the FLASH

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the official journal of the MAD RIVER RADIO CLUB

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BIG FISH

Time does fly by. The ARRL DX test is upon us and we will be having fun in Dayton soon thereafter. Wow, I can hardly wait. We'll be blessed with a new Big Fish, 48 hours of nonstop BS, the K3LR contest forum, and the world's largest ham radio fleamarket. There are a number of points to be covered in this session. I'll try to be concise and cover the issues in cronological order.

NEW EDITOR Don Daso, WA8MAZ, has agreed to take on the Editor responsibilities for the Flash. Don has the kind of background that suggests he will do a wonderful job. I hope that our contributors past and future will give Don the same excellent support which 'LNO received during the past 30 months.

NO. AMERICAN SPRINTS The CW Sprint will run on February 8, Saturday. You should have preregistered with W8FN for the team competition. Send your Scores for both SSB and CW to Don Daso so he can include them it the next Flash. It is not too late to sign up with NZ4K for the SSB Sprint. Sign up sheets, with addresses, were included in the January issue of the Flash. Go Mad River!!!

ARRL DX TEST This is the event in which MRRC can be very competitive. We have a large number of stations with Tribanders or better at respectable heights and 40 meter rotary antennas or some other gain antenna on that band. The key is getting all stations on for full time, or close to full time. If you aren't in the mood to go the distance, please consider multi-op or a guest op. If we can get every station with competitive antennas on for both modes we will be very pleased with ourselves. As usual, we should shoot for less than 50 but more than 45 entries to have a top "medium club" entry.

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CONTRIBUTORS

Joe Warden, W8LNO — WORDS FROM THE BIG FISH
Bob Brewster, W8HSK — The ROBERT TAIL = A DX ANTENNA
Jim Stahl, K8MR — DX CONTEST CHECK SHEET

BIG FISH CONTINUED

DAYTON HAMVENTION events are the remaining priority for this column. Our suite is set, thanks to Chris Kinzel. The next issue of the 'FLASH' will include a sign-up sheet for helping to staff and operate the suite. Chris will advise of the opening time and other requirements. As usual, donations to cover the cost of that activity will be appreciated.

Mary and Pete Michaelis have volunteered to share their fleamarket table space with MRRC and to coordinate that effort. That spot will provide a convenient stopping off place for the membership and may allow for disposal of some of your excesses (personal excesses excluded). We will also need some participation in that effort. Pete. Please send 'LNO a summary of your requirements and a description of the nature of the information which should accompany each item or grouping of items to be sold. Thanks to Pete and Mary for their support of the Club and initiative.

Once again, we are having problems with Stoffer's hotel in Dayton. It seems that the only double rooms which they have available are single bed rooms. Check into the net to get the latest scoup. It just wouldn't seem like the Hamvention if we didn't get rained on by that hotel.

Other matters to be dealt with include the Shirt, Hat and Jacket order form included in this issue. This is a one time offering. Orders not received by the deadline will be returned unfilled. Serious. It is just too difficult to deal with straggling orders, extra trips to the supplier, extra trips to the bank, etc. If you want any of the items offered please send your form and check now. I suspect that it will be some time before this offer is repeated.

Please, please use the score reporting form for the ARRL DX TEST. It is nearly impossible for KU8E to collect all of the club scores without your help. If you are supportive we can get a better idea of how we did in the club competition. Currently it is necessary for me to respond to that frequent question with a "Damned if I know". You can't know if you can't learn the scores. cul de w8lno ..

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The MRRC Flash is the newsletter of the Mad River Radio Club, an ARRL affiliated club serving contesters in Ohio, Michigan, Pennsylvania, Indiana, Kentucky and West Virginia. The FLASH may be reprinted in whole or in part provided proper credit is given. Mail all inquiries or submissions to WA8MAZ at the address shown on the masthead. Join the Mad River Net on 3825 Khz at 8:30 Eastern each Monday evening.

The Robert-Tail

by Bob Brewster
W8HSK

During the construction of the two towers at K8AZ, Tom's new QTH, the antenna configuration for each tower was decided for 10 through 40 meters and the north tower (closest to the shack) would also be shunt fed on 160.
What about the 80 meter antenna, he sez ?

