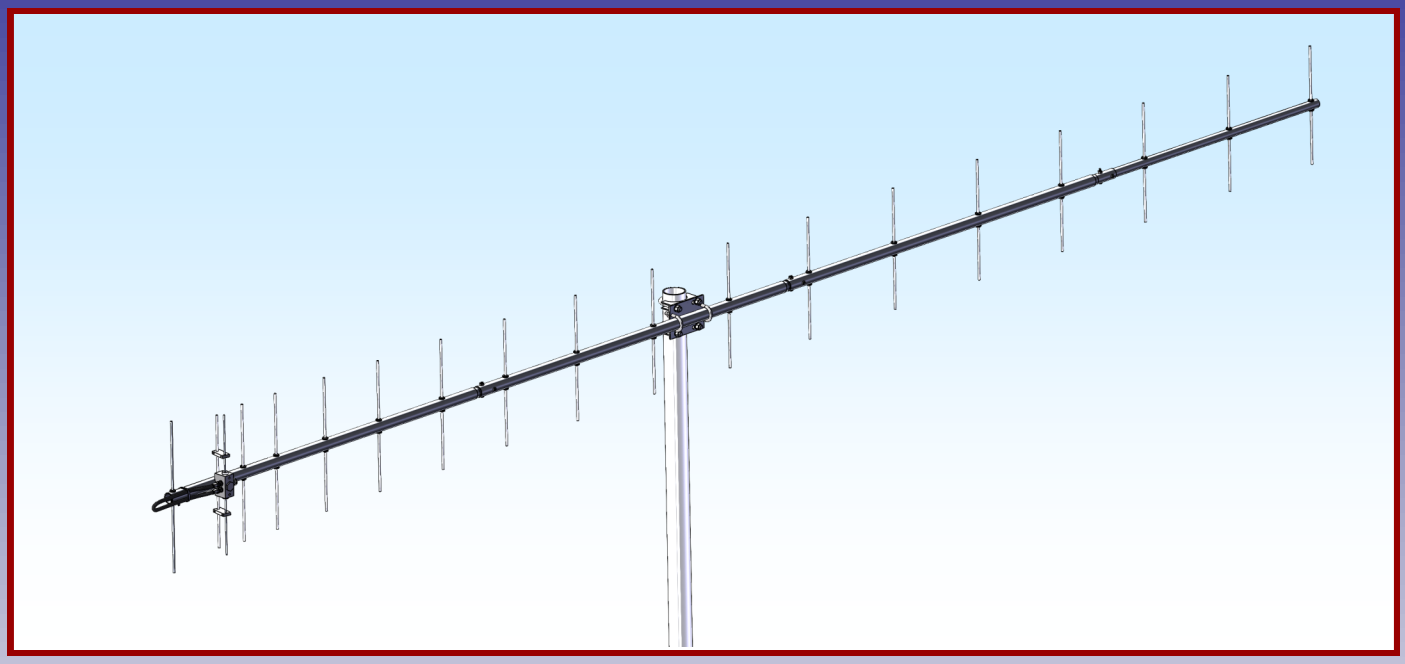
M2 Antenna Systems, Inc.
Model No: 440-18X



SPECIFICATIONS:

Model	440-18X
Frequency Range	420 To 450 MHz
*Gain	16.5 dBi
Front to back	24 dB Typical
Beamwidth	E=27° H=32°
Feed type	Folded Dipole
Feed Impedance.	50 Ohms Unbalanced
Maximum VSWR	1.5:1 Average
Input Connector	"N" Female

Power Handling	1.5 kW
Boom Length / Dia	135"' / 1" To 3/4"
Maximum Element Length	14"
Turning Radius:	69'
Stacking Distance	51" High & 52" Wide
Mast Size	2"
Wind area / Survival	0.68 Sq. Ft. / 100 MPH
Weight / Ship Wt.	5 Lbs. / 7 Lbs.

***Subtract 2.14 from dBi for dBd**

FEATURES:

M2 is always trying to design and build new antennas to fit the needs of amateur radio operators. The "X" series of antennas are all designed to keep the packaging under 48" long to minimize oversize surcharges applied by shippers. The "X" series antennas offer the same performance as its predecessor, but with shorter boom sections. The boom sections also have a thicker wall for added strength. A side benefit of the "X" series antennas are that they are more portable with the smaller sections.

The 440-18X replaces our very popular 440-18. The 440-18X is a computer optimized broadband yagi featuring an excellent pattern and good gain across its bandwidth. It can be mounted vertically or horizontally and is ideal for stacking two or more for additional gain. Its light weight yet sturdy construction keep the cost low and the performance high. Use it for ATV, OSCAR, FM, LONG HAUL TROPO, ETC. We guarantee you will be impressed.

The heart of the 440-18X is a unique Driven Element Module with superior weather resistance and power handling abilities. All connectors are O-ring sealed to the CNC machined block and internal connections are sealed in a space-age silicone gel with a dielectric strength nearly 4 times greater than air. The Balun coax connectors are triple O-ring sealed. Other key mechanical and electrical parts are CNC machined from 6061-T6 aluminum and all hardware except U-bolts is stainless steel.

