



Yagi ● Dipole ● Vertical

(Patent Pending)

SteppIR 4 Element Yagi Installation Instructions



SteppIR™ 4 element Yagi at Dayton Hamvention, 2003

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.

We would like to recognize Tom Owens K7RI for the time and effort he has put into helping us improve our instruction manual design - Thanks, Tom!

PRE-ASSEMBLY TIPS

Tools: To build the antenna you will need a 1/2", 9/16", 7/16" and 3/8" wrench and/or socket drive. A 3/8" nut driver is handy for attaching the element housings to the boom brackets, and a Phillips screw driver will be necessary. A center punch can be helpful when aligning mounting holes. If you ordered the 6 meter elements, you will also want to have a 5/16" wrench or socket (or a pair of pliers). You will also want to have a 20 foot tape measure and knife or scissors. The assistance of a friend will significantly reduce the time required to build the antenna.

Assembly Instructions: It is a good idea to make and use a working copy of the *Assembly Instructions*. You can download a copy from our web site and use it while building your SteppIR™. This will prevent the original from becoming torn, stained or otherwise mutilated when assembling the antenna. It is nice to retain a brand new set of instructions.

Users Manual: You do not need the User's Manual while assembling the antenna. Putting it inside the shack right away will help keep it in brand new condition.

Work Surfaces: Select an area large enough (32 ft x 38 ft) to accommodate building the antenna. A sheet of plywood 4' x 8' and two saw horses provide a comfortable working height and facilitate assembly of the antenna. Alternatively, any clean outdoor flat surface such as a large patio or driveway will work. It's a good idea to keep all parts close at hand and off dirt or wet grass to prevent them from becoming fouled with foreign matter during the assembly process.

A Word About Taping: Stretching tape in order to break it at the end of a wrap is a bad idea. Sooner or later stretched ends come loose. Tape wraps should always be started and ended with un-stretched tape and cut it with a knife or scissors at the end of the wrap.

Inventory: Confirm that all parts specified in the Parts List on page 4 are present before beginning. If anything is missing or there is a problem, contact the factory right away.

Abbreviations: Throughout the instructions you will find four three-letter acronyms that are used to shorten sentences. They are simply the first three letters of the subject phrase, and are explained in the instructions as you encounter them. They are:

EHU Element Housing Unit

EHT Element Housing Tube

EST Element Support Tube

FCC Flexible Connection Coupler

PARTS LIST

Description	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	

<i>BOOM ASSEMBLY PACK</i>		
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 w/ two 3/8" nuts and lock washers	2	
2" Extended leg U Bolt w/ 5/16" nut and lock washer	4	
<i>TRUSS ASSEMBLY PACK</i>		
1/8" Phillystran Kevlar® guy wire	26 ft	
2" U Bolt w/ two 5/16" nuts and two lock washes	1	
5/16" Nylock nuts	2	
2" flat plate with poles	1	
3/16" Wire clips, galvanized	8	
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 threaded bolt with lock washer and nut ⁵ (EZeye™)	1	

PARTS LIST

Description	QTY	✓
TERMINAL STRIP / EHU PACK		
2" OD PVC tube with 2 end caps attached⁶	1	
8 position terminal strip⁷	2	
1 position ground strip⁷	1	
#56 Stainless hose clamp	1	
Blue packet of connector protector⁸	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 Green 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" x 72"; two 2.25" x 48"; one 2.5" x 72")

