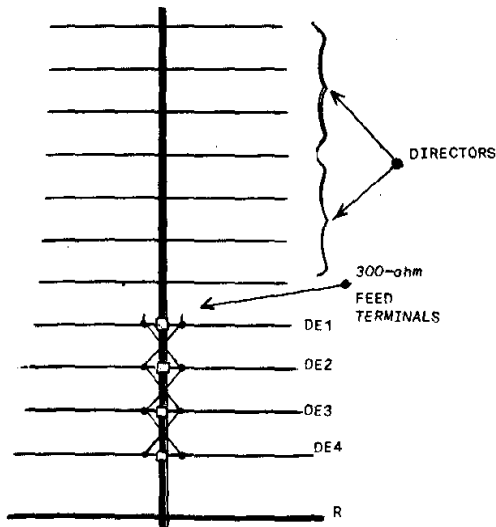


EXPERIMENTS WITH A

BILL
by THOMPSON

HOMEBREW FM YAGI

PART THREE



Part One of this series appeared in the March 1983 VUP. Part Two was in the April issue, and Part Three is what you're reading right now. Because of some interesting input from VUD readers, there'll be a fourth part. In the meantime, I seem to have been rudely interrupted by the DX season

To get back to the subject, you may recall that I started out to see if it was Possible for an enthusiast to outdo the performance of a commercially available FM antenna.

At this point, we need to go into a bit of antenna theory, but let me tell you something i learned from this project first. Thinking about building a 12 element FM yagi as at left and making it work as well as it looks like it should work are two completely

different things, It's a classic case of Theory versus Practice. Anyone with an interest in this area of electronics knows what I mean by this; Practice seems to win out over Theory very often!

The gain of any antenna is really a result of its Pattern in the horizontal and vertical planes. High gain in all the variations on the yagi design, as I discussed previously in this series, are achieved by the use of multiple directors. More directors imply increasing directivity. The higher the directivity gets, the narrower the beamwidth becomes. The narrower the beamwidth, the higher the gain. Add as many directors as you wish to a yagi, but there will quickly be diminishing returns. In fact, they won't prove to be as useful in increasing gain in practice as they are in theory.

I estimate that my 12 element design, after much planning and work, produced not much more than 7 to 8 db gain, compared to a dipole, on the best frequency, and the difference between this antenna and a Channel Master Stereo Probe 9 which was later mounted at the same height seems to bear this out. This 7 to 8 dB of forward gain was about one could expect from a smaller commercial model with a log periodic design, which would have been less trouble to mount and much less of a wind load—not to mention the smoother frequency response such a log would feature.

Remember, Channel Master's Probe 9 features forward gain that peaks at well over 12 db at its best frequency, and on a smaller boom with fewer elements. Why doesn't the homebrew antenna with all the "extra" directors feature such high gain, or at least something closer to say, 10 db? It's simple. Unless you start out with a well-designed feed section, you won't end up with much of an antenna.

Still, you can gain very valuable experience by tinkering with your own antenna designs, and of course, you can learn much from your own mistakes, So even though I now feel that commercial FM antennas are much better than practically anything the experimenter can build, it is still very much worth the effort and time involved.

Part Four of this series will list the Physical specifications you can use for building your own FM antenna designs, and we'll try to show what works best for those who wish to homebrew.

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Bill Thompson