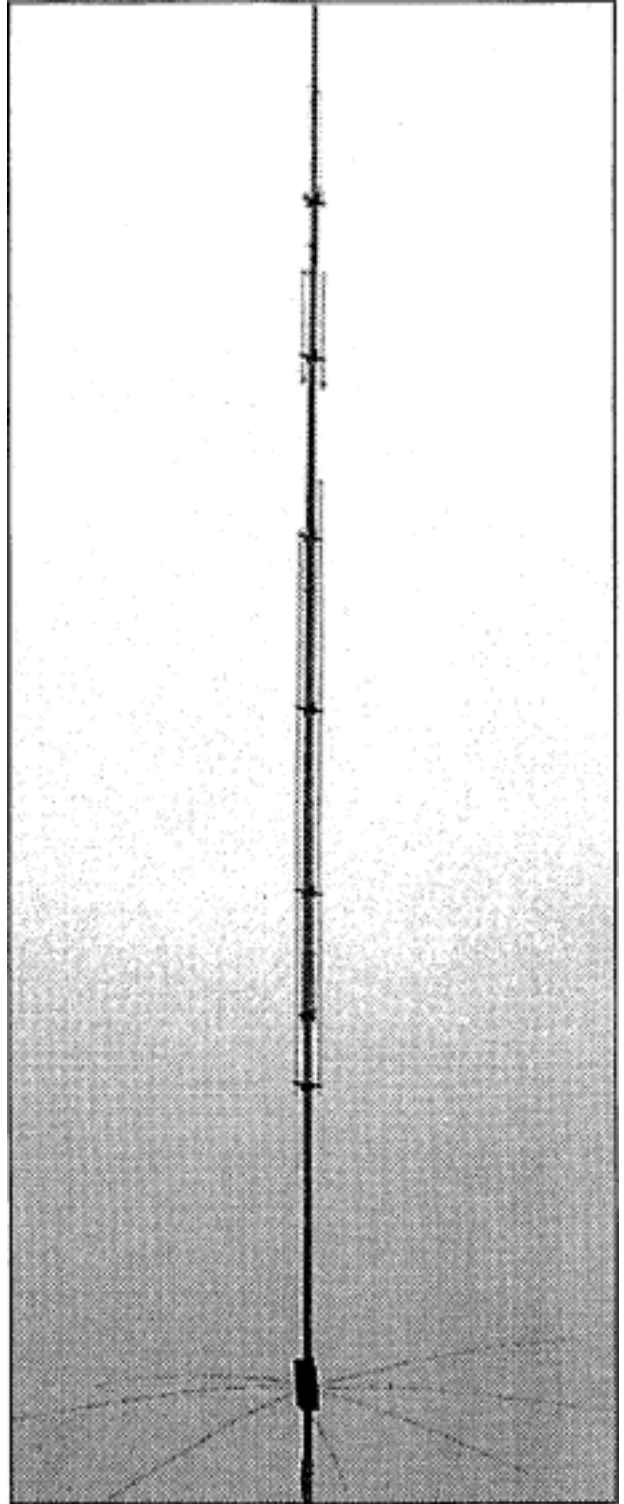


AV-620

INSTRUCTION & ASSEMBLY MANUAL

WARNING:

You can be killed if the antenna, feedline, or the equipment used to install the antenna accidentally contacts utility lines. NEVER install an antenna near utility lines.



hy-gain.

308 Industrial Park Road, Starkville, MS 39759

AV-620 Vertical Antenna

Instruction Manual

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WARNING: Improper installation and assembly can be hazardous! Read these instructions thoroughly before attempting to install or operate this product. High power transmitting devices produce voltages that can cause severe burns or other injuries.

Introduction

Hy-Gain is proud to produce the AV-620 HF Multiband Vertical. Drawing on our many years of HF and VHF Antenna experience, we have produced a well-engineered antenna capable of excellent efficiency, unmatched performance, and superior construction.

Computer optimization of the AV-620 design yields the most efficient electrical design with maximum gain and low angle of radiation for long distance communication. No traps are used to achieve six band performance. This eliminates any signal losses from trap coils. The AV-620 is resonant on all six bands with individual $3/8$ wavelength radiators. There are no "tricks" or "mystery resonances" used for impedance matching on any band.

No long wire radials or counterpoise kits are necessary for operation of the AV-620. The AV-620 is self contained for simple, convenient portable or fixed operation.

Mechanical construction of the AV-620 is designed for extreme light weight and high wind survival. Aircraft grade aluminum and high strength fiberglass are used for the entire radiator. The trap-free design allows a very low wind surface area. Bulky tubes are not required to support unwieldy traps. The broad 2:1 VSWR bandwidth on all bands eliminates large frequency shifts seen in other antennas when the antenna is wet or iced.

The AV-620 is covered by our Hy-Gain Warranty and supported by our customer service team. We would like to thank you for purchasing this product from us and ask that you let us know of any suggestion you may have. With proper assembly, installation, and maintenance, the AV-620 will provide years of faithful service.

Theory of Operation

The AV-620 HF Multiband Vertical antenna consists of an end fed radiator that is resonant in the 6, 10, 12, 15, 17, and 20 meter amateur frequency bands. Resonances on each band are the result of impedance matching a $3/8$ wavelength element with a broadband RF transformer. The characteristic impedance at the base of a $3/8$ wavelength radiator is in the order of several hundred ohms.

To match this impedance, a 4:1 toroidal transformer (voltage balun) steps the impedance down to 50 ohms. This transformer uses (2) ferrite cores for high power capability. Also, the windings are made of twisted pair wire to improve coupling and reduce loss. A second high power transformer is configured as a 1:1 current balun to help stop RF from traveling back to the feedline. The

radiator of the AV-620 is at DC ground potential for static drain. This is accomplished by an inductor in the matching circuit.

The center radiator is resonant on 20 meters. A small linear loading section near the top of the AV-620 shortens the overall height approximately 5 feet to a more manageable 23 feet total height. VSWR is under 2:1 across the entire 20 meter amateur band. Placed on the center radiator are 114 wavelength stubs for 6 (2 stubs), 10, 12, 15, and 17 meters. The stubs are placed approximately one tenth of a wavelength (electrically 118 wavelength) above the AV-620 base. At the top of each stub the impedance is very high at the frequency the stub is tuned. This high impedance stops, (chokes) RF at this point creating a resonant radiator. There is minimal loss using this method as compared to standard trap circuits. Also, VSWR bandwidth is not restricted by the "Q" of trap components.

AV-620 Specifications

VSWR at Resonance	less than 1.5:1 at antenna typical
Gain	3 dBi nominal
Height	23 feet
Weight	12 lbs
Horizontal Radiation Angle	360 degrees
Vertical Radiation Angle	16 degrees at ¼ wavelength ht.
Wind Surface Area	2.4 sq. ft.
Wind Survival	80 mph

Band(m)	2:1 VSWR (KHz)	CW (Watts Out)	POWER SSB (PEP Watts)	RTTY (Watts Out)
20	500	1500	1500	400
17	500	1500	1500	400
15	500	1500	1500	400
12	500	1500	1500	400
10	1500	1500	1500	400
6	6000	500	500	200

Antenna Location

The best performance for receiving and transmitting will be obtained by mounting the antenna in a clear location above or away from buildings, towers, feedlines, utility wires, and other antennas. While your own ingenuity and particular circumstances will determine the final mounting method, remember, all objects within 65 feet from the base of the antenna will influence the performance of the AV-620.

WARNING: Always mount this antenna so that it is out of the reach of adults as well as children and pets. The counterpoise rods can cause injury and/or severe RF burns.

- **NEVER** mount this antenna in a location that will permit unsuspecting people to come in contact with any part of the antenna.
- **NEVER** mount this antenna where a mechanical failure might allow the antenna, antenna support and feedline to contact power lines or other utility wires.
- **ALWAYS** ground the feedline at the point where it enters a building to a good earth ground for lightning protection.
- **ALWAYS** follow the guidelines for antenna installations as recommended by the US Consumer Product Safety Commission.

Antenna Mast

The recommended support mast for the AV-620 is steel water pipe between the sizes of 1-1/4" OD to 2 1/2" OD and with a length that will place the antenna base at a safe height. Do not use thin walled conduit, aluminum tubing, or "TV" mast. The AV-620 is designed to operate at a height of 8 or more feet for proper performance. Placement on the side of a house or garage at eaves level is acceptable as long as the counterpoise whips will not be in contact any snow on the roof. Placement above metal roofs is acceptable if the antenna base is at least 5 feet or more above the metal surface.

Antenna Grounding

Although the AV-620 is designed to operate efficiently without the requirement of an earth ground, SAFETY GROUNDING must still be provided to protect equipment, property and persons from the hazards of lightning strikes and other weather related electrical discharges. In addition the coaxial cable feeding the antenna should have the shield grounded to eliminate the risk of any indoor equipment failure from allowing hazardous voltages from appearing indoors and creating a shock hazard. The support mast should be grounded with a large diameter ground wire.

