

## Manual For

# KLM 27 Element UHF “Bandpass Yagi” Antenna Model KLM-420-470-27

This antenna consists of a 4-element broadband Log-Periodic surrounded by one conventional Yagi reflector and 22 Yagi-style directors. The resulting antenna has continuous coverage with a uniform pattern, SWR and gain across the entire amateur UHF band from 420 to 450 MHz, making it suitable for FM operation in the 440-450 MHz range, SSB in the 432 range, and ATV in the 434-440 range.

The following pages are cleaned up 300 DPI scans of pages of the original manual supplied with an antenna purchased in the late 1970s. These pages contain enough dimensional data (element lengths, spacing, etc) to reproduce this antenna today.

The original 3/8ths-inch aluminum tubing antenna elements had molded-on plastic mounting brackets/insulators. These brackets insulated the elements from the 1” diameter aluminum tubing boom, placing them about 1/8<sup>th</sup> inch above the boom.

A possible approach to re-creating this antenna would be to use 1¼ inch diameter PVC pipe for the boom instead. One would pass the elements through 3/8-inch diameter holes crossing the diameter of the pipe.

The log-periodic driven elements could be bolted to a piece of 1/8<sup>th</sup>-inch thick G10 glass-epoxy PC board with the right-sloping “zigs” of the log phasing harness etched into the top surface of the PCB and the left-sloping “zags” etched into the bottom surface of a double-sided PCB. The back end of the driven-element PCB would extend just enough farther back to also support the single reflector element behind the log section. The forward end of this PCB would be fitted into a slot cut into the rear end of the PVC pipe boom for the director elements. The PCB would then be bolted and/or epoxied into the notch.

The feed point of the 4-element log-periodic driven section is 50 ohms balanced. The original design used a quarter-wave sleeve balun, constructed of concentric pieces of pipe, with an integral female “N” connector at one end. A possible easier-to-fabricate alternative balun would be a piece of coax cable with several ferrite beads, of a mix rated for the VHF/UHF frequency range, slipped over it. One end of the cable would have ring terminals to connect to the feed point; the other would have a cable-mount female “N” socket attached, ready to accept a feedline with a normal male “N” plug.

# KLMelectronics, inc.

COMMUNICATIONS EQUIPMENT/ANTENNA INNOVATIONS

KLM 420-450-27  
UHF ANTENNA

Welcome to the antenna line of the KLM communications family. Your antenna kit features hi-grade materials and workmanship. It requires no additional drilling or machine work. The design has been optimized for maximum performance and durability. Altering or modifying the antenna is not recommended.

This packet contains basic assembly instructions for your antenna. A detailed Dimension Sheet, Assembly Pictorial, and Parts List are included to assist in successful construction.

## I. PREASSEMBLY

Select an assembly area large enough to accomodate boom and element lengths. Two sawhorses or large boxes are useful for holding antenna boom at a comfortable working height. A shallow box is handy for holding and sorting the small hardware. The following tools are required: Tape measure, screwdriver, spintites, socket or end wrenches. Common nut sizes encountered are:

5/16" . . . . .	6-32 hdwe	Boom, element, insulator ass'y
11/32" . . . . .	8-32 hdwe	
7/16" . . . . .	½-20 hdwe	- U-bolts

**PLEASE NOTE:** With the exception of U-bolts, most small nuts and screws can be considered "tightened securely" when moderately hand tightened with screwdriver or spintite. When using tools with additional leverage on any hardware, care must be taken not to overtighten and damage components.

For the best results and the best use of your time, we strongly recommend familiarizing yourself with all parts and instructions before beginning assembly.

## II. ASSEMBLY INSTRUCTIONS

1. Thoroughly unpack shipping box and check all components and hardware against the attached Parts List supplied for your particular antenna model. In the event a difference is apparent, please check for a "Factory Up-date/Changes" list accompanying this instruction sheet prior to contacting your KLM dealer or the factory. Note that hardware packages are modularized for each assembly operation.

### III. BOOM ASSEMBLY: (Multiple sections only)

1. The ends of each boom section to be assembled are letter-marked in felt pen. Assemble boom sections matching like letters ("A" to "A", etc.) and aligning screw holes. Each joint requires 2 sets of 8-32 x 1½" screws, nuts, and lockwashers from the hardware package. Tighten nuts securely.

2. Note: On some models a boom assembly screw hole may coincide with insulator mounting hole. Exchange screw later, as necessary, with longer element mounting screw.

