

The Miniquad

The Miniquad has two unusual features. 1) It is of all-metal construction¹, thus eliminating the problems of treating bamboo and welding spiders, only to have the whole antenna come tumbling down in a year or two, and 2) It is miniaturized², taking up less than *half* the space of a normal two-element quad. Added features of the Miniquad are its low cost, extremely light weight, and general ease of construction. The Miniquad can be built from parts of an old beam, or it can be fabricated from scrap aluminum. It is light enough to be turned by a low-priced TV rotator.

Theory

The antenna illustrated in Fig. 1 is essentially a two-element quad with .12 wave-

length spacing. Note that the two loops are insulated from the booms and thus from each other. The horizontal dimension is $.25\lambda$, while the vertical dimension has been reduced from the usual $.25\lambda$ to $.125\lambda$. The difference is made up with loading coils at the bottom of each of the two loops. The Miniquad is thus *rectangular*, rather than cubical, in configuration. The 52-ohm transmission line is inductively coupled to the loading coil on the driven element.

Construction

The Miniquad lends itself to much flexibility in construction. The original version was built at almost zero cost from the parts of an old Telrex beam. However, eight ten-foot sections of tubing of almost any mater-

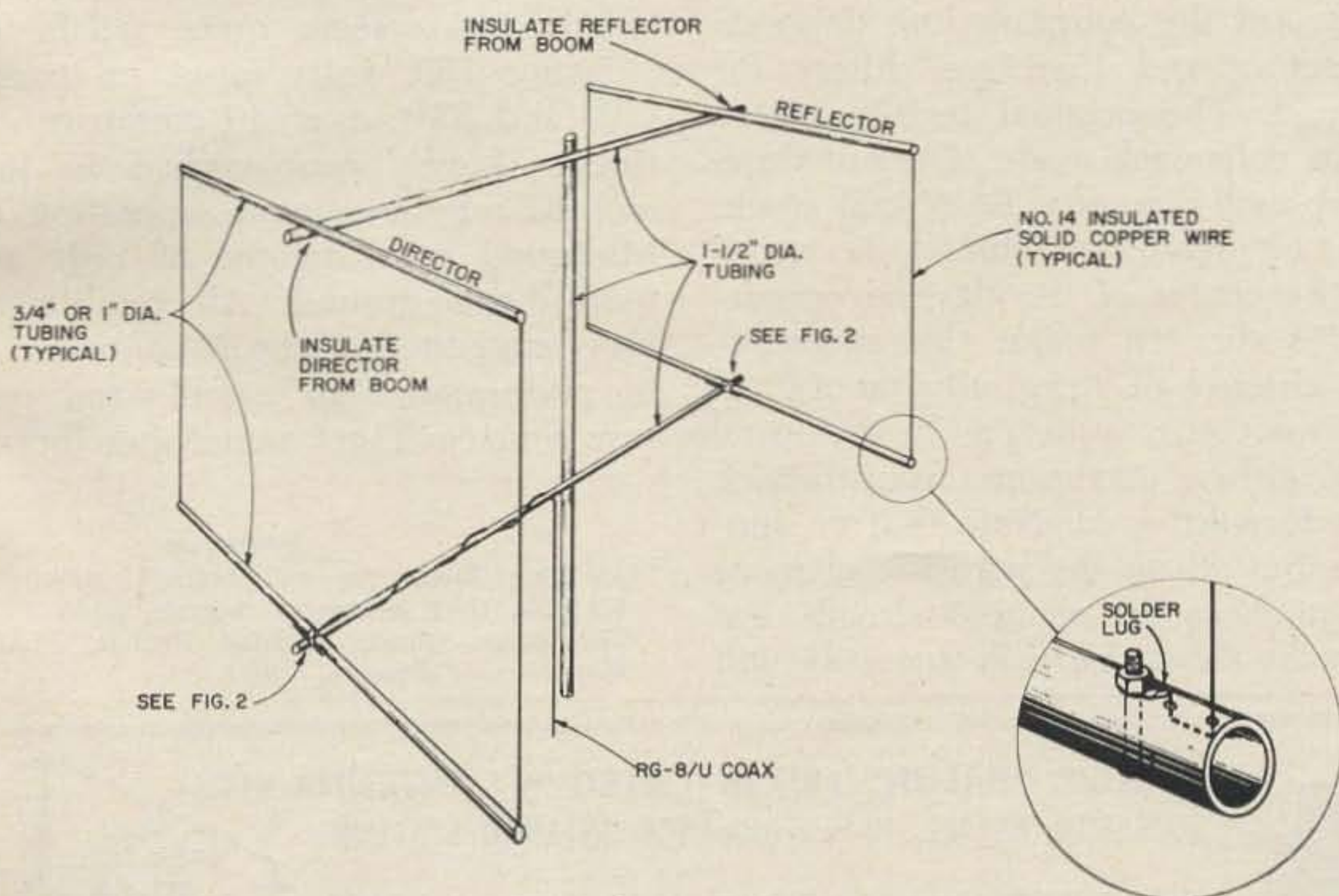


Fig. 1. Construction of the miniquad. For operation at 14250 kHz, element spacing is 100 inches, the horizontal supports are 208 inches long and the vertical distance between the horizontal supports is 104 inches. The upper supports are insulated from the boom with standoff insulators.