The AV-620 is DC grounded for static discharge. This is accomplished with a choke coil in the Matching Unit. This coil could fail under high voltage spikes from a near or direct lightning strike.

Additional protection can be accomplished by grounding the shield of the coax where it enters the building to a good earth ground or directly burying the cable in the earth for several feet before it enters the building. The coaxial cable should be totally disconnected from the station during threatening weather conditions for maximum lightning protection.

Antenna Guying

For normal operation up to 80 mph winds, the AV-620 will not require guying. For extreme locations such as tall building rooftops, a safety guy is recommended. Use Dacron® rope to guy the center radiator. Attach ropes 14 feet above the antenna base. Use care not to disturb the radiator stubs.

Customer Supplied Components

- Quality low-loss 50 ohm coax cable with PL-259 connectors
- VSWR Analyzer (MFJ-259B or equiv.) or HF transceiver with VSWR meter
- Mounting mast with required hardware to provide sturdy support

Tools Required For

- 1/4" Standard Blade Screwdriver
- #1 Phillips Screwdriver
- #2 Phillips Screwdriver
- 3/8" Open End Wrench
- 3/8" Nut Driver
- 5/16" Nut Driver (Deep Socket)
- 5/16" Open End Wrench
- 7/16" Nut Driver
- 7/16" Open End Wrench
- 10 mm Open End Wrench
- Tape Measure 20'
- Suitable Eye Protection
- Pliers
- WD-40® or equivalent

Safety Precautions

WARNING! You can be killed if the antennas, feedline, or the equipment used to install the antenna accidentally contacts any utility lines. Never install an antenna near power lines!

- Be careful while climbing and carrying the antenna. It is heavy enough to cause you to lose your balance if it is handled too casually or if any part of the antenna snags on a gutter, ladder, tree, or other item.
- Mount the antenna high enough and in the clear so that it is out of reach by any person or pet. Do not allow trees or other structures near the retractor portion of the antenna. The counterpoise whips can cause serious eye injury.
- Ensure that the mast is sturdy enough to support the weight of this antenna including the windload of the antenna.

Verification of Parts

Refer to the Box Contents and Parts Bags listings below to identify all parts. Also refer to Page 10 for drawings of the various brackets used in the AV-620. If any part is missing or damaged, turn to the Technical Assistance portion of this manual. There is extra hardware supplied with the antenna.

Box Contents

Part Number	Part Description	ID Number	Quantity	Received
17-AV620-4	Instruction Manual Bag	IM	1	
17-AV620-1	Parts Bag #1	PB1	1	
17-AV620-2	Parts Bag #2	PB2	1	
17-AV620-3	Parts Bag #3	PB3	1	
80-AV620-1	AV620 Matching Unit	NW	1	
810-0620-1	Base Insulator 1 1/4" x 12" •	IN1	1	
810-0620-3	Radiator Insulator 1" x 6"	IN2	1	
17-AV620-5	Base Tube 1 1/2" x 12"	BA	1	
17-AV620-6	Small Tube Bundle	ST	1	
810-0620-6	Radiator Section 13/8" x 48"	BB	1	
810-0620-7	Radiator Section 1 1/4" x 72"	BC	1	
810-0620-8	Radiator Section 1 1/8" x 72"	BD	1	
810-0620-9	Radiator Section 1 1/8" x 48"	BE	1	
810-0620-10	Radiator Section 1" x 48"	BF	1	
738-0620	Antenna Mounting Plate	AM	1	

Small Tube Bundle

Part Number	Part Description	ID Number	Quantity	Received
810-0620-2	Stub Section 1/4" x 20"	CK	1	
810-0620-11	Stub Section 1/4" x 24"	CL	1	
810-0620-21	Stub Section 1/4" x 36"	CG	1	
810-0620-14	Stub Section 1/4" x 48"	CF	2	
810-0620-15	Stub Section 1/4" x 72"	CE	4	
810-0620-12	Stub Section 3/16" x 18"	CB	1	
810-0620-13	Stub Section 3/16" x 21"	CA	1	
810-0620-17	Stub Section 3/16" x 30 1/2"	CD	1	
810-0620-18	Stub Section 3/16" x 33"	CC	1	
810-0620-19	Stub Section 3/16" x 55"	CH	2	
738-2760	48" Stainless Steel Whip	CW	7	

Parts Bag Contents

Instruction Manual Bag

Part Number	Part Description	ID Number	Quantity	Received
925-AV620	AV-620 Instruction Manual	MN	1	
925-1007	Ameritron Warrant Card	WC	1	
924-1780	Warning Label	WL	7	

Parts Bag #1

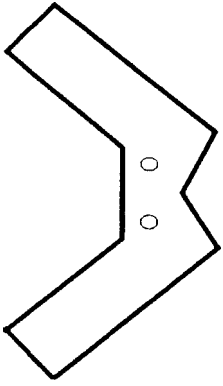
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656-03755	6-32 x 3/8" Screw SS	S1	28	
656-1500S	6-32 x 1 1/2" Screw SS	S3	20	
656-1750S	6-32 x 1 3/4" Screw SS	S4	2	
705-06325	6-32 Ke s Nut SS	N1	51	
660-03755	10-32 x 3/8" Screw SS	S6	12	
660-1500S	10-32 x 1 1/2" Screw SS	S7	4	
711-1037S	#10 Lock Washer SS	W1	10	
705-10325	10-32 Nut SS	N2	12	
705-1032SNL	10-32 Nut Nylon Insert SS	N3	12	
662-20005	1/4-20 x 2" Bolt SS	S8	4	
662-2500S	1/4-20 x 2 1/2" Bolt SS	S9	4	
705-2520SNL	1/4-20 Nut Nylon Insert SS	N5	8	
745-3150S	Hose Clam SS	HC	3	
810-0620-16	Stub Slice 3/16" x 1 1/2"	SS	4	
745-3108	Counterpoise Rin SS	R1	2	
765-1009	Plastic Ca 1/4"	C1	4	
765-1000	Plastic Cap 1"	C2	1	

Parts Bag #2

Part Number	Part Description	ID Number	Quantity	Received
735-1610	Radiator Clam Bracket	RB	20	
737-1618	Linear Loading End Strap	LE	1	
737-1619	1 Linear Loading Bracket	LB	2	

Parts Bag #3

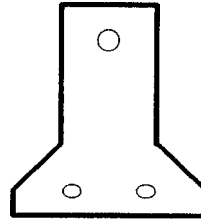
Part Number	Part Description	ID Number	Quantity	Received
758-9200	2 1/2" U-Bolt Assembly SS	UB	2	
758-9195	Mast Saddle	MS	2	
808-1786-6	Mast Plate	MP	2	
738-2600	90 Degree Stub Insulator	P1	8	
738-2602	180 Degree Stub Spacer	P2	3	
735-1611	Stub Base Bracket	SB	3	
11-AV620-1	Jumper Wire	J1	1	



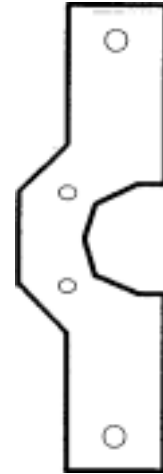
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PIN 738-2600 Qty (2)
Plastic
ID# P1



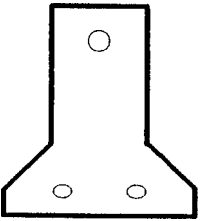
180 Degree Stub Insulator
PIN 738-2602 Qty (2)
Plastic
ID# P2



Single Stub Insulator
PIN 737-8100 Qty (5)
Plastic
ID# P3



Dual Stub Base Bracket
PIN 735-1611 Qty (1)
Aluminum
ID# SB2



Single Stub Base Bracket
PIN 735-1618 Qty (2)
Aluminum
ID# SB1



Radiator Clamp Bracket
PIN 735-1610 Qty (16)
Aluminum
ID# RB

TASK I

Center Radiator Assembly

() Refer to Figure A to assemble the Center Radiator. Attach BA tubing section to the Base Insulator (rNI) with (2) 1/4-20 x 2" bolts (S8) and 1/4-20 nylock nuts (N5). Do not tighten the nuts at this time.

() Find the (2) counterpoise rings (RI). Press the ring flat sides together and slide them onto the Base Insulator (IN1). Leave rings loose at this time.

() Attach BB tubing section to the Base Insulator (INI) with (2) 1/4-20 x 2" bolts (S8) and 1/4-20 nylock nuts (N5). Do not tighten the nuts at this time.

() Place (1) hose clamp (HC) over the slotted end of tubing section BB. Slide unslotted end of BC tubing section 4 inches (10 cm) into BB. Tighten hose clamp. NOTE: For protection against oxidation, a conductive paste such as NoAloxg may be used between *telescoping pieces of aluminum tubing only*. Do not apply the paste to insulators or coax connections.

