

4. Slide a 3/4" x 16" capacitor tube onto the longer half of all the 3/8" x 72" and 77" sections and work the tubes solidly into the capacitor caps. Push another capacitor cap onto the opposite end of the 3/4 x 16" tube.

The shorter half of all 72" sections receive an 8" capacitor tube.
The remaining pair of 77" sections receive 9" or 10" capacitor tubes.
See chart below.

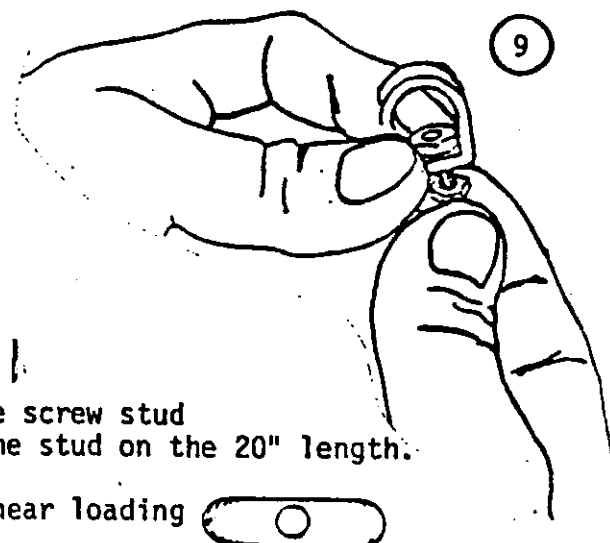
<u>ELEMENT</u>	<u>3/8" O.D.</u>	<u>10M CAPACITOR</u>	<u>CENTER CAPS</u>	<u>15M CAPACITOR</u>
Director D3	2 ea. 72"	8"	27"	16"
Director D1	2 ea. 72"	8"	27 3/4"	16"
Front Driven	2 ea. 72"	8"	28"	16"
Rear Driven	2 ea. 77"	9"	28 1/2"	16"
Reflector	2 ea. 77"	10"	28 3/4"	16"

5. After each capacitor tube is installed, push on the second capacitor cap and work it solidly into the tube.

Orient the type "A" straps per sketch with the long tab coming off the top side and the drain holes underneath. DO NOT TIGHTEN YET.

This completes the Capacity Bank Assembly.

Prepare ten 5/8" compression clamps as shown. Dab a bit of paste on the end and threads of the 3/8" x 10-32 hexhead screw. Position the 10-32 nut in the clamp and thread together.



9

- Beginning with one of the Director-D3 capacitor bank (3/8" O.D. x 72"), spread a small amount of paste on both sides of each type "A" strap fingers where they attach to the studs. Next place fingers onto the studs. Separate two 10 & 15M capacitor tubes 1/16 to 1/8" as required for the "A" strap holes to fit the stud. The 15M strap attaches to the screw stud on the 3/8" O.D. x 5" section and the 10M strap to the stud on the 20" length.

- Insert a peanut into the drilled end of the 3/8" linear loading section ("L" shaped part).



LINEAR REINFORCING INSERT "PEANUT"

- Place the drilled end onto the screw stud OVER the 10M capacitor strap. Secure both studs with 8-32 lockwashers and nuts.

The studs and straps are on the "top" of the element so orient the drain holes in the capacitors DOWN by rotating the 72" section as needed. Then tighten the screws securing the straps to the capacitors.

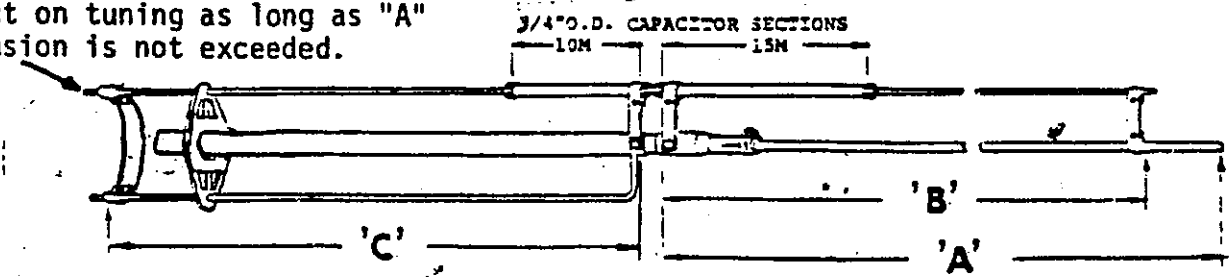
- Slide a diamond-shaped linear insulator about 6" onto the shorter half (10M side) of the 3/8" O.D. tubes.

- Using a small swab, apply paste inside the loops of the type "B" and "C" jumpers and to about 2" of the 1/2" O.D. x 51" tip. Install the 1/2" tip, "B" and "C" jumpers, and adjust to the dimensions below by hooking a tape measure on the type "A" capacitor straps and pulling toward "A" and "B" or "C". Measure to the outer edge of the "B" and "C" straps. Tighten all hardware on this assembly. Mark it appropriately (D3), wipe off excessive paste and repeat for the other half.

- Repeat Step 9 for the D1, Front Driven, Rear Driven, & Reflector element parts marking them accordingly.

ELEMENT	1/2" O.D tube REQUIRED		A		B		C
DIRECTOR D3	50"	124.62	53"	124.62	44"	110.76	26 1/4" 64.13
DIRECTOR D1	50 1/2"	125.00	53 1/2"	125.00	42 3/4"	106.575	26 1/4" 64.13
FRONT DRIVEN	40 3/4"	103.505	43 3/4"	111.015	42 3/4"		25 1/4" 64.13
REAR DRIVEN	51"	123.15	54"	123.15	47 1/4"	120.015	27 1/4" 68.25
REFLECTOR	58 1/2"	135.00	61 1/2"	135.00	47 1/2"	118.75	27 3/4" 70.785

Excess length at either end has no effect on tuning as long as "A" dimension is not exceeded.



Element tip caps are not supplied or recommended due to potential moisture build-up inside the tips when caps are used.

Vårt datum/Our date

Vår ref./Our ref.

Handläggare/Department, Handled by

Tele direkt/Telephone direct

Ert datum/Your date

Er ref./Your ref.

<input type="checkbox"/> för godkännande/for approval	<input type="checkbox"/> får behållas/may be kept	Mottagare/Receiver
<input type="checkbox"/> för attest/to be certified	<input type="checkbox"/> önskas i retur/please return	
<input type="checkbox"/> för underskrift/signature	<input type="checkbox"/> legalisering/legalization	
<input type="checkbox"/> för yttrande/comments	<input type="checkbox"/> visering/visaing	
<input type="checkbox"/> för handläggning/to be dealt with		
<input type="checkbox"/> för kännedom/for you information		Vidarebefordran/Reforwarding
<input type="checkbox"/> tack för lånet/thanks for the loan		
<input type="checkbox"/> enligt begäran/as requested		
<input type="checkbox"/> enligt överenskommelse/as agreed upon		
<input type="checkbox"/> mottaget brev återopos/referring to your letter		till/to

Martin!

De röda SWR kurvorna visar hur min antenn
såg ut ursprungligen Efter ändring enligt de
tips som Mike gav blev SWR bättre än vad
som specificeras även på 15 m b. Har kvar en
många inritade kurvor tillhandla skruvar 5 DM

SECO TOOLS AB

Postadress/
Postal address

Fack
773 01 Fagersta
Sweden

Telefon växel/
Telephone exchange

0223-400 00
+46 223 400 00

Telex

7510
seco s

Telegrams

secotools

Bankgiro/
Bank account

158-5900
Sv. Handelsbanken

Postgiro/
Postal account

13 00 70-6

KLMelectronics, inc.

COMMUNICATIONS EQUIPMENT/ANTENNA INNOVATIONS

March 5, 1982

Christer Skoglund
Redskapsgatan 4
S-732 00 Arboga
Sweden


Dear Mr. Skoglund:

I've reviewed your KT-34XA SWR curves and can recommend some minor adjustments. The Director D1 on 15 has apparently moved down in frequency. It is the highest Q element in the structure. So small dimensional tolerances have the most noticeable affect. Reduce the "B" dimension by 1 to 3 inches to bring the SWR corner to 21.4 as our curve shows. Slight reduction of the Reflector "B" dimension will raise the low end corner point if desired.

Looking at 10 meters, the "C" dimension on D1 could also be reduced by $\frac{1}{2}$ to 1 inch to improve 29.1 VSWR. This will also help 15 meters slightly. I recommend you do 10 meters first, then adjust 15.

That should do it. As for the sensitivity to wetness, that means water is getting inside the capacitors. A dislodged capacitor cap or a cracked cap can cause this but it is normal to just move the passband down slightly in frequency.

If desired, silicone sealant can be used around the caps to improve the seal but this will not help if everything is right in the first place. The above changes should improve the F/B as well.

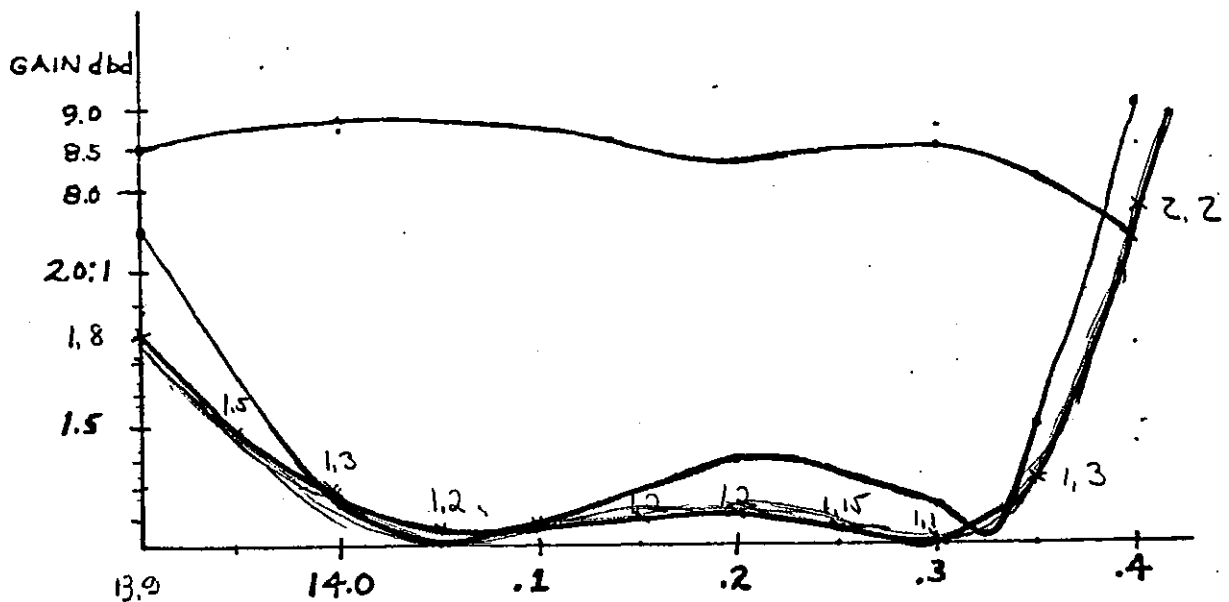
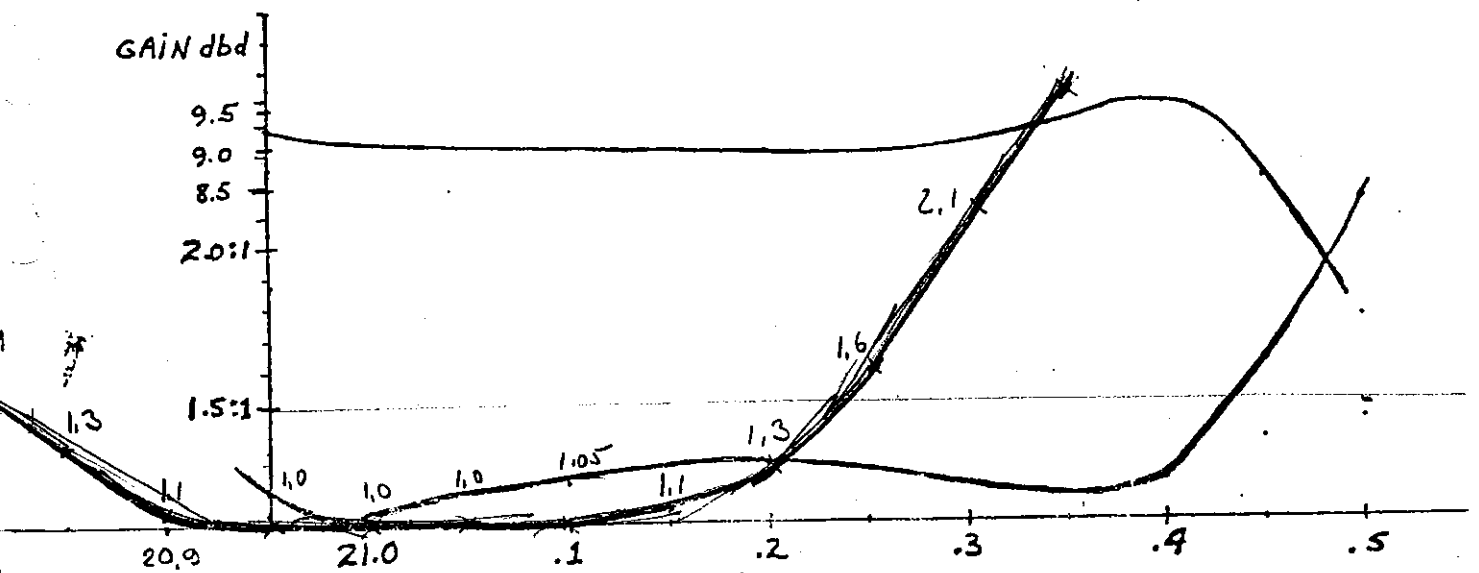
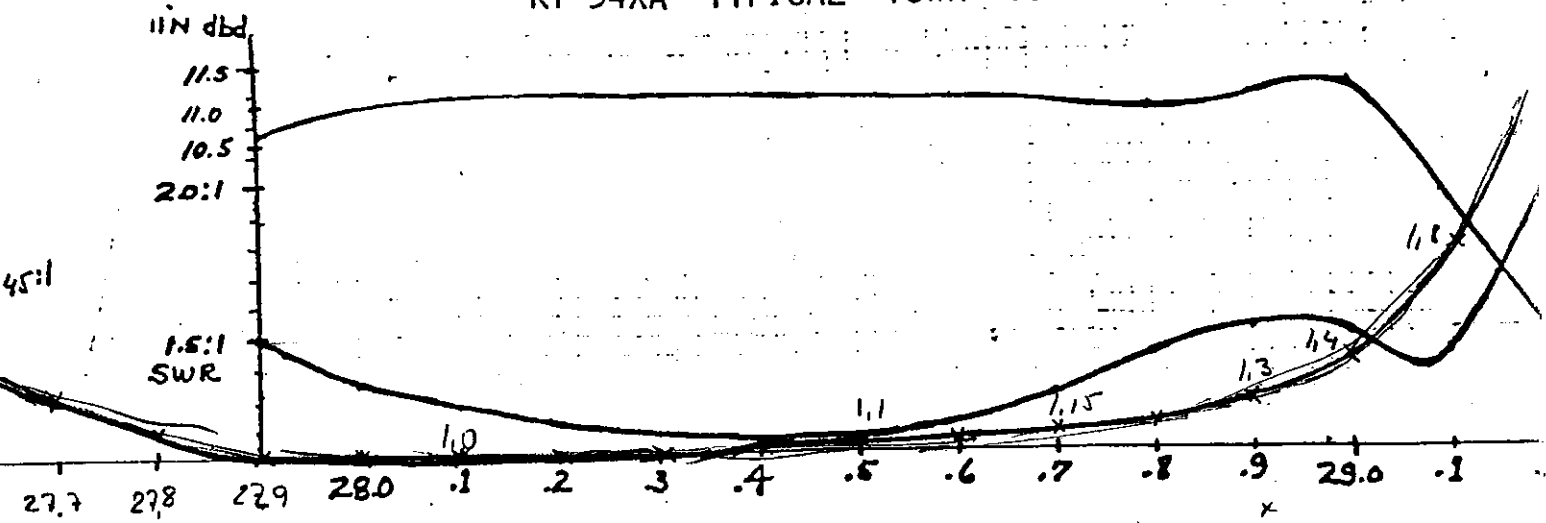

Mike Staal, K6MYC
Vice President

to
enc: Penetrox

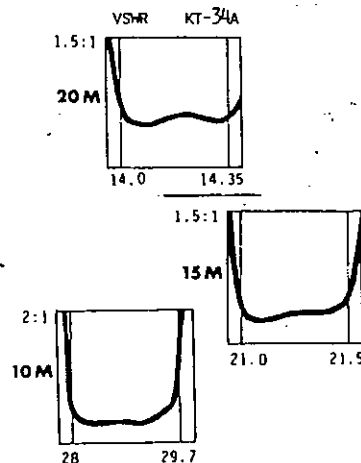
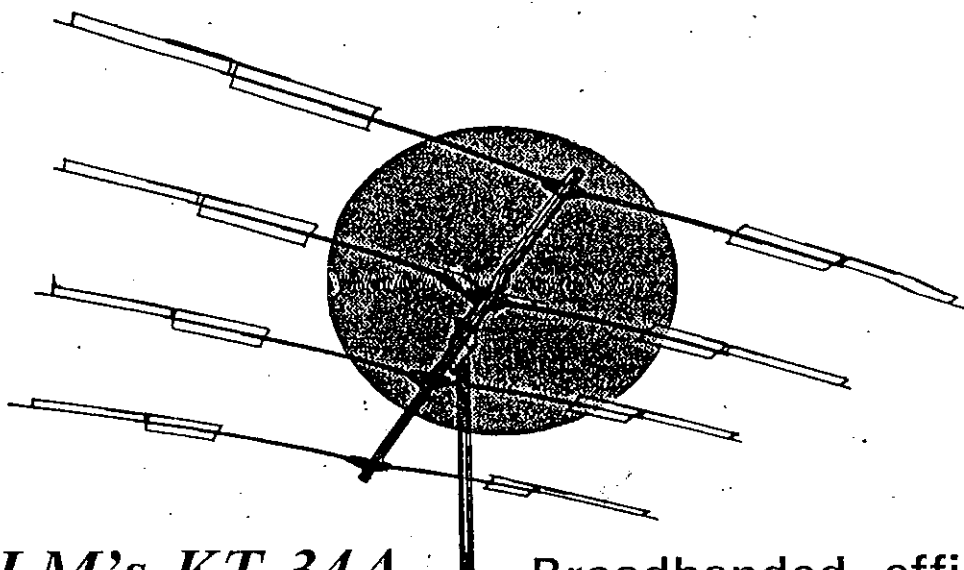
*Ätjändel 821017 enl. ovan
"B" reducerat 50mm på var
"halva"
"C" reducerat ~ 12mm på var
halva
Enastående fin SWR på alla
band. Se ny plotting*

P. O. BOX 816, MORGAN HILL, CALIFORNIA 95037 • (408) 779-7363

KT-34XA TYPICAL VSWR CURVES



Martin



KLM's KT-34A . . . Broadbanded, efficient, compact!

Thanks for your interest in our KT-34A. We're glad to have tickled your curiosity. The KT-34A is a very special antenna, representing the first significant step forward for tribander design in 20 or more years. It is made for the amateur and the equipment of today, and advanced enough to meet the challenges of the future.

What makes the KT-34A so different from a conventional tribander? Basically, the traps, coils, and capacitors have been discarded in favor of lossless linear-loading and Hi-Q air capacitors, all composed of aluminum tubing! These allow the KT-34A to handle 4KW PEP at an unusually high level of efficiency. The linear loading also makes full 1/4-wave elements possible on 10 and 15 meters, and brings 20 meters much closer to the desirable 1/4-wave than any conventional tribander (the sketch below shows the remarkable metamorphosis of the KT-34A design).

Two driven elements are employed to make the KT-34A unusually **broadbanded** (a concept applied to most KLM antennas): VSWR and performance remain nearly constant across each of the three bands (see the VSWR charts). A KLM balun is supplied to allow direct feed from your 50 ohm coax.

Structurally, the KT-34A is built tough. No boom support is required. All the aluminum, including the boom, is strong weather resistant 6063-T832 alloy. All the hardware is stainless steel except for the mounting U-bolts. Virtually indestructible Lexan insulators support the elements and insulate them from the boom. Rotation is possible by most any ham rotor. Wind balance and wind survival are excellent. Boom length is only 16 feet.

To meet your future needs, the KT-34A is easily expandable. The KT-34XA Upgrade Kit, which adds two new elements and doubles the boom length, produces substantial increases in performance. Your KT-34A cannot become obsolete!

A great deal of thought and care has gone into the design of this antenna. It's not just another "me too" tribander, but one developed from modern techniques, materials and engineering. We hope you will give it a try. We know you won't be disappointed . . .

