

**WARNING**  
**LOOK UP AND**  
**LIVE.**  
**POWER LINE**  
**CONTACTS CAN**  
**KILL**

**12C**

**ASSEMBLY INSTRUCTIONS**

**MODEL T12**

**MI: 000802**

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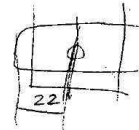
**SPCEICIFICATIONS:**

Forward Gain	6.5 dBd
Half-Power Beamwidth	49 degrees
F:B Ratio	15-25 dB
Nominal Maximum SWR	1.6:1
Feed With	50-52 ohm coaxial cable
Power Capability	Legal limit +
Boom Length	30 feet
Aluminum Alloy	6061-T6 (Mill Finish)
Hardware	Stainless Steel
Weight	58 lbs
Wind Area	11.7 sq ft
Wind Load @ 80 MPH	188 lbs
Suggested Mast	2" OD
Longest Element	38 feet
Turning Radius	24.6 feet
Maximum Wind	100 MPH
Number of Elements	12

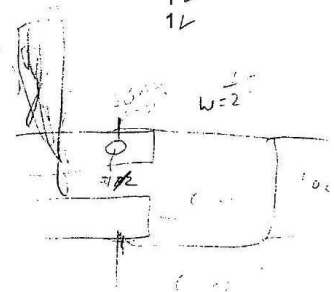
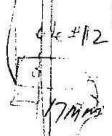
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**12P PARTS LIST T12 MI: 000802**

p/n	DESCRIPTION	QUAN
01	Tube 1.500" x 72" Marked 1 <i>38mm x 38mm 1.5t</i>	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	" 1.500" x 72" Marked 5	2 ✓
06	8" boom splice angles	8 ✓
07	Tube 1.000" x 22.5"	2 ✓
08	" .875" x 36" (With larger holes in each side at one end)	2 ✓
09	" .875" x 36" (With a single small hole toward each end)	2 ✓
10	" .875" x 17.3"	2 ✓
11	" .750" x 24"	6 ✓
12	" .750" x 22.3"	2 ✓
13	" .750" x 7.0"	2 ✓
14	" .625" x 36"	10 ✓
15	" .625" x 26.8"	2 ✓
16	" .625" x 14.3"	2 ✓
17	" .625" x 14.0"	2 ✓
18	" .625" x 3.7"	2 ✓
19	" .500" x 48"	14 ✓
20	" .500" x 36"	4 ✓
21	" .500" x 28.1"	2 ✓
22	" .500" x 19.3"	2 ✓
23	" .500" x 11.3"	2 ✓
24	" .375" x 72"	24 ✓
25	Plastic spacers -- round	4 ✓
26	Plastic spacers -- flat	12 ✓
27	Plastic Boom-Mast insulator	1 ✓
28	Truss support - angle: 1.5" x 36"	1 ✓
29	✓ Truss rope	1 ✓
30	U-Bolts	2 ✓
31	BOLTS: 3/8-16 x 3" Hex head	4 ✓
32	1/4-20 x 2" (For Element #1)	2 ✓
33	10-24 x 1.5"	32 ✓
34	10-24 x 2.5"	12 ✓
35	10-24 x 1/2"	34 ✓
36	NUTS: 3/8-16 Nylok	8 ✓
37	1/4-20 Nylok	2 ✓
38	10-24 Nylok	78 ✓
39	Flat Washers	8 ✓
40	SCREWS: #8 x 3/8"	60 ✓
41	Boom-Mast Backing Plate (1/8" x 1.5" x 5")	2 ✓
42	U-Shaped Shorting Stub (48" OAL)	1 ✓
43	Instructions	1 ✓



51mm



## ASSEMBLY INSTRUCTIONS

## MODEL T12

This antenna has two booms, one will be placed atop the other and these booms are machined so that the elements pass directly through them. There are intentionally tight tolerances here, **DO NOT FILE OUT THE HOLES MACHINED IN THE BOOMS**. Rather, if you must, use a fine emery cloth applied to the element itself.

### DO NOT USE ANTI-OXIDE GREASES ON THIS ANTENNA

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 splices.

**SALT AIR?** You need to seal each tubing joint with minimal amounts of tape, heat-shrink, Etc. 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.

