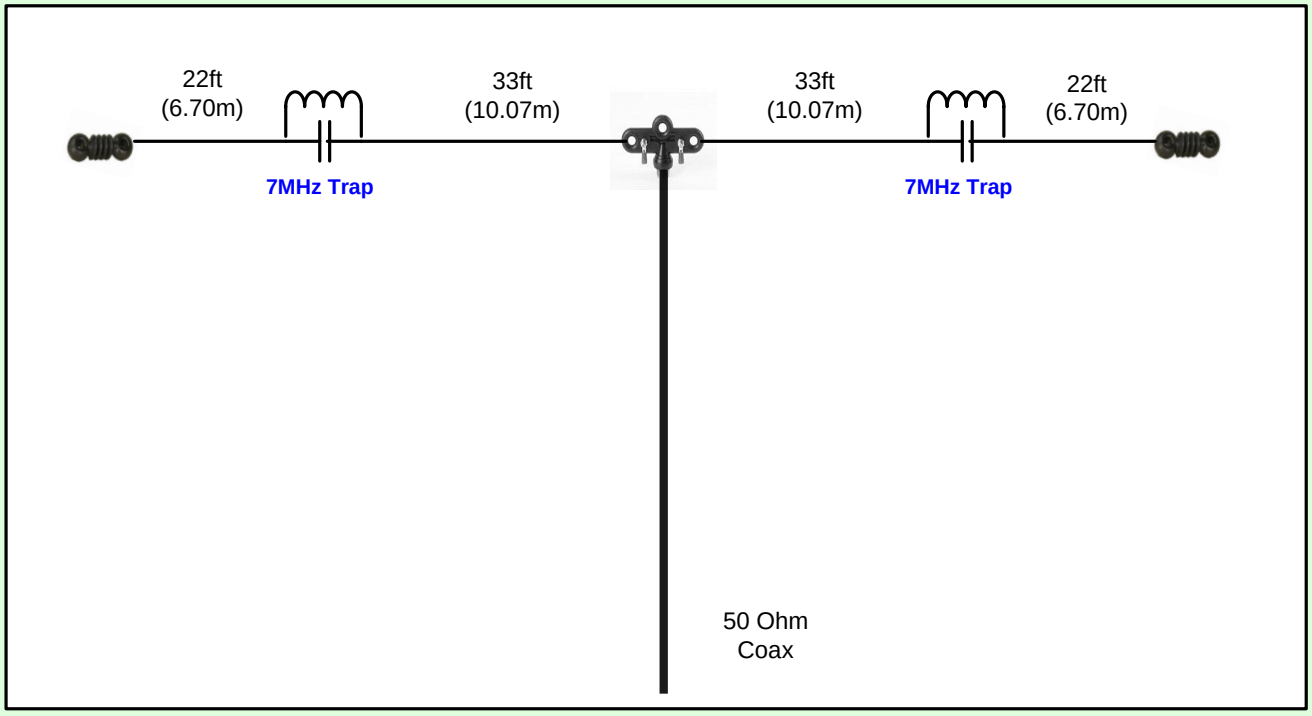
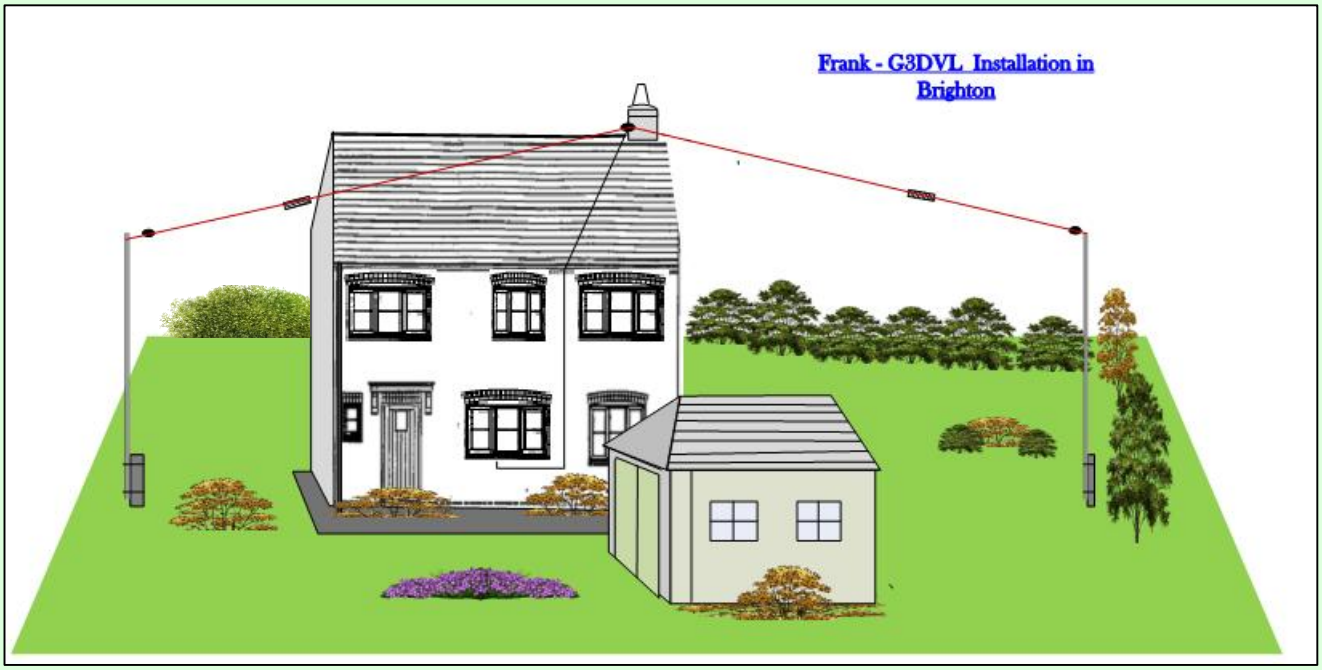
W3DZZ Multi-band Antenna 80-40-20-15-10m



