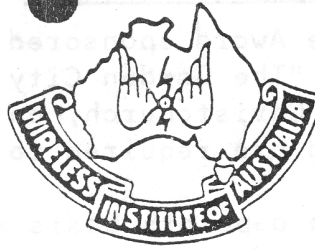


QRM

Amateur
Radio
News



MARCH 1985

Issued by the Tasmanian Division of
the Wireless Institute of Australia

Radiatorial Comment

For the first time in many months, the Editor is apologising because some contributions have had to be held over until April. Things are definitely improving - did you notice that the November editorial, reprinted last month, had to be squeezed down to a much smaller size? This time it's gone altogether! With a little bit of luck and some well-kept promises, we may be able to increase the number of pages to twelve.

Some of the comments in our pages may well be worth further discussion and we would like more letters to publicise members' opinions on the topics raised.

It is encouraging to know that regular practical working sessions are in progress on the Southern Branch's Activity Centre in Lewtown Road, Hobart. Reports on this will be included in each issue of "QRM", as will any information received from the North West on the activities of the Penguin centre. Suggestions are already flowing in, mainly to ask that certain items be programmed in "as a first priority". The most popular request seems to be for the opportunity to build as much amateur test equipment as possible - a request worthy of early consideration.

John VK7JK.

SO YOU WANT TO CONTACT THE EDITOR?

His name is John Rogers. His callsign is VK7JK. His telephone number is 002.2934C2. His address is:

1, Darville Court,
Blackman's Bay,
Hobart, 7152.

And when you lose your copy of QRM, remember he's OTHER. When he is at home, the 2nd rig is normally running and listening to Repeater 2.

The Editor's deadline for copy for the April issue of "QRM" is Friday, 29th. March. Friday, 29th. March. FRIDAY, 29th. MARCH.

AWARDS, by Bob, VK7NAI.

NZART 1985 CONFERENCE AWARD.

This year's Conference Award sponsored by the NZART has appropriately been called "The Garden City Award" as this year's conference takes place in Christchurch, on the south island.

Contacts for the Award are required to be worked between 1st February and 30th April.

The Award is earned on a points basis system, with the basic Award requiring 50 points and the Merit Award requiring 100.

Points are earned as follows:

For working Branch stations ZL3AC, ZL3AF, ZL3RR, and ZL3VV - 10 points each station.

Members of Branches 01, 05, 56, 68 - 5 points each.

All other NZART members - 1 point each.

If the station you have worked has registered for the Conference and can give you the receipt number, then you can claim an extra 3 points.

At least 2 Branch stations must be worked and claimed.

Applications with the normal details certified and posted before 15th May 1985 to be forwarded together with \$2 of any currency and posted to:

Garden City Conference Award,
P.O. Box 29040,
Fendalton,
Christchurch,
New Zealand.

TASMANIAN DEVIL AWARD.

It has been suggested that I should put down on paper some tips that may make the Tasmanian Devil Net operate a little more smoothly, so here goes:

1. Before you check in to the Net, it is advisable to have on your desk, a scratch pad for making notes.

2. On this pad, write down station call signs as they check in, on one side of the pad.

3. When you first hear them working a station, note down the following against the call sign:

NAME	LOCATION	SIGNAL REPORT
------	----------	---------------

4. The Regulations require you only to identify your station at the commencement of a contact and each 10 minutes thereafter until the end of the contact, when once again call signs must be exchanged. Therefore a contact for the Award should go something like this:

Initial call - VK7XYZ this is VK7ABC. Your signals 5 by 9 into Hobart this evening. Name is John. Nice to work you for the first time. Over.

Response should be: - Fine, John. Thanks for the 5 by 9. Your signals are also 5 by 9. Over.

Next response: - Thanks for your report, Peter. Hope to work you again soon. Bye for now. VK7XYZ VK7ABC.

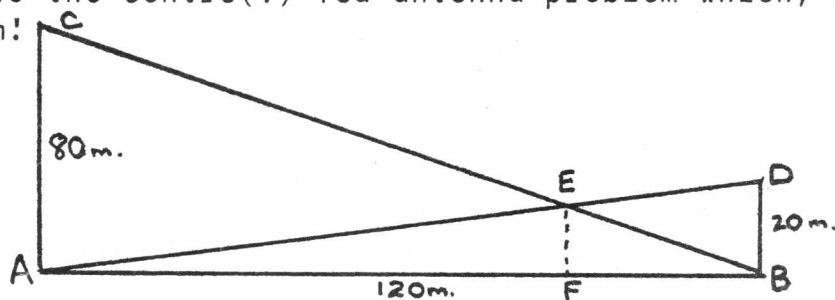
(continued)

5. If you think you may be called, make a note on the pad. The Net Controller will call each station in turn by call sign and usually also by name. Other details can be obtained by listening to them working other stations.

