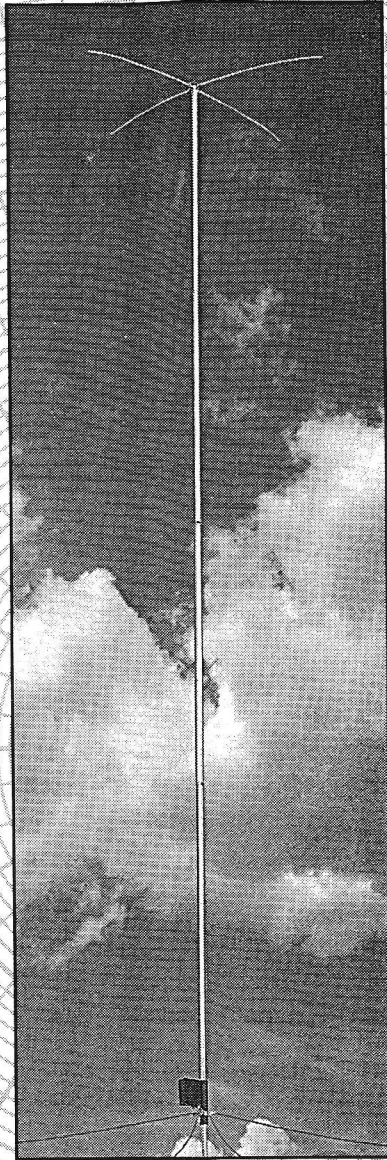
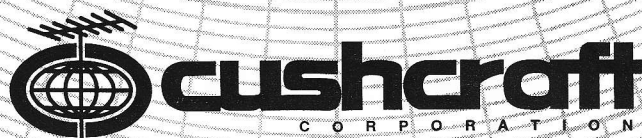


# ASSEMBLY AND INSTALLATION INSTRUCTIONS



# AV80

75 & 80 Meters



951461 (12/95)

## AV80

Your Cushcraft AV80 is a loaded 1/8 wave antenna that can be either switched between the 75 meter SSB band and the 80 meter CW band remotely or set up for fixed operation on either end of the band. It is designed to operate at full power for long periods of time. It is a convenient size and is easily assembled.

### 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 HIGH VOLTAGE OR 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.

The Cushcraft AV80 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 2. 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 the boss 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 much in the clear as possible. **EXTREME CARE MUST BE USED FOR YOUR SAFETY. YOU MUST INSURE THAT WHILE THE AV80 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 ANTENNA AS SHOWN IN FIGURE G.**

### MOUNTING

Your mast should be rigid and vertical. Always use a mast at least 1-3/4" (4.4 cm) in diameter. Be sure your mast is very rugged. The wind load of the AV80 with ice on it requires that you provide a strong mount. For elevated mounting, Cushcraft recommends a 1-3/4 to 2" (4.4 - 5.1 cm) schedule 40 metal pipe be used as the supporting member.

### ANTENNA GUYING

Cushcraft recommends guying the AV80 with a nonconductive material. Rope that will withstand exposure to weather can be attached to the AV80 at the point shown in Figure D.

### RADIAL SYSTEM

The AV80 is a low frequency HF loaded monopole antenna. Part of the antenna is the ground system. There have been volumes written on the merits of several types of radial systems. We describe two alternatives from among the many. Please choose the approach you prefer. Radial wire should be at least AWG#16 and strong enough to withstand exposure to weather. Wire can be insulated or bare.

**Elevated System** - An elevated radial system should be at least 8 feet (2.5 meters) above the ground. At least four radial wires, each approximately 1/4 wavelength long (68 feet or 20.7 meters) should be placed symmetrically as possible around the antenna. Keep wire sag to a minimum. If space is limited, the radials can be formed to fit in the space available. Objects between the radials will affect the electrical wavelength. The ends of three radials should be insulated from their supports.

**Ground Mounted System** - Mount the antenna base 3 inches (7.6 cm) above the ground. Place 12 or more radial wires 1/4 wavelength (68 feet or 20.7 meters) symmetrically around the antenna.

### SYSTEM GROUNDING

Direct grounding of the antenna and mast 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 AV80, using at least #10AWG ground wire and noncorrosive 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 5. After the antenna is completely assembled, verify dimensions for accuracy. Then, return to the section below for final tuning.

