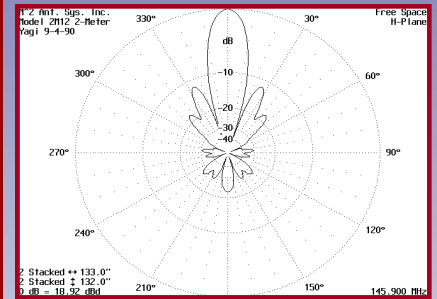
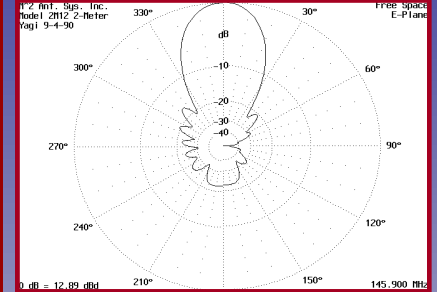
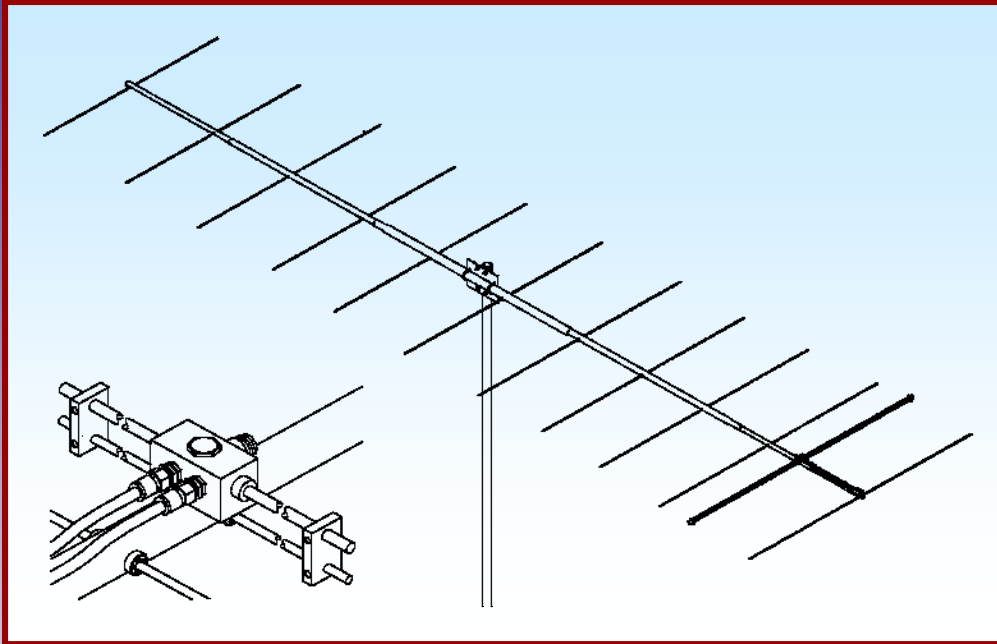




# M2 Antenna Systems, Inc. Model No: 2M12



## SPECIFICATIONS:

|                      |                    |                             |                       |
|----------------------|--------------------|-----------------------------|-----------------------|
| Model .....          | 2M12               | Power Handling .....        | 2.5 kW                |
| Frequency Range..... | 144 To 148 MHz     | Boom Length / Dia.....      | 19.5' / 1-1/2" To 1"  |
| *Gain .....          | 14.9 dBi           | Maximum Element Length..... | 40-1/4"               |
| Front to back .....  | 22 dB Typical      | Turning Radius: .....       | 10'                   |
| Beamwidth .....      | E=32° H=36°        | Stacking Distance.....      | 11' High & 11' Wide   |
| Feed type .....      | "T" Match          | Mast Size.....              | 1-1/2" to 2" Nom.     |
| Feed Impedance.....  | 50 Ohms Unbalanced | Wind area / Survival .....  | 1.5 Sq. Ft. / 100 MPH |
| Maximum VSWR.....    | 1.5:1              | Weight / Ship Wt.....       | 8 Lbs. / 10 Lbs.      |
| Input Connector..... | "N" Female         |                             |                       |

