

MIRAGE /KLM

COMMUNICATIONS EQUIPMENT, INC.

2M-11X

13927

The 2M-11X is another of KLM's new line of log driven, log tapered yagi designs. This yagi produces maximum gain for its boom length and, because of its light weight and low windload factor it is tailor made for use in larger arrays. Of course, it is perfect for crowded mast and overloaded tower situations where high gain and clean pattern are still a must. The dual driven element with its characteristic high efficiency and built-in front to back ratio eliminates the need for bulky, heavy multiple reflector structures.

SPECIFICATIONS

Electrical

Frequency range.....144 to 146 MHz
Usable range.....143 to 148 MHz
*Gain.....12.5 dbd
F/B ratio.....20 db min.
F/S ratio.....30 db min.
E plane beamwidth.....34 degrees
H plane beamwidth.....36 degrees
Feed impedance.....50ohm unbal. tef. balun incl.
Stacking distance.....E-11'4" H-11'0"

Mechanical

Boom length.....186"(472.4 cm) 2.24wavelengths
Driven elements.....2 spaced 10" - 3/8" dia.
Parasitic elements.....9 (8 dir. & 1 refl.)
Weight.....5.5 lbs.
Wind load.....1.38 sq. ft. max.
Turning radius.....109"
Mounting.....H or V -2-1/8" Mast dia. max.

To provide a more accurate and consistent gain figure, performance of this KLM antenna has been carefully measured and correlated in accordance with National Bureau of Standards Note #688. This gain figure may appear somewhat conservative when compared with others commonly found in conventional industry literature and based on older, less exacting rating methods.

REVISED: 8-2-83

BEFORE YOU BEGIN...

After unpacking your new 2M-11X yagi kit, check the parts carefully against the Parts List at the rear of this manual. Contact KLM regarding any discrepancies.

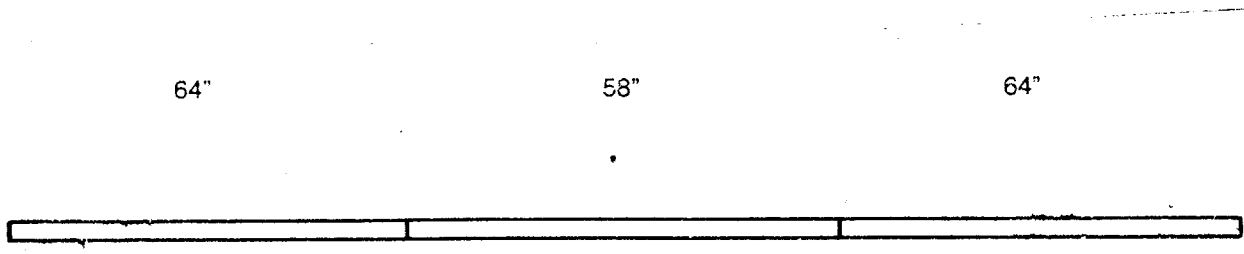
TOOLS REQUIRED

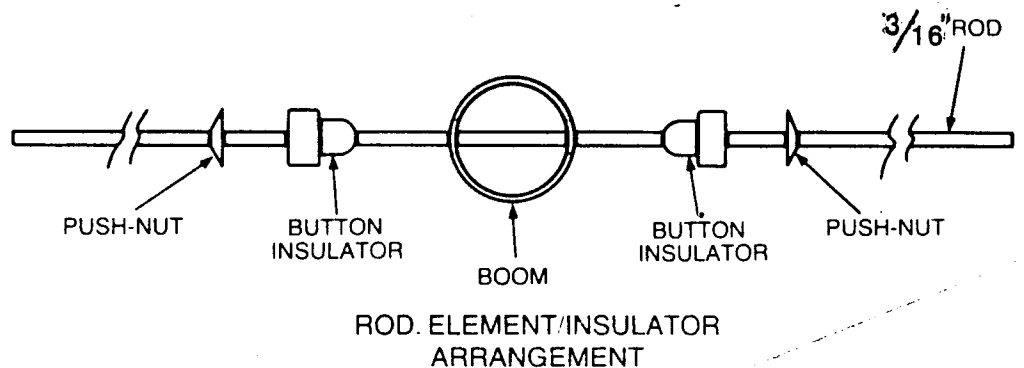
A standard flat blade screwdriver and wrenches or sockets to fit 5/16, 11/32 and 1/2 inch nuts are all that is required.

