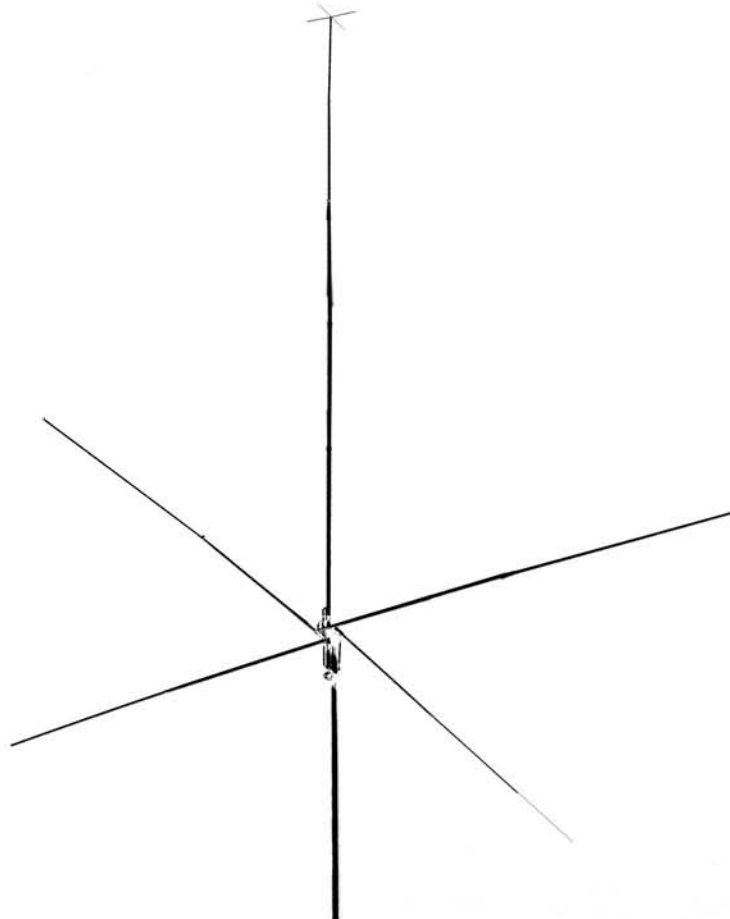


# **hy-gain<sup>®</sup>**

## **MODEL SPT-500 SUPER PENETRATOR**

### **10/12 Meter Vertical**

### **INSTRUCTION MANUAL**



308 Industrial Park Road  
Starkville, MS 39759 USA  
ph:(662) 323-9538 Fax: (662) 323-6551

Made in USA

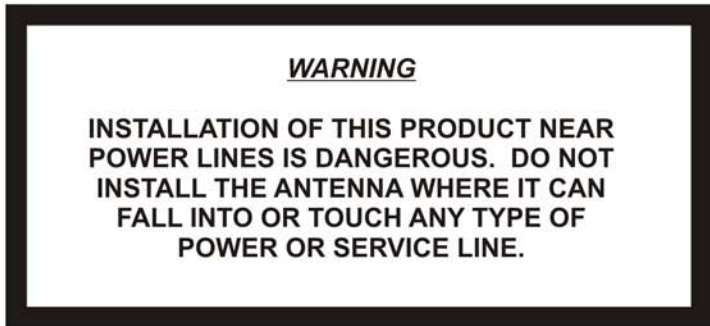
### **General Description**

The Penetrator is a full-size 5/8 wave, omnidirectional antenna. A full-sized radiator with a lower radiation angle concentrates power closer to the ground. It can be fed by any standard 50 ohm coaxial cable such as RG-8/U and RG-58/U. For runs over 50 feet, RG-8/U or RG-213/U is recommended.

The penetrator fits any masting material up to 1-5/8" O.D. A 1-1/4 plumbers pipe is highly recommended for a mast due to its low cost and high strength.

### **Specifications**

Gain.....5.3 dB  
Height.....22feet  
SWR.....less than 1.2:1  
Radial length.....8'9"  
Nominal input impedance.....50ohms  
Wind (survival).....80 mph  
Lightning protection.....DC ground  
Accepts mast.....1-1/4 to 1-5/8



### **Installation Instructions**

Unpack the antenna and refer to the parts list for identification.

Select the base assembly and the two radial plates. Refer to Figure 1 and loosely assemble these parts as shown, using the 1/4"x1" bolts, washers and nuts. Do not tighten at this time.

Referring to Figure 2, assemble the 5/8" x 55 tubes into the brackets. Align the holes and fasten with 1/4 x 1-1/4" bolts, nuts and lock washers. Do not tighten at this time.

