

SURPLUS sidelights

BY GORDON ELIOT WHITE*

ANOTHER interesting military antenna has come along in surplus. The manufacturer will probably be flabbergasted to hear that these are actually getting into the excess category, since he is selling them briskly to Uncle Sam, but at least one has gone the way of all government goodies. This is the MLA-2/B, designed by Antenna Research Associates, Beltsville, Maryland.

Fig 1 is a drawing of the MLA-2/B, a rather odd-looking loop device which has the interesting capability of handling a kilowatt continuously over the high-frequency band 3-25 MHz.

There is not a great deal of gain in the MLA-2, except above 17 MHz, but the antenna has a beautiful elevation pattern that covers both high-angle and low-angle radiation, with a 4 MHz coverage that is almost perfectly uniform. (fig. 2) The horizontal pattern is the typical figure eight of a loop, and it offers excellent directivity, with an inherent noise-figure improvement over a dipole. The pattern null is rated as sharp as 20 db.

The MLA-2's longest suit is its size, offering the performance of a half-wave antenna with a device no longer than 54 inches.

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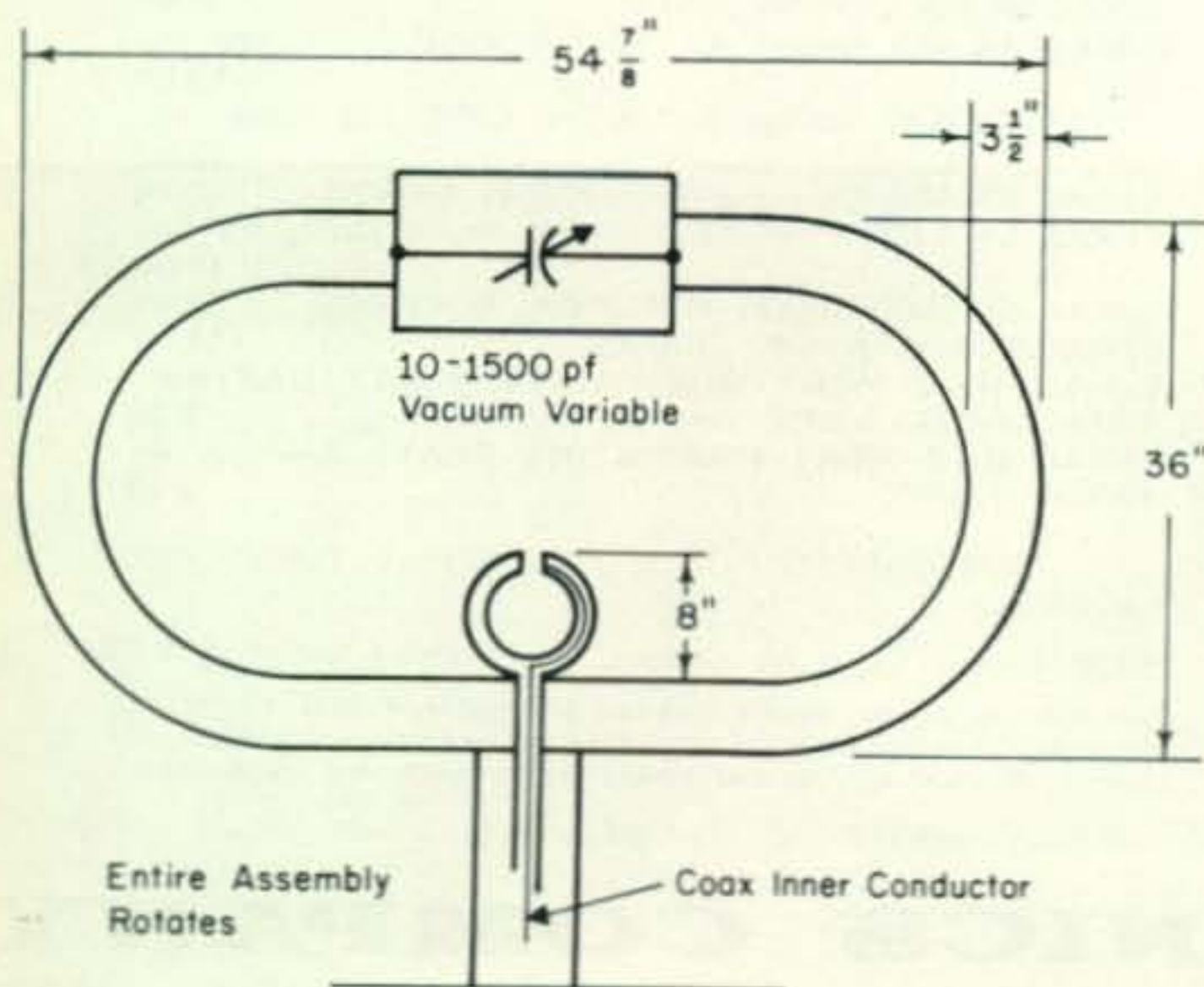


