JK MidTri 40

(2024 Edition)

4-Band Yagi (40M/20M/15M/10M)

72 Grays Bridge Road, Unit D, Brookfield, CT 06804 ▪ 475.289.2222 (TEL) ▪ 845.279.5526 (FAX) ▪ info@jkantennas.com

UPDATED : MAY 2024

JK Antennas Limited Warranty and Liability

JK Antennas ("Manufacturer") warrants to the original purchaser that this product will be free from defects in material, and workmanship for a period of one (1) year from the date of purchase. The determination of whether any part or parts will be covered by this limited warranty and whether any part or parts will be repaired, replaced or refunded will be solely determined by JK Antennas. Such determination will be made following evaluation of claim of alleged defect and subject to evaluation of possible misuse, abuse, unauthorized modifications, extreme weather conditions or improper installation. This warranty does not cover delivery, transportation, installation or any other costs that may be incurred from any defect.

The purchaser, final customer, installer and user of these products individually and collectively acknowledge that these products can cause injury or death and individually and collectively accept full responsibility and liability for any and all personal and property damage (direct, indirect and punitive) caused during installation and subsequent use.

Copyright Notice

This publication is Copyright © 2024 by JK Antennas. All rights reserved.

No part of this publication or addendum or attachments may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without prior permission of JK Antennas.

WARNINGS

- **Installation of this antenna near power lines is dangerous. Contact with any high voltage power lines could result in electric shock or loss of life. Do not install this antenna where there is any possibility that the antenna or any part of the supporting structure could come in contact with power lines.**
- **Also ensure that no persons or pets can come in any contact with the antenna after it is installed. Dangerous voltages can exist on the antenna when it is in operation and no part of the system is insulated to prevent shock.**
- **Consult with FCC OET Bulletin 65 to properly evaluate whether the chosen installation site for this antenna will comply with the FCC guidelines for human exposure limits to radio frequency electro-magnetic fields.**
- **This antenna structure is not designed to be used as a support structure. No persons or objects should be supported by or suspended from the antenna structure at any time.**
- **Because most antenna systems are installed at high heights, the installed location must take into account that falling debris may pose a hazard to humans, animals and property on the ground below.**
- **Be aware of and follow all local codes and ordinances when installing this antenna.**

TOOLS REQUIRED

This antenna uses all **SAE standard tool sizes**. Metric fasteners are *not* used on this antenna. Ensure hex keys used are **SAE** sizes to avoid stripping the socket cap screw heads.

Size	Description
5/16”	Nut driver, socket or wrench (for #6-32 nylon lock nuts)
11/32”	Nut driver, socket or wrench (for #8-32 nylon lock nuts)
3/8”	Nut driver, socket or wrench (for #10-24 nylon lock nuts)
7/16”	Nut driver, socket or wrench (for 1/4-20 nylon lock nuts)
9/16”	Nut driver, socket or wrench (for 5/16-18 nylon lock nuts)
7/64”	Allen wrench / Hex Key (for 6-32 socket head screws)
9/64”	Allen wrench / Hex Key (for 8-32 socket head screws)
5/32”	Allen wrench / Hex Key (for 10-24 socket head screws)
3/16”	Allen wrench / Hex Key (for 1/4-20 socket head screws)
9/16"	Socket and ratchet (preferred), or combination wrench, or adjustable wrench (for boom to mast u-bolts)

ASSEMBLY GUIDELINES

1. Open the boxes and lay out the elements, hardware kits and parts
2. Using the parts list at the end this document, check to make sure all tubing, hardware kits and parts are included (extra numbers of bolts, screws, nuts and washers are included)
3. **The use of Penetrox or Noalox or any other Anti-seize/Anti-Oxidant compound is HIGHLY recommended during installation of this antenna. Use a drop or 2 of this anti-seize paste on all screws before fastening. This will prevent the stainless-steel hardware from accidently locking up. Also a drop or two of the anti-oxidant paste on the element transitions will prevent corrosion in the joints as well ensure long lasting electrical performance.**

The document has been separated into different assembly sections based on the packaged hardware kits. While it is recommended to assemble in the order presented, please adjust as needed based on your working conditions and assembly area.

STEP 1: Boom

The JK MIDTRI 40 comes with three (3) **6-ft boom center** sections (sleeve assembly holes on both ends), one (1) **6-ft boom rear-end** section & one (1) **2-ft boom front -end** section (sleeve assembly holes on one end) which are connected to each other using an internal sleeve (1/4" thick) at the joint. The boom has a 2" OD.

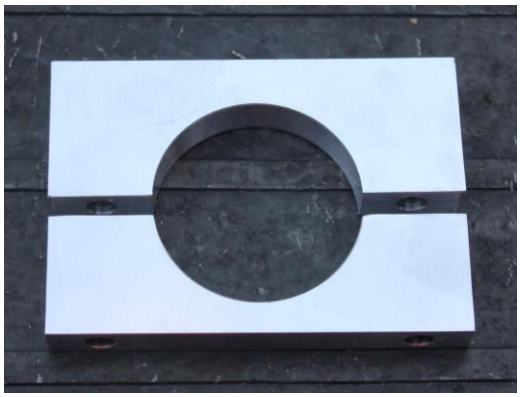
Assembled Boom Joint

Insert the internal sleeve into one of the boom sections, line up the holes and attach the sleeve using the supplied nuts and bolts in the **Boom Hardware Kit**. Do not over-tighten - once the bolt is seated firmly, make one more turn. Attach the other boom sections the same way to complete boom assembly. **The 2ft short boom section goes in the front of the boom/antenna.**

STEP 2: Boom to Mast Plate and Clamps

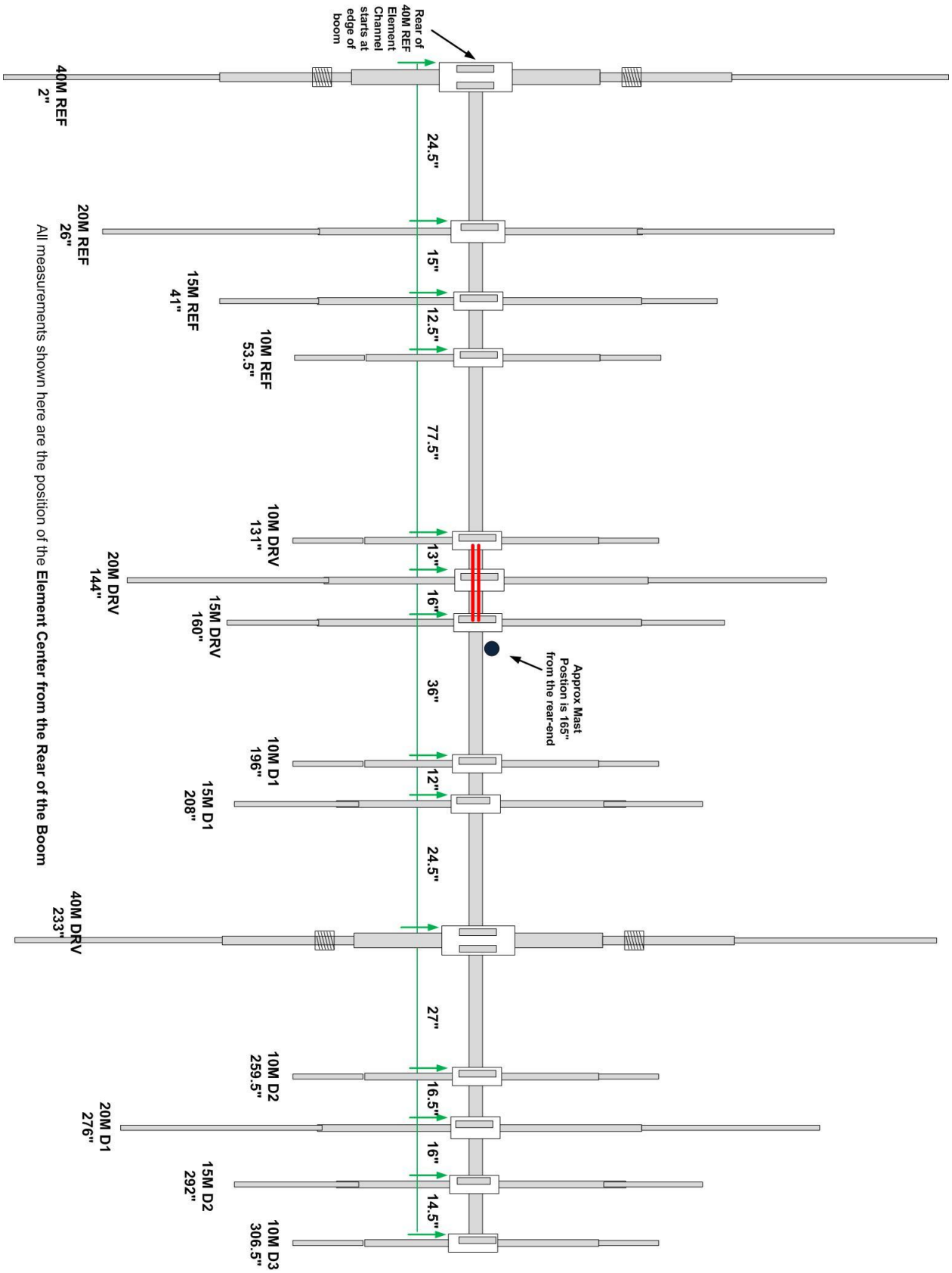
The JK MIDTRI comes with a 10" x 7" **Boom to Mast Plate**. The **Boom to Mast Plate Kit** includes four (4) sets of clamps sized for the JK MIDTRI 40 boom, along with appropriate assembly hardware. The **Mast to Mast Plate Kit** include four (4) U-bolt clamps sized for a 2" OD mast, along with appropriate assembly hardware.

