There's no need to tap dance around this one. You can dive right in and build it in short order.

T For Two
A Simple, Easy-To-Build 2 Meter Mobile Antenna

BY THOMAS M. HART*, AD1B

In the hopes of making low-profile 2 meter contacts from my car, I did quite a bit of reading (and daydreaming) about various antenna designs. My goal was a system that would be suitable for use in repeater monitoring, but still would allow access to the stronger local machines. Living in the Boston area, I have easy contact with a variety of repeaters, and a simple antenna serves my needs.

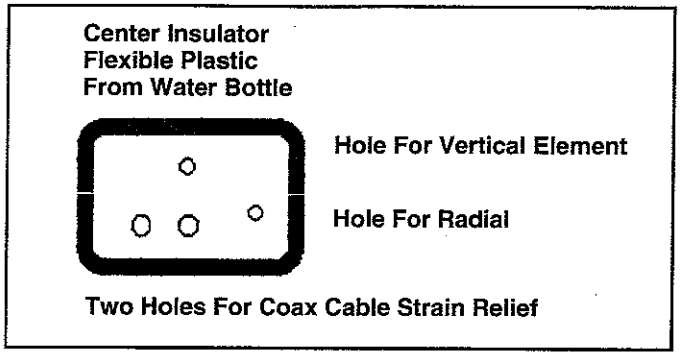
My thoughts slowly coalesced around an antenna form that is usually seen on the lower bands, especially 160 and 80 meters. I settled on a top-loaded vertical T-antenna. Further, in the interests of keeping this a "stealth antenna," I installed the finished T for Two against the side of my station wagon window.

The top-loaded antenna was patented by Simon Eisenstein of Kiev, Russia in 1909. Refer to the book *Antennas and Techniques for Low Band DXing* by John Devoldere, ON4UN, from the ARRL (1994) for additional information.

One popular variant of the top-loaded antenna is the T-antenna, which is often found on the top bands, where it is used as a current-fed, top-loaded short vertical. The T-antenna exhibits very little radiation from the horizontal elements. Unlike the inverted-L antenna, which does show horizontal radiation, the symmetrical design of the T-antenna tends to cancel most of it. According to the *ARRL Antenna Book* (1974), top loading increases the radiation resistance of grounded verticals. Practical antennas use vertical elements as long as one-half wavelength. Where long verticals are impossible, the T-load forces the current loop to the top of the antenna, keeping the largest possible current along the vertical section. The accompanying illustration shows a common T-antenna, where the length from feed point to the tip of the T section is 1/4 wavelength.

Other versions of top-loaded verticals are capacitance hat antennas, coil and capacitance hat antennas, and T-wire and coil antennas.

*54 Hermaine Avenue, Dedham, MA 02026

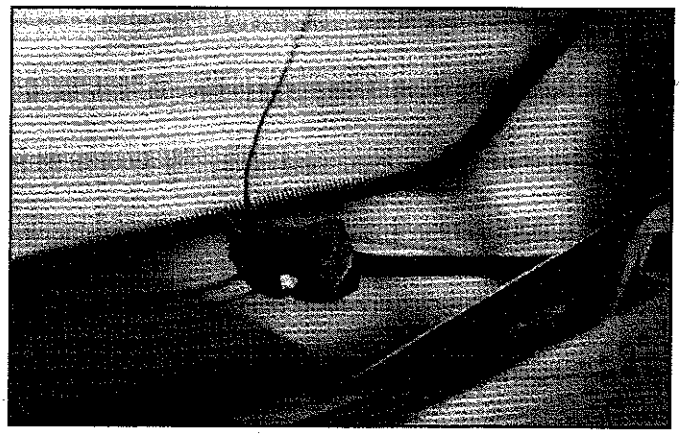


Fig, 1– The layout for the center insulator, which is made from any flexible plastic, such as that of a water or soda bottle.

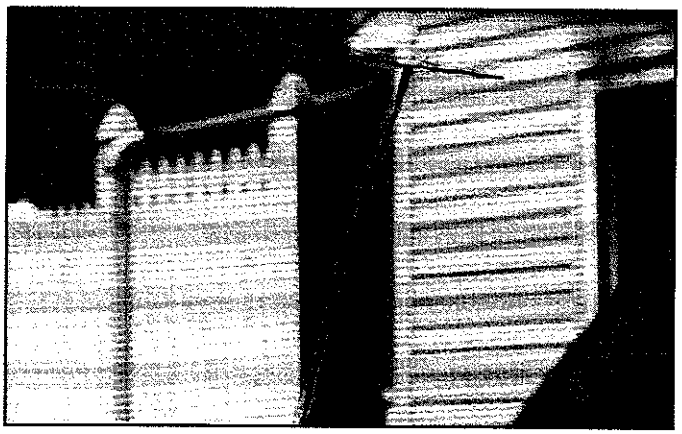
A practical T-antenna for the 80 meter band is described by ON4UN as having a vertical section of 39.4 feet (60% of 1/4 wavelength). Converted to 2 meters, the vertical section becomes 11.4 inches (0.6 times 19 inches). The top element size was determined by cutting and pruning (refer to the illustration for the size and configuration of my finished antenna).

