

Here's a ubiquitous gem of an antenna that will work from 48 MHz to 148 MHz and harmonically operate on 220 and 420 also.

# A Log Periodic Antenna For All V.H.F. - U.H.F. Bands

BY T.E. WHITE\*, K3WBH

The author postulated one day that a single antenna could be designed, constructed and operated on all frequencies from 48 to 148 MHz, and harmonically on the 1 1/4 and 3/4 meter bands also. A boom limit of 24' was a criterion, and gain requirements were set at a consistent 7 dB for all lower frequencies, rising to 10 dB on 2 meters and 11.5 dB on u.h.f. (These are honest gains over a dipole, not ephemeral isotropic manufacturer-type ballooned figures.)

Lo and behold, what emerged was a Texas-sized Log Periodic. To enhance 2 meter gain (and 432 gain: LP antennas work well on 3rd harmonic), a director string was added, projecting on a single boom out from the front terminating block of the main twin-boom assembly. By the way, electrical 3rd harmonic resonance is not exactly physically 1/3 times a fundamental length, but the broadness of the 220 and 420 bands allows for some rubber here.

Using the twin boom method of LP feeding not only provides a bridge-girder-like boom structure but enables the elements to be attached directly to the booms without insulating mounts, which would be needed on a single boom. The twin booms must however be insulated from the mast, as they are really part of the feed line. They are shorted together at the rear end only, effectively

terminating the feed system and enhancing front-to-back ratio.

Not only to conserve space and turning radius, but to sharpen the forward main lobe, elements are swept forward rather than perpendicular to the booms (for some LP "Theory," see the author's April '78 CQ article).

This array will receive all signals in the following bands (and of course may be used for two-way contact in the ham bands):

- 49 MHz experimental
- 50 MHz amateur
- 54-88 TV BC
- 108-136 aeronautical
- 136-144 Govt. & satellite
- 144 MHz amateur
- 220 MHz amateur
- 420 MHz amateur

Thus the amateur who also likes to monitor air traffic (despite its horizontal polarization, the antenna will pick up vertically polarized aero signals quite well), and fool around with DX TV and f.m. reception will be able to do so with the very same array he operates his v.h.f. and u.h.f. gear on.

The feed system evolved for the antenna is a twin one. For all low v.h.f. reception and 6 meter work, a 50 ohm coax line is baluned to the feed point in a standard manner (the balun is cut 55" for 6 meters; reception on other frequencies will not be adversely affected). For listening above the f.m. band and for 2, 1 1/4, and 3/4 meter operating, a twinlead line is connected through a mast-mounted relay. Baluns for these operations are at the shack end, for lowest loss (fig. 6).