I hope this article may assist some of you in the operation of most nets, not only the Tasmanian Devil Net.

BILL, VK7WL, GOES ALL MATHEMATICAL.

Thanks, Bill, for your very kind remark about "QRM". With your permission, I may print it in the next issue, along with the brain-boggling teaser you enclosed. Meanwhile, I give below the solution to the centre(?) fed antenna problem which, Bill says, is fair Dinkum!



In triangle ADB, $\frac{EF}{DB} = \frac{AF}{AB}$ Thus $EF = \frac{DB \cdot AF}{AB}$ $\therefore DB \cdot AF = AC \cdot FB$

In triangle ACB, $\frac{EF}{AC} = \frac{FB}{AB}$ Thus $EF = \frac{AC \cdot FB}{AB}$

$$\text{Thus } AF = \frac{AC \cdot FB}{DB} = \frac{80 \cdot FB}{20} = 4FB \quad AF + FB = AB$$

$$\therefore AB = 5FB \quad \text{i.e. } FB = \frac{AB}{5} = \frac{120}{5} = 24$$

From 2nd statement above, $EF = \frac{AC \cdot FB}{AB} = \frac{80 \cdot 24}{120} = \underline{16 \text{ metres.}}$

(Absolutely unbeatable, that is! - Ed.)

FOR SALE.

IC2A with soft cover, belt clip. \$200. Superboard Computer in commercial case, multi-voltage power supply. Dabug 3 operating system, expanded memory, stacks of information, \$200.

Contact Peter VK7PF, 181, Punchbowl Road, Launceston, 7250. 003.43018

LIAISON OFFICER FOR "QRM"!

Things are beginning to move at last! The Editor, and, I'm sure all interested readers, will be delighted to know that

BOB VK7NAI

has been elected Liaison Officer for "QRM" at the A.G.M. of the Northern Branch. Already he has contributed to our magazine, as you can see from other pages in this issue. Thank you, Bob, for your support, and I hope northern members support YOU in your liaison operations! Is it possible that this initiative from the north will result in similar moves in other areas?

NORTHERN BRANCH NOTES BY BOB VK7 NAI.

The Annual General Meeting of the Branch was held on Friday, 8th February with 25 members attending.

The following were elected Officers of the Branch for the ensuing twelve months:

President: Mike ... VK7ZWW.
Vice-President and Club Room Manager: Bill ... VK7AV.
Secretary: Byron ... VK7BD.
Treasurer: Leon ... VK7NHG.
Broadcast and Liaison Officer: Bob ... VK7NAI.
QSL Manager and Historian: Col ... VK7 LZ.
WICEN Co-ordinator: Ken ... VK7KKV.
Publications and Stores: Malcolm ... VK7MA.

A General Meeting followed, and Peter, VK7PF, showed slides taken on his recent trip to Zimbabwe and to the AMSAT meetings in the USA and England. Unfortunately, a film Peter took in the USA and on the early part of his tour of Europe went missing along with a suitcase in Paris. (I know how you feel, Peter. I once had a Pentax camera and a complete film stolen from my car in that same city - Ed.).

The next meeting of the Branch will be held at the Alanvale Division of TAFE at 7.30 p.m. on Friday 8th March, as a tour of the College and its facilities has been arranged for that night. We would like a good turn-up to the meeting, and members' XYL's and visitors from other Branches would be most welcome.

LETTERS TO THE EDITOR.

Congratulations for a fine magazine.

So much for the bouquets - now for criticism. Some years ago, before I ever thought I would become an amateur and join the W.I.A., I can recall "QRM" being posted out to members.

I have been a member of the W.I.A. for ten months now and I have attended nearly every monthly meeting of the North Branch in that time. I have also been listening to the Sunday morning broadcasts for the past four years.

One thing strikes me quite plainly and that is, like most organisations, you see the same faces at meetings and hear the same voices meeting after meeting and broadcast after broadcast.

You, the Editor, complain about the amount of information and articles that are not being forwarded for inclusion in "QRM". Perhaps the reason for lack of articles is because this magazine is not reaching the full membership of the W.I.A., but only the small fraction that attends the meetings. Perhaps consideration should once again be given to the posting to all members of our magazine. Apparently, registration of a publication with Australia Post is now a lot easier, and postage would amount to about 12 cents per copy.

