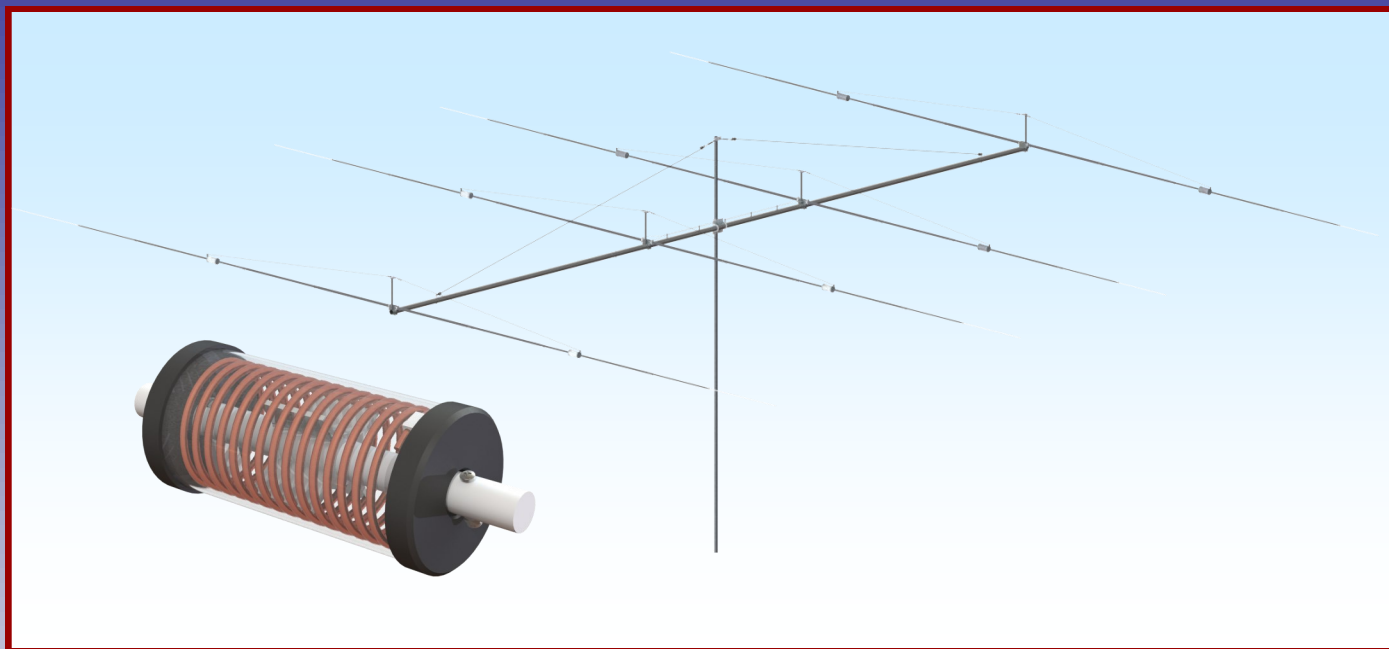




M2 Antenna Systems, Inc.

Model No: 40M4CDD



SPECIFICATIONS:

Model	40M4CDD	Connector	SO-239, Other avl.
Frequency Range	7.0-7.3 MHz continuous	Power Handling	3 Kw, Higher avl.
Typical gain	11.5 @ 70' dBi typical	Boom Length / Dia.....	42' / 3" X .125
Front to back ratio	21 dB typical	Maximum Element Length.....	49'
Beamwidth	75°	Turning Radius:	34'
Feed type / Balun	SO-239 / 1:1 Balun	Mast Size	2" or 3" Nom.
Feed Impedance.	50 Ohms	Wind area / Survival	13.0 Sq. Ft. / 100 MPH
VSWR.....	1.2:1 typical, 2.0:1 max	Weight / Ship Wt.....	160 Lbs. / 175 Lbs.

***Subtract 2.14 from dBi for dBd / FS = Free Space**

FEATURES:

Recently, M2 engineers developed a new way to make coils using CNC tooling. The result is a precision inductor increasing Q and lowering loss to new levels. A coil loaded Yagi design was computer optimized, and not one single change was required on the finished Yagi. This design gets the bandwidth and maintains performance across the band like no other 40 meter Yagi. Gain, Front to Back and VSWR are maintained nearly flat across the 7.0 to 7.2 MHz band section.

Mechanically it is easy to assemble. Only the tips of each element are different as all the coils are the same for each element. The coils themselves float in air minimizing dielectric loss. They are fully covered with a PVC cover. This antenna has been designed to meet your contesting needs and give you years of enjoyment on the 40 meter band. Remember foreign broadcast is now gone below 7.2 MHz and foreign hams can now transmit all the way to 7.2 MHz on phone and CW. 40M is now a spectacular worldwide DX band! If you haven't tried 40M lately, you are in for a treat! If you want to squeeze every last bit out of this antenna, there is now a 50 ft boom option. This add on kit improves gain and F/B ratio while maintaining a excellent vswr.

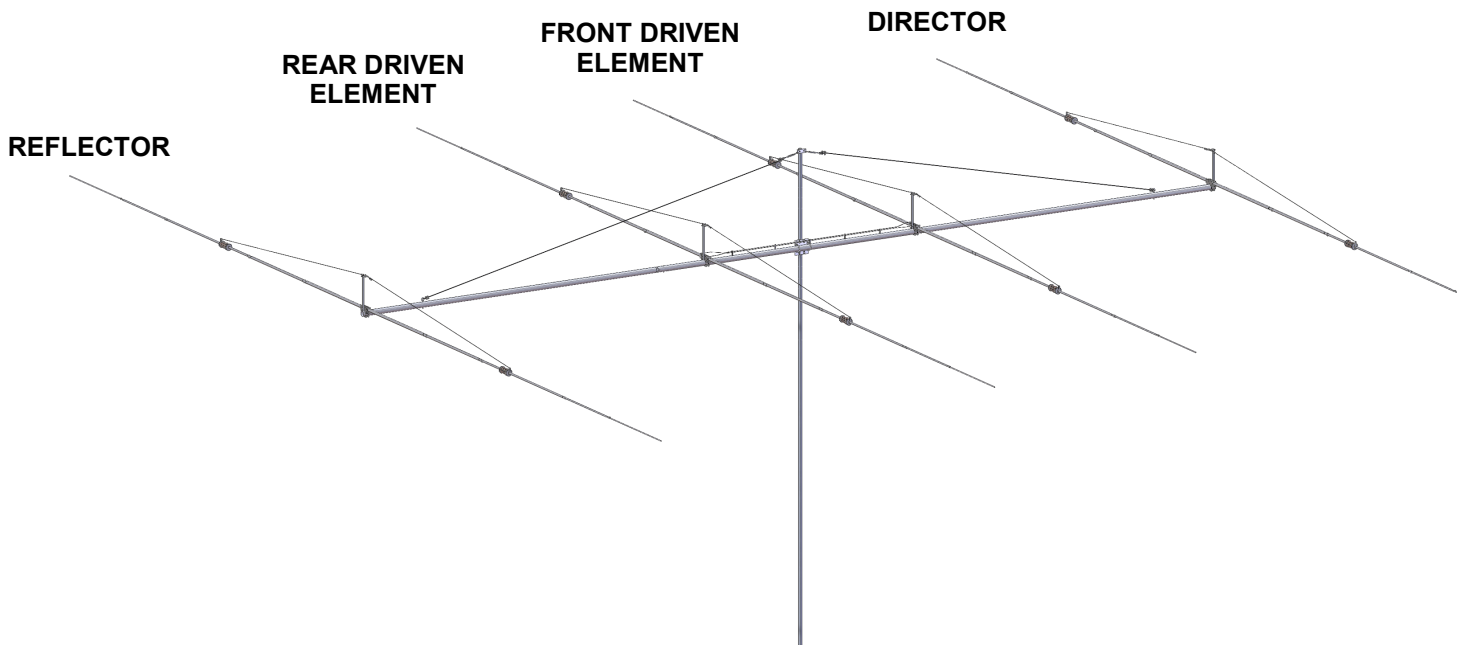
40M4CDD ANTENNA OVERVIEW

BEFORE YOU BEGIN: Look over all the DRAWINGS to get familiar with the various parts and assemblies in the system. Tools handy for assembly process: screwdriver, 11/32", 7/16", 1/2", 9/16" and 5/8" spin-tites, end wrenches and/or sockets, and a measuring tape.

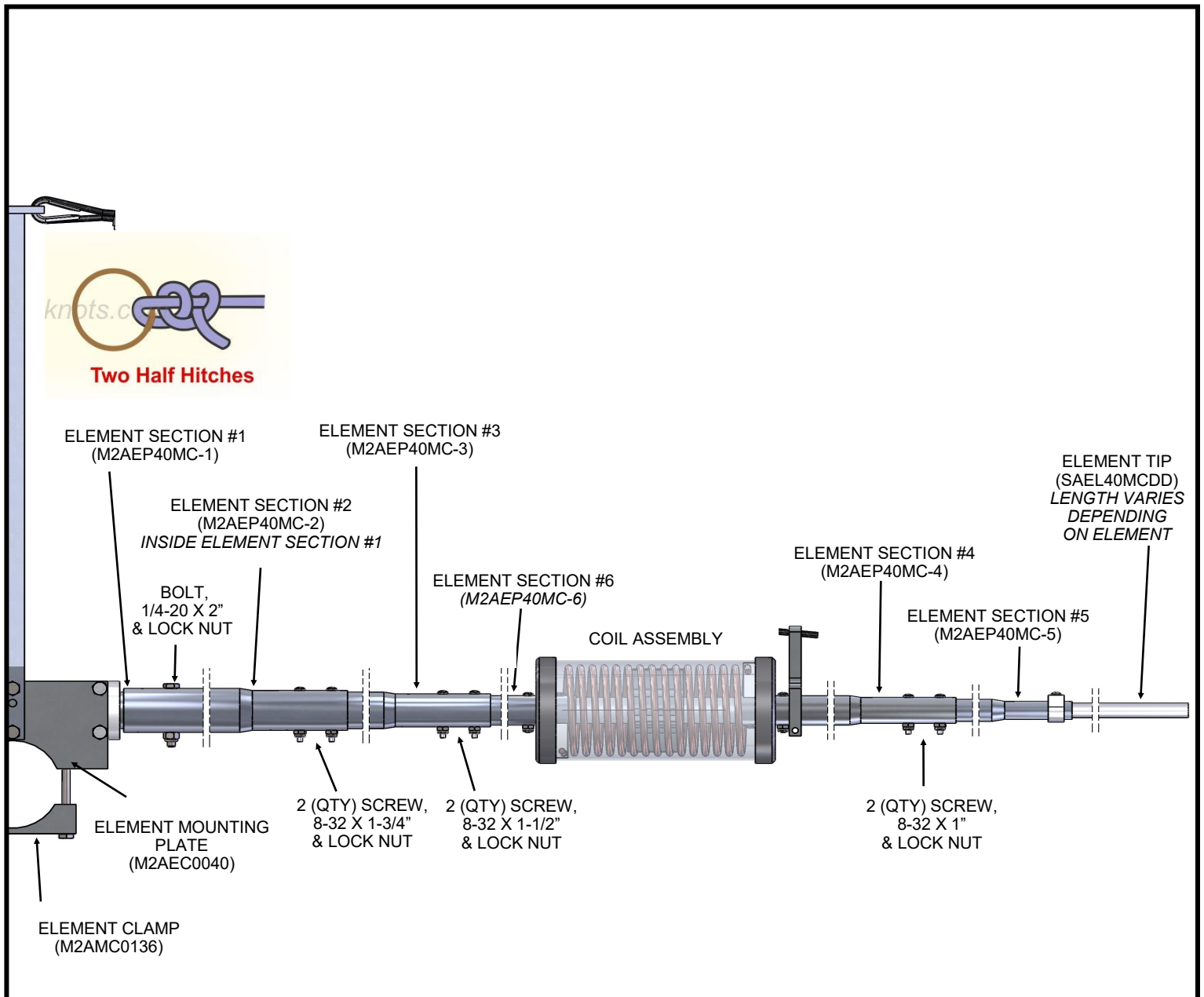
Note:

All installations are unique in some way, which means it's OK to preassemble certain hardware, or rearrange the assembly process to meet specific site requirements. A quick review of the assembly drawings should help firm up the appropriate strategy. Please remember to double-check all hardware for tightness **BEFORE** it becomes inaccessible.

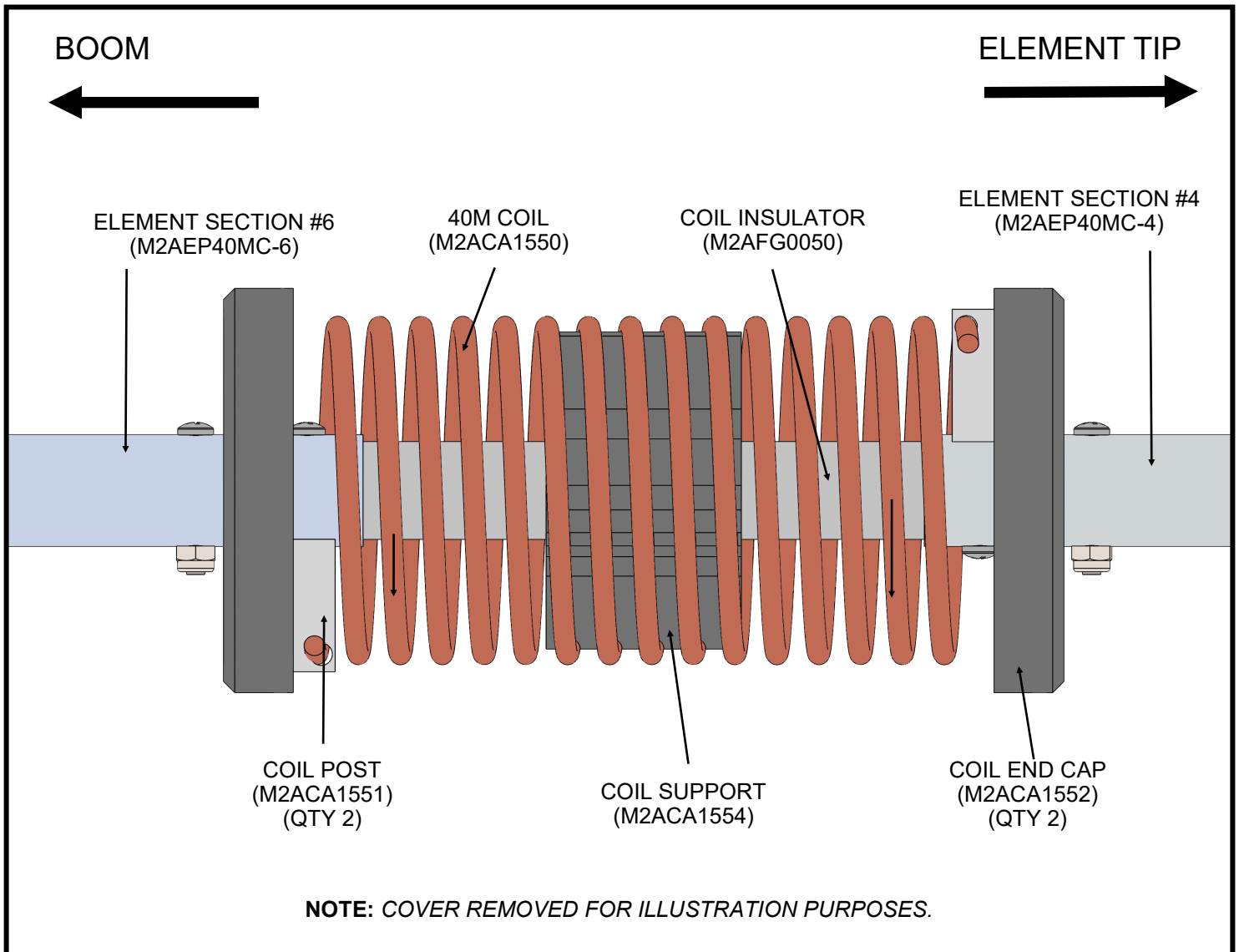
One container of zinc paste (Penetrox, Noalox, or equiv.) has been provided to enhance and maintain the quality of all mechanical and electrical junctions on this system. Apply a thin coat wherever two pieces of aluminum come in contact or any other electrical connections are made. It is also useful on screws and bolt threads as an ANTI SEIZE compound.



40M ELEMENT HALF OVERVIEW



40M COIL OVERVIEW



40M COIL ASSEMBLY INSTRUCTIONS

STEP 1:

The coil comes wound tight with 16 total turns from the factory. The excess material will be trimmed off after the coil is in its final position. Using a permanent marker, draw a straight line from one end of the coil to the other. This will help later to determine if your coil has grown in diameter during assembly. After final positioning of the coil no more 3/4 of an inch of line tilt is allowed. A larger coil will cause the inductance to change which can cause your antenna to be off frequency.

STEP 2:

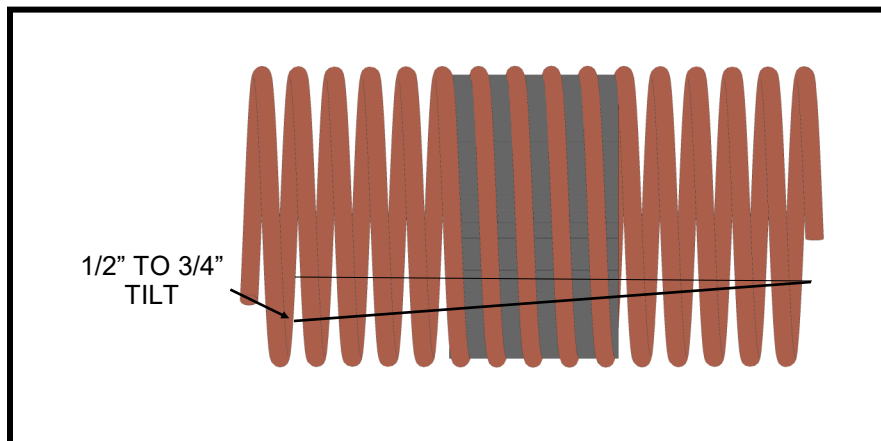
The COIL is wound tight at the factory to prevent damage during shipping. Use the COIL SPREADING TOOL provided, and carefully insert it into the first turn of the COIL. Now gently push or roll the tool through all 16 turns of the COIL. Now the COIL is nearly in its final shape and is ready to be threaded onto the COIL SUPPORT. Note the reference line drawn earlier, it will have a slight tilt after spreading.

STEP 3:

On one end, use pliers to gently straighten the last 1/2" of the COIL and file off any burrs.

STEP 4:

Begin threading the COIL onto one end of the COIL SUPPORT. **BE CAREFUL** to not deform the COIL during this process. The COIL should thread smoothly. Continue until about 5-1/2 turns are past the COIL SUPPORT or close to the center. Exact centering is not important. Again, note your reference line.



NOTE: PENETROX PASTE FOR LUBRICATING SCREW THREADS AND TUBING JOINTS HAS BEEN SUPPLIED. USE A VERY SMALL AMOUNT ON EACH SCREW THREAD AND UNDER THE COIL POSTS DURING THE NEXT OPERATION.

STEP 5:

Insert the COIL INSULATOR (M2AFG0050) into your COIL SUPPORT (M2ACA1554). Rotate the COIL and the COIL SUPPORT so the leading end of the COIL goes over and just past the inner hole in the COIL INSULATOR. Now slide on one COIL POST on to one end of the COIL so it is right over the first hole. Next, carefully slide on the ELEMENT SECTION #6 (M2AEP40MC-6) and align it so both holes in the tube match the two holes in the COIL INSULATOR.

STEP 6:

Insert hardware through the ELEMENT SECTION #6 and the COIL INSULATOR and begin threading it into the COIL POST. Tighten hardware. Thread the SET SCREW into the top of the COIL POST and with about 1/2" of wire protruding past the COIL POST, tighten the SET SCREW gently. Use supplied ALLEN WRENCH to tighten the SET SCREW.

