Antenne panneau 70 et 23cms

F.4.6 Twin-quads for 70cm and 23cm

When operating from exposed locations it is essential to own simple light-weight aerials of reasonable gain. The OM is frequently prevented from participating in contests or activity periods by weight or dimensions of his aerials.

Two versions by DJ9HO are presented which fulfil the requirements stated above. The radiation pattern of the system was measured during the 1975 aerial measuring campaign of the "UHF-Group Munich". The reflector is made from copper-clad pertinax board. This provides good conductivity (see skin- effect A.1.3) at low weight and a gain increase of 2 to 3dB. The quad-to-reflector spacing may be varied by means of just one screw. It is thus possible to achieve optimum matching of coaxial cables of 50 to 75 ohm.

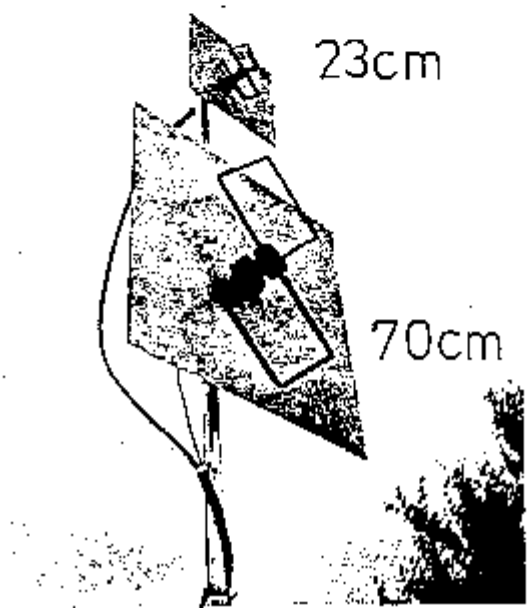


Figure 459
Aerial system for two UHF-bands.
Gain = 11 dB
The twin-quad is comparable to a 10-element Yagi. Its broad horizontal radiation pattern and the well-known DX-properties may even be regarded as advantageous over the Yagi (see also section F.9).

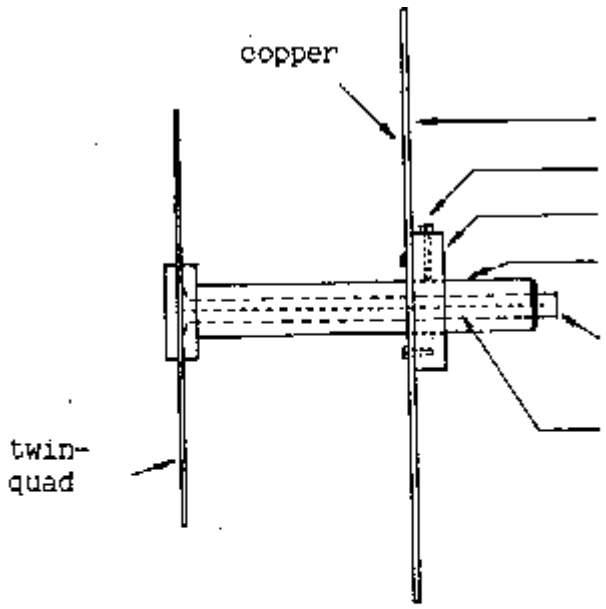


Figure 460
Identification of components

reflector (copper-clad board)

setscrew

plastic block

quad support tube (can slide in plastic block)

BNC-connector installed inside the support, soldered to coax.

Coaxial cable inside the plastic support tubing (connects BNC-connector with twin- quad).

Description

The square-shaped reflector is made from copper-clad pertinax (or fine wire mesh). The copper foil is coated with protective varnish. The size of the plastic blocks depends on the diameter of the quad support tube which in turn depends on one's possibilities for obtaining such material. The tube which also houses the coaxial cable may have about 15 to 25mm diameter. In our specimen it was turned from plastic material (23cm aerial) resp. its square cross-section was retained. The following photographs illustrate the various possibilities.

