MFJ-1846 Six-Band Hex-Beam Antenna

Parts Inventory: As you unpack, please identify and check each part against the Master Parts List on the next page. This important step will familiarize you with the contents and confirm that you have everything needed to complete construction. If any fiberglass tubes appear to be missing, check inside other larger tubes.

***Important Note*: Save the weight label attached to the shipping carton. It contains information you'll need if you report any parts damaged or missing.**

Work Area: Installing support arms and stringing the element wires will require 15 feet of unobstructed work area in every direction from the antenna's center hub. If possible, drive a length of tubing into the ground or set up on a tripod to provide level support for the antenna base.

***Important Warning*: Never assemble or install this antenna where it could contact power lines or entrance cables -- you could be killed!**

Tools: The tools listed below are necessary for assembly.

[ ] Two 7/16" wrenches or nut drivers for 1/4"-20 hardware
[ ] #2 Phillips-head screwdriver
[ ] 6-32 nut driver
[ ] Diagonal cutters or "nippy shears"
[ ] 12-foot measuring tape
[ ] Safety glasses
[ ] Pencil or marker

Antenna Location: Always mount the antenna as high and in the clear as safety permits. Never install where humans or animals could accidentally contact element wires or be exposed to high-intensity RF-fields (see FCC exposure guidelines).

Mast: The MFJ-1846 mount accepts mast diameters from 1-1/2" to 2-5/8" OD. Masts smaller than 2" OD should have a wall thickness of 1/8" to ensure stability.

Rotors: Wind loading is 3.5 square-feet. Ham-service rotors and some larger TV rotors can support this antenna safely, but always check rotor specifications before installing.

Balun: None required, a ferrite-sleeve balun is installed on the antenna's coax pigtail.

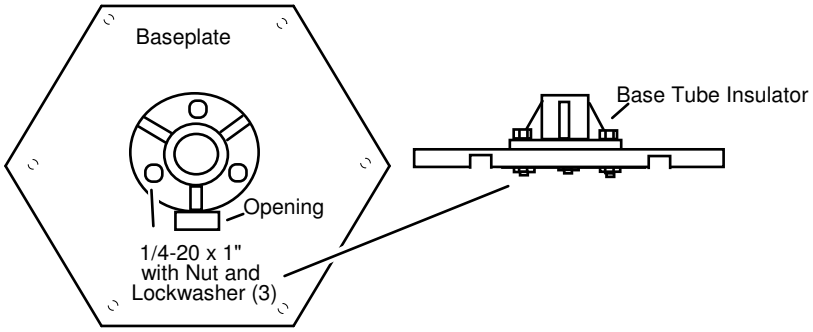
Safely Ground: Towers and masts require safety grounds to protect against lightning strikes and static build up. If possible, install one or more ground rods directly underneath the antenna and use solid 10-gauge wire secured with non-corrosive hardware for all connections. The hex beam's balanced driven elements are ungrounded, so consider installing a coaxial lightning arrestor in the feed line. The safety ground and lightning arrestor will help protect your building and its contents, but may not protect sensitive transmitting and receiving equipment connected to feed lines. For optimum protection, always disconnect antennas *outside the building* when the station is not in use or at the first sign of threatening weather.

MFJ-1846 Master Parts List:

