

# Installation Instructions

## Light Beam Multi-band Antenna Series

### Model: LBM-17M+20M

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The Light Beam Multi-band antenna is a compact, computer optimized, directional antenna with good gain and excellent front to back ratio. The antenna has been optimized for operation at 30 ft above the ground.

***Please read these Installation Instructions completely before beginning installation of your antenna.***

## Check Your Delivery

Your Light Beam antenna has been shipped in one (1) box. Carefully inspect the packaging for damage then unpack the antenna and note any shipping damage. If any damage is found, contact the shipping carrier for insurance coverage.



## Parts Photographs

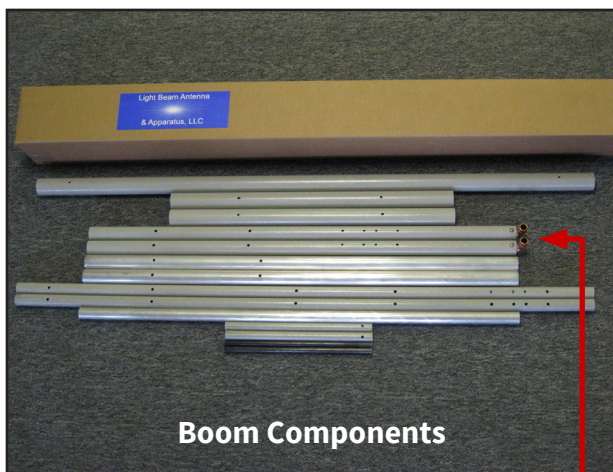


Fig. 1

Boom Components		Quantity
	1.5" OD x 48" Tube	1
	1.5" OD x 24" Tube	2
	1.25" OD x 36" Tube	2
	1.25" OD 0.058" x 36" Al. Tube	2
Note 1	1.125" OD 0.058" x 36" Al. Tube	2
	1.0" OD x 48" Tube	2
	1.0" OD 0.058" x 36" Al. Tube	1
	0.75" OD x 12" Tube	2
	0.5" OD x 12" Rod	2
Note 2	3/4" copper to 1/2" Elbow	2

**Note 1:** The 1.125" Aluminum Tube is within the 1.250" Aluminum Tube.

- **Note 2:** The Elbows and associated hardware are pre-assembled in the 1.25" x 36" Fiberglass Tubes.

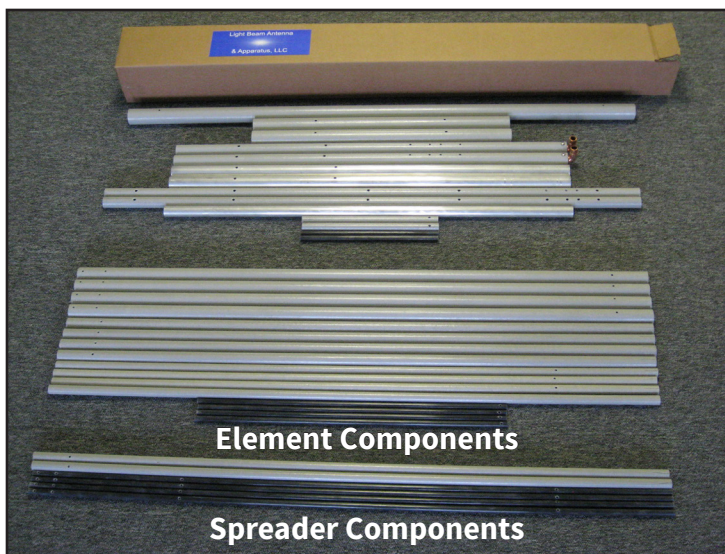


Fig. 2

Element Components		Quantity
	1.25" OD x 48" Tube	4
Note 3	1.0" OD x 24" Tube	4
Note 3	0.75" OD x 6" Rod	4
	1.0" OD x 48" Tube	4
	0.75" OD x 48" Tube	4
	0.5" OD x 24" Rod	4

Spreader Components		Quantity
	0.75" OD x 48" Tube	2
	0.5" OD x 48" Rod	4

Note 3: 1.0" OD x 24" Tube and 0.75" OD x 6" Rod are within the 1.25" OD x 48" Tube

Hardware Components	Quantity
10-24 x 2.0" SS Machine Screw	19
10-24 x 1.5" SS Machine Screw	8
10-24 x 1.0" SS Machine Screw	16
10-24 x 5/8" SS Machine Screw	2
10-24 SS Anti Vibration Hex Nut	45
10-24 Hex Nut w/Tooth Washer	4
No. 10 SS Flat Washer, .36" OD	25
¼ loop-1/4-20 x SS Eye bolt w/Nut	2
1/4-20 SS Anti-vibration Nut	2
1" SS Hose Clamp	4
3/4" SS Hose Clamp	8
1/8" - No. 10 Black Cable Clamp	13
Copper Elbows (Boom) & Hardware	2

Element Tube Lanyards	Quantity
1/8" Dacron Cord	4
S.S. Lanyard Clamps	4
1/8" x 2" Heli-tube	8
No. 10 Ring Terminal	2

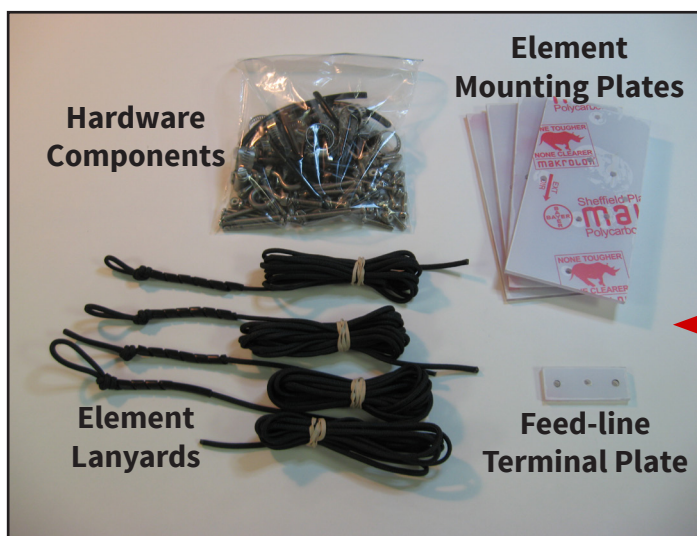


Fig. 3

Plastic Plates		Quantity
Element Mounting Plates	7.5" x 3.75" x 0.187" PC	4
Feed-line Terminal Plate	2.5" x 1" x 0.187" PC	1

RF Wire Element Assembly	Quantity
17M Driver Element (17D)	2
17M Reflector Element (17R)	1
20M Driver Element (20D)	2
20M Reflector Element (20R)	1
Balanced Feed, 17M to 20M	2

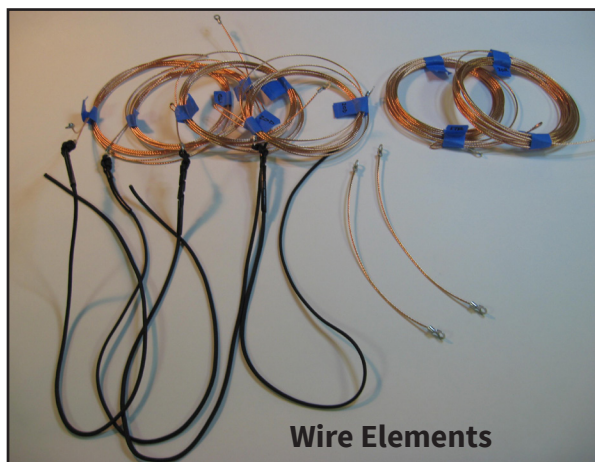


Fig. 4

## Tools Required

- ☐ Tape Measure
- ☐ A 1/4" Nut Driver or Open end wrench
- ☐ A 5/16" Nut Driver or Open end wrench
- ☐ A 3/8" Nut Driver or Open end wrench
- ☐ #2 Phillips head screwdriver
- ☐ A 7/32" Nut Driver or Open end wrench
- ☐ A 3/8" combination (box and open end) wrench
- ☐ A 7/16" combination (box and open end) wrench
- ☐ A 12" Carpenter Square



Fig. 5

## Assembly Overview



The Light Beam Multi-Band Antenna Series, LBM-17M+20M is shipped from our factory in a single box that is less than 55 inches in length. This has reduced your shipping expense.

Do not become intimidated by the length of this instructions document. We have provided very detailed instructions with many illustrative photographs to provide clarity. The inclusion of many steps in this document will ensure that you will successfully assemble and install your new antenna. Our goal is to have the antenna work correctly, the first time out of the box.

The antenna is built in stages. Initial sub-assembly can be completed indoors in the comfort of your workspace. Final assembly of the sub-assemblies to create the finished antenna will be later completed outdoors near your tower site.

## Step-by-Step Instructions

- As you progress – check off each step.
- Wear gloves and safety glasses.
- Use tools safely.

### **DANGER – Antenna Assembly**

**Failure to heed these warnings could result in serious injury or death**

While assembling your antenna you will be handling large structures. Caution must be used when moving these assemblies. Be aware of your surroundings and move all large assemblies slowly and with care.

## **DANGER – Antenna Installation**

If you are installing your antenna on a roof, tower, or other high structure or will use a ladder or scaffold to access the installation location, follow these precautions to prevent personal injury or death:

- Walk only on sound roof structures.
- Make sure the antenna assembly and installation surface are structurally sound so that they can support all loads (equipment weight, ice, and wind).
- Use safety equipment (for example, a safety harness and lifeline) appropriate for the work location.
- Perform as many procedures as possible on the ground. Do not attempt to assemble the antenna on a roof or tower.
- To avoid electric shock, stay at least 20 ft from overhead and adjacent power lines.
- If any part of the antenna or mount assembly comes in contact with a power line, call the local power company to remove it. Do not try to remove it yourself.

**Failure to heed these warnings could result in serious injury or death**

## **Boom Assembly**

The Boom Assembly consists of three (3) sub-assemblies. Each sub-assembly can be built indoors on a large workbench or table. The Boom assembly is a very strong laminated structure consisting of aluminum and fiberglass tubes nested within each other. Holes within each tube must be carefully aligned to enable insertion of all fasteners. Final assembly of the three sub-assemblies into the completed boom assembly must be performed outdoors or in a large space.

- ☐ Separate boom components identified in Fig. 1 from all other tubes and rods. See the image and list on p. 1.

## **Center Boom Sub-Assembly**

- ☐ Select the 1.5" OD x 48" fiberglass tube and select one 1.25" OD + 1.125" OD x 36" aluminum tube and orient them as shown in Fig. 6.
- ☐ Insert the aluminum tube within the right side of the fiberglass tube as shown in Fig. 7. Align the holes and insert a 10-24 x 2.0" machine screw and loosely fasten (finger tight) using a 10-24 anti-vibration hex nut.
- ☐ With care, insert the 1.0" OD 0.058" x 36" aluminum tube into the left side of the 1.5" OD x 48" fiberglass tube while aligning the smaller aluminum tube within the 1.25" OD aluminum tube installed in the previous step.



Fig. 6



Fig. 7

- Select the remaining 1.25" OD + 1.125" OD x 36" aluminum tube and carefully insert the tube into the left side of the 1.5" OD x 48" fiberglass tube as shown in Fig. 8. Rotation of the larger tube may be required to position the smaller aluminum tube to properly nest within the larger aluminum tube being inserted.
- Fully insert the aluminum tube within the left side of the fiberglass tube as shown in Fig. 8. Align the holes and insert a 10-24 x 2.0" machine screw and loosely fasten (finger tight) using a 10-24 anti-vibration hex nut.

