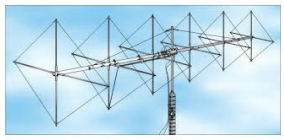
SIGNAL ENGINEERING
Lightning
6 CB
Antennas



SIGNAL ENGINEERING Lightning 6 CB Antennas Instruction Manual

Contents

SIGNAL ENGINEERING

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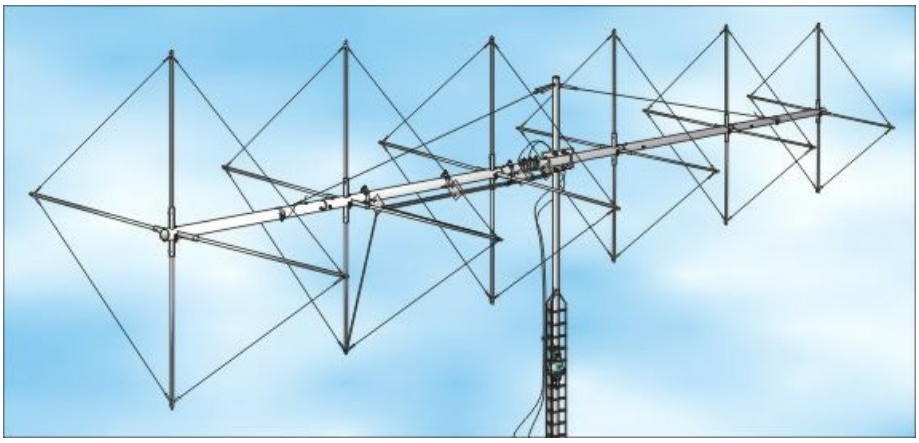


FAQs

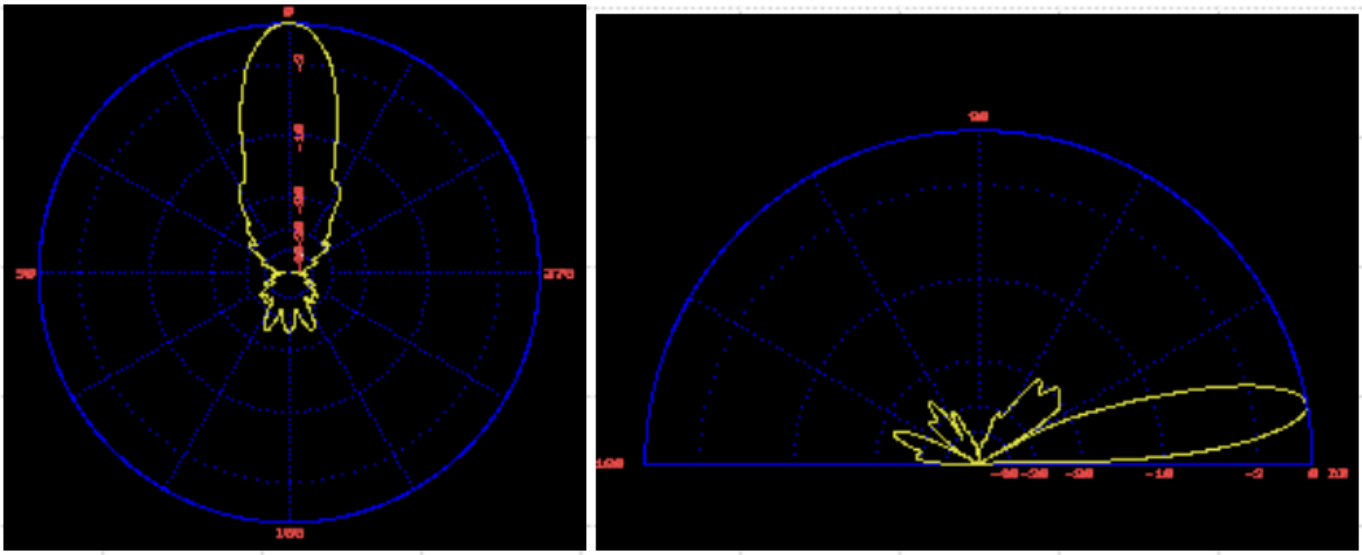
- **Q: How do I change the batteries?**

- A: To change the batteries, locate the battery compartment at the back of the product, remove the old batteries, and insert new ones following the polarity markings.

- **Q: What should I do if the product malfunctions?**
  - A: If you encounter any issues with the product, refer to the troubleshooting section in the user manual. If problems persist, contact customer support for assistance.

Lightning 6 Specifications

Mechanical	
Boom	30 ft. x 2 in. Diameter Aluminum
Spreader Brackets	6061 Heavy Wall Aluminum
Spreaders	Rugged Fiberglass, 13'7" Longest Spreader Length
Elements	Enamel Protected Copper Wire
Fasteners	Plated For Corrosion Resistance
Wind Area	7.4 Sq. Ft.
Turning Radius	16'5"
Wind Survival	100 Mph
Weight	37 Lbs.
Frequency Range	26.965Mhz - 28.870Mhz
Electrical	10/11 Meter Models Available



Lightning 6

The Lightning 6 is a 6-element directional base station antenna. The Lightning 6 takes all of the benefits of Signal Engineering's full wave design – and takes performance figures to the maximum with six elements on a wide-spaced design! If you desire the performance of our Lightning 6 but space or budget is a problem now, check out the Lightning 4+ – our 4-element beam that you can easily upgrade to 6 elements (making it a Lightning 6) whenever the time is right with our upgrade kit! The Lightning 6 is an optimized directional quad antenna incorporating all of the most desirable features for superior two-way communications. Six heavy copper wire radiating elements are precisely spaced and mounted on a rugged aluminum and fiberglass frame, forming a high-gain parasitic antenna. Exclusive SFS (Signal Feed System, patented) matching system gives maximum directional performance and dual polarity to allow switching between close (local) and long haul signal paths (DX).

ASSEMBLY INSTRUCTIONS

LIGHTNING 6

WARNING: INSTALLATION OF THIS PRODUCT NEAR POWER LINES IS DANGEROUS. INSTALLATION DIRE HONS.

1. The boom of the anterna consists of five 2″‘ diam. sections and four 1 7/8″ diam. Coupling sections. These parts are identified in the drawings below.

