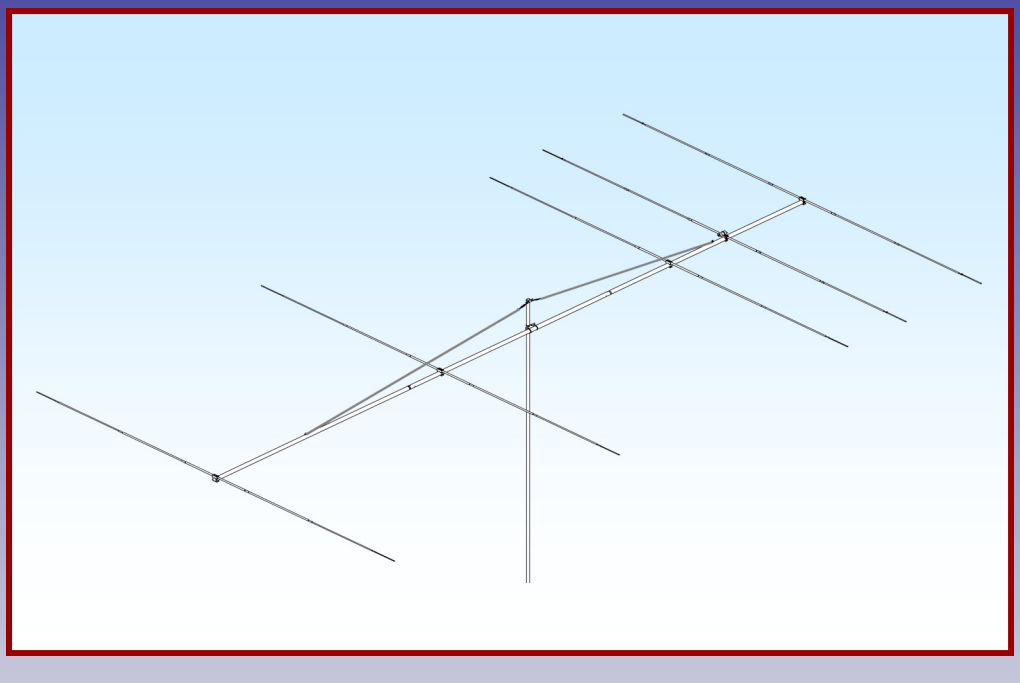
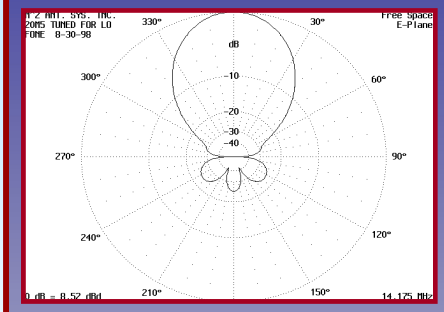
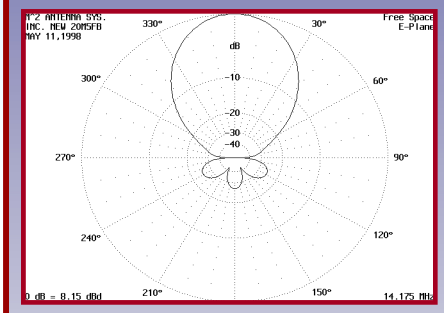
M2 Antenna Systems, Inc.
Model No: 20M5LD







SPECIFICATIONS:

Model	20M5LD
Frequency Range	14.0 – 14.350 MHz
*Gain (Full Band)	10.2 dBi Typical
Front to back	23 dB Typical
Beamwidth	E=50° / H=66°
Feed type	Direct Feed
Feed Impedance	50 Ohms Unbalanced
Maximum VSWR	1.5:1
Input Connector	SO-239, Others avl.

Power Handling	3 Kw, Higher avl.
Boom Length / Dia	45’ / 3.0 x .065 Wall
Element Length / Dia.	36.5 / 1 1/4” –1/2”
Turning Radius:	27.5’
Stacking Distance	48’ -62’
Mast Size	2” Others avl.
Wind area / Survival	10 sq. ft. / 85 MPH
Weight / Ship Wt.	76 Lbs. / 89 Lbs.

