

# Radio and Television INTERFERENCE



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# Radio and Television INTERFERENCE

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## INTRODUCTION

In recent years, tremendous advances have occurred in radio and television communications. Communication from any point on the earth, and even from transmitters hurtling through space, has become commonplace. The use of two-way radio has grown drastically, permitting personal communication from motor vehicles and homes.

Unfortunately, these advances in communications technology are not without shortcomings. Because the radio-frequency spectrum is becoming crowded, interference is becoming widespread. The thousands of complaints received by the Department of Communications (DOC) each year about interference to devices in the home offer clear evidence of the difficulties that Canadians are experiencing.

The purpose of this brochure is to help you identify interference problems, solve some of them, and recognize those that will usually require professional assistance.

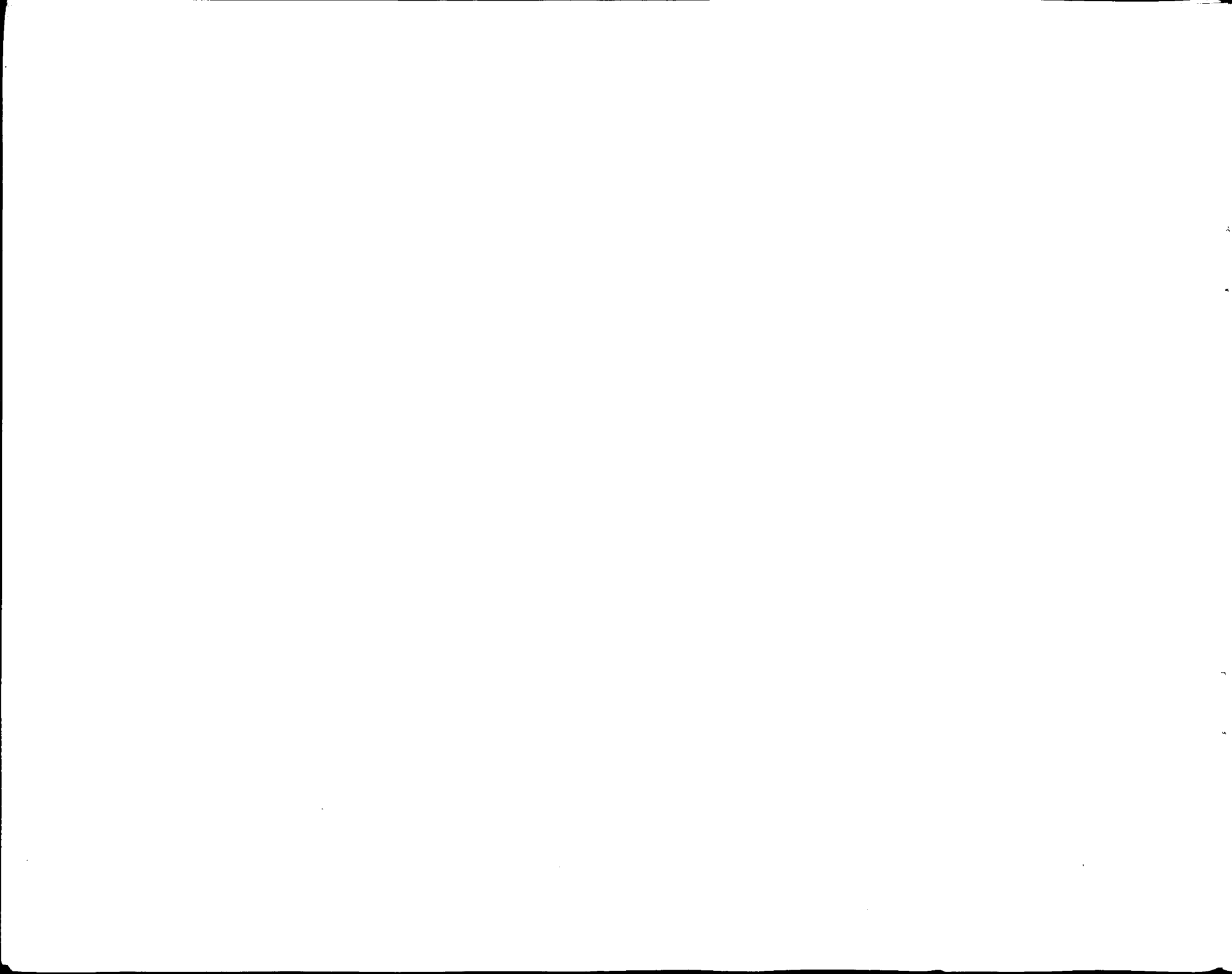
Nearly half of all reception problems are due to deficiencies or faults in the radio or television, the antenna lead or the antenna itself. This brochure will help you to find if the trouble you are having is caused by one of these factors.

As you begin to identify the type of interference you are experiencing, keep in mind that your equipment must receive and amplify the desired audio or video signal, and also reject all unwanted signals and noise. This means that even if the equipment allegedly causing the interference is being operated properly, it is still possible for you to experience interference because of deficiencies in the design of your equipment.

Remember also that your TV set cannot deliver a perfect picture if it is in poor operating condition or is poorly adjusted. If you own an older set, adjustments to components may be necessary. When buying a new set, ensure that the dealer has properly adjusted the major settings at the back and carefully follow the owner's manual to properly adjust the front controls.