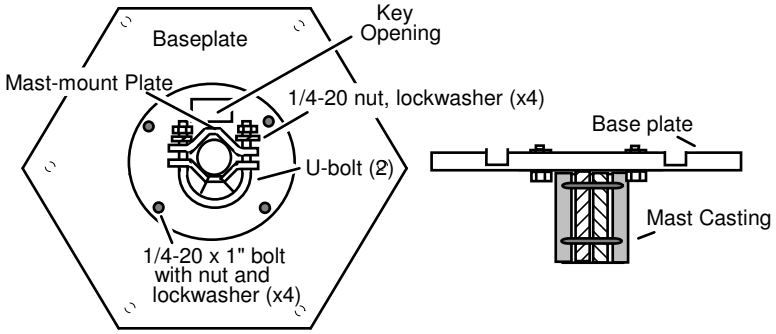
[X]	Qty	Description	Part Number
[ ]	1	Fiberglass center-support Tube, 38" x 1-1/4" OD	811-1846-3
[ ]	6	Fiberglass spreader tube, 16" x 1" OD	811-1846-4
[ ]	6	Fiberglass spreader tube, 72" x 3/4" OD	811-1846-1
[ ]	6	Fiberglass spreader tube, 72" x 1/2" OD	811-1846-2
[ ]	1	Center tube base insulator	463011-1
[ ]	2	Aluminum hex base plate	737-1846-2
[ ]	1	Aluminum mast-mount casting	MSLD
[ ]	1	Aluminum mast-mount backing plate	5011800
[ ]	1	5/16-18 x 3/4" Bolt	505842
[ ]	2	U-bolt, 1/4-20 x 2-1/2"ID x 3-1/4"	5038200
[ ]	7	1/4-20 x 1" bolt	502958
[ ]	12	1/4-20 x 1-1/2" bolt	500098
[ ]	20	1/4-20 nut	554099
[ ]	20	1/4 split lock washer	561177
[ ]	3	1/4-20 nylon insert locknut	705-2520S-NL
[ ]	1	1/4-20 x 3-1/4" bolt	662-3250S
[ ]	6	1/4-20 x 1" bolt, nylon	662-1000S-N
[ ]	6	1/4" flat washer, brass	5112100
[ ]	45	#6 x 1/2" sheet metal screw	656-0500S-A
[ ]	38	Cable clamp, nylon	745-5125B
[ ]	12	6-32 x 3/4" screw	656-0750
[ ]	24	6-32 x 5/16" screw	656-0312S
[ ]	48	6-32 kep nut	705-0632S-K
[ ]	42	Nylon tie wrap	745-2158B
[ ]	2	Aluminum feeder tubes, 3/8" OD x 31"	811-1846-FT
[ ]	2	Plastic feeder tube spacers	736-1846-FS
[ ]	6	Feeder tube support insulators	736-1846-FI
[ ]	1	Coax feeder with balun sleeves	811-1846-CB
[ ]	1	1/8" x 2-1/2" OD ABS tension-line ring	736-1846-RR
[ ]	5	1/8" x 1-1/2" OD ABS spacer	736-1845-W
[ ]	80 ft.	1/8" Dacron tensioning line	877-0120
[ ]	2	20-meter insulator rod	13-1846-20I
[ ]	2	17-meter insulator rod	13-1846-17I
[ ]	2	15-meter insulator rod	13-1846-15I
[ ]	2	12-meter insulator rod	13-1846-12I
[ ]	2	10-meter insulator rod	13-1846-10I
[ ]	2	6-meter insulator rod	13-1846-6I
[ ]	2	20-meter driven element wire	13-1846-20D
[ ]	2	17-meter driven element wire	13-1846-17D
[ ]	2	15-meter driven element wire	13-1846-15D
[ ]	2	12-meter driven element wire	13-1846-12D
[ ]	2	10-meter driven element wire	13-1846-10D
[ ]	2	6-meter driven element wire	13-1846-6D
[ ]	1	20-meter reflector wire	13-1846-20R
[ ]	1	17-meter reflector wire	13-1846-17R
[ ]	1	15-meter reflector wire	13-1846-15R
[ ]	1	12-meter reflector wire	13-1846-12R
[ ]	1	10-meter reflector wire	13-1846-10R
[ ]	1	6-meter reflector wire	13-1846-6R
[ ]	2	Wire adjusting strip	737-1615

1. Prepare the Hex Base-Plates: The antenna's hub is made up with two identically shaped aluminum plates that "clamshell" together to capture the support arms. To begin assembly, locate following parts:

[ ]	2	Hex base plate, aluminum (737-1846-2)
[ ]	1	Center tube base insulator (463011)
[ ]	1	Mast mount aluminum casting (MSLD)
[ ]	11	1/4-20 x 1" bolt (502958)
[ ]	11	1/4-20 nut (554099)
[ ]	11	1/4" lock washer (561177)
[ ]	2	1/4-20 U-bolts (5038200)
[ ]	1	Mast Mount Plate (5011800)