Fig. 1—The MLA-2/B loop antenna.

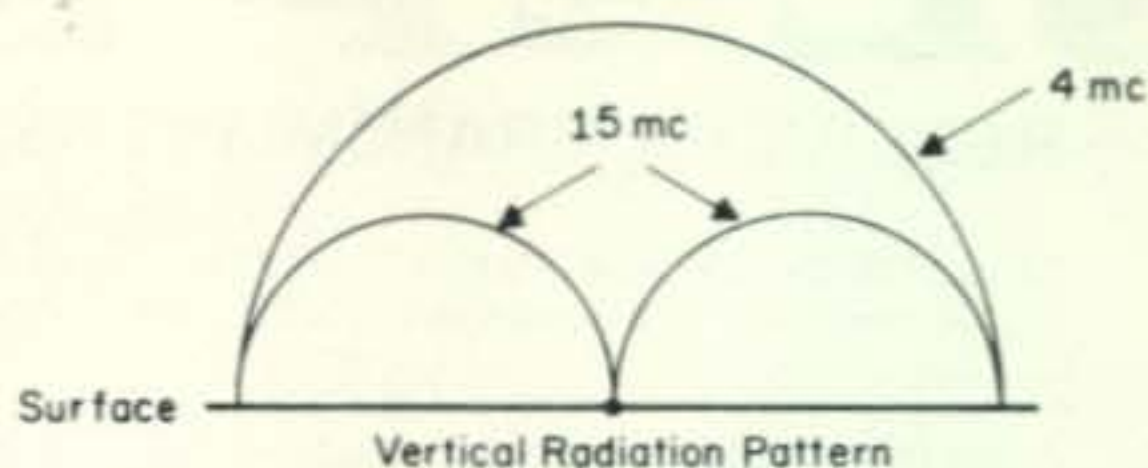


Fig. 2—Radiation patterns for the MLA-2/B.

Now let me say that I doubt the average reader will find a MLA-2 in a surplus store any time soon, but the design of the antenna could be a starting point for some very useful amateur projects. From a commercial standpoint, A.R.I. of course has a patent (no. 3,588,905) but amateurs might use it as a basis for their own experiments.

The theory of the MLA-2 is an impedance transformer from a 50 ohm transmission line to the nominal 377 ohm radiation resistance of free space. The input to the antenna is to a feed loop placed within the primary loop. The signal is inductively coupled to the primary, which is the radiating body. There is no direct connection between the primary (outer) loop, and the feed loop.

Tuning of the primary loop is accomplished by varying a motor-driven, remotely-controlled vacuum variable capacitor inserted in the top of the loop. The value is varied from 10 to 1,500 picofarads.

The loop itself is constructed of three and one-half inch diameter tubing, and the whole assembly is a rugged device, capable of standing up in 100 mile an hour winds.

