

# TENNADYNE<sup>®</sup>

*Aluminum with a PhD*

---

## ASSEMBLY INSTRUCTIONS

**MODEL: T10 - 100224**

### **SPECIFICATIONS:**

FREQUENCY COVERAGE	13-33 MHz
FORWARD GAIN	6.1 dBd
½ POWER BEAMWIDTH	52 DEGREES
F:B RATIO	To 25 Db (Rises with frequency)
NOMINAL MAXIMUM SWR	1.7:1
FEED WITH	50-52 OHM COAXIAL CABLE
POWER CAPABILITY	LEGAL LIMIT+
BOOM LENGTH	24 FT
WEIGHT	68 LBS
WIND AREA	10.1 SQ FT
WIND LOAD @ 80 MPH	162 LBS.
LONGEST ELEMENT	38 FT
TURNING RADIUS	22 FT
SUGGESTED MAST	2" OD
MAXIMUM WIND	100 MPH
ALUMINUM ALLOY	6061-T6 (Mill finish)
HARDWARE	STAINLESS STEEL
NUMBER OF ELEMENTS	10

**NOTE:** The above performance characteristics are nominals and may vary from installation to installation.

© TENNADYNE LLC. 2010 and beyond – All rights reserved

---

## Tennadyne

**Log Periodic Antennas**

P.O. Box 352; Alto, MI 49302; 616. 622.4968  
WWW.TENNADYNE.COM

Price: \$4.95

# SAFETY FIRST!

LOOK UP AND LIVE.

## POWER LINE CONTACTS CAN KILL!

---

### LIMITED WARRANTY

TENNADYNE, LLC warrants on the terms hereof, to the original purchaser of this product, for a period of one year from the date of purchase, that the product was not defective, but this warranty is void if the product has been subjected to improper or abnormal installation or usage.

If a customer believes that a product is defective, the customer may, within such one-year period, return the entire product to TENNADYNE at TENNADYNE'S factory, all shipping charges pre-paid by the customer. If the product was defective, TENNADYNE will at its option and expense repair or replace the product and will at its expense return the repaired or replaced product to the customer, in a manner selected by TENNADYNE, at the address from which the customer sent the product to TENNADYNE.

**The above warranty and remedy are exclusive and are in lieu of all other warranties, express or implied, including but not limited to implied warranties of merchantability and fitness for a particular purpose.**

**No seller will be liable for any loss, inconvenience or damage, including direct, special, incidental or consequential damages resulting from the use of or inability to use a product, whether the liability would result from breach of warranty or under any other legal theory.**

This warranty does not cover damage to or caused by an antenna (a) by reason of the antenna acting as a lightning rod, (b) by reason of corrosion or strain from exposure of an antenna to wind or weather, (c) from improper assembly, installation or use of an antenna, (d) from failure periodically to inspect and maintain an antenna and its installation, or (e) the antenna coming into contact with a source of electrical power. The customer is responsible to insure that the installation and use of an antenna complies with applicable laws (such as zoning laws) and regulations (such as condominium regulations).

The laws of some states do not allow the exclusion of implied warranties, and if these laws apply, then all express and implied warranties are limited in duration to such one year period. No warranties of any kind apply after that period.

Such repair or replacement is the customer's sole and exclusive remedy for a defective product. Specifically, TENNADYNE is not liable (to the customer or otherwise) for (a) any loss or damage arising in any way from a product or from actual or anticipated sale, lease, license or use of a product, or involving in any matter such as interruption of service, loss or business or anticipated profits, or delay in receiving, repairing, replacing or returning a product, or (b) any incidental, indirect, special or consequential damages.

No other person (such as an employee, agent or dealer) is authorized to change this warranty in any way, or to give any other warranties of any kind on behalf of TENNADYNE. This warranty gives a customer specific legal rights, and a customer may also have other rights, which vary from state to state.

As used herein, **customer** is the initial end-use purchaser of a product from seller, a **product** is an antenna therefore manufactured by TENNADYNE, a product is **defective** if and only if the product was not free of defects of material and workmanship when manufactured, and a **seller** is TENNADYNE and any authorized TENNADYNE dealer.

