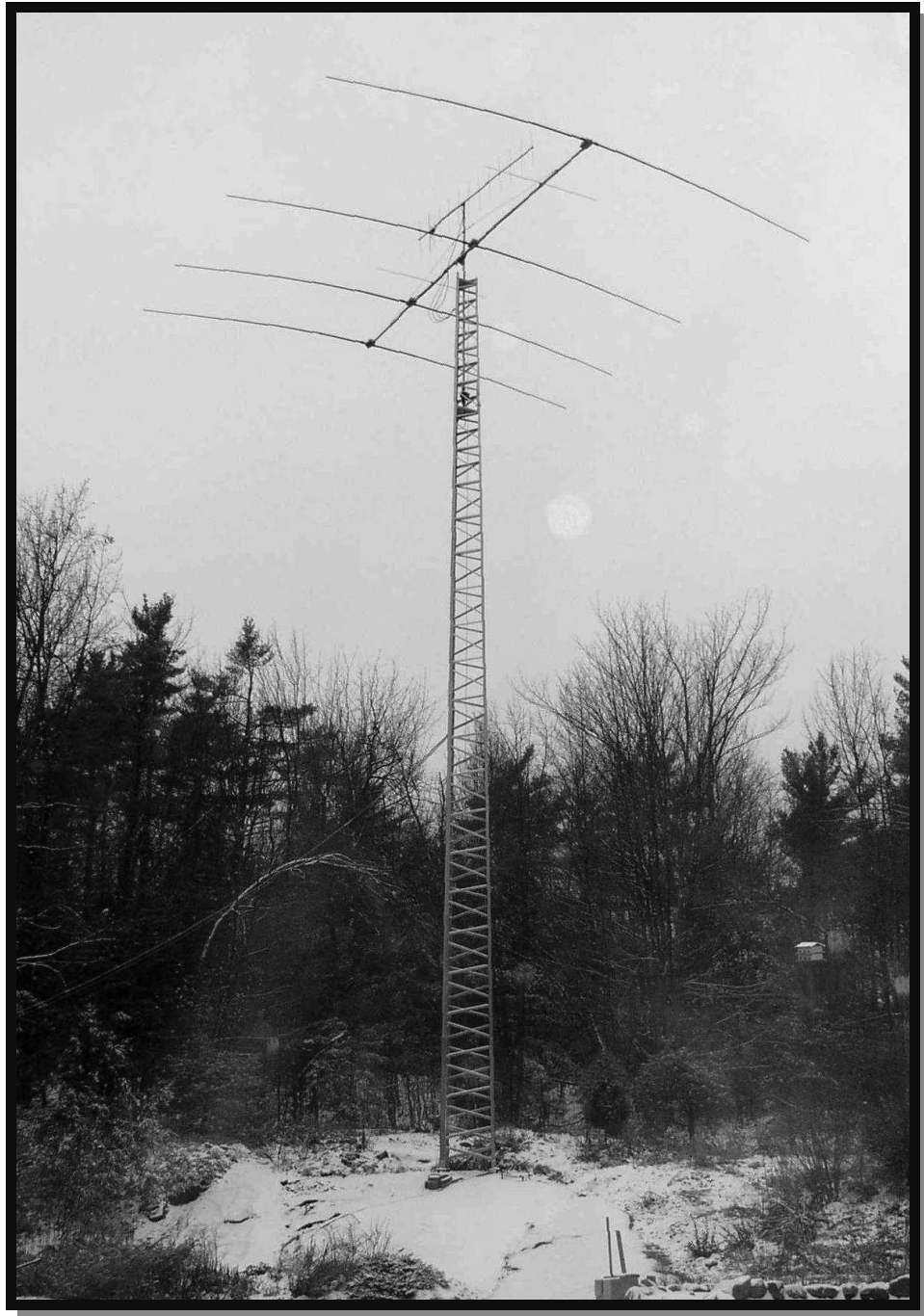


SteppIR TM ***Antenna Systems***

Yagi • Dipole • Vertical (Patent Pending)

SteppIR 4 Element Yagi Installation Instructions



SteppIR Antennas

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<<<WARNING>>>

Do not connect the antenna controller box or apply power to the antenna until instructed to do so. Otherwise, you may upset factory calibrations and possibly damage components.

PARTS LIST

<u>Description</u>	QTY	✓
Assembly Instructions	1	
Operators Manual	1	
SteppIR™ antenna controller	1	
Power supply for controller (1)	1	
Aluminum boom sections (2)	7	
Boom to mast plate 11.5" x 11.5"	2	
Driven element housing unit	1	
Passive element housing unit (3)	3	
Green fiberglass element support tubes	8	
Flexible connection couplings	8	
16 Conductor control cable, 22 AWG shielded (4)	1	
OPTIONAL: 6 meter passive element	2	
OPTIONAL: Transceiver interface w/ cable (interface is already installed in controller)	1	
<u>BOOM ASSEMBLY PACK</u>		
1/4-20 x 3" Bolt	8	
1/4-20 x 2.50" Bolt	2	
1/4-20 Nylock nut	10	
2-1/2" U Bolt	2	
2" Extended leg U Bolt	4	
5/16" Nylock nuts	12	
<u>TRUSS ASSEMBLY PACK</u>		
1/8" Phillystran Kevlar® guy wire	26 ft	
2" U Bolt	1	
5/16" Nylock nuts	4	
2" flat plate with poles	1	
3/16" Wire clips, galvanized	16	
3/16" Thimble, galvanized	4	
1/4" x 4" Turnbuckle, galvanized	2	
5/16" x 4" Eye bolt w/ nut and lock washer	3	
3/8" x 3" full thread bolt, 3 nylok nuts & 2 3/8" flat washers (EZeye™ components) (5)	1	

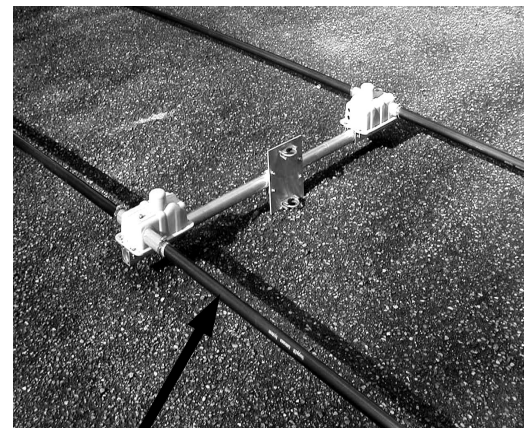
PARTS LIST

<u>Description</u>	QTY	✓
<u>TERMINAL STRIP / EHU PACK</u>		
2" OD PVC tube with 2 end caps attached (6)	1	
8 position terminal strip (7)	2	
1 position ground strip (7)	1	
#56 Stainless hose clamp	1	
Blue packet of connector protector (8)	2	
#10-32 x 3/4" Phillips screw w/ Nylock nut and flat washer (in own folded bag)	32	
All weather electrical tape	2	
20 ft Black silicone self curing wrap	2	

- (1.) Includes two power cords; one AC and one attached 24 volt
- (2.) Element-to-boom brackets have been factory installed on 4 of the boom sections. Lengths consist of: two 1-3/4" x 48"; two 2"x72"; two 2.25"x48"; one 2.5"x72")
- (3.) Two reflectors and one director; each unit is identical
- (4.) Length as specified when ordering antenna; 25 pin DB-25P factory installed on one end
- (5.) EZeye™ is used to support the boom while connecting to mast plate, and for leveling of elements
- (6.) One cap has been glued in place. The other is attached but not glued
- (7.) Packed inside the PVC tubing
- (8.) Use this compound for protecting the control cable wires and a small amount for easing installation of flexible connection couplers

Abbreviations

EHT	Element Housing Tube
EHU	Element Housing Unit
EST	Element Support Tube (pole)
FCC	Flexible Connection Coupler (rubber)

EHT**EHU****FCC****EST**

SteppIR Antenna Information Web Sites(as of 8/03/06)

<http://steppir.com/>

<http://groups.yahoo.com/group/steppir/>

<http://www.steppir.com/cgi-bin/ultimatebb.cgi>

SteppIR - Why Compromise?

The SteppIR antenna was originally conceived to solve the problem of covering the six ham bands (20m, 17m, 15m, 12m, 10m and 6m) on one tower without the performance sacrifices caused by interaction between all of the required antennas.

Yagis are available that cover 20 meters through 10 meters by using interlaced elements or traps, but do so at the expense of significant performance reduction in gain and front to back ratios. With the addition of the WARC bands on 17m and 12m, the use of interlaced elements and traps has clearly been an exercise in diminishing returns.

Obviously, an antenna that is precisely adjustable in length while in the air would solve the frequency problem, and in addition would have vastly improved performance over existing fixed length yagis. The ability to tune the antenna to a specific frequency, without regard for bandwidth, results in excellent gain and front to back at every frequency.

