

# CHAPTER 15

## Radio Frequency Interference

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## Interference & Suppression

### Front-End Overload, Cross-Modulation

•What is meant by receiver overload? **Interference caused by strong signals from a nearby transmitter**



•What is one way to tell if radio frequency interference to a receiver is caused by front-end overload? **If the interference is about the same no matter what frequency is used for the transmitter**

•If a neighbour reports television interference whenever you transmit, no matter what band you use, what is probably the cause of the interference? **Receiver overload**

•What type of filter should be connected to a TV receiver as the first step in trying to prevent RF overload from an amateur HF station transmission? **High-pass**

•When the signal from a transmitter overloads the audio stages of a broadcast receiver, the transmitted signal: **can appear wherever the receiver is tuned.**

## Front-End Overload, Cross-Modulation

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- Cross-modulation of a broadcast receiver by a nearby transmitter would be noticed in the receiver as: **the undesired signal in the background of the desired signal**
- What is cross-modulation interference? **Modulation from an unwanted signal is heard in addition to the desired signal**
- What is the term used to refer to the condition where the signals from a very strong station are superimposed on other signals being received? **Cross-modulation interference**
- What is the result of cross-modulation? **The modulation of an unwanted signal is heard on the desired signal**
- If a television receiver suffers from cross-modulation when a nearby amateur transmitter is operating at 14 MHz, which of the following cures might be effective? **A high pass filter attached to the antenna input of the television**
- How can cross-modulation be reduced? **By installing a suitable filter at the receiver**

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## Intermodulation & Key Clicks

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If someone tells you that signals from your hand-held transceiver are interfering with other signals on a frequency near yours, what may be the cause? **Your hand-held may be transmitting spurious emissions**

If your transmitter sends signals outside the band where it is transmitting, what is this called? **Spurious emissions**

What problem may occur if your transmitter is operated without the cover and other shielding in place? **It may transmit spurious emissions**

A parasitic oscillation: **is an unwanted signal developed in a transmitter**

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## Intermodulation & Key Clicks

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Parasitic oscillations in the RF power amplifier stage of a transmitter may be found: **at high or low frequencies**

Transmitter RF amplifiers can generate parasitic oscillations: **on either side of the transmitter frequency**

In Morse code transmission, local RF interference (key-clicks) is produced by: **the making and breaking of the circuit at the Morse key**

Key-clicks, heard from a Morse code transmitter at a distant receiver, are the result of: **too sharp rise and decay times of the carrier**

How can you prevent key-clicks? **By using a key-click filter**

In a Morse code transmission, local RF interference (key-clicks) is produced by: **Sparking at the key contacts**

Key-clicks can be suppressed by: **inserting a choke and a capacitor at the key**

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## Harmonics, Splatter etc.

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If a neighbour reports television interference on one or two channels only when you transmit on 15 metres, what is probably the cause of the interference? **Harmonic radiation from your transmitter**

What is meant by harmonic radiation? **Unwanted signals at frequencies which are multiples of the fundamental (chosen) frequency**

Why is harmonic radiation from an amateur station not wanted? **It may cause interference to other stations and may result in out-of-band signals**

What type of interference may come from a multi-band antenna connected to a poorly tuned transmitter? **Harmonic radiation**

If you are told your station was heard on 21,375 kHz, but at the time you were operating on 7,125 kHz, what is one reason this could happen? **Your transmitter was radiating harmonic signals**

Your amateur radio transmitter appears to be creating interference to the television on channel 3 (60-66 MHz) when you are transmitting on the 15 metre band. Other channels are not affected. The most likely cause is: **harmonic radiation from the transmitter**

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## Harmonics, Splatter etc.

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One possible cause of TV interference by harmonics from an SSB transmitter is from "flat topping" - driving the final amplifier into non-linear operation. The most appropriate remedy for this is: **reduce microphone gain**

In a transmitter, excessive harmonics are produced by: **overdriven stages**

An interfering signal from a transmitter is found to have a frequency of 57 MHz (TV Channel 2 is 54 - 60 MHz). This signal could be the: **transmission of the second harmonic of a 10 metre transmission**

Harmonics may be produced in the RF power amplifier of a transmitter if: **excessive drive signal is applied to it**

What causes splatter interference? **Over-modulation of a transmitter**

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## Audio Rectification etc.

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What sound is heard from a public address system if audio rectification of a nearby single-sideband phone transmission occurs? **Distorted speech from the transmitter's signals**

What sound is heard from a public address system if audio rectification of a nearby CW transmission occurs? **On-and-off humming or clicking**

How can you minimize the possibility of audio rectification of your transmitter's signals? **By ensuring that all station equipment is properly grounded**

An amateur transmitter is being heard across the entire dial of a broadcast receiver. The receiver is most probably suffering from: **cross-modulation or audio rectification in the receiver**

Cross-modulation is usually caused by: **rectification of strong signals**

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## Audio Rectification etc.