NOTES:-
A full analysis of this antenna is available on this link:-
http://sharon.esrac.ele.tue.nl/~on9cvd/E-Multiband%20trap%20antenne.htm

Construction details for the traps are provided on pages 2 & 3.
Plots of the far field radiation patterns are shown on page 4.



The ground slopes downhill slightly from left to right and the masts at the ends are only about 5-6metres high. The far right mast is made of 2x2 inch wood and lashed to the small tree with nylon rope to prevent damaging the tree. The coax used by G3DVL is air-spaced dielectric 75 Ohm TV coax in conjunction with an MFJ 948 ATU.

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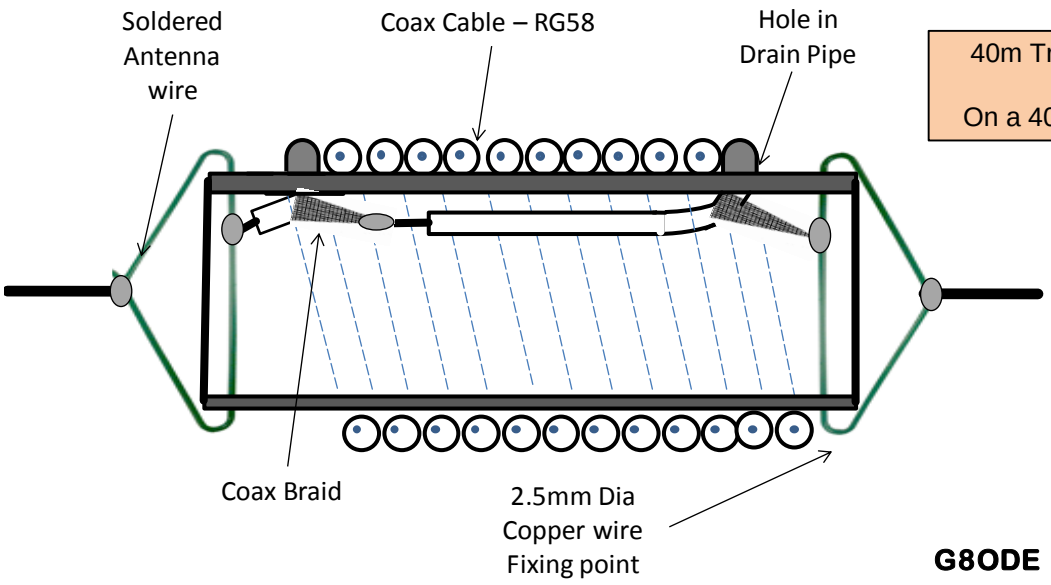
40 Metre Coaxial Trap Construction



Here is a photograph of the 7.0MHz Trap made using this form of construction. The coax has been taped over for additional protection and the ends have been sealed by fitting plastic discs and sealing with silicone bath sealer

40 Metre Coaxial Trap

N.B. A very useful tool for coax-traps is a program by Tony VE6YP called "coaxtrap.exe". The program can be downloaded his website *www.qsl.net/ve6yp* .

