

NEW ALA1530LN MAGNETIC BROADBAND ACTIVE LOOP ANTENNA

50kHz to 30MHz

**New Ultra Low Noise Figure JFET Design
with a 6dB gain boost above 10MHz**



The **ALA1530LN** is a compact Active Magnetic loop antenna primarily designed to provide improved performance over conventional passive and active antennas. This antenna is the only 1m dia. loop in production to use an ultra low noise JFET design. The loop has recently had a significant design change to improve LW/MW and SW reception. The ALA1530LN has been engineered to increase the LW and MW signal to noise ratio s/n by up to 10dB and provide an increased s/n and gain on the HF bands. The LW and MW 3rd order IMD is now approx. 20dB lower. This being a combination of reducing the gain a little and the lower IMD of the JFETs. Over the last 18 years the ALA1530 range of loops has redefined the active antenna market place; by affording the user the possibility to reject locally radiated and mains borne noise and still provide improved sensitivity compared to larger antennas. 1m dia. Aluminium loop is designed for outdoors, even at ground level. The loop has a frequency range from **50kHz to 30MHz** and matches directly to the receiver. The past 10 years has seen the ALA1530 become the premiere active loop antenna for the Radio Enthusiast, Government Monitoring and Broadcast organisations.

The amplifier is fitted in a separate module to reduce mechanical stress and facilitate easy replacement. The base of the loop is now reinforced with an acetal rod to minimised damage due to weather extremities.

The new ALA1530LN is the second generation of this antenna and uses 8 very high gain JFETs in parallel push-pull with a Bipolar transistor cascode stage for extended bandwidth. Optimum noise-less transformer feed-back resulting in a ultra low noise figure.

- Balanced low impedance Magnetic loop with enhanced performance compared to shielded and Moebius loop types
- Ultra low noise JFET design with up to 10dB lower noise floor compared to conventional low noise loop amplifiers
- Ideally suited for SDR and gain optimised for MW DX
- Up to 30dB rejection of locally radiated and power-line noise compared to an active whip
- Figure of eight directivity and deep nulls to further reduce interference; Ideal for LW/MW with antenna rotator
- Very low intermodulation, ideally suited for North America where users can be close AM BC transmitters
- Rugged construction 1m dia, Aluminium loop, with Antenna Interface and a linear regulated power supply
- (UK, Europe, N.A. only)
- No tuning necessary or matching unit; No planning problems, works at ground level, can be camouflaged
- Separate Head Amplifier fits on top of loop to reduce mechanical stress and afford easy replacement.

This is no ordinary loop antenna

The ALA1530LN is the result of several years development spun off the design of the large aperture loop, the ALA100LN. Most Broadband loops work by the H or Magnetic Field inducing a current. This current increases with frequency to negate losses with the loop's series inductance. Hence, the loop tends to have a flat sensitivity versus frequency. Loop antennas are usually designed by connecting a low impedance, high gain amplifier to a single or multi-turn loop (shielded). This approach presents several problems:

1. Shielded Moebius and Multi-turn loops have too much capacitance or inductance and hence reduced HF bandwidth. A Moebius shielded loop has 4-5 x the inductance of the ALA1530LN loop thus limiting the loop current with 6-12dB roll off above 20MHz.
2. Optimum loop/amplifier power transfer occurs over a narrow bandwidth. Also the loop's radiation resistance is very small, meaning that it picks up little signal and hence requires an extremely low noise, high gain amplifier to provide optimum reception.

Wellbrook has solved the above problems by designing amplifier so that the very low noise of the loop's real resistance is mismatched to the input impedance of the low noise amplifier. Hence, reducing the amplifier noise floor by up to 10dB compared to more conventional low noise amplifiers. This can only be done with JFET amplifiers with a near to zero noise figure. The E-Field is cancelled out by virtue of the loop aperture being very small in terms of wavelength and the phase difference of the balanced loop output is 180 degrees.

