

J-POLE ANTENNA

(Vertical End Fed Hertz)

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The J-Pole antenna is an omnidirectional antenna that can be used for base, mobile and field day stations. It does not need a ground plane, radials or a complicated matching system. The J-Pole can be cheaply, simply and quickly constructed using a variety of techniques, some of which are discussed in this article.

THEORY

The J-Pole antenna consists of a half-wavelength radiator fed by a quarter-wave matching stub. Effectively, the antenna is an end fed dipole. The antenna has an omnidirectional pattern with a low take-off angle. The quarter-wave stub is a transformer that provides a means of transforming the high impedance of the antenna to that of the transmission line.

Materials

Almost any conceivable material may be used to construct a J-Pole. The main considerations being where the antenna will be located, the effects of weather, construction of the short-circuit between the two elements and the method of attaching the transmission line to the antenna.

Some possible materials are aluminium tubing, 300 Ω twin lead, wire, copper tape and copper tubing. 300 Ω twin lead J-Pole antennas are light and very portable.

Attaching the Feedline

The feedline can be attached by welding it to the elements or by making or using commercially available clamps. Some designers suggest using self-taping screws, but I do not recommend this as it can weaken the elements and provide a hole for water to seep into

the antenna. Lugs can be soldered to the end of the transmission line to simplify attachment. The locations of the transmission line feedpoints usually needs to be determined by trial and error and adjusted from design guidelines to give the lowest SWR.

Sealant

If the antenna is too be installed outside for prolonged periods of time then all joints and the co-axial cable connections should be sealed using a neutral cure (one that doesn't smell like vinegar) sealant to prevent water ingress and corrosion.

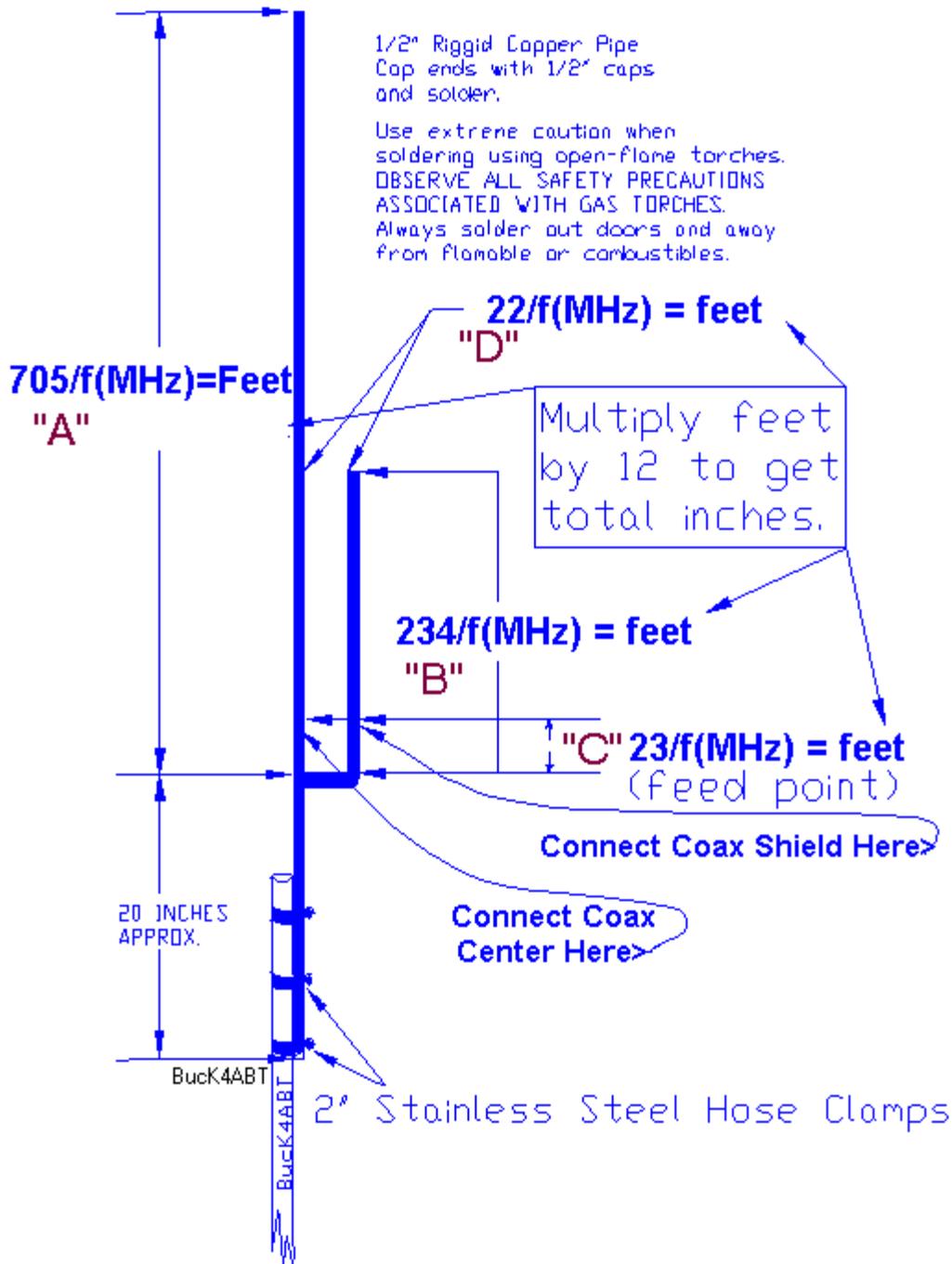
Balun or Choke

Co-axial cable is an unbalanced feedline, and it will radiate from the outer shield and affect the radiation characteristics of the antenna. Therefore, if co-axial cable is used as the feedline then a choke or balun is recommended.

A choke wound from four to six turns of coaxial cable with a diameter of 125 mm can be used. Alternatively, depending on the type of co-axial cable used, a ferrite bead balun or other current type balun could be used. One suggestion is to use a 50-ferrite-bead (FB-73-2401) sleeve-over-coax balun (a W2DU type balun) taped to the base of the antenna.

Mounting the Antenna

The antenna may be fastened to any supporting structure including grounded metal. Ideally, the antenna should be mounted at least a quarter-wavelength above any metal structures.





Copper J-Pole

Frequency {MHz}	146	223	440	28.2
Total Length {in.}	60.625	39.692	20.116	313.874
To Notch {in.}	20.250	13.258	6.719	104.840
Stub {in.}	3.000	1.964	0.995	15.532
Spacing {in.}	3.000	1.964	0.995	15.532