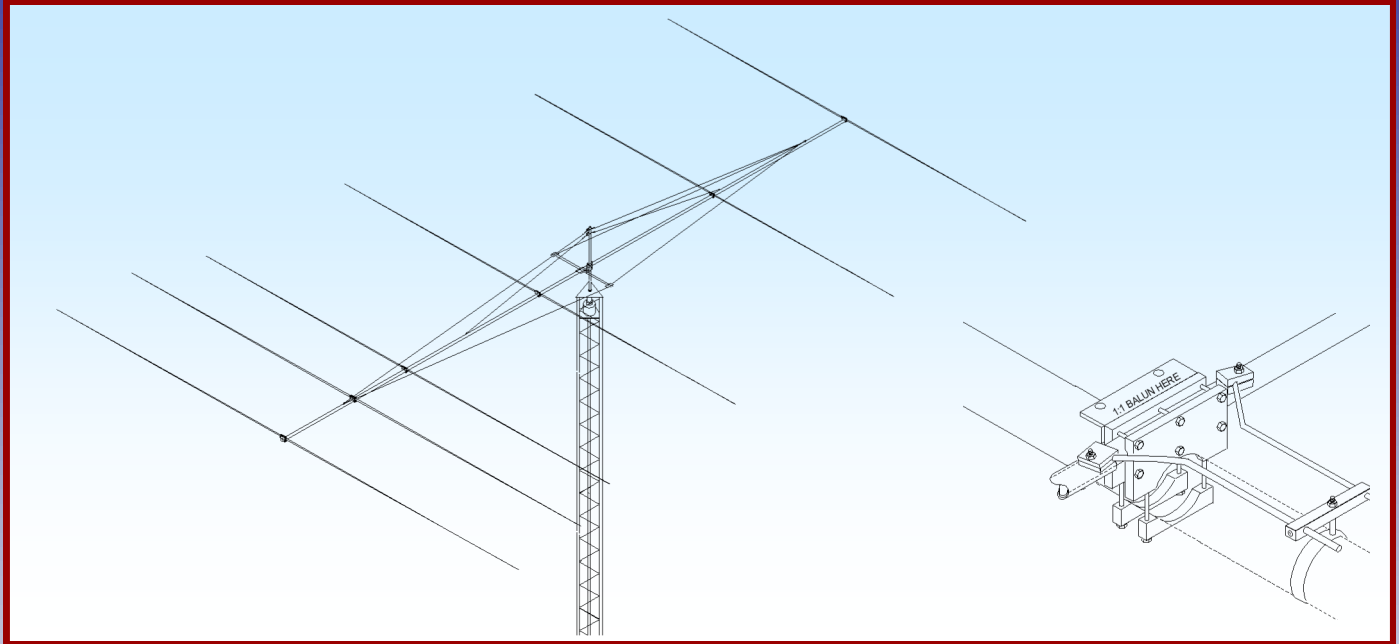




# M2 Antenna Systems, Inc. Model No: 20M6-125



## SPECIFICATIONS:

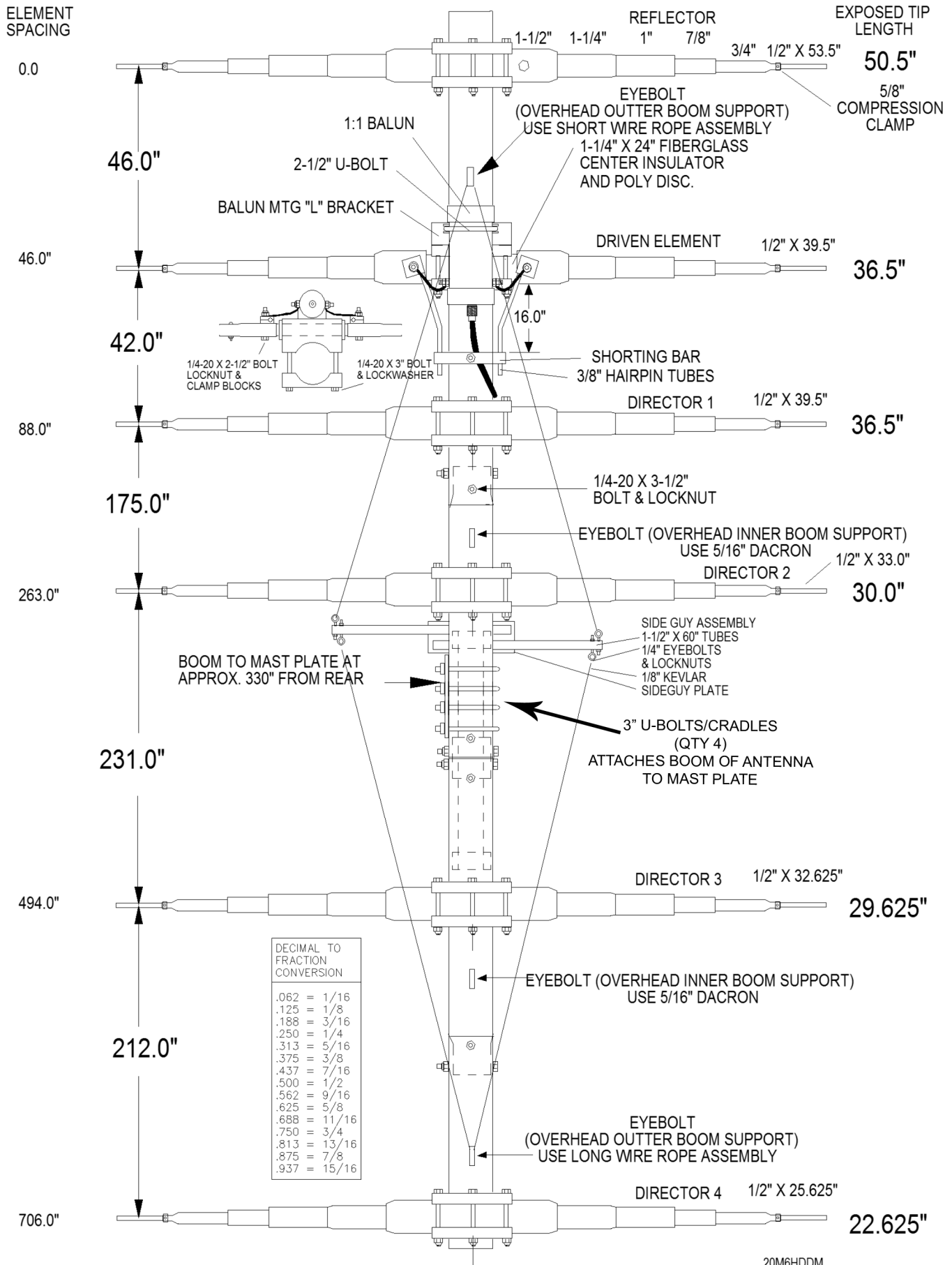
Model .....	20M6-125	Power Handling .....	3 Kw, Higher avl.
Frequency Range .....	14.0– 14.350 MHz	Boom Length / Dia .....	59' / 3.0 x .125 Wall
*Gain, (FS) / Over gnd.....	11.19dBi / 16.6dBi @70'	Element Length / Dia. ....	36.5' / 1 1/4" –1/2"
Front to back.....	25 dB Typical	Turning Radius: .....	40'
