

A Center-Fed "Zepp" for 80 and 40

Fast QSY for the Phone-C.W. Operator

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The center-fed "Zepp" antenna is reviewed by W4NML, showing how complete coverage of a single band is made easy by using old concepts. Although the author shows how to use the Zepp on 80 and 40, only, the system can be used from 80 through 10 meters by employing an all-band transmatch.

MULTIBAND antennas fed with resonant feeders were very popular in the pre-coax cable days. This article is presented to review a good, but seemingly forgotten system. This antenna should be of interest to traffic and contest operators, and to the casual operator who likes to use both the c.w. and phone portions of the 80- and 40-meter bands.

Our section s.s.b. net meets on 3965 kc. and the c.w. net meets on 3575 kc. Many schemes were tried to make one antenna usable on both ends of the band so that a low s.w.r. could be maintained while securing efficient operation at the different frequencies. None of the antennas tried would permit an excursion of more than 300 kc. without a serious s.w.r. problem between the transmitter and the line. Getting from 80 to 40 meters with such an antenna was even more perplexing. The writer's dilemma was finally solved by the installation of the old reliable center-fed Zepp antenna.

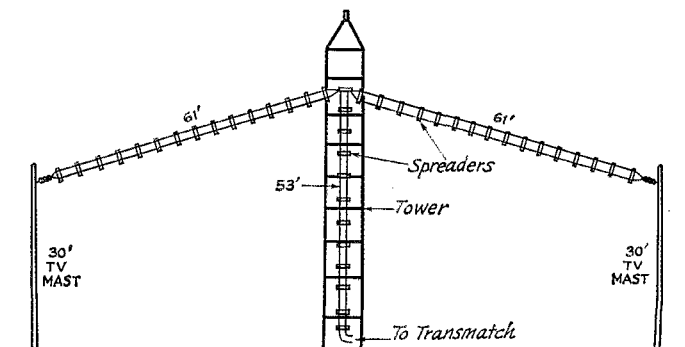
Choosing the Dimensions

In order to use the antenna on 40, 75, and 80 meters, tuned feeders are required¹. So that the feeders can be matched to the transmitter, a

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¹ Center-fed Antennas, *A.R.E.L. Antenna Book*, Chapter 6.

Fig. 1—Layout of the 2-band Zepp antenna. Dimensions for each part of the antenna are shown. Feed point is anchored to one of the wooden support arms (See Fig. 3).



transmatch is used at the "shack" end of the line. Parallel tuning is used to minimize the complexity of the transmatch. This requires that the transmission line presents a high impedance to the transmatch on both bands.

The charts in the handbooks did not give a set of Zepp antenna dimensions that were suitable for the author's installation. Because of the existing tower, which would permit the antenna to be supported at the 50-foot level, and because the ham shack was adjacent to the tower, the prescribed feeder lengths were not practical. A graph was plotted to show the frequency extremes to which the antenna would be tuned, showing the minimum and maximum impedance points across the bands. It was determined that the combined length of one leg of the feed line and one section of the dipole would be 114 feet.² A length of 53 feet was used for the feed line and each leg of the driven element was cut to 61 feet.

To broaden the antenna's response, the driven element's effective area was made larger by paralleling two lengths of No. 12 copper wire as shown in Figs. 1 and 2. With this arrangement, the Q of the antenna is lower, permitting the operator to QSY approximately 200 kc. without readjusting the transmatch.

Construction Notes

The driven element and the feed line are made from No. 12 copper wire. The 4-inch wide ceramic spreaders used to hold the feeder wires apart are made by the E. F. Johnson Co. Light-weight poly spacers are used to spread the driven-element wires and are sold as 'TV "clothespins" by the Telco Co. (Fig. 2). All of the spreaders are attached to the No. 12 wire by short pieces of No.

² This length is generally 145 feet for operation in the 3.5- to 30-Mc. range when the antenna is mounted horizontally (no droop), away from steel towers, and with a single-wire driven element. — Editor

18 copper wire. The distance between the spreaders is 4 feet for both the driven element and the feed line.

Sections of 1 × 4-inch lumber are used to hold the feeders away from the steel tower (Fig. 3). Each piece is 24 inches long, notched at one end, and is fastened to the tower with U-bolts. Porcelain telephone-type insulators are attached to the feed-line end of each board, offering low-loss anchor points for the transmission line. The uppermost support arm, at the 50-foot level, is used as a mount for the center of the driven element.