() Place (1) hose clamp (HC) over the slotted end of tubing section BC. Slide undrilled end of BD tubing section 4 inches (10 cm) into BC. Tighten hose clamp.

() Insert Radiator Insulator (IN2) into tubing section BD. Attach with (2) 10-32 x 1 1/2" screws (S7) and 10-32 nylock nuts (N3). Do not tighten nuts at this time.

() Slide drilled end of tubing section BE over Radiator Insulator (IN2). Attach with (2) 10-32 x 1 1/2" screws (S7) and 10-32 nylock nuts (N3). Do not tighten nuts at this time.

() Place (1) hose clamp (HC) over the slotted end of tubing section BE. Slide an end of BF tubing section 13 inches (33.0 cm) into BE. Tighten hose clamp.

() The exposed length of BF is now set at 35" (88.9 cm). This is the 20 meter length dimension L20 and is set for center band operation. See CHART A (page 19) for other settings.

() Place 1" plastic cap (C2) over top end of tubing section BF.

TASK II

Stub Base Bracket Assembly

() Refer to Figure B for Stub Base Bracket Assembly. Study Figures B, C and D to learn how the stubs are attached for each band. Note how the various brackets are offset 45 and/or 90 degrees for proper antenna assembly.

() Find the three aluminum Stub Brackets (SB). Attach a Radiator Bracket (RB) to each Stub Bracket with (2) 6-32 x 3/8" screws (S1) and (2) 6-32 keps nuts (NI).

() Mount each Stub Base Bracket to the AV-620 Radiator using a Radiator Bracket (RB) , (2) 6-32 x 1 3/4" screws (S3), and (2) 6-32 keps nuts (NI). NOTE the degrees offset for each bracket in Figure B. Position the Stub Brackets ABOVE the Radiator Brackets.

TASK III

Stub Insulator Assembly

() Place the AV-620 Radiator on a flat surface such as a driveway or garage floor. This will aid in mounting the Stub Insulators by keeping them aligned with each other.

() Refer to Figure C for Stub Insulator Assembly. There are two types of stub insulators: 90 Degree and 180 Degree. The locations of the 90 Degree insulators are labeled "A» and the 180 degree insulators are labeled "B 1" and "B2".

() Find the three 180 Degree Stub Insulators (P2). Attach each one to a Radiator Bracket (RB) using (2) 6-32 x 3/8" screws (S1) and (2) 6-32 keps nuts (NI).

() Mount the 180 degree spacers on the AV-620 Radiator using a Radiator Bracket (RB), (2) 6-32 x 1 1/2" (S3) screws, and (2) 6-32 keps nuts (NI). USE the dimensions in Figure C to space and rotate the insulators into their proper locations. Position the Stub Insulators ABOVE the Radiator Brackets.

() Find the eight 90 Degree Stub Insulators (P 1). Attach each one to a Radiator Bracket (RB) using (2) 6-32 x 3/8" screws (S1) and (2) 6-32 keps nuts (NI).

() Mount the 90 degree spacers on the AV-620 Radiator in pairs using (2) 6-32 x 1 1/2" screws (S3) and (2) 6-32 keps nuts (NI). There are four pairs of 90 degree insulators. USE the dimensions in Figure C to space and rotate the insulators into their proper locations. Position the Stub Insulators ABOVE the Radiator Brackets.

TASK IV

Stub Assembly

() Refer to Figure D for the stub assemblies.

() TEN METER STUB: Notice on the 3/16" x 30 1/2" rod CD the ends are tapped at different lengths. Thread an end of tubing section CE onto the 1" tapped length end of rod CD. Thread it on at least 3/4" (2 cm) and carefully tighten with pliers until it is tight against rod CD. Do not compress the tubing where it is threaded onto the rod.

NOTE: A small amount of WD-40® or NoAlox® can be used on these threaded connections to ease assembly. Do not use oil. WD-40 **will** evaporate over time and NoAlox is a conductive paste.

NOTE: THIS CONNECTION WILL NOT LOOSEN OVER TIME AS THERE IS NO TORQUE ON THE CONNECTION WHEN THE STUB ASSEMBLY IS MOUNTED ON THE ANTENNA.

() TWELVE METER STUB: Notice on the 3/16" x 33" rod (CC), the ends are tapped at different lengths. Thread an end of tubing section (CF) onto the 1" tapped length end of rod (CC). Thread it on at least 3/4" (2 cm) and carefully tighten with pliers until it is tight against rod CC. Do not compress the tubing where it is threaded onto the rod.

() Thread a stub splice (SS) into the end of tubing section CF at least 3/4" (2 cm) until it is tight inside the tube.

() Thread an end of tubing section (CG) onto the stub splice (SS) until it reaches tubing section CF. Carefully tighten tubing section (CG) against CF with pliers. Do not compress the tubing where it is threaded onto the stub splice.

() FIFTEEN METER STUB: Notice on the 3/16" x 18" rod (CB), the ends are tapped at different lengths. Thread an end of tubing section (CE) onto the 1" tapped length end of rod (CB). Thread it on at least 3/4" (2 cm) and carefully tighten with pliers until it is tight against rod CB. Do not compress the tubing where it is threaded onto the rod.

() Thread a stub splice (SS) into the end of tubing section CE at least 3/4" (2 cm) until it is tight inside the tube.

() Thread an end of tubing section (CE) onto the stub splice (SS) until it reaches tubing section (CF). Carefully tighten tubing section CE against tubing section CF with pliers. Do not compress the tubing where it is threaded onto the stub splice.

() SEVENTEEN METER STUB: Notice on the 3/16" x 21" rod (CA), the ends are tapped at different lengths. Thread an end of tubing section CE onto the 1" tapped length end of rod (CA). Thread it on at least 3/4" (2 cm) and carefully tighten with pliers until it is tight against rod CA. Do not compress the tubing where it is threaded onto the rod.

() Thread a stub splice (SS) into the end of tubing section CE at **least** 3/4" (2 cm) until it is tight inside the tube.

() Thread an end of *another* tubing section (CE) onto the stub splice (SS) until it reaches tubing section CE. Carefully tighten tubing section CE against *the previous* tubing section CE with pliers. Do not compress the tubing where it is threaded onto the stub

() SIX METER STUBS: Installation of the six meter stubs is optional. If six meter operation is not desired do not attach the stubs to the radiator. Leaving the stubs off will not effect operation of the other bands. These stubs are the two 3/16" rods (CH). They are single section stubs and do not require assembly.

TASK V

Stub Mounting

() Refer to Figure E to install the stub assemblies on the AV-620 Radiator. The bottom of each stub assembly can be slid into the corresponding top stub insulator and fed through consecutive insulators until it reaches the corresponding stub bracket.

6 Meter Stubs

() If operation on 6 meters is desired, find the two six meter stubs (CH). Slide the threaded end of each stub through the top of the 6 meter stub insulator.

() Mount each stub in the 6 meter stub brackets using (2) 10-32 standard nuts (N2) and a #10 Lockwasher (WI) as shown in Figure E.

() Set Lengths L6A and L6B according to the desired operating frequencies in Chart A (page

10 and 12 Meter Stubs

() Select the 10 meter stub assembly and slide the threaded end through top of the proper 90 degree stub insulator. Continue feeding the stub through the next three insulators.
NOTE: The 10 meter stub will pass completely through the top stub insulator.

() Attach the stub in the 10 meter stub bracket position using (2) 10-32 standard nuts (N2) and a #10 Lockwasher (W 1) as shown in Figure E.

() Set 10 meter stub length L10 according to the desired operating frequency in Chart A (page 19).

() Select the 12 meter stub assembly and slide the threaded end through top of the proper 90 degree stub insulator. Continue feeding the stub through the next three insulators.
NOTE: The 12 meter stub will pass completely through the top stub insulator.

() Attach the stub in the 12 meter stub bracket position using (2) 10-32 standard nuts (N2) and a #10 Lockwasher (W 1) as shown in Figure E.

() Set 12 meter stub length L12 according to the desired operating frequency in Chart A.

15 and 17 Meter Stubs

() Select the 15 meter stub assembly and slide the threaded end through top of the proper 180 degree stub insulator. Continue feeding the stub through the next five insulators.
NOTE: The 15 meter stub will pass completely through the top stub insulator.

() Attach the stub in the 15 meter stub bracket position using (2) 10-32 standard nuts (N2) and a #10 Lockwasher (WI) as shown in Figure E.

- () Set 15 meter stub length L15 according to the desired operating frequency in Chart A.
- () Select the 17 meter stub assembly and slide the threaded end through top of the proper 90 degree stub insulator. Continue feeding the stub through the next five insulators.
- () Attach the stub in the 17 meter stub bracket position using (2) 10-32 standard nuts (N2) and a #10 Lockwasher (W I) as shown in Figure E.
- () Set 17 meter stub length L17 according to the desired operating frequency in Chart A.
- () Place a 1/4" plastic cap (C1) on the open end of tubing sections for each stub assembly (Figure E).

