

INSTALLATION INSTRUCTIONS FOR THE HUSTLER 4-BTV TRAP VERTICAL

GENERAL DESCRIPTION:

The Hustler 4-BTV is a four band trap vertical, providing an omnidirectional pattern. The 4-BTV is designed as a self-supporting vertical to provide optimum operation, 10 through 40 meters. This antenna is expressly designed for those installations with restricted areas.

The Hustler 4-BTV provides electrical selection of bands through the use of optimum Q traps, which are individually and precisely tuned and internally sealed at the Hustler factory. Your warranty will be null and void if the traps are tampered with. The traps are parallel tuned circuits which provide efficient insulation between the vertical sections, thus permitting multi-band operation. Broad band conditions over the entire ham band and very low SWRs are possible, when installed properly. The 75 meter operation is provided when the Super Hustler RM-75-S is installed on the top of the 4-BTV.

The Hustler 4-BTV was designed to provide optimum performance from both an electrical and mechanical standpoint. Mechanically, this antenna boasts a heavy duty base and heavy duty aluminum tubing. The mechanical assembly is accomplished with all stainless steel clamps. The use of these clamps permits readjustment at a later date if necessary, and permits individual peaking of each band, if so desired. The mechanical construction is such that guying is not ordinarily needed or desired. If the 75 meter resonator is attached to the 4-BTV, under extreme conditions, it may be desirable to guy the antenna above the 20 meter trap with small diameter polypropylene rope.

The electrical performance provided by the Hustler 4-BTV is considerably improved over any other antenna of this type. Broad banding is such that only one measurement is provided, which permits operation over the entire ham band. Separate settings for phone and CW are not necessary. The antenna provides a nominal 52 ohm base impedance when installed and tuned according to instructions. The radiation efficiency is equivalent to, or greater than, other trap verticals.

INSTALLATION:

An important part of any vertical antenna is its ground system. While the Hustler 4-BTV was designed as a space saver, we would recommend the following installations from a performance viewpoint:

1. For optimum performance, roof mount with radials; select a suitable mounting location such as a short tower or heavy duty chimney clamp and securely install the antenna according to the instructions. Roof mounting of the antenna will provide height which, in turn, will generally provide better signals.
2. Second choice, ground mount with radials; if you are unable to mount the antenna in the preferred roof mount configuration, the second best choice would be that of ground mounted on a four foot ground stake, driven into the ground so that only 18" protrude. The radials in this type installation will provide a better overall performance than that of stake mount only. Excellent performance can be expected, however, not as good as roof mount.

3. Least desirable, ground mount without radials; if you are one of the unfortunate with restricted space and are unable to use a ground radial system, ground mounting of the antenna on a four foot ground stake driven into the ground with only 18" protruding, will provide very good performance which, in turn, will be in direct ratio to the ground conductivity and soil conditions in your particular area. If the ground conductivity is good, you obviously, will obtain better results. As stated previously, the 4-BTV was expressly designed to give you optimum performance in this configuration. Therefore, if ground mounting without radials is a necessity, you can still obtain better performance from the 4-BTV than that obtainable from any similar antenna.

When radials are used in a roof mount configuration, every attempt should be made to permit a 20 to 45 degree droop from the horizontal. This is accomplished by choosing a mounting pipe or short tower long enough to make these angles possible. In any case, where the antenna or the radials are mounted over, or near, metallic objects, the radials must be insulated or mounted at least 6" over the roof. It is recommended that the radials be constructed of large diameter insulated wire; #14 is usually ample. When radials are installed, they should be equally spaced around 360°, with radials of equal length opposite of each other. They should be attached to the base mount in accordance with Figure 5. The importance of radials or the ground system cannot be over-emphasized. If the instantaneous voltage curve of a vertical is studied, at a given instant, a voltage of a single polarity will be observed. The ground system must provide the voltage of the opposite polarity. If any resistance exists in this circuit, obviously the efficiency of the antenna will suffer. The ground or radial system must be considered as half of the antenna. When radials are used, high impedance will exist at the ends of the radials, and adequate insulation must be provided or their purpose will be defeated.

IMPORTANT:

FOLLOW ASSEMBLY INSTRUCTIONS CAREFULLY AND, ABOVE ALL, PROVIDE A STRONG SUITABLE MOUNT.

