The TDFMODVRFDS

Given the success of the TDTMODVR, we have constructed and evaluated the TDFMODVRFDS. It has proven to be effective and sufficiently robust for its intended use, and it was not expensive to construct. It stayed in the air from Sunday 04-10-22 until Monday 04-18-22 and did not fail physically or operationally, so we're calling it a success.

To refresh your memory on the TDTMODVR, go to the Central Louisiana Amateur Radio Club (CLARC) website, www.clarc.us, and click on **Resources**. On the **Resources** page, scroll own until you see **Projects for New Hams**, and you will find the article on the TDTMODVR. There you will find instructions for how to build your own, and you will find an explanation for the insane abbreviation.

Speaking of insane abbreviations, TDTMODVR stands for **T**emporary **D**eployment **T**wo **M**eter **O**mni **D**irectional **V**ertical **R**adiator. In other words, it's a neat little portable two-meter ground plane that works well. Now the new one is the **T**emporary **D**eployment **F**orty **M**eter **O**mni **D**irectional **V**ertical **R**adiator **F**ield **D**ay **S**pecial. It is essentially the same as the two-meter version except that all of the elements are 32 feet 9 inches long instead of .

The reasoning, which may turn out to be flawed, behind the construction of the TDFMODVRFDS was to have a vertically polarized 40-meter antenna to go along with the club's 40-meter horizontally polarized dipole. The hope is that physical separation of the two antennas and cross polarization will allow us to run phone, CW, and digital simultaneously on 40 meters. The idea is to attain some attenuation of 40-meter signals between antennas by virtue of cross polarization and minimize interference among stations and give us a better chance for a respectable score.

Quoting from the 2018 Edition of the ARRL Handbook (Section 21.1.1) "*For best results in **line-of-sight** communications, antennas at both ends of the circuit should have the same polarization, However, it is not essential for both stations to use the same polarization for ionospheric propagation or sky wave. This is because the radiated wave is bent and rotated considerably during its travel through the ionosphere. At the far end of the circuit of the communications path the wave may be horizontal, vertical, or somewhere in between at any given instant. For that* *reason, the main consideration for a good DX antenna is a low angle of radiation rather than the polarization*."

So, if CLARC has stations on 40-meter phone, CW, and digital simultaneously, we really don't want them to hear each other. If the antennas for those same stations are 500 to 700 feet apart, the signals from one to the other will ***not*** be traveling through the ionosphere and getting bent, rotated, and tossed around. Those signals are going directly from one antenna, through the Woodworth pinetreesphere, to the other antenna and hopefully maintaining a high degree of their original polarization, vertical or horizontal. Basically, this should mean we are, within our 1,000-foot maximum diameter, dealing with ***line-of-sight*** communication. If one antenna is vertical and the other is horizontal, they will be *cross-polarized*, and the strength of the received signal, and the resulting interference, will be diminished.

The TDFMODVRFDS was constructed from materials I had on hand.

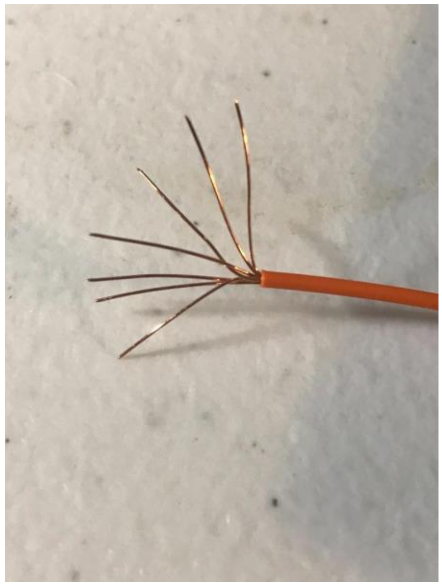
Wire for the vertical radiator was from a roll of Belden "Appliance Wiring Material". It was a twisted-pair wire, and the roll was dated "DEC 1 '88". It appears to be two twisted runs of AWG #14 stranded, tinned copper wire.

The wire had to be untwisted. When it was untwisted to a single run, it had a "memory" such that the run was twisted/kinked. In order to get an accurate measurement of length and the keep the wire from lengthening (untwisting/unkinking) under tension, it was scientifically and precisely stretched.

