

Installation Instructions, Light Beam Plus Antenna Series

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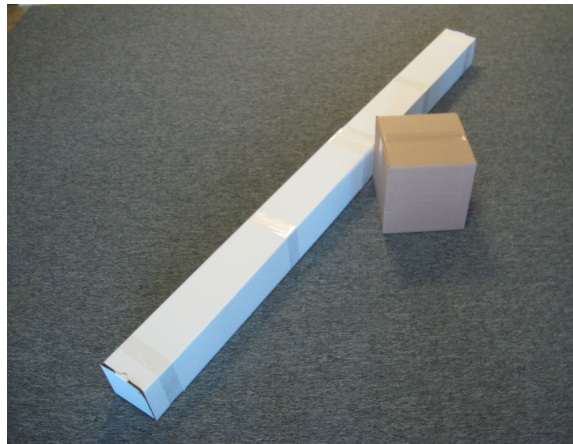
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The Light-Beam Plus series of antenna include 5 models, the LB-20M, LB-17M, LB-15M, LB-12M, and LB-10M. Each is a compact, computer optimized, directional antenna with good gain and excellent front to back ratio. All are optimized for operation at 30 ft above ground. Installation steps are the same for each model of the Light Beam Plus series of antenna.

Please read these Installation Instructions, completely, prior to the antenna installation being started.

Check Your Delivery

Your Light Beam Plus antenna has been shipped in two (2) boxes. 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.



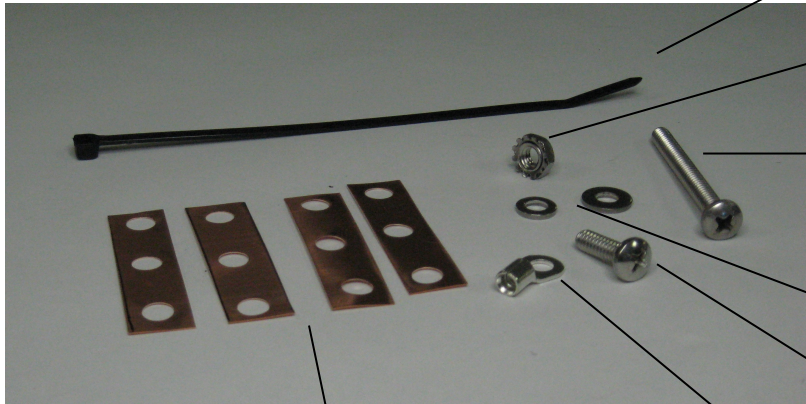
The long plastic parts and the boom are shipped in one box and the End Plate & Hub Assemblies, wire bundles and hardware are in the other box. Locate the hardware parts bag and wire bundles. Check the hardware and wire assemblies against the parts list below to assure the proper quantities of parts are included. Refer to the parts picture page to identify the hardware. Next, check the long plastic parts, the boom and the End Plate & Hub Assemblies against the parts list to assure all of these parts are present. If any parts are discovered missing, please contact us immediately for replacements.

Parts List

<u>Part Name:</u>	<u>Qty</u>
I Beam Assembly	8
End Plate & Hub Assembly	2
Boom	1
Feedline Brace	1
End Spacer	2
Wire Shorting Plate - 0.5"X2"X0.012" Copper	4
Driven Element Wires Bundle (has 4 terminals)	1
All remaining wire bundles are identical (have 2 terminals)	5
5/8" X 10-24 SS Pan Head Phillips Machine Screw	48
2" X 10-24 SS Pan Head Phillips Machine Screw	4
10-24 SS Hex Nut w Toothed Washer	54
10-24 SS Anti-Vibration Nut with nylon insert	12
No. 10 SS Flat Washer 0.44" OD, 0.060" thick	34
No. 10 SS Flat Washer 0.36" OD, 0.060" thick	2
5- 9/16 " Black Nylon Cable Tie	6
No. 10 Un-insulated Ring Terminal	2

Parts Pictures

Sample of Hardware – part Identification



Wire Shorting Plates, Copper
Qty-4 -- **CAUTION Sharp Edges** --

5- 9/16 " Black Nylon Cable
Qty.- 6

10-24 SS Hex Nut w/toothed Washer
Qty-54

2" X 10-24 SS Pan Head Phillips
Machine Screw
Qty.- 4

No. 10 SS Flat Washers
0.36"Qty.-2, 0.44" Qty-34

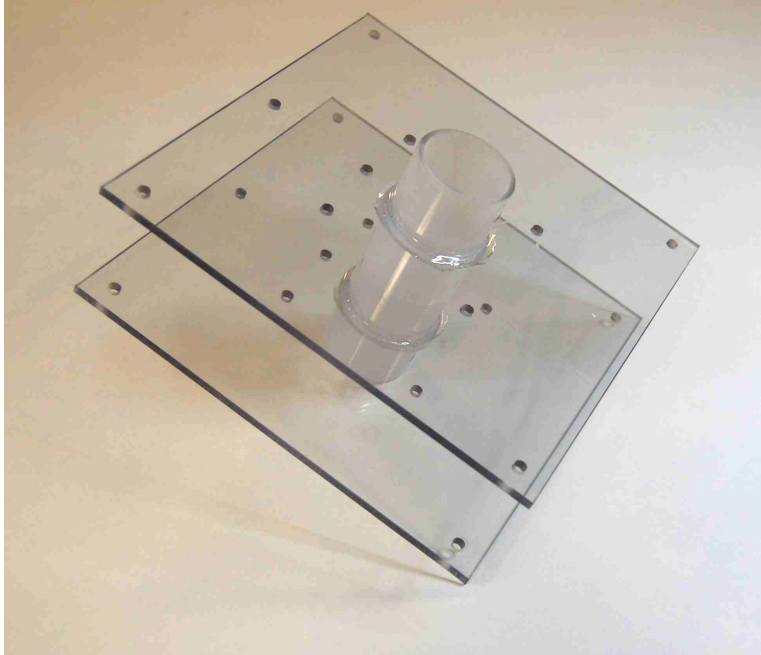
5/8"X10-24 SS Pan Head
Phillips Machine Screw
Qty-48