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

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

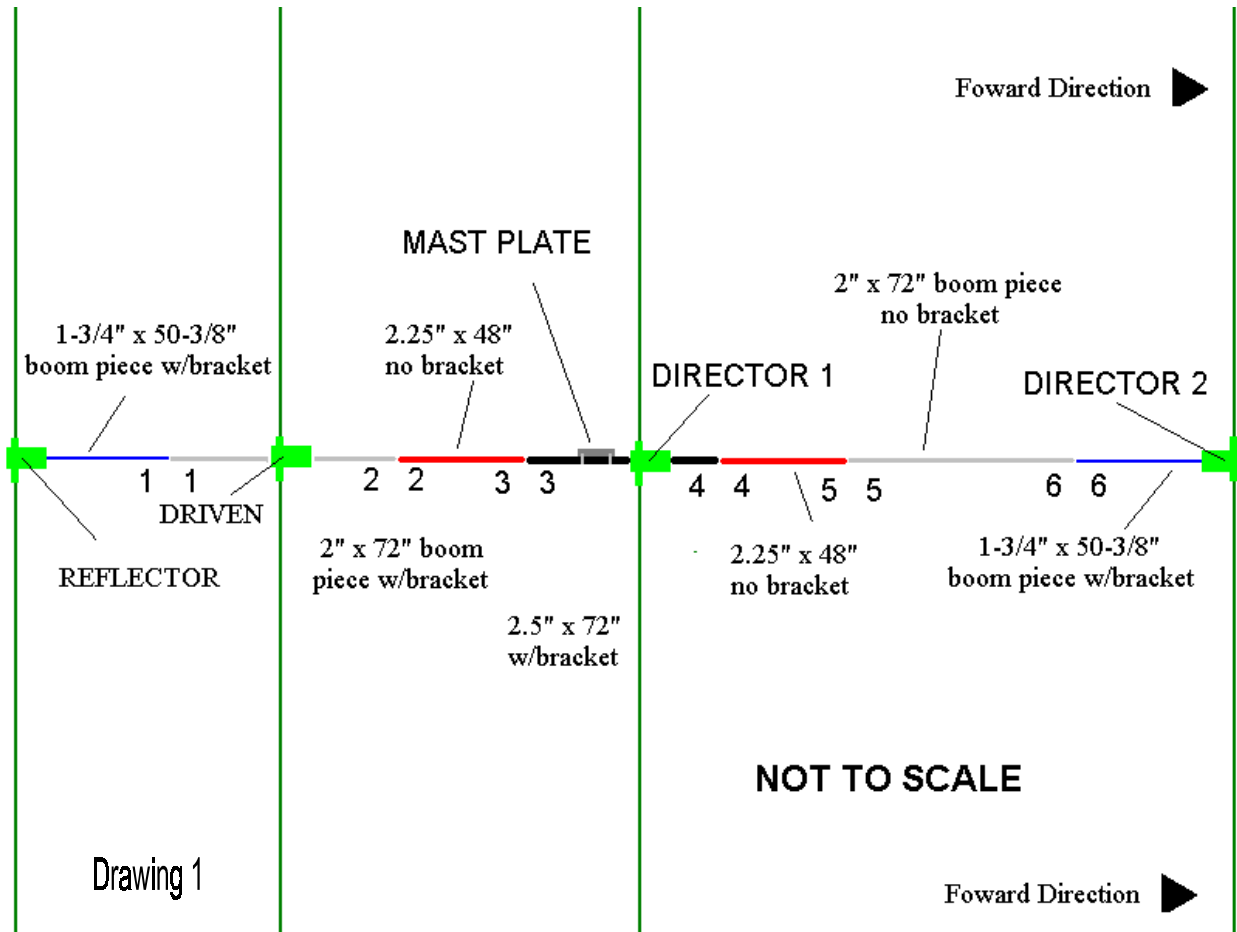
STEP 1: Build the Boom

The boom is completely assembled and drilled at the factory to assure precision element alignment. 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 scribed on it. Match each number with the exact same number of a corresponding boom piece as shown in figure 1. 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. Refer to graph 2 for selecting proper bolt sizes for each respective connection.



Graph 2: Bolt Sizes Required for Assembling Boom

Joint	Bolt Size	QTY
1	1/4-20 x 2.50" w/ nylock 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*

*the second fastener at this joint is the 5/16" x 4" Eyebolt used for the truss assembly (see page 17)

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 the drawing 1 on the prior page. 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, prior page) 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" eye-bolt that holds each end of the 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



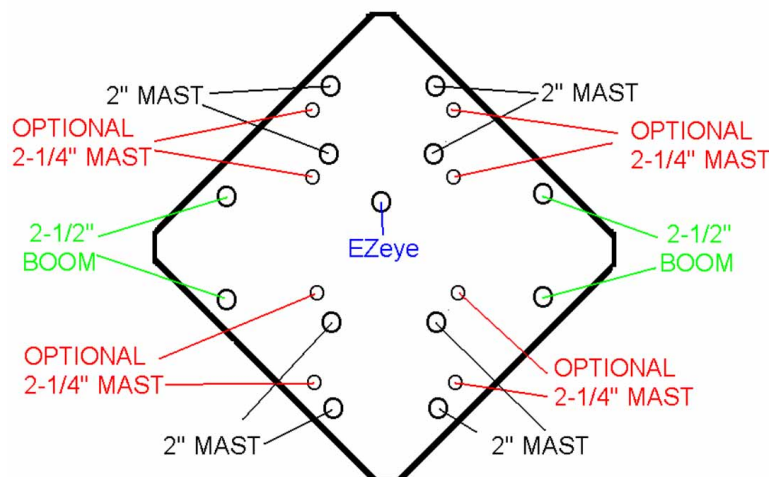
Figure 4

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 that, 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.