### IV. DRIVEN ELEMENT ASSEMBLY

1. Attach the driven element insulators to the boom according to position and spacing specified on Dimension Sheet using 8-32 x 1½" screws, nuts, and lockwashers. Orient element cradle section to the rear of the insulator mounting screw (see Assembly Pictorial).

2. Use tape measure to select and match driven elements according to lengths specified in Dimension Sheet. Mount elements and straps to insulators as shown in Assembly Pictorial. Use 6-32 x 1½" screws, nuts, and lockwashers. Note orientation of screws on Assembly Pictorial (nuts are to side). Tighten securely.

### REFLECTOR/DIRECTOR ASSEMBLY

1. Use a tape measure to select reflector/director elements. Insert 8-32 x 1½" screws through the integrally molded insulators and attach to boom, orienting the offset element lengths towards the rear.

If you ordered a KLM balun with the antenna use an 8-32 x 1½" screw to mount the balun clip and the first director to the boom. (See Assembly Pictorial). Snap balun into clip placing lead straps onto feedpoint studs (front driven element). Secure with additional flatwashers, lockwashers, and nuts.

### VI. FINAL INSPECTION

1. Use tape measure and Dimension Sheet to double check all elements for correct spacing and length. Use Assembly Pictorial to double check correct placement of straps, screws, balun, etc.

Re-check all nuts and screws for tightness.