No. 10 Uninsulated Ring Terminal
Qty-2

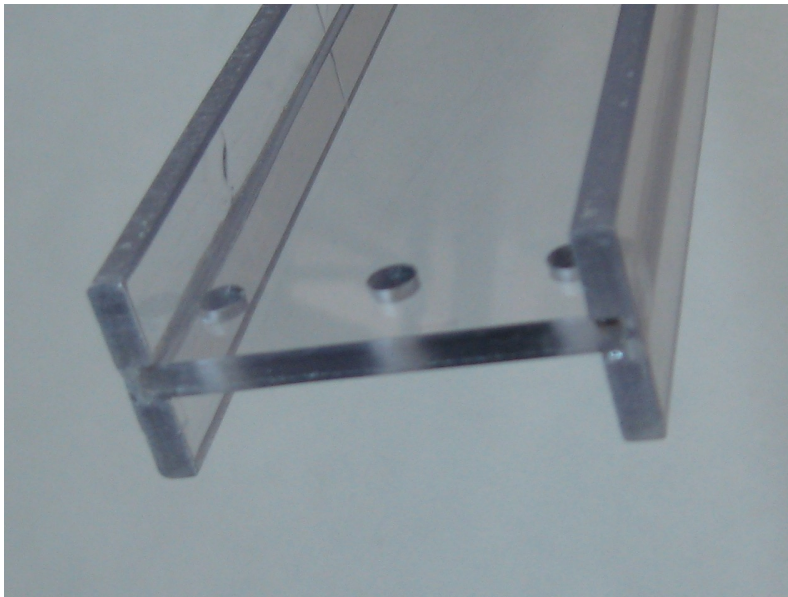


Hardware Shipping Package

Parts Pictures (continued)



End Plate & Hub Assembly



I Beam Assembly – End View

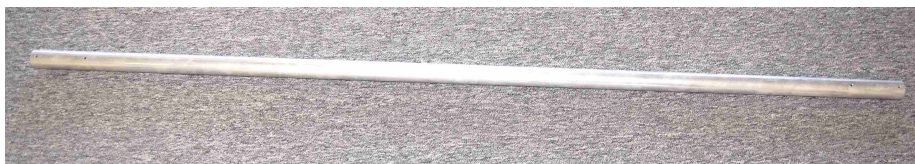
Parts Pictures (continued)



Feedline Brace



End Spacer



Boom

Parts Pictures (continued)



Driven Element Center Wires Bundle (4 terminals)



All Other 2 Terminal Wire Bundles

Tools Required

Only 2 tools are required to assemble your LightBeam Antenna:

- A 3/8" combination (box and open end) wrench and a
- #2 Phillips head screwdriver.



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

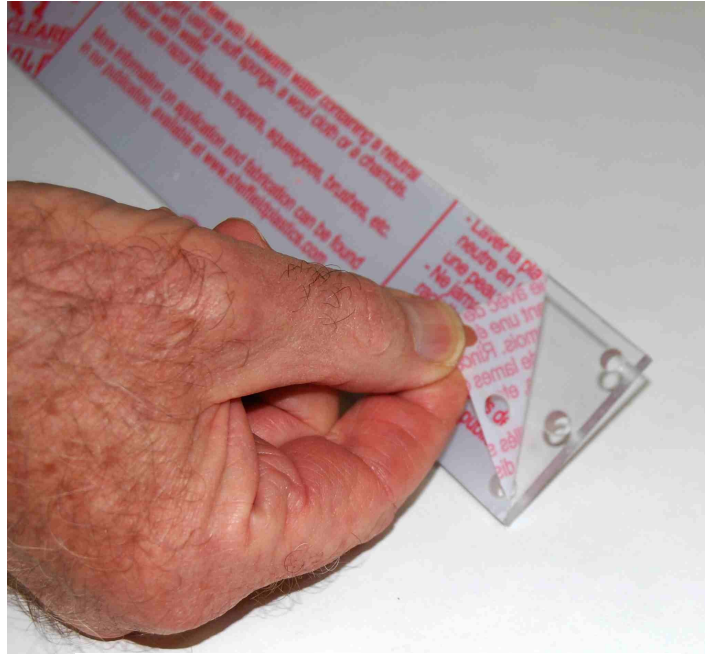
If you are installing your antenna on a roof, tower, or other high structure or will use a ladder or scaffold to access the installation location, follow these precautions to prevent personal injury or death:

- 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

Part Preparation

Prior to beginning antenna assembly, it will be necessary to remove the protective tape from the End Spacers and Feedline Brace as shown in the photos below.



End Spacer Prep.



Feedline Brace Prep.