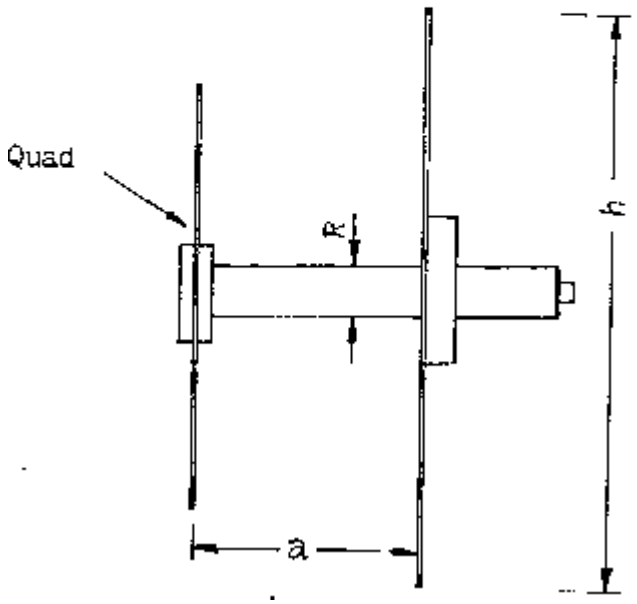
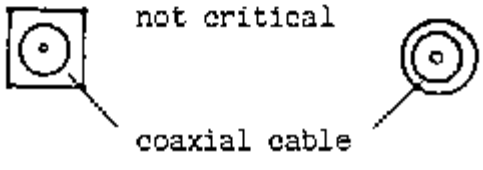


Figure 461 Dimensions

	70cm band		23cm band
h	55 cm		25 cm
a	10 cm		3 cm
R	2 cm	to	1.8 cm



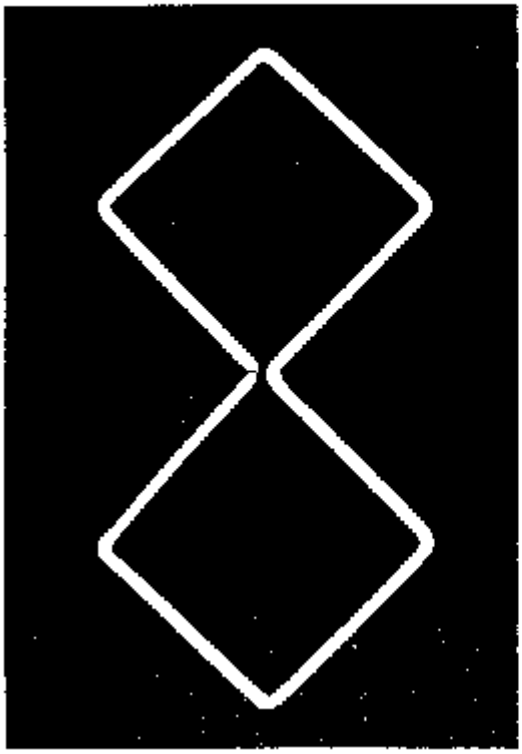


Figure 462
Dimensions of the quad element

Band:	70 cm	23 cm
width of side (inside)	17-17.5 cm	6 cm

Material: Copper, 4mm diam.

The quad radiator is bent from a single piece of wire as shown by the photograph. The transmission line is connected at the centre with the inner conductor being connected to the left and the outer conductor connected to the right (or vice-versa).

