

Letters to the Editor

A New Horizontal Polarized High Gain Omni-Directional Antenna (Nov/Dec 2011)

Hi Larry,

I enjoyed the article "A New Horizontally Polarized High Gain Omni-Directional Antenna" by Tom Apel, K5TRA, in the Nov/Dec 2011, issue of QEX, on pages 3 - 9. The article jogged my obsession with three-phase power and reminded me of an antenna I saw in a text book decades ago.

That antenna was a microwave example of an omnidirectional tripole antenna built of three dipoles at 120° orientations around a circle, using three-phase feed points tapped off at 120° intervals around TM(1,1) circular waveguide. It appears in Electronic Designers' Handbook, by Landee, Davis, Albrecht, published by McGraw-Hill, 1957, page 21-37 and page 20-37.

This suggested to me a tripole antenna built of three quarter-wavelength whip antennas as follows. I haven't tried this yet, but I can't resist sharing the idea to find out who has already tried it.

The basic tripole comprises three quarter-wave whips pointing radially outward from a center point to form a planar Y. The inner ends of the whips form the feed point. Unlike most feed points, the tripole feed point has three terminals, and is fed with three-phase power through a three-phase transmission line. Three-phase open-wire transmission lines are common at 50 and 60 Hz, but are rare at radio frequencies.

Three coaxial lines can be used, with each center conductor driving one terminal of the feed point. The three shields are tied together at the feed point, and are not connected to anything else. From the point of view of each single coax, one whip is driven, and the other two are used as ground radials for that coax. The tripole forms a rotating dipole in the plane of the Y, so the axis of rotation is perpendicular to the plane of the Y.

Unbalance in the feed signals leads to simultaneous counter-rotating dipoles, called positive sequence and negative sequence in the three-phase literature.

In the horizontal plane, a single horizontal tripole is horizontally polarized and omnidirectional. Along the vertical axis, a single horizontal tripole emits circularly-polarized radiation.

Stacked tripoles can be used to increase horizontal omnidirectional gain similarly to the antennas discussed in Tom's article.

Tripole Yagi for Circular Polarization

Helices and crossed Yagis are well-known directional antennas for circular polarization. (See "Microwavelengths: Circular Polarization," by Paul Wade, W1GHZ, QST, Oct 2011, pp 98-99).

A crossed Yagi is two Yagis crossed on the same boom, driven 90° out of phase. At each element location on the boom, there are four half elements sticking out in four directions to make a cross.

A tripole Yagi replaces each cross of four half-elements with three half elements 120° apart. The driven element is a tripole as described above.

— 73, Peter Traneus Anderson, KC1HR, 42 River St, Andover, MA, 01810;
traneus@verizon.net

Hi Peter,

Thanks for letting us know that you enjoyed the article by Tom Apel, K5TRA. Your description of a tripole Yagi does sound interesting. I wonder if any readers have tried such an antenna, and what experiences they may have to share.

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

2012 Appalachian Trail Ham Radio Survey

The goal of this survey is to determine ham radio coverage all along the Appalachian Trail and develop a list of useable repeaters, VOIP links and APRS tracking/texting reliability for hikers with HT's along the trail. Ham hikers are asked to schedule a 1 or 2 day local hike while carrying an APRS HT and GPS, so that their track and coverage will be captured by the <http://aprs.fi> web page.

The survey hikes will begin in Georgia in mid March, Tennessee/North Carolina in early April, Virginia in April and early May, then Maryland, Pennsylvania and New York in late May. After a month break, the survey will resume in Connecticut in July, and on to Maine by the end of August. The timing is designed to coincide with the north-bound trek of the hundreds of thru-hikers that attempt the 2175 mile hike each year. In this way, ham radio can also serve in a support role for any emergency assistance for these hikers.

If you are interested in helping with the survey, see the plan on <http://aprs.org/at.html> and contact me.

— 73, Bob Bruninga, WB4APR, 115 Old Farm Ct, Glen Burnie, MD, 21060;
wb4apr@amsat.org.

Hi Bob,

I am sorry we weren't able to get this note into QEX in time for the southern part of the survey, but I hope some of our northeast readers will be able to hike sections of the AT and add their data to your results.

— 73, Larry Wolfgang, WR1B

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