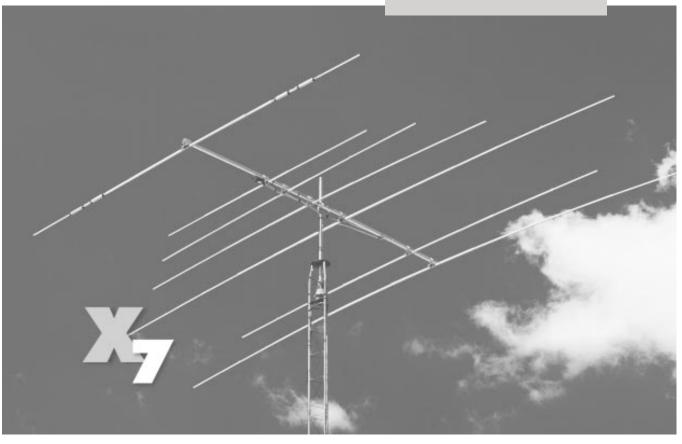


ASSEMBLY & INSTALLATION



20-15-10 Meter Seven Element Beam



Thank you for your purchase of the Cushcraft X7 Tribander. This antenna is designed and manufactured to give the best performance and trouble free service. The antenna will perform as specified if the instructions are followed during assembly and installation. Cushcraft operates a full service Technical Support staff to answer questions regarding assembly, tuning, parts and just about everything else. Please contact us by phone (603) 627-7877 (8 AM - 5PM Eastern Time), FAX (603) 627-1764, or email techsup@cushcraft.com for prompt service.

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 INSTALLATION RECOMMENDED BY THE U.S. CONSUMER PRODUCT SAFETY COMMISSION AND LISTED IN THE ENCLOSED PAMPHLETS.

Antenna System Planning

Before assembly, take time to review your installation plans for the antenna. Location of the antenna is very important. Surrounding objects such as trees, power lines, buildings, and other antennas will interact with an HF Yagi. To minimize the effects of surrounding objects, mount the antenna as high and in the clear as possible. Metallic guy wire within 30 feet of this antenna, broken with strain insulators, will improve performance.

40 Meter Add-On Kit

The X740 40 meter add-on kit is available for the X7. The kit consists of a loaded dipole element that is mounted on the boom section BA between Elements #2 and #3. The 40 meter element requires a separate coax feed. Contact Cushcraft or your dealer for more information.

YOU MUST INSURE THAT NEITHER PEOPLE OR PETS CAN COME IN CONTACT WITH YOUR ANTENNA WHILE IT IS IN OPERATION. DEADLY VOLTAGES AND CURRENTS MAY EXIST. ALSO, SINCE THE EFFECTS OF EXPOSURE TO RF 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 8.

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.

System Grounding

Direct grounding of the antenna, mast and tower is very important. This serves as protection from lightning strikes and static buildup. A good electrical connection should be made to one or more ground rods directly at the base of the tower or mast using at least #10 AWG ground wire and non-corrosive hardware. For details and safety standards, consult the National Electrical Code. A coaxial lightning arrester should be used. Cushcraft offers several different models such as the LAC series.

Assembly

The assembly procedure for the X7 consists of assembling the following subassemblies.

1) Verification of Parts. 2) Boom Assembly. 3) Element Assembly. 4) Element to Boom Assembly.

5) Feed System Assembly. 6) Boom to Mast Clamp Assembly.

Assembly of the X7 will be easiest if the preceding steps are performed in the given order. For easier tower mounting, some or all of the elements may be mounted to the boom when the antenna is on the tower. If this option is chosen, the feed system can be attached after the elements are mounted.

Please read through the entire assembly procedure before beginning.

1-Verification of Parts

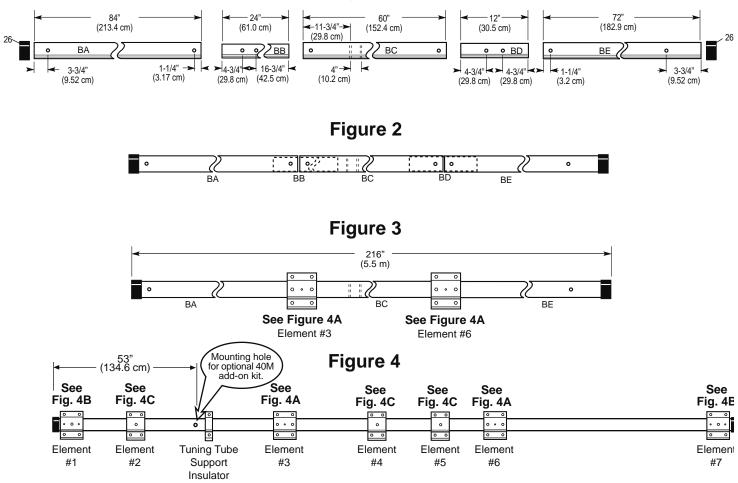
Verify all parts are present by using the X7 Master Parts List. Check off each part when it is counted. There are extra parts intentionally shipped with this antenna. Place common hardware in temporary containers for ease of assembly. Note all hardware is Stainless Steel.

Part No.	Description Metric	Equivalent	Quantity	
014597	#8-32 x 3" Stainless Steel Machine Screw #	#8 x 7.6 cm	2	
(79FS	1/2" Tinned Copper Braid 6" Long with Lugs 1.2 of	cm x 15 cm	2	
010011	#8-32 Stainless Steel Nut		8	
010082	1/4-20 x 1" Grade V Hex Bolt 0.6 cm - 2	20 x 2.5 cm	48	
010085	1/4-20 Stainless Steel Nut	0.6 cm	15	
010120	#8-32 x 2" Stainless Steel Machine Screw	#8 x 5.1 cm	4	
010123	#8-32 x 1 1/2" Stainless Steel Machine Screw	#8 x 3.8 cm	4	
010184	1/4" Stainless Steel Flat Washer	0.6 cm	87	
010207	3/8" Stainless Steel Flat Washer	0.9 cm	4	
010208	3/8" Stainless Steel Lock Washer	0.9 cm	4	