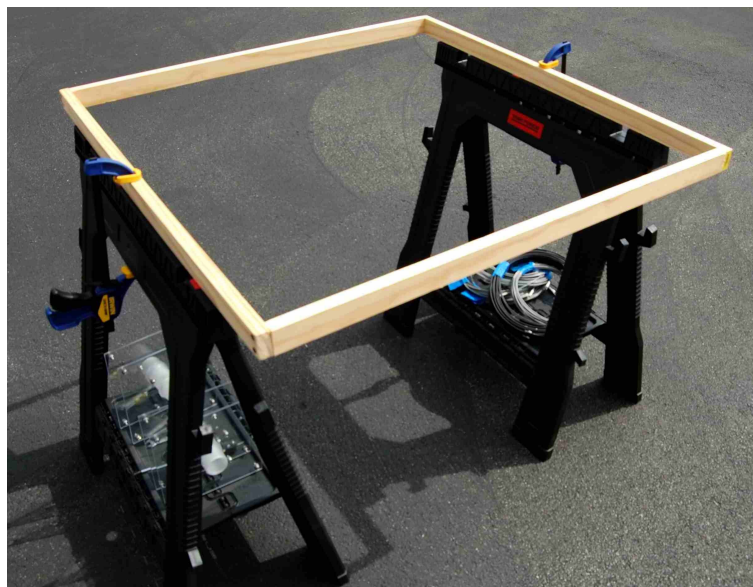
Assembly Overview

We will now begin assembling the Light Beam Plus antenna. This process consists of first attaching the driven element I Beam Assemblies to the driven element End Plate and Hub Assembly to form a large “X” structure that supports the driven element wires. The driven element wire assemblies are then strung around the driven element support “X” and attached to the feedline brace and end spacer to form the driven element assembly. In similar fashion, you will then construct director assembly by attaching I Beam Assemblies to the director End Plate and Hub Assembly and placing the director wires around the director support “X” and attaching them to the director end spacer. Finally, the driven element and director assemblies are placed on the boom, secured in place, the feed line is attached, and the antenna assembly is complete.

Use 5/8” long #10 screws to assemble the driven element and director support “X” assemblies.

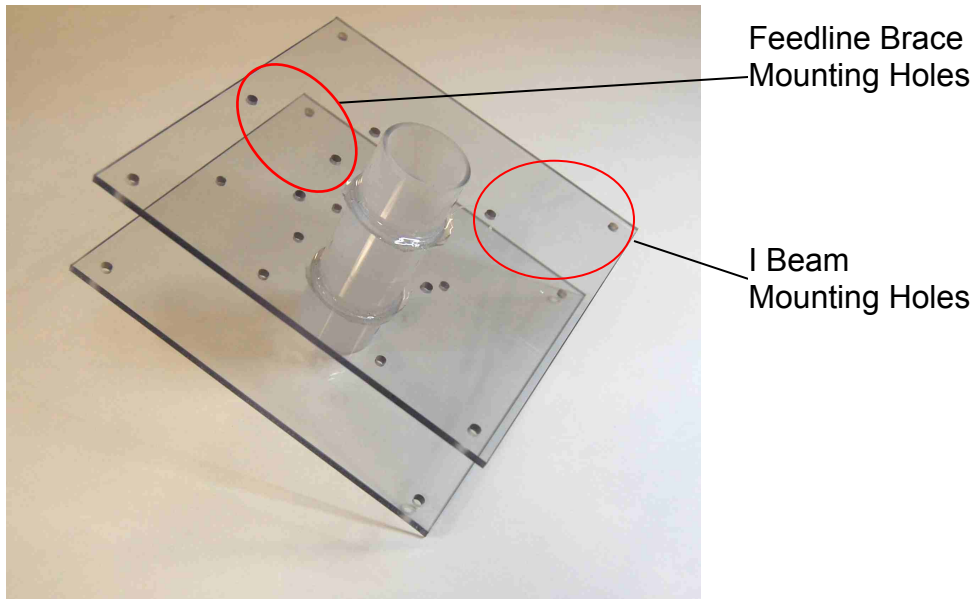
As you progress – check off each step in the [] box provided.

An assembly stand made of a wooden frame on some table height supports, as show below, makes a convenient aid in completing the antenna assembly.

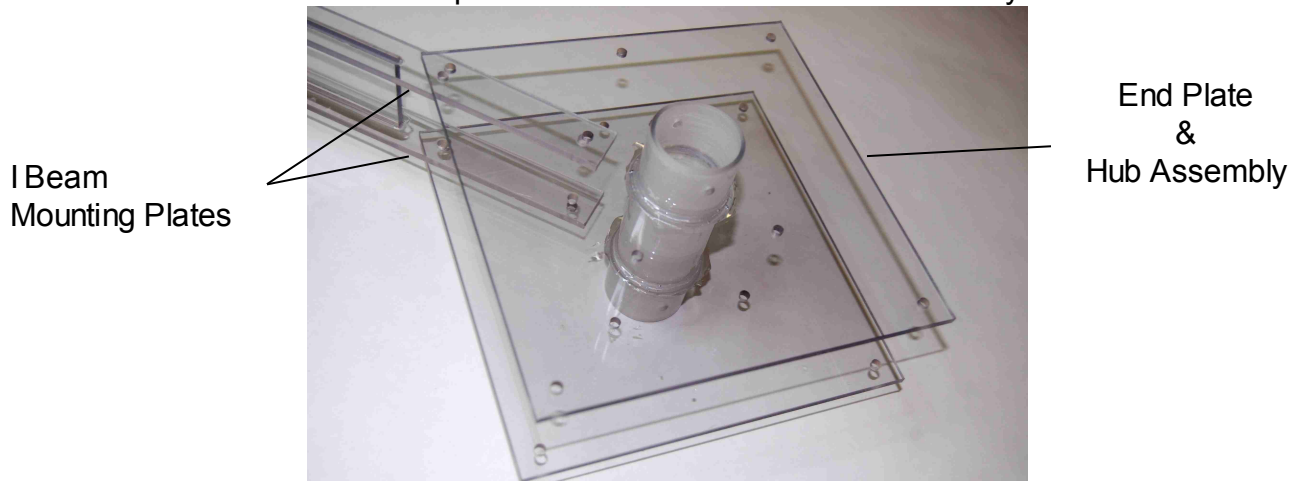


Driven Element Assembly

- Locate one of the two End Plate & Hub Assemblies. See the picture below – note the 2 additional holes in the end plate of this assembly. In a later step, these holes are used to mount the feedline Brace.



