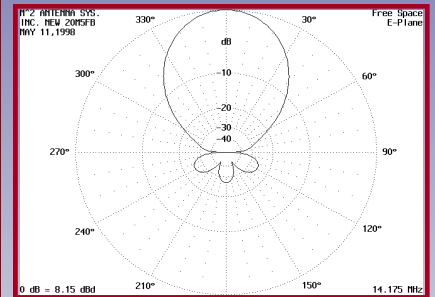
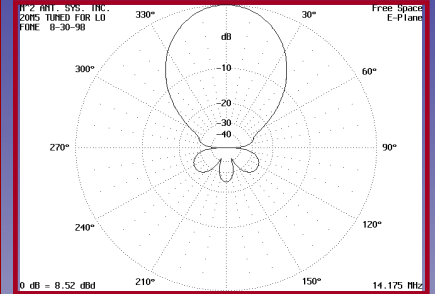
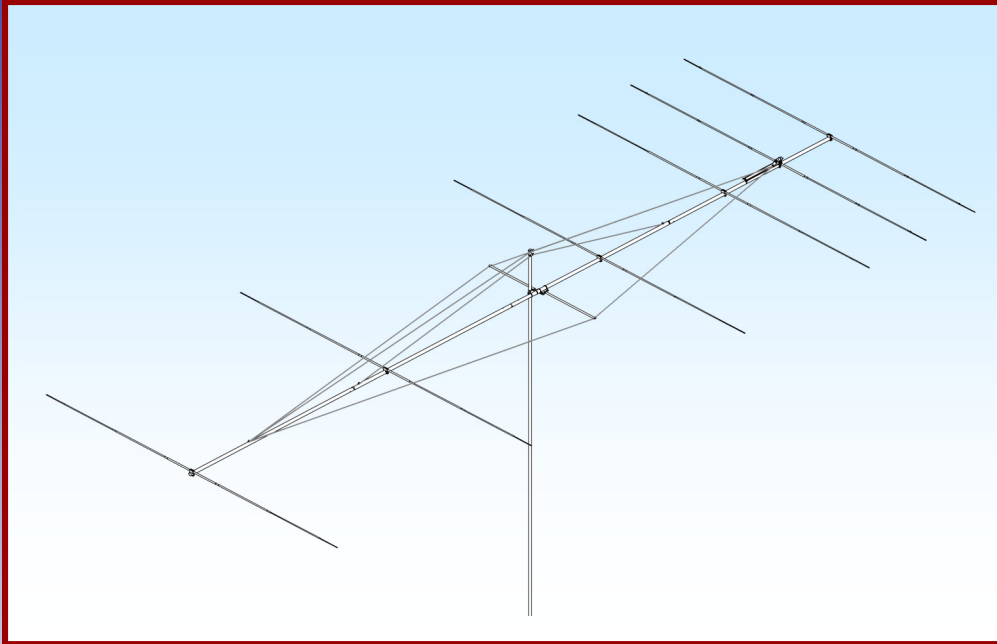




M2 Antenna Systems, Inc.

Model No: 20M6L



SPECIFICATIONS:

Model	20M6L	Power Handling	5 Kw, Higher avl.
Frequency Range	14.0 – 14.350 MHz	Boom Length / Dia	59.25' / 3.0 x .065 Wall
*Gain (Full Band)	11.34 dBi Typical	Element Length / Dia.	27.25' / 1 1/4" – 1/2"
Front to back	24 dB Typical	Turning Radius:	34.5'
Beamwidth	E=45° / H=56°	Stacking Distance	48' - 62'
Feed type	Direct Feed	Mast Size	2" Others avl.
Feed Impedance	50 Ohms Unbalanced	Wind area / Survival	14 sq. ft. / 90 MPH
Maximum VSWR	1.5:1	Weight / Ship Wt.	83 Lbs. / 89 Lbs.
Input Connector	SO-239, Others avl.		

***Subtract 2.14 from dBi for dBd / FS = Free Space**

FEATURES:

The 20M6L (LITE) is BRAND NEW! It features the same on air performance as it's very popular, heavy weight brother, the 20M5, but it is much lighter weight. We listened to our customers and have carefully reduced it's weight significantly while reducing the wind survival rating by only 10 MPH. The 20M5L has the same clean pattern and great gain across the band. It is easier and quicker to assemble as well as easier to install. Stacking a pair will cost less and put less stress on your tower! Mechanically; a pair of machined, 3/8" x 4" aluminum boom-to-element plates and saddles ground each parasitic element and keep elements aligned perfectly for years to come. Elements taper in 1/4" steps from 1-1/4" to the adjustable 1/2" tips. The re-designed 50 foot x 3" dia. boom is a full 1/16 wall. All critical hardware is stainless steel. The 20M5LGS is available through our fine distributors, worldwide. For you 100 mph+ hill topers, we make a **SURVIVOR SERIES** sold factory direct only! See our web site for more details on all our outstanding products.

****We now offer 1:1 baluns in 3 power ranges; 2.5, 5 and 10kW! Be sure to pick you favorite when purchasing the 20M5LGS.****

20M6L ASSEMBLY MANUAL

TOOLS REQUIRED, Phillips screw driver, 11/32" nut driver or socket, 7/16" end wrench, 7/16", 1/2", and 9/16" socket set, measuring tape. We recommend the use a light coat of zinc paste (Penetrox or Noalox) at each joint in the antenna and a dab on the threads of each screw and bolt.