Verification of Parts continued

010209 38" Stanies Steel Lock Water .0.9 cm 4 011941 92 Stanies Steel Lock Water .0.9 cm 10 01309 2-7/8" Center-to-center U-B04 4" Long .0.8 cm 12 014399 14" Stanies Steel Lock Nut. .0.6 cm 65 014459 14" Stanies Steel Lock Nut. .0.6 cm 65 014464 11" Cutah-Clamp® .2.2 cm 4 014465 11" Cutah-Clamp® .0.6 A 10.2 cm 1 014466 11" Cutah-Clamp® .0.6 A 10.2 cm 1 014667 11" Cutah-Clamp .0.6 A 10.2 cm 1 014667 11" Worn Clamp .0.6 A 10.2 cm 1 030409 11" Worn Clamp .2.5 cm 6 030411 1-1.8" Worn Clamp .2.5 cm 6 030411 1-1.8" Worn Clamp .2.5 cm 1 030411 1-1.8" Worn Clamp .2.5 cm 1 030411 1-1.8" Worn Clamp .2.5 cm 1 040667 78" 8 brief A 10 brief breginss Insulator .2.4 2.4 2.3 cm	Part No.	Description Metric Equivalent	Quantity	
011911 #P Stanless Steel Lock Washer 0 013209 2.78" Canter-conter U-Bolt 4" Long 7.3 cm -10.2 cm Long 2 014387 #P Stanless Steel Lock Nut. 0.6 cm 85 014387 #V Stanless Steel Lock Nut. 0.6 cm 85 014486 T/* Cush-a-Clamp® 2.2 cm 4 014487 1.4" A Stanless Steel Hax Not. 0.6 x 10.2 cm 6 014487 1.4" A Stanless Steel Hax Not. 0.6 x 10.2 cm 11 014582 1.4" Stanless Steel Hax Not. 0.6 x 10.2 cm 16 030407 50" Worm Clamp				
014397 #6-32 Stainless Steel Lock Nut. 0.6 cm 85 0144395 7/8' Cush-a-Clamp® 2.2 cm 4 0144395 7/8' Cush-a-Clamp® 2.5 cm 4 0144395 11' Cush-a-Clamp® 2.5 cm 4 0144395 11' Cush-a-Clamp® 2.5 cm 4 014439 11' A' s' Stainless Steel Fat Washer 1/8' Thick 0.6 cM stain 6 030407 5/8' Worn Clamp 1 1 6 030411 1-16' Worn Clamp 2.5 cm 6 6 030412 1-16' Worn Clamp 3.8 cm 2 6 030411 1-16' Worn Clamp 3.8 cm 2 2 2 2 2.2 cm 1.8 cm 2 <	011941	#8 Stainless Steel Lock Washer		
014397 #6-32 Stainless Steel Lock Nut. 0.6 cm 85 0144395 7/8' Cush-a-Clamp® 2.2 cm 4 0144395 7/8' Cush-a-Clamp® 2.5 cm 4 0144395 11' Cush-a-Clamp® 2.5 cm 4 0144395 11' Cush-a-Clamp® 2.5 cm 4 014439 11' A' s' Stainless Steel Fat Washer 1/8' Thick 0.6 cM stain 6 030407 5/8' Worn Clamp 1 1 6 030411 1-16' Worn Clamp 2.5 cm 6 6 030412 1-16' Worn Clamp 3.8 cm 2 6 030411 1-16' Worn Clamp 3.8 cm 2 2 2 2 2.2 cm 1.8 cm 2 <	013209	2-7/8" Center-to-center U-Bolt 4" Long 7.3 cm -10.2 cm Long	2	
014399 1/4" Starless Steel Lock Nut. 0.6 cm 85 014486 1" Cush-a-Clamp® 2.2 cm 4 014486 1" Adv Lock-a-Clamp® 3.2 cm 6 014487 1/4" Starless Steel Flax Mach 0.6 x 10.2 cm 6 014488 1/4" starless Steel Flax Mach 0.6 x 10.2 cm 6 014489 1/4" Starless Steel Flax Mach 0.6 x 10.2 cm 6 030409 1/4" Starless Steel Flax Mach 0.6 x 10.2 cm 6 030401 1/16" Worm Clamp 1.6 cm 1 2 030411 1/16" Worm Clamp 2.2 cm 6 6 030412 1/16" Worm Clamp 3.8 cm 6 6 030412 1/2" Black Plastic Cap 0.3 cm 2 1 04455 1/2" Black Plastic Cap 0.4 cm 2 1 1 04456 5/8" x Drilled Floerglass Insulator 7.6 x 3.3 x 6.3 cm 1 1 1 124566 6/8" x 2 172" Thack Plastic Cap 2.3 x 20.3 cm 1 1 1 1 1 1 1 1 1 1 1 <td< td=""><td>014387</td><td>•</td><td>12</td><td></td></td<>	014387	•	12	
014495 7/8° Cush-a-Clamp® 2.2 cm 4 014496 1° Cush-a-Clamp® 3.2 cm 6 014487 1° A' x 4° Stanless Steel Fat Washer 1/8° Thick 0.6 x 10.2 cm 11 014488 1/4° x 4° Stanless Steel Fat Washer 1/8° Thick 0.6 x 10.2 cm 11 014489 1/4° x 4° Stanless Steel Fat Washer 1/8° Thick 0.6 x 10.2 cm 11 034047 58° Worn Clamp .1.5 cm 12 034049 11/16° Worn Clamp .2.5 cm 16 034041 1-1/8° Worn Clamp .2.5 cm 6 034041 1-1/8° Worn Clamp .3.8 cm 6 034042 1-1/8° Worn Clamp .3.8 cm 6 034042 1-1/8° Worn Clamp .3.8 cm 6 034042 1-1/8° Worn Clamp .3.8 cm 2 045053 1/2° Black Plastic Cap .0.9 cm 12 045646 58° x 8° Drilled Florglass insulator .2.2 x 0.3 cm 1 124566 78° x 4° Thim Drilled Florglass insulator .7.6 x 6.3 x 2.0 sm 1 124566 78° x 414° Aluminum Web Blocks .0.4 cm 2 1 <tr< td=""><td></td><td>1/4" Stainless Steel Lock Nut</td><td></td><td></td></tr<>		1/4" Stainless Steel Lock Nut		
014497 1-14" cush-aciang@ 3.2 cm 6 014582 14" x 4" similess Sizel Fat Washer 1/8" Thick. 0.6 x 10.2 cm 11 014582 14" x 4" similess Sizel Fat Washer 1/8" Thick. 0.6 x 10.2 cm 11 030407 58" Worn Clamp. 1.6 cm 12 030409 11/16" Worn Clamp. 2.5 cm 16 030411 1-1/8" Worn Clamp. 2.8 cm 6 030412 1-1/8" Worn Clamp. 3.8 cm 6 030412 1-1/8" Worn Clamp. 3.8 cm 6 030412 1-1/8" Worn Clamp. 0.9 cm 12 045526 2-1/2" Black Plastic Cap. 0.9 cm 2 124565 7/8" x 8" Drilled Floerglass insulator 2.2 x 0.3 cm 1 124565 1"x 8" Drilled Floerglass insulator 7.6 x 5.3 x 20.3 cm 1 124565 1"x 8" Drilled Floerglass insulator 7.6 x 5.3 x 20.3 cm 1 124567 1"x 8" Drilled Floerglass insulator 7.6 x 5.3 x 20.5 cm 1 124566 1"x 8" Drilled Floerglass insulator 7.6 x 1.3 x 0.3 cm 2 124566 1"x 8" 1/4" Auminum Mounting Plate 2.0 x 2.0	014495	7/8" Cush-a-Clamp®	4	
014588 1/4" x 4" Stainless Stele Hax Bolt	014496	1" Cush-a-Clamp®	4	
014922 1/4" Stainless Steel Flat Washer 1/8" Thick. 0.6 & 0.3 cm 6 034049 11/16" Worm Clamp 1.7 cm 14 034049 11/16" Worm Clamp 2.5 cm 16 03411 1.1/2" Worm Clamp 2.9 cm 6 03411 1.1/2" Worm Clamp 3.8 cm 6 030412 1.1/2" Worm Clamp 3.8 cm 6 030412 1.1/2" Worm Clamp 3.8 cm 6 050073 3/8" Black Plastic Cap 0.9 cm 12 054526 2.1/2" Black Plastic Cap 6.4 cm 2 124665 7/8" x 8" Drilled Fiberglass Insulator 2.6 x 20 cm 1 124665 1" x 8" Drilled Fiberglass Insulator 2.6 x 20 ar 1 124667 1" x 8" Drilled Fiberglass Insulator 2.6 x 20 ar 1 124667 1" x 8" Drilled Fiberglass Insulator 7.5 x 6.3 x 2.5 cm 1 124667 3" x 1/4" Aluminum Mounting Plate 2.0 ar 20 ar 20 ar 20 ar 20 ar 20 ar 21 ar 20 ar 21 ar 20 ar 20 ar 20 ar 21 ar 20 ar 21 ar 20 ar 20 ar 21 ar 20 ar 20 ar 21 ar 20 ar 20 ar 20 ar 21 ar 20 ar 21 ar 20 ar 20 ar 21 ar 20 ar 20 ar 21 ar 20 ar 20 ar	014497	1-1/4" Cush-a-Clamp®	6	
03407 68" Worn Clamp 1.6 cm 12 03409 1'Worn Clamp 2.5 cm 16 03411 1'16" Worn Clamp 2.9 cm 6 03412 1-1/3" Worn Clamp 2.9 cm 6 03411 1-1/3" Worn Clamp 3.8 cm 6 050053 12" Black Plastic Cap 0.9 cm 12 054626 2-1/2" Black Plastic Cap 0.4 cm 2 054626 2-1/2" Black Plastic Cap 0.4 cm 2 124565 56" x 6" Drilled Fiberglass Insulator .6 x 2.0 3 cm 1 124567 1'x 8" Drilled Fiberglass Insulator .7 x 4 x 2.0 3 cm 1 124567 1'x 8" Drilled Fiberglass Insulator .7 x 4 x 2.0 3 cm 1 124567 1'x 1'A Turing Tube Insulator .7 x 4 x 3.2 x 5 cm 1 124564 3'x x 1/4" Aluminum Mounting Plate .2 3 x 2.0 3 x 0.6 cm 1 124454 3'x x 1/4" Aluminum Mounting Plate .7 3 x 2.5 x 6 cm 1 24404 NOALOX® conductive lubricant .0 3 x 1.3 x 0.5 cm 2 3 24404 NOALOX® conductive lubricant .0 3 x 1.3 x 0.5 cm 2 </td <td>014588</td> <td>1/4" x 4" Stainless Steel Hex Bolt</td> <td>11</td> <td></td>	014588	1/4" x 4" Stainless Steel Hex Bolt	11	
030409 11/16* Worn Clamp 17 cm 14 030411 11/8* Worn Clamp 2.9 cm 6 030412 11/12* Worn Clamp 3.8 cm 6 050073 3/2* Black Plastic Cap 0.9 cm 12 045426 2-1/2* Black Plastic Cap 6.4 cm 2 124665 7/8* x 8* Drilled Fiberglass insulator 2.5 x 20 a cm 1 124667 7/8* x 10* Alled Fiberglass insulator 2.6 x 20 a cm 1 124667 7/8* x 1/4* Aluminum Mouning Plate 2.0 3 x 20 a cm 1 124564 3* x 2/12* x 1* Turing Tube Insulator 6.4 cm 2 120322 2* x 1/4* Aluminum Mouning Plate 2.0 3 x 20 a x 20 a x 20 a cm 1 124564 3* x 5 1/4* x 3/16* Drilled Extuded Aluminum Teaket 7.8 x 13.8 x 3 cm 3 230322 2* x 1/4* Aluminum Teaket 7.8 x 13.8 x 3 cm 3 3 24564 3* x 5 1/4* x 3/16* Drilled Extuded Aluminum Teaket	014592	1/4" Stainless Steel Flat Washer 1/8" Thick	6	
030410 1*/Worm Clamp 2.5 cm 6 030411 1-1/8*/Worm Clamp	030407	5/8" Worm Clamp	12	
030411 1-1/2' Worn Clamp .2.9 cm 6 030412 1-1/2' Worn Clamp .3.8 cm 6 050053 10'' Black Plastic Cap .0.9 cm 2 050077 36' Black Plastic Cap .0.9 cm 2 054526 2-1/2' Black Plastic Cap .0.6.4 cm 2 124666 76'' x 8' Drilled Fiberglass Insulator .2.2 x 2.0 cm 1 124567 7'' x 8' Drilled Fiberglass Insulator .2.2 x 2.0 cm 1 124567 7'' x 8' Drilled Fiberglass Insulator .2.6 c cm 1 124567 7'' x 1'' Tuning Tube Blocks .6.4 cm 2 124567 2'' x 1'' x 1/4' Tuning Tube Shorting Strap .7.3 x 2.5 x.6 cm 1 124562 2'' x 1'' x 1/4' Tuning Tube Shorting Strap .7.3 x 2.5 x.6 cm 1 124564 3'' x 5-1/4'' x 1/5' Feed Strap Plastic Insulator .5.1 x 3.8 x.3 cm 3 2'' x 1-1/2'' x 1/3' F feed Strap Plastic Insulator .5.1 x 3.8 x.3 cm 3 2'' x 1-1/2'' x 1/3' F feed Strap Plastic Insulator .5.1 x 3.8 x.3 cm 3 2'' x 1-1/2'' x 1/3' F feed Strap Plastic Insulator .5.1 x 3.8 x.3 cm 3 2'' x 1-1/2'' x 1/3'	030409	11/16" Worm Clamp	14	
030412 1.1/2" Worm Clamp	030410	1" Worm Clamp	16	
050053 1/2* Black Plastic Cap	030411	1-1/8" Worm Clamp	6	
050077 3/8* Black Plastic Cap .0.9 cm 12 045426 5/8* x 8* Drilled Fiberglass Insulator .16 x 20.3 cm 2 124565 5/8* x 8* Drilled Fiberglass Insulator .2.2 x 20.3 cm 1 124567 1* x 8* Drilled Fiberglass Insulator .2.5 x 20.3 cm 1 170335 2.1/2* Formed Aluminum Wee Blocks .6.4 cm 2 194554 5* x 2.1/2* x 1* Turing Tube Blocks .6.4 cm 2 194555 2.7/8* x 1* 1/4* Tuning Tube Blocks .6.4 cm 2 194552 2.7/8* x 1* 1/4* Tuning Tube Blocks .6.4 cm 1 20332 Danger Label .1 1 20332 Danger Label .1 1 324560 3* x 5-1/4* x 3/16* Drilled Extruded Aluminum Bracket .2.0 x 13.3 x 0.5 cm 2 324564 1* x 5-1/4* x 3/16* Drilled Extruded Aluminum Bracket .2.5 x 13.3 x 0.3 cm 2 324564 1* x 5-1/4* x 3/16* Drilled Extruded Aluminum Bracket .2.5 x 13.3 x 0.5 cm 8 324564 1* x 5-1/4* x 3/16* Drilled Extruded Aluminum Bracket .2.5 x 13.3 x 0.5 cm 8 <	030412	1-1/2" Worm Clamp	6	
054526 2-1/2* Black Plastic Cap	050053	1/2" Black Plastic Cap	2	
