Active Antenna Amplifier Kit is now available for purchase.
73, LZ1AQ

(http://active-antenna.eu/wp-content/uploads/2014/04/the-kit-product-7.jpg)

Active Antenna Amplifier (model AAA-1C)

87.00 €

The Kit

The amplifier kit consists of the following parts:

- Amplifier board (mounted and tested)
- Control board (mounted and tested)
- 6-pin Female connector for connection of remote control switches
- Plastic ABS IP55 protected box
- 3 mounting screws diam. 3.5 mm
- Load resistor 100 ohms / 2W
- Short service cable crimped with two RJ45 connectors
- Spare RJ45 shielded plug connector
- Spare RJ45 unshielded plug connector

In stock

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Description | **Terms of Sale**

Product Description

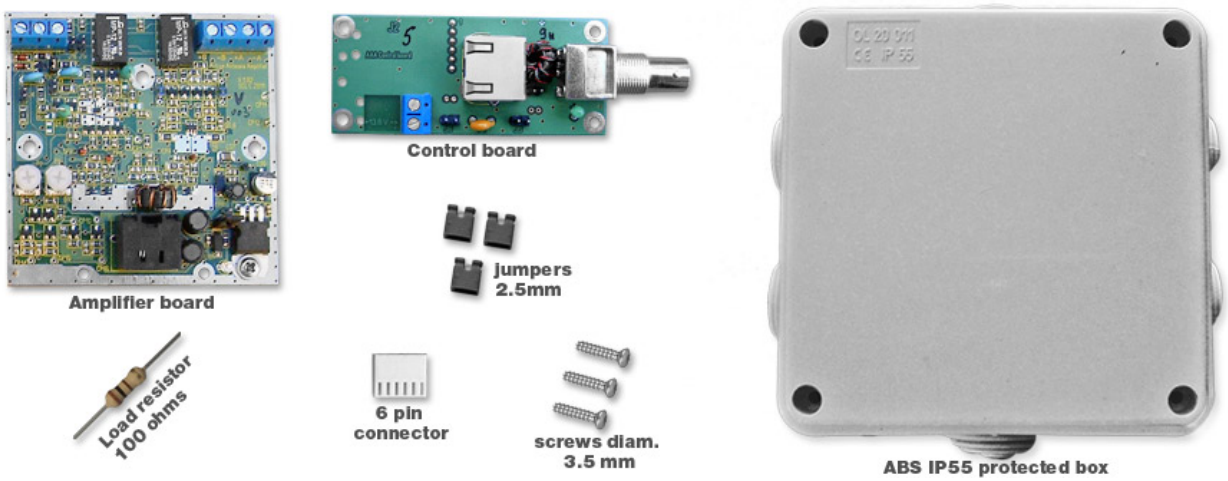
Minimal additional efforts are needed to complete this active antenna project. For more details look at the Active Antenna Amplifier Technical Section (http://active-antenna.eu/amplifier-kit/technical-documentation/).

This amplifier is intended for construction of small wideband active receiving antennas from LF to upper HF bands. The mechanical construction of the particular loop/dipole antenna must be performed by the user. This amplifier can use two separate small magnetic loops. These two loops are used also as two arms of a small electrical dipole. Thus 3 different antennas can be used. The amplifier has four remotely switched modes: Loop A, Loop B, crossed parallel loops A&B and dipole. Each mode can be switched immediately and this enables us to use the best antenna for the moment.

This kit consists of two SMD mounted PC boards – an amplifier board and a control board. The amplifier has low noise, high dynamic range and wideband properties. It has separate current and voltage amplifiers for the different antennas. It is a balanced design and uses monolithic pairs. The balanced power amplifier uses medium power BJT with very low IMD and can give approximately 75 mW of output power on a 50 ohms load in order to minimize the non-linear distortions. The small antenna frequency response in all modes is flat in a wide frequency range. Usable frequencies are from 20 KHz up to 55 MHz. The antenna gain in the current and voltage mode is set to be approximately the same to avoid striking differences in the gain when the antennas are switched. Every kit set has been tested.

