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End Fed Antenna

Operating Manual

version 1.1

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1 Why use an end fed antenna?

Years ago the end fed antenna was the most popular HF antenna type used by radio amateurs.

The Hertz antenna is an antenna with an electrical length of a half wavelength at its resonant frequency. It can be fed at the low impedance point at the centre as a half wave dipole or fed at the high impedance point at either end.

The end fed half wave antenna is a classic HF antenna. One of the earliest examples was the Zepp antenna where the half wave antenna was end fed by an open transmission line. It was originally used on Zeppelin airships in World War 1 as a trailing wire lowered from the airship while in flight.

The end fed half wave antenna appears in many professional and amateur radio textbooks and the design of the Cross Country Wireless End Fed Antenna matching unit is similar to that described in the 1939 edition of the "Electrical and Radio Notes for Wireless Operators" produced by the UK Air Ministry at the start of World War 2.

There are two main benefits in using an end fed half wave antenna over a co-ax fed half wave dipole.

The main one is that the antenna feed impedance is around 2500 ohms and very little RF current flows into the RF earth or counterpoise. In many applications the co-ax feed to the antenna matching unit will act as an efficient counterpoise. If used as a vertical antenna then it doesn't need an extensive set of earth radials to be efficient.

The second benefit is that the point of maximum radiation is half way along the antenna. If the antenna wire is suspended vertically from a tree, fishing rod or pole then with the 20m version the point of maximum radiation is 5m above ground level usually well above local ground level clutter. If the antenna is being used at a temporary location the wire can be very quickly erected from a window in the building to a nearby support or tree without having to run co-ax cable or run earth radials. Again the point of maximum radiation is half way along the antenna wire giving some isolation from RF interference carried on the building's electrical system.

The design of the Cross Country Wireless End Fed Antenna is based on the classic designs brought up to date with modern high voltage components, CAD design and professional network analysers. The field tests showed that the theory worked well in practice and a highly efficient monoband HF antenna could be erected in almost any situation making it ideal for HF portable use.

Of all the antennas I've designed and used over the years this is the one I'm most pleased with.

I hope you enjoy using the Cross Country Wireless End Fed Antenna!

73,

Chris Moulding, G4HYG



2 Specification

Antenna length:	Half wavelength at the operating frequency		
	40m	20.78m	68' 2" (21m antenna wire supplied)
	30m	14.37m	47' 2" (15m antenna wire supplied)
	20m	10.63m	34' 11" (11m antenna wire supplied)

Antenna matching unit

Input impedance	50 ohms		
Output impedance	2500 ohms		
Cable connector	SO239		
Size (overall)	140mm x 105mm x 35mm	5.5" x 4.25" x 1.3"	
Power rating	200 W		

The End Fed Antenna meets the requirements of EC Directives EN50082-1 EMC Generic Immunity Standard (Residential, Commercial and Light Industrial), RoHS (Restriction of Hazardous Substances) and WEEE (Waste Electrical and Electronic Equipment).

3 Parts



Parts

Antenna matching unit

Antenna wire

Antenna insulator



4 Tuning

Connect the antenna wire to the antenna terminal.

Connect any earth or counterpoise connection to the earth terminal using the wing nut.

Erect the antenna in the desired configuration.

Connect the HF transmitter to the SO239 antenna connector with a SWR meter in line.

Measure the SWR at your operating frequency and cut the antenna wire until the SWR is at a minimum.

For best results take the time to do this correctly as the antenna and antenna matching unit will be operating at peak efficiency when correctly tuned.

SAFETY NOTE: The end of the antenna and the antenna terminal is a high impedance point and is at a high RF voltage when transmitting. When fed with 100W the RF voltage will be around 500 V. Do not touch the antenna terminal or the ends of the antenna while transmitting.

5 Installation suggestions