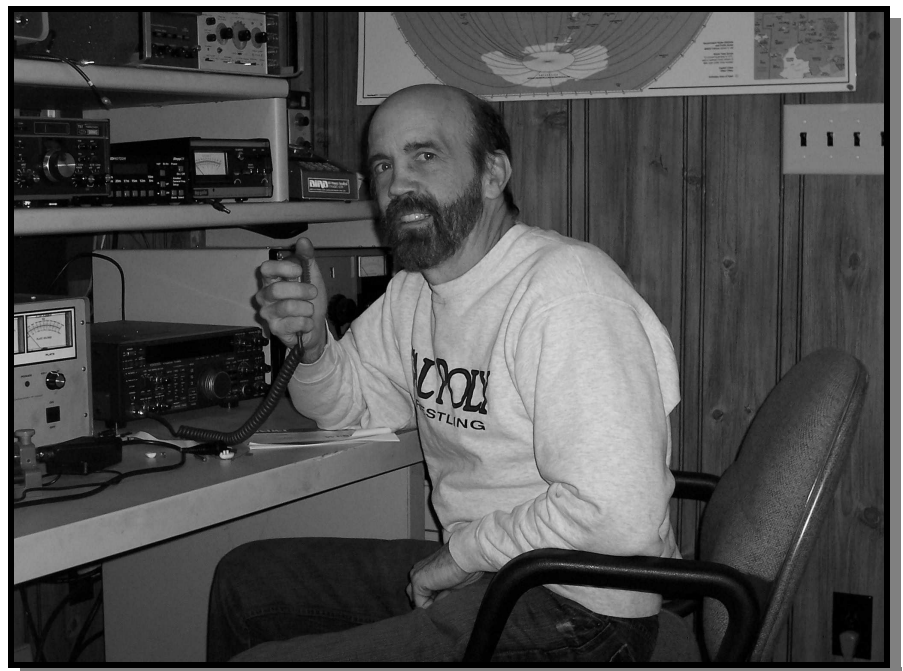
The SteppIR design was made possible by the convergence of determination and high tech materials. The availability of new lightweight glass fiber composites, Teflon blended thermoplastics, high conductivity copper-beryllium and extremely reliable stepper motors has allowed the SteppIR to be a commercially feasible product.

The current and future SteppIR products should produce the most potent single tower antenna systems ever seen in Amateur Radio! We thank you for using our SteppIR antenna for your ham radio endeavors.

Warm Regards,

Mike Mertel

*Michael (Mike) Mertel - K7IR
President*



SteppIR Design

Currently, most multi-band antennas use traps, log cells or interlaced elements as a means to cover several frequency bands. All of these methods have one thing in common—they significantly compromise performance. The SteppIR™ antenna system is our answer to the problem. Resonant antennas must be made a specific length to operate optimally on a given frequency.

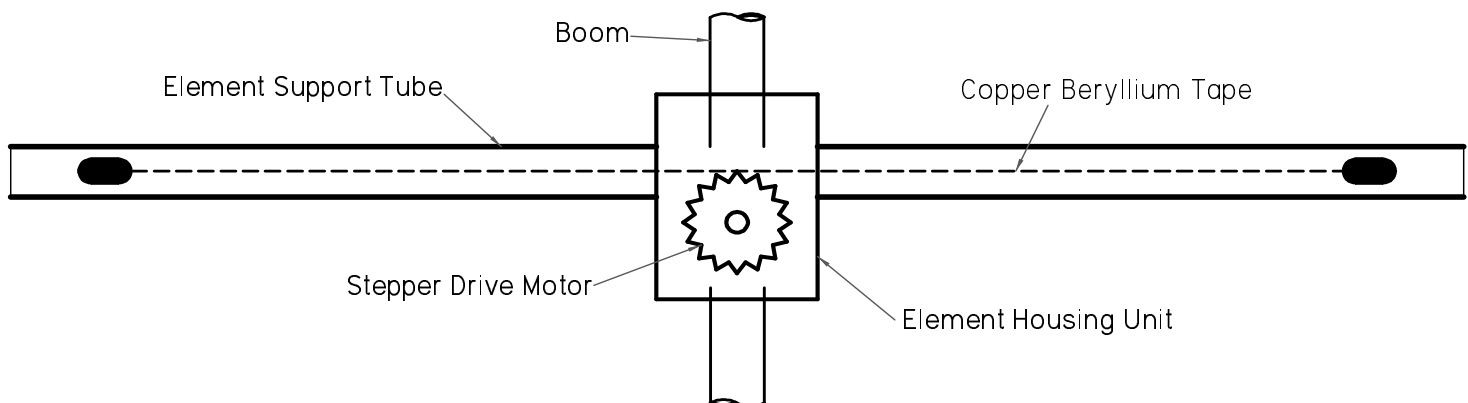
So, instead of trying to “trick” the antenna into thinking it is a different length, or simply adding more elements that may destructively interact, why not just change the antenna length? Optimal performance is then possible on all frequencies with a lightweight, compact antenna. Also, since the SteppIR can control the element lengths, a long boom is not needed to achieve near optimum gain and front to back ratios on 20 - 10 meters.

Each antenna element consists of two spools of flat copper-beryllium strip conductor mounted in the antenna housing. The copper-beryllium strips are perforated to allow a stepper motor to drive them simultaneously with a sprocket. Stepper motors are well known for their ability to index very accurately, thus giving very precise control of each element length. In addition, the motors are brush less and provide extremely long service life.

The copper-beryllium strip is driven out into hollow, lightweight fiberglass support elements (see below), forming an element of any desired length up to 36' long. The fiberglass poles are telescoping, lightweight and very durable. When fully collapsed, each element measures 48" in length.

The ability to completely retract the copper-beryllium antenna elements, coupled with the collapsible fiberglass poles makes the entire system easily portable.

The antenna is connected to a microprocessor-based controller (via 22 gauge conductor cable) that offers numerous functions including dedicated buttons for each ham band, continuous frequency selection from 20m to 6m, 17 ham and 6 non-ham band memories, 180° direction reversal or bi-directional mode in just 3 seconds (yagi).



WORD OF CAUTION

Be Careful to avoid making contact with power lines or other potential hazards when constructing, moving and installing the antenna, as you could be seriously injured or even killed if a metal object comes in contact with high voltage.

ASSEMBLING THE ANTENNA

It is highly recommended that you read these Assembly Instructions in their entirety before assembling the antenna. Doing so will provide you an overall idea of what needs to be done and helps avoid making time-consuming mistakes. At a minimum, read the directions for each step before starting it. Building your SteppIR™ is a straightforward process. It entails:

- Building the boom
- Connecting the boom-to-mast plate to the boom using the EZeye™
- Securing the element housing units to the element-to-boom brackets
- Connecting the required wiring
- Attaching the wiring enclosure and control cable to the boom
- Preparing the fiberglass element support tubes
- Attaching the fiberglass element support tubes to the element housing units
- Installing the optional 6M passive elements (if ordered)
- Installing the boom truss support assembly

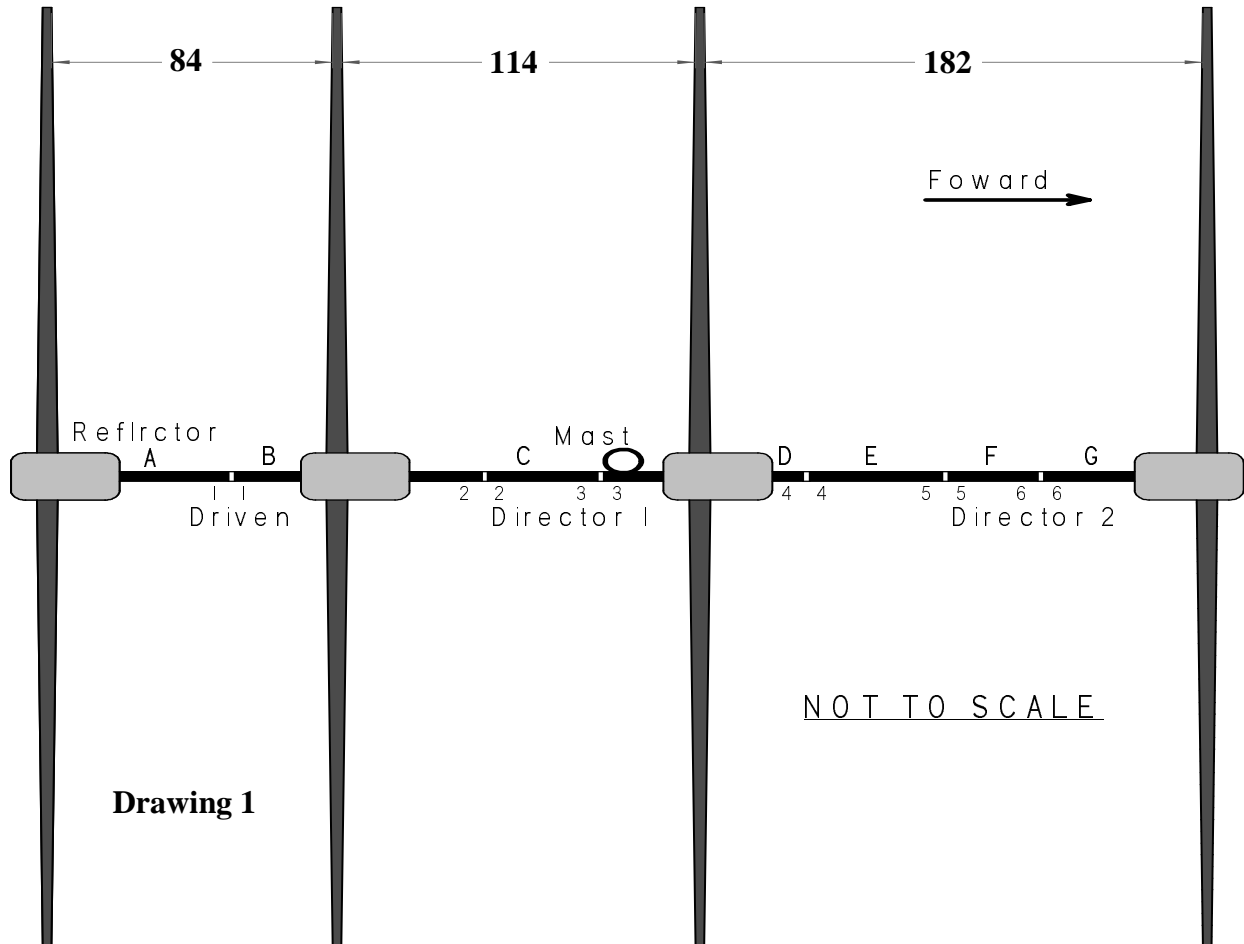
Build the Boom

The boom is completely assembled and drilled at the factory to assure precision element alignment. You may notice in some cases that on a given splice (**Figure 1**) the holes on each side of the splice are at 90 degrees with each other. This is as designed and **not** a mistake. Pre-drilled holes are quite snug to align almost perfectly. If the holes are visibly out of alignment when you are assembling the boom, you probably have the boom pieces put together in the wrong order - or the section of booms without an element to boom bracket may need to be rotated 180 degrees. Each boom piece has a number permanently **written, scribed** or **stamped** on it. Match each number with the exact same number of a corresponding boom piece. **Figure 1** shows joint # 1 markings inside the ring (they must line up). **Drawing 1** on the next page shows how each boom section is numbered.