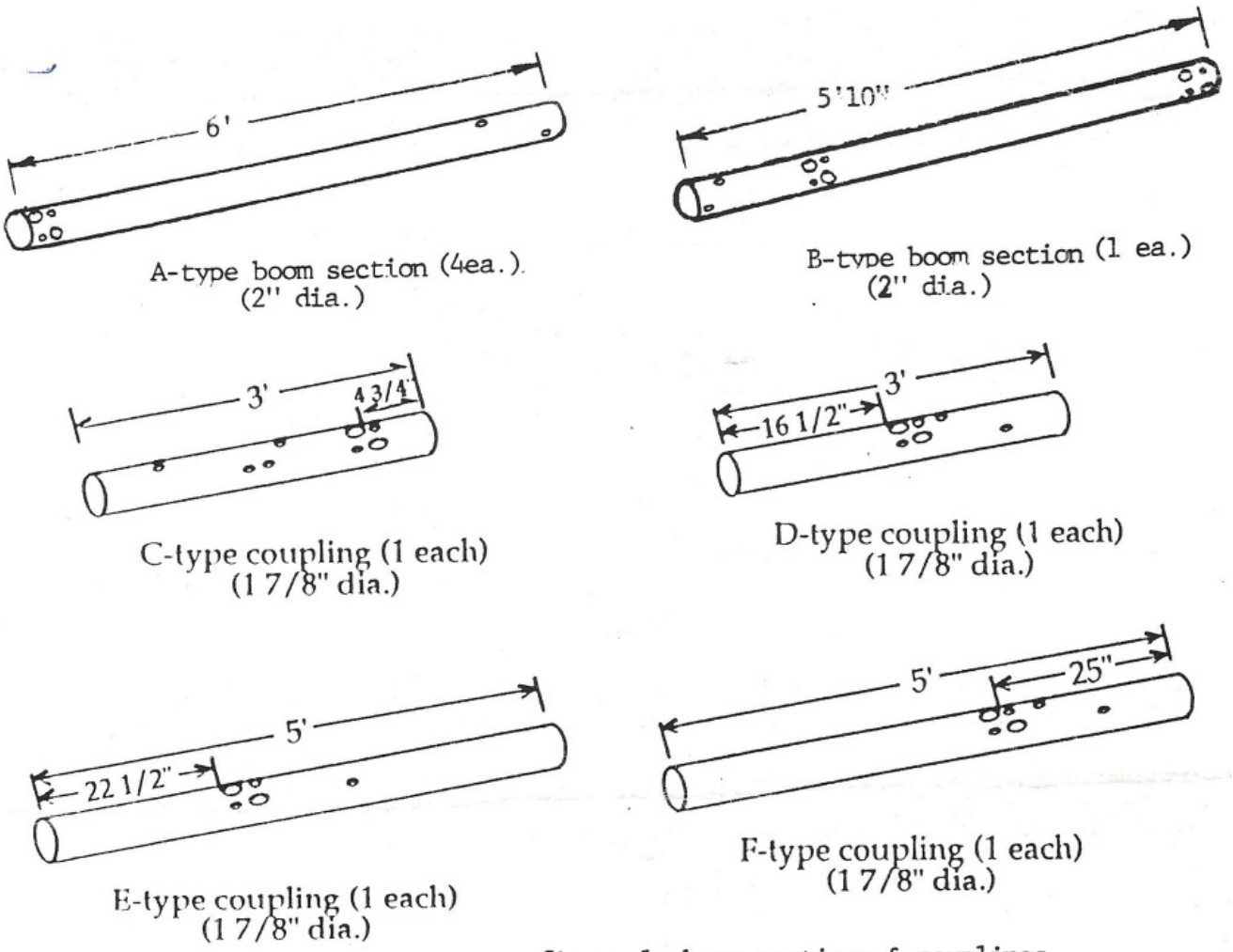


figure 1- boom sections & couplings

- The boom is assembled by first putting together 5 sub-assemblies, then joining these to form the complete structure which is 30′ long.

2. Install 2 of the 1/2″‘ dia X 18″ long rod support brackets in one end of an A-type boom section. Refer to figures 2a & 2b. Secure in the boom section with 10-32 X 2 1/2″‘ bolts, nuts, and lockwashers.

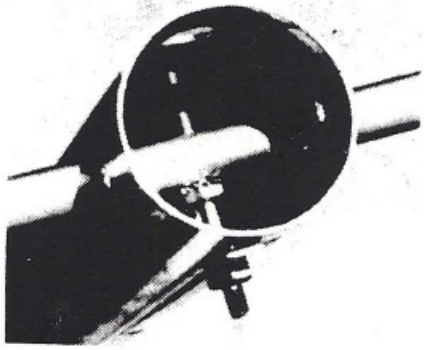


figure 2a

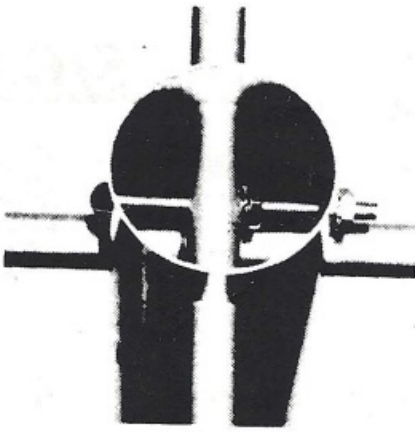


figure 2b

3. Install the E-type coupling (identified from fig.) in the appropriate end of the B-type boom section, as shown in fig.3. Insert 2 of the 1/2″‘ dia rod support brackets through both the boom and coupling sections after aligning the 1/2″‘ holes. Again bolt the rod support brackets in place with 10-32 X 2 1/2″‘ bolts. Note: You will not be able to install nuts and lockwashers inside the boom.

