



SkyHawk 3X10

20/15/10 Meter Tri-Band Yagi Antenna

DXE-3X10-INS Rev 2a



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DX Engineering SkyHawk 3X10

Congratulations on the purchase of your **DX Engineering SkyHawk 3X10**. You now possess the finest computer optimized tri-band on the market. The SkyHawk features low weight, zero mast torque, a balanced beam and high wind survival. Corrosion and UV resistant materials are used throughout its construction. Only stainless steel fasteners and rivets are used. Custom designed aluminum extrusions make assembly a snap. Multiple wall boom construction, eliminating the need for stays, coupled with ultra thin trap-free riveted elements significantly reduces wind load.



DX Engineering SkyHawk Tri-Band Yagi Antennas are the choice of experienced DXers, especially if your interest is HF contesting. The DX Engineering SkyHawk provides the highest payback in performance and operating pleasure compared to any other single component in your station.

This well-designed, single-tower system offers outstanding performance without the headaches of maintaining more substantial antenna farms. DX Engineering SkyHawk antenna reflects the latest computer-optimized design for maximum gain and bandwidth. It is built from the finest materials, including all stainless steel hardware.

The SkyHawk antenna offers minimal wind-loading for its size and is torque-balanced to reduce wear and tear on your rotor. Assembly is easy, as tower top adjustments have been eliminated and the elements are truly locked in place.

DX Engineering SkyHawk features include:

- EZ-mount system for attaching antenna to mast
- All parts de-burred
- Stainless steel pop-riveted elements
- Quality DX Engineering Balun and Balun mounting system
- No user adjustment required - just assemble and put it up

Additional specifications include:

20 meters:

- Three elements
- Effective boom length: 23 ft.
- VSWR: less than 1.4:1 between 14.0 and 14.35 MHz, measured at feed-point
- Front to back: >20 dB across the entire band
- F/B peaks at 14.150 MHz at 21 dB
- Gain: better than 7 dBi across band
- 7.4 dBi gain at 14.350 MHz

15 meters:

- Three elements
- Effective boom length: 15 ft., 6 in.
- VSWR: less than 1.5:1 between 21.0 and 21.45 MHz, measured at feed-point
- Front to back: >16 dB across the entire band
- F/B peaks at 21.350 at 24.5 dB
- Gain: better than 7 dBi across band
- 7.6 dBi gain at 21.45 MHz

10 meters:

- Four elements
- Effective boom length: 16 ft., 9 in.
- VSWR: less than 1.5:1 between 28.0 and 28.9 MHz, measured at feed-point
- Front to back: >14 dB across the entire band
- F/B peaks at 28.5 at 15 dB
- Gain: better than 7.7 dBi across band
- 9.2 dBi gain at 28.9 MHz

NOTE: ALL DIMENSIONS IS THIS INSTRUCTION ARE IN INCHES (MILLIMETERS) UNLESS OTHERWISE NOTED.

Required Tools

Rivet tool: POP Rivetool PRG 430, POP Rivetool PRGIII or equivalent

Flat blade screwdriver

Phillips head screwdriver

Nut Driver: 11/32" and 3/8" nut driver

Wrench: 7/16" and 1/2"

Pair of saw horses or similar support

Permanent marker

Before You Start

WARNING: INSTALLATION OF THIS PRODUCT NEAR POWER LINES IS DANGEROUS. FOR YOUR SAFETY FOLLOW THE INSTALLATION INSTRUCTIONS.

WARNING: AT NO TIME DURING ASSEMBLY, INSTALLATION, ADJUSTMENT, OR OPERATION SHOULD ANY PART OF THIS PRODUCT BE ALLOWED TO COME INTO CONTACT WITH ELECTRIC POWER LINES, NOR SHOULD THIS PRODUCT BE INSTALLED IN SUCH A WAY THAT ANY PART OF IT MAY CONTACT POWER LINES DURING NORMAL OPERATION OR IN THE EVENT OF STRUCTURAL FAILURE. FAILURE TO EXERCISE EXTREME CARE IN THIS MATTER CAN RESULT IN DAMAGE TO PROPERTY, PERSONAL INJURY OR DEATH.

Before you start assembling the antenna, read the instructions completely, paying special attention to the diagrams. When you unpack the box, do so on a surface where you will not lose small parts. Check the parts against the PARTS LIST, identifying each part carefully.

NOTE: Check to see that all parts are present before beginning assembly.

Installation Notes

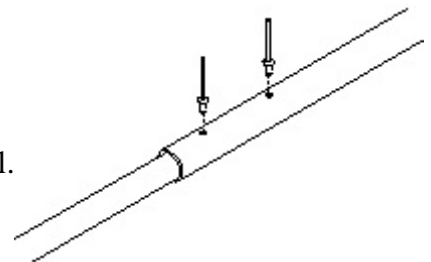
CHOOSING AN INSTALLATION SITE: As with all directional antennas, care must be taken in the choice of an installation site for your SkyHawk 3X10. Select a place clear of power lines or other obstructions. The SkyHawk 3X10 should be mounted at least 30 ft (9.1 m) above the ground for proper operation. If the SkyHawk 3X10 is mounted a full-wave above ground, the takeoff angle is 14° with a minor lobe at 40° or so. For a 1/2-wave it's closer to 20° . At mounting heights below 1/2-wave the takeoff angle is much greater than 20° . There's no easy way to calculate it, but there are graphs for wave angles at heights of 1/4, 1/8 and so on in any edition of the A.R.R.L. *Antenna Handbook*. The SkyHawk 3X10 should be able to rotate without hitting anything. Finally, it should not be near any large masses of metal, like metal roofing or siding. Plan your installation so that metallic guy wires are broken up with compression insulators and no other antennas are nearby, i.e. dipoles mounted right under the beam.

MASTS AND GUYING: In order to avoid coupling between antenna elements and guy wires that can de-tune the antenna it may be necessary to break up the guy wires with insulators. If the separation between the antenna and the highest set of guys is less than 15' (4.6m) it would be a good idea to use insulators on each of the uppermost guys at intervals of 10' (3m). Place the first insulator on each guy AT THE MAST OR TOWER, for that too is a conductor that can be coupled to the antenna by any horizontal or near-horizontal guy wire connected to it.

Rivet Installation

The elements of your SkyHawk 3X10 are assembled with two or three blind rivets per joint. Blind rivets were chosen to provide fast, strong, reliable, vibration proof assembly, with high grip and pull-up strengths. Open end stainless steel rivets are used because they provide better than 80% more shear and tensile strength than closed end aluminum rivets. Blind rivets are easily set by:

1. Line up the holes in each tube as shown in the diagram.
2. Insert a blind rivet in each hole.
3. Making sure the rivet is fully seated, set the rivet with rivet tool.
4. Repeat step 3 for the other rivets.



If for some reason you need to remove a blind rivet: Blind rivets may easily be removed by drilling through them with a 1/8(3) drill bit. Be careful not to drill through the entire element and be sure to remove any remnants left from the removed rivet.

Fastener Assembly

Installing and tightening fasteners is a simple procedure but one which is often done incorrectly. Tightening fasteners to the proper torque keeps bolts tight, increases joint strength, creates friction between parts to resist shear and improves the fatigue resistance of the connection. Unfortunately fasteners are usually over tightened causing them to fracture or at least causing thread damage making them impossible to disassemble.