If you have followed the home remedies suggested and the interference continues, you should contact your service representative for assistance. We suggest you provide the technician with a copy of the Interference Identification Questionnaire provided in the Appendix.

***Remember:*** To avoid the possibility of a shock, fire or violation of your equipment warranty, any **INTERNAL** modifications to your equipment should be done **ONLY** by a qualified service representative.

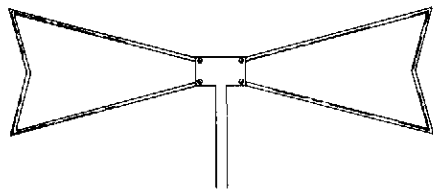


# CHECKING YOUR TELEVISION ANTENNA

The first thing to assess when you have an unsatisfactory TV picture is whether your antenna is appropriate for your needs, correctly installed and in good condition. No matter where your television is located, it needs an antenna attached by a lead-in wire to the terminals on the set to bring in a minimum signal for a clear picture. This section describes the kinds of antennas available and explains what problems to look for.

## Which antenna is best for you?

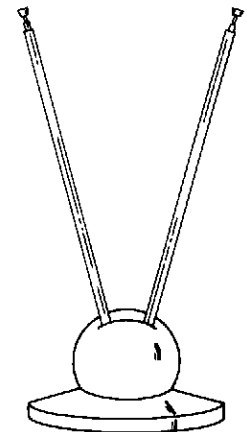
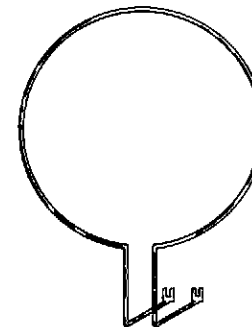
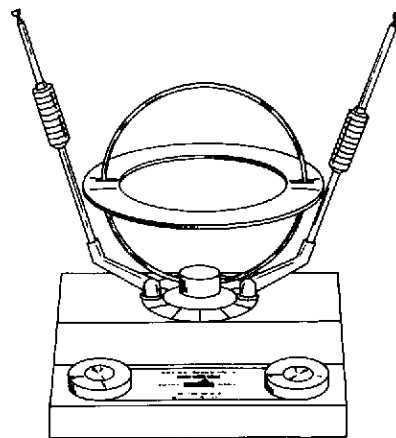
Improved reception can be obtained only by using a good antenna. But choosing the right antenna is often confusing. There are many types, each designed for a specific purpose, and each with certain limitations. This section may help you choose the best antenna for your needs, or find out whether your present antenna is adequate.



## Indoor antennas

The most common indoor antenna for VHF reception (channels 2-13) is the "rabbit ears" type. UHF reception (channels 14-83) is obtained with a "loop" or "bow tie" antenna. Generally, these antennas are satisfactory only within about 13 km (eight miles) of the transmitting tower, and often less if the signal is blocked by buildings or other obstructions.

If you have one of these antennas, try it in various positions to see which brings in the best picture.



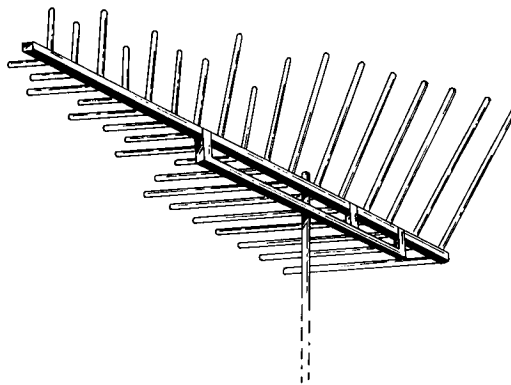
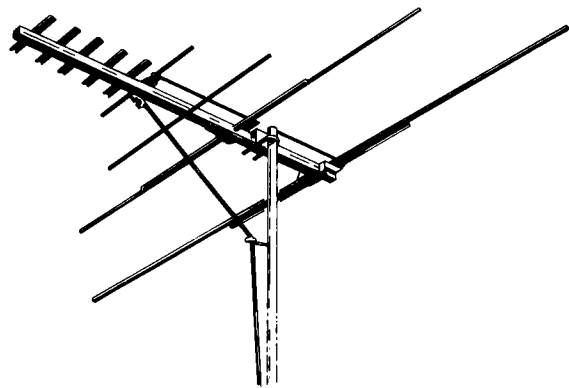
Common types of indoor antennas

Each time you change channels, you may have to change the position of the antenna. Also, pull the rabbit ears all the way out for the lowest channel (2) and push them in for the higher channels. If the TV picture remains poor for all antenna positions, there is a good chance that you need an outdoor antenna.

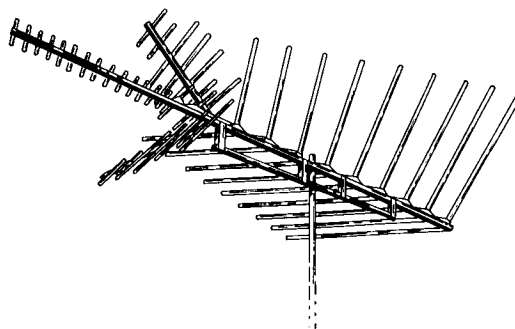
## Outdoor antennas

Outdoor antennas are larger and more efficient than indoor types. Generally, the higher the antenna and the greater the number of elements (metal rods) to capture the signal, the more efficient it will be. The choice of an outdoor antenna depends on your location and what you want it to do.