W3DZZ Multi-band Antenna 80-40-20-15-10m

The traps for this antenna can also be made using coils and capacitors. E A Rule G3FEW (RAOTA 1487) who is a fellow member published this information as part of his trapped Multi-band antenna in the RAOTA journal issue OTN89 and also made the article available on the web as a PDF.

http://www.norfolkamateurradio.org/pdf/talks/G3FEW%20Multiband%20Antenna.pdf.

The table below provides details of how to make the coils. A 40mm diameter plastic tube is used for the former, and a 100pf high voltage capacitor to tune the trap for each of the HF bands. However he also suggests a way of making a capacitor from double sided glass fibre copper laminate board (PCB).. For high powers in excess of 100 watts the high voltage capacitor should be used, because the epoxy resin used for the PCB material may become over stressed and start to breakdown. If the capacitor's value falls between 90pf to 110pf it may Be necessary to change in antenna element Length.

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Alternate Method for making Traps

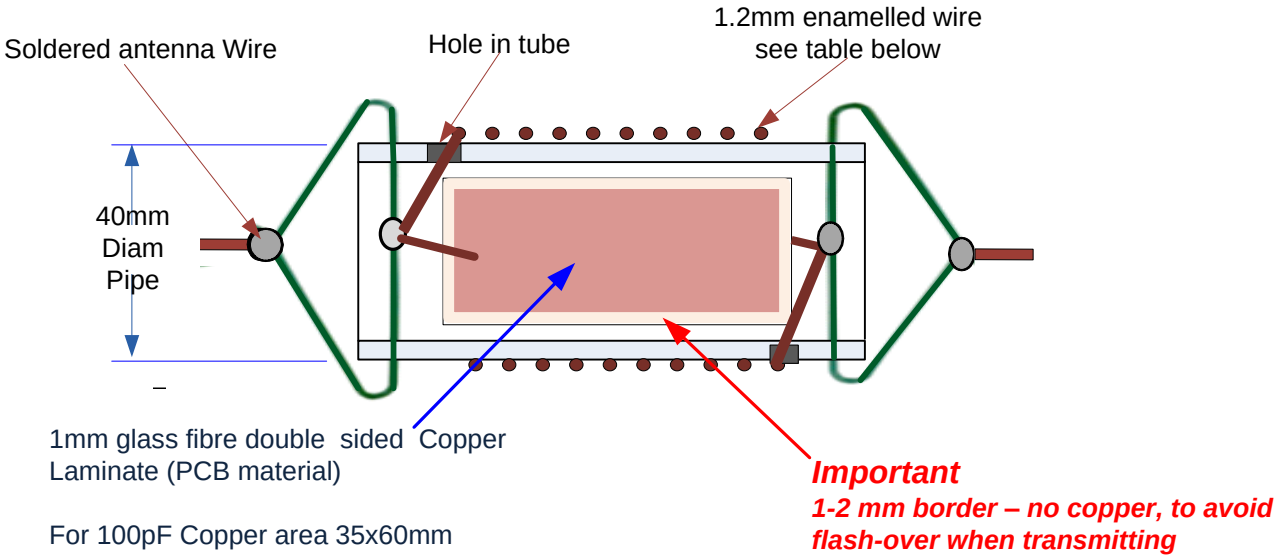

Table 1. LC Trap winding details.

	Trap	Freq MHz	Turns	uH	Capacitor pF
	10m	28.4	2.5	0.312	100
	12m	24.94	3	0.407	100
	15m	21.225	3.5	0.562	100
	17m	18.118	4	0.771	100
	20m	14.2	5	1.256	100
	30m	10.15	8	2.458	100
W3DZZ	40m	7.1	10	5.024	100

NOTE:-
The high-lighted 40m trap details are suitable for the W3DZ. Some experimenting with the number of turns may be necessary as the wire length is not specified.

