ANTENNAS & THINGS

BY JOE CARR, K4IPV

SIMPLE ANTENNAS AND ACCESSORIES FOR SIGNAL IMPROVEMENT

This is the first installment of a new bi-monthly antenna column in *Popular Communications*. In future installments I will take a look at different antennas that operate in various popular bands from DC to daylight (well, maybe not quite that broad!) for shortwave listeners, VHF/UHF monitor/scanner listeners, BCB and VLF DX'ers, and others. I will also do a few product reviews of both antennas and antenna related accessories. There may even be a construction project or two . . . antenna related, of course.

What the column will *not* cover are non-antenna related topics and ham radio antennas. There is plenty of material around on ham antennas, including articles in *CQ* magazine, so we will not cover antennas for these bands. The thrust of the articles in this column will be practical. Antennas theory will be kept to a minimum (in fact, a deep null), while "how-to" build-it will be covered in depth. Most of the antennas that I will cover in this column either I personally, or any of several close friends, have built and tested. I welcome your input: suggestions, brickbats, kudos or bribes can be sent to me either c/o the editor, or at P.O. Box 1099, Falls Church, VA 22041. Now let's get down to brass tacks.

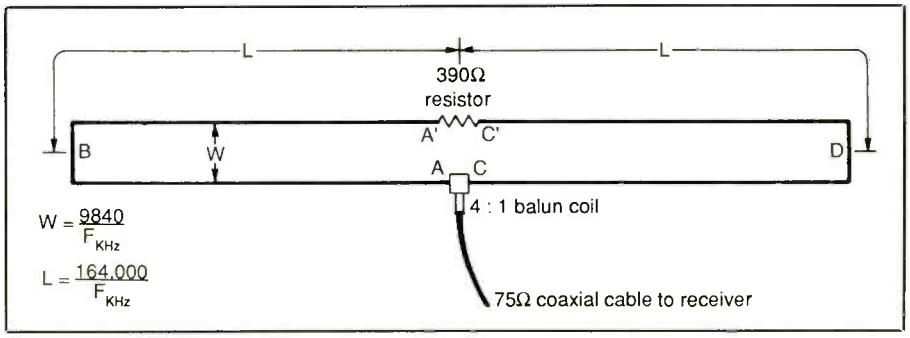

Figure 1

Build the TCFTFD Dipole

Several different "standard" high frequency (HF) antennas are used by shortwave listeners, but random length wires and dipoles are by far the most common. Both of these antennas are susceptible to noise pick-up from the local environment, with the random length wire being more susceptible than the half wavelength center-fed dipole. In addition, the dipole is rather long at low frequencies. For example, a 49-meter (≈6000kHz) dipole antennas is on the order of 77 feet long. The *tilted, center-fed, terminated, folded dipole* (TCFTFD, also sometimes called the T²FD or TTFD) is an answer to both the noise pick-up and length problems (the over-