Boom to Mast Plate attached to Boom
(Illustrative picture used)



Aluminum Clamp with uneven halves
(narrower half always mounted on plate side)

Diagram 1



All measurements shown here are the position of the **Element Center from the Rear of the Boom**

Recommended assembly method: Mount a short (5 foot tall) temporary mast into the ground. Mount the **Boom to Mast Plate** onto the short mast with the U-bolts from the **Mast to Plate Kit** and continue with assembly of the antenna. Once finished, remove the U-bolts and re-attach the assembled antenna on your tower.

Mast position for the JK MIDTRI40 is **165"** from the reflector-end of the Boom.

Measure and mark the mast position on the boom, and mount the boom at the identified position on the plate using the **Boom to Mast Plate Kit**. Mount the boom so that the bolt head faces up (towards the sky) and the nut faces down (towards the ground).

IMPORTANT NOTE: All clamp sets have uneven halves (i.e. one half of the clamp set is narrower than the other); the narrower half is mounted on the plate side.

The JK MIDTRI-40 assembly is broken down in this manual as JK MIDTRI & 2-el-40M assemblies separately. The JK MIDTRI and the 2-el-40M have their own and separate feedpoint.

BEFORE THE ELEMENT ASSEMBLY, PLEASE SLIDE THE TRUSS CLAMP ONTO THE BOOM (refer STEP6 /PAGE 20)

STEP 3: JK MidTri Element Assembly

The elements of the JK MIDTRI are comprised of various telescoping sizes of aluminum tubing attached to each other using counterbored holes to create a mechanically and electrically superior joint in a 3" overlap. Elements are designed to be mounted on the underside of the boom, following the location and measurements of **Diagram 1** on the previous page.

First assemble the **Driven Element Center Sections** (STEP 3a). Then, gather the Driven Element and other element center sections, and follow the instructions in the **Element to Element Plate** (STEP 3b) and the **Boom to Element Plate** (STEP 3c) sections coming after. Once all the center sections are mounted on the boom at the identified locations, the rest of the element tapers will be assembled off the antenna (STEP 3d).

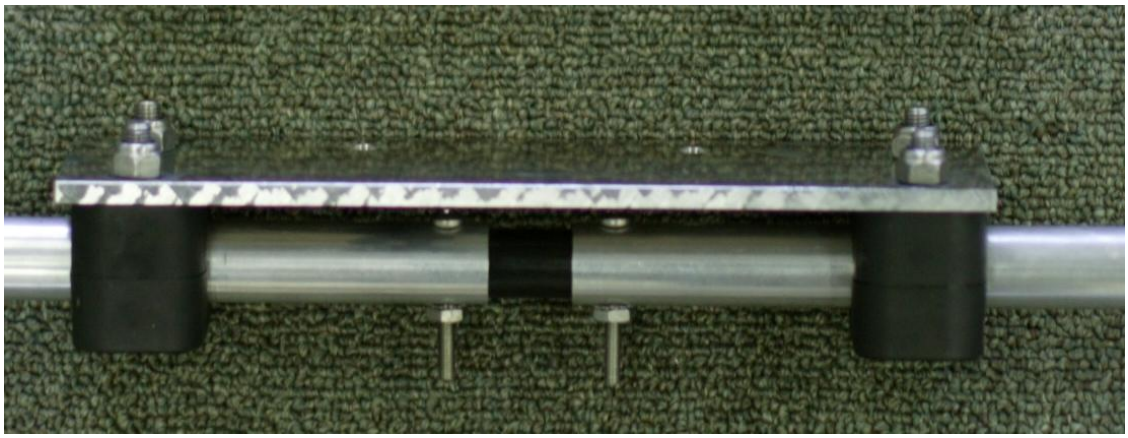
STEP 3a: Driven Element Center Section Assembly

The JK MIDTRI has three Driven Elements - one for each band (20M, 15M, 10M). Each Driven Element center section is comprised of two (2) aluminum tubes, one (1) solid fiberglass rod, and the screws and nuts found in the appropriately marked **Driven Element Hardware Kit**. (20M element also uses a 1.125"OD doubler tube)

	20M DRV	15M DRV	10M DRV
ALUMINUM TUBES (2)	36" LONG 1.25" OD	12" LONG 1" OD	18" LONG .75" OD
FIBERGLASS ROD	1" OD	.875" OD	.625" OD
BUTTON HEAD SCREWS	4" LONG	2-1/2" LONG	

For each band's Driven Element center section, the appropriately sized fiberglass rod is used to join together the two corresponding aluminum tubes (see chart above). Slide one end of the fiberglass rod inside the end of one tube and align the holes. Place the screws through the hole and tighten with a Keps nut. Do the same on the other side so that the fiberglass rod has aluminum tubes attached on both sides.

NOTE: The head of the button head screw is to be placed on the same side as the counterbored hole on the opposite end of the tube. The button head screws form the studs that the transmission lines attach to, and these need to be pointing down when assembled and all counterbored holes facing up.

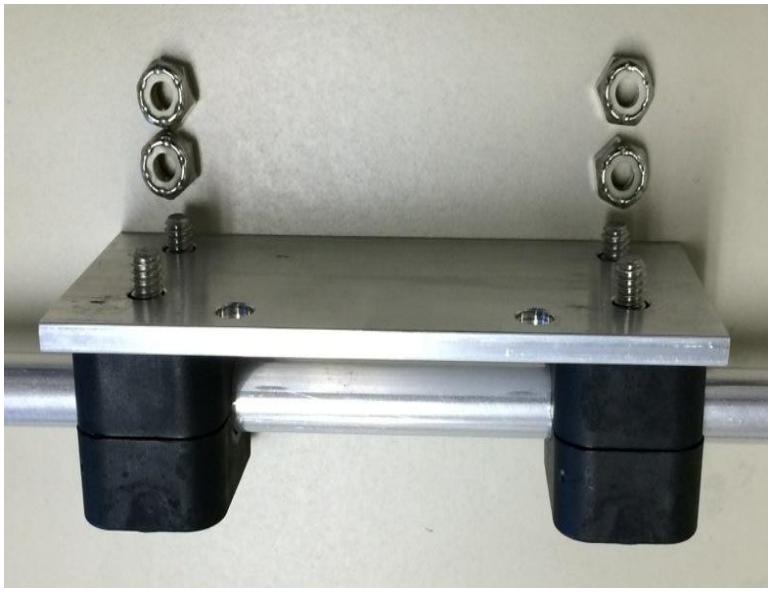


Completed Driven Element Assembly mounted on Element Plate

The aluminum tube/fiberglass rod assemblies of the driven element center sections can be mounted on the element plates and then onto the boom the same as the other element sections.

STEP 3b: Element to Element-Plate Assembly - Reflector, Driven and Director(s)

The 20M, 15M and 10M Element center sections (Driven Element, Reflector & Directors) are all attached to an **Element Plate** using the **Element to Element-Plate Kit**.



Element being mounted to Element Plate using Black Clamps and nylon nuts

Take the center (largest) section of each element (see chart below), and attach to an element plate using two (2) **Black Polyamide Clamps** and the appropriate hardware from the corresponding **Element to Element Plate Kit**. Make sure to mount the tubing so that the larger holes used for element taper assembly face up (towards the sky) and NOT down (towards the ground).

Before applying final torque to the black clamps, there are two alignments that have to be completed:

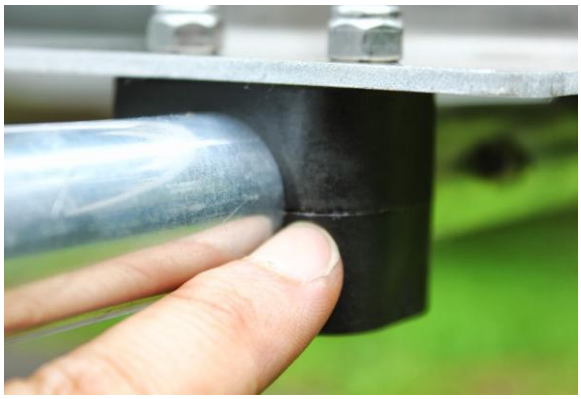
1) Center the mounting plate on the element center section.

