

THE “OZIPOLE Mk II”

A Portable Multiband Dipole

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Many amateurs might be familiar with the “Ozipole”, a small portable loaded dipole for the 40 m to 6 m bands. It was designed by Peter VK2EVB and supplied as a kit by the Mid North Coast Amateur Radio Group. More information can be found at their website www.mncarg.org. This is a description of a version which was built from parts obtained mostly from hardware and salvage suppliers and garage sales. This modified version includes capacitance loading elements and a balun at the feedpoint, with the aim of improving bandwidth, efficiency and matching to the transmission line. The total cost for the antenna was about \$ 100.

PARTS LIST :

Antenna Parts

2 x Black Poly Riser pipes, 15 mm Ø x 900 mm, threaded both ends
2 x Brass Pipe Couplings, 2 x 15 mm Ø female
2 x Brass Reduction Bushings, 15 mm male to 6 mm Ø female
2 x Brass Nipples, 6 mm Ø male
12 x Brass Machine Screws, 3 mm x 25 mm
1 x Brass tube, 4 mm Ø x 300 mm
8 x Brass tubes, 3mm Ø x 300 mm
2 x Telescopic Whips, 900 mm
16 m PVC Insulated wire, 7x 0.16 mm conductors, 1.25 mm outer Ø [Altronics W2257*]
3 m PVC Insulated wire, 24 x 0.20 mm conductors, 2.0 mm outer Ø [Altronics W 2112*]
600 mm solid copper wire, 1.2 mm Ø [Altronics W0409*]
6 x Alligator Clips, 45 mm
6 x Black Poly Riser pipes, 15 mm Ø x 150 mm, threaded both ends
2 x PVC Tee Couplings, 15 mm Ø with one threaded socket
1 x Brass Tee Coupling, 15 mm Ø with threaded sockets
2 x PVC Elbow Couplings, 15 mm Ø with one threaded socket
1 x PVC Joiner 15 mm Ø with threaded sockets
* Nearest sizes

Balun for feedline

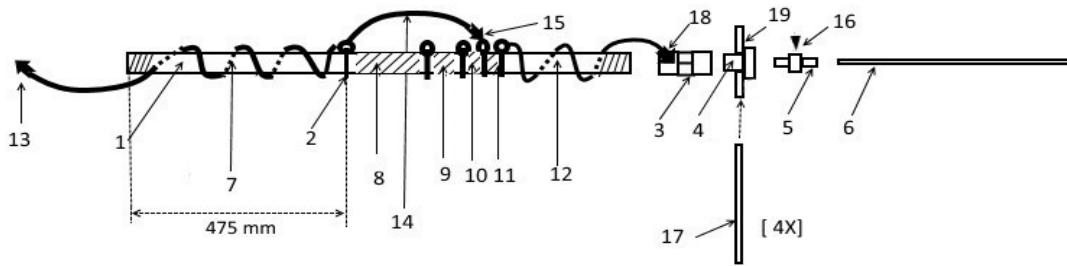
1 x Weatherproof ABS Box, 85 mm x 50 mm x 30 mm
1 x Toroidal Balun (see below)

Support Mast

2 x 2 m Paint Roller telescopic extension handles [second hand]
1 x Camera Tripod, (Pan & Tilt Head removed) [second hand]
12 m Polypropylene rope, 4 mm Ø
3 Large Tent pegs

CONSTRUCTION :

The antenna was constructed according to the basic Ozipole design by MNCARG.
(It seems that the instructions have been removed from their website, but can be found on various Yahoo groups including <https://groups.yahoo.com/neo/groups/Ozi-pole> and <https://groups.yahoo.com/neo/groups/hfpack>)
Where I used a different construction method, it is explained below.

