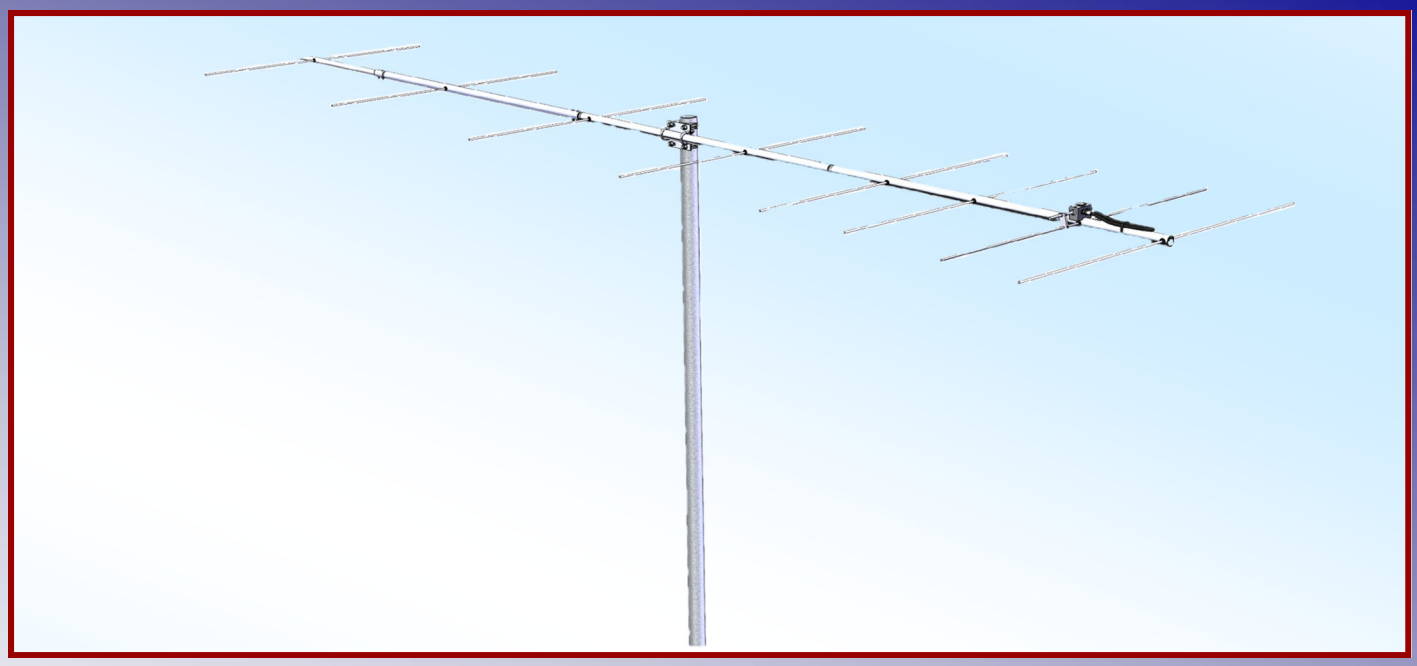
M2 Antenna Systems, Inc.
Model No: 168-8



SPECIFICATIONS:

Model	168-8
Frequency Range	162 To 173.5 MHz
*Gain	12.71 dBi
Front to back	20 dB Typical
Feed type	“T” Match
Feed Impedance.	50 Ohms Unbalanced
VSWR	1.5:1 Average
Input Connector	“N” Female
Power Handling	1.5 kW
Boom Length / Dia	120” / 1”
Maximum Element Length	36” / 3/16”
Turning Radius:	Call
Stacking Distance	Call
Mounting	1-1/2” to 2” Nom.
Wind area / Survival	1.2 Sq. Ft. / 100MPH
Weight / Ship Wt.	5 Lbs. / 7 Lbs.

***Subtract 2.14 from dBi for dBd**

FEATURES:

Performance has been computer optimized to meet your application. Physical construction emphasizes long term electrical and mechanical durability. Elements are 3/16” 6061-T6 aluminum rod, mounted through the boom on UV stabilized polyethylene button insulators, and locked in position with stainless steel shaft retainers. The “T” Match driven element, uses a CNC machined central block with O-ring sealed connectors. Internal connections are encapsulated in a silicone gel with a dielectric strength 3.7 times greater than air for enhanced power handling. Balun connectors are triple O-ring sealed to the coax.