The wire was tied to the tow hook on the 4 Runner and to the trailer hitch on the Tacoma. I coasted the Tacoma down the slope of the driveway, and when my assistant told me the wire was straight, I set the brake and checked the wire. I let the truck coast about another inch or two until the wire was fairly taut, set the brake, and let it all stand for 5 or 10 minutes. I stretched it about another inch and let it stand for another 5 or 10 minutes. Stretching removed the pattern in the wire.

I've had the wire used for the radials since the early 80s. It is insulated, stranded, hard-drawn copper with a mind of its own. It twists, kinks, and does what it pleases and not what you want it to do! There are 7 strands of wire, and the individual strands appear by measurement to be 29 or 30 gauge, which should make the 7/30 wire about 22 gauge overall.

Despite its age, the wire is in good shape. The conducts are bright and take solder easily, and it is strong for its size.



I. Materials and Tools

A. Tools

1. 100-watt soldering iron
2. Wire cutter (a/k/a side cutter, dikes, diagonal cutter)
3. Measuring tape (at least 50 feet)

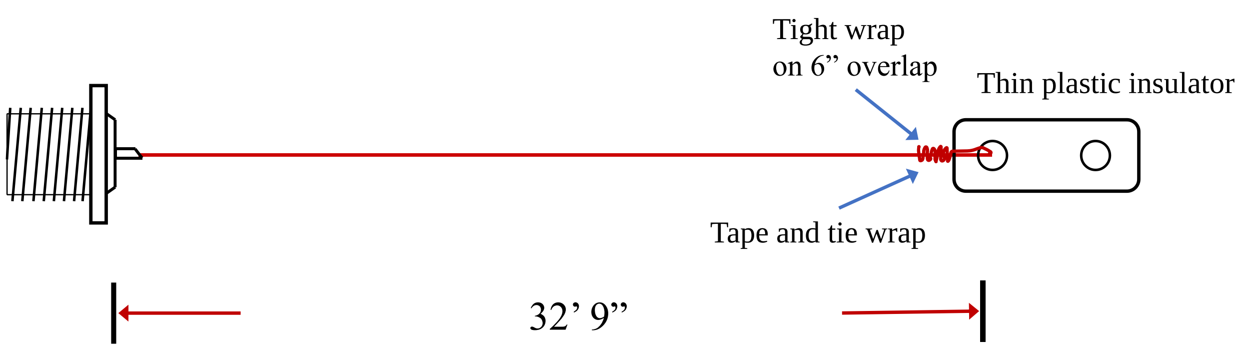
B. Materials

1. SO-239 Chassis (panel) connector with 4 mounting holes
2. Solder (60/40, rosin core)
3. #14 AWG stranded insulated copper wire (vertical radiator), 33 feet 3 inches
4. #28 to #16 AWG stranded insulated copper wire (radials), 4 pieces 33 feet 3 inches each
5. #6-32 x 3/8 screw (stainless steel or brass), 6
6. #6-32 lock washer (stainless steel or brass), 6
7. #6-32 nut (stainless steel or brass), 6
8. Ring terminal 4-6 stud, #14-16 wire
9. Thin (⅛” to ¼” thick) plastic insulator, 5
10. Tie wraps
11. Electrical tape

