

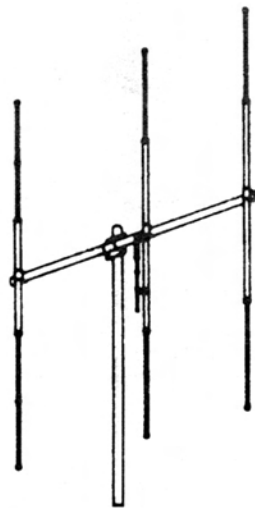
# ASSEMBLY INSTRUCTIONS



**M103C**

**3 ELEMENT**

**10/11 Meter Maximum Beam**



**[www.macoantennas.net](http://www.macoantennas.net)**

**(815) 244-3500**

MACo Antennas, A Division of Charles Electronics, LLC  
302 S. East Street, Mt. Carroll, IL 61053

# MACO M103C

## PACKING LIST

<u>PART</u>	<u>QTY</u>	<u>O.D.</u>	<u>SIZE</u>	<u>LENGTH</u>	<u>DESCRIPTION</u>	<u>CHECKLIST</u>
T59P	1	1-1/2"	.050	72"	ALUM TUBING SWAGED 1 END 6"	___
T28	1	1-1/2"	.050	72"	ALUM TUBING	___
T11P	3	5/8"	.050	72"	ALUM TUBING SLTD BOTH ENDS	___
T04	2	1/2"	.050	80 1/2"	ALUM TUBING	___
T01	4	1/2"	.050	72"	ALUM TUBING	___
P01P	1		1/4" x 5"	5"	PLATE 1-1/2" BOOM TO 1-1/2" MAST	___
G01P	1				GAMMA MATCH	___
Z08P	2				GAMMA STRAPS F/COAX CONNECTS	___
S42	1				FEMALE COAX CONN W/MOUNTING	___

### HARDWARE BAG #1

U02	7	1-1/2"			PLATED U-BOLTS	___
S02	7	1-1/2"			PLATED SADDLES	___
N03	14	5/16"			LOCK NUTS	___

### HARDWARE BAG #2

BE1P	3	1-1/2"			BOOM TO ELEMENT MOUNT	___
W58P	6	5/8"			EXTRUDED ALUM CLAMPS	___
S21	11		10-24	1/2"	MACHINE SCREWS	___
PL2	6		.437		PLASTIC CAP - BLACK	___
N11	11		10-24		SQUARE NUTS	___
Z02P	2		1/2"		GAMMA STRAPS	___
N12	4		#10		LOCKWASHER	___
PL4	1		1-1/2"		PLASTIC CAP - BLACK	___
PL4R	1		1-1/2"		PLASTIC CAP - RED	___
	1				INSTRUCTION SHEET	___
	1				WARRANTY SHEET/SAFETY SHEET	___
	1				TIP SHEET	___

Please note: In an effort to keep the price on Maco Antennas down, we have decided not to clean up all the burrs and rough edges on the parts. We recommend that you deburr and clean up each part with files, sandpaper, etc. so that they go together easily. We are aware this needs to be done but have elected not to do it to save you the money we would have to add to the price of the kit for this service.

# MACO M103C

## ASSEMBLY INSTRUCTIONS

### FIGURE 1    GENERAL INSTRUCTIONS

This drawing shows a view of the antenna assembled. The M103C may be used vertically or horizontally. These instructions and FIGURES 2 through 4 show the correct assembly instructions. It is highly recommended that rope be put in the elements to prolong their life.

Upon completion of assembly, install the red plastic cap (PL4R) on the director end of the antenna, and the black plastic cap (PL4) on the reflector end. This will allow you to determine at a glance the direction of transmit and receive.

### FIGURE 2    BOOM ASSEMBLY AND MAST MOUNTING

To assemble the boom insert the swaged end of the 1-1/2" O.D. boom section (T59P) 5 inches into one end of the other 1-1/2" O.D. boom section (T28P). The overall length of the boom should be about 11' 7". Center the boom-to-mast plate (P03P) over the joint and clamp the boom sections together with the U-bolts, saddles and hardware as shown in detail 2A.

This antenna is designed for mounting on a 1-1/2" O.D. heavy duty mast. Mount using 1-1/2" U-bolts, saddles and hardware as shown in detail 2B.

#### **CAUTION.....**

Take care to avoid any contact with overhead power lines when raising your antenna. Serious or fatal injury could result.

### FIGURE 3    ELEMENT ASSEMBLY AND MOUNTING

To assemble the elements, use (4) of the clamps (W58P) and #10 x 1/2" screw and square nuts (S2 1, N1 1) as shown in the element assembly detail. Insert a length of the 1/2" O.D. unslotted tubing (T01P) into each end of the element sections. Adjust each end to the "B" dimensions and tighten the clamps. Check the overall length ("A" dimension). Push a 437" plastic cap (PL2) on each end of the elements.

Mount the elements onto the boom using U-bolts, saddles, and hardware (U02, S02, NO 1, N02) too fasten the boom-to-element clamp (BE 1P) as shown in the element mounting detail. From the 72" to center, end of the boom, measure in 5/8" to the outside edge of the mounting hardware and fasten the director. Refer to Figure 1 for the spacing dimensions and fasten the driven element and reflector.

Line the elements up with the use of a level or any other workable method. Double check the spacing dimensions and make sure the elements are centered in the boom-to-element clamps. Tighten all hardware taking care to line the elements up with the use of a level. Check your measurements and make sure the elements are centered on the boom.

