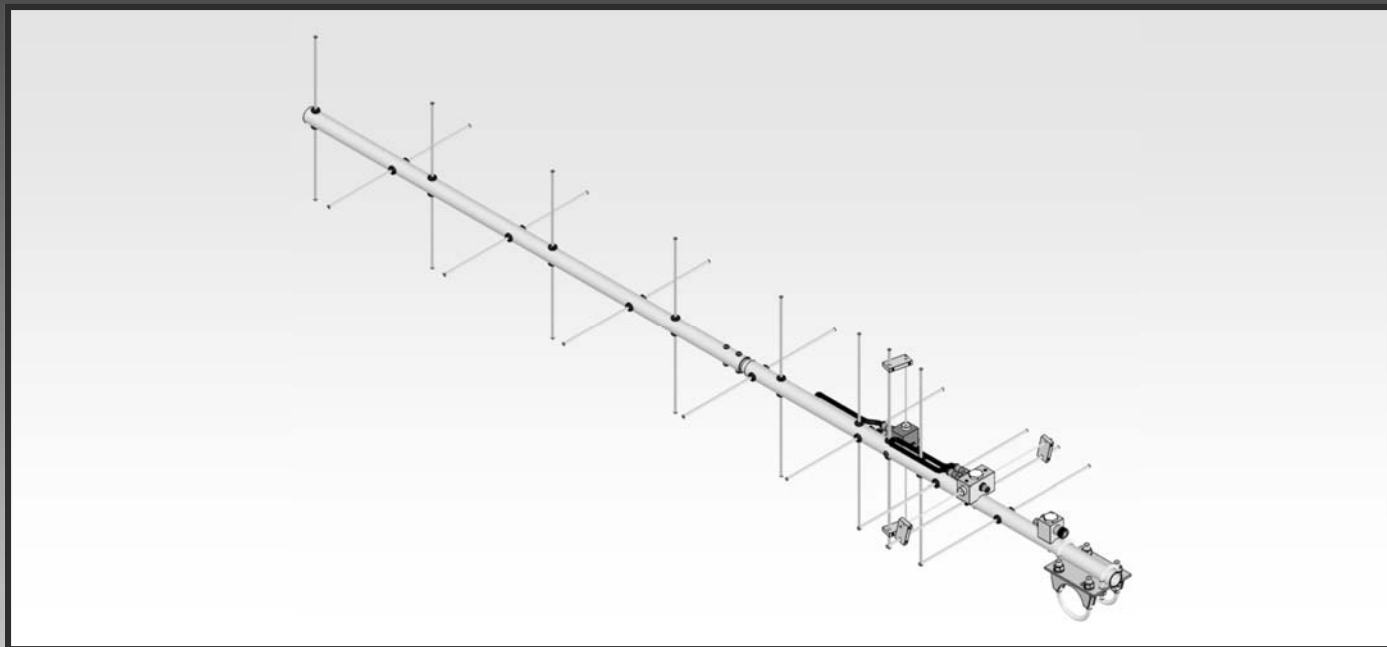




# M2 Antenna Systems, Inc.

## Model No: 436CP16



### SPECIFICATIONS:

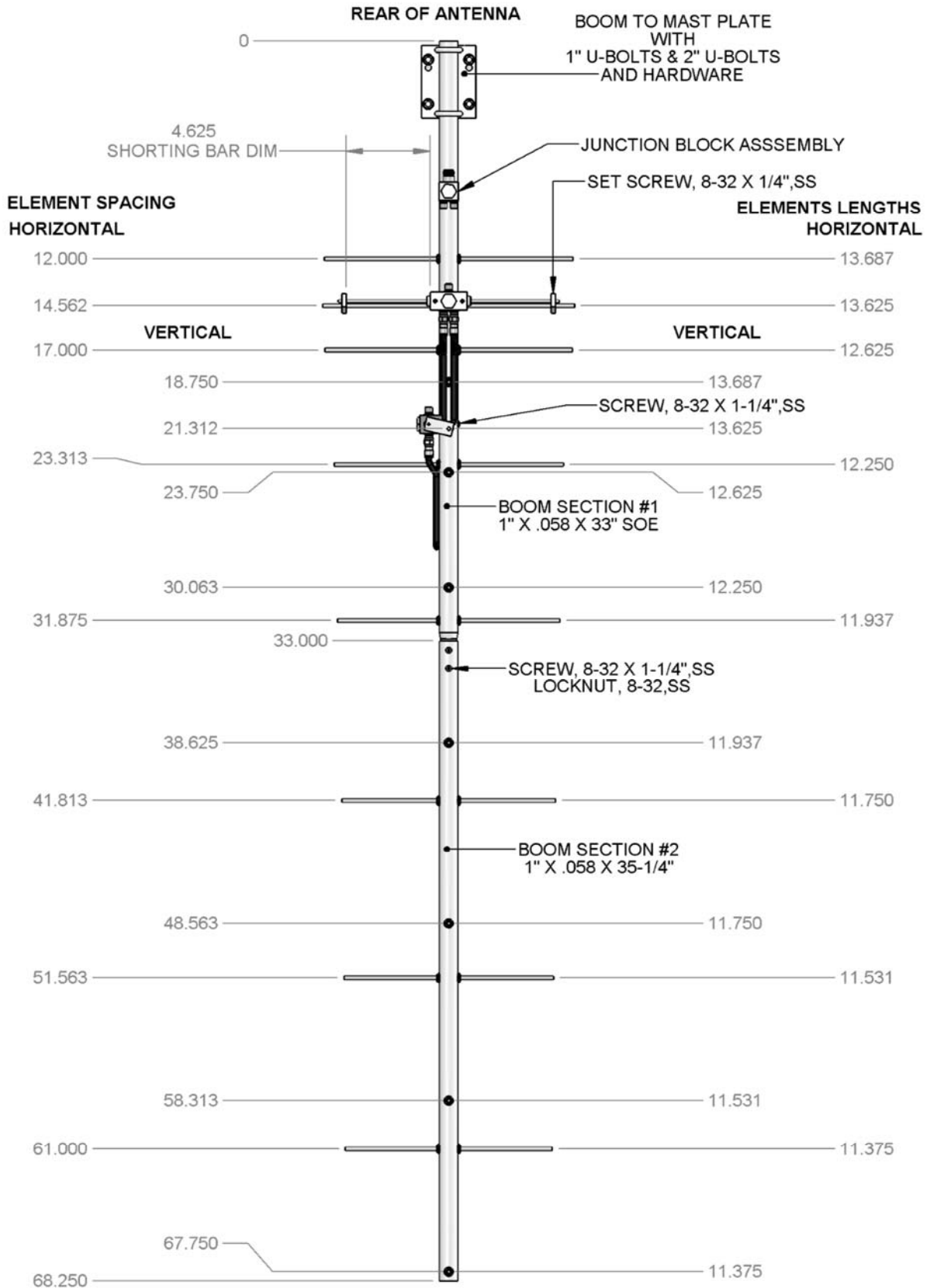
Model .....	436CP16	Power Handling .....	1 kW
Frequency Range.....	432 To 438 MHz	Boom Length / Dia.....	65-3/4" / 1"
*Gain .....	13.3 dBi	Maximum Element Length.....	13-3/4"
Front to back .....	15 dB Typical	Turning Radius: .....	64"
Beamwidth .....	42° Circular	Stacking Distance.....	36"
Feed type .....	Folded Dipole	Mast Size.....	1-1/2" to 2" Nom.
Feed Impedance. ....	50 Ohms Unbalanced	Wind area / Survival .....	0.4 Sq. Ft. / 100MPH
Maximum VSWR.....	1.5:1	Weight / Ship Wt.....	4 Lbs. / 7 Lbs.
Input Connector.....	"N" Female		

**\*Subtract 2.14 from dBi for dBd**

### FEATURES:

The 436CP16 is a light weight, circularly polarized antenna optimized for Low Earth Orbit (LEO) satellite communications or other applications where a small circular polarized antenna is required. Optimum match and gain are between 432 & 440 MHz for the satellite band. Rear mounted for easy coaxial cable routing. A preamp can be mounted close to the antenna for almost no coax loss before the preamp, maximizing your receive performance. Computer design techniques help keep spurious side lobes low down for optimum signal to noise ratios. This antenna features the same CNC machined, O-ring and silicone-gel sealed, driven element assemblies common to all M<sup>2</sup> Yagi antennas. This insures years of trouble free performance regardless of weather.

