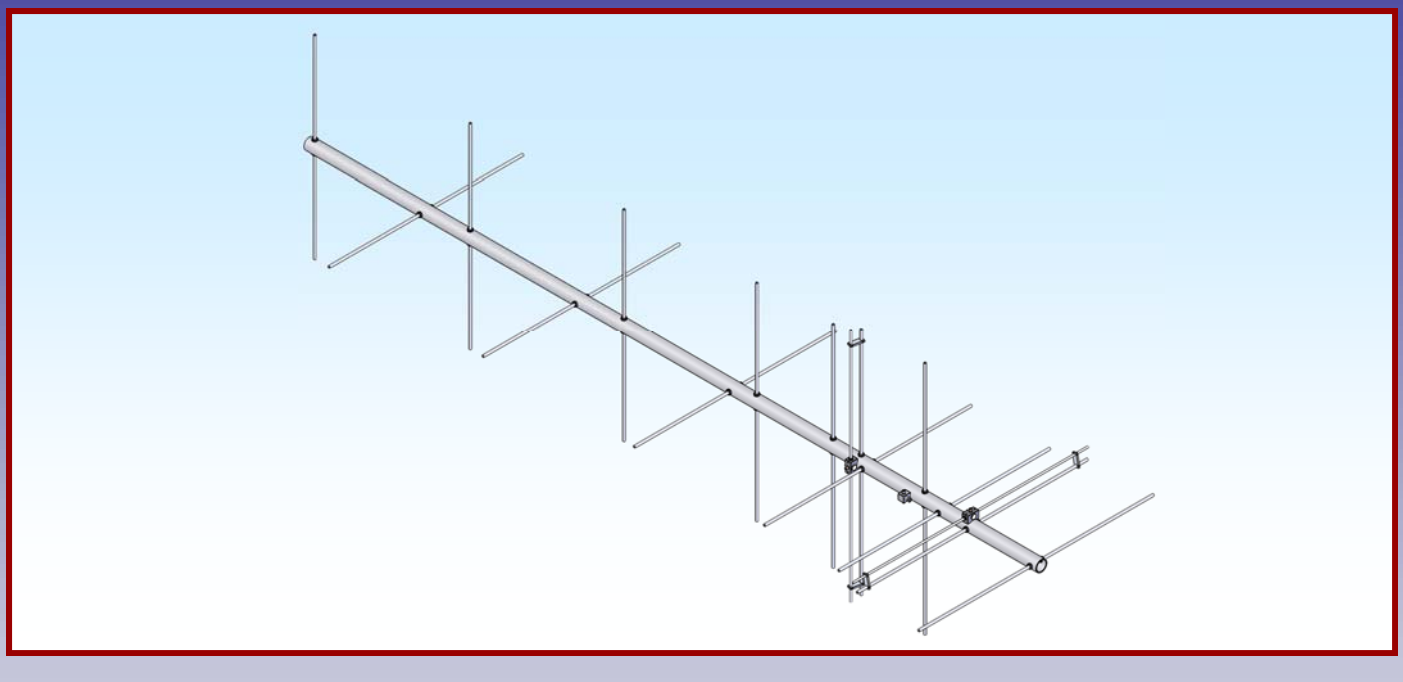
M2 Antenna Systems, Inc.
Model No: 140CP14M



SPECIFICATIONS:

Model	140CP14M
Frequency Range	135 To 144.5 MHz
*Gain	12.53 dBi
Front to back	19 dB Typical
Feed type	Folded Dipole
Feed Impedance.	50 Ohms Unbalanced
Maximum VSWR	1.5:1
Input Connector	"N" Female
Power Handling	1.5 kW
Boom Length / Dia	134" / 2"
Maximum Element Length	43"
Turning Radius:	71"
Stacking Distance	92" HIGH—96" WIDE
Mast Size	2" Nom.
Wind area / Survival	1.0 Sq. Ft. / 100MPH
Weight / Ship Wt.	6 Lbs. / 10 Lbs.