STEP 7:

The second COIL POST is mounted on the OPPOSITE SIDE of the COIL INSULATOR so 15 1/2 turns of the COIL are used. The extra 1/2 turn COIL should pass over the COIL INSULATOR hole. Slide on the second COIL POST and align

40M COIL ASSEMBLY INSTRUCTIONS

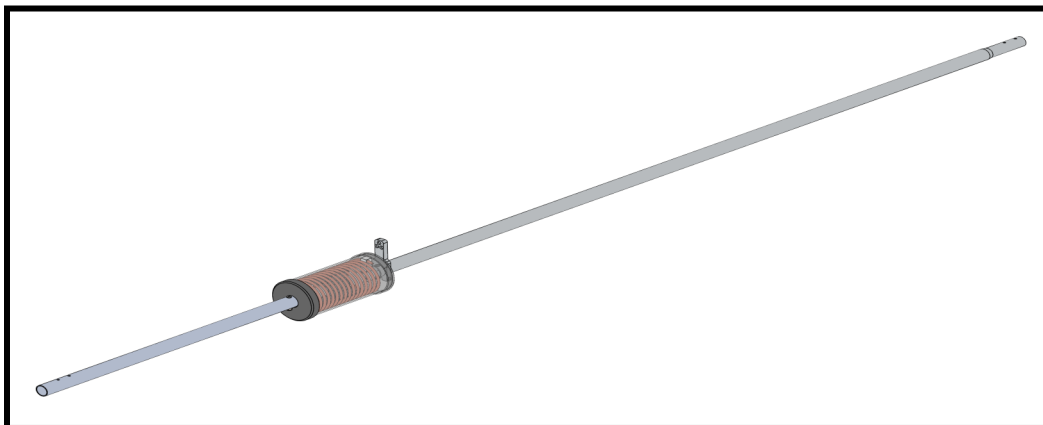
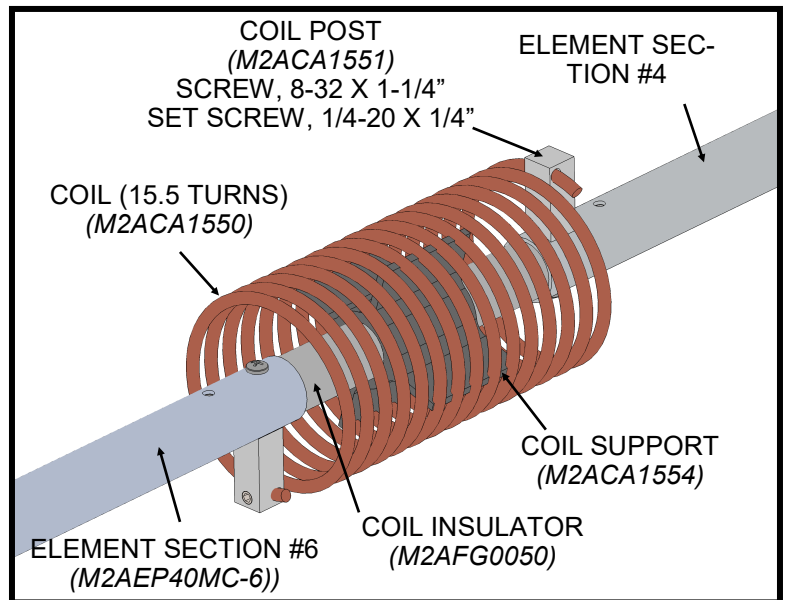
it over the hole. Slide on ELEMENT SECTION #4 (M2AEP40MC-4) and fasten the COIL POST to the tubing assembling using the supplied hardware. Use your reference line and adjust the coil so the line has no more tilt than 3/4"

STEP 8:

Insert the SET SCREW into the COIL POST and tighten gently. Adjust the COIL and COIL SUPPORT location for equally spaced turns. The distance between each turn should be the same as the COIL wire diameter. Once the COIL is straight and aligned, tighten the final SET SCREW securely.

STEP 9:

Slide COIL COVER and COIL END CAPS onto COIL ASSEMBLY. Secure COIL END CAPS into position by securing hardware through TUBE ASSEMBLIES on both ends of the COIL ASSEMBLY. Slide ELEMENT OVERHEAD SUPPORT onto ELEMENT SECTION until it reaches the head of the screw holding on the COIL COVER. Clamp ELEMENT OVERHEAD SUPPORT in place with screw and locknut.



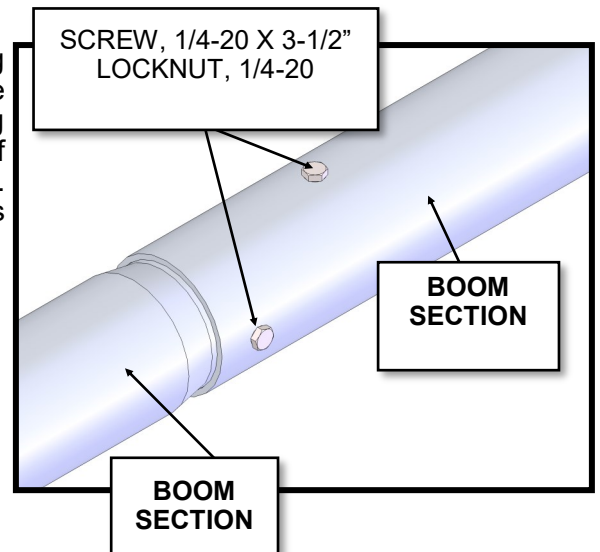
STEP 10:

Assemble all the remaining COIL ASSEMBLIES by repeating steps 1-9. Set COIL ASSEMBLIES aside for future use.

40M4CDD BOOM ASSEMBLY INSTRUCTIONS

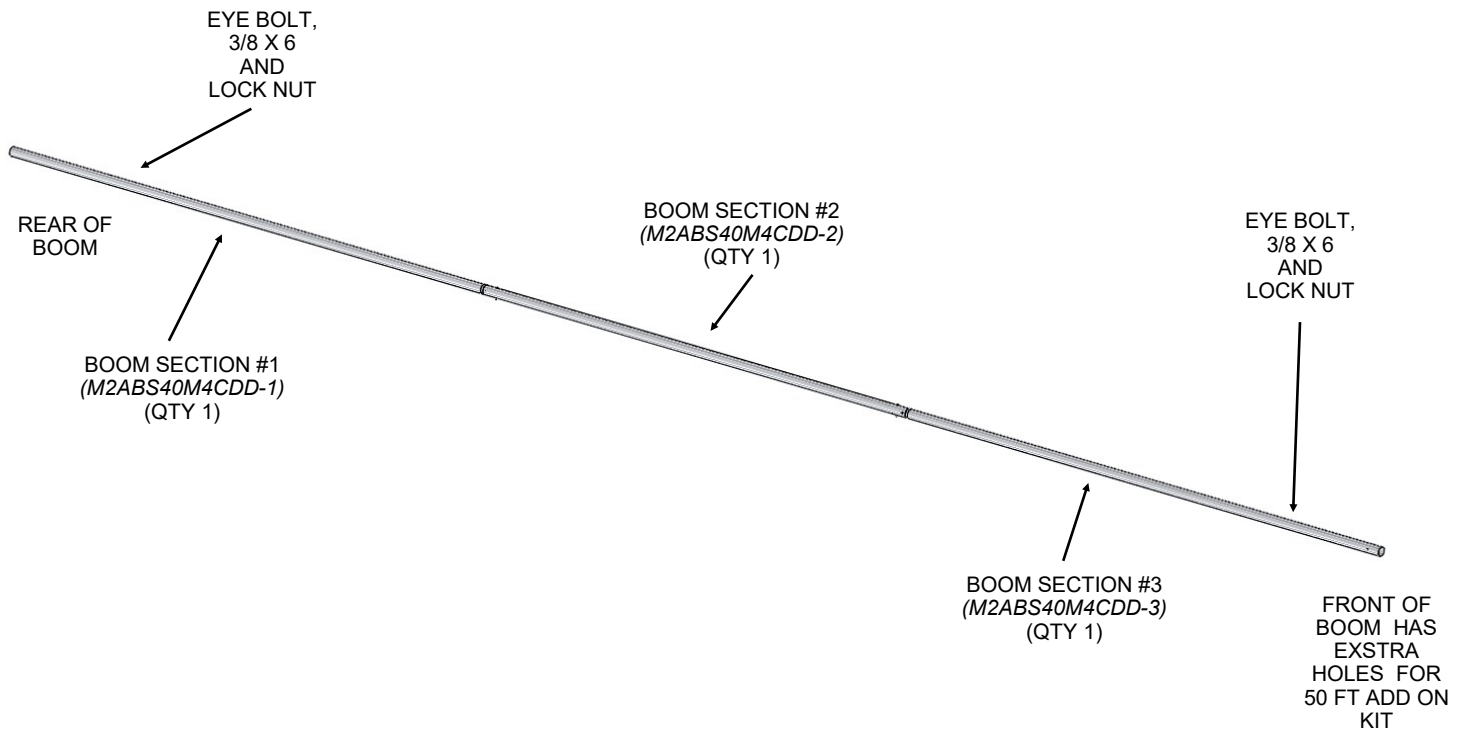
STEP 11:

At this point it will be helpful to perform the remaining assembly steps with the BOOM ASSEMBLY elevated off the ground (about 3 feet). This can be accomplished by using sawhorses or something similar. Wipe off the swaged ends of each BOOM SECTION and apply a small amount of PENTROX. Refer to the drawing below and assemble BOOM SECTIONS as shown. Insert hardware and tighten.



STEP 12:

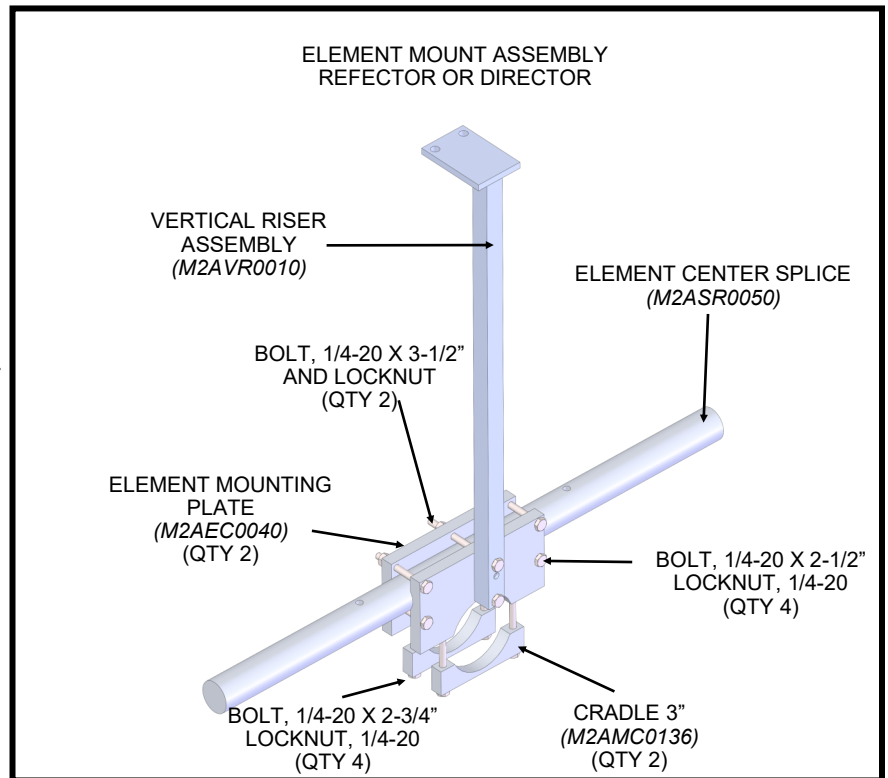
Add the eye bolts into the open hole on boom sections 1 # 3



