

SERIAL NUMBER:



ANTENNAS, INC.

40M-2B

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40M-2B

The 40M-2B is KLM's carefully designed effort to produce a modest size 40 meter monobander with superior performance and bandwidth. The tuning options listed in the assembly manual will enable you to achieve optimum performance over your favorite part of the band. Extensive R & D and post-production field testing reveal the 40M-2B as a highly successful design... one we are sure you will find very rewarding and enjoyable to work with. Thus, the 40M-2B joins the ranks of KLM's other great amateur products.

SPECIFICATION

Bandwidth.....	7.0-7.3 MHz x125 KHz
Gain.....	4.9 dBd
VSWR.....	1.5:1
F/B.....	12 dB
Feed Impedance.....	50 ohms unbalanced
Balun	1:1 High Power
Element Length.....	46 feet
Boom Length.....	16' / 3" O.D.
Turn Radius.....	25 feet
Wind Load.....	6 square feet
Weight.....	45 pounds
Mast.....	2" O.D.

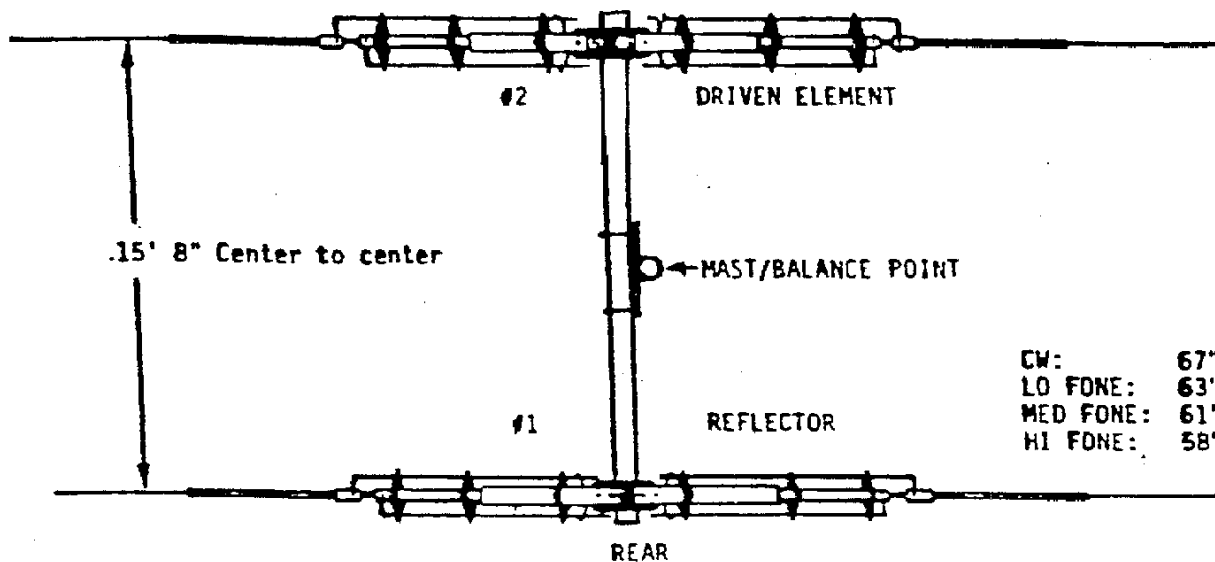
DIMENSION SHEET

40m-2B

TIP SETTINGS:

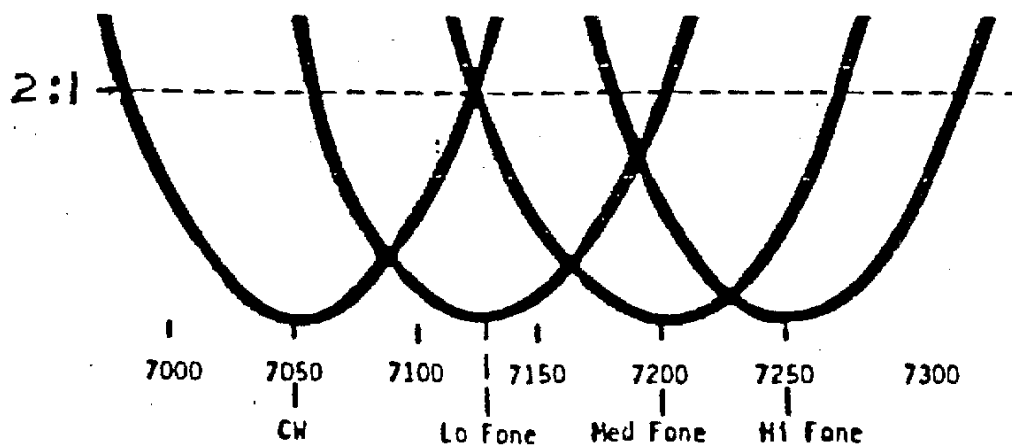
CW: 68"
LO FONE: 64"
MED FONE: 61"
HI FONE: 59"