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

FEATURES:

The 20M5LD (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. We have also made it a “direct feed” Yagi requiring no matching, only a 1:1 balun. 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 44 foot x 3“ dia. boom is a full 1/8 in wall in the center section but the tips are half the weight at 1/16” wall. All critical hardware is stainless steel. The 20M5L is available through our fine distributors, worldwide. For you 100 mph+ hill toppers, we make a **SURVIVOR SERIES** sold factory direct only! See our web site for more details on all our outstanding products.

M2 Antenna Systems, Inc. 4402 N. Selland Ave. Fresno, CA 93722
Tel: (559) 432-8873 Fax: (559) 432-3059 Web: www.m2inc.com

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20M5LD ASSEMBLY MANAUL

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 5 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 5 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 4 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" bolts up from the bottom. 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. Assemble the boom sections by inserting the two sections with swages into the center straight section. Add two 1/4-20 x 3-1/2" bolts, and locknuts to each joint and tighten. Install the two eyebolts in the boom end sections and tighten the nuts.

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.

	Spacing between elements	Running element spacing
REFL	0.0	0.0"
D.E.	70.00	70.0"
D1	50.00	120"
D2	205.75	325.75"
D3	202.25	528.0"

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 three 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. Install 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 and tighten the assembly. 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.

10. Determine the BALANCE POINT of the assembled antenna and mount the BOOM TO MAST PLATE (BMP) using two 3 inch U-bolts, stainless steel lock washers and nuts.

11. OVERHEAD BOOM SUPPORT SYSTEM.

A. Attach one end of the cord to the rear eyebolt using two turns around the eyebolt and a series of three half hitches or equivalent knots. Without cutting the cord, secure other end at the front eyebolt. Pull on the knots *HARD* to *SET* them and tape the excess cord back to main cord tightly with black vinyl electricians tape. Seal ends with heat or flame to prevent fraying.

B. ADD LOCKING TO TURNBUCKLES: Remove the clockwise threaded end (usually the end with eye) and thread a 5/16-18 plain nut all the way to the end of the threads on each turnbuckle. This is used to lock the turnbuckle one final adjustments are accomplished. Reassemble the turnbuckles.

C. TEMPORARILY insert a standard 2" U-bolt through the TURNBUCKLE PLATE and add two nuts so that about 1/2 inch of the threads stick out. Insert U-bolt studs through the top set of 2" U-bolt holes in the boom to mast plate from the boom side and add two more nuts. Open the two turnbuckles until just a thread or two from each end shows inside the body of the turnbuckle. Hook the turnbuckles into the holes at the edge of the turnbuckle plate. Equalize the Dacron cord over the plate and cut it. Take two wraps of the cord through the eye of the rear turnbuckle, PULL the cord as tight as possible and make the knots as before. Repeat for the front cord section and turnbuckle. Cut off any excess over one foot long and again seal and tape the excess cord back to the main cord.