# 436CP16 DIMENSION SHEET



# 436CP16 ASSEMBLY MANUAL

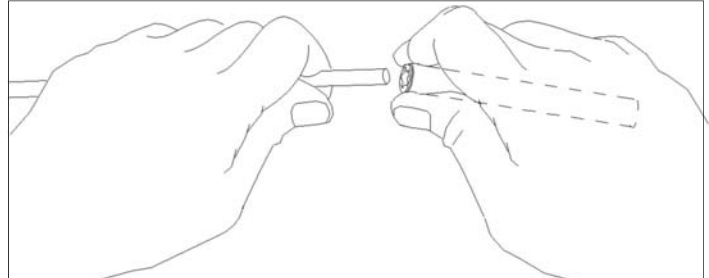
TOOL REQUIRED FOR ASSEMBLY: Screwdriver, 11/32 nut driver or wrench, 7/16" and 1/2" socket or end wrenches, measuring tape.

1. Locate boom sections #1 & #2.

## ASSEMBLING THE HORIZONTAL ELEMENTS

2. Lay out the elements by "H" length and position as shown in 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 1/2" off center. Push the element through the hole in 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.
3. Install the 3/16" rod DRIVEN ELEMENT as you did the reflector. Then continue with the installation of the DIRECTORS. **Note that the Director Elements MAY not consistently diminish in length from rear to front, so pay close attention to length and position.**
4. Now begin centering the elements. Use a tape measure to EQUALIZE, within 1/32", the amount the element 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. Correct any obvious misalignments.
5. Stainless steel SHAFT RETAINERS lock the elements in place. They should always be used for permanent and long term antenna installations. For portable or temporary use, the button insulators are adequate for holding the elements and the retainers may be left off.

To install the stainless steel SHAFT RETAINERS, use thumb and forefinger to hold the retainer over the end of the PUSH TUBE (3/8" x 3" tube, supplied in the kit), internal fingers on retainer dished into tube. HOLD THE ELEMENT FIRMLY TO PREVENT IT FROM SLIDING OFF CENTER and press the retainer onto the element end and continue until retainer butts on insulator button. Locking pliers,



**lightly** clamped up against opposite button insulator will help maintain center reference (if you push the first retainer too far, remove element from boom, push retainer completely off the element, and start over). Install another retainer to the opposite side of the element. Continue installing retainers until all elements are secured.

6. Mount the **HORIZONTAL** DRIVEN ELEMENT BLOCK / ROD ASSEMBLY to the **TOP** of the boom using a single 8-32 X 1-1/4" screw. Orient the block with the two balun connectors facing to front.
7. Install the 8-32 x 1/4" set screws (internal Allen head - tool supplied) into the SHORTING BARS. Slide the bars onto the 1/8" Driven Element Block Rods and the 3/16" driven element rod. Position the Shorting Bars as shown on the Dimension Sheet, with the given dimension between the outer face of the driven element block and the inner face of the shorting bar. Align the bars with each other and tighten the set screws.

