

73 Review

by Jim Gray W1XU

AntennasWest
1500 N. 150 W.
Provo UT 84604
Tel. (801) 373-8425
Price Class: \$40-\$70

The Happy HalfSquare™

Inexpensive gain in a compact package.

The AntennasWest HalfSquare is a simple, light, unobtrusive and inexpensive gain antenna that you can erect almost anywhere you can put a dipole. This useful antenna is rugged, neat, and plain terrific!

What kind of an antenna is a half-square? Read on.

Antenna Evolution

Nearly everyone has heard of the quad antenna, or the cubical quad array. The plain quad consists of a full wavelength of wire laid out in a rectangle, usually a square. A single quad loop has 1 to 2 dB of gain over a dipole, making it worth obtaining. A cubical quad array is merely two quad loops in a "space cube" figure. The array produces even more gain, something on the order of 5 to 6 dB over a half-wave dipole.

Now for the HalfSquare

The half-square antenna is just a single quad loop, opened up and stretched out to give greater gain and a lower radiation angle (see Figure 1). In the half-square configuration, that simple wavelength of wire is good for about 4 dB of gain. How does it happen? Simple. The source of the quad's gain is the separation between portions of the antenna having in-phase currents. By opening the loop and increasing the separation between the in-phase segments to a half wavelength, we more than double the gain of the quad loop.

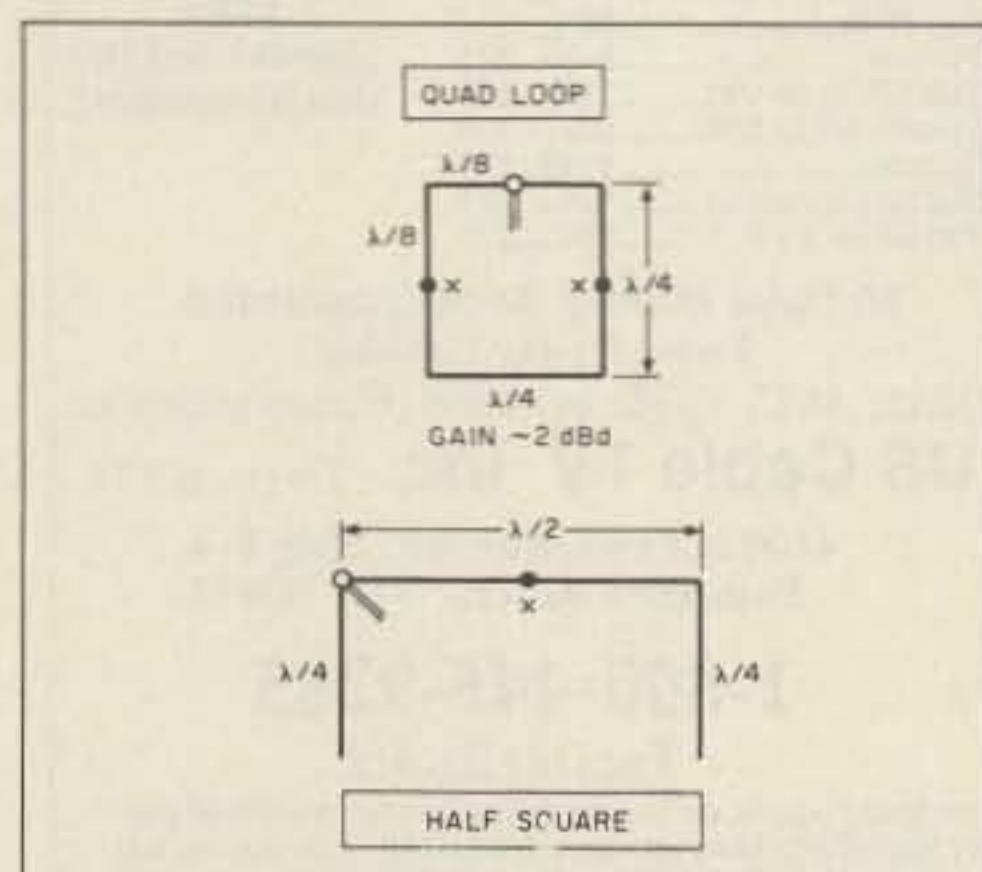


Figure 1. Cutting the quad loop and opening it out produces the HalfSquare. The half-wave spacing more than doubles the gain over the quad loop and the higher feedpoint gives a lower angle of radiation.

