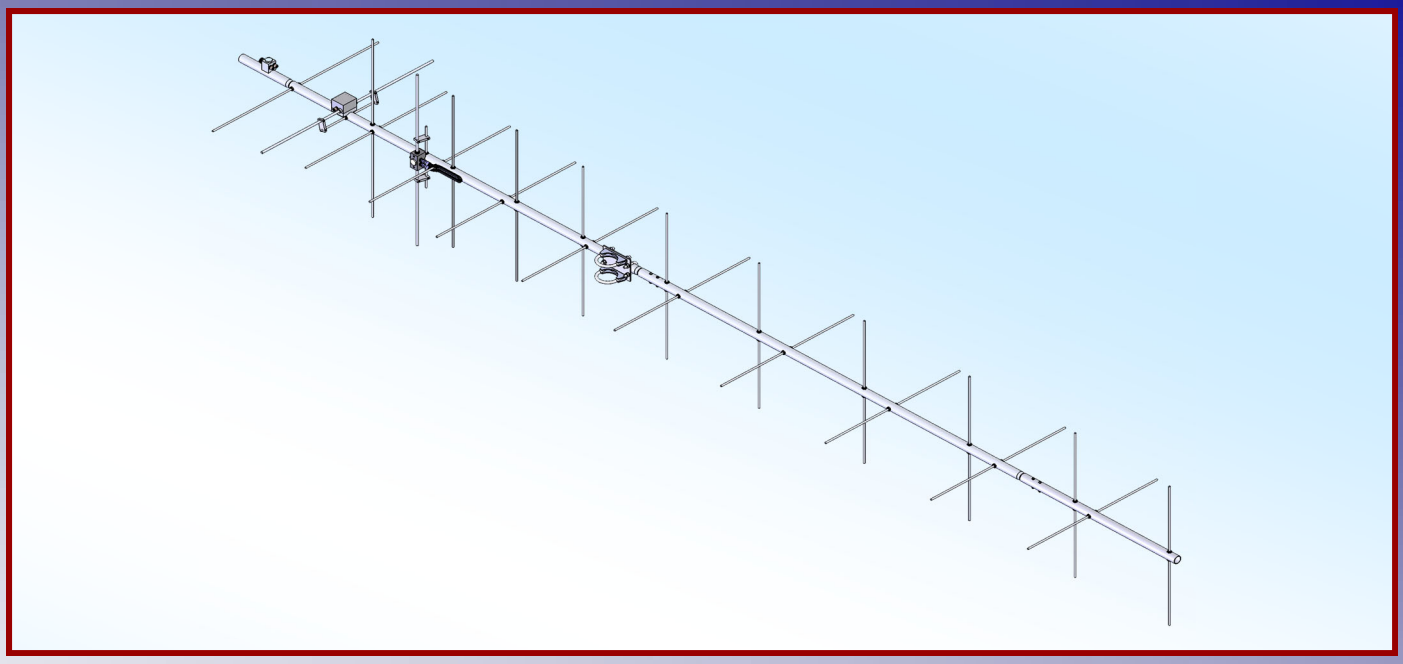
M2 Antenna Systems, Inc.
Model No: 167XP22



SPECIFICATIONS:

Model	167XP22
Frequency Range	163 To 175 MHz
*Gain	14.21 dBi
Front to back	18 dB Typical
Feed type	“T” Match
Feed Impedance.	50 Ohms Unbalanced
Maximum VSWR	1.5:1 Typical
Input Connector	“N” Female
Power Handling	1.5 kW
Boom Length / Dia	217” / 1”- 3/4”
Maximum Element Length	37”
Turning Radius:	Call
Stacking Distance	Call
Mast Size	1-1/2” to 2” Nom.
Wind area / Survival	1.0 Sq. Ft. / 100 MPH
Weight / Ship Wt.	8 Lbs. / 10 Lbs.

***Subtract 2.14 from dBi for dBd**

FEATURES:

The 167XP22 is 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 satellite work but is also excellent for terrestrial uses.

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.

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167XP22 ASSEMBLY MANUAL

TOOLS REQUIRED FOR ASSEMBLY: 1/2”, 7/16” and 11/32” spin-tights, end wrenches or sockets, pliers, Philip head screw driver and measuring tape.

