NEW FLG100LN

FLAG, KAZ ANTENNA AMPLIFER

Ultra Low Noise FET Design

100kHz to 30MHz

FLG100LN. The Flag Antenna Amplifier Model FLG100LN is designed to provide a high impedance match to a Terminated Flag or similar loop antenna whilst providing additional gain compared the more usual passive transformer 50Ω match.

The Flag and the KAZ Delta are probably the simplest uni-directional antennas available for amateur construction. However, some of these antennas have a relatively low output, hence, their performance can be limited by the receiver noise floor, therefore a high gain low noise amplifier is required to bring the signal to an acceptable level. Furthermore, where it is necessary to have a lengthy feeder run, common mode pick-up can degrade the antennas directivity. Thus the use of a high gain amplifier at the antenna will lift the signal level above the common mode signal ingress. However, it is also necessary to use an amplifier that also has high common mode rejection. This is achieved by using a balanced amplifier.

Another necessary requirement is to have a high antenna/amplifier to feed line isolation. If this is not done, the antenna can behave like an end-fed aerial with a significant loss in directivity, i.e. the feed line becomes the RF return path for the Antenna.

A key feature of the FLG100LN is very high antenna to feed-line isolation; this is equivalent to 10pF.

The FLG100LN has a very high gain of approx. 23dB, thus it is ideally suited for use with George Wallner's Double Half Delta loop (DHDL) and Neil Kazaros's Double KAZ Delta antenna (DKAZ). These type of antennas are effectively two loops run close together with a near 180 degree phasing. This done by having antenna twisted in the middle of the loop. The antenna pattern is very similar to a "cross-fire" phased array of two Flags. However, these antennas have a low output, hence the requirement for a high gain low noise amplifier.

The FLG100LN amplifier is based on the new low noise design of the Wellbrook ALA100LN Large Aperture Loop antenna. It uses 4 high gain JFETs in parallel push-pull cascode operation for extended bandwidth with optimum noise-less transformer feed-back resulting in a much lower amplifier noise floor.

FLG100LN FEATURES

- Very low IMD ensures good performance in presence of strong BCB signals
- Ideal for LW/MW DX and 160m Ham Band
- Antenna to feeder isolation equiv. to 10pF at 1.0MHz
- 23dB gain at 1MHz compared to Flag with a 800 to 50Ω Transformer
- Very high rejection of power-line noise and a high signal to feeder common mode ratio
- Improved antenna isolation compared to a single ended JFET buffer
- Supplied with Antenna Interface and a low noise 12 volt regulated PSU; Europe and N. A. only
- Compatible with the Wellbrook Array Phasing Unit
- Very low noise Figure. Approx. >1.0dB
- Can be used with EWE, Pennant, K9AY, KAZ, DKAZ and DHDL

FLG100LN ADVANTAGES

Correct operation of the Flag antenna i.e. maximum F/B ratio depends critically on the antenna being isolated from the feeder. Otherwise the antenna will behave as an end fed vertical with little or no directivity. Hence, a feed line matching transformer is required with a very low input/output capacitance. Also as the Flag antenna has a relatively low output, normally additional amplification is required at the receiver to bring the signal up to an acceptable level. However, in some installations common mode or feeder pick-up can degrade the antennas' performance. Therefore, if the additional amplification is at the antenna, then the signal output will far exceed any feed-line pick-up. Hence, there will be no degradation of F/B. The issue of feed line pick-up and low signal output can be of much higher importance with an end-fire Flag array where the array gain is lower than a single Flag. Hence, additional antenna amplification is a must for close spaced arrays.

INTERMODULATION

The **second order intermodulation** performance of a wideband amplifier is very important because sum and difference signals especially from high power AM BCB can produce **IMD** way before the **third order** IMD is noticeable. Most commercial wideband amplifiers generate quite high second order **IMD**. The FLG100LN has been specifically designed to reduce intermodulation products to a minimum. Hence, the second order and the third order intercept points are typically **+90dBm** (IP2) and **+49dBm** (IP3) respectively. Thus the level of the intermodulation products are generally below the atmospheric and man made noise.

ANTENNA DESIGN

The FLG100LN consists of an 800Oh matching/isolating transformer a high gain balanced broadband amplifier using 4 very high gain low noise JFETS. The amplifier is encapsulated in synthetic resin and housed in a ABS box, this ensures reliable operation in all weather conditions. The FLG100LN provides very low noise performance and a large signal handling ability. Rejection of power line/mains borne noise is accomplished by using a balanced amplifier and the input isolation transformer.

INSTALLATION

The FLG100LN Antenna Amplifier simply connects to the antenna using the two screw terminals. The user provided feeder cable connects to the Antenna Interface. The 12 volt regulated power supply (EU, UK and US only). Connects to the Antenna Interface. 50Ω coaxial feeder cable is recommended for the antenna. The maximum feeder length is 100m. The Antenna Interface feeds the 12 volt dc power to the antenna. A 1m coax. lead connects the Antenna Interface to the receiver.

Flag, EWE and K9AY Use:
Replace the existing antenna matching transformer with the FLG100LN Head and fit the Antenna Interface/PSU at the receiver.

The FLG100LN should be positioned away from sources of interference such as fluorescent lights, TVs, computers and electrical wiring. In most cases satisfactory results can be obtained by vertical mounting the antenna about 1.0m above ground level and at least 20m from any buildings.

TECHNICAL INFORMATION

Power consumption:	12 volts at 100mA
Frequency coverage:	100kHz to 30MHz
Amplifier Intercept point typically:	2nd order +90dBm
(Test freq. 0.8MHz+1.0MHz)	3rd order +49dBm
Output:	50Ω BNC

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