TENNADYNE, LLC

# T10 PARTS LIST

PART #	DESCRIPTION	QUAN
<u>Aluminum Tube</u>		
01	Square 1.500" x 72" MARKED 1	2
02	1.500" x 72" MARKED 2	2
03	1.500" x 72" MARKED 3	2
04	1.500" x 72" MARKED 4	2
05	Round 1.000" x 23.1"	2
06	.875" x 36"	2
07	.875" x 33.8"	2
08	.875" x 12.8"	2
09	.750" x 24"	6
10	.750" x 16.0"	2
11	.625" x 36"	8
12	.625" x 33.0"	2
13	.625" x 17.9"	2
14	.625" x 4.2"	2
15	.500" x 48"	14
16	.500" x 38.0"	2
17	.500" x 27.0"	2
18	.500" x 17.1"	2
19	.375" x 72"	20
20	BOOM SPLICE INSERTS – 8"	6
21	LARGE FLAT SPACERS	4
22	SMALL FLAT SPACERS	12
23	PLASTIC BOOM-MAST INSULATOR (BMI)	1
24	BMI REINFORCEMENT THICK WASHERS	4
25	SLIPPNOTT CLAM SHELLS (pair)	1
<u>BOLTS &amp; MACHINE SCREWS</u>		
26	B 3/8-16 x 3.5" Hex	4
27	3/8-16 x 4.5" for SLIPPNOTTS	4
28	MS 1/4-20 x 2" (Element # 1)	2
29	MS 10-24 x 2.5"	20
30	MS 10-24 x 1.5"	18
31	MS 10-24 x 1-1/4" (Elements)	16
32	MS 10-24 x 1.0" (Elements)	14
33	MS 6-32 x 3/4" (Element Tips)	20
34	MS 10-24 x 1/2"	2
35	MS 10-24 x 1/2" Cap Screws (w/wrench)	24
36	NUTS: 1/4-20 Nylok	2
37	3/8-16 Nylok	8
38	10-24 Nylok	94
	6-32 Nylok	20
39	WASHERS	16
40	U-SHAPED SHORTING STUB	1
41	INSTRUCTIONS	1
42	CHOKE PLATE & TIE WRAP	1

# T10 BOOM LAYOUT

BS#	FROM END OF TUBE w/NUMBER	HOLE SIZE	FUNCTION	Eventually will be:	
1	2.0"	1.000"	<b>First Tube of Element # 1</b>	6 nested tubes	
	4.0"	.1875"	Large flat spacer		
	6.0"	.1875"	Large flat spacer		
	40.0"	.1875"	Small Flat Spacer		
	48.9"	.875"	<b>First Tube of Element # 2</b>		5 nested tubes
	69.0"	.1875"	Boom Splice		
	71.0"	.1875"	Boom Splice		
-----					
2	1.0"	.1875"	Boom Splice	5 nested tubes	
	3.0"	.1875"	Boom Splice		
	5.0"	.1875"	Large flat spacer		
	7.0"	.1875"	Large flat spacer		
	19.0"	.875"	<b>First Tube of Element # 3</b>		
	41.0"	.1875"	Small Flat Spacer		
	56.8"	.750"	<b>First Tube of Element # 4</b>		4 nested tubes
	64.5"	.375"	Mast Insulator		
	67.5"	.375"	Mast Insulator		
	69.0"	.1875"	Boom Splice		
71.0"	.1875"	Boom Splice			
-----					
3	1.0"	.1875"	Boom Splice	3 nested tubes	
	3.0"	.1875"	Boom Splice		
	18.7"	.625"	<b>First Tube of Element # 5</b>		
	32.0"	.1875"	Small Flat Spacer		
	49.2"	.625"	<b>First Tube of Element # 6</b>		3 nested tubes
	67.0"	.1875"	Small Flat Spacer		
	69.0"	.1875"	Boom Splice		
71.0"	.1875"	Boom Splice			
-----					
4	1.0"	.1875"	Boom Splice	2 nested tubes	
	3.0"	.1875"	Boom Splice		
	4.5"	.625"	<b>First Tube of Element # 7</b>		3 nested tubes
	29.1"	.500"	<b>First Tube of Element # 8</b>		
	31.0"	.1875"	Small Flat Spacer		
	51.2"	.500"	<b>First Tube of Element # 9</b>		2 nested tubes
	67.5"	.1875"	Small Flat Spacer		
	71.0"	.500"	<b>First Tube of Element # 10</b>		2 nested tubes
	71.6"	_____?	Coaxial Cable Connection		

## BEFORE ASSEMBLY

**GETTING STARTED BY GETTING ORGANIZED** - Organize the tubing into groups, first by tube OD (Outside Diameter) and then by length and check all against the parts list to make sure it's all there. Notify us immediately if you are missing anything.

**Tools** - You will need the usual assortment of small hand tools to assemble this antenna as well as quality black electrical tape. We recommend the use of a mixture of WD-40 and lock graphite, or similar compound, to lubricate each and every tubing joint and screw hole during assembly, the end of each element being placed into the boom and the boom splice couplers.