KT-34A SPECIFICATIONS

Frequencies of operation:

14.0-14.350 MHz

21.0-21.450

28-29.750

Feed impedance: 50 ohms with balun supplied

Power rating: 4KW PEP

Boom: 16 ft. x 3" O.D.

Fast: for 2" O.D. (standard)

Element length: 24 ft. average

Turning radius: 16 ft.

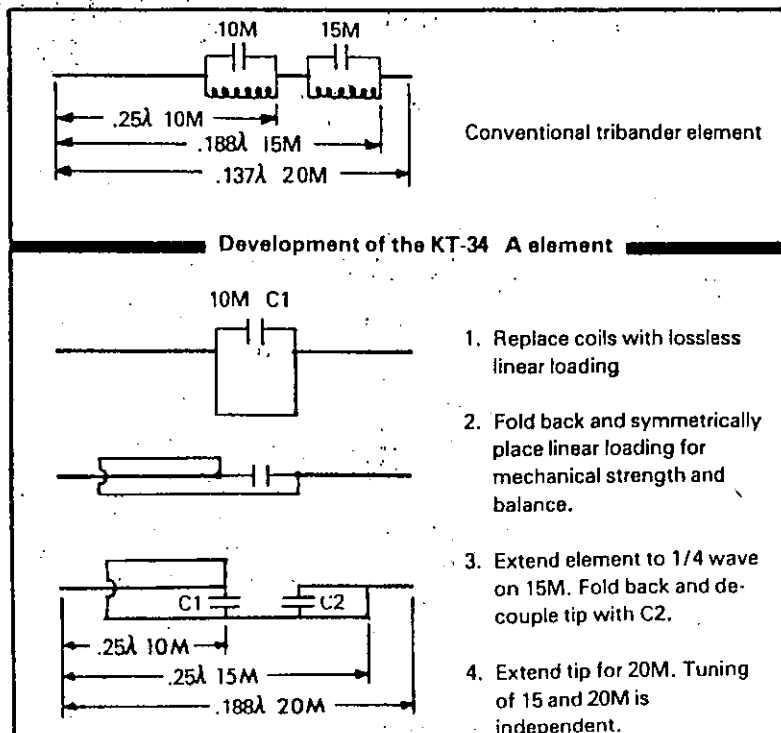
Wind area: 6 sq. ft.

Wind survival: 100 MPH

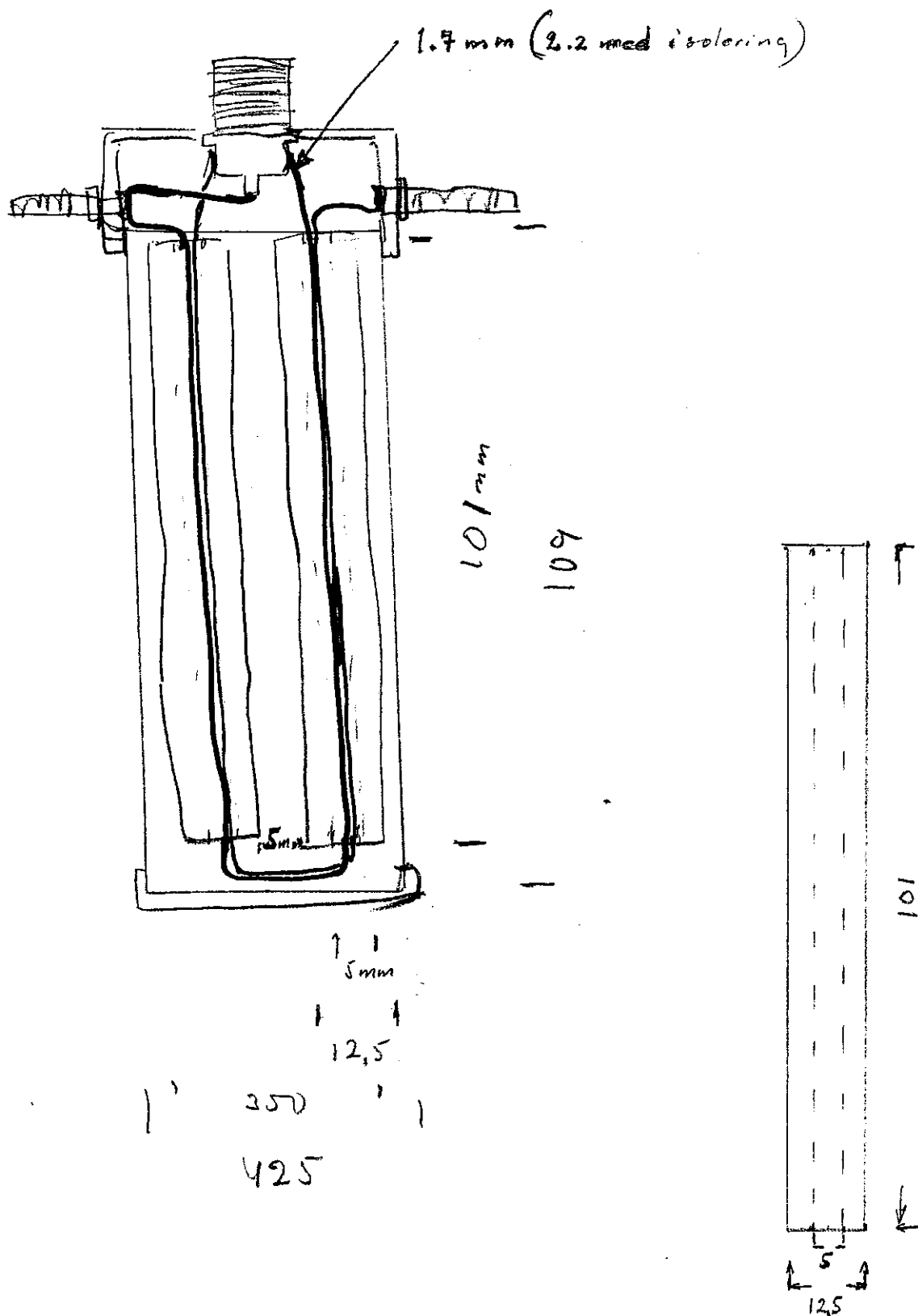
Suitable Rotors: TR-44, Ham "M", HD-73,

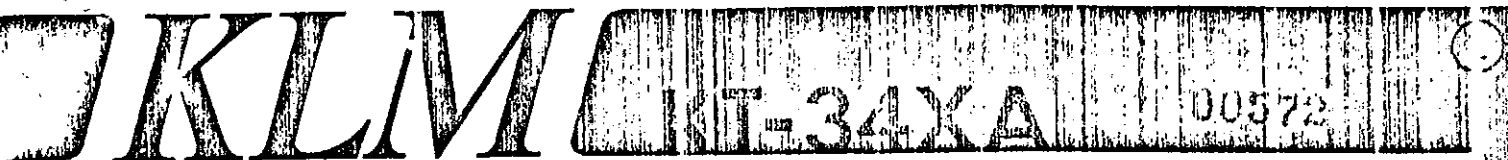
KR-400, etc.

Price: \$299.95



KLM 4:1 3ALON 5KW





KT-34XA

The KT-34XA is the latest in KLM's new series of tribanders. Innovative in concept, practical in design, the KT-34XA outperforms all commercially available tribanders and many monoband systems, too.

The world famous, performance proven KT-34 is the heart of the "X". But, by doubling the boom length, adding one optimally placed full size 10 meter element, and one more tri-resonant element, gain jumps by 4 dB on 10 meters and 2-2½ dB on 20 and 15.

Gain is virtually flat across 20 and 15 meters. On 10 meters, the "X" is optimized for the DX'er, 28 to 29 MHz.

While achieving performance equal to, or exceeding, a stacked monoband array, the modest size of the KT-34XA means smaller tower and rotator requirements and a lower overall windload.

Power handling capability is excellent and efficiency is high. Normal operation over the rated bandwidths require no adjustments other than assembly to the original instruction dimensions.

SPECIFICATIONS

Frequency of Operation:

20M: 14.0-14.350 MHz

15M: 21.0-21.450 MHz

10M: 28-29 MHz

Gain:

20M: 8.5-9 dBd

15M: 9-9.5 dBd

10M: 11-11.3 dBd

F/B: 20 dB

F/S: 40 dB

Feed Impedance: 50 ohms unbalanced
(with 4:1 balun supplied)

Power Rating: 4 KW PEP

Active Elements:

20M = 5

15M = 5

10M = 6

Boom Length: 32'

Element Length: 24'8" Maximum

Turning Radius: 21.6"

Wind Area: app. 9 sq ft

Wind Survival: 100 MPH

Mounting: 2"O.D. mast

Boom Support: Overhead Guy Cables

Suitable Rotors: TR-44, Ham M type, HD-73 Alliance
KR-400, etc.

PARTS LIST

2

KT-34XA

HARDWARE PACKAGE #1

3/8-16 x 2" Bolts	2
3/8-16 Nuts	6
3/8 Lockwashers	6
5/16-18 Nuts	10
5/16 Lockwashers	10
1/2-20 x 3 1/2" Bolts	18 or 22
1/2-20 Nuts	18 or 22
Lockwashers	18 or 22
10-32 x 2 1/2" Screws	24
10-32 Nuts	36
#10 Lockwashers	36
8-32 x 1 3/4" Screws	20
32 x 1/2" Screws	64
8-32 Nuts	106
#8 Lockwashers	106
#8 Flatwashers	2
#6 x 3/8" Sheetmetal Screws	7

HARDWARE PACKAGE #2

1/2" O.D. x 1" Reinforcing Plug	10
Capacitor Caps	40
Standoffs, Phasing Strap	2
HTM-8/M-10 Band Clamps	10
5/8 Compression Clamps	12
10-32 x 3/8 HEXHEAD Screws	12
10-32 Nuts	12

HARDWARE PACKAGE #3

Insulator Inserts 1 1/2" to 1"	12
Linear Insulators 1"	10

HARDWARE PACKAGE #4

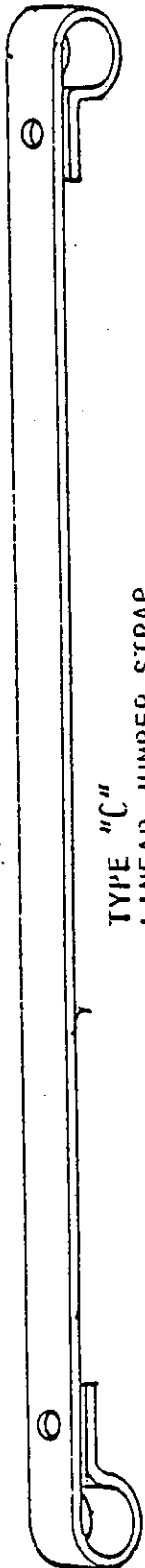
Capacitor Straps "A"	20
15M Straps "B"	10
Linear Jumper "C"	10
Match Strap "D"	2
1/2" x 3 3/4" Jumper Strap	4

HARDWARE PACKAGE #5

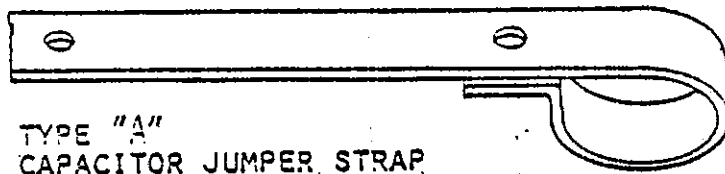
5/8" O.D. x 4" Fiberglass Rod	10
3/4" O.D. x 5" Swaged Tube	10

IN SHIPPING BOX

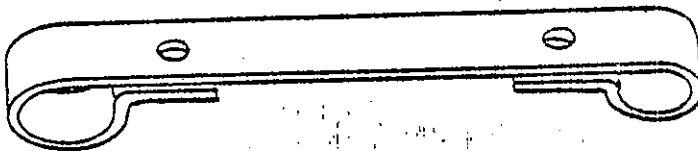
3" O.D. Boom:	
x 8' 6" Swaged	3
x 8'	1
or	
x 8' 6" Swaged	1
x 8'	3
2.850 x 16" inserts	2
1" O.D. x 72" Swaged (with insert)	10
3/4" O.D. x 72" Swaged (with sleeves)	2
3/4" O.D. x 23 3/4"	10
x 8"	6
x 9"	2
x 10"	2
x 16"	10
1/2" O.D. x 25 1/2"	2
x 41"	2
x 51"	6
x 59"	2
3/8" O.D. x 72"	6
x 77	4
x 30 "L" Bent	10
3/8" O.D. Match Assembly	1
Phasing Straps 1/2 x 55 1/2	2
2" U-bolts and Cradles	5 ea.
3" U-bolts and Cradles	2 ea.
HTM-350 Band Clamps	6
Insulators 1 1/2" x 3 1/2"	6
3" I.D. Cast Boom Clamps	2
Boom-to-Mast Plate 9" x 9" or larger	1
Guy Cable Assembly	1
Anti-Sieze Paste	1
Boom Plugs 3" (FACTORY OPTION SUPPLIED)	2
KLM 3-60-4:1 Balun & Clip	1 ea.



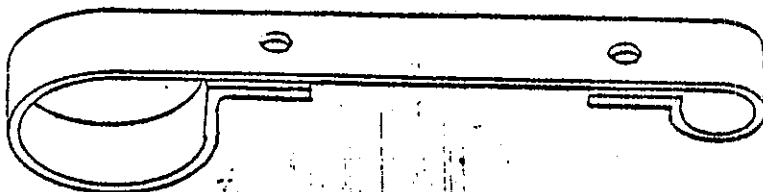
TYPE "C"
LINEAR JUMPER STRAP



TYPE "A"
CAPACITOR JUMPER STRAP

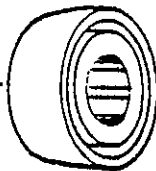


TYPE "B"
15 METER SHORTING STRAP

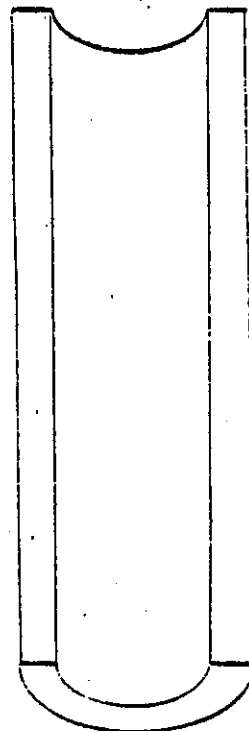
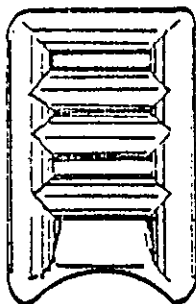


TYPE "D"
MATCH STRAP

CAPACITOR
CAPS



PHASING STRAP
STANDOFF

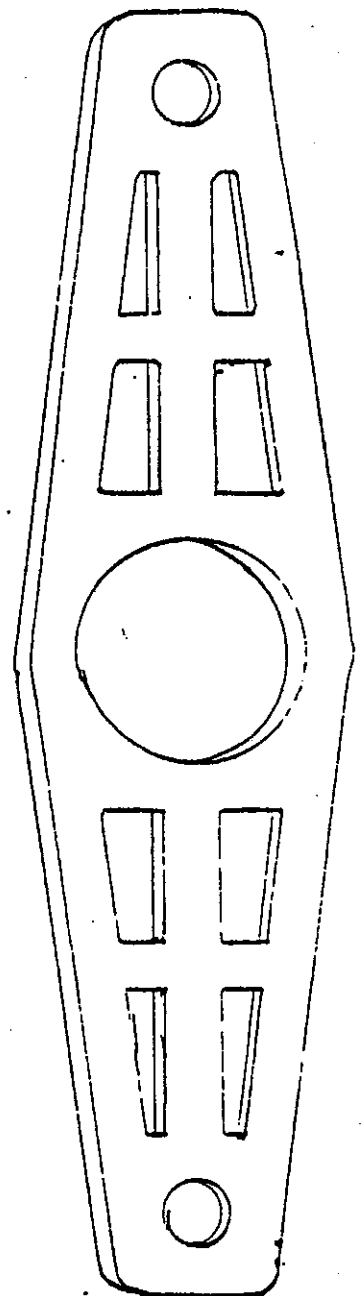


INSULATOR
REDUCTION
SECTION



LINEAR
REINFORCING
INSERT "PEANUT"

LINEAR
INSULATOR



I. BEFORE YOU BEGIN.....

4

1. Select an area large enough to accomodate boom and element lengths. A long workbench is helpful for assembling the element halves. Two sawhorses or large boxes are useful for holding the boom at a comfortable working height. A shallow box is handy for holding and sorting the small hardware. You will need a tape measure, screwdriver, spintites & socket or end wrenches. Common nut sizes used are:

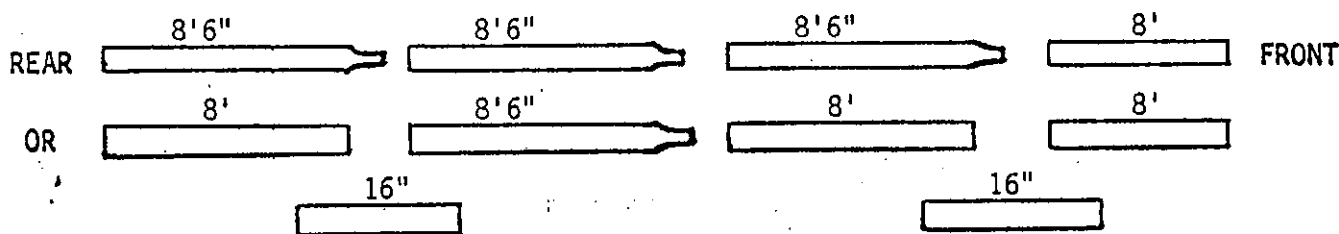
8-32 hdwe 11/32" 0.34375 10-32" 0.375 12-28 hdwe 1/2" 0.5 1-20/28 hdwe 9/16" 0.5625 3/8-16 hdwe 7/16" 0.4375 5/16-18 hdwe 1/2" 0.5

Please remember, most small nuts and screws can be considered tightened securely when moderately hand tightened with screwdriver or spintites. When using tools with additional leverage on any hardware large or small, care must be taken not to overtightened and damage components.

2. A conductive zinc or copper paste is supplied with this antenna kit. Apply it lightly between all aluminum-to-aluminum and aluminum-to-copper joints. This includes element overlaps, straps, balun leads, etc. The paste should be used under each nut & lockwasher where they touch any part of the aluminum elements. Use of this paste ensures long lasting electrical connections and ease in mechanical assembly.
3. Thoroughly unpack the shipping box and check all hardware and components against the parts list. In the event a difference is apparent, please check for a "Factory Update/Change" sheet accompanying these instructions prior to contacting your dealer or the KLM factory.
4. It is helpful to separate and group the larger components so that they are convenient to locate during the assembly process.
5. Correct assembly and dimensional adjustments are very important to successful operation of the KLM Tribander. A number of illustrations are provided to acquaint you with specific parts and assembly procedures. We suggest you read through the assembly instructions and familiarize yourself with the hardware before you actually begin construction.

II. BOOM ASSEMBLY

1. Lay out the 3" O.D. boom sections as shown in the sketch below. Insert the swaged (necked down) ends into the adjacent straight sections. If your boom has only one swaged section, install the insert couplings. Align bolt holes and secure each joint with two 1-20 x 3 1/2" bolts, lockwashers, and nuts.



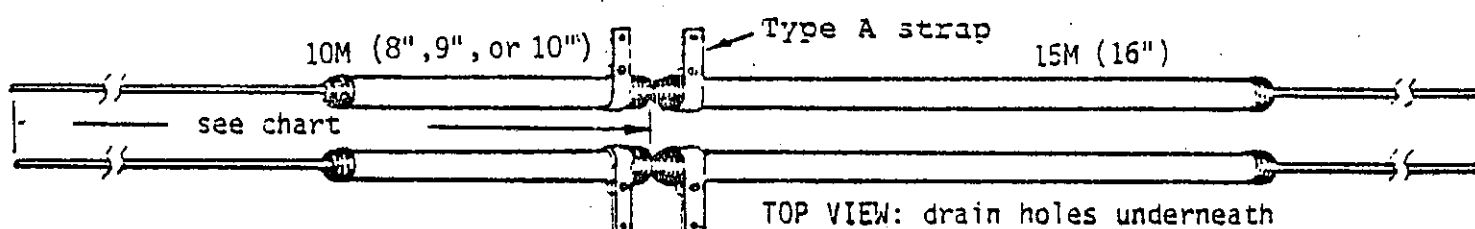
2. Slide a 3" I.D. cast aluminum boom clamp 3 1/2' onto rear of boom and another 6 1/2' onto front of boom. Exact placement is not necessary at this time.

III. CAPACITY BANK ASSEMBLY

NOTE: A short block of wood with a $\frac{7}{16}$ to $\frac{1}{2}$ " hole, clamped in a bench vice is handy for use during installation of the plastic (polyethylene) capacitor caps.

