

# Analogue radio

## FM and AM reception

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### More information section at [bbc.co.uk/reception](http://bbc.co.uk/reception)

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# Wavebands

Analogue radio means FM and AM:

- FM (frequency modulation), also known as VHF (very high frequency)
- AM (amplitude modulation), broadcast on short wave (SW), medium wave (MW) and long wave (LW)

	Frequencies used	Coverage
FM	very high	only near the transmitter
SW	high	worldwide
MW	medium	up to approx 150 km
LW	low	up to approx 400 km

In the UK, most analogue radio stations (including the BBC's) broadcast on FM and/or MW, with BBC Radio 4 also on LW. FM gives the best sound quality.

For a list of frequencies for the BBC's national radio stations, see [bbc.co.uk/radio/waystolisten/analogue/](http://bbc.co.uk/radio/waystolisten/analogue/).

# FM reception

FM gives excellent sound quality and is mostly in stereo. Signals can usually be picked up with the small telescopic aerial on a portable radio, or the wire or ribbon cable supplied with a hi-fi system. For serious listening, though, you may want to install a permanent external aerial.

Most reception problems with FM are caused either by a weak signal or by some kind of interference.

## Hissing or fading

This is usually a sign of a weak signal.

- If the problem has just started, check **This week's transmitter work** at [bbc.co.uk/reception](http://bbc.co.uk/reception) to see if your local transmitter is temporarily affected by a fault or maintenance work.
- If you have a portable radio with a telescopic aerial, make sure it is fully extended. Tilt and swivel the aerial until you get the best signal. Try moving the radio to another position, such as near a window, higher up or in another room.
- If your FM tuner is part of a hi-fi system, make sure you have connected the wire or ribbon aerial supplied. Consult your system's manual for more details.
- If reception is still not good enough, you may need an external aerial (see page 4).

## Distorted S and Z sounds (sibilance)

This is the result of receiving two signals that are interfering with each other – one signal is reflected off a tall building or a hill and arrives a moment later than the direct signal. It is known as multipath distortion.

- If you are using a portable radio, try moving it around the room.
- If you are installing an external aerial, a directional aerial that only picks up signals coming direct from the transmitter will help to reduce the distortion. Use an aerial with as many elements as possible. A circular or 'halo' aerial is more likely to cause the problem rather than solve it.

## Twittering and whistling

These annoying sounds (sometimes called 'birdies') are usually caused by another station transmitting on a frequency very close to the station you are listening to. This is called adjacent channel interference (ACI). It usually only affects stereo FM.

- If this is a long-term problem, an external directional aerial, preferably on the roof, is recommended (see page 4).

Twittering noises can also be caused by high air pressure, which brings fine weather and allows FM signals to travel further than normal. You may also get interference from strong foreign stations. There is nothing you can do about this – reception will only improve when the weather changes.

If you are very close to a transmitter, noises or distortion may be caused by a very strong signal.

- If you have a portable radio, partly close the telescopic aerial.
- If you have a hi-fi system, you can plug a device called an attenuator (available from electrical shops) into the tuner's aerial socket. This will reduce the signal by a set amount.

## Buzzing, crackling and clicks

Bursts of buzzing, crackling or regular clicks are often caused by electrical interference from things such as a domestic appliance or a faulty fridge or central heating thermostat.

- To identify what is causing the interference, leave the radio on and try switching off or disconnecting your appliances one at a time.
- Also check the radio in case it has a loose aerial connection or mains lead.

## Interference from an outside source

If you think you are experiencing interference from something outside your property, you can report it to Ofcom, the broadcasting regulatory body, and ask them to investigate. They will ask for an assurance that your aerial system has been checked and there may be a charge for the investigation service. See the Ofcom website, [www.ofcom.org.uk/complain](http://www.ofcom.org.uk/complain), or phone 020 7981 3040 (9am–5pm); textphone (for deaf or hard of hearing) 020 7981 3043.