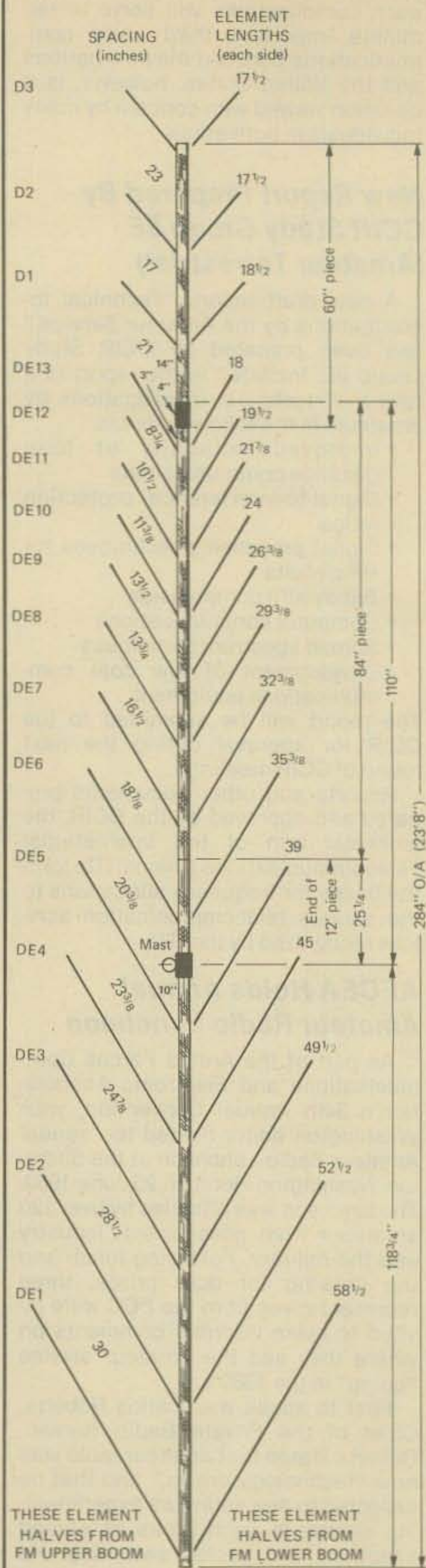


Fig. 1- Overall dimensions for the multi-band log periodic antenna.

\*36 Lake Ave., Fair Haven, N.J. 07701

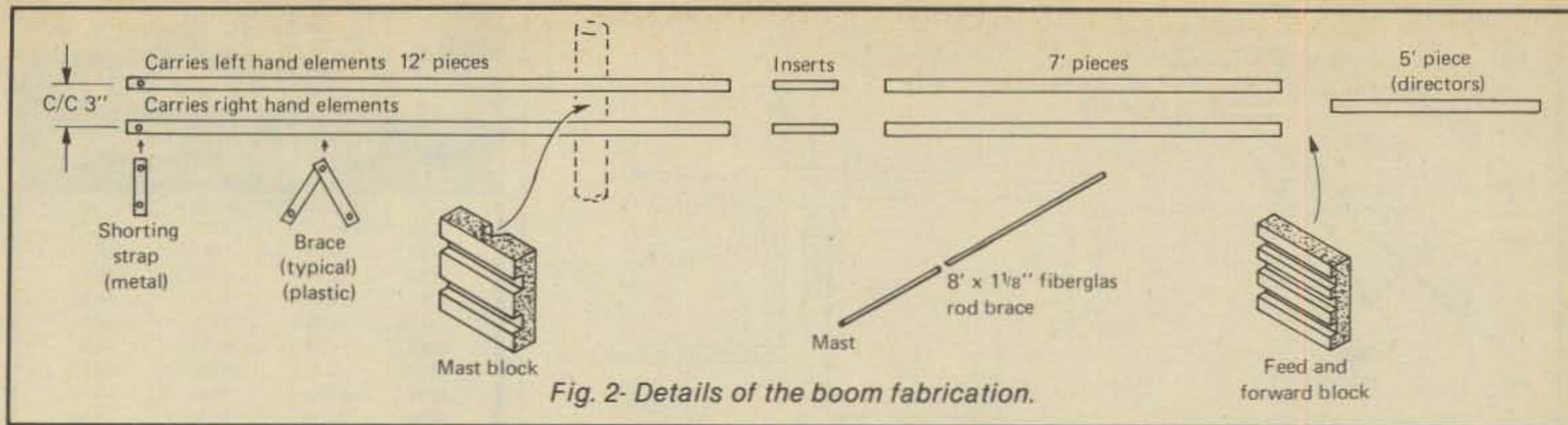


Fig. 2- Details of the boom fabrication.