Beamwidth .....	E=46° / H=60°	Stacking Distance .....	65' -70'
Feed type.....	Hair pin match	Mast Size .....	2" to 3 " Nom.
Feed Impedance.....	50 Ohms Unbalanced	Wind area / Survival.....	16 Sq. Ft. / 125 MPH
Maximum VSWR .....	1.2:1	Weight / Ship Wt. ....	240 Lbs. / 270 Lbs.
Input Connector .....	SO-239, Others avl.		

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

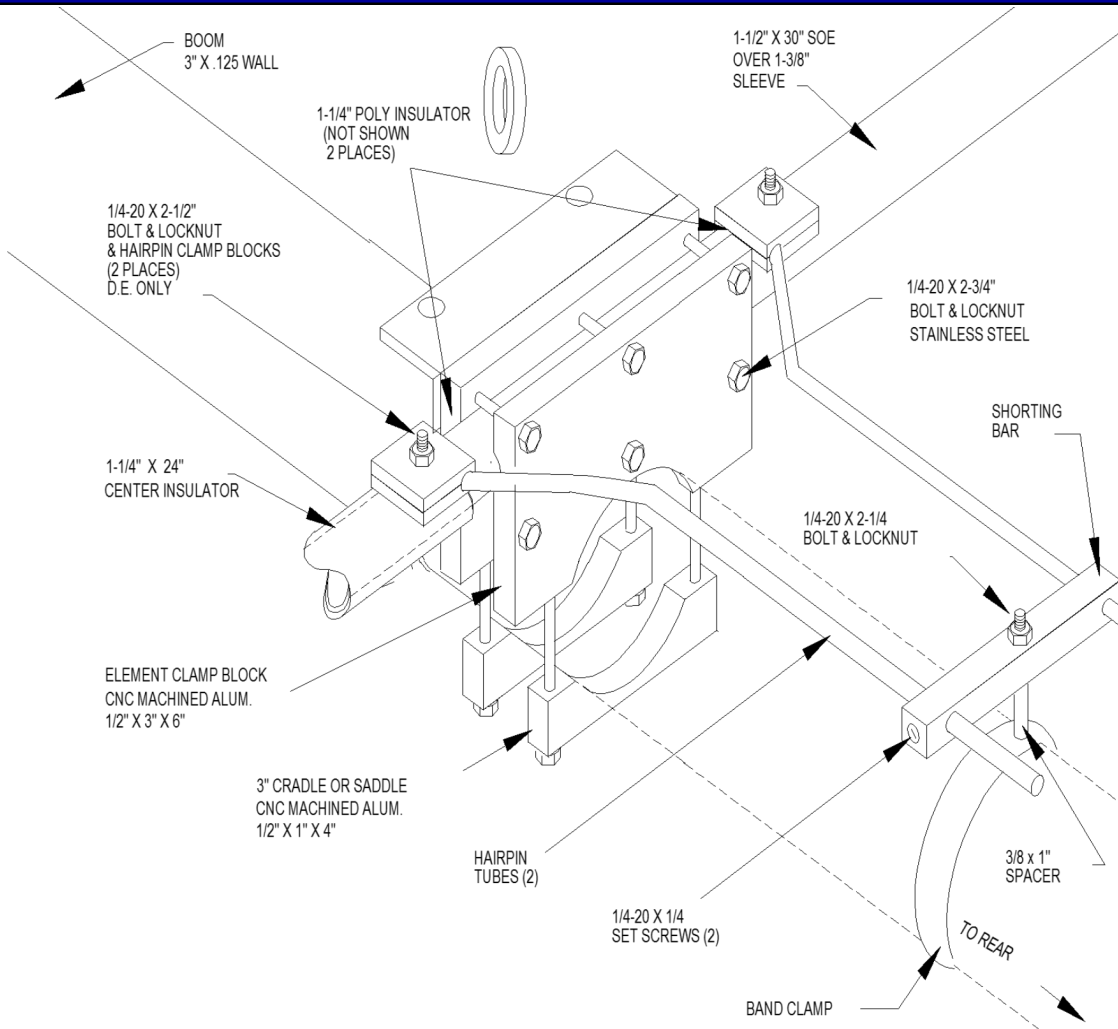
## FEATURES:

The 20M6-125 is a medium spaced, high performance, **full band coverage** 6 element Yagi, computer optimized to squeeze the last drop of performance from this boom length. The design provides virtually flat gain, exceptional front to back and excellent VSWR never exceeding 2:1 at the upper band edge. Larger, sleeved elements and boom provide the 125 MPH wind survival factor. Construction includes machined boom to element mounting plates and a rugged hairpin match. This antenna will be in the air for many years, keeping you on the top of the pileup in spite of Mother Nature! There is no finer, stronger antenna available today.

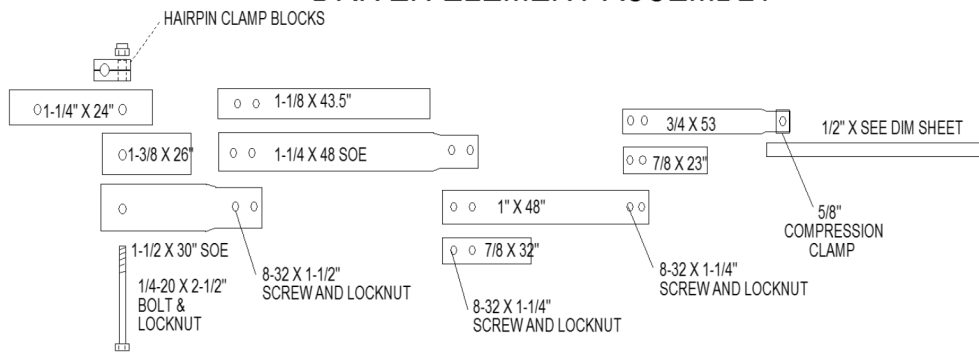
# 20M6-125 DIMENSION SHEET



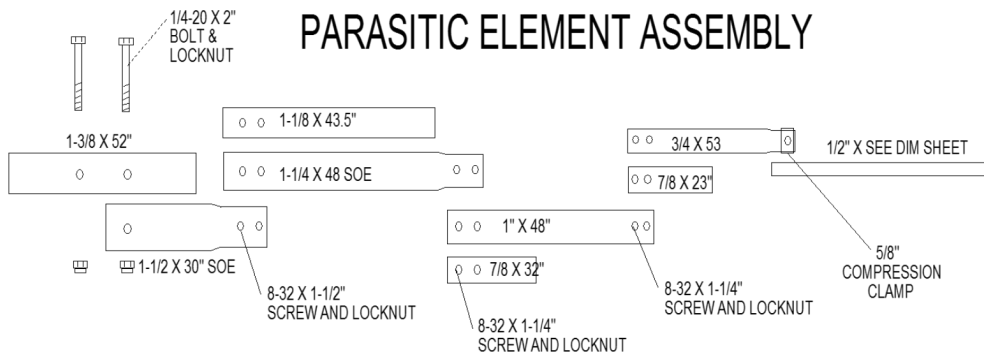