Some of the more common types are shown below.



*Common types of outdoor antennas*



## Pointing the antenna

It is surprising how many antennas are installed pointing in the wrong direction — usually backwards. A poorly aimed antenna may still pull in a usable signal but it will be comparatively weak. Even if the antenna was installed correctly, wind can sometimes turn it slightly away from the direction in which it was originally aimed.

Apply the following general rules for positioning antennas:

- aim the shorter elements toward the station;
- when V-shaped elements are used, point the open end of the "V" toward the station;
- experiment by pointing the antenna in various directions and checking the picture.

In some cases, you may find that the best signal is obtained when the antenna points slightly away from the station, because of obstacles in the path of the signal.



## Are your antenna and lead-in wire properly installed?

Many problems with TV reception can be traced to improperly installed antennas and lead-in wires.

### ■ The antenna

If you wish to install a new antenna or check whether your present antenna is properly installed you may wish to consult a TV-antenna installer who is familiar with installation conditions.

Normally, outdoor television antennas are mounted on a post or tower. These structures should be attached to a ground rod using copper wire of at least No. 12 gauge.

### ■ The lead-in wire

It is important to use a good lead-in wire to connect the antenna to your TV set. Most installations use the ribbon, or twin-lead type that has two wires separated by insulation. A shielded-type coaxial cable may be necessary in some situations to minimize interference. Coaxial cable is the only type suitable for use with cable television.

## Do's and don'ts for installation

- For the usual twin-lead wire, standoff insulators must be used to hold the wire away from the mast, roof, walls and metal ducts on its way down to the TV set. There should be no direct contact between the lead-in wire and metal, except at the terminals.
- The first standoff insulator should be as close to the antenna terminal as possible.
- The twin-lead wire should be twisted one turn for every three feet of length to help prevent excessive movement in the wind and to minimize interference. Don't twist too tightly or the wire may break.
- Never paint the lead-in, terminals, standoff insulators or lightning arrestor.
- Do not use a combination of twin-lead and coaxial cable without the proper matching transformers.
- Do not splice the lead-in wire, even with solder. Splices decrease the amount of signal reaching the TV set.
- Do not let excess wire coil behind the TV set. This may create ghosting in the picture or signal loss. Buy a little more wire than you estimate for the job, then cut off any excess when installation is complete.
- Attach both lead-in wires securely to the two antenna input terminals.

- To keep the two wires from touching each other, attach each wire to a U-shaped metal clip, which fits neatly under the terminal screw.
- There may be two pairs of these terminals (connectors), one labelled VHF and the other UHF. Antennas for channels 2-13 should be connected to the VHF terminals and antennas for channels 14-83 should be connected to the UHF terminals. Only one antenna should be connected at a time. If an exterior antenna is connected, the rabbit ears should be disconnected.

## Poor reception areas

If you live in an area where reception is poor, you may wish to consider installing a preamplifier; a small, inexpensive device that can be mounted on the antenna. Be sure to buy a model that matches the type of lead-in wire you are using.

These amplifiers boost the incoming signal and may provide a very significant increase in picture quality.

## Nothing lasts forever

Corrosion will reduce the effectiveness of TV antennas. This is a particularly serious problem along the sea coast, where the air contains a lot of salty moisture, or in urban areas near major industries. Over time, aluminum antennas develop a coat of aluminum oxide, preventing some of the signal from reaching your TV set.

Deformed or broken elements can also reduce the antenna's efficiency.

Corroded or bent antennas should be replaced. Good-quality antennas can now withstand the effects of rain, snow and corrosion for many years.

Lead-in wires can become dry or brittle with age and the two wires inside may short-circuit. If this occurs, the wire should be replaced.

## Isolating your television interference problem

The following "checklist" is intended to help you decide if your television reception problem is due to an interfering signal or equipment problems in your antenna system.

## Checklist

### ■ 1. A visual check of the antenna should determine if:

- the antenna is the correct type;
- it is positioned to prevent screening by buildings, trees or other aerials;
- it points to the desired station;
- it is free from corrosion, wind damage or loose connections.

### ■ 2. A check of the lead-in should determine if:

- it is a low signal-loss type;
- it is in good condition (free of corrosion and water penetration);
- the terminals or soldered connections are in good condition;
- a pre-amplifier (if used) is working satisfactorily and is the correct type for the channel in use;
- any splitter boxes are in good condition.

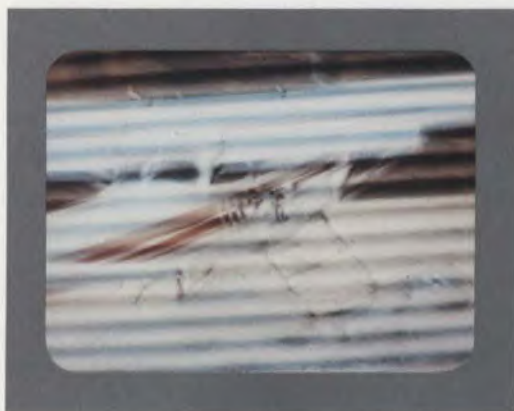
## IDENTIFYING TELEVISION INTERFERENCE



### Normal picture

Use this normal picture for comparison with the other pictures on this page.