NOTE: THE COMPLETE ASSEMBLY DETAILS ARE ON THE "DIMENSION SHEET". This written section includes mostly tips and suggestions on assembly sequence. Experienced builders may only need the DIMENSION SHEET and Pictures.

Note: Each element is identical except for the EXPOSED length of the 1/2" diameter tips.

1. Assemble the 1", and 3/4" sections first. Hardware is called out on DIMENSION SHEET. The 1/2" tip are in 6 pairs. The tips are secured by a single custom compression clamp one each 3/4" element section. Install all tip sections (See compression clamp and tip assembly detail) sheet for more detailed information. Use a felt pen to identify each element set by position as it is completed.
2. Assemble 6 sets of ELEMENT CLAMP PLATE pairs using 1/4-20 x 2" bolts and locknuts, finger tight. Next, slide a 1-1/4" x 60" section into 5 CLAMP PLATE sets. Rotate each section so the tip holes will be vertical when the element is mounted on the boom. Center each section (28 inches sticking out each side) and tighten the clamp plate bolts evenly, so the sides of the two plates stay parallel. Repeat for all four parasitic element center sections (Refer to Reflector and Element detail pictures). Hold on further assembly until center of each element is mounted on the boom in the correct location (see step 6 & 7).
3. DRIVEN ELEMENT: Remove the top TWO bolts in the last clamp plate assembly. Locate the angle bracket for Balun mounting and mount it to the clamp plate assembly with the top of the bracket sticking out away from the clamp plate. Then re-insert the bolts and locknuts loosely. Now, insert the 1" x 24 fiberglass rod into the clamp set and center so that 10 inches sticks out each side. Rotate the rod so the bolt holes are vertical and tighten the clamp bolts. Slip on the POLY DISCS (Refer to Reflector and Element detail pictures).

TIP: sometimes these are tight. Be sure the inner edges of the Poly Discs are chamfered and the ends of the Fiberglass Rod are tapered slightly. Place the disc over the end of the rod and drive on with a mallet.

Then slip the 1-1/8 X 9-3/4" sleeves and the 1-1/4" x 30" butt sections over the fiberglass rod, align the holes, and insert the 1/4-20 x 2 1/2" bolts up from the bottom add the 3/8 clamp block pairs to bolt. Add a single plain nut to each bolt and tighten securely forming a studs for the balun leads. Add the lock nuts, finger tight at this time.

4. See BOOM splice detail sheet. The boom is symmetrical, so inner and outer sections are identical. Check the machined surfaces of the 144" splice section for deep scratches or dents. File off any rough spots. Lubricate splice lightly with oil and slide halfway into one of the swaged inner boom sections. Add two 1/4-20 x 3-1/2" bolts, and locknuts but do not tighten. Now slide remaining inner section onto the splice. Add the hardware and **tighten all four bolts**. Add a straight section to each end of the center assembly, align holes and secure with 1/4-20 x 3-1/2" hardware.

5. Orient the eyebolt eyes to the top of the boom. Place the boom on bucks, or equivalent, to get it to a convenient working height. Refer to the DIMENSION SHEET and using a tape measure and a marking pen or piece of tape. Mark the ELEMENT LOCATIONS on the boom. START from ONE INCH IN from the rear of the boom.

20M6L ASSEMBLY MANUAL

	Spacing between elements	Running element spacing
REFL	0.0	0.0"
D.E.	41.50	41.50"
D1	41.75	83.25"
D2	166.00	249.25"
D3	242.50	491.75"
D4	214.25"	706.0"

Dimensions reference the center to center spacing between elements.

6. At the REFLECTOR element location, mount a center element assembly on the boom using a SADDLE CLAMP under each ELEMENT CLAMP PLATE (see Dimension sheet and Pictures). Be sure to lube these bolts as they thread into aluminum. Align the element with the EYEBOLTS and tighten bolts.

7. Mount the DRIVEN ELEMENT center assembly. Align with the REFLECTOR and tighten. Continue mounting the other four DIRECTOR center sections.

8. Next, attach the outer element pairs to both ends of the 1-1/4" central element sections and tighten the hardware securely. Double check for correct lengths and positions. Tighten securely.

9. See Driven Element Detail Picture. Install your choice 1:1 balun with a 2-1/2" U-bolt and cradle. Do not over tighten the U-bolt as damage can occur to the balun housing. Route the balun leads to the STUDS formed earlier. Remove the nuts, place the balun lead wire terminals over the studs, reinstall the nuts to the assembly and leave loose for now. Install the main feed line or feed line jumper cable that should include the rotator loop and tape the connector up carefully. Use large cable ties or equivalent to secure the cable to the boom.

FOR THE FOLLOWING STEPS. PLEASE REFER TO BOOM SPLICE, VERTICAL RISER & SIDE GUY DETAIL SHEET.