# 20M6-125 ASSEMBLY DETAILS



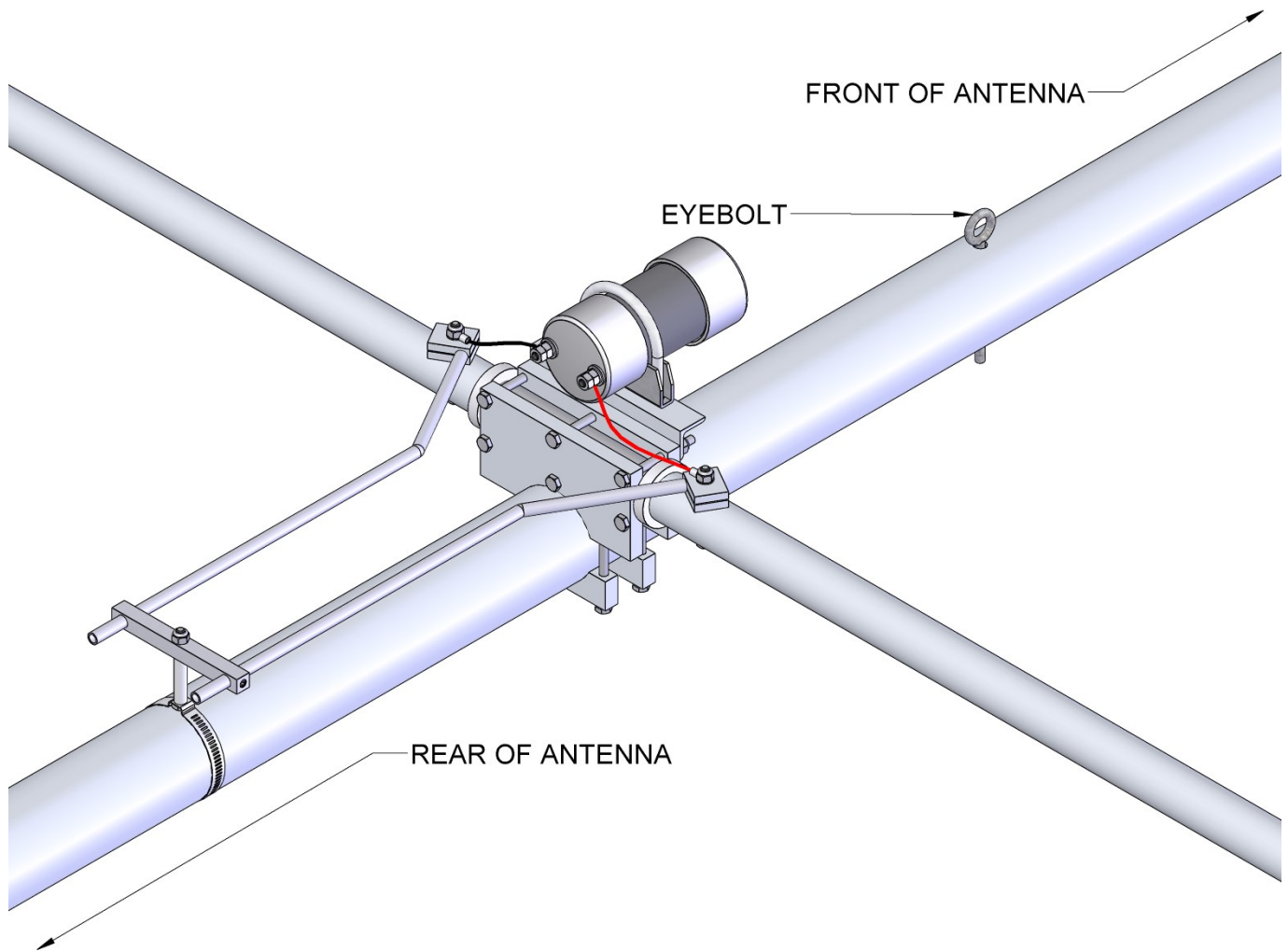
## DRIVEN ELEMENT ASSEMBLY



## PARASITIC ELEMENT ASSEMBLY



# 20M6-125 HAIRPIN ADDENDUM



**NOTE:**  
HAIRPIN HAS BEEN ROUTED TO THE REAR OF ANTENNA TO  
AVOID INTERFEARENCE WITH OVERHEAD SUPPORT EYEBOLT.

# 20M6-125 ASSEMBLY MANUAL

NOTE: THE "DIMENSION SHEET" AND THE "HARDWARE ARRANGEMENT" DRAWINGS ARE QUITE COMPLETE WITH ASSEMBLY INFORMATION. EXPERIENCED BUILDERS MAY NOT REQUIRE THE WRITTEN INSTRUCTIONS. WHEN IN DOUBT, USE THE WRITTEN WORD. ANTI-SEIZE PASTE (PENETROX OR NOALOX) IS RECOMMENDED ON ALL HARDWARE THREADS AND ALUMINUM JOINTS. TOOLS REQUIRED: Electric drill, screw driver, 11/32" nut driver or socket, 7/16" end wrench, 7/16", 1/2", and 9/16" socket set, measuring tape.

