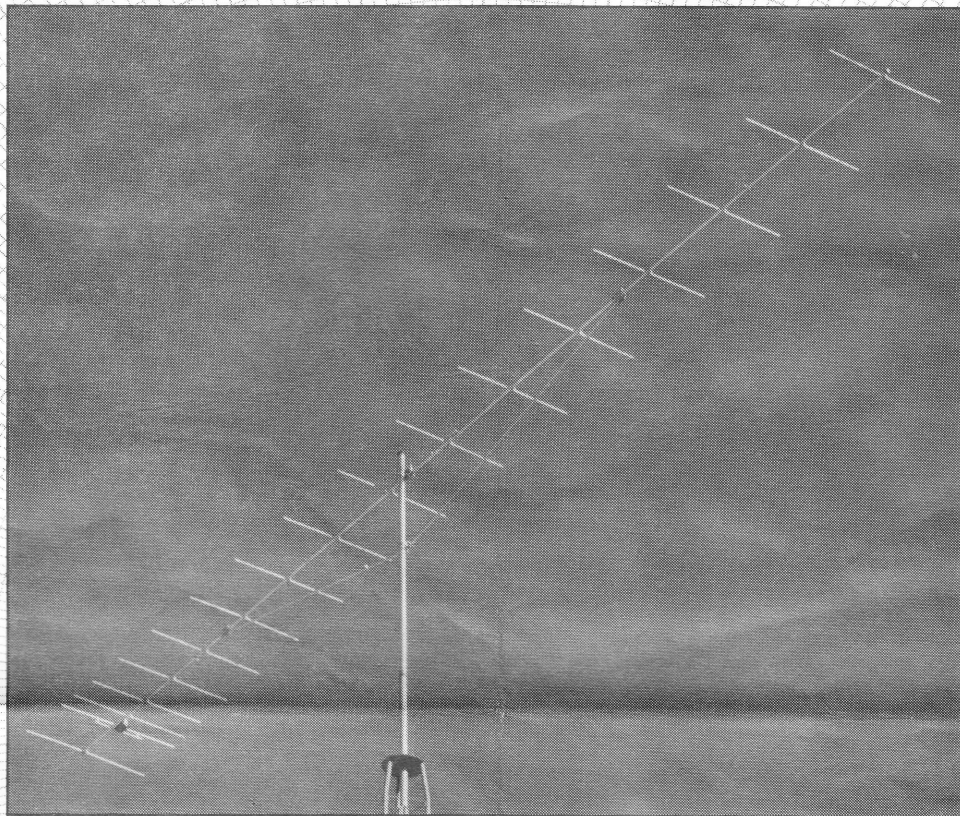
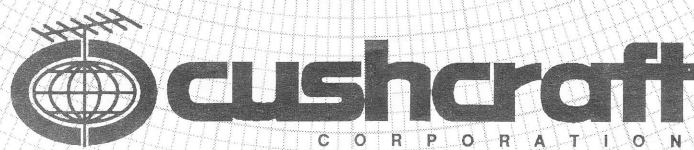


# ASSEMBLY AND INSTALLATION INSTRUCTIONS



# 17B2

2 METER BOOMER  
144-145 MHz



951415 (7/92)

**WARNING**

THIS ANTENNA IS AN ELECTRICAL CONDUCTOR. CONTACT WITH POWER LINES CAN RESULT IN DEATH, OR SERIOUS INJURY. DO NOT INSTALL THIS ANTENNA WHERE THERE IS ANY POSSIBILITY OF CONTACT WITH OR HIGH VOLTAGE ARC-OVER FROM POWER CABLES OR SERVICE DROPS TO BUILDINGS. THE ANTENNA, SUPPORTING MAST AND/OR TOWER MUST NOT BE CLOSE TO ANY POWER LINES DURING INSTALLATION, REMOVAL OR IN THE EVENT PART OF THE SYSTEM SHOULD ACCIDENTALLY FALL. FOLLOW THE GUIDELINES FOR ANTENNA INSTALLATIONS RECOMMENDED BY THE U.S. CONSUMER PRODUCT SAFETY COMMISSION AND LISTED IN THE ENCLOSED PAMPHLET.

Your Cushcraft 17B2 Boomer antenna is designed and manufactured to give trouble free service. This antenna will perform as specified if the instructions and suggestions in this manual are followed and care is used in the assembly and installation. When checking the components received in your antenna package use the parts listed beside each diagram. There is a master parts list on page 7. If you are unable to locate any tube or component, check the inside of all tubing. *IMPORTANT: Save the weight label from the outside of the carton. Each antenna is weighed at the factory to verify the parts count. If you claim a missing part, you will be asked for the weight verification label.*

**PLANNING**

Plan your installation carefully. If you use volunteer helpers be sure that they are qualified to assist you. Make certain that everyone involved understands that you are in charge and that they must follow your instructions. If you have any doubts at all, employ a professional antenna installation company to install your antenna.