Well, Tom's towers are about 310 feet apart, 120 feet high and the plane of the towers is broadside to Europe and the South Pacific. I volunteered to revamp an antenna design which I had used in W3 land a lot of years ago, based on Woody's Bob-Tail design.

I had flipped over a 40 meter Bob-Tail so that the phasing sections were close to the ground and isolated the center vertical from the phasing line. The center of the phasing line is a current loop (low impedance) and suitable for 50 ohm coax feed. The center conductor of the coax was connected to the center vertical and the coax shield connected to the center of the phasing line which connects to the two outside verticals.
The 3 40 meter verticals (aluminum quarter-wave self supporting) were each mounted on vertical ten foot 4 by 4's, 68 feet apart. The Q of the array was low enough so that 80% of the 40 meter band could be worked at an SWR of 2:1 or better. This design had eliminated the tuner and grounded system, provided direct coax feed and proved to have excellent gain at the DX angles.

So Tom and I proceeded to round up the necessary materials for an 80 meter wire array to be hung from a rope strung between the towers. He found an 1,100 foot roll of appliance wire at the local electronics surplus store and the price was right. It was for 220 volt use and had HV insulation. The tower pulleys were hung at about the 105 foot level and a ½ inch rope strung between the towers.
The array wire was laid out on the ground, measured and cut with several additional inches added for insulator loops. The corners and center were marked with colored tape. The corner insulators were strung on the wire before the end insulators and hanger ropes were installed. The hanger rope lengths should be adjusted to allow for the ½ inch rope slack and to keep the phasing line parallel to the ground.

Figure 1 shows the final configuration of this array.

A reference dipole was hung at the 70 foot level in the same plane as the array.
A prototype design of this array was hung in late 1985. It featured a common phasing line tieing all four outside verticals together to determine if 2 discrete SWR nulls could be seen, one in the CW band DX segment and one in the PHONE BX segment.

The SWR readings showed that this configuration of the antenna on 80 would not permit operating at both the CW and PHONE DX segments under an SWR of 2:1 with a common phasing section for all four outside verticals.

We changed to separate phasing sections for each bay of three verticals, set the resonant frequency of the outside bay in the CW DX segment and the inside bay in the PHONE DX segment.

This change allowed us to approach optimum phasing which is accomplished by the use of the formulae which are shown in Fig. 1.

Refer also to Fig. 3.

Relay switching was added to the feed system to permit instant selection of either CW or PHONE segment. One relay selects the proper phasing section coincident with the other relay selecting the corresponding center vertical. These relays are Potter Brumfield Model KUP11D15 24vdc 10 amp contacts, clear polycarbonate cover and solder lug terminals. These relays and similar ones are available on the surplus market for under $ 5.00. Within each relay the common relay contacts are wired together to increase contact area. Don't worry about high voltage insulation since the relays are operating at a low voltage point. A balun was used in the feed system to effect a 1-2-1 binomial distribution of antenna current. The relays together with the balun are mounted on the plexiglas panel. See Fig. 2.

It is suggested that the phasing sections be insulated wire. The SWR and plate current readings were monitored periodically during windy weather and indicated very little change. The tag lines at the bottom corners should be set to reduce slack in the phasing lines.

Some considerations that influenced this design - -

1. A few studies have been conducted on radiation efficiency of horizontal dipoles at 1/10 wavelength above poor conductivity ground. Radiation efficiency of 85% was achieved so I was not to concerned about having the 80 meter phasing lines 24 feet above ground. The phasing sections on the 40 meter array were only 7 feet above ground.
2. The tuner was eliminated and provided direct coax feed.
3. In the northern Ohio area the angles of most incoming 80 meter DX signals lie between 15 and 45 degrees.
4. An 80 meter dipole at 100 feet has its maximum vertical angle gain at 40 degrees above the horizon.

Some comments about performance - -

1. On receive the array is quieter than the reference dipole.
2. There is no apparent noise pickup from the towers due in part to the deep nulls off the ends of the array.
3. The Russian beacon (3635 kcs) can usually start to be heard about 1930 (2:30pm EST) on the array. The reference dipole hears the beacon about an hour later.

