

Multi- Range Vertical Antenna UA1DZ

by Igor Grigorov, RK3ZK

Antenna history: Antenna UA1DZ is a very interesting multi- range vertical antenna designed by known Russian radio amateur UA1DZ. The antenna was very popular in use in the former USSR. Russian radio amateurs widely use the antenna at present days also. The antenna works with a low SWR on 40-m, 20-m and 15m. Firstly UA1DZ told about his antenna in the ether, and after that, lots Russian radio amateurs have did the antenna and Antenna UA1DZ became very popularity. First printing papers about antenna UA1DZ appeared in reference [1]. This antenna has gain 3,67 dBi at 40-m, gain 4 dBi at 20-m, gain 7,6 dBi at 15m (reportedly to VA3TTT, reference [2]).

Antenna construction: Figure 1 shows the construction and matching device of multi-range vertical antenna UA1DZ (based on reference [1]). The vibrator of the antenna has the length in 9.3 meters and four counterpoises of the antenna have length in 9.4 meters. Why has the antenna such sizes? Well, for his multi range antenna UA1DZ used an old military vertical antenna and this one had such sizes.

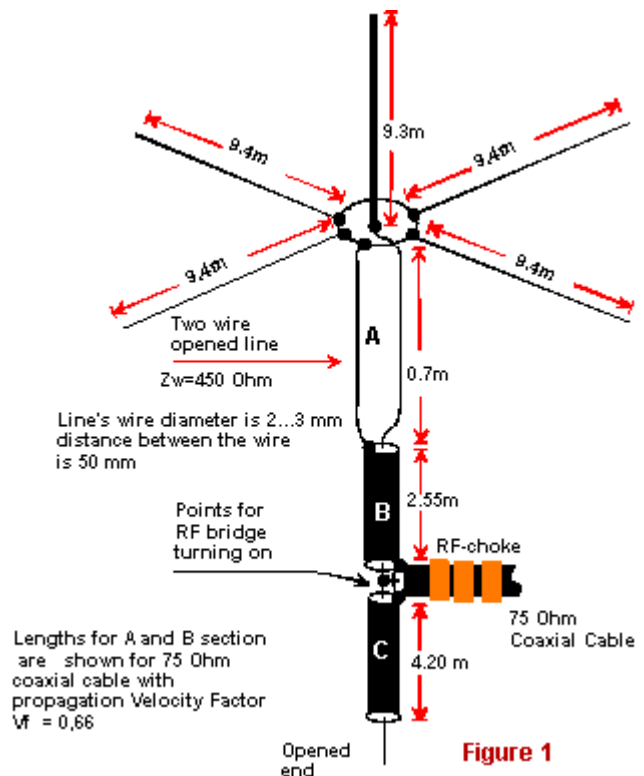
If you have not such old military vertical antenna, of course, it is possible to do home made vibrator and counterpoises! The vibrator and counterpoises must be made from copper or aluminum stuff. Do not use iron wire for HF antenna at all! Iron does not work properly in HF transmitting antennas, especially at upper amateur HF ranges.

Guys must be used with the antenna for providing wind strength. Use acryl cord or iron wire "broken" by insulators to one - meter lengths. Base insulator should have high mechanical and electrical strength because antenna vibrator has a large weight and there is high RF- voltage across the base insulator in transmitting period.

Matching device: It is made on one length of two – wire opened line and two lengths of a 75- Ohms coaxial cable. With the matching device the antenna can work on ranges 40-m, 20-m and 15m with a SWR in coaxial cable no more than 2:1. Two wire opened line "A" does initial matching the antenna input impedance with feeding coaxial cable. The line has characteristic impedance of 450 Ohm and one meter initial length. As usual, the line has ended length about 0.7- meter.

Coaxial cable "B" with characteristic impedance of 75- Ohm and with length 2.5 meters makes further matching for input impedance of the antenna system with feeding coaxial cable. An opened on the end length of coaxial cable "C" makes compensation of a reactive part of the input impedance of the antenna system.

Two wire line (part A) and the matching parts B and C must be placed not less the 50 centimeters above the roof. Parts A and B should be placed in straight line. It is possible to coil the part C in a bay.



Antenna tuning: The antenna UA1DZ is tuned as follow.

- An RF bridge is turned to input terminal of antenna matching device (see Figure 1).
- Shift antenna resonance frequencies in amateur 40- and 15-m bands by gradually diminishing the length of matching section A. Five centimeters truncation the length of matching section A does frequency shift up to 200 kHz on 21 MHz, and up to 60 kHz on 7 MHz.

It is quite possible to tune the length of matching section A so, that antenna UA1DZ will have the resonance frequencies inside ranges 21 and 7 MHz. If the antenna UA1DZ has resonances on these ranges (40- and 15-m), it will have a resonance frequency inside 20-m range.

Two-wire opened line: It is possible to use either commercial made two-wire opened line either homebrew one. Remind, that two-wire transmission line with aerial dielectric and 450 Ohm characteristic

ANTENTOP- 01- 2003, # 002

impedance has relation between the diameter of its wires and the distance between these wires nearly 20 (see [Figure 2](#)).

RF – choke should be used: An RF-choke should be installed on the coaxial cable at the antenna terminal. This RF-choke precludes leaking of RF currents on the outer braid of the coaxial cable.