**LOCATION**

Location of the antenna is very important. Surrounding objects such as trees, power lines, other antennas, etc. will seriously reduce efficiency. To minimize the effects of surrounding objects, mount the antenna as high and in the clear as possible. If metal guy wires are used, they should be broken with strain insulators. **EXTREME CARE MUST BE USED FOR YOUR SAFETY. YOU MUST INSURE THAT WHILE THE 17B2 IS IN OPERATION NEITHER PEOPLE OR PETS CAN COME IN CONTACT WITH ANY PORTION OF YOUR ANTENNA. DEADLY VOLTAGES AND CURRENTS MAY EXIST. ALSO, SINCE THE EFFECTS OF EXPOSURE TO RF FIELDS ARE NOT FULLY UNDERSTOOD, LONG TERM EXPOSURE TO INTENSE RF FIELDS IS NOT RECOMMENDED. THERE IS A WARNING STICKER WHICH MUST BE ATTACHED TO THE BOOM AS SHOWN IN FIGURE E.**

**MOUNTING**

The mast mount bracket will accommodate up to a 2" (5.1 cm) mast. A 1-1/2" OD (3.8 cm) or larger heavy wall tubing mast should be used. A good heavy duty antenna rotator will provide the best service and longest life. Often it is desirable to mount several antennas on one mast. To keep possible interaction to a minimum, place your antennas as far apart as you can.

**SYSTEM GROUNDING**

Direct grounding of the antenna, mast and tower is very important. This serves as protection from lightning strikes and static buildup, and from high voltage which is present in the radio equipment connected to the antenna. A good electrical connection should be made to one or more ground rods (or other extensive ground system) directly at the base of the tower or mast, using at least #10AWG ground wire and non-corrosive hardware. For details and safety standards, consult the National Electrical Code. You should also use a coaxial lightning arrester. Cushcraft offers several different models, such as LAC-1, LAC-2 and the LAC-4 series

**ASSEMBLY**

Assemble your antenna by following the directions and illustrations in steps 1 through 7. After the antenna is completely assembled, verify dimensions and element spacings for accuracy. Then, return to the section below for final tuning.

**TUNING PROCEDURE**

The 17B2 does not normally require tuning after assembly. However, if you wish to check the VSWR before installation, please observe the following procedures. To prevent detuning the antenna, it should be tuned in place or at least 7 feet (2.13 meters) above ground and clear of surrounding objects. Keep all metal obstructions such as guy wires and other antennas at least 10 feet (3.05 m) away since they will nullify any adjustment and degraded performance will result.

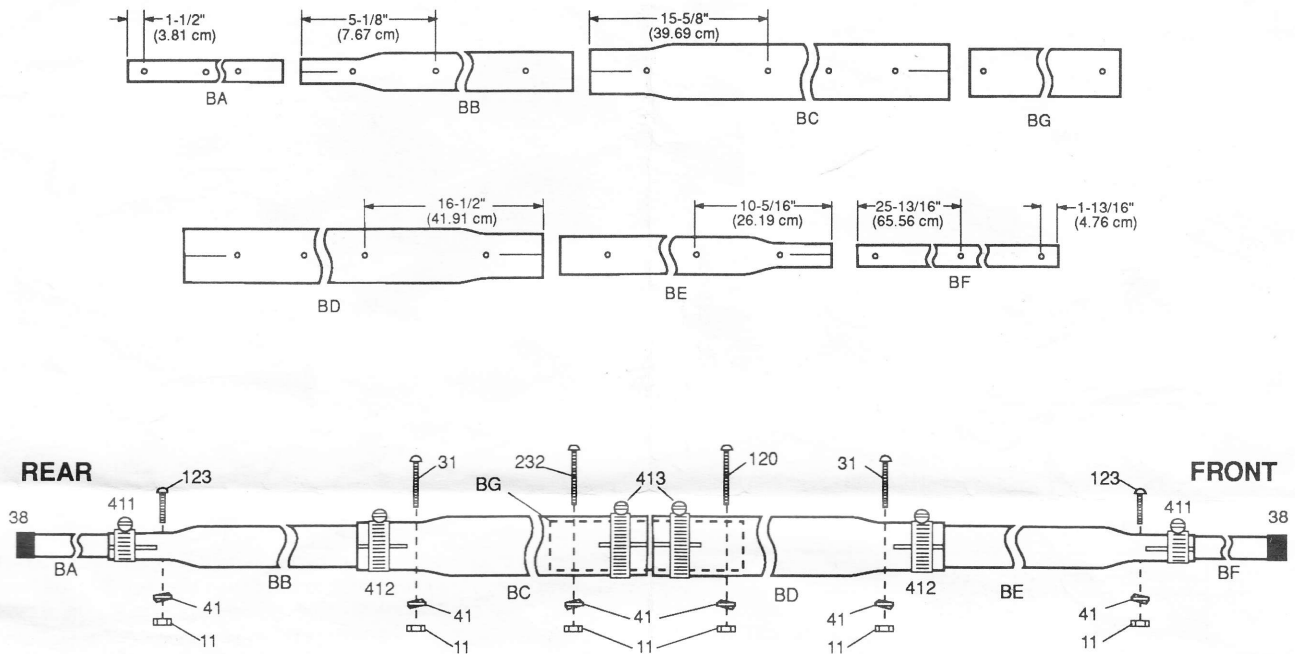
Run the coax cable from your transmitter to the area in which the antenna is going to be tested. The length of this cable or your feedline is not critical. Connect a good quality VHF VSWR bridge to the end of this cable. Connect a short length of cable [20 ft (610 cm) or less] from the VSWR bridge to the antenna. Set the transmitter to your center operating frequency. When you read VSWR, be sure you move far enough away from the antenna so that your body does not effect the reading.

Measure the VSWR. If it is too high, move both T-Match straps (125) by 1/4" (.6 cm) either inward or outward and check the VSWR. *Both T-Match straps should be the same distance from the center of the driven element.* If the VSWR improved, then continue moving the T-Match straps in the same direction. If the VSWR deteriorated then move the T-Match straps in the opposite direction. Repeat this procedure until no further improvement can be made. You have matched your antenna. Then tighten all connections on the T-Match driven element assembly. Tape the feedline to the boom and mast as shown in figure I.