STEP 2: Connect the Boom-to-Mast Plate to the Boom

We are showing you this step now, even though in all likelihood this will 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™ before you are up at 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 (drawing 2). 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, these 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.



Drawing 2

Locate the two boom-to-mast plates and the 3/8" x 3" full threaded bolt, nut and lock washer (figure 5). Insert the bolt through both portions of mast plate and tighten (figure 6), be sure that all the remaining holes are lined up with each other. Attach the mast plate to the mast using the four 2" U bolts with saddles, lock washers and nuts (Figure 7). Tighten securely, then thread on another 3/8" nut and a 3/8" flat washer. This represents the first part of the EZeye™. *Note: We are showing this step now, even though you may very well be installing the mast plate to the mast on the tower as a last step in your process.*

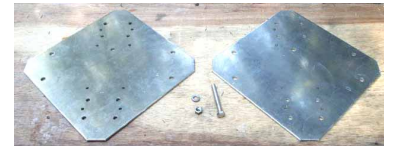


Figure 5



Figure 6



Figure 7



Figure 10

Your antenna comes with our highly innovative EZeye™ system. This system serves two purposes; The first is to allow you to “latch” the boom onto the mast plate and secure it safely while you are attaching the 2-1/2" U-bolts with saddles (figure 8). The second, is to allow you to level the elements before securing the U-bolts to the mast plate (figure 9). As an added benefit, the EZeye™ also prevents vertical movement of the elements in the event of high winds!



Figure 8



Figure 9

Lift the boom so that the eyebolt in the middle rests on top of the EZeye™ threaded bolt (figure 8). This bolt will support the full weight of the antenna, but as a safety precaution always 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 (figure 10).

□ STEP 3: 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 (unless you ordered the optional “N” connector) below the gray control cable (figure 11). **This EHU is for the driven element.**



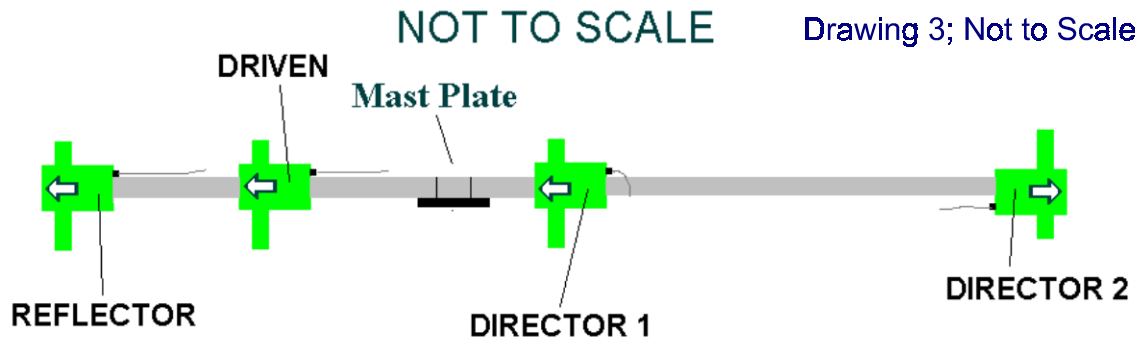
Figure 11

The other three EHUs are for the reflector and 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 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 below (looking down on boom).



PROPER MOUNTING DIRECTION OF ELEMENT HOUSING UNITS

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. **Tighten the bolts securely—but not too tight.** If you overtighten the nuts you may split the plastic flanges on the EHUs. Drawing 4 shows proper placement of bolts, nuts and flat washer.