4. The array has considerable attenuation of high angle signals which was demonstrated in the recent CQ WW CW contest in that it was not difficult to see through the big guns on the east coast.

In conclusion, I believe that off-the-ground mounted broadside phased array has a lot to offer as a DX antenna, particularly for the hams faced with restrictions on the use of towers.. See Figure 4.

The Q of this array favors use at 7 and 14 mhz. since one bay can cover a large portion of each band under 2:1 SWR. The use of 2, 3 and 5 element bays in various configurations offer interesting design possibilities for around the compass coverage or super gain antennas.

These antennas are not difficult to build or tune and can be serviced and maintained from step ladder height. If anyone puts together an array based on this configuration, I certainly would be interested in hearing about the results.

My thanks to Tom , K8AZ for providing the facility, material and help and a lot of hot cocoa on those cold winter days.
To the MRRC Gang - Best of DX in 87 !

Bob W8HSK

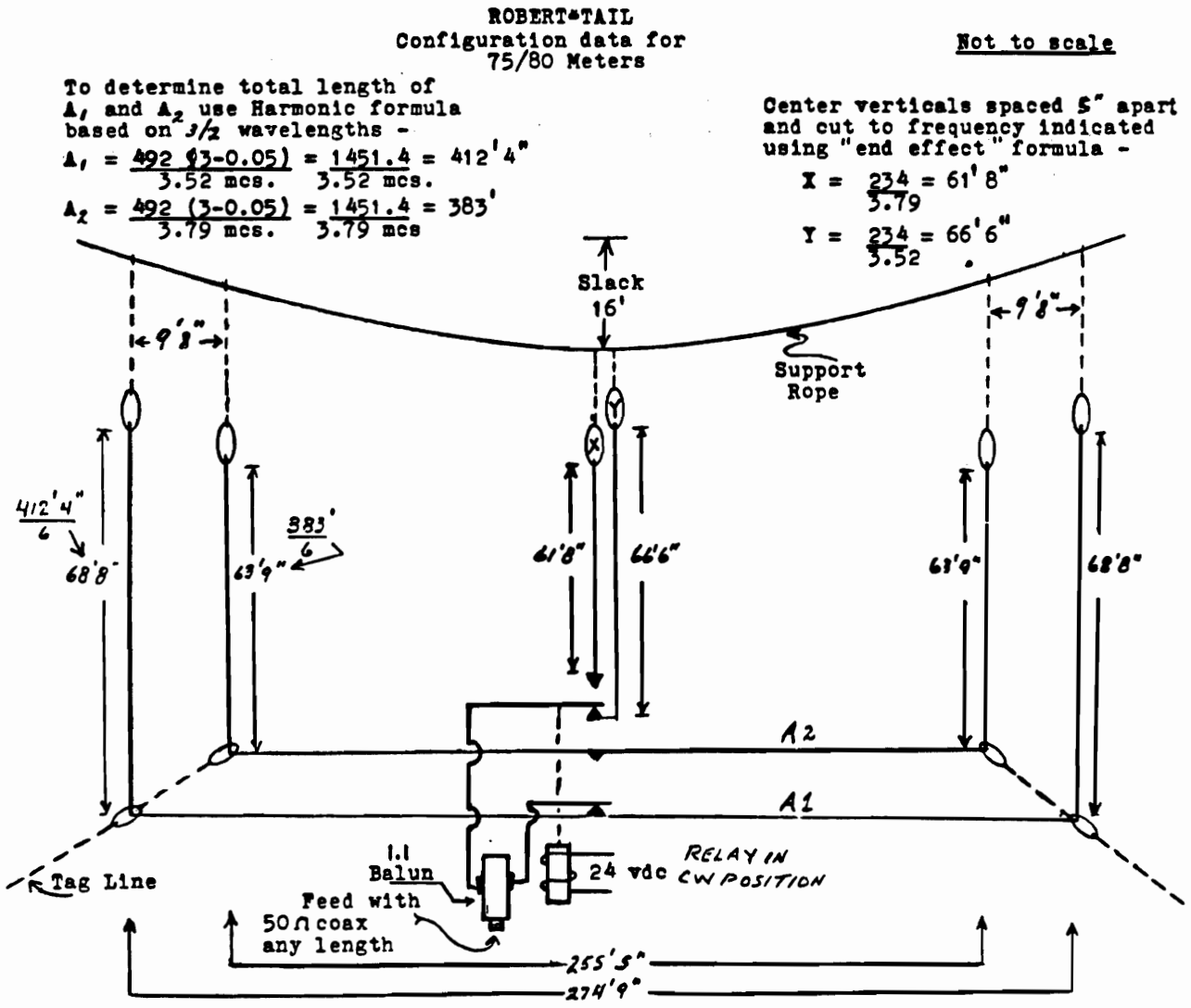
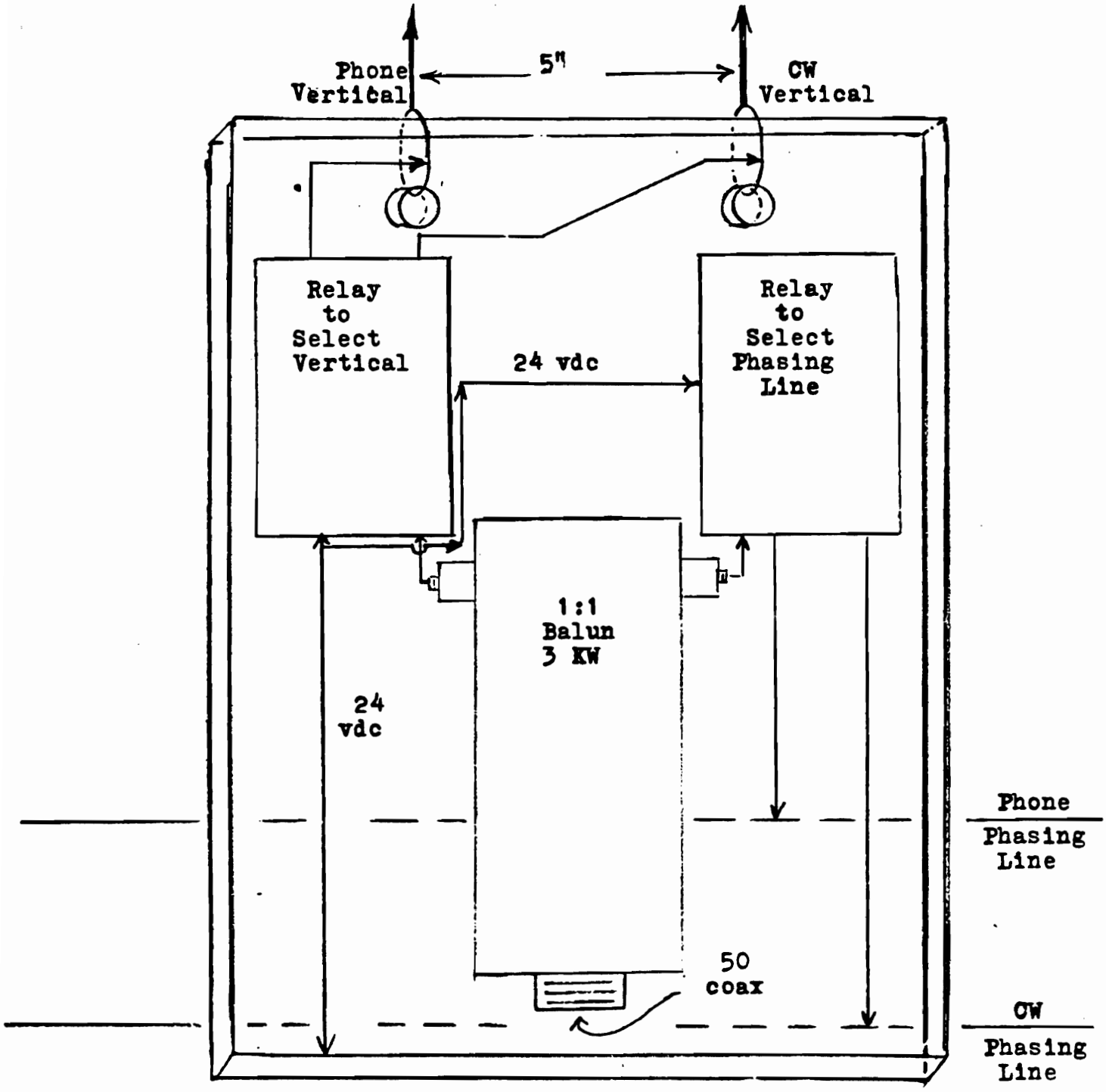


