

IMPROVING RECEPTION

by dr Buis

Back in 1975, I was 13 years old then, I got my first radio, it was a Grundig 3028.



Picture 1 Grundig 3028

Until then I would spend my free time after school like most kids playing football, this would all come to a change, I started listening to medium wave stations and very soon discovered that the stations playing the most interesting music were the illegal ones.

Besides from the famous offshore stations from the North sea I heard local pirates like Mabioko, Venus and later the famous radio Milano.

In order to improve reception I took a copper wire of approx. 150 feet, climbed as high as I dared in a tree, hung it up there and connected it to the antenna input of my Grundig valve radio, now all stations came booming in, especially at nighttime.

I still remember the endless hours of tuning and tuning all over the medium wave and hearing pirates from all over Holland with no problems of noise what so ever.

Back in those days nobody had a computer or any HF equipment and all my neighbors as far as I recollect used simple light bulbs, the very same that are now banned by European rules in order to save energy.

Problems started when my parents bought their first color TV, as soon as they switched the cursed thing on I heard an annoying humming QRM on all frequencies.

Late in the evening when they switched it off again I had a clear reception and could listen to even the weakest stations, there simply was no man made noise during nighttime.

Nowadays we're able to buy the best digital receivers for not too much money and still it's become a big challenge to catch those weak (pirate) stations because of the high noise level that occurs on all bands, this is mostly man made noise and it originates from computers, switching power supplies, DC fans, state of the art lighting systems and especially plasma TV sets, etcetera.

During my years of listening to pirates I have learned one or two things in order to improve reception, the challenge is now not to gain as much signal as possible but to GET THE BEST SIGNAL TO NOISE RATIO.

In this article I would like to share my knowledge on this subject with you and hope you will be able to improve your reception of the most interesting stations you can possibly hear, that's right free radio stations.

Rule number 1 75% of your reception is the antenna the other 25% is your receiver.

You may have bought an expensive SW receiver like a Kenwood R5000 or an NRD 535, and still you will not get better results with these receivers compared to cheap modern receivers like the K-PO, if you don't put any effort in a proper antenna you will never get good results. You will have to keep in mind that a good antenna with a cheap receiver will give you better results than an expensive receiver with a lousy antenna.

I did some amazing DXing with my Roadstar which I bought by Conrad for less than 70 euro using an indoor loop made of junk box parts.

Rule number 2 a low signal with no noise is better than a huge signal with a lot of noise

If you put up a very long wire in your backyard you will get huge signals into your receiver but you will soon realize that the strong stations come in stronger and the weak stations will drown in the background noise, so it's not that simple.

Even a good grounding system is not sufficient these days because of all the manmade noise.

It is much better to put an antenna system that picks up as less noise as possible, we have already learned that in current days man made noise is a major problem on the other hand obtaining a sensitive receiver for not too much money is quite easy.

All radio signals are basically made of both a magnetic and an electric component, hence the name electromagnetic waves, manmade noise behaves like a radio signal however that consists mainly of the electric component.

So in order to decrease the level of manmade noise we should use an antenna that picks up only the magnetic component of the radio waves, for that purpose a magnetic loop is the best antenna and it is widely used by DXers worldwide that live in crowded areas.

A magnetic loop for SW or MW reception is easily made, all you need is some wire, a wooden or plastic frame and variable capacitor 0-200pF or 0-500pF out of an old radio set. Picture 2 shows a loop for MW that I used with a cheap 2nd hand Grundig receiver, it is simple placed a behind the radio and the ferrite rod picks up the signal from the



loop. picture 2 MW loop on a wooden frame.

This loop has 6 turns, it is approx. 60x60cm, the variable capacitor is 2x300pF.

This antenna even works better with the well-known K-PO receiver which is quite sensitive on the MW band.



Picture 3
The K-PO with a loop in the living room

Picture 3 displays the K-PO with a loop on a wooden frame of approx. 90x40cm, with these dimensions I was able to put the receiver and the antenna on top of a cabinet in the living room.

