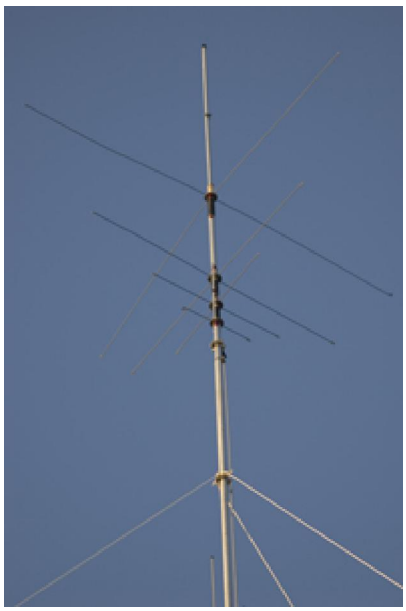
Hy-Gain AV640 (Patriot) Antenna and Guests

(Updated 06 November 2007)

I hope to have links to larger photos soon

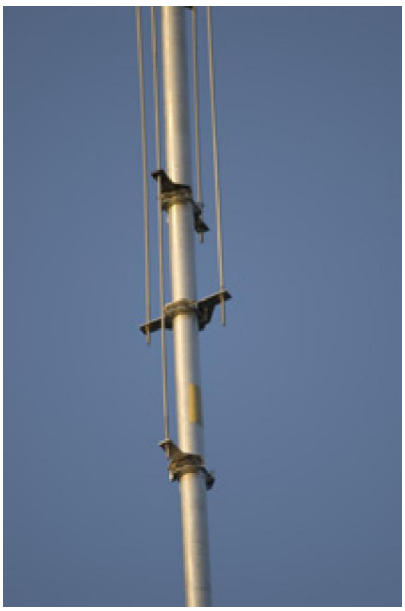
The AV640 like all multi-band antennas, or all antennas for that matter, is a collection of compromises. As there are no traps the vertical is surprisingly wide band on each of the bands it covers (40 through 6-meters including all the new WARC bands.) It's about 200KHz or a tad more on 40 while giving full band coverage on the others. The antenna is designed to operate without a radial system, but it does have a small counterpoise at the base. The recommendation is to keep this counterpoise at least 5 feet away from metal objects such as rain gutters and other antennas. One note, although the adds say the antenna is rated for the full legal limit of 1500 watts it has a limit of 300 watts on 6-meters.

Assembly is relatively straight forward with a good set of directions. However there are a lot of parts so the assembly is not a 5 minute job. Lay out the parts in order to make sure they are all there, follow the directions step-by-step and expect a couple of hours for the assembly.



Tophats and loading coils

Matching network and base of stubs



Base of stubs

Tune up will, or should be relatively close using their figures and each band can be tuned individually without affecting the tuning on the other bands. 40 meters is set by adjusting the length of the top most tube piece, or overall length of the antenna. This let me easily set the 40 meter band to favor the CW portion, yet operate in the bottom of the voice section with a bit over 200 KHz of bandwidth less than a 2:1 SWR. 20 and 15 are set by trimming the length of the appropriate "top hats" while setting the other bands for the center (by adjusting the stub lengths) gave full band operation. If the AV640 is placed on a 10' mast to check, the resonant frequencies and minimum SWR for each band should be very close to

what you get when the antenna is mounted on a tower. On the other hand, trying to tune it in a horizontal position is likely to give some misleading numbers.

Performance: I have the AV-640 installed on a 40 foot tower at the West end of my shop. I can only give subjective figures as I could not switch back and forth between antennas. All comparisons were against the station in the house with sloping dipoles on 40 with the top ends at 90 feet, a tri-band bean (TH-5) on 20, 15, and 10 at 100 feet, and a 7L Yagi on 15 at 115 feet. Not exactly a fair comparison. However the AV640 has worked well with a fair amount of DX on 40. On 6-meters I've worked the East, West, and Gulf coasts. That is to say it worked well under the conditions at the time, not in comparison to any other antennas.

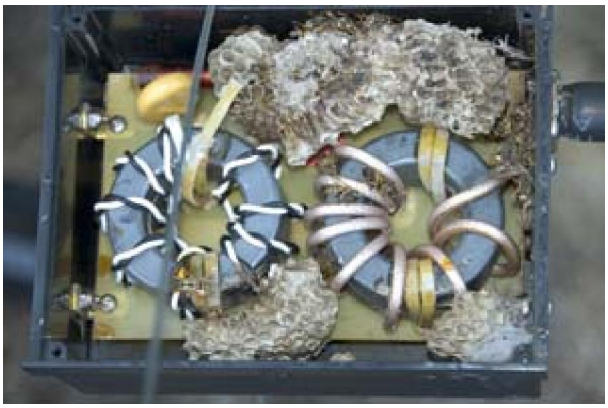
Since this was first written I've moved the full station to the shop. This has allowed me to switch from the AV640 to 40 meter, center fed, half wave sloping dipoles. At times the AV60 may be as much as 2 S-units stronger and at other times it is weaker which pretty much shows the polarization diversity and angle of radiation differences at any one moment.


