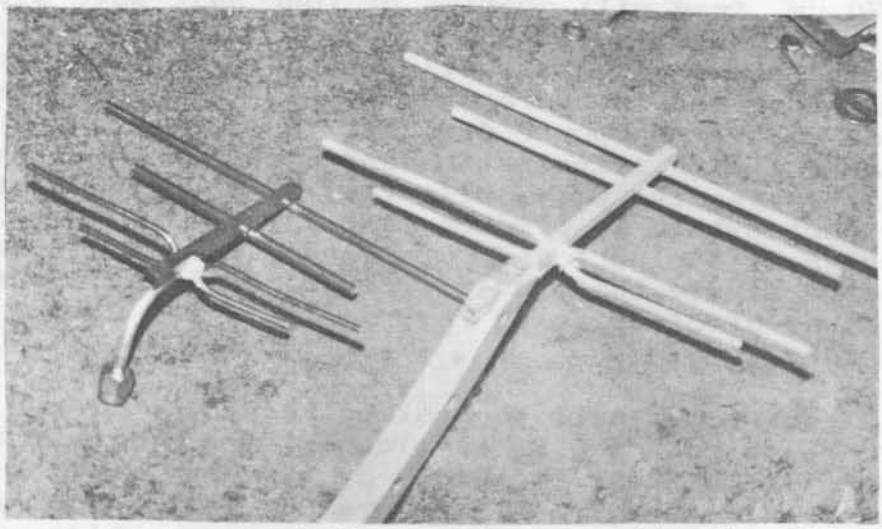
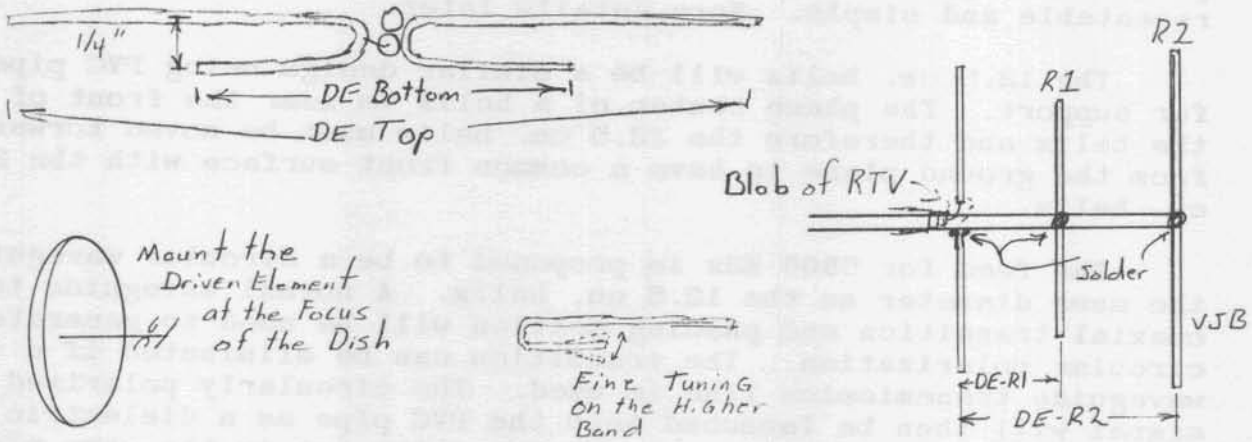
DUAL BAND DISH FEEDS

Kent Britain WA5VJB



These antennas grew out of the need for a combination 903/1296 MHz dish feed. Drawing on WA3RMX's work and after a dozen versions, this design is the evolutionary result. The dimensions have been very consistent between the dozen test antennas we have built.



The performance looks pretty good. The Return Loss is -15 to -20 dB (That's a 1.2 to 1.4 SWR). The Front to Back ratio's been a consistent 12 dB. If you can measure Return Loss/SWR, it's pretty easy to trim the antennas to better than a 20 dB Return Loss/ 1.1 to 1 SWR. If you simply build to these dimensions, the SWR is usually better than 2 to 1.

When tuning/pruning the Driven Element, start with the longer element, then tune the shorter element. The little blob of RTV (Silicon Rubber) has almost no effect. (The driven element dip moved down 10 MHz at 2304) Fine adjustment of the shorter element can be either by filing the tip or by bending the tip up or down.

Construction is 12 gauge Copper wire (about 2 mm dia.) for the elements with 1/8" Copper or Brass tubing (about 3 mm) for the boom. The driven elements were formed by bending the wire around a screwdriver. The antennas are feed through a short piece of .141" simi-rigid coax.

For outside use a bird protector or some type of weather cover would be needed, but it's great for Grid Expeditions and Antenna Ranges.

Band/MHz	Top DE	Bottom DE	DE-R1	DE-R2	R1	R2
903/1296	5.9"	4.50"	1.9"	2.4"	4.8"	6.8"
1296/2304	4.2"	2.50"	1.25"	2.25"	2.8"	4.8"
1269/2410	4.3"	2.40"	1.2"	2.3"	2.7"	4.9"
1296/1691	4.2"	3.40"	1.75"	2.25"	3.7"	4.8"
2304/3456	2.5"	1.75"	.80"	1.25"	1.9"	2.8"

All dimensions in Inches

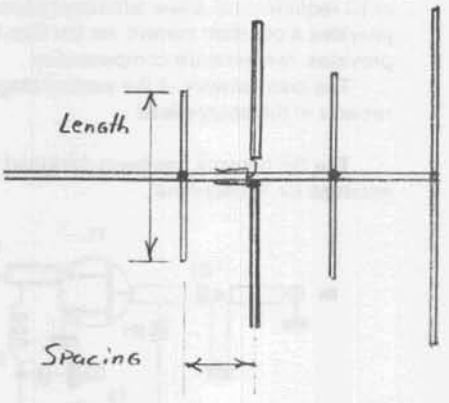
The Dual Band feed works best with .3 to .35 F/D dishes. These are fairly deep dishes and this feed would have a lot of spill over with the typical .35 to .4 F/D dishes.

A partial solution is to increase the gain of the feed. WR0I tried to make me a computer model of this feed, but the usual Yagi Programs had trouble with a multi-band Yagi using directors for each band.

Adding only one director for the higher frequency improves illumination on a typical surplus dish, but only for the higher band. The director adds additional loading to the driven element, so the driven element must be shorted about 2%.

Optional Director:

Band/MHz	Bottom DE	Length	Spacing
903/1296	4.40"	4.3"	2.2"
1296/2304	2.45"	2.35"	1.0"
1296/2410	2.35"	2.3"	1.0"
1296/1691	3.30"	3.2"	1.4"
2304/3456	1.70"	1.6	0.7"



Compared to an optimized horn, this feed will give about 2 dB less gain from a typical dish, but which would you rather carry around? A pair of 3 ft. dishes with scalar feeds, for a single 3.5 ft. dish and a Dual Band Feed?

I did build a Tri-Bander, (903:1296:2304) but it wasn't reproducible without a stack of test equipment.

Finally my thanks to Harold Reasoner, K5SXK for putting up with all my questions. And to my Beta Test Site, W5ETG for proving the antennas were reproducible.

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