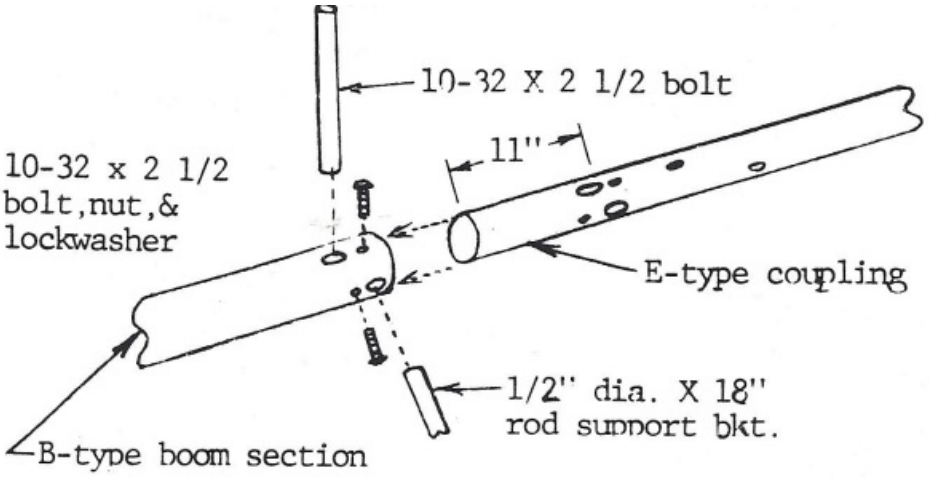


figure 3

- Install the “C” type coupling in the other end of the “B” type boom section. Insert 2 of the 1/2‴ diam. Rod support brackets through both the boom and coupling sections. (Refer to figure 9)

4. Install the F-type coupling at the appropriate end of an A-type boom section. Agair inserts 2-rod support brackets through both the boom section and coupling after aligning the 1/2‴ dia holes. Refer to figure.

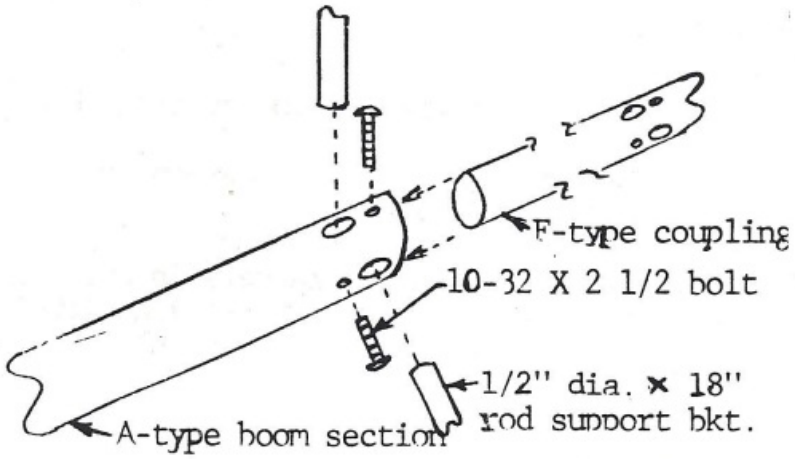


figure 4

- Install the D-type coupling at the appropriate end of an A-type boom section. Install 2 rod support brackets after aligning the 1/2‴ holes. Refer to Figure 4a.

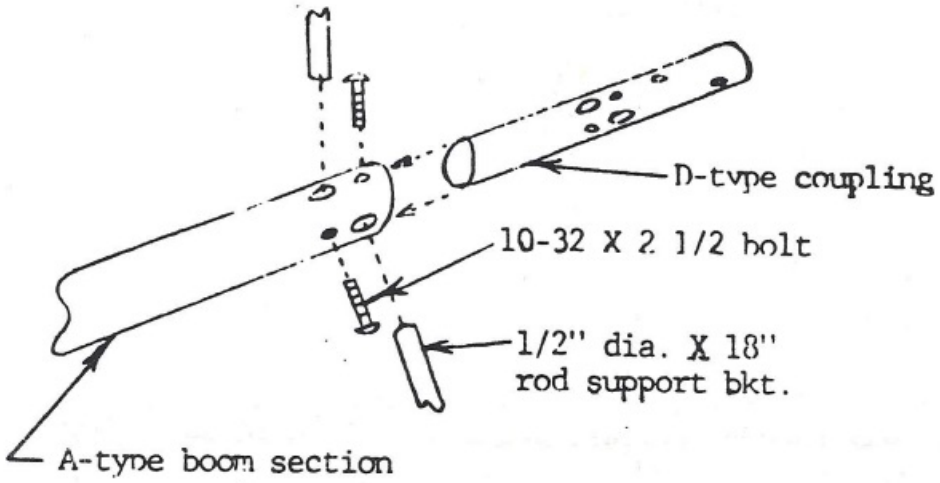


figure 4a

5. Install 2-rod support brackets in the last A-type boom section, as in step 2.

6. There are 6 bundles of fiberglass rods. Select the 4 longest rods, and insert them in the 1/2‴ dia rod support brackets in the A-type boom section from step 2. (The drilled end of the rods must be away from the boom). Carefully unroll the REFLECTOR element wire. This wire is identified by WHITE shrink tubing, marking the points of attachment to the fiberglass rods. Attach the wire to the rods using 4 wire clamps and 4-40 hardware, including 4-40 X 3/4 bolts, nuts, & lockwashers. Refer to figures 5 & 6.

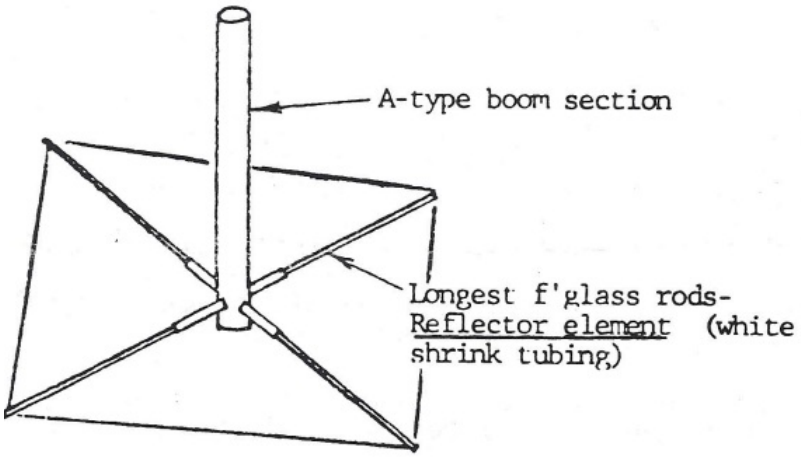


figure 5

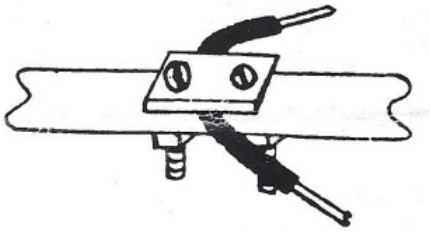


figure 6

- slide each ot the fiberglass rods out equally (approximately). Secure two opposing rods (180 degrees apart) in place in the rod support brackets by installing a #8 X 1/4 self-tapping screw in the hole in the bracket. The screw should be started at an angle, and screwed in at an angle to capture the fiberglass. Refer to figure 7.