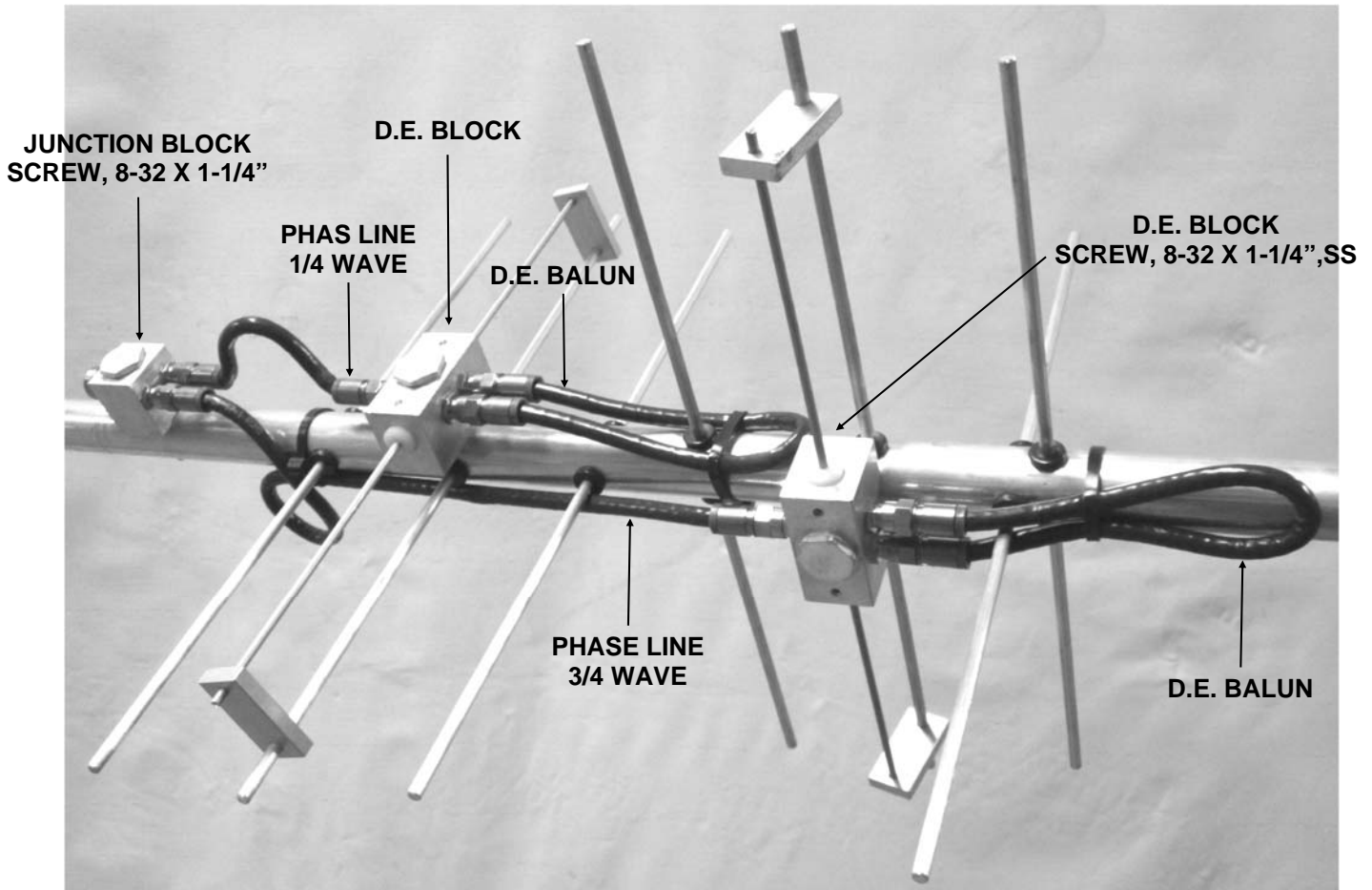
## ASSEMBLING THE VERTICAL ELEMENTS

8. Repeat steps #2 through #5 to install the Vertical elements, using the Dimension Sheet as your guide to lengths and spacing. Note: The vertical element set is shifted forward on the boom by 1/4 wavelength. This increases isolation between element planes, improving circularity and ease of phasing / matching the two element sets.