# #1 - ASSEMBLE BOOM

Assemble the boom in two sections, the rear and the front (figure A). Slide worm clamps (413) onto the large diameter ends of tubes BC and BD. Slide worm clamps (412) onto the smaller diameter end of the tubes BC and BD and worm clamp (411) on the smaller diameter end of tubes BB and BE. Insert the end of tube BA into the end of tube BB until the first set of holes are aligned. Insert the screw, washer and nut as shown below. Refer to the dimensions in figure A to be sure that the proper tube ends are joined. Do the same with tubes BB, BC, BD, BE and BF. Join the two boom sections together with tube BG. Tighten the screws and worm clamps. Push the plastic caps (38) onto the ends of the boom. NOTE: screw 232 will be used later for attachment to element EK.

**FIGURE A**

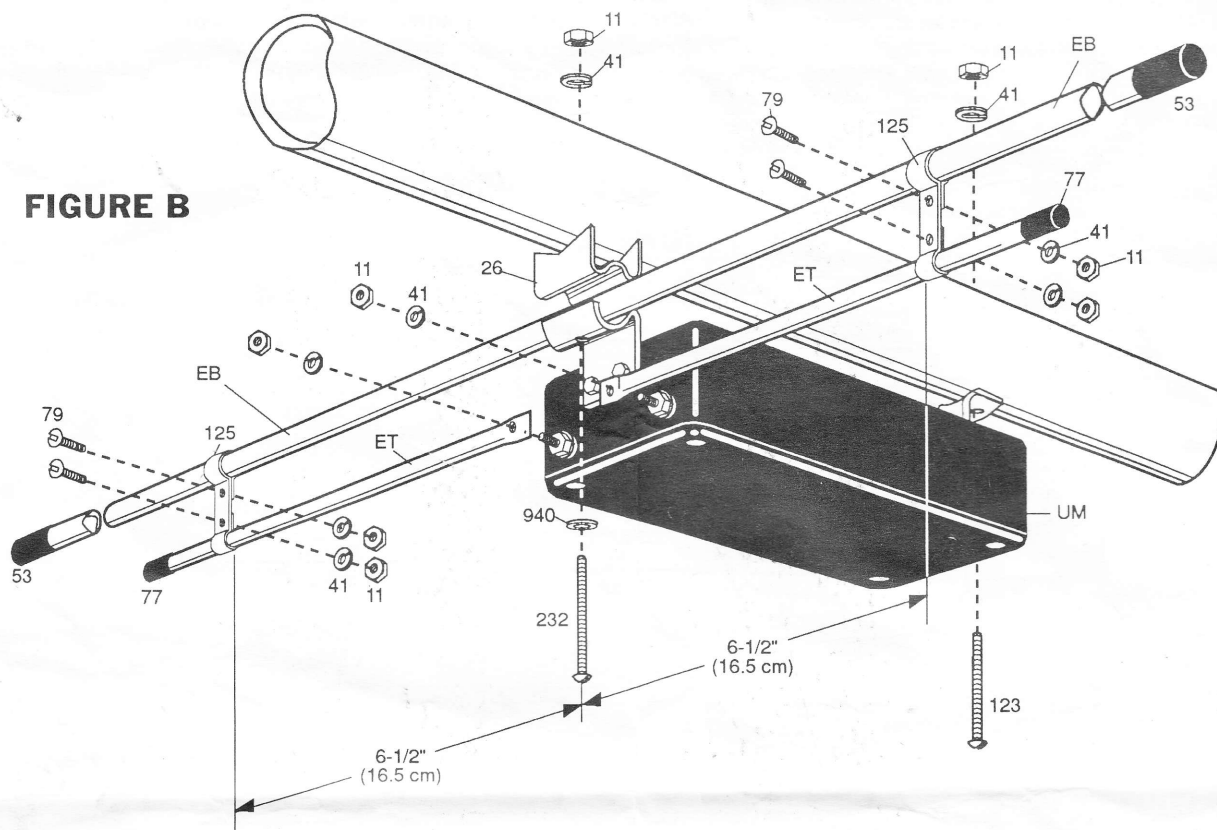


KEY	P/N		DESC.	SIZE	QTY
BA			ALUM TUBING	1" x 64" (2.5 x 162.6 cm)	1
BB			ALUM TUBING	1-1/4" x 60" (3.2 x 152.4 cm)	1
BC			ALUM TUBING	1-1/2" x 72" (3.8 x 182.9 cm)	1
BD			ALUM TUBING	1-1/2" x 72" (3.8 x 182.9 cm)	1
BE			ALUM TUBING	1-1/4" x 60" (3.2 x 152.4 cm)	1
BF			ALUM TUBING	1" x 60" (2.5 x 152.4)	1
BG			ALUM TUBING	1-3/8" x 12" (3.5 x 30.5 cm)	1
11	010011		SS HEX NUT	8-32	6
31	010231		SS SCREW	8-32 x 1-3/4" (4.4 cm)	2

KEY	P/N		DESC.	SIZE	QTY
41	011941		SS LOCK WASHER	#8	6
38	050038		PLASTIC CAP	1" (2.54 cm)	2
120	010120		SS SCREW	8-32 x 2" (5.1 cm)	1
123	010123		SS SCREW	8-32 x 1-1/2" (3.8 cm)	2
232	010232		SS SCREW	8-32 x 2-1/2" (6.4 cm)	1
411	030411		SS WORM CLAMP	1-3/8" (3.5 cm)	2
412	030412		SS WORM CLAMP	1-1/2" (3.8 cm)	2
413	030413		SS WORM CLAMP	1-3/4" (4.5 cm)	2

