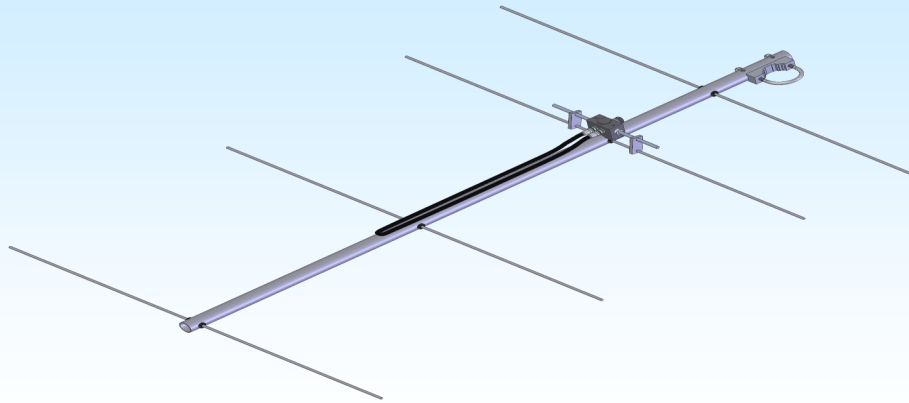




# M2 Antenna Systems, Inc.

## Model No: 164-4



### SPECIFICATIONS:

Model .....	164-4	Input Connector .....	"N" Female
Frequency Range .....	164 To 167 MHz	Power Handling.....	2.5 kW
*Gain .....	9.6 dBi	Boom Length / Dia .....	46" / 1"
Front to back.....	20 dB Typical	Maximum Element Length .....	36.375 X 3/16"
Beamwidth .....	E=54° H=44°	Turning Radius:.....	46"
Feed type.....	"T" Match	Stacking Distance .....	CALL
Feed Impedance.....	50 Ohms Unbalanced	Mast Size .....	1-1/2" to 2" Nom.
Maximum VSWR .....	1.2:1	Wind area / Survival.....	0.50 Sq. Ft. / 100 MPH

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

### FEATURES:

Clean mechanical design, broad band coverage and computer optimized performance make the 164-4 an exceptional antenna. A totally sealed and grounded driven element design with a balun provides the heart that will beat for years to come. It is perfect for base and portable use.

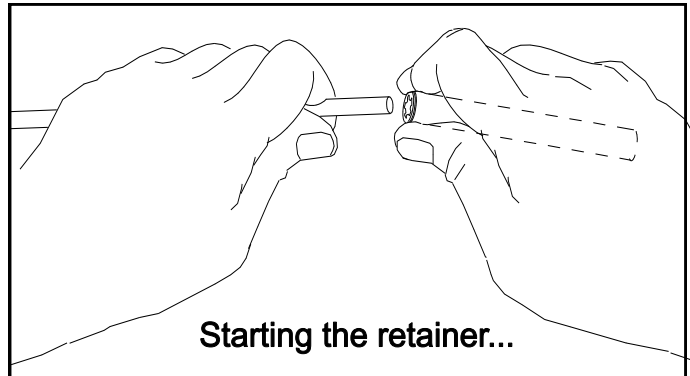
# 164-4 ASSEMBLY MANUALS

Assembly of the 164-4 is easy! You will need a Phillips #2 screwdriver, 11/32 nut driver or equivalent, 7/16 and 1/2" end wrench. Use the DIMENSION SHEET and the written assembly process below.

1. Lay out the elements by length and position as shown the DIMENSION sheet. Find rough center of the reflector (longest) element by balancing it across finger. Push on a black button insulator to about 1/2" from center. Insert the element through the holes at the rear of the boom and install the second button. 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.**
2. Now begin centering the elements. Use a tape measure to EQUALIZE the amount the element sticking out on each side of the boom. Once all are centered, sight down the antenna from the rear and compare tip symmetry. Look for any obvious discrepancies and correct if found.
3. Stainless steel SHAFT RETAINERS are used for securing the elements and insulators. Always use for permanent and long term antenna installations. For most portable or temporary use, the button insulators are satisfactory and the retainers may be left off.