STEP BY STEP ASSEMBLY:

1. Check the parts against the Parts List, and notify your distributor or the factory of any shortages.
2. Install mounting bracket in desired location. Tighten "U" bolts securely. Use lockwashers and 1/4"-20 hex nuts (heavy nuts).
3. Accurately cut radial lengths (if desired) in accordance with instructions on Page 8.
4. Prepare split lead on coax in accordance with Figures 1 and 2. RG-8/U coax is recommended.
5. Install lugs on coax as shown in Figure 3 and weatherproof with electrical tape.
6. Install coax feed line and radials as shown in Figure 5.

8. After making all connections to the mounting bracket, a heavy protective coating such as Krylon would be very advantageous.
9. Assemble all 1-1/4" stainless steel clamps, using the 1-1/4"-20 x 3/4" screws and 1/4-20 square nuts as shown in Figure 6.
10. Assemble the 3/8" x 13" tubes to the hub as shown in Figure 4, using the 6-32 machine screws, number 6 lockwashers and the 6-32 hex nut.
11. Install the 10 meter trap to the 1-1/4" x 72" tube, using one of the clamp assemblies. Set to Dimension A from Table 1, Figure 7, the measurement should be made at the end of the long tube and the bottom edge of the trap. Securely and carefully tighten the clamp.

IMPORTANT: THE PLASTIC CAP IS THE TOP OF THE TRAP AND MUST BE INSTALLED IN THAT MANNER.

12. Install 1-1/4" clamp at each end of one of the 1-1/4" x 20" tubes and slide over the tube of the 10 meter trap. Install 15 meter trap in the opposite end of the same tube and set both Dimensions B from Table 1. The measurement should be made from the upper most edge of the plastic cap to the bottom edge of the 20" tube, and from the top of the 20" tube to the bottom edge of the 15 meter trap. Securely tighten clamps.
13. Install the second 1-1/4" x 20" tube, complete with clamps, on the 15 meter trap and then install the 20 meter trap in the top of that tube. Set to Dimension C from Table 1, again measuring from the top of the plastic at the bottom of the tube, and from the top of the tube to the bottom edge of the trap.
14. Install spider assembly as shown in Figure 4. It should be flat against the top of the 20 meter trap cover. Securely tighten the 6-32 x 3/4" screw with lockwasher and hex nut.
15. Install the 1-1/4" x 56" tube to the 20 meter trap and set to Dimension D from Table 1. Securely tighten clamps.
16. Each clamp should be installed near the edge of the tubing to obtain the greatest purchase. Re-check all bolts to insure tightness. Re-check all Dimensions against Table 1 to insure correctness.
17. Install assembled antenna on mounting bracket and set the bottom Dimension A, from Table 1, and securely tighten clamps.

TUNING:

The Dimensions given in Table 1 are approximate and will vary, depending on environment. To check antenna tuning, use a sensitive SWR bridge, such as a CESCO CM-52 (DO NOT USE A

FIELD STRENGTH METER). Using only sufficient power to obtain a full scale reading, check and record the SWR at the high, center and low edge of the bands. If the SWR reading is lowest at the high end, lengthen the related section of the antenna; if it is lowest at the low end, shorten this antenna section. Always attempt to get the very lowest SWR reading in the center of the band. Tuning in this manner will permit operation in both the phone and CW portions with a low SWR. If you favor one end of the band or the other, you can retune the antenna to provide the lowest SWR in that portion, if desired.

In the process of tuning the antenna, it is mandatory that you always start with 10 meters and work your way up the antenna. Tune 10 first, then 15, 20, and 40 meters last. Any adjustment made on 10 will affect the other bands. Any adjustment made of 15 will affect 20 and 40. By the same token, any adjustment on 20 will affect 40. For adjustments on any of the bands individually 10 meters adjust Dimension A; 15 meters, adjust Dimension B; 20 meters, adjust Dimension C; and 40 meters, adjust Dimension D.

It is not necessary to remove the bracket each time to adjust the antenna. It is only necessary to remove the antenna from the bracket. If the desired SWR cannot be reached, it is probably because of a ground condition.

