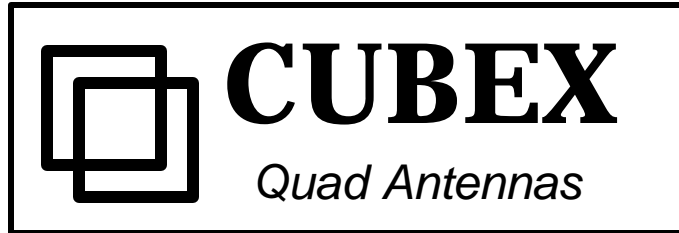


INSTRUCTIONS: CUBEX - MARK II Series



MK II – PT3 MK II – PT5

Safety warning

Please read through these instructions completely before starting your installation.

Antenna work is dangerous. Always wear an OSHA approved safety harness with the appropriate nylon or wire rope safety lanyards to protect yourself and your helpers from falls. Also all helpers on the ground should be wearing hard hats to protect them from falling objects such as tools etc.

Cubex Co., Inc. has no control over the conditions at the antenna site and therefore can not be held responsible for any damage or injury to persons or property.

If for any reason you do not understand any part of these instructions, or your installation is different and these instructions do not pertain to your situation. Do not hesitate to call Cubex Co., Inc. for assistance at (561) 748-2830

Note: Take precautions when handling and further processing fiberglass material. It is recommended that gloves be used when working with this material.

Price: \$ 4.95 US

A S S E M B L Y I N S T R U C T I O N S*The CUBEX MK II PT 3 and 5 Band QUAD ANTENNA*

FOREWORD: The CUBEX MK II is a pre-tuned Quad Antenna. All elements are factory measured and under normal conditions should not require adjustment. Elements are designed for operation in the center of each band. Should one wish to favor the low or high end of one or more bands, limited "tuning", is provided for at Note 2 at the end of the Instructions. It is recommended that the assembly Instructions be read completely prior to starting Installation.

1. Begin antenna assembly by laying one of the "spider" castings on the ground with the "trough" facing upward. Place the butt ends of four spreader arms in the spider troughs. **BE SURE** the arms are all similar (Driven Element or Reflector). Fasten each spreader arm to its respective casting arm using two "gear" driven clamps on each arm. One clamp is located near the butt of the arm and is positioned between the two guides on the outer face of the casting. The other clamp is positioned near the end of the casting arm in the depression provided for it. The gear driven clamps are assembled and tightened by hand using a screwdriver. With the screw head facing upward, loop the strap around the arm, positioning the adjustment screw next to the arm and tighten slightly.

Final permanent tightening should be done at the very end of the wire element assembly after everything has been positioned properly. The same procedure is followed for the remaining assemblies.

2. Select the 10 METER DRIVEN ELEMENT, remove only the Twist Ties and carefully uncoil and gently straighten the element (Use similar technique for all elements). This will permit the element wire bundle to be laid out straight in preparation for stringing through the spreader arms.

3. The stringing procedure is illustrated by Figure 3 and there will be less of a tendency to tangle if this procedure is followed closely.

As the wire element is unfolded, carefully remove the tape and straighten the "bends" enough to allow passage through the holes drilled in the spreader arms, but try and retain enough of the kink so that it can later be centered in each respective arm for the purpose of maintaining a uniformly square structure configuration.

The 10 meter elements are strung through the first set of holes nearest the butt end of the arms; 12 meter next (optional) 15 meter elements near the center of the arms; then 17 meter (optional) and finally the 20 meter elements near the tips of the arms. **BE SURE** that Driven Element wires are used with Driven Element ARMS, Reflector wires with Reflector ARMS.

The wire ends of all DRIVEN ELEMENTS are terminated at a special DRIVEN ELEMENT TERMINAL BLOCK as shown In Figure 1. (Separate terminal block for each band) or at the CUBEX MATCHING TRANSFORMER (optional item).