**TIGHTEN ALL HARDWARE SNUG; DO NOT CRUSH THE TUBING. CRUSHING GREATLY WEAKENS THE TUBING.**

## ASSEMBLY INSTRUCTIONS

(continued)

### FIGURE 4    GAMMA MATCH MOUNTING

Mount the gamma match (G01P) to the driven element, using the gamma straps (Z02P, Z08P) and attaching hardware as shown. Attach your 52 ohm coaxial cable to the connector (S42) and dress along boom and down the mast. The gamma is shown pointing down - this is to let water out.

### ADJUSTING THE STANDING WAVE RATIO (SWR)

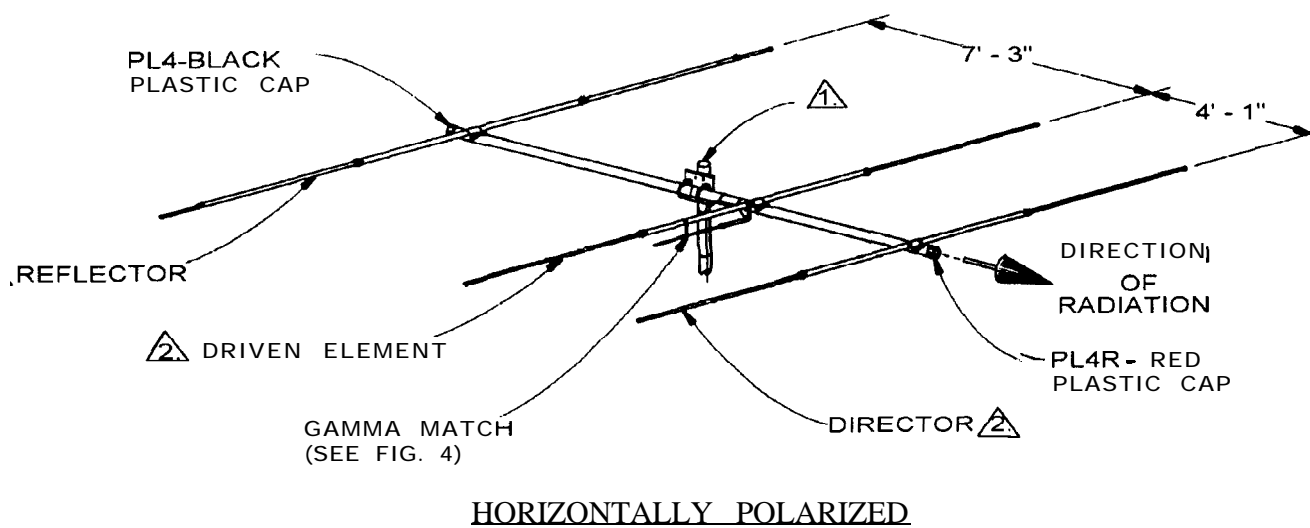
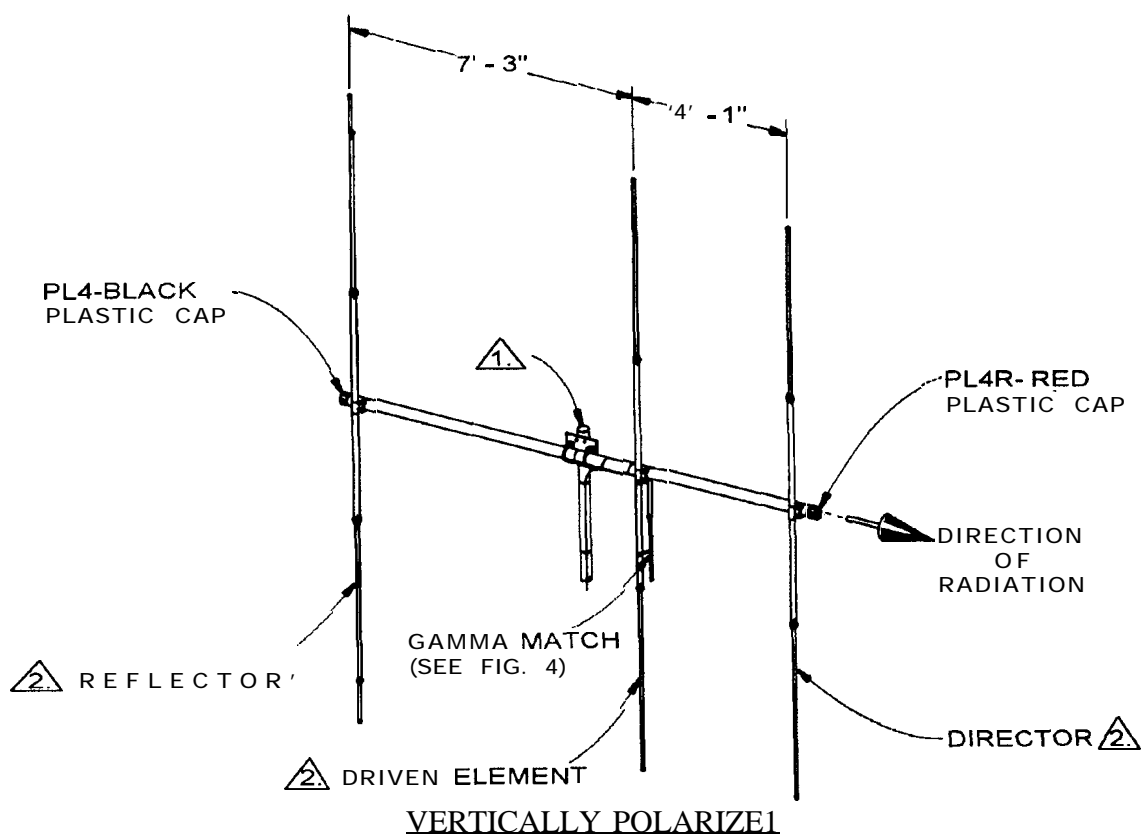
Refer to Figure 4. The dimensions given are approximate and should be used as a starting point. The gamma match has 2 adjustments. First is the capacitor adjust and second is the slider adjust. Connect a SWR bridge coax between your transmitter and the antenna and check the SWR. If adjustment is required, loosen the clamp on the gamma match and the screws holding the slider (gamma straps (Z02P)). Next move the capacitor adjustment first one direction, then the other until a minimum **SWR reading** is obtained. If SWR is not yet satisfactory, move the slider out 2" away from the boom. If the reading has gone up move the slider back to the original position and then 2" towards the boom. Now readjust the capacitor for minimum SWR. You should now be able to determine which direction to move the slider. Repeat the above procedure moving the slider in smaller increments until a satisfactory SWR is obtained. Tighten all hardware. Disconnect the SWR bridge and reconnect your coaxial cable.

