HEXXAGONAL BEAM

Mark 2

DXE-HEXX-5TAP-2, DXE-HEXX-1TAP-2

DXE-HEXX-BEAM-MARK2-INS Rev. 6b

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Introduction

The DX Engineering **HEXXAGONAL BEAM KITS** provide a fast, economical way to build the hottest new design of an antenna concept that has been around since the 1980's. **HEXXAGONAL BEAM** component kits are available for an easy, step-by-step approach to designing your own antenna or to upgrade an existing installation.

The DX Engineering **HEXXAGONAL BEAM Mark 2** Five Band Hexxagonal Beam Antenna Package is a complete build-it-yourself system, including pre-assembled wire element kits, assembled wire guide and rope attachment clamps and a revolutionary new Five-Band Stainless Steel/PTFE Rigid Feeder System ***(US Patent No. 8,669,91, US Patent No. D624,060, British Patent No. GB248003 B)*** which operates all bands, 20 thru 10 meters with a single feedline. All hardware is high quality stainless steel. The pre-cut wire elements are 14 gauge stranded copper with black PVC insulation with special black wire guide tubes and ring terminals factory assembled. The rope supplied is a double-braided Dacron/Polyester, not weakened by decay or mildew and provides excellent resistance to abrasion. The color sealed black polyester yarn used in the braided jacket also protects the cord from damage due to ultra-violet light. The fiberglass spreaders are measured and cut to length with pre-cut slits on one end for proper tightening using the stainless steel band clamps. Also included is the complete DX Engineering Hexx Hub (***US Patent No. D605,184***). The cast aluminum Hexxagonal Beam Hub provides a superior mounting platform with built-in v-saddle clamping channels and all stainless steel v-bolts and hardware are included.

The DX Engineering **HEXXAGONAL BEAM Mark 2** can offer gain and front-to-back performance that exceeds your expectations for a multi-band two element beam, as its unique shape is much smaller, better balanced and has been reported to receive less noise than typical beams. This lighter, easier to handle antenna can be rotated with a light duty rotator, and it performs well, even when it is not mounted very high above the ground. With the DX Engineering **HEXXAGONAL BEAM Mark 2** and kits are based on the G3TXQ design with a broadband, u-shaped reflector for better coverage of the bands with low SWR. This is only one of the dramatic improvements of the G3TXQ broadband design over the "classic" dual-w hex beam antennas.

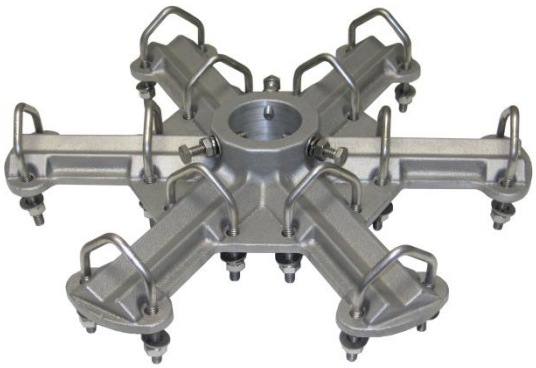
The patented Five Band Stainless Steel/PTFE Rigid Feeder System is a revolutionary breakthrough for Hexagonal Beam Antennas!

This new Stainless Steel/PTFE Rigid Feeder System ***(US Patent No. 8,669,91, US Patent No. D624,060, British Patent No. GB248003 B)*** eliminates vulnerable coaxial cable feedpoint sections - providing a weatherproof, low-loss, high power balanced connection to all bands for optimum

antenna pattern control. This revolutionary Rigid Feeder attaches directly to the outside of the full-size 1-1/4" fiberglass Center Post. It is no longer necessary to drill or slice up a center post - weakening it - to attach or protect older coaxial cable feeders with homebrew or terminal strip connections. The use of this balanced feeder system maintains optimal pattern, where other antennas have compromised unbalanced coaxial feeders with potentially distorted patterns.

The integral center insulators with the unique serpentine wire grip assure long, reliable performance. The pre-assembled and tested Five Band Stainless Steel/PTFE Rigid Feeder System is also ideal for retrofitting to other, older hexagonal beam designs using the DX Engineering wire element dimensions - or with your own hex antenna with appropriate testing and modifications.

At the center of the new **HEXXAGONAL BEAM Mark 2** is the exclusive DX Engineering cast aluminum HEXX Hub ***(US Patent No. D605,184)***. Specially designed and mechanically superior to available home-made base plate designs, the HEXX Hub has integral V-saddles and Stainless Steel V-Bolt hardware to firmly attach the fiberglass spreaders in proper alignment without drilling or crushing. The upper and lower mast mounts are integrally cast into the hub, eliminating the need to find separate mounting flanges, reducing assembly time, improving mast alignment and providing a far stronger, heavy duty attachment for the mast. For the rest of the antenna frame, high quality stainless steel element clamps rigidly hold the telescoping fiberglass sections at the correct lengths without drilling holes. Exclusive DX Engineering stainless steel element clamps with studs provide secure attachment points for the Five Band Stainless Steel/PTFE Rigid Feeder System ***(US Patent No. 8,669,91, US Patent No. D624,060, British Patent No. GB248003 B)*** without drilling. The unique Floating Element Wire Guides allow independent movement of the radiating wire elements and flexible fiberglass spreaders in the wind without creating breaking stresses. These special Wire Guides are attached to the spreaders without drilling, for a stronger, longer lasting antenna.



The DX Engineering **HEXXAGONAL BEAM Mark 2** is a directional beam antenna made with fiberglass spreaders and wire elements that looks like a very large inverted umbrella frame. Even at 22 feet wide and approximately 5 feet tall, it has a smaller turning radius than a two element 20 meter Yagi, and offers several enhanced operating characteristics. It may be mounted at the top of a rotatable mast or directly into a light to medium duty rotator. This antenna is fed at the top of the center post with a single 50Ω feedline. This top fed feedline arrangement has been tested and proven to function better than a bottom feedpoint connection. The Mark 2 purposely excludes poorly functioning 6 meter elements that other hex beam manufacturers have added, to preserve the broadband hex beam antenna's 10 and 12 meter performance.

HEXXAGONAL BEAM Features

The DX Engineering **HEXXAGONAL BEAM Mark 2** design has a number of important advantages over a Yagi:

- **Small turning radius -** the **HEXXAGONAL BEAM Mark 2** has a turning radius of 11'
- **Gain** - 5 dBi (3 dBd), depending on band - similar to 2 element Yagi, far exceeding performance of multi-band mini-beams
- **Front-to-Back** - >20 dB, depending on band
- **Balanced in the wind** - Hexxagonal symmetry reduces torque on the rotor
- **Light weight** - fully assembled - less than 25 pounds
- **Wind load** - less than 5 square feet
- **Can be turned with a light duty rotator** - no need to spend big dollars
- **Performs well at low heights -** good results at 20 to 30 feet above ground
- **Five Band gain and front-to-back -** can meet or exceeds other small antennas
- **Handles full legal limit power** – no power restriction as on competing antennas
- **Low Noise results** - approaches performance of closed loop antennas
- **Full length pre-cut elements** - no lossy coils or traps
- **Five-Band Stainless Steel/PTFE Rigid Feeder System** ***(US Patent No. 8,669,91, US Patent No. D624,060, British Patent No. GB248003 B)***
- **Requires no matching network** - direct single 50 ohm coax feed
- **New, easier and faster assembly** - fewer parts to speed completion of the antenna project

HEXXAGONAL BEAM Kits

DXE-HEXX-5TAP-2 - The DX Engineering **HEXX BEAM Mark 2 - Five-Band Total Antenna Package** consists of these four kits:

DXE-HEXX-1HBP	**HEXXAGONAL BEAM** Hub package *(US Patent No. D605,184)*
DXE-HEXX-1SCP-2	**HEXXAGONAL BEAM** Spreader & Center Post package
DXE-HEXX-5FFP	**HEXXAGONAL BEAM** 5-Band Stainless Steel/PTFE Rigid Feeder System ***(US Patent No. 8,669,91, US Patent No. D624,060, British Patent No. GB248003 B)***
DXE-HEXX-5WRP-2	**HEXXAGONAL BEAM** 5-band Wire Element & Wire Guide package

DXE-HEXX-1TAP-2 - The DX Engineering **HEXX BEAM 1-Band Total Antenna Package** consists of these three kits:

DXE-HEXX-1HBP	**HEXXAGONAL BEAM** Hub package *(US Patent No. D605,184)*
DXE-HEXX-1SCP-2	**HEXXAGONAL BEAM** Spreader & Center Post package
DXE-HEXX-1WRP-2	**HEXXAGONAL BEAM** 1-band Wire Element & Wire Guide package

Parts Lists

DXE-HEXX-1HBP - HEXX HUB

Qty	Description
1	Cast Aluminum Hexxagonal Hub *(US Patent No. D605,184)*
12	1.5" short Stainless Steel V-Bolt
12	1/4-20 Stainless Steel Hardware Kit for V-Bolts
6	1/4-20 Stainless Steel Hex Head Bolt 1.5" long
6	1/4-20 Stainless Steel Hex Nut
6	1/4-20 Stainless Steel Flat Washer
6	1/4-20 Stainless Steel Split Washer

DXE-HEXX-1SCP-2 - HEXXAGONAL BEAM Spreader & Center Post

Qty	Description	
1	Fiberglass Tube, Gray, 1.25" OD x 58" Long, .120 Wall (for the Center Post)	
6	Fiberglass Tube, Gray, 1.00" OD x 58" Long, .120 Wall with slits	
6	Fiberglass Tube, Gray, 0.75" OD x 43" Long, .120 Wall with slits	
6	Fiberglass Tube, Gray, 0.75" OD x 5" Long, .120 Wall	
6	Fiberglass Tube, Gray, 0.50" OD x 48" Long, .120 Wall	
1	Tube, Antenna, Aluminum, 1.375" OD x 14" Long, Slit one end (for the Center Post)	
6	**DXE-ECL-1000** - Element Clamp for 1" and 1.125" OD tubing	
6	**DXE-ECL-0875** - Element Clamp for .75" and smaller OD tubing	
1	**DXE-ECL-1500** - Element Clamp for 1.375" and 1.5" OD tubing	
1	Vinyl End Cap, Black	
2	**STI-DBR-94-100** - Dacron/Polyester Rope, 100 Foot Roll	
6	Spreader Rope Connection Assembly w/cushioned P-Clamps mounted on Stainless Steel Band Clamps	
1	Center Post Rope Connection Assembly - includes the following parts:	
	1	**DXE-MPH-1** Multi-Purpose Hub 1.5"
	3	1/4-20 x 1.25" Stainless Steel Hex Head Bolt
	3	1/4-20 Stainless Steel Nut
	3	1/4-20 Stainless Steel Square Nut
	3	1/4" Stainless Steel Split Washer
	3	1/4" Stainless Steel Flat Washer, 18-8

DXE-HEXX-5FFP - HEXXAGONAL BEAM 5-Band Stainless Steel/PTFE Rigid Feeder System *(US Patent No. 8,669,91, US Patent No. D624,060, British Patent No. GB248003 B)*

Qty	Description
1	Five Band Stainless Steel/PTFE Rigid Feeder ***(US & British Patented)***
1	Coaxial cable feedpoint pigtail
1	UHF Female-to-Female Adapter (dual SO-239 type)

DXE-HEXX-5WRP - HEXXAGONAL BEAM 5-band Wire & Wire Guide

Qty	Description
2	20/17/15/12/10 Meter Wire Driven Element Sets - #14 Copper Stranded Wire with Black PVC Insulation with Ring Terminals attached and Wire Guides installed
1	20/17/15/12/10 Meter Wire Reflector Element Sets - #14 Copper Stranded Wire with Black PVC Insulation with Ring Terminals attached and Wire Guides installed
15	#10 hole, 16-14 Wire Gauge Ring Terminal (Spares for various bands and/or adjustment in element lengths)
12	Floating Wire Guides for 1/2" Spreader
18	Floating Wire Guides for 3/4" Spreader

DXE-HEXX-1WRP HEXXAGONAL BEAM 1-band Wire & Wire Guide

Qty	Description
2	20 Meter Wire Driven Element - #14 Copper Stranded Wire with Black PVC Insulation with Ring Terminals attached and Wire Guides installed
1	20 Meter Wire Reflector Element - #14 Copper Stranded Wire with Black PVC Insulation with Ring Terminals attached and Wire Guides installed
6	#10 hole, 16-14 Wire Gauge Ring Terminal (Spares for various bands and/or adjustment in element lengths)
1	UHF Female-to-Female Adapter (dual SO-239 style)
1	Coax Wire Assembly, 10" with PL-259 and Ring Terminals
1	Single Band Feeder Insulator Clamp Assembly
6	Floating Wire Guides for 3/4" Spreader.