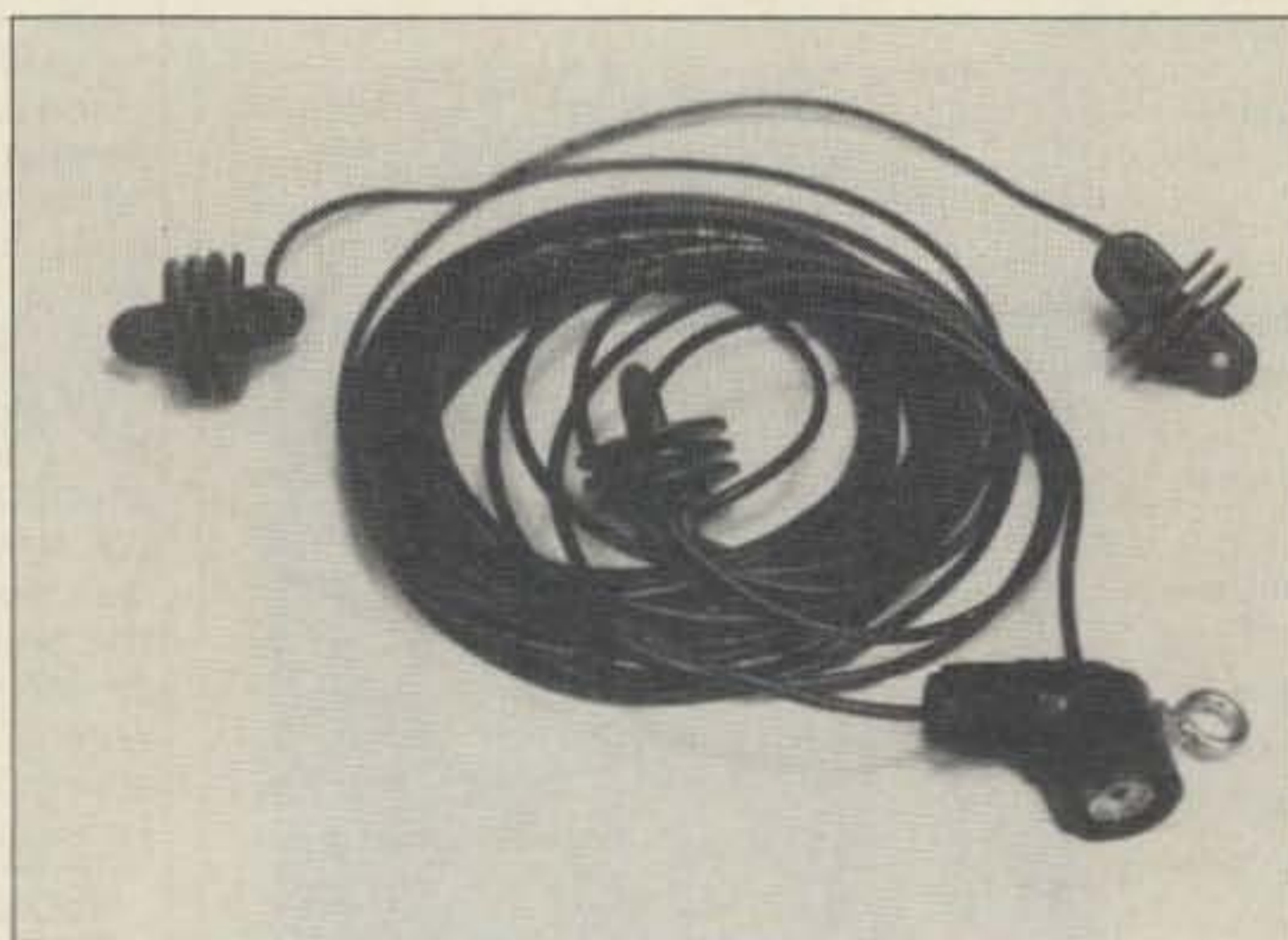


Photo. The happy HalfSquare.