But if you want to improve reception you might want to put up the loop outside on the roof or on your mast, for that purpose I have built several loops on PVC frames which is obviously more weather proof than a wooden frame, remember that no metal parts may be used in the frame.



picture 4 outdoor loop

Picture 4 shows a loop for outdoor purposes, the reception improved quite a bit compared to the loop inside the house, signals are cleaner with less noise.

BUT HOW DO YOU GET THE SIGNAL INSIDE THE RECEIVER? I have used twinlead 450ohm and the variable capacitor is place inside the house near the receiver an extra RF transformer (on a ferrite rod of an old receiver) is connected and taped on the back of the receiver near the ferrite inside the receiver.

Picture 4 also shows the vertical (helical) antenna that I have used for MW transmissions, it worked quite well for transmitting but for reception purposes it picked up too much noise and static.

To further improve reception I have built a loop of 2x2mtr on a PVC frame using 3 turns. After putting this antenna up on the roof reception was quite amazing, early in the morning I

could easily pick up signals from USA stations on 1620, 1660 kHz and even sometimes on

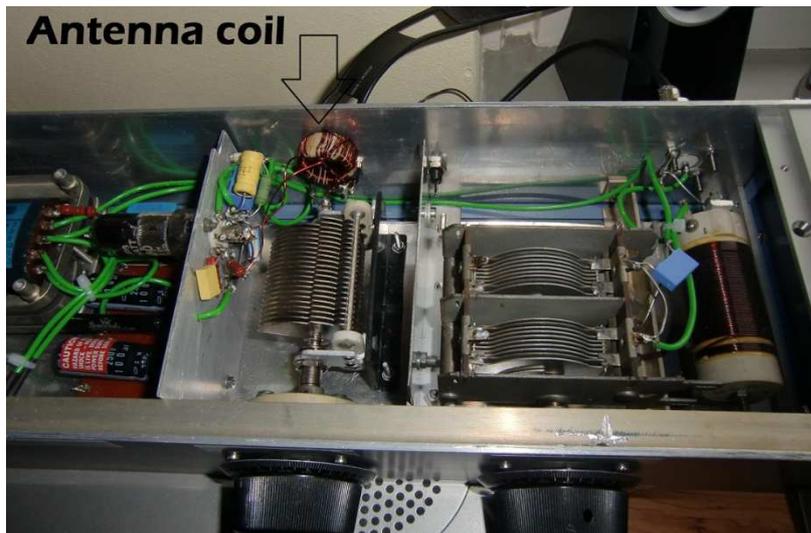


lower frequencies.

Picture 5 The 2x2mtr. Loop

If you don't have a receiver with a ferrite antenna but a communication receiver you should use an RF amplifier, I have used an RF amplifier with one valve EF80 connected between the loop and the receiver, it is very important that there is NO connection made between any part of the loop and the receiver for that purpose I use an RF coil on a ferrite core of 32mm with 22 windings primary and 5 windings secondary.

Basically this can be used for MW but also for SW reception, the higher the frequency the less windings you will have to use.



Picture 6 RF amplifier

Picture 6 shows the RF amplifier, notice the antenna coil and the variable capacitor on the left which are both fully isolated from the frame or ground.

Finally I have put up a loop of 1 turn 8x2,5m on the roof of my house, signals were really strong, but obviously I could not direct this loop since I couldn't move my house. Still reception on MW was amazing and I could use it for transmitting as well.



Picture 7 Huge Loop

Picture 7 shows the loop on top of the roof, both poles are made of fiber, no metal is used in order not to disturb the signals!

Reception can still be improved if you use a balanced RF input and a very small antenna inside your house that picks up more noise, the trick is now to add the "bad" signal into the RF amplifier 180 degrees turned so it will fully terminate the noise level, you can use a small antenna made of a couple of inches of wire inside your house and connect this wire via a variable capacitor of 30pF to one of the two sides of the twinlead, some testing and experimenting will be required. If you want to learn more about this technique please contact me at radiorowbox@hotmail.com

Dr. Buis