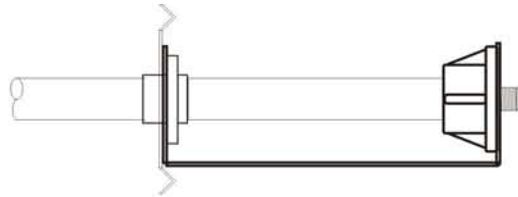
Tighten the 1/4 x 1" bolts holding the base bracket and radial plates.

Attach the two rod support insulators to the base assembly using the two phillips head screws. Use the two pre-drilled holes in the base for the mounting location. Attach the matching rod to the base as shown. The two rods should run parallel to each other. The matching rod should not touch the radial bracket or any other part of the antenna except the two points at the bottom where it is bolted to the feed point and the radiator.

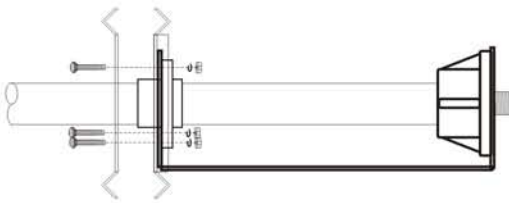
Attach the DC grounding rod from the feed point to the radial bracket as shown. This is a direct DC short to ground and does not affect the operation of the antenna. This DC ground prevents static buildup in the antenna which can damage your transceiver and helps prevent damage in the event of a lightning strike.



The base assembly will have the top insulator pre-installed. Remove the three 1/4 -20 nuts, bolts and split washers.



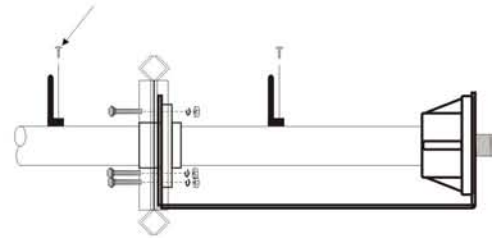
Place one of the radial brackets on the base and align the holes so that the bracket is square with the base.



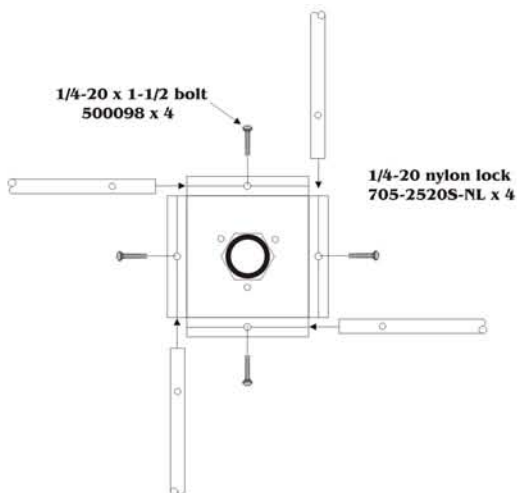
Place the other bracket on top of the first and align the holes. Insert the bolts that you removed from the base.

Reinstall the split washers and nuts but do not tighten them at this time.