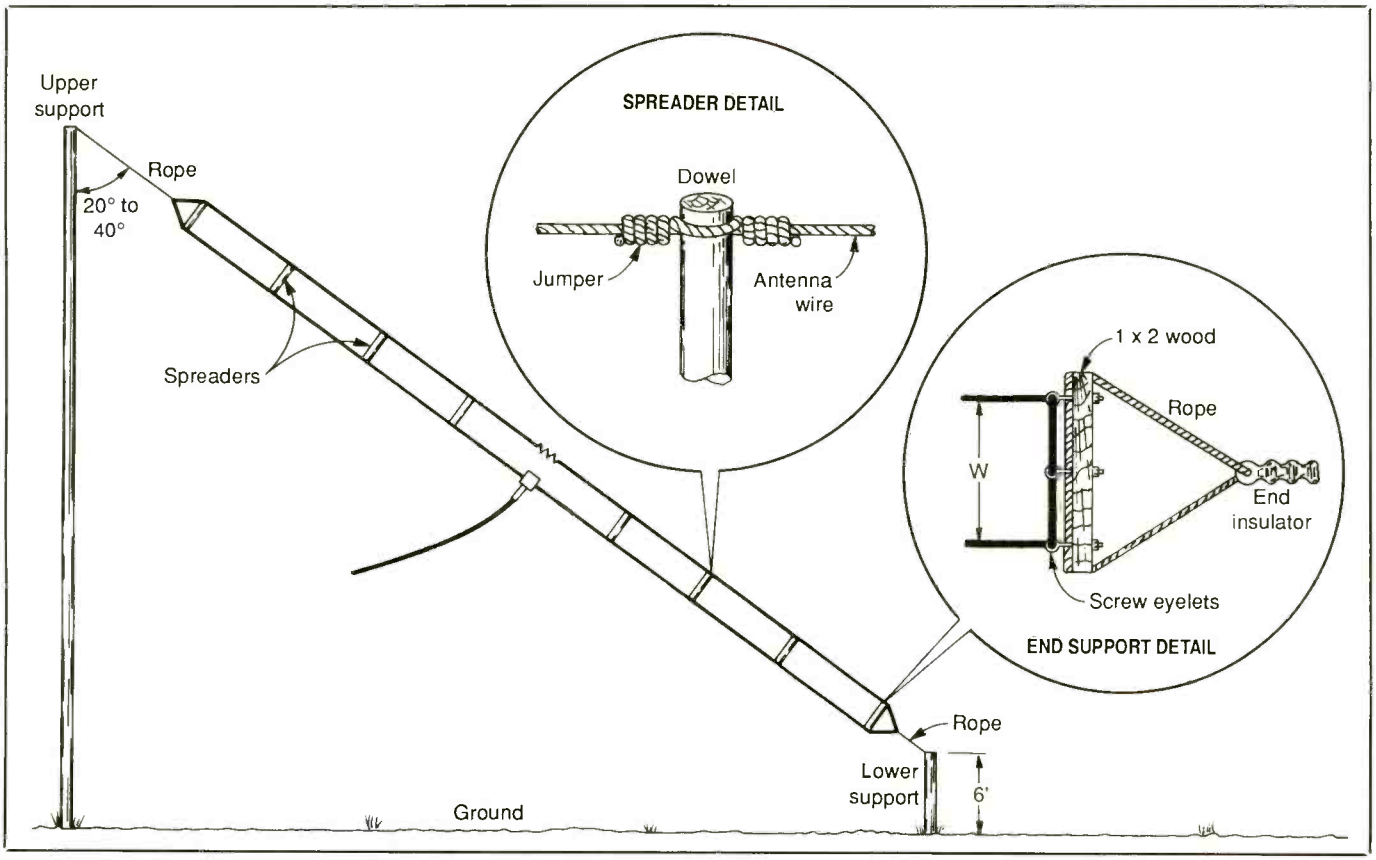

Figure 2

Table 1
Dimensions For Other Bands

Band	Length (L)	Spread (W)
41-m	23″	16.5″
31-m	16′11″	12″
25-m	13′11″	10″
22-m	12′	8.6″
19-m	10′8″	7.75″
16-m	9′3″	6.75″
13-m	7′7″	5.5″

all length for a 49-meter TCFTFD antennas is 54 feed). This antenna was first described in public in 1949 by Navy Captain C.L. Countryman, although the U.S. Navy tested it for a long period in California during World War II. The TCFTFD can offer claimed gains of 4 to 6 dB over a dipole, depending on the frequency and design, although 3 dB is probably closer to the mark.

In addition, the TCFTFD can also be used at higher frequencies than its design frequency. Some sources claim that the TCFTFD can be used over a five or six to one frequency range, although my own observations are that four to one is more likely. Nonetheless, a 49-meter antennas will work over a range of 6,000 kHz to 25,000 kHz, with at least some decent performance up into the 11-meter Citizen's Band.

The basic TCFTFD antenna, shown in Fig. 1, resembles folded dipole in that it has two parallel conductors, of length "l," spaced a distance "W" apart, and shorted together at the ends. The feedpoint is the middle of one conductor, where a 4:1 BALUN coil and 75-ohm coaxial cable transmission line to the receiver are used. A non-inductive, 390-ohm resistor is placed in the center of the other conductor. This resistor can be a 1-watt or 2-watt carbon composition or metal film resistor, by MUST NOT be a wirewound resistor. The TCFTFD can be built from ordinary #14 stranded antenna wire.

For a TCFTFD antenna covering 49 through 11 meters, the spread between the conductors should be 19½ inches, while the length (L) is 27 feet. Note that length L includes one-half of the 19-inch spread because it is measured from the center of the antenna element to the center of the end supports.

Construction of the antenna is shown in Fig. 2. The FCFTFD is a sloping antenna, with the lower support being about 6 feet off the ground. The height of the upper support depends on the overall length of the antenna. For a 49-Meter design the height is on the order of 50 feet.

The parallel wires are kept apart by spreaders. At least one commercial TCFTFD antenna uses FVC spreaders, while others use ceramic. You can use wooden dowels of either 1-inch or 5/8-inch diameter, although a coating of varnish or urethane spray is recommended for weather protection. Drill two holes, or a size sufficient to pass the wire, that are the dimension "W" apart (19-inches for 49-Meters). Once the spreaders are in place, take about a foot of spare antenna wire and make a jumper to hold the dowel in place. The jumper is wrapped around the antenna wire on either side of the dowel and then soldered.

The two end supports can be made of 1x2 wood treated with varnish or urethane spray. The wire is passed through screw eyes as shown in the inset to Fig. 2. A support rope is passed through two holes on either end of the 1x2, and then tied off at an end insulator.

The TCFTFD antenna is noticeably quieter than the random length wire antenna and somewhat quieter than the half wavelength dipole. When the tilt angle is around 30 degrees, the pattern is close to omnidirectional. Although a litter harder to build than dipoles, it offers some advantages that ought not be overlooked. The dimensions given above will suffice when the "bottom end" frequency is the 49-Meter band, and it will work well on higher bands. For other bands (and higher) use the dimensions in Table 1.

Joe Carr is a well-known technical writer with a quarter century of experience. He is employed as an electronics engineer, and worked for 16-years as an electronics technician. He is a ham radio operator, and has held the callsign K4IPV since 1959. His shortwave listening activities go back to 1957 when he used a Knightkit regenerative shortwave receiver, which was soon replaced by an aged Hallicrafters S-20R. Today, his equipment is a bit better. Joe is the author of Practical Antenna Handbook (TAB Books, Blue Ridge Summit, PA 17294-0850; Catalog no. 3270, $21.95; 1-800-233-1128) and the forthcoming Joe Carr's Receiving Antennas Handbook *(HighText Publications, Inc. 7128 Miramar Road, #15, San Diego, CA 92121.)*