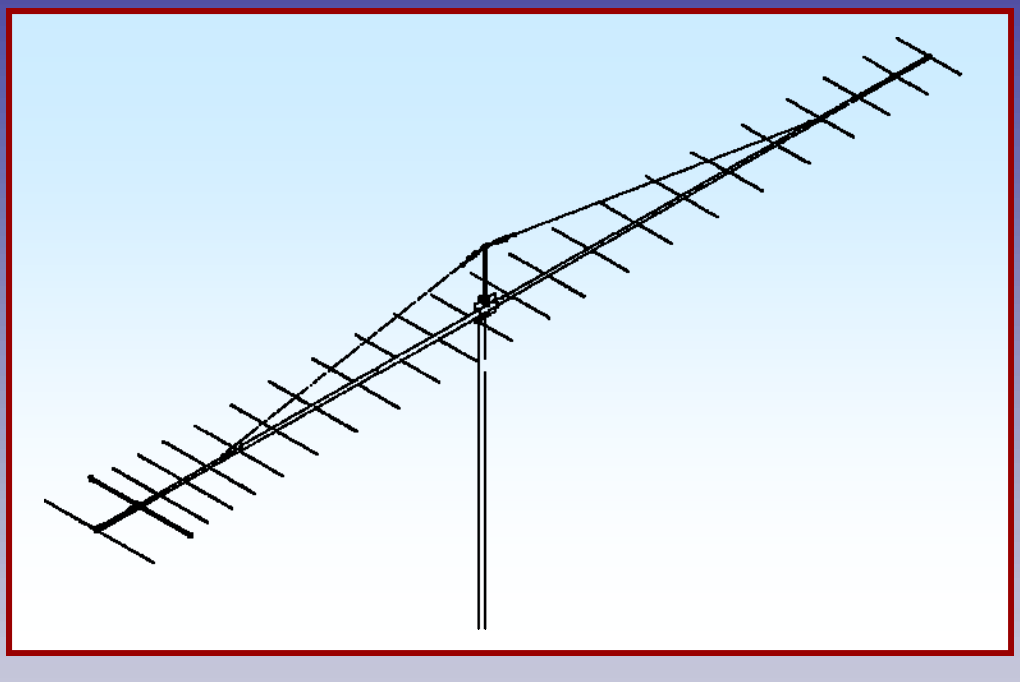
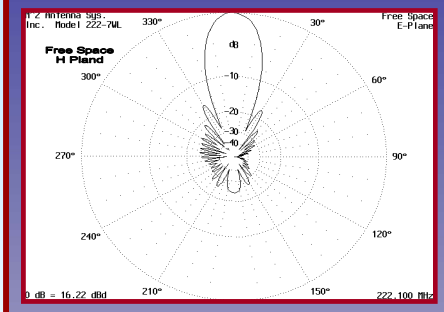
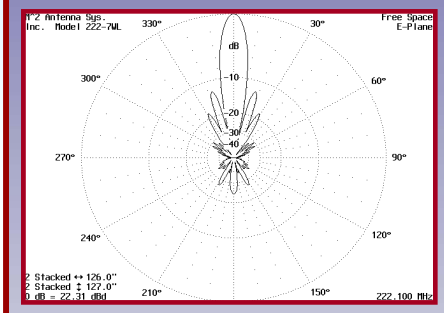
M2 Antenna Systems, Inc.
Model No: 222-7WL







SPECIFICATIONS:

Model	222-7WL
Frequency Range	222 To 226 MHz
*Gain	18.8 dBi
Front to back	25 dB Typical
Beamwidth	E=22° H=23°
Feed type	"T" Match
Feed Impedance.	50 Ohms Unbalanced
Maximum VSWR	1.2:1 Typical
Input Connector	"N" Female

Power Handling	1.5 kW
Boom Length / Dia	32' 5" / 1-1/4" To 3/4"
Maximum Element Length	26"
Turning Radius:	18' 3"
Stacking Distance	137" High & 140" Wide
Mast Size	1-1/2" to 2" Nom.
Wind area / Survival	2.7 Sq. Ft. / 100 MPH
Weight / Ship Wt.	11 Lbs. / 13 Lbs.

***Subtract 2.14 from dBi for dBd**

FEATURES:

The 222-7WL is an ultra high performance, computer designed Yagi that covers 222 to 226 with flat gain and VSWR. Lightweight and streamlined yet strong, it compliments any VHF system. Our O-ring and silicone gel sealed Driven Element Module and stainless steel hardware will keep mother nature at bay for years to come. The low windload overhead dacron support line and built in support mast make it ideal for mounting right at the top of your mast. Help keep 222 an amateur band. Stay active on one of your best VHF frequencies with the 222-7WL on your mast.