**Read** - Read these instructions several times before starting the actual assembly process & until the process becomes clear. Refer to **FIGS. 1, 2 & 3** as you read to develop the understanding of how the antenna is constructed.

**Left and Right** - Left and Right, as used in these instruction, are arbitrarily assigned.. Assembled in the mirror image, the result is just as good. BUT, following the directions as stated will keep you organized and once started **MUST** be followed.

**Assembly Phases** - The antenna will be assembled in 5 phases:

<u>Phase</u>	<u>Description</u>	<u>After which you will have</u>
1	Boom Section Preparation	10 prepared Boom Sections 6 feet long (5 identical pairs) with the first tube of the elements attached.
2	Boom Section Splicing	After which you will have 2 identical sub-booms 24 feet long
3	Boom Completion	Spacers attached and booms secured atop each other
4	Element Build Out	Completed antenna with elements attached
5	Attachments and Feedline	Installation of BMI, shorting stub, balun, antenna ready to go in the air

## ASSEMBLY INSTRUCTIONS

This antenna has two sub-booms, one will be placed atop the other to form one structural boom with two separate electrical paths. These sub-booms are machined so that the elements pass directly through them. There are intentionally tight tolerances here, typically 1 or 2 thousandths of an inch, **DO NOT FILE OUT THE HOLES MACHINED IN THE BOOMS.** Rather, if you must, use a fine emery cloth applied to the element itself.

Lubrication and Protection - Repeating here: We recommend the use of a mixture of WD-40 and lock graphite, or similar compound such as Penetrox A, to lubricate each and every tubing joint and screw hole during assembly, the end of each element being placed into the boom and the boom splices.

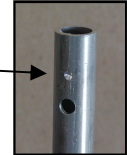
**SALT AIR ENVIRONMENT?** You need to seal each tubing joint with minimal amounts of tape, heat-shrink or similar sealant. **Note:** Use absolutely no more of these materials than is needed. Excess on the outside of the tubes can cause an unwanted shift in the velocity of propagation along the tube. Completely cover the protruding stainless steel boom hardware with a sealant to avoid corrosion and resultant galvanic action that can cause electrical noise.

## ASSEMBLY PHASE 1 - Boom Section Preparation (Steps 1—10)

The following steps are doubles.. Do each one twice - and in exactly the same way. Place the BOOM SECTIONS (BS?) so that the BS 1, 2 or 3 marker label marked on the tube is facing up and to your **LEFT**. These will be done in sequence, from the BS 1s through BS 3s, two pair at a time. The distances noted in the **INTO WHAT** column are from the end of the BS tube marked with marker label BS?. Now, with the Boom Section (BS) running across in front of you, the **RIGHT** & **LEFT** used in the **INTO WHAT** column are as viewed looking down the BS from the **LEFT** end of the BS. **The object is to alternate the sides of the BS that the elements protrude from.**

**Caution:** Here is where you need to be precise and follow the directions exactly.

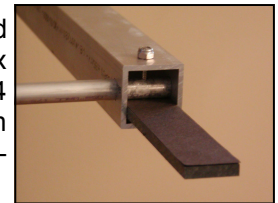
**Also Note:** Always insert the end of a tube where there is an identifying mark machined above the hole. This machined mark must go into the Boom Section (BS)



STEP	WHAT GOES	INTO WHAT	FASTEN WITH
1	1.000" x 23.1" tube Do not run these 1/4" nuts down tight, you will need to remove them later. See <b>FIG. 4</b> for correct Machine screw installation. All following hardware installation is to be installed tightly.	BS 1 to the RIGHT at 2.0"	1/4-20 x 2" machine screws & nuts
2	.875" x 33.8" tube	BS 1 to the LEFT at 48.9"	10-24 x 1.5" machine screws & nuts
3	.875" x 12.8" tube	BS 2 to the RIGHT at 19.0"	10-24 x 1.5" machine screws & nuts
4	.750" x 16.0" tube	BS 2 to the LEFT at 56.8"	10-24 x 1.5" machine screws & nuts
5	.625" x 33.0" tube	BS 3 to the RIGHT at 18.7"	10-24 x 1.5" machine screws & nuts
6	.625" x 17.9" tube	BS 3 to the LEFT at 49.2"	10-24 x 1.5" machine screws & nuts
7	.625" x 4.2" tube	BS 4 to the RIGHT at 4.5"	10-24 x 1.5" machine screws & nuts
8	.500" x 38.0" tube	BS 4 to the LEFT at 29.1"	10-24 x 1.5" machine screws & nuts
9	.500" x 27.0" tube	BS 4 to the RIGHT at 51.2"	10-24 x 1.5" machine screws & nuts
10	.500" x 17.1" tube	BS 4 to the LEFT at 71.0"	10-24 x 1.5" machine screws & nuts <b>## See Below</b>