That's the secret of the half-square.

There's another advantage to the half-square method of using a wavelength of wire. Typically, a full-wave loop has a feedpoint impedance in excess of 100 ohms. That requires some sort of matching system. But if the half-square is fed at the right point, it has a perfect match to common 50 ohm coaxial cable.

Corner Feed

Let's return to the quad loop as a comparison. Since it is a complete loop, it will have the same impedance no matter where you feed it. But once you cut the loop and stretch it out, creating a half-square, the impedance seen by a feedline will depend on where you attach it to the wire. If you place the feedpoint at one end of the wire, the impedance will be on the order of a thousand ohms. But if you feed the half-square at a quarter wave from the end, at either of the corners, you will see an impedance of about 50 ohms—a nice match to coax without any tuner or matching transformers.

Corner feed has practical advantages, too. You can support your feedline with the antenna support itself, so you can bring the antenna closer to the house or shack. You can also use lighter supports.

To understand why corner feed works this way, think of the half-square as a pair of half-wave dipoles. Old-time antenna manuals used to feature the "quarter-up quarter-over" dipole. This consisted of a dipole with one vertical and one horizontal leg. Imagine two of these end-to-end and fed in phase.

The horizontal legs would have the same

potential at their ends, so they might as well be joined. If joined, there is no need for two feedpoints; one is sufficient. The resulting antenna is the half-square. The radiation from the horizontal legs is self-canceling, but the radiation from the vertical legs is additive. The result is 4 dB of gain from an antenna that's the same length as a simple dipole (see Figure 2).

More important than the gain is the lower angle of radiation from the half-square. In fact, at the low angles that favor DX, the half-square has given me up to two S-units of signal improvement over a dipole at the same height. The drooping ends, the half-wave spacing, and the corner-feed system are the

secrets of the half-square's great performance and good impedance matching.

Clever Construction

The AntennasWest HalfSquare is a delight to work with. The wire used in its construction is heavy-duty, black QuietFlex™ that resists kinking. In fact, I even tied it in a knot to test it. After untying it, I could find no visible damage or deformation. The wire's tough plastic covering makes it totally impervious to the environment. That means no noise from rain and snow, wind, or wind-born dust like we experience in Arizona. Under the insulation, the wire surface stays shiny-bright.

