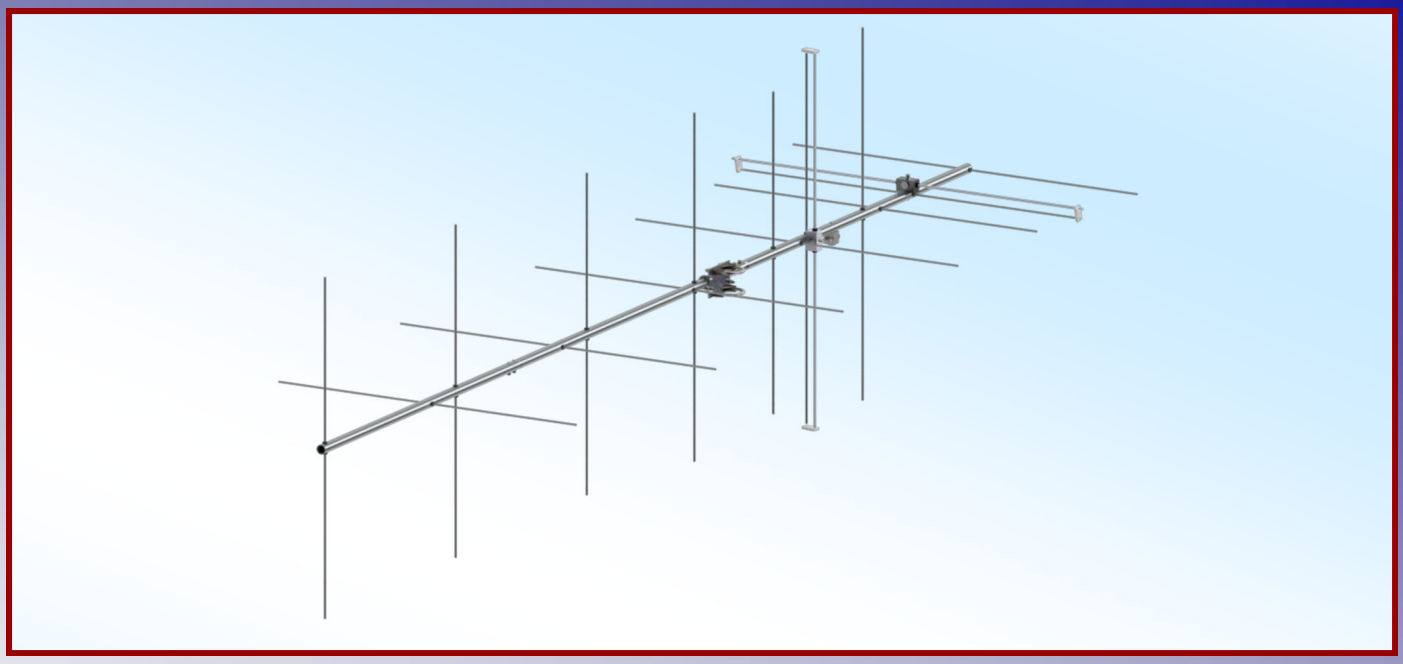
M2 Antenna Systems, Inc.
Model No: 135CP14



SPECIFICATIONS:

Model	135CP14
Frequency Range	135 To 136 MHz
*Gain	12.5 dBiC
Front to back	20 dB Typical
Feed type	"T" Match
Feed Impedance.	50 Ohms Unbalanced
Beamwidth	52°
Maximum VSWR	1.3:1
Input Connector	"N" Female
Power Handling	1.5 kW
Boom Length / Dia	129" / 1"
Maximum Element Length	44"
Turning Radius:	Call
Stacking Distance	Call
Mounting	1 -1/2" to 2" Nom.
Wind area / Survival	1.1 Sq. Ft. / 100MPH
Weight / Ship Wt.	8 Lbs. / 10 Lbs.

***Subtract 2.14 from dBi for dBd**

FEATURES:

The 135CP14 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 3/16" 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 135CP14 !

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Rev.01

135CP14 ASSEMBLY MANUAL

135CP14
ASSEMBLY MANUAL

TOOLS REQUIRED FOR ASSEMBLY: Flat blade screw driver, 7/16 and 1/2" end wrench , small pliers.

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.

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" ROD 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.