If this expense does not seem justified, perhaps an approach to Federal Office might result in the inclusion of "QRM" with the Tasmanian mailing of "A.R.". I wonder if a separate subscription for "QRM" might not be such a bad idea.

Relatively new Novice.

THE TAMAR VALLEY AWARD - REVISED RULES.

The Northern Branch of the W.I.A., Tasmanian Division, has instituted a new award. The purpose of this award is to encourage all amateurs to make contact with amateurs resident in the Tamar Valley Region of Northern Tasmania. Short wave listeners may also qualify for the award in the usual manner.

You may qualify for the award in any of the following sections and you may qualify for more than one award.

SECTION 1: OPEN: By the use of any combination of bands and modes available to the applicant. (Split banding is permitted but cross banding is not except between NAOCP and ALOCP holders).

SECTION 2: - HF ONLY: By the use of any combination of bands up to 30 MHz available to the applicant.

SECTION 3: - VHF/UHF/SHF: As for Section 2 but above 30 MHz.

SECTION 4: - SINGLE BAND: Any one band of those available.

SECTION 5: - SINGLE MODE: Any one of those available.

SECTION 6: - ALL NOVICE: Contact with Novice only (including "K" calls below 30 MHz).

SECTION 7: - REPEATER: Via in-band repeaters.

SECTION 8: - SATELLITE: Via amateur satellites. Cross banding to HF allowed if permitted under licence term

SECTION 9: - SWL'ing: For short wave listeners.

Section 4 and 5 may be combined with other sections.

Applicants must earn twenty points to qualify for the award.

Stations can be worked only once for each award.

Points are earned as follows:

<u>CALL AREA</u>	<u>ON HF</u>	<u>ON VHF/UHF/SHF</u>
Tasmania	1 point (20 stations)	2 points (10 stations)
Australia	2 points (10 stations)	4 points (5 stations)
All others	4 points (5 stations)	10 points (2 stations)

Stations in the following municipalities (shires) are eligible as contacts for the award:

City of Launceston	Lilydale
Beaconsfield	St. Leonards
Evandale	Westbury
George Town	

Applications in the form of log extracts should show the applicant's Name, Callsign, Section applied for, Callsign of the station contacted, Date, Time, Band or frequency, Mode and Municipality.

Claims are to be made by the applicant only. Spot checks may be made with stations in VK7 for confirmation. QSL CARDS ARE NOT REQUIRED. Only contacts made after 1st. September 1984 are eligible as claims, and applications for the award should be made to:

The Awards Manager, PO Box 168, Launceston, Tas. 7250.

A fee of \$2 or five IRC's should accompany the claim.

Directional Antennas with Closely-Spaced Elements

By John D. Kraus,* W8JK

(This article is taken from the January issue of "QST" 1938 and is submitted by Holger, VK7KI - see notes at end)

ONE of the simplest and most efficient radiators used on short waves is the horizontal half-wave antenna.¹ Offhand it might not appear that two such antennas would make a good radiating system, if placed parallel to each other a small fraction of a wavelength apart and fed with currents 180 degrees out of phase. It is true, however, that this arrangement forms a simple and very compact directional antenna.

Fig. 1 is a sketch of two half-wave radiators oriented in the horizontal plane as described and placed high above the ground. The spacing may be a small fraction of a wavelength. If the wires

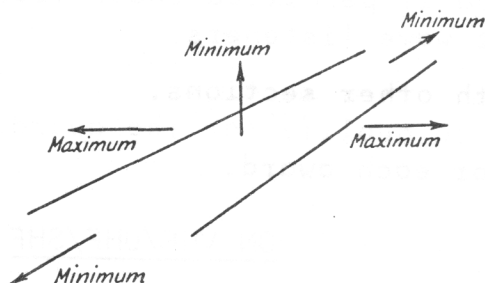


FIG. 1—TWO HALF-WAVE ANTENNAS CLOSELY SPACED AND WITH CURRENTS 180 DEGREES OUT OF PHASE

The arrows indicate the directions in which radiation is a maximum and a minimum.

are not placed too close together, the pair will radiate the same power as would a single half-wave antenna with the same input. But, because of the close-spacing and out-of-phase currents, the direction in which the radiation takes place is profoundly altered. G. H. Brown² was the first to point out the advantages of using such close spacing.