If resonance can be adjusted properly but a low SWR cannot be reached, then it is probably due to insufficient insulation at the ends of the radials, improper angle of the radials, or reflections from nearby resonant objects. A number of conditions may cause the resonance to shift from the factory dimensions, occasionally to the point that resonance cannot be reached within the normal range of adjustment; lengthening or shortening the radials may be necessary to compensate for these conditions. Changing coax lengths or adjusting a tuner may make the SWR appear better but will not change the antenna, the final radiator, or its performance. When the antenna is tuned properly at resonance, little change in SWR will occur regardless of where the bridge is located in the line.

CONCLUSION:

Your installation is now complete. We are sure that you will enjoy many hours of pleasurable operation from your own Hustler 4-BTV trap vertical. If you have any questions regarding the installation or performance of this antenna, you may write to New-Tronics Corporation, Customer Service Office.

"PACKAGE CONTENTS"

<u>ITEM</u>	<u>QTY</u>	<u>PART NUMBER</u>	<u>DESCRIPTION</u>
1	1	4098	Bracket Assembly
2	1	4190	Top Tube Section 1-1/4" x 56"
3	1	4087-1	Lower Tube Section 1-1/4" x 72"
4	2	4087-2	Intermediate Tube Section 1-1/4" x 20"
5	1	4090-1	Ten Meter Trap
6	1	4090-2	Fifteen Meter Trap
7	1	4090-3	Twenty Meter Trap
8	6	5481	Spider Tubes - 3/8" OD x 13"
9	1	4198	Accessory Kit Consisting of the Following:

[A] IN CLOTH BAG

10	7	3993	Clamps
10 [a]	2	3488-4	"U" Bolts
11	7	2194-32	Round Head Screws 1/4-20 x 3/4"
12	4	2491-3	Lockwashers - 1/4" split
13	7	4243-1	Square Nuts - 1/4-20
15	1	3609-1	Spider Hub
16	1	2194-15	Screw - 6-32 x 3/4"
17	7	2382-13	Nuts - 6-32
18	7	2381-8	Lockwasher #6 Ext Tooth
19	4	2382-21	Nuts - 1/4-20 x 7/32" thick
19 [a]	1	4513	Terminal Lug - 1/4" hole
19 [b]	1	4514	Terminal Lug #10 hole
19 [c]	6	3162-9	Flat Head Screws - 6-32 x 5/8"

[B] IN KRAFT BAG FOR RADIAL MOUNTING

20	2	2700-7	Hex Head Bolt - 1/4-20 x 1-1/2"
21	8	2233-16	Washers - 5/8" OD x 1/4" ID
22	2	2491-3	Lockwashers - 1/4"
23	2	2382-21	Nuts - 1/4-20 x 7/32" thick

Also contained in this package is the spider assembly No. 4457-1 for for 75/80 meter operation. Part numbers for parts associated with assembly are detailed on page 4260-9.