M2 Antenna Systems, Inc. 4402 N. Selland Ave. Fresno, CA 93722
Tel: (559) 432-8873 Fax: (559) 432-3059 Web: www.m2inc.com

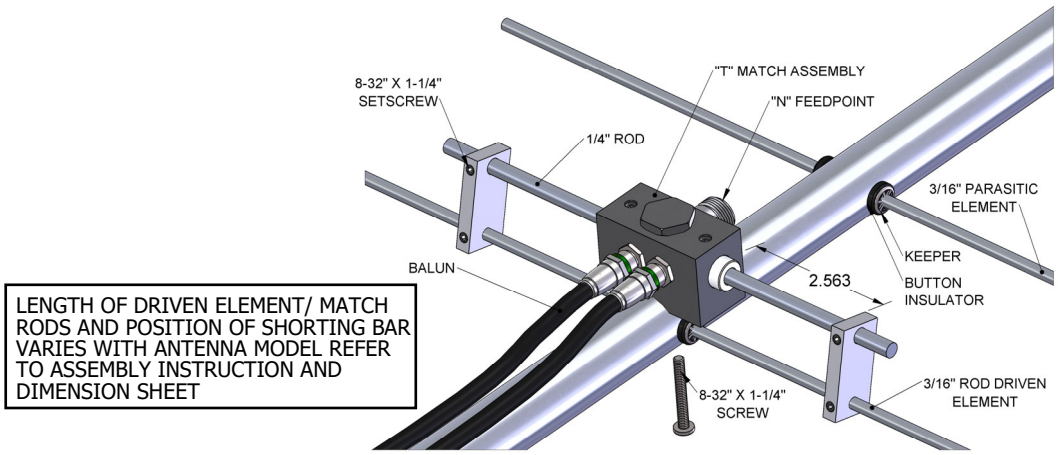
09/06/22
REV 1

168-8 ASSEMBLY MANUAL

1. Start by laying out the boom sections using the DIMENSION sheet as a guide. Use 8-32 X 1-1/4 screws and locknuts to join sections. Sections may be swaged to fit each other or use short internal splice sections.

2. Lay out the elements by length and position as shown the DIMENSION sheet. Start with the reflector (longest) element and push on a black button insulator to about 1/2" from center. Push the element through the holes 1/2" from the rear of the boom and install the second button, snugging it up into boom. DO NOT BOTHER WITH ACCURATELY CENTERING the element at this time and DO NOT INSTALL the stainless steel SHAFT RETAINERS yet. This is easier to do after all the 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 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 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. Look for any obvious discrepancies and correct if found.