### GET ORGANIZED

Organize the tubing into groups, first by tube OD and then by length and check all against the parts list to make sure it's all there. A round tube with larger holes through both sides of one end is always placed with that end of the tube into the boom.

### ASSEMBLY

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, Etc., marked on the tube is facing up and, relatively, to your left. These will be done in sequence, from BS 1 through BS 5. The double holes (both sides) in one end of an element tube are always placed with these double holes into the boom. The distances noted in the **INTO WHAT** column are from the end of the BS tube marked with BS ?. See FIGS. 1, 2 & 3. **RIGHT & LEFT** are relative, the object is to alternate directions.

STEP	WHAT GOES	INTO WHAT	FASTEN WITH
1	1.000" x 22.5" tube	BS 1 to the RIGHT at 2.0"	1/4-20 x 2" bolt & nut
2	.875" x 36" tube	BS 1 to the LEFT at 51.7"	10-24 x 1.5" bolt & nut
3	.875" x 17.3" tube	BS 2 to the RIGHT at 25.0"	10-24 x 1.5" bolt & nut
4	.750" x 22.3" tube	BS 2 to the LEFT at 66.2"	10-24 x 1.5" bolt & nut
5	.750" x 7.0" tube	BS 3 to the RIGHT at 31.8"	10-24 x 1.5" bolt & nut
6	.625" x 26.8" tube	BS 3 to the LEFT at 65.9"	10-24 x 1.5" bolt & nut
7	.625" x 14.0" tube	BS 4 to the RIGHT at 25.0"	10-24 x 1.5" bolt & nut
8	.625" x 14.3" tube	BS 4 to the LEFT at 53.3"	10-24 x 1.5" bolt & nut
9	.625" x 3.7" tube	BS 5 to the RIGHT at 7.1"	10-24 x 1.5" bolt & nut
10	.500" x 28.1" tube	BS 5 to the LEFT at 30.5"	10-24 x 1.5" bolt & nut
11	.500" x 19.3" tube	BS 5 to the RIGHT at 51.8"	10-24 x 1.5" bolt & nut
12	.500" x 11.3" tube	BS 5 to the LEFT at 71.2"	10-24 x 1.5" bolt & nut

**ASSEMBLE THE BOOM SECTIONS ONE-TO-ANOTHER** – Position all BS with the numbers on them to the left and facing up. These are again double steps.

STEP	WHAT GOES	INTO WHAT	FASTEN WITH
13	8" splice angle	BS 1 inside the right end	10-24 x 1/2" bolts & nuts
14	8" splice angle	BS 2 inside the right end	10-24 x 1/2" bolts & nuts
15	8" splice angle	BS 3 inside the right end	10-24 x 1/2" bolts & nuts
16	8" splice angle	BS 4 inside the right end	10-24 x 1/2" bolts & nuts
17	Join the boom sections together, BS 1 to BS 2, Etc, at the Splices		10-24 x 1/2" bolts & nuts

**SINGING ANTENNAS:** There are open holes in the booms where you can see the heads of the bolts that hold the elements in place. Cover these holes with a small strip of quality electrical tape.

You should now have two, separate, but identical, 30 ft booms together. Turn one of these upside down so that the numbers on it are all facing down.

**THE FOLLOWING ARE SINGLE SSTEPS, DONE ONLY TO THE BOOM WITH THE NUMBERS FACING DOWN.** Position the spacers with them pointing upward from this boom.

18	Round spacer	BS 1 at RS	10-24 x 1.5" bolt & nut
19	Round spacer	BS 2 at RS	10-24 x 1.5" bolt & nut
20	Round spacer	BS 4 at RS	10-24 x 1.5" bolt & nut
21	Round spacer	BS 5 at RS	10-24 x 1.5" bolt & nut

Flat spacers are installed with one on each side of the boom.

22	Flat spacers	BS 1 at FS	10-24 x 2.5" bolt & nut
23	Flat spacers	BS 1 at FS	10-24 x 2.5" bolt & nut
24	Flat spacers	BS 3 at FS (2 places)	10-24 x 2.5" bolt & nut
25	Flat spacers	BS 4 at FS	10-24 x 2.5" bolt & nut
26	Flat spacers	BS 5 at FS	10-24 x 2.5" bolt & nut
27	Place the bare boom on top of the boom with the spacers and fasten one boom to the other at These spacers as in steps 18-26. The smooth sides of the booms, albeit with holes, face each other.		

