

# EXPERIMENTS WITH A

BILL  
by THOMPSON

## HOMEBREW FM YAGI PART ONE

In the VHF spectrum, most practical high-gain antennas are yaqi (or more properly, yagi-uda antennas) antennas, or some kind of combination of the yaqi and log periodic design. You may have noticed by now that the best FM DXing antennas are usually quite close to the classical yaqi design, if you are at all familiar with that basic element configuration.

The problem with the yagi, at least the basic type of yagi, is that it is narrowband by nature—it can really only work well at or near one frequency, unless you are willing to make a few compromises to broaden signal response. Thus, it's pretty simple to make yourself a homemade yagi out of old antenna elements or aluminum tubing stock, if you want to "cut" it for a particular frequency. As you approach the FM broadcast band frequencies, the physical size of an antenna is quite manageable for the average experimenter. So, with the availability of old antennas, what DXer isn't tempted to try a little project of his own?

In my own case, I became interested in increasing directivity by adding elements. I've noticed that most FM deep fringe antennas have boom lengths not exceeding 12 feet, with many of them geared to a 10-foot design, and with any more than 10 elements being rare, except in a purely log-periodic type of array. Personally, I believe that maximum gain versus overall performance has been achieved by Channel Master in their Stereo Probe 9 model, and that model only features 9 elements, incredibly. Their secret lies in how they use those elements, and the fact that the driven section of the Probe 9 features four full resonant folded dipole antennas tuned to exactly the right parts of the 88 to 108 MHz band.

However, it would seem that the experimenter could outdo the specs of most commercially made antennas by using more elements on a longer boom, at least at first glance. But, it's not that simple. The 20 MHz bandwidth of the FM broadcast band is the limiting factor here. Adding more directors on a longer boom will increase the antenna's directivity—

—but it also will lower the antenna feedpoint impedance. It is important that this impedance be maintained as close to the norm—in our case 300 ohms—as possible.

Adding even one more director to a proven design can screw things up faster than you can imagine, in some cases. Adding a few more can really be asking for trouble.

I decided to ask for a lot of trouble by taking an Antenna-craft design that was not particularly noted for being a hot DX antenna and making some of my own changes—mostly to see if I could achieve very sharp directivity on the FM band.

Note the driven section of the antenna: four half-wave dipoles (DE1 through 4) in log-type configuration.  
PART TWO NEXT MONTH