Parts required but not supplied

JTL-12555 - Jet-Lube SS-30 Pure Copper Anti-Seize

The above products are limited to domestic UPS Ground shipping only

Note: Jet-Lube SS-30 or Never Seez® should be used to prevent galling (seizing) of stainless steel hardware.

TES-2155 - 3M Temflex™ 2155 Rubber Splicing Tape
TES-06132 - Scotch® Super 33+ Tape
The **DXE-FCC050-H05-B** - Feedline Current Choke and the **DXE-BMB-1P** Balun Mounting Kit for a .750 in. thru 1.50 in. Boom - are suggested options and this manual describes their installation.

Tools Required

1/4", 5/16", 3/8" and 7/16" Deep Well Nut Drivers and/or Open End Wrenches
Tape Measure, 50 ft
Step Ladder, 6 ft. ***Use proper precautions for step ladder safety***
Screwdriver
Pliers
Scissors
Lighter or flame source (to slightly melt the cut rope ends to keep them from fraying)
Use proper safety precautions for a lighter or flame producing item
Marking Pen or Pencil
Three foot Tripod and three foot mast pipe - To hold the antenna while under construction.

Manual Updates

Every effort is made to supply the latest manual revision with each product. Occasionally a manual will be updated between the time your DX Engineering product is shipped and when you receive it. Please check the DX Engineering web site (www.dxengineering.com) for the latest revision manual.

HEXXAGONAL BEAM Construction

This manual for the DX Engineering **HEXXAGONAL BEAM Mark 2** is written in sections for the various assemblies. Each section of assembly instructions is titled with the **HEXXAGONAL BEAM Mark 2** kit name and model number for easy reference.

The typical build sequence is:

1. Assemble the patented HEXX HUB
2. Center Post assembly
3. 5-Band Stainless Steel/PTFE Rigid Feeder System Installation
4. Install the Center Post Rope Hub
5. Installation of the optional **DXE-FCC050-H05-A** Feedline Current Choke
6. Spreader assembly
7. Wire Element installation
8. Installation on a Mast and Rotator
9. SWR Testing

An outdoor area of about a minimum 30 foot square is required for assembly of this antenna.

There are parts made from fiberglass in this kit. Take normal precautions when handling any fiberglass material. There may be fiberglass dust, slivers or particles present when the fiberglass parts were manufactured. The use of typical fiberglass handling safety gear (gloves, dust mask, eye shield, clothing, etc.) when handling and working with fiberglass is recommended. Use a damp rag to wipe the parts. **Do not** use compressed air to clean fiberglass parts. Measures can be taken to reduce exposure after a person has come in contact with fiberglass. Eyes should be flushed with water and any area of exposed skin should be washed with soap and warm water to remove fibers. Clothing worn while working with fiberglass should be removed and washed separately from other clothing. The washing machine should be rinsed thoroughly after the exposed clothing has been washed. Check with your local or state safety and/or environmental agencies for more detailed precautions.

The use of a three foot tripod and a three foot mast pipe makes construction of the antenna easier (see **Figure 1**).

Figure 1 - Using a temporary tripod and mast for assembly at ground level

Sufficient space is required for the installation of the antenna on your mast or tower.

The finished antenna is approximately 22 feet in diameter.

Hexxagonal Hub Assembly Instructions

DXE-HEXX-1HBP - HEXXAGONAL HUB (US Patent No. D605,184) Parts List

Qty	Description
1	Cast Aluminum Hexxagonal Hub *(US Patent No. D605,184)*
12	1.5" short Stainless Steel V-Bolt
12	1/4-20 Stainless Steel Hardware Kit for V-Bolts
6	1/4-20 Stainless Steel Hex Head Bolt, 1.5" long
6	1/4-20 Stainless Steel Hex Nut
6	1/4-20 Stainless Steel Flat Washer
6	1/4-20 Stainless Steel Split Washer

Insert the twelve Stainless Steel V-Bolts over the cast V-Saddles as shown in **Figure 2**.

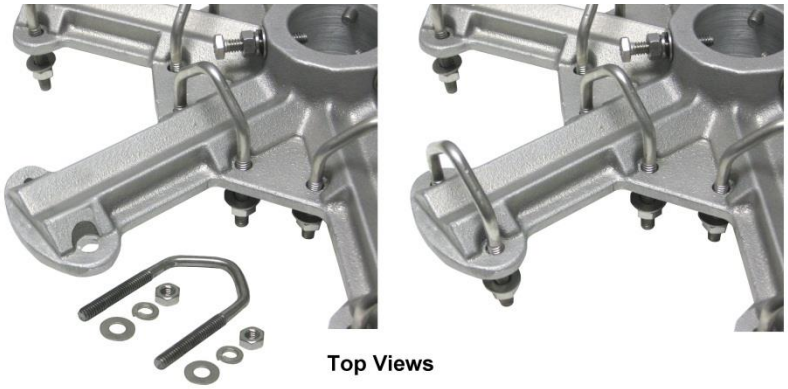
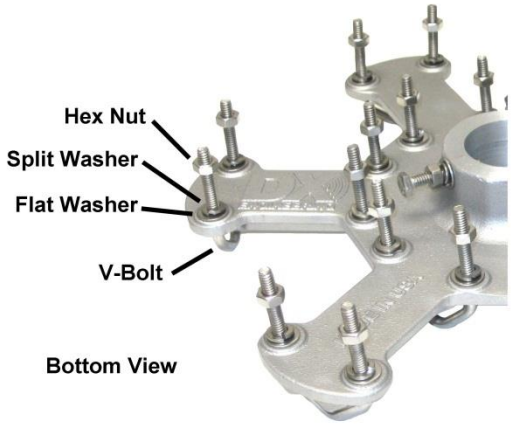


Figure 2



Jet-Lube SS-30 Anti-Seize or Never Seez® should be used to prevent galling (seizing) of stainless steel hardware.

Install a flat washer, a split washer and a 1/4-20 nut on each V-Bolt leg, snug the nuts partially.

Install six 1/4 -20 bolts, six flat washers, six split washers and six nuts, into the top and bottom cast-in flanges of the hub, as shown in **Figure 3**. These will be adjusted to fit the center post for the **HEXXAGONAL BEAM**.

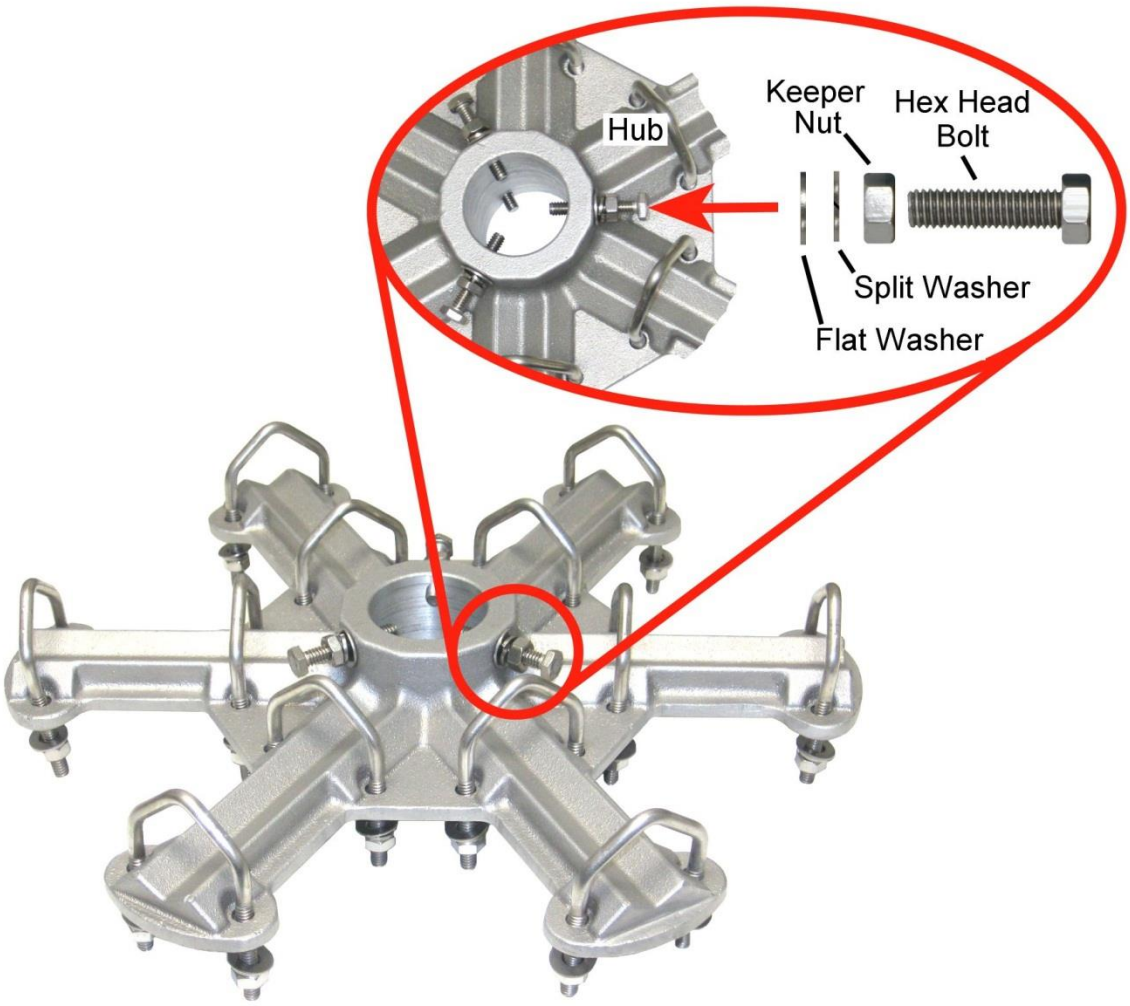


Figure 3

The DX Engineering Hexxagonal Hub is now ready for use as the solid foundation for your **HEXXAGONAL BEAM Mark 2**.

Working with Fiberglass

There are parts made from fiberglass in this kit. Take normal precautions when handling any fiberglass material. There may be fiberglass dust, slivers or particles present when the fiberglass parts were manufactured. The use of typical fiberglass handling safety gear (gloves, dust mask, eye shield, clothing, etc.) when handling and working with fiberglass is recommended. Use a damp rag to wipe the parts. **Do not** use compressed air to clean fiberglass parts. Measures can be taken to reduce exposure after a person has come in contact with fiberglass. Eyes should be flushed with water and any area of exposed skin should be washed with soap and warm water to remove fibers. Clothing worn while working with fiberglass should be removed and washed separately from other clothing. The washing machine should be rinsed thoroughly after the exposed clothing has been washed. Check with your local or state safety and/or environmental agencies for more detailed precautions.