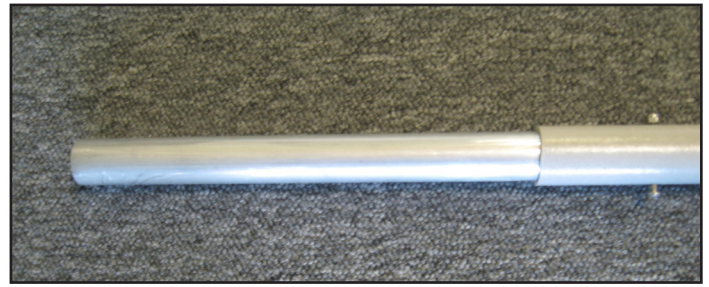


Fig. 8

**This completes the Center Boom Sub-Assembly, Fig. 9. Place this sub-assembly aside for use later.**

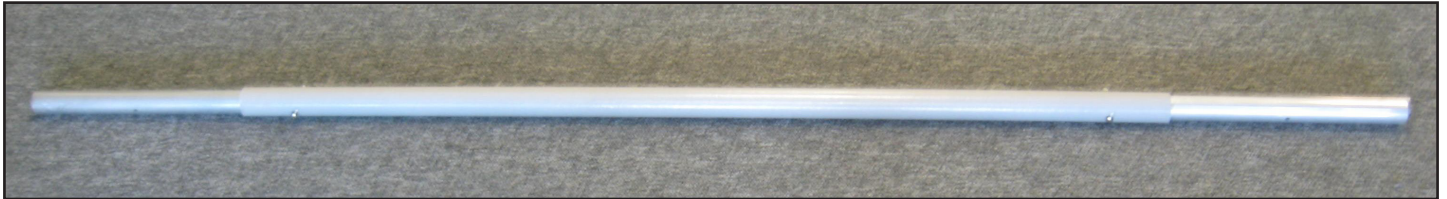


Fig. 9

## Boom End Sub-Assembly

**The Front End of the Boom and the Back End of the Boom will be assembled in the following steps.**

- Select one of the 1.5" OD x 24" fiberglass tubes, one of the 1.250" OD x 36" fiberglass tubes with copper elbow and one of the 1.0" OD x 48" fiberglass tubes. Orient the tubes as shown in Fig. 10. Note the alignment of the holes and the relative position of each tube.

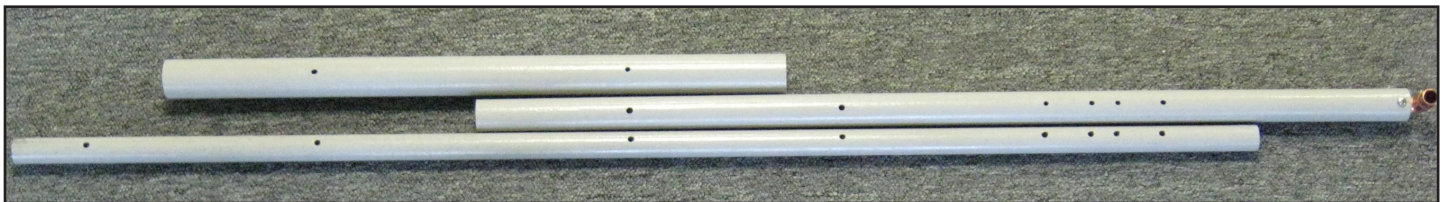


Fig. 10

- Insert the 1.0" x 48" fiberglass tube into the 1.25" OD x 36" fiberglass tube with copper elbow until all holes align in both tubes.
- Temporarily insert a 10-24 x 1.5" Machine Screw in the hole indicated by the arrow in Fig. 11.

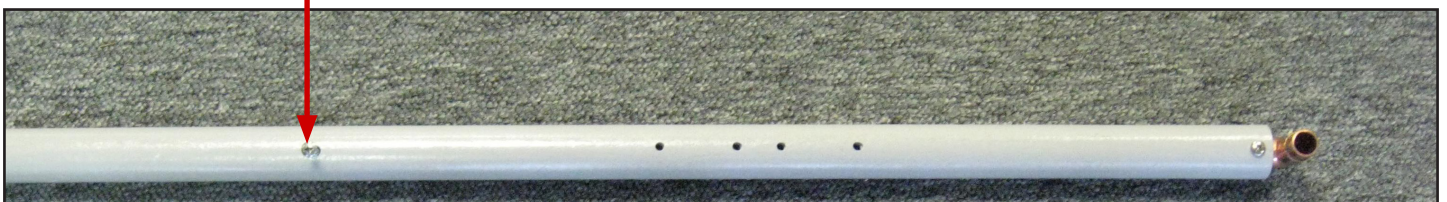


Fig. 11

- Insert the 1.25" OD x 36" fiberglass tube with copper elbow into the 1.5" OD x 24" fiberglass tube until the holes are aligned in all tubes as shown in Fig. 12.



Fig. 12

- Insert a 10-24 x 2.0" Machine Screw in the hole indicated in Fig. 13 and loosely fasten (finger tight) using a 10-24 anti-vibration hex nut. Remove the temporary screw that was inserted in the previous step, see Fig. 11.



Fig. 13

- Repeat the previous 5 Steps of the Boom End Sub-Assembly and build the other end of the Boom.
- Position both Boom End Assemblies as shown in Fig. 14. Insert a 0.5" OD x 12" Rod into the Copper elbow of each Boom End Assembly. **Note that this is a loose fit.**

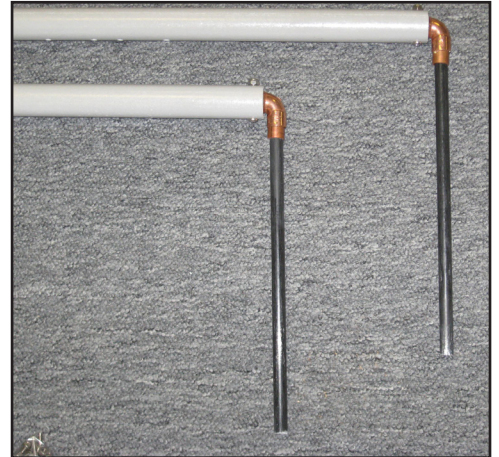


Fig. 14

- Insert a 1/4" -20 Eye-bolt with 1/4"-20 Nut into each of the 0.75" OD x 12" fiberglass tubes as shown in Fig. 15. Fasten the Eye-bolt to the tube using a 1/4"-20 anti-vibration Hex Nut.



Fig. 15

- Position the Eye-bolt as shown in Fig. 16. Tighten the anti-vibration Hex Nut until the tube deforms slightly.

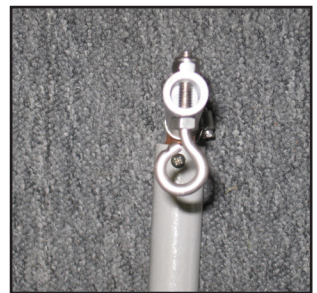


Fig. 16

- Place a 3/4" Stainless Steel Hose Clamp (the smaller of the two sizes of hose clamp.) over the slit-end of each of the 0.75" OD x 12" fiberglass tubes as shown in Fig. 17. Tighten slightly.



Fig. 17

- Place each of the tubes completed in the previous step over the 0.5" OD x 12" Rods as shown in Fig. 18. Tighten the hose clamps.

**This completes both Boom End Sub-Assemblies. Place both aside with the Center Boom Assembly as shown in Fig. 19.**

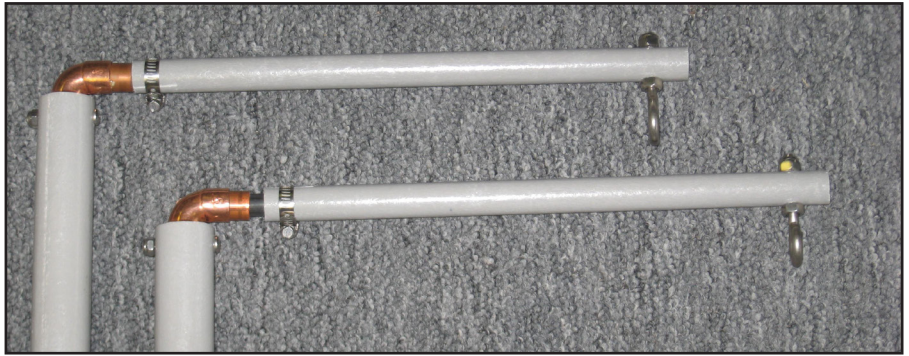


Fig. 18

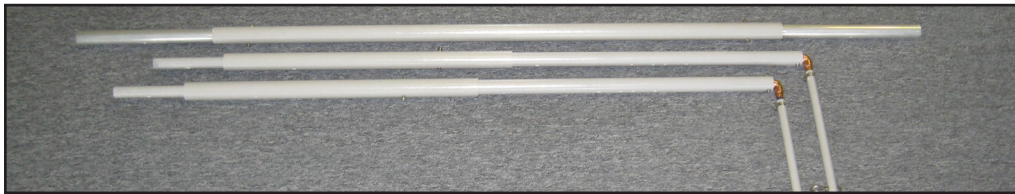


Fig. 19

## Element Assembly

The Element Assembly consists of four (4) Element Sub-Assemblies. All sub-assemblies are almost identical with exception of the orientation of the hose clamps. This difference will be discussed later within these instructions. Each sub-assembly can be built indoors on a large workbench or table.

- Separate the Element component tubes and rods shown in Fig. 2 from other remaining tubes and rods. See the list on Page 2.
- Insert the 1.0" OD x 48" fiberglass tube into the 1.25" OD x 48" fiberglass tube and align the holes as shown in Fig. 20.
- Insert a 10-24 x 1.5" Machine Screw and a 10-24 anti-vibration nut as shown in Fig. 21. Tighten well.
- Place the 1" Stainless Steel Hose Clamp (the larger of the two sizes of hose clamp) over the slit-end of a 1.0" OD x 48" fiberglass tube as shown in Fig. 22. Note that the slit-end of the tube is positioned on the right side end of the tube. Also note that the hose clamp adjustment screw is above the tube.
- Place a 3/4" Stainless Steel Hose Clamp (the smaller of the two sizes of hose clamp.) over the slit-end of a 0.75" OD x 48" fiberglass tube. Then insert the 0.75" OD tube into the 1.0" OD tube as shown in Fig. 23. Note the orientation of both hose clamps.
- Slightly tighten both hose clamps.



Fig. 20



Fig. 21



Fig. 22



Fig. 23

- ☐ Repeat the previous five (5) steps and assemble a second element that is of the same orientation as the first Element assembled.
- ☐ The remaining two (2) Elements are assembled in a similar fashion as the previously assembled Elements except the orientation is opposite. See the following figures. See (Fig. 24 through Fig. 27)

**Note: The slit-end of the tubes are positioned on the left side end of each tube. Also note that the hose clamp screws are above the tubes. Note the orientation of both hose clamps.**

- ☐ Assemble the remaining two Elements as shown in Fig. 24 through Fig. 27.