The steps in building a T for Two are as follows:

1. Prepare a center insulator from suitable material. I used a piece of plastic cut from a water container. Holes cut with a paper punch allow the passage of the wires; when done, I used a sheet metal screw to attach the insulator to the plastic molding next to the car window.
2. Build a 1/4-wave dipole for 2 meters and cut the elements careful-



Here is a view of the center insulator, which is made from readily available plastic.



The antenna itself is simply attached to the rear car window with clear Scotch® tape.

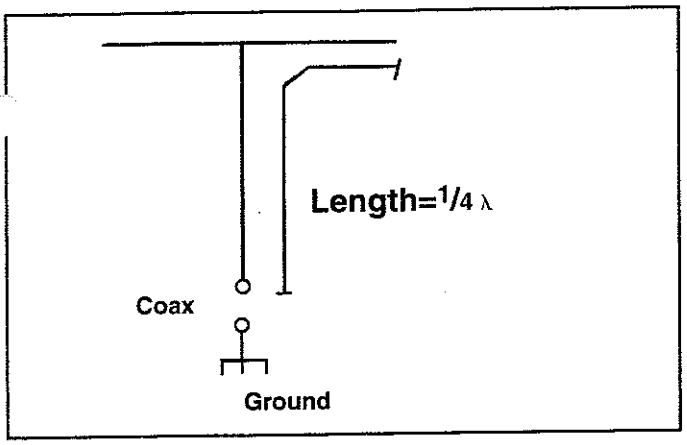


Fig. 2– A standard quarter-wave T-antenna.

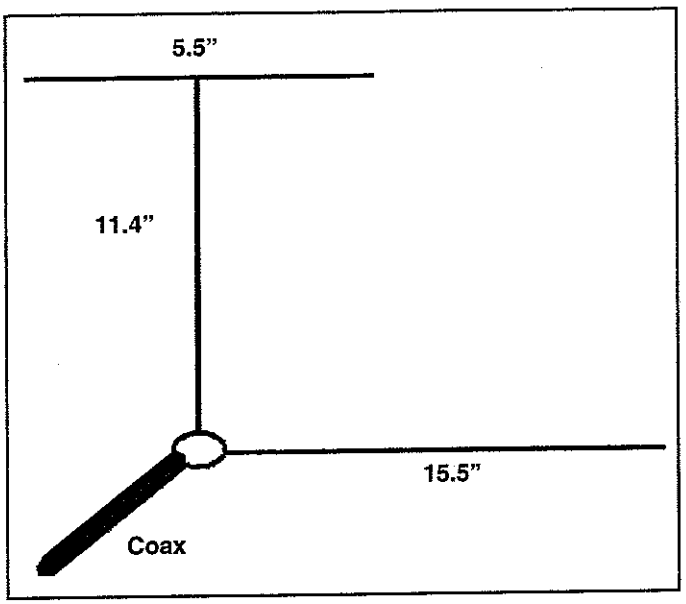


Fig. 3– Dimensions for the T for Two antenna. (See text for details.)

ly to achieve proper loading using an SWR meter. To start, element lengths of 20–21 inches are sufficient. I taped the unit to a window in the house to provide a suitable support for the tune-up process.

3. After the dipole is pruned, cut back the element attached to the coax center tap to 11.5 inches (this is the T-antenna vertical section). Attach a 7 inch top section to the vertical element and trim this to a final match using the existing radial as a counterpoise.

4. Use clear tape to attach the antenna to the vehicle glass. Check the SWR and prune the radial (not the T) to achieve a final match. Instead of cutting the radial, you may simply fold it back on itself until the SWR is correct. The size of the final antenna is smaller than I originally expected, probably due to the capacitance effect of the vehicle. Secure the radial with tape or a pin.

At this point, you should have a working 2 meter antenna that will provide reasonable performance with a very low profile. In addition to the 2 meter band, I use it to listen to NOAA Weather radio and have found it quite satisfactory. The window in my station wagon storage area is more than sufficient to support the antenna. I used RadioShack hookup wire with black plastic insulation for the antenna along with RG8X coax and have had no problems so far. ■