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What devices would you install to reduce or eliminate audio-frequency interference to home entertainment systems?

### **Bypass capacitors**

Stereo speaker leads often act as antennas to pick up RF signals. What is one method you can use to minimize this effect? **Shorten the leads**

Stereo amplifiers often have long leads which pick up transmitted signals because they act as:

### **receiving antennas**

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## Audio Rectification etc.

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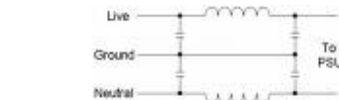
What device can be used to minimize the effect of RF pickup by audio wires connected to stereo speakers, intercom amplifiers, telephones, etc.?

### **Ferrite core**

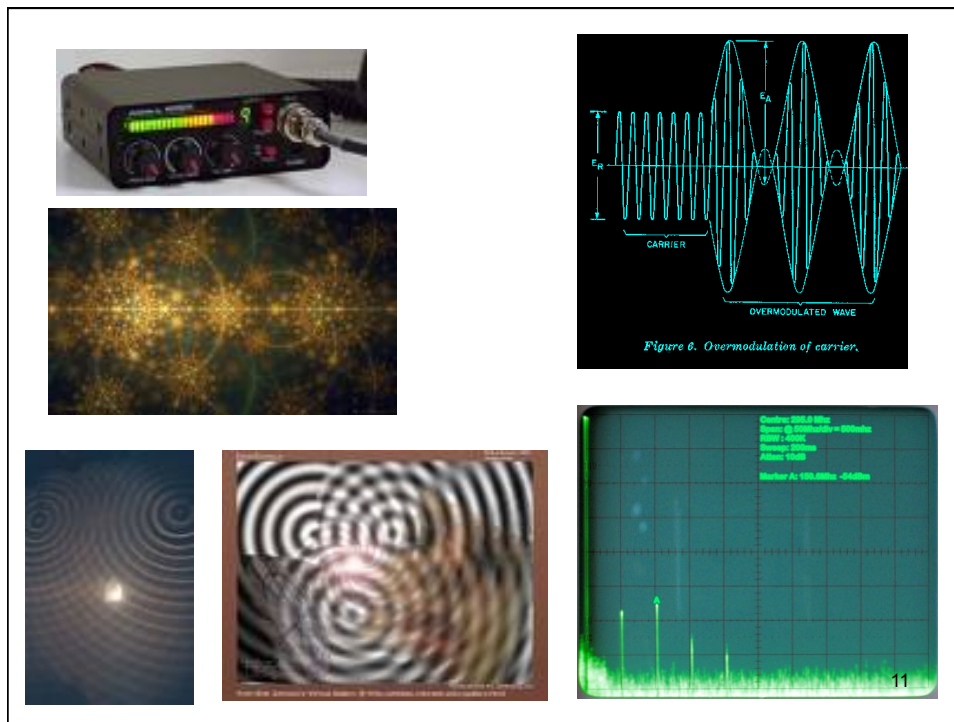
One method of preventing RF from entering a stereo set through the speaker leads is to wrap each of the speaker leads around a: **ferrite core**

What should be done if a properly operating amateur station is the cause of interference to a nearby telephone? Ask the telephone company to install

### **RFI filters**



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## Use of Filters, etc.

What type of filter might be connected to an amateur HF transmitter to cut down on harmonic radiation? **A low pass filter**

In order to reduce the harmonic output of a high frequency (HF) transmitter, which of the following filters should be installed at the transmitter? **Low pass**

To reduce harmonic output from a transmitter, you would put a \_\_\_\_\_ in the transmission line as close to the transmitter as possible: **A low pass filter**

Why do modern HF transmitters have a built-in low pass filter in their RF output circuits? **To reduce harmonic radiation**

What should be the impedance of a low pass filter as compared to the impedance of the transmission line into which it is inserted? **About the same**

A low pass filter suitable for a high frequency transmitter would: **attenuate frequencies above 30 MHz**

A high pass filter would normally be fitted: **at the antenna terminals of the TV receiver**

## Use of Filters, etc.

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- When considering filters remember

**High pass filters go on the receiver end**

**Low pass filters go on the transmitter**

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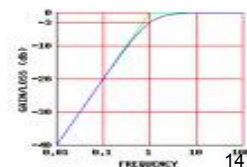
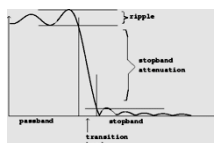
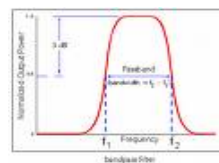
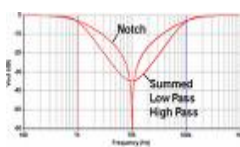
## Use of Filters, etc.

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What circuit blocks RF energy above and below a certain limit? **A band pass filter**

A band pass filter will: **allow only certain frequencies through**

A band reject filter will: **pass frequencies each side of a band**



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