124565 5/8* x 8' Drilled Fiberglass Insulator 16 x 20.3 cm 2 124566 7/8* x 8' Drilled Fiberglass Insulator 2.5 x 20.3 cm 1 154554 3' x 2-1/2' x 1'' Tuning Tube Insulator 7.6 x 6.3 x 2.5 cm 1 170035 2.1/2' Formed Aluminum Vee Blocks 6.4 cm 2 194552 2.7/8' x 1'' Aluminum Vee Blocks 6.4 cm 1 20032 2.7/8' x 1'' Aluminum Vee Blocks 6.4 cm 1 20032 2.7/8' x 1'' Aluminum Vee Blocks 1 1 20032 2.7/8' x 1'' Aluminum Vee Blocks 1 1 20032 Danger Label 1 1 1 20032 2'' x 1/12'' x 1/8' Foed Strap Plastic Insulator 7.6 x 13.3 x 0.3 cm 3 204506 8'' x 5-1/4'' x 3/16' Drilled Extruded Aluminum Bracket 2.0 x 13.3 x 0.5 cm 8 204504 4'' x 5-1/4'' x 3/16' Drilled Extruded Aluminum Bracket 2.5 x 13.3 x 0.5 cm 8 204504 4'' x 5-1/4'' x 3/16' Drilled Extruded Aluminum Bracket 2.5 x 13.3 x 0.5 cm 8 204504 4'' x 5-1/4'' x 1/8' Drilled Extruded Aluminum Bracket 2.5 x 13.3 x 0.5 cm 8 204505 Brush </td <td>050077</td> <td>3/8" Black Plastic Cap</td> <td>12</td> <td></td>	050077	3/8" Black Plastic Cap	12	
124566 7/8' x 8' Drilled Florgiass Insulator 2.2 x 20.3 cm 1 124567 3' x 2-1/2'' x 1'' Tuning Tube Insulator 7.6 x 6.3 x 2.5 cm 1 17035 2.1/2'' k 1'' Tuning Tube Insulator 7.6 x 6.3 x 2.5 cm 1 17035 2.1/2'' k 1'' Auminum Wee Blocks 6.4 cm 2 194542 2'' x 8'' x 1'' A' Uminum Tube Shotting Strap 7.3 x 2.5 x.6 cm 1 124604 NOAL CX8 conductive Unitoriant 1 20.3 x 20.3 x 0.6 cm 1 244604 NOAL CX8 conductive Unitoriant 1 20.3 x 20.3 x 0.6 cm 1 230326 Danger Label 1 20.3 x 0.3 x 0.5 cm 2 2 3.4 x 3/4 x 1/8' Drilled Extruded Aluminum Bracket 7.6 x 13.3 x 0.5 cm 2 2 3.4 x 3/4 x 3/16' Drilled Extruded Aluminum Bracket 10.2 x 13.3 x 0.5 cm 2 2 3.2 x 1/2'' x 4/1 x 3/16' Drilled Extruded Aluminum Bracket 10.2 x 13.3 x 0.5 cm 2 2 2 1 3.2 x 1/2'' x 4/1 x 3/16' Drilled Extruded Aluminum Bracket 10.2 x 13.3 x 0.5 cm 2 2 1 3.2 x 1/2'' x 4/1 x 1/8'' Drilled Extruded Aluminum Bracket 10.2 x 13.3 x 0.5 cm 2 2 1 1 1 1 1 1 <	054526	2-1/2" Black Plastic Cap6.4 cm	2	
124667 1' x 8' Drilled Fiberglass Insulator 2.5 x 2.0 a cm 1 145454 3' x 2-1/2' x 1'' Tuning Tube Insulator 7.6 x 6.3 x 2.5 cm 1 170035 2-1/2' Formed Aluminum Wee Blocks 2.0 3 x 20.3 x 0.6 cm 1 194555 2'' X 1'' Tuning Tube Shorting Strap 7.3 x 2.5 x .6 cm 1 20032 2'' X 1'' X 1''' Tuning Tube Shorting Strap 7.3 x 2.5 x .6 cm 1 20032 2'' X 1'' X 1''' Tuning Tube Shorting Strap 7.3 x 2.5 x .6 cm 1 200326 Danger Label 1 1 2 203320 2'' x 1'' X 1''' Tuning Tube Shorting Bracket 2.0 3 x 13.3 x 0.5 cm 2 324506 3'' x 5-1'4'' x 10'' Drilled Extruded Aluminum Bracket 1.0 2.1 3.3 x 0.3 cm 2 324507 4'' x 5-1'4'' x 10'' Drilled Extruded Aluminum Bracket 1.0 2.2 x 13.3 x 0.3 cm 2 324564 1'' x 5-1'4'' x 10'' Drilled Extruded Aluminum Bracket 1.0 2.2 x 13.3 x 0.3 cm 2 330885 Brush 1 2.0 3'' 15 Meter Director Trap 52.7 cm 2 T9 1'' 10 Meter Director Trap 52.7 cm 1 1 BA 2-1/2' x 40' Drilled Aluminum Tube	124565	5/8" x 8" Drilled Fiberglass Insulator 1.6 x 20.3 cm	2	
154554 3" x 2-1/2" x 1" runing Tube Insulator 7.6 x 6.3 x 25 cm 1 170035 2-1/2" Formed Aluminum Woe Blocks 2.0 x 0.3 x 0.6 cm 1 194542 2" X 8" x 1/4" Aluminum Mouning Plate 2.0 x 2.0 x 0.6 cm 1 194555 2-7/8" x 1" x 1/4" Truning Tube Shorting Strap 7.3 x 2.5 x.6 cm 1 246604 NOAL_OXB Conductive Unitoriant 1 20326 20326 Danger Label 1 1 324503 3" x 5-1/4" x 1/8" Foed Strap Plastic Insulator 5.1 x 3.8 x 3.3 cm 3 324504 3" x 5-1/4" x 3/16" Drilled Extruded Aluminum Bracket 2.0 x 13.3 x 0.5 cm 2 324504 1" x 5-1/4" x 3/16" Drilled Extruded Aluminum Bracket 2.5 x 13.3 x 0.3 cm 2 330885 Brush 1 2 2 1 17B 20-3/4" 15 Meter Director Trap 1 1 1 18B 2-3/4" 2" Drilled Aluminum Tube 6.4 x 213 cm 1 1 19 1" 10" Drilled Aluminum Tube 6.4 x 213 cm 1 1 19 2-1/2" x 60" Drilled Aluminum Tube 6.0 x 31 cm 1 1 164 2.2"	124566	7/8" x 8" Drilled Fiberglass Insulator 2.2 x 20.3 cm	1	
170035 2-1/2" Formed Aluminum Vee Blocks 6.4 cm 2 194545 2-7/8" x 1" x 1/4" Turning Tube Shorting Strap 7.3 x 2.5 x.6 cm 1 290326 Danger Label 1 1 290326 Danger Label 1 1 323832 2" x 1-1/2" x 1/8" Feed Strap Plastic Insulator 5.1 x 3.8 x.3 cm 3 324506 8" x 5-1/4" x 1/8" Drilled Extruded Aluminum Bracket 2.0 3 x 13.3 x 0.5 cm 2 324506 8" x 5-1/4" x 3/16" Drilled Extruded Aluminum Bracket 1.0 2 x 13.3 x 0.3 cm 2 324506 8" x 5-1/4" x 3/16" Drilled Extruded Aluminum Bracket 2.5 x 13.3 x 0.3 cm 2 324506 4" x 5-1/4" x 3/16" Drilled Extruded Aluminum Bracket 2.5 x 13.3 x 0.3 cm 2 330885 Brush 1 2.4 2 m 1 BA 2-0/24" 15 Meter Director Trap 6.2 7 cm 1 BA 2-1/2" x 84" Drilled Aluminum Tube 6.4 x 213 cm 1 BA 2-1/2" x 84" Drilled Aluminum Tube 6.0 x 61 cm 1 BB 2-3/8" x 12" Drilled Aluminum Tube 6.0 x 81 cm 1 BD 2-3/8" x 12" Drilled Aluminum Tube 6.0 x 81 cm	124567	1" x 8" Drilled Fiberglass Insulator 2.5 x 20.3 cm	1	
194542 8' x 8'' x 1/4' Auminum Mounting Plate 20.3 x 20.3 x 0.6 cm 1 194555 2:7/8'' x 1'' x 1/4' Tuning Tube Shorting Strap 7.3 x 25 x.6 cm 1 290326 Danger Label 1 1 203327 Danger Label 1 1 3234504 3' x 5-1/4'' x 1/8' Drilled Extruded Aluminum Bracket 7.6 x 13.3 x 0.3 cm 6 324504 3' x 5-1/4'' x 3/16'' Drilled Extruded Aluminum Bracket 2.0 x 13.3 x 0.5 cm 8 324505 8' x 5-1/4'' x 3/16'' Drilled Extruded Aluminum Bracket 2.0 x 13.3 x 0.5 cm 8 324506 8' x 5-1/4'' x 3/16'' Drilled Extruded Aluminum Bracket 2.5 x 13.3 x 0.3 cm 2 330855 Brush 1 1 1 710 17' 10 Meter Director Trap 52.7 cm 2 1 719 17' 10 Meter Director Trap 43.2 cm 1 1 82 2-1/2' x 84'' Drilled Aluminum Tube 6.4 x 213 cm 1 1 84 2-1/2' x 80'' Drilled Aluminum Tube 6.0 x 61 cm 1 1 85 2-1/2' x 80'' Drilled Aluminum Tube 6.0 x 31 cm 1 1 86 2	154554	3" x 2-1/2" x 1" Tuning Tube Insulator 7.6 x 6.3 x 2.5 cm	1	
194555 2-7/8" x 1" x 1/4" Tuning Tube Shorting Strap 7.3 x 2.5 x.6 cm 1 290326 Danger Label 1 323832 2" x 1-1/2" x 1/8" Feed Strap Plastic Insulator 5.1 x 3.8 x.3 cm 3 324506 8" x 5-1/4" x 1/8" Drilled Extruded Aluminum Bracket 7.6 x 13.3 x 0.3 cm 2 324506 8" x 5-1/4" x 3/16" Drilled Extruded Aluminum Bracket 2.0 x 13.3 x 0.5 cm 2 324509 4" x 5-1/4" x 1/8" Drilled Extruded Aluminum Bracket 2.5 x 13.3 x 0.3 cm 2 324509 4" x 5-1/4" x 1/8" Drilled Extruded Aluminum Bracket 2.5 x 13.3 x 0.3 cm 2 330855 Brush. 1 1 1 TB 20.3/4" 15 Meter Director Trap 52.7 cm 2 T9 17" 10 Meter Director Trap 6.4 x 213 cm 1 BA 2-1/2" x 84" Drilled Aluminum Tube 6.4 x 152 cm 1 BB 2.3/3" x 12" Drilled Aluminum Tube 6.4 x 132 cm 1 BC 2.1/2" x 72" Drilled Aluminum Tube 2.5 x 91 cm 4 EA 1.1/4" x 72" Aluminum Tube slotted 1 end 2.5 x 91 cm 4 EC 1.1/4" x 72" Aluminum Tube slotted 1 end 2.5 x 91 cm </td <td>170035</td> <td>2-1/2" Formed Aluminum Vee Blocks 6.4 cm</td> <td>2</td> <td></td>	170035	2-1/2" Formed Aluminum Vee Blocks 6.4 cm	2	
244604 NOALOX® conductive lubricant. 1 290322 Danger Label 1 323832 2" x 1-1/2" x 1/8" Feed Strap Plastic Insulator 5.1 x 3.8 x 3.0 arm 3 324504 3" x 5-1/4" x 1/8" Drilled Extruded Aluminum Bracket 7.6 x 13.3 x 0.5 cm 2 324509 4" x 5-1/4" x 3/16" Drilled Extruded Aluminum Bracket 10.2 x 13.3 x 0.5 cm 8 324509 4" x 5-1/4" x 1/8" Drilled Extruded Aluminum Bracket 2.5 x 13.3 x 0.5 cm 8 324504 1" x 5-1/4" x 1/8" Drilled Extruded Aluminum Bracket 2.5 x 13.3 x 0.5 cm 8 330885 Brush 1 1 1 TB 20-5/4" 15 Meter Director Trap 52.7 cm 2 1 TB 20-5/4" 15 Meter Director Trap 64.4 x 132 cm 1 1 BA 2.1/2" x 44" Drilled Aluminum Tube 64.4 x 152 cm 1 1 BB 2.3/8" x 12" Drilled Aluminum Tube 64.4 x 152 cm 1 1 BD 2.3/8" x 12" Drilled Aluminum Tube 6.0 x 31 cm 1 1 BC 2.1/2" x 44" Drilled Aluminum Tube 6.0 x 31 cm 1 1 BD 2.3/8" x 12	194542	8" x 8" x 1/4" Aluminum Mounting Plate 20.3 x 20.3 x 20.3 cm	1	
290326 Danger Label 1 323832 2" x 1-1/2" x 1/8" Feed Strap Plastic insulator 5.1 x 3.8 x 3.0 m 3 324506 3" x 5-1/4" x 1/8" Drilled Extruded Aluminum Bracket 20.3 x 13.3 x 0.5 m 2 324506 8" x 5-1/4" x 3/16" Drilled Extruded Aluminum Bracket 20.3 x 13.3 x 0.5 m 2 324564 1" x 5-1/4" x 3/16" Drilled Extruded Aluminum Bracket 2.5 x 13.3 x 0.5 m 2 330865 Brush 1 1 TB 20-3/4" 15 Meter Director Trap 52.7 cm 2 T9 17" 10 Meter Director Trap 43.2 cm 2 BA 2-1/2" x 64" Drilled Aluminum Tube 64 x 213 cm 1 BB 2-3/8" x 12" Drilled Aluminum Tube 64 x 152 cm 1 BC 2-1/2" x 64" Drilled Aluminum Tube 64 x 153 cm 1 BC 2-3/8" x 12" Drilled Aluminum Tube 64 x 183 cm 1 EA 1-1/4" x 72" Aluminum Tube solted 2 ends 3.2 x 183 cm 1 EA 1-1/4" x 72" Aluminum Tube solted 7/8" swege 1 end 1.9 x 91 cm 6 EB 1-1/8" x 54" Aluminum Tube solted 7/8" swege 1 end 1.9 x 91 cm 6 <	194555	2-7/8" x 1" x 1/4" Tuning Tube Shorting Strap 7.3 x 2.5 x .6 cm	1	
323832 2" x 1/12" x 1/8" Feed Strap Plastic Insulator 5.1 x 3.8 x .3 cm 3 324504 3" x 5-1/4" x 1/8" Drilled Extruded Aluminum Bracket 7.6 x 13.3 x 0.5 cm 2 324509 4" x 5-1/4" x 3/16" Drilled Extruded Aluminum Bracket 10.2 x 13.3 x 0.5 cm 2 324509 4" x 5-1/4" x 3/16" Drilled Extruded Aluminum Bracket 10.2 x 13.3 x 0.5 cm 8 324508 Brush. 1 1 1 18 20-3/4" 15 Meter Director Trap 52.7 cm 2 19 17" 10 Meter Director Trap 43.2 cm 2 MNX79 MNX7 Matching Network. 1 1 BA 2-1/2" x 84" Drilled Aluminum Tube 6.4 x 213 cm 1 BC 2-1/2" x 44" Drilled Aluminum Tube 6.4 x 152 cm 1 BD 2-3/8" x 24" Drilled Aluminum Tube 6.0 x 51 cm 1 BE 2-1/2" x 72" Drilled Aluminum Tube 0.6 0.4 x 183 cm 1 BE 2-1/2" x 72" Drilled Aluminum Tube 1.0 x 1.2 x 1.	244604	NOALOX® conductive lubricant	1	