# PARTS LIST

KLM 420-450-27  
UHF BANDPASS ANTENNA

HARDWARE PACKAGE

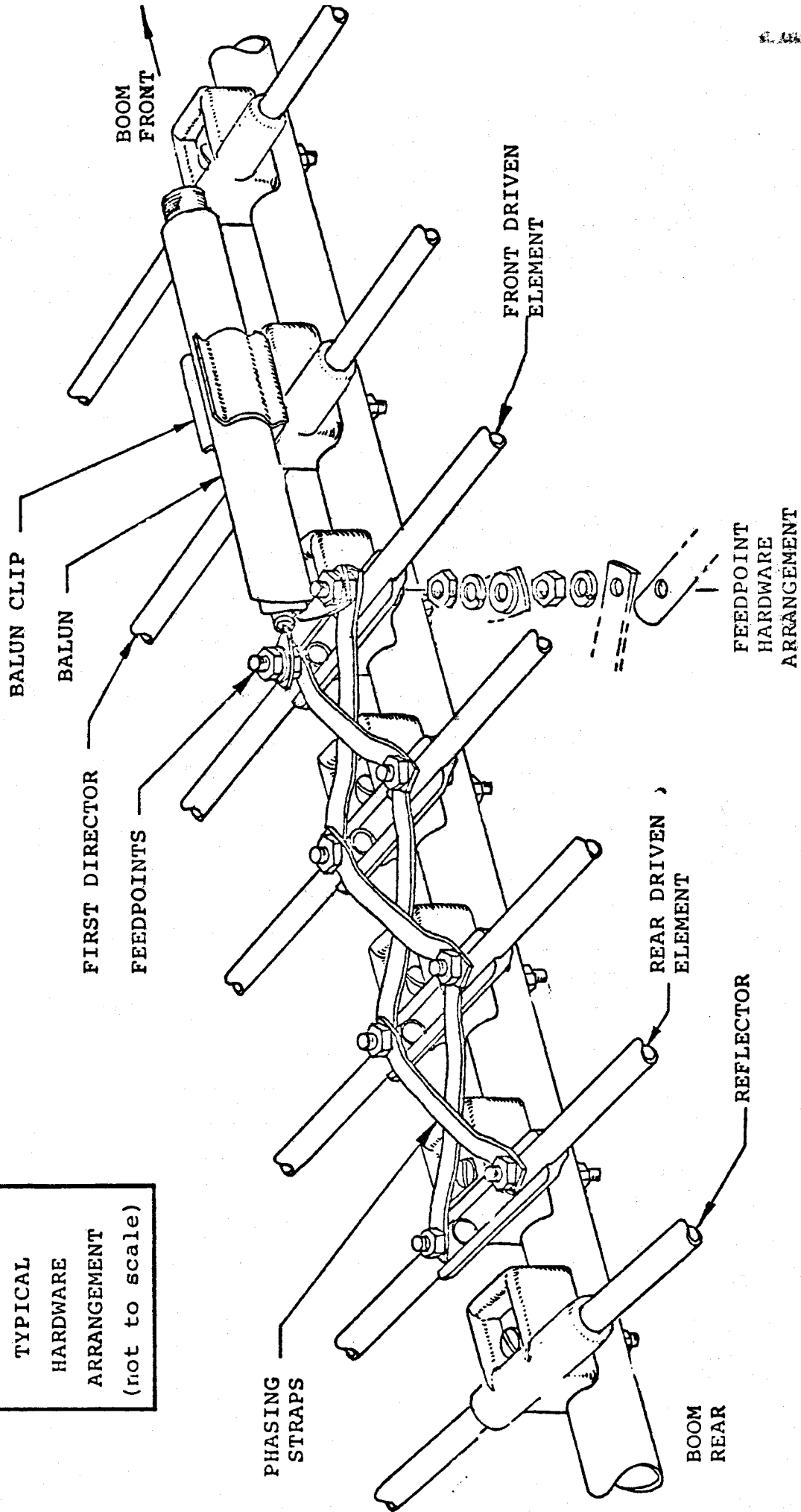
IN SHIPPING BOX

6-32 x 1½" Screws	8	1"O.D. Boom:	
6-32 Nuts	10	x 64" Swaged	1
#6 Lockwashers	10	x 61"	1
#6 Flatwashers	2	3/8"O.D. Elements:	
8-32 x 1½" Screws	2	<u>Driven</u>	
8-32 x 1½" Screws	27	x 4½"	4
8-32 x 1 3/4" Screws	1	x 5 3/8"	2
8-32 Nuts	28	x 5½"	2
#8 Lockwashers	28	<u>Reflectors/Directors</u>	
¼-20 Nuts	4	x 9½"	1
¼ Lockwashers	4	x 10"	1
1½" U-bolts & Cradles	2 ea.	x 10¼"	16
1" End Caps	2	x 10½"	1
Phasing Straps ¼ x 3 15/16	6	x 10 3/4"	3
Driven Insulators	4	x 14"	1
		Boom-to-Mast Plate:	
		3 3/16x3 3/16x1/8	1

# ASSEMBLY PICTORIAL

UHF

TYPICAL  
HARDWARE  
ARRANGEMENT  
(not to scale)



ELEMENT LENGTH AND SPACING WILL VARY WITH SPECIFIC ANTENNA MODEL. SOME USE ONLY THREE DRIVEN ELEMENTS AND/OR OMIT THE REFLECTOR ELEMENT. SEE DIMENSION SHEET SUPPLIED WITH YOUR ANTENNA.

# DIMENSION SHEET

KLM 420-450-27

VHF ANTENNA

ELEMENT SPACING  
(Inches from boom rear)

