10 Metre EH Antenna

AN EH ANTENNA FOR 10 METRES
This is a companion to the 20 and 40 metre L+L EH Antennas published in the April 2003 issue of Amateur Radio

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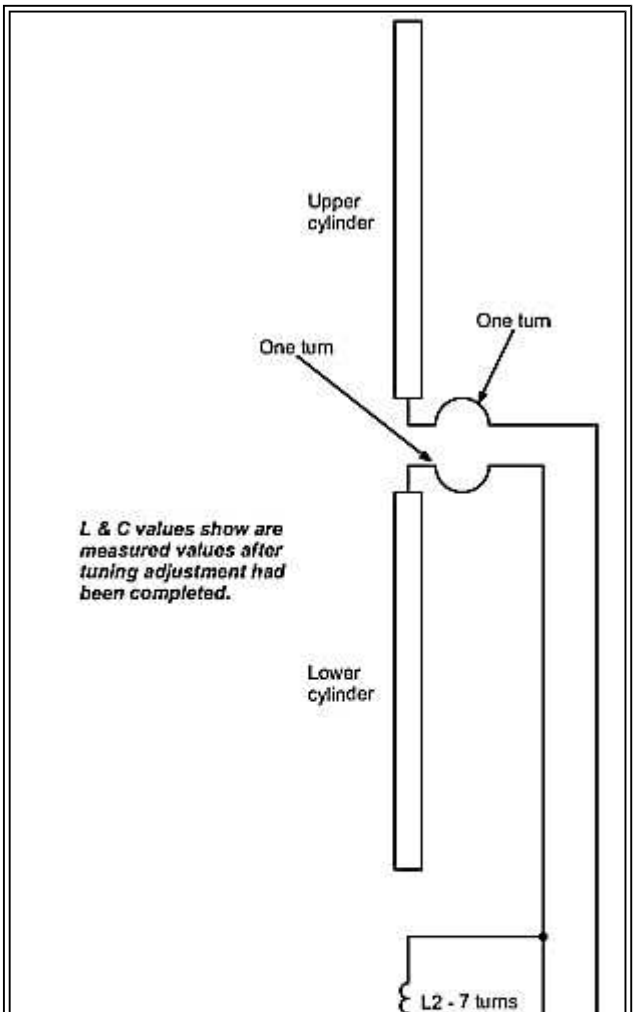
Addendum added June 2005

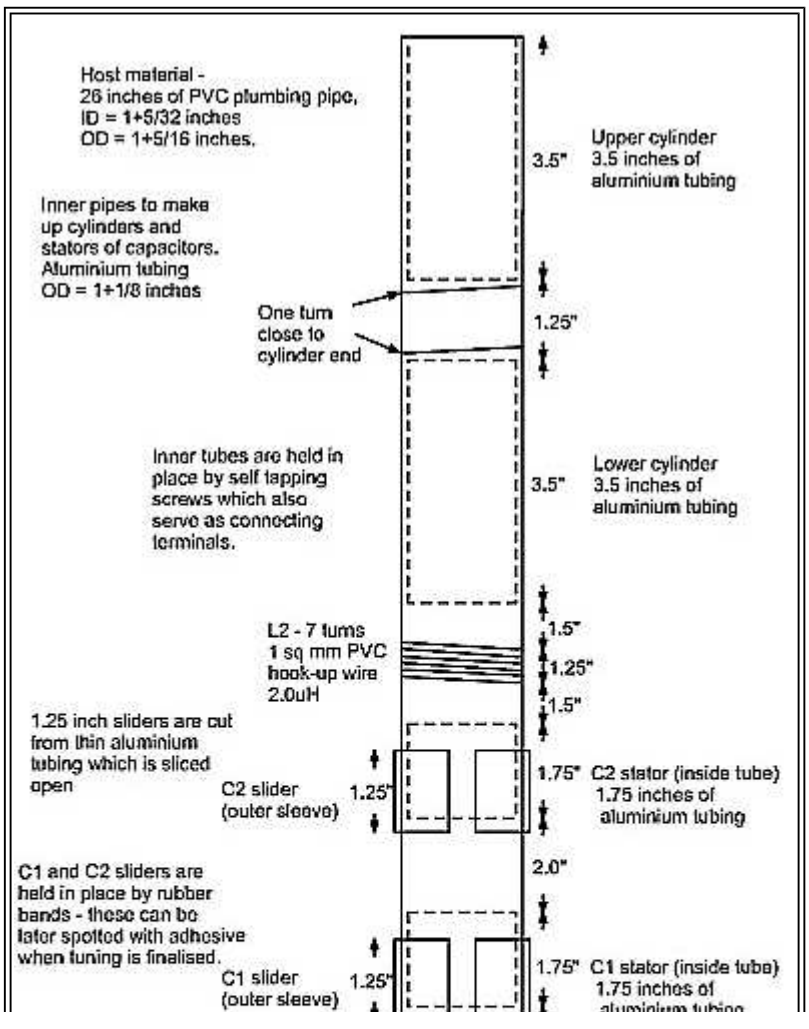
Introduction

Here is a 10 metre version of the EH antennas published the April 2000 issue of Amateur Radio and which was assembled at around the same time. However it was put aside because of the problem encountered with interaction between the antenna tuning and the coaxial feeder. At that time I had not learned how to prevent this with a coax trap. The antenna has now been fitted with a tuned trap at its base and this has stabilised the tuning to the extent that any interaction is now negligible.

Circuit Diagram

The antenna has the same basic circuit arrangement as the 20 and 40 metre versions previously published and which use the L+L balanced type of matching network. However also added is the tuned trap to eliminate interaction between antenna tuning and the coax feeder. For detail of operation of the matching network and why the trap is fitted, refer to my previous articles listed under the "Reference" heading. Circuit detail for the 10 metre antenna is shown in figure 1.