Without such RF-choke the outer braid of the coaxial cable will serve as a radiating part of the vertical antenna. It causes big level of RF interferences when the antenna works on transmission. 10 -30 ferrite rings, hardly dressed on the coaxial cable at the antenna terminal, make the most simple an RF-choke. The place for a RF choke is shown in [Figure 1](#).

Hula- Hoop magnetic Loop

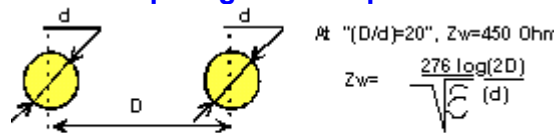


Figure 2

References:

1. RB5IM.: Ground plane UA1DZ. Bulletin UC 1993, C.27.
2. A. Barskiy, VA3TTT: About antenna L www.krasnodar.online.ru/hamradio

Hula- Hoop magnetic Loop

by **Yuri Kazakevich**, EW6BN, , ew6bn@tut.by



After long QRT (birth of my daughter, changing my QTH) I was going again QRV!!!

So, I needed an antenna! But where can I install it? It was not possible to install any antenna on the roof of my house. I had only place for installation of an antenna, the place was my balcony of my house. Well, it was very place. What an antenna can install at the place? I thought, it was only a Magnetic Loop Antenna.

I remembered, when I still went to school, I used a Magnetic Loop Antenna made from old coaxial cable for my work on CB - range 27 MHz. The antenna worked very well. Well, I decided to use a Magnetic Loop Antenna for my very restricted area for a work at 14 MHz.

Lots information about Magnetic Loop Antennas I found in the Internet, in particular in reference [\[1\]](#), it is a free e- book on antennas (in Russian).

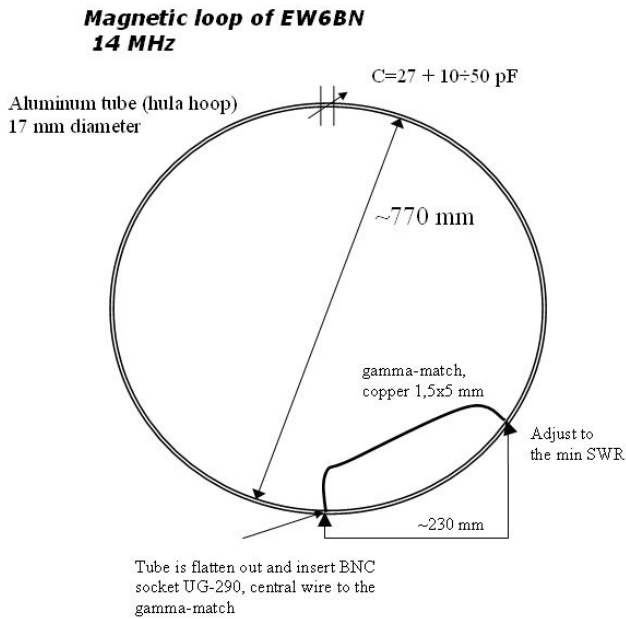
I decided to make my Magnetic Loop Antenna on the basis of an aluminum hula - hoop. Hula – hoops in diameter of 77 centimeters and with 17 mm tube

diameter were on sale in my local shop. The hula – hoop tuned at 14 MHz with two capacitor- one variable capacitor 10- 50 pF, and other, bridged to the variable capacitor, a fixed capacitor in 27 pF. The capacitors placed at the top the hoop. For my loop I used gamma feeding, because it has very high efficiency. [Figure 1](#) shows my Magnetic Loop Antenna. I have got 1:1.3 SWR with the gamma match.

The Magnetic Loop Antenna was installed on the third floor of a brick five-floor house. A wooden stick hold the antenna almost in one meter aside from the balcony. It was impossible to do a rotary design of the antenna for my conditions, so I just fixed the antenna on the line West – East. My house is situated at outskirts of the city, so, the West is opened, only one imperfection, a high-voltage power electric line on 110 kV is in 50 meters from my antenna....

On reception the antenna worked perfectly. But, unfortunately, there was a small handicap from the high-voltage power electric line.

Figure 1 Magnetic Loop Antenna



The antenna had very good results at transmission mode. See my first QSOs, that I have made straight away after installation of the antenna.

18:50 UTC, 13 July 2003:

I heard "CQ de G3KXV". I pressed on key – "G3KXV de EW6BN/QRP..."
And ... "EW6BN/QRP de G3KXV" op Vic.
YES, the QSO is made!
I gave RST 579 QSB.
He gave me 569, also QSB, 100-w and a dipole, your mag loop 77 cm doing very well!

Reference:

1. Igor Grigorov: " Antennas for radio amateurs - 1998, Majkop, e-book,
Available free at <http://cqham.ru/ftp/rk3zk/zip>

EW6BN:A Field Operation



19:25, UTC, 13 July 2003:

HB9DRK/QRP stayed on CQ, he received my call, gave me 329, I gave him the info about my mag loop, and HB9DRK/QRP gave me a new rpt 559, he used 5-w and a delta.

Perfectly... My soul was singing, but I had to do QRT for a while...

So, my balcony Magnetic Loop Antenna allows me to be in the ether again and to do interesting QSOs over the World!