NOTE: A "PUSH TUBE" HAS BEEN PROVIDED FOR INSTALLING THE ELEMENT KEEPERS. USE A POCKET KNIFE TO CHAMFER IN INNER LIP OF ONE END OF THE TUBE TO PROVIDE MORE RELIEF FOR THE KEEPER FINGERS DURING INSTALLATION.

4. Use thumb and index finger to hold a Shaft Retainer over end of the 3/8 x 3" push tube (internal fingers 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 down element until 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). Repeat for the opposite side. Continue installing Shaft Retainers until all elements are locked in place.
5. Mount the DRIVEN ELEMENT FEED BLOCK to the boom using a single 8-32 screw 1/4" longer than the boom diameter. Orient with feed and balun connectors oriented as shown on the Dimension Sheet.



6. Generally the balun is installed in one long loop. Rear mounted baluns may be coiled once if length extends beyond boom. Attach balun to the block connectors and tighten **gently** using a 7/16" end wrench. Form the balun coax close to the boom and secure with cable ties (snug but not crushing or kinking the coax).
7. Install the 8-32 x 1/4" set screws (internal Allen head - tool supplied) into the SHORTING BARS. Slide the bars onto the 3/16" rod driven element tips and the 1/4" Feed Block Rods. Position the Shorting Bars as specified on the DIMENSION SHEET: the distance given is between the outer face of the Feed Block and the inner face of the Shorting Bar. Align the bars and rods with each other and tighten the setscrews.
8. At this point it is important to determine whether your antenna will be mounted horizontally **or** Vertically. Locate the two sets of holes at the rear of the antenna. Insert the 2" u-bolt into the uni-cradle and slide this assembly into one of the two sets of holes on the rear of the boom. Finish the assembly by installing (2) 1/4" lock washers and 1/4-20 nuts.
9. **MOUNTING FOR HORIZONTAL OR VERTICAL POLARIZATION**  
Route the feed line coax towards the rear of the antenna past the reflector element and onto your mast. Secure the feed line coax to the antenna boom with the supplied nylon ties.  
THIS COMPLETES THE ANTENNA ASSEMBLY.

# 164-4 ASSEMBLY MANUALS

10. For optimum performance, mount antenna high and in the clear. **Always** use high quality coax and connectors. Old, corroded, or poor quality materials can SERIOUSLY affect VSWR, gain, and pattern. If possible, test the antenna, connectors and feedline BEFORE installation. At 6' in height, the antenna will exhibit performance **approaching** the specifications. If it doesn't, check feedline and connectors for continuity and shorts. Check antenna shorting bars, element placement and length, against Dimension Sheet.

## 11. MOUNTING AND STACKING INFORMATION

**Rear mounted antennas** can generally be mounted in any polarization to any type of mast, conductive or non-conductive.

**Center mounted antennas** can also be mounted in any polarity. **However, a mast or crossboom in-line (parallel) with the element plane must be non-conductive.** Anything conductive in the element plane will disrupt the pattern and reduce performance (even the feedline). When a non-conductive mast or crossboom is in-line with elements, route feedline away at right angles to the elements and reattach at least 6" beyond element tips. Fiberglass is the recommended material for a non-conductive mast or crossboom because of its strength and weather resistance.

**Stacking:** See the Dimension Sheet for stacking separation dimensions.

1. All driven element blocks MUST be oriented to the same side of boom.
2. All boom-to-mast plates MUST be mounted at the same point on the boom.
3. Feed / phasing lines MUST be of equal electrical length or, ideally, multiples of 1 wavelength in order to maintain equal phasing in the array.