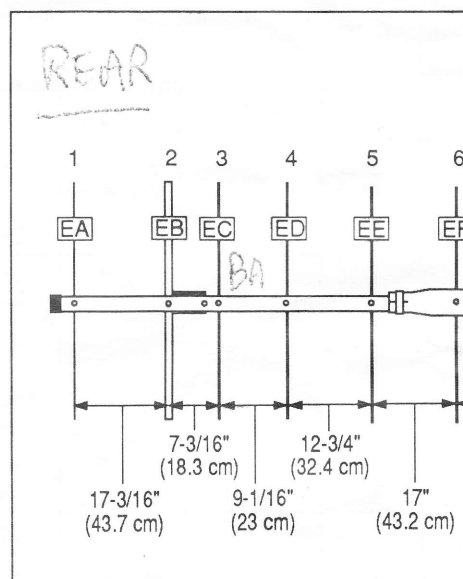
## #2 - ASSEMBLE T-MATCH

FIGURE B










KEY	P/N	DISPLAY	DESC	SIZE	QTY
EB			ALUM TUBING	1/2" x 39-3/4" (1.3 x 101 cm)	1
ET			ALUM TUBING	3/8" x 8-1/2" (.95 x 21.6 cm)	2
UM	UM2N		UltraMatch BALUN	4-3/4" x 2-1/2" (12 x 6.4 cm)	1
11	010011		SS HEX NUT	8-32	8
26	190026		ALUM BRACKET	7/8" (2.2 cm)	1
41	011941		SS LOCK WASHER	#8	8
53	050053		PLASTIC CAP	1/2" (1.27 cm)	2
77	050077		PLASTIC CAP	3/8" (.95 cm)	2
79	010079		SS MACHINE SCREW	8-32 x 1/2" (1.3 cm)	4
123	010123		SS MACHINE SCREW	8-32 x 1-1/2" (3.81 cm)	1
125	200125		T-MATCH STRAP		2
232	010232		SS MACHINE SCREW	8-32 x 2 1/2" (6.4 cm)	1
940	360940		ALUM FLAT WASHER	#8	1

Assemble the T-match to the driven element (EB) as illustrated in figure B. First attach the UltraMatch to the driven element with the hardware shown. Then connect the T-match elements (ET) to the UltraMatch with the split washers (41) and nuts (11). Next, attach the T-match elements to the driven element with the T-match straps (125) and hardware shown while noting the spacing dimensions between the straps. Place plastic caps (53) on the ends of the tube EB and plastic caps (77) on the ends of the tubes ET. Attach this subassembly to position 2 on the boom as shown in figure D noting that the UltraMatch "N" connector must face the center of the antenna. Tighten all screws.





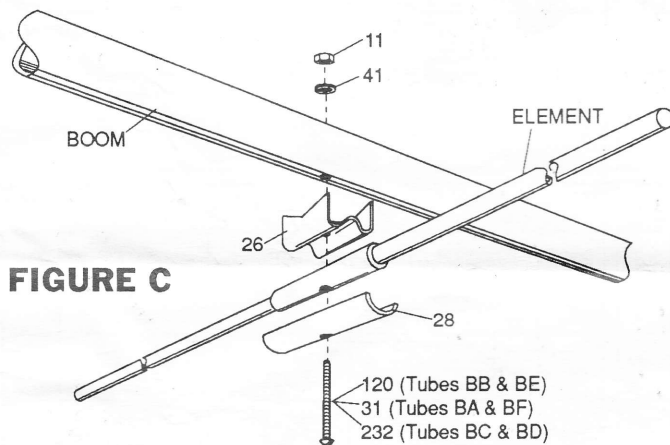
KEY	P/N	DISPLAY	DESC	SIZE	QTY
11	010011		SS HEX NUT	8-32	16
26	190026		ALUMINUM BRACKET	7/8" (2.2 cm)	16
28	190028		ALUMINUM HALF WASHER	1" (2.54)	16
31	010231		SS SCREW	8-32 x 1-3/4" (4.5 cm)	6
41	011941		SS LOCK WASHER	#8	16
120	010120		SS MACHINE SCREW	8-32 x 2" (3.1 cm)	5
232	010232		SS SCREW	8-32 x 2-1/2" (6.4 cm)	5

## #3 - MOUNT ELEMENTS

Attach the solid rod reflector and directors to the boom at the locations shown on figure D. First check all element lengths using table A. The elements are progressively shorter as you proceed toward the front end of the boom. Attach each element to the boom using the hardware shown in figure C.

