It's time for Field Day, and if you're looking for an all-purpose portable antenna to get you on 80, 40, and 20 meters, W6FZA's variation on the good 'ol dipole may be just what you need.

A Three-Band Field Day Dipole

BY ALAN MARGOT,* W6FZA

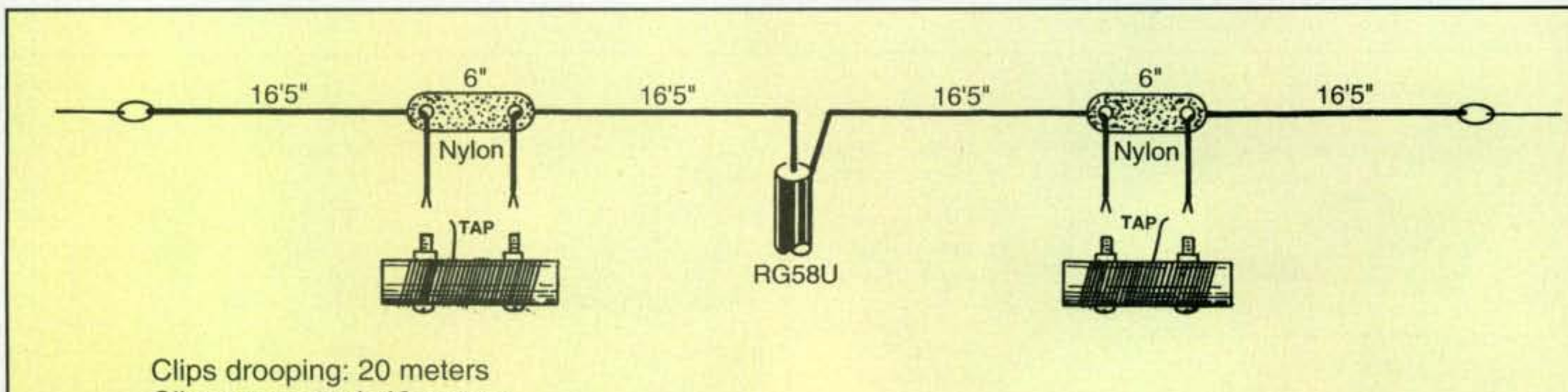
The old-fashioned dipole is hard to beat for portable and Field Day work. Just tie twine to the ends, throw them over a branch, and you're on the air! If the ends are lower, push up the middle and call it an inverted Vee. It is also a forgiving antenna, both mechanically and electrically. No tuner is necessary. Just put it up and talk!

The antenna I started with was a two-band 20/40-meter dipole that has been used for years on Field Day, and then coiled up and put away in my garage. It has been responsible for thousands of contacts. Now, however, with the sunspot cycle bottoming out, 80 meters is an important consideration for Field Day contacts.

In its original state, the antenna was a 40-meter dipole with a 6-inch break at the center of each side, secured by 6-inch nylon loops (heavy fishline could also be used). At each end of the break the wires are terminated in clips, with 1- or 2-inch clip leads. The clips can be

*P.O. Box 12106, Palm Desert, CA 92255
e-mail: <radioham1932@aol.com>

Photo A– Test setup in the author's back yard. The antenna is barely visible above the trees (look for the coil) as it climbs toward the top of the PVC mast.



Clips drooping: 20 meters
Clips connected: 40 meters
Coils clipped in: 80 meters
Outer clip to tap: 75 meters
See "Coil Data" table for tap location

Fig. 1– The set of coils that resonates on 80 meters with a tap for 75.

Photo B– The 80-meter coil as installed in the 20/40-meter dipole. (This may help you find the antenna in photo A.)

left to droop for 20 meters or be clipped together for 40. Lowering the antenna and changing the clips takes only a few minutes. Thus, I figured, why not make loading coils to put between the clips to make the antenna resonant on 75 and 80 meters?

Not So Fast . . .

The answer was not quite as easy as it appeared it would be. After spending more than 70 years making wire antennas, this old sliderule engineer estimated that a coil of around 30 µH would be about right. However, after many pleasant hours spent experimenting with coil diameter, length, and number of turns, I found that about 43 µH of inductance per coil would be necessary to bring the antenna to resonance on 80 meters, and about 31 µH for 75. Several sets of coils have been made, including one set (see fig. 1) that resonates on 80 meters with a tap for 75. For someone anticipating using both 75 and 80, the latter set could be ideal. Performance of all coils has been remarkably consistent when the following specs are observed.

The coils are wound on 4-inch-long sections of 1 1/4-inch (I.D.) thick-wall PVC pipe, which has an outer diameter of 1.7 inches. Holes were drilled at each end, about 3 1/2 inches apart, and 1-inch screws were put through to terminate the coils and provide studs for attaching the clips. RadioShack #22 insulated hookup wire was used for the coils. This wire comes in a packet of three little spools with about 25 feet per spool (RadioShack part #278-1224). This wire turns snugly at 16 turns per inch so that the 48-turn, 80-meter coils have a length of about 3.1 inches. It is important that no substitutions be made here, as a #22 wire with slightly thicker insulation would make a longer coil and a new set of parameters would be required. (Several other types of wire were tried, but this was by far the neatest and easiest to handle.)