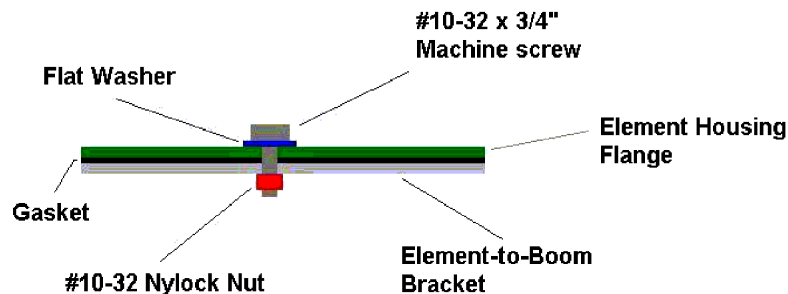
Figure 13



Figure 14



Figure 15



Drawing 4

IMPORTANT. Flat washers need to be placed BETWEEN the bolt heads and plastic element housings to avoid damaging the housings.

□ STEP 4: 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 inside the PVC tubing. Locate the terminal strips and small blue packet of connector protector. **Each EHU control cable also has a bare ground wire. It needs to be connected to one position of the terminal strip shown at the bottom of figure 16.**

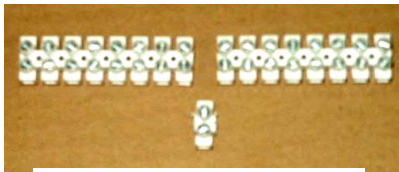


Figure 16

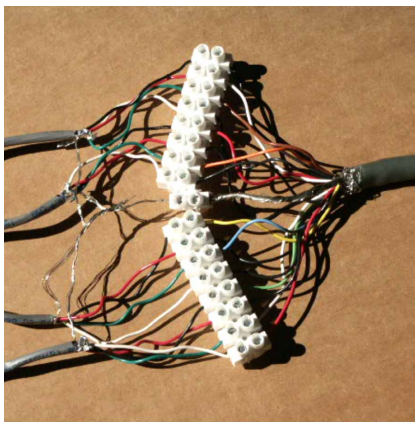
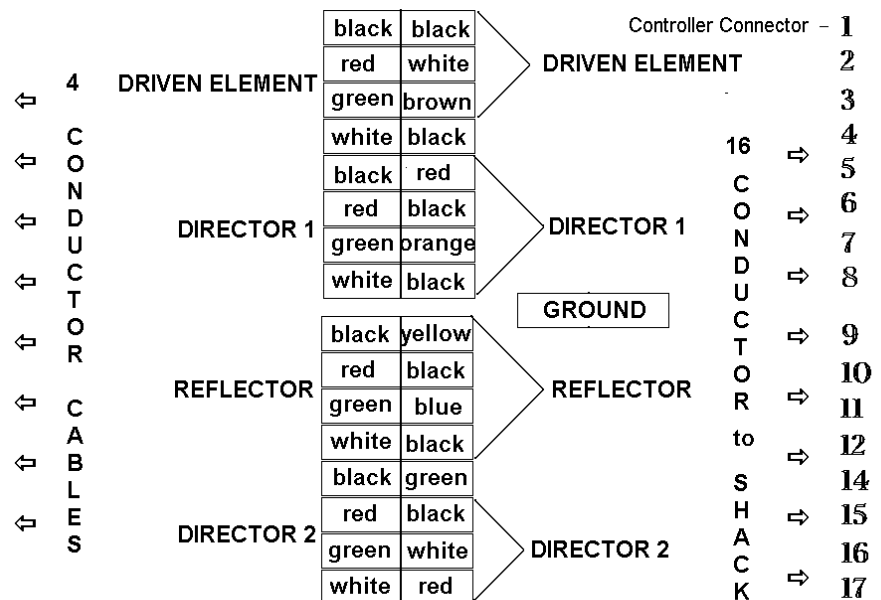


Figure 17



Drawing 4

The left side of figure 17 shows how these control cables are wired. Note the single position ground terminal in between each 8 position terminal strip. The right side shows how the 16 conductor control cable (8 pairs of wires, each pair with one colored wire and one black wire) that goes to the shack is connected. **Do NOT connect the 16 conductor cable to the SteppIR™ controller until instructed to do so.**

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, backshell 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 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 his 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 taped 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. Slide the cables and terminals strips into the PVC tube (figure 20). Then pull all 5 cables into the slot in the PVC tubing (figure 21).

