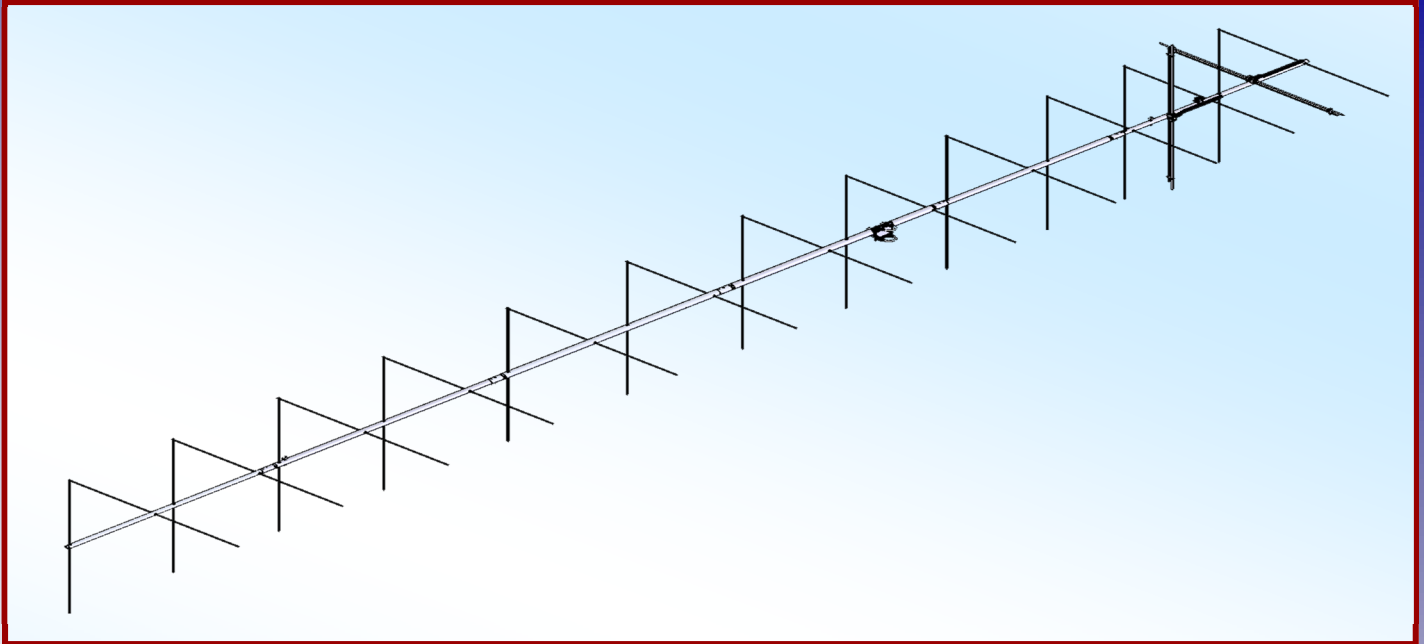




# M2 Antenna Systems, Inc. Model No: 138XP30



## SPECIFICATIONS:

Model .....	138XP30	Power Handling.....	1.5 kW
Frequency Range.....	137 To 138.8 MHz	Boom Length / Dia .....	362"/ 2 1/2" to 2"
Gain.....	19.34 dBi	Turning Radius:.....	Call
Front to back .....	19 dB Typical	Stacking Distance .....	Call
Feed type .....	T-Match	Mast Size .....	2" Nom.
Feed Impedance .....	50 Ohms Unbalanced	Wind area / Survival.....	3.2 Sq. Ft. / 100 MPH
Maximum VSWR.....	1.2:1 Max	Weight / Ship Wt. ....	75 Lbs. / 85 Lbs.
Input Connector.....	"N" Female		

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

## FEATURES:

The 138XP30 is a heavy duty, high performance cross polarized antenna with a remarkably clean pattern. The pattern is important in order to match the antenna's noise temperature with modern low noise preamps. This antenna is ideal for specialized satellite communications. The CNC machined driven element module is O-ring sealed and weather tight for low maintenance and long-term peak performance. Internal connected are encapsulated in a space-age silicone gel that seals out moisture and improves power handling. The large 3/8" 6061-T6 rod elements are centered to minimize interaction and maintain good ellipticity. Insulators are UV stabilized and locked in place with stainless keepers. Rugged construction, uncompromising performance: that's the M<sup>2</sup> 138XP30.