324504 3* x 5-1/4" x 1/8" Drilled Extruded Aluminum Bracket 7.6 x 13.3 x 0.5 cm 2 324506 4* x 5-1/4" x 3/16" Drilled Extruded Aluminum Bracket 20.3 x 13.3 x 0.5 cm 2 324504 1* x 5-1/4" x 3/16" Drilled Extruded Aluminum Bracket 2.5 x 13.3 x 0.5 cm 2 330865 Brush 1 1 330865 Brush 1 1 TB 20.34" 15 Meter Director Trap 52.7 cm 2 79 17" 10 Meter Director Trap 43.2 cm 1 BA 2-1/2" x 84" Drilled Aluminum Tube 6.4 x 213 cm 1 BA 2-1/2" x 84" Drilled Aluminum Tube 6.4 x 152 cm 1 BC 2-3/8" x 24" Drilled Aluminum Tube 6.0 x 31 cm 1 BD 2-3/8" x 12" Drilled Aluminum Tube 6.4 x 182 cm 1 BE 2-1/2" x 72" Aluminum Tube slotted 1 end 2.8 x 132 cm 4 C1 1 x 36" Aluminum Tube slotted 2 ends 3.2 x 183 cm 1 EA 1-1/4" x 72" Aluminum Tube slotted 1 end 2.8 x 132 cm 4 ED 3/4" x 36" Aluminum Tube slotted 1 end 1.9 x 91 cm 8 EB 1-1/4"	290326	Danger Label	1	
324506 8" x 5-1/4" x 3/16" Drilled Extruded Aluminum Bracket 20.3 x 13.3 x 0.5 cm 2 324509 4" x 5-1/4" x 1/8" Drilled Extruded Aluminum Bracket 2.5 x 13.3 x 0.5 cm 2 324508 Brush 1 1 2.5 x 13.3 x 0.5 cm 2 330885 Brush 1 1 1 1 TB 20-3/4" 15 Meter Director Trap 2.5 x 13.3 x 0.5 cm 2 1 TB 20-3/4" 15 Meter Director Trap 4.2 cm 2 1 BA 2-1/2" x 84" Drilled Aluminum Tube 6.4 x 213 cm 1 1 BB 2-3/8" x 24" Drilled Aluminum Tube 6.0 x 61 cm 1 1 BC 2-1/2" x 84" Drilled Aluminum Tube 6.0 x 61 cm 1 1 BD 2-3/8" x 12" Drilled Aluminum Tube 6.0 x 161 cm 1 1 BD 2-3/8" x 12" Drilled Aluminum Tube 6.0 x 31 cm 1 1 1 EA 1-1/4" x 72" Aluminum Tube slotted 2 ends 3.2 x 183 cm 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 <td>323832</td> <td>2" x 1-1/2" x 1/8" Feed Strap Plastic Insulator 5.1 x 3.8 x .3 cm</td> <td>3</td> <td></td>	323832	2" x 1-1/2" x 1/8" Feed Strap Plastic Insulator 5.1 x 3.8 x .3 cm	3	
324509 4* x 5-1/4" x 3/16" Drilled Extruded Aluminum Bracket 10.2 x 13.3 x 0.5 cm 8 324564 1* x 5-1/4" x 1/8" Drilled Extruded Aluminum Bracket 2.5 x 13.3 x 0.3 cm 2 330885 Brush 1 1 TB 20-3/4" 15 Meter Director Trap 52.7 cm 2 T9 17" 10 Meter Director Trap 43.2 cm 2 MNX79 MNX7 Matching Network 1 1 BA 2-1/2" x 84" Drilled Aluminum Tube 6.4 x 213 cm 1 BB 2.3/8" x 24" Drilled Aluminum Tube 6.4 x 152 cm 1 BC 2-1/2" x 64" Drilled Aluminum Tube 6.4 x 152 cm 1 BD 2-3/8" x 12" Drilled Aluminum Tube 6.4 x 183 cm 1 BE 2-1/2" x 20" Drilled Aluminum Tube slotted 1 end, 1" tube insert 1 end 2.8 x 132 cm 4 EC 1* x 45" Aluminum Tube slotted 5/8" swege 1 end 1.9 x 91 cm 8 ED 3/4" x 36" Aluminum Tube slotted 1 end 1.9 x 91 cm 8 1.2 x 148" Aluminum Tube EG 1* x 48" Aluminum Tube slotted 2 ends 2.5 x 122 cm 1 1.2 x 36" Aluminum Tube EG 1* x 48" Aluminum Tube slotted 1 e	324504	3" x 5-1/4" x 1/8" Drilled Extruded Aluminum Bracket 7.6 x 13.3 x 0.3 cm	6	
324564 1* x 5-1/4* x 1/8" Drilled Extruded Aluminum Bracket 2.5 x 13.3 x 0.3 cm 2 330885 Brush 1 TB 20-3/4" 15 Meter Director Trap 52.7 cm 2 T9 17" 10 Meter Director Trap 43.2 cm 2 MNX79 MNX7 Matching Network 1 1 BA 2-1/2" x 64" Drilled Aluminum Tube 6.4 x 213 cm 1 BB 2-3/8" x 24" Drilled Aluminum Tube 6.0 x 61 cm 1 BC 2-1/2" x 72" Drilled Aluminum Tube 6.0 x 31 cm 1 BE 2-1/2" x 72" Drilled Aluminum Tube 6.0 x 31 cm 1 BE 2-1/2" x 72" Aluminum Tube slotted 2 ends 3.2 x 183 cm 1 EB 1-1/4" x 72" Aluminum Tube slotted 7/8" swege 1 end 2.8 x 132 cm 4 EC 1* x 36" Aluminum Tube slotted 5/8" swege 1 end 1.3 x 91 cm 6 EE 1/2" x 36" Aluminum Tube slotted 5/8" swege 1 end 1.0 x 122 cm 4 EG 1* x 48" Aluminum Tube slotted 1 end 2.5 x 122 cm 1 EF 3/8" x 34" Aluminum Tube slotted 1 end 2.5 x 122 cm 1 1 EF 3/8" x 34" Al	324506	8" x 5-1/4" x 3/16" Drilled Extruded Aluminum Bracket 20.3 x 13.3 x 0.5 cm	2	
330885 Brush. 1 TB 20-3/4" 15 Meter Director Trap. 52.7 cm T9 17" 10 Meter Director Trap. 43.2 cm MNX79 MNX7 Matching Network. 1 BA 2-1/2" x 84" Drilled Aluminum Tube 6.4 x 213 cm BB 2-3/8" x 24" Drilled Aluminum Tube 6.0 x 61 cm BC 2-1/2" x 72" Drilled Aluminum Tube 6.0 x 61 cm BD 2-3/8" x 12" Drilled Aluminum Tube 6.4 x 183 cm EA 1-1/4" x 72" Aluminum Tube slotted 2 ends 3.2 x 183 cm EA 1-1/4" x 72" Aluminum Tube slotted 7/8" swege 1 end 2.8 x 132 cm ED 3/4" x 36" Aluminum Tube slotted 7/8" swege 1 end 1.8 x 91 cm EE 1/2" x 36" Aluminum Tube slotted 2 ends 2.5 x 91 cm EE 1/2" x 36" Aluminum Tube slotted 2 ends 2.5 x 122 cm EG 1* x 48" Aluminum Tube slotted 1 end 2.5 x 61 cm EH 7/8" x 48" Aluminum Tube slotted 1 end 3.2 x 91 cm EL 1/2" x 36" Aluminum Tube slotted 1 end 3.2 x 91 cm EG 1* x 48" Aluminum Tube slotted 1 end 3.2 x 122 cm EH 1/8" x 36" Aluminum Tube slotted 1 end 3.2 x 122	324509	4" x 5-1/4" x 3/16" Drilled Extruded Aluminum Bracket 10.2 x 13.3 x 0.5 cm	8	
TB 20-3/4" 15 Meter Director Trap 52.7 cm 2 T9 T7 10 Meter Director Trap 43.2 cm 2 MNX79 MNX7 Matching Network. 1 BA 2-1/2" x 84" Drilled Aluminum Tube 6.4 x 213 cm 1 BB 2-3/8" x 24" Drilled Aluminum Tube 6.0 x 61 cm 1 BC 2-1/2" x 60" Drilled Aluminum Tube 6.4 x 152 cm 1 BD 2-3/8" x 12" Drilled Aluminum Tube 6.4 x 153 cm 1 BE 2-1/2" x 72" Drilled Aluminum Tube 6.4 x 153 cm 1 EA 1-1/4" x 72" Aluminum Tube slotted 2 ends 3.2 x 183 cm 1 EB 1-1/8" x 52 " Aluminum Tube slotted 1 end 1.9 x 91 cm 8 EC 1" x 36" Aluminum Tube slotted 7/8" swege 1 end 1.9 x 91 cm 8 EE 1/2" x 36" Aluminum Tube slotted 7/8" swege 1 end 1.0 x 122 cm 4 EG 1" x 48" Aluminum Tube slotted 1 end 2.5 x 91 cm 8 EF 3/8" x 36" Aluminum Tube slotted 1 end 2.5 x 122 cm 1 EH 1/8" x 48" Aluminum Tube slotted 1 end 2.5 x 61 cm 2 EJ 3/8" x 38" Aluminum Tube slott	324564	1" x 5-1/4" x 1/8" Drilled Extruded Aluminum Bracket 2.5 x 13.3 x 0.3 cm	2	
19 17" 10 Meter Director Trap 43.2 cm 2 MNX79 MINX7 Matching Network 1 BA 2-1/2" x 84" Drilled Aluminum Tube 6.4 x 213 cm 1 BB 23/8" x 24" Drilled Aluminum Tube 6.0 x 61 cm 1 BC 2-1/2" x 60" Drilled Aluminum Tube 6.4 x 152 cm 1 BD 2-3/8" x 12" Drilled Aluminum Tube 6.4 x 153 cm 1 EA 1-1/4" x 72" Drilled Aluminum Tube 6.4 x 153 cm 1 EA 1-1/4" x 72" Drilled Aluminum Tube slotted 1 end, 1" tube insert 1 end 2.8 x 132 cm 4 EC 1 x 36" Aluminum Tube slotted 7/8" swege 1 end 2.5 x 91 cm 4 ED 3/4" x 36" Aluminum Tube slotted 7/8" swege 1 end 1.9 x 91 cm 8 EE 1/2" x 36" Aluminum Tube slotted 1 end 2.5 x 91 cm 4 EG 1" x 48" Aluminum Tube 1.0 x 122 cm 4 EG 1" x 48" Aluminum Tube slotted 1 end 2.5 x 122 cm 1 EH 7/8" x 48" Aluminum Tube 1.0 x 81 cm 4 EG 1" x 48" Aluminum Tube 1.0 x 81 cm 4 EH 7/8" x 48" Aluminum Tube <td< td=""><td>330885</td><td>Brush</td><td>1</td><td></td></td<>	330885	Brush	1	
MNX79 MNX7 Matching Network 1 BA 2-1/2" x 84" Drilled Aluminum Tube 6.4 x 213 cm 1 BB 2-3/8" x 24" Drilled Aluminum Tube 6.0 x 61 cm 1 BC 2-1/2" x 60" Drilled Aluminum Tube 6.4 x 152 cm 1 BD 2-3/8" x 12" Drilled Aluminum Tube 6.4 x 152 cm 1 BE 2-1/2" x 72" Drilled Aluminum Tube 6.4 x 183 cm 1 EA 1-1/4" x 72" Aluminum Tube slotted 2 ends 3.2 x 183 cm 1 EB 1-1/8" x 52" Aluminum Tube slotted 1 end, 1" tube insert 1 end 2.8 x 132 cm 4 EC 1" x 36" Aluminum Tube slotted 5/8" swege 1 end 1.9 x 91 cm 8 ED 3/4" x 36" Aluminum Tube slotted 2 ends 2.5 x 91 cm 4 EG 1" x 48" Aluminum Tube slotted 1 end 1.3 x 91 cm 8 EG 1" x 48" Aluminum Tube slotted 2 ends 2.5 x 122 cm 1 EH 7/8" x 48" Aluminum Tube slotted 1 end 2.5 x 51 22 cm 1 EH 7/8" x 48" Aluminum Tube slotted 1 end 2.5 x 61 cm 2 EJ 3/8" x 32" Aluminum Tube slotted 1 end 3.2 x 91 cm 2 EK	TB	20-3/4" 15 Meter Director Trap 52.7 cm	2	
BA 2-1/2" x 84" Driled Aluminum Tube 6.4 x 213 cm 1 BB 2-3/8" x 24" Drilled Aluminum Tube 6.0 x 61 cm 1 BC 2-1/2" x 60" Drilled Aluminum Tube 6.0 x 61 cm 1 BD 2-3/8" x 12" Drilled Aluminum Tube 6.0 x 31 cm 1 BE 2-1/2" x 72" Drilled Aluminum Tube 6.0 x 31 cm 1 BE 1-1/4" x 72" Drilled Aluminum Tube slotted 2 ends 3.2 x 183 cm 1 EA 1-1/4" x 72" Aluminum Tube slotted 1 end, 1" tube insert 1 end 2.8 x 132 cm 4 EC 1" x 36" Aluminum Tube slotted 5/8" swege 1 end 1.9 x 91 cm 8 EE 1/2" x 36" Aluminum Tube slotted 1 end 1.3 x 91 cm 6 EF 3/8" x 48" Aluminum Tube slotted 2 ends 2.5 x 122 cm 1 EG 1" x 48" Aluminum Tube slotted 1 end 2.5 x 122 cm 1 EH 7/8" x 48" Aluminum Tube slotted 1 end 2.5 x 61 cm 2 EJ 3/8" x 24" Aluminum Tube slotted 1 end 3.2 x 91 cm 4 EF 1/8" x 48" Aluminum Tube slotted 1 end 3.2 x 91 cm 2 EJ 1/4" x 48" Aluminum Tube slotted 1 end 2.5 x 61 cm <td< td=""><td>Т9</td><td>17" 10 Meter Director Trap 43.2 cm</td><td>2</td><td></td></td<>	Т9	17" 10 Meter Director Trap 43.2 cm	2	
BB 2-3/8" x 24" Drilled Aluminum Tube 6.0 x 61 cm 1 BC 2-1/2" x 60" Drilled Aluminum Tube 6.4 x 152 cm 1 BD 2-3/8" x 12" Drilled Aluminum Tube 6.0 x 31 cm 1 BE 2-1/2" x 72" Drilled Aluminum Tube 6.0 x 31 cm 1 BE 2-1/2" x 72" Drilled Aluminum Tube 6.0 x 31 cm 1 EA 1-1/4" x 72" Aluminum Tube slotted 2 ends 3.2 x 183 cm 1 EB 1-1/8" x 52" Aluminum Tube slotted 7/8" swege 1 end 2.8 x 132 cm 4 EC 1" x 36" Aluminum Tube slotted 7/8" swege 1 end 1.9 x 91 cm 8 EE 1/2" x 36" Aluminum Tube slotted 5/8" swege 1 end 1.9 x 91 cm 8 EE 1/2" x 36" Aluminum Tube slotted 1 end 1.3 x 91 cm 6 FF 3/6" x 48" Aluminum Tube slotted 2 ends 2.5 x 122 cm 1 EG 1" x 48" Aluminum Tube slotted 1 end 2.5 x 122 cm 2 2 EJ 3/6" x 32" Aluminum Tube slotted 1 end 3.2 x 91 cm 2 2 EJ 3/6" x 34" Aluminum Tube slotted 1 end 3.2 x 91 cm 2 2 EM 1/2" x 24" Aluminum Tube slotted 1 e	MNX79	MNX7 Matching Network	1	