If one wishes to assemble the antenna for operation with the Cubex Matching Transformer, it is recommended that the 15 meter DRIVEN ELEMENT be strung first and loosely linking the driven element ends together. The 10 and 20 meter wires are then brought to the same point as they are installed. (Note, If used, the 12 and 17 meter wires can then be added). The transformer can then be installed at the 15m point and the various driven elements positioned and tensioned appropriately.

The wire element ends of the 20 meter and 10 meter DRIVEN ELEMENTS have extra long "fold backs". These provide the slight added length needed for attachment to the Cubex Matching Transformer. When all DRIVEN ELEMENTS are terminated separately, this excess fold back is simply trimmed off and discarded.

3. For REFLECTOR assembly, the procedure is the same as step 2 except that the wire element ends are simply brought together at the "end kinks", spliced (recommend "lineman's splice" and soldered.

After the 2 element assemblies (Driven and Reflector) have been completed, the boom should be temporarily supported on a 9 to 10 foot step ladder or lashed to the side of a tower at a height which will permit the bottom element wires to clear the ground.

WARNING - THE CUBEX SPIDERS HAVE BEEN PRE-SPREAD USING A MICROMETER FOR PRECISE MEASUREMENT. TO FORCE THE UNITS OPEN PAST THE ALREADY PRE-DEFINED LIMITS WILL RESULT IN BREAKAGE OF THE CAST UNITS.

4. The REFLECTOR assembly, is placed at the end of the boom and the DRIVEN ELEMENT is placed at the other end of the boom. (8 ft. on standard boom, and 12 ft. separation on Long Boom option) After the assemblies are in place on the boom they should be rotated and aligned so that all bottom element wires are parallel to the ground.

Place the BOOM/MAST COUPLER (cast or alum. plate) at the center of the boom. Fasten the coupler to the boom using the supplied bolts. 2" OD booms require 2 - 2"x5/16" U-bolts with the HD 3" O.D. boom option requiring 4 - 3"x3/8" U bolts. All U-bolts are secured using, nuts and lock washers. The bolts should be tightened on the boom sufficiently to preventing rotation of either with respect to the other.

5. As an aid to lifting the array, an 8 to 10 foot pole or pipe section (GIN POLE) may be temporarily secured to the mast or tower. The Gin Pole is a pole or pipe that has a small pulley at the top. Using a strong rope the antenna can be pulled up to the final mounting position by an assistant with little danger to the tower climber. This will usually facilitate getting the array up to the top of tower, mast, etc.

The antenna array is then lifted into place on the tower and the boom/mast coupler plate is secured to the mast using the supplied hardware. The antenna & boom assembly is bolted to the mast using the supplied U-bolts 2" or 3". **REMINDER: DON'T TAKE CHANCES. USE A CLIMBING BELT OR SAFETY HARNESS WHILE ON A TOWER. THE LIFE YOU SAVE COULD BE YOURS!**

CAUTION; While every effort has been made in designing and fabricating both the spreader arms and the spiders for maximum strength, it is possible to suffer breakage if the assembly is dropped or impacted against buildings, trees, etc., Use care in handling.

6. FEEDING THE, 2 ELEMENT QUAD. The feed-point impedance's of this antenna will vary with each band. Twenty meters is about 50 ohms, Fifteen meters = 75 ohms and Ten meters is about 110 ohms. The CUBEX matching transformer is a combination unbalanced to balanced and impedance transformation device. It will allow for single feed line with acceptable SWR while using 3 or 5 bands of operation.

An alternative method of feeding the multi band quad utilizes a remote antenna switch such as the AMERITRON RCS-8V. When using the remote antenna switch or separate feed lines for each band it will be necessary to fabricate Co-Ax matching sections from 75 ohm RG11U cable. These must be an "Odd" one-quarter wavelength to function properly (1,3,5, ,etc.).

For 10 meters use 69 inches of RG/11U attached to 10 -meter DRVN. EL. FEED POINT and any length of RG8/U from the other end of the RG/11U to the transmitter.

For 15 meters, use 92 inches of RG/11U attached to the 15-meter DRVN. EL. FEED POINT and any length of RG8/U from other end of RG11U to the transmitter.

Any excess cable can be coiled (6" dia.) and taped together.