**THE ELEMENTS:** Start with element #12, the smallest, at the front of the antenna. **THESE ARE**

**DOUBLE STEPS. See FIG. 1.**

28	.375" x 72" tube	.500" x 11.3" tube, El. # 12	#8 x 3/8" screw
29	.375" x 72" tube	.500" x 19.3" tube, El. # 11	#8 x 3/8" screw
30	.375" x 72" tube	.500" x 28.1" tube, El. # 10	#8 x 3/8" screw
31	.375" x 72" tube	.500" x 36" tube	#8 x 3/8" screw
32	Results of step 31	.625" x 3.7" tube, El. # 9	#8 x 3/8" screw
33	.375" x 72" tube	.500" x 36" tube	#8 x 3/8" screw
34	Results of step 33	.625" x 14.3" tube, El. # 8	#8 x 3/8" screw
35	.375" x 72" tube	.500" x 48"	#8 x 3/8" screw
36	Results of step 35	.625" x 14" tube, El. # 7	#8 x 3/8" screw
37	.375" x 72" tube	.500" x 48" tube	#8 x 3/8" screw
38	Results of step 37	.625" x 26.8" tube, El. # 6	#8 x 3/8" screw
39	.375" x 72" tube	.500" x 48" tube	#8 x 3/8" screw
40	Results of step 39	.625" x 36" tube	#8 x 3/8" screw
41	Results of step 40	.750" x 7" tube, El. # 5	#8 x 3/8" screw
42	.375" x 72" tube	.500" x 48" tube	#8 x 3/8" screw

STEP	WHAT GOES	INTO WHAT	FASTEN WITH
43	Results of Step 42	.625" x 36" tube	#8 x 3/8" screw
44	Results of Step 43	.750" x 22.3" tube, Element #4	#8 x 3/8" screw
45	.375" x 72" tube	.500" x 48" tube	#8 x 3/8" screw
46	Results of Step 45	.625" x 36" tube	#8 x 3/8" screw
47	Results of Step 46	.750" x 24" tube	#8 x 3/8" screw
48	Results of Step 47	.875" x 17.3" tube	#8 x 3/8" screw
49	.375" x 72" tube	.500" x 48" tube	#8 x 3/8" screw
50	Results of Step 49	.625" x 36" tube	#8 x 3/8" screw
51	Results of Step 50	.750" x 24" tube	#8 x 3/8" screw
52	Results of Step 51	.875" x 36.0" tube (double holes one end) Element #2	#8 x 3/8" screw
53	.375" x 72" tube	.500" x 48" tube	#8 x 3/8" screw
54	Results of Step 53	.625" x 36" tube	#8 x 3/8" screw
55	Results of Step 54	.750" x 24" tube	#8 x 3/8" screw
56	Results of Step 55	.875" x 36" tube	#8 x 3/8" screw
57	Results of Step 56	1.000" x 22.5" tube, Element #1	#8 x 3/8" screw

**STOP & COMPARE. Does it look like the photos & drawings in this manual?**

- 58 Remove the nuts holding Element #1 in place, slip the shorting stub onto the bolts and put the nuts back on the bolts. The stub then protrudes from the rear of the antenna.
- 59 Install the Boom-Mast Insulator at **M** on the booms. See **FIGS. 5 & 6**. The small holes in one corner of the BMI need to be at the top, preferably to the front. 3/8-16 x 3.5" bolts, nuts, Etc.
- 60 Install the TRUSS SUPPORT onto the BMI at the smaller holes 10-24 x 1.5" bolts & nuts
- 61 Install the TRUSS SUPPORT ROPE by threading it through the holes in the top of the truss support. Start with one end of the rope tied around the booms at a spacer, up through the holes in the support and on to the other end of the booms where it is to be tied, again at a spacer. Don't allow the rope to compress the booms together.

