The Hexbeam Antenna

Early Personal Experiences

Chris Newton (N6FR)

What's a Hexbeam?

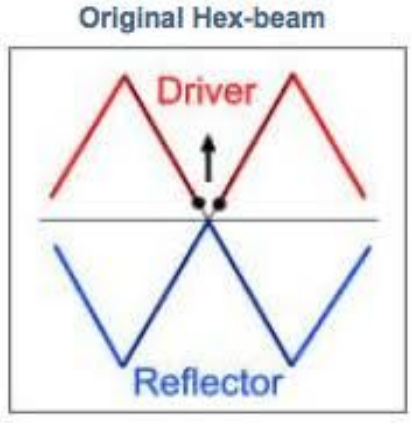
- A unique, multi-band, directional antenna
- Constructed from two wire elements
  - A two-part driven element
  - A single reflector element
- Multiple antennas can be stacked on a single "inverted umbrella" frame
- Fed with a single coax feed

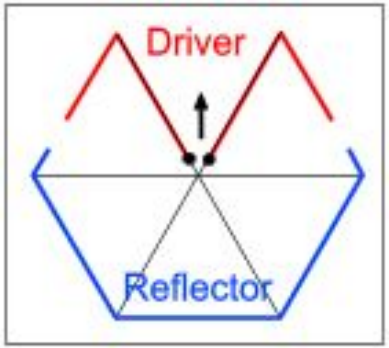
Hexbeam Features & Benefits

Lightweight Antennas are wire, frame is fiberglass or wood	Easy to homebrew/build Easy to raise/mount
Small, symmetrical wind profile	Smaller tower/guy requirements Smaller rotator required
Each antenna individually tunable for resonance	No tuner required Single coax, direct to transceiver
Start with one band, easily add additional bands/antennas on same frame in the future	Low-cost expandability

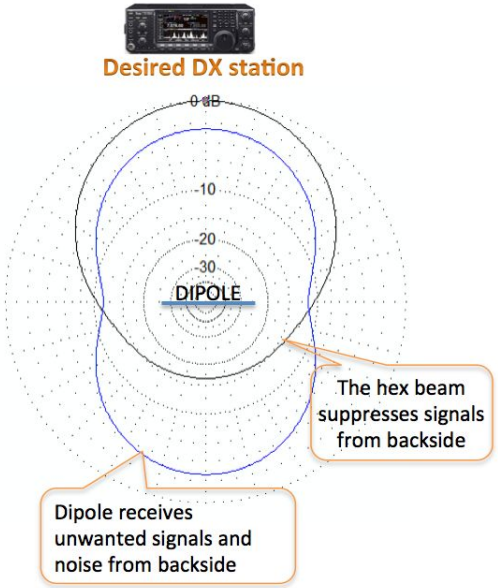
History: “Original” to “Broadband”

- Originally designed by Mike Traffie (N1HXA) in early 1990’s
  - Original design employed two wire elements in opposing “W”
  - Worked well, but some limitations were discovered
    - Tuning is extremely sensitive to wire length and element spacing
    - Bandwidth is narrow
- Improvements by Steve Hunt (G3TXQ) in 2007 lead to currently-popular “broadband” variation
  - Reflector simplified across back of antenna
  - Reduced sensitivity to tuning
  - Significantly improves bandwidth
  - However, elements are larger, requiring larger frame
    - 22’ diameter vs. 19’ diameter

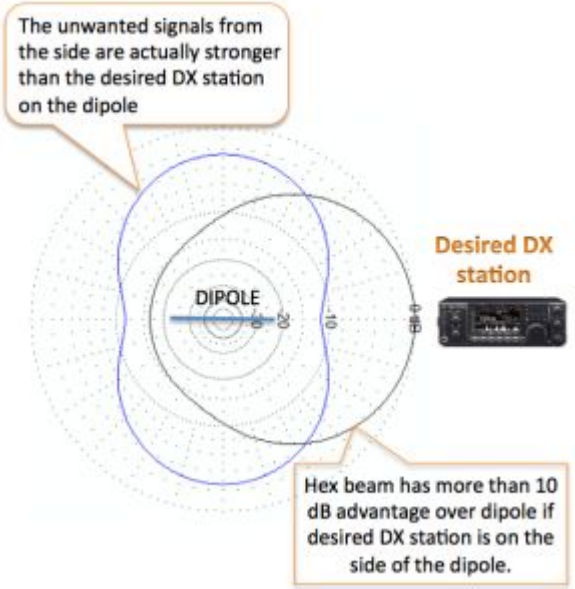




Hexbeam Performance vs. Dipole



- Modest gain (approx. 3 dB) over dipole, when aligned in most-favorable direction
- But big advantage (approx. 10 dB) in least-favorable direction
- In all directions, big suppression of unwanted signals (over 10 dB front-to-back ratio)



Directionality & Backside Suppression are Key Advantages

The KIO Technologies Hexbeam

- Complete kit
  - High-grade aluminum center post pre-wired for up to 6 bands (20m - 6m)
  - Aluminum base plate
  - Fiberglass poles pre-marked for antennas
  - High quality wire, ropes and hardware
  - Individual antennas' elements pre-cut and spaced for resonance
  - Detailed, clear instructions provided

Construction Details

Baseplate and center post

Driven element attachments

Top of center pole
w/spreader ropes attached

Construction Details (cont.)

Basic construction finished in less than 1.5 hours

Mast is 2.5” fiberglass pole
Rotator is inexpensive RCA TV-antenna model

Wiring it up

- RG-213 Coax feed at top of center pole
- As with any dipole/coax interface, a common-mode choke required to suppress unwanted signal reflection on coax shield
  - A simple coax coil will suffice
  - KIO offers a set of large suppression beads as an alternative/option
- Standard 4-conductor rotator cable

Early Experiences: Improved DX!

- As promised, excellent SWR performance across the entire range of all bands
- In general 4-6 db improvement in FT-8 signal/noise reports
- Noticeable directionality - just have to remember to “turn the antenna” !

SWR measurements at the transceiver

	Bottom	Middle	Top
20m	1.1	1.3	1.8
17m	1.3	1.4	1.5
15m	1.3	1.6	2
12m	1.4	1.5	1.6
10m	1.5	1.6	1.7
6m	1.5	2.7	2.5

A cost-effective way to step-up to a directional, multi-band antenna

Resources

KIO Technologies (products, technical articles, etc.)	https://www.k4kio.com/
QST review of KIO Tech. Hexbeam (August 2017)	http://www.k4kio.com/wp-content/uploads/2017/07/PROD-REV-FOR-KIO.pdf
“Understanding the Hexbeam” (lots of good info)	http://www.karinya.net/g3txq/hexbeam/
Hexbeam parts from Max-Gain Systems In case you want to “homebrew”	https://mgs4u.com/product/hexbeam-antenna-fiberglass-kit/