\*Subtract 2.14 from dBi for dBd

## FEATURES:

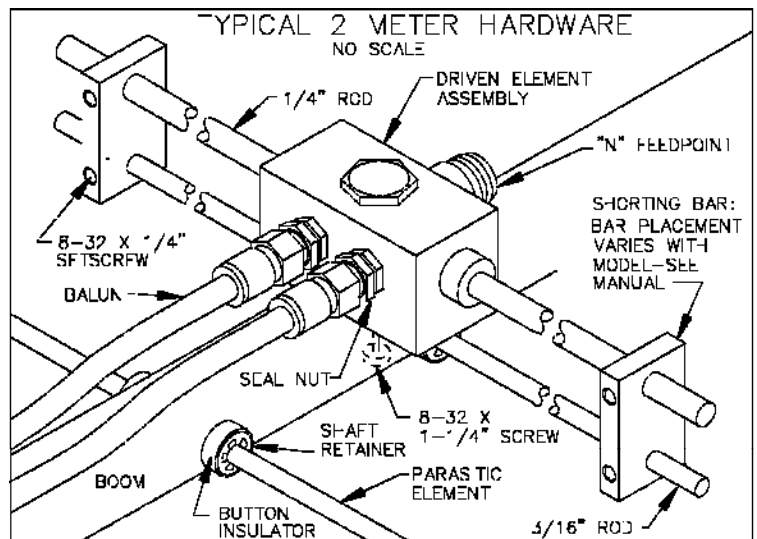
The 2M12 features the latest computer techniques for optimization of pattern and gain. Clean patterns allow you to hear more and interfere less. Clean patterns are essential for stacking. The 2M12 is ideal for stacking in either polarization. Two 2M12's side by side vertically polarized are a dynamite FM DX package and 4 or more are perfect for long haul tropo DXing or moonbounce.

Structurally the 2M12 is sturdy and clean, requiring no boom support. Elements are 3/16" 6061-T6 aluminum rod mounted through the boom on UV stabilized "button" insulators. The boom is a full 1-1/2 inch diameter in the middle tapering through two 1-1/4 inch sections to stiff 1 inch tips. The heart of the 2M12 is the unique Driven Element Module: connectors are O-ring sealed to the CNC machined block and balun connectors feature triple O-ring seals. Internal module connections are sealed in a space-age silicone gel (with nearly 4 times the dielectric strength of air) to enhance power handling. The 2M12: superior performance, long term electrical and mechanical integrity. Options include power dividers, phasing lines 'H' frames and rotators.

# 2M12 ASSEMBLY MANUAL

Tools handy for assembly process: screwdriver, 11/32" spin-tite or socket, 7/16" and 1/2" end wrenches / sockets, measuring tape.

1. Start by laying out the boom sections using the DIMENSION sheet as a guide. Use 8-32 X 1-1/2" screws and locknuts to join 1" to 1-1/2" sections, 8-32 x 1-3/4" screws to join 1-1/4" to 1-1/2" sections.
2. Lay out the elements by length and position as shown the DIMENSION sheet. Start with the reflector (longest) element. Balance on finger to find rough 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 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. Begin installing the stainless steel SHAFT RETAINERS. Use thumb and index finger to hold a retainer over end of the 3/8 x 3" push tube (retainer dished into tube). Hold the element firmly and start the retainer onto the rod by applying pressure with the push tube. Push the 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 retainer too far). Repeat for the opposite side. Continue installing retainers 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 forward and balun connectors facing to rear.
7. Before installing the balun, thread a 3/8" SEAL NUT all the way onto each connector, with the black Neoprene face of the nuts facing out. Attach balun to the Block 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 **gently** with 1/2" end wrench). A lot of torque is unnecessary. Form the balun close to the boom and secure 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 as specified on the Dimension Sheet: 17.75" out from the block. Align the bars and rods with each other and tighten the setscrews. **NOTE: THE DRIVEN ELEMENT CAN BE REVERSED IF FEEDLINE OFF THE REAR IS DESIRED.**