2) There are holes drilled on each side of the element center sections. **Place the larger counter-bored holes face up on the same side as the nuts are on the mounting plate**. In other words, the plate will be horizontal when mounted (with the black clamps on the underneath), the nuts will be on the topside of the plate and the counterbored holes should be facing straight up.

	20M	15M	10M
CENTER SECTION OD & BLACK CLAMP ID	1.25"	1"	.75"

After you do the alignments, tighten the screws on the black clamps evenly, alternating between each bolt. Do not apply all the torque to one bolt at a time, as this raises the chances of galling occurring when the opposite bolt is tightened. The gap between the blocks should just close when the torque is correct, and there should be an even amount of thread sticking out above each nut. **Do NOT continue to add additional torque after the gap closes.**

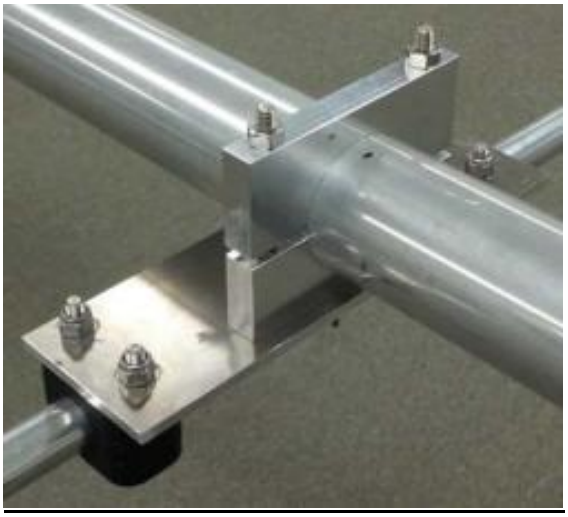
CAUTION: Continuous over-tightening can cause the screw-head to jam through the black clamps holes.



Make sure to center the tubing exactly at the mid-point of the plate.

STEP 3c: Boom to Element Plate Assembly

Once the center sections are mounted on the plates, they can be attached to the boom using one (1) clamp set and the appropriate hardware from the **Boom to Element Plate Kit**. Follow the element positioning indicated in the diagram above.



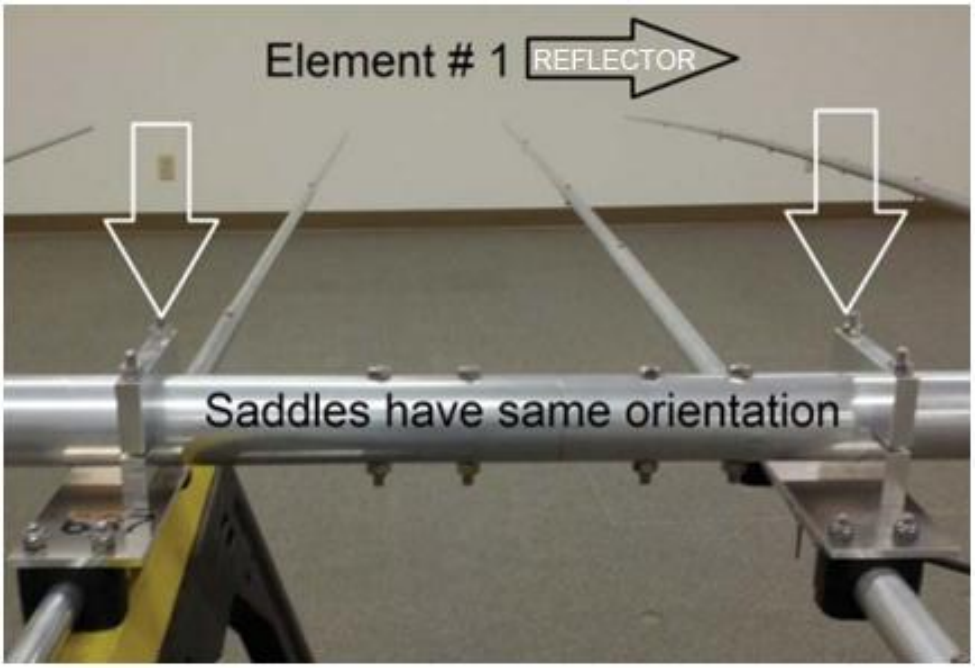
Element Plate mounted to Boom using Saddle clamp

NOTE: The placement of the Driven Elements will also be guided by the attachment of the Transmission Lines (see section on Transmission Line Assembly for more details). Therefore, do NOT do final tightening of the nuts on the Boom to Element Clamps holding the Driven Elements until the Transmission Line is in place.

REMEMBER: All clamp sets have uneven halves (i.e. one half of the set is narrower than the other); the narrower half is mounted on the plate side.

- **IMPORTANT: Since JK MIDTRI uses only 1 clamp per element plate, and the clamp is mounted off-center, Be SURE TO orient the clamp side of the plate closest to the reflector of the antenna, i.e the side towards the 20M Reflector element.**

- **IMPORTANT: It is advisable to have a tape measure that can measure down to 1/16th of an inch. Placing the element plates on the boom accurately will ensure the most precise, accurate and effective antenna performance.**



Before final torquing, re-check spacing and horizontal alignments of element center sections on the boom using the measurements illustrated on Diagram 1.

Attention : *20M Drv is at the center of the boom joint. Please invert the bolt on each side of the joint with the nut facing upwards and the bolt head facing downwards. This will make it easy to mount the 20M DRV element plate.*

STEP 3d: Element Taper Assembly

Once the element plates/element center sections have been mounted to the boom at the appropriate locations, the remaining tubes can be sleeved in to complete the tapered element sections, based on the schedule in **Diagram 2**.

JK MIDTRI ELEMENT TAPER SCHEDULE

EXPOSED LENGTHS

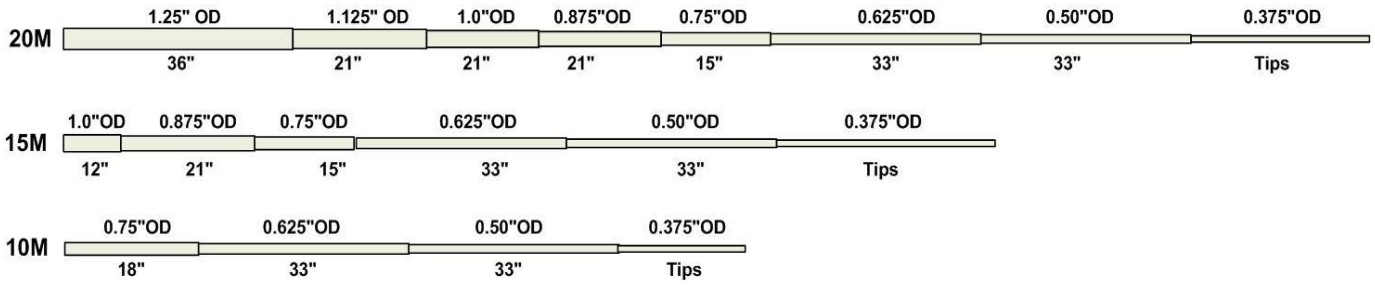
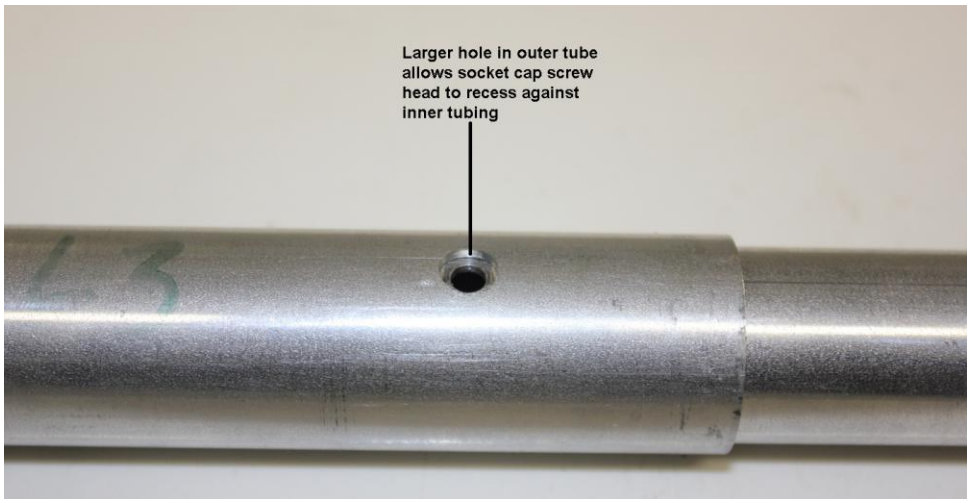


Diagram 2

Note the joint in the picture below illustrating the counterbored (larger) hole in the outer tube to tightly nest the screw head.



