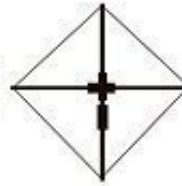


# VHF Quad Antenna Class



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Dept Of Corrections Training Academy  
1301 Concordia Ct.  
Springfield, IL.

## Kit

### Parts List:

1Ea. 1/2"X10' PVC  
1Ea. 1"X10' PVC  
3Ea. 1" PVC T  
2Ea. 1/2" PVC Cross, X  
4Ea. 1"X1/2" Bushing PVC  
180" Coper Wire  
10" clear plastic tubing

### Student Parts List:

1Ea. 20' RG58 coax with PL259  
connector attached.  
1Ea. PVC Glue, Clear,  
small can

**SWR Curve we found on test antenna.  
from 139 to 163MHZ 2:1 SWR  
Center was 146.5 MHz @1:1  
Power rating depends on Coax used.**

## Scope:

**This class is to teach First Responders to build and maintain VHF antennas! People such as Ham Radio Operators need to have the knowledge to build and maintain Communications equipment. This is part of that training.**

**In the event you find yourself working at an EOC or Air Line crash site. Knowledge such as this and pre planning for such events will save lives and property.**

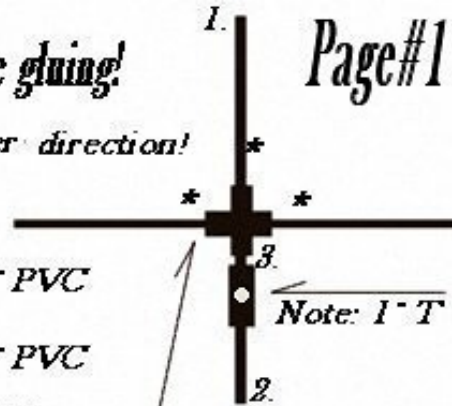
**This antenna is usable for ESDA, Police, Ambulance, Ham, and many more VHF uses.**

## Any Questions ASK before gluing!

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*Note: Be Sure 1" T is facing the proper direction!  
Before Gluing!*

1. Cut 6Ea. Pieces of 1/2" X 15" PVC
2. Cut 2Ea. Pieces of 1/2" X 11" PVC
3. Cut 2Ea. Pieces of 1/2" PVC 1.5" long
4. Cut 2Ea. Pieces of 1" PVC 7.5" long
5. Glue 1" X 1/2" Bushing into each end of 2Ea. PVC TEE.
6. Glue 6 Ea 1/2" X 15" PVC into top and both sides of 1/2" cross \*

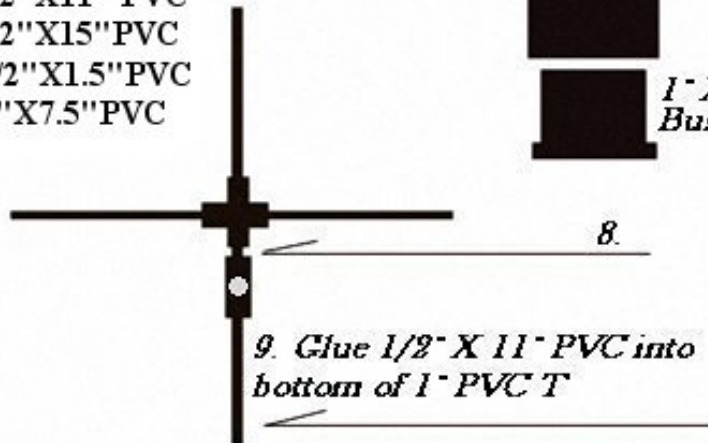
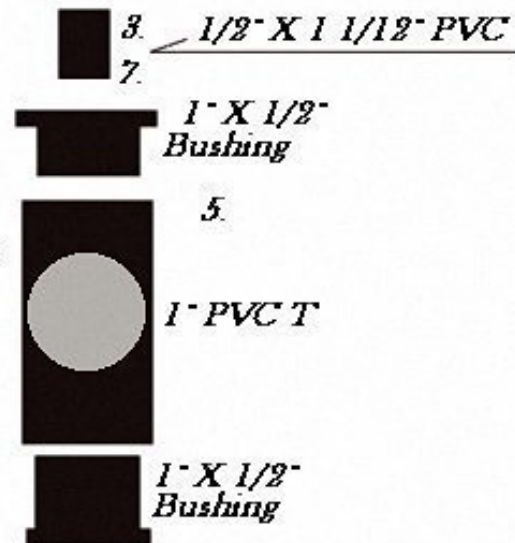