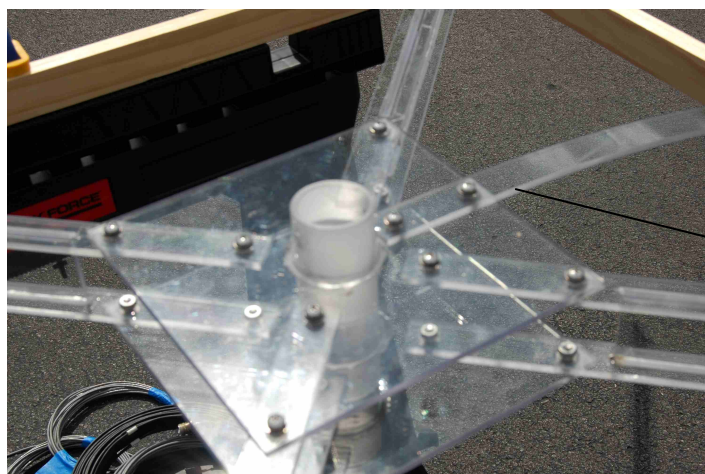
- Locate one I Beam Assembly. Orient the I Beam so that the two I Beam mounting plates are nearest to the End Plate & Hub Assembly and that both are within the End Plate & Hub Assembly. Insert the I Beam mounting plates into the space between the plates of the End Plate & Hub Assembly as shown



- Fasten the I Beam Assembly to the End Plate & Hub Assembly in 4 places. The screws have a larger washer placed over them prior to inserting them through the end plates from the outside as shown.

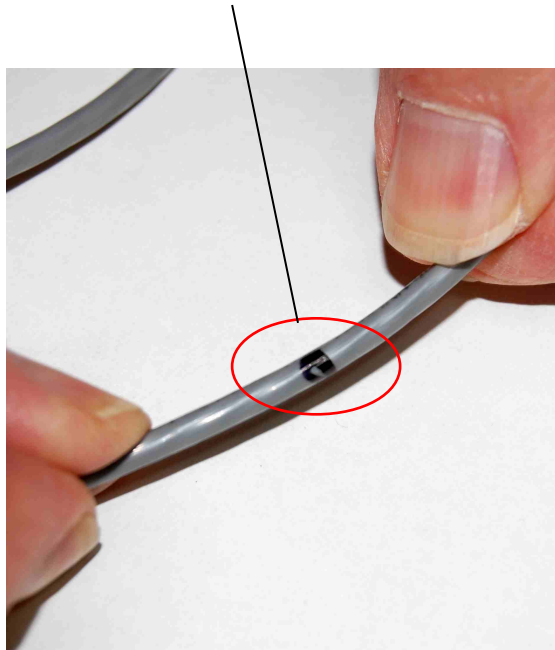


- Continue in a similar manner attaching the 3 remaining I Beam Assemblies to the End Plate & Hub Assembly.
- Locate the Feedline Brace. It is the L shaped plastic part. Attach the long end of this brace to the top 2 holes in the End Plate and Hub Assembly on the outside of the end plate with the L facing away (down) from the screw heads. Don't forget to place washers over the screws before inserting them. This brace points to the top of the antenna.



Feedline
Brace

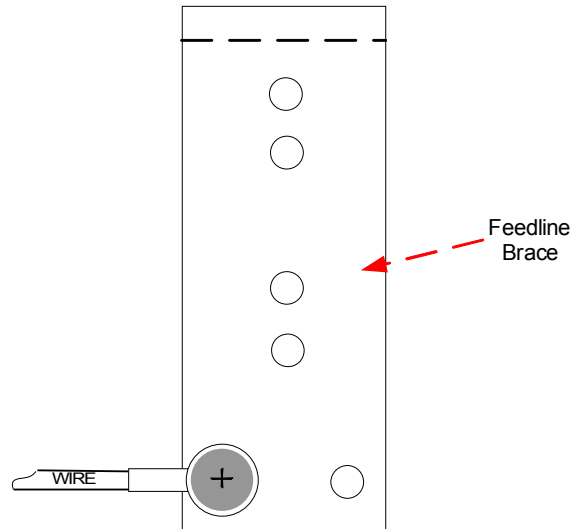
- Locate the Driven Element Wire Bundle that has 4 terminals. Opening the bundle will produce 2 wires with terminals at each end. You will find a black mark at 2 places on each wire.



- Bend the wire sharply at each of these black marks on both wires as shown.

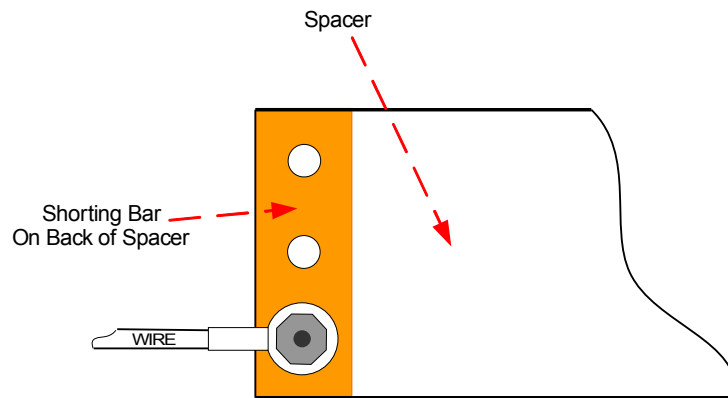


- Note that each wire now has a longer wire section extending beyond one of the bends. Attach the longer end section of one wire to the left hole of the Feedline Brace as shown. Position the wire terminal so it is at 90 degrees to the brace and use no washer – the terminal serves as the washer in this case.

