

PLEASE READ BEFORE ATTEMPTING INSTALLATION OF YOUR MFJ-701 RFI-FREE CHOKE KIT

WHERE TO FIT

IMPORTANT, make sure ALL routes for interference are choked (for one remaining route could still allow interference). When the problem is solved it may be possible to remove some chokes from certain cables without re-introducing the interference. AC cords usually carry the most interference and should receive priority treatment. RFI-Free Chokes will be most effective installed as close to the equipment end of the cord as possible (the radio end instead of the AC connector plug end). It is here that the radio-frequency impedance will be the lowest. (See "Theory").

HOW TO INSTALL

Depending on the diameter and stiffness of the cable, RFI-Free Chokes can be used in various configurations, as pictured in photos A, B, C, D, E and F. To get the most effect, the greatest number of turns possible are needed or more chokes added. 8 turns should not be used unless interference is confined to the AM broadcast or CB frequencies.

- More than 7 turns, use 1 as in photo A. Note the way windings are arranged with the TWO ends as far apart as possible.
- 4 to 6 turns, use 2 as pictured in photo B, or if the problem remains make two chokes in a series as in photo F.
- 3 turns, use 3 as in photo B.
- 2 turns, use 4 as in photo C.
- For RIGID cable, use at least 6 as in photo D.
- For RIBBON cable fold cable as in photo E.
- When installing the RFI-Free Choke Kit make sure that no dirt gets in between the mating of the two u-cores.
- In cases of multiple use RFI-Free Chokes have been designed to snap together (as in photos B, C, D and F).

TROUBLE SHOOTING

Unless the interference problem can be made to happen on demand, it may be difficult to cure. It is easier to work with a simple problem. Complex problems can often be simplified by unplugging things: for example, remove as many components as possible from the system and start adding each component back one at a time after each test is made, adding a choke where necessary when interference reappears.