Two views of the AV-640 and tower

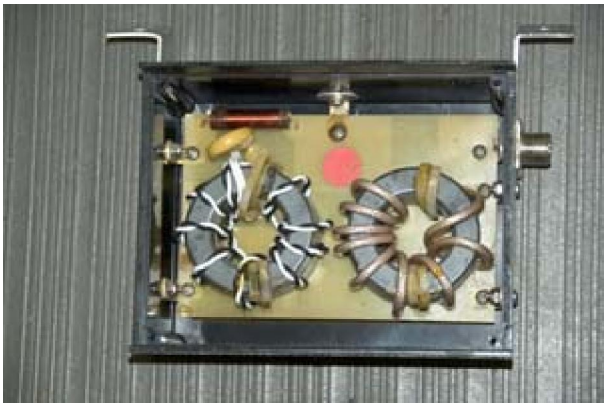
History and Guests:

I had been making a few contacts on 40, but used the rig in the shop to mostly monitor W1AW code practice prior to this summer. Although the SWR on 6 as well as 40 seemed to be close to normal the other bands had changed frequency and the minimum SWR had gone from 1.1:1 up to around 1.5 or 1.7 to 1. This called for a closer inspection which required lowering the antenna. The tower base is hinged so with the aid of one ham on the shop roof with a rope and a couple on the ground while I pulled on one of the nylon guys to the AV-640 to keep it out of the trees we lowered it onto a couple of sawhorses. (Note to self: add raising fixture or fold over mast).

Outwardly I only found one insulator/spacer for a tuning stub broken which should not have affected the operation of the antenna. The next step was to open the matching network. The inside was packed with "cooked" Wasps and nests.



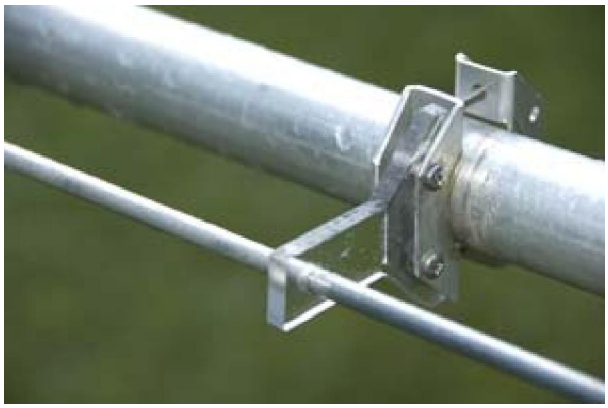
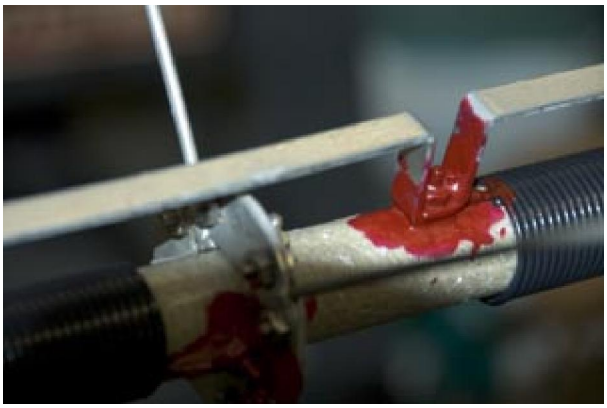
Note the pile of Wasps and "Wasp Goo" over the coax connector on the right.



The matching network after cleaning and the broken spacer with replacements in the works.

I disassembled the matching network and cleaned it thoroughly. The broken spacer was replaced with a piece of Lexan (TM) and the top loading coils had the connections cleaned and weatherproofed.

NOTE the spacer should be a loose fit on the stub. The AV640 is flexible. If the Lexan is a tight fit, it will grab the stub when the antenna is laid down, bending the stub and stub attach point.

The new Lexan (TM) spacer (left) and the weatherproofed connection for the top loading (right)



Flooded Heat shrink tubing used to weatherproof the AV-640 and TV antenna connections. Cable grounding at the tower base on the right.

After reassembly the antenna was mounted on a temporary mast and the MFJ analyzer used to check resonance, impedance, and band width.
At this point I played "musical tower sections" by using the best 5 sections from two Aluminum towers to get 40 feet, mounted the AV-640 on the tower, and raised the tower back into position at the end of the shop. Raising 40 feet of tower with a 25 foot vertical on top wouldn't have been so bad if the two big

trees to the North West weren't there. (One can be seen in the top photo on this page). Fortunately the AV640 is a bit flexible and the guy lines provided the means to spring the antenna far enough to the South to miss the top branches while three other hams pushed the tower up into position. The antenna worked well for about two weeks and then went back to the same problems previously experienced, but without the Wasps.

Since I typed the above the antenna has given up again. I assume it's a problem with the bottom connector on the matching network and I should have changed that when the antenna was down.
Addendum: The bottom connector was bad. I replaced it with a new N-type and the antenna is back in operation.

I'm currently working on the big antennas so it may be a while before I get back to the AV-640, but it sure is a handy antenna for the shop.
One more time...The SWR went up and the resonant frequency for each band shifted down. Apparently a near by lightning strike took out the protective choke across the output of the matching network. The choke is clearly visible at the top of the matching network shown in the lower of the two photos of the matching network. At HyGain's suggestion I clipped the choke out and all readings went back to normal.

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If you have comments or suggestions on Content or spelling, (Proof readers welcome) email me at
Roger Halstead