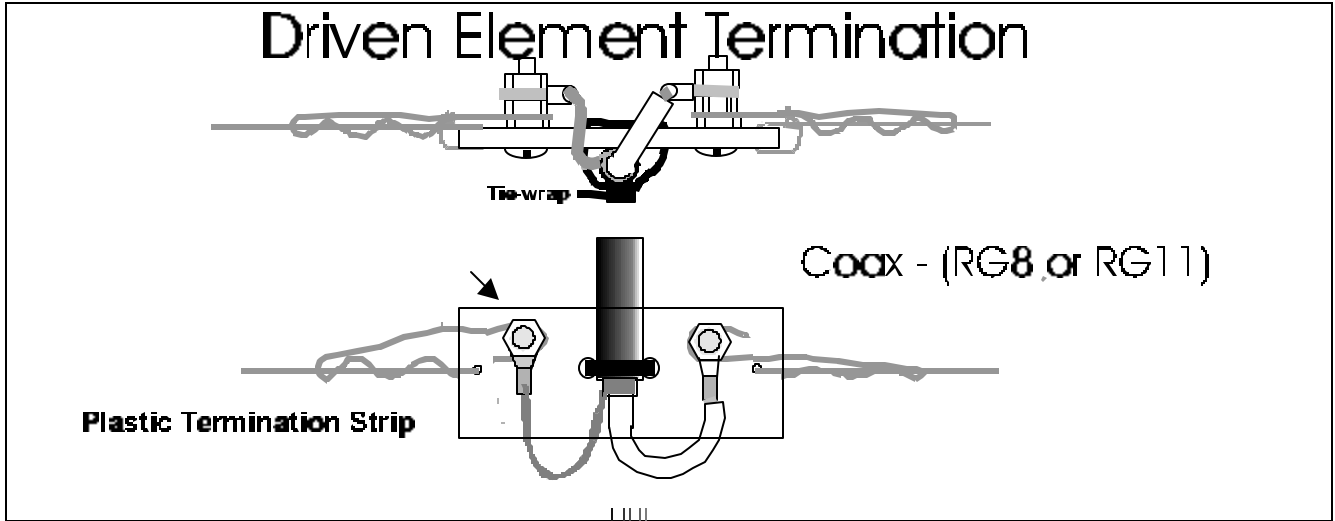
See Table I on the following page for dimensions of linear matching sections.

NOTE: In some situations it maybe be better to make a 3/4 wave (207 in) 75 ohm 10 m stub. Any excess cable should be wrapped and taped into a 6" coil.

Where a REMOTE SWITCHING SYSTEM is used, one would position the remote unit at a point on the boom where both 10 and 15 meter matching sections could terminate at the box. This would eliminate splicing of cables, Baluns are generally not needed and have proven effective in only a small percentage of unusual situations. Fortunately, the great majority of quad installations perform very satisfactorily without the need to resort to complicated matching systems, but in an occasional "rare" case of difficulty, the Gamma Match (either individual or Tri-Gamma) has proven to be a good solution. *For Gamma Match information see "Old Notes" at end of instructions.*

The CUBEX matching transformer is an excellent choice for matching the antenna system to the transceiver. It is rated at 1.5 kw PEP and allows for a single FEED LINE and matches the CUBEX antenna without the hassle of complicated matching networks.

Good luck and DX –



Note: These terminals are not supplied when Cubex Matching Transformer is ordered with Antenna.

Matching Stub dimensions: Table I

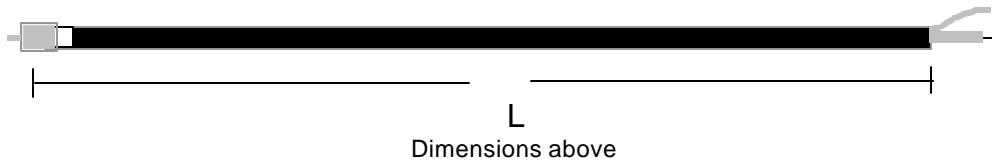
Electrical Quarter wave 75 ohm coax ; velocity factor = 0.67