***Subtract 2.14 from dBi for dBd**

FEATURES:

The 140CP14M is high performance circular polarized antenna with a remarkably clean pattern. The pattern is important in order to match the antenna's noise temperature with modern low noise preamps. This antenna is ideal for satellite work but is also excellent for terrestrial uses like long haul tropo communications.

The CNC machined driven element module is O-ring sealed and weather tight for low maintenance and long-term peak performance. Internal connected are encapsulated in a space-age silicone gel that seals out moisture and improves power handling. The 3/8" 6061-T6 rod elements are centered on the boom to minimize interaction and maintain good ellipticity. Insulators are UV stabilized and locked in place with stainless keepers. Rugged construction, uncompromising performance for the boom length: that's the M^2 140CP14M!

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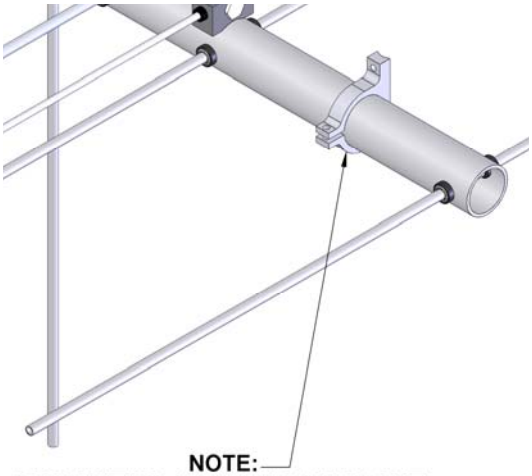
140CP14M ASSEMBLY MANUAL

TOOLS REQUIRED FOR ASSEMBLY: flat and Phillips screwdriver, 7/16 and 1/2" end wrench , small pliers, measuring tape.

NOTE: THIS CIRCULAR POLARIZED ANTENNA IS MADE UP OF TWO IDENTICAL SEVEN (7) ELEMENT YAGI ANTENNAS THAT MOUNT IN OPPOSITE PLANES ON THE BOOM. ONE YAGI IS SHIFTED A QUARTER WAVELENGTH (90 DEGREES) AHEAD OF THE OTHER ON THE BOOM AND THEN THE TWO ARE PHASED AND MATCHED TOGETHER TO PRODUCE EITHER RIGHT OR LEFT HAND CIRCULAR POLARITY. THESE INSTRUCTIONS WILL DESCRIBE ASSEMBLY FOR RIGHT HAND CIRCULAR POLARITY.