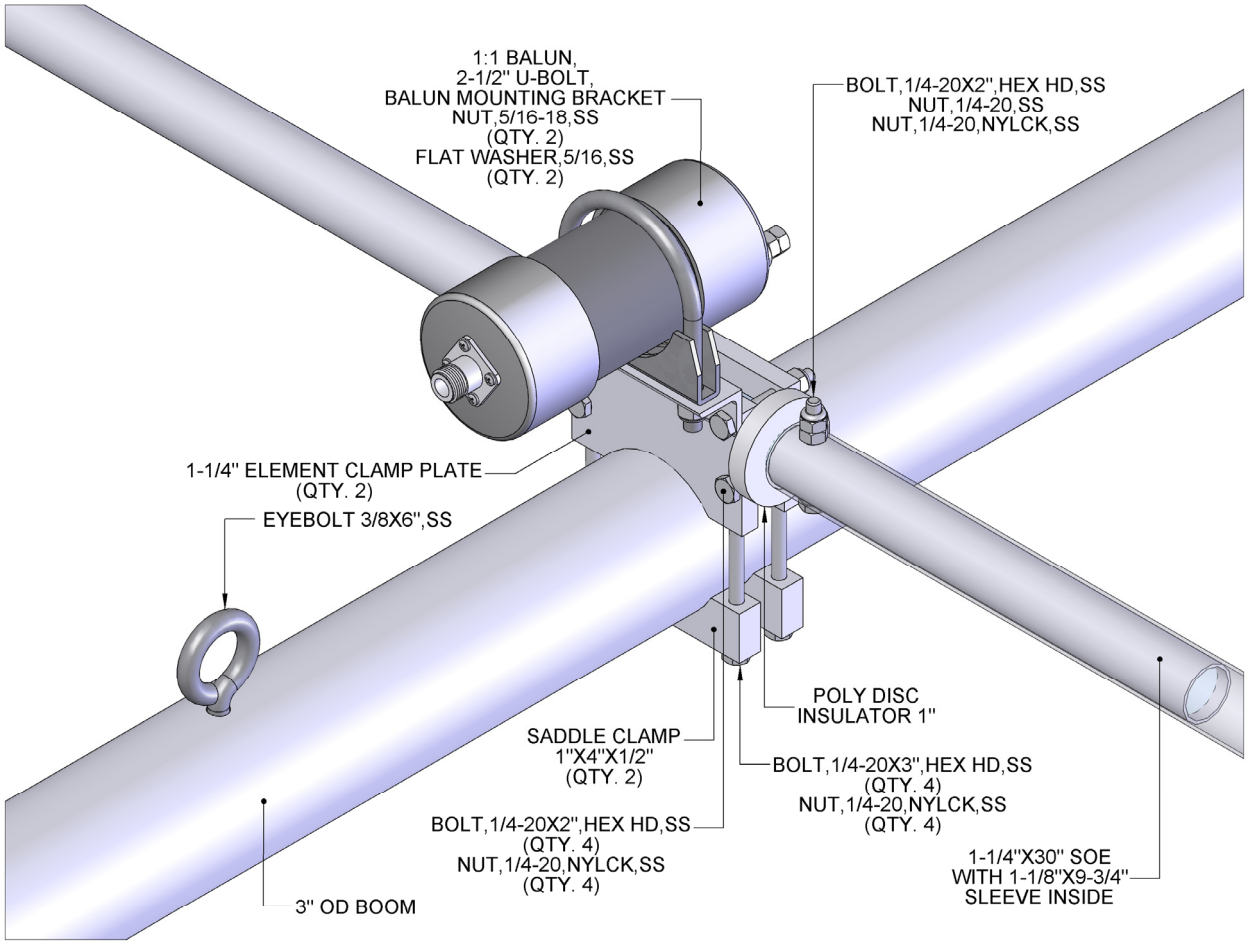
D. Now DISASSEMBLE the U-bolt from the boom to mast plate. The guy assembly is now centered and the turnbuckle plate is ready to be installed to the mast and raised until the boom is straight. (about 4 feet).