# 138XP30 ASSEMBLY MANUAL

**TOOLS REQUIRED FOR ASSEMBLY:** 1/2" and 7/16" end wrenches or sockets, pliers, measuring tape.

## ASSEMBLING THE BOOM

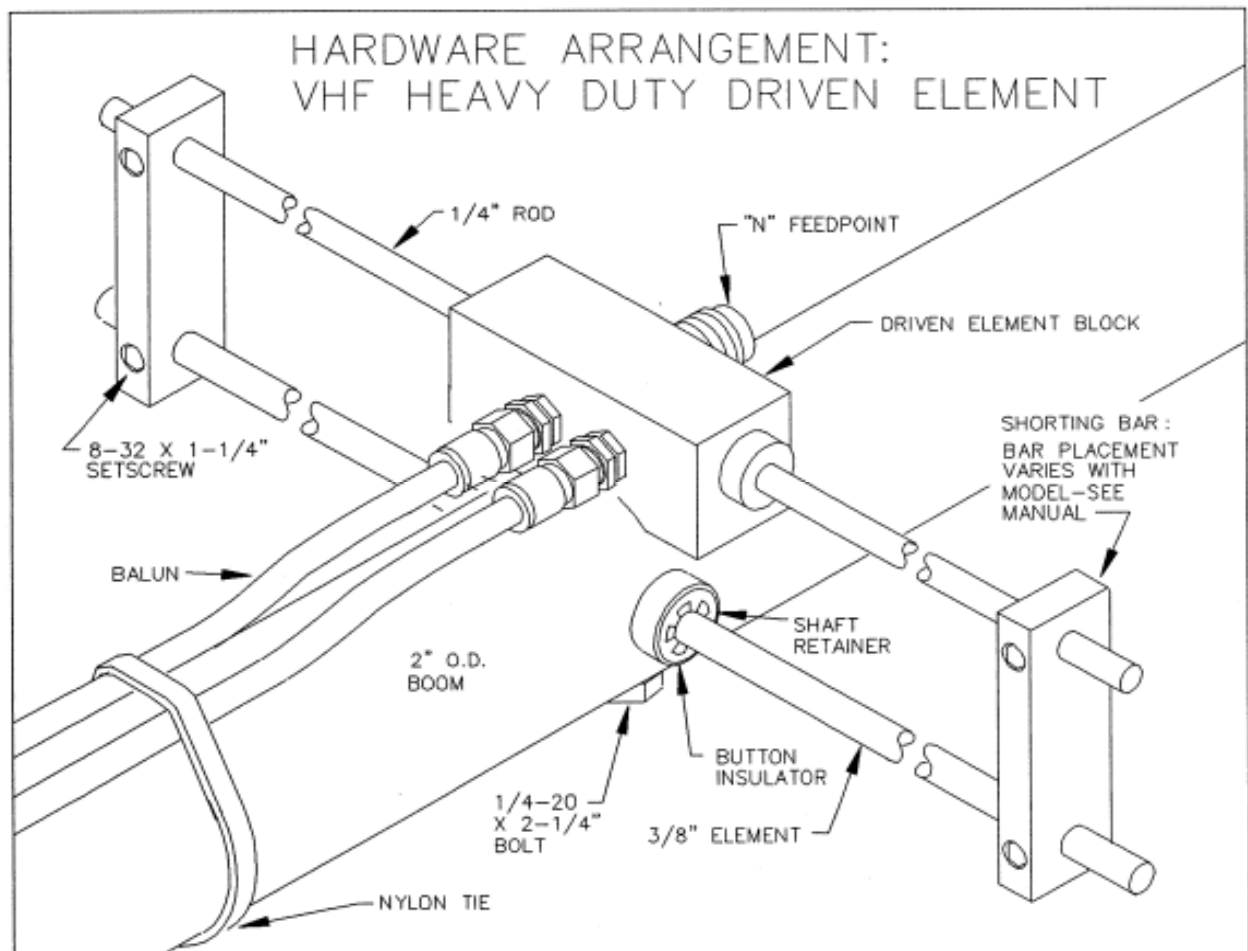
1. Install two 1" x 2-1/4" O.D. BUSHING RINGS to inner end of each 2" boom section. Align holes on one bushing with hole set at 5-1/2" from boom end and secure with 8-32 x 1/8" setscrew (Allen wrench supplied). The second bushing is installed flush with boom end. Align holes and secure with setscrew. Repeat for remaining boom section.
2. Refer to Dimension Sheet and note boom hole positions for orientation: REAR of central section has first 5/8" element hole at 18-7/16" from end. Before assembling boom sections, slide two 2-1/2" ring clamps about 80" onto the rear end of the central boom section and position about 8" apart, clear of any element holes.
3. Secure 1/4" x 8" x 8" BOOM TO MAST PLATE to flat faces of ring clamps with 1/4-20 x 1-1/4" bolts and locknuts. Loosely install 1/4-20 x 1" bolts and locknuts into ring clamp fingers. Proceed with boom assembly. Rear 2" boom section has more holes than front section. Assemble the bushed end of the 2" boom sections into the central 2-1/2" boom section, align holes and secure with 1/4-20 x 3" bolts and locknuts.