### Radio transmitter interference



This is how your picture looks when it is picking up the transmissions of General Radio Service, amateur, police or other radio transmitters. The problem will normally affect VHF channels only. You may notice that the interference pattern changes or moves as the radio-transmitter operator talks.

If you experience this type of interference, refer to page 16 for the steps you or your service representative can take to eliminate it.

Do not confuse this interference with a horizontal-control problem.

### Horizontal-control problem



When your set requires adjustment to the horizontal-hold control or replacement of a bad component, the above pattern will likely appear on your TV picture; and you may also hear a high-pitched tone.

To eliminate the problem, simply adjust your horizontal-hold control. If the pattern persists, call your service representative.

### Electrical appliance interference

### Weak TV signal



#### Normal picture

Use this normal picture for comparison with the other pictures on this page.



This is how the television picture looks when your set is reacting to devices such as hair dryers, electric shavers, mixers, blenders, power saws or vehicle ignition systems operating in or near your home. When this type of interference occurs, you may hear a sizzling or buzzing noise along with the sound of the TV program.

If you have this type of interference, refer to the methods on page 14 for locating the offending device and correcting the problem.

Do not confuse this interference with a weak TV signal.



This is the type of television picture you will receive if you are far from the TV transmitter or if there are obstructions between you and the transmitter. An ineffective antenna, improper antenna positioning, or a disconnected or broken lead-in wire may also cause this problem. The sound quality usually will not be affected unless the TV signal is extremely weak.

You may be able to improve the quality of the signal by installing a higher antenna, using a directional antenna or signal amplifier, or repairing the lead-in wire. These solutions are discussed in the previous section.





### FM interference

### Fine-tuning problem



### Normal picture

Use this normal picture for comparison with the other pictures on this page.

Interference from a nearby FM broadcast station could cause this type of pattern on your TV screen and might influence the sound as well. Although it normally will affect TV channel 6 only, other channels in the VHF series (channels 2-13) may occasionally be affected.

Note that the interference pattern may change or vary with the sound of the FM broadcast station program, NOT the sound of the TV program.

Techniques to eliminate this type of interference are discussed on page 16.

Do not confuse this interference with a fine-tuning problem.

This type of pattern will appear on your screen if the fine tuner of the TV set is not properly adjusted. Although it looks similar to FM interference, note that the pattern changes with the sound of the TV program.

Re-adjust the fine-tuning control of the TV set to eliminate the problem.

If there is no fine-tuning adjustment on the set or if the fine tuner won't turn far enough, contact your service representative.



### Co-channel interference

### Ghosting



### Normal picture

Use this normal picture for comparison with the other pictures on this page.

This type of pattern will appear on your screen when your set is receiving two TV signals simultaneously. Note that the two images are different, as though one picture has been placed on top of the other.

Co-channel interference is due to either atmospheric conditions or the location of your home in relation to the TV stations. While little can be done to correct a problem caused by atmospheric conditions, it is usually temporary. However, if it is caused by the location of your home in relation to the TV stations, use of a directional antenna may help to eliminate the problem.

Do not confuse this interference with ghosting.

This type of picture appears when either the TV signal is reflected or the TV antenna or antenna lead-in wire is in poor condition.

The TV signal could be reflected from a mountain, building or other structure, so that two signals are sent over different paths to your TV set and arrive at slightly different times. With "ghosting," note that the two images are the same.

Rotation of your TV antenna to a new position or installation of a coaxial cable lead-in wire may resolve this problem. If rotating the antenna does not help, have a service representative check the condition and/or placement of the antenna and its lead-in wire.



### Electrical interference – power lines



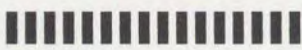
#### Normal picture

Use this normal picture for comparison with the other picture on this page.



If this type of interference appears on your TV picture, contact your power utility.





## IDENTIFYING CABLE - TELEVISION SERVICE PROBLEMS

This section illustrates a variety of interference problems that may occur in a cable system due to defects or incorrect adjustments in the cable system itself. Since these faults are strictly system-related, we have not provided descriptions of how or why the interference occurs.



If you think you are encountering any of these problems, notify your cablevision customer-service department.

### Radio and television interference from household equipment

Intermittent crackling, clicking, humming or buzzing noises on a radio or in the sound from your TV — or tears, dots and lines in a TV picture — can be caused by interference from household electrical devices or appliances. Sometimes, plugging the television or radio into another wall outlet may reduce the interference to a tolerable level. Items such as light-dimmer switches, electric blankets, aquarium heaters, fluorescent lights and heating pads are all potential sources of interference. The following step-by-step procedure will help you locate the equipment that is causing the interference.

Normally, interference will affect two receivers simultaneously. If possible, before beginning your investigation to locate the source of interference, obtain a second receiver to see if it is also affected by the same noise.

Is a second receiver affected by the same noise?

YES

**Step 1:** Obtain a battery-powered portable radio in good working condition. (The interference should affect this radio even though it is operated on batteries.)