It is strongly recommended that a lubricant such as **JTL-12555** Jet-Lube SS-20 Pure Copper Anti-Seize be used on the threads to reduce friction which allows the fastener to be properly tensioned.

The best way to properly tension a fastener is to tighten the nut until the lock washer is flat and then tighten it no more than an additional one quarter turn. This rule should be followed except for U-bolts and the 1/4 x 2-3/4(70) boom to saddle screw where one additional full turn is required.

Tubing Assembly

In order to decelerate oxidation and to improve electrical conductivity a high quality RF conductive anti-oxidizing compound should be used. **JTL-12555** Jet-Lube SS-30 is an ideal electrical joint compound that ensures proper electrical connections between aluminum and copper metal parts such as conductors, telescoping aluminum tubing, or other antenna and grounding parts. Apply a thin layer to each metal to metal antenna connection with a brush or clean cloth. Be careful not to accumulate excess material on other parts or yourself as it's quite difficult to remove and virtually impossible to clean out of clothing.

Parts List

10 Meter Reflector			
	Qty	Description	Size
<input type="checkbox"/>	1	Element Section A 10M	3/4(19) x 28(711)
<input type="checkbox"/>	2	Element Section B 10M	5/8(16) x 35-7/8(911)
<input type="checkbox"/>	2	Element Section C 10M Reflector	1/2(12) x 71-1/8(1,807)

10 Meter Driven			
	Qty	Description	Size
<input type="checkbox"/>	1	Element Insulator Driven	
<input type="checkbox"/>	2	Element Section A 10M Driven	3/4(19) x 14(356)
<input type="checkbox"/>	2	Element Section B 10M Driven	5/8(16) x 38(965)
<input type="checkbox"/>	2	Element Section C 10M Driven	1/2(13) x 68-43/64(1,744)

10 Meter Director 1			
	Qty	Description	Size
<input type="checkbox"/>	1	Element Section A 10M	3/4(19) x 28(711)
<input type="checkbox"/>	2	Element Section B 10M	5/8(16) x 35-7/8(911)
<input type="checkbox"/>	2	Element Section C 10M Director 1	1/2(13) x 63-23/32(1,618)

10 Meter Director 2			
	Qty	Description	Size
<input type="checkbox"/>	1	Element Section A 10M	3/4(19) x 28(711)
<input type="checkbox"/>	2	Element Section B 10M	5/8(16) x 35-7/8(911)
<input type="checkbox"/>	2	Element Section C 10M Director 2	1/2(13) x 64-9/16(1,640)

15 Meter Reflector			
	Qty	Description	Size
<input type="checkbox"/>	1	Element Section A 15M	3/4(19) X 47-7/8(1,216)
<input type="checkbox"/>	2	Element Section B 15M	5/8(16) X 59-7/8(1,521)
<input type="checkbox"/>	2	Element Section C 15M	1/2(13) X 71-7/8(1,826)
<input type="checkbox"/>	2	Element Section D 15M Reflector	3/8(10) X 28-15/32(723)

15 Meter Driven			
	Qty	Description	Size
<input type="checkbox"/>	1	Element Insulator Driven	
<input type="checkbox"/>	2	Element Section A 15M Driven	3/4(19) X 23-7/8(606)
<input type="checkbox"/>	2	Element Section B 15M Driven	5/8(16) X 59-7/8(1,521)
<input type="checkbox"/>	2	Element Section C 15M	1/2(13) X 71-7/8(1,826)
<input type="checkbox"/>	2	Element Section D 15M Driven	3/8(10) X 23-5/8(600)

15 Meter Director			
	Qty	Description	Size
<input type="checkbox"/>	1	Element Section A 15M	3/4(19) X 47-7/8(1,216)
<input type="checkbox"/>	2	Element Section B 15M	5/8(16) X 59-7/8(1,521)
<input type="checkbox"/>	2	Element Section C 15M	1/2(13) X 71-7/8(1,826)
<input type="checkbox"/>	2	Element Section D 15M Director	3/8(10) X 14-5/64(358)

20 Meter Reflector			
	Qty	Description	Size
<input type="checkbox"/>	1	Element Section A 20M	1(25) X 47-7/8(1,216)
<input type="checkbox"/>	2	Element Section B 20M	7/8(22) X 47-7/8(1,216)
<input type="checkbox"/>	2	Element Section C 20M	3/4(19) X 71-7/8(1,826)
<input type="checkbox"/>	2	Element Section D 20M	5/8(16) X 65-7/8(1,673)
<input type="checkbox"/>	2	Element Section E 20M	1/2(13) X 47-7/8(1,216)
<input type="checkbox"/>	2	Element Section F 20M Reflector	3/8(10) X 47-7/32(1,199)

20 Meter Driven			
	Qty	Description	Size
<input type="checkbox"/>	1	Element Insulator 20M Driven	
<input type="checkbox"/>	2	Element Section A 20M Driven	1(25) X 23-7/8(606)
<input type="checkbox"/>	2	Element Section B 20M Driven	7/8(22) X 47-7/8(1,216)
<input type="checkbox"/>	2	Element Section C 20M	3/4(19) X 71-7/8(1,826)
<input type="checkbox"/>	2	Element Section D 20M	5/8(16) X 65-7/8(1,673)
<input type="checkbox"/>	2	Element Section E 20M	1/2(12) X 47-7/8(1,216)
<input type="checkbox"/>	2	Element Section F 20M Driven	3/8(10) X 28-3/16(716)

20 Meter Director			
	Qty	Description	Size
<input type="checkbox"/>	1	Element Section A 20M	1(25) x 47-7/8(1,216)
<input type="checkbox"/>	2	Element Section B 20M	7/8(22) X 47-7/8(1,216)
<input type="checkbox"/>	2	Element Section C 20M	3/4(19) X 71-7/8(1,826)
<input type="checkbox"/>	2	Element Section D 20M	5/8(16) X 65-7/8(1,673)
<input type="checkbox"/>	2	Element Section E 20M	1/2(12) X 47-7/8(1,216)
<input type="checkbox"/>	2	Element Section F 20M Director	3/8(10) X 10-1/2(267)

Boom			
	Qty	Description	Size
<input type="checkbox"/>	1	Boom Section A	2(51) X 71-7/8(1,826)
<input type="checkbox"/>	1	Boom Section B	2(51) X 71-7/8(1,826)
<input type="checkbox"/>	1	Boom Section C	2(51) X 71-7/8(1,826)
<input type="checkbox"/>	1	Boom Section D	2(51) X 71-7/8(1,826)
<input type="checkbox"/>	1	Boom Splice A	1-7/8(48) X 71-3/4(1,822)
<input type="checkbox"/>	1	Boom Splice B (Double Wall Tube)	1-7/8(48) X 71-3/4(1,822)
<input type="checkbox"/>	1	Boom Splice C	1-7/8(48) X 71-3/4(1,822)
<input type="checkbox"/>	1	Element Compensator	1.9(48) X 56(1,422)

Hardware			
	Qty	Description	Size
<input type="checkbox"/>	4	Element Saddle	1-1/4
<input type="checkbox"/>	10	Element Saddle	1
<input type="checkbox"/>	11	Boom Saddle	
<input type="checkbox"/>	1	Mast Saddle	