1. Pair up 1/2" element tip sections by length. Insert 1/2" sections into the swaged end of the 3/4" x 53" sections secure with 5/8" Compression Clamps (SEE COMPRESSION CLAMP & TIP ASSEMBLY DETAIL). Set the proper exposed tip length (SEE DIMENSION SHEET). Install all tip sections. Use a felt pen and masking tape to identify each element set by position as it is completed.

2. Slide a 7/8" X 23" EXTERNAL SLEEVE over the butt end of a 3/4" x 53" & 1/2" tip assembly and align holes. Install this assembly into the end of a 1" x 48" element section with holes at 1/2" and 1-1/2" from end. Use 8-32 x 1-1/4" screws and locknuts at the joint. Tighten securely. Slide a 7/8" x 32" SLEEVE SECTION into the butt end of the 1" section and align holes. Attach a 1-1/4" x 48" ELEMENT SECTION to 1" ELEMENT SECTION using 8-32 x 1-1/2" screws and locknuts. Repeat for all elements.

3. PARASITIC ELEMENT ASSEMBLY: Slide a 1-1/2" x 30" INNER ELEMENT SECTION onto each end of a 1-3/8" x 51" CENTER SLEEVE, align holes, and secure with a 1/4-20 x 2" bolt and locknut. Slide on the second 1-1/2 x 30" section. Align the holes and secure with the second 1/4-20 x 2" bolt and locknut. Place a clamp plate one either side at the center of this element assembly and rotate so the bolt heads are up. Add the 1/4-20 x 2-3/4" bolts through the 6 holes and add the locknuts. Check the element centering again and then tighten the clamp block bolts evenly to keep the plates parallel. Repeat for the other two PARASITIC ELEMENTS.

4. DRIVEN ELEMENT ASSEMBLY: Refer to the HARDWARE ARRANGEMENT drawing and assemble THE LAST pair of ELEMENT CLAMP PLATES including the "L" BRACKET for mounting the balun. Slide in the 1-1/4" x 24" fiberglass rod, center it, align holes up and down and tighten the clamp bolts evenly. Now add the white poly rings to each side of the fiberglass rod and push them up against the clamp plates. Insert the 1-3/8" x 26" sleeves into the last two 1-1/2 x 30" SOE tubes. Align the holes and carefully slide these assemblies over the fiberglass rod ends. Align all the holes and, FROM THE BOTTOM, insert two 1/4-20 x 2-1/2" bolts. Drop on two HAIRPIN CLAMP BLOCKS and add a locknut finger tight to each bolt.

5. BOOM ASSEMBLY: Inspect the CENTER BOOM SPLICE for any nicks or scratches. File smooth if any found. Lightly oil or lubricate the COUPLING RINGS and insert the splice onto one plain end of a 3" x 180" swaged boom section. Add the two 1/4-20 x 3-1/2 bolts and locknuts, but do not tighten. Now slide the second boom section on and align the holes. Add the bolts and tighten. Next add the 3" x 180" plain ends. Add the 1/4-20 x 3-1/2 bolts and locknuts and tighten.

6. 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. Position one PARASITIC CENTER SECTION one inch from the end of the boom, add the saddle clamps and the four 1/4-20 x 3" bolts (a dab of Noalox on the threads make insertion easy). Align the top of the clamp to the eyebolt and tighten the saddle clamps evenly. Next, 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. Mount the center element assemblies on the boom the same as the reflector. Align each with the reflector and tighten.

# 20M6-125 ASSEMBLY MANUAL

7. HAIRPIN MATCH ASSEMBLY: Refer to the HARDWARE ARRANGEMENT drawing. Insert a 1/4-20 X 2-1/4" bolt from inside the band clamp and install the band clamp loosely positioned about 30" inches in front of the driven element. Mount the BALUN using the 2-1/2" U-bolt and cradle but do not over tighten. Remove the finger tight nuts over the hairpin clamp blocks and place the balun lead lugs over the studs and replace the nuts finger tight. Next, slide the short bent end of the 3/8" tubes into the small hairpin clamp blocks and flush the ends of the tubes with the blocks. Align and tighten the clamp block bolts lightly. Install the shorting bar on the straight ends of the tubes and add the 1/4-20 x 1/4" set screws, but do not tighten on to the tubes yet. Set to the proper shorting bar dimension, align and tighten the set screws securely. Move the band clamp under the shorting bar, add the 3/8" spacer tube on the stud and drop the shorting bar over the stud and add the locknut. Tighten the band clamp, and then tighten the nut.

Refer to the DIMENSION SHEET. This dimension is from the inner edge of the shorting bar to the inner edge of the tube. Install the main feedline or feed line jumper on the 1:1 balun. Tape the connector up carefully. Use the large cable ties to secure the cable to the boom.

8. INSTALLING THE ELEMENT TIP SECTIONS: Start with the REFLECTOR tip sections and insert each double wall 1" element butt into the 1-1/4" center sections. align the holes and insert the 8-32 x 1-1/2" screws. Add the locknuts and tighten securely. Continue adding the other tip sections until the antenna is complete.