**Step 2:** Place the radio near your fusebox, breaker panel or electrical conduit.

**Step 3:** Tune the radio between stations, where the interference is quite noticeable.

**Step 4:** When the interference starts, turn OFF the main electrical switch so that ALL power in the house or apartment is OFF.

NO

You may have a fault in your receiver, causing what appears to be interference. Consult a qualified technician.

*Note: ALWAYS EXERCISE CAUTION WHEN HANDLING FUSES OR BREAKERS!*





Does the interference stop?

||||| YES

||||| NO

The interference source is an appliance or device within your house or apartment.

To locate the source, follow Steps 5 through 8.

**Step 5:** Turn ON the main electrical switch; wait for the interference to return.

**Step 6:** Turn OFF each fuse or circuit breaker until the interference stops.

**Step 7:** Turn ON the circuit that stopped the interference and wait for it to occur again.

**Step 8:** Unplug (turn off) and plug in (turn on) each appliance and device in the circuit until this action corresponds to the interference stopping and/or starting. When this occurs, you have found the source. If you place your radio next to the suspect appliance or device while it is working, you should note an increase in the intensity of the noise.

**If you have located the interference source**

The device should be repaired or replaced or a suppression filter should be installed by an electronics technician.


*Note: In devices such as heating pads, fish tank heaters, etc., where power goes on and off intermittently, disconnecting the power to the source may delay the interference cycle.*

**If you haven't located the interference source**

After following this procedure, or if you do not wish to do this type of testing, contact your local service shop for assistance. If the service technician requires help or advice, he will call the nearest Department of Communications office.



*If you are sure that the interference source is not in **your** house or apartment, you may wish to continue the investigation by following these steps:*




### **IF YOU LIVE IN A HOUSE**

If the interference does NOT STOP after Step 4 (page 13), its source is outside your home, possibly caused by the electrical circuit feeding the houses in your neighborhood. Radio interference caused by faulty household electrical devices seldom travels further than half a city block.

Therefore, if you have overhead power lines in your area, follow the electrical lines feeding your house out to the pole. The interference source will likely be in one of the two or three other houses connected to the same point (or near the same point) as your house.

Contact the neighbors involved; they are likely suffering from interference too. Follow Steps 1 through 4 to locate the device causing the interference; and Steps 5 through 8 to locate the actual device.

If you have underground power lines in your neighborhood, contact the nearest neighbors (one or two on each side, and two directly across the street or behind) and follow Steps 1 through 4, and 5 through 8 if applicable.



### **IF YOU LIVE IN AN APARTMENT**

If the interference does NOT STOP after Step 4 (page 13), its source is probably in another apartment in your building, possibly carried by the building's electrical wiring.

The apartment with the interfering device is usually within about four floors above or below yours.

To determine which apartment has the device causing the interference, go with the building manager/superintendent to the building's electrical-meter room, after having the tenants notified of the procedure. With the manager/superintendent, wait for the interference to start, place the radio next to each circuit-breaker box and systematically interrupt the power to each apartment, starting with those on your floor (and then the floors above and below yours) for a short period of time (about five seconds).

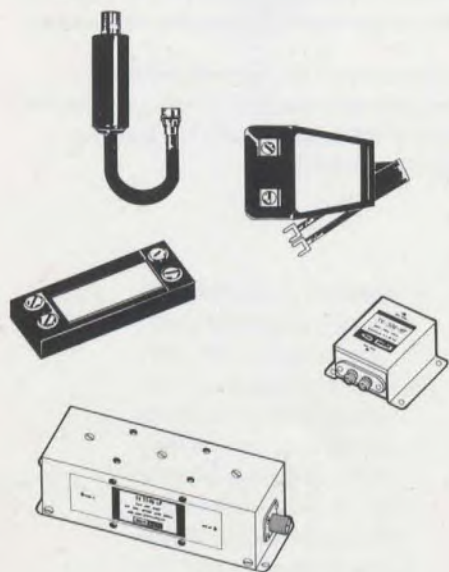
If the interference goes off and on when the power to an apartment is turned off and on, you have located the unit with the interference-causing device.

Proceed to that apartment and, with the consent of the occupant, follow Steps 5 through 8 to locate the actual device causing the interference.

If the noise source is found to be building machinery (for example, an elevator), discuss the correction of the problem with the building manager/superintendent.

## Television interference from radio transmitters

There is no set procedure for eliminating radio interference to television reception other than trial and error. The first step is to install an inexpensive high-pass filter on the back of your TV set.