Boom/Mast Plates			
	Qty	Description	
<input type="checkbox"/>	2	1/4-20 HEX NUT 18-8 (7/16 X 7/32)	
<input type="checkbox"/>	2	1/4 SPLIT RING LW 18-8	
<input type="checkbox"/>	2	#10 SPLIT RING LW 18-8	
<input type="checkbox"/>	2	#10-32 X 3/8 PHIL RND HD MS 18-8	
<input type="checkbox"/>	1	MAST PLATE	
<input type="checkbox"/>	1	BOOM PLATE	
<input type="checkbox"/>	4	5/16-18 HEX NUT 18-8 (1/2 X 17/64)	
<input type="checkbox"/>	4	5/16 SPLIT RING LW 18-8	
<input type="checkbox"/>	2	1/4-20 X 2-3/4 PHIL RND HD MS 18-8	
<input type="checkbox"/>	2	5/16-18 X 2 X 3-1/8 U-BOLT 18-8	
<input type="checkbox"/>	2	U-BOLT SADDLE 2	
<input type="checkbox"/>	4	5/16 FLAT WASHER 18-8 (11/32 X 11/16 X 1/16)	
<input type="checkbox"/>	4	5/16-18 HEX SERRATED FLANGE NUT 18-8 (1/2 X 9/32)	
<input type="checkbox"/>	4	5/16-18 X 1-1/4 FLANGE HEAD HEX CS 18-8	

Balun Assembly			
	Qty	Description	
<input type="checkbox"/>	1	BALUN WITH MOUNTING PLATE ASSEMBLY and Hardware	
<input type="checkbox"/>	1	BALUN CLAMP ASSEMBLY	

Boom Compensator		
	Qty	Description
<input type="checkbox"/>	3	#10 SPLIT RING LW 18-8
<input type="checkbox"/>	3	#10-24 HEX NUT 18-8 (3/8 X 1/8)
<input type="checkbox"/>	3	#10-24 X 3/4 PHIL RND HD MS 18-8
<input type="checkbox"/>	2	BOOM COMPENSATOR BRACKET
<input type="checkbox"/>	1	BOOM COMPENSATOR

Boom Hardware Package		
	Qty	Description
<input type="checkbox"/>	43	1/4-20 HEX NUT 18-8 (7/16 X 7/32)
<input type="checkbox"/>	43	1/4 SPLIT RING LW 18-8
<input type="checkbox"/>	2	1/4-20 X 2 X 2-11/16 U-BOLT 18-8
<input type="checkbox"/>	28	1/4-20 X 5/8 PHIL RND HD MS 18-8
<input type="checkbox"/>	11	1/4-20 X 2-3/4 PHIL RND HD MS 18-8
<input type="checkbox"/>	2	PROTECTIVE CAP 2

Driven Element Boom Hardware Package		
	Qty	Description
<input type="checkbox"/>	12	1/4-20 HEX NUT 18-8 (7/16 X 7/32)
<input type="checkbox"/>	12	1/4 SPLIT RING LW 18-8
<input type="checkbox"/>	2	COMPRESSION CLAMP SMALL ADJUSTABLE
<input type="checkbox"/>	12	1/4-20 X 5/8 PHIL RND HD MS 18-8
<input type="checkbox"/>	4	ELEMENT SADDLE 1 DRIVEN
<input type="checkbox"/>	2	ELEMENT SADDLE 1-1/4 DRIVEN
<input type="checkbox"/>	2	ELEMENT SPACER
<input type="checkbox"/>	2	FEED STRAP

Element Hardware Package		
	Qty	Description
<input type="checkbox"/>	6	# 8 SPLIT RING LW 18-8
<input type="checkbox"/>	6	# 8-32 HEX NUT 18-8 (11/32 X 1/8)
<input type="checkbox"/>	6	# 8-32 X 1-1/2 PHIL RND HD MS 18-8
<input type="checkbox"/>	136	1/8 X 17/64 POP RIVET 18-8

Assembly - Driven Elements

10DR	15DR	20DR
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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1. Locate the bag for the element you wish to assemble.
2. Locate one of the B element sections and slide the side with one hole into one of the A element sections so all holes line up.
NOTE: If the holes don't line up exactly, rotate one or both of the elements 180°.
3. Insert one end of the element insulator into the above assembly. Line up the holes and pass a # 8 x 1-1/2 in (38 mm) screw followed by a # 8 lock washer and hex nut. Hand tighten
4. Slide the side with one hole of the other B element section into the remaining A element section so all the holes line up.
5. Insert the other end of the element insulator into the above assembly. Line up the holes and pass a # 8 x 1-1/2 in (38 mm) screw followed by a # 8 lock washer and hex nut. Hand tighten
6. Locate one of the C element sections and insert the side with the two holes furthermost from the end into one of the B element sections. Line up all the holes and secure with two rivets.
7. Identify the completed 10 meter element section with a felt tip marker.
8. Locate one of the C element sections and insert the side with the three holes furthermost from the end into one of the B element sections. Line up all the holes and secure with three rivets.
9. Insert the other C element section into the other B element section as above and secure with three rivets.
10. Locate one of the D element sections and insert the side with the two holes furthermost from the end into one of the C element sections. Line up all the holes and secure with two rivets.
11. Insert the other D element section into the other C element section as above and secure with two rivets.
12. Identify the completed 15 meter element section with a felt tip marker.
13. Locate one of the E element sections and insert it into one of the D element sections. Line up all the holes and secure with two rivets.
14. Insert the other E element section into the other D element section as above and secure with two rivets.
15. Locate one of the F element sections and insert it into one of the E element sections. Line up all the holes and secure with two rivets.
16. Insert the other F element section into the other E element section as above and secure with two rivets.
17. Identify the completed 20 meter element section with a felt tip marker.

Assembly - Elements

10D2	10D1	10R	15D	15R	20D	20D
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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					<input type="checkbox"/>	<input type="checkbox"/>
					<input type="checkbox"/>	<input type="checkbox"/>
					<input type="checkbox"/>	<input type="checkbox"/>

1. Locate the bag for the element you wish to assemble.
2. Locate one of the B element sections and insert the side with the three holes furthermost from the end into one side of the A element section. Line up all the holes and secure with rivets.
3. Insert the other B element section into the other side of A element section as above and secure with rivets.
4. Locate one of the C element or tip sections and insert the side with the two or three holes furthermost from the end into one of the B element sections. Line up the all the holes and secure with rivets.
5. Insert the other C element or tip section into the other B element section as above and secure with rivets.
6. Identify the completed 10 meter element section with a felt tip marker.
7. Locate one of the D element or tip sections and insert the side with the two holes furthermost from the end into one of the C element sections. Line up all the holes and secure with two rivets.
8. Insert the other D element or tip section into the other C element section as above and secure with two rivets.
9. Identify the completed 15 meter element section with a felt tip marker.
10. Locate one of the E element sections and insert it into one of the D element sections. Line up all the holes and secure with two rivets.
11. Insert the other E element section into the other D element section as above and secure with two rivets.
12. Locate one of the tip sections and insert it into one of the E element sections. Line up all the holes and secure with two rivets.
13. Insert the other tip section into the other E element section as above and secure with two rivets.
14. Identify the completed 20 meter element section with a felt tip marker.

Assembly - Boom

Each boom has been assembled and each section numbered for easy reassembly. In the event that the numbers have worn off, each section may be identified using the dimensions given in the pictorial found shown in this manual.