FRONT



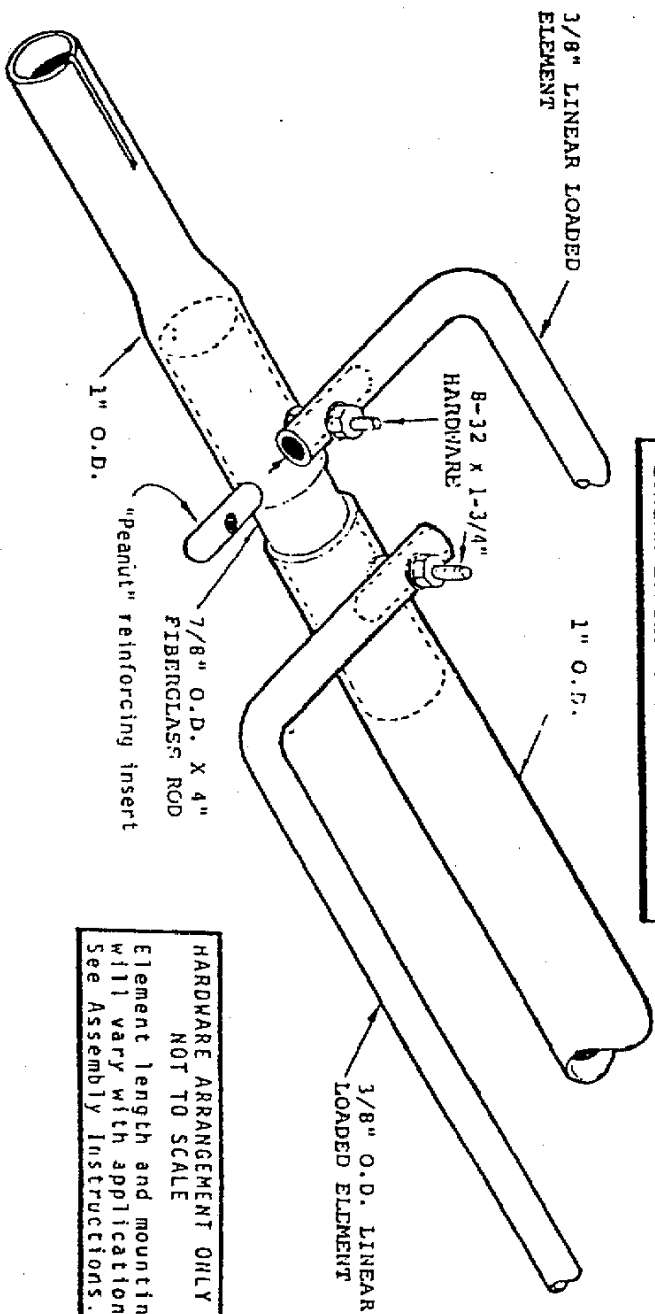
CW: 67"
LO FONE: 63"
MED FONE: 61"
HI FONE: 58"

TYPICAL VSWR CURVES

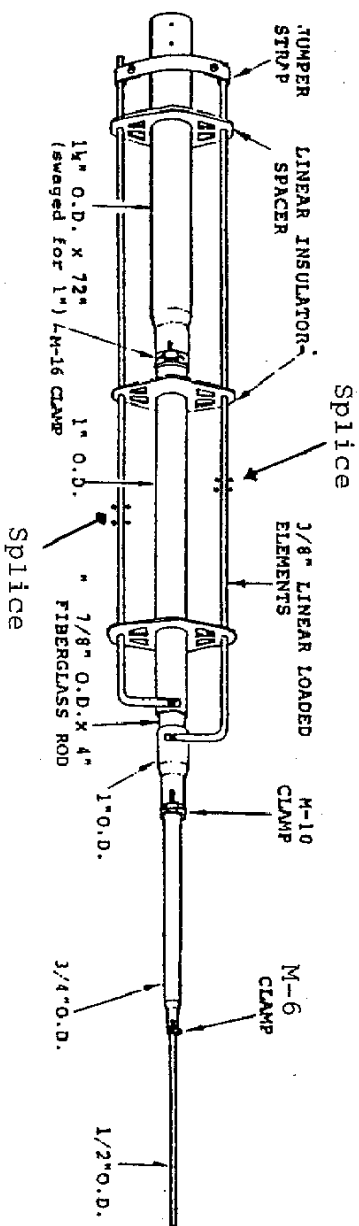


ASSEMBLY PICTORIAL

LINEAR LOADED ELEMENT ASSEMBLY



HARDWARE ARRANGEMENT ONLY
NOT TO SCALE
Element length and mounting
will vary with application:
See Assembly Instructions.