10. HAIRPIN MATCH ASSEMBLY: Locate the 3-1/2 stainless band clamp and insert a 1-1/4-20 x 2 1/4" bolt through the hole from the inside. Add the 3/8 x 1" spacer and then add the 5" long shorting bar. Secure with a locknut. Using the DIMENSION SHEET, place the clamp around the boom at the proper distance in front of the Driven element. Insert the straight ends of the 3/8" x 44" hairpin tubes into the shorting bar. Then feed the angled end of the tubes between the clamp blocks at the butt of each driven element half. Align the tubes and tighten the clamp halves securely. Insert the 1/4-20 x 1/4" set screws into the ends of the shorting bar, adjust as required to the correct position and tighten the set screws. Tighten the band clamp around the boom to insure a good ground. Attach feedline section at this time, if possible. Use the large cable ties to secure the balun and the main feedline to the boom up to near the boom to mast plate position.

11. Determine the BALANCE POINT of the assembled antenna (approximately 330" from the reflector). Mount the 8" x 8" BOOM TO MAST PLATE there using two 3 inch U-bolts, stainless steel lock washers and nuts. Add two of the four HEAVY DUTY 2 inch mast U-bolts and install a short (6' or so) temporary mast in order to pre-rig the boom support cables. Use the lighter 2 inch U-bolt to attach one of the turnbuckle / plate assemblies to the temporary mast. Then slide it right down to the boom to mast plate. Extend the turnbuckle eyebolts so just one thread shows inside the body.

12. If you purchased the optional inner over head guy kit. Support boom so that it is straight or droops just slightly at the ends. Attach one end of the 32' 5/16" DACRON CORD to an inner eyebolt using 3 half hitches. Pull them as tight as possible and tape the leftover end back to the main line using black electrical tape. Tie other end of cord at the other inner eyebolt.

20M6L ASSEMBLY MANUAL

13. Equalize cord length at turnbuckle plate and cut. Put two turns of the rear cord through rear turnbuckle eye, pull tight, and add three TIGHT half-hitches. Repeat for front cord section. Cut any leftover cord at 10". Seal loose ends with heat or flame and tape to main lines. At this point the cord should be stretched tight nearly PARALLEL with the boom. Now raise the turnbuckle plate assembly up the temporary mast until the boom begins to lift at the eyebolts. Pull firmly at the middle of each support lines to help the knots take a good set. If possible leave the lines under tension overnight. Readjust plate height as needed. Final tensioning with turnbuckles can be done at the time of installation. Remember to safety-wire turnbuckles to maintain adjustments.

14. Install the 3/8" eyebolts attached to the ends of the 1/8" aircraft cables into the outer boom eyebolt holes. Note: The longer cable assembly (27-6') goes forward, the shorter (about 23') to the rear. Install the remaining turnbuckle / plate assembly about 5-6' above the boom to mast plate. Unscrew turnbuckle eyebolts until just one thread shows inside body. Install a cable eye into each turnbuckle eye,. Pull aircraft cable through turnbuckle eye, apply tension and install two cable clips to secure cable. Repeat for other cable, balancing tension, so temporary mast remains square with boom.

16. If you have purchased the optional side guy kit. Attach the sideguy plate to underside of boom as shown in the diagrams provided. Secure with 3" U-Bolts. Insert a pair of eyebolts into opposite sides of each 1-1/2" x 60" sideguy tube. Mount the tubes to the sideguy plate with 1-1/2" U-bolts. Position tubes so about 3' extends beyond plate (tubes are extended farther after ropes are installed). Use sections of the 120' length of 3/16" Dacron rope to tie between the sideguy eyebolts and the **outer** boom eyebolts. Balance tension when tying off so boom remains straight. Then loosen the 1-1/2" U-bolts and slide each sideguy tube out until the lines are fairly taut. Great tension is not required: the side guys are provided to damp out and limit major boom flex, not to lock boom into a rigid structure. Adjust the tension on both sides so that the boom is straight. Side guy tubes may be temporarily removed and taped to boom if it seems likely they will interfere during antenna installation.

CAREFULLY DESIGNED AND MANUFACTURED BY:

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FRESNO, CA 93722

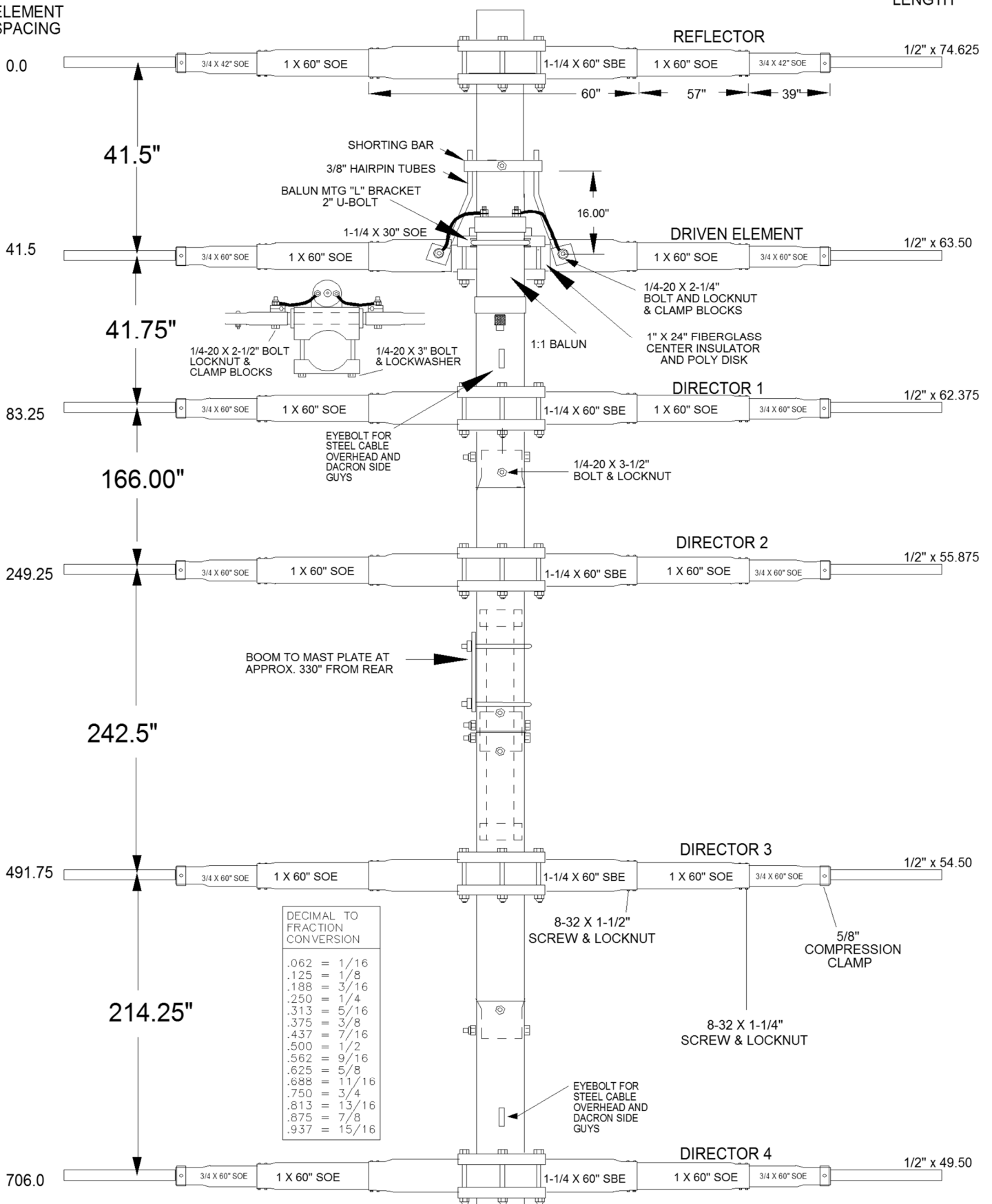