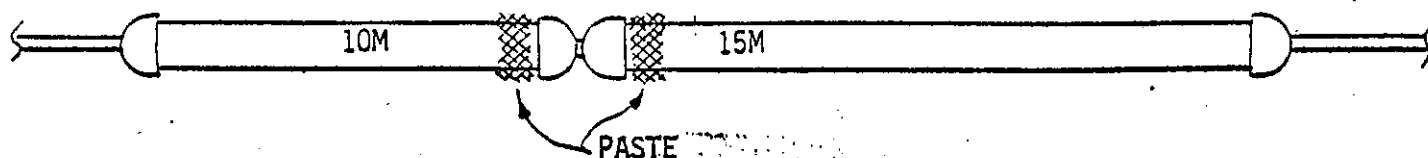
The instructions make a special effort to show how to keep the position and orientation of element components consistent and symmetrical (among elements and element halves) during assembly. It is also helpful to refer often to the pictorials and the "Overview". You should identify various element sections with a felt pen as they are completed. This will speed assembly later.

The sketch below shows a typical pair of $\frac{3}{8}$ " O.D. linear loading sections with $\frac{3}{4}$ " O.D. capacitor tubes in place. Note the type "A" straps are installed on one section to form a mirror image of the other. This assures proper orientation when the complete element is assembled.



ELEMENT	$\frac{3}{8}$ " O.D.	10M CAPACITOR	CENTER CAPS @	15M CAPACITOR
Director D3	2 ea. 72"	8"	27"	16"
Director D1	2 ea. 72"	8"	28"	16"
Front Driven	2 ea. 72"	8"	28"	16"
Rear Driven	2 ea. 77"	9"	28½"	16"
Reflector	2 ea. 77"	10"	29"	16"

- Slide two capacitor caps, back to back, onto all the $\frac{3}{8}$ " O.D. x 72" and 77" tubing. Center the caps on the $\frac{3}{8}$ " tube according to the chart above. Lightly rounding tubing ends with fine sandpaper may ease initial installation. For positioning the caps, pushing the $\frac{3}{8}$ " tubing through a $\frac{1}{2}$ " hole in a 2 x 4 that is securely clamped to a bench or cabinet may help.
- Prepare the $\frac{3}{4}$ " O.D. capacitor tubes for installation. Push a wad of cloth or foam through the inside of all tubes to remove aluminum chips, dust, moisture, etc. Capacitor sections: $\frac{3}{4}$ " O.D. x 8", 9", 10", and 16".
- Slide a type "A" capacitor jumper strap onto each capacitor tube. Insert the 8-32 x $\frac{1}{2}$ " screws, lockwashers, and nuts but do not tighten at this time.
Apply paste to all the capacitor tubes in the areas shown on the sketch below. Then slide the jumper straps toward the ends until they are $\frac{1}{4}$ " from the end.



4. Slide a 3/4" x 16" capacitor tube onto the longer half of all the 3/8" x 72" and 77" sections and work the tubes solidly into the capacitor caps. Push another capacitor cap onto the opposite end of the 3/4 x 16" tube.

The shorter half of all 72" sections receive an 8" capacitor tube.
The remaining pair of 77" sections receive 9" or 10" capacitor tubes.
See chart below.

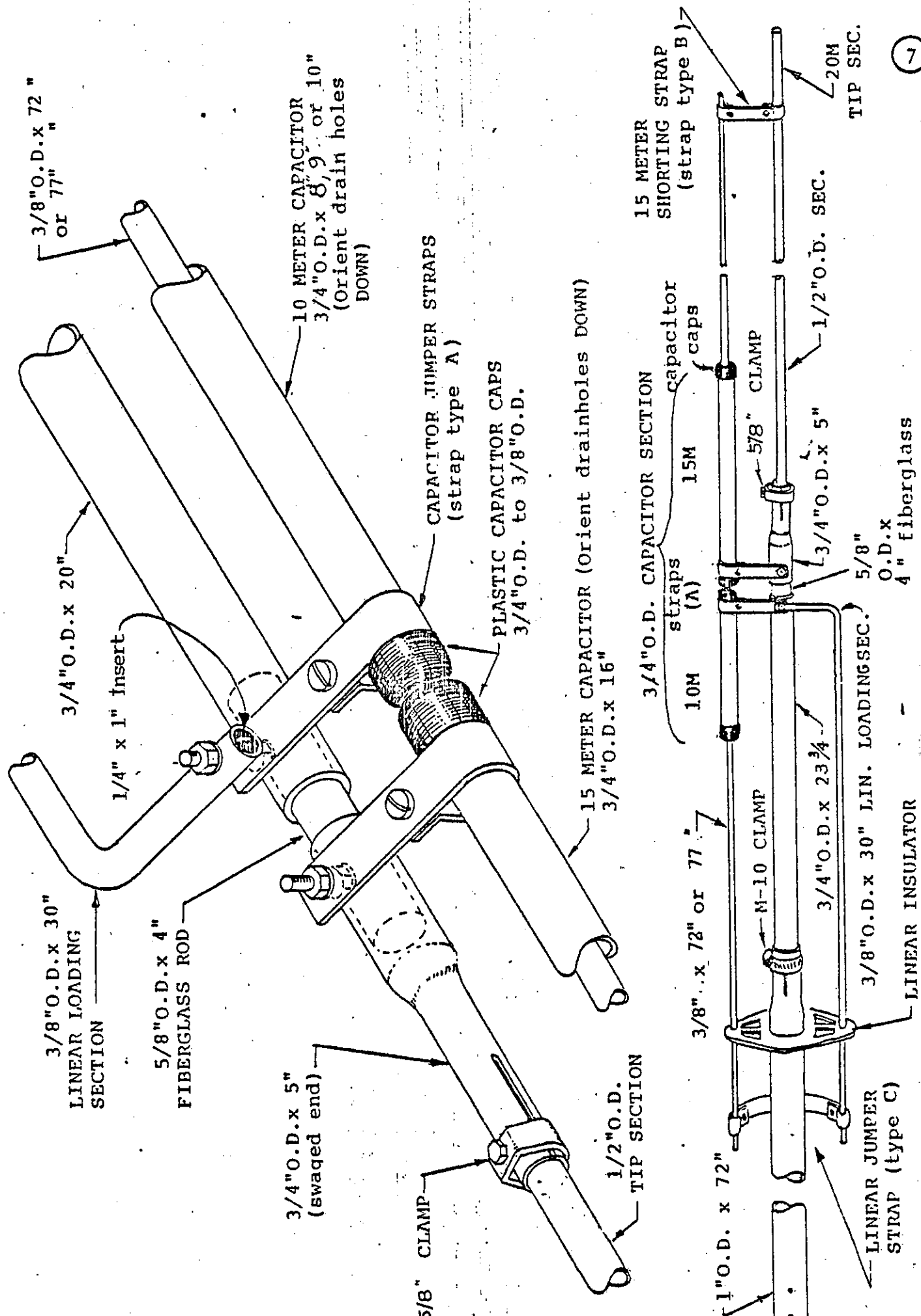
<u>ELEMENT</u>	<u>3/8"O.D.</u>	<u>10M CAPACITOR</u>	<u>CENTER CAPS @</u>	<u>15M CAPACITOR</u>
Director D3	2 ea. 72"	8"	27"	16"
Director D1	2 ea. 72"	8"	28"	16"
Front Driven	2 ea. 72"	8"	28"	16"
Rear Driven	2 ea. 77"	9"	28 1/2"	16"
Reflector	2 ea. 77"	10"	29"	16"

5. After each capacitor tube is installed, push on the second capacitor cap and work it solidly into the tube.

Orient the type "A" straps per sketch with the long tab coming off the top side and the drain holes underneath. DO NOT TIGHTEN YET.

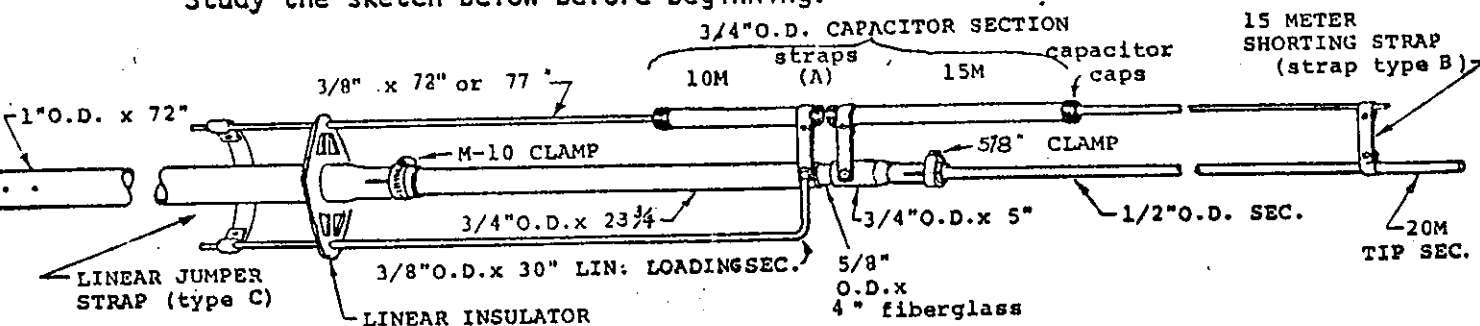
This completes the Capacity Bank Assembly.

TYPICAL ELEMENT-HALF & DETAIL



IV. ELEMENT TIP ASSEMBLY (Reflector, Rear Driven, Front Driven, D1 & D3)

Study the sketch below before beginning.

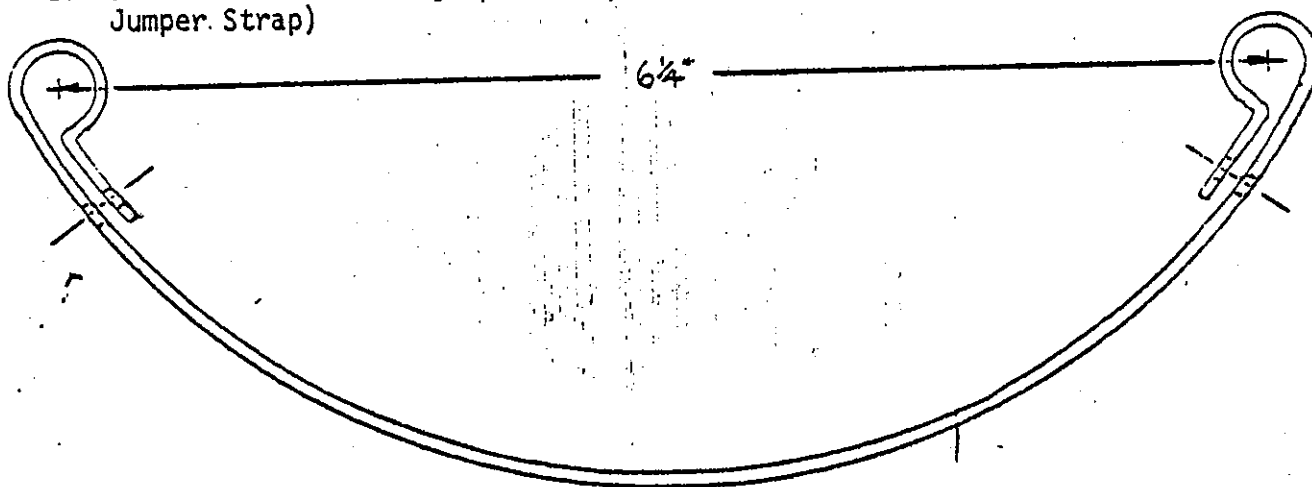


NOTE: A bench vice is handy for holding the $\frac{3}{4} \times 23\frac{3}{4}$ main part during this assembly.

1. Assemble the $23\frac{3}{4}$ \" & 5\" swaged $\frac{3}{4}$ \" O.D. sections to the end of the $\frac{5}{8}$ \" O.D. fiberglass rod. Align holes and secure with 8-32 x $1\frac{3}{4}$ \" screws, nuts, and lockwashers. Tighten until the tubing flattens onto the rod and the assembly becomes rigid.

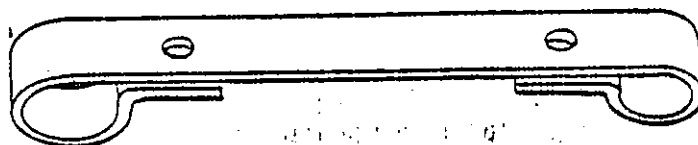
Repeat for all ten sections.

2. Bend all ten linear jumper straps to the arc drawn below. (Type \"C\" Jumper Strap)



Add the 8-32 x $\frac{1}{4}$ \" screws, nuts, & lockwashers. Finger tighten only at this time.

3. Prepare the type \"B\" shorting strap by adding the 8-32 x $\frac{1}{4}$ \" screws, nuts, and lockwashers. Finger tighten only at this time.



TYPE \"B\"
15 METER SHORTING STRAP

4. Prepare ten 5/8" compression clamps as shown. Dab a bit of paste on the end and threads of the 3/8" x 10-32 hexhead screw. Position the 10-32 nut in the clamp and thread together.

5. Beginning with one of the Director-D3 capacitor bank (3/8" O.D. x 72"), spread a small amount of paste on both sides of each type "A" strap fingers where they attach to the studs. Next place fingers onto the studs. Separate two 10 & 15M capacitor tubes 1/16 to 1/8" as required for the "A" strap holes to fit the stud. The 15M strap attaches to the screw stud on the 3/8" O.D. x 5" section and the 10M strap to the stud on the 20" length.

6. Insert a peanut into the drilled end of the 3/8" linear loading section ("L" shaped part).



LINEAR REINFORCING INSERT "PEANUT"

7. Place the drilled end onto the screw stud OVER the 10M capacitor strap. Secure both studs with 8-32 lockwashers and nuts.

The studs and straps are on the "top" of the element so orient the drain holes in the capacitors DOWN by rotating the 72" section as needed. Then tighten the screws securing the straps to the capacitors.

Slide a diamond-shaped linear insulator about 6" onto the shorter half (10M side) of the 3/8" O.D. tubes.

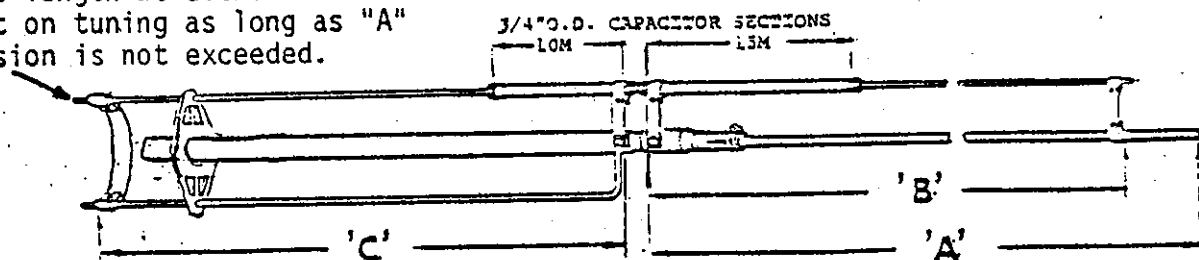
9. Using a small swab, apply paste inside the loops of the type "B" and "C" jumpers and to about 2" of the 1/2" O.D. x 51" tip. Install the 1/2" tip, "B" and "C" jumpers, and adjust to the dimensions below by hooking a tape measure on the type "A" capacitor straps and pulling toward "A" and "B" or "C". Measure to the outer edge of the "B" and "C" straps. Tighten all hardware on this assembly. Mark it appropriately (D3), wipe off excessive paste and repeat for the other half.

10. Repeat Step 9 for the D1, Front Driven, Rear Driven, & Reflector element parts marking them accordingly.

Original math

	<u>1/2" O.D. TUBE REQUIRED</u>	<u>A</u>	<u>B</u>	<u>C</u>
DIRECTOR D3	51" 129.5	53" 135.1	44" 111.7	26" 66.0
DIRECTOR D1	51" 129.5	53 1/2" 136.0	43 1/2" 110.5	27" 68.6
FRONT DRIVEN	41" 104.1	43 3/4" 111.1	43" 109.9	26 3/4" 67.9
REAR DRIVEN	51" 129.5	53" 134.6	47 3/4" 121.3	27 1/2" 69.2
REFLECTOR	59" 149.9	61 1/2" 136.2	47 1/2" 120.6	27 3/4" 70.5

Excess length at either end has no effect on tuning as long as "A" dimension is not exceeded.



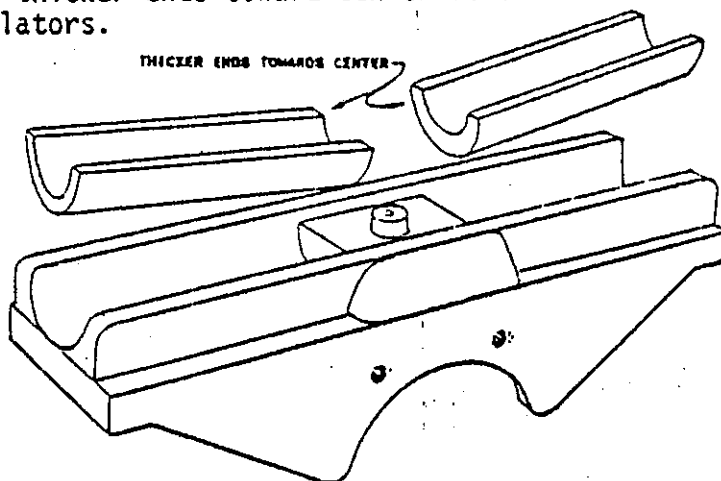
Element tip caps are not supplied or recommended due to potential moisture build-up inside the tips when caps are used.

V. ASSEMBLING THE D2 ELEMENT

1. Prepare two 5/8" compression clamps as shown on Page 9 and place on the swaged (neck down) tips of the mounted 3/4" x 72" element sections. Apply paste to 3" of each 1/2" O.D. x 25 1/2" tip sections and insert into swaged. Adjust until 22 1/2" is showing. Tighten clamp until tubing cannot be rotated or pulled out.

VI. MOUNTING ELEMENT SECTIONS TO INSULATORS

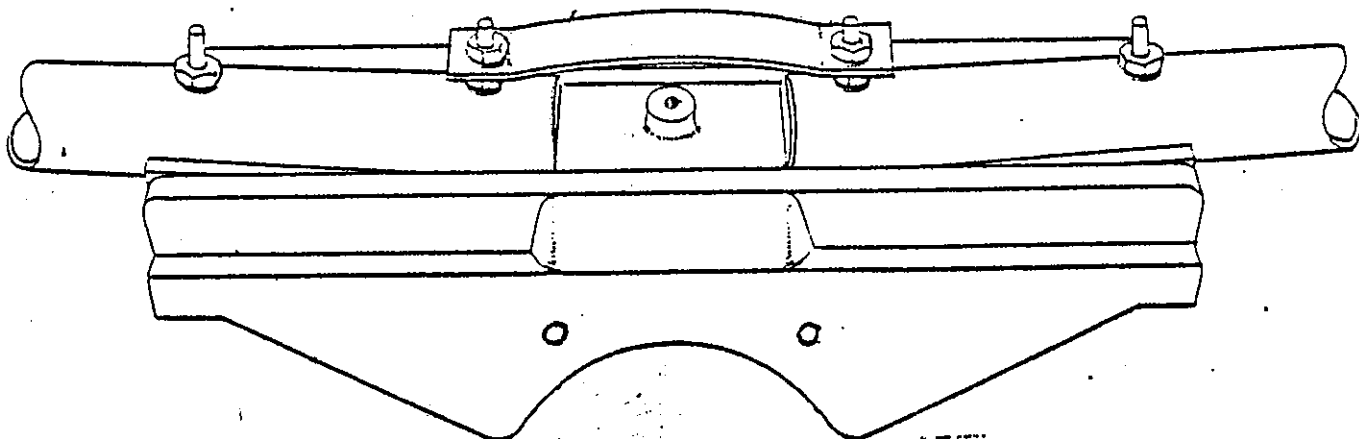
1. The KLM Lexan insulator has been designed to accomodate up to 1 1/2" O.D. elements. Antennas using smaller O.D. elements are supplied with half-round reduction sections. These are placed in the two element channels on top of the insulator with the thicker ends toward center as shown in the drawing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



2. Mount the 3/4" O.D. x 72" D2 element sections (with 1" and 7/8" O.D. butt sleeves) to an insulator.

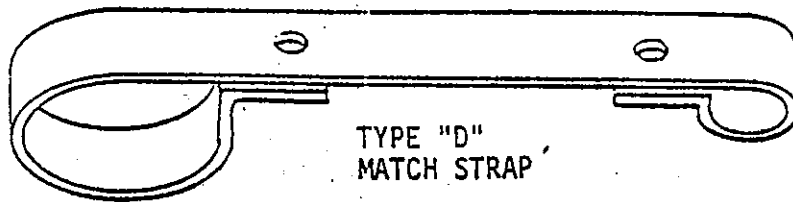
NOTE: The element butt holes are drilled at a slight angle to compensate for the upward camber of the insulator cradle. Element should be rotated 180 degrees until the mounting screws pass easily through the insulator and element. The 10-32 x 2 1/2" screws are inserted from the bottom of the insulator and secured with lockwashers and nuts above the element butt (the studs formed by the two inside screws are used later for strap connections). Tighten the nuts securely to be sure the element sections are well seated in the insulator. Note that upon installation, the sections tilt up slightly to compensate for element droop.