40M4CDD ELEMENT MOUNT ASSEMBLY INSTRUCTIONS

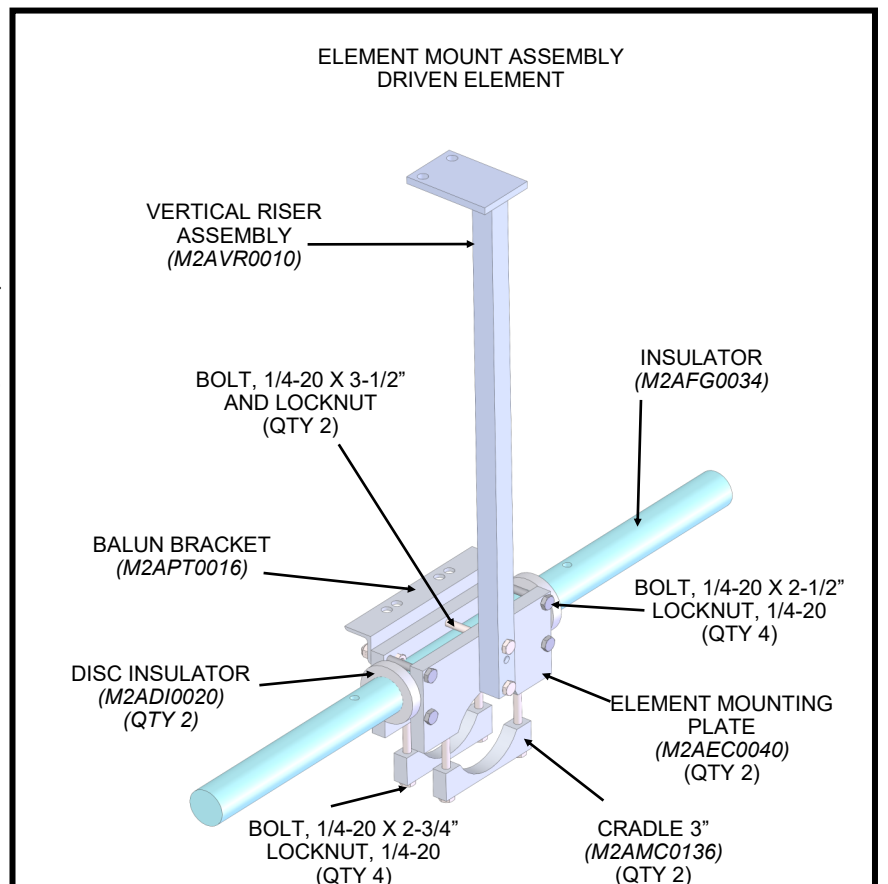
STEP 13:

Assemble the ELEMENT MOUNT assemblies for the reflector and front director element. Refer to the assembly drawing to aid in assembly. Be sure to center the ELEMENT CENTER SPLICE and the holes are in the vertical position.

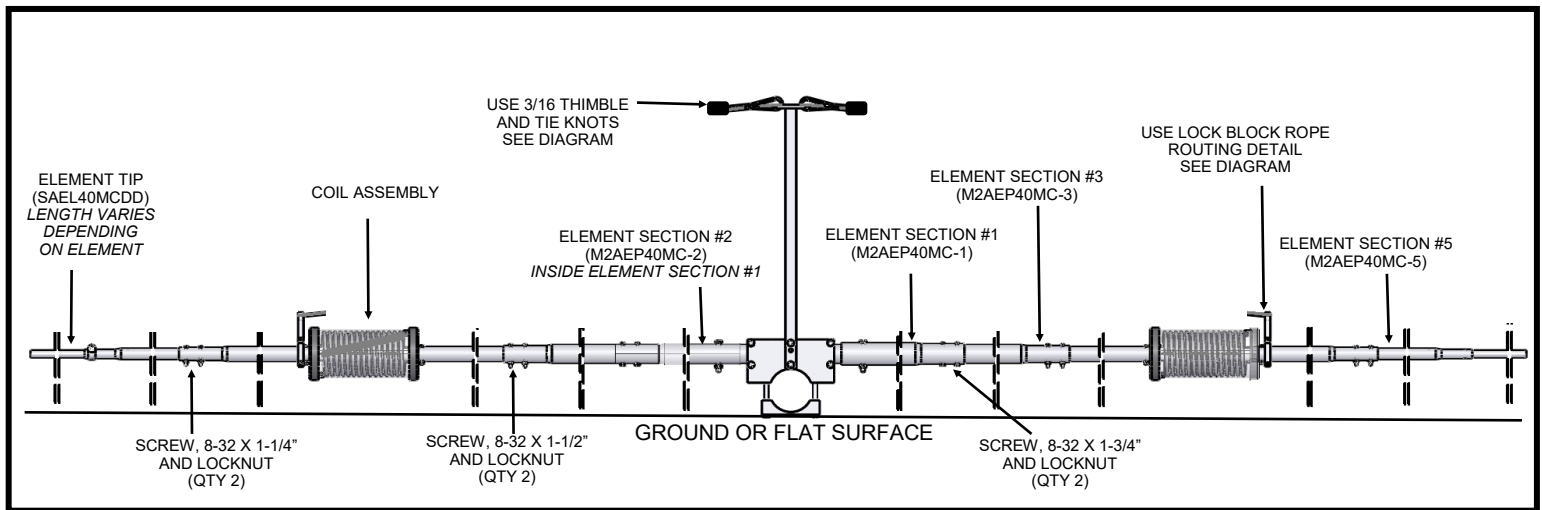


STEP 14:

Assemble the DRIVEN ELEMENT MOUNT assembly for the DRIVEN ELEMENTS. Refer to the assembly drawing to aid in assembly. Be sure to center the INSULATOR and that the holes are in the vertical position. The DISC INSULATORS are a press fit. Heating them with a heat gun or hot water will help in assembly.



40M ELEMENT FINAL ASSEMBLY INSTRUCTIONS



NOTE: For the final assembly on all the elements, it is best to perform the next steps on the ground or long flat surface. This will aid during final adjustment of the ELEMENT OVER HEAD SUPPORT. *The ELEMENT HALVES are symmetrical on both sides. Do each of the following steps on both sides of the ELEMENT.*

STEP 15:

Slide ELEMENT SECTION #2 onto ELEMENT CENTER SPLICE or INSULATOR.

STEP 16:

Slide ELEMENT SECTION #1 onto ELEMENT SECTION #2. Insert hardware and tighten locknut. Attach VERTICAL RISER ASSEMBLY. For the driven element you need to add (4) CLAMP BLK, 3/8 (HAIRPIN) (M2AMC0261) and hardware. See drawings for hardware call out for the different elements.

STEP 17:

Insert ELEMENT SECTION #3 into the end of ELEMENT SECTION #1. Insert and tighten hardware.

STEP 18:

Insert the ELEMENT SECTION #6 of the COIL ASSEMBLY previous assembled in STEPS 1-10 into ELEMENT SECTION #3. Insert and tighten hardware.

STEP 19:

Insert ELEMENT SECTION #5 into the end of ELEMENT SECTION #4. Insert and tighten hardware.

STEP 20:

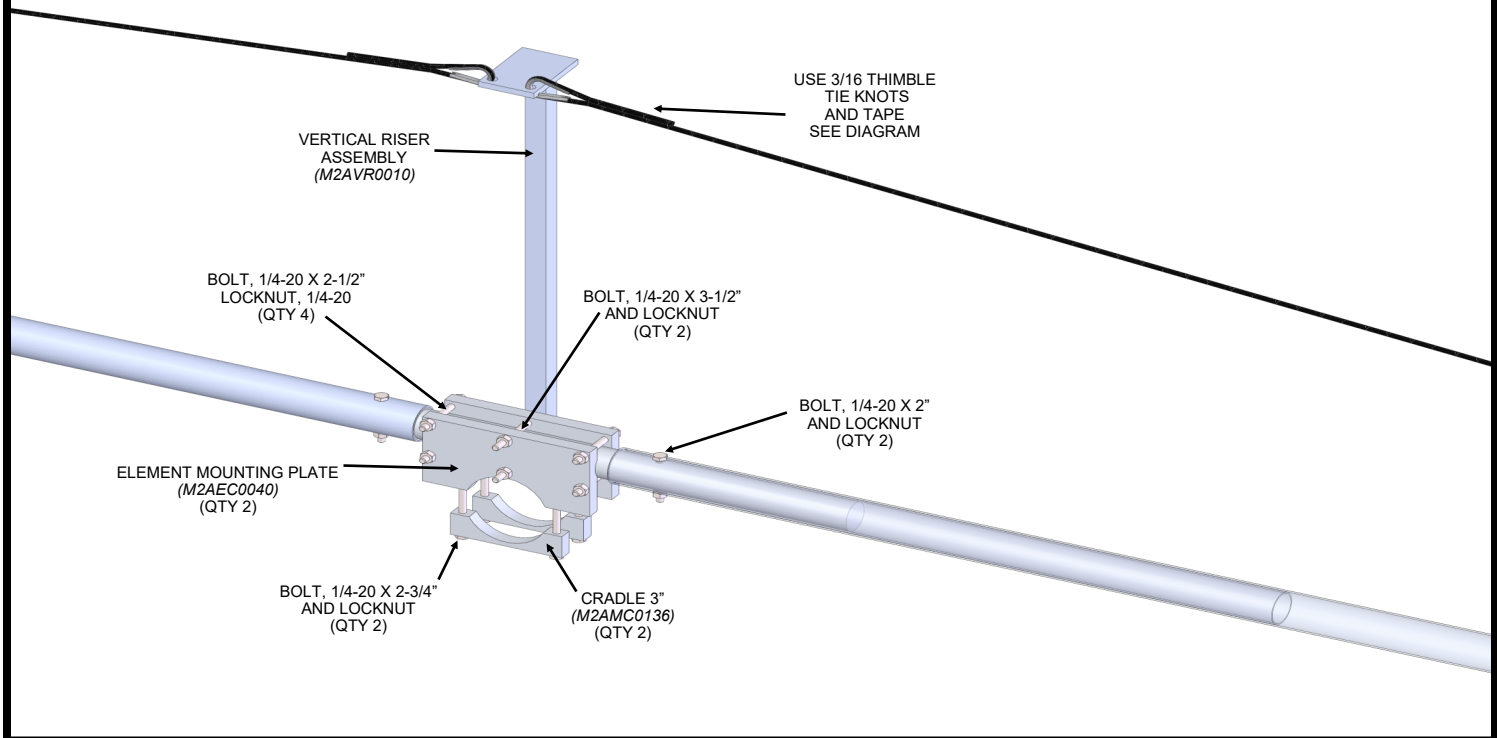
To adjust the ELEMENT TIP, a COMPRESSION CLAMP is used. First thread on the hex nut to capture the screw in the CLAMP. Then slide the COMPRESSION CLAMP so that the screw is lined up with the hole in ELEMENT SECTION #5. Use the DIMENSION SHEET and set the proper exposed length of the 1/2" ELEMENT TIP for the appropriate element, then mark the element assembly to avoid confusion later. See GENERIC COMPRESSION CLAMP DETAIL page for more detail.