Features

- 4 remotely switched modes (Loop A, Loop B, crossed parallel loops A&B and dipole)
- Each mode can be switched immediately
- Good sensitivity and a flat frequency response
- High dynamic range
- Protected input from strong signals
- High immunity to local noise with balanced amplifiers and balanced feed line
- Balun transformer coupling for common mode noise reduction
- Extensive documentation manuals with detailed description how to build your own small antennas



Control board and cable

The amplifier is connected to the receiver via a control box and an FTP (shielded CAT5E) cable with RJ45 connectors which ensure good balance to avoid common mode noise signals. The cable length can be above 100m. There is a possibility to limit the maximal voltage applied to the receiver input which is needed for some direct sampling SDR. The amplifier has jumpers for setting it to the particular environment. It is of SMD design and is mounted and tested.

Input

The amplifier input is protected from high electromagnetic field intensities – it can be used with magnetic and electric small antenna in the immediate vicinity (20 – 30 m) of transmitting HF antennas even if the power is 1 – 2 KW. The amplifier has input filters to reject the frequencies above 55 MHz to avoid the influence of strong stations in the broadcast FM band (80-108MHz).

Power & Other

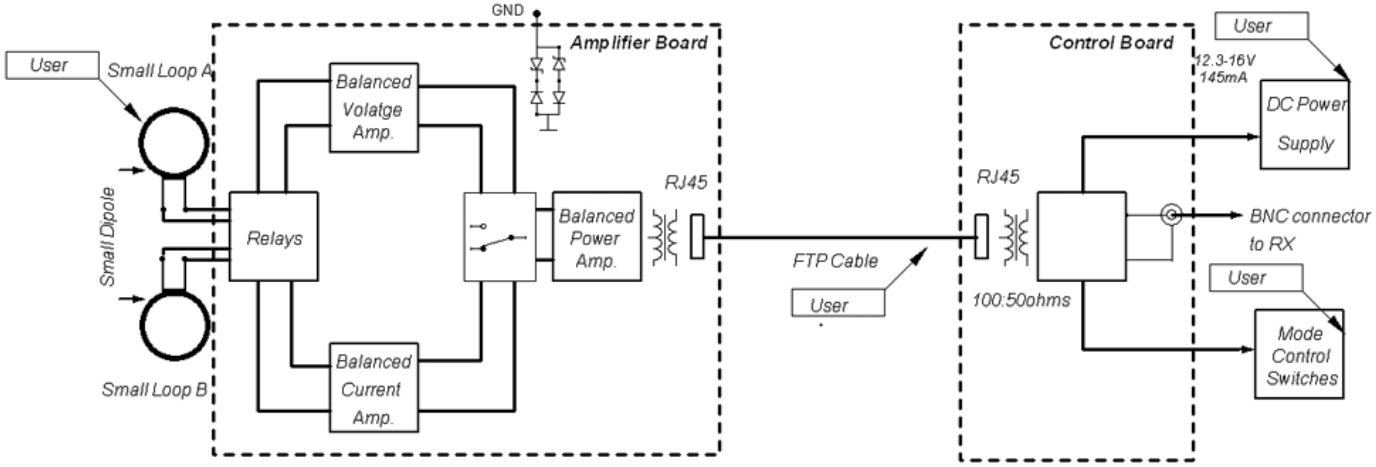
The amplifier is powered by a nominal 13.8 V (12.3 – 16 V margins) DC power supply @ 145 mA nominal current. The standard existing power supplies (PS) for the transceivers or receivers can be used. The amplifier is mounted in an ABS plastic (IP55 protected) box. It can be used with any receiver which has sufficient sensitivity and 50 ohms input impedance. This amplifier can be used as a building block for more sophisticated antennas such as phased arrays etc.

Tested parameters in production stage

- DC operating points
- Frequency response at 7 points. 0.1, 0.3, 1, 10 , 30, 50 , 100 MHz
- Output noise power
- 1 dB output compression point at 10MHz
- Second harmonic OIP2 at 3.680/7.360 MHz

This set of measurements assures that the amplifier has normal gain, frequency response, noise floor and dynamic range.