**The COLLINS BALUN** This uses approximately 10 ft of only RG8 or RG213 coax cable. More is OK with the extra being in the pigtail to the shack. For best results, all turns are side-by-side, not bunched. Using a 3" or so form to wind the coil on, wind 4 turns, allowing 2-4" of cable from the coil to the antenna feed point. Secure these 4 turns in place and then wind another 4 turns directly atop the first 4. This places the coil input and output on the same side of the coil.

- 62 See **FIG. 6**. Install the Collins Balun at the front of the Antenna, at the smallest element 10-24 x 1/2" bolts & nuts
- 63 See **FIG. 5**. Mount the antenna to your mast at the BMI. 3/8-16 U-Bolts, nuts, ETC.

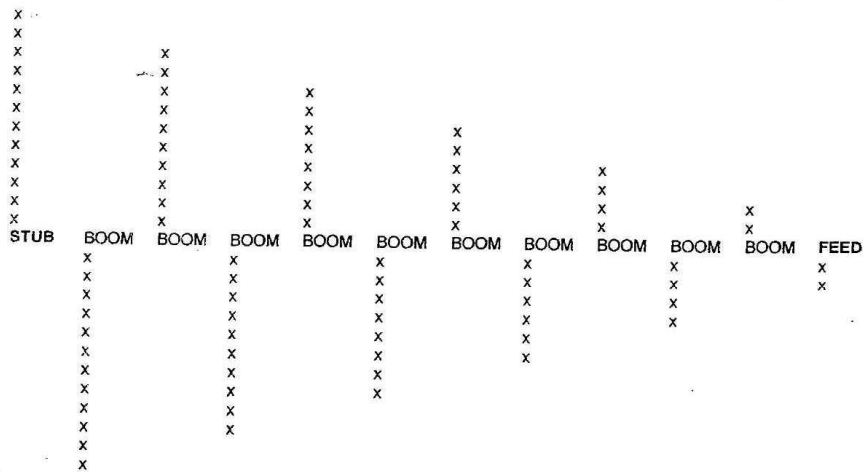
**FIG. 1****TUBING SIZES & LENGTHS USED TO MAKE UP THE ANTENNA ELEMENTS**

Please note, the actual length of most tubes will be a bit smaller than the lengths shown in the below table.  
All dimensions are in inches.

EL #/Tube Size	1.000"	.875"	.750"	.625"	.500"	.375"
1	22.5	36	24	36	48	72
2		36.0	24	36	48	72
3		17.3	24	36	48	72
4			22.3	36	48	72
5			7.0	36	48	72
6				26.8	48	72
7				14.0	48	72
8				14.3	36	72
9				3.7	36	72
10					28.1	72
11					19.3	72
12					11.3	72

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

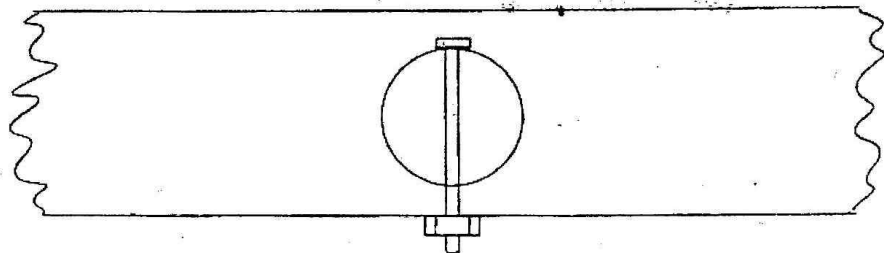
BOOM SECTION	ELEMENT #	DISTANCE (in) FROM LEFT (NUMBERED) END OF BOOM
1	1	2.0
	2	51.7
2	3	25.0
	4	66.2
3	5	31.8
	6	65.9
4	7	25.0
	8	53.3
5	9	7.1
	10	30.5
	11	51.8
	12	71.2

**FIG. 3** This is what half of the antenna should look like, that is, a single boom, when viewed from above. The other half of the antenna is identical, but eventually, the elements in that boom will point in the opposite direction.

#### ELEMENTS TO BOOM ASSEMBLY

Refer back to FIG. 3, insert the larger end of the proper element into the proper hole in the boom and secure the element into place with a 10-24 x 1½" bolt and a 10-24 nut, the bolt passing through the 3/8" hole, through the element and out the smaller hole. Then, secure it with the nylok nut, don't dent the boom too much.