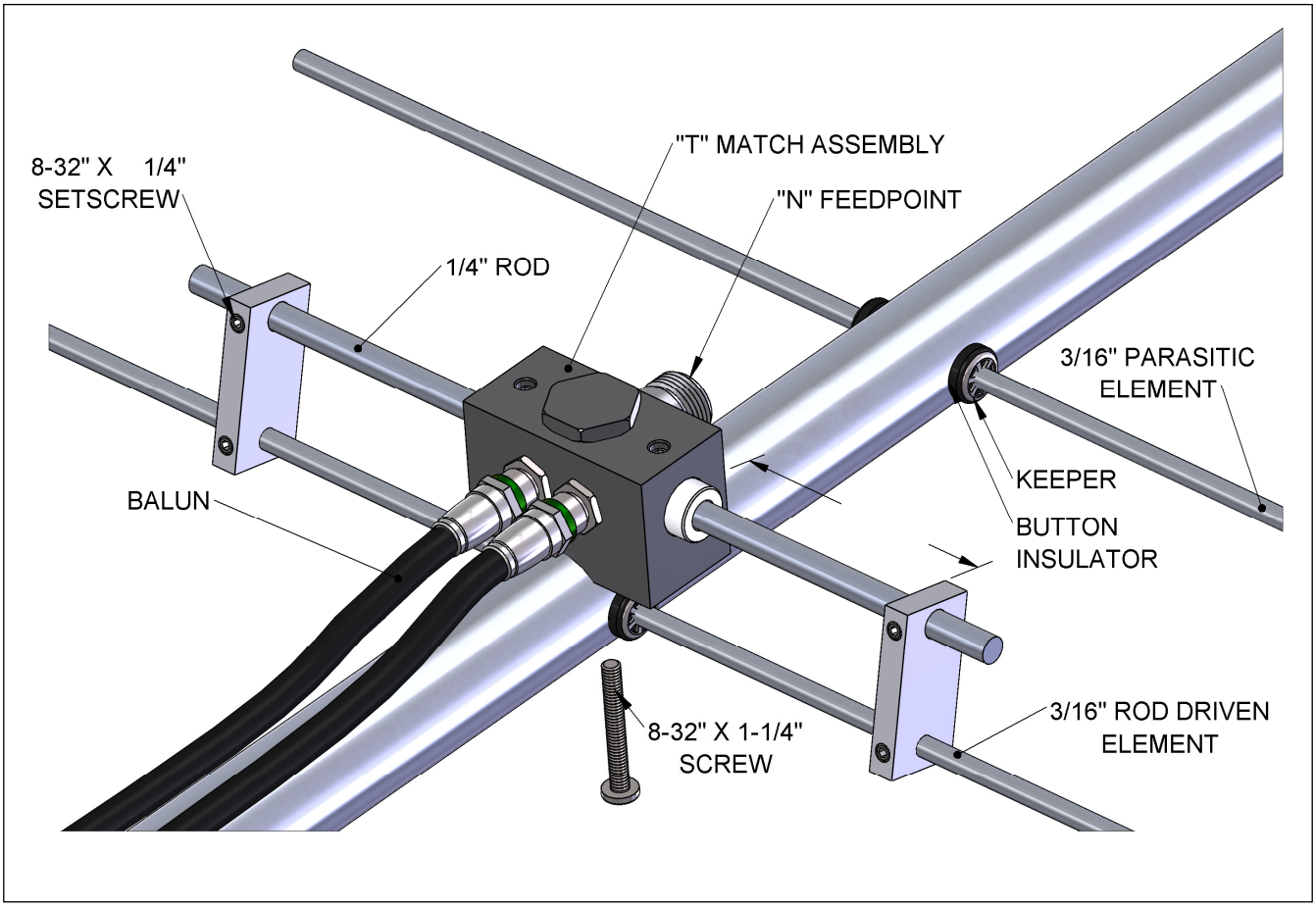
ASSEMBLING THE BOOM

1. Slip the 1-1/4” into the rear 1-1/2” section, align the holes and secure using (2) 8-32 x 2” screws. Add the 8-32 locknuts. Slip the 1” x 60” section into the 1-1/4” section. Align the holes and secure using (2) 8-32 x 1-1/2” screws and locknuts. Finally add the 3/4” diameter boom tip and secure using (2) 8-32 x 1-1/4” screws and locknuts. Tighten all hardware securely.