As indicated by the arrows in Fig. 1, the radiation from the pair is very small—theoretically zero—off the ends and also vertically. The radiation horizontally broadside is a maximum and is considerably greater than from a single half-wave antenna fed with the same power.

Fig. 2 shows the close spacing idea applied to a number of practical directive antenna systems. The type of Fig. 2-A is 32 feet long. It has two half-wave radiators spaced one-eighth wave-

length and fed at the center. The cross-over feeds the two radiators 180 degrees out of phase. The feeders connect on at the middle of the cross-over. The radiation from the antenna is maximum in both directions broadside and minimum off the ends. The gain in both directions broadside is as much as or more than in the one preferred direction when a half-wave radiator is used with a reflector one-quarter wavelength behind. Dimensions are given for fundamental operation in the 14-Mc. band. The antenna is actually a multi-band affair, giving approximately the same horizontal bi-directional pattern on 28 Mc. as on 14 Mc., or on any frequency between these two bands. When used on 56 Mc. the horizontal pattern has four lobes. For fundamental operation on 28 Mc. the dimensions of Fig. 2-A should be halved. This smaller array would have about the same bi-directional pattern on both 28 and 56 Mc.

An antenna of about the same size as the one of Fig. 2-A is shown in Fig. 2-B. This antenna is end-fed, instead of center-fed. An array having two sections, which uses four half-wave elements, is shown in Fig. 2-C. It is 62 feet long. The array of Fig. 2-D has 4 sections or 8 half-wave elements and is 112 feet long. The antennas of Fig. 2-B, C, and D have the bi-directional pattern only on their fundamental frequency—14 Mc. in this case. When operated on 28 Mc. their horizontal patterns will have four main lobes. For fundamental operation on 28 Mc. the dimensions should, of course, be halved.

CONSTRUCTION

To make one of these antennas as a unit so that it may be supported between two poles it is convenient to use spreaders, which, for a 14-Mc. antenna, are about 9 feet long. These may be either of bamboo or 1- by 1-inch strips of wood. A suggested arrangement for a two-section antenna is given in Fig. 3. Since the antenna bears a striking resemblance to one of the "T" or flat-top types popular a decade or two ago, it is called a "flat-top beam."³

The cross-over at the middle of the flat-top is made by using two 6-inch feeder-spreader insulators, one placed horizontally at the center and the other vertically half-way between the center and one end of the wooden spreader. The two-wire feed line comes up from below and con-

*Arlington Blvd., Ann Arbor, Mich.

¹ An excellent treatment of the characteristics of horizontal antennas has been given by George Grammer, *QST*, Nov., 1936, and March, 1937.

² G. H. Brown, "Directional Antennas," *Proc. I.R.E.*, Jan., 1937.

³ J. D. Kraus, "Small But Effective Flat-top Beam," *Radio*, March and June, 1937.

nects on to the cross-over at the horizontal center insulator. In order to get greater separation at the cross-over, the insulators may be made longer by fastening two 6-inch feeder spreaders end-to-end. The wire length at the cross-over is of necessity a few inches more than the spacing. Thus, the wire length at the cross-over of a 14-Mc. antenna (8 feet 8 inches spacing) may be about 8 feet 11 inches.

The line used to support the long wooden spreaders at each end of the flat-top should preferably be of rope. In case a 4-section flat-top is used, a method of accomplishing the additional cross-overs is indicated by dotted lines in Fig. 3. One vertical feeder-spreader insulator is used at the middle of the long wooden spreader. The recommended spacing lengthwise between the sections of the flat-top is about 2 feet.

FEEDING

The main characteristics of a flat-top directional antenna are the closely-spaced elements, about one-eighth wavelength apart, and currents 180 degrees out of phase. All the elements are driven. The spacing is not critical but one-eighth wavelength seems to be about optimum when 180-degree phasing is used, and is recommended. The mutual coupling between closely spaced out-of-phase wires is such that the impedance at the center of the half-wave elements becomes quite small and, inversely, quite large at the ends. Accordingly, the current flowing at voltage nodes is very high.

The dimensions are not critical and the values of Fig. 2 are recommended for use on any frequency in the 14-Mc. band. Compensation is made for any small variations when the antenna is tuned up.