### TUNING PROCEDURE

**DO NOT MAKE ADJUSTMENTS IN THE MATCHING NETWORK BOX WHILE TRANSMITTING. DOING SO COULD LEAD TO ELECTROCUTION.** All tuning is done inside the matching network. Do not adjust the length of the radiator. By compressing the turns on L1, L2 and L3 (Figure A) the AV80 will be resonant at the bottom of the CW and SSB bands. To raise the resonant frequency begin by spreading the turns on L3. To raise the CW resonant frequency higher, spread the turns on L2. For SSB, spread the turns on L1.

# MASTER PARTS LIST

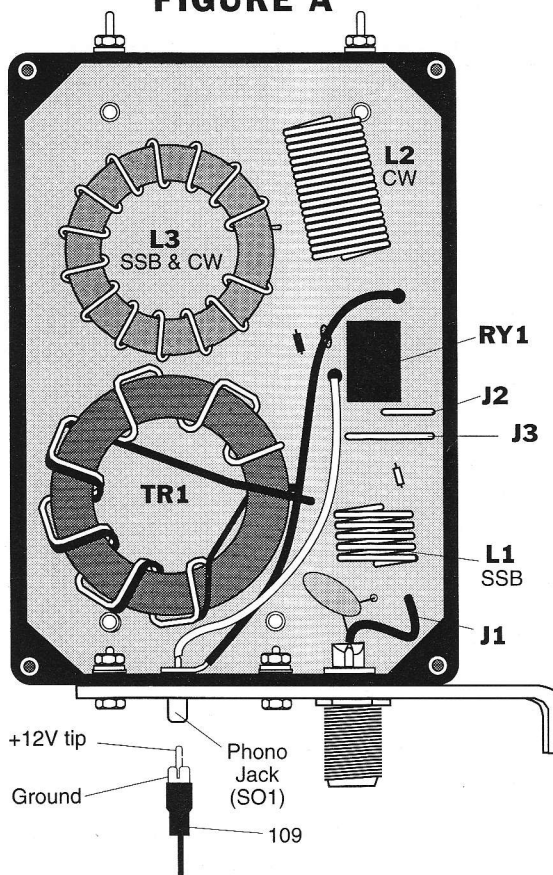
KEY	PART#	DESCRIPTION	QTY	KEY	PART#	DESCRIPTION	QTY
9	010009	8-32 (1.7 cm) stainless steel machine screw	4	404	010404	5/16" x 3-1/4" x 2-7/16" (.8 x 8.2 x 6.2 cm) stainless steel U-bolt	2
32	902832	49" (124.5 cm) tapered stainless steel rod w/tip	4	405	010405	5/16" x 4-1/2" x 2-7/16" (.8 x 11.4 x 6.2 cm) stainless steel U-bolt	2
49	014149	#8 nut/washer	24	414	030414	1-5/16" to 2-1/4" (3.3 to 5.7 cm) stainless steel worm clamp	6
51	014151	5/16" (.79 cm) nut/washer	8	748	190748	Angle bracket for lower radials	4
62	014162	#10 nut/washer	1	899	102899	Solder lug	4
63	170063	1/2" x 1/2" x 3-1/2" (1.3 x 1.3 x 8.9 cm) aluminum V-block	4	941	360941	Aluminum flat washer	8
79	010079	8-32 x 1/2 stainless steel machine screw	12	4079	194079	4" x 10" (10.2 x 25.4 cm) aluminum mounting plate	1
96	202296	Aluminum radial clamp	4	BA	AV80BA	Base assembly	1
99	050099	2" (5.1 cm) black plastic cap	1	BB	AV80BB	6.27' x 2" (191 x 5.1 cm) swaged aluminum tube	4
109	351109	Switchcraft plug	1	BC	AV80BC	6.0' x 2" (183 x 5.1 cm) swaged aluminum tube	1
115	050115	Vinyl boot	1	MN	AV80MN	MN-80 box assembly for AV80	1
116	240116	Silicone pack	1				
140	194140	MN support bracket	1				
232	010232	8-32 x 2-1/2" (6.35 cm) stainless steel machine screw	6				
326	290326	Danger label	1				