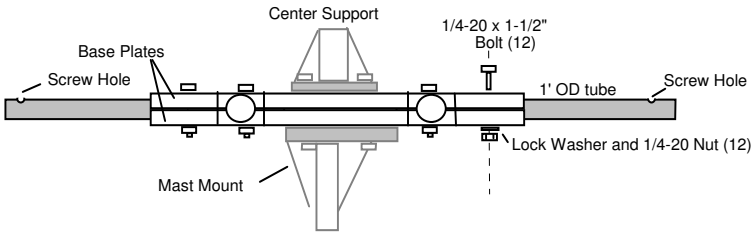
[ ] Install the MSLD center-tube insulator on one of the base plates using three 1/4-20 x 1" bolts, as shown above. Tighten bolts securely.



[ ] Place the MSLD casting on the other base, positioning it so the key openings align.
[ ] Secure the casting in place with four 1/4-20 x 1" bolts, as shown below.
[ ] Insert the two 1/4" U-bolts into the casting (U-bolts fit into grooves).
[ ] Install the mast-mount plate on the U-bolts and temporarily secure with 1/4-20 hardware.

2. Assemble the Base: Locate the following parts.

[ ]	6	Fiberglass spreader tube, 1" OD x 16" (811-1846-4)
[ ]	12	1/4-20 x 1-1/2" bolts (500098)
[ ]	12	1/4-20 nut (554099)
[ ]	12	1/4" lock washer (561177)



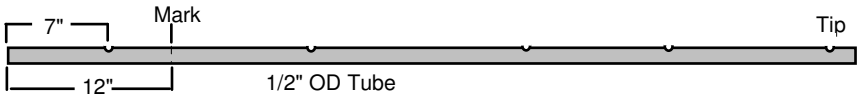
Locate the small screw pilot-hole drilled at one end of each 16" tube. When tubes are installed in the base, this hole should be "upward-facing" (same side as the center support).

[ ] Position the two base plates opposing each other and align the key holes.
[ ] Slide a 16" tube into position and secure it loosely using 1/4-20 x 1-1/2" hardware.
[ ] Repeat this procedure to install the remaining five 16" tubes.
[ ] Once all six tubes are installed, tighten all hardware to secure the tubes in place.

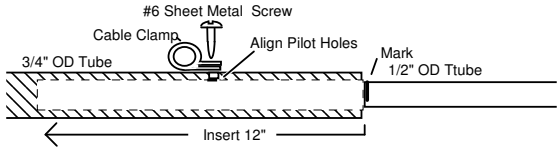
Important Note: *When securing tubes, tighten firmly, but do not over-torque so as to distort the base plates and compress the tubes. Over-tightening could damage them.*

3. Prepare Spreader Arms: Find the following parts.

[ ]	6	Fiberglass spreader tube, 72" x 3/4" OD (811-1846-1)
[ ]	6	Fiberglass spreader tube, 72" x 1/2" OD (811-1846-2)
[ ]	6	#6 x 1/2" sheet metal screw (656-0500S-A)
[ ]	6	Cable clamp, nylon (745-5125B) These parts serve as wire guides.



[ ] Identify the base end of the 1/2" OD tubes by a screw pilot-hole drilled 7" from the end.
[ ] Mark each tube exactly 12" from the base end (12" is the insertion depth when these tubes are secured to the larger 3/4" tubes).

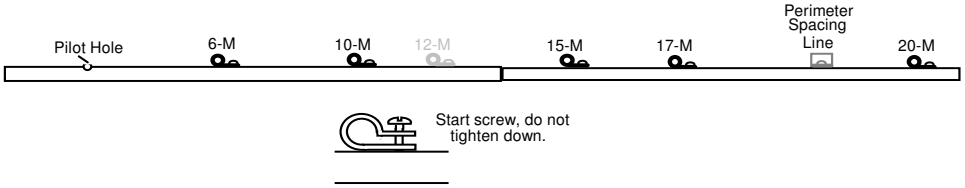


[ ] Identify the outer end of the 3/4" OD tubes by a screw pilot hole 5" from the end.
[ ] Insert the 1/2" OD tube exactly 12" into the 3/4" OD tube.
[ ] Carefully align the two screw pilot holes and install a cable clamp as shown below.
[ ] Repeat this procedure for the remaining five spreaders.

