



Industry Canada Industrie Canada

# **CUTTING THROUGH... INTERFERENCE ON AM AND FM RADIOS**

**94.7**  
**1020**

FM  
STEREO  
MEM1

AM  
MONO  
MEM6

**96.5**  
**1140**

Canada

This information is available in a series of brochures, a videocassette and a CD-ROM. The Industry Canada Internet site <http://strategis.ic.gc.ca>, under the heading *Marketplace Services* includes useful information and advice for solving interference problems.

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## **CUTTING THROUGH... INTERFERENCE ON AM AND FM RADIOS**

As the use of transmitters, receivers and communication devices increases, so do the disruptions in signal reception.

As a rule, FM receivers are less affected by crackling noises than AM receivers. Conversely, AM radio is not as susceptible to the signal reflection phenomena.

### **IDENTIFY THE SOURCE OF THE INTERFERENCE**

**First, determine whether the source of the interference is internal or external to the radio itself.**

**The interference may be caused by atmospheric conditions, and in that case, all you can do is wait for conditions to change.**

Real interference and improper tuning of the desired station can have the same effect. Changing the orientation of the radio can maximize reception of the desired signals. In some cases, an outdoor antenna also helps.

For more information on antenna, refer to the brochure:

**CUTTING THROUGH...VARIOUS  
SOLUTIONS TO INTERFERENCE.**



### **BASIC CHECKS**

- Check connections.
- Disconnect all accessories.
- Perform the equipment substitution test.
- Check with neighbours.

For more information, refer to the brochure:

**CUTTING THROUGH...  
RADIO INTERFERENCE.**





## AUDIO RECTIFICATION

### Can unwanted voices or sounds be heard on your AM or FM radio?

When you hear unwanted voices or sounds, the equipment is receiving interference from GRS transmitters (better known as CB radios), from amateur radio transmissions, or from other radio services with a transmitter located nearby. The interference thus appears intermittently, as the signals are being transmitted.

This kind of interference, known as audio rectification, is usually caused by the receiver. With this phenomenon, an electronic circuit, usually an amplifier, is suddenly affected by strong unwanted outside radio signals. If the equipment is surrounded by an intense radio signal, the circuit wiring or the system components may act as antennas and pick up an unwanted signal. This is not necessarily due to a technical fault in the transmitter. The entry point of the unwanted signal must be located, which can be done by disconnecting all accessories to isolate the culprit.

Check your neighbourhood for transmitter antennas in order to identify the potential source of the interference, then try to find a solution with the person responsible. Filters, shielding or grounding may be required.

### How to locate the entry point of an unwanted signal

- A. Disconnect all accessories connected to the radio such as auxiliary speakers, turntable, interconnecting stereo system cables, tape deck and compact disc player. Reconnect each cable one at a time to identify the accessory that is the source of interference. Proper grounding and good connections between the accessory and the equipment sometimes eliminate the interference. If necessary, ask a technician to do the installation or modifications.
- B. If the interference persists after all the accessories have been disconnected, the problem may lie between the volume control circuit and the speakers. If varying the volume has no effect on the level of the offending radio signal, the entry is likely the speaker wiring. To verify this potential entry point, disconnect the speaker wires from the amplifier and listen for the interference with the headphones. If the problem disappears, any unshielded speaker wires should be replaced with shielded audio cable.



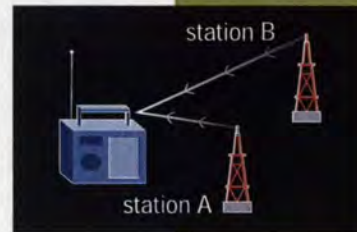
For more information on shielding, refer to the brochure:

**CUTTING THROUGH... VARIOUS SOLUTIONS TO INTERFERENCE.**



## RECEIVER OVERLOAD

When station A is tuned in, the sound from station B can be heard in the background. (It may actually drown out station A.) This can occur only when the signal received from station B is much stronger than that from station A, because station B is closer. The signal from station B is either intercepted by the antenna or picked up directly by the electronic circuits inside the receiver. If station B is new to the neighbourhood, the broadcaster will help you. Repointing the antenna may eliminate reception of the strong undesired signal if the desired signal is not too weak.

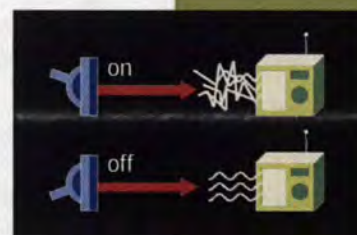


## INTERFERENCE SPECIFIC TO AM RADIO

### Interference from electrical sources

Some electrical equipment or installations in the home may cause interference.

To identify or discover certain other types of electrical interference not described below, it may be necessary to carry out the breaker test. Details of this test are contained in the brochure *Cutting Through...Radio Interference*.



### Fluorescent and neon lights

Fluorescent lights produce a kind of steady buzz when they are turned on, while neon lights can trigger short clicks. Neon lights contain gas under pressure that emits bright light when traversed by an electrical charge. Moving the radio further away or replacing the tubes or fixtures may solve the problem. Certain repairs can also be made by a technician to eliminate the problem.

### Motors

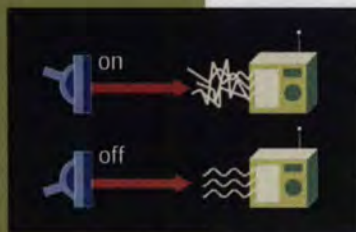
Many motors can cause interference on AM radios, including those in **electric shavers, sewing machines, vacuum cleaners, blow dryers and mixers**. The sound of the interference is similar to that of the device causing it. Since these devices are operated only for brief periods, it is often impractical to try eliminating the interference. Nevertheless, a filter may be added to the device or to the radio.