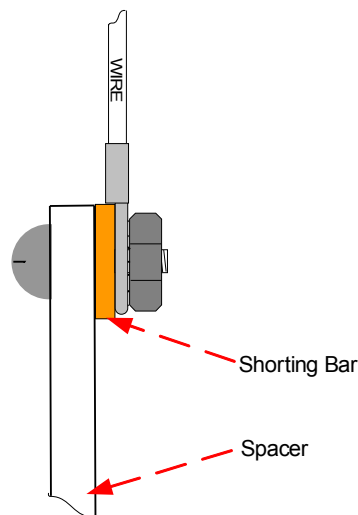


Driven Element
Connection – Top View

- Route the wire around the support “X” through the bottom set of slots to the opposite side of the support “X” where it is attached to the End Spacer. Locate an End Spacer. Position the terminal to be at 90 degrees to the spacer. Using hardware and a shorting bar, fasten the wire to bottom hole of the End Spacer as shown.



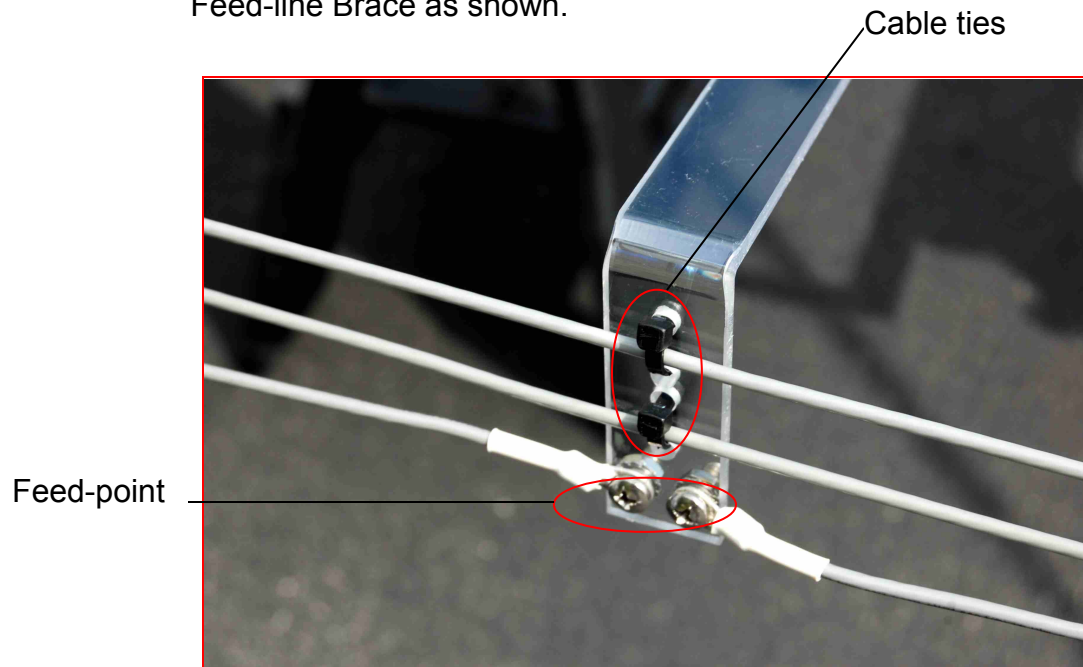
Wire to Spacer Connection
Side View



Wire to Spacer Connection
Top View

- In similar fashion, locate the longer wire segment on the remaining wire. Attach the remaining driven element wire to the open right hole in the Feedline Brace, route it around the Support "X" lower slots and attach it to the opposite end of the End Spacer using hardware and a shorting bar like the other driven element wire.

- ❑ Locate 2 of the other Element Wire Bundles having only 2 terminals each. Open the bundle and locate the black marks on these wires and bend them as previously described. Note that there will now be 2 wire segments, nearest the terminals, that are shorter than the others.
- ❑ Attach one of the remaining wire terminals to one of the center holes in the End Spacer, route it around the Support “X” center slots and attach it to the center hole at opposite end of the End Spacer. Be sure that the shorting bar is in place.
- ❑ Locate the other Element Wire. Attach this wire to the top (remaining) holes in the End Spacer, route it around the Support “X” top slots and attach it to the top hole at opposite end of the End Spacer. Be sure that the shorting bar is in place.
- ❑ Ensure all 6 fasteners on the Element End Spacer are secure, then add and tighten a 10-24 SS Anti-Vibration Nut over each of 6 Hex Nut w/tooth washer on the Element End Spacer.
- ❑ Using black cable ties, tie each of these 2 element wires to the Feed-line Brace as shown.