## #1 - IMPEDANCE MATCHING ASSEMBLY SET-UP

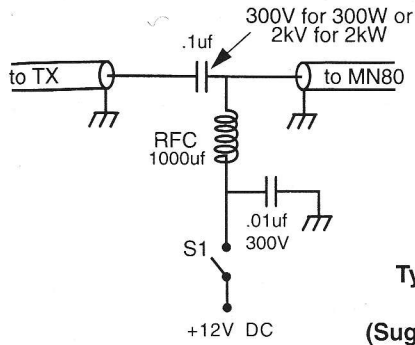
Before using your AV80 it is necessary to set up the matching network (MN80) for proper operation. The matching network is equipped with a relay that switches inductance in and out of the circuit to allow remote selection of CW or SSB operation. To use this relay you must supply +12 Volts DC to either the phono plug SO1 (Option 3) or inject +12 Volts DC through the coax (Option 4). Select one of the following options.

- Option 1** - To operate on 80m (CW) only. Cut the jumpers J1 and J2 (Figure A).
- Option 2** - To operate on 75m (SSB) only. Cut the jumpers J1 and J3 (Figure A).
- Option 3** - To switch between CW and SSB using built-in relay and separate +12V DC line to phono jack SO1 (Figure A), determine whether you want the antenna tuned to CW or SSB when no power is applied to the relay (use chart in Figure B). Cut the corresponding jumper wire (Figure A). Also cut jumper wire J1. A phono plug is supplied in the parts bag for this option.

FIGURE A



**Option 4** - To switch between CW and SSB using built-in relay and injecting +12V DC through coax, determine whether you want the antenna tuned to CW or SSB when no power is applied to the relay (use chart in Figure B). Cut the corresponding jumper wire (Figure A). The AV80 matching network will automatically decouple the +12V DC from your RF signal. You will have to construct a +12V DC injection circuit (Figure B) to be placed at the opposite end of your coax. Do not connect any equipment between your injection circuit and the AV80. Cushcraft does not supply a +12V DC injection circuit. Failure to use a proper injection circuit will lead to damage of transmitting equipment. Cushcraft is not responsible for damages associated with the use of a DC voltage injected through coax cable attached to the AV80.



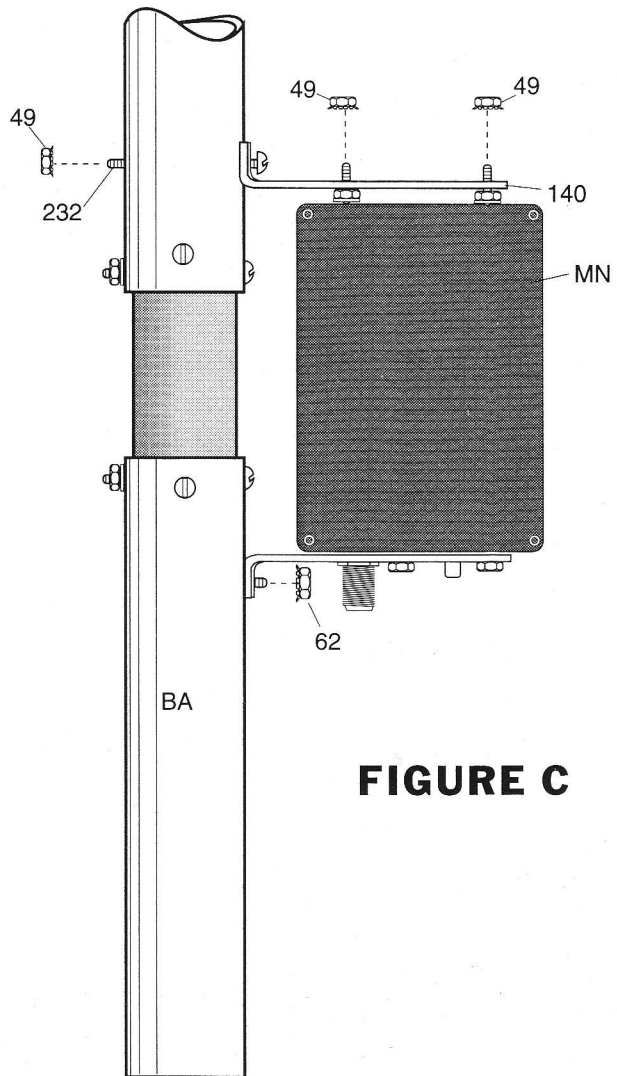
Jumper	Voltage	
	0V	+12V
J2 Cut	CW	SSB
J3 Cut	SSB	CW