Center Post and Spreader Assembly Instructions

DXE-HEXX-1SCP-2 - HEXXAGONAL BEAM Spreader & Center Post Parts List

Qty	Description	
1	Fiberglass Tube, Gray, 1.25" OD x 58" Long, .120 Wall (for the Center Post)	
6	Fiberglass Tube, Gray, 1.00" OD x 58" Long, .120 Wall with slits	
6	Fiberglass Tube, Gray, 0.75" OD x 43" Long, .120 Wall with slits	
6	Fiberglass Tube, Gray, 0.75" OD x 5" Long, .120 Wall	
6	Fiberglass Tube, Gray, 0.50" OD x 48" Long, .120 Wall	
1	Tube, Antenna, Aluminum, 1.375" OD x 14" Long, Slit one end (for the Center Post)	
6	**DXE-ECL-1000** - Element Clamp for 1" and 1.125" OD tubing	
6	**DXE-ECL-0875** - Element Clamp for .75" and smaller OD tubing	
1	**DXE-ECL-1500** - Element Clamp for 1.375" and 1.5" OD tubing	
1	Vinyl End Cap, Black	
2	**SYN-DBR-94-100** - Dacron/Polyester Rope, 100 Foot Roll	
6	Spreader Rope Connection Assemblies with cushioned p-clamps installed	
1	Center Post Rope Connection Assembly - includes the following parts:	
	1	**DXE-MPH-1** Multi-Purpose Hub 1.5"
	3	1/4-20 x 1.25" Stainless Steel Hex Head Bolt
	3	1/4-20 Stainless Steel Nut
	3	1/4-20 Stainless Steel Square Nut
	3	1/4" Stainless Steel Split Washer
	3	1/4" Stainless Steel Flat Washer, 18-8

Center Post Assembly

Assemble the one 1-1/4" OD x 58" long fiberglass center post tube into the one 1-3/8" x 14" long aluminum tube, with the slit end of the aluminum tube oriented toward the middle of the center post. The other end of the aluminum tube is aligned flush with the end of the fiberglass center post. Secure the two parts together using the **DXE-ECL-1500** Element Clamp over the slits with a 3/8" spacing between the end of the slit end of the aluminum tube to the element clamp as shown in **Figure 4**.

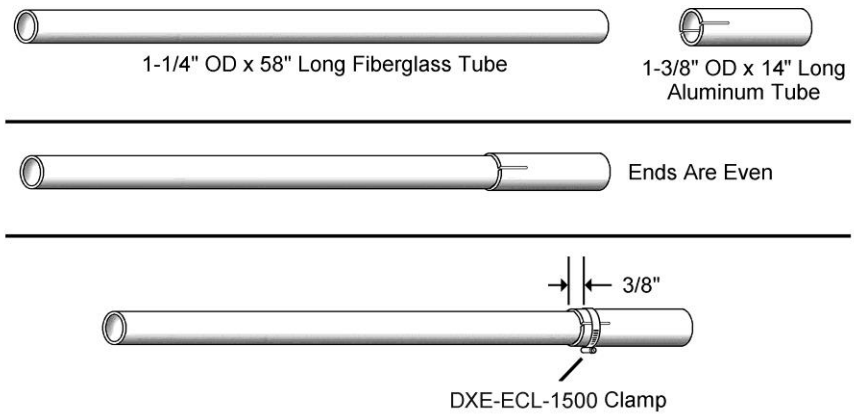
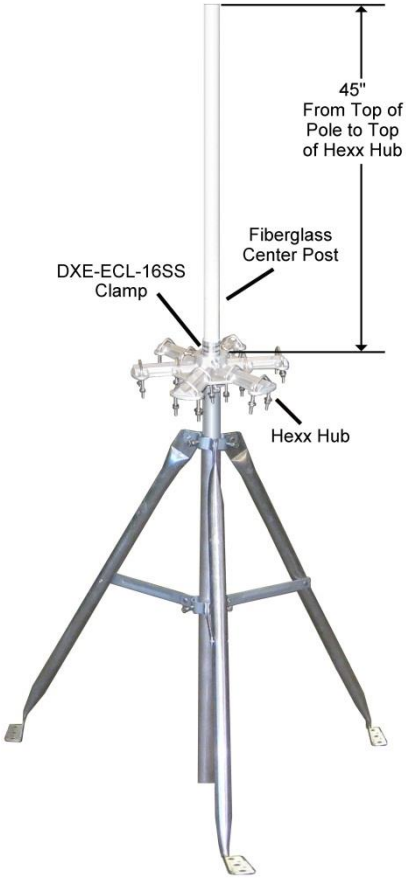


Figure 4



Insert the center post with aluminum tube sleeve into the Hexxagonal Hub. The height of the center post should be 45" above the top of the Hexx Hub as shown in **Figure 4**.

Hand tighten the upper and lower mast mount hardware on the Hexxagonal Hub evenly, to position the post ***exactly in the center*** of the hub. Make certain that the plane of the hub is perpendicular to the post so the post and hub are concentrically spaced through the hub with the mast mount hardware equally tightened. Tighten the mast mount bolts progressively, but carefully, to maintain even spacing between the post and the hub upper and lower mast mounts as shown in **Figure 5**.

The mast mount bolts should be tightened firmly to secure the hub, but not enough to dent the aluminum tubing. Final position of these bolts is maintained by tightening the keeper nuts only until the split washers are flat while keeping the mast mount bolts from turning further.

Once assembled, you can use a customer supplied 3 foot tube that will fit over the 1-3/8" OD aluminum tube that sticks below the bottom of the Hexxagonal Hub and tripod as shown in **Figure 4**, to aid in assembling the antenna system at ground level.

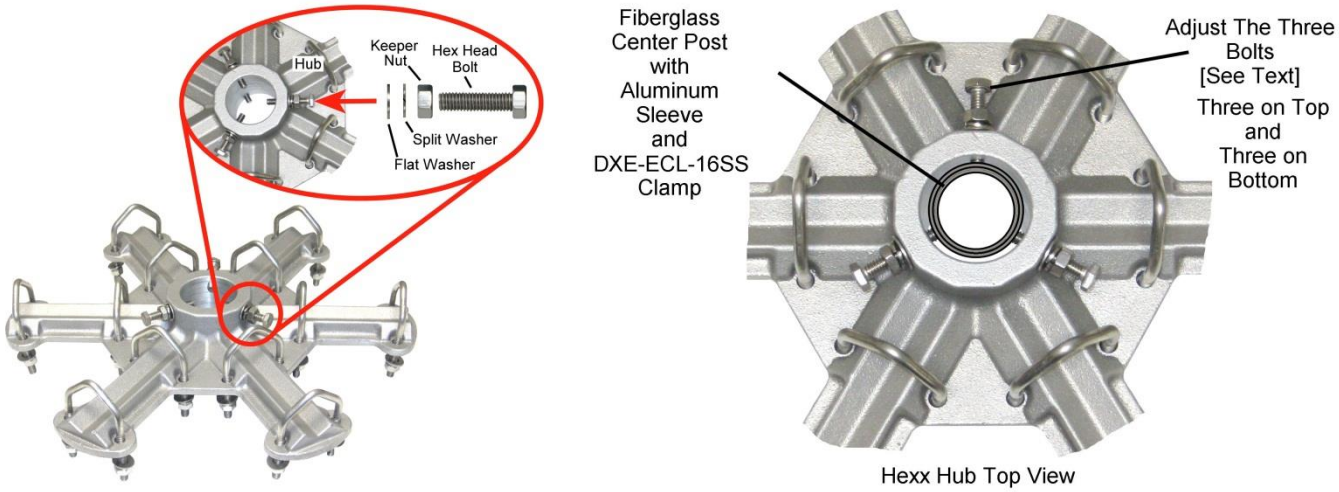


Figure 5

If you are building the DX Engineering **HEXXAGONAL BEAM 1-Band Total Antenna Package - DXE-HEXX-1TAP-2**, skip the section titled **5-Band Stainless Steel/PTFE Rigid Feeder System installation**. Install the Rope Hub and Spreaders as described in the sections titled **Installing the Center Post Rope Hub** and the **Spreader Assembly.** The Single Feed system is described in the section titled: **DXE-HEXX-1WRP-2 One-Band Wire and Wire Guide Package (page 28).**

If you are building the DX Engineering **HEXXAGONAL BEAM Mark 2 Five-Band Total Antenna Package - DXE-HEXX-5TAP-2** continue below.

5-Band Stainless Steel/PTFE Rigid Feeder System installation

Slide the entire US & British patented 5-Band Stainless Steel/PTFE Rigid Feeder System onto the 1-1/4" OD center post. Position the center of the 10 meter insulator 5" above the patented Hexx Hub (**DXE-HEXX-1HBP**). Tighten the insulator clamps after each of the insulators are aligned to face directly between the two spreaders facing the front of the antenna as shown in **Figure 6**.

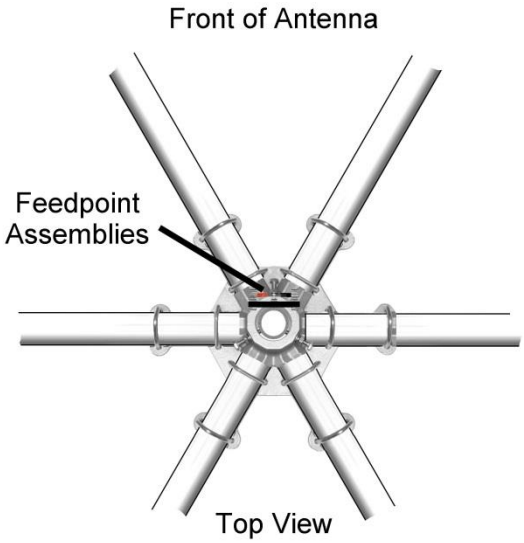


Figure 6

Center Feed with Front of Beam

Install the Coaxial Cable pigtail to the top (20 meter) feedpoint on the Five Band Stainless Steel/PTFE Rigid Feeder as shown in **Figure 7**. The Five Band Stainless Steel/PTFE Rigid Feeder is factory assembled with all hardware. You will have to remove and re-use some of the nuts, washers and lock washers to install the pigtail. Later on you will also remove and re-use hardware when installing the driven element wires. Note, there is a small package of spare hardware included.

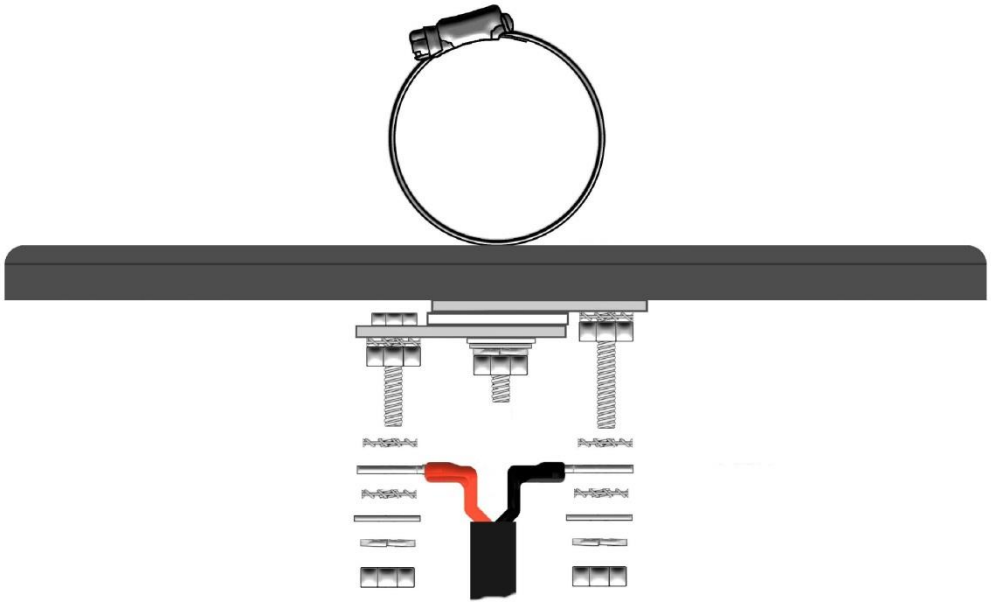
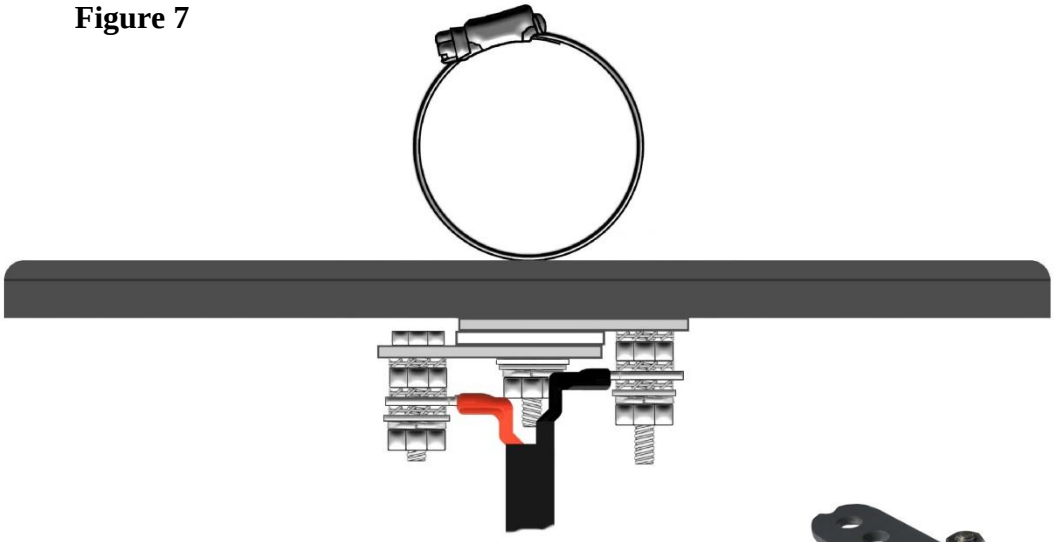


Figure 7



Installing the Center Post Rope Hub

Using **Figure 8** as a reference, assemble the center post rope connection hub assembly with hardware.