---

### **NOTE!**

When assembling for vertical use, set antenna on a pole about 8 to 9 feet above the ground horizontally and adjust SWR for 1.7. When you turn the antenna vertical and mount it on the tower, etc., the SWR will drop to 1.5 or less . This is good; QUIT!

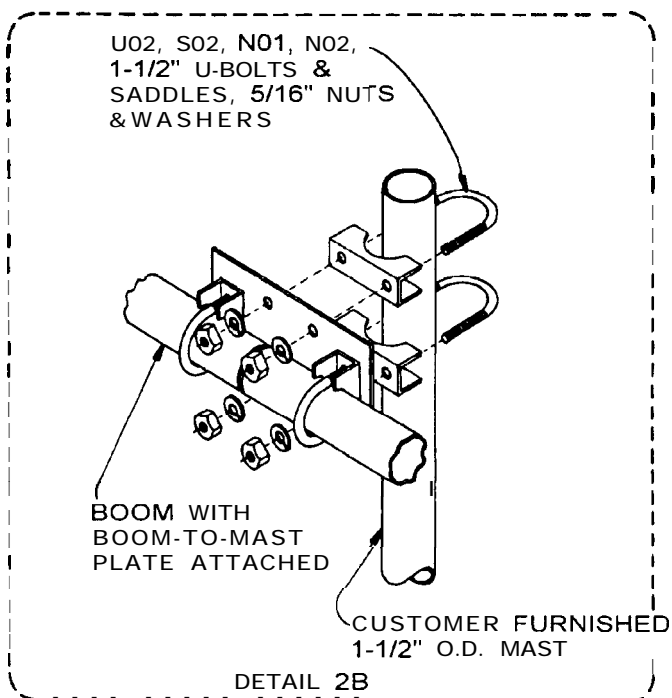
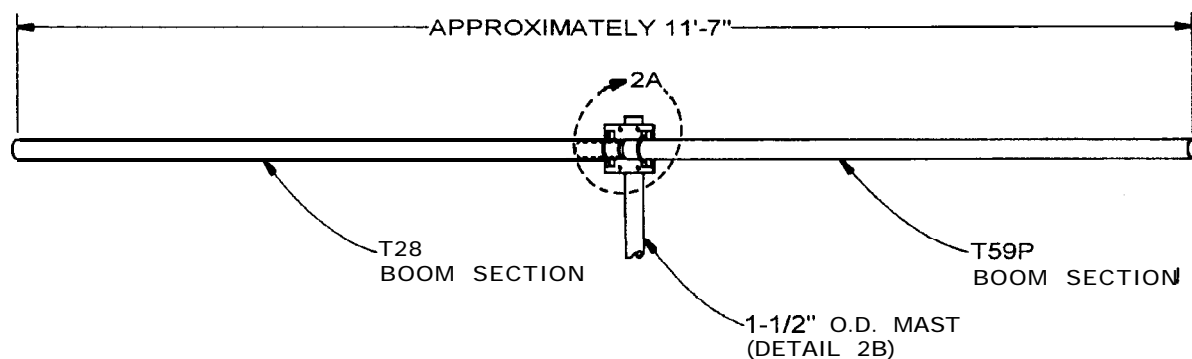
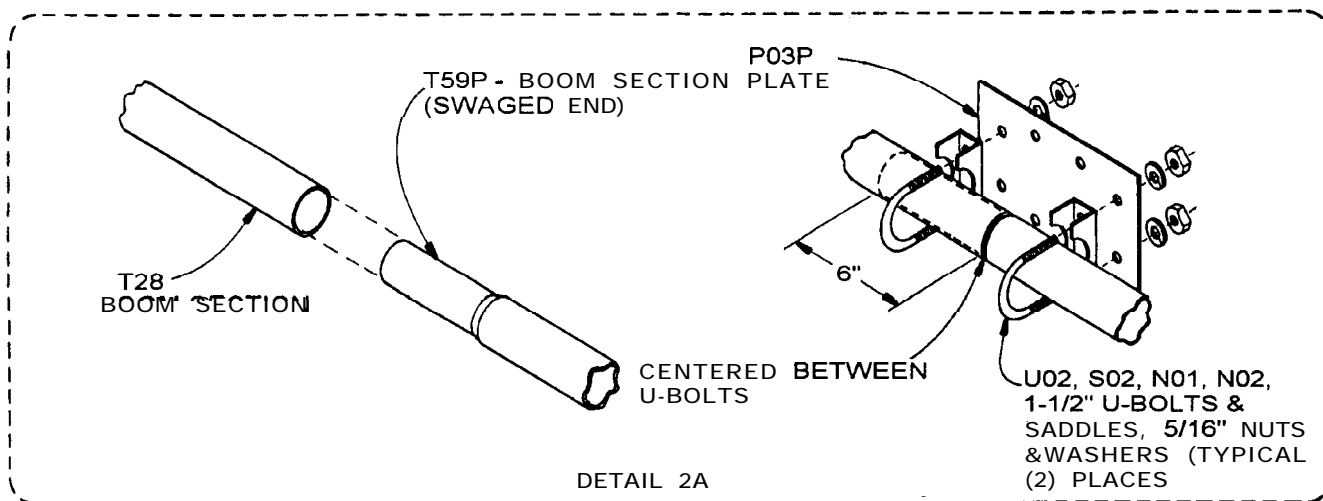
---