**FIGURE B**  
**Typical +12 Volt DC Injection Circuit**  
 (Suggested not supplied)

KEY	P/N	DISPLAY	DESC	SIZE	QTY
49	014149		NUT/WASHER	8-32	4
62	014162		NUT/WASHER	10-24	1
140	194140		MN SUPORT BRACKET		1
232	010232		SS MACHINE SCREW	8-32 x 2-1/2" (6.35 cm)	1
BA	AV80BA		BASE ASSEMBLY		1
MN	AV80MN		BOX ASSEMBLY		1

## #2 - ATTACH MATCHING ASSEMBLY

Attach the black box assembly (MN) to the base assembly using the hardware shown in Figure C.



**FIGURE C**

### #3 - ASSEMBLE RADIATOR

Locate the 4 sections of aluminum tubing with swaged ends (BB). Slide one worm clamp (414) over the top of the base section. Next, slide the large end of one of the BB tubes over the top of the base section. Align the through holes and place a 2-1/2" (6.3 cm) machine screw (232) through the tubes and secure with (49) nut/washers (see Figure F). Tighten clamps. Repeat this procedure for the remaining 3 BB tubes. The last radiator section is the non-swaged tube (BC). Slide plastic end cap (99) onto the non-slotted end of BC. Attach radial clamps (96) and top radials (32) (Figure E) just below the black end cap. Secure BC to antenna in the same fashion as the previous sections.

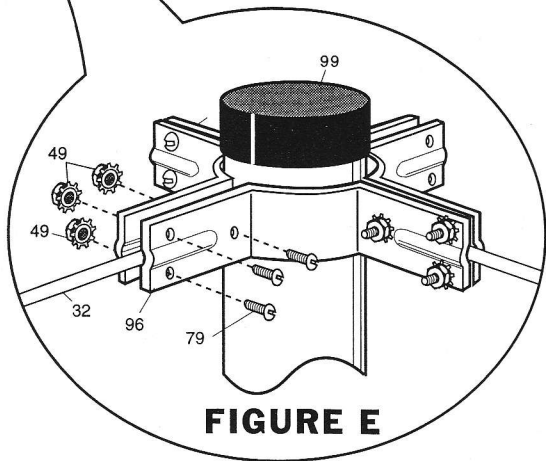
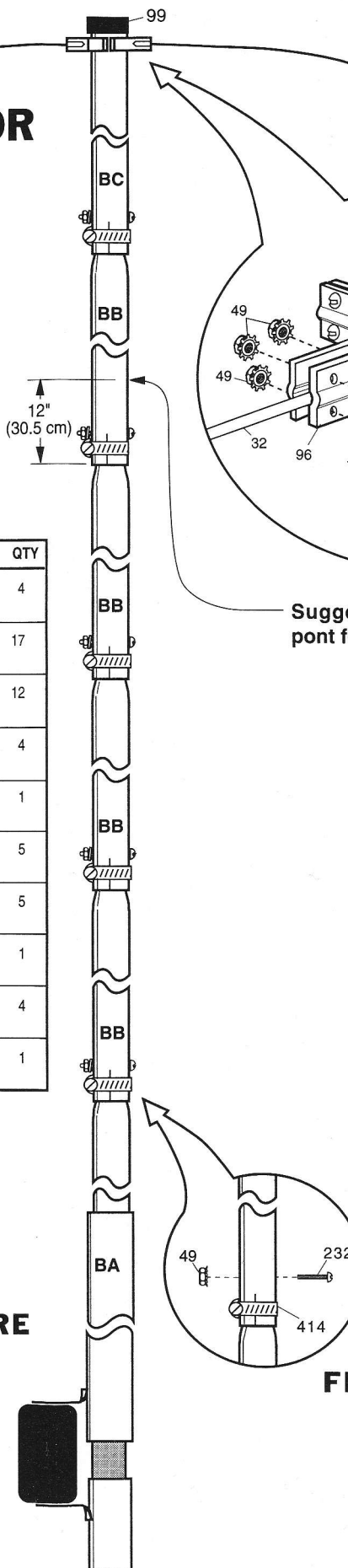


FIGURE E

Suggested attachment point for guys.