- 1. Find boom section A which may be identified with the number “1” at one end and boom splice A which may be identified with the “1” and “2” in the center.
- 2. Place a saddle over the holes closest to the unidentified end of boom section A and secure with a 1/4 x 2-3/4(70) screw, lock washer and hex nut.
- 3. Slide the end identified with “1” of boom section A over the “1” side of boom splice A and lineup the holes.
- 4. Place a boom saddle over the above set of holes and secure with a 1/4 x 2-3/4(70) screw, lock washer and hex nut.
- 5. Repeat the above for boom section B and boom splice B placing a boom saddle over each set of holes and securing with a 1/4 x 2-3/4(70) screw, lock washer and hex nut
- 6. Slide the “4” end of boom section C over boom splice B and place boom saddles over the first two sets of holes and secure with 1/4 x 2-3/4(70) screws, lock washers and hex nuts.
- 7. Line up the four holes of the mast saddle with those in the tube above and secure with two 1/4 x 2-3/4(70) screw, lock washer and hex nut.
- 8. Attach, with the threaded holes up, the boom plate to the boom saddle using two #10 x 3/8(10) screws and lock washer.
- 9. Insert two 5/16 x 1(25) hex head screws and tighten.
- 10. Start a flange nut on each screw.
NOTE: The above flange nuts must kept loose enough to allow easy insertion into the mast plate.
- 11. Continue assembling boom splice C and boom section D adding boom saddles as above except for the second and third set of holes on the end of boom section D.
- 12. Line up the boom compensator brackets and boom compensator.
- 13. Insert a #10 x 3/4(19) screw through one of the holes, followed by a #10 lock washer and hex nut. Hand tighten.
- 14. Repeat the above step for the remaining two holes.
- 15. Line up the holes of two boom saddles with the second and third set of holes from the end of boom section D.
- 16. Position the boom compensator over the two boom saddles and line up all four holes and secure with two 1/4 x 2-3/4(70) screw, lock washers and hex nuts.
- 17. Tighten the #10 hex nuts on the boom compensator.
- 18. Place a boom cap over each end of the boom. When the boom end caps are in place, open a small hole in the lower edge of the boom end caps to allow any condensation or moisture to weep out of the boom assembly.

This completes assembly of the boom.

NOTE: The end of the boom with the boom compensator is the FRONT of the antenna.

Assembly - Driven Elements to Boom

In the following steps, each driven element will be assembled onto the boom. You will find that assembly will be much easier if the boom is supported by a saw horse or similar support at either end. Refer to the ELEMENT POSITION page at the end of this instruction for proper placement.

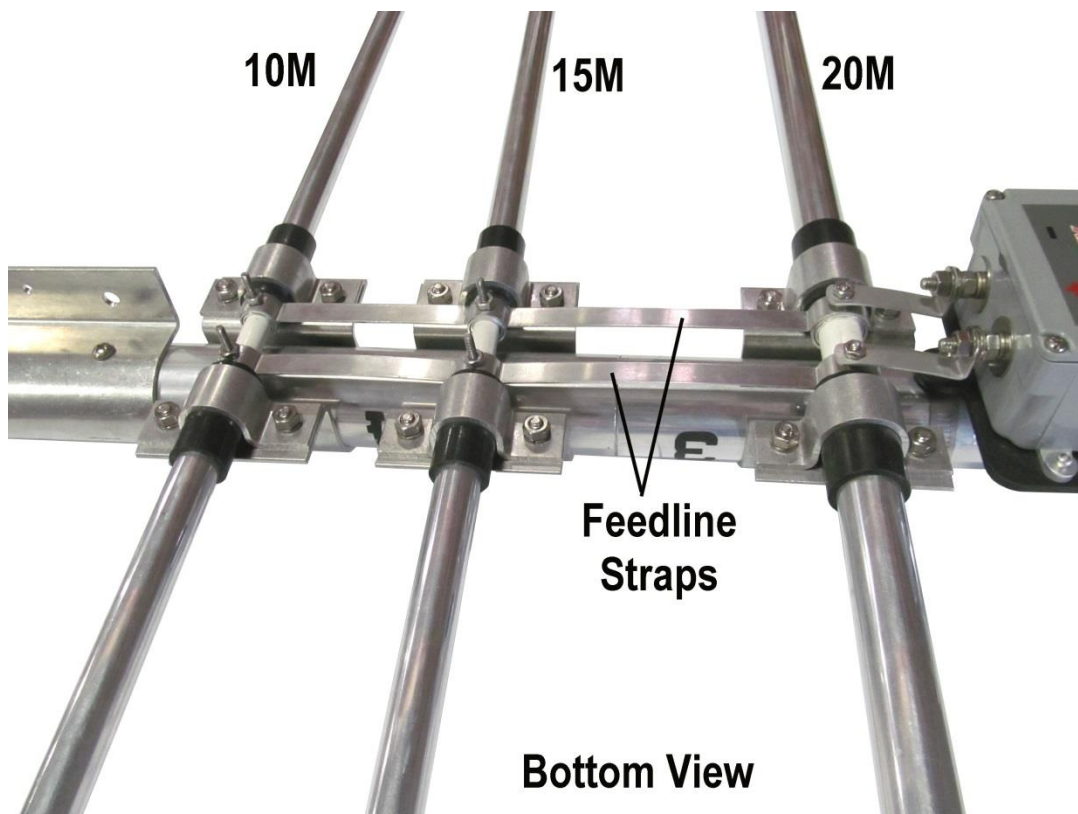
10DR	15DR	20DR
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

1. Rotate the boom so the flat portion of the boom saddles are facing down.
2. Insert a 1/4 x 5/8(16) screw through each hole on one side of the boom saddle.
3. Position an element saddle as shown followed by a 1/4 lock washer and hex nut. Tighten only enough so the nut won't fall off (two or three turns).
4. Slide one side of a driven element through the element saddle.
5. Assemble an element saddle on the other side and secure with 1/4 x 5/8(16) screws, lock washers and hex nuts.
6. Center the element insulator and position the nut side of the screws *down*.

Repeat steps 2 through 6 for the remaining two driven elements.

IMPORTANT! Driven element saddles are narrower than the others and are not interchangeable.

NOTE: The two large element saddles are used on 20 meter element while the four smaller saddles are for 10 and 15 meters.



- 7. Remove the #8 hex nuts and lock washers from each driven element.
- 8. Place one of the feed straps onto the driven elements as shown and secure with #8 lock washers and hex nuts. Do not tighten hex nuts at this time.
- 9. Place the remaining feed strap onto the driven elements and secure with #8 lock washers and hex nuts. Once again, do not tighten the hex nuts at this time.
- 10. Align all three center insulators.
- 11. Tighten the #8 hex nuts starting with the 15 meter driven element, followed by the 10 and then 20 meter driven elements.
- 12. Straighten the feed straps making sure they are parallel to the boom.
- 13. If necessary, realign the element insulators.
- 14. Tighten the 1/4 hex nuts on all of the driven element saddles.

Assembly - Elements to Boom

In the following steps, each element and the element compensator will be assembled onto the boom. You will find that assembly will be much easier if the boom is supported by a saw horse or similar support at either end. Refer to the pictorial on the pullout sheet and the ELEMENT POSITION page at the end of this instruction for proper placement.

NOTE: The elements may be slid through both clamps after they are installed.