7. Glue 1/2" X 1 1/2" PVC into 1" X 1/2" Bushing

8. Glue 1/2" X 1 1/2" PVC assembled with 1" T to 1/2" Cross

Cuts:

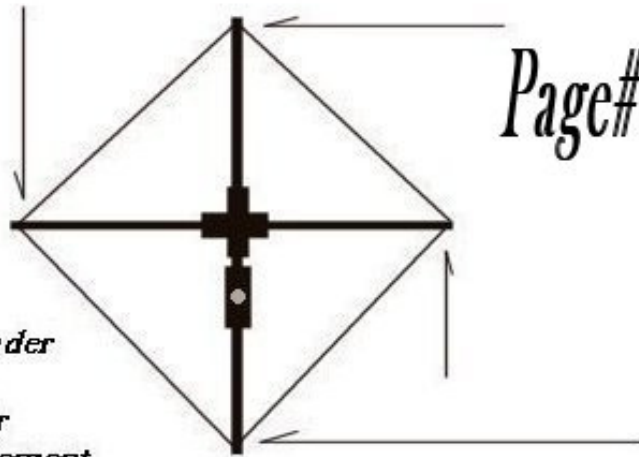
- 2Ea. 1/2" X 11" PVC
- 6Ea. 1/2" X 15" PVC
- 2Ea. 1/2" X 1.5" PVC
- 2Ea. 1" X 7.5" PVC



9. Glue 1/2" X 11" PVC into bottom of 1" PVC T

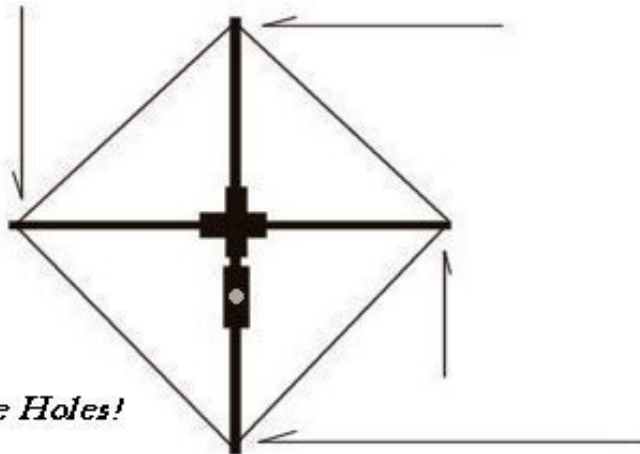
*14.5" Driven Element wire Holes!*

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*Drill holes in each spreader  
14.5 inches from center  
of 1/2" PVC-X fitting, for  
driven Element. Measurement  
on Reflector is 15" from center  
out each spreader.*