3. Mount the 1" O.D. x 72" element half pairs to the remaining insulators (check that the 7/8" O.D. butt reinforcing inserts are in place with holes aligned).
4. Apply paste and place a 1/2" x 3 3/4" jumper strap across the inner element studs for the Reflector, D1, D2, and D3 and secure with additional 10-32 nuts and lockwashers. For convenience, DO NOT install the completed element tip assemblies yet.



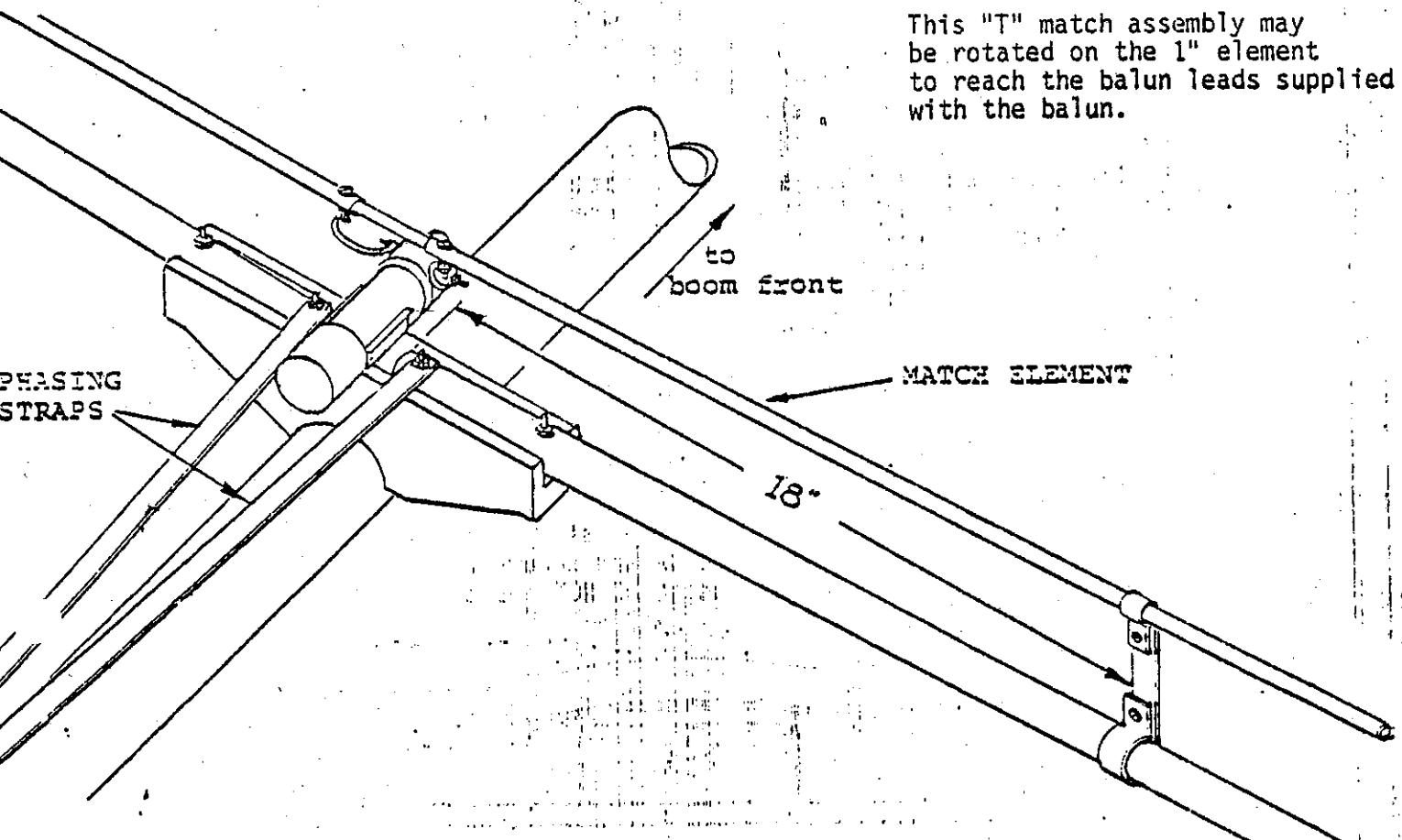
I. FRONT DRIVEN ELEMENT "T" MATCH ASSEMBLY

1. Locate the two type "D" match straps and install the $\frac{1}{8}$ " x 8-32 screws, lockwashers, and nuts loosely.



2. Select one of two remaining elements without center jumpers and slide a type "D" on each side locating them 18" each side of the element butts (apply paste under the straps and tighten in place per sketch below).

MATCH ASSEMBLY - FRONT DRIVEN ELEMENT

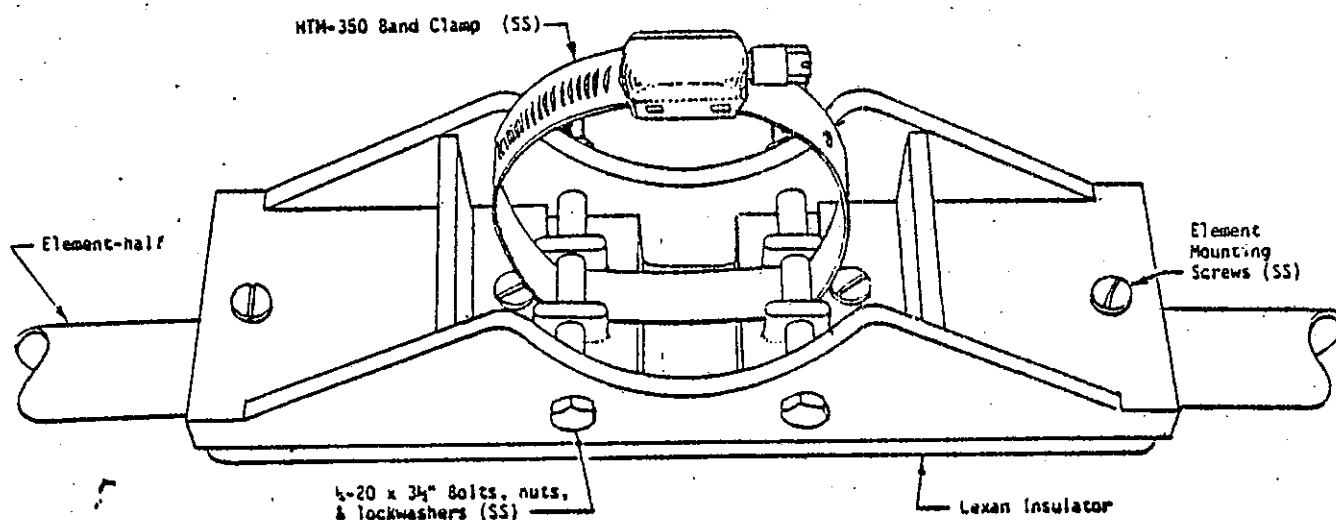


3. Now slide the preassembled $\frac{3}{8}$ " O.D. match assembly tubing first into one side; then into the other. Apply paste to the appropriate areas under the strap. Center the assembly over the element insulator and tighten the type "D" strap screws.
4. Insert a #6 sheet metal screw through the end hole in the balun clip and mount the balun clip to the circular boss in the center of the element insulator.
5. Snap the 3-60-4:1 4KW PEP balun into place. Apply paste and attach the #12 AWG copper leads between the balun and the "T" match using #8 flatwashers, lockwashers, and nuts on the "T" match studs. Keep the lead as short as possible without distorting this assembly.

NOTE: The only thing critical about this assembly is that paste is applied to all joints as this assembly carries the full power of your transmitter.

III. INSTALLATION OF ELEMENT MOUNTING CLAMPS

1. The large HTM-350 band clamps are bolted into the underside of the Lexan insulators with $\frac{1}{2}$ -20 x $3\frac{1}{2}$ " bolts, lockwashers, and nuts (stainless steel) as shown in the drawing below. Install in all the insulators. DO NOT over-tighten the $\frac{1}{2}$ -20 bolts (100 in lbs. maximum torque).



KT-34XA COMPLETE HALF ANTENNA ASSEMBLY DRAWING

KT-34XA
6 Element
Tribander
*
OVERVIEW &
DIMENSIONS

2.49

98"

CLAMP (for overhead guy cable)

DIRECTOR (D2)

 $3/4" \text{O.D.} \times 72"$ $1/2" \text{O.D.} \times 22-1/2"$ SHOWING

57.2

IMPORTANT: NOTE POSITION OF
LINEAR LOADING/CAPACITOR SECTIONS:

03 - to rear
02 - none
01 - forward
F.D. - rear
R.D. - forward
REF. - rear

2.41

95"

DIRECTOR (D1)

 $D=20"$ $B=43\frac{1}{2}"$ $C=27"$ $A=53\frac{1}{2}"$

MAST, AT PHYSICAL
BALANCE POINT. (APP.
14'6" FROM BOOM REAR)

ORIENT CAPACITOR DRAIN HOLES DOWN!

1.50

59"

FRONT DRIVEN

 $C=26\frac{3}{4}"$ $A=43\frac{3}{4}"$

Match assembly
tilted for clarity

 $D=18"$ $B=43"$

1.40

55"

REAR DRIVEN

 $D=21"$ $B=47\frac{3}{4}"$ $C=27\frac{1}{2}"$ $A=53"$

1.88

74"

CLAMP (for overhead guy cable)

REFLECTOR

 $C=27\frac{3}{4}"$ $A=61-1/2"$ $D=18"$ $B=47\frac{1}{2}"$

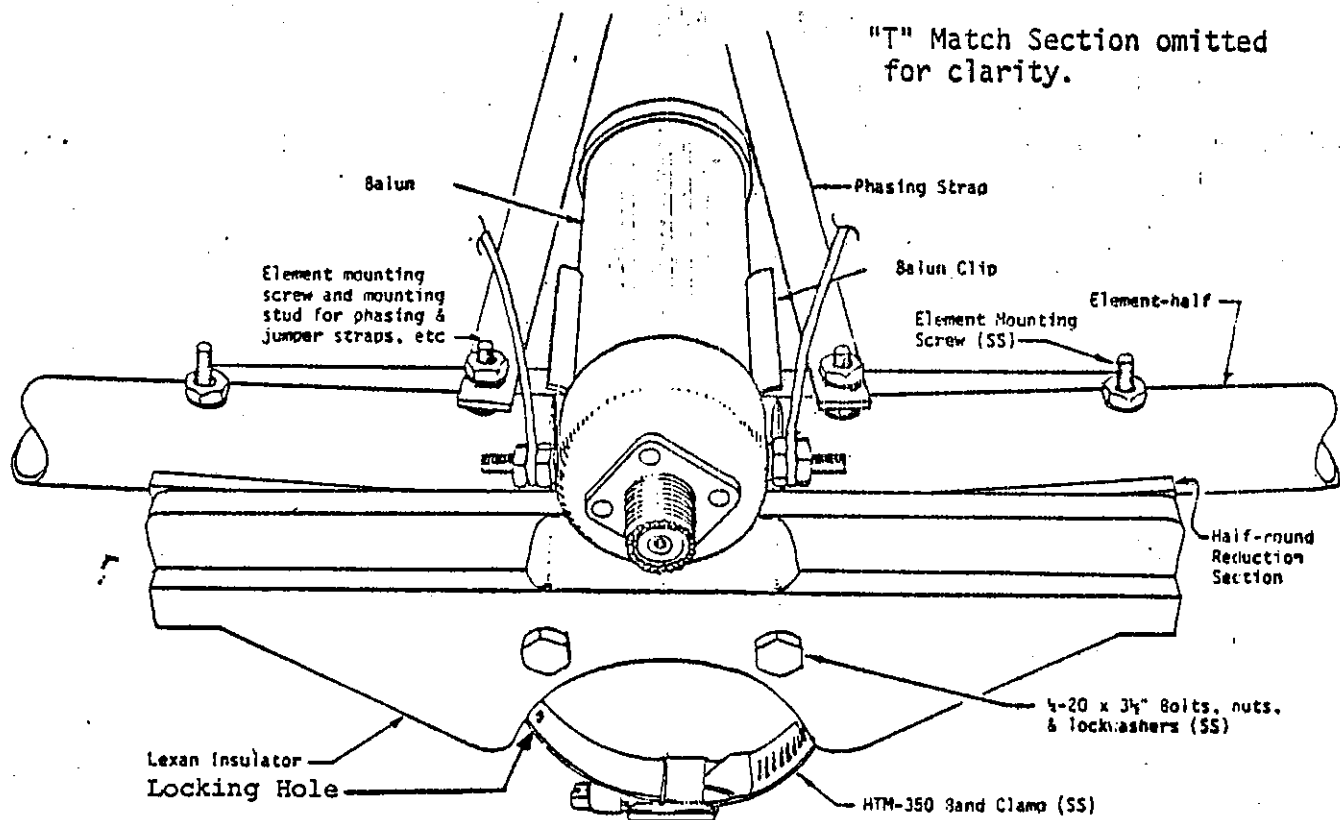
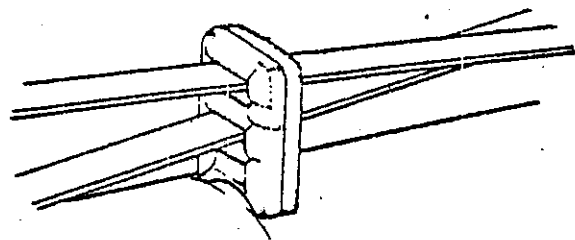
REAR

IX. MOUNTING ELEMENTS TO BOOM (See complete half antenna sketch)

14

NOTE: The completed element tips are NOT installed as yet.

1. Rotate boom until splice bolts are diagonal, heads up. Center element #1 (Reflector) insulator 3" from the boom end and tighten the band clamp.
2. Mount element #2 (Rear Driven) 74" from #1 (center-to-center). Align element with reflector and tighten clamp.
3. Loosely mount element #3 (Front Driven) 55" forward of #2 (Rear Driven).
4. Slide 55½" phasing straps through two standoffs until they are centered. Apply paste around the strap holes and install straps between elements #2 and #3. Place ends onto inner set of element mounting screw studs (over existing nuts). Slide element #3 forward to fit straps. Be sure straps cross at center and connect to element halves on opposite side of the boom. Secure with #10 lockwashers & nuts.
5. Tension the phasing straps by tapping element #3 away from #2 until straps are taut. (Hold boom straight for this operation.) Align #3 element sections with the others and tighten clamp.

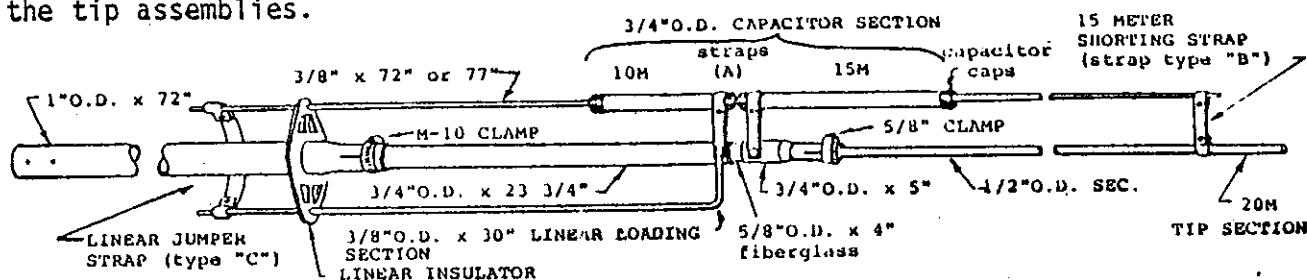


6. Place Director D1 59" forward of the Front Driven Element. Align and secure.
7. Place Director D2 95" forward of D1. Align and secure.
8. Place Director D3 98" forward of D2. Align and secure.
9. Once elements are all correctly aligned, the HTM-350 clamps may be additionally secured. Drill a small hole into boom (#38 drill) through existing hole in HTM-350 band clamp. Tighten a #6x3/8" sheetmetal screw into hole. This operation is recommended especially if you live in an area with extreme weather conditions or if it is likely that the elements will snag on guy wires, trees, or other obstacles during installation of the antenna.

X. ELEMENT TIP MOUNTING (Refer to the Complete Half Antenna Sketch)

15

NOTE: At this point, your particular assembly area may dictate whether you mount the element tips now or get the antenna to the next installation step prior to installing the tips. If your installation permits, you may even be able to mount the existing boom and partial element assembly on the tower before adding the tip assemblies.



1. Select an element tip pair previously marked reflector. Apply paste to about 2" of the 3/4"O.D. element butt and slide on an M10 or M8 stainless band clamp. Refer to the "D" dimension and the capacitor bank location with respect to the other elements on the complete half antenna drawing. Also note that the studs on the element tip should be up and the capacitor vent holes down.
2. Insert the 3/4"O.D. tube into the 1"x72" swaged element to the proper "D" dimension and tighten the band clamp.
3. Repeat for the other half tip.
4. Repeat the above steps for the Rear Driven, Front Driven, D1 and D3 element tips.

XI. BOOM-TO-MAST MOUNTING PLATE & GUY ASSEMBLY:

The antenna is attached to mast via a 9 x 9 mounting plate located at the physical balance point. The boom is braced front and rear by an adjustable guy cable harness. The guy cable end-loops tie to cast aluminum ring clamps near each end of the boom. The harness center plate is attached to the mast section extending above the antenna.

1. Center the boom-to-mast plate at the physical point of the antenna with feedline attached (about 14'6" from rear of boom). Lightly secure with two 3" U-bolts.
2. Mount a 3 or 4 foot temporary mast (not supplied) to the mounting plate. Secure with two 2" U-bolts.
3. Using the temporary mast as a guide, sight down boom from one end and rotate mounting plate until riser is perpendicular to element plane. Tighten the 3" U-bolts until boom just begins to deform.
4. Even up turnbuckle eyebolts on the guy cable harness and unscrew until 1/8" of threads shown inside.
5. Attach guy harness center plate to boom side of temporary mast about 2-3 feet from the top of the boom.
6. Place looped end of rear cable into gap in rear boom ring clamp (moving clamp as necessary) and secure with 3/8-20 x 2" bolt, lockwasher, and nut. Attach front cable to front ring clamp.

7. Make initial boom straightening and support adjustments by a combination of (1) moving the cast ring clamps along the boom and (2) changing the point of attachment of center plate on the riser. Be sure tension is even from front to rear and temporary mast is not pulled off center. Check that when boom is straight, the phasing straps are taut and not buckled.
8. Disconnect center plate and remove the temporary mast. Tape the harness to the boom so that it does not interfere with installation of antenna.

XII. INSPECTION

1. Upon completion of assembly, have another individual recheck antenna against critical dimensions "A", "B", "C", and "D" on Completed Half Antenna Assembly drawing.
2. If possible, allow antenna to temp. cycle overnight. Then check and re-tighten all connections. This will insure long-lasting mechanical and electrical integrity.
3. Check once again to make sure all the capacitor caps are pressed firmly onto the 3/4" O.D. capacitor sections and that the drain holes are "down".

XIII. PRE-INSTALLATION CHECK-OUT

1. Since the permanent installation of any antenna requires a great deal of time and effort, we would like to suggest the following tests be made on the KT-34XA prior to final installation.
2. Attach your good quality 50 ohm feedline to the balun and place the KT-34XA on a temporary support 10 to 25 feet above ground. Use a non-metal roof, tall ladder, short tower, etc.
3. Using your exciter and a good quality SWR bridge, take SWR readings every 100 KHz on each band. Start and end at or beyond the band edges. Naturally some SWR will be present and the general shift, because of the low height, will indicate the antenna is resonant slightly low in frequency. For the most accurate SWR readings, keep the system simple, i.e., exciter - SWR bridge - antenna. Eliminate scopes, antenna switches, filters, etc., for your initial readings. This simple system should be used for your post-installation SWR check also.

Gross problems such as 50-100% power reflected on all portions of each band indicate a problem in the feedline or balun. Disconnect the feedline at both ends and check for center pin-to-pin continuity and connecto shell-to-shell continuity. There should be no continuity between center pin and shell. The balun should show continuity from center pin-to-shell and to each of the balanced terminals.

4. Another rough check of general performance even with the antenna at the low temporary height is to listen to the signals on 10, 15, and 20. If possible, compare it with another antenna on those bands. Signals on 10 and 15 meters particularly should sound lively. Twenty meters may be subdued somewhat by the temporary test height conditions. Again, you're looking for anything grossly different than what you would expect.