BEFORE YOU BEGIN...

Select an assembly area large enough to comfortably accommodate overall antenna dimensions. A shallow box is handy for holding and sorting the smaller hardware, as is a marking pen for identifying components.

Some simple tools are required: a tape measure, screwdriver a set of spin-tites and socket or end wrenches. Common nut sizes are:

8-32 Hdwe = $1\frac{1}{32}$ "

5/16-18 Hdwe = $\frac{1}{2}$ "

10-32 Hdwe = $\frac{3}{8}$ "

3/8"-16 Hdwe = $\frac{9}{16}$ "

1/4-20 Hdwe = $\frac{7}{16}$ "

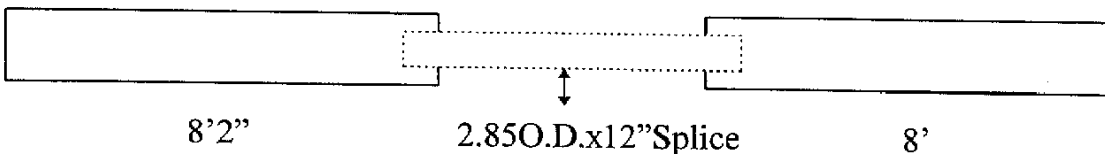
To avoid damage to antenna components, be aware that most hardware need only be moderately hand-tightened with screwdriver or spintite to be secure. When using tools with mechanical leverage such as socket or end wrenches, care must be taken not to over-torque nuts and damage components.

Thoroughly unpack shipping box and check components and hardware against the Parts List. If there is a difference, look for a "Factory Update/Change" sheet accompanying the assembly instructions prior to contacting KLM.

For easiest and fastest assembly, take a few moments before starting to familiarize yourself with the assembly guide and the antenna components.

BOOM ASSEMBLY

Lay out the boom sections on the ground as shown in the sketch below.

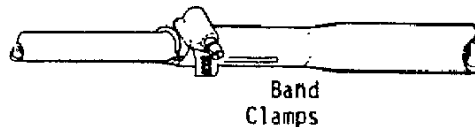


To assembly the boom sections, insert the splice into the appropriate straight end and align the bolt holes. Each boom joint is cross-bolted with four $\frac{1}{4}$ "-20 x $3\frac{1}{2}$ " bolts, lockwashers and nuts. Torque nuts up to 10'/lbs.

ASSEMBLY OF ELEMENT

1. Insert 7/8" O.D. x 4" fiberglass rod into 1" O.D. tubing until holes align. Secure with a 8-32 x 1 3/4" screw, lockwasher and nut. Screws are extra long to provide studs for subsequent mounting of 3/8" O.D. linear elements.
2. Add short 1" O.D. x 6" tubing section to other end of fiberglass rod and secure as in above.
3. Lay out the 3/8" O.D. x 6' linear loaded elements on opposite sides of the 1" tubing. Insert 1" x 1/4" reinforcing peanuts into the angled ends and place on studs created by steps #1 and #2. Secure with 8-32 lockwashers and nuts.
4. From the butt ends of the 3/8" O.D. linear loaded sections, slide on a diamond shaped insulator with a 1" central hole. Work up the tubes until it is about 30" from the angled ends. Slide on another and position about 4" from the butt of the 1" tube.
5. Slide the swaged end of a 1 1/4" O.D. x 72" section 3" onto the butt end of the 1" O.D. tube and secure with an M-16 clamp.
- 5A. The smaller inside section of each telescoping joint is always coated lightly with a conductive paste before assembly to promote good long lasting electrical connections.

