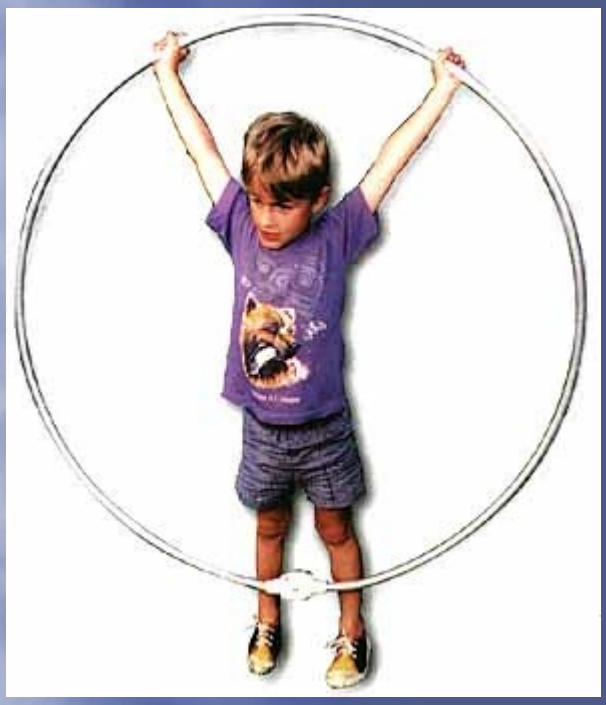
RADIO ACTIVE
February 1999 Tried & Tested

ALA 1530 active antenna



Mike Richards takes a close look at this very compact antenna system for listeners with limited space.

This fascinating shortwave antenna from Wellbrook Communications provides continuous coverage from 150kHz right through to 30MHz making it an ideal antenna for the short wave listener.

It's also extremely compact with an overall diameter of just 1m. With such wide coverage from such a small antenna, you can be forgiven for wondering why everyone doesn't use one!

As well as reviewing the ALA 1530, I'll try and give you an insight into the pros and cons of active antenna systems such as this.

Now to most listeners an antenna in its simplest form is just a length of wire strung-up as high as possible and connected to the receiver. The important bit for best reception is the length of the wire. If you've looked at antenna designs you will know that there are a myriad of different systems ranging from the simple long wire through various dipoles to some really wild and complicated systems.

When building a home-made antenna system you are usually stuck with a very limited space, so the wire's usually just as long as you can manage. If you're using the popular long wire antenna you might be surprised to hear that the correct length for the wire is at least a wavelength long at the lowest frequency you want to receive. If that's 1.8 MHz it would need to be 160m long - hardly practical in the average back garden! Although this is an extreme example, it remains true that few of us can erect a properly dimensioned wire or passive antenna in our garden. It's this simple fact that has created a market for what are known as active antenna systems.

One of the fundamentals of antenna design is the need to match the antenna with the input of your receiver. In most cases this means

matching to a 50 Ohm impedance. When the matching is correct you get the maximum transfer of that precious signal from the antenna to your receiver. Whilst this matching is comparatively easy with a full size antenna, short antennas are notoriously difficult to match. As a result, most domestic wire antenna systems only manage to transfer a small proportion of the available signal to the receiver.

If you try and build a really compact antenna i.e. a 1m loop as used for the ALA1530 or maybe a short whip, you can be faced with a very difficult matching problem. The solution used by 'active' antenna designs is to employ a special amplifier to provide the impedance matching and some useful extra gain. It's the use of an amplifier circuit that gives this type of antenna its 'active' title. There are lots of active antenna designs around from simple whips to all manner of variations on the loop principle.

Now you don't get 'ought for nought', so what are the disadvantages of these attractively compact active antennas. The main problem is the degradation in the receiver's overload performance. You will usually find that the overload performance of most active antennas is somewhat worse than that of your receiver. Although this may seem very serious at first, the impact of this deterioration rather depends on whether or not there are any particularly strong signals near you. i.e. a local transmitter. However, if you live in the clear, this degradation may well go completely unnoticed.

There can also be problems with the introduction of noise into the system However, this is usually minimal as the noise levels on the HF bands are generally much higher than that caused by the receiver and active antenna.