If any gross problem appears to be present, a continuity check of each element should be made. Check for continuity across each joint. This continuity check will almost invariably expose the problem and we consider it a most valuable time spent to insure long trouble-free operation.

1. When installing antenna, remember to allow about 2½ feet of mast above the boom for mounting the guy harness center plate.
2. After antenna is installed, reconnect center plate and slide it up mast until the boom is straight. Final adjustments and balancing of tension are accomplished adjusting turnbuckles. Block the eyebolts to prevent twisting of cables during adjustment. When boom is straight, safety-wire the turnbuckles.
3. See Page 18 for typical SWR curves for each band. Your curves may vary somewhat due to instrument accuracy, height above ground, surrounding objects, etc. But, you should be able to recognize key corner points and ripple.

INSTALLATION HINTS AND KINKS

Good quality coax feedline of the proper impedance is a major factor in achieving good VSWR across each ham band. KLM recommends the following cable.

1. RG-213 AU
2. Times FM-8 Foam Coax
3. Belden 8214 Foam Coax

Other brands of foam "RG-8 type" coax are typically not 50 ohm (more like 60-70 ohm) and should be avoided.

2. Large objects and other antennas, 40 or 80 meter dipoles for instance, can also affect the VSWR of a tribander. To check for detrimental effects, temporarily lower or remove the dipole or at least rotate it 90° out of line with the tribander elements. If the VSWR is reduced, one of the antennas should be relocated to avoid adversely affecting the performance of the Tribander.

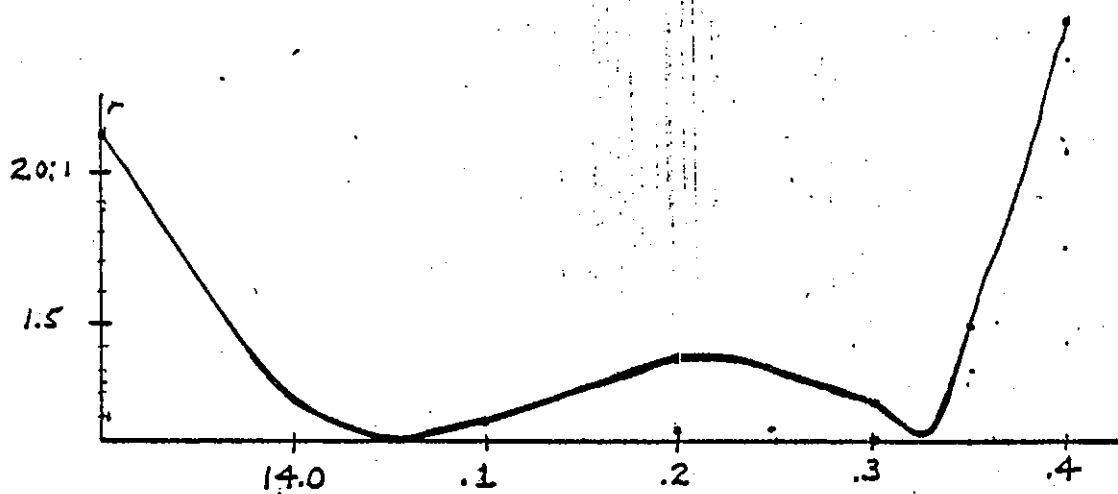
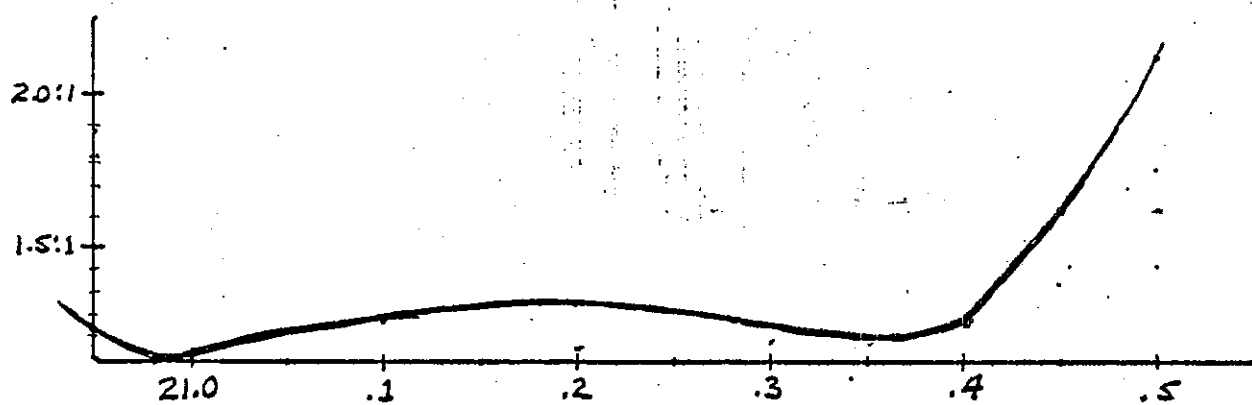
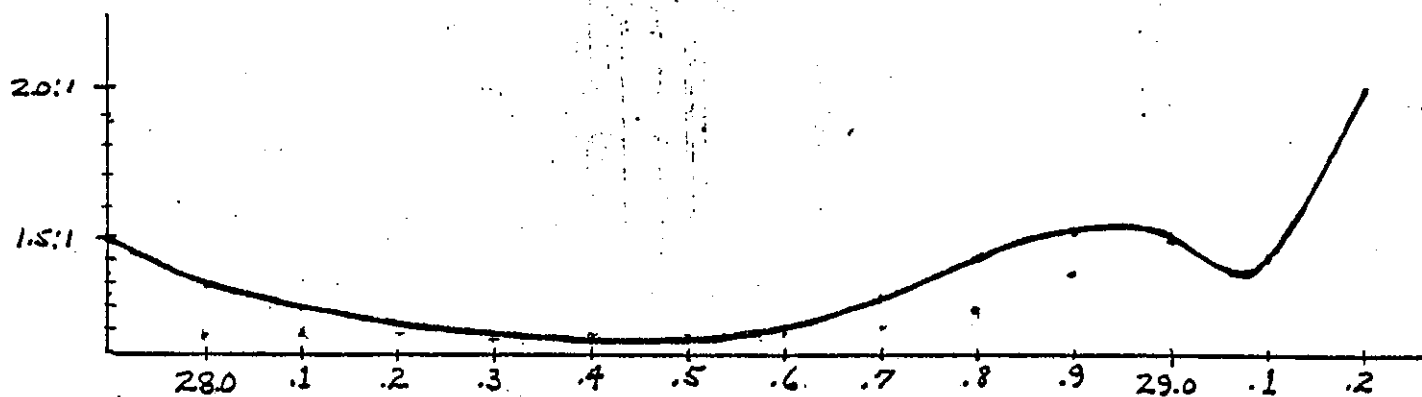
The KLM 40 meter dipole (7.2-1) can be used with the Tribander and will work well. But, the dipole must be mounted above or below the Tribander and in line with its boom (90° out from elements).

3. Mounting height: Generally, the comment "the higher - the better" is true. Excellent performance can be realized, however, from 30 feet on up. Ten (10) meters will be affected least by increased heights over 30 feet and 20 meters will be improved the most.

Overall, antenna efficiency is reduced at low heights because surrounding objects (building, trees, metal fences, etc.) absorb RF from the antenna before that energy can become a sky-wave. Whenever possible, mount the antenna high and in the clear.

KT-34XA TYPICAL VSWR CURVES

18



KLM

KT-34A

REVISED 5/2/80

①

COMMUNICATIONS EQUIPMENT/ANTENNA INNOVATIONS

01224

KLM KT-34 BANDPASS TRIBANDER

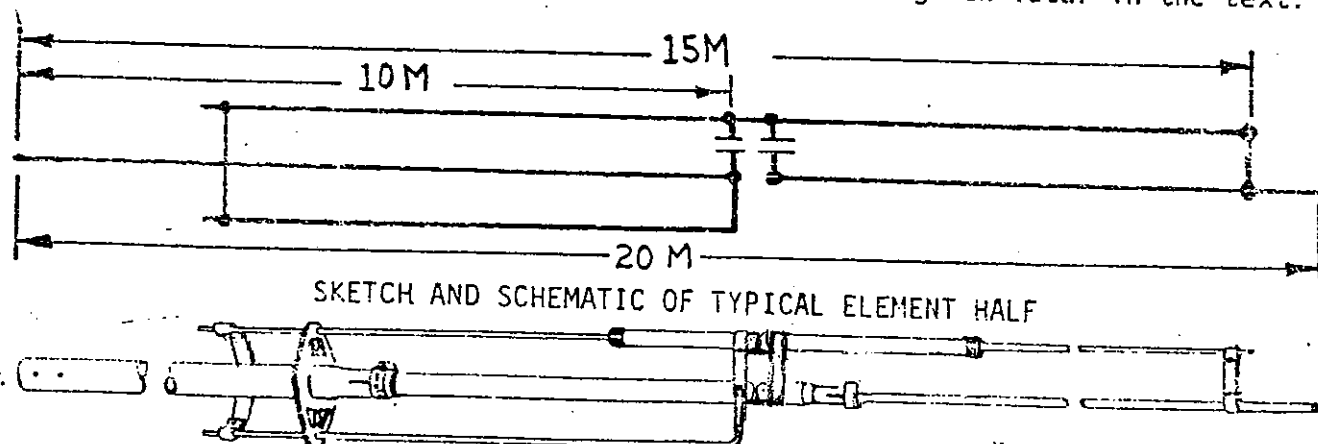
The KT-34 Tribander is innovative in concept, unique in its practical design, consistent in superior performance.

All four of the elements work on each band. Ten meters is a full-sized element using a trap formed with a small amount of linear loading (also used to shorten 20 meter section) and an air capacitor. Fifteen meters uses a tuned decoupling stub with another air capacitor and is also a full-size element. Twenty meters is approximately 75% of full size and defined by the element extending beyond the 15 meter decoupling jumper. Twenty and fifteen meters tune with total independence.

Two driven elements (log cell) with all three resonances are employed to achieve a broadband driven structure which allows almost constant flat VSWR and performance across each of the three bands. Basic feed impedance is 200 ohms balanced and is transformed to 50 ohms unbalanced with the 4KW PEP KLM balun (supplied).

Power handling capability is excellent with no lossy coils or capacitors. Consequently efficiency is high (a conventional tribander may be rated at 8db gain but if it's only 50% efficient, the effective gain is really 5db).

Normal operation (14.-14.350), (21.0-21.450), and (28.-29.50 MHz) requires no adjustments other than the original assembly dimensions given later in the text.



KT-34A SPECIFICATIONS

Frequency of Operation:

20M = 14.0 - 14.35 MHz

15M = 21.0 - 21.45 MHz

10M = 28.0 - 29.75 MHz

Elements: 4 on each band

Max element Length: 24 feet

Gain: 7dB over a dipole reference

SWR: 20M-25dB, 15M-22dB, 10M-20dB

Return Loss: 30dB or better

Feed Impedance: 200 ohms balanced/50 ohms
with 4:1 balun supplied

Power Rating: 4KW P.E.P.

Wind Area: 6 sq. ft.

Wind Survival: 100 M.P.H.

Turning Radius: 15 ft.

Weight: 45 lbs.

Boom Length/Dia.: 15 ft./3" O.D.

Mounting: 2" mast

PARTS LIST

KT-34A BANDPASS TRIBANDER

Hardware Package #1

x 3 3/4" Jumper Strap
 20 x 3 1/2" Bolts, s.s.
 -32 x 2 1/2" Screws
 andoffs, phasing straps
 x 1" Linear Inserts (Peanuts)

✓ 2 ~~10~~ +2
 ✓ 10 ~~16~~ +8
 ✓ 16 ~~2~~ +7
 ✓ 2 ~~8~~ +4

IN SHIPPING BOX

Boom: 3"O.D. x 8'6" Swaged (Rear)
 x 8' (Front)

1
1

Elements:

1"O.D. x 72" Swaged with 7/8" insert
 3/4"O.D. Section x 23 3/4"

8
8

Hardware Package #2

32 x 1/2" Screws
 32 x 1 3/4" Screws
 5 x 3/8" Sheetmetal Screws
 0-32 x 3/8" Hexhead Screws

✓ 56 ~~16~~ +11
 ✓ 16 ~~7~~ +12
 ✓ 7 ~~8~~ +2
 ✓ 8 ~~1~~ +7

3/4"O.D. Capacitor Sections:

x 8"
 x 9"
 x 10"
 x 16"

4
2
2
8

Hardware Package #3

3 atwashers
 3 ckwashers
 Nuts

✓ 2 ~~94~~ +2
 ✓ 94 ~~94~~ +35
 ✓ 94 ~~94~~ +36

1/2"O.D. x 49 1/2"
 x 42 1/2"
 x 51 1/2"
 x 59.0"

2
2
2
2

3/8"O.D. x 72"
 x 77"
 x 30" with bend

4
4
8

Hardware Package #4

10 Flatwashers
 10 Lockwashers
 0-52 Nuts

2 - 2
 26 - ~~34~~ +8
 34 - ~~34~~ +0

Match Section (Factory Assembled):

3/8"O.D. x 24"
 1/2"O.D. x 4" Fiberglass Rod
 8-32 x 1 1/2" Screws, Nuts, & Lockwashers

2
1
2 ea

Hardware Package #5

-20 Nuts & Lockwashers
 /8-16 Nuts & Lockwashers
 /16-18 Nuts & Lockwashers

✓ 10 ea. ~~4~~ +8
 ✓ 4 ea. ~~4~~ +12
 ✓ 4 ea. ~~4~~ +6

Boom-to-Mast Plate 8" x 9" or larger
 Phasing Straps 1/2" x 55 1/2"

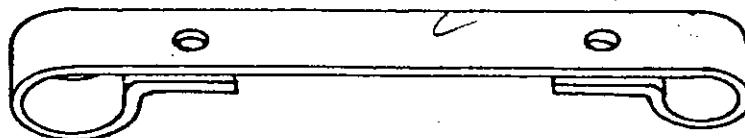
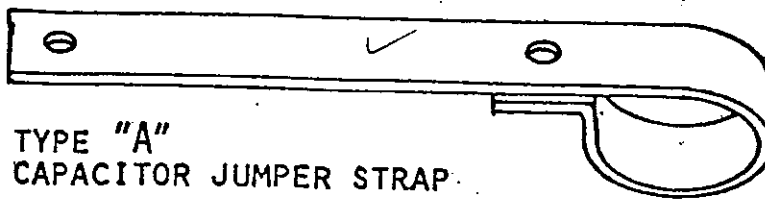
1
2

IN HARDWARE BOX

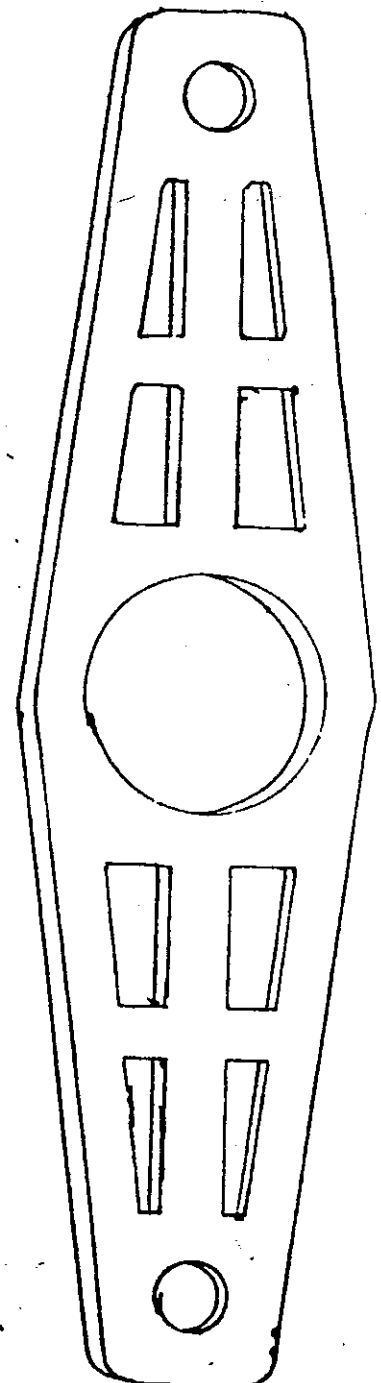
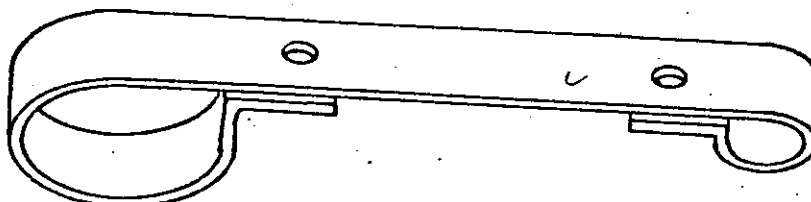
-10 (or M-8) Band Clamps
 /8" Compression Clamps
 Capacitor Caps
 0-32 Nuts
 a) itor Strap (Type A)
 SM strap (Type B)
 in Jumper Strap (Type C)
 ation Strap (Type D)
 linear Insulators 1"
 eading Sections 1 1/2" to 1"
 /4" D. x 5" Swaged Section
 " fiberglass Rod (5/8"O.D.)
 TM-550 Band Clamps
 Anti-Sieze Paste
 " U-bolts & Cradles
 " U-bolts & Cradles
 Boom Caps (Factory Option)
 alun & Clip 3-60-4:1
 nsulators 1 1/2" x 3"
 Instructions

✓ 8 ~~8~~ +0
 ✓ 8 ~~8~~ +0
 ✓ 32 ~~32~~ +0
 ✓ 8 ~~8~~ +0
 ✓ 16 ~~16~~ +0
 ✓ 8 ~~8~~ +0
 ✓ 8 ~~8~~ +0
 ✓ 2 ~~2~~ +0
 ✓ 8 ~~8~~ +0
 ✓ 8 ~~8~~ +0
 ✓ 8 ~~8~~ +0
 ✓ 8 ~~8~~ +0
 ✓ 4 ~~4~~ +0
 ✓ 1 ~~1~~ +0
 ✓ 2 ea. ~~2~~ +3
 ✓ 2 ea. ~~2~~ +0
 ✓ 2 ea. ~~2~~ +0
 ✓ 1 ea. ~~1~~ +0
 ✓ 4 ~~4~~ +0
 ✓ 1 ~~1~~ +0

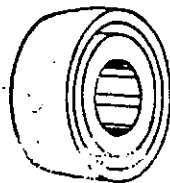
~~Soumaragareby~~
 79580 RATTVIT
 0248/12497
~~Mandag Ivcekq~~



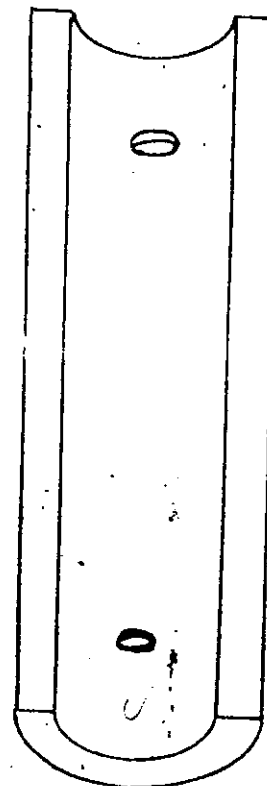
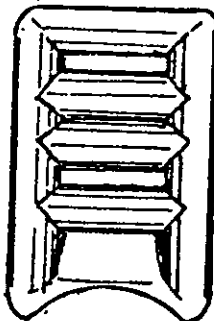
LINEAR
INSULATOR



CAPACITOR
CAPS

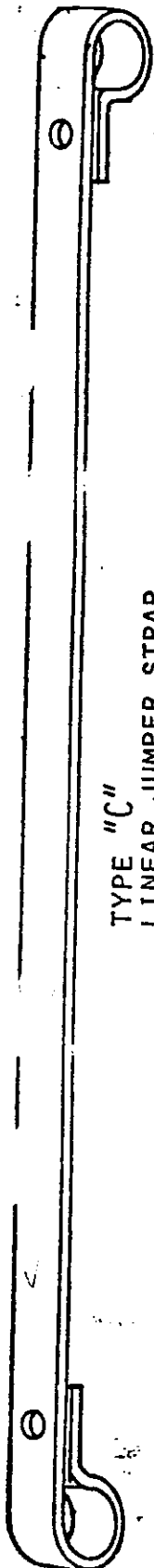


PHASING STRAP
STANDOFF



INSULATOR
REDUCTION
SECTION

TYPE "C"
LINEAR JUMPER STRAP



ANTENNA ASSEMBLY GUIDE:

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, and a set of spin-tite, and socket or end wrenches. Common nut sizes are:

3/8" 10-32 Hdwe
7/16" 1/2-20 Hdwe

1/2" 5/16-18 Hdwe
9/16 3/8-16 Hdwe

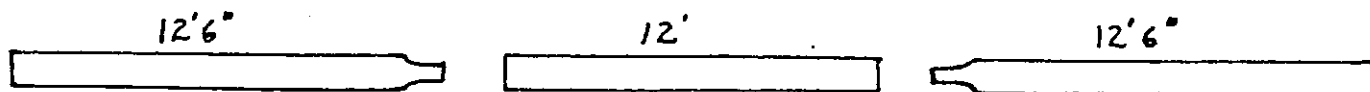
To avoid damage to antenna components, be aware that most hardware need only be moderately hand tightened with screwdriver or spintite to be secure. When using sockets with mechanical leverage such as socket or end wrenches, care must be taken to over-torque nuts and damage components.