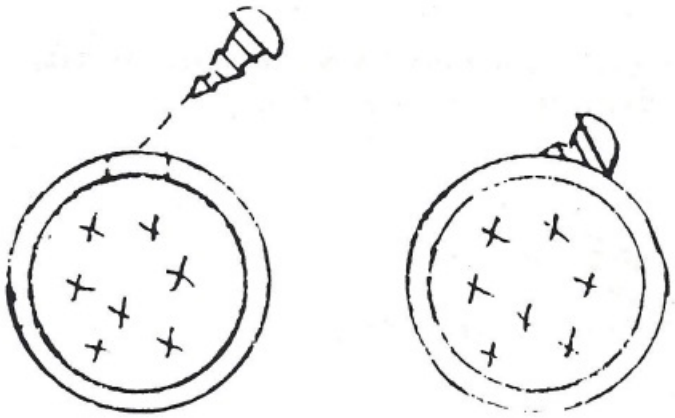


figure 7

- Now slide the other two fiberglass rods out to tension the element wire, and lock the rods in place with self-tapping screws. The rods should be pushed out until they are just ready to low but are not bowed. This will ensure adequate tension in the wire and correct element spacing.

7. Select the 4 next-longest fiberglass rods, and the B-type boom section (with E-type Insert the rods approximately l’ from the end of the boom. Carefully unroll the driven element wire. This wire is in two pieces and is identified by blue shrink tubing marking two attachment points to the fiberglass rods. Attach this wire to the fiberglass rods using two wire clamps and two 4-40 X 3/4 bolts(use a single bolt in an outermost hole at feedpoint A &feedpointB). Refer to Figure 8.
    - Note: Make certain that the wires leave the bolts at feed point A & feed point B at a 45-degree angle as shown. This is best accomplished by not tightening these two nuts until the fiberglass rods have been pushed out to tension the site minute to Eden pleased eaten due con flexure in the wind. It is a little difficult to judge the tension in the driven element wire, as it is not on a flat surface as was the reflector

wire during tensioning. Therefore it is best to make a trial tensioning and pick up the boom section so the element is vertical, and note the tension/bowing. Again the rods must be pushed out to the point where they are just ready to bow.

8. Insert 4 of the remaining fiberglass rods (the remaining rods are all the same length) in the rod support brackets at the other end of the B-type boom section. Carefully unroll the Ist director element wire, identified by red shrink tubing. Attach this wire to the fiberglass rods at the points marked by shrink tubing as before. Tension the wire as before.
9. Insert 4 fiberglass rods into each of the remaining boom sections. Attach one of the director wires identified by yellow shrink tubing to each set of rods; and tension as before. All of the wires with yellow shrink tubing are the same length. At this p, elements are assembled and tensioned on the 5 bucm sections. You are sections now ready to join the boom sections together. Refer to Figure 9 for the proper sequence. Although the 2nd, 3rd, and 4th directors are the same length, the boom sections they are mounted on must be joined together as shown in Figure 9.