STEP 21:

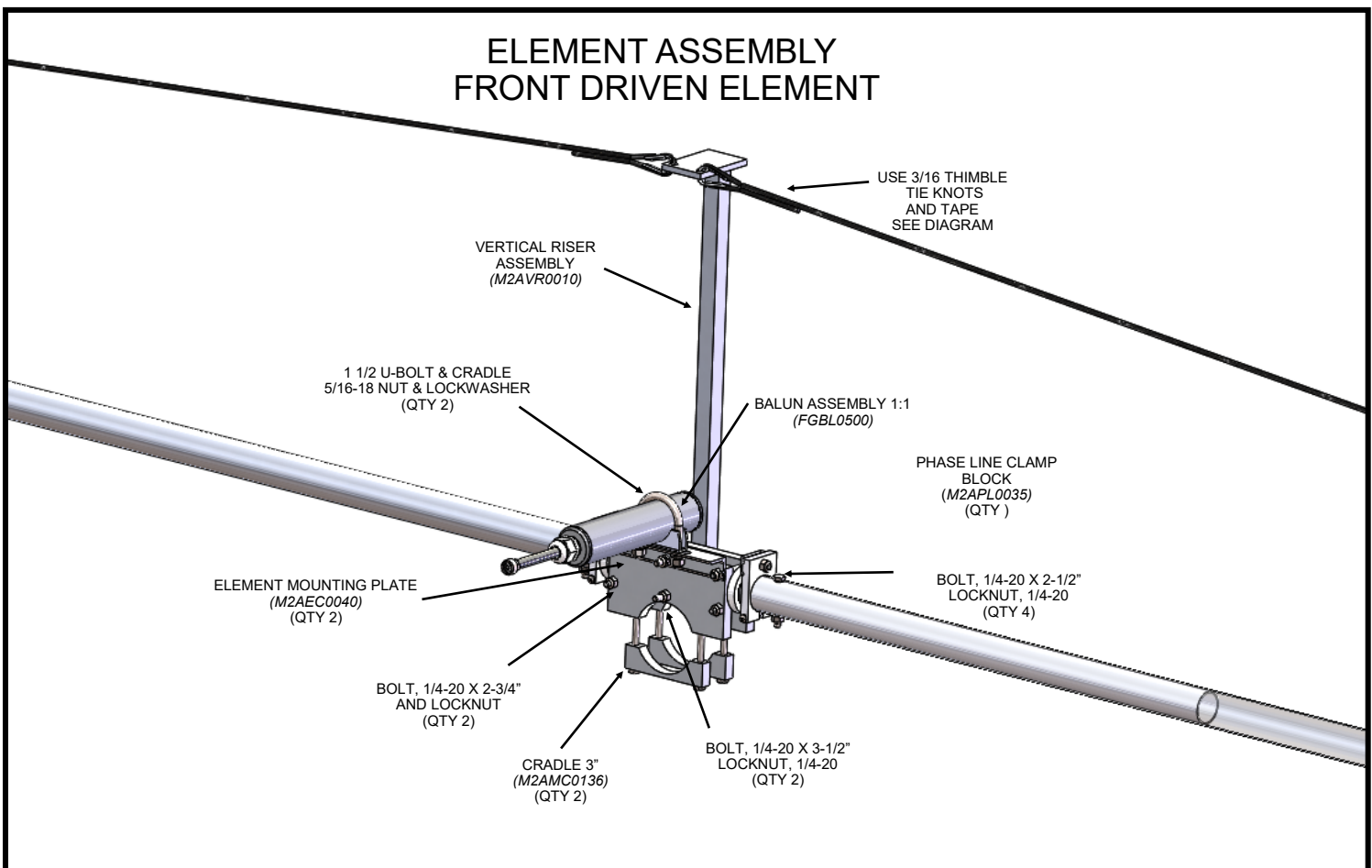
Tensioning the element overhead guys: See the LOCK BLOCK AND KNOT DETAIL page. Familiarize yourself with knots at the top of VERTICAL RISER, bend the thimbles open and insert them into the holes on the top plate of the VERTICAL RISER, then bend them back to there original shape. Follow the knot diagram and tie the upper section of rope, leave no more than 3" of excess rope and finalize by taping the short tail of rope down to the main portion of rope. Thread the opposite end of the rope through the ELEMENT OVERHEAD SUPPORT (M2APL0212) (See the LOCK BLOCK AND KNOT DETAIL page) and tension the rope so the element is in a level or neutral position. It is always best to have the element in a level or neutral position or with a slight sag downward. Over tensioning can lead to a upward bowed element causing instability. This finalizes the element construction.

40M4CDD ASSEMBLY DETAIL

ELEMENT ASSEMBLY REFLECTOR OR DIRECTOR ELEMENT



ELEMENT ASSEMBLY FRONT DRIVEN ELEMENT



40M4CDD PHASING LINE AND BALUN ASSEMBLY INSTRUCTIONS

STEP 22:

Refer to the dimension sheet for element placement. If you have purchased the additional kit to increase the antenna to 50 ft please refer the 40M4CDD-50 dimension sheet for element positions and tip lengths. With the boom elevated on sawhorses or equivalent, using a long tape measure and a permanent marker lay the boom out by marking the centers of each element. Equalize the amount of extra boom at both ends on the antenna.

STEP 23:

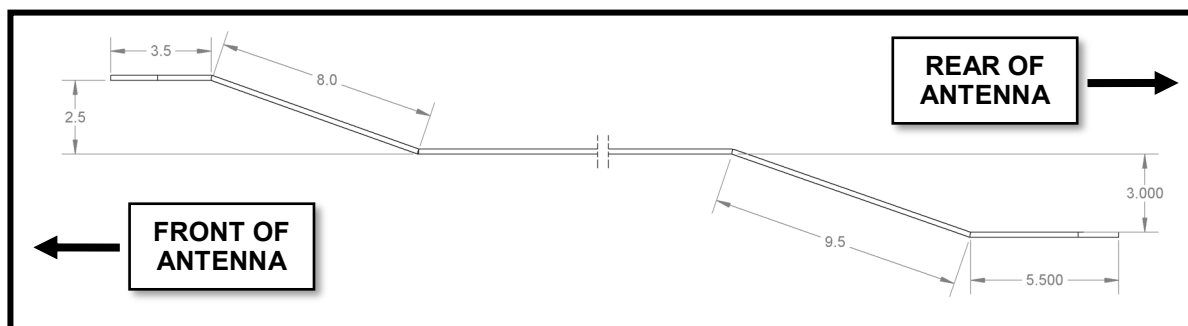
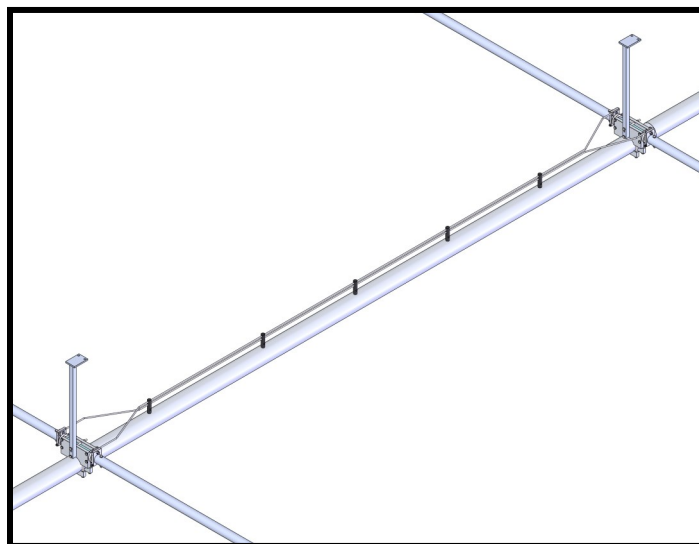
Install each element at the marks on the boom. Be sure the eye bolts in each end of the boom are in the up position. Double check the positions of each element and lightly tighten.

STEP 24:

Standing at one end of the antenna, sight down the boom and reference each element to one another making sure each element is parallel to one another, make small adjustments as needed and tighten.

STEP 25:

The PHASING LINES are two 3/16" bent aluminum rods equally spaced apart with Delrin STANDOFFS. Slide the two aluminum PHASING LINES into the 5 Delrin PHASING LINE STANDOFFS. If you bend the PHASING LINES first you will not be able to slide on the STANDOFFS. Zip tie the STANDOFFS to the CROSS BOOM equally spaced apart between the FRONT and REAR DRIVEN ELEMENTS.

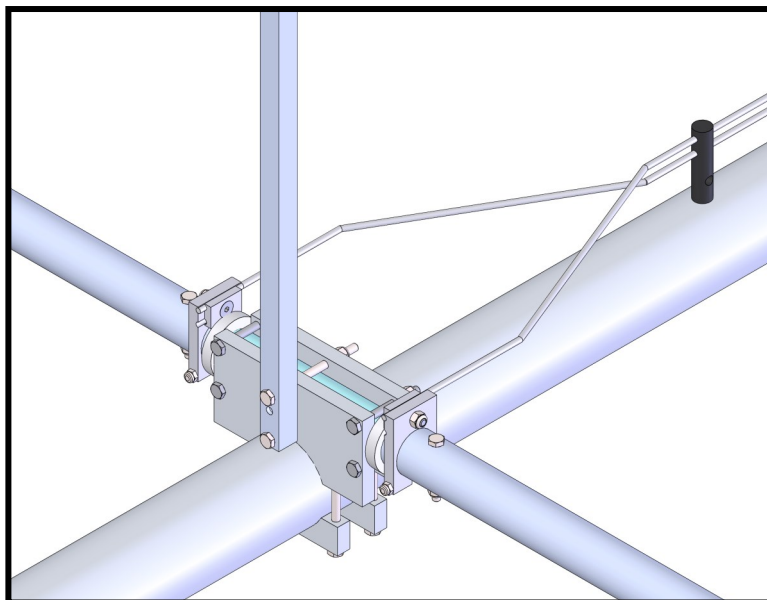


STEP 26

Bend PHASING LINES using drawing as an approximate guide.