Block diagram. Two small loops act also as arms of a small vertical dipole



What the user should prepare

- Loop antenna
- FTP cable with crimped RJ45 plugs
- External DC power supply
- 3 switches for manual mode control or simple interface for PC control

Specification

General

Output impedance	50 Ohms, BNC connector on control board
Power supply(10)	External, 13.8 V, =< 145 mA Polarity protection & recoverable fuse are on the control board
Maximal output voltage	6V p-p or 4.2 V p-p
Physical size	76 x 76 mm Amplifier board; 32mm x76mm Control board

Current amplifier with 1m diam. loop

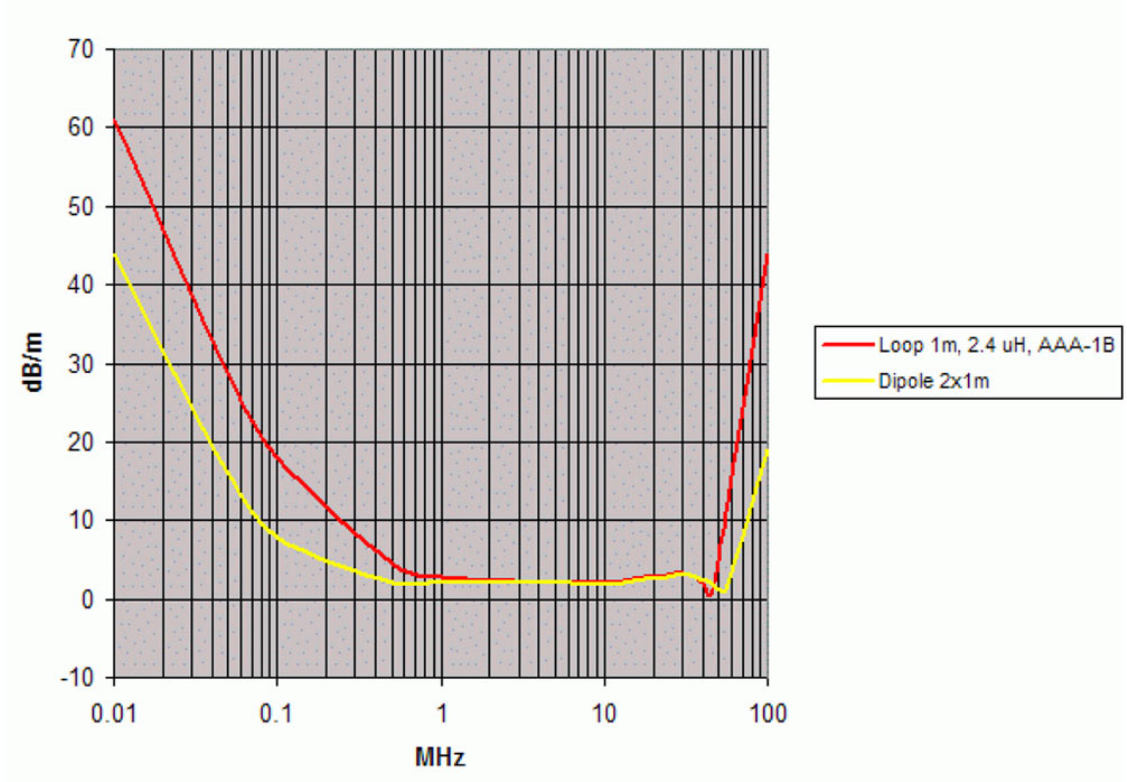
Loop	diam. 1 m, 1 turn, conductor with 25 mm diameter, 2.4 uH
Antenna Factor $\mathbf{K_a}$	2 dB meters^{-1} @ 10 MHz (1 uV/m input signal will give 0.8 uV output voltage)
$\mathbf{K_a}$ Frequency response	0.35 – 51 MHz; (within 3dB)
Usable frequency range	0.02 – 55 MHz
MDS @ 10MHz	0.5 uV/m, Noise bandwidth =1KHz
Output noise power at 10MHz	-116 dBm
1 dB output compression point	+19dBm (5.6 V p-p), equal to +125 dB(uV/m) at input
Second harmonic OIP2	+88dBm to +94dBm
Third harmonic OIP3	+41dBm to +42dBm