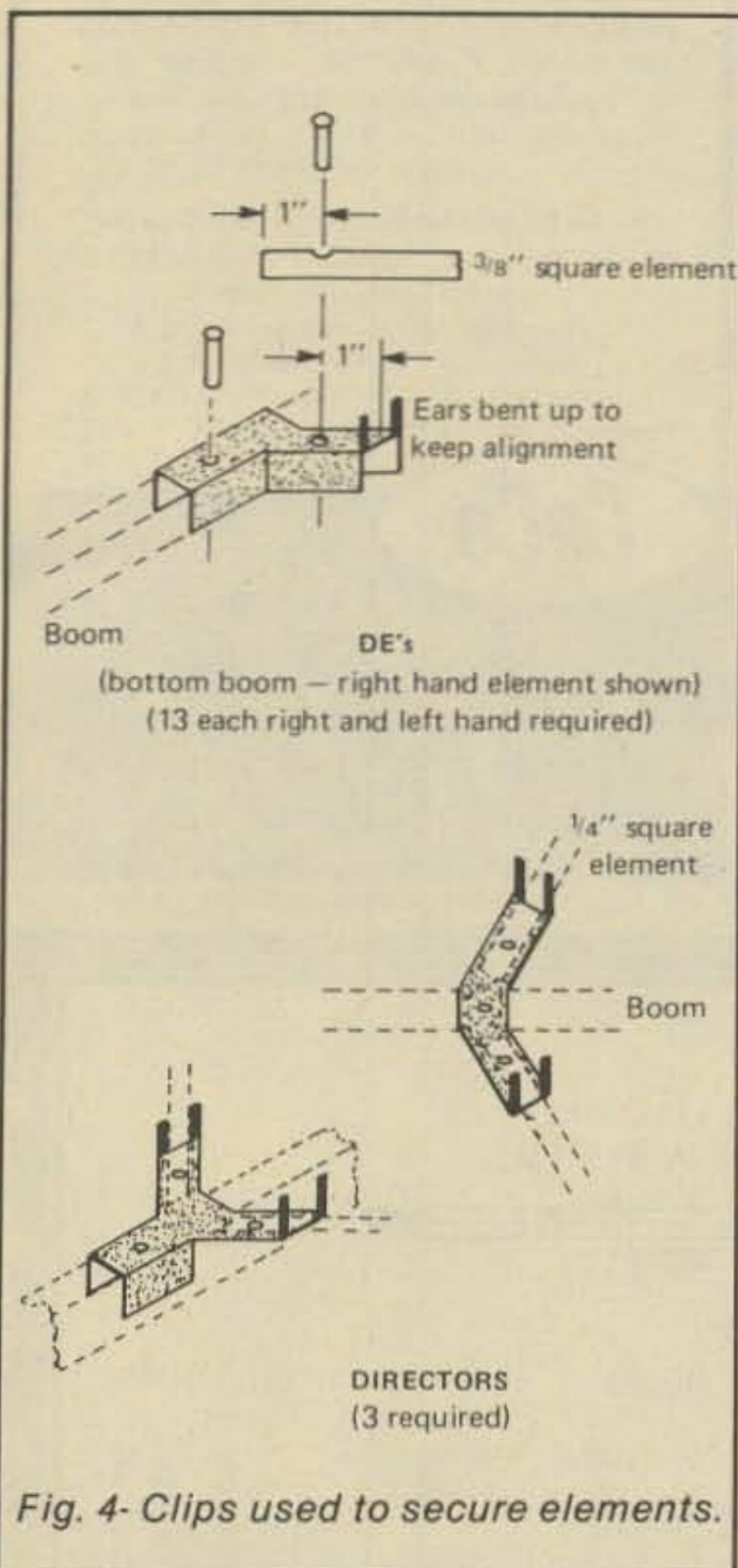


Fig. 4- Clips used to secure elements.