### RIGHT-LEFT-RIGHT-LEFT-RIGHT-LEFT FOR EACH BOOM SECTION AND RESULTING BOOM! EXACTLY THE SAME FOR BOTH BOOMS!

**## BEFORE STEP 10:** Get the Choke Plate which is a 6" length of flat PVC with one hole drilled through it. Insert the end with the hole into Boom Section 4 and underneath where the .500" x 17.1" tube will be inserted. Then take the 10-24 x 1.5" bolt and insert it through Boom Section 4 AND through the Choke Plate up through the .500" tube and then out the other side of Boom Section 4. Tighten down with nut provided. The picture to the right is provided to clarify the installation of the Choke Plate.



This is to be **ONLY** installed on **ONE** Boom Section 4. It doesn't matter which.

## Element Placement on the Booms

**T12 Shown** - All antennas including the T8 are assembled in this manner.

**Notice** how the elements alternate between the top and bottom booms.



**T6 Shown** - This is an example of a **WRONG** install.

Look carefully - ALL the elements are lined up on the bottom boom. See the difference between the two examples? The correct install has elements alternating—top/bottom/top/bottom, etc. like the top picture. Your SWR will be *whacko* if your antenna looks like this! ☺



### ASSEMBLY PHASE 2— Boom section splicing (Steps 11—14)

Position the BS with the number marked thereon to the left and with the number facing upward. **Again, do each of these steps twice.** Proceed with steps 10 through 14 using supplied Allen Wrench.

STEP	WHAT GOES	INTO WHAT	FASTEN WITH
11	8" splice insert	BS 1 <b>inside</b> the right end	10-24 x 1/2" Socket HD Cap Screws & nuts <b>Position the 1/2" Socket HD Cap Screws on the tip of supplied Allen Wrench and insert it upward through the larger hole (1/2" or 3/8") in the bottom of the boom, continuing upward with it through the smaller hole in the top of the boom until the Socket HD Cap Screw protrudes upward, and outside of the boom. Secure it here with the 10-24 nyloc nuts.</b>
12	8" splice insert	BS 2 <b>inside</b> the right end	10-24 x 1/2" Socket HD Cap Screws & nuts
13	8" splice insert	BS 3 <b>inside</b> the right end	10-24 x 1/2" Socket HD Cap Screws & nuts
14	Join the Boom Sections together at the splices, BS 1 to BS 2, Etc. 10-24 x 1/2" Socket HD Cap Screws & nuts		

You should now have two separate, but identical, 24 foot booms together. **Turn one of these booms upside down so that the numbers marked on its four Boom Sections all face down.** Cover the boom holes with a good quality electrical tape at this time. Just the boom holes, the ones where you've inserted the machine screws that hold the elements in place.

### ASSEMBLY PHASE 3—Boom completion (steps 15—21)

These next steps are singles; do them **ONLY** to the boom you have just turned upside down. Install the spacers onto this boom with the spacers pointing up.

STEP	WHAT GOES	INTO WHAT	FASTEN WITH
15	Large flat spacer	BS 1 at A near EI #1	10-24 x 2.5" machine screws & nuts
16	Flat Spacers	BS 1 at B	10-24 x 2.5" machine screw & nut
17	Large flat spacers	BS 2 at A	10-24 x 2.5" machine screws & nuts
18	Flat Spacers	BS 2 at B	10-24 x 2.5" machine screw & nut
19	Flat Spacers	BS 3 at B Two places	10-24 x 2.5" machine screw & nut
20	Flat spacers	BS 4 at B Two places	10-24 x 2.5" machine screw & nut

Place the remaining completed boom, numbers facing up, atop the boom with the spacers installed. Slide the top boom down between the flat spacers using the same type fasteners as were used in Steps 1-20 above. (Flexing of the booms a bit may be necessary here.) Nothing should be between these booms except air! **The element halves should point in opposite directions, i.e., half of #1 to the right with the other half of the same element to the left from the other boom.** The next element #2 halves must also alternate booms and be on the opposite boom sides as compared to element #1.

Double Check - All other elements alternate booms and sides like elements #1 and #2. See **FIG. 3.** and photos. In other words, as you go down the boom, the elements from the top boom must alternate RIGHT – LEFT – RIGHT – LEFT, Etc. **AND** the lower boom elements must go in the opposite alternate directions.

**Stop all assembly and check what you've done against FIG. 3.  
This is where the most common assembly error occurs.**



**ASSEMBLY PHASE 4**—Element Build out (Steps 22– 33)

**THE ELEMENTS:** Start with the smallest element, #10, at the front of the antenna. These are double steps, do one step for each side of the antenna. See **FIG. 1**.