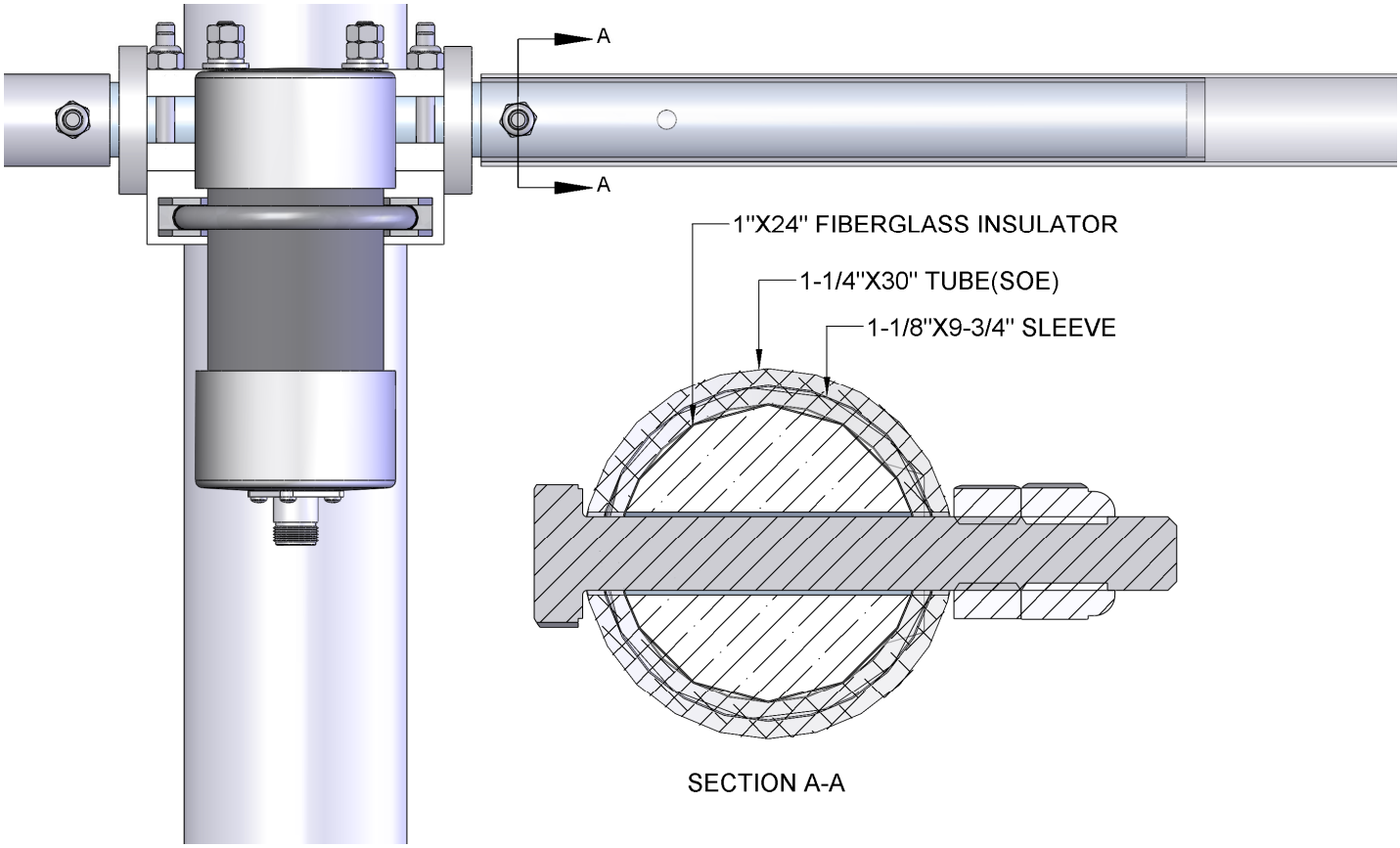
E. If practical, after the final assembly and ***before*** installation, Re Check and tighten as required , all hardware. Double check dimensions and adjust a required. Let the overhead guy system support the boom and take a "set" overnight. After final installation, do any minor boom straightening with the turnbuckles. Then tighten the jam nuts on each turnbuckle to prevent loosening.

13. This completes the ASSEMBLY. When the antenna is installed in position on the mast, the main feed line can be attached and sealed at that time. REMEMBER to support the feed line at the antenna boom and on the mast. Leave an adequate feed line loop for rotation around the tower. Mount horizontally polarized VHF and UHF antennas at least 40" above or below this antenna to minimize interaction.