Some high-pass filters

### ■ Installing a high-pass filter

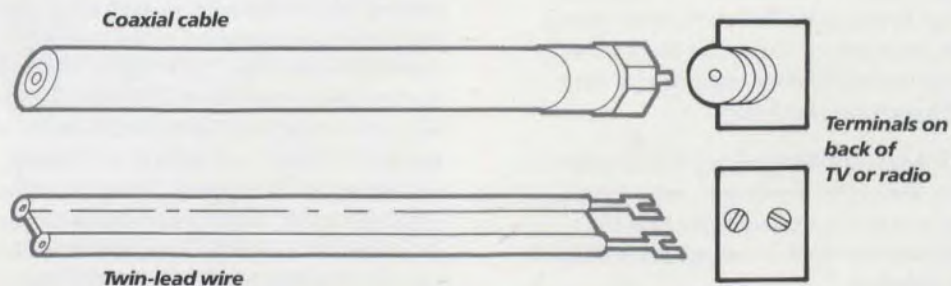
1. Determine the type of antenna wire that is connected to your TV set. There are two possibilities:

**Coaxial cable** — a round lead-in wire that requires a filter “impedance” of 75 ohms.

**Twin-lead wire** — a flat wire that requires a filter “impedance” of 300 ohms.

2. Purchase the filter that matches the type of antenna wire coming from your set. Examples of the high-pass filters available in most stores that sell or repair television sets are shown. The impedance information mentioned above will usually be on the filter label.

3. Carefully read the instructions provided with the filter before installation. It should be installed on the back of your TV set, as near to the antenna terminal as possible. The antenna terminal and the filter terminal will look like either one of the illustrations below, depending upon the type of wire used — coaxial or twin lead.
4. If you have cable television service, you may still install the filter at the antenna terminal. However, if the interference continues, contact the cable company repair service for assistance. DO NOT attempt to modify the cable system yourself.





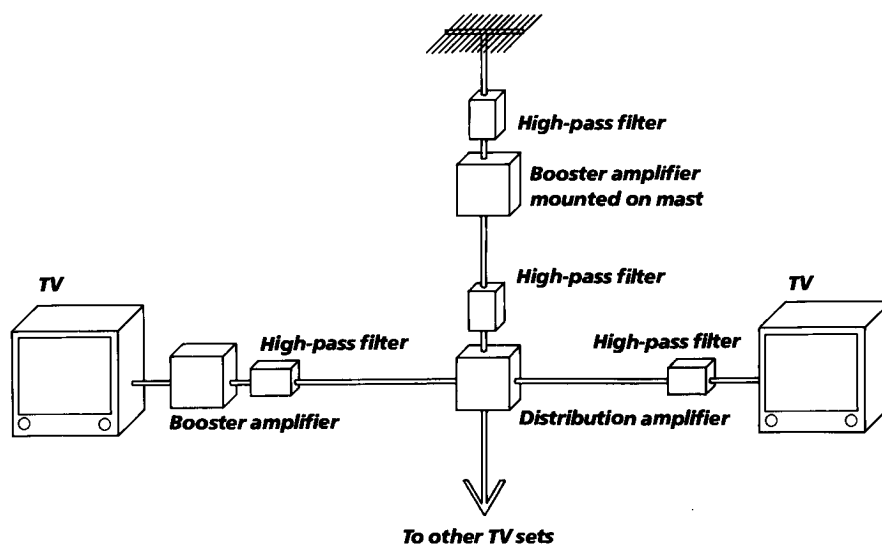
5. Attach the filter as follows:

- a. Disconnect the antenna wire from the television set antenna terminals.
- b. Connect the antenna wire to the input terminals of the filter.
- c. For a twin-lead wire, connect a 2.5 to 5.0 cm (1" to 2") "jumper wire" from the antenna input terminals of the set to the filter. For coaxial cable, you must obtain a "jumper cable" with the proper connectors already installed. (This can be purchased when you buy the coaxial filter.)
- d. When using twin-lead wire, be sure the two leads make contact with the terminals. For coaxial cable, be sure the connector plugs are properly installed on the coaxial cable.

- e. If you have an amplifier in your antenna system, you should have the filter installed before the amplifier, as close to it as possible. You may also require another filter before the TV set's input terminals (see illustration below). If the amplifier is located close to the set, install the filter before the amplifier only.

- f. The connecting wires between the filter and amplifier and between the amplifier and antenna terminal should be as short as possible.
- g. The instructions provided with the filter may call for a ground connection. This wire should be as short as possible and should connect the high-pass filter ground terminal to a metallic cold-water pipe or a ground rod. Copper wire of at least 12 gauge is recommended for this purpose.
- h. If installation of the filter at the TV antenna terminals does not entirely eliminate the interference, have your service representative install a high-pass filter inside the TV set at the tuner input terminals. Remember, internal modifications to your set should be done only by a service representative.

*Installing a high-pass filter*



*Note: Booster amplifiers are usually located near the back of the TV set; mast-mounted (outdoor) amplifiers are usually located on the antenna, and distribution amplifiers are usually located somewhere along the distribution system. If you think there is a distribution amplifier in your antenna system, be sure to trace its entire length, because amplifiers are usually in out-of-the-way places such as clothes closets and basements.*

## Radio transmitter interference to household equipment

Telephones, radios, record players, electronic organs, home intercom systems and similar devices can pick up interference from nearby two-way radio transmitters and other radio-frequency emissions. This is known as audio rectification interference. How your equipment is affected will depend upon the source of the interference. For example, if your equipment is picking up the signal of a nearby two-way radio transmitter, you will usually hear the radio operator's voice.

However, your equipment may not have been designed to reject radio signals. If only one piece of equipment is affected, it will probably have to be modified to resolve the problem.

It is usually best if modifications can be made in your home while the interference is occurring. This will enable the service representative to determine where the interfering signal is entering your equipment.