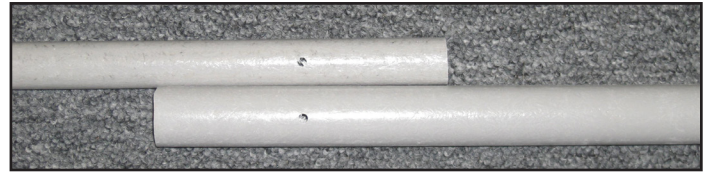


Fig. 24

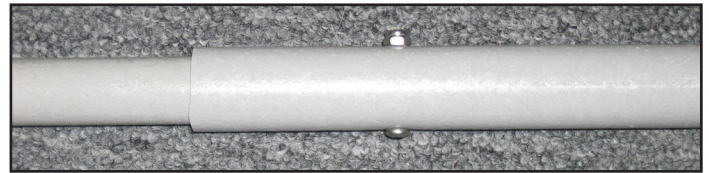


Fig. 25

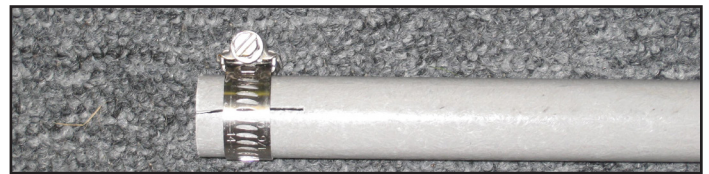


Fig. 26

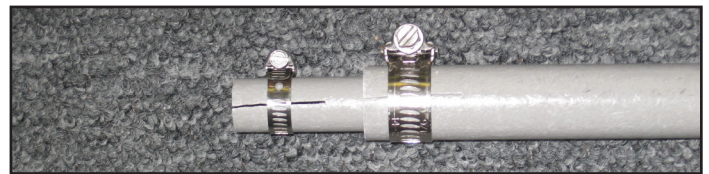


Fig. 27

**Complete the following steps for each of the four (4) 0.5" x 24" fiberglass rods.**

- ☐ Select a 10-24 x 1.0" SS Machine Screw, a 1/8" No. 10 Black Cable Clamp, and a 10-24 SS Anti-vibration Hex Nut. Insert the hardware through the hole of the fiberglass rod as shown in Fig. 28.
- ☐ Insert each completed rod sub-assembly into each element sub-assembly as shown in Fig. 29.



Fig. 28

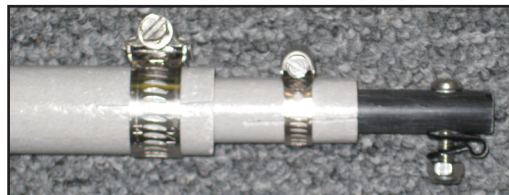


Fig. 29

**The four (4) Element Sub-Assemblies are now complete as shown in Fig. 30.**

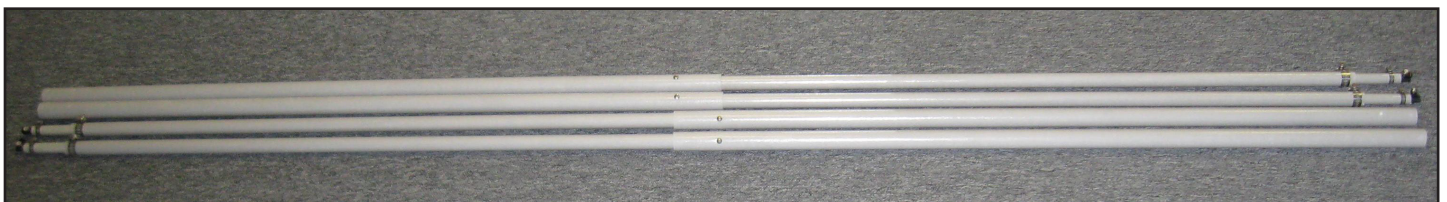


Fig. 30

## Spreader Assembly

The Spreader Assemblies consist of two (2) identical sub-assemblies. Each sub-assembly can be built indoors on a large workbench or table.

- ☐ Select the four (4) 0.5" OD x 48" fiberglass rods as shown in Fig. 31.

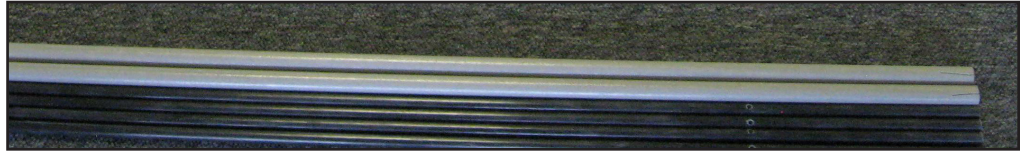


Fig. 31

- ☐ Select a quantity of two (2) -- 10-24 x 1.0" SS Machine Screws, two (2) -- 1/8" No. 10 Black Cable Clamps, and two (2) -- 10-24 SS Anti-vibration Hex Nuts. Insert the hardware through the hole of the fiberglass rod as shown in Fig. 32.



Fig. 32

- ☐ Repeat the previous step for the remaining three (3) fiberglass rods. **Note that the Black Cable Clamp is on the Hex Nut side of each fastener.**
- ☐ Place a 3/4" Stainless Steel Hose Clamp (the smaller of the two sizes of hose clamp.) over the slit-end of a 0.75" OD x 48" fiberglass tube. Then insert the 0.0.5" OD fiberglass rod into the 0.75" OD tube as shown in Fig. 33. Tighten the hose Clamp slightly.



Fig. 33

- ☐ Repeat the previous step for the remaining 0.75" OD x 48" fiberglass tube and fiberglass rod.
- ☐ Insert the 0.5" OD x 48" fiberglass rod into the 0.75" OD x 48" fiberglass tube and align the holes as shown in Fig. 34. Then Insert a 10-24 x 1.0" Machine Screw and a 10-24 anti-vibration nut. Tighten well. **Note that the Black Cable Clamps should be oriented on the same side of both fiberglass rods.**



Fig. 34

- ☐ Repeat the previous step for the remaining spreader sub-assembly.

This completes the assembly of the Spreader Sub-Assemblies as shown in Fig. 35.

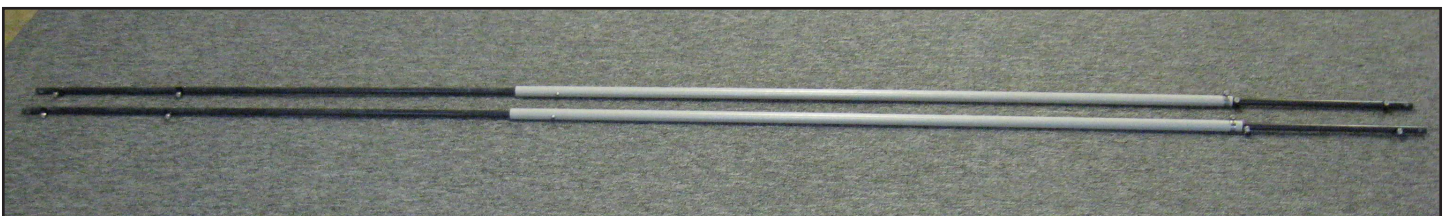


Fig. 35

## Mounting the Element Sub-Assemblies to the Boom End Sub-Assemblies

A large flat surface (5' x 10') is required for the following steps. This can be performed indoors if space permits. During the following steps, the Element Mounting Plates and the Terminal Plate will be attached to the Boom End Sub-Assemblies. In addition, the Element Sub-Assemblies will be oriented correctly and then partially mounted to the Element Mounting Plates.

- ☐ Prepare all plastic plates by premoving the protective plastic film from both surfaces of the plates as shown in Fig. 36.



Fig. 36

### Driven Element Assembly

- ☐ Select either one of the Boom End Sub-Assemblies and temporarily remove the tube and rod from the copper elbow as shown in Fig. 37.

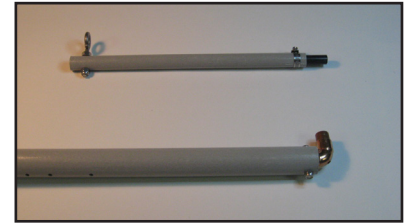


Fig. 37

- ☐ Select one (1) of the Element Mounting Plates and insert two (2) 10-24 x 5/8" Machine Screws as shown in Fig. 38. Fasten the screws using two (2) 10-24 Hex Nuts with Tooth Washer. Tighten both fasteners well. These fasteners will later become terminals for the 20M Driven Element Wires.

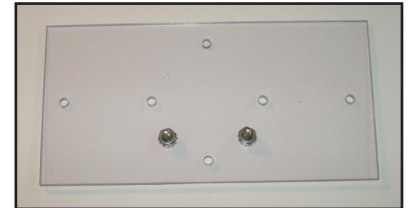


Fig. 38

- ☐ Select two (2) 10-24 x 2" Machine screws and two (2) No. 10 SS Flat washers. Place one washer on each screw. Then insert the screws and washers through the Element Mounting Plate that was prepared during the previous step. Orient the Element Mounting Plate as shown in Fig. 39. Then insert the screws in the Boom End Assembly through the 1st and 3rd holes as indicated in Fig. 39.

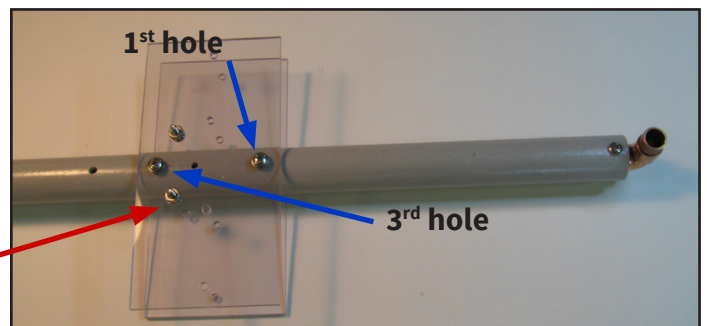


Fig. 39

**Note:** The Hex Nuts with Tooth Washer of the Driven Element Terminals are oriented up, on the top surface of the Element Plate and are the furthest distance from the copper elbow as shown in Fig. 40.

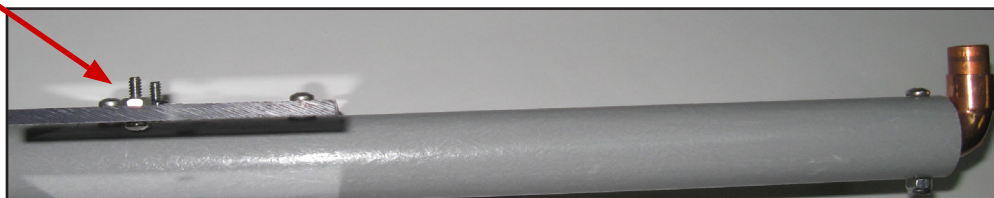


Fig. 40

- Select another Element Mounting Plate and position on the bottom of the Boom End Sub-assembly, passing the screws from the previous step through the bottom Element Mounting Plate as shown in Fig. 41. Then place a No. 10 SS Flat Washer over each screw and fasten each with a 10-24 Stainless Steel Anti-vibration Hex Nut. Tighten both fasteners well.

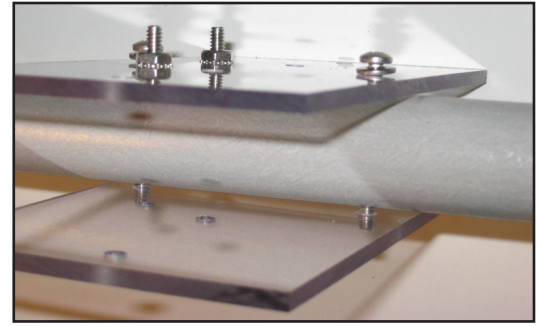


Fig. 41

- Select the Feed-line Terminal Plate. Insert two (2) 10-24 x 1.0" Machine Screws and fasten with two (2) 10-24 Hex Nuts with Tooth Washer as shown in Fig. 42. Tighten both fasteners well.