ELEMENT HALF  
LENGTH

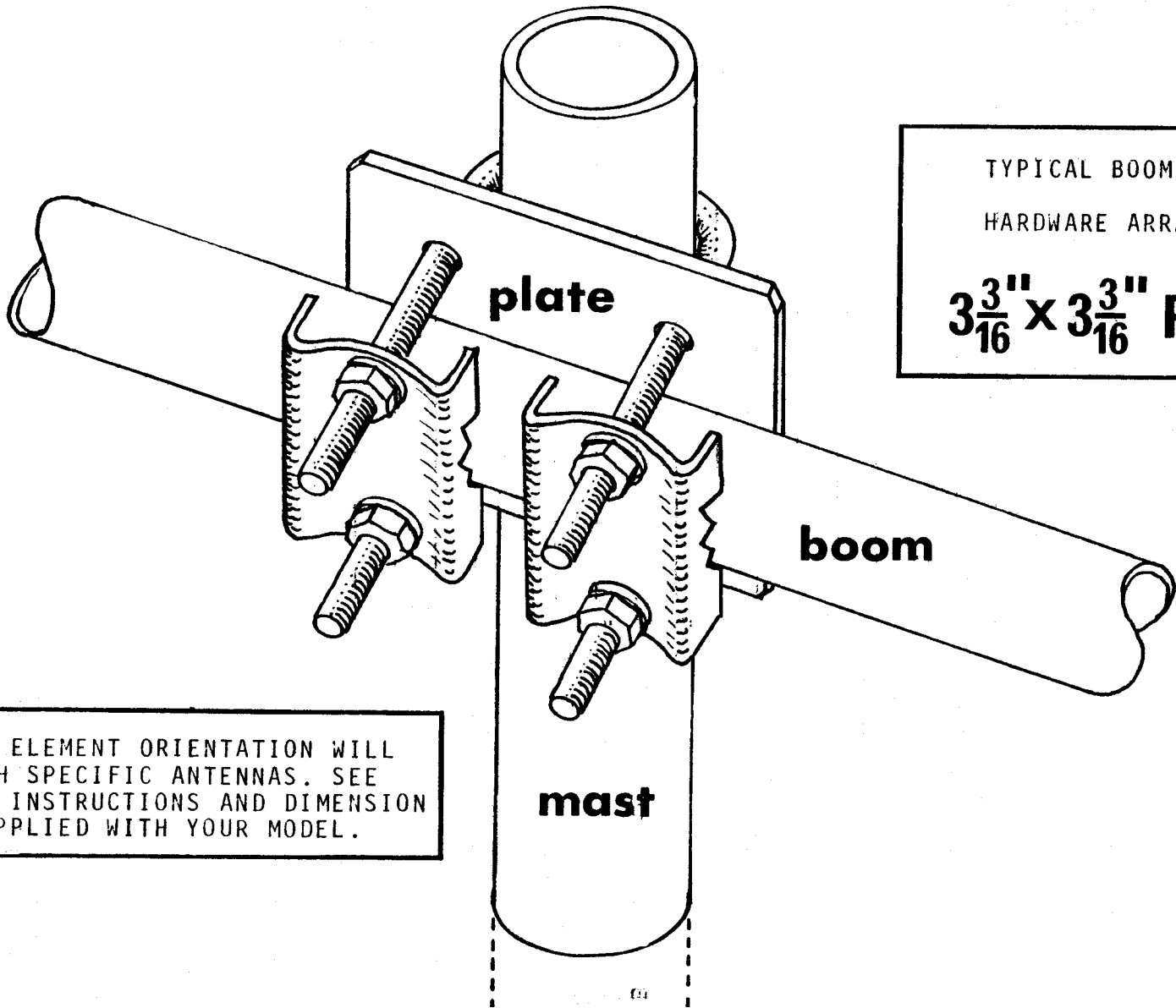
FRONT

	120 _____	9.5	
	115.5 _____	10.0	
	110.5 _____	10.75	
	105.5 _____	10.25	
	100.5 _____	10.75	
	95.5 _____	10.25	
	90.5 _____	10.75	
	85.5 _____	10.25	
	80.5 _____	10.25	
	75.5 _____	10.25	
	70.5 _____	10.25	
	65.5 _____	10.25	
	60.5 _____	10.25	Directors
Balance/Mounting Point →	55.5 _____	10.25	
	50.5 _____	10.25	
	45.5 _____	10.25	
	40.5 _____	10.25	
	35.5 _____	10.25	
	30.5 _____	10.25	
	25.5 _____	10.25	
	20.5 _____	10.25	
	16.0 _____	10.5	
	12.5 _____	4.5	} Driven Elements
	9.5 _____	4.5	
	6.5 _____	5.375	
	3.5 _____	5.5	
	1.0 _____	14.0	- Reflector

REAR

XX = FEEDPOINTS 50 OHM BALANCED. FOR OPTIMUM PERFORMANCE  
 A KLM 420-470-50N BALUN IS RECOMMENDED (TYPE "N" CONNECTOR!)  
MOUNTING: 3" x 3" MOUNTING PLATE (TWO 1½" U-BOLTS) AT BALANCE POINT  
 (APPROXIMATELY 58" FROM BOOM REAR).

ALL ELEMENTS ARE 3/8" O.D. ALUMINUM TUBING  
 SPACING BETWEEN INSIDE ENDS OF ALL DRIVEN ELEMENTS IS 1.45"  
 ALL SCREW HOLES IN DRIVEN ELEMENTS ARE .3" FROM END  
 ALL PHASING STRAPS ARE .22" WIDE 3.7" SCREW-HOLE TO SCREW-HOLE



TYPICAL BOOM

HARDWARE ARR

$3\frac{3}{16}$ " X  $3\frac{3}{16}$ " P

BOOM AND ELEMENT ORIENTATION WILL VARY WITH SPECIFIC ANTENNAS. SEE ASSEMBLY INSTRUCTIONS AND DIMENSION SHEET SUPPLIED WITH YOUR MODEL.