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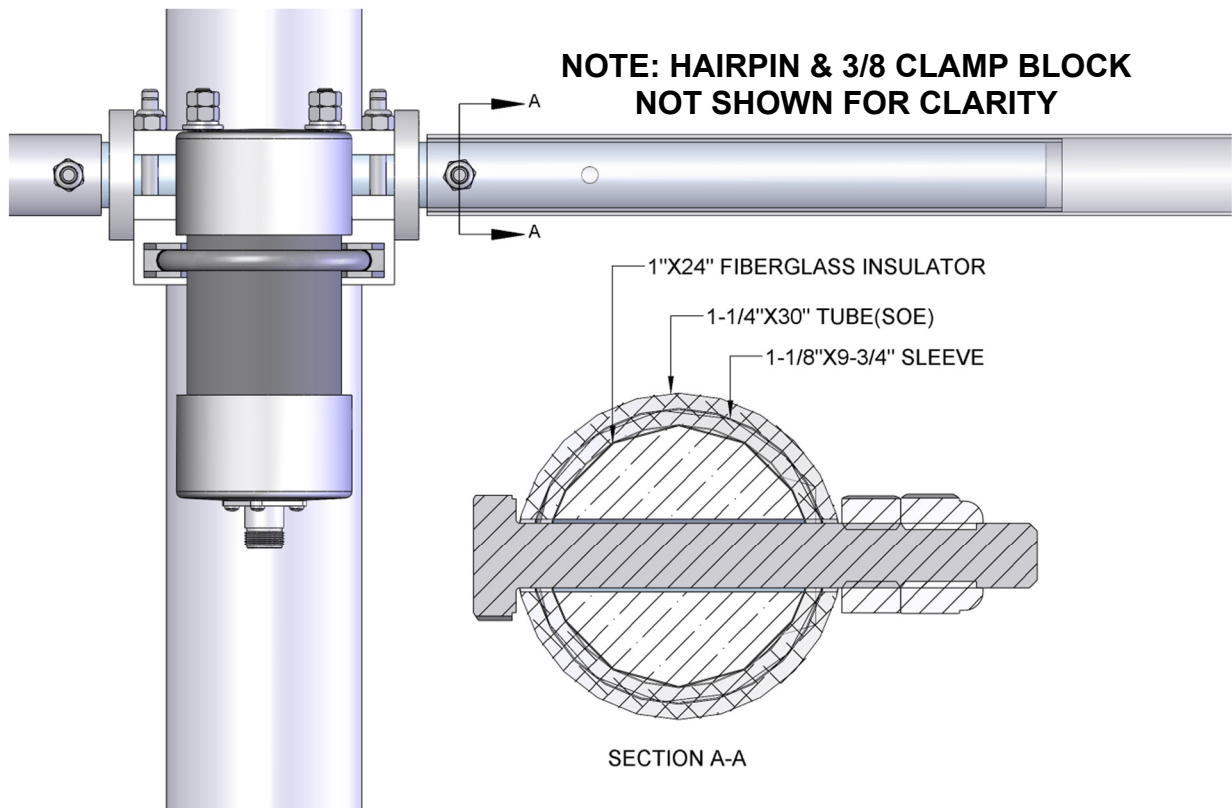
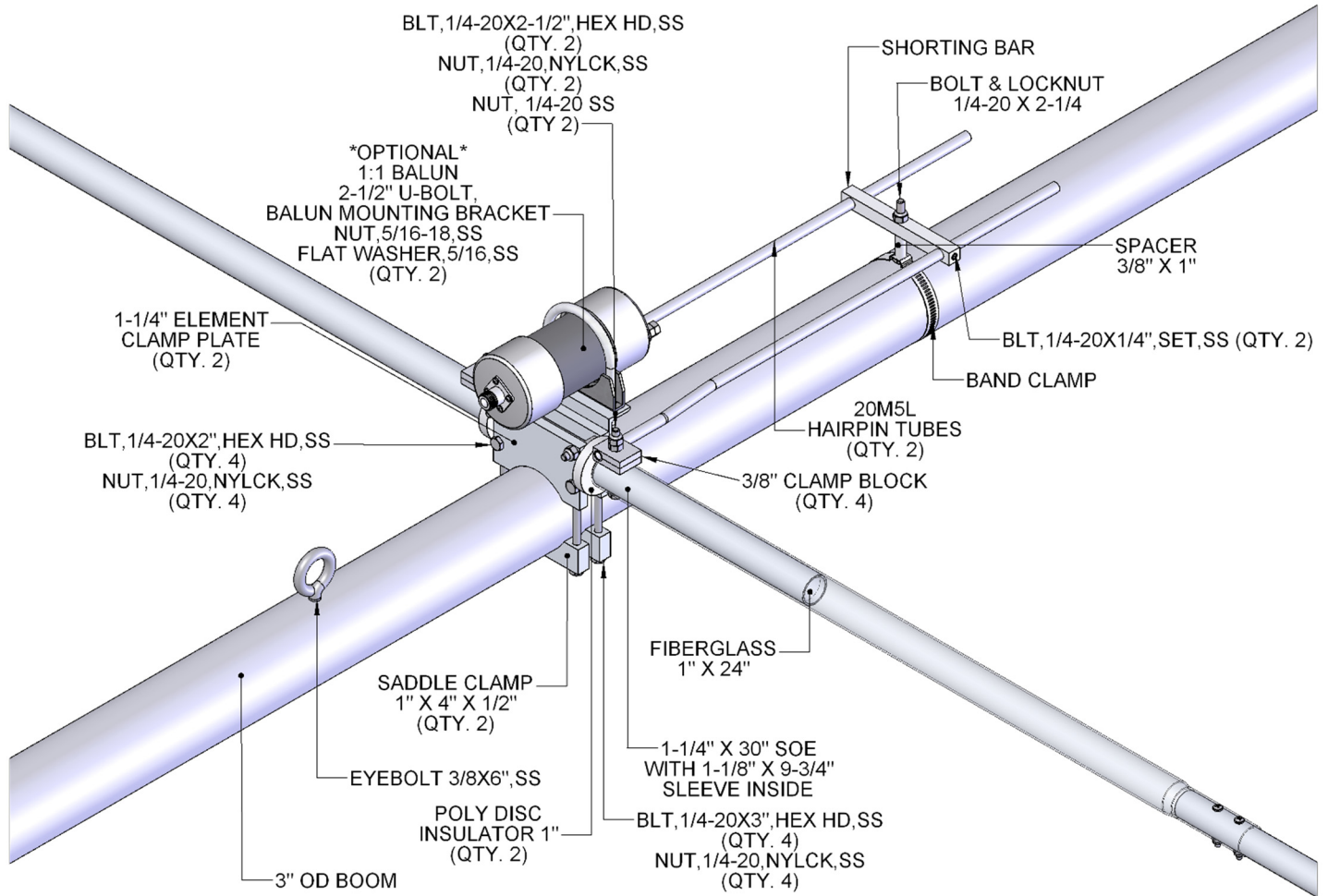
20M6L DIMENSION SHEET

