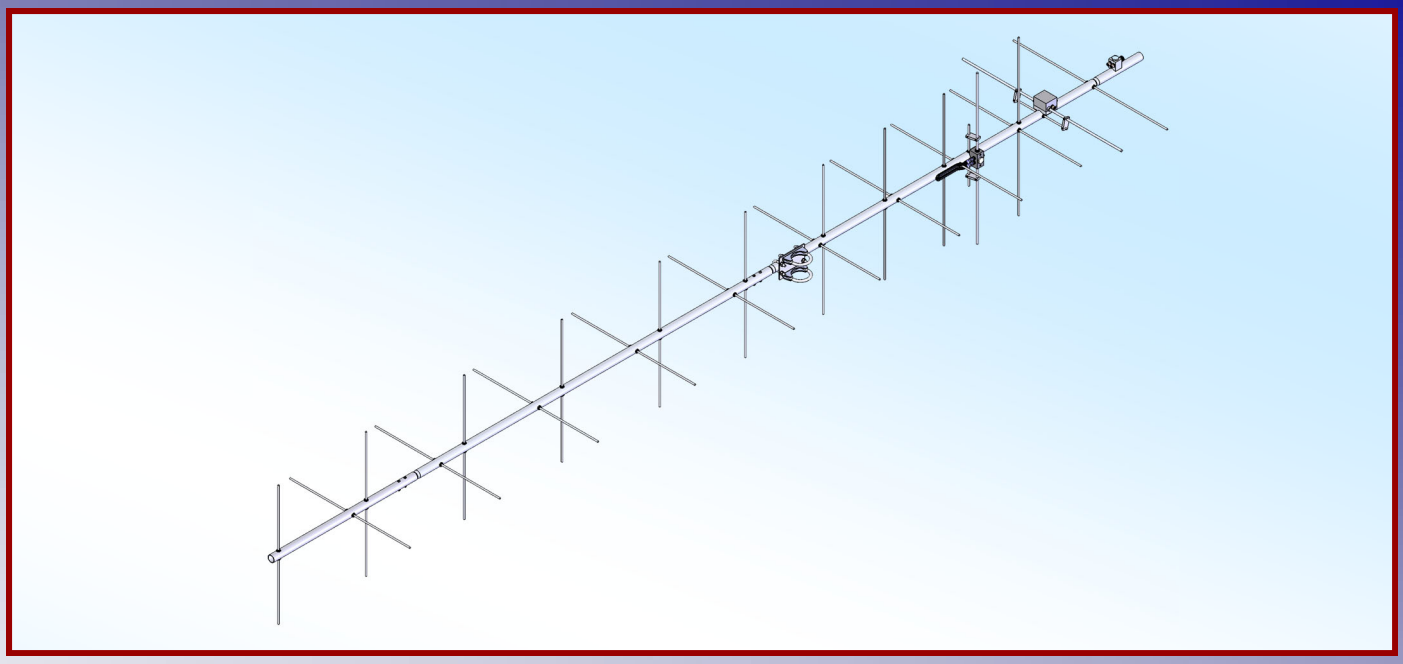
M2 Antenna Systems, Inc.
Model No: 402CP18



SPECIFICATIONS:

Model	402CP18
Frequency Range	400-423 MHz
*Gain	15.64 dBi
Front to back	19 dB Typical
Feed type	"T" Match
Feed Impedance.	50 Ohms Unbalanced
Maximum VSWR	1.6:1 Typical
Input Connector	"N" Female
Power Handling	1 kW
Boom Length / Dia	54" / 1-1/2"
Maximum Element Length	15"
Turning Radius:	Call
Stacking Distance	34"
Mast Size	1-1/2" to 2" Nom.
Wind area / Survival	1.0 Sq. Ft. / 100 MPH
Weight / Ship Wt.	7 Lbs. / 9 Lbs.

***Subtract 2.14 from dBi for dBd**

FEATURES:

The 402CP18 is high performance circular 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 satellite work but is also excellent for terrestrial uses like ATV, repeater operation, and long haul tropo DX.

The CNC machined driven element module is O-ring sealed and weather tight for low maintenance and long-term peak performance. Internal connections are encapsulated in a space-age silicone gel that seals out moisture and improves power handling. The 3/16" 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 for the boom length: that's the M^2 402CP18 !