KEY	P/N	DISPLAY	DESC	SIZE	QTY
32	902832		SS ROD (124.5 cm)	49"	4
49	014149		NUT/WASHER	8-32	17
79	010079		SS MACHINE SCREW	1/2" (1.3 cm)	12
96	202296		ALUMINUM RADIAL CLAMP		4
99	050099		BLACK CAP	2" (5.1 cm)	1
232	010232		SS MACHINE SCREW	2-1/2" (6.35 cm)	5
414	030414		SS WORM CLAMP	2-1/4" (5.7 cm)	5
BA	AV80BA		BASE ASSEMBLY		1
BB	AV80BB		SWAGED ALUM TUBE	6.27' x 2" (191 x 5.1 cm)	4
BC	AV80BC		ALUM TUBE	6.0' x 2" (183 x 5.1 cm)	1

FIGURE D

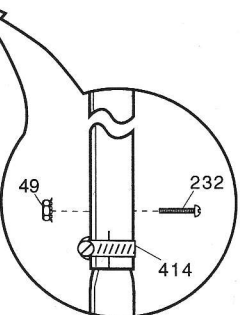




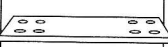

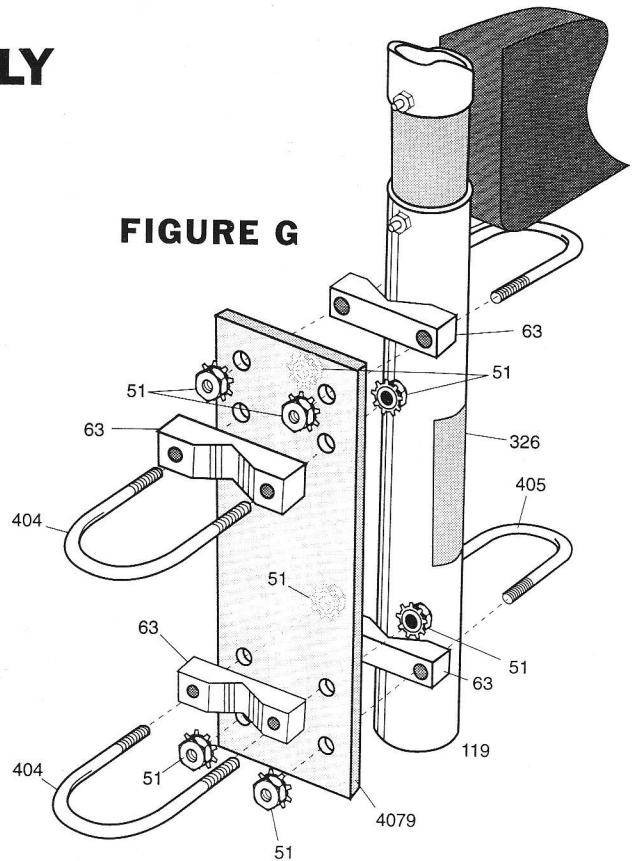


FIGURE F

## #4 - BASE TO MAST ASSEMBLY







Attach the antenna base to your mast as shown in Figure G. First attach the mounting plate (4079) with U-bolts (405), aluminum V-blocks (63), and nut/washers (51). The bottom of the plate should be even with the bottom of the antenna to leave room for the radial clamping system. Affix danger label (326) to the antenna so that is easy to see. When attaching antenna to the mast use the 404 U-bolts, aluminum V-blocks (63), and nut/washers (51).

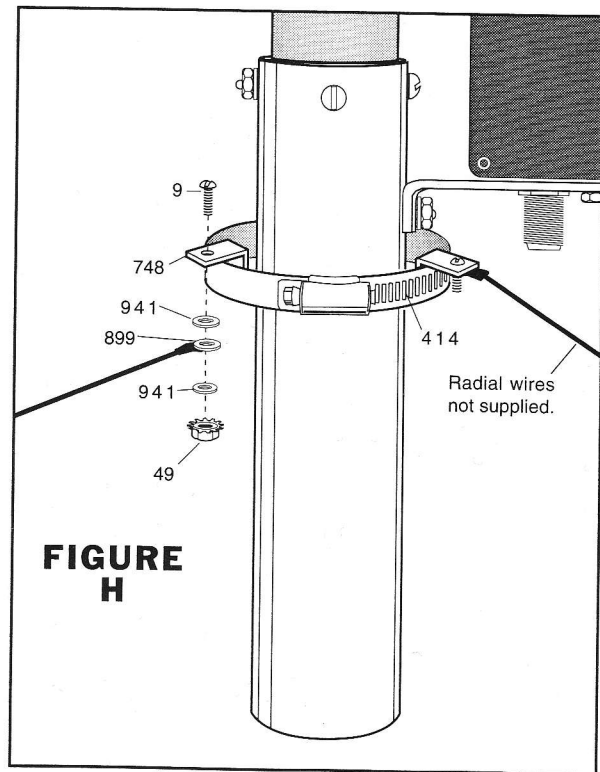
KEY	P/N	DISPLAY	DESC	SIZE	QTY
51	014151		NUT/WASHER	5/16" (.8 cm)	8
63	170063		V-BLOCK	2" (5.1 cm)	4
404	010404		U-BOLT	2-7/16 x 3-1/4" (6.2 x 8.2 cm)	2
405	010405		U-BOLT	2-7/16" x 4-1/2" (6.2 x 11.4 cm)	2
4079	194079		MOUNTING PLATE		1
326	290326		DANGER LABEL		1