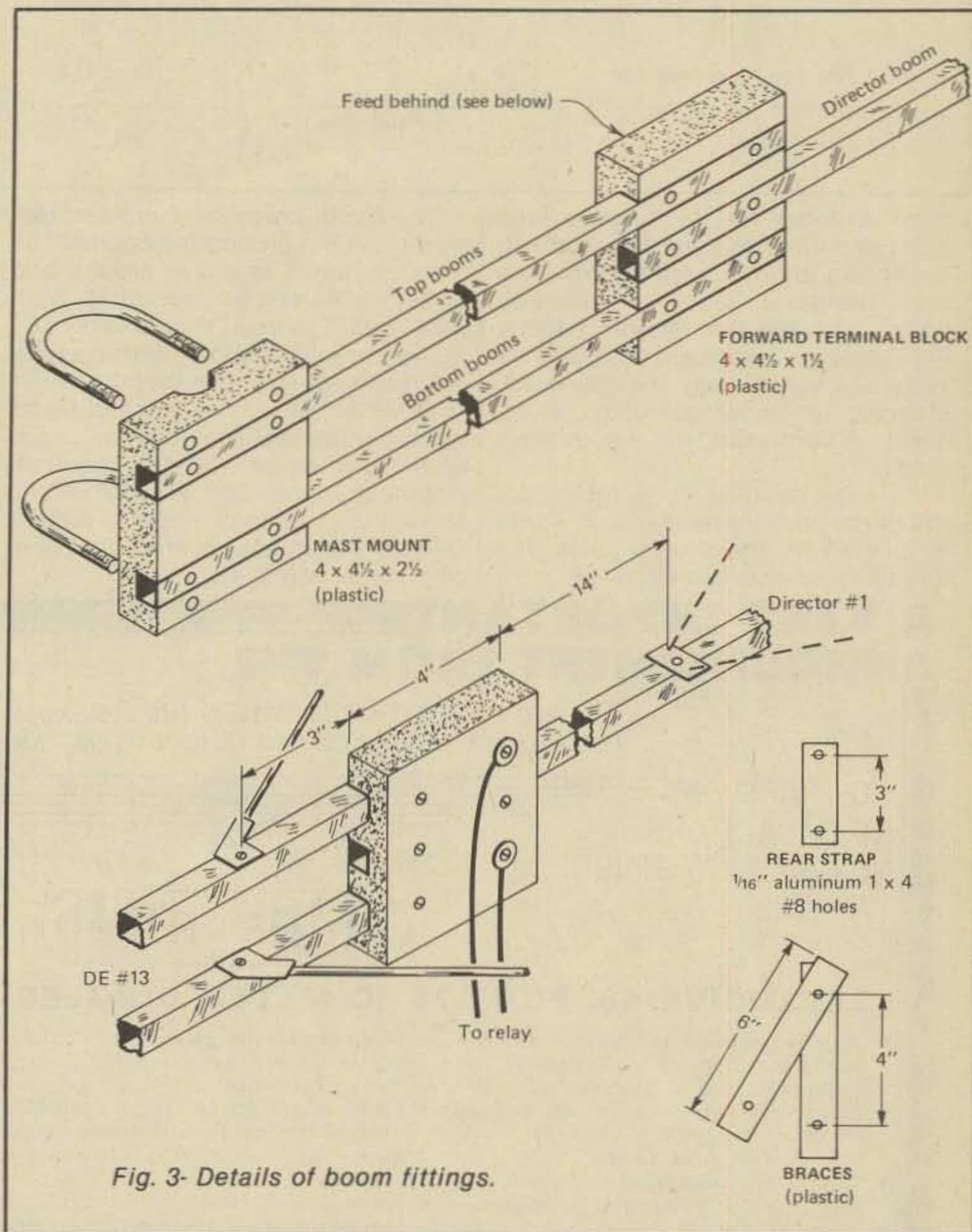


Fig. 3- Details of boom fittings.