II. Construction Details

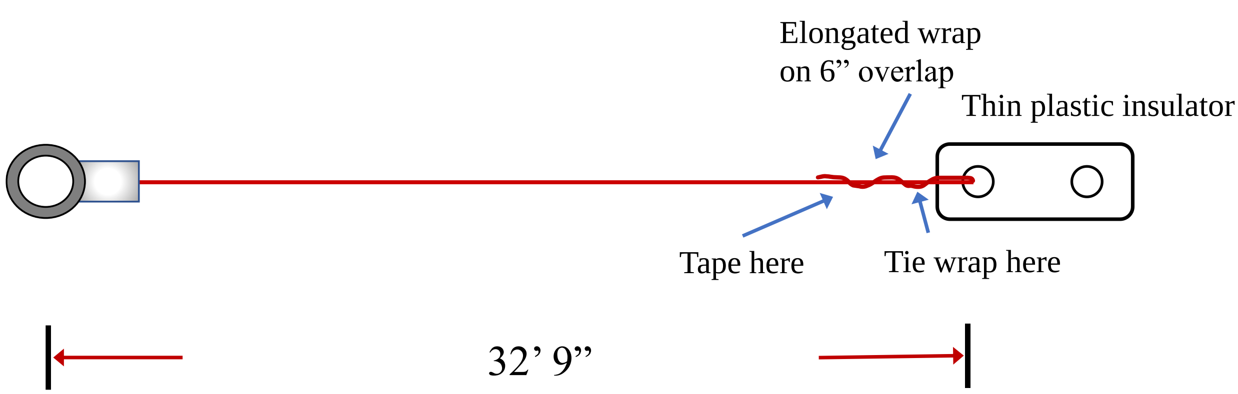
A. Vertical Radiator

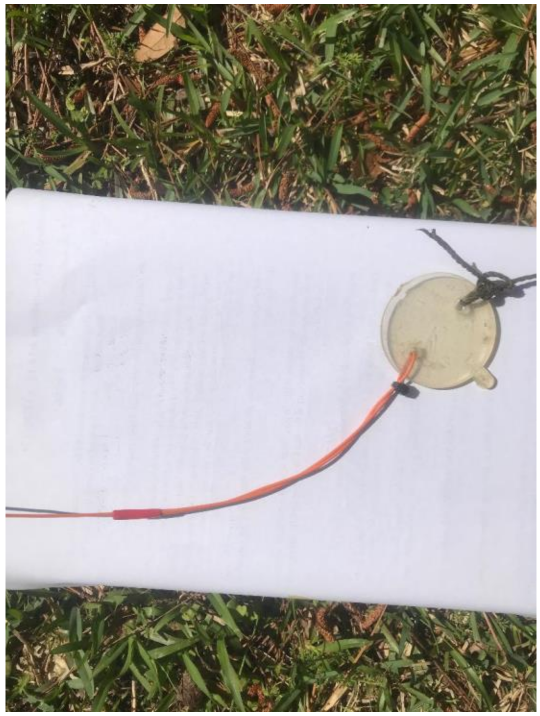
1. Strip about ½ inch of insulation off one end of the 33 foot 3 inch section of #14 AWG stranded insulated wire. Twist the strands of wire together if they are splayed out after you strip it.
2. Tin the end of the exposed wire.
3. Tin the interior of the center projection of the SO-239. connector.
4. Solder the 33’3” section of the #14 AWG wire to the center section of the SO-239 connector.
5. Thread the #14 AWG wire through the insulator. Loop it back through and wrap the wire closely and tightly back on the main wire element. Tape and tie wrap the wire in place. Length of wire from the end of the loop through the insulator to the base of the center tap on the SO-239 should be 32’ 9”.



B. Radials

1. Strip ¼ inch of insulation from one end of each of the four radial wires.
2. Solder a ring terminal on one end of each of the four radials.
3. Thread the radial wire through the insulator. Loop it back through and wrap the wire three or four elongated turns back on the radial element. Tape and tie wrap the wire in place. Length of wire from the end of the loop through the insulator to the middle of ring on the ring terminal should be 32’ 9”.
4. Prepare all four radials.





III. Assemble the Antenna

A. Starting at the insulator, carefully roll up the vertical radiator into a nice, neat coil about 12 to 18 inches in diameter. Put a little tape around the coil in a couple of places so it will stay coiled.
B. With the #6 hardware, attach a radial to one of the four mounting holes on the SO-239 connector. Coil it up as was done for the vertical radiator.
C. Install the remaining radials, and coil each one as you go.