BAND	CABLE TYPE	LENGTH (IN.)	LENGTH (CM)
10 Meters	RG11/U 75 ohm	69 in (3/4 w-17'-3")	175.25 cm (5.2575m)
12 Meters	RG11/U	79-9 1/2" in (3/4w=19'-11")	202.74 cm (6.082m)
15 Meters	RG11/U	92 in. (3/4w=23'-0")	233.68 cm (7.01m)
17 Meters	Note 3		
20 Meters	RG 8/U 50 ohm	Any length	
40 Meters	RG11/U	23.35 ft (420 in)	7.1171 m

Note 1- that any length 50 ohm coax maybe connected to the end of these matching stubs.

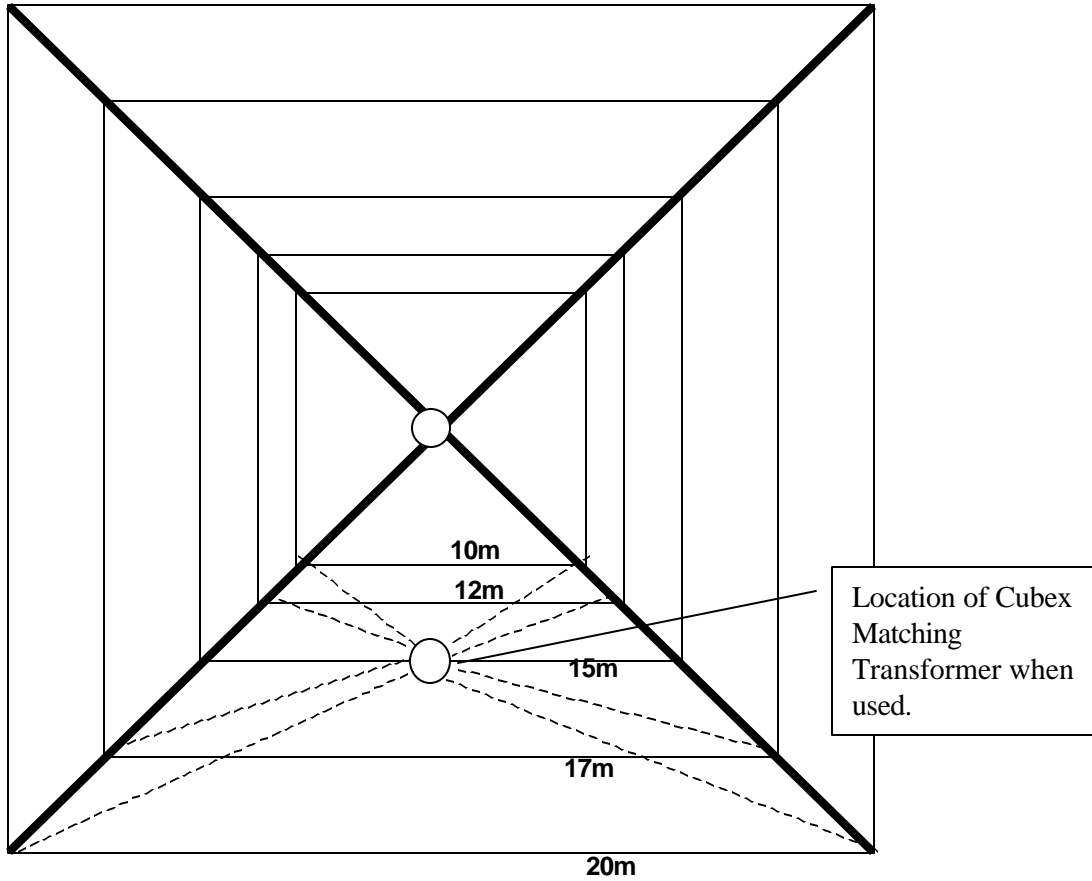
Note 2- Some experimentation may be required in adjusting each matching stub to optimize the impedance transformation.

Note 3- 17 meters should not require any stub and match okay with 50 ohm cable.