Fig. 42

- Place a No. 10 SS Flat Washer over a 10-24 x 2" Machine Screw. Insert that screw into the center hole of the Feed-line Terminal Plate. Orient the Feed-line Terminal Plate as shown and insert the screw and plate

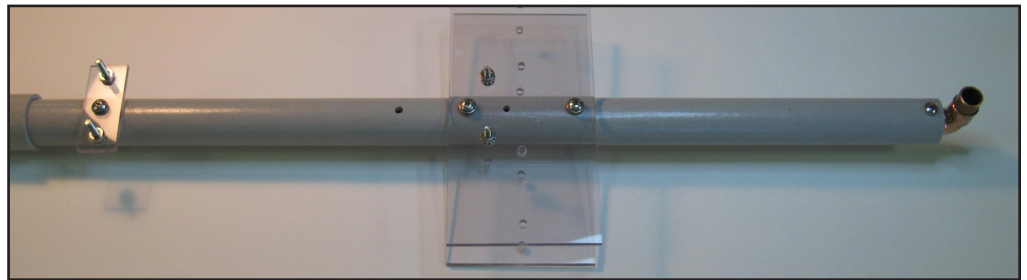


Fig. 43

into the Boom End Sub-Assembly in the hole shown in Fig. 43. Fasten the machine screw with a 10-24 Anti-vibration Hex Nut and tighten well.

- Place a No. 10 SS Flat Washer over each of two (2) 10-24 x 2.0" Machine Screws. Insert the screws passing through both the top and bottom Element Mounting Plates as shown in Fig. 44. Place a No. 10 Flat SS Washer and then a 10-24 Anti-vibration Hex Nut over each screw. Tighten the fasteners finger-tight.

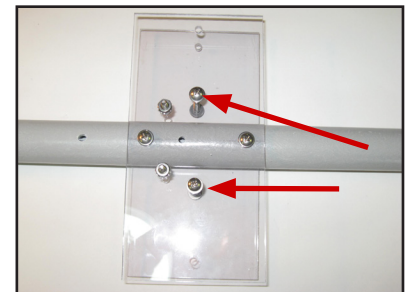


Fig. 44

**Note: Two (2) of the Element Sub-Assemblies will now be attached to the Boom End Sub-assembly. Please refer to Fig. 30 and note that there are both left-hand and right-hand Element Sub-Assemblies.**

- Select one (1) right-hand Element Sub-Assembly and one (1) left-hand Element Sub-Assembly.

- Orient the selected Element Sub Assemblies next to the Boom End Sub-Assembly as shown in Fig. 45. **Note the orientation of the Hose Clamp adjustment screws. The Adjustment Screw of each Clamp is oriented away from the Boom on the outer side of each Element.**

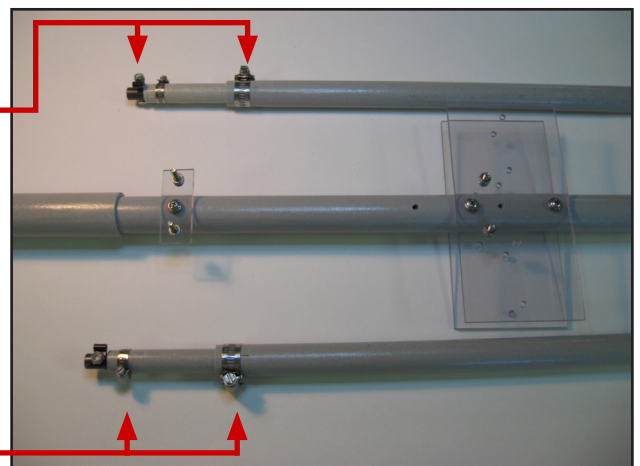


Fig. 45

- Reposition the Element Sub-Assemblies and ensure that the orientation is unchanged. Align the hole in each Element Sub-Assembly with the holes in the top and bottom Element Mounting Plates as shown in Fig. 46. Fasten each Element Sub-Assembly to the Boom-End Sub-Assembly by placing a No. 10 SS Flat Washer over a 10-24 x 2.0" Machine Screw, then pass the screw through the top mounting plate, the element, then the bottom mounting plate. Place a No. 10 SS Flat Washer and then a 10-24 Anti-vibration Hex Nut over each screw. Tighten the fasteners finger-tight.

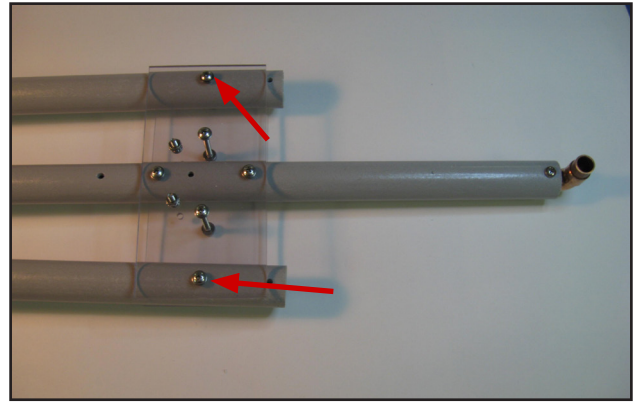


Fig. 46

- Secure the ends of both Element Sub-Assemblies together using an elastic band as shown in Fig. 47.

**This completes the assembly of the Driven Element Assembly. The Driven Element Wires will be added to this assembly during the final assembly of the antenna.**

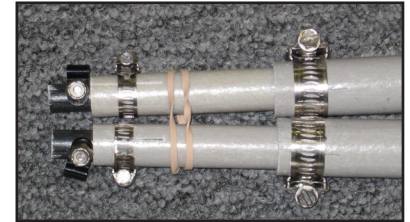
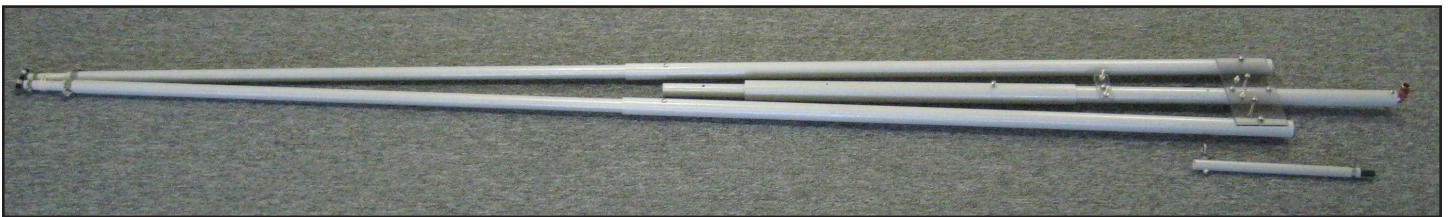


Fig. 47

**Note: The orientation of all Hose Clamp Adjustment Screws. They are positioned on the outer side of each element, facing up.**



Driven Element Assembly

## Reflector Element Assembly

- Select the remaining Boom End Sub-Assembly and temporarily remove the tube and rod from the copper elbow as shown in Fig. 48.

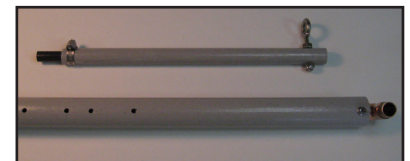


Fig. 48

- Select an Element Mounting Plate and position over the Boom End Assembly as shown in Fig. 49. Then select one (1) 10-24 x 2" Machine screw and one (1) No. 10 SS Flat washer. Place the washer on the screw. Then insert the screw and washer through the top Element Mounting Plate. Insert the screw in the Boom End Assembly through the 2nd hole as indicated in Fig. 49.

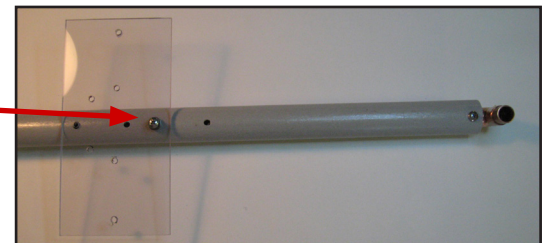


Fig. 49

- Position the remaining Element Mounting plate on the bottom of the Boom End Sub-Assembly. Pass the screw installed during the previous step through the hole in this plate as indicated in Fig. 50. Then place a No. 10 SS Flat Washer over the screw and fasten with a 10-24 SS Anti-vibration Hex Nut. Tighten Finger tight.
- Select one (1) 10-24 x 2" Machine screw and one (1) No. 10 SS Flat washer. Place the washer on the screw. Then insert the screw and washer through the bottom Element Mounting Plate. Insert the screw in the Boom End Sub-Assembly through the 4th hole as indicated in Fig. 50.

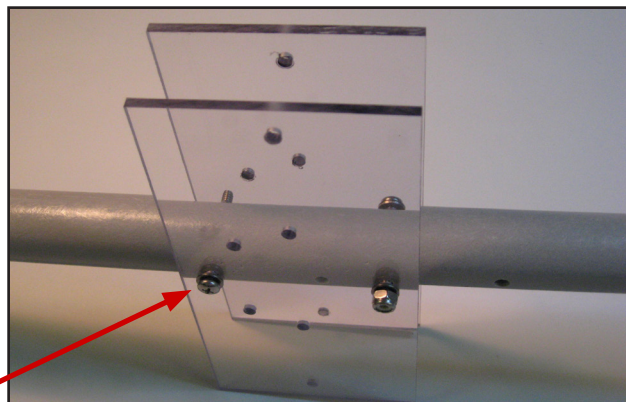


Fig. 50

- Select a No. 10 Flat washer and place it over the screw that was installed during the previous step as shown in Fig. 51. Then place a No. 10 Black Cable Clamp and a 10-24 SS Anti-vibration Hex Nut on the screw. Tighten the fastener finger-tight.

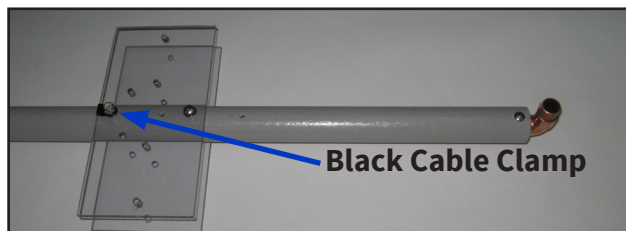


Fig. 51

- Place a No. 10 SS Flat Washer over each of two (2) 10-24 x 2.0" Machine Screws. Insert the screws passing through both the top and bottom Element Mounting Plates as shown in Fig. 52. Place a No. 10 Flat SS Washer and then a 10-24 Anti-vibration Hex Nut over each screw. Tighten the fasteners finger-tight.

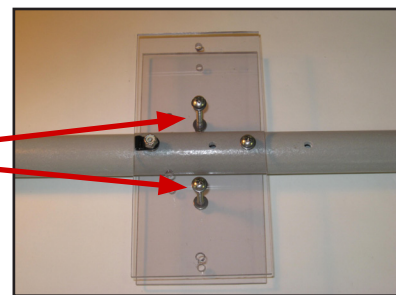


Fig. 52

- Orient the selected Element Sub Assemblies next to the Boom End Sub-Assembly as shown in Fig. 53. **Note the orientation of the Hose Clamp adjustment screws.**



Fig. 53

- Reposition the Element Sub-Assemblies and ensure that the orientation is unchanged. Align the hole in each Element Sub-Assembly with the holes in the top and bottom Element Mounting Plates as shown in Fig. 54. Fasten each Element Sub-Assembly to the Boom-End Sub-Assembly by placing a No. 10 SS Flat Washer over a 10-24 x 2.0" Machine Screw, then pass the screw through the top mounting plate, the element, then the bottom mounting plate. Place a No. 10 SS Flat Washer and then a 10-24 Anti-vibration Hex Nut over each screw. Tighten the fasteners finger-tight.

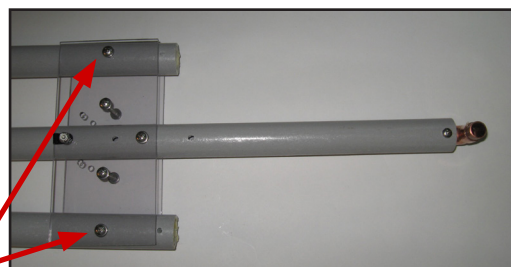


Fig. 54

- Secure the ends of both Element Sub-Assemblies together using an elastic band as shown in Fig. 55. This completes the assembly of the Reflector Element Assembly. The Reflector Element Wires will be added to this assembly during the final assembly of the antenna.