IMPORTANT: LARGE ELEMENT SADDLES ARE USED TO SECURE THE TWO 20 METER ELEMENTS TO THE BOOM. THE REMAINING ELEMENTS ARE SECURED WITH SMALL ELEMENT SADDLES.

20R	20D	15R	15D	10R	10D1	10D2
□	□	□	□	□	□	□
□	□	□	□	□	□	□
□	□	□	□	□	□	□
□	□	□	□	□	□	□
□	□	□	□	□	□	□

1. Insert a 1/4 x 5/8(16) screw through each hole on the boom saddle.
2. Position an element saddle on one side followed by a 1/4 lock washer and hex nut. Tighten only enough so the nut won't fall off (two or three turns).
3. Repeat the above procedure for the other side of the element saddle.
4. Slide the element through both element saddles.
5. Center the element insulator and position the rivet side of the element down. Securely tighten all four fasteners.

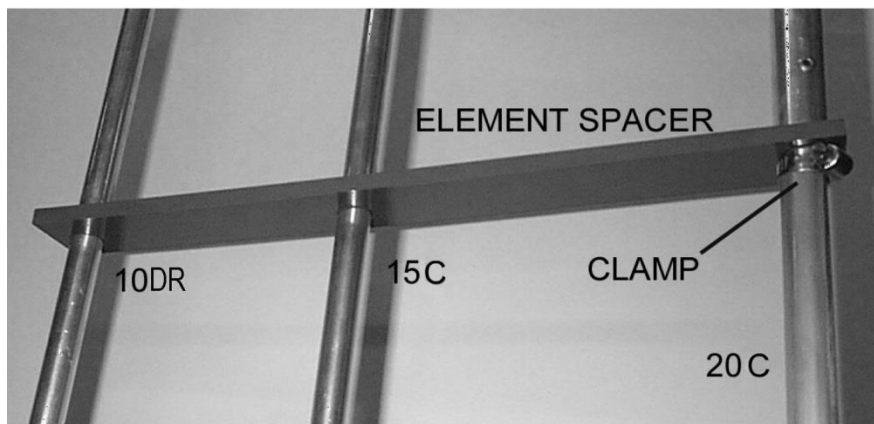
Repeat steps 1 through 5 for the remaining elements.

- 6. Insert a 1/4 x 2(51) U-bolt into the left hand pair of holes on the second boom saddle. Secure it with 1/4 lock washers and hex nuts
- 7. Insert a second 1/4 x 2(51) U-bolt into the right hand pair of holes on the same boom saddle. Secure it with 1/4 lock washers and hex nuts.
- 8. Insert the element compensator through the two U-bolts and center it.
- 9. Tighten the nuts on each U-bolt leg evenly. **NOTE:** Do not over tighten the U-bolts as this will only deform the compensator and possibly break it.
- 10. Sight down the boom and make sure that the elements all line up.
- 11. Straighten any out of line elements and re-tighten boom saddle screws as necessary.

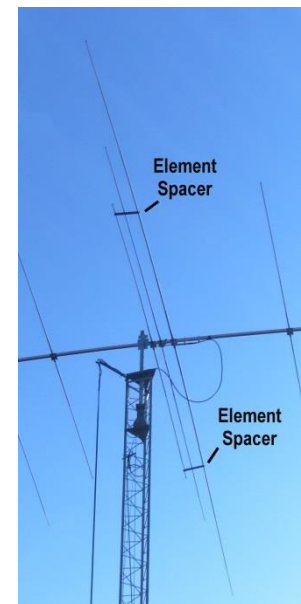
Assembly - Element Spacer

The element spacers are designed to maintain the relationship between the three driven elements providing unchanging performance under a wide variety of operating conditions. They will be placed on element sections 20C, 15C and 10DR.

- 1. Slide the large hole of one of the element spacers over the 20 meter driven element. As you approach the 15 meter driven element, slide it through the center hole followed by the 10 meter element through the end hole.
NOTE: Position the notched side of the holes to slide over the rivets.



Bottom View

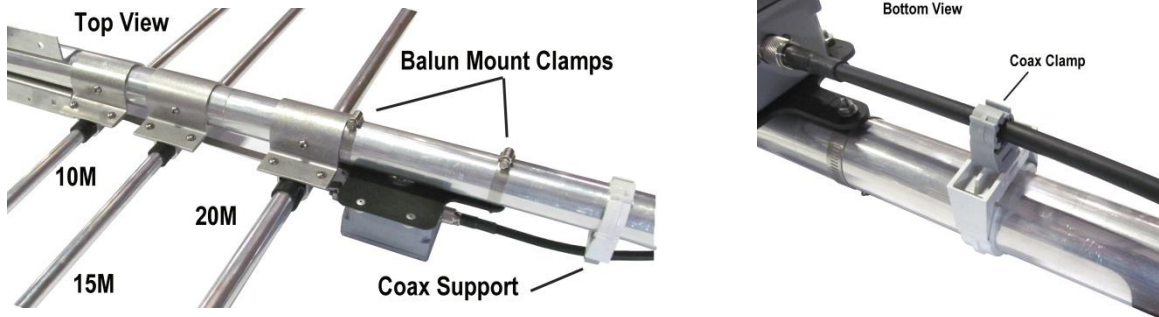


- 2. Position the element spacer so it rests against the end of element 20C.
- 3. Slide one of the hose clamps over the 20 meter driven element until you reach the element spacer. Securely tighten the hose clamp leaving about a 1/16" of clearance between it and the spacer.

Repeat steps 1 through 3 for the remaining element spacer.

Assembly - Balun

- 1. Install the Balun mounting plate with clamps and coax clamp to the rear of the 20 meter driven element as shown. Do not tighten the Balun clamps until step 5.



- 2. Verify the Balun leads are facing the 20 meter driven element.



- 3. Attach one of the Balun strap to one of the screws on the 20 meter driven element using the feedline strap and hardware as shown above. Adjust the Balun position so there is no strain on the feedline strap.
- 4. Attach the second Balun feedline strap as above.
- 5. Tighten the Balun mounting clamps in place.

NOTE: The following three steps may completed after the antenna is installed on the tower.

- 6. Install the coax clamp assembly behind the Balun as shown.
- 7. Connect the feed line to the Balun
- 8. Seal the Balun coax connection



Boom Mounting Plate

Attach the Boom Mounting Plate to the Boom Mounting Bracket using two small Phillips Head screws and split washers as shown.



Loosely install two Flange Head Hex bolts in the mounted mast plate in the upper two threaded holes as shown. Allow approximately 3/8" (0.95cm) between mast plate and the bottom of the flange part of the bolt as shown.



Boom End Caps and Drain Holes

Install the Vinyl Boom Caps on the ends of the boom. Wrap electrical tape around the cap and on the boom to help ensure the cap stays in place over time.

Cut a triangle drain hole in the bottom of the cap as show. This allows any moisture build up in the boom to vent out.



Mast Plate Mounting on Antenna Mast

The mast plate is supplied with hardware to mount to a 2" OD (51mm) mast. Additional holes in the mast plate have been provided to accommodate a 2-3/8" (60mm) mast with customer supplied clamps and hardware.

Position a 2" (51mm) U-bolt saddle over the second pair of holes from the top as shown.

Pass a 5/16 x 2" (51mm) U-bolt through the 2" (51mm) U-bolt saddle and mast plate. Secure with a 5/16" flat washers, lock washers and hex nuts.