Each tube has one larger, counterbored hole drilled on one end, on one side. **The side of the tube with the counterbored hole is ALWAYS the outer tube of a joint, with the smaller outer-diameter tube sleeved inside.**

The element sections are joined together with a single socket head cap screw. In all cases where element sections are telescoped together, the head of the socket head screw will be inserted into the larger diameter counterbored hole through the outer tubing and exit out the other side of the larger diameter tubing.

IMPORTANT: Always be aware of the orientation of the larger countersunk hole, and keep them all on the same side as you insert the next tubing section. This way all the socket cap heads remain on the same side of the element tubing.

	1.25" OD TUBE	1.125" OD TUBE	1" OD TUBE	.875" OD TUBE	.75" OD TUBE	.625" OD TUBE	.5" OD TUBE	.375" OD TUBE
20M	**CENTER**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
15M			**CENTER**	**X**	**X**	**X**	**X**	**X**
10M					**CENTER**	**X**	**X**	**X**

Following the taper schedules above, assemble the element tubes in descending order on both sides of the element center sections. Align the holes and attach them to each other firmly using the appropriate screws and nuts in the **Element Hardware Kits**. Do not forget to use the anti-seize paste.

NOTE: Nylon nuts used on element sections should not be torqued so much that they crush the tubing. The nut only needs to seat firmly, as the nylon lock will keep it from loosening.

Screw fits into recessed hole - face up

Nylon Nut placed on opposite end - face down

Band	Transition	Screw Size	Nut
20M	1.25" - 1.125"	1-1/2" (SH1024-1)	NN1024
20M	1.125" - 1"	1-1/2" (SH1024-1)	NN1024
20M/15M	1" - .875"	1-1/4" (SH832-2)	NN832
20M/15M	.875" - .75"	1-1/4" (SH832-2)	NN832
20M/15M/10M	.75" - .625"	1" (SH832-1)	NN832
20M/15M/10M	.625" - .5"	3/4" (SH632-2)	NN632
20M/15M/10M	.5" - .375"	3/4" (SH632)	NN632

NOTE: The screw heads should all be on the top side of the element (facing the sky) and the nuts on the bottom side of the element (facing the ground).

Exposed Tip lengths of the elements (.375" OD tubes) are as follows:

20M REF	20M DRV	20M D1	15M REF	15M DRV	15M D1	15M D2	10M REF	10M DRV	10M D1	10M D2	10M D3
40"	32-1/2"	7"	29"	29-1/4"	20-3/8"	21"	25"	19"	17-1/2"	17-3/8"	15-1/4"

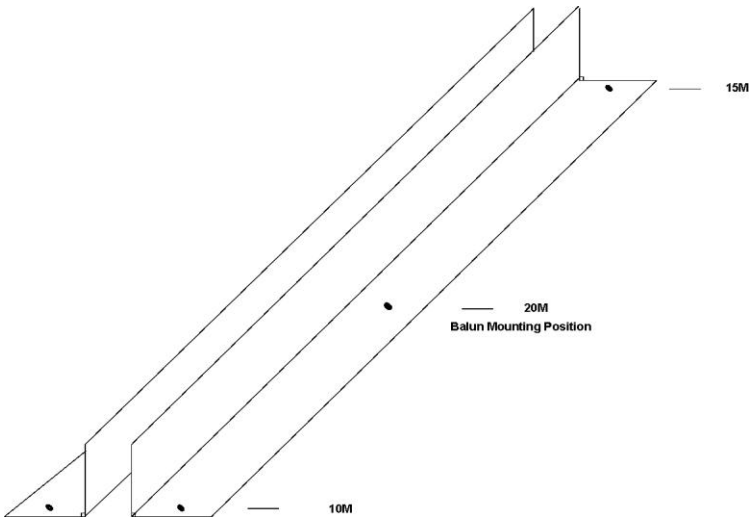
Once all element tapers are installed, it is time to do final horizontal alignment of all the elements on the boom. Sight down the boom and align any elements that need it. Complete final torquing of nuts on all boom to element clamps.

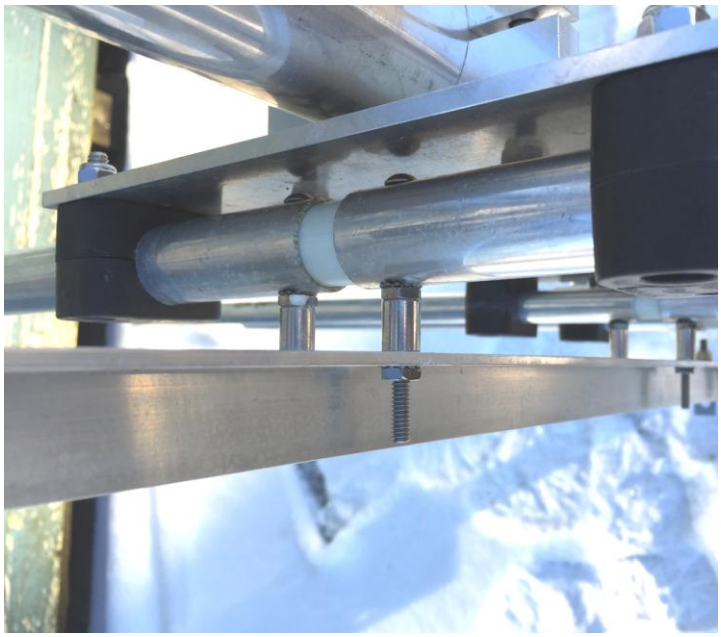
STEP 4: Transmission Lines & Balun Assembly

The JK MIDTRI is delivered with "pair" of L shaped angle aluminum strip that's 30 inches long. Once mounted, the gap between the transmission lines will be approximately 3/8" (0.375"). The final nut below the transmission line is always the Nyloc Nut.

Aluminum spacers are placed between the transmission lines for 15M &10M driven elements EXCEPT the 20M Driven Element to keep the transmission lines level. There are 2 different sizes of spacers, which are found along with their corresponding Nyloc nuts in the **Transmission Line/Balun Kit**:

- Aluminum Spacer #1 (5/8" long) goes on the 10M Driven elements.
- Aluminum Spacer #2 (1/2" long) goes on the 15M Driven elements.





The JK MIDTRI is delivered without a balun. We recommend a 1:1 current balun since the antenna is designed to be fed with a 50 Ohm balanced source, bringing the antenna to true optimum performance.

Mount your balun to the transmission line beneath the 20M Driven element, using the “L” shaped brackets and hardware provided in the **Transmission Line/ Balun Kit.** Use the aluminum spacers to bring the mounting position of the “L” to the balun, just to the point where the balun can be just below the transmission lines. If preferred, a simple length of tie-wrap could be used to secure the balun to the transmission line. Use the supplied Nylock Nut to tighten the “L” brackets below the transmission line and spacers.

(Using a longer lead from the balun to the transmission line can alter the SWR characteristics on all bands. If using a different lead than the one provided please make sure that’s it is not more than 2-3 inches long.)

Most Important !!

Please make sure to route the coax away from the Transmission line. It's very important that the coax from/to the balun is not secured or attached or touches the Transmission line. You can loop it around sideways and then go over to the boom and attach there.

STEP 5: 2-el-40M Installation

The 40M elements are comprised of various telescoping sizes of aluminum tubing and are designed to be mounted on the **underside** of the boom, following the location and measurements below:

The Reflector element channel will start at the edge on the Rear of the Boom. This will put the 40M Reflector element at 2” from the Rear of the boom.

Please note the 40M Element Channel is 4” wide and the tubing is centered on the element Plate.

40M ELEMENT	POSITION ON BOOM FROM REAR END
REF	2.0”
DRV	233”

First assemble the **Driven Element Center Section** (STEP 5a). Then, gather the Driven Element and other element center sections, and follow the instructions in the **Element to Element Channel** (STEP 5b) and the **Boom to Element Channel** (STEP 5c) sections coming after. Once all the center sections are mounted on the boom at the identified locations, the rest of the element tapers will be assembled off the antenna (STEP 5e).

STEP 5a: Driven Element Center Section Assembly

The Driven Element center section is comprised of two (2) 36" long aluminum tubes with an outer diameter of 1.75” OD, one (1) solid fiberglass rod (1.5” OD), and the hardware found in the **Driven Element Hardware Kit**.

1) Slide one end of the fiberglass rod inside the end of one aluminum tube and align the holes.

2) Place the shorter screw on the hole away from the center and tighten using a nylon nut.

3) Place the longer button-head screw through the hole closer to the center with a serrated lock washer on each side and tighten with a nylon nut.

4) Do the same on the other side so that the fiberglass rod has aluminum tubes attached on both sides.

Once assembled, the Driven Element center section can be mounted onto the element plates and then onto the boom the same as the other element sections in the next step. ***(The above picture shows the Balun "L" straps attached to the element center screws.)***

STEP 5b: 40M Element to Element Channel Assembly

The JKMIDTRI 40M element center sections are attached to an **Element Channel**. Attach each 40M center section (all 1-3/4" outer diameter tubes) to a 40M element channel using two (2) **Black Polyamide Clamps** and the hardware from the **Element to Element Channel Kit**.