Either Zepp feeders or a matching stub and 600-ohm line can be used to feed the antennas. The Zepp feeders or the stub connect at the

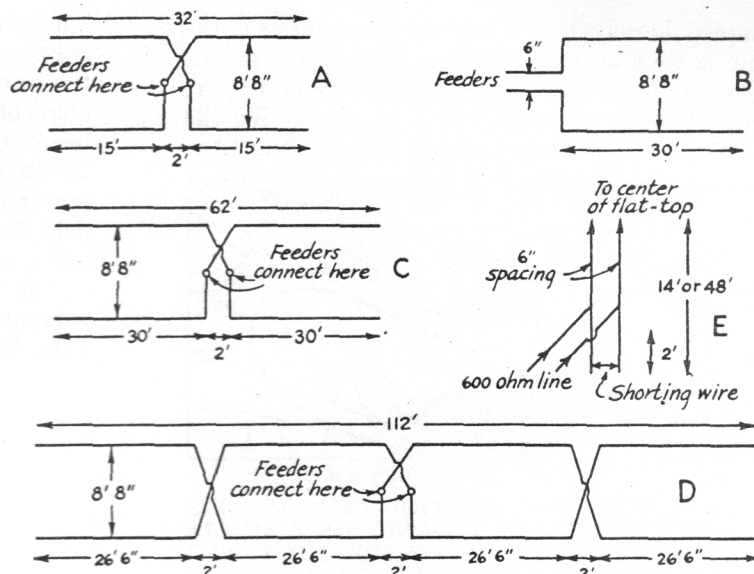


FIG. 2—FOUR TYPES FOR USE IN THE 14-MC. BAND

A and B are single-section types, C a 2-section, and D a 4-section. For fundamental operation on 28 Mc. the dimensions should be halved. Approximate dimensions for a matching stub to feed the 2-section antenna of C are given in E.

center of the cross-over in the flat-top as shown in Fig. 3. The approximate dimensions for a stub to feed the antenna of Fig. 2-C is indicated in Fig. 2-E. With more sections the 600-ohm line will connect farther from, and with fewer sections closer to, the shorting wire on the stub.

Where the line is not over a wavelength or two long, the Zepp type of feed is very practical. It is also convenient if one expects to use the same flat-top beam on a number of bands. For example, the antenna of Fig. 2-A may be series fed at the transmitter on 14 Mc. and parallel fed on 28 Mc. The feeders in this case would be either one-half or one wavelength long, approximately, since this antenna is fed at a current loop (voltage node) on 14 Mc. A matching stub for this antenna would also be either one-half or one wavelength long on 14 Mc. and about 8 feet either longer or shorter on 28 Mc. The other antennas, Figs. 2-B, C, and D, are all fed close to current nodes as used on 14 Mc. so that matching stubs to feed

them should be either one-quarter or three-quarter wavelengths long. It is often convenient to use a three-quarter wavelength stub as one may be able to adjust it from the ground after the

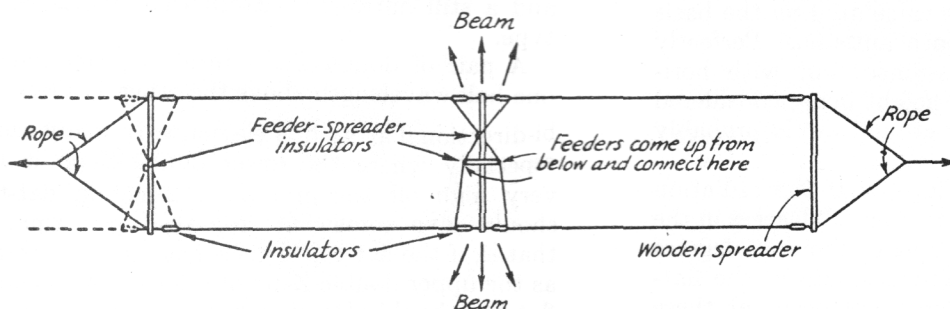


FIG. 3—TOP VIEW SHOWING CONSTRUCTION OF A 2-SECTION ANTENNA WHICH IS POPULARLY TERMED A "FLAT-TOP" BEAM

Method of making cross-over if extra sections are added is shown by dotted lines at left.

antenna has been pulled up into place. It is advisable to use good 6-inch spreader-insulators throughout the stub and 600-ohm line.

In adjusting the stub the antenna is shock-excited from another antenna or from an r.f. line

(continued).