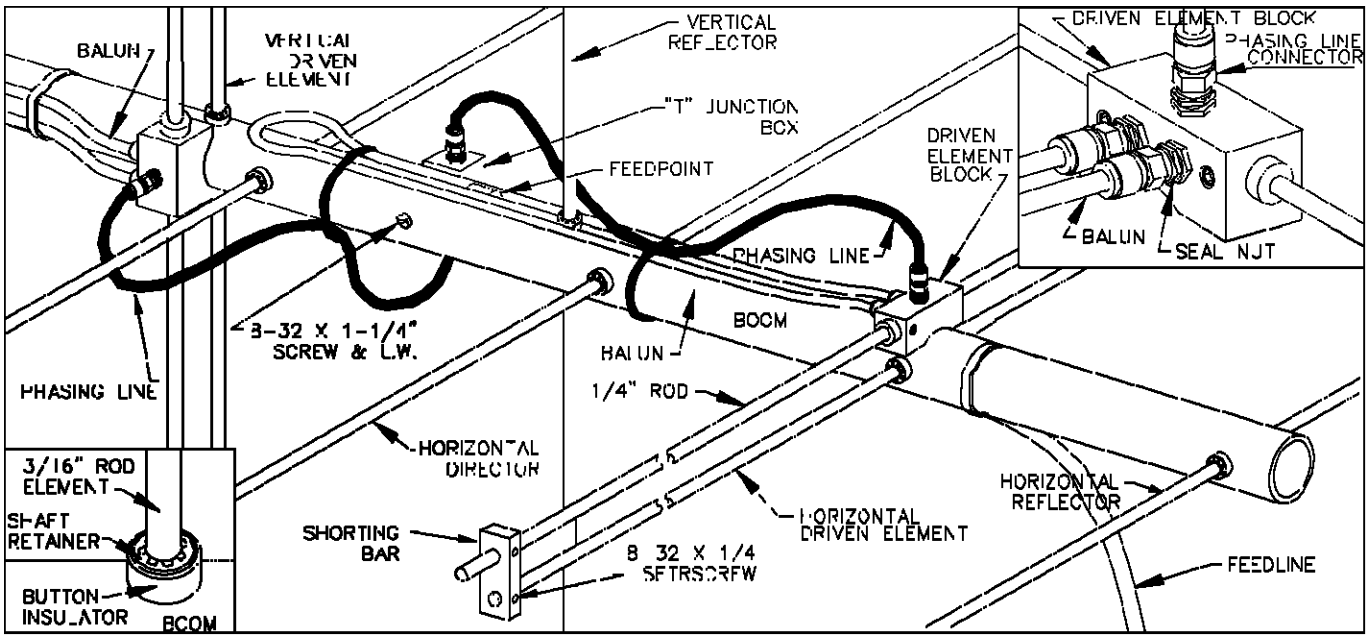
1. Use a screwdriver to slightly spread the fingers on two 2” RING CLAMPS and slide them onto rear of boom. Position about 64” from rear. Install a 1/4-20 x 1” bolt and locknut into each clamp, but do not tighten at this time.

NOTE: IF MOUNTING ANTENNA TO H-FRAME, SLIDE T-BRACE CLAMP ON THE BOOM BEFORE INSTALLING ELEMENTS INTO BOOM.



2. MOUNTING THE REAR (HORIZONTAL) SET OF ELEMENTS: Refer to the DIMENSIONAL DRAWING for the length and locations of elements. Start with the longest element, the REFLECTOR. Balance the 3/8” Element over your forefinger to find the approximate center. Slide on a black INSULATOR BUTTON to just about 1" off center. Insert the element through the hole 1” from the REAR of the boom and feed the small end of the insulator into the hole until it bottoms on the insulator shoulder. Add the second button insulator. DON'T BOTHER WITH ACCURATE CENTERING YET.

3. Install the 3/8” HORIZONTAL DRIVEN ELEMENT as in step #2, above.



4. Find the DRIVEN ELEMENT CONNECTOR BLOCK with the short 1/4” rod match elements. Position it over the 1/4” hole slightly forward of the driven element. Orient so the 2 connectors in the block are facing to the FRONT. Secure with a 1/4-20 x 2-1/4" bolt and lockwasher and tighten in place.

5. Now install 5 horizontal DIRECTOR elements to boom.

6. Using a tape measure, carefully center each of the 7 installed elements by matching the exposed element length on each side of the boom. After all horizontal elements are physically centered, double check quickly for symmetry by sighting along the element tips from the rear of the boom on each side and look for any differences. Correct if found.

7. NOTE: The SHAFT RETAINERS should always be used for permanent and long term antenna installations. However, 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. The button insulators, normally a tight fit, hold the elements quite securely.

To install the stainless steel element SHAFT RETAINERS, start by using thumb and forefinger to hold the retainer against the end of the PUSH TUBE (3" gray PVC tube, supplied in the kit), internal fingers on retainer dished into tube. HOLD THE ELEMENT FIRMLY TO PREVENT IT FROM SLIDING OFF CENTER and press the retainer onto the element end and continue until retainer butts on insulator button (Locking pliers, ***lightly*** clamped on the element up against opposite button insulator, will help maintain center reference. If you push the first retainer too far, remove element from boom and push retainer completely off the element, then try again). Now repeat for the other side of the element. Continue installing retainers until all seven elements are locked in place.