THEORY

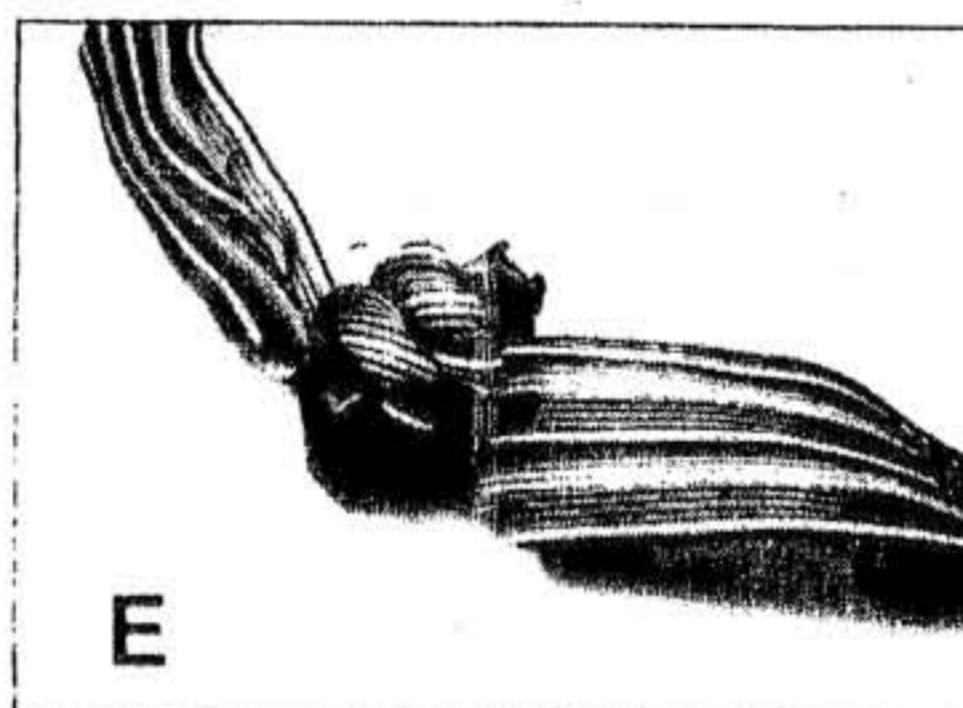
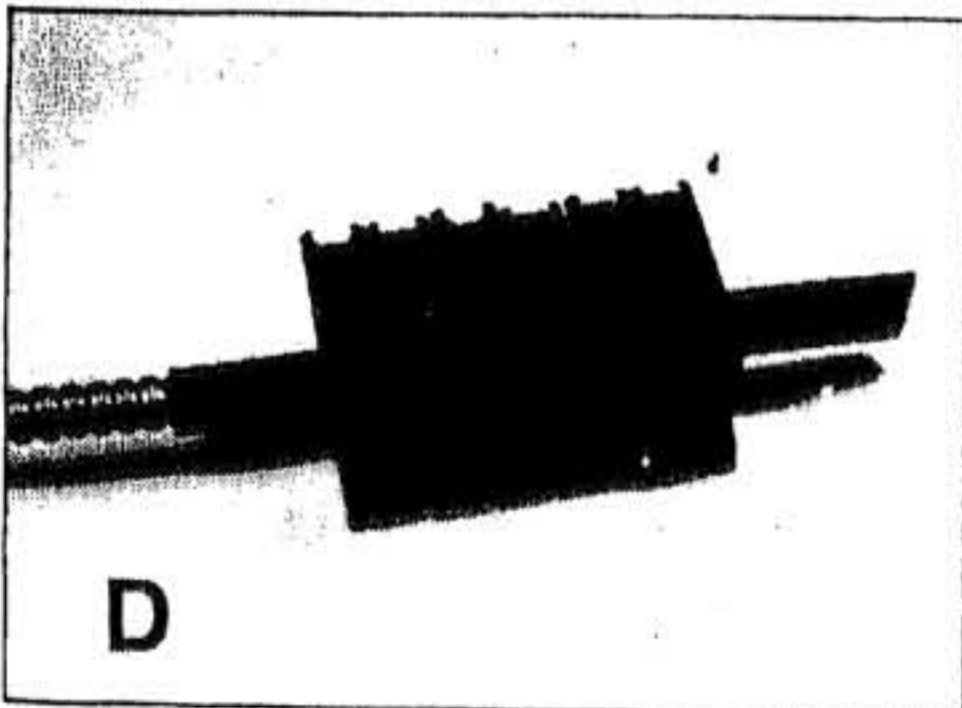
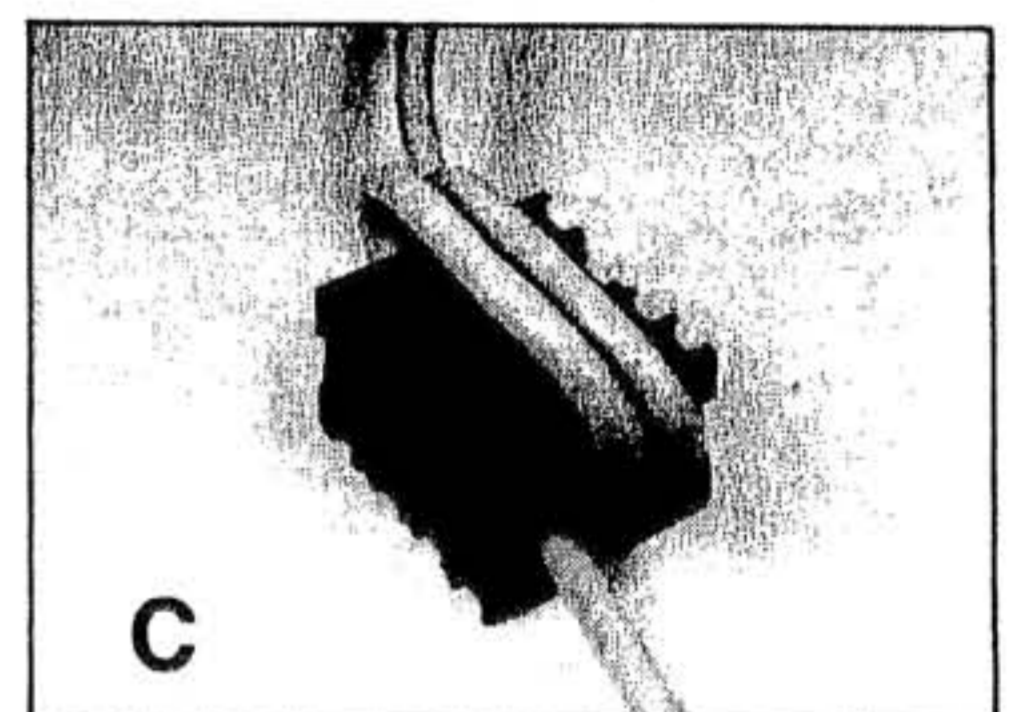
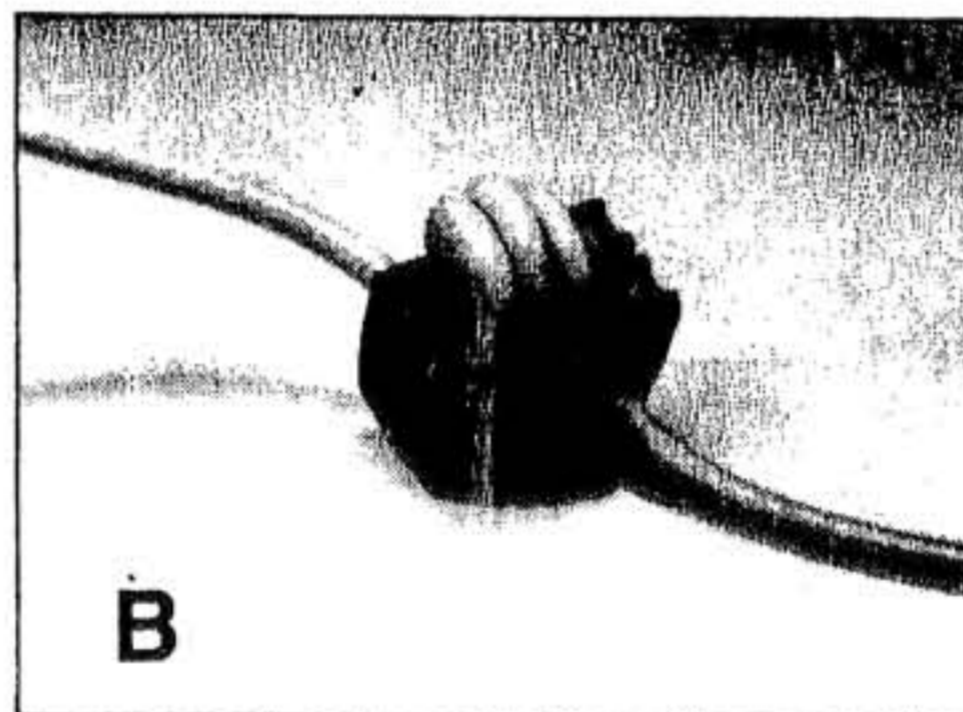
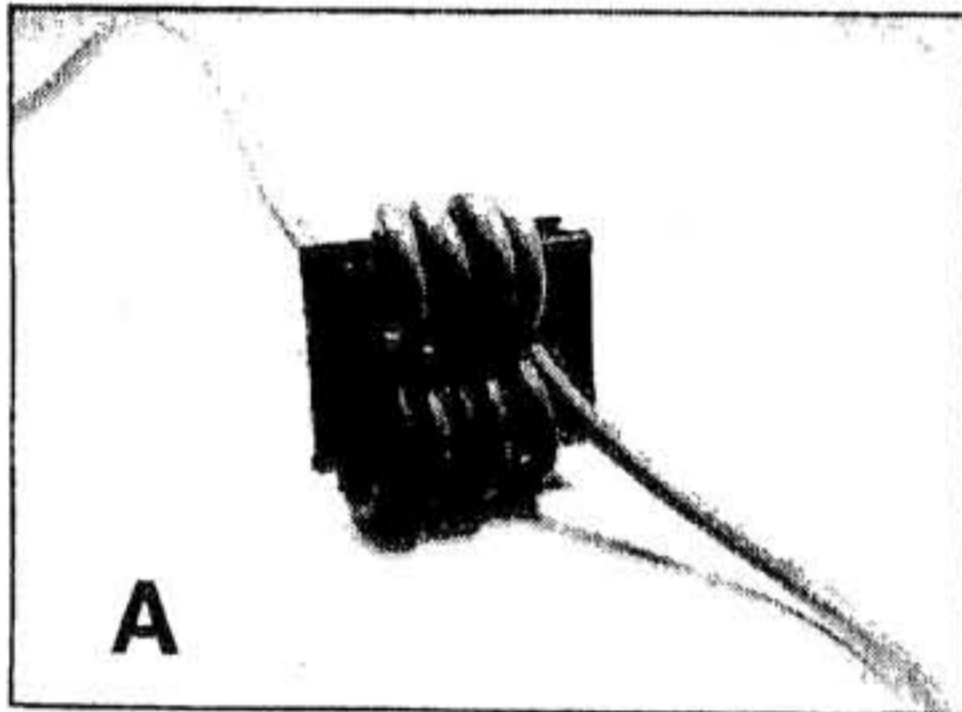
In a multicore cable, common-mode currents are those that are not balanced by an equal flow in the opposite direction within other cores of the same cable that is, they return by some external route. It can be said that they are outside currents rather than inside. Cables act as antennas to transmit or receive outside currents and outside currents are easily coupled to the inside currents of electronic equipment. The common-mode choke works by providing a high impedance to these outside currents. Chokes have the greatest effect where the circuit impedance is lowest. At radio frequencies there are places of low-impedance at intervals of half a wavelength along a cable. There is usually a low-impedance point right next to the equipment box (radio, computer, etc.) and it is here that a RFI-Free Choke should be installed. Typically, an RFI-Free Choke on a long cable needs to introduce a loss of at least 10dB measured in a 50 ohms circuit. For short cables that loop between boxes a smaller loss may be sufficient, all the use of fewer turns or fewer cores.