*"X= Cross fitting"!*



*15" Reflector Wire Holes!*

***Remember! Measure from the center of the Cross Fitting  
out to find measurement!***

***The very center of the diamond out!***

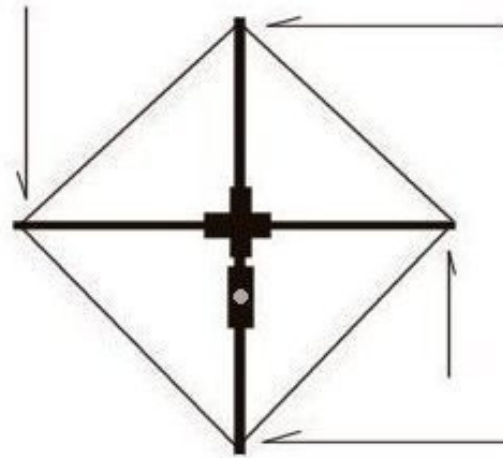
*ANY Questions ask!*

*10. Drill wire holes in the sides of the spreaders  
not the face!*



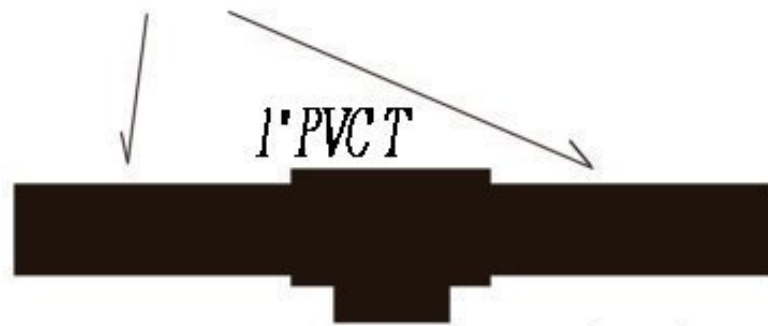
11. Run the copper wire through the holes all the way around to form the diamond. Twist the wire, tighten with pliers. Solder it and cut off excess. The spreaders should not be bent in any way by the tightening of the wire. But the wire should be tight not sloppy!

There should be a distance "1/2" or more from the end of the spreader and the hole the wire goes through.