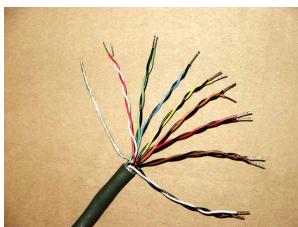


Figure 18

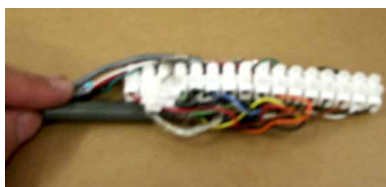


Figure 19



Figure 20

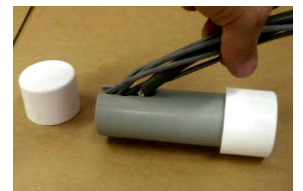


Figure 21

That completes the required wiring.

□ **STEP 5: Attach the Wiring Enclosure and Control Cable to the Boom**

Locate the unattached white PVC tube cap, #56 stainless steel hose clamp and black electrical tape.

Place the cap onto the open end of the PVC tubing. You do not need to glue the cap. It will be trapped against the 2-1/2" U-bolt as shown in figure 22, thereby keeping it from coming loose. The PVC tubing serves as our wiring enclosure and protects the connections from the weather.

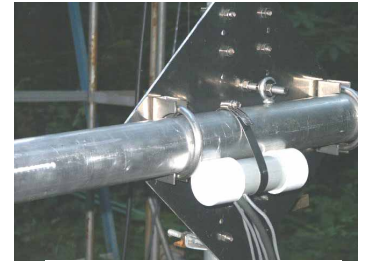


Figure 22

Fasten the wiring enclosure to the boom using the #56 stainless steel hose clamp. Center it as shown in figure 22. **Do not trap the cables between the clamp and PVC tubing or over-tighten the clamp.**

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. This is to prevent the cables from becoming damaged when moving the antenna and installing it on your tower.

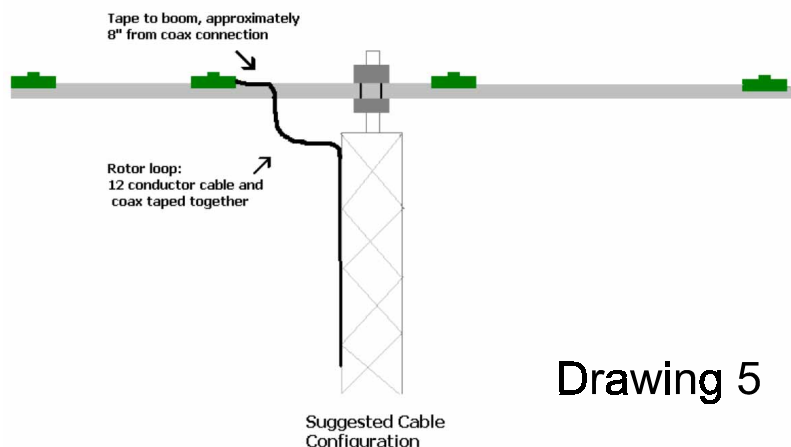


Figure 23

Six equally spaced tape points on both sides of the boom should be fine (figure 23). Then tape the cables to the bottom of the boom on both sides of the boom-to-mast plate using two wraps of electrical tape.

Position the wiring enclosure so it is snug against the boom and the loose end of the cap is trapped against the 2-1/2" U-bolt as shown in figure 22. Make sure the slot is facing downward. The slot is intentionally left unsealed so that any water from condensation inside the tube can escape.

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.



Drawing 5

□ **STEP 6: Prepare the Fiberglass Element Support Tubes**

Locate the eight fiberglass poles, two rolls of black electrical tape, two rolls of Black silicone self-curing tape and your tape measure. Note that 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.

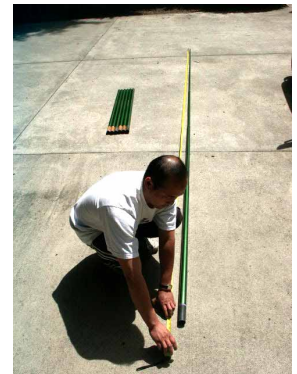


Figure 24

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 and back onto the fiberglass pole.**



Figure 25

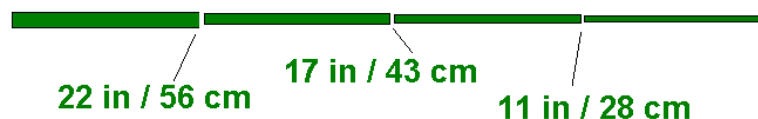
The common method for wrapping tape requires starting the tape at an angle of about 10 degrees to the object being wrapped and continuing around it in the same direction, overlapping the tape over itself by about one-half a tape width per wrap until the desired area has been covered. Be sure to use plenty of tape.