BC 2-1/2" x 60" Drilled Aluminum Tube 6.4 x 152 cm 1 BD 2-3/8" x 12" Drilled Aluminum Tube 6.0 x 31 cm 1 BE 2-1/2" x 72" Drilled Aluminum Tube 6.4 x 183 cm 1 EA 1-1/4" x 72" Aluminum Tube slotted 2 ends 3.2 x 183 cm 1 EB 1-1/4" x 72" Aluminum Tube slotted 2 ends 3.2 x 183 cm 1 EB 1-1/8" x 52" Aluminum Tube slotted 2 ends 2.5 x 91 cm 4 ED 3/4" x 36" Aluminum Tube slotted 5/8" swege 1 end 1.9 x 91 cm 8 EE 1/2" x 36" Aluminum Tube slotted 5/8" swege 1 end 1.9 x 91 cm 8 EF 3/8" x 48" Aluminum Tube slotted 2 ends 2.5 x 91 cm 4 EG 1" x 48" Aluminum Tube slotted 2 ends 2.5 x 122 cm 4 EG 1" x 48" Aluminum Tube slotted 1 end 2.2 x 122 cm 2 EJ 3/8" x 32" Aluminum Tube slotted 1 end 3.2 x 91 cm 2 EL 1-1/4" x 36" Aluminum Tube slotted 1 end 3.2 x 91 cm 2 EJ 3/8" x 36" Aluminum Tube slotted 1 end 2.9 x 122 cm 2 EL 1-1/4" x 36" Aluminum Tube slotted 1 end 2.9 x 122 cm <	BA		1	
BD 2-3/8" x 12" Drilled Aluminum Tube 6.0 x 31 cm 1 BE 2-1/2" x 72" Drilled Aluminum Tube 6.4 x 183 cm 1 EA 1-1/4" x 72" Aluminum Tube slotted 2 ends 3.2 x 183 cm 1 EB 1.1/8" x 52" Aluminum Tube slotted 1 end, 1" tube insert 1 end 2.8 x 132 cm 4 EC 1" x 36" Aluminum Tube slotted 5/8" swege 1 end 1.9 x 91 cm 8 ED 3/4" x 36" Aluminum Tube slotted 5/8" swege 1 end 1.9 x 91 cm 8 EE 1/2" x 36" Aluminum Tube slotted 2 ends 2.5 x 122 cm 4 EG 1" x 48" Aluminum Tube slotted 2 ends 2.5 x 122 cm 1 EG 1" x 48" Aluminum Tube slotted 1 end 2.2 x 122 cm 2 EJ 3/8" x 32" Aluminum Tube slotted 1 end 2.5 x 61 cm 2 EJ 3/8" x 36" Aluminum Tube slotted 1 end 3.2 x 91 cm 2 EL 1-1/4" x 36" Aluminum Tube slotted 2 ends 3.2 x 122 cm 1 EN 3/8" x 36" Aluminum Tube slotted 2 ends 3.2 x 122 cm 2 EL 1-1/4" x 36" Aluminum Tube slotted 2 ends 3.2 x 122 cm 1 EN 3/8" x 36" Aluminum Tube slotted 2 ends <td< td=""><td>BB</td><td></td><td>1</td><td></td></td<>	BB		1	
BE 2-1/2" x 72" Drilled Aluminum Tube 6.4 x 183 cm 1 EA 1-1/4" x 72" Aluminum Tube slotted 2 ends 3.2 x 183 cm 1 EB 1-1/8" x 52 " Aluminum Tube slotted 1 end, 1" tube insert 1 end 2.8 x 132 cm 4 EC 1" x 36" Aluminum Tube slotted 7/8" swege 1 end 2.5 x 91 cm 4 ED 3/4" x 36" Aluminum Tube slotted 5/8" swege 1 end 1.9 x 91 cm 8 EE 1/2" x 36" Aluminum Tube slotted 2 ends 2.5 x 122 cm 4 EG 1" x 48" Aluminum Tube slotted 2 ends 2.5 x 122 cm 1 EH 7/8" x 48" Aluminum Tube slotted 1 end 2.5 x 122 cm 2 EJ 3/8" x 32" Aluminum Tube slotted 1 end 2.5 x 122 cm 2 EJ 3/8" x 32" Aluminum Tube slotted 1 end 2.5 x 61 cm 2 EJ 3/8" x 36" Aluminum Tube slotted 1 end, drilled 1 end 3.2 x 91 cm 2 EL 1/1/4" x 36" Aluminum Tube slotted 2 ends 1.0 x 91 cm 4 EK 1" x 24" Aluminum Tube slotted 2 ends 3.2 x 122 cm 1 EN 3/8" x 36" Aluminum Tube slotted 2 ends 3.2 x 122 cm 1 EN 1/2" x 24" Aluminum Tube slotted 2 e	BC		1	
EA 1-1/4" x 72" Aluminum Tube slotted 2 ends 3.2 x 183 cm 1 EB 1-1/6" x 52 " Aluminum Tube slotted 1 end, 1" tube insert 1 end 2.8 x 132 cm 4 EC 1" x 36" Aluminum Tube slotted 7/8" swege 1 end 2.5 x 91 cm 4 ED 3/4" x 36" Aluminum Tube slotted 5/8" swege 1 end 1.9 x 91 cm 8 ED 3/4" x 36" Aluminum Tube slotted 1 end 1.3 x 91 cm 6 EF 3/8" x 48" Aluminum Tube slotted 1 end 1.0 x 122 cm 4 EG 1" x 48" Aluminum Tube slotted 1 end 2.5 x 122 cm 1 EH 7/8" x 48" Aluminum Tube slotted 1 end 2.5 x 61 cm 2 EJ 3/8" x 36" Aluminum Tube slotted 1 end 3.2 x 182 cm 2 EL 1-1/4" x 36" Aluminum Tube slotted 1 end 2.5 x 61 cm 2 EL 1-1/4" x 36" Aluminum Tube slotted 1 end 3.2 x 91 cm 2 EL 1-1/4" x 36" Aluminum Tube slotted 2 ends 3.2 x 122 cm 1 EN 3/8" x 36" Aluminum Tube slotted 2 ends 3.2 x 122 cm 2 EL 1-1/4" x 48" Aluminum Tube slotted 2 ends 3.2 x 122 cm 1 ER 1-1/4" x 48" Aluminum Tube slotted 2 ends<		2-3/8" x 12" Drilled Aluminium Tube	1	
EB 1-1/8" x 52 " Aluminum Tube slotted 1 end, 1" tube insert 1 end	BE	2-1/2" x 72" Drilled Aluminum Tube	1	
EC 1" x 36" Aluminum Tube slotted 7/8" swege 1 end	EA		1	
ED 3/4" x 36" Aluminum Tube slotted 5/8" swege 1 end 1.9 x 91 cm 8 EE 1/2" x 36" Aluminum Tube slotted 1 end			4	
EE 1/2" x 36" Aluminum Tube slotted 1 end			4	
EF 3/8" x 48" Aluminum Tube 1.0 x 122 cm 4 EG 1" x 48" Aluminum Tube slotted 2 ends 2.5 x 122 cm 1 EH 7/8" x 48" Aluminum Tube slotted 1 end 2.2 x 122 cm 2 EJ 3/8" x 32" Aluminum Tube 1.0 x 81 cm 4 EK 1" x 24" Aluminum Tube slotted 1 end, drilled 1 end 2.5 x 61 cm 2 EL 1-1/4" x 36" Aluminum Tube slotted 1 end, drilled 1 end 3.2 x 91 cm 2 EM 1/2" x 24" Aluminum Tube slotted 1 end .0 x 81 cm 6 EN 3/8" x 36" Aluminum Tube slotted 1 end .0 x 91 cm 2 EM 1/2" x 24" Aluminum Tube slotted 2 ends .0 x 91 cm 4 EP 1-1/4" x 48" Aluminum Tube slotted 1 end .0 x 91 cm 4 EP 1-1/4" x 48" Aluminum Tube slotted 1 end .2.9 x 122 cm 1 ER 1-1/8" x 48" Aluminum Tube slotted 1 end .2.9 x 122 cm 2 ES 1/2" x 36" Aluminum Tube slotted 1 end .2.9 x 91 cm 2 ES 1/2" x 36" Aluminum Tube slotted 1 end .9.9 x 91 cm 4 EV 1"x 36" Aluminum Tube slotted 2 ends .2.5 x 91 cm 2 <td></td> <td>3/4" x 36" Aluminum Tube slotted 5/8" swege 1 end 1.9 x 91 cm</td> <td>8</td> <td></td>		3/4" x 36" Aluminum Tube slotted 5/8" swege 1 end 1.9 x 91 cm	8	
EG 1" x 48" Aluminum Tube slotted 2 ends 2.5 x 122 cm 1 EH 7/8" x 48" Aluminum Tube slotted 1 end 2.2 x 122 cm 2 EJ 3/8" x 32" Aluminum Tube 1.0 x 81 cm 4 EK 1" x 24" Aluminum Tube slotted 1 end, drilled 1 end 2.5 x 61 cm 2 EL 1-1/4" x 36" Aluminum Tube, slotted 1 end, drilled 1 end 3.2 x 91 cm 2 EM 1/2" x 24" Aluminum Tube slotted 1 end 1.3 x 61 cm 6 EN 3/8" x 36" Aluminum Tube slotted 2 ends 3.2 x 122 cm 1 EP 1-1/4" x 48" Aluminum Tube slotted 2 ends 3.2 x 122 cm 1 ER 1-1/8" x 48" Aluminum Tube slotted 1 end 2.9 x 122 cm 2 ES 1/2" x 36" Aluminum Tube slotted 1 end 2.9 x 122 cm 2 ES 1/2" x 36" Aluminum Tube slotted 1 end 2.2 x 91 cm 2 ES 1/2" x 36" Aluminum Tube slotted 5/8" OD swege 1 end, drilled 1 end 1.9 x 91 cm 4 EV 1" x 56" Aluminum Tube slotted 5/8" OD swege 1 end, drilled 1 end 1.9 x 91 cm 4 EV 1" x 56" Aluminum Tube slotted 2 ends 2.5 x 91 cm 2 EV 1" x 56" Aluminum Tube s			6	
EH 7/8" x 48" Aluminum Tube slotted 1 end				
EJ 3/8" x 32" Aluminum Tube 1.0 x 81 cm 4 EK 1" x 24" Aluminum Tube slotted 1 end, drilled 1 end 2.5 x 61 cm 2 EL 1-1/4" x 36" Aluminum Tube, slotted 1 end, drilled 1 end 3.2 x 91 cm 2 EM 1/2" x 24" Aluminum Tube slotted 1 end 1.3 x 61 cm 6 EN 3/8" x 36" Aluminum Tube 1.0 x 91 cm 4 EP 1-1/4" x 48" Aluminum Tube slotted 2 ends 3.2 x 122 cm 1 ER 1-1/8" x 48" Aluminum Tube slotted 1 end 2.9 x 122 cm 2 ES 1/2" x 36" Aluminum Tube 1.3 x 91 cm 2 ES 1/2" x 36" Aluminum Tube slotted 1 end 2.2 x 91 cm 2 ET 7/8" x 36" Aluminum Tube slotted 1 end 2.2 x 91 cm 2 EU 3/4" x 36" Aluminum Tube slotted 5/8" OD swege 1 end, drilled 1 end 1.9 x 91 cm 4 EV 1"x 36" Aluminum Tube slotted 2 ends 2.5 x 91 cm 2 EY 1"x 5-1/4" Aluminum Tube slotted 2 ends 2.5 x 91 cm 2 EZ 3/8" x 30" Intentionally Bent Aluminum Tube crimped and drilled 1 end 1.0 x 76 cm 2 FL1 3/8" x 16" Aluminum Flat Feedline Strap	-			
EK 1" x 24" Aluminum Tube slotted 1 end, drilled 1 end				
EL 1-1/4" x 36" Aluminum Tube, slotted 1 end, drilled 1 end				
EM 1/2" x 24" Aluminum Tube slotted 1 end				
EN 3/8" x 36" Aluminum Tube 1.0 x 91 cm 4 EP 1-1/4" x 48" Aluminum Tube slotted 2 ends 3.2 x 122 cm 1 ER 1-1/8" x 48" Aluminum Tube slotted 1 end 2.9 x 122 cm 2 ES 1/2" x 36" Aluminum Tube slotted 1 end 1.3 x 91 cm 2 ES 1/2" x 36" Aluminum Tube slotted 1 end 2.2 x 91 cm 2 EU 3/4" x 36" Aluminum Tube slotted 5/8" OD swege 1 end, drilled 1 end 1.9 x 91 cm 4 EV 1"x 36" Aluminum Tube slotted 5/8" OD swege 1 end, drilled 1 end 2.5 x 91 cm 2 EV 1"x 36" Aluminum Tube slotted 2 ends 2.5 x 91 cm 2 EY 1"x 5-1/4" Aluminum Tube slotted 2 ends 2.5 x 13.3 cm 2 EZ 3/8" x 30" Intentionally Bent Aluminum Tube crimped and drilled 1 end 1.0 x 76 cm 2 FL1 3/8" x 16" Aluminum Flat Feedline Strap 0.9 x 41 cm 2 FL2 3/8" x 20-3/4" Aluminum Flat Feedline Strap 0.9 x 53 cm 2				
EP 1-1/4" x 48" Aluminum Tube slotted 2 ends 3.2 x 122 cm 1 ER 1-1/8" x 48" Aluminum Tube slotted 1 end 2.9 x 122 cm 2 ES 1/2" x 36" Aluminum Tube 1.3 x 91 cm 2 ET 7/8" x 36" Aluminum Tube slotted 1 end 2.2 x 91 cm 2 EU 3/4" x 36" Aluminum Tube slotted 5/8" OD swege 1 end, drilled 1 end 1.9 x 91 cm 4 EV 1"x 36" Aluminum Tube slotted 5/8" OD swege 1 end, drilled 1 end 2.5 x 91 cm 2 EV 1"x 36" Aluminum Tube slotted 2 ends 2.5 x 91 cm 2 EY 1"x 5-1/4" Aluminum Tube slotted 2 ends 2.5 x 13.3 cm 2 EZ 3/8" x 30" Intentionally Bent Aluminum Tube crimped and drilled 1 end 1.0 x 76 cm 2 FL1 3/8" x 16" Aluminum Flat Feedline Strap 0.9 x 41 cm 2 FL2 3/8" x 20-3/4" Aluminum Flat Feedline Strap 0.9 x 53 cm 2				
ER 1-1/8" x 48" Aluminum Tube slotted 1 end				
ES 1/2" x 36" Aluminum Tube 1.3 x 91 cm 2				
ET 7/8" x 36" Aluminum Tube slotted 1 end				
EU 3/4" x 36" Aluminum Tube slotted 5/8" OD swege 1 end, drilled 1 end 1.9 x 91 cm 4 EV 1"x 36" Aluminum Tube slotted 1 end				
EV 1"x 36" Aluminum Tube slotted 1 end				
EY 1" x 5-1/4" Aluminum Tube slotted 2 ends		5		
EZ 3/8" x 30" Intentionally Bent Aluminum Tube crimped and drilled 1 end1.0 x 76 cm 2 FL1 3/8" x 16" Aluminum Flat Feedline Strap0.9 x 41 cm 2 FL2 3/8" x 20-3/4" Aluminum Flat Feedline Strap0.9 x 53 cm 2				
FL1 3/8" x 16" Aluminum Flat Feedline Strap 0.9 x 41 cm 2 FL2 3/8" x 20-3/4" Aluminum Flat Feedline Strap 0.9 x 53 cm 2				
FL2 3/8" x 20-3/4" Aluminum Flat Feedline Strap 0.9 x 53 cm 2				
FL3 3/8" X 28-3/4" Aluminum Flat Feedline Strap 0.9 x 73 cm 2				
	FL3	3/8° x 28-3/4° Aluminum Flat Feedline Strap	2	