For further study concerning the multi-band W3DZZ antenna refer to this excellent article by ***Bob J. van Donselaar ON9CVD*** using the link below:-

http://sharon.esrac.ele.tue.nl/~on9cvd/E-Multiband%20trap%20antenne.htm#W3DZZ

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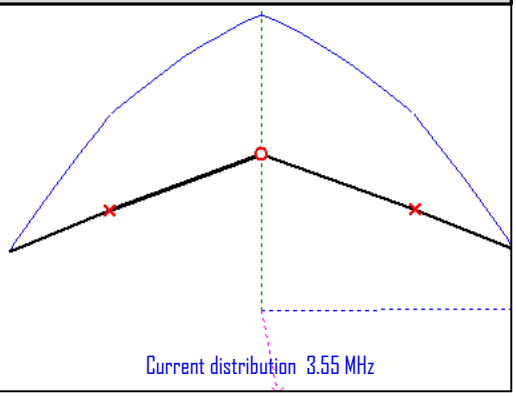
W3DZZ Multi-band Antenna 80-40-20-15-10m

N.B. Antenna Plots produced using MMANA-GAL Antenna Model Program – 10m plots omitted to save space.
The Antenna was modelled at 10m above the REAL Ground whose Conductivity=5mS/m and Dielectric = 13.

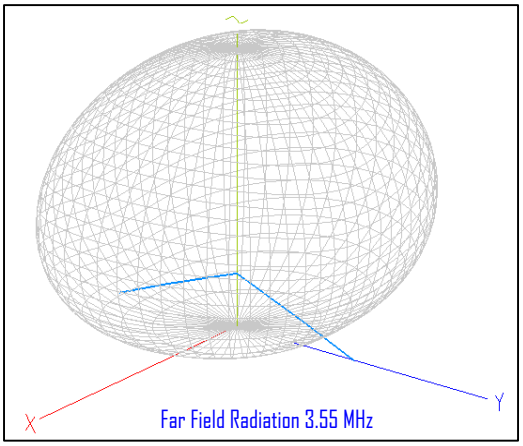
On the plots below the red X denotes the 40m trap. The red O denotes the source of transmitter.



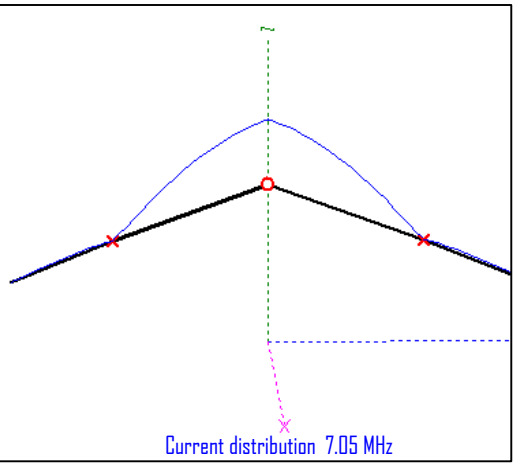
Current distribution 3.55 MHz

3.55 MHz Antenna Current Distribution and 3D Far Field Radiation plots.

The 3.55MHz current plot shows that the 40m trap is not operating and the antenna is behaving as a simple dipole. Since the height is 10m and this is a 1/8 wave above ground, the antenna exhibits significant NVIS properties with a single lobe.



