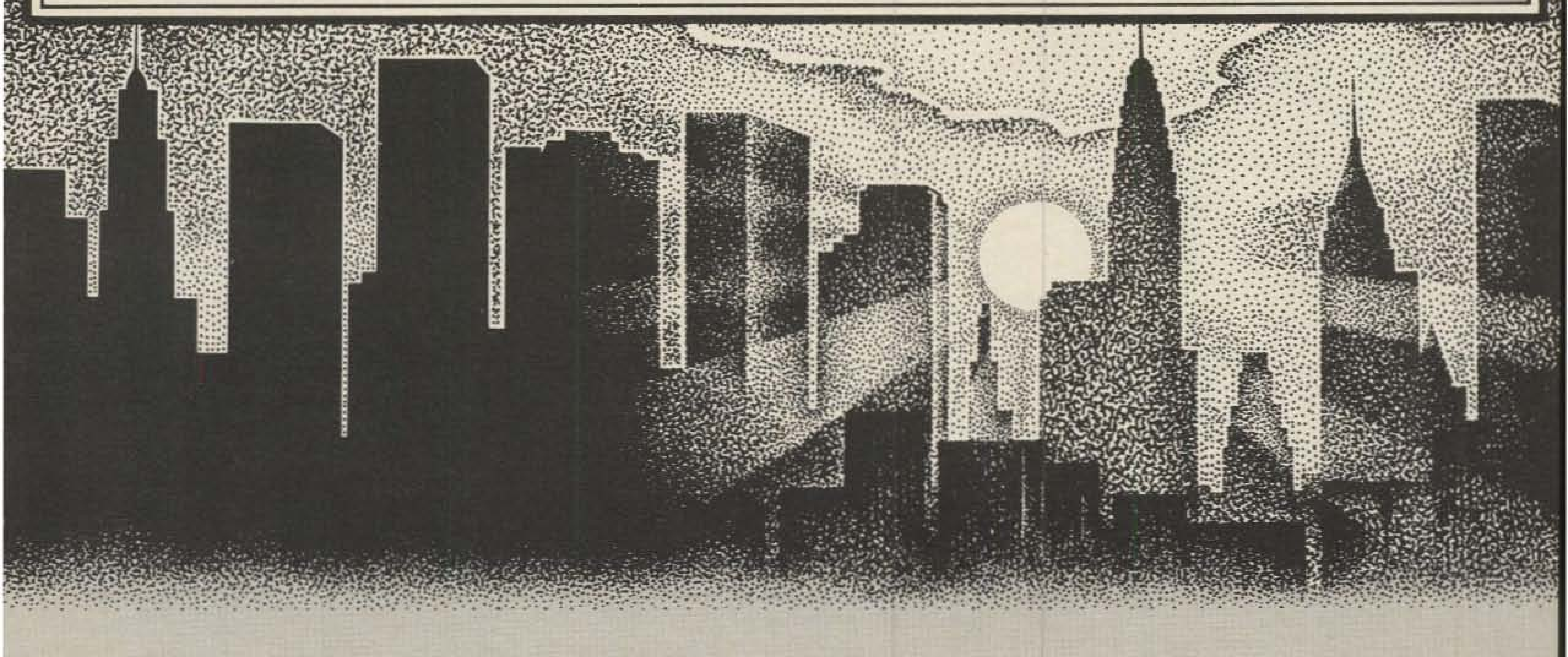
Cheer up city-lot dwellers! W1HXU has come up with an antenna system that you can use to work some of the rare ones.



The Grounded Half-Quad Loop An All-Band Antenna

BY JOHN P. TYSKEWICZ*, W1HXU

The informative articles by VE2CV and W1FB on the Half-Delta Loop† demonstrated that a relatively small and effective antenna can be made for the low-frequency bands. In my situation, as with most city lots, a full-size low-band dipole must run a zig-zag course, but the Half-Delta Loop would still exceed my boundary lines. A bit of arithmetic, however, solved the dilemma. By utilizing a Half-Quad Loop configuration, the antenna would fit into place with room to spare and would be fed directly as if it were a pure Marconi.

The radiated field of the Half-Delta is dominantly vertically polarized and must emit from the vertical λ/6 tower or wire.