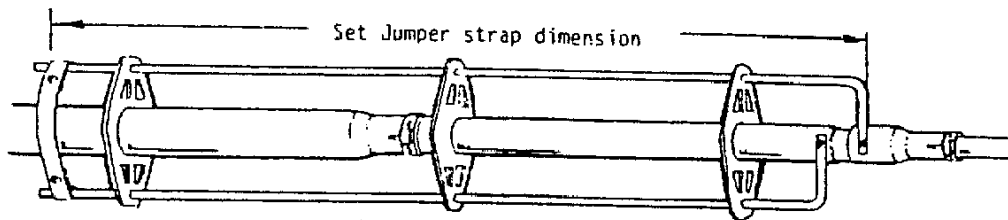
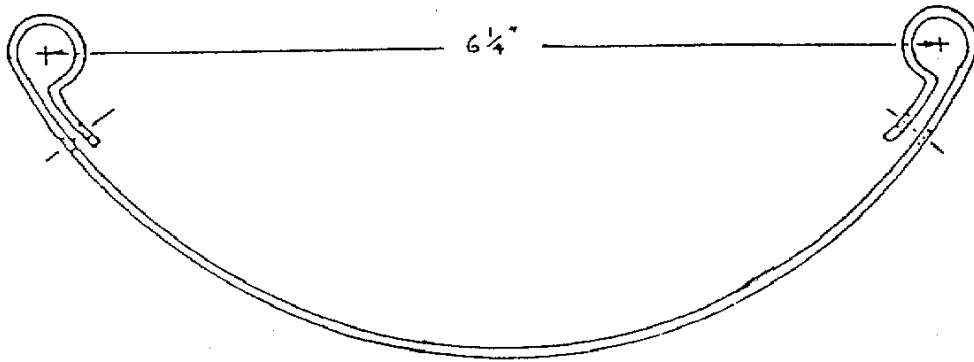
Each telescoping section is secured with a specified band or compression clamp located 1/16" back from slit end of larger tubing. To help the band clamp make a tight connection it may be necessary to close the slit end slightly with a pair of pliers.



6. Linear Splice rod has been pre-installed inside the linear "L" bend. Remove and coat with conductive paste. Now slide the 3/8" x 5' Linear element onto the splice and secure with 8-32 x 5/8" screws, lockwashers and nuts provided.

7. Slide a linear loading insulator with 1 1/4" central hole onto the butt end of the 1 1/4" tubing and then also about 12" onto the butts of the 3/8" O.D. linear loading sections. For extended insulator life in high winds, a loose fit on the 3/8" O.D. tubing is recommended. Maintain insulator position with a band of black electricians tape around main element on either side of the insulator.

8. Bend one of the 1/2" x 8 1/2" linear loading jumper straps into the arc shown in the profile below. Slide onto the butt ends of the 3/8" linear loading sections and set to 130" (measure with tape from "L" bend on outermost linear loading section to outside of jumper strap - strap itself is inside the measurement). Secure with 8-32 x 1/2" screws, nuts and lockwashers. See sketch below.



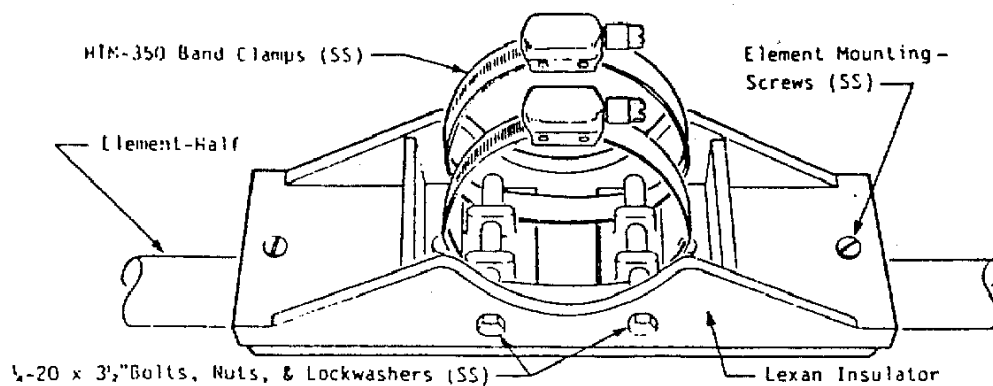
9. Slide a 3/4" O.D. x 72" section 3" into the swaged end of the 1" tubing and secure with an M-8 or M-10 clamp. (If you are working in a limited assembly area, install the 3/4" and 1/2" tubing later.
10. Add a M-6 compression clamp to the swaged end of the 3/4" tubing. Insert a 1/2" O.D. x 72" section until the correct amount is showing to optimize your 40M-2A to the band. Use the dimension given in the table following this sections.
11. Half of the Reflector element is now complete. Repeat Steps #1 through #10 for the other half. Make it a mirror image of the first reflector. Keep in mind that tip tubing dimension on this half must match that of the original.
12. Steps #1 through # 11 are repeated for the remaining element. Dimension for the linear-loading sections, linear jumper straps, and tip sections will vary with each element and according to the section of the band you are optimizing for. Use the chart below to select correct tubing and set strap and tip dimensions (given for both elements). Remember to use paste for all electrical junctions (overlaps, straps, studs, etc.). Pair up element halves as they are completed to avoid mix-ups.