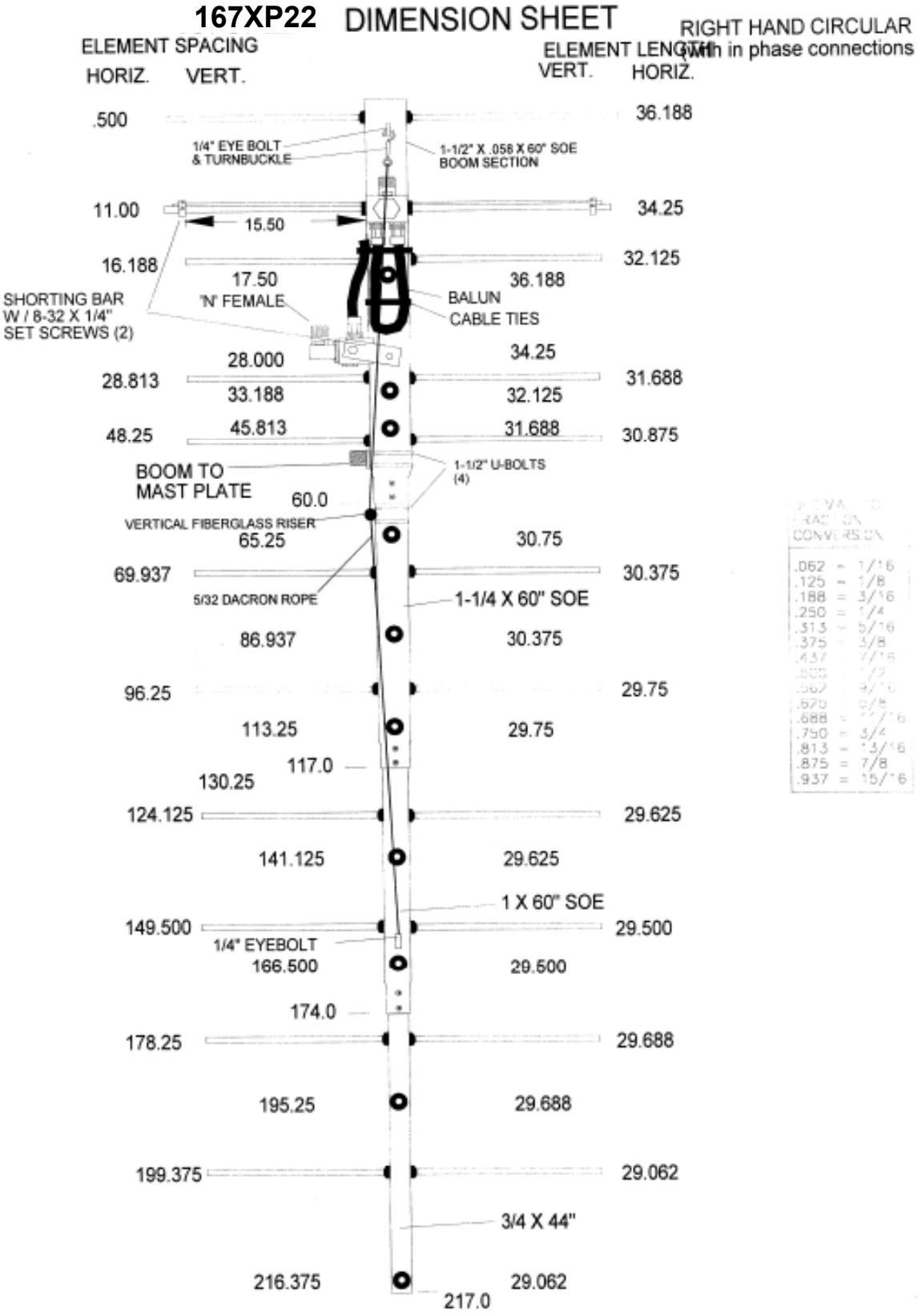
2. Set the boom up on bucks at waist level in preparation of element installation. It might be handy to install the large 6” x 8” x 3/16” boom to mast plate at this point as it can be “C” clamped to a bench to hold the boom steady for the following steps. Install the two 1/4” eye bolts. One eyebolt goes in the hole just in front of the rear reflector. The other attaches near the front of the 1” section.

INSTALLING THE ELEMENTS (NOTE: Deform the button insulators slightly with pliers to help hold the elements in place during assembly.

1. Separate the 3/16” rod elements by length into two sets, “H” and “V”. NOTE: THE LENGTH OF THE THIRD DIRECTOR DIFFER FOR THE HORIZONTAL TO VERTICAL SET. Install 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 3/4” off center. Push the element through the holes and install the second button, pushing 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 after all the horizontal elements are installed in the boom.



167XP22 DIMENSION SHEET



2. Install the 3/16” DRIVEN ELEMENT ROD as you did the reflector and then the DIRECTOR ELEMENTS.

3. Now accurately center the elements using a tape measure. EQUALIZE the amount of rod sticking out on each side of the boom within 1/16” or better. 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 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 8-32 x 1-3/4” screw. Orient the block with the two balun connectors facing forward, “N” connector to the rear.

6. Install the 8-32 x 1/4” set screws (internal Allen head - tool supplied) into the SHORTING BARS. Slide the bars onto the element rods and **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

7. 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 HAS A RIGHT ANGLE “N’ CONNECTOR and should be mounted on the RIGHT side of the boom when the rear driven block is up (LOOKING FORM THE REAR). The two connectors for the balun face the rear.