Many options are available. 222 2PORT AND 4 PORT power dividers, VHF-50-2227WL-2 AND -4 phasing harnesses, 'H' frames and our OR-2800 AZ and MT-1000 or MT3000 EL rotators are among the most popular.

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222-7WL ASSEMBLY MANUAL

Tools required: slot screwdriver, 11/32",7/16", and 1/2" end wrenches and / or sockets.

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 3/4" to 1" sections; 1-1/2" screws for 1" to 1-1/4" sections; 1-3/4" screws for 1-1/4" to 1-1/2" and 1-1/2" to 1-1/2" sections.
Assemble the two 1-1/2" boom sections first. The 1-1/2" section with both ends swaged has a 5/16" element hole 4-3/16" from the "rear" end. Install the other 1-1/2" section to this end. The 1-1/4" section with a hole 9-9/16" from the swaged end is also assembled to the rear, as is the 1" x 59" straight section (rear of boom). The other 1-1/4" section assembles to the "front" of the 1-1/2" sections, followed by the swaged 1" section and the 3/4" x 49" straight section (front of boom). To make assembly easier, support the completed boom about waist high on bucks, tables, etc. or, drive a 1-1/2" to 2" pipe into the ground and temporarily attach boom using boom to mast plate and U-bolts at balance point.

2. Layout the 3/16" elements by length and position as shown the DIMENSION sheet. Start with the REFLECTOR (26") element. Balance across finger to find center 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 internal locking "KEEPERS" yet. This is easier to do after all the elements are installed in the boom.

3. Install the 25" 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. Begin installing the stainless "keepers." Use thumb and index finger to hold a keeper over end of the 3/8 x 3" push tube (keeper dished into tube). Hold the element firmly and start the keeper onto the rod by applying pressure with the push tube. Push the keeper 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 keeper too far). Repeat for the opposite side. Continue installing keepers until all elements are locked in place.

6. Mount the DRIVEN ELEMENT BLOCK ASSEMBLY to the top 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.

7. Before installing the COAX BALUN, thread a 3/8" SEAL NUT all the way onto BOTH connectors, with the black Neoprene face of the nuts facing out. Attach balun and 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 *very gently* with 1/2" end wrench). Form the balun 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. Slide the bars onto the 3/16" rod driven element tips and then onto the Driven Element Block Rods. Position the Shorting Bars according to your optimization preference: for the lower part of the band set 11" from the outer edge of the drive block to the inside edge of the bar OR 10-3/4" for the upper, FM part of the band. Align the bars and rods with each other and tighten the setscrews.

9. Attach the square 18" RISER TUBE to the boom-to-mast plate using two 8-32 x 1-1/4" screws and locknuts. The large holes at the top of the riser are slightly off-center and should be oriented away from the boom-to-mast plate and closer to the centerline of the boom.

10. The boom to mast plate is normally mounted at the balance point, about 13' 4" from rear of boom. Since the feed line represents significant weight it is best to have it on a temporary equivalent attached and fastened along the boom with cable ties before final mounting the plate. Use two 1-1/2" U-bolts and the stainless nuts and lock washers provided. DO NOT OVER TIGHTEN. 2" U-bolts are provided for mounting the antenna to your mast.

11. Refer to 800m support drawing. Install the two small "U" clips (3/16" rod) into the top side of the 1" rear and front boom sections. Secure with keepers.

12. Install the two turnbuckles into the top of the riser with open ends of the hooks "UP". Adjust threads until just one or two show inside turnbuckle body. Adjust the boom with supports until the middle is 4" to 6" LOWER than the ends. Attach one end of the Kevlar cord to the rear U clip by taking two wraps through the "u" and finishing with two half-hitches or a square knot. Adjust to leave 2" to 4" of cord after knots. Attach the other end of the cord to the front clip in the same way. Equalize excess cord at the riser tube and cut. Take rear cord end and make two wraps through rear turnbuckle eye, then pull line tight and knot as above. Repeat for front cord and turnbuckle.

13. Now support antenna at the boom-to-mast plate. This tensions the cord and helps the knots to take a set. If possible, let this process extend overnight. Then adjust turnbuckles so boom is level. Kevlar is Arimid fiber (the same material in Philistran) and does not stretch. If you boom droops over night, then your knots are slipping. Cut excess lengths from cord, leaving 2" to 4". To prevent fraying melt ends with heat or flame and tape back to main line.

THIS COMPLETES THE ANTENNA ASSEMBLY.

INSTALLATION AND STACKING INFORMATION

A. *Never mount the antenna with* a *metallic mast, crossboom or feedline in the element plane: pattern and performance will deteriorate.* Use a fiberglass or equivalent mast or crossboom instead.