BOOM ASSEMBLY

The boom consists of three (3) pieces of one inch diameter aluminum tubing. The center section has been swaged down in size at each end to accept the other two pieces. The ends should be marked but if the marking is not clear, the straight piece with 5/16 inch holes in one plane and 3 smaller holes in the other plane is the rear or driven element end boom section. It also has a 5/16 inch element mounting hole that should match a similar hole in one end of the center section. Assemble the boom and secure with the stainless 8-32 x 1-1/4 inch hardware provided. Tighten the forward section joint but leave the rear single screw joint loose at this point. It can be tightened after the 36-1/2 inch (92.7 cm) element is in place.

It is usually helpful to install the U-bolts and the boom-to-mast plate at this time. Mount it approximately 77 inches (195.5 cm) from the rear end of the boom. Final positioning is done later and is determined by the balance point and the mounting polarity. This completes the boom assembly.





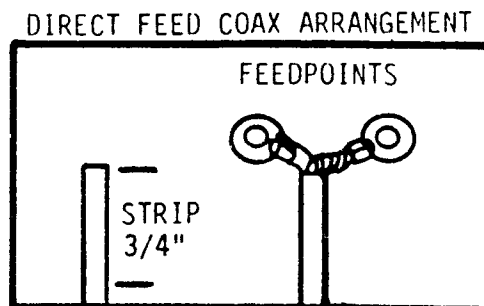
NOTE: Performance and VSWR will suffer if elements are not centered properly.

Once each element is centered within 1/32 inch (.079 cm) carefully add the push-nuts and shove them up tight against the button insulators. Remember the element centering cannot be changed once the keepers are installed so be sure the elements are perfectly centered before completing this keeper installation. A few extra keepers have been provided in case of assembly error.

For short term field trips and mountain topping the button insulators will hold the elements centered and keeper installation is not recommended if the antenna is to be disassembled. Additional keepers can be ordered from KLM.

FEEDLINE INSTALLATION

Two lugs have been provided for inexpensive, reliable feedline attachment to the feedpoint of the antenna. Follow the sketch for feedline preparation.



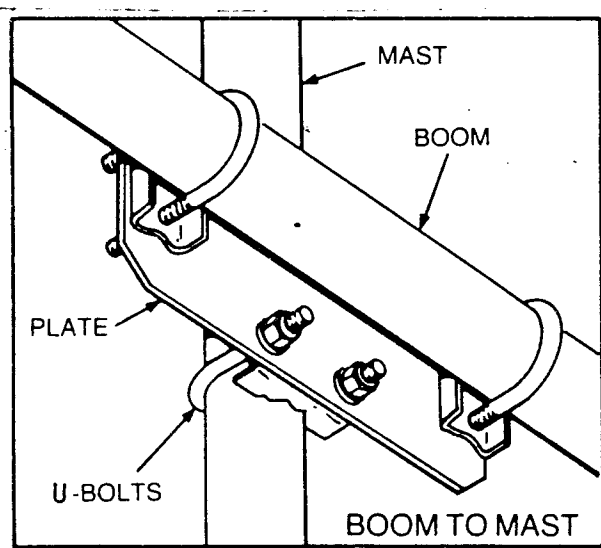
If special coax is to be used, and/or connector mounting is desired, the lugs can be attached to either SO-239, "N" UG-58 or equivalent connectors and this assembly mounted right at the feedpoint. Use #12 AWG or equivalent wire size between the lugs and the connector and keep the exposed lead to 1/4 inch (.635 cm) or less. Remember the connector body connects to the grounded stud and the center conductor attaches to either side of the front driven element half.

NOTE: If more than one antenna is used and a higher gain array is planned, proper phasing is essential. This means that whichever side you have chosen to attach the center conductor, that side must be the same for all the antennas in the array structure. If the center conductor side is reversed a 180 degree phase reversal occurs and the array pattern will be destroyed or badly distorted.. Again, to be correct the coax center conductor must be attached to all the right side driven elements or all the left side driven elements but cannot be intermixed without the 180 degree phase reversal occurring.