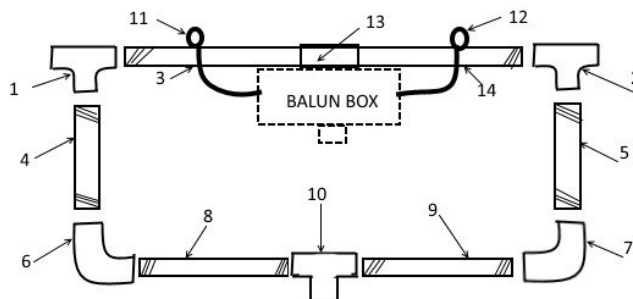


RADIATOR CONSTRUCTION

- 1 Black Poly Riser pipe , 15 mm Ø x 900 mm, threaded both ends
- 2 Brass Machine Screws, 3 mm x 25 mm with copper wire loops
- 3 Brass Pipe Coupling, 2 x 15 mm Ø female
- 4 Brass Reduction Bushing, 15 mm male to 6 mm Ø female
- 5 Brass Nipple, 6 mm Ø male
- 6 Telescopic Whip 900 mm
- 7 Copper wire PVC insulated , (24 x 0.20 mm), 750 mm
- 8 L1 : 75 turns PVC insulated wire (7x 0.16 mm)
- 9 L2 : 18 turns PVC insulated wire (7x 0.16 mm)
- 10 L3 : 9 " " " " "
- 11 L4 : 6 " " " " "
- 12 Copper wire PVC insulated, (24 x 0.20 mm), 350 mm
- 13 Alligator clip
- 14 Copper wire PVC insulated, (24 x 0.20 mm), 220 mm
- 15 & 18 Alligator Clips
- 16 Set Screw 3 mm x 10 mm
- 17 Brass tubing, 3 mm Ø x 300 mm [4x]
- 19 Brass tubing, 4 mm Ø x 37 mm [4x]

The radiators were constructed as shown above. After winding the coils, the ends were soldered to bare solid copper wire loops, which serve as tap points for the 40 m, 20 m, 15 m, 10m and 6 m bands, progressing outwards. A link (14) with an alligator clip (15) is used to select the tap position for each band. Another link (12) is connected to to the brass coupling (3) with an alligator clip (18), and the radiator wire (7) is attached to the balun at another copper wire loop by an alligator clip (13) (see Support Bracket diagram). Short 4 mm Ø brass tubes (19) were soldered into holes drilled in the reduction bushing (4). Up to four of the 300 mm x 3 mm Ø tubes can be inserted into these sockets to produce a variable amount of capacitance loading when the antenna is assembled. (See Tuning Chart below)

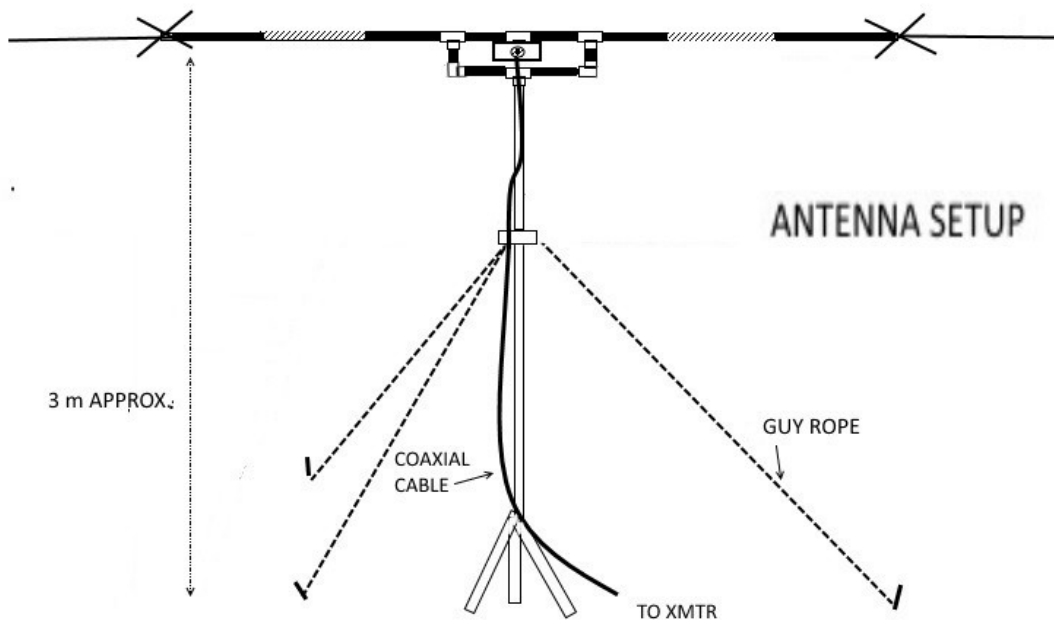
The Support Bracket was assembled as shown below, applying PVC cement to the joints. The PVC Tee connectors (1 & 2) may need to be reamed out a little to provide a tight friction fit for the radiator poly pipes, which should not fall out when the dipole is assembled. **NB : Do not glue the radiators into the Tee connectors.**