Element#	Length 3/8" Linear Loaded Elements (2)	Set Jumper Strap:		1/2" Tip Showing		
		CW	Low, Mid & Hi (Phone)			
#1 REFLECTOR	11' (132")	10' 10" (130")	67"	63"	61"	58"
#2 DRIVEN	10' 3" (123")	10' 1" (121")	68"	64"	61"	59"

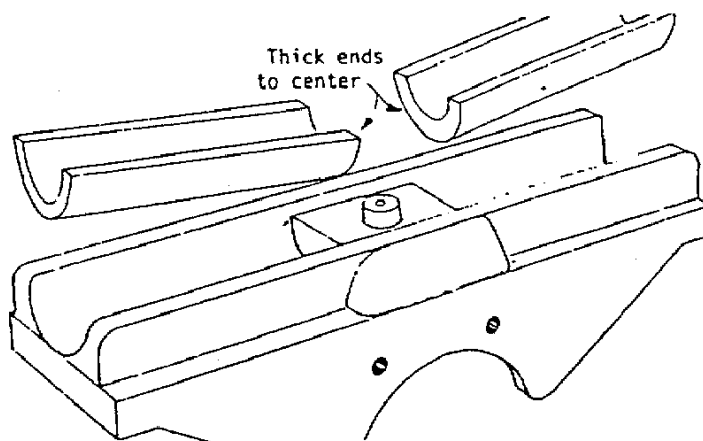
NOTE: Tip dimensions are designed to produce a response of 1.5:1 VSWR and better, across approximately 100 KHz in the part of band designated, at the height of 45' or more.

PREPARING THE INSULATOR

The large HTM-350 band clamps are bolted into the underside of the Lexan insulators with 1/4-20 x 3 1/2" bolts, lockwashers and nuts (stainless steel) as shown in the following drawing, Install in all the insulators.



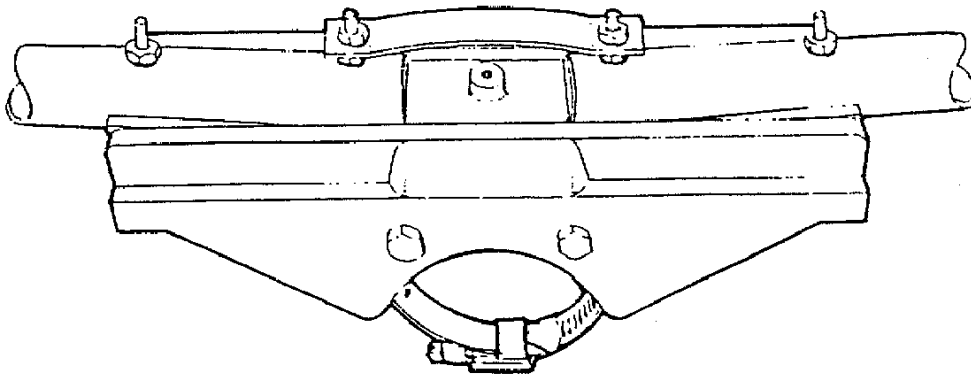
The KLM Lexan insulator has been designed to accommodate up to 1 1/2" O.D. elements. Antennas using smaller O.D. elements are supplied with half-round reduction sections. These are placed in the two element channels on the top of the insulator with the thicker ends toward center as shown in the drawing below. Prepare all insulators.



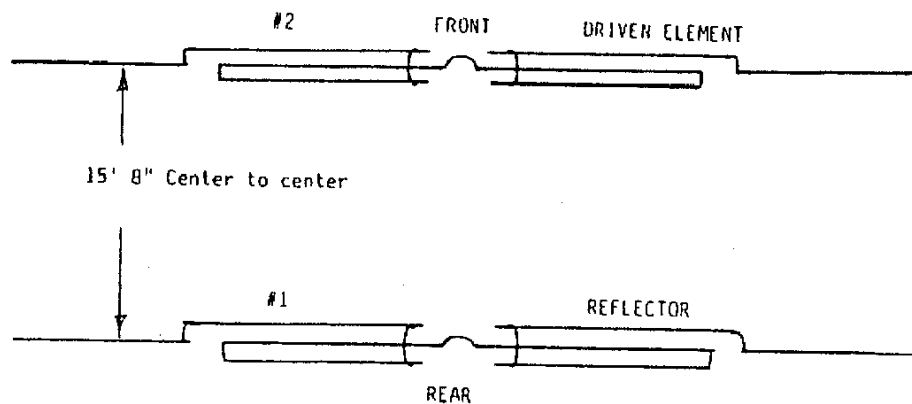
Take each pair of element halves, in sequence and attach them to insulators, check that reinforcing inserts in element half butts are flush and mounting holes are aligned. Lay the element half butt into the insulator channel. Insert 10-32 x 2 1/2" screws from bottom of insulator and secure above element butt with 10-32 nuts and lockwashers. Holes in element half butt will align one way only drilled slightly off square to compensate element half butt 180 degrees and repeat.