Figure 1



NOTE: The X7 is shipped with NOALOX® conductive lubricant and an applicator brush. Apply small amounts of the lubricant to telescoping tubing sections during element and boom assembly. Apply small amounts of lubricant to bolt/U-bolt threads to prevent galling (seizing) of the nuts during assembly. Also, apply small amounts to the feedstrap assembly and matching network connections.

2-Boom Assembly

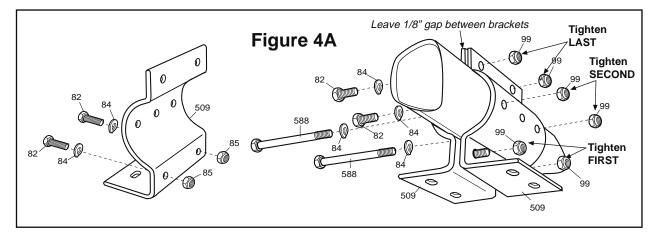
Figures 1, 2, 3 and 4 show the steps for boom assembly. Identify the tubing sections, element brackets and hardware required for this step by using the Boom Subassembly Parts List. Note the element brackets for Elements #3 and #6 join the boom sections (Figure 3).

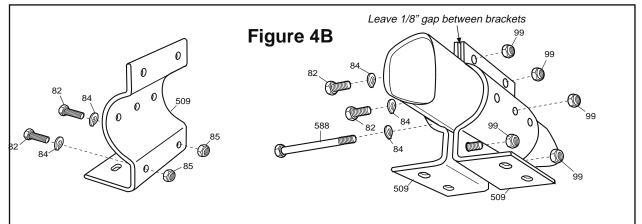
Refer to Figures 4A, 4B, 4C and 4D to assemble element brackets. The 1/4" hex nuts (85) are used as spacers on all brackets. Tighten these nuts in place before assembling element bracket halves. The 1/4" flat washers (1/8" thick) (529) are only used on 1/8" thick brackets as spacers (Figure 4C). The Boom may be placed on a flat surface with all brackets laying flat on the surface. This will allow all brackets to be fastened in line with each other. When tightening the hardware, refer to Figure 4A and tighten all bracket hardware in this order. When tightening the last two nuts on (509) brackets, do not completely compress the element brackets together. Leave a 1/8" (.12 cm) gap between the brackets. Do not tighten the bolts on the Tuning Tube Support Insulator Bracket (Figure AD). Allow the bracket to remain loose on the boom for Step 5 (Feed System Assembly).