- 1 FOR DETAILS OF BOOM ASSEMBLY AND MAST MOUNTING, SEE FIG. 2
- 2 FOR DETAILS OF ELEMENT ASSEMBLY AND MOUNTING, SEE FIG. 2

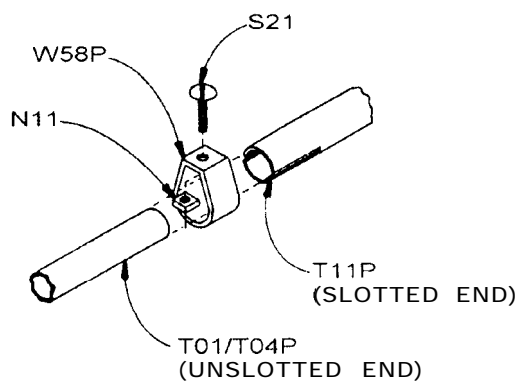
GENERAL ASSEMBLY

FIGURE 1



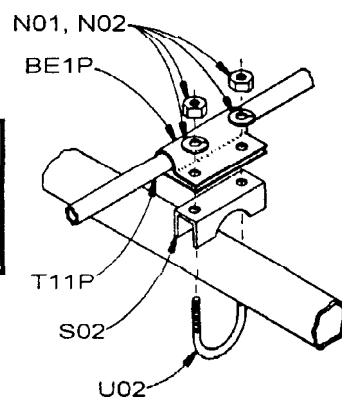
## BOOM ASSEMBLY & MAST MOUNTING

FIGURE 2

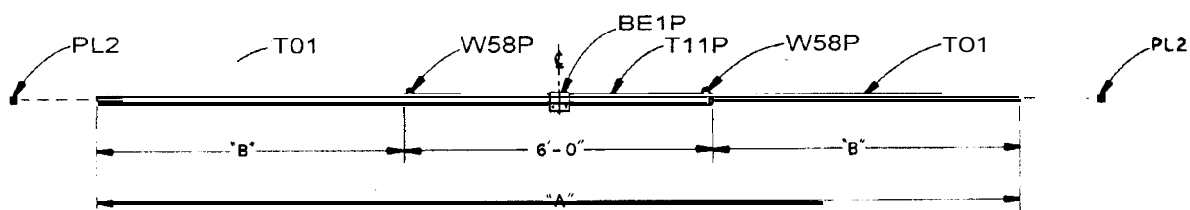


ELEMENT ASSEMBLY DETAILS

Please read the Assembly and Troubleshooting Tips at the end of this instruction booklet before assembling elements.



ELEMENT MOUNTING DETAIL



**NOTE!** Assemble for the middle of the desired channels, that is 27.200 for regular channel CB's as this is channel 20.