8. Install two 8-32 x 1/4” set screws (internal Allen head - tool supplied) into each of the SHORTING BARS. Slide the bars onto the 3/8” rod driven element tips and 1/4” Driven Element Block Rods. Position the Shorting Bars as specified on the Dimension Sheet: measurement is from the outer face of the driven element block to the inner face of the shorting bar. Align the bars and rods with each other and tighten the setscrews.

THIS COMPLETES THE ASSEMBLY OF THE **HORIZONTAL** YAGI MODULE EXCEPT FOR ADDING THE COAX BALUN AND THE MATCHING / PHASING HARNESS.

9. Now install the (VERTICAL) yagi element set. The longest element (REFLECTOR) mounts forward of, and perpendicular to the first horizontal director already in position. Install as IN STEP #2.

10. Install the vertical 3/8” driven element.

11. **CONSTRUCTION FOR RIGHT HAND CIRCULAR POLARITY:** The installed position of the VERTICAL DRIVEN ELEMENT BLOCK on the boom is critical to proper circularity. Using the HORIZONTAL elements and the ASSEMBLY DRAWING as a reference, orient the boom so the rearmost reflector is horizontal and the **horizontal driven element block is on top of the boom.** LOOKING AT THE ANTENNA FROM THE REAR, MOUNT THE VERTICAL DRIVEN ELEMENT BLOCK ON THE **LEFT** HAND SIDE OF THE BOOM, ORIENTING THE TWO CONNECTORS TO THE FRONT. See the Hardware dwg. Secure with 1/4-20 x 2-1/4” bolt and lockwasher. Install the Shorting Bars as in step #8.

For Left hand Circularity, mount the block to the LEFT-hand side of the boom with the two connectors to the front.

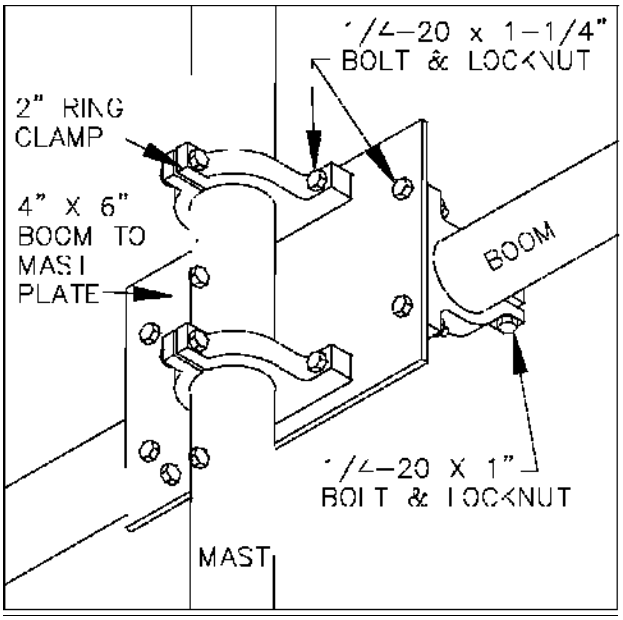
12. Now continue installing the DIRECTORS as before. Center the elements and add the retainers. THIS COMPLETES THE SECOND YAGI (VERTICAL).

140CP14M ASSEMBLY MANAUL

13. Install the “T” BLOCK to the 1/4” boom hole between the two driven elements. Position on the OPPOSITE side of boom as the forward driven element, “N” connector facing to rear. Secure with a 1/4-20 x 2-1/4” bolt and lockwasher.

14. Before installing the Baluns and Matching / Phasing Harness, thread 3/8” SEAL NUTS fully onto all small connectors, with the black Neoprene side of the nuts facing out.