HORIZONTALLY POLARIZED, the antenna may be mounted to a metallic vertical mast or a horizontal NON-METALLIC crossboom. If mounted to a horizontal crossboom, route the feedline forward to the boom to-mast plate, loop down at right angles to the elements, and bring back to crossboom at least 6" beyond element tips.

VERTICALLY POLARIZATED, the antenna may be mounted to a NON METALLIC VERTICAL MAST or a horizontal metallic crossboom. If mounted to a vertical mast, route the feed line forward to the boom-to-mast plate, loop out at a right angle to the boom, and bring down to the mast at least 6 inches below the element tips.

B. To optimize the performance of this high quality antenna, always use high quality coax and connectors. Old, corroded, or poor quality materials are common sources of serious performance losses.

C. If possible, test the antenna, connectors and feedline BEFORE installing to your mast or tower. At 6 feet or more the antenna will exhibit performance similar to higher mounting heights. Set antenna on a ladder or temporary mast. Check for continuity and that match is close to "specs" across the rated bandwidth.

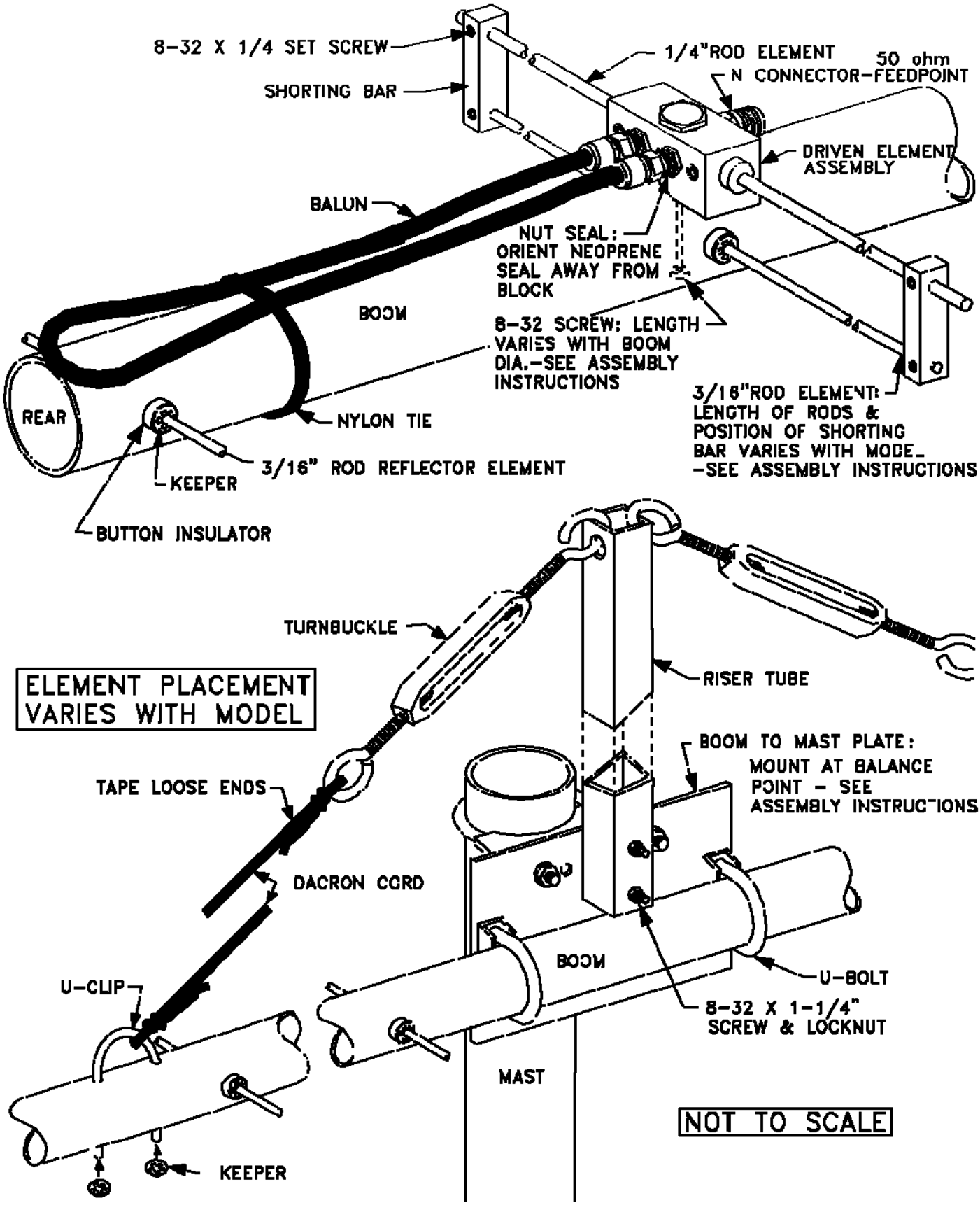
D.STACKING REMINDERS: (If you are unsure about stacking multiple antennas, please call M2 and let us help you DO IT RIGHT.)