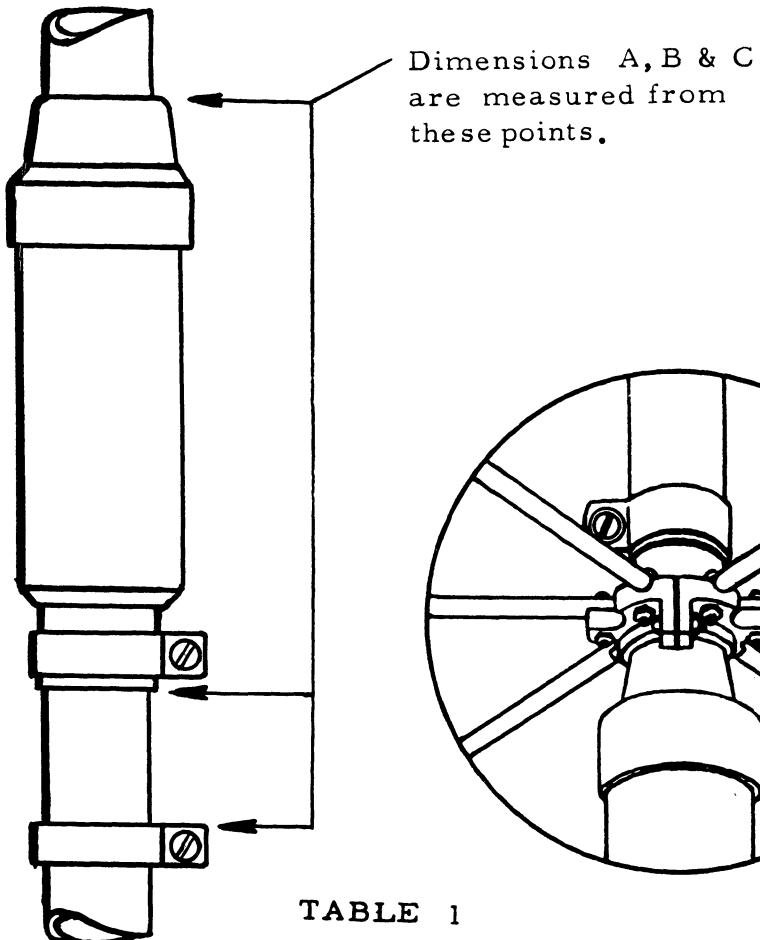


TABLE 1

TYPE OF INSTALLATION	A	B	C	D
On a roof with 5 foot pipe and radials	$2 \frac{3}{32}$	$2 \frac{1}{16}$	$1 \frac{7}{8}$	$6 \frac{1}{8}$
On a metal tower with radials drooped 45 degrees	$1 \frac{31}{32}$	2	$1 \frac{5}{32}$	$6 \frac{1}{8}$
On ground with radials	$1 \frac{1}{32}$	$1 \frac{21}{32}$	$1 \frac{1}{16}$	$6 \frac{21}{8}$
On ground without radials	0	$\frac{1}{2}$	$1 \frac{1}{16}$	$6 \frac{21}{8}$

Above dimensions are in inches.