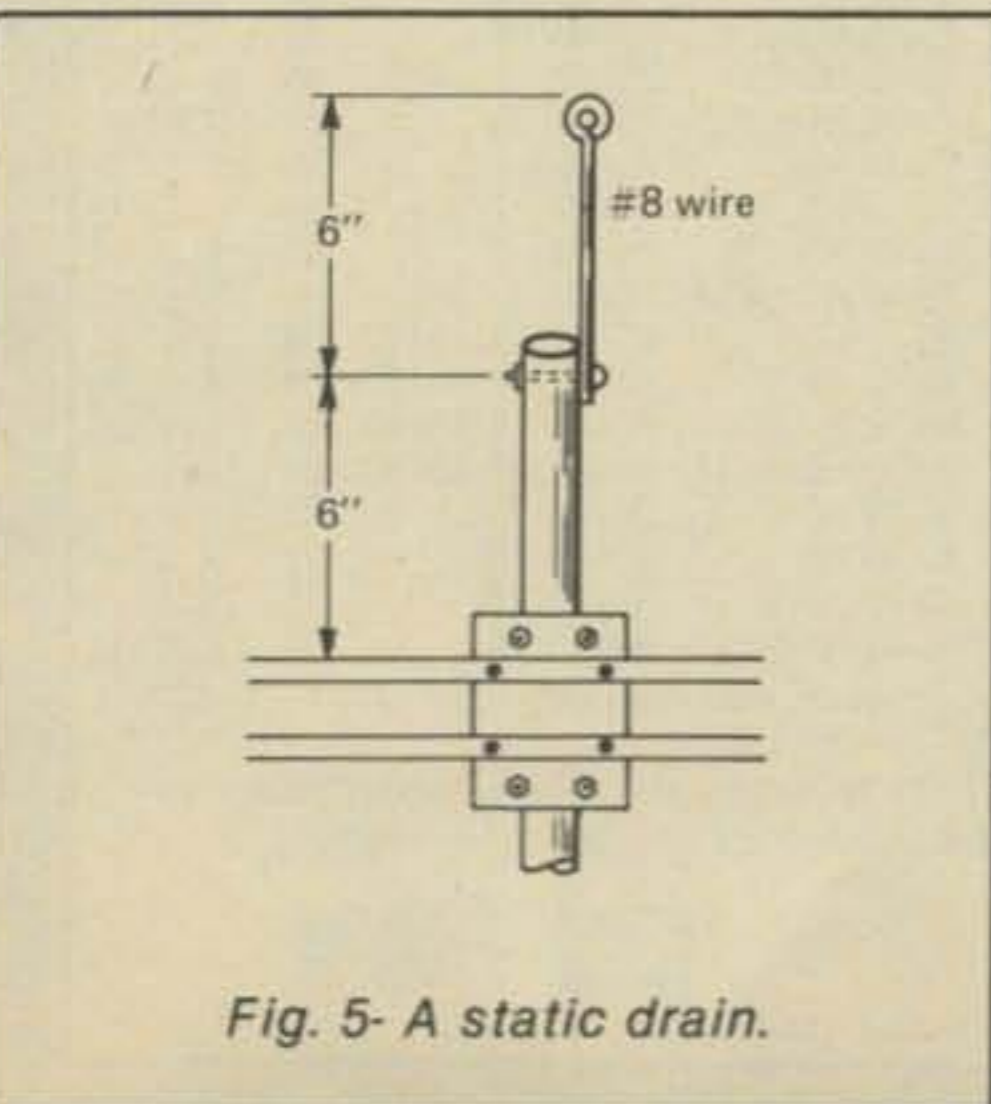


Fig. 5- A static drain.

Before proceeding to construction details, a cautionary note: This antenna will radiate any spurious out-of-band transmitter products. Make sure your rig's spurious emissions are at least 60 dB down. A low-pass filter on six is mandatory.

Square tubing is much stronger than round, and despite what you may think, offers no more wind resistance or loading. Standard 12' lengths of 1"

sq. 60-61-T6 grade are available from stock from any Reynolds or other aluminum distributor. We need four lengths, broken up as shown in fig. 2. The whole lengths are spliced at point "T" of fig. 1 to the partial lengths, using inserts of square maple (the kind used for drawer guides in good quality furniture) about 9" long.