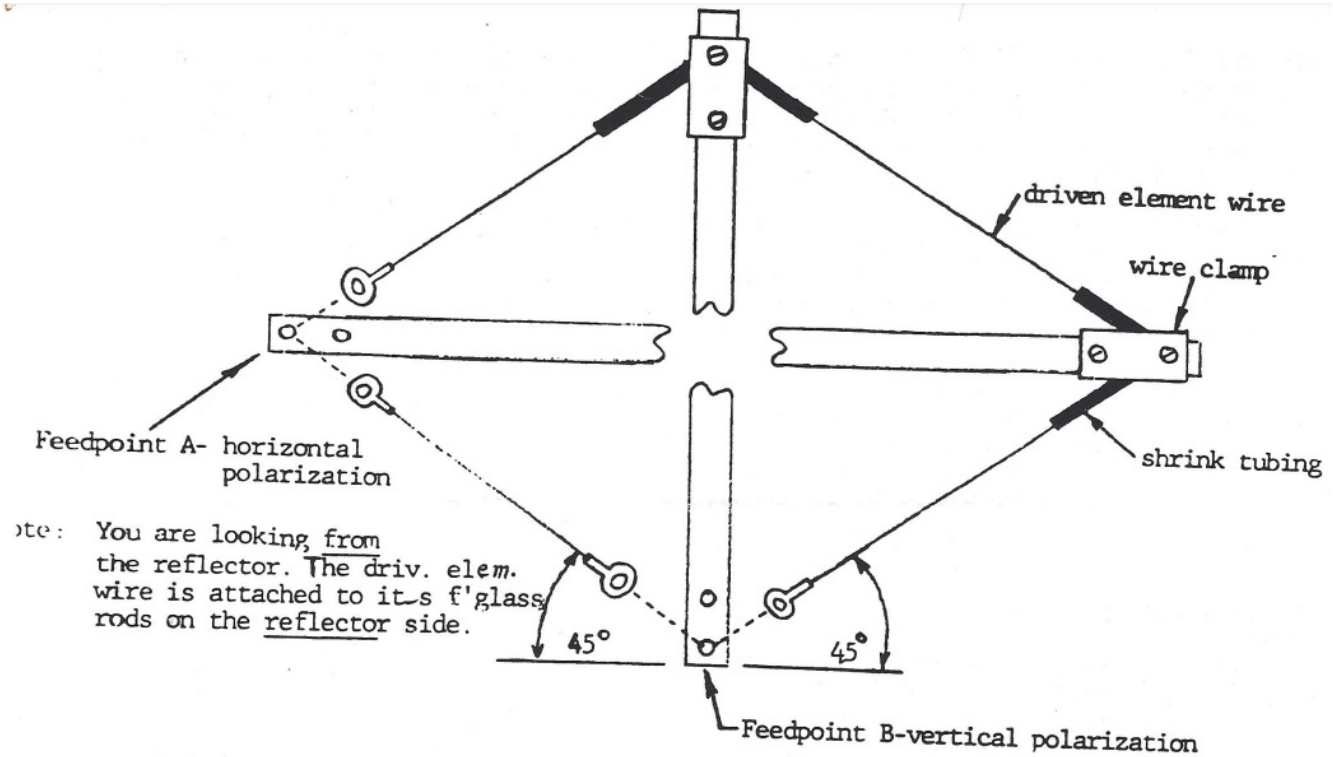


figure 8- driven element assembly

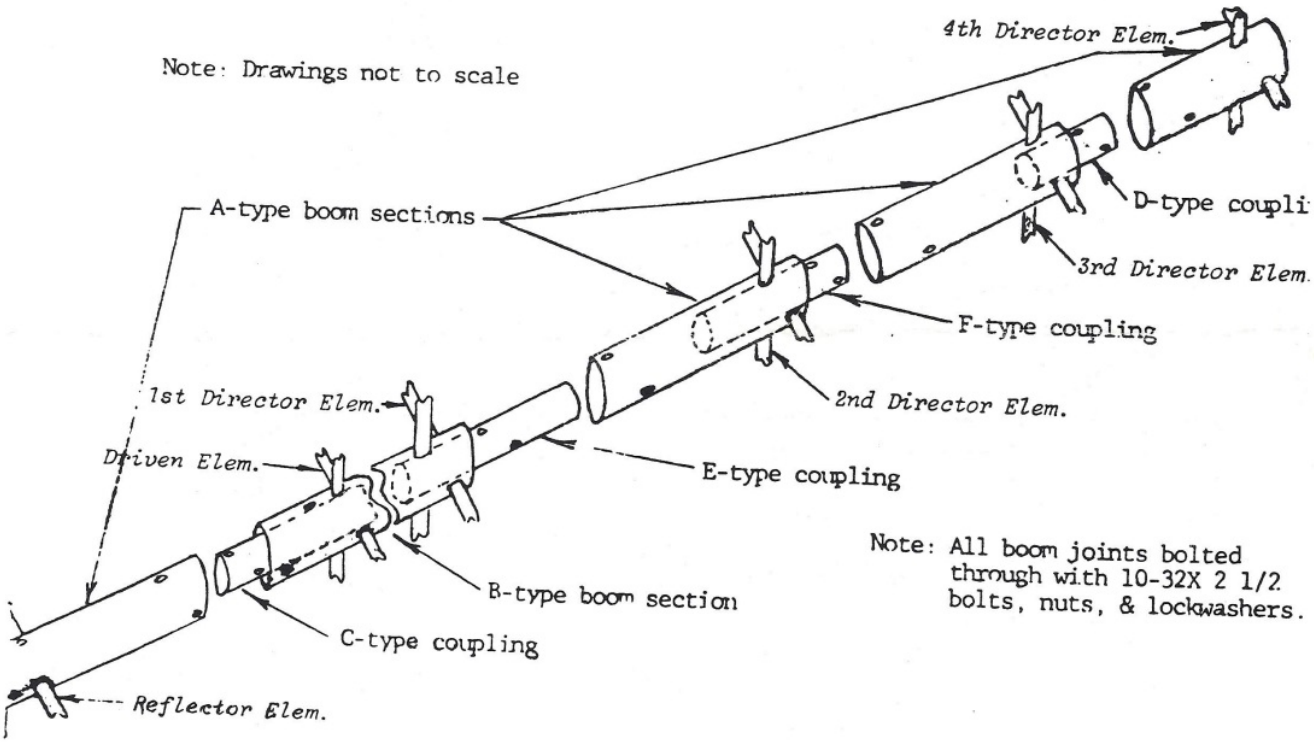


figure 9

10. The final steps in assembling the boom involve the preparation of your mast section as shown in fig. 10 (this is the last section that goes into the rotor), and the installation of this mast along with the boom-to-mast plate on the boom. Figure 11 the location of guy points on the boom and the height of the short mast section above the boom. There will be a bit of sag in the boom when it is assembled, and the turnbuckles are used to eliminate this. Simply support the boom near the center and tighten the turnbuckles until the boom sag is eliminated. After the turnbuckles have been adjusted, it is a good idea to tape them over with electrical tape to prevent them from loosening•

    - Note: When attaching the short mast and plate to the boom, align the part of the mast that will be going to the rotor with one of the fiberglass rods havifeedfeed point"‘ or “feed point B” (from fig.8) on it. This feed point which will be down and parallel to the tower, will be used to connect the feed stub for vertical polarization.