EXPOSED TIP LENGTH

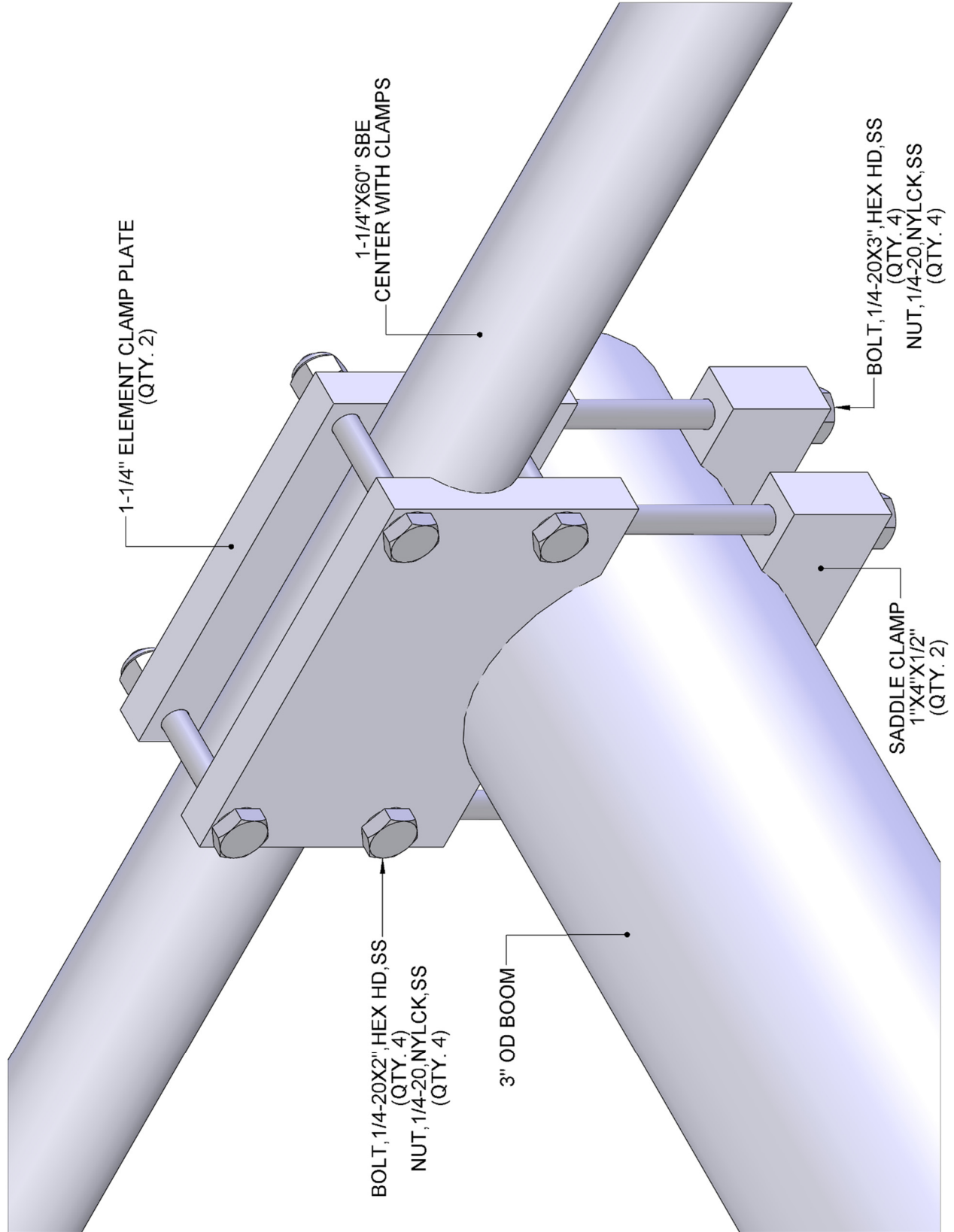
ELEMENT SPACING



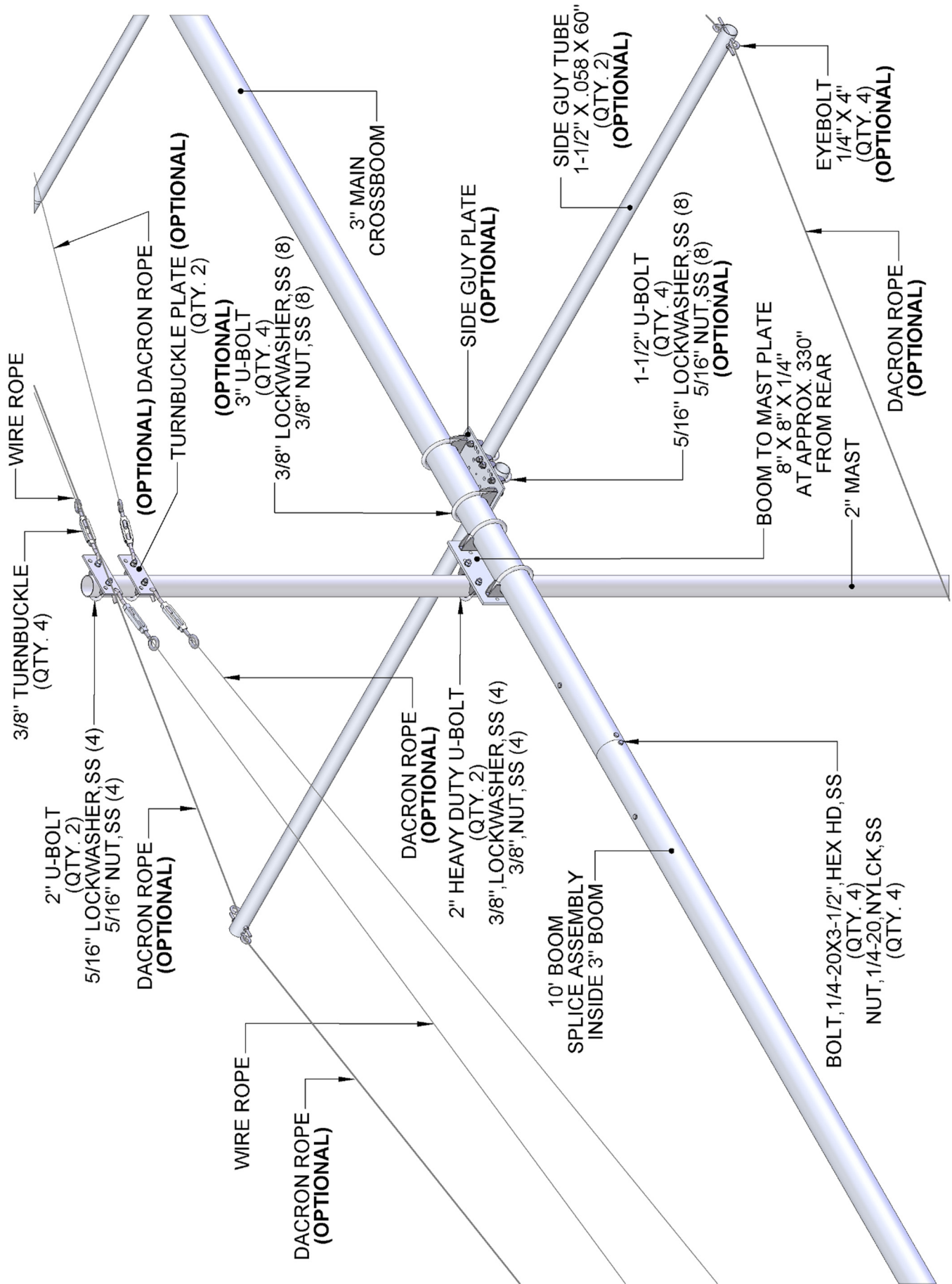
20M6L D.E. & BALUN DETAIL



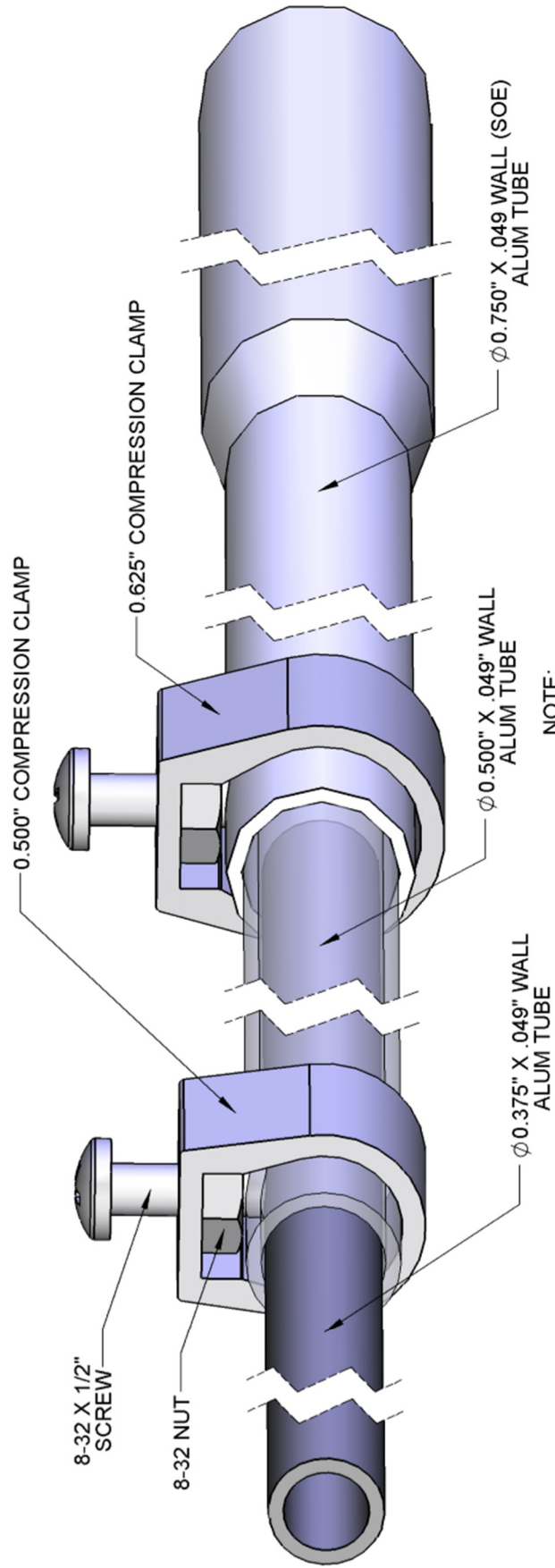
20M6L REFLECTOR & DIRECTOR DETAIL



20M6L VERTICAL RISER & SIDE GUY



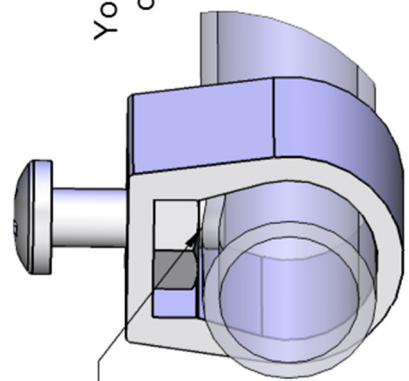
GENERIC COMPRESSION CLAMP DETAIL



NOTE:
TUBES SHOWN TRANSPARENT
TO SHOW MORE DETAIL

NOTE:

Generic layout to show how compression clamps work. Your antenna may have one or the other or may even have both compression clamp sizes.



