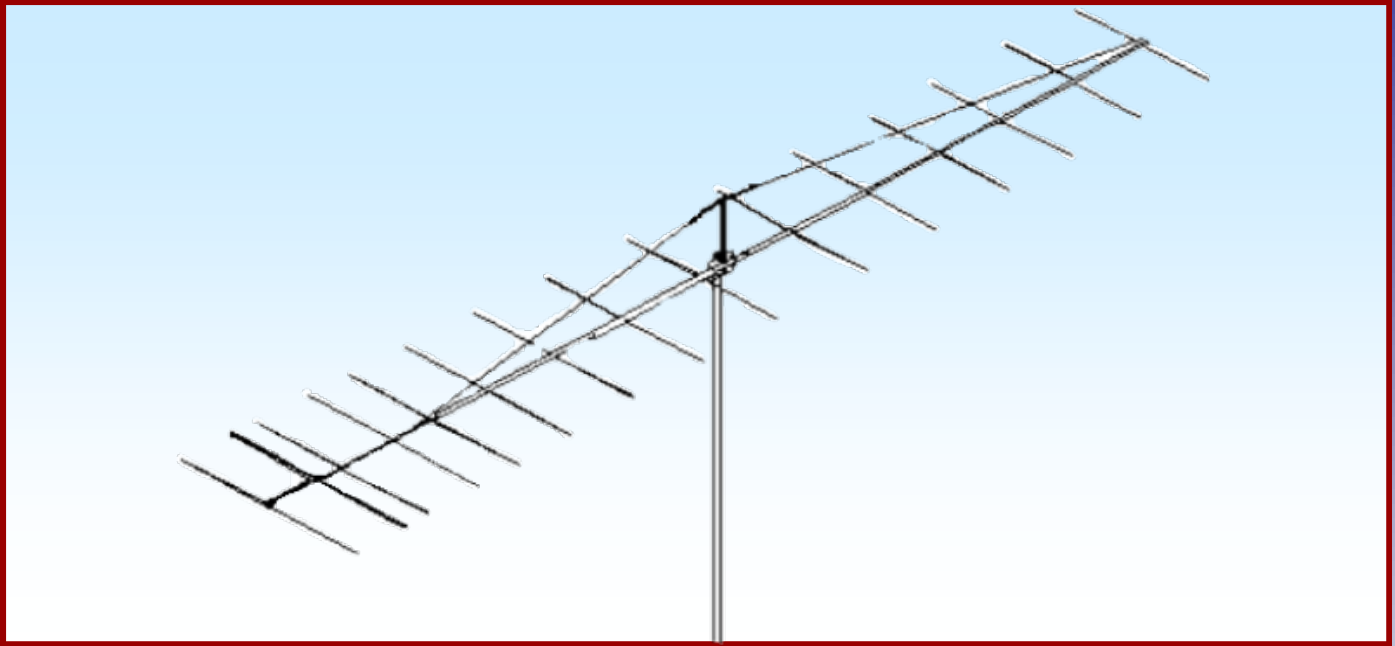




M2 Antenna Systems, Inc. Model No: 162-15



SPECIFICATIONS:

Model	162-15	Power Handling	1.5 kW
Frequency Range	161 to 163 MHz	Boom Length / Dia	32' 8" / 1-1/2" to 3/4"
*Gain	17.44 dBi	Maximum Element Length	36" / 3/16"
Front to back	22 dB Typical	Turning Radius:	Call
Feed type	"T" Match	Stacking Distance	Call
Feed Impedance	50 Ohms Unbalanced	Mounting	2" Nom.
Maximum VSWR	1.2:1	Wind area / Survival	2.6 Sq. Ft. / 100 MPH
Input Connector	"N" Female	Weight / Ship Wt.	13 Lbs. / 14 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.

162-15 ASSEMBLY MANUAL

TYPICAL TOOLS REQUIRED: measuring tape, phillips screwdriver, 11/32, 7/16, and 1/2 nut drivers, end wrenches and / or sockets. Heavy duty models may require larger sizes.