# 436CP16 ASSEMBLY MANUAL

9. INSTALLATION OF THE *VERTICAL* DRIVEN ELEMENT BLOCK DETERMINES THE CIRCULARITY OF THIS ANTENNA. THE ORIENTATION OF THE BLOCK FOR RHC - RIGHT HAND CIRCULARITY, IS SHOWN ON THE DIMENSION SHEET AND DRAWING AND DESCRIBED BELOW:

Viewed from the rear of the boom (rearmost Reflector HORIZONTAL), the *VERTICAL* Driven Element Block mounts to the *RIGHT* hand side of the boom with the two Balun connectors oriented to the *FRONT*. Secure with 8-32 x 1-1/4" screw. Install the Shorting Bars as in step #7.



10. Install **JUNCTION BLOCK** to boom with 8-32 x 1-1/4" screw. Depending on model, orientation of block may vary from drawing - see Dimension Sheet for exact placement. Attach Baluns and Phasing lines to the Driven Element Blocks and Junction Block as shown in the picture. Tighten the 'F' connectors **gently** using a 7/16" end wrench. Depending on model and polarity, the Vertical balun may loop around another element. This is normal. Form balun coax until it is close to the boom and secure with a nylon cable tie. Also secure the other balun and the matching / phasing harness coax with cable ties. Ties should be snug but not crushing or kinking the coax.
11. Use good quality coax and "N" connector for your feedline (see Installation Tips). Secure feed coax near connector on Junction Block, to provide stress relief. 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 cross boom. **Do not route feed line to boom to mast plate as exiting antenna here will adversely affect circular field.**

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12. The boom to mast plate is at the REAR of the boom. Use two 1" U-bolts and the stainless nuts and lock washers provided. DO NOT OVER TIGHTEN. 2" U-bolts (and stainless steel nuts / lockwashers) are provided for mounting the antenna to your mast or cross boom, other sizes are available upon request.

## INSTALLATION TIPS

13. A circular polarized antenna creates fields in all planes or polarities. Performance DETERIORATES SIGNIFICANTLY if it is CENTER MOUNTED on a metal (conductive) mast or crossboom. A mast or crossboom of any NON-CONDUCTIVE material can 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.).
14. Try to keep the cable run to under 100 ft. to prevent excessive signal loss.  
Recommended feedlines, in order of preference:  
Andrews or Celwave 1/2" hardline  
Times LMR400 or Belden 8214
15. To maintain proper phasing when stacking two or more antennas, mount each with the same orientation of Driven Element Blocks. DO NOT MOUNT IN MIRROR IMAGE. See the Specification Sheet for stacking distances. For more detailed stacking information contact M<sup>2</sup>.

**THIS COMPLETES THE ANTENNA ASSEMBLY.**

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

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# 436CP16 PARTS & HARDWARE

DESCRIPTION	QTY.
Boom Section #1, 1 x .058 x 36" SOE .....	1
Boom Section #2, 1 x .058 x 35-1/4" .....	1
Elements, 3/16" alum. rod x (see dims.) .....	16
Driven Element Assembly.....	2
Junction Block Assembly (SADE0065).....	1
Balun Cable, RG6-U 1/2 Wave.....	2
Phase Line Cable, RG6-U 3/4 Wave .....	1
Phase Line Cable, RG6-U 1/4 Wave .....	1
Shorting bars, .75 x 1.532 x .250" (M2ASB0080) .....	4
Boom to mast plate, 3 x 4 x .125" (M2APT0019).....	1
U-bolt and cradle, 1-1/2" .....	2
U-bolt, 1" .....	2
Assembly instructions .....	1

## IN HARDWARE BAG

Button insulators, 3/16" black .....	32
Shaft Retainers, 3/16" ss .....	32
Nut, 5/16-18 ss .....	4
Lockwasher, 5/16" ss.....	4
Screw, 8-32 x 1-1/4" panhead ss .....	5
Set screw, 8-32 x 1/4" ss .....	8
Locknut, 8-32, ss .....	2
Nuts, 1/4-20 ss.....	4
Lockwasher, 1/4-20 ss .....	4
Allen wrench, 5/32" .....	1
Push tube, 3/8 x 3" (for keeper installation) .....	1
Cable ties, 8".....	5

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