, connect the battery and fit the unit about two metres up on the desired wall.

### General considerations

All of the sensor power supply and sensor loop wiring on modern burglar alarm systems is low voltage and poses no shock hazard provided the control panel has been properly fitted. The control panel of mains operated systems will need wiring into a separate fused unswitched spur from your mains supply. Follow the instructions provided with each panel for details of mains wiring and earth connections. The 12 Volt auxiliary supply wired to powered sensors and the bell box is usually fused within the panel. Note that working on a system with power applied risks shorting the auxiliary supply and blowing the fuse. If all PIRs stop working, this is the most likely cause.

The power supplies in mains operated systems can often be backed up by rechargeable batteries, so that your home will still be protected in the case of a power cut or if the supply cable is tampered with. Likewise, most bell boxes have a rechargeable battery within them, making it very difficult for a burglar to disable the system. Cutting the lead to the bell box (which should in any case not be accessible from the outside of the premises) will result in the bell box sounding. Note that most bellboxes normally sound only for a predetermined period (usually up to 30 minutes) as required by legislation. Many alarm control panels have a separate output which remains switched on indefinitely after the alarm is triggered and this is usually connected to a strobe beacon on the bellbox so that you may see upon return to your home that the system has triggered.

*Take a good look at the system kits and burglar alarm accessories featured in this section of the Maplin catalogue. If you have any questions, or would like to discuss installation of a security system in your home with our trained staff, please call into one of our stores or call our Technical Helpline for a prompt and courteous service.*