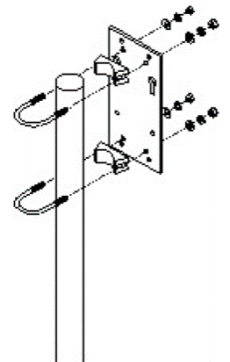
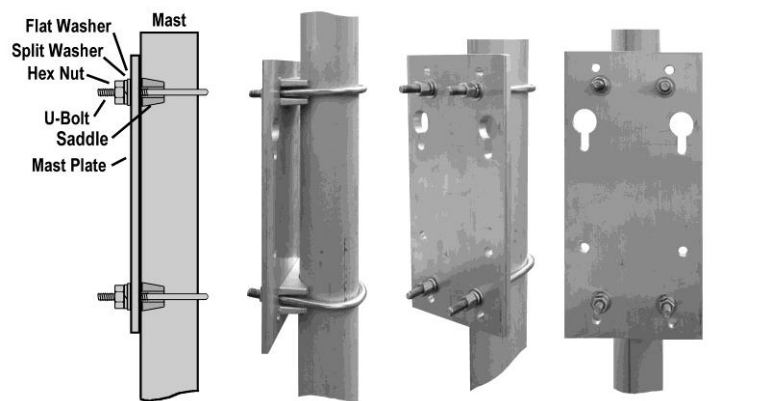
Position a 2" (51mm) U-bolt saddle over the second pair of holes from the bottom as shown.

Pass a 5/16 x 2" (51mm) U-bolt through the 2" (51mm) U-bolt saddle and mast plate. Secure with a 5/16" flat washers, lock washers and hex nuts.

Slide this assembly over the mast, with the top of the large end of the keyhole facing up and securely tighten in place.

The best way to properly tension a fastener is to tighten the nut until the lock washer is flat and then tighten it no more than an additional one quarter turn. This rule should be followed except for the Mast Mount Plate U-bolts where one additional full turn is required.

NOTE: IT IS EXTREMELY IMPORTANT THAT EACH HEX NUT IS EVENLY TIGHTENED. APPLYING UNEQUAL AMOUNTS OF TORQUE TO THE U-BOLT LEGS MAY LEAD TO PREMATURE FAILURE



Mounting the antenna to the Antenna Mast Assembly

Ensure all proper safety precautions are followed while on the tower to avoid any personal injury.

Line up the two Flange Head Bolt Heads located on the boom plate with large hole in each keyhole on the mast plate as shown.

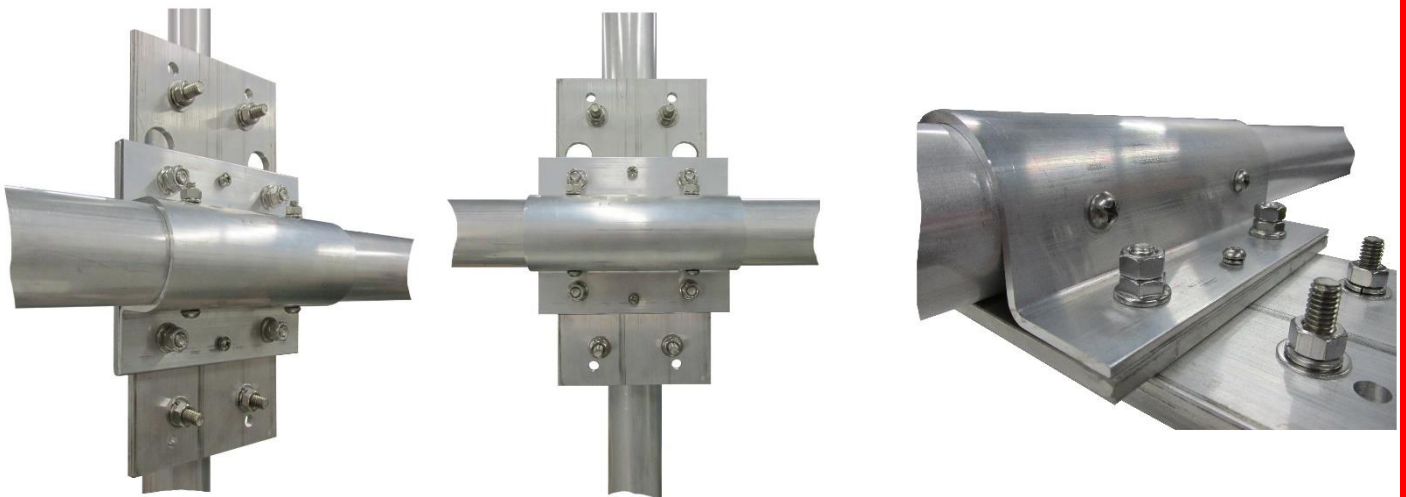
Pass the Flange Hex Heads through the Mast Plate (larger holes) and let the Flange Head Bolts and Boom drop into the slots on the Mast Plate as shown.



Snug the two upper Flange Head Hex Bolts in place when the holes are all lined up. Snug two Hex Nuts with split washers on the other side in place.

Insert 5/16 x 1" (25 mm) Flange Head Hex Bolts through one of the lower holes. Tighten the Flange bolts and secure with Hex Nuts and split washers.

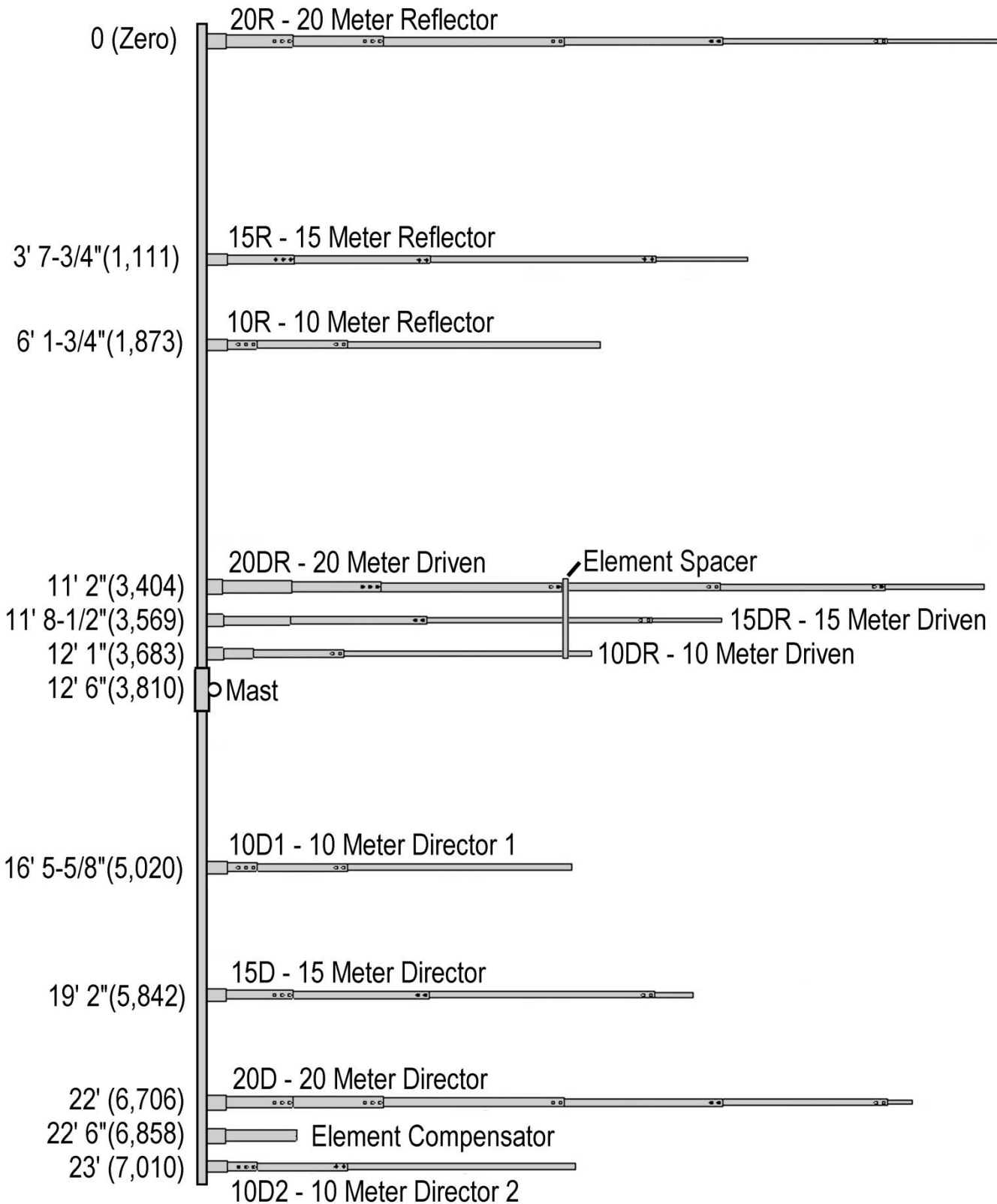
Securely tighten the upper Flange Hex Bolts and Hex Nuts. Securely add regular Hex Nuts on top of all four of the Flange Hex Nuts used to act as nut locks