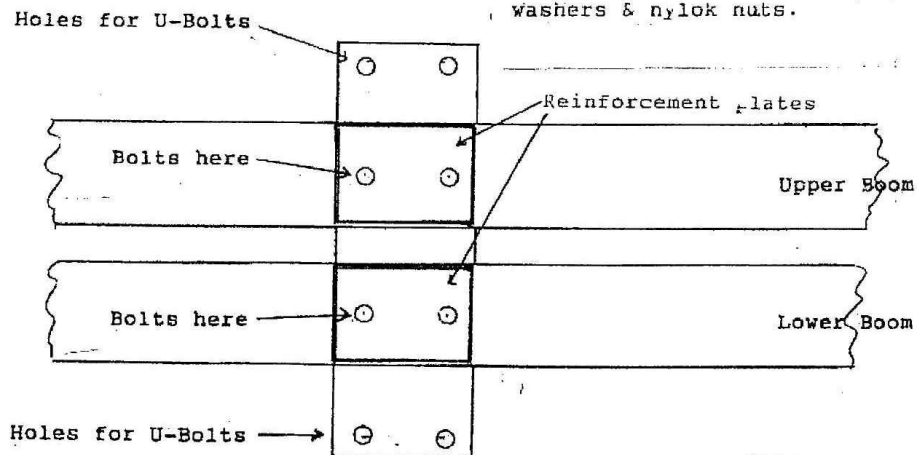
FIG. 4



These bolts extend away from the other boom following final assembly.

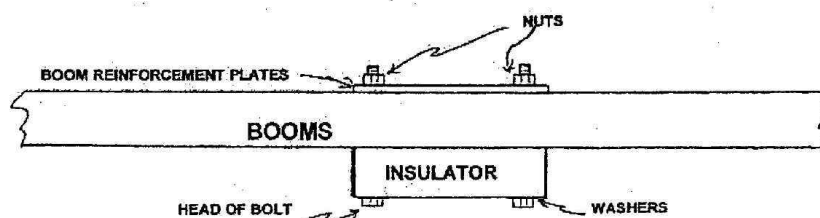
FIG. 5

The boom is secured to the boom-mast insulator with the 4 hex bolts, flat washers & nylok nuts.

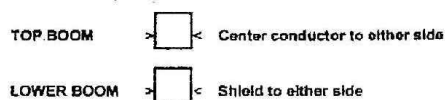




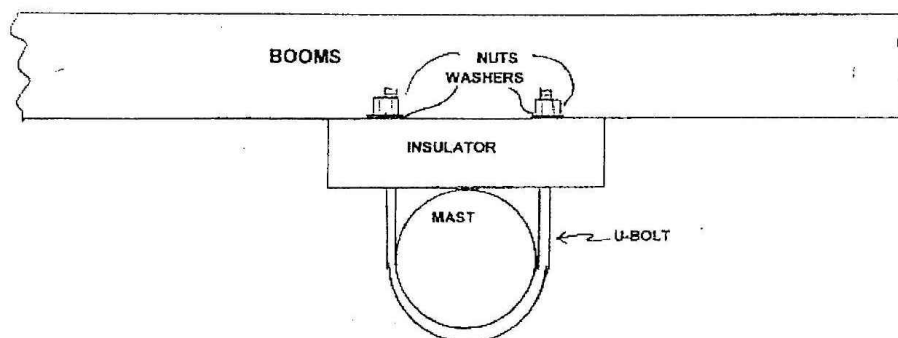
**FIG. 6 BOOM-MAST INSULATOR ATTACHMENT TO THE BOOM**