9. Determine the BALANCE POINT of the assembled antenna and mount the BOOM TO MAST PLATE using two 3 inch U-bolts, stainless steel lockwashers and nuts.

10. OVERHEAD BOOM SUPPORT SYSTEM. This antenna is supplied with both outer and inner overhead support systems. The outer support system uses the supplied wire rope assemblies. Install turnbuckle plate to your mast at 48" *minimum* from your boom. Before hooking turnbuckles to turnbuckle plate open turnbuckles until just a thread or two from each end shows inside the turnbuckle body. Before you continue (SEE WIRE ROPE ASSEMBLY DETAIL SHEET & DIM SHEET) for more information. Complete wire rope assemblies as shown on wire rope assembly sheet. Hook turnbuckles to turnbuckle plate & install the other end of wire assemblies to outer set of holes on the antenna boom (SEE DIM SHEET).

The inner overhead boom support system uses 5/16" Dacron rope & eyebolts (3/8" X 6"). Install eyebolts to inner eyebolt hole set on antenna boom. Use a 2nd turnbuckle plate and the 2 more turnbuckles and secure the upper end of the Dacron to your mast (SEE DIM SHEET). Remember to open turnbuckles until just a thread or two from each end shows inside the turnbuckle body. After final installation, do any minor boom straightening with the turnbuckles. Cut off any excess over one foot long. Pull on the knots *HARD* to *SET* then use black vinyl electricians tape and tape excess cord back to main cord. Seal ends with heat or flame to prevent fraying. Then safety wire to prevent changes to settings.

11. Install side guy support system. Use supplied Kevlar (1/8" X 120') and cut as needed to get 4 Kevlar pieces for your side support system (SEE DIMENSION SHEET FOR MORE INFORMATION).

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

**M<sup>2</sup> ANTENNA SYSTEMS, INC.**

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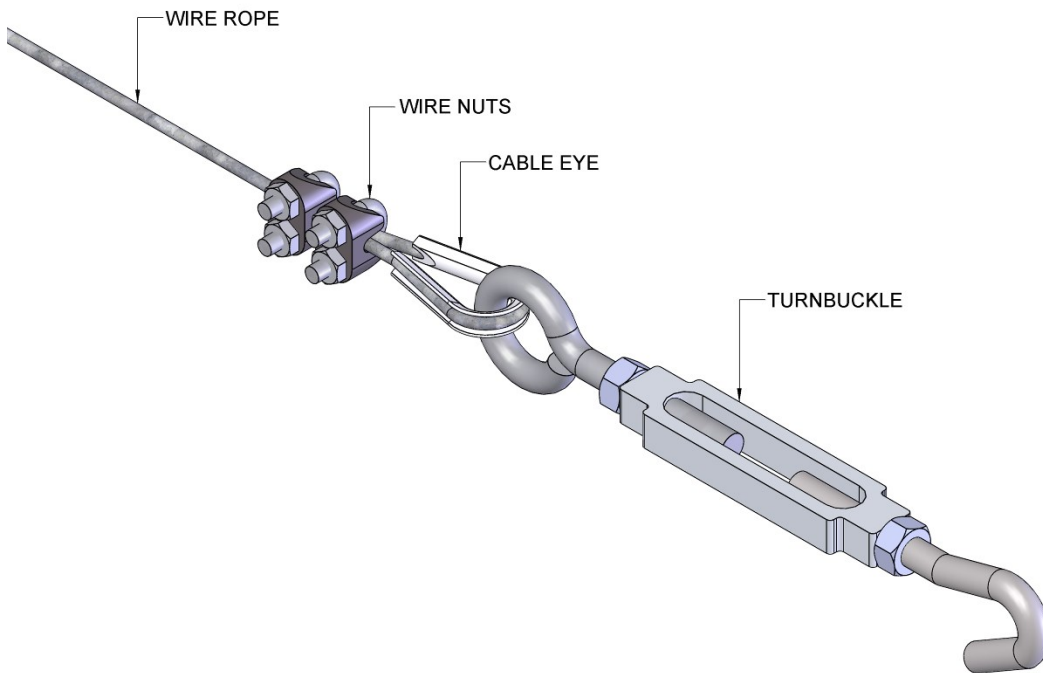
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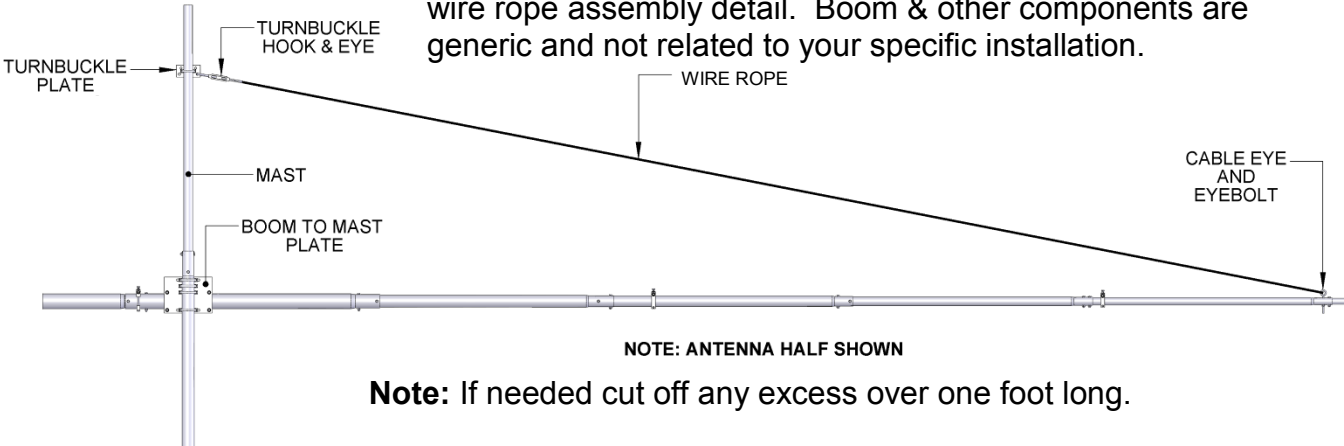
# WIRE ROPE ASSEMBLY DETAIL