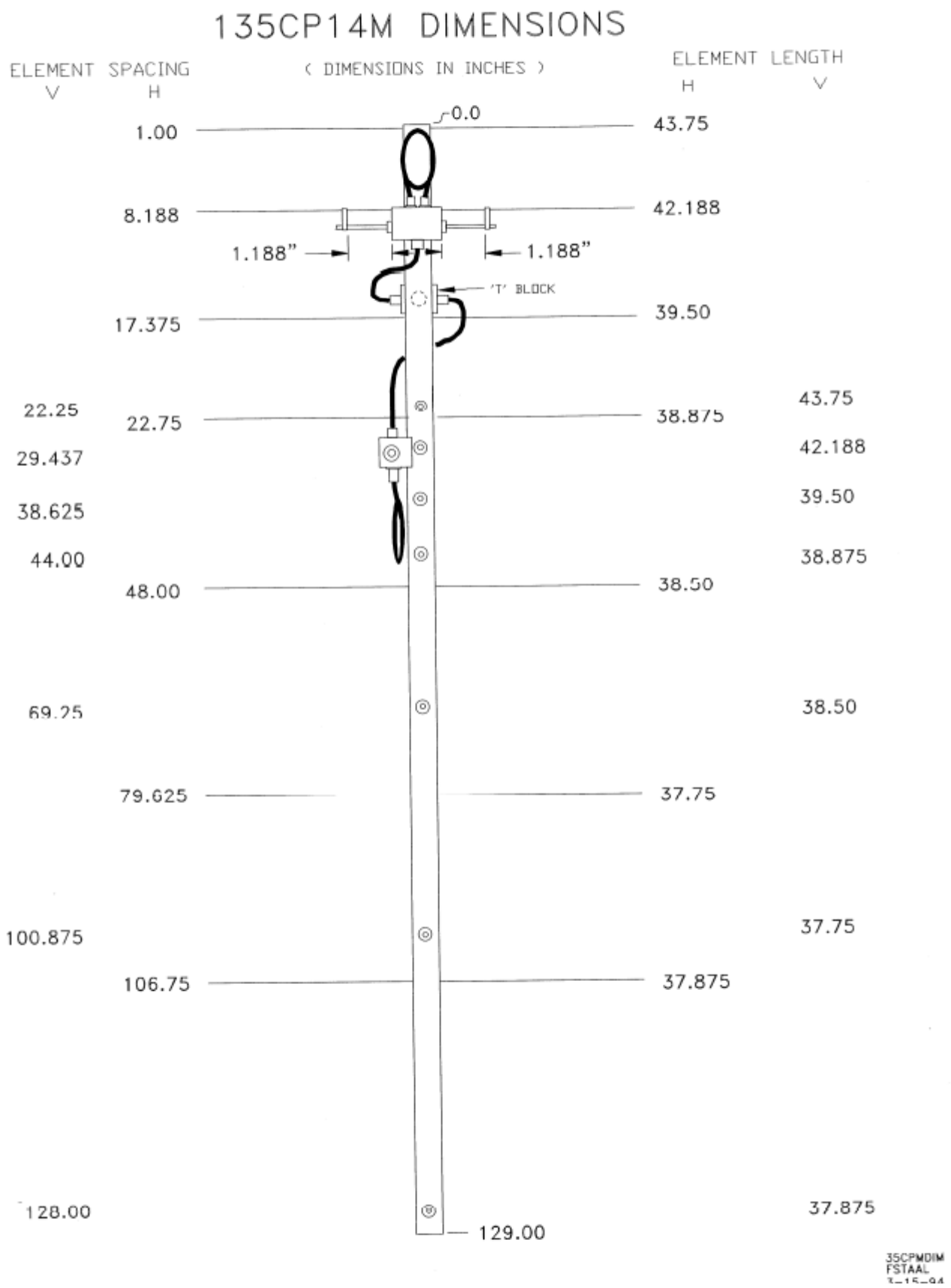
4. Find the DRIVEN ELEMENT CONNECTOR BLOCK with the short 1/4" rod match elements. Position it over the 1/4" hole just forward of the driven element. Orient so the 2 connectors in the block are facing to the REAR. Fasten it with a 1/4-20 x 2-1/4" bolt and lockwasher and tighten in place.