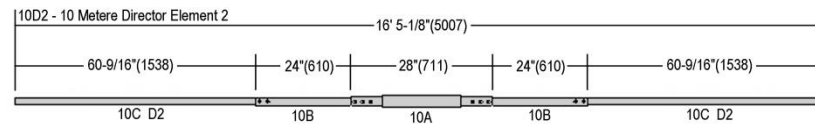
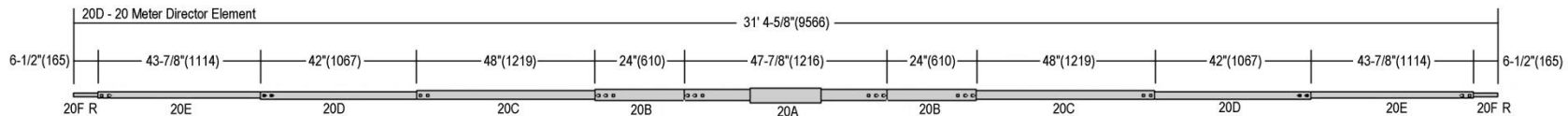
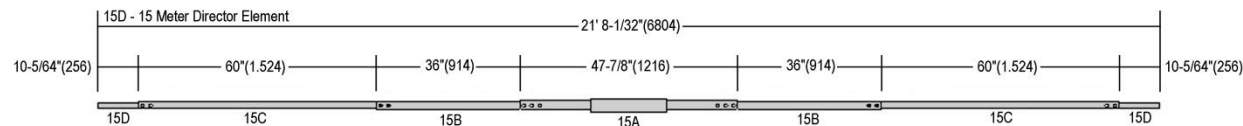
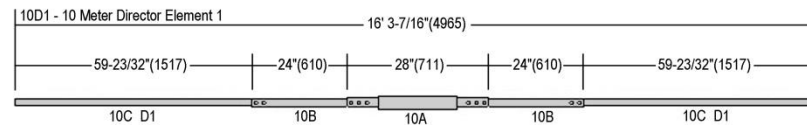
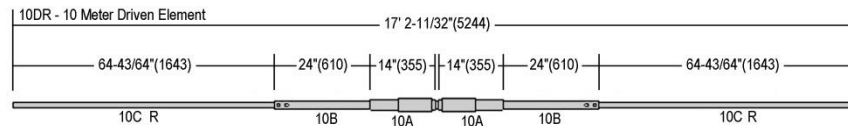
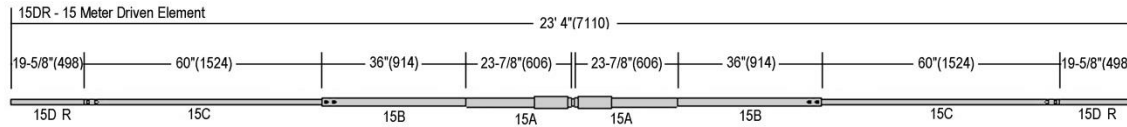
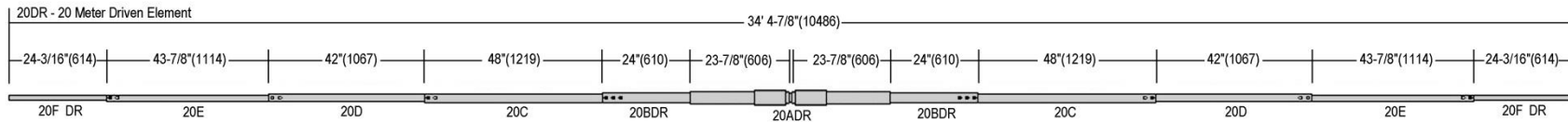
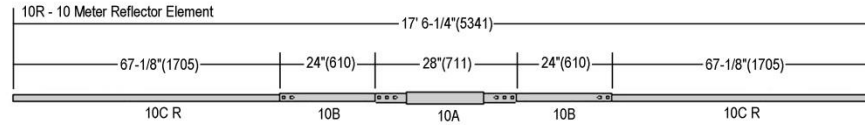
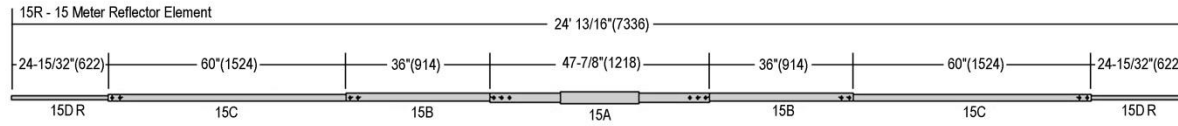
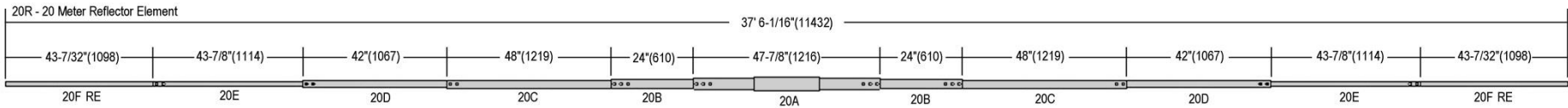


Connect and weatherproof the coaxial cable connection to the Balun (if not previously done).

Use electrical tape to secure the coax cable to the mast as needed.

