simple high-gain wire antenna for high-frequencies

Design and layout of a four-element, double-extended Zepp that provides up to 7-dB gain on 15 meters

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There's an old saying that you can't get something for nothing, especially when you're working with antennas, but you *can* make one wire antenna, the length of a 75-meter dipole, work like a bomb on 75 and deliver 7-dB broadside gain on 15! This is only one-half dB less than a three-element beam on this band. I call the antenna the FEDEZ – Four-Element Double-Extended Zepp.

Many amateurs have used the extended double Zepp which gives 3-dB gain at its design frequency. However, with the addition of phasing stubs and two more elements you can obtain up to 4-dB more gain. All it takes is a little arithmetic which, in my case, was supplied by W6DMY. The basic design was taken from the 1943 edition of the ARRL *Antenna Handbook*. The dimensions for any frequency are given in electrical degrees in **fig. 1** (remember that 180° = 1/2 wavelength).

Since most of my on-the-air activities are confined to nets on 75 and 40 meters, with hamming just for fun on 15, the four-element double-extended Zepp I use has a 21.3-MHz center frequency (see **fig. 2**).

Although the two 7.68-foot phasing stubs can hang straight down from the antenna as shown in **fig. 2**, I use lumped constants for the two outer stubs as shown in **fig. 3**. Part of the 450-ohm open-wire feedline is used as the center phasing stub. Each of the lumped-constant stubs I use consist of an 11-turn coil, 2-inches in diameter, 2-3/4 inches long, wound with number-12 wire. Each end of the phasing coil is supported by the strain insulator as shown in **fig. 3.**

With this antenna I have yet to receive less than an S9 report on the SARO Bourbon net that meets every night on 75 meters, especially from San Diego and Medford, Oregon. On 15 meters I have received numerous S9 reports from the East coast as well as from Japan. WØQWH in Stanley, Kansas, who has given me signal checks on 47 different antennas over the past year, gave me his

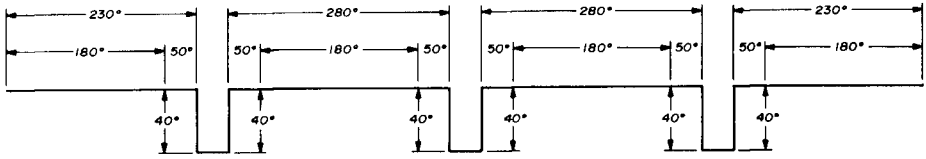

fig. 1. Basic design of the four-element, double-extended Zepp antenna. All dimensions are given in electrical degrees (180° = 1/2 wavelength).

best report, although it wasn't S9 — he apparently has a very stingy S-meter!

The dimensions of my urban lot require that I use this antenna in the inverted-vee configuration. This detracts from the gain somewhat because the wide spacing between the centers of the elements determines gain, and the drooping legs reduce this distance slightly. However, since I feed the antenna with 450-ohm open-wire ladder line to the Ultimate Transmatch,[1] I think I've at last found the ultimate antenna to go with my ultimate transmatch. I don't think you can beat it for city-sized lots.

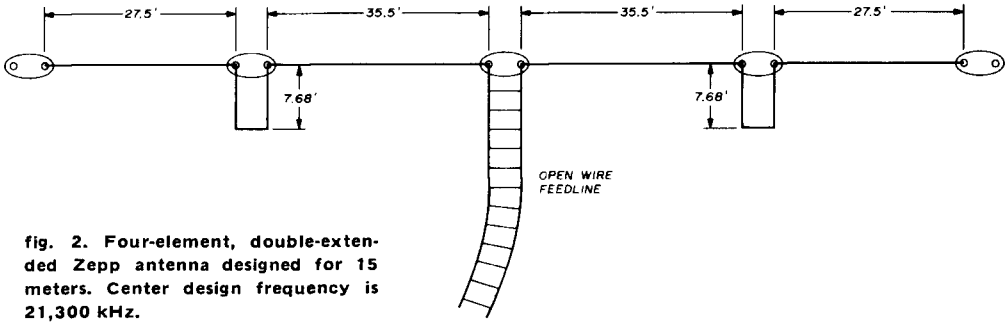

fig. 2. Four-element, double-extended Zepp antenna designed for 15 meters. Center design frequency is 21,300 kHz.

reference

1. Lewis G. McCoy, W1ICP, "The Ultimate Transmatch," *QST*, July, 1970, page 24.

ham radio

fig. 3. The two outer phasing lines can be hung down from the antenna as shown in fig. 2, or phasing inductances may be used as shown here. L1 and L2 are each 11 turns no. 12, 2" diameter, 2-3/4" long. Antenna may be used in the inverted-vee configuration if space is limited.