The feed loop is matched to the trans-

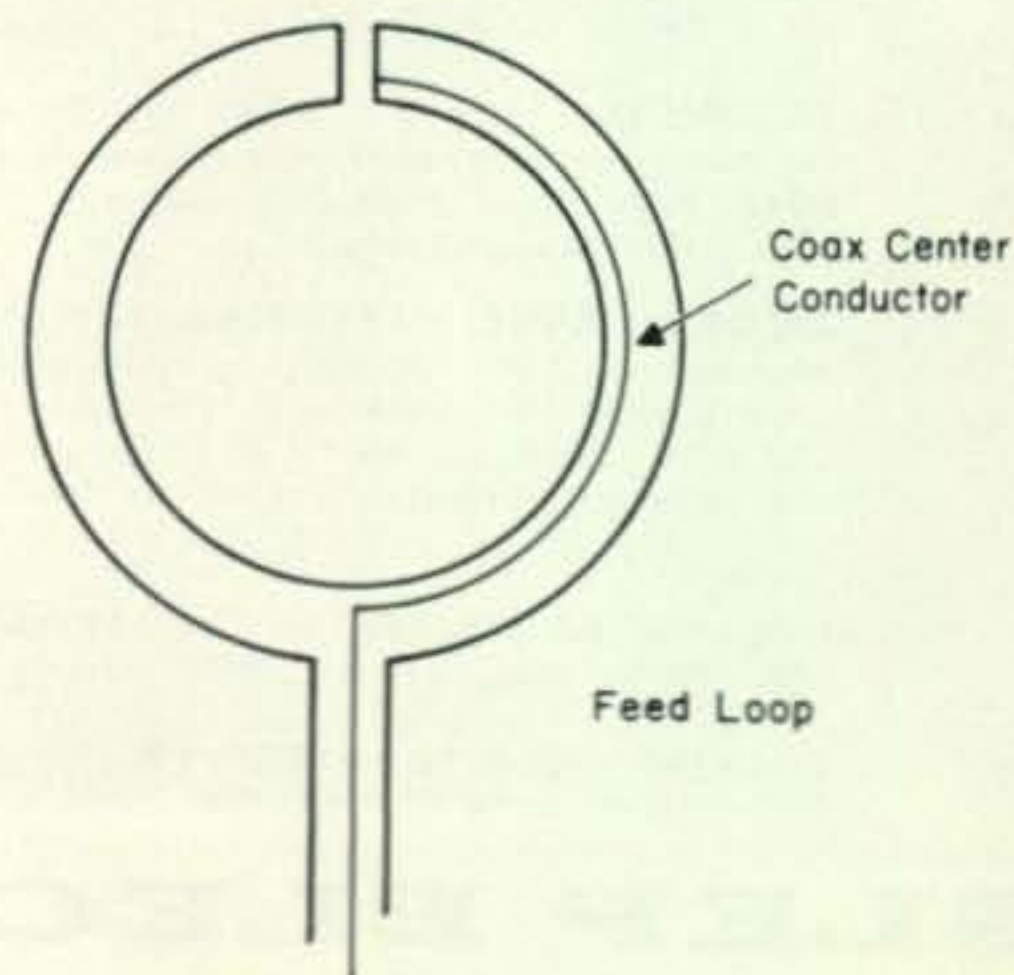
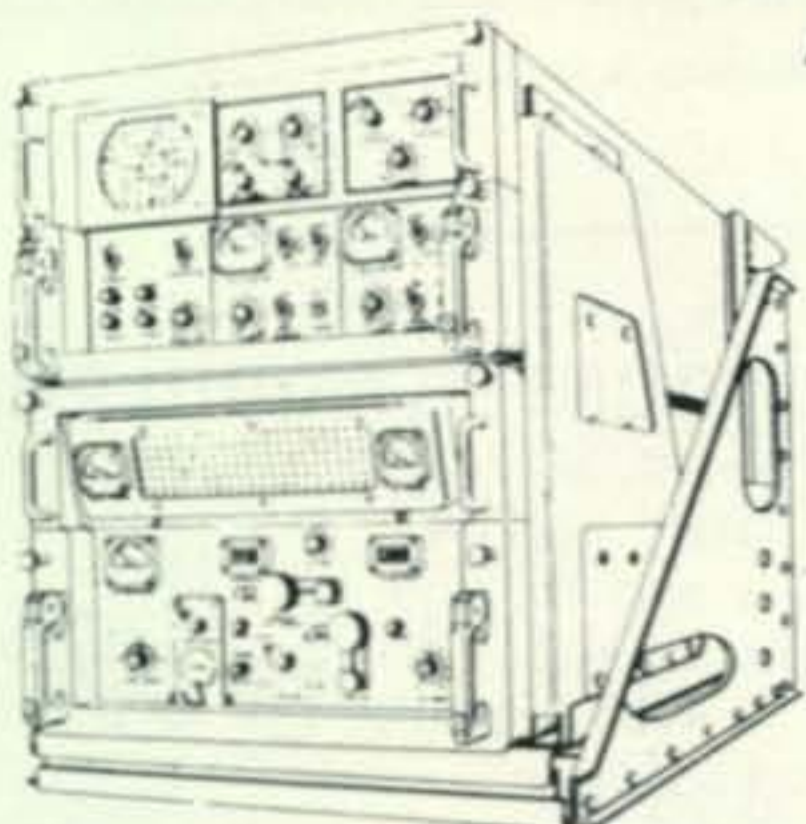