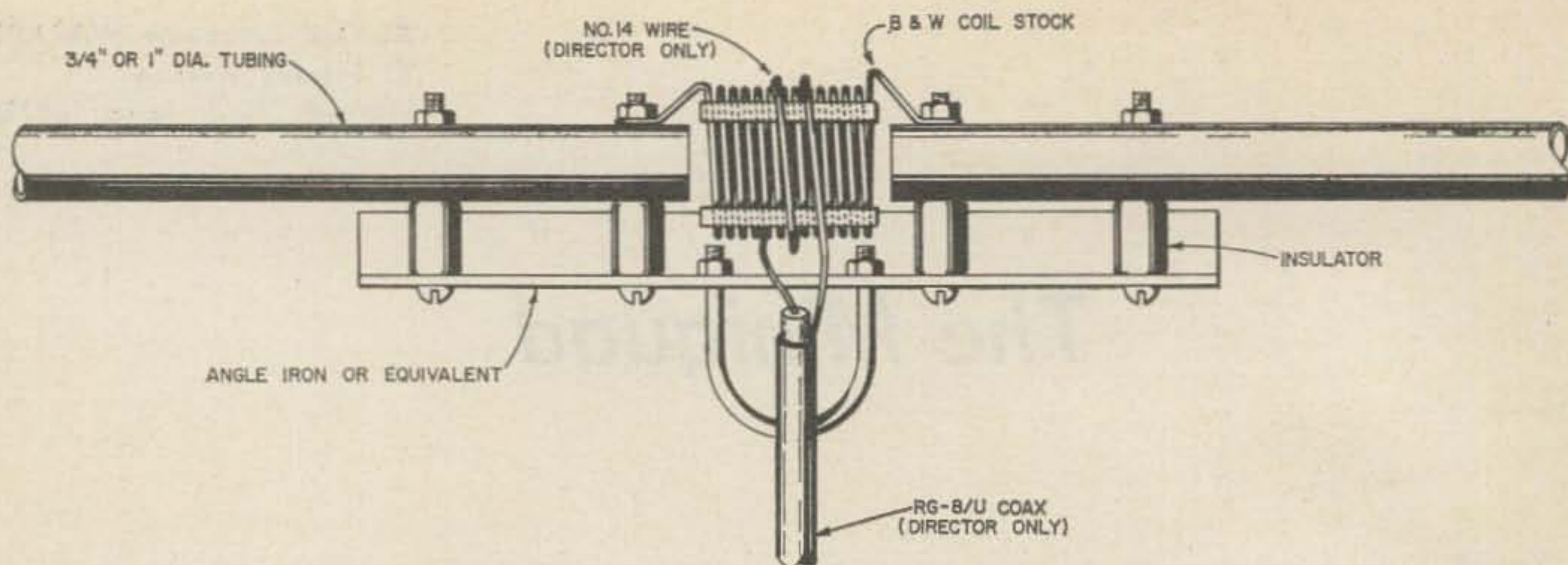


Fig. 2. Loading coil for the miniquad: a piece of coil stock two inches in diameter and three inches long is about right. The feedline is coupled into the antenna with a two or three turn loop around the loading coil.

ial and any diameter provide elements. Center mounts can be constructed of aluminum angle irons with standoffs as insulators. Masts and booms are made of TV masting. Standard antenna hardware is used for mounting the booms to the mast.

The vertical portions of each loop are of insulated number 14 solid copper wire, of the type commonly used in electrical housewiring. The wires may be attached to the ends of the horizontal elements by any convenient means. The wires should be tightened so that the top and bottom elements "bow" slightly toward each other.

Coils

The exact number of turns for the two loading coils and the coupling link depends on many factors and therefore differs for each Miniquad. The original twenty meter Miniquad has coils each made of about three inches of two-inch-diameter B&W coil stock. The driven element coil should be grid-dipped for the center of the desired operating band. Be sure to make this measurement in the absence of stray inductances.

The reflector coil is adjusted, in the usual manner, for either maximum front-to-back ratio or best forward gain. Note that no tuning stub is required on the parasitic element of the Miniquad, as the element already has a loading coil. Thus the reflector coil will

simply have somewhat more inductance than that of the driven element.

The 52 ohm coax is coupled to the driven element by winding about five turns of insulated #14 solid copper wire around the loading coil. Since only this link is across the transmission line, a very low standing wave ratio may be obtained by proper choice of the number of turns.

Performance

The SWR of the twenty meter Miniquad used at WA2APT is less than 1.5:1 for the entire band, and close to 1:1 over much of the band. Transmitter output tuning is quite broad, with retuning required only for large frequency changes. Front-to-back and front-to-side ratios seem quite satisfactory.

Using 150 watts input on twenty meter CW and SSB, over 40 countries on all continents have been worked in just a few months of occasional operating, using the Miniquad at a height of only twenty-five feet above ground. All qualitative indications suggest that the Miniquad comes close in performance to a full-sized quad. Who says you can't get something for nothing?

... WA2APT

Footnotes

- 1 "All-Metal Quad for 15 Meters", Edwin Fehrenbach, KZ5EG, *QST Magazine*, March, 1961.
- 2 "The Short Quad," Walter Pinner, WA8BHP, *QST Magazine*, February, 1964.



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