COMPLETING ANTENNA

1. Install the seal nuts on each female balun connector with the black neoprene seal out. Then install a balun to each driven element block connector. Form the balun coax away from the block in a single loop. Form closely to the boom and secure near the loop end with a nylon tie. Depending on the model, a balun may loop around an element in the opposite polarity. This is normal. Tighten the connectors gently with a 7/16” end wrench and then run the seal nuts up against the face of each male cable connector. Gently tighten about 3/4 turn beyond finger tight with a 1/2” end wrench.

OVERHEAD GUY SUPPORT ASSEMBLY:

1. Mount the small 3” x 4” plate where the second boom section just starts. Use 1-1/2” U-bolts, nuts and lockwashers. Add the two 1” U-bolts loosely and then insert the fiberglass mast section with the large end into the U-bolts. Align the top hole with the boom and tighten the nuts on the 1” U-bolts.

2. Tie one end of the 5/32 dacron guy rope to the front eyebolt. Thread the other end through the fiberglass mast top hole and back to the rear of the boom. Open up the 1/4” turnbuckle until just one thread shows on each end inside the body. Hook the turnbuckle into the rear eyebolt and attach the Dacron rope securely. Adjust the turnbuckle until the boom is straight.

NOTE: The 167XP22 is a cross polarized antenna that creates fields in both H and V planes. By combining the HORIZONTAL AND THE VERTICAL elements through equal lengths of 50 Ohm feed line and into an M2 2 port power divider, RIGHT HAND CIRCULAR POLARITY is created. By making one of the feed lines longer by 1/2 wavelength, LEFT HAND CIRCULAR POLARITY is created. LEFT HAND CIRCULAR can also be done at the time of assembly by mounting the REAR DRIVEN ELEMENT on the other side of the boom. Always mount this antenna at the rear as shown or on a nonconductive support mas and bring the feedlines off the rear.

Carefully Manufactured By
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167XP22 PARTS & HARDWARE

167XP22 PARTS LIST

DESCRIPTION	QTY.	
BOOM SECTION #1, 1-1/2” X .058 X 60” SOE	1	
BOOM SECTION (REAR), 2” X .058 X 30”	1	*OPTIONAL*
BOOM SECTION #2, 1-1/4” X .058 X 60” SOE	1	
BOOM SECTION #3, 1” X .058 X 40”	1	
BOOM SECTION #4, 3/4” X .049 X 46”	1	
ELEMENTS, 3/16” ROD (SEE DIMENSION SHEET)	22	
DRIVEN ELEMENT ASSEMBLY	2	
BALUN, RG-6 (1/2 WAVE)	2	
MAST ASSEMBLY, 3/8” X 18” ROD FIBERGLASS	1	
BOOM TO MAST PLATE, .125” X 3” X 4”	1	
BOOM TO 4” SQUARE SUPPORT BOOM	1	
GUY CORD, DACRON 5/32 X 180”	1	
COUNTERWEIGHT, 3” X 7” ROUND STEEL (7 LB)	1	*OPTIONAL*
ASSEMBLY MANUAL	1	

IN HARDWARE BAG #1:		
U-BOLT AND CRADLE, 1-1/2”	4	
U-BOLT (SQUARE), 4”	2	
IN HARDWARE BAG #2:		
TURNBUCKLE, 1/4” HOOK AND EYE	1	
EYEBOLTS, 1/4” X 2” SS	2	
U-BOLT, 3/4”	2	
NUT, 1/4-20 SS	4	
LOCKWASHER, 1/4” SPLIT RING SS	4	
SHORTING BAR	4	
BUTTON INSULATORS, 3/16”	44	
SHAFT RETAINER, 3/16”	44	
EYEBOLT, 1/4” SHORT	2	
NUT, 3/8-16 SS	4	
LOCKWASHER, 3/8 SPLIT RING SS	4	
NUT, 5/16-18 SS	8	
LOCKWASHER, 5/16 SPLIT RING SS	8	
SET SCREW, 1/4-20 X 1/4” SS	2	
SCREW, 8-32 X 1-3/4” SS	2	
SCREW, 8-32 X 1-1/2” SS	2	
SCREW, 8-32 X 1-1/4” SS	2	
SET SCREW, 8-32 X 1/4” SS	8	
LOCKNUT, 8-32 SS	6	
CABLE TIE, NYLON	3	
ALLEN HEAD WRENCH, 5/64”	1	
NUTSEAL	4	
PUSH TUBE, 3/8” X 3”	1	