Assemble all element halves to insulators and set each completed element aside, in order.

The reflector element (#1) requires a 1/2" x 3 3/4" jumper strap between element halves. Bow the strap slightly, as needed, to fit the two innermost element mounting screw studs and secure with additional lockwashers and nuts. See sketch below.



1. Center element #1 at two inches from the rear of the boom (about 1/2" of boom should extend beyond insulator) and securely tighten the HTM-350 clamp. Install the remainder of element to element #1, with the help of another person if possible, by sighting down boom from rear end. When each element is aligned and properly spaced, tighten the clamp.
2. Loosely mount the 8" x 9" Boom-to-mast plate with 3" U-bolts and cradles. It may be necessary to rotate the boom to clear boom splice bolts. Re-level elements if necessary.
3. If you live in an area of severe weather, or if it is likely the antenna element will snag on trees, guy wires, etc. during installation, it is recommended that the elements be additionally secured in the following manner: Drill a #36 pilot hole into the boom through the existing hole in each HTM-350 band clamp. Then install #6 x 3/8" sheet metal screws (supplied).



BALUN/MATCH SECTION INSTALLATION

Mount the balun as shown in the Balun Mounting Detail drawing. The balun mounts to the insulator with a #6 x 3/8" sheet metal screw, the balun should be as close as possible to the driven element. Make the connections to the driven element using short lengths of solid copper wire provided.

Attach the coax matching section to the balun. Lay the coax along the boom and fasten in place using good quality plastic tape or strap-fasteners. The surplus should be coiled and fastened to the mast or boom. It is important that this cable be mounted in such a way that it is not subjected to mechanical stress; i.e., main feedline. Fasten the connectors between feedline and match-section securely to the boom or mast.

COMPLETING THE INSTALLATION

Attach good quality 50 ohm feedline (such as Belden 8214 or Times FM-8) to the match section connector and route back to the middle of the boom, securing it every few feet with straps or tape.

Determine the balance point of the antenna and attach the 8" x 9" boom-to-mast plate at that point with two 3" U-bolts. Carefully orient perpendicular to element plane.

These are 3" plastic plugs supplied for boom ends to keep out birds and reduce wind noise. Cut or drill a small drain hole in the bottom side of each.

If possible, allow the antenna to temperature cycle overnight. Various nuts and bolts may then require re-tightening. Check all hardware for tightness. Loose hardware is much easier to correct on the ground. The boom-to-mast plate is drilled to accept a 2" mast. Install with four 2" U-bolts.

METRIC CONVERSION

When converting American measurements to metric use the scale and chart below to identify lengths of bolts, diameters of tubes, etc. The American inch (1") and foot (1') can be converted in this way.

1" (inch) = 2.54 cm

Example: 48" x 2.54 = 121.92 cm

1' (foot) = 30.48 cm

Fractional Inch Millimeters

1 / 16.....	1.588
1 / 8.....	3.175
3 / 16.....	4.700
1 / 4.....	6.350
5 / 16.....	7.937
3 / 8.....	9.525
7 / 16.....	11.112
1 / 2.....	12.700
9 / 16.....	14.288
5 / 8.....	15.875
11 / 16.....	17.463
3 / 4.....	19.050
13 / 16.....	20.638
7 / 8.....	22.225
15 / 16.....	23.813
1.....	25.400