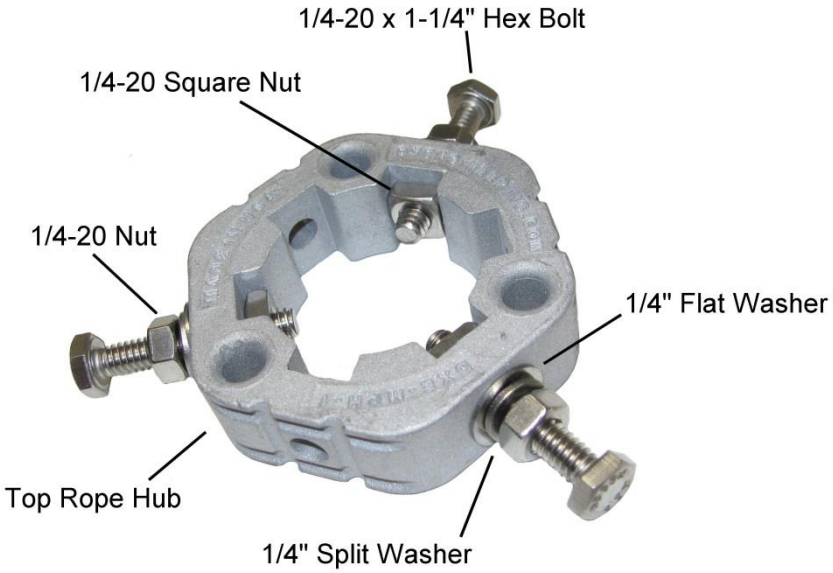


Figure 8

Install center post rope connection hub assembly, 1-1/2" from the top of the center post as shown in **Figure 9**. Orient this hub so its vertical holes are facing between every other spreader. Tighten the hub hardware carefully so the center post and the hub are concentric (space between the center post and the interior of the hub is even). When tightened to the center post, lock the hex head bolts in place by tightening the 1/4-20 hex nuts against the hub. Install the 1-1/4" black vinyl cap on the top of the center post.

Figure 9

Installing the optional Feedline Current Choke

Using the optional **DXE-BMB-1P**, attach the long aluminum strip to the bottom of the optional **DXE-FCC050-H05-B** Feedline Current Choke. Place the Feedline Current Choke on the Center Post using the two stainless steel band clamps (included with the **DXE-BMB-1P**). One clamp is located below the 20 meter feed point clamp and the lower band clamp is located above the 17 meter element clamp as shown in **Figure 10**. Connect the coaxial pigtail to the top of the Feedline Current Choke. If the optional Feedline Current Choke is not installed, use the supplied UHF to UHF adapter to connect your RG-213 (or equivalent) coaxial cable to the feedline pigtail.

Figure 10

Spreader Assembly

Locate the 25 fiberglass tubes. They are nested inside each other in the shipping box as shown in **Figure 11**.

- One 1-1/4" x 58" long fiberglass tube used for the center post assembly.
- Six 1" OD x 58" long fiberglass tubes slit on one end for the spreaders.
- Six 3/4" OD x 43" long fiberglass tubes slit on one end for the spreaders.
- Six 1/2" OD x 48" long fiberglass tubes for the spreaders.
- Six 3/4" OD x 5" long fiberglass tubes used to re-enforce the 1" OD tubes when mounted in the Hexx Hub.

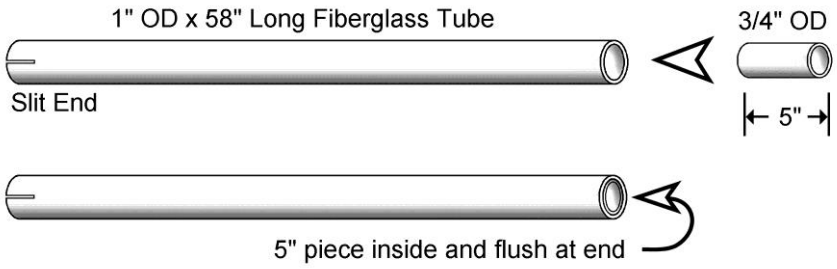
#	Qty	Fiberglass Tubes
❶	1	1.25" OD x 58" Long
❷	6	1.00" OD x 58" Long Slit One End
❸	6	0.75" OD x 43" Long Slit One End
❹	6	0.50" OD x 48" Long
❺	6	0.75" OD x 5" Long

Figure 11 - Fiberglass Tubes

For ease of assembly and adjustment of the spreaders each element clamp tightening nut should be under the spreader as you look down on the antenna.

Insert a 3/4" OD x 5" long fiberglass reinforcement tube flush into the un-slit end of each of the six 1" OD x 58" long fiberglass sections. When the 1" OD is slid into the one of the six Hexxagonal Hub V-Saddle channels, under the V- Bolts ensure the smaller 5" long tube inside stays at the end. These short 5" pieces are being used to re-enforce the 1" tube under the V-Bolts.

Leave a space of about 1/2" to 3/4" between the upper mast mount surface of the hub and the end of each 1" OD spreader section. The slits at the far end should be aligned horizontally , not vertically. Ensuring the inside tube does not move, tighten the V-bolt nuts evenly until the lock washers are flattened, without crushing the section as shown in **Figure 12**.



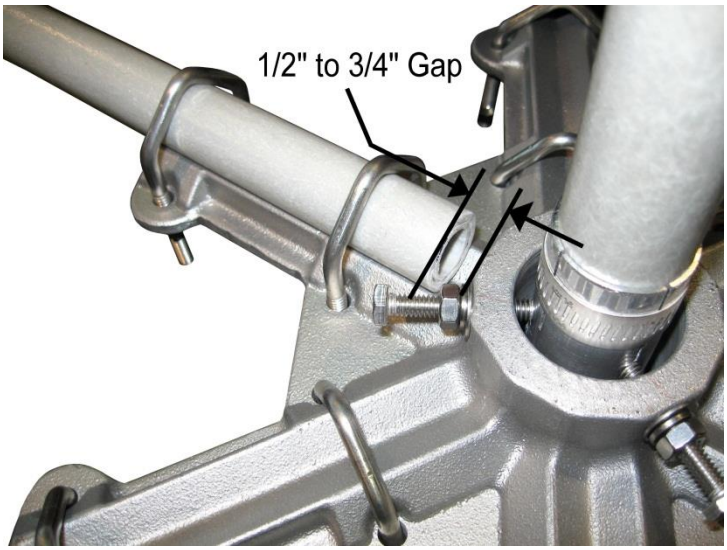


Figure 12

Place one **DXE-ECL-1000** on each slit end of the six 1" OD sections. Slide the 3/4" OD x 43" long sections into the 1" sections and clamp them together, adjusting the 3/4" section to 39" in length as shown in **Figure 13**.

Ensure the slit ends are horizontally aligned, not vertical. Position the element clamp about 1/4" to 3/8" away from the end of the section when tightening. Do not over-tighten which will damage the element clamp. The clamp tightening screw should be on the bottom of the tube assembly.

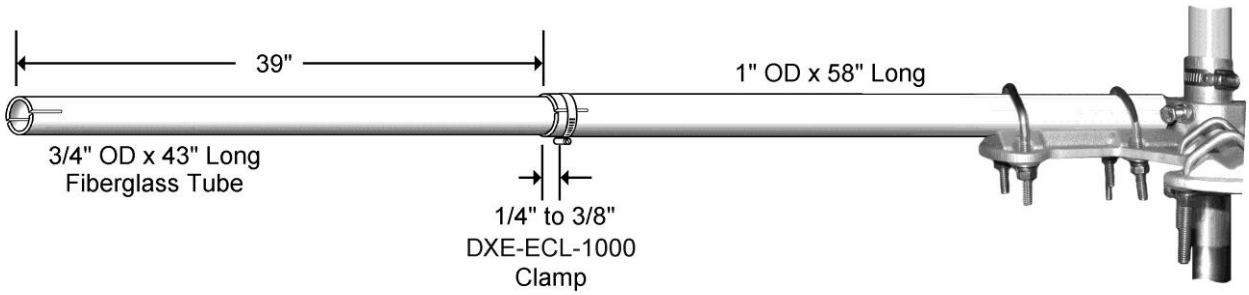


Figure 13

Slide the 1/2" OD x 48" long fiberglass section into the 3/4" fiberglass sections. Referring to **Figure 14** for each spreader, slide the three 3/4" wire element guides, the **DXE-ECL-0875** band clamp, the two 1/2" wire element guides and the Rope Connection clamps as shown.

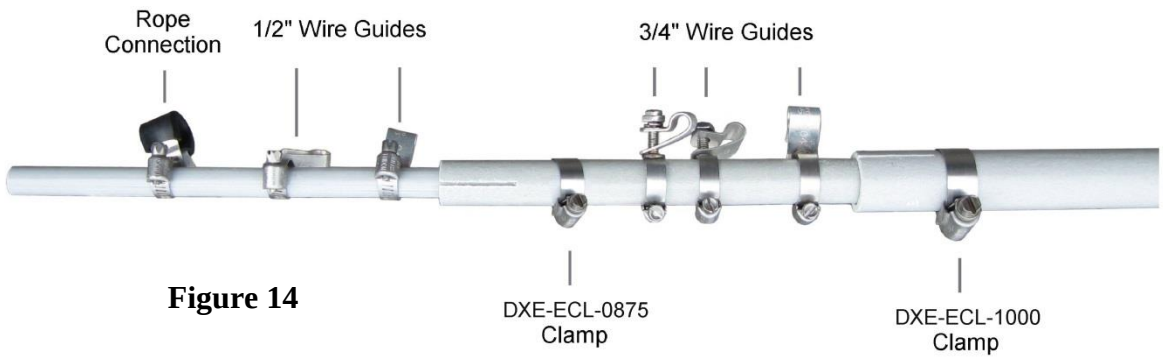


Figure 14

For each spreader, slide the 3/4" fiberglass section out of the 1" OD section to 39" as shown in **Figure 15**. Tighten the **DXE-ECL-1000**. Slide the 1/2" OD long fiberglass section out of the 3/4" OD sections to 42" as shown in **Figure 15** and tighten the **DXE-ECL-0875** clamp. Position the element clamps about 1/4" to 3/8" away from the end of the section when tightening. Do not over-tighten which will damage the element clamp. The clamp tightening screw should be on the bottom of the tube assembly. When completed, the three long sections (or tubes) making up one spreader will be 139" in length.