<b>STEP</b>	<b>WHAT GOES</b>	<b>INTO WHAT</b>	<b>FASTEN WITH</b>
<b>On BS 4</b>			
22	.375" x 72" tube	.500" x 17.1" tube: Element #10	6-32 x 3/4" machine screw & nut
23	.375" x 72" tube	.500" x 27.0" tube: Element #9	6-32 x 3/4" machine screw & nut
24	.375" x 72" tube	.500" x 38.0" tube: Element #8	6-32 x 3/4" machine screw & nut
25	.375" x 72" tube	.500" x 48" tube	6-32 x 3/4" machine screw & nut
26	Results of Step 25	.625" x 4.2" tube: Element #7	10-24 x 1.0" machine screw & nut
<b>On BS 3</b>			
27	.375" x 72" tube	.500" x 48" tube	6-32 x 3/4" machine screw & nut
28	Results of Step 27	.625" x 17.9" tube: Element #6	10-24 x 1.0" machine screw & nut
29	.375" x 72" tube	.500" x 48" tube	6-32 x 3/4" machine screw & nut
30	Results of Step 29	.625" x 33.0" tube: Element #5	10-24 x 1.0" machine screw & nut
<b>On BS 2</b>			
31	.375" x 72" tube	.500" x 48" tube	6-32 x 3/4" machine screw & nut
32	Results of Step 31	.625" x 36" tube	10-24 x 1.0" machine screw & nut
33	Results of Step 32	.750" x 16.0" tube: Element #4	10-24 x 1-1/4" machine screw & nut
34	.375" x 72" tube	.500" x 48" tube	6-32 x 3/4" machine screw & nut
35	Results of Step 34	.625" x 36" tube	10-24 x 1.0" machine screw & nut
36	Results of Step 35	.750" x 24" tube	10-24 x 1-1/4" machine screw & nut
37	Results of Step 36	.875" x 12.8" tube: Element #3	10-24 x 1-1/4" machine screw & nut
<b>On BS 1</b>			
38	.375" x 72" tube	.500" x 48" tube	6-32 x 3/4" machine screw & nut
39	Results of Step 38	.625" x 36" tube	10-24 x 1.0" machine screw & nut
40	Results of Step 39	.750" x 24" tube	10-24 x 1-1/4" machine screw & nut
41	Results of Step 40	.875" x 33.8" tube: Element #2 i	10-24 x 1-1/4" machine screw & nut
42	.375" x 72" tube	.500" x 48" tube	6-32 x 3/4" machine screw & nut
43	Results of Step 42	.625" x 36" tube	10-24 x 1.0" machine screw & nut
44	Results of Step 43	.750" x 24" tube	10-24 x 1-1/4" machine screw & nut
45	Results of Step 44	.875" x 36" tube	10-24 x 1-1/4" machine screw & nut
46	Results of Step 45	1.000" x 23.1" tube: Element #1	10-24 x 1-1/4" machine screw & nut

**ASSEMBLY PHASE 5**—Install shorting stub, BMI, & balun (Steps 47—49)

**Before Proceeding - STOP AND COMPARE. DOES IT LOOK LIKE THE PHOTOS AND DRAWINGS ?**

**Step 47 - SHORTING STUB**

Remove the nuts from the 1/4-20 machine screws holding Element #1 in place, slip the shorting stub onto these and replace the nuts while positioning the stub per the photos. Reach into the element tube with long-nosed pliers to hold the machine screws in place for tightening during this step.

**The Collins Balun.** This uses approximately 12 ft of **ONLY** RG-8 or RG-213 coaxial cable. For best results, the turns are side-by-side, not bunched (See photo). Form a coil of 4 side-by-side turns of coax say, going from left to right. We use a 3" light wall PVC pipe for a coil form. Secure (tape/tie-wrap) these first 4 turns in place and once you've done this, go on top of the first 4 turns with another 4 turns, these will go from right to left. This causes both ends of the coil to be on the same side. Allow only 2-5" of cable from the coil to the antenna feed point. If you construct your own, don't use so much tape that water cannot drain from the coil.

**Step 48 -** Install the **Collins Balun (CHOKER)** at the front of the Antenna, by the smallest element, in front of the antenna and on the already installed Choke Plate using the supplied Hose Clamp. Wrap the Hose Clamp over and through the inside of the CHOKER and then down and around the Choke Plate. Tighten the Hose Clamp firmly. Now electrically connect the Choke to the Boom Sections (feed points). Take the Center Conductor and install it on the top boom. Take the Braid and install it on the bottom boom. Secure both the Center Conductor and Braid to the Boom Sections using the supplied 10-24 x 1/2" machine screws & nuts. See **Figure 7**.