Wire rope assembly half is pre-assembled at factory as shown above. Complete the other end of the assembly using the supplied wire nuts, cable eye and turnbuckle as shown below. In some

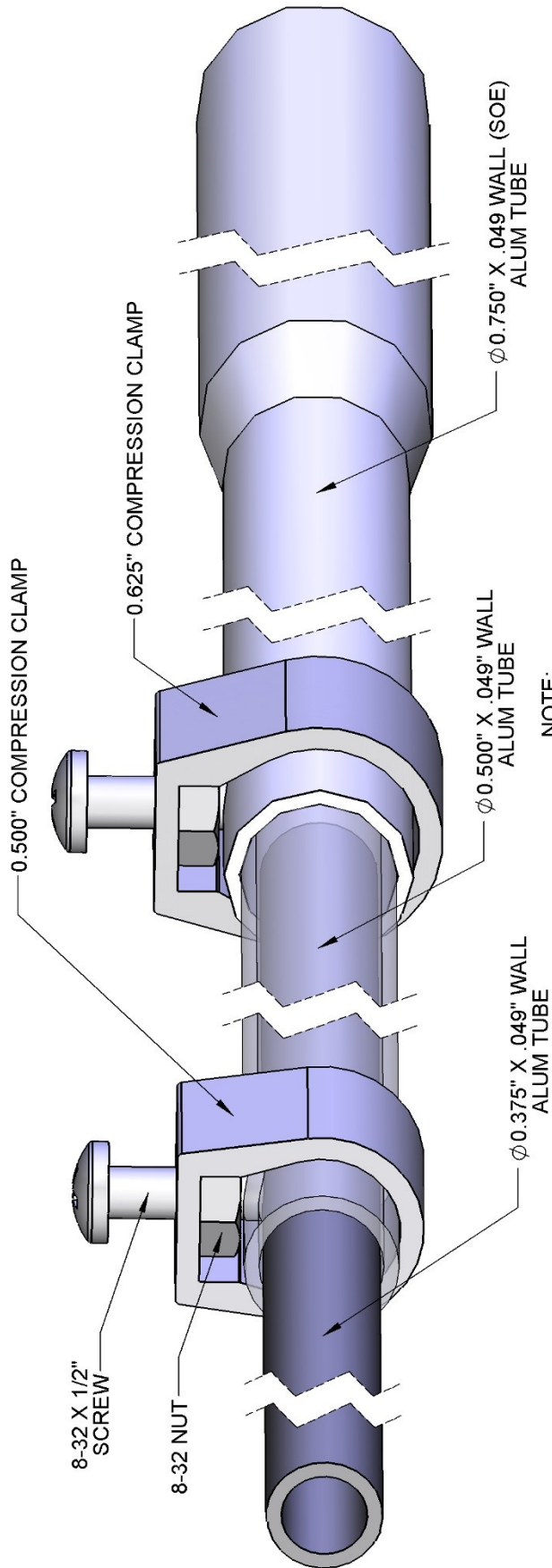


**Note:** Picture below is used only to show overhead support wire rope assembly detail. Boom & other components are generic and not related to your specific installation.



