

## SAMS – Symmetric Antenna Matching System – Short description



Frontview control unit

### Initial Position

Because of their many advantages, symmetric antennas are very popular in the field of amateur radio. However, these antennas often not only run at their designed frequency, but also cover whole frequency bands or even frequency ranges.

Physical limitations are governed by build-configuration and working frequency. Impedance can vary from a few ohms up to kilohms and is often afflicted with extensive blind spots.

The results are high **SWR** on the feeder, which is then run as open line feeder, so as to reduce the amount of **signal-loss**.

Today's transceivers and amplifiers are fitted with a 50 ohm coaxial connection. Therefore, there is a need for a matching unit for adjusting symmetry, impedance transformation, and compensation of reactance. The matching unit must be feeded with exactly 50 ohm.

Resolving these problems is often not practicable at the radio station. The same can be said for so-called automatic tuners, which are generally not designed for symmetrical antennas. Therefore, other solutions need to be made available.

### Solutions

A remote-controlled matching network is installed, externally at the feed-in point of the antenna or, respectively at the end of its open feeder line. The network guarantees antenna symmetry and impedance transformation to exactly 50 ohms unbalanced. This instrument is constructed for external mounting and is laid out for continuous high loading\* up to 2.5 KW. The matching range\* is configured from a few ohms up to and above 1000 ohms, as is the range of reactance.

*\*Note that the impedance adjustability of each network is dependant on frequency. Also, the maximum permitted load depends upon the matching ratio.*

The control unit is situated in the radio shack, enabling adjustment of all the components of the outdoor network. It can be manually or automatically operated (with optional automatic board) available initially for transceivers from Icom Ltd. Automatic antenna matching is purely frequency-governed, bringing great advantages, especially while receiving. The frequency grid is dependant on band and laid out from 20 to 200 kHz.

The control panel has 'left', 'right' and a 'fast' key for each adjustment unit and digital meters shows the current values of each unit for control and setting. There are switches for moving from manual to automatic mode.

In the automatic mode, the matching values per frequency can be fixed, using the 'set' key, these are automatically managed. There are 44 settings available for the chosen frequency grids, more can be provided if necessary.



separate weatherproof matching network

Using the keys Z1 and Z2, additional switching functions(e.g. enlargement of L/C or antenna switching) are possible.

The unit runs on 115 / 230 Volt AC. The lead line to the matching unit is conventional using a 15 pole, shielded cable. The control unit can be used without the matching network, e.g. for use in automatic logging of settings of a magnetic loop or for other self-builder projects.

*SAMS is a very real innovation for antenna matching. It must be noted however, that antenna matching is a very complex operation and many parameters have to be taken into consideration, especially when using high outputs. Depending on impedance, 30 watts can produce up to 5KV ! The performance parameters of the matching equipment are defined by the antenna and this must be considered in the planning of and use of the station.*