**CAUTION – In the following steps, make sure that the threads are clean and well lubricated.**

**Step 49 -** Mount the **Boom-Mast Insulator** on the booms, at the point labeled **C**, using 3/8" bolts, washers and nuts and reinforcement Washers (thick washers). See **FIG. 5 & 6**. The parts sequence is: Head of bolt - washer – Boom-Mast-Insulator – Booms – Reinforcement Washers (thick washers) – Nuts 3/8-16 x 3.5" Bolts, Etc.

**Step 50 -** Mount the antenna to your mast. See **FIG. 8**. See **CAUTION** above.

SLIPP-NOTT Clamps (two half shells), 3/8-16 bolts, nuts & washers. Note: If your mast is of such a size that you need a longer bolt for your SLIPP-NOTT Clamps, please give us a call and we will send them to you. The parts sequence is: Head of bolt – Washer- Slipp-Nott Clamp (half shell) – Mast<sub>3</sub> BMI – Washer – Nuts (review picture).

**FIG. 1 TUBING SIZES AND LENGTHS USED TO MAKE UP THE ELEMENTS**

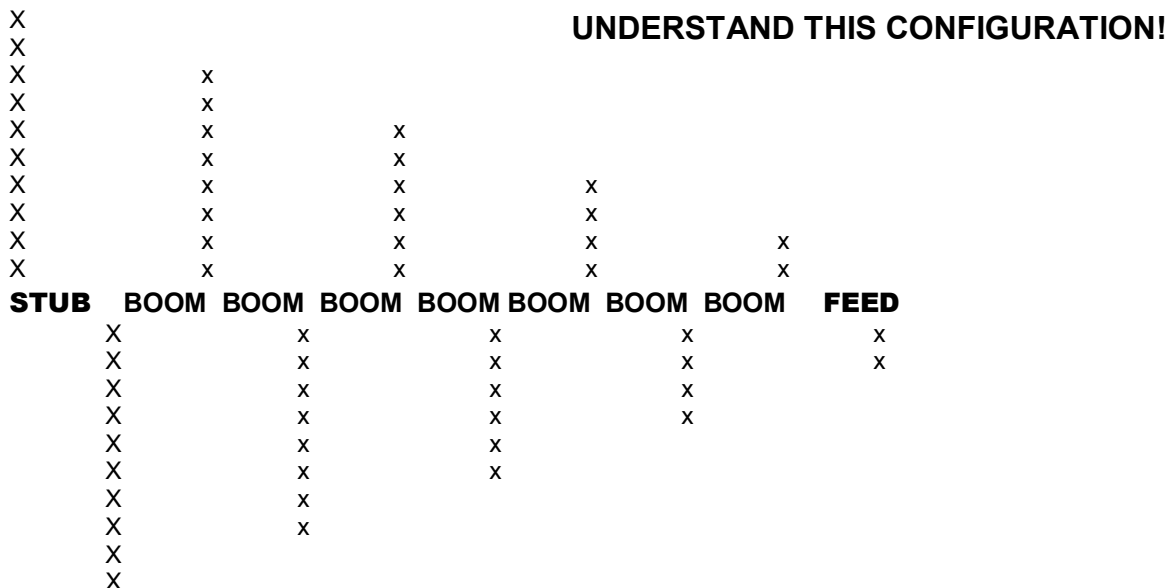
Please note: The length tubes without decimals is approximate.

EL # / TUBE SIZE	1.000"	.875"	.750"	.625"	.500"	.375"	# nested tubes
1	23.1"	36"	24"	36"	48"	72"	6
2		33.8"	24"	36"	48"	72"	5
3		12.8"	24"	36"	48"	72"	5
4			16.0"	36"	48"	72"	4
5				33.0"	48"	72"	3
6				17.9"	48"	72"	3
7				4.2"	48"	72"	3
8					38.0"	72"	2
9					27.0"	72"	2
10					17.1"	72"	2

