

YAESU STEALTH ANTENNA

Jim Andrews, KH6HTV

5 March 2014



Fig. 1 ATAS-120 antenna



Fig. 2 Ground Radials Details

Yaesu makes the perfect HF rig and antenna for the budget minded amateur who also suffers from antenna restrictions. I am talking about the Yaesu FT-857 (\$820) transceiver and the companion, mobile whip antenna, the Yaesu ATAS-120 (\$325). The Yaesu engineers did a great job of engineering this combo to work together flawlessly.

The FT-857 is an all band (160m - 70cm), all mode (SSB, AM, FM, CW & Digital), 100 Watt transceiver. The ATAS-120 antenna is a mobile whip antenna for 40 meters thru 6 meters. It is what is called a "screw-driver" antenna. This means that it has an internal motor to adjust the length of the antenna and the tap on the loading coil to adjust it's resonate frequency. The FT-857/ATAS-120 combo is designed to send all of the necessary DC control signals from the transceiver to the antenna's motor over the antenna feed-line coax cable. No extra cabling is required. Tuning is an extremely simple matter. Simply push the TUNE button on the FT-857 front panel and the rig turns on automatically and sends out a low powered CW carrier to the antenna. The FT-857 includes a built-in VSWR bridge and it thus measures the VSWR during the tuning process. Knowing what the last frequency was and the desired new frequency, The FT-857 sends the appropriate UP or DOWN control signal to the antenna. When the VSWR drops dramatically to a match, the FT-857 tells the antenna motor to stop, and turns off the tuning carrier. Switching bands can be done very rapidly.

While the FT-857/ATAS-120 combo was obviously designed for mobile operations, it can also be used for home base stations in locations where antennas are not allowed. The ATAS-120 can be a very stealthy antenna, but still quite effective. Granted, it will not

have as high gain as a wire dipole strung really high in the air, or a yaggi beam antenna on a really tall (and very visible) tower. But if you want an antenna your neighbors can't see, or recognize as an antenna, then the ATAS-120 may be the answer to your prayers. The ATAS-120 looks like a black baseball bat with a 36" flexible whip extending out the top. The "bat's" length varies from 19.9" (6m) to 26.4" (40m).

I "planted" my ATAS-120 in the lawn in my back yard here on Maui. See Fig. 1. While I had no need to "hide" my antenna -- an antenna this small could easily be hidden among various garden plantings for CC&R restricted QTHs.

I buried sixteen ground radial wires spaced symmetrically around the antenna. Consulting the internet, I found many references recommending the ground radials be 0.1λ at the lowest frequency of operation. Thus my ground radials are all 14 ft., #14, solid copper, insulated wire. Fig. 2 shows the details of the coax connection and the ground radials. I drove a long 3/8" metal post into the ground as the basic mechanical support. The RF connector on the ATAS-120 is a very beefy, ruggedized UHF, male plug. I thus used a long, 3 1/2", UHF (f/f) barrel adapter for the coax cable to antenna connection. This barrel adapter is clamped securely to the 3/8" ground post with a screwdriver adjustable hose clamp. Also wedged tightly under the hose clamp to the ground post is a 2", 1/4x20 bolt. I used this bolt as the attachment point for all of the ground radial wires. I attached 1/4" ring terminals to each of the copper ground wires. In addition to crimping them, I also soldered each ring terminal to it's wire. I used a long, 75 ft. run of new RG-8X coax cable to run from the ham shack to the antenna. I also buried this coax in the lawn. At the base of the antenna, I added a 1:1 balun to minimize RF currents flowing back to the shack on the outside of the coax. I made this balun by winding six turns of the RG-8X coax through a 2 1/2" dia. ferrite toriod. The UHF coax connector on the cable was made water tight by wrapping it in silicone wrap tape.

Does it work ? Yes ! It always tunes to $< 1.5:1$ VSWR on all bands, 40m thru 6m. Using it, I have been able to work all around the Pacific Rim with it on the higher bands of 15, 12 and 10 meters. It has also worked well for me on 17, 20 and 30 meters. 40 meters here in the middle of the Pacific has been a challenge for me with both my vertical and horizontal HF antennas. The ATAS-120 works as well from this base station ground mount as it does in conventional mobile service. It can also very easily be removed from the ground mount and used mobile. I also have a horizontal, wire, HF dipole at my Maui QTH. It is an Alpha-Delta, model DX-EE, multi-element dipole for 40m, 20m, 15m and 10m. I have it installed at 15 ft. height. I have found it very useful to be able to switch back and forth between the vertical ATAS-120, monopole and the horizontal Alpha-Delta, dipole. Depending upon the propagation conditions, HF noise sources, etc. sometimes the vertical is superior to the horizontal dipole. The gain of the mobile vertical is definitely less than the dipole on the lower bands of 40m and 20m. On the higher bands, the mobile vertical's length is starting to approach $\lambda/4$ and it's gain definitely improves.