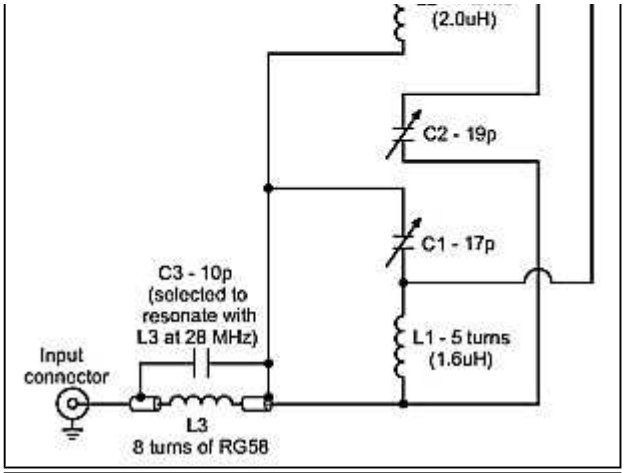


Figure 1 - Circuit Diagram

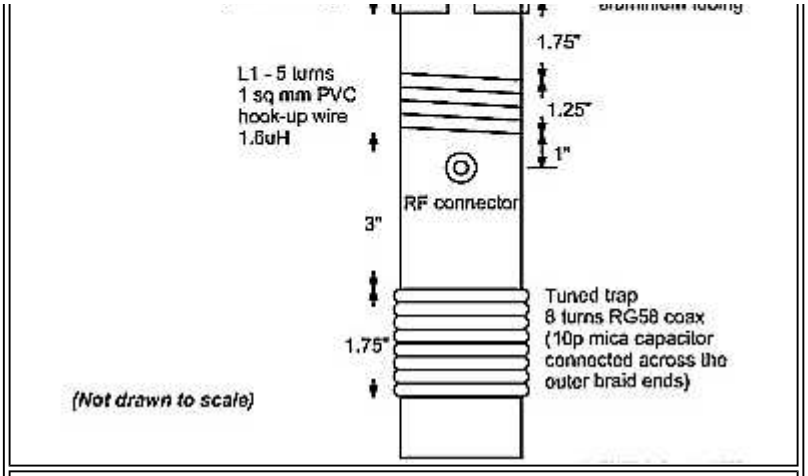


Figure 2 - Assembly

Assembly Detail

The assembly is shown in figure 2. As before the host material to support the dipole cylinders and the matching network is PVC plumbing tube. Again the dipole cylinders fit on the inside of the tubing and are made of aluminium tubing which I recovered from the broken tiller of one of the boats we used to sail. More of the tubing is used for the capacitor stators fitted inside the PVC tube.

The slider sections of the capacitors were also made from thin aluminium tubing with a portion of the side cut out. I recovered this from an old IF can previously used in a valve superhet receiver.

Fortunately I had left plenty of PVC tube spare at the bottom of the antenna, below the input connector and in this space I wound 8 turns of RG58 coax around the PVC tube to form the coaxial inductor for the trap. This measured about 1.7 uH and was resonated around 29 MHz with a 10 pF capacitor. I find the easiest way to check its resonant frequency is to poke the dip meter coil up the centre of the PVC pipe. (This must be done with input and output leads disconnected so that the trap is not too loaded for the dip to appear).

I measured the through signal loss of the trap into 50 ohms resistance. Loss was so low that I deemed it negligible.

Without the trap, the antenna was a crazy thing to adjust. With the trap fitted, tuning was as stable as a rock.

Previous tests that I had carried out on a 20 metre L+L antenna indicated that the signal tended to be skewed upwards if the trap was fitted close to the input connector rather than a short distance down the coax cable. I wondered how this 10 metre antenna would perform with the trap so close. I carried out some very rough tests in the backyard and indications were that the signal was spread at right angles and upwards at around the same field strength. So there seemed to be some evidence of this skewing and that the antenna might perform about the same for high angle and low angle transmission.

Summary

Described is a 10 metre version of the EH antenna using the L+L type matching network. Included in the assembly is a tuned trap which is effective in inhibiting out of balance current on the coax feeder and eliminating interaction between the feeder and the antenna tuning.

Extensive field measurements have not been carried out but limited tests, with the trap fitted as shown, indicate that field strength could be similar for both low and high angle radiation.

XYL Margaret with the Antenna

Addendum, June 2005

Since this article was prepared and subsequently published, it has become clear that these antennas work much better if a short coax tail is allowed to be active in series with the antenna input connector. I would suggest that instead of installing the trap at the bottom of the PVC tube, put it in series with the coax cable, 1 metre down from the antenna input connector. Of course without the trap on the PVC tube, the input connector is connected directly to the matching network.

Other relevant articles in AR

(1) EH Antennas for 20 and 40 metres - Lloyd Butler VK5BR, Amateur Radio, April 2003.

(2) The EH Antenna - More Information on how it works and how it has performed. -
Lloyd Butler VK5BR, Amateur Radio, November 2003

(3) The EH Antenna - Radiation from Coax - Measurements on Proportion of Power Lost.
Lloyd Butler VK5BR, Amateur Radio, May 2004

(4) The EH Dipole with the L+T and Star type matching networks.
Lloyd Butler VK5BR, Amateur Radio, July 2004

On the Internet

(1) Refer to articles on the EH Antenna by VK5BR at:- **http://www4.tpgi.com.au/users/ldbutler/**
Or link from:- **http://www.qsl.net/vk5br/**

(2) EH Antenna web site:- **http://www.eh-antenna.com**