NOTE:
8-32 X 1/2" SCREW
PRESSES ON INNER TUBE

NOTE: INSIDE TUBE NOT SHOWN FOR CLARITY

20M6L PARTS & HARDWARE

DESCRIPTION	QTY.
BOOM SECTIONS, 3" X .125 X 15' SWAGED.....	2
BOOM SECTION, 3" X .065 X 15' STRAIGHT.....	2
BOOM SPLICE ASSEMBLY, 10'	1
BOOM TO MAST PLATE, 8 X 8 X .250" (M2APT0070)	1
ELEMENT DRIVEN, 1-1/4 X .058 X 30" ALUM. TUBE SOE.....	2
SLEEVE, 1-1/8 X .058 X 9-3/4" ALUM. TUBE.....	2
ELEMENT 1-1/4 X .058 X 60" ALUM. TUBE SBE	5
1 X .058 X 60" SOE ALUM. TUBE	12
3/4 X .049 X 60" SOE ALUM. TUBE	12
1/2 X .049 X SEE DRAWING SHEET	12
DRIVEN ELEMENT HAIRPIN TUBES 23", "SPECIAL"	2
3/8" ELEMENT CLAMP BLOCK.....	4
HF SHORTING BAR	1
SHORTING BAR SPACER, 3/8" X 1" (M2ARS0010)	1
BAND CLAMP, MODIFIED, 2-1/2 TO 3-1/2, #52	1
ELEMENT CLAMP CAP, 4 X 2-1/2 FOR 1-1/4" (M2AEC0042).....	10
ELEMENT CLAMP CAP, 4 X 2-1/2 FOR 1" FG (M2AEC0038).....	2
CRADLE, 3.0 LD 1 X 4 X 1/2"	12
TURNBUCKLE PLATE, 2 X 5 X 3/16".....	1
TURNBUCKLE, 3/8 X 6" ZINC	2
OVERHEAD SUPPORT ASSEMBLY, 1/8" X 330" (SAOS20M6L1)	1
OVERHEAD SUPPORT ASSEMBLY, 1/8" X 275" (SAOS20M6L2).....	1
CABLE CLIPS, 1/8"	4
CABLE EYES, 1/8"	2
U-BOLT, 3"	2
U-BOLT, 2" HEAVY DUTY	4
U-BOLT, 2" STANDARD	1
U BOLT, 2-1/2" (FOR BALUN)	1
FIBERGLASS INSULATOR, 1" X 24" (M2AFG0043)	1
ASSEMBLY MANUAL	1
PARTS BAG	
L BRACKET, BALUN MTG 1 X 1 X 4" ALUM.....	1
POLY DISC INSULATOR 1"	2
IN HARDWARE BAG #1	
BOLT, 1/4-20 X 3-1/2", SS	8
BOLT, 1/4-20 X 3", SS.....	24
BOLT, 1/4-20 X 2-1/4", SS	1
BOLT, 1/4-20 X 2-1/2", SS	2
BOLT, 1/4-20 X 2", SS.....	24
BOLT, 1/4-20 X 1/4", SET, SS.....	2
LOCKWASHER, 1/4", SS	4
NUT, 1/4-20 LOCKING, SS.....	37
NUT, 1/4-20, SS	6
NUT, 5/16-18 SS	4
LOCKWASHER, 5/16 SS	4
NUT, 3/8-16 SS	14
LOCKWASHER, 3/8 SPLIT RING SS	14
IN HARDWARE BAG #2	
SCREW, 8-32 X 1-1/2" SS	24
SCREW, 8-32 X 1-1/4" SS	24
SCREW, 8-32 X 1/2" SS.....	12
NUT, 8-32 LOCKING, SS	48
NUT, 8-32, SS	12
COMPRESSION CLAMP, 5/8"	12
ZINC PASTE, CUP.....	1

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20M6L OPTIONAL PARTS & HARDWARE

OPTIONAL BALUN

BALUN, 1:1 (FERRITE) 2.5 KW	1
BALUN, 1:1 (COAX) 5 KW.....	1
BALUN, 1:1 (HIGH POWER) 10 KW	1

OPTIONAL SIDE GUY KIT

SIDE GUY PLATE, 6 X 8 X 3/16.....	1
SIDE GUY TUBE, 1-1/2 X .058 X 60"	2
DACRON ROPE, 3/16 X 120'	1
EYE BOLT, 1/4 X 4 ZINC.....	4
LOCK NUT, 1/4-20 SS.....	4
U-BOLT & CRADLE 3".....	2
U-BOLT & CRADLE 1-1/2"	4
NUT, 5/16-18 SS	8
LOCK WASHER, 5/16 SS.....	8
NUT, 3/8-16 SS	4
LOCK WASHER, 3/8-16	4

OPTIONAL INNER BOOM GUY KIT

TURNBUCKLE PLATE, 2 X 5 X 3/16	1
DACRON ROPE, 5/16 X 32'	1
TURNBUCKLE, 3/8 X 6" ZINC.....	2
EYE BOLT, 3/8 X 6" ZINC	2
U-BOLT & CRADLE 2".....	1
NUT, 3/8-16 SS	2
LOCKWASER, 3/8 SS	2
NUT, 5/16-18 SS	2
LOCKWASER, 5/16 SS	2

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