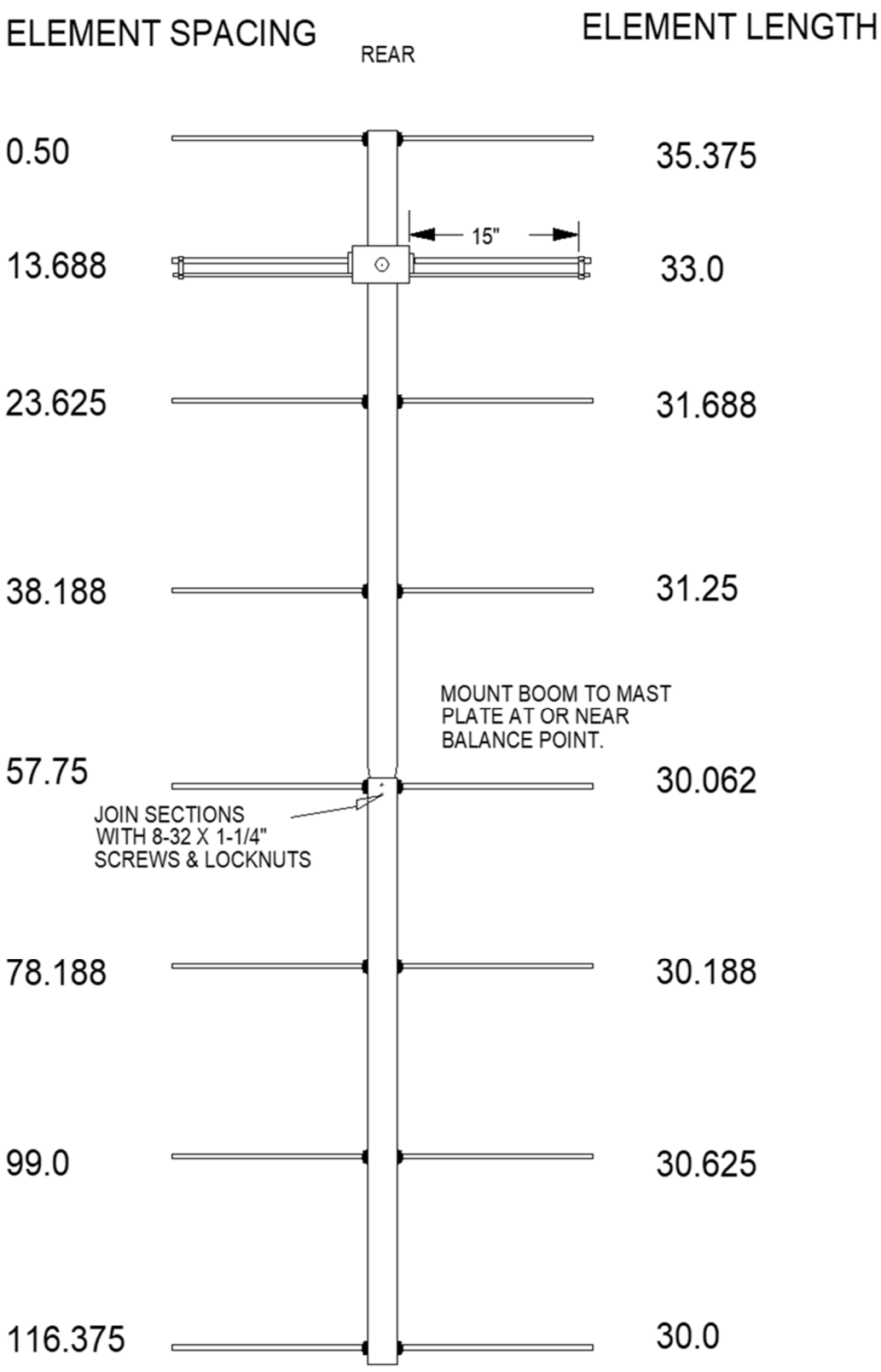
5. NOTE: The SHAFT RETAINERS, used for securing the elements, should always be used for permanent and long term antenna installations. For portable or temporary use, or whenever it is anticipated that the antenna will be disassembled within a short time, the retainers may be left off. The button insulators, normally a tight fit, hold the elements quite securely.
   Begin installing the stainless shaft retainers. Use thumb and index finger to hold a Shaft Retainer over end of the 3/8 x 3" push tube (Shaft Retainer dished into tube). Hold the element firmly and start the keeper onto the rod by applying pressure with the push tube. Push the Shaft Retainer until up tight against the button insulator (Locking pliers, ***lightly*** clamped up against opposite button insulator will help maintain center reference and keep you from pushing the first Shaft Retainer too far). It is a good idea to install the second SHAFT RETAINER after final testing.

6. Mount the DRIVEN ELEMENT T-MATCH BLOCK to the underside of the boom using a single 8-32 X 1-1/4" screw. Orient the block with feed connector facing to center and balun connectors facing to rear. Block orientation may be reversed if you wish feedline to exit from rear of boom.

7. Coil the balun so it will not extend beyond the reflector when installed. Attach balun to the block and tighten the connectors ***gently*** using a 7/16" end wrench. A lot of torque is unnecessary. Squeeze the balun coil across the middle until it is close to the boom and secure to boom with a nylon cable tie. Tie should be snug but not crushing or kinking the coax.