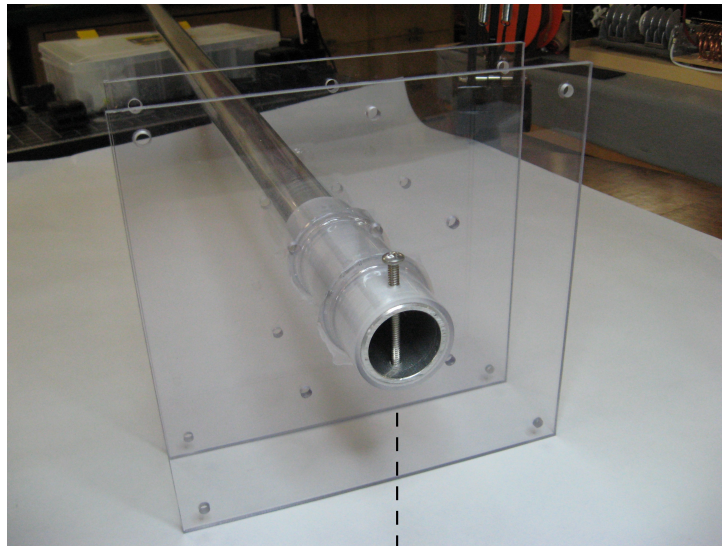


**This completes the Driven Element Assembly.
Carefully move the assembly to a safe location.**

Director Element Assembly

- ❑ Locate the remaining End Plate and Hub Assembly and, in similar fashion to the driven element, attach the 4 remaining I Beam Assemblies to form the director wire support X. Refer to the assembly pictures for the driven element support X.
- ❑ In similar fashion to the driven element – route the remaining wires around the director support X and connect them to the End Spacer using hardware and Shorting Bars, as previously illustrated.

Assure that the two mounting holes in the cylindrical tube of the End Plate and Hub Assembly point at the end spacer.

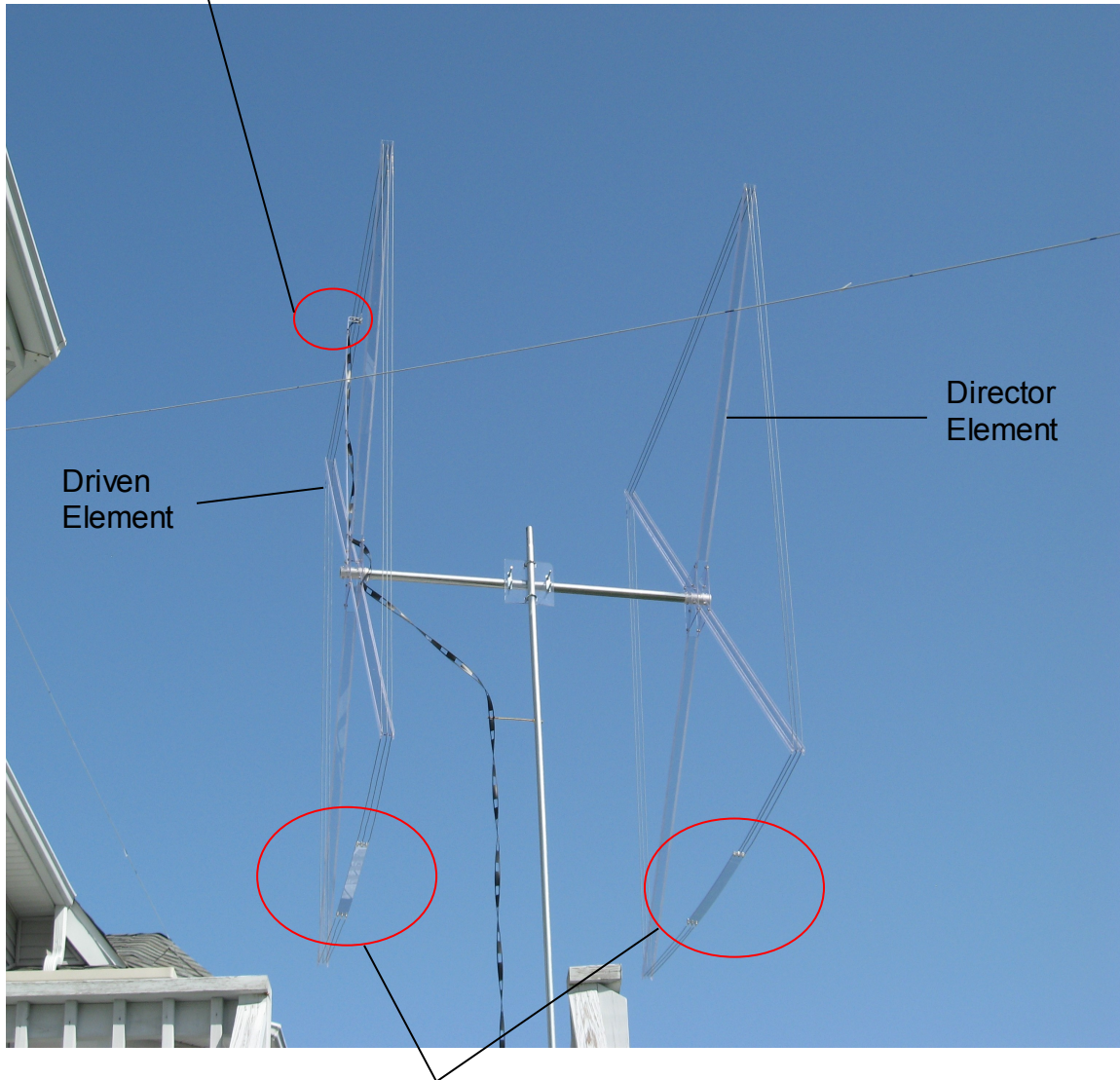


Mounting Holes aligned and pointing downward toward the End Spacer Assembly

- ❑ Ensure all 6 fasteners on the Element End Spacer are secure, then add and tighten a 10-24 SS Anti-Vibration Nut over each of 6 Hex Nut w/tooth washer on the Element End Spacer.
- ❑ This completes the Director Element Assembly. Carefully move the assembly to a safe location.