Voltage amplifier with dipole arms of 2 x 1 m

Antenna Factor $\mathbf{K_a}$	2 dB meters^{-1} @ 10 MHz (1 uV/m input signal will give 0.8 uV output voltage)
$\mathbf{K_a}$ Frequency response	0.35 – 55 MHz; (within 3dB)
Usable frequency range	0.02 – 55 MHz
MDS @ 10MHz	0.25 uV/m, Noise bandwidth =1KHz
Output noise power at 10MHz	-118 dBm
1 dB output compression point	+19dBm (5.6 V p-p) equal to +125 dB(uV/m) at input
Second harmonic OIP2	+94dBm to +103dBm
Third harmonic OIP3	+40dBm to +42dBm

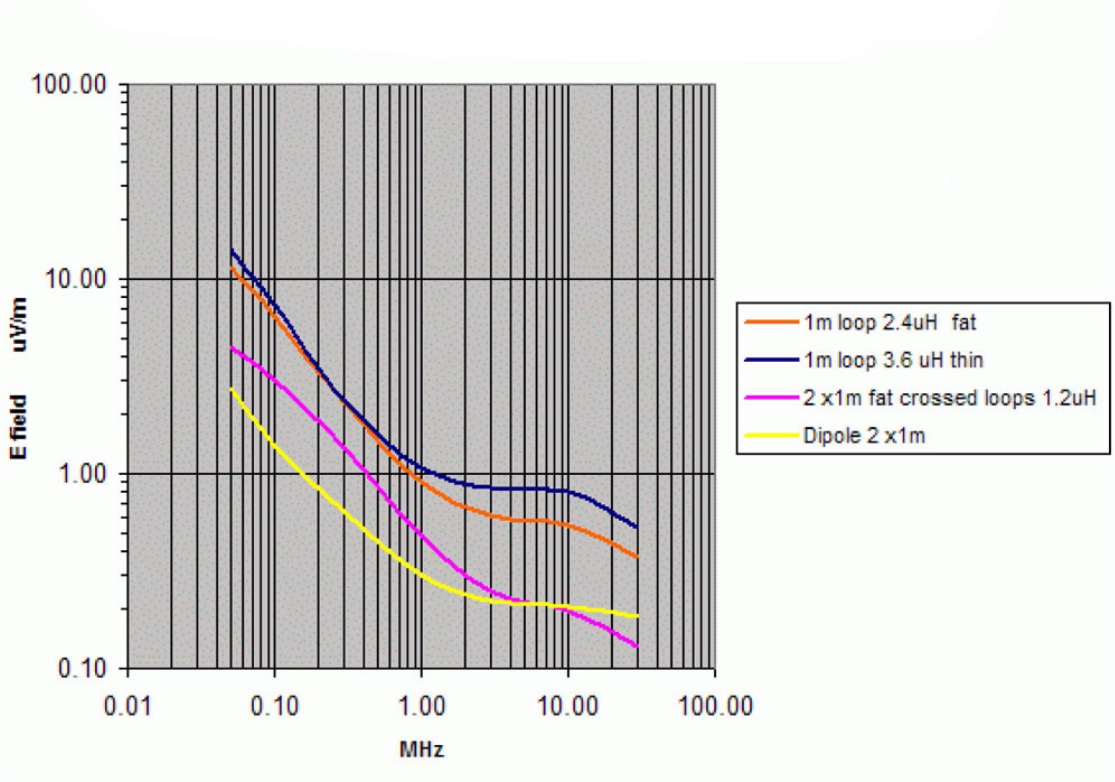
Charts

Antenna Factor K_a



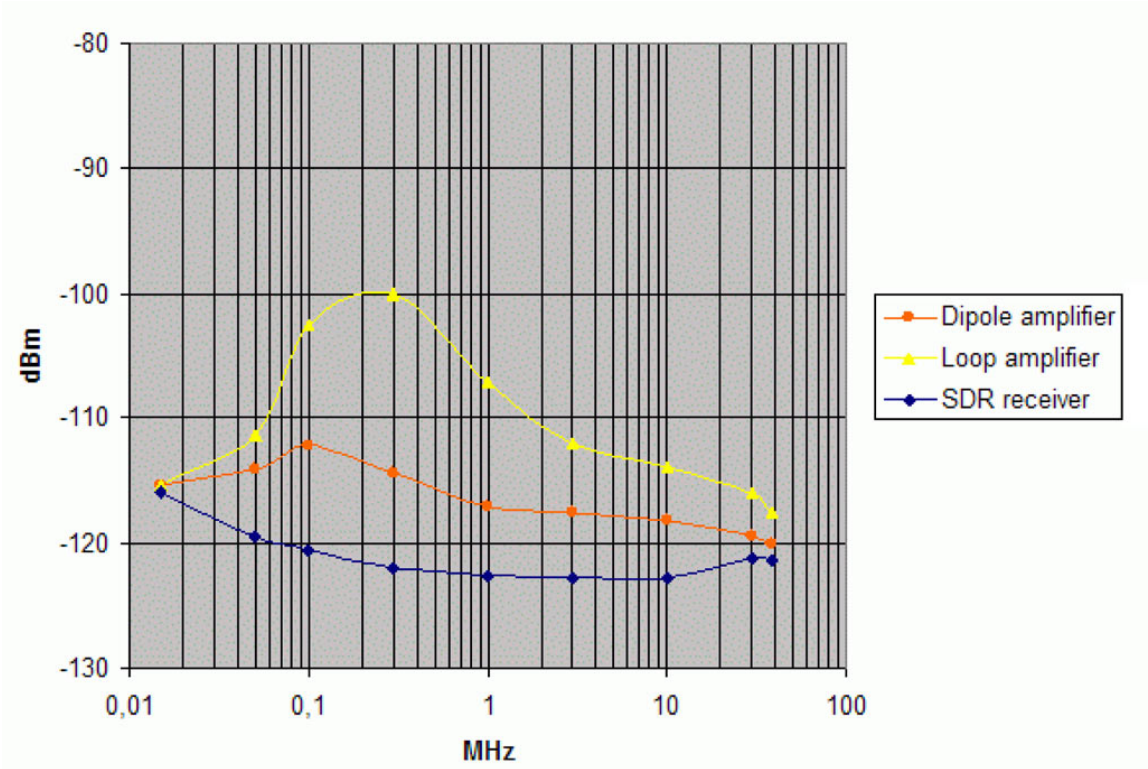
Spice simulated antenna factor **K_a** for loop and dipole. The circular loop is with single turn 1m diam. made with 25mm diam. alum. tube with 2.4 uH inductance. The dipole has two 1 m long arms – effective height is 1 m. .

Active Antenna MDS at 1 KHz BW – Spice Models



Spice simulated input minimal discernible signal (MDS) in [uV/m] for different antennas. The noise bandwidth is 1KHz. First two loops are 1m diam. single turn (thin and fat conductor). 2-crossed loops are loops with 1m diam. circular shape (1.56 m^2 total area), each with fat conductor. The dipole is with 2 arms of 1 m. See Antenna section for details. A small loop and dipole models are used which is acceptable up to 10 MHz. For higher frequencies the MDS values might be not reliable.

Measured Output Noise Levels AAA-1C



Output noise levels of the active antenna amplifier measured at 1 KHz bandwidth without antenna. The loop amplifier is measured with 2.4 uH equivalent loop inductance connected to the input. The dipole amplifier is measured with 10 pF equivalent dipole capacitance. The equivalent input noise level of a direct sampling SD receiver is given for comparison. Usually the commercial RX and TRX have similar or lower noise floor. This chart is useful to obtain information for the needed noise floor of the receiver which will be used with this active antenna. A practical rule is that the receiver noise floor should be at least 6 dB bellow the output noise level of the antenna amplifier.