DIPOLE SUPPORT BRACKET

- 1 & 2 PVC TEE CONNECTION, 15 mm Ø
- 3 & 14 BLACK POLY RISER PIPE, 15 mm Ø, 150 mm
- 4 & 5 BLACK POLY RISER PIPE, 15 mm Ø, 150 mm
- 6 & 7 PVC ELBOW CONNECTION, 15 mm Ø
- 8 & 9 BLACK POLY RISER PIPE, 15 mm Ø, 150 mm
- 10 BRASS TEE CONNECTION, 15 mm Ø THREADED
- 11 & 12 SOLID COPPER WIRE LOOPS
- 13 PVC JOINER 15 mm Ø

The dipole should be raised to a height of approximately 3 metres. I used a camera tripod and two paint roller extension handles to obtain the height, with guy ropes for lateral support.

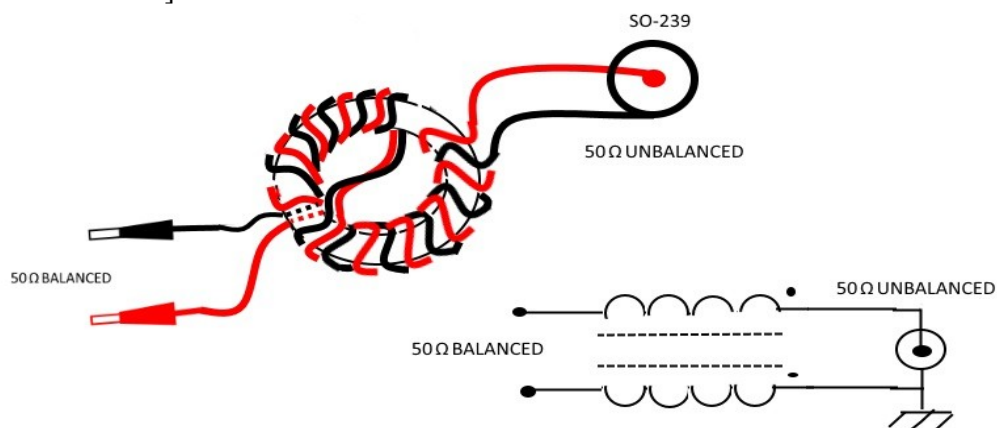


BALUN & FEEDLINE

A 1 : 1 balun was used on the 40 m to 10 m bands. The construction of the balun is shown below.

1 : 1 BALUN

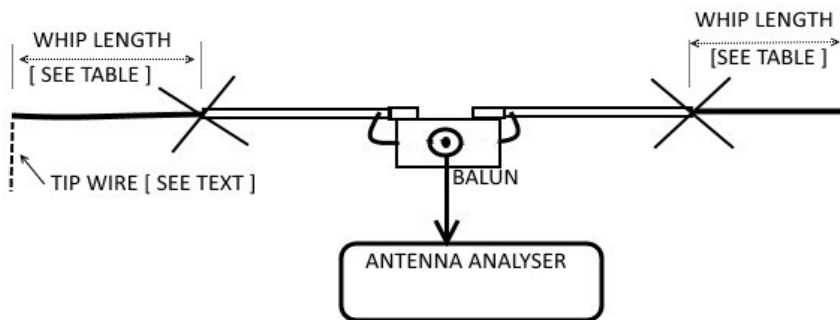
11 Bifilar turns of PVC insulated wire (14 x 0.20 mm) [Altronics W2263*] on 37 mm Ø ferrite toroid



TUNING

An antenna analyser was used to indicate the resonant frequency of the dipole elements. Tuning is accomplished by selection of the appropriate tap point on the tuning coils L1-L2-L3-L4, installing up to four capacitance loading rods on each side of the antenna, and adjustment of the length of the telescopic whip sections at each end of the elements. If the telescopic whips are not long enough to tune the antenna, extra hanging wires attached at the tips with alligator clips can be used. On the 30 m band, no resonance was obtained and a wide range ATU would be required to use the antenna. No tuning was carried out on the 6 m band as the balun did not have sufficient bandwidth for 6 m operation.