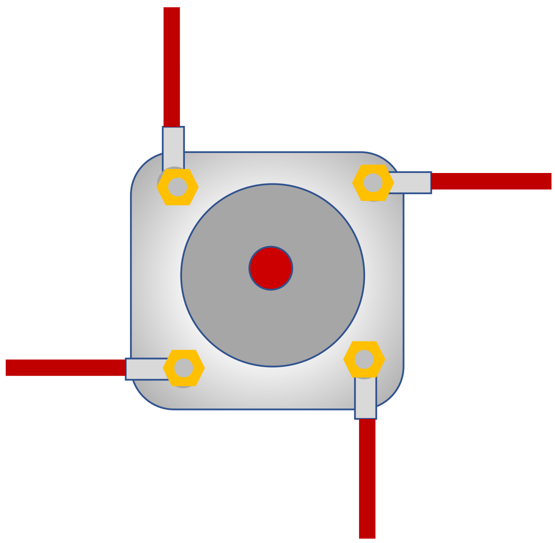
IV. Deployment

A. With your slingshot, bow and arrow, air cannon, drone, fishing rod, mortar, howitzer, rocket launcher, or whatever you use, shoot a line over a limb as far away from the trunk of the tree as possible but where the limb is at least about 2 ½ inches thick.
B. Pull your support line back over the limb.
C. Uncoil the vertical radiator and attach the insulator to your support line.
D. Connect the coaxial feedline to the SO-239 connector.

E. Pull the antenna up about waist high and uncoil the radials, keeping them 90º apart.

F. Attach support lines to the insulators on the radials.

G. Locate some nearby tree trunks, poles, stakes, or whatever to tie off the radials. Try to keep them 90º apart if possible. You can tie them off with a good bit of slack at this point if you wish. This will keep them from twisting/tangling together as you elevate the vertical radiator.



H. Hoist the top of the vertical radiator up 50 or more feet.

I. The radials should droop about 30º to 45º from the level of the SO-239. The radials do not have to be pulled taut like a violin string. They can droop between the SO-239 and the tie-off point. The support lines should be a bit over head high where they are tied off.

X. Notes on Materials, Construction, Deployment, and Performance

A. I used insulated wire perchance one of the wire elements comes into casual contact with a limb or bush.

B. Leave some extra wire, approximately 6 inches, on the wire elements perchance they have to be lengthened. Cutting them longer doesn't work.

C. Wrap the excess wire on the center (radiating element) tightly. It is supporting the weight of the antenna.

D. The wrap on the excess wire on the radials can be elongated. There will not be much tension on the radial elements.

E. Buy a couple of extra sets of #6 hardware. You WILL drop and lose a piece or two.

G. Do not pull the radials taut like a banjo string! They can droop a bit. If you pull them taut, then you are placing an extra load on the SO-239 solder joint and the wrap at the upper insulator. The antenna will know, and it will not be happy.

H. When the subject antenna was constructed, assembled, and deployed as described, the SWR minimum was at 7.15 MHz with a value of 1.15. The radials drooped about 30º down from the SO-239 and were not taut.

I. When the subject antenna was deployed in my back yard, the vertical radiator was about 8 feet from the trunk of the supporting tree, and the antenna seemed to work fine. If you want it more "in the clear", shoot lines over two trees, tie the insulator for the vertical radiator to the two lines and hoist it up.

J. The solder joint between the bottom of the vertical radiator and the SO-239 held up well. Because the radials keep the base of the antenna fairly stationary, there is not a lot of flexing in this joint.

K. For a temporary installation, the coax can lay on the ground.

L. There was no apparent need to stress relieve the coax from the base of the antenna.

In two leisurely sessions on the back porch operating 100 watts on CW, I worked 26 QSOs with the TDFMODVRFDS. On 40 meters, no tuner was needed. All QSOs were on 40 meters save for one on 15 meters. During the first operating session, the Georgia QSO party was on, so a number of the QSOs were with GA stations. The QSO on 15 meters required the use of the (manual) tuner. I had an SKCC contact with Stan ZL2BLQ in New Zealand on 21.058 MHz. The locations of stations worked on 40 meters included: GA, NC, MD, IL, IN (POTA K-4178), MS, Cuba, CT, AL, KS, TX, Ontario Canada, and MI.

Why the emphasis on using ancient wire from my "junk box"? As long as it is copper and in reasonable shape, one need not go out and buy new stuff. Will it stretch? I don't know. If I notice a change, I can easily shorten it a bit. My insulators were polycarbonate test coupons that I recovered from a trash bin at a former work location. They're good insulators and tough as nails. Building an antenna that works well is half the fun. The other half is the QSOs you make with it.

Will this horizontal *versus* vertical antenna setup yield the results we want? I don't know, but I believe it is worth a try. It will be an opportunity to learn something new, one way or the other.

With some modifications to increase physical stamina, an antenna of this type could be permanently deployed and yield good results.