**FIG. 2 ELEMENT PLACEMENT v. BOOM SECTION**

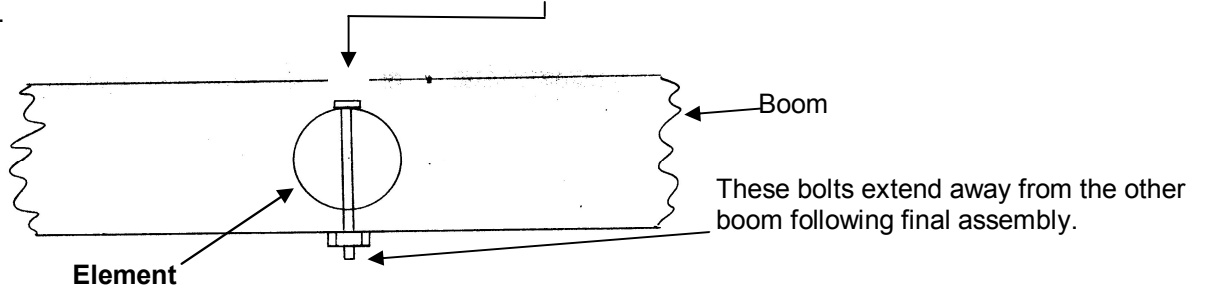
<u>ELEMENT #</u>	<u>DISTANCE FROM LEFT &amp; MARKED END OF BOOM</u>	<u>BOOM SECTION</u>
1	2.0"	1
2	48.9"	
3	19.0"	2
4	56.8"	
5	18.7"	3
6	49.2"	
7	4.5"	4
8	29.1"	
9	51.2"	
10	17.0"	

**FIG. 3** This is what **HALF** of the antenna should look like, **a single boom only**, when viewed from above or below. The point is, the elements in the top boom alternate in direction, right-left-right-left, Etc. The elements in the lower boom also alternate in direction but point opposite those in the top boom.

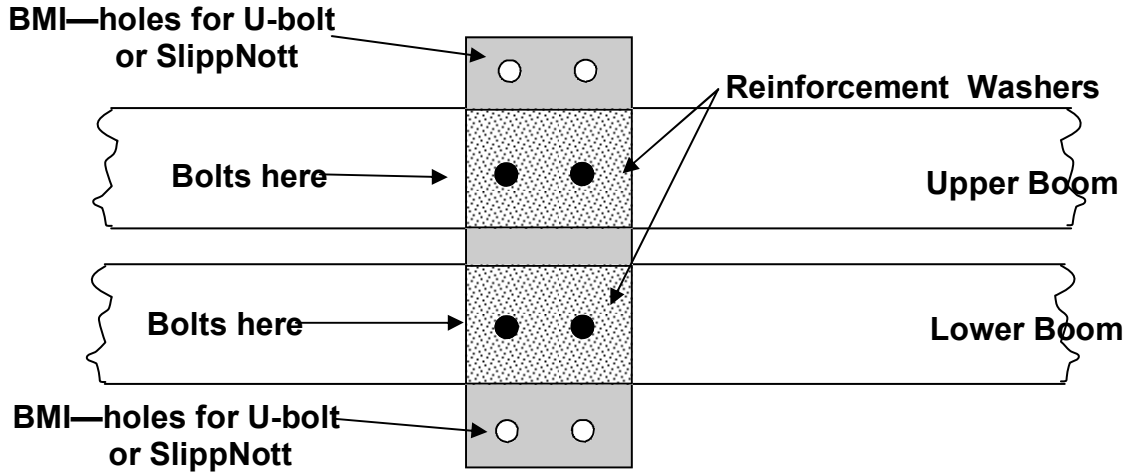


**Fig. 4 - Elements to Boom Assembly**

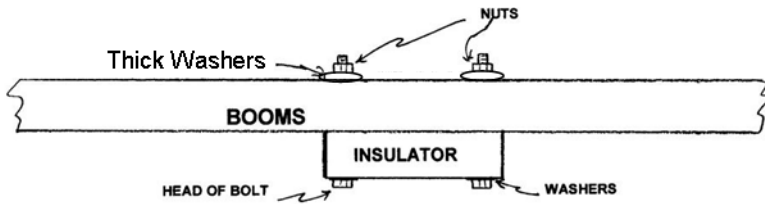
Referring to Fig. 1-3, insert the dimpled end of the proper element into the proper hole in the boom and secure the element into place with a 10-24 bolt through the 3/8" hole, through the element and out the smaller hole. Then, secure it with the nyloc nut.



