ANTENNAS FOR STANDARD BROADCAST STATION RECEPTION

A 86-1-2

GENERAL

The Commission has received many requests from radio stations as well as individuals requesting information regarding antennas for broadcast station reception of CONELRAD ALERTS.

OBJECT

This document describes various types of antennas and auxiliary equipment that may improve reception in fringe areas or may reduce co-channel or adjacent channel interference.

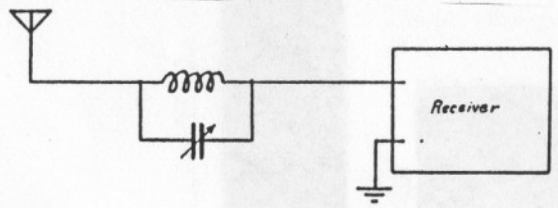
DISCUSSION

In all cases it is advisable to locate the receiving antenna as far from a source of interference (such as radio transmitters or transmitting antennas) as possible and to use coaxial or shielded transmission line to the receiver antenna terminals, as shown in Fig. 1.

If the receiver is used in close proximity to a radio transmitter it may be necessary to install the receiver in a shielding compartment, as indicated in Fig. 1, and to provide a shielded trap at the input to the receiver. Such a trap should resonate at the frequency of the interfering transmitter.

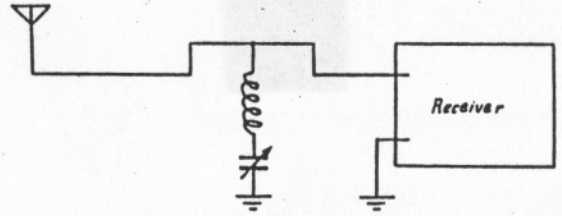
The trap may be of the type shown at "A"

"A"



or of the type shown at "B"

"B"



If the receiver has a high impedance input it will often be found that the trap connected across the receiver antenna and ground posts (type "B") will be superior for eliminating the undesired signal.

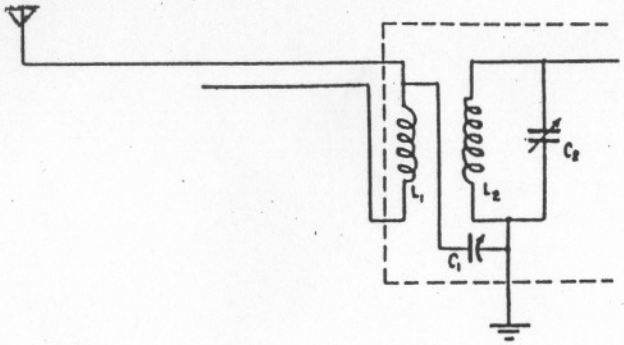
Traps, of course, are only suitable when the desired signal and the undesired signal are on different frequencies.

If the undesired signal is on the same frequency as the desired signal a directive antenna is usually necessary provided both stations are not in the same direction.

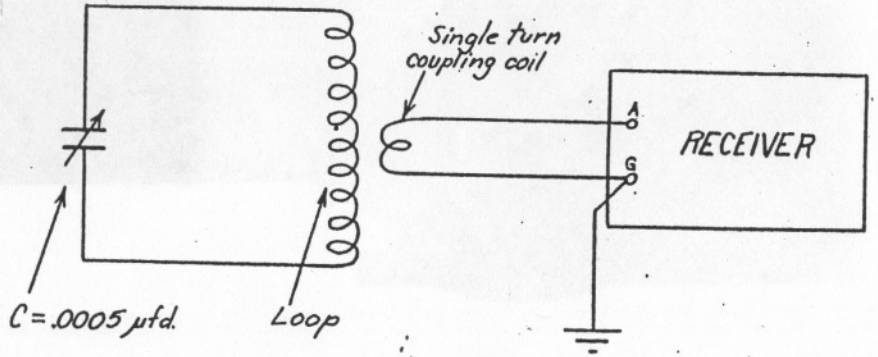
If the interfering signal has groundwave characteristics a loop antenna may prove suitable (see Fig. 2 for dimensions) by orienting the null towards the undesired station. If the interfering signal has skywave characteristics, a loop will not be as effective but might improve reception.

In cases where the desired signal is weak or where skywave interference is severe a "Beverage" antenna may produce a worthwhile improvement in reception (see appendix for details).

The "Beverage" antenna is probably the best antenna for standard broadcast reception where high gain and/or high directivity are necessary. It does, however, require considerable space and is costly.