The Tuning table below shows the results of tuning adjustments. Variable factors including ground conductivity and proximity of other objects will affect the results.



TUNING SETUP

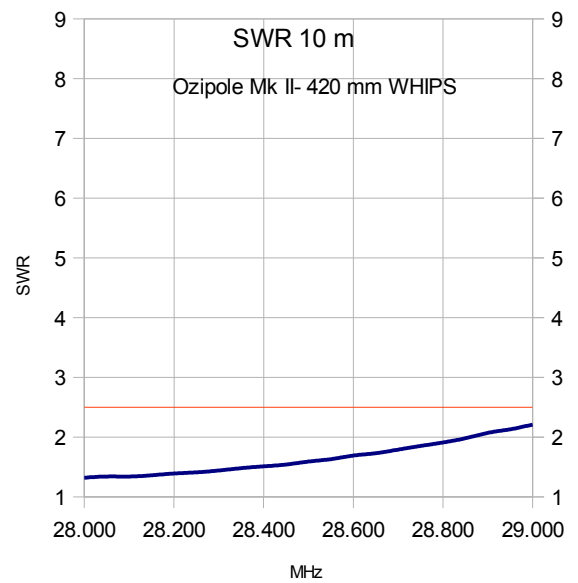
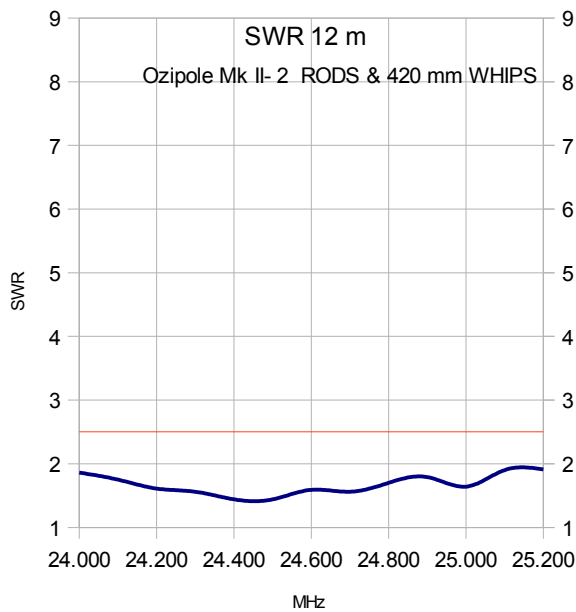