TASK VI

Linear Loading Assembly

- () Refer to Figure F for assembly of the LinearLoading section.
- () Remove the (2) 10-32 nuts (N3) from the TWO 10-32 screws (S7) shown in Figure F.
- () Mount a Linear Loading Bracket (LB) on each screw. Position the bracket as shown in Figure F and tighten nuts (N3).
- () Feed 1/4" x 20 and 1/4" x 24" tubing sections (CK & CL) through the two open holes in the top pair of 90 degree stub insulators and secure each tube to a Linear Loading Bracket (LB) with a 10-32 x 3/8" screw (S6) and #10 Lock Washer (WI).
- () Connect the Linear Loading End Bracket (LE) to the lower ends of tubing sections CK & CL with a 10-32 x 3/8" screw (S6) and #10 Lock Washer (WI). VERIFY the Linear Loading End Bracket (LE) is equally spaced between the Radiator and 17 meter stub as shown in Figure F. There are no length adjustments in the Linear Loading Section. Notice the CK & CL tubing sections are in line with the 10 and 12 Meter stubs and do not touch each other.

TASK VII

Matching Unit Mounting

- () Refer to Figure G to find the location of where the Matching Unit (MU) is mounted. Remove the (2) 1/4-20 nuts (N5) from the (2) 1/4-20 x 2" bolts (S8) that secure the Matching Unit to the antenna base. Use the lower pair of bolts to mount the MU as shown in Figure G.
- () Place the Matching Unit on the bolts and secure in place with the (2) nuts. Be sure the coax connector end of the Matching Unit faces the base (bottom) of the antenna.
- () Using a 6-32 keps nut (N1), connect one end of the jumper wire (J1) to the

counterpoise terminal of the Matching Unit. Do not over-tighten this nut. The other end of the jumper wire is attached later.

TASK VIII

Counterpoise Assembly

- () Refer to Figure G to assemble the counterpoise.
- () Loosely attach the counterpoise rings (RI) to the base insulator (INI) with (2) 6-32 x 1 3/4" screws (S4) and 6-32 keps nuts (NI).
- () Loosely attach the counterpoise rings (RI) together with (8) 10-32 x 3/8" screws (S6) and 10-32 nylock nuts (N3).
- () Place the (7) 48 inch (122 cm) counterpoise whips (CW) into the slots provided in the sides of the rings. The slot facing the Matching Unit (MU) does not receive a whip.
- () Tighten the 10-32 nuts (N3) around the rings to secure the whips.
- () Place the loose end of jumper wire (J1) under the closest 6-32 screw(S4) that holds a ring to the base insulator as shown in Figure G. Tighten the (2) 6-32 nuts (NI) that secure the rings to the base insulator.
- () Attach a warning label to the end of each whip as shown in Figure

TASK IX

Antenna Mounting Plate Assembly

- () Refer to Figure H for assembly of the Antenna Mounting Plate
- () Place (4) 1/4-20 x 2 1/2" bolts (S9) through a Mast Plate (MP), a Mast Saddle (MS), and the antenna mounting plate (AM) and secure with 1/4-20 nylock nuts (N5). Do not tighten the nuts.
- () Place the antenna base under the Mast Saddles and align the end of the base with the edge of the mounting plate as shown in Figure H.
- () Tighten the (4) bolts to hold the antenna base in place. Do not over-tighten the nuts.
- () Place the (2) U-bolt assemblies (UB) into the holes in the antenna mounting plate as shown in Figure H. Leave nuts loose until installation of the antenna.

Installation

The AV-620 antenna should be mounted at least 8 feet above ground. The main reason for this minimum height is safety. The AV-620 will work well at a minimum height of five feet but precautions from dangerous voltages must be taken.

Always have help for the installation process. Do not attempt to install the antenna alone. Review the requirements for Antenna Location and safety precautions regarding Power Lines earlier in this manual.

The easiest method of installing the AV-620 is to first mount the Antenna Mounting Plate (AM) on the support mast. Tighten the mounting plate U-Bolts. Have the Mast Saddles and Mast Plates (MS & MP) loosely mounted on the mounting plate. Raise the antenna and slide the antenna base under the Mast Saddles (MS) until the antenna base is flush with the lower edge of the mast plate (Figure H). Tighten the antenna base in place.

The AV-620 may be roof mounted on a tripod or similar support. Keep the AV-620 base a minimum of 5 feet above the roof surface. This minimum dimension is the same for any roof material type. Attach a suitable ground wire to the support mast as mentioned in the Grounding section of this manual.

Tuning

The AV-620 should be checked with an VSWR meter before permanent installation to verify proper assembly and Matching Unit performance. Place the AV-620 at least 8 feet above ground and in as clear an area as possible. Connect the coax to the antenna base and test the VSWR using either an MFJ-259B VSWR Analyzer or equivalent or a transceiver and VSWR meter.

The 2:1 VSWR Bandwidth should be referenced to determine performance. VSWR measurements made at the antenna base are the most accurate and may show a slightly narrower VSWR bandwidth than the specifications chart lists. Be sure to use very low power (less than 5 watts) when measuring VSWR at the antenna base.

The AV-620 has few variables in its design. Therefore, VSWR should be very close to specifications. If any adjustments are needed, refer to Chart A (page 19) to verify dimensions and use Chart B (page 19) to calculate the amount of adjustment needed to place the AV-620 on frequency.

Do not adjust, the length of the AV-620 Radiator except at the very top section BF. There are no adjustments in the Linear Loading Section. Only adjust BF (for 20 meters) and the individual stub bases. Each frequency band is individually adjustable. Adjustments to individual bands will have minimal effect on other bands.

The length of coax will vary the VSWR. Lengths less than 50 feet will have stronger harmonic resonances than longer lengths. If a particular frequency will not properly resonate, try adding 3-5 feet or more of coax. Record the VSWR resonances on each band before and after adding coax. One or more of the resonance points will change. RF loss at HF is not a major problem with RG8 or larger coax. There will be a minimal performance difference between a 50 ft. length and a 75 ft. length.

To lessen the possibility of RFI/TVI, roll up 6-8 turns of coax 8" inches diameter approximately one quarter wave (or multiple) from the base of the antenna. Use the quarter wave length of the frequency that causes the greatest amount of

Maintenance

The AV-620 should be inspected mechanically at least once a year. *Normal* wear and tear varies significantly with climate.

Anti-Oxidation paste such as NoAlox@ or others can be applied to the radiator tubing sections. Use small amounts. Do not place the paste on the coax connector or inside of the Matching Unit.

Inspect the inside of the Matching Unit on a regular basis. Remove dirt, bugs, or questionable material. Look for any degradation of parts. High voltage static discharges (lightning) may cause a failure to the small coil in the Matching Unit. This coil is a protection device. Make sure it is in good shape.

Do not screw and unscrew the nylon insert nuts several times. If portable operation is desired, use stainless steel hardware without the nylon locking feature.

The AV-620 may be painted. Clean all aluminum surfaces well to improve paint adherence. Paint the antenna *after* it is assembled and tuned. **DO NOT PAINT PLASTIC PARTS.**

Technical Assistance

Technical assistance is available during normal business hours on weekdays. Hy-Gain is located in the Central Time Zone. Our hours are 7:00 AM till 4:00 PM CST Monday through Friday.

Hy-Gain can be reached by telephone, FAX, email and regular mail at the following addresses:

Hy-Gain Antennas
 308 Industrial Park Road
 Starkville, MS 39759
 Telephone (800) 572-6572 or (662) 323-9538
 FAX (662) 323-5803
 E-Mail hy-gain@hy-gain.com
 Web Page "<http://www.hy-gain.com>"

Service history has shown that most problems are operating or installation errors, rather than equipment failures. Most problems can be resolved over the telephone. Please contact our staff before shipping parts or equipment to us.

The packing material used to ship this antenna is designed to prevent shipping damage. Please reuse the original shipping carton if possible. Hy-Gain will not be responsible for shipping damage on returned items with improper packing.