OTHER WAYS TO SOLVE INTERFERENCE

Currents that are balanced by an equal flow in the opposite direction are called differential mode. They can cause interference and are not affected by common-mode chokes. There will be some problems that cannot be cured by the steps outlined here. Conventional AC line, low pass and high pass filters, shielded cables or modification to the equipment may then be necessary instead of or in addition to the RFI-Free Choke Kit.

OTHER INFORMATION

In Canada and the USA literature is available from the Department of Communications (DOC) and the Federal Communications Commission (FCC) for free. This service is also available in many other countries. Amateur radio associations also have literature available for sale.



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IF FURTHER INFORMATION
IS REQUIRED PLEASE DROP
US A LINE OR CALL DIRECT
601-323-5869

"How to Eliminate RFI"

Usually the best location for the RFI-Free Choke is as close as possible to the point of entry of the cable to the equipment.


Typically the RFI-Free Choke Kit would be used on the following cables:

- Antenna cables
- Power cords
- Loudspeaker cables
- Microphone cables

- Test leads
- Multiconductor control cables
- Telephone cords
- Computer cables, including ribbon cables

Various methods of installation are illustrated in the data sheet enclosed with the RFI-Free Choke Kit.

APPLICATION

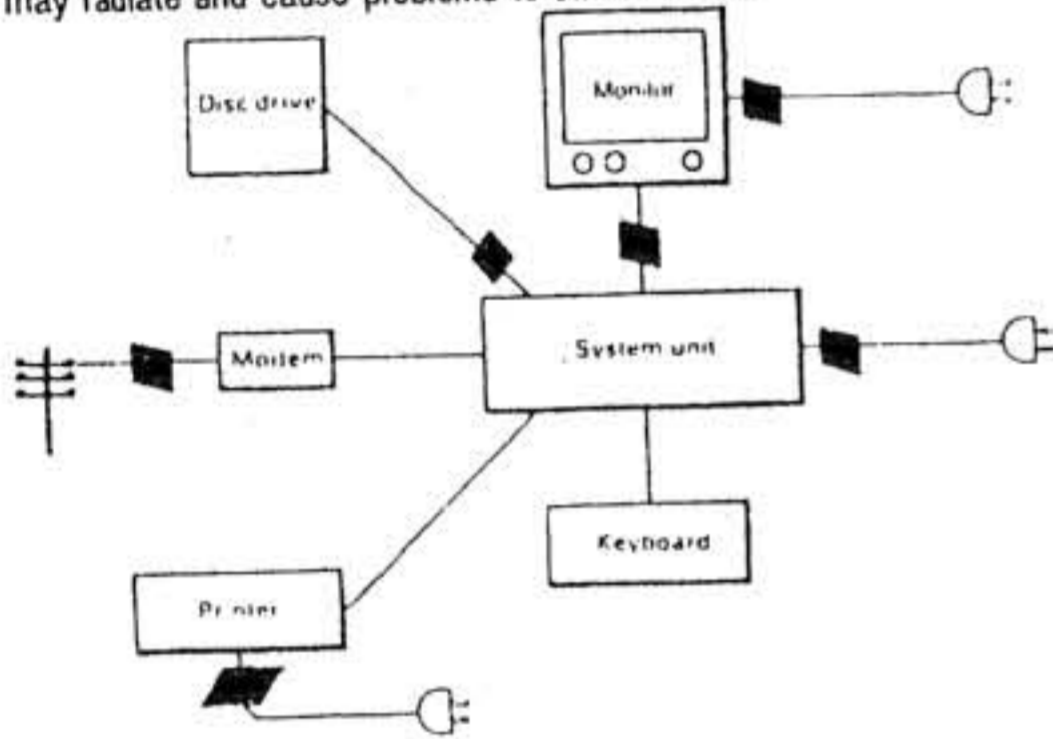
In the diagrams shown the symbol  denotes the recommended place to install a RFI-Free Choke.

• COMPUTERS

Emission may cause interference to broadcast and communication radios and television receivers. The susceptibility of the computer to outside interference may also result in data errors (particularly at the time of operation of switches or contactors).

Long cables that may act as antennas - particularly telecommunications and LAN cables - are prime candidates for RFI-Free Chokes.

Cables to VDUs and disk drives handle high data rates and may radiate and cause problems to other devices.



• PROCESS CONTROL

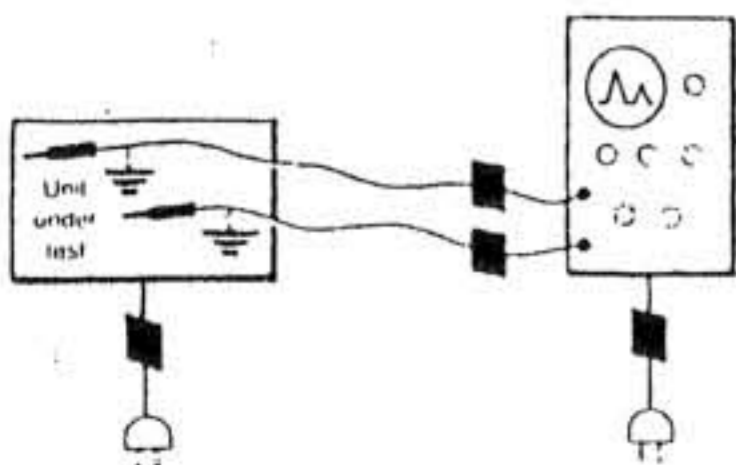
Process conditions have been distributed by hand-held radio transmitters used to commission or maintain plant because of inadequate common-mode rejection by the local controller electronics. A RFI-Free Choke should cure this problem.

Interference from switches, contacts and commutators in electrical machinery may often be reduced by a RFI-Free Choke around the AC line.



• INSTRUMENTATION

Test Equipment - particularly an oscilloscope, spectrum analyser or ATE - may suffer radio or impulsive interference onto its input leads due to earth loops. RFI-Free Chokes on test leads, power supplies and incidental connections will avoid loss of accuracy.



