A Simple 6M FM Ground Plane

Larry Banks / W1DYJ

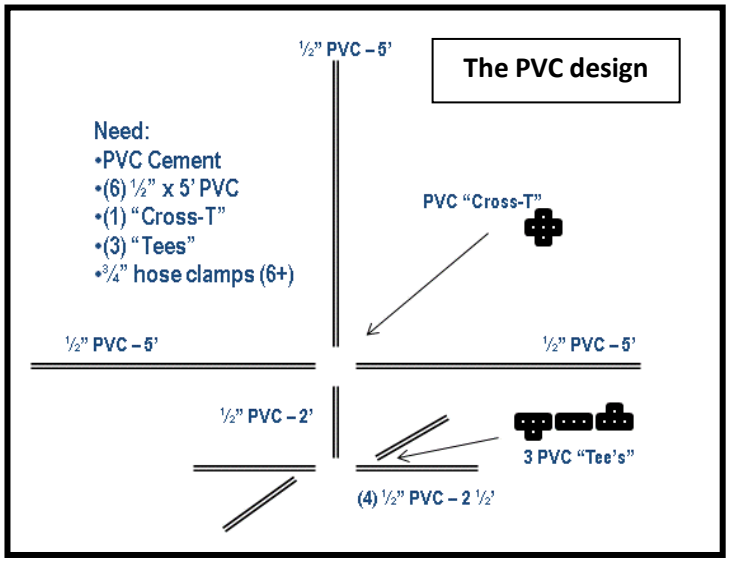
Background

The Minuteman Repeater Association (MMRA) < https://www.mmra.org/ > is an Eastern Massachusetts non-profit organization providing communications infrastructure and volunteers for community and emergency events. It owns a linked system of over 20 repeaters from 10m to 33cm in the Boston area and is a source of both repeater hardware and personnel for emergency and public service events.

In my role as MMRA net manager for the Tuesday evening *Technical Informational and Other Stuff* net I should have the ability to monitor all of the MMRA repeaters. With my now 20-year-old TS-2000 and the 2M/70cm FM stick on my roof I can monitor those repeaters. At the 2019 New England HamXposition I purchased an Alinco DR-235 MkIII to cover the 220 repeaters, using a simple ground-plane in my attic: < https://www.qsl.net/w1dyj/220%20Antenna%20Results.pdf >. But I needed an antenna for 6M to feed my TS590SG.

Design

I modeled and built a simple vertical dipole made from #22 hard-drawn copper wire. Unfortunately this 6M dipole would be too tall to hang from my attic rafters. After trying to bend it in some way to make it fit, I realized that a simple ground-plane would work and be short enough to fit my attic.

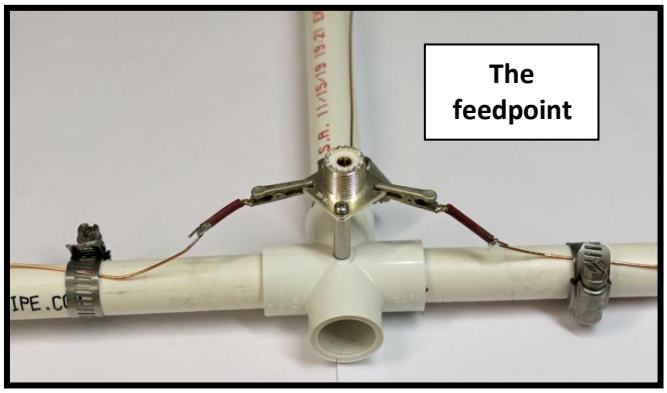


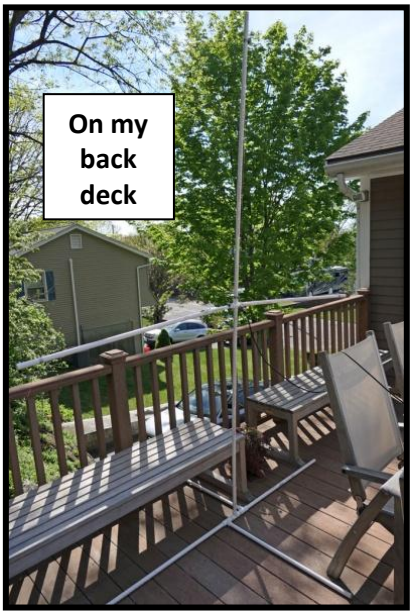
One of my favorite building materials is 1/2" schedule 40 PVC. It's easy to machine, glues together quickly, and there exist a lot of joints, elbows, etc. that you can use to fashion whatever shape you can design. As I wanted to test this on my back deck, I drew up a quick prototype of a self-standing ground-plane – see the basic design of the PVC tubing in the figure to the right.

This might also work well for portable operation if designed to be a quick put-up and take-down structure.

Implementation

A quick trip to the local big-box store acquired the PVC to build this. Don't forget to purchase the PVC cement. (And use gloves with that stuff!) A hacksaw and some sandpaper was all I needed to build the structure. I did not





cement all the parts together as I wanted to be able to break it down for storage as I was testing it, and later to be able to carry it up to my attic. I used alligator clips to connect the two ground wires to the active wire after fitting the two ground PVC tubes into the "Tee" connector cemented to the vertical tube. (Don't forget the story of the guy who built a boat in his basement…)

My modeling showed that 55" of the #22 wire was about the right length to use for the three legs of the ground-plane. I cut this and ran it along the PVC, clamping it at the ends of the three legs with standard stainless-steel hose camps. Setting it up on my deck showed that it was worth the effort.

Results

I hung this at the western end of the attic which faces the target repeater in Marlboro MA, about 24 miles away from my QTH in Woburn. It seems to work quite well.