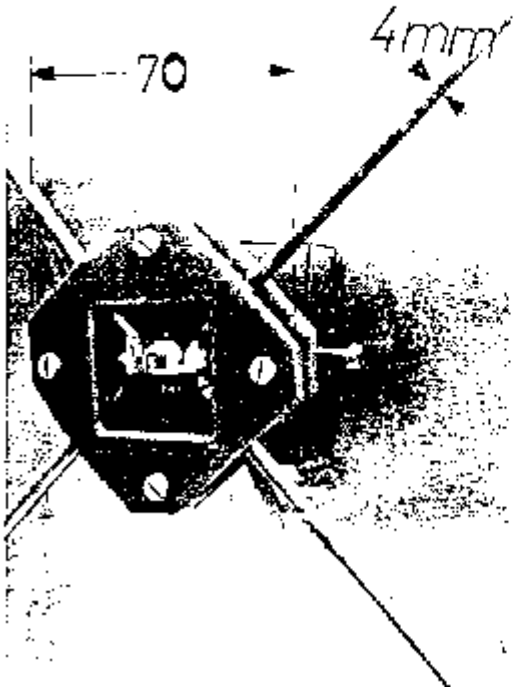


Figure 463
Quad support of the 70cm version. The driven element is clamped between two PVC plates in this particular case. Other synthetic materials may be employed since voltages are minimal at this "cold" point. The feed assembly should be sealed in the case of permanently installed aerials.

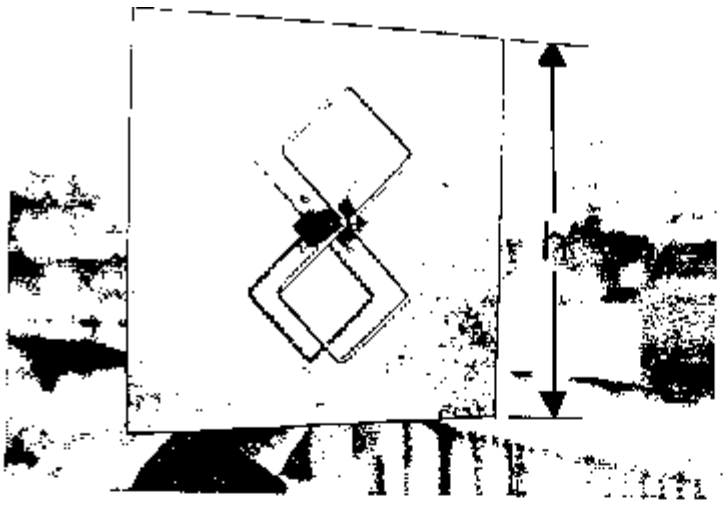


Figure 464
Overall view of the 23cm version. See figure 461 for dimension h.

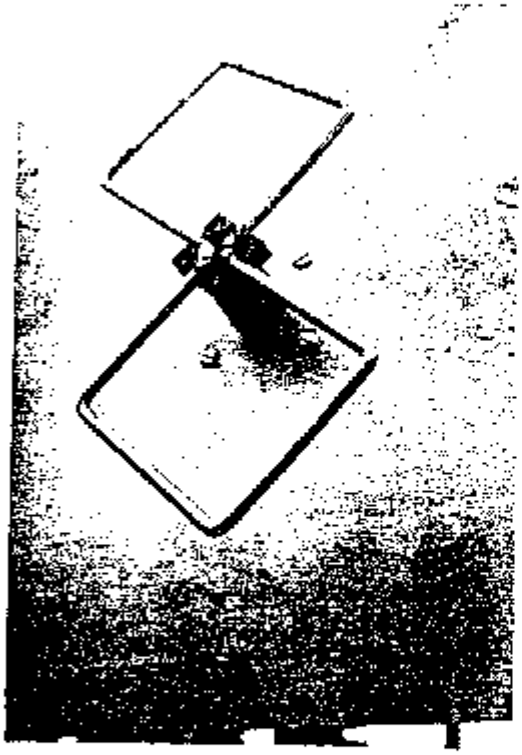


Figure 465
The coaxial cable (such as RG-8, RG-9, RG-213 or equiv.) is routed through the plastic tubing and soldered to the twin-quad (inner conductor to the right, screening to the left). The feed point of a permanently installed aerial should be sealed against water intrusion.