Fig. 55

## All Sub-Assemblies are complete

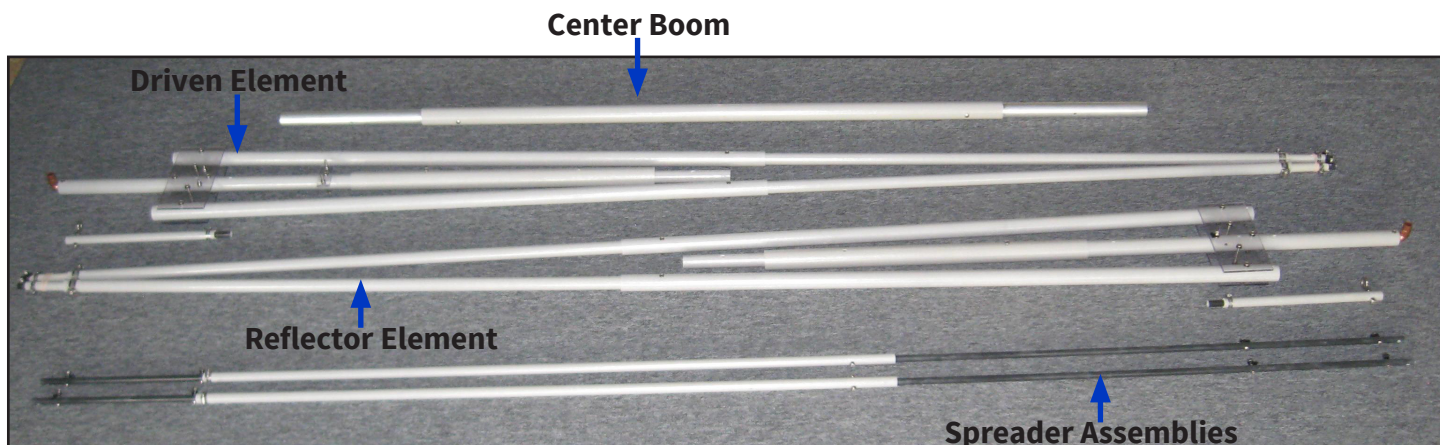


Fig. 56

## Final Assembly and Installation

Final assembly of your new Light Beam Multi-band (LBM) antenna will need to be completed outdoors on a level surface such as a driveway or patio. A 15' x 26' area is required. If assembly is to take place on a lawn or other rough surface, a large tarp is recommended. Using a tarp will enhance the retrieval of parts that are accidentally dropped.

- Carefully carry the Assemblies shown in Fig. 56 to your new work location. Also move all other remaining antenna parts such as remaining hardware, RF Wire Assemblies and Lanyards.
- Place the Driven Element Assembly at one end of the outdoor work area.
- Remove the Elastic Band that is holding the Element ends together.
- Remove the two (2) fasteners that are indicated in Fig. 57.

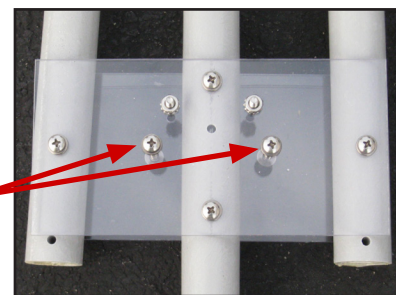


Fig. 57

- Swing one of the Elements till it is perpendicular to the Boom End Assembly, align the hole in the Element with the holes in the Element Mounting Plates and re-insert one (1) of the fastners previously removed. Do not tighten. See Fig. 58.

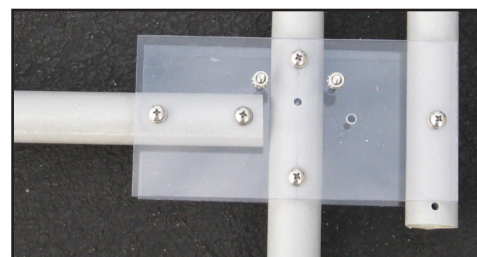


Fig. 58

- Using a carpenter's square, verify that the position of the Element Assembly is perpendicular to the Boom End Assembly. Then tighten the fastener very well. See Fig. 59.



Fig. 59

- Repeat the previous two (2) steps to position and fasten the other Element Assembly. See Fig. 60.
- Tighten all 6 fasteners very well.

**This completes the Driven Element Assembly. Place the Reflector Element Assembly in the outdoor workspace.**

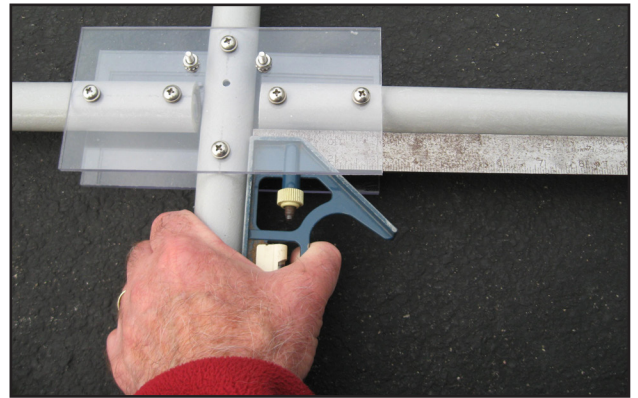


Fig. 60

- Repeat the steps previously used to position the elements of the Driven Element Assembly to position the elements of the Reflector Element Assembly. Verify that the elements are square with the Boom End Assembly. Tighten all six (6) fasteners well. See Fig. 61.

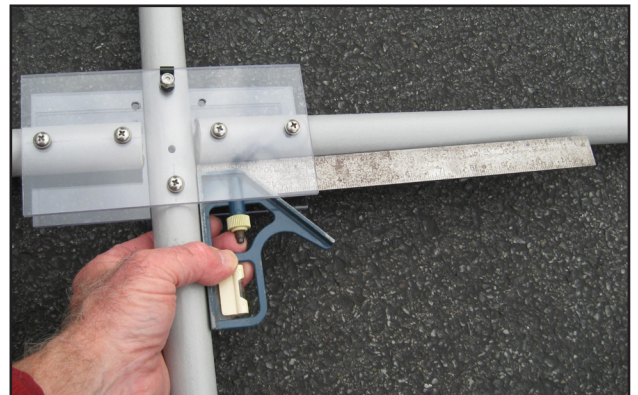


Fig. 61

- Place the Boom Center Assembly near the Driven Element Assembly. Align the holes in each as shown in Fig. 62.
- Remove the fastener shown in Fig. 62.

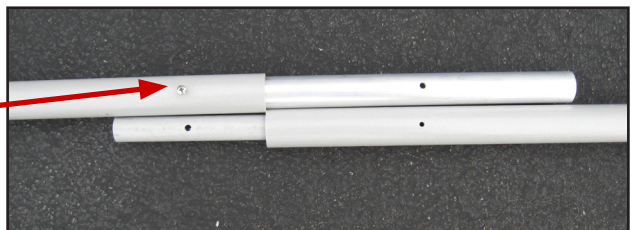


Fig. 62

- ☐ Insert the small fiberglass tube of the Driven Element Assembly Into the aluminum tube of the Boom Center Assembly as shown in Fig. 63.

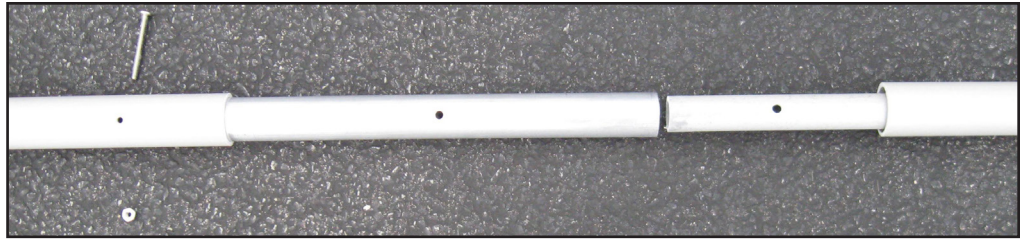


Fig. 63

- ☐ Align all holes and re-insert the fastener removed in the previous step. Also insert one (1) 10-24 x 2.0" SS machine screw in the Driven Element Assembly Boom End as shown in Fig. 64. Add a 10-24 Anti-vibration Hex Nut to each machine screw.

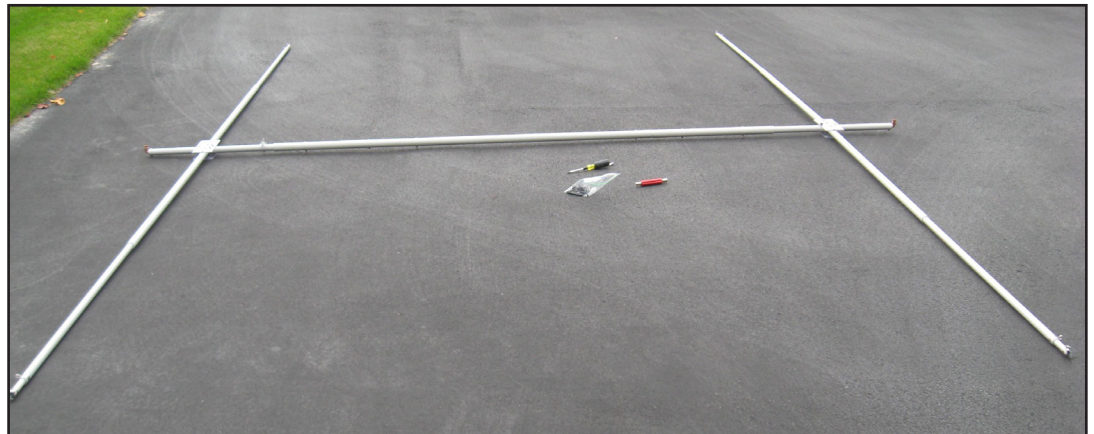


Fig. 64

**Note: A small space may remain between the outside tubes of the Boom Assembly. This space is acceptable.**

- ☐ Tighten each fastener well.
- ☐ Place the Reflector Element Assembly near the Boom Center Assembly and Driven Element Assembly. Repeat the previous four (4) steps to fasten the Reflector Element Assembly to the Boom.
- ☐ Tighten each fastener well.

**This completes the attachment of the Driven Elements and the Reflector Elements to the complete Boom structures.**



**Note: The following steps set the initial starting length of the Elements. This initial length setting will change later when the Element Wires are properly tensioned.**

- ☐ Select one of the elements and extend the end of the 0.5" OD Rod to a length of 17.0" as shown in Fig. 65. Tighten the 3/4" SS Hose Clamp.
- ☐ Repeat the previous step for each one of the remaining three (3) elements.

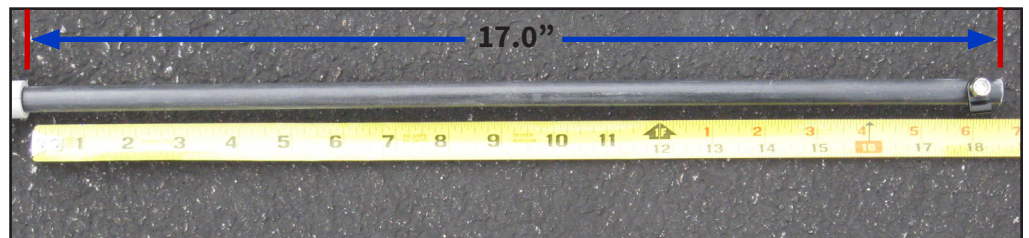


Fig. 65

- Select one of the elements and extend the end of the 0.75" OD Tube to a length of 41.0" as shown in Fig. 66. Tighten the 1.0" SS Hose Clamp.