Now you may well be thinking... okay, but how can a tiny 1m loop receive anything like the same signal levels as a full size dipole? The answer is it can't, but the difference is surprisingly small. A quick look at some basic theory shows that the smallest or simplest antenna would be a point source. Now if you look at the theoretical advantage of a properly matched full size dipole over a point source it comes out at just 2.5dB more. Converted to a ratio, that equates to just 1.8 times more signal - not a lot really! As active antennas are somewhat larger than a point source the real difference is even less and often barely perceptible.

Now one of the key points in the design of the ALA 1530 is that it's described

as a magnetic loop antenna - so what's the significance of the magnetic bit? To understand this we need to take a brief look at the composition of a radio signal. The radiated signal from a transmitter comprises an electromagnetic wave that travels through the atmosphere to the receiver. The important point to note is that the wave has two clear parts, namely an electric field and a magnetic field that's why it's called an electro-magnetic wave. Both of these fields travel through the

atmosphere together and carry the same information.

Most conventional wire antennas work by capturing the electric field and passing it to the receiver. However, the ALA 1530 magnetic loop system largely ignores the electric field and takes its signal from the magnetic field. The main advantage of using the magnetic field is the ability to reject lots of locally generated electric noise. Another advantage of the magnetic loop is a very wide frequency response so there are no complicated antenna tuning systems required. This is due to the fact that the current induced into the loop is proportional to the field strength and not the frequency. Yet another advantage of the loop is the fact that it's designed to be used close to ground level. This makes it really easy to install and ideal for those with very limited space.

The ALA1530 was delivered ready-built in a large package - the postman will curse you if you buy one! Unpacking was dead easy and revealed the basic antenna unit. antenna interface, power supply, patch lead and full instructions.

The antenna was very well built, comprising a 1m diameter aluminium loop with a uPVC amplifier box at the base. This was epoxy resin filled, so providing a very rigid and waterproof assembly. I mounted the antenna on a simple wooden base and placed it on the ground on the back lawn. Making the connection to the receiver and interface unit required a 50 Ohm coaxial feeder with BNC connectors at each end. At the receiver end this feeder connects to the antenna interface which subsequently links to the receiver. Before you can really get going you also need to connect up the supplied 12 volt power unit. That was all there was to it!

Choosing a location for the ALA1530 does require a little thought as it needs to be at ground level and ideally 6m away from any surrounding building. The antenna does have some directional characteristics which can be used to help further reduce any local noise pick-up.

Checking the performance of an antenna system is always a rather subjective process as the HF bands are in a state of constant change. For the sake of this review I compared the performance of the loop with a simple random wire system around 20m long with a long wire balun, but erected rather too close to the house and in particular the TV antenna. I figured this was fairly typical of that used by many listeners. The ALA1530 was mounted according to the manufacturer's instructions, some 6m from the house on the back lawn.

On powering up I immediately noticed a much lower noise level than I had been used to with the random wire system. To measure this I used the receiver's S meter to check the noise levels at various frequencies

throughout the antenna's usable range. This confirmed my initial thoughts and showed that the noise floor with the ALA1530 was up to 5 S points better than the random wire antenna. This was a stunning improvement and certainly made me rethink my own antenna set up! A check of the received signal strength showed very similar results between the two antennas. The simple result of this is that with this test set up the ALA1530 produced by far the best results with significantly cleaner signals. I was also fortunate in not suffering from any local transmitting stations to compromise the overload performance.

I have to say I was very impressed with the overall performance of the ALA1530 and would seriously consider using one myself. It really is absolutely ideal for anyone who doesn't have the space for full size wire -antennas.

The ALA1530 is available in the format reviewed with an aluminium sheathed loop at £119.95. Alternatively the polythene sheathed version is available at £109.95. If you're really stuck for space there's even the ALA2000 indoor version at £89.95. The post and packing charge for all three loops is free for UK and Irish Republic, and £20 outside the British Isles. For more details or **to order** your antenna contact
Wellbrook Communications at The Farthings
Beulah
Llanwrtyd Wells
Powys
Wales LD5 4YD
UK
Phone 01591 620316.

My thanks to Wellbrook for the loan of the review model.

Radio Active Rating **** Absolutely ideal for anyone who doesn't have the space for full size wire antennas.

The ALA 1530 Review featured in the February1999 edition of Radio Active and is reproduced here by kind permission of Radio Active - see their Web site for details of back copies. Prices mentioned may alter.