CHART A

Band Portion	L20	L17	L15	L12	L10
CW	41"	163"	137"	114 ½"	100 ½"
CENTER	35"	163"	136 ¼"	114 ¾"	99 ¾"
SSB	32"	163"	135 ½"	115"	99"

Band Portion	L6A	L6B
50-52 MHz	54 ¼"	53 ¾"
52-54 MHz	52 ¼"	51 ¾"

CHART B

Band	Length Adjustment
20 Meters	25 KHz per inch
17 Meters	60 KHz per ½ inch
15 Meters	100 KHz per ½ inch
12 Meters	150 KHz per ½ inch
10 Meters	125 KHz per ½ inch
6 Meters	300 KHz per ¼ inch

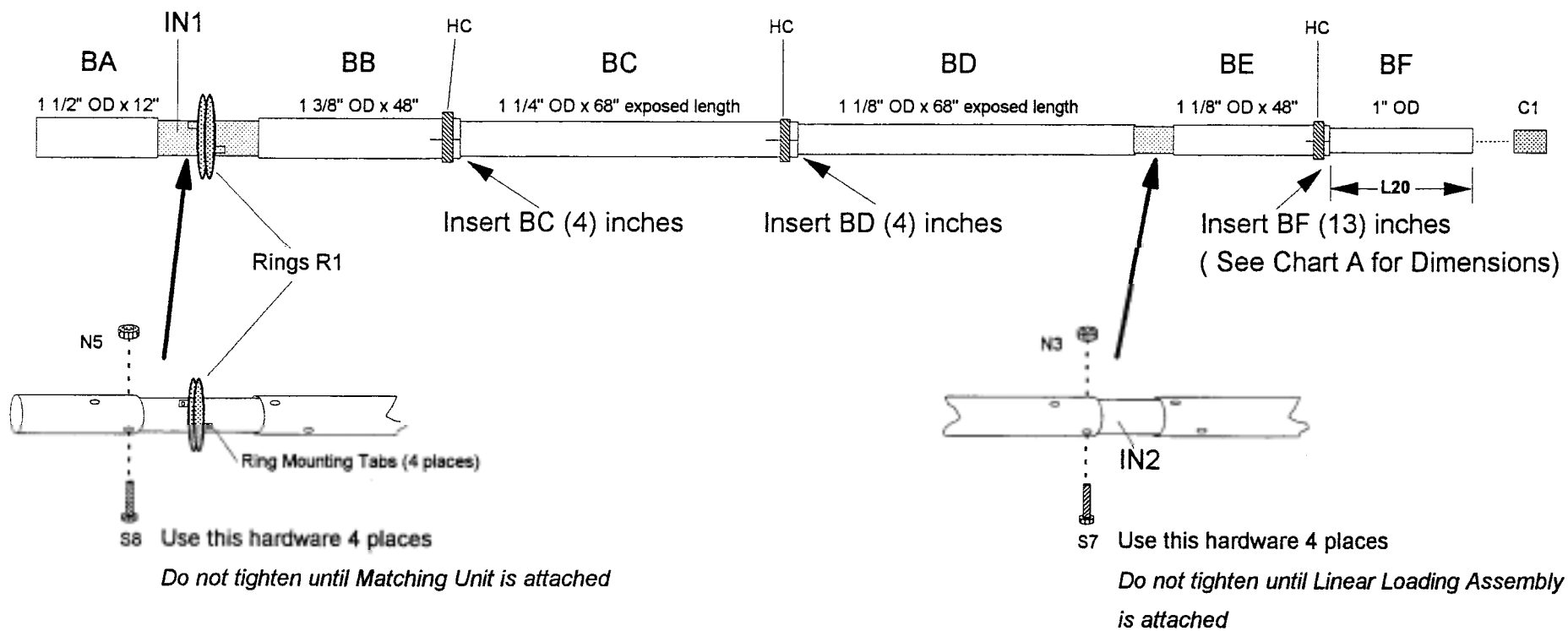


FIGURE A

AV-620 Center Radiator Assembly

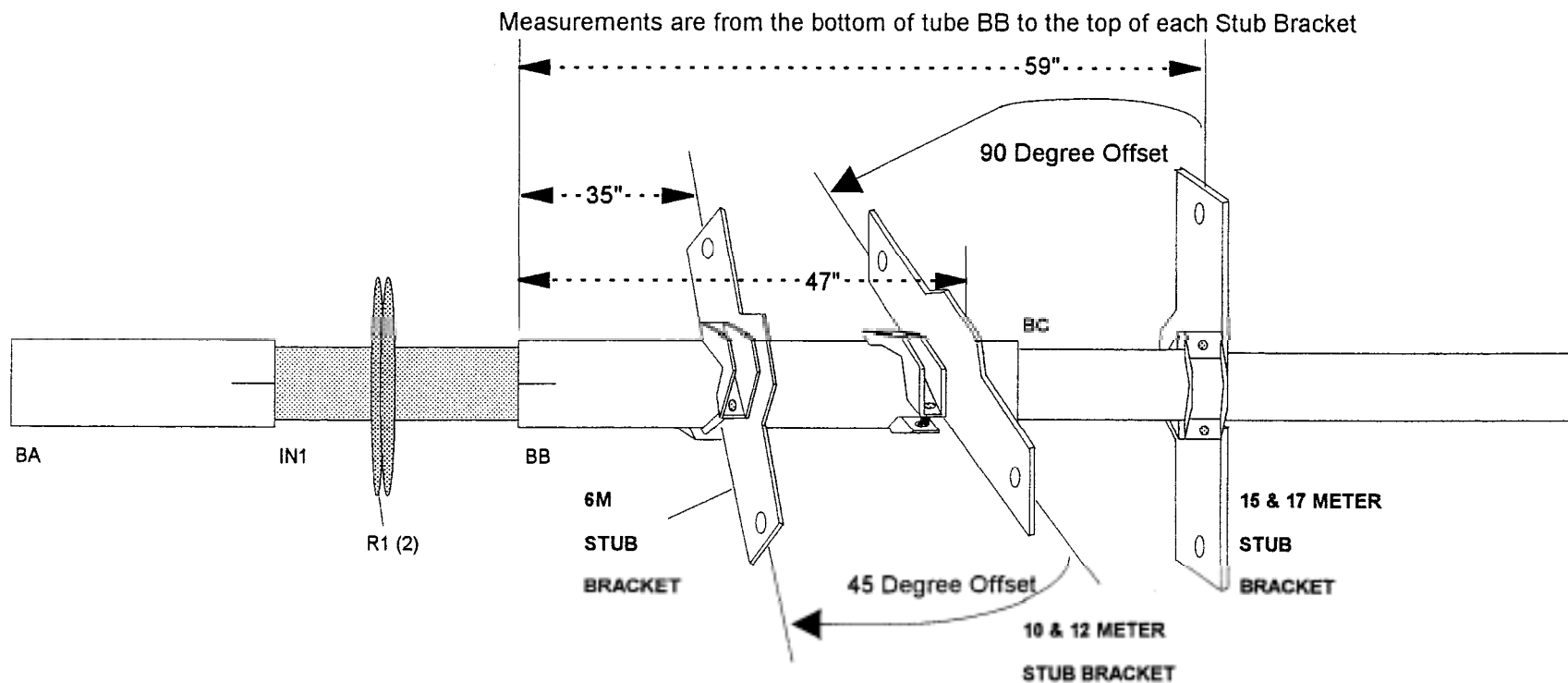
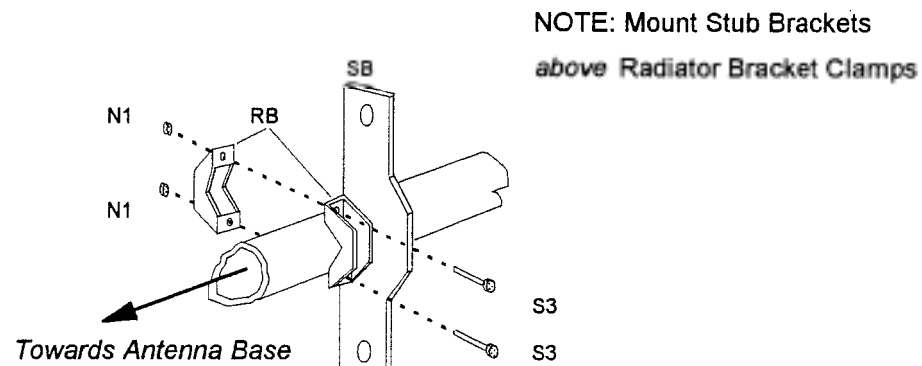
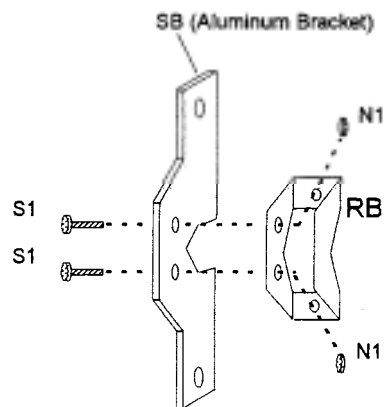
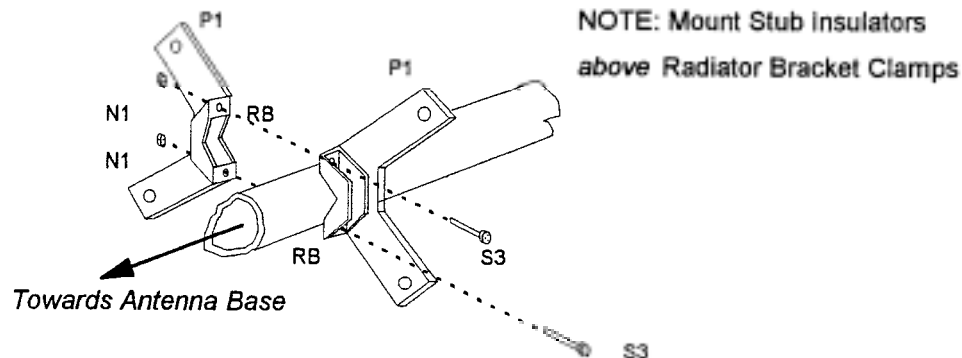
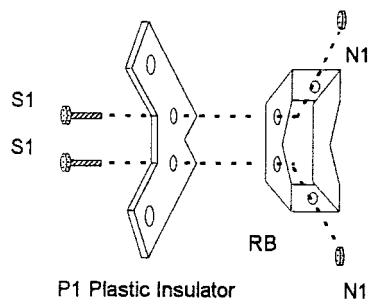
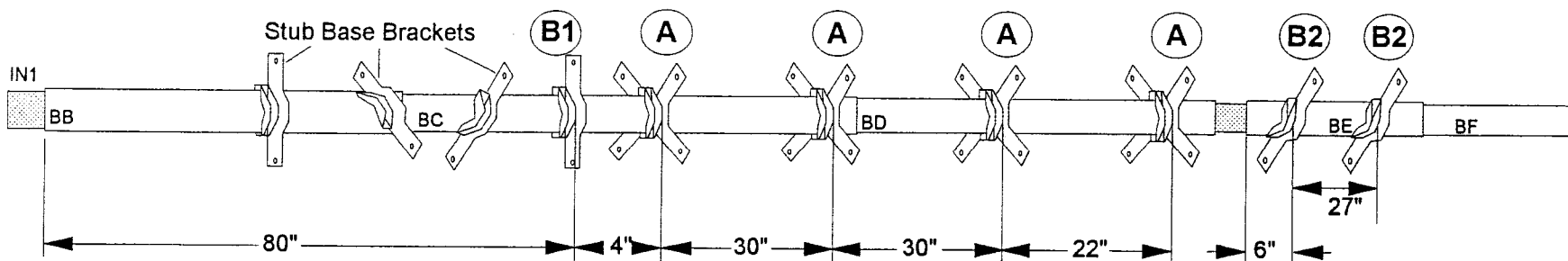