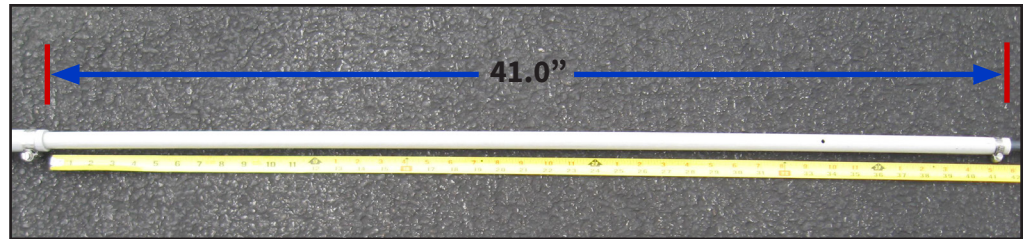


Fig. 66

- Repeat the previous step for each one of the remaining three (3) elements.

- Select both of the two (2) Spreader Assemblies and place them in the workspace. Loosen the 3/4" SS Hose Clamp on one of the Spreader Assemblies and extend the 0.5" OD Rod to a length of 38.0" as shown in Fig. 67. Tighten the 3/4" SS Hose Clamp.

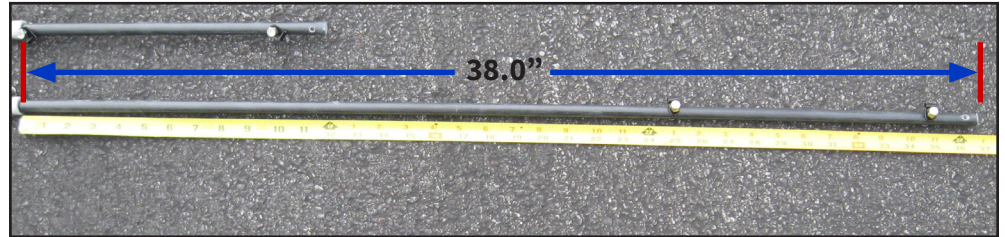


Fig. 67

- Repeat the previous step for the remaining Spreader Assembly.

- Select one of the Spreader Assemblies and position it to span both elements on one side of the Boom. Align the hole in the end of the Spreader Assembly with the hole in the 0.75" OD Tube of an Element Assembly. Select a 10-24 x 1.5" SS Machine Screw and insert the screw through the bottom of the Element Assembly then through the end of the 0.5" OD Rod of the Spreader Assembly as shown in Fig. 68. Fasten with a 10-24 Anti-vibration Nut. Tighten well.

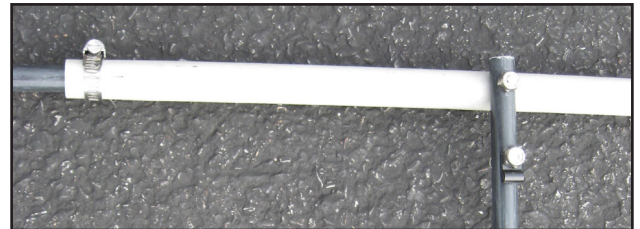


Fig. 68

- Position the Spreader Assembly to be parallel with the Boom Assembly. Repeat the previous step to attach the other end of the same Spreader Assembly to the opposite Element Assembly.
- Repeat the previous two (2) steps and attach the remaining Spreader Assembly to the Elements of the other side of the antenna as shown in Fig. 69.

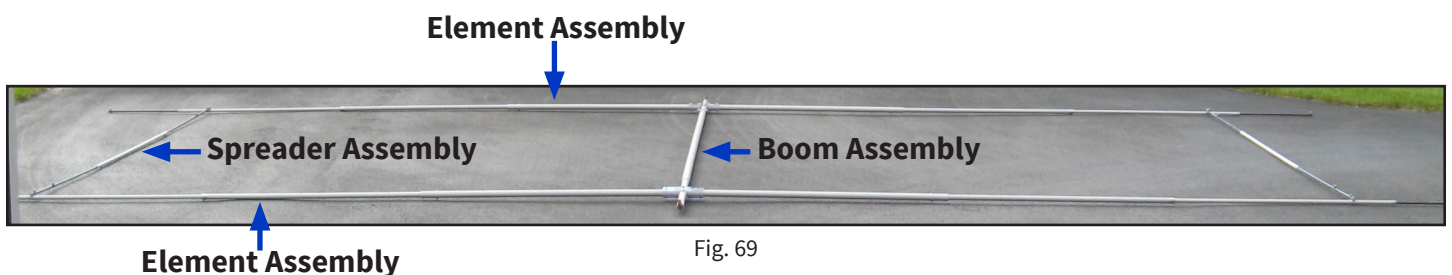


Fig. 69

**Note:** The following steps will result in the RF Wire Assemblies being attached to the completed antenna support structure of Fig. 69.

- Select the two (2) wires that form the Balanced Feed-line that connects the 17M Elements to the 20M Elements. Place the wire lugs over the terminals as shown in Fig. 70. Place one of four (4) 10-24 SS Hex Nuts over each terminal. Tighten well.

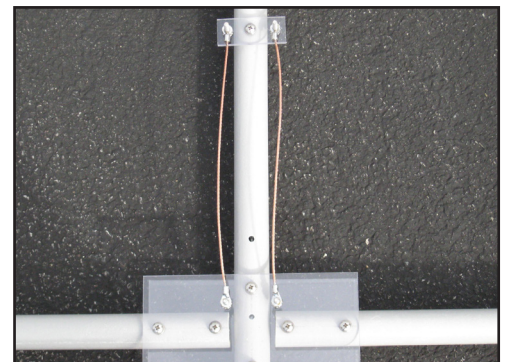


Fig. 70

- Select the Wire Assembly that is labeled **17R**. This is the 17M Reflector Element. Carefully unwrap the wire bundle. Note that the wire is folded back upon itself at both ends. These are the outside ends of the element.

Where the wire is folded back upon itself, this is the point on the wire where the Black Cable Clamp is located.

**At the Reflector End of the antenna**, temporarily remove the 10-24 SS Anti-vibration Hexnut and Black Cable Clamp, then insert the wire as shown in Fig. 71. Replace the Black Cable Clamp with wire and the Hex Nut on the Machine Screw and tighten well. Position the Black Cable Clamp as shown in Fig. 72.

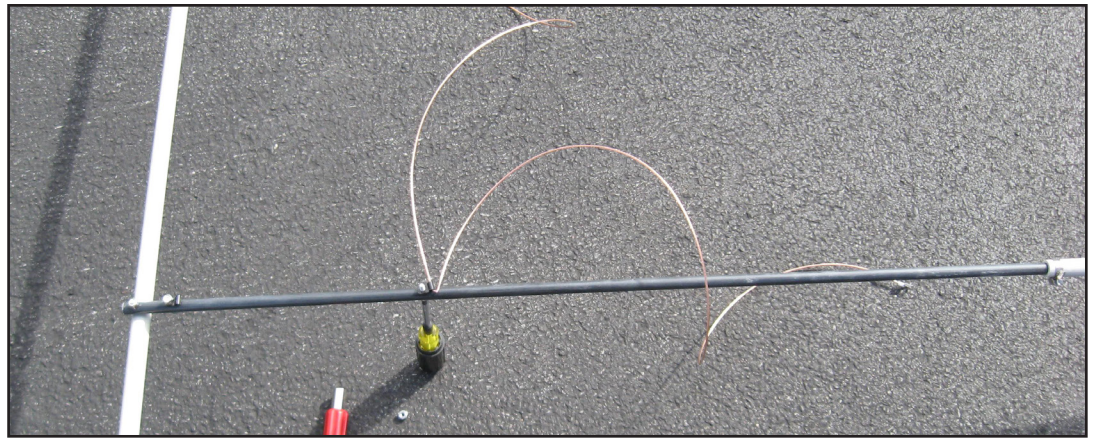


Fig. 71

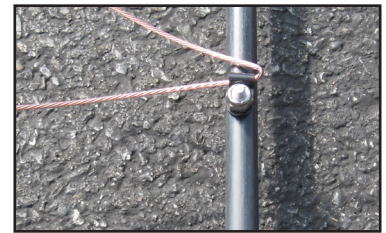


Fig. 72

- At the other end of the wire from the previous step, repeat the previous step to fasten the wire within the Black Cable Clamp located on the other side of the Boom at the Reflector End of the antenna as shown in Fig. 73.

**This completes the installation of the 17M Reflector Element. The loose ends of the element will be secured in a later step.**

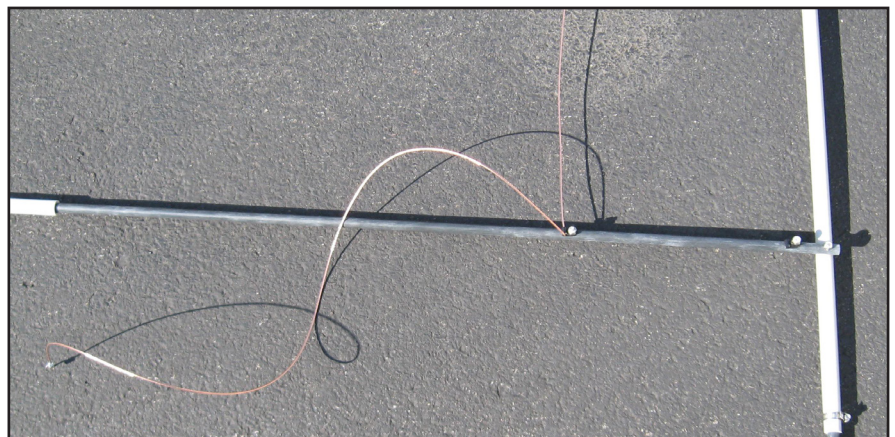


Fig. 73

- Select one (1) of the two (2) Wire Assemblies that is labeled **17D**. This is a 17M Driven Element. Carefully unwrap the wire bundle. Note that the wire is folded back upon itself at one end. This is the outside end of the element. Connect the ring terminal on the other end of the wire and position it at the terminal plate as shown in Fig. 74. Remove the 10-24 SS Anti-vibration Hex Nut, place the ring terminal over the machine screw and replace the Hex Nut. Tighten well.

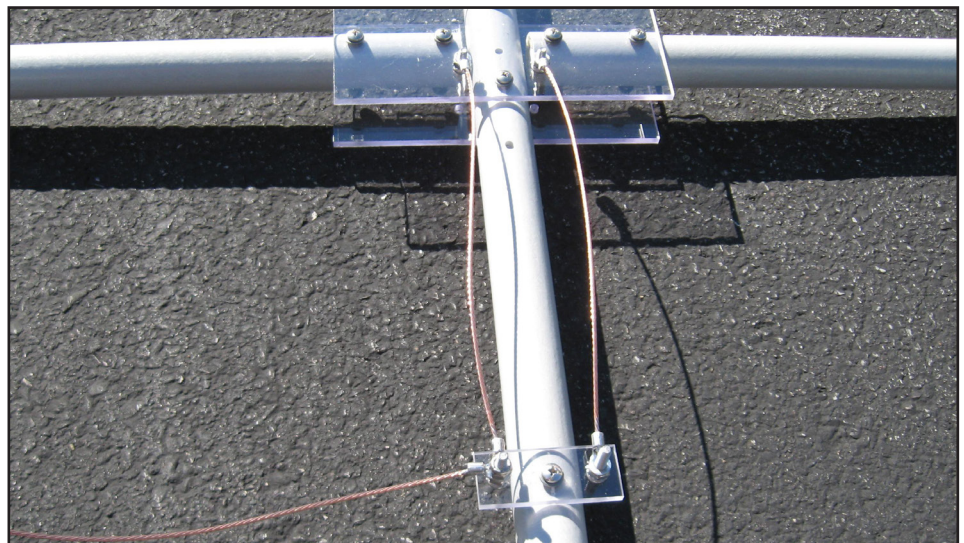


Fig. 74

- **At the Driven End of the antenna,** temporarily remove the 10-24 SS Anti-vibration Hex Nut and Black Cable Clamp, then insert the wire. Replace the Black Cable Clamp with wire and the Hex Nut on the Machine Screw and tighten well. Position the Black Cable Clamp as shown in Fig. 75.

