

# HUSTLER Vent

## INSTALLATION INSTRUCTIONS FOR THE HUSTLER 4-BTV TRAP VERTICAL

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### 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 glassline.

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 of 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 20 to 45 degree droop from the horizontal. This is accomplished by choosing a mounting pipe or port 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 50', with radials of equal length opposite of each other. They should be attached to the base point in accordance with Figure 5. The importance of radials or the ground system cannot be overemphasized. 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. Complete the registration card and return it to the Hustler people immediately.
2. Check the parts against the Parts List, and notify your distributor or the factory of any shortages.
3. Install mounting bracket in desired location. Tighten "U" bolts securely. Use lockwashers and 1/4"=20 hex nuts (heavy nuts).
4. Accurately cut radial lengths (if desired) in accordance with Table 1.
5. Prepare split lead on coax in accordance with Figures 1 and 2. RG-8/U coax is recommended.
6. Install lugs on coax as shown in Figure 3 and weatherproof with electrical tape.
7. 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" filister head screws with flatwashers, lockwashers, 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 2" 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.

WARNING:

The Dimensions given in Table 1 are approximate and will vary, depending on environment. 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>EM</u>	<u>QUANTITY</u>	<u>PART NO.</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 Sections, 1 1/4 x 20"
5	1 ✓	4090-1	10 M Trap Assembly
6	1 ✓	4090-2	15 M Trap Assembly
7	1 ✓	4090-3	20 M Trap Assembly
8	6 ✓	3553-6	Spider Tubes 3/8 O.D. x 13"
9	1 ✓	4198	Accessory Kit Consisting of the Following:

(a) IN CLOTH BAG

0	7 ✓	3993	Clamps
1	2 ✓	3488-4	U Bolts
2	7 ✓	2893-4	Screws 1/4-20 x 3/4 Fil. Hd. Screw
3	4 ✓	2491-3	Lockwashers, 1/4" split
4	7 ✓	4243-1	Square Nut 1/4-20
5	7 ✓	2233-5	Washer 1/4 I.D. x 1/2 O.D. x 1/16
6	1 ✓	3609-1	Spider Hub
7	7 ✓	2194-15	Screw 6-32 x 3/4
8	7 ✓	2382-13	Nut 6-23
9	7 ✓	2381-8	Lockwasher No. 6 Ext. Tooth
0	4 ✓	2382-21	Nut 1/4-20 x 7/32 thick
1	1 ✓	4513	Terminal Lug 1/4 hole
2	1 ✓	4514	Terminal Lug No. 10 hole

(b) IN KRAFT BAG FOR RADIAL MOUNTING

3	2 ✓	2700-7	Hex Hd. Bolt 1/4-20 x 1 1/2
4	8 ✓	2233-16	Washers 5/8 O.D. x 1/4 I.D.
5	2 ✓	2491-3	Lockwashers 1/4
6	2 ✓	2382-21	Nut 1/4-20 x 7/32 thick

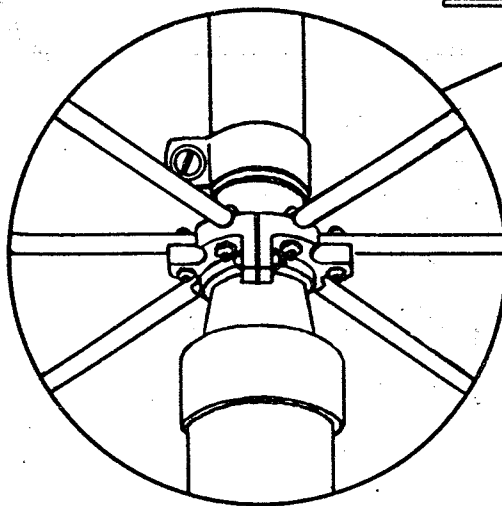


TABLE 1

TYPE OF INSTALLATION	A	B	C	D
On a roof with 5 foot pipe and radials	$2 \frac{3}{32}$	$2 \frac{1}{16}$	$1 \frac{7}{8}$	$61 \frac{1}{8}$
On a metal tower with radials drooped 45 degrees	$1 \frac{31}{32}$	2	$1 \frac{5}{32}$	$61 \frac{1}{8}$
On ground with radials	$1 \frac{1}{32}$	$1 \frac{21}{32}$	$1 \frac{1}{16}$	$62 \frac{1}{8}$
On ground without radials	0	$\frac{1}{2}$	$1 \frac{1}{16}$	$62 \frac{1}{8}$

Above dimensions are in inches.