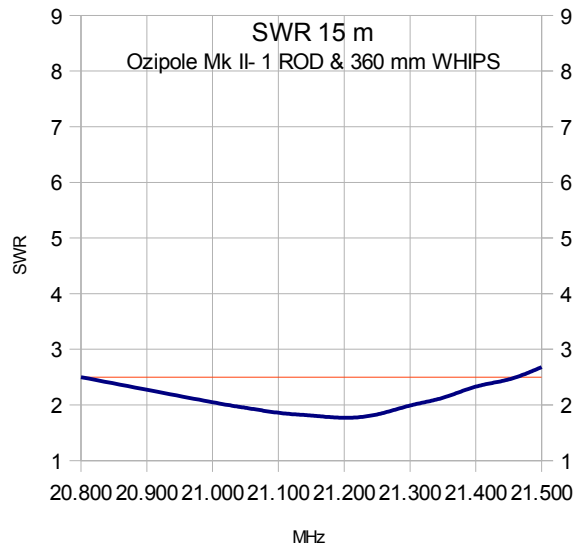
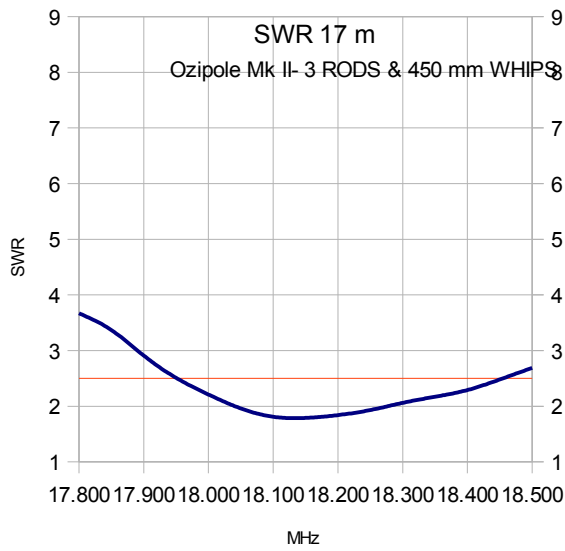
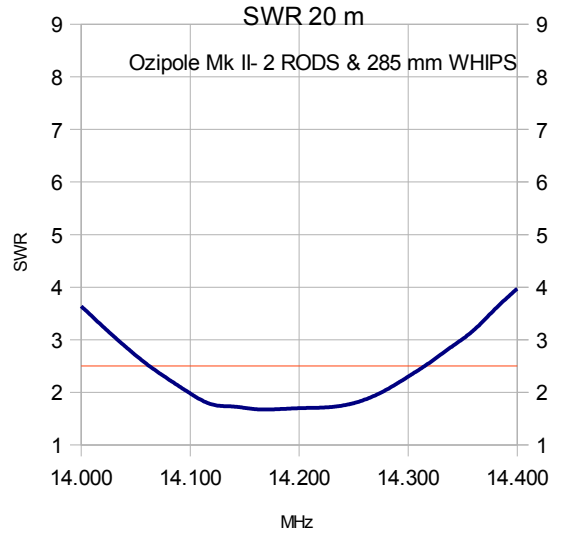
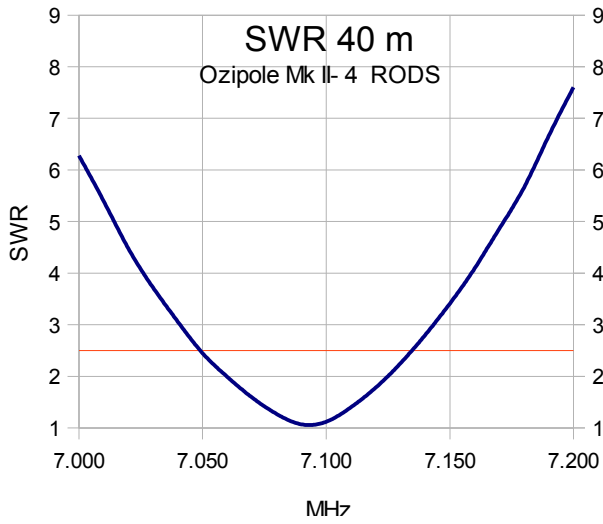
TUNING CHART [Values shown are examples, alternative configurations are possible]