Before applying final torque to the black clamps, there are several alignments that must be completed:

1) Center the mounting plate exactly at the middle of the center section tube.

2) Align the tubes so that when screws are used to attach the next taper, the screw heads will face up (towards the sky).

2) When mounting the Driven Element center, make sure that the exposed screws face away from the Element Plate (down, towards the ground)

After the above alignments are completed, tighten the screws on the black clamps evenly, alternating between each bolt. Do not apply all the torque to one bolt at a time, as this raises the chances of galling occurring when the opposite bolt is tightened. The gap between the blocks should just close when the torque is correct, and there should be an even amount of thread sticking out above each nut. **Do NOT continue to add additional torque after the gap closes.**

CAUTION: Continuous over-tightening can cause the screw-head to jam through the black clamps holes.

40M center sections mounted on element channels

STEP 5c: Boom to Element Plate/Channel Assembly

Once the 40M center sections are mounted on the channels they are attached to the boom using two (2) clamp sets and the appropriate hardware from the **Boom to Element Channel Kit** (for 40M) Follow the element positioning indicated in the table in the beginning of Step 5.

40M) center section mounted to boom using saddle clamps

REMEMBER: All clamp sets have uneven halves (i.e. one half of the set is narrower than the other); the narrower half is mounted on the plate side.

IMPORTANT: It is advisable to have a tape measure that can measure down to 1/16th of an inch. Placing the element plates on the boom accurately will ensure the most precise, accurate and effective antenna performance.

Before final torquing, re-check spacing and horizontal alignments of element center sections on the boom using the measurements in the table above. Minor adjustments (quarter inch to half inch) to element positions may be necessary in cases where the elements fall on the boom joints.

STEP 5d: 40M Coil Assembly

Each 40M coil assembly is comprised of two 1.25"OD aluminum tubes, one fiberglass rod, one coil, and the appropriate screws, nuts, serrated lock washers and silicone tape (**Coil Hardware Kit).**

The fiberglass rod has 4 holes, which are ¼" holes. The outside holes from the center and are used for the mechanical mounting of the tubing to the fiberglass. The inside holes are used for mounting the coil using the Full Thread screws.

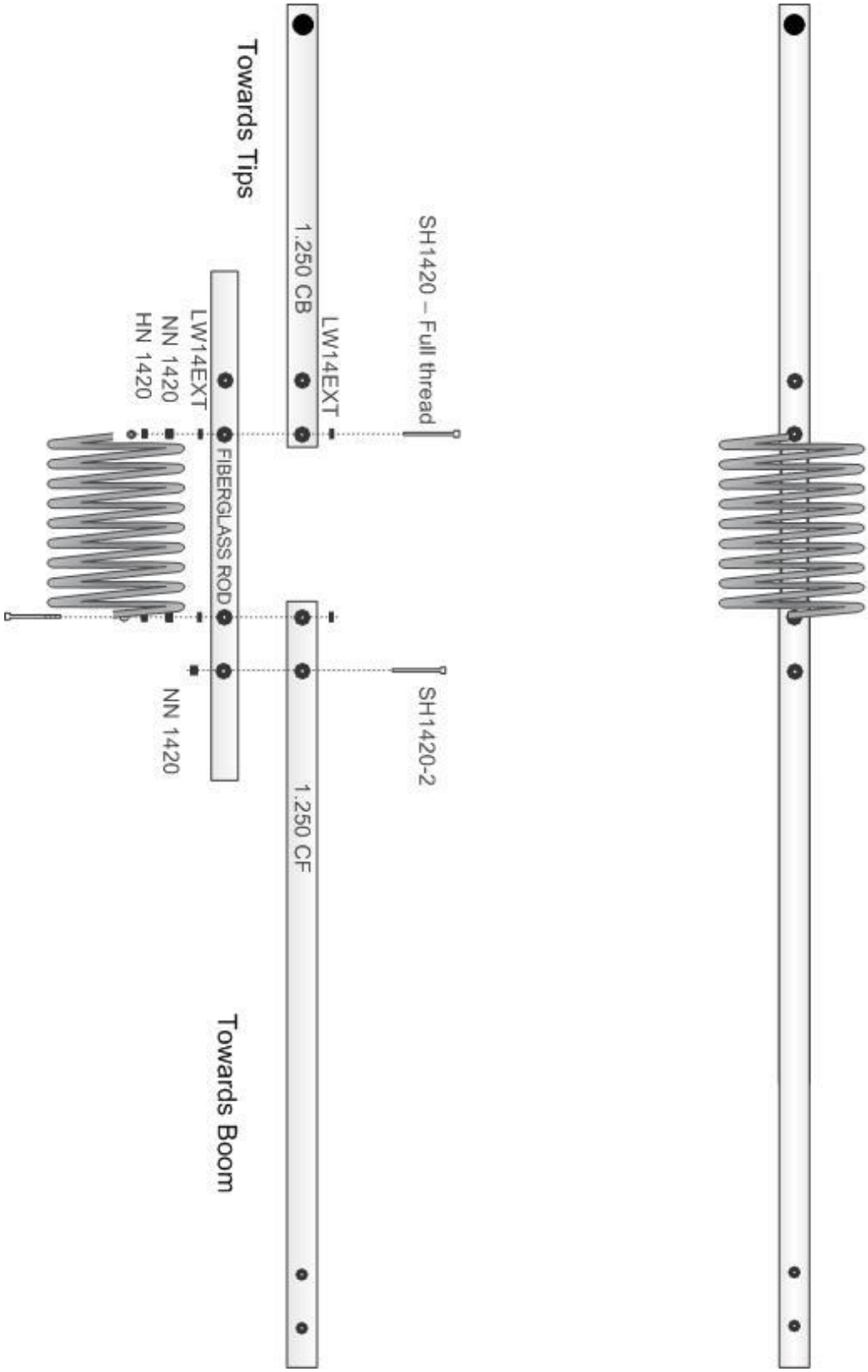
NOTE: Always use an anti-oxidant (Penetrox) while tightening the screws and nuts.

1) Starting with either the CF or the CB tube, insert the fiberglass rod and line-up the holes. Attach the tubes to the rod through the outside holes using the provided ¼-20 screws and ¼-20 nylon nuts.

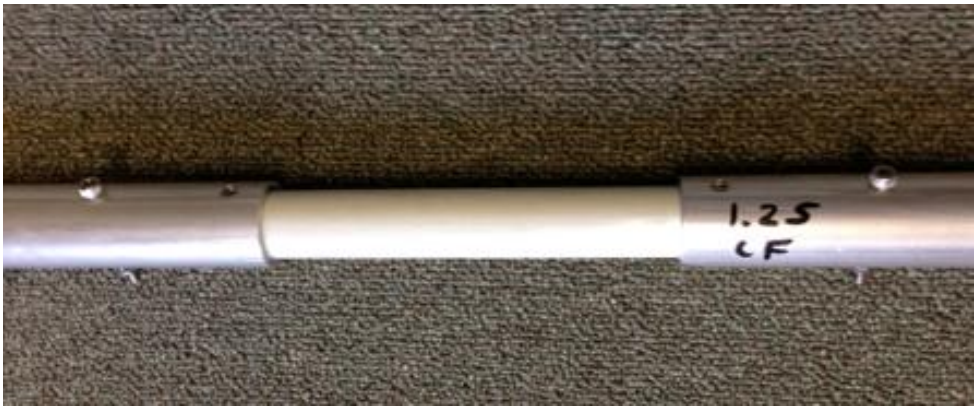
2) Repeat on the other side of the fiberglass rod with the remaining tube. Once completed, the section should look like the picture below, with the ¼" holes still open

JK ANTENNAS & SYSTEMS

40 Meters Coil Section Assembly – **2017 version**



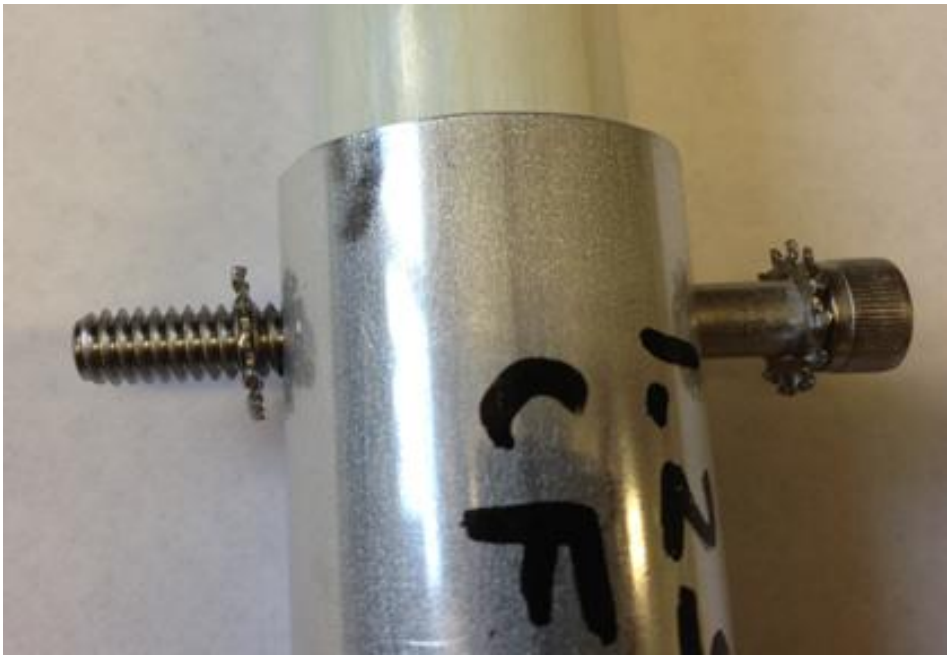
¼” holes (outside) to attach fiberglass rod to aluminum tubes



1/4" holes (inside) to mount the coil

Now, to attach the coils, follow these steps:

3) Place a serrated/tooth washer (LW14ExT) onto a 1/4"-20 Full-thread screw, and insert into one of the 1/4” holes on the fiberglass rod/tube assembly.