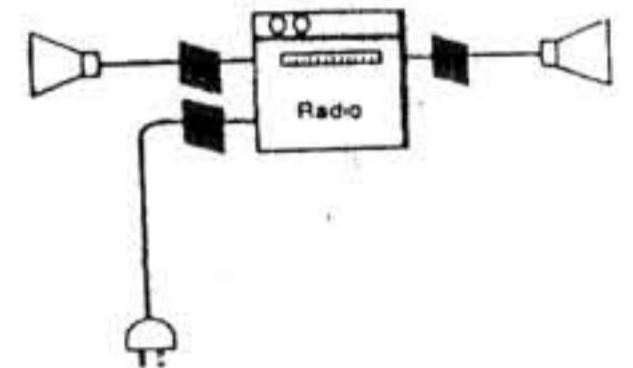
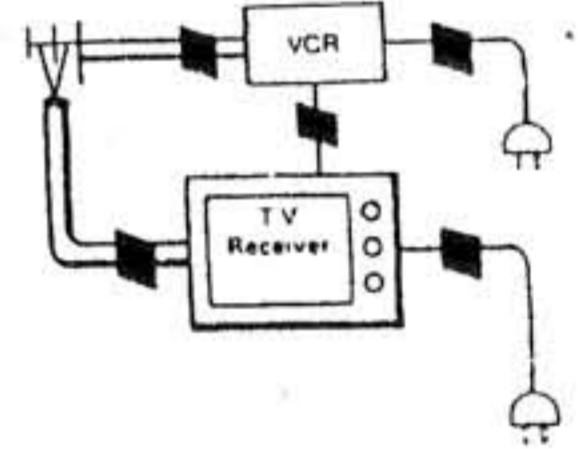
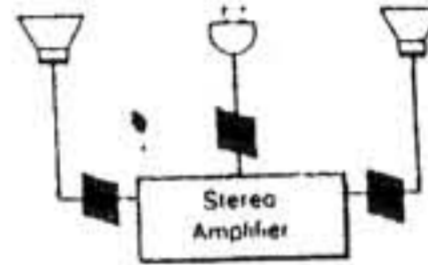
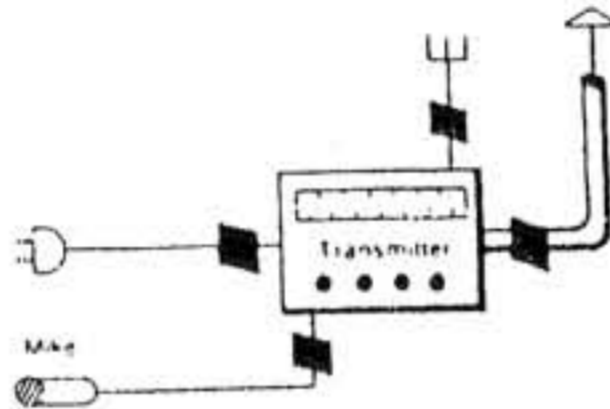
• WINDING DETAILS

Max. cable diameter (mm)
Max. number of turns

9.9	7.2	5.4	5.2	4.3	3.6	3.0	
1	2	3	6	8	10	12	14

• GENERAL

Power cables will not only act as antennas but also conduct interference directly from other equipment.