STEP 27

Insert PHASING LINES into THE REAR DRIVEN ELEMENT MOUNTS. Tighten nuts.



40M4CDD HAIR PIN AND BALUN ASSEMBLY INSTRUCTIONS

STEP 27

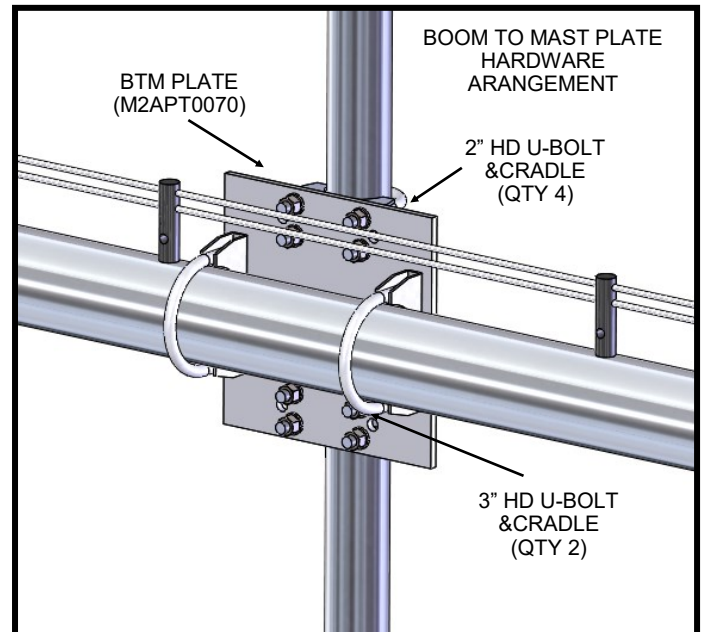
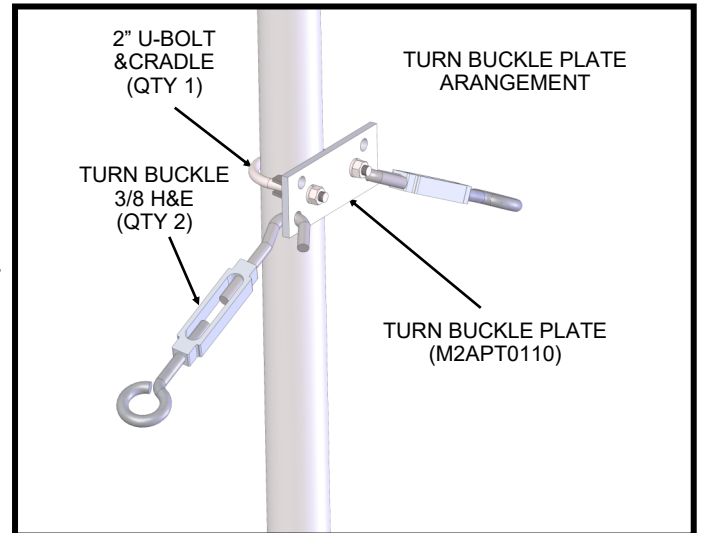
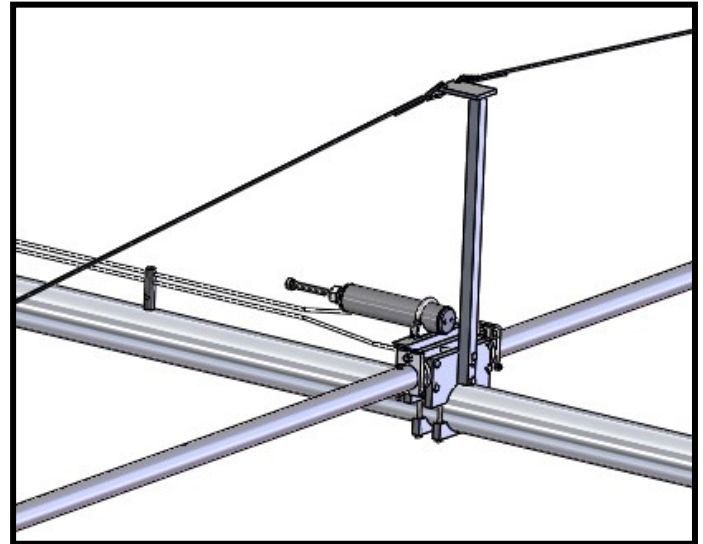
Insert PHASING LINES into THE PHASE LINE CLAMP BLOCK. Attach the balun leads to each side under the nuts that tighten the phase line clamps. Install large nylon ties through each phase line stand off and secure in place and equally spaced.

STEP 28

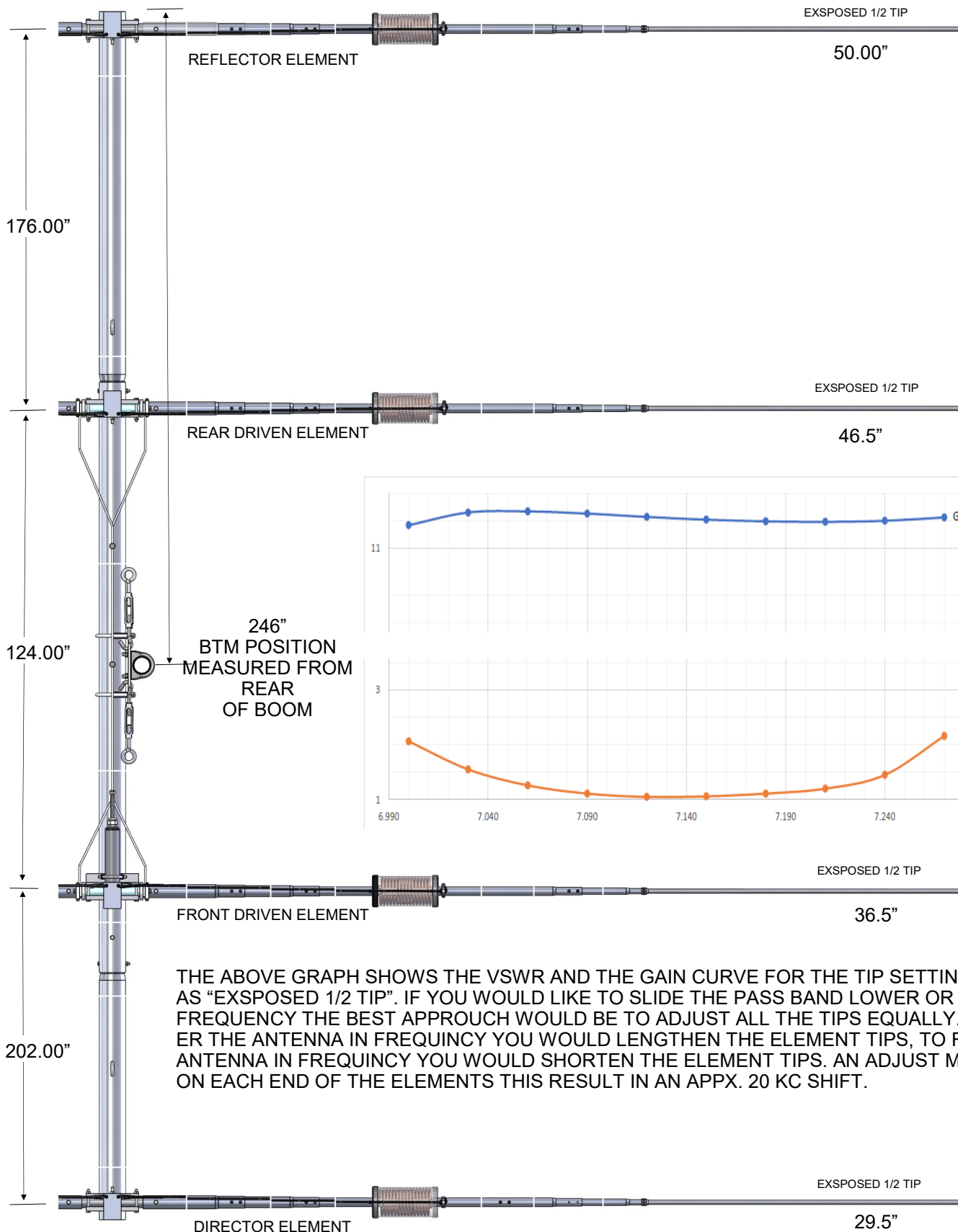
Installing a temporary mast while the antenna is still on the ground will help set up the main boom overhead support rope to ease installation on the tower. Find a 2" x 84" pcs. of tubing and install it to the boom to mast plate as shown in the boom to mast plate hardware arrangement. Add the turn buckle plate about 12" to 24" above the BTM plate. Find the 5/16" dacron rope and tie each end to the eye bolt (see the knot diagram) at each end of the boom. Cut the rope leaving equal lengths of rope past the mast on each side. Pull the rope tight, and tie each end to the turnbuckles leaving as little slack as possible. Now loosen the U-bolt and raise the turnbuckle plate until the boom straightens. Let this stay tight for at least overnight allowing the rope to stretch and take a set. Be sure to tape the rope ends down to the tensioned side of the rope to prevent knots from coming loose.

STEP 29

Before tower installation be sure to check all hardware for tightness, check all elements overhead rope supports for tight knots and review the droop of each element, adjust as needed. Loosen the turnbuckle plate and lower the plate releasing tension from the ropes. Remove the turnbuckles from the turnbuckle plate and tape them to the boom for easy access during tower installation. After final installation be sure to safety wire the turnbuckles to avoid the turnbuckles from loosening while under vibration. Be sure to use good quality coax with a quality connectors for final installation.