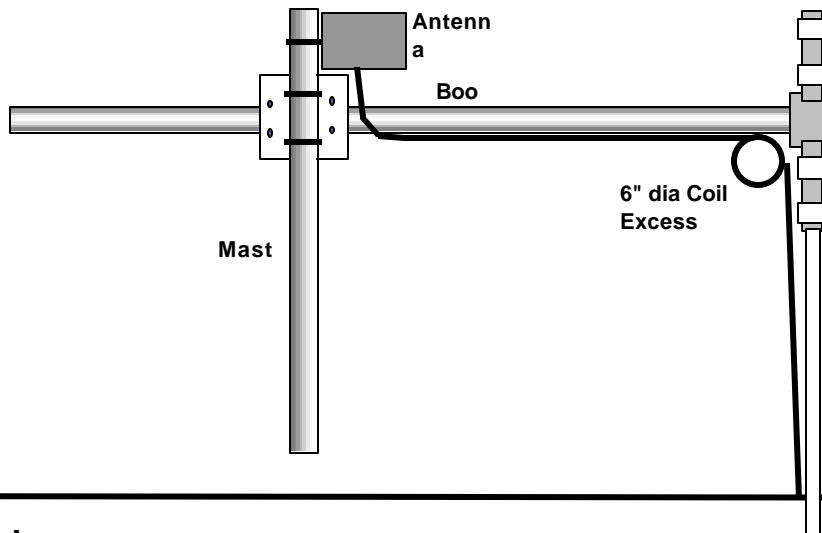
Note - Cables supplied by Cubex may vary in length (longer) from above as we use a special RG-11 coaxial cable with a VF of 0.72

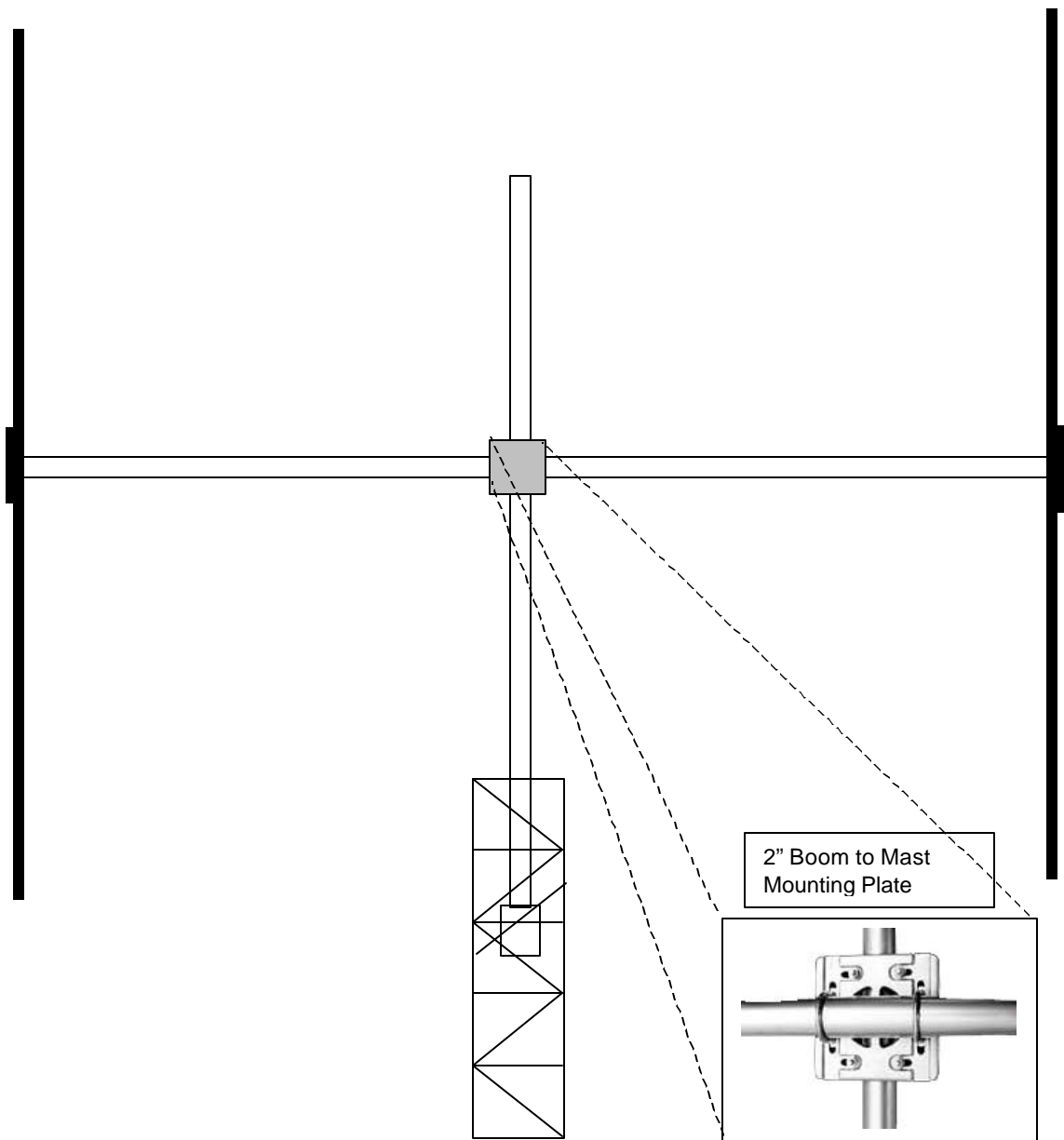
QUAD LOOP DIMENSIONS:



BAND	10M	12M	15M	17M	20M
Reflector					
Driven Ele.					

Purposely left blank – Use to record specific data as assembled.





Truss guying of the boom is advisable when using 2 inch boom material in lengths greater than 8 feet. Heavy duty booms (2" x 0.125) do not require the bridge truss arrangement.

A good grade of non-metallic outdoor grade nylon or dacron line may be used. (Cubex Dacron Antenna Rope is ideal and supplied with our larger antennas).

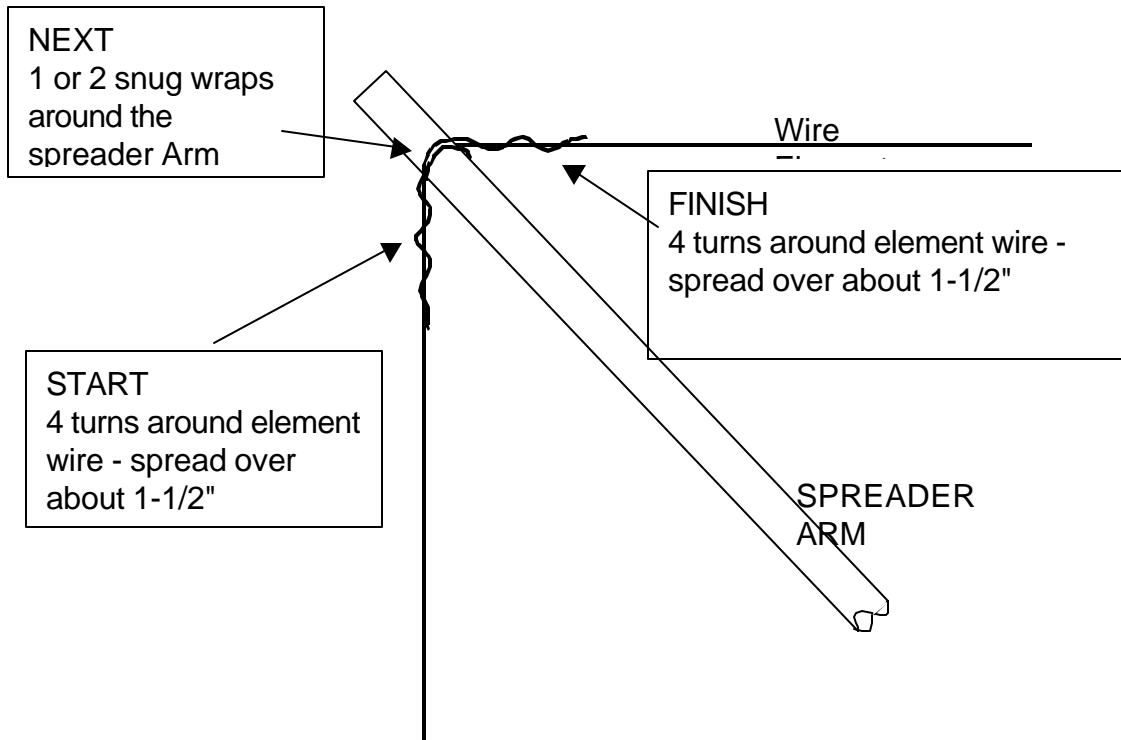
Stranded Wire Element Preparation

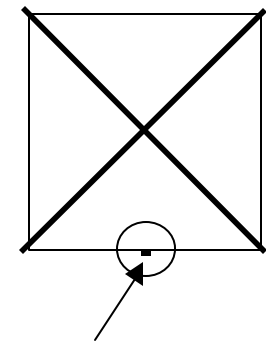
CAUTION: Working with stranded antenna wire certain precautions are required. First to prevent wire strands from unraveling when cutting to proper lengths it is important to flow solder about 1/2" either side of the cut point. Be careful as the wires may be very hot after soldering.

The second caution comes when un-spooling the wire to the necessary lengths. It is recommended that the wire be "unrolled" from the roll and not "stripped", as this will accentuate the spiral wrap tendency leading to wire kinks. Always be on the watch for wire kinks forming and take appropriate action to prevent them. If one should occur, it may be recoverable by carefully straightening it while smoothing.

Wire Element Support - "Wire Wrap"

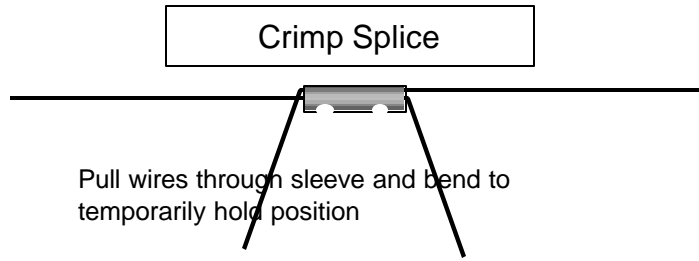
After feeding the element wire through the spreader arm holes, and checking for arm alignment, the "wire wrap" should be applied. This following procedure will assure minimum flexing of the element wire at the arm attachment point and to maintain element/spreader arm alignment we recommend securing all 20 meter and 17 meter element arm attachment points in the following manner. Generally speaking 15, 12 or 10 meter elements will not need this treatment. Sufficient "Wire Wrap" wire has been provided for this procedure - follow the diagram below.





Connecting Element Wires -

Reflector / Director Connections - splice or crimp sleeve



Crimp Splice

Pull wires through sleeve and bend to temporarily hold position

Fig. 3a Trim wire ends after completing adjustment of tension

Alternate method-Line Splice



"Line men's" Splice

Fig. 3b

Locate the small bag of crimp sleeves (5 +1 spare).
 After completing the wiring of the Reflector and Director elements the ends must be connected to complete the Quad loop. Slide both ends through the sleeve as shown in fig 3b. Pull wire through to eliminate the slack in the wire. Temporarily fold each wire end as above to hold the wire position. Check the tension in all of the sides of this element, making sure that the arms are "square" and in line. Make an adjustment at the sleeve and if satisfied Crimp, or solder the element wire into the sleeve. This technique allows you to get the element wire tension correct without committing to a wire wrap or crimped connection.

Additional Notes on feeding:

Separate lines are to be preferred over the simplified "Single FEED LINE" method to a common junction point of elements. This is not to say that the "SF" system is unacceptable, but one must be prepared to accept some SWR compromise when using it. If difficulty is encountered in LOADING and/or SWR with either system.

FEED LINE PRUNING should be attempted as the NUMBER ONE approach when using the "SF" approach.