Carefully Note the Orientation of the Antenna Components

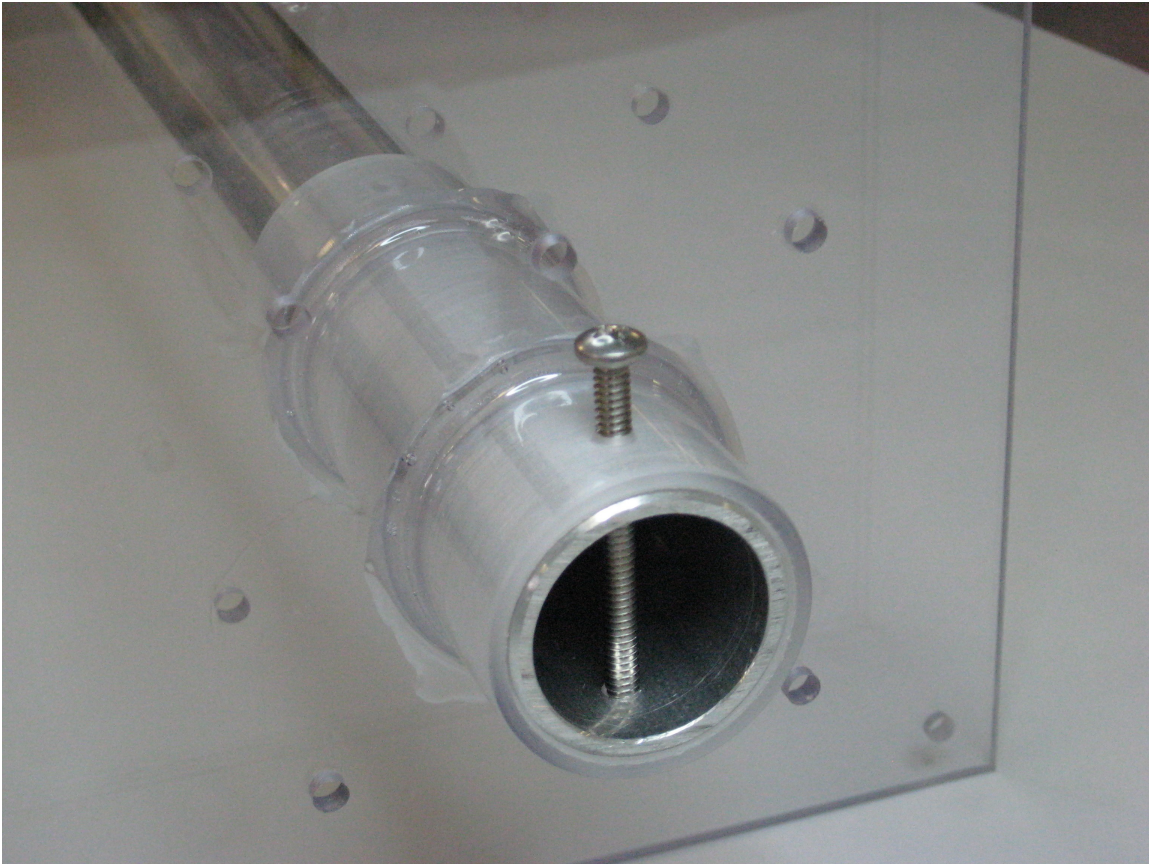
The Feedline Brace is positioned at the top of the antenna and pointing toward the Director Element.



End Spacers are positioned at the bottom of the antenna

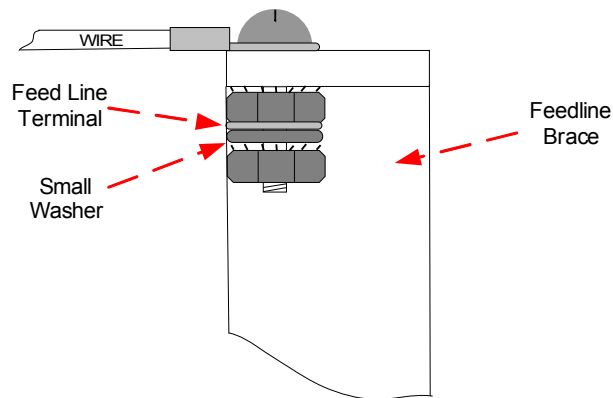
Final Assembly

- ❑ Locate the Boom and 4, 2" X 10-24 SS Pan Head, Phillips Machine Screws as well as 4, #10 nuts.
- ❑ Insert one end of the boom into the Driven Element - End Plate and Hub Assembly and secure it with 2 of the above screws and nuts.



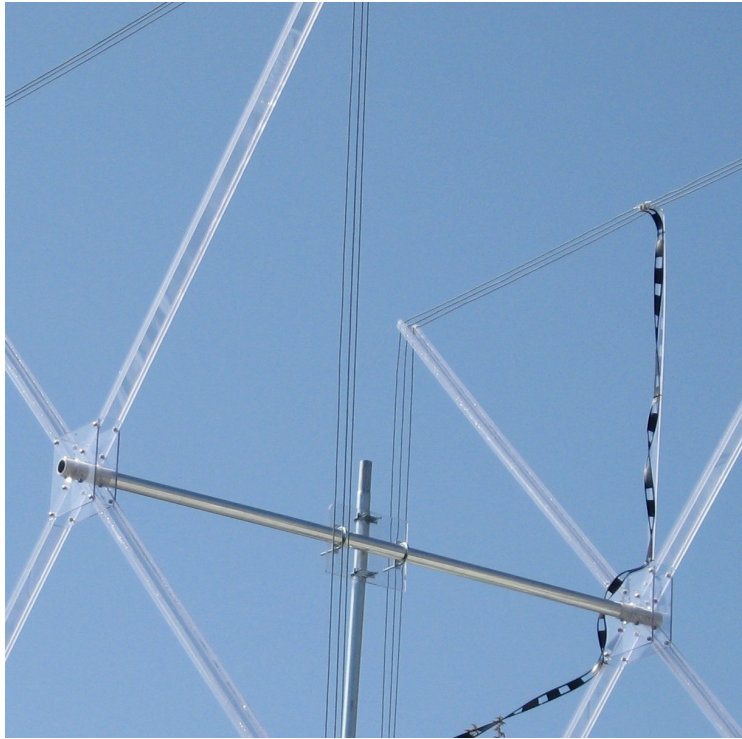
- ❑ In similar fashion, insert the other end of the boom into the Director Element – End Plate and Hub Assembly and secure it with 2 of the above screws and nuts.