15. Attach Baluns and Phasing lines to the Driven Element Blocks and Junction Block as shown on the Hardware Dwg. There is no polarity requirement for connections to "T" block and phasing lines are of equal length - select best routing. 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. Depending on model and polarity, baluns may loop around or straddle an element in the opposite polarity. This is normal. A balun that extends beyond the boom end may be looped to shorten. Form baluns and phasing lines close to the boom and secure with nylon cable ties. Ties should be snug but not crushing or kinking the coax.



16. For finding balance point of antenna, attach the feedline, even temporarily, to the "N" connector on the "T" Junction Block. Secure coax to boom near connector to relieve stress. Route feed coax to rear and secure to boom again between the reflector and driven element. Allow about 60 inches of cable to hang in a loop from the REAR of the antenna before routing back to a mast or cross-boom attach-point. Feedline should clear all element tips and sides by al least 12”. This will maintain top antenna performance and good standing wave ratio.

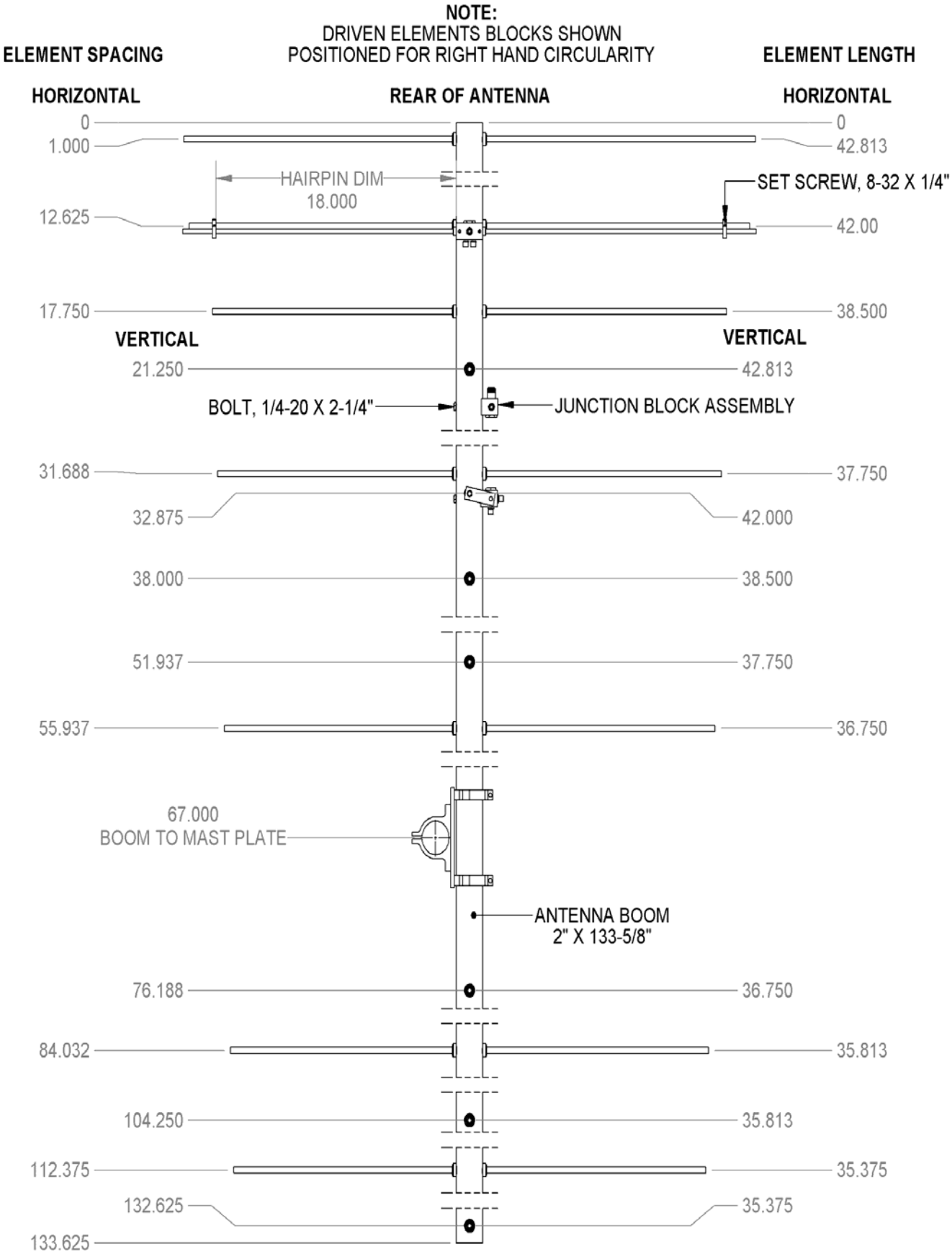
17. Locate the BALANCE POINT of the antenna and slide the 2” ring clamps, installed earlier, to that point. Install the BOOM TO MAST PLATE to the clamps, long side to boom, using 1/4-20 x 1-1/4” bolts and locknuts. Two additional 2” clamps and 1/4-20 hardware are supplied for installation to a 2” mast. Bolt to boom-to-mast plate on opposite side from boom clamps. Loosely install 1/4-20 x 1” bolt and locknut in each set of clamp fingers.