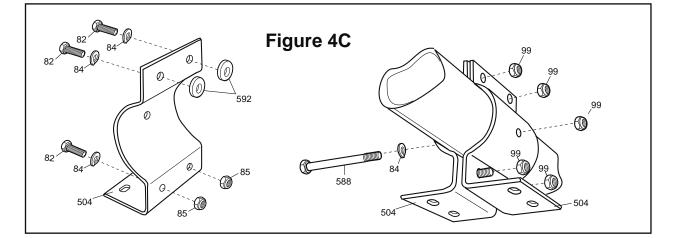
Nylon insert lock nuts are designed for one-time use. Do not tighten these nuts if you expect to disassemble antenna sections during antenna mounting.

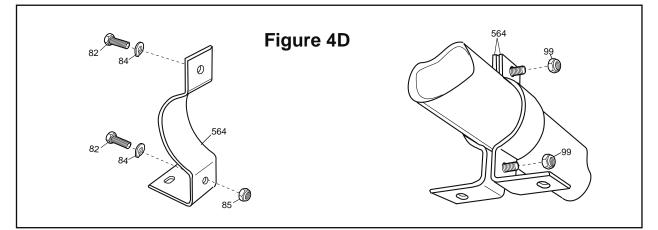
After mounting boom end caps (26), drill a small hole (1/4") in the bottom edge of the cap for water drainage. Determine which edge of the end cap will be on the ground facing side of the boom when antenna is mounted in its final position.

ID	Part #		Description	Dimensions	Qty
82	010082		Hex Bolt	1/4-20 x 1" (.6 x 2.5 cm)	28
84	010084	Ø	SS Lock Washer	1/4" (.6 cm)	39
85	010085	9	SS Nut	1/4-20 (.6 cm)	15
99	014399	0	SS Lock Nut	1/4" (.6 cm)	39
504	324504	i.j.	Aluminum Bracket	3" x 5-1/4" x 1/8" (7.6 x 13.3 x .3 cm)	6
509	324509		Aluminum Bracket	4" x 5-1/4 x 3/16" (10.2 x 13.3 x .5 cm)	8
564	324564	E S	Aluminum Bracket	1" x 5-1/4" x 1/8" (2.5 x 13.3 x .3 cm)	2
588	014588		SS Hex Bolt	1/4" x 3-1/2" (.6 x 10.2 cm)	9
592	014592	Ø	SS Flat Washer	1/4" (1/8" thick) (.6 x .3 cm)	6









3-Element Assembly

Figures 5, 54, 48, and 52 show the stage for element assembly. Identify the tubing sections required for each element using the Element Subassembly Parts List. Each telescoping tubing section is inserted 4 inches into the larger section except where noted in Figure 5. Adjust the length of the not tubing section is give each element the proper total hall length. All dimensions should be within 14 inch of the values given. Mark the center of tubing sections E4, E5, and E9 with a marker as shown in Figure 64. These marks will be used to B84 + 44m elements are nounted on the boom. The dimension for tube E5 is measured from the end of trap TB. The dimension between traps TB and T9 is measured between the ends of each trap. The 71 inches all terms for tube E5 are as installed with mores pointing toward the boom. Also position trap drain holes so they will be facing the ground when the enterna is in its final position.

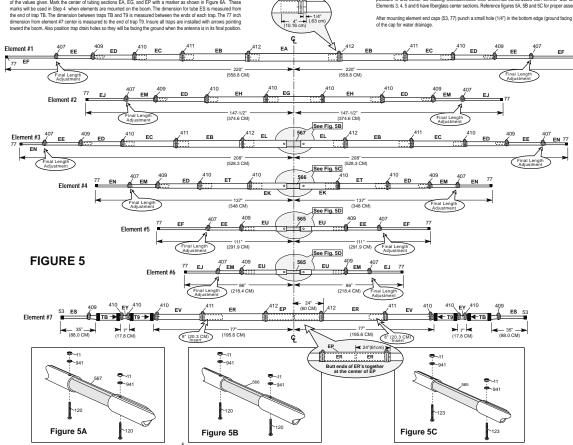
IMPORTANT

Unless indicated otherwise, telescop elements 4" (10.16 cm) and tighter the worm clamp Ø

Install all worm clamps as shown. Tighten all worm clamps until the telescoped tubing cannot rotate inside the larger tube. Take care not to overtighten and strip the worm clamp. Extra worm clamps are provided, toke that all ellement sections can be talstaned using a satellarging screw at each tubing transition. Use stainless screws for best performance. Properly installed worm clamps will provide years of trouble free

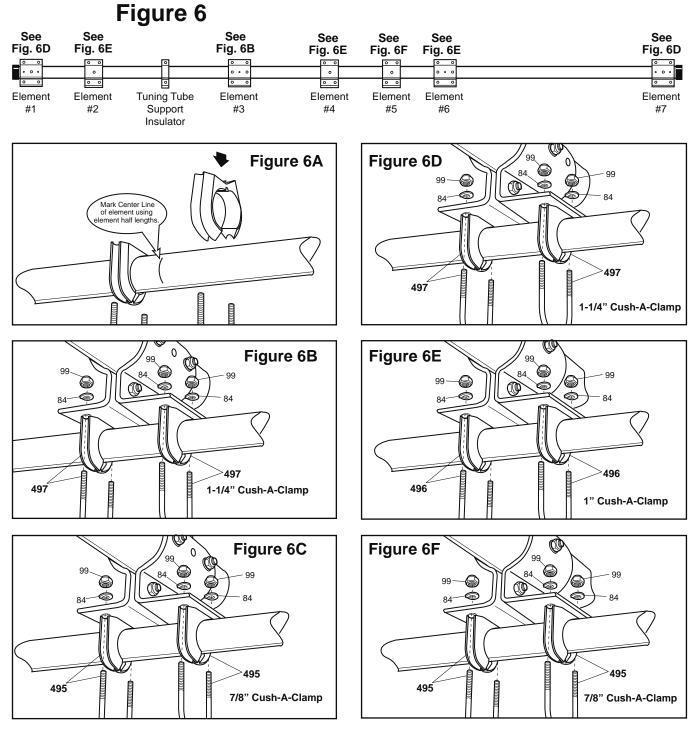
service. The XT is constructed entirely with .058-inch wall tubing. This creates a tight transition with the closest possible fit and better ice-loading characteristics than antennas constructed with thinner wail tubing. Elements 3, 4, 5 and 6 have fiberglass center sections. Reference figures 5A, 5B and 5C for proper assembly.

After mounting element end caps (53, 77) punch a small hole (1/4") in the bottom edge (ground facing side) of the cap for water drainage.



ID	Part #		Description	Dimensions	Qty
11	010011	9	SS Nut	#8-32	8
53	050053		Black Plastic Cap	1/2" (1.3 cm)	2
77	050077	۵	Black Plastic Cap	3/8' (0.9 cm)	12
120	010120	0	SS Machine Screw	#8-32 x 2" #8 x 5.1 cm)	4
123	010123	0	SS Machine Screw	#8-32 x 1-1/2" (#8 x 3.8 cm)	4
407	030407	б	Worm Clamp	5/8" (1.6 cm)	12
409	030409	6	Worm Clamp	11/16" (1.7 cm)	14
410	030410	6	Worm Clamp	1" (2.5 cm)	18
411	030411	0	Worm Clamp	1-1/8" (2.9 cm)	6
412	030412	\bigcirc	Worm Clamp	1-1/2" (3.8 cm)	6
565	124565		Fiberglass Insulator	5/8" x8" (1.6 x 20.3 cm)	2
566	124566		Fiberglass Insulator	7/8" x 8" (2.2. x 20.3 cm)	1
567	124567		Fiberglass Insulator	1" x 8" (2.5 x 20.3)	1
941	011941	0	SS Lock Washer	#8	8
EA	X79EA	0	Aluminum Tube	1-1/4" x 72" (3.2 x 183 cm)	1
EB	X79EB	0	Aluminum Tube	1-5/8" x 52" (2.8 x 132 cm)	4
EC	E79EC	0	Aluminum Tube	1" x 36" 2.5 x 91 cm)	4
ED	X79ED	0	Aluminum Tube	3/4" x 36" (1.9 x 91 cm)	8
EE	X79EE		Aluminum Tube	1/2" x 36" (1.3 x 91 cm)	6
EF	E79EF		Aluminum Tube	3/8" x 48" (1.0 x 122 cm)	4
EG	E79EG	0	Aluminum Tube	1" x 48" (2.5 x 122 cm)	1
EH	E79EH	0	Aluminum Tube	7/8" x 48" (2.2 x 122 cm)	2
EJ	E79EJ		Aluminum Tube	3/8" x 32" (1.0 x 81 cm)	4
EK	X79EK	0	Aluminum Tube	1" x 24" (2.5 x 61 cm)	2
EL	X79EL	0	Aluminum Tube	1-1/4" x 36" (3.2 x 91 cm)	2
EM	X79EM		Aluminum Tube	1/2" x 24" (1.3 x 61 cm)	6
EN	X79EN		Aluminum Tube	3/8" x 36" (1.0 x 99 cm)	4
EP	X79EP	0	Aluminum Tube	1-1/4" x 48" (3.2 x 122 cm)	1
ER	X79ER	0	Aluminum Tube	1-1/8" x 48" (2.9 x 122 cm)	2
ES	X79ES		Aluminum Tube	1/2" x 36" (1.3 x 91 cm)	2
ET	X79ET		Aluminum Tube	7/8" x 36" (2.2 x 91 cm)	2
EU	X79EU		Aluminum Tube	3/4" x 36" (1.9 x 91 cm)	4
EV	X79EV	20	Aluminum	1" x 36" (2.5 x 91 cm)	2
FY	A34SEF	5	Aluminim	1" x 5-1/4" (2.5 x 13.3 cm)	2

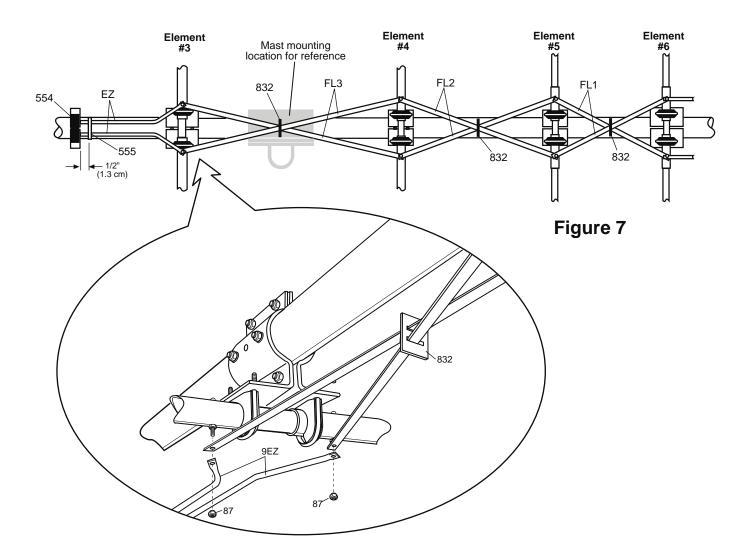
6



4-Element to Boom Assembly

Elements can be attached to the boom when the antenna is on the ground or when the antenna is being installed on a tower. Identify the hardware required to secure the elements by using the Element-to-Boom Parts List. Figure 6 shows the position of each element on the boom. Figures 6A, 6B, 6C, 6D, 6E, 6F show the hardware required to attach each element to the element bracket Position each element center mark equidistant between each Cush-A-Clamp. Leave the Cush-A-Clamps loose on the Log Cell Elements (#3, #4, #5, #6) until the feed straps are attached in Step 5. There are three sizes of Cush-A-Clamps. Tighten each clamp until the element tubing can no longer rotate inside the Cush-A-Clamp. The lock washers under the nuts securing the Cush-A-Clamps should be tightened until they are flat against the mounting bracket.

