

Letters to the Editor

Design, Construction and Evaluation of the Eight Circle Vertical Array for Low Band Receiving (Mar/Apr 2010)

The Lost 6 dB

Concerning the article by Joel Harrison, W5ZN and Bob McGwier, N4HY, the gain numbers for the eight circle vertical array are 6 dB lower than reported in the article.

This is due to the combining method used, which does not provide isolation between the antenna elements. Signals arriving on any one antenna element are dissipated not only in the 75 Ω build-out resistor of the element in question, but also in the 75 Ω build-out resistors of the other three antennas. This 6 dB loss can be avoided by using 0 degree hybrid combiners (sometimes referred to as "magic tees"). Use of three hybrid combiners to combine the four antenna elements, such as the MiniCircuits PSC 2-1-75 combiners, in this application provides approximately 25 dB of isolation between the antennas and also provides a 75 Ω termination to both ends of the 56° delay line (when used with the MiniCircuits PSC 2-1-75 only one 56° line is required since the impedance is 75 Ω at all ports). This improves the broadband performance of the system by providing good return loss over a much wider bandwidth for the delay line.

As the authors state, they believe the receive system gain (with the 6 dB loss) was adequate in their application. With that in mind, if the 0 degree hybrid combiners are used, the additional 6 dB of gain could be used up by building out the impedance of each antenna to 300 Ω . This approach lowers the Q by a factor of four and further improves the bandwidth by the same factor. The receive system gain is reduced by 6 dB, but the hybrid combiners improve the gain by 6 dB, so the net system gain change is 0 dB. This does require the addition of a 4:1 transformer at each antenna element to match the impedance to the 75 Ω transmission lines. Not only does this improve the bandwidth, it reduces the possible degradation of the antenna elements not tracking each other with time and environmental changes

— 73, Robye Lahlum, W1MK, 45 Brookview Rd, Boxford, MA, 01921; w1mk@arrl.net

Hi Robye,

Thank you for your informative feedback on our article and we concur with your conclusions. While gain is not the primary objective in this array design, individual ele-

ment and array stability is very important as detailed in the article. Our approach was to provide a very simple feed system with good stability and excellent performance and your feedback takes that approach to the next level. We greatly appreciate you sharing it!

— Joel Harrison, W5ZN, 528 Miller Rd, Judsonia, AR 72081; w5zn@w5zn.org

— Bob McGwier, N4HY, 64 Brooktree Rd, East Windsor, NJ 08520; rvmcgwier@gmail.com

A Simple Path to Complex Impedance (Sep/Oct 2010)

Dear Larry,

A few errors crept into my article, and here are the corrections:

On page 7, in Table 1A, Program Line # D084, the INSTR should read "x" not "X."

On page 13, in Table 3B, the Average Error (%) for 10.0 SWR should read "3.40" not "5.05."

On page 13, in Table 3C, Max Error (%) should read "Max Error (Deg)", and Average Error (%) should read "Average Error (Deg)", and Standard Deviation (%) should read "Standard Deviation (Deg)."

On page 15, in Table 4C, Max Error (%) should read "Max Error (Deg)", and Average Error (%) should read "Average Error (Deg)", and Standard Deviation (%) should read "Standard Deviation (Deg)."

Throughout the text I refer to the coupler that I used as "bidirectional." This is the correct name of the type of coupler that I built and used. The bidirectional circuit in Figure 5 on page 5, is what I built, and it is correctly named in that figure's caption. In several other figures and photos, however, the coupler is incorrectly referred to as, or is incorrectly labeled as, a "dual directional coupler," or a "DDC." Technically this is an error because a dual directional coupler is a different circuit from the bidirectional coupler circuit that I had built, although either type of coupler works well in this application.

— 73, Michael Bowman, KG2MG, 5077 Old Bald Hill Rd, N. Hemlock, NY 14466; kg2mg@arrl.net

Hi Michael,

Thank you for sending those corrections. Our apologies to you and our readers for not catching and correcting those errors in the article.

— 73, Larry Wolfgang, WR1B, QEX Editor; lwolfgang@arrl.org