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 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 26

Recommended Lengths for Silicone Wrap



Drawing 6

- Next, you will weatherproof each joint with the green self-curing silicone tape. **It is important that you pre-cut the silicone tape to the recommended lengths.** If you do so, you will have more than enough for each joint. **Refer to drawing 6 on the prior page for proper lengths 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. You can also purchase extra from us, at \$7 per 20 foot roll.

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 green silicone wrap about 1/4” to the right of the black electrical tape. Using the common way discussed on the prior page, wrap one layer completely around the pole so the tape fully overlaps itself. Then slowly wrap ONE LAYER of silicone tape to the left, 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. Fig-

□ STEP 7: 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.

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

Locate the eight flexible connection couplers (FCCs) 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

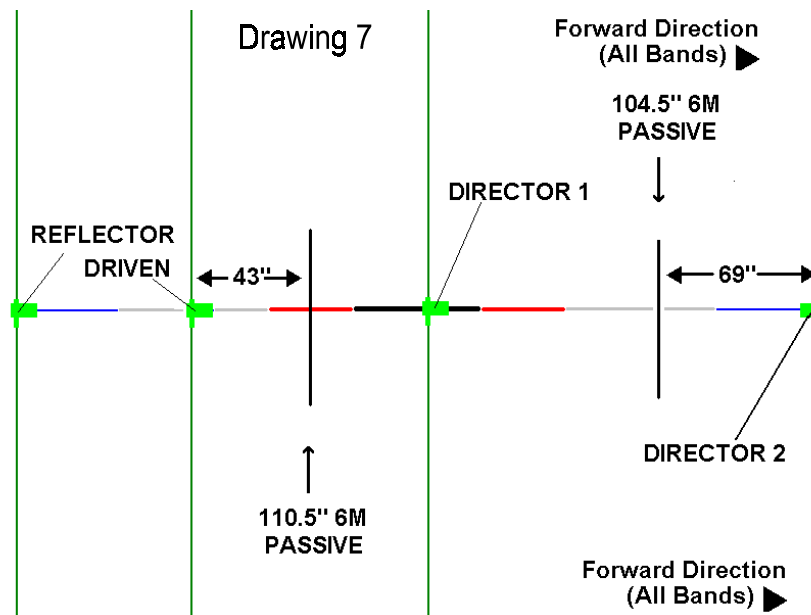
2. Insert the butt end of that EST into one of the EHTs on an EHU, as shown in figure 29. **It is very important to ensure that the butt end of the EST firmly bottoms out inside the EHT. Make sure the EST is seated all the way into the EHT. Then push the FCC firmly onto the EHT until it is flush with the aluminum reinforcing ring on the EHT.** You can use a small amount of the connector protector to assist in sliding the FCC on, as shown in figure 29. The correct mounting position of the FCC is shown in figure 30. **It is imperative that the stainless steel hose clamp be located so that the clamp on the outside of the FCC on the EHU side of the connection is completely on top of the aluminum reinforcing ring.**
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 you tightened them) before raising the antenna to the tower, to be sure that there has been no cold flowing of the PVC material on the FCC.

□ STEP 8: Install the Optional 6 Meter Passive Element (If ordered)

The 6 meter passive element kit consists of two passive elements. Each one is a different length, and each one has a different size of stainless steel U-bolt due to their respective placing on the boom.

The first passive element consists of three pieces; One 1/2" x 58-1/2" element section and two 3/8" x 26.5" element sections (figure 31). The overall length is approximately 110.5". This passive element is placed on the boom **43" from the center point of the driven element to the center of the 6m passive element** the center of the green telescoping tube of the driven to the center of the aluminum 6m passive element) **using a 2.25" U-bolt.**

The second passive element consists of three pieces; One 1/2" x 58" element section and two 3/8" x 23.35" element sections. The overall length is approximately 104.5". This passive element is placed on the boom **69" from the center point of director 2 and the center of the passive element using a 2" U-bolt.**