FIGURE B
AV-620 Stub Base Bracket Installation

A 90 Degree Stub Insulator Assembly

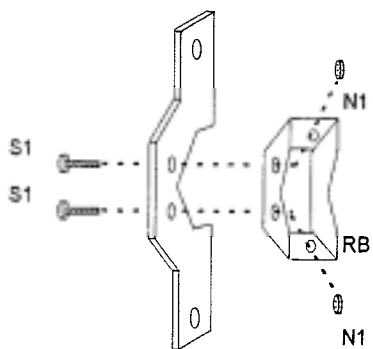


NOTE: Align Spacers as shown. Keep corresponding holes in line. Assembling antenna on a flat surface will help.



NOTE: All measurements measured to the TOP of each insulator

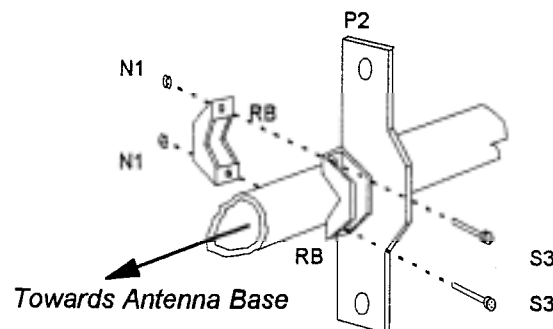
P2 Plastic Insulator



B 180 Degree Stub Insulator Assembly

B1 This stub insulator is for the six meter stubs. It is mounted in line with the 6 meter Stub Bracket in FIGURE B. It is 45 degrees offset from the other stub insulators.

B2 These stub insulators are for 15 & 17 meters. Align them with the 15 & 17 meter stub bracket.

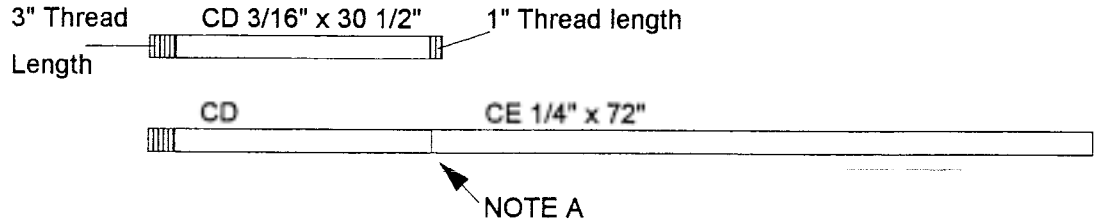


NOTE: Mount Stub Insulators above Radiator Bracket Clamps

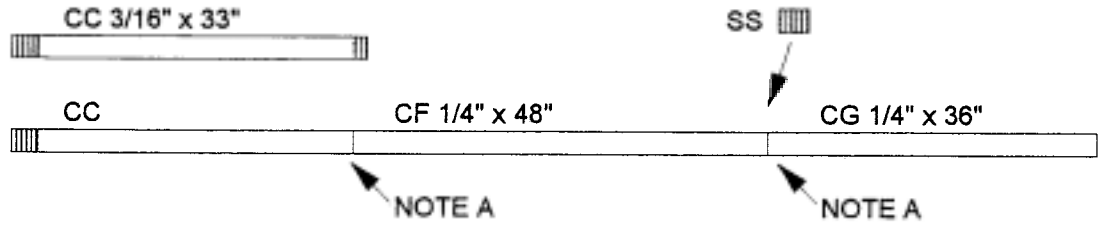
FIGURE C

AV-620 Stub Insulator Assembly

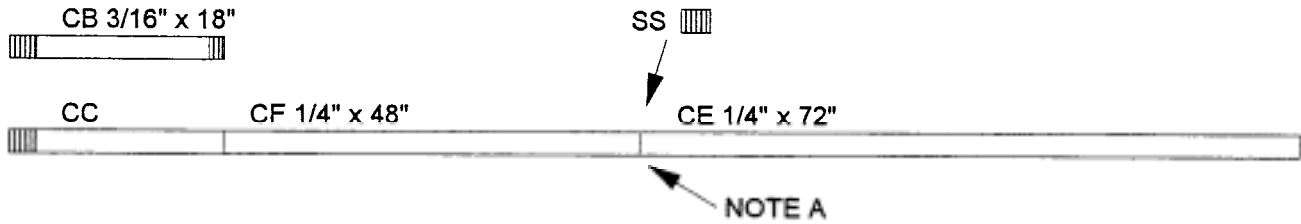
10 Meter Stub Assy



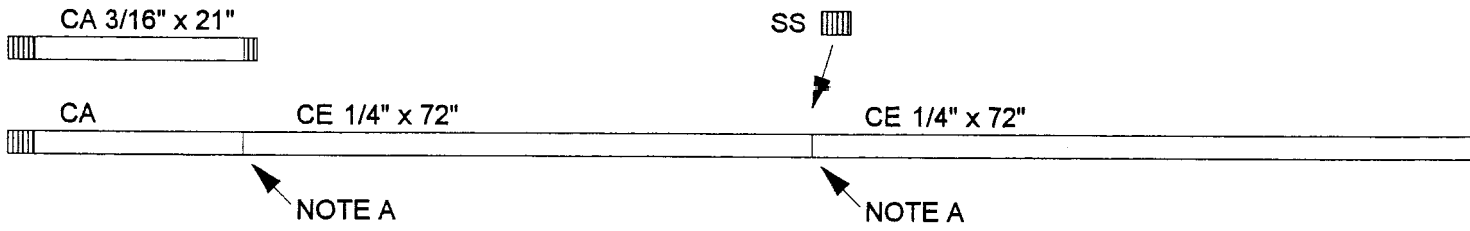
12 Meter Stub Assy



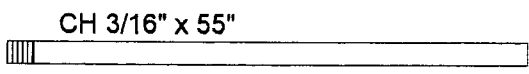
15 Meter Stub Assy



17 Meter Stub Assy



6 Meter Stubs



There are (2) of the CH rods

Figure B
Stub Assembly

NOTE A: When tightening connections, do not compress tubing where it is threaded onto the 3/16" rods or onto a Stub Splice. Carefully grip pliers 1" (2.5 cm) away from tube end.