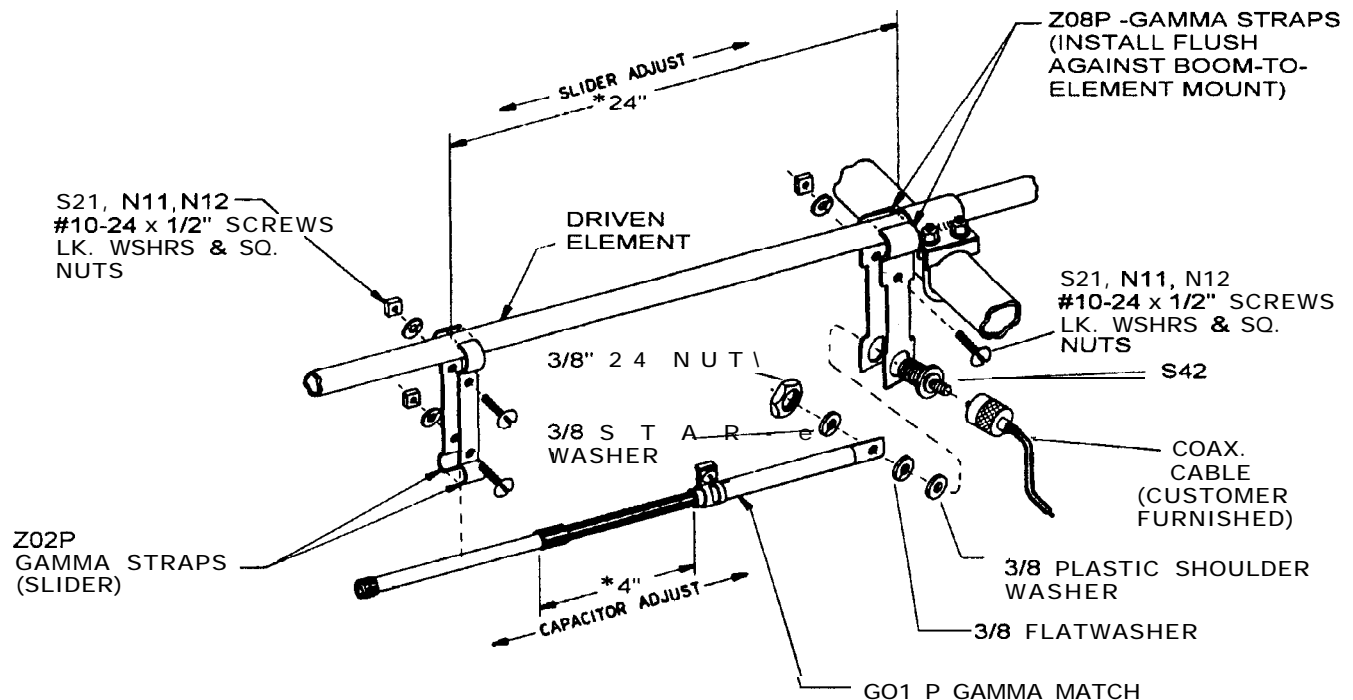
FREQUENCY (MHz)	REFLECTOR		DRIV. ELEM.		DIRECTOR	
	"A"	"B"	"A"	"B"	"A"	"B"
26.500/26.999	18'-6"	6'-3"	17'-6"	5'-9"	16'-9"	5'-4.5"
27.000/27.199	18'-5"	6'-2.5"	17'-5"	5'-8.5"	16'-8"	5'-4"
27.200/27.399	18'-3"	6'-1.5"	17'-4"	5'-8"	16'-6"	5'-3"
27.400/27.599	18'-2"	6'-1"	17'-3"	5'-7.5"	16'-5"	5'-2.5"
27.600/27.799	18'-1"	6'-.5"	17'-1"	5'-6.5"	16'-4"	5'-2"
27.800/27.999	17'-11"	5'-11.5"	17'-0"	5'-6"	16'-3"	5'-1.5"
28.000/28.199	17'-10"	5'-11"	16'-10"	5'-5"	16'-1"	5'-0.5"
28.200/28.399	17'-8"	5'-10"	16'-9"	5'-4.5"	16'-0"	5'-0"
28.400/28.599	17'-7"	5'-9.5"	16'-8"	5'-4"	15'-11"	4'-11.5"
28.600/28.799	17'-5"	5'-8.5"	16'-7"	5'-3.5"	15'-10"	4'-11"
28.800/29.999	17'-4"	5'-8"	16'-5"	5'-2.5"	15'-8"	4'-10"
29.000/29.199	17'-2"	5'-7"	16'-3"	5'-1.5"	15'-7"	4'-9.5"
29.200/29.399	17'-1"	5'-6.5"	16'-2"	5'-1"	15'-6"	4'-9"
29.400/29.599	16'-11"	5'-5.5"	16'-1"	5'-0.5"	15'-4"	4'-8"
29.600/29.799	16'-10"	5'-5"	16'-0"	5'-0"	15'-3"	4'-7.5"
29.800/30.000	16'-9"	5'-4.5"	15'-10"	4'-11"	15'-2"	4'-7"

ELEMENT ASSEMBLY & MOUNTING

FIGURE 3

**\*NOTE:** THESE DIMENSIONS ARE APPROXIMATE. REFER TO THE INSTRUCTIONS ON ADJUSTING THE S.W.R TO DETERMINE EXACT SETTINGS. THERE ARE 2 SEPARATE GAMMA ADJUSTMENTS, 1. CAPACITOR ADJUSTMENT, 2. SLIDER POSITION.

**DO NOT MOVE BOTH AT THE SAME TIME.** MOVE THE CAPACITOR FIRST, THEN, IF NECESSARY MOVE THE SLIDER, AND GO BACK TO THE CAPACITOR.



## GAMMA MATCH MOUNTING

FM103C

Mount the gamma match (GO 1P) to the driven element, using the gamma straps (Z02P, Z08P) and attaching hardware as shown. Attach your 52 ohm coaxial cable to the connector (S42) and dress along boom and down the mast. The gamma is shown pointing down - this is to let water out.

### ADJUSTING THE STANDING WAVE RATIO (SWR)

Refer to Figure 4. The dimensions given are approximate and should be used as a starting point.\* The gamma match has 2 adjustments. First is the capacitor adjust and second is the slider adjust. Connect a SWR bridge coax between your transmitter and the antenna and check the SWR. If adjustment is required, loosen the clamp on the gamma match and the screws holding the slider (gamma straps (Z02P)). Next move the capacitor adjustment first one direction, then the other until a minimum SWR reading is obtained. If SWR is not yet satisfactory, move the slider out 2" away from the boom. If the reading has gone up move the slider back to the original position and then 2" towards the boom. Now readjust the capacitor for minimum SWR. You should now be able to determine which direction to move the slider. Repeat the above procedure moving the slider in smaller increments until a satisfactory SWR is obtained. Tighten all hardware. Disconnect the SWR bridge and reconnect your coaxial cable.





**Caution:**

**TAKE CARE TO AVOID ANY CONTACT WITH  
OVERHEAD POWERLINES WHEN RAISING,  
INSTALLING, OR REPAIRING YOUR  
ANTENNA, TOWER, OR ROTOR.**

**DEATH WILL OCCUR!**

Installing and rigging towers, masts and antennas require specialized skills and experience. Information supplied by MACo assumes that all products will be installed by personnel having these skills and have installed similar products before. No one should attempt to install towers or masts without these knowledgeable skills.