18. INSTALLATION TIPS: This antenna, when assembled as described above, creates a field in all planes or polarities around the antenna. For this reason do not mount the antenna on a metal mast or cross-boom. The performance will be severely reduced. A suitable 2” mast of any non conductive material can be used. FIBERGLASS is the first choice because of its strength and resistance to the weather and UV. Choose a nonconductive section long enough to keep the closest element tip at least 12" from any metal mast, tower or feedline.

NOTE: CLAMPING TO THE 3” DIAMETER MAST IS DONE WITH PAIRS OF 3” MACHINED SADDLE CLAMPS FACING EACH OTHER AROUND THE MAST AND SECURED WITH 1/4”-20 x 4” BOLTS PASSING THROUGH BOTH SADDLE CLAMPS AND THE BOOM TO MAST PLATE.

THIS COMPLETES THE ANTENNA ASSEMBLY.

140CP14M DIMENSION SHEET



140CP14M PARTS & HARDWARE

DESCRIPTION	QTY
Boom, 2” x 133.625 x .125”, alum,	1
Element Rod, 3/8 alum. X See Chart	14
Driven element block assembly	2
Junction block assembly (SADE0070)	1
Balun cable, RG-6U	2
Matching / phasing cable, RG-6U, 18.5"	2
Boom to mast plate, 4” X 6” X .250” (M2APT0030)	1
Rings clamp, 2” (M2AEC0190)	4
Shorting block, 1/4 x 3/4 x 2-3/16" (M2ASB0310)	4
Button insulators, black polyethelene, 3/8”	30
Shaft Retainer, 3/8”, SS	30
Nut seal, 3/8-32 with neoprene face	8
Cable ties, 8" black nylon	6
Assembly instructions	1

IN HARDWARE BAG

1/4-20 x 2-1/4” bolt, SS	3
1/4 Lockwasher SS	3
1/4-20 x 1” bolt SS	12
1/4-20 locknut SS	12
Set screws 8-32 x 1/4" SS	8
Allen Wrench, 5/64”	1
Push tube, 5/8 for 3/8” Element Rods	1

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140CP14M REFRESHER KIT

DESCRIPTION	QTY
Driven element block assembly	2
Junction block assembly (SADE0070)	1
Shorting block, 1/4 x 3/4 x 2-3/16" (M2ASB0310)	4
Balun cable, RG-6U	2
Matching / phasing cable, RG-6U, 18.5"	2
Nut seal, 3/8-32 with neoprene face	8
Cable ties, 8" black nylon	6
Penetrox / Zinc Paste	1
Assembly instructions	1

IN HARDWARE BAG

1/4-20 x 2-1/4” bolt, SS	3
1/4 Lockwasher SS	3
Set screws 8-32 x 1/4" SS	8
Allen Wrench, 5/64”	1

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