Figure 1

Drawing 1 below shows the layout of the boom for assembly. Note that the lengths shown for each boom piece are overall lengths, the actual finished length of the boom will be 32 feet. The paired numbers shown in the drawing are inscribed on each associated boom section during the manufacturing process. Matching these numbers will insure correct alignment. Refer to **Table 2** for proper bolt sizes for each respective connection.



Drawing 1

Table 2: - Bolt Sizes Required for Assembling Boom		
Joint	Bolt Size	QTY
1	1/4-20 x 2.50" w / nylock nut	1
1*	5/16" x 4" Eyebolt / nut	1
2	1/4-20 x 3" w /nylock nut	2
3	1/4-20 x 3" w / nylock nut	2
4	1/4-20 x 3" w / nylock nut	2
5	1/4-20 x 3" w / nylock nut	2
6	1/4-20 x 2.50" w /nylock nut	1
6*	5/16" x 4" Eyebolt / nut	1

Section	Dimensions	With Bracket
A	1-3/4 x 50-3/8	Yes
B	2 x 72	Yes
C	2.25 x 48	No
D	2.5 x 72	Yes
E	2.25 x 48	No
F	2 x 72	No
G	1-3/4 x 50-3/8	Yes

* The second fastener at this joint is the 5/16" x 4" Eyebolt used for the truss assembly. (**Figure 3**)

Locate and position the seven sections of boom tubing, and the respective fasteners. **Rub a thin film of connector protector around the circumference of all male boom pieces BEFORE sliding the female sections over them (Figure 2).** Also, **do not twist the aluminum tubing excessively as that can cause binding.** Assemble the boom by sliding the seven sections together in the order shown on **Drawing 1**. Insert the required bolts into the holes and loosely attach them with the 1/4" nylock nuts. On the boom connections numbered 1 and 6 (see **Drawing 1**) one hole will be larger than the other. The smaller hole is for the 1/4-20 x 2.50" bolt and nylock nut, the larger hole is for the 5/16" eyebolt that holds each end of the Pillystran Kevlar™ truss material in place (**Figure 3**). There is also a hole for a third 5/16" x 4" eyebolt (used for the EZeye™ feature explained later) located at the center point of the boom. Install this eyebolt with the nut and lock washer as shown in **Figure 4**.



Figure 2



Figure 3

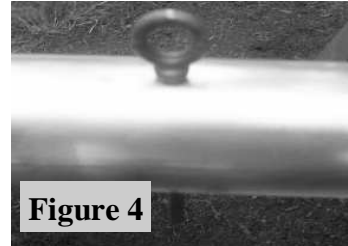


Figure 4

Now tighten the nuts on each bolt and eyebolt securely. Before continuing to the next step verify that all nuts and bolts, including those installed at the factory, are securely tightened.

Note: In some cases you may find it necessary to assist the bolts that you are installing by “threading” them with a wrench. Do NOT attempt to hammer them into place.

Connect the Boom-to-Mast Plate to the Boom

We are showing you this step now, even though in all likelihood this may be one of the last steps, as you raise the finished antenna up to the tower. It is a good idea to use the mast plate and a temporary mast as a means of supporting the antenna while assembling the elements, and to familiarize yourself with the EZeye™ adjustment system before you are up on the tower!

The mast plate consists of two identical pieces, each 11.5" x 11.5" x 3/16" thick. The mast plate has 21 pre-drilled holes (**Figure 4.5**). The 2" mast holes are used to secure the antenna to the mast on your tower. The optional pilot holes are there in the event you are using a 2-1/4" mast. If you are using a 2" mast, the optional holes are left unused. The 2-1/2" boom holes are used for attaching the boom to the mast plate. The EZeye™ hole will be explained later in this section.

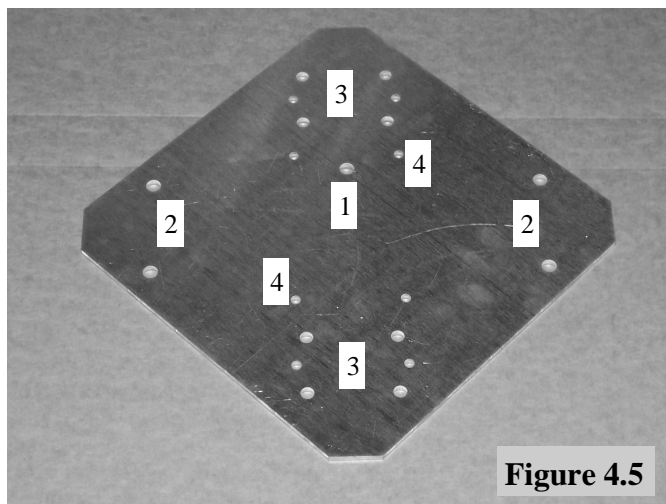


Figure 4.5

- | | |
|----------------|---------------------|
| 1) EZeye™ | – 1 Hole .402 dia. |
| 2) 2 1/2" Boom | – 4 Holes .402 dia. |
| 3) 2" Mast | – 8 Holes .344 dia. |
| 4) Not Used | – 8 Holes .257 dia. |

Locate:

- Two boom-to-mast plates (**Figure 5**)
- One 3/8x16x 3" fully threaded bolt (EZeye™ bolt)
- Three 3/8x16x nut
- One 3/8 lock washer
- Two 3/8 flat washer
- Four 2" U-bolts with saddles, lock washers and nuts
- Two 2 1/2" U-bolts with saddles, lock washers and nuts

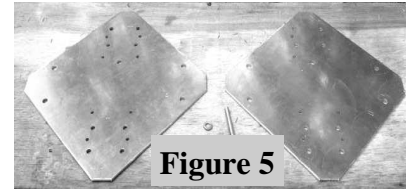


Figure 5

Insert the 3/8x16x 3" fully threaded bolt through the EZeye™ hole in both mast plate add a lock washer and nut then tighten (**Figure 6**), be sure that all the remaining holes are lined up with each other. Attach the mast plate to the mast (or temporary mast) using the four 2" U-bolts with saddles, lock washers and nuts and Tighten securely (**Figure 7**). Thread another 3/8" nut onto the EZeye™ bolt and add a 3/8" flat washer. This represents the first part of the EZeye™ adjustment system.

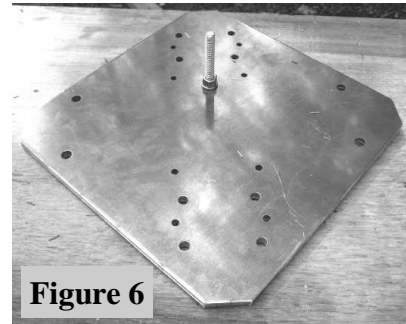


Figure 6

Lift the boom so that the eyebolt in the middle rests on top of the EZeye™ threaded bolt (**Figure 8**). This bolt can support the full weight of the antenna.

Note: If you are doing this on the tower leave the safety rope or cable in place until you have secured the boom in place with the U-bolts.

Place another 3/8" flat washer after the eyebolt and then another 3/8" nut. Attach the 2-1/2" U-bolts, saddles and nuts loosely, and then use two wrenches to "level" the elements as shown **Figure 9**. When finished, securely tighten the nuts on both U-bolts and EZeye™ (**Figure 10**).

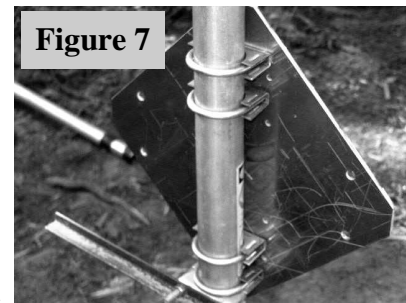


Figure 7

The EZeye™ adjustment system also helps prevents vertical movement of the elements in the event of high winds!