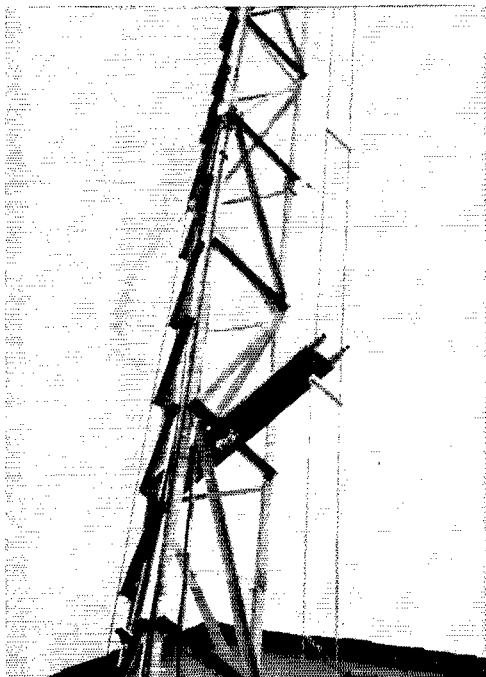


Fig. 3—Wooden support arms hold the transmission line away from the tower. Telephone-type insulators are mounted at the end of each board to make the feed line secure.

The far ends of the antenna are supported by 30-foot TV masts. A pulley and halyard arrangement is used for raising and lowering the ends of the antenna. Because the end supports are not as high as the feed point of the antenna, the dipole has a slight droop, but this does not seem to impair the performance.

The transmission line is brought into the operating position by means of feed-through insulators, mounted on a plywood strip which fits under a partially raised window. Insulated No. 12 house wire is used between the feed-through insulators and the transmatch.

Transmatch

Ideas for the author's tuner (Fig. 4) were taken from the excellent transmatch article by McCoy.³ Band changing is made possible by a

³ QST, July 1965.

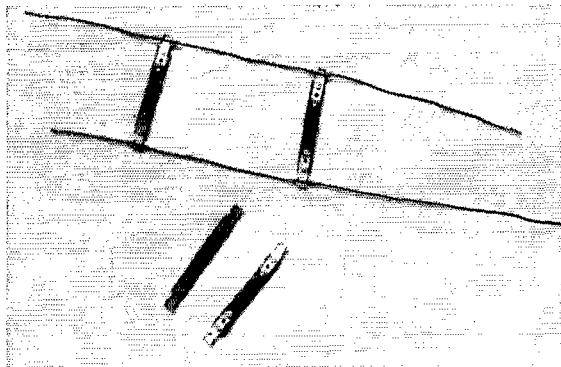


Fig. 2—Details showing how the driven element spreaders are attached to the No. 12 wire. No. 18 copper wire is wrapped above and below each spreader to hold it in place.

large ceramic switch (origin unknown) which was obtained at a hamfest. An identical switch is used for selecting the taps for the feed line (Fig. 5). Coil L_1 contains 56 turns of No. 14 wire, is 3 inches in diameter, and has 8 turns-per-inch (Air Dux 2408T). A stationary link, L_2 , at the center of L_1 , contains 8 turns of No. 14 wire and is a part of the Air Dux coil from which L_1 is made. The link is tuned with a 300-pf. variable capacitor. The author did not have a unit of the correct type, so two 150-pf. capacitors were parallel-connected (mounted under the chassis). Capacitor C_1 is a 100-pf.-per-section variable with wide spacing. To give L_1 some rigidity, it is mounted on a plexiglass tube which is supported by the frame of C_1 with stand-off insulators.

Results

While using clip leads, the correct tap points for the feeders were found by operating the transmitter through a Collins wattmeter and tuning C_1 and C_2 for zero reflected power. The

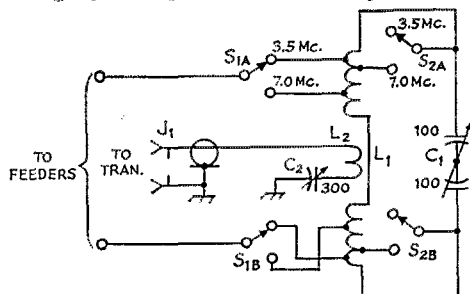


Fig. 4—Schematic diagram of the W4NML transmatch. C_1 —100 pf. per section transmitting variable. (Split stator type with 0.175-inch spacing between plates.)

C_2 —300-pf. variable capacitor (0.078 spacing or greater). J_1 —SO-239 coax connector.

L_1 —56 turns, 3-inch diam., 8 turns per inch coil. S_1 taps are 9 turns from ends of coil for 80 meters, and are 22 turns from ends of coil for 40 meters. S_2 taps are 5 turns from ends of coil for 80 meters and 17 turns from ends of coil for 40 meters. (Air Dux 2408T or Polycoils 1779 usable.)

L_2 —8 turns of Air Dux 2408T (center portion of L_1).

S_1, S_2 —Ceramic rotary, 2 poles, 2 positions, 2 sections.

transmatch permitted the transmitter to "see" 50 ohms in any part of either band. After establishing the correct tap points for the feed line, permanent connections were made between L_1 and the switches.

Next, the tuner was used with the 30L-1 amplifier at an output level of 700 watts. After a 30-minute QSO, no evidence of coil heating could be detected.