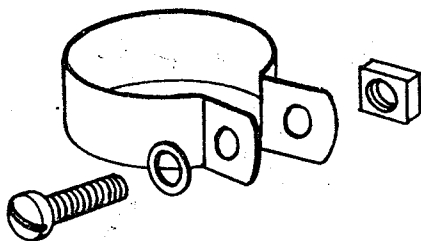


FIGURE 6

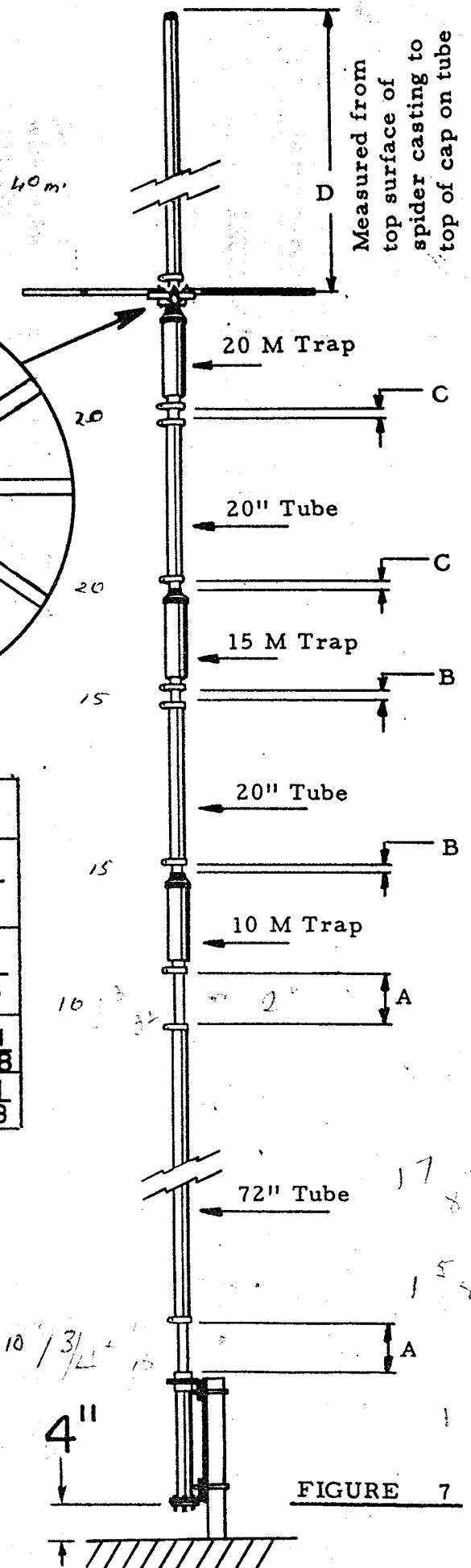


FIGURE 7

**RECOMMENDED METHOD OF PREPARING COAX**

Split End

Separate strands of braid with an awl, being careful not to break any.