1. All driven element blocks MUST be oriented to the same side of boom.
2. AII boom-to-mast plates MUST be mounted at the same point on the boom.
3. Feed *I* phasing lines MUST be of equal electrical length or multiples of 1 wavelength in order to maintain equal phasing in the array. Improper phasing can severely deteriorate performance.
4. See Specifications page for E and H plane stacking distances.

222-7WL DIMENSION SHEET

DECIMAL	FRACTION		FRACTION	DECIMAL
.50	1/2"	REAR	26"	26.0
11.25	11-1/4"	8-32 X 1-1/4" SEE STEP 8	25"	25.0
17.688	1' 5-11/16"		24-3/16"	24.188
25.375	2' 1-3/8"		23-7/16"	23.437
36.688	3' 0-11/16"	1 X 59 STR	23-1/2"	23.50
50.25	4' 2-1/4"	58 — 8-32 X 1-1 2" SCREWS & LOCKNUTS	23-1/4"	23.25
65.562	5' 5-9/16"	1-1/4 X 60 SOE	22-7/8"	22.875
81.188	6' 9-3/16"		22-13/16"	22.813
98.062	8' 2-1/16"	113 — 8-32 X 1-3 4" SCREWS & LOCKNUTS	22-5/8"	22.625
116.688	9' 8-11/16"	1-1/2 X 60 SOE	22-9/16"	22.562
135.50	11' 3-1/2"		22-3/8"	22.375
154.437	12' 10-7/16"		22-3/8"	22.375
APPROX 160" BOOM TO MAST PLATE		173 — 8-32 X 1-3 4" SCREWS & LOCKNUTS		
174.188	14' 6-3/16"		22-3/8"	22.375
195.188	16' 3-3/16"	1-1/2 X 60 SBE	22-1/4"	22.25
216.313	18' 0-5/8"		22-1/8"	22.125
238.188	19' 10-3/16"	230 — 8-32 X 1-3 4" SCREWS & LOCKNUTS	22"	22.0
259.562	21' 7-9/16"	1-1/4 X 60 SOE	21-13/16"	21.813
280.875	23' 4-7/8"		21-13/16"	21.813
302.437	25' 2-7/16"	289 — 8-32 X 1-1 2" SCREWS & LOCKNUTS	21-13/16"	21.813
324.25	27' 0-1/4"	' X 60 SOE	21-11/16"	21.688
346.25	28' 10-1/4"	344 — 8-32 X 1-1 4" SCREWS & LOCKNUTS	21-5/16"	21.313
368.062	30' 8-1/16"	344 X 49 STR	21-1/16"	21.062
389.375	32' 5-3/8"		21-13/16"	21.813

DRIVEN ELEMENT & OVERHEAD SUPPORT



222-7WL PARTS & HARDWARE

DESCRIPTION	QTY
BOOM SECTION 1.50” X .058 X 60” SBE	1
BOOM SECTION 1.50” X .058 X 60“ SBE	1
BOOM SECTION 1.25” X .058 X 60“ SOE	2
BOOM SECTION 1.00” X .058 X 60“ SOE	1
BOOM SECTION 1.00” X .058 X 59“	1
BOOM SECTION 0.75” X .049 X 49“	1
ELEMENTS 0.188 ROD X DIM SHEET	23
DRIVEN ELEMENT BLOCK ASSEMBLY	1
BALUN, R-6 1/2 WAVE	1
BOOM TO MAST PLATE 0.188 X 6” X 4”	1
VERTICAL RISER, 3/4” X 18”	1
TURNBUCKLES, 0.25 X 4”	2
U-BOLT AND CRADLE, 2”	2
U-BOTL AND CRADLE, 1.50	2
KEVLAR (ARIMID FIBER) CORD, 3/32” X 0.25”	1
ASSEMBLY MANUAL	1

IN HARDWARE BAG:

SHORTING BAR	2
U-CLIP	2
BUTTON INSULATORS	46
KEEPER, SS	50
NUT, 5/16-18, SS	8
LOCKWASHER, 5/16, SS	8
SET SCREW, 8-32 X 0.25, SS	4
SCREW, 8-32 X 1.75, SS	6
SCREW, 8-32 X 1.50, SS	4
SCREW, 8-32 X 1.25, SS	5
LOCKNUT, 8-32, SS	14
CABLE TIE, NYLON	5
SEAL NUTS, 3/8-32	2
ALLEN HEAD WRENCH, 5/64”	1
PUSH TUBE, 0.375 X 3.00”	1

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