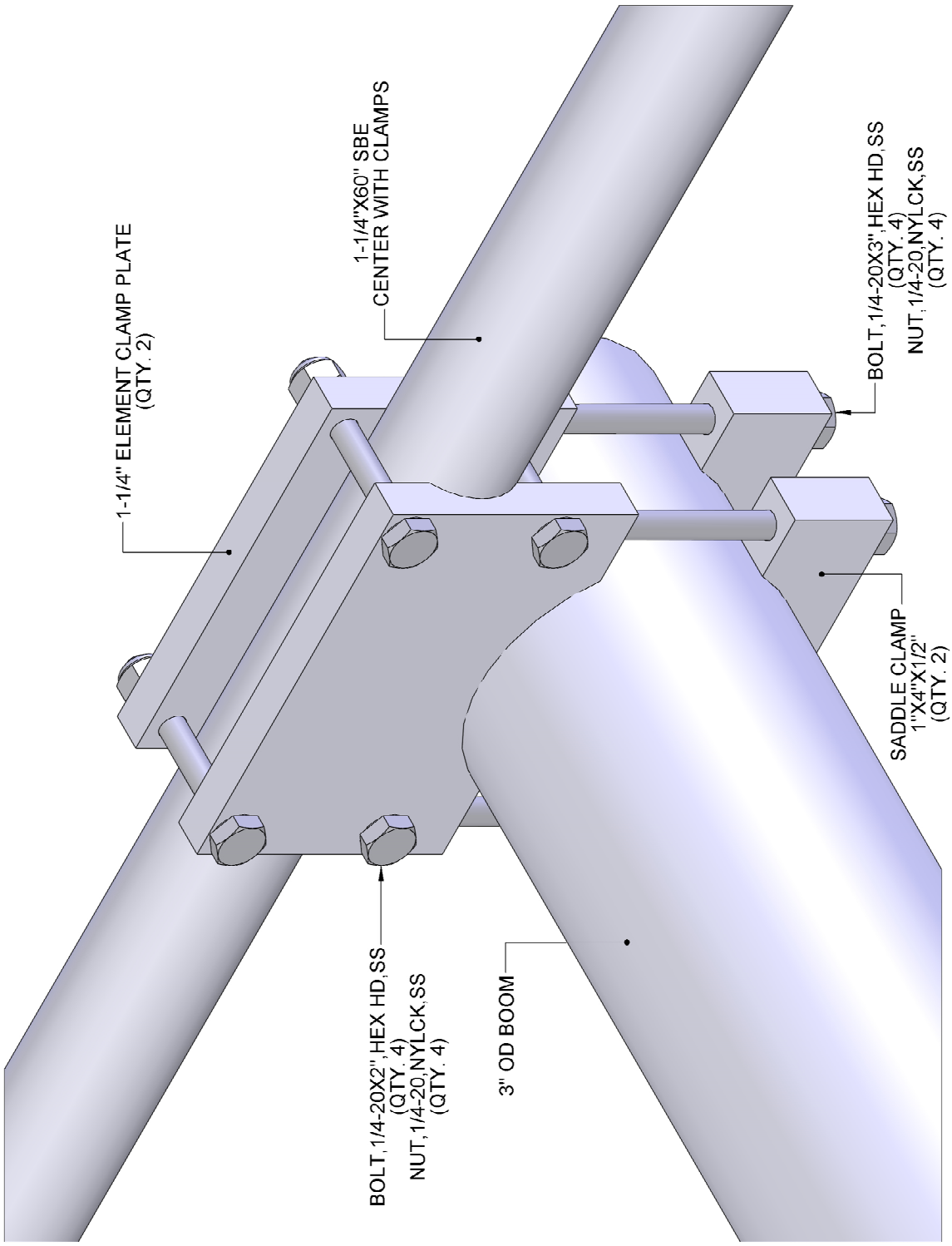
M² ANTENNA SYSTEMS, INC.
4402 N. SELLAND AVE.
FRESNO, CA 93722
(559) 432-8873 FAX: 432-3059