The plastic cable clamp serves as a wire guide for the 12-meter element. Note that all wire-guide loops are oriented toward the central hub of the antenna.

4. Install Wire Guides: To install the remaining wire guides, locate the following parts:

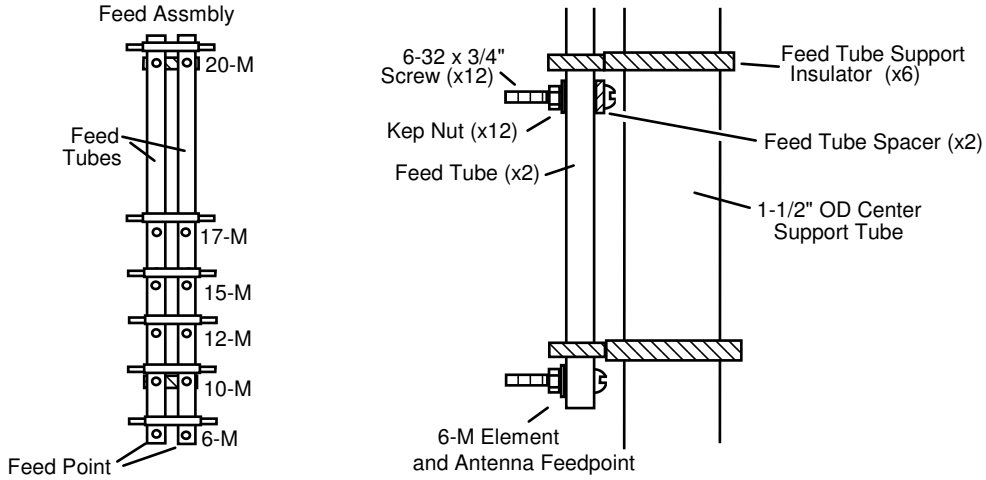
[ ]	32	#6 x 1/2" sheet metal screw (656-0500S-A)
[ ]	32	Cable clamp, nylon (745-5125B)



[ ] Install cable clamps on the spreader arms at the band positions shown above, only driving the screws in far enough to loosely retain the clamps (it makes wire installation easier later on). *Note that guides for the perimeter spacing line are only installed on two spreaders.*

5. Assemble the Feed Network: Locate the following items.

[ ]	1	Fiberglass center-support tube, 38" x 1-1/4" OD (811-1846-3)
[ ]	2	Aluminum feed tubes, 3/8" OD x 26" (811-1846-FT)
[ ]	2	Plastic feed-tube spacers (736-1846-FS)
[ ]	6	Feed tube support insulators (736-1846-FI)
[ ]	12	6-32 x 3/4" screw (656-0750)
[ ]	12	6-32 Kep nut (705-0632S-K)



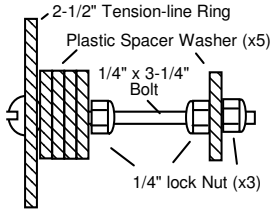
The two 3/8" feed tubes form a 50-ohm balanced transmission line. Six feed-tube support insulators hold it in position on the center tube, and the two feed spacers prevent the tubes from rotating. Insulators should fit snugly over the feed tubes and support tube.

[ ] Relieve insulator openings, as needed, for a smooth friction fit over the feed-tubes and mast.
[ ] Install insulators on the feed tubes, positioning each one above the paired screw holes.
[ ] Using 6-32 x 3/4" screws, install the feed-tube spacers at the 10-M and 20-M feed points. Secure screws with Kep nuts.

[ ] Install the remaining 3/4" screws as shown, securing with Kep nuts.
[ ] Carefully slide the feed-tube assembly onto the 38" center support tube.