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†J. Belrose, "The Half-Delta Loop: A Grounded, Vertically Polarized Antenna, Ham Radio, May 1982. J. Belrose and D. DeMaw, "The Half-Delta Loop: A Critical Analysis and Practical Deployment, QST, September 1982.

The Half-Quad with two λ/8 and spaced verticals therefore appeared to be the better buy.

Not having a scale-model testing range and instruments to determine the scale factor, azimuthal pattern, and impedance, my experiment was to be done at full size on an "all or nothing" basis. The high and low impedances would have to shift for themselves. During a cold and drizzly rain *(the best antenna weather—ed.)*, our zig-zag 80–40 meter dipole was lowered to the wet ground, carefully packaged, and put on "stand by." An assortment of used No. 14 copper wire was spliced and soldered together for the new flat-top and drop wires (for good luck, one must always use a part from an old antenna to make a better new antenna—Moriarty's Law).

VE2CV found that the physical length of the λ/2 Delta Loop is longer than the normal electrical dimension. This end effect proved to be smaller for the λ/2 Quad Loop as erected and shown in fig. 1.

At one time I had had a λ/4 40 meter wire suspended from the tree. Still in place is a 40" high, iron-pipe ground post and about 800' of buried wire in the form of 20 random-length pieces radially disposed about a 270° perimeter. The other 90° segment is presently occupied by a hostile neighbor and his vegetable garden. One radial wire, which happens to be insulated No. 14 house-wire, extends to the ground rod near the house, and its wire enters via a feed-through wall insulator originally installed for Zepp feeders. The other feed-through insulator is used for the "hot" antenna wire. The indoor transmatch should be close to the feed-through connectors.

The back-guyed wood mast attached to the house extends to 35', and a better substitute for a tree is a bonded metal tower or mast. The only above-ground improvement is to use taller masts, as the Quad is fundamentally vertically polarized. This will shorten the flat-top and ground space.

Table I lists three antenna modifications and respective resonant frequencies as measured with a grid dip meter when coupled to a jumper coil (1" diame-