PARTS LIST
40M-2B

DESCRIPTION	PART #	QTY
Boom, 3" O.D. x 8'2"	T3000	1
Boom, 3" O.D. x 8', Straight	T3000	1
With Insert, 2.85 O.D. x 12", Straight	T0285	1
Element, 1 1/4" O.D. x 72", Swaged, Drilled	T1140	4
With Insert, 1 1/8" x 34"	T1180	4
Element, 1" O.D. x 67", Straight	T1000	4
Element, 3/4" O.D. x 72", Swaged	T0340	4
Element, 1/2" O.D. x 72", Straight	T0120	4
Linear Elements, 3/8" O.D. x 72" W/"L" Bend	T0380	8
Linear Element Splice, 5/16" x 4" Rod, Drilled	R0516	8
Linear Elements, 3/8" O.D. x 51"	T0380	4
Linear Elements, 3/8" O.D. x 60"	T0380	4
Boom-to-mast Plate, 8" x 9" x 1/4"	PO809	1
Coaxial Match Section	B4002	1
High Power Balun, 1:1	BHP06	1
Insulators, 1 1/2" x 3"	PL66139A	2
<u>HARDWARE BAG #1</u>		
Sheet Metal Screws, #6 x 3/8"	28000	5
Screws, 8-32 x 1/2"	28011	8
Screws, 8-32 x 1 3/4"	28016	8
Nuts, 8-32	28202	41
Lockwashers, #8	28352	41
Nuts, 10-32	28203	12
Lockwashers, #10	28353	12
Flatwashers, #10	28303	4
Screws, 10-32 x 2 1/2"	28025	8
<u>LINEAR "L" BEND HARDWARE (Factory Installed on Tubing)</u>		
Screws, 8-32 x 5/8"	28027	16
Nuts, 8-32	28202	16
Lockwashers, #8	28352	16
<u>HARDWARE BAG #2</u>		
Nuts, 1/4-20	28204	8
Lockwashers, 1/4"	28354	8
Bolts, 1/4-20 x 3 1/2"	28526	8
Nuts, 5/16-18	28206	8
Lockwashers, 5/16"	28356	8
Nuts, 3/8-16	28205	4

PARTS LIST (CONT.)
40M-2B

<u>DESCRIPTION</u>	<u>PART #</u>	<u>QTY</u>
<u>HARDWARE BAG #2 (Cont)</u>		
Lockwashers, 3/8"	28355	4
Jumper Strap, 1/2" x 3 3/4"	S0120	1
Peanut Inserts, 1/4" x 1"	PL66106	8
<u>HARDWARE BAG #3</u>		
Insulator Inserts, 1 1/2" to 1 1/4"	PL66108	4
Linear Insulators, 1" Hole	PL66136	8
Linear Insulators, 1 1/4" Hole	PL66107	4
"C" Straps, 1/2" x 11 1/2" before bend	S0120C	4
Nylon Ties, Large	PL66119	12
<u>HARDWARE BAG #4</u>		
Hose Clamps, M-10	28488	4
Hose Clamps, M-16	28477	4
Hose Clamps, HTM-350	28487	4
Hose Clamps, M-6	28200	4
<u>HARDWARE BAG #5</u>		
Fiberglass, 7/8" x 4"	F0780	4
Tubing, 1" O.D. x 6", Swaged	T1000	4
<u>HARDWARE BAG #6</u>		
Boom Caps, 3"	PL66133	2
U-Bolts & Cradles, 3"	28410	2
U-Bolts & Cradles, 2"	28402	4
Conductive Paste, 1 oz	16001	1

Updated 11-20-96

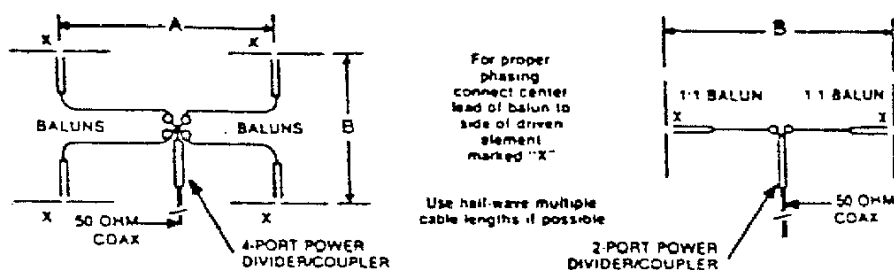


ANTENNAS, INC.

BALUNS

Your KLM Antennas balun has been fully tested, both electrically and physically, before leaving the factory. To maximize the performance and efficiency of your balun, please note the following recommendations.

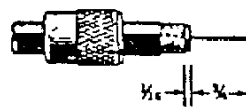
- 1) Keep the lead lengths from balun to feedpoints as short as possible. Un-necessary length can upset VSWR, bandwidth, etc. Solder lugs are a good idea too.
- 2) Be sure studs on HF balun are at least 3/8" from other antenna hardware.
- 3) When stacking two or more antennas, use balun stud identified with black dot on hot side on HF or center lead (VHF/UHF) as key for proper phasing (see sketch below).



- 4) KLM HF/VHF Baluns are normally supplied with SO-239 type connectors. Use only PL-259 connectors with them. Assembly of PL-259 connectors (for two types of coax) are shown below.