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

ASSEMBLY

Lay out 3" O.D. boom sections on the ground as shown in the sketch below:



To assemble, insert the swaged (necked down) end of the boom sections into the appropriate straight boom section and align the bolt holes. Each joint is cross-bolted with two 1/2-20 x 3 1/2" bolts, lockwashers, and nuts. Torque nuts up to 10 ft./lbs.

Place the assembled boom on two sawhorses or boxes about 1/3 the length from each end. Slide a 3" I.D. cast-aluminum ring clamp onto each end. Position roughly 3 ft from the rear and 5 ft from the front. If clamps do not slide easily spread them open slightly with two nuts inside split on a 5/16" or 3/8" bolt.

Select an area large enough to accommodate boom and element lengths. A long workbench is helpful for assembling the element halves. Two sawhorses or large boxes are useful for holding the boom at a comfortable working height. A shallow box is handy for holding and sorting the small hardware. You will need a tape measure, screwdriver, spintites and socket or end wrenches. Common nut sizes used are:

11/32" 8-32 hdwe
3/8" 10-32" hdwe

7/16" 1-20/28 hdwe
1/2" 5/16-18 hdwe

Please remember, most small nuts and screws can be considered tightened securely when moderately hand tightened with screwdriver or spintites. When using tools with additional leverage on any hardware large or small, care must be taken not to overtightened and damage components.

A conductive zinc or copper paste is supplied with this antenna kit. Apply it lightly between all aluminum-to-aluminum and aluminum-to-copper joints. This includes element overlaps, straps, balun leads, etc. This paste should be used under each nut and lockwasher where they touch any part of the round aluminum elements. Use of this paste ensures long lasting electrical connections and ease in mechanical assembly.

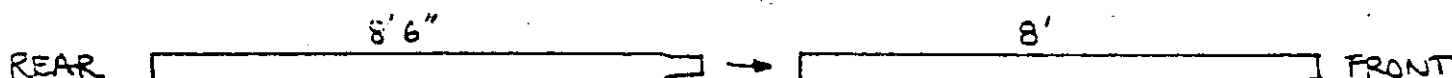
Thoroughly unpack the shipping box and check all hardware and components against the Parts list. In the event a difference is apparent, please check for a "Factory Update/Change" sheet accompanying these instructions prior to contacting your dealer or the KLM factory.

It is helpful to separate and group the larger components so that they are convenient to locate during the assembly process.

Correct assembly and dimensional adjustments are very important to successful operation of the KLM Tribander. A number of illustrations are provided to acquaint you with specific parts and assembly procedures. We suggest you read through the assembly instructions and familiarize yourself with the hardware BEFORE you actually begin construction.

BOOM ASSEMBLY

Insert the swaged (necked down) end of the 3"O.D. x 8'6" rear boom section into the drilled end of the 8' forward boom section. Rotate sections as needed to align bolt holes and secure with two 1-20 x 3 1/2" bolts, lockwashers, and nuts.

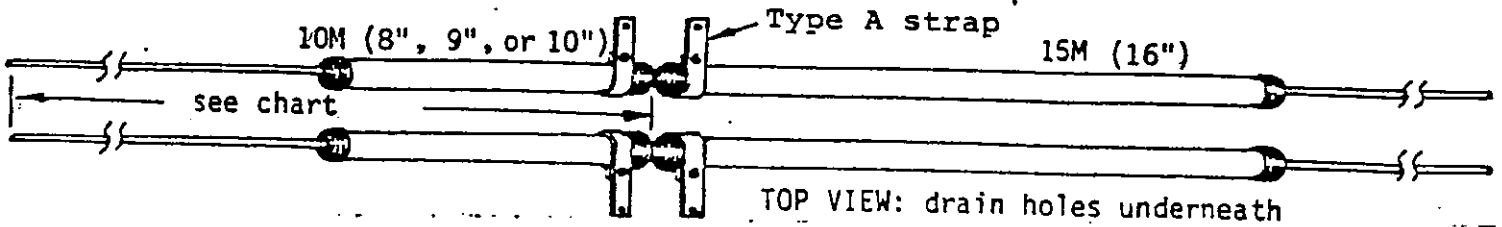


CAPACITY BANK ASSEMBLY

NOTE: A short block of wood with a 7/16 to 1/2" hole, clamped in a bench vice is handy for use during installation of the plastic (polyethylene) capacitor caps.

The instructions make a special effort to show how to keep the position and orientation of element components consistent and symmetrical (among elements and element halves) during assembly. It is also helpful to refer often to the pictorials and the "Overview". You should identify various element sections with a felt pen as they are completed. This will speed assembly later.

The sketch below shows a typical pair of 3/8"O.D. linear loading sections with 3/4"O.D. capacitor tubes in place. Note the type "A" straps are installed on one section to form a mirror image of the other. This assures proper orientation when the complete element is assembled.



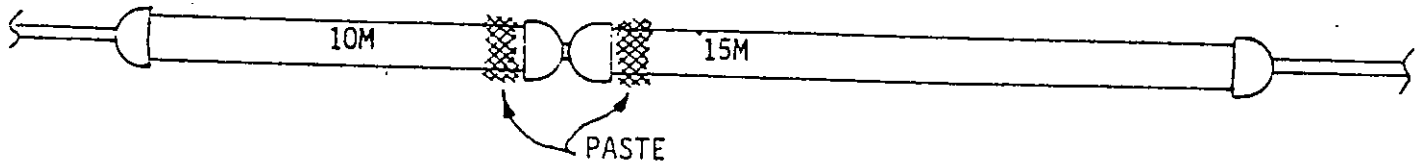
ELEMENT	3/8"O.D.	10M CAPACITOR	CENTER CAPS @	15M CAPACITOR
Director D1	2 ea. 72"	8"	27 1/2"	16"
Front Driven	2 ea. 72"	8"	28"	16"
Rear Driven	2 ea. 77"	9"	28"	16"
Reflector	2 ea. 77"	10"	28 1/2"	16"

Slide two capacitor caps, back to back, onto all the 3/8"O.D. x 72" and 77" tubing. Center the caps on the 3/8" tube according to the chart above. Lightly rounding tubing ends with fine sandpaper may ease initial installation. For positioning the caps, pushing the 3/8" tubing through a 1/2" hole in a 2 x 4 that is securely clamped to a bench or cabinet may help.

Prepare the 3/4"O.D. capacitor tubes for installation. Push a wad of cloth or foam through the inside of all tubes to remove aluminum chips, dust, moisture, etc. Capacitor sections: 3/4"O.D. x 8", 9", 10", and 16".

- Slide a type "A" capacitor jumper strap onto each capacitor tube. Insert the 8-32 x 1/2" screws, lockwashers, and nuts but do not tighten at this time.

Apply paste to all the capacitor tubes in the areas shown on the sketch below. Then slide the jumper straps toward the ends until they are 1/4" from the end.



Slide a 3/4" x 16" capacitor tube onto the longer half of all the 3/8" x 72" and 77" sections and work the tubes solidly into the capacitor caps. Push another capacitor cap onto the opposite end of the 3/4" x 16" tube.

The shorter half of both 72" sections receive an 8" capacitor tube. The remaining pair of 77" sections receive 9" or 10" capacitor tubes. See chart above.

- After each capacitor tube is installed, push on the second capacitor cap and work it solidly into the tube. Orient the type "A" straps per sketch with long tab coming off the top side and the drain holes underneath. DO NOT TIGHTEN YET.

This completes the Capacity Bank Assembly.

3/8" O.D. x 30"
LINEAR LOADING SECTION

5/8" O.D. x 4"
FIBERGLASS ROD

1/4" x 1" Insert

3/4" x 23 3/4"

10 METER CAPACITOR
3/4" O.D. x 8", 9" or 10"
(Orient drain holes DOWN)

15 METER CAPACITOR (Orient drain holes DOWN)
3.1" O.D. x 16"

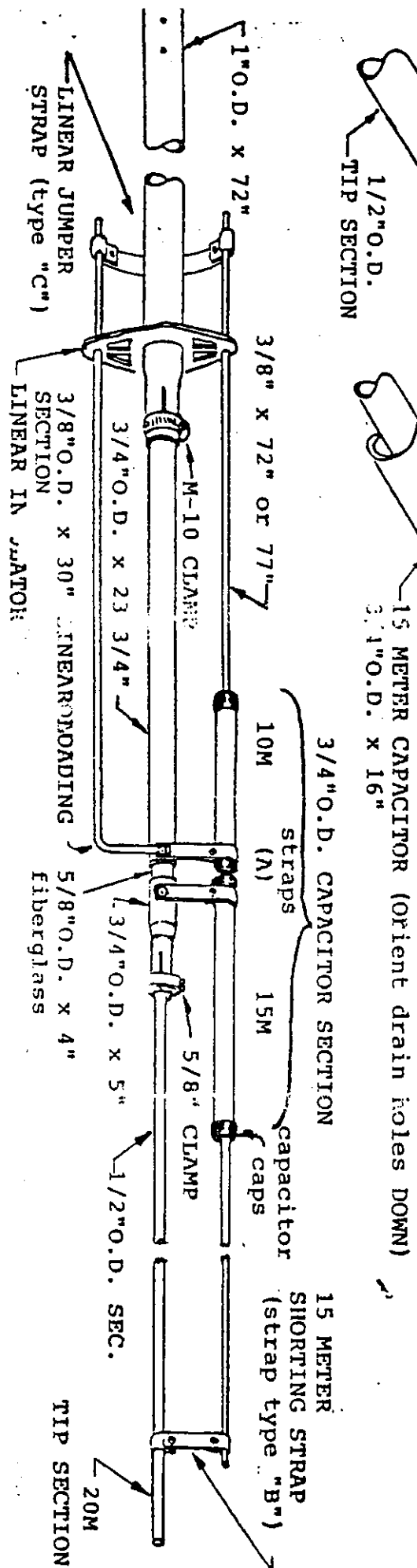
CAPACITOR JUMPER STRAPS
(strap type "A")

PLASTIC CAPACITOR CAPS
3/4" O.D. to 3/8" O.D.

3/4" O.D. x 5"
(swaged end)

1/2" O.D. TIP SECTION

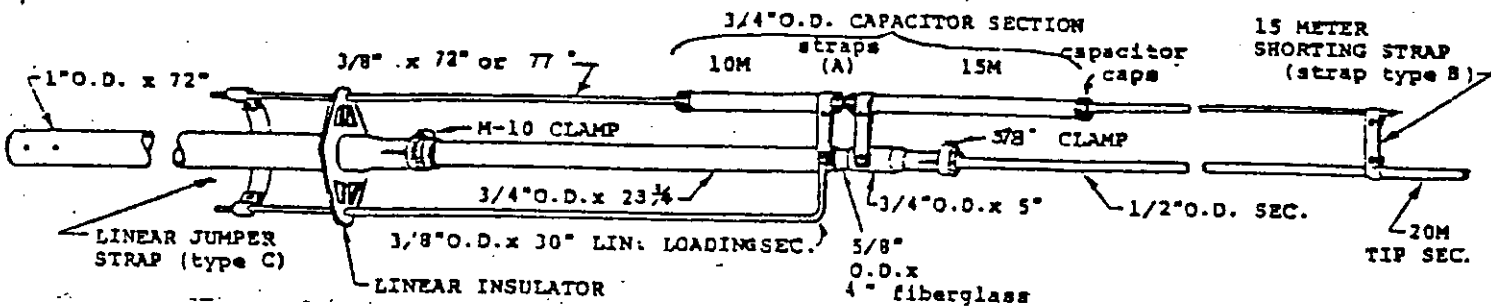
3/8" CLAMP



IV: ELEMENT TIP ASSEMBLY (Reflector, Rear Driven, Front Driven, D1)

7

Study the sketch below before beginning.

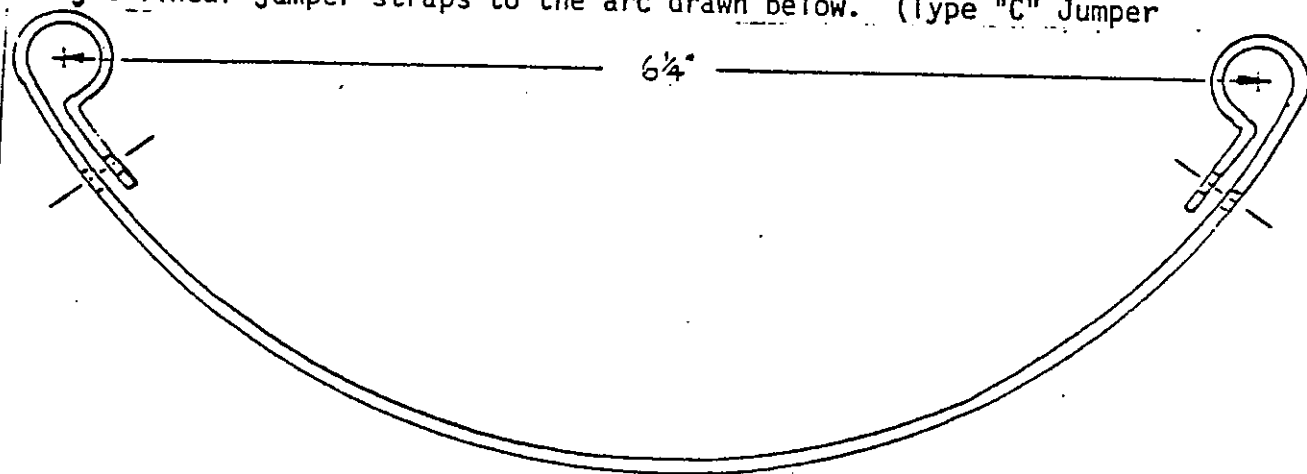


NOTE: A bench vice is handy for holding the 3/4" x 23 3/4" main part during this assembly.

1 Assemble the 23 3/4" & 5" swaged 3/4" O.D. sections to the end of the 4" x 5/8" O.D. fiberglass rod. Align holes and secure with 8-32 x 1 3/4" screws, nuts, and lockwashers. Tighten until the tubing flattens onto the rod and the assembly becomes rigid.

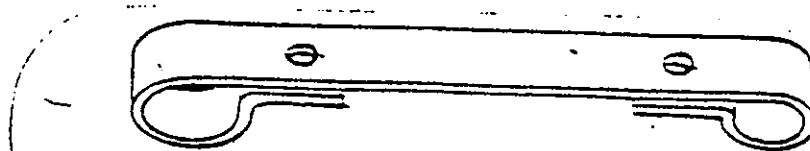
Repeat for all eight sections.

Bend all eight linear jumper straps to the arc drawn below. (Type "C" Jumper Strap).



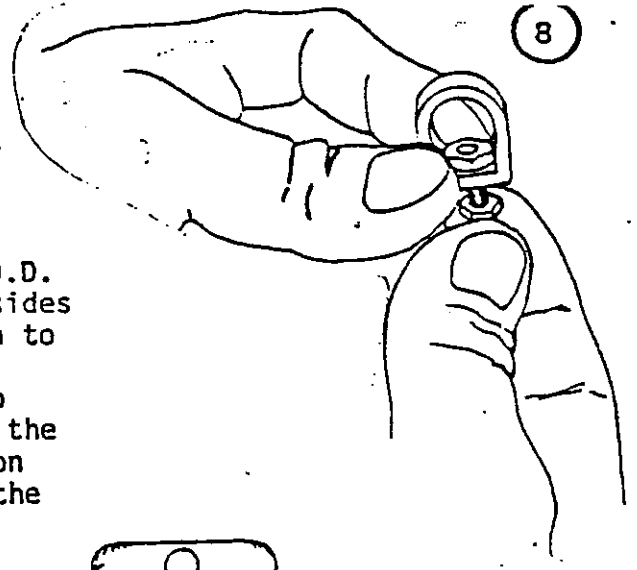
Add the 8-32 x 1/2" screws, nuts, and lockwashers. Finger tighten only at this time.

3 Prepare the type "B" shorting strap by adding the 8-32 x 1/2" screws, nuts, and lockwashers. Finger tighten only at this time.



TYPE "B"
15 METER SHORTING STRAP

Prepare eight 5/8" compression clamps as shown. Dab a bit of paste on the end and threads of the 10-32 x 3/8" hexhead screw. Position the 10-32 nut in the clamp and thread together.



Beginning with Director D1 capacitor bank (3/8" O.D. x 72"), spread a small amount of paste on both sides of each type "A" strap fingers where they attach to the studs. Next place fingers onto the studs. Separate two 10 and 15M capacitor tubes 1/16" to 1/8" as required for the "A" strap holes to fit the stud. The 15M strap attaches to the screw stud on the 3/4" O.D. x 5" section and the 10M strap to the stud on the 20" length.



LINEAR
REINFORCING
INSERT (PEANUT)

Insert a peanut into the drilled end of the 3/8" linear loading section ("L" shaped part).

Place the drilled end into the screw stud OVER the 10M capacitor strap. Secure both studs with 8-32 lockwashers and nuts.

The studs and straps are on the "top" of the element so orient the drain holes in the capacitors DOWN by rotating the capacitor section as needed. Then tighten the screws securing the straps to the capacitors.

Slide a diamond-shaped linear insulator about 6" onto the shorter half (10M side) of the 3/8" O.D. tubes.

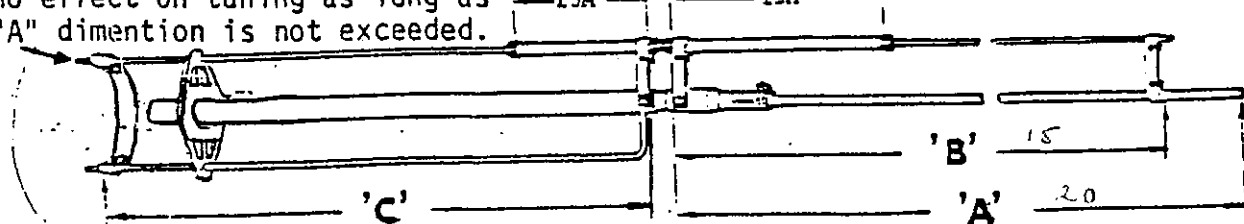
Using a small swab, apply paste inside the loops of the type "B" and "C" jumpers and to about 2" of the 1/4" O.D. x 51" tip. Install the 1/4" tip, "B" and "C" jumpers, and adjust to the dimensions below by hooking a tape measure on the type "A" capacitor straps and pulling toward "A" and "B" or "C". Measure to the outer edge of the "B" and "C" straps. Tighten all hardware on this assembly. Mark it appropriately (D1), wipe off excessive paste, and repeat for the other half.

Repeat Step 9 for the Front Driven, Rear Driven, and Reflector element parts marking them accordingly.

	1/4" O.D. TUBE REQUIRED	20	15	10
DIRECTOR D1	49 1/2" 49	51" 51	43 1/2" 42 3/4	24 1/2" 23 3/4
FRONT DRIVEN	42 1/2" 42	45" 45	43" 42 3/4	26" 25 3/4
REAR DRIVEN	51 1/2" 51 1/2	55" 55	47 3/4" 47 1/4	27" 27
REFLECTOR	59" 58 1/2	60 1/2" 60 1/2	47 1/2" 47 1/2	28" 28

Excess length at either end has no effect on tuning as long as "A" dimension is not exceeded.

1/4" O.D. CAPACITOR SECTIONS

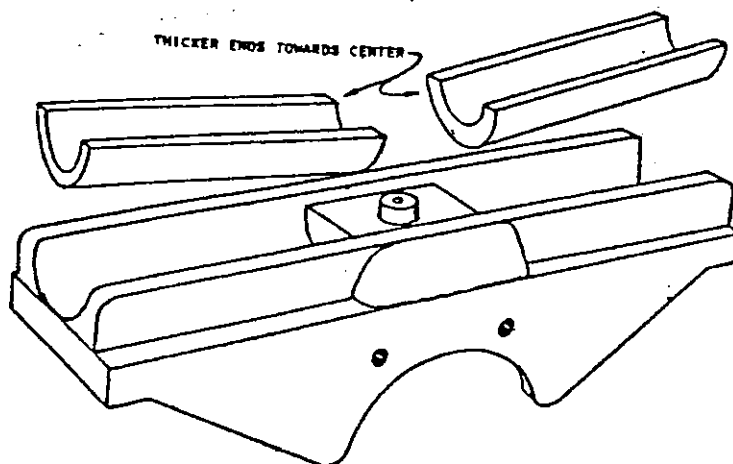


Element tip caps are not supplied or recommended due to potential moisture build-up inside the tips when caps are used.