The copies of this newsletter will be distributed to WIA members at Branch meetings and to other interested subscribers by post at purely nominal cost. Anyone who would wish to take up this offer, please contact the Editor on 002.293402.

coupled loosely to it. The shorting wire on the stub is then adjusted for a maximum of current through the short. The transmission line is next connected on the stub a foot or two above the short and adjusted up or down the stub until the

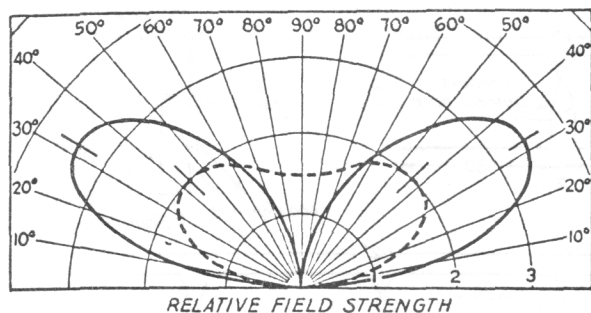


FIG. 4—COMPUTED RADIATION CHARACTERISTICS IN THE VERTICAL PLANE FOR A SINGLE HALF-WAVE ANTENNA (DASHED) AND A 2-SECTION FLAT-TOP (SOLID) BOTH AT A HEIGHT OF THREE-EIGHTHS WAVELENGTH ABOVE GROUND

standing waves along the transmission line are a minimum. A sensitive r.f. current meter (0-200 ma.) equipped with a single turn loop and an insulated hook can be used to slide along one side of the transmission line, so that readings may be made quickly at four or five points along the line spaced about an eighth wavelength apart. Insulation of the antenna and feeders from the transmitter plate supply voltages is, of course, important in any installation.

PERFORMANCE

Because of the out-of-phase currents, the vertical radiation from the flat-top antenna approaches zero. As a result, the maximum radiation in the vertical plane is lowered to a smaller vertical angle. In Fig. 4 the vertical radiation characteristics of a single half-wave antenna (dashed curve) and a 2-section or 4-element flat-top antenna (solid curve) are compared for a height in both cases of three-eighths wavelength above ground. The plane in which the radiation is shown is at right angles to the antennas. The relative field strength is plotted in arbitrary units, and the curves are calculated on the basis of the same power to both antennas. Perfectly conducting ground is assumed, but with horizontal antennas and the height being considered the patterns for ordinary ground would probably be quite similar.

It is apparent from Fig. 4 that the radiation maximum is lowered from about 43 degrees in the case of the half-wave antenna to about 32 degrees for the flat-top. The maximum gain of the flat-top over the half-wave does not occur at these angles, however, but rather at lower ones—15 degrees and less. It is these low angles which are frequently the most effective in long distance communication. The effect of lowering the vertical angle of maximum radiation from a flat-top beam is most pronounced at heights up to a half wavelength or so above ground. At greater heights the angle of the lowest lobe becomes nearly the same as that for a single half-wave antenna. For 14-Mc. DX a height of three-quarters to one wavelength above ground seems worth while.

Although much of the gain comes through vertical directivity, the horizontal gain is also important. This depends mainly on the number of sections used. Fig. 5 shows the measured horizontal radiation pattern for a single-section

antenna (see Fig. 2-A). The maximum radiation is broadside and the minimum is off the ends of the antenna. The radiation is 3 db down at an angle of about 35 degrees off the center line of the beam (broadside). At 70 degrees the signal is over 20 db down, representing a front-to-side signal power ratio of well over 100 to 1. The relative field strength is plotted in decibels, the minimum signal observed being taken as 0 db.

The power gain of a single-section flat-top compared to a single half-wave antenna is over 4 db. When used on its second harmonic the gain

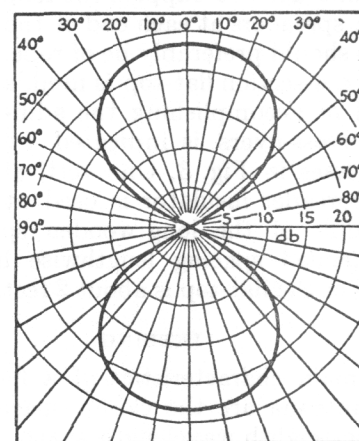


FIG. 5—MEASURED HORIZONTAL RADIATION PATTERN OF SINGLE-SECTION FLAT-TOP ANTENNA

The relative field strength is plotted in decibels.

is about 6 db. The horizontal radiation as measured from a 2-section flat-top (Fig. 2-C) is only slightly narrower, the signal being 3 db down at about 30 degrees off the center. Thus, a 2-section flat-top puts out a very satisfactory signal over an angle of about 60 degrees in each direction broadside, and a usable signal over an even wider angle. The null off the ends, however, is very pronounced. Three 2-section antennas arranged at angles of 120 degrees with respect to each other should give good coverage over 360 degrees. The gain of a 2-section flat-top is over 6 db. A 4-section array would have over 8 db gain and a still narrower pattern than the 2-section type.