DRIVEN ELEMENT DETAIL

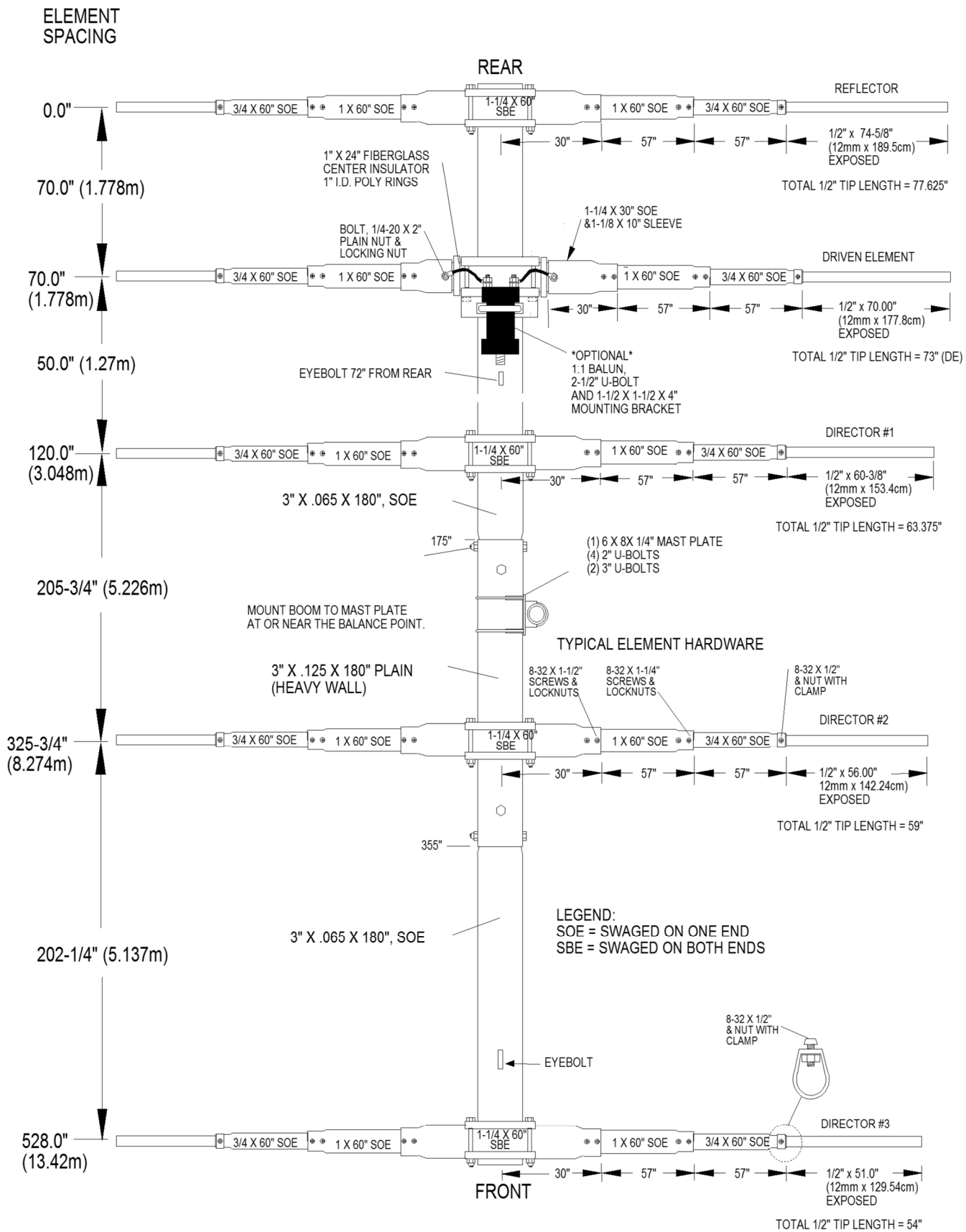




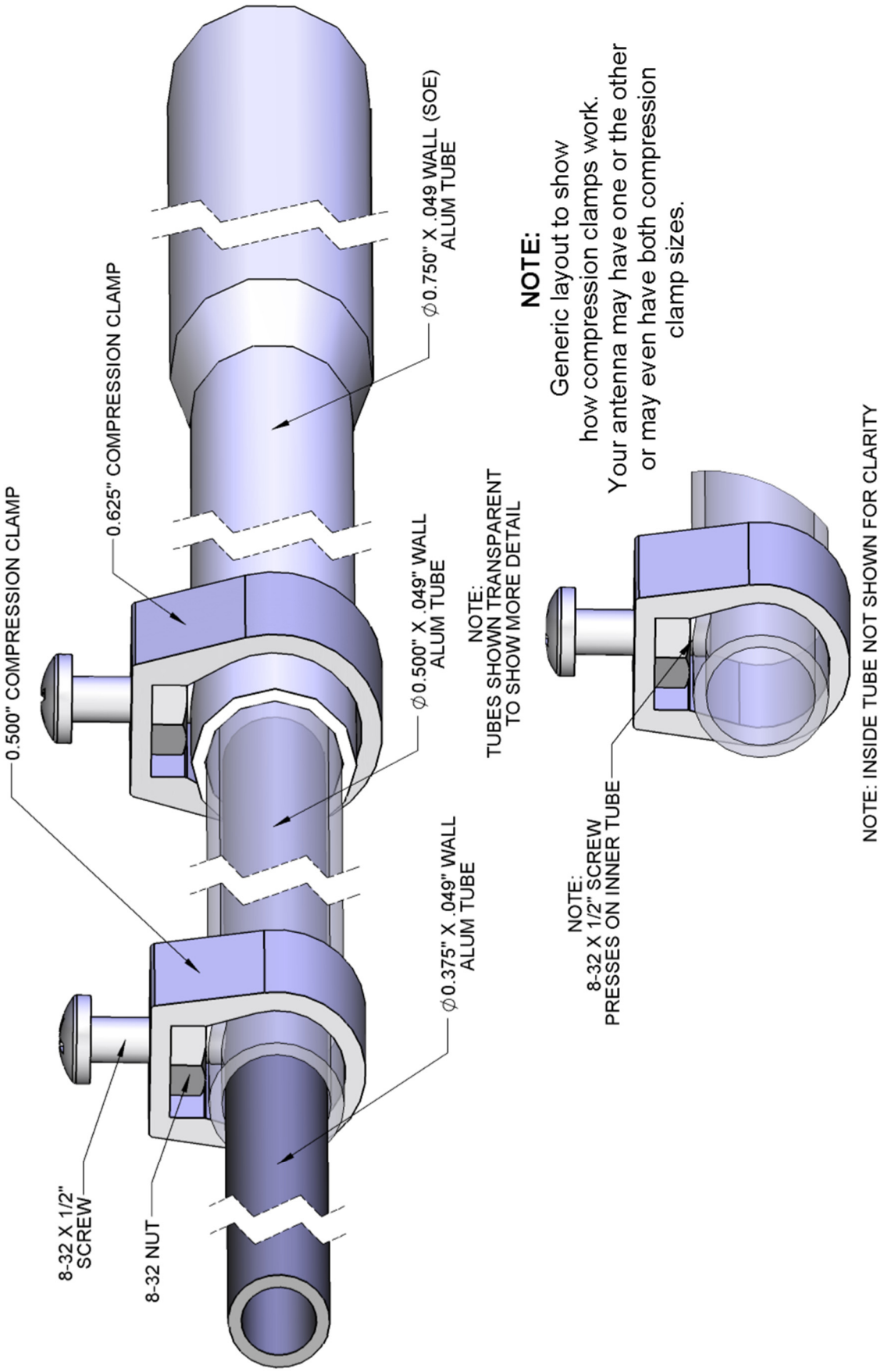
REFLECTOR/DIRECTOR DETAIL



20M5LD DIMENSION SHEET



GENERIC COMPRESSION CLAMP 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.

20M5LD PARTS & HARDWARE

DESCRIPTION	QTY.
BOOM SECTIONS, 3" X .065 X 15' SWAGED	2
BOOM SECTION, 3" X .125 X 15' STRAIGHT	1
BOOM TO MAST PLATE, 6 X 8 X .250" (STANDARD 2" UBOLT)	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	4
1 X .058 X 60" SOE ALUM. TUBE	10
3/4 X .049 X 60" SOE ALUM. TUBE	10
1/2 X .049 X SEE DRAWING SHEET	10
ELEMENT CLAMP CAP, 4 X 2-1/2 FOR 1-1/4" M2AEC0042	8
ELEMENT CLAMP CAP, 4 X 2-1/2 FOR 1" FG M2AEC0038	2
CRADLE, 3.0 LD 1 X 4 X 1/2"	10
TURNBUCKLE PLATE, 2 X 5 X 3/16"	1