# 2M12 ASSEMBLY MANUAL

9. The boom to mast plate is normally mounted at the balance point. Since the feedline represents significant weight it is best to have it attached and fastened along the boom with cable ties before final mounting of 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.

## 10. INSTALLATION AND 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.** If possible, 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 1.5:1 or better from 144 to 148 MHz.

### **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 wavelength in order to maintain equal phasing in the array. Improper phasing can severely deteriorate performance.

FOR HORIZONTAL POLARIZATION, the 2M12 may be mounted to a metallic vertical mast or a horizontal NON-METALLIC crossboom (no conductive material in element plane). If mounted to a horizontal crossboom, route the feedline forward to the boom-to-mast plate, loop down, and bring back to crossboom at least 6" beyond element tips. Two 2M12 antennas are ideal for stacking, one above the other in horizontal polarity. ***H plane optimum stacking distance is 11'. 10***

FOR VERTICAL POLARIZATION, the 2M12 may be mounted to a NON METALLIC VERTICAL MAST (no conductive material in element plane) 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 angles to the boom, and bring down to the mast at least 6 inches BELOW THE ELEMENT TIPS. Two vertically polarized 2M12 antennas are typically stacked side by side on a horizontal crossboom. ***Stacking distance is 11'.***

If you are unsure about stacking multiple antennas, please call **M<sup>2</sup>** and let us help you DO IT RIGHT

THIS COMPLETES THE ANTENNA ASSEMBLY.

CAREFULLY MANUFACTURED BY:

## **M<sup>2</sup> ANTENNA SYSTEMS, INC.**

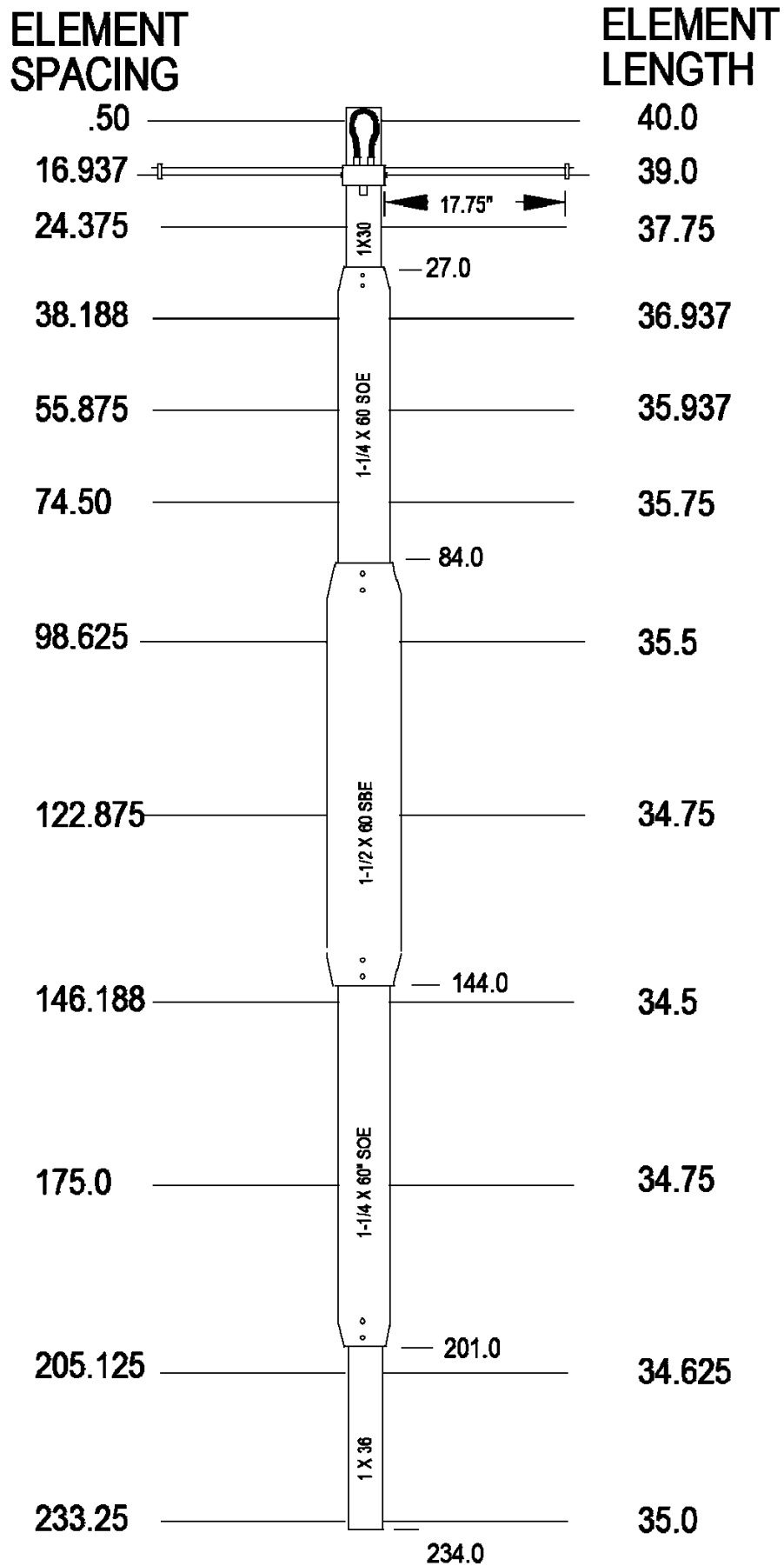
4402 N. Selland Ave.