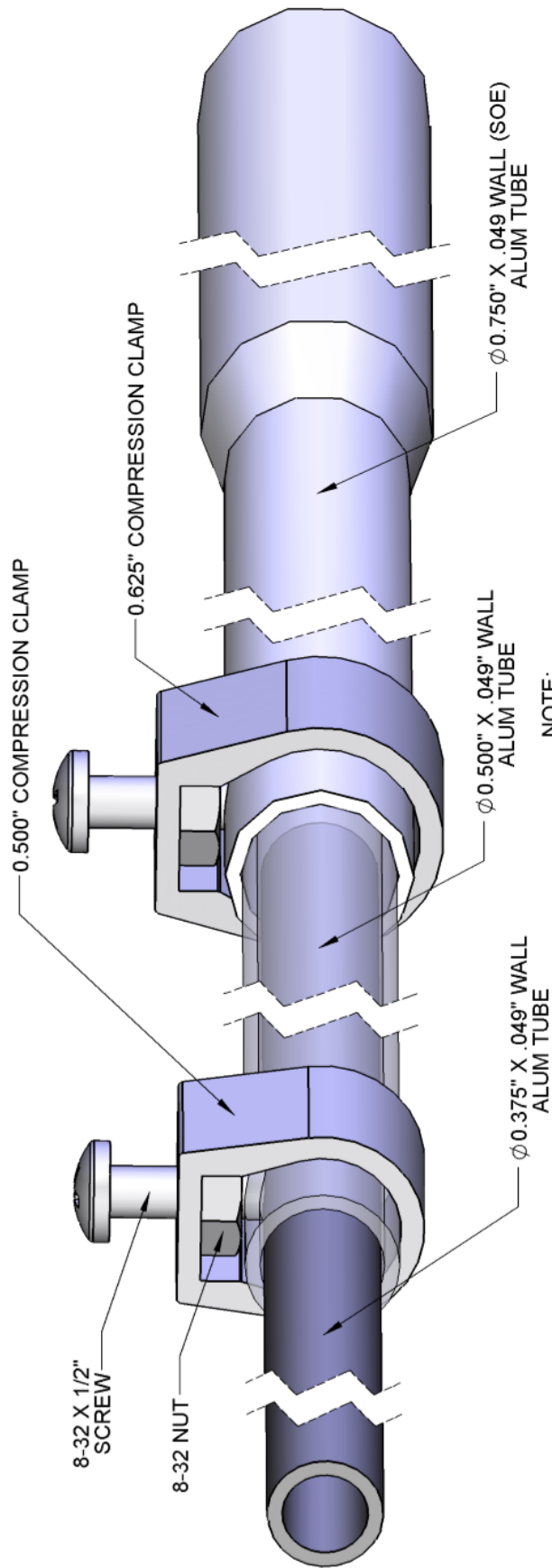


40MCDD-42 DIMENSION SHEET



THE ABOVE GRAPH SHOWS THE VSWR AND THE GAIN CURVE FOR THE TIP SETTING SHOWN AS "EXPOSED 1/2 TIP". IF YOU WOULD LIKE TO SLIDE THE PASS BAND LOWER OR HIGHER IN FREQUENCY THE BEST APPROACH WOULD BE TO ADJUST ALL THE TIPS EQUALLY. TO LOWER THE ANTENNA IN FREQUENCY YOU WOULD LENGTHEN THE ELEMENT TIPS, TO RAISE THE ANTENNA IN FREQUENCY YOU WOULD SHORTEN THE ELEMENT TIPS. AN ADJUSTMENT OF 1" ON EACH END OF THE ELEMENTS THIS RESULT IN AN APPX. 20 KC SHIFT.

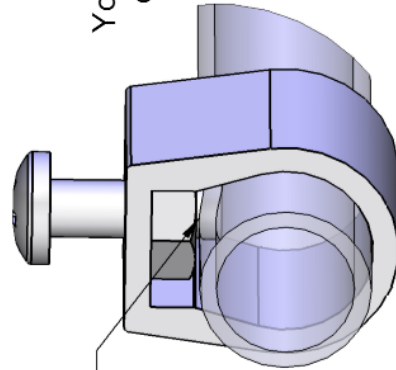
GENERIC COMPRESSION CLAMP DETAIL



NOTE:
TUBES SHOWN TRANSPARENT
TO SHOW MORE DETAIL

NOTE:

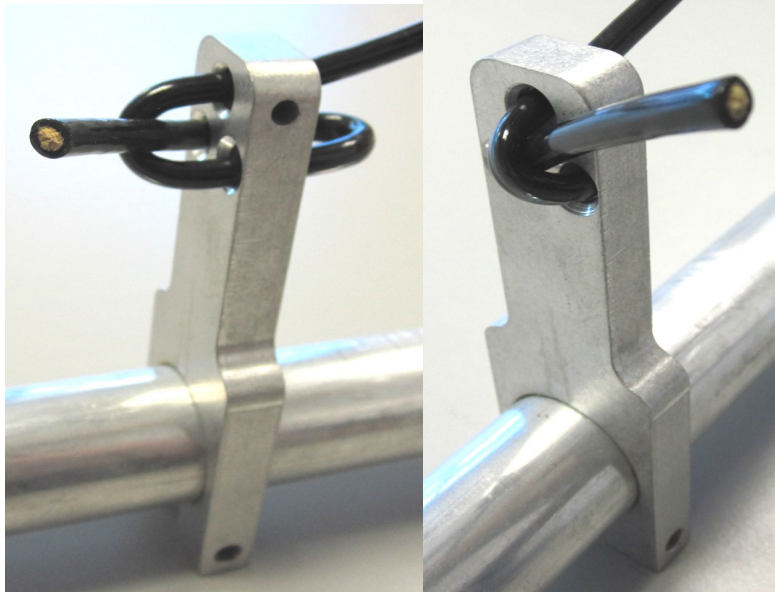
Generic layout to show
how compression clamps work.
Your antenna may have one or the other
or may even have both compression
clamp sizes.



NOTE: INSIDE TUBE NOT SHOWN FOR CLARITY

LOCK BLOCK AND KNOT DETAIL

LOCK BLOCK ROPE ROUTE DETAIL



After final adjustments of knots and lock blocks, use electrical tape to tape the excess rope down to the main rope as prevention for rope slippage.