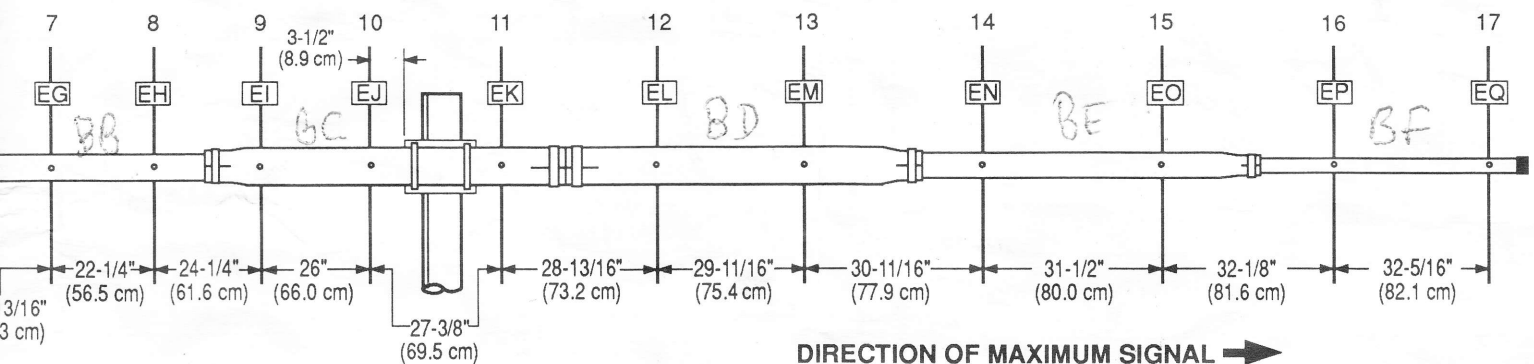
**TABLE A (Element Lengths)**

KEY	Element Number	LENGTH	
		INCHES	CM
EA	1	40-3/4	103.5
EB	1	39-3/4 x 1/2	101 x 1.2
EC	1	38-1/8	96.8
ED	1	37-1/4	94.6
EE	1	36-11/16	93.2
EF	1	36-3/8	92.4
EG	1	36	91.4
EH	1	35-13/16	91.0
EI	1	35-5/8	90.5
EJ	1	35-7/16	90.0
EK	1	35-1/4	89.5
EL	1	35-1/8	89.2
EM	1	34-15/16	88.7
EN	1	34-13/16	88.4
EO	1	34-5/8	88.0
EP	1	34-7/16	87.5
EQ	1	34-1/4	87.0



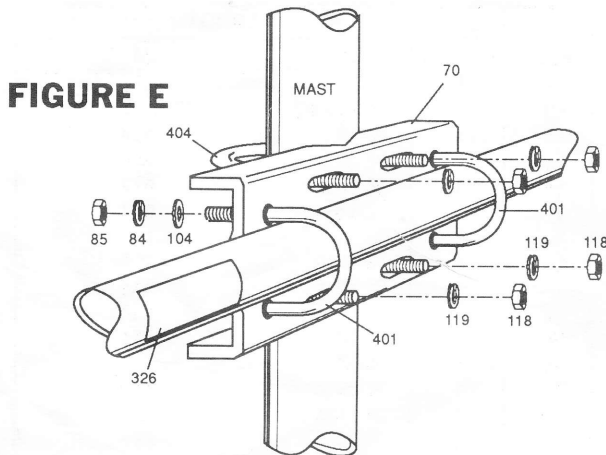
**FIGURE C**

**FIGURE D**



## #4 - ASSEMBLE BOOM TO MAST MOUNT

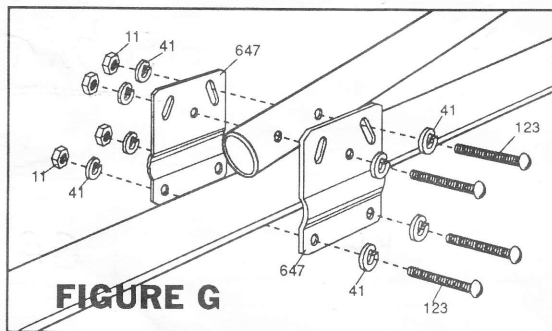
Assemble and mount the boom to mast clamp bracket (70) between elements 10 and 11 with the U-bolts 401 as shown in figure E. Secure with flat washer (104), lock washer (84) and nut (85) in that order. Note that the rear of the mast clamp must be 3-1/2 inches (8.9 cm) from element 10 as shown on figure D. You are now ready to mount the antenna to your mast using the U-bolts 404. Secure with lock washer (119) and nut (118) in that order. Affix the warning label (326) to the boom as shown in figure E.



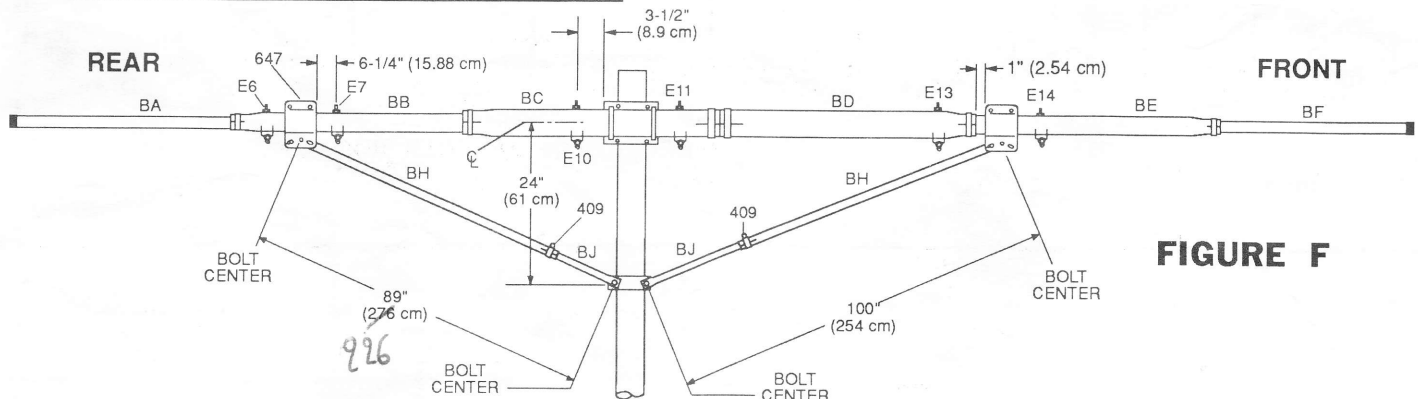
KEY	P/N	DISPLAY	DESC	SIZE	QTY
84	010084		SS LOCK WASHER	1/4" (.64 cm)	4
85	010085		SS HEX NUT	1/4" (.64 cm)	4
104	010104		SS FLAT WASHER	1/4" (.64 cm)	4
118	010118		SS HEX NUT	5/16" (.79 cm)	4
119	010119		SS LOCK WASHER	5/16" (.79 cm)	4
401	010401		SS U-BOLT	1 1/2" x 3" (3.8 x 7.6 cm)	2
404	010404		SS U-BOLT	2 1/2" x 3" (5.5 x 7.6 cm)	2
70	190070		MOUNTING PLATE	4" x 6" (10.2 x 15.2 cm)	1
326	290326		DANGER LABEL		1