12. Glue 2E2. 1" X 7.5" PVC into each end of a 1" PVC "T"

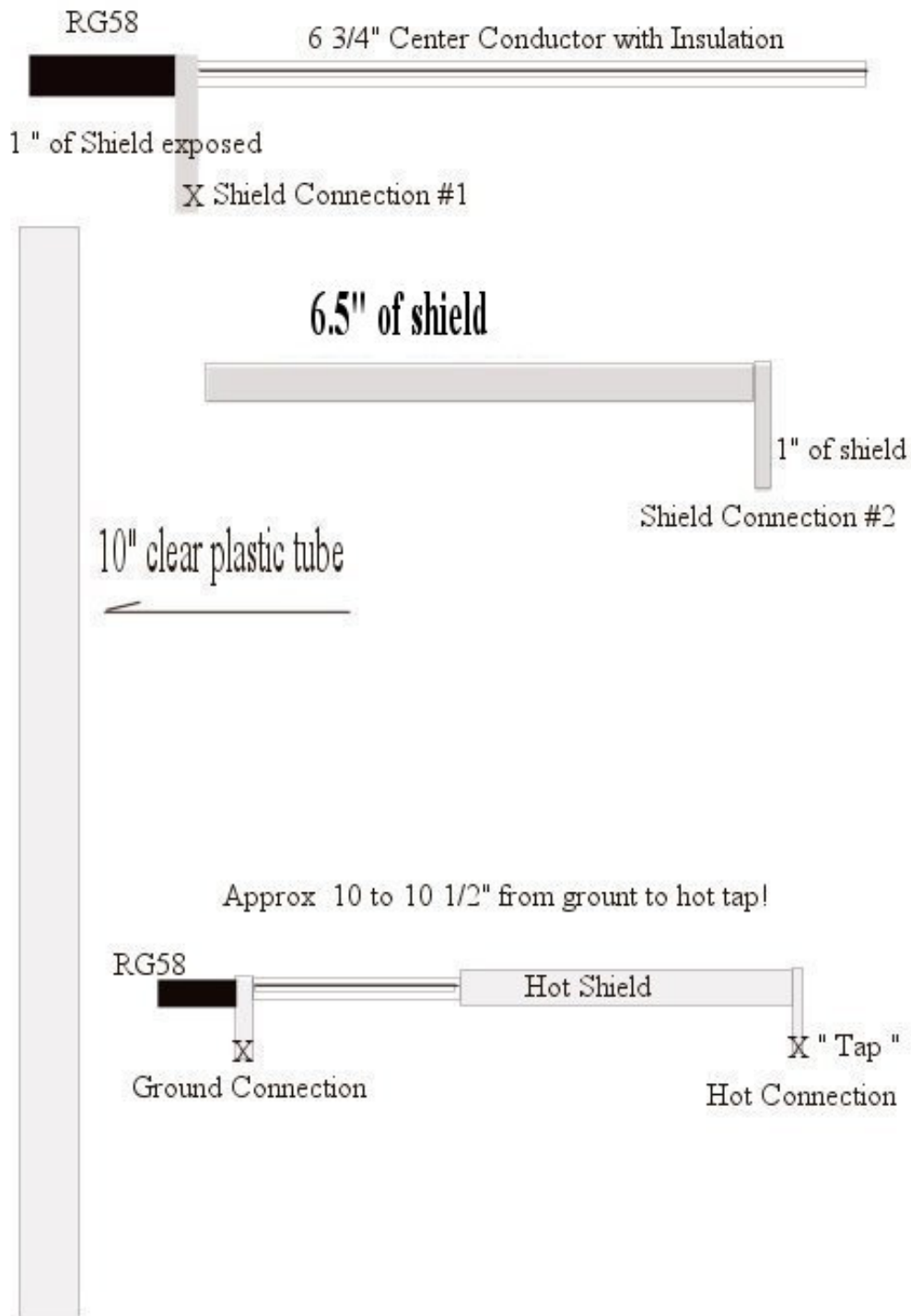
1" X 7.5" PVC

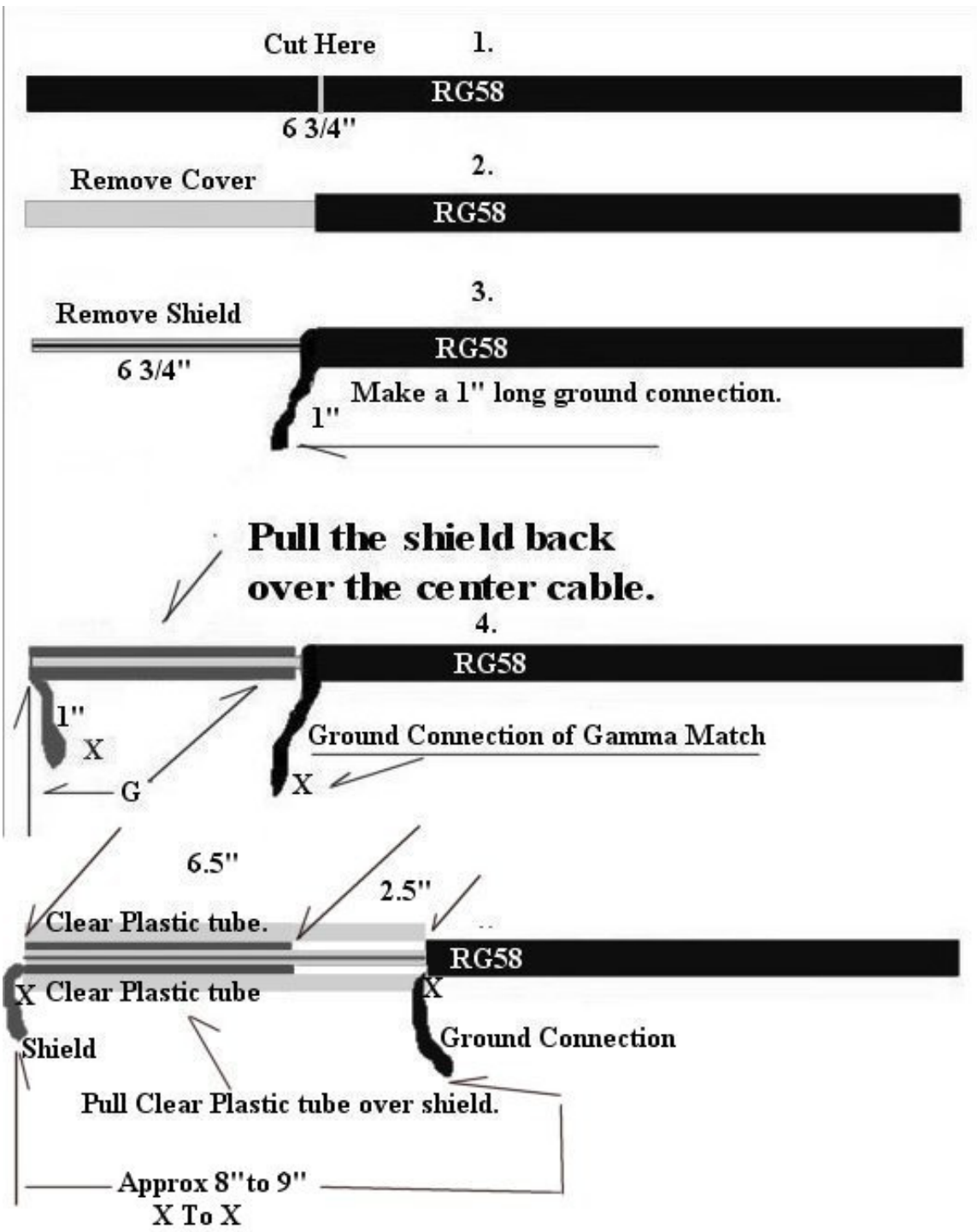


Boom Assembly ↑ Be sure to leave bottom open!