6. Assemble the Tension-line Ring Assembly: Locate the following parts.

[ ]	1	2-1/2" OD ABS tension-line ring (736-1846-RR)
[ ]	5	1/8" x 1-1/2" OD ABS spacer (736-1845-W)
[ ]	3	1/4-20 nylon insert (Ny-lock) nuts (705-2520S-NL)
[ ]	1	1/4-20 x 3-1/4" bolt (662-3250S)



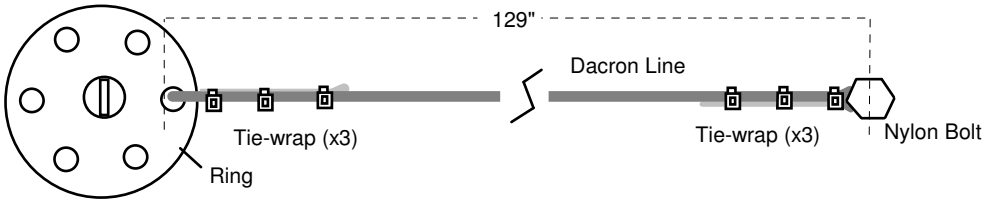
[ ] Install the tension-line ring and four (4) spacers on the 3-1/4" bolt. Secure with a Ny-lock nut.
[ ] Install the fifth spacer at the opposite end of the bolt, securing with two lock nuts, as shown.

7. Install tension lines on the ring assembly: Find the items listed below:

[ ]	36	Nylon tie wrap (745-2158B)
[ ]	6	1/4-20 x 1" bolt, nylon (662-1000S-N)
[ ]	80 ft.	1/8" Dacron tensioning line (877-0120)

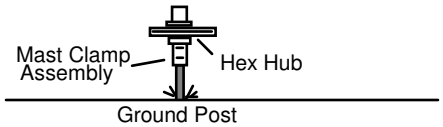
Accuracy is important because these lines set the curvature of the spreaders and element wire tension. If possible, recruit a second pair of hands to help you measure. We secure the lines with tie wraps instead of knots to prevent slippage and ensure better measurement accuracy. Pull the tie the wraps tight -- and coil each line up as you install it to avoid tangles with other lines.

[ ] Cut six lines, 135" each (left-over portion will be used for the perimeter spacing line).
[ ] Using a match or small torch, melt the ends of each line to prevent fraying.
[ ] Secure the end of one line around a nylon bolt, as shown. Secure tightly with three tie wraps.



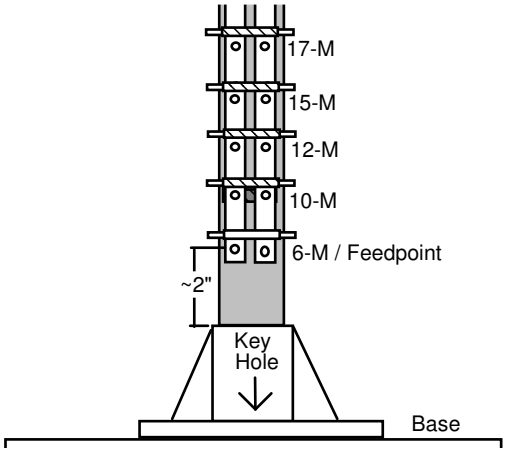
[ ] Install the opposite end of the line through a hole in the ring. Apply tension to take up slack.
[ ] Using a tape measure, set line length to exactly 129" and secure with three tie wraps.
[ ] Repeat this process to prepare the remaining five lines.

8. Prepare Site for Final Assembly: Mount the hex base on a temporary support pole (see below). The antenna base should be level and 1 to 2 feet above ground. Allow 15 feet of unobstructed space in every direction from the center for final assembly.



9. Install the Center Support Tube:

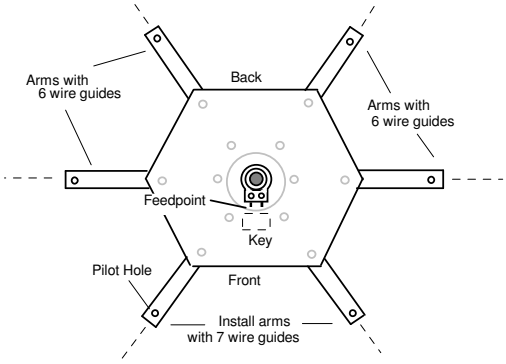
[ ] Insert the center support tube into the center support insulator.
[ ] Rotate it so the feed tubes are aligned with the key hole (see below).
[ ] Position the feed assembly so the bottom pair of screws are 2" above the base insulator.