Plastic blocks of hi-impact Lexan, Cyclocac or equivalent, one for the

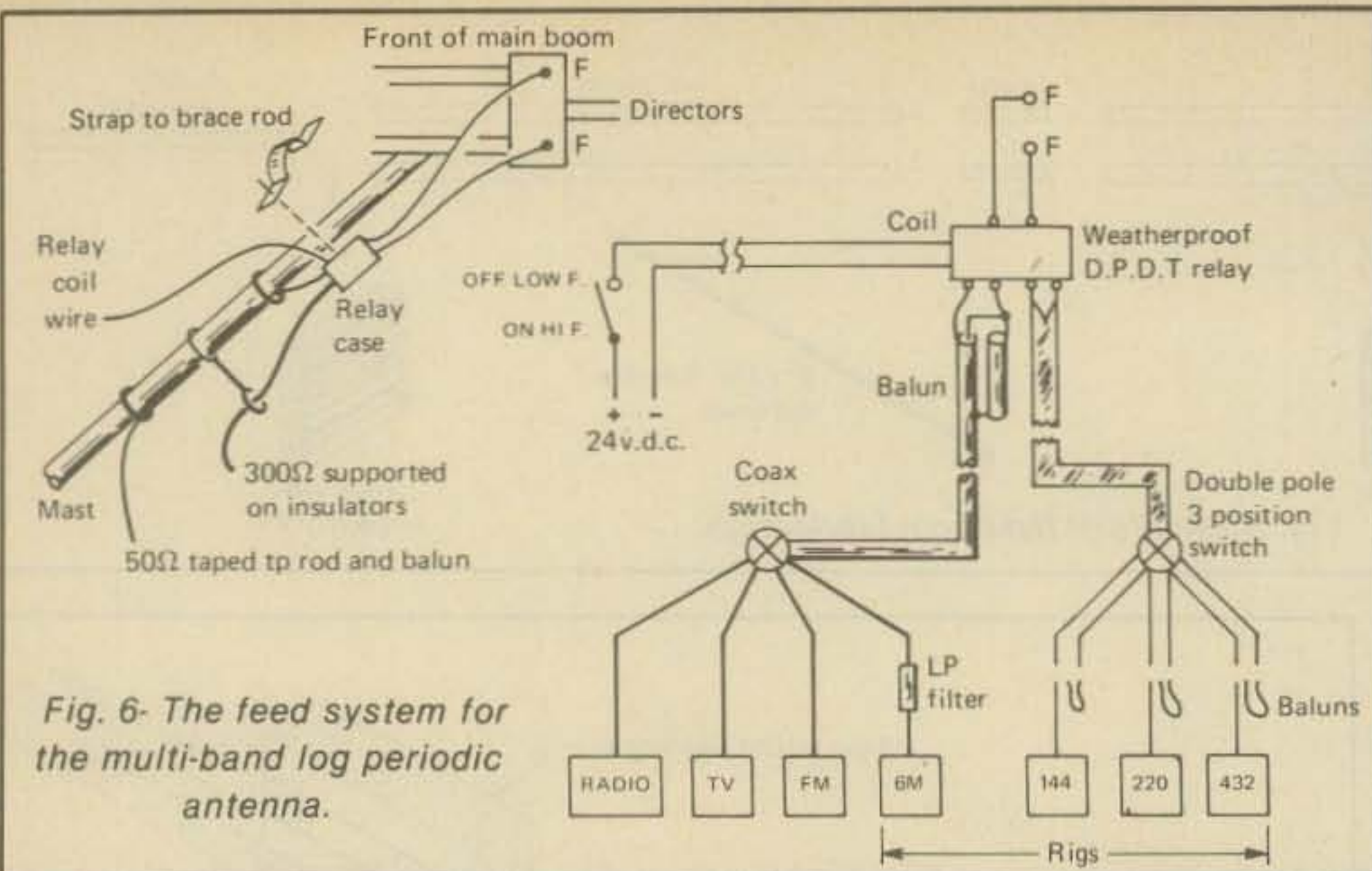


Fig. 6- The feed system for the multi-band log periodic antenna.

mast and one for the forward feed point and director boom attachment, are shown in fig. 3. Also shown there are triangular plastic stiffening straps and the rear shorting strap. Fig. 4 shows the zip element clamps required, which may be punched, stamped or diecut out of  $\frac{3}{16}$  alum. sheet. Also shown are the director clips.

Element material is  $\frac{3}{8}$  tubing for the larger ones in the rear and  $\frac{1}{4}$  into  $\frac{3}{8}$  sleeves for the shorter pairs. The director elements are all  $\frac{1}{4}$ ".

The boom brace is fiberglass rod, as it must not ground the booms. The whole antenna is above ground and arrestors must be inserted in both feed lines. The mast should extend 6" above the upper boom, with a static drain of #8 wire above that (fig. 5).

LP antennas do not seem to be as ground-reflective sensitive as yagis, and great height is not required. Anything above 25' will do nicely. More important than height is a clear field of fire in any desired direction: no foliage, wires, etc.

## YOUR HAM TUBE HEADQUARTERS!

TUBES BOUGHT SOLD AND TRADED  
SAVE \$\$\$ - HIGH \$\$\$ FOR YOUR TUBES

### MONTHLY SPECIALS

2E26	\$4.50	7360	\$8.25
572B	29.50	7735A	25.00
811A	10.80	8042	19.50
813	28.50	8072	46.50
6146B	4.95	8121	49.50
6360	4.75	8122	58.00
6883B	5.25	8236	22.00
6907	45.00	8950	5.50
7094	86.50	2N5641	3.50

LARGEST EIMAC DISTRIBUTOR-CALL  
BRAND NEW \*\*\*\* FACTORY GUARANTEED  
TOP BRAND Popular Receiving Tube Types.  
Factory Boxed. FREE LIST Available—  
Includes full line of RF Power Transistors.  
Minimum Order \$25.