Fresno, CA 93722

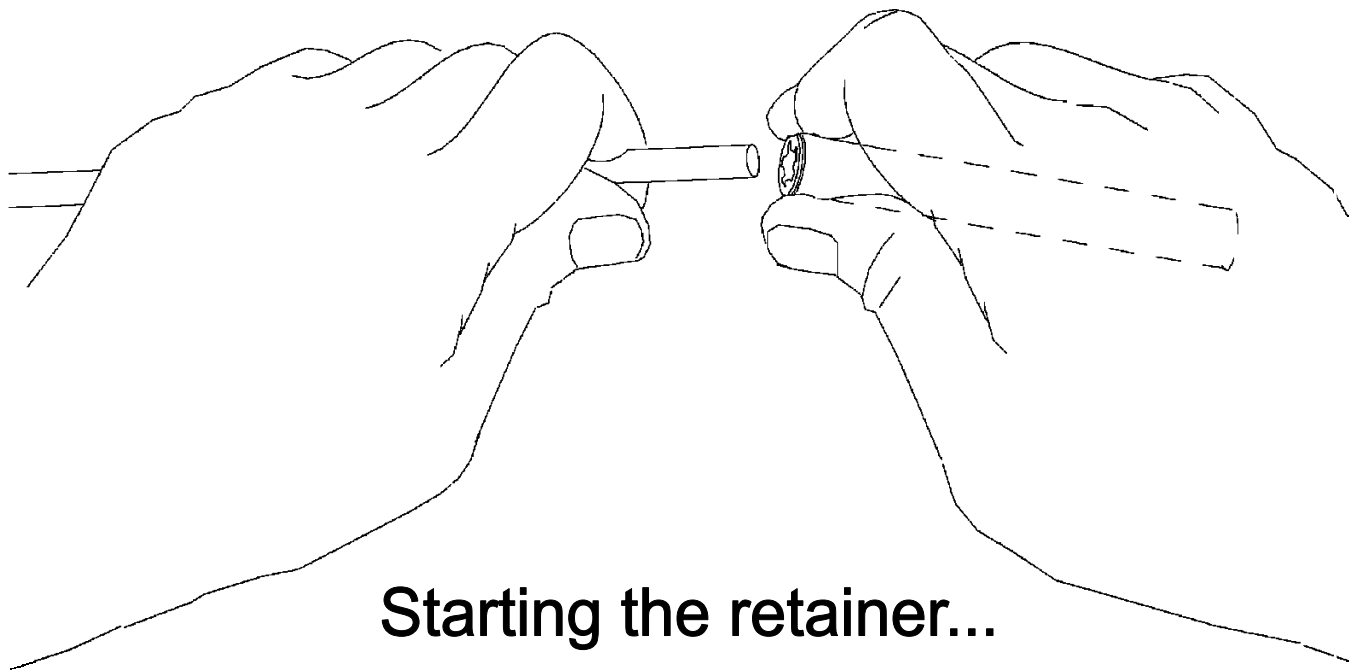
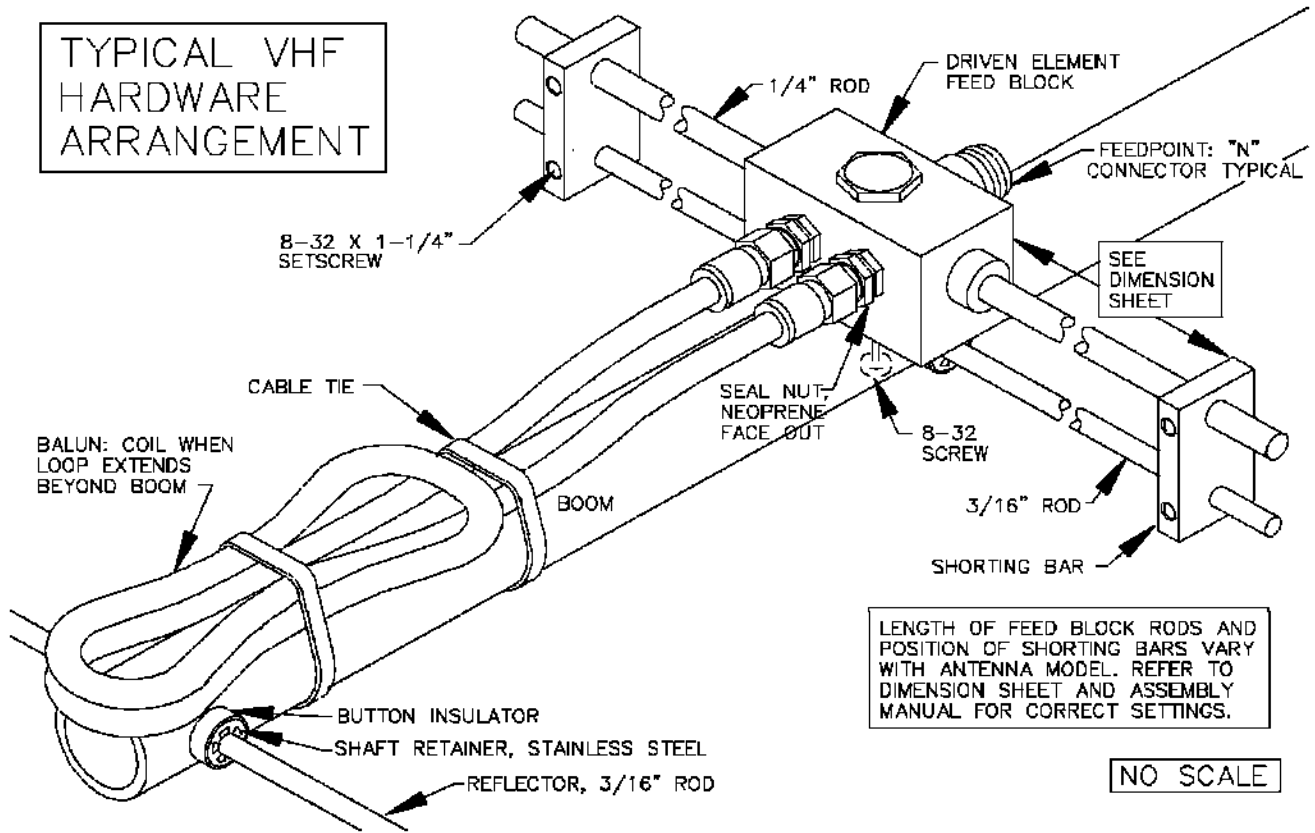
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[www.m2inc.com](http://www.m2inc.com) Email: [sales@m2inc.com](mailto:sales@m2inc.com)