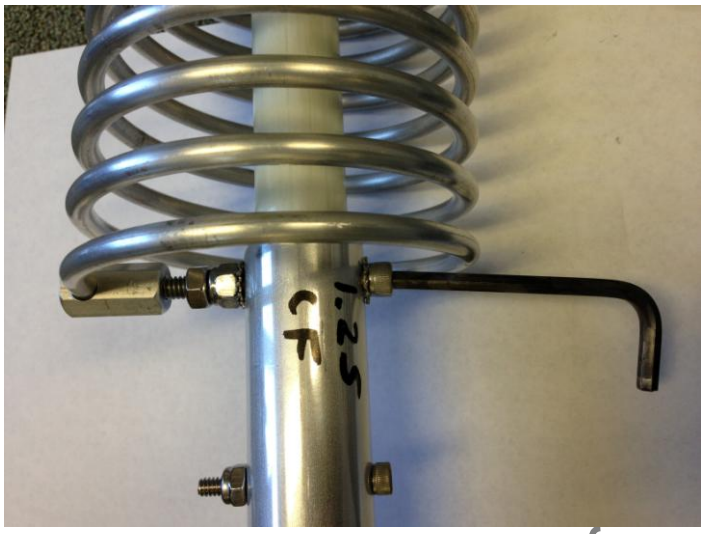
4) Add another serrated/tooth washer onto the screw on the far side of the rod, and finish with a 1/4-20 nylon-nut. <u>Tighten as far as you can, stopping just short enough to still allow the screw to rotate freely</u>.

5) Attach a 1/4-20 plain hex nut and turn it until it reaches the nylon nut.

6) Follow these same steps with the remaining hole on the other side of the fiberglass rod, <u>but this time insert the screw from the opposite side of the rod</u>.

7) Wrap the provided silicone tape over the exposed section of the fiberglass rod (this tape has no adhesive, so it <u>only</u> bonds to itself – stretch and wind the tape over the exposed section, using approximately 24 inches or less of tape on each rod).

8) Slide the coil onto the assembly; thread the Full-thread screw seven or more times directly into the coil standoff. (until you see a symmetry in the coil around the fiberglass rod mounting)



9) <u>GENTLY</u> tighten the hex-nut over the standoff to act as a jam nut.

10) Do the same on the other side.

11) Tighten the nylon-nut firm and tight along the tube.

NOTE: It is very important to have a solid mechanical connection, with the nut and screw making a tight contact over the tubing. Visually inspect the coil assembly for any twists or non-symmetry while tightening these nuts. Adjust them carefully by pulling them back into place. Repeat this same process for all the coil assemblies.

The total assembled length of the "coil assembly" is approximately **60".**

NOTE: While tightening, take care to NOT put too much pressure over the coil standoffs. We recommend that you hold the standoff with pliers or a wrench to prevent any excess pressure being put on the coil joint to the standoff while tightening the jam-nut.

STEP 2e: Element Taper Assembly

Once the 40M center section has been mounted, and the coil sections have been assembled, the remaining tubes can be sleeved in to complete the tapered element sections.

40M: The 40M element has eight (9) tapered aluminum sections on each side of the 1.75" center section, ranging from 1.5" (largest) to .375" (smallest).

1) Slide 6 inches of the 1.5" OD tube into the center section tube and align the holes. Attach using the appropriate hardware (**40M Element Hardware Kit**) as shown in the table below. (Use a drop of anti-seize paste on all screws).

Transition	Screw Size	Nylon Nut Size
1.75" – 1.5"	SH51618-4	NN51618
1.5" – 1.25"	SH51618-3	NN51618
1.25" - 1"	SH1024-1	NN1024

1" - .875"	SH832-3	NN832
.875" - .75"	SH832-3	NN832
.75" - .625"	SH832-1	NN832
.625" - .5 Slit"	SH632	NN632
.5" Slit - .375"	HC-2	none

2) Slide the CF side of the 40M coil assembly (1.25" tube) into the 1.5" OD tube and attach.

Important : All tubing has 2 different hole diameters at each end. For example the 1"OD tubing the #10 thru hole side goes into the 1.25-CB" tubing and the counterbore single hole side towards the 0.875"OD tubing.

3) Continue to assemble and attach the progressively smaller tapers of aluminum tubing, using the appropriate hardware, as shown in the table above.

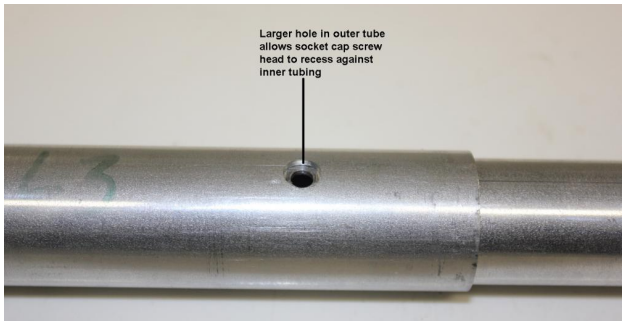
Exposed Length	**36"**	**30"**	**30"+18"**	**33"**	**21"**	**21"**	**33"**	**33"**		**Tip Length**
40M Ref	1.75"	1.5"	1.25"	1"	.875"	.75"	.625"	.5" **Slit**	.375" is the tip	**30" – CW** **27" - SSB**
40M Drv	1.75"	1.5"	1.25"	1"	.875"	.75"	.625"	.5" **Slit**	.375" is the tip	**13"- CW** **11" - SSB**

The tips lengths have been optimized for (7.0MHz -7.200MHz) 7.050 +or- performance. – **CW**
The tips lengths have been optimized for (7.080MHz – 7.260MHz) 7.125 +or- performance. – **SSB**

4) The smallest taper on each element is inserted into the slit end of the previous size, and attached using a hose-clamp (and not the screws). The exposed tip length of the smallest taper on each element must follow the table above.

SPECIAL NOTE: All tapers use single hole counterbore to tightly nest the screw head onto the tube inserted into it.

Note the joint in the picture below illustrating the counterbored (larger) hole in the outer tube to tightly nest the screw head.



- Each tube has one larger, counterbored hole drilled on one end, on one side. **The side of the tube with the counterbored hole is ALWAYS the outer tube of a joint, with the smaller outer-diameter tube sleeved inside.**

- The element sections are joined together with a single socket head cap screw. In all cases where element sections are telescoped together, the head of the socket head screw will be inserted into the larger diameter counterbored hole through the outer tubing and exit out the other side of the larger diameter tubing.
- **<u>IMPORTANT:</u> Always be aware of the orientation of the larger countersunk hole, and keep them all on the same side as you insert the next tubing section. This way all the socket cap heads remain on the same side of the element tubing.**

NOTE: Always use an anti-oxidant (Penetrox) while tightening the screws and nuts.

We recommend assembled elements to have the screw head on the top side of the element (facing the sky) and the nut on the bottom side of the element (facing the ground).

top side of the element (facing the sky) and the nut on the bottom side of the element (facing the ground).

STEP 5f: 40M Balun Assembly

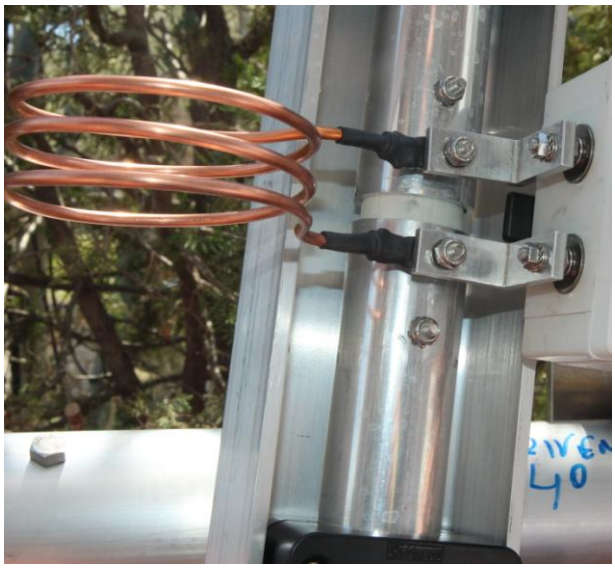
1) Insert serrated lock washers (LW10ExT) from the **40M Driven Element Hardware Kit** onto the <u>longer</u> <u>center</u> exposed screws of the Driven Element.