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Rev.00

402CP18 ASSEMBLY MANUAL

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

1. Install the horizontal Driven element assembly with the “F” connector to the rear of the boom as shown in the DIMENSION SHEET.

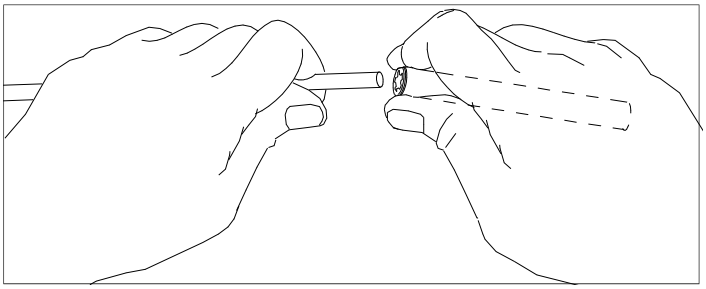
ASSEMBLING THE HORIZONTAL ELEMENTS

2. Lay out the elements by “H” length and position 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 1/2” off center. Push the element through the holes 10.00" 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.

3. Continue with the installation of the DIRECTORS. ***Note that the Director Elements do 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 PLASTIC PUSH TUBE
(5/8" 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 VERTICAL DRIVEN ELEMENT ASSEMBLY to the **SIDE** fo the boom using a single 8-32 X 1-3/4" screw. Orient the assembly with the ”f” connector facing to rear as shown on dimension sheet

ASSEMBLING THE VERTICAL ELEMENTS

7. 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.

8. I**NSTALLATION OF THE *VERTICAL* DRIVEN ELEMENT BLOCK DETERMINES THE CIRCULARITYOF 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 “f” connector oriented to the REAR. Secure with 8-32 x 1-3/4” screw.

402CP18 ASSEMBLY MANUAL

9. Install JUNCTION BLOCK to boom with 8-32 x 1-3/4" screw. Depending on model, orientation of block may vary from drawing - see Dimension Sheet for exact placement. Before installing the Matching / Phasing Harness, thread 3/8" SEAL NUTS fully onto all connectors, with the black Neoprene side facing out. Attach the Phasing lines to the Driven Element Blocks and Junction Block as shown on the Dwg. 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 tighten ***gently*** with 1/2" end wrench). A lot of torque is unnecessary. Secure the matching / phasing harness coax with cable ties. Ties should be snug but not crushing or kinking the coax.

10. 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. Route feed line to the rear of antenna and loop coax around the 3" cross boom to allow for elevation movement

11 The boom to mast plate is mounted to the rear of the boom. Use the 3" cradles and 1/4-20 x 4.00 bolts and locknuts provided to mount the BTM plate to the cross boom. Use the 1 1/2" cradles and 1/4-20 x 2 3/4 bolts and lock nuts provided to mount antennas to the BTM plates. See the dimension sheet for the proper stacking distance. Orientated the antennas exactly the same, not mirror image. Antenna orientation is critical, miss orientation of antennas will severely disturb the performance of the array.

INSTALLATION TIPS

12. A circular polarized antenna creates fields in all planes or polarities. Performance DETERIORATES SIGNIFICANTLY if it is mounted on a metal (conductive) mast or crossboom. Unless the metal boom is behind the rear most reflector element. For center mounted antennas 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.).

13. 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

14. 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^2.

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402CP18 PARTS LIST

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PARTS LIST

12-1-98

DESCRIPTION	QTY.
Boom section, 1.1/2 X .058 X 71.00 plain w/ sleeve	1
Elements, 3/8 x .049" alum.tube x (see dims.)	16
BTM plate 4.0 X 6.0 X 1/4 plate	1
Driven element assembly,	2
Junction Block assembly	1
Phasing line, RG6-U quarterwave length	1
Phasing line, RG6-U three quarterwave length	1
1 1/2 cradle	4
3.0”cradle"	4
Assembly instructions	1
IN HARDWARE BAG	
Button insulators, 3/8" black	32
Shaft Retainers, 3/8" ss	32
Screw, 8-32 x 1-3/4" panhead	3
Nuts, nyloc 1/4-20 ss	3
Bolt, 1/4-20 x 2 3/4 ss	4
Bolt, 1/4-20 x 4.0 ss	4
Seal nuts, 3/8-32 gold zinc	8
Push tube, 5/8 x 3" (for keeper installation)	1
Cable ties, 8"	4