TURNBUCKLE, 3/8"	2
EYEBOLT, 3/8 X 6"	2
DACRON ROPE, 5/16" X 36 FT	1
U-BOLT, 3"	2
U-BOLT, 2" STANDARD	4
U-BOLT, 2" STANDARD (FOR TURNBUCKLE)	1
U BOLT, 2-1/2" (FOR BALUN)	1
FIBERGLASS INSULATOR, 1" X 24" STANDARD	1
ASSEMBLY MANUAL	1
PARTS BAG	
BALUN, 1:1, 3 KW, SO-239 (FGBL0100)	1
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	4
BOLT, 1/4-20 X 3", SS	20
BOLT, 1/4-20 X 2", SS	22
NUT, 1/4-20 LOCKING, SS	26
NUT, 1/4-20, SS	2
NUT, 5/16-18 SS	12
LOCKWASHER, 5/16 SS	12
NUT, 3/8-16 SS	8
LOCKWASHER, 3/8 SPLIT RING SS	6
IN HARDWARE BAG #2	
SCREW, 8-32 X 1-1/2" SS	20
SCREW, 8-32 X 1-1/4" SS	20
SCREW, 8-32 X 1/2" SS	10
NUT, 8-32 LOCKING, SS	40
NUT, 8-32, SS	10
COMPRESSION CLAMP, 5/8"	10
ZINC PASTE, CUP	1

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