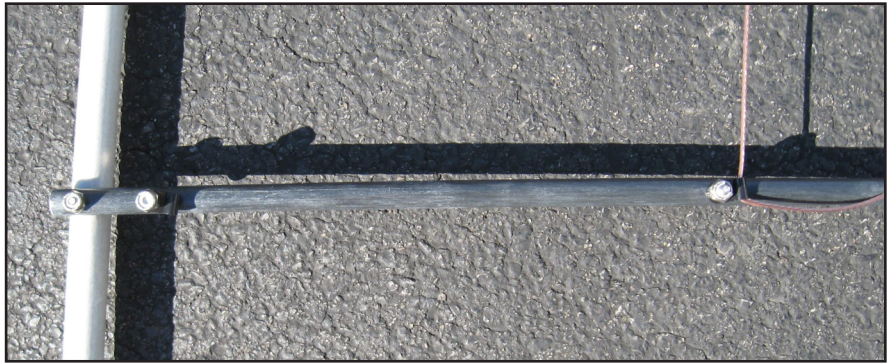


Fig. 75

- Twist the driven and reflector element wires to remove curl from each wire.
- Pass the black cord that is attached to the ring terminal of the 17M Driven Element Wire through the ring terminal of the 17M Reflector Element wire as shown in Fig. 76. Pull the cord through the ring terminal till the wire tie is against the ring terminal, then secure this position with a knot.



Fig. 76

- Select one (1) of the 1/8" x 2" Heli-tubes and wrap the spiral tube about the cord as shown in Fig. 77.



Fig. 77

- Completely wrap the cord with the spiral tube as shown in Fig. 78.

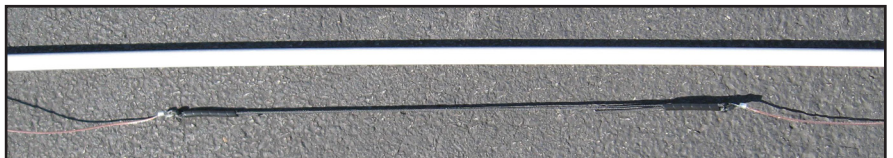


Fig. 78

- Select the remaining Wire Assembly that is labeled **17D**. Repeat the previous six (6) steps to install the other 17M Driven Element.

**This completes the installation of the 17M Driven Elements.**

- Select the Wire Assembly that is labeled **20R**. This is the 20 M Reflector Element. Carefully unwrap the wire bundle. Note that the wire is folded back upon itself at both ends. These are the outside ends of the element. Where the wire is folded back upon itself, this is the point on the wire where the Black Cable Clamp is located. **At the Reflector End of the antenna**, temporarily remove the two (2) 10-24 SS Anti-vibration Hex Nuts and Black Cable Clamps, then insert the wire in both as shown in Fig. 79. Replace the Black Cable Clamps with wire and the Hex Nuts on the Machine Screws and tighten well. Position the Black Cable Clamps as shown in Fig. 79.

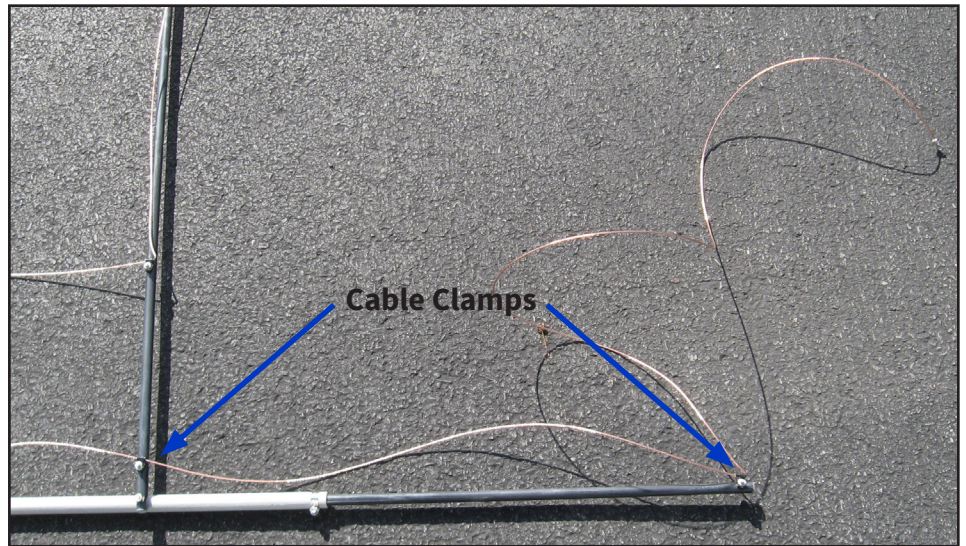


Fig. 79

- At the other end of the wire from the previous step, repeat the previous step to fasten the wire within the Black Cable Clamps located on the other side of the Boom at the Reflector End of the antenna as shown in Fig. 80.

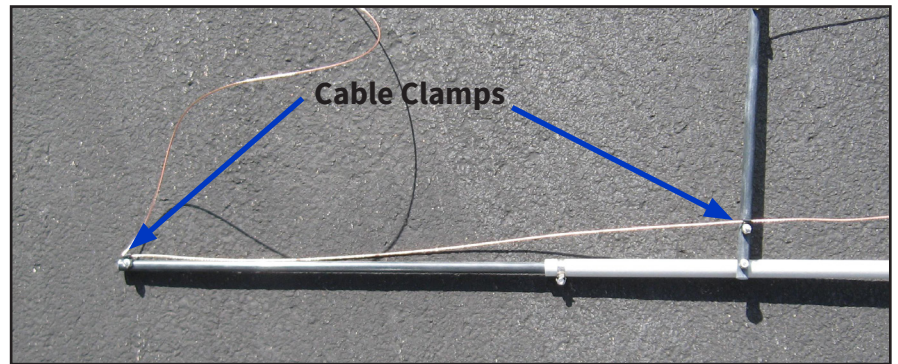


Fig. 80

- On the Reflector Element end of the Boom, locate the Black Cable Clamp as shown in Fig. 81. Temporarily remove the 10-24 SS Anti-vibration Hex Nut and Black Cable Clamp, then insert the wire. Replace the Black Cable Clamp with wire and the Hex Nut on the Machine Screw and tighten well.

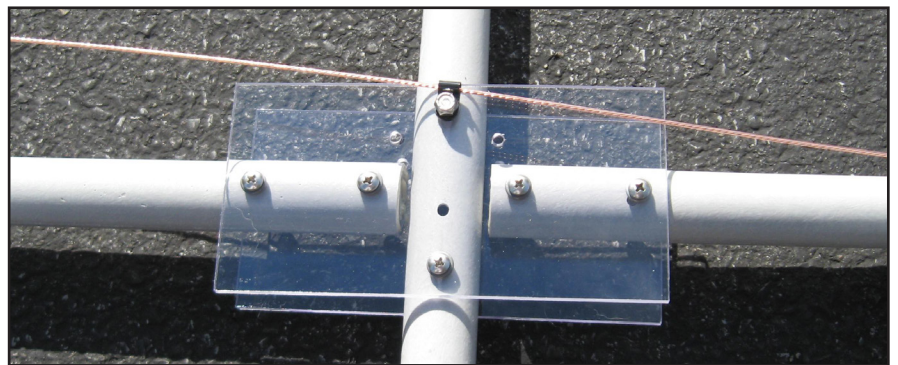


Fig. 81

**This completes the installation of the 20M Reflector Element.**

- Select one (1) of the two (2) Wire Assemblies that is labeled **20D**. This is a 20 M Driven Element. Carefully unwrap the wire bundle. Note that the wire is folded back upon itself at one end. This is the outside end of the element. Connect the ring terminal on the other end of the wire and position it at the terminal plate as shown in Fig. 82. Remove the 10-24 SS Anti-vibration Hex Nut, place the ring terminal over the machine screw and replace the Hex Nut. Tighten well.

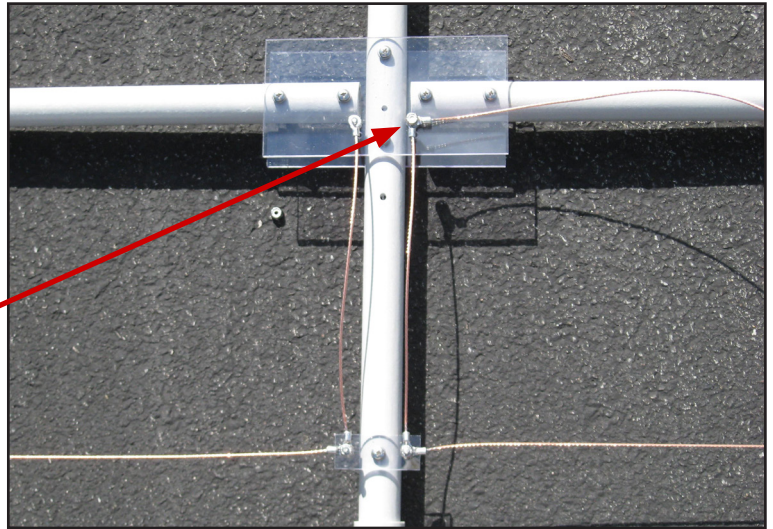


Fig. 82

- **At the Driven End of the antenna**, temporarily remove the two (2) 10-24 SS Anti-vibration Hex Nuts and Black Cable Clamps, then insert the wire through both. Replace the Black Cable Clamps with wire and the Hex Nuts on the Machine Screws as shown in Fig. 83 and tighten well.

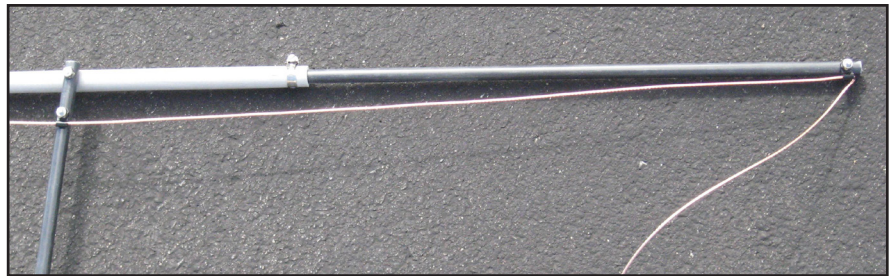


Fig. 83

- Twist the driven and reflector element wires to remove curl from each wire.



Fig. 84

- Pass the black cord that is attached to the ring terminal of the 20M Driven Element Wire through the ring terminal of the 20M Reflector Element wire as shown in Fig. 84. Pull the cord through the ring terminal till the wire tie is against the ring terminal, then secure this position with a knot.



Fig. 85

- Select one (1) of the 1/8" x 2" Heli-tubes and wrap the spiral tube about the cord as shown in Fig. 85.

- Completely wrap the cord with the spiral tube as shown in Fig. 86.



Fig. 86

- Select the remaining Wire Assembly that is labeled **20D**. Repeat the previous six (6) steps to install the other 20 M Driven Element.