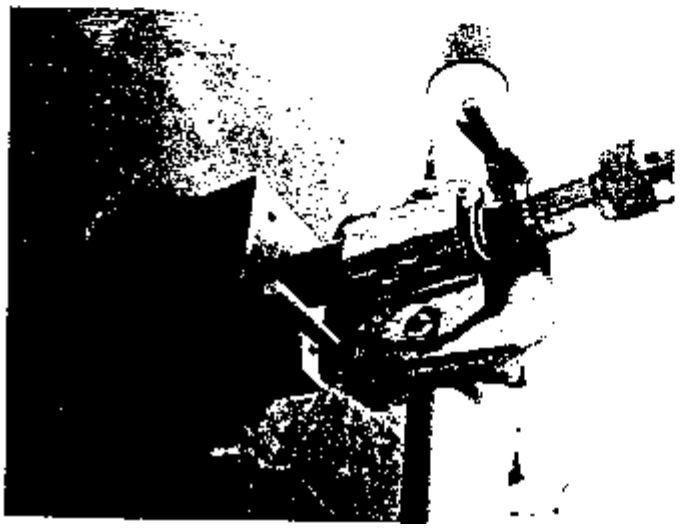


Figure 466
Rear view. A normal holder as customary for t.v.aerials is used to clamp the aerial to the aluminium mast. An N-connector (G.4) terminates the Flexwell cable used in our sample at the rear.

The UHF version with reflector plate designed by DJ9HO was additionally optimized by means of a commercial (HP) return-loss instrument. The shown trace was painted onto the scope of the instrument. The horizontal axis represents the frequency range 1.0 to 1.5 GHz. The vertical axis represents the logarithm of the power reflected by the aerial. It is clear to see that the return loss is approximately 30 dB. This means that the power reflected by the aerial is 30 dB below the incident power. The voltage across the "reverse detector" of a VSWR meter at an incident power of 10 watts into a correctly tuned aerial is so small that there is practically no movement of the needle, i.e. practically all the power is absorbed by the aerial (as in a dummy load), amplified according to the gain and emitted into space as effective radiated power.

An example based on this 23cm aerial and an assumed incident power should clarify this and aquaint the OM with the terminus "return loss".

TX power (incident)	return loss	at approx. freq. (MHz)	power refl. by aerial	power emitted by aerial
10 watt	3 dB	1200/1500	5 watt	5 watt
10 watt	6 dB	1240/1400	2.5 watt	7.5 watt
10 watt	10 dB	1250/1350	1.0 watt	9.0 watt
10 watt	20 dB	1270/1310	0.1 watt	9.9 watt
10 watt	30 dB	1290/1300	0.01 watt	9.99 watt