Fig. 3—Matching system for the MLA-2/B.

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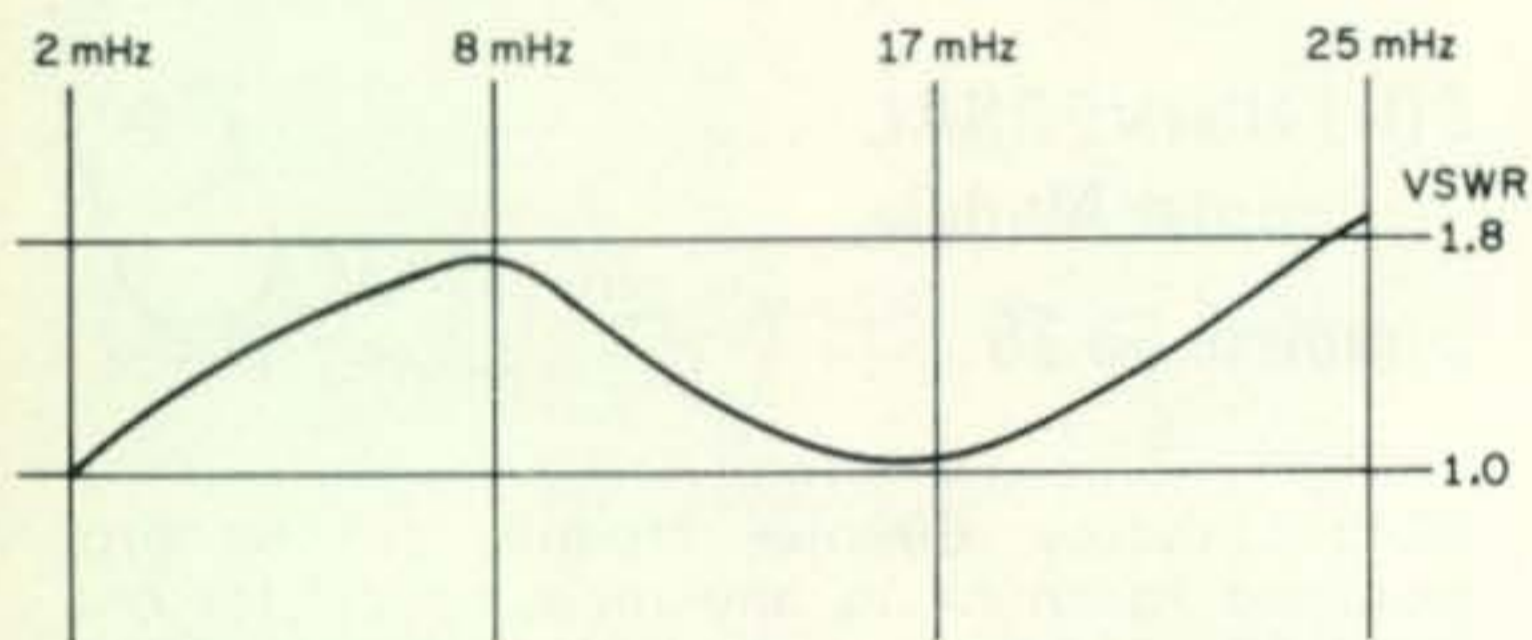