V. MOUNTING ELEMENT SECTIONS TO INSULATORS

9

1. The KLM Lexan insulator has been designed to accommodate up to $1\frac{1}{2}$ " 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 top of the insulator with the thicker ends toward center as shown in the drawing below. Prepare all insulators.

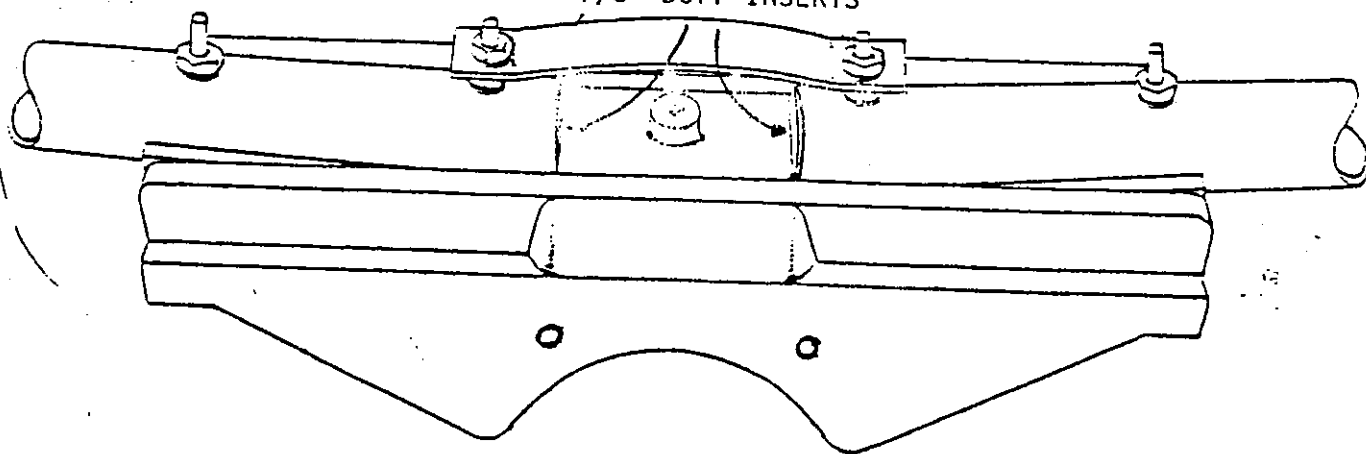


2. Mount the 1" O.D. x 72" element half pairs to the insulators (check that the $\frac{7}{8}$ " O.D. butt reinforcing inserts are in place with holes aligned).

NOTE: The element butt holes are drilled at a slight angle to compensate for the upward camber of the insulator cradle. Element should be rotated 180 degrees until the mounting screws pass easily through the insulator and element. The 10-32 x $2\frac{1}{4}$ " screws are inserted from the bottom of the insulator. Apply paste to the element around the screw hole and secure with lockwashers and nuts above the element butt (the studs formed by the two inside screws are used later for strap connections). Tighten the nuts securely to be sure the element sections are well seated in the insulator. Note that upon installation, the sections tilt up slightly to compensate for element droop.

3. Apply paste and place a $\frac{1}{2}$ " x $3\frac{3}{4}$ " jumper strap across the inner element studs for the Reflector and D1. Secure with additional 10-32 nuts and lockwashers. For convenience, DO NOT install the completed element tip assemblies yet.

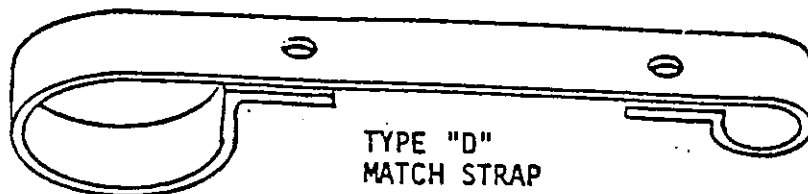
7/8" BUTT INSERTS



VI. FRONT DRIVEN ELEMENT "T" MATCH ASSEMBLY

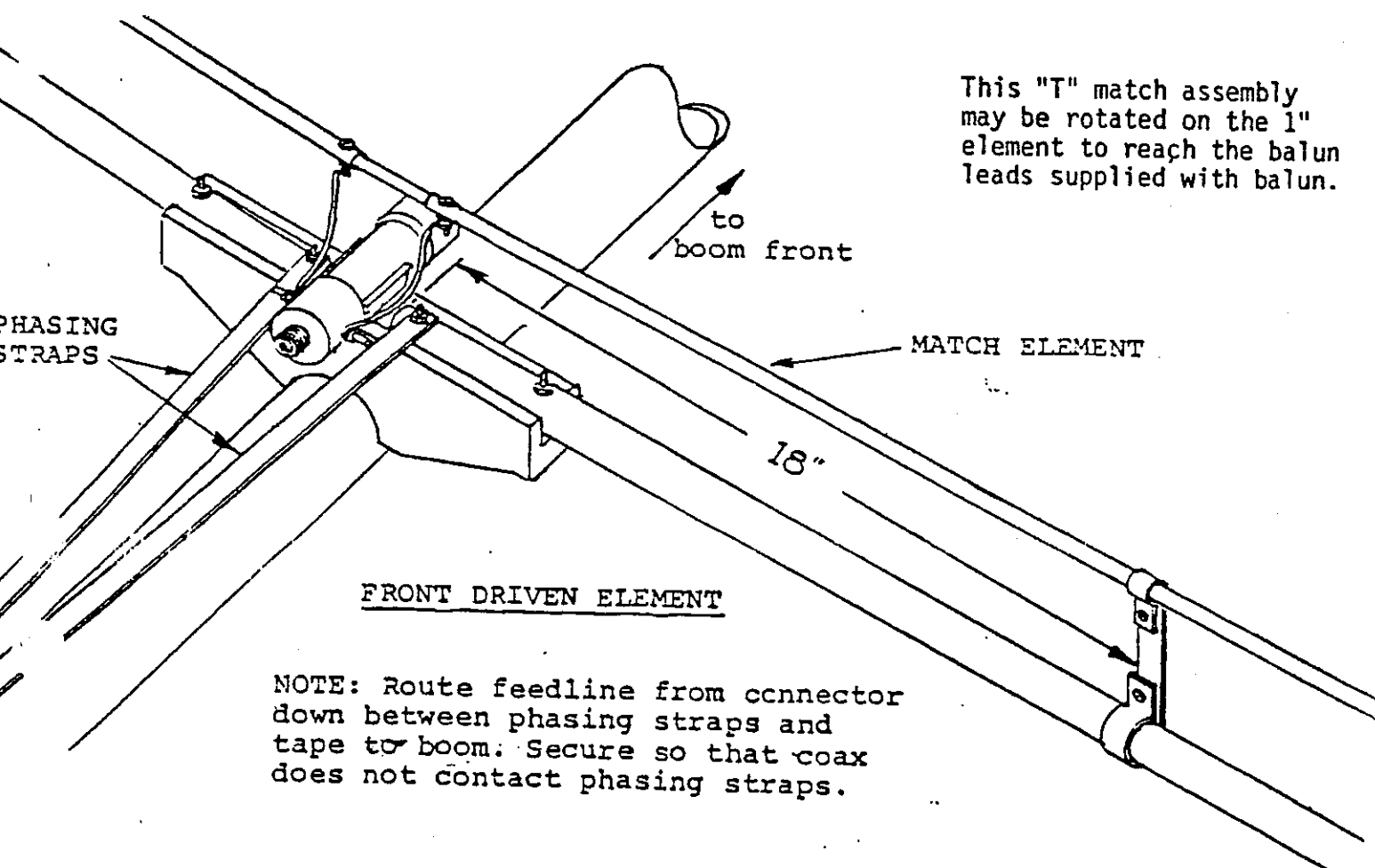
10

1. Locate the two type "D" match straps and install the $\frac{1}{4}$ " x 8-32 screws, lockwashers, and nuts loosely.



2. Select one of two remaining element insulator assemblies without center jumpers and slide a type "D" on each side locating them 18" each side of the element butts (apply paste under the straps and tighten in place per sketch below).

MATCH ASSEMBLY - FRONT DRIVEN ELEMENT

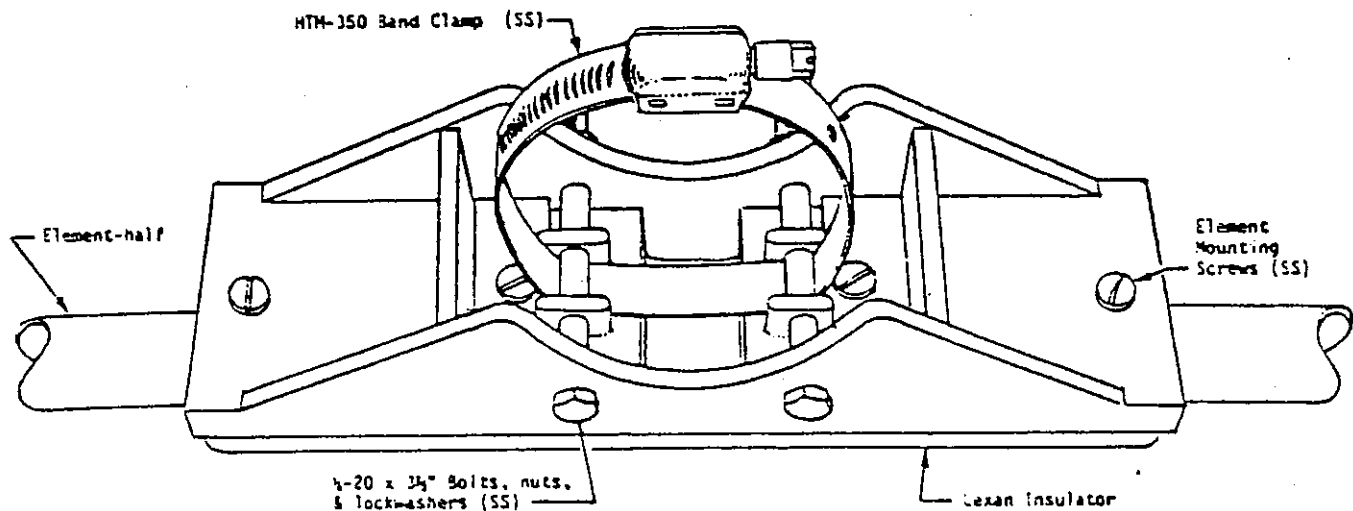


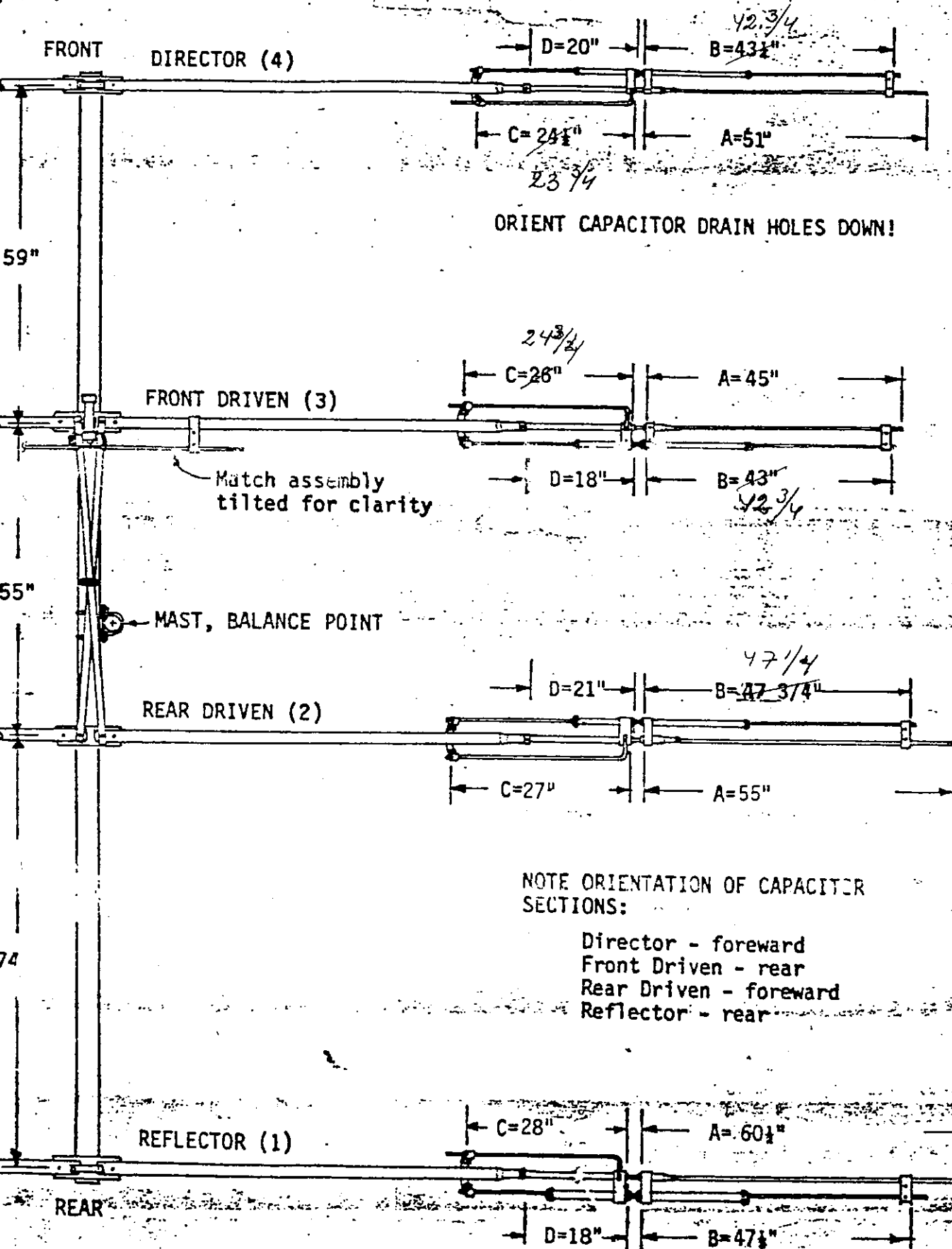
3. Now slide the preassembled 3/8" O.D. match assembly tubing first into one side; Then into the other. Apply paste to the appropriate areas under the strap. Center the assembly over the element insulator and tighten the type "D" screws around the 3/8" tubes.
4. Insert a #6 sheet metal screw through the end hole in the balun clip and mount the balun clip to the circular boss in the center of the element insulator.
5. Snap the 3-60-4:1 4KW PEP balun into place. Apply paste and attach the #12 AWG copper leads between the balun and the "T" match using #8 flatwashers, lockwashers, and nuts on the "T" match studs. Keep the lead as short as possible without distorting this assembly.

NOTE: The only thing critical about this assembly is that paste is applied to all joints as this assembly carries the full power of your transmitter.

I. INSTALLATION OF ELEMENT MOUNTING CLAMPS

1. The large HTM-350 band clamps are bolted into the underside of the Lexan insulators with 1/2-20 x 3 1/2" bolts, lockwashers, and nuts (stainless steel) as shown in the drawing below. Install in all the insulators. DO NOT over-tighten the 1/2-20 bolts (100 in lbs. maximum torque).



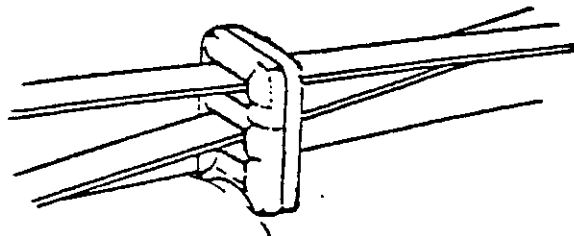


I. MOUNTING ELEMENTS TO BOOM (See complete half antenna sketch)

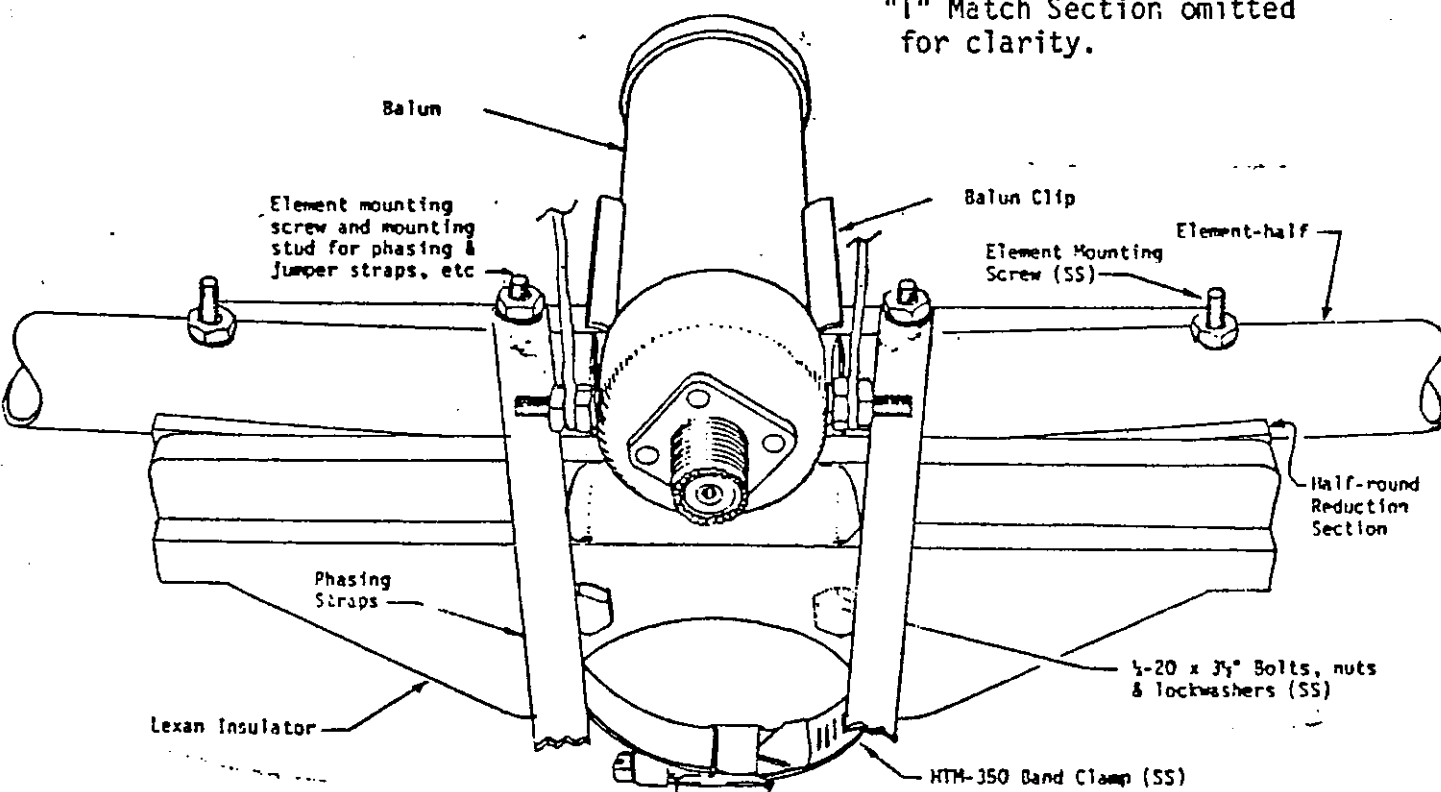
(13)

NOTE: The completed element tips are NOT installed as yet.

1. Rotate boom until splice bolts are diagonal, heads up. Center element #1 (Reflector) insulator 3" from the boom end and tighten the band clamp.
2. Mount element #2 (Rear Driven) 74" from #1 (center-to-center). Align element with reflector and tighten clamp.
3. Loosely mount element #3 (Front Driven) 55" forward of #2 (Rear Driven).
4. Slide 55½" phasing straps through two standoffs until they are centered. Apply paste around the strap holes and install straps between elements #2 and #3. Place ends onto inner set of element mounting screw studs (over existing nuts). Slide element #3 forward to fit straps. Be sure straps cross at center and connect to element halves on opposite side of the boom. Secure with #10 lockwashers & nuts.
5. Tension the phasing straps by tapping element #3 away from #2 until straps are taut. (Hold boom straight for this operation.) Align #3 element sections with the others and tighten clamp.



"T" Match Section omitted for clarity.