F1 [MHz] *	F2 [MHz] *	COILS	WHIPS [mm]	CAPACITANCE RODS [§]	SWR
7.050	7.135	L1-L2-L3-L4	0	4	1.07
7.080	7.140	L1-L2-L3-L4	230	3	1.17
7.070	7.155	L1-L2-L3-L4	875	0	1.18
10.000		N/A			
14.050	14.325	L2-L3-L4	285	2	1.68
14.090	14.410	L2-L3-L4	650	0	1.70
17.950	18.450	L3-L4	450	3	1.81
17.730	18.390	L3-L4	500	2	1.75
20.800	21.450	L3-L4	360	1	1.77
24.000	25.200	L4	420	2	1.79
28.000	29.000	L4	420	0	1.59

* BANDWIDTH LIMITS FOR SWR < 2.5 [APPROXIMATE]

§ ON EACH HALF OF ANTENNA

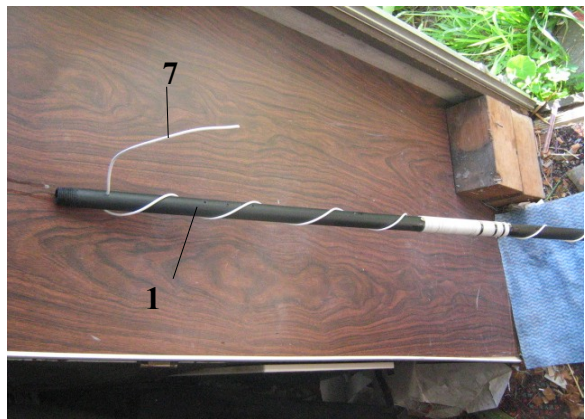
SWR GRAPHS



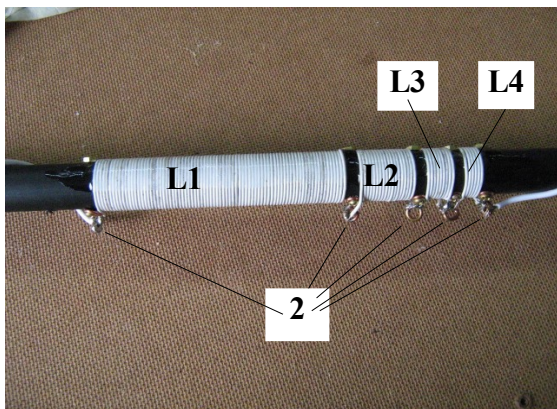
PHOTOGRAPHS



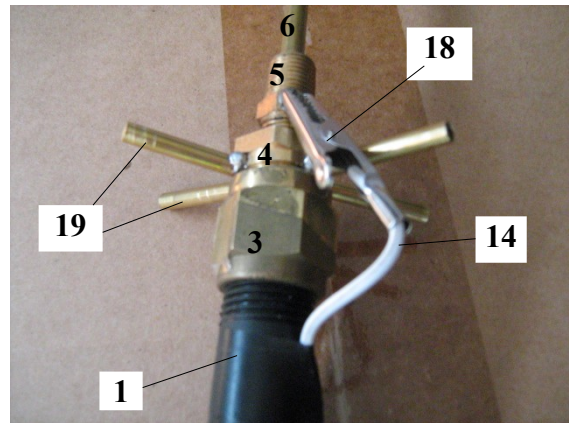
Dipole Support Frame



Radiator Element



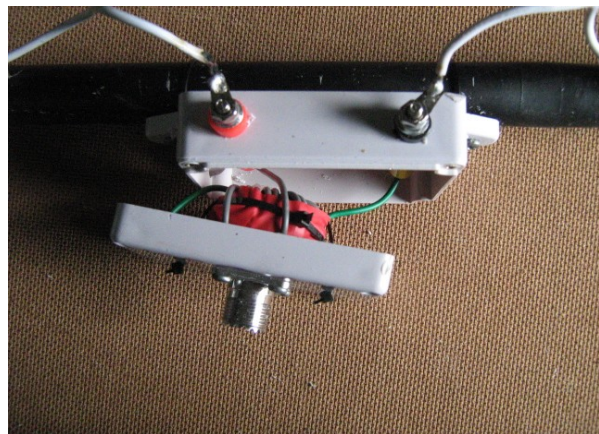
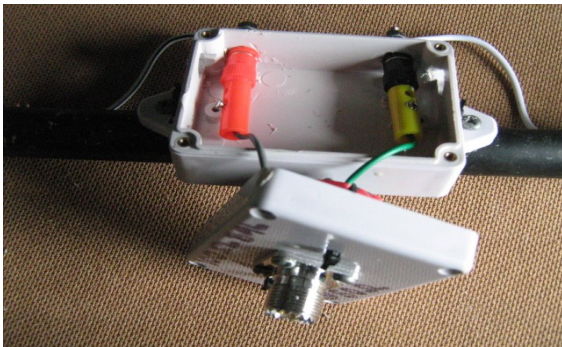
Loading Coils



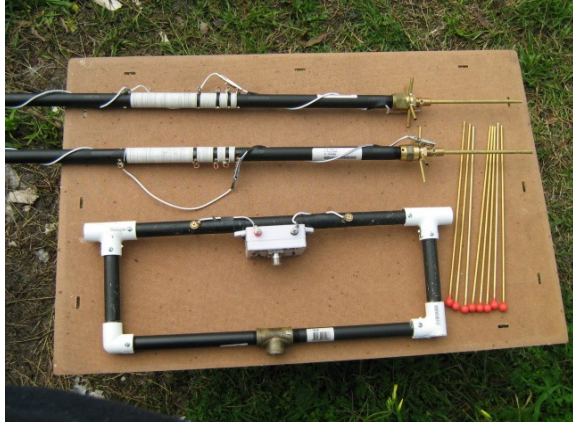
End of element with sockets for capacitance rods

[Numbered items in the photographs refer to Radiator Construction Diagram]

1:1 Balun



1:1 Balun Top View



Antenna Components



Support Mast



Antenna in use