- 1) Cut end of cable even. Remove jacket 1 1/8" do not nick braid.



- 2) Bare 3/4" of center conductor, do not nick conductor. Trim braided shield 1/16" and tin. Slide coupling ring on cable.



- 3) Screw the plug assembly on cable. Solder plug assembly to braid through solder holes. Solder conductor to contact sleeve.



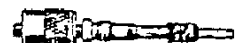
- 4) Screw coupling ring on assembly.



- 1) Cut end of cable even. Remove jacket 2 1/32" do not nick braid. Slide coupling ring and adapter on cable.



- 2) Fan braid slightly and fold back over cable.



- 3) Compress braid around cable. Position adapter to dimension shown. Press braid down over body of adapter and trim.



- 4) Bare 1/2" of center conductor, do not nick conductor. Pre-tin exposed center conductor.



- 5) Screw the plug assembly on adapter. Solder braid to shell through solder holes.



- 6) Screw coupling ring on back shell.

IMPORTANT NOTE: If your balun is supplied with type "N" connectors (HF/VHF option-UHF standard), PLEASE READ ON...

Type "N" Connectors are noted for their low loss and good weather seal characteristics, but they must be carefully mated and only to other cleaned and carefully assembled type "N" connectors.

KLM Antennas gives 90 day materials and workmanship warranty and does not cover type "N" center pins bent or broken during installation or field use, so please read the following application notes carefully. (See next page) RG-8/U Cable Assembly to connectors.

FOR BALUNS WITH TYPE "N" CONNECTORS

- 1) Use only type "N" connectors with your balun. Do not use PL-259 (SO-239) type connectors. They will ruin it.
- 2) Carefully mate Type "N" connectors straight on. Jamming them together at angles will damage or break the center pins.
- 3) Carefully assemble your own type "N" connectors. See below for step-by-step details.



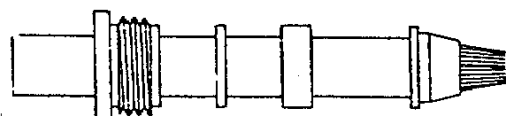
A) Cut end of cable even



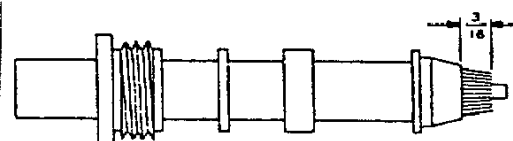
B) Remove vinyl jacket 1/2" do not nick braid.



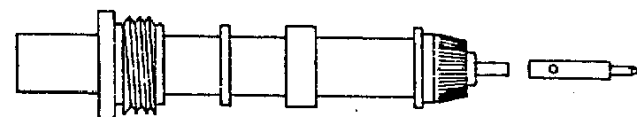
C) Comb out copper braid as shown. Bare 1/4" of center conductor-do not nick conductor.



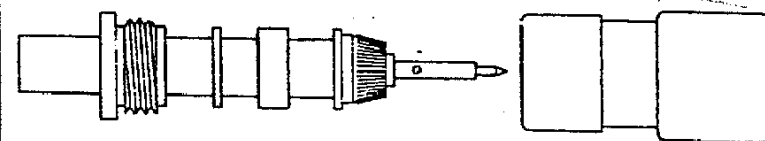
D) Taper braid as shown. Slide nut, washer and gasket on vinyl jacket. Slide clamp on braid.



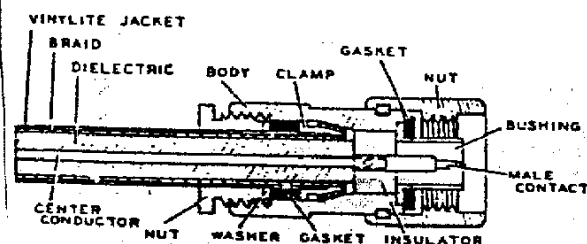
E) With clamp in place, trim braid as shown.



F) Fold copper braid back on clamp. Tin center conductor, using minimum amount of heat.



G) Holding contact with pliers, soft solder contact to center conductor. It is imperative that back end of contact be flush with polyethylene dielectric. Do not use excess solder. Wipe clean - see that end of cable insulator is clean and free of solder, rosin and foreign material.



H) Slide body into place carefully so that center conductor enters hole in insulator. Face of cable dielectric must fit flush against insulator. Properly tighten body and nut with wrenches.

NOTES: This assembly procedure applies to type "N" plugs. The procedure for jacks is the same except for the use of a female contact and a jack body.