## Interference to telephones

Signals from nearby radio transmitters can enter your telephone system through the telephone line leading to the house, the telephone wiring inside the house, or inside the telephone itself.

Cordless telephones use radio frequencies and are actually small two-way radio systems. As such, they are more susceptible to interference from nearby radio transmitters, including other nearby cordless telephones.

If you have a cordless telephone that is a source of interference, you are required to discontinue its use until the problem is resolved. Consult the dealer or equipment manufacturer if you need assistance in resolving such an interference problem.

## Interference to audio amplifiers

A multiple-input audio amplifier may be susceptible to interference on one or more of the signal inputs. Generally, turntables, cartridges, tape heads or microphones are the most susceptible. For example, if the only input affected is from a turntable, disconnect the turntable cartridge from the amplifier at the input terminals of the amplifier.

If the interference is eliminated, the cartridge or the wire between it and the amplifier is "picking up" the radio signal. Proper grounding, good connections, shielding and filtering are often the keys to solving this type of radio signal interference. Often, a "process of elimination" approach must be used. Such work should normally be done by a service technician.

### Service referrals

#### *If you:*

#### *Contact:*

Own your own telephone

The dealer or manufacturer's service representative

Own a cordless telephone

The manufacturer

Lease your telephone

The company's service centre

### Grounding

All grounding should be to a good earth-ground such as a metallic cold-water pipe or 2.5 m (eight feet) ground rod. The illustration below shows the correct and incorrect methods of grounding components.

### Shielding

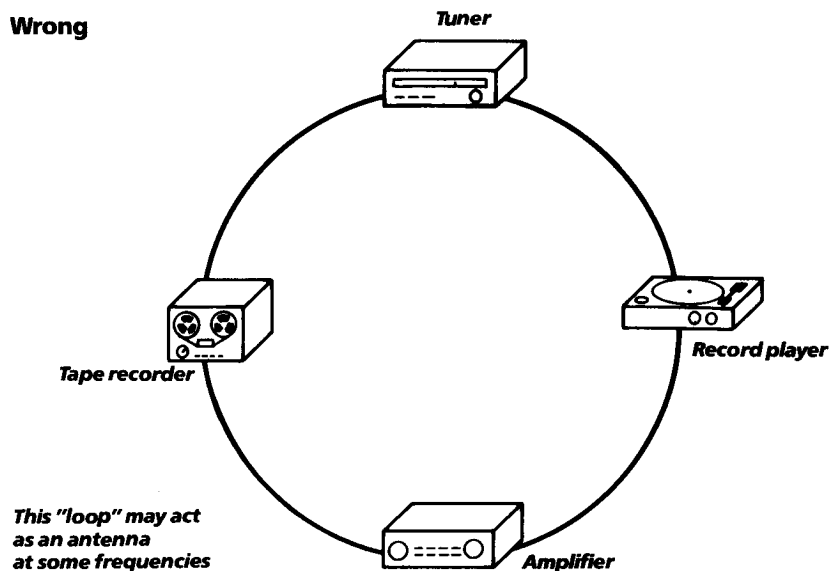
All speaker leads from audio equipment should be made of two-conductor shielded wires. The shield should be grounded only at the amplifier end, and should not be used as an audio conductor. The two internal wires should be connected to the speaker.

### Power-line filter

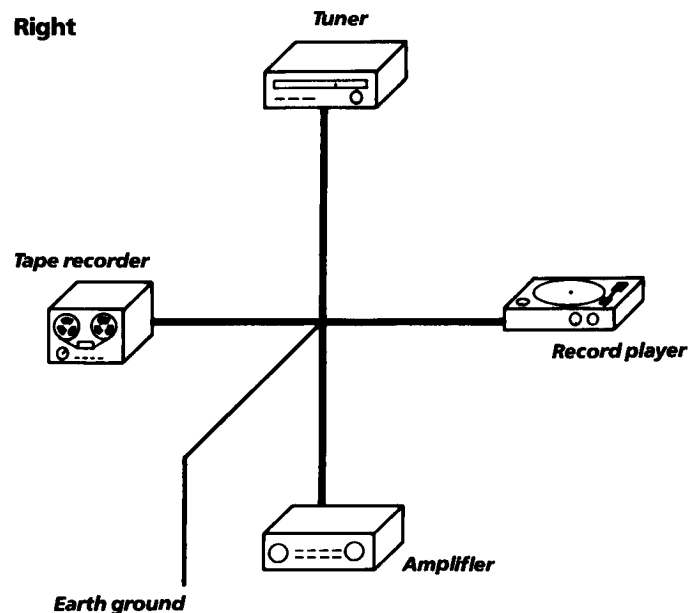
Radio signals may be entering the audio device through the AC power line. Several power-line filters to correct this interference problem are available commercially.

Audio rectification interference can be the most difficult type of interference to eliminate completely. You may have to use more than one suppression technique to achieve satisfactory results. It is normal to find that techniques used successfully in one case will not work with an apparently identical problem. Satisfactory results are best achieved through trial-and-error checks, using the techniques in this brochure.

**Wrong**



**Right**







## CONCLUSION

If you still experience problems after following the guidelines suggested in this brochure for resolving interference, you may wish to contact the manufacturer of your equipment or a commercial service shop for assistance. The Department of Communications does not repair interfering devices. However, especially in difficult cases, advice and assistance will be provided to the user by a service technician. Please be sure to enclose a completed copy of the "Interference Identification Questionnaire" provided in the Appendix, along with any other relevant information.