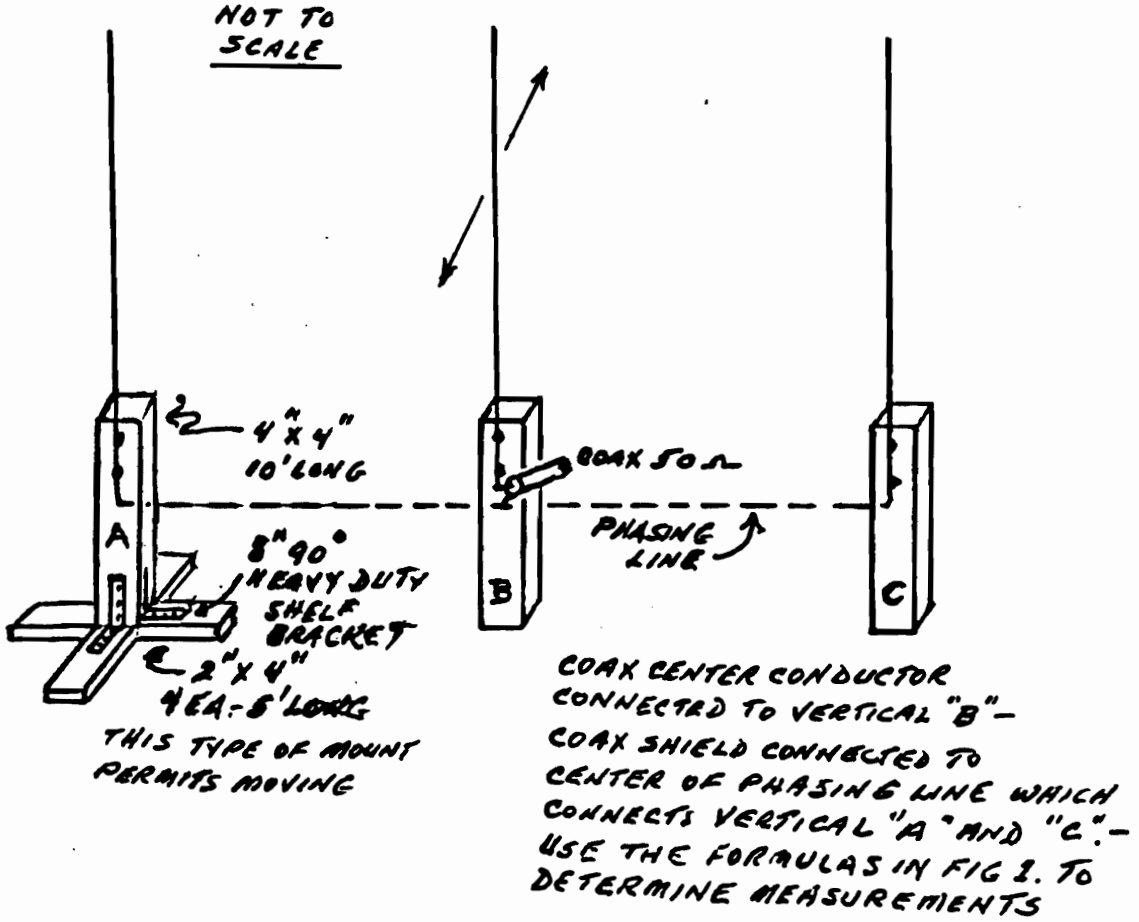
Figure 1.