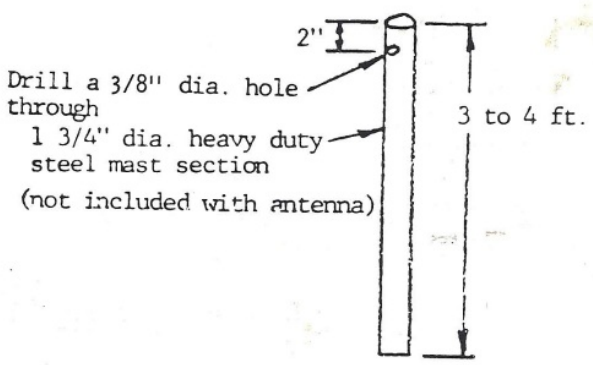


figure 10

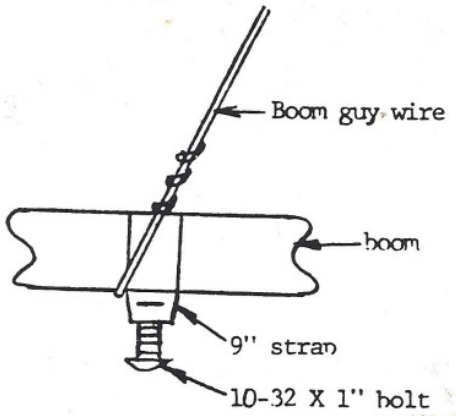


figure 11a

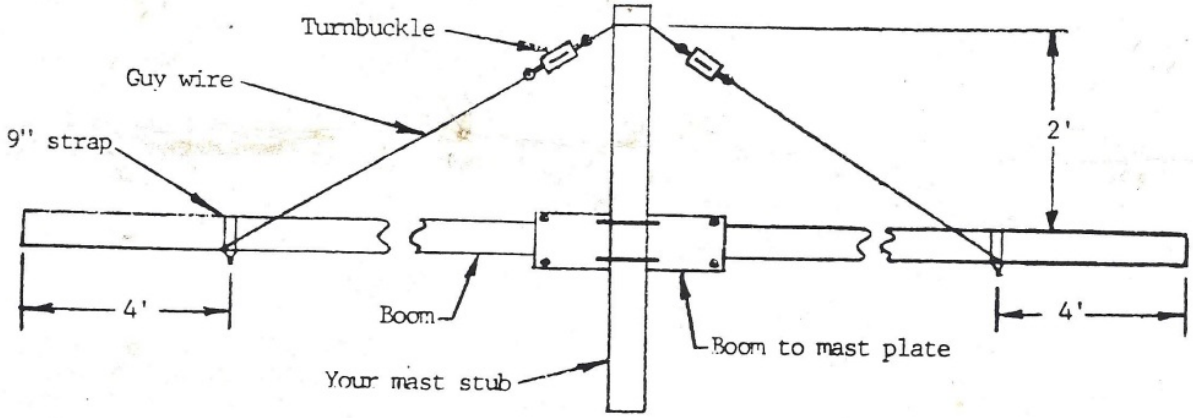
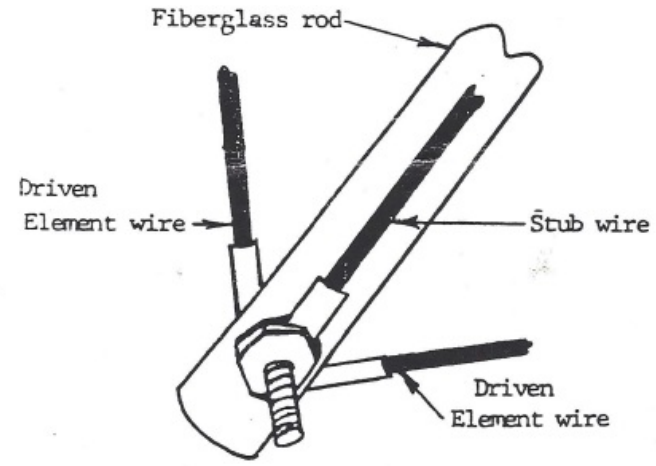


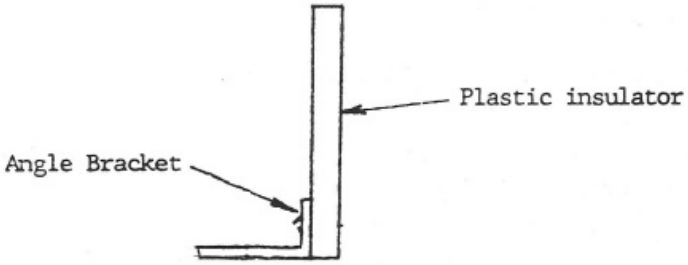
Figure 11b

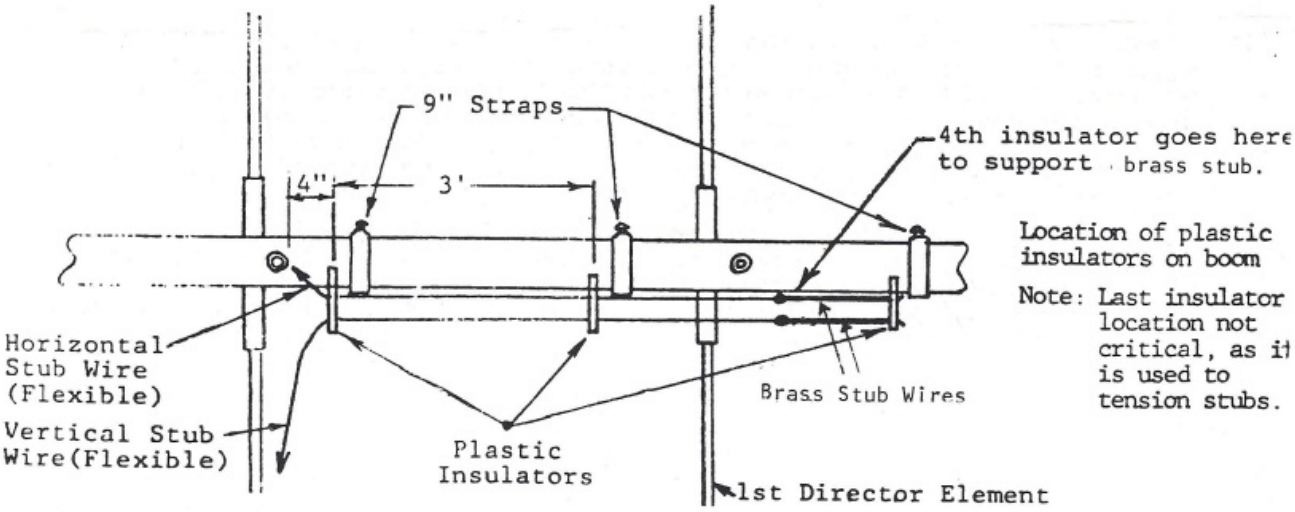
11. INSTALLATION OF THE SFSE MATCHING SYSTEM to the fiberglass rod, and then along the boom toward the boom to the mast plate. The stub wires are supported by 2″ plastic insulators where they run along the boom, and they such that both stub wires can be fed through each insulator. Refer to the figures below for details of the stub wire installation andconnectionn to the driven element.



Stub wire attachment to driven element

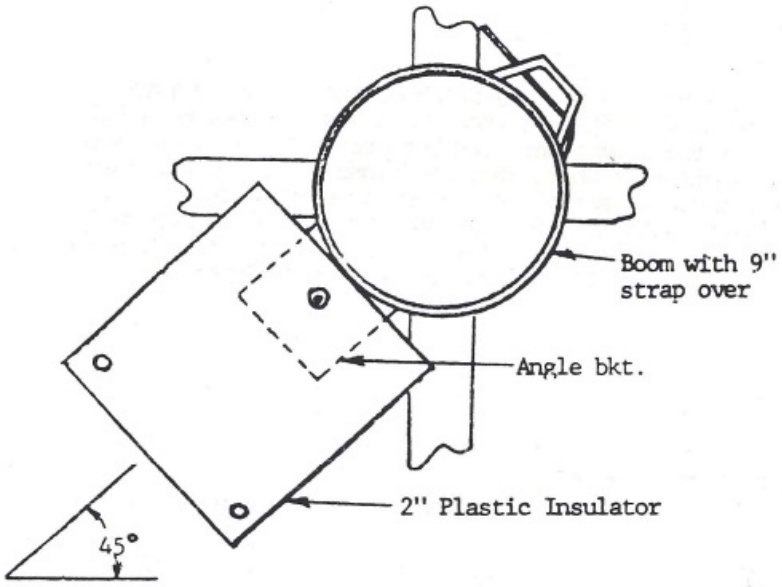
NOTE: Do not tape the flexible stub wires to any metal on the boom. They may be taped to the fiberglass rods no further than 3 ft. up.