The 440-18X offers you uncompromising performance, enduring mechanical construction, and long term electrical integrity.

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

05/22/21
Rev.01

440-18X ASSEMBLY MANUAL

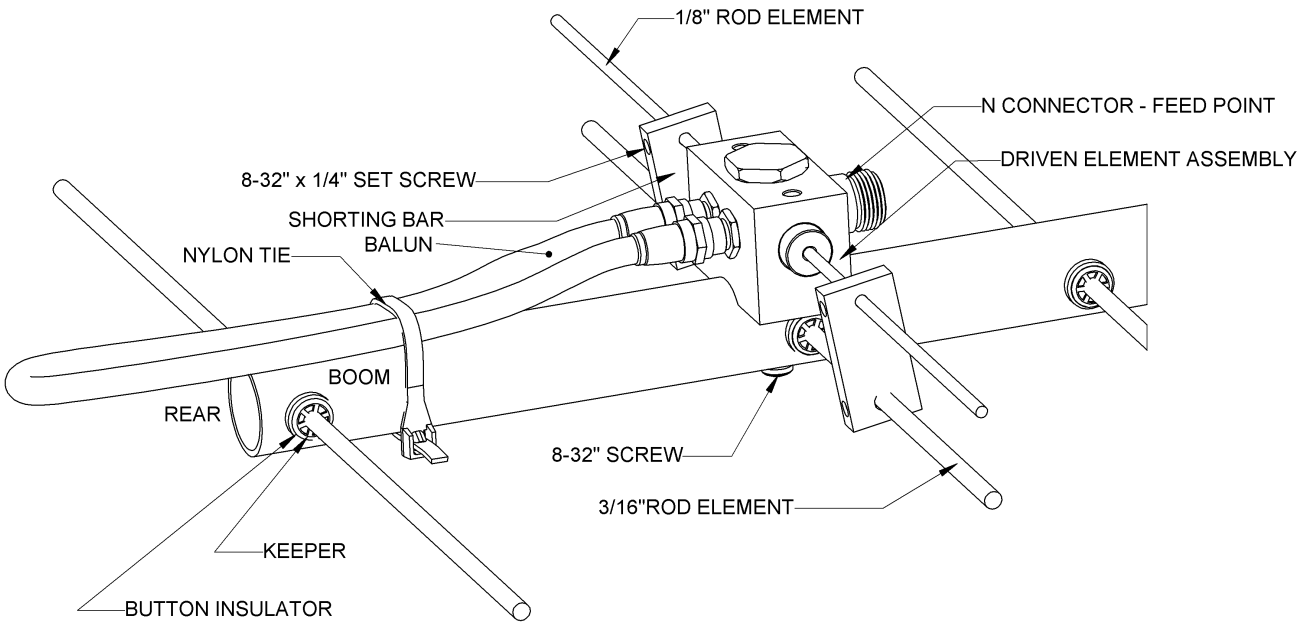
1. Start by laying out the boom sections using the DIMENSION sheet as a guide. Use 8-32 X 1-1/4 screws and locknuts to join sections. Sections may be swaged to fit each other or use short internal splice sections.

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 internal locking “KEEPERS” 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 or installed on one side only. 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 BLOCK to the boom using a single 8-32 X 1-1/4" screw and lockwasher. 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. Attach balun and tighten the connectors ***gently*** using a 7/16" end wrench. A lot of torque is unnecessary. 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 1/8" 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 setscrews.

9. The boom to mast plate is normally mounted at the balance point, approximately 52" from the rear . 1" 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. Since the feed line represents significant weight it is best to have it attached and fastened along the boom with cable ties before balancing the boom and mounting the plate.

10. **INSTALLATION, 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.

C. STACKING REMINDERS:
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 multiples of 1/2 wavelength in order to maintain equal phasing in the array. Improper phasing can severely deteriorate performance.
4. As a general rule, you never want to have metallic structures, such as a mast or feed lines parallel to the elements unless it is behind the reflector. Having a metallic structure in the same plane as the elements in front of the reflector element can cause VSWR problems and or skewed patterns.

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.