10. Install the Spreader Arms: Find these items.

[ ] 6 #6 x 1/2" sheet metal screw (656-0500S-A)
[ ] 4 Pre-assembled spreader arms with 6 wire guides.
[ ] 2 Pre-assembled spreader arms with 7 wire guides.

The two spreaders with 7 wire guides are installed at the front (or feed) side of the antenna.

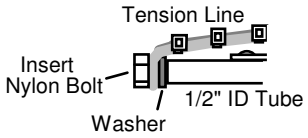


[ ] Insert a spreader arm with 7 wire guides into a 1'" tube adjacent to the feed assembly.
[ ] Carefully align the pilot holes and install a sheet-metal screw.
[ ] Install an arm with 6 guides *directly opposite* the first arm (to balance the antenna). Secure it.
[ ] Insert the second arm with 7 guides adjacent to the feed assembly and secure.
[ ] Install an arm with 6 guides directly opposite and secure.
[ ] Install the remaining two arms and secure.

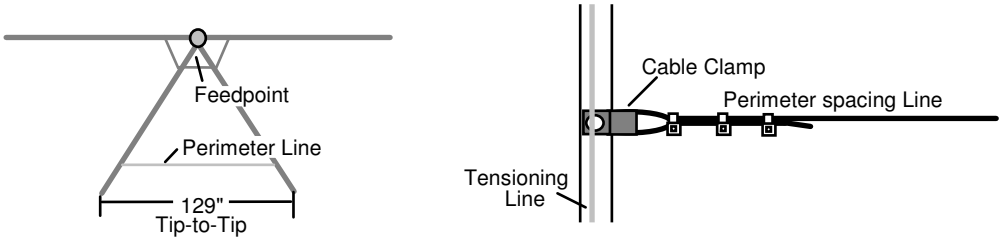
11. Install Tension and Perimeter Lines: Locate the following materials. Note that the washer protects the tension line from the rough edge of the fiberglass tube.

[ ] 6 1/4" flat washer, brass (5112100)
[ ] 6 Nylon tie wrap (745-2158B)
[ ] Remaining Dacron tensioning line

[ ] Unwind one of the pre-installed tension lines and install a brass washer on the nylon bolt.
[ ] Bend the mating spreader arm upward and insert the nylon bolt into the end (see below).
[ ] Repeat for the remaining five tensioning lines.



The perimeter-spacing line is installed across the front (aperture) side of the antenna using the remaining Dacron line.

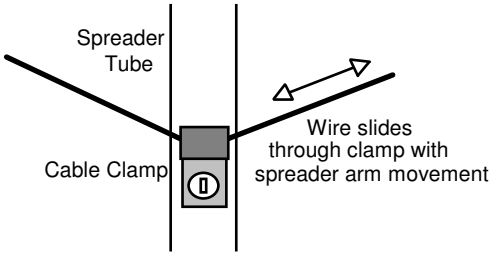


[ ] Prepare one end of the Dacron line (melt end).
[ ] Attach the end to one of the two perimeter-line cable clamps and secure it with tie wraps.
[ ] Thread other end through the opposite clamp and adjust length for a tip-to-tip spacing of 129".
[ ] Secure with tie wraps, cut off excess line, and melt end.

12. Install 6-Meter Element and Feed: Find the following materials:

[ ]	1	Coax feed pigtail with balun sleeves (811-1846-CB)
[ ]	2	6-meter insulator rod (13-1846-6I)
[ ]	2	6-meter driven element wire (13-1846-6D)
[ ]	1	6-meter reflector wire (13-1846-6R)
[ ]	4	6-32 x 3/16 screw
[ ]	4	6-32 kep nut (705-0632S-K)