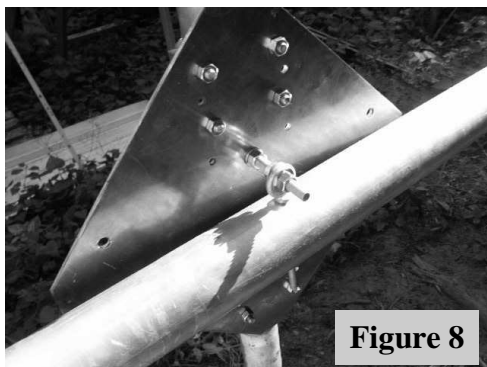


Figure 8

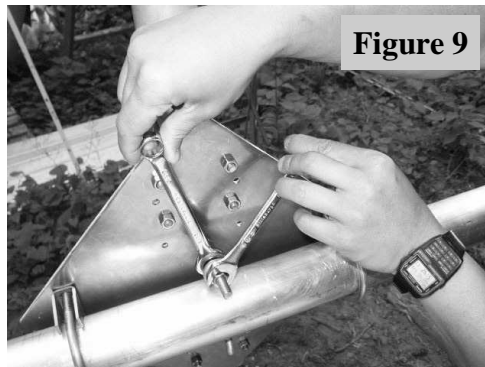


Figure 9

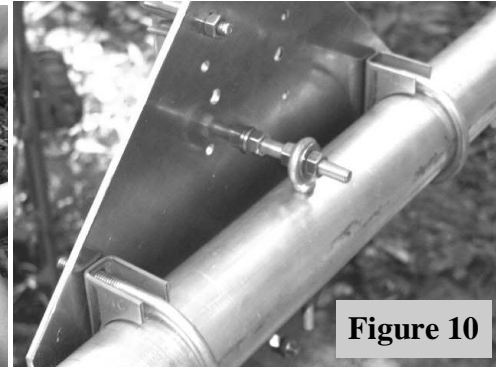


Figure 10

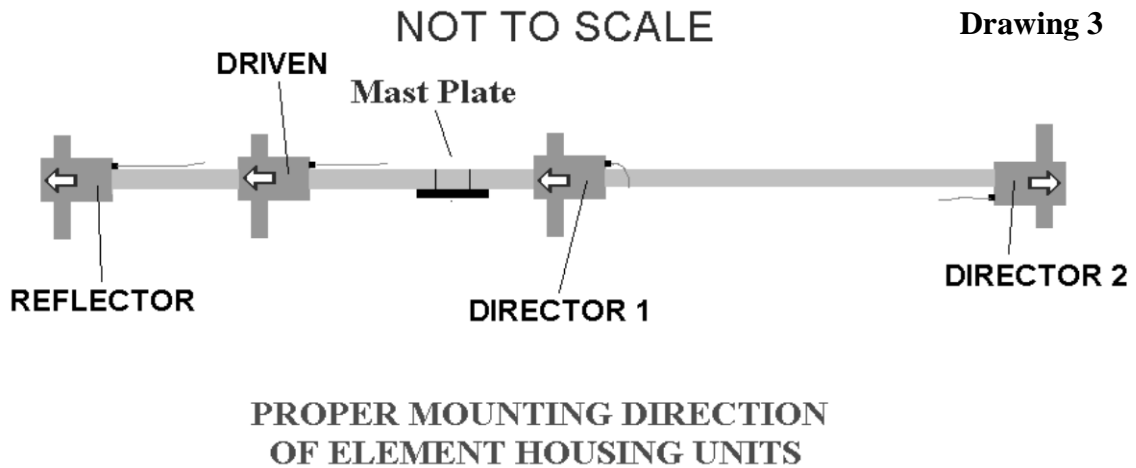
Secure the Element Housing Units to the Element-to-Boom Brackets

Locate the 4 element housing units (EHUs). One of them will have an SO-239 coax connector (or the optional “N” connector) below the gray control cable (**Figure 11**). **This EHU is for the driven element.**

The other three EHUs are for the reflector and two directors (parasitic elements). Each EHU has the same length control cable, you can trim them to length if you desire, once they have been secured to the boom. All of the parasitic EHUs are interchangeable in that it does not matter which one you use for the directors or reflector. Observe that the olive green element housing tubes (EHTs) on the end of each EHU appear to be uneven in length (**Figure 12**). This is by design. They are centered inside the housing.

**Figure 11****Figure 12**

Proper EHU orientation is critical to operation of the antenna. Make sure they are installed on the element-to-boom brackets exactly as shown in Drawing 3 (looking down on the boom).

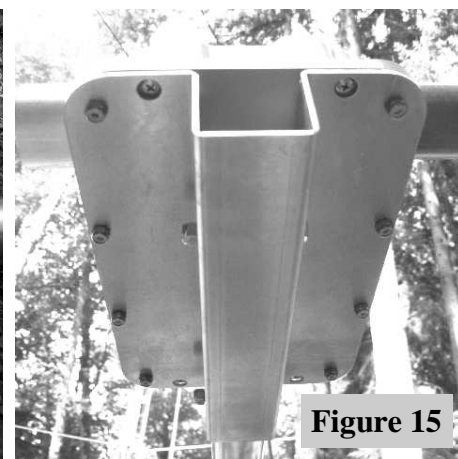
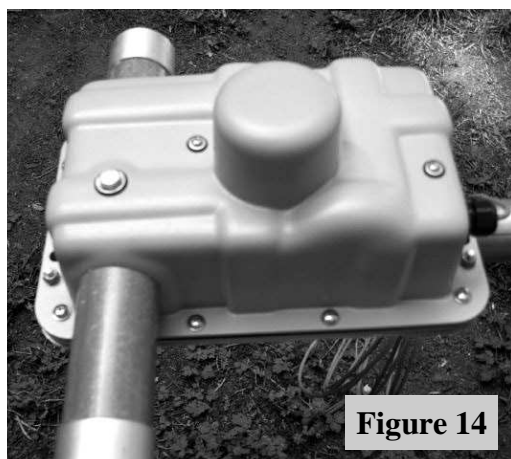
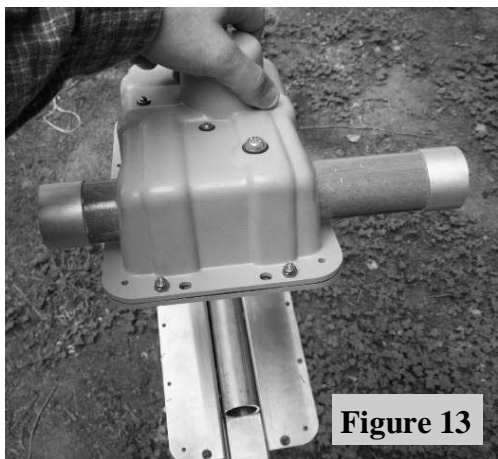


Refer to **Figures 13, 14 and 15**. Attach each EHU in place using eight #10-32 x 3/4" Phillips machine screws, flat washers and nylock nuts.

IMPORTANT: A flat washers need to be place BETWEEN the bolt heads and plastic element housings to avoid damaging the housings.

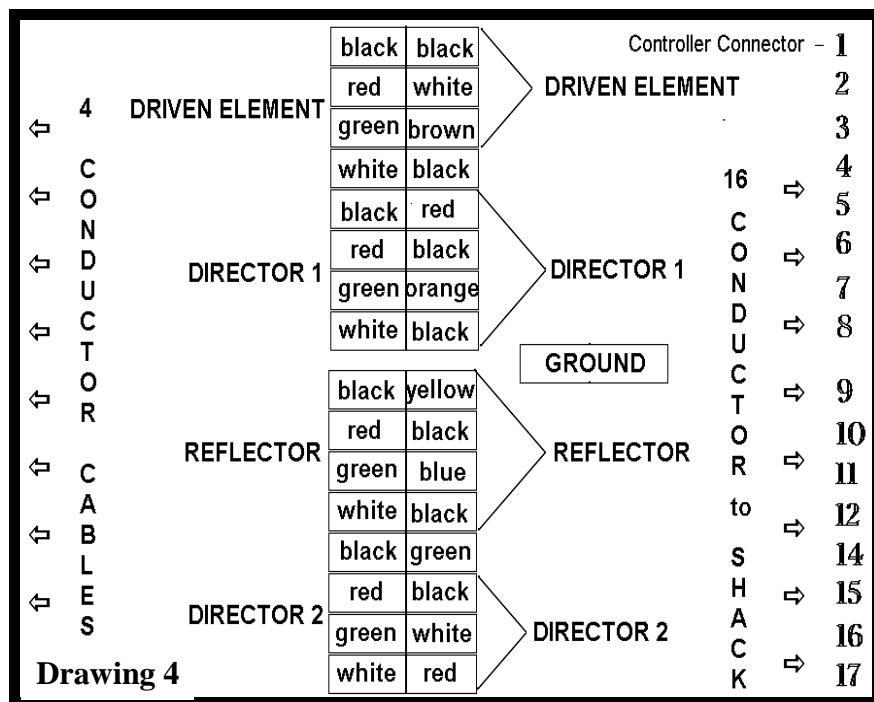
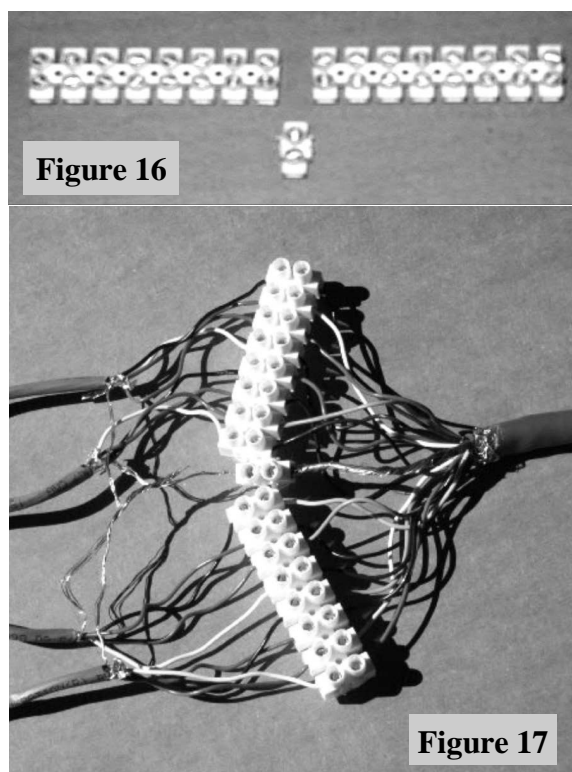
Tighten the bolts securely—but not too tight. If you over-tighten the nuts you may split the plastic flanges on the EHUs.