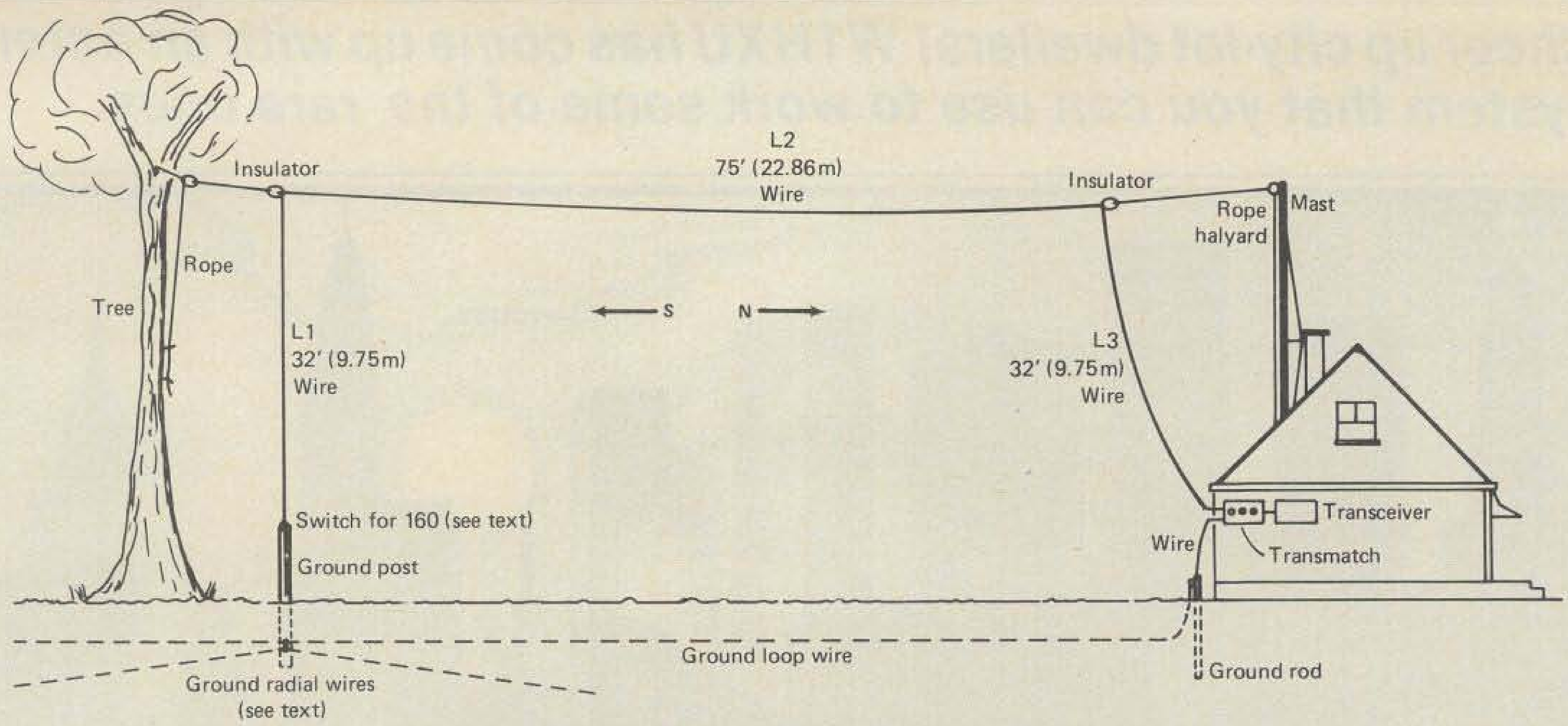

Fig. 1– The GHQ antenna installation at W1HXU.

L-1	L-2	L-3	Harmonic Resonances (MHz) Grid-Dip Meter Readings							
32′	82′	32′	**3.33**	6.65	10.1	13.4	16.8	19.8	24.0	26.6
32′	75′	32′	**3.50**	7.10	10.8	14.2	17.9	21.1	24.4	28.3
32′	70′	32′	**3.63**	7.35	11.2	14.8	18.6	21.9	25.3	29.4

Table I– Resonance with three different wire lengths.

ter, 5 turns). The coil was connected across the indoor feed-through terminals with the transmatch disconnected. L-1 and L-3 remained constant and a dimensional change was made to L-2. L-1 includes the ground post and L-3 includes the 2′ feed-through to the transmatch.

The first test with 146′ of wire put us outside the low end of the bands. On the second try with 139′ of wire we did it and made the third test to get another point on the curve.

As with the Half-Delta Loop the higher-order resonant frequencies are not integral multiples of the fundamental frequency. For "all-band" operation the base frequency must be close to 3.50 MHz. Fortunately, this low-Q wire when connected to my home-made "antenna tuner" of the low-pass type similar to the Drake line loads up nicely for 75 meter phone.

A good r.f. output indicator and rapid tune-up aid is an r.f. ammeter, and also a field strength meter consisting of a 2 meter vertical dipole and an IN34 diode detector installed in the attic with a RG58 line leading to the O-l d.c. milliammeter in the shack.

Another r.f. ammeter was inserted in the ground return line at the transmatch, and its reading was 50% of the antenna current. At the moment the significance of this underground-to-antenna current ratio is not clear, but it could be useful to determine the quality of the ground-plane image.

The one-band operator can apply our corrected handbook formula for his trivia net frequency.

$$L\ (\text{feet}) = \frac{486}{f\ (\text{MHz})}$$

or

$$L\ (\text{meters}) = \frac{148}{f\ (\text{MHz})}$$

Now comes the bottom line: The spotty 10 meter band was open, and on the first call with 100 watts I got an S8 from a JA2. I then switched to 15 and got an S9 from JG3 land; then a UK4 after a 2X2 call on 20. The following evening during a pile-up on 40 I got a short RST exchange with a UK2, and 26 hours later on 80 a G2 completed the round-up.

By installing a high-voltage-rated ground disconnect switch on top of the ground post, the Half-Quad Loop can be converted to a λ/4 Marconi for 160.

This spliced up bunch of wire is the neatest, best, and simplest "all-band" antenna that I have used in the past half-century.