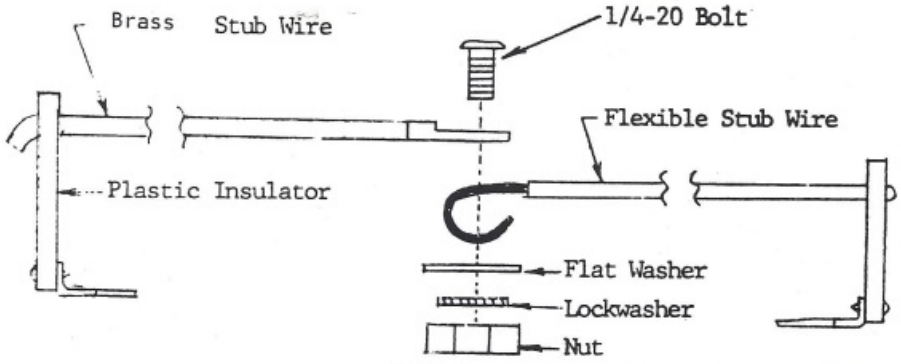


Location of plastic insulators on boom

Note: Last insulator location not critical, as it is used to tension stubs.



Mounting of plastic insulators to boom



Joining the Flexible and Brass Stub Wires

12. Prepare your two 50-ohm coax cables as shown in fig. 12 below. The crimp terminals are simply crimped to the coax center conductor, however, soldering is recommended in addition to crimping. One coax line is attached to each stub wire as shown in Fig. 13a,b below. A good starting point for the attachment of the coax to the stub is about 2″‘ in from the insulator. The coax center conductor goes to the bare stub wire, and the braid simply is clamped directly to the boom, directly opposite the center conductor point of attachment, using a 9″ strap.
    - Note: Make certain to seal the coax against moisture where the braid stops, as shown in fig. l. A silicone-type sealer works fine, as long as the coax is not moved around too much after the sealer is applied. It is therefore best to apply the sealer after any matching adjustments (described in nthe ext step) are performed.

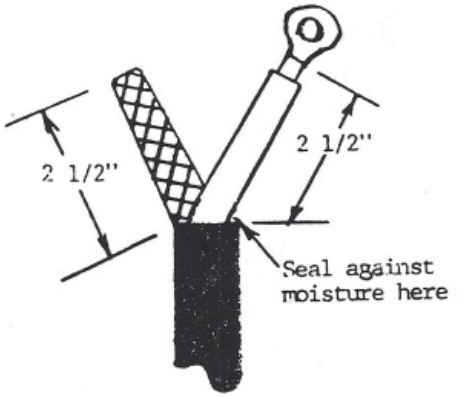


figure 12

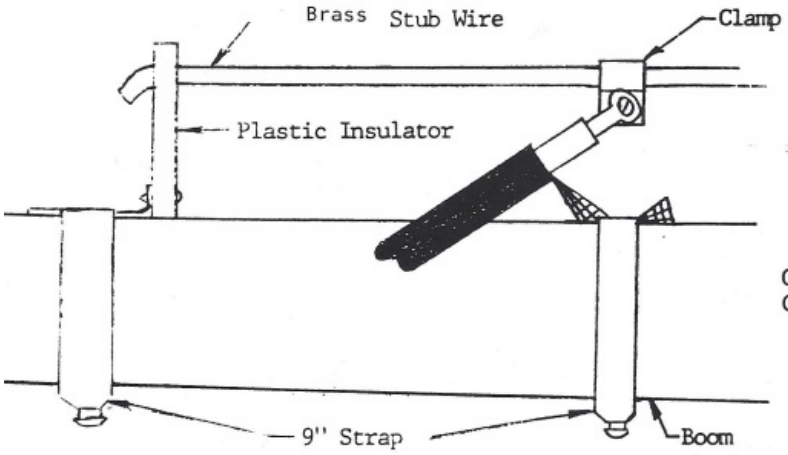


Figure 13a- Coax attachment to Brass Stub Wire

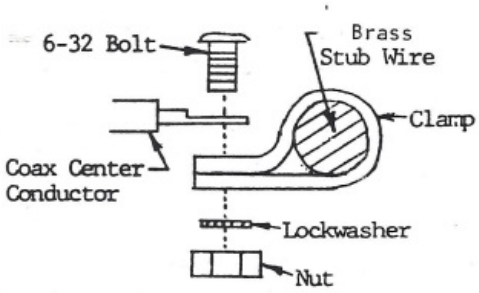
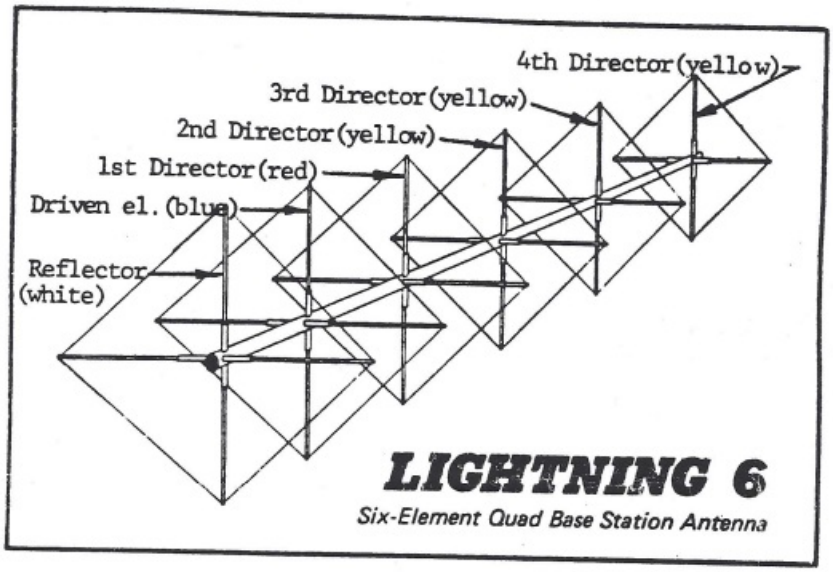
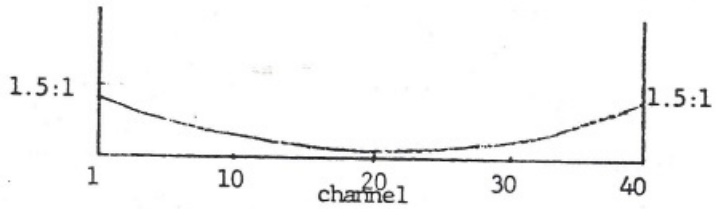