**FIG. 7 COAX CABLE ATTACHMENT**



**FIG. 8 ANTENNA TO MAST**



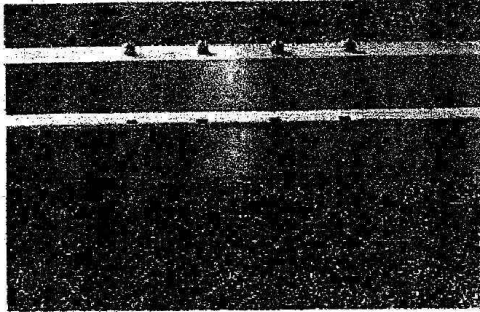
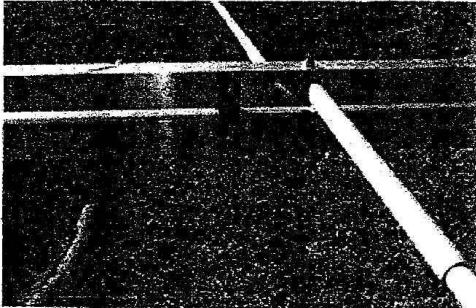
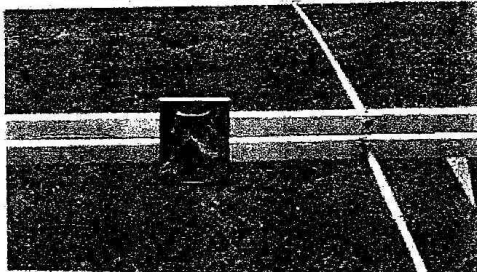


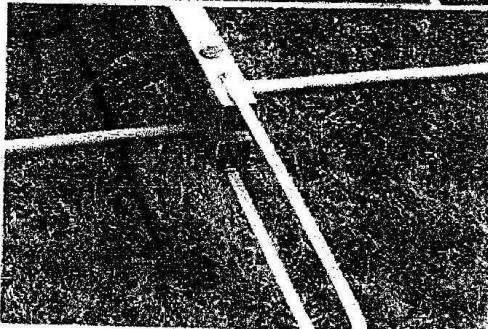
Photo of a splice.



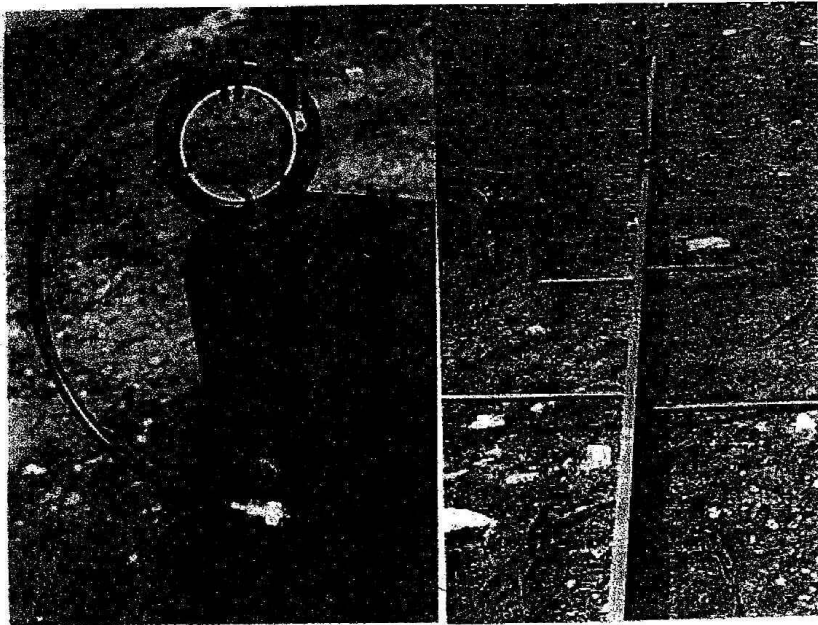
An element with flat spacers.



The Boom-Mast insulator and  
an element.