Feed System Mounting Panel
for Robert-Tail Array
(Not to Scale)



Array Mounting Panel is Plexiglas 8" x 15" ¼" thick
24 vdc Power Supply line is common to both relays -
Switch Power Supply On or Off
ON -- Phone Bay
OFF -- CW Bay
Relays and Balun are wire mounted with # 12 insulated house wire through holes in the Plexiglas plate. All inter-component wiring and leads to the verticals is done with #12 insulated house wire.

Figure 2


NOT TO SCALE
2 - 4" X 4" 10' LONG
COAX 50 Ω
PHASING LINE
A
B
C
8" 90° HEAVY DUTY SHELF BRACKET
2" X 4" 4 EA - 5' LONG
THIS TYPE OF MOUNT PERMITS MOVING
COAX CENTER CONDUCTOR CONNECTED TO VERTICAL "B" - COAX SHIELD CONNECTED TO CENTER OF PHASING LINE WHICH CONNECTS VERTICAL "A" AND "C". - USE THE FORMULAS IN FIG 1. TO DETERMINE MEASUREMENTS

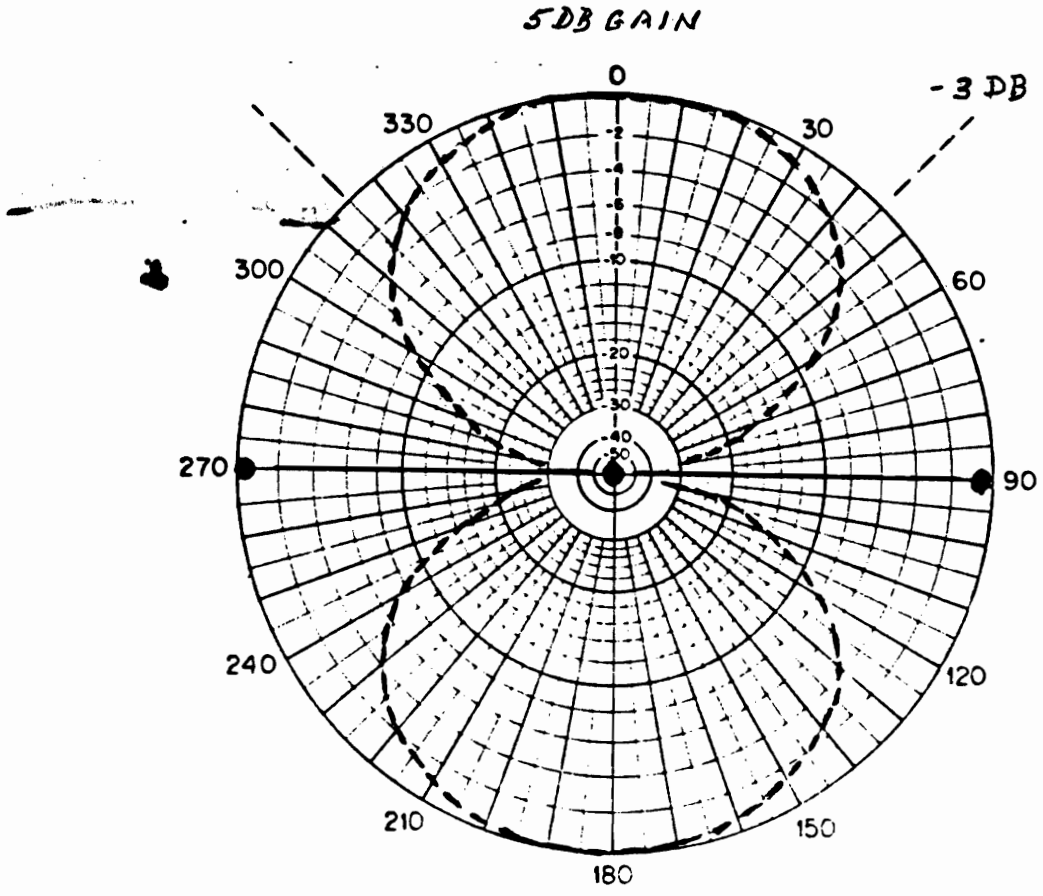

5DB GAIN
-3 DB
0
30
60
90
120
150
180
210
240
270
300
330
-2
-4
-6
-10
-20
-30
-40
-50

Figure 4.