1. Locate the small packet of connector protector. Two #6-32 x 3/4" machine screws with split lock washers and nuts are shipped attached to each end of the 1/2" element sections. Remove the machine screws from the 1/2" tubing and identify the ends of the 3/8" tubing that have the least amount of distance from the edge of the tubing to the drilled hole. Lightly coat the circumference of those areas with a very thin film of the connector protector. Slide the coated end of the 3/8" tubing into the 1/2" tubing, align the holes and securely fasten the pieces together with the machine screws. **Check to be sure that the elements are the proper length.** Repeat for the second passive element, this completes the assembly of the element.
2. Using a tape measure, determine the correct passive element placement as shown in Drawing 7 on page 16. Be sure to measure from the actual element of the 6m passive, NOT from where the U-bolt attaches (figure 32). Tighten securely. **Make sure the elements are aligned with the green fiberglass poles.**

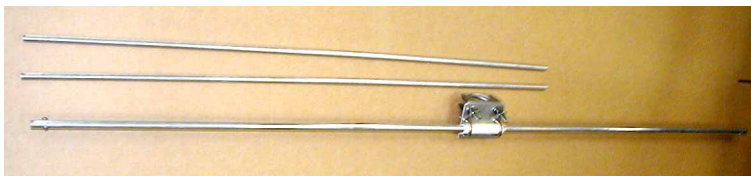


Figure 31

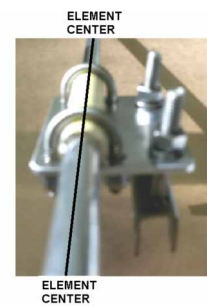


Figure 32

□ STEP 9: Install the Boom Truss Support Assembly

Locate the eight 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.

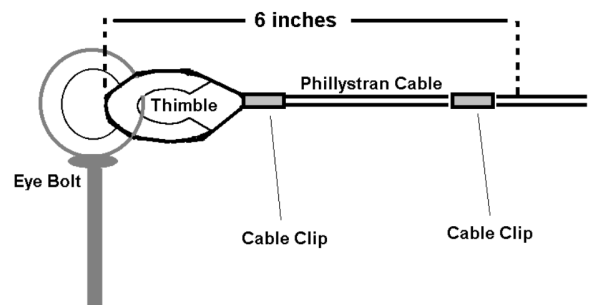
1. Using a hammer, lightly tap the thimbles so that the center opening is forced onto the eye bolt at the end of the boom (figure 33). Press the thimble back together as close as possible once it is through the eyebolt. Thread the Phillystran through the eyebolt, so that it rests on the channel of the thimble (figure 34). You will use approximately 12" of Phillystran to loop through the eyebolt (six inches down, six inches back) as shown in Drawing 8.



Figure 33



Figure 34



Drawing 8

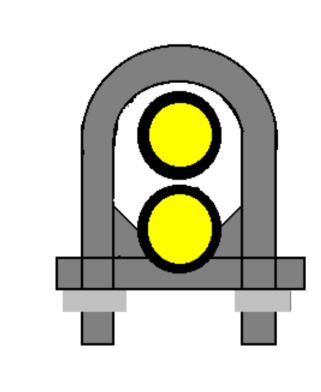
**DO NOT CUT THE PHILLYSTRAN CABLE UNTIL YOU HAVE INSTALLED ONE SIDE OF THE TRUSS—
THE MEASUREMENTS FOR EACH SIDE ARE NOT EQUAL IN LENGTH.**

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 second approximately 2-1/2” from the first cable clip (figure 35). you will want to thread the Phillystran into the cable clip, so that each section is on top of the other, as shown in Drawing 9. Tighten the nuts securely.

2. 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



Drawing 9



Figure 36

3. Attach the thimbles, Phillystran and wire clips in the same manner as in step one on the prior page. The finished assembly should look like figure 37 and figure 38.
4. 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

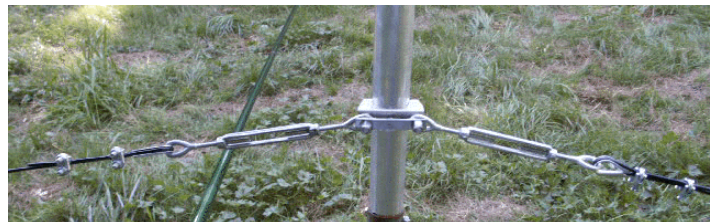


Figure 38

Upgrading the Controller (Upgrade Kit Customers Only)

1. Make sure the Elements are retracted, use the Setup Retract Elements menu selection (page 11; 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 the balun so if your SWR is higher than before use the following procedure to correct:

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

To reset this setting back to it's original value use the Factory Default All in the setup menu (page 8; Operators Manual).

Thank you for choosing SteppIR!!

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