MAGNETIC LOOP ANTENNA ADVANTAGE

Most active antennas are the whip type and respond mainly to the electric-field. The Magnetic Broadband Loop responds primarily to the magnetic-field, this ensures high rejection of nearby **electric-fields**. The intensity of the electric-field is usually higher than the magnetic-field when an antenna is close to interference sources such as TVs fluorescent lamps, mains wiring etc. Therefore, by rejecting the electric-field there will be a reduction in local interference compared to other types of active and passive antennas. Interference reduction is further enhanced by the deep nulls of the 'Figure-of-Eight' directivity pattern.

INTERMODULATION

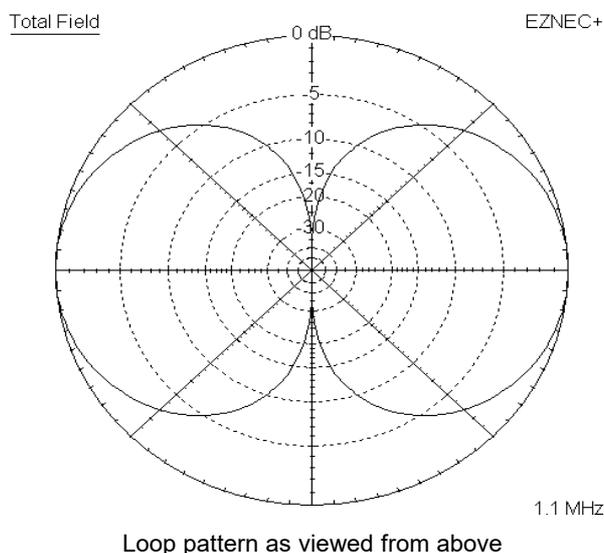
Some active antennas generate intermodulation products which can appear as spurious signals interfering with reception. This interference is usually second order intermodulation is caused by non-linearity in the amplifier, producing signals which are the sum and difference of strong Broadcast stations. The ALA1530LN Broadband Loop has been specifically designed to reduce intermodulation products to a minimum. The second order and the third order intercept points are typically **+100dBm** OIP2 and **+50dBm** OIP3 respectively. Thus the level of the intermodulation products are generally below the atmospheric and man made noise.

ANTENNA DESIGN

The Loop antenna consists of a rigid aluminium loop and uses 8 very high gain JFETs in parallel push-pull with a Bipolar transistor cascode stage for extended bandwidth. Optimum noise-less transformer feed-back dynamically drives the JFET source resistance to a fraction of an Ohm, resulting in a ultra low noise figure. The amplifier is encapsulated in resin and housed in a uPVC box, this ensures reliable operation in all weather conditions. The antenna provides low noise performance, large signal handling ability. Rejection of mains borne noise is accomplished by using a balanced amplifier so that the feeder does not form part of the antenna return path. The amplifier input is protected with high speed diodes.

The ALA1530LN is supplied with an Antenna Interface and a 12 volt regulated power supply. RG58C 50 ohm coaxial feeder cable is recommended for the antenna. The recommended maximum feeder length is 100m. A 1m coax. lead connects the Antenna Interface to the receiver. To realise to benefit of the improved s/n, the ambient local noise needs to be low too.

The ALA 1530 should be positioned approximately 5m away from any buildings.



TECHNICAL INFORMATION

Power consumption:	12 volts at 100mA
Amplifier Intercept point typically (MW Band):	OIP2 +100dBm, OIP3 +50dBm
Amplifier Noise Figure:	Approx. 0.2dB
Output impedance:	50 ohms BNC
Max. Field strength	400V/m or 1.0A/m pulse

Wellbrook Communications
The Farthings
Beulah
Llanwrtyd Wells, Powys
LD5 4YD



GB

www.wellbrook.uk.com

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Phone 01591 620316

E-mail: sales@wellbrook.uk.com

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