## #5 - ASSEMBLE BRACES

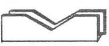



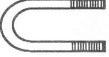
Assemble the mast braces using figure F. If you stack two 17B2's, you may opt to place the braces above rather than below the boom. First place a worm clamp (409) on the slotted end of tubes BH. Then insert the tubes BJ into the slotted ends of tubes BH, set to the dimensions shown and tighten the clamps. Next attach the other end of tubes BH to the boom at the positions shown in figure F using clamps (647), screws (23), washers (41) and nuts (11) as shown in figure G.



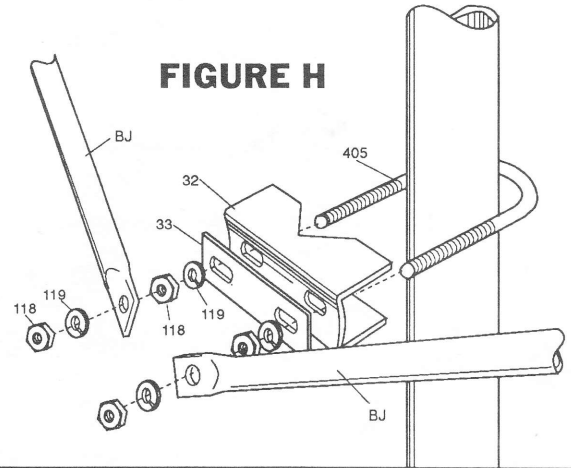
KEY	P/N	DISPLAY	DESC	SIZE	QTY
BH			ALUM TUBING	7/8" x 72" (2.2 x 183 cm)	2
BJ			ALUM TUBING	3/4" x 36"	2
11	010011		SS HEX NUT	8-32	8
41	011941		SS LOCK WASHER	#8	16
123	010123		SS SCREW	8-32 x 1-1/2" (3.8 cm)	8
647	191647		BRACE CLAMP		4



## #6 -BRACE TO MAST ATTACHMENT

KEY	P/N	DISPLAY	DESC	SIZE	QTY
32	190032		U-BOLT BRACKET	3-5/8" x 2-1/2" (9.2 x 6.4 cm)	1
33	193133		BACKING PLATE	3-1/2" x 1-1/8" (6.4 x 2.8 cm)	1
118	010118		SS HEX NUT	5/16" (.79 cm)	4
119	010119		SS LOCK WASHER	5/16" (.79 cm)	4
405	010405		SS U-BOLT	2-1/2" x 4-1/2" (6.4 x 11.4 cm)	1

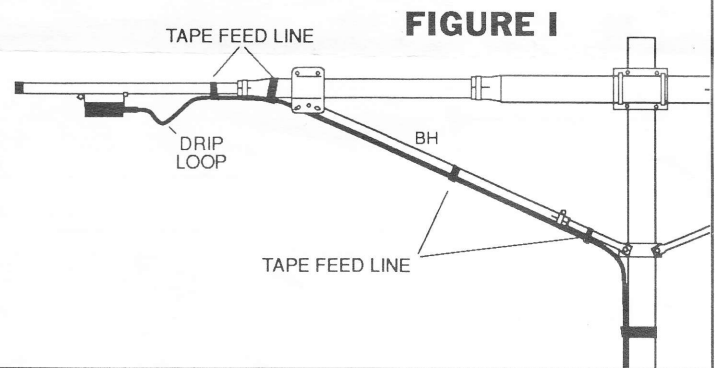
Attach the brace clamp to the mast as shown in figure H. First attach the clamp (32) to the mast with U-bolt 404, backing plate (33) and one set of washers (119) and nuts (118) as shown. Next set the 24 inch (61 cm) dimension as shown in figure F and tighten the nuts securely. Then attach the flattened end of tubes BJ to the U-bolt with washers (119) and nuts (118) as shown in figure H and tighten the nuts. If the antenna isn't flat enough, you may loosen the worm clamps and adjust the length of the braces slightly.