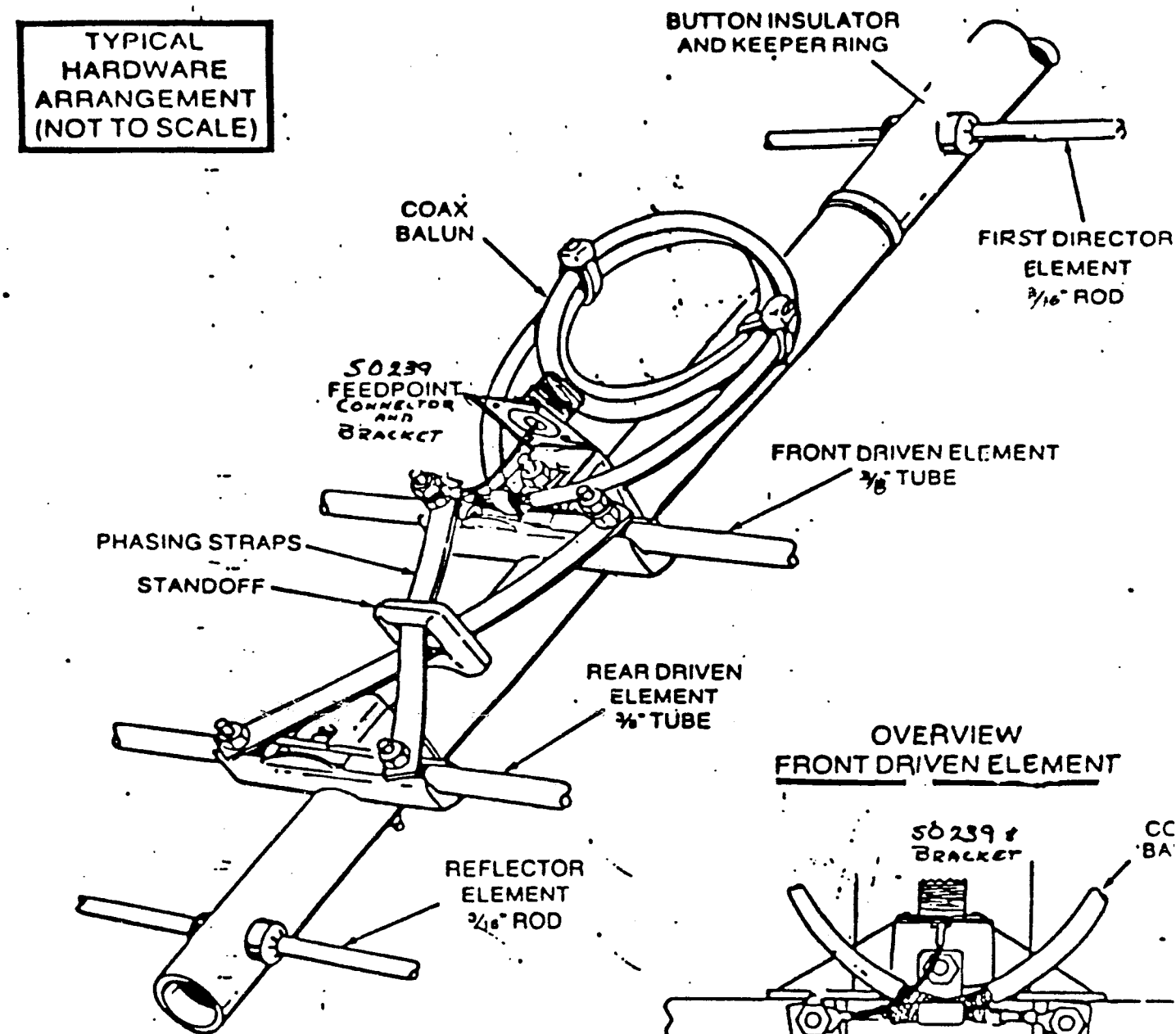
Physical mounting and identical positioning of the boom to mast plate are also essential in maintaining the proper phase in the array. This is just as important as identical electrical phasing if the array is to perform to it's optimum.

One more reminder, each piece of coax feeding each antenna should be the same electrical length or vary only in one wavelength multiples. Good engineering practice dictates the feedline be in orders of halfwave multiples so that feedline impedance variances do not affect the match when coupling multiple antennas together through power dividers.

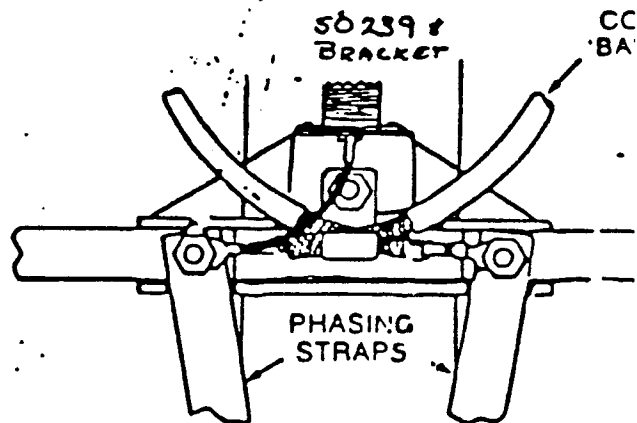
KLM provides fully assembled and phase matched, low loss coaxial phasing lines as well as two and four port power dividers for the 144, 220 and 432 MHz amateur bands.