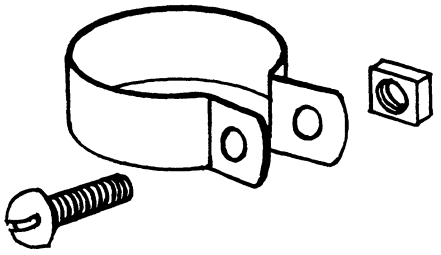


FIGURE 6

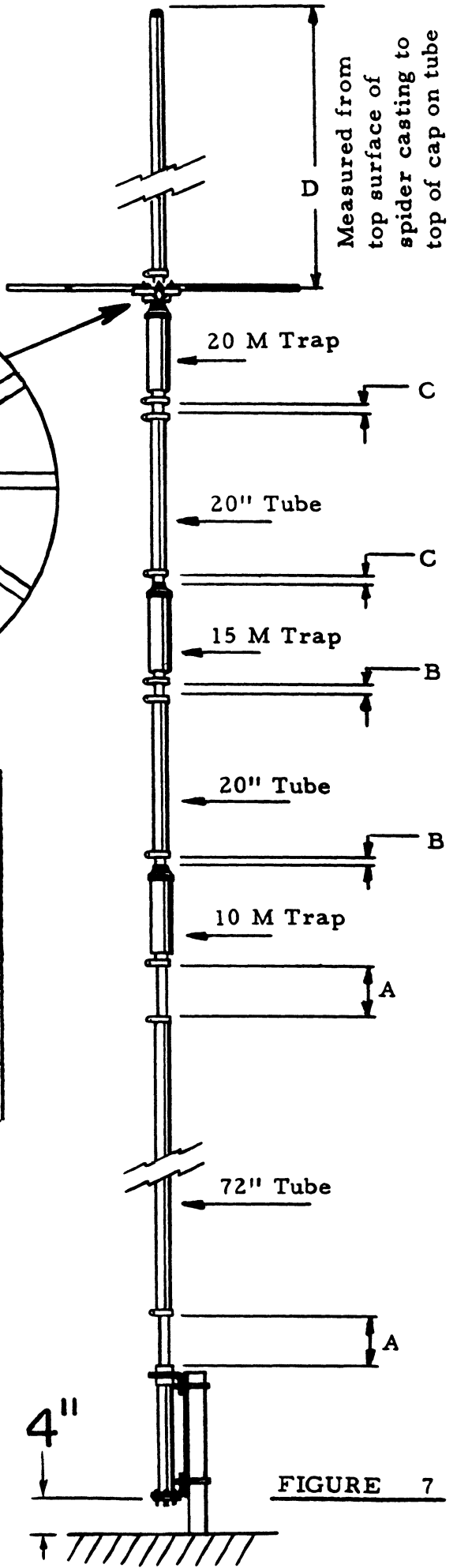


FIGURE 7

RECOMMENDED METHOD OF PREPARING COAX

Split End

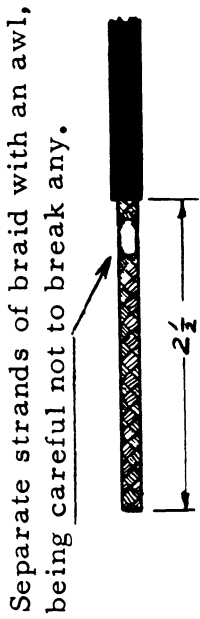
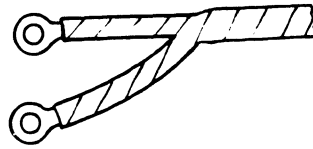


FIGURE 1

Draw center conductor out with an awl or dull pointed instrument.



FIGURE 2



Lug with $\frac{3}{16}$ " dia. hole on shield end.

FIGURE 3

Solder on the size lugs as indicated above. Tape tightly with plastic electrical tape. After installing coat with corona dope.