Allow \$3.00 Minimum For UPS Charges  
40 watt RF power transistor 2N6084-\$13.50  
Linear RF transistors in stock.

Eimac Tubes & Accessories in Stock

Write or phone for free catalog.

TUBES-BOUGHT, SOLD AND TRADED  
Premium Prices Paid for EIMAC TUBES

CQ

# CeCo

Use toll free no.  
800-221-0860

COMMUNICATIONS, Inc.  
2115 Avenue X  
Brooklyn, NY 11235  
Phone (212) 646 6300

SERVING THE INDUSTRY SINCE 1922

CIRCLE 30 ON READER SERVICE CARD

## A VERY IMPORTANT ANNOUNCEMENT FROM THE

WORLD'S LARGEST SPECIALISTS IN THE DESIGNING, DEVELOPING AND MANUFACTURING OF "NO COIL, NO TRAP" ANTENNA SYSTEMS.

NO TRAPS,  
NO CAPACITORS,  
NO COILS, NO STUBS



# MOR-GAIN

### EXCLUSIVE 66 FOOT, 75-10 METER DIPOLES

- May be installed as inverted vee with negligible effect on performance.
- Fabricated from highstrength 40% copperweld wire - over 500 pounds breaking strength.
- Stainless steel hardware.
- Completely assembled and pre-tuned. No cutting or measuring necessary.
- 1-year limited warranty.
- Patented linear phase loading principle eliminates need for traps, loading coils or stubs.
- Engineering design and manufacturing is backed by our more than 15 years experience.
- Professional grade design - Amateur models are identical to those we produce for commercial/industrial systems.
- No antenna tuner required for operation within stated specifications.
- Re-tuneable by the user to accommodate site proximity effects.
- HD/A models have female coax connector. Other models have lugs at center insulator.

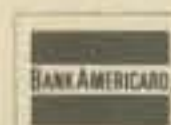
Mor-Gain  
2200 C South 4th Street  
P.O. Box 329 C  
Leavenworth, Kansas 66048  
(913) 682-3142  
Monday - Friday: 9AM-5PM CST

# MOR-GAIN

MODEL	BAND (Meters)	LENGTH (feet)	PRICE
40-20 HD	40/20	36	\$ 69.25
40-20 HD/A	40/20	36	\$ 75.50
75-10 HD	75/40/20/15/10	66	\$112.25
75-10 HD/A	75/40/20/15/10	66	\$118.50
75-10 HD(SP)	75/40/20/15/10	66	\$112.25
75-10 HD(SP)A	75/40/20/15/10	66	\$118.50
75-20 HD	75/40/20	66	\$ 95.50
75-20 HD/A	75/40/20	66	\$101.75
75-20 HD(SP)	75/40/20	66	\$ 95.50
75-20 HD(SP)A	75/40/20	66	\$101.75
75-40 HD	75/40	66	\$ 81.00
75-40 HD/A	75/40	66	\$ 87.25
75-40 HD(SP)	75/40	66	\$ 81.00
75-40 HD(SP)A	75/40	66	\$ 87.25
80-10 HD	80/40/20/15/10	69	\$117.25
80-10 HD/A	80/40/20/15/10	69	\$123.50
80-10 HD(NT)	80/40/20/15/10	69	\$117.25
80-10 HD(NT)A	80/40/20/15/10	69	\$123.50
80-40 HD	80/40/15	69	\$ 85.75
80-40 HD/A	80/40/15	69	\$ 92.00
80-40 HD(NT)	80/40/15	69	\$ 85.75
80-40 HD(NT)A	80/40/15	69	\$ 92.00

Please include \$3.00 for shipping and insurance.

N/T series are models specifically optimized for novice band operators.



Please write for fully descriptive 5 page brochure. Contact your favorite dealer or order direct from Mor-Gain.