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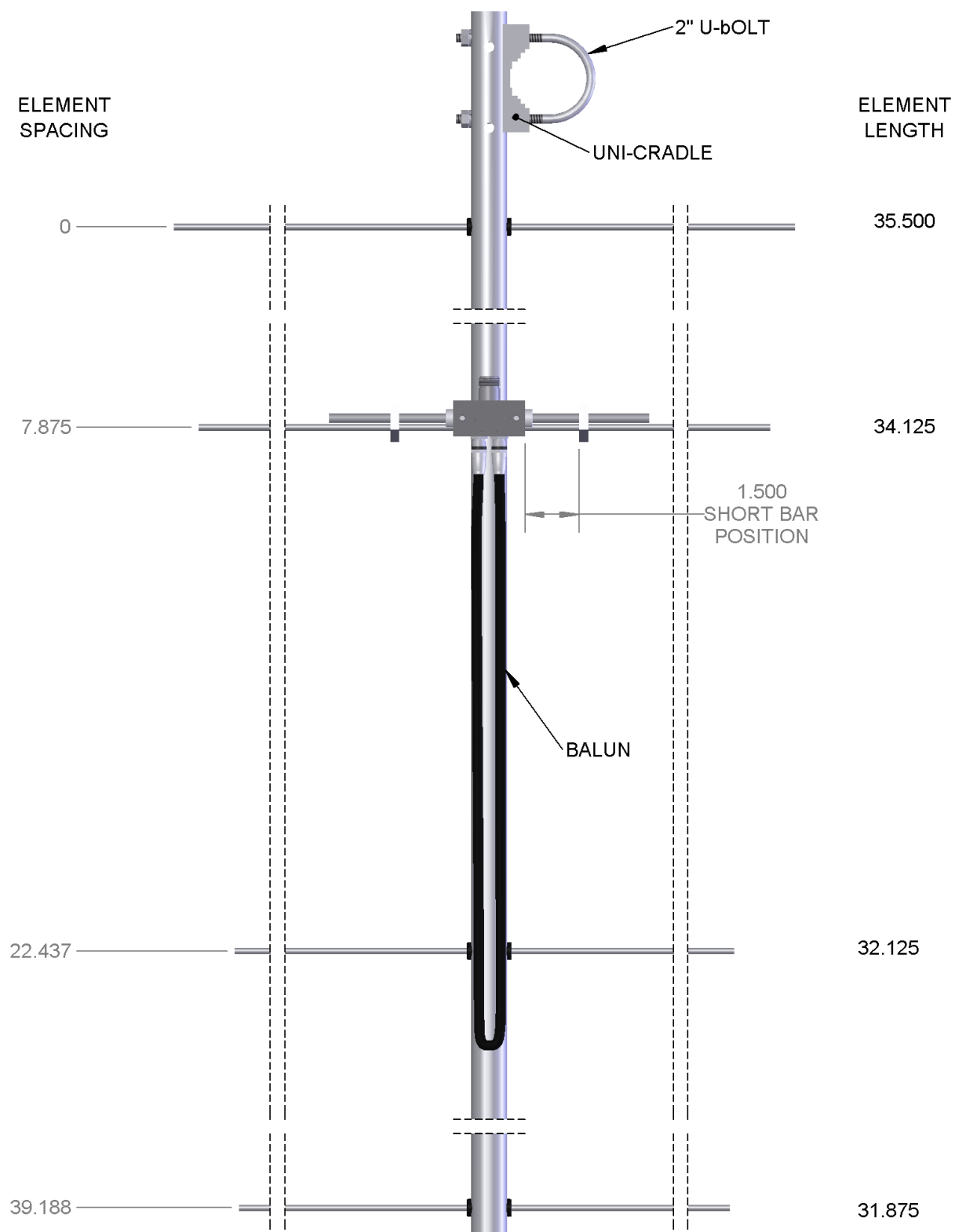
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# 164-4 ASSEMBLY MANUALS

164-4



# 164-4 DIMENSION SHEET

DESCRIPTION .....	Qty
Boom section, 1" x .065 x 46.00" STR.....	1
Element rod, 3/16" x see Dimension Sheet .....	4
Driven Element Assembly (M2ADEA2MVHF1) .....	1
Balun, RG-6U 1/2 wavelength.....	1
Assembly Instructions .....	1

IN HARDWARE BAG .....	Qty
U-bolt, 2 ss.....	1
Uni-cradle, (M2AMC0070) .....	1
3/16, button insulators.....	10
3/16, keeper.....	10
Nut, 1/4-20 ss .....	2
Lock washer, split ring 1/4" ss.....	2
Shorting bars, 1/4" x 3/4", (M2ASB0090) .....	2
Screw, 8-32 x 1-1/4", ss .....	1
Set screw, 8-32 x 1/4" ss.....	4
Nylon tie, large black, 6".....	3
Push tube, 3/8 x 3".....	1
Allen wrench, 5/32" .....	1

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