ROBERT-TAIL SWR CURVES.

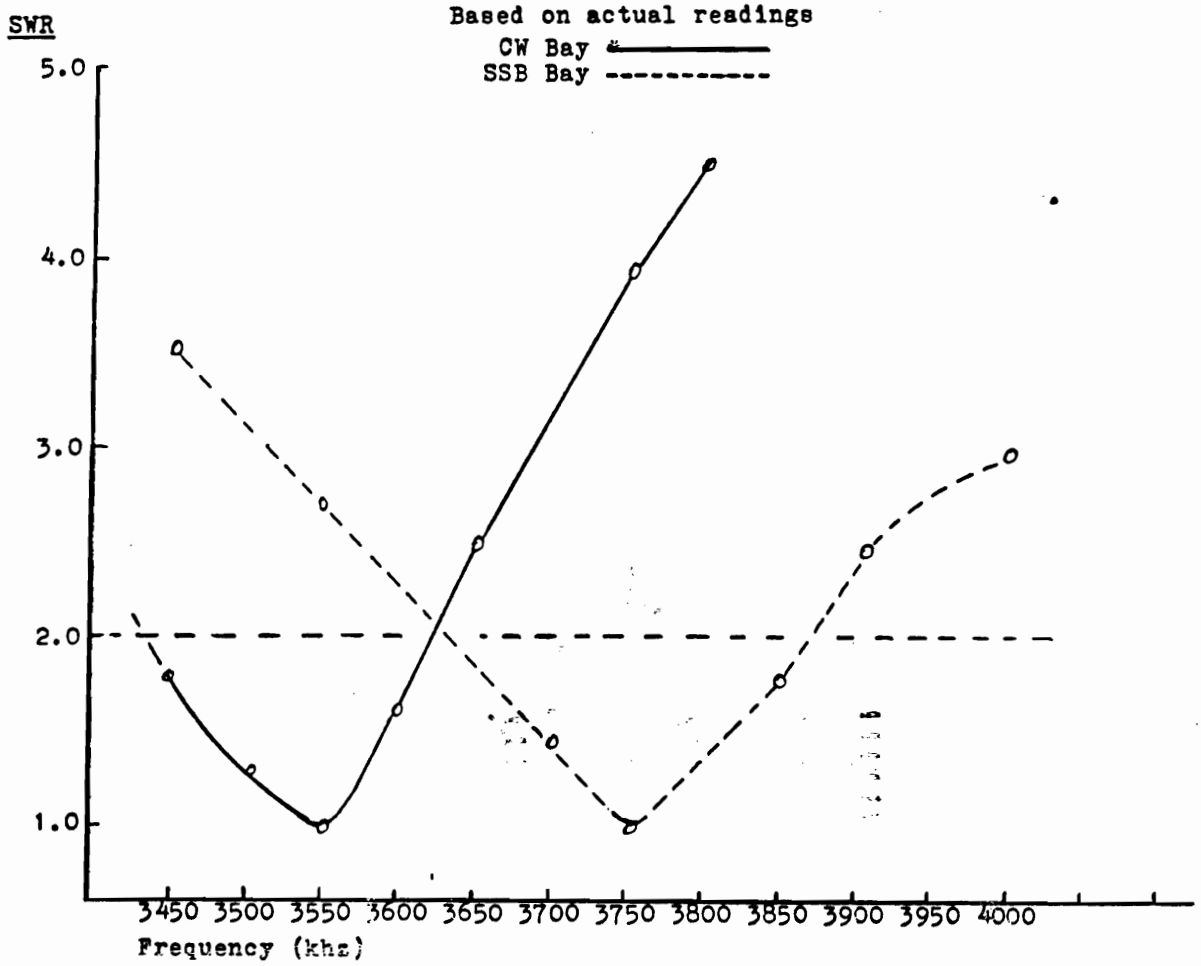


Figure 3

MAD RIVER RADIO CLUB

28 SOUTH HEMSTEAD ROAD
WESTERVILLE, OHIO 43081

COLUMBUS, O. 7
FM
FEB 11
OHIO

USA 22

FIRST CLASS MAIL