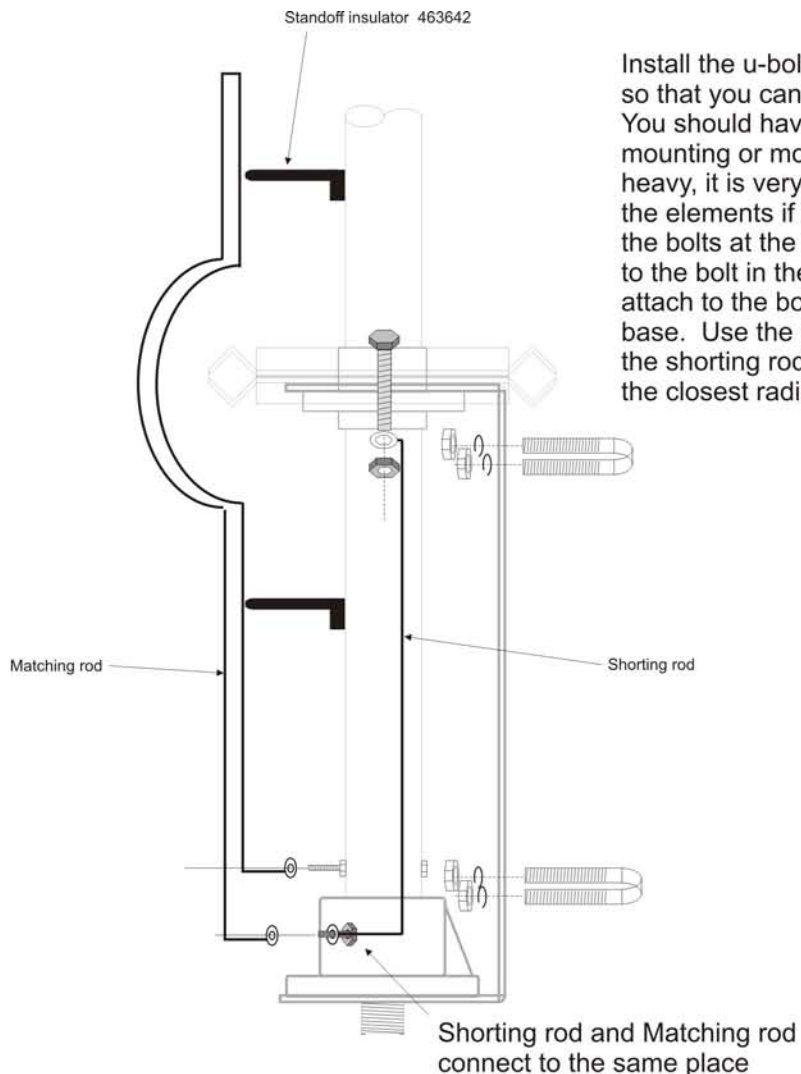
#8 self tapping



Install the two standoff insulators in the pre-drilled holes using the #8 self tapping screws. Orientation of the insulators is not important.