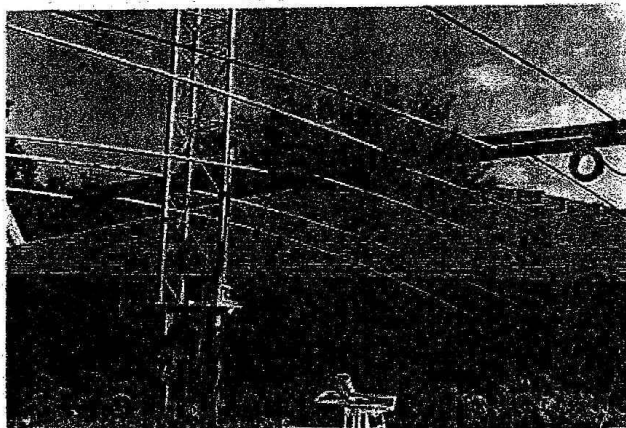
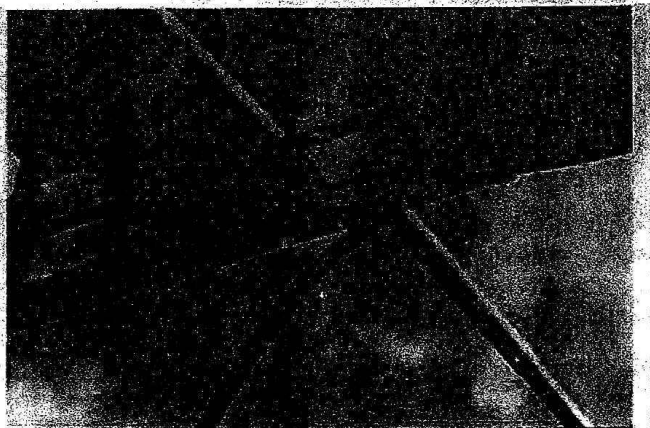


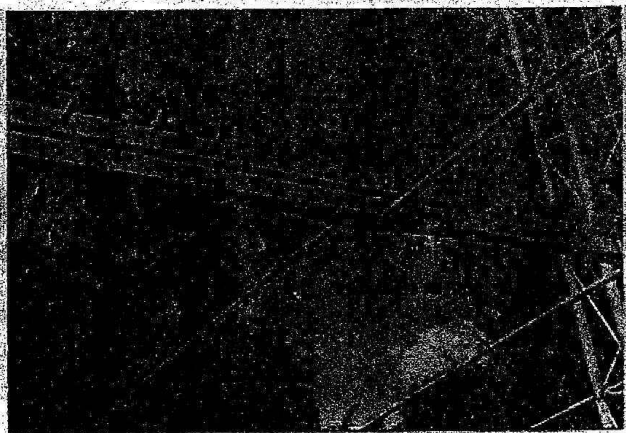
Element #1, a round spacer  
and the shorting stub.



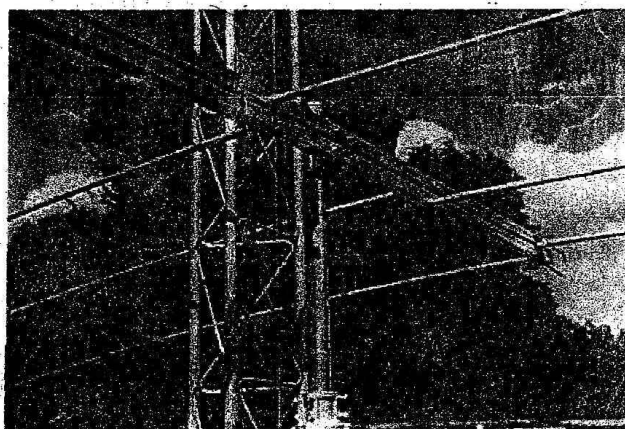
THIS PHOTO SHOWS THE BALUN (BN) AND HOW IT IS CONSTRUCTED. THE INNER DIAMETER OF THE TUBULAR FORM IS 3".

WHILE THIS IS A PHOTO OF A T12, ALTERNATING OF THE ELEMENTS IS COMMON TO ALL TENNADYNE LP\* AND IS PLAIN TO SEE. THIS PARTICULAR PHOTO SHOWS THE T12 AT THE STAGE OF ASSEMBLY AFTER THE BOOMS ARE ASSEMBLED AND THE INITIAL ELEMENT PARTS ARE INSTALLED.



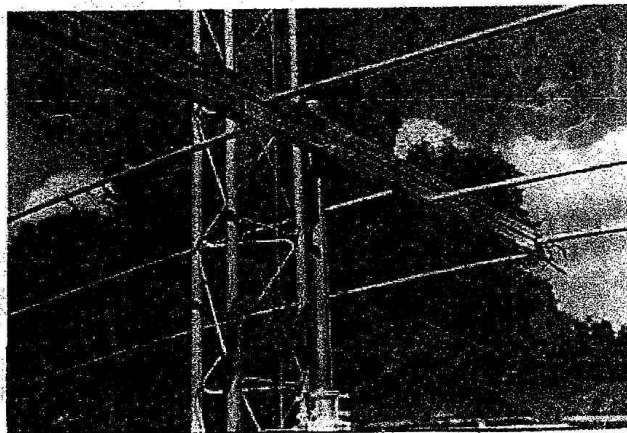


THESE PHOTOS SHOW PROPER ELEMENT PHASE  
REVERSAL AND ATTACHMENT OF THE COAX TO  
THE LOWER BOOM.