NOTE: If the eight mounting holes for the element housing do not line up with the eight holes in the element bracket it may be necessary to loosen the two horizontal bolts that hold the element bracket to the boom . After mounting the element housing to the element bracket be sure to re tighten the two horizontal bolts.



Connect the Required Wiring

Each of the four EHUs has a four conductor control cable attached to it using a waterproof strain relief fitting. These fittings were properly tightened at the factory and should not be disturbed. The other end of these control cable have stripped and tinned wires that will be connected to the terminal strips that were shipped with the PVC tub kit. Locate the terminal strips (**Figure 16**) and small blue packet of connector protector. Each EHU control cable also has a bare ground wire. It needs to be connected to the one position terminal strip shown at the bottom center of **Figure 16**.



The left side of **Figure 17** shows how these control cables are wired. Note the single position ground terminal in between the two 8 position terminal strips. The right side shows how the 16 conductor control cable (8 pairs of wires, each pair with one colored wire and one black wire) going to the shack is connected.

Warning: Do NOT connect the 16 conductor cable to the SteppIR™ controller until instructed to do so.

Note: If you ordered the 16 conductor control cable, it is included in your antenna kit. The required 25 pin connector has been installed on one end and the factory has stripped and tinned the wires on the other end. If you did not order this cable, you must supply it yourself, wire the 25 pin DB-25P connector and prepare the other end. In such case, a separate connector, back shell and cable wiring drawing have been included in your kit. Call the factory if you would like a cable prepared for you.

Carefully review Figures 17 and Drawing 4 before proceeding. First complete the reflector, director and driven element wiring. The 16 conductor cable wiring going to the controller will follow.

NOTE: If you are upgrading to a 4 element from a SteppIR™ 3 element Yagi, you will need to use the included 35 foot roll of 4 conductor cable to extend the control cable on each antenna housing to accommodate the longer boom length. The process is easy - first, cut the cable to the desired length, ensuring that each antenna housing control cable will reach the terminal strip located at the mast plate. Match the color of each wire, solder and thoroughly wrap with electrical tape. When this is completed, continue with the steps below.

1. Start with the driven element cable. **Dip each wire into the connector protector - except the bare ground wire** (this will be done in the next step). A thin coating is sufficient. Insert each of the four colored wire into their respective location on the first 8 position terminal strip. **Drawing 4** provides the exact location and color codes. Tighten the set screws as each wire is inserted, but **be careful not to over-tighten these screws**. Repeat this procedure for the first director, reflector and second director cables.
2. **Twist the four bare ground wires from the four control cables together, dip them into the connector protector and insert them into one end of the single position terminal strip.** Secure them by tightening the set screw. That completes the control cable wiring for the EHUs.
3. Locate the 16 conductor cable that goes to the controller. If it is not already coiled neatly, coil it before proceeding. Follow the same procedure as above and connect each colored wire. The 16 conductor control cable has eight pairs of wires, each pair twisted together and with heat shrink at the factory. **It is imperative that these twisted pairs do not get mixed up, or you will have to use an volt/ohm meter to ascertain which pairs match correctly.** **Figure 18** shows the respective pairings: black/white; brown/black; red/black; orange/black; yellow/black; blue/black; green/black and white/red. This sequence is exactly the order in which to connect the wires, as shown in **Drawing 4**. Follow the same procedure as above and connect each colored wire. **Coat each wire with connector protector. Don't forget to coat the bare ground wire.**
4. Route the single bare ground wire from the 16 conductor control cable in between the two 8 position terminal strips. Insert it into the unused end of the single position terminal strip with the 4 ground wires from the EHUs and tighten the set screw. When finished, the single position terminal strip should be close to the two 8 conductor terminal strips as shown in **Figure 17**.

Position the cables so they are parallel with the two 8 position terminal strips (**Figure 19**). The single 16 conductor control cable will be on one side and the four 4 conductor cables the other. Locate the unattached black ABS threaded plug and associated tube as shown in **Figure 20**. The ABS tubing serves as our wiring enclosure and protects the connections from the weather. Put a couple of raps of electrical tape around the wire bundle where it will pass through the notch in the threaded plug to protect the cable sheath from the threads in the tube. Slide the cables and terminals strips into the ABS tube, position the threaded plug with the cut out for the cables and screw the **tube** onto the threaded end plug until it fairly tight. Fasten the wiring enclosure to the boom using the stainless steel hose clamp as shown in **Figure 22**. This completes the required wiring.

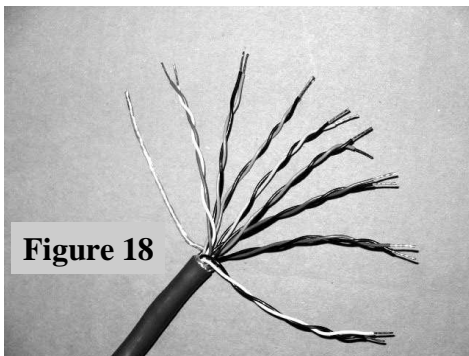


Figure 18

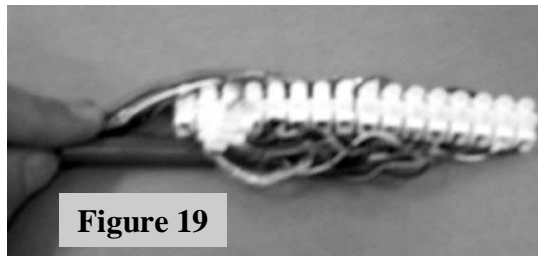


Figure 19

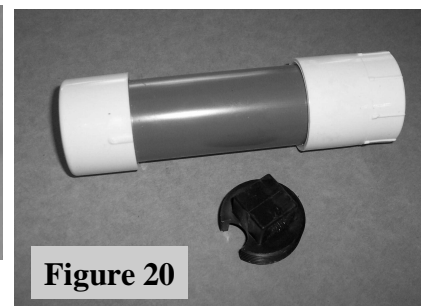


Figure 20

Attach the Wiring Enclosure and Control Cable to the Boom

Fasten the wiring enclosure to the boom using the #56 stainless steep hose clamp. Center it as shown in **Figure 22**. Position the tube so that the notch in the threaded plug will be to the bottom to permit any moisture that might collect to drain.

Caution: Do NOT trap the cables between the clamp and PVC tubing or over-tighten the clamp. Be Careful NOT to tape the cables over a sharp edge unless you provide extra protection to prevent eventually cutting through the sheath and shorting the wires.

Start at one end of the boom and tape all the cables snugly to the bottom of the boom so there are no loops or slack cables as shown in **Figure 23 & Figure 23.5**. Six equally spaced tape points on each sides of the boom using two wraps of electrical tape each should be fine. This is to prevent the cables from becoming damaged when moving the antenna and installing it on your tower. Secure the 16 conductor cable and coax to the boom about 8" from the SO-239 connector.

NOTE: Be sure to secure the cables before placing the antenna on the tower, as you will not be able to reach the driven element from the tower! Refer to **Drawing 5** below for our suggested cable configuration.

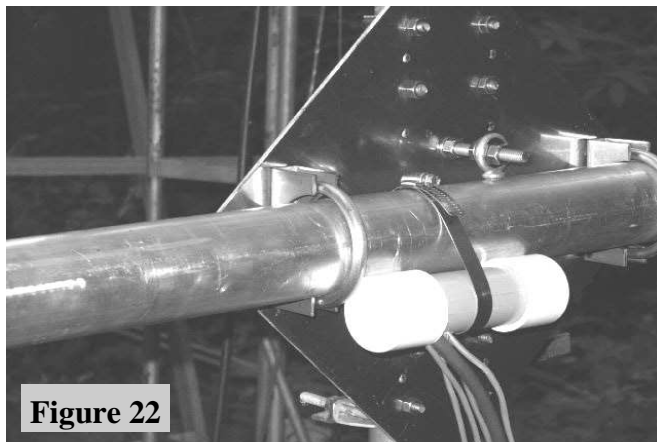


Figure 22

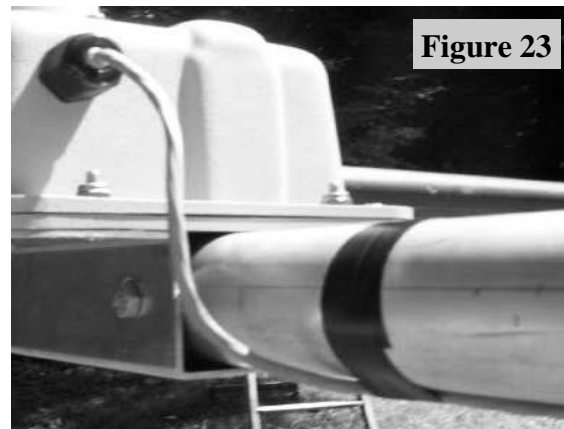
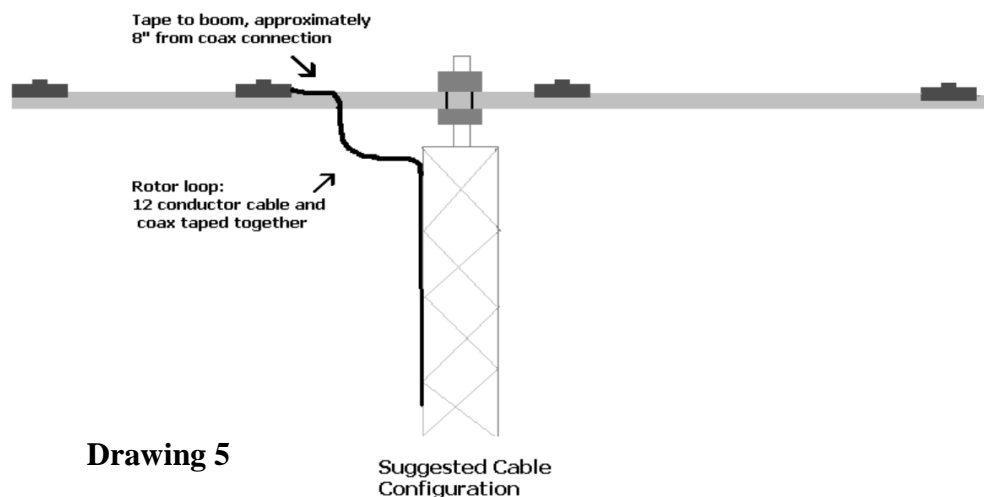