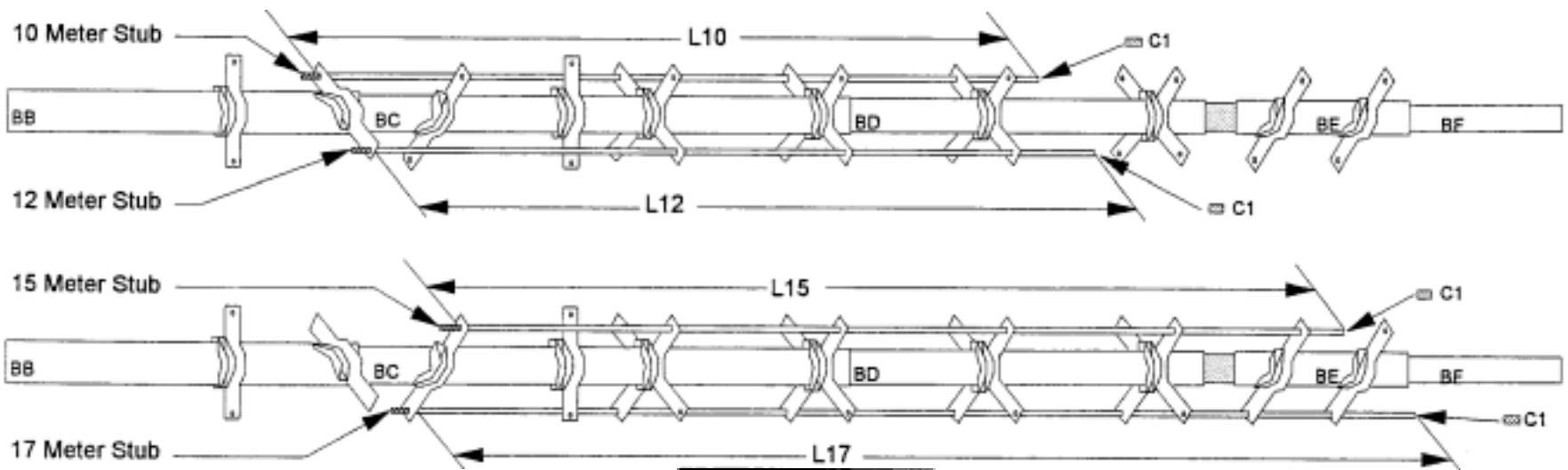
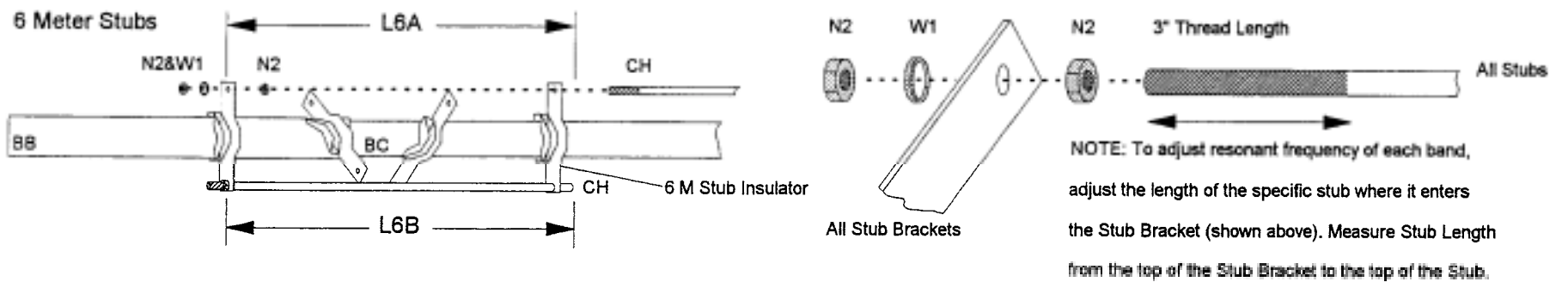
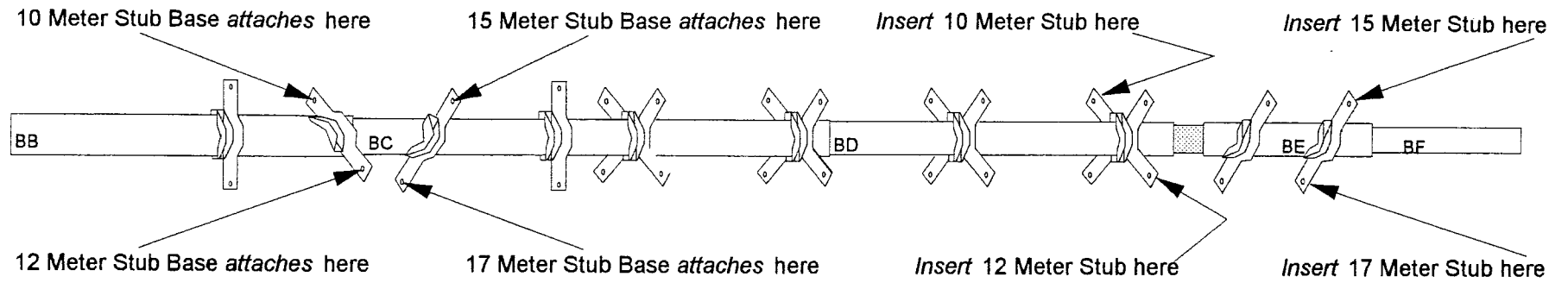