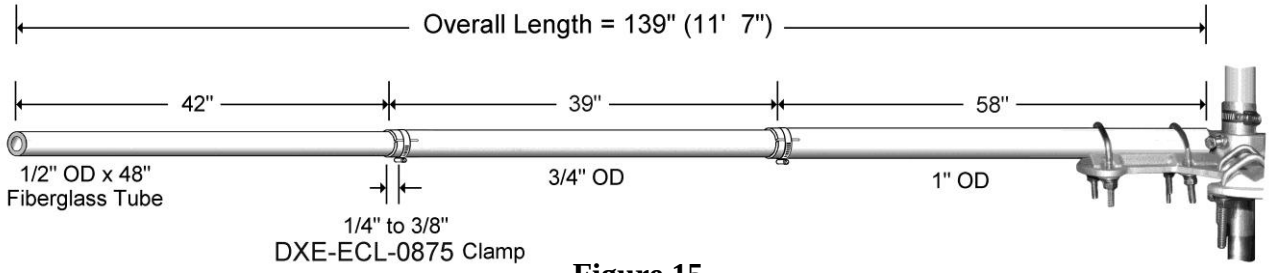
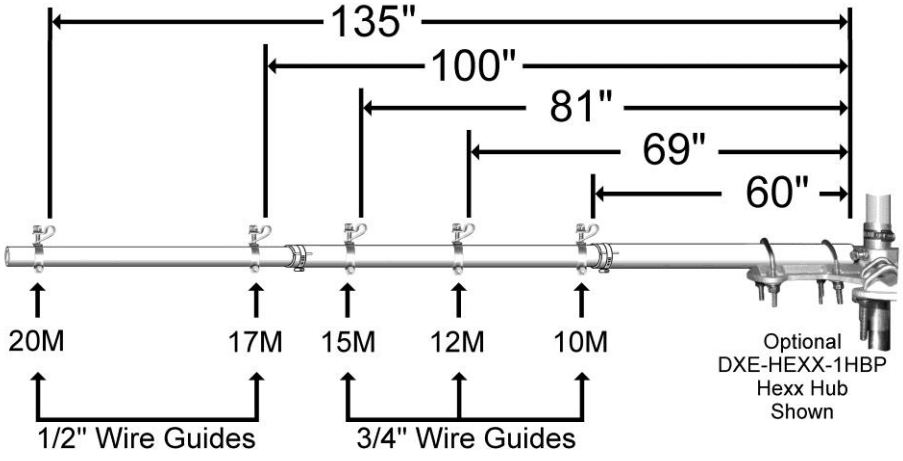


Figure 15

Place and snug the wire guides to the **approximate dimensions** shown in **Figure 16** on the spreaders positioned vertically (P-Clamp up with loop toward the Hexx Hub - center of the antenna). **<u>These assemblies will need to be moved for final positioning on your antenna.</u>** Snug the band clamps in place and **do not tighten**.

Figure 16



Typical placement of Wire Guide Clamps

Tighten each spreader rope connection assembly 1/2" from the end of each spreader and tighten with the clamp stud and cushioned p-clamp are positioned vertically as shown in **Figure 17**.

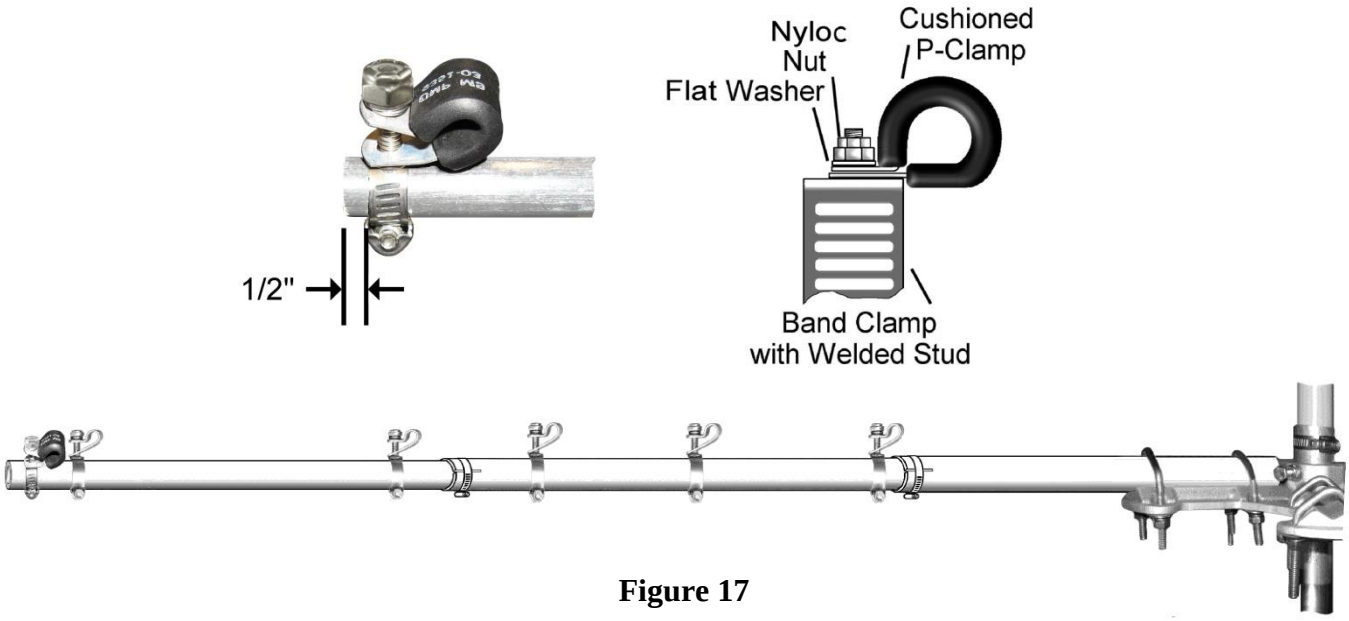


Figure 17

The Dacron Polyester rope that came with the **Spreader and Center Post Package** may now be cut into specific lengths for the antenna assembly. After cutting this type of rope, the ends should be slightly melted with a flame to prevent unraveling. The dimensions indicated include extra length for knots. Upon completion of the antenna, excess rope may be trimmed and re-melted.

Cut seven pieces of spreader support rope 144" in length (12 ft.).

Cut one piece of rope 78" in length (6 ft., 5 in.).

Cut one piece of rope 112" in length (9 ft., 4 in.).

Cut 10 element spacer ropes (2 for each band) to the 'cut lengths' dimensions in **Table 1**.

Band	Element Spacer Ropes Cut Length (2 each)
20	30"
17	24"
15	22"
12	20"
10	18"

Table 1 - Element Spacer Ropes

Caution: Bowed fiberglass spreaders can cause injury if they are accidentally released. Be sure helpers are not in the proximity of a bowed spreader during assembly.

Attach the 144" spreader support ropes onto each spreader rope connection assembly, knotting through and around the cushioned p-clamp.

Working with help, if possible, using the step ladder positioned near the center of the antenna. Pull on the spreader support rope to bow the spreader up. The spreader support rope must be horizontal when the spreader is moved into the final antenna position. See **Figure 18**. Knot the rope through one of the three vertically aligned holes on the center post support rope attachment hub. Adjacent spreaders share rope attachment holes on this hub.

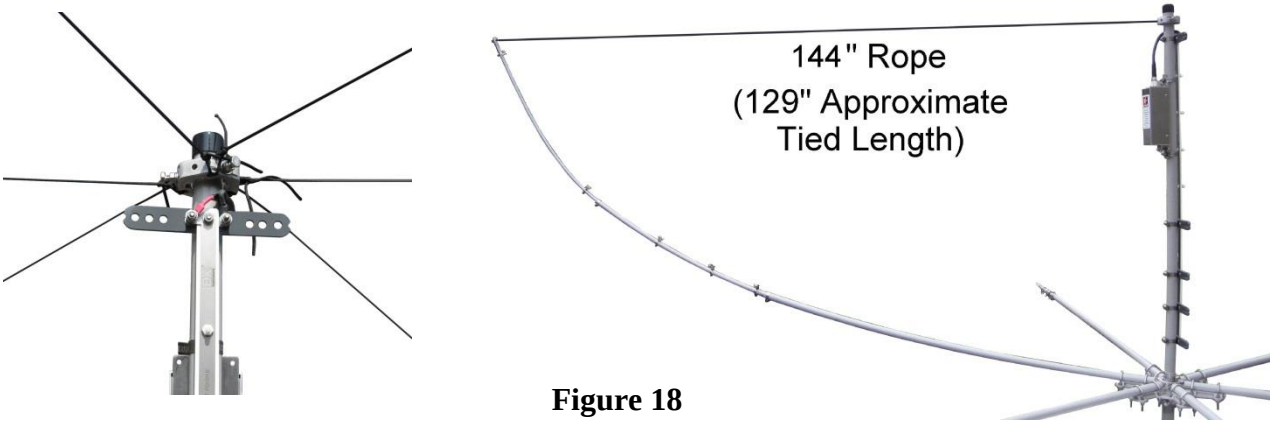


Figure 18

Repeat this process on the spreader on 'opposite' sides of the antenna until all six spreaders are secured in their final position. Each spreader end will be at the same horizontal height position as the rope attachment hub on the center post.

The seventh 144" rope is strung between the spreader rope attachment clamps at the end of the spreaders adjacent to the feeder insulator, across the front of the beam. Secure this rope into a horizontal position of about 129" tied length **without** pulling these two spreader ends together as shown in **Figure 19**.

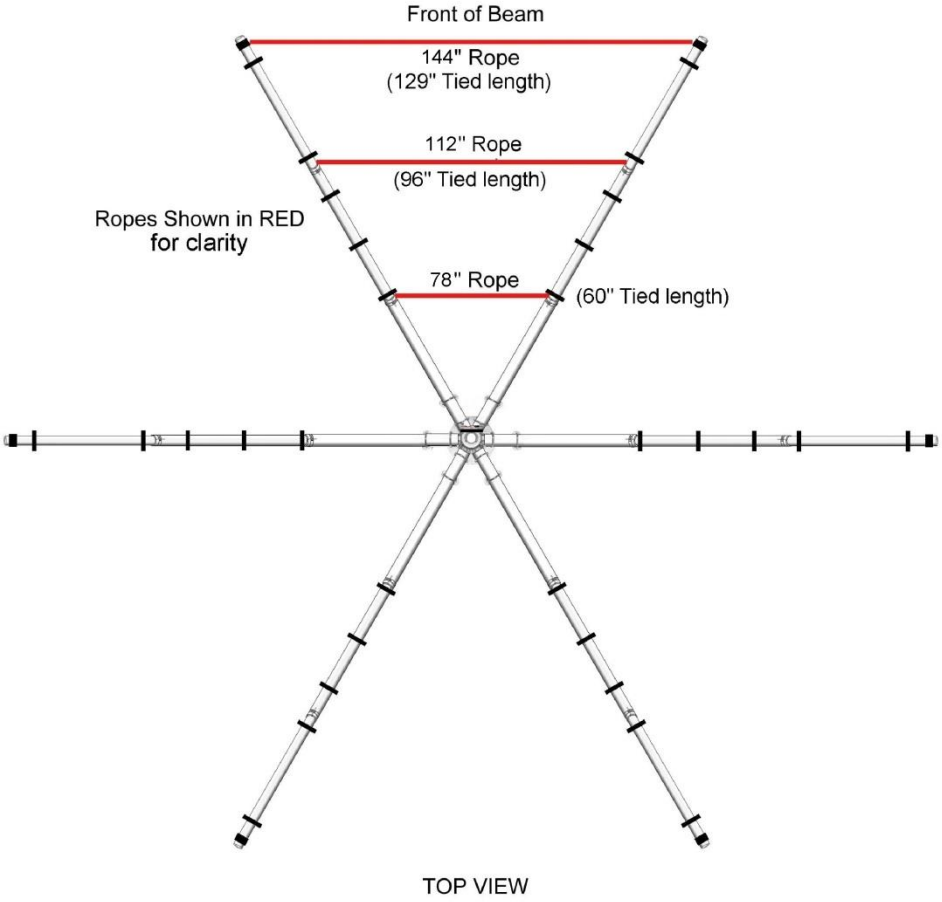


Figure 19

Ropes previously installed from the ends of each spreader to the center post rope attachment hub are not shown in this picture for clarity.