Far Field Radiation 3.55 MHz

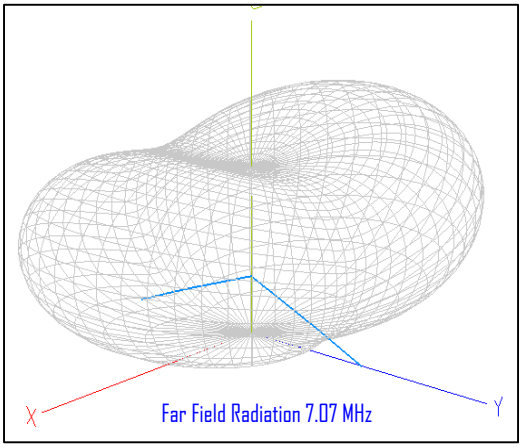


Current distribution 7.05 MHz

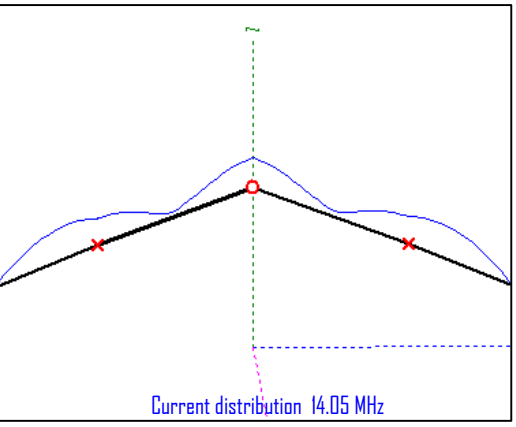
7.07 MHz Antenna Current Distribution and 3D Far Field Radiation plots.

This time the current plot shows that the 40m trap is operating.

Then antenna is behaving as a simple dipole. The height of 10m above the gound is a ¼ wave, and the antenna still exhibits significant NVIS properties with a single slightly elongated lobe in the broadside direction.



Far Field Radiation 7.07 MHz

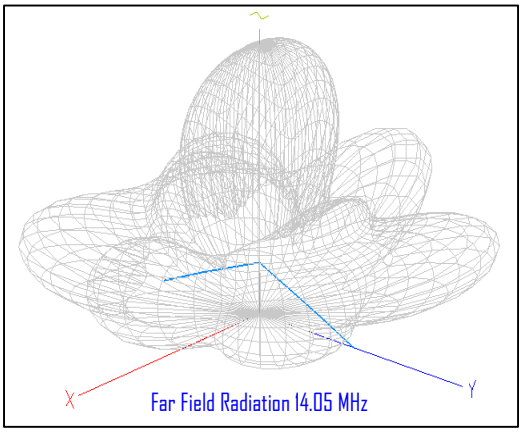


Current distribution 14.05 MHz

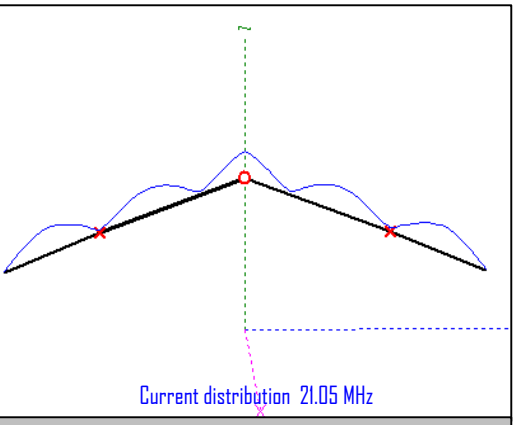
14.05MHz Antenna Current Distribution and 3D Far Field Radiation plots.

The 14.05 MHz current plot shows that the 40m trap is not operating and the antenna is behaving as ¾ wave dipole.

The antenna is now just ½ wave above the ground ,and the effects of ground reflections have been reduced, enabling 6 low angle lobes to appear providing DX radiation, and a single NVIS lobe.



Far Field Radiation 14.05 MHz

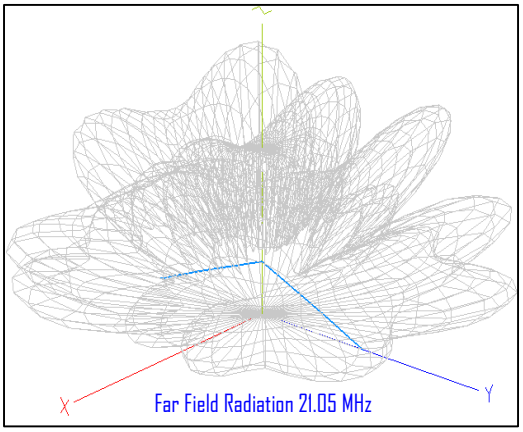


Current distribution 21.05 MHz

21.05MHz Antenna Current Distribution and 3D Far Field Radiation plots.

The 12.05 MHz current plot shows that the 40m trap is not operating and the antenna is behaving as 5/4 wave dipole.

The antenna is now just about 2/3 wave above the ground ,and the effects of ground reflections have been reduced further. There are 10 low angle side lobes providing DX radiation in several directions, and further 3 high angle NVIS lobes.



Far Field Radiation 21.05 MHz

Note:- The current's amplitude changes as the impedance of the antenna changes with frequency.

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