Element Position



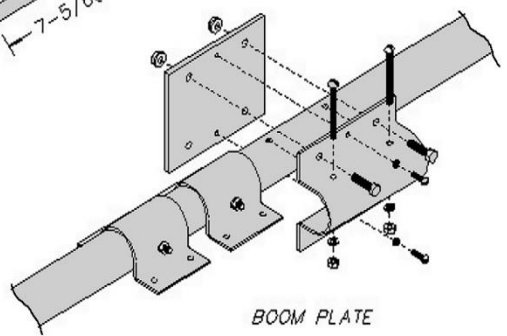
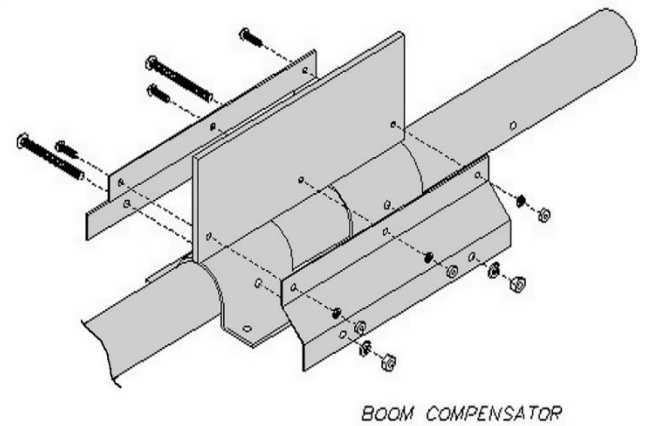
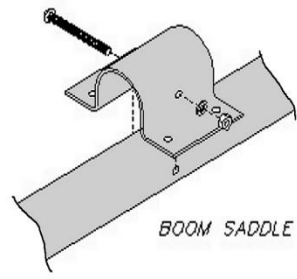
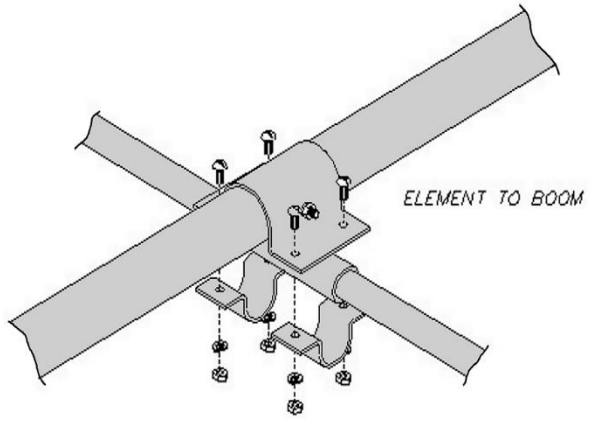
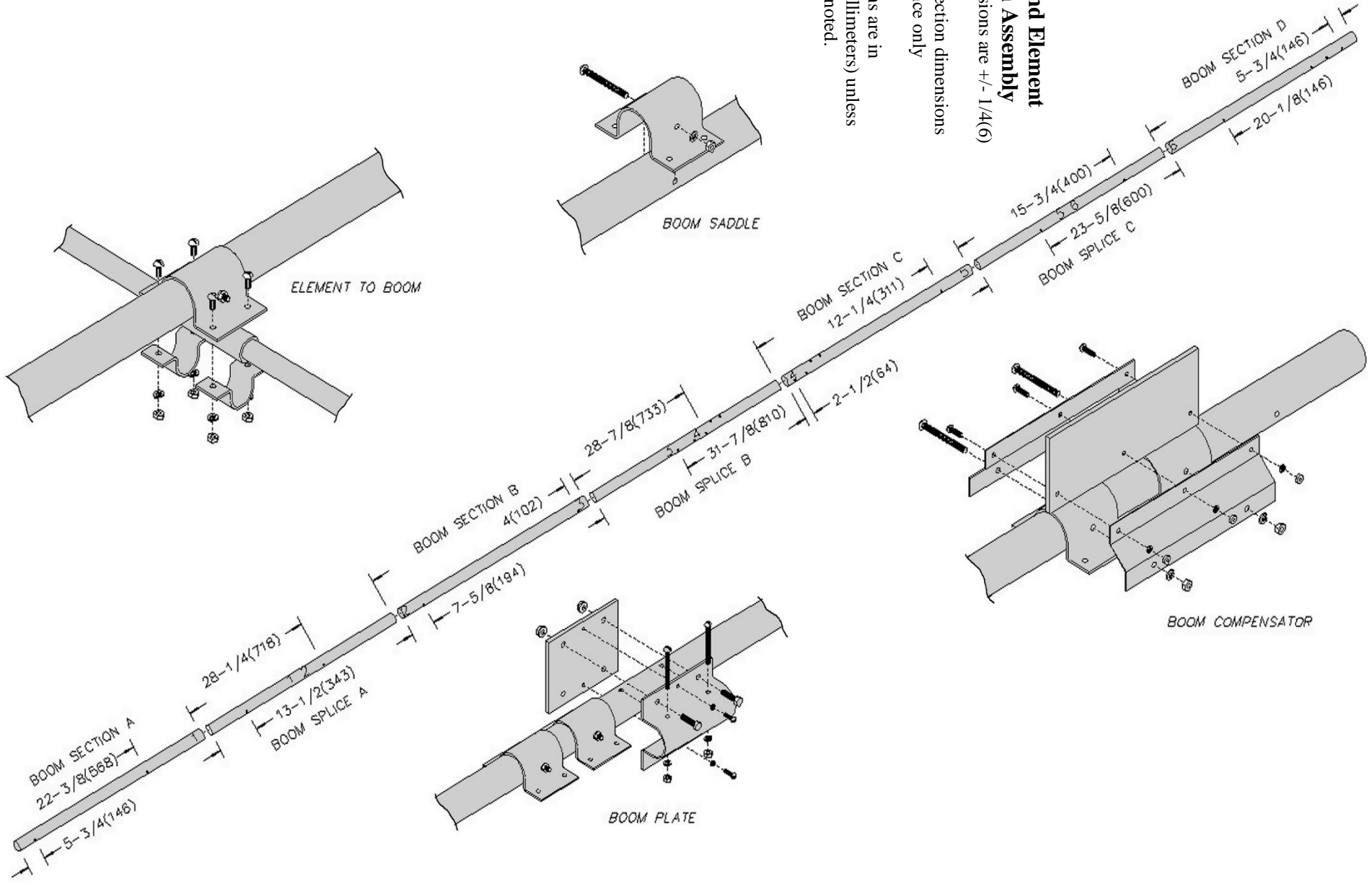


Note: All dimensions are +/- 1/4"(6mm)
 Element section dimensions are reference only
 Dimensions are in inches(millimeter) unless otherwise noted

All dimensions are +/- 1/4(6)
 Element section dimensions
 are reference only
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 inches (millimeters) unless
 otherwise noted

Element Assembly

Boom and Element to Boom Assembly
 All dimensions are $\pm 1/4(6)$
 Element section dimensions are reference only
 Dimensions are in inches (millimeters) unless otherwise noted.



Notes

Notes

Technical Support

If you have questions about this product, or if you experience difficulties during the installation, contact DX Engineering at (330) 572-3200. You can also e-mail us at:

DXEngineering@DXEngineering.com

For best service, please take a few minutes to review this manual before you call.

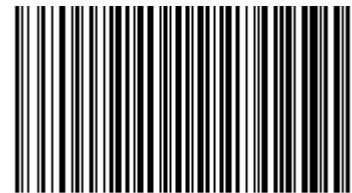
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