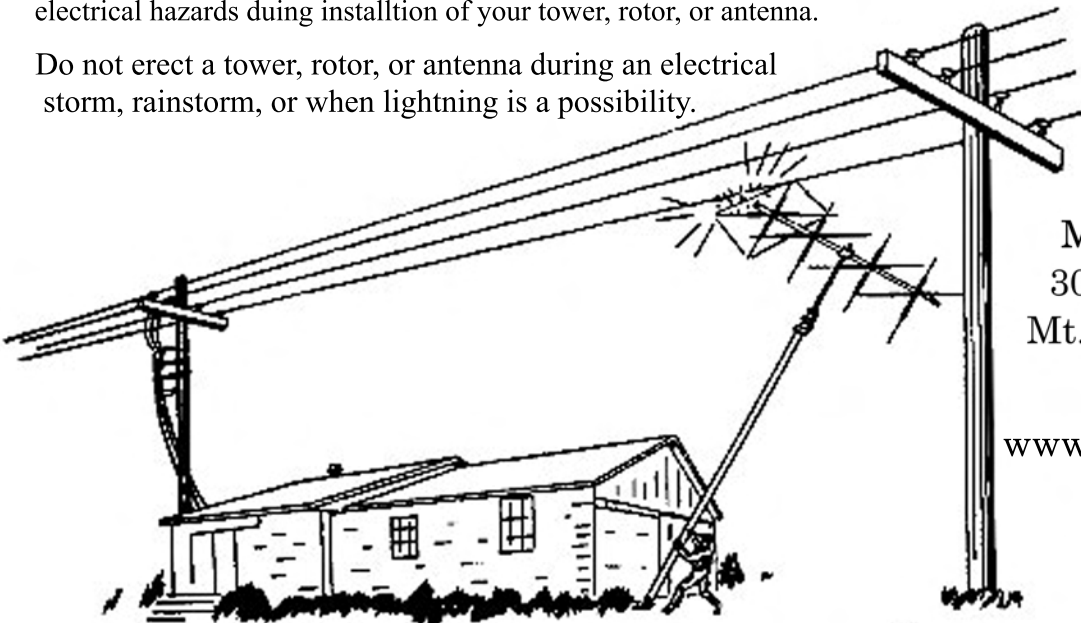
MACo assumes no liability if faulty or dangerous installation practices are used. There are available, trained and experienced personnel to assist in installation, maintenance, or disassembly. Contact your local installer if consultation or assistance is required.

All tower and antenna installations should be thoroughly inspected at least twice a year by qualified, experienced, and trained personnel to insure proper performance and safety standards.

### Electrical Warning

An additional warning precaution is given to be careful of surrounding high voltage power wires and other electrical hazards during installation of your tower, rotor, or antenna.

Do not erect a tower, rotor, or antenna during an electrical storm, rainstorm, or when lightning is a possibility.



**MACo Antennas**  
302 S. East Street  
Mt. Carroll, IL 61053

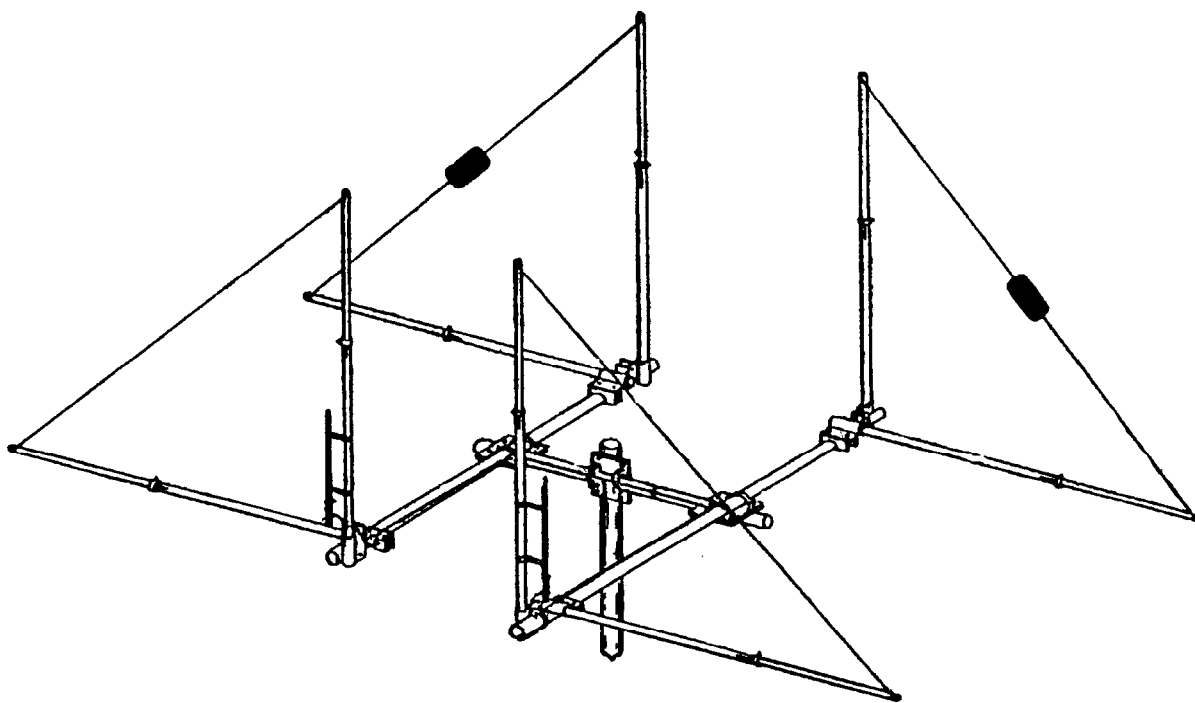
[www.macoantennas.net](http://www.macoantennas.net)  
(815) 244-3500