Results

When compared to other antenna systems used by the author, the new skywire showed improved performance. It was believed that some sacrifice in efficiency would result from changing to the new antenna. Happily, it was found that we could have our cake, and eat it too! Extended use indicated that the performance was, indeed, better than with previous antennas used.

I wish to thank three friends for their help in making this article possible: K4WVN for his tower climbing and photography work, K4ADK for building the transmatch cabinet, and Roy LeCrone for additional darkroom and photographic assistance.

Although this antenna system is an old standard, it may be the answer to your QSY problems. The cost is nominal and the results are most rewarding.

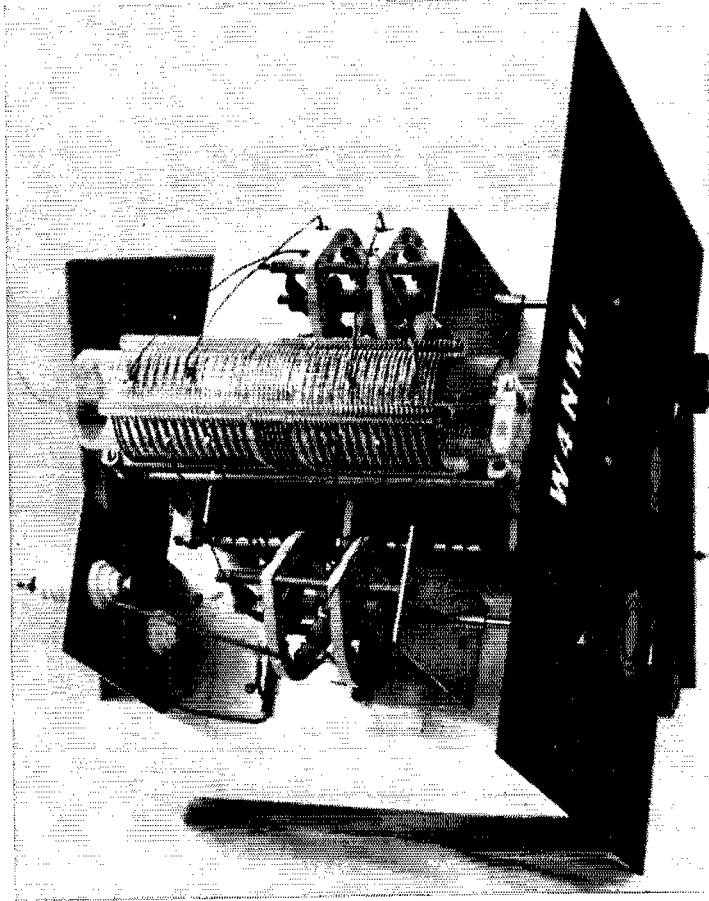
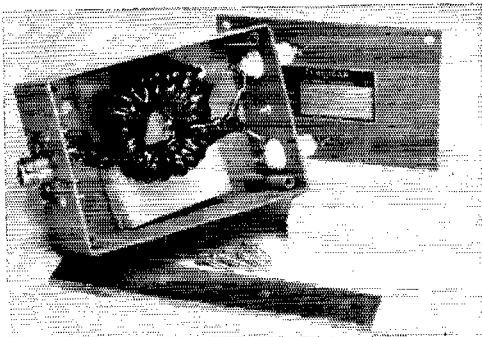


Fig. 5—Top-chassis view of the transmatch. C_2 is mounted under the chassis.

• New Apparatus

Broad-band Ferrite Baluns

THE Translab baluns are broad-band ferrite types covering the 2-30-Mc. frequency range. Two models are available, both rated at 2 kw. p.e.p. Model 601 provides a 1:1 ratio to match 50-ohm



coax to 50-ohm balanced loads, while model 601A is made for applications that require a 4:1 impedance ratio to match 50- or 70-ohm coax to 200- or 300-ohm balanced loads.

The balun is housed in a $6 \times 3\frac{1}{4} \times 2\frac{1}{2}$ -inch metal box and is electrically insulated from it. A UG-58A/U (type N) waterproof, constant-impedance coaxial fitting is mounted at one end of the enclosure and a pair of ceramic feedthrough insulators at the opposite end. The transformer itself is encapsulated in plastic to prevent moisture penetration and is mounted between two blocks of foam plastic for shock protection. Weight of the entire unit is only 13 ounces.

A fiber glass spreader and mounting hardware, included with the balun, make the assembly usable as the center support of a dipole antenna. In applications where the balun is to be fastened to a boom or a mast, a simple mounting structure (not furnished) must be fashioned from a small aluminum plate and mast clamps. Four mounting holes are located on the back of the box for either type of mounting.

The price for either model is in the \$20. price range plus postage, and the manufacturer is Translab Inc., 4754 Federal Boulevard, San Diego, California 92102.

— K1AF