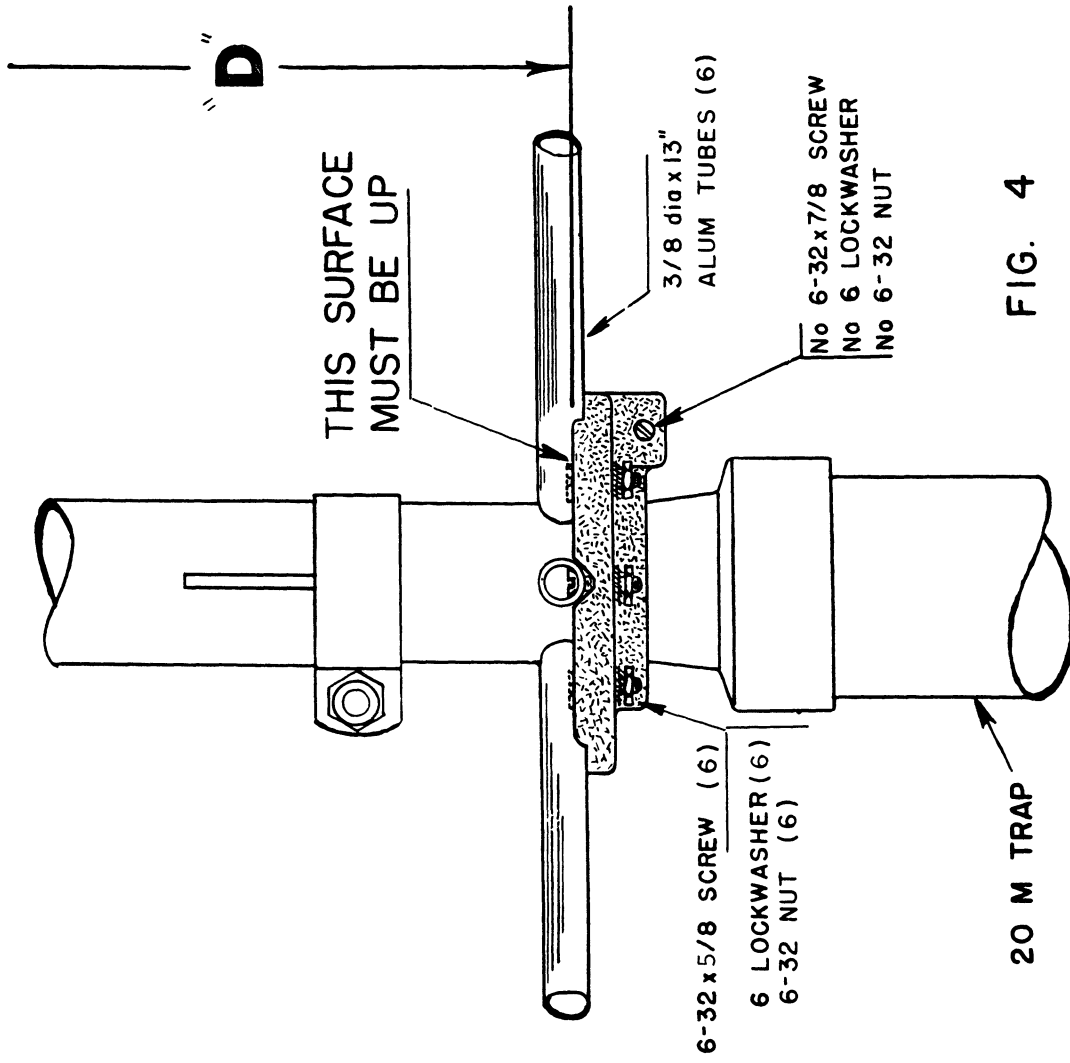


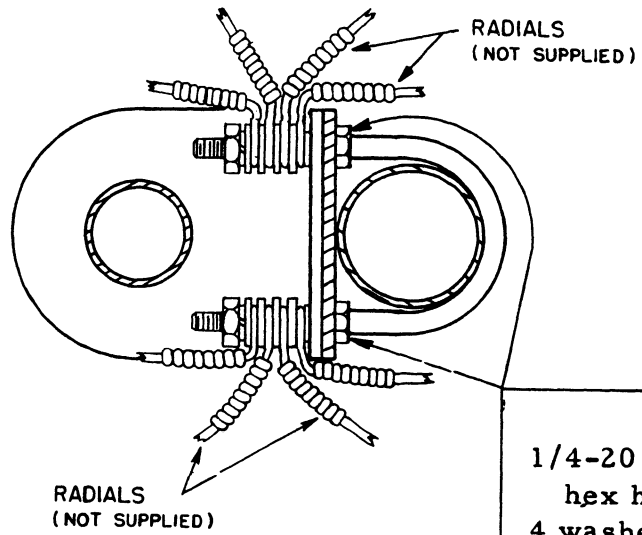
FIG. 4

ILLUSTRATION SHOWING FEED LINE AND RADIALS CONNECTIONS

RADIAL LENGTHS FOR
4 BAND OPERATION

2 Each Required

10 Meters	8' 4"
15 Meters	11' 4"
20 Meters	16' 4"
40 Meters	32' 4"



- 1/4-20 x 1-1/2
hex head bolts
- 4 washers 5/8 o.d.
- 1 lockwasher 1/4"
- 1 hex nut 1/4-20

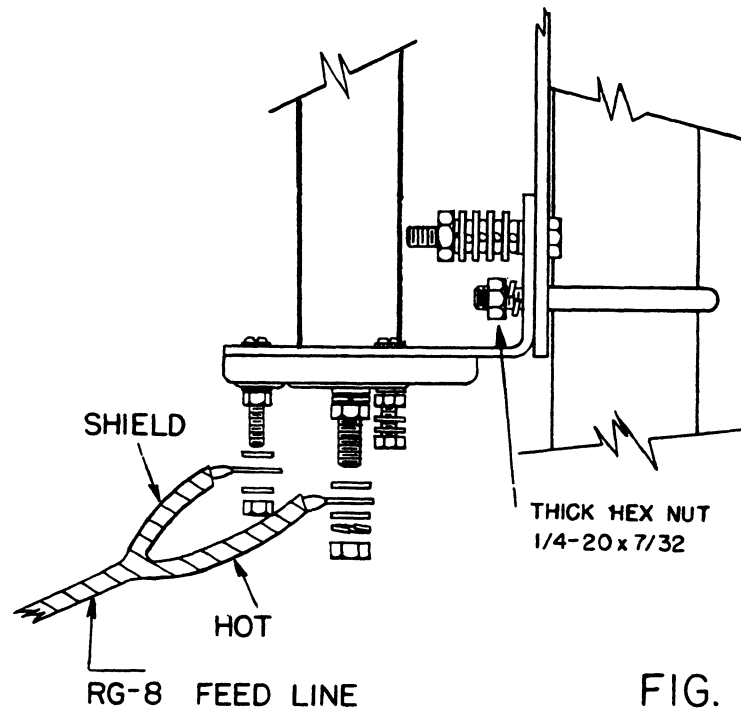
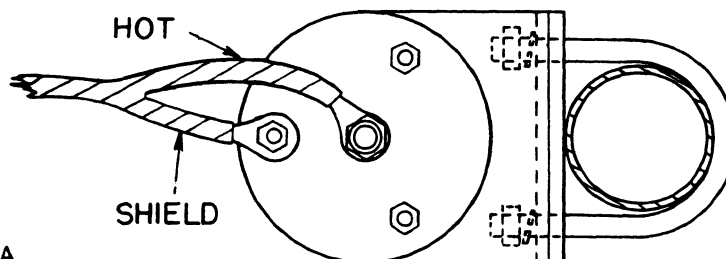