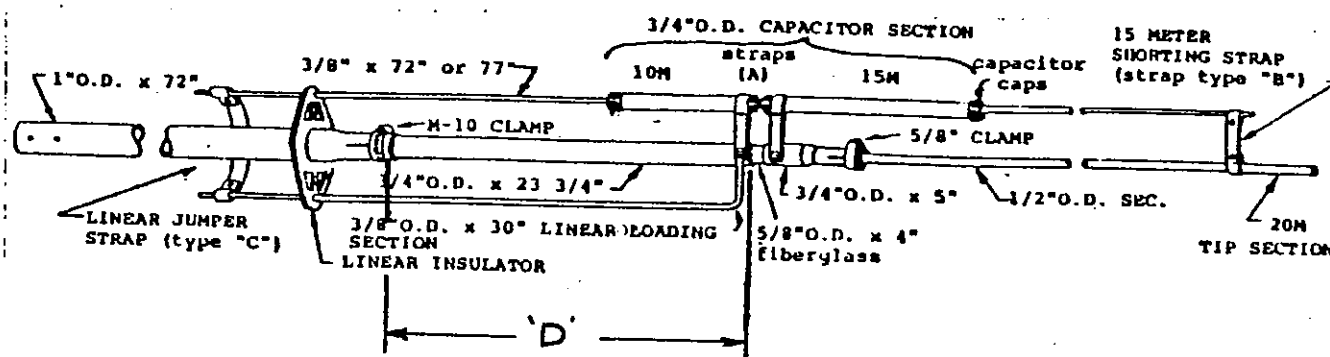


6. Place Director D1 59" forward of the Front Driven Element. Align and secure.
7. Once elements are all correctly aligned, the HTM-350 clamps may be additionally secured. Drill a small hole into boom (#38 drill) through existing hole in HTM-350 band clamp. Tighten a #6 x 3/8" sheetmetal screw into hole.

This operation is recommended especially if you live in an area with extreme weather conditions or if it is likely that the elements will snag on guy wires, trees, or other obstacles during installation of the antenna.

IX. ELEMENT TIP MOUNTING (Refer to the Complete Half Antenna Sketch)

NOTE: At this point, your particular assembly area may dictate whether you mount the element tips now or get the antenna to the next installation step prior to installing the tips. If your installation permits, you may even be able to mount the existing boom and partial element assembly on the tower before adding the tip assembled.



1. Select an element tip pair previously marked "Reflector". Apply paste to about 2" of the 3/4" O.D. element butt and slide on an M10 or M8 stainless band clamp. Refer to the "D" dimension and the capacitor bank location with respect to the other elements on the complete half antenna drawing. Also note that the studs on the element tip should be up and the capacitor vent holes down.
2. Insert the 3/4" O.D. tube into the 1" x 72" swaged element to the proper "D" dimension and tighten the band clamp.
3. Repeat for the other half tip.
4. Repeat the above steps for the Rear Driven, Front Driven, and D1 element tips.

Dimension "D"

D1	20"
FD	18"
RD	21"
REF.	18"

Y. ATTACHING THE BOOM-TO-MAST PLATE

1. Raise the antenna off its supports and determine the balance point on the boom. This will be in the area of the central boom splice.
2. Center the 9" x 9" boom-to-mast plate at the balance point and secure with two 3" U-bolts. Plate may be mounted on either side of the boom.
3. Two 2" U-bolts are supplied for securing antenna to mast.

I. INSPECTION

1. Upon completion of assembly, have another individual recheck antenna against critical dimensions shown on Dimension Sheet.
2. If possible, allow antenna to temp. cycle overnight. Then check and re-tighten all connections. This will ensure long lasting mechanical and electrical integrity.
3. Check once again to make sure all the capacitor caps are pressed firmly onto the 3/8" O.D. capacitor sections and that the drain holes are "down".

PRE-INSTALLATION CHECK-OUT

15

1. Since the permanent installation of any antenna requires a great deal of time and effort, we would like to suggest the following tests be made on the KT-34A prior to final installation.
2. Attach your good quality 50 ohm feedline to the balun and place the KT-34A on a temporary support 10 to 25 feet above ground. Use a non-metal roof, tall ladder, short tower, etc.
3. Using your exciter and a good quality SWR bridge, take SWR readings every 100 KHz on each band. Start and end at or beyond the band edges. Naturally, some SWR will be present and the general shift, because of the low height, will indicate the antenna is resonant slightly low in frequency. For the most accurate SWR readings, keep the system simple, i.e., exciter - SWR bridge - antenna. Eliminate scopes, antenna switches, filters, etc., for your initial readings. This simple system should be used for your post-installation SWR check also.

Gross problems such as 50-100% power reflected on all portions of each band indicate a problem in the feedline or balun. Disconnect the feedline at both ends and check for center pin-to-pin continuity and connector shell-to-shell continuity. There should be no continuity between center pin and shell. The balun should show continuity from center pin-to-shell and to each of the balanced terminals.

4. Another rough check of general performance even with the antenna at the low temporary height is to listen to the signals on 10, 15, and 20. If possible, compare it with another antenna on those bands. Signals on 10 and 15 meters particularly should be lively. Twenty meters may be subdued somewhat by the temporary test height conditions. Again, you're looking for anything grossly different than what you would expect.

If any gross problem appears to be present, a continuity check of each element should be made. Check for continuity across each joint. This continuity check will almost invariably expose the problem and we consider it a most valuable time spent to ensure long trouble-free operation.

1. INSTALLATION HINTS AND KINKS

1. Good quality coax feedline of the proper impedance is a major factor in achieving good VSWR across each ham band. KLM recommends the following cables.
 1. RG-213 AU
 2. Times FM-8 Foam Coax
 3. Belden 8214 Foam Coax

Other brands of foam "RG-8 type" coax are typically not 50 ohm (more like 60-70 ohm) and should be avoided.

2. Large objects and other antennas, 40 or 80 meter dipoles for instance, can also affect the VSWR of a tribander. To check for detrimental effects, temporarily lower or remove the dipole or at least rotate it 90° out of line with the tribander elements. If the VSWR is reduced, one of the antennas should be relocated to avoid adversely affecting the performance of the Tribander.

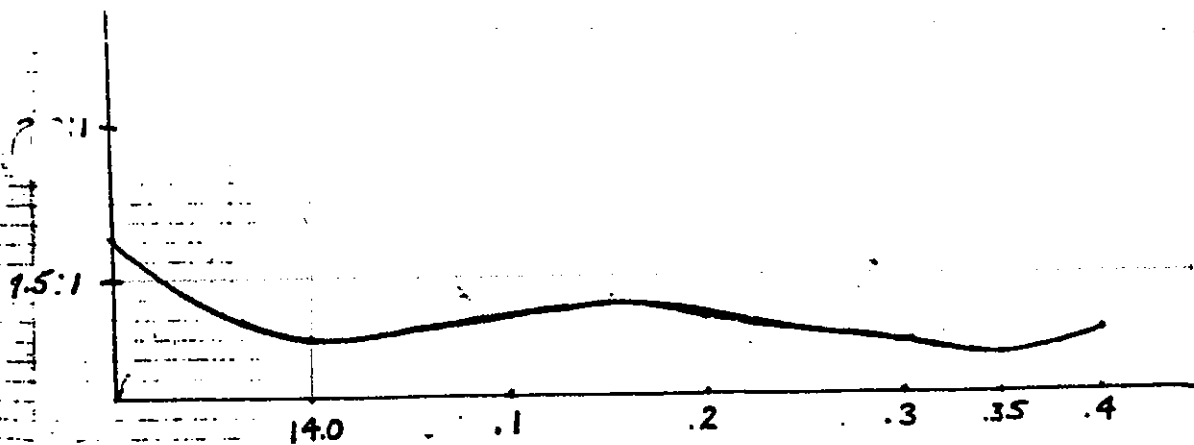
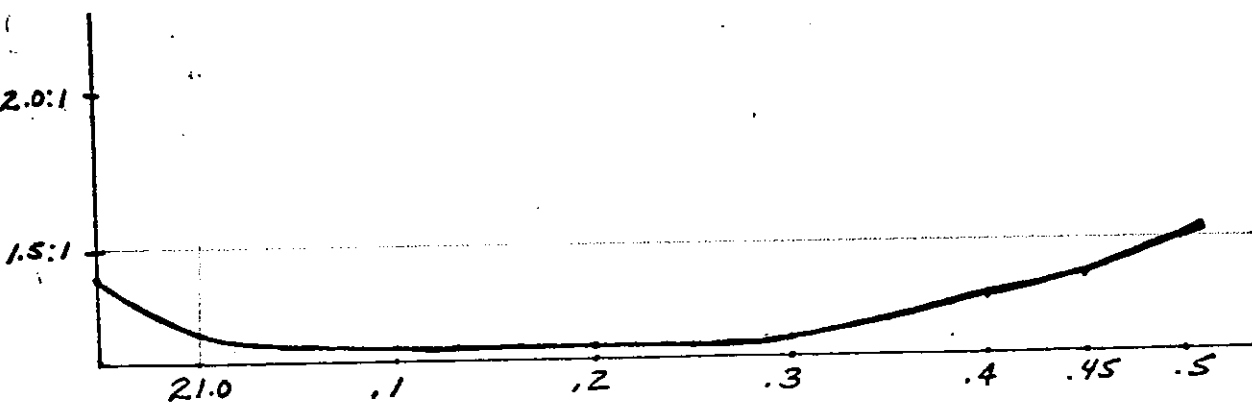
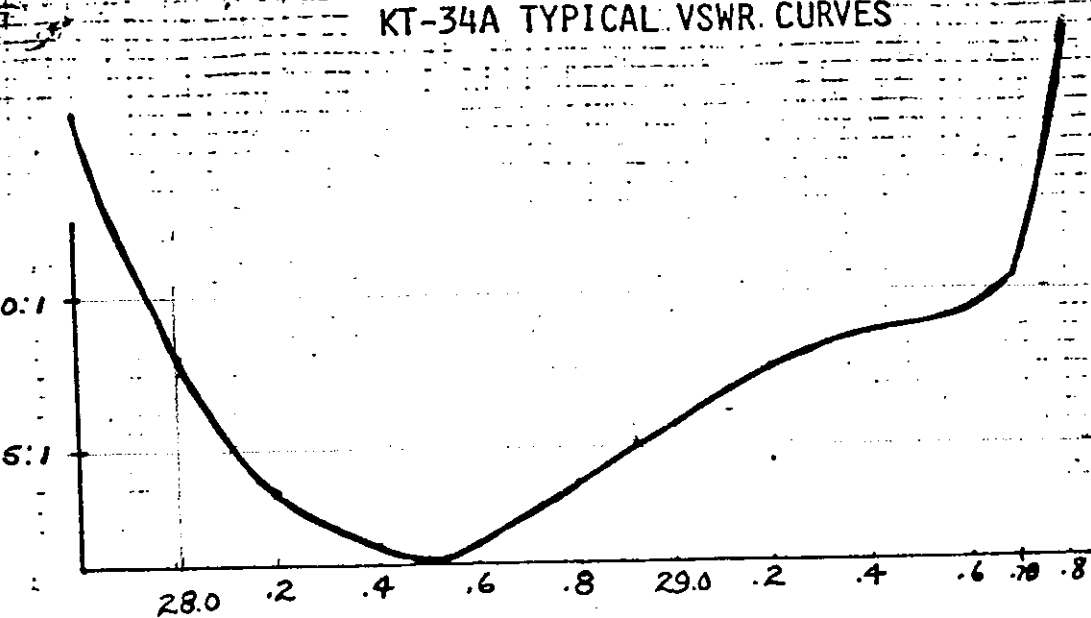
The KLM 40 meter dipole (7.2-1) can be used with the Tribander and will work well. But, the dipole must be mounted above or below the Tribander and in line with its boom (90° out from elements).

3. Mounting height: Generally, the comment "the higher - the better" is true. Excellent performance can be realized, however, from 30 feet on up. Ten (10) meters will be affected least by increased heights over 30 feet and 20 meters will be improved the most.

Overall, antenna efficiency is reduced at low heights because surrounding objects (buildings, trees, metal fences, etc.) absorb RF from the antenna before that energy can become a sky-wave. Whenever possible, mount the antenna high and in the clear.

4. See Page 17 for typical SWR curves for each band. Your curves may vary somewhat due to instrument accuracy, height above ground, surrounding objects, etc. But, you should be able to recognize key corner points and ripple.

KT-34A TYPICAL VSWR CURVES



EVE

MIRAGE

/KLM
COMMUNICATIONS EQUIPMENT, INC.

KT-34A AND KT-34XA
"FROM THE HORSE'S MOUTH"

VSWR High on Low End of 15M? The tuning of the reflector controls the VSWR on the Low End of each band. The "B" Dimension tunes the 15 meter resonance of each element. Sometimes it is difficult to look at the VSWR curve and determine if the reflector has moved up or down in frequency. Try shortening the reflector "B" Dimension by 1". If the Low End VSWR improves, you can move the "B" Dimension as much as 3 inches without having much effect on 20 meters. If shortening makes the condition worse, then put "B" as long as possible and extend the "D" Dimension up to 2" as required. The "D" Dimension also effects 10 and 20 meters slightly so check for satisfactory VSWR on those bands.

VSWR High on the Low End of each Band? If you have High VSWR on the Low End of each band, check the color of your capacitor caps. If they are black you need to purchase an update kit. This consists of new capacitor tubes and caps. Follow the instructions in the kit and it should correct your Low End VSWR problem. If you already have white or light green capacitor caps and you have Low Band edge VSWR problems, remember, the reflector controls the Low End. Start with 10 meters "C" Dimension on the reflector. Adjust as required to improve the VSWR; 1 to 1½" adjustment should be the most you should change the "C" Dimension. Next check 15 Low End VSWR. If it's still high, adjust the "B" Dimension. The "A" Dimension controls 20 exclusively. Remember, you should not adjust the VSWR if it is poor only pointing the antenna in one or two directions. This indicates a problem outside the antenna created by another structure.

VSWR High on High End of 10M/15M/20M? If you have High VSWR on the High End of all three bands, start your adjustments on 10 meters as correcting 10 will also improve each band. The "C" Dimension controls 10 meters. Usually the High End has moved down slightly so shortening the "C" Dimension by as much as 1 inch may be required. Next check 15 meter High End again. If the VSWR is still High, shorten the "B" 1 to 3 inches as required. Normally, when 10 and 15 are correct, 20 will also be right but if needed the "A" Dimension can be adjusted as necessary.

What does the "A" after the KT-34 and KT-34X mean? About one year after we started making the KT-34 and KT-34X, we changed the boom wall thickness. For upgrade and repair purposes only, we designated the change with the letter "A" after KT-34 and KT-34X so we could ship the correct replacement parts. No tuning, dimension, or other part change is connected with the "A" suffix.

VSWR High when it rains? Several things can cause this. Before blaming the antenna, make sure the feedline is not the culprit. If the feedline is okay, then it may be in the capacitor sections of the antenna. Polyethelene capacitor caps may be cracked or dislodged allowing drops of water inside the capacitor. It only takes one drop to have severe effects on the VSWR. If no caps appear dislodged or cracked, then water may have been blown into one or more of the capacitor vent holes. This usually occurs only if the antenna hangs over the edge of a building or a cliff where high velocity updrafts can occur and drive droplets of water up and into the vent holes. On the older antennas the capacitor tubes had vent holes on the underside to permit drainage. Time and experience has shown that the tubes should not be vented and recent construction has eliminated this feature. Mirage/KLM now provides an update kit with new capacitor tubes and caps.

If water has been blown into the vent holes, the High VSWR condition will usually correct itself in a day or two. If it does not correct itself, it means there may be other problems. If High power was used during the rain, induced High VSWR condition arcing may have occurred inside the capacitor and a carbon path may still exist. Director D1 usually sees the Highest voltage during operation and the arcing will normally occur at the junction of the 10 and 15 meter capacitor tubes near where the "A" straps are attached to the capacitor tubes. This element can be reached and removed from the boom for repair without disturbing the rest of the installation.

VSWR High across 15M; okay on 10 and 20 after rain? This probably means water has seeped inside the 15 meter capacitors. Check for cracked or dislodged capacitor caps. 15 meters has the highest Q elements and therefore is the most sensitive to disturbances. If the antenna is located where high winds can drive moisture into the vent holes of the capacitor caps, you should purchase an update kit to correct the problem.

How close can I stack a 40M beam? 40 meter horizontally polarized antennas usually disturb 15 meters the most because of the harmonic relationship. To minimize this when stacking 40 and 15 on the same tower, orient the 40 meter antenna at a direction 90 degrees from the tribander. Stacking should not be closer than 6 feet with a two element forty and further if 40 is more than 2 elements.

How close can I stack a 2M beam? Usually the 2 meter beam will not affect the tribander. The two meter beam should be at least 1/2 wavelength (40 inches) away from the tribander and further if possible. The larger the 2 meter antenna, the more it may be affected.

How close can I stack a 40M Dipole at 90°? As close as 3 to 4 feet as long as it rotates with the tribander and is not fixed to the tower; such as wire inverted V might be.

How far should the beam be from the ground? At about 1/4 wavelength at the lowest frequency (16 feet at 20M) the antenna will begin to exhibit reasonable performance. It, of course, the angle of radiation will be almost straight up so not much DX will be easily worked. At a 1/2 wavelength (32 ft.) up there is a real improvement. Recommended height for excellent performance is 45 feet or higher.

How much power can the 34 handle? All you can legally muster and then some. Lossless elements and good design have been used to virtually eliminate any power handling problems. If, however, your VSWR goes high for any reason running high power may only cause further damage.

Can the 34 be peaked for even greater gain on one portion of the band? Yes, but only .2 to .3db and at a huge sacrifice to all other performance aspects of the rest of the antenna. A high degree of interaction from band to band occurs in any tribander & gain may be severely affected on the other bands. The KT-34A and KT-34XA were designed with max gain as the top priority and it's unlikely, without a good antenna range, any further overall improvement can be made even by narrowing banding.

Can you add a 40M dipole to the end of a 34? Not without the possibility of disturbing the performance of the 34A or 34XA. If you try it anywhere, put it behind the reflector by six (6) or more feet. The recommended spot for a rotatable 40 meter dipole is above or below the tribander by 3 to 6 feet and in line with the boom. This should eliminate any noticeable interaction.

How much power will the balun take? The balun is rated at 4KW peak envelope power (PEP). It can take more for short periods but core saturation may occur causing severe overheating and loss of balance. Non-linearity can also occur perhaps generating spurious or harmonic responses.

How tight can the insulator clamp be tightened? Tests run at the factory show the clamp, when properly lubricated, can actually compress the boom material noticeably before failing. Normal tightening by hand with a spintite or small socket wrench is adequate and a hole in the clamp is provided to pin it after proper alignment has been achieved. During initial assembly, we recommend retightening after one overnight temperature cycle.

How come the F/B is lower than other beams? The KT-34A has excellent front-to-back for a tribander. Monobanders may be a bit better. The KT-34XA was designed specifically for maximum gain on each band. Front-to-back was certainly a consideration but not at the expense of gain, which rivals or exceeds many monobanders its size or larger.

How hard is the 34 to tune? Normally the KT-34A and XA are "tuned" during assembly by setting the parts to specific called out Dimensions so no tuning should be required. If tuning is required, it is not difficult if you know two things. The Reflector has the most control over VSWR at the Low End of the band and the Director D1 (right in front of the Front Driven) controls the High End. The "C" Dimension sets 10 meters, "B" sets 15 meters, and "A" Dimensions sets up 20 meters.

How long does it take to put it together? Reports back from users indicate as little as four hours and as much as forty hours. Typically eight to ten hours for the first time with a 34A and ten to twelve hours for the XA. The instructions have many detailed pictures. Common sense, pictures, and dimensions are all you should really need but much more is provided in the Assembly Manual.

How far apart in order to phase two 34's? The 34A's could be stacked at 22 to 30 feet apart and XA's 35 to 45 feet apart.

What is the best height for the 34? The Lowest band usually suffers the most at low heights. In order for 20 meters to do the best job, it should be up 45 feet or more. Over 120 feet is questionable because performance may not be optimum when the band is wide open. A lower height might be better. 60-70 feet is probably optimum for most applications.

Do power lines effect the performance? Yes, but a lot depends on their height and distance from the antenna. To make a crude check for interaction, check the VSWR with the antenna pointed in a clear direction. Then rotate the antenna towards the power lines. If VSWR changes, interaction is occurring with some probable performance degradation.

How come the non-driven elements are not grounded? They can be but the element mounting insulator Mirage/KLM uses is designed for maximum versatility of element mounting and testing. Keeping it insulated from ground maximizes this capability. If grounding is desired, a simple connection from the center of the middle jumper strap to the boom is sufficient. This jumper to ground at the middle will not effect performance or VSWR.

What is the advantage of no traps? The KT34A and XA really does have traps but our construction avoids the use of coils. Using linear loading in place of a coil greatly reduces coil losses and the linear loading portion also radiates far better than a coil. Our capacitors use air as the basic dielectric which requires that they be large but their Q is extremely high. All this adds up to no heating of components which means more power is radiated.

Can the KT be painted? Yes, but we recommend several things first. Put the antenna up and be sure it is working correctly on all bands. If possible, leave it up a few days so the aluminum oxidizes slightly. This should make the paint stick better.