Figure 23



Figure 23.5



Drawing 5

Prepare the Fiberglass Element Support Tubes

Locate:

- Eight telescoping fiberglass poles (EST's)
- Two rolls of black electrical tape
- Two rolls of Black silicone self-curing tape
- Your tape measure

Note: Stainless steel reinforcing rings are used on some pole sections to provide extra strength in potential high wind conditions.

The green fiberglass poles are all assembled in the same manner and, when extended, become element support tubes (ESTs) for the elements themselves. The elements (flat copper-beryllium strips) are shipped retracted inside their respective EHUs. Repeat the following procedure for each of the eight poles.

1. Telescope a pole to full length by pulling each section out **firmly** in place using a twisting motion. **Be sure each joint is locked in place and fully extended.** Pole lengths may vary but, when fully extended, each pole must be at least 17 ft 8 inches in length as measured from the butt end of the pole to the tip (**Figure 24**). **Verify the length for each pole before wrapping the joints.**
2. In this step you will wrap each joint on the fiberglass poles with the all weather electrical tape. Each joint needs **1/2"** of tape on both sides of the joint (**Figure 25**, the picture looks like there is more, but adhere to the 1/2" rule or you will come up short on silicone wrap in step 3). **Exception. On joints with reinforcing rings, the tape must continue further so it extends 1/2" beyond the ring onto the fiberglass pole.**

Apply one complete wrap of electrical tape around the fiberglass tube as you begin, and then work your way across the joint and back using half overlapping wraps, **so that the entire area is seamlessly covered.** Carefully stretch and smooth the tape with your finger as you apply, and especially when you change directions - this will help avoid ripples and have the tape lie as smoothly as possible. At the end of the run, cut the tape with a knife or scissors and press the end onto the pole. Then run your hand over the tape a couple of times to firm up the bonding. The final joint should look like **Figure 25**.



Figure 24

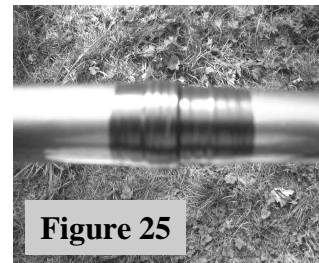


Figure 25

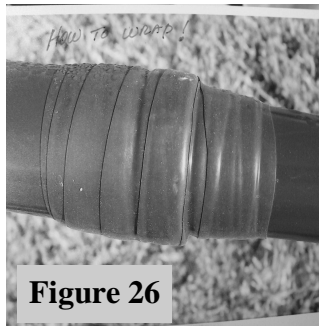
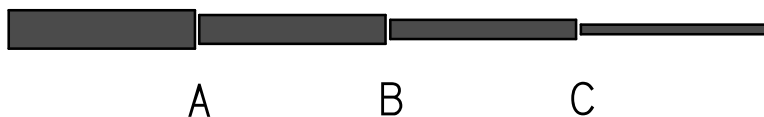


Figure 26

Recommended Lengths for Silicone Tape Wrapping



- A - 18 in / 46 cm
- B - 16 in / 41 cm
- C - 11 in / 28 cm

Drawing 6

- Next, you will weatherproof each joint with the black self-curing silicone tape. **It is important that you pre-cut the silicone tape to the recommended lengths (Drawing 6)**. If you do so, you will have more than enough for each joint. In the event you require more silicone wrap, Home Depot carries Model HTP-1010 Gardner Bender Silicone Rubber Fusion Tape in their electrical department, UPC code: 032076560102; Radio Shack and Wal-Mart are authorized retailers for the brand we buy, Tommy Tape.

IMPORTANT: Silicone tape will not stick to just any surface. It only bonds to itself. Be sure to remove all the connector protector residue from your hands before handling silicone tape, as that residue will cause the silicone wrap not to adhere to itself in places. take care to keep the silicone wrap free of dirt or debris. Also, this tape MUST be cut. Do not tear it. Wash your hands before completing the following steps.

Position the black silicone wrap about 1/4" to the right of the black electrical tape. Wrap one layer completely around the pole so the tape fully overlaps itself. Then slowly wrap **ONE LAYER** of silicone tape to the left using half overlapping wraps, extending about 1/4" beyond the black tape. When you reach the end, wrap one layer completely around the pole so the tape fully overlaps, just as you did at the beginning of the wrap. As before, carefully stretch and smooth the tape as you go (**Figure 26**).

IMPORTANT: After the silicone tape has been applied, be sure to rub each wrap with your hand several times to ensure that it is flat and has adhered to itself.

Attach the Fiberglass Element Support Tubes to the Element Housing Units

The butt ends of the green fiberglass poles may vary slightly in outside diameter. Some of them may have been sanded, while others were not. The colors at the ends will be either natural, or black. The difference in colors has no affect on performance. Do not be concerned if they vary slightly in tightness when being installed on the EHUs. This is normal. All poles are tested at the factory prior to shipping, but in the event the pole just won't fit it is okay to sand it to fit.

The EHTs on the EHUs have aluminum reinforcing rings attached to provide extra strength in high wind conditions (**Figure 27**).

Locate the eight rubber boots and repeat the following procedure for each of the eight fiberglass poles.

- Place the narrow end of an FCC onto the butt end of an EST. Slide it about 6" out onto the EST (**Figure 28**).



Figure 27



Figure 28

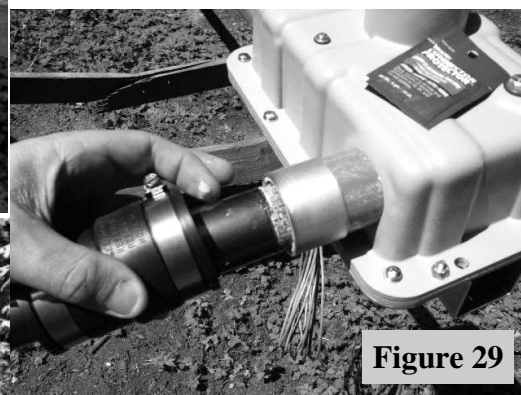


Figure 29

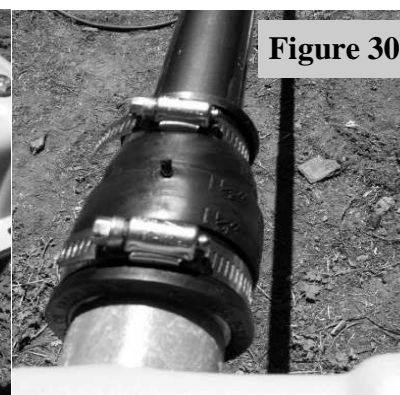


Figure 30

2. Insert the butt end of that EST into one of the EHTs on an EHU, as shown in **Figure 29**. **It is very important to ensure that the butt end of the EST firmly bottoms out inside the EHT.** Then push the rubber boot firmly onto the EHT until the hose clamp is past the aluminum ring and will clamp down onto the fiberglass EST. This ensures that the hose clamp and rubber boot can grip onto the fiberglass and the ring will prevent the rubber boot from ever coming off. The correct mounting position of the rubber boot is shown in **Figure 30**. Note that current production antennas now have a narrower aluminum ring (.4").
3. Firmly tighten both stainless steel hose clamps, one over the EHT and the other over the EST. Then test the connection by pulling and twisting it. There should be no slippage at the joints.