# Gamma Match Page

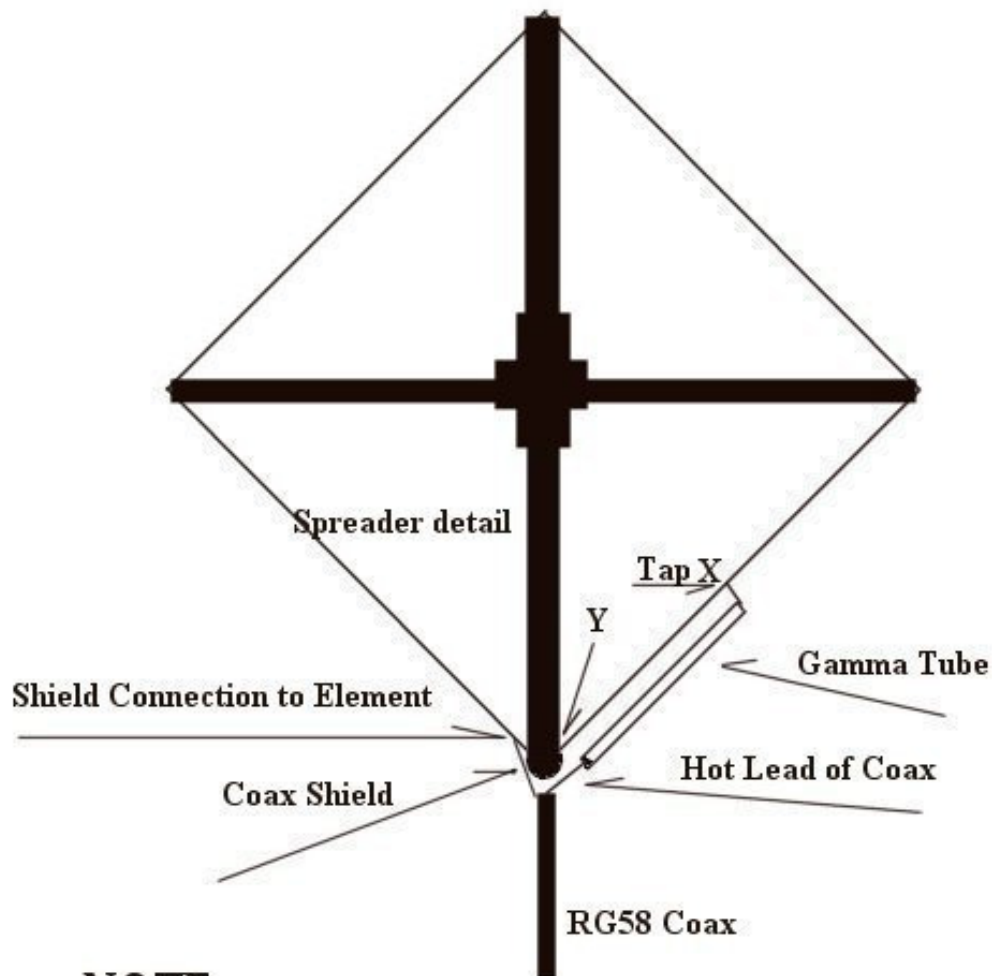
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Be sure to weather seal ends of Gamma tube and connections with RTV or liquid electrical tape.