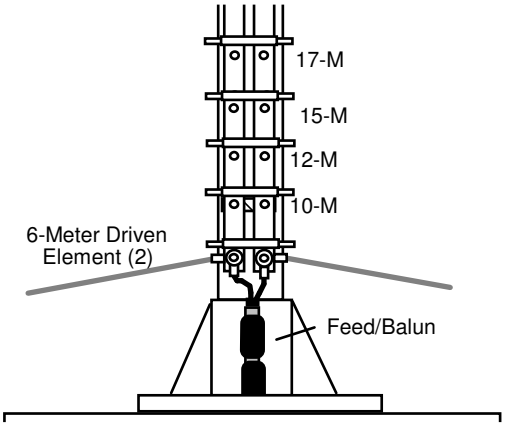
Installation Notes: Element wires should slide through the wire guides, allowing spreader arms to flex back and forth in heavy wind without yanking and damaging the wire (see below). Element will be installed from the highest frequency band to the lowest, working from the center of the antenna outward.



Each wire is pre-measured, and the loosely installed wire guides should allow you to pass the end lugs easily. Before installing, uncoil each wire carefully and lay it out in a straight line, removing any kinks or snarls. Once an element wire is installed, tightened down the wire-guide screws. Begin by installing the feedline and the 6-meter driven element wires -- these share the same connection points on the feed assembly.

[ ] Thread the feedline/balun assembly through the keyhole in the base.

[ ] Install the coax and one leg of each element on the lowest pair of feed tube screws.
[ ] Thread 6-M wires through the first set of guides

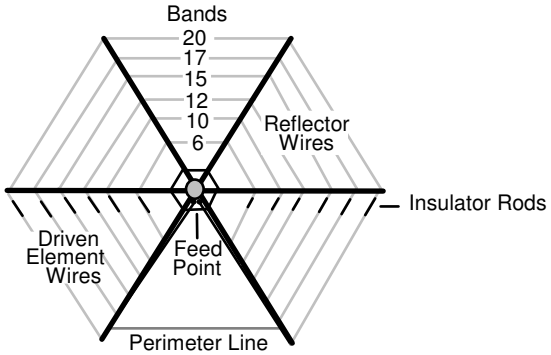


[ ] Attach a insulator rod to each end using 6-32 hardware.
[ ] Attach the 6-M reflector wire to one insulator, thread it around to the other insulator and attach.

13. Install Remaining Elements:

Installation Notes: Use the same procedure to install the remaining wire elements in sequence (do not attempt to adjust any of the element wires for sag during this procedure). In addition to the insulating rods and wire packets, you'll need the following items:

[ ]	20	6-32 x 5/16" screw (656-0312S)
[ ]	20	6-32 kep nut (705-0632S-K)



[ ] Install the 10-Meter elements using 13-1846-10D, I, and R
[ ] Install the 12-Meter elements using 13-1846-12D, I, and R
[ ] Install the 15-Meter elements using 13-1846-15D, I, and R
[ ] Install the 17-Meter elements using 13-1846-17D, I, and R
[ ] Install the 20-Meter elements using 13-1846-17D, I, and R

When element installation is complete, inspect wires for sag. None should be pulled up tight or sag more than 2 to 3-three inches (spans with insulator rods may sag slightly more). Some sag is

normal and will not affect performance. In the rare event that all of the element wires are excessively tight or hanging too loose, it may be necessary to adjust the length of the tension lines. Lengthen lines to increase wire tension -- and shorten them to loosen it. Adjust no more than 1" per line at a time. Most hardware stores carry 4-inch black tie-wraps suitable for re-securing the lines. Black ties are recommended for better UV immunity. Finally, before removing the antenna from its assembly mount, re-check all hardware for tightness.

Pre-testing: When checking SWR prior to installation, ground proximity may impact measurement. Raise the antenna at least 8 feet on a temporary mount.

Handling and Mounting: Although the MFJ-1846 is light and easily lifted by a single person, *never attempt to install it alone.* The frame could become unwieldy and throw you off balance. If mishandled, element wires could be damaged by obstacles in the immediate area. Personal safety and the protection of the antenna's wire elements should take priority over other considerations.