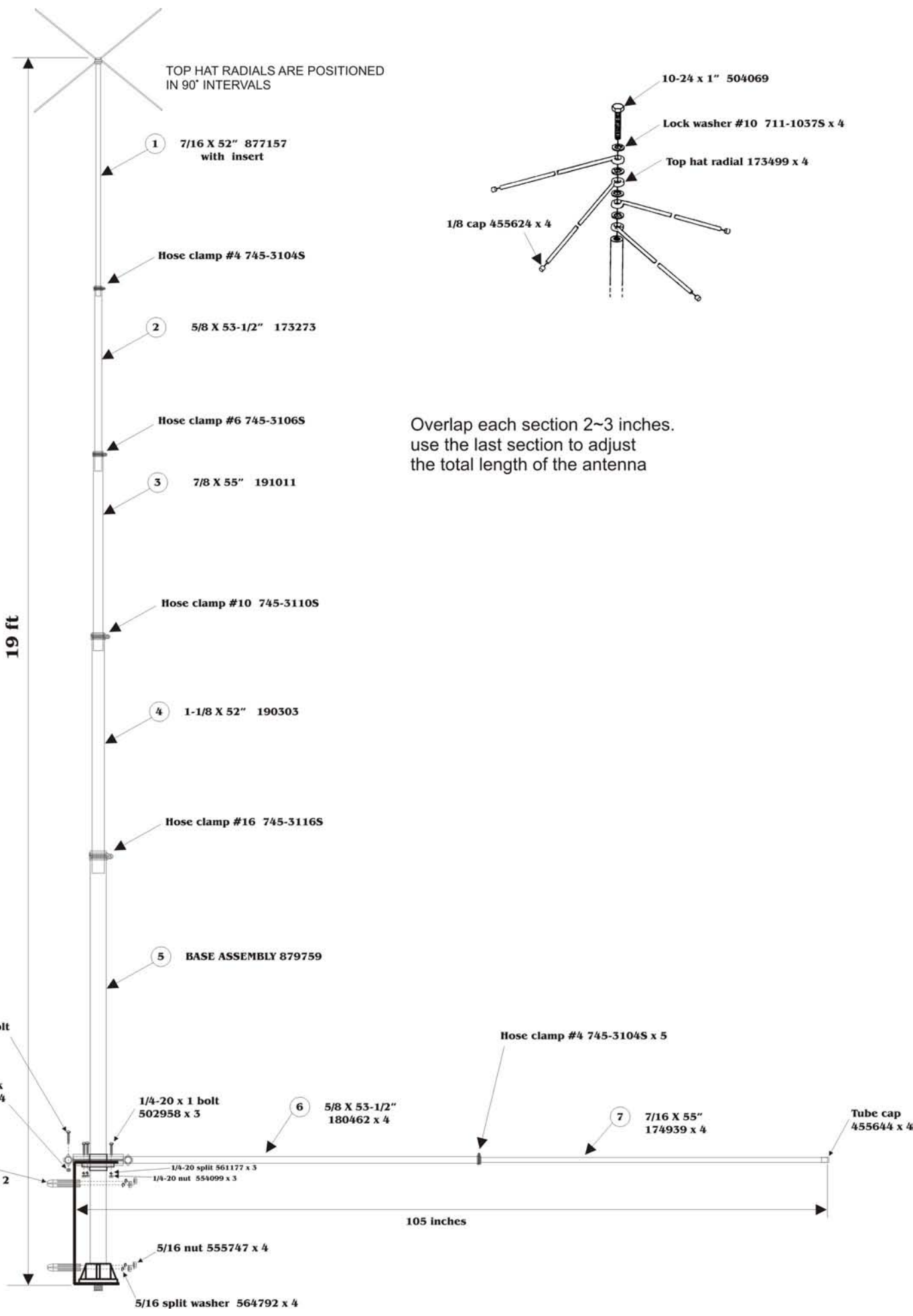


Install the four 5/8" tubing that have the hole 2 inches from the large end. Align the hole with the bracket and insert the 1/4-20 bolt. After all bolts are inserted you may install the four nylon lock nuts and tighten them all, including the three nuts on the insulator.



Install the u-bolts in the back of the mounting bracket loosely so that you can support the antenna on a temporary mast. You should have a friend help support the antenna when mounting or moving it around. Although the antenna is not heavy, it is very large in size and could injure someone or bend the elements if it were to fall over. Connect the matching rod to the bolts at the bottom of the base. The short side should connect to the bolt in the 1-1/4 main radiator tube. The longer one will attach to the bolt that protrudes from the black insulator on the base. Use the pre-installed nuts and lock washers. Also Connect the shorting rod from the base insulator to the 1/4-20 nut that holds the closest radial in place.

Install the rest of the vertical elements as shown in the diagram on the next page. Do this before the rest of the radials are attached as it will be easier to tilt the antenna without the radials at their full length. A saw horse or step ladder will be helpful in holding the antenna on its side for access. Overlap each section about three inches and insert the top section until the total length of the antenna is 19 ft. See the next page for a diagram. Use the supplied hose clamps to secure the tubing. Large clamps for the big tubing and small clamps for the smaller sections. Install the top hat onto the 7/16 tubing that contains a threaded insert at one end. Space the elements so that they are 90 degrees apart from each other. Use the diagram on the next page for reference. Return the antenna to vertical and install remaining sections of radial tubing so that they are 105 inches long. Install a tubing cap at the tip of each radial. Remember that the mounting location of the antenna will affect the tuning point and may cause the center frequency of the antenna to shift. The SWR should be checked with an antenna analyzer such as the MFJ-259 or a suitable swr wattmeter before the antenna is installed on the tower. Test the antenna just a few feet off the ground in an open area away from large metal objects. This will identify any problems before the antenna is up and will allow the user to fine tune it to the operating frequency they prefer. If the lowest swr point is below the desired operating frequency then the antenna is too long and needs to be shortend. If the lowest swr point is above the desired operating frequency, then the antenna is too short and needs to be lengthened. If you can't find a dip in the swr anywhere then something is assembled incorrectly, you have bad coax, or your not getting a correct SWR reading. The antenna will read a direct short at the feed point when using a multimeter and the shorting rod is installed. This is normal and should not be viewed as a problem. Once everything is tuned, check that all hardware is tight and mount the antenna on your mast or tower. Always ask a friend for help as it is dangerous for you to attempt to install this antenna by yourself.



**PARTS LIST**

P= Parts pack item 872019

B= Pre-installed on base assembly

1	877157	7/16 x 52" with insert	1	P1	455644	TUBE CAP	4
2	173273	5/8 x 53-1/2"	1	P2	745-3104S	#4 HOSE CLAMP	5
3	191011	7/8 x 55"	1	B3	502958	1/4-20 X 1" BOLT	3
4	190303	1-1/8 x 52"	1	B4	561177	1/4-20 SLIT WASHER	3
5	879759	Base Assembly	1	B5	554099	1/4-20 NUT	3
6	190462	5/8 x 53-1/2" With hole	4	P6	555747	5/16 NUT	4
7	174939	7/16 x 55"	4	P7	564792	5/16 SPLIT WASHER	4
8	173499	TOP HAT ROD	4	P8	543792	U-BOLT	2
9	160042	RADIAL PLATE	2	P9	705-2520S-NL	1/4-20 NYLON LOCK NUT	4
10	170774	MATCHING ROD	1	P10	500098	1/4-20 X 1-1/2 BOLT	4
11	170775	SHORTING ROD	1	P11	745-3116S	#16 HOSE CLAMP	1
				P12	745-3110S	#10 HOSE CLAMP	1
				P13	745-3106S	#6 HOSE CLAMP	1
				P14	455624	1/8 ROD CAP	4
				P15	711-1037S	#10 LOCK WASHER	4
				P16	504069	10-24 X 1" BOLT	1
				P17	463642	STANDOFF INSULATOR	2
				P18	515852	#8 SELF TAP SCREW	2