Install the 78" and the 112" ropes across the front of the beam, tied around the spreaders where the smaller fiberglass spreader section is clamped into the next larger section. Secure these ropes into a horizontal position with out pulling the middle sections of the two spreaders together as shown in **Figure 19**. These two spreaders will now remain straight when the wire elements are strung around and tied and straightened into position with tension.

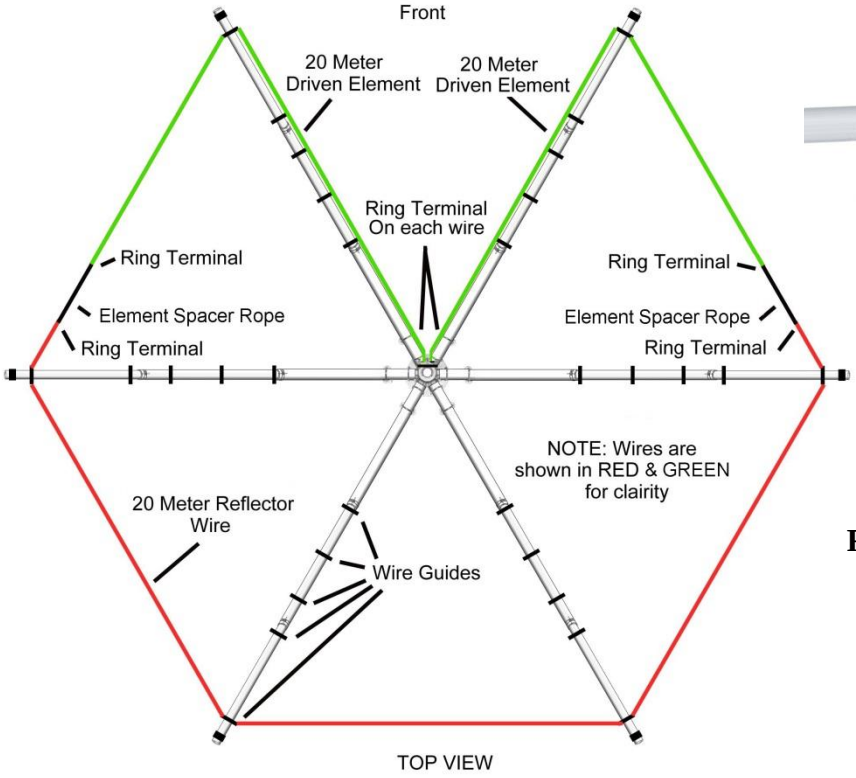
Installing the Wire Elements

The precut and assembled wire sets have the wire guide tubes and ring terminals installed. The wire lengths are as shown in **Table 2**. Minor variations in these lengths will not adversely affect antenna performance.

Band	Driven Elements (2) Wire Length	Reflector Wire Length
20	17' 10-1/2"	33' 10"
17	13' 10-1/4"	26' 3"
15	11' 10"	22' 6"
12	9' 11-1/2"	19'
10	8' 8-3/4"	16' 8-3/4"

Table 2 - Driven Wire Elements and Reflector Wire Elements

Start with the 20 meter band. Thread one end of the two driven element wires (front of beam) with the black tubes and ring terminals through the previously installed wire guide clamps, positioning one of the black tubes through each clamp as shown. If the tube does not fit through the loosened wire guide clamp, you may need to nudge the installed clamp opening slightly (see below). The tubes are pre-installed on the wire sets. Once the tubes are in place, tighten the Nyloc nuts on the wire guides clamp to hold the tubes perpendicular to it's spreader as shown in **Figure 20**.



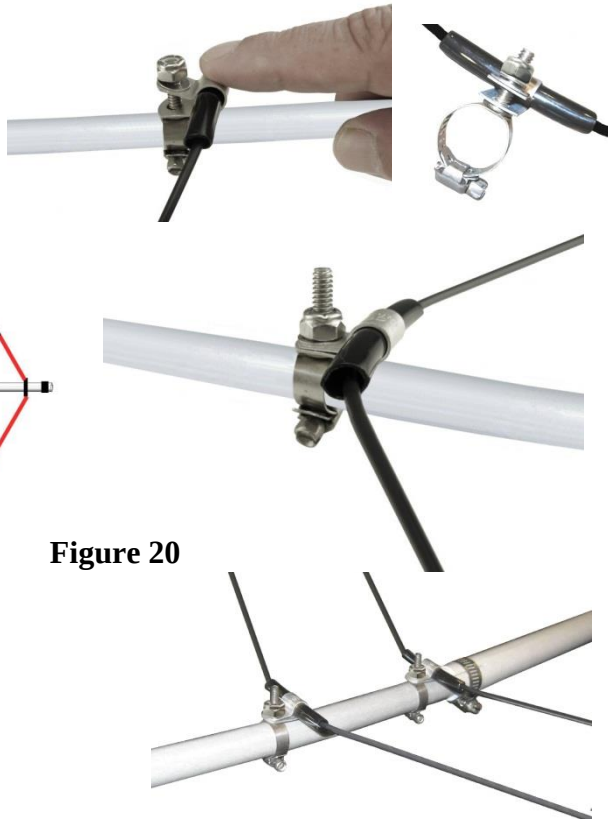
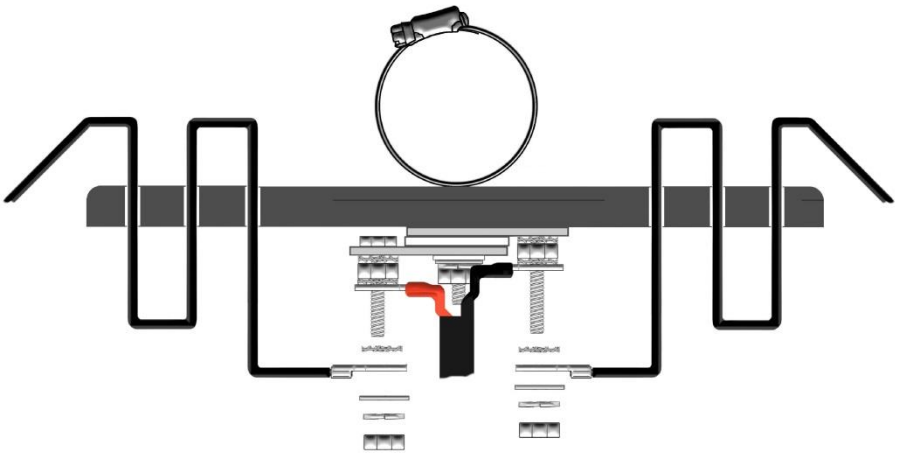
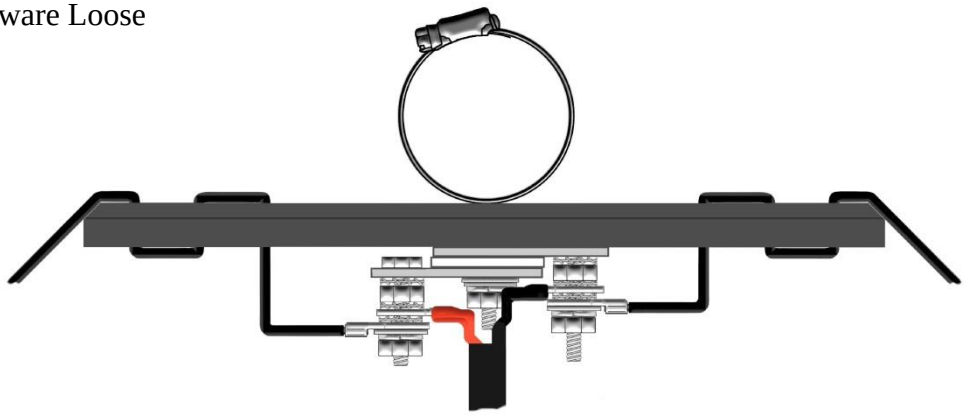


Figure 20

Connect the 20 meter Driven Element Wires to the Five Band Stainless Steel/PTFE Rigid Feeder. Hardware previously installed to hold the coaxial pigtail is removed and re-used. Refer to **Figure 21** for the hardware sequence.



Hardware Loose



Hardware installed

Side View

Viewed from front of antenna

Figure 21

The 20 meter reflector (rear of beam) wire with black tubes and ring terminals is threaded through the p-clamps used for the reflectors in the same manner as the driven element. Thread the wire and black tubes through and position one tube in each p-clamp.

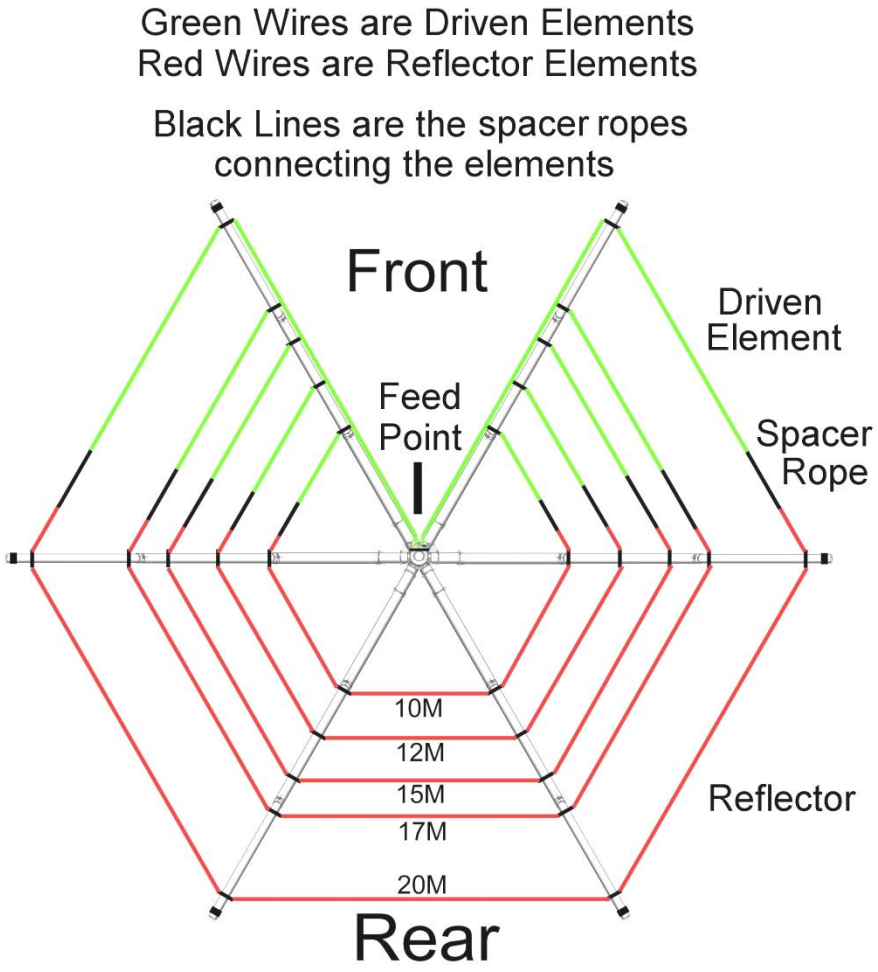


Figure 22

Repeat the sequence to install the 17 meter driven element wires and the 17 meter reflector wire. The coaxial cable pigtail is only installed on the 20 meter feed.

Repeat the sequence to install the 15 meter driven element wires and the 15 meter reflector wire.

Repeat the sequence to install the 12 meter driven element wires and the 12 meter reflector wire.

Repeat the sequence to install the 10 meter driven element wires and the 10 meter reflector wire.

Figure 23 is a side view for reference showing the wire elements installed.