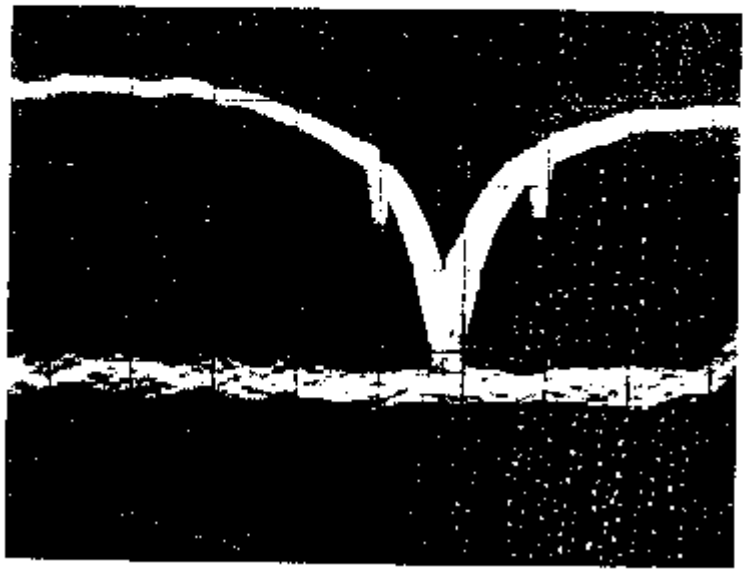
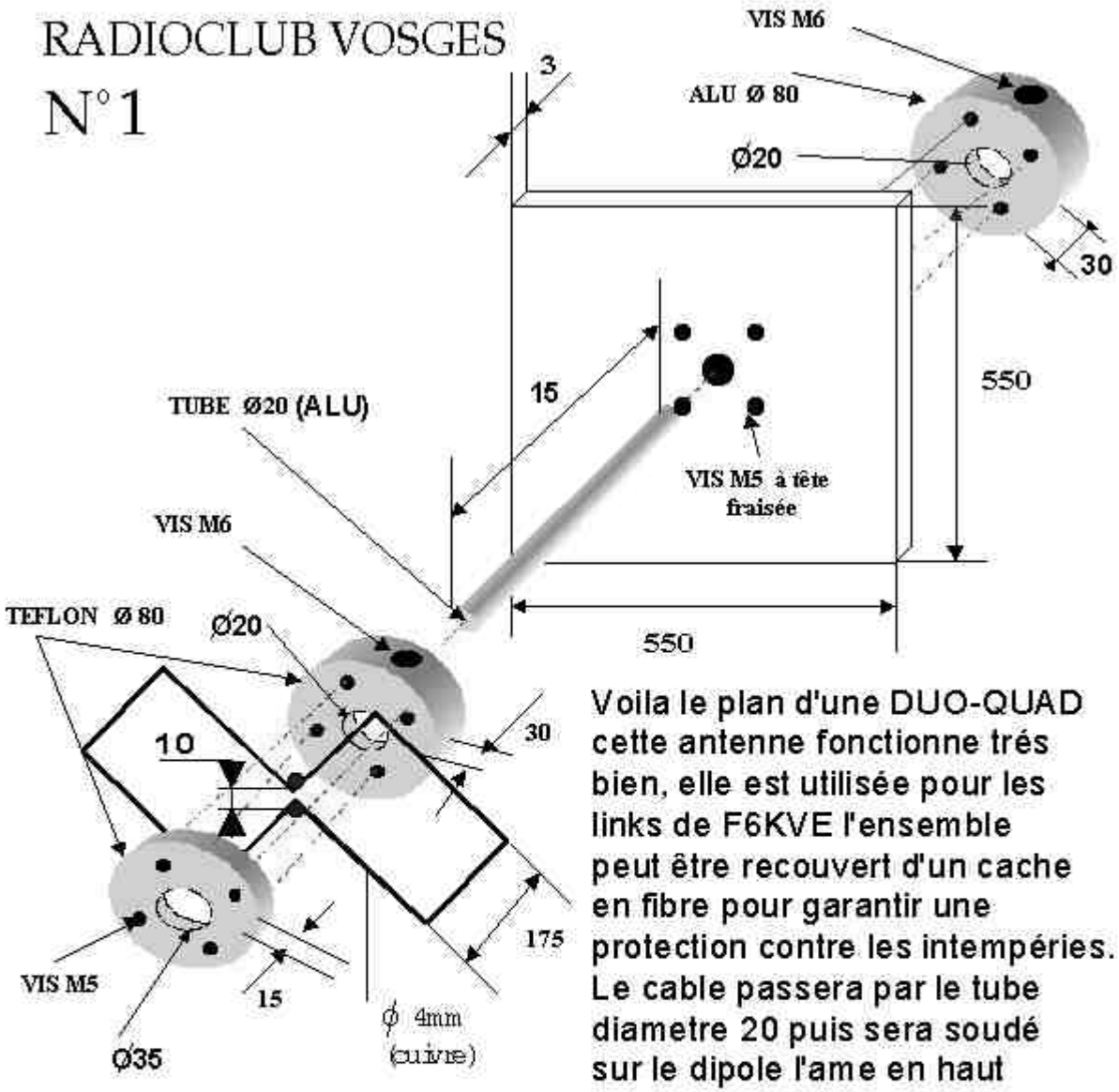


Figure 468
Scale:
horizontal: 50 MHz/div.
vertical: 10 dB/div.
return loss

1 GHz 1,3 GHz 1,5 GHz

RADIOCLUB VOSGES

N°1



Voila le plan d'une DUO-QUAD cette antenne fonctionne trés bien, elle est utilisée pour les links de F6KVE l'ensemble peut être recouvert d'un cache en fibre pour garantir une protection contre les intempéries.
Le cable passera par le tube diametre 20 puis sera soudé sur le dipole l'ame en haut et la masse en bas.
(voir points bleus)
Le R.O.S se règle en fonction de l'espacement entre le dipole et la plaque de tôle.(env 100 mm)

DUO-QUAD 430MHZ

F4ASB@F6KVE