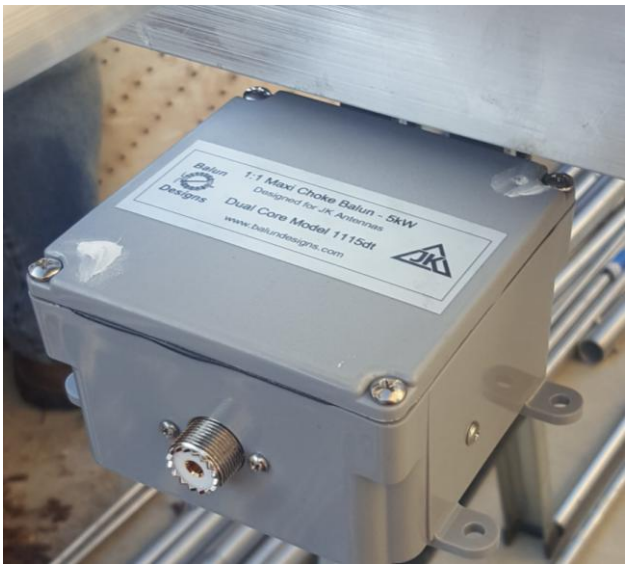
2) Next, mount the copper SHUNT coil and the balun " L" leads onto the exposed screws, with the balun on one side and the shunt coil on the other.

(MOST IMPORTANT: PLEASE DO NOT ADJUST OR SPREAD THE SHUNT COIL SENT FROM THE FACTORY)

3) Insert another serrated lock washer on each screw

4) Insert the Nyloc Nut (NN1024) and tighten, but be careful NOT to over-tighten





5) Check the entire setup for snug fit and make sure there are no loose joints in the coil or the balun leads.

STEP 6: Truss Assembly

1) Mount the two (2) clamps in the **Boom to Truss Cable Kit** onto the boom at the following locations:

- At approximately **110** inches from the mast/center on the boom's **Reflector** side
- At approximately **85** inches from the mast/center on the boom's **Director** side

1) Attach the clamp from the **Mast to Truss Cable Kit** onto the mast, 36 inches or more above the boom, using the provided hardware. Use the plain Hex Nut with Lockwasher and then add the Flat Washer before inserting the Turnbuckles.

2)

3) Mount the eye-side of each of the **Jaw-Eye Turnbuckles** (packaged with **Truss Cables**), one on either side of the Mast to Trust Clamp. Loosen the turnbuckles and apply Penetrox to the threads. Add another Flat Washer and then complete with the Nylock Nut to the Hex Screw on the Mast clamp.

4) Adjust the tensions of the turnbuckles as needed and level the boom after mounting the antenna on the mast.

STEP 7: Antenna Final Check and Test – prior to installation

Dimensions: Although the element lengths are set from the factory, it is highly recommended that you take the time to document and check *all* the dimensions of your assembled antenna with factory dimensions. There is so much time involved in installing the smallest of antennas that is not worth skipping the dimension documentation. We recommend that make a note of all your element spacings and lengths down to a ¼". Diagram 1 on page 4 shows the element spacings and Diagram 2 on page 9 shows the element taper lengths for the JKMidTri. The tip lengths for all JK MidTri elements are on page 10.

The lengths and tapers for the 40M elements are shown on Page 20.

Hardware Installation: Verify that all the hardware has been tightened and there are no loose fasteners.

SWR Test: You may connect a SWR analyzer with the antenna only a few feet off the ground to make sure you do not have a short or open circuit anywhere. You can do this by verifying that you do not have an extremely high SWR on every band. Do not be concerned unless the SWR is high on all bands. The antenna will not have the specified SWR curves unless it is installed at a height of at least 30 feet above ground. With the antenna at least 6 feet from the ground, you will start to see the SWR "dip" below 2:1 somewhere in or near each of the three supported frequency ranges for the JKMidTri.

For 20M – the dip will be around 14.0 MHz at 5Ft above the ground.
For 15M – the dip will be around 21.1 MHz at 5Ft above the ground.
For 10M – the dip will be around 28.5 MHz with a 1.5:1 swr at 5Ft above the ground
For 40M, the swr dip will be somewhere around 200 KHz below the desired center frequency at 5ft above the ground. This may very well mean that your lowest swr for a CW setting may be somewhere around 6.875MHz to 6.9MHz at 5ft above the ground.

Most Important: Any adjustments to the 40M elements should be done to **both** the Driven and the Reflector simultaneously. To shift the swr curve, by either increasing or reducing the tip lengths, a change of 1" in the tips on both sides (Driven and Reflector) will shift the curve by approximately 20KHz. It's very important to preserve the original ratio of the driven element and Reflector.

Installation: The antenna should be installed by a professional in a safe manner on a support structure that is rated to handle the weight and wind load of this antenna, in all expected weather conditions. The boom to mast plate is supplied with saddle clamps to mount to a 2" outer diameter mast (user supplied). The JK MidTri40 antenna is designed to be fed with 50 Ohm coaxial cable such as RG-8 or RG-213. Pretest the entire run of coax cable with a 50 Ohm "dummy load" to ensure there are no problems with either the coax or the coax connectors. Most SWR issues are due to coax or connector issues and not related to the antenna itself. Even if the coax was previously being used for another antenna, repositioning of the cable can cause new connector faults to occur. You should also test the cable at the full power you intend to run, if possible.

Surrounding metallic objects (other antennas, guy wires, etc.) can affect the performance of the antenna. If the antenna is not interacting with anything, you can expect the specified SWR curve, gain and front to rear performance. There are no user adjustments necessary for this antenna - any SWR issues indicate a coax and/or connector fault, or interaction of this antenna with another metallic object and those situations must be corrected.

JK MidTri 40 Parts List

			Description	
BOOM TO MAST ASSEMBLY				
BMP 6 (New)		for 2" mast	10" x 7" Mast Plate	1
Boom to Mast Plate				
BMC 2.0-3i-3/8		2"	Boom to Plate clamp	4
	HH3816	3-3/4"	Hex Head Screw 3/8-16	8+2
	NN3816		Nylon Nut 3/8-16	8+2
Mast to Mast Plate				
U-Bolt		2"	Mast to Plate clamp	4
BOOM & TRUSS ASSEMBLIES				
AT2.0Boom 8ft-2S			Boom Section 8ft 2.0" OD	2
AT2.0Boom 8ft-1S			Boom End Section 8ft 2.0" OD	1
AT2.0Boom 2ft-1S			Boom End Section 2ft 2.0”OD	1
AT1.75Sleeve			Boom Sleeve	3
Boom Hardware				
	HH3816	2-3/4"	Hex Head Screw 3/8-16	12+2
	NN3816		Nylon Nut 3/8-16	12+2
Boom to Truss Cable				
BTC2.0		2"	2" Boom Brackets for Truss Cables	2
	HH3816	3-1/4”	Hex Head 3/8-16	4+1
	NN3816		Nylon Nut 3/8-16	4+1
Truss Cables + Turnbuckles				
TC95			95" truss cable	1
TC120			120" truss cable	1
TBJE1200			Turnbuckle (800#)	2
Mast to Truss Cable				
U Bolt			Mast - Truss Clamp	1
	FW38	Fender Washer 3/8	Fender Washer 3/8	4+1
	NN38		Nylon Nut 3/8	2+1
BOOM TO 20M ELEMENT ASSEMBLIES				
BEP-3		9" x 3"	Element Plate for 20M	3
Element to Element Plate (two 20M Elements)				
BC1.25		1-1/4"	Black Polyamide clamps	6
	SH1420	2-3/4"	Socket Head Screw 1/4-20	12+2
	NN1420		Nylon Nut 1/4-20	12+2
Boom to Element Plate (two 20M Elements)				
BEC2.0-3i-5/8		2"	Boom to Element Plate clamp	3
	HH51618	3-1/2"	Hex Head Screw 5/16-18	6+1
	NN51618		Nylon Nut 5/16-18	6+1
BOOM TO 15M/10M ELEMENT ASSEMBLIES				
BEP-4		8" x 2-1/2"	Element Plate for 15M/10M	9
Element to Element Plate (four 15M Elements)				
BC1.0		1"	Black Polyamide clamps	8
	SH1420	1-3/4"	Socket Head Screw 1/4-20	16+2