Fig. 4—Rough v.s.w.r. figures over the 2-25 mHz range.

mission line by bringing the coax into one side of the loop, as per the ratio of the diameter of the feed loop to the primary is 1:6. In the actual MLA-2 the feed loop appears to be more or less a standard aircraft loop direction finder about eight inches in diameter. The old MN-26 World War II loop was of the same general size.

The primary loop has an average radius of twenty-two inches, but it is flattened, and the resulting shape is 51 $\frac{7}{8}$ inches across (center of tubing) and 36 inches high (center to center of tubing).

The MLA-2 needs to be operated between

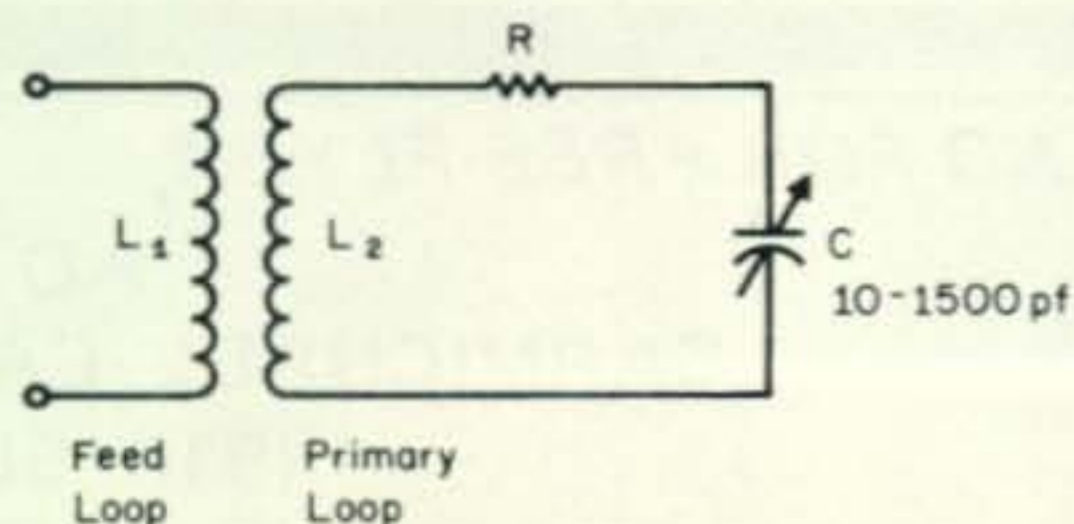


Fig. 5—Schematic representation of the MLA-2/B.

three and five feet above the surface, and requires no ground system. V.s.w.r. with a 50 ohm line is 2:1 or better. Fig. 4 indicates the rough v.s.w.r. figures over the 2-25 mHz range, and Fig. 5 is the schematic representation of the design.

This cost the U.S. about \$3,000, by the way.

I have not transmitted with the MLA-2/B, but I have seen it in action with a receiver, and its performance was excellent over a wide range of frequencies, directions and wave angles. ■

Math's Notes [from page 46]

should of course obtain applicable data sheets for specific details.

cuits we would like to mention this month

There are two new 7400 series TTL cir- and both are from Texas Instruments. The two chips are the SN74143 and SN74144. Both are fairly complex integrated circuits containing a decade counter, storage capabilities, BCD to 7 segment decoder and LED or lamp driver. With one of these 24 pin plastic DIP packages you have the complete decade counter stage less only the readout. Small quantity price for these is in the area of \$5 and for quantities of 100, they drop to \$3.60 each. Write to TI for additional data.

At this point I would like to wish all of my readers a very happy, healthy and prosperous New Year, and of course, the very best of DX.

73, Irv, WA2NDM