1. Lay out the boom sections and assemble using the DIMENSION SHEET as a guide for position and hardware.
2. 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.**
3. 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.
4. 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.
5. 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). HINT: IT HELPS TO DISH THE INNER EDGE OF THE PUSH TUBE TO CREATE MORE CLEARANCE FOR THE KEEPER FINGERS. USE A COUNTER SINK OR A A POCKET KNIFE TO CREATE THE CHAMFER. Hold the element firmly and start the keeper onto the rod by applying pressure with the push tube. Push the Shaft Retainer (keeper) on element until it is 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.
6. 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.
7. Thread a 3/8" SEAL-NUT fully onto each balun connector on the feed block, with black Neoprene side facing out. 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. Then back the Seal Nuts out and finger-tighten firmly up against the face of the connectors (or tighten **gently** with 1/2" end wrench). Form the balun coax close to the boom and secure with cable ties (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. 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 sets crews.
9. For center mounted antennas, the boom to mast plate is normally mounted as close as possible to the balance point (with feedline or a temporary equivalent attached). For rear mounted antennas, use the boom length provided behind the reflector element. Prepare the plate by adding the square riser tube using the holes provided. Use 8-32 x 1-1/4 screws and locknuts. Orient the square tube so the holes at the upper end are away from the plate. This offset helpt to keep the support cable directly over the top of the boom. Keep mounting plate at least 1" from any element. Secure plate with two U-bolts and the stainless nuts and lock washers provided. DO NOT OVER TIGHTEN. Additional U-bolts and stainless nuts / lockwashers are provided for mounting the antenna to your mast.
10. Once the plate is mounted, open the turnbuckles until just one thread shows inside the body on each end. Turn the turnbuckle so the hook is pointed up and insert the hook into an upper hole. Repeat for the other turnbuckle. Install the two 1/4" eyebolts near each end of the boom if not already done.
11. Attach one end of the black Dacron cord supplied to an eyebolt. Double knot so it cannot slip. For

162-15 ASSEMBLY MANUAL

neatness, use black electricians tape to tape the cord ends back to the main line. Now attach the other end of the cord to the other eyebolt. **DO NOT CUT THE CORD YET.** Now pull the cord from each eyebolt toward the middle and center it at the square mast. Pull the excess away and **NOW** cut the cord at the center of the excess loop. Tension the cord through the turnbuckle eye and attach the cord to a turnbuckle. **HINT: IT HELPS TO PLACE THE BOOM BETWEEN TWO SUPPORTS THAT LET THE MIDDLE SAG SLIGHTLY. THIS WILL HELP TO GET THE CORDS TIGHT BEFORE FINAL ADJUSTMENT.** Pull on your knots hard during and after the process so they can take a set. This will help to eliminate long term boom droop as the cord takes a set. Pick up the antenna and bounce it a couple times against the support cords. No slippage should occur and the boom should stay straight. Final adjust out any sag just before installation or when installed on the mast.

THIS COMPLETES THE ANTENNA ASSEMBLY.

12. 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.

13. MOUNTING 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 it's strength and weather resistance.

M² ANTENNA SYSTEMS, INC.