- ❑ Assure that the End Spacer for the Director element is on the same side of the boom as the End Spacer for the Driven element. Both End Spacers will be positioned at the bottom of the antenna. The Feed-line Brace on the Driven element will point up when the antenna is installed.
- ❑ The Light Beam Plus Antenna series are balanced antennas. Normally, it is best to use balanced feed-line. Unbalanced coaxial feed-line may be used in conjunction with a 1:1 Balun installed between the antenna and the coax.
- ❑ The impedance of the antenna is near 50 ohms. When using a balanced feed-line, measure the length of the feed-line as an even multiple of $\frac{1}{4}$ wavelength ($\frac{2}{4}$, $\frac{4}{4}$, $\frac{6}{4}$, etc.) of the antenna center frequency. The antenna impedance of near 50 ohms will thereby be present at the far end of the balanced feed-line.
- ❑ Connect each side of a balanced feed line to the two feed point screws in the Feed-line Brace as shown below. The balanced feed-line is behind the washer in this view.



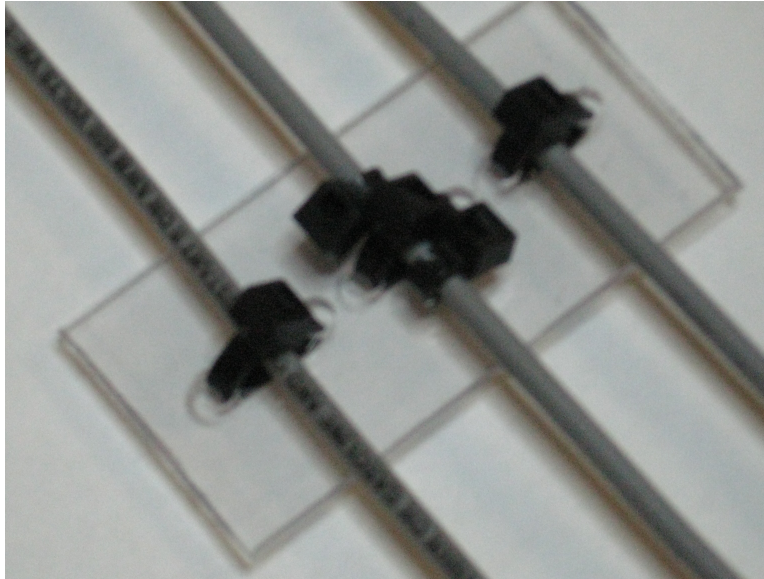
Driven Element & Feedline
Connection – Side View

- The Ladder Line should also be wire tied to the hole in the Driven Element End Plate and Hub assembly and supported with stand off type feed line supports to keep it away from the boom and antenna mast. Twist the Ladder Line so that there is about 1 twist per foot of Ladder Line.

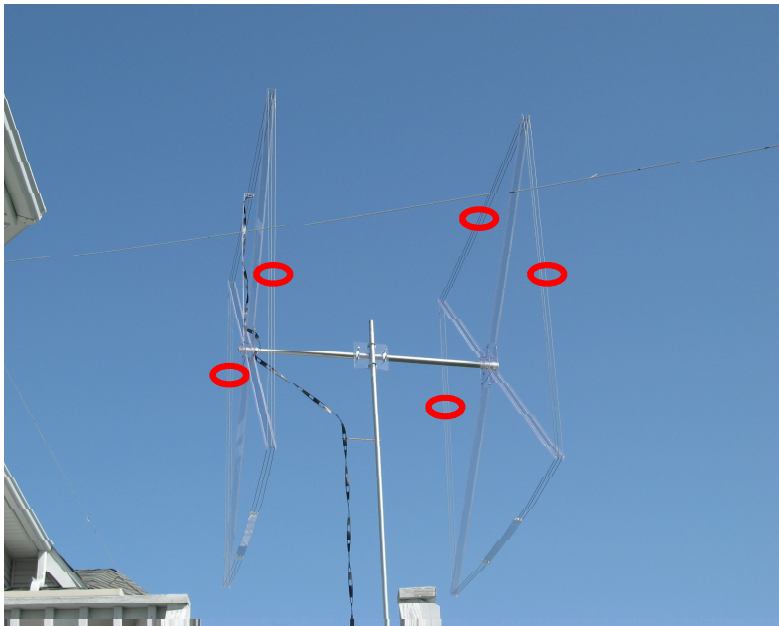


- Attach your boom to mast support to the center of the boom being careful to align the plate so that the Feed Line Brace is vertical and at the top of the antenna.

- ☐ Using the cable ties provided, secure the Wire Spacer Plate to the 3 wires of each antenna element at the locations indicated.



- ☐ Secure the Wire Spacer Plates at each of the 5 locations indicated. Position at the mid-point of the side.



- Your Light-Beam antenna assembly is now complete and the antenna is ready to mount on a mast.



- The most flexible method of feeding the antenna is to use a balanced antenna tuner between the Ladder Line and 50 ohm coaxial line. Other feed methods are possible - for example: a 1:1 balun at the end of a $\frac{1}{2}$ wavelength Ladder Line feed line. These options are discussed in the Light-Beam antenna feeding and matching document that can be found on our web site at www.lightbeamantenna.com.