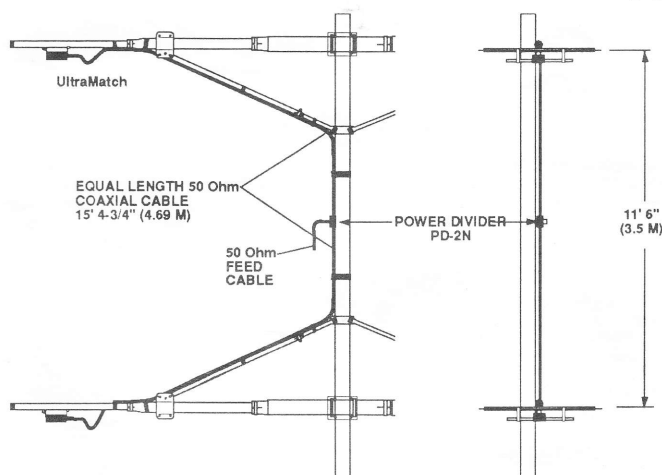
**FIGURE H**

## #7 - FEEDLINE ATTACHMENT

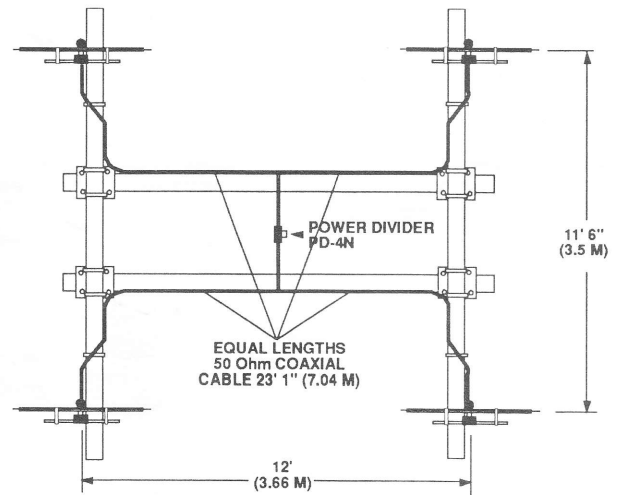
When the antenna is in its final location, apply some of the silicone on the outer threads of the connector on the UltraMatch. **SILICONE SHOULD NOT BE SPREAD ON THE CENTER PIN!** Attach your feedline connector to the UltraMatch. Tape your feedline down the boom and mast as shown in figure I. It's a good idea to provide a drip loop in the coax as shown to help protect the connector from water damage. Some recommended stacking arrangements are shown on figure J. When you have completed this section, return to the the tuning section on page 1.



**FIGURE I**



**2 ANTENNA STACK**



**4 ANTENNA STACK**

# MASTER PARTS LIST

KEY	P/N	DESCRIPTION	QTY	KEY	P/N	DESCRIPTION	QTY
11	010011	8-32 stainless steel hex nut	37	BA		1" x 64" (2.5 x 162.6 cm) aluminum tubing drilled	1
26	190026	7/8" (2.2 cm) formed aluminum bracket	17	BB		1-1/4" x 60" (3.2 x 152.4 cm) aluminum tubing	1
28	190028	Aluminum half washer	16			slotted, drilled, swaged	
31	010231	8-32 x 1-3/4" (4.4 cm) stainless steel machine screw	8	BC		1-1/2" x 72" (3.8 x 182.9 cm) aluminum tubing	1
32	190032	3-5/8" x 2-1/2" (9.2 x 6.4 cm) U-bolt bracket	1			slotted both ends, drilled, swaged	
33	193133	3-1/2" (6.4 cm) backing plate	1	BD		1-1/2" x 72" (3.8 x 182.9 cm) aluminum tubing	1
38	050038	1" (2.54 cm) black plastic cap	2			slotted both ends, drilled, swaged	
41	011941	# 8 stainless steel split lock washer	46	BE		1-1/4" x 60" (3.2 x 152.4 cm) aluminum tubing	1
53	050053	1/2" (1.3 cm) black plastic cap	2			slotted, drilled, swaged	
70	190070	4" x 6" (10.2 x 15.2 cm) formed mounting plate	1	BF		1" x 60" (2.5 x 152.4 cm) aluminum tubing drilled	1
77	050077	3/8" (.95 cm) black plastic cap	2	BG		1-3/8" x 12" (3.5 x 30.5 cm) aluminum tubing drilled	1
79	010079	8-32 x 1/2" (1.3 cm) stainless steel machine screw	4	BH		7/8" x 72" (2.2 x 182.9 cm) aluminum tubing	2
84	010084	1/4" (.64 cm) stainless steel lock washer	4	BJ		3/4" x 36" (1.9 x 91.4 cm) aluminum tubing	2
85	010085	1/4" (.64 cm) stainless steel hex nut	4			flattened one end	
104	010104	1/4" (.64 cm) stainless steel flat washer	4	EA		40-3/4" (103.5 cm) aluminum rod	1
116	240116	Silicone Package	1	EB		39-3/4" x 1/2" (101 x 1.2 cm) aluminum tube	1
118	010118	5/16" (.79 cm) stainless steel hex nut	8	EC		38-1/8" (96.8 cm) aluminum rod	1
119	010119	5/16" (.79 cm) stainless steel lock washer	8	ED		37-1/4" (94.6 cm) aluminum rod	1
120	010120	8-32 x 2" (5.1 cm) stainless steel machine screw	6	EE		36-11/16" (93.2 cm) aluminum rod	1
123	010123	8-32 x 1-1/2" (3.8 cm) stainless steel machine screw	11	EF		36-3/8" (92.4 cm) aluminum rod	1
125	200125	T-match strap	2	EG		36" (91.4 cm) aluminum rod	1
232	010232	8-32 x 2-1/2" (6.4 cm) stainless steel machine screw	6	EH		35-13/16" (91 cm) aluminum rod	1
326	290326	Danger label	1	EI		35-5/8" (90.5 cm) aluminum rod	1
401	010401	1-1/2" x 3" (3.8 x 7.6 cm) stainless steel U-bolt	2	EJ		35-7/16" (90.0 cm) aluminum rod	1
404	010404	2-1/2" x 3" (5.5 x 7.6 cm) stainless steel U-bolt	2	EK		35-1/4" (89.5 cm) aluminum rod	1
405	010405	2-1/2" x 4-1/2" (6.4 x 11.4 cm) stainless steel U-bolt	1	EL		35-1/8" (89.2 cm) aluminum rod	1
409	030409	7/8" (2.2 cm) stainless steel worm clamp	2	EM		34-15/16" (88.7 cm) aluminum rod	1
411	030411	1-1/4" (3.2 cm) stainless steel worm clamp	2	EN		34-13/16" (88.4 cm) aluminum rod	1
412	030412	1-1/2" (3.8 cm) stainless steel worm clamp	2	EO		34-5/8" (88.0 cm) aluminum rod	1
413	030413	1-3/4" (4.5 cm) stainless steel worm clamp	2	EP		34-7/16" (87.5 cm) aluminum rod	1
647	191647	Boomer bracket brace clamp	4	EQ		34-1/4" (87.0 cm) aluminum rod	1
940	360940	#8 aluminum flat washer	1	ET		8-1/2" x 3/8" (21.6 x .95 cm) aluminum tube	2
				UM	UM2N	UltraMatch Balun	1