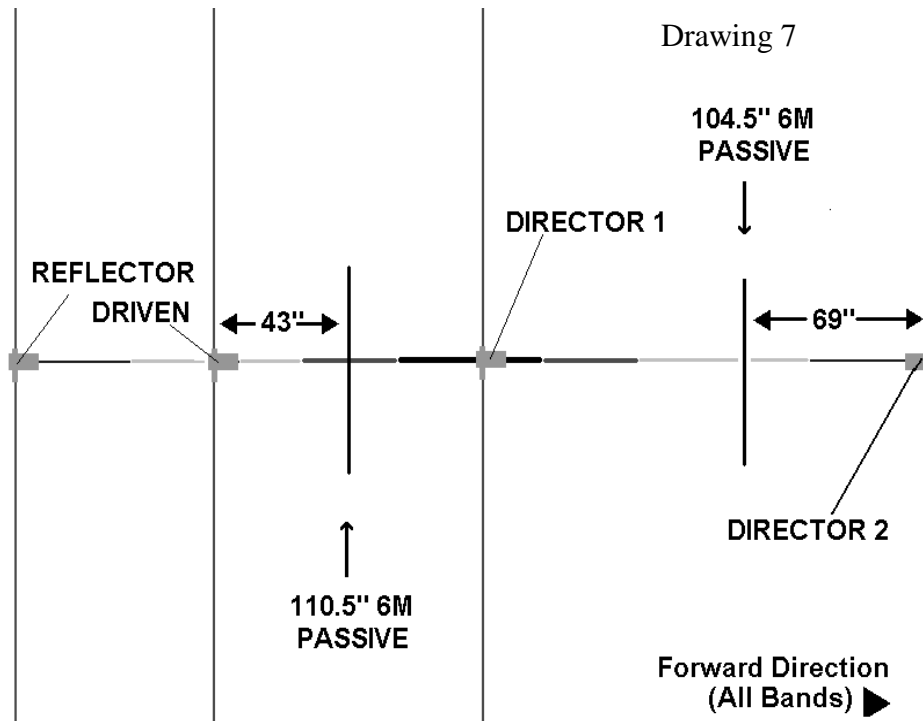
NOTE: You should re-tighten each clamp a second time (at least 30 minutes after the first time) before raising the antenna to the tower, to be sure that there has been no cold flowing of the PVC material on the rubber boot.

Install the Optional 6 Meter Passive Element (If ordered)

If you have purchased the optional 6M passive element kit:

Locate: (Ref: **Picture 31**)

- One 6M passive element kit 110.5" (long)
 - One mounting kit (long)
 - One 6M passive element kit 104.5" (short)
 - One mounting kit (short)
 - Blue packet of Connector Protector
- Using their respective hardware kits (long & short - **Picture 31**) assemble the two 6M passive elements. Identify the ends of the 3/8" tubing that have the shortest distance from the end of the tubing to the drilled hole. Lightly coat the circumference of these ends with a very thin film of the connector protector. Slide the coated ends of the 3/8" tubing into the 1/2" tubing and align the holes.

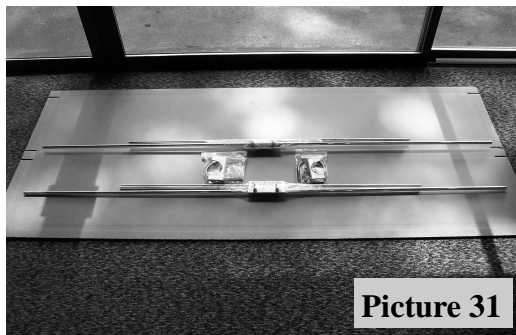


Note: Verify that the long element measures 110.5" and the short element measures 104.5".

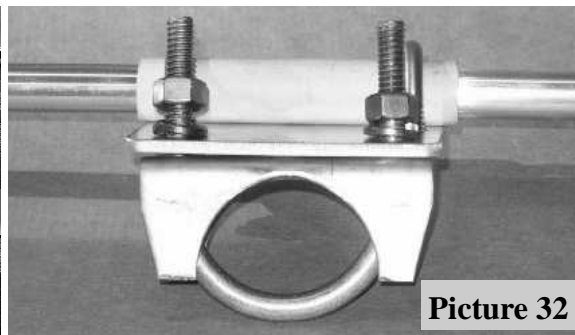
Securely fasten the pieces together with the 6-32x3/4" machine screws and nylock nuts.

Install the U-bolt on the center bracket as shown in **Picture 32**.

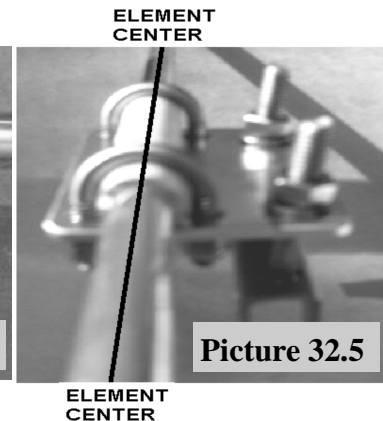
The 6M passive elements should be mounted on the bottom side of the boom the same as the other elements. Using a tape measure, determine the correct passive element placement as shown in **Drawing 7**. Be sure to measure from the actual center line of the 6m passive element, NOT from where the U-bolt attaches (**Picture 32.5**). Make sure the elements are aligned with the green fiberglass poles. Tighten securely.



Picture 31



Picture 32



Picture 32.5

Install the Boom Truss Support Assembly

Locate the sixteen 3/16" galvanized cable clips, four 3/16" galvanized thimbles, two 1/4" x 4" galvanized turnbuckles and the 26 feet of 1/8" non-conductive Phillystran® Kevlar™ cable.

- Using a hammer, lightly tap the thimbles so that the center opening is forced onto the eye bolt at the end of the boom (**Figure 33**). Press the thimble back together as close as possible once it is through the eyebolt. Thread the Phillystran through the eyebolt, so that it rests on the channel of the thimble. You will use approximately 12" of Phillystran to loop through the eyebolt (six inches down, six inches back) as shown in **Figure 34**.



Figure 33



Figure 34

**DO NOT CUT THE PHILLYSTRAN CABLE UNTIL YOU HAVE INSTALLED ONE SIDE OF THE TRUSS—
THE MEASUREMENTS FOR EACH SIDE ARE NOT EQUAL IN LENGTH.**

Attach the cable clips to the Phillystran, with the first one as close to the end of the thimble as possible, so the cable will be “locked” in, and the next three approximately 1” apart (**Figure 35**). **Figure 35.6** is a sample cable made up for the picture only to show what a finished cable will look like. You will want to thread the Phillystran into the cable clip, so that one section is on top of the other, as shown in **Figure 35.4**. Tighten the nuts securely.

- Locate the 2” U-bolt, saddle, two 5/16” nuts, 2” flat plate and two 5/16” nylock nuts. Position the U-bolt 26” to 30” above the boom on the antenna mast and secure with the two 5/16” stainless nuts (do not use the nylock nuts yet). Position the eye of the turnbuckles on each leg of the U-Bolt, place the 2” flat plate behind them, and fasten the 5/16” nylock nuts securely as shown in **Figure 36**. When properly secured, cut the remaining Phillystran cable for use on the other half of the truss.

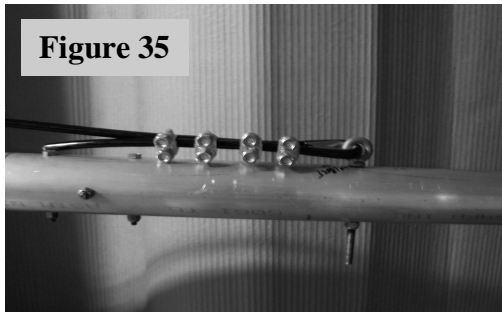


Figure 35

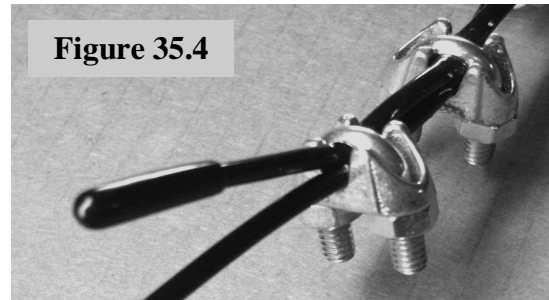


Figure 35.4

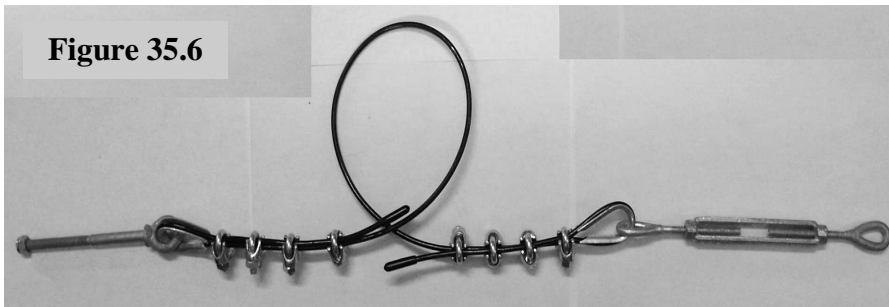


Figure 35.6

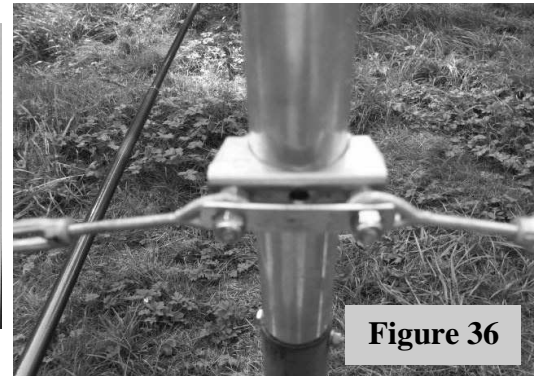


Figure 36

- Attach the thimbles, Phillystran and wire clips in the same manner as in step one. The finished assembly should look like **Figure 37** and **Figure 38**.
- While holding the Phillystran in one hand (this will prevent the cable from twisting while you tighten the turnbuckles), tighten the turnbuckles using a wrench or screwdriver as a lever, until the boom is evenly supported and level on both sides.