ID	Part #		Description	Dimensions	Qty
84	010084	0	SS Lock Washer	1/4" (.6 cm)	28
99	014399	9	SS Lock Nut	1/4" (.6 cm)	28
495	014495		Cush-a-Clamp®	7/8" (2.2 cm)	6
496	014496		Cush-a-Clamp®	1" (2.5 cm)	4
497	014497		Cush-a-Clamp®	1-1/4" (3.2 cm)	4



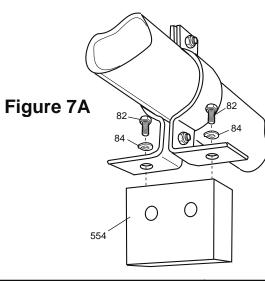
5-Feed System Assembly

The feed system consists of 3 sub-assemblies. They are the feed-straps, the tuning-tube insulator and the matching network. Figure 7 illustrates the 3 pairs of feed-straps (FL1, FL2, FL3). Refer to the Feed System Subassembly Parts List for the hardware required to install the straps. Slide a feed-strap insulator (832) on to each pair of feed-straps to space and insulate the straps. Elements may be rotated slightly during feed strap attachment. Tighten Cush-A-Clamps on Elements #3, #4, #5 and #6.

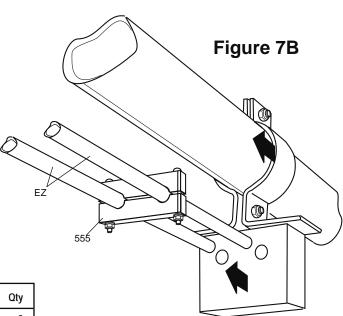
Locate the 2 tuning-tubes (EZ). Attach the punched ends of each tube to the screws at the center of Element #3.

Locate the Tuning Tube Shorting Strap (555). Loosen the 2 screws and slide the strap onto the tuning tubes (EZ). Leave strap loose.

ID	Part #		Description	Dimensions	Qty
87	014387	6	SS Lock Nut	#8-32	8
554	154554	0 0	Tuning Tube Insulator	3" x 2-1/2" x 1" (7.6 x 6.3 x 2.5 cm)	1
555	194555		Tuning Tube Shorting Strap	2-7/8" x 1" x 1/4" (7.3 x 2.5 x .6 cm)	1
832	323832		Strap Insulator	2" x 1-1/2" x1/8" (5.1 x 3.8 x .3 cm)	3
FL1	X79FL1		Feedline Strap	3/8" x 16" (.9 x 41 c m)	2
FL2	X79FL2		Feedline Strap	3/8" x 20-3/4" (.9 x 53)	2
FL3	X79FL3		Feedline Strap	3/8" x 28-3/4" (.9 x 73 cm)	2
EZ	X79EZ		Bent Alum Tube	3/8" x 30" (.95 x 7.6 cm)	2



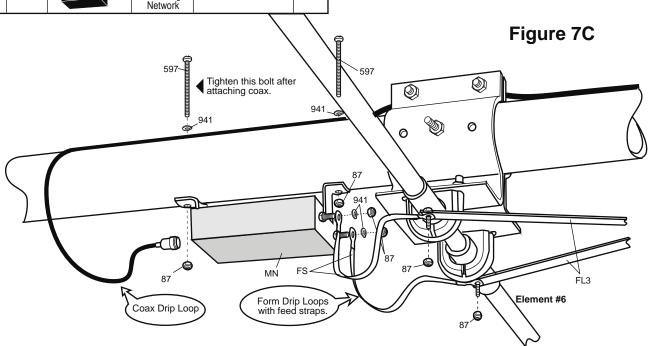
ID	Part #		Description	Dimensions	Qty
82	010082		Hex Bolt	1/4-20 x 1" (.6-20 x 2.5 cm)	2
84	010084	Ø	SS Lock Washer	1/4" (.6 cm)	2
87	014387	0	SS Lock Nut	#8-32	2
554	154554	0 0	Tuning Tube Insulator	3" x 2-1/2" x 1" (7.6 x 6.3 x 2.5 cm)	1
555	194555		Tuning Tube Shorting Strap	2" x 1-1/2" x 1/8" (5.1 x 3.8 x .3 cm)	1
597	014597		SS Machine Screw	#8-32 x 3" (7.6 cm)	2
941	011941	Ø	SS Lock Washer	#8	4
EZ			Tuning Tube	3/8" x 30" (,95 x 76.2 cm)	2
FS	X79FS	00	Feed	6" (15.2 cm)	2
MN	MNX79		Matching Network		1

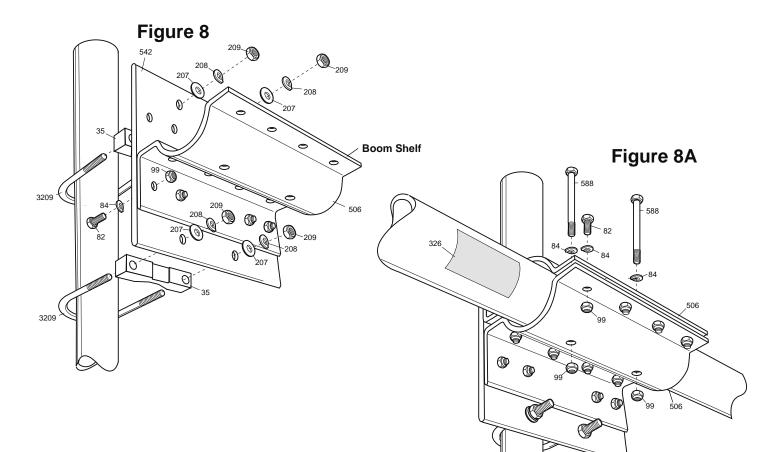


Refer to Figure 7A and attach the tuning tube insulator to the boom bracket. Use the hardware listed in the Tuning Tube Insulator Subassembly Parts List. Slide the insulator toward tuning tubes (EZ) until tube ends slide into the insulator holes, (Figure 7B). Tighten bolts on boom bracket securing tuning tube insulator in place.

Reference Figure 7 and position the Tuning Tube Shorting Strap (555) 1/2 inch from the tuning tube insulator. Adjusting this strap will not have a significant effect on the VSWR of the X7. Tighten strap screws.

Reference Figure 7C for matching network mounting. Required hardware is listed in the Matching Network Subassembly Parts List. Attach matching network (MN) to boom with two 8-32 bolts (597). Do not tighten "left" bolt until coax is securely attached to matching network. Connect feed straps (FS) from matching network terminals to each FL3 end at the center of Element #6. Form drip loops in the feed straps and position them as shown in Figure 7C. Form the feed-straps away from the Cush-A-Clamp U-bolts and Element #6 element bracket.





ID	Part #		Description	Dimensions	Qty
35	170035	P	Aluminum V-Block	2-1/2" (6.3 cm)	2
82	010082		Hex Bolt	1/4-20 x 1" (2.5 cm)	16
84	010084	Ø	SS Lock Washer	1/4" (0.6 cm)	18
99	014399	00	SS Lock Nut	1/4" (.6 cm)	18
207	010207	Ø	SS Flat Washer	3/8" (.95 cm)	4
208	010208	0	SS Lock Washer	3/8" (.95 cm)	4
209	010209	9	SS Lock Nut	3/8" (.95 cm)	4
326	290326		Danger Label		1
506	324506		Aluminum Bracket	8" x 5-1/4" x 3/16" (20.3 x 13.3 x .5 cm	2
542	194542		Alu Mounting Plate	8" x 8" x 1/4" 20.3 x 20.3 x .6 cm)	1
588	014588		SS Hex Bolt	1/4" x 3-1/2" (.6 x 8.9 cm)	2
3209	013209		U-Bolt	2-7/8" (7.3 cm)	2

6-Boom to Mast Clamp Assembly

The X7 boom to mast clamp is designed to be mounted on the tower/mast so the built in boom shelf feature can be utilized. Following this suggestion, if possible, will simplify antenna installation.

Reference Figure 8 for assembly of boom to mast clamp. Required hardware is listed in the Boom to Mast Clamp Assembly Parts List. Form the boom shelf by attaching the lower boom bracket (506) to the mast plate (542). Attach mast plate (542) to mast using U-bolts (3209) and V-blocks (35).

Place the boom on the boom shelf during installation. Loosely attach the top boom bracket (506) to the mast-plate (542) and to the lower boom bracket (506) as shown in Figure 8A. This allows the boom to be moved back and forth for tower top element mounting.

When all elements are securely mounted to the boom and the feed system is in place, line up the 2 holes in the top of the upper boom bracket (506) holes with the corresponding 2 holes in boom section BC. Insert bolts (588) and tighten in place. Next, tighten the 8 bolts, securing the upper and lower boom brackets. Tighten the 4 bolts connecting the upper boom bracket to the mast plate.

Attach good quality coax with a PL-259 connector to the X7 matching network. Route the coax as shown in Figure 7C. Form a drip-loop with the coax and secure the coax to the boom. Insure PL-259 connector is waterproofed with a good quality sealant after it is attached to the matching network. Tighten the 8-32 bolt securing the matching network to the boom.

Tuning Procedure

The X7 does not require tuning. The broadband VSWR characteristics of the log cell can not be improved by adjusting element lengths. Varying the element dimensions from those suggested in this manual is not recommended. For help with tuning, please contact Cushcraft technical support.

The X7 Design Story

Cushcraft marketed its first 10-15-20 meter tri-bander, the ATB-34, in 1976. The antenna was updated mechanically and re-introduced as the A4 in 1980. The A4 evolved into the A4S when all hardware was changed to stainless steel.

The ATB-34, A4, A4S models became the most popular 18-foot tri-bander worldwide. In 1997 the A4S was evaluated for performance using the latest antenna design software. Computer analysis showed potential improvements were possible through the use of a log periodic cell for a driven element. The X7 was born. The log periodic cell feed is the only commercially available feed system with inherent forward gain over a dipole. By properly spacing the reflectors and directors, and input impedance of 200 ohms was achieved on 10, 15, and 20 meters. A 4:1 guadrifilar Guanella type ferrite balun was designed to provide a 50 ohm match at the X7 feedpoint.

The mechanical construction of the X7 was designed using Yagi Strength® (YS) software. A safety factor of 1.25 was used to guarantee an added cushion of safety over the 100 MPH rating of the boom, elements and hardware. All tubing for the boom and elements is 0.058 inch wall. The element and boom brackets are constructed of 6061-T6 extruded aluminum. All hardware is stainless steel.

On-the-air performance of the X7 yields an excellent radiation pattern, broadband low VSWR, and minimal trap loss.

Cushcraft has developed new manufacturing equipment to improve the quality of our products. Our products are now designed and constructed to a higher level of quality than ever before. We hope you will appreciate our efforts.

SPECIFICATIONS

Frequency Coverage (Meters) Total number of Elements		10, 15, 20 7
Maximum Gain (dB) 2	20M	12.5 @ 14 deg
	5M	13.0 @ 12 deg
above ground		10M 12.9 @ 14 deg
Maximum Front to Back Ratio (dB	B)	30
Number of Elements per Band	,	3
VSWR Minimum		1.1:1
VSWR 1.5:1 Bandwidth (KHz) 2	20M	600
	5M	750
1	ОМ	1700
Longest Element, ft (m)		37.2 (11.33)
Turning Radius, ft (m)		20.0 (6.09)
Boom Length, ft (m)		18 (5.49)
Boom Diameter, in (cm)		2-1/2 (6.35)
Maximum Mast Diameter OD, in	(cm)	2-1/2 (6.35)
Maximum Wind Survival, mph (kp	oh) ́	>100 (>161)
Maximum Wind Surface Area, ft ²	(m ²)	7.9 (.73)
Windload @ 80 mph, lb (kg)	、 ,	202 (92)
Maximum Power Handling (KW)		2
Weight, lb. (kg)		60 (27.2)
Design Safety Factor		1.25
- .		

Limited Warranty Cushcraft Corporation, 48 Perimeter Road, Manchester, New Hampshire 03103, 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 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 a limitation 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.



48 Perimeter Road, Manchester NH 03103 USA • Telephone: 603-627-7877 • Fax: 603-627-1764 • E-mail: sales@cushcraft.com Web Site: http://www.cushcraft.com • International - Tel: +1-603-627-7877 • Fax:+1-603-627-1764