# 2M12 DIMENSION SHEET



# 2M12 ASSEMBLY DETAILS



# 2M12 PARTS & HARDWARE

| DESCRIPTION.....                           | QTY |
|--|-----|
| BOOM SECTION, 1-1/2 X .058 X 60" SBE ..... | 1   |
| BOOM SECTION, 1-1/4 X .058 X 60" SOE ..... | 2   |
| BOOM SECTION, 1 X .058 X 36" STR.....      | 1   |
| BOOM SECTION, 1 X .058 X 30" STR.....      | 1   |
| ELEMENTS, 3/16 ROD x Dimension Sheet ..... | 12  |
| DRIVEN ELEMENT BLOCK ASSEMBLY.....         | 1   |
| ASSEMBLY MANUAL .....                      | 1   |
| BALUN, RG-6 1/2 WAVE .....                 | 1   |
| BOOM-TO-MAST PLATE, .188 X 6 X 4" .....    | 1   |
| U-BOLT AND CRADLE, 2' .....                | 2   |
| U-BOLT AND CRADLE, 1-1/2" .....            | 2   |

## IN HARDWARE BAG:

|                                |    |
|--------------------------------|----|
| SHORTING BAR .....             | 2  |
| BUTTON INSULATORS.....         | 24 |
| SHAFT RETAINER, SS.....        | 24 |
| NUT, 5/16-18 SS .....          | 8  |
| LOCKWASHER, 5/16 SS .....      | 8  |
| SETSCREW, 8-32 X 1/4, SS.....  | 4  |
| SCREW, 8-32 X 1-1/4 SS.....    | 1  |
| SCREW, 8-32 X 1-1/2 SS.....    | 4  |
| SCREW, 8-32 X 1-3/4 SS.....    | 4  |
| LOCKNUT, 8-32 SS .....         | 8  |
| CABLE TIE, NYLON .....         | 2  |
| SEAL NUTS, 3/8-32 .....        | 2  |
| ALLEN HEAD WRENCH, 5/64" ..... | 1  |
| PUSH TUBE, 3/8 X 3" .....      | 1  |

## M<sup>2</sup> ANTENNA SYSTEMS, INC.

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# M2 Antenna Systems, Inc. *New Design Update!*



## FEATURES:

M2 Antenna Systems Inc. is constantly improving our products to meet the high demands of customers expectations. Our latest upgrade is the use of the **New DB6U** Connector on all Baluns & Phasing Lines used on many of our products.

The DB 360 Compression Connection System creates two 360° compression connections (one interior and one exterior) providing a permanent, “double bubble” connection. The **DB6U** Connector also features internal O-ring for connector face weather proofing.

Note: You may find **Nut Seal's** listed on the parts list, but will no longer be provided with the Hardware. Seal nuts were used with previous F Connector design. This notice will act as temporary document while we update our many existing Instruction Manuals.