Mounting Considerations: Many users successfully mount and rotate hex beams on roof-tops or at end-gables using premium quality TV antenna hardware. However, when mounting on a tower or installing in areas where high winds and icing may occur, use a rotor designed for amateur radio service -- along with a thick-wall mast and stainless-steel hardware. It is normal for the fiberglass support arms to flex and move in high winds. Make sure element wires are clear of blowing tree limbs and other wires. For roof mounts, avoid close proximity to metal roofing, flashing, metal gutters, ice belt, house wiring, aluminum-backed insulation, and other conductive surfaces that could elevate SWR and degrade on-air performance.

Coaxial cable: For roof-top installations, a lighter-weight cable (premium-grade RG-8X or LMR-240) will be adequate for all but legal-limit amplifiers. When running maximum legal power, or for long runs, invest in RG-8 or some premium low-loss equivalent.

In Case Of Trouble: The hex beam is electrically simple, so difficulties are more likely to be mechanical. Check for the following:

[ ] Badly stretched or detached element wires
[ ] Loose hardware
[ ] Damaged wire guides
[ ] Connector failure, water incursion into the coax
[ ] Branches or debris on the element wires.

To obtain factory replacement parts, refer to the Warrantee section of the manual.

Typical Specifications:

Gain	5.3 dBi in free space (higher over ground)
Front-to-Back Ratio	15-20 dB typical
Turning Radius	11 feet
Maximum Mast Size:	2-1/16" OD
Weight:	25 pounds
Wind Loading	3.5 square feet

Warrantee

If manufactured by MFJ Enterprises, Inc. and purchased from an authorized dealer or directly from MFJ, we warrant to the original owner that this product shall be free from defects in material and workmanship for a period of 12 months from date-of-purchase provided the following terms and conditions are satisfied:

1. The purchaser must retain a dated proof-of-purchase (bill of sale, cancelled check, credit card or money order receipt, etc.) describing the product so as to establish the validity of the warranty claim. In addition, the original copy or machine reproduction of such proof shall be provided to MFJ at the time of warranty service. MFJ shall have the discretion to deny warranty service without dated proof-of-purchase. Any evidence of alteration, erasure, or forgery shall be cause to void any and all warranty terms immediately.

2. MFJ agrees to repair or replace, at its option and without charge to the original owner, any defective product under warranty, provided the product is returned postage prepaid to MFJ Enterprises, Inc. with a personal check, cashiers check, or money order in the amount of $7.00 to cover postage and handling.

3. MFJ Enterprises, Inc. will supply any replacement parts free of charge for any MFJ product under warranty upon request. A dated proof-of-purchase and a $5.00 personal check, cashiers check, or money order must be provided to cover postage and handling for parts and materials.

4. This warranty *shall not be voided* for owners who attempt to repair defective units. Technical consultation is available by calling (662) 323-5869.

5. This warranty does not apply to kits sold by or manufactured by MFJ Enterprises, Inc. (once assembly begins, the owner becomes the manufacturer).

6. Wired and tested PC board products are covered by this warranty provided only the wired and tested PC board product is returned. Wired and tested PC boards installed in the owner's own cabinet or connected to switches, jacks, or cables, etc. and sent to MFJ Enterprises, Inc. will be returned at the owner's expense un-repaired.

7. Under no circumstances shall MFJ Enterprises, Inc. be liable for consequential damages to persons or property by the use of any MFJ products.

8. Out-of-warranty Service: MFJ Enterprises, Inc. will repair any out-of-warranty product provided the unit is shipped prepaid. All repaired units will be shipped COD to the owner. Repair charges will be added to the COD fee unless other arrangements are made.

9. This warranty is given in lieu of any other warranty expressed or implied.

10. MFJ Enterprises, Inc. reserves the right to make changes or improvements in the design or manufacture of its products without incurring any obligation to install such changes upon products previously manufactured.

11. All MFJ products to be serviced in-warranty or out-of-warranty should be addressed to MFJ Enterprises, Inc., 300 Industrial Park Road, Starkville, Mississippi 39759, USA and must be accompanied by a letter describing the problem in detail along with a copy of a dated proof-of-purchase.

12. This warranty conveys specific rights, and you may also be entitled to other rights which may vary from state to state.