## SPECIFICATIONS

Frequency, MHz	144-145	Side Lobe Attenuation,	>60
No. Elements	17	dB, E Plane	
Forward Gain, dBd	18.0	Electrical Wavelength	4.5
Front to Back Ratio, dB	26	Boom Length, ft (m)	31 (9.45)
SWR 1.2:1 Typical		Longest Element, in (cm)	40.75 (103.5)
2:1 Bandwidth, MHz	>2	Turning Radius, ft (m)	17.25 (5.26)
Power Rating, Watts PEP	2000	Mast Size Range, in (cm)	1.5-2
3 dB Beamwidth, Degrees			(3.8-5.1)
E Plane	2 x 14.5	Wind Load, ft <sup>2</sup> (m <sup>2</sup> )	3.9 (.36)
H Plane	2 x 15.0	Weight, lb (kg)	15.75 (7.14)

## LIMITED WARRANTY

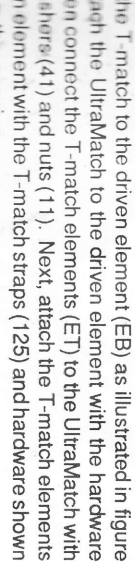
Cushcraft Corporation, P.O. Box 4680, Manchester, New Hampshire 03108, warrants to the original consumer purchaser for one year from date of purchase that each Cushcraft antenna is free of defects in material or workmanship. If, in the judgement of Cushcraft, any such antenna is defective, then Cushcraft Corporation will, at its option, repair or replace the antenna at its expense within thirty days of the date the antenna is returned (at purchaser's expense) to Cushcraft or one of its authorized representatives. This warranty is in lieu of all other expressed warranties, any implied warranty is limited in duration to one year. Cushcraft Corporation shall not be liable for any incidental or consequential damages which may result from a defect. Some states do not allow limitations on how long an implied warranty lasts or exclusions or limitations of incidental or consequential damages, so the above limitation and exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. This warranty does not extend to any products which have been subject to misuse, neglect, accident or improper installation. Any repairs or alterations outside of the Cushcraft factory will nullify this warranty.



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SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE





**FIGURE C**

BOOM

ELEMENT





11

41

26

28

120 (Tubes BB & BE)  
31 (Tubes BA & BF)  
232 (Tubes BC & BD)

31	010231		SS LOCK WASHER	8-32 x 1-3/4 (4.5 cm)	5
41	011941		SS LOCK WASHER	#8	16
120	010120		SS MACHINE SCREW	8-32 x 2" (3.1 cm)	5
232	010232		SS SCREW	8-32 x 2-1/2" (6.4 cm)	5

KEY	Number	INCHES	CM
EA	1	40-3/4	103.5
EB	1	39-3/4 x 1/2	101 x 1.2
EC	1	38-1/8	96.8
ED	1	37-1/4	94.6
EE	1	36-11/16	93.2
EF	1	36-3/8	92.4
EG	1	36	91.4
EH	1	35-13/16	91.0
EI	1	35-5/8	90.5
EJ	1	35-7/16	90.0
EK	1	35-1/4	89.5
EL	1	35-1/8	89.2
EM	1	34-15/16	88.7
EN	1	34-13/16	88.4
EO	1	34-5/8	88.0
EP	1	34-7/16	87.5
EQ	1	34-1/4	87.0

Figure 1 is a schematic diagram of a test specimen, showing the location of strain gauges (EA through EQ) and the direction of maximum signal. The specimen is a vertical rod with various sections and dimensions. The gauges are located at specific points along the length, with dimensions provided in inches and centimeters. The direction of maximum signal is indicated by an arrow pointing upwards.

Point	Gauge Label	Dimension (inches)	Dimension (centimeters)
1	EA	17-3/16"	(43.7 cm)
2	EB	7-3/16"	(18.3 cm)
3	EC	9-1/16"	(23 cm)
4	ED	12-3/4"	(32.4 cm)
5	EE	17"	(43.2 cm)
6	EF	19-13/16"	(50.3 cm)
7	EG	22-1/4"	(56.5 cm)
8	EH	24-1/4"	(61.6 cm)
9	EI	26"	(66.0 cm)
10	EJ	3-1/2"	(8.9 cm)
11	EK	27-3/8"	(69.5 cm)
12	EL	28-13/16"	(73.2 cm)
13	EM	29-11/16"	(75.4 cm)
14	EN	30-11/16"	(77.9 cm)
15	EO	31-1/2"	(80.0 cm)
16	EP	32-1/8"	(81.6 cm)
17	EQ	32-5/16"	(82.1 cm)

DIRECTION OF MAXIMUM SIGNAL →

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