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. To install the element KEEPERS, start by using thumb and forefinger to hold the stainless steel keeper against the end of the PUSH TUBE (3" gray PVC tube, supplied in the kit), internal fingers on keeper dished into tube. HOLD THE ELEMENT FIRMLY TO PREVENT IT FROM SLIDING OFF CENTER and press the keeper onto the element end and continue until keeper butts on insulator button.Now repeat for the other side of the element. Continue installing keepers until all seven elements are locked in place.

135CP14 DIMENSION SHEET



8. Locate two 1/4 x 3/4 x 2-3/16" aluminum shorting bars. Using the 5/64" allen wrench SUPPLIED, install the set screws in each shorting block and install between the 3/8" DRIVEN ELEMENT rod and 1/4" match rod on each side of driven element. Position inner edge of bars **at 1-3/16**" from outer edge of driven element block as shown on Dimension Sheet.

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

9. Now start again and install the second (VERTICAL) yagi element set. The longest element (REFLECTOR) mounts about 5" 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.

CONSTRUCTION FOR RIGHT HAND CIRCULAR POLARITY

11. 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 **RIGHT** HAND SIDE OF THE BOOM, ORIENTING THE TWO CONNECTORS TO THE FRONT. Secure with 1/4-20 x 2-1/4" bolt and lockwasher. Install the Shorting Bars as in step #8.

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

12. Identify the NUT SEALS (3/8-32 nuts with neoprene seal on one face) and run a nut on each connector on the driven element blocks and "T" junction block.. THE SEAL face should be 'OUT'. Locate the two coiled balun cables and install them carefully on the two adjacent connectors on each DRIVEN ELEMENT BLOCK. Tighten the connector gently with a 7/16" end wrench or equivalent and then run the SEAL NUT up againgst the face of the connector and tighten about 1/2 turn beyond finger tight using a 1/2" end wrench. When both baluns are installed, tie the baluns against the boom using one black nylon tie on each.

NOTE: DEPENDING ON THE POSITION OF NEARBY ELEMENTS, THE BALUN LOOP MAY FALL AROUND ANOTHER ELEMENT. THIS IS NORMAL AS LONG AS THE BALUN LOOP IS KEPT FLAT AGAINST THE BOOM.

13. Install the "T" BLOCK to the 1/4" boom hole just forward of the horizontal driven element. Position on underside of boom, "N" connector facing to rear. Secure with a 1/4-20 x 2-1/4" bolt and lockwasher.

14. Attach the MATCHING CABLES as shown in the sketch: short cable back to horizontal driven element, longer cable forward to vertical driven element. Tighten as before, using 7/16" end wrench. Tighten the NUT SEAL gently with a 1/2" end wrench. Now add the nylon ties to hold the cable pairs close to the boom.

15. 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, longest edge parallel to boom, using

135CP14 ASSEMBLY MANAUL

1/4-20 x 1" bolts and locknuts. Two additional 2" clamps 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.

16. INSTALLATION TIPS: This antenna, when assembled as described above, creates a field in all planes or polarities around the antenna. For this reason it is DETRIMENTAL to the performance to mount the antenna on a metal mast or cross-boom. 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.

17. Attach a high quality, WELL STRESS RELIEVED, 'N' type male connector to the 'T' connector. Route feed cable to rear and secure to boom 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.

Carefully Manufactured By
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135CP14 PARTS LIST

PART LIST
MODEL 135CP14

DESCRIPTION	QTY
Boom,2" x 129" x .125", alum,	1
Plate, Boom to mast,4" X 6" X .250" alum	1
Driven element block assembly	2
Element Rod, 3/8 alum. X	
43.75	2
42.188	2
39.50	2
38.875	2
38.50	2
37.75	2
37.875	2
Balun cable, RG-6U	2
Matching cable, , RG-6U	2
'T' Connector block	1
Boom to Mast Clamp Rings, 2"	4
Assembly instructions	1

IN HARDWARE BAG

Keepers, 3/8", SS	30
Button insulators, black polyethelene, 3/16'	30
1/4-20 x 2-1/4" bolt, SS	3
1/4 Lockwasher	3
1/4-20 x 1" bolt	12
1/4-20 locknut	12
Cable ties, 8" black nylon	6
Set screws 8-32 x 1/4" stainless	8
Shorting blocks 1/4 x 3/4 x 2-3/16" alum	4
Allen Wrench, 5/64"	1
Nut seal, 3/8-32 with neoprene face	8
Push tube, 3/8 x 3" alum for keeper install	1