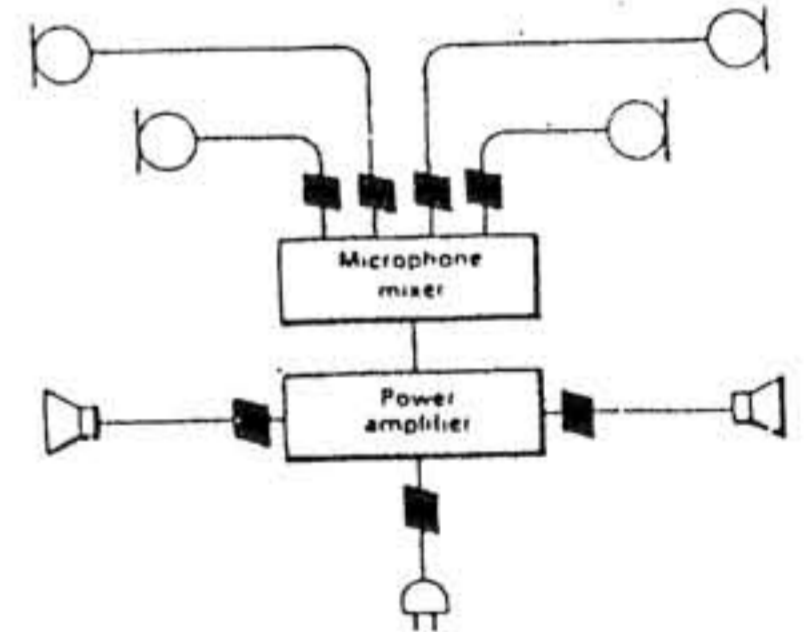


• RADIO TRANSMITTERS

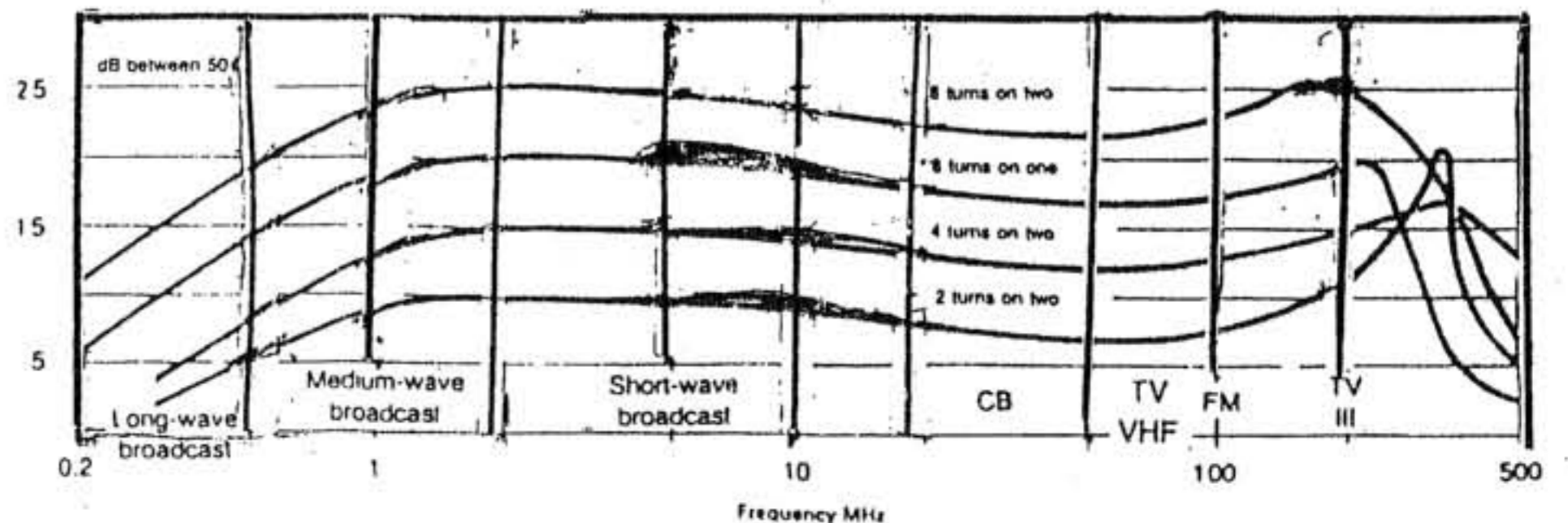
Interference may be caused by CB or amateur radio transmitters because of poor transmitting antenna balance or from radiation by interconnecting cables and the AC line. "FEEDBACK" to the microphone of a transmitter may give trouble if the operator is close to the antenna or has poor RF grounding. A choke will help cure these problems.

• AUDIO AMPLIFIERS, TELEVISIONS, RADIO AND STEREO SYSTEMS

The usual symptoms are breakthrough of mobile or broadcast radio, thermostat clicks, etc. If the induced signals are sufficient to overload the amplifier they will be rectified and any amplitude modulation thus made audible. The longest cables are generally the most vulnerable to pick-up. These will be the loudspeaker connections coaxial antenna or interconnecting component cables. For public address or stage sound systems the microphone cables should also receive attenuation and RFI-Free Chokes installed.



• ATTENUATION/FREQUENCY CHARACTERISTIC



• LOW-FREQUENCY PARAMETERS

Permitted unbalanced current flow: 8 ampere-turns (balanced current within the cable will not contribute to this limit, which is set by saturation of the core).