MODELS SUPPLIED WITH HEAVY DUTY "H" FRAME:

4. Slide X-Brace Mounting Ring 20" onto rear of boom and install 1/4-20 x 1" CAPSCREW finger tight (components supplied with "H" frame hardware).

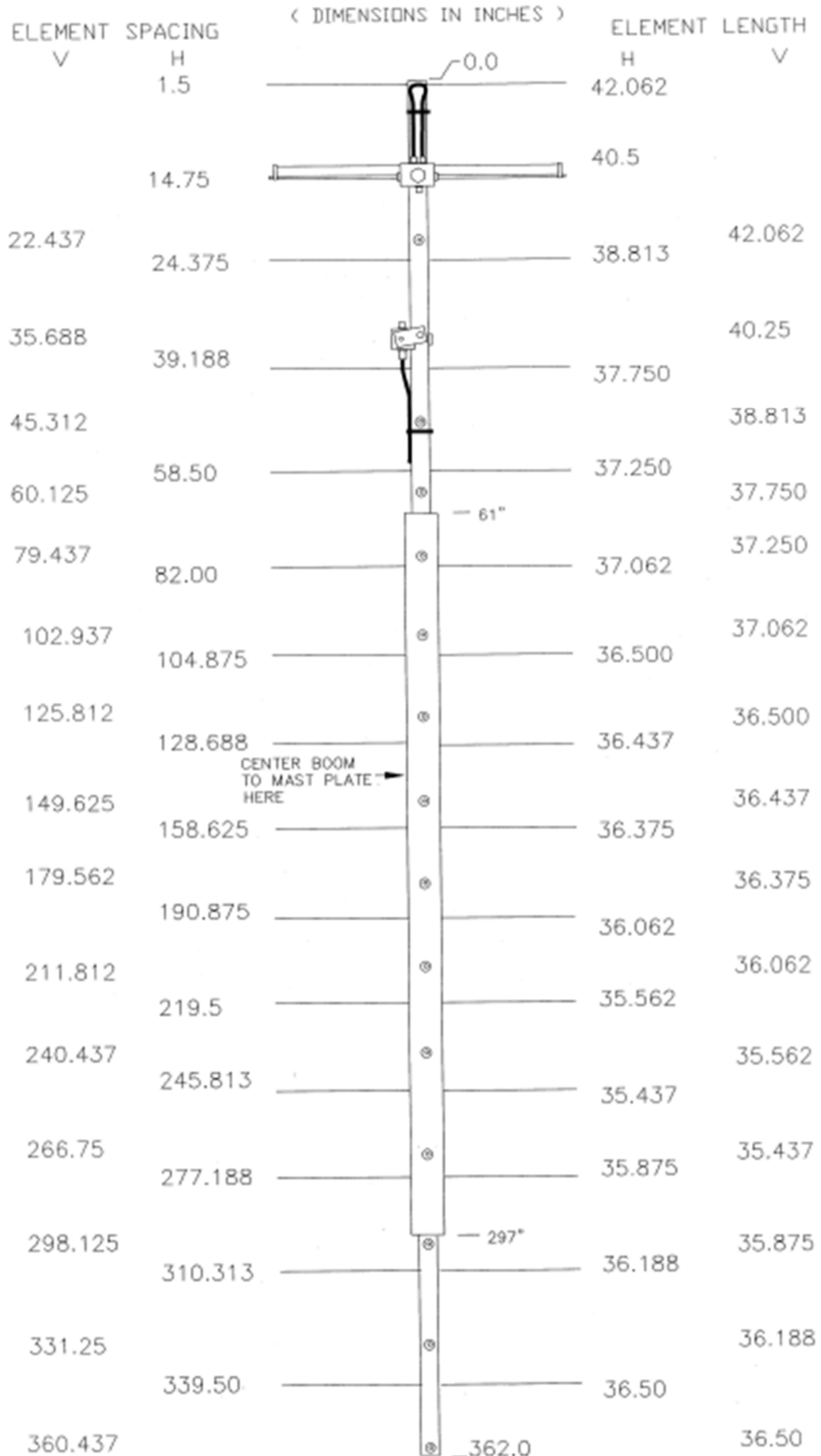
## ASSEMBLING THE HORIZONTAL ELEMENTS

1. Separate 3/8" ROD elements by length into two identical sets, "H" and "V". Position the "H" element set along the boom by length and spacing as shown the DIMENSION sheet. Start with the REFLECTOR (longest) element. Balance it on your finger to find rough center and push on a black button insulator to about 1" off center. Push the element through the holes 1" from the rear of the boom and install the second button, snugging it up into boom. DO NOT BOTHER CENTERING the element at this time and DO NOT INSTALL the stainless steel SHAFT RETAINERS yet. It is easier to do it after all the horizontal elements are installed in the boom.