Ofcom is also responsible for licensing radio users and preventing illegal broadcasting, so you can also report suspected interference from a 'pirate' radio station.

## External FM aerials

If you want to use an external aerial, first check that your radio or hi-fi system has an aerial socket.

Ideally, you should use a directional aerial with two or more elements (a Yagi aerial) that covers the whole FM band (87.5MHz to 108MHz). To connect it, use low-loss coaxial cable (as used for TV aerials).

### External aerials

We suggest that installation is carried out by a professional aerial installer, registered with the CAI (Confederation of Aerial Industries): [www.cai.org.uk](http://www.cai.org.uk).

If you get background hiss on FM in stereo, but this disappears when you switch to mono, you may be in an area of low signal strength. A larger aerial with more elements should resolve this.

The circular or 'halo' types of aerial are not recommended because they can allow distortion. Use one of these only if it is physically impossible to fit a directional aerial, or if you want to receive a range of local stations from different directions.

You should place the aerial as high up as possible on the outside of the house. The safest place is on the roof, at a height at least 1 metre clear of the roof and other aerials.

You can also have an outdoor aerial installed in the loft, though the results may not be quite as good because the incoming signal may be weakened by such things as roof tiles, loft insulation, water tanks, electrical cable and even the gables of the house. On the other hand, the aerial will be protected from atmospheric corrosion and so will not need to be checked as often as an outdoor aerial.

A professional aerial installer will be able to advise you on which type is best for you.

Normally, the elements of the aerial should be horizontal, i.e. parallel to the ground. However, you may find reception is clearer with the elements in the vertical position if you are receiving signals from a small relay transmitter, or if the transmitter is blocked by a hillside.

Experiment with the position of the aerial until you get the best possible reception. For example, you may be able to use part of the roof to block unwanted interference.

If you already have a TV aerial down-lead, you can connect your FM aerial to this, but you need to incorporate both combiner and diplexer units to separate the radio and TV signals. If you want the aerial to feed more than one radio, you will also need a splitter/combiner.

## AM reception

### Medium wave (MW) and long wave (LW)

*For short wave (SW) reception, see the [Radio reception overseas factsheet](#).*

In the UK, most AM stations broadcast on MW. Of the BBC's national stations, Radio Five Live is on MW, while Radio 4 broadcasts on MW and LW as well as FM.

AM signals can travel long distances, although obstructions such as large buildings or hills may weaken them. Reception quality can also vary a great deal from day to night because of differences in the atmosphere. You may get good, clear reception during the day, but after sunset the signal may fade or become distorted. Signals travel further at night, so you may get interference from other AM transmitters, and you may even hear stations from outside the UK.

Portable radios usually have a built-in AM aerial inside the set – if there is a telescopic aerial this is for use with FM only. Hi-fi systems that include AM radio often have a plastic loop or wire that you need to plug into a socket or connect to terminals on the back – if you don't, you may hear nothing when you tune to AM radio stations. See your hi-fi system manual for more information.

- AM aerials are directional, so you may need to turn the radio, wire or loop for the best possible reception.
- Placing the radio near a window or on a window sill may also help.
- Careful tuning may find a stronger signal and help minimise interference from other stations. This is easier to do with a radio that has a display screen that shows the exact frequencies rather than one with a tuning bar or dial.

If your AM reception is generally poor, you may like to consider getting digital radio instead, especially if you regularly listen to AM stations such as BBC Radio Five Live. For information on how to get digital radio, visit [bbc.co.uk/digital](http://bbc.co.uk/digital).

### Buzzing, crackling and clicks

These noises are all signs of electrical interference, which can badly affect AM signals.

- Clicks and buzzes can be caused by interference from a domestic appliance or a faulty fridge or central heating thermostat. To identify what is causing the interference, leave the radio on and try switching off or disconnecting your appliances one at a time.
- Outdoor sources such as street lamps, flashing signs and power lines can all cause crackling.

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