**This completes the installation of the 20 M Driven Elements.**

The following steps will result in the RF Wire Elements being tensioned properly. Changes to the length of the fiberglass support structures should be equal on both sides of the antenna boom. Ensure the entire antenna structure is on a flat surface before beginning the tensioning of the wires. Do not over-tension the wires.

- To lengthen a support structure, the best technique is to grasp the smaller side of the structure, then using the thumb, push against the larger side of the structure as shown in Fig. 87.



Fig. 87

- To place the wires under tension thereby making the wires straighten, loosen the 3/4" SS Hose Clamp on one (1) of the Spreader Assemblies and gently extend the 0.5" OD Rod till the wire is straight. Do not over-tension. See Fig. 88.

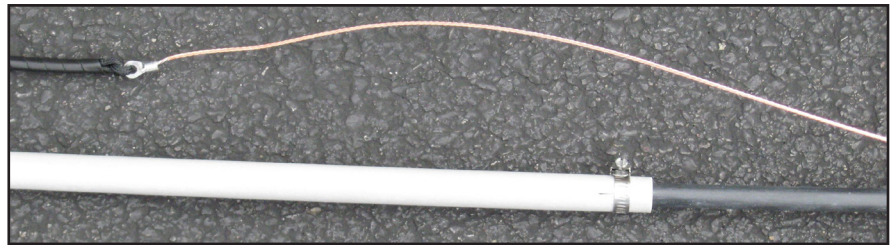


Fig. 88

- Repeat the previous step on the remaining Spreader Assembly.

- Using a soft-lead pencil, mark the 0.75" OD Tube at the 1.0" OD tube position on each of the Element Assemblies as shown in Fig. 89. This mark is a starting point reference mark. This provides a visual method of verifying that each element length on each side of the antenna boom are of equal length.



Fig. 89

- Extend the right-hand 17M **Reflector Element** a length of 1.0" as shown in Fig. 90. Then extend the left-hand 17M **Reflector Element** to the same length. Repeat lengthening the right-hand and left-hand element lengths until the **Reflector Element** wire is under tension and is straight. Do not over-tension. The element length on both sides of the antenna boom should be equal.



Fig. 90

- Extend the right-hand 17M **Driven Element** a length of 1.0" as shown in Fig. 90. Then extend the left-hand 17M **Driven Element** to the same length. Repeat lengthening the right-hand and left-hand element lengths until the **Driven Element** wires are under tension and are straight. Do not over-tension. The element length on both sides of the antenna boom should be equal.

**Note:** The Spreader Assemblies will curve slightly as the wire is tensioned. This is normal.

**Note:** The extended length of the Driven Element Assemblies is several inches shorter than the extended length of the Reflector Element Assemblies.

- Using a soft-lead pencil, mark the 0.5" OD Rod at the 0.75" OD tube position on each of the Element Assemblies as shown in Fig. 91. This mark is a starting point reference mark. This provides a visual method of verifying that each element length on each side of the antenna boom are of equal length.
- Extend the right-hand 20 M **Reflector Element** a length of 1.0" as shown in Fig. 91. Then extend the left-hand 20 M **Reflector Element** to the same length. Repeat lengthening the right-hand and left-hand element lengths until the **Reflector Element** wire is under tension and is straight. Do not over-tension. The element length on both sides of the antenna boom should be equal.



Fig. 91

**Note:** The Element Ends will curve slightly as the wire is tensioned. This is normal.

- Extend the right-hand 20 M **Driven Element** a length of 1.0" as shown in Fig. 92. Then extend the left-hand 20 M **Driven Element** to the same length. Repeat lengthening the right-hand and left-hand element lengths until the **Driven Element** wires are under tension and are straight. Do not over-tension. The element length on both sides of the antenna boom should be equal.

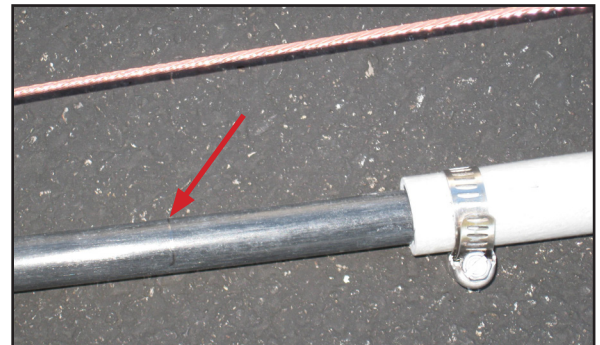


Fig. 92

**Note:** The Element Ends will curve slightly as the wire is tensioned. This is normal.

**Note:** The extended length of the Driven Element Assemblies is several inches shorter than the extended length of the Reflector Element Assemblies.

This completes the tensioning of the 17 Meter and 20 Meter Wire Assemblies.

The following steps will result in the assembly and tensioning of the Driven Element and Reflector Element support structure.

- Select one (1) of the four (4) Element Lanyards. Uncoil the lanyard and place the loop end of the lanyard around an element at the point where a spreader is fastened to the element. Pull the opposite end of the lanyard through the loop as shown in Fig. 93.



Fig. 93

- Tighten the lanyard loop as shown in Fig. 94.



Fig. 94

- Repeat the previous two (2) steps for the remaining lanyards, attaching them to the remaining elements.

- Insert a tube and rod assembly into the copper elbow at one end of the Boom Assembly as shown in Fig. 95.

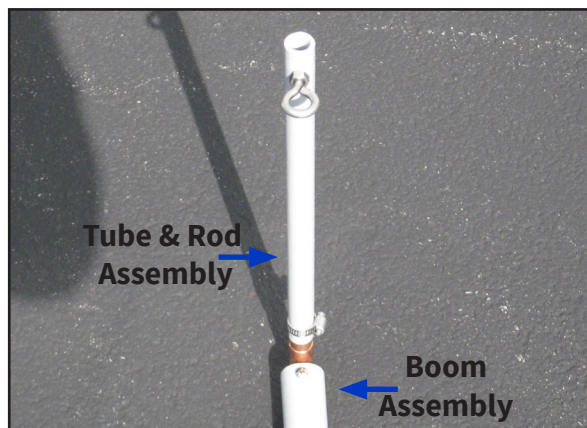


Fig. 95

- Select two (2) SS Lanyard Clamps and thread one lanyard through each of the clamps as shown in Fig. 96.

- Place each Lanyard through the SS Eyebolt then back through each Lanyard Clamp as shown in Fig. 97.

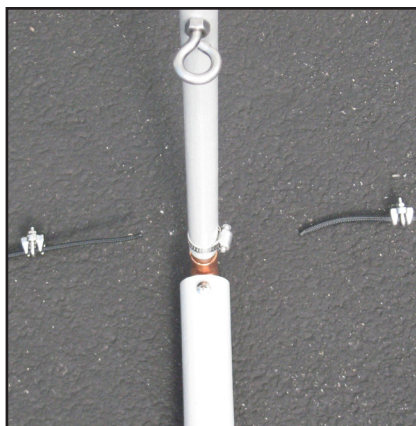


Fig. 96

- Tighten each Lanyard Clamp until the lanyard is snug yet the lanyard can still be pulled through the clamp.



Fig. 97

**Note: An ASSISTANT will be required to help during the next step.**

- Grasp a Lanyard in each hand. Pull both Lanyards equally, placing equal tension on both Lanyards so that the Eye Bolt and Tube remain centered and vertical, as shown in Fig. 98. Ask your ASSISTANT to tighten each Lanyard Clamp securely. Tighten well.



Fig. 98

- Select two (2) of the 1/8" x 2" Heli-tubes and wrap the spiral tubes on the Lanyards as shown in Fig. 99.



Fig. 99

- Loosen the adjustment screw of the 3/4" SS Hose Clamp and raise the vertical tube between 3" to 6" as shown in Fig. 100. Re-tighten the hose clamp.

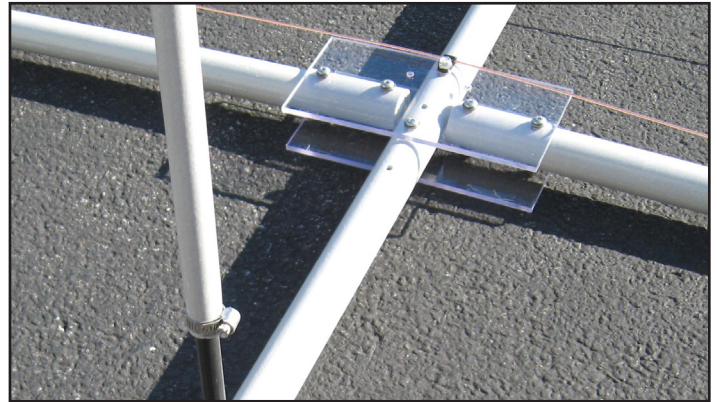


Fig. 100

- The ends of both Elements should be about 2" to 3" above the ground as shown in Fig. 101. If the Element ends are not at the correct height, adjust the height of the vertical tube.



Fig. 101

- Dress the excess Lanyard by winding the excess upon the Lanyard. Secure with a half-hitch knot as shown in Fig. 102.

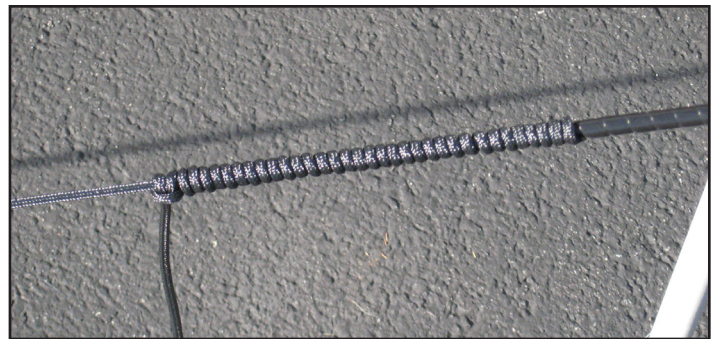


Fig. 102

- Repeat this step to dress the other Lanyard excess as shown in Fig. 103.

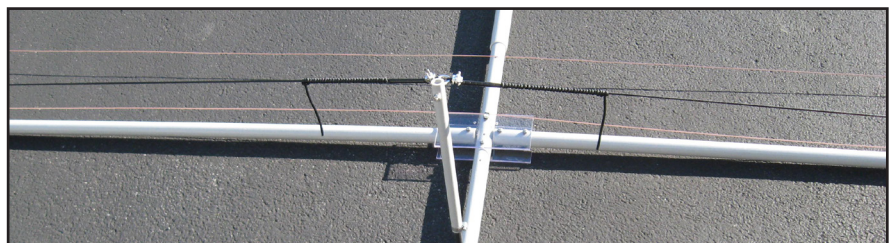


Fig. 103

- ☐ Repeat the previous Nine (9) steps for the Elements mounted on the other end of the Boom. Install the Lanyards and adjust to the correct tension.

**You have completed the installation of your new Light Beam Multi-band antenna.**

- ☐ Measure the length of the antenna Boom and locate the center of the Boom. This is the balance-point of the antenna. Locate your Boom-to-Mast Mounting Plate at this location. The Light Beam MP-1.75 Mounting Plate (Sold seperately) is ideal but any sturdy Boom-to-Mast Mount can be used.
- ☐ Your new Light Beam Multi-band antenna has a 50 Ohm impedance at the center of each amateur band. The antenna is a balanced antenna therefore a 1:1 Balun is required to interface your 50 Ohm coaxial cable to the antenna. A current balun will perform best. (Sold Seperately) Your favorite 1:1 Balun or Coaxial Choke will also work well.
- ☐ The antenna can be easily carried to your tower site by lifting the boom at the balance point.

## **CONGRATULATIONS !!**



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