A pair of double-Zepp antennas, one stacked one-half wavelength above the other, is a familiar bi-directional array of 4 elements. In many cases, especially where the lower double-Zepp is not very high off the ground, a 2-section flat-top should give somewhat improved performance, that is, if the flat-top is placed at the same height as the upper double-Zepp of the pair. A 2-section flat-top should also give more gain over a much wider horizontal angle than 4 co-linear half-wave antennas in phase and at the same height above ground.

The small dimensions of the flat-top antenna make it suitable for use in many locations. Through the use of close-spacing the gain is exceptionally good for an array of its size.

(see notes on next page.)

The version that I made up is the 25m. long beam, as Section C, page 16 of "A.R." for September 1984. Using the measurements from the "QST" article, that gives 40 feet per element and 2 feet spacing in the centre, giving an overall length of 82 feet, which is 25 metres.

For the end and centre wire supports, I used 45 x 20 mm. pine, and had to use an additional rope from the centre of the end supports to the apex of the rope triangle. The open wire feeder is 1 mm. enamelled wire and spaced 55 mm. using 6 mm. quad. The A.T.U. is a Z-match and a noise bridge is used as a match to the transmitter.

Other references:

1. A combination driven array, page 142 ARRL Antenna Book, 13th. Edition.
2. Wire antennas, "A.R.", September 1984, page 12.
3. Flat Top, RSGB Handbook, 4th Edition, page 13/58.
4. End Fire Arrays, 1983 Radio Amateurs' Handbook, page 20/9. Holger, VK7KI.

SOUTHERN BRANCH A.G.M. ELECTION OF OFFICERS.

The following office bearers were elected unopposed:

- a) President: Russ Pitman, VK7ZRP.
- b) Secretary: Arthur Hinsley, VK7GH.
- c) Treasurer: Phil Lovett, VK7BZ.
- d) Equipment Officer: John Holbrook, VK7ZJH.
- e) Broadcast Officer: Deferred to next meeting.
- f) WICEN Co-ordinator: Anthony Tulk, VK7ZTA.
- g) Repeater 2 Co-ordinator: Anthony Tulk, VK7ZTA.
- h) Membership Officer: Deferred to next meeting.
- i) QSL Officer: "Sandy" Powell, VK7FL.
- j) Vice-President: Barry Riseley, VK7KAD.

HOBART AMATEURS TAKE PART IN REGATTA. Alan VK7ZAR.

On Saturday at dawn - well, 7.30 a.m. anyway - five amateurs set off to make their contribution to the communications of Hobart Regatta. They were Shayne VK7BX, Anthony VK7ZTA, Alan VK7ZAR, Kevan VK7KV and Warren VK7CV, and from all reports, they achieved excellent results.

First, there was the P.A. commentary primarily on the rowing and swimming events, using 2 metres from the water. This was very well-received, with crystal clear communications. On Saturday afternoon, VK7RR and VK7KJ went aeronautical mobile and followed the Bruny and Wedge Island races from the air. They provided a number of position reports for relay to the public on the foreshore.

On Tuesday, basically the same procedures were carried out. Warren reported from the water for the swimmers and Alan for the rowing, while Sue Cure, Warren's daughter played her part from the foreshore. On air interviews were included, and when Warren came ashore, a number of people thanked him, saying that it was the first time they had ever known what was happening in the swimming events. Alan reported a similar reaction - the State Rowing Council were most intrigued by what was done from the water, and it seems this may become a regular event on our calendar. The Athletics Board also expressed great interest.

The equipment used consisted mainly of IC2A's handhelds and a 251 base station for patching. Shayne was concerned with the patching and, as always, did a very "professional" job.

Monitors AGC-HM-123

HM-123A 12" DIAGONAL SCREEN / TEXT DISPLAY MONITOR

Designed for use with advanced level small business or scientific computer systems. This high performance data display monitor features an anti-reflective and dark tinted viewing screen, computer matched appearance and high resolution graphics and text display. With 5 x 7 input character, monitor resolution and computer compatible scanning provide a displayed capability of 24 lines and 80 characters.