The antenna can be a piece of wire approximately 80' long, supported in any convenient open location. The counterpoise should parallel the antenna about half the antenna length and spaced about six inches from the antenna. L_1 should be a broadcast high impedance primary coil, about 50 to 60 turns; C_1 is the "balancing" condenser and should be a small variable, probably 0.00035 mfd will prove suitable in most cases. L_1 should be inductively coupled to the tuned input circuit of the receiver. In use, the desired signal is tuned in by the input circuit, and the balance condenser adjusted for best reduction in noise. When properly adjusted, this circuit will make a very marked improvement in the signal to noise ratio.



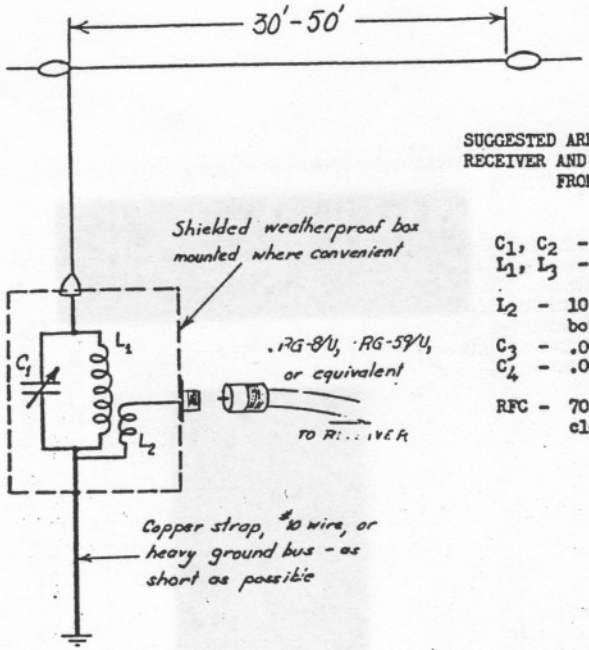
LOOP DIMENSIONS

13 turns #20 wire, wound on a square form 12 inches on a side, 1/8 inch spacing between turns.

COUPLING COIL

1 turn #20 wire, wound inside loop and spaced approximately 1 inch from loop winding.

Note: Lead from coupling turn to receiver may be short length of flexible, twisted wire.



SUGGESTED ARRANGEMENT FOR LOCATING RECEIVER AND ANTENNA AT A DISTANCE FROM EACH OTHER

C_1, C_2 - 350 mmfd variable
L_1, L_3 - 20 - 40 microhenry (broadcast band coil)
L_2 - 10 turns #26 around bottom end of L_1
C_3 - .005 600v ceramic by-pass
C_4 - .002 600v feed-thru type capacitor
RFC - 70 turns #18 enam. wire, closewound on 2½" d. form

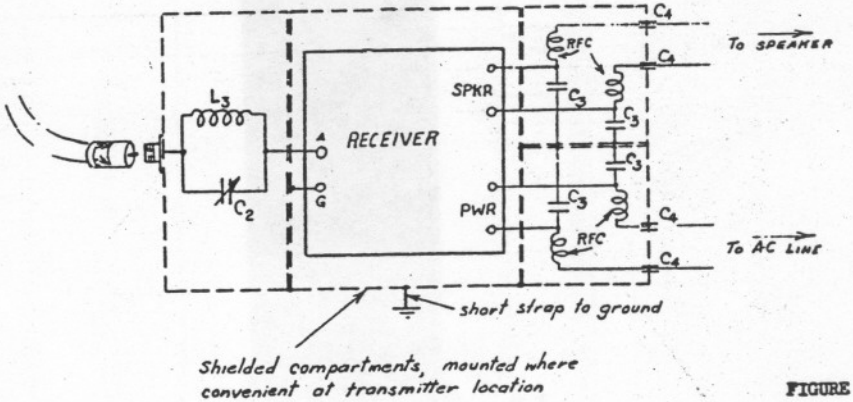


FIGURE 1

Vertical receiving antennas with properly tuned and phased reflectors and directors are a possibility for improving reception but the cost is usually prohibitive.

For an article on methods of noise reduction, see Proceedings of the Institute of Radio Engineers, March 1939, page 188, for a paper on "A New Antenna System for Noise Reduction", by V. D. Landon J. D. Reid. The authors suggest the following simple diagram as a typical circuit that is effective in the reduction of man made noise entering the receiver through the power cord.