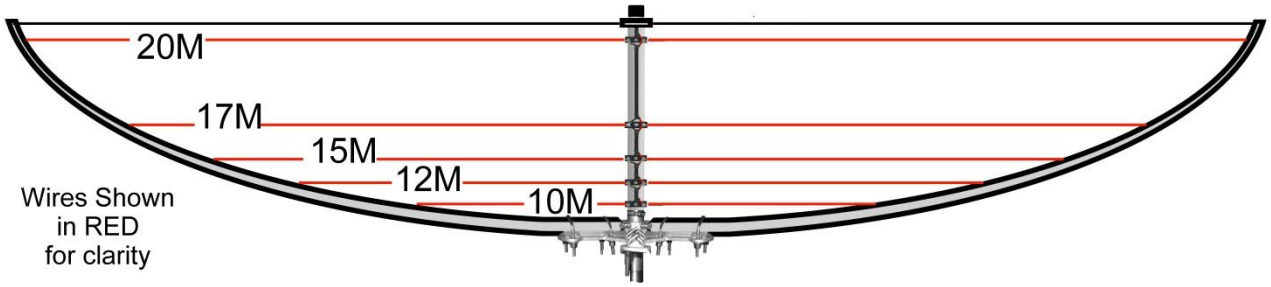


Figure 23

The previously cut ropes (Table 1) for the element spacers are installed for each band as shown in **Figure 24**. The critical spacing final measurements are shown in **Table 3**.

Band	Element Spacer Ropes Critical Spacing Length
20	**23-1/2"**
17	**18"**
15	**15-1/2"**
12	**13-1/4"**
10	**11-3/4"**

Table 3

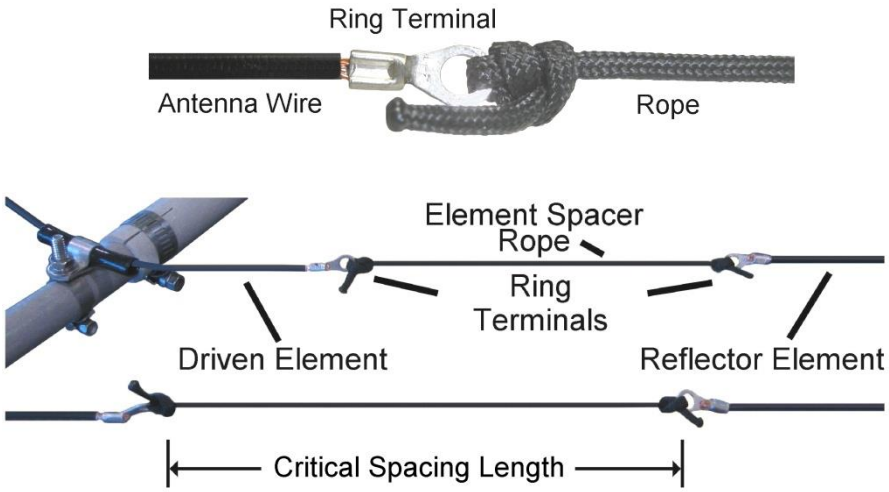


Figure 24

Note: Although not normally required for installations 35 feet above ground, for lower antenna installations, minor adjustments, by trimming of a particular wire driven element and/or reflector element wires may be needed to minimize the SWR. Additional information on tuning is found in the section: "SWR Testing" at the end of these assembly instructions. Additional Ring Terminals are supplied for this purpose.

Final leveling and slight tension on the wires is accomplished by small, equal adjustments of the wire guide stud clamp positions on the spreaders away from the center of the antenna. Too much tension will distort the shape of the spreaders and slacken the other wire elements. This adjustment process may take some time to get an acceptable balance between element tensions, but the goal is to have all the wires horizontal, evenly spaced, with only slight tension to prevent antenna wires from moving toward and away from each other in gentle breezes. The unique feature of the "floating wire guides" will allow all of the spreaders and wires to move independently in strong winds without causing undue stress, and then return to their natural position.

Remember, having tight wires will not improve performance - only appearance. A little slack is better than too tight. This will eliminate stretching of the element wires and unnecessary tension on the wire element ring terminals.

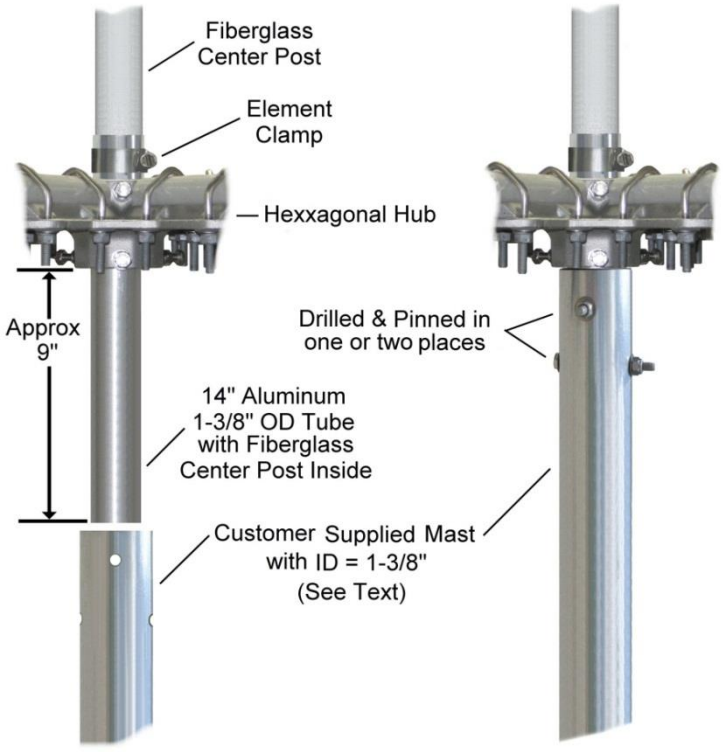
Perform final tightening of all spreader clamps, wire guide and rope attachment p-clamp hardware and stud clamps. DO NOT over tighten these stainless steel element clamps. A modest tightening of these small gear screws will accomplish sufficient hold.

If the optional Feedline Current Choke was not installed, connect a coaxial cable (RG-213 or equivalent) feedline to the included double female SO-239 (UHF to UHF) adapter installed at the end of the pigtail. If the optional Feedline Current Choke is installed, connect your coaxial cable feedline (RG-213 or equivalent) to the bottom of the Feedline Current Choke. Use electrical tape to hold the coaxial cable to the center post and to an extended mast, if used, above the rotator. Route the coaxial cable around the rotator with the appropriate loop, as shown in the image on page 27, using tape to secure the coaxial cable to the mast.

Installation on a Mast and Rotator

The aluminum tube that holds the Fiberglass Center Post is supplied with the Hexxagonal Beam. This tube has an outside diameter of 1-3/8" and may be used directly into a rotator. When mounting the completed Hexxagonal Beam on the customer supplied mast, use mast or tubing that has an inside diameter of 1-3/8".

This mast could be 3 feet or 6 feet long depending on your rotator specifications. When using DX Engineering tubing, use two pieces of .058" wall thickness tubes that are 1-1/2" OD and 1-5/8" OD and nested together to give you a thick wall mast that the 1-3/8" tube will fit in.



Once mounted, the mast should be held to the Hexxagonal Beam tube by drilling one or two holes and pinning as shown in the picture.

Install your completed DX Engineering **HEXXAGONAL BEAM Mark 2** with a rotator at a height of at least 25 feet for very good results. The best overall results are realized with the antenna at 35 to 65 feet.

SWR Testing

The **HEXXAGONAL BEAM Mark 2** should not require tuning. SWR may be checked when the antenna is at least 8 feet above the ground, however SWR dips may not be under 2:1 or not in the band. Once the antenna is elevated to a 35 foot or higher operating position, SWR curves should dip well below 1.5:1 within each band, with much lower SWR likely near the low end or middle of the 20 and 15 meter bands, and lowest SWR around 28.200 MHz in the 10 meter band, however the G3TXQ broadband version provides low SWR over a wide frequency range. Lower frequency SWR dips are normal for antennas installed below 35 feet. If any adjustments are desired, they should be done incrementally and simultaneously with a small changes of driven and reflector element wire lengths. Example: Tuning on 10 meters is done by trimming approximately 1/4" on each driven element wire and approximately 1/2" on the end of the respective reflector wire. Extra Ring Terminals are included in the kit to allow replacements as you trim the wire lengths. Once the frequency of the lowest SWR may appear below the band, if the SWR is checked before the antenna is elevated into appropriate position. Reasonable SWR should be the result on all bands after the antenna is elevated.

Temporary accumulation of moisture or ice on the element spacer ropes has very little effect on SWR.

Enjoy your high quality, DX Engineering **HEXXAGONAL BEAM**, which should offer years of trouble free performance.

HEXXAGONAL DX ENGINEERING BEAM

****

Resume assembly from this point if you are building the 1-Band Total Antenna Package - DXE-HEXX-1TAP

This kit is used to make one band **HEXXAGONAL BEAM** wire elements and attach them to our unique floating element wire guides. The floating wire guides allow your spreaders to have independent movement during windy conditions reducing stress and strain on the element wires and spreaders.

Assembly of the Hexx Hub, Spreaders, Wire Gide Clamps, Rope Clamps and Rope Hub is identical to the Five Band version. The difference being the Single Band has one feedpoint assembly that you will locate on the center post at the desired height for a particular band. The wire element set included is already measured and pre-assembled for 20 meters. If you desire a different band, the wire elements will have to be trimmed accordingly. Extra ring terminals are included in this kit to accomplish that task.

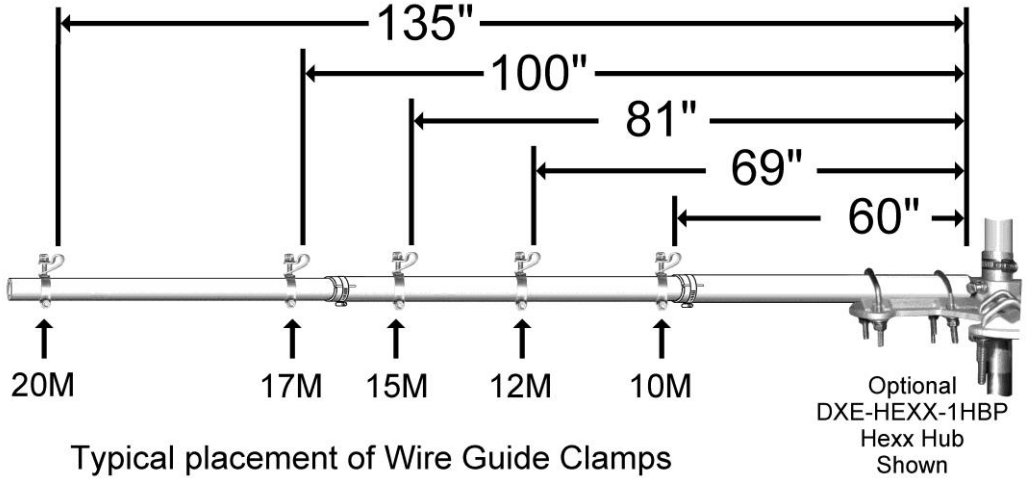
The **HEXXAGONAL BEAM** 1-band Coax Feeder is custom made from high quality coaxial cable. The ring terminals are crimped, hand soldered and special weatherproof adhesive shrink tubing installed for a long lasting precision feedline assembly. The coaxial cable center conductor connection has red shrink tubing on the ring terminal.

Exclusive DX Engineering stainless steel band clamp with welded stud provides a secure attachment for the driven element feedpoints without drilling. The high strength insulator features serpentine wire grip and stainless steel hardware providing superior connections for trouble free operation.

DXE-HEXX-1WRP-2 HEXXAGONAL BEAM 1-Band Wire Element & Wire Guide

Qty	Description
2	20 Meter Wire Driven Element - #14 Copper Stranded Wire with Black PVC Insulation with Ring Terminals attached and Wire Guides installed
1	20 Meter Wire Reflector Element - #14 Copper Stranded Wire with Black PVC Insulation with Ring Terminals attached and Wire Guides installed
6	#10 hole, 16-14 Wire Gauge Ring Terminal (Spares for various bands and/or adjustment in element lengths)
1	UHF Female-to-Female Adapter (dual SO-239 style)
1	Coax Wire Assembly, 10" with PL-259 and Ring Terminals
1	Single Band Feeder Insulator Clamp Assembly
60"	Double-braided Dacron/Polyester rope
6	Floating Wire Guides for 3/4" Spreader.

