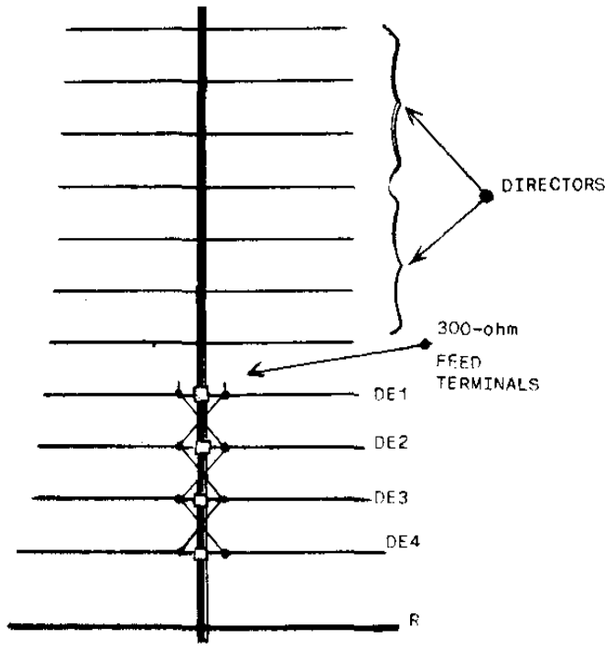
EXPERIMENTS WITH A HOMEBREW FM YAGI

by BILL THOMPSON

PART TWO

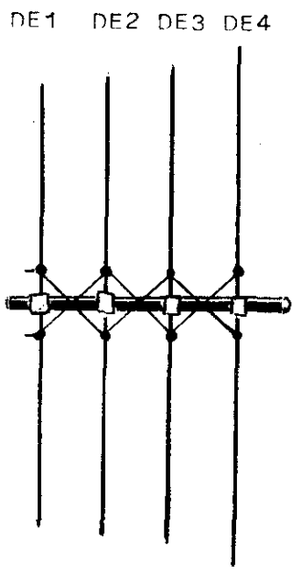
Last month, I started to detail my homebrew project to try to build an FM DX antenna, using old antenna parts to modify a. commercially made model. The antenna I based my modifications on was obtained a few years ago primarily to experiment with. Back then, it was sold by Radio Shack as their model 15—1638. Perhaps as a result of some bad reviews, they replaced it with another design, and now called the 15—1638A. Both the 15—1638, and the "A" version were made for RS by the now defunct Antennacraft comPany,



The original 15—1638 is a ten element model, on a 10 foot boom: six directors, three driven elements in log—type con—figuration and a reflector. Perhaps due to both close element spacing and the three—element driven section, it proved to be a poor antenna for forward gain. In fact, one independent lab was surprised to find that it only showed 5.5 dR gain, compared to a half wave dipole, at 98 MHz——very strange for a ten element design.

It seemed to me that the number of directors, as well as the poor feed section, contributed to the problem. As mentioned last month, as more directors are added, antenna feedpoint impedance qets lowered, and that makes it hard to transfer signal current to your lead—in——which expects" to 'see" a 300—ohm impedance at the antenna terminals for maximum efficiency.

Using parts of other old Antennacraft antennas, a drill, a tube cutter (to prune elements to desired lengths), and assorted hardware (metal screws, nuts, bolts, etc.), I first set out to make a four element feed sectlon. This consisted of four half—wave dipoles, connected with a transposed feed line (i.e. "criss—crossed' 300—Ohm line), in log type configuration as shown below. The four driven elements, shown as PE1 to PE4 in the diagram, were cut to be resonant as follows:



DEl	108.0 MHz	As can be seen, the shortest one is made to be resonant just above the top of the FM hand, and the long—est, just below the bottom limit.
DE2	101.4 MHz	
DE3	94.7 MHz	
PF4	88.0 MHz	

In any log—type array, the broader the frequency range to be covered, the greater number of driven elements necessary for good performance across the entire range——and this is true even when you combine the log principle with a basic yaqi desion of multiple directors, feed (driven) section, and reflector.

In the next part of this series, I'll detail my element lengths and spacings, and report on what I found out about this homebrew design when put into use as a DX antenna at about 40 feet above ground level.