The Department of Communications has a number of technical publications available for service technicians. These may also be of use to consumers with experience in electricity, and those who wish to "do it yourself!"

Please contact the nearest Department of Communications office to discuss your needs. Offices can be found in the following locations:

### ALBERTA

Calgary  
Edmonton  
Grande Prairie

### BRITISH COLUMBIA

Cranbrook  
Kelowna  
Langley  
Prince George  
Prince Rupert  
Vancouver\*  
Victoria

### MANITOBA

Brandon  
Winnipeg\*

### NEW BRUNSWICK

Bathurst  
Moncton\*  
Saint John

### NEWFOUNDLAND

Corner Brook  
Saint John's

### NORTHWEST TERRITORIES

Fort Smith  
Yellowknife

### NOVA SCOTIA

Halifax  
Sydney

### ONTARIO

Belleville  
Hamilton  
Kenora  
Kitchener  
Kingston  
London  
North Bay  
Ottawa  
Sault Ste. Marie  
Sudbury  
Thunder Bay  
Timmins  
Toronto\*  
Windsor

### PRINCE EDWARD ISLAND

Charlottetown

### QUEBEC

Chicoutimi  
Montreal\*  
Quebec  
Rimouski  
Rouyn  
Sept-Îles  
Sherbrooke  
Trois-Rivières

### SASKATCHEWAN

Regina  
Saskatoon

### YUKON TERRITORY

Whitehorse

\* A Regional Office is also found at this location.

|||||

# APPENDIX - INTERFERENCE IDENTIFICATION QUESTIONNAIRE

In requesting assistance from the manufacturer, dealer, or a DOC office, the following information will be helpful in analyzing your problem.

Date \_\_\_\_\_

1. Name \_\_\_\_\_  
 Address \_\_\_\_\_  
 Telephone: *residence* \_\_\_\_\_ *business* \_\_\_\_\_

2. Type of interference identified:

<input type="checkbox"/> Radio transmitter	<input type="checkbox"/> Electrical – power lines
<input type="checkbox"/> Electrical appliance	<input type="checkbox"/> Audio
<input type="checkbox"/> FM	<input type="checkbox"/> Other
<input type="checkbox"/> Co-channel	<input type="checkbox"/> Unknown

3. Equipment affected by interference (check all that apply):

TV VHF channels (list channels) \_\_\_\_\_

TV UHF channels (list channels) \_\_\_\_\_

AM radio       FM radio

Telephone: customer-owned

Telephone: company-owned

Cordless telephone

Other

4. Do you have:

	Yes	No
Inside antenna (rabbit ears)	_____	_____
Outside antenna	_____	_____
Cablevision	_____	_____
Satellite dish	_____	_____
Booster amplifier in use	_____	_____

5. At what time of day does the interference usually occur and how long does it last?

\_\_\_\_\_

\_\_\_\_\_

6. Were suggested home remedies made?

Yes       No

Please explain (be specific) \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

7. Was the level of interference affected in any way by the modifications suggested in this brochure?

Yes     No

Comments \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

8. Complete the following section if your particular interference problem is not described in this handbook.

a. Television sound interference is best described as:

- voice
- radio or TV station programming
- clicking sound
- buzzing sound
- frying sound
- humming sound
- roaring sound
- whistling sound
- other (describe) \_\_\_\_\_  
\_\_\_\_\_

b. Television video interference is best described as:

- diagonal lines
- horizontal bands of snow
- band of colored dots that cycle on and off every few seconds
- band(s) or line(s) of dots that move(s) across the screen and resemble(s) Morse-code transmissions
- snow that covers the entire picture
- double images
- black diagonal lines
- horizontal herringbone pattern
- watery effect
- vertical lines (describe the color) \_\_\_\_\_
- most of screen is blacked out
- all of the screen is blacked out
- other (describe) \_\_\_\_\_  
\_\_\_\_\_

c. The interference pattern is (circle one):  
(horizontal)    (vertical)    (diagonal)

9. a. Was a service representative called:

Yes     No

b. If yes, were suggested modifications made?

Yes     No

Please explain (be specific) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

10. a. If a radio transmitter is involved, was the operator contacted?

\_\_\_\_ Yes      \_\_\_\_ No

b. If yes, what was the result of that conversation?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

c. Were suggested transmitter modifications made?

\_\_\_\_ Yes      \_\_\_\_ No

Please explain (be specific) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

11. a. Are any of your neighbors experiencing the same type of interference?

\_\_\_\_ Yes      \_\_\_\_ No

If yes, on a separate sheet, indicate their names, addresses, and type of equipment receiving the interference (TV, AM/FM radio, electronic organ, etc.).

b. Was the information provided in this brochure shared with your neighbors?

\_\_\_\_ Yes      \_\_\_\_ No

If yes, please explain what modifications were made to their equipment and if the modifications eliminated or reduced the level of interference. (Use separate sheet if necessary.)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

12. Give any other pertinent information which you feel will assist in analyzing your interference problem.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Please leave the following space blank. (For use by manufacturer, dealer, or DOC District Office.)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