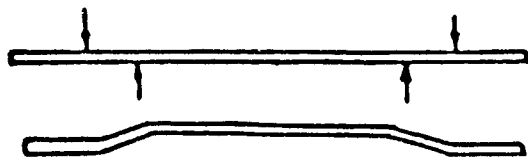
**TYPICAL
HARDWARE
ARRANGEMENT
(NOT TO SCALE)**



**OVERVIEW
FRONT DRIVEN ELEMENT**

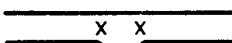


°5° bend phasing straps before installing



Not to Scale

2M-11X DIMENSIONS

ELEMENT SPACING		ELEMENT LENGTH		$\frac{1}{2}$ LEN. SHOWING	
CM	INCHES	INCHES	CM		
466.73	183 $\frac{3}{4}$		35 $\frac{1}{4}$	89.54	17.125
397.67	156 $\frac{9}{16}$		35 $\frac{1}{2}$	90.17	17.25
331.63	130 $\frac{9}{16}$		35 $\frac{5}{8}$	90.49	17.513
268.61	105 $\frac{3}{4}$		35 $\frac{7}{8}$	91.12	17.438
217.65	82 $\frac{11}{16}$		36 $\frac{1}{4}$	92.08	17.625
157.48	62		36 $\frac{1}{2}$	92.71	17.75
112.40	44 $\frac{1}{4}$		36 $\frac{7}{8}$	93.66	17.938
74.93	29 $\frac{1}{2}$		37 $\frac{3}{16}$	94.46	18.094
58.42	23		15	38.1	
33.02	13		19 $\frac{1}{4}$	48.9	
2.54	1		40 $\frac{5}{8}$	103.19	19.813

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2M-11X

PARTS LIST

ITEM DESCRIPTION	PART NUMBER	QUANTITY
Boom, 1" OD x .058" x 64", Straight	T1000	2
Boom, 1" OD x .058" x 64", Swaged	T1000	1
Element, 3/8" OD x .035" x 19-1/4"	T0380	2
Element, 3/8" OD x .035" x 15"	T0380	2
Rod Element, 3/16" OD x 40-5/8"	R0316	1
Rod Element, 3/16" OD x 37-3/16"	R0316	1
Rod Element, 3/16" OD x 36-7/8"	R0316	1
Rod Element, 3/16" OD x 36-1/2"	R0316	1
Rod Element, 3/16" OD x 36-1/4"	R0316	1
Rod Element, 3/16" OD x 35-5/8"	R0316	1
Rod Element, 3/16" OD x 35-7/8"	R0316	1
Rod Element, 3/16" OD x 35-1/2"	R0316	1
Rod Element, 3/16" OD x 35-1/4"	R0316	1
Phasing Straps, 1/2" x .063" x 10-3/4"	S0120	2
Boom-to-Mast Plate, 4" x 6" x 1/8"	P0406	1
Coax Balun; 2M-4:1	B7303	1
Hardware Bag #1:		
Screws, 8-32 x 2"	28017	2
Screws, 8-32 x 1-1/4"	28014	8
Screws, 8-32 x 1"	28013	4
Nuts, 8-32	28202	17
Lockwashers, #8	28352	17
Flatwashers, #8	28302	3
Hardware Bag #2:		
Button Insulators	66125	20
Pushnuts, 3/16"	28218	22
Driven Insulators, Type II, 3/8" x 1"	66113	2
Phasing Strap Spacers, 1" x 1-1/4"	66121	2
Nylon Ties, Large	66119	5
Nuts, 5/16-18	28206	8
Lockwashers, 5/16"	28356	8
Large Hardware Bag:		
H.D. U-Bolts & Cradles, 1-1/8"	28409	2
U-Bolts & Cradles, 2"	28402	2
"L" Bracket connector	CLB39	1
Assembly Manual - 9 Pages	M4070	1

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COMMUNICATIONS EQUIPMENT, INC.

JUNE 1, 1988

Use the piece of 3/8" tubing supplied in this kit for installing the button insulators and the pushnuts. This piece of tubing is not part of the finished antenna.