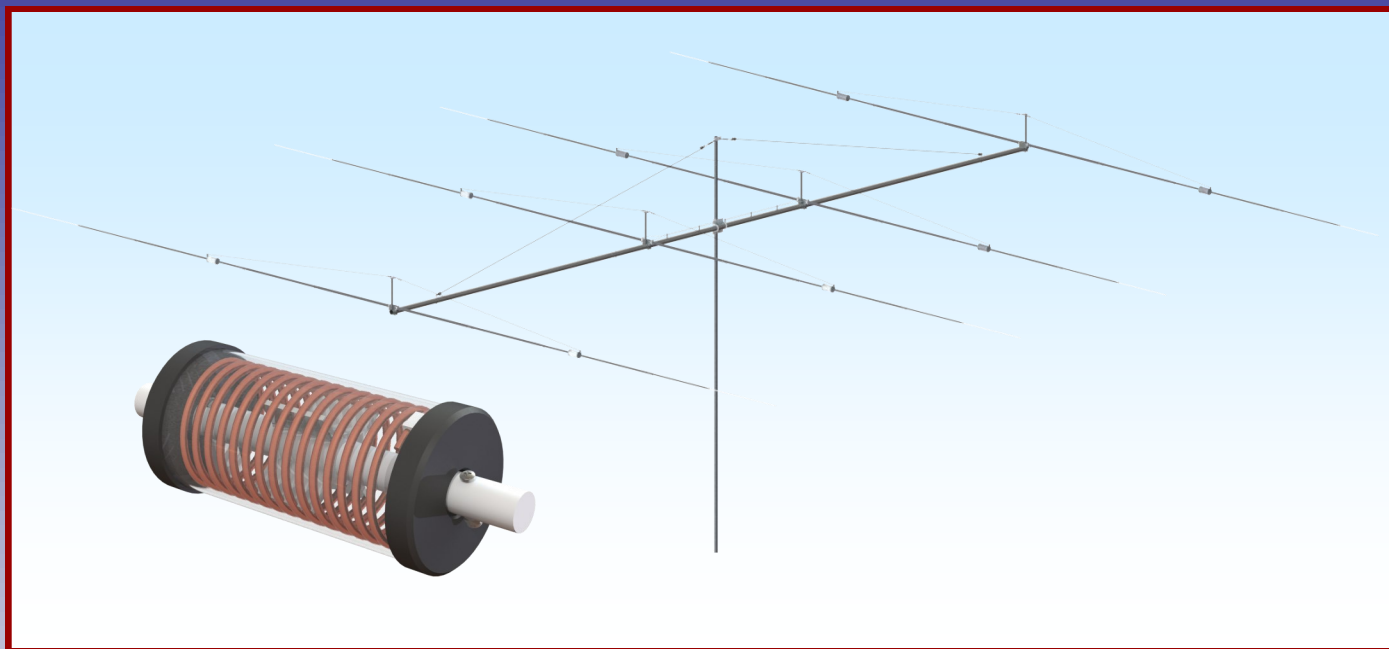
40M4CDD PARTS & HARDWARE

DESCRIPTION	QTY
BOOM SECTION #1-3, 3.0" X .125" X 180", SOE (M2ABS40M4CDD-1-3).....	2
BOOM SECTION #2, 3.0" X .125" X 156" (M2ABS40M4CDD-2)	1
ELEMENT SECTION #1: 1-1/2" X .058" X 60", SOE (M2AEP40MC-1).....	8
ELEMENT SECTION #2: 1-3/8" X .058" X 23.812" (M2AEP40MC-2).....	8
ELEMENT SECTION #3: 1-1/4" X .058" X 60", SOE (M2AEP40MC-3).....	8
ELEMENT SECTION #4: 1" X .058" X 60", SOE (M2AEP40MC-4).....	8
ELEMENT SECTION #5: 3/4" X .049" X 48", SOE (M2AEP40MC-5).....	8
ELEMENT SECTION #6: 1" X .058" X 24", ALUMINUM (M2AEP40MC-6).....	8
ELEMENT TIP ASSEMBLY, 1/2" X .049" X 53.00" (M2AEP40M4CDD-7).....	2
ELEMENT TIP ASSEMBLY, 1/2" X .049" X 49.50" (M2AEP40M4CDD-8).....	2
ELEMENT TIP ASSEMBLY, 1/2" X .049" X 39.50" (M2AEP40M4CDD-9).....	2
ELEMENT TIP ASSEMBLY, 1/2" X .049" X 35.00" (M2AEP40M4CDD-10).....	2
PHASE LINE ROD, 3/16 X 132" (M2AEP40M4CDD-11)	2
ELEMENT CENTER SPLICE, 1.25" X 24", ALUMINUM ROD (M2ASR0050).....	2
INSULATOR, 1.25" X 24", FIBERGLASS ROD (M2AFG0034)	2
ELEMENT MOUNTING PLATE, 3" X 6" X .500", ALUMINUM (M2AEC0040).....	8
CRADLE 3", 1" X 4" X .500", ALUMINUM (M2AMC0136)	8
DISC INSULATOR, POLYETHYLENE, 2" OD (M2ADI0020)	4
PHASE LINE CLAMP (M2APL0035)	2
PHASE LINE CAP (M2APL0067).....	2
PHASE LINE STAND OFF (M2ASO0050).....	5
BALUN, 1:1 (FGBL0500).....	1
VERTICAL RISER ASSEMBLY (M2AVR0010).....	4
DACRON ROPE, 5/16 X 40 FT	1
ELEMENT OVERHEAD SUPPORT, 1.250" X 3.750" X .375", ALUMINUM (M2APL0212).....	8
DACRON ROPE, 3/16 X 28'.....	4
BOOM TO MAST PLATE, 8" X 8" X .250", ALUMINUM (M2APT0070).....	1
PENETROX / ZINC PASTE CUP.....	1
ASSEMBLY MANUAL	1
BAG #1	
40M COIL, 15 1/2 TURNS (M2ACA1550).....	8
COIL POST, .500" X .500" X 1.187", ALUMINUM (M2ACA1551).....	16
COIL END CAP, 4.465" X .625", UMHW (M2ACA1559).....	16
COIL COVER, 4.2" X 7.250", PVC TUBE (M2ACA1560).....	8
COIL SUPPORT, 2.937" X 1.75", POLYETHYLENE (M2ACA1554).....	8
COIL INSULATOR, .875" X 10.625", FIBERGLASS (M2AFG0050).....	8
COIL SPREADING TOOL, 5/8" X 2", DELRIN (M2ACA1558).....	1
BAG #2	
3" U-BOLT & CRADLE	2
2" U-BOLT & CRADLE, HEAVY DUTY.....	4
2" U-BOLT & CRADLE	1
1 1/2 U-BOLT & CRADLE.....	1
BAG #3	
TURNBUCKLE, 3/8".....	2
THIMBLE, 3/8/ 5/16 LIGHT DUTY ZINC	4
EYEBOLT, 3/8" X 6"	2
THIMBLE, 3/16" ZINC LIGHT DUTY.....	8
TURN BUCKLE PLATE, 2" X 5" X .250", ALUMINUM (M2APT0110).....	1
COMPRESSION CLAMP, 5/8" (M2AMC0145).....	8
BALUN BRACKET 6"(M2APT0016).....	1
BAG #4	
LOCK WASHER, 3/8", SS	12
NUT, 3/8-16", SS.....	12
LOCK NUT, 3/8-16, SS.....	2
LOCK WASHER, 5/16", SS	4
NUT, 5/16-18, SS	4
BOLT, 1/4-20 X 3-1/2", SS.....	12
BOLT, 1/4-20 X 2-3/4", SS.....	16
BOLT, 1/4-20 X 2-1/2", SS.....	16
BOLT, 1/4-20 X 2", SS.....	8
BOLT, 1/4-20 X 1.0", FLAT ALLEN HEAD, SS	4
SET SCREW, 1/4-20 X .250", SS	16
LOCKNUT, 1/4-20, SS.....	45
BAG #5	
SCREW, 8-32 X 2.0", SS.....	4
SCREW, 8-32 X 1-3/4", SS.....	16
SCREW, 8-32 X 1-1/2", SS.....	24
SCREW, 8-32 X 1-1/4", SS.....	48
SCREW, 8-32 X 1/2", SS.....	8
NUT, 8-32, SS.....	8
LOCKNUT, 8-32, SS	76
ALLEN HEAD WRENCH, 1/8"	1



M2 Antenna Systems, Inc.

Model No: 40M4CDD-50



SPECIFICATIONS:

Model	40M4CDD-50	Connector	SO-239, Other avl.
Frequency Range	7.0-7.3 MHz continuous	Power Handling	3 Kw, Higher avl.
Typical gain	11.75 @ 70' dBi typical	Boom Length / Dia.....	50' / 3" X .125
Front to back ratio	22 dB typical	Maximum Element Length.....	49'
Beamwidth	75°	Turning Radius:	34'
Feed type / Balun	SO-239 / 1:1 Balun	Mast Size	2" or 3" Nom.
Feed Impedance.	50 Ohms	Wind area / Survival	13.0 Sq. Ft. / 100 MPH
VSWR.....	1.2:1 typical, 2.0:1 max	Weight / Ship Wt.....	200 Lbs. / 230 Lbs.

***Subtract 2.14 from dBi for dBd / FS = Free Space**

FEATURES:

Recently, M2 engineers developed a new way to make coils using CNC tooling. The result is a precision inductor increasing Q and lowering loss to new levels. A coil loaded Yagi design was computer optimized, and not one single change was required on the finished Yagi. This design gets the bandwidth and maintains performance across the band like no other 40 meter Yagi. Gain, Front to Back and VSWR are maintained nearly flat across the 7.0 to 7.2 MHz band section.

Mechanically it is easy to assemble. Only the tips of each element are different as all the coils are the same for each element. The coils themselves float in air minimizing dielectric loss. They are fully covered with a PVC cover. Two tuning options are available; 7.0-7.2 or 7.1-7.3 but still broadband. This antenna has been designed to meet your contesting needs and give you years of enjoyment on the 40 meter band. Remember foreign broadcast is now gone below 7.2 MHz and foreign hams can now transmit all the way to 7.2 MHz on phone and CW. 40M is now a spectacular worldwide DX band! If you haven't tried 40M lately, you are in for a treat! Mechanically, the elements are identical to it's older brother, the 40M4LLDD. The 40M4C can also withstand continuous winds of 100 mph or the constant battering of high winds. This antenna too, WILL frustrate Mother Nature! The 3 kW continuous, 5 kW peak, 1:1 balun completes the package.

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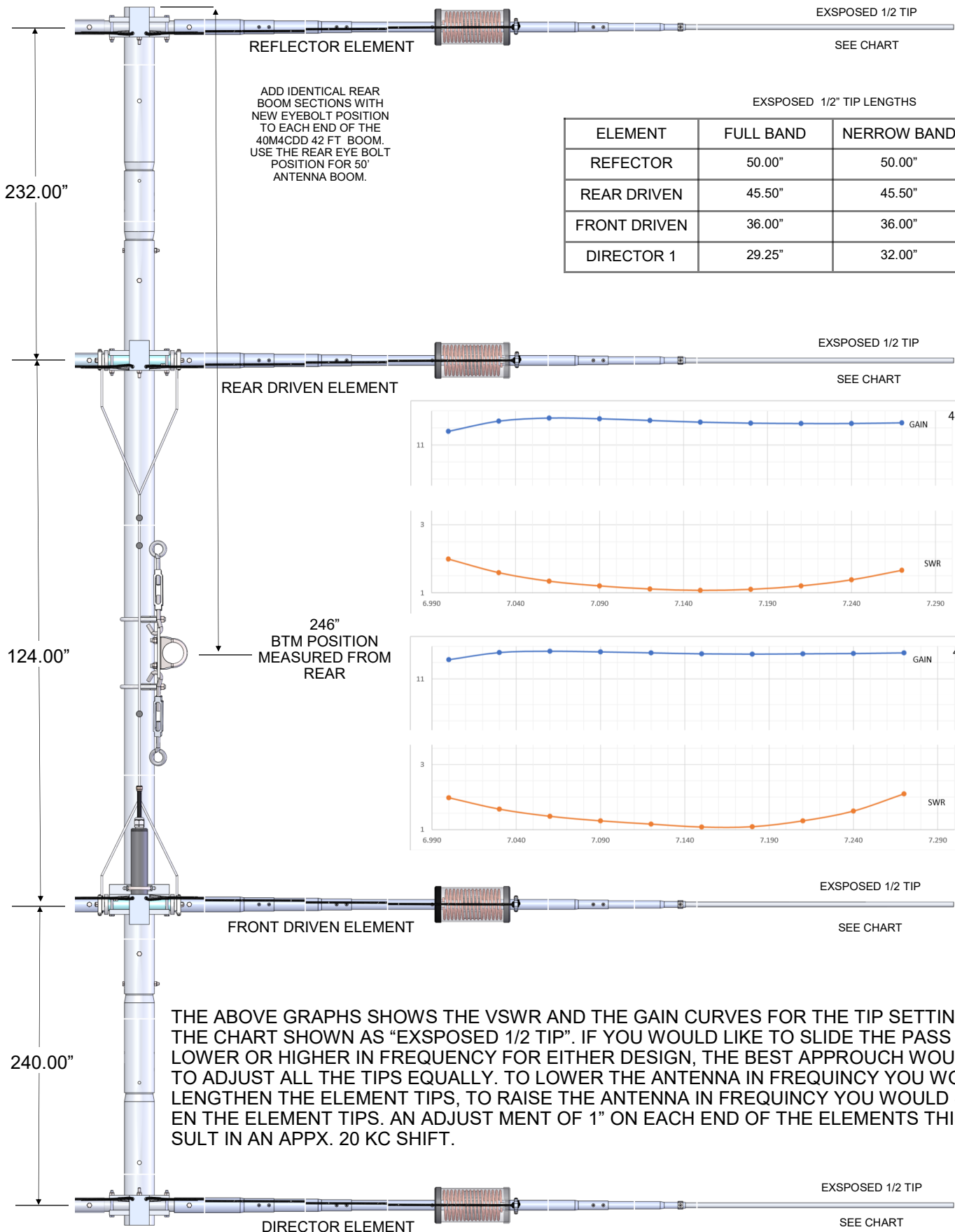
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4/15/20
REV 1

40M4CDD-50 PARTS & HARDWARE

DESCRIPTION	QTY
BOOM SECTION #4-5, 3.0" X .125" X "52, SOE (M2ABS40M4CDD-4-5).....	2
DACRON ROPE, 5/16 X 50 FT	1
HARDWARE	
BOLT, 1/4-20 X 3.5 SS	4
LOCKING NUT, 1/4-20 SS	4

40MCDD-50 DIMENSION SHEET



THE ABOVE GRAPHS SHOWS THE VSWR AND THE GAIN CURVES FOR THE TIP SETTING IN THE CHART SHOWN AS "EXPOSED 1/2 TIP". IF YOU WOULD LIKE TO SLIDE THE PASS BAND LOWER OR HIGHER IN FREQUENCY FOR EITHER DESIGN, THE BEST APPROACH WOULD BE TO ADJUST ALL THE TIPS EQUALLY. TO LOWER THE ANTENNA IN FREQUENCY YOU WOULD LENGTHEN THE ELEMENT TIPS, TO RAISE THE ANTENNA IN FREQUENCY YOU WOULD SHORTEN THE ELEMENT TIPS. AN ADJUST MENT OF 1" ON EACH END OF THE ELEMENTS THIS RESULT IN AN APPX. 20 KC SHIFT.