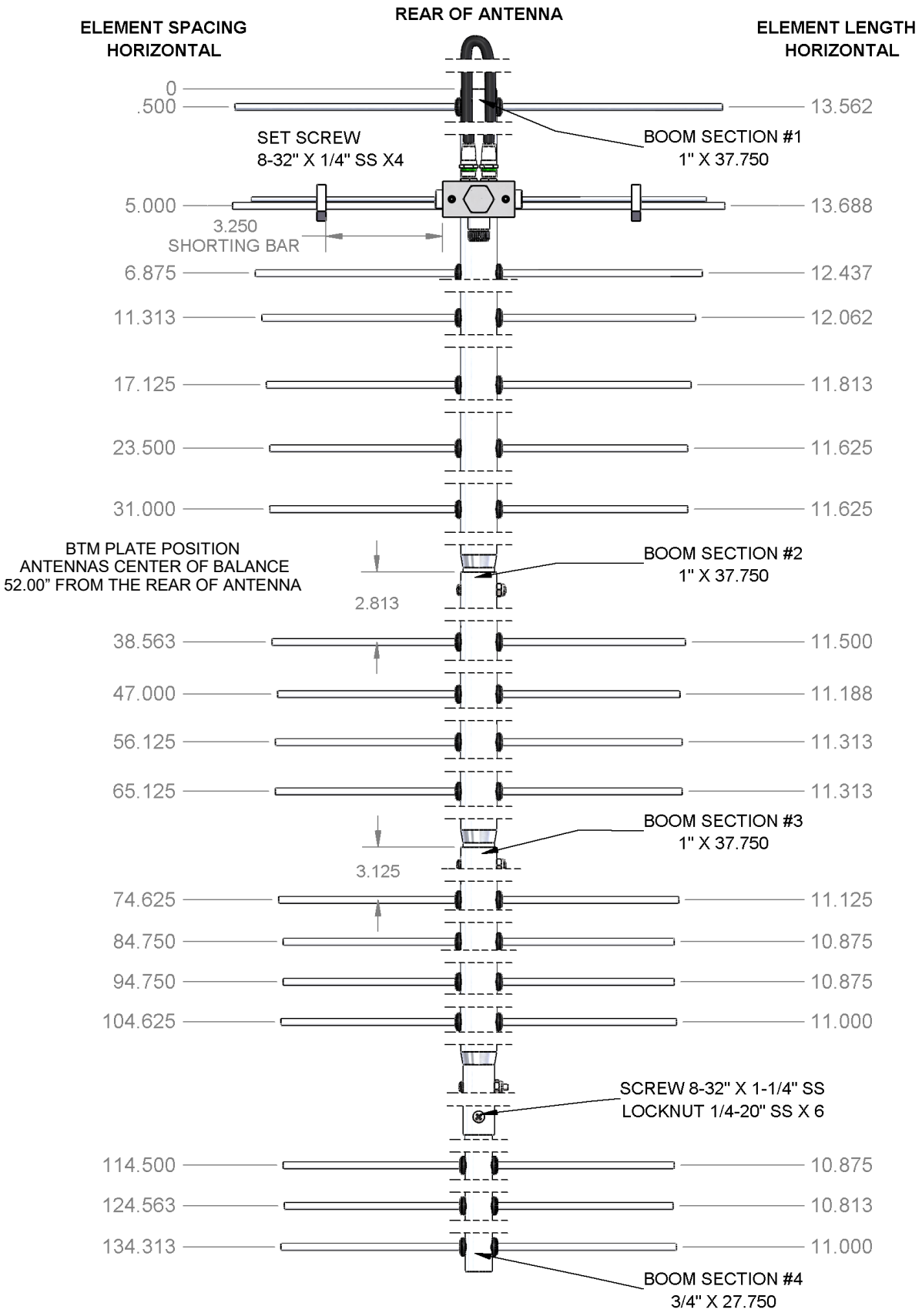
Stacking? Call **M²**and let us help you DO IT RIGHT

THIS COMPLETES THE ANTENNA ASSEMBLY.

CAREFULLY MANUFACTURED BY:

M² ANTENNA SYSTEMS, INC.
4402 N. Selland Ave.
Fresno, CA 93722
(559) 432-8873 Fax: 432-3059
www.m2inc.com Email: sales@m2inc.com

440-18X DIMENSION SHEET



440-18X PARTS & HARDWARE

DESCRIPTION	QTY
BOOM SECTION, 1 X .065 X 37-3/4" SOE(M2ABS44018X-1)	1
BOOM SECTION, 1 X .065 X 37-3/4" SOE(M2ABS44018X-2)	1
BOOM SECTION, 1 X .065 X 37-3/4" SOE(M2ABS44018X-3)	1
BOOM SECTION, 3/4 X .049 X 27-3/4"(M2ABS44018X-4)	1
ELEMENTS, 3/16 ROD x DIMENSION SHEET	18
DRIVEN ELEMENT ASSEMBLY(SADEA432UHF1)	1
BALUN, RG-6 1/2 WAVE(SABL70CM)	1
BOOM-TO-MAST PLATE, .188 X 3" X 4"(M2APT0019)	1
U-BOLT AND CRADLE, 2"	2
U-BOLT, 1"	2
ASSEMBLY MANUAL	1

IN HARDWARE BAG:

SHORTING BAR(M2ASB0080)	2
BUTTON INSULATORS	36
KEEPER, SS	36
NUT, 5/16-18 SS	4
LOCKWASHER, 5/16 SS	4
NUT, 1/4-20 SS	4
LOCKWASHERS, 1/4 SS	4
SETSCREW, 8-32 X 1/4, SS	4
SCREW, 8-32 X 1-1/4 SS	7
LOCKNUT, 8-32 SS	6
CABLE TIE, NYLON	3
ALLEN HEAD WRENCH, 5/64"	1
PUSH TUBE, 3/8 X 3"	1

CAREFULLY MANUFACTURED BY:

M^2 ANTENNA SYSTEMS, INC.
4402 N. Selland Ave.
Fresno, CA 93722
(559) 432-8873 Fax: 432-3059
www.m2inc.com Email: sales@m2inc.com