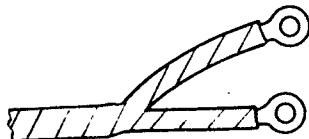
**FIGURE 1**

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



**FIGURE 2**

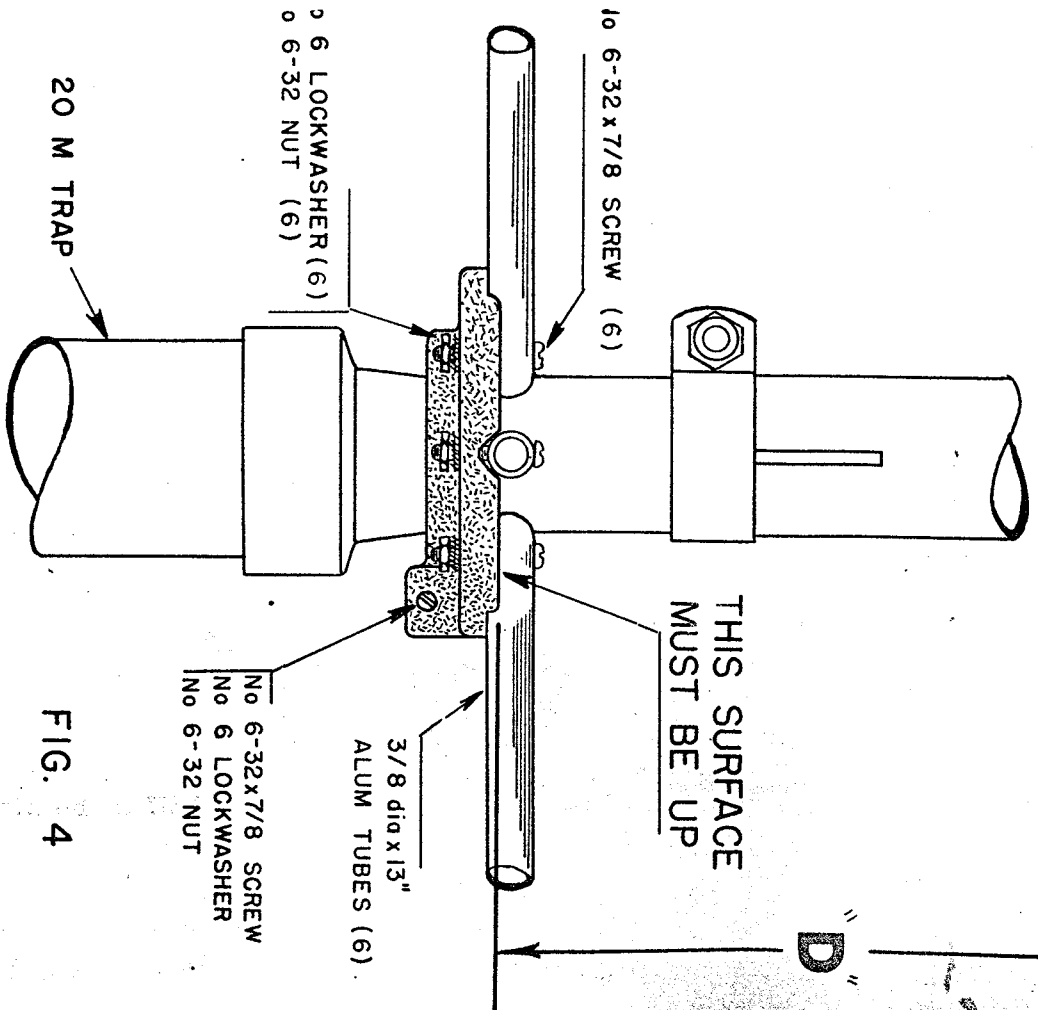
Lug with 3/16" dia. hole on shield end.



**FIGURE 3**

Lug with 1/4" dia. hole on hot side.