	NN1420		Nylon Nut 1/4-20	16+2
Element to Element Plate (five 10M Elements)				
BC.75		3/4"	Black Polyamide clamps	10
	SH1420	1-3/4"	Socket Head Screw 1/4-20	20+2
	NN1420		Nylon Nut 1/4-20	20+2
Boom to Element Plate (four 15M Elements, five 10M Elements)				
BEC2.0-3i		2"	Boom to Element Plate clamp	9
	HH1420	3-1/2"	Hex Head Screw 1/4-20	18+2
	NN1420		Nylon Nut 1/4-20	18+2
20M ELEMENT ASSEMBLIES (3 Elements)				
AT1.25-20M-REF-D1		REF & D1 Center	72" Alum Tube 1.25" OD	2
AT1.25-20M-DRV		DRV Center	36" Alum Tube 1.25" OD	2
AT1.125-20M			24” Alum Tube 1.125”OD	6
AT1.0-20M			24" Alum Tube 1.0" OD	6
AT.875-20M			24" Alum Tube .875" OD	6
AT.75-20M			18" Alum Tube .75" OD	6
AT.625-20M			36" Alum Tube .625" OD	6
AT.5-20M			36" Alum Tube .5" OD	6
AT.375-20M-REF		REF Tips	46" Alum Tube .375" OD	2
AT.375-20M-DRV		DRV Tips	38.5" Alum Tube .375" OD	2
AT.375-20M-D1		D1 Tips	13" Alum Tube .375" OD	2
20M Element Hardware				
	SH1024-1	1-1/2"	Socket Head Screw 10-24	12+2
	NN1024		Nylon Nut 10-24	12+2
	SH832-2	1-1/4"	Socket Head Screw 8-32	12+2
	SH832-1	1"	Socket Head Screw 8-32	6+2
	NN832		Nylon Nut 8-32	18+2
	SH632-2	7/8”	Socket Head Screw 6-32	6+2
	SH632-1	3/4"	Socket Head Screw 6-32	6+2
	NN632		Nylon Nut 6-32	12+2
20M Driven Element Hardware				
	FG1.0DE	1" OD	Fiberglass Rod for Driven Element	1
	BH1024	4"	Button Head Screw 10-24	2+1
	KN1024		Keps Nut 10-24	2+1
15M ELEMENT ASSEMBLIES (4 Elements)				
AT1.0-15M-REF-D1-D2		REF-D1-D2 Center	24" Alum Tube 1" OD	3
AT1.0-15M-DRV		DRV Center	12" Alum Tube 1" OD	2
AT.875-15M			24" Alum Tube .875" OD	8
AT.75-15M			18" Alum Tube .75" OD	8
AT.625-15M			36" Alum Tube .625" OD	8
AT.5-15M			36" Alum Tube .5" OD	8
AT.375-15M-REF		REF Tips	32" Alum Tube .375" OD	2
AT.375-15M-DRV		DRV Tips	32-1/4" Alum Tube .375" OD	2

AT.375-15M-D1		D1 Tips	23-3/8" Alum Tube .375" OD	2
AT.375-15M-D2		D2 Tips	24" Alum Tube .375" OD	2
15M Element Hardware				
	SH832-2	1-1/4"	Socket Head Screw 8-32	16+2
	SH832-1	1"	Socket Head Screw 8-32	8+2
	NN832		Nylon Nut 8-32	24+2
	SH632-2	7/8”	Socket Head Screw 6-32	8+2
	SH632-1	3/4"	Socket Head Screw 6-32	8+2
	NN632		Nylon Nut 6-32	16+2
15M Driven Element Hardware				
	FG.875DE	.875" OD	Fiberglass Rod for Driven Element	1
	BH1024	2-1/2"	Button Head Screw 10-24	2+1
	KN1024		Keps Nut 10-24	2+1
10M ELEMENT ASSEMBLIES (5 Elements)				
AT.75-10M-DRV		DRV Center	18" Alum Tube .75" OD	2
AT.75-10M-REF-D1-2-3		REF-D1-D2-D3 Center	36" Alum Tube .75" OD	4
AT.625-10M			36" Alum Tube .625" OD	10
AT.5-10M			36" Alum Tube .5" OD	10
AT.375-10M-REF		REF Tips	28" Alum Tube .375" OD	2
AT.375-10M-DRV		DRV Tips	22" Alum Tube .375" OD	2
AT.375-10M-D1		D1 Tips	20-1/2” Alum Tube .375" OD	2
AT.375-10M-D2		D2 Tips	20-3/8" Alum Tube .375" OD	2
10M Element Hardware				
	SH832-1	1"	Socket Head Screw 8-32	10+2
	NN832		Nylon Nut 8-32	10+2
	SH632-2	7/8”	Socket Head Screw 6-32	10+2
	SH632-1	3/4"	Socket Head Screw 6-32	10+2
	NN632		Nylon Nut 6-32	20+2
10M Driven Element Hardware				
	FG.625DE	.625" OD	Fiberglass Rod for Driven Element	1
	BH1024	2-1/2"	Button Head Screw 10-24	2+1
	KN1024		Keps Nut 10-24	2+1
TRANSMISSION LINES/BALUN ASSEMBLY - Tribander Section				
TL30			Aluminum Angle Bar	2
	AS-1	5/8"	Aluminum Spacer	2+2
	AS-2	1/2"	Aluminum Spacer	2+2
	LWExt10		Lock Washer External Tooth #10	4+1
	NN1024		Nylon Nut 1024	6+2
TL1.5			Aluminum "L" Bracket for Balun	2
	NN1024		Nylon Nut 1024	2+1
	AS-2	1/2”	Aluminum Spacer	2+2
	AS-3	3/8”	Aluminum Spacer	2+2
	AS-4	1/4"	Aluminum Spacer	2+2

40M ADD-ON JK MidTri

BOOM TO ELEMENT ASSEMBLIES				
40M Channel-1			40M Element Channel	2
Element to Element Channel				
BC1.75		1.3/4" ID	Black Polyamide clamps	8
	SH1420-5	3"	Socket Head Screw 1/4-20	16+2
	NN1420		Nylon Nut 1/4-20	16+2
Boom to Element Channel				
BEC2.0 3i		2"	Boom to Element Plate Clamp	4
	HH1420	3-1/2"	Hex Head Screw 1/4-20	8+2
	NN1420		Nylon Nut 1/4-20	8+2
40M ELEMENT ASSEMBLIES				
6AT1.75			6 ft Alum Tube 1.75" OD	1
6AT1.75			3 ft Alum Tube 1.75" OD	2
3AT1.5			3 ft Alum Tube 1.5" OD	4
3AT 1.25 CFC			3 ft Alum Tube 1.25" Coil Front	4
3AT1.25 CBC			18" Alum Tube 1.25" Coil Back	4
3AT1.0			3 ft Alum Tube 1" OD	4
3AT.875			24" Alum Tube .875 OD	4
3AT.75			24" Alum Tube .75" OD	4
3AT.625			3 ft Alum Tube .625" OD	4
3AT.5S			3 ft Alum Tube .5" OD (slit end)	4
3AT.375			3 ft Alum Tube .375" OD	4
Coil Assembly				
	40M Coils		40M Coils	4
	FG1.0 Coil		Fiberglass rod 1" OD	4
	Coil Hardware			
	SH1420	1-3/4"	Socket Head Screw 10-24	8+2
	SH1420	3" Full Thread	**FULL THREAD** Socket Head Screw 1/4 -20	8+2
	NN1420		Nylon Nut 1/4 -20	16+2
	HN1420		Hex Nut 1/4 -20	8+2
	LW14ExT		Lock Washer 1/4 External Tooth	16+2
	Tape		Tape	1
Element Hardware				
	SH1024-1	1-1/2"	Socket Head Screw 10-24	4+1
	SH51618-3	2"	Socket Head Screw 5/16-18	4+2
	SH51618-4	2-1/4'	Socket Head Screw 5/16-18	4+2
	NN1024		Nylon Nut 10-24	4+2
	NN51619		Nylon Nut 5/16-18	8+2
	SH832-3	1-1/4"	Socket Head Screw 8-32	8+2
	SH832-1	1"	Socket Head Screw 8-32	4+1
	NN832		Nylon Nut 8-32	12+2
	SH632		Socket Head Screw 6-32	4+2
	NN632		Nylon Nut 6-32	4+2
	HC-2		Hose Clamp	4+2
40M Driven Element Hardware				

FG1.5DE		Fiberglass Rod for Driven Element	1
BH1024-1	2-1/4"	Socket Head Screw 10-24	2+1
BH1024-2	3"	Socket Head Screw 10-24	2+1
NN1024		Nylon Nut 10-24	4+2
FW10		Flat Washer #10	4+2
LW10ExT		Lock Washer #10 External Tooth	4+2
KN1024		Keps Nuts 10-24	2+1
SCOIL		Shunt Coil	1
SUPPLIES			
Balun Brackets			2
Balun			1