**Note:** If needed cut off any excess over one foot long.

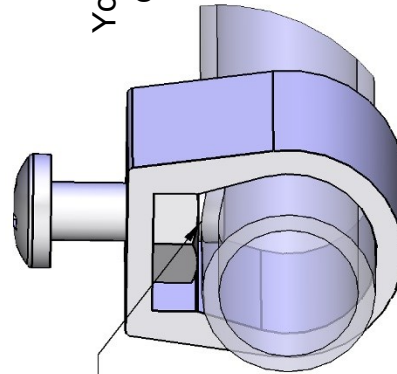
# GENERIC COMPRESSION CLAMP DETAIL



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



# 20M6-125 PARTS & HARDWARE

<u>DESCRIPTION</u>	<u>QTY</u>
BOOM SECTIONS, 3" X .125 X 180" SOE ALUM. TUBE .....	2
BOOM SECTIONS, 3" X .125 X 180" STRAIGHT ALUM. TUBE .....	2
BOOM SPLICE ASSEMBLY, 2-1/2 X 120" W/SPLICE RINGS .....	1
SIDE GUY TUBE, 1.5 X .058 X 60" .....	2
BOOM TO MAST PLATE, 3/8 X 12 X 12" (M2APT0250).....	1
SIDE GUY PLATE, 6 X 8 X .3/16" (M2APT0088).....	1
1-1/2 X .058 X 30" ALUM. TUBE .....	12
CENTER SLEEVE, 1-3/8 X .058 X 52" .....	5
CENTER SLEEVE, 1-3/8 X .058 X 26" .....	2
1-1/4 X .058 X 48" ALUM. TUBE SOE.....	12
1-1/8 X 43-1/2" SLEEVE .....	12
1 X .058 X 48" ALUM TUBE .....	12
7/8 X .058 X 32" ALUM. TUBE .....	12
7/8 X .058 X 23" ALUM. TUBE .....	12
3/4 X .049 X 53" ALUM. TUBE SOE.....	12
1/2 X .049 X SEE DIMENSIONS, ALUM. TUBE STRAIGHT .....	12
FIBERGLASS INSULATOR, 1-1/4 X 24" (M2AFG0034).....	1
HAIR PIN TUBE, 3/8 X 40" .....	2
ELEMENT CLAMP BLOCK, 3 X 6 X 1/2" (M2AEC0041) .....	12
MACHINED CRADLE, 3" LD (M2AMC0136).....	12
BALUN, 1:1 3-30 MHZ STANDARD .....	1
TURNBUCKLE PLATE, 2 X 5 X .25" (M2APT0110).....	2
WIRE ROPE, 1/8" X 334" WITH 3/8" FORGED EYEBOLT (27' 5") .....	1
WIRE ROPE, 1/8" X 280" WITH 3/8" FORGED EYEBOLT (23').....	1
DACRON ROPE, BLACK, 5/16 X 32 FT.....	1
DACRON, 3/16" X 120 FT. ....	1
TURNBUCKLE, 3/8" X 6" FORGED .....	4
EYEBOLT, 3/8" X 6" STANDARD .....	2
EYEBOLT, 1/4" X 3" FORGED .....	4
CABLE TIES, LARGE .....	5
U-BOLT & CRADLE, 3".....	4
U-BOLT & CRADLE, 2-1/2" .....	1
U-BOLT & CRADLE, 2" HD .....	4
U-BOLT & CRADLE, 2".....	2
U-BOLT & CRADLE, 1-1/2" .....	4
COMPRESSION CLAMP, 5/8" (M2AMC0145).....	12
ASSEMBLY MANUAL.....	1
 <b><u>HAIRPIN PARTS BAG</u></b>	
POLY DISC, 1-1/4" (M2ADI0020).....	2
SHORTING BAR, HAIRPIN 1/2 X 1/2 X 5" (M2ASB0262) .....	1
BALUN 'L' BRACKET, 1 X 1 X 1/8 X 6" (M2APT0016) .....	1
BAND CLAMP, 3-1/2", #52 WITH HOLE, SS .....	1
CLAMP BLOCK, HAIRPIN, 1" X 1/4 X 1-1/4" (M2AMC0261).....	4
SPACER, HAIRPIN, 3/8" X 1" TUBE .....	1

# 20M6-125 PARTS & HARDWARE

## **HARDWARE BAGS**

BOLT, 1/4-20 X 3-1/2" SS .....	8
BOLT, 1/4-20 X 3" SS .....	24
BOLT, 1/4-20 X 2-3/4" SS .....	36
BOLT, 1/4-20 X 2-1/2" SS .....	2
BOLT, 1/4-20 X 2-1/4" SS .....	1
BOLT, 1/4-20 X 2" SS .....	10
SET SCREWS, 1/4-20 X 1/4 SS .....	2
LOCKWASHER, 1/4" SPLIT RING SS.....	24
NUT, 1/4-20 LOCKING SS .....	59
NUT, 5/16-18 SS .....	14
LOCKWASHER, 5/16 SS .....	14
NUT, 3/8-16 SS .....	18
LOCKWASHER, 3/8 SPLIT RING SS .....	18
SCREW, 8-32 X 1-3/4" SS .....	24
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 .....	72
NUT, 8-32, SS .....	12
CABLE CLIPS, 1/8" .....	4
CABLE EYE, 1/8" .....	2
ALLEN WRENCH, 1/8" .....	1
PENETROX, CUP .....	2

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