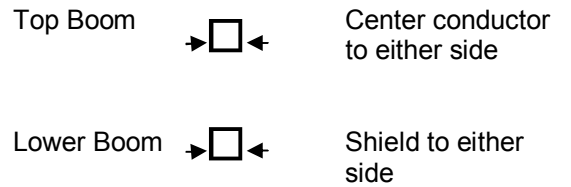
**Fig. 5**



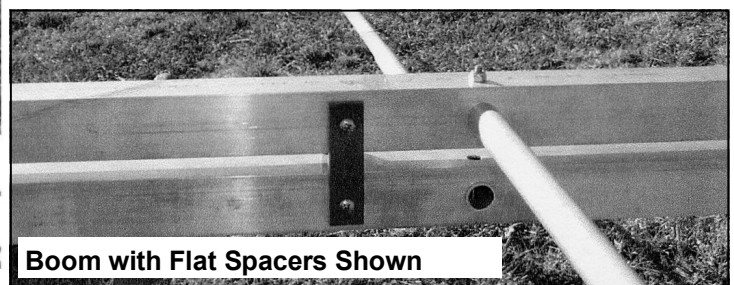
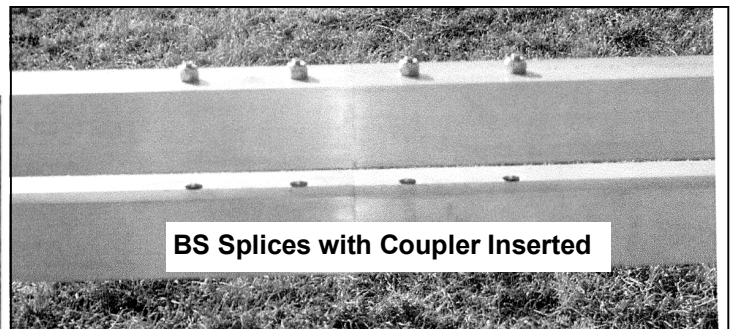
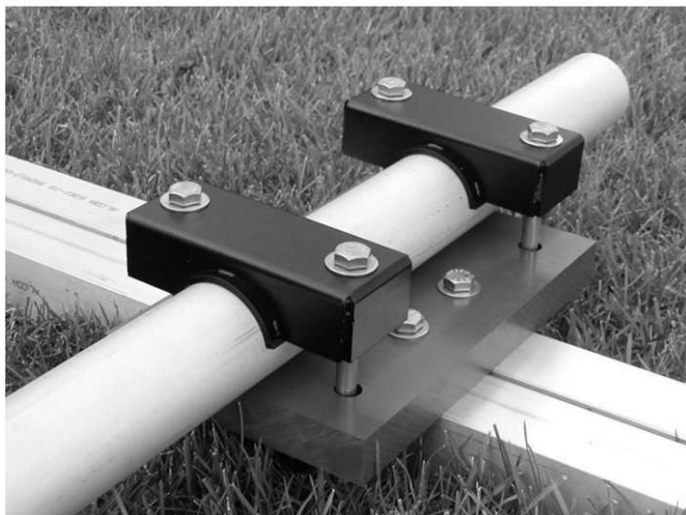
**Fig. 6 - BOOM-MAST INSULATOR ATTACHMENT TO BOOM**



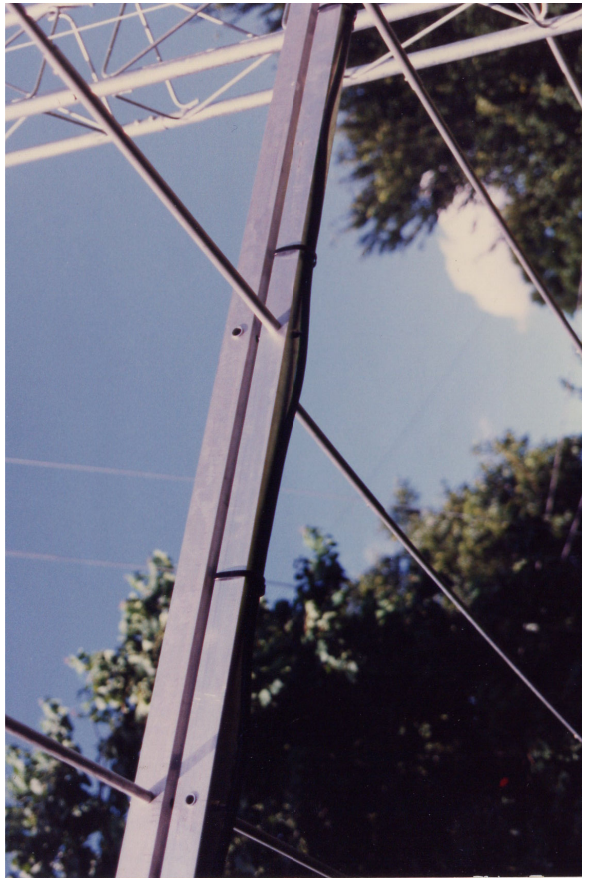
**Fig. 7 - COAX CABLE ATTACHMENT**



**Fig. 8 - ANTENNA TO MAST WITH SLIPP NOTT**







**These photos show proper element phase reversal and attachment of the coax to the lower boom.**