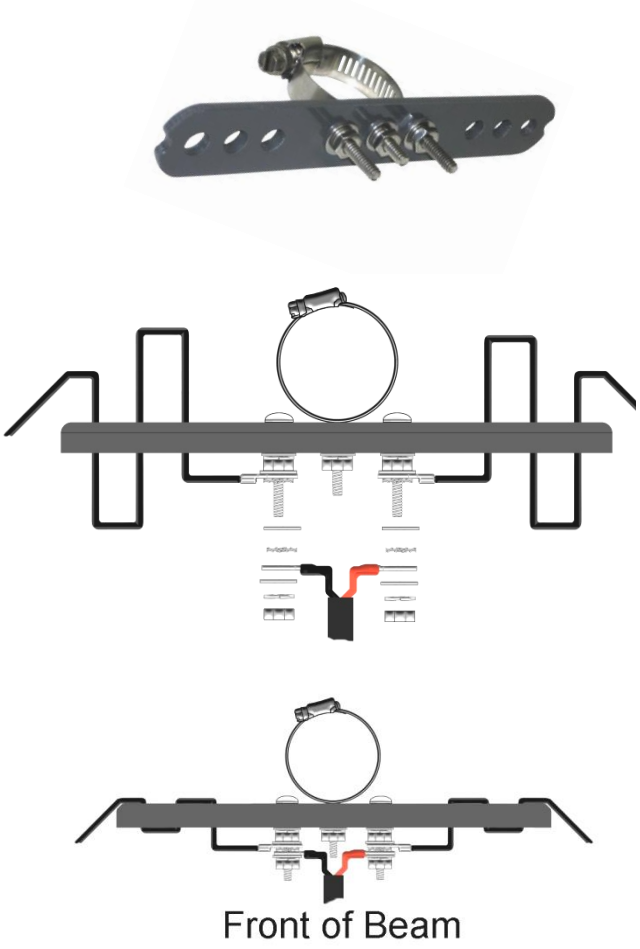
Choose the band you are constructing and install the Wire Guide as shown below on a typical spreader positioned vertically. These assemblies will be moved for final positioning on your antenna. Snug them in place and do not tighten.

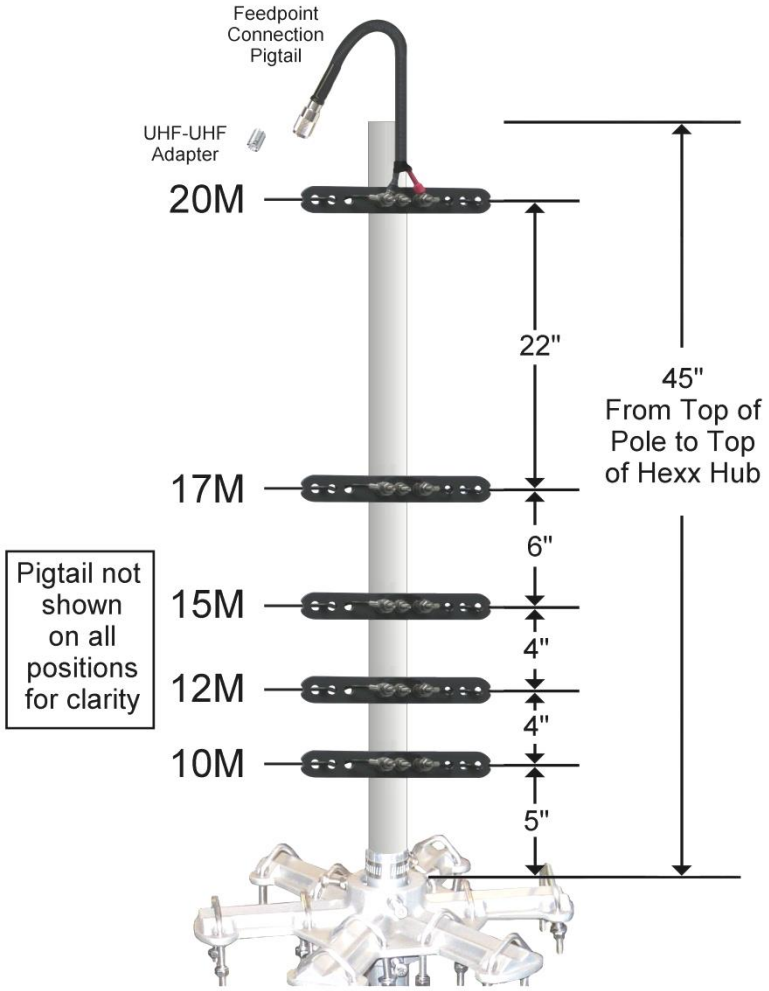


Typical placement of Wire Guide Clamps

5-Band positions - Position depends on your band choice - Choose one

Mount the Single Band Insulator Center Feed Clamp Assembly on the vertical post in the position for the chosen band. One end of the two Driven Element Wires is threaded through the wire guide clamps and connected to the center feed. Route the wires through the center insulator in a serpentine manner as shown.





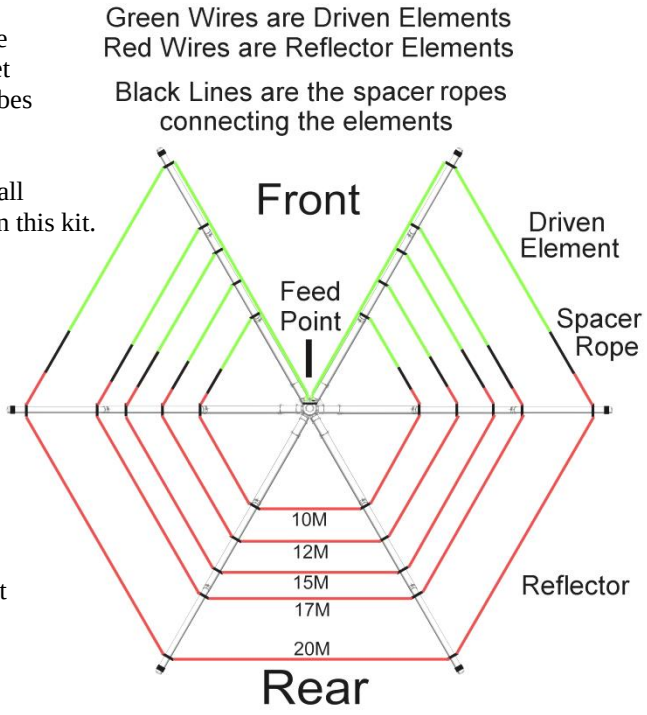
Thread the other end of the two driven element wires (front of beam) with the black tubes and ring terminals through the previously installed wire guide clamps, positioning one of the black tubes through the clamp as shown. If the tube does not fit through the loosened wire guide clamp, you may need to nudge the installed clamp opening slightly (see below). The tubes are -pre-installed on the wire sets. Once the tubes are in place, tighten the clamp to hold the tubes perpendicular to it's spreader as shown below.

Depending on the band you are installing, the reflector and the driven elements may be a different length than the supplied set of elements which are cut for 20 meters and have the black tubes and ring terminals installed.

For the other bands, you will have to trim the lengths and install new ring terminal. There are 6 spare ring terminals included in this kit.

Band	Driven Elements (2) Wire Length	Reflector Wire Length
20	17' 10-1/2"	33' 10"
17	13' 10-1/4"	26' 3"
15	11' 10"	22' 6"
12	9' 11-1/2"	19'
10	8' 8-3/4"	16' 8-3/4"

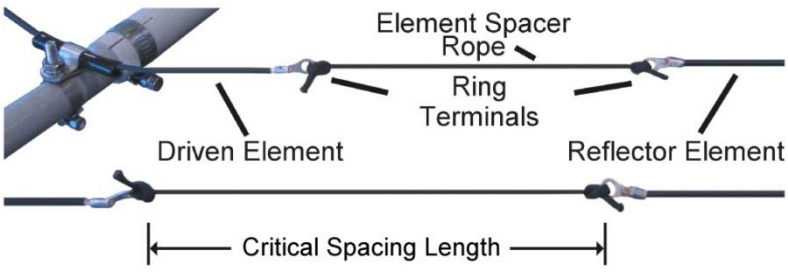
Note: Although not normally required, minor adjustment, or trimming of each wire driven element and/or reflector element wire may be needed to minimize the SWR. Additional Ring Terminals are supplied for this purpose.



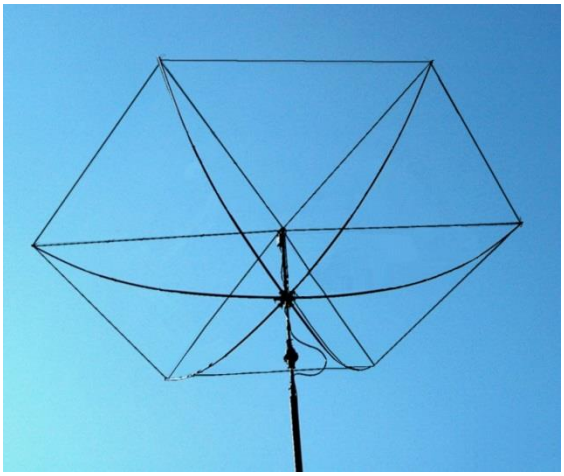
The reflector (rear of beam) wires with black tubes and ring terminals are threaded through the clamps used for the reflector in the same manner as the driven elements. Thread the wires & black tubes through and position one tube in each clamp. Later, once all wire elements are in place you will tighten the clamps that hold the wire guides in place.

Using the 60" of rope included, cut two pieces to the length required for the band you are building. Use the rope to make and connect the elements together for the band you have chosen as shown

Band	Element Spacer Ropes Cut Length (2 of each)	Element Spacer Ropes <u>Critical</u> Tied Length
20	30"	23-1/2"
17	24"	18"
15	22"	15-1/2"
12	20"	13-1/4"
10	18"	11-3/4"



NOTE: Creating a 2-band antenna by adding a 1-Band Kit to a 1-band **HEXXAGONAL BEAM** may require special length jumpers and special element dimensions which may vary from the dimensions in this manual. The process of creating a two-band antenna has not been evaluated by DX Engineering. The owner of the antenna assumes the responsibility to make the element and coax jumper lengths required for a 2 band model.



HEXXAGONAL

DX ENGINEERING

BEAM

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.

Warranty

All products manufactured by DX Engineering are warranted to be free from defects in material and workmanship for a period of one (1) year from date of shipment. DX Engineering's sole obligation under these warranties shall be to issue credit, repair or replace any item or part thereof which is proved to be other than as warranted; no allowance shall be made for any labor charges of Buyer for replacement of parts, adjustment or repairs, or any other work, unless such charges are authorized in advance by DX Engineering. If DX Engineering's products are claimed to be defective in material or workmanship, DX Engineering shall, upon prompt notice thereof, issue shipping instructions for return to DX Engineering (transportation-charges prepaid by Buyer). Every such claim for breach of these warranties shall be deemed to be waived by Buyer unless made in writing. The above warranties shall not extend to any products or parts thereof which have been subjected to any misuse or neglect, damaged by accident, rendered defective by reason of improper installation, damaged from severe weather including floods, or abnormal environmental conditions such as prolonged exposure to corrosives or power surges, or by the performance of repairs or alterations outside of our plant, and shall not apply to any goods or parts thereof furnished by Buyer or acquired from others at Buyer's specifications. In addition, DX Engineering's warranties do not extend to other equipment and parts manufactured by others except to the extent of the original manufacturer's warranty to DX Engineering. The obligations under the foregoing warranties are limited to the precise terms thereof. These warranties provide exclusive remedies, expressly in lieu of all other remedies including claims for special or consequential damages. SELLER NEITHER MAKES NOR ASSUMES ANY OTHER WARRANTY WHATSOEVER, WHETHER EXPRESS, STATUTORY, OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS, AND NO PERSON IS AUTHORIZED TO ASSUME FOR DX ENGINEERING ANY OBLIGATION OR LIABILITY NOT STRICTLY IN ACCORDANCE WITH THE FOREGOING.

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