Ground Plane for the 40,-30,-20 and 17- meter Bands

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The antenna is very simple. It is just vertical radiator in 10- meter length that is matched at the each working band by its own matching unit that is switched on with help of relay. However to the design I came not straight away. There were tried several multiband antennas (for example, antennas from **References** 1 and 2) but for some reason no one of them did not satisfied me. I could not get good SWR at each of desirable working bands of the antennas. Friend of mine, UA7A, ex UA6CW, advised to me to use the described below antenna. He helped to me to calculate matching circuits for the antenna. **Figure 1** shows schematic of the antenna. **Figure 2** shows schematic of the matching units for 40,- 30,- 20 and 17- meter Bands. To eliminate static from the antenna the vertical radiator is grounded through pair resistors in 430- kOhm/2- Wtts.



Figure 2 Matching units for 40,- 30,- 20 and 17- meter Bands.





Figure 1 Ground Plane for the 40,- 30,- 20 and 17- meter Bands

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Table 1 shows data for the matching unit. All inductors are coiled by wire in 2- mm diameter (12- AWG). Inductors are air- winding. Diameter of each inductor is 40- mm. Gap between coils is 3- 5-mm. The gap should be defined at the tuning of the antenna. High-voltage ex- USSR capacitors **K15U-1** are used in the matching unit.

Vacuum ex- USSR relay V1V did switching on the matching circuit. All matching circuits were sitting in aluminum box by dimension 330x200x130- mm. Figure 3 shows the design of the box. (There are matching circuits for the 80/75- meter Band inside the matching box. However, the antenna could not provide satisfaction operation on the bands. So I did not use the antenna on the bands)



Ground Plane. General view

Capacitor, pF	Inductor, turns	Band, m	
300	3	40	
(3X100- pF)			
118	8	30	
(100- pF + 18- pF)			
22	8.5	20	
112	5.3	17	
(100- pF+ 18- pF)			

Table 1 Data for parts for the matching unit



Figure 3 Box with matching circuits





Ground Plane. Radials

Relay V1V



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Antenna may tune in the resonance by length of the radials and changing inductance of the inductors (by squeeze/stretch). **Table 2** shows data for the antenna measured by MFJ- 259-B. There are shown data for two antenna locations at the roof. "Variant 1" shows data for initial installation of the antenna. Then antenna for some reason was relocated to other place. "Variant 2" shows the data for the other installation of the antenna.

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The places were almost equal to each other. The difference is in the length of the coaxial cable going from my transceiver to the antenna. Length of the cable at "Variant 1" was 18- meter. Length of the cable at "Variant 2" was 40.6- meter.

References

- 1. http://www.dl2kq.de/ant/3-3.htm
- 2. http://www.antentop.org/ua1dz.htm

 Table 2 Data for Two Variants of Installation of the Ground Plane Antenna

Variant 1					Variant 2			
F, MHz	SWR	R	х	F, MHz	SWR	R	Х	
18.200	1.1	52	7	18.170	1.0	49	3	
18.068	1.2	58	8	18.068	1.1	56	4	
14.100	1.1	44	3	14.110	1.0	50	4	
14.000	1.2	46	8	14.000	1.2	56	7	
14.200	1.2	41	0	14.200	1.1	46	6	
14.300	1.3	36	0	14.300	1.3	44	11	
14.370	1.5	33	0	14.350	1.3	44	14	
10.110	1.0	49	3	10.100	1.1	46	7	
1.150	1.1	46	4	10.150	1.1	45	4	
7.000	1.1	49	6	7.000	1.2	41	6	
7.100	1.1	45	4	7.100	1.0	50	1	
7.200	1.4	37	8	7.200	1.3	62	7	



Capacitors K15U-1



Ground Plane. Box with matching circuits

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