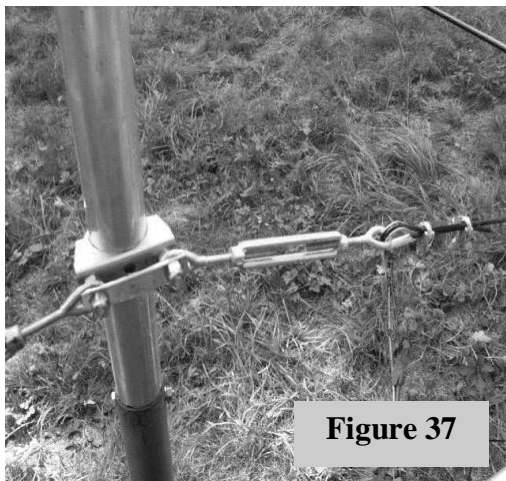


Figure 37



Figure 38

Upgrading the Controller (Upgrade Kit Customers Only)

1. Make sure the Elements are retracted, use the Setup Retract Elements menu selection in the Operators Manual.
2. All saved information like Serial interface setup and Custom antenna lengths are saved in the CPU so you will need to manually record these settings before proceeding.
3. Remove the 2 rear connector standoffs using a 3/16" nut driver (there are 6 standoffs if you have the optional transceiver serial interface).
4. Remove the 4 4-40 screws from the sides of the Box.
5. Slide off the top cover.
6. Unplug the driver PCB by pulling to the rear.
7. **Before removing the CPU on the Display Board, note that there is a slight indent on the side of the chip, facing towards the LCD display circuit board. You will want to reinstall the new chip in the exact same manner.** Extract the CPU (the only chip in a socket) using a PLCC chip extractor, if you don't have one of these, carefully extract the CPU using a small screw driver that will fit into the slots in the connector corners. Pry up one corner then the other until the microprocessor chip is free. Be sure to pry out both sides equally, or you may bend the pins on the CPU.
8. Insert new CPU in the socket making sure the pin 1 indicator (there will be a slight round indent on the side of the CPU that is used to orient the chip correctly in the socket) is facing the display
9. Reassemble the controller using the New driver PCB taking care to ensure all rows of the connectors between the two PCBs are aligned properly.

There are slight variations in the balun so if your SWR is higher than before use the following procedure to correct:

- Select the ham mode.
- Select the 20m band button or the Band with the highest SWR. Check and Record the SWR.
- Hold the Select key down while using the UP/ DN arrows to adjust for the best SWR.

To return this setting back to it's original value use the Factory Default All in the setup menu in the Operators Manual.

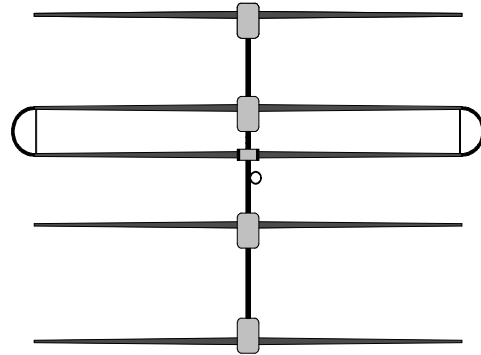


Limited Warranty

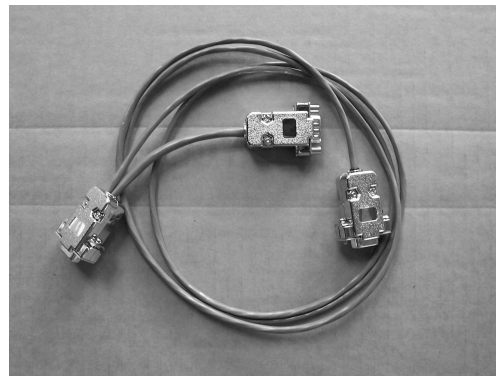
These products have a limited warranty against manufacturer's defects in materials or construction for two (2) years from date of sale. Do not modify this product or change physical construction without the written permission of SteppIR Antennas Inc. This limited warranty is automatically void if improper selection, installation, unauthorized modifications or physical abuse beyond the manufacturer's control has occurred. Manufacturer's responsibility is strictly limited to repair or replacement of defective components. The manufacturer assumes no further liability.

SteppIR Options

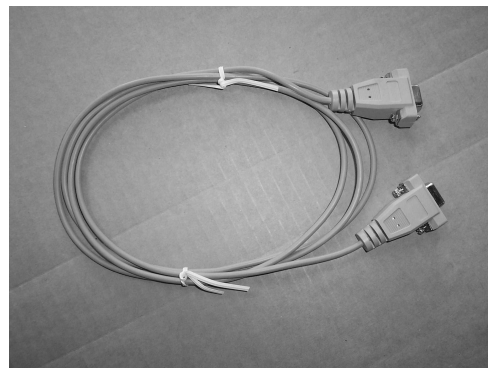
- 40m - 30m Dipole (loop)



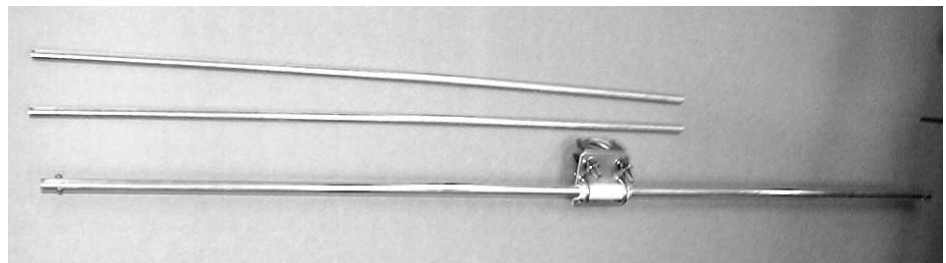
- “Y” Cable



- Transceiver Interface (Rig Specific)

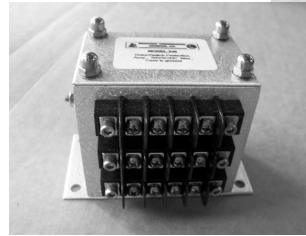


- 6m Passive Element Kit



- **Voltage Suppressor & RF Bypass Unit (ICE)** (8 & 12 Conductor Models)

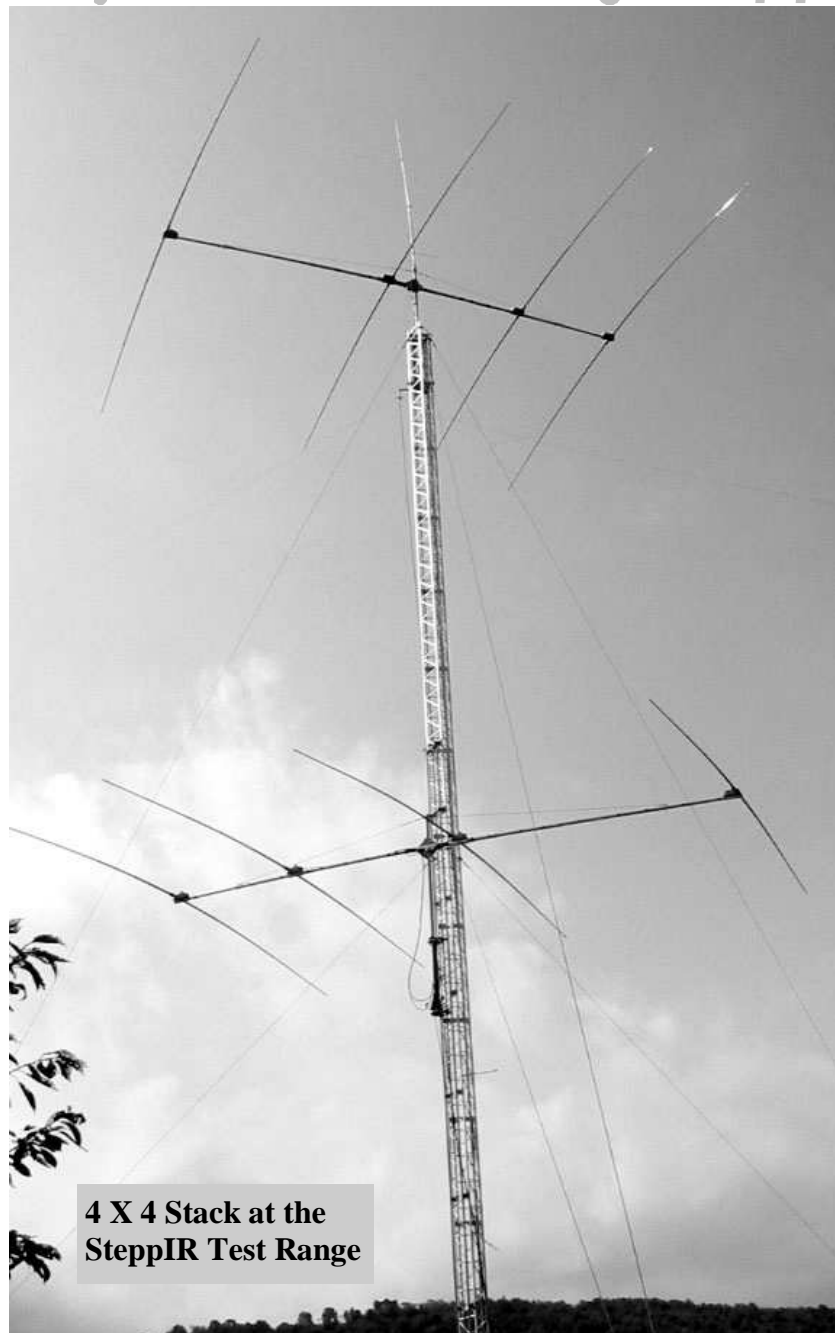
Note: You will need two 8 conductor units to get a 16 conductor protection.



- **Element Expansion Kit**

Dipole	to	2 Element
2 Element	to	3 Element
3 Element	to	4 Element

Thank you for choosing SteppIR!!



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