The coils do their job beautifully on both 75 and 80 meters, although the bandwidth is a little narrower than expected, with the 2:1 SWR points about 30 kHz on either side of the resonant frequency (as shown, the resonant frequencies are 3580 kHz for 80 meters and 3900 kHz for 75). A small tuner

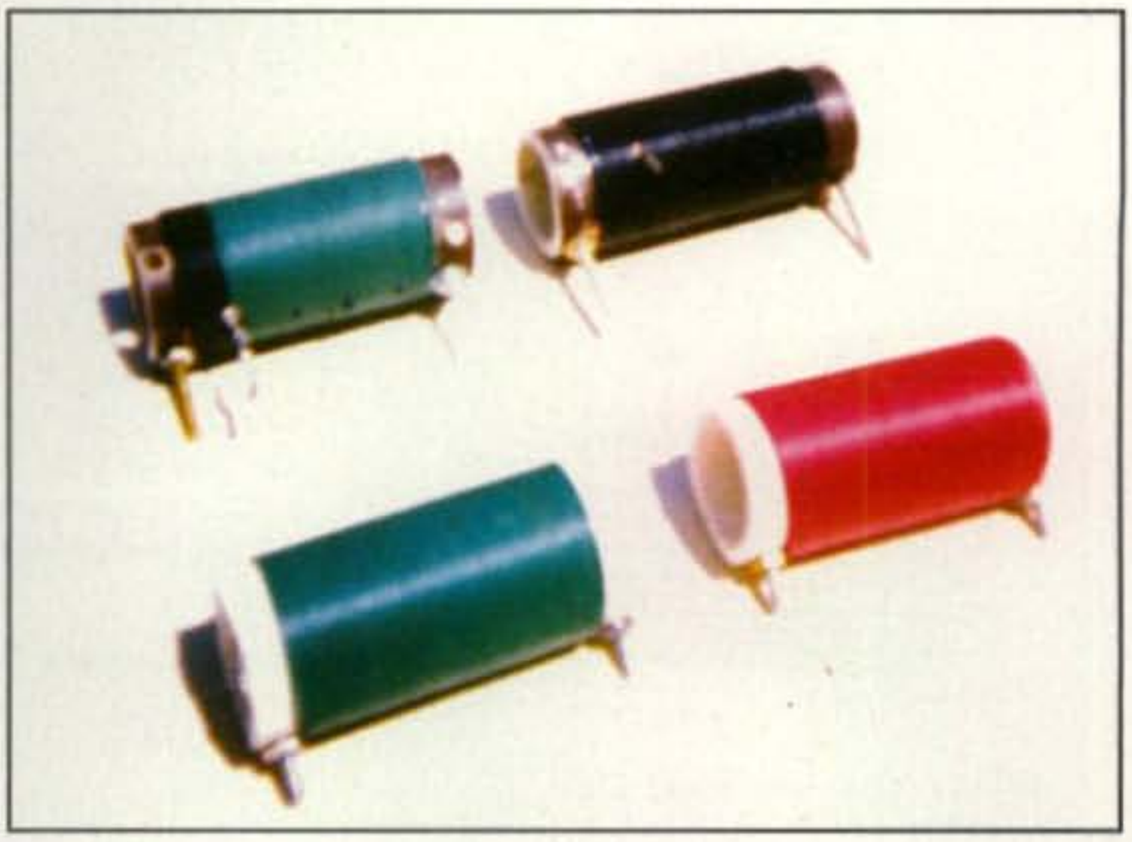


Photo C– Close-ups of the loading coils. The two in the foreground are for 80 meters only. The two in the rear are for 80 meters, with taps added for 75 meters.

Frequency	Turns	Length	Diameter
3580 kHz	48	3.1"	1.7"
3900 kHz	39	2.6"	1.7"

Wire: RadioShack #278-1224 #22 insulated hookup, 16 turns per inch

Table I– Coil data.

can easily allow the antenna to cover the entire 3.5–4-MHz band. As a side note, staggering the coil inductances did not widen the bandwidth, but did send the SWR skyward!

A Winner on the Air

The three-bander is a winner on 20 and 40 meters and a very satisfactory compromise on 75 and 80. It outperforms many 80-meter configurations in the field, because the high-current portion is up high, free and clear. At portable setups such as Field Day, many other 80-meter antennas of less than 70 feet in length often have their maximum current points in among the obstacles or even in the tuner!

Although the higher the better, as with all antenna installations, the three-bander performs well at lower installations as well. Tests showed that lowering the ends to within a foot of the ground made only small changes in SWR and frequency response. For 80 meters, this antenna would be unquestionably better if the loading coils were nearer the ends, but that is impossible here without losing the 20/40-meter combo. Occupying a temporary location in my back yard with the center up about 25 feet and the ends at 10 feet (a typical Field Day installation), the 80-meter performance was a happy surprise, with contacts up and down the coast yielding good reports.

There are also some possibilities for permanent installations for users with limited space. The three-band antenna described here requires only 64 linear feet when pulled wide, and much less when the ends are dropped vertically. Up to 10 feet at each end could be allowed to drop vertically with no effect on 20-meter operation and very little effect on 40, meaning that it's possible to squeeze this antenna into a 45-foot linear space, as long as 10-foot vertical drops are possible. ■