Figure 13b- Center Conductor attachment to Stub Wire

13. **SWR ADJUSTMENT**
    - IF SWR TDO HIGH ON CHANNEL 1- Move the coax attachment point toward the end of the stub.
    - IF SWR TOO HIGH ON CHANNEL. 40- Move the coax attachment point away from the end of the stub. Make certain the connections to the stub and boom are tight. Tape the coax cable to the boom where it leads away from the stub. SWR should be adjusted with the final length of the coax feeding the antenna. The typical sex is shown in the figure below.
        - **Note**: The horizontal and vertical feedlines may attach to the stubs at different points.





Typical SWR - Lightning 6

A two-position switch may be used to select between horizontal and vertical polarization at the operating position. For optimum results, follow the tips below;

- Break up all guy wires in the vicinity of the antenna with egg"‘ insulators spaced at 10-13’ intervals.
- Locate Lightning 6 as far as possible from other antennas and metal objects.

WARNING: INSTALLATION OF THIS PRODUCT NEAR POWER LINES IS DANGEROUS. YOUYOUP, SAFETY FOLLOW THE INSTALLATION DIRECTIONS.

1. WHEN PUTTING UP OR TAKING DOWN THE ANTENNA, CARE MUST BE TAKEN TO ENSURE THAT NO PART OF THE ANTENNA OR SUPPORTING STRUCTURE COMES INTO CONTACT WITH ELECTRIC POWER LINES. IF CONTACT IS MADE WHILE A PERSON IS HOLDING THE ANTENNA, COAX, OR SUPPORTING STRUCTURE, ELECTROCUTION CAN RESULT.
2. A COMMUNICATIONS TOWER IS THE RECOMMENDED SUPPORTING STRUCTURE FOR THIS ANTENNA. THE TOWER SHOULD BE RATED TO CARRY BOTH THE WEIGHT OF THE ANTENNA, ROTOR, AND MAST AS WELL THE COMBINED WIND LOAD. TV-TYPE TELESCOPING MASTS AND TUBULAR, NON-TELESCOPING MASTS ARE NOT STRONG ENOUGH TO USE WITH THIS ANTENNA, AND PIPE IS NOT RECOMMENDED AS IT IS TOO DIFFICULT TO RAISE WITH THE COMBINED WEIGHT OF ANTENNA, ROTOR, ETC.
3. CARF MUST BE TAKEN TO LOCATE THE ANTENNA INSTALLATION SUCH THAT IF THE ENTIRE ASSEMBLY WERE TO FALL DOWN, NO PART WOULD CONTACT AN ELECTRIC. POWER LINE. A GOOD RULE TO FOLLOW IS TO LOCATE THE TOWEP. RASE TWICE AS FAR FROM THE NEAREST. POWER LINE AS THE DISTANCE FROM THE GROUND TO THE TOP OF THE HIGHEST PART OF THE ANTENNA,
4. IF THE TOWER YOU ARE GOING TO USE TO SUPPORT THE ANTENNA DOES NOT HAVE A WARNING

LABEL ON IT, YOU ARE REQUIRED TO ATTACH THE ONE PROVIDED WITH THE ANTENNA TO THE TOWER.

PARTS LIST

PARTS LIST- LIGHINING 6 SIX ELEMENT QUAD

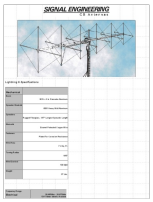
PARTS LIST- LIGHINING 6 SIX ELEMENT QUAD

DESCRIPTION	QUANTITY	PART NO.
Support bracket, fiberglass rod	12	6EL70
A-type boom section	4	6EL71
B-type boom section	1	6EL72
C-type boom coupling	1	6EL73
D-type boom coupling	1	6EL74
E-type boom coupling	1	6EL75
F-type boom coupling	1	6EL76
Reflector rod(fiberglass)	4	6EL77
Driven element rod(fiberglass)	4	6EL78
Director rod(fiberglass)	16	6EL79
Reflector element wire	1	6EL80
Driven element wire	1	6EL81
First director element wire	1	6EL82
2nd, 3rd, & 4th director elem. wires	3	6EL83
Boom to mast plate	1	6EL84
Matching stub wire (flexible)	2	6EL85
Plastic insulator	4	6EL86
Wire clamps	22	6EL87
1/4-20 U-bolts	4	
4-40 X 3/4 machine screw	46	
4-40 nut & lockwasher	48	
10-32 X 2 1/2 machine screw	22	
10-32 nut & lockwasher	26	
10-32 X 1 machine screw	5	
9" mounting strap	8	
#8 X 1/4 self tapping screw	24	
1/4-20 X 3/8 machine screw	2	
1/4-20 nut	10	
1/4-20 split lockwasher	8	
1/4-20 external tooth lockwasher	2	
1/4 flat washer	2	
Turnbuckle	2	
Terminal Lug, #6	2	
Clamp, 1/8	2	
6-32x 3/8 Machine Screw	2	
6-32 Nut & Lockwasher	2	
Brass Stub Wire	2	
Guy Wire	25 FT.	

CONTACT INFORMATION

- Click here to compare SIGNAL ENGINEERING Beams Vs. Conventional Beams
- SIGNAL ENGINEERING
- 3091 Lawrence Expy
- Santa Clara, CA 95051
- Telephone **408-247-2300**
- Toll free Message Center 1-**800-761-9409**
- Email Us: **sigeng@att.net**

Documents / Resources

	**SIGNAL ENGINEERING Lightning 6 CB Antennas** [pdf] Instruction Manual Lightning 6 CB Antennas, Lightning 6, CB Antennas, Antennas

References

- **User Manual**