# 138XP30 DIMENSION SHEET

## 138XP30 DIMENSION SHEET



DECIMAL TO FRACTION CONVERSION

.062 = 1/16"
.125 = 1/8"
.188 = 3/16"
.250 = 1/4"
.313 = 5/16"
.375 = 3/8"
.437 = 7/16"
.50 = 1/2"
.562 = 9/16"
.625 = 5/8"
.688 = 11/16"
.750 = 3/4"
.813 = 13/16"
.875 = 7/8"
.937 = 15/16"
1.00 = 1"

# 138XP30 ASSEMBLY MANUAL

2. Install the 3/8" DRIVEN ELEMENT as you did the reflector and then the DIRECTOR ELEMENTS. When the 2-1/2" boom section is reached, set first button insulator about 1-1/4" off center.
3. Now accurately center the elements using a tape measure. EQUALIZE the amount of tube sticking out on each side of the boom. Once you have all the elements centered, sight down the element tips from the rear comparing each side. Look for any obvious discrepancies and correct if found.
4. Begin installing the stainless SHAFT RETAINERS. Use thumb and index finger to hold a retainer over end of the 3/8" x 3" push tube (keeper dished into tube). Hold the element firmly and start the retainer onto the rod by applying pressure with the push tube. Push the retainer until up tight against the button insulator (Locking pliers, clamped up against opposite button insulator will help maintain center reference and keep you from pushing the tube off center. Alternately, grab the opposite side of the element near the boom and pull it hard sideways to the boom to preload and increase the friction of the element on the button insulators while pushing the retainer. Do all the retainers on one side first, DOUBLE CHECK CENTERING and then do the other side. Continue installing retainers until all HORIZONTAL elements are locked in place.
5. Mount the HORIZONTAL DRIVEN ELEMENT BLOCK / 1/4" ROD ASSEMBLY to the TOP of the boom using a 1/4-20 x 2-1/4" bolt WITH A LOCKWASHER UNDER THE HEAD OF THE BOLT. Orient the block with the two balun connectors facing backward, "N" connector to front.
6. Install the 8-32 x 1/4" set screws (internal Allen head - tool supplied) into the SHORTING BARS. Slide the bars onto the 3/8" driven element tubes and on over the 1/4" Driven Element "T" match Block Rods. Position the Shorting Bars per the DIMENSION SHEET. Align the rods parallel and the bars with each other and tighten the set screws moderately at this time to keep the bars in place. Final tightening should be done after each antenna has been checked out electrically with an antenna analyzer or SWR bridge.

## ASSEMBLING VERTICAL ELEMENTS

1. Repeat steps #1 through #6 for the Vertical elements, using the Dimension Sheet as your guide to lengths and spacing. Note the vertical driven element block should be mounted on the right side of the boom when the rear driven block is up. The two connectors for the balun face to the front. NOTE WHEN INSTALLING THE SHORTING BARS THAT THE DIMENSIONS ARE DIFFERENT FOR THE FORWARD SET OF ELEMENTS.