MACo Antennas is a Division of Charles Electronics, LLC

# ASSEMBLY INSTRUCTIONS



## V-QUAD STACKING KIT



### VQ2SK

---

*Maco Antennas - a Division of Charles Electronics, LLC*  
*302 S. East St. Mount Carroll, IL 61053*  
*815-244-3500*

# VQ2SK

## PARTS LIST

<u>PART</u>	<u>QTY</u>	<u>OD</u>	<u>SIZE</u>	<u>LENGTH</u>	<u>DESCRIPTION</u>	<u>CHECKLIST</u>
T60P	2	1 ½"	.050	60"	ALUMINUM TUBING	_____
T61	1	1.400"	.050	24"	BOOM SPLICE SWAGED TO 1.400	_____
WH1	1			12'	CO PHASE HARNESS	_____
P01	1		¼"x5"	5"	BOOM TO MAST PLATE	_____

## HARDWARE BAG

U02	4	1 ½"		PLATED U-BOLTS	_____
S02	4	1 ½"		PLATED SADDLES	_____
N03	8	5/16"		LOCK NUTS	_____
	1			INSTRUCTION SHEET	_____
	1			WARRANTY SHEET	_____

WHEN ORDERING REPLACEMENT PARTS, ALWAYS GIVE THE PART NUMBER AND DESCRIPTION.

MACO ANTENNAS  
A DIVISION OF CHARLES ELECTRONICS, LLC  
302 S. EAST ST.  
MT. CARROLL, IL 61053  
815-244-3500 (phone)  
815-244-3501 (fax)  
[www.macoantennas.net](http://www.macoantennas.net)

PLEASE NOTE: In an effort to keep the price down on Maco Antennas, we elected not to remove all burrs and rough edges. We are aware that this needs to be done. We suggest that you use a file and sandpaper to assure the parts slip together easily.

Rev 06/09

# VQ2SK

## ASSEMBLY INSTRUCTIONS

### FIGURE 1

Slide the swaged end of 1 1/2" O.D. tubing into one end of the other 1 1/2" O.D. section. Adjust for a total boom length of 10 feet.

### FIGURE 2

Center the plate on the coupled sections and attach with the 1 1/2" U-bolts and saddles and 5/16" lockwashers and hex nuts. Avoid over-tightening the U-bolts in order to not crush and weaken the boom.

### FIGURE 3

On one of the V-Quads, the gamma match will have to be moved across to it's partner element. Reassemble that gamma match so that both gamma matches will be in the vertical position, as shown.

Install both V-Quads on the stacking boom as shown in the drawing.

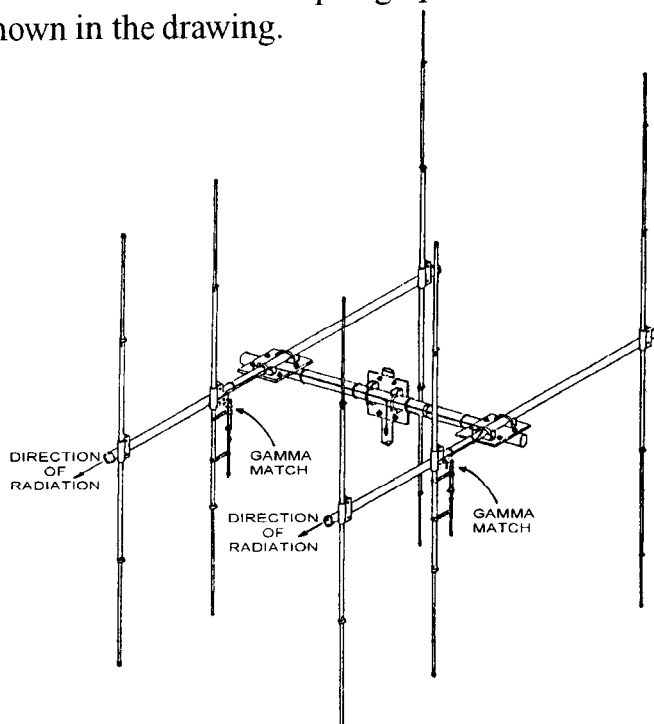
Connect the two PL-259's to the two SO-239's at the gamma matches, and tape the coax. harness to the boom, as shown in Fig. 2.

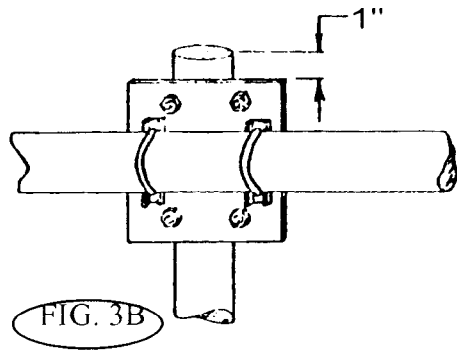
Any length of RG-8 or RG-58 coax. cable may be used between the antenna phasing harness and the transmitter. For the best all around performance mount the VQ2 antennas in the vertical and horizontal position as shown in Fig. 3. Also, the gamma matches must be in the vertical position as shown on the drawing.