### Electrical contacts

Some electrical contacts can be the source of interference that takes the form of small staccato sounds or continuous crackling. After a while, electrical contacts on some thermostatic devices become dirty or pitted causing sparking when the electrical current passes through. **Heating**



**pads, electric blankets, aquarium heaters and doorbell transformers** can cause this type of interference. The breaker test will help locate the source so it can be replaced or repaired.



### **Dimmer switches**

The radio crackles continuously at a fairly high pitch that can be heard across the entire AM band. Conduct the breaker test to find the faulty switch, and replace it with a better quality dimmer switch equipped with a filter. The metal boxes that cover certain dimmer switches also act as excellent shielding.

### **Oil or gas burners**

The sound from this type of interference is distinguished by intermittent buzzing lasting anywhere from a few seconds to a few minutes. This interference is caused by the spark created to light the pilot flame in this equipment. Call in a qualified technician to repair or replace the ignition system.

### **Electric fences**

This equipment primarily affects AM radio. The interference caused by an electric fence resembles a "tick" repeated at regular intervals of one or two seconds. By nature, this type of interference is found only in rural regions. If the interference persists after the electric fence has been disconnected, the problem lies in the control box. If the interference occurs only when the electric fence is operating, the installation of the electric wire should be checked. A damaged section of wire or branches or shrubs rubbing against the wire are two possible sources of the interference.

### **Industrial, scientific or medical (diathermic or heating) equipment**

Do you hear a cyclical vibrating buzz or hum in your radio? Some radio frequencies are used to produce heat in the food, plastics and wood industries and can cause this type of interference. Diathermy is used for medical purposes. Check to see if this equipment is located in the neighbourhood. In most cases, corrective measures must be applied to the equipment causing the interference. Contact officials in the institution where the equipment is located.

### **Intermodulation**

The radio is emitting a mixture of voices and music resulting from the mixing of two or more radio stations. In the presence of strong radio waves, corroded metal contacts or connections can act as detectors



and generate unwanted signals that affect receivers in the surrounding area. This is more precisely referred to as external rectification. If the interference affects a broad range of frequencies, the source is often located very close to the most powerful transmitter, on the antenna itself, on the guy wires or very close to the broadcast station. The corroded contact must be identified so it can be cleaned or insulated. A word of caution: there may be more than one source of interference at a single location. The level of interference will decrease as sources are eliminated. Generally, this type of interference disappears when it rains. Involved radio stations will help you identify and eliminate this type of problem.

### Weak signal

Sound on the radio is weak. There is a whistling or buzzing sound in the background. In addition, it is difficult to tune in the desired station, and adjacent stations can drown out its signal. Broadcasting stations are assigned specific coverage areas. Outside the designated area, stronger signals from neighbouring stations will overwhelm weaker signals, because the frequency of the closer station will cover the more distant signals. Changing the orientation of the radio may maximize reception of the desired signal. If the two stations are broadcasting from different directions, an outdoor directional antenna can amplify the weak signal. Whenever an attempt is made to pick up a station from a point outside its broadcast area, a number of interference problems can appear.

### Nighttime interference

In the evening, does the sound of the desired station fade in and out, and do one or more other stations occasionally drown it out? This type of interference is linked to the propagation characteristics of AM radio signals. At night, transmitters located hundreds or even thousands of kilometres away can disrupt reception of stations in the area. Changing the orientation of the AM radio should improve reception. On the other hand, this solution may prove temporary, because ongoing variations in signal propagation during the night are apt to change reception conditions unpredictably.

**If none of these sources of interference appears to be the one affecting your AM radio, run the breaker test explained in the brochure: Cutting through... radio interference.**



### IF THE PROBLEM PERSISTS...

**The source of the interference is probably outside the home.**

Check with your immediate neighbours. The location where the interference is most intense is very likely to be the source of the



disruption. Ask your neighbours to perform the breaker test in their homes to isolate the faulty device. An appliance or electrical device rarely causes interference extending beyond a few houses. This should help you find the source of the interference.

### **IF THE PROBLEM PERSISTS...**

**The interference may be caused by electrical power lines. The power grid supplying the neighbourhood may be the source of the interference.**

#### **Electrical power lines**



This type of disruption sounds like sizzling, sparking, intermittent or continuous crackling and appears and varies in intensity with weather conditions (dry or damp weather, wind). Additionally, if the result of the breaker test indicates that the source is outside the home, there is a good chance the interference is caused by faulty components in electrical power lines in the surrounding area.

Contact your electrical utility to resolve the problem.

## **INTERFERENCE SPECIFIC TO FM RADIO**

### **Weak signal**

Have you been unable to tune in your favourite FM station since a new station went on the air on a neighbouring frequency? FM stations each have their own specific coverage area. Although some listeners living outside this area can still pick up the station, a station with a stronger signal may override more distant signals. A directional antenna can boost the weaker signal, provided of course, the two stations are not located in the same direction. A difference of 90 to 120 degrees is ideal.

### **Multiple signals**

In a moving car, the receiver may give off a "fut-fut-fut" sound. This type of interference is common when signals are coming from more than one direction, or when they are reflected off buildings or other structures. Depending on how you travel, signals come and go, and sometimes disappear in a cacophony of noise.

Reflection is a characteristic specific to FM signals. When the receiver allows, switching from stereo to mono mode can sometimes improve reception.



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## A solid dark green textured book cover with a vertical crease down the center. The texture is a fine, uniform weave, typical of cloth-bound books. The color is a deep, slightly muted green. The cover shows signs of wear, including some scuffing and a slight discoloration along the edges and the central crease. The spine is visible on the left side, showing the same texture and color. The overall appearance is that of a well-used, classic library book.

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.







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