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

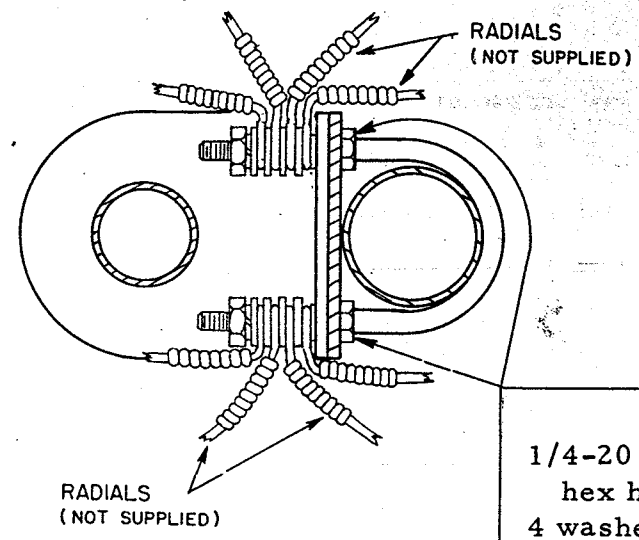


**FIG. 4**

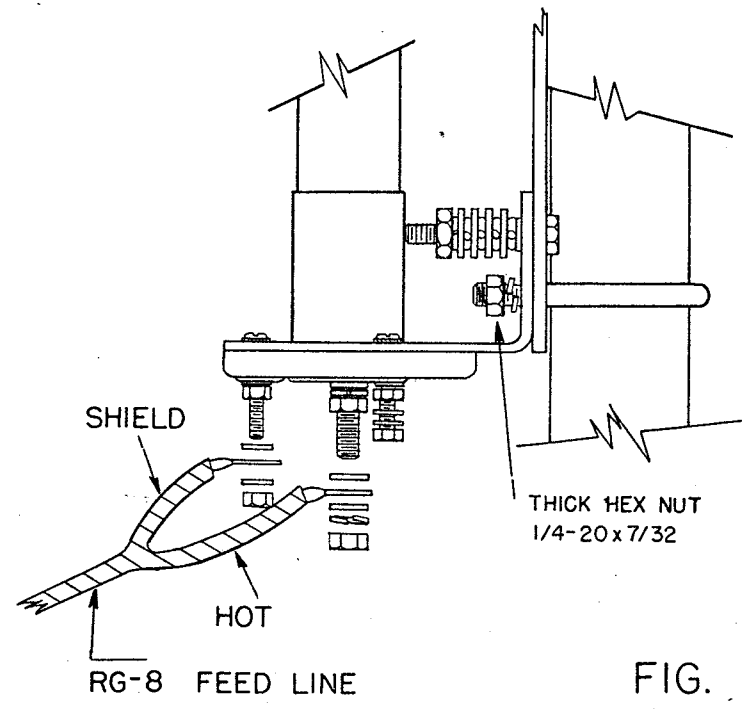
**RADIAL LENGTHS FOR  
4 BAND OPERATION**

2 Each Required

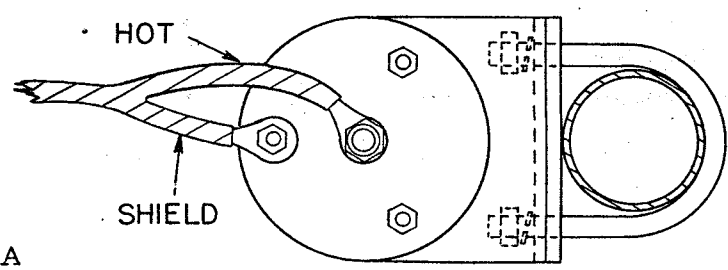
10 Meters	8' 4"	2540
15 Meters	11' 4"	3454
20 Meters	16' 4"	4978
40 Meters	32' 4"	9855



- 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 METER OPERATION

The 4-BTV can be used on 75 meters by the addition of one of the mobile resonators RM-75, for up to 400 watts SSB or RM-75-S, to legal limit SSB.

The resonator is very easily installed on the top of the 4-BTV by removing plastic cap at the top and screwing the resonator on the 3/8" X 24 stud provided.

The RM-75-S, as supplied, will cover a frequency range of 3600 to 3800 KHz; cutting 5 1/2 inches from the RM-75-S will permit it to cover a frequency range of 3750 KHz to 4 MHz. Model RM-75 will cover the frequency range of 3600 KHz to 3850 KHz as supplied and will cover the range of 3700 KHz to 4 MHz if 3 1/2 inches are cut from the tip rod. The dimensions and frequency given are approximate and will vary somewhat with environment.

The rod, being stainless steel, should be cut on a grinding wheel, carefully deburring the cut edge so that the rod will enter properly. Be careful. Do not lose the small split clutch collar. It is not necessary to remove the clutch nut entirely to remove the tip rod.

For optimum operation radials should be installed on the ground, and must be used when roof mounted. Cut 75 meter radials to 64' - 4" and adjust the 40 meter radials to 36' - 6". Tuning of the RM-75 (S) for 75 meters is accomplished by adjusting the tip rod up or down.

### STEP BY STEP

1. Remove 4-BTV from base by loosening the bottom clamp. (Mark base with tape so re-adjustment of bottom measurement isn't required.)
2. Cut 2 radials 64' - 4" and install on bolts supplied.
3. Recut 40 meter radials to 36' - 6".
4. Cut the stainless steel tip rod as explained in the paragraph above. Install on top of 4-BTV on the 3/8-24 stud provided.
5. Replace antenna on the base and check SWR to find resonant frequency.
6. If frequency is higher or lower than that desired, remove antenna from base and readjust tip rod. Adjust longer for lower frequency and shorter for a higher frequency. One inch of tip rod movement amounts to about 40 KC. Center frequency SWR should be below 1.2 to 1.0 on a good bridge such as the Cesco bridge, Model CM-52. Band width with SWR under 2 to 1 should be between 60 to 100 KC depending upon the installation and environment.