---

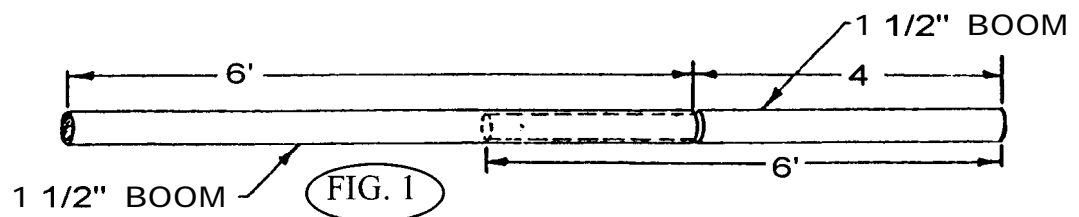
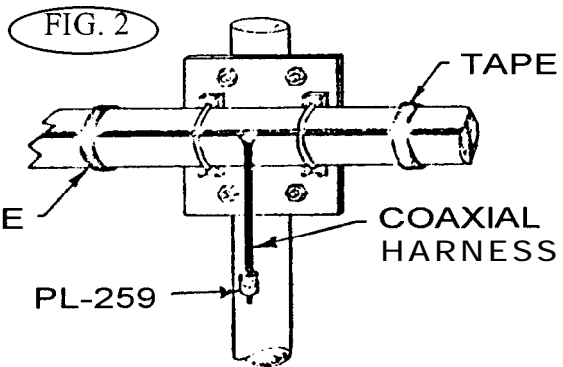
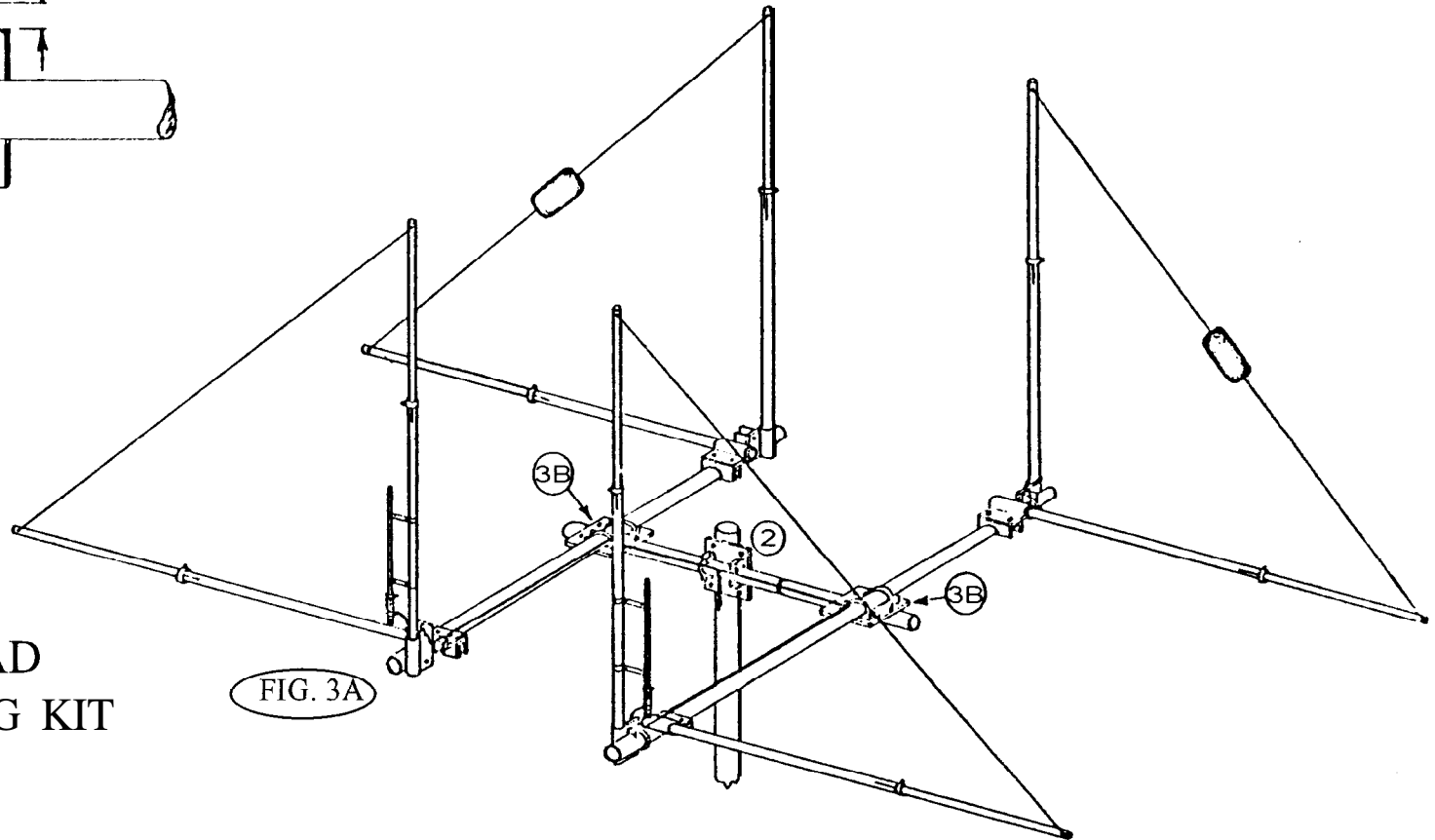
### M103C STACKING

A pair of M103C's may be stacked by using the VQ2 Stacking Kit. Simply follow the assembly instructions given for the VQ2 Stacking Kit and disregard the first two paragraphs of the step labeled "Fig. 3". Continue with the paragraph "Connect the two PL-259's -----". Orient the gamma match as shown in the drawing.





# V-QUAD STACKING KIT



VQ2SK