THESE PHOTOS SHOW PROPER ELEMENT PHASE  
REVERSAL AND ATTACHMENT OF THE COAX TO  
THE LOWER BOON.



## INSTALLATION TIPS

1. **TENNADYNE** LPDA antennas are sensitive devices with large capture areas and cannot be installed in close proximity to another antenna that operates on the same frequency as the LPDA. Two wavelengths of separation for these is required. Dissimilar frequency antennas need to be mounted under the following guideline. Use a minimum vertical separation of  $1/10$ th wavelength at the lowest operating frequency, more is better. Dissimilar frequency inverted V antennas mounted beneath the LPDA do not seem to cause much interaction but one should always be aware of the potential. 40M dipoles may interact on 15M. Similar or dissimilar frequency antennas can be mounted much closer if they are turned 90 degrees to the LPDA. You cannot, for instance, re-mount your old HF beam on the same tower with a **TENNADYNE** HF LPDA.
2. We cannot recommend the use of ferrite devices.....of any kind.
3. When installing the screws, stop and back them out when the twisting gets tough. Stainless steel is a wonderfully corrosion resistant material but, it's not all that strong. Should you use a power driver, you'll probably break off some screw heads. No matter.....until it's time to take the antenna apart.
4. Should you encounter SWR problems, make sure that the antenna is correctly assembled, check the actual antenna against the drawings and photos in this manual. If the antenna is correctly assembled, since this is such a simple device, your problem lies elsewhere.
5. We recommend a pre-installation check of the feed line into a known load prior to the installation of the cable, no matter how new or old the feed line may be. In any event, when testing, the SWR bridge, or any other instrument used of this purpose, must be the last item in the coax line, the next stop for the signal is the antenna itself. You cannot read the antenna impedance through the coax line with any of the SWR analyzers, the instrument must be applied at the antenna feed point for this measurement.
6. If you build your own **Collins Balun** for an HF LPDA, DO NOT use coaxial cable with a foam dielectric, it won't support the center conductor in the required tight turns.
7. **SHORTING STUB:** Every conducting material in the universe has a resonant frequency for its size and the same is true of the booms of our LPs which is also the feed structure for the antenna. Our booms are "hot" and this can create high SWR at the boom resonant point because of the very high impedance at the end of the end-fed half-wave. To counter this resonance and to remove it from a ham band, we have added a shorting stub to the antenna and while the length of this stub is cut to suit the particular LP on our test range, Mother Nature sometimes doesn't cooperate with us. We, therefore, recommend check of the antenna at 10-12 ft above ground to ascertain that Nature is cooperative in your case. If not, making the shorting stub shorter will cause the boom resonance to rise in frequency. 24 inches overall length, however, is about the minimum, we don't want Element #1 turning into a reflector. Splitting the stub and straightening it out causes the boom resonance to drop in frequency. If you want the entire antenna to be at ground potential, however, you can't cut the stub.

## MOST COMMON CAUSES OF PROBLEMS

1. Incorrect assembly of the antenna. If all of the elements from, say, the top boom, come out of one side only of that boom, this is incorrect. They alternate. See FIG. 3.
2. The feed line, bad connector assembly. A simple ohmmeter check is OK but that won't tell the whole story.
3. Other nearby antennas or objects resonant or not on the same frequency as the LPDA. If the SWR changes as you turn the antenna, this is a probable. Mounting just above a metal roof can be very problematical, it provides a ground plane just below the antenna.
4. Incorrect application of or faulty instrumentation. Some of the new analyzers require caution in use.
6. Check for shorting materials between the booms.

HELP IS AT: 915-446-4510 or [tennadyn@ktc.com](mailto:tennadyn@ktc.com)

**TENNADYNE**  
011008



## LIMITED WARRANTY

TENNADYNE CORPORATION 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 ~~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 CORP.

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