At the corner feedpoint there is a specially-

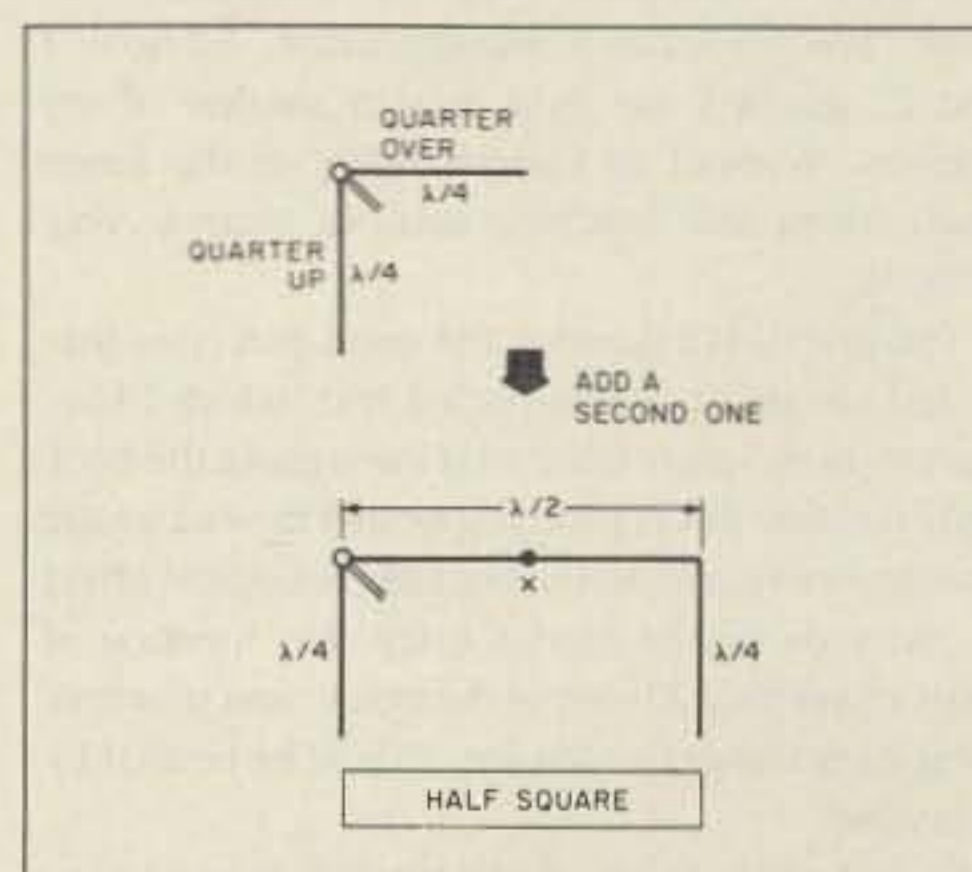


Figure 2. Evolution of the HalfSquare from a phased dipole pair. Connecting two quarter-up/quarter-over dipoles eliminates need for second feedpoint. Gain over a single dipole is on the order of 4 dB.

made housing that accepts the coaxial connector from your feedline. The connection is surrounded by a unique drip shield that keeps weather away from the mating surfaces. The housing also has a strain relief attachment point for the support rope that you use to attach the corner to the house, tree, mast, or whatever support you choose.

The two free ends of the antenna have a novel insulator that serves two purposes: The one we all know about—insulation—and the other, making tuning adjustments. A slip-and-lock arrangement permits easy adjustments of the length of the wire, which simplifies fine tuning for resonance.

AntennasWest makes HalfSquare antennas for each of the amateur bands, as well as for other bands where commercial, military, or industrial frequencies are used. Since an antenna that transmits well also receives well, it's no surprise that many HalfSquares are used for monitoring broadcasts from sensitive spots around the globe.

HalfSquares can be coiled, slipped into plastic bags with resealable tops, and carried in a suitcase. A HalfSquare needs no tuner to properly match the input/output impedance of even the most sensitive solid-state transceiver. The HalfSquare is an ideal portable DXpedition antenna.

If it's your pleasure to operate on more than one band (as most of us do), don't expect the HalfSquare to act like a beam on other than the band it was cut for. But don't be surprised to find that your antenna tuner will load it easily as a random wire on many other bands. As a random wire, my 20 meter HalfSquare has given service on 75, 40, 30, 17, 15, and 12 meters.

You might want to buy a HalfSquare for each band you operate on. Or you might get a HalfSquare for the band where DX competition is the greatest, or where you have DX goals, then use a general coverage antenna, like the G5RV, for rag-chewing. Many hams that run traffic to the South Pole or maintain schedules over long paths have found the half-square more consistent in performance than beam antennas because of its lower angle of radiation.

The price of AntennasWest HalfSquares built for the 10 and 12 meter bands is \$40; for the 15 and 17 meter bands, \$45; for the 20 meter band, \$50; for the 30 meter band, \$60; and for the 40 meter band, \$70. Allow \$5 for shipping and handling.

Conclusions

I am very happy with my AntennasWest HalfSquare. It's got a lot going for it with neatness, "invisibility" (it doesn't attract attention from the neighbors), a rugged and weather-proof design, usable DX gain, simplicity, and instant-easy use with any transmitter. I highly recommend them! **73**

Jim Gray W1XU, 210 Chateau Circle, Payson, Arizona 85541, has been 73's Propagation columnist since 1984. He's been a ham for 39 years, and likes to operate CW on WARC bands 12, 17, and 30. He's also interested in aviation and photography.

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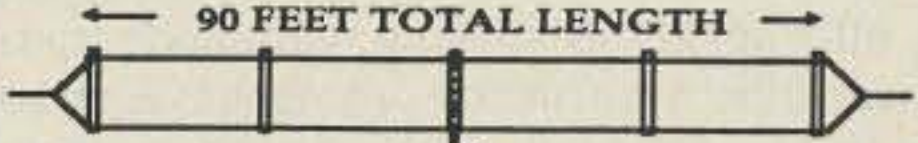
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