X = 8 1/2" to 9" from Point Y



**NOTE:** Wind coax around 1" Boom 8 times. Tape in place.

- A. Gammn tap length is approx 8.5 to 9 inches from edge of PVC spreader, where wire exits hole in PVC spreader. Point Y to X
- B. Shield connection from coax to Element must be less than 1/4" long.
- C. Tape or tie wrap coax to spreader to Boom, then make a current balun by making 8 turns around the 1" Boom. Tape Coax coil in place with electrical tape.



## Adjustment of your Two Meter Quad Gamma match!

### Be sure your measuring equipment is for VHF

1. Hook it to an SWR meter or SWR analyzer. If using a SWR bridge **use the lowest power** your radio will allow. Be sure to tie wrap the gamma tube in place against the element wire first!
2. **Adjust the tap** distance on the quad element till the SWR is less than 1.4 to 1. Usually you can achieve less than 1.2:1 SWR, and a 2:1 Bandwidth from 139 to 160 MHz. Depending on conductor size and Gamma match Q.
3. This should happen around 8 to 9 inches from the PVC spreader, where the quad element wire exits the spreader arm, on the opposite side from the Shield / Ground connection of the coax.
4. **Double check** this measurement on the SWR meter with actual power applied from a radio with the antenna on a test stand away from any obstacles by at least one to two wavelengths. If outside, and no test stand, point the antenna up at the sky with the reflector on the ground, again remember” driven element facing up”. This also sometimes works in your garage with the antenna on the concrete floor. I’ve done this and had it work out fine for me. But I did not have anything in the rafters of the garage to stop the signal from escaping the building. IE wet roof, snow, ceiling lights etc.
5. **Solder** the tap point in place.
6. **Before** putting the antenna up on a tower, re-check the SWR on the coax it is to be hooked to with the antenna on a test stand 5 feet off the ground, out side, with no obstacles with in 10 meters or more, if possible. This should be a very good final check of the antenna.
7. **If all goes well** your ready to seal the gamma match. Use **liquid electrical tape** and let air dry. Seal all connections, and places where water, snow etc might damage. This does include your antennas wire connections, end of the open coax cable and the gamma match etc. Do this on each and every element. You also could use RTV Silicone seal, if it does not smell like ammonia. If you use RTV make sure it’s for electrical connections, before using it. One good way is to put it on a shinny penny, and see if it causes any corrosion to the surface of the coin. Do this if you don’t know anything about the product. If it will discolor a penny don’t use it. Another choice is to use fiberglass resin with a hardener to coat the connections, end of the open coax cable and the gamma match, etc.
8. **Mount the antenna** so that the element that the coax hooks to is configured as the front of the antenna. Normally facing North on a rotor. Some rotors use South as their center reference. If you mount the antenna on the side of a tower. You might mount it on a “**Side Mount**” made from 1” PVC and “U” clamps. Face the antenna away from the tower. Reflector nearest to the tower. The Reflector could be right up against the tower leg or face. Don’t let any element make metal to metal contact with the tower. Remember this antenna needs to have the coax shield grounded before it enters your home. Keep this away from power lines etc.
9. [http://www.w8ji.com/omega\\_and\\_gama\\_matching.htm](http://www.w8ji.com/omega_and_gama_matching.htm)  
Go to the above Web Site on the Internet for:
10. [http://www.w8ji.com/omega\\_and\\_gama\\_matching.htm](http://www.w8ji.com/omega_and_gama_matching.htm)  
How the Gamma and T matching systems work, also how to design them.