## COMPLETING ANTENNA

1. Before installing the Baluns, thread 3/8" SEAL NUTS fully onto all "F" connectors, with the black Neoprene face of the nuts facing out. Attach Baluns to the Driven Element Blocks as shown on the drawing. Tighten the connectors gently using a 7/16" end wrench. Once the connectors are tight, back the Seal Nuts out and finger-tighten firmly up against the face of the connectors (or righten gently with 1/2" end wrench). A lot of torque is unnecessary. Depending on model and polarity, a balun may loop around an element in the other polarity. This is normal. Form baluns close to the boom and secure with a nylon cable tie. Also secure feed coax with cable ties. Ties should be snug but not crushing or kinking the coax.
2. Adjust the 8" x 8" boom mounting plate to its desired orientation and position at balance point. Keep hardware at least 1/2" from nearest element. Tighten the 1" boom ring clamp bolts. Capture mast or crossboom between a pair of 3" saddle clamps and bolt to plate with 1/4-20 x 4" bolts and locknuts. Four sets of clamps and hardware are supplied.
3. The overhead guy system requires at least 18" of 3" mast above the antenna. Start by loosely assembling the 2" x 5" TURNBUCKLE PLATE to the mast with a 3" U-bolt and 3/8-24 stainless nuts and lockwashers, resting it just above the boom to mast plate. Uncoil the Phillstrand guy cable and install 5/16" eyebolts at ends into the 11/32" holes 30" from rear and 55" from front of the boom. Secure with stainless 5/16" nuts and lockwashers. Equalize excess cable at the boom to mast plate and cut.
4. Open the two turnbuckles until only one or two threads show inside body. Hook turnbuckles into turnbuckle plate. Open the two cable thimbles and install one into each turnbuckle eye. Support boom at boom to mast plate and allow ends to droop. Route rear cable through eye, around thimble and pull taut. Secure cable with 2 guy wire clips or 2 guy crimps (installer's choice). Repeat for front cable.
5. Now slide the turnbuckle plate up the mast until the boom is straight and the cables are set taut. Tighten 3" U-bolt. Minor adjustments can be made with the turnbuckles (safety-wire to preserve settings).

# 138XP30 ASSEMBLY MANUAL

## INSTALLATION NOTES:

1. The 138XP30 is a cross polarized antenna that creates fields in both H and V planes, or in ALL planes if phased and fed together for circularity. Mounting on a metal (conductive) mast or crossboom can severely affect performance. A 3" mast or crossboom of any NON-CONDUCTIVE material should be used. Fiberglass is the prime choice for its strength and weather resistance. Mount the antenna so that element tips are at least 12" from any conductive material (mast, tower, feedline, etc.)
2. Attach feedlines and fasten to the boom with cable ties. Use good quality coax and "N" connector for your feedlines. To provide stress relief use a nylon tie to secure feed coax near connector on each block. Route feedlines to rear of boom and secure again. Allow coax to hang in a loop between the rear end of the boom and the reattachment point (at least 12" beyond element tips) on the mast or crossboom. ***Do not route feedlines to boom to mast plate as exiting antenna here will adversely affect field.***

**THIS COMPLETES THE ANTENNA ASSEMBLY**

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# 138XP30 PARTS & HARDWARE

## 138XP30 PARTS LIST

DESCRIPTION	QTY
BOOM SECTION, 2 X .125 X 67".....	1
BOOM SECTION, 2 X .125 X 71".....	1
BOOM SECTION, 2-1/2 X .125 X 236".....	1
ELEMENTS, 3/8" ROD X Dimension Sheet.....	30
DRIVEN ELEMENT "T" MATCH BLOCK.....	2
BALUN, 1/2 WAVE RG-6U.....	2
BOOM TO MAST PLATE, .250 X 8" X8".....	1
SADDLE CLAMP, 3".....	6
RING CLAMP, 2-1/2".....	2
BUSHING, 1" X 2-1/4" O.D.....	4
GUY ASSEMBLY, 26' CABLE, EYEBOLTS, THIMBLES.....	1
ASSEMBLY MANUAL.....	1
U-BOLT & CRADLE, 3".....	1
TURNBUCKLE, 3/8".....	2
TURNBUCKLE PLATE, 2" X 5".....	1

### IN HARDWARE BAG:

SHORTING BAR.....	4
BUTTON INSULATORS, 3/8".....	60
SHAFT RETAINERS, 3/8" SS.....	60
LOCK NUT, 3/8-16.....	2
LOCK WASHER, 3/8.....	2
NUT, 5/16-18 SS.....	2
LOCK WASHER, 5/16 SS.....	2
BOLT, 1/4-20 X 4" SS.....	6
BOLT, 1/4-20 X 3" SS.....	4
BOLT, 1/4-20 X 2-1/4" SS.....	2
BOLT, 1/4-20 X 1-1/4" SS.....	4
BOLT, 1/4-20 X 1" SS.....	2
LOCK NUT, 1/4-20 X SS.....	16
SET SCREW, 8-32 X 1/4" SS.....	8
SET SCREW, 8-32 X 1/8" SS.....	4
CABLE THIMBLE, 3/16".....	2
CABLE TIE, 14" NYLON.....	6
ALLEN HEAD WRENCH, 5/64.....	1
NUTSEAL.....	4
PUSH TUBE, 3/8" X 3".....	1

STR = STRAIGHT TUBE  
SOE = SWAGED ONE END  
SBE = SWAGED BOTH ENDS

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