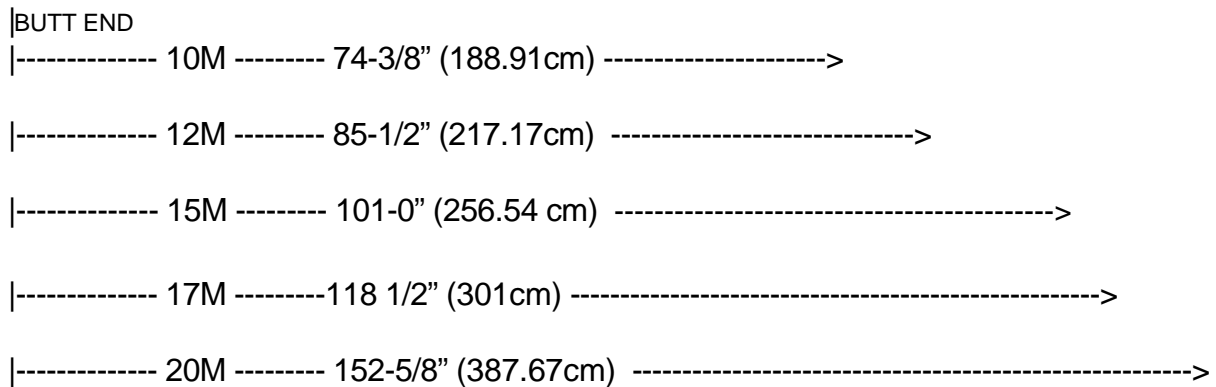
Baluns are generally not needed and have proven effective in only a small percentage of unusually rough situations. Fortunately, the great majority of quad installations perform very satisfactorily without the need to resort to complicated matching systems, but in an occasional "rare" case of difficulty, the Gamma Match (either individual or Tri-Gamma) has proven to be a good solution. For Gamma Match information see historical notes at end of instructions, or refer to Bill Orr's book on Quads.

Cubex Engineering
 2 ELEMENT QUAD DIMENSIONS (PER SIDE)

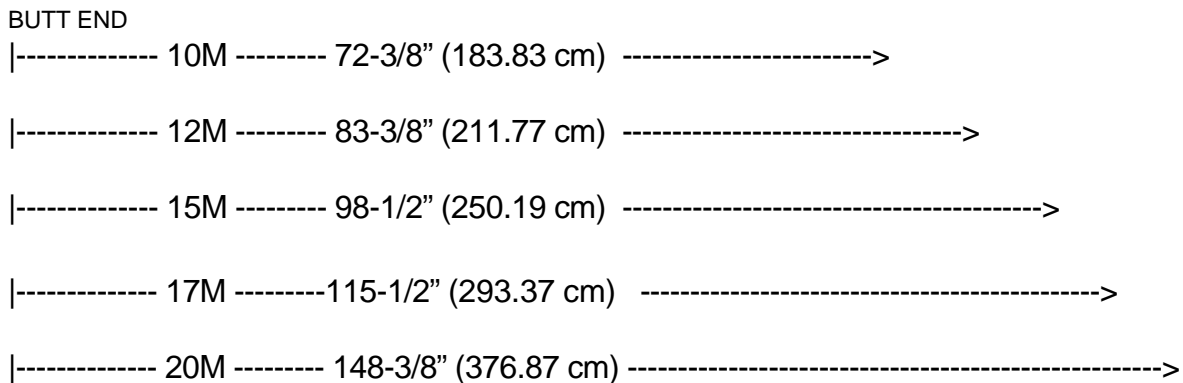
BAND	10 M		12M		15M		17M		20M	
	Inches	CM	Inches	CM	Inches	CM	Inches	CM	Inches	CM
Reflector	107.50	273.05	124.00	314.96	145.00	368.30	170.50	433.07	218.00	553.72
Driven EI	105.00	266.70	120.75	306.71	142.00	360.68	166.50	422.91	212.00	538.48

ARM DRILLING DIMENSIONS

REFLECTOR:



DRIVEN ELEMENT:



NOTE:

These dimensions are for reference only, actual dimensions may vary slightly from those above in actual practice.