Figure E
Stub Installation

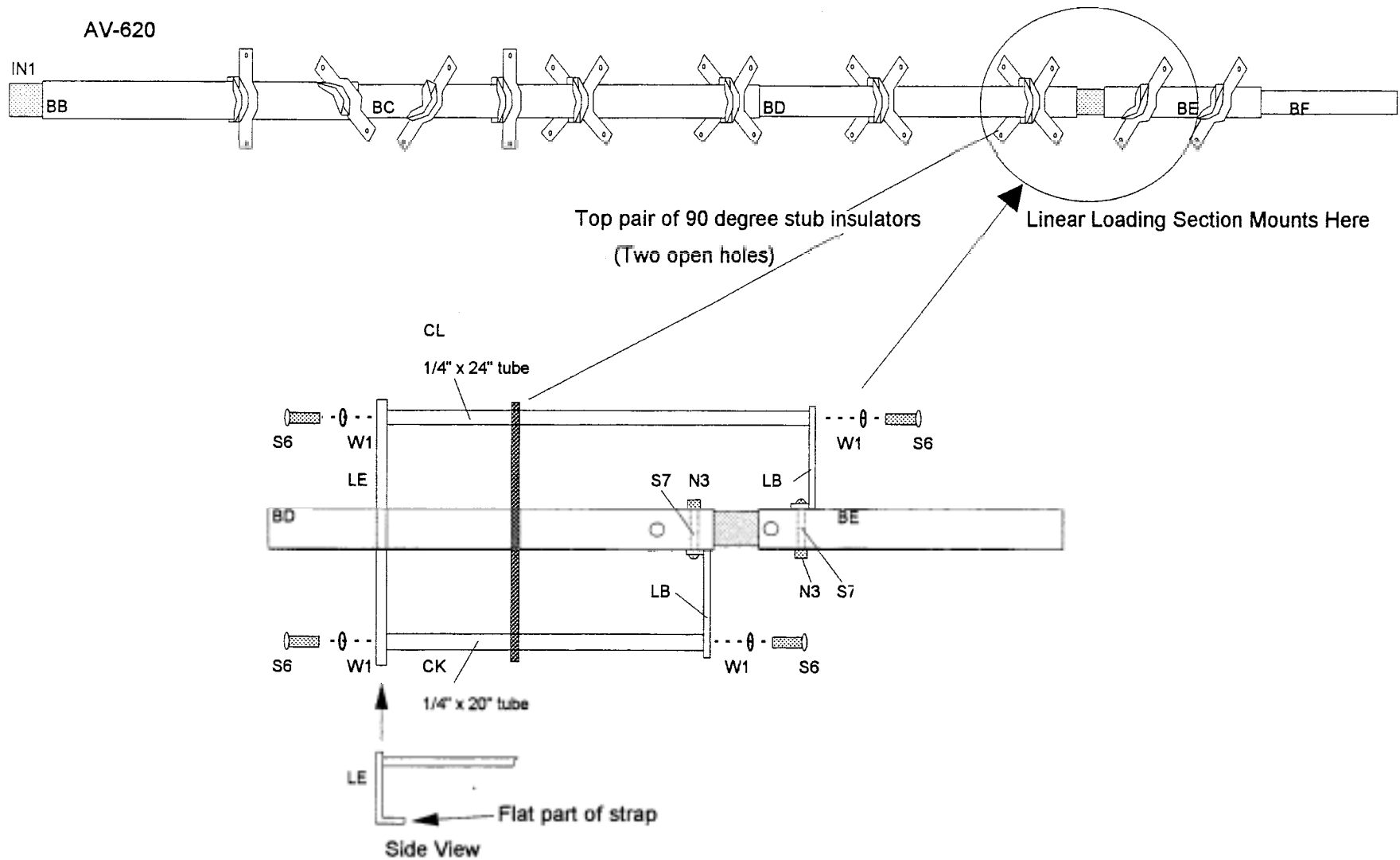


FIGURE F
Linear Loading Assembly

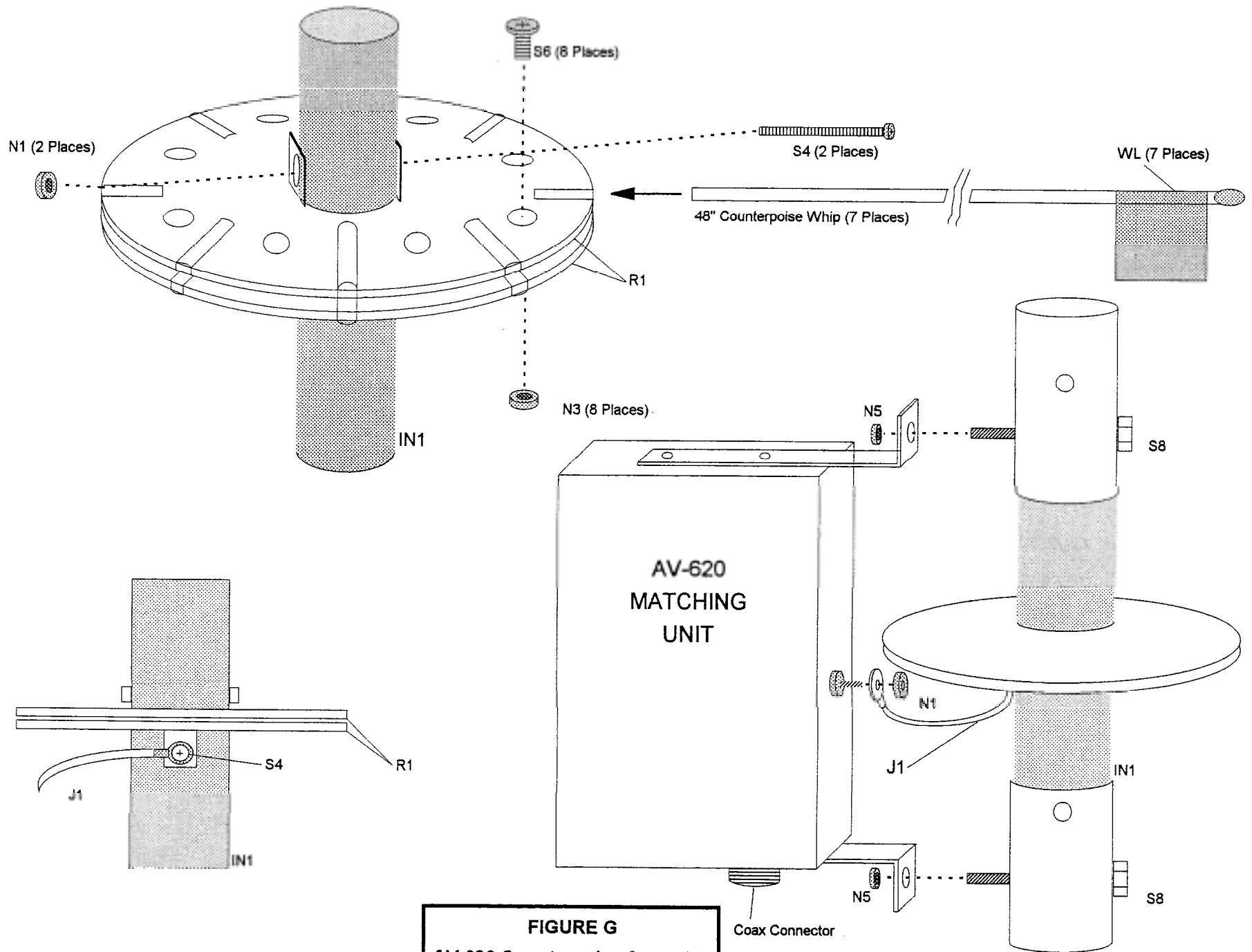


FIGURE G
AV-620 Counterpoise Assembly

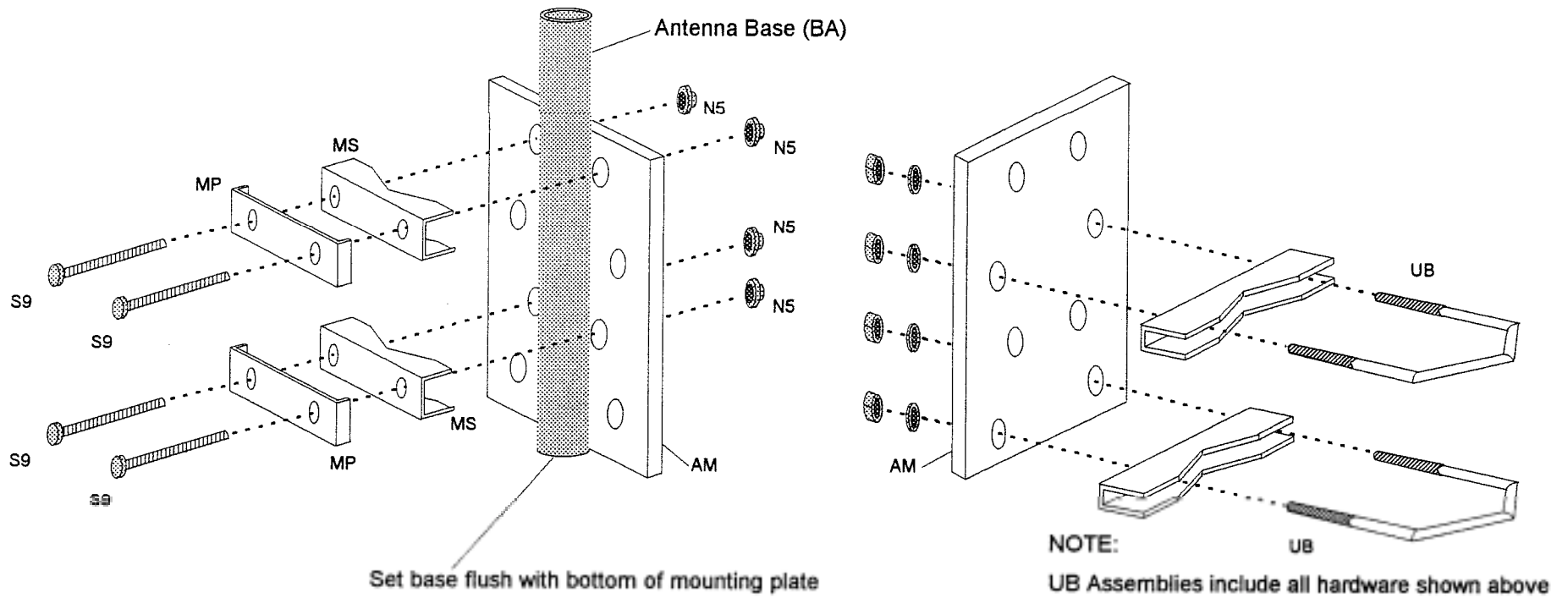


FIGURE H
Antenna Mounting Plate Assembly

hy gain® 24-MONTH LIMITED WARRANTY

hy gain Warrants to the original owner of this product, if manufactured by *hy gain* and purchased from an authorized dealer or directly from *hy-gain* to be free from defects in material and workmanship for a period of 24 months from date of purchase provided the following terms of this warranty are satisfied.

1. The purchaser must retain the dated proof-of-purchase (bill of sale, canceled check, credit card or money order receipt, etc.) describing the product to establish the validity of the warranty claim and submit the original or machine reproduction of such proof-of-purchase to *hy-gain* at the time of warranty service. *hy-gain* shall have the discretion to deny warranty without dated proof-of-purchase. Any evidence of alteration, erasure, or forgery shall be cause to void any and all warranty terms immediately.
2. *hy-gain* agrees to repair or replace at *hy-gain's* option without charge to the original owner any defective product under warranty, provided the product is returned postage prepaid to *hy-gain* with a personal check, cashiers check, or money order for \$8.00 covering postage and handling.
3. Under no circumstances is *hy-gain* liable for consequential damages to person or property by the use of any *hy-gain* products.
4. Out-of-warranty Service: *hy-gain* will repair any out-of-warranty product provided the unit is shipped prepaid. All repaired units will be shipped COD to the owner. Repair charges will be added to the COD fee unless other arrangements are made.
5. This warranty is given in lieu of any other warranty expressed or implied.
6. *hy-gain* reserves the right to make changes or improvements in design or manufacture without incurring any obligation to install such changes upon any of the products previously manufactured.
7. All *hy-gain* products to be serviced in-warranty or out-of-warranty should be addressed to ***hy-gain, 308 Industrial Park Road, Starkville, Mississippi 39759, USA*** and must be accompanied by a letter describing the problem in detail along with a copy of your dated proof-of-purchase.
8. This warranty gives you specific rights, and you may also have other rights which vary from state to state.