## #5 ATTACH BASE RADIALS


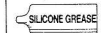
Attach radials to the antenna referring to Figure H. Use the worm clamp (414), angle brackets (748) and hardware provided. Space the radials evenly around the base.

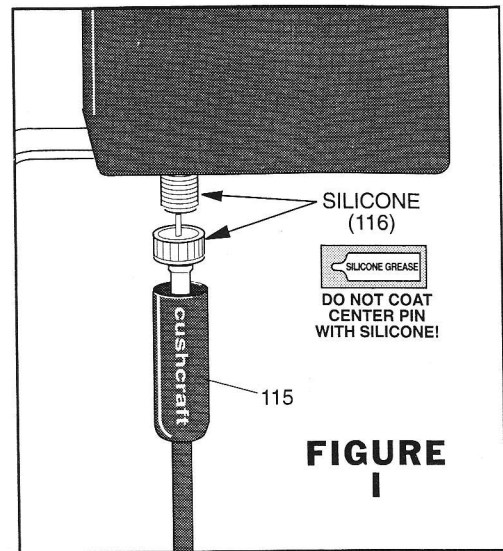
KEY	P/N	DISPLAY	DESC	SIZE	QTY
9	010009		SS MACHINE SCREW	8-32 x 5/8" (1.7 cm)	4
49	014149		NUT/WASHER	8-32	4
414	030414		SS WORM CLAMP	2-1/4" (5.7 cm)	1
748	190748		ANGLE BRACKET		4
899	102899		SOLDER LUG		4
941	360941		ALUM FLAT WASHER		8



# #6 - FEEDLINE

The AV80 is designed for use with 50 Ohm coaxial cable terminated with a PL-259 connector. Any length of cable can be used with your AV80. The shortest length of cable will have the least loss. A connector boot is included for use with your new antenna (figure 1). Slide the boot over the cable before attaching your PL-259. Coat only the outside connector threads and shell with silicone grease. Do not coat the center pin or receptacle. After the PL-259 is firmly screwed onto the antenna connector, slide the vinyl boot over the connector and against the connector bracket for a good weather-tight connection. After the antenna is on the mast, tape the feedline to the mast. If you plan to install the antenna in a salty or corrosive environment, you may want to consider coating it with a clear marine varnish or equivalent after it is assembled. For final tuning see page 1.

KEY	PART#		DESCRIPTION	SIZE	QTY
050115	115		CONNECTOR BOOT		1
240116	116		SILICONE PACKAGE		1



**FIGURE 1**

## SPECIFICATIONS

Frequency, MHz	3.5-4.0
Electrical Wavelength	1/8 wavelength to top hat
SWR 1.2:1 Typical	
2:1 Bandwidth (KHz)	225
Power Rating, Watts PEP	1500
Radiation Angle, degrees	18
Horizontal Radiation Pattern, degrees	360
Height, ft (m)	36 (10.97)
Mast Size Range, in (cm)	1.5-1.75 (3.8-4.4)
Wind Load, ft <sup>2</sup> (m <sup>2</sup> )	4.2 (.42)
Weight, lb (kg)	20 (9.1)

#### LIMITED WARRANTY

Cushcraft Corporation, P.O. Box 4680, Manchester, New Hampshire 03108, warrants to the original 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 purchasers 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 the misuse, neglect, accident or improper installation. Any repairs or alterations outside of the Cushcraft factory will nullify this warranty.



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