8. Install the 8-32 x 1/4" set screws (internal Allen head - tool supplied) into the SHORTING BARS.

168-8 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
.500 = 1/2
.562 = 9/16
.625 = 5/8
.688 = 11/16
.750 = 3/4
.813 = 13/16
.875 = 7/8
.937 = 15/16

Slide the bars onto the 3/16" rod driven element tips and then onto the Driven Element Block Rods. Position the Shorting Bars as specified on the DIMENSION SHEET: the distance given is between the outer edge of the Driven Element Block and the inner edge of the Shorting Bar. Align the bars and rods with each other and tighten the set screws.

9. The boom to mast plate is normally mounted at the balance point. Use two 1" U-bolts and the stainless nuts and lock washers provided. DO NOT OVER TIGHTEN. 2" U-bolts and cradles are provided for mounting the antenna, other sizes are available for purchase. Since the feed line represents significant weight it is best to have it attached and fastened along the boom with cable ties before final mounting the plate.

10. **INSTALLATION AND TESTING STACKING INFORMATION**

A. To protect your investment in this high performance antenna, always use high quality coax and connectors. Old, corroded, or poor quality materials are common sources of serious performance losses.

B. Test the antenna, connectors and feedline, BEFORE installing to your mast or tower. At 6 feet or more the antenna will exhibit VSWR ***similar*** to higher mounting heights. Set antenna on a ladder or temporary mast. Check for continuity and match across the band. It should be close to "spec" across the rated bandwidth. When satisfied, add the second SHAFT RETAINERS as described in step 5.

FOR HORIZONTAL POLARIZATION, the antenna may be mounted to a **METALLIC** vertical mast or a horizontal **NON-METALLIC** cross boom. If mounted to a horizontal cross boom, route the feedline forward to the boom-to-mast plate, loop down, and bring back to cross boom at least 6" beyond element tips. Antennas are typically stacked one above the other in horizontal polarity. ***SEE SPEC SHEET FOR STACKING DISTANCE.*** See Stacking Reminders.

FOR VERTICAL POLARIZATION, the antenna may be mounted to a **NON METALLIC VERTICAL** MAST or a horizontal **METALLIC** cross boom. If mounted to a **NON METALLIC** vertical mast, Turn the driven element 180 degrees so the feed line and "N" connector is facing to the rear of the antenna. Route the feed line to the rear of the antenna, keeping 4" to 6" behind the reflector element. Let the cable droop at least 6 inches BELOW THE VERTICAL ELEMENT TIPS. Re-attach the feed line to the mast below the element tips. A simple structure can easily be fabricated if you want something to support the feed line. See M2 "L" brace kit for ideas. Vertically polarized Antennas are typically stacked side by side on a horizontal cross boom. See Stacking Reminders.

If you are unsure about stacking multiple antennas, please call **M²** and let us help you DO IT RIGHT! Visit our website, https://www.m2inc.com/blog/ for other tips.

168-8 PARTS & HARDWARE

DESCRIPTION	QTY
BOOM SECTION, 1” X .058 X 60” SOE	1
ELEMENTS, 3/16” ROD X SEE DIMENSION SHEET	9
DRIVEN ELEMENT ASSEMBLY	1
BALUN, RG-6	1
BOOM TO MAST PLATE, .188 X 3” X 4”	1
U-BOLT AND CRADLE, 2”	2
U-BOLT, 1”	2
ASSEMBLY MANUAL	1

IN HARDWARE BAG

BUTTON INSULATORS	16
SHAFT RETAINER, SS	16
NUT, 5/16-18 SS	4
LOCKWASHER, 5/16 SPLIT RING SS	4
NYLOCK NUT, 1/4-20 SS	4
SCREW, 8-32 X 1-1/4” SS	3
NYLOCK NUT, 8-32 SS	4
SHORTING BAR	2
SET SCREW, 8-32 X 1/4” SS	4
NYLON TIE	3
SEAL NUT, 3/8-32	2
ALLEN WRENCH, 5/64”	1
PUSH TUBE, 3/8” X 3”	1

M² ANTENNA SYSTEMS, INC.
4402 N. SELLAND AVE.
FRESNO, CA 93722
(559) 432-8873 FAX: 432-3059
www.m2inc.com Email: sales@m2inc.com