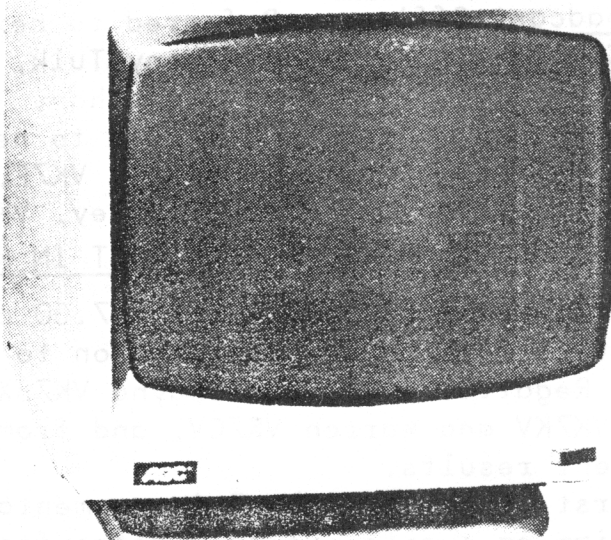
FEATURES

- * High resolution crisp, clear.
- * Anti-reflective, dark tinted, 75 square inch screen.
- * 80 characters x 24 lines display capability.
- * Attractive, computer matched styling.
- * Textured high impact plastic front panel and metal housing.
- * 80 Column and 40 column switchable.
- * All controls on the back, except power lamp switch.

SPECIFICATION

- * CRT: 12", 90°, 635R display standard phosphor P31.
- * Resolution: Centre 1000 lines
Corner 900 lines
- * Video response: 10Hz-22MHz (within 3db)
- * Power consumption: DC12V, 1.1A
- * Dim (mm): 308W x 266H x 333D (mm)
- * N. Weight (Kgs): 6.8kgs/set

Package: Freight package:
16.7 cuft/78.2kgs/8 sets/one carton.



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<u>UHF</u>		
<u>Mobile</u>		
IC 45A	430MHz/FM/10w syn. 12v/mic.	395.00
IC 47A	430MHz/FM/25w syn. 12v. mic.	499.00
IC 490A	430MHz multi-mode syn. MBL.	689.00
<u>Portable</u>		
IC 4E	430MHz syn. HT, Nicad & Charger	339.00
IC04A	430MHz syn. HT, Nicad & Charger	395.00
<u>1.2GHz Mobile</u>		
IC 120	1260-1300MHz 1w. Mobile	699.00
<u>6 METER</u>		
<u>Portable</u>		
IC 505	6m multi-mode, portable syn. 1-10w. XCVR. FM unit EX248 Option.	449.00
<u>ATTENDANT ACCESSORIES</u>		
<u>AMPLIFIERS</u>		
IC 2KL/PS	10-160m solid state liner 701/720A/730/ 740/745A/751A	1,749.00
IC ML1	10w Mobile Liner for IC2A	95.00
ICML12	10w Solid State Liner for IC 120	450.00
<u>HF ANTENNA TUNERS</u>		
(701/720A/730/740/745A/751A)		
IC AT100	Auto Antenna Tuner 100W	499.00
IC AT500	Auto Antenna Tuner 500W	620.00
<u>SPEAKERS</u>		
IC SP3	Base Station Speaker	69.00
IC SP4	Remote Speaker for Mobile	29.00
IC SP5	Remote Speaker for Mobile	30.00
IC SP10	Remote Speaker for Mobile	39.00
<u>POWER SUPPLIES</u>		
IC PS15	12v Power Supply 720A/730/740/ 745A/751A	215.00

OBTAINABLE
FROM:

HOBBY ELECTRONICS
477 Nelson Road, Mount Nelson,
HOBART, Tasmania.

Phone:
(002) 23 6751

HAMFEST NEWS

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We are now able to confirm the Montrose Bay Yacht Club as the venue for TARC 85.

These excellent facilities are located just north of Hobart on the shores of the beautiful blue Derwent. Ample car parking is available and the site lends itself to the relatively easy erection of aereals.

As we intend to try to arrange a special rate with a local motel for block booking, your accommodation arrangements should be given some thought now.

HAMFEST FORMAT

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The Hamfest will be run over the Saturday and Sunday of the Queen's Birthday Long Weekend in June (i.e. 8th and 9th).

Saturday will be a WIA members day and will include the historical Blinking Billy re-enactment and other amateur related activities.

There will be an ox or pig or some other poor unfortunate animal or part thereof roasted by way of social activity at the Montrose Bay Yacht Club that evening (that is the Saturday evening).

Sunday will be an open to the public day with a view towards attracting interest generally in our hobby.

Success or failure will depend entirely upon you.

Please read the inside back cover of the last QRM newsletter we listed there our requirements for your assistance. When will you let us know the role you intend to play????