FIG. 5



75/80 METER OPERATION:

Excellent fifth band performance is obtainable by installing a Hustler resonator directly on the 3/8"-24 stud located under the plastic cap on the 4-BTV top element. Fifth band operation is automatic with the resonator installed, switching or removal is not required and 10-40 meter performance is not degraded.

RESONATOR CHOICE:

The Hustler Super Series, RM-75-S or RM-80-S have the widest bandwidth and are rated at full legal SSB and CW power. The standard series, RM-75 or RM-80, are rated at 400 SSB power. Specific frequency coverage of each resonator is detailed on the Tip Rod Length Chart.

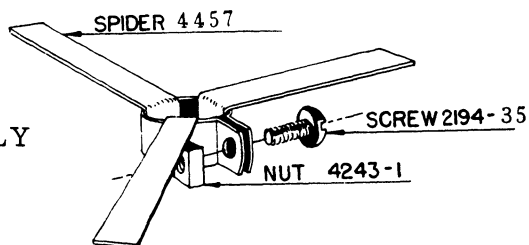
BANDWIDTH:

75/80 meter bandwidth is between 80 and 100 KHz for an SWR of 2 to 1 or better depending on resonator choice, installation and environment. This bandwidth, while restricted, is greater than any comparable product and compares favorably with a full size dipole.

STEP-BY-STEP:

- 1 - With reference to Figure 7, mark the location of the bottom "A" dimension and remove the 4-BTV from its base by loosening the lowest stainless steel clamp.
- 2 - If your installation is elevated, two radials are required at the following lengths. If space is restricted, radials may be zig-zagged or run in an "L" configuration avoiding near parallel wrap back. Phone Band: 75 meter resonator - 64'4". CW Band: 80 meter resonator - 65'6".
- 3 - Install the spider assembly, part #4457-1, after bending the three spider arms as illustrated, on the top of the 56" upper tube section just below the 75 or 80 meter resonator.
- 4 - Determine and set approximate tip rod length from the chart for your desired band location. Tighten tip rod locking nut securely and attach resonator to 4-BTV.
- 5 - Replace the 4-BTV on the mounting bracket to its original "A" dimension.
- 6 - Check performance with SWR bridge. Minor adjustment [lowest SWR] may be required on the tip rod length to establish resonance at the desired 75 or 80 meter frequency.
- 7 - Reactance of the resonator may cause slight change in 40 meter resonance. This is easily corrected by adjusting element dimension "D", Figure 7.

SPIDER ASSEMBLY
No. 4457-1



TIP ROD LENGTHS FOR 75 OR 80 METER RESONATORS USED WITH 4-BTV

Tip rod length measured from top of tip ball down to top of clutch locking nut as illustrated.

NOTE: All resonators are supplied with tip rod lengths for mobile operation. With the 4-BTV, a shorter length is required, therefore, remove the tip rod from the resonator and grind off the necessary amount from the end that inserts in the resonator. Before cutting, ascertain the approximate rod length from the chart plus four inches for insertion in the upper tube section of the resonator.

Dimensions indicated are approximate.

<u>FREQUENCY [KHz]</u>	<u>RM-75-S</u>	<u>RM-75</u>
4000	18"	21-1/4"
3950	19-5/8"	22"
3900	21"	22-1/2"
3850	22-1/2"	23-3/4"
3800	24-1/8"	24-3/4"
3750	25-5/8"	26"
3725	26-1/2" [Novice Band]	26-3/4" [Novice Band]
3700	27-1/4"	27-3/4"
<u>FREQUENCY [KHz]</u>	<u>RM-80-S</u>	<u>RM-80</u>
3700	27-1/4"	27-3/4"
3650	29"	29-1/4"
3600	30-5/8"	31"
3550	33"	33"
3500	34 - 5/8"	34-3/4"

The above dimensions are exposed lengths of tip rod.