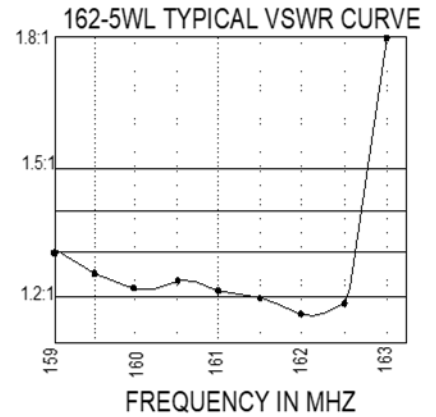
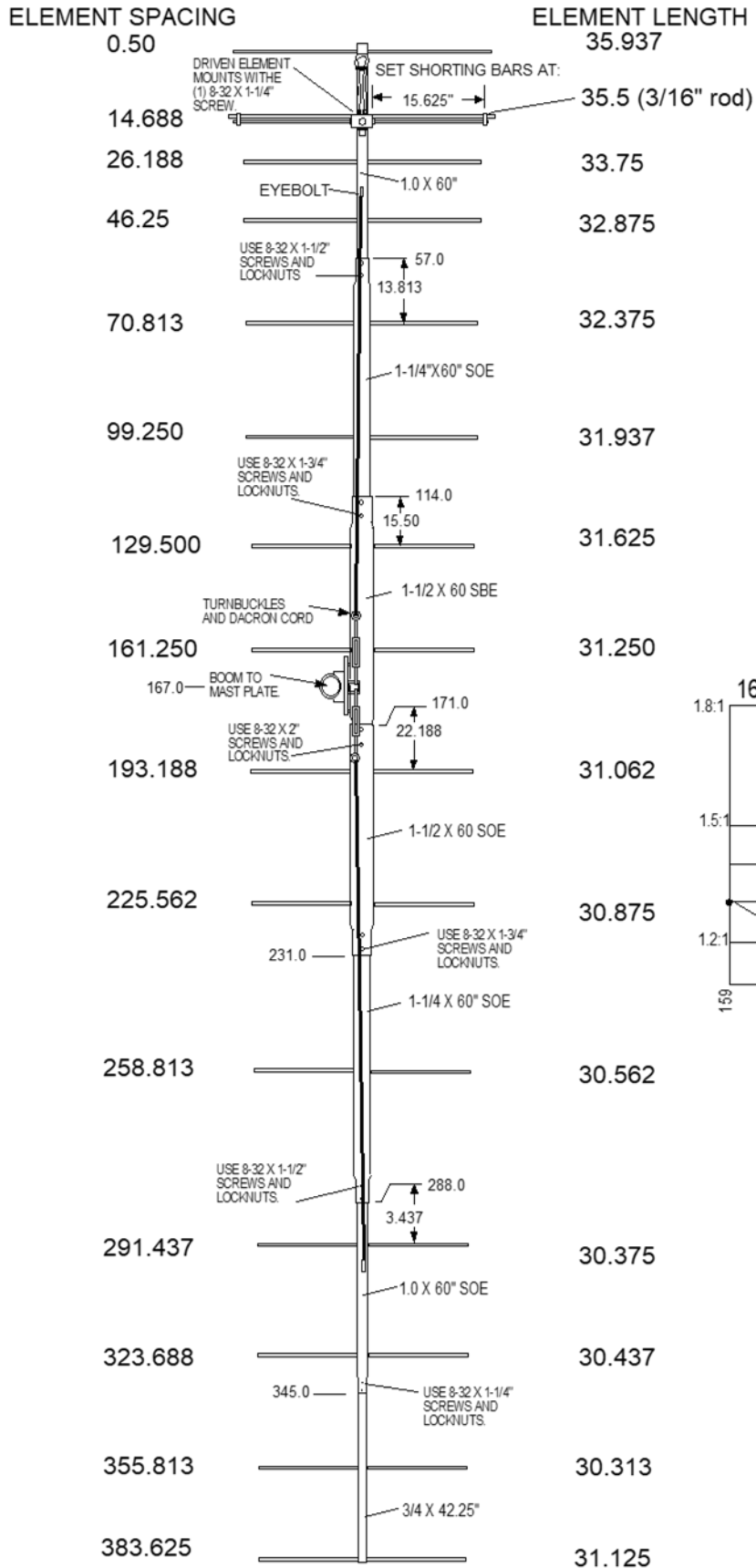
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162-15 ASSEMBLY MANUAL



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

WATCHOUT! ELEMENT LENGTHS DO NOT TAPER IN THIS DESIGN!

162-15 PARTS & HARDWARE

DESCRIPTION	QTY
BOOM SECTION, 1-1/2 X .058 X 60" SBE TFS* AND 1-1/4.....	1
BOOM SECTION, 1-1/2 X .058 X 60" SOE TF** 1-1/4.....	1
BOOM SECTION, 1-1/4 X .058 X 60" SOE TF** 1.....	2
BOOM SECTION, 1X .058 X 60"	1
BOOM SECTION, 1 X .058 X 60" SOE TF** 3/4*.....	1
BOOM SECTION, 3/4 X .049 X 42.25"	1
BOOM-TO-MAST PLATE, 4 X 6 X 3/16 W/ RISER HOLES.....	1
SUPPORT MAST, (RISER), 3/4 X 3/4 X 15"	1
U-BOLT AND CRADLE, 2".....	2
U-BOLT, 1-1/2".....	2
DACRON CORD, 3/32 X 30 FT.	1
ASSEMBLY MANUAL	1

IN HARDWARE BAG:

BUTTON INSULATORS.....	30
SHAFT RETAINER, SS.....	30
NUT, 5/16-18 SS	8
LOCKWASHER, 5/16 SS	8
EYEBOLTS, 1/4 X 4".....	2
LOCKNUTS, 1/4-20 SS.....	2
TURNBUCKLES, 1/4", HOOK AND EYE.....	2
SCREW, 8-32 X 2", SS	2
SCREW, 8-32 X 1-3/4, SS	4
SCREW, 8-32 X 1-1/2 SS	4
SCREW, 8-32 X 1-1/4SS	5
LOCKNUT, 8-32 SS	14
SHORTING BAR, 1/4 AND 3/16 HOLES	2
SET SCREW, 8-32 X 1/4, SS.....	4
CABLE TIE, NYLON	3
SEAL NUTS, 3/8-32	2
ALLEN HEAD WRENCH, 5/64"	1
PUSH TUBE, 3/8 X 3"	1

*TFS = TO FIT ITSELF

**TF = TO FIT O.D. SIZE XX

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